

Industrial Automation Guide 2014



Industrial Products & Systems

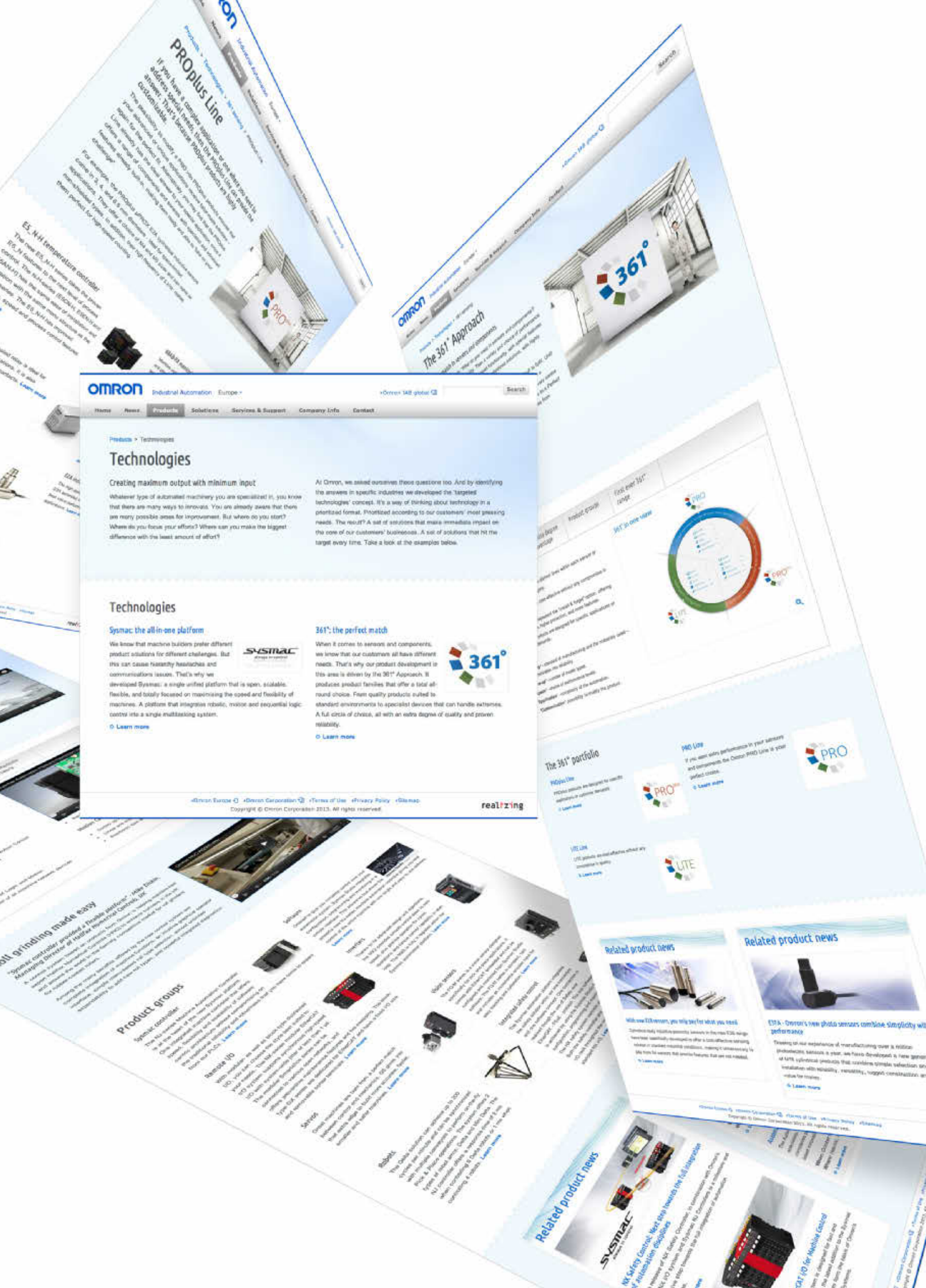
Targeted Technologies

Creating maximum output with minimum input

By identifying the many ways of innovation in specific industries we developed the 'targeted technologies' concept. It's a way of thinking about technology in a prioritized format. Prioritized according to our customers' most pressing needs. The result? A set of solutions that make immediate impact on the core of our customers' businesses. A set of solutions that hit the target every time. Take a look at the examples on our website.

industrial.omron.eu/technologies





PROplus Line

If you have a complex application or one that you need to address, start with the PROplus Line for the most customizable solution.

The PROplus Line offers a wide range of products and solutions that can be customized to meet your specific needs. This includes a variety of components and modules that can be configured to meet your requirements.

For example, the PROplus Line offers a wide range of products and solutions that can be customized to meet your specific needs. This includes a variety of components and modules that can be configured to meet your requirements.

The 361° Approach



OMRON Industrial Automation - Europe

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Technologies

Creating maximum output with minimum input

Whatever type of automated machinery you are specialized in, you know that there are many ways to improve. You are already aware that there are many possible areas for improvement. But where do you start? Where do you focus your efforts? Where can you make the biggest difference with the least amount of effort?

At Omron, we asked ourselves these questions too. And by identifying the answers in specific industries we developed the 'targeted technologies' concept. It's a way of thinking about technology in a prioritized format. Prioritized according to our customers' most pressing needs. The result? A set of solutions that make immediate impact on the core of our customers' businesses. A set of solutions that hit the target every time. Take a look at the sampler below.

Technologies

Systemac: the all-in-one platform

We know that machine builders prefer different product solutions for different challenges. But this can cause inherent headaches and communications issues. That's why we developed Systemac: a single unified platform that is open, scalable, flexible, and totally focused on maximizing the speed and flexibility of machines. A platform that integrates robotic, motion and sequential logic control into a single multitasking system.

[Learn more](#)

361°: the perfect match

When it comes to sensors and components, we know that our customers all have different needs. That's why our product development in this area is driven by the 361° Approach. It produces product families that offer a total all-round choice. From quality products suited to standard environments to specialist devices that can handle extremes. A full circle of choice, all with an extra degree of quality and proven reliability.

[Learn more](#)

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361° in one view

PROplus Line

PROplus Line offers a wide range of products and solutions that can be customized to meet your specific needs. This includes a variety of components and modules that can be configured to meet your requirements.

361° Approach

The 361° Approach is a way of thinking about technology in a prioritized format. Prioritized according to our customers' most pressing needs. The result? A set of solutions that make immediate impact on the core of our customers' businesses.

The 361° portfolio

PROplus Line
PROplus Line offers a wide range of products and solutions that can be customized to meet your specific needs. This includes a variety of components and modules that can be configured to meet your requirements.

PROplus
PROplus offers a wide range of products and solutions that can be customized to meet your specific needs. This includes a variety of components and modules that can be configured to meet your requirements.

LITE
LITE offers a wide range of products and solutions that can be customized to meet your specific needs. This includes a variety of components and modules that can be configured to meet your requirements.

Product groups

Systemac controller
The Systemac controller is a single unified platform that is open, scalable, flexible, and totally focused on maximizing the speed and flexibility of machines. A platform that integrates robotic, motion and sequential logic control into a single multitasking system.

Systemac I/O
Systemac I/O offers a wide range of products and solutions that can be customized to meet your specific needs. This includes a variety of components and modules that can be configured to meet your requirements.

Systemac Motion
Systemac Motion offers a wide range of products and solutions that can be customized to meet your specific needs. This includes a variety of components and modules that can be configured to meet your requirements.

Systemac Logic
Systemac Logic offers a wide range of products and solutions that can be customized to meet your specific needs. This includes a variety of components and modules that can be configured to meet your requirements.

Systemac Sensors
Systemac Sensors offers a wide range of products and solutions that can be customized to meet your specific needs. This includes a variety of components and modules that can be configured to meet your requirements.

Related product news

With new E2E sensors, you only pay for what you need
Omron's new E2E sensors offer a wide range of products and solutions that can be customized to meet your specific needs. This includes a variety of components and modules that can be configured to meet your requirements.

ESA - Omron's own photo sensors combine simplicity with performance
ESA offers a wide range of products and solutions that can be customized to meet your specific needs. This includes a variety of components and modules that can be configured to meet your requirements.

Related product news

Systemac I/O for Machine Control
Systemac I/O offers a wide range of products and solutions that can be customized to meet your specific needs. This includes a variety of components and modules that can be configured to meet your requirements.

Systemac Motion for Machine Control
Systemac Motion offers a wide range of products and solutions that can be customized to meet your specific needs. This includes a variety of components and modules that can be configured to meet your requirements.

Welcome to our world

Our best-in-class devices for your automation system

Welcome to Omron's world of advanced industrial automation. The INDUSTRIAL AUTOMATION GUIDE is your essential tool to select best-in-class devices for your automation system. It highlights our core competences in sensing, control, visualisation, motion and panel components.

Of course, Omron offers a much larger range of products than you can find on the attached DVD's. For more information on services and company competence visit our website.

Here you will find:

- Latest product news
- Technical product specifications
- 2D / 3D CAD Library
- Customer references
- Technology concepts
- Supporting product documentation
- Knowledge Base - "myOmron"
- Events Calendar
- Contact information

industrial.omron.eu

Industrial Automation Guide 2014



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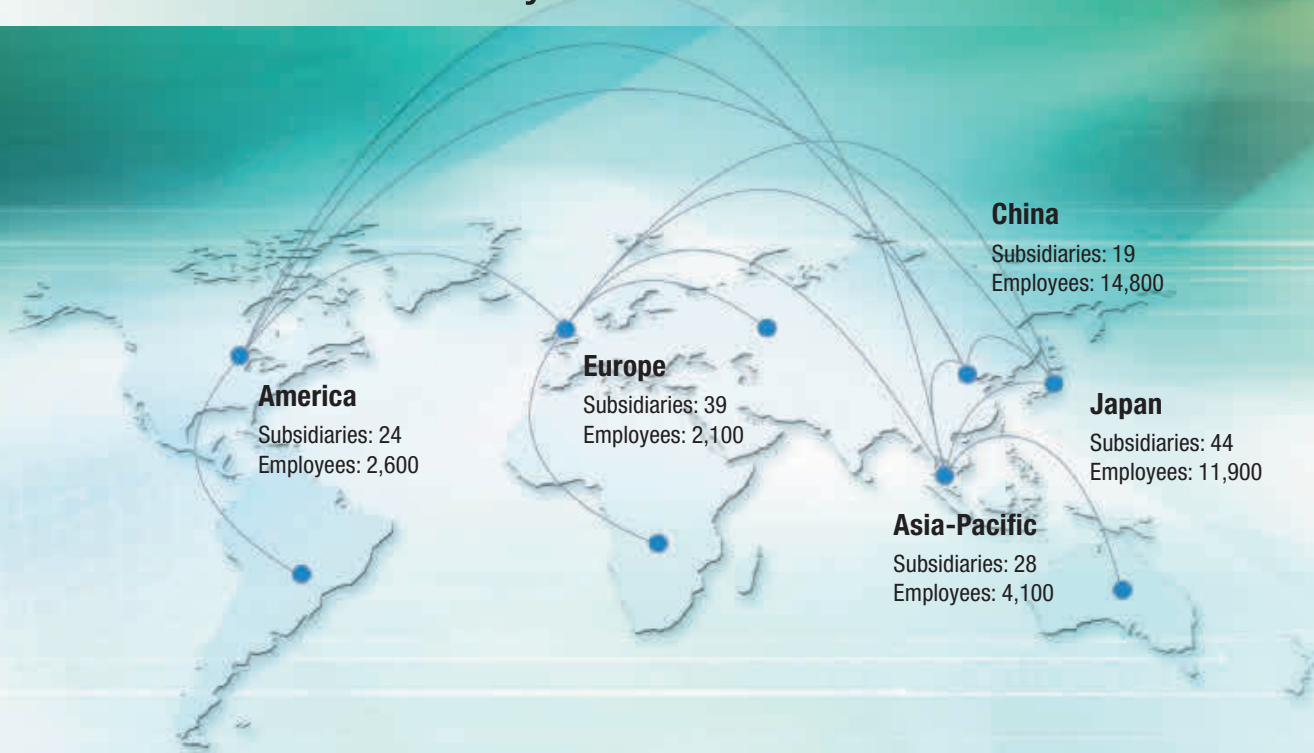
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Machine Automation Competence

Wherever and whenever you need it



A Global Corporation

Omron Industrial Automation is a global manufacturer of technologically advanced products and a leading provider of application expertise. It is part of Omron Corporation, which has been anticipating and meeting social needs since its founding in 1933.

Omron continues to make significant contributions in a wide variety of fields, such as industrial automation, electronic components and healthcare.

Omron Industrial Automation Europe

In Europe we have maintained a leading position in machine and industrial automation for over 30 years. We use our expertise in machine automation in helping our customers to turn their dreams into reality... world class machines and solutions.

Specialization is about supporting you with competent and experienced people, quality products that work in conditions far beyond their published specifications and always maintaining our commitment to you, the customer. We provide solutions based on our customers needs, whether that solution is used in a fixed form through to a highly flexible machine.

- **50 years in industrial automation**
- **Over 35,000 employees**
- **Support in every European country**
- **Over 1,800 employees in 19 European countries**
- **800 specialised field engineers**
- **7% of turnover invested in R&D**
- **More than 200,000 products**
- **More than 6,950 patents registered to date**

Application support

As Omron customer, you will have our support that matches your precise needs. Our dedicated automation experts will help you develop the best machine architecture, our dedicated product specialists will help get the best functionality, and an experienced account manager will follow and coordinate the total business cycle.



“From the moment you contact Omron,
you get direct access to our application expertise.”



◀ **European manufacturing**

Omron has manufacturing sites in 's-Hertogenbosch, the Netherlands and Nufringen, Germany where, in addition to our standard product range, we can provide fast and flexible customised solutions using on-site R&D facilities and expertise. Both factories meet very strict quality assurance standards, and are at the forefront of meeting global environmental standards. Omron actively welcomes visitors to these facilities.



◀ **Online support**

Omron's website is designed to provide fast, no-nonsense support, enabling you to quickly find the latest information on manuals, data sheets and brochures, read about our latest product releases, and check out the most frequently asked questions. You can also download our latest software versions or patch upgrades along with 2-D and 3-D CAD drawings. All the support you need is available on industrial.omron.com.



◀ **European Repair Centre**

Omron has set up a special repair service with DHL that enables your product to be collected, repaired and returned within 5 days. This repair service is totally free of charge for products under Omron's warranty conditions, and includes a direct collection and delivery at your site. You can get more information about this service at repair.europe.omron.com.

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1 Machine automation controller



2 Programmable logic controllers (PLC)



3 Remote I/O



4 Human machine interface (HMI)



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Limit switches**



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29 Digital panel indicators



34 Pushbutton switches



SMART PLATFORM

One software – One connection – One minute

Omron's Smart Platform is designed to make machine automation easy. It provides seamless, drag-and-drop integration of all automation components in your machine. From sensor to controller, from HMI to drive, all devices are accessible through one connection using a single software suite, CX-One.

Built-in distributed intelligence in Omron devices means less time programming and troubleshooting.



Everyone claims ease of use, a short movie explains how easy programming and configuration really can be:

www.smartplatform.info



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NJ-SERIES MACHINE AUTOMATION CONTROLLER

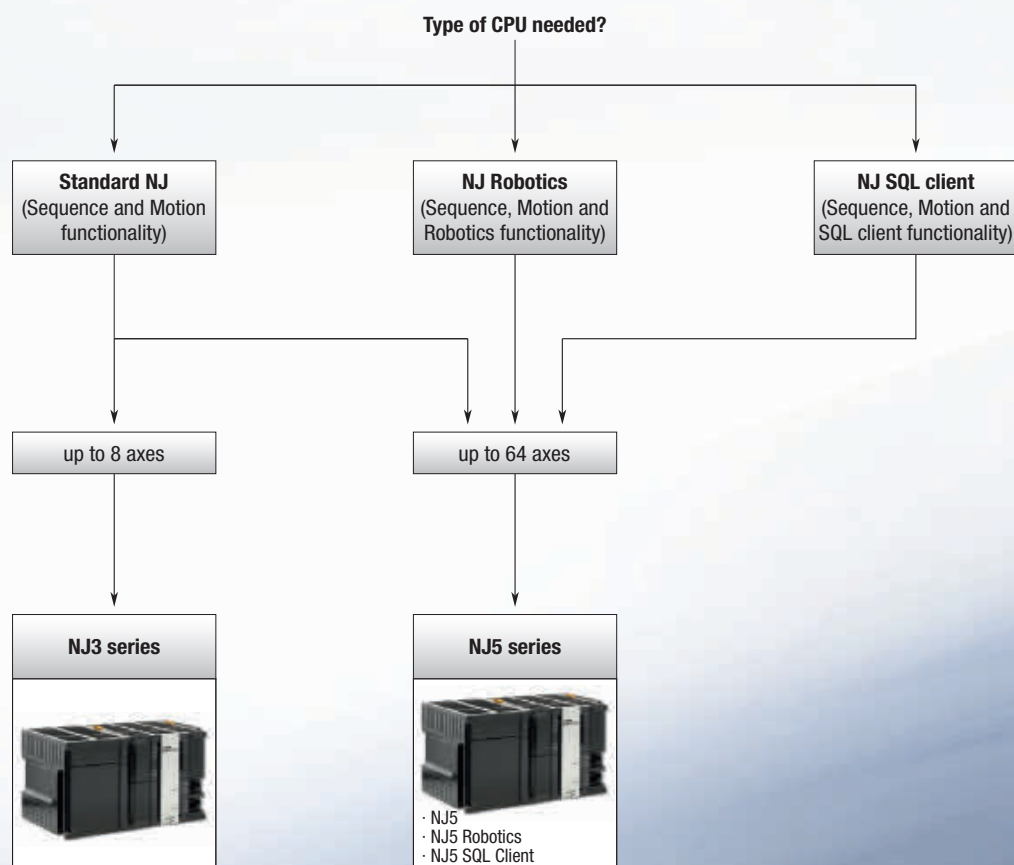
Complete and robust machine automation

The NJ-Series Machine Automation Controller is at the heart of the new Sysmac platform. One integrated machine controller that offers speed, flexibility and scalability of software-centric architecture without compromising on the traditional reliability and robustness that you have come to expect from Omron PLCs. The NJ-Series is designed to meet extreme machine control requirements in terms of motion control speed and accuracy, communication, security and robust system. You just create...

- Integration of logic and motion in one Intel CPU
- Scalable control: CPUs for 4, 8, 16, 32 and 64 axes
- EtherCAT and EtherNet/IP ports embedded
- Fully conforms to IEC 61131-3 standards
- Certified PLCopen function blocks for motion control
- Linear, circular and spiral (helical) interpolation
- CPU units with SQL client and robotic functionality



SYSMAC
always in control



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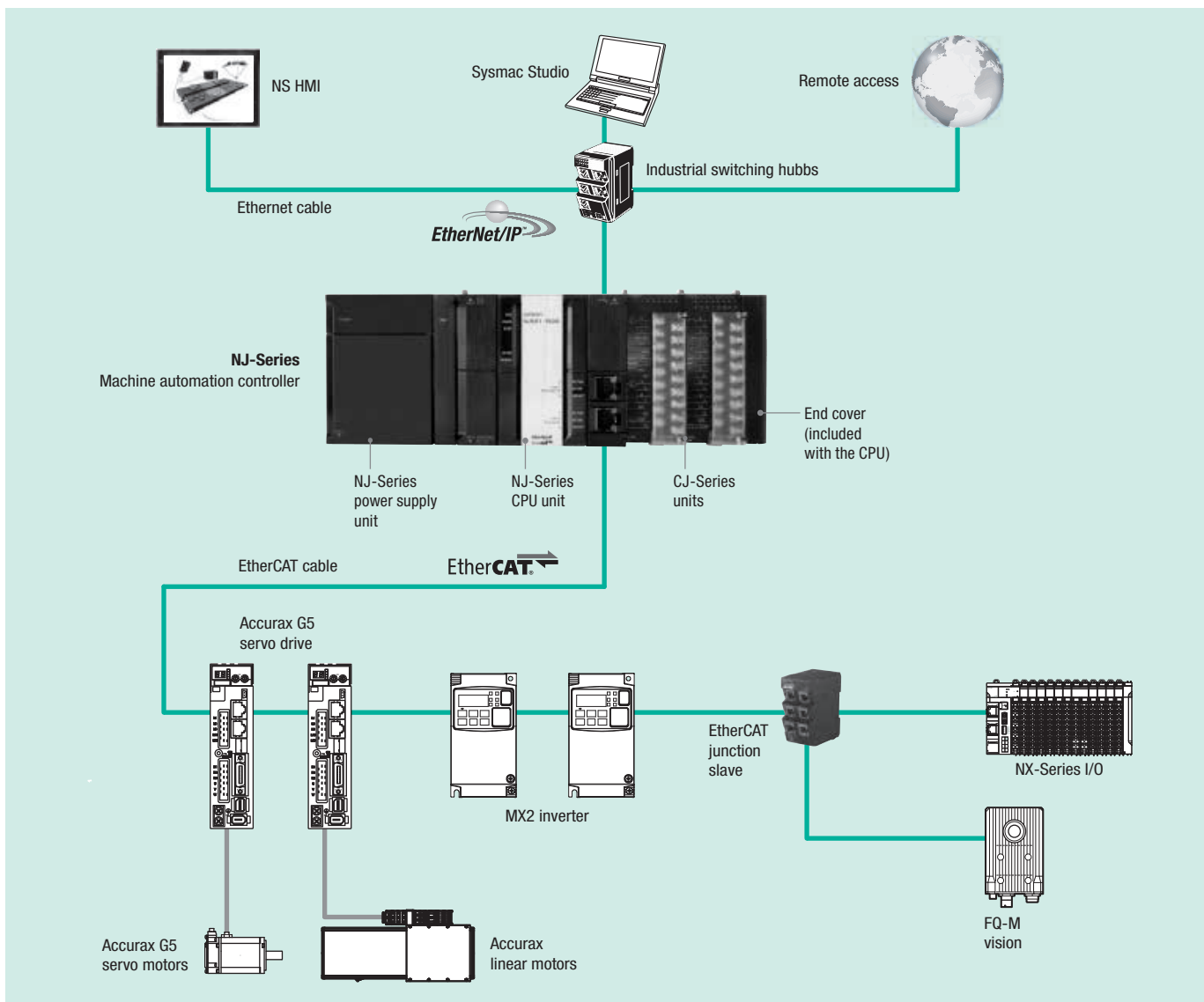


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- Linear, circular and spiral (helical) interpolation
- CPU units with SQL client and robotic functionality

Ordering information



Power supply

Type	Output capacity at 5 VDC	Output capacity at 24 VDC	Max. output power	Features	Size in mm (H × W × D)	Order code
100 to 240 VAC	6.0 A	1.0 A	30 W	Run output	90 × 70 × 90	NJ-PA3001
24 VDC						NJ-PD3001

CPU

Series	Description	Max. Digital I/O points	Program capacity	Variables capacity	Max. I/O units	5 VDC current consumption	Size in mm (H × W × D)	Number of axes	Order code
NJ5 series	Sequence and motion functionality	2,560	20 MB	2 MB: Retained 4 MB: Not retained	CPU rack: 10 units max. Expansion rack: 40 units max. (up to 3 expansion racks)	1.90 A	90 × 90 × 90	64	NJ501-1500
	Sequence, motion and robotics functionality							32	NJ501-1400
								16	NJ501-1300
								64	NJ501-4500
	Sequence, motion and SQL client functionality							32	NJ501-4400
								16	NJ501-4300
									NJ501-4310 ^{*1}
								64	NJ501-1520
								32	NJ501-1420
	16	NJ501-1320							
NJ3 series	Sequence and motion functionality		5 MB	0,5 MB: Retained 2 MB: Not retained				8	NJ301-1200
								4	NJ301-1100

*1 The NJ501-4310 CPU unit only supports one delta robot.

Note: The end cover unit CJ1W-TER01 is included with the CPU unit.

Accessories

Type	Remarks	Size in mm (H × W × D)	Order code
EtherCAT branching unit	3 ports, 24 VDC, DIN rail mounting	90 × 25 × 78	GX-JC03
	6 ports, 24 VDC, DIN rail mounting	90 × 48 × 78	GX-JC06
Industrial switching hub	3 ports, 24 VDC, DIN rail mounting	90 × 25 × 78	W4S1-03B
	5 ports, 24 VDC, DIN rail mounting	90 × 48 × 78	W4S1-05B
	5 ports, 24 VDC, failure detection, DIN rail mounting	90 × 48 × 78	W4S1-05C
SD memory card	2 GB		HMC-SD291
DIN track	Length: 0.5 m, height: 7.3 mm		PPF-50N
	Length: 1 m, height: 7.3 mm		PPF-100N
	Length: 1 m, height: 16 mm		PPF-100N2
End plate to secure the units on the DIN track	2 pieces are included with the CPU unit and I/O interface unit		PPF-M (2 pcs.)
Battery for NJ-series CPU unit	The battery is included with the CPU unit		CJ1W-BAT01
End cover	The end cover is included with each CPU unit and I/O interface unit		CJ1W-TER01

Computer software

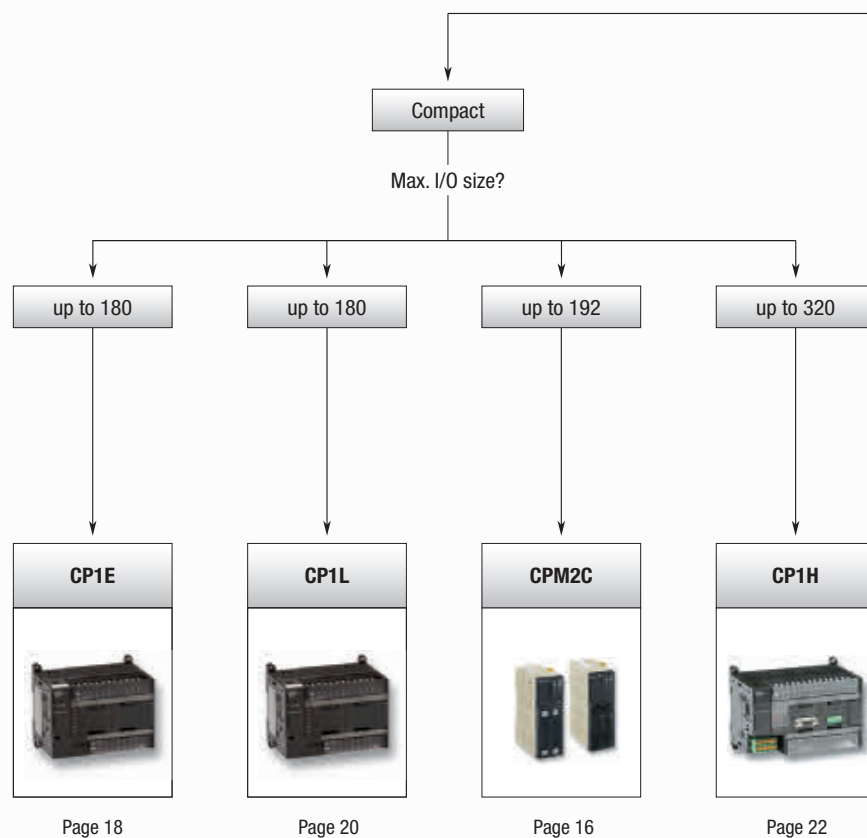
Specifications	Order code
Sysmac Studio	SYSMAC-SE2_

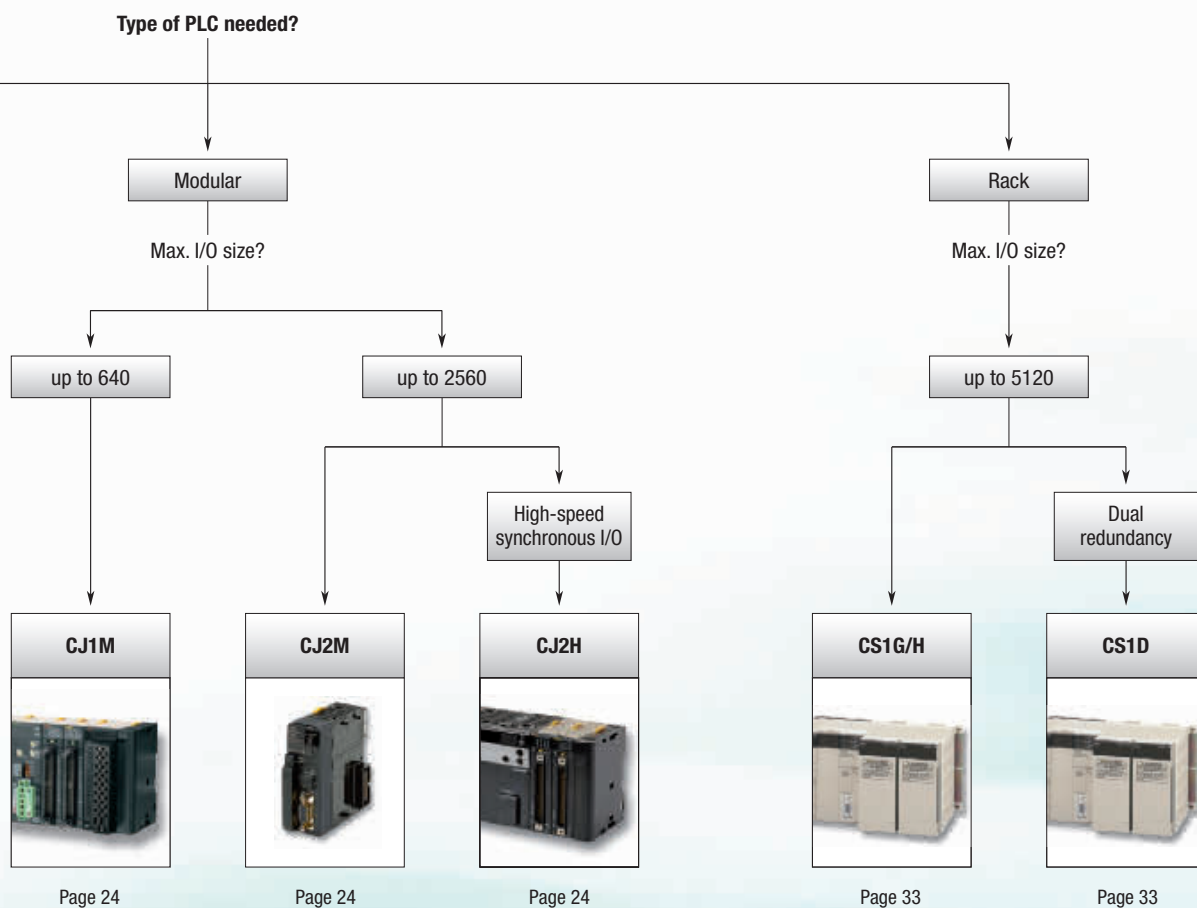
KNOW ONE... KNOW THEM ALL!

Whether your automation requires a simple and economical solution, or your target is advanced, high-speed control, you can find what you need in Omron's line-up of Programmable Controllers.




And if your systems grow, or change due to market demand, you will find that only Omron offers a full range of Compact PLCs and Modular PLCs that share the same architecture. Therefore your programs are fully upward compatible, both in memory allocation and instruction set.

- One scalable PLC family to always match exactly with your application
- Transparent communication routing through different networks
- The best size/performance ratio in the industry







Selection table

Compact PLC series				
				
Model	CPM2C	CP1E	CP1L	CP1H
Max digital I/O points*1	192	180	180	320*2
Built-in	Digital I/O	10 to 32	10 to 60	10 to 60
	Interrupt inputs	2 or 4	4 or 6	2, 4, or 6
	Counter inputs	2 or 4	5 or 6	4
	Pulse outputs*1	2	2	2
CPU features*1	Compact size Expansion units Quick-response inputs High-speed counter Pulse output with PWM RS-232C port Real time clock	USB port Expansion I/O units Quick-response inputs High-speed counter Pulse output with PWM RS-232C port RS-485 port Real time clock 2 Analogue adjusters See Analogue I/O section	USB or Ethernet port Expansion I/O units Quick-response inputs High-speed counter Pulse output with PWM Up to 2 serial option boards Real time clock 1 Analogue adjuster See Analogue I/O section	USB port Expansion I/O units CJ-series Special I/O Units CJ-series CPU Bus Units Quick-response inputs High-speed counter Pulse output with PWM RS-232C port Option board slots Real time clock 1 Analogue adjuster LED display, 2 digit See Analogue I/O section
Instruction Execution time (bit instruction)	0.64 µs	1.19 µs	0.55 µs	0.10 µs
Program memory	4K words	2 or 8K steps	5 or 10K (+10K Function block) steps	20K steps
Data memory	2K words	2 or 8K words	10 or 32K words	32K words
External memory	Expansion memory unit	–	Memory cassette	Memory cassette
Analogue I/O	Analogue I/O unit Temperature sensor unit	Built-in for E-NA model (2 in + 1 out) Analogue I/O Expansion Units Temperature Input Expansion Units	Built-in for EL/EM model (2 inputs) Analogue I/O Expansion Units Temperature Input Expansion Units	Built-in for XA model (4 in + 2 out) Analogue I/O Expansion Units Temperature Input Expansion Units CJ Analogue I/O Units CJ Temperature Units
Special function units	–	–	–	CJ-series Special I/O Units CJ-series CPU Bus Units
Fieldbus master	–	ModBus	Ethernet ModBus	Ethernet EtherNet/IP Controller Link DeviceNet PROFIBUS-DP PROFINET ModBus CompoNet CompoBus/S CAN (freely configurable)
Fieldbus I/O	CompoBus/S DeviceNet	PROFIBUS-DP CompoBus/S DeviceNet	PROFIBUS-DP CompoBus/S DeviceNet	PROFIBUS-DP CompoBus/S DeviceNet
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*1 Some features listed are not available for all CPU types within each series. Please review specifications for more information on CPU features and performance.

*2 Represents local I/O capacity. If a fieldbus master is used more I/O is possible.

Programmable logic controllers

Modular PLC series				Rack PLC series	
					
Model	CJ1M/G	CJ2M	CJ2H	CS1G/H	CS1D
Max. digital I/O points*1	1280	2560	2560	5120	5120
Built-in*1	Digital I/O	16	–	–	–
	Interrupt inputs	4	–	–	–
	Counter inputs	2	–	–	–
	Pulse outputs	2	–	–	–
CPU features*1	Compact size No backplane required Large program capacity Easy backups Built-in pulse I/O Loop control CPU type Real time clock	USB port Ethernet/IP port High-speed I/O units Option board plug-in Structures and arrays Tag data links Compact size No backplane required Large program capacity Function Block memory Easy backups Real time clock	USB port Ethernet/IP port High-speed I/O units Structures and arrays Tag data links Synchronous I/O Compact size No backplane required Extra Large program capacity Easy backups Real time clock	High I/O capacity Inner board support Large program capacity Backwards compatible Easy backups Real time clock	Redundant CPU Redundant power supply Hot swapping High I/O capacity Inner board support Large program capacity Backwards compatible Easy backups Real time clock
Instruction Execution time (bit instruction)	0.10/0.04 µs	0.04 µs	0.016 µs	0.04/0.02 µs	0.04/0.02 µs
Program memory	5 to 60K steps	5 to 60K steps	50 to 400K steps	10 to 250K steps	10 to 250K steps
Data memory	32 to 128K words	64 to 160K words	160 to 832K words	64 to 448K words	64 to 448K words
CompactFlash memory	Up to 512 MB				
Analogue I/O	Analogue I/O unit Temperature sensor unit Temperature control unit				
Special function units	Temperature control High-speed counters (500 kHz) SSI encoder input Position control Protocol macro RFID sensor unit Weighing unit Data collection & storage unit		Temperature control High-speed counters (500 kHz) SSI encoder input Position control Protocol macro RFID sensor unit High-speed I/O Synchronised Position Data collection & storage unit	Temperature control SSI encoder input High-speed counters (500 kHz) Position control Motion control Process control Protocol macro RFID sensor unit Data collection & storage unit	
Fieldbus master	Ethernet EtherNet/IP Controller Link DeviceNet PROFIBUS-DP PROFINET ModBus CompoNet CompoBus/S CAN (freely configurable)				
Fieldbus I/O	DeviceNet PROFIBUS-DP CAN (freely configurable)				
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*1 Some features listed are not available for all CPU types within each series. Please review specifications for more information on CPU features and performance.



The versatile slim-line controller

An extensive range of models ensures efficient machine control in an ultra-compact package. CPU units are available with relay or transistor output, terminal block or various connector options, and an optional real-time clock function. Select the output type, number of I/O points and other specifications to meet your needs. Expansion I/O units with 8 to 32 I/O points make it possible to configure a control system with a maximum of 192 I/O points.

- Space-saving slim outline, high-density I/O
- 10-32 I/O points per CPU, transistor or relay outputs
- 20 kHz counter input, two 10 kHz pulse outputs integrated
- Two communication ports built-in, freely accessible
- Digital, analogue, and fieldbus expansion units

Ordering information

Input points	Output points	Program capacity	Data memory capacity	Logic execution speed	Size in mm (H × W × D)	I/O Connectors	Output method	Built-in functions	Real time clock	Order code
6 points	4 points	4K words	2K words	0.64 μs	90 × 33 × 65	2 Terminal blocks	Relay	1 Encoder input (20 kHz)	–	CPM2C-10CDR-D
							Yes	CPM2C-10C1DR-D		
						2 Fujitsu (24 pt)	Transistor (source type)	1 Encoder input (20 kHz) 2 Pulse output (10 kHz)	–	CPM2C-10CDT1C-D
							Yes	CPM2C-10C1DT1C-D		
						2 MIL (20 pt)	Transistor (source type)	1 Encoder input (20 kHz) 2 Pulse output (10 kHz)	–	CPM2C-10CDT1M-D
							Yes	CPM2C-10C1DT1M-D		
12 points	8 points	4K words	2K words	0.64 μs	90 × 33 × 65	2 Terminal blocks	Relay	1 Encoder input (20 kHz)	–	CPM2C-20CDR-D
							Yes	CPM2C-20C1DR-D		
						2 Fujitsu (24 pt)	Transistor (source type)	1 Encoder input (20 kHz) 2 Pulse output (10 kHz)	–	CPM2C-20CDT1C-D
							Yes	CPM2C-20C1DT1C-D		
						2 MIL (20 pt)	Transistor (source type)	1 Encoder input (20 kHz) 2 Pulse output (10 kHz)	–	CPM2C-20CDT1M-D
							Yes	CPM2C-20C1DT1M-D		
16 points	16 points	4K words	2K words	0.64 μs	90 × 33 × 65	2 Fujitsu (24 pt)	Transistor (source type)	1 Encoder input (20 kHz) 2 Pulse output (10 kHz)	–	CPM2C-32CDT1C-D
						2 MIL (20 pt)	Transistor (source type)	1 Encoder input (20 kHz) 2 Pulse output (10 kHz)	–	CPM2C-32CDT1M-D
6 points	4 points	4K words	2K words	0.64 μs	90 × 40 × 65	1 Fujitsu (24 pt)	Transistor (source type)	1 Encoder input (20 kHz) 2 Pulse output (10 kHz) Programmable Slave with DeviceNet slave and CompoBus/S Master	Yes	CPM2C-S110C-DRT
6 points	4 points	4K words	2K words	0.64 μs	90 × 40 × 65	1 Fujitsu (24 pt)	Transistor (source type)	1 Encoder input (20 kHz) 2 Pulse output (10 kHz) CompoBus/S Master	Yes	CPM2C-S110C

Note: All CPU's are available only with DC supply voltage (CPM2C-PA201 can be used as power supply). CPU's with sourcing transistor outputs are also available with sinking transistor outputs. MIL = connector according to MIL-C-83503 (compatible with DIN 41651/IEC 60603-1). For I/O Cables and Terminal Blocks, see page 76



Expand the capacity of your CPM2C PLC

Expansion I/O units with 8 to 32 I/O points make it possible to configure a control system with a maximum of 192 I/O points

Ordering information

Unit	Output type	I/O Connectors	Inputs	Outputs	Order code
Expansion I/O units	-	1 Fujitsu (24 pt)	8	-	CPM2C-8EDC
		1 MIL (20 pt)			CPM2C-8EDM
	-	1 Fujitsu (24 pt)	16	-	CPM2C-16EDC
		1 MIL (20 pt)			CPM2C-16EDM
	Relay	1 Terminal block	-	8	CPM2C-8ER
	Transistor output (source type)	1 Fujitsu (24 pt)	-		CPM2C-8ET1C
		1 MIL (20 pt)		CPM2C-8ET1M	
	Transistor output (source type)	1 Fujitsu (24 pt)	-	16	CPM2C-16ET1C
		1 MIL (20 pt)			CPM2C-16ET1M
	Relay	2 Terminal blocks	6	4	CPM2C-10EDR
	Relay	2 Terminal blocks	12	8	CPM2C-20EDR
	Transistor output (source type)	2 Fujitsu (24 pt)	16	16	CPM2C-24EDT1C
		2 MIL (20 pt)			CPM2C-24EDT1M
	Transistor output (source type)	2 Fujitsu (24 pt)	16	16	CPM2C-32EDT1C
2 MIL (20 pt)		CPM2C-32EDT1M			
Analogue I/O units	Analogue (resolution 1/6,000)	2 Terminal blocks	2	1	CPM2C-MAD11
Temperature sensor units	Thermocouple input	1 Terminal block	2	-	CPM2C-TS001
	Platinum resistance input	1 Terminal block	2	-	CPM2C-TS101
CompoBus/S I/O link unit	-	1 Terminal block	I/O link of 8 input bits and 8 output bits		CPM2C-SRT21
RS-232C and RS422 adapter units	-	1 D-sub 9-pin	RS-232C		CPM2C-CIF01-V1
		1 Terminal block and 1 D-sub 9-pin	RS-232C and RS422		CPM2C-CIF11

Note: Expansion I/O units with sourcing transistor outputs are also available with sinking transistor outputs.
 MIL = connector according to MIL-C-83503 (compatible with DIN 41651/IEC 60603-1).
 For I/O Cables and Terminal Blocks, see page 76



Maximum functionality at minimum cost

Omron’s CP1E series targets a “lean” automation solution, but still offers all functionality you need to control relatively simple applications, including outstanding positioning capability. The CP1E comes with 10, 14, 20, 30, 40 or 60 I/O built-in and can be expanded with a wide range of CP1W expansion units up to 180 I/O points. It uses a standard USB port for programming and monitoring. The CP1E-N CPU types have a RS232C serial communication port embedded and offer an extra serial communication port that can be used to connect frequency inverters or temperature controllers. As the CP1E series shares the same architecture as the CP1L, CP1H, CJ, and CS1 series, programs are compatible for memory allocations and instructions.

Ordering information

CP1E CPU	Digital input	Digital output	Max. I/O points (incl. expansions)	Communication ports	Input/output functions	Output type	Power supply	Expandability	Program capacity	Data memory capacity	Logic execution speed	Order code	
E-type with 10 I/O points	6	4	10	-	5 Encoder inputs (10 kHz) 4 Interrupts/counters	Relay	84 to 264 VAC 20.4 to 26.4 VDC	-	2K steps	2K words	1.19 µs	CP1E-E10DR-A	
						Transistor (sinking)						CP1E-E10DR-D	
						Transistor (sourcing)						CP1E-E10DT-D	
												CP1E-E10DT1-D	
												CP1E-E14SDR-A	
E-type with 14 I/O points	8	6	14		6 Encoder inputs (10 kHz) 6 Interrupts/counters	Relay	84 to 264 VAC				CP1E-E20SDR-A		
E-type with 20 I/O points	12	8	20					Up to 3 expansion units ^{*1}				CP1E-E30SDR-A	
E-type with 30 I/O points	18	12	150									CP1E-E40SDR-A	
E-type with 40 I/O points	24	16	160										
N-type with 14 I/O points	8	6	14	RS-232C port	6 Encoder inputs (2 × 100 kHz, 4 × 10kHz) 6 Encoder inputs (2 × 100 kHz, 4 × 10kHz) 2 Pulse outputs (100 kHz)	Relay	84 to 264 VAC 20.4 to 26.4 VDC	-	8K steps	8K words		CP1E-N14DR-A	
						Transistor (sinking)						CP1E-N14DR-D	
						Transistor (sourcing)						CP1E-N14DT-D	
												CP1E-N14DT1-D	
												CP1E-N20DR-A	
N-type with 20 I/O points	12	8	20		6 Encoder inputs (2 × 100 kHz, 4 × 10kHz) 6 Encoder inputs (2 × 100 kHz, 4 × 10kHz) 2 Pulse outputs (100 kHz)	Relay	84 to 264 VAC 20.4 to 26.4 VDC				CP1E-N20DR-A		
						Transistor (sinking)					CP1E-N20DR-D		
						Transistor (sourcing)					CP1E-N20DT-D		
											CP1E-N20DT1-D		
											CP1E-NA20DR-A		
NA-type with 20 I/O points and analogue I/O	12	8	140		6 Encoder inputs (2 × 100 kHz, 4 × 10kHz) 2 analogue inputs (1/6,000) 1 analogue output (1/6,000) 6 Encoder inputs (2 × 100 kHz, 4 × 10kHz) 2 Pulse outputs (100 kHz) 2 analogue inputs (1/6,000) 1 analogue output (1/6,000)	Relay	84 to 264 VAC 20.4 to 26.4 VDC	Up to 3 expansion units ^{*1}			CP1E-NA20DR-A		
						Transistor (sinking)					CP1E-NA20DT-D		
						Transistor (sourcing)					CP1E-NA20DT1-D		

CP1E CPU	Digital input	Digital output	Max. I/O points (incl. expansions)	Communication ports	Input/output functions	Output type	Power supply	Expandability	Program capacity	Data memory capacity	Logic execution speed	Order code
N-type with 30 I/O points	18	12	150	RS-232C port	6 Encoder inputs (2 × 100 kHz, 4 × 10kHz)	Relay	84 to 264 VAC 20.4 to 26.4 VDC	Up to 3 expansion units ^{*1}	8K steps	8K words	1.19 μs	CP1E-N30DR-A
					6 Encoder inputs (2 × 100 kHz, 4 × 10kHz)	Transistor (sinking)						CP1E-N30DR-D
					2 Pulse outputs (100 kHz)	Transistor (sourcing)						CP1E-N30DT-D
				RS-232C port RS-485 port (half-duplex)	6 Encoder inputs (2 × 100 kHz, 4 × 10kHz)	Relay	84 to 264 VAC					CP1E-N30S1DR-A
					6 Encoder inputs (2 × 100 kHz, 4 × 10kHz)	Transistor (sinking)	20.4 to 26.4 VDC					CP1E-N30S1DT-D
					2 Pulse outputs (100 kHz)	Transistor (sourcing)						CP1E-N30S1DT1-D
N-type with 40 I/O points	24	16	160	RS-232C port	6 Encoder inputs (2 × 100 kHz, 4 × 10kHz)	Relay	84 to 264 VAC 20.4 to 26.4 VDC	Up to 3 expansion units ^{*1}	8K steps	8K words	1.19 μs	CP1E-N40DR-A
					6 Encoder inputs (2 × 100 kHz, 4 × 10kHz)	Transistor (sinking)						CP1E-N40DR-D
					2 Pulse outputs (100 kHz)	Transistor (sourcing)						CP1E-N40DT-D
				RS-232C port RS-485 port (half-duplex)	6 Encoder inputs (2 × 100 kHz, 4 × 10kHz)	Relay	84 to 264 VAC					CP1E-N40S1DR-A
					6 Encoder inputs (2 × 100 kHz, 4 × 10kHz)	Transistor (sinking)	20.4 to 26.4 VDC					CP1E-N40S1DT-D
					2 Pulse outputs (100 kHz)	Transistor (sourcing)						CP1E-N40S1DT1-D
N-type with 60 I/O points	36	24	180	RS-232C port	6 Encoder inputs (2 × 100 kHz, 4 × 10kHz)	Relay	84 to 264 VAC 20.4 to 26.4 VDC	Up to 3 expansion units ^{*1}	8K steps	8K words	1.19 μs	CP1E-N60DR-A
					6 Encoder inputs (2 × 100 kHz, 4 × 10kHz)	Transistor (sinking)						CP1E-N60DR-D
					2 Pulse outputs (100 kHz)	Transistor (sourcing)						CP1E-N60DT-D
				RS-232C port RS-485 port (half-duplex)	6 Encoder inputs (2 × 100 kHz, 4 × 10kHz)	Relay	84 to 264 VAC					CP1E-N60S1DR-A
					6 Encoder inputs (2 × 100 kHz, 4 × 10kHz)	Transistor (sinking)	20.4 to 26.4 VDC					CP1E-N60S1DT-D
					2 Pulse outputs (100 kHz)	Transistor (sourcing)						CP1E-N60S1DT1-D

*1 There is no restriction on the possible combination of CP1W expansion units. All expansion units can be combined with each other up to the maximum number of expansions.

Note: The CP1E E-type has no real-time clock and therefore no battery. The N/NA-type has one optional battery for the real-time clock.
 The CP1E-N/NA-type has 6 Interrupts/counters.
 The CP1E-NxxS1 CPU types do not support serial option boards.

Accessories

Type	Remarks	Order code
USB programming cable	A-type male to B-type male (length: 1.8 m)	CP1W-CN221
RS-232C option board	D-Sub, 9 pins, female (15 m max.)	CP1W-CIF01
RS-422A/485 option board	Terminal block (50 m max.)	CP1W-CIF11
RS-422A/485 (isolated) option board	Terminal block (500 m max.)	CP1W-CIF12
Ethernet option board	100/10Base-TX (Auto-MDIX)	CP1W-CIF41 ^{*1}
Battery for CP1E-N/NA type	To retain time of clock	CP1W-BAT01

*1 Only firmware v2.0



The compact machine controller

When it comes to controllers for compact machines, Omron's CP1L series offers the compactness of a micro-PLC with the capability of a modular PLC. It provides all the functionality you need to control your machine, including outstanding positioning capability. The CP1L comes with 14, 20, 30, 40, or 60 I/O built-in and can be expanded with a wide range of CP1W expansion units up to 180 I/O points. It uses a standard USB port for programming and monitoring and offers two optional plug-in serial communication ports, of which one can be used for a display or Ethernet option as well. As the CP1L series shares the same architecture as the CP1E, CP1H, CJ1, and CS1 series, programs are compatible for memory allocations and instructions.

Ordering information

CP1L CPU	Digital input	Digital output	Max. I/O points (incl. expansions)	Input/output functions	Output type	Power supply	PLC port	Expandability	Program capacity	Data memory capacity	Logic execution speed	Order code
L-type with 10 I/O points	6	4	10	4 Encoder inputs (100 kHz) 2 Interrupts/counters	Relay	84 to 264 VAC 20.4 to 26.4 VDC	USB	-	5K steps	10K words	0.55 µs	CP1L-L10DR-A
				4 Encoder inputs (100 kHz) 2 Pulse outputs (100 kHz) 2 Interrupts/counters	Transistor (sinking) Transistor (sourcing)							CP1L-L10DR-D CP1L-L10DT-D CP1L-L10DT1-D
				4 Encoder inputs (100 kHz) 4 Interrupts/counters	Relay							CP1L-L14DR-A CP1L-L14DR-D CP1L-L14DT-D CP1L-L14DT1-D
L-type with 14 I/O points	8	6	54	4 Encoder inputs (100 kHz) 2 Pulse outputs (100 kHz) 2 Interrupts/counters	Transistor (sinking) Transistor (sourcing)	84 to 264 VAC 20.4 to 26.4 VDC	Up to 1 expansion units ^{*1}	5K (+10K FB) steps	32K words	0.55 µs	CP1L-M30DR-A	
				4 Encoder inputs (100 kHz) 6 Interrupts/counters	Relay						CP1L-M30DR-D CP1L-M30DT-D CP1L-M30DT1-D	
				4 Encoder inputs (100 kHz) 2 Pulse outputs (100 kHz) 6 Interrupts/counters 2 Analogue inputs (1/1,000)	Transistor (sinking) Transistor (sourcing)						CP1L-EM30DR-D CP1L-EM30DT-D CP1L-EM30DT1-D	
L-type with 20 I/O points	12	8	60	4 Encoder inputs (100 kHz) 6 Interrupts/counters	Relay	84 to 264 VAC 20.4 to 26.4 VDC	Ethernet	10K steps	32K words	0.55 µs	CP1L-M30DR-A	
				4 Encoder inputs (100 kHz) 2 Pulse outputs (100 kHz) 6 Interrupts/counters	Transistor (sinking) Transistor (sourcing)						CP1L-M30DR-D CP1L-M30DT-D CP1L-M30DT1-D	
				4 Encoder inputs (100 kHz) 6 Interrupts/counters 2 Analogue inputs (1/1,000)	Relay						CP1L-EM30DR-D CP1L-EM30DT-D CP1L-EM30DT1-D	
M-type with 30 I/O points	18	12	150	4 Encoder inputs (100 kHz) 6 Interrupts/counters	Relay	84 to 264 VAC 20.4 to 26.4 VDC	USB	Up to 3 expansion units ^{*1}	10K steps	32K words	0.55 µs	CP1L-M30DR-A
				4 Encoder inputs (100 kHz) 2 Pulse outputs (100 kHz) 6 Interrupts/counters	Transistor (sinking) Transistor (sourcing)							CP1L-M30DR-D CP1L-M30DT-D CP1L-M30DT1-D
				4 Encoder inputs (100 kHz) 6 Interrupts/counters 2 Analogue inputs (1/1,000)	Relay							CP1L-EM30DR-D CP1L-EM30DT-D CP1L-EM30DT1-D
M-type with 30 I/O points	18	12	150	4 Encoder inputs (100 kHz) 6 Interrupts/counters	Relay	84 to 264 VAC 20.4 to 26.4 VDC	Ethernet	10K (+10K FB) steps	32K words	0.55 µs	CP1L-M30DR-A	
				4 Encoder inputs (100 kHz) 2 Pulse outputs (100 kHz) 6 Interrupts/counters	Transistor (sinking) Transistor (sourcing)						CP1L-M30DR-D CP1L-M30DT-D CP1L-M30DT1-D	
				4 Encoder inputs (100 kHz) 6 Interrupts/counters 2 Analogue inputs (1/1,000)	Relay						CP1L-EM30DR-D CP1L-EM30DT-D CP1L-EM30DT1-D	

CP1L CPU	Digital input	Digital output	Max. I/O points (incl. expansions)	Input/output functions	Output type	Power supply	PLC port	Expandability	Program capacity	Data memory capacity	Logic execution speed	Order code
M-type with 40 I/O points	24	16	160	4 Encoder inputs (100 kHz) 6 Interrupts/counters	Relay	84 to 264 VAC 20.4 to 26.4 VDC	USB	Up to 3 expansion units ^{*1}	10K steps	32K words	0.55 µs	CP1L-M40DR-A
				4 Encoder inputs (100 kHz) 2 Pulse outputs (100 kHz) 6 Interrupts/counters	Transistor (sinking)							CP1L-M40DR-D
					Transistor (sourcing)							CP1L-M40DT-D
				4 Encoder inputs (100 kHz) 6 Interrupts/counters 2 Analogue inputs (1/1,000)	Relay	Ethernet	CP1L-EM40DR-D					
					4 Encoder inputs (100 kHz) 2 Pulse outputs (100 kHz) 6 Interrupts/counters 2 Analogue inputs (1/1,000)		Transistor (sinking)		CP1L-EM40DT-D			
				Transistor (sourcing)		CP1L-EM40DT1-D						
M-type with 60 I/O points	36	24	180	4 Encoder inputs (100 kHz) 6 Interrupts/counters	Relay	84 to 264 VAC 20.4 to 26.4 VDC	USB	10K steps	10K (+10KFB) steps	32K words	0.55 µs	CP1L-M60DR-A
				4 Encoder inputs (100 kHz) 2 Pulse outputs (100 kHz) 6 Interrupts/counters	Transistor (sinking)							CP1L-M60DR-D
					Transistor (sourcing)							CP1L-M60DT-D
				4 Encoder inputs (100 kHz) 6 Interrupts/counters 2 Analogue inputs (1/1,000)	Relay	Ethernet	CP1L-EM60DR-D					
					4 Encoder inputs (100 kHz) 2 Pulse outputs (100 kHz) 6 Interrupts/counters 2 Analogue inputs (1/1,000)		Transistor (sinking)					CP1L-EM60DT-D
				Transistor (sourcing)		CP1L-EM60DT1-D						

*1 There is no restriction on the possible combination of CP1W expansion units. All expansion units can be combined with each other up to the maximum number of expansions.

Accessories

Type	Remarks	Order code
Memory cassette	512K words (upload/download program)	CP1W-ME05M
USB programming cable	A-type male to B-type male (length: 1.8 m)	CP1W-CN221
RS-232C option board	D-Sub, 9 pins, female (15 m max.)	CP1W-CIF01
RS-422A/485 option board	Terminal block (50 m max.)	CP1W-CIF11
RS-422A/485 (isolated) option board	Terminal block (500 m max.)	CP1W-CIF12
Ethernet option board	100/10Base-TX (Auto-MDIX)	CP1W-CIF41
LCD display	4 rows × 12 characters	CP1W-DAM01
Analogue I/O option board (only for CP1L-EL/EM)	2 inputs, 0 to 10 V/0 to 20 mA	CP1W-ADB21
Analogue I/O option board (only for CP1L-EL/EM)	2 outputs, 0 to 10 V	CP1W-DAB21V
Analogue I/O option board (only for CP1L-EL/EM)	2 inputs, 0 to 10 V/0 to 20 mA + 2 outputs 0 to 10 V	CP1W-MAB221
Battery	For replacement purpose	CJ1W-BAT01

Note: CP1L-10 I/O points CPU does not support option boards.
 CP1L-30/40/60 I/O points CPUs support two option boards.
 For Ethernet Cables and Accessories, see page 85.



The all-in-one PLC

Designed for compact machines, it combines the size of a micro PLC and the power of a modular PLC. Four built-in high-speed counters and four pulse outputs are ideal for multi-axis positioning control. The CP1H-XA comes with 4 analogue inputs and 2 analogue outputs built-in. This makes it suitable for simple loop control, using the PLC's advanced PID control function with auto-tuning. The CP1H can be expanded with CP1W I/Os and supports up to 2 CJ1 special I/O units. This means that it is open to popular fieldbuses and supports all communication units of the CJ1 series.

- Up to 1 MHz for inputs/outputs
- CJ1M compatible instruction set and execution speed
- 4 analogue inputs and 2 analogue outputs for the XA model
- USB port for easy communication, programming and configuration
- Supports PROFIBUS, DeviceNet, CAN and Ethernet

Ordering information

CP1H CPU	Digital input	Digital output	Max. I/O points (incl. expansions)	Input/output functions	Output type	Power supply	PLC port	Expandability	Program capacity	Data memory capacity	Logic execution speed	Order code
Y-type with 20 I/O points	12	8	300	4 Encoder inputs (2 × 1 MHz + 2 × 100 kHz) 4 Pulse outputs (2 × 1 MHz + 2 × 100 kHz) 6 Interrupts/counters	Transistor (sinking)	20.4 to 26.4 VDC	USB	Up to 7 expansion units ^{*1}	20K steps	32K words	0.1 µs	CP1H-Y20DT-D
X-type with 40 I/O points	24	16	320	4 Encoder inputs (100 kHz) 8 Interrupts/counters	Relay	84 to 264 VAC	CP1H-X40DR-A					
				4 Encoder inputs (100 kHz) 4 Pulse outputs (100 kHz) 8 Interrupts/counters	Transistor (sinking) Transistor (sourcing)	20.4 to 26.4 VDC	CP1H-X40DT-D CP1H-X40DT1-D					
XA-type with 40 I/O points and analogue I/O				4 Encoder inputs (100 kHz) 8 Interrupts/counters	Relay	84 to 264 VAC	CP1H-XA40DR-A					
				4 Analogue inputs (1/12,000) 2 Analogue outputs (1/12,000)	Transistor (sinking) Transistor (sourcing)	20.4 to 26.4 VDC	CP1H-XA40DT-D CP1H-XA40DT1-D					

*1 CP1H CPU series can be expanded with CP1W expansion units (up to 7 units) and CJ1 Special I/O units (up to 2 units).

Note: Some expansion units count for 2 unit numbers (eg. CP1W-AD041, CP1W-DA041, CP1W-TS002 and CP1W-TS102) but only 7 expansion unit numbers can be allocated in a CP1H PLC's configuration.

Accessories

Type	Remarks	Order code
Memory cassette	512K words (upload/download program)	CP1W-ME05M
USB programming cable	A-type male to B-type male (length: 1.8 m)	CP1W-CN221
RS-232C option board	D-Sub, 9 pins, female (15 m max.)	CP1W-CIF01
RS-422A/485 option board	Terminal block (50 m max.)	CP1W-CIF11
RS-422A/485 (isolated) option board	Terminal block (500 m max.)	CP1W-CIF12
Ethernet option board	100/10Base-TX (Auto-MDIX)	CP1W-CIF41
LCD display	4 rows × 12 characters	CP1W-DAM01
Expansion I/O connecting cable	80 cm cable to connect CP1W expansion units	CP1W-CN811
CJ1 expansion unit adapter	Unit to connect CJ1 Special I/O units	CP1W-EXT01
Battery	For replacement purpose	CJ1W-BAT01



Expand the capacity of your compact PLC

A wide variety of expansion units such as Digital I/O, Analogue I/O and Remote I/O are available to create the application you need. These CP1W expansion units can be used for CP1E-, CP1L-, and CP1H series PLC.

Ordering information

Expansion unit	Inputs	Outputs	Max I/O points	Input/output functions	Input/output type	Size in mm (H x W x D)	No. of unit numbers allocated (CP1H only) ^{*1}	Order code
Digital I/O units	8	–	8 points	8 Inputs	–	90 x 66 x 50	1	CP1W-8ED
	–	8	8 points	8 Outputs	Relay	90 x 66 x 50	1	CP1W-8ER
					Transistor (sinking)	90 x 66 x 50	1	CP1W-8ET
					Transistor (sourcing)	90 x 66 x 50	1	CP1W-8ET1
	12	8	20 points	12 Inputs/8 outputs	Relay	90 x 86 x 50	1	CP1W-20EDR1
					Transistor (sinking)	90 x 86 x 50	1	CP1W-20EDT
					Transistor (sourcing)	90 x 86 x 50	1	CP1W-20EDT1
	24	16	40 points	24 Inputs/16 outputs	Relay	90 x 150 x 50	1	CP1W-40EDR
					Transistor (sinking)	90 x 150 x 50	1	CP1W-40EDT
					Transistor (sourcing)	90 x 150 x 50	1	CP1W-40EDT1
Analogue I/O units	4	–	4 analogue points	4 Analogue inputs (resolution 1/6,000)	Analogue	90 x 86 x 50	2	CP1W-AD041
	–	4	4 analogue points	4 Analogue outputs (resolution 1/6,000)	Analogue	90 x 86 x 50	2	CP1W-DA041
	–	2	2 analogue points	2 Analogue outputs (resolution 1/6,000)	Analogue	90 x 86 x 50	1	CP1W-DA021
	2	1	3 analogue points	2 Analogue inputs (resolution 1/6,000) 1 Analogue output (resolution 1/6,000)	Analogue	90 x 86 x 50	1	CP1W-MAD11
Temperature sensor units (K, J)	2	–	2 analogue points	2 Thermocouple inputs (K or J)	–	90 x 86 x 50	1	CP1W-TS001
	4	–	4 analogue points	4 Thermocouple inputs (K or J)	–	90 x 86 x 50	2	CP1W-TS002
Temperature sensor units (Pt100, JPt100)	2	–	2 analogue points	2 Platinum resistance thermometer inputs (Pt100 or JPt100)	–	90 x 86 x 50	1	CP1W-TS101
	4	–	4 analogue points	4 Platinum resistance thermometer inputs (Pt100 or JPt100)	–	90 x 86 x 50	2	CP1W-TS102
CompoBus/S I/O link unit	8 points	8 points	16 points	I/O link of 8 input bits and 8 output bits	CompoBus/S communication	90 x 66 x 50	1	CP1W-SRT21
PROFIBUS-DP I/O link unit	16 points	16 points	32 points	I/O link of 16 input bits and 16 output bits	PROFIBUS-DP communication	90 x 66 x 50	1	CPM1A-PR21
DeviceNet I/O link unit	32 points	32 points	64 points	I/O link of 32 input bits and 32 output bits	DeviceNet communication	90 x 66 x 50	1	CPM1A-DRT21

^{*1} Some expansion units count for 2 unit numbers (eg. CP1W-AD041, CP1W-DA041, CP1W-TS002 and CP1W-TS102) but only 7 expansion unit numbers can be allocated in a CP1H PLC's configuration.



Fast and powerful CPUs for any task

The family of CJ1 and CJ2 CPUs range from very small CPUs for simple sequence control to powerful and fast models that offer total machine control which can handle up to 2,560 I/O points. This enables you to modularize or 'slice' your machine into logical sections without changing PLC series.

All CPU units support IEC61131-3 Structured text, Sequential Function Charts and ladder language. Omron's extensive function block library helps to reduce your programming effort, while you can create your own function blocks to suit your specific needs.

All CJ2M CPU units can be equipped with pulse I/O option modules to perform position control for up to 4 axes, using dedicated instructions.

Ordering information

Max. digital I/O points	Program capacity	Data memory capacity	Logic execution speed	Max. I/O units	Width	5 V current consumption	Built-in functions	Order code
2,560	400 K	832 K	16 ns	40	80 mm	820 mA	USB + EtherNet/IP + RS-232C	CJ2H-CPU68-EIP
2,560	250 K	512 K	16 ns	40	80 mm	820 mA	USB + EtherNet/IP + RS-232C	CJ2H-CPU67-EIP
2,560	150 K	352 K	16 ns	40	80 mm	820 mA	USB + EtherNet/IP + RS-232C	CJ2H-CPU66-EIP
2,560	100 K	160 K	16 ns	40	80 mm	820 mA	USB + EtherNet/IP + RS-232C	CJ2H-CPU65-EIP
2,560	50 K	160 K	16 ns	40	80 mm	820 mA	USB + EtherNet/IP + RS-232C	CJ2H-CPU64-EIP
2,560	60 K	160 K	40 ns	40	62 mm	700 mA	USB + EtherNet/IP, serial comm. option slot	CJ2M-CPU35
2,560	30 K	160 K	40 ns	40	62 mm	700 mA	USB + EtherNet/IP, serial comm. option slot	CJ2M-CPU34
2,560	20 K	64 K	40 ns	40	62 mm	700 mA	USB + EtherNet/IP, serial comm. option slot	CJ2M-CPU33
2,560	10 K	64 K	40 ns	40	62 mm	700 mA	USB + EtherNet/IP, serial comm. option slot	CJ2M-CPU32
2,560	5 K	64 K	40 ns	40	62 mm	700 mA	USB + EtherNet/IP, serial comm. option slot	CJ2M-CPU31
2,560	400 K	832 K	16 ns	40	49 mm	420 mA	USB + RS-232C	CJ2H-CPU68
2,560	250 K	512 K	16 ns	40	49 mm	420 mA	USB + RS-232C	CJ2H-CPU67
2,560	150 K	352 K	16 ns	40	49 mm	420 mA	USB + RS-232C	CJ2H-CPU66
2,560	100 K	160 K	16 ns	40	49 mm	420 mA	USB + RS-232C	CJ2H-CPU65
2,560	50 K	160 K	16 ns	40	49 mm	420 mA	USB + RS-232C	CJ2H-CPU64
2,560	60 K	160 K	40 ns	40	31 mm	500 mA	USB + RS-232C	CJ2M-CPU15
2,560	30 K	160 K	40 ns	40	31 mm	500 mA	USB + RS-232C	CJ2M-CPU14
2,560	20 K	64 K	40 ns	40	31 mm	500 mA	USB + RS-232C	CJ2M-CPU13
2,560	10 K	64 K	40 ns	40	31 mm	500 mA	USB + RS-232C	CJ2M-CPU12
2,560	5 K	64 K	40 ns	40	31 mm	500 mA	USB + RS-232C	CJ2M-CPU11
1,280	60 k	128 k	40 ns	40	69 mm	1,060 mA	Loop control engine (300 blocks) with Gradient Temperature Control	CJ1G-CPU45P-GTC
1,280	60 k	128 k	40 ns	40	69 mm	1,060 mA	Loop control engine (300 blocks)	CJ1G-CPU45P
1,280	30 k	64 k	40 ns	40	69 mm	1,060 mA	Loop control engine (300 blocks)	CJ1G-CPU44P
960	20 k	64 k	40 ns	30	69 mm	1,060 mA	Loop control engine (300 blocks)	CJ1G-CPU43P
960	10 k	64 k	40 ns	30	69 mm	1,060 mA	Loop control engine (50 blocks)	CJ1G-CPU42P
640	20 k	32 k	100 ns	20	49 mm	640 mA	2 Encoder inputs (100 kHz) 2 Pulse outputs (100 kHz) 4 interrupt/counter inputs	CJ1M-CPU23
320	10 k	32 k	100 ns	10	49 mm	640 mA	2 Encoder inputs (100 kHz) 2 Pulse outputs (100 kHz) 4 interrupt/counter inputs	CJ1M-CPU22
160	5 k	32 k	100 ns	10	49 mm	640 mA	2 Encoder inputs (100 kHz) 2 Pulse outputs (100 kHz) 4 interrupt/counter inputs	CJ1M-CPU21
640	20 k	32 k	100 ns	19	62 mm	950 mA	100 base-Tx Ethernet port	CJ1M-CPU13-ETN
				20	31 mm	580 mA	–	CJ1M-CPU13
320	10 k	32 k	100 ns	9	62 mm	950 mA	100 base-Tx Ethernet port	CJ1M-CPU12-ETN
				10	31 mm	580 mA	–	CJ1M-CPU12
160	5 k	32 k	100 ns	9	62 mm	950 mA	100 base-Tx Ethernet port	CJ1M-CPU11-ETN
				10	31 mm	580 mA	–	CJ1M-CPU11

Accessories

Description	Remarks	Order code
High-speed data collection and storage unit, with CF card slot and Ethernet port	CPU bus unit	CJ1W-SPU01-V2
Pulse I/O option module for CJ2M CPU Units, 2 encoder inputs, 2 pulse outputs	NPN (sinking) outputs	CJ2M-MD211
Pulse I/O option module for CJ2M CPU Units, 2 encoder inputs, 2 pulse outputs	PNP (sourcing) outputs	CJ2M-MD212
CompactFlash memory card, 128 MB, for all models (not required for operation)	Industrial grade	HMC-EF183
CompactFlash memory card, 256 MB, for all models (not required for operation)	Industrial grade	HMC-EF283
CompactFlash memory card, 512 MB, for all models (not required for operation)	Industrial grade	HMC-EF583
CompactFlash PC-Card adapter	–	HMC-AP001
I/O terminal block (40-pt.) for CJ1M-CPU2_/CJ2M-MD21_	Push-in	XW2R-P40G-T
I/O terminal block (40-pt.) for CJ1M-CPU2_/CJ2M-MD21_	Clamp	XW2R-E40G-T
I/O terminal block (40-pt.) for CJ1M-CPU2_/CJ2M-MD21_	M3 Screws	XW2R-J40G-T
Connection cable between I/O terminal block and CJ1M-CPU2_/CJ2M-MD21_ (_____ = length in cm)	MIL (40 pt)	XW2Z-_____FF-L
Servo unit terminal block for 1 axis	–	XW2B-20J6-8A
Servo unit terminal block for 2 axes	–	XW2B-40J6-9A
SMARTSTEP cable for CJ1M-CPU2_/CJ2M-MD21_, cable length: 1 m	–	XW2Z-100J-A26
W-series servo cable for CJ1M-CPU2_/CJ2M-MD21_, cable length: 1 m	–	XW2Z-100J-A27
CX-One, integrated software for programming and configuration of all Omron control system components	–	CX-ONE-AL__C-E
Connection cable, D-Sub 9-pin PC serial port to PLC peripheral port (length: 2.0 m)	–	CS1W-CN226
Connection cable, D-Sub 9-pin PC serial port to PLC peripheral port (length: 6.0 m)	–	CS1W-CN626
USB to serial conversion cable	–	CP1W-CIF31
RS-232C Option Board ^{*1}	–	CP1W-CIF01
RS-422A/485 Option board ^{*1}	–	CP1W-CIF11
RS422A/485 (isolated) Option board ^{*1}	–	CP1W-CIF12
Battery Set ^{*2}	–	CJ1W-BAT01
USB Programming cable	–	CP1W-CN221

*1 Only used with CJ2M-CPU3_

*2 Included with the CPU unit

Note: - MIL = connector according to MIL-C-83503 (compatible with DIN 41651/IEC 60603-1).
 - More accessories are available. Please refer to CJ-Series Data Sheets and Operation Manuals for details
 For I/O Cables and Terminal Blocks, see page 76
 For Ethernet Cables and Accessories, see page 85



Power and flexibility

CJ systems can operate on 24 VDC power supply, or on 100 to 240 VAC mains. For small-scale systems with mainly digital I/O a low cost, small capacity power supply can be used. For systems with many analogue I/Os and control/communication units, it may be necessary to use a larger power supply unit.

Depending on the CPU type, up to 3 expansions can be connected to the CPU 'rack', giving a total capacity of 40 I/O units. The total length of the expansion cables of one system may be up to 12 m.

Ordering information

Power supply

Input range	Power consumption	Output capacity at 5 VDC	Output capacity at 24 VDC	Max. output power	Features	Width	Order code
21.6 to 26.4 VDC	35 W max.	2.0 A	0.4 A	16.6 W	–	27 mm	CJ1W-PD022
19.2 to 28.8 VDC	50 W max.	5.0 A	0.8 A	25 W	–	60 mm	CJ1W-PD025
85 to 264 VAC 47 to 63 Hz	50 VA max.	2.8 A	0.4 A	14 W	–	45 mm	CJ1W-PA202
	100 VA max.	5.0 A	0.8 A	25 W	Run output (SPST relay) Maintenance status display	80 mm	CJ1W-PA205R CJ1W-PA205C

Note: The CJ1W-PD022 has no galvanic isolation

I/O expansion

Type	Description	Width, Length	Order code
I/O control unit	Required unit on CPU 'rack' to connect I/O expansions	20 mm	CJ1W-IC101
I/O interface unit	Start unit for each I/O expansion 'rack'. Requires a power supply unit.	31 mm	CJ1W-II101
I/O expansion cable	Connects CJ1W-IC101 or -II101 to the next expansion rack's -II101	0.3 m	CS1W-CN313
		0.7 m	CS1W-CN713
		2.0 m	CS1W-CN223
		3.0 m	CS1W-CN323
		5.0 m	CS1W-CN523
		10 m	CS1W-CN133
		12 m	CS1W-CN133-B2



8 to 64 points per unit – input, output or mixed

Digital I/O units serve as the PLC's interface to achieve fast, reliable sequence control. A full range of units, from high-speed DC inputs to relay outputs, let you adapt CJ1 to your needs.

CJ1 units are available with various I/O densities and connection technologies. Up to 16 I/O points can be wired to units with detachable M3 screw terminals or screwless clamp terminals. High-density 32- and 64- point I/O units are equipped with standard 40-pin flat cable-connectors. Prefabricated cables and wiring terminals are available for easy interfacing to high-density I/O units.

Ordering information

Points	Type	Rated voltage	Rated current	Width	Remarks	Connection type ^{*1}	Order code
16	AC input	120 VAC	7 mA	31 mm	–	M3	CJ1W-IA111
8	AC input	240 VAC	10 mA	31 mm	–	M3	CJ1W-IA201
8	DC input	24 VDC	10 mA	31 mm	–	M3	CJ1W-ID201
16	DC input	24 VDC	7 mA	31 mm	–	M3 Screwless	CJ1W-ID211 CJ1W-ID211(SL)
16	DC input	24 VDC	7 mA	31 mm	Fast-response (15 µs ON, 90 µs OFF)	M3	CJ1W-ID212
16	DC input	24 VDC	7 mA	31 mm	Inputs start interrupt tasks in PLC program	M3	CJ1W-INT01
16	DC input	24 VDC	7 mA	31 mm	Latches pulses down to 50 µs pulse width	M3	CJ1W-IDP01
32	DC input	24 VDC	4.1 mA	20 mm	–	1 × Fujitsu	CJ1W-ID231
32	DC input	24 VDC	4.1 mA	20 mm	–	1 × MIL ^{*1} (40 pt)	CJ1W-ID232
32	DC input	24 VDC	4.1 mA	20 mm	Fast-response (15 µs ON, 90 µs OFF)	1 × MIL ^{*1} (40 pt)	CJ1W-ID233
64	DC input	24 VDC	4.1 mA	31 mm	–	2 × Fujitsu	CJ1W-ID261
64	DC input	24 VDC	4.1 mA	31 mm	–	2 × MIL ^{*1} (40 pt)	CJ1W-ID262
8	Triac output	250 VAC	0.6 mA	31 mm	–	M3	CJ1W-OA201
8	Relay output	250 VAC	2 A	31 mm	–	M3 Screwless	CJ1W-OC201 CJ1W-OC201(SL)
16	Relay output	250 VAC	2 A	31 mm	–	M3 Screwless	CJ1W-OC211 CJ1W-OC211(SL)
8	DC output (sink)	12 to 24 VDC	2 A	31 mm	–	M3	CJ1W-OD201
8	DC output (source)	24 VDC	2 A	31 mm	With short-circuit protection, alarm	M3	CJ1W-OD202
8	DC output (source)	24 VDC	0.5 A	31 mm	With short-circuit protection, alarm	M3	CJ1W-OD204
16	DC output (sink)	12 to 24 VDC	0.5 A	31 mm	–	M3 Screwless	CJ1W-OD211 CJ1W-OD211 (SL)
16	DC output (source)	24 VDC	0.5 A	31 mm	With short-circuit protection, alarm	M3 Screwless	CJ1W-OD212 CJ1W-OD212 (SL)
16	DC output (sink)	24 VDC	0.5 A	31 mm	Fast-response (15 µs ON, 80 µs OFF)	M3	CJ1W-OD213
32	DC output (sink)	12 to 24 VDC	0.5 A	20 mm	–	1 × Fujitsu	CJ1W-OD231
32	DC output (source)	24 VDC	0.3 A	20 mm	With short-circuit protection, alarm	1 × MIL ^{*1} (40 pt)	CJ1W-OD232
32	DC output (sink)	24 VDC	0.5 A	20 mm	Fast-response (15 µs ON, 80 µs OFF)	1 × MIL ^{*1} (40 pt)	CJ1W-OD234
64	DC output (sink)	12 to 24 VDC	0.3 A	31 mm	–	2 × Fujitsu	CJ1W-OD261
64	DC output (source)	24 VDC	0.3 A	31 mm	–	2 × MIL ^{*1} (40 pt)	CJ1W-OD262
16+16	DC in+out (source)	24 VDC	0.5 A	31 mm	–	2 × MIL ^{*1} (20 pt)	CJ1W-MD232
32+32	DC in+out (sink)	24 VDC	0.3 A	31 mm	–	2 × MIL ^{*1} (40 pt)	CJ1W-MD263
32+32	DC in+out (TLL)	5 VDC	35 mA	31 mm	–	2 × MIL ^{*1} (40 pt)	CJ1W-MD563

*1 MIL = connector according to MIL-C-83503 (compatible with DIN 41651/IEC 60603-1).

Note: All digital I/O units are designated as basic I/O units.
For I/O Cables and Terminal Blocks, see page 76

Accessories

Description	Connection type	Order code
Replacement 18-point screwless terminal blocks for I/O units, pack of 5 pcs.	Screwless	CJ-WM01-18P-5
Replacement 18-point screw terminal blocks for I/O units, pack of 5 pcs.	M3	CJ-OD507-18P-5



From basic analogue I/O to advanced temperature control

The CJ-series offers a wide choice of analogue input units, fit for any application, from low-speed, multi-channel temperature measurement to high-speed, high-accuracy data acquisition. Analogue outputs can be used for accurate control or external indication.

Advanced units with built-in scaling, filtering and alarm functions reduce the need for complex PLC programming. High-accuracy process I/O units support an extensive range of sensors, for fast and accurate data acquisition. Temperature control units relieve the PLC CPU of PID calculations and alarm monitoring. These functions are handled autonomously by the unit, offering control performance and auto-tuning functions similar to stand-alone temperature controllers.

Ordering information

Points	Type	Ranges	Resolution	Accuracy ¹	Conversion time	Width	Remarks	Connection type	Order code
4	Universal analogue input	0 to 5 V 1 to 5 V 0 to 10 V 0 to 20 mA 4 to 20 mA K, J, T, L, R, S, B Pt100, Pt1000, JPt100	V / I: 1/12,000 T/C: 0.1 °C RTD: 0.1 °C	V: 0.3% I: 0.3% T/C: 0.3% RTD: 0.3%	250 ms/4 point	31 mm	Universal inputs, with zero/span adjustment, configurable alarms, scaling, sensor error detection	M3	CJ1W-AD04U
		Screwless	CJ1W-AD04U(SL)						
4	Analogue input	0 to 5 V, 0 to 10 V, -10 to 10 V, 1 to 5 V, 4 to 20 mA	1/8,000	V: 0.2% I: 0.4%	250 µs/point	31 mm	Offset/gain adjustment, peak hold, moving average, alarms	M3	CJ1W-AD041-V1
		Screwless	CJ1W-AD041-V1 (SL)						
4	High-speed analogue input	1 to 5 V, 0 to 10 V, -5 to 5 V, -10 to 10 V, 4 to 20 mA	1/40,000	V: 0.2% I: 0.4%	35 µs/4 points	31 mm	Direct conversion (CJ2H special instruction)	M3	CJ1W-AD042
8	Analogue input	1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA	1/8,000	V: 0.2% I: 0.4%	250 µs/point	31 mm	Offset/gain adjustment, peak hold, moving average, alarms	M3	CJ1W-AD081-V1
		Screwless	CJ1W-AD081-V1 (SL)						
2	Analogue output	0 to 5 V, 0 to 10 V, -10 to 10 V, 1 to 5 V, 4 to 20 mA	1/4,000	V: 0.3% I: 0.5%	1 ms/point	31 mm	Offset/gain adjustment, output hold	M3	CJ1W-DA021
		Screwless	CJ1W-DA021 (SL)						
4	Analogue output	1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA	1/4,000	V: 0.3% I: 0.5%	1 ms/point	31 mm	Offset/gain adjustment, output hold	M3	CJ1W-DA041
		Screwless	CJ1W-DA041 (SL)						
4	High-speed analogue output	1 to 5 V, 0 to 10 V, -10 to 10 V	1/40,000	0.3%	35 µs/4 points	31 mm	Direct conversion (CJ2H special instruction)	M3	CJ1W-DA042V
8	Voltage output	0 to 5 V, 0 to 10 V, -10 to 10 V, 1 to 5 V	1/8,000	0.3%	250 µs/point	31 mm	Offset/gain adjustment, output hold	M3	CJ1W-DA08V
		Screwless	CJ1W-DA08V (SL)						
8	Current output	4 to 20 mA	1/8,000	0.3%	250 µs/point	31 mm	Offset/gain adjustment, output hold	M3	CJ1W-DA08C
		Screwless	CJ1W-DA08C (SL)						
4 + 2	Analogue in + out-put	1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA	1/8,000	in: 0.2% out: 0.3%	1 ms/point	31 mm	Offset/gain adjustment, scaling, peak hold, moving average, alarms, output hold	M3	CJ1W-MAD42
		Screwless	CJ1W-MAD42 (SL)						
4	Universal analogue input	DC voltage, DC current, Thermocouple, Pt100/Pt1000, potentiometer	1/256,000	0.05%	60 ms/4 points	31 mm	All inputs individually isolated, configurable alarms, maintenance functions, user-defined scaling, zero/span adjustment	M3	CJ1W-PH41U
2	Process input	4 to 20 mA 0 to 20 mA 0 to 10 V, -10 to 10 V, 0 to 5 V, -5 to 5 V, 1 to 5 V, 0 to 1.25 V, 1.25 to 1.25 V	1/64,000	0.05%	5 ms/point	31 mm	Configurable alarms, maintenance functions, user-defined scaling, zero/span adjustment, square root, totaliser	M3	CJ1W-PDC15

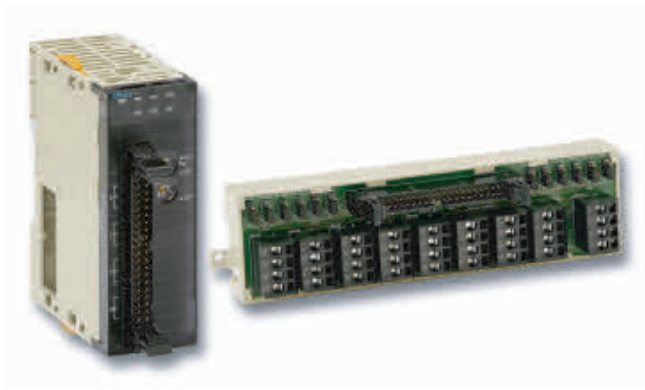
Points	Type	Ranges	Resolution	Accuracy*1	Conversion time	Width	Remarks	Connection type	Order code
2	Thermocouple input	B, E, J, K, L, N, R, S, T, U, WRe5-26, PLII, -100 to 100 mV	1/64,000	0.05%	5 ms/point	31 mm	Configurable alarms, maintenance functions	M3	CJ1W-PTS15
4	Thermocouple Input	B, J, K, L, R, S, T	0.1°C	0.3%	62.5 ms/point	31 mm	4 configurable alarm outputs	M3	CJ1W-PTS51
4	Resistance thermometer input	Pt100, JPt100	0.1°C	0.3%	62.5 ms/point	31 mm	4 configurable alarm outputs	M3	CJ1W-PTS52
6	Thermocouple input	K-type (-200 to 1,300°C) J-Type (-100 to 850°C)	0.1°C	0.5%	40 ms/point	31 mm	Basic I/O unit, setup by DIP switches, adjustable filtering 10/50/60 Hz	M3	CJ1W-TS561
								Screwless	CJ1W-TS561 (SL)
6	Resistance thermometer input	Pt100 (-200 to 650°C) Pt1000 (-200 to 650°C)	0.1°C	0.5%	40 ms/point	31 mm	Basic I/O unit, setup by DIP switches, adjustable filtering 10/50/60 Hz	M3	CJ1W-TS562
								Screwless	CJ1W-TS562 (SL)
4	Temperature control loops, Thermocouple	B, J, K, L, R, S, T	0.1°C	0.3%	500 ms total	31 mm	4 control outputs: PNP open collector, 100 mA max.	M3	CJ1W-TC002
2	Temperature control loops, Thermocouple	B, J, K, L, R, S, T	0.1°C	0.3%	500 ms total	31 mm	2 control outputs: PNP open collector, 100 mA max., 2 current transformer inputs for heater burnout detection.	M3	CJ1W-TC004
4	Temperature control loops, RTD	Pt100, JPt100	0.1°C	0.3%	500 ms total	31 mm	4 control outputs: PNP open collector, 100 mA max.	M3	CJ1W-TC102
2	Temperature control loops, RTD	Pt100, JPt100	0.1°C	0.3%	500 ms total	31 mm	2 control outputs: PNP open collector, 100 mA max., 2 current transformer inputs for heater burnout detection.	M3	CJ1W-TC104
1	Load Cell Interface unit	10 VDC or 2.5 VDC, max. four 350Ω load cells.	24 bit, 0.1μV/count	Linearity error: <0.02% FS	0.33 ms	31 mm	Self-contained unit designed for fast weight and force measurement. Low-pass filter adjustable 3 Hz - 1 kHz. Made by Unipulse Co.	M3	CJ1W-F130
1	Weighing unit	10 VDC, max. four 350Ω load cells	24 bit, 0.3μV/count	Linearity error: <0.01% FS	2 ms	31 mm	Self-contained unit designed for feed weighing, discharge weighing, hopper scales, packing scales, bag filling, etc. Made by Unipulse Co.	M3	CJ1W-F159

*1 Accuracy for Voltage and Current Inputs/Outputs as percentage of full scale and typical value at 25°C ambient temperature (Consult the operation manual for details)
Accuracy for Temperature Inputs/Outputs as percentage of process value and typical value at 25°C ambient temperature (Consult the operation manual for details)

Note: All Analogue I/O units are designated as Special I/O units, except TS561/TS562, which are Basic I/O units (cannot be used with CP1H).

Accessories

Description	Connection type	Order code
Replacement 18-point screwless terminal blocks for I/O units, pack of 5 pcs.	Screwless	CJ-WM01-18P-5
Replacement 18-point screw terminal blocks for I/O units, pack of 5 pcs.	M3	CJ-OD507-18P-5



Add motion control to any CJ-Series PLC

From simple position measurement to multi-axis synchronised motion control, the CJ-Series offers a full range of units:

- Counter units gather position information from SSI- or incremental encoders. Actual positions are compared with internally stored target values.
- CJ2M CPU Units have dedicated positioning functions that can be used by installing up to 2 Pulse I/O option modules.
- Position Control units are used for point-to-point positioning with servo drives or stepper motors. Target data and acceleration/deceleration curves can be adjusted on-the-fly.
- Position- and Motion Control units equipped with EtherCAT or MECHATROLINK-II interface can control multiple drives through a single high-speed link. Message routing through multiple communication layers allows the attached drives to be configured from any point in the control network.

Ordering information

Channels/ Axes	Type	Signal type	Unit class	Width	Remarks	Connection type	Order code
2	SSI inputs (absolute position data)	Synchronous serial protocol	Special I/O unit	31mm	Baud rate, encoding type, data length, etc. can be set per channel	M3 screw	CJ1W-CTS21-E
2	500 kHz Counter	24 V, line driver	Special I/O unit	31mm	2 configurable digital inputs + outputs	1 × Fujitsu (40 pt)	CJ1W-CT021
4	100 kHz Counter	Line driver, 24 V via terminal block	Special I/O unit	31mm	Target values trigger interrupt to CPU	1 × MIL (40 pt)	CJ1W-CTL41-E
1	DC Motor Control unit	PWM (24 V/4 A)	Special I/O unit	31mm	4 configurable digital inputs + 50 kHz counter input	3 × Screwless	CJ1W-DCM11-E
2	Pulse I/O option module for CJ2M CPU	24 V, line driver	CPU Option Module	20mm	100 kpps encoder inputs and pulse outputs, NPN (sinking), interrupt / fast response inputs	1 × MIL (40 pt)	CJ2M-MD211
2	Pulse I/O option module for CJ2M CPU	24 V, line driver	CPU Option Module	20mm	100 kpps encoder inputs and pulse outputs, PNP (sourcing), interrupt / fast response inputs	1 × MIL (40 pt)	CJ2M-MD212
1	Position Control unit	24 V open collector	Special I/O unit	31mm	500 kpps pulse outputs, inputs for origin, limit switches, stop, interrupt	1 × Fujitsu (40 pt)	CJ1W-NC113
2	Position Control unit	24 V open collector	Special I/O unit	31mm	500 kpps pulse outputs, inputs for origin, limit switches, stop, interrupt	1 × Fujitsu (40 pt)	CJ1W-NC213
4	Position Control unit	24 V open collector	Special I/O unit	31mm	500 kpps pulse outputs, inputs for origin, limit switches, stop, interrupt	2 × Fujitsu (40 pt)	CJ1W-NC413
2	Position Control Unit High speed type	24 V open collector	Special I/O Unit	51mm	500 kpps pulse outputs, built-in feedback pulse counters, synchronous multi-axis control	MIL	CJ1W-NC214
4	Position Control Unit High speed type	24 V open collector	Special I/O Unit	62mm	500 kpps pulse outputs, built-in feedback pulse counters, synchronous multi-axis control	MIL	CJ1W-NC414
2	Position Control Unit	EtherCAT	CPU bus unit	31mm	Position, speed and torque control, access to all drive parameters	RJ45	CJ1W-NC281
4	Position Control Unit	EtherCAT	CPU bus unit	31mm	Position, speed and torque control, access to all drive parameters	RJ45	CJ1W-NC481
4	Position Control Unit	EtherCAT	CPU bus unit	31mm	Position, speed and torque control, access to all drive parameters, supports up to 64 general purpose EtherCAT slaves	RJ45	CJ1W-NC482
8	Position Control Unit	EtherCAT	CPU bus unit	31mm	Position, speed and torque control, access to all drive parameters	RJ45	CJ1W-NC881
8	Position Control Unit	EtherCAT	CPU bus unit	31mm	Position, speed and torque control, access to all drive parameters, supports up to 64 general purpose EtherCAT slaves	RJ45	CJ1W-NC882
16	Position Control Unit	EtherCAT	CPU bus unit	31mm	Position, speed and torque control, access to all drive parameters	RJ45	CJ1W-NCF81
2	Position Control Unit	MECHATROLINK-II	CPU bus unit	31mm	Position, speed and torque control, access to all drive parameters	ML-II	CJ1W-NC271
4	Position Control Unit	MECHATROLINK-II	CPU bus unit	31mm	Position, speed and torque control, access to all drive parameters	ML-II	CJ1W-NC471
16	Position Control unit	MECHATROLINK-II	CPU bus unit	31mm	Position, speed and torque control, access to all drive parameters	ML-II	CJ1W-NCF71
30	Advanced Motion Control unit	MECHATROLINK-II, Encoder I/O, digital I/O	CPU bus unit	49mm	Trajexia Motion Controller on the CJ-series	ML-II, 9-pin D-Sub, screwless push-in	CJ1W-MCH72

Note: Line driver signal type units also available.

Accessories

Description	Connection type	Order code
Screwless terminal block for connecting 24 V or Line driver encoders to CJ1W-CTL41-E	Push-in	XW2G-40G7-E
General purpose I/O connection cable for I/O units with 40-pt. Fujitsu connector (____ = length in cm)	Fujitsu (40 pt.) to MIL (40 pt.)	XW2Z-____BF-L
General purpose I/O connection cable for I/O units with 40-pt. MIL connector (____ = length in cm)	2 × MIL (40 pt)	XW2Z-____FF-L
Servo relay unit 1-Axis position control unit	–	XW2B-20J6-1B
Servo relay unit 2-Axes position control unit	–	XW2B-40J6-2B
Cable connecting servo relay unit to Position control unit CJ1W-NC113, cable length 1 m. For Accurax G5 servo drives.	–	XW2Z-100J-A14
Cable connecting servo relay unit to Position control unit CJ1W-NC213/413, cable length 1 m. For Accurax G5 servo drives.	–	XW2Z-100J-A15
Cable connecting servo relay unit to Position control unit CJ1W-NC113, cable length 1 m. For SmartStep 2 servo drives.	–	XW2Z-100J-A14
Cable connecting servo relay unit to Position control unit CJ1W-NC213/413, cable length 1 m. For SmartStep 2 servo drives.	–	XW2Z-100J-A15
Cable connecting servo relay unit to Position control unit CJ1W-NC133, cable length 1 m. For Accurax G5 servo drives.	–	XW2Z-100J-A18
Cable connecting servo relay unit to Position control unit CJ1W-NC233/433, cable length 1 m. For Accurax G5 servo drives.	–	XW2Z-100J-A19
Cable connecting servo relay unit to Position control unit CJ1W-NC133, cable length 1 m. For SmartStep 2 servo drives.	–	XW2Z-100J-A18
Cable connecting servo relay unit to Position control unit CJ1W-NC233/433, cable length 1 m. For SmartStep 2 servo drives.	–	XW2Z-100J-A19
Cable connecting servo relay unit to Accurax G5 servo drives, cable length 1 m.	–	XW2Z-100J-B25
Cable connecting servo relay unit to SmartStep 2 servo drive, cable length 1 m.	–	XW2Z-100J-B29

Note: For General-purpose I/O Cables and Terminal Blocks, see page 76



Open to any communication

The CJ-Series offers both standardised open networks interfaces, and cost-efficient high-speed proprietary network links. Datalinks between PLCs, or to higher-level information systems can be made using serial or Ethernet links, or the easy-to-use controller link network.

Omron supports the 2 major field networks, DeviceNet and PROFIBUS-DP. For high-speed field I/O, Omron's own CompoBus/S offers an unsurpassed ease of installation. Fully user-configurable serial and CAN-based communication can be used to emulate a variety of application-specific protocols. EtherNet/IP units provide data link functions to share large amounts of data between PLCs. The new PROFINET-IO controller together with the SmartSlice modular I/O system offers Ethernet based I/O with controller- and network redundancy.

Ordering information

Type	Ports	Data transfer	Protocols	Unit class	Width	Connection type	Order code
Serial	2 × RS-232C		CompoWay/F, Host link, NT link, Modbus, User-defined	CPU bus unit	31 mm	9-pin D-Sub	CJ1W-SCU21-V1
Serial	2 × RS-232C	High-speed	CompoWay/F, Host link, NT link, Modbus, User-defined	CPU bus unit	31 mm	9-pin D-Sub	CJ1W-SCU22
Serial	2 × RS-422A/RS-485		CompoWay/F, Host link, NT link, Modbus, User-defined	CPU bus unit	31 mm	9-pin D-Sub	CJ1W-SCU31-V1
Serial	2 × RS-422A/RS-485	High-speed	CompoWay/F, Host link, NT link, Modbus, User-defined	CPU bus unit	31 mm	9-pin D-Sub	CJ1W-SCU32
Serial	1 × RS-232C + 1 × RS-422/RS-485		CompoWay/F, Host link, NT link, Modbus, User-defined	CPU bus unit	31 mm	9-pin D-Sub	CJ1W-SCU41-V1
Serial	1 × RS-232C + 1 × RS-422/RS-485	High-speed	CompoWay/F, Host link, NT link, Modbus, User-defined	CPU bus unit	31 mm	9-pin D-Sub	CJ1W-SCU42
Ethernet	1 × 100 Base-Tx		UDP, TCP/IP, FTP server,SMTP (e-mail), SNTP (time adjust), FINS routing, socket service	CPU bus unit	31 mm	RJ45	CJ1W-ETN21
EtherNet/IP	1 × 100 Base-Tx		EtherNet/IP, UDP, TCP/IP, FTP server, SNTP, SNMP	CPU Bus unit	31 mm	RJ45	CJ1W-EIP21
Controller link	2-wire twisted pair		Omron proprietary	CPU bus unit	31 mm	2-wire screw + GND	CJ1W-CLK23
DeviceNet	1 × CAN		DeviceNet	CPU bus unit	31 mm	5-p detachable	CJ1W-DRM21
PROFIBUS-DP	1 × RS-485 (Master)		DP, DPV1	CPU bus unit	31 mm	9-pin D-Sub	CJ1W-PRM21
PROFIBUS-DP	1 × RS-485 (Slave)		DP	Special I/O unit	31 mm	9-pin D-Sub	CJ1W-PRT21
PROFINET-IO	1 × 100 Base-Tx		PROFINET-IO Controller, FINS/UDP	CPU Bus unit	31 mm	RJ45	CJ1W-PNT21
CAN	1 × CAN		User-defined, supports 11-bit and 29-bit identifiers	CPU bus unit	31 mm	5-p detachable	CJ1W-CORT21
CompoNet	4-wire, data + power to slaves (Master)		CompoNet (CIP-based)	Special I/O unit	31 mm	4-p detachable IDC or screw	CJ1W-CRM21
CompoBus/S	2-wire (Master)		Omron proprietary	Special I/O unit	20 mm	2-wire screw + 2-wire power	CJ1W-SRM21

Accessories

Description	Connection type	Order code
RS-232C to RS-422/RS-485 signal converter. Mounts directly on serial port.	9-pin D-sub to screw clamp terminals	CJ1W-CIF11
Controller link PCI board with support software	PCI, wired CLK	3G8F7-CLK23-E
Controller link repeater unit (wire to wire)	Screw - Screw	CS1W-RPT01
Controller link repeater unit (wire to HPCF fiber)	Screw - HPCF connector	CS1W-RPT02
Controller link repeater unit (wire to graded-index glass fiber)	Screw - ST connector	CS1W-RPT03
PROFIBUS DP to RS-422/RS-485 Serial Gateway. User-configurable, with Omron protocols built-in.	9-pin D-sub to screw clamp terminals	PRT1-SCU11
PROFINET IO + ModBus/TCP to Modbus/RTU (RS-485) Gateway.	3 × RJ45 to screw clamp terminals	EJ1N-HFU-ETN

Note: For Ethernet Cables and Accessories, see page 85



Fast and powerful CPUs for any task

Omron's CS1-series CPUs are available in two processor speeds, each in various memory capacities. Besides the basic CPU models, versions are available for dual redundant operation, supporting I/O hot-swapping. All CPUs have one dedicated board slot with a direct CPU-bus connection, in which a serial communication board or a loop control board can be mounted. All CPU units support IEC61131-3 structured text and ladder language.

Omron's extensive function block library helps to reduce your programming effort, while you can create your own function blocks to suit your specific needs.

Ordering information

Max. Digital I/O points	Program capacity	Data memory capacity	Logic execution speed	Max. I/O units	Additional functions	Order code
5120	250K steps	448K words	20 ns	80	–	CS1H-CPU67H
				71	Supports duplex power supply and I/O hot-swapping	CS1D-CPU67S
	68	CPU for full dual-redundancy		CS1D-CPU67H		
		CPU for full dual-redundancy, with loop control board		CS1D-CPU67P		
	80	–		CS1H-CPU66H		
	80	–		CS1H-CPU65H		
	71	Supports duplex power supply and I/O hot-swapping		CS1D-CPU65S		
	68	CPU for full dual-redundancy		CS1D-CPU65H		
		CPU for full dual-redundancy, with loop control board		CS1D-CPU65P		
		30K steps		64K words	40 ns	80
	20K steps	–	CS1H-CPU63H			
	60K steps	–	CS1G-CPU45H			
1280	30K steps		40	–		CS1G-CPU44H
			35	Supports duplex power supply and I/O hot-swapping		CS1D-CPU44S
960	20K steps		30	–		CS1G-CPU43H
				–		CS1G-CPU42H
	10K steps		26	Supports duplex power supply and I/O hot-swapping		CS1D-CPU42S

Accessories

Description	Remarks	Order code
High-speed data collection and storage unit, with CF card slot and Ethernet port	CPU bus unit	CS1W-SPU01-V2
High-speed data collection and storage unit, with CF card slot and 2 Ethernet ports	CPU bus unit	CS1W-SPU02-V2
Duplex unit, required for CS1D-CPU6_H systems	–	CS1D-DPL01
Serial communication option board, 2 x RS-232C	–	CS1W-SCB21-V1
Serial communication option board, 1 x RS-232C + 1 x RS422/RS-485	–	CS1W-SCB41-V1
Loop control option board	50 control blocks max.	CS1W-LCB01
Loop control option board	300 control blocks max.	CS1W-LCB05
Replacement battery set, for all CS1 CPUs	–	CS1W-BAT01
Compact Flash memory card, 128 MB, for all models (not required for operation)	Industrial grade	HMC-EF183
Compact Flash memory card, 256 MB, for all models (not required for operation)	Industrial grade	HMC-EF283
Compact Flash memory card, 512 MB, for all models (not required for operation)	Industrial grade	HMC-EF583
Compact Flash PC-Card adapter	–	HMC-AP001
CX-One, integrated software for programming and configuration of all Omron control system components	–	CX-ONE-AL__C-E
Connection cable, D-Sub 9-pin PC serial port to PLC peripheral port	length: 2.0 m	CS1W-CN226
Connection cable, D-Sub 9-pin PC serial port to PLC peripheral port	length: 6.0 m	CS1W-CN626
USB to serial conversion cable	–	CS1W-CIF31



Expand with up to 7 racks

CS1 systems can operate on 24 VDC power supply, or on 100-240 VAC mains. For small-scale systems with mainly digital I/O a low cost, small capacity power supply can be used. For systems with many analogue I/Os and control/communication units, it may be necessary to use a larger power supply unit.

PLC racks are available in several sizes, from 2 to 10 slots wide. Special backplanes are required for duplex systems. Depending on the CPU type, up to 7 expansions can be connected to the CPU rack, giving a total capacity of 80 I/O units. The total length of the expansion cables of one system may be up to 12 m.

Ordering information

Power supplies

Input range	Power consumption	Output capacity 5 VDC	Output capacity 26 VDC	Max. output power	Extra functions	Order code
19.2 to 28.8 VDC	40 W max.	6.6 A	0.62 A	30 W	–	C200HW-PD024
		4.3 A	0.56 A	28 W	Power supply for dual-redundant system	CS1D-PD024
	55 VA max.	5.3 A	1.3 A	40 W	–	C200HW-PD025
85 to 264 VAC 50/60 Hz	120 VA max.	4.6 A	0.62 A	30 W	Power supply for dual-redundant system	CS1D-PD025
					Maintenance status display	C200HW-PA204C
					–	C200HW-PA204
	180 VA max.	9.0 A	1.3 A	45 W	Service output 24 VDC, 0.8 A	C200HW-PA204S
					Run status output (SPST relay)	C200HW-PA204R
					Run status output (SPST relay)	C200HW-PA209R
150 VA max.	7.0 A	1.3 A	35 W	Power supply for dual-redundant system	CS1D-PA207R	

Specifications

Type	Slots	Expansion connector	Width	Special functions	Order code
CPU backplane	2	No	200 mm	–	CS1W-BC023
CPU backplane	3	Yes	260 mm	–	CS1W-BC033
CPU backplane	5	Yes	330 mm	–	CS1W-BC053
CPU backplane	8	Yes	435 mm	–	CS1W-BC083
CPU backplane	10	Yes	505 mm	–	CS1W-BC103
Expansion backplane	3	Yes	260 mm	–	CS1W-BI033
Expansion backplane	5	Yes	330 mm	–	CS1W-BI053
Expansion backplane	8	Yes	435 mm	–	CS1W-BI083
Expansion backplane	10	Yes	505 mm	–	CS1W-BI103
CPU backplane	5	Yes	505 mm	For Duplex CPU + Power supplies	CS1D-BC052
CPU backplane	8	Yes	505 mm	For Duplex Power supplies	CS1D-BC082S
Expansion backplane	9	Yes	505 mm	For Duplex Power supplies	CS1D-BI092

Type	Remarks	Order code
I/O Expansion cable to connect CS1 CPU backplane or Expansion backplane to next Expansion backplane.	0.3 m	CS1W-CN313
	0.7 m	CS1W-CN713
	2.0 m	CS1W-CN223
	3.0 m	CS1W-CN323
	5.0 m	CS1W-CN523
	10.0 m	CS1W-CN133
	12.0 m	CS1W-CN133-B2



Up to 96 I/O points per unit – input, output or mixed

Digital I/O units serve as the PLC's interface to achieve fast, reliable sequence control. A full range of units, from high-speed DC inputs to relay outputs, let you adapt CS1 to your needs.

CS1 units are available with various I/O densities and connection technologies. Up to 16 I/O points can be wired to units with detachable M3 screw terminals directly. High-density 32- and 64- point I/O units are equipped with standard 40-pin connectors. Prefabricated cables and wiring terminals are available for easy interfacing to high-density I/O units.

Ordering information

Points	Type	Rated voltage	Rated current	Remarks	Connection type	Order code ^{*1}
16	AC or DC input	120 VAC or VDC	10 mA	–	M3	CS1W-IA111
16	AC input	240 VAC	10 mA	–	M3	CS1W-IA211
16	DC input	24 VDC	7 mA	–	M3	CS1W-ID211
16	DC input	24 VDC	7 mA	Inputs start interrupt tasks in PLC program	M3	CS1W-INT01
16	DC input	24 VDC	7 mA	Latches pulses down to 50 µs pulse width	M3	CS1W-IDP01
32	DC input	24 VDC	6 mA	–	1×40 pt Fujitsu	CS1W-ID231
64	DC input	24 VDC	6 mA	–	2×40 pt Fujitsu	CS1W-ID261
96	DC input	24 VDC	5 mA	–	2×56 pt Fujitsu	CS1W-ID291
8	Triac output	250 VAC	1.2 A	–	M3	CS1W-OA201
16	Triac output	250 VAC	0.5 A	–	M3	CS1W-OA211
8	Relay output	250 VAC	2.0 A	–	M3	CS1W-OC201
16	Relay output	250 VAC	2.0 A	–	M3	CS1W-OC211
16	DC output (sink)	12 to 24 VDC	0.5 A	–	M3	CS1W-OD211
16	DC output (source)	24 VDC	0.5 A	With short-circuit protection, alarm	M3	CS1W-OD212
32	DC output (sink)	12 to 24 VDC	0.5 A	–	1×40 pt Fujitsu	CS1W-OD231
32	DC output (source)	24 VDC	0.5 A	With short-circuit protection, alarm	1×40 pt Fujitsu	CS1W-OD232
64	DC output (sink)	12 to 24 VDC	0.3 A	–	2×40 pt Fujitsu	CS1W-OD261
64	DC output (source)	24 VDC	0.3 A	With short-circuit protection, alarm	2×40 pt Fujitsu	CS1W-OD262
96	DC output (sink)	12 to 24 VDC	0.1 A	–	2×56 pt Fujitsu	CS1W-OD291
96	DC output (source)	24 VDC	0.1 A	–	2×56 pt Fujitsu	CS1W-OD292
32+32	DC output (sink)	12 to 24 VDC	0.3 A	–	2×40 pt Fujitsu	CS1W-MD261
32+32	DC in+out (source)	24 VDC	0.3 A	With short-circuit protection, alarm	2×40 pt Fujitsu	CS1W-MD262
48+48	DC output (sink)	12 to 24 VDC	0.1 A	–	2×56 pt Fujitsu	CS1W-MD291
48+48	DC in+out (source)	12 to 24 VDC	0.1 A	–	2×56 pt Fujitsu	CS1W-MD292

^{*1} C200H I/O units can also be mounted, except on CS1D systems.

Note: All Digital I/O units are designated as Basic I/O units.

Accessories

Description	Connection type	Order code
Connection cable between I/O terminal block and I/O unit with 40-pt Fujitsu connector (_ _ _ = length in cm)	Fujitsu (40pt)	XW2Z- _ _ B
I/O terminal block for input unit with 40-pt Fujitsu connector	Push-in	XW2R-P34G-C1
I/O terminal block for output unit with 40-pt Fujitsu connector	Push-in	XW2R-P34G-C3
I/O terminal block for input unit with 40-pt Fujitsu connector	Clamp	XW2R-E34G-C1
I/O terminal block for output unit with 40-pt Fujitsu connector	Clamp	XW2R-E34G-C3
I/O terminal block for input unit with 40-pt Fujitsu connector	M3 Screws	XW2R-J34G-C1
I/O terminal block for output unit with 40-pt Fujitsu connector	M3 Screws	XW2R-J34G-C3

Note: For I/O Cables and Terminal Blocks, see page 76



From basic analogue I/O to process control

CS1 offers a wide choice of analogue input units, fit for any application, from low-speed, multi-channel temperature measurement to high-speed, high-accuracy data acquisition. Analogue outputs can be used for accurate control or external indication.

Advanced units with built-in scaling, filtering and alarm functions reduce the need for complex PLC programming. High-accuracy process I/O units support an extensive range of sensors, for fast and accurate data acquisition. All process and temperature I/O units provide isolation between all individual channels.

Ordering information

Points	Type	Ranges	Resolution	Accuracy ¹	Conversion time	Remarks	Connection type	Order code
4	Analogue input	0 to 5 V, 0 to 10 V,	1/8,000	V: 0.2% of PV I: 0.4% of PV	250 µs/point	Offset/gain adjustment, peak hold, moving average, alarms	M3	CS1W-AD041-V1
8	Analogue input	-10 to 10 V, 1 to 5 V, 4 to 20 mA		0.2% of PV			M3	CS1W-AD081-V1
16	Analogue input						2 x MIL (34p.)	CS1W-AD161
4	Analogue output	0 to 5 V, 0 to 10 V, -10 to 10 V, 1 to 5 V, 4 to 20 mA	1/4,000	V: 0.3% of PV I: 0.5% of PV	1 ms/point	Offset/gain adjustment	M3	CS1W-DA041
8	Voltage output	0 to 5 V, 0 to 10 V, -10 to 10 V, 1 to 5 V		0.3% of PV			M3	CS1W-DA08V
8	Current output	4 to 20 mA		0.5% of PV			M3	CS1W-DA08C
4 + 4	Analogue in + output	0 to 5 V, 0 to 10 V, -10 to 10 V, 1 to 5 V (4 to 20 mA input)	1/8,000	Vin: 0.2% of PV I in: 0.4% of PV out: 0.3% of PV	1 ms/point	Offset/gain adjustment, scaling, peak hold, moving average, alarms, output hold	M3	CS1W-MAD44
4	Process input	4 to 20 mA, 0 to 20 mA, 0 to 10 V, -10 to 10 V, 0 to 5 V, -5 to 5 V, 1 to 5 V, 1 to 1.25 V, -1.25 to 1.25 V	1/64,000	0.05% of PV	5 ms/point	Configurable alarms, maintenance functions, user-defined scaling, zero/span adjustment, square root, totaliser.	M3	CS1W-PDC11
8	Process input	-10 to 10 V, 0 to 5 V, 1 to 5 V, 4 to 20 mA	1/16,000	0.3% of PV	62.5 ms/point	Configurable alarms, zero/span adjustment, square root	M3	CS1W-PDC55
4	Thermocouple input	B, E, J, K, L, N, R, S, T, U, WRe5-26, PLII, -100 to 100 mV	1/64,000	0.05% of PV	5 ms/point	Configurable alarms (absolute + rate-of-change), peak hold, maintenance functions	M3	CS1W-PTS11
4	Resistance thermometer input	Pt50, Pt100 JPt100, Ni508.4	1/64,000	0.05% of PV	5 ms/point	Configurable alarms (absolute + rate-of-change), peak hold, maintenance functions	M3	CS1W-PTS12
4	Thermocouple input	B, J, K, L, R, S, T	0.1°C	0.3% of PV	62.5 ms/point	4 configurable alarm outputs	M3	CS1W-PTS51
4	Resistance thermometer input	Pt100, JPt100	0.1°C	0.3% of PV	62.5 ms/point	4 configurable alarm outputs	M3	CS1W-PTS52
8	Thermocouple input	B, J, K, L, R, S, T	0.1°C	0.3% of PV	31.2 ms/point	Configurable alarms per channel	M3	CS1W-PTS55
8	Resistance thermometer input	Pt100, JPt100	0.1°C	0.3% of PV	31.2 ms/point	Configurable alarms per channel	M3	CS1W-PTS56
4	2-Wire transmitter input	1 to 5 V, 4 to 20 mA	1/4,096	0.2% of FS	25 ms/point	Built-in power supply for transmitter, configurable alarms, square root, rate-of-change, etc.	M3	CS1W-PTW01
8	Power transducer input	-1 to 1 mA, 0 to 1 mA	1/4,096	0.2% of FS	25 ms/point	Inrush current limiter, configurable alarms, averaging, etc.	M3	CS1W-PTR01
8	Power transducer input	-100 to 100 mV, 0 to 100 mV	1/4,096	0.2% of FS	25 ms/point	Inrush current limiter, configurable alarms, averaging, etc.	M3	CS1W-PTR02
4	Pulse rate input	20000 pps, voltage, open collector, contact	up to 1/32,000	—	25 ms/point	Averaging, totaliser	M3	CS1W-PPS01

Points	Type	Ranges	Resolution	Accuracy ^{*1}	Conversion time	Remarks	Connection type	Order code
4	Isolated control output	1 to 5 V, 4 to 20 mA	1/4,000	I: 0.1% of FS V: 0.2% of FS	25 ms/point	Output readback, high/low/rate limiting, disconnection alarm, zero/span adjustment	M3	CS1W-PMV01
4	Isolated control output	-10 to 10 V, 0 to 10 V, -5 to 5 V, 0 to 5 V, -1 to 1 V, 0 to 1 V	1/4,000	0.1% of FS	10 ms/point	High/low/rate limiting, output hold, zero/span adjustment	M3	CS1W-PMV02

^{*1} Accuracy for Voltage and Current Inputs/Outputs as percentage of full scale and typical value at 25°C ambient temperature (Consult the operation manual for details)
Accuracy for Temperature Inputs/Outputs as percentage of process value and typical value at 25°C ambient temperature (Consult the operation manual for details)

Note: All analogue I/O units are designated as special I/O units

Add motion control to any CS1 PLC



From simple position measurement to multi-axis synchronised motion control, CS1 offers a full range of units:

- Counter units gather position information from SSI- or incremental encoders. Actual positions are compared with internally stored target values.
- Position control units are used for point-to-point positioning with servo drives or stepper motors. Target data and acceleration/deceleration curves can be adjusted on-the-fly.
- Position- and motion control units equipped with MECHATROLINK-II interface can control multiple drives through a single high-speed link. Message routing through multiple communication layers allows the attached drives to be configured from any point in the control network.

Ordering information

Channels/Axes	Type	Signal type	Unit class	Remarks	Connection type	Order code
2	SSI inputs (absolute position data)	Synchronous serial protocol	Special I/O unit	Baud rate, encoding type, data length, etc. can be set per channel 2 digital outputs, NPN/PNP selectable.	M3 screw	CS1W-CTS21
2	500 kHz Counter	24 V, 12V, line driver	Special I/O unit	4 configurable digital inputs + 4 configurable digital outputs Target values trigger interrupt to CPU	1 × Fujitsu (40 pt)	CS1W-CT021
4					2 × Fujitsu (40 pt)	CS1W-CT041
1	Position control unit	24V open collector	Special I/O unit	500 kpps pulse outputs, inputs for origin, limit switches, stop, interrupt	1 × Fujitsu (40 pt)	CS1W-NC113
2	Position control unit	24V open collector	Special I/O unit	500 kpps pulse outputs, inputs for origin, limit switches, stop, interrupt	1 × Fujitsu (40 pt)	CS1W-NC213
4	Position control unit	24V open collector	Special I/O unit	500 kpps pulse outputs, inputs for origin, limit switches, stop, interrupt	2 × Fujitsu (40 pt)	CS1W-NC413
1	Position control unit	Line driver	Special I/O unit	500 kpps pulse outputs, inputs for origin, limit switches, stop, interrupt	1 × Fujitsu (40 pt)	CS1W-NC133
2	Position control unit	Line driver	Special I/O unit	500 kpps pulse outputs, inputs for origin, limit switches, stop, interrupt	1 × Fujitsu (40 pt)	CS1W-NC233
4	Position control unit	Line driver	Special I/O unit	500 kpps pulse outputs, inputs for origin, limit switches, stop, interrupt	2 × Fujitsu (40 pt)	CS1W-NC433
2	Motion control unit	Analogue	Special I/O unit	Closed loop with automatic trapezoid or S-curve acceleration/deceleration	Snap-on connectors (3M)	CS1W-MC221-V1
4	Motion control unit	Analogue	Special I/O unit	Closed loop with automatic trapezoid or S-curve acceleration/deceleration	Snap-on connectors (3M)	CS1W-MC421-V1

Accessories

Description	Connection type	Order code
Servo relay unit 1-Axis position control unit	–	XW2B-20J6-1B
Servo relay unit 2-Axes position control unit	–	XW2B-40J6-2B
Cable connecting servo relay unit to Position control unit CS1W-NC113, cable length 1 m. For Accurax G5 servo drives.	–	XW2Z-100J-A6
Cable connecting servo relay unit to Position control unit CS1W-NC213/413, cable length 1 m. For Accurax G5 servo drives.	–	XW2Z-100J-A7
Cable connecting servo relay unit to Position control unit CS1W-NC113, cable length 1 m. For SmartStep 2 servo drives.	–	XW2Z-100J-A6
Cable connecting servo relay unit to Position control unit CS1W-NC213/413, cable length 1 m. For SmartStep 2 servo drives.	–	XW2Z-100J-A7
Cable connecting servo relay unit to Position control unit CS1W-NC133, cable length 1 m. For Accurax G5 servo drives.	–	XW2Z-100J-A10
Cable connecting servo relay unit to Position control unit CS1W-NC233/433, cable length 1 m. Accurax G5 servo drives.	–	XW2Z-100J-A11
Cable connecting servo relay unit to Position control unit CS1W-NC133, cable length 1 m. For SmartStep 2 servo drives.	–	XW2Z-100J-A10
Cable connecting servo relay unit to Position control unit CS1W-NC233/433, cable length 1 m. For SmartStep 2 servo drives.	–	XW2Z-100J-A11
Cable connecting servo relay unit to Accurax G5 servo drives, cable length 1 m.	–	XW2Z-100J-B25
Cable connecting servo relay unit to SmartStep 2 servo drive, cable length 1 m.	–	XW2Z-100J-B29

Note: For General-purpose I/O Cables and Terminal Blocks, see page 76



Open to any communication, standard or user-defined

CS1 provides both standardised open networks interfaces, and cost efficient, high-speed proprietary network links. Datalinks between PLCs, or to higher-level information systems can be made using Serial or Ethernet links, or the easy-to-use Controller Link network.

Omron supports the 2 major field networks, DeviceNet and PROFIBUS-DP. For high-speed field I/O, Omron's own CompoBus/S offers an unsurpassed ease of installation. Fully user-configurable serial and CAN-based communication can be used to emulate a variety of application-specific protocols. EtherNet/IP units provide data link functions to share large amounts of data between PLCs. The PROFINET-IO controller together with the SmartSlice modular I/O system offers ethernet-based I/O with controller- and network redundancy.

Ordering information

Type	Ports	Protocols	Unit class	Remarks	Connection type	Order code
Serial	2 × RS-232C	CompoWay/F, Host Link, NT link, Modbus, User-defined	CPU bus unit	–	9-pin D-Sub	CS1W-SCU21-V1
Serial	2 × RS-232C/RS-485	CompoWay/F, Host Link, NT link, Modbus, User-defined	CPU bus unit	–	9-pin D-Sub	CS1W-SCU31-V1
Serial	2 × RS-232C	CompoWay/F, Host Link, NT link, Modbus, User-defined	CPU option board	–	9-pin D-Sub	CS1W-SCB21-V1
Serial	1 × RS-232C + 1 × RS-422/RS-485	CompoWay/F, Host Link, NT link, Modbus, User-defined	CPU option board	–	9-pin D-Sub	CS1W-SCB41-V1
GP-IB	Master/Slave selectable	GP-IB instrument communication	Special I/O unit	–	GP-IB	CS1W-GPI01
Ethernet	1 × 100 Base-Tx	UDP, TCP/IP, FTP server, SMTP (e-mail), SNMP (time adjust), FINS routing, socket service	CPU bus unit	–	RJ45	CS1W-ETN21
Controller link	2-wire twisted pair	Omron proprietary	CPU bus unit	–	2-wire screw + GND	CS1W-CLK23
	Optical HPCF				2 × HPCF connector	CS1W-CLK13
	Optical graded-index fiber				4 × ST connector	CS1W-CLK53
EtherNet/IP	1 × 100 Base-Tx	EtherNet/IP, UDP, TCP/IP, FTP server, SNMP, SNMP	CPU Bus unit	31 mm	RJ45	CS1W-EIP21
DeviceNet	1 × CAN	DeviceNet	CPU bus unit	–	5-p detachable	CS1W-DRM21-V1
CompoNet	4-wire, data + power to slaves (Master)	CompoNet (CIP-based)	Special I/O unit	–	4-p detachable IDC or screw	CS1W-CRM21
PROFIBUS-DP	1 × RS-485 (Master)	DP, DPV1	CPU bus unit	–	9-pin D-Sub	CS1W-PRM21
CAN	1 × CAN	CANopen, User-defined	CPU bus unit	–	5-p detachable	CS1W-CORT21
PROFINET IO	1 × 100 Base-Tx PROFINET IO controller	FINS UDP	CPU bus unit	–	RJ45	CS1W-PNT21
PROFIBUS-DP	1 × RS-485 (Slave)	DP	C200H special I/O unit	C200H units cannot be used on CS1D systems	9-pin D-Sub	C200HW-PRT21
CompoBus/S	2-wire (Master)	Omron proprietary	C200H special I/O unit		2-wire screw + 2-wire power	C200HW-SRM21-V1

Accessories

Description	Connection type	Order code
RS-232C to RS-422/RS-485 signal converter. Mounts directly on serial port.	9-pin D-sub to screw clamp terminals	CJ1W-CIF11
Controller link PCI board with support software	PCI, wired CLK	3G8F7-CLK23-E
Controller link PCI board with support software	PCI, HPCF connectors	3G8F7-CLK13-E
Controller link PCI board with support software	PCI, ST connectors	3G8F7-CLK53-E
Controller link repeater unit (wire to wire)	Screw - Screw	CS1W-RPT01
Controller link repeater unit (wire to HPCF fiber)	Screw - HPCF connector	CS1W-RPT02
Controller link repeater unit (wire to graded-index glass fiber)	Screw - ST connector	CS1W-RPT03
PROFIBUS DP to RS-422/RS-485 Serial Gateway. User-configurable, with Omron protocols built-in.	9-pin D-sub to screw clamp terminals	PRT1-SCU11
PROFINET IO + ModBus/TCP to Modbus/RTU (RS-485) Gateway.	3 × RJ45 to screw clamp terminals	EJ1N-HFU-ETN

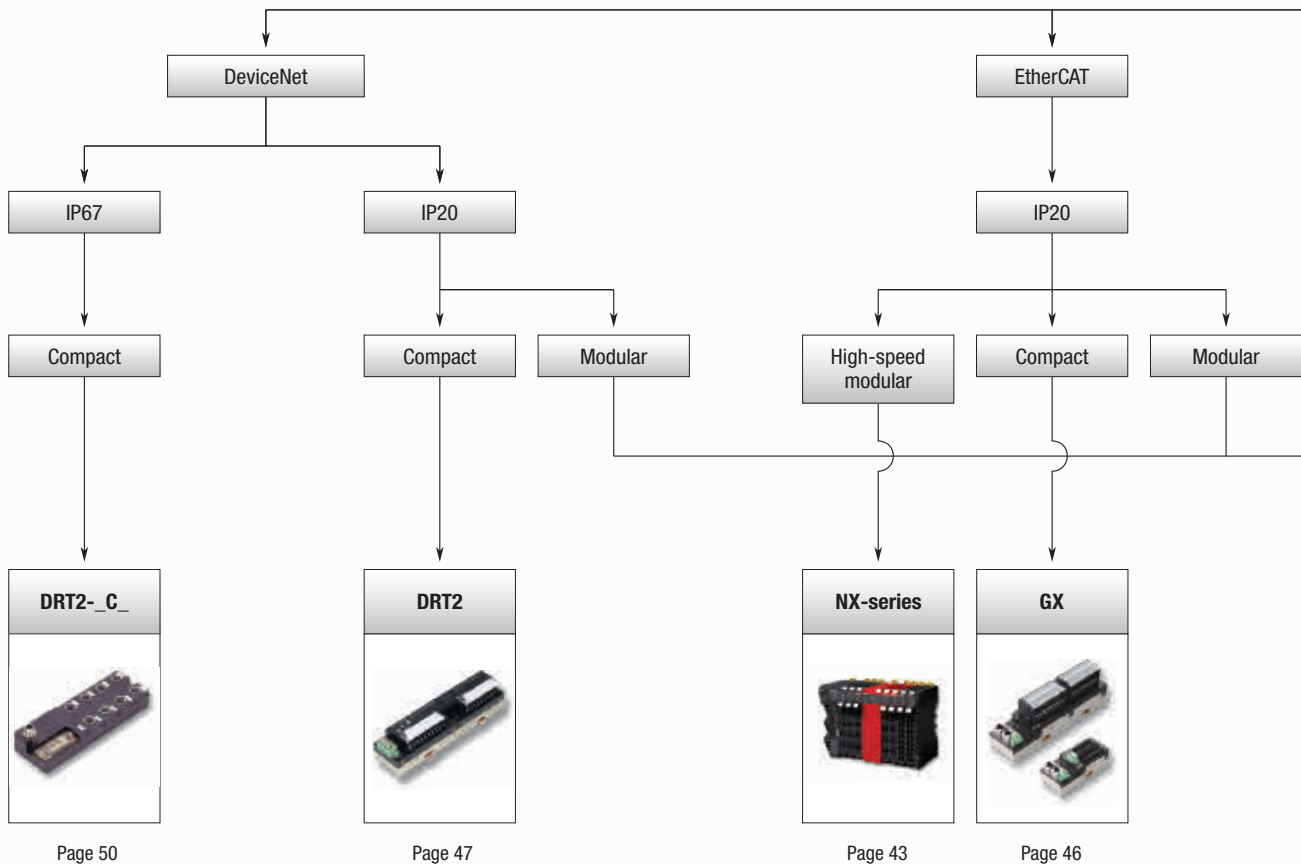
Note: For Ethernet Cables and Accessories, see page 85






I/O SYSTEMS TO MEET EVERY NEED




Choose by network, style and flexibility

Compact remote I/O units combine a fixed number of I/O points in a space-saving housing. Built-in smart monitoring functions for voltage level, broken wire, actuator and cycle time will assist in planning preventive maintenance for machines and eliminating costly downtime. Compact smart slaves are available for the open EtherCAT, DeviceNet and CompoNet networks, and Omron's CompoBus/S offers a more simple and cost-efficient solution.

Modular remote I/O systems offer the possibility to install just the right number and type of I/O's where you need them. I/O modules range from basic and economical digital I/O's to high-performance modules with intelligent functions. With a choice of communication couplers for various open networks, you can adapt to existing installations and end-user demands, or make the right trade-off between performance and ease-of-use. Besides EtherCAT as main machine automation network, Omron offers connectivity to DeviceNet, CompoNet, PROFINET IO, PROFIBUS DP, and MECHATROLINK-II.



	Modular I/O		Compact I/O		
					
Model	NX-series	SmartSlice	GX	DRT2	CRT1
Network connection	EtherCAT in- and outgoing connections by RJ45 ethernet plug	DeviceNet, CompoNet, PROFIBUS DP, PROFINET I/O, EtherCAT, MECHATROLINK-II	EtherCAT in- and outgoing connections by RJ45 ethernet plug	DeviceNet with open-style push-in terminal block	CompoNet, unshielded 4-wire flat cable and IDC connectors, or general-purpose 2-wire cable by screw terminals
I/O types	Digital standard and high-speed synchronous, analogue standard and high-speed, temperature, encoders, pulse output	Digital I/O, analogue I/O, temperature inputs, high-speed counter with control outputs	8 DI + 8 DO 16 DI+extension 16 DO+extension 16 relay out 4 AI (V/I) 2 AO (V/I) Incremental encoder (24 V/line driver)	8/16 DI+extension, 8/16 DO+extension, 8 DI + 8 DO 16 relay out, 4 AI (V/I, TC, Pt100), 2 AO (V/I),	8/16 DI+extension, 8/16 DO+extension, 8 DI + 8 DO 4 AI, 2 AO, 2 DI, 2 DO
I/O Connection technology	Push-in wiring on removable terminal block	Push-in wiring on removable terminal block	M3 screw terminals (1- or 3-wire DI)	M3 screw terminals (1- or 3-wire DI)	M3 screw terminals
Smart features	Synchronous I/O over EtherCAT, timestamping, safety I/O	I/O and power supply diagnostics, operation timers and counters per I/O point	automatic or fixed address allocation	I/O and power supply diagnostics, operation timers and counters per I/O point, analogue value calculations and alarms	I/O and power supply diagnostics, operation timers and counters for each I/O point, analogue value calculations and alarms
Ingress Protection class	IP20 (DIN rail mounting in cabinets)	IP20 (DIN rail mounting in cabinets)	IP20 (DIN rail mounting in cabinets)	IP20 (DIN rail mounting in cabinets)	IP20 (DIN rail mounting in cabinets)
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	Compact I/O	Field I/O	
			
Model	SRT2	DRT2- C_	SRT2- C_
Network connection	CompoBus/S, (2-wire + power) by M3 screw terminals	DeviceNet with M12 micro connector	CompoBus/S, by 4-wire M12 connector, unshielded
I/O types	4/8/16 DI, 4/8/16 DO, 8/16 relay out, 4 AI (V/I) 2 AO (V/I)	8/16 DI, 8/16 DO, 8DI + 8 DO	4/8 DI, 4/8 DO
I/O Connection technology	M3 screw terminals (1- or 3-wire DI)	M12, 1 or 2 I/O signals per connector, 7/8" I/O Power connector	M12 connectors, one I/O point per connector
Smart features	I/O isolation, status indication	I/O and power supply diagnostics, operation timers and counters per I/O point	I/O isolation, status indication
Ingress Protection class	IP20 (DIN rail mounting in cabinets)	IP67, flat mounting by two M5 screws	IP67, flat mounting by three M5 screws
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Performance and practicality for machine control

Modern machine control requires system-wide synchronisation of motion axes with microsecond accuracy. The NX I/O system offers this timing accuracy and repeatability for a wide variety of in- and outputs. Its ultra-fast internal bus system is synchronised with the Distributed Clock of the EtherCAT network, resulting in system-wide deterministic I/O operation.

NX-series I/O covers a full range of units, including standard and high-speed digital I/O's, various performance levels in analog I/O, encoder inputs and pulse outputs. The series continues to expand with time-stamped I/O, safety I/O and application-specific modules.

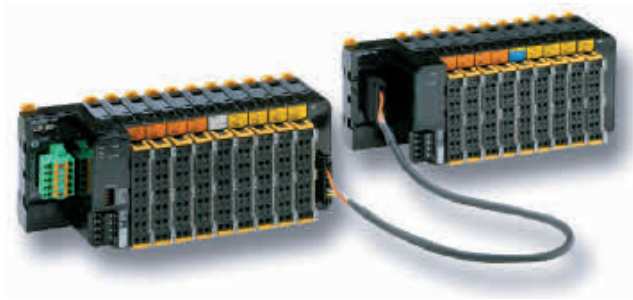
- Ideal match with Sysmac machine automation controllers
- Synchronous I/O updates, system-wide, with less than 1 µs jitter
- High density: up to 16 digital or 8 analog signals in 12 mm width
- Removable wiring terminals for easy system assembly and testing

Ordering information

Module type	Signal type	Performance	Channels	Width	Order code
Communication coupler	EtherCAT slave	Up to 63 I/O units Max. 1,024 bytes in + 1,024 bytes out Supports Distributed Clock Maximum I/O power supply 4 A	2	46 mm	NX-ECC201
		Up to 63 I/O units Max. 1,024 bytes in + 1,024 bytes out Supports Distributed Clock Maximum I/O power supply 10 A			NX-ECC202
Safety controller	Safety over EtherCAT protocol	For up to 256 Safety I/O points	32	30 mm	NX-SL3300
		For up to 1,024 Safety I/O points	128	30 mm	NX-SL3500
Digital input	NPN type	Standard (< 0.4 ms On/Off-delay)	4	12 mm	NX-ID3317
			8	12 mm	NX-ID4342
			16	12 mm	NX-ID5342
		High-speed (< 0.1 µs On/Off-delay)	4	12 mm	NX-ID3343
			4	12 mm	NX-ID3344
			4	12 mm	NX-ID3417
	PNP type	Standard (< 0.4 ms On/Off-delay)	4	12 mm	NX-ID3417
			8	12 mm	NX-ID4442
			16	12 mm	NX-ID5442
		High-speed (< 0.1 µs On/Off-delay)	4	12 mm	NX-ID3443
			4	12 mm	NX-ID3444
			4	12 mm	NX-ID3444
Safety inputs (PNP type)	with connectivity to Omron safety devices	4	12 mm	NX-SIH400	
	High-density unit	8	12 mm	NX-SID800	
AC input, 240 VAC	Individually isolated inputs	4	12 mm	NX-IA3117	
Digital output	NPN type	Standard (< 0.8 ms On/Off-delay)	4	12 mm	NX-OD3121
			8	12 mm	NX-OD4121
			16	12 mm	NX-OD5121
		High-speed (< 0.3 µs On/Off-delay)	4	12 mm	NX-OD3153
			2	12 mm	NX-OD2154
			2	12 mm	NX-OD2154
	PNP type	Standard (< 1.0 ms On/Off-delay)	4	12 mm	NX-OD3256
			8	12 mm	NX-OD4256
			16	12 mm	NX-OD5256
		High-speed (< 0.3 µs On/Off-delay)	4	12 mm	NX-OD3257
			2	12 mm	NX-OD2258
			2	12 mm	NX-OD2258
	Safety outputs (PNP type)	0.5 A per point	4	12 mm	NX-SOD400
		2.0 A per point	2	12 mm	NX-SOH200
Relay, 250 VAC, 2 A	Normally Open (SPST)	2	12 mm	NX-OC2633	
	Normally Open + Normally Closed (SPDT)	2	12 mm	NX-OC2733	
Encoder input	Incremental encoder	PNP type, 500 kHz	1	12 mm	NX-EC0122
			2	12 mm	NX-EC0222
		Line driver, 4 MHz	1	24 mm	NX-EC0142
	SSI encoder	Synchronous serial, 2 MHz	1	12 mm	NX-ECS112
			2	12 mm	NX-ECS212
Pulse output	Pulse Up/Down, Pulse + Direction	PNP type, 500 kHz	1	12 mm	NX-PG0122

Module type	Signal type	Performance	Channels	Width	Order code
Analog input	4 to 20 mA single ended	1/8,000 resolution 250 µs/channel	2	12 mm	NX-AD2203
			4	12 mm	NX-AD3203
			8	12 mm	NX-AD4203
	4 to 20 mA differential	1/8,000 resolution 250 µs/channel	2	12 mm	NX-AD2204
			4	12 mm	NX-AD3204
			8	12 mm	NX-AD4204
		1/30,000 resolution 10 µs/channel	2	12 mm	NX-AD2208
			4	12 mm	NX-AD3208
			8	12 mm	NX-AD4208
	±10 V single ended	1/8,000 resolution 250 µs/channel	2	12 mm	NX-AD2603
			4	12 mm	NX-AD3603
			8	12 mm	NX-AD4603
	±10 V differential	1/8,000 resolution 250 µs/channel	2	12 mm	NX-AD2604
			4	12 mm	NX-AD3604
			8	12 mm	NX-AD4604
		1/30,000 resolution 10 µs/channel	2	12 mm	NX-AD2608
4			12 mm	NX-AD3608	
8			12 mm	NX-AD4608	
Temperature sensor input	Thermocouple type B, E, J, K, L, N, R, S, T, U, WRe5-26, PL II	0.1°C resolution 250 ms/unit	2	12 mm	NX-TS2101
			4	24 mm	NX-TS3101
		0.01°C resolution 10 ms/unit	2	12 mm	NX-TS2102
			4	24 mm	NX-TS3102
	0.001°C resolution 60 ms/unit	2	12 mm	NX-TS2104	
		4	24 mm	NX-TS3104	
	RTD type Pt100 (3-wire), Pt1000, Ni508.4	0.1°C resolution 250 ms/unit	2	12 mm	NX-TS2201
			4	24 mm	NX-TS3201
		0.01°C resolution 10 ms/unit	2	12 mm	NX-TS2202
			4	24 mm	NX-TS3202
0.001°C resolution 60 ms/unit	2	12 mm	NX-TS2204		
	4	24 mm	NX-TS3204		
Analog output	4 to 20 mA	1/8,000 resolution 250 µs/channel	2	12 mm	NX-DA2203
			4	12 mm	NX-DA3203
		1/30,000 resolution 10 µs/channel	2	12 mm	NX-DA2205
			4	12 mm	NX-DA3205
	±10 V	1/8,000 resolution 250 µs/channel	2	12 mm	NX-DA2603
			4	12 mm	NX-DA3603
		1/30,000 resolution 10 µs/channel	2	12 mm	NX-DA2605
			4	12 mm	NX-DA3605
Power unit	NX bus power feed unit, 24 VDC input, non-isolated			12 mm	NX-PD1000
	I/O power feed unit, for separation of power groups, maximum capacity 4 A			12 mm	NX-PF0630
	I/O power feed unit, for separation of power groups, maximum capacity 10 A			12 mm	NX-PF0730
	I/O power connection unit, 16 × IOV			12 mm	NX-PC0020
	I/O power connection unit, 16 × IOG			12 mm	NX-PC0010
	I/O power connection, 8 × IOV + 8 × IOG			12 mm	NX-PC0030
System unit/Accessories	Grounding terminal, 16 points			12 mm	NX-TBX01
	End cover (included with Communication Coupler)			12 mm	NX-END01
	Replacement front connector with 8 wiring terminals (A+B)			12 mm	NX-TBA082
	Replacement front connector with 8 wiring terminals (A+B with FG)			12 mm	NX-TBC082
	Replacement front connector with 12 wiring terminals (A+B)			12 mm	NX-TBA122
	Replacement front connector with 12 wiring terminals (C+D)			12 mm	NX-TBB122
	Replacement front connector with 16 wiring terminals (A+B)			12 mm	NX-TBA162
	Replacement front connector with 16 wiring terminals (C+D)			12 mm	NX-TBB162
	Replacement front connector with 16 wiring terminals (A+B with FG)			12 mm	NX-TBC162
	DIN rail insulation spacers (one set of 3 pcs)				NX-AUX01
	Keying pins to prevent mismatch of unit and terminal block (one set for 10 units)				NX-AUX02

Note: For Ethernet cables and Accessories, see page 85



The smartest modular I/O system

Omron's SmartSlice I/O system is compact, intelligent and easy. When used with Omron's CS1/CJ1 DeviceNet master units it is plug-and-work, no configuration tool is required. By using built-in functions such as pre-scaling, totalising, differentiation and alarming in analogue I/O units, PLC programming can be minimised. Preventive maintenance data can be accessed using CX-Integrator software, standard PLC function blocks or NS-series Smart Active Parts.

- Most compact in the market (84 mm high)
- Easy set-up, backup and restore functions
- Diagnostics and preventive maintenance data at I/O level
- Detachable terminal blocks allow hot-swapping without re-wiring
- 3-wire connection with 'push-in' technology, no screwdriver required for installation

Ordering information

Model	Function	Specifications	Size in mm (HxWxD)	Order code
Interface units	DeviceNet interface unit	For up to 64 I/O units	84x58x70	GRT1-DRT
	CompoNet interface unit	For up to 64 I/O units (limited to 32 byte in + 32 byte out)	84x58x70	GRT1-CRT
	PROFIBUS-DP interface unit	For up to 64 I/O units	84x58x70	GRT1-PRT
	PROFINET-IO interface unit	For up to 64 I/O units	84x58x70	GRT1-PNT
	MECHATROLINK-II interface unit	For up to 64 I/O units (slave to Trajexia motion controller)	84x58x70	GRT1-ML2
	EtherCAT interface unit	For up to 64 I/O units (slave to Trajexia and Sysmac controller)	84x58x70	GRT1-ECT
	End plate	One unit required per bus interface	84x20x58	GRT1-END
	End plate with memory function	Supports toolless replacement of PROFINET-IO interface unit	84x20x58	GRT1-END-M
I/O units	4 NPN inputs	24 VDC, 6 mA, 3-wire connection	84x15x74	GRT1-ID4
	4 PNP inputs	24 VDC, 6 mA, 3-wire connection	84x15x74	GRT1-ID4-1
	8 NPN inputs	24 VDC, 4 mA, 1-wire connection + 4xG	84x15x74	GRT1-ID8
	8 PNP inputs	24 VDC, 4 mA, 1-wire connection + 4xV	84x15x74	GRT1-ID8-1
	4 AC inputs	110 VAC, 2-wire connection	84x15x74	GRT1-IA4-1
	4 AC inputs	230 VAC, 2-wire connection	84x15x74	GRT1-IA4-2
	4 NPN outputs	24 VDC, 500 mA, 2-wire connection	84x15x74	GRT1-OD4
	4 PNP outputs	24 VDC, 500 mA, 2-wire connection	84x15x74	GRT1-OD4-1
	4 PNP outputs with short-circuit protection	24 VDC, 500 mA, 3-wire connection	84x15x74	GRT1-OD4G-1
	4 PNP outputs with short-circuit protection	24 VDC, 2 A, 2-wire connection	84x15x74	GRT1-OD4G-3
	8 NPN outputs	24 VDC, 500 mA, 1-wire connection + 4xV	84x15x74	GRT1-OD8
	8 PNP outputs	24 VDC, 500 mA, 1-wire connection + 4xG	84x15x74	GRT1-OD8-1
	8 PNP outputs with short-circuit protection	24 VDC, 500 mA, 1-wire connection + 4xG	84x15x74	GRT1-OD8G-1
	2 relay outputs	240 VAC, 2A, normally-open contacts	84x15x74	GRT1-ROS2
	60 kHz Counter unit, NPN	A+B encoder inputs + 1 Z/control input + 1 output (NPN-type)	84x15x74	GRT1-CT1
	60 kHz Counter unit, PNP	A+B encoder inputs + 1 Z/control input + 1 output (PNP-type)	84x15x74	GRT1-CT1-1
	100 kHz Counter / Positioner unit	A+B+Z encoder inputs (line driver or 24 V selectable) + 1 control input + 2 outputs (PNP-type)	84x15x74	GRT1-CP1-L
	2 analogue inputs, current/voltage	±10 V, 0-10 V, 0-5 V, 1-5 V, 0-20 mA, 4-20 mA	84x15x74	GRT1-AD2
	2 analogue outputs, voltage	±10 V, 0-10 V, 0-5 V, 1-5 V	84x15x74	GRT1-DA2V
	2 analogue outputs, current	0-20 mA, 4-20 mA	84x15x74	GRT1-DA2C
	2 Pt100 inputs	Pt100, 2-wire or 3-wire connection	84x15x74	GRT1-TS2P
	2 Pt1000 inputs	Pt1000, 2-wire or 3-wire connection	84x15x74	GRT1-TS2PK
2 Thermocouple inputs	Types B, E, J, K, N, R, S, T, U, W, PL2, with cold junction compensation	84x15x74	GRT1-TS2T	
Model	Description		Size in mm (HxWxD)	Order code
Other units	I/O power feed unit, separates power supply between groups of I/O units		84x15x74	GRT1-PD2
	I/O power feed unit with electronic overload protection, separates power supply between groups of I/O units		84x15x74	GRT1-PD2G
	I/O power feed and distribution unit, separates power supply between groups of I/O units, 8xV + 4xG		84x15x74	GRT1-PD8
	I/O power feed and distribution unit, separates power supply between groups of I/O units, 4xV + 8xG		84x15x74	GRT1-PD8-1
	I/O power connection unit, 8xV + 4xG		84x15x74	GRT1-PC8
	I/O power connection unit, 4xV + 8xG		84x15x74	GRT1-PC8-1
	Turnback unit, right-hand side		84x20x58	GRT1-TBR
	Turnback unit, left-hand side		84x58x70	GRT1-TBL
	Turnback cable, one meter		1 m	GCN2-100

Accessories

Description	Order code
Replacement front connectors, pack of 5 pcs.	GRT1-BT1-5
PROFIBUS-DP connector, 9-pin D-sub	PROFIBUS Connector 839550
PROFIBUS-DP connector, 9-pin D-sub, with bus termination	PROFIBUS Term. Conn. 846086
PROFINET RJ45 connector	IE-PS-RJ45-FH-BK
CompoNet connectors	See page 48



When speed counts: EtherCAT I/O

EtherCAT is an extremely fast industrial automation network, which uses standard ethernet cabling. It makes very efficient use of the standard Ethernet transmission frame, with each node accessing the entire frame on the fly. This reduces the delay in each slave to microsecond level.

Its deterministic nature makes EtherCAT extremely suitable for motion control. Omron provides PLC-based as well as stand-alone motion control solutions based on EtherCAT.

The GX-series I/O units provide the basic in- and outputs for such systems, including high-speed encoder inputs which can feed position information into the controller.

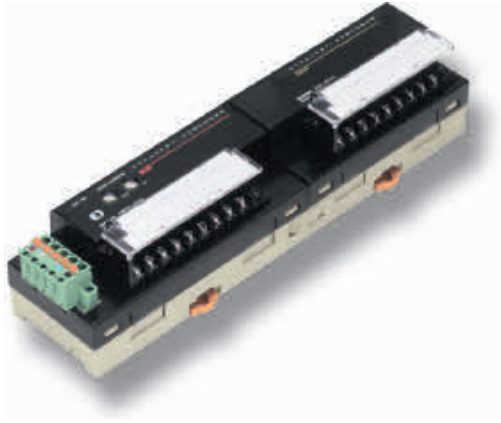
Ordering information

Unit Type	Specification	Size in mm (HxWxD)	Remarks	Order code
16-point NPN input unit	24 VDC, 6 mA per point	52 x 135 x 57	Expandable with one XWT unit	GX-ID1611
16-point NPN input unit	24 VDC, 6 mA per point	52 x 200 x 69	3-tier connection for direct sensor wiring	GX-ID1612
16-point PNP input unit	24 VDC, 6 mA per point	52 x 135 x 57	Expandable with one XWT unit	GX-ID1621
16-point PNP input unit	24 VDC, 6 mA per point	52 x 200 x 69	3-tier connection for direct sensor wiring	GX-ID1622
16-point relay output unit	2 A per point, max. 8 A per common	52 x 160 x 58	with easy-to-replace relays, expandable with one XWT unit	GX-OC1601
16-point NPN output unit	24 VDC, 0.5 A per point	52 x 135 x 57	Expandable with one XWT unit	GX-OD1611
16-point NPN output unit	24 VDC, 0.5 A per point	52 x 200 x 69	3-tier connection for direct sensor wiring	GX-OD1612
16-point PNP output unit	24 VDC, 0.5 A per point	52 x 135 x 57	Expandable with one XWT unit	GX-OD1621
16-point PNP output unit	24 VDC, 0.5 A per point	52 x 200 x 69	3-tier connection for direct sensor wiring	GX-OD1622
8-point input + 8-point output unit (NPN)	24 VDC, input 6 mA, output 0.5 A per point	52 x 135 x 57	–	GX-MD1611
8-point input + 8-point output unit (NPN)	24 VDC, input 6 mA, output 0.5 A per point	52 x 200 x 69	3-tier connection for direct sensor wiring	GX-MD1612
8-point input + 8-point output unit (PNP)	24 VDC, input 6 mA, output 0.5 A per point	52 x 135 x 57	–	GX-MD1621
8-point input + 8-point output unit (PNP)	24 VDC, input 6 mA, output 0.5 A per point	52 x 200 x 69	3-tier connection for direct sensor wiring	GX-MD1622
4-Channel analogue input unit	1 to 5 V, 1 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA,	52 x 135 x 57	Resolution 1/6000, conversion time 4 ms (4 inputs)	GX-AD0471
2-Channel analogue output unit	1 to 5 V, 1 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA,	52 x 135 x 57	Resolution 1/6000, conversion time 2 ms (2 outputs)	GX-DA0271
1-Channel incremental encoder input (24V)	Open collector, up to 125 kHz	52 x 215 x 69	A, B, Z, 2 x Latch, Reset inputs	GX-EC0211
1-Channel incremental encoder input (line driver)	RS422 signal level, up to 1 MHz	52 x 215 x 69	A, B, Z, 2 x Latch, Reset inputs	GX-EC0241

Expansion units

Unit Type	Specification	Size in mm (HxWxD)	Remarks	Order code
8-point PNP input expansion unit	24 VDC, 6 mA per point	50x66x50	Expansion unit for GX, DRT2 and CRT1 series	XWT-ID08-1
16-point PNP input expansion unit	24 VDC, 6 mA per point	50x94x50	Expansion unit for GX, DRT2 and CRT1 series	XWT-ID16-1
8-point PNP output expansion unit	24 VDC, 0.5 A per point	50x66x50	Expansion unit for GX, DRT2 and CRT1 series	XWT-OD08-1
16-point PNP output expansion unit	24 VDC, 0.5 A per point	50x94x50	Expansion unit for GX, DRT2 and CRT1 series	XWT-OD16-1
3 port branching unit	24 VDC, 3 x RJ45	90x25x78	EtherCAT junction box for T-branching	GX-JC03
6 port branching unit	24VDC, 6 x RJ45	90x48x78	EtherCAT junction box for star branching	GX-JC06

Note: To order models with NPN (sinking) outputs and corresponding inputs (+V common), omit the "-1" from the model code.



Smart DeviceNet I/O

Compact DeviceNet I/O units with extensive diagnostic functions. Data regarding power supply status, I/O response times, operation counters and on-time are continuously recorded and checked against user-defined limits. Any deviation is reported to the control system, as indication to perform machine maintenance and prevent unplanned downtime. Smart DeviceNet I/Os are supported by PLC Function Blocks and HMI Smart Active Parts, allowing program-less visualisation and monitoring from the CJ1 PLCs and NS operator terminals.

- Compact size IP20 housing
- Expandable digital I/Os
- Built-in diagnostics and preventive maintenance functions
- Detachable I/O terminal blocks
- Analogue I/O with data pre-processing and alarm functions

Ordering information

Unit type	Specifications	Size in mm (HxWxD)	Remarks	Order code
8-point PNP input unit	24 VDC, 6 mA per point	50x115x50	–	DRT2-ID08-1
16-point PNP input unit	24 VDC, 6 mA per point	50x115x50	Expandable with one XWT unit	DRT2-ID16-1
16-point PNP input unit	24 VDC, 6 mA per point	50x180x58	3-tier connection for direct sensor wiring	DRT2-ID16TA-1
8-point PNP output unit	24 VDC, 0.5 A per point	50x115x50	–	DRT2-OD08-1
16-point PNP output unit	24 VDC, 0.5 A per point	50x115x50	Expandable with one XWT unit	DRT2-OD16-1
16-point PNP output unit	24 VDC, 0.5 A per point	50x180x58	3-tier connection for direct actuator wiring	DRT2-OD16TA-1
16-point relay output unit	2 A per point, max. 8 A per common	50x125x52	with easy-to-replace relays, expandable with one XWT unit	DRT2-ROS16
8-point input + 8-point output unit (PNP)	24 VDC, input 6 mA, output 0.5 A per point	50x115x50	–	DRT2-MD16-1
8-point input + 8-point output unit (PNP)	24 VDC, input 6 mA, output 0.5 A per point	50x180x58	3-tier connection for direct sensor/actuator wiring	DRT2-MD16TA-1
4-Channel analogue input unit	0 to 5 V, 1 to 5 V, 0 to 10 V, -10 to 10 V, 0 to 20 mA, 4 to 20 mA	50x115x50	Resolution 1/6000, conversion time 4 ms (4 inputs)	DRT2-AD04
4-Channel analogue input unit	1 to 5 V, 1 to 5 V, 0 to 10 V, -10 to 10 V, 0 to 20 mA, 4 to 20 mA	50x115x50	Resolution 1/30000, conversion time 250 ms (4 inputs)	DRT2-AD04H
2-Channel analogue output unit	0 to 5 V, 1 to 5 V, 0 to 10 V, -10 to 10 V, 0 to 20 mA, 4 to 20 mA	50x115x50	Resolution 1/6000, conversion time 2 ms (2 outputs)	DRT2-DA02
4-Channel temperature input unit	Platinum Resistance Thermometer types Pt100, JPt100	50x115x50	0.3% accuracy, conversion time 250 ms (4 inputs)	DRT2-TS04P
4-Channel temperature input unit	Thermocouple types R, S, K, J, T, B, L, E, U, N, W, and PL2	50x115x50	0.3% accuracy, conversion time 250 ms (4 inputs)	DRT2-TS04T

Expansion units

Unit type	Specifications	Size in mm (HxWxD)	Remarks	Order code
8-point PNP input expansion unit	24 VDC, 6 mA per point	50x66x50	Expansion unit for GX, DRT2 and CRT1 series	XWT-ID08-1
16-point PNP input expansion unit	24 VDC, 6 mA per point	50x94x50	Expansion unit for GX, DRT2 and CRT1 series	XWT-ID16-1
8-point PNP output expansion unit	24 VDC, 0.5 A per point	50x66x50	Expansion unit for GX, DRT2 and CRT1 series	XWT-OD08-1
16-point PNP output expansion unit	24 VDC, 0.5 A per point	50x94x50	Expansion unit for GX, DRT2 and CRT1 series	XWT-OD16-1

Note: To order models with NPN (sinking) outputs and corresponding inputs (+V common), omit the "-1" from the model code.

Accessories

Type	Order code
Power supply tap with 2 fuses, 2 bus connectors and termination resistor	DCN1-1P
T-branch tap with 3 bus connectors (screw clamp) and terminating resistor	DCN1-1C
T-branch tap with 3 bus connectors (screwless)	DCN1-1NC
T-branch tap with 5 bus connectors (screw clamp) and terminating resistor	DCN1-3C
T-branch tap with 5 bus connectors (screwless)	DCN1-3NC
Terminating resistor with screw terminals	DRS1-T

Smart CompoNet I/O



Combining the smart features of DRT2 DeviceNet I/O and the speed and ease of use of CompoBus/S, CompoNet is ideal for high-speed machine control with a flexible and expandable architecture. The special flat cable and IDC connectors make installation quick and easy. The use of repeaters allows wide-area networks with free topology, ideal for conveyor- and warehouse automation.

- Compact size IP20 housing
- Expandable digital I/Os with detachable terminal blocks
- Easy network wiring with IDC connections
- Built-in diagnostics and preventive maintenance functions
- Analogue I/O with data pre-processing and alarm functions

Ordering information

Unit type	Specifications	Size in mm (HxWxD)	Remarks	Order code
4-point PNP input unit	24 VDC, 6 mA per point	24x80x20	Screwless I/O connector, power supply via CompoNet cable	CRT1B-ID04SL-1-300
8-point PNP input unit	24 VDC, 6 mA per point	50x115x57.6	Screw terminals, common power terminals per 8 points	CRT1-ID08-1
8-point PNP input unit	24 VDC, 6 mA per point	50x96x60	3 push-in terminals per I/O point (signal + power)	CRT1-ID08SL-1
16-point PNP input unit	24 VDC, 6 mA per point	50x115x50	Expandable with one XWT unit.	CRT1-ID16-1
16-point PNP input unit	24 VDC, 6 mA per point	52x180x69	3 terminals per I/O point (for power distribution)	CRT1-ID16TA-1
4-point PNP output unit	24 VDC, 0.2 A per point	24x80x20	Screwless I/O connector, power supply via CompoNet cable	CRT1B-OD04SL-1-300
8-point PNP output unit	24 VDC, 0.5 A per point	50x115x57.6	Screw terminals, common power terminals per 8 points	CRT1-OD08-1
8-point PNP output unit	24 VDC, 0.5 A per point	50x96x60	3 push-in terminals per I/O point (signal + power)	CRT1-OD08SL-1
16-point PNP output unit	24 VDC, 0.5 A per point	50x115x50	Expandable with one XWT unit.	CRT1-OD16-1
16-point PNP output unit	24 VDC, 0.5 A per point	52x180x69	3 terminals per I/O point (for power distribution)	CRT1-OD16TA-1
8-point SSR output unit	265 V AC, 0.3 A per point	50x95x57.6	Screw terminals, common power terminals per 8 points	CRT1-ROF08
8-point relay output unit	250 VAC, 2 A per point, 8 A per common	50x95x57.6	Screw terminals, common power terminals per 8 points	CRT1-ROS08
16-point relay output unit	250 VAC, 2 A per point, 8 A per common	50x140x57.6	8 outputs per common	CRT1-ROS16
2-point input + 2-point output unit, PNP	24 VDC, 0.1 A per point	24x80x20	Screwless I/O connector, power supply via CompoNet cable	CRT1-MD04SL-1-300
8-point input + 8-point output unit, PNP	24 VDC, 0.5 A per point	50x115x57.6	Screw terminals, common power terminals	CRT1-MD16-1
8-point input + 8-point output unit, PNP	24 VDC, 0.5 A per point	50x170x60	3 push-in terminals per I/O point (signal + power)	CRT1-MD16SL-1
8-point input + 8-point output unit PNP	24 VDC, 0.5 A per point	52x180x69	3 terminals per I/O point (for power distribution)	CRT1-MD16TA-1
4-Channel analogue input unit	0 to 5 V, 1 to 5 V, 0 to 10 V, -10 to 10 V, 0 to 20 mA, 4 to 20 mA	50x115x50	Resolution 1/6000, conversion time 4 ms (4 inputs)	CRT1-AD04
2-Channel analogue output unit	0 to 5 V, 1 to 5 V, 0 to 10 V, -10 to 10 V, 0 to 20 mA, 4 to 20 mA	50x115x50	Resolution 1/6000, conversion time 2 ms (2 outputs)	CRT1-DA02
4-Channel Temperature input unit	Platinum Resistance Thermometer type Pt100	50x115x50	0.3% accuracy, conversion time 250 ms (4 inputs)	CRT1-TS04P
4-Channel Temperature input unit	Thermocouple types R, S, K, J, T, B, L, E, U, N, W and PL2	50x115x50	0.3% accuracy, conversion time 250 ms (4 inputs)	CRT1-TS04T

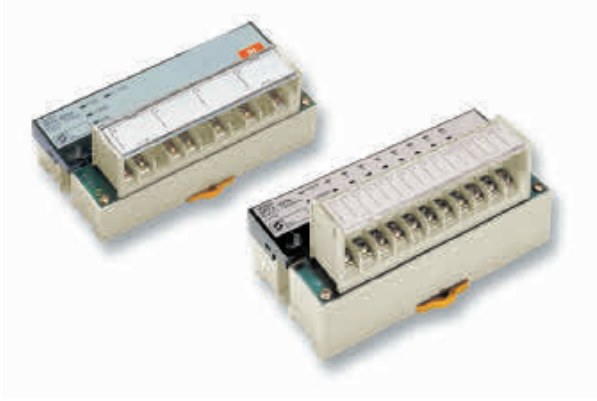
Expansion units

Unit type	Specifications	Size in mm (HxWxD)	Remarks	Order code
8-point PNP input expansion unit	24 VDC, 6 mA per point	50x66x50	Expansion unit for GX, DRT2 and CRT1 series	XWT-ID08-1
16-point PNP input expansion unit	24 VDC, 6 mA per point	50x94x50	Expansion unit for GX, DRT2 and CRT1 series	XWT-ID16-1
8-point PNP output expansion unit	24 VDC, 0.5 A per point	50x66x50	Expansion unit for GX, DRT2 and CRT1 series	XWT-OD08-1
16-point PNP output expansion unit	24 VDC, 0.5 A per point	50x94x50	Expansion unit for GX, DRT2 and CRT1 series	XWT-OD16-1

Note: To order models with NPN (sinking) outputs and corresponding inputs (+V common), omit the "-1" from the model code.

Accessories

Unit type	Specifications	Size in mm (HxWxD)	Remarks	Order code
CompoNet Repeater unit	1 upstream port + 1 downstream port	50x95x43	For extending CompoNet trunk lines, or creating branch lines	CRS1-RPT01
CompoNet 4-wire flat cable	For IP20 use	100 m	For power supply + communication, use with DCN4-connectors	DCA4-4F10
CompoNet Branch connector for trunk line	For IP20 use	–	To create a branching point on a trunk line	DCN4-TR4
CompoNet Branch line end connector	For IP20 use	–	To connect a branch line to a trunk line	DCN4-BR4
CompoNet Y-connector	For IP20 use	–	To connect two line connectors to one slave unit	DCN4-MD4
CompoNet Screw terminal connector	For IP20 use	–	To provide conventional screw terminals for masters or slaves	DCN4-TB4
CompoNet Terminator	For IP20 use	–	Plugs in to DCN4-MD4 or DCN4-TR4	DCN4-TM4
CompoNet connector tool	For DCN4-connectors	–	To attach DCN4-connectors to DCA4-4F10 flat cable	DWT-A01
CompoNet Screw terminal connector	For IP20 use, box of 10 pcs	–	To provide conventional screw terminals for 4-point bit slaves	HCN-TB4LMZG-B10+
Bit slave flat cable plug	For CRT1B-_D04SL-1-300 slaves	–	Allows mounting bit slaves directly on flat cable	DCN4-MR4
Bit slave mounting plate	For CRT1B-_D04SL-1-300 slaves	–	Mount with two screws, bit slave clips in place	CRT1-ATT03



Fast and easy over CompoBus/S

Omron's unique CompoBus/S is the original I/O bus for machine automation. With free topology and up to 500 m bus length in long-distance mode, it can be used as a remote I/O system. In high-speed mode (100 m max.) the guaranteed sub-millisecond cycle time makes it ideal for efficient machine control. Used with the compact CPM2C-S PLC as master, your machine control system will fit in the smallest spaces.

- Compact size in IP20 housing
- Fast cycle time; less than 1 ms per 256 I/O points
- Easy set-up; no software required
- Choice of 4- 8- and 16-point Digital I/O; transistor-, and relay models
- Analogue In/Outputs and customisable modules available

Ordering information

Unit type	Specifications	Size in mm (HxWxD)	Remarks	Order code
4-point PNP input unit	24 VDC, 6 mA per point	48x80x50	Compact IP20 I/O	SRT2-ID04-1
8-point PNP input unit	24 VDC, 6 mA per point	48x80x50	Compact IP20 I/O	SRT2-ID08-1
16-point PNP input unit	24 VDC, 6 mA per point	48x105x50	Compact IP20 I/O	SRT2-ID16-1
16-point PNP input unit	24 VDC, 6 mA per point	50x180x59	3-tier connection for direct sensor wiring	SRT2-ID16T-1
4-point PNP output unit	24 VDC, 0.3 A per point	48x80x50	Compact IP20 I/O	SRT2-OD04-1
8-point PNP output unit	24 VDC, 0.3 A per point	48x80x50	Compact IP20 I/O	SRT2-OD08-1
16-point PNP output unit	24 VDC, 0.3 A per point	48x105x50	Compact IP20 I/O	SRT2-OD16-1
16-point PNP output unit	24 VDC, 0.5 A per point	50x180x59	3-tier connection for direct sensor/actuator wiring	SRT2-OD16T-1
8-point input + 8-point output unit (PNP)	24 VDC, input 6 mA, output 0.3 A per point	50x180x59	3-tier connection for direct actuator wiring	SRT2-MD16T-1
8-point relay output unit	Max. 3 A per point	50x100x50	with easy-to-replace relays	SRT2-ROC08
16-point relay output unit	Max. 3 A per point	50x155x50	with easy-to-replace relays	SRT2-ROC16
4-Channel analogue input unit	0 to 5 V, 1 to 5 V, 0 to 10 V, -10 to 10 V, 0 to 20 mA, 4 to 20 mA	48x105x50	Resolution 1/6000, conversion time 4 ms (4 inputs)	SRT2-AD04
2-Channel analogue output unit	0 to 5 V, 1 to 5 V, 0 to 10 V, -10 to 10 V, 0 to 20 mA, 4 to 20 mA	48x105x50	Resolution 1/6000, conversion time 2 ms (2 outputs)	SRT2-DA02

Note: To order models with NPN (sinking) outputs and corresponding inputs (+V common), omit the "-1" from the model code.

Accessories

Type	Order code
CompoBus/S 4-wire flatcable for power and communication (100 m)	SCA1-4F10
CompoBus/S branch connector (IDC) for flatcable	SCN1-TH4
CompoBus/S termination connector (IDC) for flatcable	SCN1-TH4T
CompoBus/S termination block (screw connection)	SRS1-T



DeviceNet I/O for harsh environments

Rugged I/O units for field mounting. The DRT2 slave units feature internal diagnostic and maintenance data collection, which can be accessed over the network. Power supply status, I/O response times, operation counters and on-time monitor data is available at all times, and is internally checked against user-defined limits. Maintenance warnings will be generated when limits are exceeded. Using CX-One or NS-series HMI with Smart Active Parts for visualisation, this allows more efficient system setup, commissioning and troubleshooting without any additional programming.

- IP67 protection, DRT2 versions are also oil- and welding-spatter proof
- Internal circuits powered by DeviceNet; fewer connections means less installation errors
- Smart Slave functions for diagnostics and preventive maintenance
- Indication of broken wire and short-circuit in I/O signals
- M12 connectors for fast installation

Ordering information

Unit type	Specifications	Size in mm (HxWxD)	Remarks	Order code
4-point PNP input unit	24 V, 6 mA	123x60x44	Separate I/O power supply connection	DRT2-ID04CL-1
8-point PNP input unit	24 V, 6 mA	175x60x44	Separate I/O power supply connection	DRT2-ID08CL-1
8-point PNP input unit	24 V, 11 mA, with power short-circuit and sensor disconnection detection	175x60x38	Unit power supply via DeviceNet cable	DRT2-ID08C-1
16-point PNP input unit	24 V, 6 mA, 2 inputs per M12 connector	175x60x44	Separate I/O power supply connection	DRT2-HD16CL-1
16-point PNP input unit	24 V, 11 mA, 2 inputs per M12 connector, with power short-circuit and sensor disconnection detection	175x60x38	Unit power supply via DeviceNet cable	DRT2-HD16C-1
4-point PNP output unit	24 V, 0.5 A per point	123x60x44	Separate I/O power supply connection	DRT2-OD04CL-1
8-point PNP output unit	24 V, 0.5 A per point	175x60x44	Separate I/O power supply connection	DRT2-OD08CL-1
8-point PNP output unit	24 V, 1.5 A per point (8 A total), with short-circuit protection + indication	175x60x44	Separate I/O power supply connection	DRT2-OD08C-1
16-point PNP output unit	24 V, 0.5 A per point, 2 points per M12 connector	175x60x44	Separate I/O power supply connection	DRT2-WD16CL-1
8-point input + 8-point PNP output unit	24 V, 6 mA input, 0.5 A output per point, 2 points per M12 connector	175x60x44	Separate I/O power supply connection	DRT2-MD16CL-1

Note: To order models with NPN (sinking) outputs and corresponding inputs (+V common), omit the "-1" from the model code.

Accessories

Unit type	Specifications	Order code
DeviceNet thin cable	with one M12 socket connector (female), 1 m	DCA1-5CN01F1
DeviceNet thin cable	with one M12 socket connector (female), 2 m	DCA1-5CN02F1
DeviceNet thin cable	with one M12 socket connector (female), 5 m	DCA1-5CN05F1
DeviceNet thin cable	with one M12 socket connector (female) and one M12 plug connector (male), 1 m	DCA1-5CN01W1
DeviceNet thin cable	with one M12 socket connector (female) and one M12 plug connector (male), 2 m	DCA1-5CN02W1
DeviceNet thin cable	with one M12 socket connector (female) and one M12 plug connector (male), 5 m	DCA1-5CN05W1
DeviceNet T-connector for thin cable	with two M12 socket connectors (female) + one M12 plug connector (male)	DCN2-1
DeviceNet terminator	with M12 plug connector	DRS2-1
Power supply cable	with one 7/8 inches socket connector (female), 2 m	XS4F-D421-102-A
Power supply cable	with one 7/8 inches socket connector (female), 5 m	XS4F-D421-105-A
Power supply cable	with one 7/8 inches socket connector (female) and one 7/8 inches plug connector (male), 2 m	XS4W-D421-102-A
Power supply cable	with one 7/8 inches socket connector (female) and one 7/8 inches plug connector (male), 5 m	XS4W-D421-105-A
Power supply T-connector	with two 7/8 inches socket connectors (female) + one 7/8 inches plug connector (male)	XS4R-D424-5
4-wire I/O connection cable	with one M12 plug connector (male), 1 m	XS2H-D421-C80-A
4-wire I/O connection cable	with one M12 plug connector (male), 2 m	XS2H-D421-D80-A
4-wire I/O connection cable	with one M12 plug connector (male), 5 m	XS2H-D421-G80-A
4-wire I/O connection cable	with one M12 socket connector (female) and one M12 plug connector (male), 1 m	XS2W-D421-C81-A
4-wire I/O connection cable	with one M12 socket connector (female) and one M12 plug connector (male), 2 m	XS2W-D421-D81-A
4-wire I/O connection cable	with one M12 socket connector (female) and one M12 plug connector (male), 5 m	XS2W-D421-G81-A
Y-connector for 16-point I/O units	Splits the 2 I/O points per M12 connector to two M12 connectors	XS2R-D426-1
Y-connector cable for 16-point I/O units	Splits the 2 I/O points per M12 connector to two M12 connectors, 1 m	XS2R-D426-C11-F
M12 connector	M12 plug connector (male), solder type	XS2G-D421
M12 connector	M12 socket connector (female), solder type	XS2C-D421
IP67 cap for M12 sockets	Metal cap for unused I/O connections	XS2Z-12



Dust- and waterproof CompoBus I/O

Rugged I/O units for field mounting. Omron's unique CompoBus/S is the most efficient I/O bus for machine automation. With free topology and up to 500 m bus length in long-distance mode, it can be used as a remote I/O system. In high-speed mode (100 m max.) the guaranteed sub-millisecond cycle time makes it ideal for efficient machine control. With IP67 slave modules distributed throughout the machine, the need for protective enclosures is minimised.

- IP67 protection against dust and water
- Fast cycle time; less than 1 ms for 256 I/O points
- Easy setup; no software required
- Choice of 4- and 8-point Digital I/O
- M12 connectors for easy field wiring

Ordering information

Unit type	Specifications	Size in mm (HxWxD)	Order code
4-point PNP input unit	24 V, 6 mA	114x54x45	SRT2-ID04CL-1
8-point PNP input unit	24 V, 6 mA	114x54x45	SRT2-ID08CL-1
4-point PNP output unit	24 V, 0.5 A per point	114x54x45	SRT2-OD04CL-1
8-point PNP output unit	24 V, 0.5 A per point	114x54x45	SRT2-OD08CL-1

Note: To order models with NPN (sinking) outputs and corresponding inputs (+V common), omit the "-1" from the model code.

Accessories

Unit type	Specifications	Remarks	Order code
CompoBus/S terminator	with M12 plug connector	-	SRS2-1
M12 connector	M12 plug connector (male), screw type	For CompoBus/S 4-wire round cable	XS2G-D4S7
M12 connector	M12 socket connector (female), screw type	For CompoBus/S 4-wire round cable	XS2C-D4S7
M12 T-connector (4-wire)	with two M12 socket connectors (female) + one M12 plug connector (male)	-	XS2R-D427-5
4-wire I/O connection cable	with one M12 plug connector (male), 1 m	-	XS2H-D421-C80-A
4-wire I/O connection cable	with one M12 plug connector (male), 2 m	-	XS2H-D421-D80-A
4-wire I/O connection cable	with one M12 plug connector (male), 5 m	-	XS2H-D421-G80-A
4-wire I/O connection cable	with one M12 socket connector (female) and one M12 plug connector (male), 1 m	-	XS2W-D421-C81-A
4-wire I/O connection cable	with one M12 socket connector (female) and one M12 plug connector (male), 2 m	-	XS2W-D421-D81-A
4-wire I/O connection cable	with one M12 socket connector (female) and one M12 plug connector (male), 5 m	-	XS2W-D421-G81-A
Y-connector for 16-point I/O units	Splits the 2 I/O points per M12 connector to two M12 connectors	-	XS2R-D426-1
Y-connector cable for 16-point I/O units	Splits the 2 I/O points per M12 connector to two M12 connectors, 1 m	-	XS2R-D426-C11-F
M12 connector	M12 plug connector (male), solder type	-	XS2G-D421
M12 connector	M12 socket connector (female), solder type	-	XS2C-D421
IP67 cap for M12 sockets	Metal cap for unused I/O connections	-	XS2Z-12

NB SERIES – The feature-rich, cost-effective HMI

A complete series with comprehensive features

Omron's new NB HMI series is simply as smart and as dependable as it looks. A feature-rich HMI with Omron's high quality extending throughout the complete series, this new HMI generation offers you the utmost in reliability. The logical choice for use with Omron's popular CP1 family of compact machine controllers, the NB series has just the right model to suit your application, no matter for what branch of industry.

Best-in-class display

- LED backlit TFT LCD
- Wide viewing angle
- More than 65,000 display colours
- Stores up to 120 MBs of screen data

Smart design

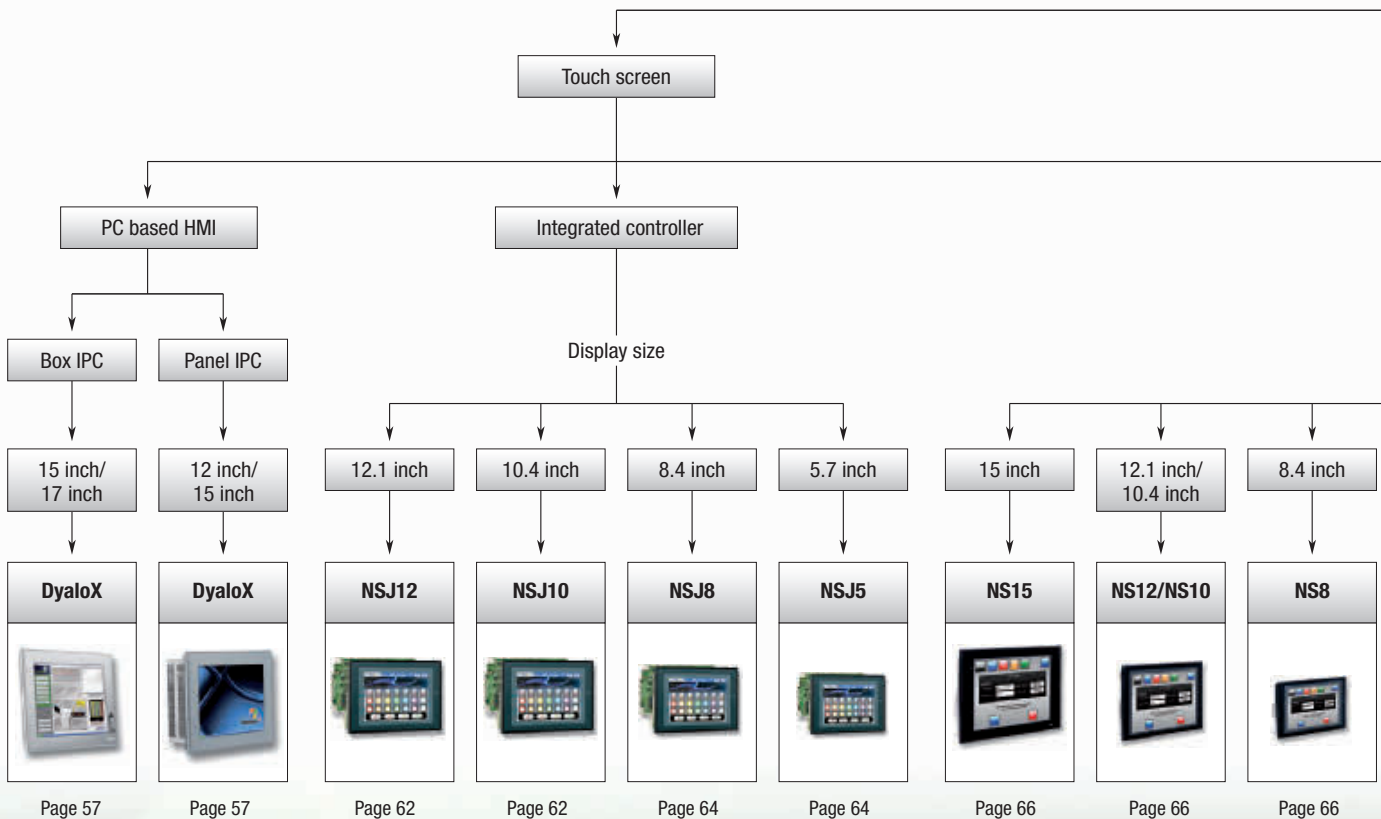
- Portrait or landscape display mode
- Connection to Omron and non-Omron devices, e.g. PLCs/inverters
- Serial, USB or Ethernet connectivity
- PictBridge printer connection

Saving you time

- USB memory stick support
- Animations and easy-to-use functions
- Multi-language support and tool
- On/off-line simulation

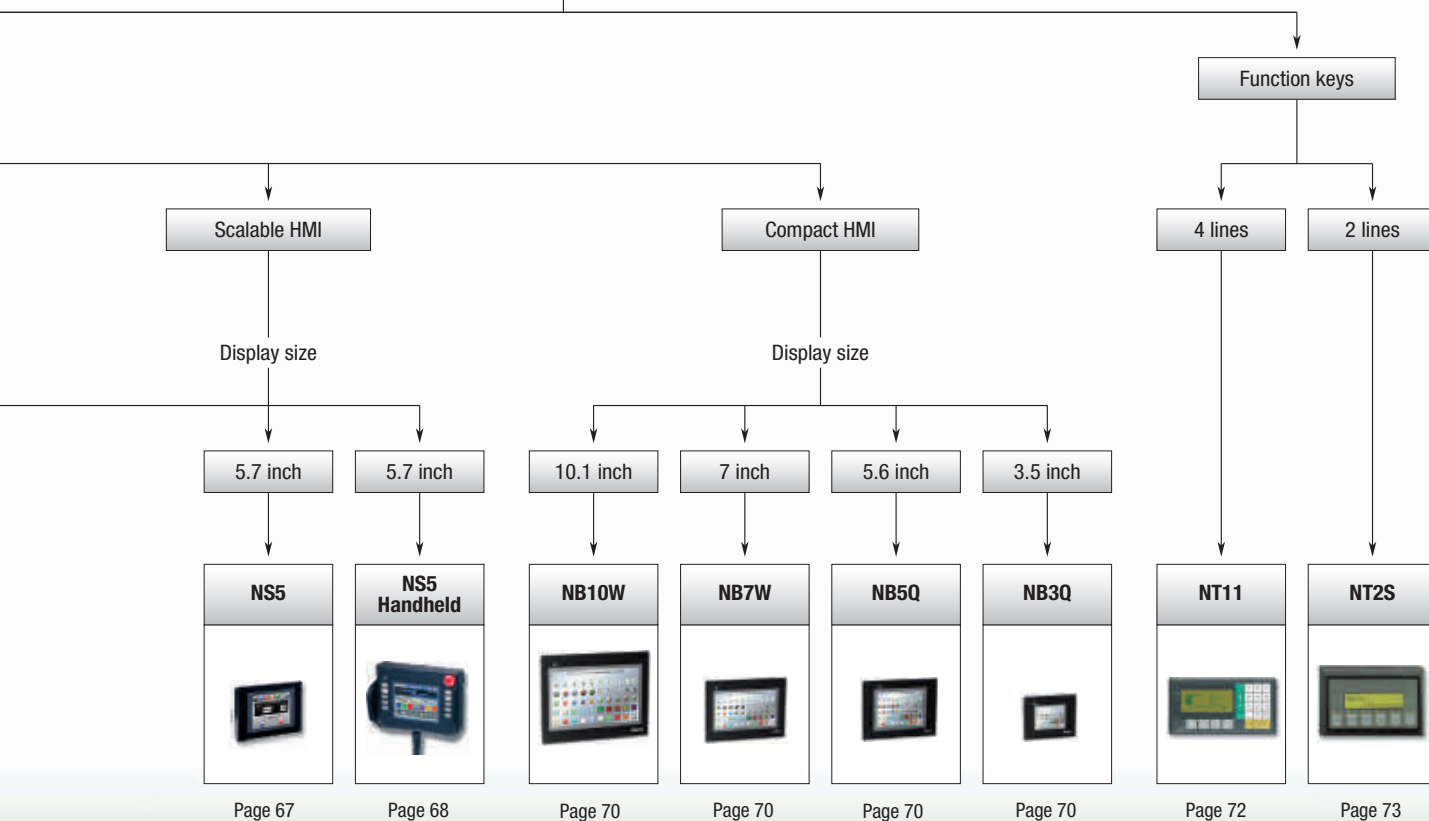


For more information please visit:
industrial.omron.eu/nb















Interaction type





Selection table

Integrated controller				
				
Model	NSJ12	NSJ10	NSJ8	NSJ5
Display	12.1 inch colour TFT	10.4 inch colour TFT	8.4 inch colour TFT	5.7 inch colour TFT
Resolution	800 × 600 pixels	640 × 480 pixels	640 × 480 pixels	320 × 240 pixels
Control	CJ1G-CPU45H; 60k-steps program memory, 128k-words data memory, logic instruction time 0.04 µs	CJ1G-CPU45H; 60k-steps program memory, 128k-words data memory, logic instruction time 0.04 µs	CJ1G-CPU45H; 60k-steps program memory, 128k-words data memory, logic instruction time 0.04 µs	CJ1G-CPU45H; 60k-steps program memory, 128k-words data memory, logic instruction time 0.04 µs
Communication	DeviceNet Master/Slave or PROFIBUS Master and Ethernet interface	DeviceNet Master/Slave or PROFIBUS Master and Ethernet interface	DeviceNet Master/Slave or PROFIBUS Master and Ethernet interface	DeviceNet Master/Slave or PROFIBUS Master and Ethernet interface
Expansion (1 board max.)	I/O extension	I/O extension	I/O extension	I/O extension
Dimensions in mm (H×W×D)	Without expansion unit 241×315×73.3 With expansion unit 241×315×89.3	Without expansion unit 241×315×73.3 With expansion unit 241×315×89.3	Without expansion unit 177×232×73.3 With expansion unit 177×232×89.3	Without expansion unit 142×195×79 With expansion unit 142×195×95
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Scalable HMI						
						
Model	NS15	NS12	NS10	NS8	NS5	NS5 handheld
Display	15 inch TFT colour	12.1 inch TFT colour	10.4 inch TFT colour	8.4 inch TFT colour	5.7 inch TFT colour	5.7 inch STN colour
Resolution	1024 × 768 pixels (XGA)	800 × 600 pixels (SVGA)	640 × 480 pixels (VGA)	640 × 480 pixels (VGA)	320 × 240 pixels (QVGA)	320 × 240 pixels (QVGA)
Number of colours	256 (32,768 for image data)	256 (32,768 for image data)	256 (32,768 for image data)	256 (32,768 for image data)	256 (32,768 for image data)	256 (4,096 for image data)
Memory Size	60 MB screen memory	60 MB screen memory, 32,768 words + 32,768 bits internal memory and 8192 words + 8192 bits retentative memory	60 MB screen memory, 32,768 words + 32,768 bits internal memory and 8192 words + 8192 bits retentative memory	60 MB screen memory, 32,768 words + 32,768 bits internal memory and 8192 words + 8192 bits retentative memory	60 MB screen memory, 32,768 words + 32,768 bits internal memory and 8192 words + 8192 bits retentative memory	60 MB screen memory, 32,768 words + 32,768 bits internal memory and 8192 words + 8192 bits retentative memory
Options	Controller Link, Video input board (NS-CA002)	Ethernet, Controller Link, Video input board (RGB/Composite)	Ethernet, Controller Link, Video input board (RGB/Composite)	Ethernet, Video input board (RGB/Composite)	Ethernet	RS-232 or RS-422 communication depending on cable
Dimensions in mm (H×W×D)	300×400×80	241×315×48.5	241×315×48.5	177×195×48.5	142×195×54	176×223×70.5 (excl. emergency button)
Page	66				67	68

Human machine interfaces (HMI)

		Compact HMI			
					
Model		NB10W	NB7W	NB5Q	NB3Q
Display		10.1 inch Wide TFT LCD	7 inch Wide TFT LCD	5.6 inch TFT LCD	3.5 inch TFT LCD
Resolution		800 × 480 pixels	800 × 480 pixels	320 × 234 pixels	320 × 240 pixels
Number of colours		65,536	65,536	65,536	65,536
Memory		128 MB (including system area)	128 MB (including system area)	128 MB (including system area)	128 MB (including system area)
Communication ports	Serial Communication	1 × RS-232C & 1 × RS-232C/422A/485	1 × RS-232C & 1 × RS-232C/422A/485	1 × RS-232C & 1 × RS-232C/422A/485	1 × RS-232C/422A/485
	USB (USB Host only on TW01 model)	1 × USB Host & 1 × USB Slave	1 × USB Host & 1 × USB Slave	1 × USB Host & 1 × USB Slave	1 × USB Host & 1 × USB Slave
	Ethernet	1 × Ethernet	1 × Ethernet (TW01 model)	1 × Ethernet (TW01 model)	1 × Ethernet (TW01 model)
Dimensions in mm (H×W×D)		210.8×268.8×54.0	148×202×46	142×184×46	103.8×129.8×52.8
Page		70			

		Function-key HMI			
					
Model		NT11	NT2S		
Type of Display		LED backlight LCD	LED backlight LCD		
Number of F-keys		22	6 or 20 depending on model		
Number of characters		20 × 4 lines	16 × 2 lines		
Printer connection		Yes	Depending on model		
Number of screens		250	65,000 (limited by memory)		
Size in mm (H×W×D)		113×218×38.2	6 F-keys 60×109×43 20 F-keys 107×107×43		
Page		72	73		





Industrial PC created for 24/7 operation in the most demanding industrial environments

The DyaloX Industrial PC is designed to provide exceptional performance operating around-the-clock throughout its lifetime. Drawing on our many years of experience in industrial-class standalone PC-based equipment, we have created unique self-diagnostic hardware and software, such as the Omron RAS solution, to ensure that DyaloX IPCs will keep on running long after other IPCs have given up.

- Omron RAS solution
- Industrial-grade 600 MHz or 1.3 GHz Intel Celeron CPU
- Reliable silicon storage up to 8GB
- Fan-less heat sink cooling for enhanced reliability
- 3 year warranty, 5 year minimum availability, 7 year courier repair service

Ordering information

DyaloX IPC

Type		Order Code
Industrial PC panel, 600 MHz CPU	12 inches, 600 MHz, 1 GB internal, black	NSA12-TX12B
	12 inches, 600 MHz, 1 GB internal, silver	NSA12-TX12S
	15 inches, 600 MHz, 1 GB internal, black	NSA15-TX12B
	15 inches, 600 MHz, 1 GB internal, silver	NSA15-TX12S
Industrial PC panel, 1.3 GHz CPU	12 inches, 1.3 GHz, 1 GB internal, 4 GB storage, black	NSA12-TX01B-E
	12 inches, 1.3 GHz, 1 GB internal, 4 GB storage, silver	NSA12-TX01S-E
	15 inches, 1.3 GHz, 1 GB internal, 4 GB storage, black	NSA15-TX01B-E
	15 inches, 1.3 GHz, 1 GB internal, 4 GB storage, silver	NSA15-TX01S-E
Industrial PC box, 1.3 GHz CPU	1.3 GHz, RAM: 1 GB, storage: 4 GB	NSA-CPU04-E

Touch panel

Type		Order Code
Touchscreen panel	15 inches, black	NSA-TX151B
	15 inches, silver	NSA-TX151S
	17 inches, black	NSA-TY171B
	17 inches, silver	NSA-TY171S

Accessories

Type	Order Code
4 GB CF with XP Embedded English	NSA-CEX04-E
8 GB CF with XP Embedded English	NSA-CEX08-E
16 GB CF with XP Embedded English	NSA-CEX16-E
1 GB DDR-SD RAM (non-ECC)	NSA-MR191
DVI & USB cable 0.1 m	NSA-DU02
DVI & USB cable 2 m	NSA-DU22
DVI & USB cable 5 m	NSA-DU52
DVI cable 10 m	NSA-DV101
Set of 5 Anti-reflection sheets for 12 inches	NS12-KBA04
Set of 5 Anti-reflection sheets for 15 inches	NS15-KBA04
Battery for NSA12/15-TX01, NSA-CPU	NSA-BAT01
Battery for NSA12/15-TX12	NSA-BAT03

DyaloX IPC specifications

Main specifications

Item	NSA1_-TX12	NSA1_-TX01_-E	NSA-CPU04-E		
OS	CF with Windows XP embedded ¹	Preinstalled Windows XP embedded			
Processor	600 MHz Intel Celeron-M Processor	1.3 GHz Intel Celeron-M Processor			
Storage device	Type	Industrial CF memory or HDD ¹	DiskOnModule (Flash memory)		
	Capacity	CF: 4/8 GB (with OS) IDE I/F ¹	4 GB	4 GB	
	Service life (write cycles)	CF: 100,000 write cycle/block HDD: 2 years at 24 hours/day operation, 3 years at 8 hours/day operation	NAND flash memory: 100,000 write cycles (to the same block) ²		
Memory	Main memory	1 GB DDR-SDRAM (non-ECC)	1 GB DDR-SDRAM (non-ECC)	1 GB DDR-SDRAM (non-ECC)	
	Cache memory	512 KB Level 2 cache memory (built into the CPU)			
Interface	Keyboard	–	PS/2 keyboard with 6-pin MINI DIN connector		
	Mouse	–	PS/2 mouse with MINI DIN connector		
	Serial ports	2 ports conforming to EIA RS-232C for 9-pin D-SUB male connectors			
	Ethernet	2 × 10 BASE-T/100 BASE-TX RJ45 connector	One 10 BASE-T/100 BASE-TX port for an RJ45 connector		
	USB ports	4 × USB 2.0/1.1 ports for USB type-A connectors. (2 on front panel, cable 3 m max.)	2 USB 2.0/1.1 ports for USB type-A connectors	2 USB 2.0/1.1 ports for USB type-A connectors	2 USB 1.1 for USB type-A connectors
	Memory Card	1 CF Card slot			
	Video output	–	1 DVI port for DVI-I connector		
	Audio	–	Line-In/Line-Out/Mic-In for mini jack		
Expansion slots	PCI expansion bus, 1 slot	PCI expansion bus, 2 slots			
Special RAS board	External input port	3-pin connector port for the UPS power interruption signal			
	Status LED indicators	4 (RUN/BATLOW/ERR/DIAG)			
RAS functions	Special RAS board functions	Alive connection monitoring, device restart, timer start, startup and shutdown monitoring, backlight lit time measurement, UPS power interrupt signal output, and logging functions			
	Motherboard RAS functions	Standard PC RAS info, post error logging, post error retry, CMOS data recovery			
POWER LED indicator	Yes (green)				
Service life ³	50,000 hours at 40°C		50,000 hours at 30°C		
Battery life	Main board	5 years at 25°C (NSA-BAT03)	5 years at 25°C (NSA-BAT01)		
	RAS board	5 years at 25°C (NSA-BAT03)	5 years at 25°C (NSA-BAT01)		

¹ Sold separately

² Calculate condition

Free area: 500 MB (*excluding OS & Application)

Overwrite data size/time: 0.5 MB/time

Overwrite times/day: 10,000 times/day

MTBF: (500 MB *100,000 times) / (0.5 MB *10,000 times/day) = 10,000 days = 27 years

³ The service life is a guideline that is provided strictly for reference. It varies with factors such as the installation location and operating conditions.

Touch Panel specifications

Item	NSA12-TX12_-E	NSA15-TX12_-E	NSA12-TX01_-E	NSA15-TX01_-E	
Display panel	Type	TFT colour LCD			
	Size	12.1 inches	15 inches	12.1 inches	15 inches
	Resolution	1024×768 dots			
	Brightness	300 cd/m ² (typical)			
	Viewing angle	130° left to right, 90° up and down			
	Colours displayed	262,144			
Backlight	Type	2 CCFL	4 CCFL	2 CCFL	4 CCFL
	Brightness adjustment	Three-level software adjustment ¹			
	Backlight not lit detection	The software reads the lamp burnout detection signal from the inverter ²			
	Service life	50,000 hours min. ³			
Touch panel	Type	Analogue resistive type			
	Effective input area Size in mm (H×W)	185.5×247	229×305	185.5×247	229×305
	Operating service life	10,000,000 operations (with non-stop key stroking using fingers to input) 100,000 characters (with non-stop character entry using a stylus to input)			
Interface	USB ports	4 x USB2.0/1.1 for type-A connectors (2 on front side)		2 x USB2.0/1.1 for type-A connectors	
	Video Input	-			
POWER LED indicator	Yes (green)				
Service life ⁴	50,000 hours at 25°C		50,000 hours at 40°C		

¹ The contrast cannot be adjusted significantly.

² It is not the service life, but rather lamp failure due to hardware problems such as a broken wire that is detected. Backlight not lit detection means both backlight lamps have burnt out.

³ The service life is a guideline for maximum contrast at room temperature with normal humidity and is provided strictly for reference. It varies significantly with the ambient temperature.

The service life will be shorter under extreme (high or low) temperature conditions and falls off sharply particularly under low-temperature conditions.

⁴ The service life is a guideline that is provided strictly for reference. It varies with factors such as the installation location and operating conditions.

General specifications

Item	NSA1_-TX12_-E	NSA1_-TX01_-E	NSA-CPU0_-E
Rated supply voltage	24 VDC		
Allowable supply voltage range	20.4 VDC to 27.6 VDC (24 VDC ±15%)	20.0 VDC to 27.6 VDC (24 VDC ±15%)	
Power consumption	12 inches: 65 W max. 15 inches: 75 W max.	12 inches: 80 W max. 15 inches: 100 W max.	60 W max.
Ambient operating temperature	0 to 50°C ^{*1}		
Ambient storage temperature	-10 to 60°C ^{*1}		
Ambient operating humidity	10% to 80% with no condensation ^{*1}		
Ambient storage humidity	10% to 85% with no condensation ^{*1}		
Operating atmosphere	Must be free of corrosive gases. Must be fairly dust free.		
Noise resistance	Conforms to IEC6100-4-4, power supply line: 2 kV		
Vibration resistance (in operation)	Conforms to JIS C0041, 0.05 mm amplitude at 10 to 55 Hz for 50 min. Each in the X, Y, and Z directions		
Shock resistance (in operation)	Conforms to JIS C0041, 196 m/s ² three times each in the X, Y, and Z directions		
Degree of protection	Front panel: IP65 or the equivalent ^{*1}		–
Weight	12 inches: 5 kg max. 15 inches: 7 kg max.	12 inches: 5 kg max. 15 inches: 7 kg max.	4 kg max.
Dimensions in mm (HxWxD)	12 inches: 281×342×98 15 inches: 296.5×397.5×103	12 inches: 264×322×100 15 inches: 312×384×108	233x308x76.5

^{*1} For more information, please check the user manual.

CF & HDD

Item	NSA-CEX04	NSA-CEX08
Storage capacity	4 GB	8 GB

Touch panel specifications (box model)

Item	NSA-TX151	NSA-TY171	
Display panel	Type	TFT colour LCD	
	Size	15.0 inches	17.0 inches
	Resolution	1024×768 dots	1280×1024 dots
	Brightness	270 cd/m ² (typical)	200 cd/m ² (typical)
	Viewing angle	130° left to right, 90° up and down	
	Colours displayed	262,144	
Backlight	Type	2 CCFL	4 CCFL
	Brightness adjustment	10 level adjustment by rotary switch	
	Service life	50,000 hours min. ^{*1}	
Touch panel	Type	Analogue resistive type	
	Effective input area Size in mm (H×W)	229×305	272×340
	Operating service life	10,000,000 operations (with non-stop key stroking using fingers to input) 100,000 characters (with non-stop character entry using a stylus to input)	
Interface	USB ports	3 x USB 1.1 for type-A connectors (2 on front side) 1 x USB 1.1 (used for touch) for type-B connector	
	Video Input	1 x DVI-D port	
POWER LED indicator	Yes (green)		
Service life ^{*2}	50,000 hours at 30°C		

^{*1} The service life is a guideline for maximum contrast at room temperature with normal humidity and is provided strictly for reference. It varies significantly with the ambient temperature.

The service life will be shorter under extreme (high or low) temperature conditions and falls off sharply particularly under low-temperature conditions.

^{*2} The service life is a guideline that is provided strictly for reference. It varies with factors such as the installation location and operating conditions.

General specifications (box model)

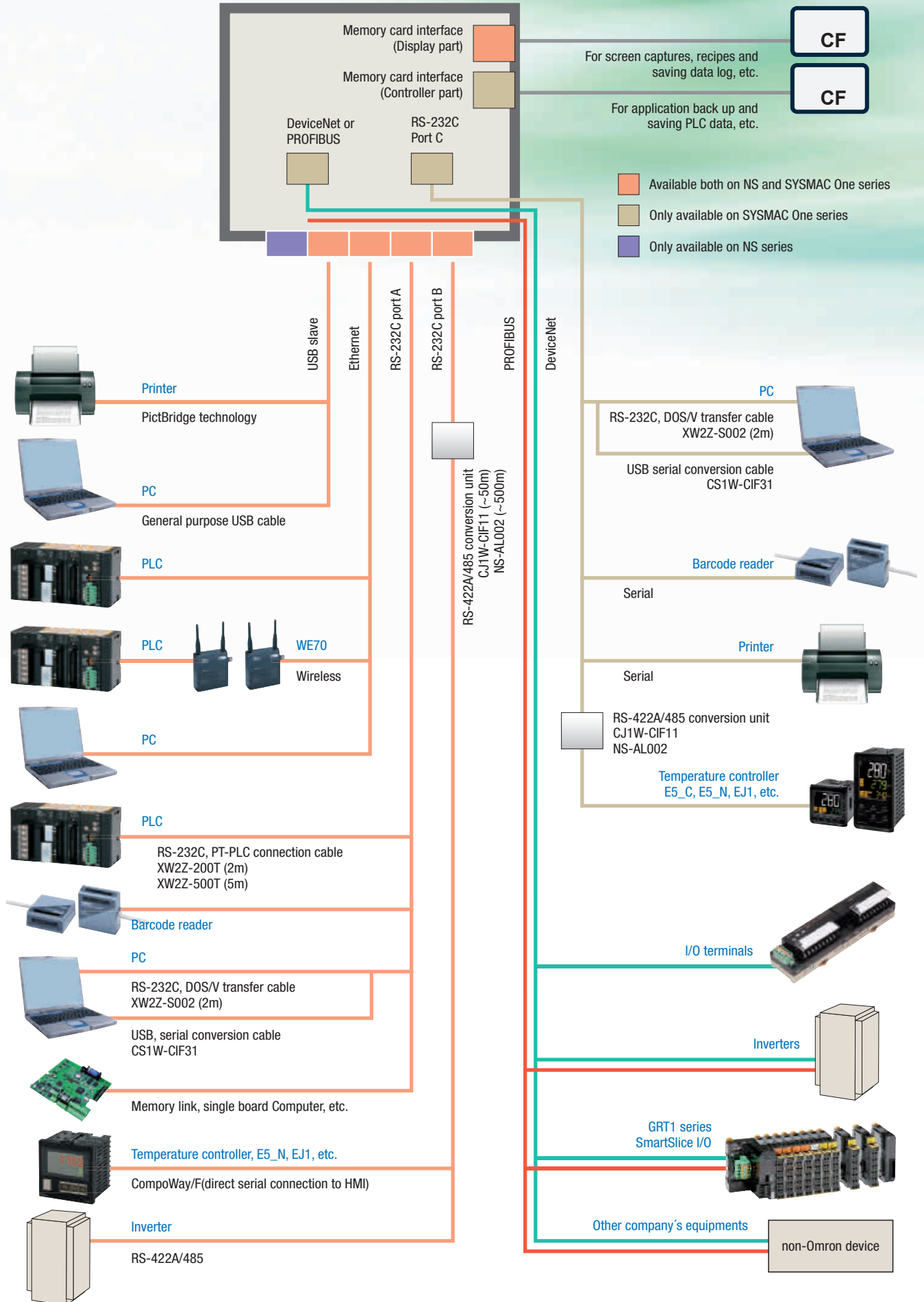
Item	NSA-TX151	NSA-TY171
Rated supply voltage	24 VDC	
Allowable supply voltage range	20.0 VDC to 27.6 VDC (24 VDC ±15%)	
Power consumption	40 W max.	55 W max.
Ambient operating temperature	0 to 50°C ^{*1}	
Ambient storage temperature	-10 to 60°C ^{*1}	
Ambient operating humidity	10% to 80% with no condensation ^{*1}	
Ambient storage humidity	10% to 85% with no condensation ^{*1}	
Operating atmosphere	Must be free of corrosive gases. Must be fairly dust free.	
Noise resistance	Conforms to IEC6100-4-4, power supply line: 2 kV	
Vibration resistance (in operation)	Conforms to JIS C0041, 0.05 mm amplitude at 10 to 55 Hz for 50 min. Each in the X, Y, and Z directions	
Shock resistance (in operation)	Conforms to JIS C0041, 196 m/s ² three times each in the X, Y, and Z directions	
Degree of protection	IP65F (front panel oil protection) ^{*1}	
Weight	6 kg max.	7 kg max.
Dimensions in mm (HxWxD)	328x404x57	371x436x57

^{*1} For more information, please check the user manual.



System configuration

(Picture represents backside of a SYSMAC One unit)





HMI with integrated PLC and Network interface

The NSJ12 and NSJ10 are combined with a CJ1G-CPU 45H and a DeviceNet or PRO-FIBUS interface fitted into a compact housing occupying less panel space than the separate products. Programming can be done via the standard high-speed USB port. The SYSMAC One is completely transparent, so the PLC, network (including field devices) and HMI can be accessed via a single port. A great advantage when servicing your machine remotely.

- HMI + PLC with 2 separate CPUs for greater performance and reliability
- Transparent architecture for easy remote maintenance
- Compact design occupying less panel space
- Flexible and cost-effective solution with multiple screen sizes, CPUs & networks
- Smart Active Parts for graphical interaction to field devices

Ordering Information

Type					Order Code
SYSMAC One 12.1" TFT	CJ1G-CPU45H	PROFIBUS	with Ethernet	Black	NSJ12-TS01B-G5P
				Ivory	NSJ12-TS01-G5P
SYSMAC One 10" TFT	CJ1G-CPU45H	PROFIBUS	with Ethernet	Black	NSJ10-TV01B-G5P
				Ivory	NSJ10-TV01-G5P

Type					Order Code
SYSMAC One 12.1" TFT	CJ1G-CPU45H	DeviceNet	with Ethernet	Black	NSJ12-TS01B-G5D
				Ivory	NSJ12-TS01-G5D
SYSMAC One 10" TFT	CJ1G-CPU45H	DeviceNet	with Ethernet	Black	NSJ10-TV01B-G5D
				Ivory	NSJ10-TV01-G5D

Note: For the accessories, please refer to page 69

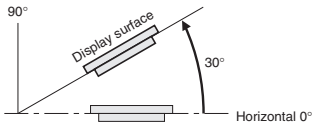
Specifications

Item	NSJ12-TS01-G5D	NSJ10-TV01-G5D
Supply voltage	24 VDC	
Allowable supply voltage range	20.4 to 27.6 VDC (24 VDC ±15%)	
Power consumption	30 W max.	
Current consumption	Controller Section Internal 5 V: 500 mA max. DeviceNet Section Internal 5 V: 200 mA max., External 24 V: 18 mA max.	
Inrush current *1	At 24 VDC: 10 A/20 ms max. for cold start at room temperature	
Ambient operating temperature (depending on angle of display surface off horizontal) *2	90° to 60°: 0 to 50°C 60° to 30°: 0 to 45°C 30° to 0°: Use prohibited	
Ambient storage temperature	-20 to 60°C	
Ambient operating humidity	0 to 40°C: 35% to 85% (with no condensation) 40 to 50°C: 35% to 60% (with no condensation)	
Ambient operating environment	No corrosive gases	
Insulation resistance	20 MΩ min. (at 100 VDC) between DC external and GR terminals	
Dielectric strength	800 VDC for 1 min between DC external and GR terminals, leakage current: 10 mA max.	
Noise immunity	2 kV on power supply line (conforming to IEC 61000-4-4)	
Vibration resistance (during operation)	10 to 57 Hz, 0.075-mm amplitude, 57 to 150 Hz, acceleration: 9.8 m/s ² in X, Y and Z directions for 80 minutes	
Shock resistance (during operation)	147 m/s ² , 3 times each in X, Y and Z directions	
External dimensions in mm (W×H×D)	Without Expansion unit	315x241x73.3
	With Expansion unit	315x241x89.3
Panel output dimensions	302 ⁺¹ ₀ ×228 ⁺¹ ₀ mm (W×H) Panel thickness: 1.6 to 4.8	
Grounding	100 Ω or less	
Weight	2.7 kg max.	2.5 kg max.
Degree of protection	Front operating panel: Equivalent to IP65F and NEMA4 ^{*3}	

Item	NSJ12-TS01-G5D	NSJ10-TV01-G5D
Battery life	5 years (at 25°C) The SRAM and RTC will be backed up for 5 days after the battery runs low (i.e., after the indicator lights orange). The SRAM and RTC will be backed up by a super capacitor for 5 minutes after removing the old battery (i.e., after turning ON power after 5 minutes).	
International standards	Conforms to cULus and EC Directives.	

*1 A delay circuit that charges a capacitor is used to limit the inrush current. If a hot start is performed when the power supply has been OFF only a short period of time, the capacitor will still be charged and the inrush current specified above will be exceeded by up to approximately five times the specified value. When selecting fuses or breakers for external circuits, allow sufficient margin in the melting temperatures, detection characteristics, and inrush current.

*2 Display angles off horizontal are as follows:



*3 May not be applicable in locations with long-term exposure to oil.



HMI with integrated PLC and Network interface

The NSJ8 and NSJ5 are combined with a CJ1G-CPU 45H PLC and a DeviceNet or PROFIBUS interface. It is fitted into a compact housing occupying less panel space than the separate products. Programming can be done via the standard high-speed USB port. The SYSMAC One is completely transparent, so the PLC, network (including field devices) and HMI can be accessed via a single port. A great advantage when servicing your machine remotely.

- HMI + PLC with 2 separate CPUs for greater performance and reliability
- Transparent architecture for easy remote maintenance
- Compact design taking up less panel space
- Flexible and cost effective solution with multiple screen sizes, CPUs & networks
- Smart Active Parts for graphical interaction to field devices

Ordering Information

Type					Order Code
SYSMAC One 8.4" TFT	CJ1G-CPU45H	PROFIBUS	with Ethernet	Black	NSJ8-TV01B-G5P
				Ivory	NSJ8-TV01-G5P
SYSMAC One 5.7" TFT	CJ1G-CPU45H	PROFIBUS	with Ethernet	Black	NSJ5-TQ11B-G5P
				Ivory	NSJ5-TQ11-G5P

Type					Order Code
SYSMAC One 8.4" TFT	CJ1G-CPU45H	DeviceNet	with Ethernet	Black	NSJ8-TV01B-G5D
				Ivory	NSJ8-TV01-G5D
SYSMAC One 5.7" TFT	CJ1G-CPU45H	DeviceNet	with Ethernet	Black	NSJ5-TQ11B-G5D
				Ivory	NSJ5-TQ11-G5D

Function	CJ1G-CPU45H
UM capacity	60K steps
I/O	1,280 points
Extended data memory	32K words × 3 banks
EM file memory	Yes
Maximum number of Expansion Racks	3
FB program memory capacity	1024 KB
Maximum number of FB definitions	1,024
Maximum number of FB instances	2,048
Variable table sizes	128 KB

Note: For the accessories, please refer to page 69

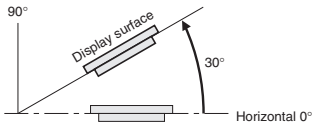
Specifications

Item	NSJ8-TV01-G5D	NSJ5-TQ11-G5D
Supply voltage	24 VDC	
Allowable supply voltage range	20.4 to 27.6 VDC (24 VDC ±15%)	
Power consumption	30 W max.	SQ0_: 21 W max. TQ0_: 22 W max.
Current consumption	Controller Section Internal 5 V: 500 mA max. DeviceNet Section Internal 5 V: 200 mA max., External 24 V: 18 mA max.	
Inrush current *1	At 24 VDC: 10 A/20 ms max. for cold start at room temperature	
Ambient operating temperature (depending on angle of display surface off horizontal) *2	90° to 60°: 0 to 50°C 60° to 30°: 0 to 45°C 30° to 0°: Use prohibited	90° to 30°: 0 to 50°C 30° to 0°: 0 to 40°C
Ambient storage temperature	-20 to 60°C	
Ambient operating humidity	0 to 40°C: 35% to 85% (with no condensation) 40 to 50°C: 35% to 60% (with no condensation)	
Ambient operating environment	No corrosive gases	
Insulation resistance	20 MΩ min. (at 100 VDC) between DC external and GR terminals	
Dielectric strength	800 VDC for 1 min between DC external and GR terminals, leakage current: 10 mA max.	
Noise immunity	2 kV on power supply line (conforming to IEC 61000-4-4)	
Vibration resistance (during operation)	10 to 57 Hz, 0.075-mm amplitude, 57 to 150 Hz, acceleration: 9.8 m/s ² in X, Y and Z directions for 80 minutes	
Shock resistance (during operation)	147 m/s ² , 3 times each in X, Y and Z directions	
External dimensions in mm (W×H×D)	Without Expansion unit	232×177×73.3
	With Expansion unit	232×177×89.3
Panel output dimensions	220.5 ^{+0.50} ×165.5 ^{+0.50} mm (W×H) Panel thickness: 1.6 to 4.8	195×142×79
Grounding	100 Ω or less	
Weight	2.0 kg max.	1.1 kg max.
Degree of protection	Front operating panel: Equivalent to IP65F and NEMA4 ^{*3}	

Item	NSJ8-TV01-G5D	NSJ5-TQ11-G5D
Battery life	5 years (at 25°C) The SRAM and RTC will be backed up for 5 days after the battery runs low (i.e., after the indicator lights orange). The SRAM and RTC will be backed up by a super capacitor for 5 minutes after removing the old battery (i.e., after turning ON power after 5 minutes).	
International standards	Conforms to cULus and EC Directives.	

*1 A delay circuit that charges a capacitor is used to limit the inrush current. If a hot start is performed when the power supply has been OFF only a short period of time, the capacitor will still be charged and the inrush current specified above will be exceeded by up to approximately five times the specified value. When selecting fuses or breakers for external circuits, allow sufficient margin in the melting temperatures, detection characteristics, and inrush current.

*2 Display angles off horizontal are as follows:



*3 May not be applicable in locations with long-term exposure to oil.



One-touch machine management

The NS-series is our advanced HMI series that covers a large range from 5.7" Monochrome STN to 15" TFT. Easily programmed it offers advanced features like, multiple communication possibilities, good synergy with our PLC's and other devices with Ladder monitor, Smart Active Parts and proven reliability.

- Perfect clarity and fast switching screens
- Extremely long backlight life (up to 50,000 hours)
- Support all European languages, Asian and Cyrillic
- Easy data logging on compact flash
- Large Memory size (60 MB)
- Support for several non-Omron PLC's

Ordering information

Type			Order Code
TFT, 15", 1024 x 768 pixels	with Ethernet	Black	NS15-TX01B-V2
		Silver	NS15-TX01S-V2
TFT, 12", 800 x 600 pixels	no Ethernet	Black	NS12-TS00B-V2
		Ivory	NS12-TS00-V2
	with Ethernet	Black	NS12-TS01B-V2
		Ivory	NS12-TS01-V2
TFT, 10", 640 x 480 pixels	no Ethernet	Black	NS10-TV00B-V2
		Ivory	NS10-TV00-V2
	with Ethernet	Black	NS10-TV01B-V2
		Ivory	NS10-TV01-V2
TFT, 8.4", 640 x 480 pixels	no Ethernet	Black	NS8-TV00B-V2
		Ivory	NS8-TV00-V2
	with Ethernet	Black	NS8-TV01B-V2
		Ivory	NS8-TV01-V2

Note: For the accessories, please refer to page 69

Specifications

Item	NS15	NS12	NS10	NS8
Display type	15 inch colour TFT	12 inch colour TFT	10 inch colour TFT	8 inch colour TFT
Display resolution	1024×768 (XGA)	800×600 (SVGA)	640×480 (VGA)	
Number of colours	256 (32.768 for image data)			
Backlight	2×CCFL	1×LED		
Backlight lifetime	Min. 50000 hours			
View angle	Left/right ±85°, Top 70°, Bottom 80°	Left/right ±60°, Top 45°, Bottom 75°	Left/right ±60°, Top 35°, Bottom 65°	Left/right ±65°, Top 50°, Bottom 60°
Touch panel	Analogue resistive touch	Matrix resistive touch		
Number of functional keys	3	–		
Dimensions in mm (H×W×D)	304×405×75.8	241×315×48.5		177×232×48.5
Weight	4.2 kg max.	2.5 kg max.		2.0 kg max.
Screen data capacity	60 MB			
Internal memory	Bit memory: 32,767 bits, Word memory: 32,767 words, Retentative memory: 8,192 bits and 8,192 words.			
Memory card interface	1 slot ATA Compact Flash card			
Printer connection	PictBridge support			
Serial (COM1)	1×RS-232			
Serial (COM2)	1×RS-232/422/485	1×RS-232		
USB Slave	For programming & printing			
Ethernet	IEEE 802.3u 10Base-T/100Base-TX			
Expansion module	Optional network/video unit			Optional video unit
Line voltage	24 VDC ±15%			
Power consumption	45 W max.	25 W max.		
Battery	CJ1W-BAT01			
Battery lifetime	5 years (at 25°C)			
Enclosure rating (front side)	IP65F (equivalent to NEMA4)			
Obtained standards	UL 1604 Class 1 Diff. 2, cUL, CE, Lloyds, DNV			
Operating environment	No corrosive gases			
Noise immunity	Conforms to IEC61000-4-4, 2 KV (power lines)			
Ambient operating temperature	0 to 50°C ¹			
Ambient operating humidity	35% to 85% (0 to 40°C) with no condensation, 35% to 60% (40 to 50°C) with no condensation			

¹ see manual for details.



More power, smaller size

The smallest NS HMI is available in two brightness variations, both with a vivid color TFT touchscreen. It is equipped with a USB connection for project download/upload and the possibility to communicate over Ethernet. One great advantage with the NS is that you can make use of Omron's unique Smart Active Parts (SAP) that save you time when configuring, commissioning and maintaining your machine. SAP are pre-programmed, pre-tested visualisation objects with embedded communication code, bringing 'drag and drop' simplicity to HMI design.

- Perfect clarity and fast switching screens
- Extremely long backlight life (up to 75,000 hours)
- Support all European languages, Asian and Cyrillic
- Easy data logging on compact flash
- Large Memory size (60 MB)
- Support for several non-Omron PLC's

Ordering information

Type				Order Code
NS5-TQ	TFT, 5.7", 320×240 pixels	no Ethernet	Black	NS5-TQ10B-V2
			Ivory	NS5-TQ10-V2
		with Ethernet	Black	NS5-TQ11B-V2
			Ivory	NS5-TQ11-V2
NS5-SQ	TFT, 5.7", 320×240 pixels	no Ethernet	Black	NS5-SQ10B-V2
			Ivory	NS5-SQ10-V2
		with Ethernet	Black	NS5-SQ11B-V2
			Ivory	NS5-SQ11-V2

Note: For the accessories, please refer to page 69

Specifications

Item	NS5-TQ	NS5-SQ
Display type	5.7 inch colour TFT	
Display resolution	340×240 (QVGA)	
Number of colours	256 (32,768 for image data)	
Backlight	LED	
Backlight lifetime	Min. 75000 hours	
View angle	Left/right ±80°, Top 80°, Bottom 60°	
Touch panel	Matrix resistive touch	
Number of functional keys	–	
Dimensions in mm (H×W×D)	142×195×54	
Weight	1.0 kg max.	
Screen data capacity	60 MB	
Internal memory	Bit memory: 32,767 bits, Word memory: 32,767 words, Retentative memory: 8,192 bits and 8,192 words.	
Memory card interface	1 slot ATA Compact Flash card	
Printer connection	PictBridge support	
Serial (COM1)	1×RS-232	
Serial (COM2)	1×RS-232	
USB Slave	For programming & printing	
Ethernet	IEEE 802.3u 10Base-T/100Base-TX	
Expansion module	–	
Line voltage	24 VDC ±15%	
Power consumption	15 W max.	
Battery	CJ1W-BAT01	
Battery lifetime	5 years (at 25°C)	
Enclosure rating (front side)	IP65F (equivalent to NEMA4)	
Obtained standards	UL 1604 Class 1 Diff. 2, cUL, CE, Lloyds, DNV	
Operating environment	No corrosive gases	
Noise immunity	Conforms to IEC61000-4-4, 2 KV (power lines)	
Ambient operating temperature	0 to 50°C ^{*1}	
Ambient operating humidity	35% to 85% (0 to 40°C) with no condensation, 35% to 60% (40 to 50°C) with no condensation	

^{*1} See manual for details.



NS5 handheld, suitable for use in harsh conditions

The NS series has evolved into a mobile format. Based on the standard 5.7" TFT colour version, we can offer a handheld version of the NS series. Offering 10 Function keys for the most used functions and with a protection degree of IP65 it is the product to use in harsh environment where freedom of movement is needed.

- 10 Function keys, 4 hardwired for inching
- Emergency switch on front plus enable switch on back of unit
- Well protected against water, IP65
- Compact Flash, Serial and USB interface

Ordering information

Type	Order code
NSH5	TFT, 5.7", 320×240 pixels Black NSH5-SQR10B-V2

Accessories

Type	Order code
Bracket NS handheld protecting emergency button from accidental activation	NSH5-ATT01
Bracket NS handheld for wall mounting	NSH5-ATT02
Cable NS handheld, RS-422, 10m UL	NSH5-422UL-10M
Cable NS handheld, RS-232, 10m UL	NSH5-232UL-10M
Cable NS handheld, RS-232, 3m UL	NSH5-232UL-3M

Specifications

Memory card interface	1 slot ATA Compact Flash card
Serial (COM1)	1×RS-232/RS-422A
USB Slave	For programming
Line voltage	24 VDC ±15%
Power consumption	10 W max.
Battery	CJ1W-BAT01
Battery lifetime	5 years (at 25°C)
Enclosure rating	IP65 ^{*1}
Obtained standards	UL 1604 Class 1 Diff. 2, cUL, CE, NEMA equivalent
Operating environment	No corrosive gases
Noise immunity	Conforming to IEC 61000-4-4: 2 kV (power supply line)
Ambient operating temperature	0 to 40°C
Ambient operating humidity	35% to 85% max. (with no condensation)
Vibration resistance (during operation)	10 to 57 Hz with amplitude of 0.075 mm, 57 to 150 Hz with acceleration of 9.8 m/s ² three minutes each in X, Y, and Z directions
Shock resistance (during operation)	147 m/s ² three times each in X, Y, and Z directions
Drop test ^{*1}	Dropped from 1 m. Conforming to JIS B 3502/IEC61131-2

^{*1} see manual for details.

Ordering information

Type	Description	Order code	
Cable	Serial programming cable	XW2Z-S002	
	USB programming cable, 2 m	CP1W-CN221	
PT-to-PLC Connecting Cable	PT connection: 9 pins Length: 2 m	XW2Z-200T	
	PLC connection: 9 pins Length: 5 m	XW2Z-500T	
Accessories	Video input	Inputs: 4 channels NTSC / PAL NS-CA001	
		Inputs: 2 channels NTSC / PAL, 1 channel RGB NS-CA002	
	Cable to connect NS-CA00_ to Video console unit	F150-VKP (2 m) F150-VKP (5 m)	
	Controller link interface unit	NS-CLK21	
	RS-422A/485 adapter (50 m)	CJ1W-CIF11	
	RS-422A adapter (500 m)	NS-AL002	
	Anti-reflection sheets (5 sheets)	NS15	NS15-KBA04
		NS12/10	NS12-KBA04
		NS8	NS7-KBA04
		NS5	NT30-KBA04
	Anti-reflection protective covers (5 pack)	NS12/10	NS12-KBA05
		NS8	NS7-KBA05
		NS5	NT31C-KBA05
	Transparent protective covers (5 pack)	NS15 (1 cover)	NS15-KBA05N
		NS12/10	NS12-KBA05N
		NS8	NS7-KBA05N
		NS5	NT31C-KBA05N
	Chemical-resistant cover (1 cover)	NS5	NT30-KBA01
	Attachment adapter	(NT625C/631/631C series to NS12 series)	NS12-ATT01
		(NT625C/631/631C series to NS12 series) Black	NS12-ATT01B
		(NT620S/620C/600S series to NS8 series)	NS8-ATT01
		(NT600M/600G/610G/612G series to NS8 series)	NS8-ATT02
	Memory card	128 MB	HMC-EF183
256 MB		HMC-EF283	
512 MB		HMC-EF583	
Memory card adapter for PC		HMC-AP001	
Battery		CJ1W-BAT01	



The feature-rich, cost-effective HMI

The combination of high quality and rich features add up to give outstanding value for an HMI in the economy class. The NB-Designer software to create your HMI application is free of charge and can be downloaded from our website.

- More than 65,000 display colors TFT touch screen
- Available in sizes ranging from 3.5 to 10 inches
- Long-life LED backlight
- Serial, USB or Ethernet communication
- USB memory stick support (TW01 model only)
- 128 MB internal memory
- Vector and bitmap graphics

Ordering information

HMI panels

Product name	Specifications	Order code
NB3Q	3.5 inch, TFT LCD, Color, 320 × 240 dots	NB3Q-TW00B
	3.5 inch, TFT LCD, Color, 320 × 240 dots, USB Host, Ethernet	NB3Q-TW01B
NB5Q	5.6 inch, TFT LCD, Color, 320 × 234 dots	NB5Q-TW00B
	5.6 inch, TFT LCD, Color, 320 × 234 dots, USB Host, Ethernet	NB5Q-TW01B
NB7W	7 inch, TFT LCD, Color, 800 × 480 dots	NB7W-TW00B
	7 inch, TFT LCD, Color, 800 × 480 dots, USB Host, Ethernet	NB7W-TW01B
NB10W	10.1 inch, TFT LCD, Color, 800 × 480 dots, USB Host, Ethernet	NB10W-TW01B

Options

Product item	Specifications	Order code
NB-to-PLC Connecting cable	For NB to PLC via RS-232C (CP/CJ/CS), 2m	XW2Z-200T
	For NB to PLC via RS-232C (CP/CJ/CS), 5m	XW2Z-500T
	For NB to PLC via RS-422A/485, 2m	NB-RSEXT-2M
Software	Supported Operating Systems: Windows 7, Windows Vista®, Windows XP ^{*1} (SP1 or higher). Download from the Omron website.	NB-Designer ^{*2}
Display protective sheets	For the NB3Q contains 5 sheets	NB3Q-KBA04
	For the NB5Q contains 5 sheets	NB5Q-KBA04
	For the NB7W contains 5 sheets	NB7W-KBA04
	For the NB10W contains 5 sheets	NB10W-KBA04
Attachment	Mounting bracket for NT31/NT31C series to NB5Q series	NB5Q-ATT01

^{*1} Except for Windows XP 64-bit version

^{*2} The NB5Q-TW01B and NB7W-TW01B are supported by NB-Designer version 1.10 or higher. The NB3Q-TW0_B and NB10W-TW01B are supported by NB-Designer version 1.20 or higher.

Model	Panel cutout (H × V mm)
NB3Q	119.0 (+0.5/-0) × 93.0 (+0.5/-0)
NB5Q	172.4 (+0.5/-0) × 131.0 (+0.5/-0)
NB7W	191.0 (+0.5/-0) × 137.0 (+0.5/-0)
NB10W	258.0 (+0.5/-0) × 200.0 (+0.5/-0)

Note: Applicable panel thickness: 1.6 to 4.8 mm.

Specifications

HMI

Specifications	NB3Q		NB5Q		NB7W		NB10W
	TW00B	TW01B	TW00B	TW01B	TW00B	TW01B	TW01B
Display type	3.5 inch TFT LCD		5.6 inch TFT LCD		7 inch TFT LCD		10.1 inch TFT LCD
Display resolution (H×V)	320×240		320×234		800×480		800×480
Number of colors	65,536						
Backlight	LED						
Backlight lifetime	50,000 hours of operating time at the normal temperature (25°C) ^{*1}						
Touch panel	Analog resistive membrane, resolution 1024×1024, life: 1 million touch operations						
Dimensions in mm (H×W×D)	103.8×129.8×52.8		142×184×46		148×202×46		210.8×268.8×54.0
Weight	310 g max.	315 g max.	620 g max.	625 g max.	710 g max.	715 g max.	1,545 g max.

^{*1} This is the estimated time when the luminous intensity is decreased by 50% per LED at room temperature and humidity. It is a typical value.

Functionality

Specifications	NB3Q		NB5Q		NB7W		NB10W
	TW00B	TW01B	TW00B	TW01B	TW00B	TW01B	TW01B
Internal memory	128MB (including system area)						
Memory interface	– USB Memory		– USB Memory		– USB Memory		USB Memory
Serial (COM1)	RS-232C/422A/485 (not isolated), Transmission distance: 15m Max. (RS-232C), 500m Max. (RS-422A/485), Connector: D-Sub 9-pin		RS-232C, Transmission distance: 15 m Max., Connector: D-Sub 9-pin				
Serial (COM2)	–		RS-232C/422A/485 (not isolated), Transmission distance: 15m Max. (RS-232C), 500m Max. (RS-422A/485), Connector: D-Sub 9-pin				
USB Host	Equivalent to USB 2.0 full speed, type A, Output power 5V, 150mA						
USB Slave	Equivalent to USB 2.0 full speed, type B, Transmission distance: 5m						
Printer connection	PictBridge support						
Ethernet	–	10/100 base-T	–	10/100 base-T	–	10/100 base-T	10/100 base-T

General

Specifications	NB3Q		NB5Q		NB7W		NB10W
	TW00B	TW01B	TW00B	TW01B	TW00B	TW01B	TW01B
Line voltage	20.4 to 27.6 VDC (24 VDC –15 to 15%)						
Power consumption	5 W	9 W	6 W	10 W	7 W	11 W	14 W
Battery lifetime	5 years (at 25°C)						
Enclosure rating (front side)	Front operation part: IP65 (Dust proof and drip proof only from the front of the panel)						
Obtained standards	EC Directives, KC, cUL508						
Operating environment	No corrosive gases.						
Noise immunity	Compliant with IEC61000-4-4, 2KV (Power cable)						
Ambient operating temperature	0 to 50°C						
Ambient operating humidity	10% to 90% RH (without condensation)						

Applicable Controllers

Brand	Series	Brand	Series
OMRON	Omron C Series Host Link	Schneider	Schneider Modicon Uni-TelWay
	Omron CJ/CS Series Host Link		Schneider Twido Modbus RTU
	Omron CP Series	Delta	Delta DVP
Mitsubishi	Mitsubishi Q_QnA (Link Port)	LG (LS)	LS Master-K Cnet
	Mitsubishi FX-485ADP/485BD/422BD (Multi-station)		LS Master-K CPU Direct
	Mitsubishi FX0N/1N/2N/3G		LS Master-K Modbus RTU
	Mitsubishi FX1S		LS XGT CPU Direct
	Mitsubishi FX2N-10GM/20GM		LS XGT Cnet
	Mitsubishi FX3U	GE Fanuc Automation ^{*1}	GE Fanuc Series SNP
	Mitsubishi Q series (CPU Port)		GE SNP-X
	Mitsubishi Q00J (CPU Port)		Modbus
Mitsubishi Q06H	Modbus RTU		
Panasonic	FP series	Modbus RTU Slave	
Siemens	Siemens S7-200	Modbus RTU Extend	
	Siemens S7-300/400 (PC Adapter Direct)	Modbus TCP	
Allen-Bradley ^{*1} (Rockwell)	AB DF1		
	AB CompactLogix/ControlLogix		

^{*1} AB and GE will be supported by NB-Designer version 1.20 or higher.

Note: For details, refer to NB Series Host Connection Manual (Cat.No V108).

HMI with four text lines and 22 F-keys



The NT11 is a Function key HMI with four text lines that can each hold up to 20 characters. It has a parallel printer connection next to a serial port for connection to a PLC. It has a LED backlight that has a life expectancy of at least 50,000 hours.

- Easy programming software.
- Small size and installation depth.
- Customisable F-Keys
- Printer connection.
- Cost effective solution.

Ordering information

Type			Order code
STN monochrome	Ten-key type	Ivory	NT11-SF121-EV1
		Black	NT11-SF121B-EV1

Accessories

Type	Description		Order code	
Cables	For screen transfer		XW2Z-S002	
	For PLC connection	PT: 9-pin PLC: 9-pin	Cable length: 2 m Cable length: 5 m	XW2Z-200T XW2Z-500T
		PT: 9-pin PLC: Mini-peripheral	Cable length: 2 m	NT-CN221

Software

Type	Order code
NTST Version 4.8	NTZJCAT1EV4
Upgrade NTST Version 4.8	NTZJCAT1EV4S

Specifications

Size in mm (HxWxD)	113×218×38.2
Effective display area	100×40mm (160×64 pixels)
Line voltage	24 VDC ±15%
Function keys	22 keys
Touch panel	–
Obtained standards	CE, cULus
No. of display characters (standard characters)	20 characters × 4 lines
No. of registered screens	250
Screen data capacity (standard)	32 KB
Expansion memory	–
Memory card interface	–
Printer connection	Supported
Backlight life	50,000 hours average



HMI with two text lines, 6 or 20 F-keys and up to two serial ports

The NT2S is the smallest HMI that we can offer you. It is based on a 16 × 2 lines LCD display with 6 or 20 Function keys. It offers IP65 protection, an optional RTC and printer connection.

- Easy and free programming software.
- Small size and installation depth.
- Real Time Clock (depending on model).
- Printer connection (depending on model).
- Cost effective solution.

Ordering information

Type			Order code
STN monochrome	Programmable	6-key type, Black	NT2S-SF121B-EV2
			NT2S-SF122B-EV2
	PLC controlled	20-key type, Black	NT2S-SF123B-EV2
			NT2S-SF125B-E
Programmable	20-key type, Black	NT2S-SF126B-E	
		PLC controlled	NT2S-SF127B-E

Accessories

Type	Description	Order code
NT2S-SF121/125 and NT3S	peripheral port CPM series except CPM2C, 2 m	NT2S-CN212-V1
NT2S-SF121/125 and NT3S	peripheral port CPM series except CPM2C, 5 m	NT2S-CN215-V1
NT2S-SF122/SF123/SF126/SF127	peripheral port CPM series except CPM2C, 2 m	NT2S-CN222-V1
NT2S-SF122/SF123/SF126/SF127	peripheral port CPM series except CPM2C, 5 m	NT2S-CN225-V2
NT2S-SF121/125 and NT3S	mini-peripheral port CJ1/CS1 and CPM2C series, 2 m	NT2S-CN223-V2
NT2S-SF122/SF123/SF126/SF127	mini-peripheral port CJ1/CS1 and CPM2C series, 2 m	NT2S-CN224-V1
NT2S-SF121/125 and NT3S	serial port CJ1/CS1/CP1/CPM2/CQM1(H), 2 m	NT2S-CN232-V1
NT2S-SF121/125 and NT3S	serial port CJ1/CS1/CP1/CPM2/CQM1(H), 5 m	NT2S-CN235-V1
NT2S-SF122/SF126	serial port CJ1/CS1/CP1/CPM2/CQM1(H), 2 m	NT2S-CN242-V1
All NT2S and NT3S models	serial programming cable, 2 m	NT2S-CN002

Software

Type	Order code
This software is provided free of charge and features Windows fonts, a Multi language import/export utility, a character map to design your own characters and can be used to place bitmaps in your application.	NTXS

Specifications

Size in mm (H×W×D)	60×109×43 (6 F-keys), 107×107×43 (20 F-keys)
Effective display area	56×11 mm
Line voltage	24 VDC ±10%
Touch panel	–
Obtained standards	CE, cULus
No. of display characters (standard characters)	16 characters x 2 lines
No. of registered screens	65,000 max.
Screen data capacity (standard)	24 KB in Programmable models
Expansion memory	–
Memory card interface	–
Internal memory	1K words data, 1K words retentative memory
Printer connection	Supported
Multi-Vendor support	Supported for several non-Omron PLCs. *1
Backlight life	LED, min. 50,000 hours

*1 Please contact Omron for a list of available drivers.





Coming soon

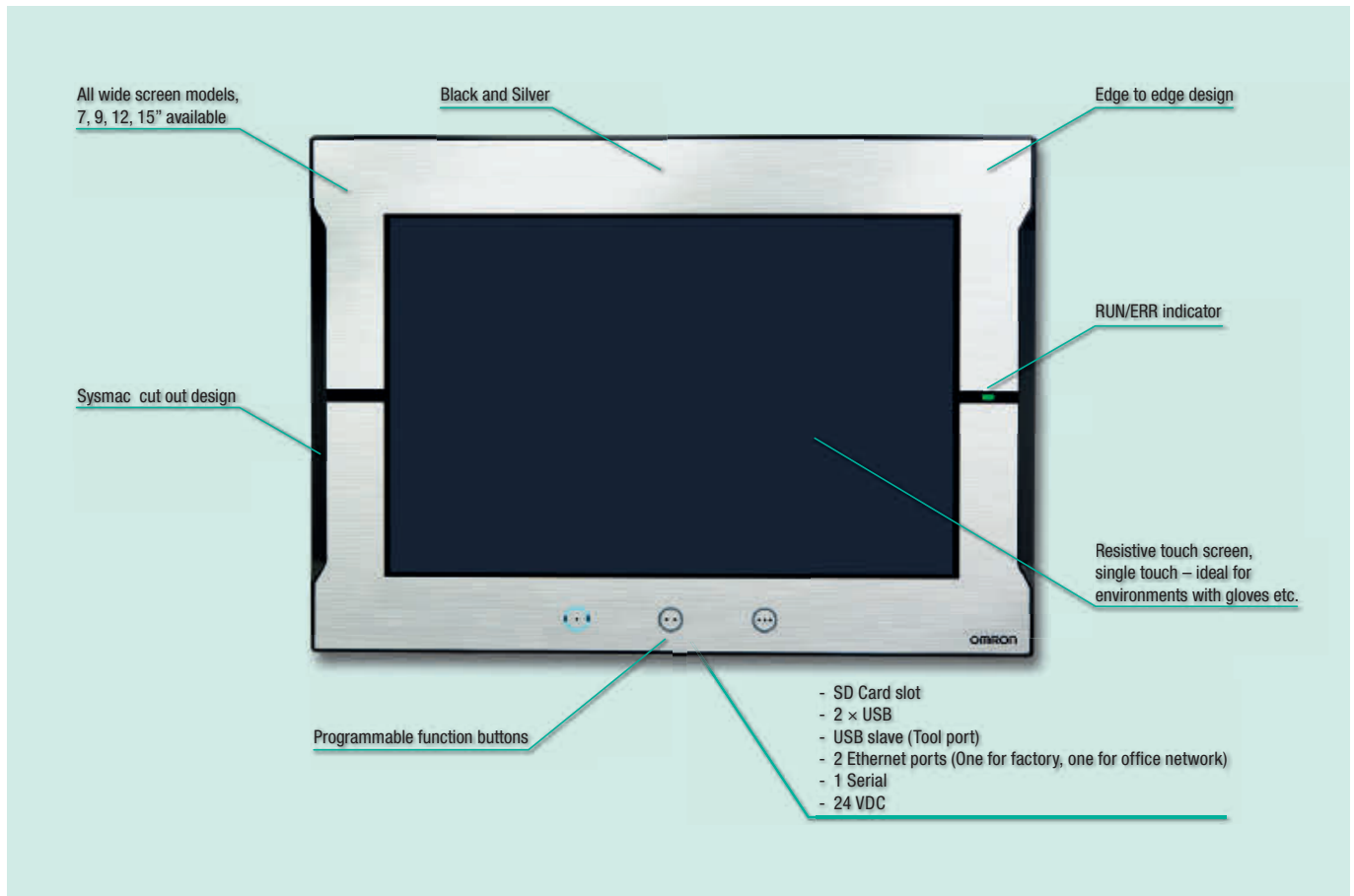
The next generation of Machine Interface

An HMI that is dynamic, intuitive and predictive makes industrial machines more attractive and competitive. The Omron Sysmac HMI enables faster, more efficient control and monitoring—and a more natural, proactive relationship between operator and machine.

The design has been based on real applications and customer requirements, a future-proofed, scalable platform that will evolve with their ever-changing needs, allowing real time reaction to events

- Complete functionality scalable with widescreen across 7", 9", 12", 15" range
- Available in black or silver
- High resolution (1280 × 800 pixel for 12" and 15", 800 × 480 pixel for 7" and 9")
- Coming soon. Please contact your Omron representative




















System overview



Note: Coming soon. Please contact your Omron representative.

Ordering information

I/O cables

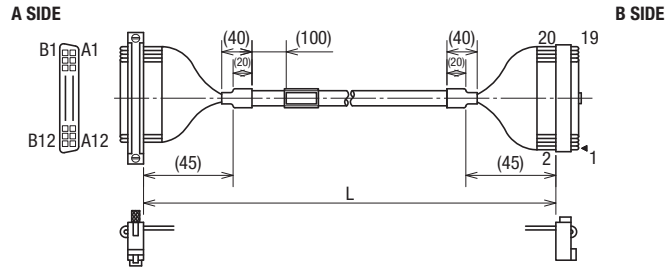
Shape	PLC connection	Terminal connection	Length in cm										Wiring	Order code		
			30	50	75	100	150	200	250	300	400	500				
	FCN24	MIL20	-	■	-	■	-	■	-	■	-	■	-	■	Straight	XW2Z-[...]AD-L
		Open ends	-	-	-	■	-	■	-	■	-	■	-	■	n. a.	XW2Z-[...]AL-L
	FCN40	MIL20 × 2	-	-	-	■	■	■	-	■	■	■	-	■	Straight	XW2Z-[...]BH-L01
			Reverse	-	-	-	■	■	■	-	■	■	■	-	■	XW2Z-[...]BH-L02
		MIL40	-	■	-	■	■	■	-	■	-	■	-	■	Straight	XW2Z-[...]BF-L
	Open ends	-	-	-	■	-	■	-	■	-	■	-	■	n. a.	XW2Z-[...]BN-L	
	FCN56	MIL20 × 3	-	-	-	-	■	■	-	■	-	-	-	Straight	XW2Z-[...]CJ-L01	
			Reverse	-	-	-	-	■	■	-	■	-	-	-	XW2Z-[...]CJ-L02	
		MIL20 + MIL40	-	-	-	-	■	■	-	-	-	-	-	-	Straight	XW2Z-[...]CK-L01
	Reverse	-	-	-	-	■	■	-	-	-	-	-	-	XW2Z-[...]CK-L02		
	MIL60	-	-	-	■	-	■	-	■	-	-	-	-	Straight	XW2Z-[...]CG-L	
	MIL20	MIL20	-	■	-	■	-	■	-	-	-	-	-	Straight	XW2Z-[...]DD-L	
		Open ends	-	■	-	■	■	■	-	■	-	■	-	■	n. a.	XW2Z-[...]DL-L
		Fork terminals	-	■	-	■	■	■	-	■	-	■	-	■	n. a.	XW2Z-[...]DM-L
	MIL34	MIL34	-	-	-	-	-	■	-	-	-	-	-	Straight	XW2Z-[...]EE-L	
	MIL40	MIL20 × 2	-	-	■	■	-	■	-	■	-	■	-	■	Reverse	XW2Z-[...]FH-L01
			Straight	-	-	■	■	-	■	-	■	-	■	-	■	XW2Z-[...]FH-L02
		MIL40	■	■	-	■	■	■	-	■	-	■	-	■	Straight	XW2Z-[...]FF-L
	Open ends	-	-	-	■	■	■	■	■	-	■	-	■	n. a.	XW2Z-[...]FN-L	

Note: For [...] fill in the 4-digit length in cm

I/O cables XW2Z

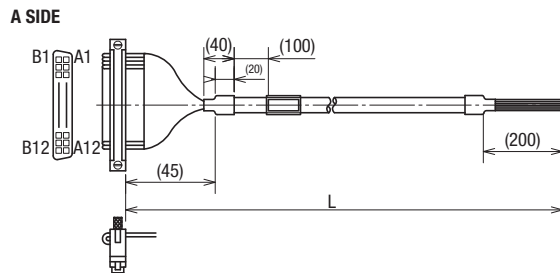
XW2Z-_AD-L

PLC connection	Terminal connection	Wiring	Length in cm (L)							Order code					
			30	50	75	100	150	200	250		300	400	500		
24-pin FCN Connector	20-pin MIL Connector	Straight	-	■	-	-	-	-	-	-	-	-	-	XW2Z-0050AD-L	
			-	-	-	■	-	-	-	-	-	-	-	XW2Z-0100AD-L	
			-	-	-	-	-	■	-	-	-	-	-	-	XW2Z-0200AD-L
			-	-	-	-	-	-	-	■	-	-	-	-	XW2Z-0300AD-L



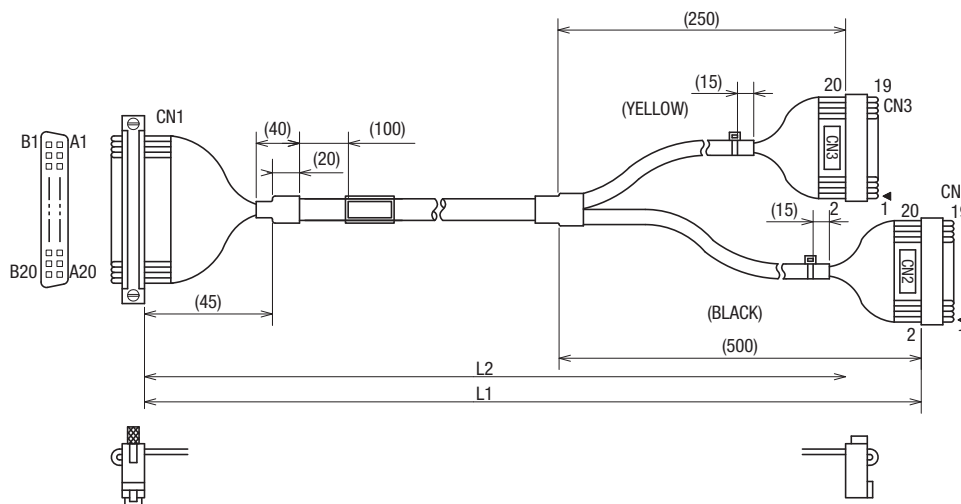
XW2Z-_AL-L

PLC connection	Terminal connection	Wiring	Length in cm (L)							Order code				
			30	50	75	100	150	200	250		300	400	500	
24-pin FCN	Loose Wires	Straight	-	-	-	■	-	-	-	-	-	-	-	XW2Z-0100AL-L
			-	-	-	-	-	■	-	-	-	-	-	XW2Z-0200AL-L
			-	-	-	-	-	-	-	■	-	-	-	-



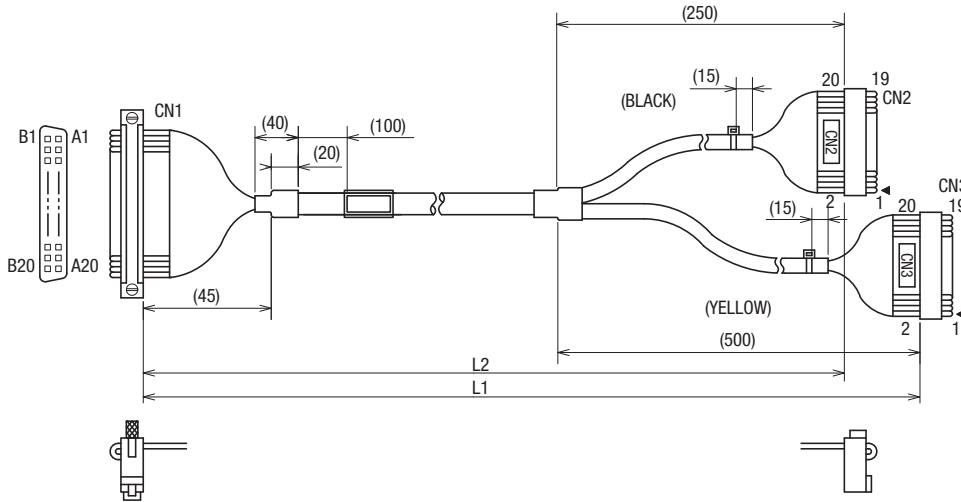
XW2Z-_BH-L01

PLC connection	Terminal connection	Wiring	Length in cm (L1)					Length in cm (L2)					Order code			
			100	150	200	300	400	500	75	125	175	275		375	475	
40-pin FCN	Two 20-pin MIL	Straight	■	-	-	-	-	-	■	-	-	-	-	-	-	XW2Z-0100BH-L01
			-	■	-	-	-	-	-	■	-	-	-	-	-	XW2Z-0150BH-L01
			-	-	■	-	-	-	-	-	■	-	-	-	-	XW2Z-0200BH-L01
			-	-	-	■	-	-	-	-	-	■	-	-	-	XW2Z-0300BH-L01
			-	-	-	-	■	-	-	-	-	-	■	-	-	XW2Z-0400BH-L01
			-	-	-	-	-	-	■	-	-	-	-	-	■	-



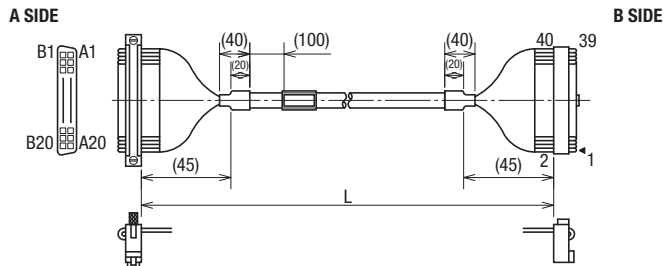
XW2Z-_BH-L02

PLC connection	Terminal connection	Wiring	Length in cm (L1)					Length in cm (L2)					Order code		
			100	150	200	300	400	500	75	125	175	275		375	475
40-pin FCN	Two 20-pin MIL	Reverse	■	-	-	-	-	-	■	-	-	-	-	-	XW2Z-0100BH-L02
			-	■	-	-	-	-	-	■	-	-	-	-	XW2Z-0150BH-L02
			-	-	■	-	-	-	-	-	■	-	-	-	XW2Z-0200BH-L02
			-	-	-	■	-	-	-	-	-	■	-	-	XW2Z-0300BH-L02
			-	-	-	-	■	-	-	-	-	-	■	-	XW2Z-0400BH-L02
			-	-	-	-	-	■	-	-	-	-	-	■	XW2Z-0500BH-L02



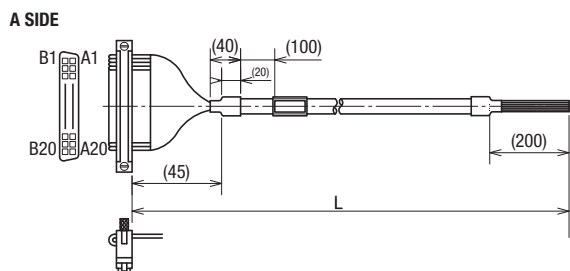
XW2Z-_BF-L

PLC connection	Terminal connection	Wiring	Length in cm (L)										Order code	
			30	50	75	100	150	200	250	300	400	500		
40-pin FCN	40-pin MIL	Straight	-	■	-	-	-	-	-	-	-	-	-	XW2Z-0050BF-L
			-	-	-	■	-	-	-	-	-	-	-	XW2Z-0100BF-L
			-	-	-	-	■	-	-	-	-	-	-	XW2Z-0150BF-L
			-	-	-	-	-	■	-	-	-	-	-	XW2Z-0200BF-L
			-	-	-	-	-	-	-	■	-	-	-	XW2Z-0300BF-L
			-	-	-	-	-	-	-	-	-	■	-	XW2Z-0500BF-L



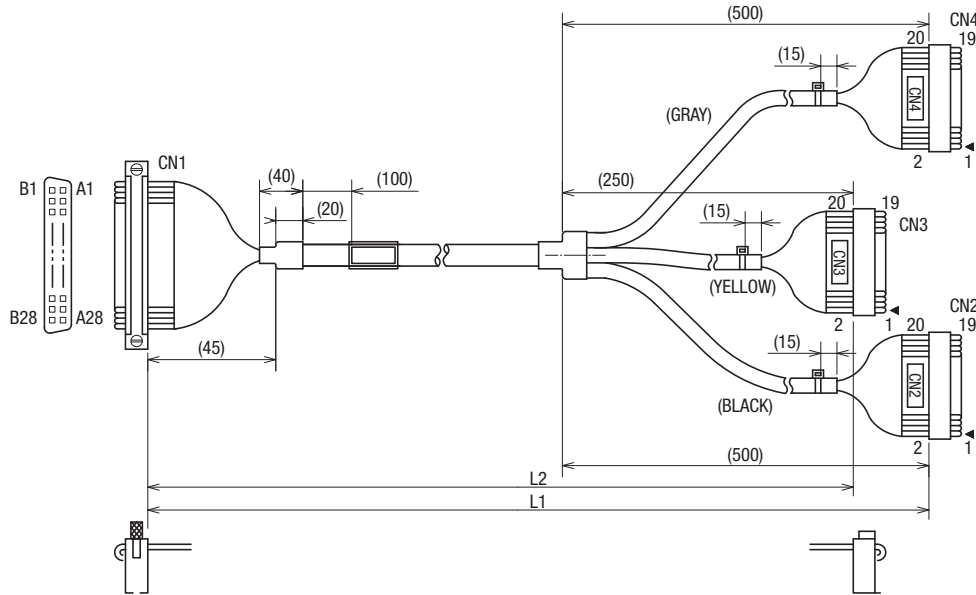
XW2Z-_BN-L

PLC connection	Terminal connection	Wiring	Length in cm (L)										Order code
			30	50	75	100	150	200	250	300	400	500	
40-pin FCN	Loose Wires	Straight	-	-	-	■	-	-	-	-	-	-	XW2Z-0100BN-L
			-	-	-	-	■	-	-	-	-	-	XW2Z-0200BN-L
			-	-	-	-	-	■	-	-	-	-	XW2Z-0300BN-L
			-	-	-	-	-	-	■	-	-	-	XW2Z-0500BN-L
			-	-	-	-	-	-	-	-	-	■	-



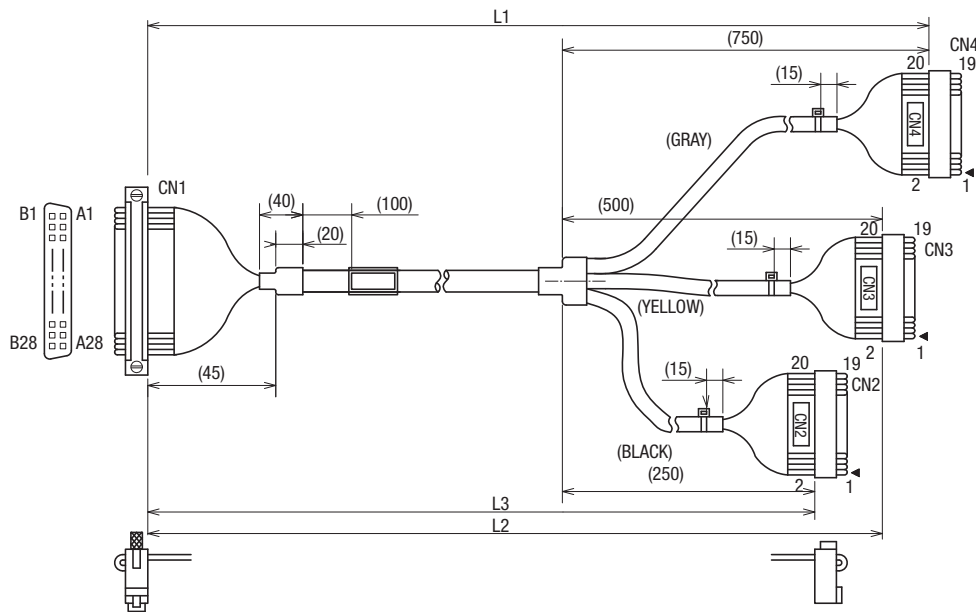
XW2Z- _CJ-L01

PLC connection	Terminal connection	Wiring	Length in cm (L1)					Length in cm (L2)					Order code			
			100	150	200	300	400	500	75	125	175	275		375	475	
56-pin FCN	Three 20-pin MIL	Straight	-	■	-	-	-	-	-	■	-	-	-	-	-	XW2Z-0150CJ-L01
			-	-	■	-	-	-	-	-	■	-	-	-	-	XW2Z-0200CJ-L01
			-	-	-	■	-	-	-	-	-	■	-	-	-	XW2Z-0300CJ-L01



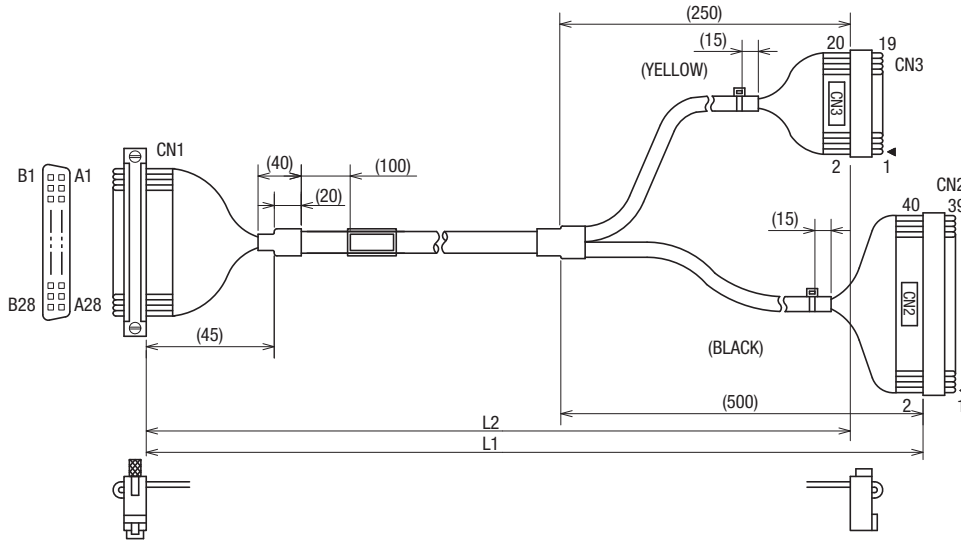
XW2Z- _CJ-L02

PLC connection	Terminal connection	Wiring	Length in cm (L1)					Length in cm (L2)					Length in cm (L3)					Order code				
			100	150	200	300	400	500	75	125	175	275	375	475	50	100	150		250	300		
56-pin FCN	Three 20-pin MIL	Reverse	-	■	-	-	-	-	-	■	-	-	-	-	-	■	-	-	-	-	XW2Z-0150CJ-L02	
			-	-	■	-	-	-	-	-	-	■	-	-	-	-	-	■	-	-	-	XW2Z-0200CJ-L02
			-	-	-	■	-	-	-	-	-	-	-	■	-	-	-	-	■	-	-	XW2Z-0300CJ-L02



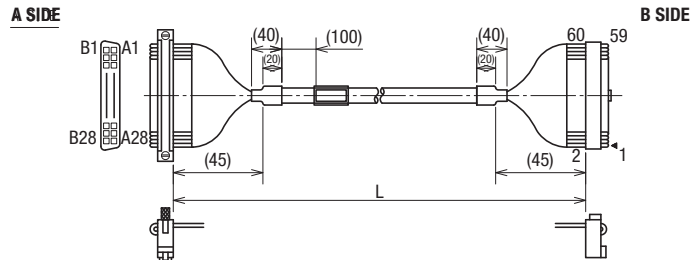
XW2Z-CK-L0

PLC connection	Terminal connection	Wiring	Length in cm (L1)					Length in cm (L2)					Order code	
			100	150	200	300	400	500	75	125	175	275		375
56-pin	40-pin MIL	Straight	-	■	-	-	-	-	■	-	-	-	-	XW2Z-0150CK-L01
		Reverse	-	■	-	-	-	-	■	-	-	-	-	XW2Z-0150CK-L02
		Straight	-	-	■	-	-	-	-	■	-	-	-	XW2Z-0200CK-L01
		Reverse	-	-	■	-	-	-	-	■	-	-	-	XW2Z-0200CK-L02



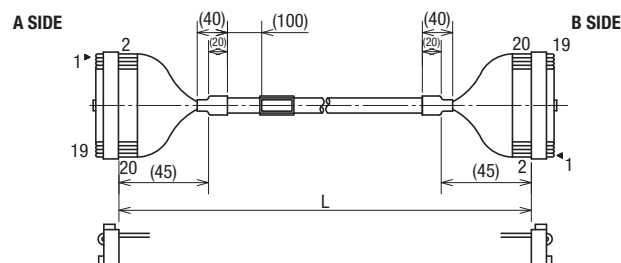
XW2Z-CG-L

PLC connection	Terminal connection	Wiring	Length in cm (L)								Order code		
			30	50	75	100	150	200	250	300		400	500
56-pin FCN	60-pin MIL	Straight	-	-	-	■	-	-	-	-	-	-	XW2Z-0100CG-L
			-	-	-	-	■	-	-	-	-	-	XW2Z-0200CG-L
			-	-	-	-	-	-	■	-	-	-	XW2Z-0300CG-L



XW2Z-DD-L

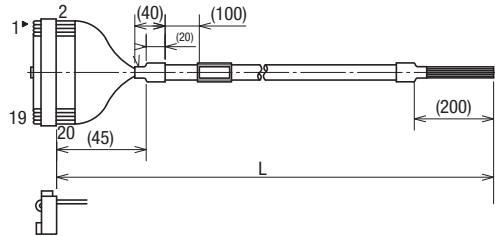
PLC connection	Terminal connection	Wiring	Length in cm (L)								Order code		
			30	50	75	100	150	200	250	300		400	500
20-pin MIL	20-pin MIL	Straight	-	■	-	-	-	-	-	-	-	-	XW2Z-0050DD-L
			-	-	-	■	-	-	-	-	-	-	XW2Z-0100DD-L
			-	-	-	-	-	■	-	-	-	-	XW2Z-0200DD-L



XW2Z-_DL-L

PLC connection	Terminal connection	Wiring	Length in cm (L1)								Order code			
			30	50	75	100	150	200	250	300		400	500	
20-pin MIL	Loose Wires	Straight	-	■	-	-	-	-	-	-	-	-	XW2Z-0050DL-L	
			-	-	-	■	-	-	-	-	-	-	-	XW2Z-0100DL-L
			-	-	-	-	■	-	-	-	-	-	-	XW2Z-0150DL-L
			-	-	-	-	-	■	-	-	-	-	-	XW2Z-0200DL-L
			-	-	-	-	-	-	■	-	-	-	-	XW2Z-0300DL-L
			-	-	-	-	-	-	-	■	-	-	-	XW2Z-0500DL-L

A SIDE

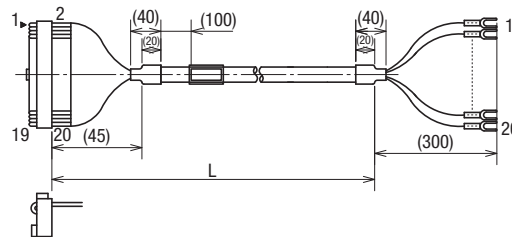


XW2Z-_DM-L

PLC connection	Terminal connection	Wiring	Length in cm (L1)								Order code			
			30	50	75	100	150	200	250	300		400	500	
20-pin MIL	Loose Wires with Fork Terminals	Straight	-	■	-	-	-	-	-	-	-	-	XW2Z-0050DM-L	
			-	-	-	■	-	-	-	-	-	-	-	XW2Z-0100DM-L
			-	-	-	-	■	-	-	-	-	-	-	XW2Z-0150DM-L
			-	-	-	-	-	■	-	-	-	-	-	XW2Z-0200DM-L
			-	-	-	-	-	-	■	-	-	-	-	XW2Z-0300DM-L
			-	-	-	-	-	-	-	■	-	-	-	XW2Z-0500DM-L

A SIDE

B SIDE

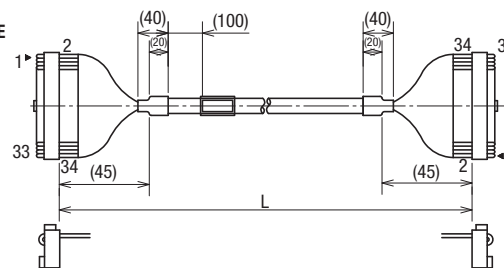


XW2Z-0200EE-L

PLC connection	Terminal connection	Wiring	Length in cm (L1)								Order code		
			30	50	75	100	150	200	250	300		400	500
34-pin MIL	34-pin MIL	Straight	-	-	-	-	-	■	-	-	-	-	XW2Z-0200EE-L

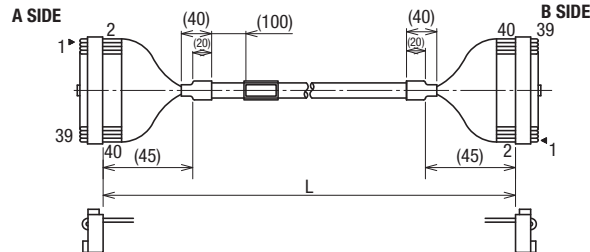
A SIDE

B SIDE



XW2Z-FF-L

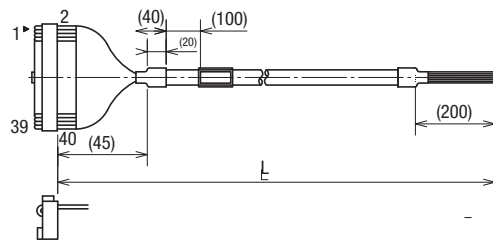
PLC connection	Terminal connection	Wiring	Length in cm (L1)									Order code		
			30	50	75	100	150	200	250	300	400		500	
40-pin MIL	40-pin MIL	Straight	■	-	-	-	-	-	-	-	-	-	XW2Z-0030FF-L	
			-	■	-	-	-	-	-	-	-	-	XW2Z-0050FF-L	
			-	-	■	-	-	-	-	-	-	-	-	XW2Z-0100FF-L
			-	-	-	■	-	-	-	-	-	-	-	XW2Z-0150FF-L
			-	-	-	-	-	■	-	-	-	-	-	XW2Z-0200FF-L
			-	-	-	-	-	-	■	-	-	-	-	XW2Z-0300FF-L
-	-	-	-	-	-	-	-	-	■	-	-	XW2Z-0500FF-L		



XW2Z-FN-L




PLC connection	Terminal connection	Wiring	Length in cm (L1)									Order code		
			30	50	75	100	150	200	250	300	400		500	
40-pin MIL	Loose Wires	Straight	-	-	-	■	-	-	-	-	-	-	XW2Z-0100FN-L	
			-	-	-	-	■	-	-	-	-	-	XW2Z-0150FN-L	
			-	-	-	-	-	■	-	-	-	-	-	XW2Z-0200FN-L
			-	-	-	-	-	-	■	-	-	-	-	XW2Z-0250FN-L
			-	-	-	-	-	-	-	■	-	-	-	XW2Z-0300FN-L
			-	-	-	-	-	-	-	-	-	■	-	XW2Z-0500FN-L

A SIDE

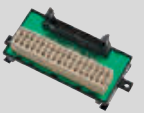




I/O terminal blocks

General purpose I/O terminals

Shape	Connection type	Number of points	Order code
	Push-in	20 pt	XW2R-P20G-T
		34 pt	XW2R-P34G-T
		40 pt	XW2R-P40G-T
		50 pt	XW2R-P50G-T
		60 pt	XW2R-P60G-T
	Clamp	20 pt	XW2R-E20G-T
		34 pt	XW2R-E34G-T
		40 pt	XW2R-E40G-T
		50 pt	XW2R-E50G-T
		60 pt	XW2R-E60G-T
	Screw	20 pt	XW2R-J20G-T
		34 pt	XW2R-J34G-T
		40 pt	XW2R-J40G-T
		50 pt	XW2R-J50G-T
		60 pt	XW2R-J60G-T



Omron PLC I/O terminals

Shape	Connection type	I/O unit type	Order code
	Push-in	32 inputs Fujitsu	XW2R-P34G-C1
		32 inputs MIL	XW2R-P34G-C2
		32 outputs Fujitsu	XW2R-P34G-C3
		32 outputs MIL	XW2R-P34G-C4
	Clamp	32 inputs Fujitsu	XW2R-E34G-C1
		32 inputs MIL	XW2R-E34G-C2
		32 outputs Fujitsu	XW2R-E34G-C3
		32 outputs MIL	XW2R-E34G-C4
	Screw	32 inputs Fujitsu	XW2R-J34G-C1
		32 inputs MIL	XW2R-J34G-C2
		32 outputs Fujitsu	XW2R-J34G-C3
		32 outputs MIL	XW2R-J34G-C4



Accessories

Type	Connector	Specification	Colour	Length	Order code
Ethernet installation cable	none	CAT 5, SF/UTP, 4 × 2 × AWG 24/1 (solid core), Polyurethane (PUR)	Green	100 m	WM IE5IC4x2xAWG24/1-PUR
	none	CAT 5, SF/UTP, 4 × 2 × AWG 26/7 (stranded core), Polyurethane (PUR)		100 m	WM IE5IC4x2xAWG26/7-PUR
Ethernet socket	RJ45 socket	DIN-rail mount socket to terminate installation cable in the cabinet	Grey	60 × 17.5 × 67 mm	WM IE-TO-RJ45-FJ-B
Ethernet field-mount plugs	Metal RJ45	for AWG22 to AWG26	Chrome	52 mm	WM IE-PS-RJ45-FH-BK
	Plastic RJ45	for AWG22 to AWG24	Black	52 mm	XS6G-T421-1

Industrial switching hubs

Shape	Functions	Ports	Failure detection	Power supply voltage	Order code
	Quality of Service (QoS): EtherNet/IP control data priority Failure detection: Broadcast storm and LSI error detection 10/100BASE-TX, Auto-negotiation	3	–	24.0 VDC±5%	W4S1-03B
		5			W4S1-05B
			■		W4S1-05C

EtherCAT junction slave

Shape	Functions	Ports	Power supply voltage	Order code
	Creation of star- and tree topologies in EtherCAT networks. Distributed Clock (DC) is supported.	3	20.4 to 28.8 VDC (24 VDC –15% to 20%)	GX-JC03
		6		GX-JC06



FA Wireless LAN unit

WE70 utilises spread-spectrum modulation technology based on radio waves to enable communication between devices in a limited area. This gives users the mobility to move around within a broad coverage area and still be connected to the network. The smart roaming function enables high speed roaming therefore moving equipment and mobile object can communicate at high speed.

- Conforms to IEEE 802.11a/b/g.
- Same noise and environment resistance level as a PLC.
- Features Omron's original security system.
- Signals can be observed with LED indicators.
- Conforms to radio wave standards for the USA, Europe, and China.

Ordering information

Area	Type	Order code
Europe	Access Point (Master)	WE70-AP-EU
	Client (Slave)	WE70-CL-EU
USA	Access Point (Master)	WE70-AP-US
	Client (Slave)	WE70-CL-US
China	Access Point (Master)	WE70-AP-CN
	Client (Slave)	WE70-CL-CN

Accessories

Type	Specifications	Order code
Directional Magnetic-base Antenna	1 set with two Antennas, 2.4 GHz/5 GHz Dual-band compatible	WE70-AT001H

Type	Order code
DIN Rail Mounting Bracket (for TH35 7.5)	WT30-FT001
DIN Rail Mounting Bracket (for TH35 15)	WT30-FT002
Antenna Extension Cable (5 m)	WE70-CA5M

Note: For Ethernet Cables and Accessories, see page 85

TURNING IDEAS INTO MACHINES THAT WORK...

This section will enable you to select the ideal motion controller, servo drive and inverter solution for your application. Especially created towards customer needs, our products are developed to help you build machines faster, with more flexibility and with total reliability. Because when we say it works, IT WORKS!

For more information on Omron automation solutions, please visit the Scalable Machine Automation mini-site at



www.scalablemachine.info

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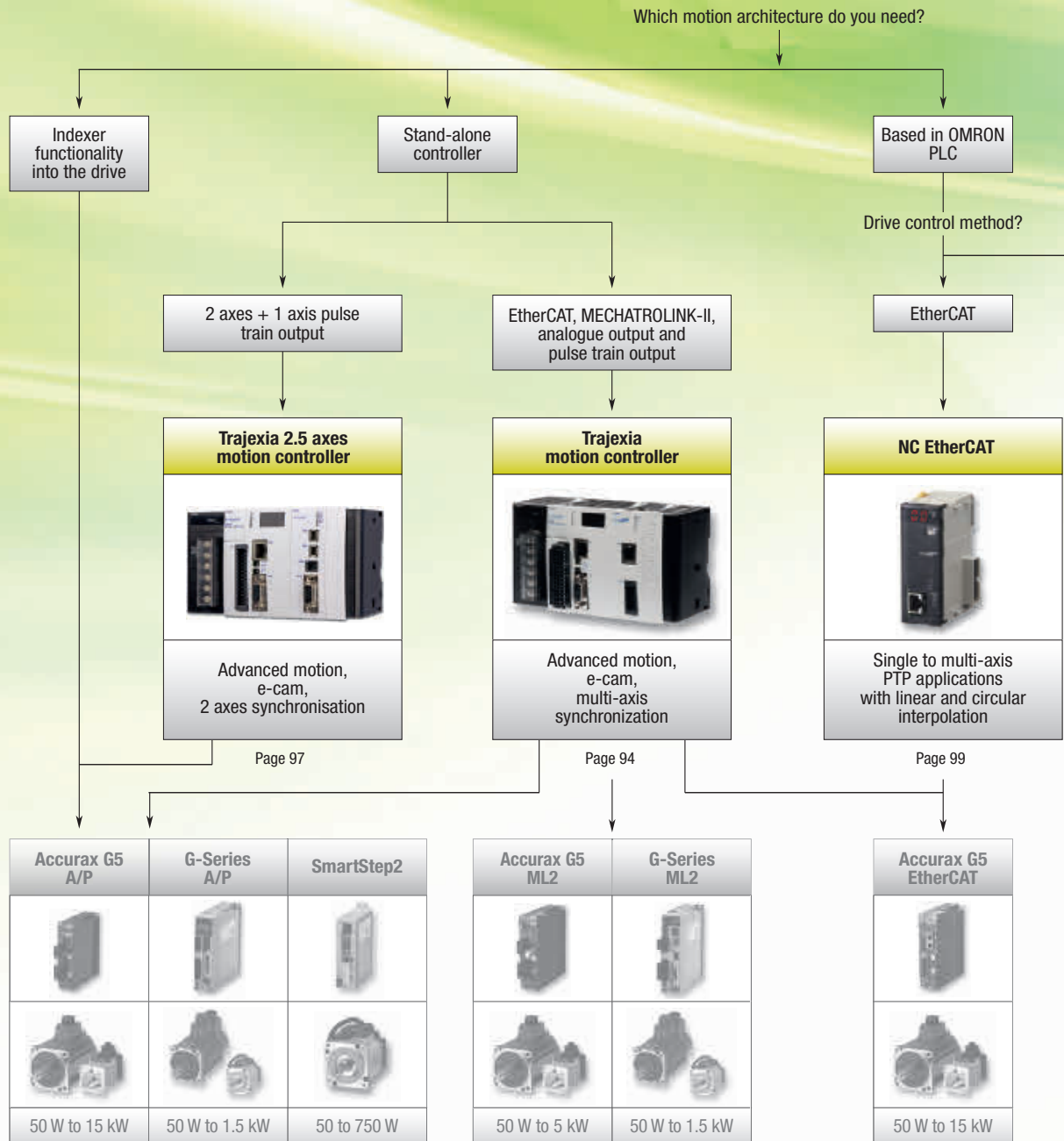
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Motion controllers



MOTION CONTROLLERS

EtherCAT®



CJ-Series PLC with EtherCAT

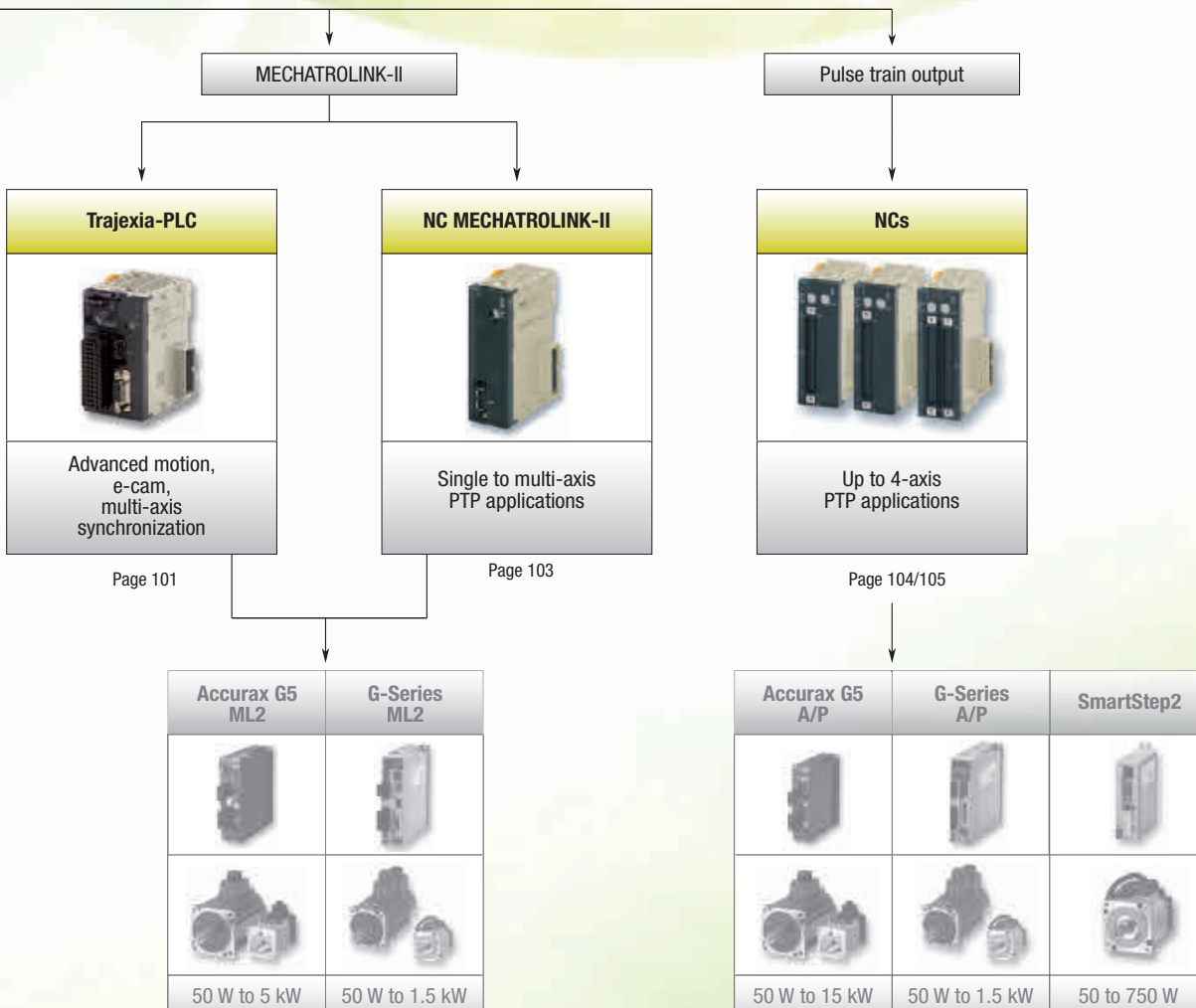
- Position control unit CJ1W-NC with EtherCAT
- Support for up to 16 axes and 64 inverters, vision systems and distributed I/O modules

Trajexia with EtherCAT





- Perfect control of 64 axes
- Scalability with EtherCAT masters for 4, 16 and 64 axes
- Supports servos, inverters, vision systems and distributed I/O modules






EtherCAT®





Motion controllers				
				
Model	Trajexia stand-alone		NC EtherCAT	Trajexia-PLC
	The advanced stand-alone motion controller	Trajexia 2.5 axes motion controller	16-axis point-to-point positioning controller	Advanced multi-axes motion controller in a PLC
Axes control method	EtherCAT, MECHATROLINK-II, analogue output and pulse-train output	2 axes for position, speed and torque control and 1 axis for pulse train output in open loop	EtherCAT	MECHATROLINK-II
Number of axes	4, 16, 64	2	2, 4, 8, 16	4, 30
Applicable servo drive	Accurax G5 and G-Series	Accurax-G5	Accurax G5	Accurax G5 and G-Series
Application	Advanced motion, e-cam, ELS, Phase shift, Registration	Advanced motion, e-cam, ELS, Phase shift, Registration	From simple PTP to multi axis PTP with linear and circular interpolation	Advanced motion, e-cam, ELS, Phase shift, Registration
Servo control mode	Position, speed and torque	Position, speed and torque	Position, speed and torque	Position, speed and torque
PLC series	Stand-alone motion controller: Serial and Ethernet/IP built-in, PROFIBUS-DP, DeviceNet and CANopen communication options	Stand-alone motion controller: Serial and EtherNet/IP built-in, PROFIBUS-DP, DeviceNet and CANopen communication options	CJ	CJ
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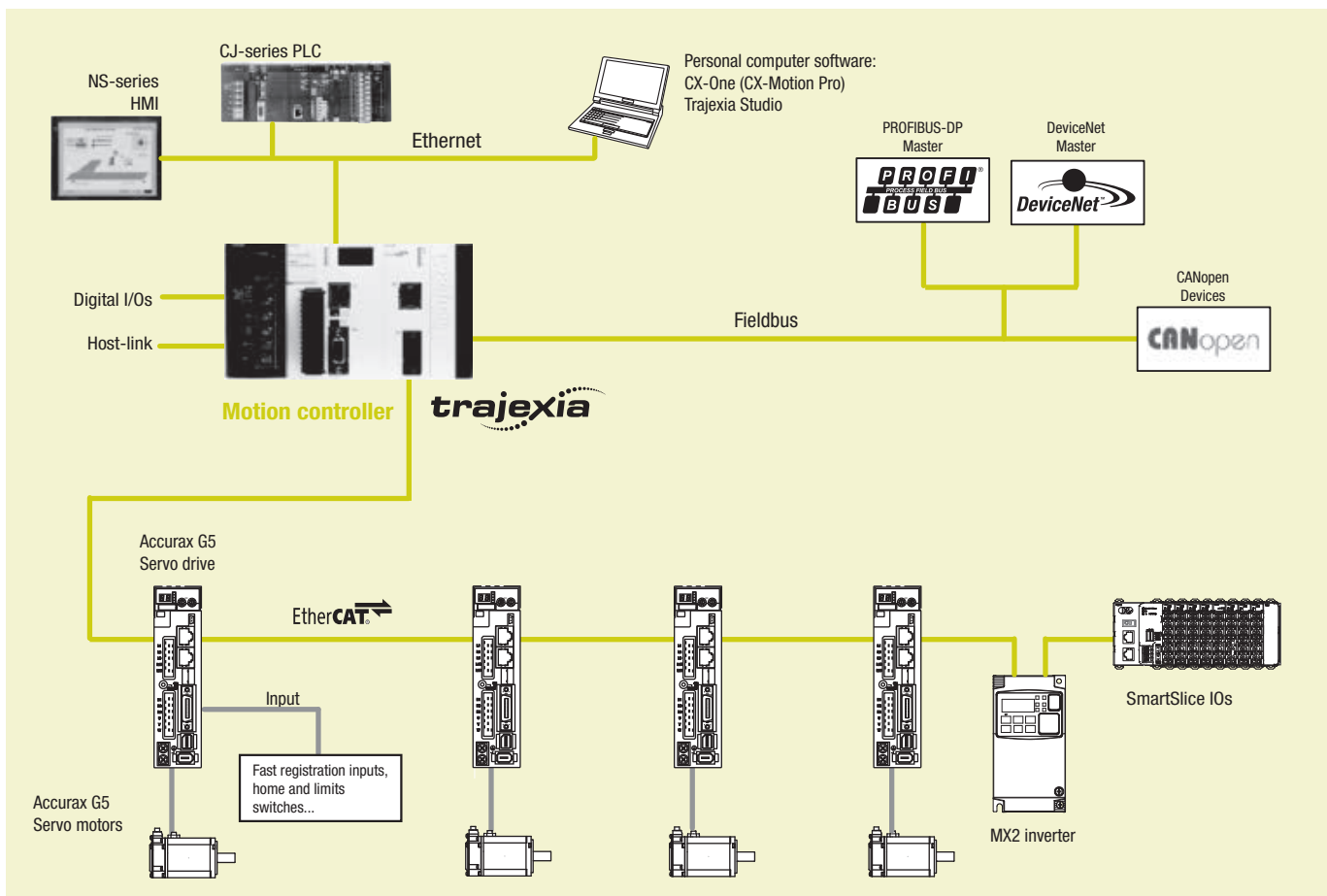
Motion controllers			
			
Model	NC MECHATROLINK-II	CJ1W-NC_3	CJ1W-NC_4
	16-axis point-to-point positioning controller	4-axis point-to-point positioning controller	4-axis point-to-point positioning controller with synchronization
Axes control method	MECHATROLINK-II	Pulse train output	Pulse train output
Number of axes	2, 4, 16	1, 2, 4	2, 4
Applicable servo drive	Accurax G5 and G-Series	SmartStep 2 and Accurax G5	SmartStep 2 and Accurax G5
Application	From simple PTP to multi axis PTP coordinated systems	Point to point applications	Point-to-point with complex interpolations
Servo control mode	Position, speed and torque	Open loop position with linear interpolation	Open loop position with linear and circular interpolation
PLC series	CJ and CS1	CJ an CS1	CJ
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Stand-alone advanced motion controller over EtherCAT

- Perfect motion control of up to 64 axes. Scalability with EtherCAT masters for 4, 16 and 64 axes.
- Supports position, speed and torque control
- Multi-tasking controller capable of running up to 22 tasks simultaneously
- Advanced motion control such as linear, circular, helical or spherical interpolation, electronic cams and gearboxes via simple motion commands.
- Control of servos, inverters, vision systems and distributed I/Os over a single EtherCAT network
- Support for EtherNet/IP communications
- Advanced debugging tools including data trace and oscilloscope functions
- Open communication: Serial and EtherNet/IP built-in, PROFIBUS-DP, DeviceNet and CANopen

Ordering information



Trajexia motion controller

Name	Order code
Trajexia motion controller Unit, up to 64 axes. (Trajexia end cover unit TJ1-TER is included)	TJ2-MC64
Trajexia motion controller unit, up to 16 axes. (Trajexia end cover unit TJ1-TER is included)	TJ1-MC16
Trajexia motion controller unit, up to 4 axes. (Trajexia end cover unit TJ1-TER is included)	TJ1-MC04
Power supply for Trajexia system, 100-240 VAC	CJ1W-PA202
Power supply for Trajexia system, 24 VDC	CJ1W-PD022

Trajexia - axes control modules

Name	Order code
Trajexia EtherCAT master unit (up to 64 servo drives) ^{*1}	TJ2-ECT64
Trajexia EtherCAT master unit (up to 16 servo drives)	TJ2-ECT16
Trajexia EtherCAT master unit (up to 4 servo drives)	TJ2-ECT04
Trajexia MECHATROLINK-II master unit (up to 16 stations) ^{*2}	TJ1-ML16
Trajexia MECHATROLINK-II master unit (up to 4 stations) ^{*2}	TJ1-ML04
Trajexia flexible axis unit (for 2 stations)	TJ1-FL02

^{*1} The number of servo drives is currently limited to 32 when using TJ2-MC64 motion controller with firmware 2.0132.

^{*2} The TJ1-ML04 and TJ1-ML16 supported by the TJ2-MC64 motion controller are V2 (Version 2) and lot number equal or above Lot. No.091019 (YYMMDD).

Trajexia - communication modules

Name	Order code
Trajexia DeviceNet slave unit	TJ1-DRT
Trajexia PROFIBUS-DP slave unit	TJ1-PRT
Trajexia CANopen unit	TJ1-CORT

EtherCAT - related devices

Servo system & frequency inverters

Name	Order code	
Accurax G5 servo drive EtherCAT built-in	R88D-KN___-ECT	
MX2 inverter with EtherCAT option board	Frequency inverter	3G3MX2-A_
	EtherCAT option board	3G3AX-MX2-ECT

Note: Refer to servo systems and frequency inverter sections for detailed specs and ordering information

SmartSlice IOs system

Function	Specification	Order code
SmartSlice interface unit	SmartSlice EtherCAT interface unit	GRT1-ECT
End plate, one unit required per bus interface		GRT1-END
4 NPN inputs	24 VDC, 6 mA, 3-wire connection	GRT1-ID4
4 PNP inputs	24 VDC, 6 mA, 3-wire connection	GRT1-ID4-1
8 NPN inputs	24 VDC, 4 mA, 1-wire connection + 4xG	GRT1-ID8
8 PNP inputs	24 VDC, 4 mA, 1-wire connection + 4xV	GRT1-ID8-1
4 AC inputs	110 VAC, 2-wire connection	GRT1-IA4-1
4 AC inputs	230 VAC, 2-wire connection	GRT1-IA4-2
4 NPN outputs	24 VDC, 500 mA, 2-wire connection	GRT1-OD4
4 PNP outputs	24 VDC, 500 mA, 2-wire connection	GRT1-OD4-1
4 PNP outputs with short-circuit protection	24 VDC, 500 mA, 3-wire connection	GRT1-OD4G-1
4 PNP outputs with short-circuit protection	24 VDC, 2 A, 2-wire connection	GRT1-OD4G-3
8 NPN outputs	24 VDC, 500 mA, 1-wire connection + 4xV	GRT1-OD8
8 PNP outputs	24 VDC, 500 mA, 1-wire connection + 4xG	GRT1-OD8-1
8 PNP outputs with short-circuit protection	24 VDC, 500 mA, 1-wire connection + 4xG	GRT1-OD8G-1
2 relay outputs	240 VAC, 2 A, normally-open contacts	GRT1-ROS2
2 analogue inputs, current/voltage	±10 V, 0-10 V, 0-5 V, 1-5 V, 0-20 mA, 4-20 mA	GRT1-AD2
2 analogue outputs, voltage	±10 V, 0-10 V, 0-5 V, 1-5 V	GRT1-DA2V
2 analogue outputs, current	0-20 mA, 4-20 mA	GRT1-DA2C
2 Pt100 inputs	Pt100, 2-wire or 3-wire connection	GRT1-TS2P
2 Pt1000 inputs	Pt1000, 2-wire or 3-wire connection	GRT1-TS2K
2 Thermocouple inputs	Types B, E, J, K, N, R, S, T, U, W, PL2, with cold junction compensation	GRT1-TS2T

Note: Refer to Automation systems catalogue for detailed specs and accessories information

GX-Series I/O Blocks

Name	Specification	Order code
16 NPN inputs	24 VDC, 6 mA, 1-wire connection, expandable	GX-ID1611
16 PNP inputs	24 VDC, 6 mA, 1-wire connection, expandable	GX-ID1621
16 NPN outputs	24 VDC, 500 mA, 1-wire connection, expandable	GX-OD1611
16 PNP outputs	24 VDC, 500 mA, 1-wire connection, expandable	GX-OD1621
8 inputs and 8 outputs, NPN	24 VDC, 6 mA input, 500 mA output, 1-wire connection	GX-MD1611
8 inputs and 8 outputs, PNP	24 VDC, 6 mA input, 500 mA output, 1-wire connection	GX-MD1621
16 NPN inputs	24 VDC, 6 mA, 3-wire connection	GX-ID1612
16 PNP inputs	24 VDC, 6 mA, 3-wire connection	GX-ID1622
16 NPN outputs	24 VDC, 500 mA, 3-wire connection	GX-OD1612
16 PNP outputs	24 VDC, 500 mA, 3-wire connection	GX-OD1622
8 inputs and 8 outputs, NPN	24 VDC, 6 mA input, 500 mA output, 3-wire connection	GX-MD1612
8 inputs and 8 outputs, PNP	24 VDC, 6 mA input, 500 mA output, 3-wire connection	GX-MD1622
16 relay outputs	250 VAC, 2 A, 1-wire connection, expandable	GX-OC1601
4 analogue inputs, current/voltage	±10 V, 0-10 V, 0-5 V, 1-5 V, 4-20 mA	GX-AD0471
2 analogue outputs, current/voltage	±10 V, 0-10 V, 0-5 V, 1-5 V, 4-20 mA	GX-DA0271
2 encoder open collector inputs	500 kHz Open collector input	GX-EC0211
2 encoder line-driver inputs	4 MHz Line driver input	GX-EC0241

Note: The GX-Series I/O blocks are only supported by the T2-MC64 motion controller and with official firmware release above 2.0132.

Vision system

Name	Specification	Order code
Vision system with EtherCAT interface	NPN	FZM1-350-ECT
	PNP	FZM1-355-ECT
Smart camera with EtherCAT interface	NPN/Color camera	FQ-MS120-ECT
	NPN/Monochrome camera	FQ-MS120-M-ECT
	PNP/Color camera	FQ-MS125-ECT
	PNP/Monochrome camera	FQ-MS125-M-ECT

Note: The vision systems are only supported by the T2-MC64 motion controller and with official firmware release above 2.0132.

MECHATROLINK-II - related devices

Servo system & frequency inverters

Name	Order code
Accurax G5 servo drive ML-II built-in	R88D-KN___-ML2
G-Series servo drive ML-II built-in	R88D-GN___H-ML2
MX2 inverter with MECHATROLINK-II option board	Frequency inverter ML2 option board
	3G3MX2-A_ 3G3AX-MX2-MRT

Note: Refer to servo systems and frequency inverter sections for detailed specs and ordering information

SmartSlice IOs system

Function	Specification	Order code
SmartSlice Interface unit	SmartSlice MECHATROLINK-II interface unit	GRT1-ML2* ¹
End plate, one unit required per bus interface		GRT1-END
4 NPN inputs	24 VDC, 6 mA, 3-wire connection	GRT1-ID4
4 PNP inputs	24 VDC, 6 mA, 3-wire connection	GRT1-ID4-1
8 NPN inputs	24 VDC, 4 mA, 1-wire connection + 4xG	GRT1-ID8
8 PNP inputs	24 VDC, 4 mA, 1-wire connection + 4xV	GRT1-ID8-1
4 AC inputs	110 VAC, 2-wire connection	GRT1-IA4-1
4 AC inputs	230 VAC, 2-wire connection	GRT1-IA4-2
4 NPN outputs	24 VDC, 500 mA, 2-wire connection	GRT1-OD4
4 PNP outputs	24 VDC, 500 mA, 2-wire connection	GRT1-OD4-1
4 PNP outputs with short-circuit protection	24 VDC, 500 mA, 3-wire connection	GRT1-OD4G-1
4 PNP outputs with short-circuit protection	24 VDC, 2 A, 2-wire connection	GRT1-OD4G-3
8 NPN outputs	24 VDC, 500 mA, 1-wire connection + 4xV	GRT1-OD8
8 PNP outputs	24 VDC, 500 mA, 1-wire connection + 4xG	GRT1-OD8-1
8 PNP outputs with short-circuit protection	24 VDC, 500 mA, 1-wire connection + 4xG	GRT1-OD8G-1
2 relay outputs	240 VAC, 2 A, normally-open contacts	GRT1-ROS2
2 analogue inputs, current/voltage	±10 V, 0-10 V, 0-5 V, 1-5 V, 0-20 mA, 4-20 mA	GRT1-AD2
2 analogue outputs, voltage	±10 V, 0-10 V, 0-5 V, 1-5 V	GRT1-DA2V
2 analogue outputs, current	0-20 mA, 4-20 mA	GRT1-DA2C
2 Pt100 inputs	Pt100, 2-wire or 3-wire connection	GRT1-TS2P
2 Pt1000 inputs	Pt1000, 2-wire or 3-wire connection	GRT1-TS2K
2 Thermocouple inputs	Types B, E, J, K, N, R, S, T, U, W, PL2, with cold junction compensation	GRT1-TS2T

*¹ The GRT1-ML2 supports the GRT1-IA4-1, GRT1-IA4-2, GRT1-OD4G-3, GRT1-TS2P, GRT1-TS2K and GRT1-TS2T slice units only in combination with TJ2-MC64 motion controller. They are not supported in combination with TJ1-MC16/04.

Note: Refer to Automation systems catalogue for detailed specs and accessories information

MECHATROLINK-II cables

Name	Remarks	Order code
MECHATROLINK-II cables	0.5 meter	JEPMC-W6003-A5
	1 meter	JEPMC-W6003-01
	3 meters	JEPMC-W6003-03
	5 meters	JEPMC-W6003-05
	10 meters	JEPMC-W6003-10
	20 meters	JEPMC-W6003-20
	30 meters	JEPMC-W6003-30
MECHATROLINK-II terminator	Terminating resistor	JEPMC-W6022
MECHATROLINK-II repeater	Network repeater	JEPMC-REP2000

Computer software

Specifications	Order code
CX-Motion Pro V1.3.3 or higher	CX-One
Trajexia Studio* ¹ V1.3.3 or higher	TJ1-Studio

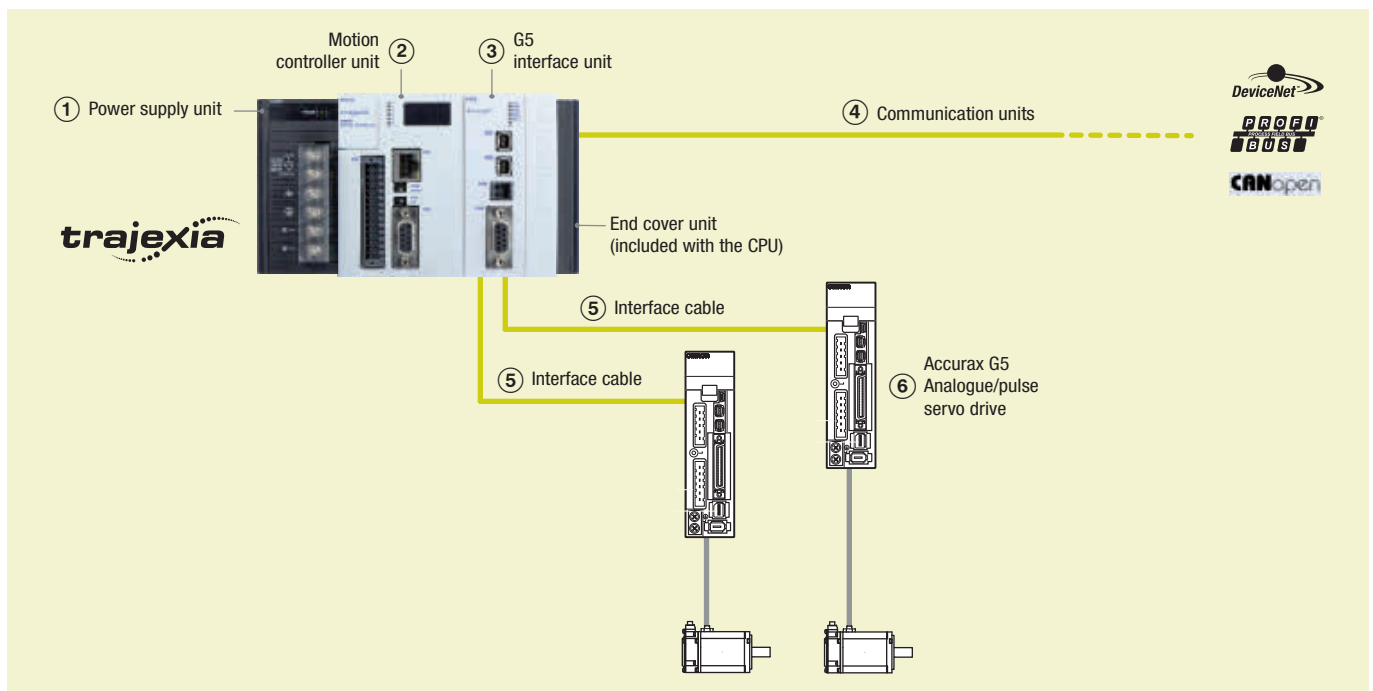
*¹ When the Trajexia Studio software is included in CX-One, then it is called CX-Motion Pro.



Stand-alone motion controller for compact and simple machines

- Perfect motion control of 2 axes
- Supports position, speed and torque control
- Serial port for master encoder axis
- Multi-tasking controller capable of running up to 22 tasks simultaneously
- 2 fast-registration inputs
- Single axis moves and axes interpolation
- Electronic cams and gearboxes
- Motion basic programming and dedicated motion commands
- Open communication: Serial and EtherNet/IP built-in, PROFIBUS-DP, DeviceNet and CANopen options

Ordering information



Trajexia system

Power supply unit

Symbol	Specifications	Order code
①	Power supply unit for Trajexia system (100 to 240 VAC)	CJ1W-PA202
	Power supply unit for Trajexia system (24 VDC)	CJ1W-PD025

Motion controller unit

Symbol	Specifications	Order code
②	Trajexia motion controller unit, up to 64 axes (Trajexia end cover unit TJ1-TER is included)	TJ2-MC64
	Trajexia motion controller unit, up to 2 axes (Trajexia end cover unit TJ1-TER is included)	TJ2-MC02

G5 interface unit

Symbol	Specifications	Order code
③	G5 interface unit	TJ2-KS02

Communication unit

Symbol	Specifications	Order code
④	Trajexia DeviceNet slave unit	TJ1-DRT
	Trajexia PROFIBUS-DP slave unit	TJ1-PRT
	Trajexia CANopen unit	TJ1-CORT

Note: The TJ2-MC02 supports a maximum of one TJ1-CORT unit.
The TJ2-MC02 supports a maximum of one TJ1-PRT or TJ1-DRT unit. No both at the same time.

Accessories

Symbol	Specifications	Order code	
⑤	Interface cable	1 m	TJ2-KC01M
		3 m	TJ2-KC03M

Servo drive related device

Symbol	Specifications	Order code
⑥	Accurax G5 Analogue/pulse servo drive (100 W to 15 kW)	R88D-KT_

Computer software

Specifications	Order code
CX-Motion Pro (version 1.4.2 or higher)	CX-One
Trajexia Studio ^{*1} (version 1.4.2 or higher)	TJ1-Studio

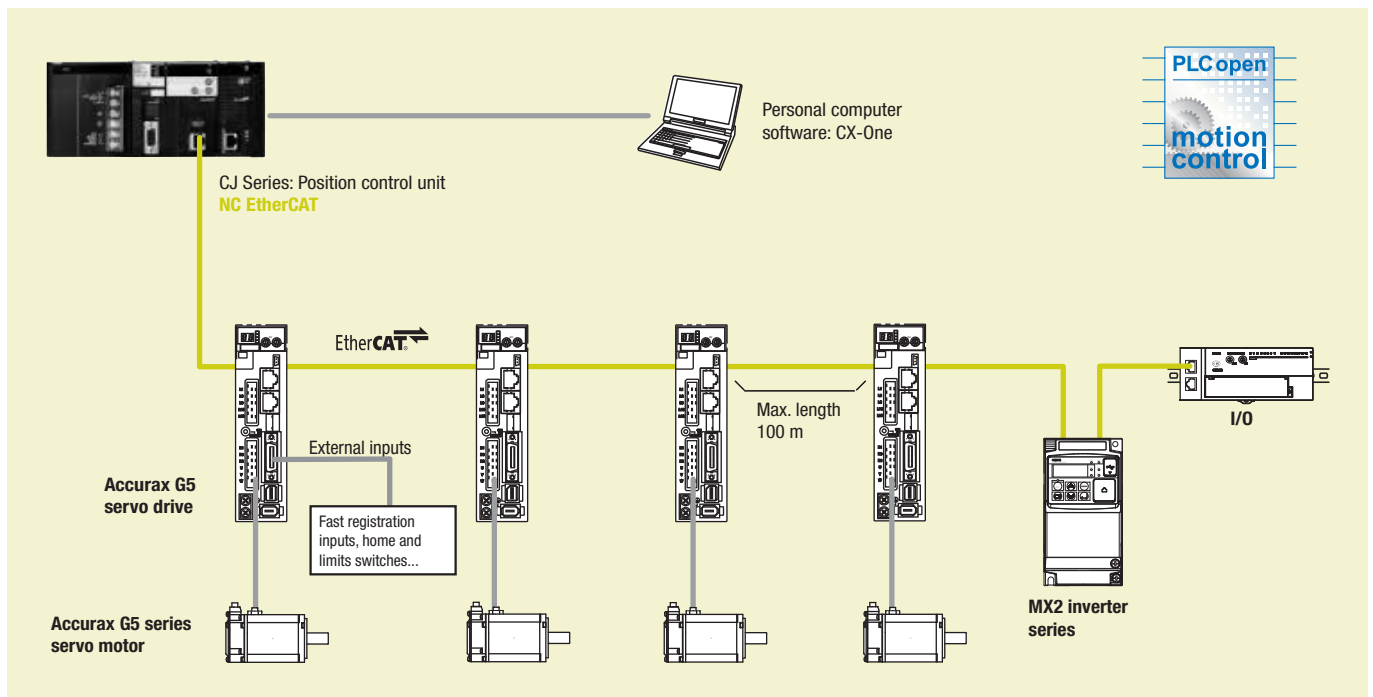
^{*1} When the Trajexia Studio software is included in CX-One, then it is called CX-Motion Pro.



Multi-axis point-to-point positioning controller over EtherCAT

- Position control units with 2, 4, 8 or 16 axes.
- NC_82 models support up to 64 additional nodes: inverters, vision systems and distributed I/Os.
- Linear and circular interpolation.
- Linear and infinite axes management.
- Programming languages: ladder and function blocks. Certified PLCopen motion control function blocks.
- The unit can perform various operation sequences in the memory operation data.
- CX-Programmer software for unit setup, EtherCAT network configuration and PLC programming.

Ordering information



Position controller unit

Name	Order code
Position controller unit - EtherCAT - 16 axes + 64 nodes for remote I/O	CJ1W-NCF82
Position controller unit - EtherCAT - 8 axes + 64 nodes for remote I/O	CJ1W-NC882
Position controller unit - EtherCAT - 4 axes + 64 nodes for remote I/O	CJ1W-NC482
Position controller unit - EtherCAT - 16 axes	CJ1W-NCF81
Position controller unit - EtherCAT - 8 axes	CJ1W-NC881
Position controller unit - EtherCAT - 4 axes	CJ1W-NC481
Position controller unit - EtherCAT - 2 axes	CJ1W-NC281

EtherCAT related devices

Servo system & frequency inverter

Name	Order code	
Accurax G5 servo drive EtherCAT built-in	R88D-KN___-ECT	
MX2 inverter with EtherCAT option board	Frequency inverter	3G3MX2-A_
	EtherCAT option board	3G3AX-MX2-ECT

Note: Refer to servo system and frequency inverter sections for detailed specs and ordering information.

GX-Series I/O Blocks

Name	Order code	
16 NPN inputs	24 VDC, 6 mA, 1-wire connection, expandable	GX-ID1611
16 PNP inputs	24 VDC, 6 mA, 1-wire connection, expandable	GX-ID1621
16 NPN outputs	24 VDC, 500 mA, 1-wire connection, expandable	GX-OD1611
16 PNP outputs	24 VDC, 500 mA, 1-wire connection, expandable	GX-OD1621
8 inputs and 8 outputs, NPN	24 VDC, 6 mA input, 500 mA output, 1-wire connection	GX-MD1611
8 inputs and 8 outputs, PNP	24 VDC, 6 mA input, 500 mA output, 1-wire connection	GX-MD1621

Name		Order code
16 NPN inputs	24 VDC, 6 mA, 3-wire connection	GX-ID1612
16 PNP inputs	24 VDC, 6 mA, 3-wire connection	GX-ID1622
16 NPN outputs	24 VDC, 500 mA, 3-wire connection	GX-OD1612
16 PNP outputs	24 VDC, 500 mA, 3-wire connection	GX-OD1622
8 inputs and 8 outputs, NPN	24 VDC, 6 mA input, 500 mA output, 3-wire connection	GX-MD1612
8 inputs and 8 outputs, PNP	24 VDC, 6 mA input, 500 mA output, 3-wire connection	GX-MD1622
16 relay outputs	250 VAC, 2 A, 1-wire connection, expandable	GX-OC1601
4 analogue inputs, current/voltage	±10 V, 0-10 V, 0-5 V, 1-5 V, 4-20 mA	GX-AD0471
2 analogue outputs, current/voltage	±10 V, 0-10 V, 0-5 V, 1-5 V, 4-20 mA	GX-DA0271
2 encoder open collector inputs	500 kHz Open collector input	GX-EC0211
2 encoder line-driver inputs	4 MHz Line driver input	GX-EC0241

Note: Refer to Automation systems catalogue for detailed specs and ordering information.

Vision system

Name	Specification	Order code
Vision system with EtherCAT interface	NPN	FZM1-350-ECT
	PNP	FZM1-355-ECT

Note: Refer to vision system documentation for detailed specs and ordering information.

Computer software

Specifications	Order code
CX-One version 4 or higher	CX-One
CX-Programmer version 9.12 or higher	CX-Programmer

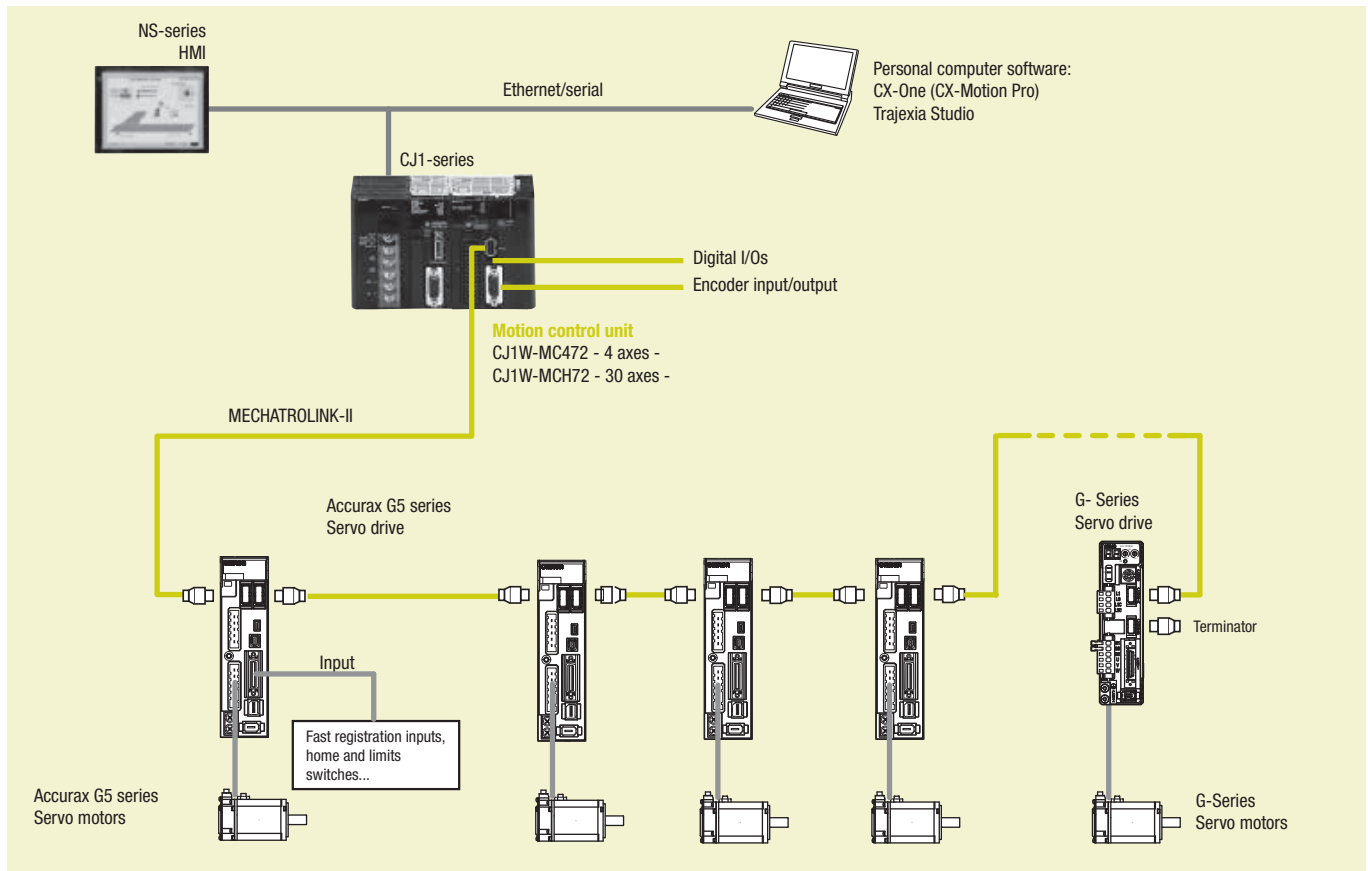


Trajexia motion controller integrated with your PLC

Trajexia, the family of advanced motion controllers that put you in control, now has a compact and integrated version. Meet Trajexia-PLC, the motion controller that has all the flexibility and modularity of Omron PLCs, plus the outstanding motion-control features of the Trajexia platform.

- Control of up to 30 physical axes
- Control of servos and inverters over a single motion network
- Advanced motion control such as CAM control, registration control, interpolation and axes synchronization via simple motion commands
- Serial port for external encoder
- Embedded digital I/Os
- I/O data exchange with the PLC CPU

Ordering information



Motion controller

Name	Model
Trajexia motion control unit, up to 30 MECHATROLINK-II axes	CJ1W-MCH72
Trajexia motion control unit, up to 4 MECHATROLINK-II axes	CJ1W-MC472

MECHATROLINK-II - related devices

Servo system

Name	Model
Accurax G5 servo drive ML-II built-in	R88D-KN____-ML2
G-Series servo drive ML-II built-in	R88D-GN__H-ML2
MX2 inverter with MECHATROLINK-II option board	Frequency inverter 3G3MX2-A_
	MECHATROLINK-II option board 3G3AX-MX2-MRT

Note: Refer to servo systems and frequency inverter sections for detailed specs and ordering information

MECHATROLINK-II cables

Name	Remarks	Model
MECHATROLINK-II cables	0.5 meter	JEPMC-W6003-A5
	1 meter	JEPMC-W6003-01
	3 meters	JEPMC-W6003-03
	5 meters	JEPMC-W6003-05
	10 meters	JEPMC-W6003-10
	20 meters	JEPMC-W6003-20
	30 meters	JEPMC-W6003-30
MECHATROLINK-II terminator	Terminating resistor	JEPMC-W6022
MECHATROLINK-II repeater	Network repeater	JEPMC-REP2000

Computer software

Specifications	Model
CX-Motion Pro V1.3.3 or higher	CX-One
Trajexia Studio ^{*1} V1.3.3 or higher	TJ1-Studio

^{*1} When the Trajexia Studio software is included in CX-One, then it is called CX-Motion Pro.

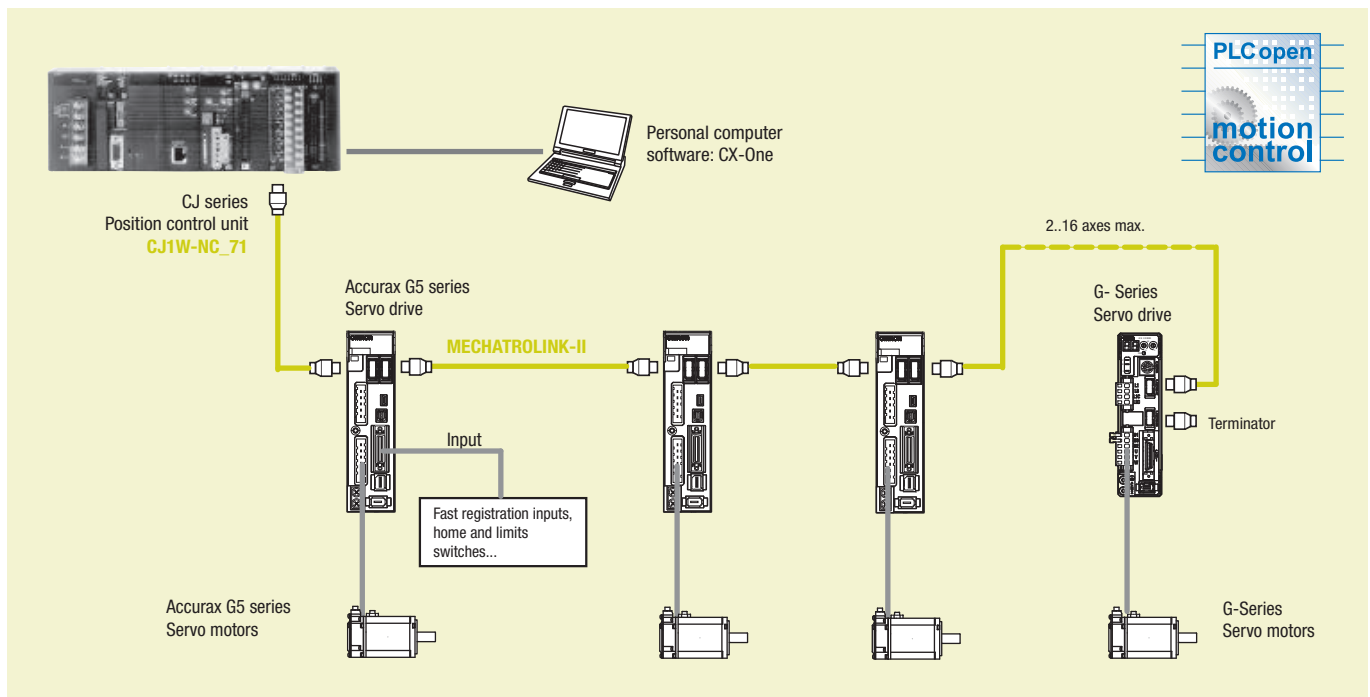


2, 4 and 16-axis point-to-point positioning controller over MECHATROLINK-II

NC_71 is a powerful controller for point-to-point applications. It is based on MECHATROLINK-II motion bus, which reduces programming and development and maintenance costs. Supports PLC open function blocks.

- Supports position, speed and torque control.
- Programming languages: ladder, function blocks. Supports PLC Open Function Blocks.
- Smart active parts for Omron HMIs terminals reduce engineering time.
- Access to the complete system from one point. Network setup, servo drives configuring and monitoring, and PLC programming.

Ordering information



Position controller unit

Name	Order code
MECHATROLINK-II position controller unit - 16 axes	CJ1W-NCF71
MECHATROLINK-II position controller unit - 4 axes	CJ1W-NC471
MECHATROLINK-II position controller unit - 2 axes	CJ1W-NC271

Computer software

Specifications	Order code
CX-One version 2.0 (CX-Motion NCF 1.70 or higher)	CX-One
CX-One version 3.0 (CX-Motion NCF 1.90 or higher)	
CX-One version 4.0 or higher	

MECHATROLINK-II related devices

Servo system

Name	Order code
Accurax G5 servo drive ML-II built-in	R88D-KN__-ML2
G-Series servo drive ML-II built-in	R88D-GN__H-ML2

Note: Refer to servo systems section for detailed specs and ordering information

MECHATROLINK-II cables

Name	Remarks	Order code
MECHATROLINK-II terminator	Terminating resistor	JEPMC-W6022
MECHATROLINK-II cables	0.5 meter	JEPMC-W6003-A5
	1 meter	JEPMC-W6003-01
	3 meters	JEPMC-W6003-03
	5 meters	JEPMC-W6003-05
	10 meters	JEPMC-W6003-10
	20 meters	JEPMC-W6003-20
	30 meters	JEPMC-W6003-30

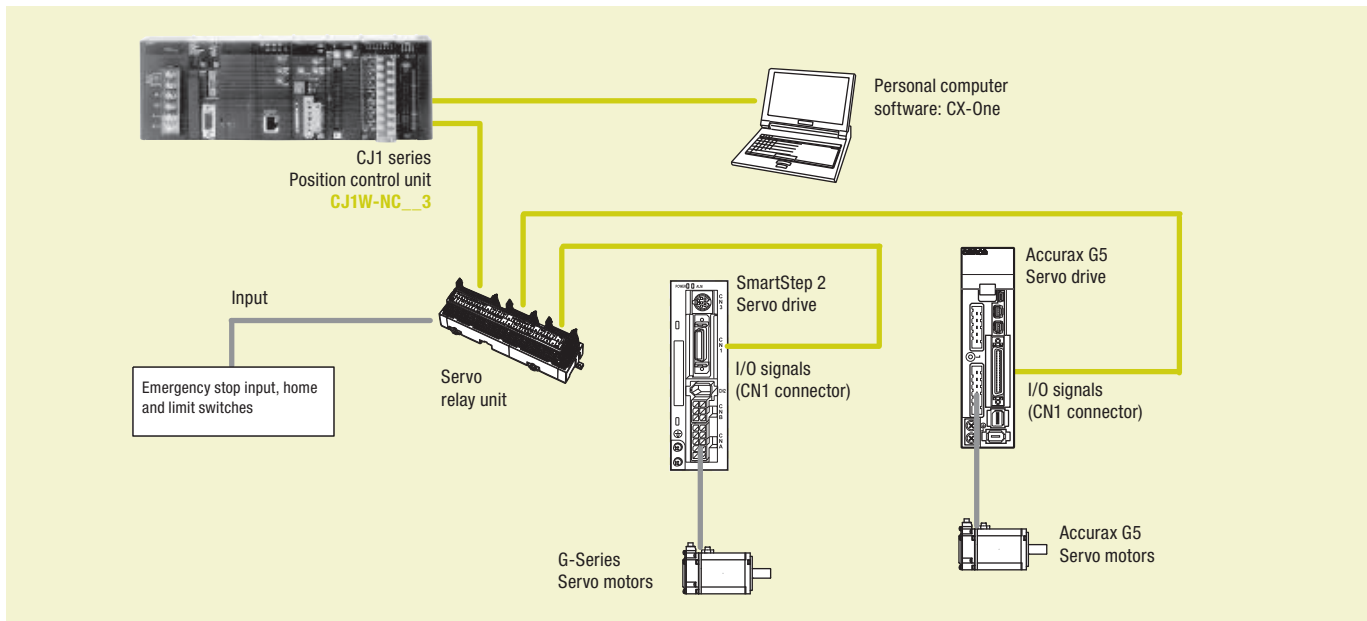


1, 2 or 4-axis point-to-point positioning controller with pulse train output

The NC motion controllers support positioning control via pulse-train outputs. Positioning is performed using trapezoidal or S-curve acceleration and deceleration. Ideal for controlling simple positioning in stepper motors and servos with pulse-train input.

- Positioning can be done by direct ladder commands
- Position and speed control
- Linear interpolation
- Interrupt feeding function
- Positioning of 100 points done from memory
- Positioning data is saved in internal flash memory, eliminating the need to maintain a backup battery.

Ordering information



Position control unit

Name	Model
1 axis position control unit. Open-collector output.	CJ1W-NC113
2 axes position control unit. Open-collector output.	CJ1W-NC213
4 axes position control unit. Open-collector output.	CJ1W-NC413
1 axis position control unit. Line-driver output.	CJ1W-NC133
2 axes position control unit. Line-driver output.	CJ1W-NC233
4 axes position control unit. Line-driver output.	CJ1W-NC433

Servo drive cables

Note: Refer the selected servo systems section for cable and servo relay units information.

Computer software

Specifications	Model
CX-One	CX-One

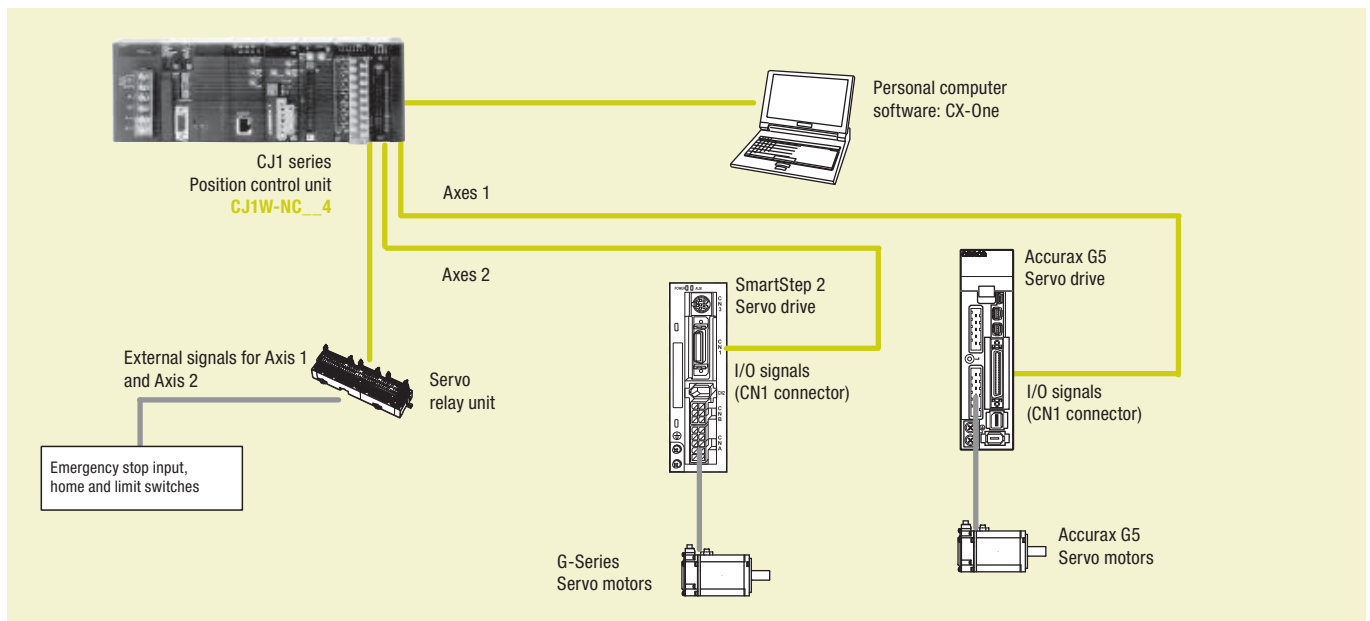


2 or 4-axis point-to-point positioning controller with pulse train output and motion control unit functionality

The NC motion controllers support positioning control via pulse-train outputs. Positioning is performed using trapezoidal or S-curve acceleration and deceleration. Ideal for controlling simple positioning in stepper motors and servos with pulse-train input. When the CJ1W-NC_4 unit is used in a CJ2 CPU, it can perform also synchronous operation by use of electronic CAMs and other function blocks.

- Position and speed control
- Linear interpolation and feeder control function
- Electronic CAM profiles and axes synchronization
- Positioning of 500 points done from memory
- Programming languages: ladder, function blocks.

Ordering information



Position control unit

Name	Model
2 axes position control unit. Open-collector output.	CJ1W-NC214
4 axes position control unit. Open-collector output.	CJ1W-NC414
2 axes position control unit. Line-driver output.	CJ1W-NC234
4 axes position control unit. Line-driver output.	CJ1W-NC434

Servo drive cables

Note: Refer to selected servo systems section for cable and servo relay units information.

Computer software

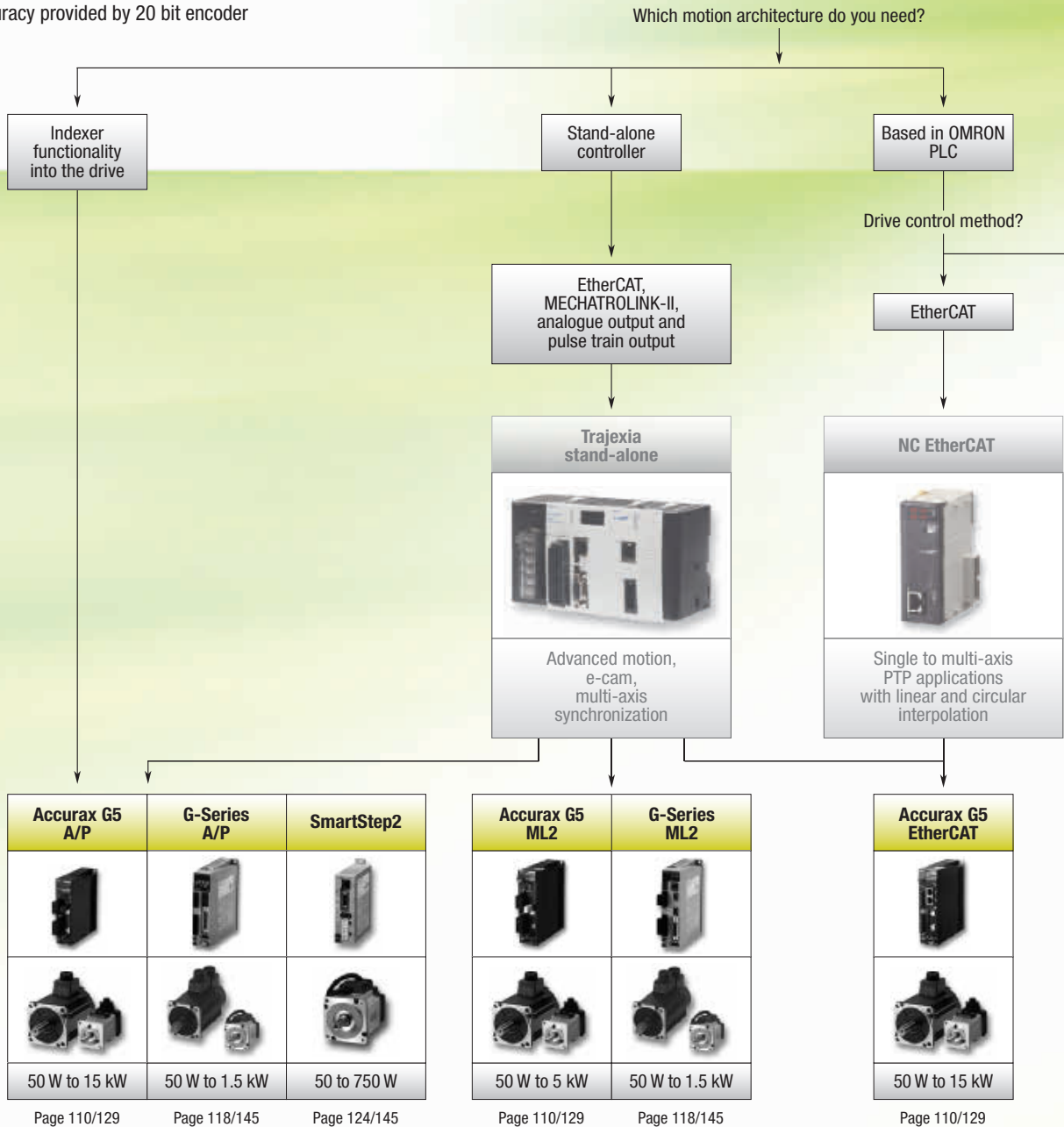
Specifications	Model
CX-One	CX-One

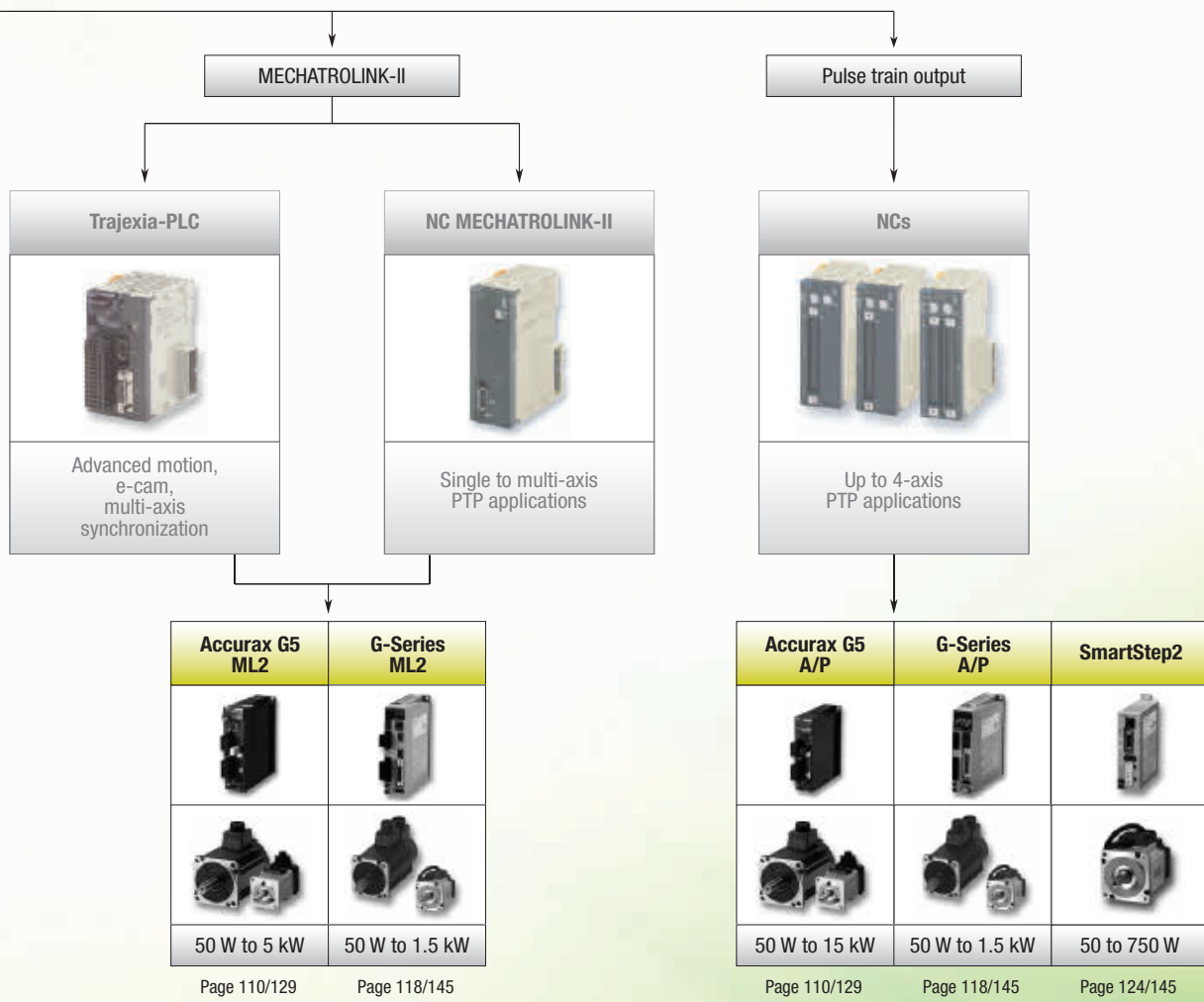
EXTREME MECHATRONICS MEETS X-STREAM AUTOMATION

At the heart of every great machine

Great machines are born from a perfect match between control and mechanics. Accurax G5 gives you the extra edge to build more accurate, faster, smaller and safer machines. You will benefit from an almost 25% reduction in motor weight, and gain 50% cabinet space. You will achieve sub micron precision and ms settling time. Some might call it perfection, we just call it tireless innovation to help you build great machines.





- EtherCAT, ML-II and analogue/pulse models
- High response frequency of 2 kHz
- Safety built-in conforming ISO13849-1 PL-d
- High accuracy provided by 20 bit encoder












Selection table

	Servo drives		
			
	Accurax G5	G-Series	SmartStep 2
	EtherCAT network and safety built-in	Compact size and ML2 motion bus	Pulse train input with ultra-compact size
Ratings 230 V single-phase	100 W to 1.5 kW	100 W to 1.5 kW	100 W to 750 W
Ratings 400 V three-phase	600 W to 15 kW	N/A	N/A
Applicable servomotor	Accurax G5 and G-Series rotary motors	G-Series	G-Series
Position control	EtherCAT, MECHATROLINK-II or Pulse train input	MECHATROLINK-II or Pulse train input	Pulse train input
Speed control	EtherCAT, MECHATROLINK-II or Analogue input ± 10 V	MECHATROLINK-II or Analogue input ± 10 V	N/A
Torque control	EtherCAT, MECHATROLINK-II or Analogue input ± 10 V	MECHATROLINK-II or Analogue input ± 10 V	Torque limits only
	Embedded indexer functionality	N/A	N/A
Safety approvals	ISO13849-1:2008 (PL d), EN 954-1:1996 (Cat-3)	N/A	N/A
Full closed loop	Built-in	N/A	N/A
Page	110	118	124

	Accurax G5 servo motors			
				
	Standard models			
	3,000 r/min motor	2,000 r/min motor	1,500 r/min motor	1,000 r/min motor
Rated speed	3,000 rpm	2,000 rpm	1,500 rpm	1,000 rpm
Maximum speed	4,500 to 6,000 rpm	3,000 rpm	2,000 to 3,000 rpm	2,000 rpm
Rated torque	0.16 Nm to 15.9 Nm	1.91 Nm to 23.9 Nm	47.8 Nm to 95.5 Nm	8.59 Nm to 28.7 Nm
Sizes	50 W to 5 kW	400 W to 5 kW	7.5 kW to 15 kW	900 W to 6 kW
Applicable servo drive	Accurax G5 servo drive	Accurax G5 servo drive	Accurax G5 servo drive	Accurax G5 servo drive
Encoder resolution	20-bit incremental/ 17-bit absolute	20-bit incremental/ 17-bit absolute	17-bit absolute	20-bit incremental/ 17-bit absolute
IP rating	IP67	IP67	IP67	IP67
Page	129			

	G-Series servo motors – Cylindrical type –			G-Series servo motors – Flat type –
				
	3,000 r/min motor	2,000 r/min motor	1,000 r/min motor	3,000 r/min motor
Rated speed	3,000 rpm	2,000 rpm	1,000 rpm	3,000 rpm
Maximum speed	4,500 to 5,000 rpm	3,000 rpm	2,000 rpm	5,000 rpm
Rated torque	0.16 Nm to 4.77 Nm	4.8 Nm to 7.15 Nm	8.62 Nm	0.32 Nm to 1.3 Nm
Sizes	50 to 1,500 W	1 to 1.5 kW	900 W	100 to 400 W
Applicable servo drive	SmartStep 2, G-Series and Accurax G5 servo drives	SmartStep 2, G-Series and Accurax G5 servo drives	SmartStep 2, G-Series and Accurax G5 servo drives	SmartStep 2, G-Series and Accurax G5 servo drives
Encoder resolution	10,000 pulses/revolution or 17-bit absolute/incremental	10,000 pulses/revolution or 17-bit absolute/incremental	10,000 pulses/revolution or 17-bit absolute/incremental	10,000 pulses/revolution or 17-bit absolute/incremental
IP rating	IP65	IP65	IP65	IP65
Page	145			

Accurax G5 servo motors			
			
	High inertia models		
	3,000 r/min motor	2,000 r/min motor	1,500 r/min motor
Rated speed	3,000 rpm	2,000 rpm	1,500 rpm
Maximum speed	5,000 rpm	3,000 rpm	2,000 to 3,000 rpm
Rated torque	0.64 Nm to 2.4 Nm	4.77 Nm to 23.9 Nm	47.8 Nm
Sizes	200 W to 750 W	1 kW to 5 kW	7.5 kW
Applicable servo drive	Accurax G5 servo drive	Accurax G5 servo drive	Accurax G5 servo drive
Encoder resolution	20-bit incremental/ 17-bit absolute	20-bit incremental/ 17-bit absolute	17-bit absolute
IP rating	IP65	IP67	IP67
Page	129		

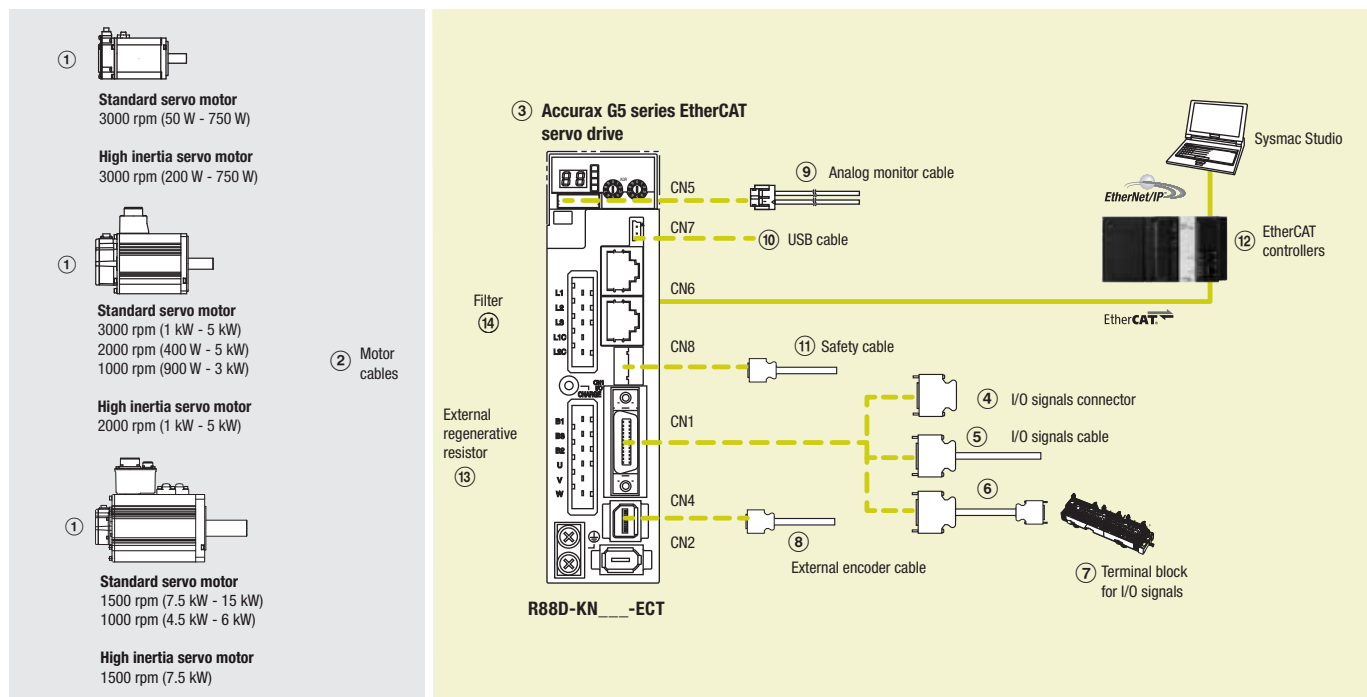


Accurate motion control in a compact size servo drive family. EtherCAT and safety built-in

- EtherCAT, ML-II and analogue/pulse servo drive models
- Safety conforming ISO13849-1 PL-d
- High-response frequency of 2 kHz
- High resolution provided by 20 bits encoder
- Drive Programming: embedded indexer functionality in the analogue/pulse models
- External encoder input for full closed loop
- Real time auto-tuning
- Advanced tuning algorithms (anti-vibration function, torque feedforward, disturbance observer)

Ordering information

Accurax G5 series EtherCAT reference configuration



Note: The symbols ①②③④⑤... show the recommended sequence to select the components in Accurax G5 servo system

Servo motors, power and encoder cables

Note: ①② Refer to the Accurax G5 servo motor chapter for servomotor, motor cables or connectors selection

Servo drives

Symbol	Specifications	① Compatible G5 series rotary servo motors		Servo drive models	
		Standard models	High Inertia models	Order code	
③	1 phase 230 VAC	100 W	R88M-K05030(H/T)-_	-	R88D-KN01H-ECT
		200 W	R88M-K10030(H/T)-_	-	-
		400 W	R88M-K20030(H/T)-_	R88M-KH20030(H/T)-_	R88D-KN02H-ECT
		750 W	R88M-K40030(H/T)-_	R88M-KH40030(H/T)-_	R88D-KN04H-ECT
		1.0 kW	R88M-K75030(H/T)-_	R88M-KH75030(H/T)-_	R88D-KN08H-ECT
		1.5 kW	R88M-K1K020(H/T)-_	-	R88D-KN10H-ECT
			R88M-K1K030(H/T)-_	-	R88D-KN15H-ECT
			R88M-K1K530(H/T)-_	-	-
	R88M-K1K520(H/T)-_	-	-		
	R88M-K90010(H/T)-_	-	-		

Symbol	Specifications		① Compatible G5 series rotary servo motors		Servo drive models
			Standard models	High Inertia models	Order code
③	3 phase 400 VAC	600 W	R88M-K40020(F/C)-_	-	R88D-KN06F-ECT
		1.0 kW	R88M-K60020(F/C)-_	-	R88D-KN10F-ECT
		1.5 kW	R88M-K75030(F/C)-_	R88M-KH1K020(F/C)-_	R88D-KN15F-ECT
			R88M-K1K030(F/C)-_	-	-
			R88M-K1K530(F/C)-_	-	-
			R88M-K1K520(F/C)-_	R88M-KH1K520(F/C)-_	-
		2.0 kW	R88M-K90010(F/C)-_	-	R88D-KN20F-ECT
			R88M-K2K030(F/C)-_	-	-
		3.0 kW	R88M-K2K020(F/C)-_	R88M-KH2K020(F/C)-_	R88D-KN30F-ECT
			R88M-K3K030(F/C)-_	-	-
			R88M-K3K020(F/C)-_	R88M-KH3K020(F/C)-_	-
		5.0 kW	R88M-K2K010(F/C)-_	-	R88D-KN50F-ECT
			R88M-K4K030(F/C)-_	-	-
			R88M-K5K030(F/C)-_	-	-
			R88M-K4K020(F/C)-_	R88M-KH4K020(F/C)-_	-
			R88M-K5K020(F/C)-_	R88M-KH5K020(F/C)-_	-
			R88M-K4K510C-_	-	-
		7.5 kW	R88M-K3K010(F/C)-_	-	-
			R88M-K6K010C-_	-	R88D-KN75F-ECT
			R88M-K7K515C-_	R88M-KH7K515C-_	-
15 kW	R88M-K11K015C-_	-	R88D-KN150F-ECT		
	R88M-K15K015C-_	-	-		

Signals cables for I/O general purpose (CN1)

Symbol	Description	Connect to	Length	Order code
④	I/O connector kit (26 pins)	For I/O general purpose	-	R88A-CNW01C
⑤	I/O signals cable	For I/O general purpose	1 m	R88A-CPKB001S-E
			2 m	R88A-CPKB002S-E
⑥	Terminal block cable	For I/O general purpose	1 m	XW2Z-100J-B34
			2 m	XW2Z-200J-B34
⑦	Terminal block (M3 screw and for pin terminals)	-	-	XW2B-20G4
	Terminal block (M3.5 screw and for fork/round terminals)	-	-	XW2B-20G5
	Terminal block (M3 screw and for fork/round terminals)	-	-	XW2D-20G6

External encoder cable (CN4)

Symbol	Name	Length	Order code
⑧	External encoder cable	5 m	R88A-CRKM005SR-E
		10 m	R88A-CRKM010SR-E
		20 m	R88A-CRKM020SR-E

Analogue monitor (CN5)

Symbol	Name	Length	Order code
⑨	Analogue monitor cable	1 m	R88A-CMK001S

USB personal computer cable (CN7)

Symbol	Name	Length	Order code
⑩	USB mini-connector cable	2 m	AX-CUSBM002-E

Cable for safety (CN8)

Symbol	Name	Length	Order code
⑪	Safety cable	3 m	R88A-CSK003S-E

EtherCAT controllers

Symbol	Name		Order code	
⑫	NJ-series	CPU unit	NJ501-1500 (64 axes)	
			NJ501-1400 (32 axes)	
			NJ501-1300 (16 axes)	
			NJ301-1200 (8 axes)	
			NJ301-1100 (4 axes)	
		Power supply unit	NJ-PA3001 (220 VAC)	
			NJ-PD3001 (24 VDC)	
	Trajexia stand-alone	Motion control unit	TJ2-MC64 (64 axes)	
			EtherCAT master unit	TJ2-ECT64 (64 axes)
			TJ2-ECT16 (16 axes)	
			TJ2-ECT04 (4 axes)	
	Position controller unit for CJ1 PLC series		CJ1W-NCF8_ (16 axes)	
		CJ1W-NC88_ (8 axes)		
		CJ1W-NC48_ (4 axes)		
		CJ1W-NC281 (2 axes)		

External regenerative resistor

Symbol	Specifications	Order code
⑬	50 Ω, 80 W	R88A-RR08050S
	100 Ω, 80 W	R88A-RR080100S
	47 Ω, 220 W	R88A-RR22047S
	20 Ω, 500 W	R88A-RR50020S

Filters

Symbol	Applicable servodrive	Rated current	Leakage current	Rated voltage	Order code
⑭	R88D-KN01H-ECT, R88D-KN02H-ECT	2.4 A	3.5 mA	250 VAC single-phase	R88A-FIK102-RE
	R88D-KN04H-ECT	4.1 A	3.5 mA		R88A-FIK104-RE
	R88D-KN08H-ECT	6.6 A	3.5 mA		R88A-FIK107-RE
	R88D-KN10H-ECT, R88D-KN15H-ECT	14.2 A	3.5 mA	400 VAC three-phase	R88A-FIK114-RE
	R88D-KN06F-ECT, R88D-KN10F-ECT, R88D-KN15F-ECT	4 A	0.3 mA/32 mA ^{*1}		R88A-FIK304-RE
	R88D-KN20F-ECT	6 A	0.3 mA/32 mA ^{*1}		R88A-FIK306-RE
	R88D-KN30F-ECT, R88D-KN50F-ECT	12.1 A	0.3 mA/32 mA ^{*1}		R88A-FIK312-RE
	R88D-KN75F-ECT	-	-		R88A-FIK330-RE
	R88D-KN150F-ECT	-	-		R88A-FIK350-RE

*1 Momentary peak leakage current for the filter at switch-on/off.

Connectors

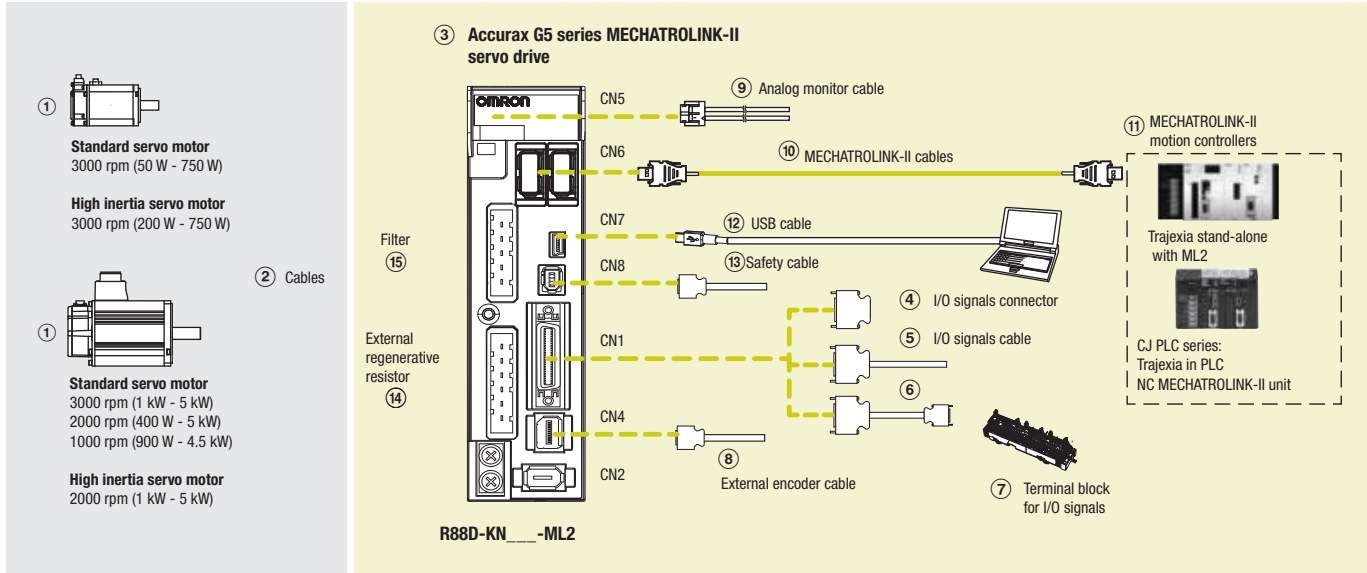
Specifications	Order code
External encoder connector (for CN4)	R88A-CNK41L
Safety I/O signal connector (for CN8)	R88A-CNK81S

Computer software

Specifications	Order code
Sysmac Studio version 1.0 or higher	SYSMAC-SE2_ _ _
CX-Drive version 2.10 or higher	CX-DRIVE 2.10
CX-One software package including CX-Drive 2.10 or higher	CX-ONE

Note: If CX-One is installed on the same computer as Sysmac Studio, it must be CX-One v4.2 or higher.

Accurax G5 series MECHATROLINK-II reference configuration



Note: The symbols ①②③④⑤... show the recommended sequence to select the components in Accurax G5 servo system

Servo motors, power and encoder cables

Note: ①② Refer to the Accurax G5 servo motor section for servomotor, motor cables or connectors selection

Servo drives

Symbol	Specifications	① Compatible G5 series rotary servo motors		Servo drive models	
		Standard models	High inertia models		
③	1 phase 230 VAC	100 W	R88M-K05030(H/T)-_	-	R88D-KN01H-ML2
			R88M-K10030(H/T)-_	-	
			R88M-K20030(H/T)-_	R88M-KH20030(H/T)-_	R88D-KN02H-ML2
		200 W	R88M-K40030(H/T)-_	R88M-KH40030(H/T)-_	R88D-KN04H-ML2
			R88M-K75030(H/T)-_	R88M-KH75030(H/T)-_	R88D-KN08H-ML2
			R88M-K1K020(H/T)-_	-	R88D-KN10H-ML2
		400 W	R88M-K1K030(H/T)-_	-	R88D-KN15H-ML2
			R88M-K1K530(H/T)-_	-	
			R88M-K1K520(H/T)-_	-	
	3 phase 400 VAC	600 W	R88M-K90010(H/T)-_	-	
			R88M-K40020(F/C)-_	-	R88D-KN06F-ML2
			R88M-K60020(F/C)-_	-	
		1.0 kW	R88M-K75030(F/C)-_	-	R88D-KN10F-ML2
			R88M-K1K020(F/C)-_	R88M-KH1K020(F/C)-_	
			R88M-K1K030(F/C)-_	-	R88D-KN15F-ML2
		1.5 kW	R88M-K1K530(F/C)-_	-	
			R88M-K1K520(F/C)-_	R88M-KH1K520(F/C)-_	
			R88M-K90010(F/C)-_	-	
2.0 kW	R88M-K2K030(F/C)-_	-	R88D-KN20F-ML2		
	R88M-K2K020(F/C)-_	R88M-KH2K020(F/C)-_			
	R88M-K3K030(F/C)-_	-	R88D-KN30F-ML2		
3.0 kW	R88M-K3K020(F/C)-_	R88M-KH3K020(F/C)-_			
	R88M-K2K010(F/C)-_	-			
	R88M-K4K030(F/C)-_	-	R88D-KN50F-ML2		
5.0 kW	R88M-K5K030(F/C)-_	-			
	R88M-K4K020(F/C)-_	R88M-KH4K020(F/C)-_			
	R88M-K5K020(F/C)-_	R88M-KH5K020(F/C)-_			
	R88M-K4K510C- _	-			
	R88M-K3K010(F/C)-_	-			

Control cables (CN1)

Symbol	Description	Connect to	Length	Order code
④	I/O connector kit (26 pins)	For I/O general purpose	-	R88A-CNW01C
⑤	I/O signals cable		1 m	R88A-CPKB001S-E
⑥	Terminal block cable	For I/O general purpose	2 m	R88A-CPKB002S-E
			1 m	XW2Z-100J-B34
2 m	XW2Z-200J-B34			
-	XW2B-20G4			
-	XW2B-20G5			
-	XW2D-20G6			
⑦	Terminal block (M3 screw and for pin terminals)			
	Terminal block (M3.5 screw and for fork/round terminals)			
	Terminal block (M3 screw and for fork/round terminals)			

External encoder cable (CN4)

Symbol	Name	Length	Order code
⑧	External encoder cable	5 m	R88A-CRKM005SR-E
		10 m	R88A-CRKM010SR-E
		20 m	R88A-CRKM020SR-E

Analogue monitor (CN5)

Symbol	Name	Length	Order code
⑨	Analogue monitor cable	1 m	R88A-CMK001S

MECHATROLINK-II cables (CN6)

Symbol	Specifications	Length	Order code
⑩	MECHATROLINK-II Terminator resistor	-	JEPMC-W6022-E
	MECHATROLINK-II cables	0.5 m	JEPMC-W6003-A5-E
		1 m	JEPMC-W6003-01-E
		3 m	JEPMC-W6003-03-E
		5 m	JEPMC-W6003-05-E
		10 m	JEPMC-W6003-10-E
		20 m	JEPMC-W6003-20-E
		30 m	JEPMC-W6003-30-E

MECHATROLINK-II motion controllers

Symbol	Name	Order code
⑪	Trajexia stand-alone Motion control unit	TJ2-MC64 (64 axes)
		TJ1-MC16 (16 axes)
		TJ1-MC04 (4 axes)
		TJ1-ML16 (16 axes)
	ML2 master unit	TJ1-ML04 (4 axes)
		TJ1-ML04 (4 axes)
	Trajexia-PLC motion controller	CJ1W-MCH72 (30 axes)
		CJ1W-MC472 (4 axes)
		CJ1W-NCF71 (16 axes)
	Position controller unit for CJ1 PLC	CJ1W-NC471 (4 axes)
		CJ1W-NC271 (2 axes)
CJ1W-NC271 (2 axes)		
Position controller unit for CS1 PLC	CS1W-NCF71 (16 axes)	
	CS1W-NC471 (4 axes)	
	CS1W-NC271 (2 axes)	

USB personal computer cable (CN7)

Symbol	Name	Length	Order code
⑫	USB mini-connector cable	2 m	AX-CUSBM002-E

Cable for safety functions (CN8)

Symbol	Description	Order code
⑬	Safety connector with 3 m cable (with loose wires at one end)	R88A-CSK003S-E

External regenerative resistor

Symbol	Specifications	Order code
⑭	50 Ω, 80 W	R88A-RR08050S
	100 Ω, 80 W	R88A-RR080100S
	47 Ω, 220 W	R88A-RR22047S
	20 Ω, 500 W	R88A-RR50020S

Filters

Symbol	Applicable servodrive	Rated current	Leakage current	Rated voltage	Order code
⑮	R88D-KN01H-ML2, R88D-KN02H-ML2	2.4 A	3.5 mA	250 VAC single-phase	R88A-FIK102-RE
	R88D-KN04H-ML2	4.1 A	3.5 mA		R88A-FIK104-RE
	R88D-KN08H-ML2	6.6 A	3.5 mA		R88A-FIK107-RE
	R88D-KN10H-ML2, R88D-KN15H-ML2	14.2 A	3.5 mA		R88A-FIK114-RE
	R88D-KN06F-ML2, R88D-KN10F-ML2, R88D-KN15F-ML2	4 A	0.3 mA /32 mA ^{*1}	400 VAC three-phase	R88A-FIK304-RE
	R88D-KN20F-ML2	6 A	0.3 mA /32 mA ^{*1}		R88A-FIK306-RE
	R88D-KN30F-ML2, R88D-KN50F-ML2	12.1 A	0.3 mA /32 mA ^{*1}		R88A-FIK312-RE

*1 Momentary peak leakage current for the filter at switch-on/off.

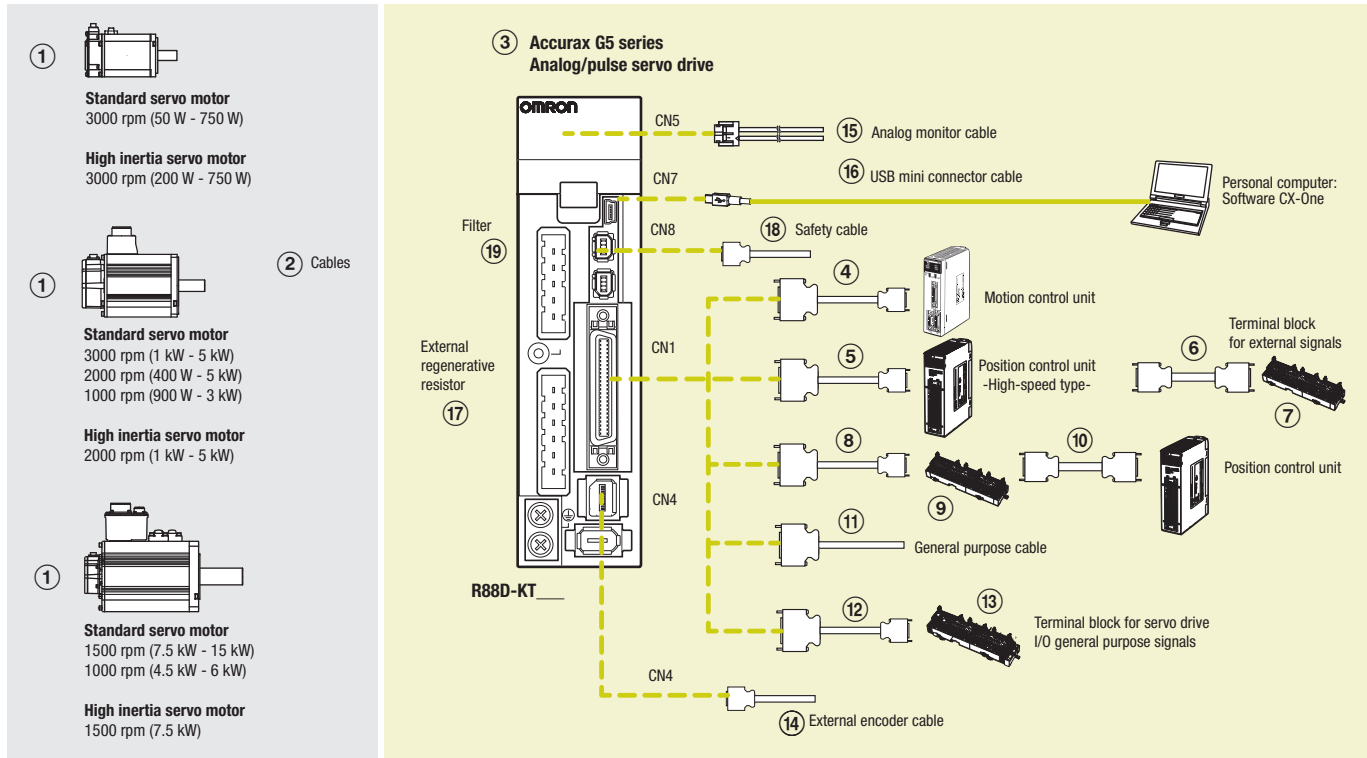
Connectors

Specifications	Order code
External encoder connector (for CN4)	R88A-CNK41L
Safety I/O signal connector (for CN8)	R88A-CNK81S

Computer software

Specifications	Order code
CX-Drive version 1.91 or higher	CX-DRIVE 1.91
CX-One software package including CX-Drive 1.91 or higher	CX-ONE

Accurax G5 series analogue/pulse reference configuration



Note: The symbols ①②③④⑤... show the recommended sequence to select the components in Accurax G5 servo system

Servo motors, power and encoder cables

Note: ①② Refer to the Accurax G5 servo motor section for servomotor, motor cables or connectors selection

Servo drives

Symbol	Specifications	① Compatible Accurax G5 series rotary servo motors		Servo drive models ^{*1}			
		Standard models	High inertia models	Order code			
③	1 phase 230 VAC	100 W	R88M-K05030(H/T)-_	-	R88D-KT01H		
			R88M-K10030(H/T)-_	-			
			200 W	R88M-K20030(H/T)-_	R88M-KH20030(H/T)-_	R88D-KT02H	
			400 W	R88M-K40030(H/T)-_	R88M-KH40030(H/T)-_	R88D-KT04H	
			750 W	R88M-K75030(H/T)-_	R88M-KH75030(H/T)-_	R88D-KT08H	
			1.0 kW	R88M-K1K020(H/T)-_	-	R88D-KT10H	
		1.5 kW	R88M-K1K030(H/T)-_	-	R88D-KT15H		
			R88M-K1K530(H/T)-_	-			
			R88M-K1K520(H/T)-_	-			
			R88M-K90010(H/T)-_	-			
			3 phase 400 VAC	600 W	R88M-K40020(F/C)-_	-	R88D-KT06F
					R88M-K60020(F/C)-_	-	
	1.0 kW	R88M-K75030(F/C)-_			-	R88D-KT10F	
	1.5 kW	R88M-K1K020(F/C)-_		R88M-KH1K020(F/C)-_	R88D-KT15F		
		R88M-K1K030(F/C)-_		-			
		R88M-K1K520(F/C)-_		R88M-KH1K520(F/C)-_			
	2.0 kW	R88M-K90010(F/C)-_	-				
		R88M-K2K030(F/C)-_	-	R88D-KT20F			
		R88M-K2K020(F/C)-_	R88M-KH2K020(F/C)-_				
	3.0 kW	R88M-K3K030(F/C)-_	-	R88D-KT30F			
		R88M-K3K020(F/C)-_	R88M-KH3K020(F/C)-_				
		R88M-K2K010(F/C)-_	-				
	5.0 kW	R88M-K4K030(F/C)-_	-	R88D-KT50F			
		R88M-K5K030(F/C)-_	-				
R88M-K4K020(F/C)-_		R88M-KH4K020(F/C)-_					
R88M-K5K020(F/C)-_		R88M-KH5K020(F/C)-_					
R88M-K4K510C-_		-					
R88M-K3K010(F/C)-_		-					
7.5 kW	R88M-K6K010C-_	-	R88D-KT75F				
	R88M-K7K515C-_	R88M-KH7K515C-_					
15 kW	R88M-K11K015C-_	-	R88D-KT150F				
	R88M-K15K015C-_	-					

^{*1} Drive Programming – embedded indexer functionality – is available in the Accurax G5 analogue/pulse models with firmware 1.10 or higher.

Control cables (CN1)

Symbol	Description	Connect to	Length	Order code	
④	Control cable (1 axis)	Motion control units CS1W-MC221 CS1W-MC421	1 m	R88A-CPG001M1	
			2 m	R88A-CPG002M1	
			3 m	R88A-CPG003M1	
	Control cable (2 axes)	Motion control units CS1W-MC221 CS1W-MC421	1 m	R88A-CPG001M2	
			2 m	R88A-CPG002M2	
			3 m	R88A-CPG003M2	
⑤	Control cable (line-driver output for 1 axis)	Position control units (high-speed type) CJ1W-NC234 CJ1W-NC434	1 m	XW2Z-100J-G9	
			5 m	XW2Z-500J-G9	
			10 m	XW2Z-10MJ-G9	
	Control cable (open-collector output for 1 axis)	Position control units (high-speed type) CJ1W-NC214 CJ1W-NC414	1 m	XW2Z-100J-G13	
			3 m	XW2Z-300J-G13	
	Control cable (line-driver output for 2 axes)	Position control units (high-speed type) CJ1W-NC234 CJ1W-NC434	1 m	XW2Z-100J-G1	
			5 m	XW2Z-500J-G1	
			10 m	XW2Z-10MJ-G1	
	Control cable (open-collector output for 2 axes)	Position control units (high-speed type) CJ1W-NC214 CJ1W-NC414	1 m	XW2Z-100J-G5	
			3 m	XW2Z-300J-G5	
	⑥	Terminal block cable for external signals (for input common, forward/reverse run prohibited inputs, emergency stop input, origin proximity input and interrupt input)	Position control units (high-speed type) CJ1W-NC234 CJ1W-NC434 CJ1W-NC214 CJ1W-NC414	0.5 m	XW2Z-C50X
				1 m	XW2Z-100X
2 m				XW2Z-200X	
3 m				XW2Z-300X	
5 m				XW2Z-500X	
10 m				XW2Z-010X	
⑦	Terminal block for external signals (M3 screw, pin terminals)		–	XW2B-20G4	
	Terminal block for ext. signals (M3.5 screw, fork/round terminals)		–	XW2B-20G5	
	Terminal block for ext. signals (M3 screw, fork/round terminals)		–	XW2D-20G6	
⑧	Cable from servo relay unit to servo drive	CS1W-NC1□3, CJ1W-NC1□3, C200HW-NC113, CS1W-NC2□3/4□3, CJ1W-NC2□3/4□3, C200HW-NC213/413, CQM1H-PLB21 or CQM1-CPU43 CJ1M-CPU21/22/23	1 m	XW2Z-100J-B25	
			2 m	XW2Z-200J-B25	
			1 m	XW2Z-100J-B31	
			2 m	XW2Z-200J-B31	
⑨	Servo relay unit	Position control units CS1W-NC1□3, CJ1W-NC1□3 or C200HW-NC113	–	XW2B-20J6-1B (1 axis)	
			–	XW2B-40J6-2B (2 axes)	
		Position control units CS1W-NC2□3/4□3, CJ1W-NC2□3/4□3 or C200HW-NC213/413	–	XW2B-20J6-3B (1 axis)	
			–	XW2B-20J6-8A (1 axis) XW2B-40J6-9A (2 axes)	
		CQM1H-PLB21 or CQM1-CPU43 CJ1M-CPU21/22/23	–	XW2B-20J6-3B (1 axis)	
			–	XW2B-20J6-8A (1 axis) XW2B-40J6-9A (2 axes)	
⑩	Position control unit connecting cable	CQM1H-PLB21	0.5 m	XW2Z-050J-A3	
			1 m	XW2Z-100J-A3	
		CS1W-NC113 or C200HW-NC113	0.5 m	XW2Z-050J-A6	
			1 m	XW2Z-100J-A6	
		CS1W-NC213/413 or C200HW-NC213/413	0.5 m	XW2Z-050J-A7	
			1 m	XW2Z-100J-A7	
		CS1W-NC133	0.5 m	XW2Z-050J-A10	
			1 m	XW2Z-100J-A10	
		CS1W-NC233/433	0.5 m	XW2Z-050J-A11	
			1 m	XW2Z-100J-A11	
		CJ1W-NC113	0.5 m	XW2Z-050J-A14	
			1 m	XW2Z-100J-A14	
		CJ1W-NC213/413	0.5 m	XW2Z-050J-A15	
			1 m	XW2Z-100J-A15	
		CJ1W-NC133	0.5 m	XW2Z-050J-A18	
			1 m	XW2Z-100J-A18	
		CJ1W-NC233/433	0.5 m	XW2Z-050J-A19	
			1 m	XW2Z-100J-A19	
CJ1M-CPU21/22/23	0.5 m	XW2Z-050J-A33			
	1 m	XW2Z-100J-A33			
⑪	General purpose cable	For general purpose controllers	1 m	R88A-CPG001S	
			2 m	R88A-CPG002S	
⑫	Terminal block cable	For general purpose controllers	1 m	XW2Z-100J-B24	
			2 m	XW2Z-200J-B24	
⑬	Terminal block (M3 screw and for pin terminals)		–	XW2B-50G4	
	Terminal block (M3.5 screw and for fork/round terminals)		–	XW2B-50G5	
	Terminal block (M3 screw and for fork/round terminals)		–	XW2D-50G6	

External encoder cable (CN4)

Symbol	Name	Length	Order code
⑭	External encoder cable	5 m	R88A-CRKM005SR-E
		10 m	R88A-CRKM010SR-E
		20m	R88A-CRKM020SR-E

Analogue monitor (CN5)

Symbol	Name	Length	Order code
⑮	Analogue monitor cable	1 m	R88A-CMK001S

USB personal computer cable (CN7)

Symbol	Name	Length	Order code
⑯	USB mini-connector cable	2 m	AX-CUSBM002-E

External regenerative resistor

Symbol	Specifications	Order code
⑰	50 Ω, 80 W	R88A-RR08050S
	100 Ω, 80 W	R88A-RR080100S
	47 Ω, 220 W	R88A-RR22047S
	20 Ω, 500 W	R88A-RR50020S

Cable for safety functions (CN8)

Symbol	Description	Order code
⑱	Safety connector with 3 m cable (with loose wires at one end)	R88A-CSK003S-E

Filters

Symbol	Applicable servodrive	Rated current	Leakage current	Rated voltage	Order code
⑲	R88D-KT01H, R88D-KT02H	2.4 A	3.5 mA	250 VAC single-phase	R88A-FIK102-RE
	R88D-KT04H	4.1 A	3.5 mA		R88A-FIK104-RE
	R88D-KT08H	6.6 A	3.5 mA		R88A-FIK107-RE
	R88D-KT10H, R88D-KT15H	14.2 A	3.5 mA		R88A-FIK114-RE
	R88D-KT06F, R88D-KT10F, R88D-KT15F	4 A	0.3 mA/32 mA ^{*1}	400 VAC three-phase	R88A-FIK304-RE
	R88D-KT20F	6 A	0.3 mA/32 mA ^{*1}		R88A-FIK306-RE
	R88D-KT30F, R88D-KT50F	12.1 A	0.3 mA/32 mA ^{*1}		R88A-FIK312-RE
	R88D-KT75F	–	–		R88A-FIK330-RE
	R88D-KT150F	–	–		R88A-FIK350-RE

*1 Momentary peak leakage current for the filter at switch-on/off.

Connectors

Specifications	Model
I/O connector kit – 50 pins – (for CN1)	R88A-CNU11C
External encoder connector (for CN4)	R88A-CNK41L
Safety I/O signal connector (for CN8)	R88A-CNK81S

Computer software

Specifications	Order code
CX-Drive version 2.10 or higher	CX-DRIVE 2.10
CX-One software package including CX-Drive 2.10 or higher	CX-ONE

Specifications

Single-phase, 230 V

Servo drive type	R88D-K_	01H_	02H_	04H_	08H_	10H_	15H_	
Applicable servo motor	R88M-K_	05030(H/T)-_	20030(H/T)-_	40030(H/T)-_	75030(H/T)-_	1K020(H/T)-_	1K030(H/T)-_	
		10030(H/T)-_	–	–	–	–	1K530(H/T)-_	
		–	–	–	–	–	1K520(H/T)-_	
		–	–	–	–	–	90010(H/T)-_	
Basic specifications	Max. applicable motor capacity	W	100	200	400	750	1,000	1,500
	Continuous output current	Arms	1.2	1.6	2.6	4.1	5.9	9.4
	Input power	Main circuit	Single-phase/3-phase, 200 to 240 VAC + 10% to –15% (50/60 Hz)					
	Supply	Control circuit	Single-phase, 200 to 240 VAC + 10% to –15% (50/60 Hz)					
	Control method		IGBT-driven PWM method, sinusoidal drive					
	Feedback		Serial encoder (incremental/absolute value)					
	Conditions	Usage/storage temperature	0 to 55°C/–20 to 65°C					
		Usage/storage humidity	90% RH or less (non-condensing)					
		Altitude	1,000 m or less above sea level					
		Vibration/shock resistance	(max.)	5.88 m/s ² 10–60 Hz (Continuous operation at resonance point is not allowed)/19.6 m/s ²				
Configuration		Base mounted						
Approx. weight	kg	0.8		1.1	1.6		1.8	

Three-phase, 400 V

Servo drive type	R88D-K_	06F_	10F_	15F_	20F_	30F_	50F_	75F_	150F_
Applicable servo motor	R88M-K_	40020(F/C)-_	75030(F/C)-_	1K030(F/C)-_	2K030(F/C)-_	3K030(F/C)-_	4K030(F/C)-_	6K010C-_	11K015C-_
		60020(F/C)-_	1K020(F/C)-_	1K530(F/C)-_	2K020(F/C)-_	3K020(F/C)-_	5K030(F/C)-_	7K515C-_	15K015C-_
		-	-	1K520(F/C)-_	-	-	2K010(F/C)-_	4K020(F/C)-_	-
		-	-	90010(F/C)-_	-	-	-	5K020(F/C)-_	-
		-	-	-	-	-	-	4K510C-_	-
		-	-	-	-	-	-	3K010(F/C)-_	-
Max. applicable motor capacity	W	0.6	1.0	1.5	2.0	3.0	5.0	7.5	15.0
Continuous output current	Arms	2.9		4.7	6.7	9.4	16.5	22.0	33.4
Input power	Main circuit	3-phase, 380 to 480 VAC + 10% to -15% (50/60Hz)							
Supply	Control circuit	24 VDC±15%							
Control method	IGBT-driven PWM method, sinusoidal drive								
Feedback	Serial encoder (incremental/absolute value)							Absolute encoder	
Conditions	Usage/storage temperature	0 to 55°C/-20 to 65°C							
	Usage/storage humidity	90% RH or less (non-condensing)							
	Altitude	1,000 m or less above sea level							
	Vibration/shock resistance	5.88 m/s ² 10–60 Hz (Continuous operation at resonance point is not allowed)/19.6 m/s ²							
Configuration	Base mounted								
Approx. weight	kg	1.9			2.7	4.7		13.5	21.0

Dimensions

Drive model	Specification	EtherCAT model				ML2 model				Analogue/pulse model				Diagram	
		H	W	D	D1	H	W	D	D1	H	W	D	D1		
R88D-KT01/02H, R88D-KN01/02H-_	230 V	100–200 W	150	40	132	70	150	40	132	70	150	40	130	70	
R88D-KT04H, R88D-KN04H-_		400 W	150	55	132	70	150	55	132	70	150	55	130	70	
R88D-KT08H, R88D-KN08H-_		750 W	150	65	172	70	150	65	172	70	150	65	170	70	
R88D-KT10/15H, R88D-KN10/15H-_		1–1.5 kW	150	86	172	70	150	86	172	70	150	85	170	70	
R88D-KT06/10/15F, R88D-KN06/10/15F-_	400 V	600 W–1.5 kW	150	92	172	70	150	92	172	70	150	91	170	70	
R88D-KT20F, R88D-KN20F-_		2 kW	198	94	195	70	198	94	195	70	198	94	193.5	70	
R88D-KT30/50F, R88D-KN30/50F-_		3–5 kW	250	130	214	70	250	130	214	70	250	130	212	70	
R88D-KT75F, R88D-KN75H-ECT		7.5 kW	250	233	334	70	-	-	-	-	250	233	334	70	
R88D-KT150F, R88D-KN150H-ECT		15 kW	450	261	271	70	-	-	-	-	450	261	270	70	



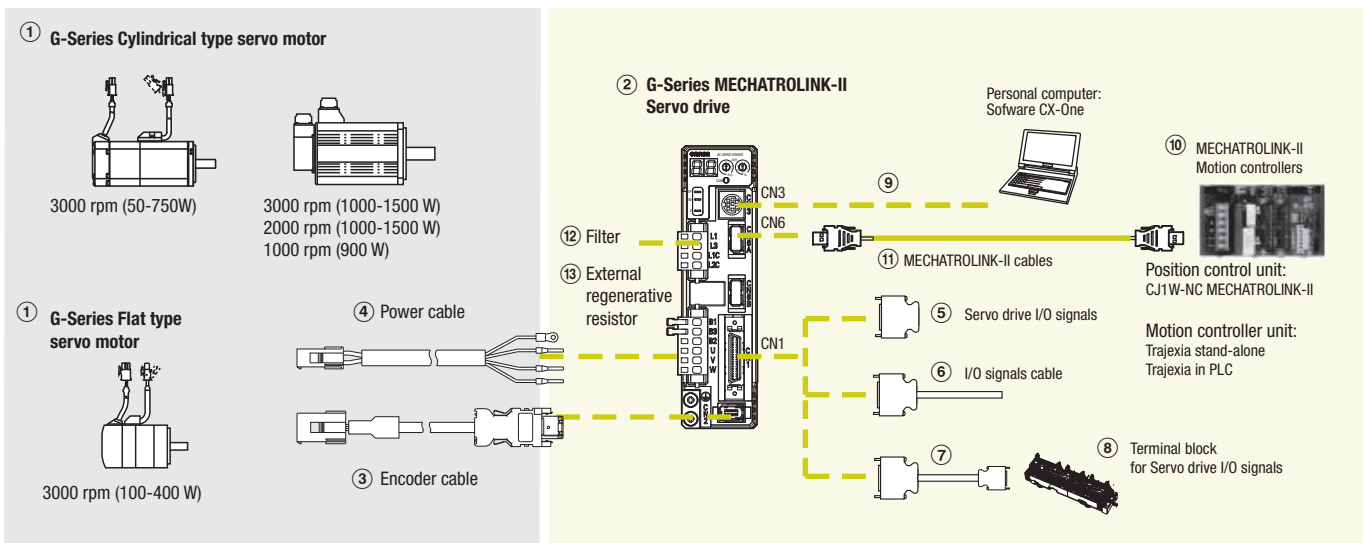
Compact in size, big in features. Save space, save wiring, save time

The G-series servo drive with built-in MECHATROLINK-II significantly reduces wiring and set-up time, while saving up to 30% of cabinet space. So you not only save on space, wiring and installation time, but also significantly reduce the chance of connection errors.

- High response frequency of 1 kHz
- Auto-tuning for easy and quick start-up
- Vibration suppression and adaptive resonance suppression filter
- Positioning, speed and torque control modes
- Fast and accurate positioning
- Separated supply for main power and control power
- Incremental and absolute encoder available

Ordering information

G-Series MECHATROLINK-II model reference configuration



Note: The symbols ①②③④⑤ ... show the recommended sequence to select the components in a G-Series servo system

Servo motors, power & encoder cables

Note: ①③④ Refer to the G-Series servo motor section for servomotor, motor cables or connectors selection

Servo drives

Symbol	Specifications	① Compatible rotary servo motors		Servo drive model	
		Cylindrical type	Flat type		
②	1 phase 200 VAC	100 W	R88M-G05030_	R88M-GP10030_	R88D-GN01H-ML2
			R88M-G10030_		
		200 W	R88M-G20030_	R88M-GP20030_	R88D-GN02H-ML2
			R88M-G40030_	R88M-GP40030_	R88D-GN04H-ML2
		750 W	R88M-G75030_	-	R88D-GN08H-ML2
		1.0 kW	R88M-G1K020T_	-	R88D-GN10H-ML2
		1.5 kW	R88M-G90010T_	-	R88D-GN15H-ML2
			R88M-G1K030T_	-	
		R88M-G1K520T_	-		
		R88M-G1K530T_	-		

Control cables (for CN1)

Symbol	Name	Connect to	Length	Order code
⑤	I/O connector kit	Servo drive I/O signals	-	R88A-CNU01C
⑥	General purpose cable		1 m	R88A-CPGB001S-E
			2 m	R88A-CPGB002S-E
⑦	Terminal block cable		1 m	XW2Z-100J-B33
			2 m	XW2Z-200J-B33
⑧	Terminal block		-	XW2B-20G4
				XW2B-20G5
				XW2D-20G6

Computer cable (for CN3)

Symbol	Name	Length	Order code
⑨	Computer cable RS232	2 m	R88A-CCG002P2

MECHATROLINK-II Motion controllers

Symbol	Name	Axes	Order code	
⑩	Trajexia stand-alone motion controller	4	TJ1-MC04	
		16	TJ1-MC16	
		64	TJ2-MC64	
	Trajexia-PLC motion controller,	4	CJ1W-MC472	
		30	CJ1W-MCH72	
		Position controller unit for CJ1 PLC	2	CJ1W-NC271
			4	CJ1W-NC471
			16	CJ1W-NCF71
	Position controller unit for CS1 PLC	2	CS1W-NC271	
		4	CS1W-NC471	
		16	CS1W-NCF71	

MECHATROLINK-II cables (for CN6)

Symbol	Specifications	Length	Order code
⑪	MECHATROLINK-II Terminator resistor	-	JEPMC-W6022-E
	MECHATROLINK-II cables	0.5 m	JEPMC-W6003-A5-E
		1 m	JEPMC-W6003-01-E
		3 m	JEPMC-W6003-03-E
		5 m	JEPMC-W6003-05-E
		10 m	JEPMC-W6003-10-E
		20 m	JEPMC-W6003-20-E
30 m	JEPMC-W6003-30-E		

Filters

Symbol	Applicable servodrive	Rated current	Leakage current	Rated voltage	Order code
⑫	R88D-GN01H_	2.4 A	3.5 mA	250 VAC single-phase	R88A-FIK102-RE
	R88D-GN02H_				R88A-FIK104-RE
	R88D-GN04H_	4.1 A	3.5 mA		R88A-FIK107-RE
	R88D-GN08H_	6.6 A	3.5 mA		R88A-FIK114-RE
	R88D-GN10H_	14.2 A	3.5 mA		
	R88D-GN15H_				

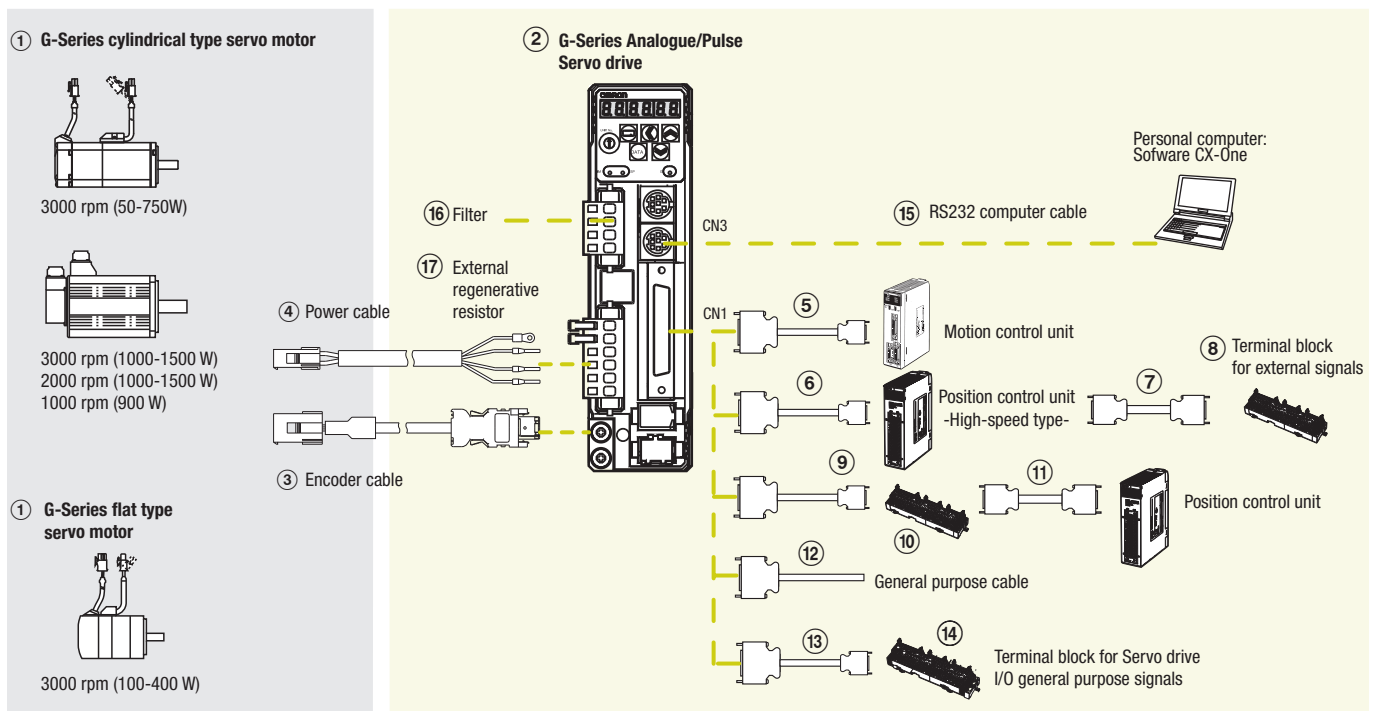
External regenerative resistor

Symbol	Specifications	Order code
⑬	50 Ω, 80 W	R88A-RR08050S
	100 Ω, 80 W	R88A-RR080100S
	47 Ω, 220 W	R88A-RR22047S
	20 Ω, 500 W	R88A-RR50020S

Computer software

Specifications	Order code
Configuration and monitoring software tool for servo drives and inverters. (CX-Drive version 1.70 or higher)	CX-Drive
Complete Omron software package including CX-Drive. (CX-One version 3.10 or higher)	CX-One

G-Series analogue/pulse model reference configuration



Note: The symbols ①②③④⑤... show the recommended sequence to select the components in a G-Series servo system

Servo motors, power & encoder cables

Note: ①③④ Refer to the G-Series servo motor section for servomotor, motor cables or connectors selection

Servo drives

Symbol	Specifications	① Compatible rotary servo motors		Servo drive model		
		Cylindrical type	Flat type	Order code		
②	1 phase 200 VAC	100 W	R88M-G05030_	R88M-GP10030_	R88D-GT01H	
			R88M-G10030_			
			200 W	R88M-G20030_	R88M-GP20030_	R88D-GT02H
			400 W	R88M-G40030_	R88M-GP40030_	R88D-GT04H
			750 W	R88M-G75030_	-	R88D-GT08H
			1.0 kW	R88M-G1K020T_	-	R88D-GT10H
			1.5 kW	R88M-G90010T_	-	R88D-GT15H
				R88M-G1K030T_	-	
			R88M-G1K520T_	-		
			R88M-G1K530T_	-		

Control cables (for CN1)

Symbol	Description	Connect to	Length	Order code	
⑤	Control cable (1 axis)	Motion control units CS1W-MC221 CS1W-MC421	1 m	R88A-CPG001M1	
			2 m	R88A-CPG002M1	
			3 m	R88A-CPG003M1	
	Control cable (2 axis)	Motion control units CS1W-MC221 CS1W-MC421	1 m	R88A-CPG001M2	
			2 m	R88A-CPG002M2	
			3 m	R88A-CPG003M2	
⑥	Control cable (line-driver output for 1 axis)	Position control units (high-speed type) CJ1W-NC234 CJ1W-NC434	1 m	XW2Z-100J-G9	
			5 m	XW2Z-500J-G9	
			10 m	XW2Z-10MJ-G9	
	Control cable (open-collector output for 1 axis)	Position control units (high-speed type) CJ1W-NC214 CJ1W-NC414	1 m	XW2Z-100J-G13	
			3 m	XW2Z-300J-G13	
	Control cable (line-driver output for 2 axis)	Position control units (high-speed type) CJ1W-NC234 CJ1W-NC434	1 m	XW2Z-100J-G1	
			5 m	XW2Z-500J-G1	
			10 m	XW2Z-10MJ-G1	
	Control cable (open-collector output for 2 axis)	Position control units (high-speed type) CJ1W-NC214 CJ1W-NC414	1 m	XW2Z-100J-G5	
			3 m	XW2Z-300J-G5	
	⑦	Terminal block cable for external signals (for input common, forward/reverse run prohibited inputs, emergency stop input, origin proximity input and interrupt input)	Position control units (high-speed type) CJ1W-NC234 CJ1W-NC434 CJ1W-NC214 CJ1W-NC414	0.5 m	XW2Z-C50X
				1 m	XW2Z-100X
2 m				XW2Z-200X	
3 m				XW2Z-300X	
5 m				XW2Z-500X	
10 m				XW2Z-010X	
⑧	Terminal block for external signals (M3 screw, pin terminals)		–	XW2B-20G4	
	Terminal block for ext. signals (M3.5 screw, fork/round terminals)		–	XW2B-20G5	
	Terminal block for ext. signals (M3 screw, fork/round terminals)		–	XW2D-20G6	
⑨	Cable from servo relay unit to servo drive	CS1W-NC1□3, CJ1W-NC1□3, C200HW-NC113, CS1W-NC2□3/4□3, CJ1W-NC2□3/4□3, C200HW-NC213/413, CQM1H-PLB21 or CQM1-CPU43 CJ1M-CPU21/22/23	1 m	XW2Z-100J-B25	
			2 m	XW2Z-200J-B25	
			1 m	XW2Z-100J-B31	
			2 m	XW2Z-200J-B31	
⑩	Servo relay unit	Position control units CS1W-NC1□3, CJ1W-NC1□3 or C200HW-NC113 Position control units CS1W-NC2□3/4□3, CJ1W-NC2□3/4□3 or C200HW-NC213/413 CQM1H-PLB21 or CQM1-CPU43 CJ1M-CPU21/22/23	–	XW2B-20J6-1B (1 axis)	
			–	XW2B-40J6-2B (2 axes)	
			–	XW2B-20J6-3B (1 axis)	
			–	XW2B-20J6-8A (1 axis)	
			–	XW2B-40J6-9A (2 axes)	
⑪	Position control unit connecting cable	CQM1H-PLB21 or CQM1-CPU43	0.5 m	XW2Z-050J-A3	
			1 m	XW2Z-100J-A3	
		CS1W-NC113 or C200HW-NC113	0.5 m	XW2Z-050J-A6	
			1 m	XW2Z-100J-A6	
		CS1W-NC213/413 or C200HW-NC213/413	0.5 m	XW2Z-050J-A7	
			1 m	XW2Z-100J-A7	
		CS1W-NC133	0.5 m	XW2Z-050J-A10	
			1 m	XW2Z-100J-A10	
		CS1W-NC233/433	0.5 m	XW2Z-050J-A11	
			1 m	XW2Z-100J-A11	
		CJ1W-NC113	0.5 m	XW2Z-050J-A14	
			1 m	XW2Z-100J-A14	
		CJ1W-NC213/413	0.5 m	XW2Z-050J-A15	
			1 m	XW2Z-100J-A15	
		CJ1W-NC133	0.5 m	XW2Z-050J-A18	
			1 m	XW2Z-100J-A18	
		CJ1W-NC233/433	0.5 m	XW2Z-050J-A19	
			1 m	XW2Z-100J-A19	
CJ1M-CPU21/22/23	0.5 m	XW2Z-050J-A33			
	1 m	XW2Z-100J-A33			
⑫	General purpose cable	For general purpose controllers	1 m	R88A-CPG001S	
			2 m	R88A-CPG002S	
⑬	Terminal block cable	For general purpose controllers	1 m	XW2Z-100J-B24	
			2 m	XW2Z-200J-B24	
⑭	Terminal block (M3 screw and for pin terminals)		–	XW2B-50G4	
	Terminal block (M3.5 screw and for fork/round terminals)		–	XW2B-50G5	
	Terminal block (M3 screw and for fork/round terminals)		–	XW2D-50G6	

Computer cable (for CN3)

Symbol	Name	Length	Order code
⑮	Computer cable RS232	2 m	R88A-CCG002P2

Filters

Symbol	Applicable servodrive	Rated current	Leakage current	Rated voltage	Order code
⑯	R88D-GT1H_ R88D-GT02H_	2.4 A	3.5 mA	250 VAC single- phase	R88A-FIK102-RE
	R88D-GT04H_	4.1 A	3.5 mA		R88A-FIK104-RE
	R88D-GT08H_	6.6 A	3.5 mA		R88A-FIK107-RE
	R88D-GT10H_ R88D-GT15H_	14.2 A	3.5 mA		R88A-FIK114-RE

External regenerative resistor

Symbol	Specifications	Order code
⑰	50 Ω, 80 W	R88A-RR08050S
	100 Ω, 80 W	R88A-RR080100S
	47 Ω, 220 W	R88A-RR22047S
	20 Ω, 500 W	R88A-RR50020S

Connectors

Specifications	Order code
I/O connector kit, 50 pins (for CN1)	R88A-CNU11C

Computer software

Specifications	Order code
Configuration and monitoring software tool for servo drives and inverters. (CX-Drive version 1.70 or higher)	CX-Drive
Complete Omron software package including CX-Drive. (CX-One version 3.10 or higher)	CX-One

Specifications

General specifications

Servo drive type	R88D-G	01H_	02H_	04H_	08H_	10H_	15H_		
Applicable servomotor	R88M-G_	05030_/10030_	20030_	40030_	75030_	G1K020T_	90010T_/1K030T_/1K5_OT_		
	R88M-GP_	10030_	20030_	40030_	-	-	-		
Basic specifications	Max. applicable motor capacity	W	100	200	400	750	1,000	1,500	
	Continuous output current	Arms	1.16	1.6	2.7	4.0	5.9	9.8	
	Max. output current	Arms	3.5	5.3	7.1	14.1	21.2	28.3	
	Input power	Main circuit	For single-phase, 200 to 240 VAC + 10% to -15% (50/60 Hz)			For single-phase/three-phase, 200 to 240 VAC + 10% to -15% (50/60 Hz)			
	Supply	Control circuit	For single-phase, 200 to 240 VAC + 10% to -15% (50/60 Hz)						
	Control method	IGBT-driven PWM method							
	Feedback	Serial encoder (incremental/absolute)							
	Conditions	Usage/storage temperature	0 to 55°C / -20 to 65°C						
		Usage/storage humidity	90% RH or less (non-condensing)						
		Altitude	1,000m or less above sea level						
		Vibration/shock resistance	5.88 m/s ² /19.6 m/s ²						
Configuration	Base mounted								
Approx. weight	Kg	0.8		1.1	1.5	1.7			

MECHATROLINK-II servo drive specifications

Position/Speed/torque control mode	Performance	Speed variance	Load variance	During 0 to 100% load ±0.01 max. (at rated speed)
			Voltage variance	0% at ±10% of rated voltage (at rated speed)
		Temperature variance	0 to 50°C ±0.1% max. (at rated speed)	
Command input	Frequency characteristics	1 kHz		
	Torque control accuracy (reproducibility)	±3% (at 20% to 100% of rated torque)		
	Soft start time setting	0 to 10 s (acceleration time and deceleration time can be set)		
I/O signal	MECHATROLINK communication	MECHATROLINK-II commands (for sequence, motion, data setting/reference, monitor, adjustment and other commands)		
	Sequence input signal	Emergency stop, 3 external latch signals, forward/reverse torque limit, forward/reverse run prohibit, origin proximity, 3 general-purpose inputs		
	Sequence output signal	It is possible to output three types of signals: positioning completed, speed coincidence, rotation speed detection, servo ready, current limit, speed limit, brake release and warning signal		

Integrated functions	Communications	RS-232 communications	Interface	Personal computer
			Transmission rate	From 2,400 to 57,600 bps
			Functions	Parameter setting, status display, alarm display (monitor, clear, history), servo drive data tracing function, test run/autotuning operations, real time trace, absolute encoder setting, default values function
		MECHATROLINK communications	Communications protocol	MECHATROLINK-II
			Transmission rate	10 Mbps
			Data length	32 bytes
	Tuning	Horizontal and vertical axis mode. One parameter rigidity setting. Load inertia detection.		
	Dynamic brake (DB)	Operates when main power OFF, servo alarm, overtravel or servo OFF		
	Regenerative processing	Built-in regeneration resistor in models from 750 W to 1.5 kW. External regeneration resistor optionally.		
	Overtravel (OT) prevention function	Dynamic brake, disables torque or emergency stop torque during POT and NOT operation		
	Emergency stop (STOP)	Emergency stop input		
	Encoder divider function	Optional division pulses possible		
	Electronic gearing	0,01 < Numerator/Denominator < 100		
	Internal speed setting function	8 internal speeds		
	Protective functions	Overvoltage, undervoltage, overcurrent, overload, regeneration overload, servo drive overheat		
Analog monitor output	The actual servomotor speed, command speed, torque and number of accumulated pulses can be measured using an oscilloscope or other device.			
Panel operator	Display functions	A 2-digit 7-segment LED display shows the servo drive status, alarm codes, parameters, etc.		
		MECHATROLINK-II communications status LED indicator (COM)		
	Switches	Rotary switch for setting the MECHATROLINK-II node address		

Analogue/pulse servo drive specifications

Performance	Control mode		Position, speed and torque control mode		
	Speed variance	Load variance	During 0 to 100% load ±0.01 max. (at rated speed)		
		Voltage variance	0% at ±10% of rated voltage (at rated speed)		
		Temperature dependence	0 to 50°C ±0.1% max. (at rated speed)		
	Frequency characteristics	1 kHz			
Torque control accuracy (reproducibility)	±3% (at 20% to 100% of rated torque)				
Soft start time setting	0 to 10 s (acceleration time and deceleration time can be set)				
Position control	Input signal	Command pulse	Input pulse type	Signal + pulse, 90° phase displacement 2-phase pulse (phase A/B) or reverse and forward pulses (CW/CCW)	
		Input pulse frequency	500 kpps max. line-driver input, 200 kpps max. open-collector input		
		Electronic gearing	0,01 < Numerator/Denominator < 100		
Speed/torque control	Input signal	Speed control	Speed reference voltage	10 VDC at 3,000 r/min: set at delivery (the scale can be set by parameters)	
		Torque limit	3 VDC at rated torque (torque can be limited separately in positive/negative direction)		
	Preset speed control	Preset speed is selectable from 8 internal settings by digital inputs.			
	Torque control	Torque reference voltage	3 VDC at rated torque: set at delivery (the scale and polarity can be set by parameters).		
Speed limit	Speed limit can be set by parameter.				
I/O signal	Sequence input signal		Forward/reverse run prohibit, deviation counter reset, alarm reset, control mode switch, pulse prohibited, speed selection, gain switch, zero speed designation, origin proximity		
	Sequence output signal		Brake release, servo ready and alarm output. It is possible also to output two types of configurable signals: current limit, rotation speed detection, warning signal, speed coincidence, positioning completed		
Integrated functions	Communications	RS-232 communications	Interface	Personal computer	
			Transmission rate	From 2,400 to 57,600 bps	
			Functions	Parameter setting, status display, alarm display (monitor, clear, history), servo drive data tracing function, test run/autotuning operations, real time trace, absolute encoder setting, default values function	
		RS-485 communications data	Interface	Communication data interface between servo drives and personal computer.	
			Transmission rate	From 2,400 to 57,600 bps	
			Functions	Parameter setting, status display, alarm display (monitor, clear, history), servo drive data tracing function, test run/autotuning operations, real time trace, absolute encoder setting, default values function	
	Tuning	Horizontal and vertical axis mode. One parameter rigidity setting. Load inertia detection.			
	Dynamic brake (DB)	Operates when main power OFF, servo alarm, overtravel or servo OFF			
	Regenerative processing	Built-in regeneration resistor in models from 750 W to 1.5 kW. External regeneration resistor optionally.			
	Overtravel (OT) prevention function	Dynamic brake, disables torque or emergency stop torque during POT and NOT operation			
	Emergency stop (STOP)	Emergency stop input			
	Encoder divider function	Optional division pulses possible			
	Protective functions	Overvoltage, undervoltage, overcurrent, overload, regeneration overload, servo drive overheat			
	Analog monitor output	The actual servomotor speed, command speed, torque and number of accumulated pulses can be measured using an oscilloscope or other device.			
	Panel operator	Display functions	A 6-digit 7-segment LED display shows the servo drive status, alarm codes, parameters, etc.		
Switches		Unit No. switch for serial communications. Value from 0 to F. To identify which servo drive the computer is accessing in RS232 communications when multiple servo drives.			

Dimensions

Drive model	Specification		ML2 models				Analogue/pulse models				
			H	W	D	D1	H	W	D	D1	
R88D-GN01/02H-ML2, R88D-GT01/02H	200 V	100 to 200 W	150 mm	40 mm	132 mm	70 mm	150 mm	40 mm	130 mm	70 mm	
R88D-GN04H-ML2, R88D-GT04H		400 W	150 mm	55 mm	132 mm	70 mm	150 mm	55 mm	130 mm	70 mm	
R88D-GN08H-ML2, R88D-GT08H		750 W	150 mm	65 mm	172 mm	70 mm	150 mm	65 mm	170 mm	70 mm	
R88D-GN10/15H-ML2, R88D-GT10/15H		1 kW to 1.5 kW	150 mm	85 mm	172 mm	70 mm	150 mm	85 mm	170 mm	70 mm	



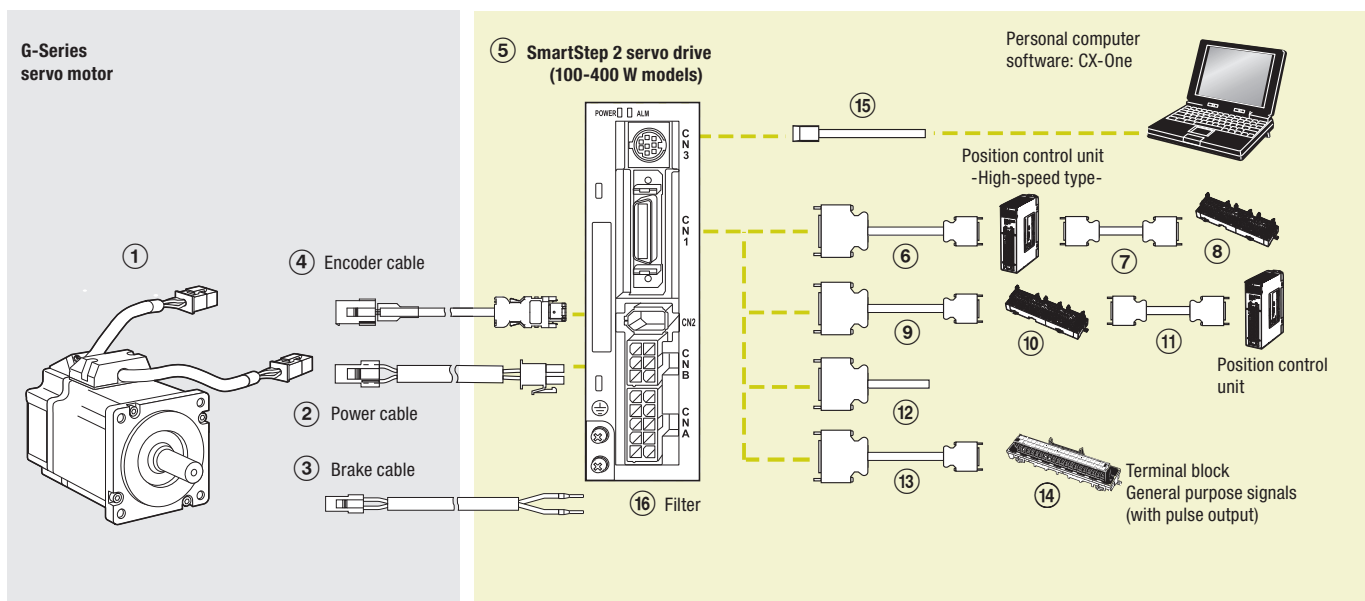
Another step forward in drive simplicity

The new SmartStep offers an ideal solution for point-to-point motion applications where simplicity is essential. SmartStep 2 keeps things simple whilst combining high performance and advanced features in a cost effective solution.

- On-line Auto-tuning and Easy set up
- Ultra-compact size. The footprint is only 48% compared to the previous SmartStep
- Two torque limits
- Electronic gear, four internal speed settings and wide range of pulse settings
- Adaptive resonance suppression filter
- Position control via pulse input 500 kpps
- Configuration and commissioning using CX Drive-software

Ordering information

SmartStep2 servo drive configuration (100-400 W)



Note: The symbols ①②③④⑤... show the recommended sequence to select the components in a SmartStep 2 servo system

Servo motor

Note: ①②③④ refer to G-Series motor section for detailed motor specifications and selection.

Servo drives

Symbol	Specifications		Compatible servo motors ①		SmartStep 2 drive model
			Cylindrical type	Flat type	
⑤	200 VAC	100 W	R88M-G05030H-__	-	R7D-BP01H
		200 W	R88M-G10030H-__	R88M-GP10030H-__	R7D-BP02HH
		400 W	R88M-G20030H-__	R88M-GP20030H-__	R7D-BP04H

Power supply cables (for CNA)

Symbol	Specifications	Appearance	Order code
⑤	Power supply input cable for single-phase power (connectors attached)		R7A-CLB002S2

Control cables (for CN1)

Symbol	Description	Connect to	Length	Order code
⑥	Control cable (line-driver output for 1 axis)	Position control unit (high-speed type) CJ1W-NC234 CJ1W-NC434	1 m	XW2Z-100J-G12
			5 m	XW2Z-500J-G12
			10 m	XW2Z-10MJ-G12
	Control cable (open-collector output for 1 axis)	Position control unit (high-speed type) CJ1W-NC214 CJ1W-NC414	1 m	XW2Z-100J-G16
3 m			XW2Z-300J-G16	
Control cable (line-driver output for 2 axis)			Position control unit (high-speed type) CJ1W-NC234 CJ1W-NC434	1 m
5 m	XW2Z-500J-G4			
10 m	XW2Z-10MJ-G4			
Control cable (open-collector output for 2 axis)	Position control unit (high-speed type) CJ1W-NC214 CJ1W-NC414	1 m	XW2Z-100J-G8	
		3 m	XW2Z-300J-G8	

Symbol	Description	Connect to	Length	Order code
⑦	Terminal block cable for external signals (for input common, forward/reverse run prohibited inputs, emergency stop input, origin proximity input and interrupt input)	Position control units (high-speed type) CJ1W-NC234 CJ1W-NC434 CJ1W-NC214 CJ1W-NC414	0.5 m	XW2Z-C50X
			1 m	XW2Z-100X
			2 m	XW2Z-200X
			3 m	XW2Z-300X
			5 m	XW2Z-500X
⑧	Terminal block for external signals (with M3 screw and for pin terminals)		-	XW2B-20G4
	Terminal block ext. signals (with M3.5 screw and for fork/round terminals)		-	XW2B-20G5
	Terminal block ext. signals (with M3 screw and fork/round pin terminals)		-	XW2D-20G6
⑨	Cable from servo relay unit to servo drive	CS1W-NC1_3, CJ1W-NC1_3, C200HW-NC113, CS1W-NC2_3/4_3, CJ1W-NC2_3/4_3, C200HW-NC213/413, CQM1H-PLB21 or CQM1-CPU43-V1 CJ1M-CPU21/22/23	1 m	XW2Z-100J-B29
			2 m	XW2Z-200J-B29
			1 m	XW2Z-100J-B32
			2 m	XW2Z-200J-B32
⑩	Servo relay unit	CS1W-NC1_3, CJ1W-NC1_3 or C200HW-NC113 position control unit CS1W-NC2_3/4_3, CJ1W-NC2_3/4_3 or C200HW-NC213/413 position control unit CQM1H-PLB21 or CQM1-CPU43-V1 CJ1M-CPU21/22/23	-	XW2B-20J6-1B (1 axis)
			-	XW2B-40J6-2B (2 axes)
			-	XW2B-20J6-3B (1 axis)
			-	XW2B-20J6-8A (1 axis)
			-	XW2B-40J6-9A (2 axes)
⑪	Position control unit connecting cable	CJ1W-NC133	0.5 m	XW2Z-050J-A18
			1 m	XW2Z-100J-A18
		CJ1W-NC233/433	0.5 m	XW2Z-050J-A19
			1 m	XW2Z-100J-A19
		CS1W-NC133	0.5 m	XW2Z-050J-A10
			1 m	XW2Z-100J-A10
		CS1W-NC233/433	0.5 m	XW2Z-050J-A11
			1 m	XW2Z-100J-A11
		CJ1W-NC113	0.5 m	XW2Z-050J-A14
			1 m	XW2Z-100J-A14
		CJ1W-NC213/413	0.5 m	XW2Z-050J-A15
			1 m	XW2Z-100J-A15
		CS1W-NC113 C200HW-NC113	0.5 m	XW2Z-050J-A6
			1 m	XW2Z-100J-A6
		CS1W-NC213/413 C200HW-NC213/413	0.5 m	XW2Z-050J-A7
			1 m	XW2Z-100J-A7
		CJ1M-CPU21/22/23	0.5 m	XW2Z-050J-A33
			1 m	XW2Z-100J-A33
CQM1H-PLB21 CQM1-CPU43-V1	0.5 m	XW2Z-050J-A3		
	1 m	XW2Z-100J-A3		
⑫	General purpose cable	For general purpose controllers	1 m	R7A-CPB001S
			2 m	R7A-CPB002S
⑬	Terminal block cable	For general purpose controllers	1 m	XW2Z-100J-B28
			2 m	XW2Z-200J-B28
⑭	Terminal block (with M3 screw and for pin terminals) Terminal block (with M3.5 screw and for fork/round terminals) Terminal block (with M3 screw and fork/round pin terminals)		-	XW2B-34G4
			-	XW2B-34G5
			-	XW2B-34G6
			-	XW2D-34G6

Cable for CN3

Symbol	Name	Length	Order code
⑮	Personal Computer Monitor Cable	2 m	R88A-CCG002P2

Filters

Symbol	Applicable servo drive	Rated current	Rated voltage	Order code
⑯	R7D-BP01H/ 02HH/ 04H	4 A	1 pH, 230 V	R7A-FIB104-RE

Connectors

Specifications	Order code
Main Circuit Connector (CNA)	R7A-CNB01P
Servomotor Connector (CNB)	R7A-CNB01A
Control I/O Connector (CN1)	R88A-CNW01C
Encoder Input Connector (CN2)	R88A-CNW01R
Servomotor Connector for Encoder Cable	R88A-CNG02R
Servomotor Connector for Servomotor Power Cable	R88A-CNG01A
Brake Cable Connector	R88A-CNG01B

External regeneration resistor

Specification	Order code
80 W, 50 Ω	R88A-RR08050S
80 W, 100 Ω	R88A-RR080100S
220 W, 47 Ω	R88A-RR22047S

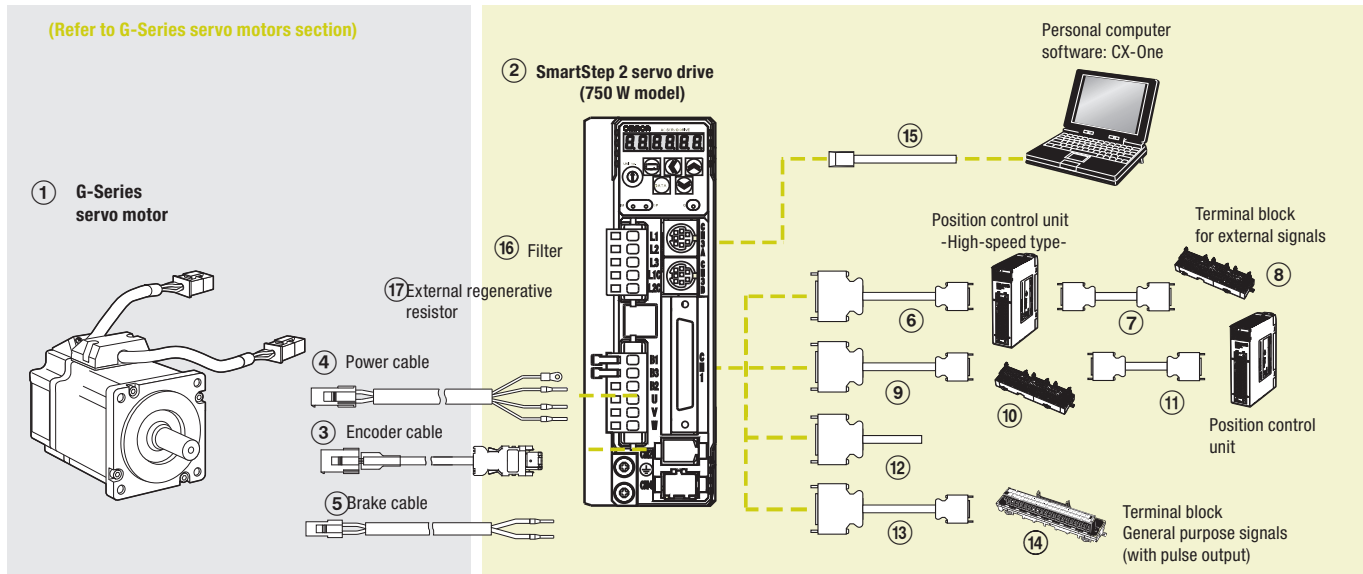
External regeneration resistor cable

Specifications	Order code
External Regenerative Resistor Connection Cable, 2 meters	R7A-CLB002RG

Parameter unit & computer software

Specifications	Order code
Parameter copy unit (with cable)	R88A-PRO2G
Configuration and monitoring software tool for servo drives and inverters. (CX-Drive version 1.8 or higher)	CX-Drive

SmartStep2 servo drive configuration (750 W)



Note: The symbols ①②③④⑤... show the recommended sequence to select the components in a SmartStep 2 servo system.

Servo motor

Note: ①③④⑤ refer to G-Series motor section for detailed motor specifications and selection.

Servo drives

Symbol	Specifications	① Compatible rotary servo motors	
		Cylindrical type	Servo drive model
②	1 phase 200 VAC 750 W	R88M-G75030H_	R88D-GP08H

Control cables (for CN1)

Symbol	Description	Connect to	Length	Order code
⑥	Control cable (line-driver output for 1 axis)	Position control units (high-speed type) CJ1W-NC234 CJ1W-NC434	1 m	XW2Z-100J-G9
			5 m	XW2Z-500J-G9
	Control cable (open-collector output for 1 axis)	Position control units (high-speed type) CJ1W-NC214 CJ1W-NC414	1 m	XW2Z-100J-G13
			3 m	XW2Z-300J-G13
⑦	Terminal block cable for external signals (for input common, forward/reverse run prohibited inputs, emergency stop input, origin proximity input and interrupt input)	Position control units (high-speed type) CJ1W-NC234 CJ1W-NC434 CJ1W-NC214 CJ1W-NC414	1 m	XW2Z-100J-G1
			5 m	XW2Z-500J-G1
			10 m	XW2Z-10MJ-G1
			3 m	XW2Z-10MJ-G5
⑧	Terminal block for external signals (M3 screw, pin terminals) Terminal block ext. signals (M3.5 screw, fork/round terminals) Terminal block ext. signals (M3 screw, fork/round terminals)	Position control units (high-speed type) CJ1W-NC234 CJ1W-NC434 CJ1W-NC214 CJ1W-NC414	1 m	XW2Z-100J-G5
			3 m	XW2Z-300J-G5
			0.5 m	XW2Z-C50X
			1 m	XW2Z-100X
⑨	Cable from servo relay unit to servo drive	CS1W-NC1_3, CJ1W-NC1_3, C200HW-NC113/213/413, CS1W-NC2_3/4_3, CJ1W-NC2_3/4_3 or CQM1H-PLB21	1 m	XW2Z-300X
			2 m	XW2Z-500X
			10 m	XW2Z-010X
⑩	Servo relay unit	CJ1M-CPU21/22/23	-	XW2B-20G4
			-	XW2B-20G5
			-	XW2D-20G6
			-	XW2Z-100J-B25
⑪	Position control unit	CS1W-NC1_3, CJ1W-NC1_3 or C200HW-NC113 position control unit	1 m	XW2Z-200J-B25
			2 m	XW2Z-100J-B31
			2 m	XW2Z-200J-B31
			-	XW2B-20J6-1B (1 axis)
⑫	Servo relay unit	CS1W-NC2_3/4_3, CJ1W-NC2_3/4_3 or C200HW-NC213/413 position control unit	-	XW2B-40J6-2B (2 axes)
			-	XW2B-20J6-3B (1 axis)
			-	XW2B-20J6-8A (1 axis)
			-	XW2B-40J6-9A (2 axes)

Symbol	Description	Connect to	Length	Order code
⑪	Position control unit connecting cable	CQM1H-PLB21	0.5 m	XW2Z-050J-A3
			1 m	XW2Z-100J-A3
		CS1W-NC113 or C200HW-NC113	0.5 m	XW2Z-050J-A6
			1 m	XW2Z-100J-A6
		CS1W-NC213/413 or C200HW-NC213/413	0.5 m	XW2Z-050J-A7
			1 m	XW2Z-100J-A7
		CS1W-NC133	0.5 m	XW2Z-050J-A10
			1 m	XW2Z-100J-A10
		CS1W-NC233/433	0.5 m	XW2Z-050J-A11
			1 m	XW2Z-100J-A11
		CJ1W-NC113	0.5 m	XW2Z-050J-A14
			1 m	XW2Z-100J-A14
		CJ1W-NC213/413	0.5 m	XW2Z-050J-A15
			1 m	XW2Z-100J-A15
CJ1W-NC133	0.5 m	XW2Z-050J-A18		
	1 m	XW2Z-100J-A18		
CJ1W-NC233/433	0.5 m	XW2Z-050J-A19		
	1 m	XW2Z-100J-A19		
CJ1M-CPU21/22/23	0.5 m	XW2Z-050J-A33		
	1 m	XW2Z-100J-A33		
⑫	General purpose cable	For general purpose controllers	1 m	R88A-CPG001S
⑬	Terminal block cable	For general purpose controllers	2 m	R88A-CPG002S
			1 m	XW2Z-100J-B24
⑭	Terminal block (M3 screw and for pin terminals) Terminal block (M3.5 screw and for fork/round terminals) Terminal block (M3 screw and for fork/round terminals)		2 m	XW2Z-200J-B24
			-	XW2B-50G4
			-	XW2B-50G5
			-	XW2D-50G6

Computer cable (for CN3)

Symbol	Name	Length	Order code
⑮	Computer cable RS232	2 m	R88A-CCG002P2

Filter

Symbol	Rated current	Leakage current	Rated voltage	Applicable servodrive	Order code
⑯	6.6 A	3.5 mA	250 VAC single-phase	R88D-GP08H	R88A-FIK107-RE

External regenerative resistor

Symbol	Specifications	Order code
⑰	50 Ω, 80 W	R88A-RR08050S
	100 Ω, 80 W	R88A-RR080100S
	47 Ω, 220 W	R88A-RR22047S
	20 Ω, 500 W	R88A-RR50020S

Connectors

Specifications	Order code
I/O connector kit -50 pins- (for CN1)	R88A-CNU11C
Power cable connector (motor side)	R88A-CNG01A
Encoder connector (Servo drive side CN2)	R88A-CNW01R
Incremental encoder cable connector (motor side)	R88A-CNG02R

Computer software

Specifications	Order code
Configuration and monitoring software tool for servo drives and inverters (CX-Drive version 1.91 or higher).	CX-Drive

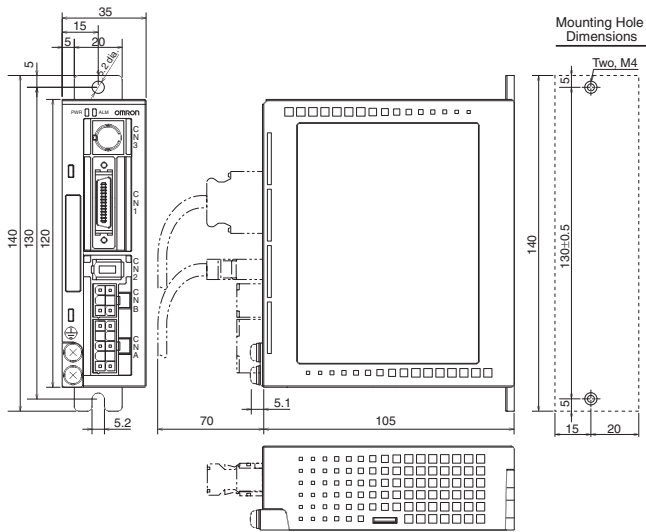
Specifications

Performance specifications

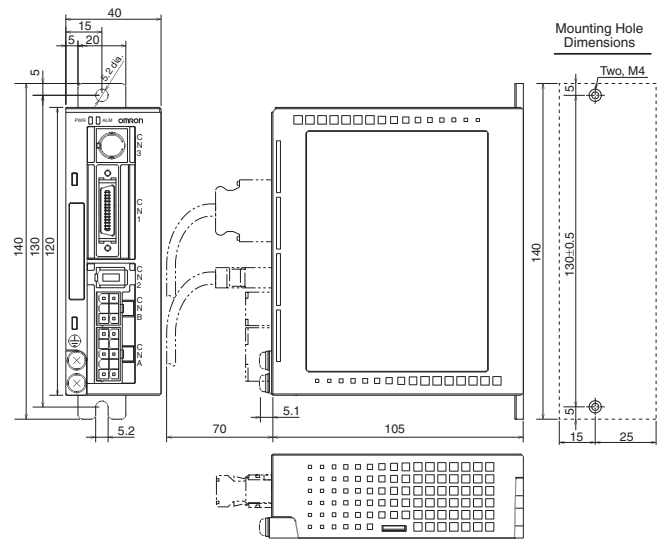
Item	200 VAC input type			
	100 W	200 W	400 W	750 W
	R7D-BP01H	R7D-BP02HH	R7D-BP04H	R88D-GP08H
Continuous output current (rms)	1.0 A	1.6 A	2.5 A	4 A
Momentary maximum output current (rms)	3.3 A	4.9 A	7.8 A	14.1 A
Main-circuit power supply	Single-phase 200 to 240 VAC (170 to 264 V), 50/60 Hz			Single-phase/three-phase 200 to 240 VAC (170 to 264 V), 50/60 Hz
Control circuit input power	-			Single-phase 200 to 240 VAC (170 to 264 V)
Control method	All-digital method			
Feedback	10,000 pulses/revolution incremental encoder			
Inverter method	PWM method based on IGBT			
PWM frequency	12 kHz		6 kHz	
Weight	0.35 kg	0.42 kg	0.42 kg	1.5 kg
Compatible motor voltage	200 V			
Command pulse response	Line drive: 500 kpps			
Compatible motor capacity	50 W 100 W	200 W	400 W	750 W
Applicable servo motor (R88M-)	G05030H G10030H GP10030H	G020030H GP20030H	G40030H GP40030H	G75030H

Dimensions

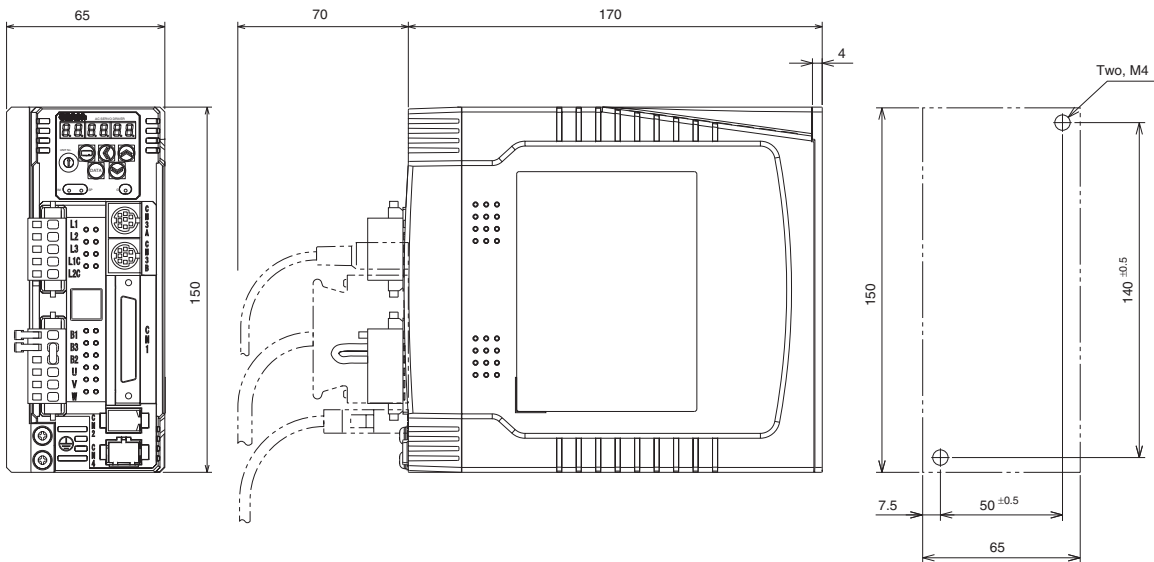
R7D-BP01H (230 V, 100 W)



R7D-BP02HH/04H (230 V, 200-400 W)



R88D-GP08H (230 V, 750 W)



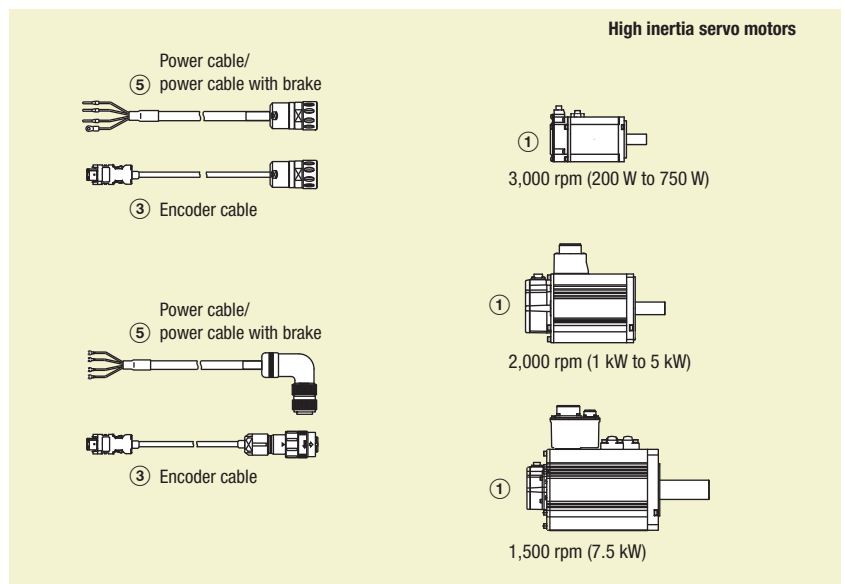
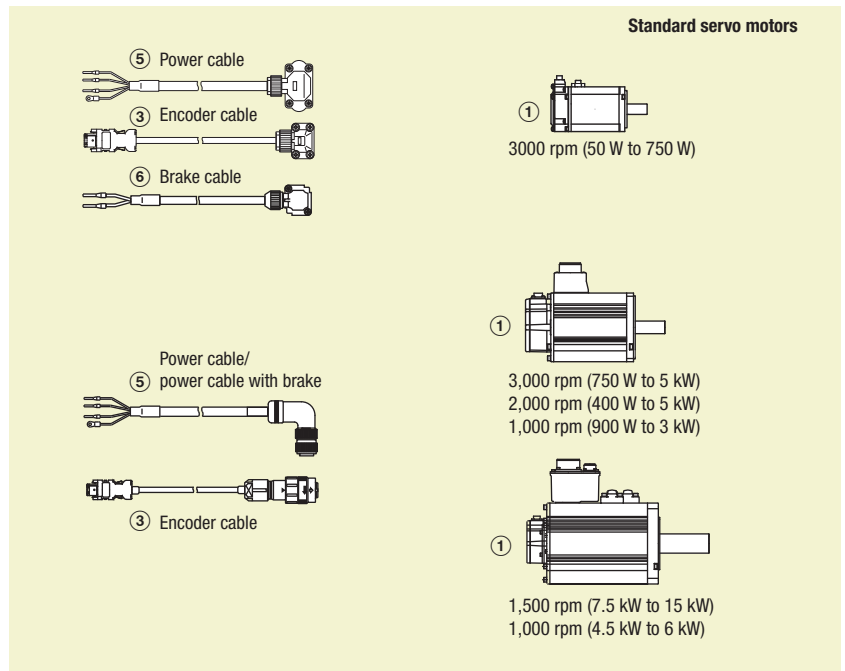
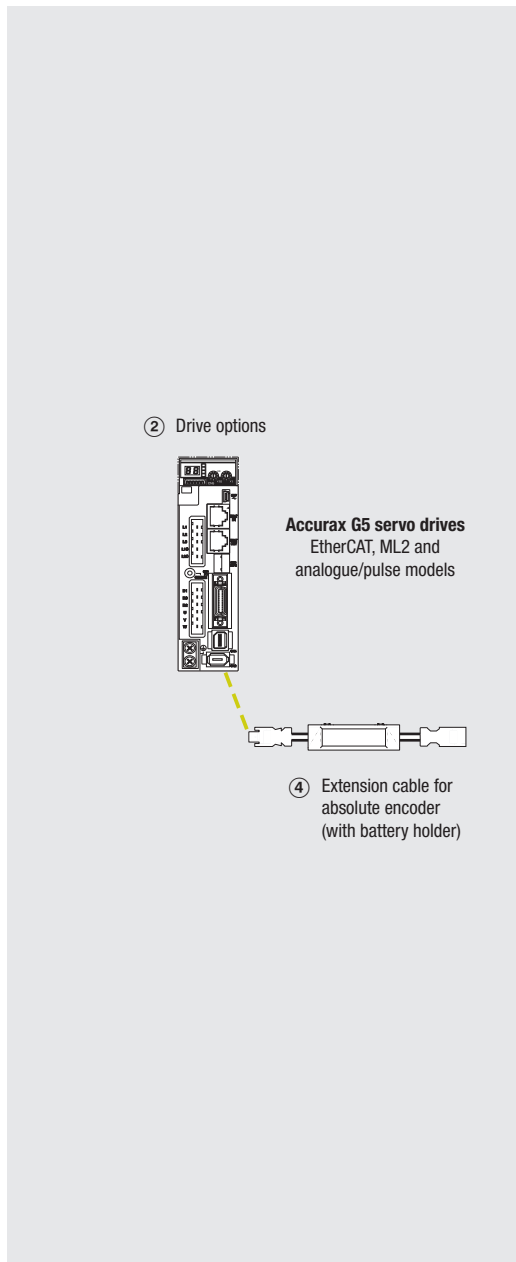


Servo motor family for accurate motion control

Accurax G5 servo motors include IP67 protection and connectors on the motor body. Use of 10 pole motors and 20 bit encoder results in 40% reduction in motor cogging. The servomotors are 25% lighter and 15% smaller due to patented new stator design PACK & CLAMP technology, 40% iron loss reduction and 15% smaller encoder.

- Standard and high inertia servo motor models
- Peak torque 300% of rated torque during 3 seconds or more depending on model
- High accuracy provided by a 20 bit resolution encoder, ABS encoder as an option
- IP67 protection in all models
- Ultra-light and compact size motor
- Low speed ripple and low torque ripple due to low torque cogging
- Various shaft, brake and seal options

Ordering information



Note: The symbols ①②③ ... show the recommended sequence to select the servo motor and cables

Servo motor



① Select motor from R88M-K or R88M-KH families using motor tables in next pages.

Servo drive


② Refer to Accurax G5 servo drive section for detailed drive specifications and selection of drive accessories.

Standard servo motors


Servo motors 3,000 r/min (50 to 5,000 W)

Symbol	Specifications				② Compatible servo drives		Order code				
	Voltage	Encoder and design	Rated torque	Capacity	G5 EtherCAT/ML2	G5 analogue/pulse					
<p>①</p>  <p>230 V (50 to 750 W)</p>  <p>230 V (1,000 to 1,500 W)</p> <p>400 V (750 to 5,000 W)</p>	230 V	Incremental encoder (20 bit) Straight shaft with key and tap	Without brake	0.16 Nm	50 W	R88D-KN01H-__	R88D-KT01H	R88M-K05030H-S2			
				0.32 Nm	100 W	R88D-KN01H-__	R88D-KT01H	R88M-K10030H-S2			
				0.64 Nm	200 W	R88D-KN02H-__	R88D-KT02H	R88M-K20030H-S2			
				1.3 Nm	400 W	R88D-KN04H-__	R88D-KT04H	R88M-K40030H-S2			
				2.4 Nm	750 W	R88D-KN08H-__	R88D-KT08H	R88M-K75030H-S2			
				3.18 Nm	1,000 W	R88D-KN15H-__	R88D-KT15H	R88M-K1K030H-S2			
				4.77 Nm	1,500 W	R88D-KN15H-__	R88D-KT15H	R88M-K1K530H-S2			
				With brake	0.16 Nm	50 W	R88D-KN01H-__	R88D-KT01H	R88M-K05030H-BS2		
					0.32 Nm	100 W	R88D-KN01H-__	R88D-KT01H	R88M-K10030H-BS2		
					0.64 Nm	200 W	R88D-KN02H-__	R88D-KT02H	R88M-K20030H-BS2		
					1.3 Nm	400 W	R88D-KN04H-__	R88D-KT04H	R88M-K40030H-BS2		
					2.4 Nm	750 W	R88D-KN08H-__	R88D-KT08H	R88M-K75030H-BS2		
			3.18 Nm		1,000 W	R88D-KN15H-__	R88D-KT15H	R88M-K1K030H-BS2			
			400 V	Absolute encoder (17 bit) Straight shaft with key and tap	Without brake	0.16 Nm	50 W	R88D-KN01H-__	R88D-KT01H	R88M-K05030T-S2	
						0.32 Nm	100 W	R88D-KN01H-__	R88D-KT01H	R88M-K10030T-S2	
						0.64 Nm	200 W	R88D-KN02H-__	R88D-KT02H	R88M-K20030T-S2	
						1.3 Nm	400 W	R88D-KN04H-__	R88D-KT04H	R88M-K40030T-S2	
						2.4 Nm	750 W	R88D-KN08H-__	R88D-KT08H	R88M-K75030T-S2	
						3.18 Nm	1,000 W	R88D-KN15H-__	R88D-KT15H	R88M-K1K030T-S2	
						4.77 Nm	1,500 W	R88D-KN15H-__	R88D-KT15H	R88M-K1K530T-S2	
						With brake	0.16 Nm	50 W	R88D-KN01H-__	R88D-KT01H	R88M-K05030T-BS2
							0.32 Nm	100 W	R88D-KN01H-__	R88D-KT01H	R88M-K10030T-BS2
							0.64 Nm	200 W	R88D-KN02H-__	R88D-KT02H	R88M-K20030T-BS2
							1.3 Nm	400 W	R88D-KN04H-__	R88D-KT04H	R88M-K40030T-BS2
	2.4 Nm	750 W					R88D-KN08H-__	R88D-KT08H	R88M-K75030T-BS2		
	3.18 Nm	1,000 W			R88D-KN15H-__		R88D-KT15H	R88M-K1K030T-BS2			
	Without brake	2.39 Nm			750 W	R88D-KN10F-__	R88D-KT10F	R88M-K75030F-S2			
		3.18 Nm			1,000 W	R88D-KN15F-__	R88D-KT15F	R88M-K1K030F-S2			
		4.77 Nm			1,500 W	R88D-KN15F-__	R88D-KT15F	R88M-K1K530F-S2			
		6.37 Nm			2,000 W	R88D-KN20F-__	R88D-KT20F	R88M-K2K030F-S2			
		9.55 Nm			3,000 W	R88D-KN30F-__	R88D-KT30F	R88M-K3K030F-S2			
		12.7 Nm			4,000 W	R88D-KN50F-__	R88D-KT50F	R88M-K4K030F-S2			
		15.9 Nm			5,000 W	R88D-KN50F-__	R88D-KT50F	R88M-K5K030F-S2			
		With brake			2.39 Nm	750 W	R88D-KN10F-__	R88D-KT10F	R88M-K75030F-BS2		
					3.18 Nm	1,000 W	R88D-KN15F-__	R88D-KT15F	R88M-K1K030F-BS2		
					4.77 Nm	1,500 W	R88D-KN15F-__	R88D-KT15F	R88M-K1K530F-BS2		
					6.37 Nm	2,000 W	R88D-KN20F-__	R88D-KT20F	R88M-K2K030F-BS2		
			9.55 Nm	3,000 W	R88D-KN30F-__	R88D-KT30F	R88M-K3K030F-BS2				
	12.7 Nm		4,000 W	R88D-KN50F-__	R88D-KT50F	R88M-K4K030F-BS2					
	Without brake	2.39 Nm	750 W	R88D-KN10F-__	R88D-KT10F	R88M-K75030C-S2					
		3.18 Nm	1,000 W	R88D-KN15F-__	R88D-KT15F	R88M-K1K030C-S2					
		4.77 Nm	1,500 W	R88D-KN15F-__	R88D-KT15F	R88M-K1K530C-S2					
		6.37 Nm	2,000 W	R88D-KN20F-__	R88D-KT20F	R88M-K2K030C-S2					
		9.55 Nm	3,000 W	R88D-KN30F-__	R88D-KT30F	R88M-K3K030C-S2					
		12.7 Nm	4,000 W	R88D-KN50F-__	R88D-KT50F	R88M-K4K030C-S2					
		15.9 Nm	5,000 W	R88D-KN50F-__	R88D-KT50F	R88M-K5K030C-S2					
		With brake	2.39 Nm	750 W	R88D-KN10F-__	R88D-KT10F	R88M-K75030C-BS2				
			3.18 Nm	1,000 W	R88D-KN15F-__	R88D-KT15F	R88M-K1K030C-BS2				
4.77 Nm			1,500 W	R88D-KN15F-__	R88D-KT15F	R88M-K1K530C-BS2					
6.37 Nm			2,000 W	R88D-KN20F-__	R88D-KT20F	R88M-K2K030C-BS2					
9.55 Nm			3,000 W	R88D-KN30F-__	R88D-KT30F	R88M-K3K030C-BS2					
12.7 Nm	4,000 W		R88D-KN50F-__	R88D-KT50F	R88M-K4K030C-BS2						
15.9 Nm	5,000 W	R88D-KN50F-__	R88D-KT50F	R88M-K5K030C-BS2							



Servo motors 2,000 r/min (1 to 5 kW)

Symbol	Specifications					② Compatible servo drives		Order code	
	Voltage	Encoder and design		Rated torque	Capacity	G5 EtherCAT/ML2	G5 analogue/pulse		
	230 V	Incremental encoder (20 bit) Straight shaft with key and tap	Without brake	4.77 Nm	1,000 W	R88D-KN10H-__	R88D-KT10H	R88M-K1K020H-S2	
				7.16 Nm	1,500 W	R88D-KN15H-__	R88D-KT15H	R88M-K1K520H-S2	
				4.77 Nm	1,000 W	R88D-KN10H-__	R88D-KT10H	R88M-K1K020H-BS2	
			7.16 Nm	1,500 W	R88D-KN15H-__	R88D-KT15H	R88M-K1K520H-BS2		
			Absolute encoder (17 bit) Straight shaft with key and tap	Without brake	4.77 Nm	1,000 W	R88D-KN10H-__	R88D-KT10H	R88M-K1K020T-S2
					7.16 Nm	1,500 W	R88D-KN15H-__	R88D-KT15H	R88M-K1K520T-S2
		400 V	Incremental encoder (20 bit) Straight shaft with key and tap	Without brake	4.77 Nm	1,000 W	R88D-KN10F-__	R88D-KT10F	R88M-K1K020F-S2
					7.16 Nm	1,500 W	R88D-KN15F-__	R88D-KT15F	R88M-K1K520F-S2
					9.55 Nm	2,000 W	R88D-KN20F-__	R88D-KT20F	R88M-K2K020F-S2
					14.3 Nm	3,000 W	R88D-KN30F-__	R88D-KT30F	R88M-K3K020F-S2
					19.1 Nm	4,000 W	R88D-KN50F-__	R88D-KT50F	R88M-K4K020F-S2
					23.9 Nm	5,000 W	R88D-KN50F-__	R88D-KT50F	R88M-K5K020F-S2
					1.91 Nm	400 W	R88D-KN06F-__	R88D-KT06F	R88M-K40020F-S2
				With brake	2.86 Nm	600 W	R88D-KN06F-__	R88D-KT06F	R88M-K60020F-S2
	4.77 Nm				1,000 W	R88D-KN10F-__	R88D-KT10F	R88M-K1K020F-BS2	
	7.16 Nm				1,500 W	R88D-KN15F-__	R88D-KT15F	R88M-K1K520F-BS2	
	9.55 Nm				2,000 W	R88D-KN20F-__	R88D-KT20F	R88M-K2K020F-BS2	
	14.3 Nm				3,000 W	R88D-KN30F-__	R88D-KT30F	R88M-K3K020F-BS2	
	19.1 Nm				4,000 W	R88D-KN50F-__	R88D-KT50F	R88M-K4K020F-BS2	
	23.9 Nm				5,000 W	R88D-KN50F-__	R88D-KT50F	R88M-K5K020F-BS2	
	Absolute encoder (17 bit) Straight shaft with key and tap	Without brake	1.91 Nm	400 W	R88D-KN06F-__	R88D-KT06F	R88M-K40020C-S2		
			2.86 Nm	600 W	R88D-KN06F-__	R88D-KT06F	R88M-K60020C-S2		
			4.77 Nm	1,000 W	R88D-KN10F-__	R88D-KT10F	R88M-K1K020C-S2		
			7.16 Nm	1,500 W	R88D-KN15F-__	R88D-KT15F	R88M-K1K520C-S2		
			9.55 Nm	2,000 W	R88D-KN20F-__	R88D-KT20F	R88M-K2K020C-S2		
			14.3 Nm	3,000 W	R88D-KN30F-__	R88D-KT30F	R88M-K3K020C-S2		
			19.1 Nm	4,000 W	R88D-KN50F-__	R88D-KT50F	R88M-K4K020C-S2		
		With brake	1.91 Nm	400 W	R88D-KN06F-__	R88D-KT06F	R88M-K40020C-BS2		
2.86 Nm			600 W	R88D-KN06F-__	R88D-KT06F	R88M-K60020C-BS2			
4.77 Nm			1,000 W	R88D-KN10F-__	R88D-KT10F	R88M-K1K020C-BS2			
7.16 Nm			1,500 W	R88D-KN15F-__	R88D-KT15F	R88M-K1K520C-BS2			
9.55 Nm			2,000 W	R88D-KN20F-__	R88D-KT20F	R88M-K2K020C-BS2			
14.3 Nm			3,000 W	R88D-KN30F-__	R88D-KT30F	R88M-K3K020C-BS2			
19.1 Nm			4,000 W	R88D-KN50F-__	R88D-KT50F	R88M-K4K020C-BS2			
23.9 Nm	5,000 W	R88D-KN50F-__	R88D-KT50F	R88M-K5K020C-BS2					

Servo motors 1,500 r/min (7.5 to 15 kW)


Symbol	Specifications					② Compatible servo drives		Order code
	Voltage	Encoder and design		Rated torque	Capacity	G5 EtherCAT	G5 analogue/pulse	
	400 V	Absolute encoder (17 bit) straight shaft with key and tap	Without brake	47.8 Nm	7,500 W	R88D-KN75F-ECT	R88D-KT75F	R88M-K7K515C-S2
				70.0 Nm	11,000 W	R88D-KN150F-ECT	R88D-KT150F	R88M-K1K1015C-S2
				95.5 Nm	15,000 W	R88D-KN150F-ECT	R88D-KT150F	R88M-K15K015C-S2
			With brake	47.8 Nm	7,500 W	R88D-KN75F-ECT	R88D-KT75F	R88M-K7K515C-BS2
				70.0 Nm	11,000 W	R88D-KN150F-ECT	R88D-KT150F	R88M-K1K1015C-BS2
				95.5 Nm	15,000 W	R88D-KN150F-ECT	R88D-KT150F	R88M-K15K015C-BS2

Servo motors 1,000 r/min (900 to 6,000 W)


Symbol	Specifications				② Compatible servo drives			Order code		
	Voltage	Encoder and design		Rated torque	Capacity	G5 EtherCAT	G5 analogue/pulse		G5 ML2	
 900 W to 3 kW	230 V	Incremental encoder (20 bit) straight shaft with key and tap	Without brake	8.59 Nm	900 W	R88D-KN15H-ECT	R88D-KT15H	R88D-KN15H-ML2	R88M-K90010H-S2	
			With brake	8.59 Nm	900 W	R88D-KN15H-ECT	R88D-KT15H	R88D-KN15H-ML2	R88M-K90010H-BS2	
		Absolute encoder (17 bit) straight shaft with key and tap	Without brake	8.59 Nm	900 W	R88D-KN15H-ECT	R88D-KT15H	R88D-KN15H-ML2	R88M-K90010T-S2	
			With brake	8.59 Nm	900 W	R88D-KN15H-ECT	R88D-KT15H	R88D-KN15H-ML2	R88M-K90010T-BS2	
		400 V	Incremental encoder (20 bit) straight shaft with key and tap	Without brake	8.59 Nm	900 W	R88D-KN15F-ECT	R88D-KT15F	R88D-KN15F-ML2	R88M-K90010F-S2
					19.1 Nm	2,000 W	R88D-KN30F-ECT	R88D-KT30F	R88D-KN30F-ML2	R88M-K2K010F-S2
	28.7 Nm				3,000 W	R88D-KN50F-ECT	R88D-KT50F	R88D-KN50F-ML2	R88M-K3K010F-S2	
	With brake			8.59 Nm	900 W	R88D-KN15F-ECT	R88D-KT15F	R88D-KN15F-ML2	R88M-K90010F-BS2	
				19.1 Nm	2,000 W	R88D-KN30F-ECT	R88D-KT30F	R88D-KN30F-ML2	R88M-K2K010F-BS2	
				28.7 Nm	3,000 W	R88D-KN50F-ECT	R88D-KT50F	R88D-KN50F-ML2	R88M-K3K010F-BS2	
	 4.5 kW to 6 kW	400 V	Absolute encoder (17 bit) straight shaft with key and tap	Without brake	8.59 Nm	900 W	R88D-KN15F-ECT	R88D-KT15F	R88D-KN15F-ML2	R88M-K90010C-S2
					19.1 Nm	2,000 W	R88D-KN30F-ECT	R88D-KT30F	R88D-KN30F-ML2	R88M-K2K010C-S2
28.7 Nm					3,000 W	R88D-KN50F-ECT	R88D-KT50F	R88D-KN50F-ML2	R88M-K3K010C-S2	
With brake				43.0 Nm	4,500 W	R88D-KN50F-ECT	R88D-KT50F	R88D-KN50F-ML2	R88M-K4K510C-S2	
				57.3 Nm	6,000 W	R88D-KN75F-ECT	R88D-KT75F	-	R88M-K6K010C-S2	
				8.59 Nm	900 W	R88D-KN15F-ECT	R88D-KT15F	R88D-KN15F-ML2	R88M-K90010C-BS2	
400 V		Absolute encoder (17 bit) straight shaft with key and tap	Without brake	19.1 Nm	2,000 W	R88D-KN30F-ECT	R88D-KT30F	R88D-KN30F-ML2	R88M-K2K010C-S2	
				28.7 Nm	3,000 W	R88D-KN50F-ECT	R88D-KT50F	R88D-KN50F-ML2	R88M-K3K010C-S2	
				43.0 Nm	4,500 W	R88D-KN50F-ECT	R88D-KT50F	R88D-KN50F-ML2	R88M-K4K510C-S2	
			With brake	57.3 Nm	6,000 W	R88D-KN75F-ECT	R88D-KT75F	-	R88M-K6K010C-S2	
				8.59 Nm	900 W	R88D-KN15F-ECT	R88D-KT15F	R88D-KN15F-ML2	R88M-K90010C-BS2	
				19.1 Nm	2,000 W	R88D-KN30F-ECT	R88D-KT30F	R88D-KN30F-ML2	R88M-K2K010C-S2	

High inertia servo motors


Servo motors 3,000 r/min (200 to 750 W)

Symbol	Specifications				② Compatible servo drives		Order code		
	Voltage	Encoder and design		Rated torque	Capacity	G5 EtherCAT/ML2		G5 analogue/pulse	
	230 V	Incremental encoder (20 bit)	Without brake	0.64 Nm	200 W	R88D-KN02H-__	R88D-KT02H	R88M-KH20030H-S2-D	
				1.3 Nm	400 W	R88D-KN04H-__	R88D-KT04H	R88M-KH40030H-S2-D	
			Straight shaft with key and tap	With brake	2.4 Nm	750 W	R88D-KN08H-__	R88D-KT08H	R88M-KH75030H-S2-D
					0.64 Nm	200 W	R88D-KN02H-__	R88D-KT02H	R88M-KH20030H-BS2-D
		Absolute encoder (17 bit)	Without brake	1.3 Nm	400 W	R88D-KN04H-__	R88D-KT04H	R88M-KH40030H-BS2-D	
				2.4 Nm	750 W	R88D-KN08H-__	R88D-KT08H	R88M-KH75030H-BS2-D	
			Straight shaft with key and tap	With brake	0.64 Nm	200 W	R88D-KN02H-__	R88D-KT02H	R88M-KH20030T-S2-D
					1.3 Nm	400 W	R88D-KN04H-__	R88D-KT04H	R88M-KH40030T-S2-D
		Absolute encoder (17 bit)	Without brake	2.4 Nm	750 W	R88D-KN08H-__	R88D-KT08H	R88M-KH75030T-S2-D	
				0.64 Nm	200 W	R88D-KN02H-__	R88D-KT02H	R88M-KH20030T-BS2-D	
			Straight shaft with key and tap	With brake	1.3 Nm	400 W	R88D-KN04H-__	R88D-KT04H	R88M-KH40030T-BS2-D
					2.4 Nm	750 W	R88D-KN08H-__	R88D-KT08H	R88M-KH75030T-BS2-D

Servo motors 2,000 r/min (1 to 5 kW)

Symbol	Specifications				② Compatible servo drives		Servo motor model			
	Voltage	Encoder and design		Rated torque	Capacity	G5 EtherCAT/ML2	G5 analogue/pulse	Order code		
	400 V	Incremental encoder (20 bit)	Without brake	4.77 Nm	1,000 W	R88D-_KN10F-__	R88D-KT10F	R88M-KH1K020F-S1		
				7.16 Nm	1,500 W	R88D-_KN15F-__	R88D-KT15F	R88M-KH1K520F-S1		
				Shaft end with key	With brake	9.55 Nm	2,000 W	R88D-_KN20F-__	R88D-KT20F	R88M-KH2K020F-S1
						14.3 Nm	3,000 W	R88D-_KN30F-__	R88D-KT30F	R88M-KH3K020F-S1
						19.1 Nm	4,000 W	R88D-_KN50F-__	R88D-KT50F	R88M-KH4K020F-S1
						23.9 Nm	5,000 W	R88D-_KN50F-__	R88D-KT50F	R88M-KH5K020F-S1
			4.77 Nm			1,000 W	R88D-_KN10F-__	R88D-KT10F	R88M-KH1K020F-BS1	
			7.16 Nm			1,500 W	R88D-_KN15F-__	R88D-KT15F	R88M-KH1K520F-BS1	
			Absolute encoder (17 bit)	Without brake	With brake	9.55 Nm	2,000 W	R88D-_KN20F-__	R88D-KT20F	R88M-KH2K020C-S1
						14.3 Nm	3,000 W	R88D-_KN30F-__	R88D-KT30F	R88M-KH3K020C-S1
						19.1 Nm	4,000 W	R88D-_KN50F-__	R88D-KT50F	R88M-KH4K020C-S1
						23.9 Nm	5,000 W	R88D-_KN50F-__	R88D-KT50F	R88M-KH5K020C-S1
		4.77 Nm				1,000 W	R88D-_KN10F-__	R88D-KT10F	R88M-KH1K020C-BS1	
		7.16 Nm				1,500 W	R88D-_KN15F-__	R88D-KT15F	R88M-KH1K520C-BS1	
		Shaft end with key		With brake	9.55 Nm	2,000 W	R88D-_KN20F-__	R88D-KT20F	R88M-KH2K020C-BS1	
					14.3 Nm	3,000 W	R88D-_KN30F-__	R88D-KT30F	R88M-KH3K020C-BS1	
					19.1 Nm	4,000 W	R88D-_KN50F-__	R88D-KT50F	R88M-KH4K020C-BS1	
					23.9 Nm	5,000 W	R88D-_KN50F-__	R88D-KT50F	R88M-KH5K020C-BS1	
					4.77 Nm	1,000 W	R88D-_KN10F-__	R88D-KT10F	R88M-KH1K020C-BS1	
					7.16 Nm	1,500 W	R88D-_KN15F-__	R88D-KT15F	R88M-KH1K520C-BS1	

Servo motors 1,500 r/min (7.5 kW)

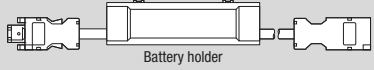

Symbol	Specifications				② Compatible servo drives		Servo motor model	
	Voltage	Encoder and design	Rated torque	Capacity	G5 EtherCAT	G5 analogue/pulse	Order code	
① 	400 V	Absolute encoder (17 bit) Shaft end with key	Without brake	47.8 Nm	7,500 W	R88D-KN75F-ECT	R88D-KT75F	R88M-KH7K515C-S1
			With brake	47.8 Nm	7,500 W	R88D-KN75F-ECT	R88D-KT75F	R88M-KH7K515C-BS1

Encoder cables for absolute and incremental encoders

Symbol	Appearance	Specifications	Order code	
③		Encoder cable for servomotors R88M-K(050/100/200/400/750)30(H/T)_	1.5 m	R88A-CRKA001-5CR-E
			3 m	R88A-CRKA003CR-E
			5 m	R88A-CRKA005CR-E
			10 m	R88A-CRKA010CR-E
			15 m	R88A-CRKA015CR-E
			20 m	R88A-CRKA020CR-E
		Encoder cable for servomotors R88M-KH(200/400/750)30(H/T)_	3 m	R88A-CRWA003C-DE
			5 m	R88A-CRWA005C-DE
			10 m	R88A-CRWA010C-DE
			15 m	R88A-CRWA015C-DE
		Encoder cable for servomotors R88M-K(1K0/1K5)30(H/T)_ R88M-K(750/1K0/1K5/2K0/3K0/4K0/5K0)30(F/C)_ R88M-K(400/600/1K0/1K5/2K0/3K0/4K0/5K0)20_ R88M-K(7K5/11K0/15K0)15_ R88M-K(900/2K0/3K0/4K5/6K0)10_ R88M-KH(1K0/1K5/2K0/3K0/4K0/5K0)20(F/C)_ R88M-KH7K515C_	1.5 m	R88A-CRKC001-5NR-E
			3 m	R88A-CRKC003NR-E
5 m			R88A-CRKC005NR-E	
10 m			R88A-CRKC010NR-E	
		15 m	R88A-CRKC015NR-E	
		20 m	R88A-CRKC020NR-E	

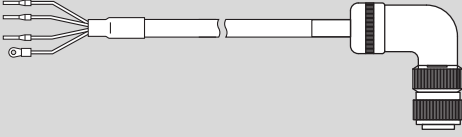
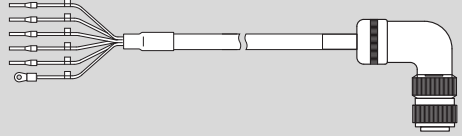

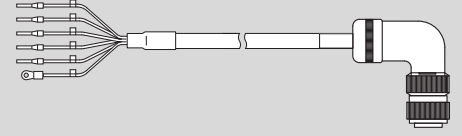
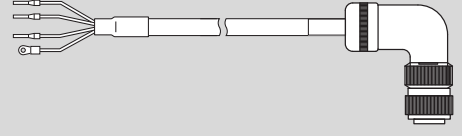
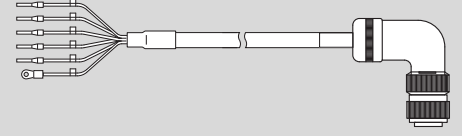
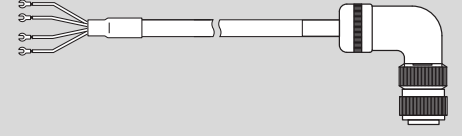
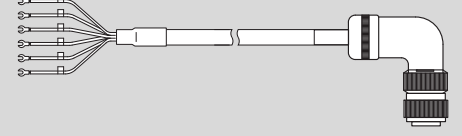
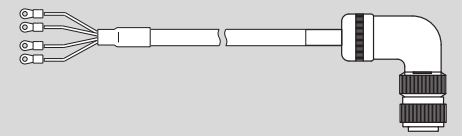
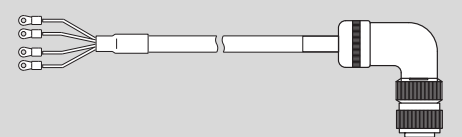
Note: For servomotors fitted with an absolute encoder you have to add the extension battery cable R88A-CRGD0R3C_ (see below) or connect a backup battery in the CN1 I/O connector.

Absolute encoder battery cable (encoder extension cable only)


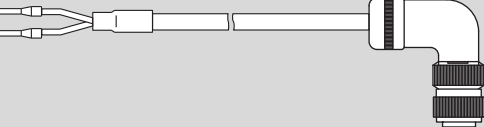
Symbol	Appearance	Specifications	Order code		
④		Absolute encoder battery cable	Battery not included	0.3 m	R88A-CRGD0R3C-E
			Battery included	0.3 m	R88A-CRGD0R3C-BS-E
		Absolute encoder backup battery	2,000 mA.h 3.6V	-	R88A-BAT01G

Power cables

Symbol	Appearance	Specifications	Order code		
⑤		For 200 V servomotors R88M-K(050/100/200/400/750)30(H/T)-__S2 Note: for servomotors with brake R88M-K(050/100/200/400/750)30(H/T)-BS2, the separate brake cable R88A-CAKA___BR-E is needed	Power cable only (without brake)	1.5 m	R88A-CAKA001-5SR-E
				3 m	R88A-CAKA003SR-E
				5 m	R88A-CAKA005SR-E
				10 m	R88A-CAKA010SR-E
				15 m	R88A-CAKA015SR-E
				20 m	R88A-CAKA020SR-E
		For 200 V servomotors R88M-KH(200/400/750)30(H/T)-__S2	without brake	3 m	R88A-CAWA003S-DE
				5 m	R88A-CAWA005S-DE
				10 m	R88A-CAWA010S-DE
				15 m	R88A-CAWA015S-DE
		For 200 V servomotors R88M-KH(200/400/750)30(H/T)-__S2	with brake	3 m	R88A-CAWA003B-DE
				5 m	R88A-CAWA005B-DE
10 m				R88A-CAWA010B-DE	
15 m				R88A-CAWA015B-DE	
		20 m	R88A-CAWA020B-DE		

Symbol	Appearance	Specifications		Order code	
⑤		For 200 V servomotors R88M-K(1K0/1K5)30(H/T)-__S2 R88M-K(1K0/1K5)20(H/T)-__S2 R88M-K90010(H/T)-__S2	without brake	1.5 m	R88A-CAGB001-5SR-E
	3 m			R88A-CAGB003SR-E	
	5 m			R88A-CAGB005SR-E	
	10 m			R88A-CAGB010SR-E	
	15 m			R88A-CAGB015SR-E	
	20 m			R88A-CAGB020SR-E	
		For 200 V servomotors R88M-K(1K0/1K5)30(H/T)-__S2 R88M-K(1K0/1K5)20(H/T)-__S2 R88M-K90010(H/T)-__S2	with brake	1.5 m	R88A-CAGB001-5BR-E
	3 m			R88A-CAGB003BR-E	
	5 m			R88A-CAGB005BR-E	
	10 m			R88A-CAGB010BR-E	
	15 m			R88A-CAGB015BR-E	
	20 m			R88A-CAGB020BR-E	
	For 400 V servomotors R88M-K(750/1K0/1K5/2K)30(F/C)-__S2 R88M-K(400/600/1K0/1K5/2K0)20(F/C)-__S2 R88M-K90010(F/C)-__S2 R88M-KH(1K0/1K5)20(F/C)-_S1	without brake	1.5 m	R88A-CAGB001-5SR-E	
3 m			R88A-CAGB003SR-E		
5 m			R88A-CAGB005SR-E		
10 m			R88A-CAGB010SR-E		
15 m			R88A-CAGB015SR-E		
20 m			R88A-CAGB020SR-E		
	For 400 V servomotors R88M-K(750/1K0/1K5/2K)30(F/C)-__S2 R88M-K(400/600/1K0/1K5/2K0)20(F/C)-__S2 R88M-K90010(F/C)-__S2 R88M-KH(1K0/1K5)20(F/C)-_S1	with brake	1.5 m	R88A-CAKF001-5BR-E	
3 m			R88A-CAKF003BR-E		
5 m			R88A-CAKF005BR-E		
10 m			R88A-CAKF010BR-E		
15 m			R88A-CAKF015BR-E		
20 m			R88A-CAKF020BR-E		
	For 400 V servomotors R88M-KH2K020(F/C)-_S1	without brake	1.5 m	R88A-CAKC001-5SR-E	
3 m			R88A-CAKC003SR-E		
5 m			R88A-CAKC005SR-E		
10 m			R88A-CAKC010SR-E		
15 m			R88A-CAKC015SR-E		
20 m			R88A-CAKC020SR-E		
	For 400 V servomotors R88M-KH2K020(F/C)-_S1	with brake	1.5 m	R88A-CAKF001-5BR-E	
3 m			R88A-CAKF003BR-E		
5 m			R88A-CAKF005BR-E		
10 m			R88A-CAKF010BR-E		
15 m			R88A-CAKF015BR-E		
20 m			R88A-CAKF020BR-E		
	For 400 V servomotors R88M-K(3K0/4K0/5K0)30(F/C)-__S2 R88M-K(3K0/4K0/5K0)20(F/C)-__S2 R88M-K(2K0/3K0)10(F/C)-__S2 R88M-K4K510C-__S2 R88M-KH(3K0/4K0/5K0)20(F/C)-_S1	without brake	1.5 m	R88A-CAGD001-5SR-E	
3 m			R88A-CAGD003SR-E		
5 m			R88A-CAGD005SR-E		
10 m			R88A-CAGD010SR-E		
15 m			R88A-CAGD015SR-E		
20 m			R88A-CAGD020SR-E		
	For 400 V servomotors R88M-K(3K0/4K0/5K0)30(F/C)-__S2 R88M-K(3K0/4K0/5K0)20(F/C)-__S2 R88M-K(2K0/3K0)10(F/C)-__S2 R88M-K4K510C-__S2 R88M-KH(3K0/4K0/5K0)20(F/C)-_S1	with brake	1.5 m	R88A-CAGD001-5BR-E	
3 m			R88A-CAGD003BR-E		
5 m			R88A-CAGD005BR-E		
10 m			R88A-CAGD010BR-E		
15 m			R88A-CAGD015BR-E		
20 m			R88A-CAGD020BR-E		
	For 400 V servomotors R88M-K6K010C-__S2 R88M-K7K515C-__S2 R88M-KH7K515C-_S1 Note: for servomotors with brake R88M-K(6K010/7K515)C-BS2 and R88M-KH7K515C-BS1 the separate brake cable R88A-CAGE-__BR-E is needed	Power cable only (without brake)	1.5 m	R88A-CAKE001-5SR-E	
3 m			R88A-CAKE003SR-E		
5 m			R88A-CAKE005SR-E		
10 m			R88A-CAKE010SR-E		
15 m			R88A-CAKE015SR-E		
20 m			R88A-CAKE020SR-E		
	For 400 V servomotors R88M-K(11K0/15K0)15C-__S2 Note: Note: for servomotors with brake R88M-K(11K0/15K0)15C-BS2, the separate brake cable R88A-CAGE-__BR-E is needed	Power cable only (without brake)	1.5 m	R88A-CAKG001-5SR-E	
3 m			R88A-CAKG003SR-E		
5 m			R88A-CAKG005SR-E		
10 m			R88A-CAKG010SR-E		
15 m			R88A-CAKG015SR-E		
20 m			R88A-CAKG020SR-E		

Brake cables (for 200 V 50 to 750 W servo motors and 400 V 6 to 15 kW servo motors)

Symbol	Appearance	Specifications	Order code	
⑥		Brake cable only. For 200 V servo motors with brake R88M-K(050/100/200/400/750)30(H/T)-BS2	1.5 m	R88A-CAKA001-5BR-E
			3 m	R88A-CAKA003BR-E
			5 m	R88A-CAKA005BR-E
			10 m	R88A-CAKA010BR-E
			15 m	R88A-CAKA015BR-E
			20 m	R88A-CAKA020BR-E
		Brake cable only. For 400 V servo motors with brake R88M-K6K010C-BS2 R88M-K(7K5/11K0/15K0)15C-BS2 R88M-KH7K515C-BS1	1.5 m	R88A-CAGE001-5BR-E
			3 m	R88A-CAGE003BR-E
			5 m	R88A-CAGE005BR-E
			10 m	R88A-CAGE0010BR-E
			15 m	R88A-CAGE015BR-E
			20 m	R88A-CAGE020BR-E

Connectors for encoder, power and brake cables

Specifications	Applicable servo motor	Order code	
Connectors for making encoder cables	Drive side (CN2)	All models	R88A-CNWO1R
	Motor side	R88M-K(050/100/200/400/750)30(H/T)_	R88A-CNK02R
	Motor side	R88M-KH(200/400/750)_	SPOC-17H-FRON169
	Motor side	R88M-K(1K0/1K5)30(H/T)_ R88M-K(750/1K0/1K5/2K0/3K0/4K0/5K0)30(F/C)_ R88M-K(400/600/1K0/1K5/2K0/3K0/4K0/5K0)20_ R88M-K(900/2K0/3K0)10_ R88M-K(4K5/6K0)10C-_ R88M-K(7K5/11K0/15K0)15C-_ R88M-KH(1K0/1K5/2K0/3K0/4K0/5K0/7K5)_	R88A-CNK04R
Connectors for making power cables	Motor side	R88M-K(050/100/200/400/750)30(H/T)_	R88A-CNK11A
	Motor side	R88M-KH(200/400/750)30(H/T)_	SPOC-06K-FSDN169
	Motor side	R88M-K(1K0/1K5)30(H/T)-S2 R88M-K(1K0/1K5)20(H/T)-S2 R88M-K90010(H/T)-S2 R88M-K(750/1K0/1K5/2K0)30(F/C)-S2 R88M-K(400/600/1K0/1K5/2K0)20(F/C)-S2 R88M-K90010(F/C)-S2 R88M-KH(1K0/1K5)20(F/C)-S1	MS3108E20-4S
	Motor side	R88M-K(1K0/1K5)30(H/T)-BS2 R88M-K(1K0/1K5)20(H/T)-BS2 R88M-K90010(H/T)-BS2	MS3108E20-18S
	Motor side	R88M-K(750/1K0/1K5/2K0/3K0/4K0/5K0)30(F/C)-BS2 R88M-K(400/600/1K0/1K5/2K0/3K0/4K0/5K0)20(F/C)-BS2 R88M-K(900/2K0/3K0)10(F/C)-BS2 R88M-K4K510C-BS2 R88M-KH(1K0/1K5/2K0/3K0/4K0/5K0)20(F/C)-BS1	MS3108E24-11S
	Motor side	R88M-K(3K0/4K0/5K0)30(F/C)-S2 R88M-K(3K0/4K0/5K0)20(F/C)-S2 R88M-K(2K0/3K0)10(F/C)-S2 R88M-K4K510C-S2 R88M-KH(2K0/3K0/4K0/5K0)20(F/C)-S1	MS3108E22-22S
	Motor side	R88M-K6K010C-_ R88M-K(7K5/11K0/15K0)15C-_ R88M-KH7K515C- S1	MS3108E32-17S
	Motor side	R88M-K(050/100/200/400/750)30(H/T)-BS2	R88A-CNK11B
	Motor side	R88M-K6K010C-BS2 R88M-K(7K5/11K0/15K0)15C-BS2 R88M-KH7K515C-BS1	MS3108E14S-2S

Note: 1. All cables listed are flexible and shielded (except the R88A-CAKA___-BR-E which is only a flexible cable).
 2. All connectors and cables listed have IP67 class (except R88A-CNWO1R connector and R88A-CRGDOR3C cable).

Specifications

Standard servo motors 3,000 r/min, 230 V

Voltage		230 V							
Servo motor model R88M-K_	20-bit incremental encoder	05030H-_	10030H-_	20030H-_	40030H-_	75030H-_	1K030H-_	1K530H-_	
	17-bit absolute encoder	05030T-_	10030T-_	20030T-_	40030T-_	75030T-_	1K030T-_	1K530T-_	
Rated output	W	50	100	200	400	750	1,000	1,500	
Rated torque	N·m	0.16	0.32	0.64	1.3	2.4	3.18	4.77	
Instantaneous peak torque	N·m	0.48	0.95	1.91	3.8	7.1	9.55	14.3	
Rated current	A (rms)	1.1	1.1	1.5	2.4	4.1	6.6	8.2	
Instantaneous max. current	A (rms)	4.7	4.7	6.5	10.2	17.4	28	35	
Rated speed	min ⁻¹	3,000							
Max. speed	min ⁻¹	6,000						5,000	
Torque constant	N·m/A	0.11±10%	0.21±10%	0.31±10%	0.39±10%	0.42±10%	0.37	0.45	
Rotor moment of inertia (JM)	kg·m ² × 10 ⁻⁴ (without brake)	0.025	0.051	0.14	0.26	0.87	2.03	2.84	
	kg·m ² × 10 ⁻⁴ (with brake)	0.027	0.054	0.16	0.28	0.97	2.35	3.17	
Allowable load moment of inertia (JL)	Multiple of (JM)	30 ⁺¹					20 ⁺¹	15 ⁺¹	

Voltage		230 V						
Servo motor model R88M-K_	20-bit incremental encoder	05030H_-	10030H_-	20030H_-	40030H_-	75030H_-	1K030H_-	1K530H_-
	17-bit absolute encoder	05030T_-	10030T_-	20030T_-	40030T_-	75030T_-	1K030T_-	1K530T_-
Rated power rate	kW/s (without brake)	10.1	19.9	29.0	62.4	65.6	49.8	80.1
	kW/s (with brake)	9.4	18.8	25.4	58	58.8	43	71.8
Allowable radial load	N	68			245		490	
Allowable thrust load	N	58			98		196	
Approx. mass	kg (without brake)	0.32	0.47	0.82	1.2	2.3	3.5	4.4
	kg (with brake)	0.53	0.68	1.3	1.7	3.1	4.5	5.4
Brake specifications	Rated voltage	24VDC±10%						
	Holding brake moment of inertia J	kg·m ² × 10 ⁻⁴		0.002		0.0018		0.33
	Power consumption (20°C)	W	7		9		17	19
	Current consumption (20°C)	A	0.3		0.36		0.70±10%	0.81±10%
	Static friction torque	N.m (minimum)	0.29		1.27		2.5	7.8
	Rise time for holding torque	ms (max.)	35		50			
	Release time	ms (max)	20		15			
Basic specifications	Time Rating	Continuous						
	Insulation class	Type B					Type F	
	Ambient operating/storage temperature	0 to 40°C/-20 to 65°C						
	Ambient operating/storage humidity	20% to 80% (non-condensing)					20% to 85% (non-condensing)	
	Vibration class	V-15						
	Insulation resistance	20 MΩ min. at 500 VDC between the power terminals and FG terminal						
	Enclosure	Totally-enclosed, self-cooling, IP67 (excluding shaft opening)						
	Vibration resistance	Vibration acceleration 49 m/s ²						
	Mounting	Flange-mounted						

*1 Applicable load inertia: The operable load inertia ratio (load inertia/rotor inertia) depends on the mechanical configuration and its rigidity. For a machine with high rigidity, operation is possible even with high load inertia. Select an appropriate motor and confirm that operation is possible.

Standard servo motors 3,000 r/min, 400 V

Voltage		400 V							
Servo motor model R88M-K_	20-bit incremental encoder	75030F_-	1K030F_-	1K530F_-	2K030F_-	3K030F_-	4K030F_-	5K030F_-	
	17-bit absolute encoder	75030C_-	1K030C_-	1K530C_-	2K030C_-	3K030C_-	4K030C_-	5K030C_-	
Rated output	W	750	1,000	1,500	2,000	3,000	4,000	5,000	
Rated torque	N·m	2.39	3.18	4.77	6.37	9.55	12.7	15.9	
Instantaneous peak torque	N·m	7.16	9.55	14.3	19.1	28.6	38.2	47.7	
Rated current	A (rms)	2.4	3.3	4.2	5.7	9.2	9.9	12	
Instantaneous max. current	A (rms)	10	14	18	24	39	42	51	
Rated speed	min ⁻¹	3,000							
Max. speed	min ⁻¹	5,000					4,500		
Torque constant	N·m/A	0.78	0.75	0.89	0.87	0.81	0.98		
Rotor moment of inertia (JM)	kg·m ² × 10 ⁻⁴ (without brake)	1.61	2.03	2.84	3.68	6.5	12.9	17.4	
	kg·m ² × 10 ⁻⁴ (with brake)	1.93	2.35	3.17	4.01	7.85	14.2	18.6	
Allowable load moment of inertia (JL)	Multiple of (JM)	20 ⁻¹	15 ⁻¹						
Rated power rate	kW/s (without brake)	35.5	49.8	80.1	110	140	126	146	
	kW/s (with brake)	29.6	43	71.8	101	116	114	136	
Allowable radial load	N	490					784		
Allowable thrust load	N	196					343		
Approx. mass	kg (without brake)	3.1	3.5	4.4	5.3	8.3	11	14	
	kg (with brake)	4.1	4.5	5.4	6.3	9.4	12.6	16	
Brake specifications	Rated voltage	24VDC±10%							
	Holding brake moment of inertia J	kg·m ² × 10 ⁻⁴		0.33				1.35	
	Power consumption (20°C)	W	17	19			22		
	Current consumption (20°C)	A	0.70±10%	0.81±10%			0.90±10%		
	Static friction torque	N.m (minimum)	2.5	7.8			11.8	16.1	
	Rise time for holding torque	ms (max.)	50					110	
	Release time	ms (max)	15					50	
Basic specifications	Time Rating	Continuous							
	Insulation class	Type F							
	Ambient operating/storage temperature	0 to 40°C/-20 to 65°C							
	Ambient operating/storage humidity	20% to 85% (non-condensing)							
	Vibration class	V-15							
	Insulation resistance	20 MΩ min. at 500 VDC between the power terminals and FG terminal							
	Enclosure	Totally-enclosed, self-cooling, IP67(excluding shaft opening)							
	Vibration resistance	Vibration acceleration 49 m/s ²							
	Mounting	Flange-mounted							

*1 Applicable load inertia: The operable load inertia ratio (load inertia/rotor inertia) depends on the mechanical configuration and its rigidity. For a machine with high rigidity, operation is possible even with high load inertia. Select an appropriate motor and confirm that operation is possible.

Standard servo motors 2,000 r/min, 230 V/400 V

Voltage		230 V					400 V						
Servo motor model R88M-K_	20-bit incremental encoder	1K020H_-	1K520H_-	40020F_-	60020F_-	1K020F_-	1K520F_-	2K020F_-	3K020F_-	4K020F_-	5K020F_-		
	17-bit absolute encoder	1K020T_-	1K520T_-	40020C_-	60020C_-	1K020C_-	1K520C_-	2K020C_-	3K020C_-	4K020C_-	5K020C_-		
Rated output	W	1,000	1,500	400	600	1,000	1,500	2,000	3,000	4,000	5,000		
Rated torque	N·m	4.77	7.16	1.91	2.86	4.77	7.16	9.55	14.3	19.1	23.9		
Instantaneous peak torque	N·m	14.3	21.5	5.73	8.59	14.3	21.5	28.7	43	57.3	71.6		
Rated current	A (rms)	5.7	9.4	1.2	1.5	2.8	4.7	5.9	8.7	10.6	13		
Instantaneous max. current	A (rms)	24	40	4.9	6.5	12	20	25	37	45	55		
Rated speed	min ⁻¹	2,000											
Max. speed	min ⁻¹	3,000											
Torque constant	N·m/A	0.63	0.58	1.27	1.38	1.27	1.16	1.27	1.18	1.40	1.46		
Rotor moment of inertia (JM)	kg·m ² × 10 ⁻⁴ (without brake)	4.60	6.70	1.61	2.03	4.60	6.70	8.72	12.9	37.6	48		
	kg·m ² × 10 ⁻⁴ (with brake)	5.90	7.99	1.90	2.35	5.90	7.99	10	14.2	38.6	48.8		
Max. load moment of inertia (JL)	Multiple of (JM)	10 ⁺¹											
Rated power rate	kW/s (without brake)	49.5	76.5	22.7	40.3	49.5	76.5	105	159	97.1	119		
	kW/s (with brake)	38.6	64.2	19.2	34.8	38.6	64.2	91.2	144	94.5	117		
Allowable radial load	N	490							784				
Allowable thrust load	N	196							343				
Approx. mass	kg (without brake)	5.2	6.7	3.1	3.5	5.2	6.7	8	11	15.5	18.6		
	kg (with brake)	6.7	8.2	4.1	4.5	6.7	8.2	9.5	12.6	18.7	21.8		
Brake specifications	Rated voltage	24VDC ±10%											
	Holding brake moment inertia (J) kg·m ² × 10 ⁻⁴	1.35								4.7			
	Power consumption (20°C)	W	14	19	17		14	19	22		31		
	Current consumption (20°C)	A	0.59±10%		0.79±10%		0.59±10%		0.79±10%		0.90±10%	1.3±10%	1.3 ±-10%
	Static friction torque	N·m (minimum)	4.9	13.7	2.5		4.9	13.7	16.2		24.5		
	Rise time for holding torque	ms (max.)	80	100	50		80	100	110		80		
	Release time	ms (max)	70	50	15		70	50	25				
Basic specifications	Time Rating	Continuous											
	Insulation class	TypeF											
	Ambient operating/storage temperature	0 to 40 °C/-20 to 85°C											
	Ambient operating/storage humidity	20% to 85% (non-condensing)											
	Vibration class	V-15											
	Insulation resistance	20 MΩ min. at 500 VDC between the power terminals and FG terminal											
	Enclosure	Totally-enclosed, self-cooling, IP67 (excluding shaft opening)											
	Vibration resistance	Vibration acceleration 49 m/s ²											
Mounting	Flange-mounted												

*1 Applicable load inertia: The operable load inertia ratio (load inertia/rotor inertia) depends on the mechanical configuration and its rigidity. For a machine with high rigidity, operation is possible even with high load inertia. Select an appropriate motor and confirm that operation is possible.

Standard servo motors 1,500 r/min, 400 V

Applied voltage		400 V		
Servo motor model R88M-K_	17-bit absolute encoder	7K515C_-	11K015C_-	15K015C_-
Rated output	W	7,500	11,000	15,000
Rated torque	N·m	47.8	70.0	95.5
Instantaneous peak torque	N·m	119.0	175.0	224.0
Rated current	A (rms)	22.0	27.1	33.1
Instantaneous max. current	A (rms)	83	101	118
Rated speed	min ⁻¹	1,500		
Max. speed	min ⁻¹	3,000		2,000
Torque constant	N·m/A	1.54		2.10
Rotor moment of inertia (JM)	kg·m ² × 10 ⁻⁴ (without brake)	101	212	302
	kg·m ² × 10 ⁻⁴ (with brake)	107	220	311
Allowable load moment of inertia (JL)	Multiple of (JM)	10 ⁺¹		
Rated power rate	kW/s (without brake)	226		302
	kW/s (with brake)	213		293
Allowable radial load	N	1,176		2,254
Allowable thrust load	N	490		686
Approx. mass	kg (without brake)	36.4		70.2
	kg (with brake)	40.4		76.3
Brake specifications	Rated voltage	24VDC±10%		
	Holding brake moment of inertia J	kg·m ² × 10 ⁻⁴	4.7	7.1
	Power consumption (20°C)	W	34	26
	Current consumption (20°C)	A	1.4±10%	1.08±10%
	Static friction torque	N·m (minimum)	58.8	100
	Rise time for holding torque	ms (max.)	150	300
	Release time	ms (max)	50	140

Applied voltage		400 V		
Servo motor model R88M-K_	17-bit absolute encoder	7K515C-__	11K015C-__	15K015C-__
Basic specifications	Time Rating	Continuous		
	Insulation class	Type F		
	Ambient operating/storage temperature	0 to 40 °C/-20 to 65°C		
	Ambient operating/storage humidity	20% to 85% RH (non-condensing)		
	Vibration class	V-15		
	Insulation resistance	20 MΩ min. at 500 VDC between the power terminals and FG terminal		
	Enclosure	Totally-enclosed, self-cooling, IP67 (excluding shaft opening)		
	Vibration resistance	Vibration acceleration 49 m/s ²		
	Mounting	Flange-mounted		

*1 Applicable load inertia: The operable load inertia ratio (load inertia/rotor inertia) depends on the mechanical configuration and its rigidity. For a machine with high rigidity, operation is possible even with high load inertia. Select an appropriate motor and confirm that operation is possible.

Standard servo motors 1000 r/min, 230 V/400 V

Applied voltage		230 V		400 V			
Servo motor model R88M-K_	20-bit incremental encoder	90010H-__	90010F-__	2K010F-__	3K010F-__		
	17-bit absolute encoder	90010T-__	90010C-__	2K010C-__	3K010C-__	4K510C-__	6K010C-__
Rated output	W	900	900	2,000	3,000	4,500	6,000
Rated torque	N·m	8.59		19.1	28.7	43.0	57.3
Instantaneous peak torque	N·m	19.3		47.7	71.7	107.0	143.0
Rated current	A (rms)	7.6	3.8	8.5	11.3	14.8	19.4
Instantaneous max. current	A (rms)	24	12	30	40	55	74
Rated speed	min⁻¹	1,000					
Max. speed	min⁻¹	2,000					
Torque constant	N·m/A	0.86	1.72	1.76	1.92	2.05	2.08
Rotor moment of inertia (JM)	kg·m² × 10⁻⁴ (without brake)	6.70		30.3	48.4	79.1	101
	kg·m² × 10⁻⁴ (with brake)	7.99		31.4	49.2	84.4	107
Allowable load moment of inertia (JL)	Multiple of (JM)	10 ⁺¹					
Rated power rate	kW/s (without brake)	110		120	170	233	325
	kW/s (with brake)	92.4		116	167	219	307
Allowable radial load	N	686		1,176	1,470		1,764
Allowable thrust load	N	196		490			588
Approx. mass	kg (without brake)	6.7		14	20	29.4	36.4
	kg (with brake)	8.2		17.5	23.5	33.3	40.4
Brake specifications	Rated voltage	24VDC±10%					
	Holding brake moment of inertia J	kg·m² × 10⁻⁴	1.35		4.7		
	Power consumption (20°C)	W	19		31	34	
	Current consumption (20°C)	A	0.79±10%		1.3±10%	1.4±10%	
	Static friction torque	N·m (minimum)	13.7		24.5	58.8	
	Rise time for holding torque	ms (max.)	100		80	150	
	Release time	ms (max)	50		25	50	
Basic specifications	Time Rating	Continuous					
	Insulation class	Type F					
	Ambient operating/storage temperature	0 to 40 °C/-20 to 65°C					
	Ambient operating/storage humidity	20% to 85% RH (non-condensing)					
	Vibration class	V-15					
	Insulation resistance	20 MΩ min. at 500 VDC between the power terminals and FG terminal					
	Enclosure	Totally-enclosed, self-cooling, IP67 (excluding shaft opening)					
	Vibration resistance	Vibration acceleration 49 m/s ²					
Mounting	Flange-mounted						

*1 Applicable load inertia: The operable load inertia ratio (load inertia/rotor inertia) depends on the mechanical configuration and its rigidity. For a machine with high rigidity, operation is possible even with high load inertia. Select an appropriate motor and confirm that operation is possible.

High inertia servo motors 3,000 r/min, 230 V

Voltage		230 V		
Servo motor model R88M-KH_	20-bit incremental encoder	20030H-__	40030H-__	75030H-__
	17-bit absolute encoder	20030T-__	40030T-__	75030T-__
Rated output	W	200	400	750
Rated torque	N·m	0.64	1.3	2.4
Instantaneous peak torque	N·m	1.91	3.8	7.1
Rated current	A (rms)	1.6	2.6	4.0
Instantaneous max. current	A (rms)	6.9	11.0	17.0
Rated speed	min⁻¹	3,000		
Max. speed	min⁻¹	5,000		4,500
Torque constant	N·m/A	0.29±10%	0.36±10%	0.45±10%
Rotor moment of inertia (JM)	kg·m² × 10⁻⁴ (without brake)	0.42		1.51
	kg·m² × 10⁻⁴ (with brake)	0.45		1.61

Voltage		230 V		
Servo motor model R88M-KH_	20-bit incremental encoder	20030H_	40030H_	75030H_
	17-bit absolute encoder	20030T_	40030T_	75030T_
Allowable load moment of inertia (JL)	Multiple of (JM)	30 ^{*1}		20 ^{*1}
Rated power rate	kW/s (without brake)	9.58	24.1	37.7
	kW/s (with brake)	9.06	23.3	35.3
Allowable radial load	N	245		392
Allowable thrust load	N	98		147
Approx. mass	kg (without brake)	0.96	1.4	2.5
	kg (with brake)	1.4	1.8	3.3
Brake specifications	Rated voltage	24 VDC±5%		
	Holding brake moment of inertia J	kg·m ² × 10 ⁻⁴	0.018	0.075
	Power consumption (at 20°C)	W	9	10
	Current consumption (at 20°C)	A	0.36	0.42
	Static friction torque	N.m (minimum)	1.27	2.45
	Rise time for holding torque	ms (max.)	50	70
	Release time	ms (max)	15	20
Basic specifications	Time Rating	Continuous		
	Insulation class	Type B		
	Ambient operating/storage temperature	0 to 40°C/-20 to 65°C		
	Ambient operating/storage humidity	20% to 85% RH (non-condensing)		
	Vibration class	V-15		
	Insulation resistance	20 MΩ min. at 500 VDC between the power terminals and FG terminal		
	Enclosure	Totally-enclosed, self-cooling, IP65 (excluding shaft opening and lead wire ends)		
	Vibration resistance	Vibration acceleration 49 m/s ²		
	Mounting	Flange-mounted		

*1 Applicable load inertia: The operable load inertia ratio (load inertia/rotor inertia) depends on the mechanical configuration and its rigidity. For a machine with high rigidity, operation is possible even with high load inertia. Select an appropriate motor and confirm that operation is possible.

High inertia servo motors 2,000 and 1,500 r/min, 400 V

R/min, voltage		2,000r/min, 400 V						1,500r/min, 400 V
Servo motor model R88M-KH_	20-bit incremental encoder	1K020F_	1K520F_	2K020F_	3K020F_	4K020F_	5K020F_	
	17-bit absolute encoder	1K020C_	1K520C_	2K020C_	3K020C_	4K020C_	5K020C_	7K515C_
Rated output	W	1,000	1,500	2,000	3,000	4,000	5,000	7,500
Rated torque	N·m	4.77	7.16	9.55	14.3	19.1	23.9	47.8
Instantaneous peak torque	N·m	14.3	21.5	28.6	43.0	57.3	71.6	119
Rated current	A (rms)	2.9	4.7	5.5	8.0	10.5	13.0	22.0
Instantaneous max. current	A (rms)	12	20	24	34	45	55	83
Rated speed	min ⁻¹	2,000						1500
Max. speed	min ⁻¹	3,000						3000
Torque constant	N·m/A	1.27	1.16	1.31	1.34	1.38	1.39	1.54
	kg·m ² × 10 ⁻⁴ (without brake)	24.7	37.1	57.8	90.2	112	162	273
	kg·m ² × 10 ⁻⁴ (with brake)	26.0	38.4	62.9	95.3	117	167	279
Max. load moment of inertia (JL)	Multiple of (JM)	5 ^{*1}						
Rated power rate	kW/s (without brake)	9.2	13.8	15.8	22.7	32.5	35.1	86.7
	kW/s (with brake)	8.8	13.4	14.5	21.5	31.1	34.1	85.1
Allowable radial load	N	490		784				1,176
Allowable thrust load	N	196		343				490
Approx. mass	kg (without brake)	6.7	8.6	12.2	16.0	18.6	23.0	42.3
	kg (with brake)	8.1	10.1	15.5	19.2	21.8	26.2	46.2
Brake specifications	Rated voltage	24 VDC±10%						
	Holding brake moment inertia (J)	kg·m ² × 10 ⁻⁴	1.35		4.7			
	Power consumption (20°C)	W	14	19	31			
	Current consumption (20°C)	A	0.59±10%	0.79±10%	1.30±10%			
	Static friction torque	N.m (minimum)	4.9	13.7	24.5			
	Rise time for holding torque	ms (max.)	80	100	80			
	Release time	ms (max)	70	50	25			
Basic specifications	Time Rating	Continuous						
	Insulation class	Type F						
	Ambient operating/storage temperature	0 to 40°C/-20 to 65°C						
	Ambient operating/storage humidity	20% to 85% RH (non-condensing)						
	Vibration class	V-15						
	Insulation resistance	20 MW min. at 500 VDC between the power terminals and FG terminal						
	Enclosure	Totally-enclosed, self-cooling, IP67 (excluding shaft opening)						
	Vibration resistance	Vibration acceleration 49 m/s ²						
	Mounting	Flange-mounted						

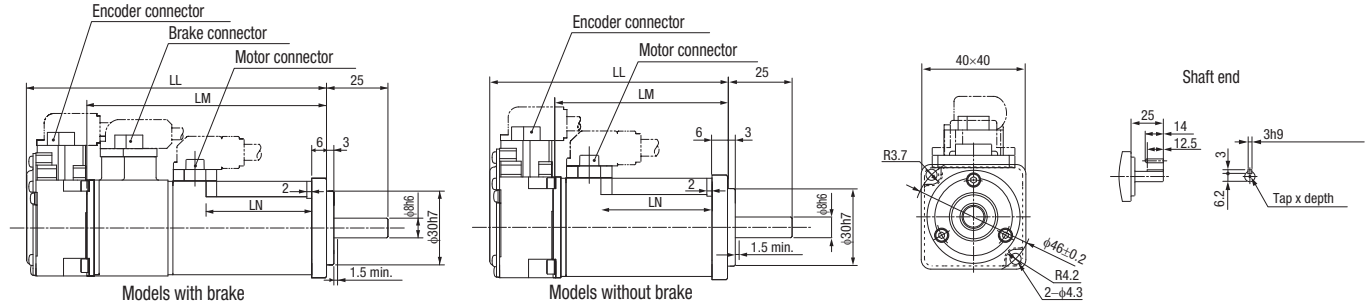
*1 Applicable load inertia: The operable load inertia ratio (load inertia/rotor inertia) depends on the mechanical configuration and its rigidity. For a machine with high rigidity, operation is possible even with high load inertia. Select an appropriate motor and confirm that operation is possible.

Dimensions

Standard servo motors

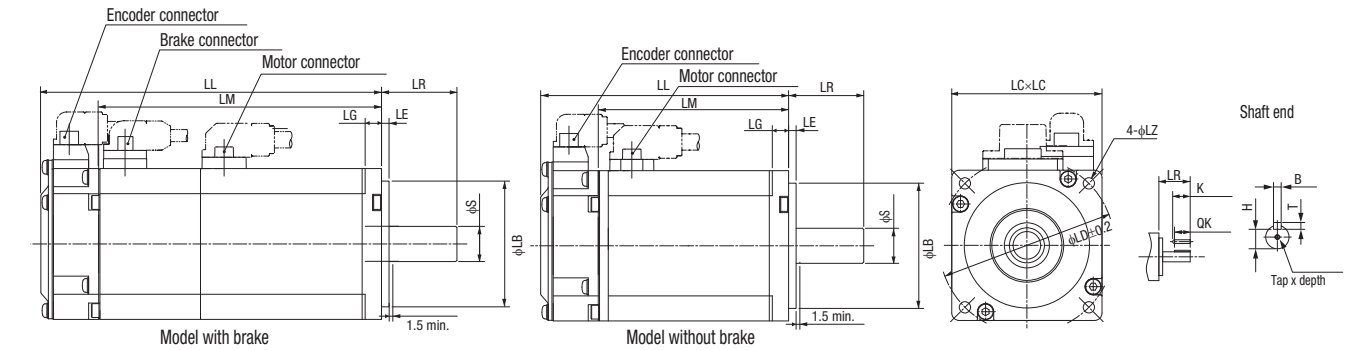
Type 3,000 r/min motors (230 V, 50 to 100 W)

Dimensions (mm)	Without brake		With brake		LN	Shaft end dimensions	Approx. mass (kg)	
	LL	LM	LL	LM			Without brake	With brake
R88M-K05030(H/T)-_S2	72	48	102	78	23	M3 × 6L	0.32	0.53
R88M-K10030(H/T)-_S2	92	68	122	98	43		0.47	0.68



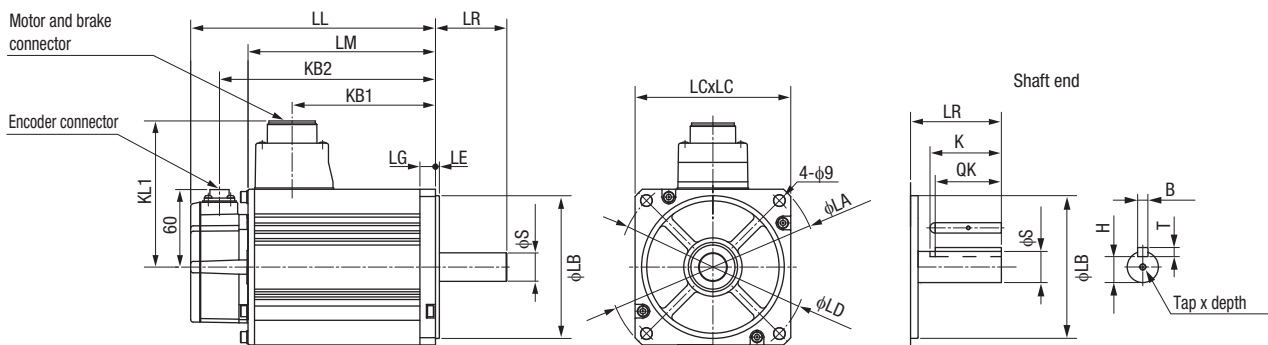
Type 3,000 r/min motors (230 V, 200 to 750 W)

Dimensions (mm)	Without brake		With brake		LR	Flange surface					Shaft end dimensions						Approx. mass kg			
	LL	LM	LL	LM		LB	LC	LD	LE	LG	LZ	S	K	QK	H	B	T	Tap × Depth	Without brake	With brake
R88M-K20030(H/T)-_S2	79.5	56.5	116	93	30	50 ^{h7}	60	70	3	6.5	4.5	11 ^{h6}	20	18	8.5	4 ^{h9}	4	M4 × 8L	0.82	1.3
R88M-K40030(H/T)-_S2	99	76	135.5	112.5								14 ^{h6}	25	22.5	11	5 ^{h9}	5	M5 × 10L	1.2	1.7
R88M-K75030(H/T)-_S2	112.2	86.2	148.2	122.2	35	70 ^{h7}	80	90		8	6	19 ^{h6}		22	15.5	6 ^{h9}	6		2.3	3.1



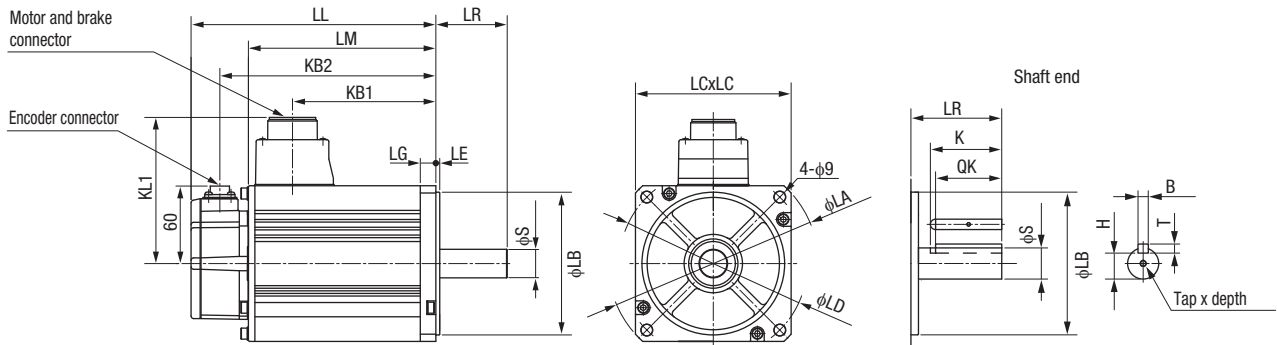
Type 3,000 r/min motors (230 V, 1 to 1.5 kW/ 400V, 750 W to 5 kW)

Voltage	Model	Without brake					With brake					LR	Flange surface					Shaft end dimensions						Approx. mass (kg)			
		LL	LM	KB1	KB2	KL1	LL	LM	KB1	KB2	KL1		LA	LB	LC	LD	LE	LG	S	Tap × Depth	K	QK	H	B	T	Without brake	With brake
230	1K030(H/T)-_S2	141	97	66	119	101	168	124	66	146	101	55	135	95 ^{h7}	100	115	3	10	19 ^{h6}	M5 × 12L	45	42	15.5	6 ^{h9}	6	3.5	4.5
	1K530(H/T)-_S2	159.5	115.5	84.5	137.5		186.5	142.5	84.5	164.5																4.4	5.4
400	75030(F/C)-_S2	131.5	87.5	56.5	109.5		158.5	114.5	53.5	136.5	103															3.1	4.1
	1K030(F/C)-_S2	141	97	66	119		168	124	63	146																3.5	4.5
	1K530(F/C)-_S2	159.5	115.5	84.5	137.5		186.5	142.5	81.5	164.5																4.4	5.4
	2K030(F/C)-_S2	178.5	134.5	103.5	156.5		205.5	161.5	100.5	183.5																5.3	6.3
	3K030(F/C)-_S2	190	146	112	168	113	215	171	112	193	113	162	110 ^{h7}	120	145	12	22 ^{h6}					41	18	8 ^{h9}	7	8.3	9.4
	4K030(F/C)-_S2	208	164	127	186	118	233	189	127	211	118	65	165		130	6	24 ^{h6}									11	12.6
	5K030(F/C)-_S2	243	199	162	221		268	224	162	246																14	16



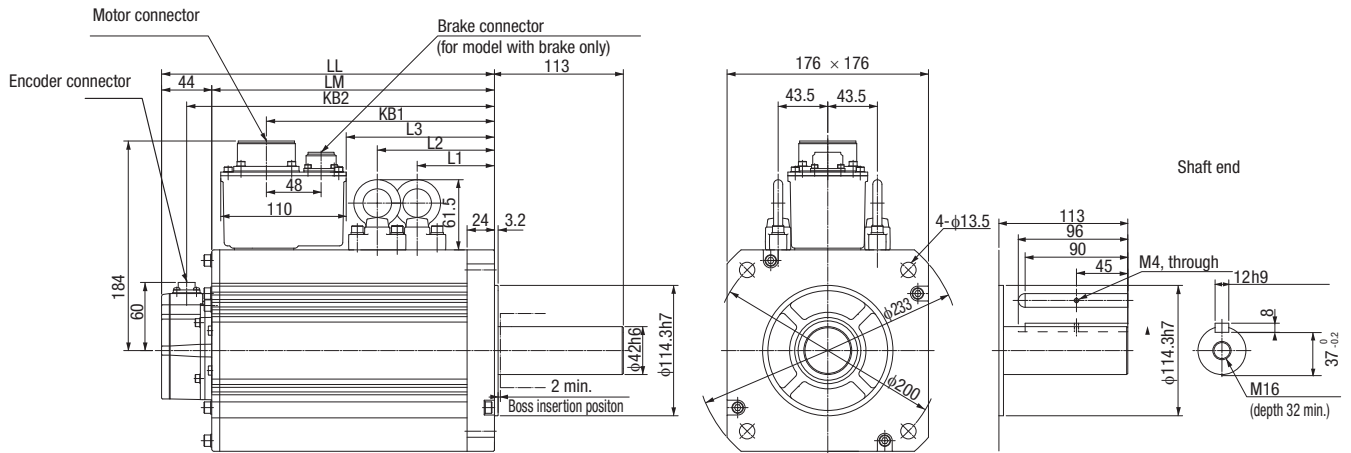
Type 2,000 r/min motors (230 V, 1 to 1.5 kW/400 V, 400 W to 5 kW)

Dimensions (mm)		Without brake					With brake					LR	Flange surface							Shaft end dimensions						Approx. mass (kg)																
Voltage	Model	LL	LM	KB1	KB2	KL1	LL	LM	KB1	KB2	KL1		LA	LB	LC	LD	LE	LG	LZ	S	Tap × Depth	K	QK	H	B	T	Without brake	With brake														
230	1K020(H/T)-S2	138	94	60	116	116	163	119	60	141	116	55	165	110 ^{h7}	130	145	6	12	9	22 ^{h6}	M5 × 12L	45	41	18	8 ^{h9}	7	5.2	6.7														
	1K520(H/T)-S2	155.5	111.5	77.5	133.5		180.5	136.5	77.5	158.5			135	95 ^{h7}	100	115	3	10		19 ^{h6}								42	15.5	6 ^{h9}	6	3.1	4.1									
400	40020(F/C)-S2	131.5	87.5	56.5	109.5	101	158.5	114.5	53.5	136.5	103	65	165	110 ^{h7}	130	145	6	12	9	22 ^{h6}	M8 × 20L	55	51	20	8 ^{h9}	3.5	4.5															
	60020(F/C)-S2	141	97	66	119		168	124	63	146																19 ^{h6}																
	1K020(F/C)-S2	138	94	60	116	116	163	119	57	141	118															22 ^{h6}																
	1K520(F/C)-S2	155.5	111.5	77.5	133.5		180.5	136.5	74.5	158.5																																
	2K020(F/C)-S2	173	129	95	151		198	154	92	176																																
	3K020(F/C)-S2	208	164	127	186	118	233	189	127	211																																
	4K020(F/C)-S2	177	133	96	155	140	202	158	96	180	140															70	233	114.3 ^{h7}	176	200	3.2	18	13.5	35 ^{h6}	M12 × 25L		50	30	10 ^{h9}	8	15.5	18.7
5K020(F/C)-S2	196	152	115	174		221	177	115	199																																	



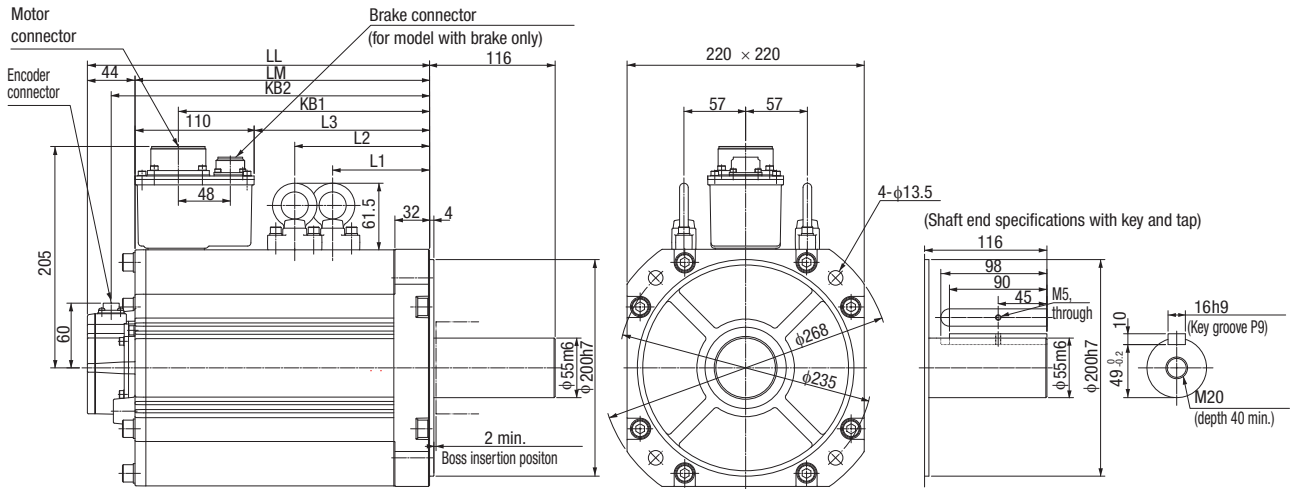
Type 1,500 r/min motors (400 V, 7.5 kW)

Dimensions (mm)		Without brake							With brake							Approx. mass (kg)	
Voltage	Model	LL	LM	KB1	KB2	L1	L2	L3	LL	LM	KB1	KB2	L1	L2	L3	Without brake	With brake
400	7K515C-S2	312	268	219	290	117.5	117.5	149	337	293	253	315	117.5	152.5	183	36.4	40.4



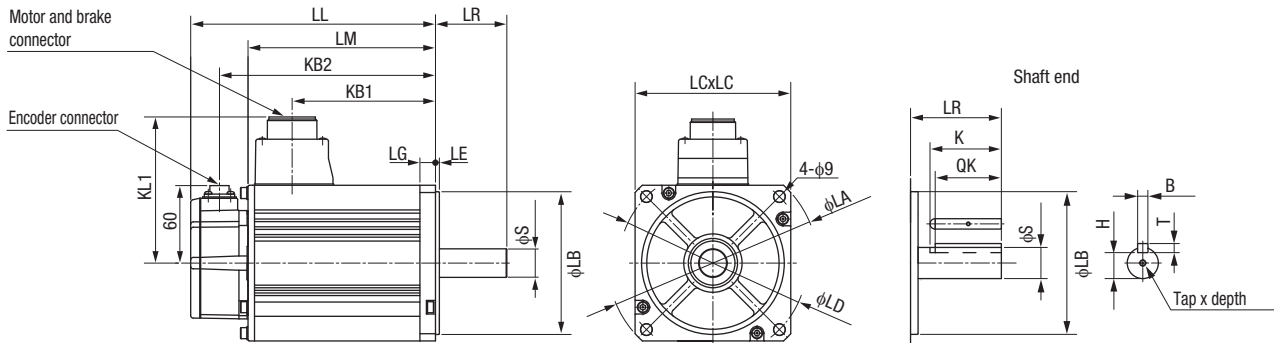
Type 1,500 r/min motors (400 V, 11 to 15 kW)

Dimensions (mm)		Without brake									With brake						Approx. mass (kg)	
Voltage	Model	LL	LM	KB1	KB2	L1	L2	L3	LL	LM	KB1	KB2	L1	L2	L3	Without brake	With brake	
R88M-K																		
400	11K015C-S2	316	272	232	294	124.5	124.5	162	364	320	266	342	124.5	159.5	196	52.7	58.9	
	15K015C-S2	384	340	300	362	158.5	158.5	230	432	388	334	410	158.5	193.5	264	70.2	76.3	



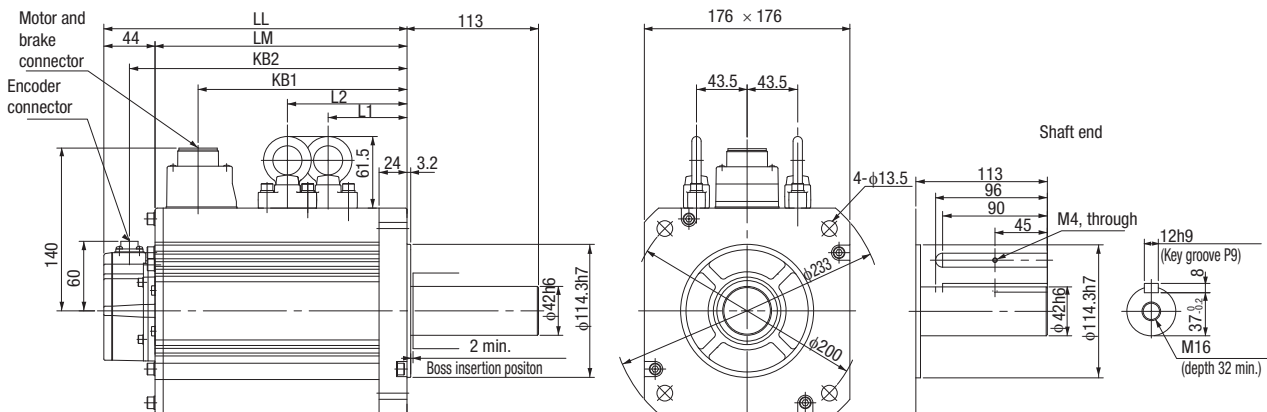
Type 1,000 r/min motors (230 V, 900 W/400 V, 900 W to 3 kW)

Dimensions (mm)		Without brake					With brake					LR Flange surface							Shaft end dimensions						Approx. mass (kg)			
Voltage	Model	LL	LM	KB1	KB2	KL1	LL	LM	KB1	KB2	KL1	LA	LB	LC	LD	LE	LG	LZ	S	Tap x Depth	K	QK	H	B	T	Without brake	With brake	
R88M-K																												
230	90010(H/T)-S2	155.5	111.5	77.5	133.5	116	180.5	136.5	77.5	158.5	116	70	165	110 ^{h7}	130	145	6	12	9	22 ^{h6}	M5 x 12L	45	41	18	8 ^{h9}	7	6.7	8.2
400	90010(F/C)-S2																				M5 x 10L							
	2K010(F/C)-S2	163.5	119.5	82.5	141.5	140	188.5	144.5	82.5	166.5	140	80	233	114.3 ^{h7}	176	200	3.2	18	13.5	35 ^{h6}	M12 x 25L	55	50	30	10 ^{h9}	8	14	17.5
	3K010(F/C)-S2	209.5	165.5	128.5	187.5		234.5	190.5	128.5	212.5																		



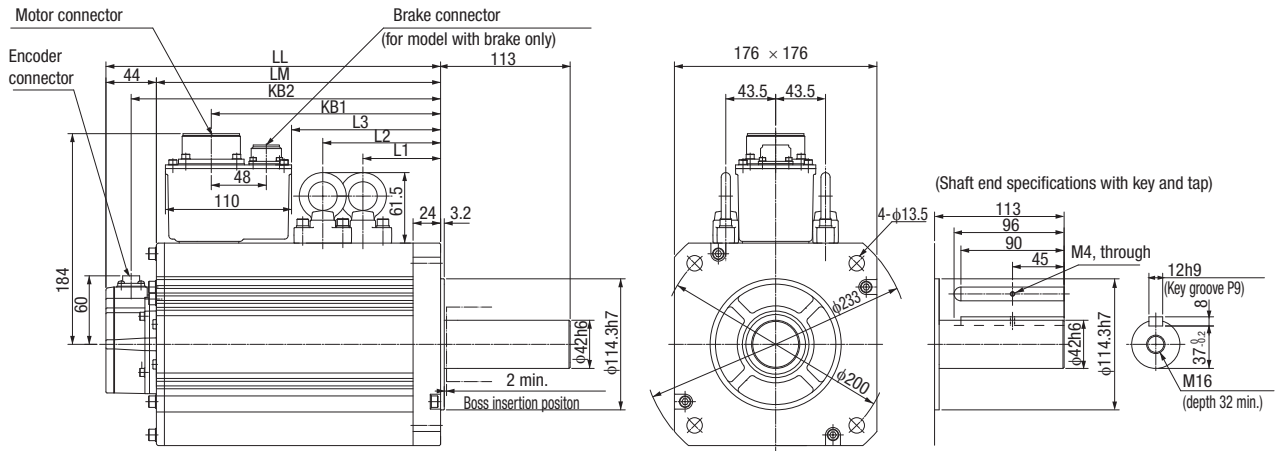
Type 1,000 r/min motors (400 V, 4.5 kW)

Dimensions (mm)		Without brake						With brake						Approx. mass (kg)	
Voltage	Model	LL	LM	KB1	KB2	L1	L2	LL	LM	KB1	KB2	L1	L2	Without brake	With brake
R88M-K															
400	4K510C-S2	266	222	185	244	98	98	291	247	185	269	98	133	29.4	33.3



Type 1,000 r/min motors (400 V, 6 kW)

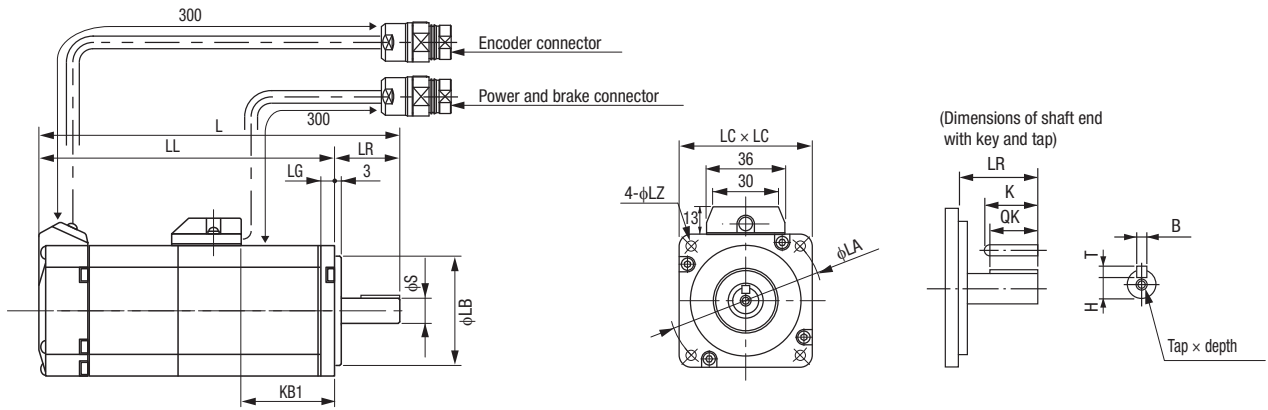
Dimensions (mm)		Without brake							With brake							Approx. mass (Kg)	
Voltage	Model	LL	LM	KB1	KB2	L1	L2	L3	LL	LM	KB1	KB2	L1	L2	L3	Without brake	With brake
	R88M-K																
400	6K010C-S2	312	268	219	290	117.5	117.5	149	337	293	253	315	117.5	152.5	183	36.4	40.4



High inertia servo motors

Type 3,000 r/min motors (230 V, 200 to 750 W)

Dimensions (mm)		Without brake		With brake		KB1	LR	Flange surface					Shaft end dimensions					Approx. mass (kg)			
Voltage	Model	L	LL	L	LL			LA	LB	LC	LG	LZ	S	Tap × Depth	K	QK	H	B	T	Without brake	With brake
	R88M-KH□																				
230	20030(H/T)-S2-D	129	99	165.5	135.5	42	30	70	50 ^{h7}	60	6.5	4.5	11 ^{h6}	M4 × 8L	20	18	8.5	4 ^{h9}	4	0.96	1.4
	40030(H/T)-S2-D	148.5	118.5	185	155	61.5		90	50 ^{h7}				14 ^{h6}	M5 × 10L	25	22.5	11	5 ^{h9}	5	1.4	1.8
	75030(H/T)-S2-D	162.2	127.2	199.2	164.2	67.2	35	90	70 ^{h7}	80	8	6	19 ^{h6}	M5 × 10L	25	22	15.5	6 ^{h9}	6	2.5	3.3



Encoder connector wiring



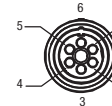
Cable length 300±30
Connector optional
Made by Hypertac
SRUC-176-MRW040 (MALE)

Pin No.	Signal
1	BAT - (0 V)
2	BAT +
3	S +
4	S -
5 to 7	Free
8	ESV (power supply)
9	EOV (power supply)
10 to 17	Free
Connector case	FG (Ground)

* Note: Pins 1 and 2 used only for motors with ABS encoder.

Mating connector:
Plug type: SPOC-17H-FRON169 (FEMALE)

Power and brake connector wiring



Cable length 300±30
Connector optional
Made by Hypertac
SRUC-06J-MSC236 (MALE)

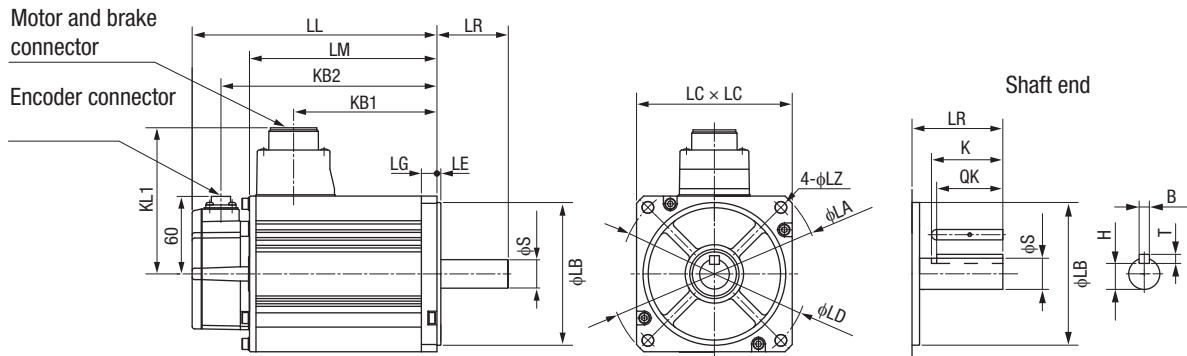
Pin No.	Output
1	Phase U
2	Phase V
3	Phase W
4	*Brake terminal
5	*Brake terminal
6	FG (ground)

* Note: Pins 4 and 5 used only for motors with brake.

Mating connector:
Plug type: SPOC-06K-FSDN169 (FEMALE)

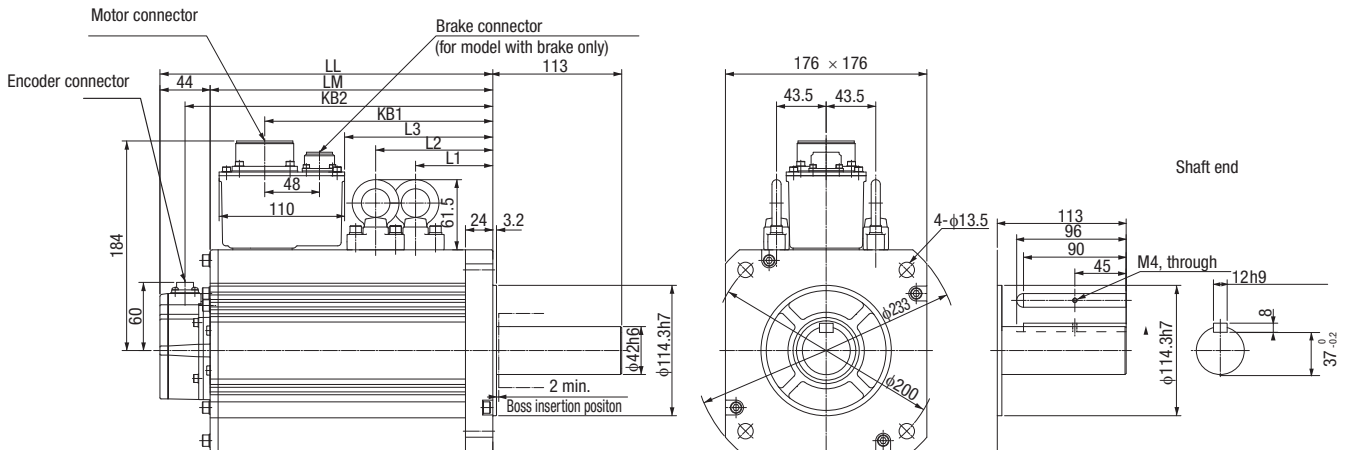
Type 2,000 r/min motors (400 V, 1 kW to 5 kW)

Dimensions (mm)		Without brake					With brake					LR	Flange surface							Shaft End Dimensions						Approx. mass (Kg)	
Voltage	Model	LL	LM	KB1	KB2	KL1	LL	LM	KB1	KB2	KL1		LA	LB	LC	LD	LE	LG	LZ	S	K	QK	H	B	T	Without brake	With brake
	R88M-KH□																										
400	1K020(F/C)-_S1	173	129	95	151	116	201	157	92	179	118	70	165	110 ^{h7}	130	145	6	12	9	22 ^{h6}	45	41	18	8 ^{h9}	7	6.7	8.1
	1K520(F/C)-_S1	190.5	146.5	112.5	168.5		218.5	174.5	109.5	196.5															8.6	10.1	
	2K020(F/C)-_S1	177	133	96	155	140	206	162	96	184	140	80	233	114.3 ^{h7}	176	200	3.2	18	13.5	35 ^{h6}	55	50	30	10 ^{h9}	8	12.2	15.5
	3K020(F/C)-_S1	196	152	115	174		225	181	115	203															16.0	19.2	
	4K020(F/C)-_S1	209.5	165.5	128.5	187.5		238.5	194.5	128.5	216.5															18.6	21.8	
	5K020(F/C)-_S1	238.5	194.5	157.5	216.5		267.5	223.5	157.5	245.5															23.0	26.2	



Type 1,500 r/min motors (400 V, 7.5 kW)

Dimensions (mm)		Without brake							With brake						Approx. mass (Kg)		
Voltage	Model	LL	LM	KB1	KB2	L1	L2	L3	LL	LM	KB1	KB2	L1	L2	L3	Without brake	With brake
	R88M-KH_																
400	7K515C-_S1	357	313	264	335	146.5	146.5	194	382	338	298	360	146.5	181.5	228	42.3	46.2



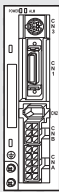


Compact in size, big in features

A wide range of compact servo motors to meet all application needs. When used with a SmartStep 2 drive, the G-Series servo motors offer the simplicity and cost-effectiveness of a stepper with the added advantages of a servo system.

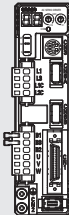
- Peak torque 300% of continuous torque during 3 seconds or more depending on model
- Servo motors supported by SmartStep2, G-Series and Accurax G5 servo drives
- Cylindrical and Flat servo motors types are available
- Encoder accuracy of 10,000 step/rev as standard and 17-bit INC/ABS encoder as optional
- IP65 as standard and shaft oil seal available
- Motors with brake as option

Ordering information

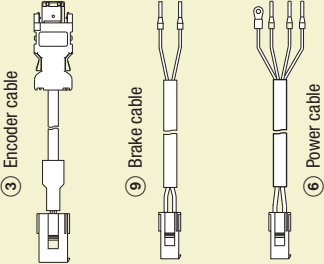
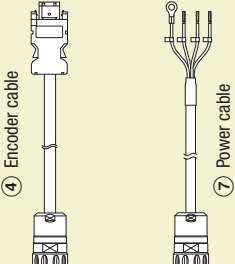
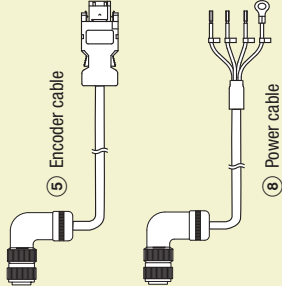
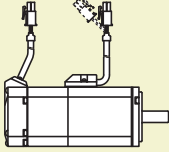
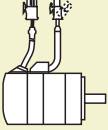
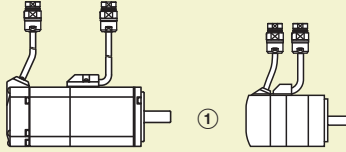
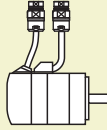
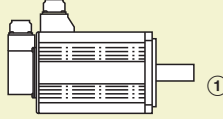


SmartStep 2
Servo drive controlled by pulses (100 to 750 W)

Drive options
②



G-Series servo drive
ML2 and analogue/pulse models (100 to 1500 W)

		
 <p>Servo motor with standard connector 3,000 rpm (50 to 750 W)</p>	 <p>Flat type servo motor with standard connector 3,000 rpm (100 to 400 W)</p>	 <p>Servo motor with circular connector 3,000 rpm (50 to 750 W)</p>
 <p>Flat type servo motor with circular connector 3,000 rpm (100 to 400 W)</p>		 <p>3,000 rpm (1,000 to 1,500 W) 2,000 rpm (1,000 to 1,500 W) 1,000 rpm (900 W)</p>

Note: The symbols ①②③④⑤⑥ ... show the recommended sequence to select the servo motor and cables



Servo drive

② Refer to G-Series and SmartStep2 servo drive section for detailed drive specifications and selection of drive accessories.


Servo motor

① Select motor from cylindrical and flat types using motor tables in next pages.

Cylindrical servo motors 3,000/2,000/1,000 r/min (230 V, 50 to 1.5 kW)



Symbol	Specifications				② Compatible servo drives		Servo motor with standard connector	Servo motor with circular connector		
	Encoder and design	Speed	Design	Rated torque	Capacity	SmartStep 2	G-Series	Order code		
 (50 to 750 W)  (900 to 1,500 W)	Incremental encoder (10,000 pulses) Straight shaft with key and tap	3,000 min ⁻¹	Without brake	0.16 Nm	50 W	R7D-BP01H	R88D-G_01H_	R88M-G05030H-S2	R88M-G05030H-S2-D	
				0.32 Nm	100 W	R7D-BP01H	R88D-G_01H_	R88M-G10030H-S2	R88M-G10030H-S2-D	
				0.64 Nm	200 W	R7D-BP02HH	R88D-G_02H_	R88M-G20030H-S2	R88M-G20030H-S2-D	
				1.3 Nm	400 W	R7D-BP04H	R88D-G_04H_	R88M-G40030H-S2	R88M-G40030H-S2-D	
				2.4 Nm	750 W	R88D-GP08H	R88D-G_08H_	R88M-G75030H-S2	R88M-G75030H-S2-D	
			With brake	0.16 Nm	50 W	R7D-BP01H	R88D-G_01H_	R88M-G05030H-BS2	R88M-G05030H-BS2-D	
				0.32 Nm	100 W	R7D-BP01H	R88D-G_01H_	R88M-G10030H-BS2	R88M-G10030H-BS2-D	
				0.64 Nm	200 W	R7D-BP02HH	R88D-G_02H_	R88M-G20030H-BS2	R88M-G20030H-BS2-D	
				1.3 Nm	400 W	R7D-BP04H	R88D-G_04H_	R88M-G40030H-BS2	R88M-G40030H-BS2-D	
				2.4 Nm	750 W	R88D-GP08H	R88D-G_08H_	R88M-G75030H-BS2	R88M-G75030H-BS2-D	
	Absolute/incremental encoder (17 bits) Straight shaft with key and tap	3,000 min ⁻¹	Without brake	0.16 Nm	50 W	–	R88D-G_01H_	R88M-G05030T-S2	R88M-G05030T-S2-D	
				0.32 Nm	100 W	–	R88D-G_01H_	R88M-G10030T-S2	R88M-G10030T-S2-D	
				0.64 Nm	200 W	–	R88D-G_02H_	R88M-G20030T-S2	R88M-G20030T-S2-D	
				1.3 Nm	400 W	–	R88D-G_04H_	R88M-G40030T-S2	R88M-G40030T-S2-D	
				2.4 Nm	750 W	–	R88D-G_08H_	R88M-G75030T-S2	R88M-G75030T-S2-D	
			With brake	0.16 Nm	50 W	–	R88D-G_01H_	R88M-G05030T-BS2	R88M-G05030T-BS2-D	
				0.32 Nm	100 W	–	R88D-G_01H_	R88M-G10030T-BS2	R88M-G10030T-BS2-D	
				0.64 Nm	200 W	–	R88D-G_02H_	R88M-G20030T-BS2	R88M-G20030T-BS2-D	
				1.3 Nm	400 W	–	R88D-G_04H_	R88M-G40030T-BS2	R88M-G40030T-BS2-D	
				2.4 Nm	750 W	–	R88D-G_08H_	R88M-G75030T-BS2	R88M-G75030T-BS2-D	
	2,000 min ⁻¹	Without brake	3.18 Nm	1 kW	–	R88D-G_15H_	R88M-G1K030T-S2	–		
			4.77 Nm	1.5 kW	–	R88D-G_15H_	R88M-G1K530T-S2	–		
			With brake	0.16 Nm	50 W	–	R88D-G_01H_	R88M-G05030T-BS2	R88M-G05030T-BS2-D	
				0.32 Nm	100 W	–	R88D-G_01H_	R88M-G10030T-BS2	R88M-G10030T-BS2-D	
				0.64 Nm	200 W	–	R88D-G_02H_	R88M-G20030T-BS2	R88M-G20030T-BS2-D	
		1.3 Nm		400 W	–	R88D-G_04H_	R88M-G40030T-BS2	R88M-G40030T-BS2-D		
		2.4 Nm		750 W	–	R88D-G_08H_	R88M-G75030T-BS2	R88M-G75030T-BS2-D		
			1,000 min ⁻¹	With brake	3.18 Nm	1 kW	–	R88D-G_15H_	R88M-G1K030T-BS2	–
					4.77 Nm	1.5 kW	–	R88D-G_15H_	R88M-G1K530T-BS2	–
					Without brake	4.8 Nm	1 kW	–	R88D-G_10H_	R88M-G1K020T-S2
7.15 Nm	1.5 kW					–	R88D-G_15H_	R88M-G1K520T-S2	–	
4.8 Nm	1 kW					–	R88D-G_10H_	R88M-G1K020T-BS2	–	
7.15 Nm	1.5 kW	–	R88D-G_15H_	R88M-G1K520T-BS2	–					

Flat type servo motors 3,000 r/min (230 V, 100 to 400 W)


Symbol	Specifications				② Compatible servo drives		Servo motor with standard connector	Servo motor with circular connector
	Encoder and design		Rated torque	Capacity	SmartStep 2	G-Series	Order code	
	Incremental encoder (10,000 pulses) Straight shaft with key and tap	Without brake	0.32 Nm	100 W	R7D-BP01H	R88D-G_01H_	R88M-GP10030H-S2	R88M-GP10030H-S2-D
			0.64 Nm	200 W	R7D-BP02HH	R88D-G_02H_	R88M-GP20030H-S2	R88M-GP20030H-S2-D
			1.3 Nm	400 W	R7D-BP04H	R88D-G_04H_	R88M-GP40030H-S2	R88M-GP40030H-S2-D
		With brake	0.32 Nm	100 W	R7D-BP01H	R88D-G_01H_	R88M-GP10030H-BS2	R88M-GP10030H-BS2-D
			0.64 Nm	200 W	R7D-BP02HH	R88D-G_02H_	R88M-GP20030H-BS2	R88M-GP20030H-BS2-D
			1.3 Nm	400 W	R7D-BP04H	R88D-G_04H_	R88M-GP40030H-BS2	R88M-GP40030H-BS2-D
	Absolute/incremental encoder (17 bits) Straight shaft with key and tap	Without brake	0.32 Nm	100 W	–	R88D-G_01H_	R88M-GP10030T-S2	R88M-GP10030T-S2-D
			0.64 Nm	200 W	–	R88D-G_02H_	R88M-GP20030T-S2	R88M-GP20030T-S2-D
		With brake	0.32 Nm	100 W	–	R88D-G_01H_	R88M-GP10030T-BS2	R88M-GP10030T-BS2-D
			0.64 Nm	200 W	–	R88D-G_02H_	R88M-GP20030T-BS2	R88M-GP20030T-BS2-D
			1.3 Nm	400 W	–	R88D-G_04H_	R88M-GP40030T-BS2	R88M-GP40030T-BS2-D

Encoder cables

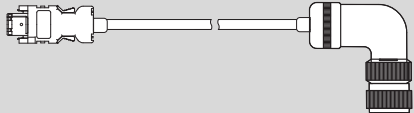
For 50 to 750 W servo motors with standard connectors

Symbol	Appearance	Specifications		Length	Order code
③		Encoder cable (50 to 750 W) R88M-G(50/100/200/400/750)30 R88M-GP(100/200/400)30	Absolute encoder T- _	1.5 m	R88A-CRGA001-5CR-E
				3 m	R88A-CRGA003CR-E
				5 m	R88A-CRGA005CR-E
				10 m	R88A-CRGA010CR-E
				15 m	R88A-CRGA015CR-E
				20 m	R88A-CRGA020CR-E
			Incremental encoder H- _	1.5 m	R88A-CRGB001-5CR-E
				3 m	R88A-CRGB003CR-E
				5 m	R88A-CRGB005CR-E
				10 m	R88A-CRGB010CR-E
				15 m	R88A-CRGB015CR-E
				20 m	R88A-CRGB020CR-E

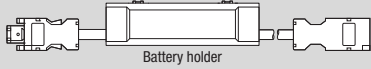

For 50 to 750 W servo motors with circular connector

Symbol	Appearance	Specifications	Length	Order code
④		Encoder cable (50 to 750 W) R88M-G(50/100/200/400/750)30_ - _ - _ - D R88M-GP(100/200/400)30_ - _ - _ - D	3 m	R88A-CRWA003C-DE
			5 m	R88A-CRWA005C-DE
			10 m	R88A-CRWA010C-DE
			15 m	R88A-CRWA015C-DE
			20 m	R88A-CRWA020C-DE

For 900 to 1,500 W servo motors

Symbol	Appearance	Specifications	Length	Order code
⑤		Encoder cable (900-1500 W) R88M-G(1K0/1K5)30T- _ R88M-G(1K0/1K5)20T- _ R88M-G90010T- _	1.5 m	R88A-CRGC001-5NR-E
			3 m	R88A-CRGC003NR-E
			5 m	R88A-CRGC005NR-E
			10 m	R88A-CRGC010NR-E
			15 m	R88A-CRGC015NR-E
			20 m	R88A-CRGC020NR-E

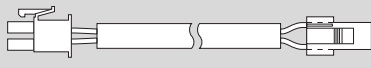

Battery cable for G-series servo drive models with absolute encoder

Symbol	Appearance	Specifications		Length	Order code
④	 <p>Battery holder</p>	Absolute encoder battery cable	Battery not included	0.3 m	R88A-CRGDOR3C-E
			Battery included	0.3 m	R88A-CRGDOR3C-BS-E
		Absolute encoder backup battery 2,000 mA.h 3.6 V	-	-	R88A-BAT01G




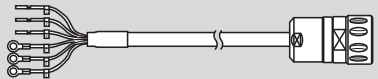
Note: The absolute encoder battery cable is only an extension and must be used with an absolute encoder cable.

Power cables


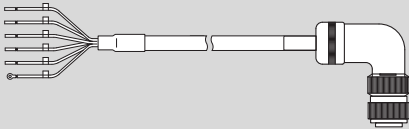
For 50 to 750 W servo motors with standard connectors

Symbol	Appearance	Specifications	Applicable servo drive	Length	Order code
⑥		For servomotors from 50 to 400 W R88M-G(050/100/200/400)30_ _ R88M-GP(100/200/400)30_ _	SmartStep 2	1.5 m	R7A-CAB001-5SR-E
				3 m	R7A-CAB003SR-E
				5 m	R7A-CAB005SR-E
				10 m	R7A-CAB010SR-E
				15 m	R7A-CAB015SR-E
		For servomotors from 50 to 750W R88M-G(050/100/200/400/750)30_ _ R88M-GP(100/200/400)30_ _	SmartStep 2 (only 750 W) and G-Series	1.5 m	R88A-CAGA001-5SR-E
				3 m	R88A-CAGA003SR-E
				5 m	R88A-CAGA005SR-E
				10 m	R88A-CAGA010SR-E
				15 m	R88A-CAGA015SR-E
20 m	R88A-CAGA020SR-E				

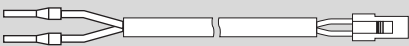
For 50 to 750 W servo motors with circular connectors

Symbol	Appearance	Specifications	Applicable servo drive	Length	Order code		
⑦		For servomotors from 50 to 400 W R88M-G(050/100/200/400)30_ R88M-GP(100/200/400)30_	Without brake -S2-D	SmartStep 2	1.5 m	R7A-CAB001-5SR-DE	
					3 m	R7A-CAB003SR-DE	
					5 m	R7A-CAB005SR-DE	
					10 m	R7A-CAB010SR-DE	
					15 m	R7A-CAB015SR-DE	
					20 m	R7A-CAB020SR-DE	
				With brake -BS2-D		1.5 m	R7A-CAB001-5BR-DE
						3 m	R7A-CAB003BR-DE
						5 m	R7A-CAB005BR-DE
						10 m	R7A-CAB010BR-DE
						15 m	R7A-CAB015BR-DE
						20 m	R7A-CAB020BR-DE
	For servomotors from 50 to 750 W R88M-G(050/100/200/400/750)30_ R88M-GP(100/200/400)30_	Without brake -S2-D	SmartStep 2 (only 750 W) and G-Series	3 m	R88A-CAWA003S-DE		
				5 m	R88A-CAWA005S-DE		
				10 m	R88A-CAWA010S-DE		
				15 m	R88A-CAWA015S-DE		
					With brake -BS2-D	3 m	R88A-CAWA003B-DE
						5 m	R88A-CAWA005B-DE
						10 m	R88A-CAWA010B-DE
						15 m	R88A-CAWA015B-DE
20 m	R88A-CAWA020B-DE						

For 900 to 1,500 W servo motors

Symbol	Appearance	Specifications	Applicable servo drive	Length	Order code		
⑧		For servomotors from 900 to 1.5 kW R88M-G(1K0/1K5)30T_ R88M-G(1K0/1K5)20T_ R88M-G90010T_	Without brake -S2	G-Series	1.5 m	R88A-CAGB001-5SR-E	
					3 m	R88A-CAGB003SR-E	
					5 m	R88A-CAGB005SR-E	
					10 m	R88A-CAGB010SR-E	
					15 m	R88A-CAGB015SR-E	
					With brake -BS2	1.5 m	R88A-CAGB001-5BR-E
						3 m	R88A-CAGB003BR-E
						5 m	R88A-CAGB005BR-E
						10 m	R88A-CAGB010BR-E
						15 m	R88A-CAGB015BR-E
20 m	R88A-CAGB020BR-E						

Brake cable with standard connector

Symbol	Appearance	Specifications	Order code	
⑥		Brake cable only. For servomotors from 50 to 750W with brake R88M-G(050/100/200/400/750)30_-BS2, R88M-GP(100/200/400)30_-BS2	1.5 m	R88A-CAGA001-5BR-E
			3 m	R88A-CAGA003BR-E
			5 m	R88A-CAGA005BR-E
			10 m	R88A-CAGA010BR-E
			15 m	R88A-CAGA015BR-E
			20 m	R88A-CAGA020BR-E

Connectors for power, encoder and brake cables

Specifications			Applicable servomotor	Order code
Connectors for power cable	Drive side (CNB)	-	R88M-G(050/100/200/400)30H_ R88M-GP(100/200/400)30H_	R7A-CNB01A
	Motor side	Standard connector	R88M-G(050/100/200/400/750)30_ R88M-GP(100/200/400)30_ R88M-G(1K0/1K5)30_-S2 R88M-G(1K0/1K5)20_-S2 R88M-G90010_-S2	R88A-CNG01A
			R88M-G(1K0/1K5)30_-BS2 R88M-G(1K0/1K5)20_-BS2 R88M-G90010_-BS2	MS3108E20-4S
			R88M-G(1K0/1K5)30_-BS2 R88M-G(1K0/1K5)20_-BS2 R88M-G90010_-BS2	MS3108E20-18S
			R88M-G(50/100/200/400/750)30_-D R88M-GP(100/200/300)_-D	SPOC-06K-FSDN169
Connectors for encoder cable	Drive side (CN2)	-	All models	R88A-CNW01R
Motor side	Standard connector	R88M-G(050/100/200/400/750)30T_ R88M-GP(100/200/400)30T_-	R88A-CNG01R	
		R88M-G(050/100/200/400/750)30H_ R88M-GP(100/200/400)30H_-	R88A-CNG02R	
		R88M-G(1K0/1K5)30T_ R88M-G(1K0/1K5)20T_ R88M-G90010T_-	MS3108E20-29S	
		R88M-G(50/100/200/400/750)30_-D R88M-GP(100/200/300)_-D	SPOC-17H-FRON169	
Connector for brake cable	Motor side	Standard connector	R88M-G(050/100/200/400/750)30_-BS2 R88M-GP(100/200/400)30_-BS2	R88A-CNG01B

Connectors included with the motor

Specifications		Applicable servomotor	Order code
Power and brake connector (MALE)	Circular connector (Hypertac)	R88M-G(50/100/200/400/750)30_-D R88M-GP(100/200/300)_-D	SRUC-06J-MSCN236
Encoder connector (MALE)		R88M-G(50/100/200/400/750)30_-D R88M-GP(100/200/300)_-D	SRUC-17G-MRWN087

Note: 1. All cables listed are flexible and shielded (except the R88A-CAGA___BR-E which is only a flexible cable).

2. The R88A-CRGC___NR-E, R88A-CAGB___SR-E, R88A-CAGB___BR-E, R88A-CRWA___C-DE, R88A-CAWA___S-DE and R88A-CAWA___B-DE cables have IP67 class (including connector).

Specifications

Cylindrical servo motors 3,000/2,000/1,000 r/min

Applied voltage		230 V										
Servo motor model R88M-__		G05030_	G10030_	G20030_	G40030_	G75030_	G1K030T	G1K530T	G1K020T	G1K520T	G90010T	
Rated output	W	50	100	200	400	750	1,000	1,500	1,000	1,500	900	
Rated torque	N·m	0.16	0.32	0.64	1.3	2.4	3.18	4.77	4.8	7.15	8.62	
Instantaneous peak torque	N·m	0.45	0.90	1.78	3.67	7.05	9.1	12.8	13.5	19.6	18.4	
Rated current	A (rms)	1.1		1.6	2.6	4	7.2	9.4	5.6	9.4	7.6	
Instantaneous max. current	A (rms)	3.4		4.9	7.9	12.1	21.4	28.5	17.1	28.5	17.1	
Rated speed	min ⁻¹	3,000							2,000		1,000	
Max. speed	min ⁻¹	5,000				4,500		5,000		3,000		2,000
Torque constant	N·m/A (rms)	0.14	0.19	0.41	0.51	0.64	0.44	0.51	0.88	0.76	1.13	
Rotor moment of inertia (JM)	kg·m ² ×10 ⁻⁴	0.025	0.051	0.14	0.26	0.87	1.69	2.59	6.17	11.2		
Allowable load moment of inertia (JL)	Multiple of (JM)	30					20		15		10	
Rated power rate	kW/s	10.4	20.1	30.3	62.5	66	60	88	37.3	45.8	66.3	
Applicable Encoder		Incremental encoder (10,000 pulses)					-		Incremental / Absolute encoder (17 bits)			
Allowable radial load	N	68		245		392		490		686		
Allowable thrust load	N	58		98		147		196				
Approx. mass	kg (without brake)	0.3	0.5	0.8	1.2	2.3	4.5	5.1	6.8	8.5		
	kg (with brake)	0.5	0.7	1.3	1.7	3.1	5.1	6.5	8.7	10.1	10	
Brake specifications	Rated voltage	24 VDC±5%					24 VDC±10%					
	Holding brake moment of inertia J	kg·m ² ×10 ⁻⁴		0.002		0.018		0.075		0.25		0.33
	Power consumption (at 20°C)	W		7		9		10		18		19
	Current consumption (at 20°C)	A		0.3		0.36		0.42		0.74		0.81
	Static friction torque	N·m (minimum)		0.29		1.27		2.45		4.9		7.8
	Rise time for holding torque	ms (max.)		35		50		70		50		80
Release time	ms (max)		20		15		20		15		70	

Applied voltage		230 V										
Servo motor model R88M-__		G05030_	G10030_	G20030_	G40030_	G75030_	G1K030T	G1K530T	G1K020T	G1K520T	G90010T	
Basic specifications	Rating	Continuous										
	Insulation grade	Type B					Type F					
	Ambient operating/storage temperature	0 to 40°C/-20 to 65°C					0 to 40°C/-20 to 80°C					
	Ambient operating/storage humidity	85% RH max. (non-condensing)										
	Vibration class	V-15										
	Insulation resistance	20 MΩ min. at 500 VDC between the power terminals and FG terminal										
	Enclosure	Totally-enclosed, self-cooling, IP65 (excluding shaft opening and lead wire ends)										
	Vibration resistance	Vibration acceleration 49 m/s ²					Vibration acceleration 24.5 m/s ²					
	Mounting	Flange-mounted										

Flat servo motors 3,000 r/min

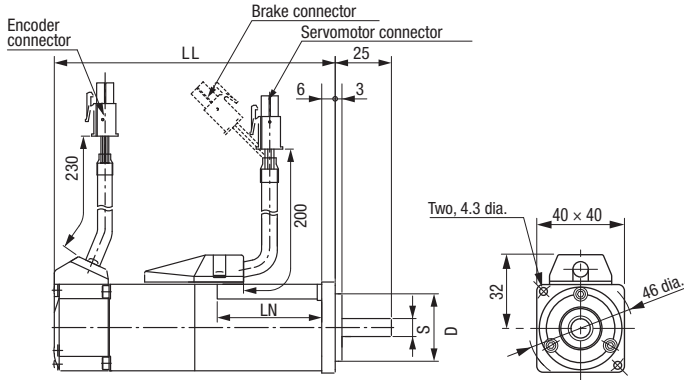
Applied voltage		230 V			
Servo motor model R88M-__		GP10030_		GP20030_	GP40030_
Rated output	W	100		200	400
Rated torque	N·m	0.32		0.64	1.3
Instantaneous peak torque	N·m	0.86		1.8	3.65
Rated current	A (rms)	1		1.6	2.5
Instantaneous max. current	A (rms)	3.1		4.9	7.5
Rated speed	min ⁻¹	3,000			
Max. speed	min ⁻¹	5,000			
Torque constant	N·m/A (rms)	0.34		0.42	0.54
Rotor moment of inertia (JM)	kg·m ² ×10 ⁻⁴	0.1		0.35	0.64
Allowable load moment of inertia (JL)	Multiple of (JM)	20			
Rated power rate	kW/s	10.2		11.5	25.5
Applicable encoder		Incremental (10,000 pulses)			
		Incremental/Absolute encoder (17 bits)			
Allowable radial load	N	68		245	
Allowable thrust load	N	58		98	
Approx. mass	kg (without brake)	0.7		1.3	1.8
	kg (with brake)	0.9		2	2.5
Brake specifications	Rated voltage	24 VDC±10%			
	Holding brake moment of inertia J	kg·m ² ×10 ⁻⁴	0.03		0.09
	Power consumption (at 20°C)	W	7		10
	Current consumption (at 20°C)	A	0.29		0.41
	Static friction torque	N·m (minimum)	0.29		1.27
	Rise time for holding torque	ms (max.)	50		60
Release time	ms (max)	15			
Basic specifications	Rating	Continuous			
	Insulation grade	Type B			
	Ambient operating/storage temperature	0 to 40°C/-20 to 80°C			
	Ambient operating/storage humidity	85% RH max. (non-condensing)			
	Vibration class	V-15			
	Insulation resistance	20 MΩ min. at 500 VDC between the power terminals and FG terminal			
	Enclosure	Totally-enclosed, self-cooling, IP65 (excluding shaft opening and lead wire ends)			
Vibration resistance	Vibration acceleration 49 m/s ²				
Mounting	Flange-mounted				

Dimensions

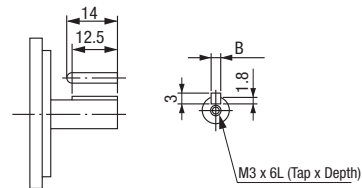
Cylindrical type 3,000 r/min (230 V, 50 to 100 W)

Dimensions (mm)	Without brake	With brake	LN	Flange surface D	Shaft end		Aprox. mass (kg)	
Model	LL	LL			S	B	Without brake	With brake
R88M-G05030_-S2_-	72	102	26.5	30 ^{h7}	8 ^{h6}	3 ^{h9}	0.3	0.5
R88M-G10030_-S2_-	92	122	46.5				0.5	0.7

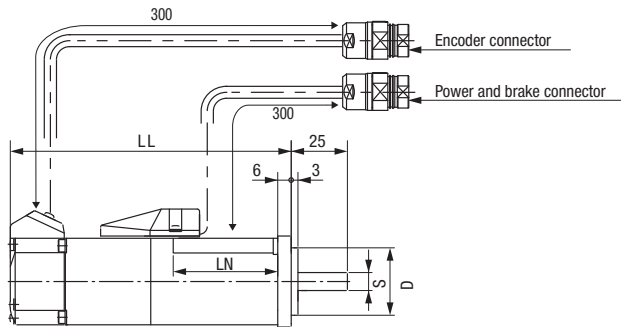
Servo motor with standard connector



(Dimensions of shaft end with key and tap)



Servo motor with circular connector



Encoder connector wiring



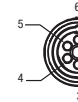
Cable length 300±30
Connector optional
Made by Hypertac
SRUC-17G-MRWN087 (MALE)

Encoder connector	
Pin No.	Signal
1	BAT - (0 V)
2	BAT +
3	S +
4	S -
5 to 7	Free
8	ESV (power supply)
9	EDV (power supply)
10 to 17	Free
Connector case	FG (Ground)

*Note: Pins 1 and 2 used only for motors with ABS encoder.

Mating connector:
Plug type: SPOC-17H-FRON169 (FEMALE)

Power and brake connector wiring



Cable length 300±30
Connector optional
Made by Hypertac
SRUC-06J-MSCN236 (MALE)

Power and brake connector	
Pin No.	Output
1	Phase U
2	Phase V
3	Phase W
4	*Brake terminal
5	*Brake terminal
6	FG (ground)

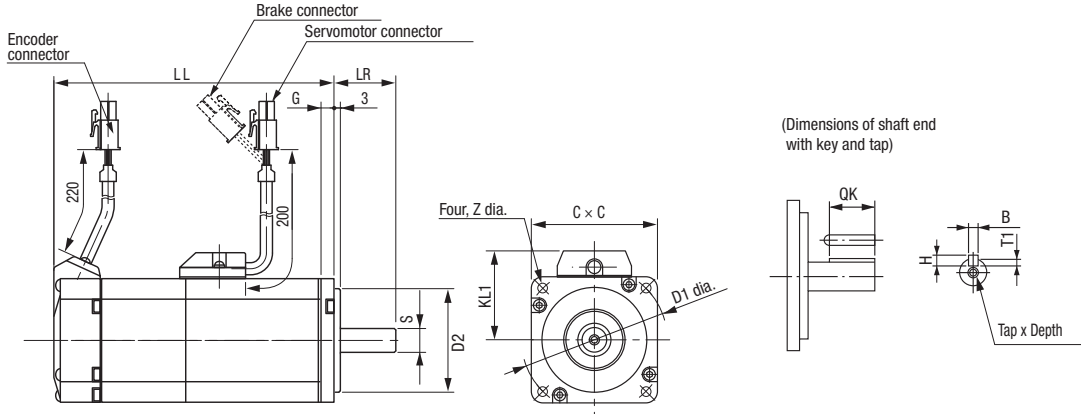
*Note: Pins 4 and 5 used only for motors with brake.

Mating connector:
Plug type: SPOC-06K-FSDN169 (FEMALE)

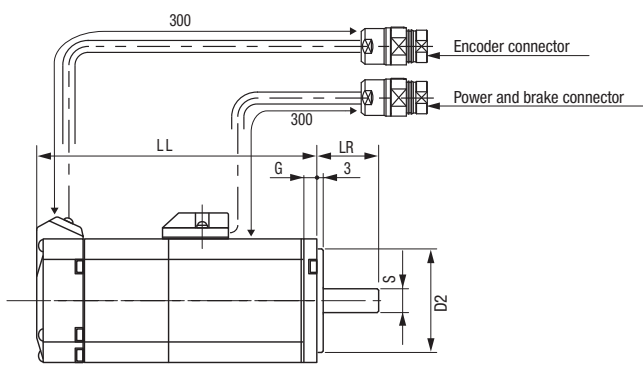
Cylindrical type 3,000 r/min (230 V, 200 to 750 W)

Dimensions (mm)	Without brake		With brake		LR	KL1	Flange surface					Shaft end					Approx. mass (kg)	
	LL	LL	LL	LL			D1	D2	C	G	Z	S	QK	B	H	T1	Tap x depth	Without brake
R88M-G20030_-S2_-	79.5	116	30	43		70	50 ^{h7}	60	6.5	4.5	11 ^{h6}	18	4 ^{h9}	4	2.5	M4 x 8L	0.8	1.3
R88M-G40030_-S2_-	99	135.5									14 ^{h6}	22.5	5 ^{h9}	5	3	M5 x 10L	1.2	1.7
R88M-G75030_-S2_-	112.2	149.2	35	53		90	70 ^{h7}	80	8	6	19 ^{h6}	22	6 ^{h9}	6	3.5		2.3	3.1

Servo motor with standard connector



Servo motor with circular connector



Encoder connector wiring

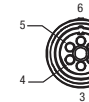


Cable length 300±30
Connector optional
Made by Hypertac
SRUC-17G-MRW087 (MALE)

Encoder connector	
Pin No.	Signal
1	BAT - (0 V)
2	BAT +
3	S +
4	S -
5 to 7	Free
8	ESV (power supply)
9	EDV (power supply)
10 to 17	Free
Connector case	FG (Ground)

*Note: Pins 1 and 2 used only for motors with ABS encoder.
Mating connector:
Plug type: SPOC-17H-FRON169 (FEMALE)

Power and brake connector wiring



Cable length 300±30
Connector optional
Made by Hypertac
SRUC-06J-MSCN236 (MALE)

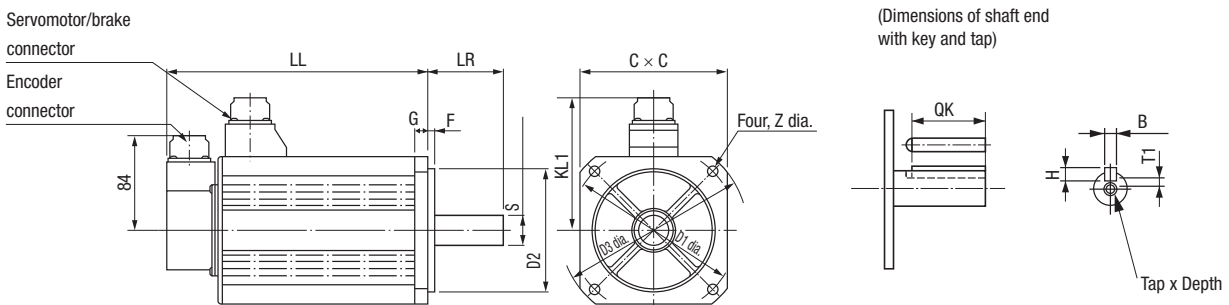
Power and brake connector	
Pin No.	Output
1	Phase U
2	Phase V
3	Phase W
4	*Brake terminal
5	*Brake terminal
6	FG (ground)

*Note: Pins 4 and 5 used only for motors with brake.

Mating connector:
Plug type: SPOC-06K-FSDN169 (FEMALE)

Cylindrical type 3,000, 2,000 and 1,000 r/min (230 V, 900 kW to 1.5 kW)

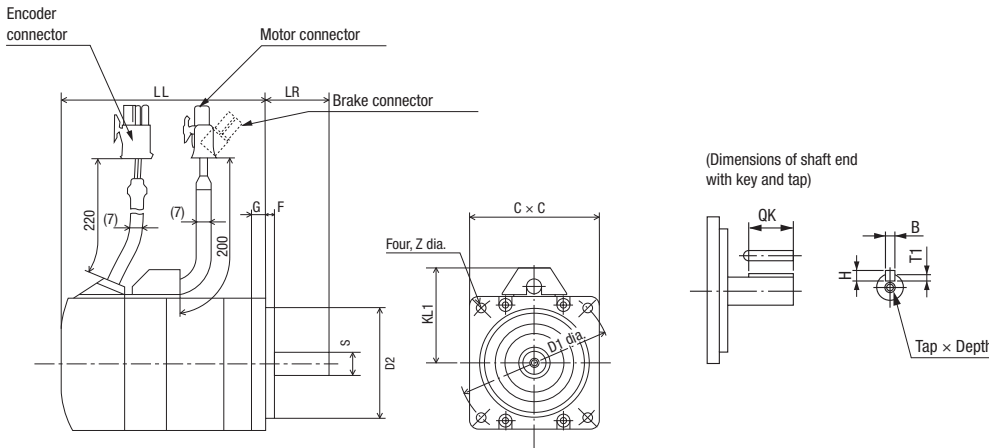
Dimensions (mm)	Without brake		With brake		LR	KL1	Flange surface					Shaft end					Approx. mass (kg)			
	LL	LL	LL	LL			D1	D2	D3	C	G	F	Z	S	QK	B	H	T1	Tap x depth	Without brake
R88M-G1K030T_-S2	175	200	55	98		100	80 ^{h7}	120	90	7	3	6.6	19 ^{h6}	42	6 ^{h9}	6	3.5	M5 x 12L	4.5	5.1
R88M-G1K530T_-S2	180	205				103	115	95 ^{h7}	135	100	10	9							5.1	6.5
R88M-G1K020T_-S2	150	175				118	145	110 ^{h7}	165	130	12	6	22 ^{h6}	41	8 ^{h9}	7	4		6.8	8.7
R88M-G1K520T_-S2	175	200																	8.5	10.1
R88M-G90010T_-S2	175	200	70																	10



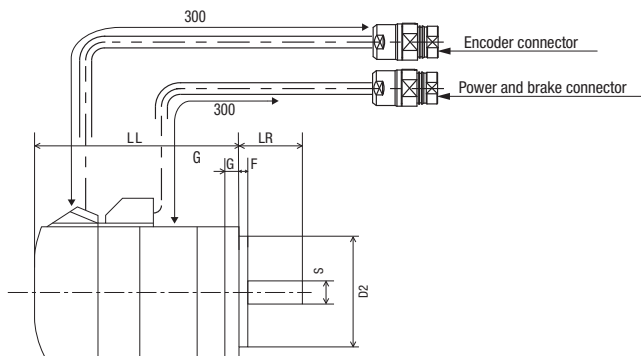
Flat type 3,000 r/min (230 V, 100 W to 400 W)

Dimensions (mm)	Without brake		LR	KL1	Flange surface							Shaft end					Approx. mass (kg)	
	LL	LL			D1	D2	C	F	G	Z	S	QK	B	H	T1	Tap × depth	Without brake	With brake
R88M-GP10030H- S2-__	60.5	84.5	25	43	70	50 ^{h7}	60	3	7	4.5	8 ^{h6}	12.5	3 ^{h9}	3	1.8	M3 × 6L	0.7	0.9
R88M-GP10030T- S2-__	87.5	111.5																
R88M-GP20030H- S2-__	67.5	100	30	53	90	70 ^{h7}	80	5	8	5.5	11 ^{h6}	18	4 ^{h9}	4	2.5	M4 × 8L	1.3	2
R88M-GP20030T- S2-__	94.5	127																
R88M-GP40030H- S2-__	82.5	115									14 ^{h6}	22.5	5 ^{h9}	5	3.0	M5 × 10L	1.8	2.5
R88M-GP40030T- S2-__	109.5	142																

Servo motor with standard connector



Servo motor with circular connector



Encoder connector wiring



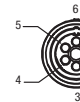
Cable length 300±30
Connector optional
Made by Hypertac
SRUC-17G-MRWN087 (MALE)

Encoder connector	
Pin No.	Signal
1	BAT - (0 V)
2	BAT +
3	S +
4	S -
5 to 7	Free
8	ESV (power supply)
9	EOV (power supply)
10 to 17	Free
Connector case	FG (Ground)

*Note: Pins 1 and 2 used only for motors with ABS encoder.

Mating connector:
Plug type: SPOC-17H-FRON169 (FEMALE)

Power and brake connector wiring



Cable length 300±30
Connector optional
Made by Hypertac
SRUC-06J-MSCN236 (MALE)

Power and brake connector	
Pin No.	Output
1	Phase U
2	Phase V
3	Phase W
4	*Brake terminal
5	*Brake terminal
6	FG (ground)

*Note: Pins 4 and 5 used only for motors with brake.

Mating connector:
Plug type: SPOC-06K-FSDN169 (FEMALE)

BORN TO DRIVE MACHINES

Harmonised motor and machine control

Specifically created for your application, the MX2 was developed to harmonise advanced motor and machine control. Thanks to its advanced design and algorithms the MX2 provides smooth control down to zero speed, plus precise operation for fast cyclic operations and torque control capability in open loop.

The MX2 also gives you comprehensive functionality for machine control such as positioning, speed synchronisation and logic programming. The MX2 is fully integrated within the Omron smart automation platform.

The MX2 is the child of a true leader in machine automation.

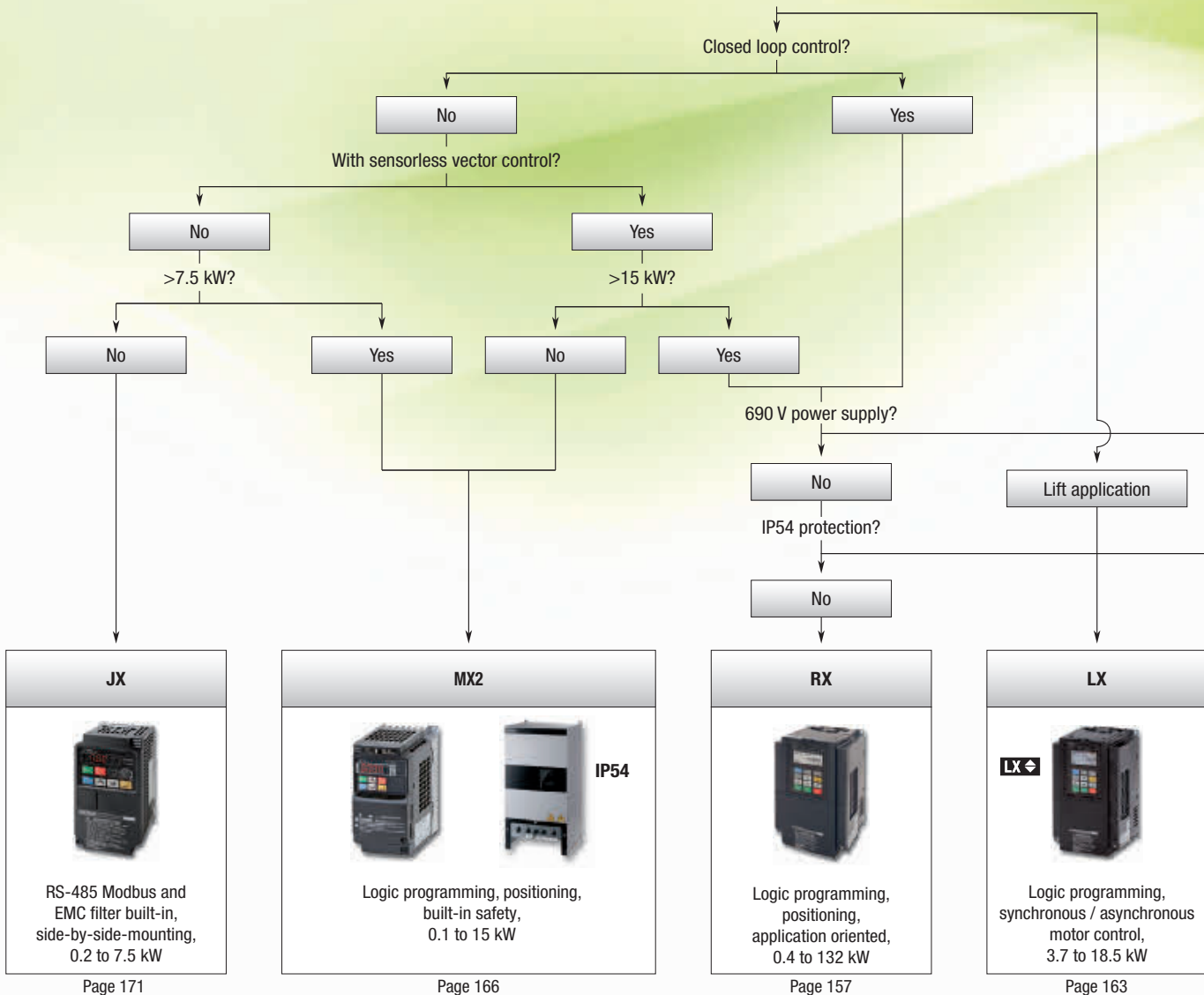
200% starting torque

Torque control in open loop

Special motors

One parameter auto-tuning

What is your inverter application needs?



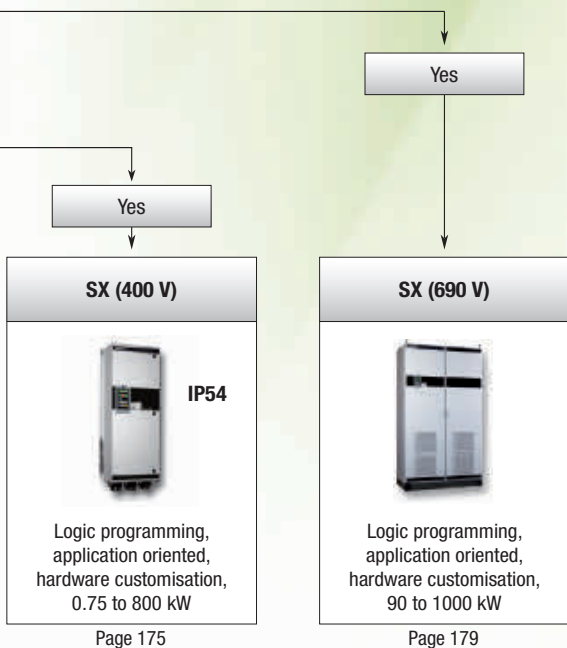
MOTOR CONTROL



- Near stand-still operation (0.5 Hz)
- Smooth control of high inertia loads
- Control of fast cyclic loads
- Ideal for low to medium torque applications
- Can replace a flux vector or servo drive in suitable systems
- Permanent magnet motors
- Fire mode
- Just by entering the kW rating of the motor the MX2 gives you smooth and safe operation








MACHINE CONTROL

- Safety inside**
 - Conforms to safety norm ISO-13849 CAT3 performance level PLD
 - 2 Safety inputs
 - External device monitoring (EDM)
- Logic programming**
 - Flow chart programming
 - Text editor
 - Intuitive – up to 5 tasks in parallel
- Positioning**
 - Up to 8 pre-set positions with “Homing”
 - Speed synchronisation
- Integrated in the Omron Smart Automation**
 - CX-Drive programming tool connected via integrated USB port on MX2.
 - Modbus RS485 built-in
 - Option units for EtherCAT, Profibus, DeviceNet, ML-II and more...



Model	RX	LX
		
	Customised to your machine	Lift applications
400 V three-phase	0.4 kW to 132 kW	3.7 kW to 18.5 kW
200 V three-phase	0.4 kW to 55 kW	–
Application	High performance, built-in know-how functionality	Lift control with asynchronous and synchronous motors
Control method	Open and closed loop for vector and V/F control	Open and closed loop vector control and V/F control
Torque features	200% at 0.0 Hz (CLV) 150% at 0.3 Hz (OLV)	150% at 0.0 Hz (CLV) 200% at 0.3 Hz (OLV)
Connectivity	Modbus, DeviceNet, PROFIBUS, MECHATROLINK-II, EtherCAT, CompoNet	Modbus
Logic programming	Standard firmware	Standard firmware
Page	157	163

Model	MX2	JX
	  IP54	
	Born to drive machines	Compact and complete
400 V three-phase	0.4 kW to 15 kW	0.4 kW to 7.5 kW
200 V three-phase	0.1 kW to 15 kW	0.2 kW to 7.5 kW
200 V single-phase	0.1 kW to 2.2 kW	0.2 kW to 2.2 kW
Application	Harmonized motor and machine control	General purpose built-in communications
Control method	Open loop speed and torque control for vector and speed for V/F control	V/F control
Torque features	200% at 0.5 Hz	150% at 3 Hz
Connectivity	Modbus, DeviceNet, PROFIBUS, MECHATROLINK-II, EtherCAT, CompoNet, EtherNet IP	Modbus
Logic programming	Standard firmware	N/A
Customisation options	IP54 enclosure	N/A
Page	166	171

Model	SX (400 V)	SX (690 V)
	 IP54	
	High performance vector control	
400 V three-phase	0.75 kW to 800 kW	–
690 V three-phase	–	90 kW to 1,000 kW
Application	High power flux vector and variable torque applications	High power flux vector and variable torque applications
Control method	Flux vector and V/F control	Flux vector and V/F control
Torque features	120% at 0,0 Hz (CLV) 120% at 0,5 Hz (OLV)	120% at 0,0 Hz (CLV) 120% at 0,5 Hz (OLV)
Connectivity	Modbus, DeviceNet, PROFIBUS, EtherCAT, Modbus TCP, CAN	Modbus, DeviceNet, PROFIBUS, EtherCAT, Modbus TCP, CAN
Logic programming	Standard firmware	Standard firmware
Customisation options	Hardware customisation (main switch, liquid cooling, 12-pulse rectifier, ...)	Hardware customisation (main switch, liquid cooling, 12-pulse rectifier, ...)
Page	175	179

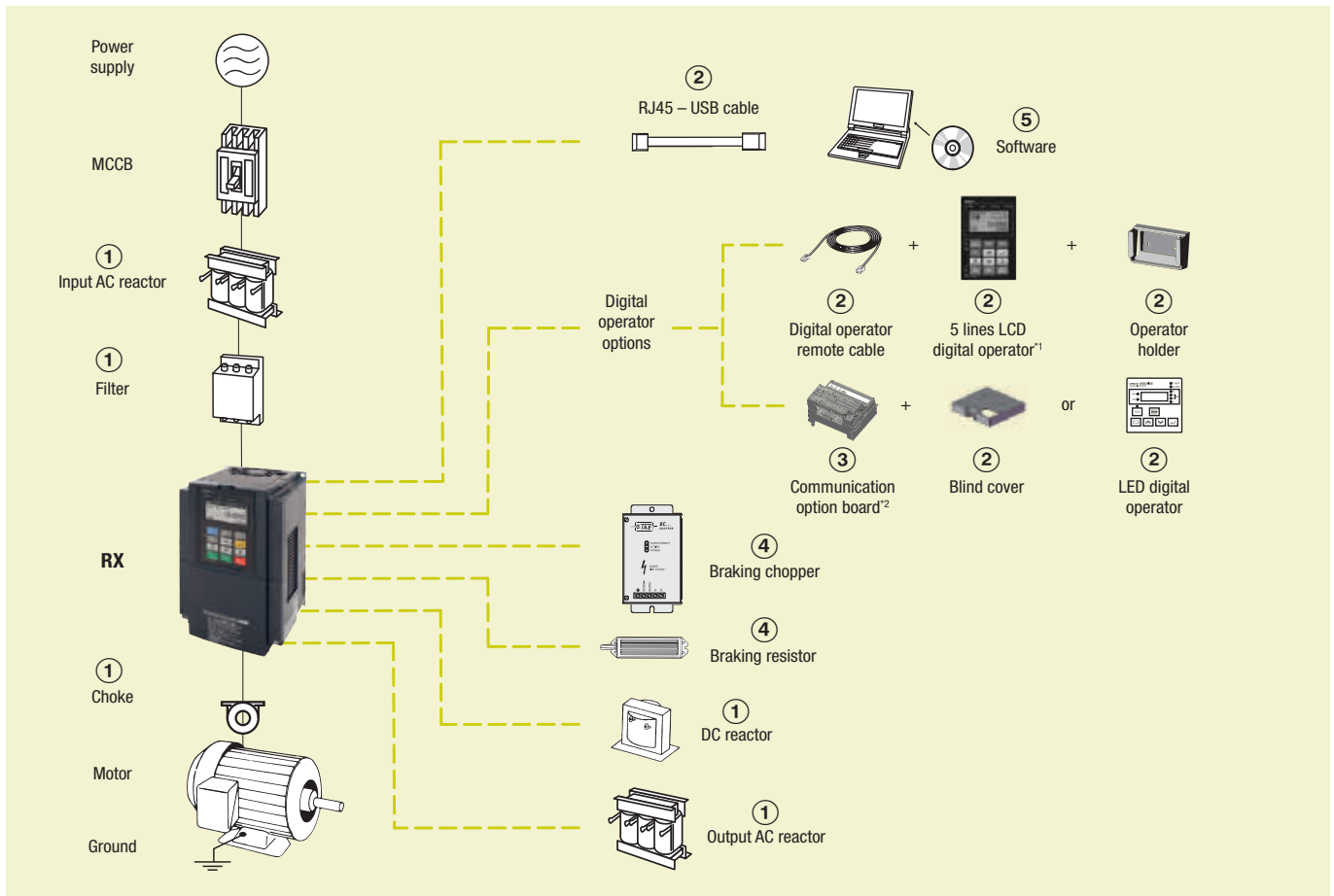


Customised to your machine

Omron realises that you need quality and reliability, plus the ability to easily and quickly customise your inverter to the application in hand. And with the RX, you have the perfect tool for the job. Naturally it combines the same high level of quality and performance for which Omron is renowned. It also has abundant application functionality on board and you can customise it yourself to match your precise requirements.

- Ratings up to 132 kW
- Full torque at 0 Hz in closed loop
- Sensor-less and vector closed-loop control
- Built-in EMC filter
- Built-in logic programmability
- Built-in application oriented functionality
- Fieldbus communications: Modbus, DeviceNet, PROFIBUS, MECHATROLINK-II, EtherCAT and CompoNet

Ordering information



¹ The 5 lines LCD digital operator is provided with the inverter from factory.

² When a communication option board is mounted, there are two options: mount a blind cover or a LED digital operator.

3G3RX

Specifications					Order code	Specifications					Order code
Voltage class	Constant torque		Variable torque		Standard	Voltage class	Constant torque		Variable torque		Standard
	Max motor kW	Rated current A	Max motor kW	Rated current A			Max motor kW	Rated current A	Max motor kW	Rated current A	
Three-phase 200 V	0.4	3.0	0.75	3.7	3G3RX-A2004-E1F	Three-phase 400 V	0.4	1.5	0.75	1.9	3G3RX-A4004-E1F
	0.75	5.0	1.5	6.3	3G3RX-A2007-E1F		0.75	2.5	1.5	3.1	3G3RX-A4007-E1F
	1.5	7.5	2.2	9.4	3G3RX-A2015-E1F		1.5	3.8	2.2	4.8	3G3RX-A4015-E1F
	2.2	10.5	4.0	12	3G3RX-A2022-E1F		2.2	5.3	4.0	6.7	3G3RX-A4022-E1F
	4.0	16.5	5.5	19.6	3G3RX-A2037-E1F		4.0	9.0	5.5	11.1	3G3RX-A4040-E1F
	5.5	24	7.5	30	3G3RX-A2055-E1F		5.5	14	7.5	16	3G3RX-A4055-E1F
	7.5	32	11	44	3G3RX-A2075-E1F		7.5	19	11	22	3G3RX-A4075-E1F
	11	46	15	58	3G3RX-A2110-E1F		11	25	15	29	3G3RX-A4110-E1F
	15	64	18.5	73	3G3RX-A2150-E1F		15	32	18.5	37	3G3RX-A4150-E1F
	18.5	76	22	85	3G3RX-A2185-E1F		18.5	38	22	43	3G3RX-A4185-E1F
	22	95	30	113	3G3RX-A2220-E1F		22	48	30	57	3G3RX-A4220-E1F
	30	121	37	140	3G3RX-A2300-E1F		30	58	37	70	3G3RX-A4300-E1F
	37	145	45	169	3G3RX-A2370-E1F		37	75	45	85	3G3RX-A4370-E1F
	45	182	55	210	3G3RX-A2450-E1F		45	91	55	105	3G3RX-A4450-E1F
	55	220	75	270	3G3RX-A2550-E1F		55	112	75	135	3G3RX-A4550-E1F
-	-	-	-	-	75	149	90	160	3G3RX-B4750-E1F		
-	-	-	-	-	90	176	110	195	3G3RX-B4900-E1F		
-	-	-	-	-	110	217	132	230	3G3RX-B411K-E1F		
-	-	-	-	-	132	260	160	290	3G3RX-B413K-E1F		

① Rasmi line filter

200 V					400 V				
Model 3G3R_X-__	Leakage Nom/Max	Rated current A	Weight kg	Order code	Model 3G3RX-__	Leakage Nom/Max	Rated current A	Weight kg	Order code
A2004/A2007/A2015/A2022/A2037	0.7/40 mA	18	2.0	AX-FIR2018-RE	A4004/A4007/A4015/A4022/A4040	0.3/40 mA	10	1.9	AX-FIR3010-RE
A2055/A2075/A2110	0.7/40 mA	53	2.5	AX-FIR2053-RE	A4055/A4075/A4110	0.3/40 mA	30	2.2	AX-FIR3030-RE
A2150/A2185/A2220	1.2/70 mA	110	8.0	AX-FIR2110-RE	A4150/A4185/A4220	0.8/70 mA	53	4.5	AX-FIR3053-RE
A2300	1.2/70 mA	145	8.6	AX-FIR2145-RE	A4300	3/160 mA	64	7.0	AX-FIR3064-RE
A2370/A2450	6/300 mA	250	13.0	AX-FIR3250-RE	A4370	2/130 mA	100	8.0	AX-FIR3100-RE
A2550	6/300 mA	320	13.2	AX-FIR3320-RE	A4450/A4550	2/130 mA	130	8.6	AX-FIR3130-RE
-	-	-	-	-	A4750/A4900	10/500 mA	250	13.0	AX-FIR3250-RE
-	-	-	-	-	A411K/A413K	10/500 mA	320	13.2	AX-FIR3320-RE

① Input AC reactors

3-phase 200 VAC		3-phase 400 VAC	
Inverter model 3G3RX-__	Order code	Inverter model 3G3RX-__	Order code
A2004/A2007/A2015	AX-RAI02800100-DE	A4004/A4007/A4015	AX-RAI07700050-DE
A2022/A2037	AX-RAI00880200-DE	A4022/A4040	AX-RAI03500100-DE
A2055/A2075	AX-RAI00350335-DE	A4055/A4075	AX-RAI01300170-DE
A2110/A2150	AX-RAI00180670-DE	A4110/A4150	AX-RAI00740335-DE
A2185/A2220	AX-RAI00091000-DE	A4185/A4220	AX-RAI00360500-DE
A2300/A2370	AX-RAI00071550-DE	A4300/A4370	AX-RAI00290780-DE
A2450/A2550	AX-RAI00042300-DE	A4450/A4550	AX-RAI00191150-DE
-	-	A4750/A4900	AX-RAI00111850-DE
-	-	A411K/A413K	AX-RAI00072700-DE

① DC reactors

3-phase 200 VAC		3-phase 400 VAC	
Inverter model 3G3RX-__	Order code	Inverter model 3G3RX-__	Order code
A2004	AX-RC10700032-DE	A4004	AX-RC43000020-DE
A2007	AX-RC06750061-DE	A4007	AX-RC27000030-DE
A2015	AX-RC03510093-DE	A4015	AX-RC14000047-DE
A2022	AX-RC02510138-DE	A4022	AX-RC10100069-DE
A2037	AX-RC01600223-DE	A4040	AX-RC06400116-DE
A2055	AX-RC01110309-DE	A4055	AX-RC04410167-DE
A2075	AX-RC00840437-DE	A4075	AX-RC03350219-DE
A2110	AX-RC00590614-DE	A4110	AX-RC02330307-DE
A2150	AX-RC00440859-DE	A4150	AX-RC01750430-DE
A2185/A2220	AX-RC00301275-DE	A4185/A4220	AX-RC01200644-DE
A2300	AX-RC00231662-DE	A4300	AX-RC00920797-DE
A2370	AX-RC00192015-DE	A4370	AX-RC00741042-DE
A2450	AX-RC00162500-DE	A4450	AX-RC00611236-DE
A2550	AX-RC00133057-DE	A4550	AX-RC00501529-DE

3-phase 200 VAC		3-phase 400 VAC	
Inverter model 3G3RX-	Order code	Inverter model 3G3RX-	Order code
		A4750	AX-RC00372094-DE
		A4900	AX-RC00312446-DE
		A411K	AX-RC00252981-DE
		A413K	AX-RC00213613-DE

① Chokes






Diameter	Description	Order code
21	For 2.2 kW motors or below	AX-FER2102-RE
25	For 15 kW motors or below	AX-FER2515-RE
50	For 45 kW motors or below	AX-FER5045-RE
60	For 55 kW motors or above	AX-FER6055-RE

① Output AC Reactor

200 V		400 V	
Model 3G3RX-	Order code	Model 3G3RX-	Order code
A2004	AX-RA011500026-DE	A4004/A4007/A4015	AX-RA016300038-DE
A2007	AX-RA007600042-DE		
A2015	AX-RA004100075-DE		
A2022	AX-RA003000105-DE	A4022	AX-RA011800053-DE
A2037	AX-RA001830160-DE	A4040	AX-RA007300080-DE
A2055	AX-RA001150220-DE	A4055	AX-RA004600110-DE
A2075	AX-RA000950320-DE	A4075	AX-RA003600160-DE
A2110	AX-RA000630430-DE	A4110	AX-RA002500220-DE
A2150	AX-RA000490640-DE	A4150	AX-RA002000320-DE
A2185	AX-RA000390800-DE	A4185	AX-RA001650400-DE
A2220	AX-RA000330950-DE	A4220	AX-RA001300480-DE
A2300	AX-RA000251210-DE	A4300	AX-RA001030580-DE
A2370	AX-RA000191450-DE	A4370	AX-RA000800750-DE
A2450	AX-RA000161820-DE	A4450	AX-RA000680900-DE
A2550	AX-RA000132200-DE	A4550	AX-RA000531100-DE
		A4750	AX-RA000401490-DE
		A4900	AX-RA000331760-DE
		A411K	AX-RA000262170-DE
		A413K	AX-RA000212600-DE

Note: This table corresponds with HD rating. When ND is used, please choose the reactor for the next size inverter.

② Accessories

Types	Appearance	Description	Order code
Remote digital operator		5 line LCD digital operator with copy function ^{*1}	3G3AX-OP05
		Operator holder (for inside cabinet mounting)	3G3AX-OP05-H-E
		LED remote digital operator	3G3AX-OP01
		Mounting kit	4X-KITmini
LED digital operator		To be used in combination with communication option boards	3G3AX-OP03
Blind cover			3G3AX-OP05-B-E
Cables		3 m remote digital operator cable	3G3AX-CAJOP300-EE
		RJ45 to USB connection cable	USB-CONVERTERCABLE 3G3AX-PCACN2

*1 This digital operator is provided with the RX inverter from factory.

③ Option boards

Types	Description	Functions	Order code
Encoder feedback	PG speed controller option card	Phase A,B and Z pulse (differential pulse) inputs (RS-422) Pulse train position command input (RS-422) Pulse monitor output (RS-422) PG frequency range: 100 kHz max	3G3AX-PG
Communication option board	DeviceNet option card	Used for running or stopping the inverter, setting or referencing parameters, and monitoring output frequency, output current ... through communications with the host controller	3G3AX-RX-DRT
	Profibus option card		3G3AX-RX-PRT
	Ethercat option card		3G3AX-RX-ECT
	CompoNet option card		3G3AX-RX-CRT
	Mechatrolink-II option card		3G3AX-RX-MRT
I/O option	Extra input/output option card	8 digital inputs, 8 digital outputs, 4 analog inputs, 1 analog output	3G3AX-EI021-ROE

④ Braking unit, braking resistor unit

Inverter					Braking resistor unit											
Voltage	Max. motor kW	Inverter 3G3RX_	Braking unit AX-BCR_	Connectable min. resistance Ω	Inverter mounted type (3% ED, 10 sec max)		Braking torque %	External resistor 10% ED 10 sec max for built-in 5 sec max for braking unit		Braking torque %						
					Order code	Resist Ω		Order code	Resist Ω							
200 V (single-/three-phase)	0.55	2004	Built-in	50	AX-REM00K1200-IE	200	180	AX-REM00K1200-IE	200	180						
	1.1	2007					100	AX-REM00K2070-IE	70	200						
	1.5	2015					35	AX-REM00K2070-IE	70	140	AX-REM00K4075-IE	75	130			
	2.2	2022								90	AX-REM00K4035-IE	35	180			
	4.0	2037								50	AX-REM00K6035-IE	35	100			
	5.5	2055					16	AX-REM00K4035-IE	35	75	AX-REM00K9020-IE	20	150			
	7.5	2075								55	AX-REM01K9017-IE	17	110			
	11.0	2110					10	AX-REM00K6035-IE	35	40	AX-REM02K1017-IE	17	75			
	15.0	2150								7.5	AX-REM00K9017-IE	17	55	AX-REM03K5010-IE	10	95
	18.5	2185											75	AX-REM19K0008-IE	8	95
	22.0	2220					5			65			80			
	30.0	2300					2035090-TE	4	-			AX-REM19K0006-IE	6	80		
	37.0	2370											6	60		
	45.0	2450					2070130-TE	2.8				2 x AX-REM19K0006-IE	3	105		
	55.0	2550											3	85		
	400 V (three-phase)	0.55	4004	Built-in	100	AX-REM00K1400-IE	400	200	AX-REM00K1400-IE	400	200					
1.1		4007								200		200				
1.5		4015	70					AX-REM00K1200-IE	200	190	AX-REM00K2200-IE	200	190			
2.2		4022								130	AX-REM00K5120-IE	120	200			
4.0		4040								120	AX-REM00K2120-IE	120	140			
5.5		4055	35					AX-REM00K4075-IE	75	140	AX-REM00K9070-IE	70	150			
7.5		4075								100	AX-REM01K9070-IE	70	110			
11.0		4110	24					AX-REM00K6100-IE	100	50	AX-REM02K1070-IE	70	75			
15.0		4150								70	AX-REM00K9070-IE	55	110			
18.5		4185								35	AX-REM03K5035-IE	30	100			
22.0		4220	20							75			85			
30.0		4300	4015045-TE					16	-			AX-REM19K0020-IE	20	95		
37.0		4370	4017068-TE					11				AX-REM38K0012-IE	15	125		
45.0		4450												100		
55.0		4550	4035090-TE					8.5				2 x AX-REM19K0020-IE	10	100		
75.0		4750						3 x AX-REM19K0030-IE	10	75						
90.0	4900	4070130-TE	5.5				2 x AX-REM38K0012-IE	6	105							
110.0	411K	4090240-TE	3.2				3 x AX-REM38K0012-IE	4	125							
132.0	413K								105							

⑤ Computer software

Description	Installation	Order code
Computer software	Configuration and monitoring software tool	CX-Drive
Computer software	Configuration and monitoring software tool	CX-One
Computer software	Software tool for energy saving calculation	€Saver

Specifications

200 V class

Three-phase: 3G3RX-		A2004	A2007	A2015	A2022	A2037	A2055	A2075	A2110	A2150	A2185	A2220	A2300	A2370	A2450	A2550		
Max applicable motor 4P kW ^{*1}	at CT	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55		
	at VT	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75		
Output characteristics	Inverter capacity kVA	200 V	at CT	1.0	1.7	2.5	3.6	5.7	8.3	11.0	15.9	22.1	26.3	32.9	41.9	50.2	63.0	76.2
			at VT	1.3	2.1	3.2	4.1	6.7	10.4	15.2	20.0	26.3	29.4	39.1	49.5	59.2	72.7	93.5
	240 V	at CT	1.2	2.0	3.1	4.3	6.8	9.9	13.3	19.1	26.6	31.5	39.4	50.2	60.2	75.6	91.4	
		at VT	1.5	2.6	3.9	5.0	8.1	12.4	18.2	24.1	31.5	35.3	46.9	59.4	71.0	87.2	112.2	
	Rated output current (A)	at CT	3.0	5.0	7.5	10.5	16.5	24	32	46	64	76	95	121	145	182	220	
	at VT	3.7	6.3	9.4	12	19.6	30	44	58	73	85	113	140	169	210	270		
Max. output voltage		Proportional to input voltage: 0 to 240 V																
Max. output frequency		400 Hz																
Power supply	Rated input voltage and frequency		3-phase 200 to 240 V 50/60 Hz															
	Allowable voltage fluctuation		-15% to 10%															
	Allowable frequency fluctuation		5%															
Braking	Regenerative braking		Internal BRD circuit (external discharge resistor)										External regenerative braking unit					
	Minimum connectable resistance		50	50	35	35	35	16	10	10	7.5	7.5	5					
Protective structure		IP20																
Cooling method		Forced air cooling																

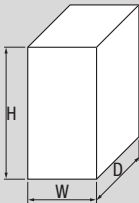
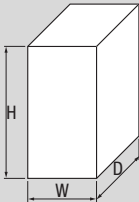
*1 Based on a standard 3-phase standard motor.

400 V class

Three-phase: 3G3RX-		A4004	A4007	A4015	A4022	A4040	A4055	A4075	A4110	A4150	A4185	A4220	A4300	A4370	A4450	A4550	B4750	B4900	B411K	B413K		
Max applicable motor 4P kW ^{*1}	at CT	0.4	0.75	1.5	2.2	4.0	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132		
	at VT	0.75	1.5	2.2	4.0	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160		
Output characteristics	Inverter capacity kVA	400 V	at CT	1.0	1.7	2.5	3.6	6.2	9.7	13.1	17.3	22.1	26.3	33.2	40.1	51.9	63.0	77.6	103.2	121.9	150.3	180.1
			at VT	1.3	2.1	3.3	4.6	7.7	11.0	15.2	20.9	25.6	30.4	39.4	48.4	58.8	72.7	93.5	110.8	135	159.3	200.9
	480 V	at CT	1.2	2.0	3.1	4.3	7.4	11.6	15.8	20.7	26.6	31.5	39.9	48.2	62.3	75.6	93.1	123.8	146.3	180.4	216.1	
		at VT	1.5	2.5	4.0	5.5	9.2	13.3	18.2	24.1	30.7	36.5	47.3	58.1	70.6	87.2	112.2	133	162.1	191.2	241.1	
	Rated output current (A)	at CT	1.5	2.5	3.8	5.3	9.0	14	19	25	32	38	48	58	75	91	112	149	176	217	260	
	at VT	1.9	3.1	4.8	6.7	11.1	16	22	29	37	43	57	70	85	105	135	160	195	230	290		
Max. output voltage		Proportional to input voltage: 0 to 480 V																				
Max. output frequency		400 Hz																				
Power supply	Rated input voltage and frequency		3-phase 380 to 480 V 50/60 Hz																			
	Allowable voltage fluctuation		-15% to 10%																			
	Allowable frequency fluctuation		5%																			
Braking	Regenerative braking		Internal BRD circuit (external discharge resistor)										External regenerative braking unit									
	Minimum connectable resistance		100	100	100	100	70	70	35	35	24	24	20									
Protective structure		IP20															IP00					
Cooling method		Forced air cooling																				

*1 Based on a standard 3-phase standard motor.

Dimensions

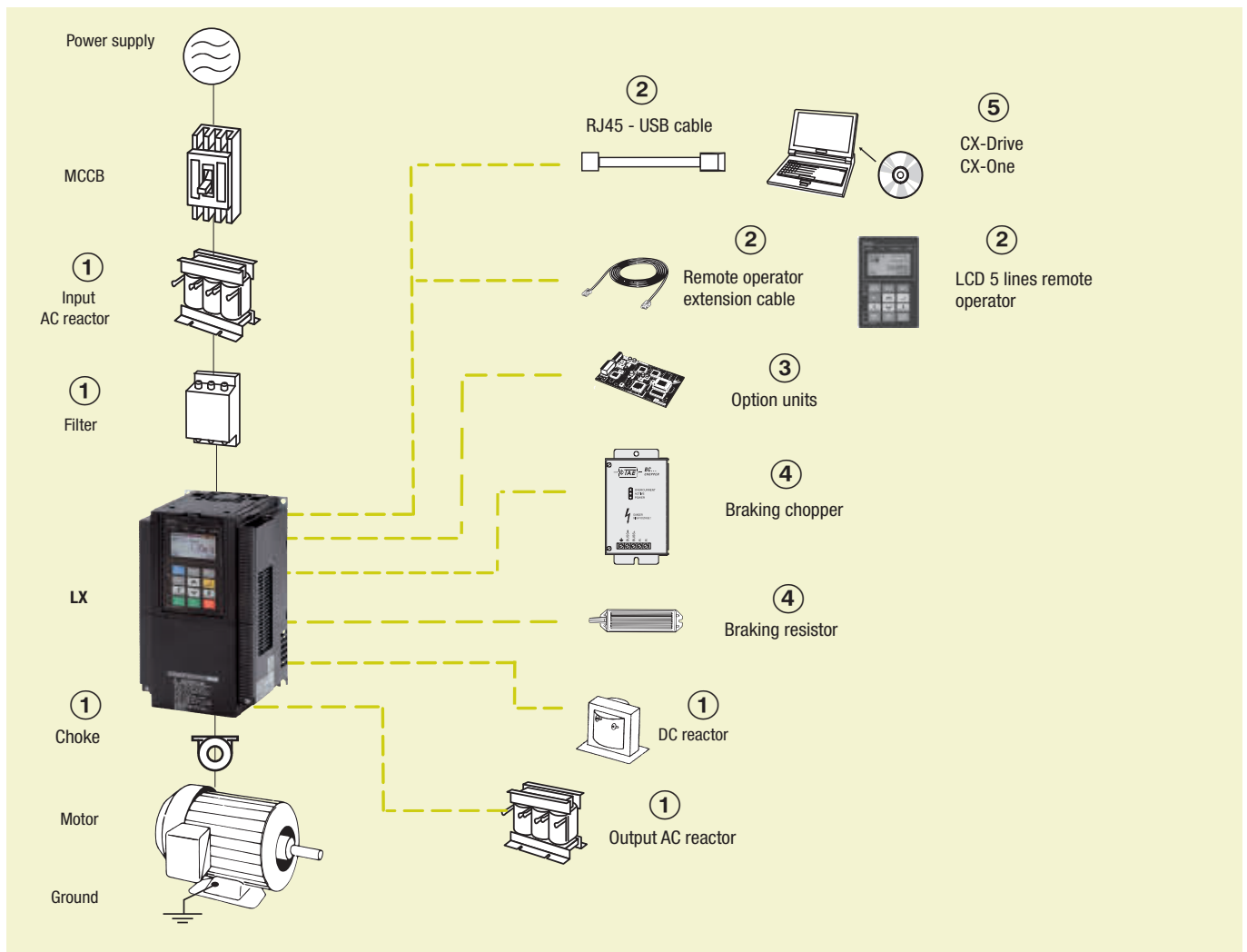
Voltage class	Inverter model	Dimensions in mm				Weight (kg)	
		H	W	D			
Three-phase 200 V	3G3RX-A2004	255	150	140	3.5		
	3G3RX-A2007						
	3G3RX-A2015						
	3G3RX-A2022						
	3G3RX-A2037						
	3G3RX-A2055	260	210	170	6		
	3G3RX-A2075						
	3G3RX-A2110						
	3G3RX-A2150	390	250	190	14		
	3G3RX-A2185						
	3G3RX-A2220						
	3G3RX-A2300	540	310	195	20		
	3G3RX-A2370	550	390	250	30		
	3G3RX-A2450						
3G3RX-A2550	700	480	250	43			
Three-phase 400 V	3G3RX-A4004	255	150	140	3.5		
	3G3RX-A4007						
	3G3RX-A4015						
	3G3RX-A4022						
	3G3RX-A4040						
	3G3RX-A4055	260	210	170	6		
	3G3RX-A4075						
	3G3RX-A4110						
	3G3RX-A4150	390	250	190	14		
	3G3RX-A4185						
	3G3RX-A4220						
	3G3RX-A4300	540	310	195	22		
	3G3RX-A4370	550	390	250	30		
	3G3RX-A4450						
	3G3RX-A4550						
	3G3RX-B4750	700	390	270	60		
	3G3RX-B4900						
	3G3RX-B411K	740	480	270	80		
	3G3RX-B413K						



Born to drive lifts

- Current vector control with or without PG
- High starting torque (200%/0.3 Hz Sensorless vector, 200%/0 Hz close loop vector control)
- IM&PM motor control
- Rescue function with flexible power supply (Control 220 VAC, Power from 48 VDC or 36 VAC)
- Static & Rotary advanced auto tuning
- Safety embedded: IEC 61508 SIL2
- One parameter Dynamic tuning
- Lift language (Hz, m/s, rpm ...)
- Built-in logic programmability
- Universal dual encoder option (Endat, Hiperface, Line driver)
- Floor position auto-learning function of up to 40 floors
- Dedicated lift functionality (Brake control, Lift sequence ...)

Ordering information



3G3LX

Specifications			Order code
Voltage class	Max motor kW	Rated current A	
Three-phase 400 V	3.7	9	3G3LX-A4037-E
	4.0	11	3G3LX-A4040-E
	5.5	14	3G3LX-A4055-E
	7.5	19	3G3LX-A4075-E
	11	27	3G3LX-A4110-E
	15	34	3G3LX-A4150-E
	18.5	41	3G3LX-A4185-E

① Line filters

400 V				
Model 3G3LX_	Leakage Nom / Max	Rated current A	Weight kg	Order code
A4037	3.3/53 mA	10	1.0	AX-FIL3010-SE
A4040 / A4055	3.3/53 mA	15	1.5	AX-FIL3015-SE
A4075 / A4110	3.4/58 mA	30	2.1	AX-FIL3030-SE
A4150 / A4185	3.4/58 mA	53	4.1	AX-FIL3053-SE

① Input AC Reactors

3-Phase 400 VAC	
Inverter Model 3G3LX_	Order code
A4037	AX-RAI03500100-DE
A4040 / A4055 / A4075	AX-RAI01300170-DE
A4110 / A4150	AX-RAI00740335-DE
A4185	AX-RAI00360500-DE

① Input AC Reactors for EN12015

3-Phase 400 VAC	
Inverter Model 3G3LX_	Order code
A4037	AX-LX-RAI4037-CE
A4040	AX-LX-RAI4040-CE
A4055	AX-LX-RAI4055-CE
A4075	AX-LX-RAI4075-CE
A4110	AX-LX-RAI4110-CE
A4150	AX-LX-RAI4150-CE
A4185	AX-LX-RAI4185-CE

② Accessories

Types	Description	Functions	Order code
Digital operator	LCD remote operator	5 Line LCD remote operator with copy function, cable length max. 3 m. *1	AX-OP05-E
	Remote operator cable	3 meters cable for connecting remote operator	3G3AX-CAJOP300-EE
	LED remote operator	LED remote operator, cable length max. 3 m	3G3AX-OP01
	Mounting kit for LED operator	Mounting kit for LED operator on panel	4X-KITMINI
Accessories	USB converter/USB cable	RJ45 to USB connection cable	3G3AX-PCACN2 USB-convertercable

*1 please note, models with firmware 4287 and 4288, the operator will only display 2 lines of text.

③ Option boards

Types	Description	Functions	Order code
Encoder feedback	PG speed controller option card	Phase A, B and Z pulse (differential pulse) inputs (RS-422) Pulse train position command input (RS-422) Pulse monitor output (RS-422) PG frequency range: 100 kHz max	3G3AX-PG
		Two encoder input board supporting Phase A, B and Z pulse (differential pulse) inputs (RS-422) EnDat 2.1 and 2.2 Hiperface 3G3AX-ABS --> PG frequency range: 100 kHz max 3G3AX-ABS30 --> PG frequency range: 30 KHz max to improve noise immunity	3G3AX-ABS 3G3AX-ABS30
		Option	Expansion I/O board

④ Braking unit, braking resistor unit

Inverter				Braking resistor unit				
Voltage	Max. motor kW	Inverter 3G3LX_ 3-phase	Braking Unit AX-BCR_	Connectable min. resistance Ω	Connectable resistance at continuous running Ω	External resistor 10%ED 10 sec max for built-in 5 sec max for Braking Unit		Braking torque %
						Order code	Resist Ω	
400 V (Three-phase)	3.7	4037	Built-in	70	200	AX-REM02K1110-IE	110	55
	4.0	4040		70	200	AX-REM02K1110-IE	110	50
	5.5	4055		70	200	AX-REM02K1110-IE	110	40
	7.5	4075		35	150	AX-REM03K5085-IE	85	45
	11.0	4110		35	150	AX-REM03K5085-IE	85	30
	15.0	4150		24	100	AX-REM19K0032-IE	32	65
	18.5	4185		24	100	AX-REM19K0032-IE	32	55

Recommended values with a 2:1 roping ratio, 1 m/s lift speed and medium lift usage

⑤ Computer software

Description	Installation	Order code
Computer software	Configuration and monitoring software tool	CX-Drive
Computer software	Configuration and monitoring software tool	CX-One

Specifications

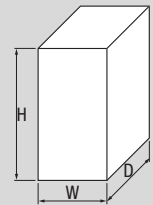
400V class

Three-phase: 3G3LX-__		A4037	A4040	A4055	A4075	A4110	A4150	A4185	
Motor kW*1		3.7	4.0	5.5	7.5	11.0	15.0	18.5	
Output characteristics	Inverter capacity kVA	400 V	5.7	5.9	9.7	13.1	17.3	22.1	26.3
		480 V	6.8	7.1	11.6	15.8	20.7	26.6	31.5
	Rated output current (A) (3min, 50%ED)		9	11	14	19	27	34	41
	Max. output voltage		Proportional to input voltage: 0..480 V						
Max. output frequency		400 Hz							
Power supply	Rated input voltage and frequency		Control supply: 1-phase 200..240 V 50/60 Hz Power supply: 3-phase 380..480 V 50/60 Hz Do not turn the inverter power on and off more often than once every 3 minutes						
	Allowable voltage fluctuation		-15% +10%						
	Allowable frequency fluctuation		5%						
Braking	Regenerative braking		Internal BRD circuit (external discharge resistor)						
	Minimum connectable resistance (Ohms)		70	70	70	35	35	24	24
	Duty at minimum resistance		10%						
Minimum resistance at continuous running (Ohms)		200	200	200	150	150	100	100	
Protective structure		IP20							
Cooling method		Forced air cooling							

*1 Based on a standard IM 3-Phase standard motor.

Dimensions

Voltage class	Inverter model	Dimensions in mm				Weight (kg)
		H	W	D		
Three-phase 400 V	3G3LX-A4037	255	150	140	3.5	
	3G3LX-A4040	260	210	170	6	
	3G3LX-A4055					
	3G3LX-A4075					
	3G3LX-A4110	390	250	190	14	
	3G3LX-A4150					
	3G3LX-A4185					



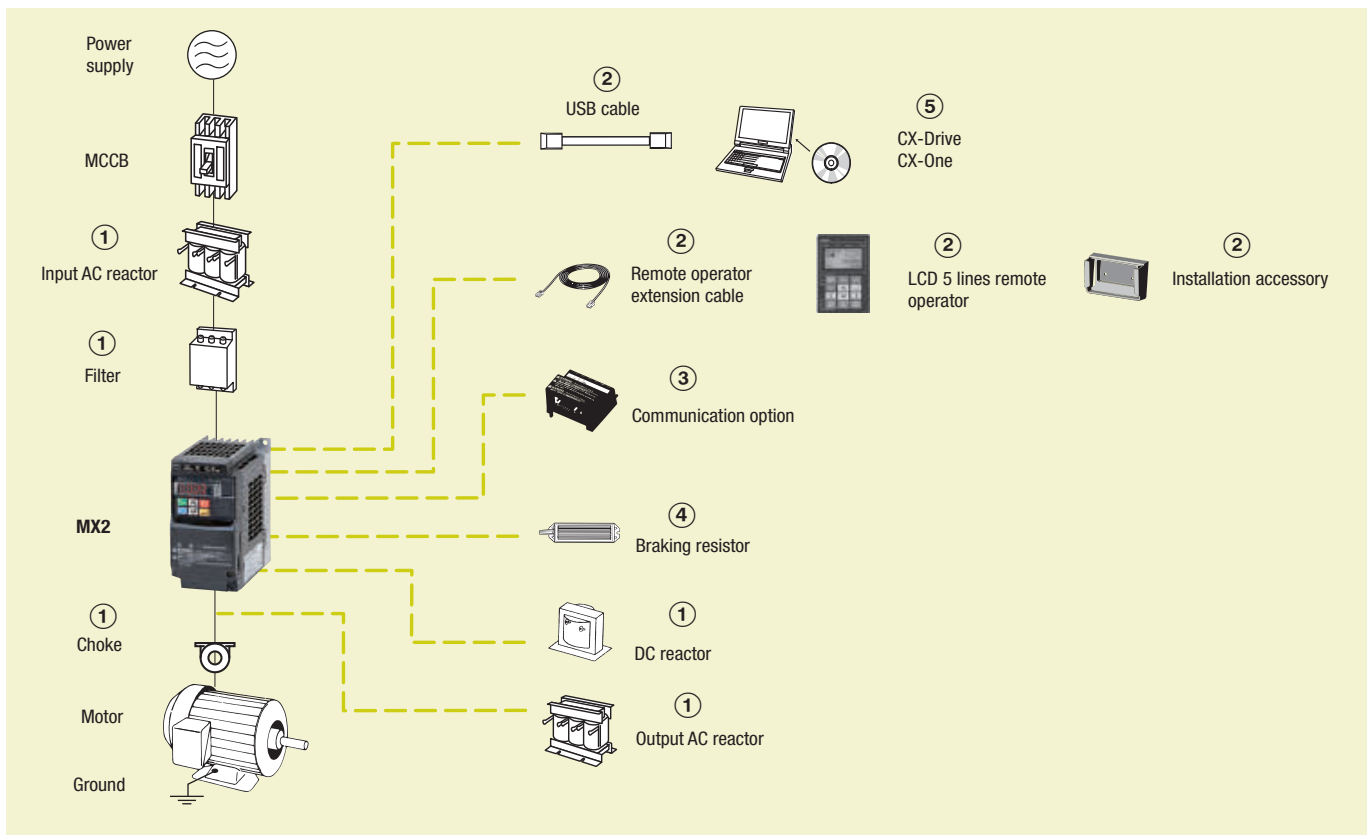


Born to drive machines

MX2 has been developed to harmonise advanced motor and machine control. Thanks to its advanced design algorithms the MX2 provides smooth control down to zero speed, plus precise operation for fast cyclic operations and torque control capability in open loop. The MX2 also gives you comprehensive functionality for machine control such as positioning, speed synchronisation and logic programming.

- Current vector control
- Double rating VT 120%/1 min and CT 150%/1 min
- IM & PM motor control
- Torque control in open loop vector
- Positioning functionality
- Built-in application functionality (i.e. Brake control)
- Fieldbus comms: Modbus, DeviceNet, PROFIBUS, MECHATROLINK-II, EtherCAT, CompoNet

Ordering information



3G3MX2

Voltage class	Constant torque		Variable torque		Order code	
	Max motor kW	Rated current A	Max motor kW	Rated current A	IP20	IP54
Single-phase 200 V	0.1	1.0	0.2	1.2	3G3MX2-AB001-E	3G3MX2-DB001-E/EC
	0.2	1.6	0.4	1.9	3G3MX2-AB002-E	3G3MX2-DB002-E/EC
	0.4	3.0	0.55	3.5	3G3MX2-AB004-E	3G3MX2-DB004-E/EC
	0.75	5.0	1.1	6.0	3G3MX2-AB007-E	3G3MX2-DB007-EC
	1.5	8.0	2.2	9.6	3G3MX2-AB015-E	3G3MX2-DB015-EC
	2.2	11.0	3.0	12.0	3G3MX2-AB022-E	3G3MX2-DB022-EC
Three-phase 200 V	0.1	1.0	0.2	1.2	3G3MX2-A2001-E	3G3MX2-D2001-E/EC
	0.2	1.6	0.4	1.9	3G3MX2-A2002-E	3G3MX2-D2002-E/EC
	0.4	3.0	0.55	3.5	3G3MX2-A2004-E	3G3MX2-D2004-E/EC
	0.75	5.0	1.1	6.0	3G3MX2-A2007-E	3G3MX2-D2007-E/EC
	1.5	8.0	2.2	9.6	3G3MX2-A2015-E	3G3MX2-D2015-EC
	2.2	11.0	3.0	12.0	3G3MX2-A2022-E	3G3MX2-D2022-EC
	3.7	17.5	5.5	19.6	3G3MX2-A2037-E	3G3MX2-D2037-EC
	5.5	25.0	7.5	30.0	3G3MX2-A2055-E	3G3MX2-D2055-EC
	7.5	33.0	11	40.0	3G3MX2-A2075-E	3G3MX2-D2075-EC
	11	47.0	15	56.0	3G3MX2-A2110-E	3G3MX2-D2110-EC
15	60.0	18.5	69.0	3G3MX2-A2150-E	3G3MX2-D2150-EC	

Voltage class	Constant torque		Variable torque		Order code	
	Max motor kW	Rated current A	Max motor kW	Rated current A	IP20	IP54
Three-phase 400 V	0.4	1.8	0.75	2.1	3G3MX2-A4004-E	3G3MX2-D4004-EC
	0.75	3.4	1.5	4.1	3G3MX2-A4007-E	3G3MX2-D4007-EC
	1.5	4.8	2.2	5.4	3G3MX2-A4015-E	3G3MX2-D4015-EC
	2.2	5.5	3.0	6.9	3G3MX2-A4022-E	3G3MX2-D4022-EC
	3.0	7.2	4.0	8.8	3G3MX2-A4030-E	3G3MX2-D4030-EC
	4.0	9.2	5.5	11.1	3G3MX2-A4040-E	3G3MX2-D4040-EC
	5.5	14.8	7.5	17.5	3G3MX2-A4055-E	3G3MX2-D4055-EC
	7.5	18.0	11	23.0	3G3MX2-A4075-E	3G3MX2-D4075-EC
	11	24.0	15	31.0	3G3MX2-A4110-E	3G3MX2-D4110-EC
	15	31.0	18.5	38.0	3G3MX2-A4150-E	3G3MX2-D4150-EC

① Line filters

Inverter		Line filter Rasmi		Line filter Schaffner	
Voltage	Model 3G3MX2-__	Current (A)	Order code	Current (A)	Order code
1-Phase 200 VAC	AB001/AB002/ AB004	10	AX-FIM1010-RE	8	AX-FIM1010-SE-V1
	AB007	14	AX-FIM1014-RE	27	AX-FIM1024-SE-V1
	AB015/AB022	24	AX-FIM1024-RE	27	AX-FIM1024-SE-V1
	3-Phase 200 VAC	A2001/A2002/ A2004/A2007	10	AX-FIM2010-RE	7.8
3-Phase 200 VAC	A2015/A2022	20	AX-FIM2020-RE	16	AX-FIM2020-SE-V1
	A2037	30	AX-FIM2030-RE	25	AX-FIM2030-SE-V1
	A2055/A2075	60	AX-FIM2060-RE	50	AX-FIM2060-SE-V1
	A2110	80	AX-FIM2080-RE	75	AX-FIM2080-SE-V1
	A2150	100	AX-FIM2100-RE	100	AX-FIM2100-SE-V1
	3-Phase 400 VAC	A4004/A4007	5	AX-FIM3005-RE	6
3-Phase 400 VAC	A4015/A4022/ A4030	10	AX-FIM3010-RE	12	AX-FIM3010-SE-V1
	A4040	14	AX-FIM3014-RE	15	AX-FIM3014-SE-V1
	A4055/A4075	30	AX-FIM3030-RE	29	AX-FIM3030-SE-V1
	A4110/A4150	50	AX-FIM3050-RE	48	AX-FIM3050-SE-V1

① Input AC reactors

Inverter		AC Reactor
Voltage	Model 3G3MX2-__	Order code
3-Phase 200 VAC	A2002/A2004/A2007	AX-RAI02800080-DE
	A2015/A2022/A2037	AX-RAI00880200-DE
	A2055/A2075	AX-RAI00350335-DE
	A2110/A2150	AX-RAI00180670-DE
1-Phase 200 VAC	AB002/AB004	AX-RAI02000070-DE
	AB007	AX-RAI01700140-DE
	AB015	AX-RAI01200200-DE
	AB022	AX-RAI00630240-DE
3-Phase 400 VAC	A4004/A4007/A4015	AX-RAI07700050-DE
	A4022/A4030/A4040	AX-RAI03500100-DE
	A4055/A4075	AX-RAI01300170-DE
	A4110/A4150	AX-RAI00740335-DE

① DC reactors

200 V single-phase		200 V three-phase		400 V three-phase	
Inverter	Order code	Inverter	Order code	Inverter	Order code
3G3MX2-AB001	AX-RC10700032-DE	3G3MX2-A2001	AX-RC21400016-DE	3G3MX2-A4004	AX-RC43000020-DE
3G3MX2-AB002		3G3MX2-A2002		3G3MX2-A4007	AX-RC27000030-DE
3G3MX2-AB004	AX-RC06750061-DE	3G3MX2-A2004	AX-RC10700032-DE	3G3MX2-A4015	AX-RC14000047-DE
3G3MX2-AB007	AX-RC03510093-DE	3G3MX2-A2007	AX-RC06750061-DE	3G3MX2-A4022	AX-RC10100069-DE
3G3MX2-AB015	AX-RC02510138-DE	3G3MX2-A2015	AX-RC03510093-DE	3G3MX2-A4030	AX-RC08250093-DE
3G3MX2-AB022	AX-RC01600223-DE	3G3MX2-A2022	AX-RC02510138-DE	3G3MX2-A4040	AX-RC06400116-DE
-		3G3MX2-A2037	AX-RC01600223-DE	3G3MX2-A4055	AX-RC04410167-DE
		3G3MX2-A2055	AX-RC01110309-DE	3G3MX2-A4075	AX-RC03350219-DE
		3G3MX2-A2075	AX-RC00840437-DE	3G3MX2-A4011	AX-RC02330307-DE
		3G3MX2-A2011	AX-RC00590614-DE	3G3MX2-A4015	AX-RC01750430-DE
		3G3MX2-A2015	AX-RC00440859-DE	-	

① Chokes

Diameter	Description	Order code
21	For 2.2 KW motors or below	AX-FER2102-RE
25	For 15 KW motors or below	AX-FER2515-RE
50	For 45 KW motors or below	AX-FER5045-RE

① Output AC reactor

Inverter		AC Reactor	
Voltage	Model 3G3MX2-__	Order code	
200 VAC	A2001/A2002/A2004/AB001/AB002/ AB004	AX-RAO11500026-DE	
	A2007/AB007	AX-RAO07600042-DE	
	A2015/AB015	AX-RAO04100075-DE	
	A2022/AB022	AX-RAO03000105-DE	
	A2037	AX-RAO01830160-DE	
	A2055	AX-RAO01150220-DE	
	A2075	AX-RAO00950320-DE	
	A2110	AX-RAO00630430-DE	
	A2150	AX-RAO00490640-DE	
	400 VAC	A4004/A4007/A4015	AX-RAO16300038-DE
		A4022	AX-RAO11800053-DE
A4030/A4040		AX-RAO07300080-DE	
A4055		AX-RAO04600110-DE	
A4075		AX-RAO03600160-DE	
A4110		AX-RAO02500220-DE	
A4150	AX-RAO02000320-DE		

② Accessories

Types	Description	Functions	Order code
Digital operator	LCD remote operator	5 Line LCD remote operator with copy function, cable length max. 3m.	AX-OP05-E
	Remote operator cable	3 meters cable for connecting remote operator	3G3AX-CAJOP300-EE
	LED remote operator	LED remote operator, cable length max. 3m	3G3AX-OP01
	Mounting kit for LED operator	Mounting kit for LED operator on panel	4X-KITMINI
	Operator holder	Holder to put the AX-OP05-E inside of the cabinet	3G3AX-OP05-H-E
Accessories	PC configuration cable	Mini USB to USB connector cable	AX-CUSBM002-E

③ Communication option boards

Description	Functions	Order code
Profibus option card	Used for running or stopping the inverter, setting or referencing parameters, and monitoring output frequency, output current, or similar items through communications with the host controller.	3G3AX-MX2-PRT
DeviceNet option card		3G3AX-MX2-DRT
Ethercat option card		3G3AX-MX2-ECT
CompoNet option card		3G3AX-MX2-CRT
Mechatrolink II option card		3G3AX-MX2-MRT
Ethernet IP option board		3G3AX-MX2-EIP
Extra input/output option board	1 analog voltage input, 1 analog current input, 1 analog voltage output, 8 discrete logic inputs, 4 discrete logic outputs	3G3AX-MX2-EI015-E

④ Braking unit, braking resistor unit

Inverter				Braking resistor unit						
Voltage	Max. motor kW	Inverter 3G3MX2_		Connectable min. resistance Ω	Inverter mounted type (3 %ED, 10 sec max)		Braking torque %	Inverter mounted type (10%ED, 10 sec max)		Braking torque %
		3-phase	1-phase		Order code	Resist Ω		Order code	Resist Ω	
200 V (Single-/Three-phase)	0.12	2001	B001	100	AX-REM00K1400-IE	400	200	AX-REM00K1400-IE	400	200
	0.25	2002	B002			180		180		180
	0.55	2004	B004			200	180	AX-REM00K1200-IE	200	180
	1.1	2007	B007	50		100	100	AX-REM00K2070-IE	70	200
	1.5	2015	B015		AX-REM00K2070-IE	70	140	AX-REM00K4075-IE	75	130
	2.2	2022	B022	35		90	90	AX-REM00K4035-IE	35	180
	4.0	2040	-		AX-REM00K4075-IE	75	50	AX-REM00K6035-IE	35	100
	5.5	2055	-	20	AX-REM00K4035-IE	35	75	AX-REM00K9020-IE	20	150
	7.5	2075	-		17	55	55	AX-REM01K9017-IE	17	110
	11	2110	-	10	AX-REM00K6035-IE	35	40	AX-REM02K1017-IE	17	75
15	2150	-	AX-REM00K9017-IE		17	55	AX-REM03K5010-IE	10	95	
400 V (Three-phase)	0.55	4004	-	180	AX-REM00K1400-IE	400	200	AX-REM00K1400-IE	400	200
	1.1	4007	-			200		200		200
	1.5	4015	-			190	190	AX-REM00K2200-IE	200	190
	2.2	4022	-	100	AX-REM00K2200-IE	200	130	AX-REM00K5120-IE	120	200
	3.0	4030	-		AX-REM00K2120-IE	120	160			160
	4.0	4040	-			120	120	AX-REM00K6100-IE	100	140
	5.5	4055	-	70	AX-REM00K4075-IE	75	140	AX-REM00K9070-IE	70	150
	7.5	4075	-			100	100	AX-REM01K9070-IE	70	110
	11	4110	-		AX-REM00K6100-IE	100	50	AX-REM02K1070-IE	70	75
	15	4150	-	35	AX-REM00K9070-IE	70	55	AX-REM03K5035-IE	35	110

⑤ Computer software

Description	Installation	Order code
Computer software	Configuration and monitoring software tool	CX-Drive
Computer software	Configuration and monitoring software tool	CX-One
Computer software	Software tool for Energy Saving calculation	€Saver

Specifications

200 V class

Single-phase: 3G3MX02- _		B001	B002	B004	B007* ¹	B015	B022	–	–	–	–	–	
Three-phase: 3G3MX2- _		2001	2002	2004	2007	2015	2022	2037	2055	2075	2110	2150	
Motor kW ^{*2}	For VT setting	0.2	0.4	0.55	1.1	2.2	3.0	5.5	7.5	11	15	18.5	
	For CT setting	0.1	0.2	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	
Output characteristics	Inverter capacity kVA	200 VT	0.4	0.6	1.2	2.0	3.3	4.1	6.7	10.3	13.8	19.3	23.9
		200 CT	0.2	0.5	1.0	1.7	2.7	3.8	6.0	8.6	11.4	16.2	20.7
		240 VT	0.4	0.7	1.4	2.4	3.9	4.9	8.1	12.4	16.6	23.2	28.6
		240 CT	0.3	0.6	1.2	2.0	3.3	4.5	7.2	10.3	13.7	19.5	24.9
	Rated output current (A) at VT		1.2	1.9	3.5	6.0	9.6	12.0	19.6	30.0	40.0	56.0	69.0
	Rated output current (A) at CT		1.0	1.6	3.0	5.0	8.0	11.0	17.5	25.0	33.0	47.0	60.0
	Max. output voltage		Proportional to input voltage: 0 ... 240 V										
Max. output frequency		400 Hz											
Power supply	Rated input voltage and frequency		Single-phase 200..240 V 50/60 Hz 3-phase 200..240 V 50/60 Hz										
	Allowable voltage fluctuation		–15% ... +10%										
	Allowable frequency fluctuation		5%										
Braking torque	At short-time deceleration		100%: <50Hz			70%: <50Hz		Approx 20%		–			
	At capacitor feedback		50%: <60Hz			50%: <60Hz							
Cooling method		Self cooling* ³				Forced-air-cooling							

*¹ Three phase model use forced-air-cooling but single phase model is self cooling.

*² Based on a standard 3-Phase standard motor.

*³ Forced air cooling for IP54 models

400 V class

Three-phase: 3G3MX2- _		4004	4007	4015	4022	4030	4040	4055	4075	4110	4150	
Motor kW ^{*1}	For VT setting	0.75	1.5	2.2	3.0	4.0	5.5	7.5	11	15	18.5	
	For CT setting	0.4	0.75	1.5	2.2	3.0	4.0	5.5	7.5	11	15	
Output characteristics	Inverter capacity kVA	380 VT	1.3	2.6	3.5	4.5	5.7	7.3	11.5	15.1	20.4	25.0
		380 CT	1.1	2.2	3.1	3.6	4.7	6.0	9.7	11.8	15.7	20.4
		480 VT	1.7	3.4	4.4	5.7	7.3	9.2	14.5	19.1	25.7	31.5
		480 CT	1.4	2.8	3.9	4.5	5.9	7.6	12.3	14.9	19.9	25.7
	Rated output current (A) at VT		2.1	4.1	5.4	6.9	8.8	11.1	17.5	23.0	31.0	38.0
	Rated output current (A) at CT		1.8	3.4	4.8	5.5	7.2	9.2	14.8	18.0	24.0	31.0
Max. output voltage		Proportional to input voltage: 0 ... 480 V										
Max. output frequency		400 Hz										
Power supply	Rated input voltage and frequency		3-phase 380 ... 480 V 50/60 Hz									
	Allowable voltage fluctuation		–15% ... +10%									
	Allowable frequency fluctuation		5%									
Braking torque	At short-time deceleration* ²		100%: <50Hz			70%: <50Hz		–				
	At capacitor feedback		50%: <60Hz			50%: <60Hz						
Cooling method		Self cooling* ²			Forced-air-cooling							

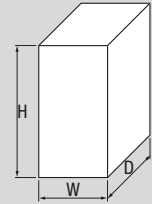
*¹ Based on a standard 3-Phase standard motor.

*² Forced air cooling for IP54 models

Dimensions

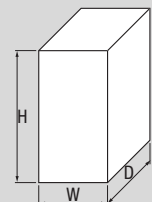
IP20

Voltage class	Inverter model	Dimensions in mm			Weight (kg)	
		H	W	D		
Single-phase 200 V	3G3MX2-AB001	128	68	109	1.0	
	3G3MX2-AB002				1.0	
	3G3MX2-AB004				1.1	
	3G3MX2-AB007	128	108	170.5	1.4	
	3G3MX2-AB015				1.8	
	3G3MX2-AB022				1.8	
Three-phase 200 V	3G3MX2-A2001	128	68	109	1.0	
	3G3MX2-A2002				1.0	
	3G3MX2-A2004			122.5	1.1	
	3G3MX2-A2007			145.5	1.2	
	3G3MX2-A2015	128	108	170.5	1.6	
	3G3MX2-A2022				1.8	
	3G3MX2-A2037	128	140	170.5	2.0	
	3G3MX2-A2055	260	140	155	3.0	
	3G3MX2-A2075				3.4	
	3G3MX2-A2110	296	180	175	5.1	
	3G3MX2-A2150	350	220	175	7.4	
	Three-phase 400 V	3G3MX2-A4004	128	108	143.5	1.5
		3G3MX2-A4007				1.6
		3G3MX2-A4015				1.8
3G3MX2-A4022					1.9	
3G3MX2-A4030					1.9	
3G3MX2-A4040		128	140	170.5	2.1	
3G3MX2-A4055		260		155	3.5	
3G3MX2-A4075					3.5	
3G3MX2-A4110		296	180	175	4.7	
3G3MX2-A4150					5.2	



IP54

Voltage class	Inverter model	Dimensions in mm			Weight (kg)
		H	W	D	
Single-phase 200 V	3G3MX2-DB001-E	464.74	179.5	292.7	8.0
	3G3MX2-DB001-EC	482.8	309.5	317.7	11.8
	3G3MX2-DB002-E	464.74	179.5	292.7	8.0
	3G3MX2-DB002-EC	482.8	309.5	317.7	11.8
	3G3MX2-DB004-E	464.74	179.5	292.7	8.4
	3G3MX2-DB004-EC	482.8	309.5	317.7	12.1
	3G3MX2-DB007-EC				12.4
	3G3MX2-DB015-EC				16.0
	3G3MX2-DB022-EC				16.0
	Three-phase 200 V	3G3MX2-D2001-E	464.74	179.5	292.7
3G3MX2-D2001-EC		482.8	309.5	317.7	11.8
3G3MX2-D2002-E		464.74	179.5	292.7	8.0
3G3MX2-D2002-EC		482.8	309.5	317.7	11.8
3G3MX2-D2004-E		464.74	179.5	292.7	8.1
3G3MX2-D2004-EC		482.8	309.5	317.7	11.9
3G3MX2-D2007-E		464.74	179.5	292.7	8.2
3G3MX2-D2007-EC		482.8	309.5	317.7	12.0
3G3MX2-D2015-EC					15.4
3G3MX2-D2022-EC					15.6
3G3MX2-D2037-EC					16.2
3G3MX2-D2055-EC		627.04	325	299.5	18.8
3G3MX2-D2075-EC					19.2
3G3MX2-D2110-EC		710.35	379	329.7	25.3
3G3MX2-D2150-EC					28.0
Three-phase 400 V	3G3MX2-D4004-EC	482.8	309.5	317.7	12.0
	3G3MX2-D4007-EC				12.5
	3G3MX2-D4015-EC				12.4
	3G3MX2-D4022-EC				12.5
	3G3MX2-D4030-EC				12.5
	3G3MX2-D4040-EC			13.1	
	3G3MX2-D4055-EC	627.04	325	299.5	18.7
	3G3MX2-D4075-EC				18.7
	3G3MX2-D4110-EC	710.35	379	329.7	23.8
	3G3MX2-D4150-EC				24.3



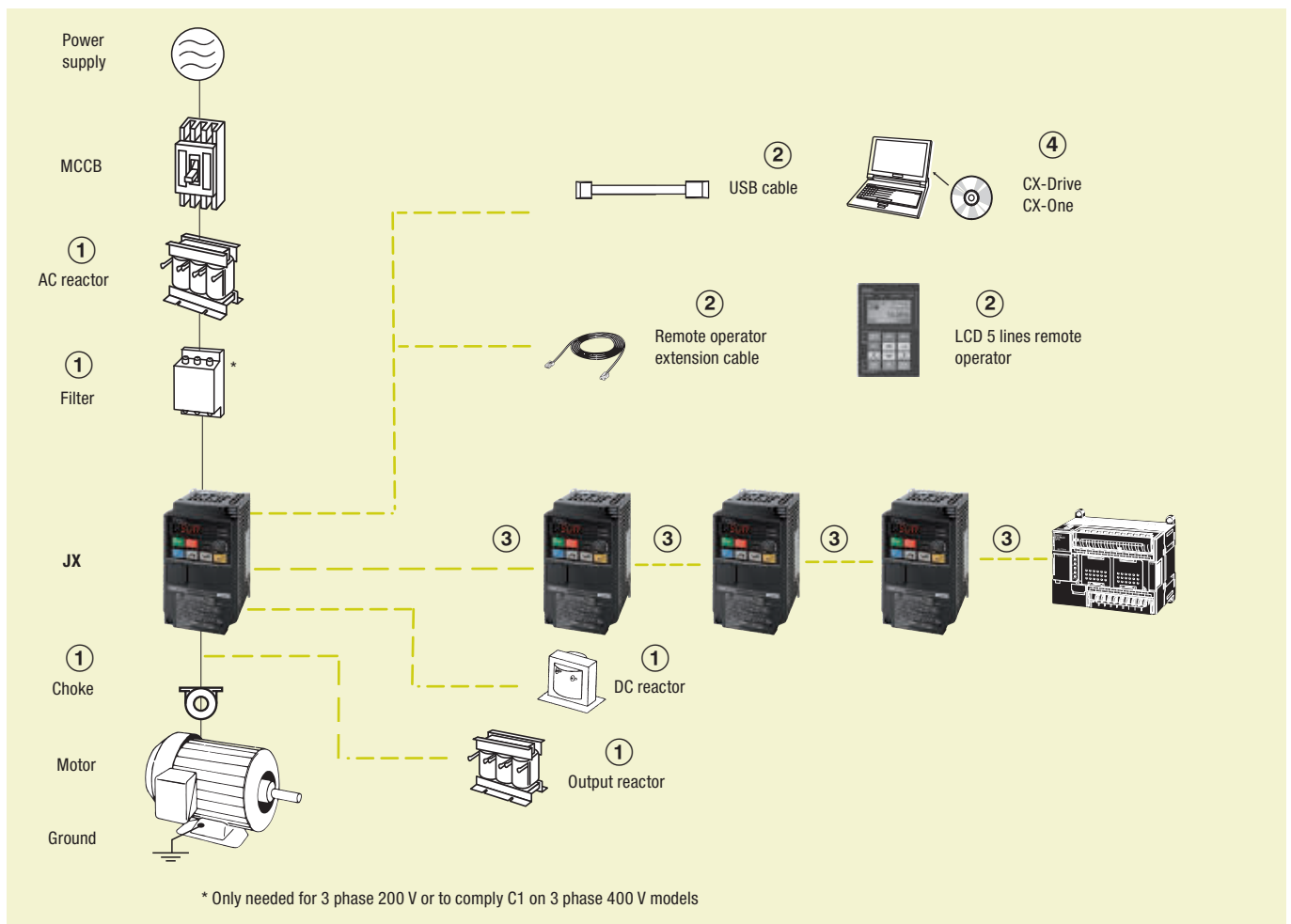


Compact and complete

With the RFI filter built-in, and the communications integrated as standard, the JX provides a compact and complete solution to a whole range of simple applications, such as conveyor control. The RS485 Modbus is built into the RJ45 port of the inverter front, making it very easy to add inverters into the network without any extra option boards. Therefore, saving costs and space.

- V/f controlled inverter
- Side by side mounting
- EMC filter built-in
- RS485 Modbus built-in
- Overload detection function (150% during 60 s)
- PID
- Micro-surge voltage suppression
- Automatic energy saving

Ordering information



3G3JX

Specifications			Order code
Voltage class	Max. applicable motor output kW	Rated output current (A)	Standard
Single-phase 200 V	0.2	1.4	3G3JX-AB002-EF
	0.4	2.6	3G3JX-AB004-EF
	0.75	4	3G3JX-AB007-EF
	1.5	7.1	3G3JX-AB015-EF
	2.2	10	3G3JX-AB022-EF
Three-phase 200 V	0.2	1.4	3G3JX-A2002-E
	0.4	2.6	3G3JX-A2004-E
	0.75	4	3G3JX-A2007-E
	1.5	7.1	3G3JX-A2015-E
	2.2	10	3G3JX-A2022-E
	3.7	15.9	3G3JX-A2037-E
	5.5	24	3G3JX-A2055-E
Three-phase 400 V	0.4	1.5	3G3JX-A4004-EF
	0.75	2.5	3G3JX-A4007-EF
	1.5	3.8	3G3JX-A4015-EF
	2.2	5.5	3G3JX-A4022-EF
	4.0	8.6	3G3JX-A4040-EF
	5.5	13	3G3JXA4055-EF
	7.5	16	3G3JXA4075-EF

① Line filters

Inverter		Line filter Rasmi		
Voltage	Model 3G3JX-__	Rated current (A)	Weight (kg)	Order code
1-Phase 200 VAC	AB002 / AB004	6	0.5	AX-FIJ1006-RE
	AB007	10	0.6	AX-FIJ1010-RE
	AB015 / AB022	26	0.8	AX-FIJ1026-RE
3-Phase 200 VAC	A2002 / A2004 / A2007	6	1.0	AX-FIJ2006-RE
	A2015 / A2022 / A2037	20	1.3	AX-FIJ2020-RE
	A2055 / A2075	40	2.3	AX-FIJ2040-RE
3-Phase 400 VAC	A4004 / A4007 / A4015	5	0.9	AX-FIJ3005-RE
	A4022 / A4040	11	1.1	AX-FIJ3011-RE
	A4055 / A4075	20	1.7	AX-FIJ3020-RE

① Input AC Reactors

Inverter		AC Reactor
Voltage	Model 3G3JX-__	Order code
3-Phase 200 VAC	A2002 / A2004 / A2007	AX-RAI02800080-DE
	A2015 / A2022 / A2037	AX-RAI00880175-DE
	A2055 / A2075	AX-RAI00350335-DE
1-Phase 200 VAC	AB002 / AB004	Under development
	AB007	
	AB015 / AB022	
3-Phase 400 VAC	A4004 / A4007 / A4015	AX-RAI07700042-DE
	A4022 / A4040	AX-RAI03500090-DE
	A4055 / A4075	AX-RAI01300170-DE

① DC Reactors

200 V single-phase		200 V three-phase		400 V three-phase	
Inverter	Order code	Inverter	Order code	Inverter	Order code
3G3JX-AB002	AX-RC10700032-DE	3G3JX-A2002	AX-RC21400016-DE	-	
3G3JX-AB004	AX-RC06750061-DE	3G3JX-A2004	AX-RC10700032-DE	3G3JX-A4004	AX-RC43000020-DE
3G3JX-AB007	AX-RC03510093-DE	3G3JX-A2007	AX-RC06750061-DE	3G3JX-A4007	AX-RC27000030-DE
3G3JX-AB015	AX-RC02510138-DE	3G3JX-A2015	AX-RC03510093-DE	3G3JX-A4015	AX-RC14000047-DE
3G3JX-AB022	AX-RC01600223-DE	3G3JX-A2022	AX-RC02510138-DE	3G3JX-A4022	AX-RC10100069-DE
-		3G3JX-A2037	AX-RC01600223-DE	3G3JX-A4040	AX-RC06400116-DE
		3G3JX-A2055	AX-RC01110309-DE	3G3JX-A4055	AX-RC04410167-DE
		3G3JX-A2075	AX-RC00840437-DE	3G3JX-A4075	AX-RC03350219-DE

① Chokes

Diameter	Description	Order code
21	For 2.2 KW motors or below	AX-FER2102-RE
25	For 7.5 KW motors or below	AX-FER2515-RE

① Output AC Reactors

Inverter	Model 3G3JX-□	AC Reactor
Voltage		Order code
200 VAC	A2001 / A2002 / A2004 AB001 / AB002 / AB004	AX-RA011500026-DE
	A2007/AB007	AX-RA007600042-DE
	A2015 / AB015	AX-RA004100075-DE
	A2022 / AB022	AX-RA003000105-DE
	A2037	AX-RA001830160-DE
	A2055	AX-RA001150220-DE
	A2075	AX-RA000950320-DE
400 VAC	A4004 / A4007 / A4015	AX-RA016300038-DE
	A4022	AX-RA011800053-DE
	A4040	AX-RA007300080-DE
	A4055	AX-RA004600110-DE
	A4075	AX-RA003600160-DE

② Accessories

Types	Description	Functions	Order code
Digital operator	LCD remote operator	5 Line LCD remote operator with copy function, cable length max. 3 m. ^{*1}	AX-OP05-E
	Remote operator cable	3 meters cable for connecting remote operator	3G3AX-CAJOP300-EE
	LED remote operator	LED remote operator, cable length max. 3 m	3G3AX-OP01
Accessories	Mounting kit for LED operator	Mounting kit for LED operator on panel	4X-KITMINI
	USB converter / USB cable	RJ45 to USB connection cable	3G3AX-PCACN2 USB-convertercable
	RJ45 T-Branch cable	T cable for RS-422 connection	3G3AX-CTB020-EE
	RJ45 Terminator resistor	Terminator resistor for RS-422 connection	3G3AX-CTR150-EE

*1 Please note, for 3G3JX inverters models, the operator will only display 2 lines of text.

④ Computer software

Description	Installation	Order code
Computer software	Configuration and monitoring software tool	CX-Drive
Computer software	Configuration and monitoring software tool	CX-One
Computer software	Software tool for Energy Saving calculation	€Saver

Specifications

200 V class

Single-phase: 3G3JX_		AB002	AB004	AB007	AB015	AB022	-	-	-	
Three-phase: 3G3JX_		A2002	A2004	A2007	A2015	A2022	A2037	A2055	A2075	
Motor kW ^{*1}	Applicable motor capacity	0.2	0.4	0.75	1.5	2.2	3.7	5.5	7.5	
Output characteristics	Inverter capacity kVA	200 V	0.4	0.9	1.3	2.4	3.4	5.5	8.3	11.0
		240 V	0.5	1.0	1.6	2.9	4.1	6.6	9.9	13.3
	Rated output current (A)		1.4	2.6	4.0	7.1	10.0	15.9	24.0	32.0
	Max. output voltage		Proportional to input voltage: 0...240 V							
	Max. output frequency		400 Hz							
Power supply	Rated input voltage and frequency		Single-phase 200...240 V 50/60 Hz Three-phase 200...240 V 50/60 Hz							
	Rated input current (A) Three-phase 200 V		1.8	3.4	5.2	9.3	13.0	20.0	30.0	40.0
	Rated input current (A) Single-phase 200 V		3.1	5.8	9.0	16.0	22.5	-	-	-
	Allowable voltage fluctuation		-15%...+10%							
	Allowable frequency fluctuation		+5%							
Built-in filter		EMC filter (C1 single phase)								
Braking torque	At short-time deceleration	Approx. 50%			50% for 3-phase 20 to 40% for 1-phase	Approx 20% to 40%		Approx 20%		
	At capacitor feedback									
Cooling method		Self cooling			Forced-air-cooling					

*1 Based on a standard 3-Phase standard motor.

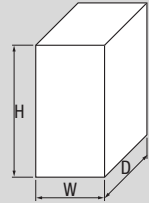
400 V class

Three-phase: 3G3JX_		A4004	A4007	A4015	A4022	A4040	A4055	A4075		
Motor kW ^{*1}	Applicable motor capacity	0.4	0.75	1.5	2.2	4.0	5.5	7.5		
Output characteristics	Inverter capacity kVA	380 V	0.9	1.6	2.5	3.6	5.6	8.5	10.5	
		480 V	1.2	2.0	3.1	4.5	7.1	10.8	13.3	
	Rated output current (A)		1.5	2.5	3.8	5.5	8.6	13.0	16.0	
	Max. output voltage		Proportional to input voltage: 0...480 V							
	Max. output frequency		400 Hz							
Power supply	Rated input voltage and frequency		3-phase 380...480 V 50/60 Hz							
	Rated input current (A)		2.0	3.3	5.0	7.0	11.0	16.5	20.0	
	Allowable voltage fluctuation		-15%...+10%							
	Allowable frequency fluctuation		+5%							
Built-in filter		EMC filter C2 class								
Braking torque	At short-time deceleration	Approx. 50%			Approx. 20% to 40%			Approx. 20%		
	At capacitor feedback									
Cooling method		Self cooling			Forced-air-cooling					

*1 Based on a standard 3-Phase standard motor.

Dimensions

Voltage class	Max. applicable motor output kW	Inverter model	Dimensions in mm			
			H	W	D	Weight (kg)
Single-phase 200 V	0.2	3G3JX-AB002	155	80	95.5	0.8
	0.4	3G3JX-AB004			109.5	0.9
	0.75	3G3JX-AB007	189	110	130.5	1.5
	1.5	3G3JX-AB015			157.5	2.3
	2.2	3G3JX-AB022			157.5	2.4
Three-phase 200 V	0.2	3G3JX-A2002	155	80	95.5	0.8
	0.4	3G3JX-A2004			109.5	0.9
	0.75	3G3JX-A2007	189	110	132.5	1.1
	1.5	3G3JX-A2015			157.5	2.2
	2.2	3G3JX-A2022			157.5	2.4
	3.7	3G3JX-A2037	250	180	167.5	4.2
	5.5	3G3JX-A2055				
	7.5	3G3JX-A2075				
Three-phase 400 V	0.4	3G3JX-A4004	189	110	130.5	1.5
	0.75	3G3JX-A4007			157.5	2.3
	1.5	3G3JX-A4015			157.5	2.4
	2.2	3G3JX-A4022	250	180	167.5	4.2
	4.0	3G3JX-A4040				
	5.5	3G3JX-A4055				
	7.5	3G3JX-A4075				

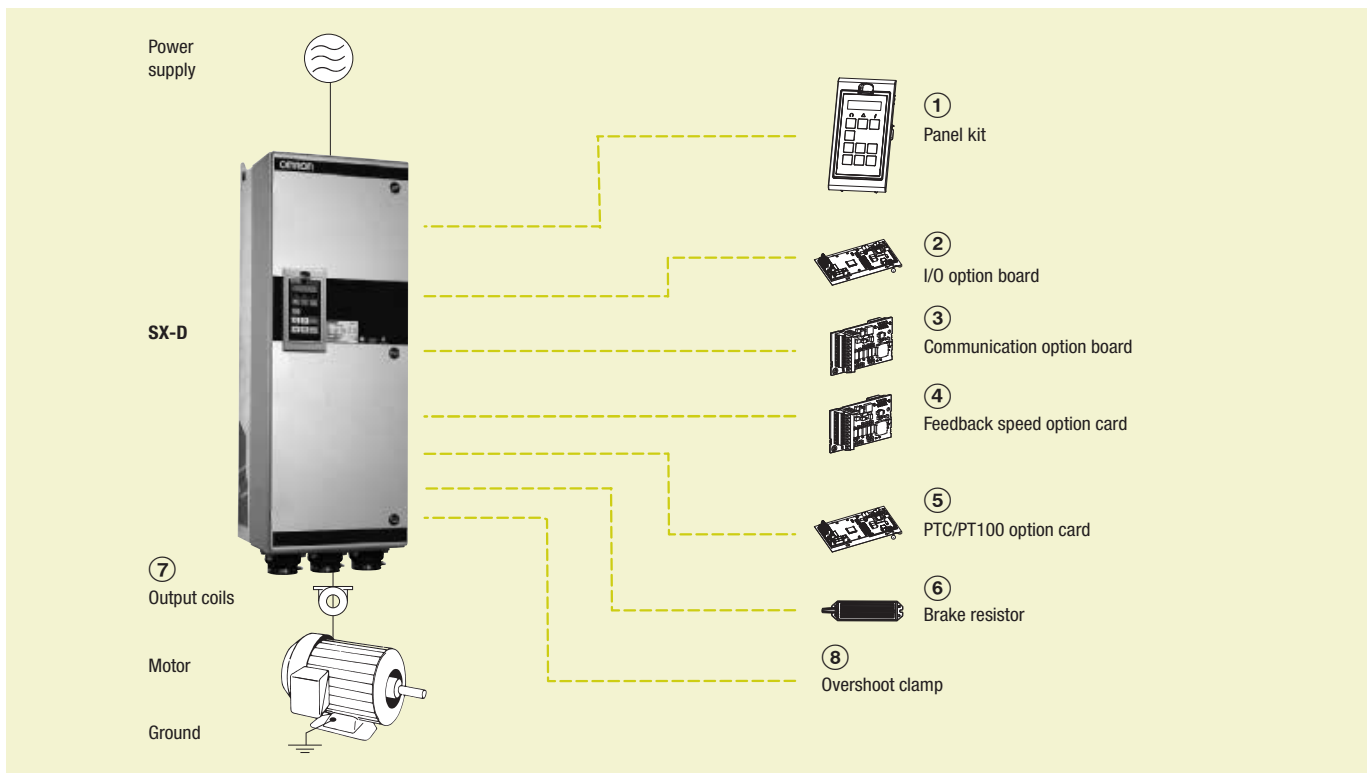




High performance vector control

- 400 V class three-phase 0.75 to 800 kW
- IP54 full range
- Compact design and robustness
- Built-in EMC filter for complete family and fuses from 200 kW
- Safety according EN13849-1 and EN62061 standards
- Logic programmability
- Communication options (EtherCAT, PROFINET, CAN, Modbus, DeviceNet, PROFIBUS, Modbus TCP)

Ordering information



SX

Specifications					Order code			
Voltage	Heavy duty		Normal duty		IP54 model		IP20 model	
					Direct torque control	V/F	Direct torque control	V/F
400 V	0.55 kW	2.0 A	0.75 kW	2.5 A	SX-D40P7-EF	SX-D40P7-EV	-	-
	1.1 kW	3.2 A	1.5 kW	4.0 A	SX-D41P5-EF	SX-D41P5-EV	-	-
	1.5 kW	4.8 A	2.2 kW	6.0 A	SX-D42P2-EF	SX-D42P2-EV	-	-
	2.2 kW	6.0 A	3 kW	7.5 A	SX-D43P0-EF	SX-D43P0-EV	-	-
	3 kW	7.6 A	4 kW	9.5 A	SX-D44P0-EF	SX-D44P0-EV	-	-
	4 kW	10.4 A	5.5 kW	13 A	SX-D45P5-EF	SX-D45P5-EV	-	-
	5.5 kW	14.4 A	7.5 kW	18 A	SX-D47P5-EF	SX-D47P5-EV	-	-
	7.5 kW	21 A	11 kW	26 A	SX-D4011-EF	SX-D4011-EV	-	-
	11 kW	25 A	15 kW	31 A	SX-D4015-EF	SX-D4015-EV	-	-
	15 kW	29.6 A	18.5 kW	37 A	SX-D4018-EF	SX-D4018-EV	-	-
	18.5 kW	37 A	22 kW	46 A	SX-D4022-EF	SX-D4022-EV	-	-
	22 kW	49 A	30 kW	61 A	SX-D4030-EF	SX-D4030-EV	-	-
	30 kW	59 A	37 kW	74 A	SX-D4037-EF	SX-D4037-EV	-	-
	37 kW	72 A	45 kW	90 A	SX-D4045-EF	SX-D4045-EV	-	-
	45 kW	87 A	55 kW	109 A	SX-D4055-EF	SX-D4055-EV	-	-
	55 kW	117 A	75 kW	146 A	SX-D4075-EF	SX-D4075-EV	-	-
	75 kW	140 A	90 kW	175 A	SX-D4090-EF	SX-D4090-EV	-	-
	90 kW	168 A	110 kW	210 A	SX-D4110-EF	SX-D4110-EV	-	-
	110 kW	200 A	132 kW	250 A	SX-D4132-EF	SX-D4132-EV	-	-
	132 kW	240 A	160 kW	300 A	SX-D4160-E1F	SX-D4160-E1V	SX-A4160-EF	SX-A4160-EV
	160 kW	300 A	200 kW	375 A	SX-D4200-E1F	SX-D4200-E1V	SX-A4200-EF	SX-A4200-EV
	200 kW	344 A	220 kW	430 A	SX-D4220-E1F	SX-D4220-E1V	SX-A4220-EF	SX-A4220-EV
	220 kW	400 A	250 kW	500 A	SX-D4250-E1F	SX-D4250-E1V	SX-A4250-EF	SX-A4250-EV
	250 kW	480 A	315 kW	600 A	SX-D4315-E1F	SX-D4315-E1V	SX-A4315-EF	SX-A4315-EV
	315 kW	520 A	355 kW	650 A	SX-D4355-E1F	SX-D4355-E1V	SX-A4355-EF	SX-A4355-EV
	355 kW	600 A	400 kW	750 A	SX-D4400-E1F	SX-D4400-E1V	SX-A4400-EF	SX-A4400-EV
	400 kW	688 A	450 kW	860 A	SX-D4450-E1F	SX-D4450-E1V	SX-A4450-EF	SX-A4450-EV
	450 kW	800 A	500 kW	1,000 A	SX-D4500-E1F	SX-D4500-E1V	SX-A4500-EF	SX-A4500-EV
500 kW	960 A	630 kW	1,200 A	SX-D4630-E1F	SX-D4630-E1V	SX-A4630-EF	SX-A4630-EV	
630 kW	1,200 A	800 kW	1,500 A	SX-D4800-E1F	SX-D4800-E1V	SX-A4800-EF	SX-A4800-EV	

① Panel kit

Type	Description	Function	Order code
Panel kit	Panel kit	Complete panel kit including operator	SX-OP02-00-E
	Blank panel kit	Complete panel kit including a blank operator	SX-OP02-01-E
Operator	External control panel	External control panel (SX-D40P7 to SX-D47P5)	SX-OP02-71-E
	External blank panel	External blank panel (SX-D4011 to SX-D4022)	SX-OP02-81-E
	Handheld control panel	Complete handheld control panel	SX-OPHH-00-E
	Digital operator	Inverter digital operator	SX-OP01-00-E
	Blank operator	Blank operator	SX-OP01-11-E

② I/O option board

Description	Function	Order code
Additional I/O option	Provides 3 extra relay outputs and 3 additional digital inputs	01-3876-01
Crane option	Dedicated option board for crane application, including additional I/O and functions	01-3876-07

③ Communication option board

Description	Function	Order code
RS232/485	MODBUS RTU serial communication by RS232 or RS485 interface with galvanic isolation	01-3876-04
PROFIBUS-DP option card	Used for operating the inverter through PROFIBUS-DP communication with the host controller	01-3876-05
DeviceNet option card	Used for operating the inverter through DeviceNet communication with the host controller	01-3876-06
Modbus/TCP, Ethernet	Used for operating the inverter through Modbus/TCP communication with the host controller	01-3876-09
EtherCAT option card	Used for operating the inverter through EtherCAT communication with the host controller	01-3876-10
PROFINET option card	Used for operating the inverter through PROFINET communication with the host controller	Under development
CAN option card	Used for operating the inverter through CAN communication with the host controller	Under development

④ Encoder feedback option card

Description	Function	Order code
Encoder option	Used for connection of the actual motor speed via encoder. Up to 100 kHz with TTL and HTL incremental encoders with 5/24 V power supply	01-3876-03

⑤ PTC/PT100 option card

Description	Function	Order code
Thermal protection	Allows to connect a motor thermistor to the inverter	01-3876-08

⑥ Braking chopper and braking resistor

All inverter sizes could be fitted with an optional built-in brake chopper from factory but is not possible to install it later. The choice of the resistor depends on the application switch-on duration and duty-cycle. Following tables describes the activation level of the built-in braking chopper and the minimum resistor that could be used depending on the input voltage.

R for different input voltage (Ω)			Order code	R for different input voltage (Ω)			Order code
220–240 VAC	380–415 VAC	440–480 VAC		220–240 VAC	380–415 VAC	440–480 VAC	
43	43	50	SX-40P7	3.8	3.8	4.4	SX-4075
43	43	50	SX-41P5	3.8	3.8	4.4	SX-4090
43	43	50	SX-42P2	2.7	2.7	3.1	SX-4110
43	43	50	SX-43P0	2.7	2.7	3.1	SX-4132
43	43	50	SX-44P0	2 × 3.8	2 × 3.8	2 × 4.4	SX-4160
43	43	50	SX-45P5	2 × 3.8	2 × 3.8	2 × 4.4	SX-4200
43	43	50	SX-47P5	2 × 2.7	2 × 2.7	2 × 3.1	SX-4220
26	26	30	SX-4011	2 × 2.7	2 × 2.7	2 × 3.1	SX-4250
26	26	30	SX-4015	3 × 2.7	3 × 2.7	3 × 3.1	SX-4315
17	17	20	SX-4018	3 × 2.7	3 × 2.7	3 × 3.1	SX-4355
17	17	20	SX-4022	3 × 2.7	3 × 2.7	3 × 3.1	SX-4400
9.7	9.7	N/A	SX-4030	4 × 2.7	4 × 2.7	4 × 3.1	SX-4450
9.7	9.7	N/A	SX-4037	4 × 2.7	4 × 2.7	4 × 3.1	SX-4500
3.8	3.8	4.4	SX-4045	6 × 2.7	6 × 2.7	6 × 3.1	SX-4630
3.8	3.8	4.4	SX-4055	–	–	–	–

Supply voltage (VAC)	Built-in brake chopper trigger level (VDC)
220–240	380
380–415	660
440–480	780

⑦ Output coils

Output coils above SX-D4132-E should be order from factory as they should be installed inside of the cabinet

Voltage	Inverter model	Rated current	Inductance	Rated voltage	Max carrier	Max output frequency	Max temp	Order code	
400 V	SX-40P7-E	2.8 A	1.5 mH	800 V	10 KHz	200 Hz	40°C	473160 00	
	SX-41P5-E	4.4 A	1.0 mH					473161 00	
	SX-42P2-E	6.6 A	0.65 mH					473162 00	
	SX-43P0-E	11.0 A	0.4 mH					473163 00	
	SX-44P0-E								
	SX-45P5-E	14.3 A	0.3 mH					473164 00	
	SX-47P5-E	18.2 A	0.25 mH					473165 00	
	SX-4011-E	26.4 A	0.175 mH					6 KHz	473166 00
	SX-4015-E	32 A	0.15 mH						473167 00
	SX-4018-E	65 A	0.1 mH						473168 00
	SX-4022-E								
	SX-4030-E								
	SX-4037-E	90 A	0.1 mH		473169 00				
	SX-4045-E								
	SX-4055-E	146 A	0.05 mH		473170 00				
	SX-4075-E								
	SX-4090-E	175 A	0.05 mH		473171 00				
SX-4110-E	275 A	0.032 mH	1.5 KHz	100 Hz	473172 00				
SX-4132-E									

⑧ Overshoot clamp

Note: Only two types of overshoot clamps could be order for after mounting

Inverter	Function	Order code
SX-40P7 to SX-4132	Together with the output coils, the overshoot clamp restricts the voltage and the dV/dt on the motor winding. Inverters must be ordered including the option DC+/DC– connectors.	52163
SX-4160 to SX-4800	Together with the output coils, the overshoot clamp restricts the voltage and the dV/dt on the motor winding. Doesn't require the "DC+/DC–" option.	52220

Computer software

Installation	Order code
Configuration and monitoring software tool	CX-Drive
Configuration and monitoring software tool	CX-One
Software tool for energy saving calculation	ESaver

Specifications

Three-phase: SX- 4 ___ -E		0P7	1P5	2P2	3P0	4P0	5P5	7P5	011	015	018	022	030	037	045	055	
Motor kW ^{*1}	For HD setting	0.55	1.1	1.5	2.2	3	4	5.5	7.5	11	15	18.5	22	30	37	45	
	For ND setting	0.75	1.5	2.2	3	4	5.5	7.5	11	15	18.5	22	30	37	45	55	
Output characteristics	Max output current (A) _-EF	3.8	6.0	9.0	11.3	14.3	19.5	27.0	39.0	46.0	55.0	69.0	92.0	111	108	131	
	Max output current (A) _-EV	3.0	4.8	7.2	9.0	11.4	15.6	21.6	31.0	37.0	44.0	55.0	73.0	89.0	108	131	
	Rated output current (A) at HD	2.0	3.2	4.8	6.0	7.6	10.4	14.4	21.0	25.0	29.6	37.0	49.0	59.0	72.0	87.0	
	Rated output current (A) at ND	2.5	4.0	6.0	7.5	9.5	13.0	18.0	26.0	31.0	37.0	46.0	61.0	74.0	90.0	109	
	Output voltage	0 to Mains supply voltage															
	Max. output frequency	400 Hz															
Power supply	Rated input voltage and frequency	3-phase 230 to 480 V 50/60 Hz															
	Allowable voltage fluctuation	10% to -15% (-10% at 230V)															
	Allowable frequency fluctuation	45 to 65 Hz															

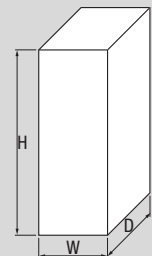
*1 Based on a standard 4-pole motor for maximum applicable motor output

Three-phase: SX- 4 ___ -E		075	090	110	132	160	200	220	250	315	355	400	450	500	630	800	
Motor kW ^{*1}	For HD setting	55	75	90	110	132	160	200	220	250	315	355	400	450	500	630	
	For ND setting	75	90	110	132	160	200	220	250	315	355	400	450	500	630	800	
Output characteristics	Max output current (A) _-EF	175	210	252	300	360	450	516	600	720	780	900	1,032	1,200	1,440	1,800	
	Max output current (A) _-EV	175	210	252	300	360	450	516	600	720	780	900	1,032	1,200	1,440	1,800	
	Rated output current (A) at HD	117	140	168	200	240	300	344	400	480	520	600	688	800	960	1,200	
	Rated output current (A) at ND	146	175	210	250	300	375	430	500	600	650	750	860	1,000	1,200	1,500	
	Output voltage	0 to Mains supply voltage															
	Max. output frequency	400 Hz															
Power supply	Rated input voltage and frequency	3-phase 230 to 480 V 50/60 Hz															
	Allowable voltage fluctuation	10% to -15% (-10% at 230V)															
	Allowable frequency fluctuation	45 to 65 Hz															

*1 Based on a standard 4-pole motor for maximum applicable motor output

Dimensions

Degree of protection	Drive model	H	W	D
IP20	SX-A4160 to SX-A4200	1,036	500	390
	SX-A4220 to SX-A4250	1,036	500	450
	SX-A4315 to SX-A4400	1,036	730	450
	SX-A4450 to SX-A4500	1,036	1,100	450
	SX-A4630 to SX-A4800	1,036	1,560	450
IP54	SX-D40P7 to SX-D47P5	416	202.6	200
	SX-D4011 to SX-D4022	512	178	292.1
	SX-D4030 to SX-D4037	590	220	295
	SX-D4045 to SX-D4090	950	284.5	314
	SX-D4110 to SX-D4132	950	344.5	314
	SX-D4160 to SX-D4250	2,250	600	600
	SX-D4315 to SX-D4400	2,250	900	600
	SX-D4450 to SX-D4500	2,250	1,200	600
	SX-D4630 to SX-D4800	2,250	1,800	600



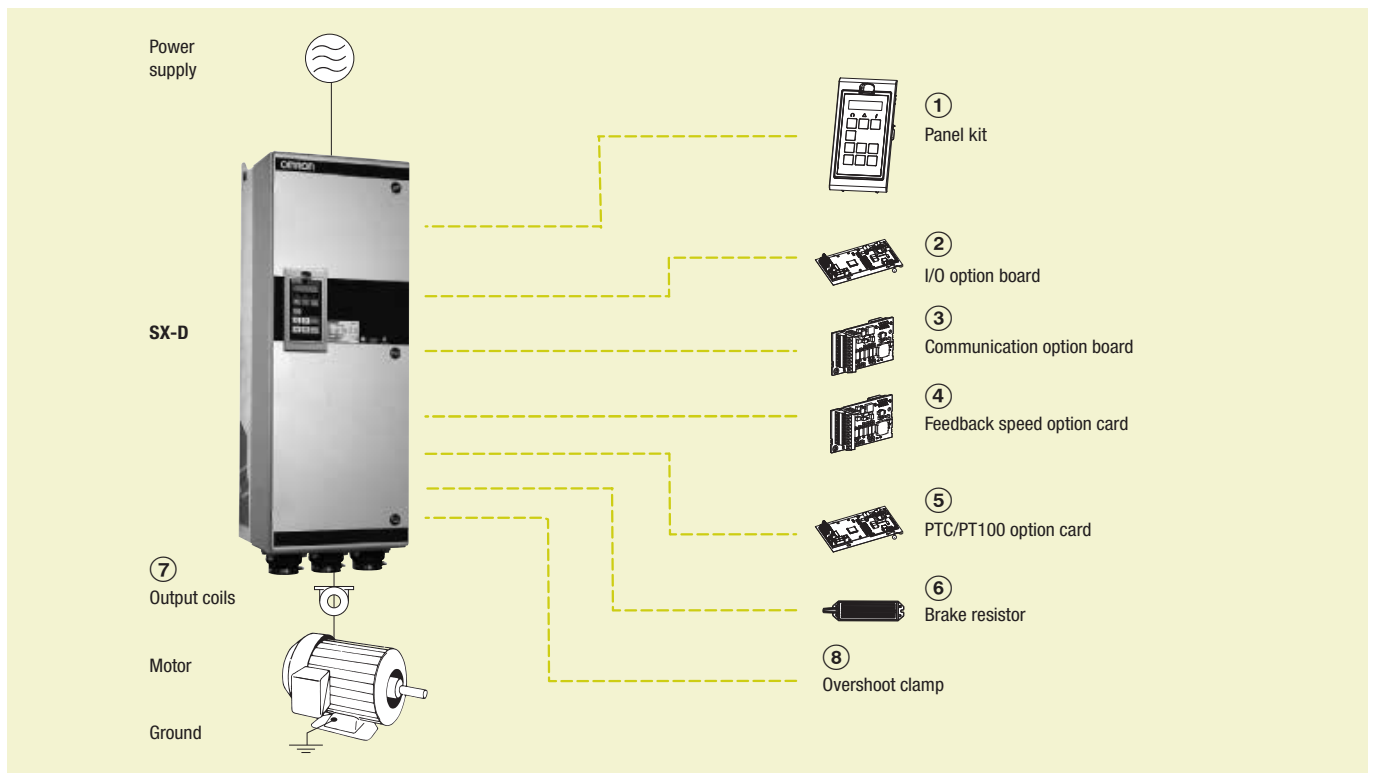


Force and flow in harmony

Designed to drive any high power application from 90 kW up to 1 MW, the new SX series of compact inverters features embedded application dedicated functionality plus logic programming and customizable LCD information to give you all the control flexibility required for applications ranging from high torque to smooth flow and pressure control.

- 500 V-690 V power supply from 90 kW up to 1 MW
- IP54 full range
- Compact design and robustness
- Built-in EMC filter for complete family and fuses from 200 kW
- Safety according EN13849-1 and EN62061 standards
- Logic programmability
- Hardware customization
- Communication options (EtherCAT, PROFINET, CAN, Modbus, DeviceNet, PROFIBUS, Modbus TCP)

Ordering information



SX

Specifications				Order code				
Voltage	Heavy duty		Normal duty		IP54 model		IP20 model	
					Direct torque control	V/F	Direct torque control	V/F
690 V	75 kW	72 A	90 kW	90 A	SX-D6090-EF	SX-D6090-EV	-	-
	90 kW	87 A	110 kW	109 A	SX-D6110-EF	SX-D6110-EV	-	-
	110 kW	117 A	132 kW	146 A	SX-D6132-EF	SX-D6132-EV	-	-
	132 kW	140 A	160 kW	175 A	SX-D6160-EF	SX-D6160-EV	-	-
	160 kW	168 A	200 kW	210 A	SX-D6200-E1F	SX-D6200-E1V	-	-
	200 kW	200 A	250 kW	250 A	SX-D6250-E1F	SX-D6250-E1V	SX-A6250-EF	SX-A6250-EV
	250 kW	240 A	315 kW	300 A	SX-D6315-E1F	SX-D6315-E1V	SX-A6315-EF	SX-A6315-EV
	315 kW	300 A	355 kW	375 A	SX-D6355-E1F	SX-D6355-E1V	SX-A6355-EF	SX-A6355-EV
	315 kW	344 A	450 kW	430 A	SX-D6450-E1F	SX-D6450-E1V	SX-A6450-EF	SX-A6450-EV
	355 kW	400 A	500 kW	500 A	SX-D6500-E1F	SX-D6500-E1V	SX-A6500-EF	SX-A6500-EV
	450 kW	480 A	600 kW	600 A	SX-D6600-E1F	SX-D6600-E1V	SX-A6600-EF	SX-A6600-EV
	500 kW	520 A	630 kW	650 A	SX-D6630-E1F	SX-D6630-E1V	SX-A6630-EF	SX-A6630-EV
	600 kW	600 A	710 kW	750 A	SX-D6710-E1F	SX-D6710-E1V	SX-A6710-EF	SX-A6710-EV
	650 kW	688 A	800 kW	860 A	SX-D6800-E1F	SX-D6800-E1V	SX-A6800-EF	SX-A6800-EV
	710 kW	720 A	900 kW	900 A	SX-D6900-E1F	SX-D6900-E1V	SX-A6900-EF	SX-A6900-EV
	800 kW	800 A	1,000 kW	1,000 A	SX-D61K0-E1F	SX-D61K0-E1V	SX-A61K0-EF	SX-A61K0-EV

① Panel kit

Type	Description	Function	Order code
Panel kit	Panel kit	Complete panel kit including operator	SX-OP02-00-E
	Blank panel kit	Complete panel kit including a blank operator	SX-OP02-01-E
Operator	Handheld control panel	Complete handheld control panel	SX-OPHH-00-E
	Digital operator	Inverter digital operator	SX-OP01-00-E
	Blank operator	Blank operator	SX-OP01-11-E

② I/O option board

Description	Function	Order code
Additional I/O option	Provides 3 extra relay outputs and 3 additional digital inputs	01-3876-01
Crane option	Dedicated option board for crane application, including additional I/O and functions	01-3876-07

③ Communication option board

Description	Function	Order code
RS232/485	MODBUS RTU serial communication by RS232 or RS485 interface with galvanic isolation	01-3876-04
PROFIBUS-DP option card	Used for operating the inverter through PROFIBUS-DP communication with the host controller	01-3876-05
DeviceNet option card	Used for operating the inverter through DeviceNet communication with the host controller	01-3876-06
Modbus/TCP, Ethernet	Used for operating the inverter through Modbus/TCP communication with the host controller	01-3876-09
EtherCAT option card	Used for operating the inverter through EtherCAT communication with the host controller	01-3876-10
PROFINET option card	Used for operating the inverter through PROFINET communication with the host controller	Under development
CAN option card	Used for operating the inverter through CAN communication with the host controller	Under development

④ Encoder feedback option card

Description	Function	Order code
Encoder option	Used for connection of the actual motor speed via encoder. Up to 100 kHz with TTL and HTL incremental encoders with 5/24 V power supply	01-3876-03

⑤ PTC/PT100 option card

Description	Function	Order code
Thermal protection	Allows to connect a motor thermistor to the inverter	01-3876-08

⑥ Braking chopper and braking resistor

All inverter sizes could be fitted with an optional built-in brake chopper from factory but is not possible to install it later. The choice of the resistor depends on the application switch-on duration and duty-cycle. Following tables describes the activation level of the built-in braking chopper and the minimum resistor that could be used depending on the input voltage.

Rmin for different input voltage (Ω)			Order code
500–525 VAC	550–600 VAC	660–690 VAC	
4.9	5.7	6.5	SX-D6090-EF
4.9	5.7	6.5	SX-D6110-EF
4.9	5.7	6.5	SX-D6132-EF
4.9	5.7	6.5	SX-D6160-EF
2 × 4.9	2 × 5.7	2 × 6.5	SX-D6200-EF
2 × 4.9	2 × 5.7	2 × 6.5	SX-D6250-EF
2 × 4.9	2 × 5.7	2 × 6.5	SX-D6315-EF
2 × 4.9	2 × 5.7	2 × 6.5	SX-D6355-EF
3 × 4.9	3 × 5.7	3 × 6.5	SX-D6450-EF
3 × 4.9	3 × 5.7	3 × 6.5	SX-D6500-EF
4 × 4.9	4 × 5.7	4 × 6.5	SX-D6600-EF
4 × 4.9	4 × 5.7	4 × 6.5	SX-D6630-EF
6 × 4.9	6 × 5.7	6 × 6.5	SX-D6710-EF
6 × 4.9	6 × 5.7	6 × 6.5	SX-D6800-EF
6 × 4.9	6 × 5.7	6 × 6.5	SX-D6900-EF
6 × 4.9	6 × 5.7	6 × 6.5	SX-D61K0-EF

Supply voltage (VAC)	Built-in brake chopper trigger level (VDC)
500–525	860
550–600	1,000
660–690	1,150

⑦ Output coils

Output coils above SX-D4132-E should be order from factory as they should be installed inside of the cabinet

Voltage	Inverter model	Rated current	Inductance	Rated voltage	Max carrier	Max output frequency	Max temp	Order code
690 V	SX-D6090-EF	90 A	0.1 mH	800 V	6 kHz	200 Hz	40°C	473169 00
	SX-D6110-EF	146 A	0.05 mH		6 kHz	200 Hz		473170 00
	SX-D6132-EF							
	SX-D6160-EF	175 A	0.05 mH		6 kHz	200 Hz		473171 00

⑧ Overshoot clamp

Note: Only two types of overshoot clamps could be order for after mounting

Inverter	Function	Order code
SX-6090 to SX-6160	Together with the output coils, the overshoot clamp restricts the voltage and the dV/dt on the motor winding. Inverters must be ordered including the option DC+/DC- connectors.	52163
SX-6200 to SX-61K0	Together with the output coils, the overshoot clamp restricts the voltage and the dV/dt on the motor winding. Doesn't require the "DC+/DC-" option.	52220

Computer software

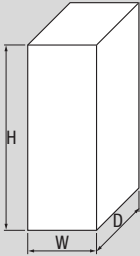
Installation	Order code
Configuration and monitoring software tool	CX-Drive
Configuration and monitoring software tool	CX-One
Software tool for energy saving calculation	€Saver

Specifications

Three-phase: SX- 6__-EF		90	110	132	160	200	250	315	355	450	500	600	630	710	800	900	1K0	
Motor kW ^{*1}	For HD setting	75	90	110	132	160	200	250	315	315	355	450	500	600	650	710	800	
	For ND setting	90	110	132	160	200	250	315	355	450	500	600	630	710	800	900	1,000	
Output characteristics	Max output current (A)	108	131	175	210	252	300	360	450	516	600	720	780	900	1,032	1,080	1,200	
	Rated output current (A) at HD	72	87	117	140	168	200	240	300	344	400	480	520	600	688	720	800	
	Rated output current (A) at ND	90	109	146	175	210	250	300	375	430	500	600	650	750	860	900	1,000	
	Output voltage	0 to Mains supply voltage																
	Max. output frequency	400 Hz																
Power supply	Rated input voltage and frequency	3-phase 500 to 690 V, 50/60 Hz																
	Allowable voltage fluctuation	10% to -15%																
	Allowable frequency fluctuation	45 to 65 Hz																

*1 Based on a standard 4-pole motor for maximum applicable motor output

Dimensions

Degree of protection	Drive model	H	W	D	
IP20	SX-A6200 to SX-A6375	1,176	500	450	
	SX-A6450 to SX-A6500	1,176	730	450	
	SX-A6600 to SX-A6630	1,176	1,100	450	
	SX-A6710 to SX-A61K0	1,176	1,560	450	
IP54	SX-D6090 to SX-D6160	952.5	344.5	314	
	SX-D6200 to SX-D6355	2,250	600	600	
	SX-D6450 to SX-D6500	2,250	900	600	
	SX-D6600 to SX-D6630	2,250	1,200	600	
	SX-D6710 to SX-D61K0	2,250	1,800	600	

NEVER-FAIL

“It’s not about our products, it’s about your production”

Our "Never-fail" concept looks beyond device reliability. The whole chain of machine control and management should be able to diagnose a potential malfunction and alert the operator while production continues.

For standard machine part or object detection, our high reliability sensors and limit switches provide the operational stability ensuring a continuous machine operation ... even beyond specifications.

And for special objects or environments you can choose the performance level you need from our wide range of application specific sensors ... without over- or underdesigning.

Our measurement and vision sensors and inspection systems are easy to set up and operate and provide the flexibility to choose the fitting quality control measures to ensure 100% perfect product quality.

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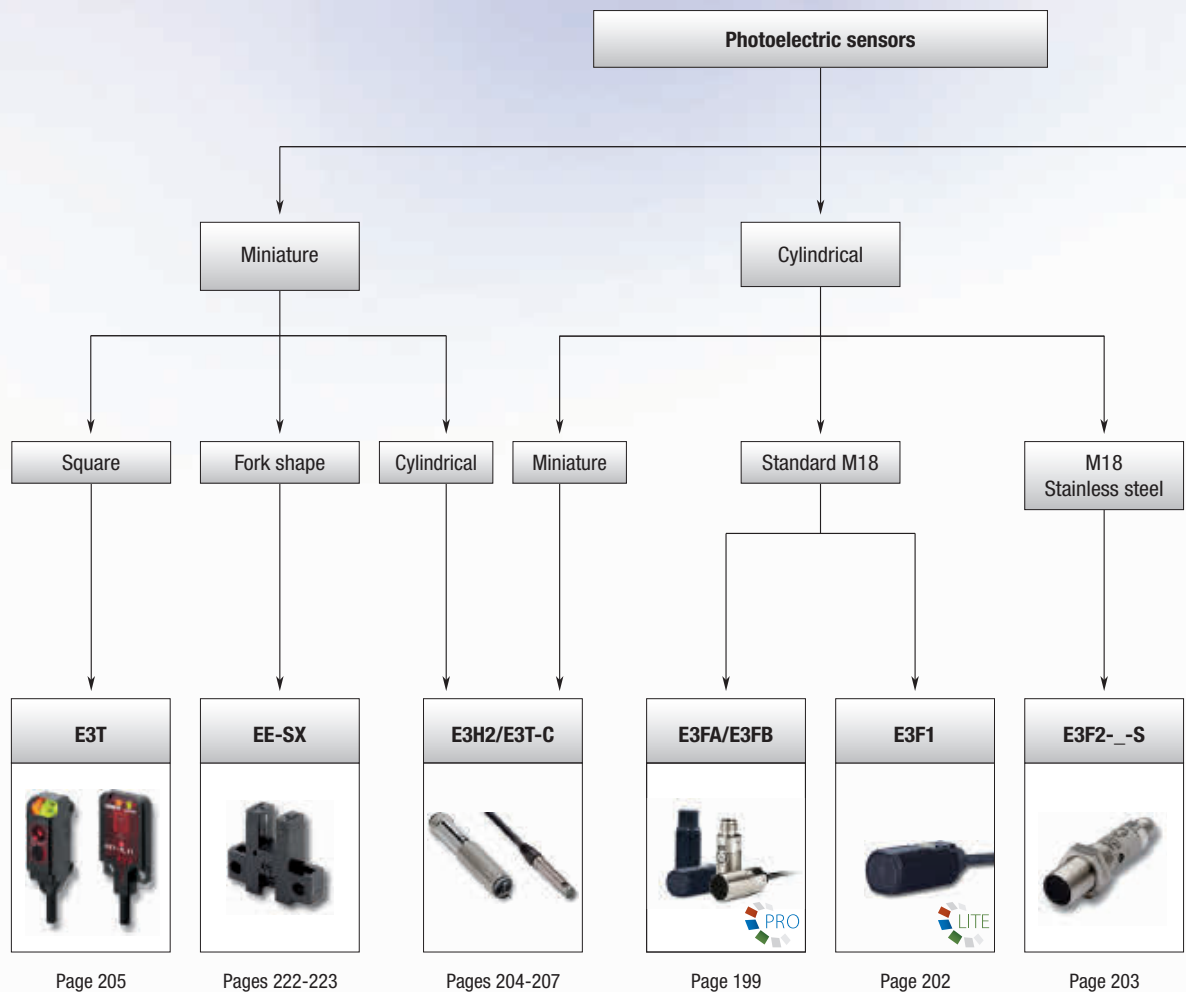
FOR MACHINES BUILT TO LAST

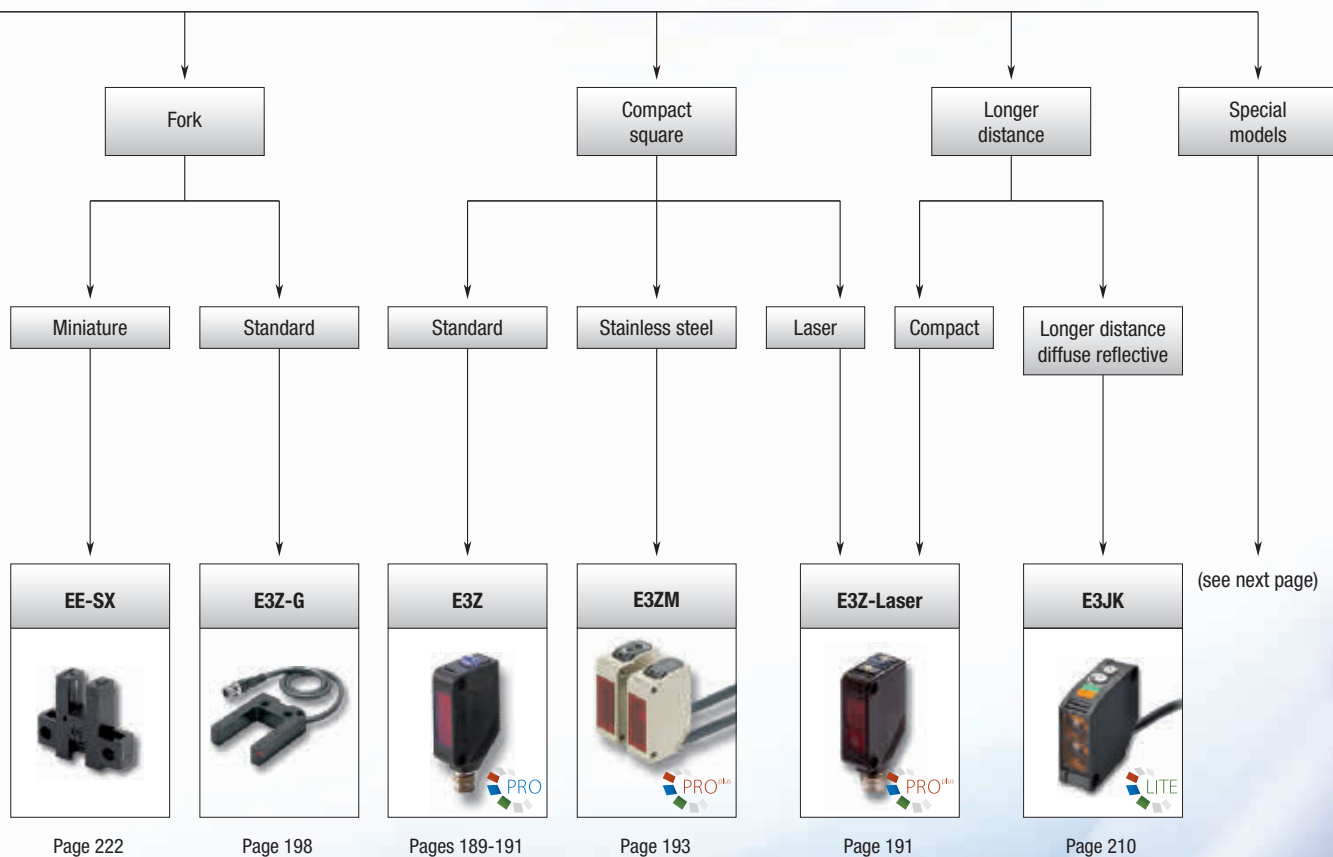
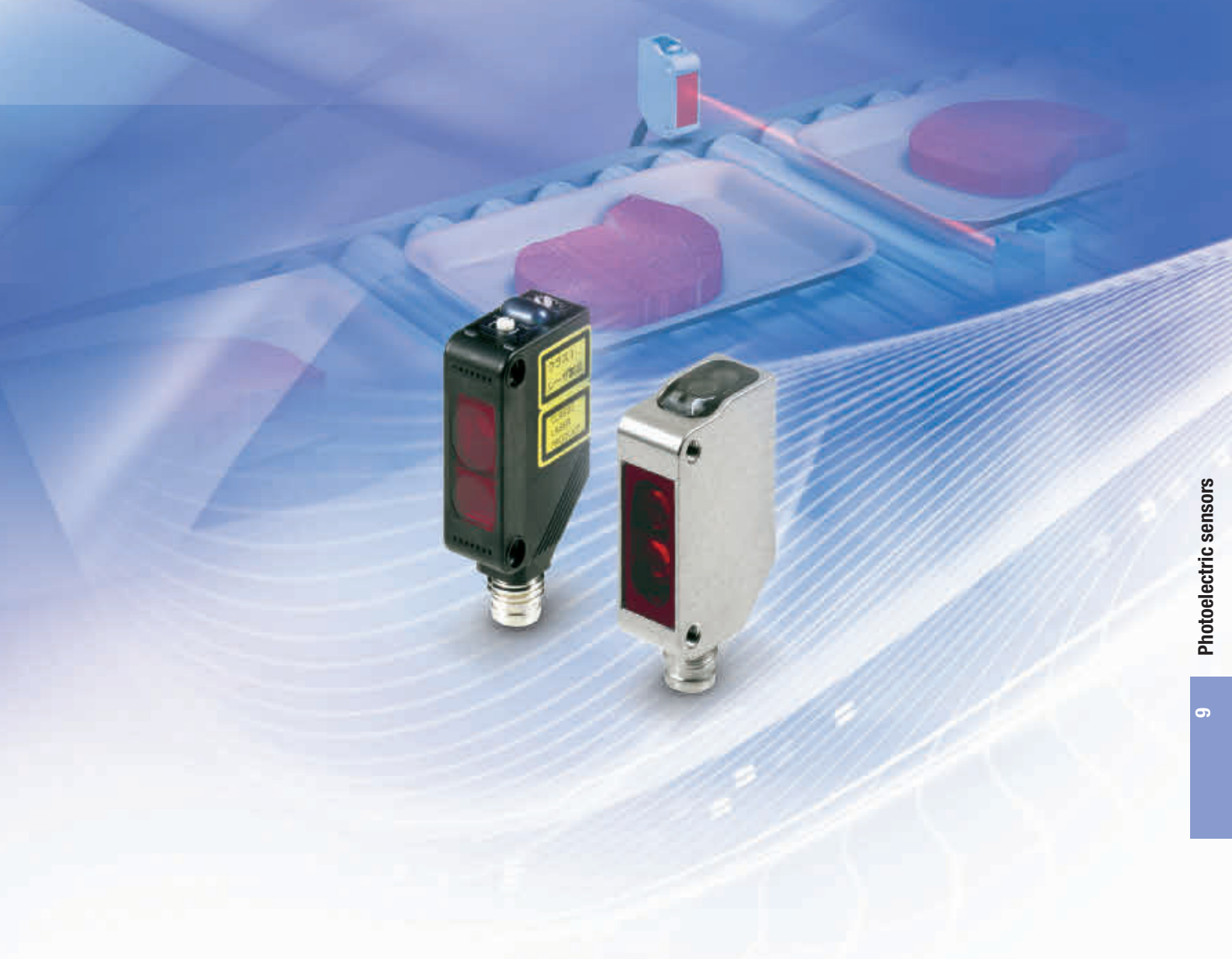
Reliability and accuracy confirmed by millions... every day

With more than one million units sold, the E3Z is among the world's most popular and successful photoelectric sensors.

Manufactured to exceptionally high engineering standards, you can take the performance reliability for granted.

- Optimal sensing performance tuned to your application
- Various housing designs fitting your application concept
- Proven performance and unmatched reliability





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Selection table

Type	Compact square			Longer distance	
					
Model	E3Z	E3ZM	E3Z Laser	E3S-CL	E3JK
361°	PRO	PRO ^{plus}	PRO ^{plus}	n.a.	LITE
Housing	PBT	Stainless steel	PBT	Zinc diecast	ABS
Through-beam	15 m, 30 m	15 m	60 m	–	40 m
Retro-reflective with M.S.R.	5 m	4 m	15 m	–	7 m
Diffuse-reflective (energetic)	1 m	1 m	–	–	2.5 m
Diffuse-reflective (background suppression)	200 mm	200 mm	300 mm	500 mm	–
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Type	Oil resistant	Mark detection	Transparent detection		
					
Model	E3ZM-C	E3ZM-V	E3ZM-B	E3Z-B	E3FA-B/-V
361°	PRO ^{plus}	PRO ^{plus}	PRO ^{plus}	PRO ^{plus}	PRO ^{plus}
Key features	Oil and lubricant resistant stainless steel housing	White LED for optimal contrast	Optimised optical system for all transparent objects	Optical system for standard transparent objects	Optimised optical system for all transparent objects
Housing	Stainless steel	Stainless steel	Stainless steel	PBT	M18 PBT/metal
Through-beam	20 m	–	–	–	–
Retro-reflective with M.S.R.	4 m	–	500 mm	500 mm, 2 m	2 m
Diffuse-reflective	1 m	12mm±2mm	–	–	–
Diffuse-reflective (background suppression)	200 mm	–	–	–	50 mm
Page	195	231	197	192	201

Cylindrical				Miniature		Fork	
							
E3FA/E3FB	E3F1	E3F2-_-S	E3H2	E3T-C	E3T	EE-SX	E3Z-G
PRO	LITE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
M18 PBT, metal	ABS	M18 stainless steel	M12 metal, M8 stainless steel	M5, M6 stainless steel	PBT	PBT	PBT
20 m	15 m	7 m	4 m, 2 m	1 m	1 m, 2 m	5 mm (slot width)	25 mm
4 m	3 m	4 m	2 m	–	200 mm	–	–
1 m	300 mm	1 m	300 mm	50 mm	30 mm	–	–
200 mm	–	100 mm	–	–	30 mm	–	–
199	202	203	204	207	205	222	198

High precision positioning		Structured object detection		Multi voltage power supply	
					
E3NC-L/E3NC-S	E3C-LDA	E3S-LS3	E3JK, E3JM, E3G-_M		
n.a.	n.a.	n.a.	n.a.		
N-Smart Laser sensors 0.1 mm Laser spot	Up to 10 µm accuracy	Wide beam	AC/DC power supply and relay output		
PBT	PBT	PBT	ABS, ABS, PBT		
–	–	–	40 m, 10 m, –		
–	7 m	–	9 m, 4 m, 10 m		
1.2 m	1 m	60 mm	2.5 m, 700 mm, 2 m		
250 mm	–	–	–, –, 1.2 m		
214	219	218	210/212/213		

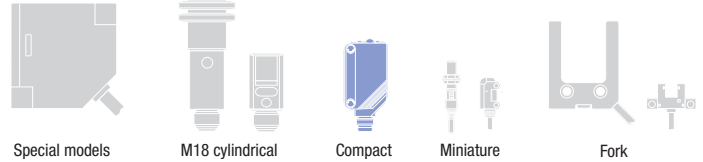


General purpose sensor in compact plastic housing



The compact housing size and the high-power LED provide an excellent performance-size ratio and the high optical precision and long sensor lifetime make the sensor the first choice for standard and challenging applications.

- Minimal optical axis deviation for easy alignment
- IP67 and IP69K for highest water resistance
- Intensive shielding for highest noise immunity (EMC)
- Multiple molding housing for high mechanical resistance



Ordering information

Sensor type	Sensing distance	Connection method				Order code ^{*1}	
						NPN output	PNP output
Through-beam 	30 m (Infrared light)	–	–	2 m	For ordering pictail versions replace '2M' of cable types with: - M1J: M12 with 30 cm cable - M3J: M8 4-pin with 30 cm cable - M5J: M8 3-pin with 30 cm cable	E3Z-T62 2M	E3Z-T82 2M
	10 m (Red light)	–	–	2 m		E3Z-T67	E3Z-T87
Retro-reflective with M.S.R. 	0.1 to 4 m ^{*2} (Red light)	–	–	2 m		E3Z-T61A 2M	E3Z-T81A 2M
	0.1 to 5 m ^{*2} (Infrared light)	–	–	2 m		E3Z-T66A	E3Z-T86A
Retro-reflective without M.S.R. 	0.1 to 5 m ^{*2} (Infrared light)	–	–	2 m		E3Z-R61 2M	E3Z-R81 2M
	1 m (adjustable) (Infrared light)	–	–	2 m		E3Z-R66	E3Z-R86
Diffuse-reflective 	100 mm (adjustable) (Infrared light)	–	–	2 m		E3Z-R61-4 2M	E3Z-R81-4 2M
	1 m (adjustable) (Infrared light)	–	–	2 m		E3Z-R66-4	E3Z-R86-4
Diffuse-reflective wide beam 	100 mm (adjustable) (Infrared light)	–	–	2 m		E3Z-D62 2M	E3Z-D82 2M
	100 mm (adjustable) (Infrared light)	–	–	2 m		E3Z-D67	E3Z-D87
Distance settable (background suppression) 	Small spot (Red light) 2 mm (BCS set to minimum) 20 mm 80 mm (BCS set to maximum)	–	–	2 m		E3Z-D61 2M	E3Z-D81 2M
	Standard (Red light) 20 mm (BGS at min. setting) 40 mm 200 mm (BGS at max. setting) Incident light level threshold (fixed) FGS (at min. setting) FGS (at max. setting)	–	–	2 m		E3Z-D66	E3Z-D86
Distance settable (background suppression) 	Small spot (Red light) 2 mm (BCS set to minimum) 20 mm 80 mm (BCS set to maximum)	–	–	2 m	E3Z-LS63 2M	E3Z-LS83 2M	
	Standard (Red light) 20 mm (BGS at min. setting) 40 mm 200 mm (BGS at max. setting) Incident light level threshold (fixed) FGS (at min. setting) FGS (at max. setting)	–	–	2 m	E3Z-LS68	E3Z-LS88	
Distance settable (background suppression) 	Small spot (Red light) 2 mm (BCS set to minimum) 20 mm 80 mm (BCS set to maximum)	–	–	2 m	E3Z-LS61 2M ^{*3}	E3Z-LS81 2M ^{*3}	
	Standard (Red light) 20 mm (BGS at min. setting) 40 mm 200 mm (BGS at max. setting) Incident light level threshold (fixed) FGS (at min. setting) FGS (at max. setting)	–	–	2 m	E3Z-LS66 ^{*3}	E3Z-LS86 ^{*3}	

^{*1} Light-ON/Dark-ON switch selectable
^{*2} Measured with E39-R1S
^{*3} For infrared LED models contact your Omron representative

Specifications

Item	Through-beam		Retro-reflective with M.S.R	Retro-reflective without M.S.R	Diffuse-reflective	Diffuse-reflective (wide beam)	Distance-settable (background suppression)		
	NPN	E3Z-T62/T67	E3Z-T61A/T66A	Red LED			Infrared LED	Standard	Small spot
	PNP	E3Z-T82/T87	E3Z-T81A/T86A	E3Z-R61/R66	E3Z-R6_-4	E3Z-D62/D67	E3Z-D61/D66	E3Z-LS61/66	E3Z-LS63/68
				E3Z-R81/R86	E3Z-R8_-4	E3Z-D82/D87	E3Z-D81/D86	E3Z-LS81/86	E3Z-LS83/88
Directional angle	Both emitter and receiver: 3° to 15°		2° to 10°		-				
Black/white error	-						10% of set distance max.	5% of set distance max.	
Light source (wave length)	Infrared LED (870 nm)	RED LED (700 nm)	Red LED (680 nm)	Infrared LED (870 nm)	Infrared LED (860 nm)		Red LED (680 nm)	Red LED (650 nm)	
Power supply voltage	12 to 24 VDC ±10%, ripple (p-p): 10% max.								
Protective circuits	Reverse polarity protection, short-circuit protection, output reverse polarity protection	Output short-circuit protection, power supply, reverse polarity protection	Reverse polarity protection, output short-circuit protection, mutual interference prevention, output reverse polarity protection			Reverse polarity protection, output short-circuit protection, mutual interference prevention			
Response time	2 ms max.		1 ms max.						
Ambient temperature	Operating	-25 to 55°C							
	Storage	-40 to 70°C (with no icing or condensation)							
Degree of protection	IEC 60529 IP67, IP69K after DIN 40050 part 9								
Material	Case	PBT (polybutylene terephthalate)							
	Lens	Denatured polyacrylate resin	Methacrylate resin		Denatured polyacrylate resin				



High ambient light immunity



High electromagnetic noise immunity



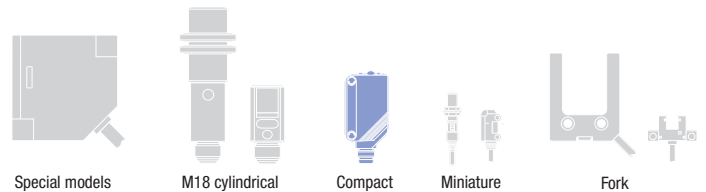
Robust and tight housing construction



LASER sensor in compact plastic housing

The E3Z LASER sensor in compact plastic housing features visible LASER light for precision positioning and detection applications.

- Visible LASER light for precision positioning and small object detection
- High power LD for long range precision
- Class 1 LASER
- Precise background suppression and low black/white error for accurate detection



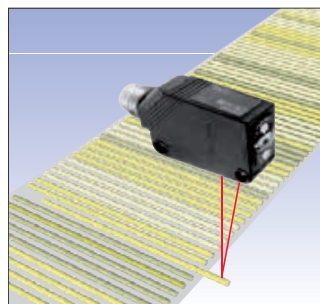
Ordering information

Sensor type	Sensing distance	Response time	Connection method				Order code ^{*1}	
							NPN output	PNP output
Through-beam 	60 m	1 ms	-	-	2 m	For ordering digital versions replace '2M' or cable types with: - M1J: M12 with 30 cm cable - M3J: M8 4-pin with 30 cm cable - M5J: M8 3-pin with 30 cm cable	E3Z-LT61 2M	E3Z-LT81 2M
Retro-reflective with M.S.R. 	0.3 to 15 m ^{*2}		-	-	2 m		E3Z-LT66	E3Z-LT86
Distance-settable (background suppression) 	20 to 300 mm		-	-	2 m		E3Z-LR61 2M	E3Z-LR81 2M
	25 to 300 mm		-	-	2 m		E3Z-LR66	E3Z-LR86
			-	-	2 m		E3Z-LL61 2M	E3Z-LL81 2M
			-	-	2 m		E3Z-LL66	E3Z-LL86
		-	-	2 m	E3Z-LL63 2M	E3Z-LL83 2M		
		-	-	2 m	E3Z-LL68	E3Z-LL88		

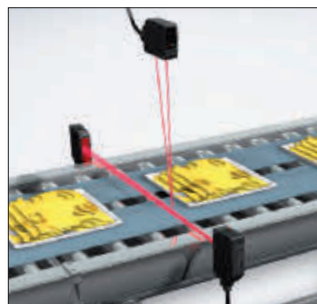
^{*1} Light-ON / Dark-ON switch selectable
^{*2} Measured with E39-R1

Specifications

Item	Through-beam	Retro-reflective with M.S.R.	Distance settable (background suppression)	
	Standard model		Standard model	High-speed model
NPN output	E3Z-LT61/-LT66	E3Z-LR61/-LR66	E3Z-LL61/-LL66	E3Z-LL63/-LL68
PNP output	E3Z-LT81/-LT86	E3Z-LR81/-LR86	E3Z-LL81/-LL86	E3Z-LL83/-LL88
Black/white error	-	-	5% (at 160 mm)	5% (at 100 mm)
Light source (wave length)	Red LD (655 nm), JIS Class 1, IEC Class 1, FDA Class II			
Power supply voltage	12 to 24 VDC ±10%, ripple (p-p): 10% max.			
Protective circuits	Power supply reverse polarity, protection, short circuit protection, output reverse polarity protection			
Response time	1 ms max.			0.5 ms max.
Ambient temperature	Operating	-10 to 55°C		
	Storage	-25 to 70°C (with no icing or condensation)		
Degree of protection	IEC 60529 IP67, IP69K after DIN 40050 part 9			
Material	Case	PBT (polybutylene terephthalate)		
	Lens	Modified polyacrylate resin	Methacrylate	Modified polyacrylate resin



Low black/white error for precise detection



Visible laser light for precision positioning



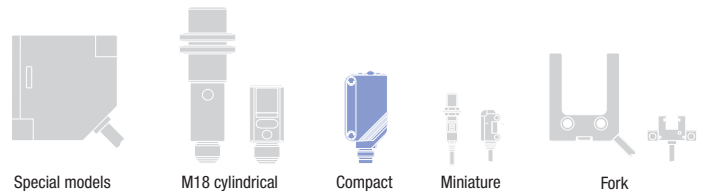
Class 1 laser

Transparent object detection photoelectric sensor in compact plastic housing



The E3Z-B provides easy adjustment for the detection of a large variety of standard transparent objects.

- Detects a wide range of bottles from single bottles to sets of stocked bottles
- IP67/IP69K tested for highest water resistance



Ordering information

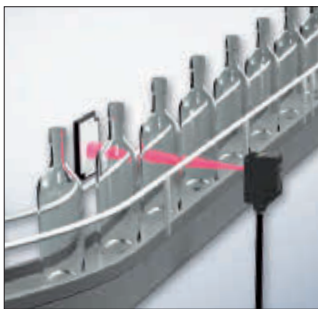
Sensor type	Sensing distance	Connection method				Order code ^{*1}	
						NPN output	PNP output
 Retro-reflective without M.S.R.	80 to 500 mm ^{*2} (adjustable)	—	—	2 m	—	E3Z-B61 2M	E3Z-B81 2M
		■	—	—	—	E3Z-B66	E3Z-B86
	0.5 to 2 m ^{*2} (adjustable)	—	—	2 m	—	E3Z-B62 2M	E3Z-B82 2M
		■	—	—	—	E3Z-B67	E3Z-B87

^{*1} Light-ON / Dark-ON switch selectable

^{*2} Measured with E39-R1S

Specifications

Item	Retro-reflective without M.S.R.		
	NPN output	E3Z-B61/E3Z-B66	E3Z-B62/E3Z-B67
	PNP output	E3Z-B81/E3Z-B86	E3Z-B82/E3Z-B87
Light source (wave length)	Red LED (680 nm)		
Power supply voltage	12 to 24 VDC ±10%, ripple (p-p) : 10% max.		
Protective circuits	Reverse polarity protection, output short-circuit protection, mutual interference prevention		
Response time	1 ms max.		
Ambient temperature	Operating	-25°C to 55°C	
	Storage	-40°C to 70°C (with no icing or condensation)	
Degree of protection	IEC 60529 IP67, IP69K after DIN 40050 part 9		
Material	Case	PBT (polybutylene terephthalate)	
	Lens	Methacrylate resin	



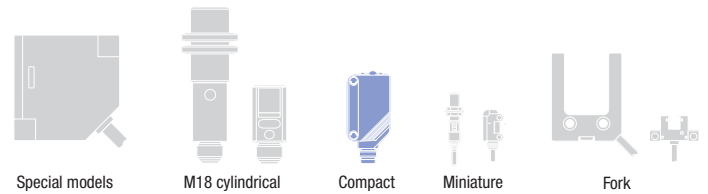
Easy adjustment for the detection of a large variety of transparent objects



Photoelectric sensor in compact stainless steel housing

Compact housing size and high power LED for excellent performance-size ratio in a rugged, detergent-resistant stainless steel housing for demanding environments.

- High grade stainless steel housing (SUS316L)
- IP67 and IP69k for highest water resistance
- ECOLAB tested and certified detergent resistance



Ordering information

Sensor type	Sensing distance	Connection method				Order code ^{*1}	
						NPN output	PNP output
Through-beam 	15 m	–	–	2 m	*2	E3ZM-T61 2M	E3ZM-T81 2M
	0.8 m with built-in slit	■	–	–		E3ZM-T66	E3ZM-T86
Retro-reflective with M.S.R. 	0.1 to 4 m	–	–	2 m		E3ZM-T63 2M	E3ZM-T83 2M
		■	–	–		E3ZM-T68	E3ZM-T88
Diffuse-reflective 	1 m (adjustable)	–	–	2 m		E3ZM-R61 2M	E3ZM-R81 2M
		■	–	–		E3ZM-R66	E3ZM-R86
Diffuse-reflective (background suppression) 	10 to 100 mm (fixed)	–	–	2 m		E3ZM-D62 2M	E3ZM-D82 2M
	10 to 200 mm (fixed)	■	–	–		E3ZM-D67	E3ZM-D87
		–	–	2 m		E3ZM-LS61X 2M ^{*3}	E3ZM-LS81X 2M ^{*3}
		■	–	–		E3ZM-LS66X ^{*3}	E3ZM-LS86X ^{*3}
		–	–	2 m	E3ZM-LS64X 2M ^{*3}	E3ZM-LS84X 2M ^{*3}	
		■	–	–	E3ZM-LS69X ^{*3}	E3ZM-LS89X ^{*3}	

*1 Light-ON / Dark-ON switch selectable except for E3ZM-LS

*2 For ordering pigtail versions replace '2M' of the cable types with:

- S1J: for M12 stainless steel plug with 30 cm cable
- S3J: for M8 4-pin stainless steel plug with 30cm cable
- S5J: for M8 3-pin stainless steel plug with 30cm cable (except for background suppression types)
- M1J: for M12 brass plug with 30cm cable
- M3J: for M8 4-pin brass plug with 30cm cable
- M5J: for M8 3-pin brass plug with 30cm cable (except for background suppression types)

*3 E3ZM-LS_X are fixed LIGHT-ON models. For fixed DARK-ON models please order E3ZM-LS_Y and for L-ON/D-ON selectable by wire please order E3ZM-LS_H.

Specifications

Item	Through-beam		Retro-reflective with M.S.R.		Diffuse-reflective
	NPN	E3ZM-T61 E3ZM-T66	E3ZM-T63 E3ZM-T68	E3ZM-R61 E3ZM-R66	E3ZM-D62 E3ZM-D67
	PNP	E3ZM-T81 E3ZM-T86	E3ZM-T83 E3ZM-T88	E3ZM-R81 E3ZM-R86	E3ZM-D82 E3ZM-D87
Light source (wave length)	Infrared LED (870 nm)			Red LED (660 nm)	Infrared LED (860 nm)
Power supply voltage	10 to 30 VDC, ±10% ripple (p-p)				
Protective circuits	Power supply reverse polarity protection, output short-circuit protection, output reverse polarity protection			Power supply reverse polarity protection, output short-circuit protection, mutual interference prevention, output reverse polarity protection	
Response time	1 ms max.				
Ambient temperature	Operating	-25°C to 55°C			
	Storage	-40°C to 70°C (with no icing or condensation)			
Degree of protection	IEC 60529 IP67, IP69K after DIN 40050 part 9				
Material	Case	SUS316L			
	Lens	Methacrylic resin			
	Display	PES (polyether sulfone)			
	Sensitivity adjustment and operation switch	PEEK (polyether ether ketone)			
	Seals	Fluoro rubber			

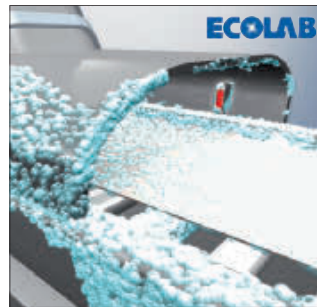
Item		Diffuse-reflective with background suppression (fixed distance)	
	NPN	E3ZM-LS61X E3ZM-LS66X	E3ZM-LS64X E3ZM-LS69X
	PNP	E3ZM-LS81X E3ZM-LS86X	E3ZM-LS84X E3ZM-LS89X
Light source (adjustable)		Red LED (650 nm)	Red LED (660 nm)
Black/white error		5% of sensing distance max.	20% of sensing distance max.
Power supply voltage		10 to 30 VDC, $\pm 10\%$ ripple (p-p): 10% max.	
Protective circuits		Power supply reverse polarity protection, output short-circuit protection, output reverse polarity protection, mutual interference protection	
Response time		1 ms max.	
Ambient temperature range	Operating	-25°C to 55°C	
	Storage	-40°C to 70°C (with no icing or condensation)	
Degree of protection		IEC 60529 IP67, IP69K after DIN 40050 part 9	
Material	Case	SUS316L	
	Lens	Methacrylic resin	
	Display	PES (polyether sulfone)	
	Sensitivity adjustment and operation switch	PEEK (polyether ether ketone)	
	Seals	Fluoro rubber	



Robust construction



Tight housing



Detergent resistant



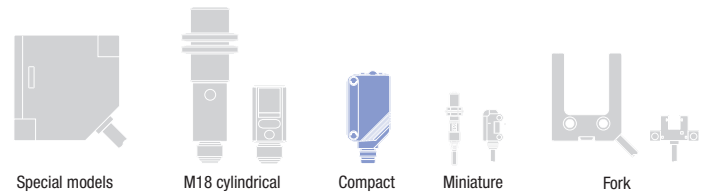
Pre-wired models with stainless steel plug connectors for best combination of highest water ingress protection with fast connect & disconnect..



Oil-resistant photoelectric sensor in compact stainless steel housing

The oil-resistant compact photoelectric sensor in a robust stainless steel housing features an enhanced functional reserve for reliable object detection in dirty and mechanically demanding environments such as automotive assembly lines.

- Oil-resistant stainless steel housing
- IP67 and IP69k for highest water resistance
- High visibility orange LED in through-beam model for easy alignment



Ordering information

Sensor type	Sensing distance	Connection method				Order code ^{*1}	
						NPN output	PNP output
Through-beam 	15 m (Infrared light)	–	–	2 m	–	E3ZM-CT61 2M	E3ZM-CT81 2M
		–	–	–	■ ^{*2}	E3ZM-CT61-M1TJ	E3ZM-CT81-M1TJ
		■	–	–	–	E3ZM-CT66	E3ZM-CT86
	20 m (Orange light)	–	–	2 m	–	E3ZM-CT62B 2M	E3ZM-CT82B 2M
		–	–	–	■ ^{*2}	E3ZM-CT62B-M1TJ	E3ZM-CT82B-M1TJ
		■	–	–	–	E3ZM-CT67B	E3ZM-CT87B
Retro-reflective with M.S.R. 	0.1 to 4m ^{*3}	–	–	2 m	–	E3ZM-CR61 2M	E3ZM-CR81 2M
		–	–	–	■ ^{*2}	E3ZM-CR61-M1TJ	E3ZM-CR81-M1TJ
		■	–	–	–	E3ZM-CR66	E3ZM-CR86
Diffuse-reflective 	1 m (adjustable)	–	–	2 m	–	E3ZM-CD62 2M	E3ZM-CD82 2M
		–	–	–	■ ^{*2}	E3ZM-CD62-M1TJ	E3ZM-CD82-M1TJ
		■	–	–	–	E3ZM-CD67	E3ZM-CD87
Diffuse-reflective (background suppression) 	10 to 100 mm (fixed)	–	–	2 m	–	E3ZM-CL61H 2M	E3ZM-CL81H 2M
		–	–	–	■ ^{*2}	E3ZM-CL61H-M1TJ	E3ZM-CL81H-M1TJ
		■	–	–	–	E3ZM-CL66H	E3ZM-CL86H
	10 to 200 mm (fixed)	–	–	2 m	–	E3ZM-CL64H 2M	E3ZM-CL84H 2M
		–	–	–	■ ^{*2}	E3ZM-CL64H-M1TJ	E3ZM-CL84H-M1TJ
		■	–	–	–	E3ZM-CL69H	E3ZM-CL89H

^{*1} Light-ON/ Dark-ON switch selectable for E3ZM-CT, E3ZM-CR and E3ZM-CD. Light-ON/ Dark-ON selectable by wire for E3ZM-CL.

^{*2} uses OMRON's Twist & Click M12 connector XS5.

^{*3} Measured with E39-R1S.

Specifications

Item	Through-beam		Retro-reflective with M.S.R.		Diffuse-reflective
	NPN	E3ZM-CT61 (-M1TJ) E3ZM-CT66	E3ZM-CT62B (-M1TJ) E3ZM-CT67B	E3ZM-CR61 (-M1TJ) E3ZM-CR66	E3ZM-CD62 (-M1TJ) E3ZM-CD67
	PNP	E3ZM-CT81 (-M1TJ) E3ZM-CT86	E3ZM-CT82B (-M1TJ) E3ZM-CT87B	E3ZM-CR81 (-M1TJ) E3ZM-CR86	E3ZM-CD82 (-M1TJ) E3ZM-CD87
Light source (wave length)	Infrared LED (870 nm)		Orange LED (615 nm)	Red LED (660 nm)	Infrared LED (860 nm)
Power supply voltage	10 to 30 VDC, including 10% ripple (p-p)				
Protective circuits	Power supply reverse polarity protection, output short-circuit protection, output reverse polarity protection		Power supply reverse polarity protection, output short-circuit protection, output reverse polarity protection, and mutual interference prevention		
Response time	1 ms max.		2 ms max.	1 ms max.	
Ambient temperature	Operating	-25°C to 55°C			
	Storage	-40°C to 70°C (with no icing or condensation)			
Degree of protection	IEC 60529 IP67, IP69K after DIN 40050 part 9				
Material	Case	SUS316L			
	Lens	PMMA (polymethylmethacrylate)			
	Display	PES (polyether sulfone)			
	Sensitivity adjustment and operation switch	PEEK (polyether ether ketone)			
	Seals	Fluoro rubber			

Item	Diffuse-reflective with background suppression (fixed distance)	
	NPN	E3ZM-CL61H (-M1TJ) E3ZM-CL66H
	PNP	E3ZM-CL81H (-M1TJ) E3ZM-CL86H
Light source (wave length)	Red LED (650 nm)	Red LED (660 nm)
Power supply voltage	10 to 30 VDC, ±10% ripple (p-p): 10% max.	
Protective circuits	Reversed power supply polarity protection, output short-circuit protection, reversed output polarity protection, mutual interference protection	
Response time	1 ms max.	
Ambient temperature	Operating	-25°C to 55°C
	Storage	-40°C to 70°C (with no icing or condensation)
Degree of protection	IEC 60529 IP67, IP69K after DIN 40050 part 9	
Material	Case	SUS316L
	Cable	Oil-resistant vinyl cable
	Lens	PMMA (polymethylmethacrylate)
	Display	PES (polyethersulfone)
	Seals	Fluoro rubber

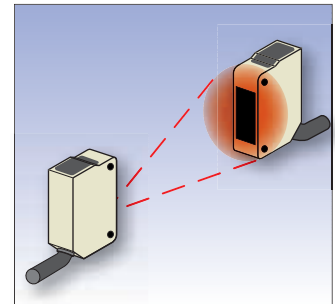


Tested oil and lubricant resistance

Oil Resistance

Test oil type	Product name	Kinetic viscosity at 40°C (mm ² /s)	pH (dilution rate)
Lubricants	Velocity Oil No. 3	2.02	-
Non-water-soluble cutting oils	Yushiron Oil No.2 AC	Less than 10	-
Water-soluble cutting oils	Yushiroken EC50T3	-	10.1 (×30)
	Yushiroken EC50T5	-	9.9 (×30)
	Yushiroken S46D	-	9.9 (×50)
	Yushiroken S50N	-	8.6 (×50)
	Yushiron Lubic HWC68	-	9.1 (×30)
	Yushiroken Synthetic #770TG	-	9.9 (×20)
	Emulcut FA-900ST	-	9.7 (×30)
	Multicool CSF-9000	-	9.7 (×20)
	Sugicut CS-68JS-1	-	9.6 (×20)
	Toyocool 3A-666	-	9.6 (×20)
	Gryton 1700	-	9.1 (×10)
	Gryton 1700D	-	9.3 (×3)

1. The Sensor was immersed in the above oils for 240 h at 55°C and then passed an insulation resistance test at 100 MΩ.
2. Use the kinetic viscosities and pHs in the above table as a guide when using the Sensor in environments containing oils not listed in the table. Additives in the oil may also affect performance. Always test applicability in advance.



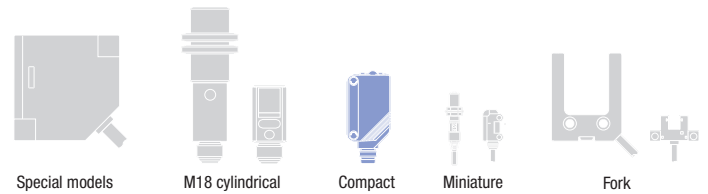
Highly visible orange LED



Transparent object detection sensor in compact stainless steel housing

The E3ZM-B family provides models for the general transparent material detection and specialized models providing highest stability for the detection of PET bottles.

- Stable PET detection using double refraction and AC³ power control technology
- Detergent resistant compact SUS316L housing



Ordering information

Sensor type	Sensing distance	Special reflector	Connection method				Order code ^{*1}	
							NPN output	PNP output
Retro-reflective with M.S.R. 	Optimised for PET bottles and trays	Order separately ^{*2}			2 m	–	E3ZM-B61 2M	E3ZM-B81 2M
				–	–	–	E3ZM-B66	E3ZM-B86
		E39-RP1 included			2 m	–	E3ZM-B61-C 2M	E3ZM-B81-C 2M
				–	–	–	E3ZM-B66-C	E3ZM-B86-C
Retro-reflective with M.S.R. 	For all transparent media (glass, PET, foils)	Order separately ^{*4}			2 m	–	E3ZM-B61T 2M	E3ZM-B81T 2M
				–	–	–	E3ZM-B66T	E3ZM-B86T

^{*1} PET optimised models are Light-ON / Dark-ON selectable by wire. E3ZM-B_T all transparent media types are Light-ON/ Dark-ON switch selectable

^{*2} For higher signal stability using circular polarisation functionality for PET bottles, order special reflector E39-RP1 separately

^{*3} Teachable all-transparent-media types are available. Contact your OMRON representative

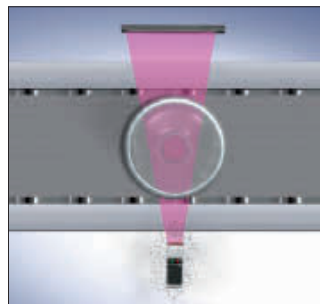
^{*4} Order reflector separately

Specifications

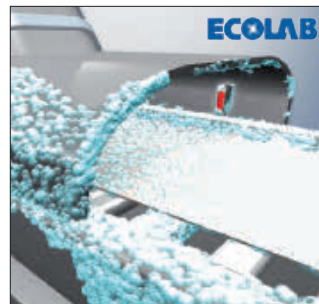
Item	PET optimised (teachable)		all-transparent-media (potentiometer adjustment)		
	NPN	E3ZM-B61(-C)/-B66(-C)	E3ZM-B6 T	E3ZM-B8 T	
	PNP	E3ZM-B81(-C)/-B86(-C)	E3ZM-B8 T	E3ZM-B8 T	
Light source (wave length)	Red LED (650 nm)				
Power supply voltage	10 to 30 VDC, ±10% ripple (p-p): 10% max.				
Protective circuits	Reversed power supply polarity protection, output short-circuit protection, mutual interference prevention, and reversed output polarity protection				
Response time	1 ms max.				
Ambient temperature	Operating	-40°C to 60°C		-25° to 55°C	
	Storage	-40°C to 70°C (with no icing or condensation)			
Degree of protection	IEC 60529 IP67, IP69K after DIN 40050 part 9				
Material	Case	SUS316L			
	Lens	PMMA (polymethylmethacrylate)			
	Display	PES (polyether sulfone)			
	Seals	Fluoro rubber			
	Cable	PVC (polyvinyl chloride)			



Utilisation of double reflection effect in PET for higher detection stability (PET optimised models)



Automatic LED power adjustment (AC³) to compensate for soiling and temperature fluctuations (PET optimised models)



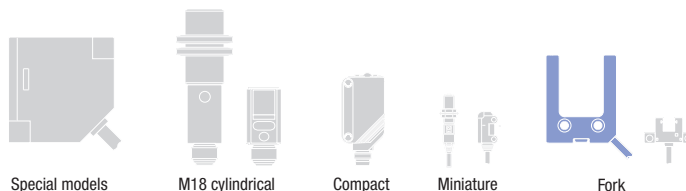
Detergent resistant



Photoelectric sensor in 25 mm plastic fork shape housing

The forked shape optical through-beam sensors combine simple installation with reliable passage detection of object, machine parts or transportation elements like hanggliders.

- Fork shape for simple installation
- 1 or 2 axis models



Ordering information

Sensor type	Sensing distance	Number of optical axes	Connection method				Order code ^{*1}	
							NPN output	PNP output
Through-beam 	25 mm (Infrared light)	1	—	—	2 m	—	E3Z-G61 2M	E3Z-G81 2M
			—	—	—		E3Z-G61-M3J	E3Z-G81-M3J
		2	—	—	2 m	—	E3Z-G62 2M	E3Z-G82M
			—	—	—		E3Z-G62-M3J	E3Z-G82-M3J

^{*1} Light-ON / Dark-ON switch selectable

Specifications

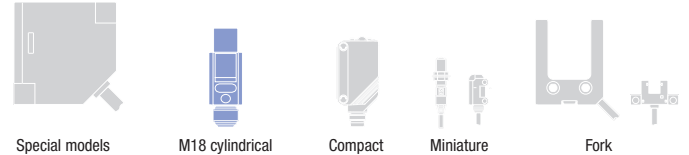
Item	Through-beam
	E3Z-G
Power supply voltage	12 to 24 VDC ±10% max. ripple (p-p): 10%
Protective circuits	Output short-circuit protection, and mutual interference prevention, power supply, reverse polarity protection
Response time	1 ms max.
Ambient temperature	Operating
	Storage
Degree of protection	IEC60529 IP64
Material	ABS



High performance photoelectric sensor in compact M18 housing

E3FA/E3FB series represents a new generation of OMRON photoelectric sensors with large varieties of reliable and easy-to-use photoelectric sensors. Featuring many standard and special functions this line is addressing many kinds of industries such as packaging, ceramics and material handling.

- Large variety of standard and special types
- High power and visible red LED enabling easy alignment and long sensing distance
- Compact and robust housing for easy integration into machines



Ordering information

Straight types

Sensor type	Sensing distance	Connection method				Order code			
						E3FA (plastic housing)		E3FB (metal housing)	
						NPN output	PNP output	NPN output	PNP output
Through-beam 	20 m	-	-	2 m	-	E3FA-TN11 2M	E3FA-TP11 2M	E3FB-TN11 2M	E3FB-TP11 2M
		-	■	-	-	E3FA-TN21	E3FA-TP21	E3FB-TN21	E3FB-TP21
Retro-reflective with MSR ^{*1} 	0.1 to 4 m (with E39-R1S)	-	-	2 m	-	E3FA-RN11 2M	E3FA-RP11 2M	E3FB-RN11 2M	E3FB-RP11 2M
		-	■	-	-	E3FA-RN21	E3FA-RP21	E3FB-RN21	E3FB-RP21
Coaxial Retro-reflective with MSR ^{*1} 	0 to 500 mm (with E39-R1S)	-	-	2 m	-	E3FA-RN12 2M	E3FA-RP12 2M	E3FB-RN12 2M	E3FB-RP12 2M
		-	■	-	-	E3FA-RN22	E3FA-RP22	E3FB-RN22	E3FB-RP22
Diffuse-reflective 	100 mm	-	-	2 m	-	E3FA-DN11 2M	E3FA-DP11 2M	E3FB-DN11 2M	E3FB-DP11 2M
		-	■	-	-	E3FA-DN21	E3FA-DP21	E3FB-DN21	E3FB-DP21
	300 mm	-	-	2 m	-	E3FA-DN12 2M	E3FA-DP12 2M	E3FB-DN12 2M	E3FB-DP12 2M
		-	■	-	-	E3FA-DN22	E3FA-DP22	E3FB-DN22	E3FB-DP22
	1 m	-	-	2 m	-	E3FA-DN13 2M	E3FA-DP13 2M	E3FB-DN13 2M	E3FB-DP13 2M
		-	■	-	-	E3FA-DN23	E3FA-DP23	E3FB-DN23	E3FB-DP23
BGS (background suppression) 	100 mm	-	-	2 m	-	E3FA-LN11 2M	E3FA-LP11 2M	E3FB-LN11 2M	E3FB-LP11 2M
		-	■	-	-	E3FA-LN21	E3FA-LP21	E3FB-LN21	E3FB-LP21
	200 mm	-	-	2 m	-	E3FA-LN12 2M	E3FA-LP12 2M	E3FB-LN12 2M	E3FB-LP12 2M
		-	■	-	-	E3FA-LN22	E3FA-LP22	E3FB-LN22	E3FB-LP22

Radial types

Sensor type	Sensing distance	Connection method				Order code			
						E3RA (plastic housing)		E3RB (metal housing)	
						NPN output	PNP output	NPN output	PNP output
Through-beam 	15 m	-	-	2 m	-	E3RA-TN11 2M	E3RA-TP11 2M	E3RB-TN11 2M	E3RB-TP11 2M
		-	■	-	-	E3RA-TN21	E3RA-TP21	E3RB-TN21	E3RB-TP21
Retro-reflective with MSR ^{*1} 	0.1 to 3 m (with E39-R1S)	-	-	2 m	-	E3RA-RN11 2M	E3RA-RP11 2M	E3RB-RN11 2M	E3RB-RP11 2M
		-	■	-	-	E3RA-RN21	E3RA-RP21	E3RB-RN21	E3RB-RP21
Diffuse reflective 	100 mm	-	-	2 m	-	E3RA-DN11 2M	E3RA-DP11 2M	E3RB-DN11 2M	E3RB-DP11 2M
		-	■	-	-	E3RA-DN21	E3RA-DP21	E3RB-DN21	E3RB-DP21
	300 mm	-	-	2 m	-	E3RA-DN12 2M	E3RA-DP12 2M	E3RB-DN12 2M	E3RB-DP12 2M
		-	■	-	-	E3RA-DN22	E3RA-DP22	E3RB-DN22	E3RB-DP22
	700 mm	-	-	2 m	-	E3RA-DN13 2M	E3RA-DP13 2M	E3RB-DN13 2M	E3RB-DP13 2M
		-	■	-	-	E3RA-DN23	E3RA-DP23	E3RB-DN23	E3RB-DP23

*1 The Reflector is sold separately. Select the Reflector model most suited to the application.

Specifications

Straight type

Model	Sensing method		Through-beam	Retro-reflective	Coaxial Retro-reflective	Diffuse-reflective			BGS (Background suppression)	
	NPN output	Pre-wired	E3F_-TN11 2M	E3F_-RN11 2M	E3F_-RN12 2M	E3F_-DN11 2M	E3F_-DN12 2M	E3F_-DN13 2M	E3F_-LN11 2M	E3F_-LN12 2M
Item	M12 Connector	Pre-wired	E3F_-TP11 2M	E3F_-RP11 2M	E3F_-RP12 2M	E3F_-DP11 2M	E3F_-DP12 2M	E3F_-DP13 2M	E3F_-LP11 2M	E3F_-LP12 2M
		M12 Connector	E3F_-TP21	E3F_-RP21	E3F_-RP22	E3F_-DP21	E3F_-DP22	E3F_-DP23	E3F_-LP21	E3F_-LP22
Sensing distance		20 m		0.1 to 4 m	0 to 500 mm	100 mm	300 mm	1 m	100 mm	200 mm
Light source (wavelength)		Red LED (624 nm)								
Power supply voltage		10 to 30 VDC (include voltage ripple of 10%(p-p) max.)								
Operation mode		Light-ON/Dark-ON selectable by wiring								
Sensitivity adjustment		One-turn adjuster							Fixed	
Protection circuits		Reversed power supply polarity protection, Output short-circuit protection and Reversed output polarity protection								
Response time		0.5 ms								
Ambient temperature		Operating	-25 to 55°C							
		Storage	-30 to 70°C (with no icing or condensation)							
Degree of protection		IEC: IP67, DIN 40050-9: IP69K								
Material	Case and Nut	E3FA: ABS, E3FB: Nickel brass								
	Lens and Display	PMMA								
	Adjuster	POM								

Radial type

Model	Sensing method		Through-beam	Retro-reflective	Diffuse-reflective		
	NPN output	Pre-wired	E3R_-TN11 2M	E3R_-RN11 2M	E3R_-DN11 2M	E3R_-DN12 2M	E3R_-DN13 2M
Item	M12 Connector	Pre-wired	E3R_-TP11 2M	E3R_-RP11 2M	E3R_-DP11 2M	E3R_-DP12 2M	E3R_-DP13 2M
		M12 Connector	E3R_-TP21	E3R_-RP21	E3R_-DP21	E3R_-DP22	E3R_-DP23
Sensing distance		15 m		0.1 to 3 m	100 mm	300 mm	700 mm
Light source (wavelength)		Red LED (624 nm)					
Power supply voltage		10 to 30 VDC (include voltage ripple of 10%(p-p) max.)					
Operation mode		Light-ON/Dark-ON selectable by wiring					
Sensitivity adjustment		One-turn adjuster					
Protection circuits		Reversed power supply polarity protection, Output short-circuit protection and Reversed output polarity protection					
Response time		0.5 ms					
Ambient temperature		Operating	-25 to 55°C				
		Storage	-30 to 70°C (with no icing or condensation)				
Degree of protection		IEC: IP67, DIN 40050-9: IP69K					
Material	Case and Nut	E3FA: ABS, E3FB: Nickel brass					
	Lens and Display	PMMA					
	Adjuster	POM					



Compact size and shape. Can be installed almost anywhere.



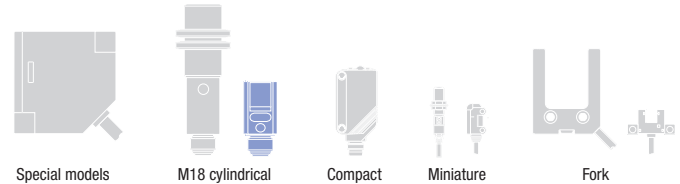
Visible LED light for easy alignment.

Transparent object detection sensor in compact M18 housing



The E3F_-B/-V provide enhanced detection stability for the detection of transparent objects. It allows an easy and intuitive adjustment to individual requirements.

- Easy adjustment to individual requirements for all transparent materials
- P-opaquing technology enables reliable detection of PET bottles also in dusty environments
- Coaxial optics (E3F_-B__1) for stable, position-independent detection



Ordering Information

Sensor type	Sensing distance	Connection method				Order code			
						E3FA (plastic housing)		E3FB (metal housing)	
						NPN output	PNP output	NPN output	PNP output
Limited distance reflective 	10 to 50 mm	-	-	2 m	-	E3FA-VN11 2M	E3FA-VP11 2M	E3FB-VN11 2M	E3FB-VP11 2M
		-	■	-	-	E3FA-VN21	E3FA-VP21	E3FB-VN21	E3FB-VP21
Coaxial retro-reflective with P-opaquing function* ¹ 	0 to 500 mm (with E39-RP1)	-	-	2 m	-	E3FA-BN11 2M	E3FA-BP11 2M	E3FB-BN11 2M	E3FB-BP11 2M
		-	■	-	-	E3FA-BN21	E3FA-BP21	E3FB-BN21	E3FB-BP21
Retro-reflective with P-opaquing function* ¹ 	0.1 to 2m (with E39-RP1)	-	-	2 m	-	E3FA-BN12 2M	E3FA-BP12 2M	E3FB-BN12 2M	E3FB-BP12 2M
		-	■	-	-	E3FA-BN22	E3FA-BN22	E3FB-BN22	E3FB-BN22

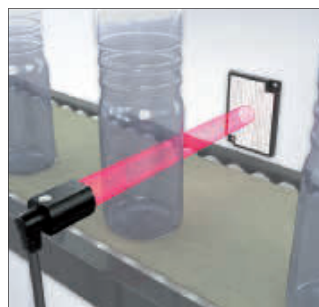
*¹ The Reflector is sold separately. Select the Reflector model most suited to the application. For PET detection E39-RP1 is recommended for best detection stability.

Ratings and Specifications

Model	Sensing method		Limited distance reflective		Retro-reflective with P-opaquing function	
	NPN output	Pre-wired M12 Connector	E3F_-VN11 2M	E3F_-VN21	E3F_-BN11 2M	E3F_-BN21
Item	PNP output	Pre-wired	E3F_-VP11 2M	E3F_-VP21	E3F_-BP11 2M	E3F_-BP12 2M
		M12 Connector	E3F_-VP21	E3F_-BP21	E3F_-BP22	E3F_-BP22
Sensing distance			10 to 50 mm		0 to 500 mm (coaxial)	0.1 to 2 m
Light source (wavelength)			Red LED (624 nm)			
Power supply voltage			10 to 30 VDC (include voltage ripple of 10%(p-p) max.)			
Operation mode			Light-ON/Dark-ON selectable by wiring			
Sensitivity adjustment			One-turn adjuster			
Protection circuits			Reversed power supply polarity protection, Output short-circuit protection and Reversed output polarity protection			
Response time			0.5 ms			
Ambient temperature		Operating	-25 to 55°C			
		Storage	-30 to 70°C (with no icing or condensation)			
Degree of protection			IEC: IP67, DIN 40050-9: IP69K			
Material	Case and Nut		E3FA: ABS, E3FB: Nickel brass			
	Lens and Display		PMMA			



Coaxial optics (E3F_-B) for detection through small holes



Reliable detection of PET bottles by unique p-opaquing technology

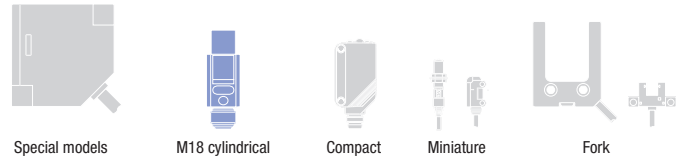


Limited-reflective types suitable for detecting transparent film to shiny, mirror film.

Standard M18 Photosensor with best price-value ratio

OMRON E3F1 series represents an M18 size Photoelectric sensor with best value at competitive price. It features the same compact housing as E3FA and meets all requirements for standard industrial applications.

- Bright visible red LED enabling easy alignment
- Reliable operation in all industrial environments
- Compact and robust housing for easy integration into machines



Ordering information

Sensor type	Sensing distance	Connection method				Order code	
						NPN output	PNP output
Through-beam 	15 m	—	—	2 m	—	E3F1-TN11 2M ^{*1}	E3F1-TP11 2M ^{*1}
		—	■	—	—	E3F1-TN21 ^{*1}	E3F1-TP21 ^{*1}
Retro-reflective ^{*2} 	0.1 to 3 m (with E39-R1S)	—	—	2 m	—	E3F1-RN11 2M	E3F1-RP11 2M
		—	■	—	—	E3F1-RN21	E3F1-RP21
Diffuse-reflective 	100 mm	—	—	2 m	—	E3F1-DN11 2M	E3F1-DP11 2M
		—	■	—	—	E3F1-DN21	E3F1-DP21
	300 mm	—	—	2 m	—	E3F1-DN12 2M	E3F1-DP12 2M
		—	■	—	—	E3F1-DN22	E3F1-DP22

^{*1} Includes the emitter and receiver.

^{*2} The Reflector is sold separately.

Specifications

Model	Sensing method		Through-beam	Retro-reflective	Diffuse-reflective	
	NPN output	Pre-wired	E3F1-TN11 2M	E3F1-RN11 2M	E3F1-DN11 2M	E3F1-DN12 2M
Item	M12 Connector	Pre-wired	E3F1-TN21	E3F1-RN21	E3F1-DN21	E3F1-DN22
		M12 Connector	E3F1-TP11 2M	E3F1-RP11 2M	E3F1-DP11 2M	E3F1-DP12 2M
		M12 Connector	E3F1-TP21	E3F1-RP21	E3F1-DP21	E3F1-DP22
Sensing distance		15 m		0.1 to 3 m	100 mm	300 mm
Light source (wavelength)		Red LED (624 nm)				
Power supply voltage		10 to 30 VDC (include voltage ripple of 10%(p-p) max.)				
Operation mode		Light-ON/Dark-ON selectable by wiring				
Sensitivity adjustment		One-turn adjuster				
Protection circuits		Reversed power supply polarity protection, Output short-circuit protection and Reversed output polarity protection				
Response time		0.5 ms				
Ambient temperature	Operating	-25 to 55°C				
	Storage	-30 to 70°C (with no icing or condensation)				
Degree of protection		IEC: IP66				
Material	Case	ABS				
	Lens and Display	PMMA				



Compact size and shape. Can be installed almost anywhere.



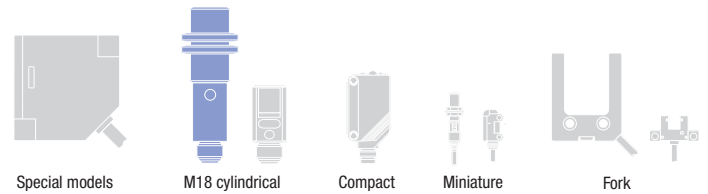
Visible LED light for easy alignment.



Photoelectric sensor in stainless steel M18 housing

For areas that undergo frequent cleaning the stainless steel housing of the E3F2-_-S provides enhanced detergent resistance and longer sensor lifetime.

- IP67, IP69K for highest water resistance
- Enhanced detergent resistance certified by ECOLAB



Ordering information

Sensor type	Sensing distance	Housing material	Connection method				Order code*1	
							NPN output	PNP output
Through-beam 	7 m	Stainless steel	-	-	2 m	-	E3F2-7C4-S 2M	E3F2-7B4-S 2M
			-	■	-	-	E3F2-7C4-M1-S	E3F2-7B4-M1-S
Retro-reflective with M.S.R. 	0.1 to 4 m*2 (adjustable)	Stainless steel	-	-	2 m	-	E3F2-R4C4-S-E 2M	E3F2-R4B4-S-E 2M
			-	■	-	-	E3F2-R4C4-M1-S-E	E3F2-R4B4-M1-S-E
Diffuse-reflective 	0.3 m (adjustable)	Stainless steel	-	-	2 m	-	E3F2-DS30C4-S 2M	E3F2-DS30B4-S 2M
			-	■	-	-	E3F2-DS30C4-M1-S	E3F2-DS30B4-M1-S
	1 m (adjustable)	Stainless steel	-	-	2 m	-	E3F2-D1C4-S 2M	E3F2-D1B4-S 2M
			-	■	-	-	E3F2-D1C4-M1-S	E3F2-D1B4-M1-S
Diffuse-reflective (background suppression) 	100 mm (fixed)	Stainless steel	-	-	2 m	-	E3F2-LS10C4-S 2M	E3F2-LS10B4-S 2M
			-	■	-	-	E3F2-LS10C4-M1-S	E3F2-LS10B4-M1-S

*1 Light-ON / Dark-ON selectable by wire

*2 Measured using E39-R1S

Specifications

Item	Through-beam	Retro-reflective with M.S.R.	Diffuse-reflective		Diffuse-reflective (background suppression)
	E3F2-7_	E3F2-R4_	E3F2-DS30_	E3F2-DS1_	E3F2-LS10_
Light source (wave length)	Infrared LED (950 nm)	Red LED (660 nm)	Infrared LED (880 nm)		Red LED (660 nm)
Power supply voltage	10 to 30 VDC				
Protective circuits	Output short-circuit protection and power supply reverse polarity protection				
Response time	2.5 ms max.	1 ms max.	2.5 ms max.	1 ms max.	
Ambient temperature	Operating	-25 to 55°C			
	Storage	-30 to 70°C (with no icing or condensation)			
Degree of protection	IEC 60529 IP67, IP69K after DIN 40050 part 9				
Material	Case	Stainless steel			
	Lens	PMMA			

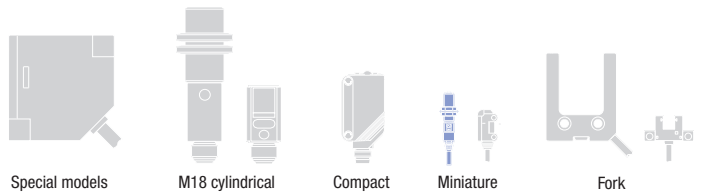


High water and detergent resistance



Miniature photoelectric sensors in cylindrical M8 and M12 housing

- M8 or M12 sized cylindrical housings when mounting space is crucial
- Retro-reflective models with two teaching modes for standard and semi-transparent objects
- pre-wired and connector models



Ordering information

M12 cylindrical housing

Sensor type	Sensing distance	Connection method				Order code ^{*1}	
						NPN output	PNP output
Through-beam 	4 m (adjustable)	–	–	2 m	–	E3H2-T4C4M 2M	E3H2-T4B4M 2M
		–	■	–	–	E3H2-T4C4M-M1	E3H2-T4B4M-M1
Retro-reflective with M.S.R. 	2 m (teachable ^{*2})	–	–	2 m	–	E3H2-R2C4M 2M ^{*3}	E3H2-R2B4M 2M ^{*3}
		–	■	–	–	E3H2-R2C4M-M1 ^{*3}	E3H2-R2B4M-M1 ^{*3}
Diffuse-reflective 	300 mm (teachable)	–	–	2 m	–	E3H2-DS30C4M 2M	E3H2-DS30B4M 2M
		–	■	–	–	E3H2-DS30C4M-M1	E3H2-DS30B4M-M1
	100 mm (fixed)	–	–	2 m	–	E3H2-DS10C4M 2M	E3H2-DS10B4M 2M
		–	■	–	–	E3H2-DS10C4M-M1	E3H2-DS10B4M-M1

^{*1} Light-ON / Dark-ON selectable by wire

^{*2} Models without teach-button are available. Contact your OMRON representative.

^{*3} Without reflector; order reflector separately

M8 cylindrical housing

Sensor type	Sensing distance	Connection method				Operation mode	Order code	
							NPN output	PNP output
Through-beam 	2 m	–	–	2 m	–	dark on	E3H2-T2C2S 2M	E3H2-T2B2S 2M
		■	–	–	–		E3H2-T2C2S-M5	E3H2-T2B2S-M5
		–	–	2 m	–	light on	E3H2-T2C1S 2M	E3H2-T2B1S 2M
		■	–	–	–		E3H2-T2C1S-M5	E3H2-T2B1S-M5

Specifications

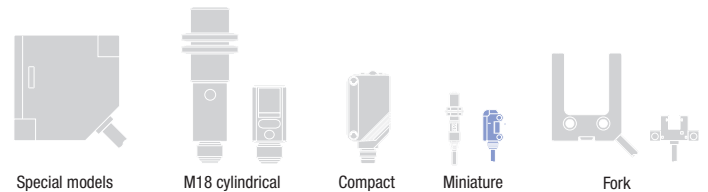
Item	Through-beam		Retro-reflective with M.S.R.	Diffuse-reflective	
	E3H2-T4	E3H2-T2	E3H2-R	E3H2-DS30	E3H2-DS10
Light source (wave length)	Infrared LED (880 nm)		Red LED (660 nm)	Infrared LED (880 nm)	
Power supply voltage	10 to 30 VDC, 10% ripple				
Protective circuits	Power supply reverse polarity protection, output short circuit protection				
Response time	2.5 ms max	1 ms max.	1.1 ms max		
Sensitivity adjustment	Potentiometer adjuster	–	Teach-in		–
Ambient temperature	Operating	-25 to +55°C	-25 to +50°C	-25 to +55°C	
Degree of protection	EN 60529: IP67				
Material	Case	nickel-plated brass	stainless steel	nickel-plated brass	
	Lens	plastic			



Photoelectric sensor in miniature plastic housing

Small sized photoelectric sensors in flat and side view shape for demanding mounting conditions.

- Small size with precision pinpoint LED where space is crucial
- 3.5 mm flat model with reliable background suppression and small black/white error
- Unique optical alignment technology ensuring minimal deviation of optical axis
- High EMC and ambient light immunity



Ordering information

Sensor type	Sensing distance	Connection method				Operation mode	Mounting screw size	Order code ^{*1}	
								NPN output	PNP output
Through-beam 	2 m	-	-	2 m	-	Light-ON	M2	E3T-ST31 2M	E3T-ST33 2M
						Dark-ON	M2	E3T-ST32 2M	E3T-ST34 2M
						Light-ON	M2	E3T-ST11 2M	E3T-ST13 2M
	1 m					Dark-ON	M2	E3T-ST12 2M	E3T-ST14 2M
						Light-ON	M3	E3T-ST11M 2M	E3T-ST13M 2M
						Dark-ON	M3	E3T-ST12M 2M	E3T-ST14M 2M
						Light-ON	M2	E3T-ST21 2M	E3T-ST23 2M
						Dark-ON	M2	E3T-ST22 2M	E3T-ST24 2M
						Light-ON	M3	E3T-ST21M 2M	E3T-ST23M 2M
300 mm	Dark-ON	M3	E3T-ST22M 2M	E3T-ST24M 2M					
	Light-ON	M2	E3T-FT11 2M	E3T-FT13 2M					
	Dark-ON	M2	E3T-FT12 2M	E3T-FT14 2M					
	Light-ON	M2	E3T-FT21 2M	E3T-FT23 2M					
	Dark-ON	M2	E3T-FT22 2M	E3T-FT24 2M					
	Light-ON	M2	E3T-SR41-C 2M ^{*3}	E3T-SR43-C 2M ^{*3}					
Retro-reflective 	30 to 200 mm ^{*2} on reflectors/ 10 to 100 mm ^{*2} on reflective foils	Dark-ON	M2	E3T-SR42-C 2M ^{*3}	E3T-SR44-C 2M ^{*3}				
		Light-ON	M2	E3T-FD11 2M	E3T-FD13 2M				
Diffuse-reflective 	5 to 30 mm	Light-ON	M3	E3T-FD11M 2M	E3T-FD13M 2M				
		Dark-ON	M2	E3T-FD12 2M	E3T-FD14 2M				
		Light-ON	M3	E3T-FD12M 2M	E3T-FD14M 2M				
		Dark-ON	M2	E3T-SL11 2M	E3T-SL13 2M				
Limited-reflective 	5 to 15 mm	Light-ON	M3	E3T-SL11M 2M	E3T-SL13M 2M				
		Dark-ON	M2	E3T-SL12 2M	E3T-SL14 2M				
		Light-ON	M3	E3T-SL12M 2M	E3T-SL14M 2M				
	5 to 30 mm	Light-ON	M2	E3T-SL21 2M	E3T-SL23 2M				
		Dark-ON	M2	E3T-SL22 2M	E3T-SL24 2M				
		Light-ON	M3	E3T-SL21M 2M	E3T-SL23M 2M				
Diffuse-reflective (background suppression) 	1 to 15 mm	Dark-ON	M3	E3T-SL22M 2M	E3T-SL24M 2M				
		Light-ON	M2	E3T-FL11 2M	E3T-FL13 2M				
	1 to 30 mm	Dark-ON	M2	E3T-FL12 2M	E3T-FL14 2M				
		Light-ON	M2	E3T-FL21 2M	E3T-FL23 2M				
Dark-ON	M2	E3T-FL22 2M	E3T-FL24 2M						

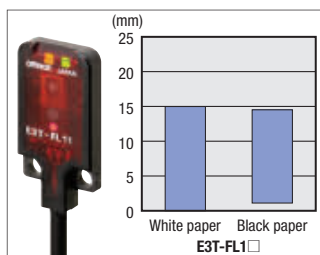
For ordering pigtail versions replace '2M' of cable types with:
 - M1J: M12 with 30 cm cable
 - M3J: M8 4-pin with 30 cm cable
 - M5J: M8 3-pin with 30 cm cable

^{*1} For pre-wired models with robotic cables add '-R' to the order code (example: E3T-FT21R 2M)
^{*2} The distances are measured with reflector E39-R4 and reflective foil E39-R37-CA. For applications with shorter distances between the sensor and the reflector contact your OMRON representative.
^{*3} Order reflector separately. Models with included reflectors are available.

Specifications

Item	Through-beam		Retro-reflective
	Side-view	Flat	Side-view
	E3T-ST1 E3T-ST2 E3T-ST3	E3T-FT1 E3T-FT2	E3T-SR4
Sensing distance	E3T-ST3_: 2 m E3T-ST1_: 1 m E3T-ST2_: 300 mm	E3T-FT1_: 500 mm E3T-FT2_: 300 mm	30 to 200 mm (with E39-R4) 10 to 100 mm (with E39-R37-CA)
Light source (wave length)	Red LED ("Pin-point" LED) $\lambda = 650$ nm		
Power supply voltage	12 to 24 VDC $\pm 10\%$, ripple (p-p) 10% max.		
Protective circuits	Power supply and control output reverse polarity protection Output short-circuit protection		Power supply and control output reverse polarity protection Output short-circuit protection, mutual interference prevention, surge suppressor
Response time	1 ms max.		
Ambient temperature	Operating	-25 to 55°C (with no icing or condensation)	
	Storage	-40 to 70°C (with no icing or condensation)	
Degree of protection	IEC60529 IP67		
Material	Case	PBT (polybutylene terephthalate)	
	Display window	Denatured polyarylate	
	Lens	Denatured polyarylate	Methacrylic resin

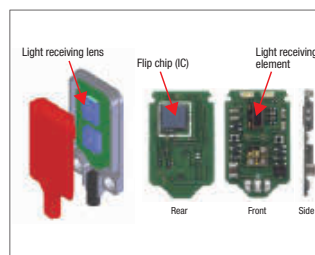
Item	Diffuse-reflective	Limited-reflective		Diffuse-reflective (background suppression)	
	Flat	Side-view		Flat	
	E3T-FD1	E3T-SL1	E3T-SL2	E3T-FL1	E3T-FL2
Sensing distance	5 to 30 mm	5 to 15 mm	5 to 30 mm	1 to 15 mm	1 to 30 mm
Black/white error	-				15% max.
Light source (wave length)	Red LED ("Pin-point" LED) $\lambda = 650$ nm				
Power supply voltage	12 to 24 VDC $\pm 10\%$, ripple (p-p) 10% max.				
Protective circuits	Power supply and control output reverse polarity protection Output short-circuit protection, Mutual interference prevention				
Response time	1 ms max.				
Ambient temperature	Operating	-25 to 55°C			
	Storage	-40 to 70°C (with no icing or condensation)			
Degree of protection	IEC60529 IP67				
Material	Case	PBT (polybutylene terephthalate)			
	Display window	Denatured polyarylate			
	Lens	Denatured polyarylate			



Minimal black / white error



The coaxial optics and the small focal lens of the retro-reflective models allow the detection of small (dia 2 mm) objects or through small holes (dia 2 mm).



The unique light receiving lens shape and the chip mounting technology, provide appropriate sensing distances for very precise and reliable detection even through smallest slits and gaps with e.g. 0.5 mm dia.



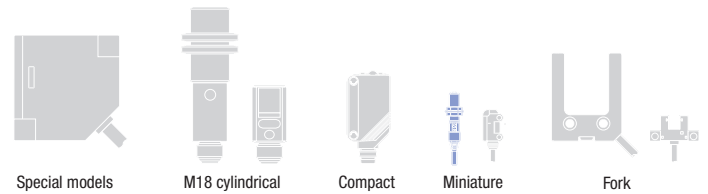
Models with mounting holes for M2 or M3 screws



Miniature photoelectric sensors in M5 and M6 sized housing

The E3T-C family of miniature photoelectric sensors is the ideal solution when mounting space is crucial.

- axial and radial M5 sized through-beam sensors
- axial M6 sized diffuse-reflective sensors
- pre-wired models in stainless steel housing



Ordering information

M5 cylindrical housing

Sensor type	Sensing distance	Connection method				Operation mode	Order code	
							NPN output	PNP output
Through-beam (axial) 	1 m	–	–	2 m	–	dark on	E3T-CT12 2M	E3T-CT14 2M
Through-beam (radial) 	500 mm	–	–	2 m	–		E3T-CT22S 2M	E3T-CT24S 2M

M6 cylindrical housing

Sensor type	Sensing distance	Connection method				Operation mode	Order code	
							NPN output	PNP output
Diffuse-reflective 	50 mm (adjustable)	–	–	2 m	–	light on	E3T-CD11 2M	E3T-CD13 2M

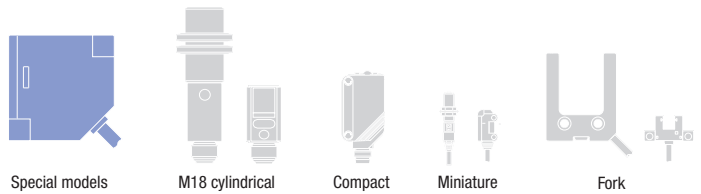
Specifications

Item	E3T-CT1_	E3T-CT2_	E3T-CD1_
Light source (wave length)	Red LED (630 nm)	Red LED (625 nm)	Infrared LED (870 nm)
Power supply voltage	12 to 24 VDC ±10%, ripple (p-p) 10% max.		
Protective circuits	Power supply reverse polarity protection, Output short-circuit protection		
Response time	0.5 ms max.		
Ambient temperature	Operating	–25 to +55°C	
	Storage	–30 to +70°C (with no icing or condensation)	
Degree of protection	IEC 60529 IP65		
Material	Case	SUS303	
	Display window	Polysulfone Epoxy	
	Lens	Polysulfone	



Distance-settable photoelectric sensor in metal housing

- Minimal black/white error for highest reliability detecting differently coloured objects (E3S-CL1)
- Setting distance up to 500 mm with reliable background suppression



Ordering information

Sensortype	Sensing distance	Connection method				Order code ^{*1}
Distance-settable (background suppression) 		-	-	■	-	E3S-CL1 2M
		-	-	-	■ M12	E3S-CL1-M1J
		-	-	■	-	E3S-CL2 2M
		-	-	-	■ M12	E3S-CL2-M1J

^{*1} Light-ON / Dark-ON switch selectable. NPN/PNP switch selectable

Specifications

Item	Distance-settable (background suppression)	
	E3S-CL1	E3S-CL2
Light source (wave length)	Red LED (700 nm)	Infrared LED (860 nm)
Black/white error ^{*1}	2% max.	10% max.
Power supply voltage	10 to 30 VDC [ripple (p-p) 10% included]	
Protective circuits	Reverse polarity protection, output short-circuit protection, mutual interference prevention	
Response time	1 ms max.	2 ms max.
Ambient temperature	-25 to 55°C (with no icing or condensation)	
Degree of protection	IEC 60529 IP67	
Material	Case	Zinc diecast
	Operation panel cover	Polyethyl sulfon
	Lens	Acrylics

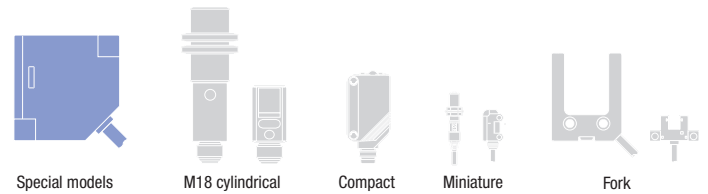
^{*1} Sensing distance difference between standard white paper (reflectivity 90%) and standard black paper (reflectivity 5%)



Long distance photoelectric sensor in plastic housing

Long distance retro-reflective and teachable distance-settable sensors in plastic housing.

- Distance-settable model with 1.2 m maximum setting distance
- M12 rotary connector or pre-wired models



Ordering information

Sensor type	Sensing distance	Connection method				Order code ^{*1}
Retro-reflective with M.S.R. 	0.5 to 10 m ^{*2}	-	-	2 m	-	E3G-R13-G 2M
		-	■	-	-	E3G-R17-G
Distance-settable (background suppression) 	0.2 to 2 m (0.2 to 1.2 m distance settable)	-	-	2 m	-	E3G-L73 2M
		-	■	-	-	E3G-L77

^{*1} Light-ON / Dark-ON switch selectable. NPN / PNP switch selectable
^{*2} Measured with E39-R2

Specifications

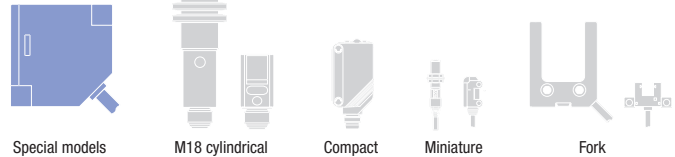
Item	Retro-reflective with M.S.R.		Distance-settable (background suppression)	
	E3G-R13-G	E3G-R17-G	E3G-L73	E3G-L77
Light source (wave length)	Red LED (700 nm)		Infrared LED (860 nm)	
Power supply voltage	10 to 30 VDC (Ripple (p-p) 10% included)		10 to 30 VDC (Ripple (p-p) 10% included)	
Protective circuits	Reverse polarity protection, output short-circuit protection, mutual interference prevention		Reverse polarity protection, output short-circuit protection, mutual interference prevention	
Response time	1 ms		5 ms	
Ambient temperature	Operating	-25 to 55°C		
	Storage	-30 to 70°C (with no icing or condensation)		
Degree of protection	IEC 60529 IP67 (with Protective Cover attached)			
Material	Case	PBT (polybutylene terephthalate)		
	Lens	Acrylics (PMMA)		



All voltage photoelectric sensor with long sensing distance

The new generation of square sized E3JK family provides significantly enhanced sensing performance and ease of operation. The family features 24 to 240 VAC power models as well as models with PNP/NPN transistor output.

- High power and visible red LED for all models enabling easy alignment and long sensing distance
- Bright indicator LEDs that are visible even at a large distance
- Best price-value ratio



Ordering information

Sensor type	Sensing distance	Connection method				Order code		
						Relay models (AC/DC)	NPN models	PNP models
Through-beam 	40 m (adjustable)	—	—	2 m	—	E3JK-TR11 2M	E3JK-TN11 2M	E3JK-TP11 2M
Retro-reflective without M.S.R. 	9 m ^{*1} (adjustable)	—	—	—	—	E3JK-RR11 2M	E3JK-RN11 2M	E3JK-RP11 2M
Retro-reflective with M.S.R. 	7 m ^{*1} (adjustable)	—	—	—	—	E3JK-RR12 2M	E3JK-RN12 2M	E3JK-RP12 2M
Diffuse-reflective 	2.5 m (adjustable)	—	—	—	—	E3JK-DR11 2M	E3JK-DN11 2M	E3JK-DP11 2M
	300 mm (adjustable)	—	—	—	—	E3JK-DR12 2M	E3JK-DN12 2M	E3JK-DP12 2M

^{*1} Measured with E39-R1S. Please order reflector separately.

Accessories

Appearance	Description	Order code
	Mounting bracket ^{*1} (A mounting bracket is not provided with the sensor. Order a mounting bracket separately if required.)	E39-L40

^{*1} When using a through-beam sensor, order one mounting bracket for the receiver and one for the emitter.

Specifications

AC models

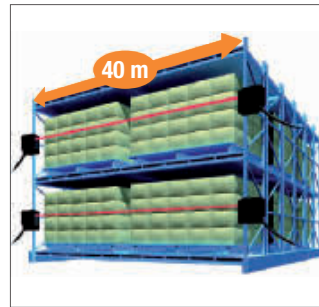
Item	Through-beam	Retro-reflective without M.S.R.	Retro-reflective with M.S.R.	Diffuse-reflective	
	E3JK-TR11	E3JK-RR11	E3JK-RR12	E3JK-DR11	E3JK-DR12
Sensing distance	40 m	9 m	7 m	2.5 m	300 mm
Light source (wave length)	Red LED (624 nm)				
Power supply voltage	24 to 240 VDC ±10% ripple (p-p): 10% max. 24 to 240 VAC ±10% 50/60 Hz				
Control output	Relay output SPDT, 250 VAC, 3 A max. (cosφ= 1), 5 VDC, 10 mA min., Light-ON/Dark-ON selectable				
Response time	20 ms max.				
Sensitivity adjustment	One-turn adjuster				
Ambient temperature	Operating				
	-25 to 55°C				
Degree of protection	Storage				
	-30 to 70°C (with no icing or condensation)				
Degree of protection	IEC60529 IP64				
Material	Case				
	ABS				
Material	Lens				
	Methacrylics (PMMA)				

DC models

Item	Through-beam		Retro-reflective without M.S.R.	Retro-reflective with M.S.R.	Diffuse-reflective	
	NPN output	E3JK-TN11	E3JK-RN11	E3JK-RN12	E3JK-DN11	E3JK-DN12
	PNP output	E3JK-TP11	E3JK-RP11	E3JK-RP12	E3JK-DP11	E3JK-DP12
Sensing distance	40 m		9 m	7 m	2.5 m	300 mm
Light source (wave length)	Red LED (624 nm)					
Power supply voltage	10 to 30 VDC, including ripple (p-p): 10%					
Control output	Open collector output (NPN/PNP), Load current: 100 mA max., Light-ON/Dark-ON selectable					
Response time	1 ms max.					
Sensitivity adjustment	One-turn adjuster					
Ambient temperature	Operating	-25 to 55°C				
	Storage	-30 to 70°C (with no icing or condensation)				
Degree of protection	IEC60529 IP64					
Material	Case	ABS				
	Lens	Methacrylics (PMMA)				



AC power-supply fits for building installations like industrial doors, elevators or car parks



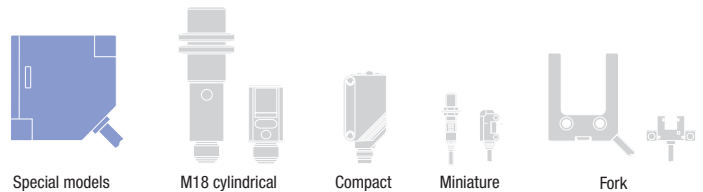
Long sensing distance up to 40 m



All voltage photoelectric sensor in plastic housing with timer function

The square sized E3JM family provides 12 to 240 VDC and 24 to 240 VAC power supply voltage, an enhanced sensing distance and a timer function.

- 12 to 240 VDC and 24 to 240 VAC supply voltage
- Relay or solid state relay output
- Models with timer function



Ordering information

Sensor type	Sensing distance	Connection method	Timer function	Order code ^{*1}		
				Relay output	DC SSR output	
					minus common	plus common
Through-beam 	10 m	Terminal block (with PG 13.5)	–	E3JM-10M4-G-N	E3JM-10S4-G-N	E3JM-10R4-G-N
			ON or OFF delay 0.1 s to 5 s (adjustable)	E3JM-10M4T-G-N	E3JM-10S4T-G-N	E3JM-10R4T-G-N
Retro-reflective with M.S.R. 	4 m		–	E3JM-R4M4-G	E3JM-R4S4-G	E3JM-R4R4-G
			ON or OFF delay 0.1 s to 5 s (adjustable)	E3JM-R4M4T-G	E3JM-R4S4T-G	E3JM-R4R4T-G
Diffuse-reflective 	700 mm (adjustable)		–	E3JM-DS70M4-G	E3JM-DS70S4-G	E3JM-DS70R4-G
			ON or OFF delay 0.1 s to 5 s (adjustable)	E3JM-DS70M4T-G	E3JM-DS70S4T-G	E3JM-DS70R4T-G

^{*1} Light-ON / Dark-ON switch selectable

Specifications

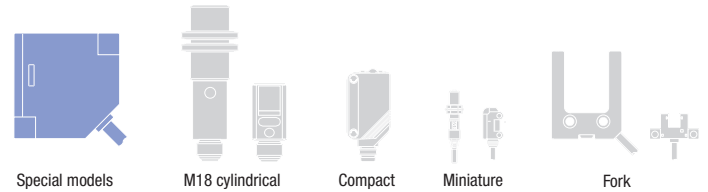
Item	Through-beam		Retro-reflective with M.S.R.		Diffuse-reflective	
	E3JM-10	E3JM-10_T	E3JM-R	E3JM-R_T	E3JM-D	E3JM-D_T
Light source (wave length)	Infrared LED (950 nm)		Red LED (660 nm)		Infrared LED (950 nm)	
Power supply voltage	12 to 240 VDC ±10% ripple (p-p) : 10% max. 24 to 240 VAC ±10% 50/60 Hz					
Control output	Relay output	250 VAC, 3 A max.; 5 VDC, 10 mA min.				
	DC SSR output	48 VDC, 100 mA max.; residual voltage 2V				
Response time	Relay output	30 ms max.				
	DC SSR output	5 ms max.				
Timer function	ON/OFF delay	–	0.1 s to 5 s	–	0.1 s to 5 s	–
Ambient temperature	Operating	-25 to 55°C				
	Storage	-30 to 70°C (with no icing or condensation)				
Degree of protection	IEC60529 IP66					
Material	Case	ABS				
	Lens	Methacrylate resin				



Long distance all voltage photoelectric sensor in plastic housing

The E3G-M series offers the long sensing distance of the E3G family for all voltage (AC and DC) installations.

- 12 to 240 VDC and 24 to 240 VAC power supply
- Terminal block connection



Ordering information

Sensor type	Sensing distance	Connection method	Timer function	Order code ^{*1}
				Relay output
Retro-reflective with M.S.R. 	0.5 to 10 m ^{*2} (Red light)	Terminal block (with PG 13.5 conduit)	–	E3G-MR19-G
			ON or OFF delay 0 to 5 s (adjustable)	E3G-MR19T-G
Distance-settable (background suppression) 	0.2 to 2 m (0.2 to 1.2 m distance settable)		–	E3G-ML79-G
			ON or OFF delay 0 to 5 s (adjustable)	E3G-ML79T-G

^{*1} Light-ON / Dark-ON switch selectable
^{*2} Measured with E39-R2

Specifications

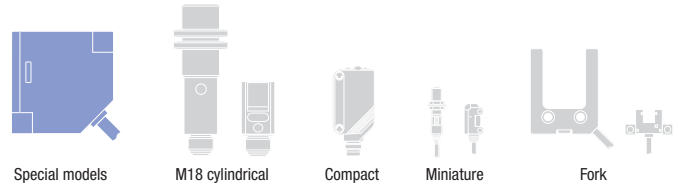
Item	Retro-reflective with M.S.R.		Distance-settable (background suppression)	
	E3G-MR19-G	E3G-MR19T-G	E3G-ML79-G	E3G-ML79T-G
Light source (wave length)	Red LED (700 nm)		Infrared LED (860 nm)	
Power supply voltage	12 to 240 VDC ±10% ripple (p-p): 10% max. 24 to 240 VAC ±10% 50/60 Hz			
Response time	30 ms			
Timer function	–	ON delay/OFF delay 0 to 5 s (Adjuster variable system)	–	ON delay/OFF delay 0 to 5 s (Adjuster variable system)
Ambient temperature	Operating	-25 to 55°C		
	Storage	-30 to 70°C (with no icing or condensation)		
Degree of protection	IEC 60529 IP67 (with protective cover attached)			
Material	Case	PBT (polybutylene terephthalate)		
	Lens	Acrylics (PMMA)		



High precision laser sensor with separate amplifier


The separate amplifier laser sensors feature sensing heads with variable spot for highest precision positioning and detection applications.

- Easy installation due to adjustable focus point and smart tuning functions
- Sensor heads up to 1.2 m sensing distance covering a wide area of applications
- High speed network connectivity to field busses like EtherCAT



Ordering information

Sensor heads




Sensor type	Sensing distance	Remarks	Order code
 Diffuse-reflective	1,200 mm	Variable spot (diffuse reflective)	E3NC-LH02 2M
	70±15 mm	Fixed spot (limited reflective)	E3NC-LH01 2M

Amplifier units



Item	Order code					
	pre-wired		with connector ^{*1}		M8 connector	
	NPN output	PNP output	NPN output	PNP output	NPN output	PNP output
2 outputs + 1 input models	E3NC-LA21 2M	E3NC-LA51 2M	–	–	–	–
1 output + 1 input models	–	–	E3NC-LA7	E3NC-LA9	E3NC-LA24	E3NC-LA54
Networking model ^{*2}	E3NC-LA0					

^{*1} order connector (E3X-CN21_) separately from accessories
^{*2} for network connection please order networking unit E3NW

Amplifier connectors

Shape	Type	Comment	Order code
	Amplifier connector	2 m PVC cable	E3X-CN21
		30 cm PVC cable with M12 plug connector (4 pin)	E3X-CN21-M1J 0.3M
		30 cm PVC cable with M8 plug connector (4 pin)	E3X-CN21-M3J-2 0.3M

Communication units

Shape	Communications method	Applicable Amplifier Units	Order code
	Sensor communication unit for EtherCAT	E3NX-FA0 E3NC-LA0 E3NC-SA0	E3NW-ECT
	Sensor dispersion (slave) unit		E3NW-DS

Specifications

Sensor heads

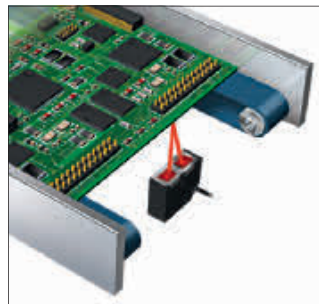
Item	Diffuse-reflective	
	E3NC-LH02	E3NC-LH01
Light source (emission wave length)	Red laser diode (660 nm), 315 µW max. (JIS Class 1, IEC/EN Class 1, and FDA Class 1)	
Sensing distance	Giga-power mode (GIGA): 1,200 mm Standard mode (Std): 750 mm High-speed mode (HS): 250 mm Super-high-speed mode (SHS): 200 mm	70±15 mm
Beam size (typical)	0.8 mm max. (at distances up to 300 mm)	0.1 mm (at 70 mm)
Degree of protection	IEC60529 IP65	

Amplifier units

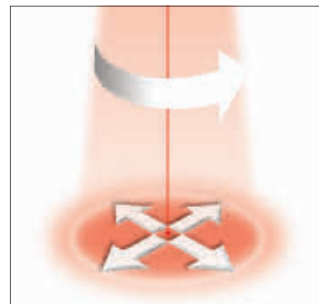
Item	2 output/1 input models		1 output/1 input models	Networking models
	NPN output	E3NC-LA21	E3NC-LA7/E3NC-LA24	E3NC-LA0
	PNP output	E3NC-LA51	E3NC-LA9/E3NC-LA54	
Outputs	2 outputs		1 output	2 outputs
Inputs	1 input			–
Supply voltage	10 to 30 VDC±10%, ripple (p-p) 10% max.			
Response time	Super-high-speed mode	80 µs		
	High-speed mode	250 µs		
	Standard mode	1 ms		
	Giga-power mode	16 ms		
Functions	Smart tuning	2-point tuning, full auto tuning, position tuning, maximum sensitivity tuning, power tuning, or percentage tuning (–99% to 99%)		
	Timer function	Select from timer disabled, OFF-delay, ON-delay, one-shot, or ON-delay + OFF-delay timer: 1 to 9,999 ms		
	Eco mode	Select from OFF (digital displays lit) or ECO (digital displays not lit)		
	Bank switching	Select from banks 1 to 4		
	Dynamic Power Control (DPC)	Provided (automatically controls light intensity and compensates incident level changes)		
Ambient temperature range	Operating	–10 to 55°C		
	Storage	–25 to 70°C (with no icing or condensation)		
Digital display	7-segment displays (sub digital display: green, main digital display: white) Display direction: switchable between normal and reversed			
Degree of protection	IP50 (IEC 60529)			



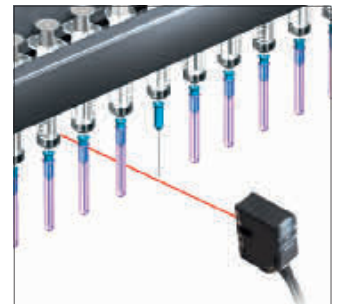
Integration into new N-Smart platform



High precision positioning



Focal point adjustment



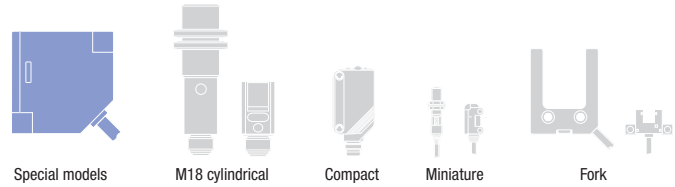
High precision detection over long range



High precision laser CMOS sensor with separate amplifier


The separate amplifier high-precision photoelectric sensors feature advanced CMOS laser sensors for high precision positioning and reliable background suppression.

- High detection stability independent from color or surface structure
- Robust IP67 sensing heads for industrial applications
- Network connectivity to field busses like EtherCAT



Ordering information

Sensor heads

Sensor type	Sensing distance	Order code
Diffuse-reflective (distance-settable) 	35–100 mm	E3NC-SH100 2M
	35–250 mm	E3NC-SH250 2M



Amplifier units

Item	Order code					
	pre-wired		with connector ^{*1}		M8 connector	
	NPN output	PNP output	NPN output	PNP output	NPN output	PNP output
2 outputs + 1 input models	E3NC-SA21 2M	E3NC-SA51 2M	–	–	–	–
1 output + 1 input models	–	–	E3NC-SA7	E3NC-SA9	E3NC-SA24	E3NC-SA54
Networking model ^{*2}	E3NC-SA0					



^{*1} order connector (E3X-CN21_) separately from accessories

^{*2} for network connection please order networking unit E3NW

Amplifier connectors

Shape	Type	Comment	Order code
	Fiber amplifier connector	2 m PVC cable	E3X-CN21
		30 cm PVC cable with M12 plug connector (4 pin)	E3X-CN21-M1J 0.3M
		30 cm PVC cable with M8 plug connector (4 pin)	E3X-CN21-M3J-2 0.3M

Communication units

Shape	Communications method	Applicable Amplifier Units	Order code
	Sensor communication unit for EtherCAT	E3NX-FA0 E3NC-LA0 E3NC-SA0	E3NW-ECT
	Sensor dispersion (slave) unit		E3NW-DS

Specifications

Sensor heads

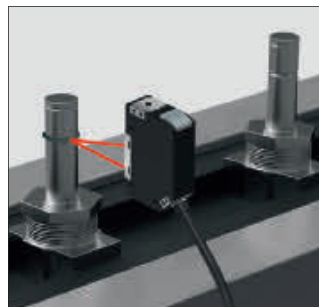
Item	Diffuse-reflective (distance-settable)	
	E3NC-SH250	E3NC-SH100
Light source (emission wave length)	Red laser diode (660 nm), 100 μ W max. (JIS Class 1, IEC/EN Class 1, and FDA Class 1)	
Measurement range	35 to 250 mm (display value: 350 to 2,500)	35 to 100 mm (display value: 350 to 1,000)
Spot diameter	1 mm (at 250 mm)	0.5 mm (at 100 mm)
Degree of protection	IEC60529 IP67	

Amplifier units

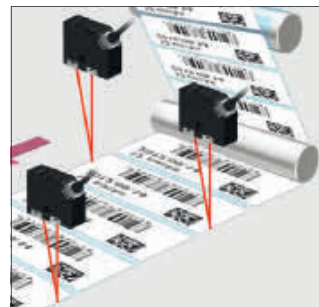
Item	2 output/1 input models		1 output/1 input models	Networking models
	NPN output	E3NC-SA21	E3NC-SA7/E3NC-SA24	E3NC-SA0
	PNP output	E3NC-SA51	E3NC-SA9/E3NC-SA54	
Outputs	2 outputs		1 output	2 outputs
Inputs	1 input			–
Supply voltage	10 to 30 VDC \pm 10%, ripple (p-p) 10% max.			
Response time	Super-high-speed mode	1.5 ms		
	High-speed mode	5 ms		
	Standard mode	10 ms		
	Giga-power mode	50 ms		
Functions	Smart tuning	2-point tuning, full auto tuning, 1-point tuning, tuning without workpiece, 2-point area tuning, 1-point area tuning, or area tuning without workpiece		
	Timer function	Select from timer disabled, OFF-delay, ON-delay, one-shot, or ON-delay + OFF-delay timer: 1 to 9,999 ms		
	Bank switching	Select from banks 1 to 4		
Ambient temperature range	Operating	–10 to 55°C		
	Storage	–25 to 70°C (with no icing or condensation)		
Digital display	7-segment displays (sub digital display: green, main digital display: white) Display direction: switchable between normal and reversed.			
Degree of protection	IP50 (IEC 60529)			



Integration into new N-Smart platform



Detection of presence of rubber O-Ring



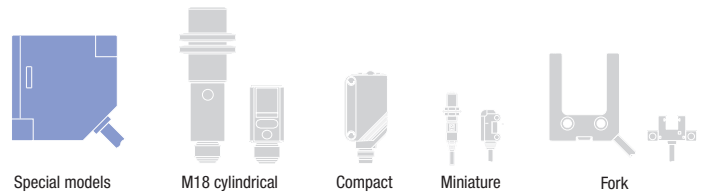
Precise positioning of packaging foil

Photoelectric sensor for structured object detection in plastic housing



The special wide beam and limited-reflective optics of the E3S-LS3 ensures reliable detection of structured objects (with holes or different heights) and can be used for example to detect printed circuit boards (PCBs).

- Wide beam and limited-reflective optics for the reliable detection of structured, shiny and irregularly shaped objects



Ordering information

Sensor type	Sensing distance	Connection method				Timer function	Output	Order code
								Light ON
Limited-reflective 	20 to 35 mm (Red light)	–	–	2 m	–	No	NPN	E3S-LS3N 2M
	10 to 60 mm (Red light)	–	–	2 m	–	No	PNP	E3S-LS3NW 2M
	20 to 35 mm	–	–	2 m	–	No		E3S-LS3P 2M
		–	–	–	■ M8 3-pin	No		E3S-LS3PT 2M
	10 to 60 mm	–	–	–	■ M8 4-pin	No		E3S-LS3P-M5J
		–	–	–	■ M8 4-pin	Yes		E3S-LS3PT-M5J
	10 to 60 mm	–	–	2 m	–	No		E3S-LS3P-M3J
		–	–	–	■ M8 3-pin	Yes		E3S-LS3PT-M3J
	10 to 60 mm	–	–	2 m	–	No		E3S-LS3PW 2M
		–	–	–	■ M8 3-pin	Yes		E3S-LS3PW-M5J
	10 to 60 mm	–	–	–	■ M8 4-pin	No		E3S-LS3PW-M3J
		–	–	–	■ M8 4-pin	Yes	E3S-LS3PWT-M3J	

Specifications

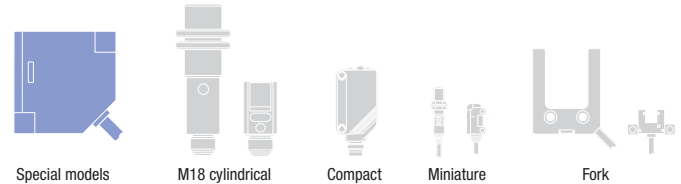
Item	Limited-reflective E3S-LS3	
Light source (wave length)	Red LED (660 nm)	
Power supply voltage	12 to 24 VDC ±10%, ripple (p-p) 10% max.	
Response time	1 ms max.	
Timer function	Available with E3S-LS3P(W)T models only. Time range: 0.1 to 1.0 s (adjustable)	
Ambient temperature	Operating	-10 to 55°C (with no icing or condensation)
	Storage	-25 to 70°C (with no icing or condensation)
Degree of protection	IEC60529 IP40	
Material	Case	ABS
	Lens	Acrylic



High precision Laser sensor with separate amplifier



The separate amplifier high-precision photoelectric sensors feature a large variety of different laser sensing heads for highest precision positioning and detection applications.

- Easy installation due to adjustable focus point and optical axis
- Wide range sensor head portfolio with different laser beam shapes
- Controller functions with easy wiring concept and power tuning function



Ordering information

Sensor heads



Sensor type	Beam type	Remarks	Order code
Diffuse-reflective 	Spot	Mounting a beam unit (sold separately) allows the use of line and area beams	E3C-LD11 2M
	Line	This model number is for the set consisting of the E39-P11 mounted to the E3C-LD11	E3C-LD21 2M
	Area	This model number is for the set consisting of the E39-P21 mounted to the E3C-LD11	E3C-LD31 2M
Retro-reflective with M.S.R. (coaxial) 	Spot (variable)	Mounting a beam unit (sold separately) allows the use of line and area beams	E3C-LR11 2M
	Spot (2.0 mm fixed dia.)	–	E3C-LR12 2M

Amplifier units

Item	Functions	Order code			
		pre-wired		with connector ^{*1}	
		NPN output	PNP output	NPN output	PNP output
Twin-output models	Area output, self-diagnosis, differential operation	E3C-LDA11	E3C-LDA41	E3C-LDA6	E3C-LDA8
External-input models	Remote setting, counter, differential operation	E3C-LDA21	E3C-LDA51	E3C-LDA7	E3C-LDA9
ATC models	Active threshold control	E3C-LDA11AT	E3C-LDA41AT	E3C-LDA6AT	E3C-LDA8AT
Analog models	Analog output	E3C-LDA11AN	E3C-LDA41AN	–	–

^{*1} order connector (E3X-CN21_) separately from accessories

Amplifier connectors

Shape	Type	Comment	Order code
	Fiber amplifier connector	2 m PVC cable	E3X-CN21
		30 cm PVC cable with M12 plug connector (4 pin)	E3X-CN21-M1J 0.3M
		30 cm PVC cable with M8 plug connector (4 pin)	E3X-CN21-M3J-2 0.3M

Specifications

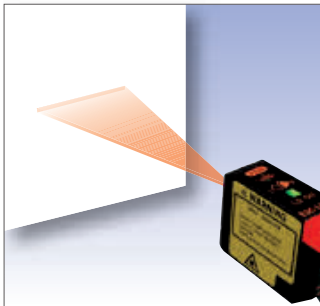
Sensor heads

Item	Diffuse-reflective			Retro-reflective with M.S.R. (coaxial)			
	E3C-LD11	E3C-LD21	E3C-LD31	E3C-LR11	E3C-LR11 + E39-P31	E3C-LR11 + E39-P41	E3C-LR12
Light source (emission wave length)	Red semiconductor laser diode (650 nm), 2.5 mW max. (JIS standard: Class 2, FDA standard: Class II)						1 mW max. (JIS standard Class 1)
Sensing distance	High-resolution mode: 30 to 1,000 mm Standard mode: 30 to 700 mm Super-high-speed mode: 30 to 250 mm			7 m 5 m 2 m	1,700 mm, 1,300 mm 700 mm	900 mm 700 mm 400 mm	7 m 5 m 2 m
Beam size (typical)	0.8 mm max. (at distances up to 300 mm)	33 mm (at 150 mm)	33x15 mm (at 150 mm)	0.8 mm max. (at distances up to 1,000 mm)	28 mm (at 150 mm)	28 × 16 mm (at 150 mm)	2.0 mm dia. (at distances up to 1,000 mm)
Functions	Variable focal point mechanism (beam size adjustment), optical axis adjustment mechanism (axis adjustment)						
Degree of protection	IEC60529 IP40						

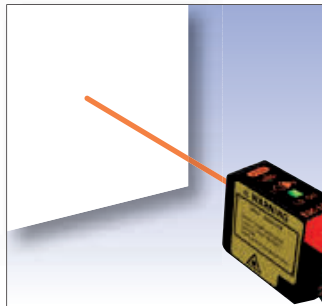
Amplifier units

Item	External-input models				Twin-output models		ATC-output models		Analog output models
	NPN output	E3C-LDA21	E3C-LDA7	E3C-LDA11	E3C-LDA6	E3C-LDA11AT	E3C-LDA6AT	E3C-LDA11AN	
	PNP output	E3C-LDA51	E3C-LDA9	E3C-LDA41	E3C-LDA8	E3C-LDA41AT	E3C-LDA8AT	E3C-LDA41AN	
Supply voltage		12 to 24 VDC±10%, ripple (p-p) 10% max.							
Re-sponse time	Super-high-speed mode	80 µs			100 µs				
	High-speed mode	250 µs							
	Standard mode	1 ms							
	High-resolution mode	4 ms							
Func-tions	Differential detection	Switchable between single edge and double edge detection mode Single edge: Can be set to 250 µs, 500 µs, 1 ms, 10 ms, or 100 ms Double edge: Can be set to 500 µs, 1 ms, 2 ms, 20 ms, or 200 ms							
	Timer function	Select from OFF-delay, ON-delay, or one-shot timer 1 ms to 5 s (1 to 20 ms set in 1-ms increments, 20 to 200 ms set in 10 ms increments, 200 ms to 1 s set in 100-ms increments, and 1 to 5 s set in 1 s increments)							
	Counter	Switchable between up counter and down counter Set count: 0 to 9,999,999			-				
	Analog output	-							1 to 5 VDC
	I/O settings	External input setting (Select from teaching, power tuning, zero reset, light OFF, or counter reset)			Output setting (Select from channel 2 output, area output, or self-diagnosis)		Output setting (Select from channel 2 output, area output, self-diagnosis, or ATC error output)		Analog output offset voltage adjustment
Digital display		Select from digital incident level + threshold or six other patterns							
Display orientation		Switching between normal/reversed display is possible							
Degree of protection		IP50 (IEC 60529)							

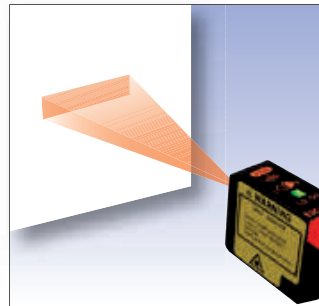
Full control over the beam shape



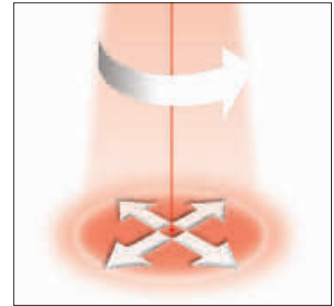
Line beam



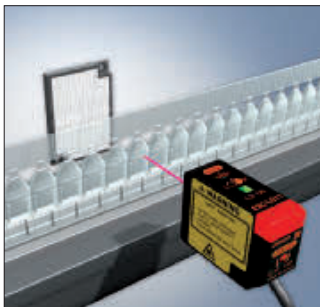
Spot beam



Area beam



Axis and focal point adjustment



High precision positioning and detection over long range

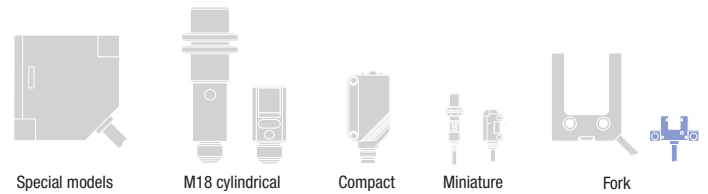
Diffuse reflective: 1 m
Retro-reflective: 7 m



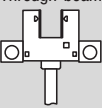
Photomicrosensor in 13 mm plastic fork shape housing

With a slot width of 13 mm the EE-SPX_03 provides stable detection of machine parts or smaller objects.

- 13 mm slot width
- 12 to 24 VDC supply voltage



Ordering information

Sensor type	Sensing distance	Connection method	Operation mode	Order code	
				NPN output	PNP output
Through-beam 	13 mm (slot width) (infrared light)	Connector 3-pin ^{*1}	Dark-ON	EE-SPX303N	EE-SPX303N + EE-2002
			Light-ON	EE-SPX403N	EE-SPX403N + EE-2002

^{*1} Order connector separately from accessories for either NPN or PNP types

Accessories

Type	Cable	Comment	Order code
Cable connector	2M PVC	For NPN types only (cannot be combined with EE-2002)	EE-1010 2M
	2M robotic PVC		EE-1010-R 2M
NPN/PNP conversion cable	0.5 m incl converter	Special cable to convert NPN to PNP + Brown OUT Black - Blue	EE-2002

Specifications

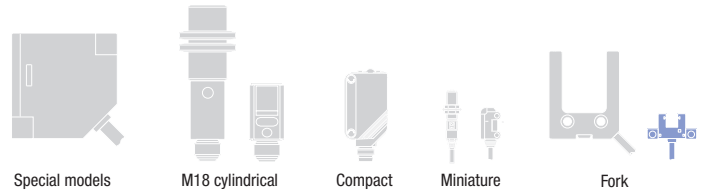
Item	Through-beam
Power supply voltage	12 to 24 VDC ±10% max. ripple (p-p): 5% max.
Response frequency	100 Hz min
Ambient temperature	Operating
	Storage
Degree of protection	IEC 60529 IP50
Material	Case
	Polycarbonate

Photomicrosensor in 5 mm plastic fork shape housing



The small sized EE-SX97 family of photomicrosensors provides accurate detection of machine parts or small objects independent of material or magnetic fields and at best value for money.

- Response frequency up to 1 kHz
- Space saving housing and connector integration



Ordering information

Connector models

Sensor type	Sensing distance	Connection method	Operation Mode	Shape ^{*1}	Order code ^{*2}	
					NPN output	PNP output
Through-beam 	5 mm (slot width) (Infrared light)	Connector (4 pin) ^{*3}	Dark-ON/Light-ON (selectable)	Standard	EE-SX970-C1	EE-SX970P-C1
				L-shaped	EE-SX971-C1	EE-SX971P-C1
				T-shaped, 7 mm	EE-SX972-C1	EE-SX972P-C1
				Close-mounting	EE-SX974-C1	EE-SX974P-C1
				T-shaped, 10 mm	EE-SX975-C1	EE-SX975P-C1
				F-shaped	EE-SX976-C1	EE-SX976P-C1
				R-shaped	EE-SX977-C1	EE-SX977P-C1

^{*1} For shape dimensions and variations see dimensions in back of the guide or refer to www.industrial.omron.eu

^{*2} Antivalent output (Light-ON and Dark-ON output available on different pins)

^{*3} Order the special connector separately from the cable connector section. For pre-wired models with 1m cable refer to EE-SX67 family in complete datasheet.

Specifications

Item	Through-beam
Power supply voltage	5 to 24 VDC ±10%, ripple (p-p): 10% max.
Response frequency	1 kHz min. (3 kHz average)
Ambient temperature	Operating
	Storage
Degree of protection	IEC60529 IP50
Material	Case
	Lens



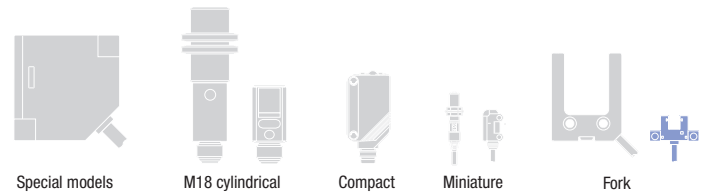
Easy to mount end position detection / limit sensors (contactless).



Photomicrosensor in thin 5 mm fork shape plastic housing

Thin shaped photomicrosensor for space saving mounting.

- Compact, thin profile enables mounting where space is crucial
- Indicator is visible from both sides
- Operating voltage range: 5 to 24 VDC



Ordering information

Pre-wired models

Sensor type	Sensing distance	Connection method				Shape ^{*1}	Operation mode	Order code	
								NPN output	PNP output
Through-beam 	5 mm (slot width) (Infrared light)	—	—	2 m	—	Standard	Dark-ON	EE-SX770	EE-SX770P
		—	—	—	—		Light-ON	EE-SX870	EE-SX870P
		—	—	—	—	L-shaped	Dark-ON	EE-SX771	EE-SX771P
		—	—	—	—		Light-ON	EE-SX871	EE-SX871P
		—	—	—	—	T-shaped	Dark-ON	EE-SX772	EE-SX772P
		—	—	—	—		Light-ON	EE-SX872	EE-SX872P

*1 For shape dimensions refer to www.industrial.omron.eu

Specifications

Item	Through-beam	
	EE-SX77/EE-SX87	
Sensing distance	5 mm (slot width)	
Power supply voltage	5 to 24 VDC ±10%, ripple (p-p): 10% max.	
Response frequency	1 kHz min. (3 kHz average)	
Ambient temperature	Operating	-25 to +55°C
	Storage	-30 to +80°C (with no icing)
Degree of protection	IEC60529 IP60	
Material	Case	PBT (polybutylene terephthalate)
	Lens	Polycarbonate

Reflectors for retro-reflective photoelectric sensors

Shape	Type	Housing material	Features	Size in mm	Applicable Sensor	Order code		
	General purpose reflectors	<ul style="list-style-type: none"> • ABS base • Acrylic surface 	Surface screw mounting (diagonal holes)	40x60x7.5	<ul style="list-style-type: none"> • Retro-reflective photoelectric sensors - without M.S.R • Retro-reflective photoelectric sensors - with M.S.R. 	E39-R1S		
			Surface screw mounting (holes on one side only)	35.4x42.3x8		E39-R9		
				51.4x60.3x8.5		E39-R42		
	Small size		Side screw mounting or surface selfadhesive	41.8x22.5x11		E39-R3		
			Surface screw mounting	23x13.7x4.9		E39-R4		
	Large size			100x100x9		E39-R8		
				84.5x84.5x8.7		E39-R40		
	High precision		Microripel for improved performance with fine beam sensors			52x40x4.8	Recommended for fine beam coaxial models (E3C-LR, E3S-CR62/67, E3T-SR4)	E39-R6
						30x45		E39-R12
				14x23x1	E39-R37-CA			
				12x24	E39-R13			
		Simple mounting		Round shape with centered mounting hole for simple screw mounting	Diameter: 84 Depth: 7.4	Photoelectric sensors with and without M.S.R.		E39-R7
	Snap mounting	Snap mounting for fast installation	Diameter: 30 Diameter of snap mount tool: 5	Recommended for snap mounting sensor E3FZ	E39-R49			

Note: the ambient operating temperature is -25°C to 55°C unless otherwise specified


Shape	Type	Housing material	Features	Size in mm	Applicable Sensor	Order code		
	Enhanced detergent resistance	<ul style="list-style-type: none"> PVC 	<ul style="list-style-type: none"> Surface screw mounting IP69k after DIN 40050 part 9 	40x60x7.5	Recommended for harsh environment sensors	E39-R50		
				20x60x6		E39-R51		
	Highest detergent resistance	<ul style="list-style-type: none"> SUS316L Borosilicat 	<ul style="list-style-type: none"> Surface screw mounting 	43x30x5		E39-R16		
	Heat resistant	<ul style="list-style-type: none"> Borosilicat 	<ul style="list-style-type: none"> Surface screw mounting 450°C heat resistance Suitable for vacuum environment 	95x51x8		E39-R47		
	Non-fogging reflector	<ul style="list-style-type: none"> ABS Acrylic surface 	Anti-fogging coating	40x60x7.5		E39-R1K		
	Special polarizing	<ul style="list-style-type: none"> ABS base PMMA surface 	Special polarizing filter to PET	44x80x8.5		E3ZM-B	E39-RP1	
	General purpose tape reflectors	<ul style="list-style-type: none"> Acrylic 	<ul style="list-style-type: none"> Self adhesive Pre cut 	35x10x0.6		Photoelectric sensors with and without M.S.R.	E39-RS1	
				40x35x0.6			Optimised for E3T-SR4	E39-RS1-CA
				80x70x0.6	Optimised for E3T-SR4	E39-RS2		
						Optimised for E3T-SR4	E39-RS2-CA	
							E39-RS3	
							Optimised for E3T-SR4	E39-RS3-CA
						<ul style="list-style-type: none"> Self adhesive Cut-to-length, roll material 	25 mm x 5 m	E39-RS25 5 m
							25 mm x 22.8 m	E39-RS25 22.8 m
							50 mm x 5 m	E39-RS50 5 m
							50 mm x 22.8 m	E39-RS50 22.8 m
	High precision tape reflectors		<ul style="list-style-type: none"> Self adhesive Pre cut 	195x22	Recommended for fine beam and laser sensors (E3S-CR62/67, E3C, E3X)	E39-RS4		
				108x46		E39-RS5		

Note: Note: the ambient operating temperature is -25°C to 55°C unless otherwise specified

Mounting brackets

Shape	Type	Material	Features	Order code
	M8 nuts	brass	100 pcs	ASMM0800
		stainless steel		ASMM0801
	M12 nuts	brass		ASMM1200
	M18 nuts			ASMM1800
		stainless steel		ASMM1802
		plastic	1 pc	ASMK1802
	M30 nuts	brass	100 pcs	ASMM3000
	M8 Washer	brass	1,000 pcs	ASZA0800
	M12 Washer			ASZA1200
		stainless steel	500pcs	ASZA1201
	M18 Washer	brass	100 pcs	ASZA1801
		stainless steel	200 pcs	ASZA1802
	M30 Washer	brass	100 pcs	ASZA3001

Mounting brackets

Shape	Type	Order code
	Quick access - snap fix for cylindrical sensors; sizes M8, M12, M18, M30	Y92E-BC08 Y92E-BC12 Y92E-BC18 Y92E-BC30
	Surface mounting for snap mount sensor E3FZ (dia 20mm hole)	E39-EL8
	Surface mounting for M18 cylindrical sensors (dia 18mm)	E39-EL12
	Telescope mounting for 12 mm rod for snap mount sensor E3FZ	E39-EL9
	Standard-surface mounting (for pre-wired or pigtail models)	E39-L104 ^{*1}
	Standard-backwall mounting	E39-L44 ^{*1}
	Protection-wall mounting (for pre-wired or pigtail models)	E39-L142 ^{*1}
	Protection-surface mounting	E39-L98 ^{*1}
	Telescope mounting	E39-L93FH
	3D rotation mounting	E39-EL4
	Snap mount accessory for E3Z (for 3mm wall thickness; hole size 33 x 14.5mm, 10 pcs. per package)	E39-EL7S-E3Z

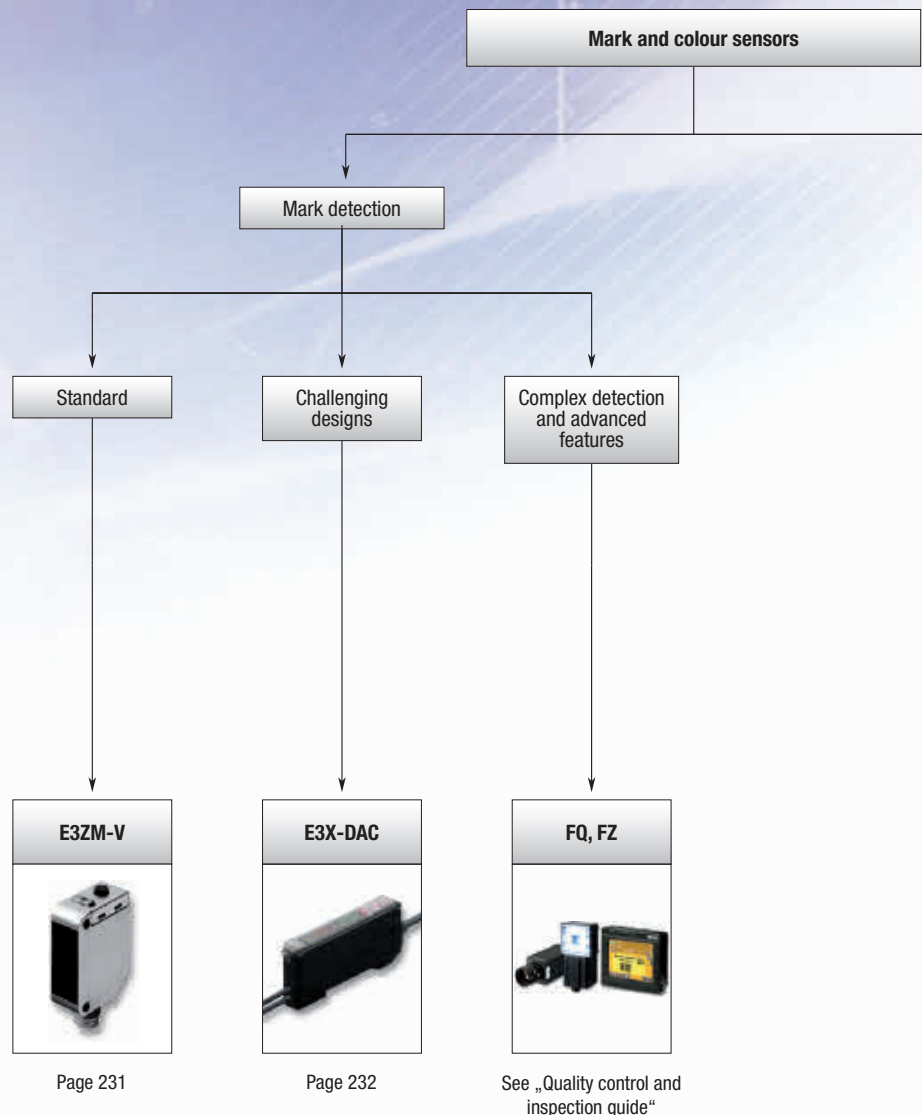
^{*1} The order references are examples for the E3Z sensor family. Refer to the sensor accessory datasheet E26E for the complete list of mounting brackets.

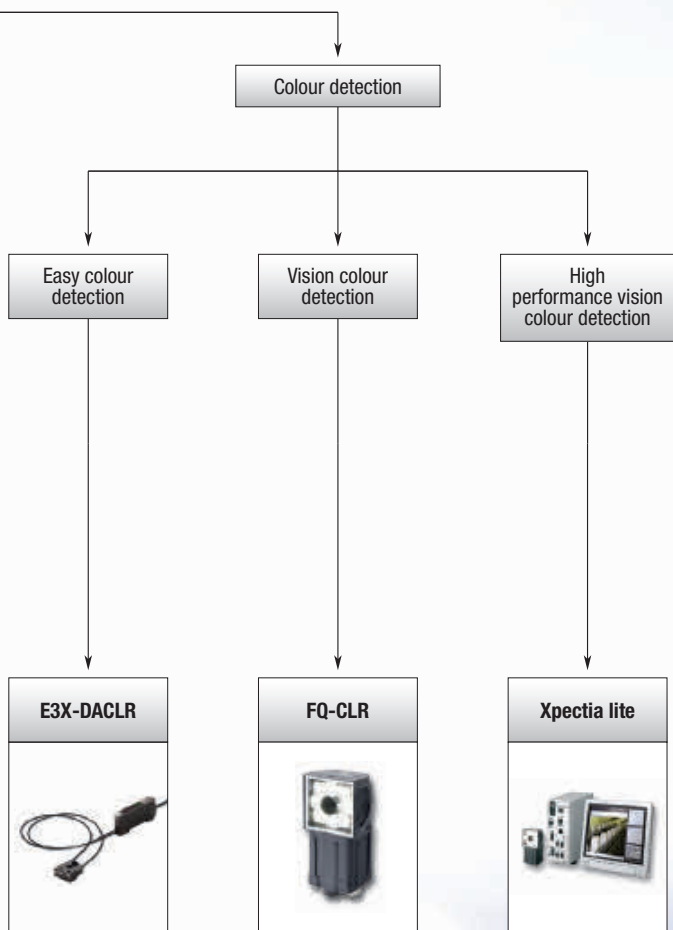
FAST ADAPTION TO CHANGING PACKAGINGS

Choose the performance you need

Packaging machines have to adapt quickly to a large variety of different packaging designs with minimal change-over time and no quality loss. For sensors detecting registration marks or colours this requires flexibility and simplicity in handling while keeping the precision and operational stability. At OMRON we closely work together with leading packaging machine makers to evaluate the requirements for sensors from commonly used packaging material as well as most critical designs or materials. Our portfolio is set up to balance the performance and budget requirements in these situations ... simply choose the performance you need.

- Reliable mark detection even in changing environmental conditions during machine operation
- Fast and easy setup up after packaging material exchange
- Performance levels fitting the machine value concept











Page 234

Page 235

See „Quality control and inspection guide“

Type	Standard print mark detection	Challenging designs	Complex detection and advanced features
			
Model	E3ZM-V	E3X-DAC	FQ, FZ
Key feature	White LED, stainless steel housing	White LED, RGB ratio comparison and extended functionality	High performance vision inspection functionality
Detection distance	12±2mm	5–50mm	See QUALITY CONTROL AND INSPECTION GUIDE
Response time	50 µs	60 µs	
Page	231	232	

Type	Easy colour detection	Vision colour detection	High performance vision colour detection
			
Model	E3X-DACLR	FQ-CLR	Xpectia lite
Key feature	Easy one-button teach operation		
No of simultaneous colour inspections	1 to 4	1 to 32	1 to 128
Output	Colour detected – digital out	■	■
	RGB value out (via ethernet)	–	■
	HSI value out (via ethernet)	–	■
Tolerance adjustment	Auto tolerance	■	–
	Teachable	■	■
	Manually adjustable	–	■
	Advanced	–	■
Page	234	235	See QUALITY CONTROL AND INSPECTION GUIDE



Registration mark sensor in compact stainless steel housing

The registration mark detection sensor in a compact stainless steel housing provides reliable detection of all common registration marks in food packaging applications.

- White LED for stable detection of differently coloured or black print marks
- SUS 316L stainless steel housing
- Easy-to-use teach-in button or remote teach
- Fast response time of 50 μ s

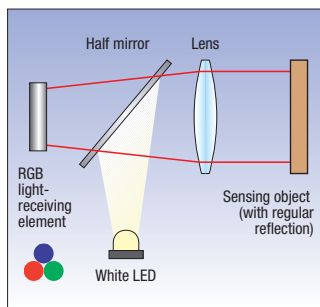
Ordering information

Sensor type	Sensing distance	Connection method				Order code ^{*1}	
						NPN output	PNP output
Mark sensor 	12 \pm 2 mm	–	–	2 m	–	E3ZM-V61 2M	E3ZM-V81 2M
			–	–	–	–	E3ZM-V66

^{*1} The output configuration (ON or OFF when mark is detected) is teachable. Common operation is output is ON when mark is detected.

Specifications

Item	NPN	E3ZM-V6
	PNP	E3ZM-V8
Light source (wave length)	White LED (450 to 700 nm)	
Power supply voltage	10 to 30 VDC \pm 10%, ripple (p-p) 10% max.	
Protective circuits	Reversed power supply polarity protection, output short-circuit protection, Reversed output polarity protection, and mutual interference prevention	
Ambient temperature	Operating	-25°C to 55°C
	Storage	-40°C to 70°C (with no icing or condensation)
Response time	50 μ s	
Degree of protection	IEC: IP67, DIN 40050-9: IP69K	
Material	Case	SUS316L
	Lens	PMMA (polymethylmethacrylate)
	Display	PES (polyether sulfone)
	Sensitivity adjustment and operation switch	PEEK (polyether ether ketone)
	Seals	Fluoro rubber



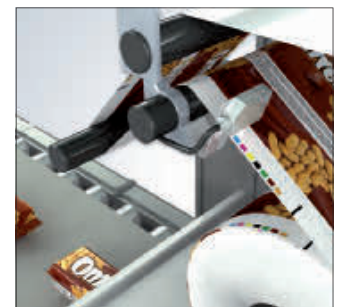
Coaxial optical system with white LED



Remote teaching



Detergent resistant



Reliable detection of standard or semi-transparent marks at normal or high speed



E3X-DAC-S high functionality mark detection sensor

The E3X-DAC-S provides reliable mark detection for standard as well as challenging applications. The separate sensing head setup allows the easy adaption to the mounting requirements even when space is crucial. The remote amplifier provides easy teaching for standard applications but also on demand full control over the detection performance for most challenging applications.

Ordering information

Pre-wired

Item	Functions	Order code (for pre-wired types with 2 m cable length)	
		NPN output	PNP output
Standard models	Timer, response speed change	E3X-DAC11-S	E3X-DAC41-S
Advanced models	Same as standard models + simultaneous determination (2 colours) AND/OR output, remote setting	E3X-DAC21-S	E3X-DAC51-S

Connector versions

Item	Functions	Order code	
		NPN output	PNP output
Standard models (fiber amplifier connector) *1	Timer, response speed change	E3X-DAC6-S	E3X-DAC8-S

*1 Order connector separately



Specifications

Item	Standard models		Advanced models
	E3X-DAC1, E3X-DAC4 E3X-DAC6, E3X-DAC8		E3X-DAC2, E3X-DAC5
Light source (wave length)	White LED (420 to 700 nm)		
Number of registered marks	1		2 (simultaneous determination)
Power supply voltage	12 to 24 VDC ±10%, ripple (p-p) 10% max.		
Protective circuits	Power supply reverse polarity protection, output short circuit protection, output reverse polarity protection, mutual interference prevention		
Ambient temperature	Operating	-25° to 55°C	
	Storage	-30° to 70°C (with no icing or condensation)	
Response time	Super-high-speed mode	Operation or reset: 60 µs	
	Standard mode	Operation or reset: 1 ms	
Operation or reset:	Standard mode		Operation or reset: 120 µs Operation or reset: 2 ms
Sensitivity setting	Teaching (one-point teaching or teaching with/without workpiece) or manual adjustment		
Functions	Detection mode	Automode (automatic selection of C-mode or I-mode) C-mode (RGB ratio) I-mode (light intensity) Mark mode (Intensity and ratio of RGB values)	
	Operating mode	ON for match (ON for same colour as registered colour) or ON for mismatch (ON for different colour from registered colour)	
	Timer function	Timer type: OFF delay, ON delay, or one-short Timer time: 1 ms to 5 s (variable)	
	Control outputs	–	
	Remote control	–	
Degree of protection	IEC60529 IP50 (with protective cover attached)		

Recommended fiber heads

Sensor type	Size	Recommended operating distance (mm)	Comment	Order code
	M6	5	Standard mark detection	E32-CC200 2M
	29x25.5x11.2 mm	40-50	Long distance - plastic	E32-L15 2M
	23x20x9 mm	25-30	Long distance - metal	E32-A09 2M
	M3	10	High precision mark detection (dia 1mm spot)	E32-EC31 2M + E39-EF51

Fiber amplifier connectors

Shape	Type	Comment	Order code
	Fiber amplifier connector	2 m PVC cable	E3X-CN21
		30 cm PVC cable with M12 plug connector (4 pin)	E3X-CN21-M1J 0.3M
		30 cm PVC cable with M8 plug connector (4 pin)	E3X-CN21-M3J-2 0.3M



Easy to operate detection of challenging or coloured registration marks.



Detection of challenging registration marks e.g. with texts or graphics.



Easy-Teach Colour Detection Sensor

The E3X-DACLR provides reliable and easy to set up one-touch colour verification. Up to four colours can be identified. The separate amplifier allows mounting in easily accessible areas for operators while the small sensor head can be mounted in locations even when space is limited.

- Easy to set up one-touch colour verification for 1 to 4 colours
- Model for remote teaching
- Small sensor head for easy mounting even when space is tight
- White LED and multi detection modes for reliable operation even for challenging applications

Ordering information

Type	Output	Tolerance adjustment	Connection method	Order code PNP ^{*1}
Single colour detection	Digital colour detected out	– Object teaching (good sample) with auto-tolerance	M8 4-pin pigtail (with 30 cm PVC cable) ^{*2}	E3X-DACLR1P-M3J 0.3M
1 to 4 colour detection	Digital colour detected out (with bank switching)	– 2-point teaching (good and bad sample)	2 m PVC cable	E3X-DACLR4P 2M

^{*1} NPN models are available. Contact your Omron representative.

^{*2} Models with 2 m PVC cable or M12 pigtail connector are available. Contact your Omron representative.

Specifications (amplifier and sensing head)

Item	Single colour detection	1 to 4 colour detection
Light source (wave length)	White LED (420 to 700 nm)	
Number of registered marks	1	1 to 4 (2 banks switchable by external input with 2 colours each)
Power supply voltage	12 to 24 VDC \pm 10%, ripple (p-p) 10% max.	
Protective circuits	Power supply reverse polarity protection, output short circuit protection, output reverse polarity protection, mutual interference prevention	
Ambient temperature	Operating	-25° to 55°C (amplifier) -40° to 70°C (sensing head)
	Storage	-30° to 70°C (amplifier); (without icing or condensation) -40° to 70°C (sensing head)
Response time	Super-high-speed mode	Operation or reset: 120 μ s
	Standard mode	Operation or reset: 1 ms Operation or reset: 2 ms
Functions	Operating mode	ON for match (ON for same colour as registered colour) or ON for mismatch (ON for different colour from registered colour)
	Timer function	Timer type: OFF delay, ON delay, or one-short Timer time: 1 ms to 5 s (variable)
	Remote control	– One-point teaching, teaching with/without workpiece, zero reset, and light emission OFF
Degree of protection	IEC60529 IP50 (with protective cover attached)	



Vision Colour Sensor with teachable inspection area and RGB value processing

The vision colour sensor FQ2-CLR provides real colour identification functionality in combination with the flexibility and functionality of a vision sensor. The teachable inspection area provides an easy and flexible set up. The colour processing and evaluation can be carried out by the FQ2-CLR directly or the RGB values are available via Ethernet to other devices.

- Teachable inspection area
- Models with single colour detection or up to 32 colour and image processing tasks
- RGB values via Ethernet

Ordering information


Type	Output	Tolerance adjustment	Connection method	Order code PNP ^{*1}
Single colour	Digital colour detected out and/or RGB value out (via ethernet)	– Object teaching (good sample) with auto-tolerance – 2-point teaching (good and bad sample)	3 m PVC cable	FQ2-CLR-V1P 3M ^{*3}
1 to 32 colour and image processing tasks			or 3 m Ethernet cable ^{*2}	FQ2-CLR-V32P 3M

^{*1} NPN models are available. Contact your Omron representative.

^{*2} I/O and Ethernet cables are included. Other cable lengths can be provided on request. Contact your Omron representative.

^{*3} Programming device 'Touch Finder FQ2-D31' is not included. Order separately incl. AC power supply and battery or use PC Tool to program FQ2-CLR.

Programming device

Type	Order code
 Touch Finder (included in FQ2-CLR-V32P) ^{*1}	FQ2-D31
	AC power supply (plug type c) for FQ2-D31
	FQ-AC4
	Rechargeable battery for FQ2-D31
	FQ-BAT1

^{*1} The FQ2-CLR can be programmed either with the Touch Finder or via a PC using the FQ2 PC Tool. After programming the FQ2-CLR, the programming device can be disconnected. Only one programming device is required for programming multiple FQ2-CLR. Contact your OMRON representative for FQ2-CLR-V32P version without included Touch Finder.

Specifications

Item	FQ2-CLR-V□
Field of view	13 x 8.2 to 53 x 33 mm
Installation distance	56 to 215 mm
Ambient temperature	Operating
	0° to 50°C
Storage	Operating
	-25° to 65°C (without icing or condensation)
Degree of protection	IEC 60529 IP67

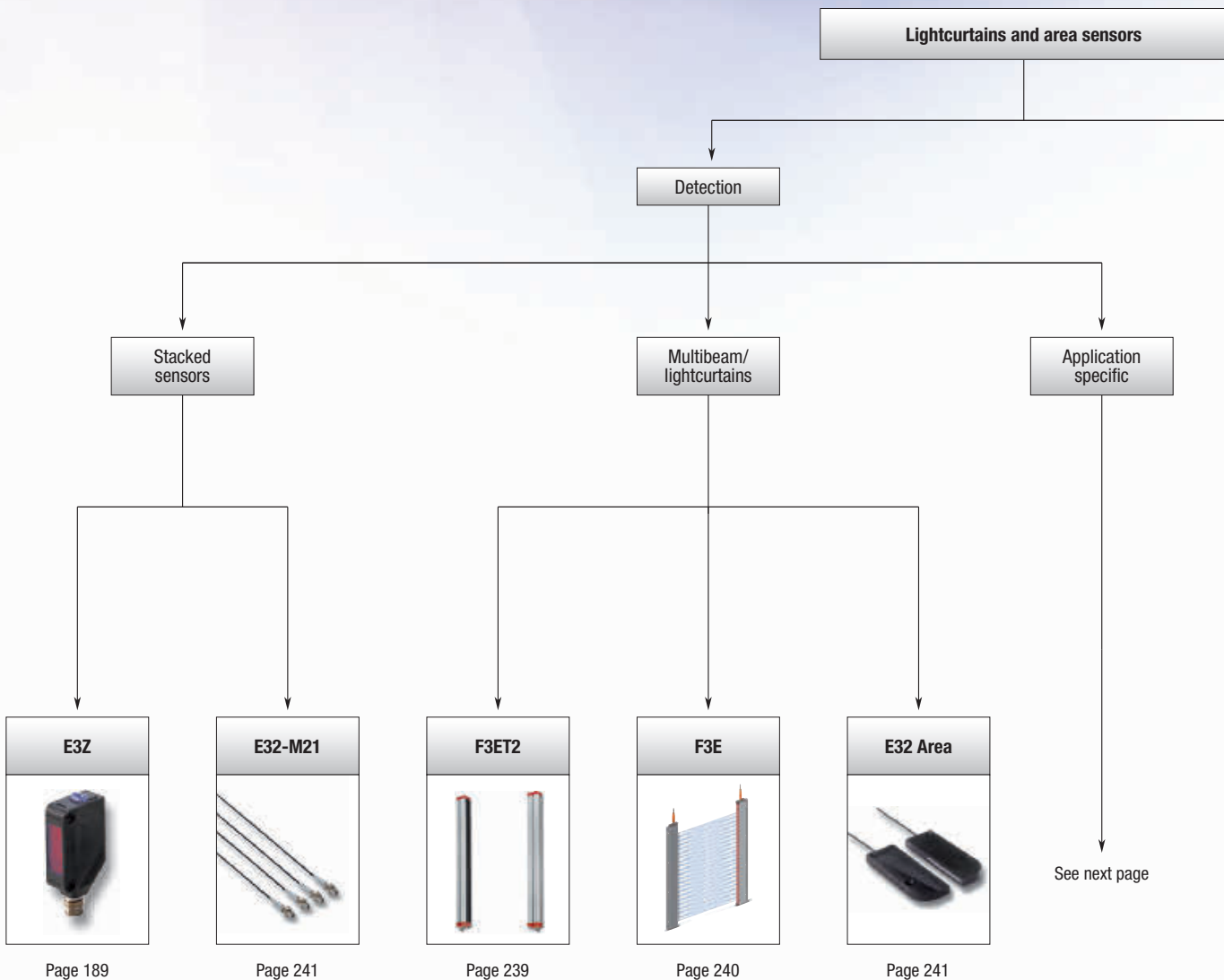
PRESENCE, HEIGHT OR PROFILE ...

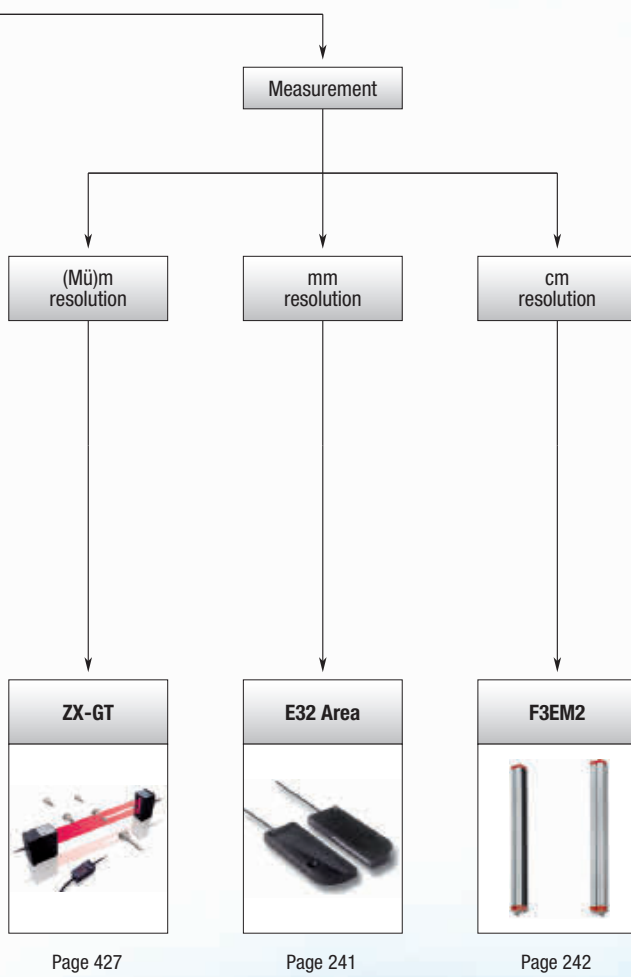
... choose the accuracy you need




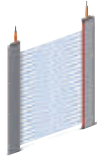


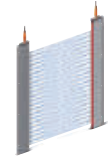
Objects with varying positions or heights or objects with holes can create multiple signals or stay undetected when using single beam sensors. These objects (e.g. parcels, bikes or natural products like ham or fish) are then wrongly classified as multiple smaller items or are not detected correctly.

Detecting these objects over their whole length or acquiring the more detailed object profile can be realized using multiple sensors or light curtains.

Omron offers a wide range of models with varying max detection heights, different resolutions and with digital, analog or serial outputs to provide the best performance match fitting your application.





Type	Stacked sensors		Multibeam sensors/lightcurtains			Application specific lightcurtains	
							
Model	E3Z	E32-M21	F3ET2	F3E	E32 area	Safety lightcurtains	F3E Elevator lightcurtains
Key features	Mutual interference prevention	4 × M3 heads combined in one fiber	Models with 5 and 18 mm pitch	Thin aluminium housing	Teachable sensitivity	Type 2, type 4 or application specific	Fulfills EN81-70
Max. sensing distance	60 m	1.3 m	15 m	5 m	4 m	50 m	5 m
Max. detection height	n. a.	4 m	2.1 m	1.8 m	70 mm	2.4 m	1.8 m
Page	189	241	239	240	241	486	240

Type	Measuring lightcurtains		
			
Model	F3EM2	E32 area	ZX-GT
Key features	cm accuracy	mm accuracy	µm accuracy
Max. sensing distance	15 m	4 m	0.5 m
Max. measurement height	2.1 m	70 mm	28 mm
Page	242	241	427



Lightcurtain in robust aluminium housing

The F3ET2 lightcurtains provide a reliable area monitoring in a robust housing. The optical synchronisation between emitter and receiver allow a fast and simple installation without special requirements.

- Optical synchronisation for reliable operation without additional wiring
- Robust aluminium housing
- NPN/PNP and light on/dark on selectable

Ordering information

Sensor type	Detection area (mm)	Pitch	Sensing distance	Channels	Connection method				Output	Order code ^{*1}
Through-beam 	150	5 mm	3 m	30	–	5 pin	–	–	PNP/NPN	F3ET2-005-150
		18 mm	15 m	8	–		–	F3ET2-018-150		
	300	5 mm	3 m	60	–		–	F3ET2-005-300		
		18 mm	15 m	16	–		–	F3ET2-018-300		
	450	5 mm	3 m	90	–		–	F3ET2-005-450		
		18 mm	15 m	24	–		–	F3ET2-018-450		
	600	5 mm	3 m	120	–		–	F3ET2-005-600		
		18 mm	15 m	32	–		–	F3ET2-018-600		
	900	5 mm	3 m	180	–		–	F3ET2-005-900		
		18 mm	15 m	48	–		–	F3ET2-018-900		
	1200	5 mm	3 m	240	–		–	F3ET2-005-1200		
		18 mm	15 m	64	–		–	F3ET2-018-1200		
	1500	5 mm	3 m	300	–		–	F3ET2-005-1500		
		18 mm	15 m	80	–		–	F3ET2-018-1500		
	1800	5 mm	3 m	360	–		–	F3ET2-005-1800		
		18 mm	15 m	96	–		–	F3ET2-018-1800		
	2100	18 mm	15 m	112	–		–	F3ET2-018-2100		

*1 Light-ON / Dark-ON selectable

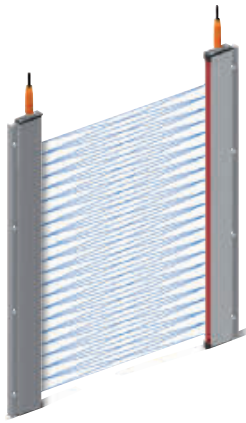
Connector cables

Type	Features	Material	Order code			
			Nut	Cable	Straight	Angled
M12	5 wires	CuZn		PVC 2 m	XS2F-M12PVC5S2M	XS2F-M12PVC5A2M
				PUR 2 m	XS2F-M12PUR5S2M	XS2F-M12PUR5A2M
				PVC 5 m	XS2F-M12PVC5S5M	XS2F-M12PVC5A5M
				PUR 5 m	XS2F-M12PUR5S5M	XS2F-M12PUR5A5M

Specifications

Item	Through-beam	
	F3ET2-005_	F3ET2-018_
Sensing distance	0 to 3 m	0 to 15 m
Vertical detection area	0 to Max _M mm; Max _M : 150, 300, 450, 600, 900, 1200, 1500, 1800 ^{*1}	0 to Max _M mm; Max _M : 150, 300, 450, 600, 900, 1200, 1500, 1800, 2100
Minimum detectable object size	10 mm	30 mm
Pitch	5 mm	18 mm
Response time	4 ms + 80 μs × number of beams	
Light source (wave length)	Infrared LED (880 nm)	
Power supply voltage	24 VDC ±20%	
Operating temperature	–10° to +55°C	
Degree of protection	IEC 60529 IP65	
Material	Case	Aluminium

*1 Models with different detection ranges are available in 150 mm intervals. Please contact your OMRON representative.



Lightcurtain in thin aluminium housing

The crossing of the multiple sensor beams provides a reliable area monitoring in a thin, easy to install housing. The thin housing makes the light curtain ideal for the installation where space is crucial.

- Thin 9 mm shape for easy design-in in elevator constructions
- High ambient light immunity
- Robust aluminium housing
- Fulfills requirements of EN81-70 (1800 mm models) for mounting in elevators

Ordering information

Sensor type	Detection area	Pitch	Sensing distance	Channels	Number of optical axis	Connection method				Order code ^{*1} Potential free output
Through-beam 	200 mm	40 mm	5 m	6	16	—	—	5 m	—	F3E-06-T1 5M
		1320 mm				120 mm	—	—	—	—
	1800 mm	120 mm		12	34	—	—	5 m	—	F3E-12-T1 5M
						—	—	—	—	F3E-12-T6
		40 mm	16	46	—	—	5 m	—	F3E-16-T1 5M	
					—	—	—	—	F3E-16-T6	
	46	136	—	—	5 m	—	F3E-46-T1 5M			
			—	—	—	—	F3E-46-T6			

*1 Light-ON/ Dark-ON settable. Common operation is Dark-ON

Specifications

Item	Through-beam			
	F3E-06-T_	F3E-12-T_	F3E-16-T_	F3E-46-T_
Number of LEDs	6	12	16	46
Number of optical axes	16	34	46	136
Pitch	40 mm	120 mm	120 mm	40 mm
Vertical detection range	20 to 200 mm	20 to 1320 mm	20 to 1820 mm	
Response time	max. 110 ms (signal interruption)			
Light source (wave length)	Infrared LED (880 nm)			
Power supply voltage	10 to 30 VDC			
Ambient temperature	Operation	-20 to +60°C		
	Storage	-40 to +70°C		
EMC conformity/standards	73/23/EWG; 89/336/EWG; 95/16/EG; EN81-1; EN81-2; EN12015; EN12016; EN61000-6-x			
Degree of protection	IEC 60529 IP54			
Dimensions	400x40.7x9 mm	1590x40.7x9 mm	2070x40.7x9 mm	2000x40.7x9 mm
Material	Case	Aluminium		

Area monitoring fiber sensor heads

When mounting space is crucial or the objects are very small, the area monitoring fibers provide a reliable object detection even when the object position varies within the monitored range.

In combination with the window monitoring function or the serial transmission of the received light level values of the fiber amplifiers, simple height comparison or measuring applications can be realized.

- Area monitoring up to 70 mm height
- Multi-beam sensor with 4 separate heads for flexible detection points
- Standard or high flex fibers



Ordering information

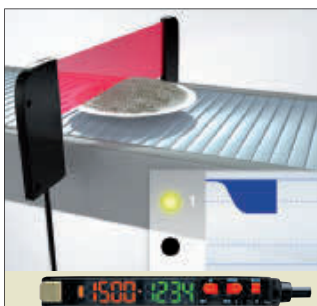
Sensor type	Sensing height (in mm)	Sensing distance (in mm)				Order code*1	
		Standard fiber		High-flex fiber		Standard fiber	High-flex fiber
		E3X-SD	E3X-DA-S	E3X-SD	E3X-DA-S		
	10	1900	4000	–	–	E32-T16	–
	11	1200	2200	800	1700	E32-T16P	E32-T16PR 2M
	30	1840	3600	1380	2600	E32-T16W 2M	E32-T16WR 2M
	50	–	–	1500	3000	–	E32-ET16WR-2 2M
	70	–	–	2300	3500	–	E32-ET16WR-1 2M
	11	1040	2000	700	1500	E32-T16J 2M	E32-T16JR 2M
	4 x separate M3 heads	600	1300	–	–	E32-M21	–
	11	–	–	150	300	–	E32-D36P1 2M

*1 Order fitting amplifier from Fiber Amplifier section

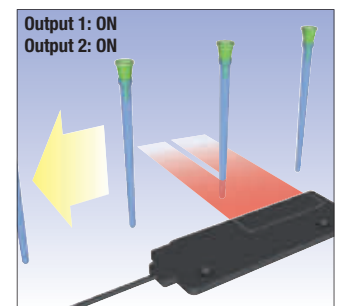
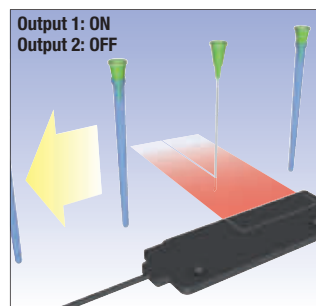
*2 Sensing area aligned to top of housing.

Specifications

Item	Standard			High-flex			
	E32-T16	E32-M21	E32-T16J E32-T16P E32-T16W	E32-D36P1	E32-ET16WR-1 E32-ET16WR-2	E32-T16JR E32-T16PR E32-T16WR	
Permissible bending radius	R25		R10	R4	R1		
Cut to length	Yes						
Ambient temperature	-40°C to 70°C						
Material	Head	ABS	Stainless steel	ABS	Brass-nickel plated	Aluminium	ABS
	Fiber	PMMA					
	Sheath	Polyethylene coating		PVC coating	Polyethylene coating		PVC coating
Degree of protection	IEC 60529 IP67		IEC 60529 IP50		IEC 60529 IP54	IEC 60529 IP50	



The two outputs of the E3X-DA-S can be used to detect two different light levels



In combination with the twin output function of the E3X-DA-S amplifier, the diffuse reflective area monitoring fibers can detect very small objects (e.g. needles) and a second state (e.g. cover present). The area beam compensates for position variations at high speed.





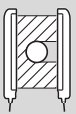


Measuring lightcurtain in robust aluminium housing

The F3EM2 provides easy to install and set up height and profile measurement. The analog output provides a simple overall height detection and the serial output models provide single beam evaluation for profile measurements.

- Robust aluminium housing
- Analog output for simple height detections
- Serial output with single beam evaluation for profile measurement
- Various output modes to adapt output data to the given application

Ordering information

Sensor type	Measurement range (mm)	Pitch ^{*1}	Sensing distance	Channels	Connection method				Order code	
									RS-232-C Serial/ analogue output models ^{*2}	Analogue output models
Through-beam (measuring) 	150	5 mm	3 m	30	—	M12 8-pin/ M12 5-pin	—	—	F3EM2-005-150	F3EM2-005-150-AV
		18 mm	15 m	8	—		—	—	F3EM2-018-150	F3EM2-018-150-AV
	300	5 mm	3 m	60	—		—	—	F3EM2-005-300	F3EM2-005-300-AV
		18 mm	15 m	16	—		—	—	F3EM2-018-300	F3EM2-018-300-AV
	450	5 mm	3 m	90	—		—	—	F3EM2-005-450	F3EM2-005-450-AV
		18 mm	15 m	24	—		—	—	F3EM2-018-450	F3EM2-018-450-AV
	600	5 mm	3 m	120	—		—	—	F3EM2-005-600	F3EM2-005-600-AV
		18 mm	15 m	32	—		—	—	F3EM2-018-600	F3EM2-018-600-AV
	900	5 mm	3 m	180	—		—	—	F3EM2-005-900	F3EM2-005-900-AV
		18 mm	15 m	48	—		—	—	F3EM2-018-900	F3EM2-018-900-AV
	1200	5 mm	3 m	240	—		—	—	F3EM2-005-1200	F3EM2-005-1200-AV
		18 mm	15 m	64	—		—	—	F3EM2-018-1200	F3EM2-018-1200-AV
	1500	5 mm	3 m	300	—		—	—	F3EM2-005-1500	F3EM2-005-1500-AV
		18 mm	15 m	80	—		—	—	F3EM2-018-1500	F3EM2-018-1500-AV
1800	5 mm	3 m	360	—	—	—	F3EM2-005-1800	F3EM2-005-1800-AV		
	18 mm	15 m	96	—	—	—	F3EM2-018-1800	F3EM2-018-1800-AV		
2100	18 mm	15 m	112	—	—	—	F3EM2-018-2100	F3EM2-018-2100-AV		

^{*1} Models with 7.5 mm pitch are available. Contact your OMRON representative.

^{*2} Models with RS-485 serial output are available. Contact your OMRON representative.

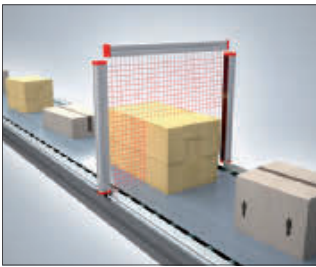
Connector cables

Type	Features	Material		Order code	
		Nut	Cable	Straight	Angled
M12	8 wires	CuZn	PUR 2 m	Y92E-M12PURSH8S2M-L	
			PUR 5 m	Y92E-M12PURSH8S5M-L	
	5 wires	CuZn	PVC 2 m	XS2F-M12PVC5S2M	XS2F-M12PVC5A2M
			PUR 2 m	XS2F-M12PUR5S2M	XS2F-M12PUR5A2M
			PVC 5 m	XS2F-M12PVC5S5M	XS2F-M12PVC5A5M
			PUR 5 m	XS2F-M12PUR5S5M	XS2F-M12PUR5A5M

Specifications

Item	Through-beam	
	F3EM2-005	F3EM2-018
Sensing distance	0 to 3 m	0 to 15 m
Vertical measurement range	0 to Max _M mm; Max _M : 150, 300, 450, 600, 900, 1200, 1500, 1800 ^{**1}	0 to Max _M mm; Max _M : 150, 300, 450, 600, 900, 1200, 1500, 1800 ^{**1}
Minimum detectable object size	10 mm	30 mm
Pitch	5 mm	18 mm
Response time	4 ms + 80 μs × number of beams (+ transmitting time for serial operation)	
Light source (wave length)	Infrared LED (880 nm)	
Power supply voltage	24 VDC ±20%	
Ambient temperature	-10° to +55°C	
Degree of protection	IEC 60529 IP65	
Material	Aluminium	

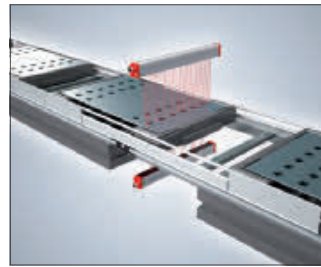
^{**1} Models with different measurement ranges are available in 150 mm intervals. Please contact your OMRON representative.



Volume measurement



Profile scan



Hole detection



Position control

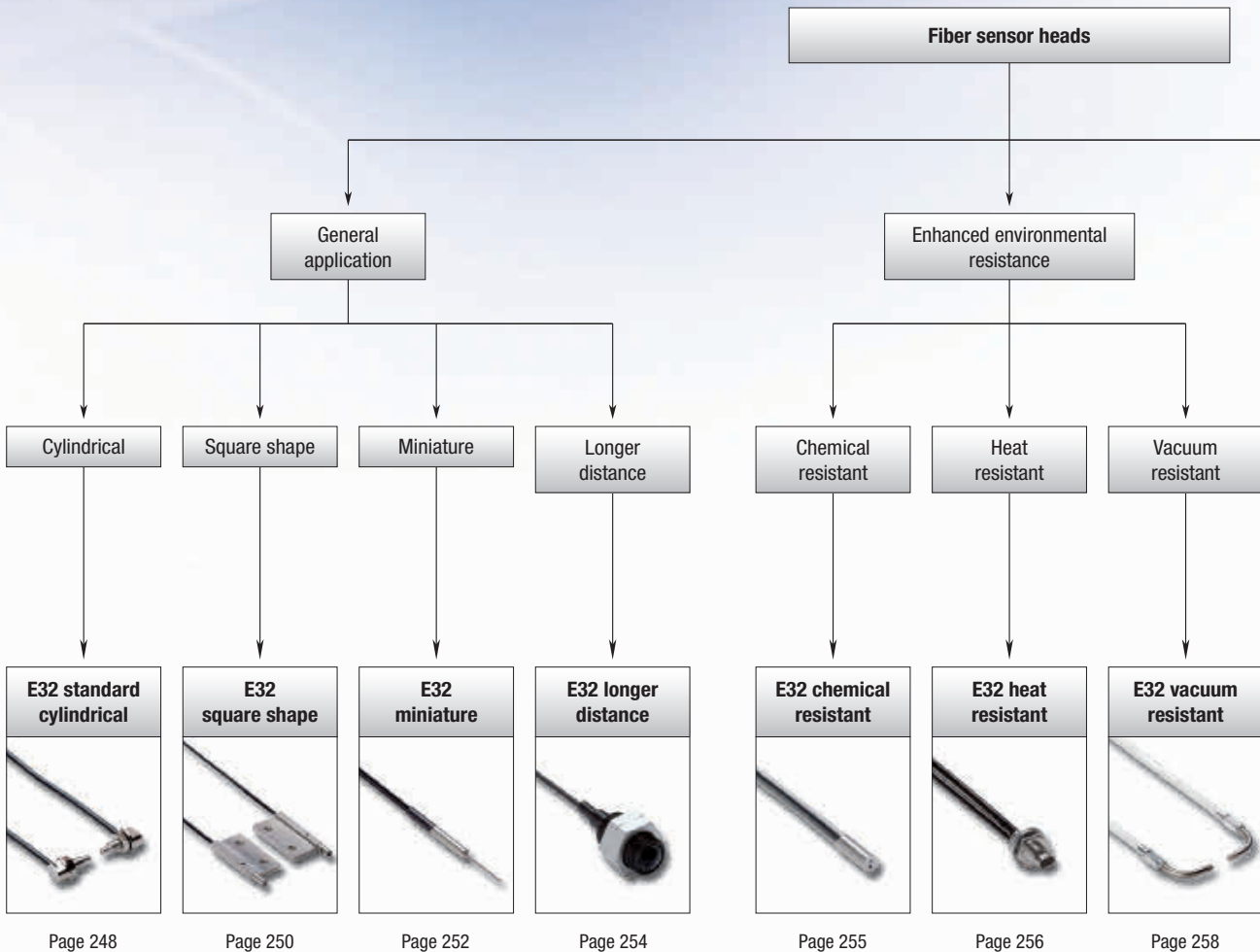
HIGH PRECISION IN SMALL SPACES

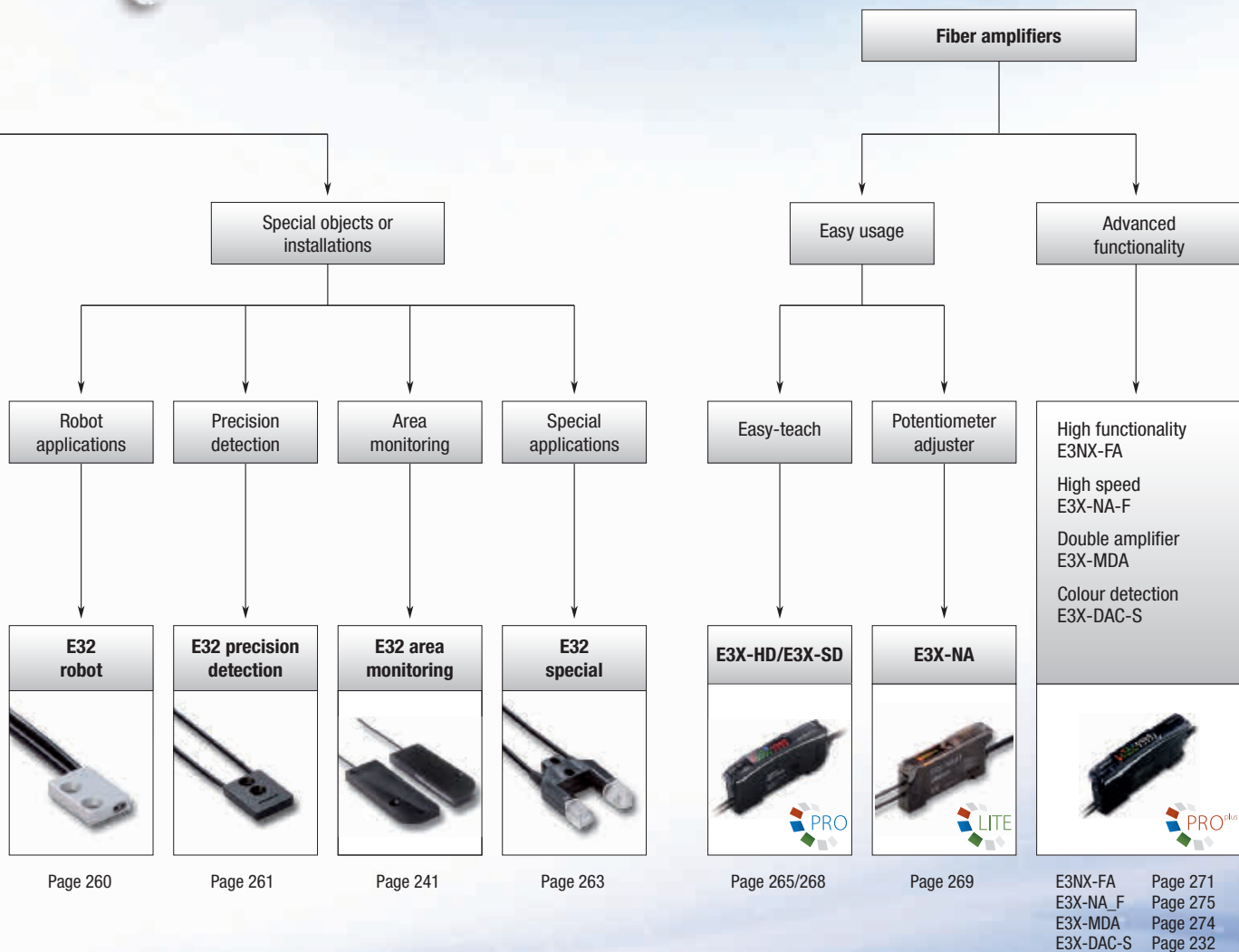
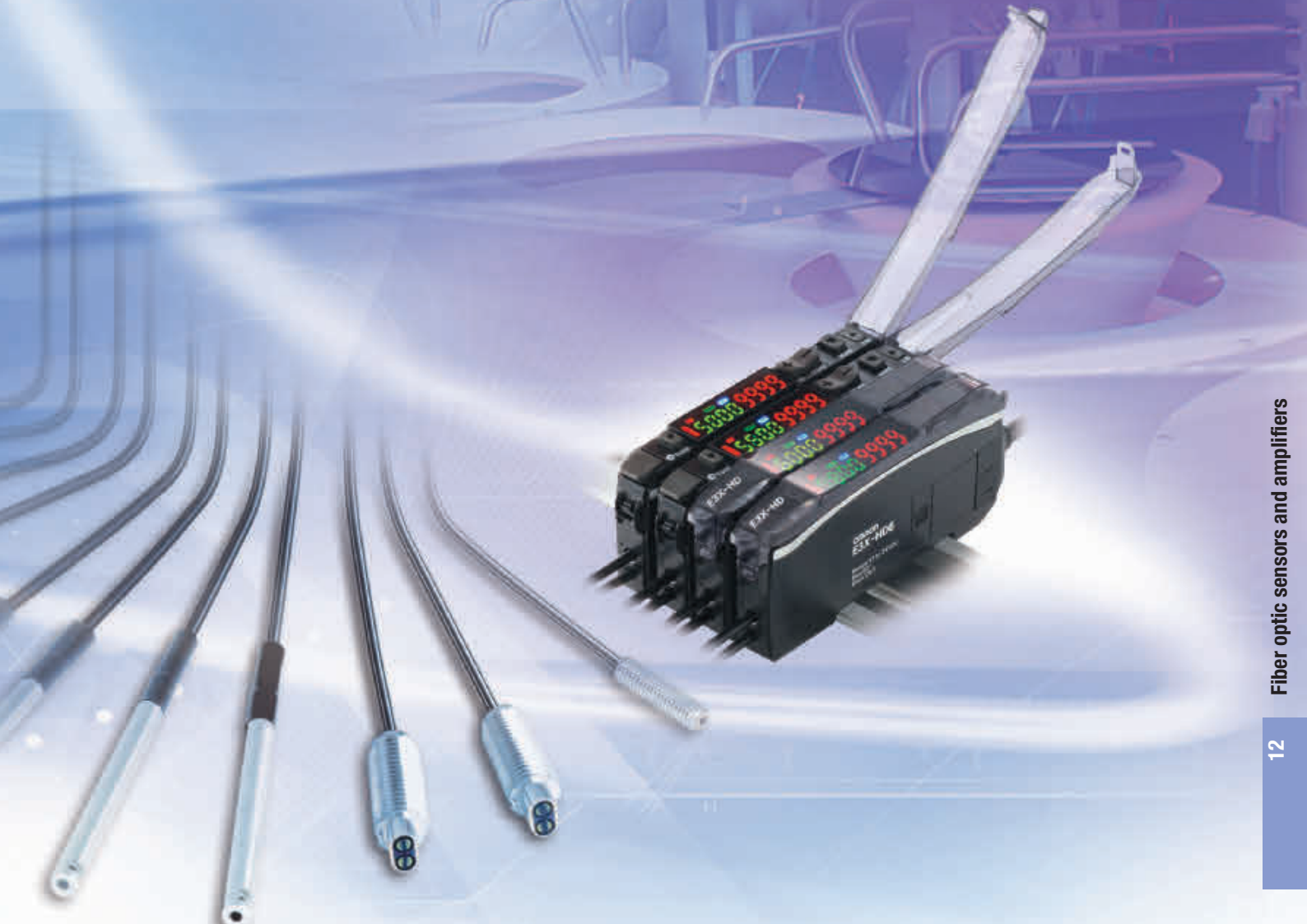
Precision and performance you can rely on

The requirements for fiber optic solutions can be very demanding particularly for applications with extreme temperatures and aggressive chemicals or for applications requiring highest precision with limited mounting space.

With the wide range of E32 fiber heads and the easy-usage amplifiers, the best performance fit for your application can be provided. The highest quality control procedures in design and manufacturing ensure that you get the precision and long service life that you can rely on.

- Long operational life
- Easy to install and adjust
- Wide portfolio range for best performance fit










E3NX-FA Page 271
 E3X-NA_F Page 275
 E3X-MDA Page 274
 E3X-DAC-S Page 232






Selection table







Fiber sensor heads




Type	Cylindrical	Square shape	Miniature	Longer distance	Chemical resistant
					
Model	E32 standard cylindrical	E32 square shape	E32 miniature	E32 longer distance	E32 chemical resistant
Key features	<ul style="list-style-type: none"> Standard and high-flex fibers Sizes M3 to M6 	<ul style="list-style-type: none"> 3 or 4 mm thin housing Models in X,Y or Z-axis Direct mounting without bracket 	<ul style="list-style-type: none"> Sizes from dia 500 µm to 3 mm Bendable sleeves 	<ul style="list-style-type: none"> Built in focal lenses 	<ul style="list-style-type: none"> Fluoroplastic cover or coating
Through-beam	1,550 mm	1,550 mm	1,550 mm	20 m	4 m
Retro-reflective	250 mm	–	–	1.5 m	–
Diffuse-reflective	650 mm	600 mm	600 mm	1.4 m	350 mm
Page	248	250	252	254	255

Note: All sensing distances measured with E3X-DA-SE-S. Longer sensing distances up to 80% can be achieved with E3X-DA-S.

Fiber amplifiers

Type	Easy teach/double display	Easy teach/single display	Potentiometer adjuster	High performance	Double amplifier
					
Model	E3X-HD	E3X-SD	E3X-NA	E3NX-FA	E3X-MDA
361°	PRO	LITE	LITE	PRO ^{plus}	n.a.
Key features	<ul style="list-style-type: none"> Easy operation by smart tuning Dynamic power control Fieldbus connectivity 	<ul style="list-style-type: none"> 1 button object teaching Auto teach during operation 	<ul style="list-style-type: none"> Easy adjustment by potentiometer 	<ul style="list-style-type: none"> High functionality signal processing (timer, counter, dynamic power control, etc.) High signal resolution Increased sensing distance Double output/external input Fieldbus connectivity 	<ul style="list-style-type: none"> 2 inputs and AND, OR signal comparison
Response time (min.)	1 ms (50 µs in super-high-speed mode)	1 ms	200 µs	1 ms (30 µs in super-high-speed mode)	1 ms (130 µs in high speed mode)
Page	265	268	269	271	274

Heat resistant	Vacuum resistant	Robot applications	Precision detection	Area monitoring	Special application
					
E32 heat resistant	E32 vacuum resistant	E32 robot	E32 precision detection	E32 area monitoring	E32 special
<ul style="list-style-type: none"> Heat resistant up to 400°C 	<ul style="list-style-type: none"> Leakage rate of 1×10^{-10} Pa·m³/s max 	<ul style="list-style-type: none"> Free moving multicore fibers for >1 Mio bending cycles 	<ul style="list-style-type: none"> Detection accuracy up to 100 µm Coaxial fibers Adjustable focal points 	<ul style="list-style-type: none"> Area monitoring up to 70 mm 	<ul style="list-style-type: none"> Detection of special objects (wafer, liquid level, flat glass, print mark ...)
3 m	950 mm	1,350 mm	3.8 m	4 m	3.8 m
–	–	–	–	–	–
500 mm	–	350 mm	600 mm	300 mm	20 mm
256	258	260	261	241	263

High speed	Colour/print mark detection	Infrared LED
		
E3X-NA-F	E3X-DAC-S	E3X-DAH-S
n.a.	n.a.	n.a.
<ul style="list-style-type: none"> Short turn on time of 20 µs 	<ul style="list-style-type: none"> White LED and RGB ratio comparison 	<ul style="list-style-type: none"> Infrared LED
20 µs	1 ms (60 µs in super high speed mode)	1ms (55µs in super high speed mode)
275	232	276



Standard cylindrical fiber sensor heads

The standard cylindrical fiber optic sensor heads provide reliable object detection, easy installation and long sensor lifetime for all general applications.

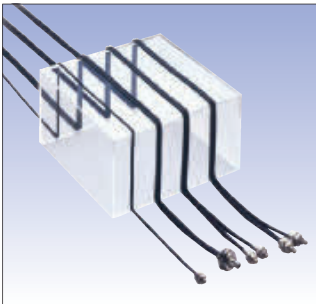
- High-flex fibers and 90° cable exit for fiber breakage prevention
- Models with hexagonal back for simplified one-nut mounting
- Sizes M3 to M6

Ordering information

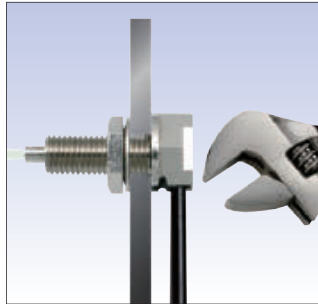
Sensor type	Size	Sensing distance (in mm)				Order code	
		Standard fiber		High-flex fiber		Standard fiber	High-flex fiber
		E3X-SD	E3X-HD	E3X-SD	E3X-HD		
	M4	800	1550	1100	1400	E32-TC200 2M	E32-ET11R 2M
	M3	200	450	50	130	E32-TC200E 2M	E32-ET21R 2M
	dia 4 mm	1100	1500	-		E32-ETC220 2M	-
	M4	-		530	1000	-	E32-T11N 2M
	M6	250		-		E32-R21	-
	M6	300	600	400	550	E32-DC200 2M	E32-ED11R 2M
	M4	70	160	30	60	E32-D211 2M	E32-D211R 2M
	M3	70	160	100	150	E32-DC200E 2M	E32-ED21R 2M
	M6	-		170	350	-	E32-D11N 2M
	dia 6 mm	80	220	35	100	E32-D14L 2M	E32-D14LR 2M

Specifications

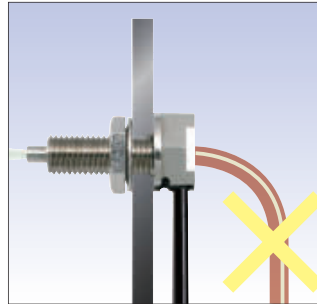
Item	Standard					High Flex				
	E32-_C200 E32-_C220	E32-D14L	E32-_C200E	E32-D211	E32-R21	E32-E_R	E32-D14LR	E32-D211R	E32-_11N	
Permissible bending radius	R25		R10			R1				
Cut to length	Yes									
Ambient temperature	-40°C to 70°C									
Material	Head	Brass-nickel plated	Stainless steel	Brass-nickel plated	Stainless steel	Plastic (ABS)	Brass-nickel plated	Stainless steel	Brass-nickel plated	
	Fiber	PMMA								
	Sheath	Polyethylene coating					PVC coating			
Degree of protection	IEC 60529 IP67									



Hi-flex multicore fibers for flexibility in installation without fiber breakage



Models with hexagonal back for simple one-nut mounting



Cable exit shifted by 90° for preventing fiber breakage



Square shape fiber sensor heads

The fiber heads in square shaped housing provide fast and easy installation on flat surfaces.

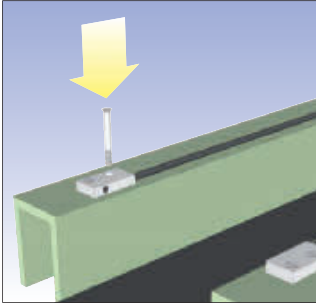
- Models with sensing direction in X, Y or Z axis
- 3 or 4mm thick housings for minimal height requirement
- Standard or high-flex fibers

Ordering information

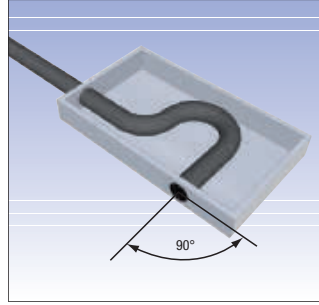
Sensor type	Size in mm (standard / high-flex)	Sensing distance (in mm)				Order code	
		Standard fiber		High-flex fiber		Standard fiber	High-flex fiber
		E3X-SD	E3X-HD	E3X-SD	E3X-HD		
	15×8×3 / 15×10×4	800	1550	1100	1400	E32-T15X 2M	E32-ETS10R 2M
	15×8×3	480	950	220	450	E32-T15Y 2M	E32-T15YR 2M
	15×8×3 / 15×9×4	480	950	1000	1300	E32-T15Z 2M	E32-ETS14R 2M
	13×9×4	-	-	1000	1300	-	E32-ET15YR 2M
	13×9×4	-	-	1000	1300	-	E32-ET15ZR 2M
	15×10×3	300	600	180	350	E32-D15X 2M	E32-D15XR 2M
	15×10×3	100	200	40	100	E32-D15Y 2M	E32-D15YR 2M
	15×10×3 / 13×6×2.3	100	200	25	120	E32-D15Z 2M	E32-EDS24R 2M
	24.5×10×3	-	-	890	1780	-	E32-A03-1 2M
	21×9×2	-	-	340	680	-	E32-A04-1 2M

Specifications

Item	Standard			High flex	
	E32-_15	E32-A03_	E32-A04_	E32-E	E32-_15_R
Permissible bending radius	R25	R10		R1	
Cut to length	Yes				
Ambient temperature	-40°C to 70°C				
Material	Head	Aluminium	Brass-nickel plated	Stainless steel	Aluminium
	Fiber	PMMA			
	Sheath	Polyethylene coating			PVC coating
Degree of protection	IEC 60529 IP67	IEC 60529 IP50		IEC 60529 IP67	



Space saving and fast mounting without additional brackets



Precise positioning during manufacturing for 90° optics to achieve minimal tolerance variations in optical output axis angle



Miniature fiber sensor heads

The miniature fiber heads provide high accuracy in smallest spaces and reliable detection of minute objects.

- Sizes from dia 500 µm to 3 mm
- Side view models with precision axis alignment for highest accuracy
- Bendable sleeves for precision positioning

Ordering information

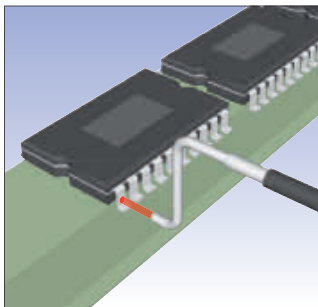
Sensor type	Size	Sensing distance (in mm)				Order code	
		Standard fiber		High-flex fiber		Standard fiber	High-flex fiber
		E3X-SD	E3X-HD	E3X-SD	E3X-HD		
	dia 3 mm	800	1550	560	1000	E32-T12 2M	E32-T12R 2M
	dia 2 mm	200	450	120	250	E32-T22 2M	E32-T22R 2M
	dia 1.5 mm	200	450	200	450	E32-T222 2M	E32-T222R 2M
	dia 1 mm	–	–	120	250	–	E32-T223R 2M
	dia 3 mm	480	950	220	450	E32-T14L 2M	E32-T14LR 2M
	dia 2 mm	340	–	–	–	E32-A04 2M	–
	dia 1 mm	180	250	60	100	E32-T24	E32-T24R 2M
	dia 1.2 mm	800	1550	560	1000	E32-TC200B* ¹	E32-TC200BR* ¹
	dia 0.9 mm	200	450	120	250	E32-TC200F* ¹	E32-TC200FR* ¹
	dia 3 mm	70	160	30	60	E32-D22 2M	E32-D22R 2M
	dia 2 mm	80	150	40	80	E32-D32 2M	E32-D32R 2M
	dia 1.5 mm	–	–	30	60	–	E32-D22B 2M
	dia 2 mm	30	60	15	30	E32-D24	E32-D24R 2M
	dia 2.5 mm	300	600	180	350	E32-DC200B 2M* ¹ * ²	E32-DC200BR * ¹ * ²
	dia 1.2 mm	70	160	30	60	E32-DC200F* ¹	E32-DC200FR* ¹
	dia 0.8 mm	–	–	20	30	–	E32-D33 2M
	dia 0.5 mm	–	–	3	6	–	E32-D331 2M

*¹ Models with 40 mm sleeve instead of 90 mm sleeve are available by adding '4' to the order code at the end, e.g. E32-TC200B4

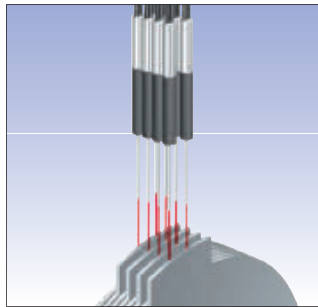
*² Sleeve cannot be bent

Specifications

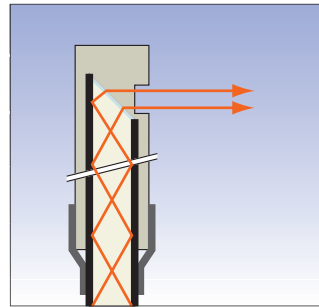
Item	Standard						High-flex					
	E32-DC200B E32-T12 E32-TC200B	E32-T14L	E32-D32	E32-D22 E32-T222 E32-TC200F	E32-D24 E32-DC200F E32-T22 E32-T24	E32-A04	E32-D32R E32-D33 E32-D331	E32-D22B	E32-DC200BR E32-T12R E32-TC200BR	E32-D22R E32-T222R E32-TC200FR	E32-D24R E32-DC200FR E32-T14LR E32-T22R E32-T223R E32-T24R	
Permissible bending radius	R25			R10			R4		R1			
Cut to length	Yes											
Ambient temperature	-40°C to 70°C											
Material	Head	Brass-nickel plated	Stainless steel	Brass-nickel plated	Stainless steel				Brass-nickel plated	Stainless steel		
	Fiber	PMMA										
	Sheath	Polyethylene coating	PVC and polyethylene	Polyethylene coating	PVC and polyethylene	PVC coating	Polyethylene coating					
Degree of protection	IEC 60529 IP67					IEC 60529 IP50		IEC 60529 IP67				



Bendable metal sleeves for precision positioning of sensors after installation



0.5 mm diameter (diffuse reflective) or 1 mm diameter (through beam) when mounting space is crucial



High precision fiber surface cutting and positioning during manufacturing to achieve minimal deviation of optical output axis angle



Longer distance fiber sensor heads

With built-in focal lenses the longer distance fiber heads provide enhanced operational stability in dusty environments or long distance applications

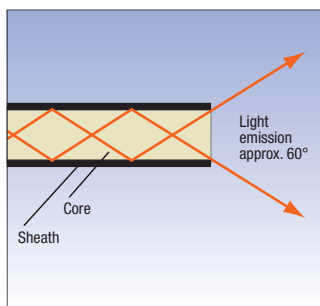
- Sensing distance up to 20 m
- Built-in focal lens
- Sizes from dia 2 mm to M14
- Easy installation - no need to attach auxiliary lenses

Ordering information

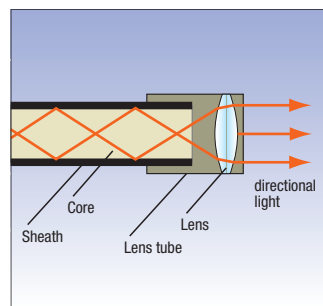
Sensor type	Size	Sensing distance (in mm)				Order code	
		Standard fiber		High-flex fiber		Standard fiber	High-flex fiber
		E3X-SD	E3X-HD	E3X-SD	E3X-HD		
	M14	14000	20000	–	–	E32-T17L	–
	25.2 × 10.5 × 8 mm	1800	4000	–	–	E32-T14	–
	M4	2100	4000	1800	3500	E32-LT11 2M	E32-LT11R 2M
	M3	720	1350	–	–	E32-TC200A 2M	–
	dia 3 mm	1400	2600	–	–	E32-T12L 2M	–
	dia 2 mm	400	850	–	–	E32-T22L 2M	–
	21.5 × 27 × 10 mm	1500	1500	–	–	E32-R16 2M	–
	22 × 17.5 × 9 mm	700	1400	–	–	E32-D16 2M	–
	M6	190	360	180	350	E32-LD11 2M	E32-LD11R 2M
	M4	100	260	–	–	E32-D21L 2M	–
	dia 3 mm	240	450	–	–	E32-D12 2M	–

Specifications

Item	Through-beam						Retro-reflective	Diffuse-reflective					
	E32-T17L/ E32-T14	E32-LT11	E32-T12L	E32TC200A	E32-LT11R	E32-T22L		E32-R16	E32-D16	E32-LD11	E32-LD11R	E32-D21L	E32-D12
Permissible bending radius	R25					R1	R10	R25	R4	R25	R10	R10	R25
Cut to length	Yes												
Ambient temperature	–40°C to 70°C												
Material	Head	ABS	Brass-nickel plated			Stainless steel	ABS	Aluminium	Brass-nickel plated		Stainless steel		
	Fiber	PMMA											
	Sheath	Polyethylene coating						PVC coating	Polyethylene coating				
Degree of protection	IP67	IP50	IP67	IP50		IP67	IP40	IP50	IP67				



Light emission of conventional fibers



With built-in focal lenses, longer sensing distances can be achieved up to 5 times longer compared to conventional sensors



Chemical resistant fiber sensor heads

The chemical resistant fibers provide long sensor lifetime in areas with frequent cleaning, usage of chemicals and higher temperatures.

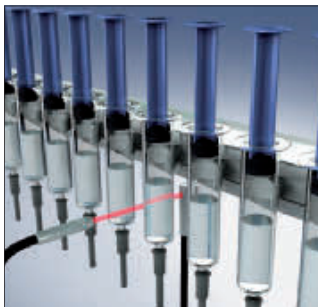
- fluoroplastic cover for highest chemical resistance
- temperature resistance up to 200°C

Ordering information

Sensor type	Size	Sensing distance (in mm)		Key feature	Order code
		E3X-SD	E3X-HD		
	M4	720	1350	Fluororesin coating	E32-T11U 2M
	dia 5 mm	2500	3200	Fluororesin cover	E32-ET11F 2M
		1600	4000		E32-T12F
		400	800		E32-T14F 2M
	M6	180	350	Fluororesin coating	E32-D11U 2M
	dia 7 mm	150	300	Fluororesin cover	E32-ED11F 2M
	dia 6 mm	100	190		E32-D12F
		40	80		E32-D14F 2M
		700	1400	Fluororesin cover Heat resistant to 200°C	E32-T81F-S 2M
	dia 5 mm	1400	2800	Fluororesin cover Heat resistant to 150°C	E32-T51F 2M

Specifications

Item	Fluororesin coating		Full fluororesin cover		Full fluororesin cover and heat resistance		
	E32-T11U	E32-D11U	E32-E_11F	E32-_12F/E32-_14F	E32-T51F	E32-T81F-S	
Permissible bending radius (in mm)	R1	R4	R75	R40		R10	
Cut to length	yes					no	
Ambient temperature	-40°C to 70°C				-40°C to 150°C		
Material	Head	Brass-nickel plated		Fluororesin			
	Fiber	PMMA				Glass	
	Sheath	Fluororesin coating		Fluororesin cover			
Degree of protection	IEC60529 IP67						



Enhanced temperature resistant models



Highest chemical resistance

The fluororesin cover provides highest chemical resistance for longest lifetime in frequently cleaned environments like aseptic filling in pharmaceutical applications



Heat resistant fiber sensor heads

The wide range of heat resistant fibers provides long sensor lifetime with highest protection in demanding environments

- heat resistant up to 400°C
- sizes from dia 2 mm to M6
- models for long distances or high detection accuracy

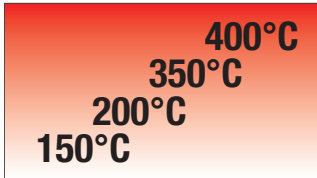
Ordering information

Sensor type	Size	Sensing distance (in mm)		Key feature	Order code	
		E3X-SD	E3X-HD		For E3X-SD and E3X-HD teachable amplifiers	For E3X-NA amplifier with potentiometer adjustment
	M4	1800	3000	-40°C to 150°C	E32-ET51 2M	
		400	800	-40°C to 100°C ^{*1} , high-flex	E32-T51R 2M	
		360	550	-40°C to 200°C	E32-T81R-S 2M	
		600	900	-60°C to 350°C	E32-T61-S 2M	
	dia 2 mm	260	450	-40°C to 150°C	E32-T54 2M	
	dia 3 mm	1400	2600	-40°C to 200°C	E32-T84S-S 2M	
	M6	400	500	-40°C to 150°C	E32-ED51 2M	
		140	280	-40°C to 100°C ^{*1} , high-flex	E32-D51R 2M	
		90	180	-40°C to 200°C	E32-D81R-S 2M	E32-D81R 2M
		90	180	-60°C to 350°C	E32-D61-S 2M	E32-D61
	M4	60	120	-40°C to 400°C	E32-D73-S 2M	E32-D73
	23×20×9 mm	15-38		-40°C to 150°C	E32-A09H 2M	
	30×24×9 mm	20-30		-40°C to 300°C	E32-A09H2 2M	
	25×18×5 mm	1-5		-40°C to 300°C	E32-L64 2M	
	36×18×5 mm	5-18			E32-L66 2M	

^{*1} Short term resistance. For continuous operation -40°C to 90°C

Specifications

Item	-40°C to 150°C	-40°C to 100°C	-40°C to 150°C		-40°C to 200°C		-40°C to 300°C		-60°C to 350°C	-40°C to 400°C
	E32-E_51	E32-D51R/T51R	E32-T54	E32-A09H	E32-_81_	E32-T84_	E32-A09H2	E32-L6_	E32-_61_	E32-D73_
Permissible bending radius (in mm)	R35	R2	R35		R10	R25				
Cut to length	Yes				No					
Material	Head	Brass-nickel plated	Stainless steel		Aluminium	Stainless steel				
	Fiber	PMMA	Acrylate resin	PMMA		Glass				
	Sheath	Fluoro resin	Polyurethane resin	Fluoro resin		Stainless steel spiral coating	Stainless steel tube	Stainless steel spiral coating		Stainless steel tube
Degree of protection	IEC 60529 IP67	IEC 60529 IP50	IEC 60529 IP67				IEC 60529 IP40		IEC 60529 IP67	



The temperature range optimised material selection provides best application fit and value - performance ratio.



Stainless steel spiral coating for flexibility with highest mechanical protection.




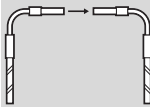
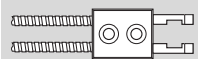
Vacuum resistant fiber sensor heads

For applications in cleanest and hot environments the vacuum resistant fibers and connecting flanges provide long operational lifetime and vacuum integrity.

- Leakage rate of 1×10^{-10} Pa·m³/s max
- Heat resistance up to 200°C
- Detergent resistant fluororesin or stainless steel fiber sheath

Ordering information

Sensor

Sensor type	Size	Sensing distance (in mm)		Temperature range	Order code
		E3X-SD	E3X-HD		
	M4	200	400	-40°C to 120°C	E32-T51V 1M
	dia 3	130	250	-40°C to 120°C	E32-T54V 1M
	dia 3	500	950	-60°C to 200°C	E32-T84SV 1M
	33 × 18 × 5.5 mm	5		-40°C to 70°C	E32-G86V-1 3M

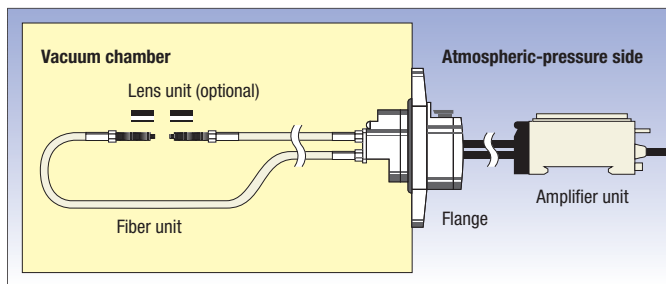
Flange

Type	Size	Order code
4 channel flange	80 × 80 × 49 mm	E32-VF4
1 channel flange	96 × dia 30 mm max.	E32-VF1
Flange-to-amplifier connection fiber	2 m length	E32-T10V 2M

Specifications

Item	Fiber sensor heads				Flange-to-amplifier fiber
	E32-T51V	E32-T54V	E32-T84SV	E32-G86V-1	E32-T10V
Permissible bending radius	R30		R25		
Cut to length	No				Yes
Material	Head	Aluminium	Stainless steel		–
	Fiber	Glass			PMMA
	Sheath	Fluororesin coating		Stainless steel spiral coating	Polyethylene coating
Degree of protection	–				

Item	Flange	
	E32-VF1	E32-VF4
Leakage rate	1×10^{-10} Pa·m ³ /s max	
Ambient temperature	–25°C to 55°C	
Material	Flange	Aluminium and stainless steel
	Seal	Aluminium
		Fluorocarbon rubber (viton)



The vacuum resistant fiber heads and flanges are sealed to prevent gas leakage into vacuum areas



Robot application fiber sensor heads

For applications on frequently or fast moving parts, the robot fibers reduce the risk of fiber breakage with a guaranteed operational life of more than 1 million bending cycles

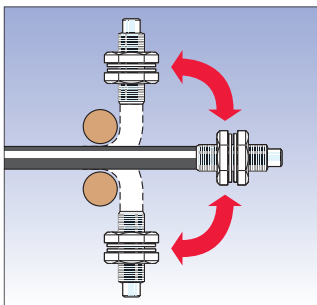
- Free moving multicore fibers for > 1 mio bending cycles
- Square shapes for easy surface installation
- Cylindrical sizes from dia 1.5 mm to M6

Ordering information

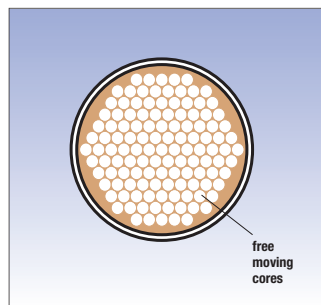
Sensor type	Size	Sensing distance (in mm)		Order code
		E3X-SD	E3X-HD	
	M4	720	1350	E32-T11 2M
	M3	200	400	E32-T21 2M
	dia 3 mm	720	1350	E32-T12B
	dia 2 mm	200	400	E32-T221B
	dia 1.5 mm	200	400	E32-T22B
	15 × 18 × 3 mm	720	1350	E32-T15XB 2M
	M6	180	350	E32-D11 2M
	M4	70	140	E32-D21B 2M
	M3	30	60	E32-D21 2M
	dia 1.5 mm	30	60	E32-D22B 2M
	15 × 10 × 3 mm	180	350	E32-D15XB 2M

Specifications

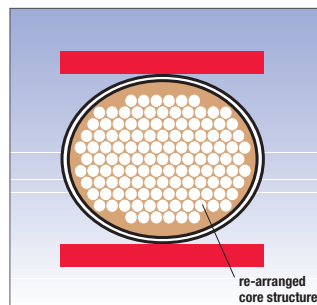
Item	Square		Cylindrical			
	E32-D15XB E32-T15XB		E32-T21	E32-D11 E32-T11	E32-D21 E32-T12B E32-T22B	E32-D21B E32-D22B E32-T221B
Permissible bending radius	R4					
Cut to length	Yes					
Ambient temperature	-40°C to 70°C					
Material	Head	Aluminium	Brass-nickel plated			Stainless steel
	Fiber	PMMA				
	Sheath	PVC coating	Polyethylene coating	PVC coating		
Degree of protection	IEC 60529 IP67					



Guaranteed more than 1 mio bending operations



Free moving fiber cores prevent fiber breakage and light intensity loss when the fiber is bent.





Precision detection fiber sensor heads

Highest precision in design and manufacturing of the fibers and focal lenses ensure highest beam and spot accuracy allowing the detection of smallest objects and height differences of less than 100 µm.

- Coaxial fibers with focal lenses for spot diameters of 100 µm
- Through-beam models with highly focused beam and precise optical axis alignment
- Limited reflective models for height difference detection of less than 100 µm

Ordering information

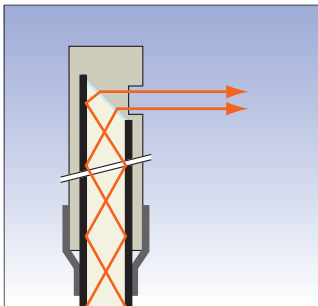
Sensor type	Preferred usage	Size	Key feature	Sensing distance (in mm)		Order code
				E3X-SD	E3X-HD	
	Precise thin object detection / accurate positioning	dia 3 mm	- High precision optical axis adjustment - Very focused beam	2000	3800	E32-T22S
		dia 2 mm		890	1780	E32-A03 2M
				340	680	E32-A04 2M
	Very small object detection	M6	–	300	600	E32-CC200 2M ^{*1}
		M3	Spot dia 0.5 mm	100	120	E32-EC31 2M
			Spot dia 0.2 mm	17		E32-EC41 1M + E39-F3B
			Spot dia 0.1 mm	7		E32-EC41 1M + E39-F3A-5
		dia 3 mm	–	160	300	E32-D32L
		dia 2 mm	–	80	150	E32-D32 2M ^{*1}
		M6	- 90° cable exit - Hexagonal back	170	350	E32-C11N 2M
		M3		25	50	E32-C31N 2M
			Spot dia 0.5 to 3mm	8 - 25 adjustable		E32-EC31 2M + E39-EF51
			Spot dia 0.5 to 1 mm	6 - 15 adjustable		E32-D32 2M + E39-F3A
dia 2 mm ^{*2}	Spot dia 0.1 to 0.6 mm	6 - 15 adjustable		E32-C42 1M + E39-F3A		
	Precision height difference detection / flat surface detection Object detection in front of background	23 × 20 × 9 mm	–	26.5±11.5		E32-A09 2M
		16 × 18 × 4 mm	–	7.2±1.8		E32-L25L ^{*1}
		20 × 20 × 5 mm	–	3.3		E32-L25
		18 × 20 × 4 mm	Precise spot e.g. for detection of a flat / reflective surface	4±2		E32-L24L ^{*1}
		34 × 25 × 8 mm	High precision (detection accuracy 100 µm)	2.4		E32-EL24-1 2M
		20.5 × 14 × 3.8 mm	Limited reflective wide beam e.g. for object detection on a flat surface	15		E32-L16-N 2M

^{*1} A high flex cable version is available. Add 'R' to the order code, e.g. E32-CC200R

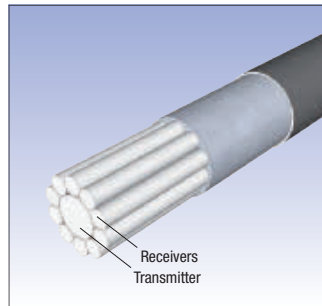
^{*2} Outer diameter of the fiber. Outer diameter of the focal lens is dia 4mm (front part)

Specifications

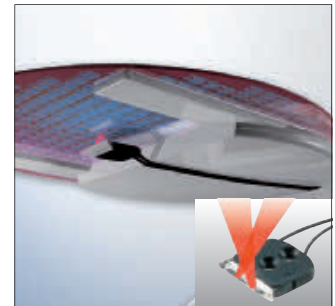
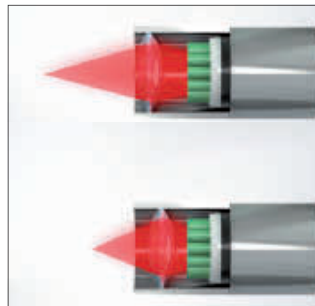
Item	Through-beam			Diffuse reflective (coaxial)			Limited reflective				
	E32-T22S	E32-A03	E32-A04	E32-C11N E32-C31N	E32-GC200	E32-C42 E32-D32/-D32L E32-EC31/-EC41	E32-EL24-1	E32-L24L E32-L25L	E32-L25	E32-L16	E32-A09
Permissible bending radius	R10	R1	R10	R4	R25		R10		R25		
Cut to length	Yes										
Ambient temperature	-40°C to 70°C										
Material	Head	Brass-nickel plated		Stainless steel	Brass-nickel plated		Brass nickel plated	Brass-nickel plated and aluminium	Polycarbonate	ABS	Aluminium
	Fiber	PMMA									
Sheath	PVC coating		Polyethylene coating		PVC coating	PVC, polyethylene and polyolefin coating		Polyethylene coating			
	IEC 60529 IP67		IEC 60529 IP50		IEC 60529 IP67				IEC 60529 IP50		IEC 60529 IP40



Focused and high precision beam alignment during manufacturing. Models available with typical deviation of 0.1° for very precise detections



Coaxial fibers provide an enhanced positioning and detection accuracy and allow the easy adjustment of the focal point using adjustable focal lenses



Limited reflective fibers utilize the total reflection on shiny surfaces to detect height differences or objects at a pre-defined distance.


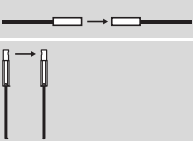
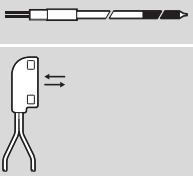
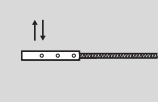

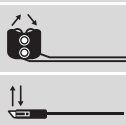


Special application fiber sensor heads

For a wide range of special applications, the task optimised fiber heads provide best fitting sensing performance and adaption to environmental requirements.

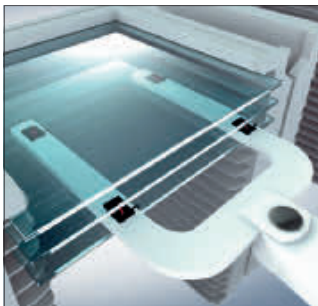
- Detection of special objects (liquids, labels on foils, etc.)
- Fiber heads optimised for special tasks (wafer mapping, flat glass, etc.)

Ordering information

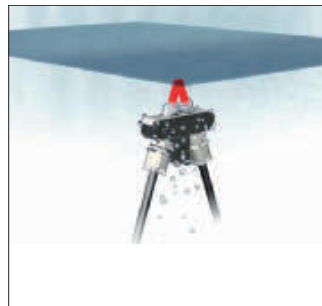
Sensor type	Size	Sensing distance (in mm)		Comment	Order code	
		E3X-SD	E3X-HD			
 Fork shape	36 × 24 × 8 mm	10		–	E32-G14	
	dia 3 mm	2000	3800	–	E32-T22S	
	dia 3 mm	1400	2600	–	E32-T24S	
	dia 3 mm	890	1780	–	E32-A03 2M	
	dia 2 mm	340	680	–	E32-A04 2M	
	dia 6 mm	liquid contact		Liquid level contact	E32-D82F1 4M	
	15 × 23.5 × 5 mm	tube contact		Liquid level detection through transparent tube or container	E32-D36T 2M	
	Glass detection	21 × 16.5 × 4 mm	8		Metal housing	E32-A10 2M
	Glass detection	20.5 × 14 × 3.8 mm	15		Plastic housing	E32-L16-N 2M
	Glass detection in hot environment	25 × 18 × 5 mm	1–5		Heat resistant up to 300°C	E32-L64 2M
		36 × 18 × 5.5 mm	5–18			E32-L66 2M
 Glass detection in wet processes	38.5 × 39 × 17.5 mm	8 to 20 (recommended: 11)		- Heat resistant up to 85°C - Recommended usage with 'tough mode' of E3X-DA-S	E32-L11FS 2M	
	Label detection	20 × 20 × 5 mm	7.2±1.8		–	E32-L25L
		18 × 20 × 4 mm	4±2		–	E32-L24L
		34 × 25 × 8 mm	2.4		Very precise spot (detection accuracy 100 µm)	E32-EL24-1 2M

Specifications

Item	E32-D82F1 E32-L11FS	E32-G14	E32-A10	E32-L16-N	E32-L66	E32-L64			
Permissible bending radius	R40	R25							
Cut to length	Yes				No				
Ambient temperature	-40°C to 70°C				-40°C to 300°C				
Material	Head	PFA	ABS	ABS	PVC	Stainless steel			
	Fiber	PMMA				Glass			
	Sheath	Polyethylene coating				Stainless steel spiral coating			
Degree of protection	IEC 60529 IP67			IEC 60529 IP30	IEC 60529 IP40	IEC 60529 IP40	IEC 60529 IP50		
Item	E32-EL24-1	E32-T24S	E32-L24L E32-L25L	E32-A04	E32-D36T	E32-A03	E32-T22S		
Permissible bending radius	R10				R4	R1			
Cut to length	Yes								
Ambient temperature	-40°C to 70°C								
Material	Head	Brass-nickel plated and aluminium	Stainless steel	Brass-nickel plated	Stainless steel	ABS	Brass-nickel plated		
	Fiber	PMMA							
	Sheath	Polyethylene coating	PVC coating	Polyethylene coating			PVC coating	Polyethylene coating	PVC coating
Degree of protection	IEC 60529 IP67		IEC 60529 IP50		IEC 60529 IP67		IEC 60529 IP50	IEC 60529 IP67	



The limited reflective fiber heads for glass detection provide a stable detection of flat glass in standard, hot or wet environment. The shapes and materials are optimized to provide the best value - performance ratio depending on the requirements.



For the detection of very small height differences like labels on foils in applications where space is crucial, the small sized limited reflective sensors provide accurate detection up to 100µm resolution.



Easy-teach digital fiber amplifier

The E3X-HD with 1-button Smart tune set-up provides fast and simple teaching. Dual digital display and advanced features make the E3X-HD ideal even for demanding applications.

- Easy teaching by Smart tuning within a few seconds
- Dynamic Power Control (DPC) for highest operational stability for changing environmental conditions or challenging objects
- M8 connector models
- EtherCAT and CompoNet Communication units for high-speed field bus connectivity

Ordering information

Item	Order code		
	Transistor output models		Communication unit model ^{*1}
	NPN output	PNP output	
Pre-wired	E3X-HD11 2M	E3X-HD41 2M	–
Fiber amplifier connector	E3X-HD6	E3X-HD8	E3X-HD0
M8 connector (4pin)	E3X-HD14	E3X-HD44	–

^{*1} For field bus connection please chose Communication unit E3X-ECT for EtherCAT or E3X-CRT for CompoNet.

Fiber amplifier connectors

Shape	Type	Comment	Order code
	Fiber amplifier connector	2 m PVC cable	E3X-CN11
		30 cm PVC cable with M12 plug connector (4 pin)	E3X-CN21-M1J 0.3M
		30 cm PVC cable with M8 plug connector (4 pin)	E3X-CN21-M3J-2 0.3M

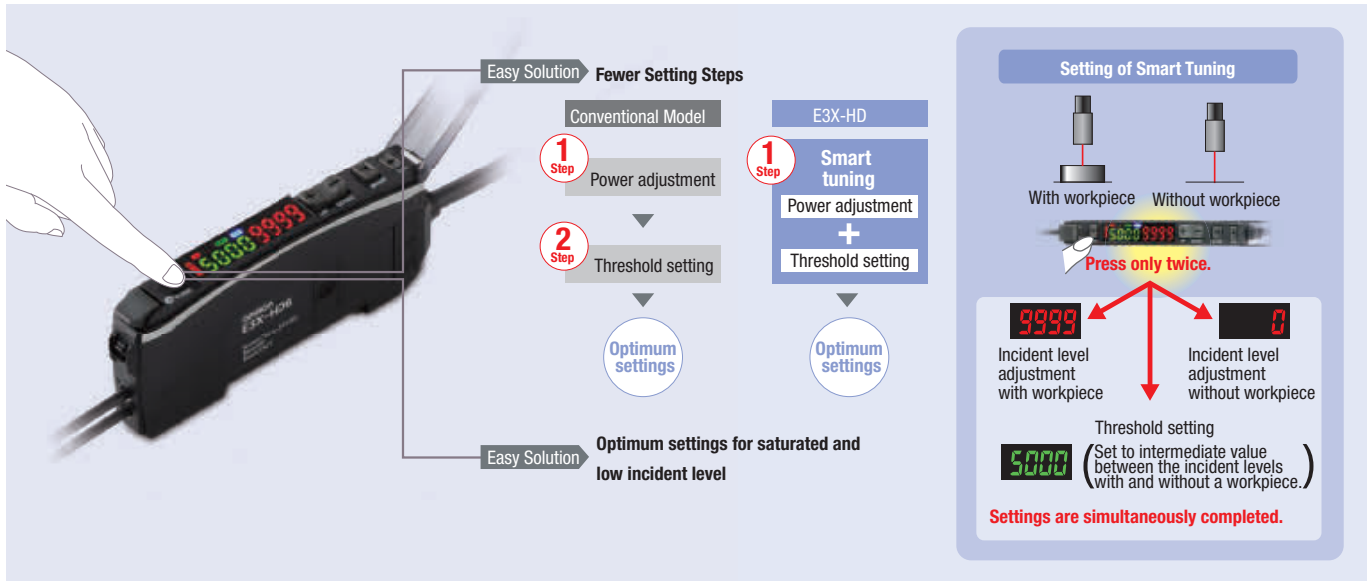
Communication units

Shape	Communications method	Applicable Fiber Amplifier Units	Order code
	CompoNet	E3X-HD0 E3X-MDA0 E3X-DA0-S	E3X-CRT
	EtherCAT		E3X-ECT

Specifications

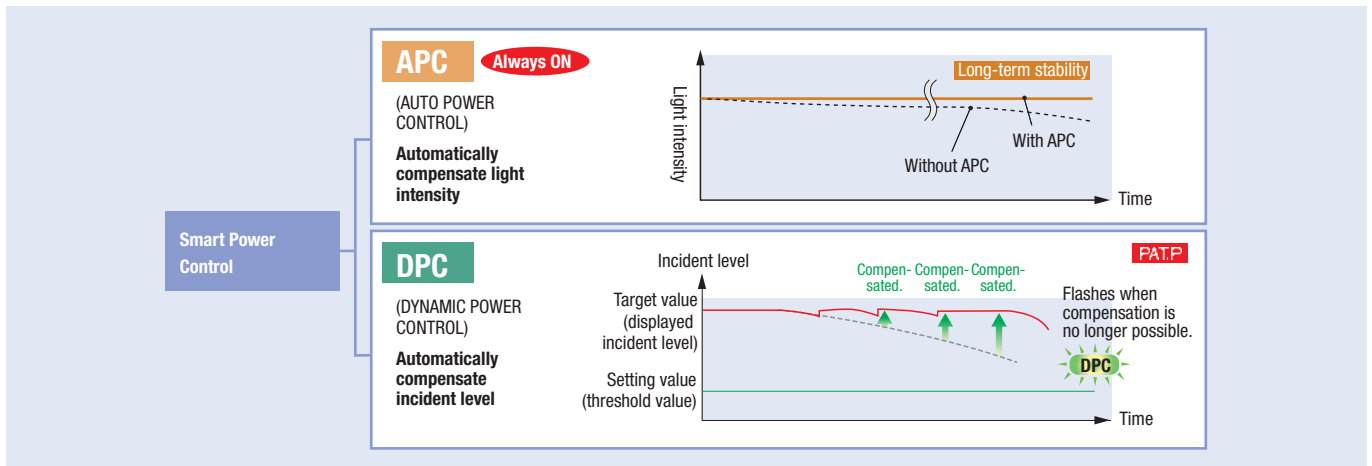
Type		Standard models						For Communications Unit
Model		E3X-HD11	E3X-HD41	E3X-HD6	E3X-HD8	E3X-HD14	E3X-HD44	E3X-HD0
Connection method		Pre-wired		Wire-saving connector		M8-4pin connector		Communications unit connector
Item	Control output	NPN output	PNP output	NPN output	PNP output	NPN output	PNP output	—
Light source (wavelength)		Red, 4-element LED (625 nm)						
Power supply voltage		12 to 24 VDC±10%, ripple (p-p) 10% max.						
Power consumption		Normal Mode: 720 mW max. (Current consumption: 30 mA max. at 24 VDC, 60 mA max. at 12 VDC.) Power Saving Eco Mode: 530 mW max. (Current consumption: 22 mA max. at 24 VDC, 44 mA max. at 12 VDC.)						
Control output		Load power supply voltage: 26.4 VDC max., open-collector output (Varies with the model depending on output is PNP or NPN.)Load current: 50 mA max. (residual voltage: 2 V max.), OFF current: 0.5 mA max.						
Response time	Super-high-speed Mode (SHS)	Operate or reset: 50 µs (NPN models) or 55 µs (PNP models)						
	High-speed Mode (HS)	Operate or reset: 250 µs						
	Standard Mode (STND)	Operate or reset: 1 ms						
	Giga-power Mode (GIGA)	Operate or reset: 1 ms						
Mutual interference prevention		Possible for up to 10 units						
Maximum connectable Units		16 units						with E3X-CRT: 16 units with E3X-ECT: 30 units

Easy One-Button-Teaching/Smart Tuning



Easy setting of optimum power and threshold by pushing tune button twice.

Smart power control



Enhanced signal stability control for compensating power reductions caused by temperature drift, dust or aging of LED.

Field bus connectivity



Field bus communication allows control by an external device to simplify setup and reduce wiring effort.



Single display digital fiber amplifier

E3X-SD allows easy one button setting and provide the best value performance ratio for standard applications.

- Auto-teaching during machine operation
- 2-point teaching within a few seconds
- Simple threshold adjustment with up/down keys

Ordering information

Item	Order code	
	NPN output	PNP output
Pre-wired	E3X-SD21 2M	E3X-SD51 2M
Fiber amplifier connector*1	E3X-SD7	E3X-SD9

*1 Order connector separately. For M8 connector models see E3X-DA-S.

Fiber amplifier connectors

Shape	Type	Comment	Order code
	Fiber amplifier connector	2 m PVC cable	E3X-CN11
		30 cm PVC cable with M12 plug connector (4 pin)	E3X-CN21-M1J 0.3M
		30 cm PVC cable with M8 plug connector (4 pin)	E3X-CN21-M3J-2 0.3M

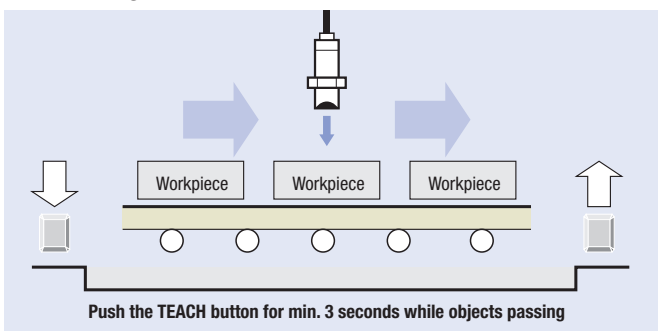
Specifications

Item	E3X-SD	
Light source (wave length)	Red, 4-element LED (625 nm)	
Power supply voltage	12 to 24 VDC ±10%, ripple (p-p): 10% max.	
Protective circuits	Power supply reverse polarity protection, output short-circuit protection, mutual interference prevention	
Response time	Operation or reset: 200 µs max	
Sensitivity setting	Teaching and digital up/down keys	
Functions	Auto power control	High-speed control method for emission current
	Mutual interference prevention	Optical communication sync. possible for up to 5 units
Digital displays	Incident level or threshold	
Degree of protection	IEC 60529 IP50 (with protective cover attached)	

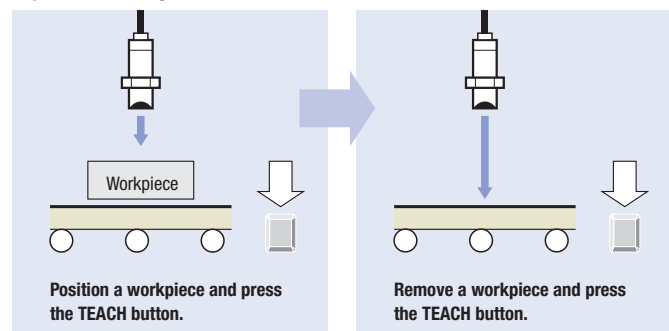
Easy operation by ergonomic buttons



Auto-teaching



2-point teaching





Digital fiber amplifier with potentiometer adjustment

The E3X-NA is the ideal amplifier for standard fiber applications providing quick & easy potentiometer adjustment and bargraph display.

- Easy adjustment with potentiometer
- Mutual interference prevention
- Enhanced water resistance types

Ordering information

Pre-wired

Item	Order code (for pre-wired types with 2 m cable length)	
	NPN output	PNP output
Standard	E3X-NA11 2M	E3X-NA41 2M
Enhanced water resistance	E3X-NA11V 2M	E3X-NA41V 2M

Connector version

Item	Order code	
	NPN output	PNP output
Standard (fiber amplifier connector)*1	E3X-NA6	E3X-NA8
Enhanced water resistance (M8 4-pin connector)	E3X-NA14V	E3X-NA44V

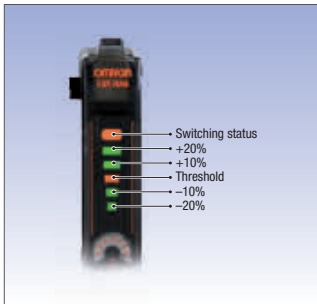
*1 Order connector separately.

Fiber amplifier connectors

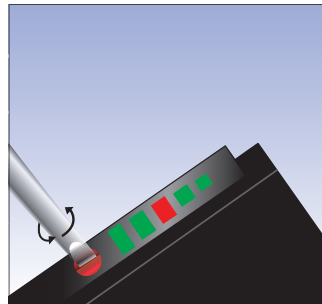
Shape	Type	Comment	Order code
	Fiber amplifier connector	2 m PVC cable	E3X-CN21
		30 cm PVC cable with M12 plug connector (4 pin)	E3X-CN21-M1J 0.3M
		30 cm PVC cable with M8 plug connector (4 pin)	E3X-CN21-M3J-2 0.3M

Specifications

Item	Standard		Enhanced water resistance
Output	NPN output	E3X-NA11, E3X-NA6	E3X-NA11V, E3X-NA14V
	PNP output	E3X-NA41, E3X-NA8	E3X-NA41V, E3X-NA44V
Light source (wave length)	Red LED (625 nm)		
Power supply voltage	12 to 24 VDC \pm 10%, ripple (p-p): 10% max.		
Protective circuit	Reverse polarity protection, output short-circuit protection, mutual interference prevention		
Response time	Operation or reset: 200 μ s max.		
Sensitivity setting	8-turn endless adjuster (potentiometer)		
Functions	OFF-delay timer: 40 ms (fixed)		
Degree of protection	IEC 60529 IP50 (with protective cover attached)		IEC 60529 IP66 (with protective cover attached)



Bargraph display with light level, switching status and threshold indicators



Simple sensitivity adjustment by potentiometer



High-performance digital fiber amplifier

The E3NX-FA amplifier is best choice for most challenging fiber applications in terms of long sensing distance, minute object detection or high speed processes.

- Easy teaching by Smart tuning within a few seconds
- New N-Smart technology provides significant improvement for sensing distance, minimum object detection and speed
- Easy and transparent information about sensor status by Solution Viewer and Change Finder function
- EtherCAT Communication unit for high-speed field bus connectivity

Ordering information

Item	Connection	Inputs/Outputs	Order code	
			NPN output	PNP output
Standard models	Pre-wired	1 output	E3NX-FA11 2M	E3NX-FA41 2M
	Fiber amplifier connector		E3NX-FA6	E3NX-FA8
Advanced models	Pre-wired	2 outputs + 1 input	E3NX-FA21 2M	E3NX-FA51 2M
	Fiber amplifier connector	1 output + 1 input	E3NX-FA7	E3NX-FA9
		2 outputs	E3NX-FA7TW	E3NX-FA9TW
	M8 connector	1 output + 1 input	E3NX-FA24	E3NX-FA54
		2 output	-	E3NX-FA54TW
Networking model ^{*1}	Connector for communication unit	via com. protocol	E3NX-FA0	

^{*1} For field bus connection please chose communication unit E3NW-ECT for EtherCAT.

Fiber amplifier connectors

Shape	Type	Comment	Order code
	Fiber amplifier connector	2 m PVC cable (4 pin)	E3X-CN21
		30 cm PVC cable with M12 plug connector (4 pin)	E3X-CN21-M1J 0.3M
		30 cm PVC cable with M8 plug connector (4 pin)	E3X-CN21-M3J-2 0.3M

Communication units

Shape	Communications method	Applicable Amplifier Units	Order code
	Sensor communication unit for EtherCAT	E3NX-FA0 E3NC-LA0 E3NC-SA0	E3NW-ECT
	Sensor dispersion (slave) unit		E3NW-DS

Specifications

Item	Type	Standard models		Advanced models					Model for sensor communications unit
	NPN output	E3NX-FA11	E3NX-FA6	E3NX-FA21	E3NX-FA7	E3NX-FA7TW	E3NX-FA24	–	E3NX-FA0
	PNP output	E3NX-FA41	E3NX-FA8	E3NX-FA51	E3NX-FA9	E3NX-FA9TW	E3NX-FA54	E3NX-FA54TW	
Connection method	Pre-wired	Wire-saving connector	Pre-wired	Wire-saving connector		M8 connector		Connector for sensor communications unit	
Inputs/outputs	Outputs	1 output		2 outputs	1 output	2 outputs	1 output	2 outputs	via com. protocol
	External inputs	–		1 input	1 input	–	1 input	–	–
Light source (wavelength)		Red, 4-element LED (625 nm)							
Power supply voltage		10 to 30 VDC, including 10% ripple (p-p)							
Power consumption		At power supply voltage of 24 VDC Standard model or model for sensor communications unit: Normal mode: 960 mW max. (current consumption: 40 mA max.), Power saving eco mode: 840 mW max. (current consumption: 35 mA max.) Advanced model: Normal mode: 1,080 mW max. (current consumption: 45 mA max.), Power saving eco mode: 930 mW max. (current consumption: 40 mA max.)							
Control output		Load power supply voltage: 30 VDC max., open-collector output Load current: groups of 1 to 3 amplifiers: 100 mA max., groups of 4 to 30 amplifiers: 20 mA max. Residual voltage: at load current of less than 10 mA: 1 V max. at load current of 10 to 100 mA: 2 V max. OFF current: 0.1 mA max.							–
Response time	Super-high-speed Mode (SHS) ^{*1}	Operate or reset for model with 1 output: 30 μs, with 2 outputs: 32 μs							
	High-speed Mode (HS)	Operate or reset: 250 μs							
	Standard Mode (Stnd)	Operate or reset: 1 ms							
	Giga-power Mode (GI&A)	Operate or reset: 16 ms							
No. of units for mutual interference prevention	Super-high-speed Mode (SHS) ^{*1}	0							
	High-speed Mode (HS)	10							
	Standard Mode (Stnd)	10							
	Giga-power Mode (GI&A)	10							
Functions		Auto power control (APC), dynamic power control (DPC), timer, zero reset, resetting settings, eco mode, bank switching, power tuning, and hysteresis width							
Maximum connectable units		30							

^{*1} The mutual interference prevention function is disabled if the detection mode is set to super-high-speed mode.

Easy One-Button-Teaching/Smart Tuning



Automatic setting of optimum values

Threshold + Incident level

5000 9999

Set to the intermediate value between the incident levels with and without a workpiece.

Incident level adjustment with and without a workpiece

Dynamic range increased by a factor of 40,000

Easy setting of optimum power and threshold by pushing tune button twice.

Smart power control

Smart Power Control

APC Always ON

(AUTO POWER CONTROL)

Automatically compensate light intensity

DPC

(DYNAMIC POWER CONTROL)

Automatically compensate incident level

Enhanced signal stability control for compensating power reductions caused by temperature drift, dust or aging of LED. Alarm output added for predictive maintenance.

N-Smart platform



The N-Smart platform provides wide portfolio of advanced sensors – all with the same intuitive operation concept and field bus connectivity.

2-in-1 Digital fiber amplifier



E3X-MDA incorporates 2 digital fiber amplifiers in one slimline housing. For applications requiring the detection of two objects simultaneously the E3X-MDA provides an easy to use operation saving space and set-up time.



- Two digital amplifiers in one slimline housing
- Twin output models – on/off or area (between two threshold values)
- Signal comparison functions (AND, OR, etc.)

Ordering information

Item	Functions	Order code	
		NPN output	PNP output
Pre-wired	AND/OR output	E3X-MDA11	E3X-MDA41
Fiber amplifier connector ^{*1}	AND/OR output	E3X-MDA6	E3X-MDA8

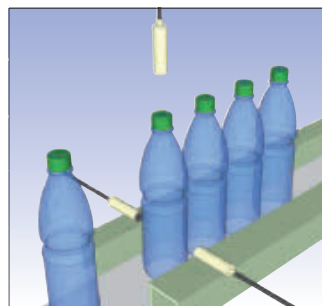
^{*1} Order connector separately.

Fiber amplifier connectors

Shape	Type	Comment	Order code
	Fiber amplifier connector	2 m PVC cable	E3X-CN21
		30 cm PVC cable with M12 plug connector (4 pin)	E3X-CN21-M1J 0.3M
		30 cm PVC cable with M8 plug connector (4 pin)	E3X-CN21-M3J-2 0.3M

Specifications

Item	E3X-MDA	
Light source (wave length)	Red LED (650 nm)	
Power supply voltage	12 to 24 VDC ±10%, ripple (p-p) 10% max.	
Protective circuits	Power supply reverse polarity protection, output short-circuit protection, mutual interference prevention	
Response time	Super-high-speed mode	130 µs for operation and reset respectively
	Standard mode	1 ms for operation and reset respectively
	High-resolution mode	4 ms for operation and reset respectively
Sensitivity setting	Teaching and digital up/down keys	
Functions	Power tuning	Light emission power and reception gain, digital control method
	Timer function	Select from OFF-delay, ON-delay, or one-shot timer. 1 ms to 5 s (1 to 20 ms set in 1-ms increments, 20 to 200 ms set in 10-ms increments, 200 ms to 1 s set in 100-ms increments, and 1 to 5 s set in 1 s-increments)
	I/O settings	Output setting (select from channel 2 output, AND, OR, leading edge sync, falling edge sync, or differential output)
Digital displays	Select from the following: Incident level for channel 1 + incident level for channel 2, Incident level + threshold, incident level percentage + threshold, incident light peak level + no incident light bottom level, minimum incident light peak level + maximum no incident light bottom level, long bar display, incident level + peak hold, incident level + channel	
Degree of protection	IEC 60529 IP50 (with protective cover attached)	



The AND and OR functionality for the two fiber channels allows simple signal processing without the need for a PLC. This allows the addition of sensor checks to machines without reprogramming the PLC.



The 2 in 1 amplifier replaces two standard amplifiers reducing space requirements and hardware cost.



Fast response digital amplifier with potentiometer

The E3X-NA_F provides a very fast response time and is the ideal amplifier for high speed detection applications.

- Short turn on time of only 20 μ s
- Easy adjustment with potentiometer

Ordering information

Item	Order code	
	NPN output	PNP output
Pre-wired	E3X-NA11F	E3X-NA41F
M8 connector (4 pin)	-*1	E3X-NA44FV

*1 Contact your OMRON representative

Specifications

Item	NPN output	E3X-NA11F	-
	PNP output	E3X-NA41F	E3X-NA44FV
Light source (wave length)	Red LED (680 nm)		
Power supply voltage	12 to 24 VDC \pm 10%, ripple (p-p): 10% max.		
Protective circuit	Reverse polarity protection, output short-circuit protection, mutual interference prevention		
Response time	Operation: 20 μ s max. Reset: 30 μ s max.		
Sensitivity adjustment	8-turn endless adjuster (potentiometer)		
Functions	OFF-delay timer: 40 ms (fixed)		
Degree of protection	IEC 60529 IP50 (with protective cover attached)		IEC 60529 IP66 (with protective cover attached)

Note: For teachable fast response fiber amplifiers with a digital display contact your OMRON representative.

Digital fiber amplifier with infrared LED



The digital fiber amplifiers with infrared LED are ideal for water detection applications or where visible light is not desired.

- Infrared LED
- LED power control and signal processing function

Ordering information

Pre-wired

Item	Order code (for pre-wired types with 2 m cable length)	
	NPN output	PNP output
Infrared light	E3X-DAH11-S 2M	E3X-DAH41-S 2M

Connector version

Item	Order code	
	NPN output	PNP output
Infrared light (fiber amplifier connector)*1	E3X-DAH6-S	E3X-DAH8-S

*1 Order connector separately

Fiber amplifier connectors
















Shape	Type	Comment	Order code
	Fiber amplifier connector	2 m PVC cable	E3X-CN21
		30 cm PVC cable with M12 plug connector (4 pin)	E3X-CN21-M1J 0.3M
		30 cm PVC cable with M8 plug connector (4 pin)	E3X-CN21-M3J-2 0.3M

Specifications

Amplifier units with cables

Item	NPN output		E3X-DAH11-S, E3X-DAH6-S
	PNP output		E3X-DAH41-S, E3X-DAH8-S
Light source (wave length)	Infrared LED		
Power supply voltage	12 to 24 VDC ±10%, ripple (p-p) 10% max.		
Protective circuits	Power supply reverse polarity protection, output short circuit protection, mutual interference prevention		
Response time	Super-high-speed mode	NPN	48 µs for operation and 50 µs for reset
		PNP	53 µs for operation and 55 µs for reset
	Standard mode		1 ms for operation and reset respectively
	High-resolution mode		4 ms for operation and reset respectively
Sensitivity setting	Teaching and digital up/down keys		
Functions	Power tuning	Light emission power and reception gain, digital control method	
	Timer function	Select from OFF-delay, ON-delay, or one-shot timer. 1 ms to 5 s (1 to 20 ms set in 1-ms increments, 20 to 200 ms set in 10-ms increments, 200 ms to 1 s set in 100-ms increments, and 1 to 5 s set in 1 s-increments)	
Digital displays	Incident level + threshold or user specific		
Degree of protection	IEC 60529 IP50 (with protective cover attached)		

Accessories

Shape	Type	Comment	Order code
	Focal lens	- Extends sensing distance by more than 500% - For M4 Through beam fibers E32-TC200, E32-ET11R, E32-T11 (fits M2.6 thread) - 2 pcs per set	E39-F1
	Focal lens (side view)	- For M4 through beam fibers E32-TC200, E32-ET11R, E32-T11, E32-T61-S, E32-T81R-S (fits M2.6 thread) - Temperature range -40°C to +200°C - 2 pcs per set	E39-F2
	Focal lens (variable)	- For precision detection with E32-D32, E32-EC41	E39-F3A
	Focal lens	- For precision detection with E32-EC41	E39-F3A-5
	Focal lens	- For precision detection with E32-EC41	E39-F3B
	Focal lens	- For precision detection with M6 coaxial diffuse reflective fibers (e.g. E32-CC200)	E39-F18
	Focal lens (side view, variable)	- For precision detection with E32-EC31	E39-EF51
	Focal lens (heat resistant)	- Extends sensing distance by more than 500% - For M4 through beam fibers E32-ET51, E32-T61, E32-T61-S, E32-T81R, E32-T81R-S (fits M4 thread) - Temperature range -60°C to +350°C - 2 pcs per set	E39-EF1-37-2 E39-F16
	Focal lens (vacuum resistant, heat resistant)	- Fits E32-T51V and E32-T54V (fits M2.6 thread) - 2 units per set - Heat resistant up to 120°C	E39-F1V
	Fiber cutter	- Included in applicable fiber	E39-F4
	Thin fiber attachment	- Amplifier adapter for thin fibers - Included in applicable fiber (2 sets)	E39-F9
	Sleeve bender	- For E32-TC200B(4) - For E32-TC200F(4) - For E32-DC200F(4)	E39-F11
	Single fiber extension connector	- Fiber extension connector for 2.2 mm dia standard fibers - One unit	E39-F10
	Dual fiber extension connector	- For fibers with dia 2.2 - For fiber with dia 1.0 - For fibers with dia between 1.0 and 2.2	E39-F13 E39-F14 E39-F15
	Protective spiral tube ^{*1}	- For M3 diffuse type sensors - Length 1 m - For M3 through beam type sensors - Length 1 m - For M4 through beam type sensors - Length 1 m - For M6 diffuse type sensors - Length 1 m	E39-F32A E39-F32B E39-F32C E39-F32D
	Fiber on roll ^{*2}	- Dia 2.2 mm - Standard monocoire, 10 mm bending radius - -40°C to 80°C - Dia 1.1 mm - Standard monocoire, 15 mm bending radius - -40°C to 80°C - Dia 2.2 mm - High flex multicore, 1 mm bending radius - -40°C to 80°C - Dia 1.1 mm - High flex multicore, 1 mm bending radius - -40°C to 80°C - Dia 2.2 mm - High temperature monocoire, 20 mm bending radius - -60°C to 150°C	E32-E01 100M E32-E02 100M E32-E01R 100M E32-E02R 100M E32-E05 100M

^{*1} Protective spiral tubes with 0.5 m length are available. Add '5' to order code...e.g. E39-F32A5

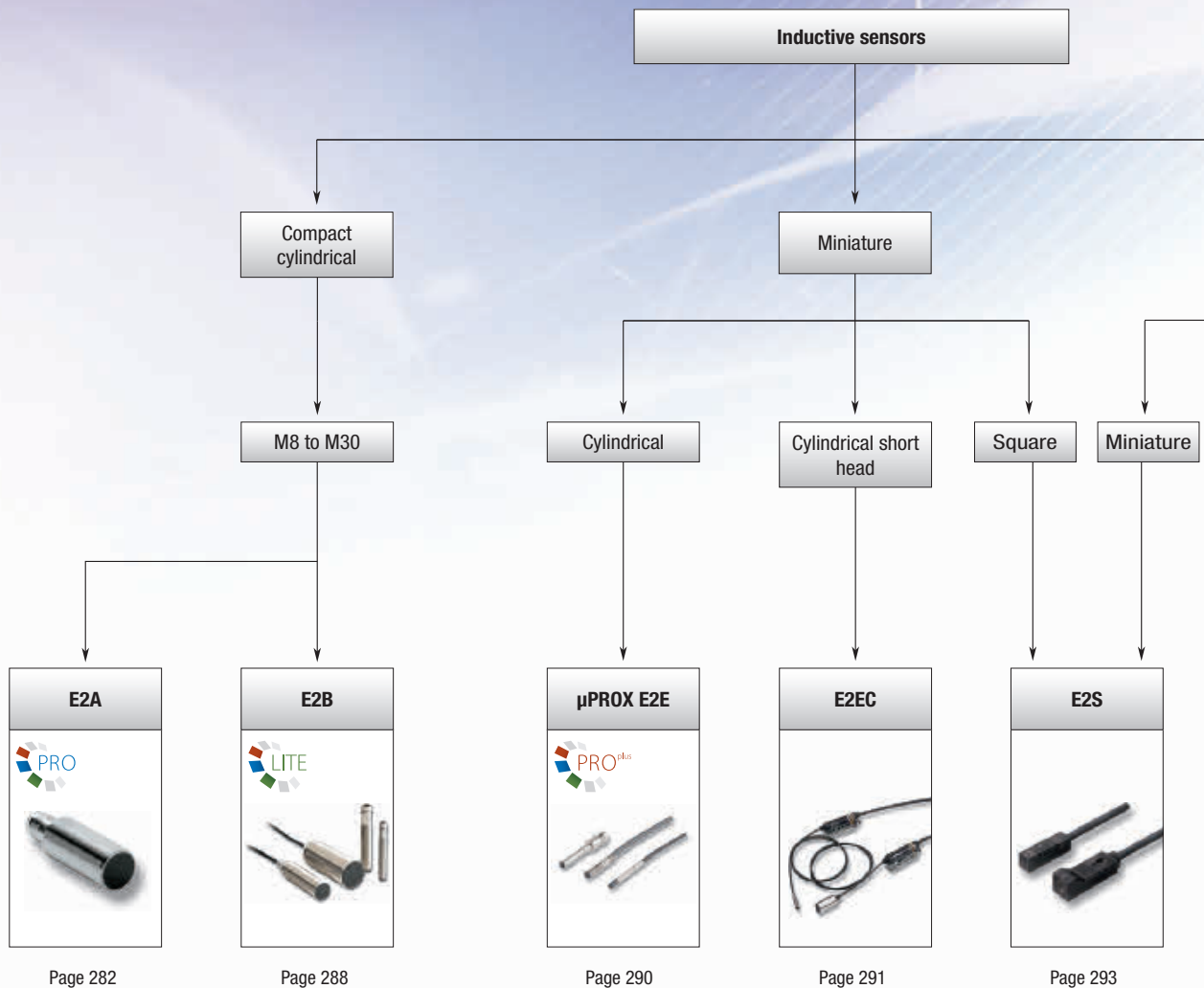
^{*2} Fiber length 100 m on a roll - cut to length

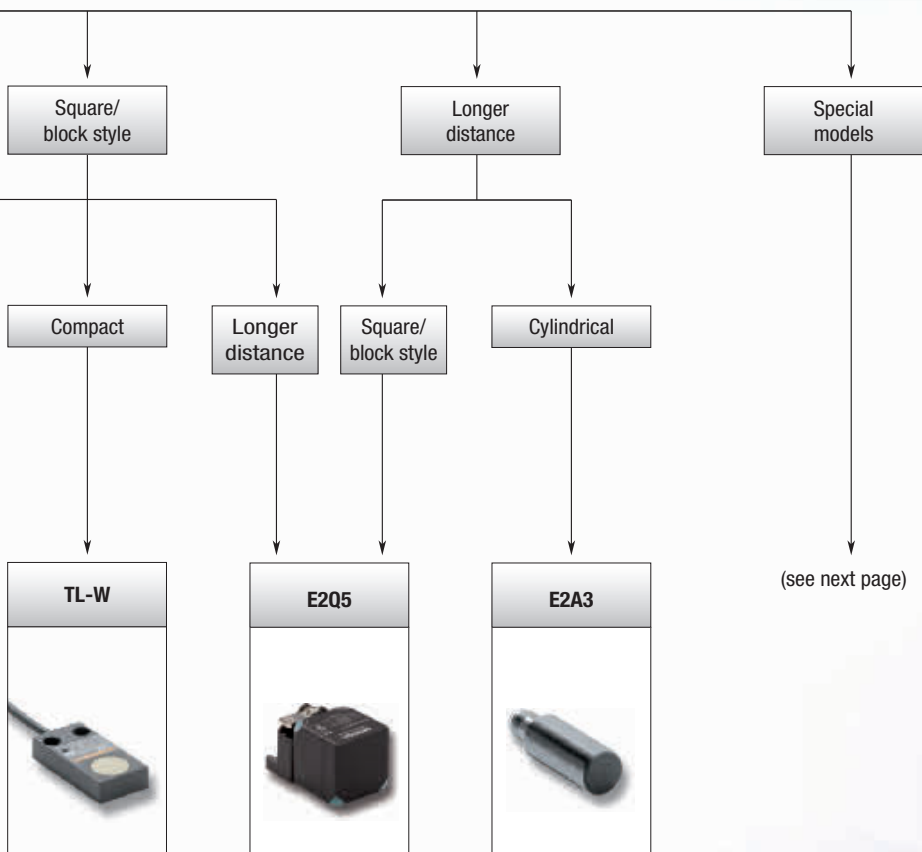
ZERO TOLERANCE ON FAILURE

Tested reliability for demanding conditions

Our inductive sensors are designed and tested to ensure a long service life and to achieve maximum machine availability even in the harshest environments. This trusted reliability makes the E2A one of the world's most popular and successful inductive proximity sensors with more than one million units sold every year.

- Wide portfolio and application range
- Highest reliability even in demanding environments
- Designed for flexibility - modular housing design for best performance fit





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Selection table




		Cylindrical				
						
Model		E2A	E2A DC 2-wire/4-wire	E2A3	E2A-S	E2B
361° product line		PRO	PRO	PRO ^{plus}	PRO	LITE
Type		Compact	Compact	Long distance	Compact	Compact
Material		Brass, SUS	Brass, SUS	Brass	Stainless steel	Stainless steel
Max. sensing distance	dia 3	–	–	–	–	–
	dia 4	–	–	–	–	–
	M5	–	–	–	–	–
	dia 6.5	–	–	–	–	–
	M8	2/4 mm	2/4 mm	3mm / –	2/4 mm	2/4 mm
	M12	4/8 mm	4/8 mm	6mm / –	4/8 mm	4/8 mm
	M18	8/16 mm	8/16 mm	11mm / –	8/16 mm	8/16 mm
	M30	15/30 mm	15/30 mm	20mm / –	15/20 mm	15/30 mm
	19 × 6 × 6	–	–	–	–	–
	22 × 8 × 6	–	–	–	–	–
31 × 18 × 10	–	–	–	–	–	
53 × 40 × 23	–	–	–	–	–	
67 × 40 × 40	–	–	–	–	–	
Mount.	Shielded	■	■	■	■	■
	Non-shielded	■	■	–	■	■
Oper. mode	NO	■	■	■	■	■
	NC	■	■	■	■	■
	NO + NC	–	■	–	–	–
Wiring	DC 2-wire	–	■	–	–	–
	DC 3-wire	■	–	■	■	■
	DC 4-wire	–	■	–	–	–
	AC 2-wire	–	□	–	–	–
Voltage	10 to 30 VDC	■	■	■	■	■
	12 to 240 VAC	–	□	–	–	–
IP rating	IP67	■	■	■	■	■
	IP69K	■	■	■	■	–
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Special models

Type	Vehicle usage certified	Detergent and heat resistant	Chemical resistant	Small diameter	
					
Model	E2AU	E2EH	E2FQ	µPROX E2E	E2EC
361° product line	PRO ^{plus}	PRO ^{plus}	PRO ^{plus}	PRO ^{plus}	PRO ^{plus}
Key features	<ul style="list-style-type: none"> e1 type approval (according to automotive directive 2005/83/EC) E1 (according to vehicle regulation ECE-R10) 	<ul style="list-style-type: none"> stainless steel housing 120°C heat resistance 	<ul style="list-style-type: none"> PTFE housing 	<ul style="list-style-type: none"> High frequency of 5 kHz: suitable for high-speed counting All sizes are also available as non-shielded types 	<ul style="list-style-type: none"> Small diameter housing with short body length
dia 3	–	–	–	0.8 to 2 mm	0.6 mm
dia 4	–	–	–	1.2 to 3 mm	–
dia 6.5	–	–	–	2 to 4 mm	–
M5	–	–	–	1.2 to 3 mm	–
M8	–	–	–	–	–
M12	■	■	■	–	2 mm
M18	■	■	■	–	7 mm
M30	■	■	■	–	–
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Format		Square		
				
Model		TL-W	E2S	E2Q5
Type		Compact	Miniature	Long distance
Material		ABS	Polyarylate	PBT
Max. sensing distance	dia 3	–	–	–
	dia 4	–	–	–
	M5	–	–	–
	dia 5.4	–	–	–
	M8	–	–	–
	M12	–	–	–
	M18	–	–	–
	M30	–	–	–
	19 × 6 × 6	–	1.6 mm	–
	22 × 8 × 6	3 mm	2.5 mm	–
31 × 18 × 10	5 mm	–	–	
53 × 40 × 23	20 mm	–	–	
67 × 40 × 40	–	–	40 mm	
Mount.	Shielded	■	–	■
	Non-shielded	■	■	■
Oper. mode	NO	■	■	■
	NC	■	■	–
	NO + NC	–	–	■
Wiring	DC 2-wire	■	■	–
	DC 3-wire	■	■	■
	DC 4-wire	–	–	■
	AC 2-wire	–	–	–
Voltage	10 to 30 VDC	■	■	■
	12 to 240 VAC	–	–	–
IP rating	IP67	■	■	■
	IP69K	–	–	■
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Special models

Type	Full metal face	Oil resistant	High precision positioning
			
Model	E2FM	E2E	E2C-EDA
361° product line	PRO ^{plus}	PRO ^{plus}	PRO ^{plus}
Key features	<ul style="list-style-type: none"> immune to aluminium and cast iron chips on sensing surface oil resistant 	<ul style="list-style-type: none"> tested oil resistance on commonly used lubricants 	<ul style="list-style-type: none"> distance teaching up to µm accuracy
dia 3	–	–	■
dia 4	–	–	–
dia 6.5	–	–	–
M5	–	–	–
M8	■	■	–
M12	■	■	■
M18	■	■	■
M30	■	■	–
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■ Standard

□ Available

– No/not available



Extended sensing range inductive sensor in cylindrical brass housing

The high quality and the long-life design of the E2A extended sensing distance provide high operational reliability, accurate performance and long sensor lifetime for a wide range of applications.

- Extended (double) sensing distance
- IP67 and IP69k for highest water protection
- DC 3-wire (NO, NC)
- Wide temperature range –40 to 70°C
- 200 mA max load current
- Wide installation and connectivity range through modular concept

Ordering information

Pre-wired

Size			Sensing distance	Thread length (overall length)	Output configuration	Order code (for pre-wired types with 2 m PVC cable)	
						Operation mode NO	Operation mode NC
M8	■	–	2.0 mm	27 (40) mm	PNP ^{*1}	E2A-S08KS02-WP-B1 2M ^{*2}	E2A-S08KS02-WP-B2 2M ^{*2}
	–	■	4.0 mm	21 (40) mm	PNP ^{*1}	E2A-S08KN04-WP-B1 2M ^{*2}	E2A-S08KN04-WP-B2 2M ^{*2}
M12	■	–	4.0 mm	34 (50) mm	PNP ^{*1}	E2A-M12KS04-WP-B1 2M	E2A-M12KS04-WP-B2 2M
	–	■	8.0 mm	27 (50) mm	PNP ^{*1}	E2A-M12KN08-WP-B1 2M	E2A-M12KN08-WP-B2 2M
M18	■	–	8.0 mm	39 (59) mm	PNP ^{*1}	E2A-M18KS08-WP-B1 2M	E2A-M18KS08-WP-B2 2M
	–	■	16.0 mm	29 (59) mm	PNP ^{*1}	E2A-M18KN16-WP-B1 2M	E2A-M18KN16-WP-B2 2M
M30	■	–	15.0 mm	44 (64) mm	PNP ^{*1}	E2A-M30KS15-WP-B1 2M	E2A-M30KS15-WP-B2 2M
	–	■	20.0 mm ^{*3}	29 (64) mm	PNP ^{*1}	E2A-M30KN20-WP-B1 2M	E2A-M30KN20-WP-B2 2M

Connector types (M12)

Size			Sensing distance	Thread length (overall length)	Output configuration	Order code (for M12 connector types)	
						Operation mode NO	Operation mode NC
M8	■	–	2.0 mm	27 (43) mm	PNP ^{*1}	E2A-S08KS02-M1-B1 ^{*2}	E2A-S08KS02-M1-B2 ^{*2}
	–	■	4.0 mm	21 (43) mm	PNP ^{*1}	E2A-S08KN04-M1-B1 ^{*2}	E2A-S08KN04-M1-B2 ^{*2}
M12	■	–	4.0 mm	24 (48) mm	PNP ^{*1}	E2A-M12KS04-M1-B1	E2A-M12KS04-M1-B2
	–	■	8.0 mm	27 (48) mm	PNP ^{*1}	E2A-M12KN08-M1-B1	E2A-M12KN08-M1-B2
M18	■	–	8.0 mm	39 (53) mm	PNP ^{*1}	E2A-M18KS08-M1-B1	E2A-M18KS08-M1-B2
	–	■	16.0 mm	29 (53) mm	PNP ^{*1}	E2A-M18KN16-M1-B1	E2A-M18KN16-M1-B2
M30	■	–	15.0 mm	44 (58) mm	PNP ^{*1}	E2A-M30KS15-M1-B1	E2A-M30KS15-M1-B2
	–	■	20.0 mm ^{*3}	29 (58) mm	PNP ^{*1}	E2A-M30KN20-M1-B1	E2A-M30KN20-M1-B2

^{*1} NPN models are available. For ordering replace "-B1" or "-B2" by "-C1" or "-C2".

^{*2} M8 sized housings are only available in stainless steel (SUS 303).

^{*3} Models with longer sensing distances of 30 mm and 35 mm are available.

Optional features

Refer to complete datasheet or contact your OMRON representative for the below optional features

Sensing module and body

- single sensing distance (ideal for compatibility with previous machine generations)
- Long body (ideal for mounting through thicker constructions)

Connection

- M8 4-pin (for ordering replace -M1 by -M3 e.g. E2A-S08KS02-M3-B1)
- M8 3-pin (for ordering replace -M1 by -M5 e.g. E2A-S08KS02-M5-B1)
- PUR cable
- Pigtails with M8 or M12 plugs

Output

- 400 mA max. load current (ideal for switching higher load currents directly)
- DC 2-wire (ideal for reduced wiring; leakage current can be used to detect cable breakage)
- DC 4-wire (NO+NC output – ideal for reduced stock for spare parts; antivalent signal can be used to detect cable breakage)
(For DC 2-wire and DC 4-wire see also page 284)

Specifications

(Exemplary for shielded versions.)

Item	M8	M12	M18	M30
	E2A-S08KS	E2A-M12KS	E2A-M18KS	E2A-M30KS
Sensing distance	2 mm±10%	4 mm±10%	8 mm±10%	15 mm±10%
Response frequency	1,500 Hz	1,000 Hz	500 Hz	250 Hz
Power supply voltage (operating voltage)	12 to 24 VDC. Ripple (p-p): 10% max. (10 to 32 VDC)			
Protective circuits	Power supply reverse polarity protection, surge suppressor, short-circuit protection		Output reverse polarity protection, power supply reverse polarity protection, surge suppressor, short-circuit protection	
Ambient temperature	Operating	-40 to 70°C		
	Storage	-40 to 85°C (with no icing or condensation)		
Degree of protection	IP67 after IEC 60529; IP69K after DIN 40050 part 9			
Material	Case	Stainless steel	Brass-nickel plated	
	Sensing surface	PBT		



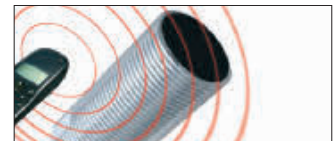
High water resistance



Cable breakage protection



High mechanical resistance



High electro-magnetic noise immunity



High resistance against temperature change



High vibration resistance



DC 2-wire or DC 4-wire inductive sensor in cylindrical brass housing

The performance and operational reliability of the E2A family is also available for DC 2-wire or DC 4-wire output.

- DC 2-wire (ideal for reduced wiring; leakage current can be used to detect cable breakage)
- DC 4-wire (NO+NC output – ideal for reduced stock for spare parts; antivalent signal can be used to detect cable breakage)

Ordering information

Pre-wired

(For different cable materials and lengths, special housing length or special connectors, please refer to complete datasheet.)

Size	Sensing distance		Thread length (overall length)	Order code (for pre-wired types with 2 m PVC cable)	
	DC 2-wire (NO) ^{*1}	DC 4-wire (NO+NC-PNP models) ^{*2}			
M8	■	–	2.0 mm	E2A-S08KS02-WP-D1 2M	E2A-S08LS02-WP-B3 2M ^{*3}
	–	■	4.0 mm	E2A-S08KN04-WP-D1 2M	E2A-S08LN04-WP-B3 2M ^{*3}
M12	■	–	4.0 mm	E2A-M12KS04-WP-D1 2M	E2A-M12KS04-WP-B3 2M
	–	■	8.0 mm	E2A-M12KN08-WP-D1 2M	E2A-M12KN08-WP-B3 2M
M18	■	–	8.0 mm	E2A-M18KS08-WP-D1 2M	E2A-M18KS08-WP-B3 2M
	–	■	16.0 mm	E2A-M18KN16-WP-D1 2M	E2A-M18KN16-WP-B3 2M
M30	■	–	15.0 mm	E2A-M30KS15-WP-D1 2M	E2A-M30KS15-WP-B3 2M
	–	■	20.0 mm	E2A-M30KN20-WP-D1 2M	E2A-M30KN20-WP-B3 2M

Connector types (M12)

Size	Sensing distance		Thread length (overall length)	Order code (for M12 connector types)	
	DC 2-wire (NO) ^{*1}	DC 4-wire (NO+NC-PNP models) ^{*2}			
M8	■	–	2.0 mm	E2A-S08KS02-M1G-D1	E2A-S08LS02-M3-B3 ^{*4}
	–	■	4.0 mm	E2A-S08KN04-M1G-D1	E2A-S08LN04-M3-B3 ^{*4}
M12	■	–	4.0 mm	E2A-M12KS04-M1G-D1	E2A-M12KS04-M1-B3
	–	■	8.0 mm	E2A-M12KN08-M1G-D1	E2A-M12KN08-M1-B3
M18	■	–	8.0 mm	E2A-M18KS08-M1G-D1	E2A-M18KS08-M1-B3
	–	■	16.0 mm	E2A-M18KN16-M1G-D1	E2A-M18KN16-M1-B3
M30	■	–	15.0 mm	E2A-M30KS15-M1G-D1	E2A-M30KS15-M1-B3
	–	■	20.0 mm	E2A-M30KN20-M1G-D1	E2A-M30KN20-M1-B3

*1. NC models are available. For ordering replace “-D1” by “-D2”.

*2. NPN models are available. For ordering replace “-B3” by “-C3”.

*3. Longer housing with thread length 49 mm and overall length 62 mm.

*4. Models with M8 4-pin connector and thread length 49 mm and overall length 61 mm.

Specifications

(Exemplary for shielded versions)

Item	M8	M12	M18	M30
	E2A-S08KS	E2A-M12KS	E2A-M18KS	E2A-M30KS
Sensing distance	2 mm±10%	4 mm±10%	8 mm±10%	15 mm±10%
Response frequency	1,500 Hz	1,000 Hz	500 Hz	250 Hz
Power supply voltage (operating voltage)	12 to 24 VDC. Ripple (p-p): 10% max. (10 to 32 VDC)			
Protective circuits	Surge suppressor, short-circuit protection (for DC 2-wire; DC 4-wire models have same protective circuits as DC 3-wire models [see page 282])			
Ambient temperature	Operating	–40 to 70°C		
	Storage	–40 to 85°C (with no icing or condensation)		
Degree of protection	IP67 after IEC 60529; IP69K after DIN 40050 part 9			
Material	Case	Stainless steel	Brass-nickel plated	
	Sensing surface	PBT		

Extended sensing range inductive sensor in cylindrical stainless steel housing

The performance and operational reliability of the E2A family is also available in stainless steel housing.

- stainless steel housing (SUS 303)



Ordering information

Pre-wired

Size	Sensing distance		Sensing distance	Thread length (overall length)	Output configuration	Order code (for pre-wired types with 2 m PVC cable)	
	PNP	NPN				Operation mode NO	Operation mode NC
M8	■	–	2.0 mm	27 (40) mm	PNP ^{*1}	E2A-S08KS02-WP-B1 2M	E2A-S08KS02-WP-B2 2M
	–	■	4.0 mm	21 (40) mm	PNP ^{*1}	E2A-S08KN04-WP-B1 2M	E2A-S08KN04-WP-B2 2M
M12	■	–	4.0 mm	34 (50) mm	PNP ^{*1}	E2A-S12KS04-WP-B1 2M	E2A-S12KS04-WP-B2 2M
	–	■	8.0 mm	27 (50) mm	PNP ^{*1}	E2A-S12KN08-WP-B1 2M	E2A-S12KN08-WP-B2 2M
M18	■	–	8.0 mm	39 (59) mm	PNP ^{*1}	E2A-S18KS08-WP-B1 2M	E2A-S18KS08-WP-B2 2M
	–	■	16.0 mm	29 (59) mm	PNP ^{*1}	E2A-S18KN16-WP-B1 2M	E2A-S18KN16-WP-B2 2M
M30	■	–	15.0 mm	44 (64) mm	PNP ^{*1}	E2A-S30KS15-WP-B1 2M	E2A-S30KS15-WP-B2 2M
	–	■	20.0 mm ^{*2}	29 (64) mm	PNP ^{*1}	E2A-S30KN20-WP-B1 2M	E2A-S30KN20-WP-B2 2M

Connector types (M12)

Size	Sensing distance		Sensing distance	Thread length (overall length)	Output configuration	Order code (for M12 connector types)	
	PNP	NPN				Operation mode NO	Operation mode NC
M8	■	–	2.0 mm	27 (43) mm	PNP ^{*1}	E2A-S08KS02-M1-B1	E2A-S08KS02-M1-B2
	–	■	4.0 mm	21 (43) mm	PNP ^{*1}	E2A-S08KN04-M1-B1	E2A-S08KN04-M1-B2
M12	■	–	4.0 mm	24 (48) mm	PNP ^{*1}	E2A-S12KS04-M1-B1	E2A-S12KS04-M1-B2
	–	■	8.0 mm	27 (48) mm	PNP ^{*1}	E2A-S12KN08-M1-B1	E2A-S12KN08-M1-B2
M18	■	–	8.0 mm	39 (53) mm	PNP ^{*1}	E2A-S18KS08-M1-B1	E2A-S18KS08-M1-B2
	–	■	16.0 mm	29 (53) mm	PNP ^{*1}	E2A-S18KN16-M1-B1	E2A-S18KN16-M1-B2
M30	■	–	15.0 mm	44 (58) mm	PNP ^{*1}	E2A-S30KS15-M1-B1	E2A-S30KS15-M1-B2
	–	■	20.0 mm ^{*2}	29 (58) mm	PNP ^{*1}	E2A-S30KN20-M1-B1	E2A-S30KN20-M1-B2

^{*1} NPN models are available. For ordering replace “-B1” or “-B2” by “-C1” or “-C2”.

^{*2} Models with longer sensing distances of 30 mm and 35 mm are available.

Specifications

(Exemplary for shielded versions)

Item	M8	M12	M18	M30
	E2A-S08KS	E2A-M12KS	E2A-M18KS	E2A-M30KS
Sensing distance	2 mm±10%	4 mm±10%	8 mm±10%	15 mm±10%
Response frequency	1,500 Hz	1,000 Hz	500 Hz	250 Hz
Power supply voltage (operating voltage)	12 to 24 VDC. Ripple (p-p): 10% max. (10 to 32 VDC)			
Protective circuits	Power supply reverse polarity protection, surge suppressor, short-circuit protection		Output reverse polarity protection, power supply reverse polarity protection, surge suppressor, short-circuit protection	
Ambient temperature	Operating	–40 to 70°C		
	Storage	–40 to 85°C (with no icing or condensation)		
Degree of protection	IP67 after IEC 60529; IP69K after DIN 40050 part 9			
Material	Case	Stainless steel (SUS 303)		
	Sensing surface	PBT		



Long (triple) distance inductive sensor in cylindrical brass housing

The E2A3 family features an optimised sensing performance to achieve triple sensing distance for quasi flush mounting requirements.

- Triple distance for enhanced sensor protection from mechanical damage
- IP67 and IP69k



Ordering information

Pre-wired

(For different cable materials and lengths, special housing length or special connectors, please refer to complete datasheet.)

Size			Sensing distance	Thread length (overall length)	Output configuration	Order code (for pre-wired types with 2 m PVC cable)	
						Operation mode: NO	Operation mode: NC
M8		-	3.0 mm	27 (40) mm	PNP	E2A3-S08KS03-WP-B1 2M	E2A3-S08KS03-WP-B2 2M
					NPN	E2A3-S08KS03-WP-C1 2M	E2A3-S08KS03-WP-C2 2M
M12		-	6.0 mm	34 (50) mm	PNP	E2A3-M12KS06-WP-B1 2M	E2A3-M12KS06-WP-B2 2M
					NPN	E2A3-M12KS06-WP-C1 2M	E2A3-M12KS06-WP-C2 2M
M18		-	11.0 mm	39 (60) mm	PNP	E2A3-M18KS11-WP-B1 2M	E2A3-M18KS11-WP-B2 2M
					NPN	E2A3-M18KS11-WP-C1 2M	E2A3-M18KS11-WP-C2 2M
M30		-	20.0 mm	44 (65) mm	PNP	E2A3-M30KS20-WP-B1 2M	E2A3-M30KS20-WP-B2 2M
					NPN	E2A3-M30KS20-WP-C1 2M	E2A3-M30KS20-WP-C2 2M

Connector types (M12)

Size			Sensing distance	Thread length (overall length)	Output configuration	Order code (for M12 connector types)	
						Operation mode: NO	Operation mode: NC
M8		-	3.0 mm	27 (44) mm	PNP	E2A3-S08KS03-M1-B1	E2A3-S08KS03-M1-B2
					NPN	E2A3-S08KS03-M1-C1	E2A3-S08KS03-M1-C2
M12		-	6.0 mm	34 (49) mm	PNP	E2A3-M12KS06-M1-B1	E2A3-M12KS06-M1-B2
					NPN	E2A3-M12KS06-M1-C1	E2A3-M12KS06-M1-C2
M18		-	11.0 mm	39 (54) mm	PNP	E2A3-M18KS11-M1-B1	E2A3-M18KS11-M1-B2
					NPN	E2A3-M18KS11-M1-C1	E2A3-M18KS11-M1-C2
M30		-	20.0 mm	44 (59) mm	PNP	E2A3-M30KS20-M1-B1	E2A3-M30KS20-M1-B2
					NPN	E2A3-M30KS20-M1-C1	E2A3-M30KS20-M1-C2

Specifications

Item	M8	M12	M18	M30
	E2A3-S08KS03	E2A3-M12KS06-	E2A3-M18KS11	E2A3-M30KS20
Sensing distance	3 mm±10%	6 mm±10%	11 mm±10%	20 mm±10%
Response frequency	700 Hz	350 Hz	250 Hz	80 Hz
Power supply voltage (operating voltage)	12 to 24 VDC. Ripple (p-p): 10% max. (10 to 32 VDC)			
Protective circuits	Power supply reverse polarity protection, surge suppressor, short-circuit protection		Output reverse polarity protection, power supply reverse polarity protection, surge suppressor, short-circuit protection	
Ambient temperature	-25 to 70°C			
Degree of protection	IP67 after IEC 60529; IP69K after DIN 40050 part 9			
Material	Case	Stainless steel	Brass-nickel plated	
	Sensing surface	PBT		



Inductive proximity sensor with gold-plated pins

Inductive proximity sensor E2A-4 was created and tested for applications in the harsh environment and at tough vibration conditions. Gold-plated contact pins provide increased protection against corrosion in high humidity and vibration.

- Gold-plated contact pins
- Connector type M8 and M12 models
- PNP/NPN NO

Ordering information

Size	Sensing distance	Connection	Body material	Thread length (overall length)	Output configuration	Operation mode	Order code
M8	2 mm	Connector M8 3 pin: gold-plated	Stainless steel	27 (40) mm	NPN	NO	E2A-S08KS02-M5-C1-4
				49 (62) mm			E2A-S08LS02-M5-C1-4
M12	4 mm	Connector M12 4 pin: gold-plated	Brass-nickel plated	34 (48) mm	PNP		E2A-M12KS04-M1-B1-4
	8 mm						E2A-M12KN08-M1-B1-4

Specifications

Size	M8		M12	
Model	E2A-S08KS02-M5-C1-4	E2A-S08LS02-M5-C1-4	E2A-M12KS04-M1-B1-4	E2A-M12KN08-M1-B1-4
Sensing mode	High-frequency oscillation			
Output	DC-3 wire			
Output type	NPN open collector		PNP open collector	
Sensing surface	Shielded		Non-shielded	
Operation mode	NO			
Indicator operation	Yellow LED			
Output	Output DC-3 wire, 3 pins		Output DC-3 wire, 4 pins	
Degree of protection	IEC60529 IP67			
Materials Case	Stainless steel		Brass-nickel plated	
Sensing surface	PBT			
PIN	Bronze(C5441) / Gold-plated contacts			
Power supply voltage	12 to 24 VDC; Ripple (p-p) 10% max.			
Operating voltage range	10 to 32 VDC			
Current consumption	10 mA max.			
Sensing distance (Standard target: mild steel ST37 8×8×1 mm)	2 mm±10%		4 mm±10%	8 mm±10%
Target	Ferrous metal (The sensing distance decreases with non-ferrous metal)			
Differential travel/Hysteresis	10% max.of sensing distance			
Response frequency	1,500 Hz		1,000 Hz	800 Hz
Control output	Load current	200 mA max. (32 VDC max.)		
	Residual voltage	2 V max.		
Power reset time	100 ms max.			
Temperature influence	±10% max. of sensing distance at 23°C within temperature range of –25 to 70°C			
	±15% max. of sensing distance at 23°C within temperature range of –40 to 70°C			
Voltage influence	±1% max. of sensing distance in rated voltage range ±15%			
Insulation resistance	50 MΩ min. (at 500 VDC) between current carry parts and case			
Dielectric strength	1,000 VAC at 50/60Hz for 1 min between current carry parts and case			
Vibration resistance	10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y and Z directions			
Shock resistance	500 m/s ² , 10 times each in X, Y and Z directions			
Standard testing environment	Ambient air temperature	23°C		
	Ambient air humidity	65% RH		
Storage	Ambient air temperature	–40 to 85°C (with no icing or condensation)		
	Ambient air humidity	35% to 95% RH		
Operating environment	Ambient air temperature	–40 to 70°C (with no icing or condensation)		
	Ambient air humidity	35% to 95% RH		



The ideal solution for standard industrial conditions

Thanks to the simple construction and Omron's innovative "hot melt" production process, the E2B sensors embody two characteristics: value-for-money and high reliability.

- All-round-visible indicator
- The laser printed part number
- Vibration shock resistance: IEC 60947-5-2 (10 to 55 Hz)
- Operating temperature: -25 to 70°C
- Water resistance: IP67

Ordering information

Pre-wired

Size			Sensing distance	Output configuration	Order code (for pre-wired types with 2 m PVC cable)	
					Operation mode NO	Operation mode NC
M8	■	–	2.0 mm	PNP ^{*1}	E2B-S08KS02-WP-B1 2M ^{*2}	E2B-S08KS02-WP-B2 2M ^{*2}
	–	■	4.0 mm	PNP ^{*1}	E2B-S08KN04-WP-B1 2M ^{*2}	E2B-S08KN04-WP-B2 2M ^{*2}
M12	■	–	4.0 mm	PNP ^{*1}	E2B-M12KS04-WP-B1 2M	E2B-M12KS04-WP-B2 2M
	–	■	8.0 mm	PNP ^{*1}	E2B-M12KN08-WP-B1 2M	E2B-M12KN08-WP-B2 2M
M18	■	–	8.0 mm	PNP ^{*1}	E2B-M18KS08-WP-B1 2M	E2B-M18KS08-WP-B2 2M
	–	■	16.0 mm	PNP ^{*1}	E2B-M18KN16-WP-B1 2M	E2B-M18KN16-WP-B2 2M
M30	■	–	15.0 mm	PNP ^{*1}	E2B-M30KS15-WP-B1 2M	E2B-M30KS15-WP-B2 2M
	–	■	30.0 mm	PNP ^{*1}	E2B-M30LN30-WP-B1 2M	E2B-M30LN30-WP-B2 2M

Connector types

Size			Sensing distance	Output configuration	Order code	
					Operation mode NO	Operation mode NC
M8	■	–	2.0 mm	PNP ^{*1}	E2B-S08KS02-MC-B1 ^{*2}	E2B-S08KS02-MC-B2 ^{*2}
	–	■	4.0 mm	PNP ^{*1}	E2B-S08KN04-MC-B1 ^{*2}	E2B-S08KN04-MC-B2 ^{*2}
M12	■	–	4.0 mm	PNP ^{*1}	E2B-M12KS04-M1-B1	E2B-M12KS04-M1-B2
	–	■	8.0 mm	PNP ^{*1}	E2B-M12KN08-M1-B1	E2B-M12KN08-M1-B2
M18	■	–	8.0 mm	PNP ^{*1}	E2B-M18KS08-M1-B1	E2B-M18KS08-M1-B2
	–	■	16.0 mm	PNP ^{*1}	E2B-M18KN16-M1-B1	E2B-M18KN16-M1-B2
M30	■	–	15.0 mm	PNP ^{*1}	E2B-M30KS15-M1-B1	E2B-M30KS15-M1-B2
	–	■	30.0 mm	PNP ^{*1}	E2A-M30LN30-M1-B1	E2B-M30LN30-M1-B2

^{*1} NPN models are available. For ordering replace "-B1" or "-B2" by "-C1" or "-C2".

^{*2} M8 sized housings are only available in stainless steel (SUS 303).

Optional features

Refer to complete datasheet or contact your OMRON representative for the below optional features

Sensing module and body

- single sensing distance (ideal for compatibility with previous machine generations)
- Long body (ideal for mounting through thicker constructions)

Connection

- M8 3-pin -MC e.g. E2B-S08KS02-MC-B1

Output

- 200 mA max. load current

Specifications

(Exemplary for shielded versions.)

Item	M8	M12	M18	M30
	E2B-S08KS	E2B-M12KS	E2B-M18KS	E2B-M30KS
Sensing distance	2 mm±10%	4 mm±10%	8 mm±10%	15 mm±10%
Response frequency	1,500 Hz	1,000 Hz	500 Hz	250 Hz
Power supply voltage (operating voltage)	12 to 24 VDC. Ripple (p-p): 10% max. (10 to 32 VDC)			
Protective circuits	Output reverse polarity protection, Power source circuit reverse polarity protection			
Ambient temperature	Operating and storage: -25 to 70°C			
Degree of protection	IP67 after IEC 60529			
Material	Case	Stainless steel	Brass-nickel plated	
	Sensing surface	PBT		



High-visibility ring LED indicator



Laser printing part number



Small diameter proximity sensors for high precision detection

Omron's latest inductive technology has now been applied to a new range of small diameter inductive sensors. The new μPROX E2E provides precision detection and allows installation in even the most confined spaces. The portfolio has been extended to include non-shielded types and versions with pig-tail connector leads.

- Miniature size: 3, 4, 6.5 mm and M4, M5 diameters
- High frequency of 5 kHz: suitable for high-speed counting
- All sizes are also available as non-shielded types
- IP67 water ingress protection
- Highly visible indicators for easy operation confirmation



Ordering information

Size			Sensing distance	Connection	Output configuration	Order code	
						Operation mode NO	Operation mode NC
dia 3 mm	■		0.8 mm	PW	PNP	E2E-C03SR8-WC-B1 2M OMS	E2E-C03SR8-WC-B2 2M OMS
					NPN	E2E-C03SR8-WC-C1 2M OMS	E2E-C03SR8-WC-C2 2M OMS
		■	2 mm	PW	PNP	E2E-C03N02-WC-B1 2M OMS	E2E-C03N02-WC-B2 2M OMS
					NPN	E2E-C03N02-WC-C1 2M OMS	E2E-C03N02-WC-C2 2M OMS
M4	■		0.8 mm	PW	PNP	E2E-S04SR8-WC-B1 2M OMS	E2E-S04SR8-WC-B2 2M OMS
					NPN	E2E-S04SR8-WC-C1 2M OMS	E2E-S04SR8-WC-C2 2M OMS
		■	2 mm	PW	PNP	E2E-S04N02-WC-B1 2M OMS	E2E-S04N02-WC-B2 2M OMS
					NPN	E2E-S04N02-WC-C1 2M OMS	E2E-S04N02-WC-C2 2M OMS
dia 4 mm	■		1.2 mm	PW	PNP	E2E-C04S12-WC-B1 2M OMS	E2E-C04S12-WC-B2 2M OMS
					NPN	E2E-C04S12-WC-C1 2M OMS	E2E-C04S12-WC-C2 2M OMS
		■	3 mm	PW	PNP	E2E-C04N03-WC-B1 2M OMS	E2E-C04N03-WC-B2 2M OMS
					NPN	E2E-C04N03-WC-C1 2M OMS	E2E-C04N03-WC-C2 2M OMS
M5	■		1.2 mm	PW	PNP	E2E-S05S12-WC-B1 2M OMS	E2E-S05S12-WC-B2 2M OMS
					NPN	E2E-S05S12-WC-C1 2M OMS	E2E-S05S12-WC-C2 2M OMS
		■	3 mm	PW	PNP	E2E-S05N03-WC-B1 2M OMS	E2E-S05N03-WC-B2 2M OMS
					NPN	E2E-S05N03-WC-C1 2M OMS	E2E-S05N03-WC-C2 2M OMS
dia 6.5 mm	■		2 mm	PW	PNP	E2E-C06S02-WC-B1 2M OMS	E2E-C06S02-WC-B2 2M OMS
					NPN	E2E-C06S02-WC-C1 2M OMS	E2E-C06S02-WC-C2 2M OMS
				M8(3P)	PNP	E2E-C06S02-MC-B1 OMS	E2E-C06S02-MC-B2 OMS
					NPN	E2E-C06S02-MC-C1 OMS	E2E-C06S02-MC-C2 OMS
		■	4 mm	PW	PNP	E2E-C06N04-WC-B1 2M OMS	E2E-C06N04-WC-B2 2M OMS
					NPN	E2E-C06N04-WC-C1 2M OMS	E2E-C06N04-WC-C2 2M OMS
				M8(3P)	PNP	E2E-C06N04-MC-B1 OMS	E2E-C06N04-MC-B2 OMS
					NPN	E2E-C06N04-MC-C1 OMS	E2E-C06N04-MC-C2 OMS

Specifications

Item	Φ3/M4		Φ4/M5		Φ6.5	
	E2E-C03S/-S04S	E2E-C03N/-S04N	E2E-C04S/-S05S	E2E-C04N/-S05N	E2E-C06S	E2E-C06N
Sensing distance	0.8 mm±10%	2.0 mm±10%	1.2 mm±10%	3.0 mm±10%	2.0 mm±10%	4 mm±10. %
Setting distance	0 to 0.56mm	0 to 1.4mm	0 to 0.84mm	0 to 2.1mm	0 to 1.4mm	0 to 2.8mm
Response frequency	5 kHz	3 kHz	4 kHz	2 kHz	3 kHz	4 kHz
Supply voltage	10 to 30 VDC					
Current consumption	≤10 mA					
Max. control output	≤50 mA		≤100 mA		≤200 mA	
Residual output voltage	≤2 V					
Ambient temperature range	-25 to 70°C					
Ambient temperature fluctuation	≤15%					
Degree of protection	IEC 60529 IP67					
Material	Case	Stainless steel (SUS303)				
	Sensing surface	Heat-resistant ABS				



Miniature short head inductive sensor for demanding mounting conditions with remote amplifier

The E2EC family features the smallest sensor heads for reliable sensing in areas where mounting space is crucial. The miniature sizes of the sensing heads are achieved by separating the sensing part from the amplifier. In contrast to standard separate amplifier models the E2EC family simplifies the installation as the amplifier is built into the cable.

- 3 mm diameter sensing head for smallest spaces
- 18 mm long ultra short M12 size housing
- Full metal housing model for highest resistance in demanding environments

Ordering information

Standard (plastic sensing surface) DC 2-wire

Size	Order code (pre-wired types with 2 m cable length) ^{*1}	
	Operation mode NO	Operation mode NC
3-mm dia.	E2EC-CR8D1	E2EC-CR8D2
5.4-mm dia.	E2EC-C1R5D1	E2EC-C1R5D2
8-mm dia.	E2EC-C3D1	E2EC-C3D2
M12	E2EC-X4D1	E2EC-X4D2

^{*1} Cable length from sensor head to remote amplifier is 0.4 m

High protection (all metal face) DC 3-wire and DC 2-wire

Size	Order code (pre-wired types with 2 m cable length) ^{*1}			
	DC 3-wire Operation mode NO		DC 2-wire Operation mode NO	
8-mm dia.	E2EC-MC2B1	E2EC-MC2D1	E2EC-QC2D1-M1GJ-T ^{*2} (fluoroplastic coating)	

^{*1} Cable length from sensor head to remote amplifier is 0.4 m

^{*2} The remote amplifier is equipped with a M12 plug with 30 cm cable. Cable length from sensor head to remote amplifier is 0.5 m

Specifications

Item	dia 3		dia 5.4	dia 8		M12
	E2EC-CR8D_		E2EC-C1R5D_	E2EC-MC E2EC-QC	E2EC-C3D_	E2EC-X4D_
Sensing distance	0.8 mm±15%		1.5 mm±10%	2 mm±10%	3 mm±10%	4 mm±10%
Response frequency	1.5 kHz			100 Hz	1 kHz	
Power supply voltage (Operating voltage)	12 to 24 VDC (10 to 30 VDC) ripple (p-p): 10% max.					
Protective circuits	Surge absorber, short-circuit protection					
Ambient temperature	Operating	-25 to 70°C (with no icing or condensation)				
	Storage					
Degree of protection	IEC60529 IP67					
Material	Case	Brass		Stainless steel (SUS303)	Brass	
	Sensing surface	ABS		Stainless steel (SUS303)	ABS	



Flat shape inductive sensor in compact plastic housing

The TL-W family offers a wide range of block style inductive sensors for simple mounting on flat surfaces. With sensing distances from 1.5 mm to 20 mm the TL-W is the ideal solution for all standard applications.

- IP67
- DC 2-wire and DC 3-wire models
- Sensing distances from 1.5 mm to 20 mm
- Side facing sensing face

Ordering information

DC 2-wire

Size in mm (H × W × D)	Sensing distance		Order code (for pre-wired types with 2 m PVC cable)		
	Operation mode normally open (NO)	Operation mode normally closed (NC)			
31 × 18 × 10	–	■	5 mm	TL-W5MD1	TL-W5MD2

DC 3-wire

Size in mm (H × W × D)	Sensing distance		Order code (for pre-wired types with 2 m PVC cable)				
	PNP-NO	PNP-NC	NPN-NO	NPN-NC			
25 × 8 × 5	–	■	1.5 mm	TL-W1R5MB1	–	TL-W1R5MC1	–
22 × 8 × 6			3 mm	TL-W3MB1	TL-W3MB2	TL-W3MC1	TL-W3MC2
31 × 18 × 10			5 mm	TL-W5MB1	TL-W5MB2	TL-W5MC1	TL-W5MC2
53 × 40 × 23			20 mm	–	–	TL-W20ME1	TL-W20ME2
31 × 18 × 10	■	–	5 mm	TL-W5F1	TL-W5F2	TL-W5E1	TL-W5E2

Specifications

Item	TL-W5MD_	TL-W1R5M_1	TL-W3M_	TL-W5M_	TL-W5E_/F_	TL-W20ME_
Sensing distance	5 mm±10%	1.5 mm±10%	3 mm±10%	5 mm±10%		20 mm±10%
Response frequency	500 Hz	1 kHz min.	600 Hz min.	500 Hz min.	300 Hz min.	40 Hz min.
Power supply voltage (operating voltage)	12 to 24 VDC (10 to 30 VDC) ripple (p-p): 10% max.				10 to 30 VDC with a ripple (p-p) of 20% max.	12 to 24 VDC (10 to 30 VDC) ripple (p-p): 10% max.
Protective circuits	Surge absorber; short-circuit protection		Surge suppressor; power supply reverse polarity protection			
Ambient temperature	–25 to 70°C (with no icing or condensation)					
Degree of protection	IEC60529 IP67					
Material	Case			Diecast aluminum		Heat-resistant ABS resin
	Sensing surface			Heat-resistant ABS resin		



Miniature square inductive sensor in plastic housing

The E2S family features miniature block style plastic housings for simple mounting on flat surfaces. The durable plastic housing with front or side facing sensing surfaces, provide best value-performance ratio for machine part movement detection.

- Miniature housing
- Front and side facing sensing faces
- Models with simple one-screw mounting
- IP67

Ordering information

DC 2-wire

Size in mm (H × W × D)			Sensing distance	Sensing face		Order code (pre-wired types with 1 m cable length)	
						Operation mode NO	Operation mode NC
19 × 6 × 6	–	■	1.6 mm	■	–	E2S-W11 1M	E2S-W12 1M
23 × 8 × 8	–	■	2.5 mm	–	■	E2S-Q11 1M	E2S-Q12 1M
				■	–	E2S-W21 1M	E2S-W22 1M
				–	■	E2S-Q21 1M	E2S-Q22 1M

DC 3-wire

Size in mm (H × W × D)			Sensing distance	Sensing face		Output specifications	Order code (pre-wired types with 1 m cable length)	
							Operation mode NO	Operation mode NC
19 × 6 × 6	–	■	1.6 mm	■	–	NPN	E2S-W13 1M	E2S-W14 1M
27 × 8 × 8	–	■	2.5 mm	–	■		E2S-Q13 1M	E2S-Q14 1M
				■	–		E2S-W23 1M	E2S-W24 1M
				–	■		E2S-Q23 1M	E2S-Q24 1M
19 × 6 × 6	–	■	1.6 mm	■	–	PNP	E2S-W15 1M	E2S-W16 1M
23 × 8 × 8	–	■	2.5 mm	–	■		E2S-Q15 1M	E2S-Q16 1M
				■	–		E2S-W25 1M	E2S-W26 1M
				–	■		E2S-Q25 1M	E2S-Q26 1M

Specifications

Item	E2S-W1 E2S-Q1	E2S-W2 E2S-Q2
Sensing distance	1.6 mm±10%	2.5 mm±15%
Response frequency	1 kHz min.	
Power supply voltage (operating voltage)	12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.	
Protective circuits	Surge suppressor; power supply reverse polarity protection	
Ambient temperature	Operating	–25 to 70°C
	Storage	–40 to 85°C (with no icing or condensation)
Degree of protection	IEC60529 IP67	
Material	Case	Polyarylate





Long distance inductive proximity sensor in plastic housing

The long sensing distance and simple installation on flat surfaces make the E2Q5 ideal for the detection of large metal objects for example in automotive assembly lines.

- M12 Plug-in connection
- Integrated short circuit and reverse polarity protection
- Sensing face positioning: Y-axis 15°, X-axis 90° increments

Ordering information

Connector types (M12)

Size in mm (H × W × D)			Sensing distance	Sensing face	Output configuration	Order code (for M12 connector types)	
						Operation mode NO	Operation mode NO + NC
67 × 40 × 40	■	-	20 mm	Changeable	NPN	E2Q5-N20E1-M1	E2Q5-N20E3-M1
			40 mm		PNP	E2Q5-N20F1-M1	E2Q5-N20F3-M1
	-	■			NPN	E2Q5-N40ME1-M1	E2Q5-N40ME3-M1
			PNP		E2Q5-N40MF1-M1	E2Q5-N40MF3-M1	

Specifications

Item	E2Q5-N20__-M1	E2Q5-N40M_3-M1
Sensing distance	20 mm±10%	40 mm±10%
Response frequency	150 Hz	
Power supply voltage	10 to 30 VDC	
Protective circuits	Output reverse polarity protection, short-circuit protection	
Ambient temperature	Operating -25 to 85°C	
Degree of protection	IEC 60529 IP 67; IP69k after DIN 40050 part 9	
Material	Case	PBT
	Sensing face	PBT



Heat and detergent resistant inductive sensor in cylindrical stainless steel housing

The heat and detergent resistant inductive sensors allow reliable metal object or machine part detection in demanding environments such as food processing.

- Temperature resistant up to 120°C
- SUS316L housing with heat resistant plastic sensing face
- IP69k for highest water resistance
- ECOLAB tested and certified detergent resistance

Ordering information

Pre-wired

Size			Sensing distance	Output configuration	Order code (for pre-wired types with 2 m heat resistant PVC cable)	
					Operation mode NO	Operation mode NC
M12			3 mm	PNP	E2EH-X3B1 2M	E2EH-X3B2 2M
				NPN	E2EH-X3C1 2M	E2EH-X3C2 2M
				DC 2-wire	E2EH-X3D1 2M	E2EH-X3D2 2M
M18			7 mm	PNP	E2EH-X7B1 2M	E2EH-X7B2 2M
				NPN	E2EH-X7C1 2M	E2EH-X7C2 2M
				DC 2-wire	E2EH-X7D1 2M	E2EH-X7D2 2M
M30			12 mm	PNP	E2EH-X12B1 2M	E2EH-X12B2 2M
				NPN	E2EH-X12C1 2M	E2EH-X12C2 2M
				DC 2-wire	E2EH-X12D1 2M	E2EH-X12D2 2M

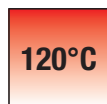
Connector types (M12)

Size			Sensing distance	Output	Order code (for M12 connector types)	
					Operation mode NO	Operation mode NC
M12			3 mm	PNP	E2EH-X3B1-M1	E2EH-X3B2-M1
				NPN	E2EH-X3C1-M1	E2EH-X3C2-M1
				DC 2-wire	E2EH-X3D1-M1G	E2EH-X3D2-M1G
M18			7 mm	PNP	E2EH-X7B1-M1	E2EH-X7B2-M1
				NPN	E2EH-X7C1-M1	E2EH-X7C2-M1
				DC 2-wire	E2EH-X7D1-M1G	E2EH-X7D2-M1G
M30			12 mm	PNP	E2EH-X12B1-M1	E2EH-X12B2-M1
				NPN	E2EH-X12C1-M1	E2EH-X12C2-M1
				DC 2-wire	E2EH-X12D1-M1G	E2EH-X12D2-M1G

Specifications

Item	M12	M18	M30
	E2EH-X3 _	E2EH-X7 _	E2EH-X12 _
Sensing distance	3 mm±10%	7 mm±10%	12 mm±10%
Response frequency (average)	500 Hz	300 Hz	100 Hz
Power supply voltage (operating voltage range)	12 to 24 VDC, ripple (p-p): 10% max. (10 to 32 VDC) (24 VDC max. at 100°C or higher)		
Protective circuits	Surge suppression, short circuit protection, power supply reverse polarity protection, output reverse polarity protection		
Ambient temperature ^{*1}	DC 3-wire models: 0 to 100°C (0 to 120°C for 1,000 hours), DC 2-wire models: 0 to 100°C (0 to 110°C for 1,000 hours)		
Degree of protection	IEC 60529 IP67, IP69k after DIN 40050-9		
Material	Case, clamping nuts	Stainless steel (SUS316L)	
	Sensing surface	PBT (polybutylene terephthalate)	
	Cable	Heat-resistant PVC	

^{*1} Operation with power supplied for 1,000 h has been verified at 120°C for DC 3-wire models and at 110°C for DC 2-wire models. Do not bend the cable repeatedly at 100°C or higher.



Enhanced temperature resistance



Enhanced detergent resistance

Chemical resistant inductive sensor in cylindrical PTFE housing

The E2FQ features a full-body fluoro plastic housing for chemical resistance (e.g. against cleaning agents used in the semiconductor industry).

- Full body fluoro plastic housing for chemical resistance
- DC 2-wire and DC 3-wire models



Ordering information

DC 2-wire (pre-wired)

Size			Sensing distance	Order code ^{*1} (for pre-wired types with 2 m PVC cable)
M12	■	—	2 mm	E2FQ-X2D1
M18			5 mm	E2FQ-X5D1
M30			10 mm	E2FQ-X10D1

DC 3-wire (pre-wired)

Size			Sensing distance	Order code ^{*1} (for pre-wired types with 2 m PVC cable)	
				PNP	NPN
M12	■	—	2 mm	E2FQ-X2F1	E2FQ-X2E1
M18			5 mm	E2FQ-X5F1	E2FQ-X5E1
M30			10 mm	E2FQ-X10F1	E2FQ-X10E1

^{*1} Operation mode normally open (NO)

Specifications

Item	M12	M18	M30
	E2FQ-X2	E2FQ-X5	E2FQ-X10
Sensing distance	2 mm±10%	5 mm±10%	10 mm±10%
Response frequency	E1, F1 models: 1.5 kHz D1 models: 800 Hz	E1, F1 models: 600 Hz, D1 models: 500 Hz	E1, F1 models: 400 Hz, D1 models: 300 Hz
Power supply voltage (Operating voltage)	E1, F1 models: 12 to 24 VDC, ripple (p-p): 10% max., (10 to 30 VDC) D1 models: 12 to 24 VDC, ripple (p-p): 20% max., (10 to 36 VDC)		
Protective circuits	D1 models: surge suppressor E1, F1 models: power supply, reverse polarity protection, short circuit protection, surge suppressor		
Ambient temperature	-25 to 70°C (with no icing or condensation)		
	Operating		
	Storage		
Degree of protection	IEC60529 IP67		
Material	Case	PTFE	
	Sensing surface	PTFE	



High chemical resistance



Inductive sensor for mobile usage in cylindrical brass housing

Designed and tested to keep your mobile machines moving.

- IP69k tested and certified for highest water resistance
- e1 type approval (according to Automotive Directive 2005/83/EC)
- E1 type approval (according to vehicle regulation ECE-R10)
- Cable or connector breakage protection

Ordering information

Pre-wired

Size	Sensing distance		Sensing distance	Thread length (overall length)	Output configuration	Order code (for pre-wired types with 2 m PVC cable) ^{*1}	
	PNP	NPN				Operation mode: NO	Operation mode: NC
M12	■	—	4.0 mm	34 mm (50 mm)	PNP	E2AU-M12KS04-WP-B1 2M	E2AU-M12KS04-WP-B2 2M
	■	—		56 mm (72 mm)	PNP	E2AU-M12LS04-WP-B1 2M	E2AU-M12LS04-WP-B2 2M
M18	■	—	8.0 mm	39 mm (59 mm)	PNP	E2AU-M18KS08-WP-B1 2M	E2AU-M18KS08-WP-B2 2M
	■	—		61 mm (81 mm)	PNP	E2AU-M18LS08-WP-B1 2M	E2AU-M18LS08-WP-B2 2M
M30	■	—	15.0 mm	44 mm (64 mm)	PNP	E2AU-M30KS15-WP-B1 2M	E2AU-M30KS15-WP-B2 2M
	■	—		66 mm (86 mm)	PNP	E2AU-M30LS15-WP-B1 2M	E2AU-M30LS15-WP-B2 2M

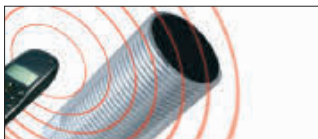
*1 NPN types and pre-wired types with PUR cable are available. Contact your OMRON representative

Connector types (M12)

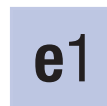
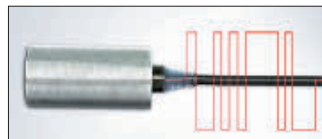
Size	Sensing distance		Sensing distance	Thread length (overall length)	Output configuration	Order code (for M12 connector types)	
	PNP	NPN				Operation mode: NO	Operation mode: NC
M12	■	—	4.0 mm	34 mm (48 mm)	PNP	E2AU-M12KS04-M1-B1	E2AU-M12KS04-M1-B2
	■	—		56 mm (70 mm)	PNP	E2AU-M12LS04-M1-B1	E2AU-M12LS04-M1-B2
M18	■	—	8.0 mm	39 mm (53 mm)	PNP	E2AU-M18KS08-M1-B1	E2AU-M18KS08-M1-B2
	■	—		61 mm (75 mm)	PNP	E2AU-M18LS08-M1-B1	E2AU-M18LS08-M1-B2
M30	■	—	15.0 mm	44 mm (58 mm)	PNP	E2AU-M30KS15-M1-B1	E2AU-M30KS15-M1-B2
	■	—		66 mm (80 mm)	PNP	E2AU-M30LS15-M1-B1	E2AU-M30LS15-M1-B2

Specifications

Item	M12	M18	M30
	E2AU-M12_	E2AU-M18_	E2AU-M30_
Sensing distance	4 mm±10%	8 mm±10%	15 mm±10%
Response frequency	1,000 Hz	500 Hz	250 Hz
Power supply voltage (operating voltage)	12 to 24 VDC. Ripple (p-p): 10% max.(10 to 32 VDC)		
Protective circuits	Output reverse polarity protection, power supply reverse polarity protection, surge suppressor, short-circuit protection		
Ambient temperature	Operating	-40 to 70°C	
	Storage	-40 to 85°C (with no icing or condensation)	
Degree of protection	IP67 after IEC 60529, IP69K after DIN 40050 part 9		
Material	Case	Brass-nickel plated	
	Sensing surface	PBT	



High electro-magnetic noise immunity (fields and cable induced)



e1 type approval after 2005/83/EC



E1 type approval after ECE-R10



Oil resistant inductive sensor in cylindrical brass housing

The E2E-_-U offers tested oil resistance on commonly used oils in the automotive industry for reliable long-life operation in automotive assembly lines.

- Oil resistant PUR cable
- M8, M12, M18 and M30 standard sizes
- IP67g (water and oil resistance)

Ordering information

DC 2-wire (pre-wired)

Size			Sensing distance	Order code (for pre-wired types with 2 m PUR cable)	
				Operation mode NO	Operation mode NC
M8	■	—	2 mm	E2E-X2D1-U	E2E-X2D2-U
M12	■	—	3 mm	E2E-X3D1-U	E2E-X3D2-U
M18	■	—	7 mm	E2E-X7D1-U	E2E-X7D2-U
M30	■	—	10 mm	E2E-X10D1-U	E2E-X10D2-U

DC 2-wire (pre-wired with M12)

Size			Sensing distance	Order code (for pre-wired types with 30 cm PUR cable and M12 plug)	
				Operation mode NO	Operation mode NC
M8	■	—	2 mm	E2E-X2D1-M1TGJ-U 0.3M	E2E-X2D2-M1TGJ-U 0.3M
M12	■	—	3 mm	E2E-X3D1-M1TGJ-U 0.3M	E2E-X3D2-M1TGJ-U 0.3M
M18	■	—	7 mm	E2E-X7D1-M1TGJ-U 0.3M	E2E-X7D2-M1TGJ-U 0.3M
M30	■	—	10 mm	E2E-X10D1-M1TGJ-U 0.3M	E2E-X10D2-M1TGJ-U 0.3M

Specifications

Item	M8	M12	M18	M30
	E2E-X2D_	E2E-X3D_	E2E-X7D_	E2E-X10D_
Sensing distance	2 mm±10%	3 mm±10%	7 mm±10%	10 mm±10%
Response frequency	1.5 kHz	1.0 kHz	0.5 kHz	0.4 kHz
Power supply voltage (operating voltage)	12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.			
Protective circuits	Surge suppressor, output short-circuit protection (for control and diagnostic output)			
Ambient temperature	Operating	-25 to 70°C		
	Storage	-40 to 85°C (with no icing or condensation)		
Degree of protection	IEC 60529 IP67 (JEM standard IP67g (waterproof and oil-proof))			
Material	Case	Stainless steel (SUS303)	Brass-nickel plated	
	Sensing surface	PBT (polybutylene terephthalate)		
	Cable	PUR for jacket, PE		





Inductive sensor in cylindrical full metal housing (case + sensing face)

The high durability stainless steel sensing face provides more than 20 times longer protection against mechanical damage than conventional sensors. The high mineral oil and coolant resistance and the immunity against small metal chips on the surface make this sensor ideal for metal cutting or drilling applications.



- Full body stainless steel housing for highest mechanical protection
- Low frequency modulation for metal chip immunity
- Flame retardant cable for high protection against welding spatter damage (pigtail models)

Ordering information



DC 2-wire (with M12 pigtail connector)

Size	Sensing distance		Sensing distance	Order code ^{*1} (for pre-wired types with 30 cm PVC cable and M12 plug)	
				PNP	NPN
M8	■	—	1.5 mm	E2FM-X1R5D1-M1TGJ	
M12	■	—	2 mm	E2FM-X2D1-M1TGJ	
M18	■	—	5 mm	E2FM-X5D1-M1TGJ	
M30	■	—	10 mm	E2FM-X10D1-M1TGJ	

DC 3-wire, M12 Connector types

Size	Sensing distance		Sensing distance	Order code ^{*1} (for M12 connector types)	
				PNP	NPN
M8	■	—	1.5 mm	E2FM-X1R5B1-M1	E2FM-X1R5C1-M1
M12	■	—	2 mm	E2FM-X2B1-M1	E2FM-X2C1-M1
M18	■	—	5 mm	E2FM-X5B1-M1	E2FM-X5C1-M1
M30	■	—	10 mm	E2FM-X10B1-M1	E2FM-X10C1-M1

DC 3-wire, pre-wired types

Size	Sensing distance		Sensing distance	Order code ^{*1} (for pre-wired types with 2 m PVC cable)	
				PNP	NPN
M8	■	—	1.5 mm	E2FM-X1R5B1 2M	E2FM-X1R5C1 2M
M12	■	—	2 mm	E2FM-X2B1 2M	E2FM-X2C1 2M
M18	■	—	5 mm	E2FM-X5B1 2M	E2FM-X5C1 2M
M30	■	—	10 mm	E2FM-X10B1 2M	E2FM-X10C1 2M

^{*1} Output configuration normally open (NO)

Specifications)

Item	M8	M12	M18	M30
	E2FM-X1R5	E2FM-X2	E2FM-X5	E2FM-X10
Sensing distance	1.5 mm±10%	2 mm±10%	5 mm±10%	10 mm±10%
Response frequency	200 Hz	100 Hz	100 Hz	50 Hz
Power supply voltage (operating voltage range)	12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.			
Protective circuits	E2FM_D1: Surge suppressor, output short-circuit protection E2FM_B1/C1: Output reverse polarity protection (not E2FM-X1R5B1-M1), power supply reverse polarity protection, surge suppressor, short-circuit protection			
Ambient temperature	Operating	-25 to 70°C (with no icing or condensation)		
	Storage			
Degree of protection	IEC60529 IP67, IP69k after DIN 40050 part 9			
Material	Case	Stainless steel (SUS303)		
	Sensing surface	Stainless steel (SUS303)		
	Cable	PVC (flame retardant)		



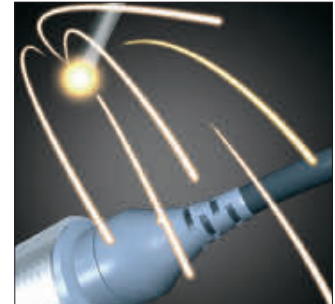
E2FM extra strong sensing face



Conventional metal face product



No interference by small metal chips on sensing surface



Cable resistant to welding spatter



High precision positioning inductive proximity sensor with separate amplifier

The separate amplifier inductive sensor family E2C-EDA offers high precision distance positioning and detection. The teach-in function allows simple installation, and with the window function (2 outputs) production tolerance checks can easily be set up and modified.

- Typically several hundred µm detection precision
- Precision distance teaching
- Window function (2 outputs) for production tolerance checks



Ordering information

Sensor heads

Appearance				Sensing distance	Repeat accuracy	Order code
Cylindrical	3 dia. × 18	■	-	0.6 mm	1 µm	E2C-EDR6-F
	5.4 dia. × 18			1 mm	1 µm	E2C-ED01* ¹
	8 dia. × 22			2 mm	2 µm	E2C-ED02* ¹
Screw	M10 × 22			2 mm	2 µm	E2C-EM02* ¹
Flat	30 × 14 × 4.8			5 mm	2 µm	E2C-EV05* ¹
Screw	M18 × 46.3	-	■	7 mm	5 µm	E2C-EM07M* ¹
Screw (heat resistant)	M12 × 22	■	-	2 mm	2 µm	E2C-EM02H

*¹ For models with cut-to-length cables add "-F" for example E2C-ED01-F
For models with protective stainless steel spiral tubes add "-S" for example E2C-ED01-S

Amplifier units with cables

Item	Functions	Order code	
		NPN output	PNP output
Twin-output models	Area output, open circuit detection, differential operation	E2C-EDA11	E2C-EDA41
External-input models	Remote setting, differential operation	E2C-EDA21	E2C-EDA51

Amplifier units with connectors*¹

Item	Functions	Order code	
		NPN output	PNP output
Twin-output models	Area output, open circuit detection, differential operation	E2C-EDA6	E2C-EDA8
External-input models	Remote setting, differential operation	E2C-EDA7	E2C-EDA9

*¹ Order fitting connector (E3X-CN21_) separately from accessories.

Specifications

Sensor heads

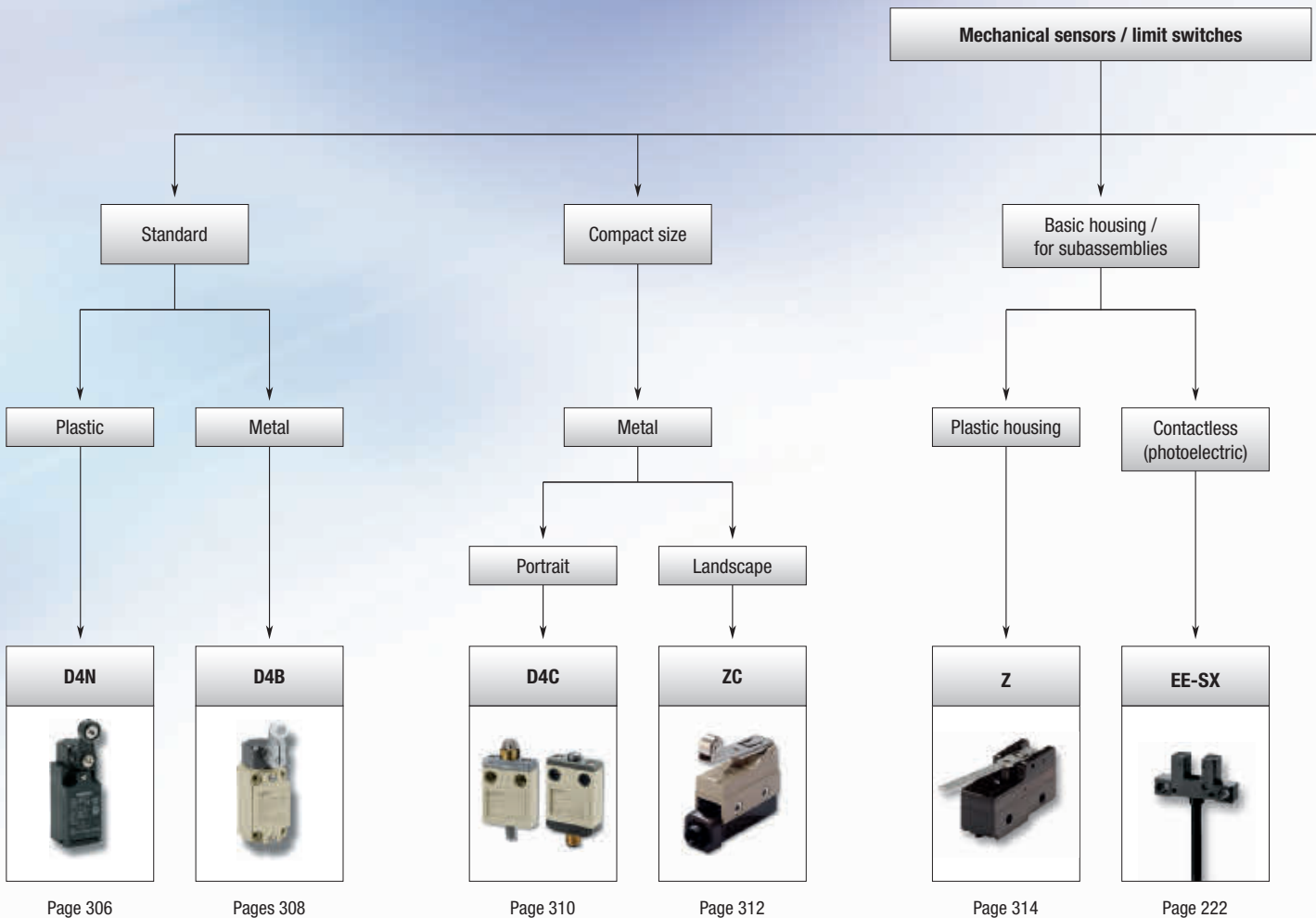
Item		3 dia.	5.4 dia.	8 dia.	M10	M18	30×14×4.8 mm	M12
		E2C-EDR6-F	E2C-ED01(-)	E2C-ED02(-)	E2C-EM02(-)	E2C-EM07(-)	E2C-EV05(-)	E2C-EM02H
Ambient temperature	Operating	-10 to 60°C (with no icing or condensation)						
	Storage	-10 to 200°C						
Degree of protection		IEC60529 IP67						IEC60529 IP60
Material	Case	Brass	Stainless steel	Brass			Zinc	Brass
	Sensing surface	Heat-resistant ABS						

Note: For amplifier specifications refer to complete datasheet

THE RELIABLE AND FLEXIBLE WAY ...

... to stop your machines

For the detection of machine part movement especially for the detection of end positions, the mechanical and optical limit switches provide accurate and reliable operation with a large variety of actuation possibilities optimized for a widest range of application and usage requirements. The easy positioning and intuitive installation, the high immunity to changing environmental influences (electromagnetic fields, sunlight, temperatures, etc.) as well as the possibility to directly switch loads with up to 15 A make these sensors ideal for a wide range of conveying and handling applications.



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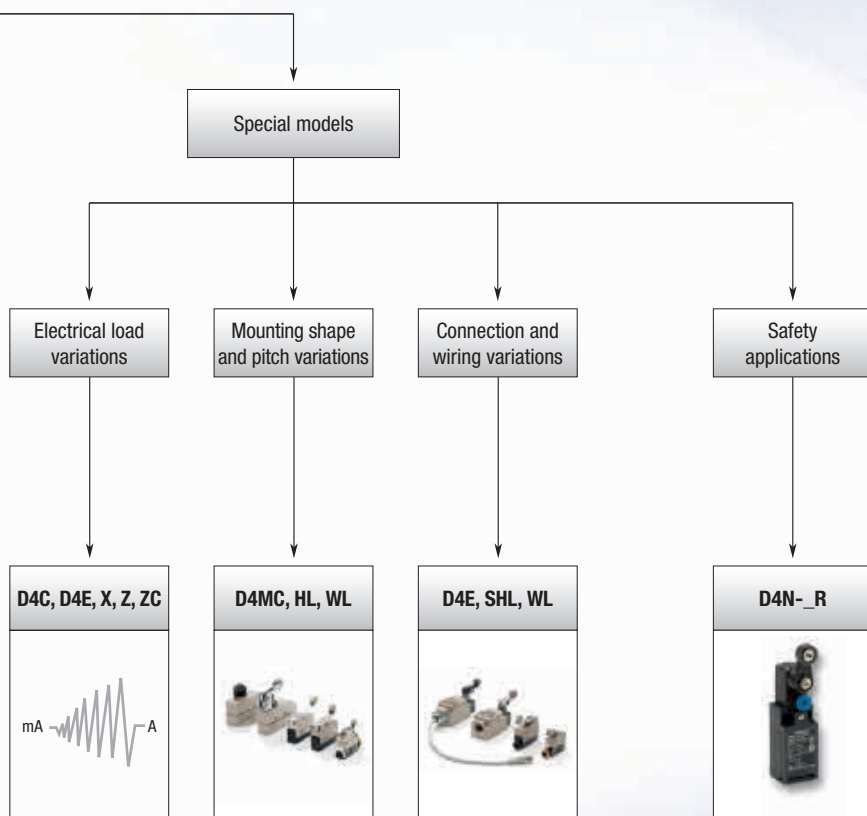
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Contact your Omron representative


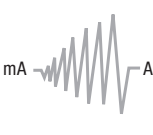



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Type		Standard		Compact		Basic housing		
								
Model		D4N	D4B	D4C	ZC	Z	EE-SX	
Material		plastic	metal			plastic		
Screw terminal	no conduit	–	–	–	–	■	–	
	Cable dia 8.5 to 10.5	–	–	–	■	–	–	
	M20	■	■	–	□	–	–	
	PG13.5	□	–	–	□	–	–	
	G1/2	□	□	–	□	–	–	
Cable connector	1/2-14NPT	□	□	–	–	–	–	
	M12	■	–	■	□	–	(Special connector)	
	Prewired	–	–	■	□	–	■	
Degree of protection		IP67				IP00		IP50 (IP60)
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Special models

Type	Extended temperature range	High precision multi direction
		
Model	WL-TH	D5B
Material	metal	
Key Features	Temperature resistance from –65°C up to 400°C	– X, Y, Z action – several µm switching accuracy – M5, M8, M10 sizes
Page	316	see DVD

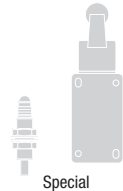
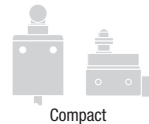
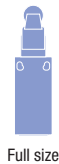
Type	Highest precision tactile measurement	Electrical load variations	Mounting shape and pitch variations	Connection and wiring variations	Safety limit switches
					
Model	ZX-T	D4C, D4E. X, Z, ZC	D4MC, HL, WL	D4E, SHL, WL	D4 Safety
Material	plastic	plastic and metal	metal		plastic and metal
Key Features	Measurement resolution up to 0.1µm	– Microloads (1mA - 100mA) – High current at high voltage switching (10A at 125VDC) – Double circuit switching	– mounting shapes and pitches popular in different countries in the world – mounting pitch variations (base mounting, diagonal pitches,...) – alternative actuator positions	– Screw conduit variations (PG13.5, G1/2, 1/2"14NPT) – cable exit variations (pigtaills, rubber snap on covers, screw on covers, with or without cable breakage protection for different cable diameters)	– mechanical form lock – manual reset – door hinge switches
Page	421	Contact your OMRON representative			430










Limit switch with plastic housing

The D4N series of limit switches in plastic housing is the ideal switch for all standard mechanical position detection applications both for safety and non-safety applications.

- Direct opening mechanism and approval by notified body
- Rugged plastic housing with double insulation
- Wide range of actuators
- M12 connectors or terminal block with M20 conduit






Ordering information

Actuator type		Connection method	Order code ^{*1}			
			1NC/1NO (snap-action) Order code	1NC/1NO (slow-action) Order code	2NC (slow-action) Order code	2NC/1NO (slow-action) Order code
 Roller lever (resin lever, resin roller)	M20	D4N-4120	D4N-4A20	D4N-4B20	D4N-4C20	
	M12 connector	D4N-9120	D4N-9A20	D4N-9B20	–	
 Plunger	M20	D4N-4131	D4N-4A31	D4N-4B31	–	
	M12 connector	D4N-9131	D4N-9A31	D4N-9B31	–	
 Roller plunger	M20	D4N-4132	D4N-4A32	D4N-4B32	D4N-4C32	
	M12 connector	D4N-9132	D4N-9A32	D4N-9B32	–	
 One-way roller arm lever (horizontal)	M20	D4N-4162	D4N-4A62	D4N-4B62	D4N-4C62	
	M12 connector	D4N-9162	D4N-9A62	D4N-9B62	–	
 One-way roller arm lever (vertical)	M20	D4N-4172	D4N-4A72	D4N-4B72	–	
 Adjustable roller lever, form lock (metal lever, resin roller)	M20	D4N-412G	D4N-4A2G	D4N-4B2G	–	
	M12 connector	D4N-912G	D4N-9A2G	D4N-9B2G	–	
 Adjustable roller lever, form lock (metal lever, rubber roller)	M20	D4N-412H	D4N-4A2H	D4N-4B2H	–	
	M12 connector	D4N-912H	D4N-9A2H	D4N-9B2H	–	

Switches with MBB contacts

MBB (Make Before Break) contacts have an overlapping structure, so that before the normally closed (NC) contact opens the normally open (NO) contact closes.

Actuator type		Connection method	Order code ^{*1}	
			1NC/1NO (slow-action)	2NC/1NO (slow-action)
 Roller lever (resin lever, resin roller)	M20	D4N-4E20	D4N-4F20	
	M12 connector	D4N-9E20	–	
 Roller plunger	M20	D4N-4E32	D4N-4F32	
	M12 connector	D4N-9E32	–	
 One-way roller arm lever (horizontal)	M20	D4N-4E62	D4N-4F62	
	M12 connector	D4N-9E62	–	

^{*1} The NC contacts provide the approved direct opening mechanism. 

Specifications

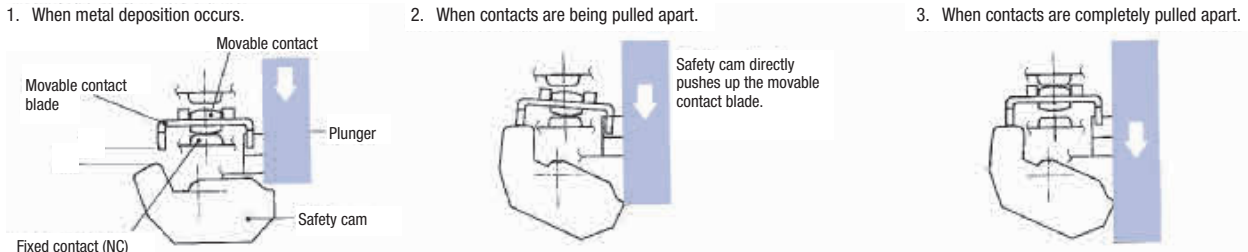
Durability* ¹	Mechanical	15,000,000 operations min.* ²
	Electrical	500,000 operations min. for a resistive load of 3 A at 250 VAC 300,000 operations min. for a resistive load of 10 A at 250 VAC
Operating speed	Roller lever	1 mm/s to 0.5 m/s
Operating frequency		30 operations/minute max.
Minimum applicable load		Resistive load of 1 mA at 5 VDC (N-level reference value)
Protection against electric shock		Class II (double insulation)
Pollution degree (operating environment)		3 (EN60947-5-1)
Contact gap		Snap-action: 2x0.5 mm min Slow-action: 2x2 mm min
Conditional short-circuit current		100 A (EN60947-5-1)
Rated open thermal current (I _{th})		10 A (EN60947-5-1)
Ambient temperature	Operating	-30 to 70°C with no icing
Degree of protection		IP67 (EN60947-5-1)

*¹ The durability is acquired for an ambient temperature of 5 to 35°C and an ambient humidity of 40% to 70%.
*² 10,000,000 operations min. for fork lever actuator.

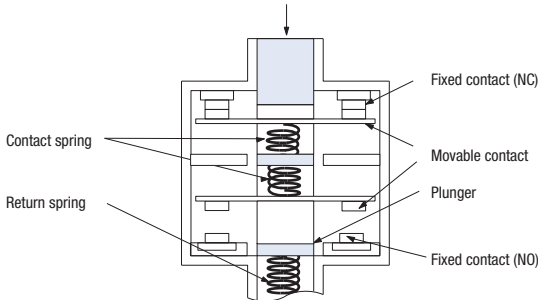
1NO/1NC Contact (Snap-action)

If metal deposition between mating contacts occurs on the NC contact side, they can be pulled apart by the shearing force and tensile force generated when part B of the

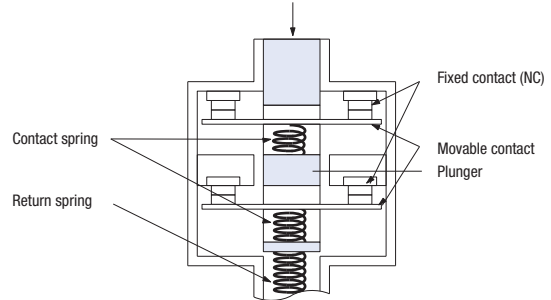
safety cam or plunger engages part A of the movable contact blade. When the safety cam or plunger is moved in the direction of the arrow, the Limit Switch releases.



1NC/1NO Contact (Slow-action)



2NC Contact (Slow-action)



NC contacts conform to EN60947-5-1 Direct Opening

When metal deposition occurs, the contacts are separated from each other by the plunger being pushed in.

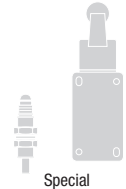
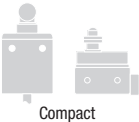
⊕ is marked on the product to indicate approval of direct opening.



Limit switch with metal housing

The D4B series of limit switches in a rugged metal housing is suitable for both safety and non-safety applications due to its direct opening mechanism and TÜV approval. Furthermore with the increased temperature range and enhanced mechanical switching lifetime, the D4B is first choice for all applications from standard to demanding environments and for highest flexibility in mounting and connectivity preferences.

- Direct opening mechanism and approval by notified body
- Rugged metal housing and extended mechanical switching lifetime (snap action models)
- Terminal block for direct wiring



Ordering information

Actuator type		Connection method	Order code ^{*1}		
			1NC/1NO (snap-action)	1NC/1NO (slow-action)	2NC (slow-action)
	Roller lever ^{*2}	Terminal block with M20 conduit ^{*3}	D4B-4111N	D4B-4511N	D4B-4A11N
	Adjustable roller lever		D4B-4116N	D4B-4516N	D4B-4A16N
	Adjustable rod lever		D4B-4117N	D4B-4517N	D4B-4A17N
	Plain		D4B-4170N	D4B-4570N	D4B-4A70N
	Roller		D4B-4171N	D4B-4571N	D4B-4A71N
	Coil spring		D4B-4181N ^{*4}	–	–
	Plastic rod		D4B-4187N ^{*4}	–	–

^{*1} The NC contacts provide the approved direct opening mechanism.

^{*2} For models with stainless steel rollers and temperature resistance of -40°C refer to WL- _-TC.

^{*3} Models with G1/2 or 1/2"14NPT conduit are available. For ordering refer to complete datasheet. For PG13.5 conduit models for non-safety applications contact your OMRON representative.

^{*4} No direct opening mechanism.

Specifications

Item		Snap-action	Slow-action
Durability ^{*1}	Mechanical	30,000,000 operations min.	10,000,000 operations min.
	Electrical	500,000 operations min. (at a 250 VAC, 10 A resistive load)	
Operating speed		1 mm/s to 0.5 m/s	
Operating frequency	Mechanical	120 operations/min	
	Electrical	30 operations/min	
Rated frequency		50/60 Hz	
Contact resistance		25 mΩ max. (initial value)	
Pollution degree (operating environment)		3 (EN60947-5-1)	
Conditional short-circuit current		100 A (EN60947-5-1)	
Conventional enclosed thermal current (I _{th})		20 A (EN60947-5-1)	
Protection against electric shock		Class I (with ground terminal)	
Ambient temperature	Operating	-40 to 80°C (with no icing) ^{*2}	
Degree of protection		IP67 (EN60947-5-1)	

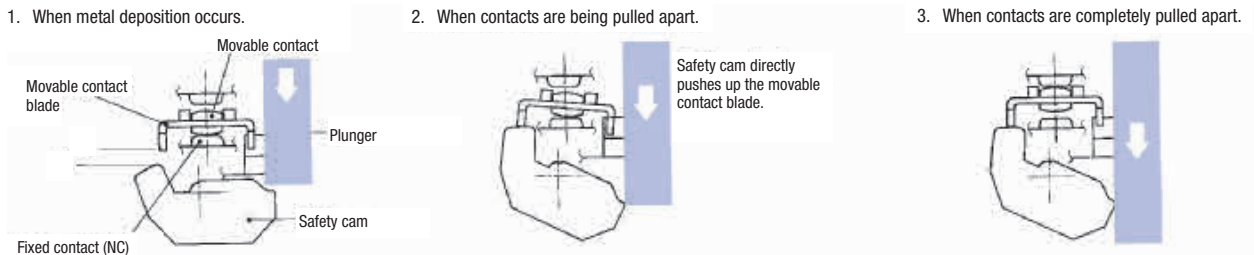
^{*1} The values are acquired for an ambient temperature of 5 to 35°C and an ambient humidity of 40 to 70%.

^{*2} -25 to 80°C for the flexible-rod actuator.

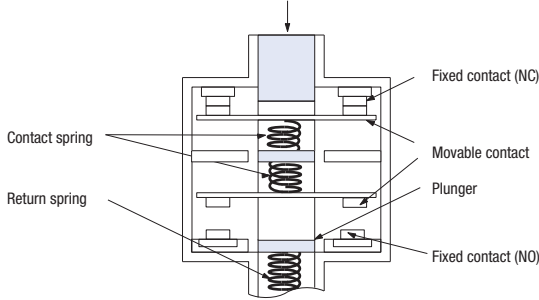
1NO/1NC Contact (Snap-action)

If metal deposition between mating contacts occurs on the NC contact side, they can be pulled apart by the shearing force and tensile force generated when part B of the

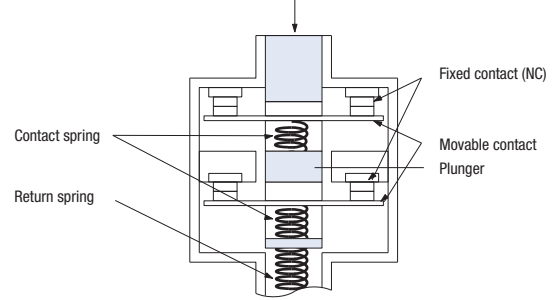
safety cam or plunger engages part A of the movable contact blade. When the safety cam or plunger is moved in the direction of the arrow, the Limit Switch releases.



1NC/1NO Contact (Slow-action)



2NC Contact (Slow-action)



NC contacts conform to EN60947-5-1 Direct Opening

When metal deposition occurs, the contacts are separated from each other by the plunger being pushed in.

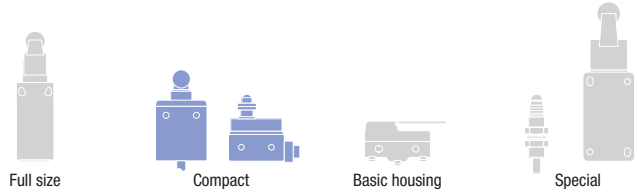
⊖ is marked on the product to indicate approval of direct opening.



Compact limit switch in metal housing

The 16 mm flat and compact size make the D4C range of limit switches very popular for all standard applications but especially where mounting space is limited or protruding housings may interfere with machine operation. The triple sealed construction, the rugged metal housing and the precisely manufactured movable parts ensure long operational life in standard or oily environments (special models).

- 16 mm flat compact size
- Rugged metal housing
- Models with M12 connector or oil resistant VCTF cable



Ordering Information

Actuator type	Load range (VDC) ^{*1} 0.8 W to 60 W max	Operation LED indicator		Connection method				Order code
		No	Yes					
Plunger 	■	■	-		■		*2	D4CC-3001
		-	■			3 m		D4C-1201
Sealed plunger 	■	■	-		■			D4CC-4001
		-	■			3 m		D4C-3201
Plunger with M14 mounting 	■	■	-		■			D4CC-3031
		-	■			3 m		D4C-1231
Roller plunger 	■	■	-		■			D4CC-4031
		-	■			3 m		D4C-3231
Sealed roller plunger 	■	■	-		■			D4CC-3041
		-	■			3 m		D4C-1241
Roller plunger with M14 mounting 	■	■	-		■			D4CC-4041
		-	■			3 m		D4C-3241
Crossroller plunger 	■	■	-		■			D4CC-3002
		-	■			3 m		D4C-1202
Sealed crossroller plunger 	■	■	-		■			D4CC-4002
		-	■			3 m		D4C-3202
Roller plunger with M14 mounting 	■	■	-		■			D4CC-3032
		-	■			3 m		D4C-1232
Crossroller plunger with M14 mounting 	■	■	-		■			D4CC-4032
		-	■			3 m		D4C-3232
Sealed crossroller plunger with M14 mounting 	■	■	-		■			D4CC-3042
		-	■			3 m		D4C-1242
Roller lever 	■	■	-		■			D4CC-4042
		-	■			3 m		D4C-3242
Coil spring 	■	■	-		■			D4CC-3043
		-	■			3 m		D4C-1243
Coil spring 	■	■	-		■			D4CC-4043
		-	■			3 m		D4C-3243
Coil spring 	■	■	-		■			D4CC-3024
		-	■			3 m		D4C-1220
Coil spring 	■	■	-		■			D4CC-4024
		-	■			3 m		D4C-3220
Coil spring 	■	■	-		■			D4CC-3050
		-	■			3 m		D4C-1250
Coil spring 	■	■	-		■			D4CC-4050
		-	■			3 m		D4C-3250

*1 See specifications for details on max. current per rated voltage and load type. Micro load models with 5mW to 0.8W are available. For ordering refer to complete datasheet.

*2 Pre-wired models with 30 cm PVC cable and M12 plug (pigtail) are available. Contact your OMRON representative.

Specifications

Voltage and current rating

Model	Rated voltage	Rated current* ¹	Non-inductive load				Inductive load				Inrush current		Applicable load range (5 to 30 VDC)
			Resistive load		Lamp load		Inductive load		Motor load		NC	NO	
			NC	NO	NC	NO	NC	NO	NC	NO			
D4C-1□□□	125 VAC		5 A	5 A	1.5 A	0.7 A	3 A	3 A	2.5 A	1.3 A	20 A max.	10 A max.	–
	250 VAC	2 A	5 A	5 A	1 A	0.5 A	2 A	2 A	1.5 A	0.8 A			
	8 VDC		5 A	5 A	2 A	2 A	5 A	4 A	3 A	3 A			
	14 VDC		5 A	5 A	2 A	2 A	4 A	4 A	3 A	3 A			
	30 VDC	2 A	4 A	4 A	2 A	2 A	3 A	3 A	3 A	3 A			
	125 VDC		0.4 A	0.4 A	0.05 A	0.05 A	0.4 A	0.4 A	0.05 A	0.05 A			–
250 VDC		0.2 A	0.2 A	0.03 A	0.03 A	0.2 A	0.2 A	0.03 A	0.03 A	–			
D4C-3□□□	30 VDC	2 A	4 A	4 A	2 A	2 A	3 A	3 A	3 A	3 A	5 A max.	2.5 A max.	0.8 W to 60 W
D4CC-3□□□	30 VDC	1 A	1 A	1 A	1 A	1 A	1 A	1 A	1 A	1 A			
D4CC-4□□□	30 VDC	1 A	1 A	1 A	1 A	1 A	1 A	1 A	1 A	1 A			
D4C-6□□□	30 VDC	0.1 A	0.1 A	0.1 A	–	–	–	–	–	–	20 A max.	10 A max.	5 mW to 0.8 W

*¹ For D4C- cable types these ratings are certified by TÜV Rheinland according to EN60947-5-1 (file no R9451333).

General specifications

Item		D4C- (cable types)	D4CC- (connector types)
Durability* ¹	Mechanical	10,000,000 operations min	
	Electrical	200,000 operations min	
Operating frequency	Mechanical	120 operations/min	
	Electrical	30 operations/min	
LED indicator		D4C-3_, D4C-6_, D4CC-4_: Operation indicator (red) Operation indicator turns OFF when the switch operates.* ²	
Ambient temperature	Operating	–10 to 70°C (with no icing)	
Degree of protection		IEC 60529: IP67	

*¹ Values are acquired at 5 to 35°C operating temperature, 40% to 70% operating humidity.

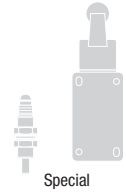
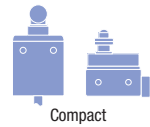
*² Models where operation indicator turns ON when the switch operates are available by adding “-B” to the order code. Contact your OMRON representative for availability.



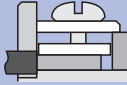
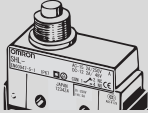
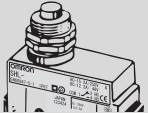

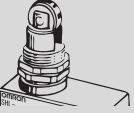



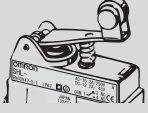
Limit switch in compact metal housing with terminal block

The compact housing size and the terminal block with side facing cable exit allow the mounting where space is crucial and self-wiring connection is preferred. The rugged and tight housing construction provides high protection while the low-force actuators make the ZC limit switch ideal for switching smaller or lighter objects.

- Terminal block for self-wiring with side facing cable exit
- Low-force actuators for switching smaller or lighter objects
- Rugged metal housing with IP67 protection



Ordering Information

Actuator type		Connection method	Order code
			
	Plunger	Terminal block with side facing cable exit (left/right changeable) for cables dia 8.5 to 10.5 mm ^{*1}	ZC-D55
	Plunger with M14 mounting		ZC-Q55
	Sealed roller plunger		ZC-N2255
	Roller plunger with M14 mounting		ZC-Q2255
	Sealed cross roller plunger		ZC-N2155
	Cross roller plunger with M14 mounting		ZC-Q2155
	Hinge lever - 50R		ZC-W55
	Hinge lever - 70R		ZC-W155
	Hinge roller lever - 50R		ZC-W255
	Hinge roller lever - 70R		ZC-W2155

*1 Models with M20 conduit or other connection variations are available. Refer to OPTIONAL FEATURES in complete datasheet for details.

Specifications

Voltage and current rating

Model	Rated voltage	Non-inductive load			Inductive load				Inrush current		
		Resistive load		Lamp load		Inductive load		Motor load		NC	NO
		NC and NO	NC	NO	NC	NO	NC	NO			
Standard type	125 VAC	10	3	1.5	10	5	2.5	30 A	15 A		
	250 VAC										
	8 VDC										
	14 VDC										
	30 VDC										
	125 VDC	6			5						
250 VDC	0.5	0.4	0.4	0.05							
High current at high VDC switching type ^{*1}	250 VDC	0.25	0.2	0.2	0.03						
	8 VDC	10	3	1.5	10	5	2.5				
	14 VDC										
	30 VDC										
	125 VDC							7.5	6		
	250 VDC	3	1.5	0.75	2	1.5	2	1.5			

*1 Refer to OPTIONAL FEATURES in complete datasheet for details.

General specifications

Durability	Mechanical	10,000,000 operations min
	Electrical	500,000 operations min
Operating speed	Plunger	0.05 mm/s to 0.5 m/s
Operating frequency	Mechanical	120 operations / min
	Electrical	20 operations / min
Insulation resistance		100 MΩ min (at 500VDC)
Contact resistance (initial)		15 mΩ max
Dielectric strength		1,000 VAC, 50/60 Hz for 1 min between non-continuous terminals 2,000 VAC, 50/60 Hz for 1 min between each terminal and non-current-carrying metal part
Vibration resistance	Malfunction	10 to 55 Hz, 1.5 mm double amplitude
Shock resistance	Destruction	1,000 m/s ² min
	Malfunction	300 m/s ² min
Ambient temperature	Operating	-10°C to 80°C (with no icing)
Ambient humidity	Operating	35% to 95% RH
Degree of protection		IEC 60529: IP67

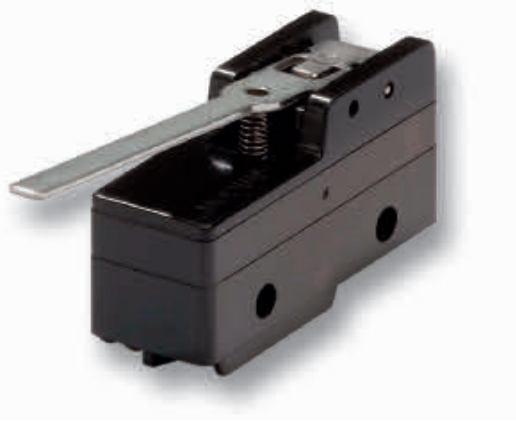
Additional specifications after EN60947-5-1 (TÜV Rheinland File No J50041904)

Category	AC-12 10A/250 VAC
Rated insulation voltage	1,000 VAC
Short circuit protective device	10A fuse type gG (IEC60269)
Protection against electrical shock	Class II

Operating characteristics

Values for OF and RF are in N and values for PT, OT, MD and OP are in mm unless otherwise specified.

	ZC-D□	ZC-Q2□	ZC-Q5□	ZC-N2□	ZC-W1□	ZC-W21□	ZC-W25□	ZC-W5□
Operating force (OF)	11.8			6.86	2.75		3.92	
Release force (RF)	4.9			1.67	0.59		0.78	
Pre-travel (PT)	1.5							
Overtravel (OT)	2.4	3		2.5	8.4		6	
Movement differential (MD)	0.2				1.4		1	
Operating Position (OP)	32.4±0.8	47.4±0.8	38.2±0.8	47.4±0.8	28.5±1.2	43.0±1.2		28.5±1.2



Limit switch with basic plastic housing

The Z series of basic switches in plastic housing provide the same electrical and mechanical switching capability and lifetime as standard limit switches. But with the basic plastic housing the basic switches are an ideal solution with best value for money for uncritical environments or when separately encased in subassemblies.

- Cost efficient basic plastic housing for subassemblies
- Same electrical and mechanical switching ratings as standard limit switches



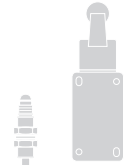
Full size



Compact



Basic housing



Special

Ordering information

Actuator type ^{*1}		Order code ^{*2}	
		Solder terminal	Screw terminal
	Pin plunger	Z-15G	Z-15G-B
	Short spring plunger	Z-15GD	Z-15GD-B
	Leaf spring	Z-15GL	Z-15GL-B
	Reverse hinge lever	Z-15GM	Z-15GM-B
	Reverse hinge roller lever	Z-15GM2	Z-15GM2-B
	Plunger with M12 mounting	Z-15GQ	Z-15GQ-B
	Hinge lever	Z-15GW	Z-15GW-B
	Hinge roller lever	Z-15GW2	Z-15GW2-B

^{*1} Other actuator types are available. For the full range refer to the complete datasheet.

^{*2} Contacts are directly accessible. Additional protective measures are required e.g. order covers from accessories.

Specifications

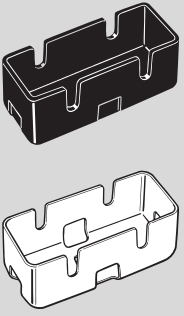

Rated voltage	Non-inductive load				Inductive load			
	Resistive load		Lamp load		Inductive load		Motor load	
	NC	NO	NC	NO	NC	NO	NC	NO
125 VAC		15 A	3 A	1.5 A		15 A	5 A	2.5 A
250 VAC		15 A	2.5 A	1.25 A		15 A	3 A	1.5 A
8 VDC		15 A	3 A	1.5 A		15 A	5 A	2.5 A
14 VDC		15 A	3 A	1.5 A		10 A	5 A	2.5 A
30 VDC		6 A	3 A	1.5 A		5 A	5 A	2.5 A
125 VDC		0.5 A ^{*1}	0.5 A	0.5 A		0.05 A	0.05 A	0.05 A

^{*1} For switching high currents at high voltages (e.g. 10A at 125VDC) contact your OMRON representative.

Durability	Mechanical	10,000,000 operations min.
	Electrical	500,000 operations min.
Operating speed	Plunger	0.01 mm to 1 m/s
Operating frequency	Mechanical	240 operations/min
	Electrical	20 operations/min
Ambient temperature	Operating	-25 to 80°C (with no icing)
Degree of protection		IP00

Accessories

Terminal covers (protection of electrical contacts against accidental contact of e. g. fingers)

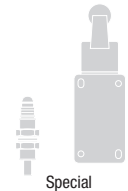
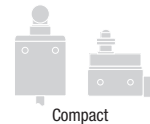
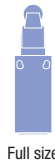
Type	Material	Order code	
		for soldering terminal models	for screw terminal models
 <p>Cover with 5 thinner parts (plastic type) or holes (metal type) as cable exit positions. Protective cover is fixed to basic switch with mounting screws of basic switch.</p>	plastic metal	AP-A	AP-B
		AP1-A	AP1-B
 <p>Cover with bottom cable exit</p>		AP-Z	



Heat and cold resistant limit and basic switches

The limit switches WL-_T provide the ruggedness, reliability and the wide actuator range of the WL family and allow a direct usage in applications with temperatures from -40 up to 120°C. For applications with even lower or higher temperatures the TZ basic switch provides reliable operation from -65 up to 400°C for sub-assemblies.

- -40 to 120°C in rugged WL limit switch housing for direct usage
- -65 to 400°C in TZ basic housing for sub-assemblies



Ordering Information

Actuator type	Connection method	Order code		
		WL-_TCG (-40 to 40°C)	WL-_THG (5 to 120°C)	TZ-1G_ (-65 to 400°C)
	Screw terminal (with PG 13.5 conduit) ^{*1}	WLCA2-TCG	WLCA2-THG	
Roller lever (side mounting and 90° overtravel)		WLCA2-2NTCG	WLCA2-2NTHG	
		WLCA12-TCG	WLCA12-THG	
Adjustable roller lever (side mounting and 90° overtravel)		WLCA12-2NTCG	WLCA12-2NTHG	
		WLD-TCG	WLD-THG	
		WLD2-TCG	WLD2-THG	
		WLD3-TCG	WLD3-THG	
		WLS-TCG	WLS-THG	
		WLS2-TCG	WLS2-THG	
		WLS3-TCG	WLS3-THG	
		WLNJ-TCG	WLNJ-THG	
Coil spring (multi wire)		WLNJ-30TCG	WLNJ-30THG	
		WLNJ-S2TCG	WLNJ-S2THG	
	Screw terminal ^{*2}	-	-	TZ-1G
		-	-	TZ-1GV
		-	-	TZ-1GV2

^{*1} Models with screw terminals with M20 conduit instead of PG13.5 are available. Contact your OMRON representative.

^{*2} Screw contacts are directly accessible. Additional protective measures or covers are required.

Specifications

Voltage and current rating

Model	Rated voltage	Rated current (TÜV: EN60947-5-1)	Non-inductive load			Inductive load			
			Resistive load	Lamp load (NC)	Lamp Load (NO)	Inductive load	Motor load (NC)	Motor load (NO)	
WL	125 VAC	-	10 A	3 A	1.5 A	10 A	5 A	2.5 A	
	250 VAC	2 A		2 A	1 A		3 A	1.5 A	
	500 VAC	-		1.5 A	0.8 A	3 A	1.5 A	0.8 A	
	8 VDC	-		6 A	4 A	3 A	10 A	6 A	4 A
	14 VDC	-							
	30 VDC	-							
	48 VDC	2 A	-	-	-	-	-	-	
	125 VDC	-	0.8 A	0.2 A	-	0.8 A	0.2 A	-	
	250 VDC	-	0.4 A	0.1 A	-	0.4 A	0.1 A	-	
	TZ	8 VDC	-	1 A	0.9 A	0.45 A	1 A	1.5 A	-
14 VDC		-							
30 VDC		-							

General specifications*1

Item		WL_-TCG	WL_-THG	TZ-1G_
Durability*1	Mechanical	10,000,000 operations min		100,000 operations min
	Electrical	750,000 operations min		50,000 operations min
Operating speed	Pin plunger	-		0.05 mm to 1 m/s
	Roller lever	1 mm to 1 m/s		-
Operating frequency	Mechanical	120 operations / minute		60 operations / minute
	Electrical	30 operations / minute		20 operations / minute
Ambient temperature	Operating*2	-40 to 40°C	5 to 120°C	-65 to 400°C
Degree of protection		IEC 60529: IP67		IEC 60529: IP00

*1 Values are acquired at 5 to 35°C operating temperature and 40% to 70% operating humidity

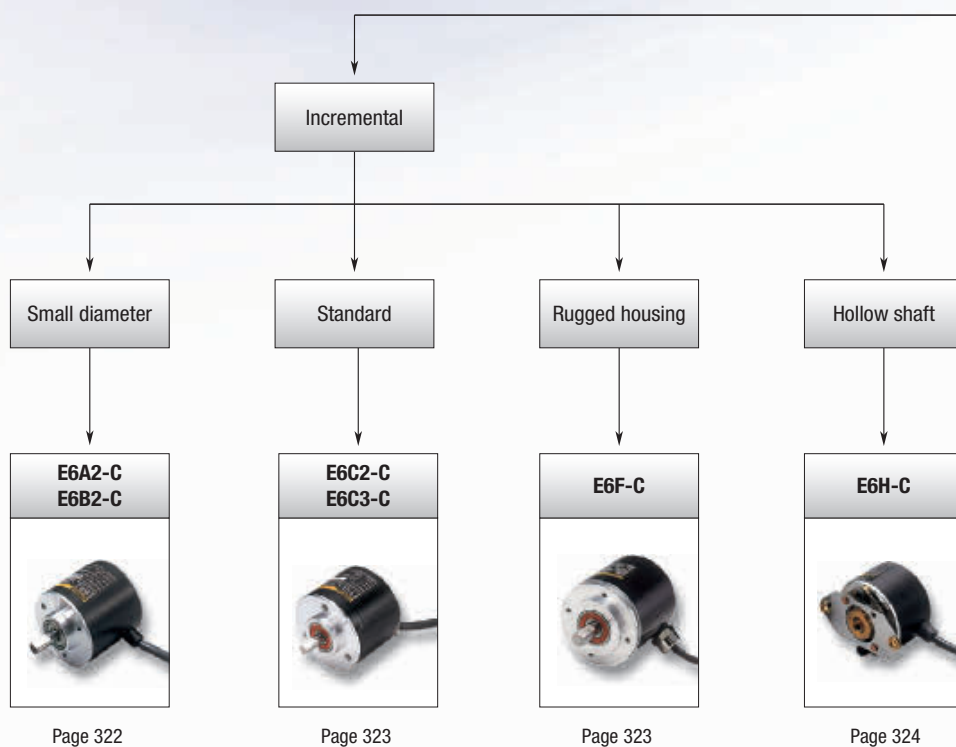
*2 With no icing

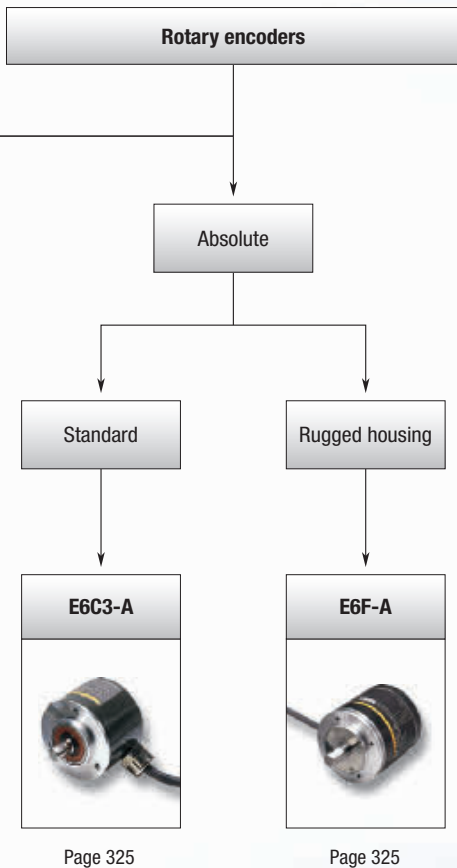
ACCURACY AND ROBUSTNESS MADE RELIABLE

Close the loop – angle, position and velocity on hand






Rotary encoders create information which represent the movement of your application. To meet challenging demands, Omron offers a wide range of absolute and incremental encoders.


- Wide resolution variety
- Models with rugged housing
- Models for multi- turn applications







Output		Incremental				
						
Model		E6A2-C	E6B2-C	E6C2-C	E6C3-C	E6F-C
Type		Small diameter shaft		Standard		Rugged housing
Resolution range	Min	10		100		
	Max	500	2,000		3,600	1,000
Output	NPN	■	■	■	■	■
	PNP	-	■	■	-	-
Size dia. in mm		25	40	50	50	60
Max force	radial	10	30	50	80	120
	axial	5	20	30	50	50
IP rating	IP50	■	■	-	-	-
	IP64	-	-	■	-	-
	IP65	-	-	-	■	■
Max. rotation frequency		5,000	6,000		5,000	
Page		322		323		

Output		Incremental	Absolute			
						
Model		E6H-C	E6C3-A	E6F-A		
Type		Hollow shaft	Standard	Rugged housing		
Resolution Range	Min	300	6	256		
	Max	3,600	1,024			
Output	NPN	■	■	■		
	PNP	-	■	■		
Size dia. in mm		40 (hollow)	50	60		
Max force	radial	29.4	80	120		
	axial	4.9	50	50		
IP rating	IP50	■	-	-		
	IP64	-	-	-		
	IP65	-	■	■		
Max. rotation frequency		10,000	5,000	5,000		
Page		324	325			

■ Standard □ Available - No/not available



Incremental rotary encoder in miniature housing

The E6A family of rotary encoders features a small sized dia 25 mm housing.

- Small sized dia 25 mm housing

Ordering information

Size dia. in mm	Output phase	Power supply voltage	Output form	Resolution (pulse/rotation)	Order code	
25	A	5 to 12 VDC	NPN voltage output	10, 20, 60, 100, 200, 300, 360, 500	E6A2-CS3E	
			NPN open collector	10, 20, 60, 100, 200, 300, 360, 500	E6A2-CS3C	
	A, B	12 to 24VDC				E6A2-CS5C
		5 to 12 VDC	NPN voltage output	100, 200, 360, 500	E6A2-CW3E	
			NPN open collector	100, 200, 360, 500	E6A2-CW3C	
		12 to 24VDC				E6A2-CW5C
	A, B, Z	5 to 12 VDC	NPN voltage output	100, 200, 360, 500	E6A2-CWZ3E	
			NPN open collector	100, 200, 360, 500	E6A2-CWZ3C	
12 to 24VDC					E6A2-CWZ5C	

E6B2-C



Incremental rotary encoder in compact housing

The E6B family of incremental rotary encoders features a housing size dia 40 mm.

- Line driver output models available

Ordering information

Size dia. in mm	Power supply voltage	Output form	Resolution (pulse/rotation)	Order code
40	5 to 24 VDC	NPN open collector output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600, 720, 800, 1,000, 1,024, 1,200, 1,500 1,800, 2,000	E6B2-CWZ6C
	12 to 24VDC	PNP open collector output	100, 200, 360, 500, 600, 1,000, 2,000	E6B2-CWZ5B
	5 to 12 VDC	NPN voltage output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600, 1,000, 1,200, 1,500 1,800, 2,000	E6B2-CWZ3E
	5 VDC	Line driver output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600, 1,000, 1,024, 1,200, 1,500 1,800, 2,000	E6B2-CWZ1X



Incremental rotary encoder with enhanced water resistant

The E6C family of dia 50 mm incremental rotary encoders features an improved water resistance compared to standard models.

- IP64f or IP65f drip-proof, oil-proof construction

Ordering information

	Size dia. in mm	Power supply voltage	Output form	Resolution (pulse/rotation)	Order code
Standard models	50	5 to 24 VDC	NPN open collector output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600, 720, 800, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000	E6C2-CWZ6C
		12 to 24VDC	PNP open collector output	100, 200, 360, 500, 600, 1,000, 2,000	E6C2-CWZ5B
		5 to 12 VDC	NPN voltage output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600, 720, 800, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000	E6C2-CWZ3E
		5 VDC	Line driver output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600, 720, 800, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000	E6C2-CWZ1X
8 dia. tough model	50	12 to 24VDC	Complimentary output	100, 200, 300, 360, 500, 600, 720, 800, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000, 2,048, 2,500, 3,600	E6C3-CWZ5GH
		5 to 12 VDC	NPN voltage output	100, 200, 300, 360, 500, 600, 720, 800, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000, 2,048, 2,500, 3,600	E6C3-CWZ3EH
		5 to 12 VDC	Line driver output	100, 200, 300, 360, 500, 600, 720, 800, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000, 2,048, 2,500, 3,600	E6C3-CWZ3XH

E6F-C



Incremental rotary encoder in rugged housing

The E6F family of dia 60 mm rotary encoders features a rugged housing.

- Strong shaft for max 120 N in radial direction and max 50 N in thrust direction)
- Water- and oil-proof structure (IP65f)

Ordering information

Size dia. in mm	Power supply voltage	Output form	Resolution (pulse/rotation)	Order code
60	12 to 24VDC	Complimentary output	100, 200, 360, 500, 600, 1000	E6F-CWZ5G



Incremental rotary encoder with hollow shaft

The E6H family of incremental encoders features a dia 40 mm housing with hollow shaft.

- Wide operating voltage range from 5 to 24 VDC
- Line drive output available (100 m max.)

Ordering information

Size dia. in mm	Power supply voltage	Output form	Resolution (pulse/rotation)	Order code
40	5 to 24 VDC	Open collector output	300, 360, 500, 600, 720, 800, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000, 2,048, 2,500, 3,600	E6H-CWZ6C
	5 to 12 VDC	Voltage output	300, 360, 500, 600, 720, 800, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000, 2,048, 2,500, 3,600	E6H-CWZ3E
	5 to 12 VDC	Line drive output	300, 360, 500, 600, 720, 800, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000, 2,048, 2,500, 3,600	E6H-CWZ3X



Absolute rotary encoder with enhanced water resistance

The E6C family of dia 50 mm incremental rotary encoders features an improved water resistance compared to standard models.

- IP65f drip-proof, oil-proof construction

Ordering information

Size dia. in mm	Power supply voltage	Output form	Output code	Resolution (pulse/rotation)	Connection method	Order code
50	12 to 24VDC	NPN open collector output	Gray code	256, 360	Connector type	E6C3-AG5C-C
				256, 360, 720, 1,024	Pre-wired type	E6C3-AG5C
			Binary	32, 40		E6C3-AN5C
		BCD	6, 8, 12	E6C3-AB5C		
		PNP open collector output	Gray code	256, 360, 720, 1,024	E6C3-AG5B	
			Binary	32, 40	E6C3-AN5B	
	BCD		6, 8, 12	E6C3-AB5B		
	5 VDC	NPN voltage output	Binary	256		E6C3-AN1E
	12 VDC					E6C3-AN2E

E6F-A



Absolute rotary encoder in rugged housing

The E6F family of dia 60 mm rotary encoders features a rugged housing.

- Stronger shaft and higher durability (120 N in radial direction and 50 N in thrust direction) than previous E6F Encoders
- Drip-proof construction meets IP64F standards
- High-resolution models (1024 pulses max. per revolution)
- Faster response for high-speed control applications (grey code: 20 kHz)

Ordering information







Size dia. in mm	Power supply voltage	Output form	Output code	Resolution (pulses/revolution)	Connection method	Order code
60	12 to 24 VDC	NPN open collector	BCD	360	Pre-wired	E6F-AB5C
			Gray code	256, 360, 720, 1,024	Connector type ^{*1}	E6F-AB5C-C
		PNP open collector	BCD	360	Pre-wired	E6F-AB5B
			Gray code	256, 360, 720, 1,024	Pre-wired	E6F-AG5B

^{*1} For extension cables order E69-DF5 (5M) or E69-DF10 (10M).

Cable connectors

Size	Shape	Type	Features	Material		Order code		
				Nut	Cable			
M8		PRO	3 pin	Brass (CuZn)	PVC 2 m	XS3F-M8PVC3S2M-EU	XS3F-M8PVC3A2M-EU	
			4 pin		PUR 2 m	XS3F-M8PUR3S2M-EU	XS3F-M8PUR3A2M-EU	
		LITE	3 pin	Brass (CuZn)	PVC 2 m	XS3F-LM8PVC3S2M	XS3F-LM8PVC3A2M	
			4 pin		XS3F-LM8PVC4S2M	XS3F-LM8PVC4A2M		
		PRO ^{plus} Detergent resistant	4 pin	Stainless steel (SUS316L)	PVC 2 m	Y92E-S08PVC4S2M-L	Y92E-S08PVC4A2M-L	
		PRO ^{plus} Robotic (drag chain)	4 pin	Brass (CuZn)	Robotic PVC 2 m	XS3F-M421-402-R	XS3F-M422-402-R	
					Robotic PUR 2 m	Y92E-M08PUR4S2M-L	Y92E-M08PUR4A2M-L	
					High robotic PUR 2 m	Y92E-M08PUR4S2M-R	Y92E-M08PUR4A2M-R	
	M12		PRO	3 wire	Brass (CuZn)	PVC 2 m	XS2F-M12PVC3S2M-EU	XS2F-M12PVC3A2M-EU
				4 wire		PUR 2 m	XS2F-M12PUR3S2M-EU	XS2F-M12PUR3A2M-EU
5 wire				PVC 2 m		XS2F-M12PVC4S2M-EU	XS2F-M12PVC4A2M-EU	
				PUR 2 m		XS2F-M12PUR4S2M-EU	XS2F-M12PUR4A2M-EU	
5 wire				PVC 2 m		XS2F-M12PVC5S2M-EU	XS2F-M12PVC5A2M-EU	
				PUR 2 m		XS2F-M12PUR5S2M-EU	XS2F-M12PUR5A2M-EU	
		LITE	3 wire	Brass (CuZn)	PVC 2 m	XS2F-LM12PVC3S2M	XS2F-LM12PVC3A2M	
						4 wire	XS2F-LM12PVC4S2M	XS2F-LM12PVC4A2M
		PRO ^{plus} LED (power and output LED, PNP)	3 wire	Nickel plated brass	PVC 2 m	–	XS2F-M12PVC3A2MPLIED	
			4 wire		PUR 2 m	–	XS2F-M12PVC4A2MPLIED	
	PRO ^{plus} Detergent resistant	4 wire	Stainless steel (SUS316L)	PVC 2 m	Y92E-S12PVC4S2M-L	Y92E-S12PVC4A2M-L		
					PRO ^{plus} 105°C Heat resistant	4 wire	Stainless steel (SUS316L)	Heat resistant PVC 2 m
	Twist & click	4 wire	Nickel plated Zinc	PVC 2 m	XS5F-D421-D80-F	XS5F-D422-D80-F		
				PUR 2 m	XS5F-D421-D80-P	XS5F-D422-D80-P		
	PRO ^{plus} Robotic (drag chain)	4 wire	Brass (CuZn)	Robotic PVC 2 m	XS2F-D421-D80-F	XS2F-D422-D80-F		
				Robotic PUR 2 m	Y92E-M12PUR4S2M-L	Y92E-M12PUR4A2M-L		
	High robotic (drag chain & torsion)	4 wire	Brass (CuZn)	High grade robotic PUR 2 m	Y92E-M12PUR4S2M-R	Y92E-M12PUR4A2M-R		
				8 pin	8 wire shielded cable	Brass (CuZn)	Shielded PUR 2m	Y92E-M12PURSH8S2M-L
Fiber amplifier (E3X) connector		Fiber amplifier connectors	Special fiber connector - 4 wire	PBT	PVC 2 m	E3X-CN21		
			Special fiber connector + M8 plug	Plug: Zinc diecast	PVC 30 cm with M8 4-pin plug	E3X-CN21-M3J-2 0.3M		
			Special fiber connector + M12 plug		PVC 30 cm with M12 4-pin plug	E3X-CN21-M1J 0.3M		
Photomicrosensor (EE-SX) connector Cable connector		Cable connector	standard cable	Nylon	PVC 1 m	EE-1017 1M		
			robotic cable		EE-1017-R 1M			

Cable connectors

Size	Shape	Type	Features	Material		Order code	
				Nut	Cable		
M12		IDC (Insulation Displacement Contact)	<p>Fast and easy IDC pressure-welded assembly</p> <p>One connector for cable diameters of 3 mm to 8 mm</p> <p>IP 67 for waterproof connection</p> <p>Smartclick connection</p>	Brass	n.a.	XS5G-D418	XS5C-D418
M8/M12		Confection-able	Plugs and connectors for self assembly	Brass	n.a.	XS2G, XS2C	Y92E_conf
M12		Field I/O boxes	Direct wiring or DeviceNet communication	–	–	XW3B, DRT2	
M8/M12		T-connectors, covers, accessories and extended wiring portfolio	n.a.	–	–	XS2R, XS3R, XY2F, ...	

ZERO DEFECT FOR PRODUCTION THAT NEVER FAILS!

Customer satisfaction highly depends on the quality of the finished goods or the performance of the machine in use. Zero defect during production is a key criterion for success. The speed of production lines is getting increasingly faster. On the other hand the machines should never fail. But can you trust the result?

The necessity for quality inspection and control in any production process is no longer a discussion point. The cost of non quality is much higher than the investment, which pays for itself within a short time. In order to further reduce the number and cost of defective goods, there is a clear trend from having just one inspection at the end of the process towards several quality checks within or even at the beginning of the process. This effect further increases the demand for accurate, reliable and fast inspection systems.

Omron offers a complete portfolio of measurement and inspection systems using different technologies and principles, but following the same guideline: keep it simple for the user.

Quality control & Inspection – Table of contents

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Measurement sensors **18**

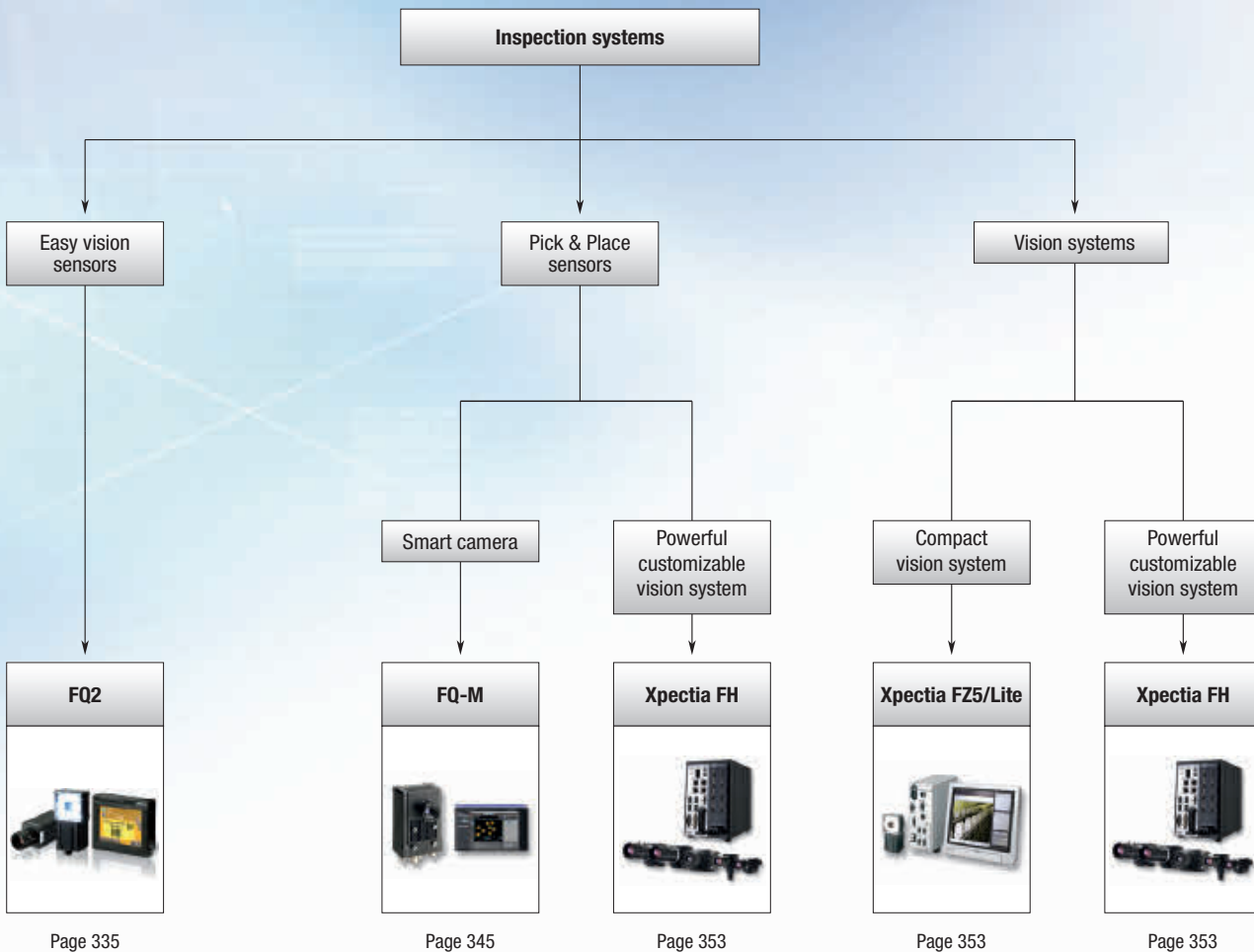
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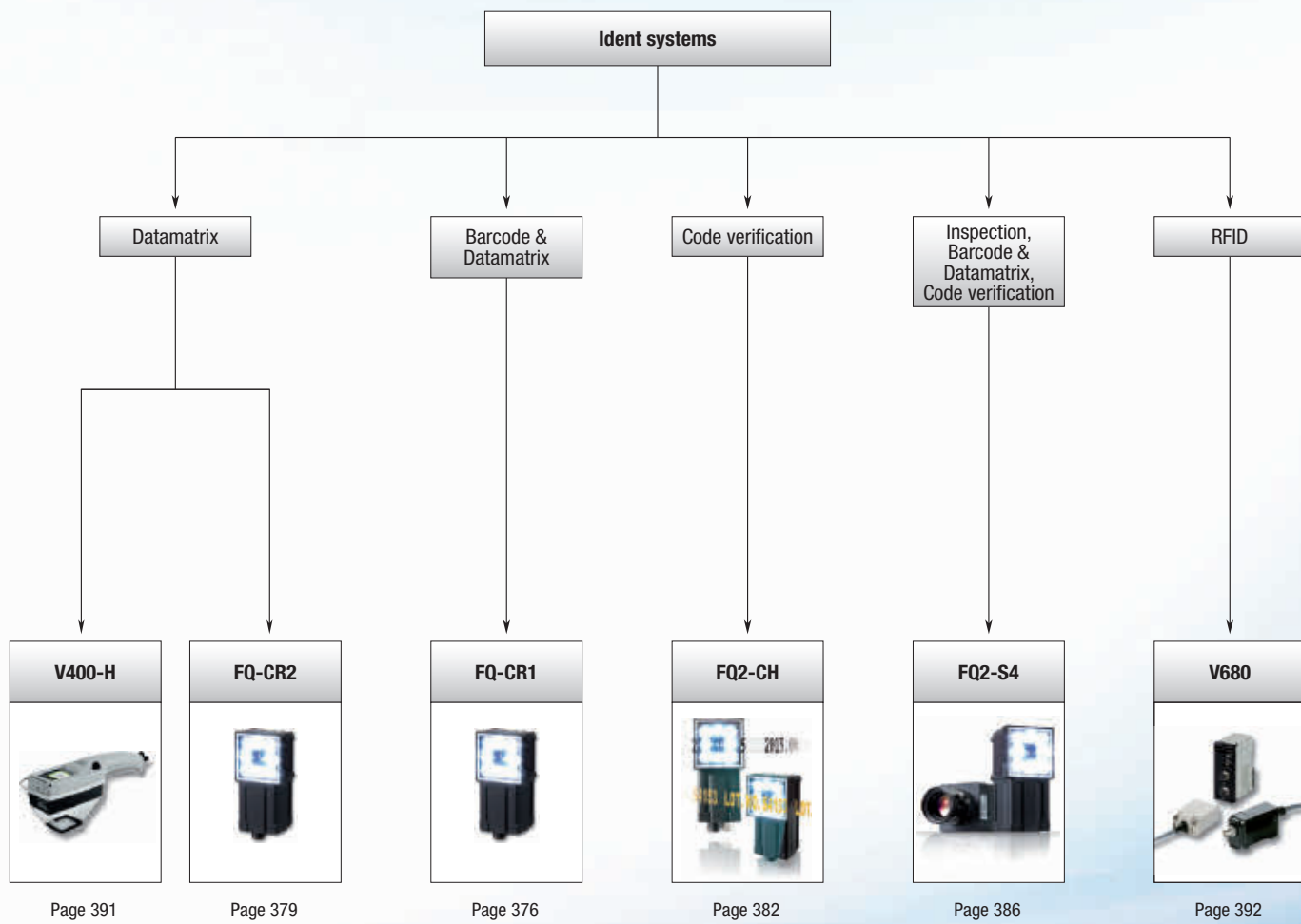
EASY VISION: TOUCH, COMMUNICATE AND GO

Built-in LCD monitor for setup and immediate image visualization

The easy vision sensor FQ2 solves the applications by an intuitive teach & go procedure. For advanced applications features such as multiple inspections, position correction, intelligent image filtering and ethernet communication are offered by the Xpectia lite. The high end is addressed by the Xpectia FJ.

- Easy vision – intuitive user interfaces
- Communication – centralized set-up & inspection via Ethernet
- High-end vision – PC-based system for challenging applications
- True colour – close to human eye identification and image processing





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Selection table

		Vision sensor	Pick & Place		Vision systems		
							
		FQ2	FQ-M	Xpectia FH	Xpectia FZ5/Lite	Xpectia FH	
Selection criteria	Model	FQ2	FQ-M	Xpectia FH	Xpectia FZ5/Lite	Xpectia FH	
	Number of connectable cameras	Smart camera	Smart camera	8	4	8	
	Camera type	Monochrome/Colour	Colour	Digital colour or black & white	Digital colour or black & white	Digital colour or black & white	
	Resolution (usable) Display dots	752 × 480 928 × 828 1,280 × 1,024	752 × 480	from 640 × 480 to 2,040 × 2,048	from 640 × 480 to 2,488 × 2,044	from 640 × 480 to 2,040 × 2,048	
	Working distance mm	Min.	8	Depends on selected lens	Depends on selected lens	Depends on selected lens	Depends on selected lens
		Max.	970	–	–	–	–
	Field of view	Min.	7.5 × 4.7	Depends on selected lens	Depends on selected lens	Depends on selected lens	Depends on selected lens
		Max.	300 × 268	–	–	–	–
	Number of storable configurations	32	32	–	–	–	
	Number of tools/configuration	32	32	limited only by memory space	limited only by memory space	limited only by memory space	
IP-Rating camera head	IP67	IP40	Depends on setup & tools, IP20	Depends on setup & tools, IP20	Depends on setup & tools, IP20		
Supply voltage	24 VDC	24 VDC	–	–	–		
Features	Image processing tools	Search, shape search II, sensitive search, area, color data, edge position, edge pitch, edge width, labeling, FQ2-S4 has additional: OCR, Bar code, 2D-code, 2D-code (DMP) and Model dictionary The types of characters and codes to be read are the same as those of FQ2-CH and FQ-CR1 & FQ-CR2	Contour based search, labelling, edge position	App. 70 processing tools for object or defect recognition, measurements, calculations, input/output, display and more. Includes also character recognition and high precision edge code inspection tools	App. 70 processing tools for object or defect recognition, measurements, calculations, input/output, display and more. Includes also character recognition and high precision edge code inspection tools	App. 70 processing tools for object or defect recognition, measurements, calculations, input/output, display and more. Includes also character recognition and high precision edge code inspection tools	
	Image preprocessing	High dynamic range (HDR), polarizing filter (attachment), and white balance	High dynamic range (HDR), white balance	Smoothing, edge enhancement, edge extraction, erosion, dilation, median, background suppression - multiple passes, configurable	Smoothing, edge enhancement, edge extraction, erosion, dilation, median, background suppression - multiple passes, configurable	Smoothing, edge enhancement, edge extraction, erosion, dilation, median, background suppression - multiple passes, configurable	
	Flow programming	–	–	■	■	■	
	User interface	PC-Tool or Touch Display	PC-Tool or Touch Display	■	■	■	
	Optional PC configuration software	Yes	Yes	■	■	■	
	Security tools	–	■	–	–	–	
	Communication	RS-232C	Optional via FQ-SDU2	–	■	■	■
		USB	–	–	■	■	■
		Ethernet	Yes	■	■	■	■
		EtherCAT	–	Yes	Yes	–	Yes
Number of digital I/O		7 in/3 out	9 in/5 out	19 in/34 out	11 in/26 out	19 in/34 out	
Page	335	345	353	353	353		

		Code reader					
							
Selection criteria	Model	FQ-CR1	FQ-CR2	FQ2-CH	FQ2-S4	V400-H	
		Smart camera	Smart camera	Smart camera	Smart camera	1	
		Monochrome	Monochrome	Monochrome	Monochrome/Colour	Digital black & white	
		752 × 480	752 × 480	752 × 480	752 × 480 928 × 828 1,280 × 1,024	–	
	Working distance mm	Min.	8	8	8	8	40 mm
		Max.	970	970	970	970	40 mm
	Field of view	Min.	7.5 × 4.7	7.5 × 4.7	7.5 × 4.7	7.5 × 4.7	5 × 5 mm
		Max.	300 × 191	300 × 191	300 × 191	300 × 268	30 × 30 mm
		32	32	32	32	limited by SD card	
		32	32	32	32	–	
	IP67	IP67	IP67	IP67	IP64		
	24 VDC	24 VDC	24 VDC	24 VDC	5 VDC		
Features	Image processing tools	2D-codes: Data Matrix, QR Code, Micro QR Code, PDF417, Micro PDF417, GS1-Data Matrix Bar codes: JAN/EAN/UPC, Code39, Codabar (NW-7), IFT (interleaved2 of 5), Code93, Code128/ GS1-128, GS1-DataBar, GS1-128 Composite Code, Pharmacode	2D-codes: Data Matrix, QR Code	OCR - Alphabet A to Z - Number 0 to 9 - Symbol '-./: Model dictionary	Search, shape search II, sensitive search, area, color data, edge position, edge pitch, edge width, labeling, OCR, Bar code, 2D-code, 2D-code (DMP) and Model dictionary The types of characters and codes to be read are the same as those of FQ2-CH and FQ-CR1 & FQ-CR2	Data Matrix, ECC200, 10×10 to 64×64, 8×18 to 16×48, QR Code (Models 1, 2), 21×21 to 57×57 (Versions 1 to 10).	
	Image preprocessing	High dynamic range (HDR), polarizing filter (attach- ment), and white balance	High dynamic range (HDR), polarizing filter (attach- ment), and white balance	High dynamic range (HDR), polarizing filter (attach- ment), and white balance	High dynamic range (HDR), polarizing filter (attach- ment), and white balance	–	
	Flow programming	–	–	–	–	–	
	User interface	PC-Tool or Touch Display	PC-Tool or Touch Display	PC-Tool or Touch Display	PC-Tool or Touch Display	–	
	Optional PC configuration software	Yes	Yes	Yes	Yes	–	
Communication	Security tools	–	–	–	–	–	
	RS-232C	–	–	Optional via FQ-SDU2	Optional via FQ-SDU2	–	
	USB	–	–	–	–	–	
	Ethernet	Yes	Yes	Yes	Yes	–	
	EtherCAT	–	–	–	–	–	
	Number of digital I/O	7 in/3 out	7 in/3 out	7 in/3 out	7 in/3 out	–	
	Page	376	379	382	386	391	

■ Standard

– No/not available





The new standard in image inspection and code verification

The FQ2 vision sensor family is set to redefine the vision sensor market, providing advanced inspection, code reading and verification only previously available in higher end vision systems. With over 100 camera options, the FQ2 provides users with the ultimate flexibility to solve applications, whether you need high resolution, code reading, integrated lighting, or a cost effective solution to solve a simple application, there is an FQ2 which fits your needs.

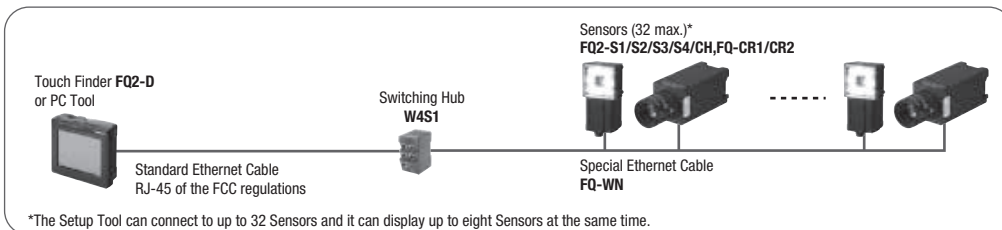
- Powerful functionality with versatile line-up
- All-in-one-housing
- Easy searching with Shape Search II
- Direct Part Marked (DPM)
- Unique OCR technology
- Code verification

System Configuration

Up to 32 Sensors can be set up and monitored from a single Touch Finder or PC Tool.

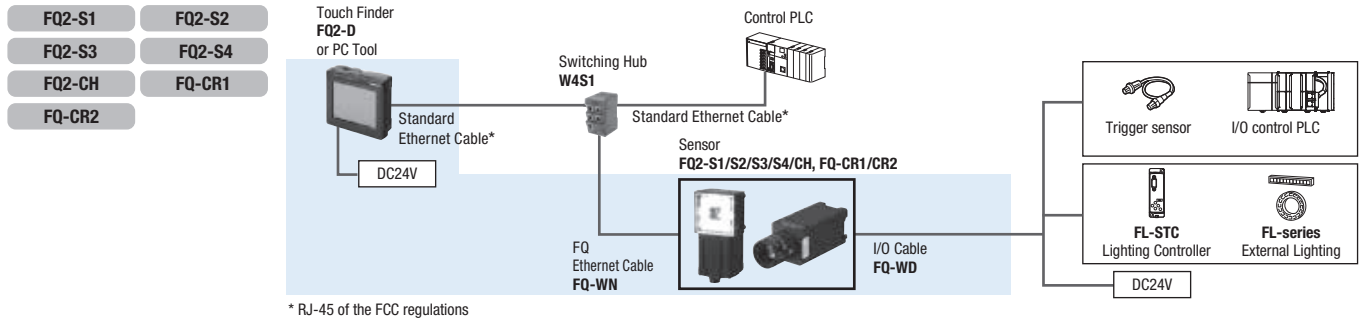
Various types of Sensors can be used at the same time.

However, I/O type and wiring method vary depending on the Sensor, so select the necessary devices.



Note: Note: If you register as a member after purchasing a Sensor, you can download free setup software that runs on a PC and can be used in place of Touch Finder. Refer to the member registration sheet for details.

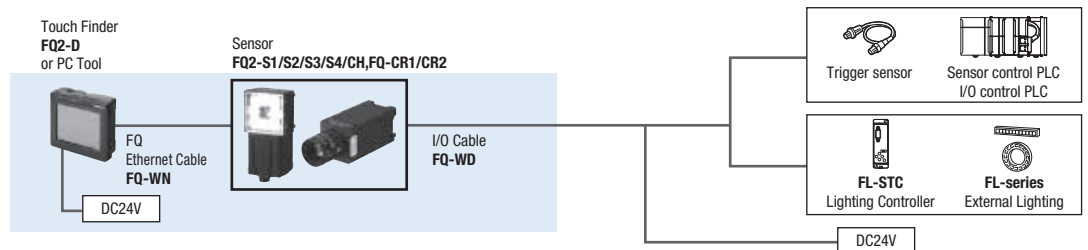
Ethernet (EtherNet/IP, No-protocol, or PLC Link) Connection



Parallel Interface Connection

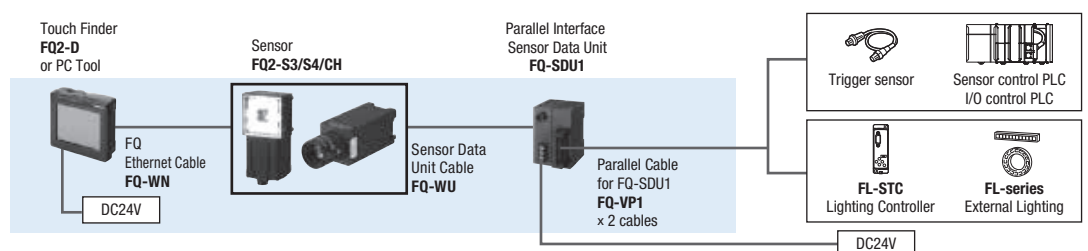
■ Connection with Standard Parallel Interface of the Sensor

- | | |
|--------|--------|
| FQ2-S1 | FQ2-S2 |
| FQ2-S3 | FQ2-S4 |
| FQ2-CH | FQ-CR1 |
| FQ-CR2 | |

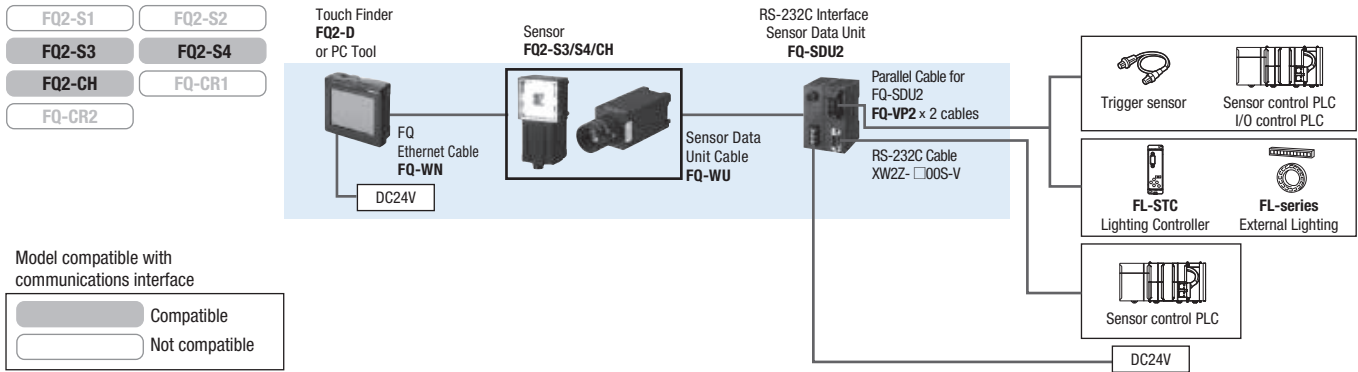


■ Connection through a Parallel Interface Sensor Data Unit

- | | |
|--------|--------|
| FQ2-S1 | FQ2-S2 |
| FQ2-S3 | FQ2-S4 |
| FQ2-CH | FQ-CR1 |
| FQ-CR2 | |



RS-232C Serial Connection



Ordering Information

Sensor

Inspection model

FQ2-S1 Series [Single-function Type]

Field of vision		Narrow View	Standard View	Wide View (Long-distance)	Wide View (Short-distance)
Number of pixels		350,000 pixels			
Color	NPN	FQ2-S10010F	FQ2-S10050F	FQ2-S10100F	FQ2-S10100N
	PNP	FQ2-S15010F	FQ2-S15050F	FQ2-S15100F	FQ2-S15100N
Field of vision/Installation distance		Refer to figure 1 on page 337.	Refer to figure 2 on page 337.	Refer to figure 3 on page 337.	Refer to figure 4 on page 337.

FQ2-S2 Series [Standard Type]

Field of vision		Narrow View	Standard View	Wide View (Long-distance)	Wide View (Short-distance)
Number of pixels		350,000 pixels			
Color	NPN	FQ2-S20010F	FQ2-S20050F	FQ2-S20100F	FQ2-S20100N
	PNP	FQ2-S25010F	FQ2-S25050F	FQ2-S25100F	FQ2-S25100N
Field of vision/Installation distance		Refer to figure 1 on page 337.	Refer to figure 2 on page 337.	Refer to figure 3 on page 337.	Refer to figure 4 on page 337.

FQ2-S3 Series [High-resolution Type]

Field of vision		Narrow View	Standard View	Wide View (Long-distance)	Wide View (Short-distance)	C-mount
Number of pixels		760,000 pixels				1.3 million pixels
Color	NPN	FQ2-S30010F-08	FQ2-S30050F-08	FQ2-S30100F-08	FQ2-S30100N-08	FQ2-S30-13
	PNP	FQ2-S35010F-08	FQ2-S35050F-08	FQ2-S350100F-08	FQ2-S35100N-08	FQ2-S35-13
Monochrome	NPN	FQ2-S30010F-08M	FQ2-S30050F-08M	FQ2-S30100F-08M	FQ2-S30100N-08M	FQ2-S30-13M
	PNP	FQ2-S35010F-08M	FQ2-S35050F-08M	FQ2-S35100F-08M	FQ2-S35100N-08M	FQ2-S35-13M
Field of vision/Installation distance		Refer to figure 5 on page 337.	Refer to figure 6 on page 337.	Refer to figure 7 on page 337.	Refer to figure 8 on page 337.	Refer to optical chart on p. 338

Inspection / ID model

FQ2-S4 Series [Standard Type]

Field of vision		Narrow View	Standard View	Wide View (Long-distance)	Wide View (Short-distance)
Number of pixels		350,000 pixels			
Color	NPN	FQ2-S40010F	FQ2-S40050F	FQ2-S40100F	FQ2-S40100N
	PNP	FQ2-S45010F	FQ2-S45050F	FQ2-S45100F	FQ2-S45100N
Monochrome	NPN	FQ2-S40010F-M	FQ2-S40050F-M	FQ2-S40100F-M	FQ2-S40100N-M
	PNP	FQ2-S45010F-M	FQ2-S45050F-M	FQ2-S45100F-M	FQ2-S45100N-M
Field of vision/Installation distance		Refer to figure 1 on page 337.	Refer to figure 2 on page 337.	Refer to figure 3 on page 337.	Refer to figure 4 on page 337.

[High-resolution Type]

Field of vision		Narrow View	Standard View	Wide View (Long-distance)	Wide View (Short-distance)	C-mount
Number of pixels		760,000 pixels				1.3 million pixels
Color	NPN	FQ2-S40010F-08	FQ2-S40050F-08	FQ2-S40100F-08	FQ2-S40100N-08	FQ2-S40-13
	PNP	FQ2-S45010F-08	FQ2-S45050F-08	FQ2-S45100F-08	FQ2-S45100N-08	FQ2-S45-13
Monochrome	NPN	FQ2-S40010F-08M	FQ2-S40050F-08M	FQ2-S40100F-08M	FQ2-S40100N-08M	FQ2-S40-13M
	PNP	FQ2-S45010F-08M	FQ2-S45050F-08M	FQ2-S45100F-08M	FQ2-S45100N-08M	FQ2-S45-13M
Field of vision/Installation distance		Refer to figure 5 on page 337.	Refer to figure 6 on page 337.	Refer to figure 7 on page 337.	Refer to figure 8 on page 337.	Refer to optical chart on p. 338

ID Model

FQ2-CH Series [Optical Character Recognition Sensor]

Field of vision		Narrow View	Standard View	Wide View (Long-distance)	Wide View (Short-distance)
Number of pixels		350,000 pixels			
Monochrome	NPN	FQ2-CH10010F-M	FQ2-CH10050F-M	FQ2-CH10100F-M	FQ2-CH10100N-M
	PNP	FQ2-CH15010F-M	FQ2-CH15050F-M	FQ2-CH15100F-M	FQ2-CH15100N-M
Field of vision/Installation distance		Refer to figure 1 on page 337.	Refer to figure 2 on page 337.	Refer to figure 3 on page 337.	Refer to figure 4 on page 337.

FQ-CR1 Series [Multi Code Reader]





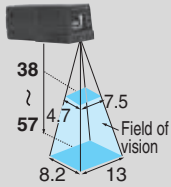
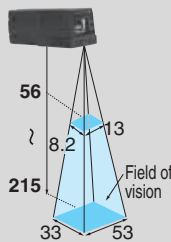
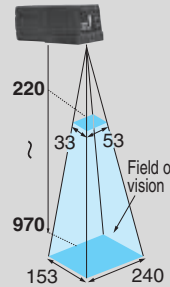
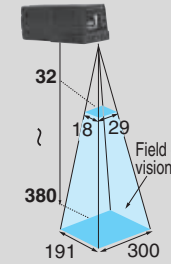
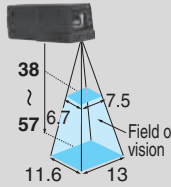
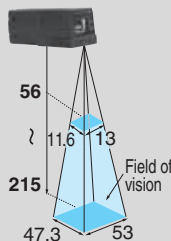
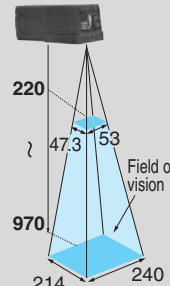
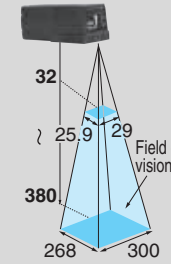
Field of vision		Narrow View	Standard View	Wide View (Long-distance)	Wide View (Short-distance)
Number of pixels		350,000 pixels			
Monochrome	NPN	FQ-CR10010F-M	FQ-CR10050F-M	FQ-CR10100F-M	FQ-CR10100N-M
	PNP	FQ-CR15010F-M	FQ-CR15050F-M	FQ-CR15100F-M	FQ-CR15100N-M
Field of vision/Installation distance		Refer to figure 1 on page 337.	Refer to figure 2 on page 337.	Refer to figure 3 on page 337.	Refer to figure 4 on page 337.

FQ-CR2 Series [2D Code Reader]

Field of vision		Narrow View	Standard View	Wide View (Long-distance)	Wide View (Short-distance)
Number of pixels		350,000 pixels			
Monochrome	NPN	FQ-CR20010F-M	FQ-CR20050F-M	FQ-CR20100F-M	FQ-CR20100N-M
	PNP	FQ-CR25010F-M	FQ-CR25050F-M	FQ-CR25100F-M	FQ-CR25100N-M
Field of vision/Installation distance		Refer to figure 1 on page 337.	Refer to figure 2 on page 337.	Refer to figure 3 on page 337.	Refer to figure 4 on page 337.

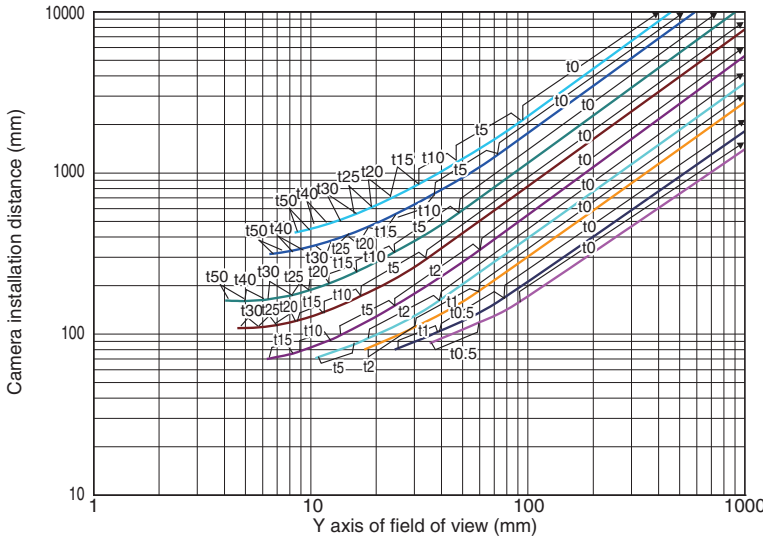
Field of vision/Installation distance

(Unit: mm)

Field of vision	Narrow View	Standard View	Wide View (Long-distance)	Wide View (Short-distance)
Appearance				
350,000 pixels type	<p>Figure 1</p> 	<p>Figure 2</p> 	<p>Figure 3</p> 	<p>Figure 4</p> 
760,000 pixels type	<p>Figure 5</p> 	<p>Figure 6</p> 	<p>Figure 7</p> 	<p>Figure 8</p> 

Optical Chart for C-mount Camera FQ2-S3□-13□/-S4□-13□

High-resolution, Low-distortion Lenses 3Z4S-LE SV-□□□□H



- 3Z4S-LE
- SV-0614H
 - SV-0814H
 - SV-1214H
 - SV-1614H
 - SV-2514H
 - SV-3514H
 - SV-5014H
 - SV-7525H
 - SV-10028H

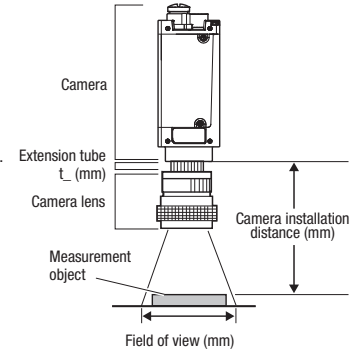
Extension tube

Examples
 t0: Extension tube is not required.
 t5: A 5-mm extension tube is required.

Meaning of Optical Chart

The X axis of the optical chart shows the field of vision (mm) (See Note.), and the Y axis of the optical chart shows the camera installation distance (mm).

Note: The lengths of the fields of vision given in the optical charts are the lengths of the Y axis.



Touch Finder

Type	Appearance	Model
DC power supply		FQ2-D30
AC/DC/battery		FQ2-D31

Cables

Type	Appearance	Cable length	Model
FQ Ethernet Cables (connect Sensor to Touch Finder, Sensor to PC)		2m	FQ-WN002
		5m	FQ-WN005
		10m	FQ-WN010
		20m	FQ-WN020
I/O Cables		2m	FQ-WD002
		5m	FQ-WD005
		10m	FQ-WD010
		20m	FQ-WD020

Sensor Data Unit (FQ2-S3/S4/CH only)

Type	Appearance	Output type	Model
Parallel Interface		NPN	FQ-SDU10
		PNP	FQ-SDU15
RS-232C Interface		NPN	FQ-SDU20
		PNP	FQ-SDU25

Cables for Sensor Data Unit

Type	Appearance	Cable length	Model
Sensor Data Unit Cable		2m	FQ-WU002
		5m	FQ-WU005
		10m	FQ-WU010
		20m	FQ-WU020
Parallel Cable for FQ-SDU1 ^{*1}		2m	FQ-VP1002
		5m	FQ-VP1005
		10m	FQ-VP1010
Parallel Cable for FQ-SDU2 ^{*1}		2m	FQ-VP2002
		5m	FQ-VP2005
		10m	FQ-VP2010
RS-232C Cable for FQ-SDU2 ^{*1}		2m	XW2Z-200S-V
		5m	XW2Z-500S-V

^{*1} When using FQ-SDU□□, 2 cables are required for all I/O signals.

External Lighting

Type	Model
3Z4S-LT Series	Refer to 3Z4S-LT/LE Series Catalog (Q164)
FL Series	Refer to FL Series Catalog (Q181)

Accessories

Application	Appearance	Name	Model
For Sensor		Mounting Bracket ^{*1}	FQ-XL
		Mounting Bracket	FQ-XL2
		Mounting Base for C-mount type ^{*2}	FQ-XLC
		Polarizing Filter Attachment ^{*1}	FQ-XF1
		Panel Mounting Adapter	FQ-XPM
For Touch Finder		AC Adapter (for AC/DC/battery model) ^{*3}	FQ-A□
		Battery (for AC/DC/battery model)	FQ-BAT1
		Touch Pen ^{*4}	FQ-XT
		Strap	FQ-XH
		SD Card (2 GB)	HMC-SD291

^{*1} Included with Integrated Sensor.



^{*2} Included with Sensor with C-mount.

^{*3} AC Adapters for Touch Finder with DC/AC/Battery Power Supply. Select the model for the country in which the Touch Finder will be used.

Plug Type	Voltage	Certified standards	Model
A	125 V max.	PSE	FQ-AC1
		UL/CSA	FQ-AC2
	250 V max.	CCC mark	FQ-AC3
C	250 V max.	—	FQ-AC4
BF	250 V max.	—	FQ-AC5
C	250 V max.	—	FQ-AC6






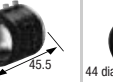



^{*4} Enclosed with Touch Finder.

Industrial Switching Hubs (Recommended)

Appearance	Number of ports	Failure detection	Current consumption	Model
	3	None	0.22 A	W4S1-03B
	5	None	0.22 A	W4S1-05B
		Supported		W4S1-05C

Lenses for C-mount Camera. Refer to optical chart on p. 338 for selection of a lens.

High-resolution, Low-distortion Lenses

Model	3Z4S-LE SV-0614H	3Z4S-LE SV-0814H	3Z4S-LE SV-1214H	3Z4S-LE SV-1614H	3Z4S-LE SV-2514H	3Z4S-LE SV-3514H	3Z4S-LE SV-5014H	3Z4S-LE SV-7525H	3Z4S-LE SV-10028H
Appearance									
Focal length	6 mm	8 mm	12 mm	16 mm	25 mm	35 mm	50 mm	75 mm	100 mm
Brightness	F1.4	F1.4	F1.4	F1.4	F1.4	F1.4	F1.4	F2.5	F2.8
Filter size	M40.5 P0.5	M35.5 P0.5	M27 P0.5	M27 P0.5	M27 P0.5	M35.5 P0.5	M40.5 P0.5	M34.0 P0.5	M37.5 P0.5

Extension Tubes

Model	3Z4S-LE SV-EXR
Contents	Set of 7 tubes (40 mm, 20 mm, 10 mm, 5 mm, 2.0 mm, 1.0 mm, and 0.5 mm) Maximum outer diameter: 30 mm dia.

Note: Do not use the 0.5-mm, 1.0-mm, and 2.0-mm Extension Tubes attached to each other. Since these Extension Tubes are placed over the threaded section of the Lens or other Extension Tube, the connection may loosen when more than one 0.5-mm, 1.0-mm or 2.0-mm Extension Tube are used together.

Note: Reinforcement is required to protect against vibration when Extension Tubes exceeding 30 mm are used.

Ratings and Performance

Sensor

Inspection Model FQ2-S1/S2/S3 Series

Item	Single-function type	Standard type	High-resolution type					
Model	NPN	FQ2-S10□□□□	FQ2-S20□□□□	FQ2-S30□□□□-08	FQ2-S30□□□□-08M	FQ2-S30-13	FQ2-S30-13M	
	PNP	FQ2-S15□□□□	FQ2-S25□□□□	FQ2-S35□□□□-08	FQ2-S35□□□□-08M	FQ2-S35-13	FQ2-S35-13M	
Field of view	Refer to Ordering Information on p.19. (Tolerance (field of vision): ±10% max.)					Select a lens according to the field of vision and installation distance. Refer to optical chart on p. 338.		
Installation distance								
Main functions	Inspection items	Search, shape search II, sensitive search, area, color data, edge position, edge pitch, edge width, and labeling						
	Number of simultaneous measurements	1	32					
	Position compensation	Supported (360° Model position compensation, Edge position compensation)						
	Number of registered scenes	8	32					
	Calibration	Supported						
Image input	Image processing method	Real color			Monochrome	Real color		Monochrome
	Image filter	High dynamic range (HDR), image adjustment (Color Gray Filter, Weak smoothing, Strong smoothing, Dilate, Erosion, Median, Extract edges, Extract horizontal edges, Extract vertical edges, Enhance edges, Background suppression), polarizing filter (attachment), and white balance (Sensors with Color Cameras only)						
	Image elements	1/3-inch color CMOS			1/2-inch color CMOS	1/2-inch Monochrome CMOS	1/2-inch color CMOS	1/2-inch Monochrome CMOS
	Shutter	Built-in lighting ON: 1/250 to 1/50,000 Built-in lighting OFF: 1/1 to 1/50,000			Built-in lighting ON: 1/250 to 1/60,000 Built-in lighting OFF: 1/1 to 1/60,000		1/1 to 1/60,000	
	Processing resolution	752 × 480			928 × 828		1280 × 1024	
	Partial input function	Supported horizontally only.			Supported horizontally and vertically			
	Lens mounts	-					C-mount	
Lighting	Lighting method	Pulse					-	
	Lighting color	White					-	
Data logging	Measurement data	In Sensor: 1,000 items (If a Touch Finder is used, results can be saved up to the capacity of an SD card.)						
	Images	In Sensor: 20 images (If a Touch Finder is used, images can be saved up to the capacity of an SD card.)						
Auxiliary function	Math (arithmetic, calculation functions, trigonometric functions, and logic functions)							
Measurement trigger	External trigger (single or continuous) Communications trigger (Ethernet TCP no-protocol, Ethernet FINS/TCP no-protocol, EtherNet/IP, or PLC Link)							

Item	Single-function type	Standard type	High-resolution type				
Model	NPN	FQ2-S10□□□□	FQ2-S20□□□□	FQ2-S30□□□□-08	FQ2-S30□□□□-08M	FQ2-S30-13	FQ2-S30-13M
	PNP	FQ2-S15□□□□	FQ2-S25□□□□	FQ2-S35□□□□-08	FQ2-S35□□□□-08M	FQ2-S35-13	FQ2-S35-13M
I/O specifications	Input signals	7 signals Single measurement input (TRIG) Control command input (INO to IN5)					
	Output signals	3 signals Control output (BUSY) Overall judgement output (OR) Error output (ERROR) The assignments of the three output signals (OUT0 to OUT2) can be changed to the individual judgements of the inspection items, the image input ready output (READY), or the external lighting timing output (STGOUT).					
	Ethernet specifications	100Base-TX/10Base-T					
	Communications	Ethernet TCP no-protocol, Ethernet FINS/TCP no-protocol, EtherNet/IP, or PLC Link					
	I/O expansion	–	–	Possible by connecting FQ-SDU1_ Sensor Data Unit. 11 inputs and 24 outputs			
	RS-232C	–	–	Possible by connecting FQ-SDU2_ Sensor Data Unit. 8 inputs and 7 outputs			
Ratings	Power supply voltage	21.6 to 26.4 VDC (including ripple)					
	Current consumption	2.4 A max.				0.3 A max.	
Environmental immunity	Ambient temperature range	Operating: 0 to 50°C Storage: –25 to 65°C (with no icing or condensation)			Operating: 0 to 40°C Storage: –25 to 65°C (with no icing or condensation)		
	Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)					
	Ambient atmosphere	No corrosive gas					
	Vibration resistance (destruction)	10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions 8 min each, 10 times					
	Shock resistance (destruction)	150 m/s ² 3 times each in 6 direction (up, down, right, left, forward, and backward)					
	Degree of protection	IEC 60529 IP67 (Except when Polarizing Filter Attachment is mounted or connector cap is removed.)				IEC 60529 IP40	
Materials	Sensor: PBT, PC, SUS Mounting Bracket: PBT Polarizing Filter Attachment: PBT, PC Ethernet connector: Oil-resistance vinyl compound I/O connector: Lead-free heat-resistant PVC				Cover: Zinc-plated steel, Thickness: 0.6 mm Case: Aluminum diecast alloy (ADC-12) Mounting base: Polycarbonate ABS		
Weight	Narrow View/Standard View: Approx. 160 g Wide View: Approx. 150 g				Approx. 160 g without base, Approx. 185 g with base		
Accessories included with sensor	Mounting Bracket (FQ-XL) (1) Polarizing Filter Attachment (FQ-XF1) (1) Instruction Manual, Quick Startup Guide Member Registration Sheet, Warning Label				Mounting Base (FQ-XLC) (1) Mounting Screw (M3 × 8mm) (4) Instruction Manual, Quick Startup Guide Member Registration Sheet		
LED class	Class 2 (Applicable standards: IEC 60825-1:1993 +A1:1997 +A2:2001, EN 60825-1:1994 +A1:2002 +A2:2001, and JIS C 6802:2005)						
Applicable standards	EN standard EN 61326 and EC Directive No.2004/104/EC			EN 61326-1:2006 and IEC 61010-1			

Inspection/ID Model FQ2-S4 Series

Item	Inspection/ID Model						
Model	NPN	FQ2-S40□□□□	FQ2-S40□□□□-M	FQ2-S40□□□□-08	FQ2-S40□□□□-08M	FQ2-S40□□□□-13	FQ2-S40□□□□-13M
	PNP	FQ2-S45□□□□	FQ2-S45□□□□-M	FQ2-S45□□□□-08	FQ2-S45□□□□-08M	FQ2-S45□□□□-13	FQ2-S45□□□□-13M
Field of view	Refer to Ordering Information on p.19. (Tolerance (field of vision): ±10% max.)					Select a lens according to the field of vision and installation distance. Refer to optical chart on p. 338.	
Installation distance							
Main functions	Inspection items	Search, shape search II, sensitive search, area, color data, edge position, edge pitch, edge width, labeling, OCR ¹ , Bar code ² , 2D-code ² , 2D-code (DMP) ³ , and Model dictionary					
	Number of simultaneous measurements	32					
	Position compensation	Supported (360° Model position compensation, Edge position compensation)					
	Number of registered scenes	32					
	Calibration	Supported					
	Retry function	Normal retry, Exposure retry, Scene retry, Trigger retry					
Image input	Image processing method	Real color	Monochrome	Real color	Monochrome	Real color	Monochrome
	Image filter	High dynamic range (HDR), image adjustment (Color Gray Filter, Weak smoothing, Strong smoothing, Dilate, Erosion, Median, Extract edges, Extract horizontal edges, Extract vertical edges, Enhance edges, Background suppression), polarizing filter (attachment), and white balance (Sensors with Color Cameras only)					
	Image elements	1/3-inch color CMOS	1/3-inch Monochrome CMOS	1/2-inch color CMOS	1/2-inch Monochrome CMOS	1/2-inch color CMOS	1/2-inch Monochrome CMOS
	Shutter	Built-in lighting ON: 1/250 to 1/50,000 Built-in lighting OFF: 1/1 to 1/50,000		Built-in lighting ON: 1/250 to 1/60,000 Built-in lighting OFF: 1/1 to 1/60,000		1/1 to 1/60,000	
	Processing resolution	752 × 480		928 × 828		1280 × 1024	
	Partial input function	Supported horizontally only.		Supported horizontally and vertically			
	Lens mounts	–					C-mount
Lighting	Lighting method	Pulse					
	Lighting color	White					

Item		Inspection/ID Model					
Model	NPN	FQ2-S40□□□□	FQ2-S40□□□□-M	FQ2-S40□□□□-08	FQ2-S40□□□□-08M	FQ2-S40□□□□-13	FQ2-S40□□□□-13M
	PNP	FQ2-S45□□□□	FQ2-S45□□□□-M	FQ2-S45□□□□-08	FQ2-S45□□□□-08M	FQ2-S45□□□□-13	FQ2-S45□□□□-13M
Data logging	Measurement data	In Sensor: 1,000 items (If a Touch Finder is used, results can be saved up to the capacity of an SD card.)					
	Images	In Sensor: 20 images (If a Touch Finder is used, images can be saved up to the capacity of an SD card.)					
Auxiliary function		Math (arithmetic, calculation functions, trigonometric functions, and logic functions)					
Measurement trigger		External trigger (single or continuous) Communications trigger (Ethernet TCP no-protocol, Ethernet FINS/TCP no-protocol, EtherNet/IP, or PLC Link)					
I/O specifications	Input signals	7 signals Single measurement input (TRIG) Control command input (IN0 to IN5)					
	Output signals	3 signals Control output (BUSY) Overall judgement output (OR) Error output (ERROR) The assignments of the three output signals (OUT0 to OUT2) can be changed to the individual judgements of the inspection items, the image input ready output (READY), or the external lighting timing output (STGOUT).					
	Ethernet specifications	100Base-TX/10Base-T					
	Communications	Ethernet TCP no-protocol, Ethernet FINS/TCP no-protocol, EtherNet/IP, or PLC Link					
	I/O expansion	Possible by connecting FQ-SDU1_ Sensor Data Unit. 11 inputs and 24 outputs					
	RS-232C	Possible by connecting FQ-SDU2_ Sensor Data Unit. 8 inputs and 7 outputs					
Ratings	Power supply voltage	21.6 to 26.4 VDC (including ripple)					
	Current consumption	2.4 A max.				0.3 A max.	
Environmental immunity	Ambient temperature range	Operating: 0 to 40°C Storage: -25 to 65°C (with no icing or condensation)					
	Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)					
	Ambient atmosphere	No corrosive gas					
	Vibration resistance (destruction)	10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions 8 min each, 10 times					
	Shock resistance (destruction)	150 m/s ² 3 times each in 6 direction (up, down, right, left, forward, and backward)					
	Degree of protection	IEC 60529 IP67 (Except when Polarizing Filter Attachment is mounted or connector cap is removed.)				IEC 60529 IP40	
Materials		Sensor: PBT, PC, SUS Mounting Bracket: PBT Polarizing Filter Attachment: PBT, PC Ethernet connector: Oil-resistance vinyl compound I/O connector: Lead-free heat-resistant PVC				Cover: Zinc-plated steel, Thickness: 0.6 mm Case: Aluminum diecast alloy (ADC-12) Mounting base: Polycarbonate ABS	
Weight		Narrow View/Standard View: Approx. 160 g Wide View: Approx. 150 g				Approx. 160 g without base, Approx. 185 g with base	
Accessories included with sensor		Mounting Bracket (FQ-XL)(1) Polarizing Filter Attachment (FQ-XF1) (1) Instruction Manual, Quick Startup Guide Member Registration Sheet, Warning Label				Mounting Base (FQ-XLC) (1) Mounting Screw (M3 × 8mm)(4) Instruction Manual, Quick Startup Guide Member Registration Sheet	
LED class		Class 2 (Applicable standards: IEC 60825-1:1993 +A1:1997 +A2:2001, EN 60825-1:1994 +A1:2002 +A2:2001, and JIS C 6802:2005)				-	
Applicable standards		EN 61326-1:2006 and IEC 61010-1					

*1 The types of characters to be read are the same as those of FQ2-CH Optical Character Recognition Sensor.

*2 The types of codes to be read are the same as those of FQ-CR1 Multi Code Reader.

*3 The types of codes to be read are the same as those of FQ-CR2 2D Code Reader.

ID Model FQ2-CH, FQ-CR1/CR2 Series

Item		Optical Character Recognition Sensor	Multi Code Reader	2D Code Reader
Model	NPN	FQ2-CH10□□□□-M	FQ-CR10□□□□-M	FQ-CR20□□□□-M
	PNP	FQ2-CH15□□□□-M	FQ-CR15□□□□-M	FQ-CR25□□□□-M
Field of view		Refer to ordering information on page 336. (Tolerance (field of vision): ±10% max.)		
Installation distance				
Main functions	Inspection items	OCR · Alphabet A to Z · Number 0 to 9 · Symbol ' - . : / Model dictionary	2D Code (Data Matrix(EC200), QR Code, MicroQR Code, PDF417, MicroPDF417, GS1-Data Matrix) Bar Code (JAN/EAN/UPC, Code39, Codabar (NW-7), ITF (Interleaved 2 of 5), Code 93, Code128/ GS1-128, GS1 DataBar* (Truncated, Stacked, Omnidirectional, Stacked Omnidirectional, Limited, Expanded, Expanded Stacked), Pharmacode, GS1-128 Composite Code (CC-A, CC-B, CC-C)	2D Code (Data Matrix(EC200), QR Code)
	Image filter	Weak smoothing, Strong smoothing, Dilate, Erosion, Median, Extract edges, Extract horizontal edges, Extract vertical edges, Enhance edges, Background suppression	None	Filter function (Smooth, Dilate, Erosion, Median), Code Error Correction Position Display
	Verification function	Supported	Supported	None
	Retry function	Normal retry, Exposure retry, Scene retry, Trigger retry		
	Number of simultaneous measurements	32		
	Position compensation	Supported (360° Model position compensation, Edge position compensation)	None	
	Number of registered scenes	32		
Image input	Image processing method	Monochrome		
	Image filter	High dynamic range (HDR) and polarizing filter (attachment)		
	Image elements	1/3-inch Monochrome CMOS		
	Shutter	Built-in lighting ON: 1/250 to 1/50,000 Built-in lighting OFF: 1/1 to 1/50,000	1/250 to 1/30,000	1/250 to 1/32,258
	Processing resolution	752 × 480		
	Partial input function	Supported horizontally only.		
Lighting	Lighting method	Pulse		
	Lighting color	White		
Data logging	Measurement data	In Sensor: 1,000 items (If a Touch Finder is used, results can be saved up to the capacity of an SD card.)		
	Images	In Sensor: 20 images (If a Touch Finder is used, images can be saved up to the capacity of an SD card.)		
Auxiliary function		Math (arithmetic, calculation functions, trigonometric functions, and logic functions)		
Measurement trigger		External trigger (single or continuous) Communications trigger (Ethernet TCP no-protocol, Ethernet FINS/TCP no-protocol, EtherNet/IP, or PLC Link)	External trigger (single or continuous)	
I/O specifications	Input signals	7 signals Single measurement input (TRIG) Control command input (IN0 to IN5)		
	Output signals	3 signals Control output (BUSY) Overall judgement output (OR) Error output (ERROR) The assignments of the three output signals (OUT0 to OUT2) can be changed to the individual judgements of the inspection items, the image input ready output (READY), or the external lighting timing output (STGOUT).	3 signals Control output (BUSY) Overall judgement output (OR) Error output (ERROR) Note: The three output signals can be allocated for the judgements of individual inspection items.	
	Ethernet specifications	100Base-TX/10Base-T		
	Communications	Ethernet TCP no-protocol, Ethernet FINS/TCP no-protocol, EtherNet/IP, or PLC Link	-	
	I/O expansion	Possible by connecting FQ-SDU1_ Sensor Data Unit. 11 inputs and 24 outputs	-	
	RS-232C	Possible by connecting FQ-SDU2_ Sensor Data Unit. 8 inputs and 7 outputs	-	
Ratings	Power supply voltage	21.6 to 26.4 VDC (including ripple)		
	Current consumption	2.4 A max.		
Environmental immunity	Ambient temperature range	Operating: 0 to 40°C, Storage: -25 to 65°C (with no icing or condensation)	Operating: 0 to 50°C, Storage: -25 to 65°C (with no icing or condensation)	
	Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)		
	Ambient atmosphere	No corrosive gas		
	Vibration resistance (destruction)	10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions 8 min each, 10 times		
	Shock resistance (destruction)	150 m/s ² 3 times each in 6 direction (up, down, right, left, forward, and backward)		
	Degree of protection	IEC 60529 IP67 (Except when Polarizing Filter Attachment is mounted or connector cap is removed.)		

Item	Optical Character Recognition Sensor	Multi Code Reader	2D Code Reader
Model	NPN	FQ2-CH10□□□□-M	FQ-CR10□□□□-M
	PNP	FQ2-CH15□□□□-M	FQ-CR15□□□□-M
Materials	Sensor: PBT, PC, SUS, Mounting Bracket: PBT, Polarizing Filter Attachment: PBT, PC Ethernet connector: Oil-resistance vinyl compound, I/O connector: Lead-free heat-resistant PVC		
Weight	Narrow View/Standard View: Approx.160 g Wide View: Approx. 150 g		
Accessories included with sensor	Mounting Bracket (FQ-XL)(1), Polarizing Filter Attachment (FQ-XF1) (1), Instruction Manual, Quick Startup Guide, Member Registration Sheet, Warning Label		
LED class	Class 2(Applicable standards: IEC 60825-1:1993 +A1:1997 +A2:2001,EN 60825-1:1994 +A1:2002 +A2:2001, and JIS C 6802:2005)		
Applicable standards	EN 61326-1:2006 and IEC61010-1		

Touch Finder

Item	Type	Model with DC power supply		Model with AC/DC/battery power supply	
		Model	FQ2-D30	Model	FQ2-D31
Number of connectable Sensor		Number of sensors that can be recognized (switched): 32 max. number or sensor that can displayed on monitor: 8 max.			
Main functions	Types of measurement displays	Last result display, Last NG display, trend monitor, histograms			
	Types of display images	Through, frozen, zoom-in, and zoom-out images			
	Data logging	Measurement results, measured images			
	Menu language	English, German, French, Italian, Spanish, Traditional Chinese, Simplified Chinese, Korean, Japanese			
Indications	LCD	Display device	3.5-inch TFT color LCD		
		Pixels	320 × 240		
		Display colors	16.7 million		
	Backlight	Life expectancy ^{*1}	50,000 hours at 25°C		
		Brightness adjustment	Provided		
Screen saver		Provided			
Operation interface	Touch screen	Method	Resistance film		
		Life expectancy ^{*2}	1,000,000 touch operations		
External interface	Ethernet	100BASE-TX/10BASE-T			
	SD card	SDHC-compliant, Class 4 or higher recommended			
Ratings	Power supply voltage	DC power connection: 21.6 to 26.4 VDC (including ripple)	DC power connection: 21.6 to 26.4 VDC (including ripple) AC adapter (manufactured by Sino-American Japan Co., Ltd) connection: 100 to 240 VAC, 50/60 Hz Battery connection: FQ-BAT1 Battery (1cell, 3.7 V)		
	Continuous operation on Battery ^{*3}	–	1.5 h		
	Power consumption	DC power connection: 0.2 A max.	DC power connection: 0.2 A max. Charging battery: 0.4 A max.		
Environmental immunity	Ambient temperature range	Operating: 0 to 50°C Storage: -25 to 65°C (with no icing or condensation)	Operating: 0 to 50°C when mounted to DIN Track or panel Operation on Battery: 0 to 40°C:-25 to 65°C (with no icing or condensation)		
	Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)			
	Ambient atmosphere	No corrosive gas			
	Vibration resistance (destruction)	10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions 8 min each, 10 times			
	Shock resistance (destruction)	150 m/s ² 3 times each in 6 direction (up, down, right, left, forward, and backward)			
	Degree of protection	IEC 60529 IP20 (when SD card cover, connector cap, or harness is attached)			
Weight	Approx. 270 g (without Battery and hand strap attached)				
Materials	Case: ABS				
Accessories included with Touch Finder	Touch Pen (FQ-XT), Instruction Manual				

^{*1} This is a guideline for the time required for the brightness to diminish to half the initial brightness at room temperature and humidity. The life of the backlight is greatly affected by the ambient temperature and humidity and will be shorter at lower or higher temperatures.

^{*2} This value is only a guideline. No guarantee is implied. The value will be affected by operating conditions.

^{*3} This value is only a guideline. No guarantee is implied. The value will be affected by the operating environment and operating conditions.

Sensor Data Units(FQ2-S3/S4/CH only)

Item		Parallel Interface	RS-232C Interface
Model	NPN	FQ-SDU10	FQ-SDU20
	PNP	FQ-SDU15	FQ-SDU25
I/O specifications	Parallel I/O	Connector 1	16 outputs (D0 to D15)
		Connector 2	11 inputs (TRIG, RESET, IN0 to IN7, and DSA) 8 outputs (GATE, ACK, RUN, BUSY, OR, ERROR, STGOUT, and SHTOUT)
	RS-232C	–	6 inputs (IN0 to IN5)
	Sensor interface	FQ2-S3 connected with FQ-WU□□□□: OMRON interface *Number of connected Sensors: 1	
Ratings	Power supply voltage	21.6 to 26.4 VDC (including ripple)	
	Insulation resistance	Between all DC external terminals and case: 0.5 MΩ min (at 250 VDC)	
	Current consumption	2.5 A max.: FQ2-S□□□□□□□□-□□□□ and FQ-SDU□□□ 0.4 A max.: FQ2-S3□□-□□□□ and FQ-SDU□□□ 0.1 A max.: FQ-SDU□□□□ only	
Environmental immunity	Ambient temperature range	Operating: 0 to 50°C, Storage: -20 to 65°C (with no icing or condensation)	
	Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)	
	Ambient atmosphere	No corrosive gas	
	Vibration resistance (destruction)	10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions, 8 min each, 10 times	
	Shock resistance (destruction)	150 m/s ² 3 times each in 6 directions (up, down, right, left, forward, and backward)	
	Degree of protection	IEC 60529 IP20	
Materials	Case: PC + ABS, PC		
Weight	Approx. 150 g		
Accessories included with Sensor Data Unit	Instruction Manual		

Battery

Item	Model	FQ-BAT1
Battery type		Secondary lithium ion battery
Nominal capacity		1,800 mAh
Rated voltage		3.7 V
Ambient temperature range		Operating: 0 to 40°C Storage: -25 to 65°C (with no icing or condensation)
Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)
Charging method		Charged in Touch Finder (FQ2-D31). AC adapter (FQ-AC□□) is required.
Charging time* ¹		2 h
Usage time* ¹		1.5 h
Battery backup life* ²		300 charging cycles
Weight		50 g max.

*¹ This value is only a guideline. No guarantee is implied. The value will be affected by operating conditions

*² This is a guideline for the time required for the capacity of the Battery to be reduced to 60% of the initial capacity. No guarantee is implied. The value will be affected by the operating environment and operating conditions.

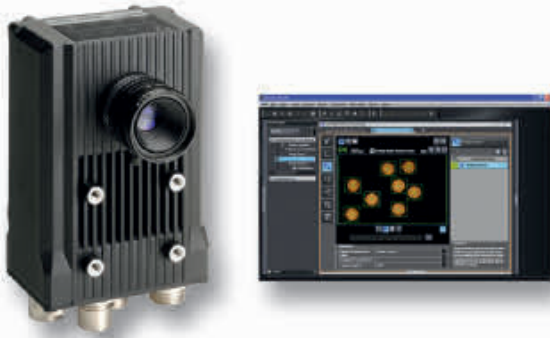
System Requirements for PC tool for FQ

The following Personal Computer system is required to use the software.

OS	Microsoft Windows XP Home Edition/Professional SP2 or higher (32-bit version) Microsoft Windows 7 Home Premium or higher (32-bit/64-bit version)
CPU	Core 2 Duo 1.06 GHz or the equivalent or higher
RAM	1GB min.
HDD	500 MB min. available space* ¹
Monitor	1,024 × 768 dots min.

*¹ Available space is also required separately for data logging.

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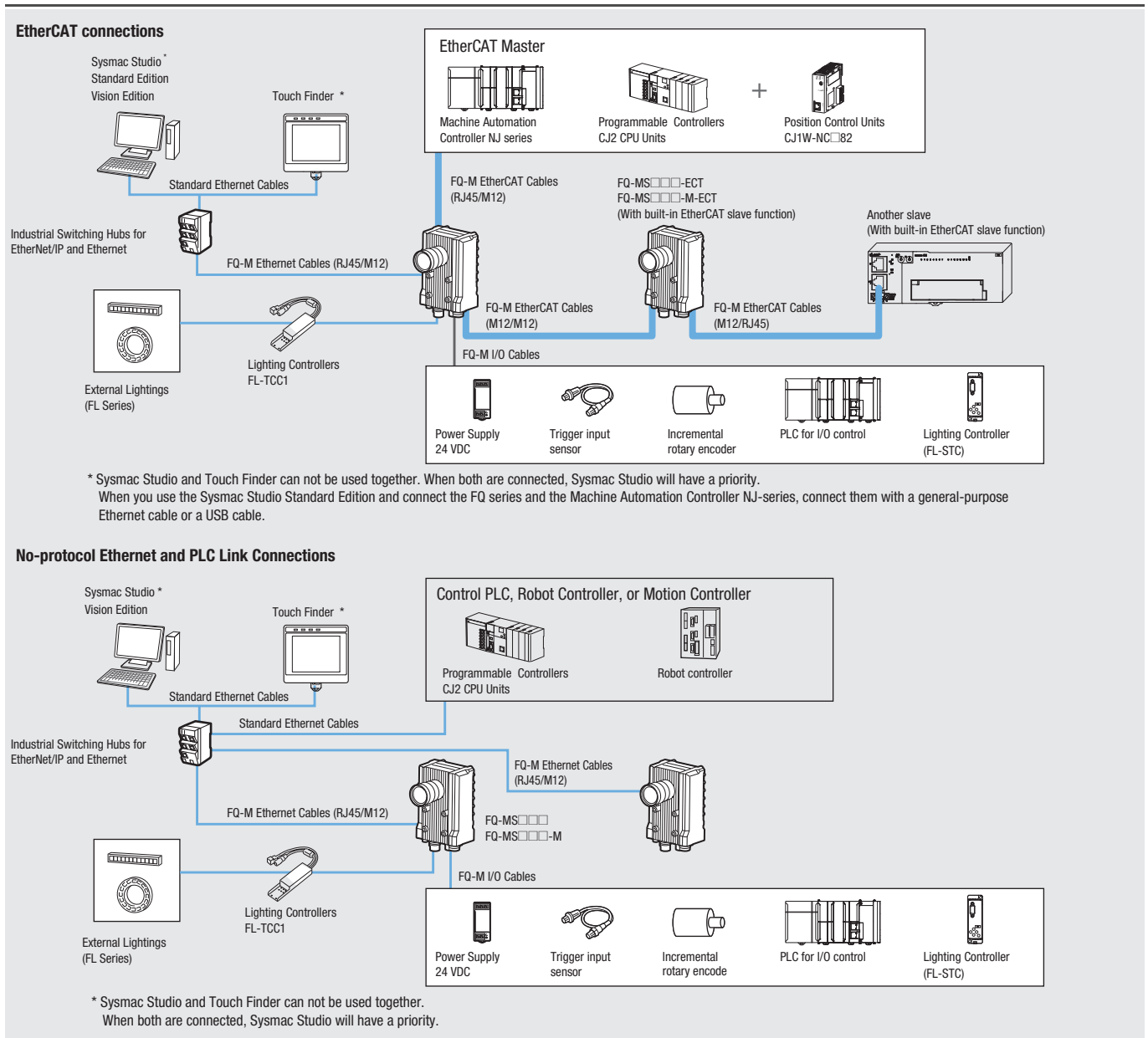
FQ-M Vision sensor

The new FQ-M series is a vision sensor designed specifically for Pick & Place applications. It comes with EtherCAT embedded and can be integrated easily into any environment. The FQ-M is compact, fast and includes an incremental encoder input for easy tracking calibration. Omron's Sysmac Studio software is the perfect tool for configuring the FQ-M and is complemented by the TouchFinder console for on-site monitoring.

Designed for motion tracking

- Made specifically for pick & place applications
- Connectivity with EtherCAT/Ethernet
- Encoder input for conveyor tracking and calibration
- Contour based object detection
- Smart calibration wizard
- Sysmac Studio software for vision system operation and setting

System configuration




Note: 1. EtherCAT and Ethernet (PLC Link) can not be used simultaneously.
 2. It is not possible to configure and adjust the FQ-M via an NJ-series controller, when they are connected via an EtherCAT network. For configuration and adjustment of FQ-M, connect the FQ-M and a computer or a Touch Finder via an Ethernet network.

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Ordering Information

Sensors

Appearance	Type			Model	
	Color	NPN	EtherCAT communication function not provided	FQ-MS120	
		PNP		FQ-MS125	
	Monochrome	NPN		FQ-MS120-M	
		PNP		FQ-MS125-M	
	Color	NPN		EtherCAT communication function provided	FQ-MS120-ECT
		PNP			FQ-MS125-ECT
	Monochrome	NPN			FQ-MS120-M-ECT
		PNP			FQ-MS125-M-ECT

Automation Software Sysmac Studio


Please purchase a DVD and required number of licenses the first time you purchase the Sysmac Studio. DVDs and licenses are available individually. Each model of licenses does not include any DVD.

Product name	Specifications			Model	Standards
		Number of licenses	Media		
Sysmac Studio Standard Edition Ver.1.□□^{*1}	The Sysmac Studio provides an integrated development environment to set up, program, debug, and maintain NJ-series Controllers and other Machine Automation Controllers, as well as EtherCAT slaves. Sysmac Studio runs on the following OS. Windows XP (Service Pack 3 or higher, 32-bit version) / Vista (32-bit version)/7 (32-bit/64-bit version)	– (Media only)	DVD	SYSMAC-SE200D	–
		1 license ^{*2}	–	SYSMAC-SE201L	–
Sysmac Studio Vision Edition Ver.1.□□	Sysmac Studio Vision Edition is a limited license that provides selected functions required for Vision Sensor FQ-M settings. Because this product is a license only, you need the Sysmac Studio Standard Edition DVD media to install it.	1 license	–	SYSMAC-VE001L	–

^{*1} The FQ-M series is supported by Sysmac Studio version 1.01 or higher.

^{*2} Multi licenses are available for the Sysmac Studio (3, 10, 30, or 50 licenses).

Touch Finder







Appearance	Type	Model
	DC power supply	FQ-MD30
	AC/DC/battery ^{*1}	FQ-MD31

^{*1} AC Adapter and Battery are sold separately.

Bend resistant Cables for FQ-M Series

Appearance	Type	Model
	For EtherCAT and Ethernet cable Angle: M12/ Straight: RJ45	Cable length: 5 m FQ-MWNL005
		Cable length: 10 m FQ-MWNL010
	For EtherCAT and Ethernet cable Straight type (M12/RJ45)	Cable length: 5m FQ-WN005-E
		Cable length: 10 m FQ-WN010-E
	For EtherCAT cable Angle type (M12/M12)	Cable length: 5 m FQ-MWNE005
		Cable length: 10 m FQ-MWNE010
	For EtherCAT cable Straight type (M12/M12)	Cable length: 5m FQ-MWNE005
		Cable length: 10 m FQ-MWNE010
	I/O Cables Angle type	Cable length: 5 m FQ-MWDL005
		Cable length: 10 m FQ-MWDL010
	I/O Cables Straight type	Cable length: 5 m FQ-MWD005
		Cable length: 10 m FQ-MWD010



Accessories

Appearance	Type		Model
	For Touch Finder	Panel Mounting Adapter	FQ-XPM
		AC Adapter (for models for DC/AC/Battery)	FQ-AC□ ^{*1}
		Battery (for models for DC/AC/Battery)	FQ-BAT1
		Touch Pen (enclosed with Touch Finder)	FQ-XT
		Strap	FQ-XH
		SD Card (2 GB)	HMC-SD291

*1 AC Adapters for Touch Finder with DC/AC/Battery Power Supply. Select the model for the country in which the Touch Finder will be used.



Plug type	Voltage	Certified standards	Model
A	125 V max.	PSE	FQ-AC1
		UL/CSA	FQ-AC2
	250 V max.	CCC mark	FQ-AC3
C	250 V max.	–	FQ-AC4
BF	250 V max.	–	FQ-AC5
O	250 V max.	–	FQ-AC6

Industrial Switching Hubs for EtherNet/IP and Ethernet

Appearance	Number of ports	Failure detection	Current consumption	Model
	3	None	0.22 A	W4S1-03B
	5	None	0.22 A	W4S1-05B
		Supported		W4S1-05C

Note: Industrial switching hubs are cannot be used for EtherCAT.

EtherCAT junction slaves

Appearance	Number of ports	Power supply voltage	Current consumption	Model
	3	20.4 to 28.8 VDC (24 VDC -15 to 20%)	0.08 A	GX-JC03
	6		0.17 A	GX-JC06

Note: 1. Please do not connect EtherCAT junction slave with OMRON position control unit, Model CJ1W-NC□81/□82.
2. EtherCAT junction slaves cannot be used for EtherNet/IP and Ethernet.

Cameras peripheral devices

Type	Model	
Cameras peripheral devices	CCTV Lenses	3Z4S-LE Series
External Lightings		FL Series
Lighting Controllers	For FL Series	FL-TCC1

Specifications

Sensors

Item	Type	EtherCAT communication function not provided		EtherCAT communication function provided	
		Color	Monochrome	Color	Monochrome
Model	NPN	FQ-MS120	FQ-MS120-M	FQ-MS120-ECT	FQ-MS120-M-ECT
	PNP	FQ-MS125	FQ-MS125-M	FQ-MS125-ECT	FQ-MS125-M-ECT
Field of vision, Installation distance		Selecting a lens according to the field of vision and installation distance.			
Main functions	Inspection items	Shape search, Search, Labeling, Edge position			
	Number of simultaneous inspections	32			
	Number of registered scenes	32			
Image input	Image processing method	Real color	Monochrome	Real color	Monochrome
	Image elements	1/3-inch color CMOS	1/3-inch monochrome CMOS	1/3-inch color CMOS	1/3-inch monochrome CMOS
	Image filter	High dynamic range (HDR) and white balance	High dynamic range (HDR)	High dynamic range (HDR) and white balance	High dynamic range (HDR)
	Shutter	Electronic shutter; select shutter speeds from 1/10 to 1/30000 (sec)			
	Processing resolution	752 (H) × 480 (V)			
	Pixel size	6.0 (μm) × 6.0 (μm)			
	Frame rate (image read time)	60 fps (16.7 ms)			
External Lightings	Connecting method	Connection via a strobe light controller			
	Connectable lighting	FL series			
Data logging	Measurement data	In Sensor: Max. 32000 items ^{*1}			
	Images	In Sensor: 20 images ^{*1}			
Measurement trigger	I/O trigger, Encoder trigger, Communications trigger (Ethernet No-protocol, PLC Link, or EtherCAT)				
I/O specifications	Input signals	9 signals Single measurement input (TRIG) Error clear input (IN0) Encoder counter reset input (IN1) Encoder input (A±, B±, Z±) ^{*2}			
	Output signals	5 signals ^{*3} OUT0 Overall judgement output (OR) OUT1 Control output (BUSY) OUT2 Error output (ERROR) OUT3 (Shutter output: SHTOUT) OUT4 (Strobe trigger output: STGOUT)			
	Ethernet specifications	100BASE-TX/10BASE-TX			
	EtherCAT specifications	– Dedicated protocol for EtherCAT 100BASE-TX			
	Connection method	Special connector cables Power supply and I/O: 1 special connector I/O cable Touch Finder, Computer and Ethernet: 1 Ethernet cable EtherCAT: 2 EtherCAT cable			
LED display		OR: Judgment result indicator ERR: Error indicator BUSY: BUSY indicator ETN: Ethernet communications indicator			
	EtherCAT display	–		L/A IN (Link/Activity IN) × 1 L/A OUT (Link/Activity OUT) × 1 RUN × 1 ERR × 1	
Ratings	Power supply voltage	21.6 to 26.4 VDC (including ripple)			
	Insulation resistance	Between all lead wires and case: 0.5 M Ω (at 250 V)			
	Current consumption	450mA max. (When the FL-series Strobe controller and lighting are used.) 250mA max. (When external lighting is not used.)			
Environmental immunity	Ambient temperature range	Operating: 0 to 50 °C, Storage: -20 to 65 °C (with no icing or condensation)			
	Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)			
	Ambient atmosphere	No corrosive gas			
	Vibration resistance (destruction)	10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions, 8 min each, 10 times			
	Shock resistance (destruction)	150 m/s ² 3 times each in 6 direction (up, down, right, left, forward, and backward)			
	Degree of protection	IEC60529 IP40			
Materials	Case: aluminium die casting, Rear cover: aluminium plate				
Weight	Approx. 390 g (Sensor only)			Approx. 480 g (Sensor only)	
Accessories	Instruction Manual				

*1 If a Touch Finder is used, results can be saved up to the capacity of an SD card.

*2 Encoder input specifications.

*3 The five output signals can be allocated for the judgements of individual inspection items.

Pulse input Specifications (When an open collector type encoder is used.)

Item	Specification		
Input voltage	24 VDC ±10%	12 VDC ±10%	5 VDC ±5%
Input current	4.8 mA (at 24 VDC, typical value)	2.4 mA (at 12 VDC, typical value)	1.0 mA (at 5 VDC, typical value)
NPN	ON voltage*1	4.8 V max.	2.4 V max.
	OFF voltage*2	19.2 V min.	9.6 V min.
PNP	ON voltage*1	19.2 V min.	9.6 V min.
	OFF voltage*2	4.8 V max.	2.4 V max.
Maximum response frequency*3	50 kHz (I/O cable: when the FQ-MWD005 or FQ-MWDL005 cables is used.) 20 kHz (I/O cable: when the FQ-MWD010 or FQ-MWDL010 cables is used.)		
Input impedance	5.1 k		

*1 ON voltage: Voltage to change from OFF to ON state. The ON voltage is the difference of voltages between the GND terminal of the encoder power terminals and each input terminal.

*2 OFF voltage: Voltage to change from ON to OFF state. The ON voltage is the difference of voltages between the GND terminal of the encoder power terminals and each input terminal.

*3 Select maximum response frequency depending on length of the encoder cable and response frequency of the encoder.

Pulse input Specifications (When a line-driver output type encoder is used.)

Item	Specification
Input voltage	EIA standard RS-422-A line driver level
Input impedance*1	120 ±5%
Differential input voltage	0.2 V min.
Hysteresis voltage	50 mV
Maximum response frequency*2	200 kHz (I/O cable: when the FQ-MWD005, FQ-MWDL005, FQ-MWD010, or FQ-MWDL010 cables is used.)

*1 When terminating resistance function is used.

*2 Select maximum response frequency depending on length of the encoder cable and response frequency of the encoder.

Touch Finder

Item	Type	Model with DC power supply	Model with AC/DC/battery power supply	
Model		FQ-MD30	FQ-MD31	
Number of connectable Sensors		2 max.		
Main functions	Types of measurement displays	Last result display, Last NG display, trend monitor, histograms		
	Types of display images	Through, frozen, zoom-in, and zoom-out images		
	Data logging	Measurement results, measured images		
	Menu language	English, Japanese		
Indications	LCD	Display device	3.5-inch TFT color LCD	
		Pixels	320 × 240	
		Display colors	16,777,216	
	Backlight	Life expectancy ^{*1}	50,000 hours at 25°C	
		Brightness adjustment	Provided	
		Screen saver	Provided	
	Indicators	Power indicator (color: green)	POWER	
		Error indicator (color: red)	ERROR	
		SD card access indicator (color: yellow)	SD ACCESS	
		Charge indicator (color: orange)	–	CHARGE
Operation interface	Touch screen	Method	Resistance film	
		Life expectancy ^{*2}	1,000,000 operations	
External interface	Ethernet	100 BASE-TX/10 BASE-T		
	SD card	Omron SD card (Model: HMC-SD291) or a SDHC card of Class4 or higher rating is recommended.		
Ratings	Power supply voltage	DC power connection	20.4 to 26.4 VDC (including ripple)	
		AC adapter connection	–	
		Battery connection	–	
	Continuous operation on Battery ^{*3}	–	100 to 240 VAC, 50/60 Hz	
	Current consumption	–	FQ-BAT1 Battery (1 cell, 3.7 V)	
Insulation resistance	–	1.5 h		
Environmental immunity	Ambient temperature range	Operating: 0 to 50°C Storage: -25 to 65°C (with no icing or condensation)	Operating: 0 to 50°C when mounted to DIN Track or panel 0 to 40°C when operated on a Battery Storage: -25 to 65°C (with no icing or condensation)	
	Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)		
Environmental immunity	Ambient atmosphere	No corrosive gas		
	Vibration resistance (destruction)	10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions 8 min each, 10 times		
	Shock resistance (destruction)	150 m/s ² 3 times each in 6 direction (up, down, right, left, forward, and backward)		
	Degree of protection	IEC 60529 IP20		
Dimensions		95 × 85 × 33 mm		
Materials		Case: ABS		
Weight		Approx. 270 g (without Battery and hand strap)		
Accessories		Touch Pen (FQ-XT), Instruction Manual		

^{*1} This is a guideline for the time required for the brightness to diminish to half the initial brightness at room temperature and humidity. No guarantee is implied. The life of the backlight is greatly affected by the ambient temperature and humidity. It will be shorter at lower or higher temperatures.

^{*2} This value is only a guideline. No guarantee is implied. The value will be affected by operating conditions.

^{*3} This value is only a guideline. No guarantee is implied. The value will be affected by the operating environment and operating conditions.

Battery Specifications

Item	Model	FQ-BAT1
Battery type		Secondary lithium ion battery
Nominal capacity		1800 mAh
Rated voltage		3.7 V
Dimensions		35.3 × 53.1 × 11.4 mm
Ambient temperature range		Operating: 0 to 40°C Storage: -25 to 65°C (with no icing or condensation)
Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)
Charging method		Charged in Touch Finder (FQ-MD31). AC adapter (FQ-AC□) is required.
Charging time ^{*1}		2.0 h
Battery backup life ^{*2}		300 charging cycles
Weight		50 g max.

^{*1} This value is only a guideline. No guarantee is implied. The value will be affected by operating conditions.

^{*2} This is a guideline for the time required for the capacity of the Battery to be reduced to 60% of the initial capacity. No guarantee is implied. The value will be affected by the operating environment and operating conditions.

Sysmac Studio

Item	Requirement
Operating system (OS) ^{*1, *2} Japanese or English system	Windows XP (Service Pack 3 or higher, 32-bit version) / Vista (32-bit version) / 7 (32-bit/64-bit version)
CPU	Windows computers with Celeron 540 (1.8 GHz) or faster CPU. Core i5 M520 (2.4 GHz) or equivalent or faster recommended
Main memory	2GB min.
Hard disk	At least 1.6 GB of available space ^{*3}
Display	XGA 1024 × 768, 1600 million colors. WXGA 1280 × 800 min. recommended
Disk drive	DVD-ROM drive
Communications ports	USB port corresponded to USB 2.0, or Ethernet port

^{*1} Sysmac Studio Operating System Precaution:
System requirements and hard disk space may vary with the system environment.

^{*2} The following restrictions apply when Sysmac Studio is used with Microsoft Windows Vista or Windows 7.

Some Help files cannot be accessed.

The Help files can be accessed if the Help program distributed by Microsoft for Windows (WinHlp32.exe) is installed. Refer to the Microsoft homepage listed below or contact Microsoft for details on installing the file. (The download page is automatically displayed if the Help files are opened while the user is connected to the Internet.)

<http://support.microsoft.com/kb/917607/en-us>

^{*3} To use the file logging function, additional memory area to save the logging data is necessary.

FQ-M Series EtherCAT Communications Specifications

Item	Specifications
Communications standard	IEC 61158 Type12
Physical layer	100BASE-TX (IEEE802.3)
Connector	M12 × 2 E-CAT IN: EtherCAT (IN) E-CAT OUT: EtherCAT (OUT)
Communications media	Use the cables for FQ-MWN□□, or FQ-WN□□ series.
Communications distance	Use the communication cable within the length of FQ-MWN□□ or FQ-WN□□ series cables.
Process data	Variable PDO Mapping
Mailbox (CoE)	Emergency messages, SDO requests, SDO responses, and SDO information
Distributed clock	Synchronization with DC mode 1
LED display	L/A IN (Link/Activity IN) × 1, L/A OUT (Link/Activity OUT) × 1, RUN × 1, ERR × 1

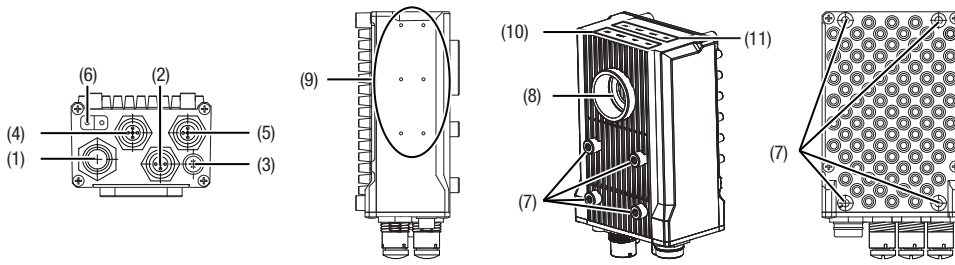
Version Information

FQ-M Series and Programming Devices

FQ-M Series	Required Programming Device	
	Sysmac Studio Standard Edition/Vision Edition	
	Ver.1.00	Ver.1.01 or higher
FQ-MS□□□(-M)	Not supported	Supported
FQ-MS□□□(-M)-ECT		

Components and Functions

Sensor

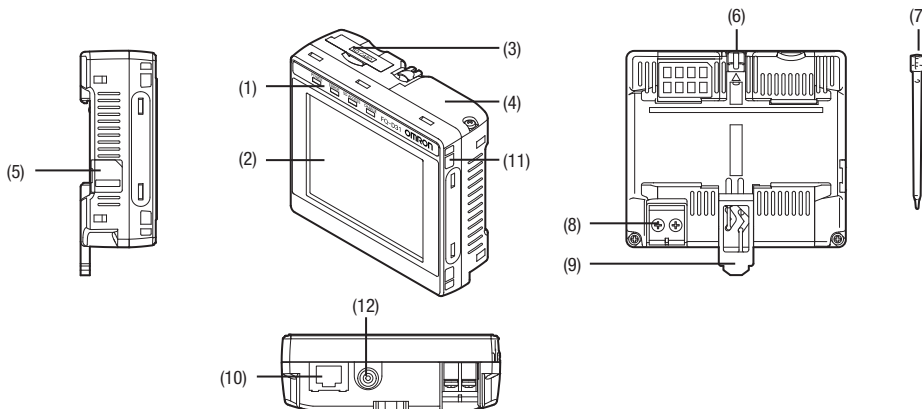


No.	Name	Description
(1)	I/O Cable connector	An I/O Cable is used to connect the Sensor to the power supply and external I/O.
(2)	Ethernet connector	An Ethernet cable is used to connect the Sensor to external devices such as PLCs, the Touch Finder, or computers.
(3)	Lighting connector	Connect an external lighting (strobe controller).
(4)	EtherCAT connector (IN) ^{*1}	Connect an EtherCAT compatible device.
(5)	EtherCAT connector (OUT) ^{*1}	Connect an EtherCAT compatible device.
(6)	Node address switch ^{*1}	Set the node address for EtherCAT communications.
(7)	Installation holes	Holes to install and secure the camera.
(8)	C-mount lens connection part	Install the C-mount lens in this part. Determine the field of view depending on the measurement target and select a suitable CCTV lens (C-mounting lens).

No.	Name	Description	
(9)	Strobe controller connection holes	Install the strobe controller in this part. FL-TCC1 can be mounted.	
(10)	Measurement process Operation indicators	OR	Lit in orange while OR signal is ON.
		ETN	Lit in orange while in Ethernet communications.
		ERROR	Lit in red when an error occurs.
(11)	EtherCAT Operation indicators	BUSY	Lit in green while the sensor is processing.
		L/A IN	Lit in green when Link with EtherCAT device is established and flickers in green when communicating (data IN).
		L/A OUT	Lit in green when Link with EtherCAT device is established and flickers in green when communicating (data OUT).
		ECAT RUN	Lit in green when EtherCAT communication is available.
		ECAT ERROR	Lit in red when an EtherCAT communications error occurs.

^{*1} FQ-MS□□□-ECT and FQ-MS□□□-M-ECT only.

Touch Finder



No.	Name	Description	
(1)	Operation indicators	POWER	Lights green when the Touch Finder is turned ON.
		ERROR	Lights red when an error occurs.
		SD ACCESS	Lights yellow when an SD card is inserted. Flashes yellow when the SD card is being accessed.
		CHARGE ^{*1}	Lights orange when the Battery is charging.
(2)	LCD/touch panel	Displays the setting menu, measurement results, and images input by the camera.	
(3)	SD card slot	An SD card can be inserted.	
(4)	Battery cover [*]	The Battery is inserted behind this cover. Remove the cover when mounting or removing the Battery.	
(5)	Power supply switch	The Battery is inserted behind this cover. Remove the cover when mounting or removing the Battery.	

No.	Name	Description
(6)	Touch pen holder	The touch pen can be stored here when it is not being used.
(7)	Touch pen	Used to operate the touch panel.
(8)	DC power supply connector	Used to connect a DC power supply.
(9)	Slider	Used to mount the Touch Finder to a DIN Track.
(10)	Ethernet port	Used when connecting the Touch Finder to the Sensor with an Ethernet cable. Insert the connector until it locks in place.
(11)	Strap holder	This is a holder for attaching the strap.
(12)	AC power supply connector ^{*1}	Used to connect the AC adapter.

^{*1} Applicable to the FQ-MD31 only.

^{*1} Applicable to the FQ-MD31 only.



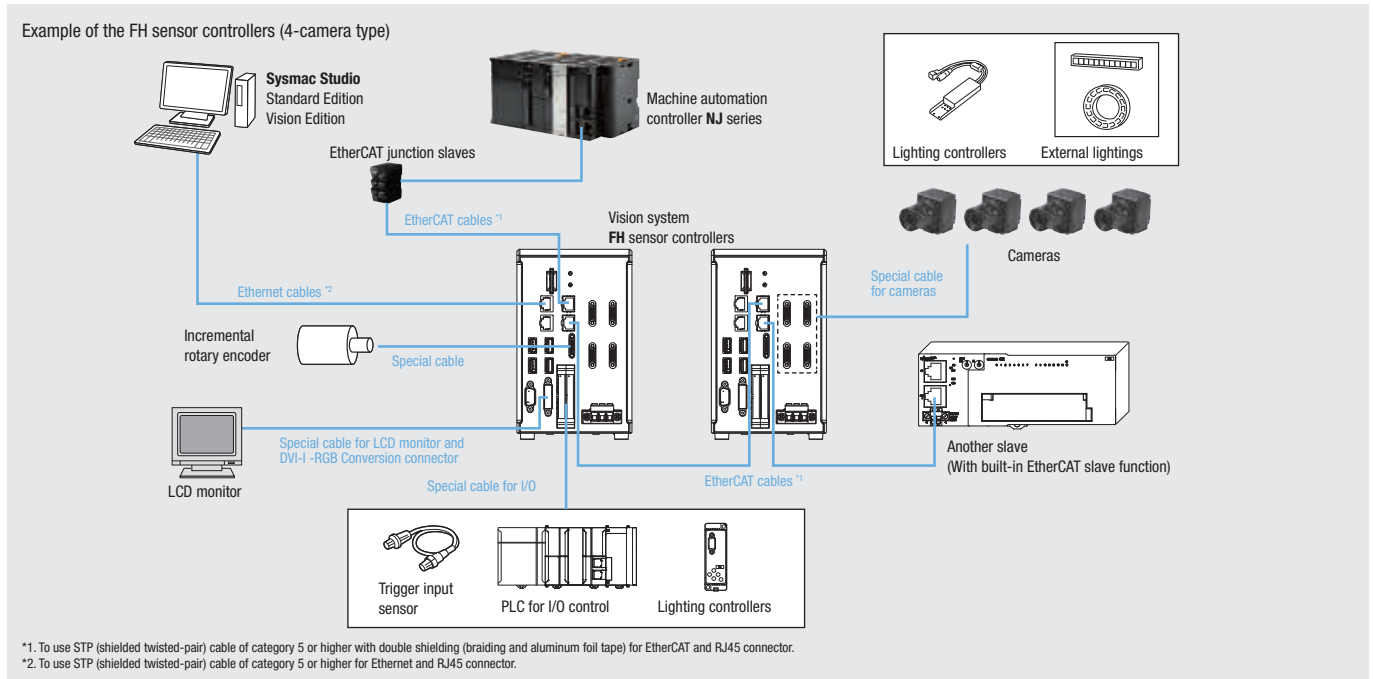
Faster machine speed and high-precision operation

The new FH vision systems are specifically intended for seamless integration with PLCs, motion controllers and robotic control systems, and are ideally suited for applications in high-speed manufacturing machines of all types. FH vision systems featuring a new and exceptionally efficient vision algorithm, high-speed image bus, four-core processing and fast EtherCAT communications. A further benefit is that FH Vision Systems are fully compatible with the Sysmac Studio Automation software.

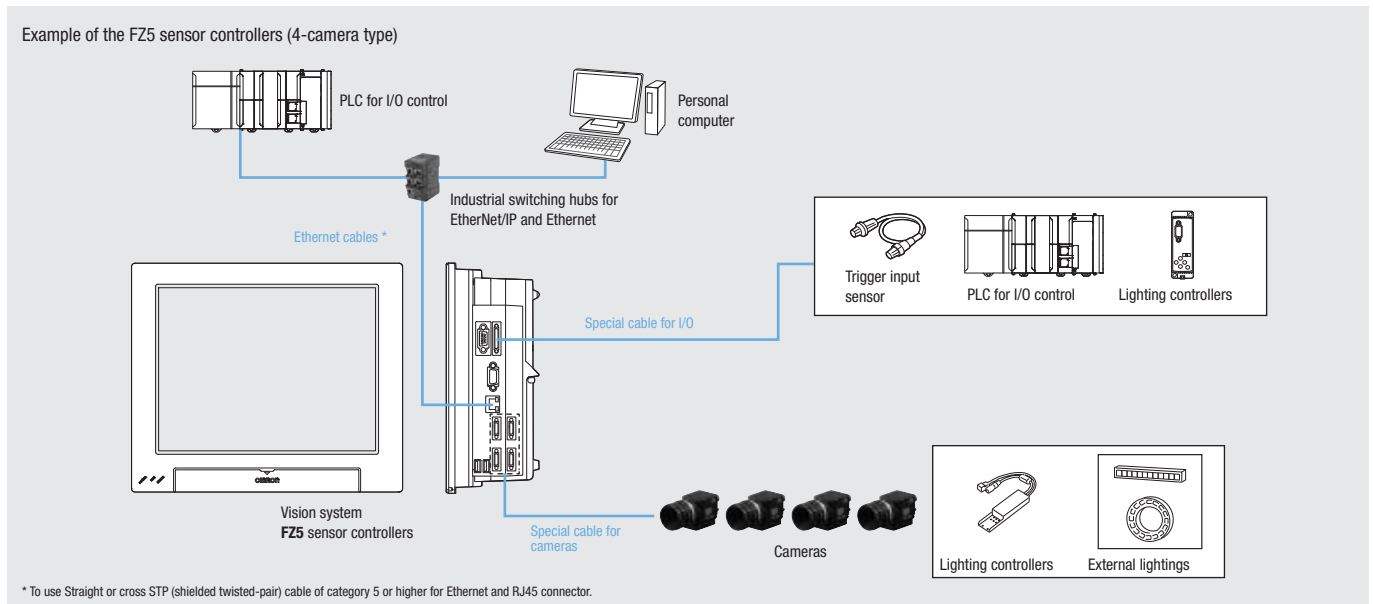
- Four-core image processing
- Fast EtherCAT communications
- Innovative Shape Search III
- Up to 8 high resolution cameras
- Supports Microsoft®.NET
- Compatible with Sysmac Studio Automation software

System configuration

EtherCAT connections for FH series




EtherNet/IP, No-protocol Ethernet and PLC Link connections for FZ5 series





Ordering information









FH series sensor controllers

Item	CPU	No. of cameras	Output	Order code	
	Box-type controllers	High-speed controllers (4 core)	2	NPN/PNP	FH-3050
			4	NPN/PNP	FH-3050-10
			8	NPN/PNP	FH-3050-20
		Standard controllers (2 core)	2	NPN/PNP	FH-1050
			4	NPN/PNP	FH-1050-10
			8	NPN/PNP	FH-1050-20

FZ5 series sensor controllers

Item	CPU	No. of cameras	Output	Order code	
	Controllers integrated with LCD	High-speed controllers	NPN	FZ5-1100	
			PNP	FZ5-1105	
			4	NPN	FZ5-1100-10
		Standard controllers	2	NPN	FZ5-600
			PNP	FZ5-605	
			4	NPN	FZ5-600-10
	Box-type controllers	Lite controllers	NPN	FZ5-L350	
			PNP	FZ5-L355	
		4	NPN	FZ5-L350-10	
			PNP	FZ5-L355-10	

Cameras

Item	Descriptions	Colour/ Monochrome	Image read time	Order code	
	High-speed CMOS cameras (Lens required) For FH series only	4 million pixels	8.5 ms	FH-SC04	
		2 million pixels	Colour	4.6 ms	FH-SC02
			Monochrome		FH-SM02
	300,000 pixels	Colour	3.3 ms	FH-SC	
		Monochrome		FH-SM	
	Digital CCD cameras (Lens required)	5 million pixels (When connecting FZ5-6□ or FZ5-L35□, up to two cameras can be connected.)	62.5 ms	FZ-SC5M2	
		2 million pixels	Colour	33.3 ms	FZ-SC2M
			Monochrome		FZ-S2M
		300,000 pixels	Colour	12.5 ms	FZ-SC
		Monochrome		FZ-S	
	High-speed CCD cameras (Lens required)	300,000 pixels	4.9 ms	FZ-SHC	
				FZ-SH	
	Small digital CCD cameras (Lenses for small camera required)	300,000-pixel flat type	Colour	12.5 ms	FZ-SFC
			Monochrome		FZ-SF
		300,000-pixel pen type	Colour	12.5 ms	FZ-SPC
			Monochrome		FZ-SP
	Intelligent Compact CMOS cameras (Camera + Manual focus lens + High power lighting)	Narrow view	16.7 ms	FZ-SQ010F	
		Standard view		FZ-SQ050F	
		Wide view (long-distance)		FZ-SQ100F	
		Wide view (short-distance)		FZ-SQ100N	
	Intelligent CCD cameras (Camera + Zoom, Autofocus lens + Intelligent lighting)	Wide view	12.5 ms	FZ-SLC100	
		Narrow view		FZ-SLC15	
	Autofocus CCD Cameras (Camera + Zoom, Autofocus lens)	Wide view	12.5 ms	FZ-SZC100	
		Narrow view		FZ-SZC15	

Lenses

C-mount Lens for 1/3-inch image sensor (Recommend: FZ-S□/FZ-SH□/FH-S□)

Model	3Z4S-LE SV-0614V	3Z4S-LE SV-0813V	3Z4S-LE SV-1214V	3Z4S-LE SV-1614V	3Z4S-LE SV-2514V	3Z4S-LE SV-3518V	3Z4S-LE SV-5018V	3Z4S-LE SV-7527V	3Z4S-LE SV-10035V
Appearance/Dimensions (mm)									
Focal length	6 mm	8 mm	12 mm	16 mm	25 mm	35 mm	50 mm	75 mm	100 mm
Brightness	F1.4	F1.3	F1.4	F1.4	F1.4	F1.8	F1.8	F2.7	F3.5
Filter size	M27.0 P0.5	M25.5 P0.5	M27.0 P0.5	M27.0 P0.5	M27.0 P0.5	M27.0 P0.5	M30.5 P0.5	M30.5 P0.5	M30.5 P0.5
Maximum sensor size	1/3 inch	1/3 inch	1/3 inch	1/3 inch	1/3 inch	1/3 inch	1/3 inch	1/3 inch	1/3 inch
Mount	C-mount								

C-mount Lens for 2/3-inch image sensor (Recommend: FZ-S□2M/FZ-S□5M2/FH-S□02)













(3Z4S-LE SV-7525H and 3Z4S-LE SV-10028H can also be used for FH-S□04)

Model	3Z4S-LE SV-0614H	3Z4S-LE SV-0814H	3Z4S-LE SV-1214H	3Z4S-LE SV-1614H	3Z4S-LE SV-2514H	3Z4S-LE SV-3514H	3Z4S-LE SV-5014H	3Z4S-LE SV-7525H	3Z4S-LE SV-10028H
Appearance/Dimensions (mm)									
Focal length	6 mm	8 mm	12 mm	16 mm	25 mm	35 mm	50 mm	75 mm	100 mm
Brightness	F1.4	F1.4	F1.4	F1.4	F1.4	F1.4	F1.4	F2.5	F2.8
Filter size	M40.5 P0.5	M35.5 P0.5	M27.0 P0.5	M27.0 P0.5	M27.0 P0.5	M35.5 P0.5	M40.5 P0.5	M34.0 P0.5	M37.5 P0.5
Maximum sensor size	2/3 inch	2/3 inch	2/3 inch	2/3 inch	2/3 inch	2/3 inch	2/3 inch	1 inch	1 inch
Mount	C-mount								

Cameras peripheral devices

Item	Descriptions	Order code
–	External lighting	FL Series
	Lighting controller (Required to control external lighting from a controller) For FL-series	FL-TCC1
	Intelligent camera diffusion plate	Wide field of vision FZ-SLC100-DL Narrow field of vision FZ-SLC15-DL
	For intelligent compact camera	Mounting bracket FQ-XL
		Mounting brackets FQ-XL2
		Polarizing filter attachment FQ-XF1
–	Mounting bracket for FZ-S_	FZ-S-XLC
–	Mounting bracket for FZ-S_2M	FZ-S2M-XLC
–	Mounting bracket for FZ-S5M_2	FZ-S5M-XLC
–	Mounting bracket for FZ-SH_	FZ-SH-XLC

Cables

Item	Descriptions	Order code
	Camera cable Cable length: 2 m, 5 m, or 10 m ^{*1}	FZ-VS
	Bend resistant camera cable Cable length: 2 m, 5 m, or 10 m ^{*1}	FZ-VSB
	Right-angle camera cable ^{*2} Cable length: 2 m, 5 m, or 10 m ^{*1}	FZ-VSL
	Long-distance camera cable Cable length: 15 m ^{*1}	FZ-VS2
	Long-distance right-angle camera cable Cable length: 15 m ^{*1}	FZ-VSL2
	Cable extension unit Up to two extension units and three cables can be connected. (Maximum cable length: 45 m ^{*1})	FZ-VSJ
	Monitor cable Cable length: 2 m or 5 m (When you connect a LCD monitor FZ-M08 to FH sensor controller, please use it in combination with a DVI-I-RGB conversion connector FH-VMRGB.)	FZ-VM
	DVI-I-RGB conversion connector For FH series only	FH-VMRGB
	Parallel I/O cable Cable length: 2 m or 5 m, For FZ series only	FZ-VP
	Parallel I/O cable for connector-terminal conversion unit Cable length: 2 m or 5 m, For FZ series only Connector-terminal block conversion units can be connected (Terminal blocks recommended products: OMRON XW2R-J50G-T, XW2R-E50G-T, XW2R-P50G-T)	FZ-VPX
	Parallel I/O cable ^{*3} Cable length: 2 m or 5 m, For FH series only	XW2Z-S013-2/-S013-5
	Encoder cable for line-driver Cable length: 1.5 m, For FH series only	FH-VR






^{*1} The maximum cable length depends on the camera being connected, and the model and length of the cable being used. For further information please refer to the "Cameras/Cables" table. When a high-speed CMOS camera FH-S_02/-S_04 is used in the high speed mode of transmission speed, two camera cables are required.

^{*2} This cable has an L-shaped connector on the camera end.

^{*3} 2 Cables are required for all I/O signals.

Recommended EtherCAT and EtherNet/IP communications cables









Use Straight STP (shielded twisted-pair) cable of category 5 or higher with double shielding (braiding and aluminum foil tape) for EtherCAT.
Use Straight or cross STP (shielded twisted-pair) cable of category 5 or higher for EtherNet/IP.

Item	Descriptions	Order code
	For EtherCAT ^{*1} Standard type cable with connectors on both ends (RJ45/RJ45) Wire gauge and number of pairs: AWG27, 4-pair cable, cable sheath material: LSZH ^{*2} , Cable colour: Blue, Yellow, or Green, Cables length: 0.2 m, 0.3 m, 0.5 m, 1 m, 1.5 m, 2 m, 3 m, 5 m, 7.5 m, 10 m, 15 m, 20 m	XS6W-6LSZH8SS□CM-Y ^{*3}
	Rugged type cable with connectors on both ends (RJ45/RJ45) Wire gauge and number of Pairs: AWG22, 2-pair cable Cables length: 0.3 m, 0.5 m, 1 m, 2 m, 3 m, 5 m, 10 m, 15 m	XS5W-T421-□MD-K ^{*3}
	Rugged type cable with connectors on both ends (M12/RJ45) Wire gauge and number of Pairs: AWG22, 2-pair cable Cables length: 0.3 m, 0.5 m, 1 m, 2 m, 3 m, 5 m, 10 m, 15 m	XS5W-T421-□MC-K ^{*3}
	Rugged type cable with connectors on both ends (M12 L/RJ45) Wire gauge and number of pairs: AWG22, 2-pair cable Cables length: 0.3 m, 0.5 m, 1 m, 2 m, 3 m, 5 m, 10 m, 15 m	XS5W-T422-□MC-K ^{*3}
-	For EtherCAT ^{*1} and EtherNet/IP Wire gauge and number of pairs: Cables AWG24, 4-pair cable	Hitachi Cable, Ltd. NETSTAR-C5E SAB 0.5 × 4P ^{*4} Kuramo Electric Co. KETH-SB ^{*4} SWCC Showa Cable Systems Co. FAE-5004 ^{*4} Panduit Corporation MPS588-C ^{*4}
-	Wire gauge and number of pairs: Cables AWG22, 2-pair cable	Kuramo Electric Co. KETH-PSB-OMR ^{*5} Nihon Electric Wire&Cable Co.,Ltd. PNET/B ^{*5}
	RJ45 assembly connector	OMRON XS6G-T421-1 ^{*5}
-	For EtherNet/IP Wire gauge and number of pairs: Cables 0.5 mm, 4-pair cable	Fujikura Ltd. F-LINK-E 0.5mm × 4P ^{*6} Panduit Corporation MPS588 ^{*6}
-	RJ45 connectors	

^{*1} The FH series supports the EtherCAT communication. It cannot be used in FZ series.
^{*2} The lineup features Low Smoke Zero Halogen cables for in-cabinet use and PUR cables for out-of-cabinet use.
^{*3} For details, refer to Cat.No.G019.
^{*4} We recommend you to use above cable for EtherCAT and EtherNet/IP, and RJ45 connector together.
^{*5} We recommend you to use above cable for EtherCAT and EtherNet/IP, and RJ45 assembly connector together.
^{*6} We recommend you to use above cable For EtherNet/IP and RJ45 connectors together.

Note: Please be careful while cable processing, for EtherCAT, connectors on both ends should be shield connected and for EtherNet/IP, connectors on only one end should be shield connected.

Peripheral devices

Item	Descriptions				Order code	
	LCD monitor For Box-type controllers				FZ-M08	
	USB memory		2 GB		FZ-MEM2G	
			8 GB		FZ-MEM8G	
	SD card		2 GB		HMC-SD291	
	For FH Controller only		4 GB		HMC-SD491	
	VESA attachment For installing the LCD integrated-type controller				FZ-VESA	
	Desktop controller stand For installing the LCD integrated-type controller				FZ-DS	
	Display/USB switcher				FZ-DU	
—	Mouse recommended products Driverless wired mouse (A mouse that requires the mouse driver to be installed is not supported.)				—	
	EtherCAT junction slaves For FH series		3 port	Power supply voltage: 20.4 to 28.8 VDC (24 VDC -15 to 20%)	Current consumption: 0.08 A	GX-JC03
			6 port		Current consumption: 0.17 A	GX-JC06
	Industrial Switching Hubs for EtherNet/IP and Ethernet		3 port	Failure detection: None	Current consumption: 0.22 A	W4S1-03B
			5 port	Failure detection: None		W4S1-05B
			5 port	Failure detection: Supported		W4S1-05C

Automation software Sysmac Studio

Please purchase a DVD and licenses the first time you purchase the Sysmac Studio. DVDs and licenses are available individually. The license does not include the DVD.

Product	Specifications	Number of model standards licenses		Media	Order code
		Number of model standards licenses	Media		
Sysmac Studio Standard Edition Ver.1.□□□	The Sysmac Studio provides an integrated development environment to set up, program, debug, and maintain NJ-series controllers and other Machine Automation controllers, as well as EtherCAT slaves. Sysmac Studio runs on the following OS. Windows XP (Service Pack 3 or higher, 32-bit version) / Vista (32-bit version) / 7 (32-bit/64-bit version)	— (Media only)	DVD *1		SYSMAC-SE200D
		1 license	—		SYSMAC-SE201L
		3 license	—		SYSMAC-SE203L
		10 license	—		SYSMAC-SE210L
		30 license	—		SYSMAC-SE230L
Sysmac Studio Vision Edition Ver.1.□□□*2	Sysmac Studio Vision Edition is a limited license that provides selected functions required for FH-series/ FQ-M-series vision sensor settings.	50 license	—		SYSMAC-SE250L
		1 license	—		SYSMAC-VE001L

*1 The same media is used for both the Standard Edition and the Vision Edition.

*2 With the Vision Edition, you can use only the setup functions for FH-series/FQ-M-series vision sensors.

- Note:**
1. Site licenses are available for users who will run Sysmac Studio on multiple computers. Ask your OMRON sales representative for details.
 2. Sysmac Studio version 1.07 or higher supports the FH series. Sysmac Studio does not support the FZ5 series.

Development Environment

Please purchase a DVD and licenses the first time you purchase the Sysmac Studio. DVDs and licenses are available individually. The license does not include the DVD.

Product	Specifications	Number of model standards licenses		Media	Order code
		Number of model standards licenses	Media		
Application Producer	Software components that provide a development environment to further customize the standard controller features of the FH series. System requirements: • CPU: Intel Pentium Processor (SSE2 or higher) • OS: Windows 7 Professional (32bit) or Enterprise (32bit) or Ultimate (32bit) • .NET Framework: .NET Framework 3.5 or higher • Memory: At least 2 GB RAM Available disk space: At least 2 GB • Browser: Microsoft® Internet Explorer 6.0 or later • Display: XGA (1024 × 768), True Colour (32-bit) or higher • Optical drive: CD/DVD drive The following software is required to customize the software: Microsoft® Visual Studio® 2010 Professional or Microsoft® Visual Studio® 2008 Professional	— (Media only)	CD		FH-AP1
		1 license	—		FH-AP1L

Ratings and Specifications

Controllers

FH sensor controllers

Type			High-speed controllers (4 core)			Standard controllers (2 core)			
Model	NPN		FH-3050	FH-3050-10	FH-3050-20	FH-1050	FH-1050-10	FH-1050-20	
	PNP								
Main functions	Controller type		Box-type controllers						
	High-grade processing items		No						
	No. of cameras		2	4	8	2	4	8	
	Connected camera		Can be connected to all cameras. (FZ-S series/FH-S series)						
	Processing resolution (FZ-S)	When connected to a intelligent compact camera		752 (H) × 480 (V)					
		When connected to a 300,000-pixel camera		640 (H) × 480 (V)					
		When connected to a 2 million-pixel camera		1600 (H) × 1200 (V)					
		When connected to a 5 million-pixel camera		2448 (H) × 2044 (V)					
	Processing resolution (FH-S)	When connected to a 300,000-pixel camera		640 (H) × 480 (V)					
		When connected to a 2 million-pixel camera		2040 (H) × 1088 (V)					
		When connected to a 4 million-pixel camera		2040 (H) × 2048 (V)					
	No. of scenes		128						
	Number of logged images ¹	When connected to a intelligent compact camera		Connected to 1 camera (Colour): 232, Connected to 2 camera (Colour): 116 Connected to 3 camera (Colour): 77, Connected to 4 camera (Colour): 58 Connected to 5 camera (Colour): 46, Connected to 6 camera (Colour): 38 Connected to 7 camera (Colour): 33, Connected to 8 camera (Colour): 29					
		When connected to a 300,000-pixel camera (FZ-S/FH-S)		Connected to 1 camera (Colour): 270, Connected to 1 camera (Monochrome): 272 Connected to 2 camera (Colour): 135, Connected to 2 camera (Monochrome): 136 Connected to 3 camera (Colour/Monochrome): 90 Connected to 4 camera (Colour): 67, Connected to 4 camera (Monochrome): 68 Connected to 5 camera (Colour/Monochrome): 54 Connected to 6 camera (Colour/Monochrome): 45 Connected to 7 camera (Colour/Monochrome): 38 Connected to 8 camera (Colour): 33, Connected to 8 camera (Monochrome): 34					
		When connected to a 2 million-pixel camera (FH-S)		Connected to 1 camera (Colour/Monochrome): 37, Connected to 2 camera (Colour/Monochrome): 18 Connected to 3 camera (Colour/Monochrome): 12, Connected to 4 camera (Colour/Monochrome): 9 Connected to 5 camera (Colour/Monochrome): 7, Connected to 6 camera (Colour/Monochrome): 6 Connected to 7 camera (Colour/Monochrome): 5, Connected to 8 camera (Colour/Monochrome): 4					
		When connected to a 2 million-pixel camera (FZ-S)		Connected to 1 camera (Colour/Monochrome): 43, Connected to 2 camera (Colour/Monochrome): 21 Connected to 3 camera (Colour/Monochrome): 14, Connected to 4 camera (Colour/Monochrome): 10 Connected to 5 camera (Colour/Monochrome): 8, Connected to 6 camera (Colour/Monochrome): 7 Connected to 7 camera (Colour/Monochrome): 6, Connected to 8 camera (Colour/Monochrome): 5					
		When connected to a 4 million-pixel camera (FH-S)		Connected to 1 camera (Colour/Monochrome): 20, Connected to 2 camera (Colour/Monochrome): 10 Connected to 3 camera (Colour/Monochrome): 6, Connected to 4 camera (Colour/Monochrome): 5 Connected to 5 camera (Colour/Monochrome): 4, Connected to 6 camera (Colour/Monochrome): 3 Connected to 7 camera (Colour/Monochrome): 2, Connected to 8 camera (Colour/Monochrome): 2					
When connected to a 5 million-pixel camera (FZ-S)		Connected to 1 camera (Colour/Monochrome): 16, Connected to 2 camera (Colour/Monochrome): 8 Connected to 3 camera (Colour/Monochrome): 5, Connected to 4 camera (Colour/Monochrome): 4 Connected to 5 camera (Colour/Monochrome): 3, Connected to 6 camera (Colour/Monochrome): 2 Connected to 7 camera (Colour/Monochrome): 2, Connected to 8 camera (Colour/Monochrome): 2							
Operation		Mouse or similar device							
Settings		Create series of processing steps by editing the flowchart (Help messages provided).							
External interface	Serial communications		RS-232C: 1 CH						
	EtherNet communications		No-protocol (TCP/UDP) 1000BASE-T						
			1 port	2 port	2 port	1 port	2port	2port	
	EtherNet/IP communications		Ethernet port baud rate: 1 Gbps (1000 BASE-T)						
	EtherCAT communications		EtherCAT protocol (100BASE-TX)						
	Parallel I/O		(In the 2-line random trigger mode) 17 inputs (STEP0/ENCTRIG_Z0, STEP1/ENCTRIG_Z1, ENCTRIG_A0 to 1, ENCTRIG_B0 to 1, DSA0 to 1, DIO to 7, DI_LINE0) 37 outputs (RUN0 to 1, READY0 to 1, BUSY0 to 1, ORO to 1, ERROR0 to 1, GATE0 to 1, STGOUT0/SHTOUT0, STGOUT1/SHTOUT1, STGOUT2 to 7, D00 to 15, ACK) (In the 5-line to 8-line random trigger mode) 19 inputs, STEP0 to 7, DI_LINE0 to 2, DIO to 7) 34 outputs (READY0 to 7, BUSY0 to 7, ORO to 7, ACK, ERROR, STGOUT/SHTOUT0 to 7)						
	Encoder interface		RS422-A line driver level. Phase A/B: single-phase 4MHz (multiplying phase difference of 1MHz by 4 times), Phase Z: 1MHz						
	Monitor interface		DVI-I output IF × 1ch						
	USB interface		4 channels (supports USB 1.1 and 2.0)						
	SD card interface		SDHC card of Class4 or higher rating is recommended.						
Ratings	Power supply voltage		20.4 to 26.4 VDC						
	Current consumption (at 24.0 VDC) ²	When connected to a intelligent compact camera, intelligent or autofocus camera	Connected to 2 cameras	5.0 A max.	5.4 A max.	6.4 A max.	4.7 A max.	5.0 A max.	5.9 A max.
			Connected to 4 cameras	–	7.0 A max.	8.1 A max.	–	6.5 A max.	7.5 A max.
			Connected to 8 cameras	–	–	11.5 A max.	–	–	10.9 A max.
		When connected to a 300,000-pixel camera, 2 million-pixel camera, 4 million-pixel camera or 5 million-pixel camera	Connected to 2 cameras	4.1 A max.	4.2 A max.	5.2 A max.	3.6 A max.	3.7 A max.	4.5 A max.
Connected to 4 cameras			–	4.8 A max.	5.6 A max.	–	4.3 A max.	5.0 A max.	
Connected to 8 cameras			–	–	6.8 A max.	–	–	6.2 A max.	
Insulation resistance		Between DC power supply and controller FG: 20 MΩ or higher (rated voltage 250 V)							

Type			High-speed controllers (4 core)			Standard controllers (2 core)			
Model			NPN	FH-3050	FH-3050-10	FH-3050-20	FH-1050	FH-1050-10	FH-1050-20
			PNP						
Operation Environment	Noise Immunity	Fast transient burst	DC power supply	Direct infusion: 2 KV Pulse rising: 5 ns Pulse width: 50 ns Burst continuation time: 15 ms/0.75 ms Period: 300 ms Application time: 1 min					
			I/O line	Cramp: 1 KV Pulse rising: 5 ns Pulse width: 50 ns Burst continuation time: 15 ms/0.75 ms Period: 300 ms Application time: 1 min					
	Ambient temperature range			Operating: 0 to 50°C Storage: -20 to 65°C (with no icing or condensation)					
	Ambient humidity range			Operating and storage: 35% to 85% (with no condensation)					
	Ambient atmosphere			No corrosive gases					
	Grounding			Type D grounding (100Ω or less grounding resistance) Conventional type 3 grounding					
Degree of protection			IEC60529 IP20						
Dimensions	Dimensions			190 × 115 × 182.5 mm					
	Weight			Approx. 3.2 kg	Approx. 3.4 kg	Approx. 3.4 kg	Approx. 3.2 kg	Approx. 3.4 kg	Approx. 3.4 kg
	Case materials			Cover: zinc-plated steel plate, side plate: aluminum (A6063)					
Accessories			Controller (1) / user manual (one Japanese and one English versions) / Instruction Installation Manual (1) / Power supply terminal block connector (1) / Ferrite core (2, FH-3050 and FH-1050), 4 (FH-3050-10 and FH-1050-10), and 8 (FH-3050-20 and FH-1050-20)						

*1 The image logging capacity changes when multiple cameras of different types are connected at the same time.

*2 The current consumption when the maximum number of cameras supported by each controller are connected. If a strobe controller model is connected to a lamp, the current consumption is as high as when an intelligent camera is connected.

FZ5 sensor controllers

Type		High-speed controllers		Standard controllers		Lite controllers		
Model	NPN	FZ5-1100	FZ5-1100-10	FZ5-600	FZ5-600-10	FZ5-L350	FZ5-L350-10	
	PNP	FZ5-1105	FZ5-1105-10	FZ5-605	FZ5-605-10	FZ5-L355	FZ5-L355-10	
Controller type						Controllers integrated with LCD		Box-type controllers
High-grade processing items		No						
No. of cameras		2	4	2	4	2	4	
Connected camera		Can be connected to FZ-S series. (Can not be connected to FH-S series.)		Can be connected to FZ-S series. (Can not be connected to FH-S series. When connecting 5 million-pixel cameras, up to two cameras can be connected.)				
Processing resolution	When connected to a intelligent compact camera	752 (H) × 480 (V)						
	When connected to a 300,000-pixel camera	640 (H) × 480 (V)						
	When connected to a 2 million-pixel camera	1600 (H) × 1200 (V)						
	When connected to a 5 million-pixel camera	2448 (H) × 2044 (V)						
No. of scenes		32						
Number of logged images *1	When connected to a intelligent compact camera	Connected to 1 camera	232		214			
		Connected to 2 cameras	116		107			
		Connected to 3 cameras	77		71			
		Connected to 4 cameras	58		53			
	When connected to a 300,000-pixel camera	Connected to 1 camera	Colour camera: 270, Monochrome Camera: 272		Colour camera: 250, Monochrome Camera: 252			
		Connected to 2 cameras	Colour camera: 135, Monochrome Camera: 136		Colour camera: 125, Monochrome Camera: 126			
		Connected to 3 cameras	Colour camera: 90, Monochrome Camera: 90		Colour camera: 83, Monochrome Camera: 84			
		Connected to 4 cameras	Colour camera: 67, Monochrome Camera: 68		Colour camera: 62, Monochrome Camera: 63			
	When connected to a 2 million-pixel camera	Connected to 1 camera	Colour camera: 43, Monochrome Camera: 43		Colour camera: 40, Monochrome Camera: 40			
		Connected to 2 cameras	Colour camera: 21, Monochrome Camera: 21		Colour camera: 20, Monochrome Camera: 20			
		Connected to 3 cameras	Colour camera: 14, Monochrome Camera: 14		Colour camera: 13, Monochrome Camera: 13			
		Connected to 4 cameras	Colour camera: 10, Monochrome Camera: 10		Colour camera: 10, Monochrome Camera: 10			
	When connected to a 5 million-pixel camera	Connected to 1 camera	Colour camera: 16, Monochrome Camera: 16		Colour camera: 11, Monochrome Camera: 11			
		Connected to 2 cameras	Colour camera: 8, Monochrome Camera: 8		Colour camera: 5, Monochrome Camera: 5			
		Connected to 3 cameras	Colour camera: 5, Monochrome Camera: 5		-			
		Connected to 4 cameras	Colour camera: 4, Monochrome Camera: 4		-			
	Operation		Touch pen, mouse, etc.					Mouse or similar device
	Settings		Create series of processing steps by editing the flowchart (Help messages provided).					
	Serial communications		RS-232C/422A: 1 CH					RS-232: 1CH
	EtherNet communications		Ethernet 100BASE-TX/10BASE-T					Ethernet 1000BASE-T/100BASE-TX/10BASE-T
EtherNet/IP communications		Ethernet port baud rate: 100 Mbps (100Base-TX)						
Parallel I/O		(When used in Multi-line random-trigger mode) 17 inputs (RESET, STEP0/ENCTRIG_Z0, STEP1/ENCTRIG_Z1, DSA0 to 1, ENCTRIG_A0 to 1, ENCTRIG_B0 to 1, DIO to 7), 29 outputs (RUN/BUSY1, BUSY0, GATE0 to 1, ORO to 1, READY0 to 1, ERROR, STGOUT0 to 3, DO0 to 15) (When used in other mode) 13 inputs (RESET, STEP0/ENCTRIG_Z0, DSA0, ENCTRIG_A0, ENCTRIG_B0, DIO to 7), 26 outputs (RUN, BUSY0, GATE0, ORO, READY0, ERROR, STGOUT0 to 3, DO0 to 15) STGOUT 2 to 3 only for camera 4 ch type		13 inputs (RESET, STEP0/ENCTRIG_Z0, DSA0, ENCTRIG_A0, ENCTRIG_B0, DIO to 7), 26 outputs (RUN, BUSY0, GATE0, ORO, READY0, ERROR, STGOUT0 to 3, DO0 to 15) STGOUT 2 to 3 only for camera 4 ch type		11 inputs (RESET, STEP, DSA, and DIO 0 to 7), 26 outputs (RUN, BUSY, GATE, OR, READY, ERROR, STGOUT 0 to 3, and DO 0 to 15) STGOUT 2 to 3 only for camera 4 ch type		
Monitor interface		Integrated controller and LCD 12.1 inch TFT colour LCD (Resolution: XGA 1,024 × 768 dots)					Analog RGB video output, 1 channel (Resolution: XGA 1,024 × 768 dots)	
USB interface		4 channels (supports USB 1.1 and 2.0)					2CH (supports USB1.1/2.0)	
Power supply voltage *2		20.4 to 26.4 VDC						
Current consumption (at 24.0 VDC) *3	When connected to a intelligent compact camera	5.0 A max.	7.5 A max.	5.0 A max.	7.5 A max.	4.0 A max.	5.5 A max.	
	When connected to a intelligent or autofocus camera							
	When connected to a 300,000-pixel camera	3.7 A max.	4.9 A max.	3.7 A max.	4.9 A max.	2.6 A max.	2.9 A max.	
	When connected to a 2 million-pixel camera							
	When connected to a 5 million-pixel camera							

Type	High-speed controllers				Standard controllers		Lite controllers	
Model	NPN	FZ5-1100	FZ5-1100-10	FZ5-600	FZ5-600-10	FZ5-L350	FZ5-L350-10	
	PNP	FZ5-1105	FZ5-1105-10	FZ5-605	FZ5-605-10	FZ5-L355	FZ5-L355-10	
Ambient temperature range	Operating: 0 to 45°C for low cooling fan speeds, 0 to 50°C for high cooling fan speeds Storage: -20 to 65°C (with no icing or condensation)					Operating: 0 to 45°C, 0 to 50°C Storage: -20 to 65°C (with no icing or condensation)		
Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)							
Weight	Approx. 3.2 kg		Approx. 3.4 kg		Approx. 3.2 kg		Approx. 3.4 kg	
Accessories	Touch pen (one, inside the front panel), Instruction manual, 6 mounting brackets						Instruction manual	

*1 The image logging capacity changes when multiple cameras of different types are connected at the same time.

*2 Do not ground the positive terminal of the 24-VDC power supply to a Lite controller.

If the positive terminal is grounded, electrical shock may occur when an SG (0-V) part, such as the case of the controller or camera, is touched.

*3 The current consumption when the maximum number of cameras supported by each controller are connected.

If a strobe controller model is connected to a lamp, the current consumption is as high as when an intelligent camera is connected.

Cameras

High-speed CMOS cameras

Model	FH-SM	FH-SC	FH-SM02	FH-SC02	FH-SM04	FH-SC04
Image elements	1/3-inch CMOS image elements		2/3-inch CMOS image elements		1-inch CMOS image elements	
Colour/Monochrome	Monochrome	Colour	Monochrome	Colour	Monochrome	Colour
Effective pixels	640 (H) × 480 (V)		2040 (H) × 1088 (V)		2040 (H) × 2048 (V)	
Pixel size	7.4 (μm) × 7.4 (μm)		5.5 (μm) × 5.5 (μm)		5.5 (μm) × 5.5 (μm)	
Shutter function	Electronic shutter; Shutter speeds can be set from 20 μs to 100 ms.		Electronic shutter; Shutter speeds can be set from 25 μs to 100 ms.			
Partial function	1 to 480 lines	2 to 480 lines	1 to 1088 lines	2 to 1088 lines	1 to 2048 lines	2 to 2048 lines
Frame rate (image read time)	308 fps (3.3 ms)		219 fps (4.6 ms) *1		118 fps (8.5 ms) *1	
Lens mounting	C-mount					
Field of vision, installation distance	Selecting a lens according to the field of vision and installation distance					
Ambient temperature range	Operating: 0 to 40°C, Storage: -25 to 65°C (with no icing or condensation)					
Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)					
Weight	Approx. 105 g			Approx. 110 g		
Accessories	Instruction manual					

*1 For high speed frame rate, 2 pieces of FZ-VS-_M cables are required.

Digital CCD Cameras

Model	FZ-S	FZ-SC	FZ-S2M	FZ-SC2M	FZ-S5M2	FZ-SC5M2
Image elements	Interline transfer reading all pixels, 1/3-inch CCD image elements		Interline transfer reading all pixels, 1/1.8-inch CCD image elements		Interline transfer reading all pixels, 2/3-inch CCD image elements	
Colour/Monochrome	Monochrome	Colour	Monochrome	Colour	Monochrome	Colour
Effective pixels	640 (H) × 480 (V)		1600 (H) × 1200 (V)		2448 (H) × 2044 (V)	
Pixel size	7.4 (μm) × 7.4 (μm)		4.4 (μm) × 4.4 (μm)		3.45 (μm) × 3.45 (μm)	
Shutter function	Electronic shutter; select shutter speeds from 20 μs to 100 ms					
Partial function	12 to 480 lines		12 to 1200 lines		12 to 2044 lines	
Frame rate (image read time)	80 fps (12.5 ms)		30 fps (33.3 ms)		16 fps (62.5 ms)	
Lens mounting	C-mount					
Field of vision, installation distance	Selecting a lens according to the field of vision and installation distance					
Ambient temperature range	Operating: 0 to 50°C Storage: -25 to 65°C (with no icing or condensation)		Operating: 0 to 40°C Storage: -25 to 65°C (with no icing or condensation)			
Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)					
Weight	Approx. 55 g		Approx. 76 g		Approx. 140 g	
Accessories	Instruction manual					

Small CCD Digital Cameras

Model	FZ-SF	FZ-SFC	FZ-SP	FZ-SPC
Image elements	Interline transfer reading all pixels, 1/3-inch CCD image elements			
Colour/Monochrome	Monochrome	Colour	Monochrome	Colour
Effective pixels	640 (H) × 480 (V)			
Pixel size	7.4 (μm) × 7.4 (μm)			
Shutter function	Electronic shutter; select shutter speeds from 20 μm to 100 ms			
Partial function	12 to 480 lines			
Frame rate (image read time)	80 fps (12.5 ms)			
Lens mounting	Special mount (M10.5 P0.5)			
Field of vision, installation distance	Selecting a lens according to the field of vision and installation distance			
Ambient temperature range	Operating: 0 to 50°C (camera amp) 0 to 45°C (camera head) Storage: -25 to 65°C (with no icing or condensation)			
Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)			
Weight	Approx. 150 g			
Accessories	Instruction manual, installation bracket, Four mounting brackets (M2)		Instruction manual	

High-speed CCD Cameras

Model	FZ-SH	FZ-SHC
Image elements	Interline transfer reading all pixels, 1/3-inch CCD image elements	
Colour/Monochrome	Monochrome	Colour
Effective pixels	640 (H) × 480 (V)	
Pixel size	7.4 (μm) × 7.4 (μm)	
Shutter function	Electronic shutter; select shutter speeds from 1/10 to 1/50,000 s	
Partial function	12 to 480 lines	
Frame rate (image read time)	204 fps (4.9ms)	
Field of vision, installation distance	Selecting a lens according to the field of vision and installation distance	
Ambient temperature range	Operating: 0 to 40°C Storage: -25 to 65°C (with no icing or condensation)	
Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)	
Weight	Approx. 105 g	
Accessories	Instruction manual	

Intelligent Compact CMOS Cameras

Model	FZ-SQ010F	FZ-SQ050F	FZ-SQ100F	FZ-SQ100N
Image elements	1/3-inch CMOS image elements			
Colour/Monochrome	Colour			
Effective pixels	752 (H) × 480 (V)			
Pixel size	6.0 (μm) × 6.0 (μm)			
Shutter function	1/250 to 1/32,258			
Partial function	8 to 752 lines			
Frame rate (image read time)	60 fps			
Field of vision	7.5 × 4.7 to 13 × 8.2 mm	13 × 8.2 to 53 × 33 mm	53 × 33 to 240 × 153 mm	29 × 18 to 300 × 191 mm
Installation distance	38 to 60 mm	56 to 215 mm	220 to 970 mm	32 to 380 mm
LED class ^{*1}	Class 2			
Ambient temperature range	Operating: 0 to 50°C Storage: -25 to 65°C			
Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)			
Weight	Approx. 150 g		Approx. 140 g	
Accessories	Mounting bracket (FQ-XL), polarizing filter attachment (FQ-XF1), instruction manual and warning label			

^{*1} Applicable standards: IEC62471-2

Intelligent CCD cameras, Autofocus CCD cameras

Model	FZ-SLC100	FZ-SLC15	FZ-SZC100	FZ-SZC15
Image elements	Interline transfer reading all pixels, 1/3-inch CCD image elements			
Colour/Monochrome	Colour			
Effective pixels	640 (H) × 480 (V)			
Pixel size	7.4 (µm) × 7.4 (µm)			
Shutter function	Electronic shutter; select shutter speeds from 1/10 to 1/50,000 s			
Partial function	12 to 480 lines			
Frame rate (image read time)	80 fps (12.5 ms)			
Field of vision *1	13 to 100 mm *2	2.9 to 14.9 mm *2	13 to 100 mm *2	2.9 to 14.9 mm *2
Installation distance	70 to 190 mm *2	35 to 55 mm *2	77.5 to 197.5 mm *2	47.5 to 67.5 mm
LED class *3 (lighting)	Class 2		-	
Ambient temperature range	Operating: 0 to 50°C Storage: -25 to 65°C (with no icing or condensation)			
Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)			
Weight	Approx. 670 g	Approx. 700 g	Approx. 500 g	
Accessories	Instruction sheet and hexagonal wrench			

*1 The length of the visual field is the lengths along the Y axis.

*2 Tolerance: ±5% max.

*3 Applicable standards: IEC62471-2

LCD Monitor

Model	FZ-M08
Size	8.4 inches
Type	Liquid crystal Colour TFT
Resolution	1,024 × 768 dots
Input signal	Analog RGB video input, 1 channel
Power supply voltage	21.6 to 26.4 VDC
Current consumption	Approx. 0.7 A max.
Ambient temperature range	Operating: 0 to 50°C; Storage: -25 to 65°C (with no icing or condensation)
Ambient humidity range	Operating and storage: 35 to 85% (with no condensation)
Weight	Approx. 1.2 kg
Accessories	Instruction sheet and 4 mounting brackets

Camera cables

Model	FZ-VS (2 m)	FZ-VSB (2 m)	FZ-VSL (2 m)
Shock resistiveness (durability)	10 to 150 Hz single amplitude 0.15 mm 3 directions, 8 strokes, 4 times		
Ambient temperature range	Operation and storage: 0 to 65°C (with no icing or condensation)		
Ambient humidity range	Operation and storage: 40 to 70%RH (with no condensation)		
Ambient atmosphere	No corrosive gases		
Material	Cable sheath, connector: PVC		
Minimum bending radius	69 mm	69 mm	69 mm
Weight	Approx. 170 g	Approx. 220 g	Approx. 170 g

Monitor cable

Model	FZ-VM
Vibration resistiveness	10 to 150 Hz single amplitude 0.15 mm 3 directions, 8 strokes, 4 times
Ambient temperature range	Operation: 0 to 50°C; Storage: -20 to 65°C (with no icing or condensation)
Ambient humidity range	Operation and storage: 35 to 85%RH (with no condensation)
Ambient atmosphere	No corrosive gases
Material	Cable sheath: heat-resistant PVC, connector: PVC
Minimum bending radius	75 mm
Weight	Approx. 170 g

Cable extension unit

Model	FZ-VSJ
Power supply voltage *1	11.5 to 13.5 VDC
Current consumption *2	1.5 A max.
Ambient temperature range	Operating: 0 to 50°C; Storage: -25 to 65°C (with no icing or condensation)
Ambient humidity range	Operating and storage: 35 to 85% (with no condensation)

Model	FZ-VSJ
Maximum units connectable	2 Units per camera
Weight	Approx. 240 g
Accessories	Instruction sheet and 4 mounting screws

*1 A 12-VDC power supply must be provided to the cable extension unit when connecting the Intelligent camera, the Autofocus camera, the Intelligent compact camera, the Strobe controller, or the Lighting controller.

*2 The current consumption shows when connecting the cable extension unit to an external power supply.

Long-distance camera cables

Model	FZ-VS2 (15 m)	FZ-VSL2 (15 m)
Shock resistiveness (durability)	10 to 150 Hz single amplitude 0.15 mm 3 directions, 8 strokes, 4 times	
Ambient temperature range	Operation and storage: 0 to 65°C (with no icing or condensation)	
Ambient humidity range	Operation and storage: 40 to 70%RH (with no condensation)	
Ambient atmosphere	No corrosive gases	
Material	Cable sheath, connector: PVC	
Minimum bending radius	93 mm	
Weight	Approx. 1600 g	

Parallel cable

Model	FZ-VP	FZ-VPX
Vibration resistiveness	10 to 150 Hz single amplitude 0.15 mm 3 directions, 8 strokes, 4 times	
Ambient temperature range	Operation: 0 to 50°C; Storage: -20 to 65°C (with no icing or condensation)	
Ambient humidity range	Operation and storage: 35 to 85%RH (with no condensation)	
Ambient atmosphere	No corrosive gases	
Material	Cable sheath: heat-resistant PVC, Connector: resin	
Minimum bending radius	75 mm	
Weight	Approx. 160 g	Approx. 180 g

Note: FZ-VP/FZ-VPX is only for the FZ series. The FH series can use XW2Z-S013-2/-S013-5.

Encoder Cable

Model	FH-VR
Vibration resistiveness	10 to 150 Hz single amplitude 0.1 mm 3 directions, 8 strokes, 10 times
Ambient temperature range	Operation: 0 to 50°C; Storage: -10 to 60°C (with no icing or condensation)
Ambient humidity range	Operation and storage: 35 to 85%RH (with no condensation)
Ambient atmosphere	No corrosive gases
Material	Cable Jacket: Heat, oil and flame resistant PVC Connector: polycarbonate resin
Minimum bending radius	65 mm
Weight	Approx. 104 g

Cameras/Cables connection table

Type of camera	Model	Cable length	High-speed CMOS cameras ^{*1}				
			300,000-pixel	2 million-pixel		4 million-pixel	
			FH-SM/SC	FH-SM02/SC02		FH-SM04/SC04	
			–	High speed mode of transmission speed select	Standard mode of transmission speed select	High speed mode of transmission speed select	Standard mode of transmission speed select
Camera cables	FZ-VS	2 m	Yes	Yes	Yes	Yes	Yes
Right-angle camera cables	FZ-VSL	5 m	Yes	Yes	Yes	Yes	Yes
		10 m	Yes	No	Yes	No	Yes
Bend resistant camera cables	FZ-VSB	2 m	Yes	Yes	Yes	Yes	Yes
		5 m	Yes	Yes	Yes	Yes	Yes
		10 m	Yes	No	Yes	No	Yes
Long-distance camera cable	FZ-VS2	15 m	Yes	No	Yes	No	Yes
Long-distance right-angle camera cable	FZVSL2						

^{*1} High-speed CMOS camera is only for the FH series.

Type of camera	Model	Cable length	Digital CCD cameras			Small digital CCD cameras Pen type / flat type	High-speed CCD cameras	Intelligent compact CMOS cameras	Intelligent CCD cameras Autofocus CCD cameras
			300,000-pixel	2 million-pixel	5 million-pixel				
			FZ-S/SC	FZ-S2M/SC2M	FZ-S5M2/SC5M2	FZ-SF/SFC FZ-SP/SPC	FZ-SH/SHC	FZ-SQ□	FZ-SLC□ FZ-SZC□
Camera cables	FZ-VS	2 m	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Right-angle camera cables	FZ-VSL	5 m	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		10 m	Yes	Yes	No	Yes	Yes	Yes	No
Bend resistant camera cables	FZ-VSB	2 m	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		5 m	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		10 m	Yes	Yes	No	Yes	Yes	Yes	No
Long-distance camera cable	FZ-VS2	15 m	Yes	Yes	No	Yes	Yes	Yes	No
Long-distance right-angle camera cable	FZVSL2								

EtherCAT communications specifications

Item	Specifications	
Communications standard	IEC61158 Type 12	
Physical layer	100 BASE-TX (IEEE802.3)	
Modulation	Base band	
Baud rate	100 Mbps	
Topology	Depends on the specifications of the EtherCAT master.	
Transmission media	Twisted-pair cable of category 5 or higher (double-shielded straight cable with aluminum tape and braiding)	
Transmission distance	Distance between nodes: 100 m or less	
Node address setting	00 to 9	
External connection terminals	RJ45 × 2 (shielded) IN: EtherCAT input data, OUT: EtherCAT output data	
Send/receive PDO data sizes	Input	56 to 280 bytes/line (including input data, status, and unused areas) Up to 8 lines can be set. ^{*1}
	Output	28 bytes/line (including output data and unused areas) Up to 8 lines can be set. ^{*1}
Mailbox data size	Input	512 bytes
	Output	512 bytes
Mailbox	Emergency messages, SDO requests, and SDO information	
Refreshing methods	I/O-synchronized refreshing (DC)	

^{*1} This depends on the upper limit of the master.

Version information

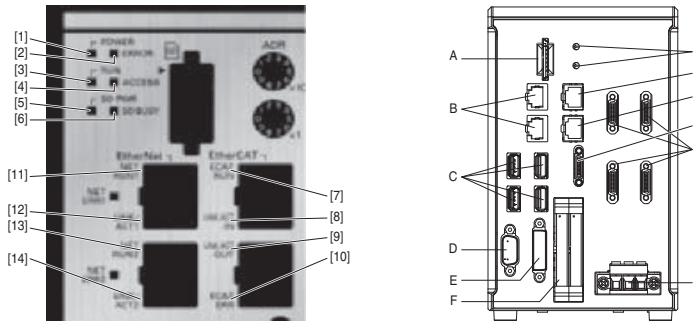
FH Series and programming devices

FH series	Required programming device	
	Sysmac Studio Standard Edition/Vision Edition	
	Ver.1.06	Ver.1.07 or higher
FH-3050 (-)	Not supported	Supported
FH-1050 (-)		

Note: 1. The auto-update to Sysmac Studio version 1.07 will be available soon.
2. Sysmac Studio does not support the FZ5 series.

Components and functions

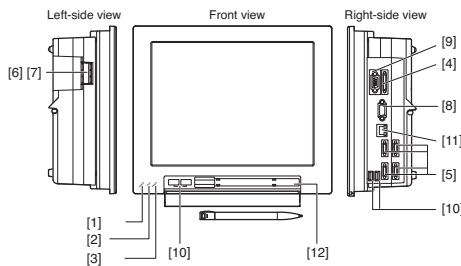
Example of the FH sensor controllers BOX type (4-camera type)



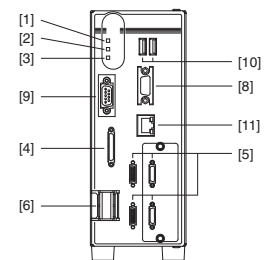
Name	Description
[1] POWER LED	Lit while power is ON.
[2] ERROR LED	Lit when an error has occurred.
[3] RUN LED	Lit while the controller is in Measurement Mode.
[4] ACCESS LED	Lit while the memory is accessed.
[5] SD POWER LED	Lit while power is supplied to the SD card and the card is usable.
[6] SD BUSY LED	Blinks while the SD memory card is accessed.
[7] EtherCAT RUN LED	Lit while EtherCAT communications are usable.
[8] EtherCAT LINK/ACT IN LED	Lit when connected with an EtherCAT device, and blinks while performing communications.
[9] EtherCAT LINK/ACT OUT LED	Lit when connected with an EtherCAT device, and blinks while performing communications.
[10] EtherCAT ERR LED	Lit when EtherCAT communications have become abnormal.
[11] EtherNet NET RUN1 LED	Lit while EtherNet communications are usable.
[12] EtherNet NET LINK/ACK1 LED	Lit when connected with an EtherNet device, and blinks while performing communications.
[13] EtherNet NET RUN2 LED	Lit when EtherNet communications are usable.
[14] EtherNet NET LINK/ACK2 LED	Lit when connected with an EtherNet device, and blinks while performing communications.

Name	Description
A	SD memory card installation connector Install the SD memory card. Do not plug or unplug the SD card during measurement operation. Otherwise measurement time may be affected or data may be destroyed.
B	EtherNet connector Connect an EtherNet device.
C	USB connector Connect a USB device. Do not plug or unplug it during measurement operation. Otherwise measurement time may be affected or data may be destroyed.
D	RS-232C connector Connect an external device such as a programmable controller.
E	DVI-I connector Connect a monitor.
F	I/O connector (control lines, data lines) Connect the controller to external devices such as a sync sensor and PLC.
G	EtherCAT address setup volume Used to set a node address (00 to 99) as an EtherCAT communication device.
H	EtherCAT communication connector (IN) Connect the opposed EtherCAT device.
I	EtherCAT communication connector (OUT) Connect the opposed EtherCAT device.
J	Encoder connector Connect an encoder.
K	Camera connector Connect cameras.
L	Power supply terminal connector Connect a DC power supply. Wire the controller independently on other devices. Wire the ground line. Be sure to ground the controller alone. Perform wiring using the attached power supply connector.

Example of the FZ5 sensor controllers LCD-integrated type (4-camera type)



Example of the FZ5-Lite sensor controllers LCD-integrated type (4-camera type)



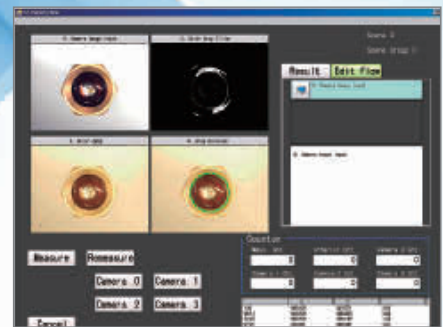
Name	Description
[1] POWER LED	Lit while power is ON.
[2] RUN LED	Lit while the controller is in Run Mode.
[3] ERROR LED	Lit when an error has occurred.
[4] I/O connector (control lines, data lines)	Connect the controller to external devices such as a sync sensor and PLC.
[5] Camera connector	Connect cameras.
[6] Power	Connect a DC power supply. Wire the power supply unit independently of other devices. After wiring, replace the terminal cover.
[7] Ground terminal	Connect the ground wire. Make sure that the controller is grounded with a separate ground wire.
[8] Monitor connector (analog RGB)	Connect a monitor. (Provided with Lite controller type only)
[9] RS-232C/RS-422 connector	Connect an external device such as a personal computer or PLC.
[10] USB connector	Connect a track ball, mouse and USB memory. A total of four USB ports are provided and any of them can be used. However, when connecting two or more USB memories, do not connect them to adjacent ports. Doing so may cause the USB memories to come into contact, resulting in malfunction or damage.
[11] EtherNet connector	Connect the controller to a personal computer.
[12] Touch pen (holder)	A touch pen is stored. (Provided with the LCD integrated type only)

VISION – TAILORED AND FIT FOR INDUSTRY

FlexXpect vision platform

FlexXpect is a modular Vision platform featuring industry specific functionality. In combination with the powerful Xpectia-hardware, the FlexXpect software modules take you into a new dimension of specialisation. FlexXpect is simple to use and can be customised easily, to focus on your individual needs. The combination of Xpectia's real colour sensing, high resolution and intuitive user guidance combined with the FlexXpect value added tools represents an unbeatable duo.

Depending on industry, different requirements and regulations are in place for quality inspection. Premium class add-on functionality, tailored for industry, is delivered by FlexXpect.



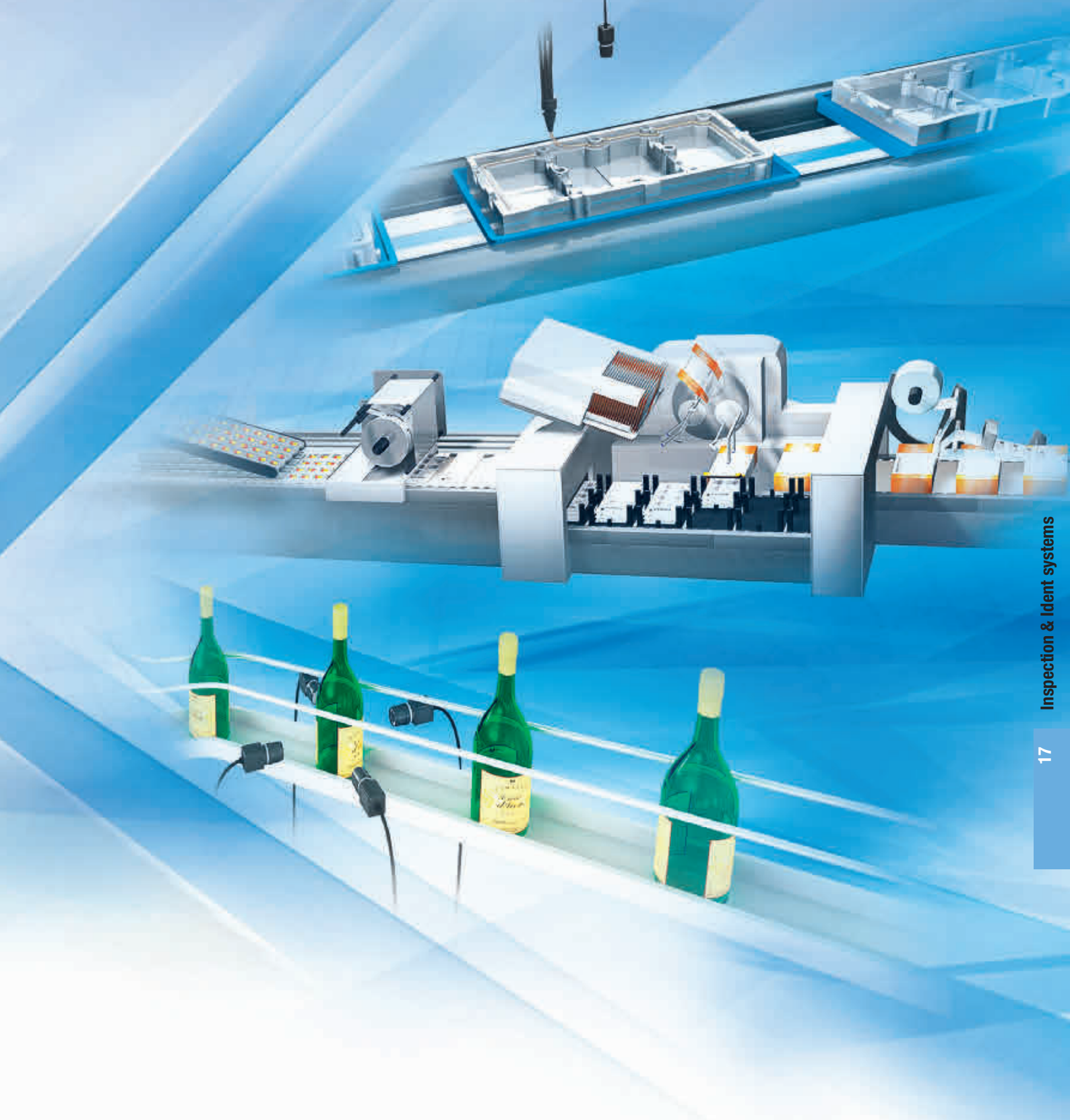
Simplicity – easy to use

FlexXpect features an easy and intuitive user interface, which allows inspection solutions to be set-up quickly and efficiently. With a built in touch screen interface and icon based menu structure, the complexity of programming the system is kept to a minimum. The Flow-Menu is an ideal tool to re-build the process sequences inside the vision platform.

Customised to your needs

The FlexXpect platform can be further customized to the needs of the individual application. Different levels of product modifications are supported. Based on the skill of the user and required functionality it offers:

- Flow programming
- GUI modifications
- Processing items & communication



YOUR BENEFITS

- FlexXpect-Glue Bead: Automatic one shot seal inspection
- FlexXpect-Pharma: 21 CFR Part 11 compliant
- FlexXpect-Labelling: 360° bottle inspection
- FlexXpect-PV: alignment & inspection of wafers

VISION – TAILORED AND FIT FOR INDUSTRY

FlexXpect Pharma

FlexXpect is a modular Vision platform. In combination with the powerful Xpectia-hardware, it takes you into a new dimension of specialisation. The FlexXpect-Pharma is targeting challenging inspections in the Pharmaceutical industry. It offers powerful inspection tools and all functions, necessary for the validation under the FDA 21 CFR Part 11. With the powerful code verification and OCR features, FlexXpect-Pharma is the ideal solution for Track & Trace applications.

Inspect any applications in Pharma:

- Blister pack
- Vials
- Syringes
- Label inspection



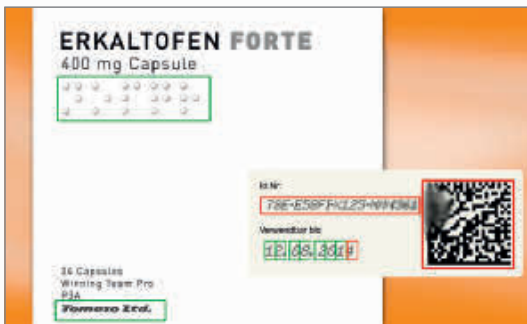
Inspect any applications in Pharma



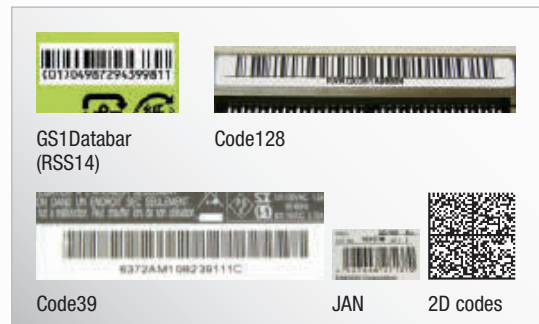
Pill inspection in blisters



Polar transformation of round strings



Date/Batch code verification (OCR/OCV)



High speed code reading

VISION – TAILORED AND FIT FOR INDUSTRY

FlexXpect Labelling

FlexXpect is a modular Vision platform. In combination with the powerful Xpectia-hardware, it takes you into a new dimension of specialisation. FlexXpect-Labeling has been designed to deliver tailored functionality for inspection of labels and packages.

Powerful image processing tools for labelling:

- OCR/OCV
- Barcode/Datamatrix
- Pattern and edge tools
- Real colour inspection
- High resolution to detect minute defects

Label unwrapping from bottles for inspection of premium beverages:

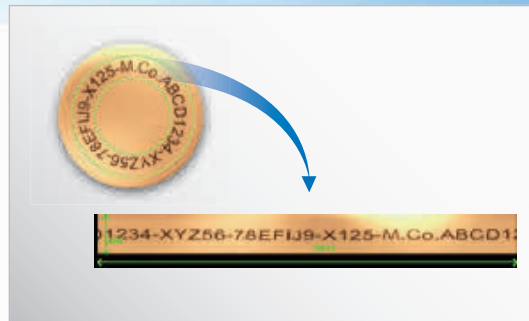
- Acquire images from up to 4x cameras
- Compensate the distortion
- Identify the overlapping areas
- Stitch the images together



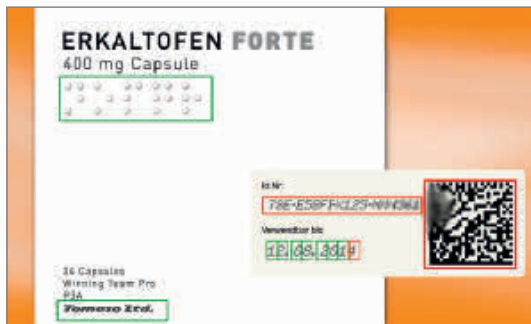
Powerful image processing tools for labelling



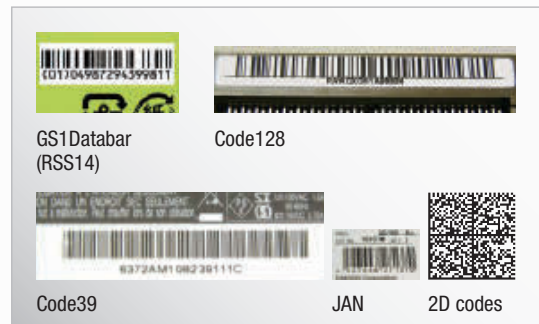
Strong OCR/OCV



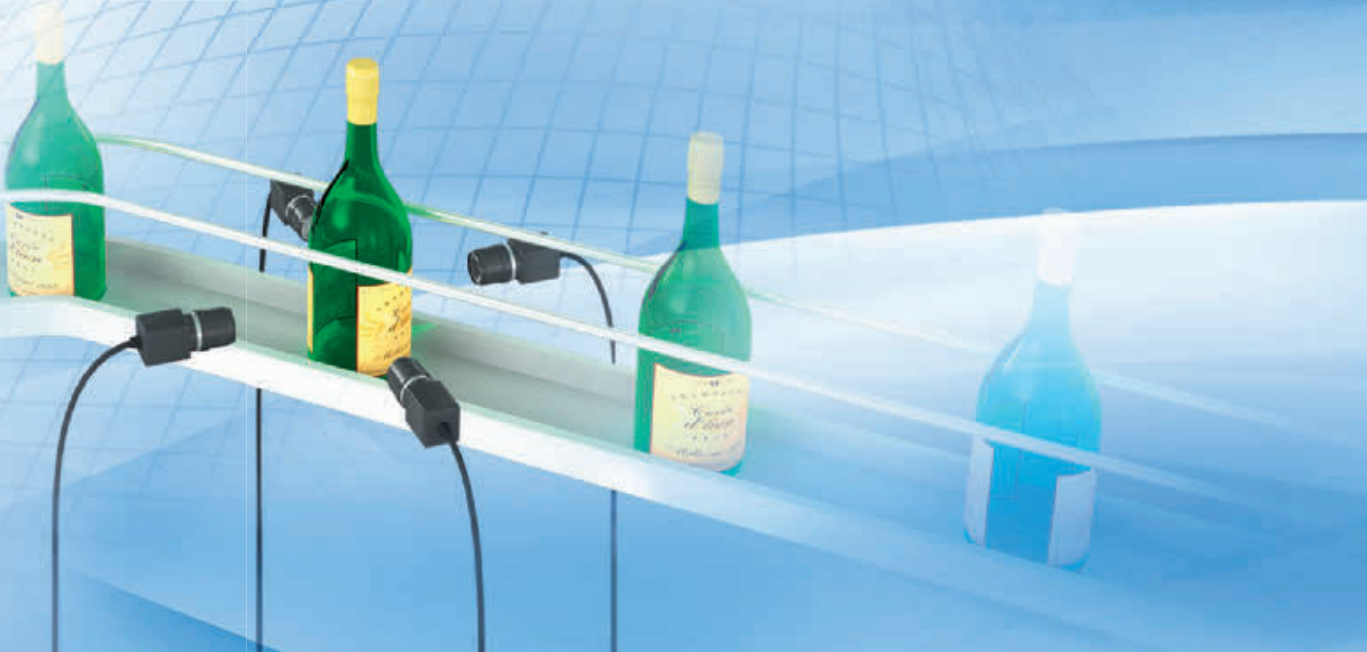
Polar transformation of round strings



Date/Batch code verification (OCR/OCV)



High speed code reading



Position and defect inspection

Produce aesthetically perfect products is a key point. FlexXpect-Labeling offers a suite of image processing tools to inspect the label for position and defects.

YOUR BENEFITS

- Strong OCR/OCV
- Code reading (Barcode, Datamatrix)
- 360° inspections of bottles
- Real colour processing items
- High resolution
- Easy & intuitive configuration



Reading different codes at a time

Two or more different codes in the same field of view can be read by utilizing a high resolution camera. This function helps to reduce the inspection time.

FlexXpect-Labeling software module	FLEXXPECT-LABELLING
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Note: FlexXpect software modules require Xpectia/FZW hardware. This is not part of the item and needs to be ordered independently.

VISION – TAILORED AND FIT FOR INDUSTRY

FlexXpect Glue Bead

FlexXpect is a modular Vision platform. In combination with the powerful Xpectia-hardware, it takes you into a new dimension of specialisation. The FlexXpect-Glue Bead inspects the complete sealing of automotive parts in one shot. Driven by the real colour functionality, any sealing can be identified and checked, independent how visible it is. Featuring a simple set-up procedure and automatic calculation of the path, it represents a powerful and straight forward solution for any glue application.

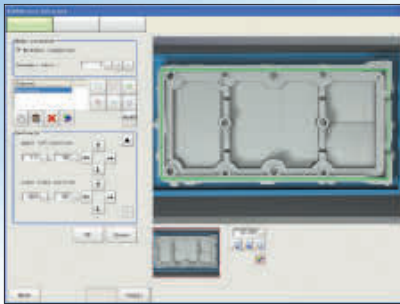
Glue Bead inspection:

- Correct path
- Thickness
- Interrupt

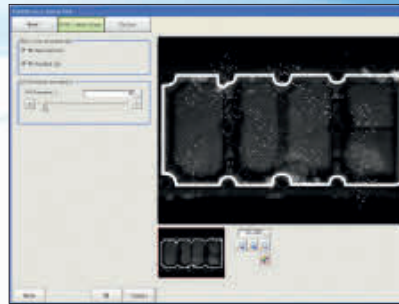


Inspect any applications in Pharma

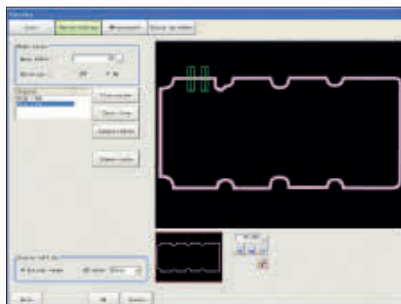
FlexXpect-Glue Bead features an intuitive and easy set-up procedure. No expert knowledge of the user is required.



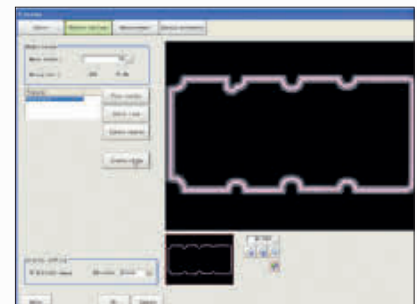
Step 1
Define inspection area.



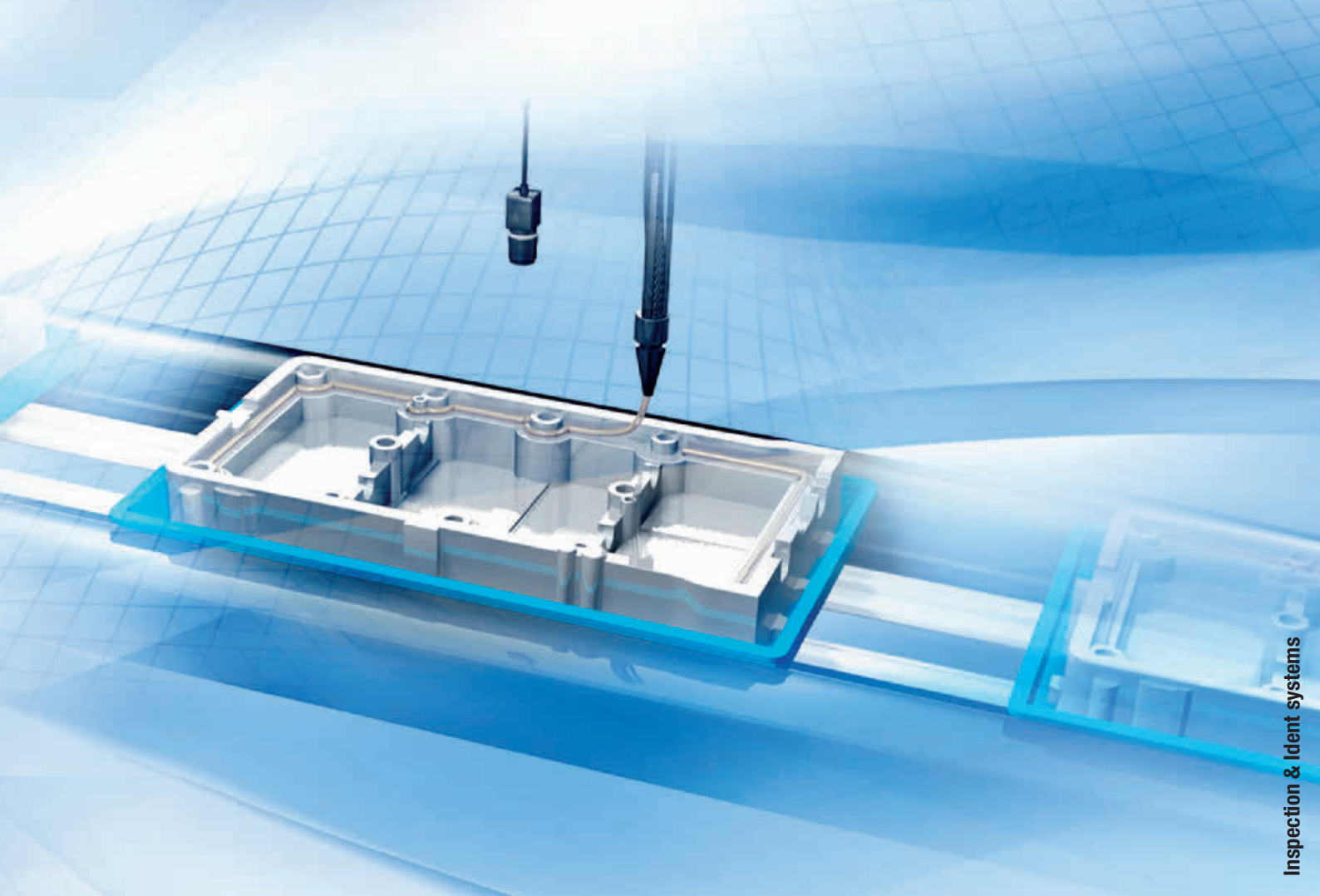
Step 2
Teach the glue.



Step 3
Define start & end point of the glue.

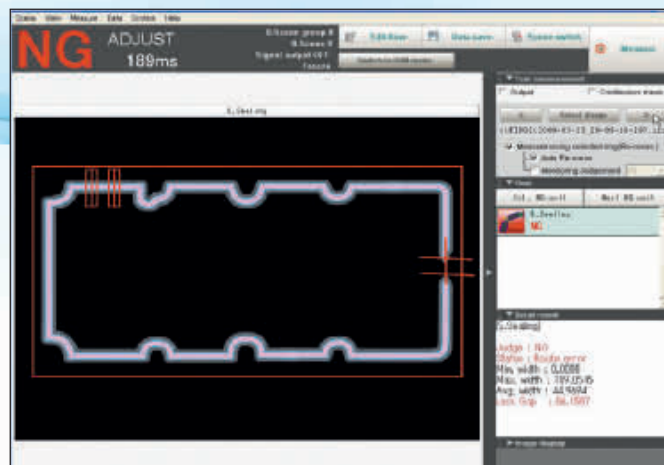
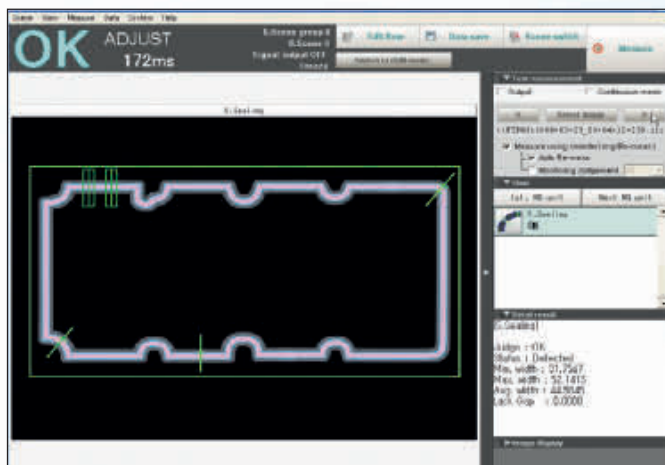


Step 4
Automatic calculation of the path of the Glue Bead.



YOUR BENEFITS

- One shot inspection of the complete path
- Easy set-up
- Automatic path calculation
- Real colour glue extraction



FlexXpect-Glue Bead software module	FLEXPECT-GLUE BEAD
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Note: FlexXpect software modules require Xpectia/FZW hardware. This is not part of the item and needs to be ordered independently.

VISION – TAILORED AND FIT FOR INDUSTRY

FlexXpect PV

FlexXpect is a modular Vision platform. In combination with the powerful Xpectia hardware, it takes you into a new dimension of specialisation. FlexXpect-PV delivers tailored functionality for alignment and the inspection of wafers for chips and cracks.

Features of FlexXpect-PV:

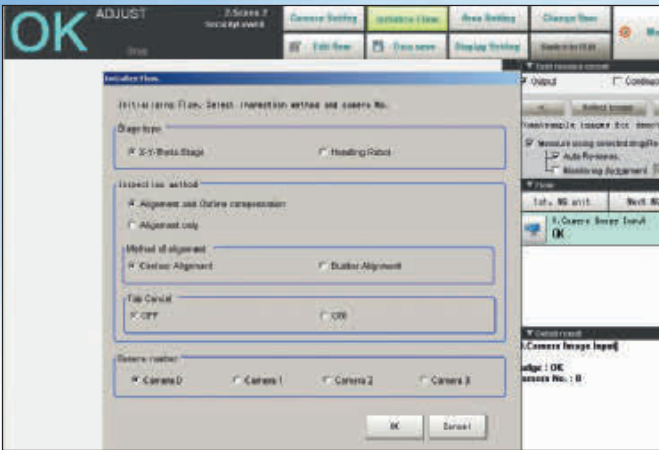
- Easy and intuitive set-up
- Automatic extraction and teaching of the PV wafer
- Precise inspections with high resolution cameras
- Automatic robot calibration
- Fade-out strings and conveyor belts

Supported PV inspections:

- Precise wafer and string alignment
- Accurate chamfer chip inspection
- Detection of minute edge cracks
- Bus bar alignment on the wafer

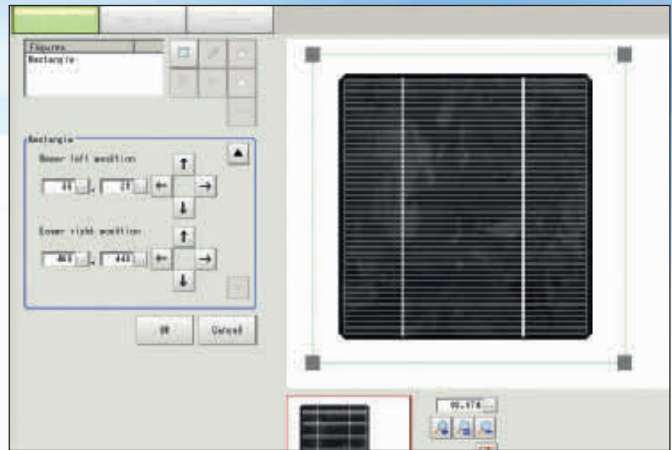


Quick set-up in simple steps:



Step 1:

Select the inspection function



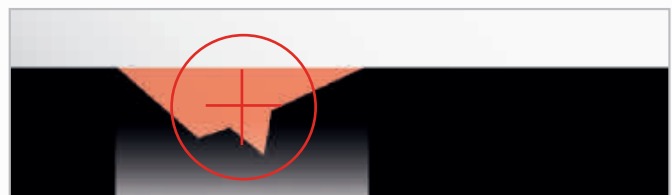
Step 2:

Draw a rectangle around the wafer



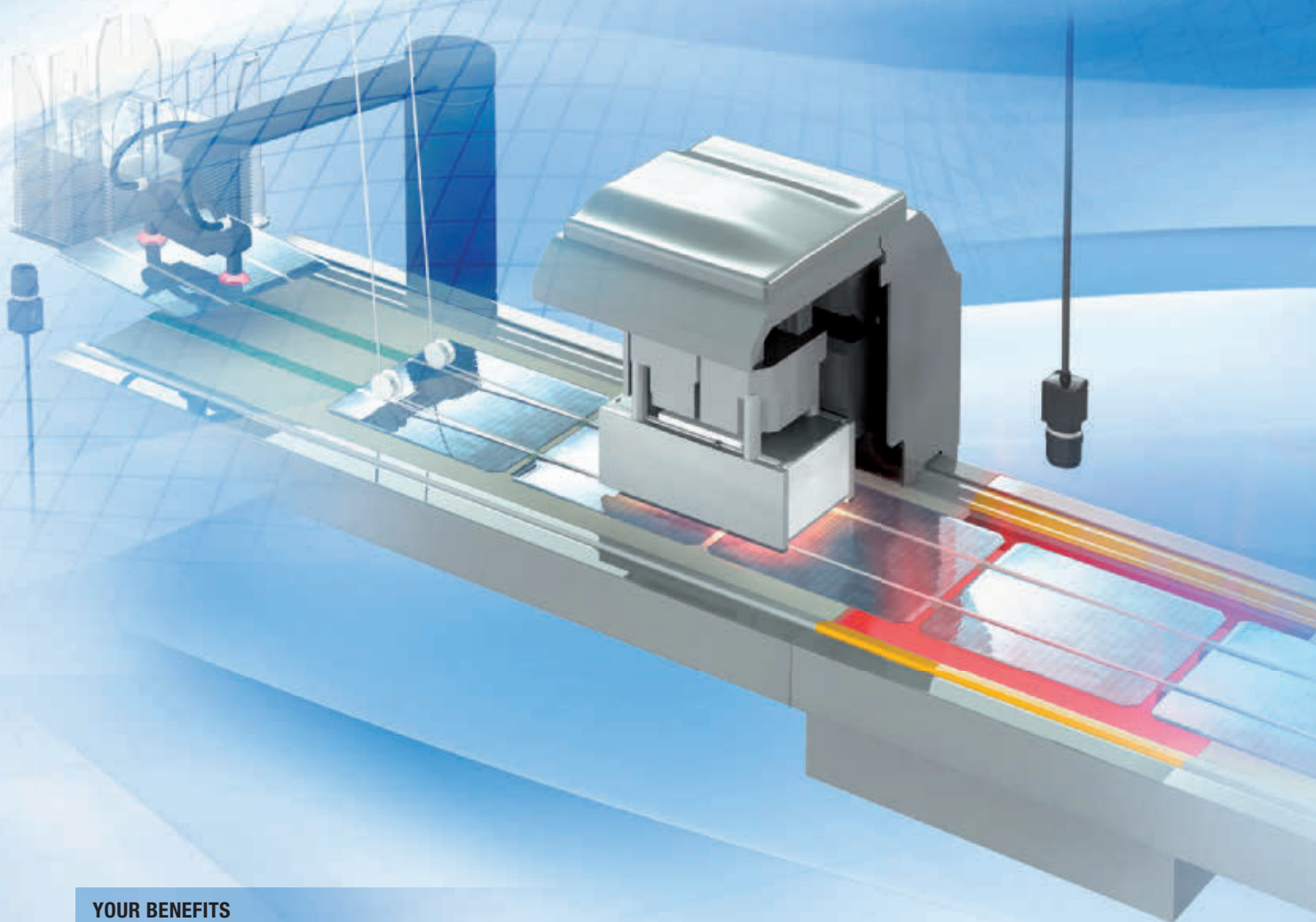
Step 3:

One step deletion of bus bars and conveyor belts (optional)



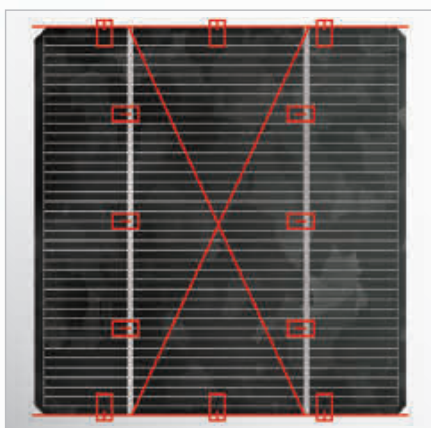
Step 4:

Start the inspection
Accurate chamfer chip inspection (0.1 mm)

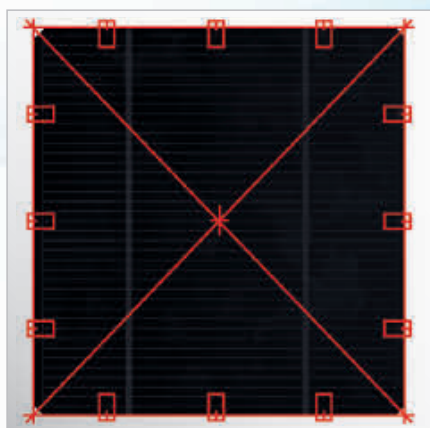


YOUR BENEFITS

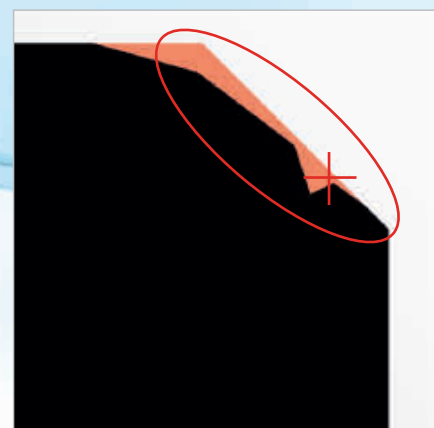
- One shot inspection of the complete path
- Easy set-up
- Automatic path calculation
- Real colour glue extraction



Bus bar alignment



Outline edge alignment



Precise detection of edge breakage

FlexXpect-PV software module	FLEXPECT-PV
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Note: FlexXpect software modules require Xpectia/FZW hardware. This is not part of the item and needs to be ordered independently.



All codes with one touch

The new compact FQ-CR1 code reader enables accurate, reliable and easy reading of barcodes and 2D codes, thanks to superior crystal clear imaging technology, which it shares with the other products in our highly regarded FQ family of vision sensors.

- 1D code reader
- 2D code reader
- Crystal-clear image quality
- One-touch control via simple, icon-driven menu

Ordering information

Field of vision		Narrow View	Standard View	Wide View (Long-distance)	Wide View (Short-distance)
Number of pixels		350,000 pixels			
Monochrome	NPN	FQ-CR10010F-M	FQ-CR10050F-M	FQ-CR10100F-M	FQ-CR10100N-M
	PNP	FQ-CR15010F-M	FQ-CR15050F-M	FQ-CR15100F-M	FQ-CR15100N-M
Field of vision/Installation distance		Refer to figure 1.	Refer to figure 2.	Refer to figure 3.	Refer to figure 4.

Field of vision/Installation distance

(Unit: mm)

Field of vision	Narrow View	Standard View	Wide View (Long-distance)	Wide View (Short-distance)
Appearance				
350,000 pixels type	<p>Figure 1</p>	<p>Figure 2</p>	<p>Figure 3</p>	<p>Figure 4</p>

Specifications

Item		Multi Code Reader
Model	NPN	FQ-CR10□□□□-M
	PNP	FQ-CR15□□□□-M
Field of view		Refer to ordering information on page 376. (Tolerance (field of vision): ±10% max.)
Installation distance		
Main functions	Inspection items	2D Code (Data Matrix(EC200), QR Code, MicroQR Code, PDF417, MicroPDF417, GS1-Data Matrix) Bar Code (JAN/EAN/UPC, Code39, Codabar (NW-7), ITF (Interleaved 2 of 5), Code 93, Code128/GS1-128, GS1 DataBar* (Truncated, Stacked, Omnidirectional, Stacked Omnidirectional, Limited, Expanded, Expanded Stacked), Pharmacode, GS1-128 Composite Code (CC-A, CC-B, CC-C))
	Image filter	None
	Verification function	Supported
	Retry function	Normal retry, Exposure retry, Scene retry, Trigger retry
	Number of simultaneous measurements	32
	Position compensation	None
	Number of registered scenes	32
	Image input	Image processing method
Image filter		High dynamic range (HDR) and polarizing filter (attachment)
Image elements		1/3-inch Monochrome CMOS
Shutter		1/250 to 1/30,000
Processing resolution		752 × 480
Partial input function		Supported horizontally only.
Lighting	Lighting method	Pulse
	Lighting color	White
Data logging	Measurement data	In Sensor: 1,000 items (If a Touch Finder is used, results can be saved up to the capacity of an SD card.)
	Images	In Sensor: 20 images (If a Touch Finder is used, images can be saved up to the capacity of an SD card.)
Auxiliary function		Math (arithmetic, calculation functions, trigonometric functions, and logic functions)
Measurement trigger		External trigger (single or continuous)
I/O specifications	Input signals	7 signals Single measurement input (TRIG) Control command input (IN0 to IN5)
	Output signals	3 signals Control output (BUSY) Overall judgement output (OR) Error output (ERROR) Note: The three output signals can be allocated for the judgements of individual inspection items.
	Ethernet specifications	100Base-TX/10Base-T
	Communications	–
	I/O expansion	–
	RS-232C	–
	Ratings	Power supply voltage
Current consumption		2.4 A max.
Environmental immunity	Ambient temperature range	Operating: 0 to 50°C, Storage: –25 to 65°C (with no icing or condensation)
	Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)
	Ambient atmosphere	No corrosive gas
	Vibration resistance (destruction)	10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions 8 min each, 10 times
	Shock resistance (destruction)	150 m/s ² 3 times each in 6 direction (up, down, right, left, forward, and backward)
Degree of protection	IEC 60529 IP67 (Except when Polarizing Filter Attachment is mounted or connector cap is removed.)	
Materials		Sensor: PBT, PC, SUS, Mounting Bracket: PBT, Polarizing Filter Attachment: PBT, PC Ethernet connector: Oil-resistance vinyl compound, I/O connector: Lead-free heat-resistant PVC
Weight		Narrow View/Standard View: Approx. 160 g Wide View: Approx. 150 g
Accessories included with sensor		Mounting Bracket (FQ-XL)(1), Polarizing Filter Attachment (FQ-XF1) (1), Instruction Manual, Quick Startup Guide, Member Registration Sheet, Warning Label
LED class		Class 2(Applicable standards: IEC 60825-1:1993 +A1:1997 +A2:2001, EN 60825-1:1994 +A1:2002 +A2:2001, and JIS C 6802:2005)
Applicable standards		EN 61326-1:2006 and IEC61010-1

Touch Finder

Item	Type	Model with DC power supply	Model with AC/DC/battery power supply
	Model	FQ2-D30	FQ2-D31
Number of connectable Sensor	Number of sensors that can be recognized (switched): 32 max. number or sensor that can displayed on monitor: 8 max.		
Main functions	Types of measurement displays	Last result display, Last NG display, trend monitor, histograms	
	Types of display images	Through, frozen, zoom-in, and zoom-out images	
	Data logging	Measurement results, measured images	
	Menu language	English, German, French, Italian, Spanish, Traditional Chinese, Simplified Chinese, Korean, Japanese	
Indications	LCD	Display device	3.5-inch TFT color LCD
		Pixels	320 × 240
		Display colors	16.7 million
	Backlight	Life expectancy ^{*1}	50,000 hours at 25°C
		Brightness adjustment	Provided
Screen saver	Provided		
Operation interface	Touch screen	Method	Resistance film
		Life expectancy ^{*2}	1,000,000 touch operations
External interface	Ethernet	100BASE-TX/10BASE-T	
	SD card	SDHC-compliant, Class 4 or higher recommended	
Ratings	Power supply voltage	DC power connection: 21.6 to 26.4 VDC (including ripple)	DC power connection: 21.6 to 26.4 VDC (including ripple) AC adapter (manufactured by Sino-American Japan Co., Ltd) connection: 100 to 240 VAC, 50/60 Hz Battery connection: FQ-BAT1 Battery (1cell, 3.7 V)
	Continuous operation on Battery ^{*3}	–	1.5 h
	Power consumption	DC power connection: 0.2 A max.	DC power connection: 0.2 A max. Charging battery: 0.4 A max.
Environmental immunity	Ambient temperature range	Operating: 0 to 50°C Storage: –25 to 65°C (with no icing or condensation)	Operating: 0 to 50°C when mounted to DIN Track or panel Operation on Battery: 0 to 40°C:–25 to 65°C (with no icing or condensation)
	Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)	
	Ambient atmosphere	No corrosive gas	
	Vibration resistance (destruction)	10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions 8 min each, 10 times	
	Shock resistance (destruction)	150 m/s ² 3 times each in 6 direction (up, down, right, left, forward, and backward)	
	Degree of protection	IEC 60529 IP20 (when SD card cover, connector cap, or harness is attached)	
Weight	Approx. 270 g (without Battery and hand strap attached)		
Materials	Case: ABS		
Accessories included with Touch Finder	Touch Pen (FQ-XT), Instruction Manual		

^{*1} This is a guideline for the time required for the brightness to diminish to half the initial brightness at room temperature and humidity. The life of the backlight is greatly affected by the ambient temperature and humidity and will be shorter at lower or higher temperatures.

^{*2} This value is only a guideline. No guarantee is implied. The value will be affected by operating conditions.

^{*3} This value is only a guideline. No guarantee is implied. The value will be affected by the operating environment and operating conditions.

Battery

Item	Model	FQ-BAT1
Battery type		Secondary lithium ion battery
Nominal capacity		1,800 mAh
Rated voltage		3.7 V
Ambient temperature range		Operating: 0 to 40°C Storage: –25 to 65°C (with no icing or condensation)
Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)
Charging method		Charged in Touch Finder (FQ2-D31). AC adapter (FQ-AC□) is required.
Charging time ^{*1}		2 h
Usage time ^{*1}		1.5 h
Battery backup life ^{*2}		300 charging cycles
Weight		50 g max.

^{*1} This value is only a guideline. No guarantee is implied. The value will be affected by operating conditions

^{*2} This is a guideline for the time required for the capacity of the Battery to be reduced to 60% of the initial capacity. No guarantee is implied. The value will be affected by the operating environment and operating conditions.

System Requirements for PC tool for FQ

The following Personal Computer system is required to use the software.

OS	Microsoft Windows XP Home Edition/Professional SP2 or higher (32-bit version) Microsoft Windows 7 Home Premium or higher (32-bit/64-bit version)
CPU	Core 2 Duo 1.06 GHz or the equivalent or higher
RAM	1GB min.
HDD	500 MB min. available space ^{*1}
Monitor	1,024 × 768 dots min.

^{*1} Available space is also required separately for data logging.

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Barcode & 2D code reader for challenging imprinted and molded codes

The FQ-CR2 allows the stable reading of codes that are molded or impressed into objects used e.g. in the automotive or electronic industry. The automatic adaption of settings ensures identifying the inspection conditions under which even challenging codes can be read.

- Optimized for imprinted or molded codes in metal, glass, PCB boards, etc.
- Automatic setting modification for finding best reading condition
- IP67

Ordering information

Field of vision		Narrow View	Standard View	Wide View (Long-distance)	Wide View (Short-distance)
Number of pixels		350,000 pixels			
Monochrome	NPN	FQ-CR20010F-M	FQ-CR20050F-M	FQ-CR20100F-M	FQ-CR20100N-M
	PNP	FQ-CR25010F-M	FQ-CR25050F-M	FQ-CR25100F-M	FQ-CR25100N-M
Field of vision/Installation distance		Refer to figure 1.	Refer to figure 2.	Refer to figure 3.	Refer to figure 4.

Field of vision/Installation distance

(Unit: mm)

Field of vision	Narrow View	Standard View	Wide View (Long-distance)	Wide View (Short-distance)
Appearance				
350,000 pixels type	Figure 1 	Figure 2 	Figure 3 	Figure 4

Specifications

ID Model FQ-CR2 Series

Item		2D Code Reader
Model	NPN	FQ-CR20□□□□-M
	PNP	FQ-CR25□□□□-M
Field of view	Refer to ordering information on page 379. (Tolerance (field of vision): ±10% max.)	
Installation distance		
Main functions	Inspection items	2D Code (Data Matrix(EC200), QR Code)
	Image filter	Filter function (Smooth, Dilate, Erosion, Median), Code Error Correction Position Display
	Verification function	None
	Retry function	Normal retry, Exposure retry, Scene retry, Trigger retry
	Number of simultaneous measurements	32
	Position compensation	None
	Number of registered scenes	32
Image input	Image processing method	Monochrome
	Image filter	High dynamic range (HDR) and polarizing filter (attachment)
	Image elements	1/3-inch Monochrome CMOS
	Shutter	1/250 to 1/32,258
	Processing resolution	752 × 480
	Partial input function	Supported horizontally only.
Lighting	Lighting method	Pulse
	Lighting color	White
Data logging	Measurement data	In Sensor: 1,000 items (If a Touch Finder is used, results can be saved up to the capacity of an SD card.)
	Images	In Sensor: 20 images (If a Touch Finder is used, images can be saved up to the capacity of an SD card.)
Auxiliary function		Math (arithmetic, calculation functions, trigonometric functions, and logic functions)
Measurement trigger		External trigger (single or continuous)
I/O specifications	Input signals	7 signals Single measurement input (TRIG) Control command input (IN0 to IN5)
	Output signals	3 signals Control output (BUSY) Overall judgement output (OR) Error output (ERROR) Note: The three output signals can be allocated for the judgements of individual inspection items.
	Ethernet specifications	100Base-TX/10Base-T
	Communications	–
	I/O expansion	–
	RS-232C	–
Ratings	Power supply voltage	21.6 to 26.4 VDC (including ripple)
	Current consumption	2.4 A max.
Environmental immunity	Ambient temperature range	Operating: 0 to 50°C, Storage: –25 to 65°C (with no icing or condensation)
	Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)
	Ambient atmosphere	No corrosive gas
	Vibration resistance (destruction)	10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions 8 min each, 10 times
	Shock resistance (destruction)	150 m/s ² 3 times each in 6 direction (up, down, right, left, forward, and backward)
	Degree of protection	IEC 60529 IP67 (Except when Polarizing Filter Attachment is mounted or connector cap is removed.)
Materials	Sensor: PBT, PC, SUS, Mounting Bracket: PBT, Polarizing Filter Attachment: PBT, PC Ethernet connector: Oil-resistance vinyl compound, I/O connector: Lead-free heat-resistant PVC	
Weight	Narrow View/Standard View: Approx.160 g Wide View: Approx. 150 g	
Accessories included with sensor	Mounting Bracket (FQ-XL)(1), Polarizing Filter Attachment (FQ-XF1) (1), Instruction Manual, Quick Startup Guide, Member Registration Sheet, Warning Label	
LED class	Class 2(Applicable standards: IEC 60825-1:1993 +A1:1997 +A2:2001, EN 60825-1:1994 +A1:2002 +A2:2001, and JIS C 6802:2005)	
Applicable standards	EN 61326-1:2006 and IEC61010-1	

Touch Finder

Item	Type Model	Model with DC power supply	Model with AC/DC/battery power supply
		FQ2-D30	FQ2-D31
Number of connectable Sensor		Number of sensors that can be recognized (switched): 32 max. number or sensor that can displayed on monitor: 8 max.	
Main functions	Types of measurement displays	Last result display, Last NG display, trend monitor, histograms	
	Types of display images	Through, frozen, zoom-in, and zoom-out images	
	Data logging	Measurement results, measured images	
	Menu language	English, German, French, Italian, Spanish, Traditional Chinese, Simplified Chinese, Korean, Japanese	
Indications	LCD	Display device	3.5-inch TFT color LCD
		Pixels	320 × 240
		Display colors	16.7 million
	Backlight	Life expectancy ^{*1}	50,000 hours at 25°C
		Brightness adjustment	Provided
Screen saver	Provided		
Operation interface	Touch screen	Method	Resistance film
		Life expectancy ^{*2}	1,000,000 touch operations
External interface	Ethernet	100BASE-TX/10BASE-T	
	SD card	SDHC-compliant, Class 4 or higher recommended	
Ratings	Power supply voltage	DC power connection: 21.6 to 26.4 VDC (including ripple)	DC power connection: 21.6 to 26.4 VDC (including ripple) AC adapter (manufactured by Sino-American Japan Co., Ltd) connection: 100 to 240 VAC, 50/60 Hz Battery connection: FQ-BAT1 Battery (1 cell, 3.7 V)
	Continuous operation on Battery ^{*3}	–	1.5 h
	Power consumption	DC power connection: 0.2 A max.	DC power connection: 0.2 A max. Charging battery: 0.4 A max.
Environmental immunity	Ambient temperature range	Operating: 0 to 50°C	Operating: 0 to 50°C when mounted to DIN Track or panel Operation on Battery: 0 to 40°C:–25 to 65°C (with no icing or condensation)
		Storage: –25 to 65°C (with no icing or condensation)	
	Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)	
	Ambient atmosphere	No corrosive gas	
	Vibration resistance (destruction)	10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions 8 min each, 10 times	
	Shock resistance (destruction)	150 m/s ² 3 times each in 6 direction (up, down, right, left, forward, and backward)	
Degree of protection	IEC 60529 IP20 (when SD card cover, connector cap, or harness is attached)		
Weight	Approx. 270 g (without Battery and hand strap attached)		
Materials	Case: ABS		
Accessories included with Touch Finder	Touch Pen (FQ-XT), Instruction Manual		

^{*1} This is a guideline for the time required for the brightness to diminish to half the initial brightness at room temperature and humidity. The life of the backlight is greatly affected by the ambient temperature and humidity and will be shorter at lower or higher temperatures.

^{*2} This value is only a guideline. No guarantee is implied. The value will be affected by operating conditions.

^{*3} This value is only a guideline. No guarantee is implied. The value will be affected by the operating environment and operating conditions.

Battery

Item	Model	FQ-BAT1
Battery type		Secondary lithium ion battery
Nominal capacity		1,800 mAh
Rated voltage		3.7 V
Ambient temperature range	Operating:	0 to 40°C
	Storage:	–25 to 65°C (with no icing or condensation)
Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)	
Charging method	Charged in Touch Finder (FQ2-D31). AC adapter (FQ-AC□) is required.	
Charging time ^{*1}	2 h	
Usage time ^{*1}	1.5 h	
Battery backup life ^{*2}	300 charging cycles	
Weight	50 g max.	

^{*1} This value is only a guideline. No guarantee is implied. The value will be affected by operating conditions

^{*2} This is a guideline for the time required for the capacity of the Battery to be reduced to 60% of the initial capacity. No guarantee is implied. The value will be affected by the operating environment and operating conditions.

System Requirements for PC tool for FQ

The following Personal Computer system is required to use the software.

OS	Microsoft Windows XP Home Edition/Professional SP2 or higher (32-bit version) Microsoft Windows 7 Home Premium or higher (32-bit/64-bit version)
CPU	Core 2 Duo 1.06 GHz or the equivalent or higher
RAM	1GB min.
HDD	500 MB min. available space ^{*1}
Monitor	1,024 × 768 dots min.

^{*1} Available space is also required separately for data logging.

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Date & lot code verifier

The FQ2-CH is the ideal solution for date & lot code verifications in packaging lines. With double speed and recognition even of angled or difficult to read texts, the sensor helps you avoid costly product returns or the installation of costly vision systems.

- Optimized for date & lot code verification in packaging lines
- Double speed
- Position compensation for angled prints
- IP67

Ordering information

Field of vision	Narrow View	Standard View	Wide View (Long-distance)	Wide View (Short-distance)
Number of pixels	350,000 pixels			
Monochrome	NPN	FQ2-CH10010F-M	FQ2-CH10050F-M	FQ2-CH10100F-M
	PNP	FQ2-CH15010F-M	FQ2-CH15050F-M	FQ2-CH15100F-M
Field of vision/Installation distance	Refer to figure 1.	Refer to figure 2.	Refer to figure 3.	Refer to figure 4.

Field of vision/Installation distance

(Unit: mm)

Field of vision	Narrow View	Standard View	Wide View (Long-distance)	Wide View (Short-distance)
Appearance				
350,000 pixels type	<p>Figure 1</p>	<p>Figure 2</p>	<p>Figure 3</p>	<p>Figure 4</p>

Specifications

ID Model FQ2-CH Series

Item		Optical Character Recognition Sensor
Model	NPN	FQ2-CH10□□□□-M
	PNP	FQ2-CH15□□□□-M
Field of view		Refer to ordering information on page 382. (Tolerance (field of vision): ±10% max.)
Installation distance		
Main functions	Inspection items	OCR · Alphabet A to Z · Number 0 to 9 · Symbol ' - . : / Model dictionary
	Image filter	Weak smoothing, Strong smoothing, Dilate, Erosion, Median, Extract edges, Extract horizontal edges, Extract vertical edges, Enhance edges, Background suppression
	Verification function	Supported
	Retry function	Normal retry, Exposure retry, Scene retry, Trigger retry
	Number of simultaneous measurements	32
	Position compensation	Supported (360° Model position compensation, Edge position compensation)
	Number of registered scenes	32
Image input	Image processing method	Monochrome
	Image filter	High dynamic range (HDR) and polarizing filter (attachment)
	Image elements	1/3-inch Monochrome CMOS
	Shutter	Built-in lighting ON: 1/250 to 1/50,000 Built-in lighting OFF: 1/1 to 1/50,000
	Processing resolution	752 × 480
	Partial input function	Supported horizontally only.
Lighting	Lighting method	Pulse
	Lighting color	White
Data logging	Measurement data	In Sensor: 1,000 items (If a Touch Finder is used, results can be saved up to the capacity of an SD card.)
	Images	In Sensor: 20 images (If a Touch Finder is used, images can be saved up to the capacity of an SD card.)
Auxiliary function		Math (arithmetic, calculation functions, trigonometric functions, and logic functions)
Measurement trigger		External trigger (single or continuous) Communications trigger (Ethernet TCP no-protocol, Ethernet FINS/TCP no-protocol, EtherNet/IP, or PLC Link)
I/O specifications	Input signals	7 signals Single measurement input (TRIG) Control command input (INO to IN5)
	Output signals	3 signals Control output (BUSY) Overall judgement output (OR) Error output (ERROR) The assignments of the three output signals (OUT0 to OUT2) can be changed to the individual judgements of the inspection items, the image input ready output (READY), or the external lighting timing output (STGOUT).
	Ethernet specifications	100Base-TX/10Base-T
	Communications	Ethernet TCP no-protocol, Ethernet FINS/TCP no-protocol, EtherNet/IP, or PLC Link
	I/O expansion	Possible by connecting FQ-SDU1_Sensor Data Unit. 11 inputs and 24 outputs
	RS-232C	Possible by connecting FQ-SDU2_Sensor Data Unit. 8 inputs and 7 outputs
	Ratings	Power supply voltage 21.6 to 26.4 VDC (including ripple) Current consumption 2.4 A max.
Environmental immunity	Ambient temperature range	Operating: 0 to 40°C, Storage: -25 to 65°C (with no icing or condensation)
	Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)
	Ambient atmosphere	No corrosive gas
	Vibration resistance (destruction)	10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions 8 min each, 10 times
	Shock resistance (destruction)	150 m/s ² 3 times each in 6 direction (up, down, right, left, forward, and backward)
Degree of protection		IEC 60529 IP67 (Except when Polarizing Filter Attachment is mounted or connector cap is removed.)
Materials		Sensor: PBT, PC, SUS, Mounting Bracket: PBT, Polarizing Filter Attachment: PBT, PC Ethernet connector: Oil-resistance vinyl compound, I/O connector: Lead-free heat-resistant PVC
Weight		Narrow View/Standard View: Approx. 160 g Wide View: Approx. 150 g
Accessories included with sensor		Mounting Bracket (FQ-XL)(1), Polarizing Filter Attachment (FQ-XF1) (1), Instruction Manual, Quick Startup Guide, Member Registration Sheet, Warning Label
LED class		Class 2(Applicable standards: IEC 60825-1:1993 +A1:1997 +A2:2001, EN 60825-1:1994 +A1:2002 +A2:2001, and JIS C 6802:2005)
Applicable standards		EN 61326-1:2006 and IEC61010-1

Touch Finder

Item	Type	Model with DC power supply		Model with AC/DC/battery power supply
		Model	FQ2-D30	FQ2-D31
Number of connectable Sensor		Number of sensors that can be recognized (switched): 32 max. number or sensor that can displayed on monitor: 8 max.		
Main functions	Types of measurement displays		Last result display, Last NG display, trend monitor, histograms	
	Types of display images		Through, frozen, zoom-in, and zoom-out images	
	Data logging		Measurement results, measured images	
	Menu language		English, German, French, Italian, Spanish, Traditional Chinese, Simplified Chinese, Korean, Japanese	
Indications	LCD	Display device	3.5-inch TFT color LCD	
		Pixels	320 × 240	
		Display colors	16.7 million	
	Backlight	Life expectancy ^{*1}	50,000 hours at 25°C	
		Brightness adjustment	Provided	
	Screen saver	Provided		
Operation interface	Touch screen	Method	Resistance film	
		Life expectancy ^{*2}	1,000,000 touch operations	
External interface	Ethernet		100BASE-TX/10BASE-T	
	SD card		SDHC-compliant, Class 4 or higher recommended	
Ratings	Power supply voltage		DC power connection: 21.6 to 26.4 VDC (including ripple)	DC power connection: 21.6 to 26.4 VDC (including ripple) AC adapter (manufactured by Sino-American Japan Co., Ltd) connection: 100 to 240 VAC, 50/60 Hz Battery connection: FQ-BAT1 Battery (1cell, 3.7 V)
	Continuous operation on Battery ^{*3}		–	1.5 h
	Power consumption		DC power connection: 0.2 A max.	DC power connection: 0.2 A max. Charging battery: 0.4 A max.
Environmental immunity	Ambient temperature range		Operating: 0 to 50°C Storage: –25 to 65°C (with no icing or condensation)	Operating: 0 to 50°C when mounted to DIN Track or panel Operation on Battery: 0 to 40°C:–25 to 65°C (with no icing or condensation)
	Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)	
	Ambient atmosphere		No corrosive gas	
	Vibration resistance (destruction)		10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions 8 min each, 10 times	
	Shock resistance (destruction)		150 m/s ² 3 times each in 6 direction (up, down, right, left, forward, and backward)	
	Degree of protection		IEC 60529 IP20 (when SD card cover, connector cap, or harness is attached)	
Weight		Approx. 270 g (without Battery and hand strap attached)		
Materials		Case: ABS		
Accessories included with Touch Finder		Touch Pen (FQ-XT), Instruction Manual		

*1 This is a guideline for the time required for the brightness to diminish to half the initial brightness at room temperature and humidity. The life of the backlight is greatly affected by the ambient temperature and humidity and will be shorter at lower or higher temperatures.

*2 This value is only a guideline. No guarantee is implied. The value will be affected by operating conditions.

*3 This value is only a guideline. No guarantee is implied. The value will be affected by the operating environment and operating conditions.

Sensor Data Units(FQ2-S3/S4/CH only)

Item	Parallel Interface		RS-232C Interface
	NPN	FQ-SDU10	FQ-SDU20
	PNP	FQ-SDU15	FQ-SDU25
I/O specifications	Parallel I/O	Connector 1	6 inputs (I0 to I5)
		Connector 2	11 inputs (TRIG, RESET, I0 to I7, and DSA) 8 outputs (GATE, ACK, RUN, BUSY, OR, ERROR, STGOUT, and SHTOUT)
	RS-232C	–	1 channel, 115,200 bps max.
	Sensor interface		FQ2-S3 connected with FQ-WU□□□□: OMRON interface *Number of connected Sensors: 1
Ratings	Power supply voltage		21.6 to 26.4 VDC (including ripple)
	Insulation resistance		Between all DC external terminals and case: 0.5 MΩ min (at 250 VDC)
	Current consumption		2.5 A max.: FQ2-S□□□□□□-□□□□ and FQ-SDU□□□ 0.4 A max.: FQ2-S3□-□□□□ and FQ-SDU□□□ 0.1 A max.: FQ-SDU□□□ only
Environmental immunity	Ambient temperature range		Operating: 0 to 50°C, Storage: –20 to 65°C (with no icing or condensation)
	Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)
	Ambient atmosphere		No corrosive gas
	Vibration resistance (destruction)		10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions, 8 min each, 10 times
	Shock resistance (destruction)		150 m/s ² 3 times each in 6 directions (up, down, right, left, forward, and backward)
Degree of protection		IEC 60529 IP20	
Materials		Case: PC + ABS, PC	
Weight		Approx. 150 g	
Accessories included with Sensor Data Unit		Instruction Manual	

Battery

Item	Model	FQ-BAT1
Battery type		Secondary lithium ion battery
Nominal capacity		1,800 mAh
Rated voltage		3.7 V
Ambient temperature range		Operating: 0 to 40°C Storage: -25 to 65°C (with no icing or condensation)
Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)
Charging method		Charged in Touch Finder (FQ2-D31). AC adapter (FQ-AC□) is required.
Charging time*1		2 h
Usage time*1		1.5 h
Battery backup life*2		300 charging cycles
Weight		50 g max.

*1 This value is only a guideline. No guarantee is implied. The value will be affected by operating conditions

*2 This is a guideline for the time required for the capacity of the Battery to be reduced to 60% of the initial capacity. No guarantee is implied. The value will be affected by the operating environment and operating conditions.

System Requirements for PC tool for FQ

The following Personal Computer system is required to use the software.

OS	Microsoft Windows XP Home Edition/Professional SP2 or higher (32-bit version) Microsoft Windows 7 Home Premium or higher (32-bit/64-bit version)
CPU	Core 2 Duo 1.06 GHz or the equivalent or higher
RAM	1GB min.
HDD	500 MB min. available space*1
Monitor	1,024 × 768 dots min.

*1 Available space is also required separately for data logging.

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All-In-One (barcode, 2D code, text, quality inspection, positioning)

For the combination of code reading or verification tasks with quality inspection and/or positioning tasks, the FQ2-S4 is the ideal solution for all required functionalities in one compact housing. Up to 32 individual inspection tasks can be set up with the easy-to-use and detachable programming devices.

- All-in-one solution for up to 32 code reading & verification, text, quality inspection and positioning tasks
- Easy-to-use and detachable programming devices
- IP67

Ordering information

Standard Type

Field of vision		Narrow View	Standard View	Wide View (Long-distance)	Wide View (Short-distance)
Number of pixels		350,000 pixels			
Color	NPN	FQ2-S40010F	FQ2-S40050F	FQ2-S40100F	FQ2-S40100N
	PNP	FQ2-S45010F	FQ2-S45050F	FQ2-S45100F	FQ2-S45100N
Monochrome	NPN	FQ2-S40010F-M	FQ2-S40050F-M	FQ2-S40100F-M	FQ2-S40100N-M
	PNP	FQ2-S45010F-M	FQ2-S45050F-M	FQ2-S45100F-M	FQ2-S45100N-M
Field of vision/Installation distance		Refer to figure 1 on page 386.	Refer to figure 2 on page 386.	Refer to figure 3 on page 386.	Refer to figure 4 on page 386.

High-resolution Type

Field of vision		Narrow View	Standard View	Wide View (Long-distance)	Wide View (Short-distance)	C-mount
Number of pixels		760,000 pixels				1.3 million pixels
Color	NPN	FQ2-S40010F-08	FQ2-S40050F-08	FQ2-S40100F-08	FQ2-S40100N-08	FQ2-S40-13
	PNP	FQ2-S45010F-08	FQ2-S45050F-08	FQ2-S45100F-08	FQ2-S45100N-08	FQ2-S45-13
Monochrome	NPN	FQ2-S40010F-08M	FQ2-S40050F-08M	FQ2-S40100F-08M	FQ2-S40100N-08M	FQ2-S40-13M
	PNP	FQ2-S45010F-08M	FQ2-S45050F-08M	FQ2-S45100F-08M	FQ2-S45100N-08M	FQ2-S45-13M
Field of vision/Installation distance		Refer to figure 5 on page 386.	Refer to figure 6 on page 386.	Refer to figure 7 on page 386.	Refer to figure 8 on page 386.	Refer to optical chart on p. 387

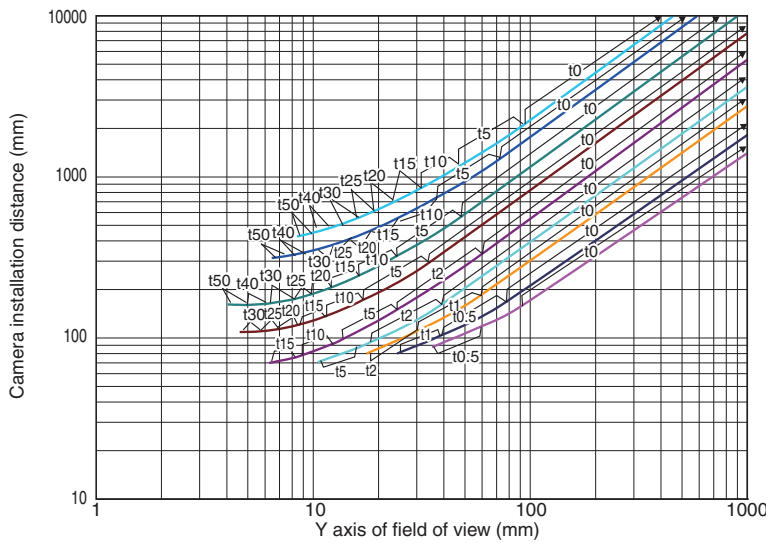
Field of vision/Installation distance

(Unit: mm)

Field of vision	Narrow View	Standard View	Wide View (Long-distance)	Wide View (Short-distance)
Appearance				
350,000 pixels type	Figure 1 	Figure 2 	Figure 3 	Figure 4
760,000 pixels type	Figure 5 	Figure 6 	Figure 7 	Figure 8

Optical Chart for C-mount Camera FQ2-S3□-13□/-S4□-13□

High-resolution, Low-distortion Lenses 3Z4S-LE SV-□□□□H



3Z4S-LE

- SV-0614H
- SV-0814H
- SV-1214H
- SV-1614H
- SV-2514H
- SV-3514H
- SV-5014H
- SV-7525H
- SV-10028H

Extension tube

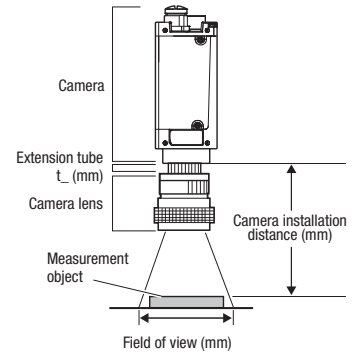
Examples

- t0: Extension tube is not required.
- t5: A 5-mm extension tube is required.

Meaning of Optical Chart

The X axis of the optical chart shows the field of vision (mm) (See Note.), and the Y axis of the optical chart shows the camera installation distance (mm).

Note: The lengths of the fields of vision given in the optical charts are the lengths of the Y axis.



Specifications

Inspection/ID Model FQ2-S4 Series

Item		Inspection/ID Model						
Model	NPN	FQ2-S40□□□□	FQ2-S40□□□□-M	FQ2-S40□□□□-08	FQ2-S40□□□□-08M	FQ2-S40□□□□-13	FQ2-S40□□□□-13M	
	PNP	FQ2-S45□□□□	FQ2-S45□□□□-M	FQ2-S45□□□□-08	FQ2-S45□□□□-08M	FQ2-S45□□□□-13	FQ2-S45□□□□-13M	
Field of view		Refer to ordering information on page 386. (Tolerance (field of vision): ±10% max.)						Select a lens according to the field of vision and installation distance. Refer to optical chart on p. 387.
Installation distance								
Main functions	Inspection items	Search, shape search II, sensitive search, area, color data, edge position, edge pitch, edge width, labeling, OCR ¹ , Bar code ² , 2D-code ² , 2D-code (DMP) ³ , and Model dictionary						
	Number of simultaneous measurements	32						
	Position compensation	Supported (360° Model position compensation, Edge position compensation)						
	Number of registered scenes	32						
	Calibration	Supported						
	Retry function	Normal retry, Exposure retry, Scene retry, Trigger retry						
Image input	Image processing method	Real color	Monochrome	Real color	Monochrome	Real color	Monochrome	
	Image filter	High dynamic range (HDR), image adjustment (Color Gray Filter, Weak smoothing, Strong smoothing, Dilate, Erosion, Median, Extract edges, Extract horizontal edges, Extract vertical edges, Enhance edges, Background suppression), polarizing filter (attachment), and white balance (Sensors with Color Cameras only)						
	Image elements	1/3-inch color CMOS	1/3-inch Monochrome CMOS	1/2-inch color CMOS	1/2-inch Monochrome CMOS	1/2-inch color CMOS	1/2-inch Monochrome CMOS	
	Shutter	Built-in lighting ON: 1/250 to 1/50,000 Built-in lighting OFF: 1/1 to 1/50,000		Built-in lighting ON: 1/250 to 1/60,000 Built-in lighting OFF: 1/1 to 1/60,000		1/1 to 1/60,000		
	Processing resolution	752 × 480		928 × 828		1280 × 1024		
	Partial input function	Supported horizontally only.		Supported horizontally and vertically				
	Lens mounts	-					C-mount	
Lighting	Lighting method	Pulse					-	
	Lighting color	White					-	
Data logging	Measurement data	In Sensor: 1,000 items (If a Touch Finder is used, results can be saved up to the capacity of an SD card.)						
	Images	In Sensor: 20 images (If a Touch Finder is used, images can be saved up to the capacity of an SD card.)						
Auxiliary function	Math (arithmetic, calculation functions, trigonometric functions, and logic functions)							
Measurement trigger	External trigger (single or continuous)							
	Communications trigger (Ethernet TCP no-protocol, Ethernet FINS/TCP no-protocol, EtherNet/IP, or PLC Link)							

Item		Inspection/ID Model					
Model	NPN	FQ2-S40□□□□	FQ2-S40□□□□-M	FQ2-S40□□□□-08	FQ2-S40□□□□-08M	FQ2-S40□□□□-13	FQ2-S40□□□□-13M
	PNP	FQ2-S45□□□□	FQ2-S45□□□□-M	FQ2-S45□□□□-08	FQ2-S45□□□□-08M	FQ2-S45□□□□-13	FQ2-S45□□□□-13M
I/O specifications	Input signals	7 signals Single measurement input (TRIG) Control command input (INO to IN5)					
	Output signals	3 signals Control output (BUSY) Overall judgement output (OR) Error output (ERROR) The assignments of the three output signals (OUT0 to OUT2) can be changed to the individual judgements of the inspection items, the image input ready output (READY), or the external lighting timing output (STGOUT).					
	Ethernet specifications	100Base-TX/10Base-T					
	Communications	Ethernet TCP no-protocol, Ethernet FINS/TCP no-protocol, EtherNet/IP, or PLC Link					
	I/O expansion	Possible by connecting FQ-SDU1_ Sensor Data Unit. 11 inputs and 24 outputs					
	RS-232C	Possible by connecting FQ-SDU2_ Sensor Data Unit. 8 inputs and 7 outputs					
Ratings	Power supply voltage	21.6 to 26.4 VDC (including ripple)					
	Current consumption	2.4 A max.				0.3 A max.	
Environmental immunity	Ambient temperature range	Operating: 0 to 40°C Storage: -25 to 65°C (with no icing or condensation)					
	Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)					
	Ambient atmosphere	No corrosive gas					
	Vibration resistance (destruction)	10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions 8 min each, 10 times					
	Shock resistance (destruction)	150 m/s ² 3 times each in 6 direction (up, down, right, left, forward, and backward)					
	Degree of protection	IEC 60529 IP67 (Except when Polarizing Filter Attachment is mounted or connector cap is removed.)				IEC 60529 IP40	
Materials	Sensor: PBT, PC, SUS Mounting Bracket: PBT Polarizing Filter Attachment: PBT, PC Ethernet connector: Oil-resistance vinyl compound I/O connector: Lead-free heat-resistant PVC				Cover: Zinc-plated steel, Thickness: 0.6 mm Case: Aluminum diecast alloy (ADC-12) Mounting base: Polycarbonate ABS		
Weight	Narrow View/Standard View: Approx. 160 g Wide View: Approx. 150 g				Approx. 160 g without base, Approx. 185 g with base		
Accessories included with sensor	Mounting Bracket (FQ-XL)(1) Polarizing Filter Attachment (FQ-XF1) (1) Instruction Manual, Quick Startup Guide Member Registration Sheet, Warning Label				Mounting Base (FQ-XLC) (1) Mounting Screw (M3 × 8mm)(4) Instruction Manual, Quick Startup Guide Member Registration Sheet		
LED class	Class 2 (Applicable standards: IEC 60825-1:1993 +A1:1997 +A2:2001, EN 60825-1:1994 +A1:2002 +A2:2001, and JIS C 6802:2005)				-		
Applicable standards	EN 61326-1:2006 and IEC 61010-1						

*1 The types of characters to be read are the same as those of FQ2-CH Optical Character Recognition Sensor.

*2 The types of codes to be read are the same as those of FQ-CR1 Multi Code Reader.

*3 The types of codes to be read are the same as those of FQ-CR2 2D Code Reader.

Touch Finder

Item	Type Model	Model with DC power supply	Model with AC/DC/battery power supply
		FQ2-D30	FQ2-D31
Number of connectable Sensor		Number of sensors that can be recognized (switched): 32 max. number of sensor that can displayed on monitor: 8 max.	
Main functions	Types of measurement displays	Last result display, Last NG display, trend monitor, histograms	
	Types of display images	Through, frozen, zoom-in, and zoom-out images	
	Data logging	Measurement results, measured images	
	Menu language	English, German, French, Italian, Spanish, Traditional Chinese, Simplified Chinese, Korean, Japanese	
Indications	LCD	Display device	3.5-inch TFT color LCD
		Pixels	320 × 240
		Display colors	16.7 million
	Backlight	Life expectancy ^{*1}	50,000 hours at 25°C
		Brightness adjustment	Provided
Screen saver	Provided		
Operation interface	Touch screen	Method	Resistance film
		Life expectancy ^{*2}	1,000,000 touch operations
External interface	Ethernet	100BASE-TX/10BASE-T	
	SD card	SDHC-compliant, Class 4 or higher recommended	
Ratings	Power supply voltage	DC power connection: 21.6 to 26.4 VDC (including ripple)	DC power connection: 21.6 to 26.4 VDC (including ripple) AC adapter (manufactured by Sino-American Japan Co., Ltd) connection: 100 to 240 VAC, 50/60 Hz Battery connection: FQ-BAT1 Battery (1cell, 3.7 V)
	Continuous operation on Battery ^{*3}	–	1.5 h
	Power consumption	DC power connection: 0.2 A max.	DC power connection: 0.2 A max. Charging battery: 0.4 A max.
Environmental immunity	Ambient temperature range		Operating: 0 to 50°C Storage: –25 to 65°C (with no icing or condensation)
	Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)
	Ambient atmosphere		No corrosive gas
	Vibration resistance (destruction)		10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions 8 min each, 10 times
	Shock resistance (destruction)		150 m/s ² 3 times each in 6 direction (up, down, right, left, forward, and backward)
	Degree of protection		IEC 60529 IP20 (when SD card cover, connector cap, or harness is attached)
Weight	Approx. 270 g (without Battery and hand strap attached)		
Materials	Case: ABS		
Accessories included with Touch Finder	Touch Pen (FQ-XT), Instruction Manual		

*1 This is a guideline for the time required for the brightness to diminish to half the initial brightness at room temperature and humidity. The life of the backlight is greatly affected by the ambient temperature and humidity and will be shorter at lower or higher temperatures.

*2 This value is only a guideline. No guarantee is implied. The value will be affected by operating conditions.

*3 This value is only a guideline. No guarantee is implied. The value will be affected by the operating environment and operating conditions.

Sensor Data Units(FQ2-S3/S4/CH only)

Item	Parallel Interface		RS-232C Interface
Model	NPN	FQ-SDU10	FQ-SDU20
	PNP	FQ-SDU15	FQ-SDU25
I/O specifications	Parallel I/O	Connector 1	6 inputs (INO to IN5)
		Connector 2	2 inputs (TRIG and RESET) 7 outputs (ACK, RUN, BUSY, OR, ERROR, STGOUT, and SHTOUT)
	RS-232C	–	1 channel, 115,200 bps max.
	Sensor interface	FQ2-S3 connected with FQ-WU□□□: OMRON interface *Number of connected Sensors: 1	
Ratings	Power supply voltage	21.6 to 26.4 VDC (including ripple)	
	Insulation resistance	Between all DC external terminals and case: 0.5 MΩ min (at 250 VDC)	
	Current consumption	2.5 A max.: FQ2-S□□□□□□-□□□ and FQ-SDU□□ 0.4 A max.: FQ2-S3□-□□□ and FQ-SDU□□ 0.1 A max.: FQ-SDU□□ only	
Environmental immunity	Ambient temperature range		Operating: 0 to 50°C, Storage: –20 to 65°C (with no icing or condensation)
	Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)
	Ambient atmosphere		No corrosive gas
	Vibration resistance (destruction)		10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions, 8 min each, 10 times
	Shock resistance (destruction)		150 m/s ² 3 times each in 6 directions (up, down, right, left, forward, and backward)
Degree of protection	IEC 60529 IP20		
Materials	Case: PC + ABS, PC		
Weight	Approx. 150 g		
Accessories included with Sensor Data Unit	Instruction Manual		

Battery

Item	Model	FQ-BAT1
Battery type		Secondary lithium ion battery
Nominal capacity		1,800 mAh
Rated voltage		3.7 V
Ambient temperature range		Operating: 0 to 40°C Storage: -25 to 65°C (with no icing or condensation)
Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)
Charging method		Charged in Touch Finder (FQ2-D31). AC adapter (FQ-AC□) is required.
Charging time* ¹		2 h
Usage time* ¹		1.5 h
Battery backup life* ²		300 charging cycles
Weight		50 g max.

*¹ This value is only a guideline. No guarantee is implied. The value will be affected by operating conditions

*² This is a guideline for the time required for the capacity of the Battery to be reduced to 60% of the initial capacity. No guarantee is implied. The value will be affected by the operating environment and operating conditions.

System Requirements for PC tool for FQ

The following Personal Computer system is required to use the software.

OS	Microsoft Windows XP Home Edition/Professional SP2 or higher (32-bit version) Microsoft Windows 7 Home Premium or higher (32-bit/64-bit version)
CPU	Core 2 Duo 1.06 GHz or the equivalent or higher
RAM	1GB min.
HDD	500 MB min. available space* ¹
Monitor	1,024 × 768 dots min.

*¹ Available space is also required separately for data logging.

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Target, “touch&go”

- Easy to use – target, “touch&go”
- Build-in LCD monitor for immediate display of results
- Accurate – reading of direct print marks
- Variable field of view

Ordering information

Main unit

Name	Communications interface	Field of vision	Remarks	Order code
2D code reader	RS-232C	5x5 to 10x10 mm	–	V400-H111
	RS-232C	15x15 to 30x30 mm	–	V400-H211

Accessories

Name	Cable length	Remarks	Order code
Contactor	–	Contactor for positioning (detachable)	V400-AC2
Communications cable	2 m	For SYSMAC series connection (with power cord)	V400-W20-2M
	5 m		V400-W20-5M
	2 m	For PC-compatible connection (with power cord)	V400-W21-2M
	5 m		V400-W21-5M
	2 m	For PC-compatible connection (when using AC adaptor)	V400-W22-2M
	5 m		V400-W22-5M
AC adaptor	–	–	V600-A22

Ratings and specifications

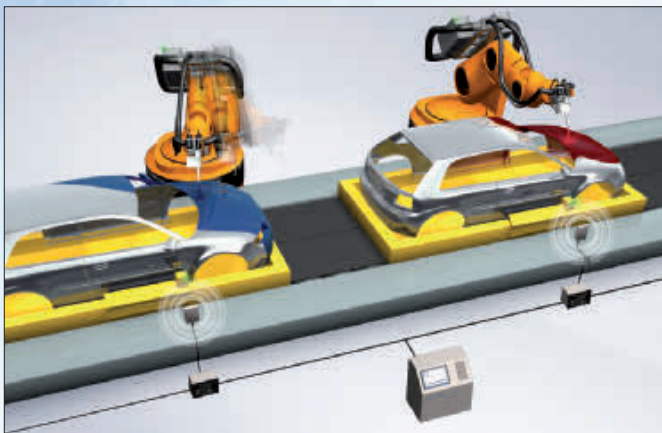
Item	V400-H111	V400-H211
Field of vision	5x5 to 10x10 mm	15x15 to 30x30 mm
Working distance	40 mm (flush when contactor is mounted)	
Power supply	5 VDC ±10%	
Current consumption	1.0 A max.	
Serial interface	RS-232C	
Applicable codes	Data matrix, ECC200, 10x10 to 64x64, 8x18 to 16x48, QR code (models 1, 2), 21x21 to 57x57 (versions 1 to 10)	
Operation method	Pressing the trigger button	
Settings	Make settings by using the manual setting window, uploading from an SD memory card, or by using support software.	
Memory card	SD memory card	
Monitor	1.8 inch TFT LCD, displaying images and read data	
Display illumination	Operation display, memory card access	
Ambient temperature	Operation: 0 to 40°C, storage: -25 to 60°C	
Ambient humidity	35 to 85% (with no condensation)	
Ambient conditions	No corrosive gases	
Vibration resistance	10 to 150 Hz, single amplitude 0.35 mm (50 m ² /s max. acceleration)	
Shock resistance	150 m ² /s in ±X, Y, and Z directions, 3 times	
Weight	Approx. 230 g	
Degree of protection	IEC 60529 IP64	
Materials	Case: ABS; optical surface: PC; display surface: PMMA	

V680 RFID SYSTEM

One for all

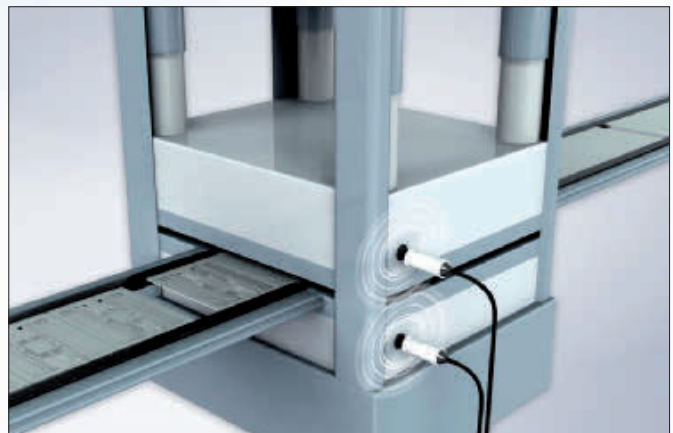
Whenever you need to have full transparency of your production process or logistic application V680 is helping you to manage your data most comfortably and reliably.

- Diagnostic functions for maintenance
- One for all: modular platform concept
- Flexible installation: long reach antennas
- Fit for speed: high turn around time
- Save time & costs: easy setup & maintenance



Production ID system for the paint shop

A RFID system is used to store the process parameters needed for the production of the car throughout the process. Harsh conditions through chemicals and high temperatures occur during the production steps. RFID is ideal for this application as it features high resistance tags for harsh conditions.



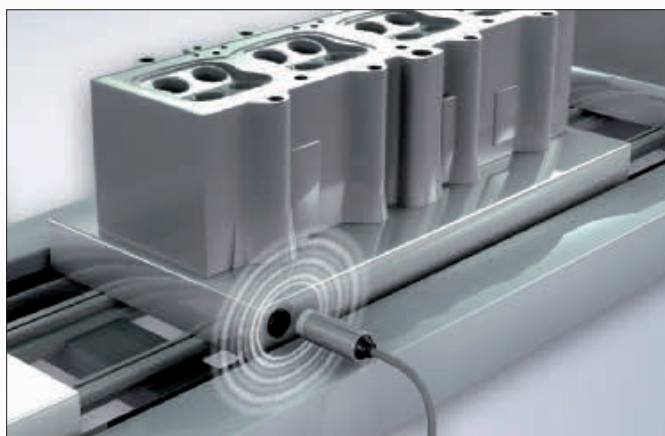
Monitoring of the moulding history

Process and maintenance related information of a moulding press can be stored by using RFID. The information can be read out permanently or on demand from a remote location and can be used to control the process.



YOUR BENEFITS

- High speed air communication
- Standardized protocol (ISO 15693)
- Large memory (up to 32kByte) and very compact tags
- Long life time of tags (FERAM variants)
- All protocols for PLC communication



Traceability of automotive parts

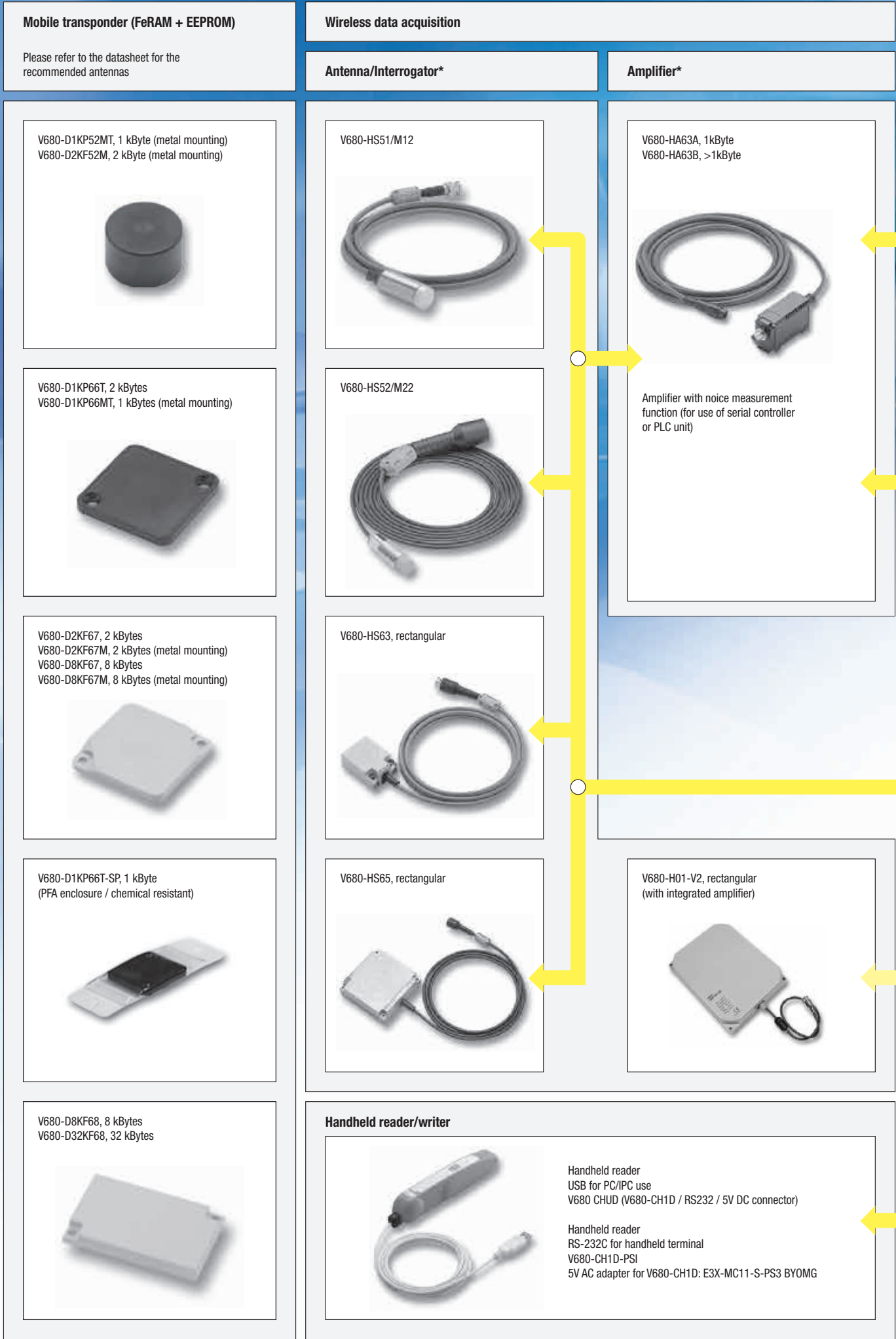
Track the parts in the production process. Process related information can be stored to guarantee high quality production.








Carrier Management

For the administration and traceability of transport carriers along the hole process RFID represents a smart solution. V680 is working on the standardized universal frequency of 13.56MHz. The flexible platform with its versatile and compact design can be easily integrated into any point in the production process.

V680 RFID Platform overview



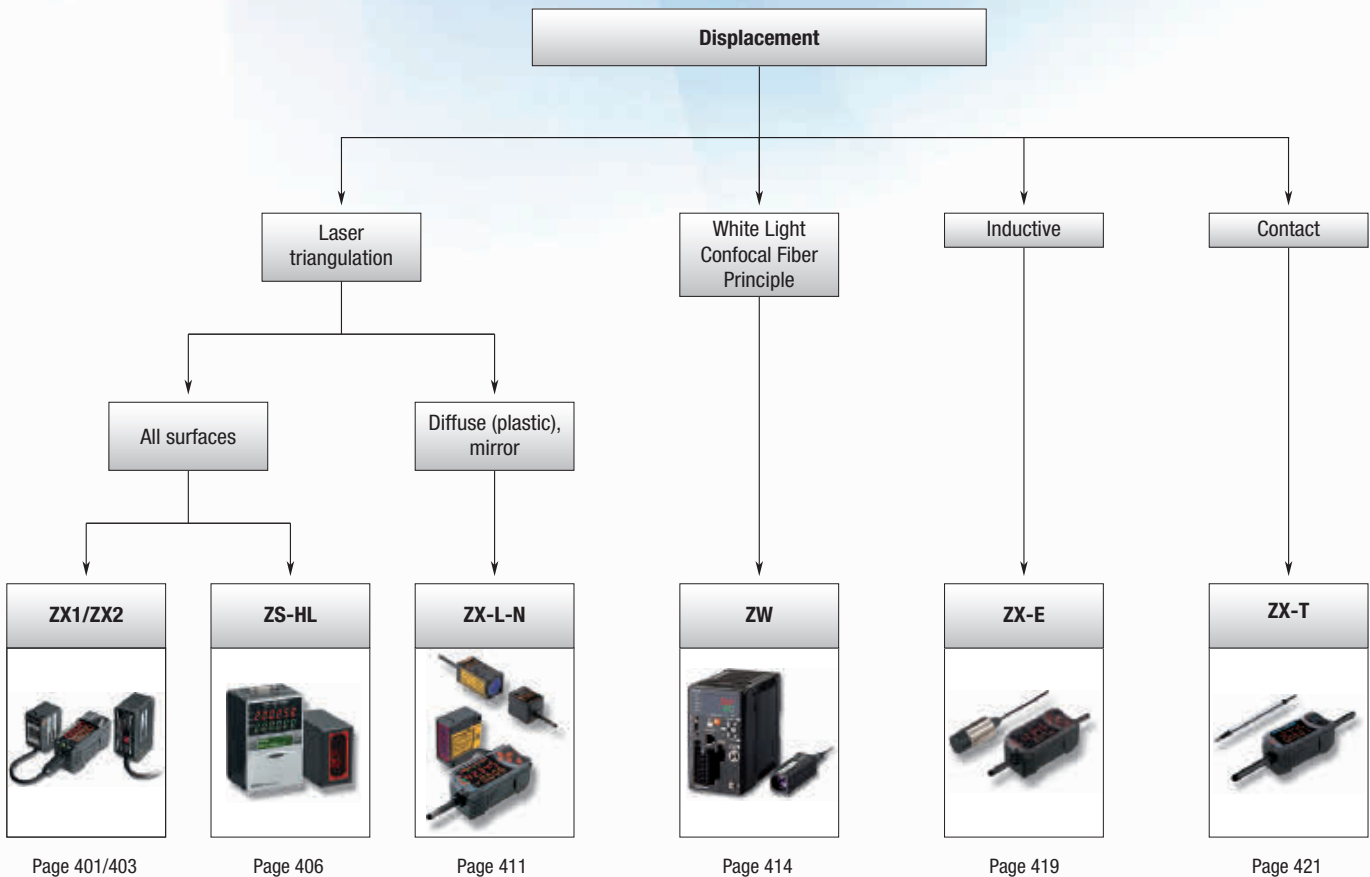
Controlling device	Feature and benefits	Communication and system integration
<p>Easy to maintain 1/2 controller for long wired serial communication V680-CA5D01-V2 (1 channel) V680-CA5D02-V2 (2 channels)</p> 	<p>High speed communication system noise and distance measurement for self diagnosis and preventive maintenance.</p> <p>Protocol analyzer function comfortable software for quick start-up and operation.</p>	<p>Serial communication for long wiring (<500 m)</p>
<p>Modular multi functional RFID communication system CJ1W-V680-C11 (1 channel) CJ1W-V680-C12 (2 channels) CS1W-V680-C11 (1 channel) CS1W-V680-C12 (2 channels)</p> 	<p>Future-proofed RFID system with enhanced connectivity and additional functionality. Up to 160 antennas can be cascaded</p> <p>Multi-functional intelligent controller for multi-purpose use.</p> <p>V680-C#-SYS can be operated as multi-tasking stand-alone system beside of existing PLC setups</p> <p>CX-One Software allows easy integration using function blocks.</p>	<p>Advanced modular RFID communication system:</p> <ul style="list-style-type: none"> - Ethernet IP - DeviceNet - PROFIBUS-DP - CAN - CompoBus/S
<p>V680-HAM81 PNP ID Flag Sensor V680-HAM91 NPN ID Flag Sensor</p> 	<p>Cost effective DeviceNet slave controller with integrated amplifier for direct connection to any DeviceNet nodes.</p>	<p>DeviceNet fieldbus high speed communication (integrated amplifier)</p>
<p>ID Flag Sensor (PNP/NPN) V680-HAM81/HAM91</p> 	<p>Easy to setup ID flag system addressing up to 64.000 ID's.</p>	<p>ID flag sensor communication</p>
<p>Handheld Terminal V680-A-7527S-G2-EG-S</p> 	<p>Wireless handheld to R/W data at any time in production process or logistics.</p> <p>Further possibility to communicate on PC/IPC platform via USB.</p> <p>Demosoftware is pre-installed.</p>	<p>Handheld/PLC/PC communication</p>

HIGH PRECISION QUALITY INSPECTION

Zero defect becomes reality – scalable accuracy in inspection

The Smart displacement sensor family offers a modular and scalable approach to solve the most challenging measurement tasks. The powerful portfolio enables you to measure profiles, thickness, distance, evenness/warpage, as well as width, edge, etc. Several measurement profiles can be performed simultaneously, using a single- or multi-controller unit. Aided by Omron's advanced technologies, the highest accuracy over long distances, speed and reliability will be achieved.

- Accurate and fast – 0.25 μm at less than 110 μs sampling time
- Scalable – multi-controller unit to coordinate and calculate up to 9 units
- Smart – data storage and remote control via networking capabilities





Profile

Position/
Diameter/Width

ZG2



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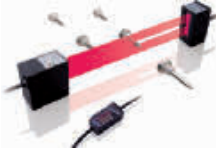
ZX-GT



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Selection table

		Laser displacement sensor			Confocal fiber sensor
					
		ZX1/ZX2	ZS-HL	ZX-L-N	ZW
Selection criteria	Model	ZX1/ZX2	ZS-HL	ZX-L-N	ZW
	Measurement range Z Min.	50±10 mm	10±0.5 mm	30±2 mm	7 mm
	Max.	600±400 mm	1500±500 mm	300±200 mm	40 mm
	Measurement range X Min.	–	–	–	–
	Max.	–	–	–	–
	Resolution Z	1.5 µm	0.25 µm	0.25 µm	0.01 µm
	Resolution X	–	–	–	–
	Linearity (±% of full scale)	0.05%	0.05%	0.2%	0.1%
	Response time	60 µs	110 µs	150 µs	500 µs
	Spot beam	■	■	■	■
	Line beam	■	■	■	–
	IP-rating head	IP67	IP64/IP67	IP50	IP40
	IP-rating controller	IP40	IP40	IP40	IP20
Ambient oper. temperature	0 to 50°C	0 to 50°C	0 to 50°C	0 to 40°C	
Number of connectable sensors	5	9	5	4	
Features	Thickness measurement	■	■	■	■
	Eccentricity	■	■	■	–
	Height	■	■	■	■
	Step	■	■	■	–
	Profile	–	–	–	–
	Distance	–	–	–	–
	Evenness	–	–	–	–
	Warpage	–	–	–	–
	Edge	–	–	–	–
	Width	–	–	–	–
	Peak	■	■	■	–
	Peak to peak	■	■	■	–
	Bottom	■	■	■	–
	Self-trigger	■	■	■	–
	Calibration	■	■	■	■
	Signal scaling	■	–	–	■
	PC-software	–	■	■	■
Application	Mirror	■	■	–	■
	Glass	■	■	–	■
	Metal	■	■	□	■
	Plastic	■	■	■	■
	Black rubber	■	■	–	■
	Paper	■	■	□	■
Supply voltage	12 to 24 VDC	■	–	■	■
	21.6 to 26.4 VDC	–	■	–	■
Control I/O	4 to 20 mA	■	■	■	■
	1 to 5 VDC	■	–	■	–
	Judgement output High/Pass/Low	■	■	■	■
	Trigger	■	■	■	■
Communication	RS-232C	■	■	■	–
	USB2.0	■	■	–	–
Page	401/403	406	411	414	

		Inductive displacement sensor	Contact displacement sensor	Profile sensor	Laser micrometer	
						
		Model	ZX-E	ZX-T	ZG2	ZX-GT
Selection criteria	Measurement range Z Min.	0.5 mm	1 mm	20 ±0.5 mm	–	
	Max.	7 mm	10 mm	210 ±30 mm	28 mm	
	Measurement range X Min.	–	–	3 mm	–	
	Max.	–	–	70 mm	–	
	Resolution Z	1 µm	0.1 µm	0.2 µm	10 µm	
	Resolution X	–	–	3 mm/631 pixels	–	
	Linearity (±% of full scale)	0.5%	0.3%	0.5%	0.1%	
	Response time	150 µs	1 ms	5 ms	150 µs	
	Spot beam	–	–	–	–	
	Line beam	–	–	☐	–	
	IP-rating head	IP67	IP67	IP64/66	IP40	
	IP-rating controller	IP40	IP40	IP20	IP40	
	Ambient oper. temperature	0 to 50°C	0 to 50°C	0 to 50°C	0 to 50°C	
	Number of connectable sensors	5	7	1	5	
Features	Thickness measurement	■	■	■	■	
	Eccentricity	■	■	■	■	
	Height	■	■	■	■	
	Step	■	■	■	■	
	Profile	–	–	☐	–	
	Distance	■	■	–	–	
	Evenness	■	■	–	–	
	Warpage	■	■	–	–	
	Edge	–	–	–	■	
	Width	–	–	☐	■	
	Peak	■	■	■	■	
	Peak to peak	■	■	■	■	
	Bottom	■	■	■	■	
	Self-trigger	■	■	■	■	
	Calibration	–	–	■	–	
	Signal scaling	■	■	–	■	
	PC-software	■	■	■	■	
	Application	Mirror	–	■	■	■
Glass		–	■	■	■	
Metal		■	■	■	■	
Plastic		–	■	■	■	
Black rubber		–	■	■	■	
Paper		–	–	■	■	
Supply voltage	12 to 24 VDC	■	■	–	■	
	21.6 to 26.4 VDC	–	–	■	■	
Control I/O	4 to 20 mA	■	■	■	■	
	1 to 5 VDC	■	■	–	■	
	Judgement output High/Pass/Low	■	■	■	■	
	Trigger	■	■	■	■	
Communication	RS-232C	■	■	■	■	
	USB2.0	■	–	■	–	
Page	419	421	423	427		

■ Standard

☐ Available

– No/not available





Highest performance for optimized productivity

Highest performance is now available in matchbox size. We are defining a new class of measurement sensors using an advanced HSDR-CMOS (High Speed and Dynamic Range) camera chip.

- Stable measurement for objects with any surface
- Best in class performance for accuracy and speed
- Compact size for quick mounting
- Increased measurement range
- Simple configuration by one-button, Smart Tuning
- Reliable measurement in harsh environments
- Integrated display

Ordering information

Sensors

Appearance	Connection method	Cable length	Sensing distance	Order code	
				NPN output	PNP output
	Pre-wired	2 m		ZX1-LD50A61 2M	ZX1-LD50A81 2M
		5 m		ZX1-LD50A61 5M	ZX1-LD50A81 5M
	Pre-wired connector	0.5 m	ZX1-LD50A66 0.5M	ZX1-LD50A86 0.5M	
	Pre-wired	2 m		ZX1-LD100A61 2M	ZX1-LD100A81 2M
		5 m		ZX1-LD100A61 5M	ZX1-LD100A81 5M
	Pre-wired connector	0.5 m	ZX1-LD100A66 0.5M	ZX1-LD100A86 0.5M	
	Pre-wired	2 m		ZX1-LD300A61 2M	ZX1-LD300A81 2M
		5 m		ZX1-LD300A61 5M	ZX1-LD300A81 5M
	Pre-wired connector	0.5 m	ZX1-LD300A66 0.5M	ZX1-LD300A86 0.5M	
	Pre-wired	2 m		ZX1-LD600A61 2M	ZX1-LD600A81 2M
		5 m		ZX1-LD600A61 5M	ZX1-LD600A81 5M
	Pre-wired connector	0.5 m	ZX1-LD600A66 0.5M	ZX1-LD600A86 0.5M	

Accessories (sold separately)

Extension cables for pre-wired connector models

An Extension cable is not provided with the sensor. Order an extension cable separately.

Cable length	Order code
10 m	ZX0-XC10R
20 m	ZX0-XC20R

Specifications

Model	NPN output	ZX1-LD50A61 ZX1-LD50A66	ZX1-LD100A61 ZX1-LD100A66	ZX1-LD300A61 ZX1-LD300A66	ZX1-LD600A61 ZX1-LD600A66
Item	PNP output	ZX1-LD50A81 ZX1-LD50A86	ZX1-LD100A81 ZX1-LD100A86	ZX1-LD300A81 ZX1-LD300A86	ZX1-LD600A81 ZX1-LD600A86
Measurement range		50±10 mm	100±35 mm	300±150 mm	600±400 mm
Light source (wave length)		Visible-light semiconductor laser (wavelength: 660 nm, 1 mW max., IEC/EN Class 2, FDA Class II ^{*1})			
Spot diameter (typical) (Defined at the measurement center distance) ^{*2}		0.17 mm dia.	0.33 mm dia.	0.52 mm dia.	0.56 mm dia.
Power supply voltage		10 to 30 VDC, including 10% ripple (p-p)			
Current consumption		250 mA max. (at power supply voltage 10 VDC)			
Control output		Load power supply voltage: 30 VDC max., Load current: 100 mA max. (Residual voltage: 1 V max. (load current 10 mA or less), 2 V max. (load current of 10 to 100 mA))			
Analog output		Current output: 4 to 20 mA, maximum load resistance: 300 Ω			
Indicators		Digital display (red), output indicator (OUT1, OUT2) (orange), zero reset indicator (orange), menu indicator (orange), laser ON indicator (green), and smart tuning indicator (blue)			
Response time	Judgment output	Super-high-speed (SHS) Mode: 1 ms High-speed (HS) Mode: 10 ms Standard (Std) Mode: 100 ms			
	Laser OFF input	200 ms max.			
	Zero reset input	200 ms max.			
Temperature characteristic ^{*3}		0.03% F.S./°C			0.04% F.S./°C
Linearity ^{*4}		±0.15% F.S.		±0.25% F.S.	±0.25% F.S. (200 to 600 mm) ±0.5% F.S. (entire range)
Resolution ^{*5}		2 μm	7 μm	30 μm	80 μm
Ambient illumination		Illumination on received light surface: 7,500 lx or less (incandescent light)		Illumination on received light surface: 5,000 lx or less (incandescent light)	
Ambient temperature		Operating: -10 to +55°C, Storage: -15 to +70°C (with no icing or condensation)			
Ambient humidity		Operating and storage: 35% to 85% (with no condensation)			
Dielectric strength		1,000 VAC, 50/60 Hz, 1 minute ³			
Vibration resistance (destruction)		10 to 55 Hz, 1.5-mm double amplitude, 2 hours each in X, Y, and Z directions			
Shock resistance (destruction)		500 m/s ² 3 times each in X, Y, and Z directions			
Degree of protection ^{*6}		IEC 60529, IP67			
Connection method		Pre-wired model (Standard cable length: 2 m, 5 m) Pre-wired connector model (Standard cable length: 0.5 m)			
Weight (packed state/ sensor only)	Pre-wired models (2 m)	Approx. 240 g / Approx. 180 g		Approx. 270 g / Approx. 210 g	
	Pre-wired models (5 m)	Approx. 450 g / Approx. 330 g		Approx. 480 g / Approx. 360 g	
	Pre-wired connector models (0.5 m)	Approx. 170 g / Approx. 110 g		Approx. 200 g / Approx. 140 g	
Materials		Case and cover: PBT (polybutylene terephthalate), Optical window: Glass, Cable: PVC, Mounting hole part: SUS303			
Accessories		Instruction sheet and Laser warning label (English)			

^{*1} Classified as Class 2 by EN60825-1 criteria in accordance with the FDA standard provisions of Laser Notice No. 50. Notification to CDRH planned. (Center for Devices and Radiological Health)

^{*2} Spot diameter: Defined as 1/e² (13.5%) of the central intensity at the measurement center distance.

False detections can occur in the case there is light leakage outside the defined region and the surroundings of the target object have a high reflectance in comparison to the target object.

Accurate measurements may not be possible for workpieces that are smaller than the spot diameter.

^{*3} Temperature characteristic: Value for the case the space between the sensor and Omron's standard target object is secured by an aluminum jig. (Measured at the measurement center distance)

^{*4} Linearity: Indicates the error with respect to the ideal straight line of the displacement output in the case of measuring Omron's standard target object (white ceramic) at a temperature of 25°C.

Linearity and measured value may vary depending on target object.

^{*5} Resolution: Defined in Standard Mode for Omron's standard target object (white ceramic) after executing Smart Tuning.

The resolution indicates the repetition accuracy for a still workpiece. Not an indication of the distance accuracy.

Resolution performance may not be satisfied in a strong electromagnetic field.

^{*6} IP67 protection applies to the connector on pre-wired connector models if an extension cable is connected.

Note: False detection outside the measurement range can occur in the case of an object with high reflectance.



Stable, easy & affordable laser measurement sensor

High accuracy and measurement stability, at an affordable price. The new ZX2 laser sensor offers best in class performance for accuracy and speed for all linear displacement applications. Utilising an advanced HSDR-CMOS image sensor, high measurement stability is achieved, even on the most challenging of surfaces.

- One touch setup
- Accurate: 1.5–5 µm
- Any surface
- High speed: 30 µs

Ordering information

Sensor heads

Optical system	Beam shape	Sensing distance	Resolution	Order code
Diffuse-reflective	Line beam	50±10 mm 40 60	1.5 µm	ZX2-LD50L
	Spot beam			ZX2-LD50
	Line beam	100±35 mm 65 135	5 µm	ZX2-LD100L
	Spot beam			ZX2-LD100
Regular reflective	Spot beam	48±5 mm 43 53	1.5 µm	ZX2-LD50V

Amplifier units

Power supply	Output type	Order code
DC	NPN	ZX2-LDA11
	PNP	ZX2-LDA41

Accessories (order separately)

These are not included with the Sensor Head or Amplifier Unit. Please order as necessary.

Calculating unit

	Order code
Calculating unit	ZX2-CAL

Sensor head extension cables*1

Cable length	Order code
1 m	ZX2-XC1R
4 m	ZX2-XC4R
9 m	ZX2-XC9R
20 m	ZX2-XC20R

*1. Extension cables cannot be coupled and used together.

Mounting brackets

Applicable Sensor Heads	Appearance	Contents	Order code
ZX2-LD50V ZX2-LD50L ZX2-LD50		Mounting Bracket: 1 Nut plate: 1 Phillips screws (M3×30): 2	E39-L178
ZX2-LD100L ZX2-LD100			E39-L179

Specifications

Diffuse reflective Sensor Heads

Item Model	ZX2-LD50L	ZX2-LD50	ZX2-LD100L	ZX2-LD100
Optical system	Diffuse reflective			
Light source (wave length)	Visible-light semiconductor laser with a wavelength of 660 nm and an output of 1 mW max. EN class 2,FDA class II ⁵			
Measurement center point	50 mm		100 mm	
Measurement range	±10 mm		±35 mm	
Beam shape	Line	Spot	Line	Spot
Beam size ^{*1}	Approx. 60 μm×2.6 mm	Approx. 60 μm dia.	Approx.110 μm×2.7 mm	Approx.110 μm dia.
Resolution ^{*2}	1.5 μm		5 μm	
Linearity ^{*3}	±0.05% F.S. (40 to 50 mm)	±0.1% F.S. (40 to 50 mm)	±0.05%F.S. (65 to 100 mm)	±0.1%F.S. (65 to 100 mm)
	±0.1% F.S. (entire range)	±0.15% F.S. (entire range)	±0.1% F.S. (entire range)	±0.15% F.S. (entire range)
Temperature characteristic ^{*4}	0.02% F.S./°C			
Ambient illumination	Incandescent lamp: 10,000 lx max. (on light receiving side)			
Ambient temperature	Operating: 0 to +50°C, Storage: -15 to +70°C (with no icing or condensation)			
Ambient humidity	Operating and storage: 35% to 85% (with no condensation)			
Dielectric strength	1,000 VAC, 50/60 Hz for 1 minute.			
Vibration resistance (destruction)	10 to 150 Hz, 0.7-mm double amplitude, 80 minutes. each in X,Y,and Z directions			
Shock resistance (destruction)	300 m/s ² 3 times each in six directions (up/down,left/right,forward/backward)			
Degree of protection	IEC60529, IP67			
Connection method	Connector connection (standard cable length: 500 mm)			
Weight (packed state)	Approx.160 g (Sensor Head only: Approx.75 g)			
Materials	Case and cover: PBT (polybutylene terephthalate), Optical window: Glass, Cable: PVC			
Accessories	Instruction sheet, Ferrite core, Laser warning label (English), FDA certification label			

Regular-reflective Sensor Heads

Item Model	ZX2-LD50V
Optical system	Regular reflective
Light source (wave length)	Visible-light semiconductor laser with a wavelength of 660 nm and an output of 0.24 mW max. EN class 1, FDA class I
Measurement center point	48 mm
Measurement range	±5 mm
Beam shape	Spot
Beam size ^{*1}	Approx. 60 μm dia.
Resolution ^{*2}	1.5 μm
Linearity ^{*3}	±0.3% F.S. (entire range)
Temperature characteristic ^{*4}	0.06% F.S./°C
Ambient illumination	Incandescent lamp: 10,000 lx max. (on light receiving side)
Ambient temperature	Operating: 0 to +50°C, Storage: -15 to +70°C (with no icing or condensation)
Ambient humidity	Operating and storage: 35% to 85% (with no condensation)
Dielectric strength	1,000 VAC, 50/60 Hz for 1 minute.
Vibration resistance (destruction)	10 to 150 Hz, 0.7-mm double amplitude, 80 minutes. each in X,Y,and Z directions
Shock resistance (destruction)	300 m/s ² 3 times each in six directions (up/down,left/right,forward/backward)
Degree of protection	IEC 60529, IP67
Connection method	Connector connection (standard cable length: 500 mm)
Weight (packed state)	Approx.160 g (Sensor Head only: Approx.75 g)
Materials	Case and cover: PBT (polybutylene terephthalate), Optical window: Glass, Cable: PVC
Accessories	Instruction sheet, Ferrite core, Laser warning label (English)

^{*1} Beam size: Defined as 1/e² (13.5%) of the central intensity at the smallest value of diameter for the measurement range (typical value) False detections can occur in the case there is light leakage outside the defined region and the surroundings of the target object have a high reflectance in comparison to the target object.

^{*2} Resolution: indicates the degree of fluctuation (±3σ) of analog output when connected to the ZX2-LDA. (The measured value is given for the center distance for OMRON's standard target object (diffuse-reflective models: white ceramic object, regular-reflective models: 1/4 λ flat mirror) when the response time of the ZX2-LDA is set to 128 ms.)

Indicates the repetition accuracy for when the workpiece is in a state of rest. Not an indication of distance accuracy. Resolution performance may not be satisfied in a strong electromagnetic field.

^{*3} Linearity: indicates the error with respect to the ideal straight line of the displacement output in the case of measuring Omron's standard target object. Linearity and measured value may vary depending on target object. F.S. indicates the full scope of the measurement range. (ZX2-LD50 (L): 20mm)

^{*4} Temperature characteristic: Value for the case the space between the sensor head and Omron's standard target object is secured by an aluminum jig. (Measured at the measurement center distance)

^{*5} These Sensors are classified as Class 2 laser devices for diffuse-reflective models and Class 1 for regular-reflective models under EN 606825-1 and the regulations of Laser Notice No. 50 for FDA certification. CDRH registration has been completed for diffuse-reflective models and is scheduled for regular-reflective models.

Note: False detection outside the measurement range can occur in the case of an object with high reflectance.

Amplifier units

Item	ZX2-LDA11	ZX2-LDA41
Measurement period ^{*1}	Min 30 μs	
Response time	60 μs, 120 μs, 240 μs, 500 μs, 1 ms, 2 ms, 4 ms, 8 ms, 12 ms, 20 ms, 36 ms, 66 ms, 128 ms, 250 ms, 500 ms	
Analog output ^{*2}	4 to 20 mA, Max. load resistance: 300Ω, ±5VDC or 1 to 5 VDC, Output impedance: 100Ω	
Judgement outputs (HIGH/PASS/LOW: 3 outputs), error output	NPN open-collector outputs, 30 VDC, 50 mA max.(residual voltage: 1 V max. for load current 10 mA max., 2 V max. for load current above 10 mA)	PNP open-collector outputs, 30 VDC, 50 mA max.(residual voltage: 1 V max. for load current 10 mA max., 2 V max. for load current above 10 mA)
Laser OFF input, zero reset input, timing input, reset input, bank input	ON: Short-circuited with 0-V terminal or 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)	ON: Supply voltage short-circuited or supply voltage within 1.5 V OFF: Open (leakage current: 0.1 mA max.)
Functions	Smart tuning, scaling, sample hold, peak hold, bottom hold, peak-to-peak hold, self-peak hold, self-bottom hold, average hold, zero reset, On-delay timer, OFF-delay timer, keep/clamp switch, (A-B)calculations ^{*3} , thickness calculation ^{*3} , mutual interference prevention ^{*3} , laser deterioration detection, bank function (4 banks)	
Indications	Judgement indicators: HIGH (orange), PASS (green), LOW (orange), 11-segment main display (red), 11-segmentsub-display (orange), laser ON (green), zero reset (green), enable (green), menu (green), HIGH threshold (orange), LOW threshold (orange)	
Power supply voltage	10 to 30 VDC, including 10% ripple(p-p)	
Power consumption	3,000 mW max. with power supply voltage of 30 VDC and power supply current of 100 mA (with Sensor connected)	
Ambient temperature	Operating: 0 to +50°C, Storage: -15 to +70°C (with no icing or condensation)	
Ambient humidity	Operating and storage: 35% to 85% (with no condensation)	
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min.	
Vibration resistance (destruction)	10 to 150 Hz, 0.7-mm double amplitude, 80 min. each in X,Y, and Z directions	
Shock resistance (destruction)	300 m/s ² 3 times each in six directions (up/down, left/right, forward/backward)	
Degree of protection	IEC60529, IP40P	
Connection method	Prewired (standard cable length: 2 m)	
Weight (packed state)	Approx. 200 g (unit only: Approx.135 g)	
Materials	Case: PBT(polybutylene terephthalate), Cover: Polycarbonate, Display: Acrylic resin, Button: Polyacetal, Cable: PVC	
Accessories	Instruction sheet	

^{*1} In the case of Omron's standard target object (white ceramic)

^{*2} Configure current output (4 to 20mA) and voltage output (±5V or 1 to 5V) by MENU mode.

^{*3} Calculating unit (ZX2-CAL) is necessary.

Calculating unit

Item	ZX2-CAL
Applicable amplifier units	ZX2-LDA11/ZX2-LDA41
Current consumption	12 mA max. (supplied from the smart sensor amplifier unit)
Ambient temperature	Operating: 0 to +50°C, storage: -15 to +70°C (with no icing or condensation)
Ambient humidity	Operating and storage: 35 to 85% RH (with no condensation)
Connection method	Connector
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min
Insulation resistance	100 MΩ (at 500 VDC)
Vibration resistance (destructive)	10 to 150 Hz, 0.7-mm double amplitude 80 min each in X, Y, and Z directions
Shock resistance (destructive)	300 m/s ² 3 times each in six directions (up/down, left/right, forward/backward)
Materials	Case: PBT (polybutylene terephthalate), Display: Acrylic resin
Weight (packed state)	Approx. 50 g
Accessories	Instruction sheet



The scalable high-precision laser measurement sensor

The ZS laser sensor family provides outstanding measurement performance on all kind of materials. Its huge range of sensor heads and scalable concept makes it a versatile platform for all high precision sensing applications.

- Highest resolution and dynamic sensing range for all surfaces
- Modular and scalable platform concept for up to 9 sensors
- Easy to use, install and maintain for all user levels
- Fast response time of 110 µs
- Multi-tasking capability – manages up to 4 measurement tools in one controller

Ordering information

Sensors

ZS-HL-series sensor heads

Optical system	Sensing distance	Beam shape	Beam diameter	Resolution ^{*1}	Order code
Regular reflective models	20±1 mm	Line beam	1.0 mmx20 µm	0.25 µm	ZS-HLDS2T
	25±2 mm		2.2 mmx45 µm	0.6 µm	ZS-HLDS2VT
Diffuse reflective models	50±5 mm		1.0 mmx30 µm	0.25 µm	ZS-HLDS5T
	100±20 mm		3.5 mmx60 µm	1 µm	ZS-HLDS10
	600±350 mm		16 mmx0.3 mm	8 µm	ZS-HLDS60
	1500±500 mm		40 mmx1.5 mm	500 µm	ZS-HLDS150

*1 Refer to the table of ratings and specifications for details.

ZS-HL-series sensor heads (for nozzle gaps) also compatible with ZS-L controller

Optical system	Sensing distance	Beam shape	Beam diameter	Resolution ^{*1}	Order code
Regular reflective models	10±0.5 mm	Line beam	900x25 µm	0.25 µm	ZS-LD10GT
	15±0.75 mm				ZS-LD15GT

*1 Refer to the table of ratings and specifications for details.

ZS-L-series sensor heads

Optical system	Sensing distance	Beam shape	Beam diameter	Resolution ^{*1}	Order code
Regular reflective models	20±1 mm	Line beam	900x25 µm	0.25 µm	ZS-LD20T
		Spot beam	25 µm dia.		ZS-LD20ST
	40±2.5 mm	Line beam	2000x35 µm		ZS-LD40T
Diffuse reflective models	50±5 mm	Line beam	900x60 µm	0.8 µm	ZS-LD50
		Spot beam	50 µm dia.		ZS-LD50S
	80±15 mm	Line beam	900x60 µm	2 µm	ZS-LD80
	130±15 mm	Line beam	600x70 µm	3 µm	ZS-LD130
	200 ±50 mm	Line beam	900x100 µm	5 µm	ZS-LD200
350 ±135 mm	Spot beam	240 µm dia.	20 µm	ZS-LD350S	

*1 This is the peak-to-peak displacement conversion value in the displacement output at the measuring center distance in high-precision mode when the number of samples to average is set to 128 and the measuring mode is set to the high-resolution mode. The standard workpiece is white aluminum ceramics in diffuse reflection mode and glass in the regular reflection mode.

ZS-HL-series sensor controllers

Supply voltage	Control outputs	Order code
24 VDC	NPN outputs	ZS-HLDC11
	PNP outputs	ZS-HLDC41
		ZS-HLDC41A (incl. USB cable + Smart monitor)

Multi-controllers

Supply voltage	Control outputs	Order code
24 VDC	NPN outputs	ZS-MDC11
	PNP outputs	ZS-MDC41

Data storage units

Supply voltage	Control outputs	Order code
24 VDC	NPN outputs	ZS-DSU11
	PNP outputs	ZS-DSU41

Accessories (sold separately)

Controller link

Item	Order code
Controller link	ZS-XCN

Panel mount adapter

Model	Order code
For 1st controller	ZS-XPM1
For expansion (from 2nd controller on)	ZS-XPM2

Cables for connecting to a Personal Computer

Type	Quantity	Order code
RS-232C	1	ZS-XRS2
USB	1	ZS-XUSB2

Extension cables for sensor heads

Cable length	Quantity	Order code
1 m	1	ZS-XC1A
4 m	1	ZS-XC4A
5 m	1	ZS-XC5B ^{*1,*2}
8 m	1	ZS-XC8A
10 m	1	ZS-XC10B ^{*1}

*1 Up to two ZS-XC_B cables can be connected (22 m max.).

*2 A robot cable (ZS-XC5BR) is also available.

Logging software

Item	Order code
Smart monitor zero professional	ZS-SW11E

Memory card

Model	Order code
64 MB	F160-N64S(S)
128 MB	QM300-N128S
256 MB	F160-N256S

Safety precautions for using laser equipment

Laser Label Indications

Attach the following warning label to the side of the ZS-L-series Sensor Head.



Specifications

Sensor heads

ZS-HL-series sensor heads

Item	ZS-HLDS2T	ZS-HLDS2VT	ZS-HLDS5T	ZS-HLDS10	ZS-HLDS60	ZS-HLDS150
Applicable controllers	ZS-HLDC series					
Optical system	Regular reflection	Diffuse reflection	Regular reflection	Regular reflection	Diffuse reflection	Diffuse reflection
Measuring center distance	20 mm	5.2 mm	25 mm	44 mm	50 mm	94 mm
Measuring range	±1 mm	±1 mm	±2 mm	±4 mm	±5 mm	±16 mm
Light source	Visible semiconductor laser (wavelength: 650 nm, 1 mW max., JIS Clas				Visible semiconductor laser (wavelength 658 nm, 1 mW max., Class 2)	
Beam shape	Line beam					
Beam diameter ^{*1}	1.0 mmx20 µm	2.2 mmx45 µm	1.0 mmx30 µm	3.5 mmx60 µm	0.3 mmx16 mm	1.5 mmx40 mm
Linearity ^{*2}	±0.05% F.S.	±0.2 %F.S.	±0.1% F.S.		±0.07 %F.S. (250 mm to 750 mm)	±0.2 %F.S. (750 mm to 950 mm)
Resolution ^{*3}	0.25 µm (No. of samples to average: 256)	0.5 µm (No. of samples to average: 128)	0.25 µm (No. of samples to average: 512)	1 µm (No. of samples to average: 64)	8 µm (average 64) (at 250 mm) 40 µm (average 64) (at 600 mm)	500 µm (average 64)
Temperature characteristic ^{*4}	0.01% F.S./°C	0.1% F.S./°C	0.01% F.S./°C			
Sampling cycle	110 µs (high-speed mode), 500 µs (standard mode), 2.2 ms (high-precision mode), 4.4 ms (high-sensitivity mode)					
Indicators	NEAR indicator	Lits near the measurement center, and nearer than the measurement center distance inside the measuring range. Flashes when the measurement target is outside of the measuring range or when the received light amount is insufficient.				
	FAR indicator	Lits near the measurement center, and further than the measurement center distance inside the measuring range. Flashes when the measurement target is outside of the measuring range or when the received light amount is insufficient.				
Operating ambient illumination	Illumination on received light surface 3,000 lx or less (incandescent light)				Illumination on received light surface 1,000 lx or less (incandescent light)	Illumination on received light surface 500 lx or less (incandescent light)
Ambient temperature	Operating: 0 to +50°C, storage: -15 to +60°C (with no icing or condensation)					
Ambient humidity	Operating and storage: 35% to 85% (with no condensation)					
Degree of protection	IP64	IP67	Cable length 0.5 m: IP66, cable length 2 m: IP67		IP66 (IEC60529)	
Vibration resistance (destructive)	10 to 150 Hz, 0.7 mm double amplitude, 80 min each in X, Y, and Z directions					
Shock resistance (destructive)	150 m/s ² 3 times each in six directions (up/down, left/right, forward/backward)					
Materials	Case: aluminum die-cast, front cover: glass					
Cable length	0.5 m, 2 m	2 m	0.5 m, 2 m			
Weight	Approx. 350 g		Approx. 600 g		Approx. 800 g	

^{*1} Defined as 1/e² (13.5%) of the center optical intensity in the measurement center distance. The beam diameter is sometimes influenced by the ambient conditions of the workpiece such as leaked light from the main beam.

^{*2} This is the error on the measured value with respect to an ideal straight line. Linear curve may change according to the workpiece. The following lists the workpieces

Model	Diffusive reflection	Mirror reflection
ZS-HLDS2T	SUS block	Glass
ZS-HLDS5T/HLDS10	White alumina ceramic	Glass
ZS-HLDS60/HLDS150	White alumina ceramic	-
ZS-HLDS2VT	-	Glass

^{*3} This is the "peak-to-peak" displacement conversion value of the displacement output in the measurement center distance when high-resolution mode and the average number in the table are set (For ZS-HLDS60, the maximum resolution at 250 mm is also included). The following lists the workpieces.

Model	Diffusive reflection	Mirror reflection
ZS-HLDS2T	SUS block	Glass
ZS-HLDS5T	White alumina ceramic	Glass
ZS-HLDS10	White alumina ceramic	-
ZS-HLDS60/HLDS150	White alumina ceramic	-
ZS-HLDS2VT	-	Glass

^{*4} Value obtained when the sensor part and object part are fixed with an aluminum jig.

ZS-L-series sensor heads

Item	ZS-LD20T	ZS-LD20ST	ZS-LD40T	ZS-LD10GT	ZS-LD15GT
Applicable controllers	ZS-HLDC/LDC series				
Optical system	Regular reflection	Diffuse reflection	Regular reflection	Diffuse reflection	Regular reflection
Measuring center distance	20 mm	6.3 mm	20 mm	6.3 mm	40 mm
Measuring range	±1 mm	±1 mm	±1 mm	±1 mm	±2.5 mm
Light source	Visible semiconductor laser (wavelength: 650 nm, 1 mW max., JIS Class 2)				
Beam shape	Line beam	Spot beam	Line beam		
Beam diameter ¹	900 x 25 μm	25 μm dia.	2,000 x 35 μm	Approx. 25 x 900 μm	
Linearity ²	±0.1%F.S				
Resolution ³	0.25 μm	0.25 μm	0.4 μm	0.25 μm	0.25 μm
Temperature characteristic ⁴	0.04% FS/°C	0.04% FS/°C	0.02% FS/°C	0.04% FS/°C	
Sampling cycle ⁵	110 μs (high-speed mode), 500 μs (standard mode), 2.2 ms (high-precision mode), 4.4 ms (high-sensitivity mode)				
Indicators	NEAR indicator	Lights near the measuring center distance, and nearer than the measuring center distance inside the measuring range. Flashes when the measurement target is outside of the measuring range or when the received light amount is insufficient.			
	FAR indicator	Lights near the measuring center distance, and further than the measuring center distance inside the measuring range. Flashes when the measurement target is outside of the measuring range or when the received light amount is insufficient.			
Operating ambient illumination	Illumination on received light surface: 3,000 lx or less (incandescent light)				
Ambient temperature	Operating: 0 to 50°C, storage: -15 to 60°C (with no icing or condensation)				
Ambient humidity	Operating and storage: 35% to 85% (with no condensation)				
Degree of protection	Cable length 0.5 m: IP66, cable length 2 m: IP67			IP40	
Materials	Case: Aluminum die-cast, front cover: Glass				
Cable length	0.5 m, 2 m				
Weight	Approx. 350 g			Approx. 400 g	
Accessories	Laser labels (1 each for JIS/EN, 3 for FDA), ferrite cores (2), insure Locks (2), instruction sheet			Laser safety labels (1 each for JIS/EN), ferrite cores (2), insure locks (2)	

¹ Defined as $1/e^2$ (13.5%) of the center optical intensity at the actual measurement center distance (effective value). The beam diameter is sometimes influenced by the ambient conditions of the workpiece, such as leaked light from the main beam.

² This is the error in the measured value with respect to an ideal straight line. The standard workpiece is white aluminum ceramics in diffuse reflection mode and glass in the regular reflection mode of the ZS-LD20T/40T/50. Linearity may change according to the workpiece.

³ This is the peak-to-peak displacement conversion value in the displacement output at the measuring center distance in high-precision mode when the number of samples to average is set to 128 and the measuring mode is set to the high-resolution mode. The standard workpiece is white aluminum ceramics in diffuse reflection mode and glass in the regular reflection mode.

⁴ This is the value obtained at the measuring center distance when the Sensor and workpiece are fixed by an aluminum jig.

⁵ This value is obtained when the measuring mode is set to the high-speed mode.

ZS-L-series sensor heads

Item	ZS-LD50	ZS-LD50S	ZS-LD80	ZS-LD130	ZS-LD200	ZS-LD350S
Applicable controllers	ZS-HLDC/LDC series					
Optical system (reflection)	Diffuse	Regular	Diffuse	Regular	Diffuse	Regular
Measuring center distance	50 mm	47 mm	50 mm	47 mm	80 mm	78 mm
Measuring range	±5 mm	±4 mm	±5 mm	±4 mm	±15 mm	±14 mm
Light source	Visible semiconductor laser (wavelength: 650 nm, 1 mW max., JIS Class 2)					
Beam shape	Line beam	Spot beam	Line beam	Line beam	Line beam	Spot beam
Beam diameter ¹	900 x 60 μm	50 μm dia.	900 x 60 μm	600 x 70 μm	900 x 100 μm	240 μm dia.
Linearity ²	±0.1%F.S.				±0.25%F.S.	±0.1%F.S.
Resolution ³	0.8 μm	0.8 μm	2 μm	3 μm	5 μm	20 μm
Temperature characteristic ⁴	0.02% FS/°C	0.02% FS/°C	0.01% FS/°C	0.02% FS/°C	0.02% FS/°C	0.04% FS/°C
Sampling cycle ⁵	110 μs (high-speed mode), 500 μs (standard mode), 2.2 ms (high-precision mode), 4.4 ms (high-sensitivity mode)					
Indicators	NEAR indicator	Lights near the measuring center distance, and nearer than the measuring center distance inside the measuring range. Flashes when the measurement target is outside of the measuring range or when the received light amount is insufficient.				
	FAR indicator	Lights near the measuring center distance, and further than the measuring center distance inside the measuring range. Flashes when the measurement target is outside of the measuring range or when the received light amount is insufficient.				
Operating ambient illumination	Illumination on received light surface: 3,000 lx or less (incandescent light)			Illumination on received light surface: 2,000 lx or less (incandescent light)	Illumination on received light surface: 3,000 lx or less (incandescent light)	
Ambient temperature	Operating: 0 to 50°C, storage: -15 to 60°C (with no icing or condensation)					
Ambient humidity	Operating and storage: 35% to 85% (with no condensation)					
Degree of protection	Cable length 0.5 m: IP66, cable length 2 m: IP67					
Materials	Case: Aluminum die-cast, front cover: Glass					
Cable length	0.5 m, 2 m					
Weight	Approx. 350 g					
Accessories	Laser labels (1 each for JIS/EN, 3 for FDA), ferrite cores (2), insure Locks (2), instruction sheet					

¹ Defined as $1/e^2$ (13.5%) of the center optical intensity at the actual measurement center distance (effective value). The beam diameter is sometimes influenced by the ambient conditions of the workpiece, such as leaked light from the main beam.

² This is the error in the measured value with respect to an ideal straight line. The standard workpiece is white aluminum ceramics in diffuse reflection mode and glass in the regular reflection mode of the ZS-LD20T/40T/50. Linearity may change according to the workpiece.

³ This is the peak-to-peak displacement conversion value in the displacement output at the measuring center distance in high-precision mode when the number of samples to average is set to 128 and the measuring mode is set to the high-resolution mode. The standard workpiece is white aluminum ceramics in diffuse reflection mode and glass in the regular reflection mode.

⁴ This is the value obtained at the measuring center distance when the sensor and workpiece are fixed by an aluminum jig.

⁵ This value is obtained when the measuring mode is set to the high-speed mode.

Sensor controllers

ZS-HL-series sensor controllers

Item		ZS-HLDC11	ZS-HLDC41	
NPN/PNP		NPN	PNP	
No. of samples to average		1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1,024, 2,048, or 4,096		
Number of mounted sensors		1 per sensor controller		
External interface	Connection method		Serial I/O: connector, other: pre-wired (standard cable length: 2 m)	
	Serial I/O	USB 2.0	1 port, full speed (12 Mbps max.), MINI-B	
		RS-232C	1 port, 115,200 bps. max.	
	Output	Judgement output	HIGH/PASS/LOW 3 outputs NPN open collector, 30 VDC, 50 mA max., residual voltage 1.2 V max	HIGH/PASS/LOW: 3 outputs PNP open collector, 50 mA max., residual voltage 1.2 V max
		Linear output	Selectable from 2 types of output, voltage or current (selected by slide switch on bottom). Voltage output: .10 to 10 V, output impedance: 40 Ω Current output: 4 to 20 mA	
Inputs	Laser OFF, ZERO reset timing, RESET	ON: Short-circuited with 0 V terminal or 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)	ON: Short-circuited to supply voltage or within 1.5 V of supply voltage. OFF: Open (leakage current: 0.1 mA max.)	
Functions		Display: Measured value, threshold value, voltage/current, received light amount, and resolution/terminal block output Sensing: Mode, gain, measurement object, head installation Measurement point: Average, peak, bottom, thickness, step, and calculations Filter: Smooth, average, and differentiation Outputs: Scaling, various hold values, and zero reset I/O settings: Linear (focus/correction), judgments (hysteresis and timer), non-measurement, and bank (switching and clear) System: Save, initialization, measurement information display, communications settings, key lock, language, and data load Task: Single task or multitask (up to 4)		
Status indicators		HIGH (orange), PASS (green), LOW (orange), LDON (green), ZERO (green), and ENABLE (green)		
Segment display	Main digital	8-segment red LED, 6 digits		
	Sub-digital	8-segment green LEDs, 6 digits		
LCD		16 digitsx2 rows, colour of characters: green, resolution per character: 5x8 pixel matrix		
Setting inputs	Setting keys	Direction keys (UP, DOWN, LEFT, and RIGHT), SET key, ESC key, MENU key, and function keys (1 to 4)		
	Slide switch	Threshold switch (2 states: High/Low), mode switch (3 states: FUN, TEACH, and RUN)		
Power supply voltage		21.6 V to 26.4 VDC (including ripple)		
Current consumption		0.5 A max. (when sensor head is connected)		
Ambient temperature		Operating: 0 to 50°C, storage: -15 to +60°C (with no icing or condensation)		
Ambient humidity		Operating and storage: 35% to 85% (with no condensation)		
Degree of protection		IP20		
Materials		Case: Polycarbonate (PC)		
Weight		Approx. 280 g (excluding packing materials and accessories)		
Accessories		Ferrite core (1), instruction sheet		

ZS-MDC11/MDC41 multi controllers

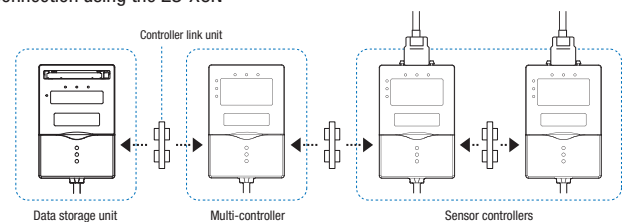
Basic specifications are the same as those for the sensor controllers.

The following points, however, are different.

- (1) Sensor heads cannot be connected.
- (2) A maximum 9 of controllers can be connected. Control link units are required to connect controllers.
- (3) Processing functions between controllers: Math functions

Controller link unit

Connection using the ZS-XCN



Data storage units

Sensor controllers		Model	ZS-DSU11	ZS-DSU41
Number of mounted sensor heads		Cannot be connected		
Number of connectable controllers		10 controllers max. (ZS-MDC: 1 controller, ZS-HLDC: 9 controllers max.) ¹⁾		
Connectable controllers		ZS-HLDC__, ZS-MDC__		
External interface	Connection method		Serial I/O: connector, other: pre-wired (standard cable length: 2 m)	
	Serial I/O	USB 2.0	1 port, full speed (12 Mbps), MINI-B	
		RS-232C	1 port, 115,200 bps. max.	
	Outputs	3 outputs: HIGH, PASS, and LOW NPN open-collector, 30 VDC, 50 mA max., residual voltage: 1.2 V max.		3 outputs: HIGH, PASS, and LOW PNP open-collector, 50 mA max., residual voltage: 1.2 V max.
Inputs	ON: Short-circuited with 0V terminal or 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)		ON: Short-circuited to supply voltage or within 1.5 V of supply voltage OFF: Open (leakage current: 0.1 mA max.)	
Data resolution		32 bits		
Function s	Logging trigger functions	Start and stop triggers can be set separately; external triggers, data triggers (self-triggers), and time triggers		
	Other functions	External banks, alarm outputs, saved data format customization, and clock		
Status indicators		OUT (orange), PWR (green), ACCESS (orange), and ERR (red)		
Segment display		8-segment green LEDs, 6 digits		
LCD		16 digitsx2 rows, colour of characters: green, resolution per character: 5x8 pixel matrix		
Setting inputs	Setting keys	Direction keys (UP, DOWN, LEFT, and RIGHT), SET key, ESC key, MENU key, and function keys (1 to 4)		
	Slide switch	Threshold switch (2 states: High/Low), mode switch (3 states: FUN, TEACH, and RUN)		

Sensor controllers	Model	ZS-DSU11	ZS-DSU41
Power supply voltage		21.6 V to 26.4 VDC (including ripple)	
Current consumption		0.5 A max.	
Ambient temperature		Operating: 0 to 50°C, storage: -15 to 60°C (with no icing or condensation)	
Ambient humidity		Operating and storage: 35% to 85% (with no condensation)	
Materials		Case: Polycarbonate (PC)	
Weight		Approx. 280 g (excluding packing materials and accessories)	
Accessories		Ferrite core (1) instruction sheet, tools for data storage unit: CSV file converter for data storage unit, smart analyzer macro edition (Excel macros for analysis of collected data)	

*1 Control link units are required to connect controllers.



Smart, fast and accurate laser measurement sensor

Smart ZX-L-N offers plug & measure technology for applications where high resolution and fast response time is required. A wide range of interchangeable sensor heads provides greater flexibility in solving most demanding applications.

- Small and light sensor heads for easy integration
- High speed response time of 150 μ s
- Easy sensor head replacement
- Scalability through a modular platform concept
- Multipoint measurement with up to 5 sensors
- Wide range of sensor heads offering laser beam width from 1 mm to 30 mm

Ordering information

Sensors

Sensor head (reflection type)

Optical method	Beam shape	Sensing distance	Resolution ^{*1}	Size in mm (HxWxD)	Order code
Diffuse-reflective	Spot beam	40 \pm 10 mm	2 μ m	39x33x17	ZX-LD40
		100 \pm 40 mm	16 μ m		ZX-LD100
		300 \pm 200 mm	300 μ m		ZX-LD300
	Line beam	40 \pm 10 mm	2 μ m		ZX-LD40L
		100 \pm 40 mm	16 μ m		ZX-LD100L
		300 \pm 200 mm	300 μ m		ZX-LD300L
Regular reflection type	Spot beam	30 \pm 2 mm	0.25 μ m	45x55x25	ZX-LD30V
	Line beam				ZX-LD30VL

^{*1} At average count of 4,096 times

Sensor head (through-beam)

Optical method	Measurement width	Sensing distance	Resolution ^{*1}	Size in mm (HxWxD)		Order code
				Transmitter	Receiver	
Through-beam	1 mm dia.	0 to 2,000 mm	4 μ m	15x15x34	15x15x19	ZX-LT001
	5 mm	0 to 500 mm				ZX-LT005
	10 mm			20x20x42	20x20x25	ZX-LT010
	30 mm		12 μ m	64.25x70x22.6	64.25x54x22.6	ZX-LT030

^{*1} At average count of 64 times

Amplifier units

Power supply	Output specifications	Order code
DC	NPN output	ZX-LDA11-N
	PNP output	ZX-LDA41-N

Note: Compatible with sensor head connection.

Accessories (order separately)

Calculating unit

	Order code
Calculating unit	ZX-CAL2

Side-view attachments

Applicable sensor head	Order code
ZX-LT1001/LT005	ZX-XF12
ZX-LT010	ZX-XF22

SmartMonitor sensor setup tool for Personal Computer connection

Name	Order code
ZX-series communications interface unit	ZX-SF11
ZX-series communications interface unit + Setup Software (CD-ROM)	ZX-SFW11EV3 ^{*1,*2}
ZX-series sensor setup and logging software (CD-ROM)	ZX-SW11EV3 ^{*1}

^{*1} When using the ZX-TDA11/41 with the SmartMonitor, either the ZX-SFW11EV3 or the ZX-SW11EV3 SmartMonitor must be used. Earlier versions cannot be used.

^{*2} The ZX-SFW11EV3 SmartMonitor can be used only to set functions and monitor waveforms.

Cables with connectors on both ends (for extension)^{*1}

Cable length	Order code
1 m	ZX-XC1A
4 m	ZX-XC4A
8 m	ZX-XC8A
9 m ^{*2}	ZX-XC9A

^{*1} Robot cable models are also available. The model numbers are ZX-XC_R.

^{*2} For use only with reflective sensors.

Specifications

Sensor head (reflection type)

Item	ZX-LD40	ZX-LD100	ZX-LD300	ZX-LD30V	ZX-LD40L	ZX-LD100L	ZX-LD300L	ZX-LD30VL
Optical method	Diffuse reflection			Regular reflection	Diffuse reflection			Regular reflection
Light source (wave length)	Visible-light semiconductor laser (wavelength 650 nm, 1 mW or less, Class 2)							
Measurement center distance	40 mm	100 mm	300 mm	30 mm	40 mm	100 mm	300 mm	30 mm
Measurement range	±10 mm	±40 mm	±200 mm	±2 mm	±10 mm	±40 mm	±200 mm	±2 mm
Beam shape	Spot			Line				
Beam diameter *1	50 µm dia.	100 µm dia.	300 µm dia.	75 µm dia.	75 µmx2mm	150 µmx2 mm	450 µmx2 mm	100 µmx1.8 mm
Resolution *2	2 µm	16 µm	300 µm	0.25 µm	2 µm	16 µm	300 µm	0.25 µm
Linearity *3	±0.2% F.S. (entire range)	±0.2% F.S. (80 to 121 mm)	±2% F.S. (200 to 401 mm)	±0.2% F.S. (entire range)	±0.2% F.S. (32 to 49 mm)	±0.2% F.S. (80 to 121 mm)	±2% F.S. (200 to 401 mm)	±0.2% F.S. (entire range)
Temperature characteristic *4	±0.03% FS/°C (except for ZX-LD300 and ZX-LD300L, which are ±0.1% FS/°C.)							
Ambient illumination	Incandescent lamp: 3,000 lx max. (on light receiving side)							
Ambient temperature	Operating: 0 to 50°C, storage: -15 to 60°C (with no icing or condensation)							
Ambient humidity	Operating and storage: 35% to 85% (with no condensation)							
Insulation resistance	20 MΩ min. at 500 VDC							
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min							
Vibration resistance (destruction)	10 to 150 Hz, 0.7-mm double amplitude 80 min each in X, Y, and Z directions							
Shock resistance (destruction)	300 m/s ² 3 times each in six directions (up/down, left/right, forward/backward)							
Protective structure	IEC 60529 IP50			IEC standard IP40	IEC 60529 IP50			IEC standard IP40
Connection method	Connector relay (standard cable length: 500 mm)							
Weight (packed state)	Approx. 150 g			Approx. 250 g	Approx. 150 g			Approx. 250 g
Materials	Case: PBT (polybutylene terephthalate), Cover: Aluminum, lens: Glass			Case and cover: Aluminum, lens: Glass	Case: PBT (polybutylene terephthalate), Cover: Aluminum, lens: Glass			Case and cover: Aluminum, lens: Glass
Accessories	Instruction sheet, Laser warning label (English)							

*1 Beam diameter: This is the value of the measurement center distance (actual value), and is defined at 1/e² (13.5%) of the central light intensity. If there is stray light outside, the defined area and the area around the object has a higher reflectance than the object.

*2 Resolution: Indicates the amount of fluctuation (±3 δ) in the linear output when connected to the ZX-LDA. (The measured value when the average count of the ZX-LDA is set to 4,096 and our standard object (white ceramic) is used for the central distance.) This indicates the repeatability precision when the work is in a static state, and does indicate the distance precision. The resolution performance may not be satisfactory in a strong electromagnetic field.

*3 Linearity: This indicates the error with respect to the ideal straight line of the displacement output when measuring our standard object.

*4 Temperature characteristic: The temperature characteristic is measured at the measurement point with the sensor and reference object (Omron's standard reference object) secured with an aluminum jig.

Note: Highly reflective objects can result in incorrect detection by causing out-of-range measurements.

Sensor head (through-beam)

Item	ZX-LT001	ZX-LT005	ZX-LT010	ZX-LT030
Optical method	Through-beam			
Light source (wave length)	Visible-light semiconductor laser (wavelength 650 nm, 1 mW or less, Class 1)			
Maximum output	0.2 mW max.	0.35 mW max.		0.2 mW max.
Measurement width	1 mm dia.	1 to 2.5 mm dia.	5 mm	10 mm
Sensing distance	0 to 500 mm	500 to 2,000 mm	0 to 500 mm	
Min. sensing object	8 mm dia. opaque object	8 to 50 µm opaque object	opaque: 0.05 mm dia.	opaque: 0.1 mm dia.
Resolution *1	4 µm *2	–	4 µm *3	
Temperature characteristic	±0.2% FS/°C			±0.3% FS/°C
Ambient illumination	Incandescent lamp: 10,000 lx max. (on light-receiving side)			
Ambient temperature	Operating: 0 to 50°C, storage: -25 to 70°C (with no icing or condensation)			
Ambient humidity	Operating: 35% to 85% (with no condensation)			
Protective structure	IEC 60529 IP40			IP 40
Connection method	Connector relay (standard cable length: 500 mm)			
Weight (packed state)	Approx. 220 g			Approx. 450 g
Cable length	Extendable up to 10 m with special extension cable.			
Materials	Case	Polyetherimide		Zinc die-cast
	Cover	Polycarbonate		
	Front filter	Glass		
Tightening torque	0.3 Nm max.			
Accessories	Instruction sheet, sensor head-amplifier connection cable			Mounting Bracket

*1 The amount of fluctuation (±3 δ) of the linear output when connected to an amplifier unit, converted to a detection span.

*2 When the average count is 64. 5 µm when the count is 32. The value when the smallest detection object shades the vicinity of the center of the 1 mm dia. detection span.

*3 When the average count is 64. 5 µm when the count is 32.

*4 For an average count of 64. The value is 15 µm for an average count of 32.

Amplifier units

Item	ZX-LDA11-N	ZX-LDA41-N
Measurement period	150 μs	
Possible average count settings*1	1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1,024, 2,048, or 4,096	
Temperature characteristic	When connected to a reflective sensor head: 0.01% FS/°C, when connected to a through-beam sensor head: 0.1% FS/°C	
Linear output*2	4 to 20 mA/FS, max. load resistance: 300 Ω, ±4 V (± 5 V, 1 to 5 V*3), output impedance: 100 Ω	
Judgement outputs (3 outputs: HIGH/PASS/LOW)*1	NPN open-collector outputs, 30 VDC, 50 mA max. Residual voltage: 1.2 V max.	PNP open-collector outputs, 30 VDC, 50 mA max. Residual voltage: 2 V max.
Laser OFF input, zero reset input, timing input, reset input	ON: Short-circuited with 0-V terminal or 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)	ON: Supply voltage short-circuited or supply voltage within 1.5 V OFF: Open (leakage current: 0.1 mA max.)
Functions	Measurement value display, present value/set value/light level/resolution display, scaling, display reverse, display OFF mode, ECO mode, number of display digit changes, sample hold, peak hold, bottom hold, peak-to-peak hold, self-peak hold, self-bottom hold, average hold, delay hold, intensity mode, zero reset, initial reset, ON-delay timer, OFF-delay timer, one-shot timer, deviation, previous value comparison, sensitivity adjustment, keep/clamp switch, direct threshold value setting, position teaching, 2-point teaching, automatic teaching, hysteresis width setting, timing inputs, reset input, monitor focus, linear output compensation, (A-B) calculations*4, (A+B) calculations*4, mutual interference*4, laser deterioration detection, zero reset memory, zero reset display, key lock	
Indications	Operation indicators: High (orange), pass (green), low (yellow), 7-segment main display (red), 7-segment subdisplay (yellow), laser ON (green), zero reset (green), enable (green)	
Power supply voltage	12 to 24 VDC ±10%, Ripple (p-p): 10% max.	
Current consumption	140 mA max. with power supply voltage of 24 VDC (with sensor connected)	
Ambient temperature	Operating: 0 to 50°C, storage: -15 to 60°C (with no icing or condensation)	
Ambient humidity	Operating and storage: 35% to 85% (with no condensation)	
Insulation resistance	20 MΩ min. at 500 VDC	
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min	
Vibration resistance (destruction)	10 to 150 Hz, 0.7-mm double amplitude 80 min each in X, Y, and Z directions	
Shock resistance (destruction)	300 m/s ² 3 times each in six directions (up/down, left/right, forward/backward)	
Connection method	Prewired (standard cable length: 2 m)	
Weight (packed state)	Approx. 350 g	
Materials	Case: PBT (polybutylene terephthalate), cover: Polycarbonate	
Accessories	Instruction sheet	

*1 The response speed of the linear output is calculated as the measurement period x (average count setting + 1) (with fixed sensitivity).
 *2 The response speed of the judgement outputs is calculated as the measurement period x (average count setting + 1) (with fixed sensitivity).
 *3 The output can be switched between a current output and voltage output using a switch on the bottom of the amplifier unit.
 *4 Setting is possible via the monitor focus function.
 *5 A calculating unit (ZX-CAL2) is required.

Calculating unit

Item	ZX-CAL2
Applicable amplifier units	ZX-LDA11-N/41-N/ZX-EDA11/41/ZX-TDA11/41
Current consumption	12 mA max. (supplied from the smart sensor amplifier unit)
Ambient temperature	Operating: 0 to 50°C, storage: -15 to 60°C (with no icing or condensation)
Ambient humidity	Operating and storage: 35% to 85% (with no condensation)
Connection method	Connector
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min
Insulation resistance	100 MΩ (at 500 VDC)
Vibration resistance (destructive)	10 to 150 Hz, 0.7-mm double amplitude 80 min each in X, Y, and Z directions
Shock resistance (destructive)	300 m/s ² 3 times each in six directions (up/down, left/right, forward/backward)
Materials	Display: Acrylic, case: ABS resin
Weight (packed state)	Approx. 50 g

ZX-series Communications Interface Unit

Item	ZX-SF11	
Current consumption	60 mA max. (supplied by the amplifier unit)	
Applicable amplifier units	ZX series	
Applicable amplifier unit versions	ZX-LDA_1-N Ver. 1.000 or higher ZX-EDA_1 Ver. 1.100 or higher ZX-TDA_1 Ver. 1.000 or higher	
Max. No. of amplifier units	5	
Communications functions	Communications port	RS-232C port (9-pin D-Sub connector)
	Communications protocol	CompoWay/F*1
	Baud rate	38,400 bps
	Data configuration	Data bits: 8, parity: none, start bits: 1, stop bits: 1, flow control: none
Indicators	Power supply: green, sensor communications: green, sensor communications error: red, external terminal communications: green, external terminal communications error: red	
Protective circuits	Reverse polarity protection	
Ambient temperature	Operating: 0 to 50°C, storage: -15 to 60°C (with no icing or condensation)	
Ambient humidity	Operating and storage: 35% to 85% (with no condensation)	
Insulation resistance	20 MΩ min. (at 500 VDC)	
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min, Leakage current: 10 mA max.	
Materials	Case: PBT (polybutylene terephthalate), cover: Polycarbonate	
Accessories	Instruction sheet, 2 clamps	

*1 Contact your Omron representative for CompoWay/F communications specifications.



Ultra-compact, lightweight sensor measures any material

The ZW confocal fiber displacement sensor delivers stable, non-contact, in-line measurement of heights, thicknesses and other dimensions. It solves the problems of traditional laser triangulation sensors: deviation between different material and inclination tolerance. The compact sensing head has no electronic parts to eliminate problems of installation space and mutual interference, electrical/magnetic noise, temperature rise and mechanical positioning.

- Minimum resolution: 0.01 μm
- Ultra-compact sensing head: 24 × 24 mm; weighs only 105 g
- High flexibility robotic cable from sensor to controller, extends 32 m
- Mount sensing head one time: no need to re-tune for changing materials
- Separate amplifier provides white LED light source, spectroscopy and processor to convert reflected color light to distance
- Automation Software Sysmac Studio simplifies system operation and setting

Ordering information

Sensor heads

Measuring range	Spot diameter	Static resolution	Order code ^{*1}
7±0.3 mm	18 μm dia.	0.01 μm ² /0.25 μm	ZW-S07
20±1 mm	40 μm dia.	0.02 μm ² /0.25 μm	ZW-S20
30±3 mm	60 μm dia.	0.06 μm ² /0.25 μm	ZW-S30
40±6 mm	80 μm dia.	0.08 μm ² /0.25 μm	ZW-S40

^{*1} When ordering, specify the cable length (0.3 m, 2.0 m).

^{*2} The high resolution types are subject to the export control restrictions

Controller with EtherCAT

Power supply	Output type	Order code
24 VDC	NPN	ZW-CE10T/ZW-C10 ^{*1}
	PNP	ZW-CE15T/ZW-C15 ^{*1}

^{*1} The high resolution types are subject to the export control restrictions

Note: Controllers with binary outputs are also available (ZW-C10T/-C15T). Please contact your OMRON sales representative for details.

Automation Software Sysmac Studio

Please purchase a DVD and required number of licenses the first time you purchase the Sysmac Studio. DVDs and licenses are available individually. Each model of licenses does not include any DVD.

Product name	Specifications	Standards		Order code	
		Number of licenses	Media		
Sysmac Studio Standard Edition Ver.1.□□ ^{*1}	The Sysmac Studio provides an integrated development environment to set up, program, debug, and maintain NJ-series controllers and other machine automation controllers, as well as EtherCAT slaves. Sysmac Studio runs on the following OS. Windows XP (Service Pack 3 or higher, 32-bit version)/Vista(32-bit version)/7(32-bit/64-bit version) This software provides functions of the Measurement Sensor Edition. Refer to Sysmac Catalog (P072) for details such as supported models and functions.	– (Media only)	DVD	–	SYSMAC-SE200D
		1 license ^{*2}	–	–	SYSMAC-SE201L
Sysmac Studio Measurement Sensor Edition Ver.1.□□ ^{*3}	Sysmac Studio Measurement Sensor Edition is a limited license that provides selected functions required for ZW-series Displacement Sensor settings. Because this product is a license only, you need the Sysmac Standard Edition DVD media to install it.	1 license	–	–	SYSMAC-ME001L
		3 licenses	–	–	SYSMAC-ME003L

^{*1} ZW-series is supported by Sysmac Studio version 1.05 or higher.

^{*2} Multi licenses are available for the Sysmac Studio (3, 10, 30, or 50 licenses).

^{*3} Setting Software Smart Monitor ZW is also available (ZW-SW101). Please contact your OMRON representative for details.

Setting software

Item	Order code
Smart Monitor ZW	ZW-SW101

Accessories

Item	Order code
Fiber Connector Cleaner	ZW-XCL

Recommended EtherCAT communications cables

Use Straight STP (shielded twisted-pair) cable of category 5 or higher with double shielding (braiding and aluminum foil tape) for EtherCAT.

Cable with connectors

Item	Recommended manufacturer	Cable length (m) ^{**1}	Order code
Standard type Cable with connectors on both ends (RJ45/RJ45) Wire gauge and number of pairs: AWG27, 4-pair Cable Cable Sheath material: LSZH ^{**2} Cable color: Yellow ^{**3}	OMRON	0.3	XS6W-6LSZH8SS30CM-Y
		0.5	XS6W-6LSZH8SS50CM-Y
		1	XS6W-6LSZH8SS100CM-Y
		2	XS6W-6LSZH8SS200CM-Y
		3	XS6W-6LSZH8SS300CM-Y
Rugged type Cable with connectors on both ends (RJ45/RJ45) Wire gauge and number of pairs: AWG22, 2-pair cable	OMRON	0.3	XS5W-T421-AMD-K
		0.5	XS5W-T421-BMD-K
		1	XS5W-T421-CMD-K
		2	XS5W-T421-DMD-K
		5	XS5W-T421-GMD-K
Rugged type Cable with connectors on both ends (M12 Straight/RJ45) Wire gauge and number of pairs: AWG22, 2-pair cable	OMRON	0.3	XS5W-T421-AMC-K
		0.5	XS5W-T421-BMC-K
		1	XS5W-T421-CMC-K
		2	XS5W-T421-DMC-K
		5	XS5W-T421-GMC-K
Rugged type Cable with connectors on both ends (M12 Right-angle/RJ45) Wire gauge and number of pairs: AWG22, 2-pair cable	OMRON	0.3	XS5W-T422-AMC-K
		0.5	XS5W-T422-BMC-K
		1	XS5W-T422-CMC-K
		2	XS5W-T422-DMC-K
		5	XS5W-T422-GMC-K
		10	XS5W-T422-JMC-K

^{**1} Standard type cables length 0.2, 0.3, 0.5, 1, 1.5, 2, 3, 5, 7.5, 10, 15 and 20m are available.
Rugged type cables length 0.3, 0.5, 1, 2, 3, 5, 10 and 15m are available.
^{**2} The lineup features Low Smoke Zero Halogen cables for in-cabinet use and PUR cables for out-of-cabinet use.
^{**3} Cables colors are available in blue, yellow, or Green

Note: For details, refer to Cat.No.G019.

Cables/connectors

Wire gauge and number of pairs: AWG24, 4-pair cable

Item	Recommended manufacturer	Order code
Cables	Hitachi Cable, Ltd.	NETSTAR-C5E SAB 0.5 × 4P ^{*1}
	Kuramo Electric Co.	KETH-SB ^{*1}
	SWCC Showa Cable Systems Co.	FAE-5004 ^{*1}
RJ45 connectors	Panduit Corporation	MPS588-C ^{*1}

^{*1} We recommend you to use above cable and connector together.

Wire gauge and number of pairs: AWG22, 2-pair cable

Item	Recommended manufacturer	Order code
Cables	Kuramo Electric Co.	KETH-PSB-OMR ^{*1}
	Nihon Electric Wire&Cable Co.,Ltd.	PNET/B ^{*1}
RJ45 Assembly connector	OMRON	XS6G-T421-1 ^{*1}

^{*1} We recommend you to use above cable and connector together.

Note: Connect both ends of cable shielded wires to the connector hoods.

Industrial switching hubs for Ethernet

Number of ports	Failure detection	Current consumption	Order code
3	None	0.22 A	W4S1-03B
5	None	0.22 A	W4S1-05B
	Supported		W4S1-05C

Note: Industrial switching hubs are cannot be used for EtherCAT.

EtherCAT junction slaves

Number of ports	Power supply voltage	Current consumption	Order code
3	20.4 to 28.8 VDC	0.08 A	GX-JC03
6	(24 VDC -15 to 20%)	0.17 A	GX-JC06

Note: 1 Please do not connect EtherCAT junction slave with OMRON position control unit, Model CJ1W-NC_81/_82.
2 EtherCAT junction slaves cannot be used for EtherNet/IP™ and Ethernet.

Specifications

Sensor head

Item	ZW-S07	ZW-S20	ZW-S30	ZW-S40
Measuring center distance	7 mm	20 mm	30 mm	40 mm
Measuring range	±0.3 mm	±1 mm	±3 mm	±6 mm
Static resolution ^{*1}	0.25 μm	0.25 μm	0.25 μm	0.25 μm
Linearity ^{*2}	±0.8 μm	±1.2 μm	±4.5 μm	±7.0 μm
Spot diameter ^{*3}	Near	20 μm dia.	45 μm dia.	70 μm dia.
	Center	18 μm dia.	40 μm dia.	60 μm dia.
	Far	20 μm dia.	45 μm dia.	70 μm dia.
Measuring cycle	500 μs to 10 ms			
Operating ambient illumination	Illumination on object surface 10,000 lx or less: incandescent light			
Ambient temperature range	Operating: 0 to 50°C, Storage: -15 to 60°C (with no icing or condensation)			
Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)			
Degree of protection	IP40 (IEC60529)			
Vibration resistance (destructive)	10 to 150 Hz, 0.35 mm single amplitude, 80 min each in X, Y, and Z directions			
Shock resistance (destructive)	150 m/s ² 3 times each in six directions (up/down, left/right, forward/backward)			
Temperature characteristic ^{*4}	0.6 μm/°C	1.5 μm/°C	2.8 μm/°C	4.8 μm/°C
Materials	Case: Fiber cable sheath: Calibration ROM:	aluminum die-cast PVC PC		
Fiber cable length	0.3 m, 2 m (Flex-resistant cable)			
Fiber cable minimum bending radius	20 mm			
Insulation resistance (Calibration ROM)	Between case and all terminals: 20 MΩ (by 250 V megger)			
Dielectric strength (Calibration ROM)	Between case and all terminals: 1,000 VAC, 50/60 Hz, 1 min			
Weight	Approx. 105 g (Chassis, fiber cable total)			
Accessories included with sensor head	Instruction sheet, Fixing screw (M2) for Calibration ROM, Precautions for correct use			

*1. Capacity value when Omron standard mirror surface target is measured at the measurement center distance as the average of 4,096 times.

*2. Material setting for the Omron standard mirror surface target: Error from an ideal straight line when measuring on mirror surface.
The reference values for linearity when targets to measure other than the above are as in the table below

Item	ZW-S07	ZW-S20	ZW-S30	ZW-S40
Glass	±1.0 μm	±1.2 μm	±4.5 μm	±7.0 μm
SUS BA	±1.2 μm	±1.4 μm	±5.5 μm	±8.5 μm
White ceramic	±1.6 μm	±1.7 μm	±6.4 μm	±9.5 μm

*3. Capacity value defined by 1/e² (13.5%) of the center optical intensity in the measured area.

*4. Temperature characteristic at the measurement center distance when fastened with an aluminum jig between the Sensor Head and the target and the Sensor Head and the controller are set in the same temperature environment.

Automation software Sysmac Studio

System requirements

Item	Condition
Operating system (OS) ^{*1, *2}	Windows XP (Service Pack 3 or higher, 32-bit version)/Vista(32-bit version)/7(32-bit/64-bit version)
CPU	Windows computers with Celeron 540 (1.8 GHz) or faster CPU. Core i5 M520 (2.4 GHz) or equivalent or faster recommended
Main memory	2 GB min.
Recommended video memory/video card for using 3D motion trace	Video memory: 512 MB min. Video card: Either of the following video cards: • NVIDIA GeForce 200 Series or higher • ATI RadeonHD5000 Series or higher
Hard disk	At least 1.6 GB of available space
Display	XGA 1024 × 768, 16 million colors. WXGA 1280 × 800 min. recommended
Disk drive	DVD-ROM drive
Communication ports	USB port corresponded to USB 2.0, or Ethernet port ^{*3}
Supported languages	Japanese, English, German, French, Italian, Spanish, simplified Chinese, traditional Chinese, Korean

*1 Sysmac Studio operating system precaution: System requirements and hard disk space may vary with the system environment.

*2 The following restrictions apply when Sysmac Studio is used with Microsoft Windows Vista or Windows 7.

Some Help files cannot be accessed.

The Help files can be accessed if the Help program distributed by Microsoft for Windows (WinHlp32.exe) is installed. Refer to the Microsoft homepage listed below or contact Microsoft for details on installing the file. (The download page is automatically displayed if the Help files are opened while the user is connected to the Internet.)

<http://support.microsoft.com/kb/917607/en-us>

*3 Refer to the hardware manual for your Controller for hardware connection methods and cables to connect the computer and Controller.

Setting software Smart Monitor ZW ZW-SW101

System requirements

Item	Condition
Operating System(OS)	Windows 7 (32 or 64-bit version) Windows XP (Service Pack3 or more, 32-bit version)
CPU	Intel Pentium III, 850 MHz or more (2 GHz or more is recommended.)
Main memory	1 GB or more
Hard disk	50 MB or more
Display	1024 × 768 dots or more, 16 million colors or more
Supported languages	Japanese/English
Communication port	Ethernet port

Controller

Item	ZW-CE10T	ZW-CE15T	
Input/Output type	NPN	PNP	
Number of connected sensor heads	1 per Controller		
Sensor head compatibility	Available		
Light source for measurement	White LED		
Segment display	Main display	11-segment red display, 6 digits	
	Sub-display	11-segment green display, 6 digits	
LED display	Status indicators	HIGH (orange), PASS (green), LOW (orange), STABILITY (green), ZERO (green), ENABLE (green), THRESHOLD-H (orange), THRESHOLD-L (orange), RUN (green)	
	EtherCAT indicators	L/A IN (Link Activity IN) (green), L/O OUT (Link Activity OUT) (green), ECAT RUN (green), ECAT ERR (red)	
External interface	Ethernet	100BASE-TX, 10BASE-T, No-protocol communications (TCP/UDP), EtherNet/IP™	
	EtherCAT	EtherCAT-specific protocol 100BASE-TX	
	RS-232C	115,200 bps max.	
	Analog output terminal block	Analog voltage output (OUT1V)	-10 V to +10 V, output impedance: 100 Ω
		Analog current output (OUT1A)	4 mA to 20 mA, maximum load resistance: 300 Ω
	32-pole extension connector	Judgment output (HIGH1/PASS1/LOW1)	Transistor output system Output voltage: 21.6 to 30 VDC Load current: 50 mA or less
		BUSY output (BUSY1)	Residual voltage when turning ON: 1.2 V or less Leakage voltage when turning OFF: 0.1 mA or less
		ALARM output (ALARM1)	
		ENABLE output (ENABLE)	
		LED OFF input (LED OFF1)	DC input system
		ZERO RESET input (ZERO)	Input voltage: 24 VDC -10% (21.6 to 26.4 VDC) Input current: 7 mA Typ. (24 VDC)
		TIMING output (TIMING1)	Voltage/Current when turning ON: 19 V/3 mA or more Voltage/Current when turning OFF: 5 V/1 mA or less
	Bank	Selected bank output (BANK_OUT 1 to 3)	Transistor output system Output voltage: 21.6 to 30 VDC Load current: 50 mA or less Residual voltage when turning ON: 1.2 V or less Leakage voltage when turning OFF: 0.1 mA or less
Selected bank input (BANK_SEL 1 to 3)		DC input system Input voltage: 21.6 to 26 VDC Input current: 7 mA Typ. (24 VDC) Voltage/Current when turning ON: 19 V/3 mA or more Voltage/Current when turning OFF: 5 V/1 mA or less	
Main functions	Exposure time	Auto/Manual	
	Measuring cycle	500 μs to 10 ms	
	Material setting	Standard/Mirror/Diffusion surfaces	
	Measurement Item	Height/Thickness/Calculation	
	Filtering	Median/Average/Differentiation/High pass/Low pass/Band pass	
	Outputs	Scaling/Different holds/Zero reset/Logging for a measured value	
	Display	Measured value/Threshold value/Analog output voltage or current value/Judgment result/Resolution/Exposure time	
	Number of configurable banks	Max. 8 banks	
	Task process	Multi-task (up to 4 tasks per bank)	
System	Save/Initialization/Display measurement information/Communication settings/Sensor Head calibration/Key-lock/Trigger-key input		
Ratings	Power supply voltage	21.6 to 26.4 VDC (including ripple)	
	Current consumption	600 mA max.	
	Insulation resistance	Across all lead wires and controller case: 20 MΩ (by 250 V megger)	
	Dialectic strength	Across all lead wires and controller case: 1,000 VAC, 50/60 Hz, 1 min.	
Environmental	Degree of protection	IP20 (IEC60529)	
	Vibration resistance (destructive)	10 to 55 Hz, 0.35-mm single amplitude, 50 min each in X, Y, and Z directions	
	Shock resistance (destructive)	150 m/s ² , 3 times each in six directions (up/down, left/right, forward/backward)	
	Ambient temperature	Operating: 0 to 40°C Storage: -15 to 60°C (with no icing or condensation)	
	Ambient humidity	Operating and storage: 35% to 85% (with no condensation)	
Grounding	D-type grounding (Grounding resistance of 100 Ω or less) Note: For conventional Class D grounding		
Materials	Case: PC		

Item	ZW-CE10T	ZW-CE15T
Weight	Approx. 750 g (main unit only), approx. 150 g (Parallel cable)	
Accessories included with controller	Instruction sheet, Member registration sheet, Parallel cable ZW-XCP2E	

Note: Controllers with binary outputs are also available (ZW-C10T/-C15T). Please contact your OMRON sales representative for details.

ZW series EtherCAT communications specifications

Item	Specification
Communications standard	IEC61158 Type12
Physical layer	100BASE-TX (IEEE802.3)
Connectors	RJ45 × 2 ECAT IN: EtherCAT input ECAT OUT: EtherCAT output
Communications media	Category 5 or higher (cable with double, aluminum tape and braided shielding) is recommended.
Communications distance	Distance between nodes: 100 m max.
Process data	Variable PDO mapping
Mailbox (CoE)	Emergency messages, SDO requests, SDO responses, and SDO information
Distributed clock	Synchronization in DC mode.
LED display	L/A IN (Link/Activity IN) × 1, AL/A OUT (Link/Activity OUT) × 1, AECAT RUN × 1, AECAT ERR × 1



Smart inductive measurement sensor

ZX-E offers the best solution for the accurate measurement of metallic objects. It is highly recommended in harsh environments such as automotive and metal working machines.

- High resolution of 1 μm
- High-speed response time of 150 μs
- Easy sensor head replacement
- Modular platform concept for different sensing technologies
- Easy linearity adjustment for any metal

Ordering information

Sensors

Sensor heads

Shape	Dimensions	Sensing distance	Resolution*1	Order code
Cylindrical	3 dia. x 18 mm	0.5 mm	1 μm	ZX-EDR5T
	5.4 dia. x 18 mm	1 mm		ZX-ED01T*2
	8 dia. x 22 mm	2 mm		ZX-ED02T*2
Screw-shaped	M10x22 mm	2 mm		ZX-EM02T*2
	M18x46.3 mm	7 mm		ZX-EM07MT*2
Flat	30x14x4.8 mm	4 mm		ZX-EV04T*2,*3
Heat-resistant, cylindrical	M12x22 mm	2 mm		ZX-EM02HT*4

*1 For an average count of 4,096.

*2 Models with protective spiral tubes are also available. Add a suffix of "-S" to the above model numbers when ordering. (Example: ZX-ED01T-S)

*3 Be sure to use ZX-EDA amplifier unit version 1,200 or later with the ZX-EV04.

*4 Be sure to use ZX-EDA amplifier unit version 1,300 or later with the ZX-EM02H.

Amplifier units

Power supply	Output type	Order code
DC	NPN	ZX-EDA11
	PNP	ZX-EDA41

Note: Compatible connection with the sensor head.

Accessories (order separately)

Calculating unit

	Model
Calculating unit	ZX-CAL2

Amplifier mounting brackets

Remarks	Model
Attached to each sensor head	ZX-XBE1
For DIN track mounting	ZX-XBE2

SmartMonitor sensor setup tool for Personal Computer connection

Name	Model
ZX-series communications interface unit	ZX-SF11
ZX-series communications interface unit + setup software (CD-ROM)	ZX-SFW11EV3*1
ZX-series sensor setup and logging software (CD-ROM)	ZX-SW11EV3

*1 The ZX-SFW11EV3 SmartMonitor can be used only to set functions and monitor waveforms.

Cables with connectors on both ends (for extension)*

Cable length	Model
1 m	ZX-XC1A
4 m	ZX-XC4A
8 m	ZX-XC8A

* Robot cable models are also available. The model numbers are ZX-XC_R.

Specifications

Sensor heads

Item	ZX-EDR5T	ZX-ED01T	ZX-ED02T/EM02T	ZX-EM07MT	ZX-EV04T	ZX-EM02HT
Measurement range	0 to 0.5 mm	0 to 1 mm	0 to 2 mm	0 to 7 mm	0 to 4 mm	0 to 2 mm
Sensing object	Magnetic metals (Measurement ranges and linearities are different for non-magnetic metals. Refer to engineering data on B-67.)					
Standard reference object	18x18x3 mm		30x30x3 mm	60x60x3 mm		45x45x3 mm
	Material: Ferrous (S50C)					
Resolution*1	1 μm					
Linearity*2	±0.5% F.S.					±1% F.S.*3
Linear output range	Same as measurement range.					
Temperature characteristic*4 (including amplifier unit)	0.15% F.S./°C	0.07% F.S./°C				0.1% F.S./°C
Ambient temperature	Operating*5	0 to 50°C (with no icing or condensation)				-10 to 200°C
	Storage*5	-20 to 70°C (with no icing or condensation)				-20 to 200°C

Item	ZX-EDR5T	ZX-ED01T	ZX-ED02T/EM02T	ZX-EM07MT	ZX-EV04T	ZX-EM02HT
Ambient humidity	Operating and storage: 35% to 85% (with no condensation)					
Insulation resistance	50 MΩ min. (at 500 DC)					
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min between charged parts and case					
Vibration resistance (destruction)	10 to 55 Hz with 1.5-mm double amplitude for 2 h each in X, Y, and Z directions					
Shock resistance (destruction)	500 m/s ² , 3 times each in X, Y, and Z directions					
Degree of protection (sensor head)	IEC60529, IP65	IEC60529, IP67				IEC60529, IP60 ^{*6}
Connection method	Connector relay (standard cable length: 2 m)					
Weight (packed state)	Approx. 120 g	Approx. 140 g		Approx. 160 g	Approx. 130 g	Approx. 160 g
Materials	Sensor head	Brass	Stainless steel	Brass	Zinc (nickel-plated)	Brass
	Case	Heat-resistant ABS				PEEK
	Sensing surface					
	Preamplifier	PES				
Accessories	Amplifier mounting brackets (ZX-XBE1), instruction manual					

*1 Accuracy: The resolution is the deviation (±3σ) in the linear output when connected to the ZX-EDA amplifier unit. The above values indicate the deviations observed 30 minutes after the power is turned ON.
(The resolution is measured with Omron's standard reference object at 1/2 of the measurement range with the ZX-EDA set for the maximum average count of 4,096 per period.)

The resolution is given at the repeat accuracy for a stationary workpiece, and is not an indication of the distance accuracy. The resolution may be adversely affected under strong electromagnetic fields.

*2 Linearity: The linearity is given as the error in an ideal straight line displacement output when measuring the standard reference object. The linearity and measurement values vary with the object being measured.

*3 The value given is for an ambient temperature of 25°C.

*4 Temperature characteristic: The temperature characteristic is measured with Omron's standard reference object at 1/2 of the measurement range.

*5 The ambient temperature given is only for the sensor head. It is -10 to 60°C for the preamp.

*6 Do not use in moist environments because the case is not waterproof.

Amplifier units

Item	ZX-EDA11	ZX-EDA41
Measurement period	150 μs	
Possible average count settings ^{*1}	1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1,024, 2,048, or 4,096	
Linear output ^{*2}	Current output: 4 to 20 mA/F.S., max. load resistance: 300 Ω Voltage output: ±4 V (±5 V, 1 to 5 V ^{*3}), output impedance: 100 Ω	
Judgement outputs (3 outputs: HIGH/PASS/LOW)	NPN open-collector outputs, 30 VDC, 50 mA max. Residual voltage: 1.2 V max.	PNP open-collector outputs, 30 VDC, 50 mA max. Residual voltage: 2 V max.
Zero reset input, timing input, reset input, judgement output hold input	ON: Short-circuited with 0-V terminal or 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)	ON: Supply voltage short-circuited or supply voltage within 1.5 V OFF: Open (leakage current: 0.1 mA max.)
Function	<ul style="list-style-type: none"> - Measurement value display - Linearity adjustment (materials selection) - Display reverse - Number of display digit changes - Bottom hold, peak-to-peak hold - Average hold - Initial reset - OFF-delay timer - Non-measurement setting - Automatic teaching - Reset input - Linear output correction - K-(A+B) calculation^{*4} - Sensor disconnection detection - Key lock 	
	<ul style="list-style-type: none"> - set value/output value/ resolution display - display OFF mode - sample hold - self-peak hold - delay hold - linearity initialization - one-shot timer - direct threshold value setting - hysteresis width setting - judgement output hold input - (A-B) calculations^{*4} - mutual interference prevention^{*4} - zero reset memory 	
	<ul style="list-style-type: none"> - Scaling - ECO mode - peak hold - self-bottom hold - zero reset - ON-delay timer - previous value comparison - position teaching - timing inputs - monitor focus - (A+B) calculations^{*4} - zero reset indicator 	
Indications	Judgement indicators: High (orange), pass (green), low (yellow), 7-segment main digital display (red), 7-segment sub-digital display (yellow), power ON (green), zero reset (green), enable (green)	
Voltage influence (including sensor)	0.5% F.S. of linear output value at ±20% of power supply voltage	
Power supply voltage	12 to 24 VDC ±10%, ripple (p-p): 10% max.	
Current consumption	140 mA max. with power supply voltage of 24 VDC (with sensor connected)	
Ambient temperature	Operating and storage: 0 to 50°C (with no icing or condensation)	
Ambient humidity	Operating and storage: 35% to 85% (with no condensation)	
Insulation resistance	20 MΩ min. (at 500 DC)	
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min	
Vibration resistance (destruction)	10 to 150 Hz with 0.7-mm double amplitude for 80 min each in X, Y, and Z directions	
Shock resistance (destruction)	300 m/s ² , 3 times each in 6 directions (up, down, left, right, forward, backward)	
Connection method	Prewired (standard cable length: 2 m)	
Weight (packed state)	Approx. 350 g	
Materials	Case: PBT (polybutylene terephthalate), cover: Polycarbonate	
Accessories	Instruction manual	

*1 The response speed of the linear output is calculated as the measurement period x (average count setting + 1) (with fixed sensitivity).

The response speed of the judgement outputs is calculated as the measurement period x (average count setting + 1) (with fixed sensitivity).

*2 The output can be switched between a current output and voltage output using a switch on the bottom of the amplifier unit.

*3 Setting is possible via the monitor focus function.

*4 A calculating unit (ZX-CAL or ZX-CAL2) is required.



Smart contact measurement sensor

ZX-T is ideal for applications where the target object may contain oil deposits or other micro-structures. In this case contact measurement is the most reliable way.

- Modular platform concept for different sensing technologies
- Air-retracting types for automated inspection
- Multipoint measurement with up to 8 sensors
- Pressing force alarm prevents malfunction
- Strong ball bearing structure assures long life time

Ordering information

Sensors

Sensor heads

Size	Type	Sensing distance	Resolution (See note.)	Order code
6 dia.	Short type	1 mm	0.1 μm	ZX-TDS01T
	Standard type	4 mm		ZX-TDS04T
	Low-load type			ZX-TDS04T-L
8 dia.	Standard type	10 mm	0.4 μm	ZX-TDS10T
	Ultra-low-load type			ZX-TDS10T-L
	Air lift type			ZX-TDS10T-V
	Air lift/air push type			ZX-TDS10T-VL

Note: The resolution refers to the minimum value that can be read when a ZX-TDA_1 amplifier unit is connected.

Amplifier units

Power supply	Output type	Order code
DC	NPN	ZX-TDA11
	PNP	ZX-TDA41

Accessories (order separately)

Calculating unit

	Order code
Calculating unit	ZX-CAL2

SmartMonitor sensor setup tool for Personal Computer connection

Name	Order code
ZX-series communications interface unit	ZX-SF11
ZX-series communications interface unit + setup software (CD-ROM)	ZX-SFW11EV3 ^{*1,*2}
ZX-series sensor setup and logging software (CD-ROM)	ZX-SW11EV3 ^{*1}

^{*1} When using the ZX-TDA11/41 with the SmartMonitor, either the ZX-SFW11EV3 or the ZX-SW11EV3 SmartMonitor must be used. Earlier versions cannot be used.

^{*2} The ZX-SFW11EV3 SmartMonitor can be used only to set functions and monitor waveforms.

ZX-series communications interface unit

Name	Order code
ZX-series communications interface unit	ZX-SF11

Cables with connectors on both ends (for extension)*

Cable length	Order code
1 m	ZX-XC1A
4 m	ZX-XC4A
8 m	ZX-XC8A

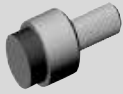

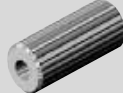

* Robot cable models are also available. The model numbers are ZX-XC_R.

Preamplifier mounting brackets

Remarks	Order code
Attached to each sensor head	ZX-XBT1
For DIN track mounting	ZX-XBT2

Actuators

Type (material)	Screw section	Appearance	Application	Applicable sensor (see note.) ZX-TDS_T	Order code
Ball type (steel)	Female screw M2.5x0.45		Measuring ordinary flat surfaces (standard actuator supplied with the ZX-TDS series)		D5SN-TB1
Ball type (carbide steel)	Female screw M2.5x0.45		Measurements where abrasion resistance is critical Measured objects: Carbide (HR90) or lower.		D5SN-TB2
Ball type (ruby)	Female screw M2.5x0.45		Measurements where abrasion resistance is critical Measured objects: Carbide (HR90) or higher.		D5SN-TB3
Needle type (carbide steel)	Male screw M2.5x0.45		Measuring the bottom of grooves and holes		D5SN-TN1

Type (material)	Screw section	Appearance	Application	Applicable sensor (see note.) ZX-TDS_T	Order code
Flat (carbide steel)	Male screw M2.5x0.45		Measuring spherical objects		D5SN-TF1
Conversion adapter (stainless steel)	Through-hole female screw M2.5x0.45		Mounting D5SN-TN1/-TF1 or commercially available actuators on ZX-TDS-series sensors		D5SN-TA

Note: ○ Replacement possible △ Conversion adapter required

Specifications

Amplifier units

Item	ZX-TDA11	ZX-TDA41
Measurement period	1 ms	
Possible average count settings *1	1, 16, 32, 64, 128, 256, 512, or 1,024	
Linear output *2	Current output: 4 to 20 mA/F.S., max. load resistance: 300 Ω Voltage output: ±4 V (±5 V, 1 to 5 V*3), output impedance: 100 Ω	
Judgement outputs (3 outputs: HIGH/PASS/LOW)	NPN open-collector outputs, 30 VDC, 30 mA max. Residual voltage: 1.2 V max.	PNP open-collector outputs, 30 VDC, 30 mA max. Residual voltage: 2 V max.
Zero reset input, timing input, reset input, judgement output hold input	ON: Short-circuited with 0-V terminal or 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)	ON: Supply voltage short-circuited or supply voltage of 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)
Function	<ul style="list-style-type: none"> - Measurement value display - Display reverse - Sample hold - Self-peak hold - Initial reset - Hysteresis width setting - Judgement output hold input - (A+B) calculations (see note 4.) - Zero reset memory - Clamp value setting - Span adjustment 	
Indicators	<ul style="list-style-type: none"> - present value/set value/output value display - ECO mode - peak hold - self-bottom hold - direct threshold value setting - timing inputs - monitor focus - sensor disconnection detection - function lock - scale inversion - warming-up display 	
Power supply voltage	Judgement indicators: High (orange), pass (green), low (yellow), 7-segment main digital display (red), 7-segment sub-digital display (yellow), power ON (green), zero reset (green), enable (green)	
Current consumption	12 to 24 VDC ±10%, ripple (p-p): 10% max.	
Ambient temperature	140 mA max. (with sensor connected), for 24-VDC power supply voltage: 140 mA max. (with sensor connected)	
Temperature characteristic	Operating and storage: 0 to 50°C (with no icing or condensation)	
Connection method	0.03% F.S./°C	
Weight (packed state)	Prewired (standard cable length: 2 m)	
Materials	Approx. 350 g	
	Case: PBT (polybutylene terephthalate), cover: Polycarbonate	

*1 The response speed of the linear output is calculated as the measurement period x (average count setting + 1).

The response speed of the judgement outputs is calculated as the measurement period x (average count setting + 1).

*2 The output can be switched between a current output and voltage output using a switch on the bottom of the amplifier unit.

*3 Setting is possible via the monitor focus function.

*4 A calculating unit (ZX-CAL2) is required.

Sensor heads

Item	ZX-TDS01T	ZX-TDS04T	ZX-TDS04T-L
Measurement range	1 mm	4 mm	
Maximum actuator travel distance	Approx. 1.5 mm	Approx. 5 mm	
Resolution*1	0.1 μm		
Linearity*2	±0.3% F.S.		
Operating force *3	Approx. 0.7 N		Approx. 0.25 N
Degree of protection (sensor head)	IEC60529, IP67		IEC60529, IP54
Mechanical durability	10,000,000 operations min.		
Ambient temperature	Operating: 0 to 50°C, storage: -15 to 60°C (with no icing or condensation)		
Ambient humidity	Operating and storage: 35 to 85% (with no icing or condensation)		
Temperature characteristic*4	Sensor head	0.03% F.S./°C	
	Preamplifier	0.01% F.S./°C	
Weight (packed state)	Approx. 100 g		
Materials	Sensor head	Stainless steel	
	Preamplifier	Polycarbonate	
Accessories	Instruction manual, preamplifier mounting brackets (ZX-XBT1)		

*1 The resolution is given as the minimum value that can be read when a ZX-TDA_1 amplifier unit is connected. This value is taken 15 minutes after turning ON the power with the average number of operations set to 256.

*2 The linearity is given as the error in an ideal straight line displacement output.

*3 These figures are representative values that apply for the measurement mid-point, and are for when the provided actuator is used, with the actuator moving downwards. If the actuator moves horizontally or upwards, the operating force will be reduced. Also, if an actuator other than the standard one is used, the operating force will vary with the weight of the actuator itself.

*4 These figures are representative values that apply for the mid-point of the measurement range.



Easy profile measurement – “teach&go”

The ZG2 enables precise shape measurement on challenging materials and surfaces. An easy and intuitive user interface enables efficient installation, setup and operation. A built-in LCD monitor indicates the measurement result in real time.

- Easy to use – intuitive user interface
- Live – built-in LCD monitor for setup and immediate profile display
- Versatile – 18 measurement tools
- Accurate – 5 µm resolution (3 mm / 631 pixels)
- Wide profiles – up to 70 mm

Ordering information

Sensor heads

Optical method	Sensing distance		Resolution		Order code
	Height direction	Width direction	Height direction	Width direction	
Diffuse reflective	210±48 mm	70 mm	6 µm	111 µm	ZG2-WDS70
Diffuse reflective	100±12 mm	22 mm	2.5 µm	35 µm	ZG2-WDS22
Diffuse reflective	50±3 mm	8 mm	1 µm	13 µm	ZG2-WDS8T
Regular reflective	22.3±0.5 mm	3 mm	0.25 µm	5 µm	ZG2-WDS3VT

Note: - For details, refer the ratings and specifications table.
- Designate the cable length (0.5 m, 2 m) when ordering.

Sensor controllers

Power supply	Output type	Order code
24 VDC	NPN	ZG2-WDC11A ^{*1}
	PNP	ZG2-WDC41A

^{*1} Setup support software for PC is attached

Accessories (order separately)

Real-time parallel output unit

Output type	Order code
NPN	ZG-RPD11
PNP	ZG-RPD41

RS-232C cable

Connecting device	Order code
For personal computer connection (2 m)	ZS-XRS2
For PLC/PT connection (2 m)	ZS-XPT2

Sensor head extension cable

Name	Order code
3 m extension cable	ZG2-XC3CR
8 m extension cable	ZG2-XC8CR
15 m extension cable	ZG2-XC15CR
25 m extension cable	ZG2-XC25CR
Digital equalizer (relay device)	ZG2-XEQ
0.2 m digital equalizer connection cable	ZG2-XC02D

Parallel mounting adaptor

	Order code
For 1 unit	ZS-XPM1
For 2 units or more	ZS-XPM2

Controller link unit

Item	Order code
Controller link unit	ZS-XCN

Memory card

Capacity	Order code
128 MB	F160-N1285
256 MB	F160-N2565

Specifications

Sensor heads

Item	ZG2-WDS70	ZG2-WDS22	ZG2-WDS8T	ZG2-WDS3VT				
Optical system	Diffuse reflective	Diffuse reflective	Regular reflective	Diffuse reflective				
Measurement range	Height direction	210±48 mm (In the high-precision mode)	100±12 mm	94±10 mm	50±3 mm	44±2 mm	22.3±0.5 mm	10.6±0.4 mm
	Width direction (typical)	70 mm	22 mm	8 mm	3 mm			
Resolution	Height direction ^{*1}	6 µm	2.5 µm	1 µm	0.25 µm			
	Width direction	111 µm (70 mm/631 pixels)	35 µm (22 mm/631 pixels)	13 µm (8 mm / 631 pixels)	5 µm (3 mm / 631 pixels)			
Linearity (in the height direction) ^{*2}	±0.1% F.S.							
Temperature characteristic ^{*3}	0.02% F.S./°C		0.03% F.S./°C		0.08% F.S./°C			
Light source	Type	Visible semiconductor laser						
	Wavelength	658 nm			650 nm			
	Output	5 mW max. output, 1 mW max. exposure (without using optical instruments)			1 mW max.			
	Laser class	Class 2M of EN60825-1 / IEC60825-1 Class IIIB of FDA (21CFR 1040.10 and 1040.11)			Class 2 of EN60825-1 / IEC60825-1 Class II of FDA (21CFR 1040.10 and 1040.11)			
Beam shape (at measurement center distance) ^{*4}	120 µm × 75 mm (typical)	60 µm × 45 mm (typical)	30 µm × 24 mm (typical)	25 µm × 4 mm (typical)				
LED	STANDBY : Lights when laser irradiation preparation is complete (indication color: green)							
	LD_ON : Lights when the laser is irradiating (indication color: green)							
Measurement object	Surface of non-transparent objects		Surface of non-transparent / transparent objects					
Environmental resistance	Ambient light intensity	Illumination on the photo-receiving face 7,000 lx max.: Incandescent lamp						
	Ambient temperature	Operating : 0 to 50°C, Storage : -15 to 60°C (with no icing or condensation)						
	Ambient humidity	Operating and storage : 35 to 85 % (with no condensation)						
	Degree of protection	IP66 (IEC60529)			IP67 (IEC60529)			
	Vibration resistance (destruction)	10 to 150 Hz with 0.35 mm single amplitude for 80 min each in X, Y, and Z directions						
Shock resistance (destruction)	150 m/s ² , 3 times each in 6 directions (up / down, right / left, forward / backward)							
Materials	Case: Aluminum diecast, Front cover : Glass, Cable insulation : Heat-resistive polyvinyl chloride (PVC), Connector : Zinc alloy or brass							
Cable length	0.5 m, 2 m (flexible cable)							
Weight	Approx. 650 g		Approx. 500 g		Approx. 300 g			
Accessories	Laser labels (EN : 2 labels, FDA : 3 labels), Ferrite core (1), Instruction manual							

^{*1} Obtained by setting an Omron standard measurement object at the measurement center distance and determining the average height of the beam line. The conditions are given in the table below. However, satisfactory resolution cannot be attained in strong electromagnetic fields. The minimum resolution of the ZG2-WDS8T/WDS3VT is 0.25 f_{Em}, even when the average number of operations is increased. Resolution does not go any lower.

Model	CCD Mode	Average No. of operations	Measurement object	
			Regular reflective	Diffuse reflective
ZG2-WDS70/WDS22/WDS8T	Standard mode	64	Omron standard white alumina ceramic object	
ZG2-WDS3VT	Standard mode		Omron standard mirrored object	Omron standard diffuse reflective object

^{*2} The tolerance for an ideal straight line obtained by determining the average height of an Omron standard measurement object for the beam line. The CCD high-resolution mode is used. Linearity varies depending on the measurement object.

Model	Measurement object	
	Regular reflective	Diffuse reflective
ZG2-WDS70/WDS22/WDS8T	Omron standard white alumina ceramic object	
ZG2-WDS3VT	Omron standard mirrored object	Omron standard diffuse reflective object

^{*3} A value attained by using an aluminium jig to secure the distance between the Sensor head and the measurement object. The CCD standard mode is used.

^{*4} Defined as 1/e² (13.5%) of the center light intensity. This may be influenced when light leakage also exists outside the defined area and the reflectivity of the light around the measurement object is higher than that of the measurement object.

Sensor controllers

Item		ZG2-WDC11/WDC11A	ZG2-WDC41/WDC41A
Input/output type		NPN	PNP
No. of connectable Sensor Heads		1 per Controller	
No. of connectable Controllers		2	
Measurement cycle ^{*1}		16 ms (high-precision mode), 8 ms (standard mode), 5 ms (high-speed mode)	
Min. display unit		10 nm	
Display range		-999.99999 to 999.99999	
Display	LCD monitor	1.8-inch TFT colour LCD (557x234 pixels)	
	LEDs	<ul style="list-style-type: none"> Judgment indicators for each task (indication colour: orange): T1, T2, T3, T4 Laser indicator (indication colour: green): LD_ON Zero reset indicator (indication colour: green): ZERO Trigger indicators (indication colour: green): TRIG 	
External interface	Input/output signal lines	Analog outputs	Select voltage or current (using the sliding switch on the bottom surface) <ul style="list-style-type: none"> Voltage output: .10 to 10 V, output impedance: 40 Ω Current output: 4 to 20 mA, maximum load resistance: 300 Ω
		Judgment output (ALL-PASSING/ERROR)	NPN open collector 30 VDC, 50 mA max.
		Trigger auxiliary output (ENABLE/GATE)	Residual voltage: 1.2 V max.
		Laser stop input (LD-OFF)	ON: 0 V short or 1.5 V max.
		Zero reset input (ZERO)	OFF: Open (leakage current: 0.1 mA max.)
		Measurement trigger input (TRIG)	
	Bank switching input (BANK A, B)		
	Serial I/O	USB2.0	1 port, full speed (12 Mbps), MINI-B
		RS-232C	1 port, 115,200 bps max.
	Parall output ^{*2}	Output	18 - terminal
Main functions	No. of settings banks	16	
	Sensitivity adjustment	Multi, High-speed multi, Auto, Fixed	
	Measurement items	Height, 2-point Step, 3-point Step, Edge position, Edge width, Angle, Intersection coordinates, Intersection angle, Sectional area (up to eight items can be measured simultaneously)	
	Auxiliary functions	Filter, Laser power adjustment, Position correction (height, position, lope), Linked operation, Point of inflection measurement	
	Profiles saved	16 profiles (1 profile per bank)	
	Trigger modes	External trigger / continuous	
Ratings	Power supply voltage	21.6 to 26.4 VDC (including ripple current)	
	Current consumption	0.8 A max. (per sensor head)	
	Insulation resistance	20 MΩ at 250 V between lead wires and Controller case	
	Dielectric strength	1,000 VAC, 50 / 60 Hz for 1 min between lead wires and Controller case	
Environmental resistance	Ambient temperature	Operating : 0 to 50°C, Storage : -15 to 60°C (with no icing or condensation)	
	Ambient humidity	Operating and storage : 35 to 85 % (with no condensation)	
	Degree of protection	IP20 (IEC 60529)	
	Vibration resistance (destruction)	Vibration frequency: 10 to 150 Hz, single amplitude: 0.35 mm, acceleration: 50 m/s ²	
	Shock resistance (destruction)	150 m/s ² , 3 times each in 6 directions (up/down, right/left, forward/backward)	
Material	Case : Polycarbonate (PC), Cable insulation : Heat-resistive polyvinyl chloride (PCV)		
Cable length	2 m		
Weight	Approx. 300 g (including cable) (Packed state: Approx. 450 g)		
Accessories	ZG2-WDC_1: Large Ferrite Core (1 piece), Instruction Manual ZG2-WDC_1A: Large Ferrite Core (1 piece), Small Ferrite Core (2 pieces), Instruction Manual, Setup Support Software (CD-ROM), USB cable (1 m)		

^{*1} The image input periods listed here are for fixed/auto sensitivity. The image input period will be longer for multi-sensitivity, high-speed multi-sensitivity, or other settings. When the high-power mode is ON, the shortest image input period is 95 ms regardless of the setting of the CCD mode. Use the eco monitor in the RUN mode to determine the actual image input period.

^{*2} when ZG-RPD is mounted

Data storage unit

Item		ZG2-DSU11	ZG2-DSU41
Input/output type		NPN	PNP
No. of connectable Controllers		2 ^{*1}	
Connectable controllers		ZG2-WDC11/WDC41	
External interface	Input/output signal lines	Inputting starting/terminating logging	ON: 0 V short or 1.5 V max. OFF: Open (leakage current : 0.1 mA max.)
		Judgment output (HIGH/PASS/LOW/ERROR)	ON: Power supply voltage short or power supply voltage -1.5 V max. OFF: Open (leakage current: 0.1 mA max.)
Serial I/O	USB2.0	NPN open collector 30 VDC, 50 mA max. Residual voltage : 1.2 V max.	
	RS-232C	PNP open collector 50 mA max. Residual voltage : 1.2 V max.	
Functions	No. of logged data ^{*2}	Memory of the main unit	1 port, full speed (12 Mbps), MINI-B
		Memory card (256 MB) ^{*4}	1 port, 115,200 bps max.
	Logging trigger functions	Profiles saved: 5,120 profiles Measurement values saved: 65,000 values max. ^{*3}	
	External banks functions	Profiles saved: 35,328 profiles max. (256 profiles x 138 files) Measurement values saved: 7,150,000 values max. (65,000 values x 110 files)	
Other functions		External triggers, data triggers (self-triggers), and time triggers	
Ratings		4096	Alarm output functions
Environmental resistance	Power supply voltage	21.6 to 26.4 VDC (including ripple current)	
	Current consumption	0.5 A max.	
Material	Ambient temperature	Operating : 0 to 50°C, Storage: 0 to 60°C (with no icing or condensation)	
	Ambient humidity	Operating and storage : 35 to 85% (with no condensation)	
Cable length	Case : Polycarbonate (PC)		
Weight	2 m		
Accessories	Approx. 280 g		
		Ferrite Core (1 piece), Instruction Manual	

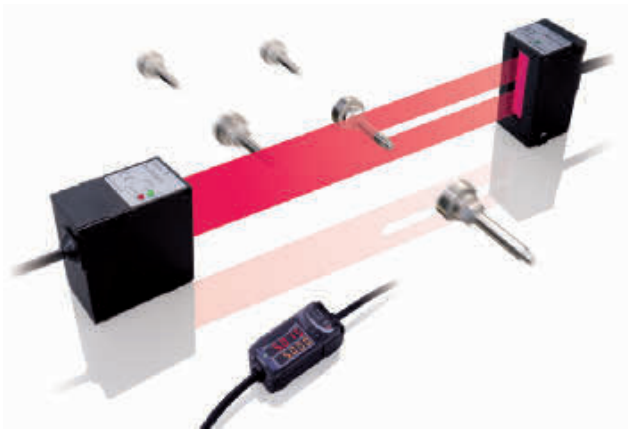
^{*1} The controller link unit is necessary for linking.

^{*2} Data is saved in the memory of the main unit during logging. The data is automatically saved in a memory card after logging is completed. The maximum number of logging differs according to set conditions. For details, refer to the Users Manual.

^{*3} Measurement values for 65,000 measurements can be saved even when two sensor controllers are connected and each performs eight tasks.

^{*4} The value is the maximum number achieved in the following conditions:

- One sensor controller performs one measurement task.
- Either profiles or measurement values are logged.



Smart laser micrometer

- High accuracy: 5-10 μm
- All surfaces
- Long sensing distance: < 500 mm
- Line width up to 28 mm
- Calculation unit for multiple heads
- Fast sampling time: 0.5 ms
- PC software for setup

Ordering information

Sensors

Type	Optical system	Measuring width	Sensing distance	Resolution	Output type	Order code
Separate type	Through-beam	28 mm	0 to 500 mm	10 μm	NPN	ZX-GT28S11
Integrated type			40 mm		PNP	ZX-GT28S41
					NPN	ZX-GT2840S11
					PNP	ZX-GT2840S41

Controller

Power supply	Output type	Order code
DC	NPN	ZX-GTC11
	PNP	ZX-GTC41

Accessories (order separately)

Set of interface unit and setup software PCs

Output type	Order code
NPN	ZX-GIF11A
PNP	ZX-GIF41A

Interface unit(RS-232C/binary output)

Power supply	Output type	Order code
DC	NPN	ZX-GIF11
	PNP	ZX-GIF41

Setup software PCs

Name	Order code
Smart monitor GT	ZX-GSW11

Calculating units

	Order code
Calculating unit	ZX-CAL2

Receiver-controller extension cable

Cable length	Quantity	Order code	
		Standard cable	Flexible cable
1 m	1 m	ZX-XGC1A	ZX-XGC1R
2 m		ZX-XGC2A	ZX-XGC2R
5 m		ZX-XGC5A	ZX-XGC5R
8 m		ZX-XGC8A	ZX-XGC8R
20 m		ZX-XGC20A	ZX-XGC20R

Up to two extension cables can be connected. However, be sure to limit the total extension cable length between the receiver and the controller to 30 meters (including the receiver cable).

Specifications

Sensor				
Item	ZX-GT28S11	ZX-GT2840S11	ZX-GT28S41	ZX-GT2840S41
Output type	NPN		PNP	
Appearance	Separate type	Integrated type	Separate type	Integrated type
Light source	Visible semiconductor laser diode (wavelength 650 nm, CLASS 1 of EN60825-1/IEC60825-1, CLASS of FDA(21CFR 1040.10 and 1040.11)			
Measuring width	28 mm			
Sensing distance	0 to 500 mm	40 mm	0 to 500 mm	40 mm
Minimum sensing object	0.5 mm dia. ^{*1}	0.2 mm dia.	0.5 mm dia. ^{(*)1}	0.2 mm dia.
Linearity	±0.1% F.S. ^{**2}			
Resolution	10 μm (number of process values to average: 16) ^{**3}			
Temperature characteristic	±0.01% F.S./C ^{**4}			
Indicators (emitter)	Laser ON indicator (green), laser alarm indicator (red)			
Indicator (receiver)	Optical axis setting indicator (green)			
Laser OFF input/sync input	ON: Short-circuited with 0 V or 1.5 V max. OFF: Open (leakage current: 0.1 mA max.)		ON: Short-circuited with power supply voltage or power supply voltage -1.5 V max. OFF: Open (leakage current: 0.1 mA max.)	
Laser deterioration alarm output	NPN open-collector output 30 VDC 20 mA max. Residual voltage 1.2 V max.		PNP open-collector output 30 VDC 20 mA max. Residual voltage 2 V max.	
Power consumption (emitter)	30 mA max.			
Power supply voltage (emitter)	24 VDC +10%, -15% ripple (p-p) 10% max.			
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min			
Insulation resistance	20 MΩ (at 500 VDC megger)			
Operating ambient illumination (emitter)	3,000 lx (incandescent light)			
Operating ambient illumination (receiver)	1,000 lx (incandescent light) ^{**5}			
Ambient temperature	Operating: 0 to +40°C, storage: -15 to +50°C (with no icing or condensation)			
Ambient humidity	Operating and storage: 35 to 85% (with no condensation)			
Vibration resistance (durability)	10 to 150 Hz single-amplitude: 0.75 mm for 80 min each in X, Y and Z directions			
Degree of protection	IEC60529 IP40			
Cable length	2 m			
Material	Case: aluminum die-cast, Lens: glass			
Weight (packed state)	Approx. 550 g	Approx. 570 g	Approx. 550 g	Approx. 570 g
Accessories	Laser warning labels, instruction sheet			

F.S.: 28 mm measuring range of receiver

*1 Distance between emitter and receiver: 500 mm, measurement object at 250 mm from receiver. Glass ends of chamfer 0.1 mm or more can be detected in glass edge measurement mode. (at binary level 70%)

**2 Linearity is given to be a typical error with respect to an ideal straight line when the distance between the emitter and receiver is 100 mm and light is blocked at a distance of 50 mm from the receiver. (On the ZX-GT2840_, the measurement object is measured at a distance of 20 mm from the receiver.)

**3 The amount of fluctuation (±3 σ) in the analog output when the distance between the emitter and receiver is 100 mm and a ZX-GTC_ is connected

**4 Change in the light cutoff value on one side when the distance between the emitter and receiver is 100 mm and the light is half-cutoff at a distance of 50 mm from the receiver (On the ZX-GT2840_, the measurement object is measured at a distance of 20 mm from the receiver.)

**5 Standard mode (NORM) used

Controller

Item		ZX-GTC11	ZX-GTC41
Output type		NPN	PNP
Measurement cycle ^{*1}		1.5 ms (standard mode (NORM)) 0.5 ms (high-speed mode (FAST)) ^{*2}	
Samples to average		1/2/4/8/16/32/64/128/256/512/1024/2048/4096	
Analog output ^{*3}		For current output: 4 to 20 mA/F.S., max. load resistance 300 Ω For voltage output: ±4 V, (±5 V, 1 to 5 V ^{*4}), output impedance 100 Ω	
Timing input, bank switching input, zero reset input, reset input		ON: short-circuited with 0 V or 1.5 V max. OFF: Open (leakage current: 0.1 mA max.)	ON: short-circuited with power supply voltage or power supply voltage -1.5 V max. OFF: Open (leakage current: 0.1 mA max.)
HIGH/PASS/LOW Judgment output ^{*5} Sync output ^{*6}		NPN open-collector output 30 VDC 50 mA max. Residual voltage 1.2 V max.	PNP open-collector output 30 VDC 50 mA max. Residual voltage 2 V max.
Indicator		Judgment output indicator: HIGH (orange), PASS (green), LOW (orange) Main display (red) sub-display (yellow) bank 1/2 (orange), zero reset (green)	
Main functions	Number of registered setups	2 banks	
	Measurement mode	Interrupted beam width measurement, incident beam width measurement, outer diameter measurement, center position measurement, IC lead pitch, IC lead width judgment, specified edge measurement, wire position measurement, glass edge position measurement	
	Display during measurement	Measured value, resolution, threshold, voltage output value, current output value (number of display digits can be changed)	
	Zero reset functions	Offset setting of zero reset value, zero reset value memory	
	Hold	Sample hold, peak hold, bottom hold, peak-to-peak hold, average hold, delay hold	
	Timer functions	ON-delay, OFF-delay, one-shot	
	Adjustment functions	Optical axis adjust mode/light intensity writing mode, variable binary level, variable edge filter, analog output scaling	
	Calculation	2 possible on up to two controllers (calculation Unit ZX-CAL2 is required for connecting controllers to each other.) A-B, A+B, width	
Other		Measurement cycle setting, threshold setting, hysteresis setting, initialization, key lock	
Temperature characteristic		±0.005% F.S./°C	

Item	ZX-GTC11	ZX-GTC41
Current consumption	150 mA max. (including receiver)	
Power supply voltage	24 VDC +10%, -15% ripple (p-p) 10% max.	
Dielectric strength	1,000 VAC, 50/60 Hz for min	
Insulation resistance	20 MΩ (at 500 VDC megger)	
Ambient temperature	Operating: 0 to +50°C, storage: -15 to +60°C (with no icing or condensation)	
Ambient humidity	Operating and storage: 35 to 85% (with no condensation)	
Vibration resistance(durability)	10 to 150 Hz single-amplitude: 0.35 mm for 80 min each in X, Y and Z directions	
Degree of protection	IEC60529 IP20	
Cable length	2 m	
Material	Case: PBT (polybutylene terephthalate), cover: Polycarbonate	
Weight (packed state)	Approx. 330 g	
Accessories	Instruction sheet	

*1 The first response time is "measurement cycle x (number of samples to average setting + 1) + 1 ms" max. For the second response time onwards, the specified measurement cycle time is output.

*2 The response time in the high-speed mode (FAST) for the IC lead pitch and IC lead width judgment modes is 1 ms.

*3 Current/voltage can be switched using the switch provided on the rear of the Controller.

*4 Can be set by the analog output scaling function.

*5 The error (ERR) state is displayed when all HIGH/PASS/LOW outputs turn OFF.

*6 Normally, wire the sync output wire directly to the emitter's sync input wire and run the controller in the standard mode. On an NPN type controller, use an NPN type emitter, and on a PNP type controller, use a PNP type emitter. Wiring of the sync wires is not required when the controller is run in the high-speed mode.
(Note, however, that the controller becomes more susceptible to the influence of ambient light in this case.)

Interface unit

Item	ZX-GIF11/-GIF11A	ZX-GIF41/-GIF41A
Compatible controller	ZX-GTC11	ZX-GTC41
Indicator	Power ON (green), controller communications (orange), controller communications error (red), RS-232C communications (orange), RS-232C communications error (red), binary output (orange)	
Communications port	RS-232C (9-pin D-sub connector)	
12-bit binary output (D11 toD0, GATE)	NPN open-collector output 30 VDC 20 mA max. Residual voltage 1.2 V max.	PNP open-collector output 30 VDC 20 mA max. Residual voltage 2 V max.
Power supply voltage	Supplied from controller (power consumption: 60 mA max.)	
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min	
Insulation resistance	20 MΩ (at 500 VDC megger)	
Ambient temperature	Operating: 0 to +50°C, storage: -15 to +60°C (with no icing or condensation)	
Ambient humidity	Operating and storage: 35 to 85% (with no condensation)	
Vibration resistance(durability)	10 to 150 Hz single-amplitude: 0.35 mm for 80 min each in X, Y and Z directions	
Degree of protection	IEC60529 IP20	
Cable length	RS-232C 0.5 m, binary output 2 m	
Material	Case: PBT (polybutylene terephthalate), cover: Polycarbonate	
Weight (packed state)	ZX-GIF_1A: Approx. 550 g ZX-GIF_1: Approx. 330 g	
Accessories	ZX-GIF_1A: Setup software (CD-ROM), 2 clamps, instruction sheet ZX-GIF_1: 2 clamps, instruction sheet	

SAFETY SIMPLIFIED TO THE MAX

Making safety transparent and understandable

In order to implement safety controls, it is essential to begin taking safety into consideration at the design stage. We offer safety systems that incorporate the latest sensing and control technologies combined with safety design, consulting services to ensure optimum machine and equipment safety and secure a safe production environment.



Understand safety in minutes and ask for your own free safety guide at:
<http://industrial.omron.eu/safety>

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INTERACT WITH YOUR MACHINE

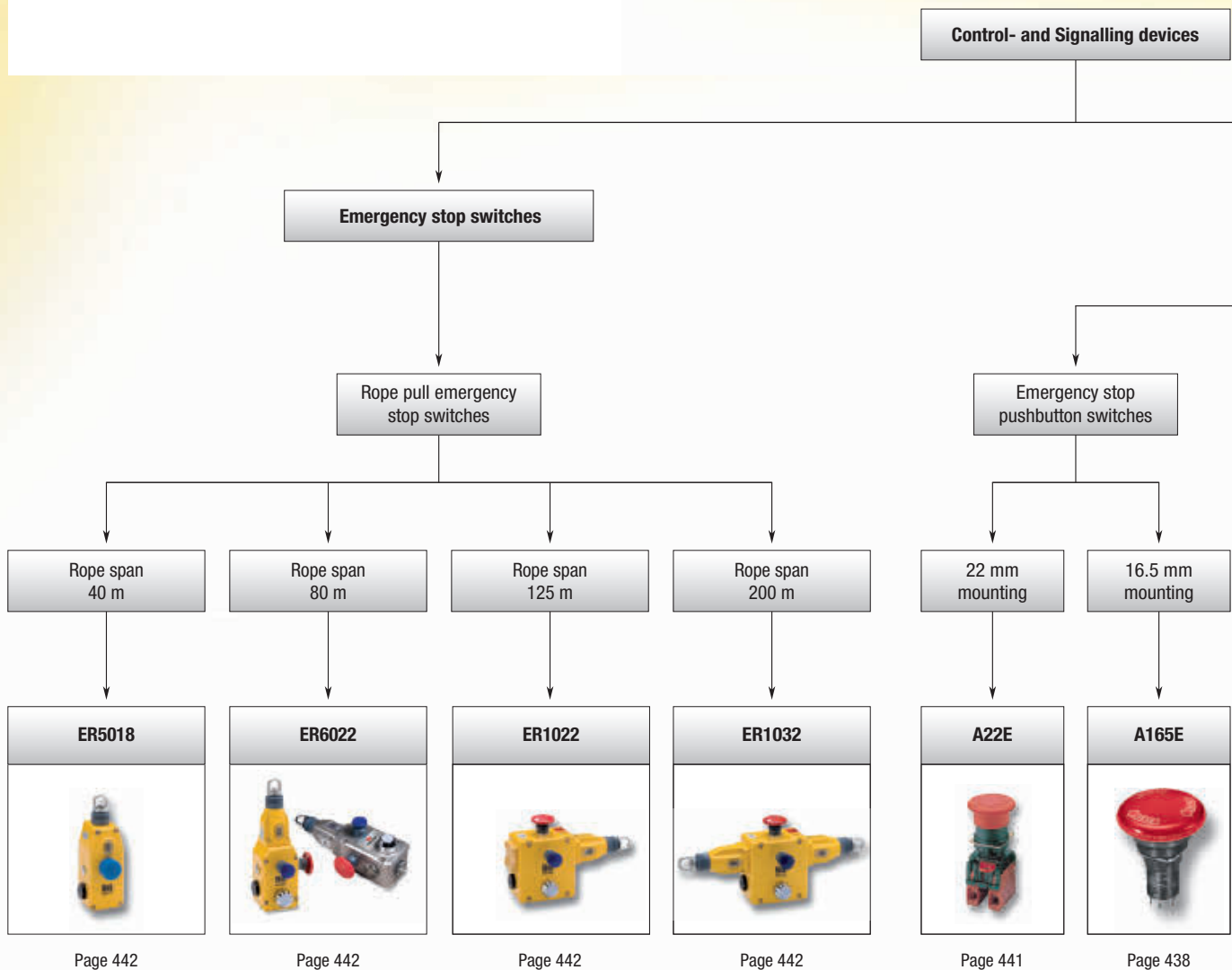
Patlite Signal towers

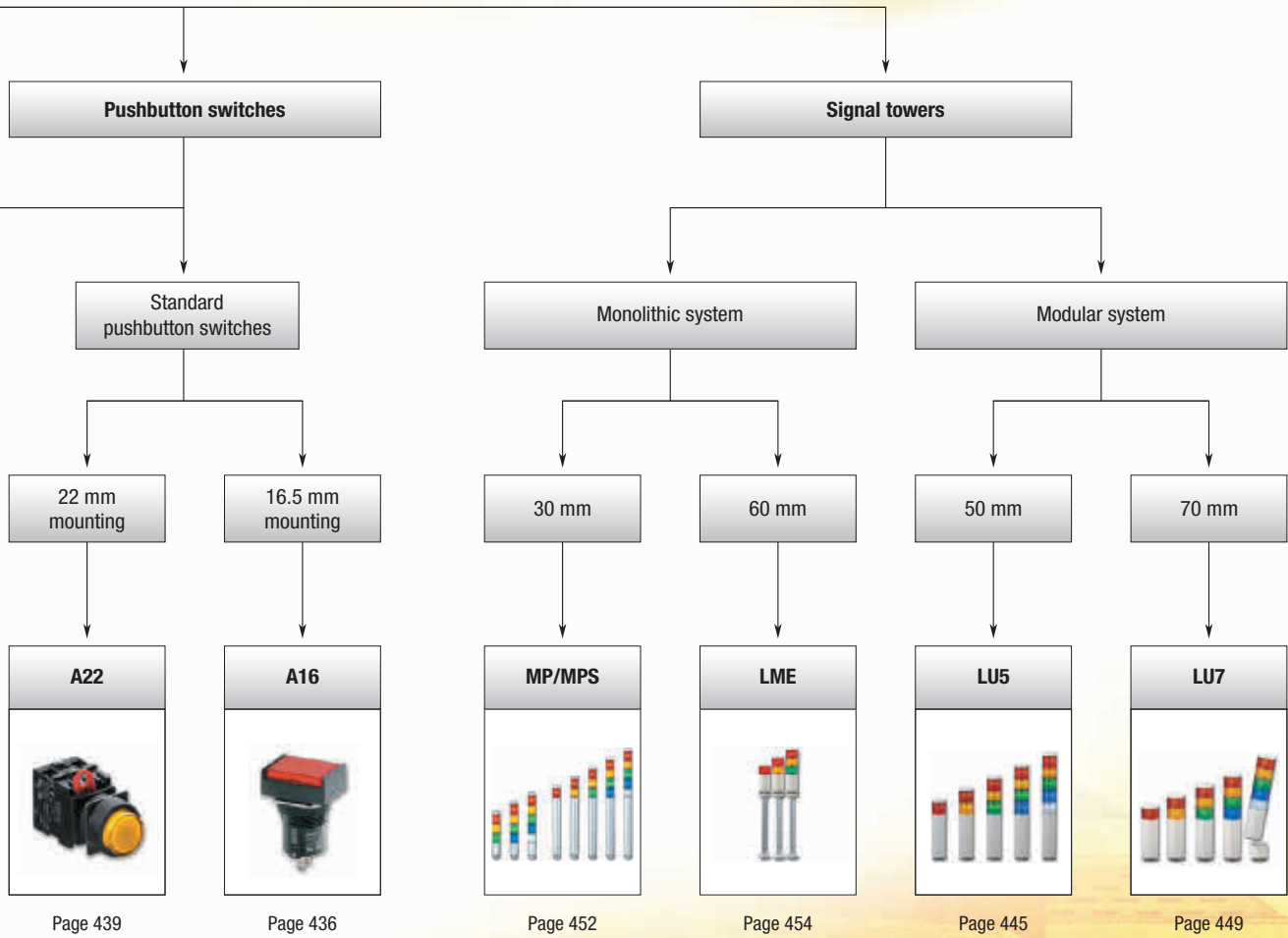
Machines that are stopped during production are creating extra cost, our signal towers are used to show this status and guide workers to service the machines efficiently, minimizing downtime and production loss.

- LED technology
- Optional sound system
- 30 mm, 50 mm, 60 mm and 70 mm diameter
- Modular and monolithic systems









Select your signal tower in a split second:
www.omron-industrial.com/safety





Selection table




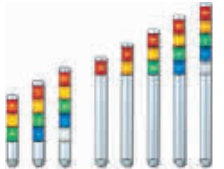



		Category	Pushbutton switch	
Selection criteria				
		Model	A16	A22
		Mounting	Nut-mounting	
		Size	16 mm	22 mm
	Shape			
Pushbutton colour	Incandescent lamp-lighted	Red	■	■
		Yellow	■	■
		Pure yellow	■	
		Green	■	■
		White	■	■
	LED-lighted	Red	■	■
		Yellow	■	■
		Pure yellow	■	
		Green	■	■
		White	■	■
	Non-lighted	Red	■	■
		Yellow	■	■
		Green	■	■
		White	■	■
		Blue	■	■
	Features	Momentary operation	■	■
		Self-holding	■	■
		Number of contacts	2	6
		IP rating	IP65	
	Switch ratings [A]	Legend plate	■	■
125 VAC		5	10	
250 VAC		3	6	
30 VDC		3	10	
	Rated load	5 A at 125 VAC, 3 A at 250 VAC, 3 A at 30 VDC	10 A at 110 VAC, 6 A at 220 VAC	
Terminals	Solder	■	–	
	PCB	–	–	
	Screw-less Clamp	–	–	
Operating voltage	5 VDC	■	■	
	12 VDC	■	■	
	24 VDC	■	■	
Form	SPDT	■	–	
	DPDT	■	–	
	SPST-NO	–	■	
	SPST-NC	–	■	
	SPST-NO + SPST-NC	–	■	
	DPST-NO	–	■	
DPST-NC	–	■		
	Page	436	439	

		Emergency stop pushbutton switches		
Selection criteria				
		Model	A165E A22E	
		Housing	Plastic	
		Protection class	IP65	
	Operating temperature range	–10 to 55°C	–20 to 70°C	
	Head size	30 mm, 40 mm	30 mm, 40 mm, 60 mm	
	Conformity	EN 60947-5-1		
Features	Max. rope span	–		
	Conduit size M20	–		
	Additional E-Stop button	–		
	LED indicator beacon	–		
	Stainless steel housing	–		
	Explosion proof housing	–		
	Lighted head	■		
	Push lock – pull reset	–	■	
Push lock – turn reset	■			
Application	E-Stop application	■		
	General safety application	■		
Contact configuration	SPST (NC)	■		
	DPST (NC)	■		
	SPST (NO) + SPST (NC)	–	■	
	TPST (NC)	■	–	
	Page	438	441	

■ Standard

□ Available

– No/not available

		Rope pull switches			
					
		ER 5018	ER 6022	ER 1022	ER 1032
Selection criteria	Model	ER 5018			
	Housing	Metal			
	Protection class	IP67			
	Operating temperature range	-25 to 80°C			
	Head size	-			
		Conformity EN60947-5-1:2004, EN60947-5-5:1997+A1:2005; EN60204-1; EN ISO 13850:2006			
Features	Max. rope span	40 m	80 m	125 m	200 m
	Conduit size M20	■			
	Additional E-Stop button	■			
	LED indicator beacon	-	■	■	■
	Stainless steel housing	-	Available	-	-
	Explosion proof housing	-	■	■	■
	Lighted head	-			
	Push lock – pull reset	-			
	Push lock, turn reset	-			
	Push lock, lock key reset	-			
Application	E-Stop application	■			
	General safety application	■			
Contact configuration	2NC+1NO	■	■	-	-
	3NC	■	■	-	-
	4NC+2NO	-	-	■	■
Page		442			
		Signalling devices			
					
		MP/MPS	LME	LU5	LU7
System	monolithic		modular		
Diameter	30 mm	60 mm	50 mm	70 mm	
LED technology	■		■		
Sound system	-		■		
IP65	■		■		
Maximum modules	5	5	5	5	
Input voltage 24 VDC	■		■		
Unit colour	silver	white or silver or black	white or silver	white or silver or black	
Page	452	454	445	449	



16 mm pushbutton switch


These sub-assembled pushbutton switches have a modular construction: pushbutton + case + lamp (if applicable) + switch. A16 is a nut-mounted pushbutton switch with a short mounting depth of less than 28.5mm below panel.

- Wide variety of control and signal devices: lighted, non-lighted and buzzer
- Quick and easy assembly, snap-in switch
- Wide range of switching capacity from standard load to micro load
- High reliability, IP65
- UL, cUL, CSA and VDE approved, conforms to EN60947-5-1 and IEC947-5-1




Ordering information

Type	Colour	Order code		
		Degree of protection: Oil-resistant IP65		
		Rectangular	Square	Round
Non-lighted LED Incandescent lamp	Red	A165L-JR	A165L-AR	A165L-TR
	Yellow	A165L-JY	A165L-AY	A165L-TY
	Pure yellow	A165L-JPY	A165L-APY	A165L-TPY
	White	A165L-JW	A165L-AW	A165L-TW
	Blue	A165L-JA	A165L-AA	A165L-TA
Non-lighted	Black	A165L-JB	A165L-AB	A165L-TB
LED	Green	A165L-TGY	A165L-AGY	A165L-TGY
Non-lighted/incandescent lamp	Green	A165L-JG	A165L-AG	A165L-TG



Cases

Appearance	Classification	Order code	
		Oil-resistant IP65	
	Momentary operation	Rectangular (2-way guard)	A165-CJM
		Square	A165-CAM
		Round	A165-CTM
	Alternate operation	Rectangular (2-way guard)	A165-CJA
		Square	A165-CAA
		Round	A165-CTA

Switches

Appearance	Classification			Order code	
	Lighted/ non-lighted (common use)	Standard load/ microload (common use)	SPDT	Solder terminal	A16-1
			DPDT		A16-2
			SPDT	PCB terminal	A16-1P
			DPDT		A16-2P
			DPDT	Screw- less clamp	A16-2S

Switches with reduced voltage lighting




Appearance	Classification			Order code	
	100 V	Standard load/ microload (common use)	SPDT	Solder terminal	A16-T1-1
			DPDT		A16-T1-2
	100 V		DPDT	Screw-less clamp	A16-T1-2S
	200 V				A16-T2-2S

Lamps

Type	Colour	Order code		
		5 VDC	12 VDC	24 VDC
LED	Red	A16-5DSR	A16-12DSR	A16-24DSR
	Yellow	A16-5DSY	A16-12DSY	A16-24DSY
	Green	A16-5DSG	A16-12DSG	A16-24DSG
	White *1	A16-5DSW	A16-12DSW	A16-24DSW
	Blue	A16-5DA	A16-12DA	A16-24DA
Type		5 VAC/VDC	12 VAC/VDC	24 VAC/VDC
Incandescent lamp		A16-5	A16-12	A16-24

*1 Use the white LED together with white or pure yellow pushbuttons.

Accessories

Name	Appearance	Classification	Remarks	Order code
Switch guards		For rectangular models	Cannot be used with the dust cover	A16ZJ-5050
		For square and round models		A16ZA-5050
Dust covers		For rectangular models	Cannot be used with the switch guard	A16ZJ-5060
		For square models		A16ZA-5060
		For round models		A16ZT-5060
Panel plugs		For rectangular models	Used for covering the panel cutouts for future panel expansion	A16ZJ-3003
		For square models		A16ZA-3003
		For round models		A16ZT-3003

Specifications

Allowable operating frequency	Mechanical	Momentary operation: 120 operations/minute max. Alternate operation: 60 operations/minute max.
	Electrical	20 operations/minute max.
Durability	Mechanical	Momentary operation: 2,000,000 operations min. Alternate operation: 200,000 operations min.
	Electrical	100,000 operations min.
Ambient temperature	Operating: -10 to 55°C (with no icing or condensation) Storage: -25 to 65°C (with no icing or condensation)	
Weight	Approx. 10 g (in the case of a lighted DPDT switch with solder terminals)	
Size in mm (HxWxD)	Round/square: 18x18x28.5 rectangular: 18x24x28.5	

Operating characteristics	Pushbutton switch	
	Oil-resistant IP65	
	SPDT	DPDT
Operating force (OF) max.	2.94 N	4.91 N
Releasing force (RF) min.	0.29 N	
Total travel (TT)	Approx. 3 mm	
Pretravel (PT) max.	2.5 mm	
Lock stroke (LTA) min.	0.5 mm	

Item	Screw-less clamp			
	Twisted wire	0.5 mm ²	0.75 mm ²	1.25 mm ²
Recommended wire size	0.5 mm ² twisted wire or 0.8 mm dia. solid wire			
Usable wires and tensile strength	Twisted wire	0.3 mm ²	0.5 mm ²	0.75 mm ²
	Solid wire	0.5 mm dia.	0.8 mm dia.	1.0 mm dia.
Tensile strength	Twisted wire	10 N	20 N	30 N
	Solid wire	10 N	20 N	40 N
Length of exposed wire	10 ± 1 mm			



Emergency stop switch

The A165E line-up offers E-Stop switches with various head types. For flexible application, a wide range of accessories is provided. To set up easy installation and maintenance, various contact combinations are available.

- Direct opening mechanism with minimum contact separation of 3 mm
- Safety lock mechanism prevents misuse
- Short mounting depth
- Modular construction; easy installation using snap-in switch

Ordering information

Switches	Rated voltage	Pushbutton color	Pushbutton size	Terminal	Contact	Order code Standard load (125 VAC at 5 A, 250 VAC at 3 A, 30 VDC at 3 A)
LED	24 VDC	Red	30 dia.	Solder terminal	SPST-NC	A165E-LS-24D-01
None	–				DPST-NC	A165E-LS-24D-02
					SPST-NC	A165E-S-01
DPST-NC	A165E-S-02					
LED	24 VDC	Red	40 dia.	Solder terminal	TPST-NC	A165E-S-03U
None	–				SPST-NC	A165E-LM-24D-01
					DPST-NC	A165E-LM-24D-02
SPST-NC	A165E-M-01					
DPST-NC	A165E-M-02					
TPST-NC	A165E-M-03U					

Note: The above models have a surface indication of "RESET." Models with "STOP" indication are also available. For further information, contact your Omron representative.

Accessories (order separately)

Item	Type	Precautions	Order code
Yellow plate	Yellow, 45 dia.	Use this as an emergency stop nameplate.	A16Z-5070
Panel plug	Round	Used for covering the panel cutouts for future panel expansion.	A16ZT-3003
Tightening tool	–	Useful for repetitive mounting. Be careful not to tighten excessively.	A16Z-3004
Extractor	–	Convenient for extracting the switch and lamp.	A16Z-5080

Specifications

Rated voltage	Resistive load		Features	Characteristics
	A165E series	A165E_-U series		
125 VAC	5 A	1 A	Operating force (OF) max.	14.7 N
250 VAC	3 A	0.5 A	Releasing force (RF) min.	0.1 N·m
30 VDC	3 A	1 A	Pretravel (PT)	3.5±0.5 mm (3±0.5 mm In case of A165E_U series)
Minimum applicable load	150 mA at 5 VDC	1 mA at 5 VDC		

Item	Emergency stop switch	
Allowable operating frequency	Mechanical	20 operations/minute max.
	Electrical	10 operations/minute max.
Insulation resistance	100 M Ω min. (at 500 VDC)	
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min between terminals of same polarity 2,000 VAC, 50/60 Hz for 1 min between terminals of different polarity and also between each terminal and ground 1,000 VAC, 50/60 Hz for 1 min between lamp terminals ^{*1}	
Durability	Mechanical	100,000 operations min.
	Electrical	100,000 operations min.
Ambient temperature	Operating: -10 to 55°C (with no icing or condensation) Storage: -25 to 65°C (with no icing or condensation)	
Protection against electric shock	Class II	

*1 LED not mounted. Test them with the LED removed.











22 mm pushbutton switch

A22 comes in a wide variety of shapes and colours and is installable in 22-dia. or 25-dia. panel cutouts. The switch unit can easily be mounted. A22 is mounted using either open-type (fork-type) or closed-type (round-type) crimp terminals.




- Finger-protection mechanism on switch unit provided as standard feature
- Increased wiring efficiency with three-row mounting of switch blocks
- IP65 oil-resistant (non-lighted models), IP65 (lighted models)
- Lighted and non-lighted, flat, projection and half- and full-guard versions
- EN60947-5-1, UL and cUL approved

Ordering information


Pushbutton

Illumination	Colour	Order code							
		Flat type	Projection type	Full-guard type	Half-guard type	Square/projection type	Square/full-guard type	Round/mushroom type (30-dia. head)	Round/mushroom type (40-dia. head)
									
Non-lighted	Red	A22-FR	A22-TR	A22-GR	A22-HR	A22-CR	A22-DR	A22-SR	A22-MR
	Green	A22-FG	A22-TG	A22-TG	A22-HG	A22-CG	A22-DG	A22-SG	A22-MG
	Yellow	A22-FY	A22-TY	A22-GY	A22-HY	A22-CY	A22-DY	A22-SY	A22-MY
	White	A22-FW	A22-TW	A22-GW	A22-HW	A22-CW	A22-DW	A22-SW	A22-MW
	Blue	A22-FA	A22-TA	A22-GA	A22-HA	A22-CA	A22-DA	A22-SA	A22-MA
	Black	A22-FB	A22-TB	A22-GB	A22-HB	A22-CB	A22-DB	A22-SB	A22-MB
Lighted	Red	–	A22L-TR	A22L-GR	A22L-HR	A22L-CR	A22L-DR	–	–
	Green	–	A22L-TG	A22L-GG	A22L-HG	A22L-CG	A22L-DG	–	–
	Yellow	–	A22L-TY	A22L-GY	A22L-HY	A22L-CY	A22L-DY	–	–
	White	–	A22L-TW	A22L-GW	A22L-HW	A22L-CW	A22L-DW	–	–
	Blue	–	A22L-TA	A22L-GA	A22L-HA	A22L-CA	A22L-DA	–	–
Buttonsize in mm		29.7 dia. x 12D	29.7 dia. x 19D	29.7 dia. x 19D	29.7 dia. x 12/18.5D	29.8 mm ² x 18D	29.8 mm ² x 18D	30 dia. x 32D	40 dia. x 32D

Switches

Switch operation	Contacts	Order code			
		Non-lighted models		Lighted models	
		Without voltage reduction unit		With voltage reduction unit	
				110 VAC	220 VAC
Momentary	SPST-NO	A22-10M	A22L-10M	A22L-10M-T1	A22L-10M-T2
	SPST-NC	A22-01M	A22L-01M	A22L-01M-T1	A22L-01M-T2
	SPST-NO + SPST-NC	A22-11M	A22L-11M	A22L-11M-T1	A22L-11M-T2
	DPST-NO	A22-20M	A22L-20M	A22L-20M-T1	A22L-20M-T2
	DPST-NC	A22-02M	A22L-02M	A22L-02M-T1	A22L-02M-T2
	Alternate	SPST-NO	A22-10A	A22L-10A	A22L-10A-T1
SPST-NC		A22-01A	A22L-01A	A22L-01A-T1	A22L-01A-T2
SPST-NO + SPST-NC		A22-11A	A22L-11A	A22L-11A-T1	A22L-11A-T2
DPST-NO		A22-20A	A22L-20A	A22L-20A-T1	A22L-20A-T2
DPST-NC		A22-02A	A22L-02A	A22L-02A-T1	A22L-02A-T2
					

Switch blocks

	Standard load	Order code
Switch blocks	SPST-NO	A22-10
	SPST-NC	A22-01
	DPST-NO	A22-20
	DPST-NC	A22-02

Lamp – LED

AC/DC	LED light	Order code			
		Operating voltage			
		6 V	12 V	24 V	24 V superbright
DC	Red	A22-6DR	–	–	–
	Green	A22-6DG	–	–	–
	Yellow ^{*1}	A22-6DY	–	–	–
	Blue	A22-6DA	–	–	–
	AC	Red	A22-6AR	–	–
AC and DC	Green	A22-6AG	–	–	–
	Yellow ^{*1}	A22-6AY	–	–	–
	Blue	A22-6AA	–	–	–
	Red	–	A22-12AR	A22-24AR	A22-24ASR
	Green	–	A22-12AG	A22-24AG	A22-24ASG
	Yellow ^{*1}	–	A22-12AY	A22-24AY	A22-24ASY
	Blue	–	A22-12AA	A22-24AA	A22-24ASA

^{*1} Used when the pushbutton colour is yellow or white

Lamp - incandescent lamp

Order code		
Operating voltage		
5 VAC/VDC	12 VAC/VDC	24 VAC/VDC
A22-5	A22-12	A22-24

Accessories

Item		Remarks	Order code			
Lamp sockets	Direct lighting	Used when changing the lighting method (LED only)	A22-TN			
	Voltage-reduction lighting		220 VAC	A22-T2		
Mounting latches	For momentary models		Order mounting latches only when mounting switch blocks or lamp sockets are purchased individually	A22-3200		
Legend plate frames	Large size	With snap-in legend plate, without text, black	Snap-in legend plate is acrylic	A22Z-3333		
		Without snap-in legend plate		A22Z-3330		
Sealing caps	For projection models		Used to prevent dust or water from entering the operation unit (pushbutton, etc.), colour: Opaque, material: Silicon	A22Z-3600T		
Three-throw spacer			Used when mounting three non-lighted switches	A22Z-3003		
Control boxes (enclosures)	Exclusively for A22		One hole	Do not use DPST-NO or DPST-NC switches, material: Polycarbonate resin	A22Z-B101	
			Two holes		A22Z-B102	
			Three holes		A22Z-B103	
Snap-in legend plates	Standard size	Without text	White	Attached to the standard-size legend plate frame, material: Acrylic	A22Z-3443W	
			Transparent		A22Z-3443C	
			White text on black background		ON	A22Z-3443B-5
		OFF	A22Z-3443B-6			
		DOWN	A22Z-3443B-8			
		POWER ON	A22Z-3443B-9			
	Large size	Without text	White		Attached to the large-size legend plate frame, material: Acrylic	A22Z-3453W
			Transparent			A22Z-3453C
	For emergency stop switch	60-dia. round plate with black letters on a yellow background			"EMERGENCY STOP" is engraved on the plate.	A22Z-3466-1
90-dia. round plate with black letters on a yellow background			Used as an emergency stop switch legend plate	A22Z-3476-1		
Lamp extractor			Rubber tool used to easily replace lamps	A22Z-3901		
Tightening wrench			Tool used to tighten nuts from the back of the panel	A22Z-3905		

Specifications

Recognized organization	Standards	File number
UL, cUL	UL508	E41515
—	EN60947-5-1	—

Contact ratings (standard load)

Rated carry current (A)	Rated voltage	Rated current (A)			
		AC15 (inductive load)	AC12 (resistive load)	DC13 (inductive load)	DC12 (resistive load)
10	24 VAC	10	10	—	—
	110 VAC	5	10	—	—
	220 VAC	3	6	—	—
	380 VAC	2	3	—	—
	440 VAC	1	2	—	—
	24 VDC	—	—	1,5	10
	110 VDC	—	—	0,5	2
	220 VDC	—	—	0,2	0,6
	380 VDC	—	—	0,1	0,2

Contacts (microload)

Rated applicable load	Minimum applicable load
50 mA at 5 VDC (resistive load)	1 mA at 5 VDC

LED indicators without voltage reduction unit

Rated voltage	Rated current	Operating voltage
6 VDC	60 mA (20 mA)	6 VDC ±5%
6 VAC	60 mA (20 mA)	6 VAC/VDC ±5%
12 VAC/VDC	30 mA (10 mA)	12 VAC/VDC ±5%
24 VAC/VDC	15 mA (10 mA)	24 VAC/VDC ±5%

Super-bright LED indicator

Rated voltage	Rated current	Operating voltage
24 VAC/VDC	15 mA	24 VAC/VDC ±5%

Incandescent lamp

Rated voltage	Rated current	Operating voltage
6 VAC/VDC	200 mA	5 VAC/VDC
14 VAC/VDC	80 mA	12 VAC/VDC
28 VAC/VDC	40 mA	24 VAC/VDC
130 VAC/VDC	20 mA	100 VAC/VDC

Voltage-reduction lighting

Rated voltage	Operating voltage	Applicable lamp (BA8S/13_gold)
110 VAC	95 to 115 VAC	LED Lamp (A22-24A_)
220 VAC	190 to 230 VAC	

Item	Pushbutton switches		Emergency stop switches		Knob-type selector switches		Key-type selector switch
	Non-lighted	Lighted	Non-lighted	Lighted	Non-lighted	Lighted	Non-lighted
Allowable operating frequency	Mechanical	Momentary operation: 60 operations/minute max.	30 operations/minute max.		Manual release: 30 operations/minute max., automatic release: 30 operations/minute max.		
	Electrical	30 operations/minute max.		30 operations/minute max.			
Durability (number of operations min.)	Mechanical	Momentary operation: 5,000,000	Momentary operation: 300,000		500,000	100,000	500,000
	Electrical	500,000		300,000	500,000	100,000	500,000
Ambient temperature	Operating	-20 to 70°C	-20 to 55°C	-20 to 70°C	-20 to 55°C	-20 to 70°C	-20 to 70°C
	Storage	-40 to 70°C	-40 to 70°C	-40 to 70°C	-40 to 70°C	-40 to 70°C	-40 to 70°C
Degree of protection	IP65 (oil-resistant)	IP65	IP65 (oil-resistant)	IP65	IP65 (oil-resistant)	IP65	IP65 (oil-resistant)
Size in mm (in-panel only)	34Hx34Wx54.7D, 34Hx34Wx72.7D for DPST switches						



Emergency stop switch

The A22E line-up of E-Stop switches offers various head types as well as lighted models. E-stop shrouds and control boxes as accessories provide flexibility in application.

- Direct opening mechanism with minimum contact separation of 3 mm
- Safety lock mechanism prevents misuse
- Easy mounting of switch block
- Lighted models for easy diagnosis and maintenance
- Modular design for flexibility in application

Ordering Information

Non-lighted models

Description	Output	Color of cap	Order code
30-dia. head Push-lock Turn-reset	SPST-NC	Red	A22E-S-01
	SPST-NO/SPST-NC		A22E-S-11
	DPST-NC		A22E-S-02
40-dia. head Push-lock Turn-reset	SPST-NC		A22E-M-01
	SPST-NO/SPST-NC		A22E-M-11
	DPST-NC		A22E-M-02
60-dia. head Push-lock Turn-reset	SPST-NC		A22E-L-01
	SPST-NO/SPST-NC		A22E-L-11
	DPST-NC		A22E-L-02

Lighted models

Description	Output	Lighting	Rated voltage	Color of cap	Order code
40-dia. head Push-lock Turn-reset	SPST-NC	LED	24 VAC/VDC	Red	A22EL-M-24A-01
	SPST-NO/SPST-NC		24 VAC/VDC		A22EL-M-24A-11
	DPST-NC		24 VAC/VDC		A22EL-M-24A-02
40-dia. head Push-lock Turn-reset	SPST-NC		220 VAC		A22EL-M-T2-01
	SPST-NO/SPST-NC		220 VAC		A22EL-M-T2-11
	DPST-NC		220 VAC		A22EL-M-T2-02

Accessories (Order separately)

Item	Classification	Remarks	Order code
Control boxes (enclosures)	One hole	Material: Polycarbonate resin	A22Z-B101
	One hole, yellow box (for emergency stop)		A22Z-B101Y
	Two holes		A22Z-B102
	Three holes		A22Z-B103
Legend plates for emergency stop	60-dia. black letters on yellow back-ground	"EMERGENCY STOP" is indicated on the plate.	A22Z-3466-1
	90-dia. black letters on yellow back-ground		A22Z-3476-1

Specifications

Contacts (standard load)

Rated carry current	Rated voltage	Rated current (A)			
		AC15	AC12	DC13	DC12
10	24 VAC	10	10	---	---
	220 VAC	3	6	---	---
	24 VDC	---	---	1.5	10
	220 VDC	---	---	0.2	0.6

- Note:**
- Rated current values are determined according to the testing conditions. The above ratings were obtained by conducting tests under the following conditions.
 - Ambient temperature: 20±2°C
 - Ambient humidity: 65±5%
 - Operating frequency: 20 operations/minute
 - Minimum applicable load: 10 mA at 5 VDC

Contacts (microload)

Rated applicable load	Minimum applicable load
50 mA at 5 VDC (resistive load)	1 mA at 5 VDC

Characteristics

Item	Emergency stop switches	
	Non-lighted model: A22E	Lighted model: A22EL
Dielectric strength	2,500 VAC, 50/60 Hz for 1 min between terminals of same polarity 2,500 VAC, 50/60 Hz for 1 min between terminals of different polarity and also between each terminal and ground	
Durability	Mechanical	Momentary operation: 300,000 operations min.
	Electrical	300,000 operations min.
Degree of protection	IP65 (oil-resistant)	IP65



Emergency stop switch

- Tension indicator – the tension indicator makes the system easy to set up and to maintain the proper rope tension
- Heavy-duty housing – the die-cast housing and stainless steel eye nut makes the ER-series rope pull switches suitable for demanding industrial applications
- Vibration tolerant – the snap-acting switch contacts protect against nuisance tripping due to vibration
- Integral E-stop – the E-stop button provides emergency stopping capability at the extreme end of the installation and is field serviceable
- ER6022 available in stainless steel housing
- ER6022, ER1022 and ER1032 available in explosion proof housing

Ordering information

Standard models

Aluminium die-cast housing

E-Stop	Indicator beacon	Contacts	Wiring entry	Order code
Not included	–	2 N/C + 1 N/O	3 × M20	44506-4010 ER5018-021M
Not included	–	3 N/C	3 × M20	44506-4030 ER5018-030M
Included	–	2 N/C + 1 N/O	3 × M20	44506-4110 ER5018-021ME
Included	–	3 N/C	3 × M20	44506-4130 ER5018-030ME
Not included	Not included	2 N/C + 1 N/O	3 × M20	44506-5010 ER6022-021M
Not included	Not included	3 N/C + 1 N/O	3 × M20	44506-5050 ER6022-031M
Not included	Included (24 VDC)	2 N/C + 1 N/O	3 × M20	44506-5110 ER6022-021ML
Not included	Included (24 VDC)	3 N/C + 1 N/O	3 × M20	44506-5150 ER6022-031ML
Included	Not included	2 N/C + 1 N/O	3 × M20	44506-5210 ER6022-021ME
Included	Not included	3 N/C + 1 N/O	3 × M20	44506-5250 ER6022-031ME
Included	Included (24 VDC)	2 N/C + 1 N/O	3 × M20	44506-5410 ER6022-021MEL
Included	Included (24 VDC)	3 N/C + 1 N/O	3 × M20	44506-5450 ER6022-031MEL
Included	Included (24 VDC)	4 N/C + 2 N/O	4 × M20	44506-6410 ER1022-042MELL
Included	Included (24 VDC)	4 N/C + 2 N/O	4 × M20	44506-6510 ER1022-042MELR
Included	Included (24 VDC)	4 N/C + 2 N/O	4 × M20	44506-7410 ER1032-042MEL

Stainless steel housing

E-Stop	Indicator beacon	Contacts	Wiring entry	Order code
Not included	Not included	2 N/C + 2 N/O	3 × M20	44506-5810 ER6022-022MSS
Not included	Not included	3 N/C + 1 N/O	3 × M20	44506-5830 ER6022-031MSS
Not included	Included	2 N/C + 2 N/O	3 × M20	44506-5910 ER6022-022MLSS
Not included	Included	3 N/C + 1 N/O	3 × M20	44506-5930 ER6022-031MLSS
Included	Not included	2 N/C + 2 N/O	3 × M20	44506-5850 ER6022-022MESS
Included	Not included	3 N/C + 1 N/O	3 × M20	44506-5870 ER6022-031MESS
Included	Included	2 N/C + 2 N/O	3 × M20	44506-5950 ER6022-022MELSS
Included	Included	3 N/C + 1 N/O	3 × M20	44506-5970 ER6022-031MELSS

Explosion proof models

Aluminium die-cast housing

E-Stop	Indicator beacon	Contacts	Wiring entry	Order code
Not included	Not included	1 N/C + 1 N/O	pre-wired, 3 m	44506-5600 XER6022-011C3
Not included	Not included	1 N/C + 1 N/O	pre-wired, 3 m	44506-6600 XER1022-011C3L
Not included	Not included	1 N/C + 1 N/O	pre-wired, 3 m	44506-6610 XER1022-011C3R
Not included	Not included	1 N/C + 1 N/O	pre-wired, 3 m	44506-7600 XER1032-011C3

Stainless steel housing

E-Stop	Indicator beacon	Contacts	Wiring entry	Order code
Not included	Not included	1 N/C + 1 N/O	pre-wired, 3 m	44506-5610 XER6022-011C3SS
Not included	Not included	2 N/C	pre-wired, 3 m	44506-5620 XER6022-020C3SS

Accessories

Item	Applicable model	Order code
Replacement Lid	ER5018	44506-3700 SM06-SL400
	ER6022	44506-5700 SM06-SL500
	ER6022-SS stainless steel	44506-5730 SM06-SLXER6022SS
Replacement Lid/LED, 24 VDC	ER1022	44506-6710 SM06-SL710
	ER1032	44506-7710 SM06-SL711
	ER6022-SS stainless steel	44506-5740 SLER6022LSS
Replacement Lid/LED	ER6022	44506-5710 SM06-SL510
Rope kit, 5 m, stainless steel	ER5018, ER6022, ER1022, ER1032	44506-2705 RK5
Rope kit, 10 m, stainless steel	ER5018, ER6022, ER1022, ER1032	44506-2710 RK10
Rope kit, 20 m, stainless steel	ER5018, ER6022, ER1022, ER1032	44506-2720 RK20
Rope kit, 50 m, stainless steel	ER5018, ER6022, ER1022, ER1032	44506-2750 RK50
Rope kit, 80 m, stainless steel	ER6022, ER1022, ER1032	44506-2780 RK80
Rope kit 100 m, stainless steel	ER6022, ER1022, ER1032	44506-2711 RK100
Rope kit 126 m, stainless steel	ER1032	44506-2726 RK126
Rope only, 5 m	ER5018, ER6022, ER1022, ER1032	44506-3705 R5M
Rope only, 10 m	ER5018, ER6022, ER1022, ER1032	44506-3710 R10M
Rope only, 20 m	ER5018, ER6022, ER1022, ER1032	44506-3720 R20M
Rope only, 50 m	ER5018, ER6022, ER1022, ER1032	44506-3750 R50M
Rope only, 100 m	ER5018, ER6022, ER1022, ER1032	44506-3711 R100M
Rope only, 126 m	ER5018, ER6022, ER1022, ER1032	44506-3726 R126M
Tensioner gripper, stainless steel	ER5018, ER6022, ER1022, ER1032	44506-4700 SM06-TG00
Eye bolt stainless steel, 8 per pack	ER5018, ER6022, ER1022, ER1032	44506-4710 SM06-EB10
Double loop clip, stainless steel, 4 per pack	ER5018, ER6022, ER1022, ER1032	44506-4720 SM06-DL20
Thimble stainless steel, 4 per pack	ER5018, ER6022, ER1022, ER1032	44506-4770 SM06-THSS
Turnbuckle, stainless steel	ER5018, ER6022, ER1022, ER1032	44506-4730 SM06-TB30
Spring, stainless steel	ER5018, ER6022, ER1022, ER1032	44506-4750 SM06-SP50
Rope pulley, stainless steel	ER5018, ER6022, ER1022, ER1032	44506-4780 SM06-RPSS
E-Stop mechanism	ER5018, ER6022, ER1022, ER1032	44506-4760 SM06-ES60
Yellow E-Stop Background Label	ER5018, ER6022, ER1022, ER1032	44506-4791 SM06-YLES

Specifications

Standard models

Item		Applicable model				
		ER5018	ER6022	ER6022SS	ER1022	ER1032
Electrical	Contact configurations	2 N/C + 1 N/O, 3 N/C	2 N/C + 1 N/O, 3N/C + 1N/O	3 N/C+1 N/O, 2 N/C+2 N/O	4 N/C + 2 N/O	4 N/C + 2 N/O
	Safety contacts	2 N/C, 3 N/C	2 N/C, 3 N/C		4 N/C	
	Switching ability	AC: 120 V–6 A, 240 V–3 A, inductive DC: 24 V–2.5 A, inductive				
	Auxiliary contacts	1 N/O		1 N/O, 2 N/O	2 N/O	
	Max. switching current/Volt/Amp	240 V/720 VA				
	Electrical life	1,000,000 minimum				
	LED indicator beacon	–	24 VDC			
Mechanical	Max. rope span	40 m	80 m	100 m	125 m	125 m each side
	Case material	Die-cast aluminum alloy		Die-cast 316 stainless steel casing	Die-cast aluminum alloy	
	Eye nut material	Stainless steel				
	Wiring entry	3 × M20			4 × M20	
	Mechanical life	1,000,000 minimum				
Environmental	Protection	IP67 (NEMA 6)				
	Operating temperature	–25 to 80°C				
	Cleaning	Water washdown				
Compliance	Standards	EN60947-5-1:2004, EN60947-5-5:1997+A1:2005; EN60204-1; EN ISO 13850:2006				
	Approvals/listings	CE marked for all applicable directives, UL and C-UL				

Explosion proof models

Item		Applicable model		
		XER6022	XER1022	XER1032
Electrical	Contact configuration	1 N/C + 1 N/O, 2 N/C		
	Safety contact	1 N/C, 2 N/C		
	Auxiliary contact	1 N/O		
	Rated voltage and current (AC15)	400 VAC/2 A AC, 250 VAC/4 A AC		
	Rated voltage and current (DC)	250 VDC/0.15 A DC		
	Switching ability	Resistive load	125 VAC/5 A, 250 VAC/5 A	
		Inductive load	125 VAC/3 A, 250 VAC/3 A	
	Switching ability	Resistive load	30 VDC/7 A, 250 VDC/0.15 A	
Inductive load		30 VDC/5 A, 250 VDC/0.03 A		
Compliance	Ex-classification	II 2 G EEx d II C T6		
	Certification	PTB00 ATEX 1093X IBExU 01 ATEX 1007X		

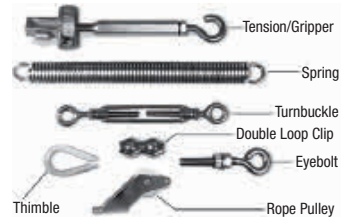
Accessories

RK rope tension kit



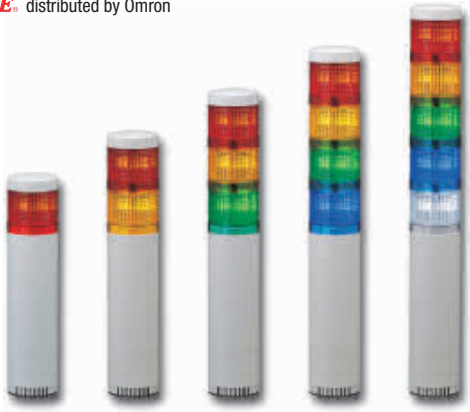
The RK rope tension kit comes with all of the required hardware for most installations. A spring is required as shown in the installation example below.

Installation Hardware



Individual hardware items may be purchased for specific installation requirements.

PATLITE distributed by Omron



Versatile modular signal tower featuring easy assembly and wiring designed for every need.

LU5 Series - Medium size modular system provides hybrid prism cut lens for enhanced visibility from any direction and distance and two selectable sound patterns up to 85 dB. Main features are the interchangeable LED modules and the color coordinated wiring for easy alignment.

- Diameter: 50 mm
- Base modules available in ivory white or in silver
- Up to 5 LED modules can be used on the light tower
- Modules of the same color operate from different terminals
- Two, user - selectable, alarms integrated in the base module with adjustable volume up to 85 dB at 1 m

Ordering information

LED module

LU5-E-R
1 2

1. E: LED unit
2. Color of LED
R: Red
Y: Yellow
G: Green
B: Blue
C: Clear/White

Base module

LU5-02UFB
1 2 3

1. Rated voltage
02: 24 VDC
2. Unit color
Blank: Ivory white
U: Silver color
3. Type
Blank: Continuous light
FB: Continuous or flashing light with audible alarm

Ordering information

LED module

Module color	Power consumption	Rated voltage	Operation voltage	Operation temperature range	Mass	Order code
Red	52 mA/1.25 W	24 VDC	Rated voltage ±10% (21.6~26.4 V)	-30°C~+60°C	44 g ±10%	LU5-E-R
Yellow						LU5-E-Y
Green	42 mA/1.0 W					LU5-E-G
Blue						LU5-E-B
Clear						LU5-E-C

Base module

Typ	Alarm/Flash	Power consumption	Rated voltage	Operation voltage	Operation temperature range	Mass	Open collector	Order code
Standard body	Continuous	1.2 W	24 VDC	Rated voltage ±10% (21.6 ~ 26.4 V)	-30°C~+60°C	182g ±10%	PNP/ NPN	LU5-02*
	2 Sounds/Flashlight					200g ±10%		LU5-02FB*

* Ivory white: black, silver: add "U"

Optional parts

Typ	Material	Order code
Wall mount bracket	Aluminum alloy die-cast	SZ-017
	ABS resin	SZ-020
Upper bracket	Metal	SZ-60NPT
		SZ-60U
Mount bracket	Aluminum alloy die-cast	SZ-016A
		SZ-70B

Typ	Height	Material	Order code
Pole	100 mm	Aluminium	Pole-100A21
	300 mm	Aluminium	Pole-300A21
	800 mm	Aluminium	Pole-800A21

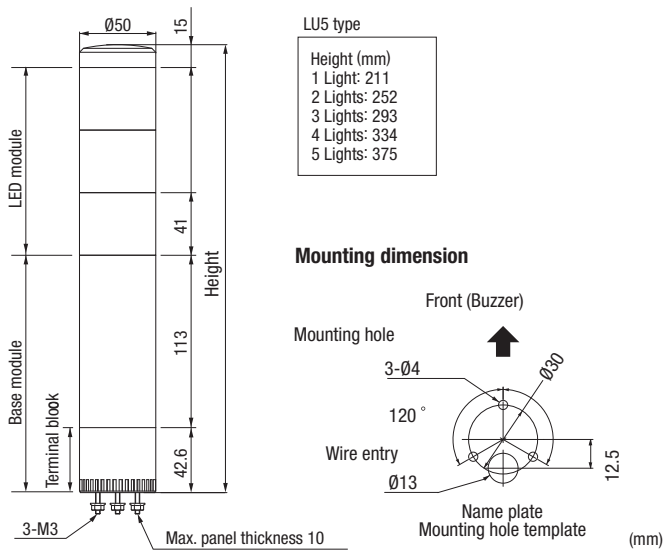
Features



LED module is stackable and reconfigurable even after installation

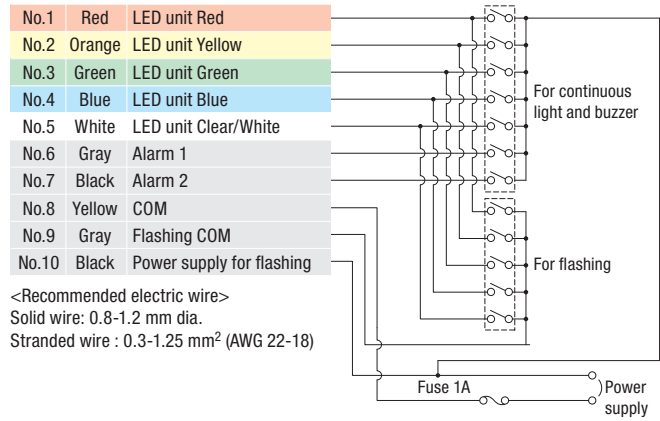
IP 65: Implemented o rings seal out liquids so that the tower can be used in wet conditions.

Dimensions

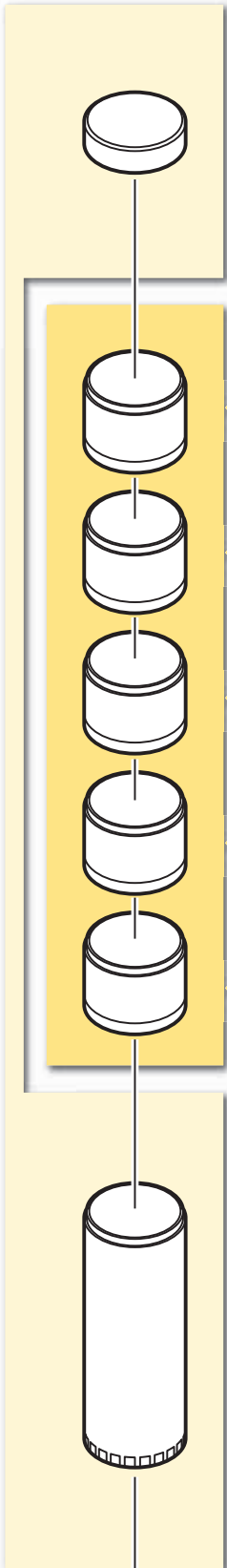


Wiring diagram

LU5-02FB
24 VDC



How to order



Optional parts

LED units



Model	LU5-E-R	LU5-E-Y	LU5-E-G	LU5-E-B	LU5-E-C
Unit color					
Rated voltage	24 VDC				
Operating voltage range	Rated voltage±10% (21.6~26.4 V)				
Current/power consumption	52 mA/1.25 W		42 mA/1.0 W		
Operating temperature range	-30°C~+60°C				
Mass	44 g±10%				

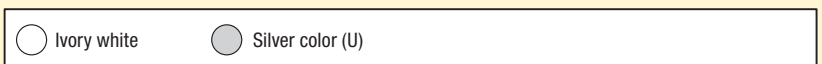


BASE units

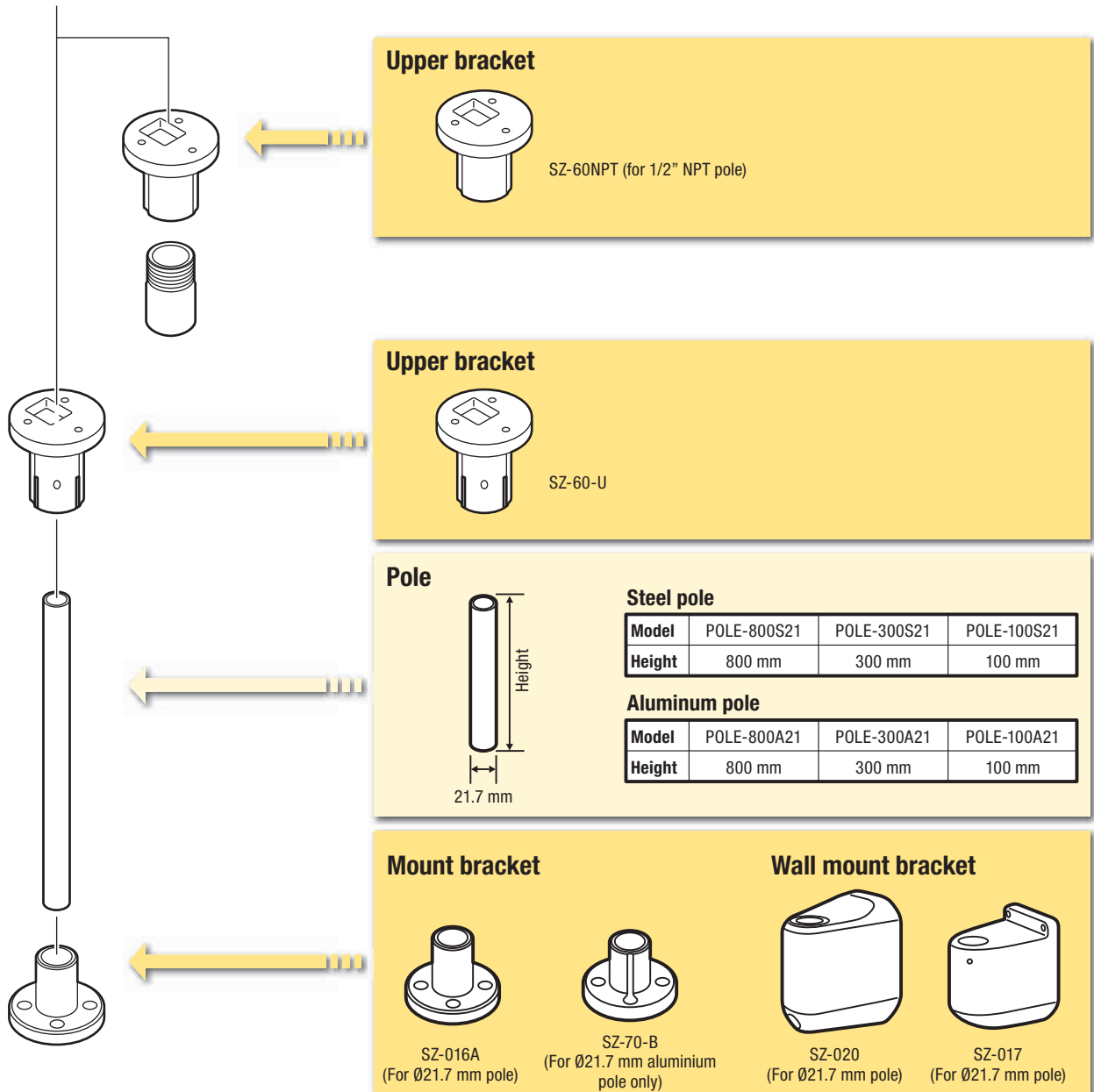


Model	LU5-02		LU5-02FB	
Color				
Standard body/short body	Standard			
Rated voltage	24 VDC			
Operating voltage range	Rated voltage±10%(21.6~26.4 V)			
Buzzer	-	*Buzzer 1	**Buzzer 2	
Current consumption	-	50±10 mA	24±10 mA	
Power consumption	-	1.2±0.25 W	0.58±0.25 W	
Sound level	-	Max: 85±5 dB (at 1 m)		
Flashing cycle	-	6±12 flashes per minutes		
Operating temperature Range	-30°C~+60°C			
Mounting direction	Upright, indoor only			
Protection rating	IP65			
Mass	182 g±10%		200 g±10%	
Open collector	PNP/NPN			

* Buzzer 1: Continuous sound **Buzzer 2: Intermittent sound



Optional parts



Specifications

Size	50 mm diameter
Input voltage options	24 VDC
Functions available	<ul style="list-style-type: none"> • Continuous only • Continuous, flashing, alarms
Mounting options	Direct mount only, includes 3 mounting nuts
Body styles	<ul style="list-style-type: none"> • Component style, wiring terminals provided • Interchangeable and stackable after purchase
Body colours	Beige
Tiers	1-5 modules can be stacked
Module colors	Red / Yellow / Green / Blue / Clear
Alarms (FB style only)	<ul style="list-style-type: none"> • Alarm 1: selectable, single-tone, continuous alarm, 85 dB (at 1 m) • Alarm 2: selectable, single tone, intermittent (slow beep) alarm, 85 dB (at 1 m)
Ratings	<ul style="list-style-type: none"> • CE • UL listed (US) • UL listed (Canada) • RoHS
Protection	<ul style="list-style-type: none"> • IP-65 • Type 4 / 4X / 13 (indoor only)
Control options	<ul style="list-style-type: none"> • Dry contact closure such as switches or relay contacts • Open-collector transistor (NPN or PNP) for 24 VDC • Direct voltage control for 24 VDC, continuous and alarm functions only

PATLITE distributed by Omron



Versatile modular signal tower featuring easy assembly and wiring designed for every need.

LU7 presents ultra bright LEDs combined with an innovative prism lens design. 1 to 5 modules can be arranged in tiers.

- Diameter: 70 mm
- Base module in 2 sizes and 3 colors
- Different modules: standard LED, strobe LED and sound
- Two, user - selectable, alarms integrated in the base module with adjustable volume up to 90 dB at 1 m.
- Color-coordinated and spring-loaded terminal block

Ordering information

LED module

Typ	Module color	Power consumption	Rated voltage	Operation voltage	Operation temperature range	Mass	Order code
Standard	Red	52 mA/1.25 W	24 VDC	Rated voltage ±10% (21.6~26.4 V)	-30°C~+60°C	60 g ±10%	LU7-E-R
	Yellow						LU7-E-Y
	Green	42 mA/1.0 W					LU7-E-G
	Blue						LU7-E-B
	Clear/White						LU7-E-C
Strobe	Red	290 mA	24 VDC	Rated voltage ±10% (21.6~26.4 V)	-30°C~+60°C	0,07 kg	LU7-XE-R
	Yellow	140 mA					LU7-XE-Y
	Green						LU7-XE-G
	Blue						270 mA
	Clear/White	280 mA					LU7-XE-C

Base module

Typ	Alarm/Flash	Power consumption	Rated voltage	Operation voltage	Operation temperature range	Mass	Open collector	Order code
Short body	Continuous	1.2 W	24 VDC	Rated voltage ± 10% (21.6~26.4 V)	-30°C~+60°C	150 g ±10%	PNP/ NPN	LU7-02S*
Standard body	Continuous					250 g ±10%		LU7 - 02*
	2 Sounds/Flashlight					280 g ±10%		LU7 -02FB*

* Ivory white: blank, black: add "K", silver: add "U"

Optional parts

Typ	Material	Order code
Wall mount bracket	Aluminum alloy die-cast	SZ-017
	PBT/ ABS resin	SZ-018
		SZ-018U
		SZ-018K
	ABS resin	SZ-020
Upper bracket	Metal	SZ - 50U
		SZ - 50UU
		SZ - 50KU
		SZ - 50NPT
Mount bracket	Aluminum alloy die-cast	SZ-016A
		SZ-70B

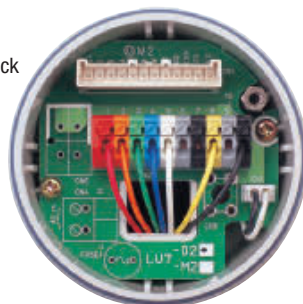
Typ	Height	Material	Order code
Pole	100 mm	Aluminium	Pole-100A21
		Steel	Pole-100S21
	300 mm	Aluminium	Pole-300A21
		Steel	Pole-300S21
	800 mm	Aluminium	Pole-800A21
		Steel	Pole-800S21

Voice and sound module (unique sound module in all directions)

Rated voltage	Power consumption	Mass	Order code
24 VDC	3.5 W	0.17 kg	LU7-V1

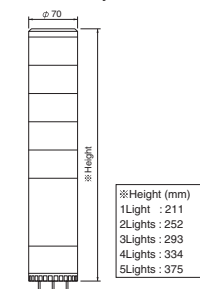
Features

Easy alignment:
Color-coordinated terminal block:
Corresponds to the lens colors for quick wiring verification in the base unit.

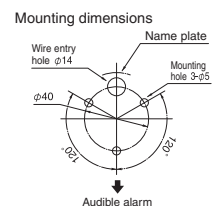
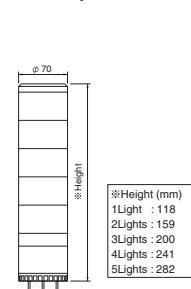


LU7-02FB

LU7 Standard body




LU7-02S Short body




How to order






Voice and sound module




Model	LU7-V1
Type	Voice synthesizer
Rated voltage	24 VDC
Power consumption	3.5 W
Weight	0.17 kg






LED units








Model	LU7-E-R	LU7-E-Y	LU7-E-G	LU7-E-B	LU7-E-C
Unit color					
Rated voltage	24 VDC				
Operating voltage range	Rated voltage±10% (21.6~26.4 V)				
Current/power consumption	52 mA/1.25 W		42 mA/1.0 W		
Operating temperature range	-30°C~+60°C				
Mass	60 g±10%				



LED strobe module






Model	LU7-XE-R	LU7-XE-Y	LU7-XE-G	LU7-XE-B	LU7-XE-C
Unit color					
Rated voltage	24 VDC				
Power consumption	290 mA	290 mA	140 mA	270 mA	280 mA
Mass	0.07 kg				




 RED
  YELLOW
  GREEN
  BLUE
  CLEAR/WHITE

BASE units

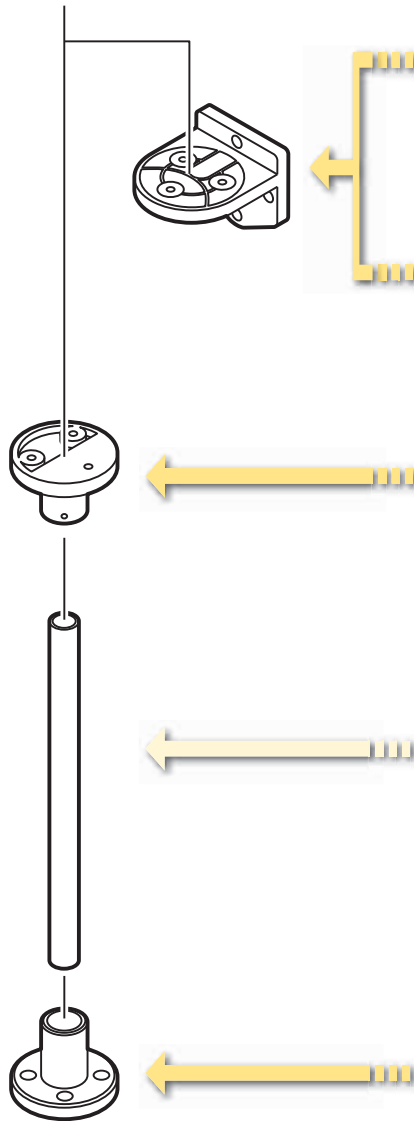
Model	LU7-02S	LU7-02	LU7-02FB
Color		  	
Standard body/short body	Short	Standard	
Rated voltage	24 VDC		
Operating voltage range	Rated voltage±10% (21.6~26.4 V)		
Buzzer	-		*Buzzer 1 **Buzzer 2
Current consumption	-		50±10 mA ; 24±10 mA
Power Consumption	-		1.2±0.25 W ; 0.58±0.25 W
Sound level	-		Max: 90±5d B (at 1 m) Min: 70 dB or Less (at 1 m)
Flashing cycle	-		60±12 flashes per minute
Operating temperature Range	-30°C~+60°C		
Mounting direction	Upright, indoor only		
Protection rating	IP65		
Mass	150 g±10%	250 g±10%	280 g±10%
Open collector	PNP/NPN		

* Buzzer 1: Continuous sound **Buzzer 2: Intermittent sound

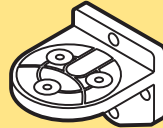
 Ivory white
  Silver color (U)
  Black (K)

Optional parts

Optional parts



Wall mount bracket



Model	SZ-18	SZ-18U	SZ-18K
Color	Ivory white	Silver color (U)	Black (K)

Upper bracket



SZ-50NPT(For 1/2" NPT pole)

Upper bracket



Model	SZ-50-U	SZ-50U-U	SZ-50K-U
Color	Ivory white	Silver color (U)	Black (K)

Pole



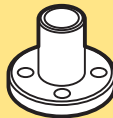
Steel pole

Model	POLE-800S21	POLE-300S21	POLE-100S21
Height	800 mm	300 mm	100 mm

Aluminum pole

Model	POLE-800A21	POLE-300A21	POLE-100A21
Height	800 mm	300 mm	100 mm

Mount bracket



SZ-016A
(For Ø21.7 mm pole)



SZ-70-B
(For Ø21.7 mm Aluminium pole only)

Wall mount bracket



SZ-020
(For Ø21.7 mm pole)

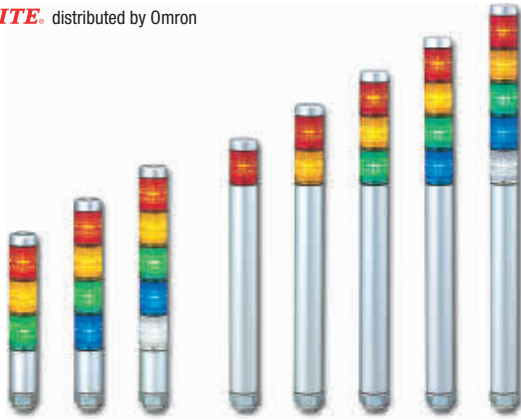


SZ-017
(For Ø21.7 mm pole)

Specifications

Size	70 mm diameter
Input voltage options	• 24 VDC
Functions available	• Continuous only • Continuous, flashing, alarms
Mounting options	Direct mount only: includes three mounting nuts
Body style	• Component style, wiring terminals provided • Interchangeable and stackable after purchase
Body color	• Beige • Black • Silver
Tiers	1-5 modules can be stacked
Module colors	• Red / Yellow / Green / Blue / Clear • Standard LED modules • Strobe-flash LED modules (24 V bases only)
Alarms (FB style only)	• Alarm 1: selectable, single-tone, continuous alarm, 90 dB (at 1 m) • Alarm 2: selectable, single tone, intermittent (slow beep) alarm, 90 dB (at 1 m)
Ratings	• CE • UL listed (US) • UL listed (Canada) • RoHS
Protections	• IP-65 • Type 4/4X/13 (indoor only)
Control options	• Dry contact closure such as switches or relay contacts • Open-collector transistor (NPN or PNP for 24 VDC) • Direct voltage control for 24 VDC, continuous and alarm functions only

PATLITE distributed by Omron



Super slim 30 mm silver body signal tower ideal for small devices

MP/MPS signal towers provide double insulation and superior UV and light translucent AS resin lenses for enhanced durability and reliability in the application environment. The 30mm diameter is ideal for small and mid-sized machines.

Up to 5 colored modules can be combined using a single mounting hole. Modules can be easily added without dismantling the whole signal tower to reduce installation effort.

- Special pre-wired versatile with 1 connection cable
- NPN/ PNP compactible
- IP65
- Each color of LED module corresponds to the lead wire color.
- Available colors are Red, Yellow, Green, Blue and Clear/White. All colors as clear-lens modules available

Ordering information

MP-502-RYGBC-B0738
 1 2 3 4 5

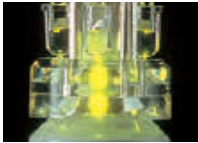
- | | | |
|---|--|---|
| 1. MP: Standard body
MPS: Short body | 4. Color of LED
R: Red
Y: Yellow
G: Green
B: Blue
C: Clear/White
Top to bottom | 5. Color of lense
Blank: Colored lens
B0738: Clear lens |
|---|--|---|

Ordering information

Number of stacks	Rated voltage	Power consumption	Open collector	Order code
1	24 VAC/VDC	0.7 W	NPN/PNP	MP/MPS-102
2		1.4 W		MP/MPS-202
3		2.0 W		MP/MPS-302
4		2.6 W		MP/MPS-402
5		3.2 W		MP/MPS-502

Features

Patented reflection system increases visibility.



High intensity LED



Good visibility from any direction

Interchangeable LED modules

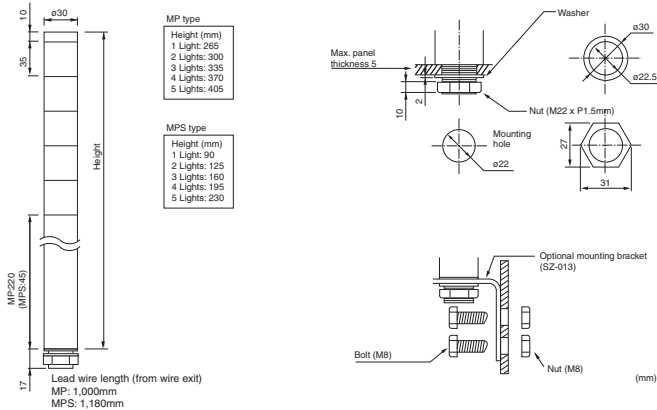
- Changeable color sequence: Easy to add/remove up to 5 colored modules even after installation.
- Note: LED modules of the same color will light up simultaneously.

The wiring remains the same.

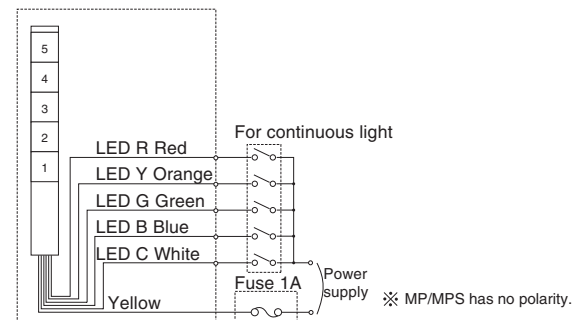
Each color of LED module corresponds to the lead wire color.



Dimensions



Wiring diagram



Specifications

Size	30 mm diameter
Input voltage options	24 VAC/VDC
Functions available	Continuous only
Mounting options	Direct mount only; includes M22 mounting nut and sealing gasket
Body style	<ul style="list-style-type: none"> • pre-assembled, pre-wired • Interchangeable and stackable after purchase
Body color	Silver
Tiers	1-5 modules can be stacked
Module colors	Red / Yellow / Green / Blue / Clear-White (for sunlight applications: clear-lense modules in all colors available)
Alarms (FB style only)	<ul style="list-style-type: none"> • CE • UL component recognition (US) • UL component recognition (Canada) • RoHS
Protection	IP-65
Control options	<ul style="list-style-type: none"> • Dry contact closure such as switches or relay contacts • Open-collector transistor (NPN or PNP) for 24 VDC • Direct voltage control

PATLITE distributed by Omron



Versatile, cost and energy efficient LED signal tower for every need

The LME series indicating light provides the latest in LED technology. 1 to 5 modules can be arranged in tiers. The original dual reflection system for enhanced light diffusion, creates bright distinctive illumination while saving energy (patent pending).

LME signal towers provide double insulation and superior UV resistant and light translucent AS resin lenses for enhanced durability and reliability in application environment.

Available Colors are Red, Yellow, Green, Blue and Clear/White.
All colors as clear-lense modules are available

- Diameter: 60 mm
- 2 selectable built-in alarms with adjustable volume up to 90 dB at 1 m for FB type
- Special pre-wired versatile and flexible cable connection of 3 m
- NPN/ PNP compatible
- IP 65

Ordering information

LME-502UFBW-C-RYGB-C-Z
1 2 3 4 5 6 7 8

- | | | |
|--|--|---|
| <p>1. Stack
1 ~ 5</p> <p>2. Rated voltage
02: 24V AC/DC</p> <p>3. Body color
Blank: Ivory white
N: Black color
U: Silver color</p> | <p>4. Type
Blank: Continuous light
FB: Continuous light or flashing light with audible alarm</p> <p>5. Mount
Blank: Pole mount
K: Pole mount (with SZ-020)
W: Direct mount</p> <p>6. Connection
C: pre-wired cable 3 m</p> | <p>7. Color of LED
R: Red
Y: Yellow
G: Green
B: Blue
C: Clear/White</p> <p>8. Color of Lens
Blank: Colored lens
Z: Clear lens</p> |
|--|--|---|

Ordering information

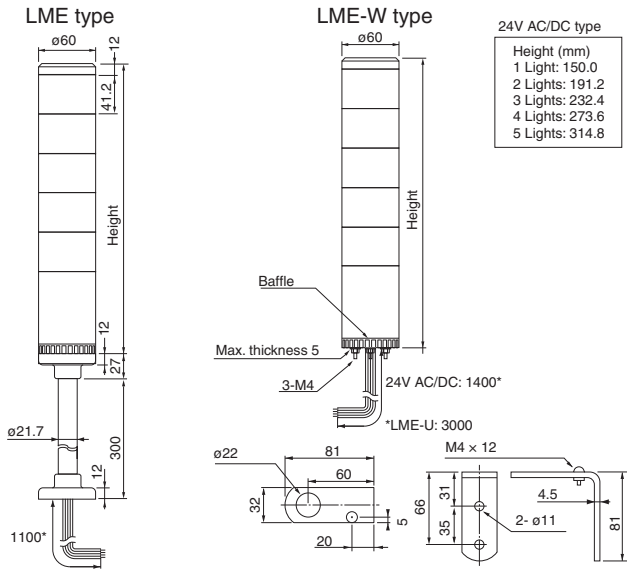
Number of stacks	Mount	Model	Rated voltage	Power consumption	Open collector	Order code	
						Continuous light	Continuous light with audible alarm
1	Pole mount	LME-102	24 VAC/DC	2.2 W	NPN/PNP	LME-102-C	LME-102-FB-C
	Direct mount		24 VAC/DC			LME-102W-C	LME-102-FBW-C
2	Pole mount	LME-202	24 VAC/DC	3.4 W		LME-202-C	LME-202-FB-C
	Direct mount		24 VAC/DC			LME-202W-C	LME-202-FBW-C
3	Pole mount	LME-302	24 VAC/DC	3.8 W		LME-302-C	LME-302-FB-C
	Direct mount		24 VAC/DC			LME-302W-C	LME-302-FBW-C
4	Pole mount	LME-402	24 VAC/DC	4.2 W		LME-402-C	LME-402-FB-C
	Direct mount		24 VAC/DC			LME-402W-C	LME-402-FBW-C
5	Pole mount	LME-502	24 VAC/DC	4.6 W		LME-502-C	LME-502-FB-C
	Direct mount		24 VAC/DC			LME-502W-C	LME-502-FBW-C

Optional parts

Typ	Material	Order code
Wall mount bracket	Aluminum alloy die-cast	SZ-017
	ABS resin	SZ-020
	PBT/ ABS resin	SZ-028
Mount bracket	Aluminum alloy die-cast	SZ-016A
	Aluminum alloy die-cast	SZ-010

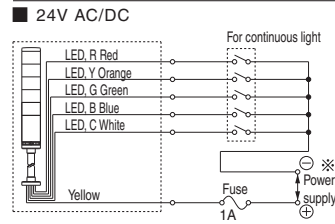
Typ	Height	Material	Order code
Pole	100 mm	Aluminium	Pole-100A21
		Steel	Pole-100S21
	300 mm	Aluminium	Pole-300A21
		Steel	Pole-300S21
	800 mm	Aluminium	Pole-800A21
		Steel	Pole-800S21

Dimensions



Wiring diagram

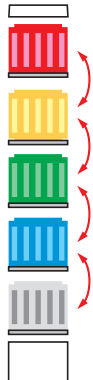
LME(-W)/LME(-W)-S-Q/LMS [Continuous type]



Features

Interchangeable LED modules

- Changeable color sequence: Easy to add / remove up to 5 colored modules even after installation.
- Note: LED modules of the same color within a signal tower will light up simultaneously.



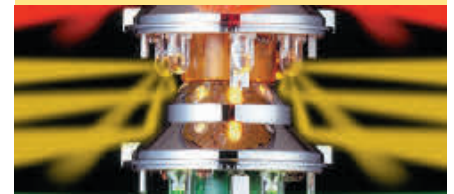
Easy to add and remove

If the number of LED module is changed, center shaft must be purchased.

The wiring remains the same

Each color of LED module corresponds to the lead wire color.

Dual reflection system



PATLITE's original dual reflection system with its exclusive hybrid prism-cut lens and 5 color LED modules create bright, distinctive, even illumination.



To bring more attention to certain conditions, two, User-selectable, Alarms integrated in the Base module with adjustable volume up to 85 dB at 1m are available.

Specifications

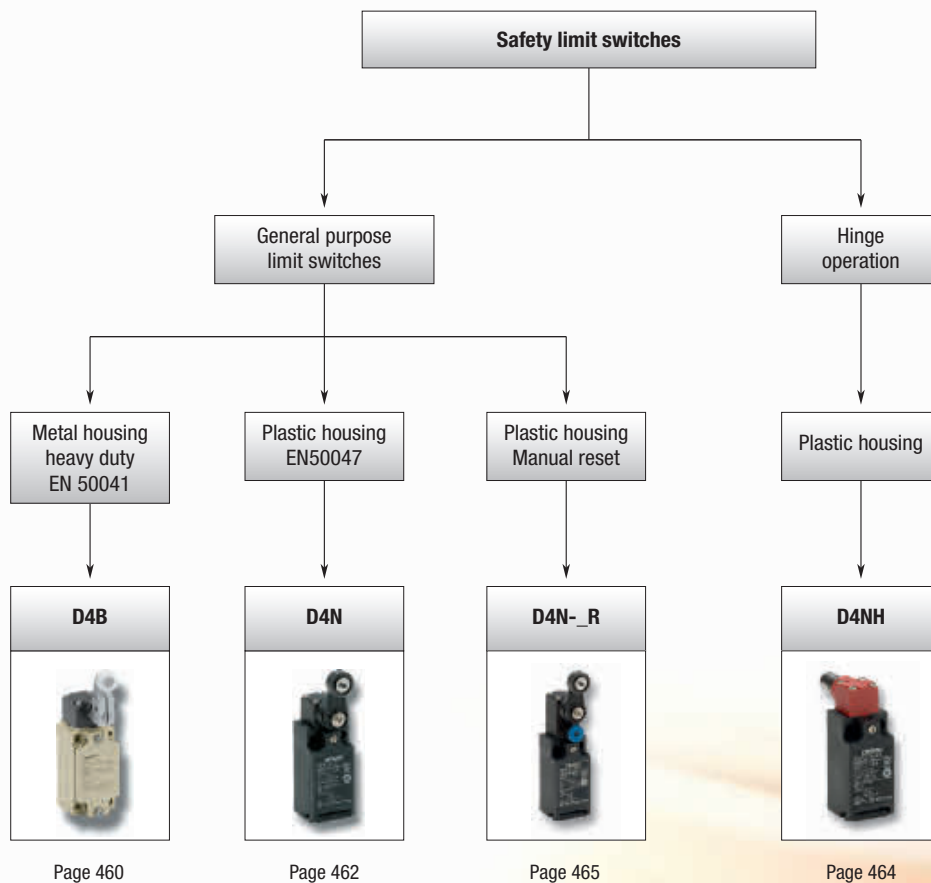
Size	60 mm diameter
Input voltage options	• 24 VAC/VDC
Functions available	• Continuous only • Continuous, flashing, alarms
Mounting options	• Pole mount: with 300 mm aluminum pole, plastic circular bracket • Direct mount: includes 3 mounting nuts
Body style	• Pre-assembled, pre-wired • Interchangeable and stackable after purchase
Body color	Beige (optional: Black or silver)
Tiers	1-5 modules can be stacked
Module colors	Red / Yellow / Green / Blue / Clear/White (for sunlight applications: clear-lense modules in all colors available)
Alarms (FB style only)	• Alarm 1: selectable, single-tone, intermittent (fast beep) alarm, 85 dB (at 1 m) • Alarm 2: selectable, single tone, intermittent (slow beep) alarm, 85 dB (at 1 m)
Ratings	• CE • UL component recognition (US) • UL component recognition (Canada) • RoHS
Protection	• IP-65 (LME, LME-W) • IP-54 (LME-FB, LME-FBW) • Type 4/4X/13 (indoor, direct-mount only)
Control options	• Dry contact closure such as switches or relay contacts • Open-collector transistor (NPN or PNP for 24 VDC) • Direct voltage control for 24 VDC, continuous and alarm functions only


PRECISE MONITORING OF GUARD POSITION

Detect linear or rotational movement of guards: D4N

Guards and covers on machines protect workers. They limit access to the dangerous parts of the machine. Our safety limit switches guarantee that the guards and covers are in place before the machine is started.

- Wide variety of actuators to fit wide range of applications
- Gold-plated contacts for reliable operation with micro loads



		Safety limit switches			
					
Selection criteria	Model	D4B	D4N	D4NH	D4N- <u>R</u>
	Housing	Metal	Plastic	Plastic	Plastic
	M12 Plug connector	–	■	■	–
	Protection class	IP67			
	Operating Temperature Range	-40 to 80°C	-30 to 70°C	-30 to 70°C	-30 to 70°C
Conformity	EN50047, EN1088				
Features	Conduit size M20	■	■	■	■
	Gold clad contacts	■	■	■	■
	Actuators				
	Resin roller, resin lever	–	■	–	■
	Resin roller, metal lever	■	■	–	–
	Metal roller, metal lever	–	■	–	–
	Bearing lever, metal lever	–	■	–	–
	Adj. resin roller, metal lever	■	■	–	■
	Adj. Rubber roller, metal lever	–	■	–	■
	Adj. Rod lever	■	–	–	–
	Top plunger	■	■	–	■
	Top roller plunger	■	■	–	■
	Horizontal roller arm lever	–	■	–	■
	Vertical roller arm lever	–	■	–	■
	Cat whisker	–	■	–	–
	Plastic Rod	■	■	–	–
	Fork lever lock (right operation)	–	■	–	–
Fork lever lock (left operation)	–	■	–	–	
Hinge operation	■	–	■	–	
Application	Position monitoring	■	■	■	■
Contact configuration	1NC/1NO snap action	■	■	–	–
	2NC snap action	–	■	–	–
	1NC/1NO slow action	■	■	■	■
	2NC slow action	■	■	■	■
	2NC/1NO slow action	–	■	■	■
	3NC slow action	–	■	■	■
	1NC/1NO (MBB slow action)	–	■	■	–
	2NC/1NO (MBB slow action)	–	■	■	–
Page	460	462	464	465	

■ Standard

– No/not available



Limit switch with metal housing

The D4B series of limit switches in a rugged metal housing is suitable for both safety and non-safety applications due to its direct opening mechanism and TÜV approval. Furthermore with the increased temperature range and enhanced mechanical switching lifetime, the D4B is first choice for all applications from standard to demanding environments and for highest flexibility in mounting and connectivity preferences.

- Direct opening mechanism and approval by notified body
- Rugged metal housing and extended mechanical switching lifetime (snap action models)
- Terminal block for direct wiring

Ordering information

Actuator type		Connection method	Order code ^{*1}		
			1NC/1NO (snap-action)	1NC/1NO (slow-action)	2NC (slow-action)
	Roller lever ^{*2}	Terminal block with M20 conduit	D4B-4111N	D4B-4511N	D4B-4A11N
	Adjustable roller lever		D4B-4116N	D4B-4516N	D4B-4A16N
	Adjustable rod lever		D4B-4117N	D4B-4517N	D4B-4A17N
	Plain		D4B-4170N	D4B-4570N	D4B-4A70N
	Roller		D4B-4171N	D4B-4571N	D4B-4A71N
	Coil spring		D4B-4181N ^{*3}	–	–
	Plastic rod		D4B-4187N ^{*3}	–	–

^{*1} The NC contacts provide the approved direct opening mechanism.

^{*2} For models with stainless steel rollers and temperature resistance of -40°C refer to WL-_-TC.

^{*3} No direct opening mechanism

Specifications

Item		Snap-action	Slow-action
Durability ^{*1}	Mechanical	30,000,000 operations min.	10,000,000 operations min.
	Electrical	500,000 operations min. (at a 250 VAC, 10 A resistive load)	
Operating speed		1 mm/s to 0.5 m/s	
Operating frequency	Mechanical	120 operations/min	
	Electrical	30 operations/min	
Rated frequency		50/60 Hz	
Contact resistance		25 mΩ max. (initial value)	
Pollution degree (operating environment)		3 (EN60947-5-1)	
Conditional short-circuit current		100 A (EN60947-5-1)	
Conventional enclosed thermal current (I _{th})		20 A (EN60947-5-1)	
Protection against electric shock		Class I (with ground terminal)	
Ambient temperature	Operating	-40 to 80°C (with no icing) ^{*2}	
Degree of protection		IP67 (EN60947-5-1)	

^{*1} The values are acquired for an ambient temperature of 5 to 35°C and an ambient humidity of 40 to 70%.

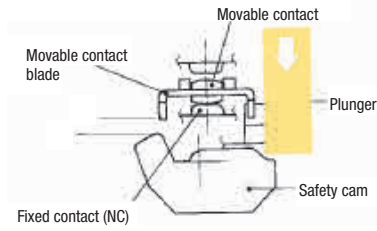
^{*2} -25 to 80°C for the flexible-rod actuator.

1NO/1NC Contact (Snap-action)

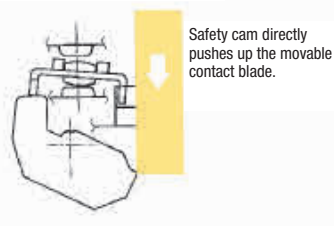
If metal deposition between mating contacts occurs on the NC contact side, they can be pulled apart by the shearing force and tensile force generated when part B of the

safety cam or plunger engages part A of the movable contact blade. When the safety cam or plunger is moved in the direction of the arrow, the Limit Switch releases.

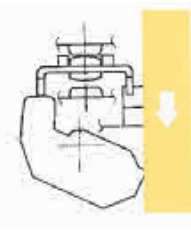
1. When metal deposition occurs.



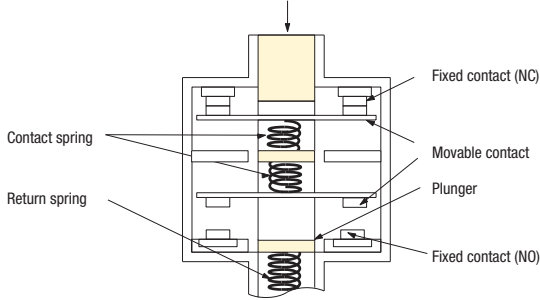
2. When contacts are being pulled apart.



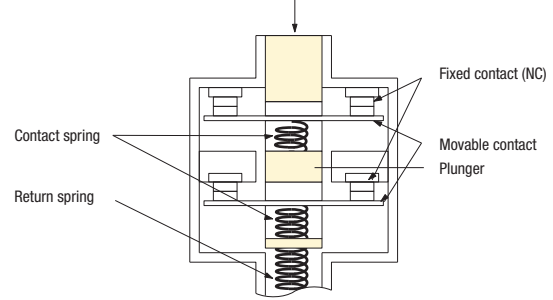
3. When contacts are completely pulled apart.



1NC/1NO Contact (Slow-action)



2NC Contact (Slow-action)



NC contacts conform to EN60947-5-1 Direct Opening

When metal deposition occurs, the contacts are separated from each other by the plunger being pushed in.

⊖ is marked on the product to indicate approval of direct opening.










Limit switch with plastic housing

The D4N series of limit switches in plastic housing is the ideal switch for all standard mechanical position detection applications both for safety and non-safety applications.




- Direct opening mechanism and approval by notified body
- Rugged plastic housing with double insulation
- Wide range of actuators
- M12 connectors or terminal block with M20 conduit

Ordering information

Actuator type		Connection method	Order code ^{*1}			
			1NC/1NO (snap-action) Order code	1NC/1NO (slow-action) Order code	2NC (slow-action) Order code	2NC/1NO (slow-action) Order code
 Roller lever (resin lever, resin roller)	M20	D4N-4120	D4N-4A20	D4N-4B20	D4N-4C20	
	M12 connector	D4N-9120	D4N-9A20	D4N-9B20	–	
 Plunger	M20	D4N-4131	D4N-4A31	D4N-4B31	–	
	M12 connector	D4N-9131	D4N-9A31	D4N-9B31	–	
 Roller plunger	M20	D4N-4132	D4N-4A32	D4N-4B32	D4N-4C32	
	M12 connector	D4N-9132	D4N-9A32	D4N-9B32	–	
 One-way roller arm lever (horizontal)	M20	D4N-4162	D4N-4A62	D4N-4B62	D4N-4C62	
	M12 connector	D4N-9162	D4N-9A62	D4N-9B62	–	
 One-way roller arm lever (vertical)	M20	D4N-4172	D4N-4A72	D4N-4B72	–	
 Adjustable roller lever, form lock (metal lever, resin roller)	M20	D4N-412G	D4N-4A2G	D4N-4B2G	–	
	M12 connector	D4N-912G	D4N-9A2G	D4N-9B2G	–	
 Adjustable roller lever, form lock (metal lever, rubber roller)	M20	D4N-412H	D4N-4A2H	D4N-4B2H	–	
	M12 connector	D4N-912H	D4N-9A2H	D4N-9B2H	–	

Switches with MBB contacts

MBB (Make Before Break) contacts have an overlapping structure, so that before the normally closed (NC) contact opens the normally open (NO) contact closes.

Actuator type		Connection method	Order code ^{*1}	
			1NC/1NO (slow-action)	2NC/1NO (slow-action)
 Roller lever (resin lever, resin roller)	M20	D4N-4E20	D4N-4F20	
	M12 connector	D4N-9E20	–	
 Roller plunger	M20	D4N-4E32	D4N-4F32	
	M12 connector	D4N-9E32	–	
 One-way roller arm lever (horizontal)	M20	D4N-4E62	D4N-4F62	
	M12 connector	D4N-9E62	–	

^{*1} The NC contacts provide the approved direct opening mechanism. 

Specifications

Durability ^{*1}	Mechanical	15,000,000 operations min. ^{*2}
	Electrical	500,000 operations min. for a resistive load of 3 A at 250 VAC 300,000 operations min. for a resistive load of 10 A at 250 VAC
Operating speed	Roller lever	1 mm/s to 0.5 m/s
Operating frequency		30 operations/minute max.
Minimum applicable load		Resistive load of 1 mA at 5 VDC (N-level reference value)
Protection against electric shock		Class II (double insulation)
Pollution degree (operating environment)		3 (EN60947-5-1)
Contact gap		Snap-action: 2x0.5 mm min Slow-action: 2x2 mm min
Conditional short-circuit current		100 A (EN60947-5-1)
Rated open thermal current (I_{th})		10 A (EN60947-5-1)
Ambient temperature	Operating	-30°C to 70°C with no icing
Degree of protection		IP67 (EN60947-5-1)

^{*1} The durability is acquired for an ambient temperature of 5°C to 35°C and an ambient humidity of 40 to 70%.

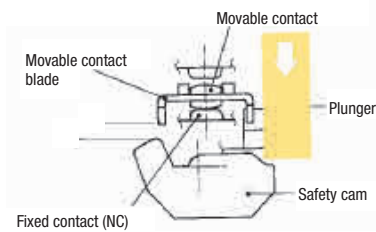
^{*2} 10,000,000 operations min. for fork lever actuator.

1NO/1NC Contact (Snap-action)

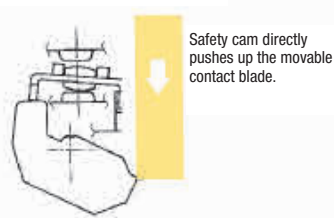
If metal deposition between mating contacts occurs on the NC contact side, they can be pulled apart by the shearing force and tensile force generated when part B of the

safety cam or plunger engages part A of the movable contact blade. When the safety cam or plunger is moved in the direction of the arrow, the Limit Switch releases.

1. When metal deposition occurs.



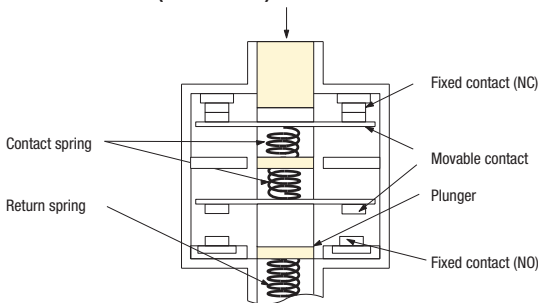
2. When contacts are being pulled apart.



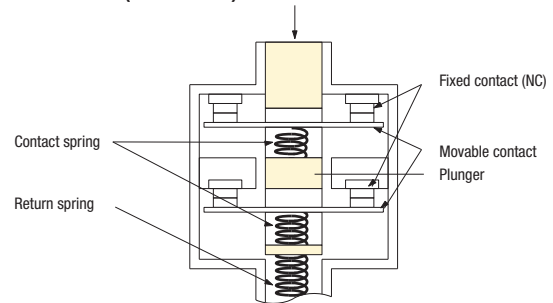
3. When contacts are completely pulled apart.



1NC/1NO Contact (Slow-action)



2NC Contact (Slow-action)



NC contacts conform to EN60947-5-1 Direct Opening

When metal deposition occurs, the contacts are separated from each other by the plunger being pushed in.

⊕ is marked on the product to indicate approval of direct opening.



Safety door hinge switch

D4NH safety-door hinge switches are available with one or two built-in contacts, shaft or arm lever actuator and various conduit types, e.g. M20.

- Direct opening mechanism
- Shaft or arm lever actuator
- Wide temperature range
- Metric conduit and M12 connector types are available

Ordering information

Switches

Actuator	Conduit size		Built-in switch mechanism		
			1NC/1NO (slow-action)	2NC (slow-action)	2NC/1NO (slow-action)
Shaft	1-conduit	M20	D4NH-4AAS	D4NH-4BAS	D4NH-4CAS
		M12 connector	D4NH-9AAS	D4NH-9BAS	–
Arm lever	1-conduit	M20	D4NH-4ABC	D4NH-4BBC	D4NH-4CBC
		M12 connector	D4NH-9ABC	D4NH-9BBC	–

Actuator	Conduit size		Built-in switch mechanism		
			3NC (slow-action)	1NC/1NO MBB (slow-action)	2NC/1NO MBB (slow-action)
Shaft	1-conduit	M20	D4NH-4DAS	D4NH-4EAS	D4NH-4FAS
		M12 connector	–	D4NH-9EAS	–
Arm lever	1-conduit	M20	D4NH-4DBC	D4NH-4EBC	D4NH-4FBC
		M12 connector	–	D4NH-9EBC	–

Specifications

Degree of protection		IP67 (EN60947-5-1)
Durability	Mechanical	1,000,000 operations min.
	Electrical	500,000 operations min. for a resistive load of 3 A at 250 VAC 300,000 operations min. for a resistive load of 10 A at 250 VAC
Operating speed		2 to 360°/s
Operating frequency		30 operations/minute max.
Protection against electric shock		Class II (double insulation)
Pollution degree (operating environment)		3 (EN60947-5-1)
Contact gap		Snap-action: 2x9.5 mm min Slow-action: 2x2 mm min
Conditional short-circuit current		100 A (EN60947-5-1)
Rated open thermal current (I _{th})		10 A (EN60947-5-1)
Ambient temperature		Operating: -30°C to 70°C with no icing







Safety-limit switch with manual reset

The D4NR family is a complete line-up of safety-limit switches with manual reset. They are available with one, two or three built-in contacts and a wide range of actuator types. To set up easy installation and maintenance, various conduit types, e.g. M20 and M12 connector types, are provided.

- Direct opening mechanism
- Various actuators
- Pull-reset switches
- Gold-plated contacts for handling micro loads
- Metric conduit types available

Ordering information

Switches		Conduit size		Order code	
				Built-in switch mechanism	
				1NC/1NO (slow-action)	2NC/1NO (slow-action)
	Roller lever (resin lever, resin roller)	1-conduit	M20	D4N-4A20R	D4N-4C20R
			M12 connector	D4N-9A20R	–
	Adjustable roller lever, form lock (metal lever, rubber roller)	1-conduit	M20	D4N-4A2HR	D4N-4C2HR
			M12 connector	D4N-9A2HR	–
	Plunger	1-conduit	M20	D4N-4A31R	D4N-4C31R
			M12 connector	D4N-9A31R	–
	Roller plunger	1-conduit	M20	D4N-4A32R	D4N-4C32R
			M12 connector	D4N-9A32R	–

Specifications

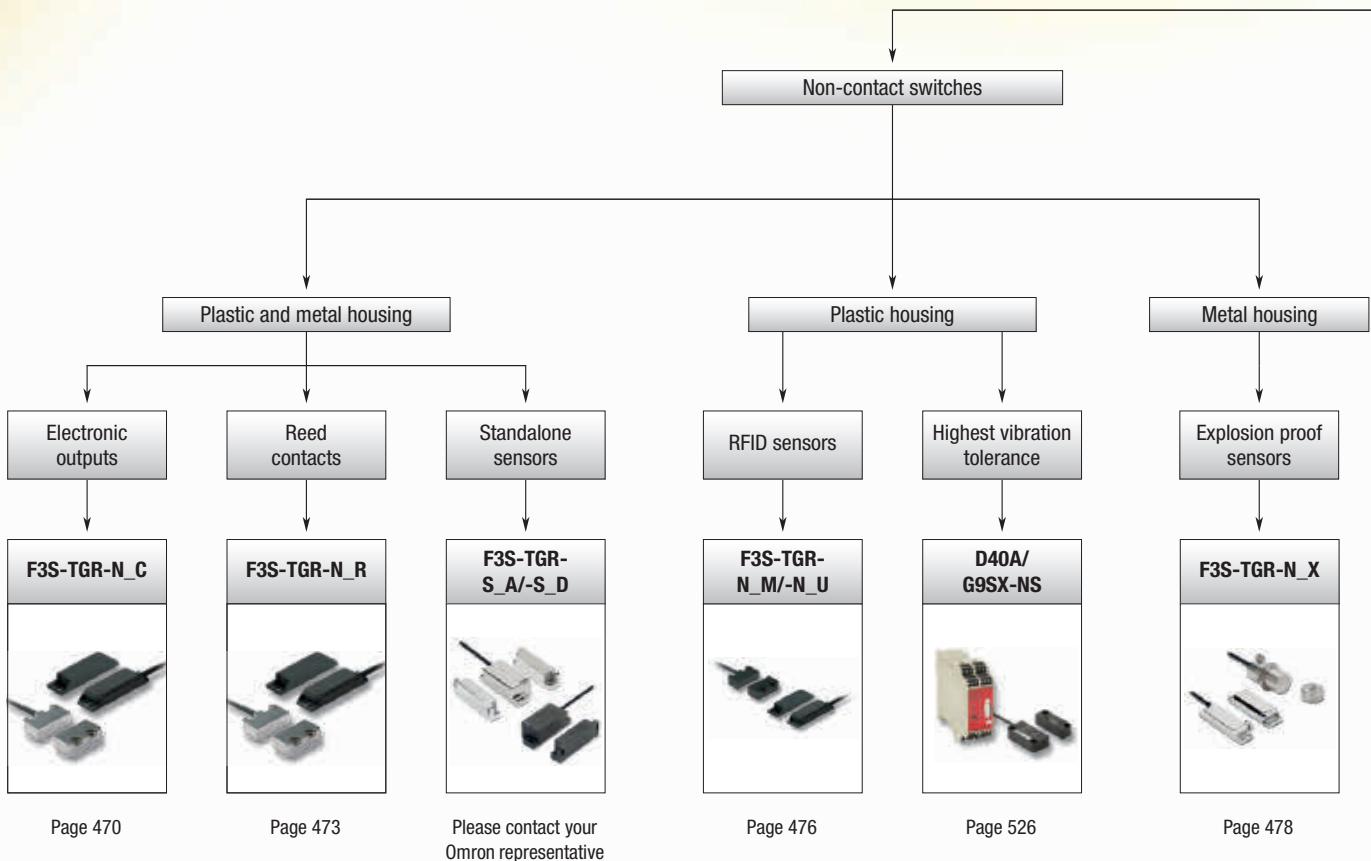
Degree of protection		IP67 (EN60947-5-1)
Durability	Mechanical	1,000,000 operations min.
	Electrical	500,000 operations min. for a resistive load of 3 A at 250 VAC 300,000 operations min. for a resistive load of 10 A at 250 VAC
Operating speed		1 mm/s to 0.5 m/s (D4N-1A20R)
Operating frequency		30 operations/minute max.
Protection against electric shock		Class II (double insulation)
Pollution degree (operating environment)		3 (EN60947-5-1)
Contact gap		Snap-action: 2×0.5 mm min Slow-action: 2×2 mm min
Rated open thermal current (I_{th})		10 A (EN60947-5-1)
Ambient temperature		Operating: -30°C to 70°C with no icing

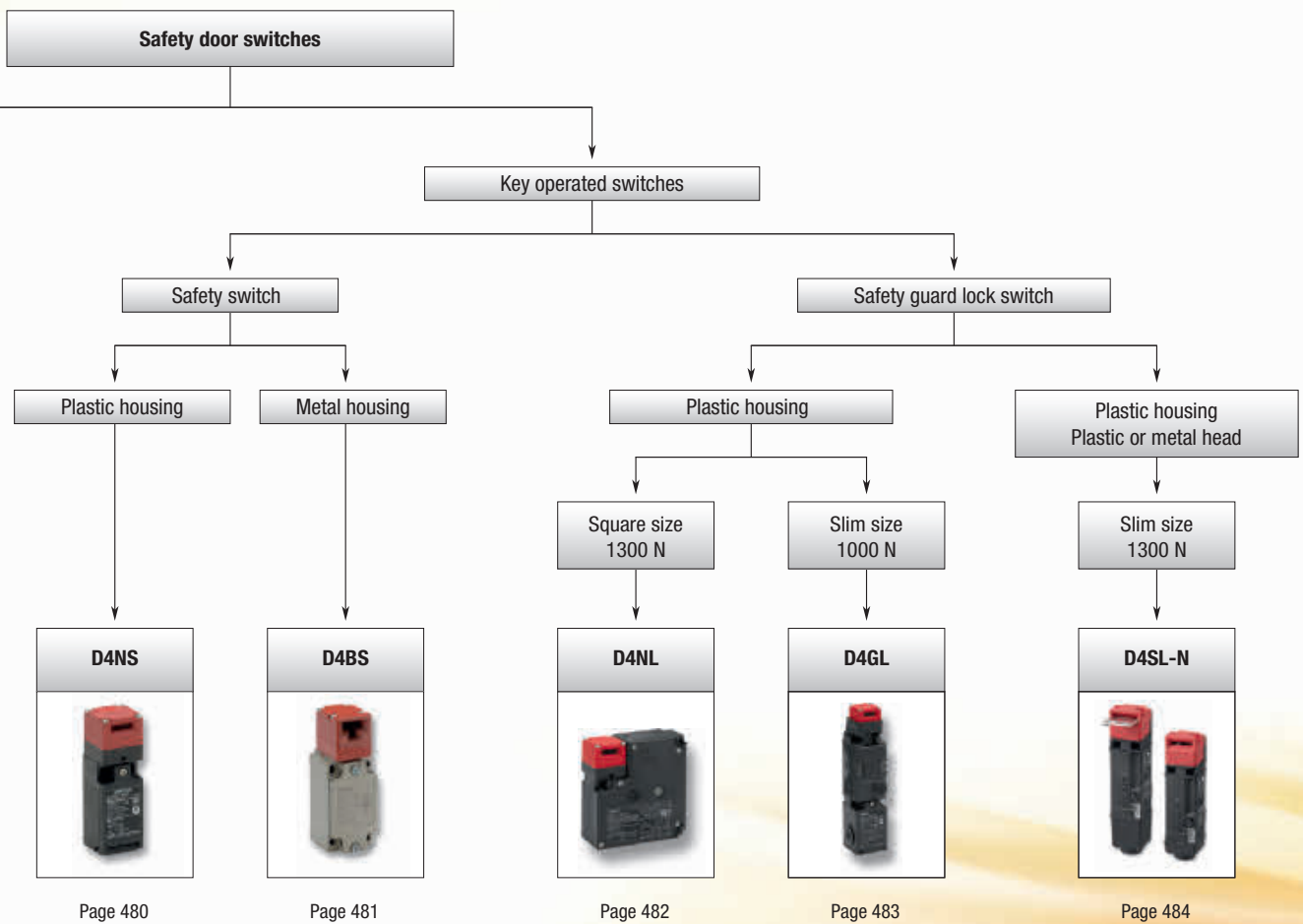
BREAK CONVENTIONAL BARRIERS IN SAFETY DESIGN

Flexibility selecting best fit control device for non-contact switch application: F3S-TGR-N

Omron has introduced a series of magnetic coded contactless switches for interlocking machine guard doors. The switches feature a built-in control function, thus saving the cost and space required for an external controller. The non-contact switches offer advantages in applications where a precise approach of the guard and lock is not possible. Applications with a large amount of dirt or high hygienic standards can also be addressed.



- Operates with all Omron safety relay units and safety bus interfaces
- Operates behind stainless steel fittings
- Non-contact – no abrasion – no particles
- Conforms to safety categories up to 4 acc. EN 954-1 and PLe acc. EN ISO 13849-1





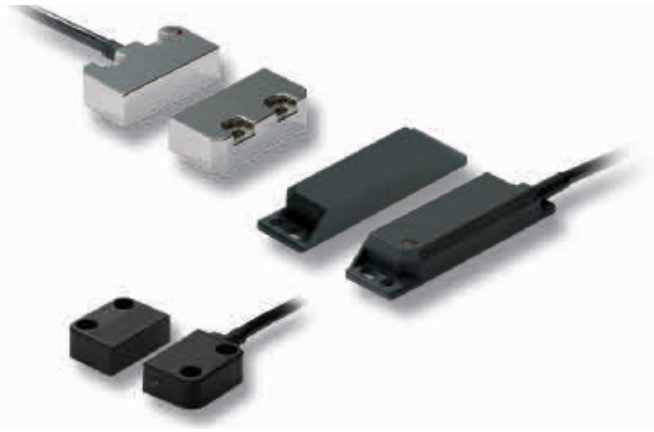
Selection table

		Non-contact safety door switches					
							
Selection criteria	Model	F3S-TGR-N_C	F3S-TGR-N_R	F3S-TGR-N_M/-N_U	F3S-TGR-S_A/-S_D	F3S-TGR-N_X	D40A/G9SX-NS
	Housing	Plastic/Metal	Plastic/Metal	Plastic	Plastic/Metal	Metal	Plastic
	Protection class	IP67/IP69K	IP67/IP69K	IP67/IP69K	IP67/IP69K	IP67	IP67
	Conformity	EN ISO 13849-1, EN60947-5-3	EN ISO 13849-1, EN60947-5-3	EN ISO 13849-1, EN60947-5-3	EN ISO 13849-1, EN60947-5-3	EN ISO 13849-1, EN60947-5-3	EN ISO 13849-1
Features	Cable length 2 m	■	■	–	–	–	■
	Cable length 5 m	■	■	■	■	■	■
	Cable length 10 m	■	■	■	■	■	–
	Connector type M12	■	■	■	■	■	–
	High temperature sensor	■	■	–	–	–	–
	Operates with G9SA, G9SB	■	■	■	■	■	–
	Operates with G9SX	■	■	■	■	■	■
	Operates with programmable safety units G9SP and NE1A	■	■	■	■	■	–
Application	Door monitoring	■	■	■	■	■	■
Contact configuration	1NC/1NO	–	–	–	–	–	■
	2NC	■	■	–	–	–	–
	2NC/1NO	■	■	■	■	■	–
	Force guided relays	–	–	–	■	–	–
	Page	470	473	476	Please contact your Omron representative	478	526

		Safety door switches		Safety door lock switches			
							
		D4NS	D4BS	D4NL	D4GL	D4SL-N	
Selection criteria	Model	D4NS	D4BS	D4NL	D4GL	D4SL-N	
	Housing	Plastic	Metal	Plastic	Plastic	Plastic/metal head available	
	Head mounting	4 directions	4 directions	4 directions	4 directions	4 directions	
	Actuation	Straight	Straight	Straight	Straight	Straight	
	Key holding force	–	–	1,300 N	1,000 N	1,300 N	
	Protection class	IP67	IP67	IP67	IP67	IP67	
Conformity		EN50047, EN1088	EN50047, EN1088	EN1088	EN1088	EN1088	
Features	Conduit size M20	■	PG 13.5	■	■	■	
	Screw terminal	■	■	■	■	■	
	Connector terminal	–	–	–	–	■	
	Operation key horizontal	■	■	■	■	■	
	Operation key vertical	■	■	■	■	■	
	Operation key adjustable horizontal	■	■	■	■	■	
	Operation key adjustable horizontal and vertical	■	–	■	■	■	
	Mechanical lock/ 24 VDC solenoid release	–	–	■	■	■	
	Mechanical lock/ 110 VAC solenoid release	–	–	■	–	–	
	Mechanical lock/ 230 VAC solenoid release	–	–	■	–	–	
	24 VDC solenoid lock/ mechanical release	–	–	■	■	■	
	110 VAC solenoid lock mechanical release	–	–	■	–	–	
	240 VAC solenoid lock mechanical release	–	–	■	–	–	
	High temperature sensor	–	–	–	–	–	
	Operates with G9SR	■	■	■	■	■	
	Operates with G9SA, G9SB	■	■	■	■	■	
	Operates with G9SX	■	■	■	■	■	
	Operates with programmable safety units G9SP and NE1A	■	■	■	■	■	
	Application	Door monitoring	■	■	■	■	■
		Door locking	–	–	■	■	■
Contact configuration	2 contact models	■	■	–	–	–	
	3 contact models	■	–	–	–	–	
	4 contact models	–	–	■	■	■	
	5 contact models	–	–	■	■	■	
	6 contact models	–	–	–	–	■	
	Slow action contacts	■	–	–	–	–	
Page		480	481	482	483	484	

■ Standard

– No/not available







Non-contact switches for monitoring the status of guarding doors

Non-contact switches monitor the status of guarding doors. LED for easy diagnosis and stainless steel housing for high hygiene demands in the food industry are available

- Connect up to 3 switches in series
- Operates with all Omron safety controllers
- Operates behind stainless steel fittings
- Non-contact – no abrasion – no particles
- Screw-hole covers support hygienic design (NMPC)
- Conforms to safety categories up to PLe acc. EN ISO13849-1




Ordering information

Polyester housing




Type	Cable connection	Contact configuration	Order code
 Elongated sensors	5 m pre-wired	2NC/1NO	F3S-TGR-NLPC-21-05
	10 m pre-wired		F3S-TGR-NLPC-21-10
	M12, 8-pin		F3S-TGR-NLPC-21-M1J8
 Small sensors	5 m pre-wired		F3S-TGR-NSPC-21-05
	10 m pre-wired		F3S-TGR-NSPC-21-10
	M12, 8-pin		F3S-TGR-NSPC-21-M1J8
 Miniature sensors	5 m pre-wired*		F3S-TGR-NMPC-21-05
	10 m pre-wired*		F3S-TGR-NMPC-21-10
	M12, 8-pin*		F3S-TGR-NMPC-21-M1J8
 Barrel sensors	5 m pre-wired		F3S-TGR-NBPC-21-05
	10 m pre-wired		F3S-TGR-NBPC-21-10
	M12, 8-pin		F3S-TGR-NBPC-21-M1J8

* Optional cable exit to the right side is available for F3S-TGR-NMPC-types. Please add "-R" to the order code (i.e. F3S-TGR-NMPC-21-05-R)

Stainless steel housing

Type	Cable connection	Contact configuration	Order code
 Elongated sensors	5 m pre-wired	2NC/1NO	F3S-TGR-NLMC-21-05
	10 m pre-wired		F3S-TGR-NLMC-21-10
	M12, 8-pin		F3S-TGR-NLMC-21-M1J8
 Small sensors	5 m pre-wired		F3S-TGR-NSMC-21-05
	10 m pre-wired		F3S-TGR-NSMC-21-10
	M12, 8-pin		F3S-TGR-NSMC-21-M1J8
 Barrel sensors	5 m pre-wired		F3S-TGR-NBMC-21-05
	10 m pre-wired		F3S-TGR-NBMC-21-10
	M12, 8-pin		F3S-TGR-NBMC-21-M1J8

Hygienic and food types

Type	Cable connection	Contact configuration	Order code
 Small sensors	5 m pre-wired	2NC/1NO	F3S-TGR-NSHC-21-05
	10 m pre-wired		F3S-TGR-NSHC-21-10
	M12, 8-pin		F3S-TGR-NSHC-21-M1J8
 Small sensors (Special food type)	5 m pre-wired		F3S-TGR-NSFC-21-05
	10 m pre-wired		F3S-TGR-NSFC-21-10
	M12, 8-pin		F3S-TGR-NSFC-21-M1J8
 Miniature sensors	5 m pre-wired*		F3S-TGR-NMHC-21-05
	10 m pre-wired*		F3S-TGR-NMHC-21-10
	M12, 8-pin*		F3S-TGR-NMHC-21-M1J8

* Optional cable exit to the right side is available for F3S-TGR-NMHC-types. Please add "-R" to the order code (i.e. F3S-TGR-NMHC-21-05-R)

Specifications

Mechanical data

Item	Model	Polyester types	Stainless steel types
Operating distance*	OFF → ON (Sao)	Min. 8 mm/max. 10 mm	
	ON → OFF (Sar)	Min. 12 mm/max. 22 mm	
Actuator approach speed	Min.	4 mm/s	
	Max.	1,000 mm/s	
Operating temperature	–	–25 to 80°C	–25 to 105°C
Enclosure protection	Flying lead M12 connector	IP69K IP67	
Material	–	Black polyester	Stainless steel 316

* Depends on type. Please see online data sheet.

Electrical data

Item	Model	Polyester types	Stainless steel types
Power supply	–	24 VDC±15%	
Power consumption	Max.	50 mA	
Switching current	Min.	10 mA, 10 VDC	
Rated loads	NC contacts	Max.	100 mA, 24 VDC 100 mA, 24 VDC
	NO contact		
Output type	–	Electronic output (potential-free optocoupler output)	

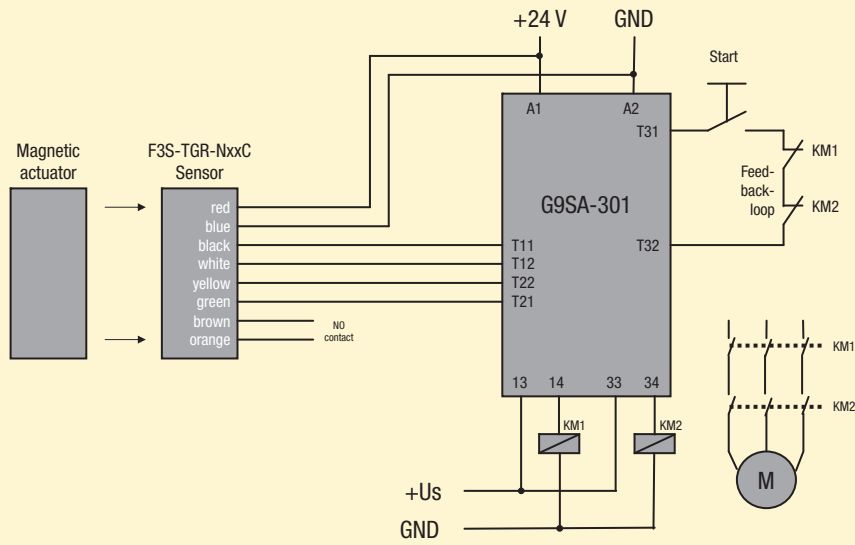
Approved standards

EN standards certified by TÜV Rheinland
EN 954-1, EN ISO13849-1
EN 60204-1
EN/IEC 60947-5-3
UL 508, CSA C22.2
BS 5304
EN 1088-1 conformance

Wiring examples (Single head connection)

G9SA

Single sensor application with G9SA-301
(up to PLe acc. EN ISO 13849-1)









Non-contact switches for monitoring the status of guarding doors

Non-contact switches monitor the status of guarding doors. Stainless steel housing for high hygiene demands in the food industry are available.

- Connect up to 6 switches in series
- Operates with all Omron safety controllers
- Operates behind stainless steel fittings
- Non-contact – no abrasion – no particles
- Screw-hole covers support hygienic design (NMPPR)
- Conforms to safety categories up PLe acc. EN ISO13849-1

Ordering information

Polyester housing




Type	Cable connection	Contact configuration	Order code	
Elongated sensors 	5 m pre-wired	2NC/1NO ^{*1}	F3S-TGR-NLPR-21-05	
	10 m pre-wired		F3S-TGR-NLPR-21-10	
	M12, 8-pin		F3S-TGR-NLPR-21-M1J8	
Small sensors 	5 m pre-wired		F3S-TGR-NSPR-21-05	
	10 m pre-wired		F3S-TGR-NSPR-21-10	
	M12, 8-pin		F3S-TGR-NSPR-21-M1J8	
Miniature sensors 	5 m pre-wired ^{*2}		2NC/1NO ^{*3}	F3S-TGR-NMPPR-21-05
	10 m pre-wired ^{*2}			F3S-TGR-NMPPR-21-10
	M12, 8-pin ^{*2}			F3S-TGR-NMPPR-21-M1J8
Barrel sensors 	5 m pre-wired	F3S-TGR-NBPR-21-05		
	10 m pre-wired	F3S-TGR-NBPR-21-10		
	M12, 8-pin	F3S-TGR-NBPR-21-M1J8		

^{*1} 2NC: 1 A, 250 VAC/1NC: 0.2 A, 24 VDC

^{*2} Optional cable exit to the right side is available for F3S-TGR-NMHR-types. Please add "-R" to the order code (i.e. F3S-TGR-NMPPR-21-05-R)

^{*3} 2NC: 0.5 A, 24 VDC/1NC: 0.2 A, 24 VDC




Stainless steel housing

Type	Cable connection	Contact configuration	Order code	
Elongated sensors 	5 m pre-wired	2NC/1NO ^{*1}	F3S-TGR-NLMR-21-05	
	10 m pre-wired		F3S-TGR-NLMR-21-10	
	M12, 8-pin		F3S-TGR-NLMR-21-M1J8	
Small sensors 	5 m pre-wired		F3S-TGR-NSMR-21-05	
	10 m pre-wired		F3S-TGR-NSMR-21-10	
	M12, 8-pin		F3S-TGR-NSMR-21-M1J8	
Barrel sensors 	5 m pre-wired		2NC/1NO ^{*2}	F3S-TGR-NBMR-21-05
	10 m pre-wired			F3S-TGR-NBMR-21-10
	M12, 8-pin			F3S-TGR-NBMR-21-M1J8

^{*1} 2NC: 1 A, 250 VAC/1NC: 0.2 A, 24 VDC

^{*2} 2NC: 0.5 A, 24 VDC/1NC: 0.2 A, 24 VDC

Hygienic and food types

Type	Cable connection	Contact configuration	Order code	
 Small sensors	5 m pre-wired	2NC/1NO ^{*1}	F3S-TGR-NSHR-21-05	
	10 m pre-wired		F3S-TGR-NSHR-21-10	
	M12, 8-pin		F3S-TGR-NSHR-21-M1J8	
 Small sensors (Special food type)	5 m pre-wired		F3S-TGR-NSFR-21-05	
	10 m pre-wired		F3S-TGR-NSFR-21-10	
	M12, 8-pin		F3S-TGR-NSFR-21-M1J8	
 Miniature sensors	5 m pre-wired ^{*2}		2NC/1NO ^{*3}	F3S-TGR-NMHR-21-05
	10 m pre-wired ^{*2}			F3S-TGR-NMHR-21-10
	M12, 8-pin ^{*2}			F3S-TGR-NMHR-21-M1J8

*1 2NC: 1 A, 250 VAC/1NC: 0.2 A, 24 VDC

*2 Optional cable exit to the right side is available for F3S-TGR-NMHR-types. Please add "-R" to the order code (i.e. F3S-TGR-NMHR-21-05-R)

*3 2NC: 0.5 A, 24 VDC/1NC: 0.2 A, 24 VDC

Specifications

Mechanical data

Item	Model	Plastic housing	Stainless steel housing
Operating distance	OFF → ON (Sao)	10 mm Close	
	ON → OFF (Sar)	20 mm* Open	
Actuator approach speed	Min.	4 mm/s	
	Max.	1,000 mm/s	
Operating temperature	–	–25 to 80°C	–25 to 105°C
Enclosure protection	Flying lead M12 connector	IP69K IP67	
Material	–	Black polyester	Stainless steel 316

* max. 22 mm, depends on the type

Electrical data

Item	Model	Plastic housing	Stainless steel housing
Contact release time	Max.	2 ms	
Initial contact resistance	Max.	500 mΩ	
Switching current	Min.	1 mA, 10 VDC	

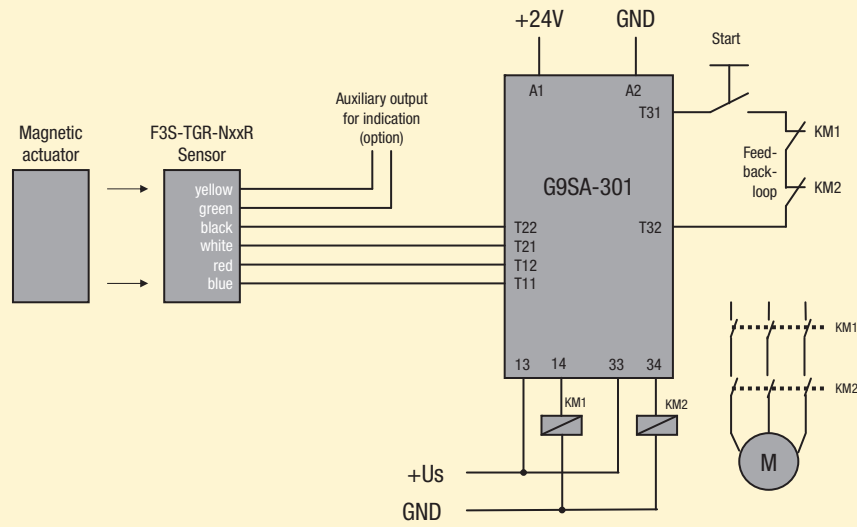
Approved standards

EN standards certified by TÜV Rheinland
EN 954-1, EN ISO13849-1
EN 60204-1
EN/IEC 60947-5-3
UL 508, CSA C22.2
BS 5304
EN 1088-1 conformance

Wiring examples (Single head connection)

G9SA

Single sensor application with G9SA-301
(up to PLe acc. EN ISO 13849-1)





Tamper resistant non-contact switches

This line-up of non-contact switches uses a design based on RFID-technology.

The RFID-design covers two operation modes:

- 1) master coding: any switch works with any actuator – like traditional reed-switches.
 - 2) unique coding: each actuator and switch use a unique code.
This is a solution for applications that require high tamper resistance
- Connect up to 20 switches in series
 - LED for easy diagnosis
 - Suitable for high pressure cleaning, CIP and SIP processes due IP69K (pre-wired types)
 - Conforms to safety categories up to PLe acc. EN ISO 13849-1

Ordering information

Master coded: Any actuator will operate with any sensor
 Unique coded: Only one actuator fits to the code of the sensor

Elongated sensors

Type	Cable connection	Contact configuration	Order code	
			Master coded	Unique coded
	5 m pre-wired	2NC/1NO	F3S-TGR-NLPM-21-05	F3S-TGR-NLPU-21-05
	10 pre-wired		F3S-TGR-NLPM-21-10	F3S-TGR-NLPU-21-10
	M12, 8-pin		F3S-TGR-NLPM-21-M1J8	F3S-TGR-NLPU-21-M1J8

Small sensors

Type	Cable connection	Contact configuration	Order code	
			Master coded	Unique coded
	5 m pre-wired	2NC/1NO	F3S-TGR-NSPM-21-05	F3S-TGR-NSPU-21-05
	10 pre-wired		F3S-TGR-NSPM-21-10	F3S-TGR-NSPU-21-10
	M12, 8-pin		F3S-TGR-NSPM-21-M1J8	F3S-TGR-NSPU-21-M1J8

Specifications

Mechanical data

Item	Model	Elongated sensor	Small sensor
Operating distance	OFF → ON (Sao)	10 mm Close	
	ON → OFF (Sar)	20 mm Open	
Actuator approach speed	Min.	4 mm/s	
	Max.	1,000 mm/s	
Operating temperature		-25 to 105°C	
Enclosure protection	Flying lead	IP69K	
	M12 connector	IP67	
Material		UL approved Polyester	

Electrical data

Item	Model	Elongated sensor	Small sensor
Power supply		24 VDC±15%	
Power consumption	Max.	0.2 A	
	Min.	1 mA, 10 VDC	
Rated loads	NC contacts	Max. 0.2 A, 24 VDC	
	NO contact	Max. 0.2 A, 24 VDC	
Output type		Electronic output (potential-free optocoupler output)	

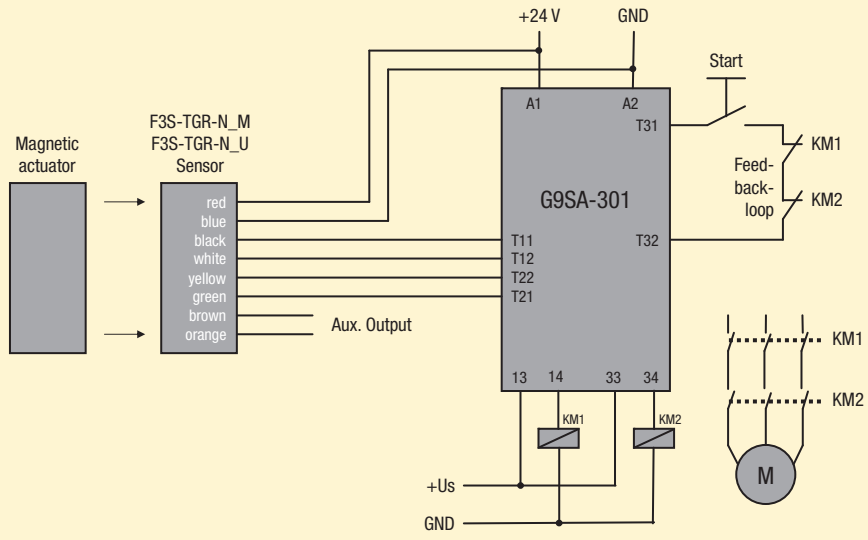
Approved standards

EN standards certified by TÜV Rheinland
EN 954-1, EN ISO13849-1
EN 60204-1
EN/IEC 60947-5-3
UL 508, CSA C22.2
BS 5304
EN 1088-1 conformance

Wiring examples (Single head connection)

G9SA

Single sensor application with G9SA-301
(up to PLe acc. EN ISO 13849-1)





Explosion proof non-contact switches

Non-contact switches monitor the status of guarding doors or the position of linear systems in applications in explosive environment.

The design includes wear-free non-contact operation for extended operation time and a robust mechanical setup to cover mechanical tolerances and vibrations.

- Connect up to 6 switches in series
- Operates behind stainless steel fittings
- Suitable for high pressure cleaning, CIP and SIP processes due IP69K (pre-wired types)
- Conforms to safety categories up to PLe acc. EN ISO 13849-1

Ordering information

Elongated sensors

Type	Cable connection	Contact configuration	Order code
	5 m pre-wired	2NC/1NO	F3S-TGR-NLMX-21-05
	10 pre-wired	2NC/1NO	F3S-TGR-NLMX-21-10

Barrel sensors

Type	Cable connection	Contact configuration	Order code
	5 m pre-wired	2NC/1NO	F3S-TGR-NBMX-21-05
	10 pre-wired	2NC/1NO	F3S-TGR-NBMX-21-10

Specifications

Mechanical data

Item	Model	Elongated sensors	Barrel sensors
Operating distance	OFF → ON (Sao)	10 mm close	
	ON → OFF (Sar)	22 mm open	
Actuator approach speed	Min.	4 mm/s	
	Max.	1000 mm/s	
Operating temperature	–	–20°C to +60°C	
Enclosure protection	Flying lead	IP 67	
Material	–	Stainless steel 316	

Electrical data

Item	Model	Elongated sensors	Barrel sensors
Power supply	–	24 VDC ±15%	
Switching current	Min.	1 mA, 10 VDC	
Rated loads	NC contacts	Max.	0.6 A, 230 VAC/24 VDC (internally fused)
	NO contact		

Ex specification

Ex specification
II 2G Ex mb IIC T6Gb, II 2D Ex mb IIC T80 Db IP67* (*Product is fully encapsulated which is considered to provide Ingress Protection to at least IP67)
Zone 1 Gas, Zone 21 Dust, Zone 2 Gas, Zone 21 Dust (An area where Gas and Dust is likely to occur in use)
IEC/EN 60079-0, IEC/EN 60079-18

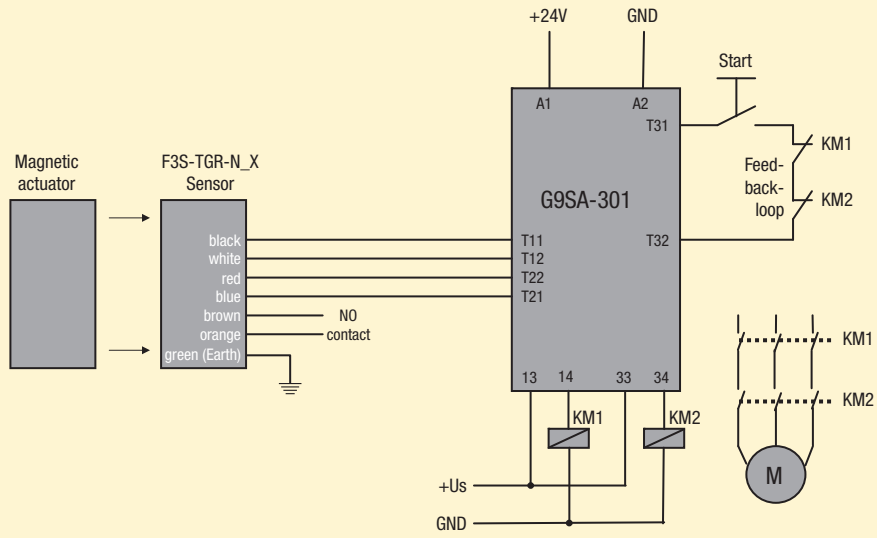
Approved standards

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EN 60204-1
EN/IEC 60947-5-3
UL 508, CSA C22.2
BS 5304
EN 1088-1

Wiring examples (Single head connection)

G9SA

Single sensor application with G9SA-301
(up to PLe acc. EN ISO 13849-1)





Safety door switch with plastic housing

The D4NS line-up includes three-contact models with 2NC/1NC and 3NC contact forms in addition to the previous contact forms, 1NC/1NO and 2NC. All models have a M20 conduit opening.





- Line-up with three contacts: 2NC/1NC and 3NC contact forms
- Line-up with two contacts 1NC/1NO and 2NC
- Standardised gold-clad contacts for high contact reliability
- Applicable for standard loads and micro loads

Ordering information

Switches (with approved direct opening contacts)

Type	Contact configuration		Conduit opening/connector	Order code
1-conduit	Slow-action	1NC/1NO	M20	D4NS-4AF
		2NC	M20	D4NS-4BF
		2NC/1NO	M20	D4NS-4CF
		3NC	M20	D4NS-4DF
	Slow-action MBB contact	1NC/1NO	M20	D4NS-4EF
		2NC/1NO	M20	D4NS-4FF

Operation keys (order separately)

Type		Order code	Type		Order code
Horizontal mounting		D4DS-K1	Adjustable mounting (horizontal)		D4DS-K3
Vertical mounting		D4DS-K2	Adjustable mounting (horizontal/vertical)		D4DS-K5

Specifications

Degree of protection		IP67 (EN60947-5-1) (This applies for the switch only. The degree of protection for the key hole is IP00.)
Durability *1	Mechanical	1,000,000 operations min.
	Electrical	500,000 operations min. for a resistive load of 3 A at 250 VAC 300,000 operations min. for a resistive load of 10 A at 250 VAC
Operating speed		0.05 to 0.5 m/s
Operating frequency		30 operations/minute max.
Direct opening force *2		60 N min.
Direct opening travel *2		10 mm min.
Minimum applicable load		Resistive load of 1 mA at 5 VDC (N-level reference value)
Protection against electric shock		Class II (double insulation)
Pollution degree (operating environment)		3 (EN60947-5-1)
Contact gap		2×2 mm min
Conditional short-circuit current		100 A (EN60947-5-1)
Rated open thermal current (I_{th})		10 A (EN60947-5-1)
Ambient temperature		Operating: -30°C to 70°C with no icing

*1 The durability is for an ambient temperature of 5°C to 35°C and an ambient humidity of 40 to 70%. For more details, consult your Omron representative.

*2 These figures are minimum requirements for safe operation.

Note: The above values are initial values.



Safety door switch with metal housing

The D4BS line-up includes two-contact models with 1NC/1NO and 2NC in a robust metal housing with 1 PG 13.5 conduit opening.



- Robust metal housing
- Line-up with two contacts: 1NC/1NO and 2NC
- Standardised gold-clad contacts for high contact reliability
- Applicable for standard loads and micro loads

Ordering information

Switches

Type	Mounting direction	Conduit size	Order code	
			1NC/1NO (slow-action)	2NC (slow-action)
1-conduit	Front-side mounting	Pg13.5	D4BS-15FS	D4BS-1AFS

Operation keys (order separately)

Type		Order code
Horizontal mounting		D4BS-K1
Vertical mounting		D4BS-K2
Adjustable mounting (horizontal)		D4BS-K3

Specifications

Degree of protection ^{*1}	IP67 (EN60947-5-1)
Durability ^{*2}	Mechanical: 1,000,000 operations min. Electrical: 500,000 operations min. (10 A at 250 VAC, resistive load)
Operating speed	0.1 m/s to 0.5 m/s
Operating frequency	30 operations/min max.
Rated frequency	50/60 Hz
Contact gap	2×2 mm min.
Direct opening force ^{*3}	19.61 N min. (EN60947-5-1)
Direct opening travel ^{*3}	20 mm min. (EN60947-5-1)
Full stroke	23 mm min.
Conventional enclosed thermal current (I _{th})	20 A (EN60947-5-1)
Conditional short-circuit current	100 A (EN60947-5-1)
Pollution degree (operating environment)	3 (EN60947-5-1)
Protection against electric shock	Class I (with ground terminal)
Ambient temperature	Operating: -40 to 80°C (with no icing)

^{*1} Although the switch box is protected from dust, oil, or water penetration, do not use the D4BS in places where dust, oil, water, or chemicals may penetrate through the key hole on the head, otherwise switch damage or malfunctioning may occur.

^{*2} The durability is for an ambient temperature of 5°C to 35°C and an ambient humidity of 40 to 70%. Contact your Omron sales representative for more detailed information on other operating environments.

^{*3} These figures are minimum requirements for safe operation.

Note: The above values are initial values.



Guard-lock safety door switch

The D4NL guard-lock safety-door switches are available with four or five built-in contacts. When locked, they have a key holding force of up to 1300 N. Mechanical lock/solenoid release types and vice versa set up the complete range.

- Safety-door switch with electromagnetic lock or unlock mechanism
- Models with four or five built-in contacts
- Strong key holding force: 1300 N
- For standard loads and micro loads
- Keys are compatible with D4GL and D4NS

Ordering information

Switches (with approved direct opening contacts)

For 110V and 230V version ask your local Omron representative

Lock and release types	Contact configuration	Conduit opening	Order code
Mechanical lock solenoid release	1NC/1NO + 1NC/1NO	M20	D4NL-4AFA-B
	1NC/1NO + 2NC	M20	D4NL-4BFA-B
	2NC + 1NC/1NO	M20	D4NL-4CFA-B
	2NC + 2NC	M20	D4NL-4DFA-B
	2NC/1NO + 1NC/1NO	M20	D4NL-4EFA-B
	2NC/1NO + 2NC	M20	D4NL-4FFA-B
	3NC + 1NC/1NO	M20	D4NL-4GFA-B
	3NC + 2NC	M20	D4NL-4HFA-B

Lock and release types	Contact configuration	Conduit opening	Order code
Solenoid lock mechanical release	1NC/1NO + 1NC/1NO	M20	D4NL-4AFG-B
	1NC/1NO + 2NC	M20	D4NL-4BFG-B
	2NC + 1NC/1NO	M20	D4NL-4CFG-B
	2NC + 2NC	M20	D4NL-4DFG-B
	2NC/1NO + 1NC/1NO	M20	D4NL-4EFG-B
	2NC/1NO + 2NC	M20	D4NL-4FFG-B
	3NC + 1NC/1NO	M20	D4NL-4GFG-B
	3NC + 2NC	M20	D4NL-4HFG-B

Note: - Conduit sizes of G1/2 and Pg 13,5 are also available.
 - Solenoid: 24 VDC, Orange LED: 10 to 115 VAC/VDC

Operation keys (order separately)

Type		Order code
Horizontal mounting		D4DS-K1
Vertical mounting		D4DS-K2

Type		Order code
Adjustable mounting (horizontal)		D4DS-K3
Adjustable mounting (horizontal/vertical)		D4DS-K5

Specifications

Degree of protection	IP67 (EN60947-5-1) (This applies for the switch only. The degree of protection for the key hole is IP00.)	
Durability ^{*1}	Mechanical	1,000,000 operations min.
	Electrical	500,000 operations min. for a resistive load of 3 A at 250 VAC
Operating speed	0.05 to 0.5 m/s	
Operating frequency	30 operations/minute max.	
Rated frequency	50/60 Hz	
Contact gap	2x2 mm min	
Direct opening force ^{*2}	60 N min. (EN60947-5-1)	
Direct opening travel ^{*2}	10 mm min. (EN60947-5-1)	
Holding force	1,300 N min.	
Minimum applicable load	Resistive load of 1 mA at 5 VDC (N-level reference value)	
Thermal current (I_{th})	10 A (EN60947-5-1)	
Conditional short-circuit current	100 A (EN60947-5-1)	
Pollution degree (operating environment)	3 (EN60947-5-1)	
Protection against electric shock	Class II (double insulation)	
Ambient temperature	Operating: -10°C to 55°C (with no icing or condensation)	

^{*1} The durability is for an ambient temperature of 5°C to 35°C and an ambient humidity of 40 to 70%. For more details, consult your Omron representative.

^{*2} These figures are minimum requirements for safe operation.

Note: The above values are initial values.



Guard-lock safety door switch

The D4GL guard-lock safety-door switches are available with four or five built-in contacts. When locked, they have a key holding force of up to 1000 N. Mechanical lock/solenoid release types and vice versa set up the complete range.

- Slim safety-door switch with electromagnetic lock or unlock mechanism
- Models with four or five built-in contacts
- Strong key holding force: 1000 N
- For standard loads and micro loads
- Keys are compatible with D4NL and D4NS

Ordering information

Switches (with approved direct opening contacts)

Lock and release types	Contact configuration	Conduit size	Order code
Mechanical lock solenoid release	1NC/1NO + 1NC/1NO	M20	D4GL-4AFA-A
	1NC/1NO + 2NC	M20	D4GL-4BFA-A
	2NC + 1NC/1NO	M20	D4GL-4CFA-A
	2NC + 2NC	M20	D4GL-4DFA-A
	2NC/1NO + 1NC/1NO	M20	D4GL-4EFA-A
	2NC/1NO + 2NC	M20	D4GL-4FFA-A
	3NC + 1NC/1NO	M20	D4GL-4GFA-A
	3NC + 2NC	M20	D4GL-4HFA-A

Lock and release types	Contact configuration	Conduit size	Order code
Solenoid lock mechanical release	1NC/1NO + 1NC/1NO	M20	D4GL-4AFG-A
	1NC/1NO + 2NC	M20	D4GL-4BFG-A
	2NC + 1NC/1NO	M20	D4GL-4CFG-A
	2NC + 2NC	M20	D4GL-4DFG-A
	2NC/1NO + 1NC/1NO	M20	D4GL-4EFG-A
	2NC/1NO + 2NC	M20	D4GL-4FFG-A
	3NC + 1NC/1NO	M20	D4GL-4GFG-A
	3NC + 2NC	M20	D4GL-4HFG-A

Note: - conduit sizes of G1/2 and Pg13,5 are also available.
- solenoid: 24 VDC, orange/green LED: 24 VDC

Operation keys (order separately)

Type		Order code
Horizontal mounting		D4DS-K1
Vertical mounting		D4DS-K2

Type		Order code
Adjustable mounting (horizontal)		D4DS-K3
Adjustable mounting (horizontal/vertical)		D4DS-K5

Specifications

Degree of protection		IP67 (EN60947-5-1) (This applies for the switch only. The degree of protection for the key hole is IP00.)
Durability *1	Mechanical	1,000,000 operations min.
	Electrical	500,000 operations min. for a resistive load of 4 mA at 24 VDC; 150,000 operations min. for a resistive load of 1 A at 125 VAC in 2 circuits and 4 mA at 24 VDC in 2 circuits
Operating speed		0.05 to 0.5 m/s
Operating frequency		30 operations/minute max.
Rated frequency		50/60 Hz
Contact gap		2x2 mm min.
Direct opening force *2		60 N min. (EN60947-5-1)
Direct opening travel *3		10 mm min. (EN60947-5-1)
Holding force		1,000 N min.
Minimum applicable load		Resistive load of 4 mA at 24 VDC (N-level reference value)
Thermal current (I_{th})		2.5 A (EN60947-5-1)
Conditional short-circuit current		100 A (EN60947-5-1)
Pollution degree (operating environment)		3 (EN60947-5-1)
Protection against electric shock		Class II (double insulation)
Ambient temperature		Operating: -10°C to 55°C with no icing

*1 The durability is for an ambient temperature of 5°C to 35°C and an ambient humidity of 40 to 70%. For more details, consult your Omron representative.

*2 These figures are minimum requirements for safe operation.

*3 These figures are minimum requirements for safe operation.

Note: The above values are initial values.



Guard-lock safety door switch

The D4SL-N guard-lock safety door switches safety door switches provides a wide range of models for the safe monitoring of entries and positions of guards.

- Key holding force 1,300 N
- 4, 5 and 6 contact types
- Terminal block type and connector type
- Drive solenoid directly from the controller
- Turning key insertion point without detaching head


Ordering information

Contact configuration

Contact model	Built-in Switch
4-contact model	Door monitor and Lock monitor are connected in series internally. A: 1NC/1NO + 1NC/1NO B: 1NC/1NO + 2NC C: 2NC + 1NC/1NO D: 2NC + 2NC
	Door monitor and Lock monitor are NOT connected in series internally. S: 1NC/1NO + 1NC/1NO T: 1NC/1NO + 2NC U: 2NC + 1NC/1NO V: 2NC + 2NC

Contact model	Built-in Switch
5-contact model	E: 2NC/1NO + 1NC/1NO
	F: 2NC/1NO + 2NC
	G: 3NC + 1NC/1NO
	H: 3NC + 2NC
6-contact model	N: 2NC/1NO + 2NC/1NO
	P: 2NC/1NO + 3NC
	Q: 3NC + 2NC/1NO
	R: 3NC + 3NC

Models







Housing	Release key type	Wiring method	Solenoid voltage/ Indicator	Lock and release type	Contact configuration (door open/closed detection switch and lock monitor switch contacts)	Conduit size ^{*1}	Order code	
Head Resin/ Body Resin ^{*2}	Standard (metal) ^{*3} 	Connector	24 VDC (Orange)	Mechanical lock Solenoid release	6-contact Model Insert the built-in switch (N, P, Q or R) into the blank _.	M20	D4SL-N4_FA-DN	
					5-contact Model Insert the built-in switch (E, F, G or H) into the blank _.	M20	D4SL-N4_FA-DN	
			4-contact Model Insert the built-in switch (A, B, C, D, S, T, U or V) into the blank _.		M20	D4SL-N4_FA-N		
			24 VDC (without indicator)					
		Terminal block	24 VDC (Orange)	Mechanical lock Solenoid release	24 VDC (Orange)	6-contact Model Insert the built-in switch (N, P, Q or R) into the blank _.	M20	D4SL-N4_FA-D
						5-contact Model Insert the built-in switch (E, F, G or H) into the blank _.	M20	D4SL-N4_FA-D
			24 VDC (without indicator)					
			4-contact Model Insert the built-in switch (A, B, C, D, S, T, U or V) into the blank _.		M20	D4SL-N4_FA		
		Connector	24 VDC (Orange)	Solenoid lock Mechanical release	24 VDC (Orange)	6-contact Model Insert the built-in switch (N, P, Q or R) into the blank _.	M20	D4SL-N4_FG-DN
						5-contact Model Insert the built-in switch (E, F, G or H) into the blank _.	M20	D4SL-N4_FG-DN
			24 VDC (without indicator)					
			4-contact Model Insert the built-in switch (A, B, C, D, S, T, U or V) into the blank _.		M20	D4SL-N4_FG-N		
Terminal block	24 VDC (Orange)	Solenoid lock Mechanical release	24 VDC (Orange)	6-contact Model Insert the built-in switch (N, P, Q or R) into the blank _.	M20	D4SL-N4_FG-D		
				5-contact Model Insert the built-in switch (E, F, G or H) into the blank _.	M20	D4SL-N4_FG-D		
	24 VDC (without indicator)							
	4-contact Model Insert the built-in switch (A, B, C, D, S, T, U or V) into the blank _.		M20	D4SL-N4_FG				

^{*1} Types also with G1/2 and 1/2-14NPT available - see online data sheet

^{*2} 'Head metal/Body resin' also available - see online data sheet

^{*3} Release key type also resin available - see online data sheet

Operation keys (order separately)

Type	Order code	Type	Order code
Horizontal mounting 	D4SL-NK1	Vertical mounting 	D4SL-NK2
Horizontal mounting (Short) 	D4SL-NK1S	Vertical mounting (Cushion rubber) 	D4SL-NK2G
Horizontal mounting (Cushion rubber) 	D4SL-NK1G	Adjustable (Horizontal) 	D4SL-NK3

Connector cables for connector types

Cable length	Order code
1 m	D4SL-CN1
3 m	D4SL-CN3
5 m	D4SL-CN5

Specifications

Degree of protection ^{*1}	IP67 (EN60947-5-1)	
Durability ^{*2}	Mechanical	1,000,000 operations min.
	Electrical	150,000 operations min. (1 A resistance at 125 VAC) ^{*3}
Operating speed	0.05 to 1 m/s	
Operating frequency	5 operations minute max.	
Direct opening force ^{*4}	60 N min. (EN60947-5-1)	
Direct opening travel ^{*4}	15 mm min. (EN60947-5-1)	
Holding force	1,300 N min.	
Minimum applicable load	1 mA resistive load at 5 VDC (N-level reference value)	
Rated insulation voltage (Ui)	150 V (EN60947-5-1)	
Rated frequency	50/60 Hz	
Protection against electric shock	Class II (double insulation)	
Pollution degree (operating environment)	3 (EN60947-5-1)	
Conditional short-circuit current	100 A (EN60947-5-1)	
Conventional free air thermal current (Ith)	2.5 A (11-42, 21-52, 21-22) 1 A (Others)	
Ambient operating temperature	-10 to 55°C (with no icing)	
Ambient operations humidity	95% max.	

^{*1} This applies for the switch only. The degree of protection for the key hole is IP00.

^{*2} The durability is for an ambient temperature of 5 to 35°C and an ambient humidity of 40% to 70%. For more details, consult your OMRON representative.

^{*3} Do not pass the 1 A, 125 VAC load through more than 3 circuits.

^{*4} These figures are minimum requirements for safe operation.

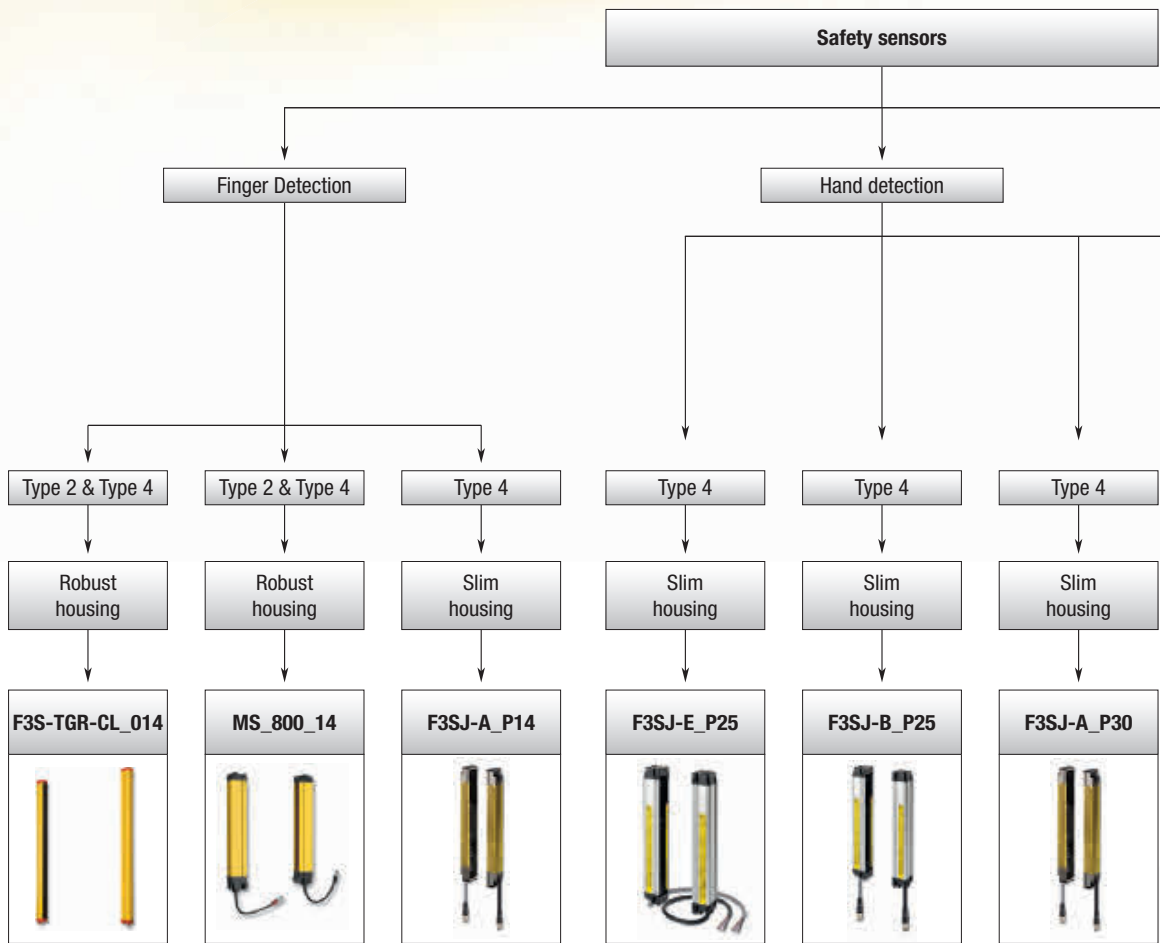
Note: 1. The above values are initial values.
2. The switch contacts can be used with either standard loads or microloads.

PROTECT OPERATORS AND PRODUCTION

Total consistency across the board

Safety Sensors are the first choice in safeguarding workplaces where persons and machines cooperate. Built-in intelligence stops the machine in conditions that are dangerous for the worker. Our F3S-TGR-CL and F3SJ range offers safety light curtains with included safe control functions for finger-, hand- and body protection.

- Finger- and Hand and body protection models
- Control functions
 - X-, T- and L-muting
 - fixed and floating blanking
 - single and double break operation
 - pre-reset access control
- Easy mounting and common wiring for all types for simple design and installation
- Certified acc. EN61496 and EN ISO 13849-1.



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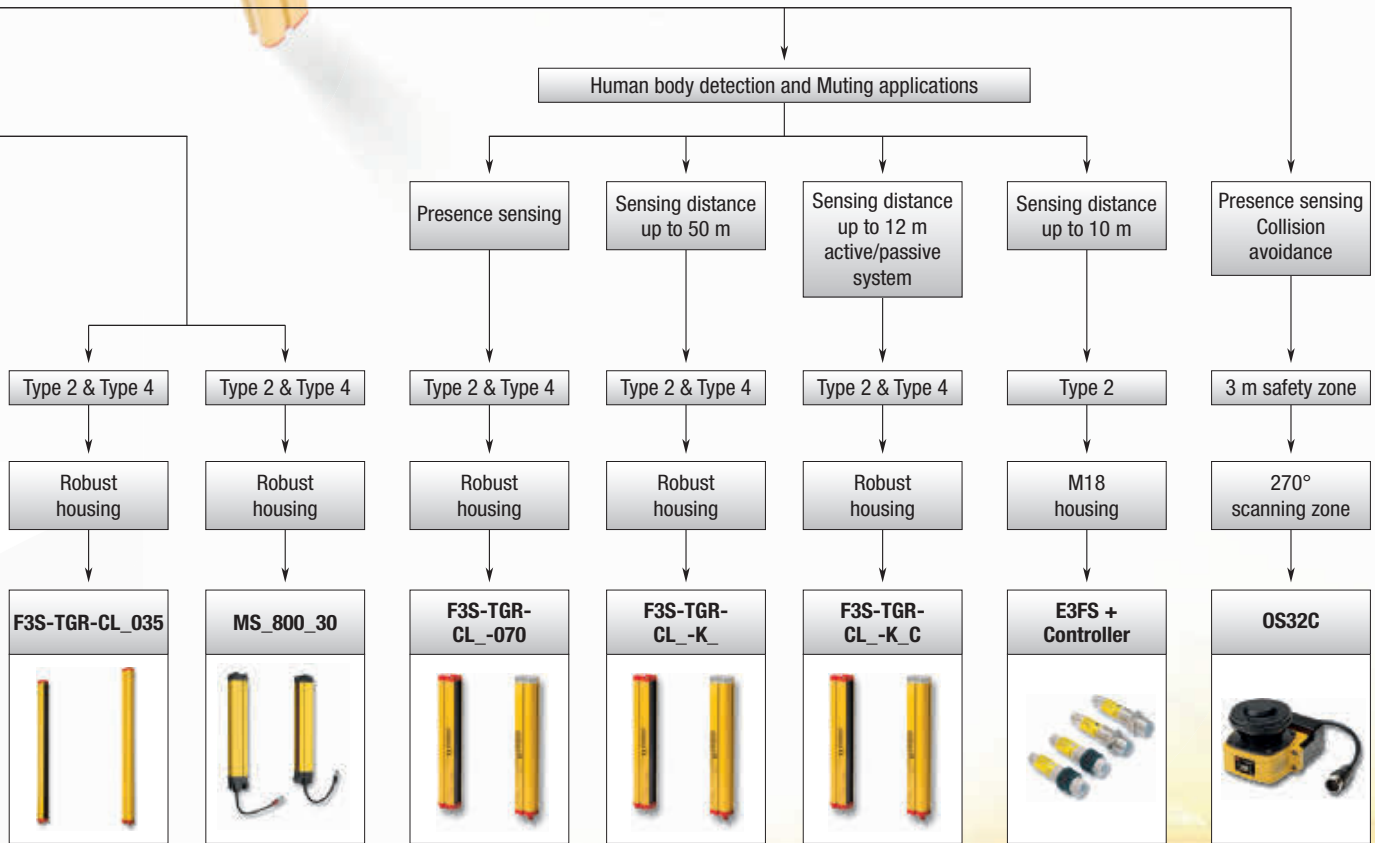
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Selection table

		Safety Sensors			
					
		F3SJ-E	F3SJ-B	F3SJ-A	MS2800 and MS4800
Selection criteria	Model	Type 4	Type 4	Type 4	Type 2 & 4
	Safety category	Type 4	Type 4	Type 4	Type 2 & 4
	Safety integrity level (IEC 61508)	–	–	–	SIL 3
	Protective height	185 to 1,105 mm	185 to 2,065 mm	245 to 2,495 mm	280 to 2,120 mm
	Resolution	25 mm	25 mm	14, 30 mm	14, 30 mm
	Reaction time	15 ms	15 ms	10 to 25 ms	14 to 59 ms
	Temperature range	–10 to 55°C	–10 to 55°C	–10 to 55°C	–10 to 55°C
Features	IP class	IP65	IP65	IP65	IP65
	Blanking function	–	–	internal	internal
	Muting function	–	■	–	option
	EDM function	internal	internal	internal	internal
	Interlock function	–	internal	internal	internal
	Series connection	–	option	option	option
	Mounting kits	option	option	inclusive	option
Application	Parameter setting	–	–	option (Console)	internal DIP switch
	External control unit	–	–	–	–
	Finger protection	–	–	■	■
	Hand protection	■	■	■	■
	Arm protection	■	■	■	■
	Body protection	■	■	■	■
	Presence detection	–	–	–	■
Supply voltage	Muting application	–	–	–	–
	Blanking application	–	–	■	■
In- and Outputs	24 VDC	■	■	■	■
	Safety outputs	2 PNP OSSD transistor outputs	2 PNP OSSD transistor outputs	2 PNP OSSD transistor outputs	2 PNP OSSD transistor outputs
	Auxiliary output	–	1 PNP (non safety)	2 PNP (non safety)	1 PNP (non safety)
	Test input	■	■	■	■
	EDM input	■	–	■	■
	Reset input	■	–	■	■
Page	Muting sensor input	–	–	–	–
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				Safety Sensors	
					
		F3S-TGR-CL	F3S-TGR-CL-K_ / -K_C	E3FS + F3SP-U3P	OS32C
Selection criteria	Model	F3S-TGR-CL	F3S-TGR-CL-K_ / -K_C	E3FS + F3SP-U3P	OS32C
	Safety category	Type 2 & 4	Type 2 & 4	Type 2	Type 3
	Safety integrity level (IEC 61508)	–	–	–	SIL 2
	Protective height	150 to 2,400 mm	500 to 1,200 mm	–	Scanning range 3 m
	Resolution	14, 35, 70 mm	–	–	–
	Beam pitch	–	300, 400, 500 mm	–	–
	Reaction time	13 to 103 ms	13 ms	32 ms	80 ms
	Temperature range	–10 to 55°C	–10 to 55°C	–10 to 55°C	–10 to 50°C
Features	IP class	IP65	IP65	IP67	IP65
	Blanking function	internal	–	–	–
	Muting function	internal	internal	option	–
	EDM function	internal	internal	option	internal
	Interlock function	internal	internal	option	internal
	Series connection	option	–	–	–
	Mounting kits	option	option	■	option
	Parameter setting	internal DIP switch	internal DIP switch	–	Software (included)
Application	External control unit	–	–	■	–
	Finger protection	■	–	–	–
	Hand protection	■	–	–	–
	Arm protection	■	–	–	–
	Body protection	■	■	■	■
	Presence detection	■	–	–	■
	Muting application	■	■	■	–
	Blanking application	■	–	–	–
Supply voltage	24 VDC	■	■	■	–
In- and Outputs	Safety outputs	2 PNP OSSD transistor outputs	2 PNP OSSD transistor outputs	2 PNP OSSD transistor outputs	2 PNP OSSD transistor outputs
	Auxiliary output	–	–	–	■
	Test input	■	■	■	–
	EDM input	■	■	–	■
	Reset input	■	■	■	■
	Muting sensor input	■	■	■	–
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Easy type for simple and affordable hand protection

The F3SJ-E-family is a type 4 safety light curtain with an optical resolution of 25 mm. An operation range of up to 7 m and a protective height up to 1,105 mm are provided with no dead zone

- Detection height = sensor height
- Small housing
- Simple and affordable hand protection
- Reduced wiring, quick mount brackets and easy-to-view-alignment beams reduce mounting time
- Type 4 sensor complying with EN 61496-1 and up to PLe according EN ISO 13849

Ordering information

Application	Detection capability	Beam gap	Operating range	Protective height(mm)	Order code
Hand protection	Dia. 25 mm	20 mm	0.2 to 7 m	185 to 1,105	F3SJ-E____P25







Note: F3SJ-E uses a 3 m prewired discrete cable.

Number of beams	Protective height (mm) ^{*1}	Order code
8	185	F3SJ-E0185P25
10	225	F3SJ-E0225P25
14	305	F3SJ-E0305P25
18	385	F3SJ-E0385P25
22	465	F3SJ-E0465P25
26	545	F3SJ-E0545P25
30	625	F3SJ-E0625P25
34	705	F3SJ-E0705P25
38	785	F3SJ-E0785P25
42	865	F3SJ-E0865P25
46	945	F3SJ-E0945P25
50	1,025	F3SJ-E1025P25
54	1,105	F3SJ-E1105P25

^{*1} Protective height (mm) = Total sensor length

Accessories (sold separately)


Sensor mounting bracket

Appearance	Specifications	Application	Remarks	Order code
	Top/bottom bracket	Top/bottom bracket for F3SJ-E/B	2 for an emitter, 2 for a receiver, total of 4 per set	F39-LJB1
	Intermediate bracket	In combination use with top/bottom bracket for F3SJ-E/B Can be used as free-location bracket.	1 set with 2 pieces	F39-LJB2 ^{*1} ^{*2}
	Quick mount bracket	Quick mount bracket for F3SJ-E/B Supports M6 slide nut for aluminum frame.	1 set with 2 pieces	F39-LJB3-M6 ^{*1}
	Quick mount bracket	Quick mount bracket for F3SJ-E/B Supports M8 slide nut for aluminum frame.		F39-LJB3-M8 ^{*2}
	Quick mount M6 bracket	Bracket to mount an intermediate bracket to the aluminum frame with a single touch.	Hexagon socket head cap screws (M6 × 10) are included.	F39-LJB3-M6K ^{*1}
	Quick mount M8 bracket			Hexagon socket head cap screws (M8 × 14) are included.
	Compatible mounting bracket	Mounting bracket used when replacing existing area sensors (F3SJ-A or F3SN) with the F3SJ-E/B.	2 for an emitter, 2 for a receiver, total of 4 per set	F39-LJB4
	Contact mount bracket	Bracket to closely contact the back side of the sensor.	2 for an emitter, 2 for a receiver, total of 4 per set	F39-LJB5

^{*1} Combining F39-LJB2 and F39-LJB3-M6K makes F39-LJB3-M6.

^{*2} Combining F39-LJB2 and F39-LJB3-M8K makes F39-LJB3-M8.

Laser pointer

Appearance	Output	Order code
	Laser pointer for F3SJ	F39-PTJ

Specifications

Model	F3SJ-E	P25
Sensor type	Type 4 safety light curtain	
Setting tool connection ^{*1}	Parameter settings: Not available	
Safety category	Safety purpose of category 4, 3, 2, 1, or B	
Detection capability	Opaque objects 25 mm in diameter	
Beam gap (P)	20 mm	
Number of beams (n)	8 to 54	
Protective height (PH)	185 to 1,105 mm	
Lens diameter	Diameter 5 mm	
Operating range ^{*2}	0.2 to 7 m	
Response time (under stable light incident condition)	ON to OFF	15 ms max.
	OFF to ON	70 ms max.
Startup waiting time	2 s max.	
Power supply voltage (Vs)	SELV/PELV 24 VDC±20% (ripple p-p 10% max.)	
Consumption current (no load)	Emitter: Up to 22 beams: 41 mA max., 26 to 42 beams: 57 mA max., 46 to 54 beams: 63 mA max. Receiver: Up to 22 beams: 42 mA max., 26 to 42 beams: 47 mA max., 46 to 54 beams: 51 mA max.	
Light source (emitted wavelength)	Infrared LED (870 nm)	
Effective aperture angle (EAA)	Based on IEC 61496-2. Within ±2.5° for both emitter and receiver when the detection distance is 3 m or over	
Safety outputs (OSSD)	Two PNP transistor outputs, load current 200 mA max., residual voltage 2 V max. (except for voltage drop due to cable extension), Leakage current 1 mA max., load inductance 2.2 H max. ^{*3} , Maximum capacity load 1 μF ^{*4}	
Output operation mode	Safety output: On when receiving light	
Input voltage	ON voltage: Vs-3 V to Vs, OFF voltage: 0 V to 1/2 Vs or open ^{*5}	
Mutual interference prevention function	Mutual interference prevention algorithm prevents interference in up to 3 sets.	
Test function	Self test (at power-ON and at power distribution) External test (emission stop function by test input)	
Protection circuit	Output short-circuit protection, and power supply reverse polarity protection	
Ambient temperature	Operating: -10 to 55°C (non-freezing), Storage: -25 to 70°C	
Ambient humidity	Operating: 35% to 85% (no condensation), Storage: 35% to 95% RH	
Operating ambient light intensity	Incandescent lamp: 3,000 lx max., Sunlight: 10,000 lx max.	
Insulation resistance	20 MΩ min. (at 500 VDC)	
Dielectric strength	1,000 VAC 50/60 Hz, 1 min	
Degree of protection	IP65 (IEC 60529)	
Vibration resistance	Malfunction: 10 to 55 Hz, Multiple amplitude of 0.7 mm, 20 sweeps in X, Y, and Z directions	
Shock resistance	Malfunction: 100 m/s ² , 1,000 times each in X, Y, and Z directions	
Pollution degree	Pollution degree 3 (IEC 60664-1)	
Power cable	Connection method: Pull-out type, cable length 3 m Number of wires: Emitter: 5 wires, receiver: 6 wires Cable diameter: Dia. 6 mm Allowable bending radius: R5 mm	
Extension cable	30 m max. ^{*6}	
Material	Case: Aluminum Cap: ABS resin, PBT Optical cover: PMMA resin (acrylic) Cable: Oil resistant PVC	
Weight (packed state)	Weight (g) = (protective height) × 2.6 + 800	
Accessories	Test rod, Instruction Manual, User's Manual (CD-ROM) ^{*7}	
Applicable standards	IEC 61496-1, EN 61496-1 UL 61496-1, Type 4 ESPE (Electro-Sensitive Protective Equipment) IEC 61496-2, CLC/TS 61496-2, UL 61496-2, Type 4 AOPD (Active Opto-electronic Protective Devices) IEC 61508-1 to -3, EN 61508-1 to -3 SIL3 IEC 13849-1: 2006, EN ISO 13849-1: 2008 (PLe, Cat.4) UL 508, UL 1998, CAN/CSA C22.2 No.14, CAN/CSA C22.2 No.0.8	

^{*1} Do not use the support software and setting console for F3SJ-A. Operation cannot be guaranteed.

^{*2} Use of the spatter protection cover causes a 10% maximum sensing distance attenuation.

^{*3} The load inductance is the maximum value when the safety output frequently repeats ON and OFF. When you use the safety output at 4 Hz or less, the usable load inductance becomes larger.

^{*4} These values must be taken into consideration when connecting elements including a capacitive load such as capacitor.

^{*5} The Vs indicates a voltage value in your environment.

^{*6} To extend a cable of the F3SJ-E, refer to the user's manual (SCHG-733/732).

^{*7} Mounting brackets are sold separately.



Basic type with a combination of performance and functionality

The F3SJ-B-family is a type 4 safety light curtain with an optical resolution of 25 mm. An operation range of up to 7 m and a protective height up to 2,065 mm are provided with no dead zone

- Detection height = sensor height
- Simple hand protection
- Muting function available
- Series connection up to three sets
- Type 4 sensor complying with EN 61496-1 and up to PLe according EN ISO 13849

Ordering information







Application	Detection capability	Beam gap	Operating range	Protective height (mm)	Order code
Hand protection	Dia. 25 mm	20 mm	0.2 to 7 m	185 to 2,065	F3SJ-B____P25

Number of beams	Protective height (mm) ^{*1}	Order code
8	185	F3SJ-B0185P25
10	225	F3SJ-B0225P25
14	305	F3SJ-B0305P25
18	385	F3SJ-B0385P25
22	465	F3SJ-B0465P25
26	545	F3SJ-B0545P25
30	625	F3SJ-B0625P25
34	705	F3SJ-B0705P25
38	785	F3SJ-B0785P25
42	865	F3SJ-B0865P25
46	945	F3SJ-B0945P25
50	1,025	F3SJ-B1025P25
54	1,105	F3SJ-B1105P25
58	1,185	F3SJ-B1185P25
62	1,265	F3SJ-B1265P25
66	1,345	F3SJ-B1345P25
70	1,425	F3SJ-B1425P25
74	1,505	F3SJ-B1505P25
78	1,585	F3SJ-B1585P25
82	1,665	F3SJ-B1665P25
86	1,745	F3SJ-B1745P25
90	1,825	F3SJ-B1825P25
94	1,905	F3SJ-B1905P25
98	1,985	F3SJ-B1985P25
102	2,065	F3SJ-B2065P25

^{*1} Protective height (mm) = Total sensor length

Accessories (sold separately)


Sensor mounting bracket

Appearance	Specifications	Application	Remarks	Order code
	Top/bottom bracket	Top/bottom bracket for F3SJ-E/B	2 for an emitter, 2 for a receiver, total of 4 per set	F39-LJB1
	Intermediate bracket	In combination use with top/bottom bracket for F3SJ-E/B Can be used as free-location bracket.	1 set with 2 pieces	F39-LJB2 ^{*1} ^{*2}
	Quick mount bracket	Quick mount bracket for F3SJ-E/B Supports M6 slide nut for aluminum frame.	1 set with 2 pieces	F39-LJB3-M6 ^{*1}
	Quick mount M8 bracket	Quick mount bracket for F3SJ-E/B Supports M8 slide nut for aluminum frame.		F39-LJB3-M8 ^{*2}
	Quick mount M6 bracket	Bracket to mount an intermediate bracket to the aluminum frame with a single touch.	Hexagon socket head cap screws (M6 × 10) are included.	F39-LJB3-M6K ^{*1}
	Quick mount M8 bracket			Hexagon socket head cap screws (M8 × 14) are included.
	Compatible mounting bracket	Mounting bracket used when replacing existing area sensors (F3SJ-A or F3SN) with the F3SJ-E/B.	2 for an emitter, 2 for a receiver, total of 4 per set	F39-LJB4
	Contact mount bracket	Bracket to closely contact the back side of the sensor.	2 for an emitter, 2 for a receiver, total of 4 per set	F39-LJB5

^{*1} Combining F39-LJB2 and F39-LJB3-M6K makes F39-LJB3-M6.

^{*2} Combining F39-LJB2 and F39-LJB3-M8K makes F39-LJB3-M8.

Laser pointer

Appearance	Output	Order code
	Laser pointer for F3SJ	F39-PTJ

Specifications

Model		F3SJ-B P25
Sensor type		Type 4 safety light curtain
Setting tool connection ^{*1}		Parameter settings: Not available
Safety category		Safety purpose of category 4, 3, 2, 1, or B
Detection capability		Opaque objects 25 mm in diameter
Beam gap (P)		20 mm
Number of beams (n)		8 to 102
Protective height (PH)		185 to 2,065 mm
Lens diameter		Diameter 5 mm
Operating range ^{*2}		0.2 to 7 m
Response time (under stable light incident condition)	ON to OFF	15 ms max. (response time at 1 set connection, series connection of 2 sets or 3 sets)
	OFF to ON	70 ms max. (response time at 1 set connection, series connection of 2 sets or 3 sets)
Startup waiting time		2 s max.
Power supply voltage (Vs)		SELV/PELV 24 VDC±20% (ripple p-p 10% max.)
Consumption current (no load)		Emitter: Up to 22 beams: 52 mA max., 26 to 42 beams: 68 mA max., 46 to 62 beams: 75 mA max., 66 to 82 beams: 88 mA max., 86 to 102 beams: 101 mA max. Receiver: Up to 22 beams: 45 mA max., 26 to 42 beams: 50 mA max., 46 to 62 beams: 56 mA max., 66 to 82 beams: 61 mA max., 86 to 102 beams: 67 mA max.
Light source (emitted wavelength)		Infrared LED (870 nm)
Effective aperture angle (EAA)		Based on IEC 61496-2. Within ±2.5° for both emitter and receiver when the detection distance is 3 m or over
Safety outputs (OSSD)		Two PNP transistor outputs, load current 200 mA max., residual voltage 2 V max. (except for voltage drop due to cable extension), Leakage current 1 mA max., load inductance 2.2 H max. ^{*3} , Maximum capacity load 1 μF ^{*4}
Auxiliary output 1		One PNP transistor outputs, load current 100 mA max., residual voltage 2 V max. (except for voltage drop due to cable extension), leak current 1 mA max.
Output operation mode		Safety output: On when receiving light Auxiliary output: – Reverse output of safety output for a basic system – ON when muting/override for a muting system
Input voltage		ON voltage: Vs-3 V to Vs, OFF voltage: 0 V to 1/2 Vs or open ^{*5}
Mutual interference prevention function		Mutual interference prevention algorithm prevents interference in up to 3 sets.
Series connection		Time division emission by series connection Number of connections: up to 3 sets (between F3SJ-Bs only) Other models cannot be connected. Total number of beams: up to 192 beams Maximum cable length for 2 sets: no longer than 7 m
Test function		Self test (at power-ON and at power distribution) External test (emission stop function by test input)
Safety-related functions		Interlock (basic system) External device monitoring (basic system) Muting (muting system) Override (muting system)
Connection type		Connector method (M12, 8-pin)
Protection circuit		Output short-circuit protection, and power supply reverse polarity protection
Ambient temperature		Operating: -10 to 55°C (non-freezing), Storage: -25 to 70°C
Ambient humidity		Operating: 35% to 85% (no condensation), Storage: 35% to 95% RH
Operating ambient light intensity		Incandescent lamp: 3,000 lx max., Sunlight: 10,000 lx max.
Insulation resistance		20 MΩ min. (at 500 VDC)
Dielectric strength		1,000 VAC 50/60 Hz, 1 min
Degree of protection		IP65 (IEC 60529)
Vibration resistance		Malfunction: 10 to 55 Hz, Multiple amplitude of 0.7 mm, 20 sweeps in X, Y, and Z directions
Shock resistance		Malfunction: 100 m/s ² , 1,000 times each in X, Y, and Z directions
Pollution degree		Pollution degree 3 (IEC 60664-1)
Power cable		Connection method: Prewired connector cable, cable length 0.3 m, connector type (M12, 8-pin), connector: IP67 rated (when mated) Number of wires: 8 wires Cable diameter: Dia. 6 mm Allowable bending radius: R5 mm
Extension cable		30 m max.
Material		Case: Aluminum Cap: ABS resin, PBT Optical cover: PMMA resin (acrylic) Cable: Oil resistant PVC
Weight (packed state)		Weight (g) = (protective height) × 2.7 + 500
Accessories		Test rod, Instruction manual, User's manual (CD-ROM) ^{*6}
Applicable standards		IEC 61496-1, EN 61496-1 UL 61496-1, Type 4 ESPE (Electro-sensitive protective equipment) IEC 61496-2, CLC/TS 61496-2, UL 61496-2, Type 4 AOPD (Active opto-electronic protective devices) IEC 61508-1 to -3, EN 61508-1 to -3 SIL3 IEC 13849-1: 2006, EN ISO 13849-1: 2008 (PLe, Cat.4) UL 508, UL 1998, CAN/CSA C22.2 No.14, CAN/CSA C22.2 No.0.8

^{*1} Do not use the support software and setting console for F3SJ-A. Operation cannot be guaranteed.

^{*2} Use of the spatter protection cover causes a 10% maximum sensing distance attenuation.

^{*3} The load inductance is the maximum value when the safety output frequently repeats ON and OFF. When you use the safety output at 4 Hz or less, the usable load inductance becomes larger.

^{*4} These values must be taken into consideration when connecting elements including a capacitive load such as capacitor.

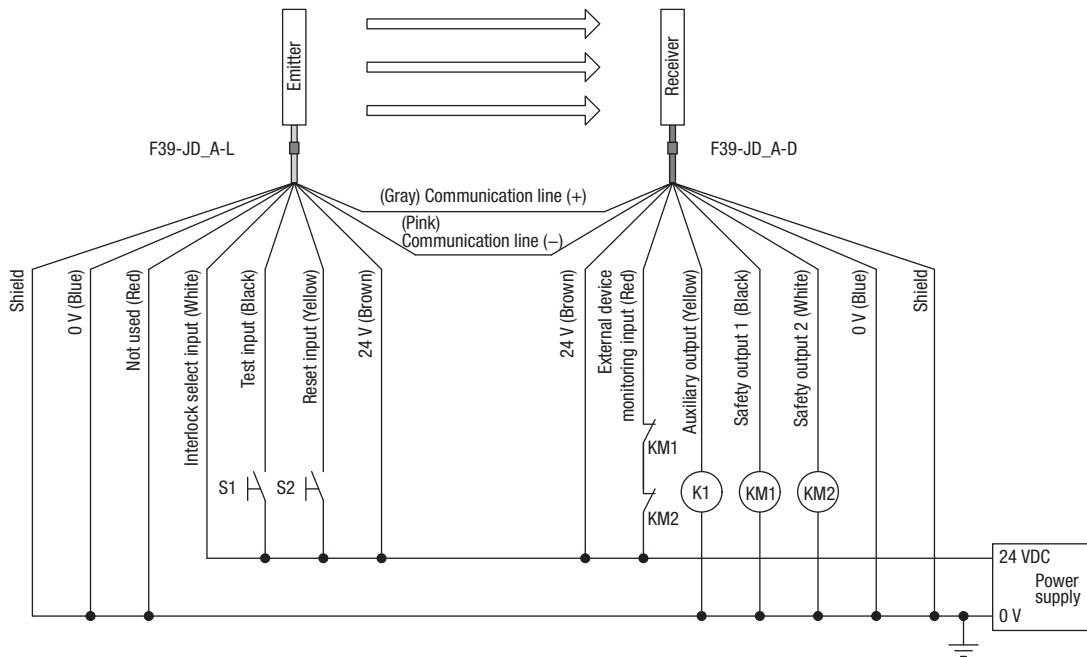
^{*5} The Vs indicates a voltage value in your environment.

^{*6} Mounting brackets are sold separately.

Connections

Basic Wiring Diagram

Wiring when using manual reset mode, external device monitoring (F3SJ-B P25) (PNP output)



- S1 : External test switch (connect to 0 V if a switch is not required)
- S2 : Interlock/lockout reset switch
- KM1, KM2 : Safety relay with force-guided contact (G7SA) or magnetic contactor
- K1 : Load or PLC, etc. (for monitoring)



Advanced type for complex safety solutions

The F3SJ-A-family is a type 4 safety light curtain with a optical resolution of 14 mm and 30 mm. An operating range of up to 9 m and protective heights up to 2,495 mm are provided with no dead zone.

- Detection height = sensor height
- Muting and blanking function available
- Series connection up to 4 Sets
- LED bar for easy alignment and diagnosis
- Type 4 sensor complying with EN 61496-1 and up to PLe according EN ISO 13849-1

Ordering information

Application	Detection capability	Beam gap	Operating range	Protective height (mm)	Order code
Finger protection	Dia. 14 mm	9 mm	0.2 to 9 m	245 to 1,631	F3SJ-A____P14
Hand/arm protection	Dia. 30 mm	25 mm	0.2 to 9 m 0.2 to 7 m	245 to 1,620 1,745 to 2,495	F3SJ-A____P30

Safety light curtain model list

F3SJ-A14 series (9 mm gap), F3SJ-A14 TS series (9 mm gap)

Number of beams	Protective height (mm) ^{*1}	Order code
26	245	F3SJ-A0245P14
28	263	F3SJ-A0263P14
34	317	F3SJ-A0317P14
42	389	F3SJ-A0389P14
50	461	F3SJ-A0461P14
60	551	F3SJ-A0551P14
68	623	F3SJ-A0623P14
76	695	F3SJ-A0695P14
80	731	F3SJ-A0731P14
88	803	F3SJ-A0803P14
96	875	F3SJ-A0875P14
108	983	F3SJ-A0983P14
116	1,055	F3SJ-A1055P14
124	1,127	F3SJ-A1127P14
132	1,199	F3SJ-A1199P14
140	1,271	F3SJ-A1271P14

*1 Protective height (mm) = Total sensor length

F3SJ-A30 series (25 mm gap)


Number of beams	Protective height (mm) ^{*1}	Order code
10	245	F3SJ-A0245P30
12	295	F3SJ-A0295P30
16	395	F3SJ-A0395P30
19	470	F3SJ-A0470P30
21	520	F3SJ-A0520P30
22	545	F3SJ-A0545P30
23	570	F3SJ-A0570P30
25	620	F3SJ-A0620P30
29	720	F3SJ-A0720P30
32	795	F3SJ-A0795P30
35	870	F3SJ-A0870P30
37	920	F3SJ-A0920P30
38	945	F3SJ-A0945P30
41	1,020	F3SJ-A1020P30
44	1,095	F3SJ-A1095P30
45	1,120	F3SJ-A1120P30
48	1,195	F3SJ-A1195P30
51	1,270	F3SJ-A1270P30
56	1,395	F3SJ-A1395P30
65	1,620	F3SJ-A1620P30
70	1,745	F3SJ-A1745P30
75	1,870	F3SJ-A1870P30
80	1,995	F3SJ-A1995P30
90	2,245	F3SJ-A2245P30
95	2,370	F3SJ-A2370P30
100	2,495	F3SJ-A2495P30

*1 Protective height (mm) = Total sensor length


Accessories (sold separately)

Single-end connector cable (2 cables per set, for emitter and receiver)



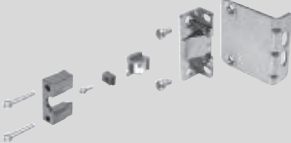


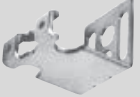


For wiring with safety circuit such as single safety relay, safety relay unit, and safety controller.

Appearance	Cable length	Specifications	Order code
	0.5 m	M12 connector (8-pin)	F39-JCR5A
	3 m		F39-JC3A
	7 m		F39-JC7A
	10 m		F39-JC10A
	15 m		F39-JC15A
	20 m		F39-JC20A


Setting Tools

Appearance	Type	Remarks	Order code
	"SD Manager" Setting support software for the F3SJ	Accessories: SD Manager CD-ROM (1), F39-CN1 branch connector (1), Connector cap (1), 2-m Dedicated cable (1), 0.3-m Dedicated cable with plug (1), Instruction manual	F39-GWUM

Sensor Mounting Brackets (Sold separately)

Appearance	Specifications	Application	Remarks	Order code
	Standard mounting bracket (for top/bottom)	(provided with the F3SJ)	2 for an emitter, 2 for a receiver, total of 4 per set	F39-LJ1
	Flat side mounting bracket	Use these small-sized brackets when performing side mounting with standard mounting brackets, so that they do not protrude from the detection surface.	2 for an emitter, 2 for a receiver, total of 4 per set	F39-LJ2
	Free-location mounting bracket (also used as standard intermediate bracket)	Use these brackets for mounting on any place without using standard bracket.	Two brackets per set	F39-LJ3
	F3SN Intermediate bracket Replacement spacers	When replacing the F3SN with the F3SJ, the mounting hole pitches in the Intermediate Brackets are not the same. This Spacer is placed between the mounting holes to mount the F3SJ.	1 set with 2 pieces	F39-LJ3-SN
	Top/bottom bracket B (mounting hole pitch 19 mm)	Mounting bracket used when replacing existing area sensors (other than F3SN or F3WN) with the F3SJ. For front mounting. Suitable for mounting hole pitch of 18 to 20 mm.	2 for an emitter, 2 for a receiver, total of 4 per set	F39-LJ4
	Bracket for replacing short-length F3SN	Mounting bracket used when an F3SN with protective height of 300 mm or less is replaced by an F3SJ.	2 for an emitter, 2 for a receiver, total of 4 per set	F39-LJ5
	Space-saving mounting bracket	Use these brackets to mount facing inward. Length is 12 mm shorter than the standard F39-LJ1 bracket.	2 for an emitter, 2 for a receiver, total of 4 per set	F39-LJ8
	Top/bottom bracket C (mounting hole pitch 13 mm)	Mounting bracket used when replacing existing area sensors having a mounting pitch of 13 mm with the F3SJ.	2 for an emitter, 2 for a receiver, total of 4 per set	F39-LJ11

Laser pointer

Appearance	Output	Order code
	Laser pointer for F3SJ	F39-PTJ

Specifications

F3SJ-A ___ P14/P30

Model	F3SJ-A ___ P14	F3SJ-A ___ P30
Sensor type	Type 4 safety light curtain	
Version	Ver. 2	
Setting tool connection	Connectable	
Safety category	Safety purpose of category 4, 3, 2, 1, or B	
Detection capability	Opaque objects 14 mm in diameter	Opaque objects 30 mm in diameter
Beam gap (P)	9 mm	25 mm
Number of beams (n)	26 to 180	10 to 100
Protective height (PH)	245 to 1,631 mm	245 to 2,495 mm
Lens diameter	Diameter 5 mm	
Operating range	0.2 to 9 m (protective height 1,640 mm max.), 0.2 to 7 m (protective height 1,655 mm min.) (Depending on the setting tool, the detection distance can be shortened to 0.5 m.)	
Response time (under stable light incident condition)	ON to OFF	1 set, 0245 to 983: 11 ms to 17.5 ms max. 1,055 or higher: 20 ms to 25 ms max.
	OFF to ON	1 set, 0245 to 983: 44 ms to 70 ms max. 1,055 or higher: 80 ms to 100 ms max.
Startup waiting time	2 s max. (2.2 s max. for series connection)	
Power supply voltage (Vs)	24 VDC±20% (ripple p-p10% max.)	
Current consumption (no load)	Emitter	To 50 beams: 76 mA max., 51 to 100 beams: 106 mA max., 101 to 150 beams: 130 mA max., 151 to 180 beams: 153 mA max., 201 to 234 beams: 165 mA max.
	Receiver	To 50 beams: 68 mA max., 51 to 100 beams: 90 mA max., 101 to 150 beams: 111 mA max., 151 to 180 beams: 128 mA max., 201 to 234 beams: 142 mA max.
Light source (emitted wavelength)	Infrared LED (870 nm)	
Effective aperture angle (EAA)	Based on IEC 61496-2. Within±2.5° for both emitter and receiver when the detection distance is 3 m or over	
Safety outputs (OSSD)	Two PNP transistor outputs, load current 300 mA max., residual voltage 2 V max. (except for voltage drop due to cable extension), allowable capacity load 2.2 µF, leak current 1 mA max. (This can be different from traditional logic (ON/OFF) because safety circuit is used.)	
Auxiliary output 1 (Non-safety output)	One PNP transistor output, load current 300 mA max., residual voltage 2 V max. (except for voltage drop due to cable extension), leak current 1 mA max.	
Auxiliary output 2 (Non-safety output. Function for Basic System.)	One PNP transistor output, load current 50 mA max., residual voltage 2 V max. (except for voltage drop due to cable extension), leak current 1 mA max.	
External indicator output (Non-safety output)	Available indicators Incandescent lamp: 24 VDC, 3 to 7 W LED lamp: Load current 10 mA to 300 mA max., leak current 1 mA max. (To use an external indicator, an F39-JJ3N universal indicator cable or an F39-A01P-PAC dedicated external indicator kit is required.)	
Output operation mode	Receiver	Safety output 1, 2: ON when receiving light Auxiliary output 1: Inverse of safety output signals (Operation mode can be changed with the setting tool.) External indicator output 1: Inverse of safety output signals for a basic system (Operation mode can be changed with the setting tool.), ON when muting/override for a muting system (Operation mode can be changed with the setting tool.)
	Emitter	Auxiliary output 2: Turns ON when the point of 30,000 operating hours is reached (Operation mode can be changed with the setting tool.) External indicator output 2: ON when lock-out for a basic system (Operation mode can be changed with the setting tool.) ON when muting/override for a muting system (Operation mode can be changed with the setting tool.)

Model	F3SJ-A P14	F3SJ-A P30
Input voltage	Test input, interlock selection input, reset input, and muting input are all ON voltage: 9 to 24 V (Vs) (sink current: 3 mA max.), OFF voltage: 0 to 1.5 V, or open External device monitoring input ON voltage: 9 to 24 V (Vs) (sink current: 5 mA max.), OFF voltage: 0 to 1.5 V, or open	
Indicator	Emitter	Light intensity level indicators (green LED × 2, orange LED × 3): ON based on the light intensity Error mode indicators (red LED × 3): Blink to indicate error details Power indicator (green LED × 1): ON while power is on Interlock indicator (yellow LED × 1): ON while under interlock, blinks at lockout. External device monitoring indicator (muting input 1 indicator), Blanking/test indicator (muting input 2 indicator) (green LED × 2): ON/flash according to function
	Receiver	Light intensity level indicators (green LED × 2, orange LED × 3): ON based on the light intensity Error mode indicators (red LED × 3): Blink to indicate error details OFF output indicator (red LED × 1): ON when safety output is OFF, blinks at lockout. ON output indicator (green LED × 1): ON while safety output is ON Muting error indicator, Blanking/test indicator (green LED × 2): ON/flash according to function
Mutual interference prevention function	Interference light prevention algorithm, sensing distance change function	
Series connection	Time division emission by series connection Number of connections: up to 4 sets (F3SJ-A only) F3SJ-E, F3SJ-B and F3SJ-TS cannot be connected. Total number of beams: up to 400 beams Maximum cable length for 2 sets: no longer than 15 m	
Test function	Self test (at power-ON and at power distribution) External test (emission stop function by test input)	
Safety-related functions	Start interlock, restart interlock (Must be set with a setting tool when the muting function is used.) External device monitor Muting (Lamp burnout detection, override function included. F39-CN6 key cap for muting is required.) Fixed blanking (must be set by a setting tool) Floating blanking (must be set by a setting tool)	
Connection method	Connector method (M12, 8-pin)	
Protection circuit	Output short-circuit protection, and power supply reverse polarity protection	
Ambient temperature	Operating: -10 to 55°C (no icing), Storage: -30 to 70°C	
Ambient humidity	Operating: 35% to 85% (no condensation), Storage: 35% to 95%	
Operating ambient light intensity	Incandescent lamp: receiving-surface light intensity of 3,000 lx max., Sunlight: receiving-surface light intensity of 10,000 lx max.	
Insulation resistance	20 MΩ min. (at 500 VDC)	
Withstand voltage	1,000 VAC 50/60 Hz, 1 min	
Degree of protection	IP65 (IEC 60529)	
Vibration resistance	Malfunction: 10 to 55 Hz, Multiple amplitude of 0.7 mm, 20 sweeps in X, Y, and Z directions	
Shock resistance	Malfunction: 100 m/s ² , 1,000 times each in X, Y, and Z directions	
Material	Casing (including metal parts on both ends): Aluminum, zinc die-cast Cap: ABS resin, Optical cover: PMMA resin (acrylic), Cable: Oil resistant PVC	
Weight (packaged)	Calculate using the following expressions: (1) For F3SJ-A ___14, weight (g) = (protective height) × 1.7 + α (2) F3SJ-A ___30, weight (g) = (protective height) × 1.5 + α The values for α are as follows: Protected height 245 to 596 mm: = 1,100 protected height 1,660 to 2,180 mm: = 2,400 Protected height 600 to 1,130 mm: = 1,500 protected height 2,195 to 2,500 mm: = 2,600 Protected height 1,136 to 1,658 mm: = 2,000	
Accessories	Test rod (*1), instruction manual, standard mounting bracket (F39-LJ1 bracket for top/bottom mounting), mounting brackets (intermediate) (*2), error mode label, User's Manual (CD-ROM) *1. The F3SJ-A□□□□55 is not included. *2. Number of intermediate brackets depends on protective height of F3SJ. For protective height from 600 to 1,130 mm: 1 set for each of the emitter and receiver is included For protective height from 1,136 to 1,658 mm: 2 sets for each of the emitter and receiver are included For protective height from 1,660 to 2,180 mm: 3 sets for each of the emitter and receiver are included For protective height from 2,195 to 2,500 mm: 4 sets for each of the emitter and receiver are included	
Applicable standards	IEC 61496-1, EN 61496-1 UL 61496-1, Type 4 ESPE (Electro-Sensitive Protective Equipment) IEC 61496-2, CLC/TS 61496-2, UL 61496-2, Type 4 AOPD (Active Opto-electronic Protective Devices) IEC 61508-1 to -3, EN 61508-1 to -3 SIL3 IEC 13849-1: 2006, EN ISO 13849-1: 2008 (PLe, Cat.4) UL 508, UL 1998, CAN/CSA C22.2 No.14, CAN/CSA C22.2 No.0.8	

Response Time

Model	Protected height (mm)	Number of beams	Response time ms (ON to OFF)	Response time ms (OFF to ON)
F3SJ-A____14 Series	245 to 263	26 to 28	11	44
	281 to 389	30 to 42	12	48
	407 to 497	44 to 54	13	52
	515 to 605	56 to 66	14	56
	623 to 731	68 to 80	15	60
	767 to 983	84 to 108	17.5	70
	1,055 to 1,271	116 to 140	20	80
	1,343 to 1,559	148 to 172	22.5	90
F3SJ-A____30 Series	1,631	180	25	100
	245 to 395	10 to 16	10	40
	420 to 720	17 to 29	11	44
	745 to 1,045	30 to 42	12	48
	1,070 to 1,295	43 to 52	13	52
	1,395 to 1,620	56 to 65	14	56
	1,745 to 1,995	70 to 80	15	60
	2,120 to 2,495	85 to 100	17.5	70

Note: Use the following expressions for series connection.

- For 2-set series connection:
Response time (ON to OFF): Response time of the 1st unit + Response time of the 2nd unit – 1 (ms), Response time (OFF to ON): Response time calculated by the above × 4 (ms)
- For 3-set series connection:
Response time (ON to OFF):
Response time of the 1st unit + Response time of the 2nd unit + Response time of 3rd unit – 5 (ms), Response time (OFF to ON): Response time calculated by the above × 5 (ms)
For models with the “-TS” suffix, multiply the response time obtained by the above × 5 (ms), or use 200 ms, whichever is less.)
- For 4-set series connection:
Response time (ON to OFF): Response time of the 1st unit + Response time of the 2nd unit + Response time of the 3rd unit + Response time of the 4th unit – 8 (ms)
Response time (OFF to ON): Response time calculated by the above × 5 (ms)

Cable extension length

Total cable extension length must be no greater than the lengths described below.

When the F3SJ and an external power supply are directly connected, or when the F3SJ is connected to a G9SA-300-SC.

Condition	1 set	2 sets	3 sets	4 sets
Using incandescent lamp for auxiliary output and external indicator output	45 m	40 m	30 m	20 m
Not using incandescent lamp	100 m	60 m	45 m	30 m

When connected to the F3SP-B1P

Condition	1 set	2 sets	3 sets	4 sets
Using incandescent lamp for external indicator output 2	40 m	30 m	25 m	20 m
Using incandescent lamp for external indicator output 1	60 m	45 m	30 m	20 m
Using incandescent lamp for auxiliary output 1				
Not using incandescent lamp	100 m	60 m	45 m	30 m

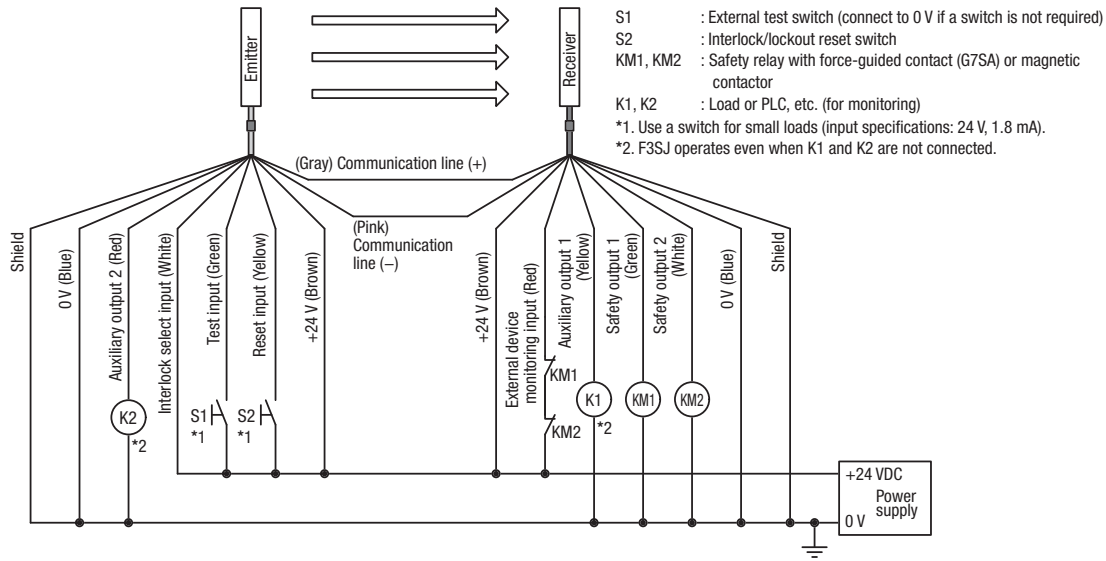
Note: Keep the cable length within the rated length. Failure to do so is dangerous as it may prevent safety functions from operating normally.

Connections

Basic Wiring Diagram

PNP Output

Wiring when using manual reset mode, external device monitoring.





Category 4 / 2 safety light curtain

The MS4800 and MS2800 family of safety light curtain provides simplicity in mounting, configuring, daily use and maintenance by providing a:

- Sensing distance up to 20m for 30mm resolution and 7 m for 14mm resolution
- LED bar for easy alignment and diagnosis
- DIP-switch setup for blanking, muting and optical coding
- Category 4 / 2 sensor complying with EN 61496-1
- All-in-one M12 connection and mounting concept with robust housing
- Multicascadable up to 3 sets

Ordering information

MS2800 Safety Category 2

Connection features										
Standard Standalone operation	Standard				Master				Slave	
Master Series connection, muting										
Slave Series connection only										
	MS2800S-				MS2800FS-				MS2800F-	
Function Set										
Basic Interlock, restart, EDM, 2 optical channels, integrated alignment tool	Basic		Advanced		Basic		Advanced			
Advanced Muting, blanking (fixed/floating)										
	MS2800S-EB-		MS2800S-EA-		MS2800FS-EB-		MS2800FS-EA-		MS2800F-E-	
Resolution	14 mm		30 mm		14 mm		30 mm		14 mm	
14 mm finger protection										
30 mm hand protection	MS2800S-EB-014-	MS2800S-EB-030-	MS2800S-EA-014-	MS2800S-EA-030-	MS2800FS-EB-014-	MS2800FS-EB-030-	MS2800FS-EA-014-	MS2800FS-EA-030-	MS2800F-E-014-	MS2800F-E-030-
Length	240 mm ... 2120 mm in 40 mm increments		280 ... 2120		280 ... 1800		280 ... 2120		240 ... 1280	

MS4800 Safety Category 4

Connection features										
Standard Standalone operation	Standard				Master				Slave	
Master Series connection, muting										
Slave Series connection only										
	MS4800S-				MS4800FS-				MS4800F-	
Function Set										
Basic Interlock, restart, EDM, 2 optical channels, integrated alignment tool	Basic		Advanced		Basic		Advanced			
Advanced Muting, blanking (fixed/floating)										
	MS4800S-EB-		MS4800S-EA-		MS4800FS-EB-		MS4800FS-EA-		MS4800F-E-	
Resolution	14mm		30mm		14mm		30mm		14mm	
14mm finger protection										
30mm hand protection	MS4800S-EB-014-	MS4800S-EB-030-	MS4800S-EA-014-	MS4800S-EA-030-	MS4800FS-EB-014-	MS4800FS-EB-030-	MS4800FS-EA-014-	MS4800FS-EA-030-	MS4800F-E-014-	MS4800F-E-030-
Length	240mm ... 2120mm in 40mm increments		280 ... 2120		280 ... 1800		280 ... 2120		240 ... 1280	

Examples

MS2800S-EB-030-1000
 Standalone operation
 Basic function set
 30mm resolution
 1000mm protective height

MS4800FS-EA-014-1200
 Series connection model
 Advanced function set
 14mm resolution
 1200mm protective height

MS4800F-E-014-600
 Slave operation
 14mm resolution
 600mm protective height

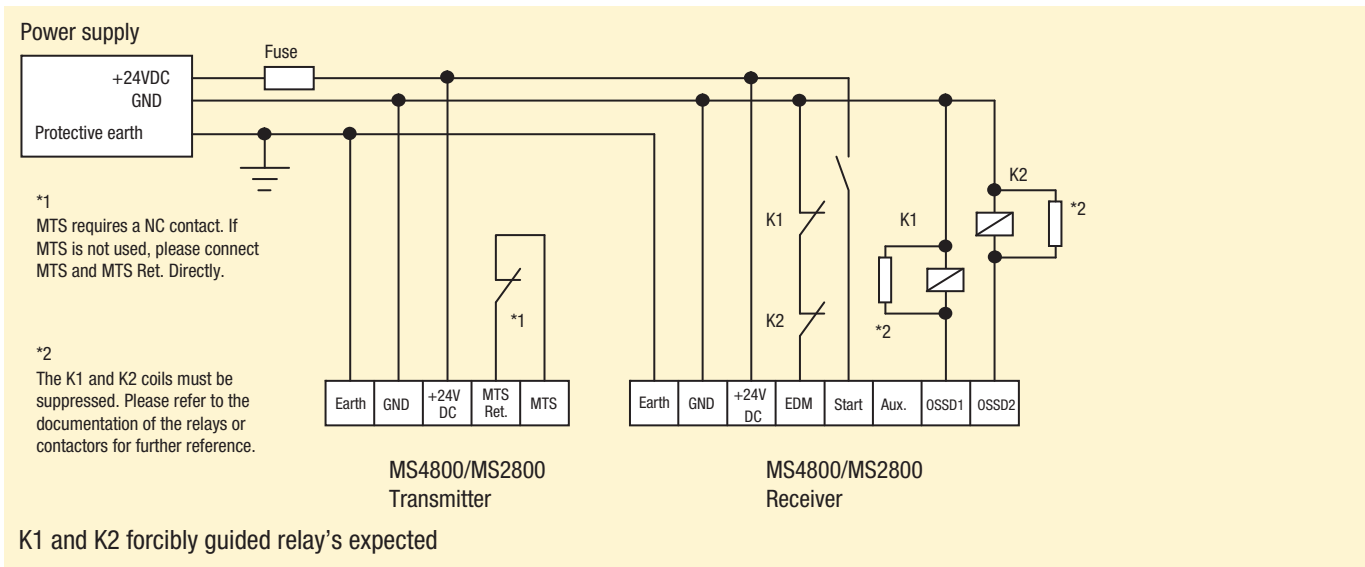
Specifications

Model	MS4800 -E - - - - -	MS2800 -E - - - - -
Sensor type	Type 4	Type2
Normal operating range	14 mm resolution: 0.3 - 7 m, 30 mm resolution: 0.3 - 20 m	
Reduced range (DIP-switch 6)	14 mm resolution: 0.3 - 3 m, 30 mm resolution: 0.3 - 8 m	
Beam pitch	14 mm resolution: 10 mm; 30 mm resolution: 20 mm	
Protective height	14 mm resolution: 280 - 1800 mm; 30 mm resolution: 240 - 2120 mm	
Detection capability	14 mm resolution: 14 mm non-transparent; 30 mm resolution: 30 mm non-transparent	
Effective aperture angle (EAA)	Within $\pm 2,5^\circ$	Within $\pm 5,0^\circ$
	for the emitter and receiver at a detection distance of at least 3m according to IEC61496-2	
Light source	Infrared LED's (880 nm), Power dissipation: 180 mW, Class 1 per EN60825-1	
Supply voltage (Vs)	24 VDC $\pm 20\%$, according EN/IEC60204, able to cover a drop of voltage of at least 20 msec	
OSSD	Two safety related PNP transistor output, load current 625 mA max. ^{*1} , short circuit protection	
Auxiliary output (non safety output)	One PNP output sourcing 100mA @ 24VDC. This output follows the OSSD's	
Output operation mode	OSSD output: Light-ON	
Test functions	Self-test (after power ON and during operation)	
Safety-related functions	All versions: Auto reset/interlock with manual reset, EDM (external device monitoring) advanced versions only: fixed blanking, floating blanking, muting	
Response time	ON to OFF: 14 to 59 ms	
Ambient light intensity	Incandescent lamp: 3000 lx max. (light intensity on the receiver surface)	
Ambient temperature	Operating: -10°C to $+55^\circ\text{C}$, storage: -25°C to $+70^\circ\text{C}$ (without icing or condensation)	
Degree of protection	IP65 (IEC60529)	
Connection methode	Flexible cable with M 12 connection: receiver: 8 pins, transmitter: 5 pins	
Materials	Case: Polyurethane powder painted aluminium, cap: polycarbonate, front window: acrylic, mounting brackets: cold rolled steel	
Size (cross section)	39 x 50 mm	
Receiver indicator lights	Individual Beam Indicator (IBI), interlock, blanking activ, RUN and STOP state, error codes	
Transmitter indicator lights	ON, OFF, failure	
AOPD (ESPE)	Type4 acc. IEC 61496-1	Type2 acc. IEC 61496-1
Suitable for safety control systems	Cat. 4 acc. EN954-1, PLe acc. EN ISO 13849-1	Cat. 2 acc. EN954-1, PLC acc. EN ISO 13849-1
Safety Integrity Level	SIL 3 according IEC 61508	
PFH	$5,9 \times 10^{-8}$	

^{*1} Up to 12 m we recommend to use the F39-JMR cables, to use longer cables and a current of 625 mA the F39-JMR cables are necessary.

Connection example

Using a manual restart and an external device monitoring





Multi-beam, finger- and hand protection safety sensor

The F3S-TGR-CL multi-beam, finger- and hand protection safety sensors satisfying with integrated safety control functions selectable via built-in dip-switches.

- Type 2 or type 4 acc. EN61496-1
- PL c or PL e acc. ISO13849
- Family concept in wiring and mounting
- All models with dip-switch setup for external device monitoring, interlock function, range setting (short and long range) and optical or wired coding
- Advanced models with pre-reset function, T-, L- or X- muting function and muting lamp integrated

Ordering information

Multi-beam safety sensors

F3S-TGR-CL2_-K_ (Type 2)

System	Sensing distance	Detection capability	Order code	
			Basic feature set ^{*1}	Advanced feature set ^{*2}
Active/passive	0.5 m to 12 m	500	F3S-TGR-CL2B-K2C-500	F3S-TGR-CL2A-K2C-500
	0.5 m to 8 m	400	F3S-TGR-CL2B-K3C-800	F3S-TGR-CL2A-K3C-800
	0.5 m to 7 m	300	F3S-TGR-CL2B-K4C-900	F3S-TGR-CL2A-K4C-900
		400	F3S-TGR-CL2B-K4C-1200	F3S-TGR-CL2A-K4C-1200
Active/active	0.5 m to 40 m	500	F3S-TGR-CL2B-K2-500	F3S-TGR-CL2A-K2-500
		400	F3S-TGR-CL2B-K3-800	F3S-TGR-CL2A-K3-800
		300	F3S-TGR-CL2B-K4-900	F3S-TGR-CL2A-K4-900
		400	F3S-TGR-CL2B-K4-1200	F3S-TGR-CL2A-K4-1200
Active/active, long distance	25 m to 50 m	500	F3S-TGR-CL2B-K2-500-LD	F3S-TGR-CL2A-K2-500-LD
		400	F3S-TGR-CL2B-K3-800-LD	F3S-TGR-CL2A-K3-800-LD
		300	F3S-TGR-CL2B-K4-900-LD	F3S-TGR-CL2A-K4-900-LD
		400	F3S-TGR-CL2B-K4-1200-LD	F3S-TGR-CL2A-K4-1200-LD

F3S-TGR-CL4_-K_ (Type 4)

System	Sensing distance	Detection capability	Order code	
			Basic feature set ^{*1}	Advanced feature set ^{*2}
Active/passive	0.5 m to 12 m	500	F3S-TGR-CL4B-K2C-500	F3S-TGR-CL4A-K2C-500
	0.5 m to 8 m	400	F3S-TGR-CL4B-K3C-800	F3S-TGR-CL4A-K3C-800
	0.5 m to 7 m	300	F3S-TGR-CL4B-K4C-900	F3S-TGR-CL4A-K4C-900
		400	F3S-TGR-CL4B-K4C-1200	F3S-TGR-CL4A-K4C-1200
Active/active	0.5 m to 40 m	500	F3S-TGR-CL4B-K2-500	F3S-TGR-CL4A-K2-500
		400	F3S-TGR-CL4B-K3-800	F3S-TGR-CL4A-K3-800
		300	F3S-TGR-CL4B-K4-900	F3S-TGR-CL4A-K4-900
		400	F3S-TGR-CL4B-K4-1200	F3S-TGR-CL4A-K4-1200
Active/active, long distance	25 m to 50 m	500	F3S-TGR-CL4B-K2-500-LD	F3S-TGR-CL4A-K2-500-LD
		400	F3S-TGR-CL4B-K3-800-LD	F3S-TGR-CL4A-K3-800-LD
		300	F3S-TGR-CL4B-K4-900-LD	F3S-TGR-CL4A-K4-900-LD
		400	F3S-TGR-CL4B-K4-1200-LD	F3S-TGR-CL4A-K4-1200-LD

^{*1} Basic feature set: Manual/automatic restart, coding

^{*2} Advanced feature set: Basic + Muting + integrated Muting lamp + Pre-reset

Safety sensors

F3S-TGR-CL2_ (Type 2)

Feature set	Master/Slave	Sensing distance	Detection capability	Length	Order code
Basic* ¹	Standalone	0.2 m to 6 m	14 mm	150 mm to 2,400 mm* ³	F3S-TGR-CL2B-014- _
		0.2 m to 14 m	35 mm		F3S-TGR-CL2B-035- _
Advanced* ²	Standalone	0.2 m to 6 m	14 mm		F3S-TGR-CL2A-014- _
		0.2 m to 14 m	35 mm		F3S-TGR-CL2A-035- _
	Master	0.2 m to 6 m	14 mm		F3S-TGR-CL2A-014- _M
		0.2 m to 14 m	35 mm		F3S-TGR-CL2A-035- _M
	Slave	0.2 m to 6 m	14 mm		F3S-TGR-CL2A-014- _S
		0.2 m to 14 m	35 mm		F3S-TGR-CL2A-035- _S
		70 mm	300 mm to 2,100 mm		F3S-TGR-CL2A-070- _S

F3S-TGR-CL4_ (Type 4)

Feature set	Master/Slave	Sensing distance	Detection capability	Length	Order code
Basic* ¹	Standalone	0.2 m to 6 m	14 mm	150 mm to 2,400 mm* ³	F3S-TGR-CL4B-014- _
		0.2 m to 14 m	35 mm		F3S-TGR-CL4B-035- _
Advanced* ²	Standalone	0.2 m to 6 m	14 mm		F3S-TGR-CL4A-014- _
		0.2 m to 14 m	35 mm		F3S-TGR-CL4A-035- _
	Master* ⁴	0.2 m to 6 m	14 mm		F3S-TGR-CL4A-014- _M
		0.2 m to 14 m	35 mm		F3S-TGR-CL4A-035- _M
	Slave* ⁴	0.2 m to 6 m	14 mm		F3S-TGR-CL4A-014- _S
		0.2 m to 14 m	35 mm		F3S-TGR-CL4A-035- _S
		70 mm	300 mm to 2,100 mm		F3S-TGR-CL4A-070- _S

*¹ Basic feature set: Manual/automatic restart, coding

*² Advanced feature set: Basic + Muting + integrated Muting lamp + Pre-reset

*³ Available length (in mm): 150, 300, 450, 600, 750, 900, 1,050, 1,200, 1,350, 1,500, 1,650, 1,800, 1,950, 2,100, 2,250, (2,400 mm, only standalone versions)

*⁴ Master/slave system: A master/slave system cannot exceed the total length of 2,400 mm

F3S-TGR-CL- _ _ M/S Master-Slave Series

- A Master-Slave cascade system is made of one master segment and one slave segment.
- The length of the total protective field can vary from minimum 300 mm till maximum 2,400 mm.


- The interconnect cable length limitation between master and slave segment is in total max. 0,9 m.

Possible combinations of master and slave are in this table:


		Slave models																					
		14 mm or 35 mm resolution															70 mm resolution						
		150	300	450	600	750	900	1,050	1,200	1,350	1,500	1,650	1,800	1,950	2,150	2,250	300	600	900	1,200	1,500	1,800	2,100
Master models (14 mm or 35 mm resolution)	150	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK	OK	OK
	300	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK	OK	OK
	450	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK			OK	OK	OK	OK	OK	OK	
	600	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK				OK	OK	OK	OK	OK	OK	
	750	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK					OK	OK	OK	OK	OK		
	900	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK						OK	OK	OK	OK	OK		
	1,050	OK	OK	OK	OK	OK	OK	OK	OK	OK							OK	OK	OK	OK			
	1,200	OK	OK	OK	OK	OK	OK	OK	OK	OK							OK	OK	OK	OK			
	1,350	OK	OK	OK	OK	OK	OK	OK	OK								OK	OK	OK				
	1,500	OK	OK	OK	OK	OK	OK										OK	OK	OK				
	1,650	OK	OK	OK	OK	OK											OK	OK					
	1,800	OK	OK	OK	OK												OK	OK					
	1,950	OK	OK	OK													OK						
2,100	OK	OK														OK							
2,250	OK															OK							

Accessories


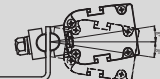
Receiver cables (M12-8pin, shielded, flying leads)

Shape	Description	Remark	Order code
	Sensor connector with open cable end M12-8pin, outer shielding layer	Receiver cable, 2 m length	Y92E-M12PURSH8S2M-L
		Receiver cable, 5 m length	Y92E-M12PURSH8S5M-L
		Receiver cable, 10 m length	Y92E-M12PURSH8S10M-L
		Receiver cable, 25 m length	Y92E-M12PURSH8S25M-L

Transmitter cables (M12-4pin, shielded, flying leads)


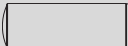
Shape	Description	Remark	Order code
	Sensor connector with open cable end M12-4pin, outer shielding layer	Transmitter cable, 2 m length	Y92E-M12PURSH4S2M-L
		Transmitter cable, 5 m length	Y92E-M12PURSH4S5M-L
		Transmitter cable, 10 m length	Y92E-M12PURSH4S10M-L
		Transmitter cable, 25 m length	Y92E-M12PURSH4S25M-L

Mounting brackets

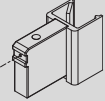
Shape	Description	Remark	Order code
	Mounting bracket	Mounting bracket × 1, SLC mounting screws × 1 set	F39-TGR-SB-ST ^{*1}
	Adjustable bracket	Adjustable bracket × 1, Bracket mounting screws × 1 set	F39-TGR-ADJ

*1 Brackets amount included in shipment is shown in table of Dimensions

Master-Slave accessories

Shape	Description	Remark	Order code
	Male-male extension connector M12-8pin, outer shielding layer	Connection cable, 0.3 m length	Y92E-M12MSM12MSPURSH80.3M-L
		Connection cable, 0.9 m length	Y92E-M12MSM12MSPURSH80.9M-L (included in slave system)
	Alignment kit – end cap	To support alignment of a Master-Slave system	F39-TGR-CL-MSA (included in slave system)

Laser alignment kit

Shape	Description	Remark	Order code
	Laser alignment kit	Scanning range: ≤ 60 m Batteries: 2 × 1.5 V Micro/AAA Laser Class 2 (IEC 60825)	F39-TGR-CL-LLK

Specifications

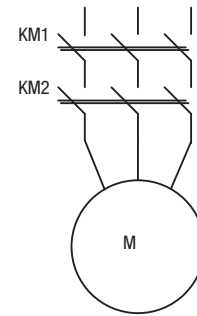
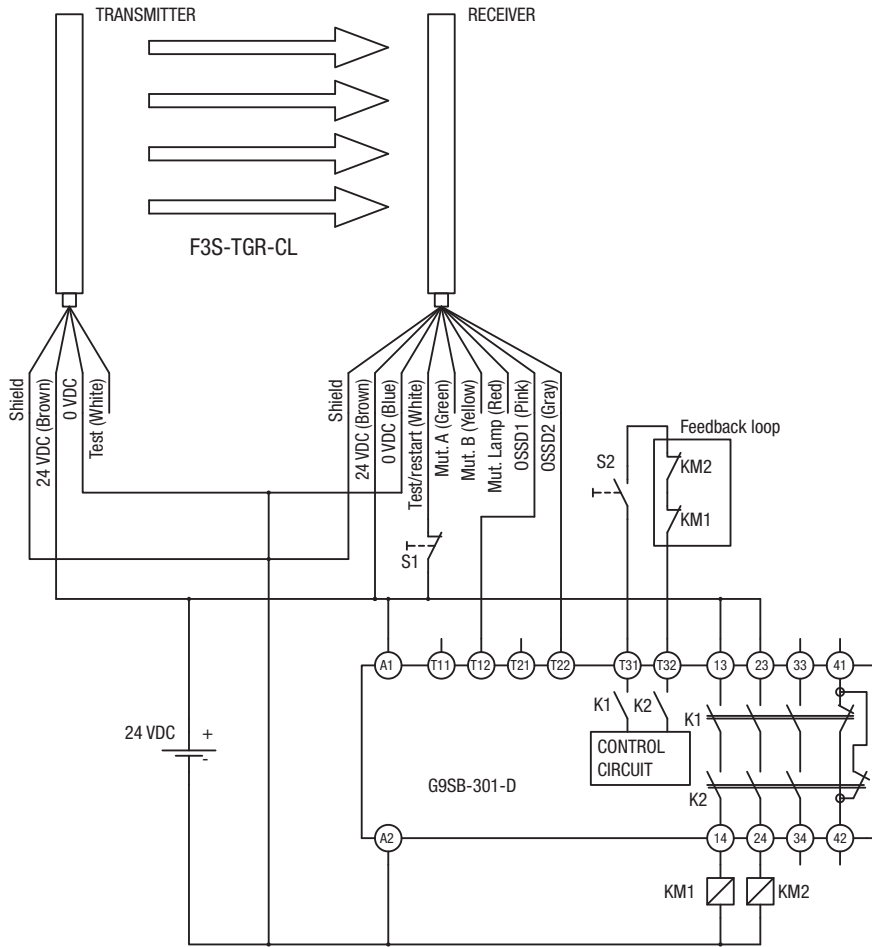
Multi-beam safety sensors

Item	F3S-TGR-CL2_-0_	F3S-TGR-CL4_-0_
Sensor type	Type 2	Type 4
Protective height	500 mm, 800 mm, 900 mm or 1,200 mm	
Operating range	F3S-TGR-CL__-K_ 0.5 to 20 m or 20 to 40 m (Dip switch option) F3S-TGR-CL__-K_-LD 25 to 50 m F3S-TGR-CL__-K2C-500 0.5 to 12 m F3S-TGR-CL__-K3C-800 0.5 to 8 m F3S-TGR-CL__-K4C- 0.5 to 7 m	
Beam pitch	F3S-TGR-CL__-K2_-500: 2 beams, 500 mm F3S-TGR-CL__-K3_-800: 3 beams, 400 mm F3S-TGR-CL__-K4_-900: 4 beams, 300 mm F3S-TGR-CL__-K4_-1200: 4 beams, 400 mm	
Effective aperture angle (EAA)	Within $\pm 5^\circ$	Within $\pm 2.5^\circ$
	for the emitter and receiver at a detection distance of at least 3 m according to IEC 61496-2	
Light source	Infrared LED (880 nm), power dissipation <3 mW, Class 1 per EN 60825-1	
Supply voltage	24 VDC \pm 20%, according EN 60204-1 able to cover a drop of voltage of at least 20 ms	
OSSD	2 PNP transistor outputs, load current 2 \times 250 mA max	
Test functions	Self test (after power ON and during operation)	
Safety-related functions	All models with dip-switch setup for external device monitoring, interlock function, range setting (short and long range) and optical or wired sync. Advanced models with selectable pre-reset function, T-, L- or X- muting function (timeout or infinite muting dip switch option) and muting lamp integrated (only for the non master-slave systems)	
Response time	ON to OFF: Maximum: 13 ms	
Ambient temperature	Operating: -10 to 55°C, Storage: -25 to 70°C (no icing, no condensation)	
Ambient humidity	95% not condensing	
Degree of protection	IP 65 (IEC 60529)	
Materials	Housing: Painted aluminum, Yellow, RAL 1018 Front Window: Acrylic Lexan Red end cap: PA6 (Standalone models), Transparent end cap: PC (Advanced standalone models), Sealing Gasket: EPDM Mounting Bracket: Cold rolled Steel	
Suitable for safety control systems	PLc (ISO 13849-1)	PLe (ISO 13849-1)
Category	Categorie 2	Categorie 4
PFHd	2.5×10^{-9}	
Proof test interval	every 20 years	

Finger- and hand safety protection sensors

Item	F3S-TGR-CL2_-0_	F3S-TGR-CL4_-0_
Sensor type	Type 2	Type 4
Protective height	150 mm to 2,400 mm	
Operating range (short setting or long setting)	F3S-TGR-CL__-014: 0.2 m to 3 m or 3 m to 6 m (Dip switch option) F3S-TGR-CL__-035: 0.2 m to 7 m or 7 m to 14 m (Dip switch option) F3S-TGR-CL__-070: 0.2 m to 7 m or 7 m to 14 m (Dip switch option)	
Detection capability	F3S-TGR-CL__-014: Opaque objects 14 mm in diameter F3S-TGR-CL__-035: Opaque objects 35 mm in diameter F3S-TGR-CL__-070: Opaque objects 70 mm in diameter	
Effective aperture angle (EAA)	Within $\pm 5^\circ$	Within $\pm 2.5^\circ$
	for the emitter and receiver at a detection distance of at least 3 m according to IEC 61496-2	
Light source	Infrared LED (880 nm), power dissipation <3 mW, Class 1 per EN 60825-1	
Supply voltage	24 VDC \pm 20%, according EN 60204-1 able to cover a drop of voltage of at least 20 ms	
OSSD	2 PNP transistor outputs, load current 2 \times 250 mA max	
Series connection	Number of connections: One master and one slave safety light curtain Total number of beams \leq 336 Maximum interconnect cable length: 900 mm	
Test functions	Self test (after power ON and during operation)	
Safety-related functions	All models with dip-switch setup for external device monitoring, interlock function, range setting (short and long range) and optical or wired sync. Advanced models with selectable pre-reset function, T-, L- or X- muting function (timeout muting), blanking, single / double brake function and muting lamp integrated (only for the non master-slave systems)	
Response time	ON to OFF: 14 ms to 103 ms	
Ambient temperature	Operating: -10 to 55°C, Storage: -25 to 70°C (no icing, no condensation)	
Ambient humidity	95% not condensing	
Degree of protection	IP 65 (IEC 60529)	
Materials	Housing: Painted aluminum, Yellow, RAL 1018 Front Window: Acrylic Lexan Red end cap: PA6 (Standalone models), Transparent end cap: PC (Advanced standalone models), Die cast aluminium (Master-, Slave models) Sealing Gasket: EPDM Mounting Bracket: Cold rolled Steel	
Suitable for safety control systems	PLc (ISO 13849-1)	PLe (ISO 13849-1)
Category	Categorie 2	Categorie 4
PFHd	2.5×10^{-9}	
Proof test interval	every 20 years	

F3S-TGR-CL and GSB-301-D in manual reset



Note: This circuit achieves up to PLe according to EN ISO 13849-1 with F3S-TGR-CL4 and up to PLc according to EN ISO 13849-1 with F3S-TGR-CL2.



Adjustable stands family

F39-TGR-AS adjustable stands product family is used to easily install, align and protect multi-beam safety sensors in the F3S-TGR-CL range. Optional mirror kits support perimeter guarding. Adjustable muting sensor mounting systems support L-, T- and X-muting.

- Robust adjustable stands in 1,200 mm and 1,600 mm
- Muting accessories for T-, X- and L-muting
- Mirror system for 2-, 3- and 4-beam applications
- Simple installation of the safety sensors
- Easy alignment of the stand by integrated level on top
- Integrated cable support plus optional cable cover

Ordering information

Adjustable stands

		Order code
Adjustable stand, 1,200 mm high	Safety sensors, Mirror systems	F39-TGR-AS-B1200
Adjustable stand, 1,600 mm high	Safety sensors, Mirror systems, Muting applications	F39-TGR-AS-B1600

Mirror system for multi-beam safety sensors (F3S-TGR-CL_-K_)

		Order code
Mirror mounting plate	2-, 3- and 4-beam systems ≤900 mm	F39-TGR-AS-MM1
	4-beam system 1,200 mm	F39-TGR-AS-MM2
Adjustable mirror kit	Use 1 pcs F39-TGR-AS-AM1 for each beam of the safety sensor	F39-TGR-AS-AM1

Muting accessories

		Order code
Mounting system for muting sensors	For L-muting	F39-TGR-AS-MA-MBL
	For X- and T-muting	F39-TGR-AS-MA-MBXT
Mounting bracket for muting sensors	For OMRON E3Z and E3G-family	F39-TGR-AS-MA-MSM
Mounting bracket for reflectors	For OMRON E39-R1S	F39-TGR-AS-MA-MRM

Cable cover

		Order code
Cable cover	For 1,200 mm stand	F39-TGR-AS-MA-CC12
	For 1,600 mm stand	F39-TGR-AS-MA-CC16

Specifications

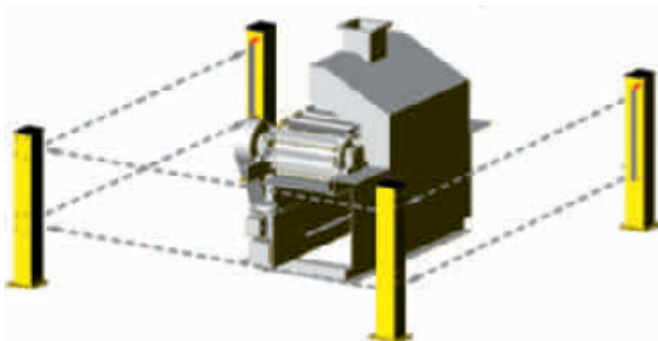
Housing	Painted steel	
Ambient temperature	During operation; -25 to 80°C (with no dew condensation)	
Adjustment range	Rotation	±15°
	vertical	F3S-TGR-CL-Sensor can be adjusted ±100 mm
	horizontal	±10°

Configuration examples

3-sided guarding, 2-beam system

e.g. F3S-TGR-CL4B-K2-500

- 1) Adjustable stand F39-TGR-AS-B1200 (4 x)
- 2) Mirror mounting plate F39-TGR-AS-MM1 (2 x)
- 3) Mirror kit F39-TGR-AS-AM1 (4 x)



Muting system, X-muting, active/passive setup

e.g. F3S-TGR-CL4A-K2C-500

- 1) Adjustable stand F39-TGR-AS-B1600 (2 x)
- 2) Muting mounting system F39-TGR-AS-MA-MBXT (2 x)
- 3) Mounting bracket (sensor) F39-TGR-AS-MSM
- 4) Mounting bracket (reflector) F39-TGR-AS-MRM





Muting actuators

The F39-TGR-MCL- _ muting actuators are plug-and-play accessories for the F3S-TGR-CL Safety Sensors. Easy wiring of the entire muting system is provided by connection boxes managing all connections needed.

- Active/active and active/passive systems supported
- T- and L- shape muting by using same parts
- Selectable muting sensor sequence
- Pre-installed mounting brackets
- Pre-wired connection cables
- Supporting Type 2 and Type 4 applications

Ordering information

Muting actuators (mounting brackets are included)

		Order code
Transmitter + Receiver set	active/active	F39-TGR-MCL
Receiver only	active/active	F39-TGR-MCL-D
Transmitter only	active/active	F39-TGR-MCL-L
Transceiver + Reflector set	active/passive	F39-TGR-MCL-R
Transceiver only	active/passive	F39-TGR-MCL-R-A
Reflector only	active/passive	F39-TGR-MCL-R-P

Connection boxes

	Order code
Connection box for Receivers and Transceivers	F39-TGR-MCL-CMD
Connection box for Transmitters	F39-TGR-MCL-CML

Mounting brackets

	Order code
Mounting bracket for one muting actuator	F39-TGR-MCL-ST

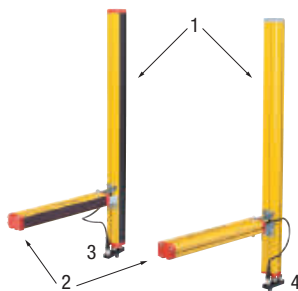
Specifications

Power supply	24 VDC±20%	
Consumption	5 W max (F39-TGR-MCL- _ only)	
Ambient temperature	During operation; -10 to + 55°C (with no dew condensation)	
Cable connector	Length	30 cm pre-wired
	RX	M12 5-pin female
	TX	M12 5-pin female
Degree of protection	IP65	
Distance between muting beams	250mm	
F39-TGR-MCL	Optical data	Through-beam system
	Operating distance	0 ... 7 m; max. 0 ... 8,4 m
	Light source	Red emitting LEDs, Wavelength 630 nm
F39-TGR-MCL-R	Optical data	Polarized retro-reflective system
	Operating distance	0 ... 4 m; max. 0 ... 4,8 m
	Light source	Red emitting LEDs, Wavelength 660 nm

Configuration examples

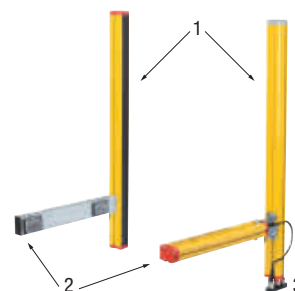
L-muting, active/active

- 1) Safety sensor (e.g. F3S-TGR-CL4A-K2-500)
- 2) Muting actuators F39-TGR-MCL
- 3) Connector box F39-TGR-MCL-CML
- 4) Connector box F39-TGR-MCL-CMD



L-muting, active/passive

- 1) Safety Sensor (e.g. F3S-TGR-CL4A-K2C-500)
- 2) Muting actuators F39-TGR-MCL-R
- 3) Connection box F39-TGR-MCL-CMD





Single-beam safety sensor in compact housing

The slender M18-sized E3FS is a type 2 safety single beam with an operating range of up to 10 m. Plastic and metal housing, cable and M12-connector offer flexibility in application together with a control unit such as F3SP-U3P or F3SP-U5P.

- Sensing distance up to 10 m
- LEDs for easy alignment and diagnosis
- Cable and M12 plug categories
- Plastic and metal housing
- Type 2 sensor complying with EN 61496-1

Ordering information

Safety single beam sensors (Type 2)

Case material	Operation distance	Order code	
Plastic	0 to 10 m	Cable type	E3FS-10B4
		Plug type	E3FS-10B4-P1
Nickel brass		Cable type	E3FS-10B4-M
		Plug type	E3FS-10B4-M1-M

Controller for safety single beam sensors

Sensors	Output contacts	Width	Order code
1 to 2 Safety single beam sensors	2 NO 2.5 A	22.5 mm	F3SP-U3P-TGR
1 to 4 Safety single beam sensors		45 mm	F3SP-U5P-TGR

Specifications

Sensors

Sensing method	Through-beam
Controller	F3SP-U3P-TGR, F3SP-U5P-TGR
Supply voltage (Vs)	24 VDC ± 10% (ripple p-p 10% max.)
Effective aperture angle (EAA)	±5° (at 3 m)
Current consumption	Emitter: 50 mA max. Receiver: 25 mA max.
Sensing distance	10 m
Standard sensing object	Opaque object: 11 mm min. in diameter
Response time	2.0 ms (E3FS only)
Control output	PNP transistor output, load current: 100 mA max.
Test input (emitter)	21.5 to 24 VDC: Emitter OFF (source current: 3 mA max.) Open or 0 to 2.5 V: Emitter ON (leakage current: 0.1 mA max.)
Ambient light intensity	Incandescent lamp: 3,000 lx max. (light intensity on the receiver surface) Sunlight: 10,000 lx max. (light intensity on the receiver surface)
Ambient temperature	Operating: -20°C +55°C, storage: -30°C +70°C (with no icing or condensation)
Degree of protection	IP67 (IEC 60529)
Light source	Infrared LED
Protection	Output short-circuit protection, reverse polarity protection

Controllers

Item	F3SP-U3P	F3SP-U5P
Number of sensors	1 to 2 safety single beam sensor	1 to 4 safety single beam sensor
Width	22.5 mm	45 mm
Muting input	2 Inputs	4 Inputs
Safety related function	Override function Muting lamp connection Interlock system (automatic and manual reset)	
Power supply voltage	24 VDC ±10%	
Power consumption	420 mA max.	
Output contacts	2 NO 2.5 A (protected by fuse), 115 VAC max.	2 NO 2.5 A (protected by fuse), 250 VAC max.
Indicators	6 LED for status and diagnostics	
Degree of protection	IP20 (IEC 60529)	
Terminal	16 screw terminals, detachable blocks with '4pin'	32 screw terminals, detachable blocks with '4pin'
Response time	≤ 30 ms	
Ambient temperature	Operation: -10°C +55°C	
Housing material	Plastic; DIN rail mounting	



OS32C Safety laser scanner

- Type 3 safety laser scanner complies with IEC61496-1/-3
- 70 sets of safety zone and warning zone combinations are available, supporting complicated changes in working environments
- A safety radius up to 3 m and warning zone(s) radius up to 10 m can be set
- 8 Individual sector indicators and various LED indications allow the user to determine scanner status at a glance
- Reference boundary monitoring function prevents unauthorized changes in the scanner position
- Configurable minimum object resolution of 30, 40, 50 or 70 mm, for hand and arm detection applications

Ordering information

Description	Order code	Description	Remarks	Order code
OS32C with back location cable entry	OS32C-BP	Configuration tool	CD-ROM OS supported: Windows 2000, XP, Vista, Windows 7	included
OS32C with side location cable entry ^{*1}	OS32C-SP1			
OS32C with back location cable entry EtherNet/IP capable for status measurement data reporting	OS32C-BP-DM			
OS32C with side location cable entry ^{*1} EtherNet/IP capable for status measurement data reporting	OS32C-SP1-DM			

^{*1} Each connector is located on the left as viewed from the back of the I/O block.

Note: This laser scanner may not be sold or imported into or used in the Federal Republic of Germany prior to December 1, 2013.

Specifications

Sensors

Sensor type	Type 3 safety laser scanner
Safety category	Category 3, performance level d (ISO13849-1: 2006)
Detection capability	Configurable; Non-transparent with a diameter of 30, 40, 50 or 70 mm (1.8% reflectivity or greater)
Monitoring zone	Monitoring zone set count: (Safety zone + 2 warning zones) × 70 sets
Operating range	Safety Zone: 3.0 m (min. obj. resolution of 50 mm or 70 mm) 2.5 m (min. obj. resolution of 40 mm) 1.75 m (min. obj. resolution of 30 mm) Warning Zone: 10.0 m
Detection angle	270°
Response time	Response time from ON to OFF: From 80 ms (2 scans) to 680 ms (up to 17 scans) Response time from OFF to ON: Response time from ON to OFF + 100 ms to 60 s (configurable)
Line voltage	24 VDC +25%/–30% (ripple p-p 2.5 V max.)
Power consumption	Normal operation: 5 W max., 4 W typical (without output load) ^{*1} Standby mode: 3.75 W (without output load)
Safety output (OSSD)	PNP transistor × 2, load current of 250mA max., residual voltage of 2 V max., load capacity of 2.2 µf max., leak current of 1 mA max. ^{*1,*2,*3}
Auxiliary output (Non-safety)	NPN/PNP transistor × 1, load current of 100 mA max., residual voltage of 2 V max., leak current of 1 mA max. ^{*2,*3,*4}
Warning output (Non-safety)	NPN/PNP transistor × 1, load current of 100 mA max., residual voltage of 2 V max., leak current of 1 mA max. ^{*2,*3,*4}
Output operation mode	Auto start, start interlock, start/restart interlock
Input	External Device Monitoring (EDM) ON: 0 V short (input current of 50 mA), OFF: Open
	Start ON: 0 V short (input current of 20 mA), OFF: Open
	Zone select ON: 24 V short (input current of 5 mA), OFF: Open
	Stand-by ON: 24 V short (input current of 5 mA), OFF: Open
Connection type	Power cable: 18-pin mini-connector (pigtail) Communication cable: M12, 4-pin connector
Connection with PC	Communication: Ethernet
Indicators	RUN indicator: Green, STOP indicator: Red, Interlock indicator: Yellow, Warning output indicator: Orange, Status/diagnostic display: 2 × 7-segment LEDs, Intrusion indicators: Red LED × 8
Enclosure rating	IP65 (IEC60529)
Dimensions (W × H × D)	133.0 × 104.5 × 142.7 mm (except cable)
Weight (Main Unit only)	1.3 kg
Approvals	Certified by: TÜV Rheinland, UL Major standards: IEC61496-1/-3 (Type 3), IEC61508 (SIL2), ISO13849-1:2008 (Category 3, performance level d), UL508, UL1998

^{*1} Rated current of OS32C is 1.025 A max. (OS32C 210 mA + OSSD A load + OSSD B load + auxiliary output load + warning output load + functional inputs). Where functional inputs are: EDM input ... 50 mA, Start input ... 20 mA, Standby input ... 5 mA, Zone X input ... 5 mA × 8 (eight zone set select inputs).


^{*2} Output voltage is input voltage – 2.0 VDC.

^{*3} Total consumption current of 2 OSSDs, auxiliary output, and warning output must not exceed 700 mA.


^{*4} Output polarity (NPN/PNP) is configurable via the configuration tool.

Accessories (sold separately)

Power cable

Appearance	Description	Remarks	Order code
	Cable length: 3 m	One cable is required per sensor	OS32C-CBL-03M
	Cable length: 10 m		OS32C-CBL-10M
	Cable length: 20 m		OS32C-CBL-20M
	Cable length: 30 m		OS32C-CBL-30M

Ethernet cable

Appearance	Description	Remarks	Order code
	Cable length: 2 m	Required for configuration and monitoring	OS32C-ECBL-02M
	Cable length: 5 m		OS32C-ECBL-05M
	Cable length: 15 m		OS32C-ECBL-15M







Note: An ethernet cable with an M12, 4-pin connector is required.

Mounting brackets

Appearance	Description	Remarks	Order code
	Bottom/side mounting bracket	Bottom/side mounting bracket × 1, unit mounting screws × 4 sets	OS32C-BKT1
	XY axis rotation mounting bracket	XY axis rotation mounting bracket × 1, unit mounting screws × 6 sets, bracket mounting screws × 1 set (must be used with OS32C-BKT1)	OS32C-BKT2
	Simple mounting bracket	Simple mounting brackets × 2, unit mounting screws × 4 sets ^{*1}	OS32C-BKT3
	Protective cover for window		OS32C-BKT4
	Mounting stand	When using a mounting stand, use an OS32C with side location cable entry (OS32C-SP1). The OS32C with back location cable entry (OS32C-BP) cannot be mounted. Use with mounting brackets (OS32C-BKT1 and OS32C-BKT2).	OS32C-MT
	Hardware kit for mounting stand	Mounting screws × 3 sets Use this when mounting a bracket to the mounting stand.	OS32C-HDT

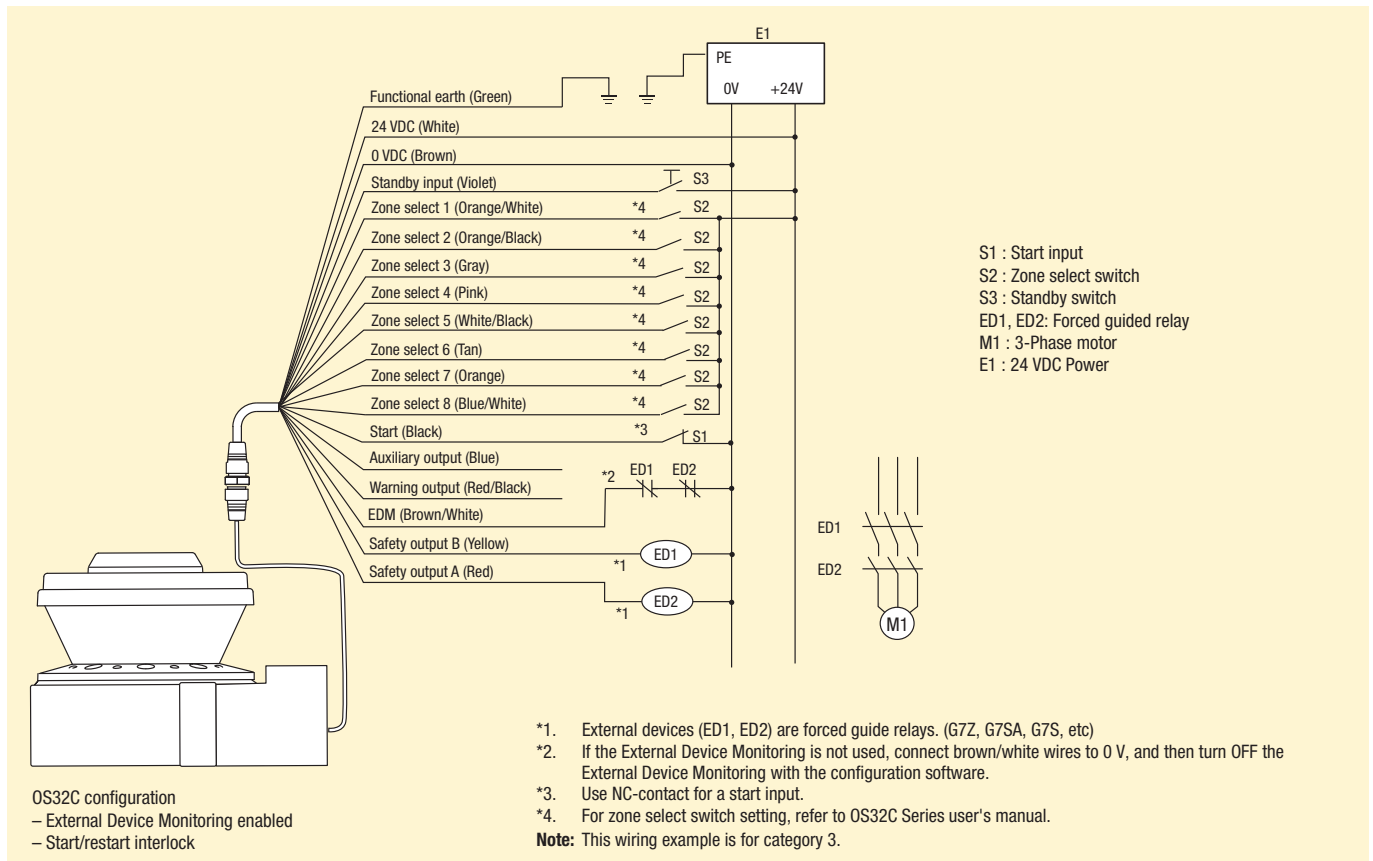
*1 There are eight OS32C mounting screws: four screws for singular use, and four screws for protective cover for window.

Miscellaneous

Appearance	Description	Remarks	Order code
	Scan window	Spare for replacement	OS32C-WIN-KT
	Sensor block without I/O block EtherNet capable for configuration and monitoring	Spare for replacement	OS32C-SN
	Sensor block without I/O block EtherNet/IP capable for status and measurement data reporting	Spare replacement for EtherNet/IP	OS32C-SN-DM
	I/O block	With cable access from the back	OS32C-CBBP
		With cable access from the left side	OS32C-CBSP1
	Window cleaning kit, anti-static cleaner	Accessory	WIN-CLN-KT

Connection

Basic connection with single OS32C unit
Category 3, performance level d (ISO13849-1)

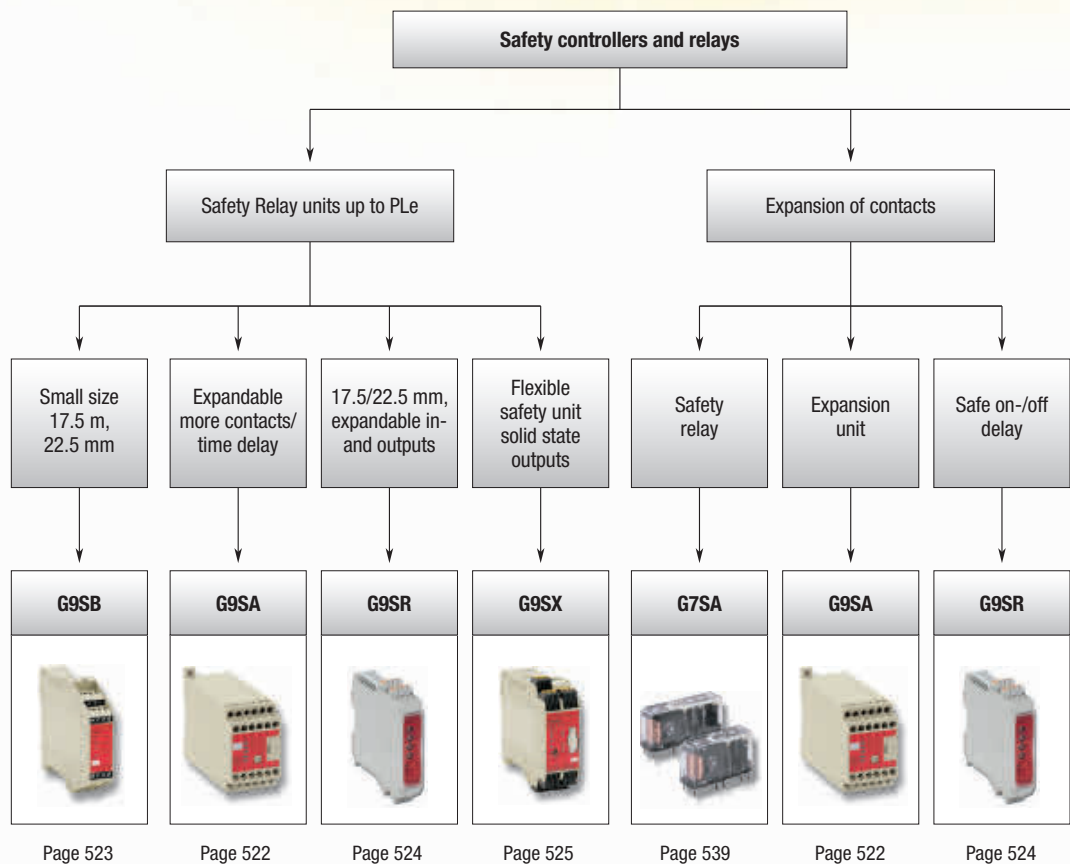


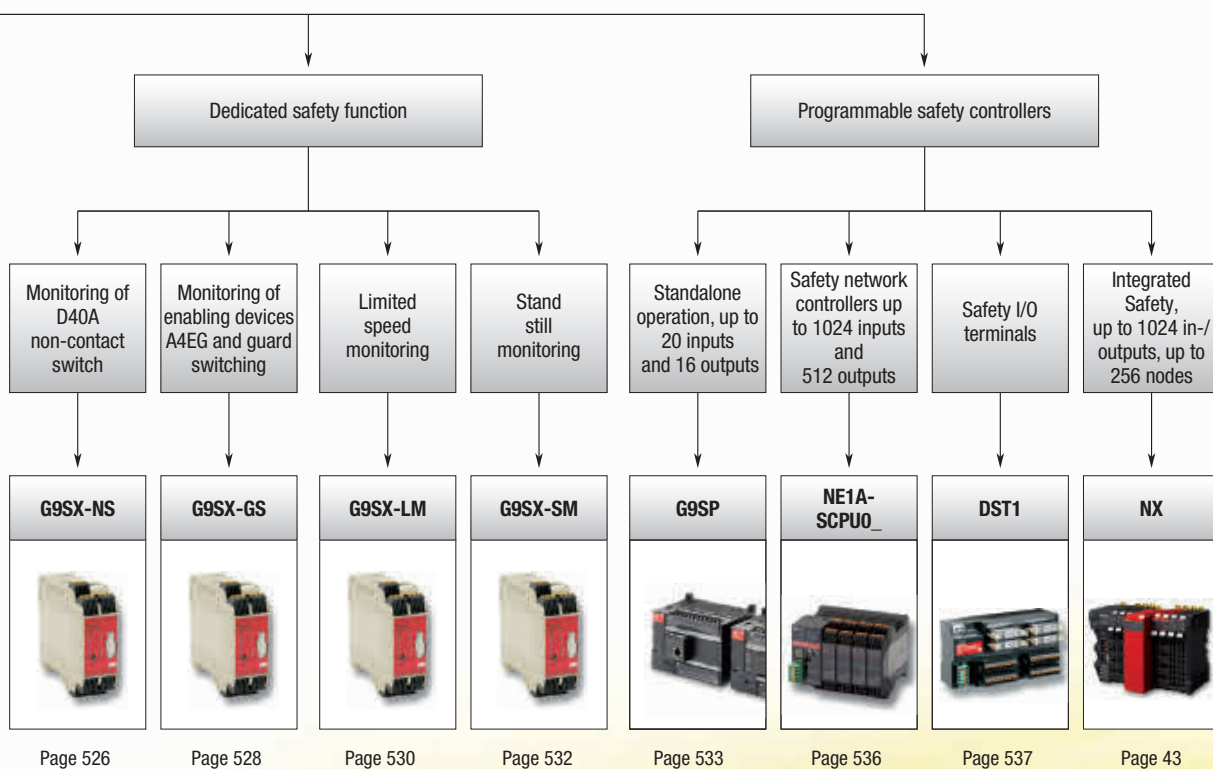
BREAK THROUGH BARRIERS IN SAFETY DESIGN

Configurable, flexible and simple





Omron safety controllers offer transparent standalone operation and scalability in safety networking applications for all sizes of machine safety control systems. The G9SP safety controller is simple to configure and setup and overcomes limitations of hard-wired solutions by adding flexibility of a software - based solution. Total cost of ownership is reduced by having user-defined function blocks and an integrated simulation tool for debugging or the application program.





- EN ISO 13849-1 (PLe) and IEC 61508 (SIL3) certification for future-proof design of the safety system
- Predefined function blocks for simple configuration and self-explanatory validation
- Equipped with Ethernet and serial interface for transparent diagnosis





Selection table

		Safety relay units		Safety relays	Flexible safety unit
					
		G9SA	G9SB	G9SR	G9SX
Selection criteria	Model	G9SA	G9SB	G9SR	G9SX
	Performance level	up to PLe acc. EN ISO 13849-1 depending on application			
	Safety integrity level (IEC 61508)	–	–	–	SIL 3
	Reaction time	max. 10 ms	max. 10 ms	depend on safety application	15 ms
	DeviceNet safety Bus interface	–	–	–	–
	Standard DeviceNet Bus interface	–	–	–	–
	EDM function	■	■	■	■
	Interlock function	■	■	■	■
	Logical 'AND' connection	–	–	■	■
	Relay expansion units	■	–	–	■
	Housing	Plastic	Plastic	Plastic	Plastic
	Operating temperature	–25 to 55°C	–25 to 55°C	–10 to 55°C	–10 to 55°C
	Flux-tight	–	–	–	–
Features	Number of poles	–	–	–	–
	Gold clad contacts	–	–	–	–
	Relay socket	–	–	–	–
	Detachable cage clamp terminals	–	–	■	■
	Screw terminals	■	■	optional	■
	Safe timing functions	■	–	on-delay and off-delay	■
	USB-interface	–	–	–	–
Programming software	–	–	–	–	
Application	E-Stop application	■	■	■	■
	Door switch monitoring	■	■	■	■
	Safety light curtain monitoring	■	■	■	■
	EDM monitoring	■	■	■	■
	Interlock function	■	■	■	■
	Logic function blocks	–	–	■	–
	Safe ON delay timer	–	–	■	–
	Safe OFF delay timer	■	–	■	■
	Two-Hand control	■	–	■	–
	Manual/automatic reset	■	■	■	■
	Non-contact switches monitoring	–	–	■	■
	Guard switching/enabling function	–	–	■	■
	limited speed monitoring	–	–	–	■
	standstill monitoring	–	–	–	■
General safety application	■	■	■	■	
Supply voltage	24 VDC	■	■	■	■
	100 VAC to 240 VAC	■	–	–	–
In- and outputs	Safety inputs	■	■	■	■
	Test signal output	–	–	■	■
	Solid state safety outputs	–	–	■	■
	Safety relay outputs	3PST-NO, 5PST-NO	DPST-NO, 3PST-NO	DPST-NO, 3PST-NO	■
	Auxiliary outputs	SPST-NC	SPST-NC	Solid state, SPST-NO	■
	4PST-NO + DPST-NC	–	–	–	–
	3PST-NO + 3PST-NC	–	–	–	–
	3PST-NO + SPST-NC	–	–	–	–
	DPST-NO + DPST-NC	–	–	–	–
5PST-NO + SPST-NC	–	–	–	–	
Page	522	523	524	525	

		Safety relays	Programmable safety system			
						
		G7SA	G9SP	NE1A-SCPU0_	DST1	
Selection criteria	Model					
	Performance level	–	up to PLe acc. EN ISO 13849-1 depending on application			
	Safety integrity level (IEC 61508)	–	SIL 3			
	Reaction time	–	dependent on safety application program			
	DeviceNet safety Bus interface	–	–	■	■	
	Standard DeviceNet Bus interface	–	Diagnosis via Ethernet and Serial interface (option)		■	
	EDM function	–	■	■	■	
	Interlock function	–	■	■	■	
	Logical 'AND' connection	–	–	–	–	
	Relay expansion units	–	–	–	–	
	Housing	Plastic	Plastic	Plastic	Plastic	
	Operating temperature	–40 to 85°C	–10 to 55°C	–10 to 55°C	–10 to 55°C	
	Features	Flux-tight	■	–	–	–
Number of poles		4pole and 6pole	–	–	–	
Gold clad contacts		■	–	–	–	
Relay socket		■	–	–	–	
Detachable cage clamp terminals		–	–	■	■	
Screw terminals		–	■	–	–	
Safe timing functions		–	■	■	■	
USB-interface		–	■	■	–	
Programming software		–	■	■	–	
Application		E-Stop application	–	■	■	■
		Door switch monitoring	–	■	■	■
		Safety light curtain monitoring	–	■	■	■
		EDM monitoring	–	■	■	■
	Interlock function	–	■	■	■	
	Logic function blocks	–	■	■	■	
	Safe ON delay timer	–	■	■	■	
	Safe OFF delay timer	–	■	■	■	
	Two-Hand control	–	■	■	■	
	Manual/automatic reset	–	■	■	■	
	Non-contact switches monitoring	–	■	■	■	
	Guard switching/enabling function	–	■	■	■	
	Supply voltage	limited speed monitoring	–	–	–	■
standstill monitoring		–	–	–	■	
General safety application		■	■	■	■	
24 VDC		■	■	■	■	
100 VAC to 240 VAC		–	–	–	–	
In- and outputs		Safety inputs	–	■	■	■
		Test signal output	–	■	■	■
		Solid state safety outputs	–	■	■	■
		Safety relay outputs	–	–	–	■
		Auxiliary outputs	–	■	■	■
		4PST-NO + DPST-NC	■	–	–	–
		3PST-NO + 3PST-NC	■	–	–	–
		3PST-NO + SPST-NC	■	–	–	–
	DPST-NO + DPST-NC	■	–	–	–	
5PST-NO + SPST-NC	■	–	–	–		
Page	539	533	536	537		

■ Standard

– No/not available



Expandable safety relay unit

G9SA-family offers a complete line-up of compact and expandable safety relay units. Modules with safe OFF-delay timing are available as well as a two-hand controller. Simple multiplication of safety contacts is possible by using the connection on the front.

- 45 mm-wide housing, expansion units are 17.5 mm wide
- Safe OFF-delay timer
- Simple expansion connection
- Certification up to PLe according to EN ISO 13849-1 depending on the application

Ordering information

Emergency-stop units

Main contacts	Auxiliary contact	Number of input channels	Rated voltage	Order code
3PST-NO	SPST-NC	1 channel or 2 channels possible	24 VAC/VDC	G9SA-301
			100 to 240 VAC	
5PST-NO	SPST-NC	1 channel or 2 channels possible	24 VAC/VDC	G9SA-501
			100 to 240 VAC	

Emergency-stop OFF-delay units

Main contacts	OFF-delay contacts	Auxiliary contact	Number of input channels	OFF-delay time	Rated voltage	Order code
3PST-NO	DPST-NO	SPST-NC	1 channel or 2 channels possible	7.5 s	24 VAC/VDC	G9SA-321-T075
					100 to 240 VAC	
				15 s	24 VAC/VDC	G9SA-321-T15
				30 s	24 VAC/VDC	G9SA-321-T30
					100 to 240 VAC	

Two-hand controller

Main contacts	Auxiliary contact	Number of input channels	Rated voltage	Order code
3PST-NO	SPST-NC	2 channels	24 VAC/VDC	G9SA-TH301
			100 to 240 VAC	

Expansion unit

The expansion unit connects to a G9SA-301, G9SA-501, G9SA-321, or G9SA-TH301.

Main contacts	Auxiliary contact	Category	Order code
3PST-NO	SPST-NC	4	G9SA-EX301

Expansion units with OFF-delay outputs

The expansion unit connects to a G9SA-301, G9SA-501, G9SA-321, or G9SA-TH301.

Main contact form	Auxiliary contact	OFF-delay time	Order code
3PST-NO	SPST-NC	7.5 s	G9SA-EX031-T075
		15 s	G9SA-EX031-T15
		30 s	G9SA-EX031-T30

Specifications

Power input

Item	G9SA-301/TH301 / G9SA-501 / G9SA-321-T_
Power supply voltage	24 VAC/VDC: 24 VAC, 50/60 Hz, or 24 VDC 100 to 240 VAC: 100 to 240 VAC, 50/60 Hz
Operating voltage range	85 to 110% of rated power supply voltage

Inputs

Item	G9SA-301/321-T_/TH301	G9SA-501
Input current	40 mA max.	60 mA max.

Contacts

Item	G9SA-301/501/321-T_/TH301/EX301/EX031-T_
	Resistive load (cosφ= 1)
Rated load	250 VAC, 5 A
Rated carry current	5 A

Characteristics

Item	G9SA-301/TH301 / G9SA-501/321-T_ / G9SA-EX301/EX031-T_	
Operating time	30 ms max. (not including bounce time)	
Response time *1	10 ms max. (not including bounce time)	
Durability	Mechanical	5,000,000 operations min. (at approx. 7,200 operations/hr)
	Electrical	100,000 operations min. (at approx. 1,800 operations/hr)
Minimum permissible load (reference value)	5 VDC, 1 mA	
Ambient temperature	Operating: -25 to 55°C (with no icing or condensation) Storage: -25 to 85°C (with no icing or condensation)	

*1 The response time is the time it takes for the main contact to open after the input is turned OFF.



Slim-size safety unit

G9SB is a family of slender safety relay units, providing two safety contacts in a 17.5 mm- and three safety contacts in a 22.5mm-wide housing.

- 17.5 mm- and 22.5 mm-wide housing
- 1- and 2-input channel units
- Manual and automatic reset units
- Certification up to PLE according to EN ISO 13849-1 depending on the application

Ordering information

Main contacts	Auxiliary contact	Number of input channels	Reset mode	Input type	Rated voltage	Size (HxWxD)	Order code	
DPST-NO 2 safety contacts	None	2 channels	Auto-reset	Inverse	24 VAC/VDC	100 mmx17.5 mmx112 mm	G9SB-2002-A	
		1 channel or 2 channels		+ common			G9SB-200-B	
		2 channels	Manual-reset	Inverse			G9SB-2002-C	
		1 channel or 2 channels		+ common			G9SB-200-D	
3PST-NO 3 safety contacts	SPST-NC	None (direct breaking)	Auto-reset	-	24 VDC	100 mmx17.5 mmx112 mm	G9SB-3010	
		2 channels		Inverse	+ common	24 VAC/VDC	100 mmx22.5 mmx112 mm	G9SB-3012-A
		1 channel or 2 channels						G9SB-301-B
		2 channels	Manual-reset	Inverse	+ common			G9SB-3012-C
		1 channel or 2 channels						G9SB-301-D

Specifications

Power input

Item	G9SB-200 _ _	G9SB-3010	G9SB-301 _ _
Power supply voltage	24 VAC/VDC: 24 VAC, 50/60 Hz, or 24VDC 24 VDC: 24 VDC		
Operating voltage range	85 to 110% of rated power supply voltage		
Power consumption	1.4 VA/1.4 W max.	1.7 W max.	1.7 VA/1.7 W max.

Inputs

Item	G9SB-200 _ _	G9SB-3010	G9SB-301 _ _
Input current	25 mA max.	60 mA max. (See note.)	30 mA max.

Note: Indicates the current between terminals A1 and A2.

Contacts

Item	G9SB-200 _ _	G9SB-3010	G9SB-301 _ _
	Resistive load (cosφ= 1)		
Rated load	250 VAC, 5 A		
Rated carry current	5 A		

Characteristics

Item	G9SB-200 _ _	G9SB-3010	G9SB-301 _ _
Response time *1	10 ms max.		
Durability	Mechanical	5,000,000 operations min. (at approx. 7,200 operations/hr)	
	Electrical	100,000 operations min. (at approx. 1,800 operations/hr)	
Minimum permissible load (reference value)	5 VDC, 1 mA		
Ambient operating temperature	-25°C +55°C (with no icing or condensation)		

*1 The response time is the time it takes for the main contact to open after the input is turned OFF.



Compact safety relay unit family

G9SR family modules operate standalone and as a system with input and output extension. All modules are simple to set up using DIP-switches and provide clear diagnosis via LEDs on the front.

- Three modules for all safety relay unit applications
- Solid-state outputs for long life and high current safety relay outputs
- Detailed LED indications enable easy diagnosis
- Safe on- and off-delay function up to PLe
- Up to PLe according to EN ISO 13949-1 and SIL 3 according to EN 61508

Ordering information

Advanced unit

Safety outputs	Auxiliary outputs	No. of input channels	Rated voltage	Terminal block type	Order code
Instantaneous					
2 PST-NO (contact)	1 PNP transistor outputs	1 or 2 channels	24 VDC	removable cage clamp terminals	G9SR-AD201-RC

Basic unit

Safety outputs	Auxiliary outputs	No. of input channels	Rated voltage	Terminal block type	Order code
Instantaneous					
2 P channel MOS FET transistor output	1 PNP transistor output	1 or 2 channels	24 VDC	removable cage clamp terminals	G9SR-BC201-RC

Expansion unit

Safety outputs		Auxiliary outputs	Rated voltage	Terminal block type	Order code
Instantaneous	ON/OFF-delayed				
–	3 PST-NO (contact) ^{*1}	1 (solid state) PNP transistor outputs	24 VDC	removable cage clamp terminals	G9SR-EX031-T90-RC

^{*1} The ON/OFF delay time can be set in 16 steps as follows: 0/0.1/0.2/0.5/1/1.5/2/2.5/5/10/20/30/45/60/75/90 s

Specifications

Power input

Item	G9SR-AD_	G9SR-BC_	G9SR-EX_
Rated supply voltage	19.2 to 28.8 VDC (24 VDC ±20%)		

Inputs

Item	G9SR-AD_	G9SR-BC_	G9SR-EX_
Safety input	Operating voltage: 19.2 VDC to 28.8 VDC, internal impedance: Approx. 3 kΩ		
Feedback/reset input			

Outputs

Item	G9SR-BC202-_
Instantaneous safety output	P channel MOS FET transistor output Load current: Using 2 outputs: 2 A DC max.
Auxiliary output	PNP transistor output Load current: 500 mA max.

Expansion unit

Item	G9SR-AD_	G9SR-EX_
Rated load	250 VAC, 5 A AC15 (inductive load)	
Rated carry current	6 A	
Maximum switching voltage	250 VAC	

Characteristics

Item	G9SR-AD_	G9SR-BC_	G9SR-EX_
Operating time (OFF to ON state)	150 ms max.		
Response time (ON to OFF state)	50 ms max.		
Durability	Electrical	–	
	Mechanical	–	
Ambient temperature	–10°C +55°C (with no icing or condensation)		



Flexible safety unit

G9SX-family modules can be connected by a logical "AND" function to implement partial/global stopping of a machine. Solid-state outputs, detailed LED diagnosis and clever feedback signals help to keep maintenance easy. The line-up is completed by expansion units with safe timing functions.

- Clear and transparent segmentation of safety functions by use of unique "AND" connection
- Solid-state outputs for long life and relay outputs in extension box available
- Detailed LED indications enable easy diagnosis
- Clever feedback signals for easy maintenance
- PLe according to EN ISO 13849-1 and SIL 3 according to EN 61508

Ordering information

Advanced unit

Safety outputs		Auxiliary outputs	No. of input channels	Max. OFF-delay time ^{*1}	Rated voltage	Terminal block type	Order code
Instantaneous	OFF-delayed						
3 P channel MOS-FET transistor output	2 P channel MOS-FET transistor output	2 PNP transistor outputs	1 or 2 channels	0 to 15 sec in 16 steps	24 VDC	Screw terminals Cage clamp terminals	G9SX-AD322-T15-RT G9SX-AD322-T15-RC
2 P channel MOS-FET transistor output	2 P channel MOS-FET transistor output	2 PNP transistor outputs	1 or 2 channels	0 to 150 sec in 16 steps	24 VDC	Screw terminals Cage clamp terminals	G9SX-AD-322-T150-RT G9SX-AD-322-T150-RC
				0 to 15 sec in 16 steps	24 VDC	Screw terminals Cage clamp terminals	G9SX-ADA-222-T15-RT G9SX-ADA-222-T15-RC
				0 to 150 sec in 16 steps	24 VDC	Screw terminals Cage clamp terminals	G9SX-ADA-222-T150-RT G9SX-ADA-222-T150-RC
				0 to 150 sec in 16 steps	24 VDC	Screw terminals Cage clamp terminals	G9SX-ADA-222-T150-RT G9SX-ADA-222-T150-RC

*1 The OFF-delay time can be set in 16 steps as follows: T15: 0/0.2/0.3/0.4/0.5/0.6/0.7/1/1.5/2/3/4/5/7/10/15 s, T150: 0/10/20/30/40/50/60/70/80/90/100/110/120/130/140/150 s.

Basic unit

Safety outputs		Auxiliary outputs	No. of input channels	Rated voltage	Terminal block type	Order code
Instantaneous	OFF-delayed					
2 P channel MOS FET transistor output	–	2 PNP transistor output	1 or 2 channels	24 VDC	Screw terminals Cage clamp terminals	G9SX-BC202-RT G9SX-BC202-RC

Expansion unit

Safety outputs		Auxiliary outputs	OFF-delay time	Rated voltage	Terminal block type	Order code
Instantaneous	OFF-delayed					
4 PST-NO (contact)	–	2 (solid state) PNP transistor outputs	–	24 VDC	Screw terminals Cage clamp terminals	G9SX-EX401-RT G9SX-EX401-RC
–	4 PST-NO (contact)		Synchronized with G9S-X-AD - unit		Screw terminals Cage clamp terminals	G9SX-EX041-T-RT G9SX-EX041-T-RC

Specifications

Power input

Item	G9SX-AD	G9SX-BC202-	G9SX-EX-
Rated supply voltage	20.4 to 26.4 VDC (24 VDC -15% +10%)		

Inputs

Item	G9SX-AD	G9SX-BC202-
Safety input	Operating voltage: 20.4 VDC to 26.4 VDC, internal impedance: Approx. 2.8 kΩ	
Feedback/reset input		

Outputs

Item	G9SX-AD	G9SX-BC202-
Instantaneous safety output OFF-delayed safety output	P channel MOS FET transistor output Load current: Using 2 outputs or less: 1 A DC max. Using 3 outputs or more: 0.8 A DC max.	P channel MOS FET transistor output Load current: Using 1 output: 1 A DC max. Using 2 outputs: 0.8 A DC max.
Auxiliary output	PNP transistor output Load current: 100 mA max.	

Expansion unit

Item	G9SX-EX-
Rated load	250 VAC, 3A/30 VDC, 3A (resistive load)
Rated carry current	3 A
Maximum switching voltage	250 VAC, 125 VDC

Characteristics

Item	G9SX-AD	G9SX-BC202-	G9SX-EX-
Operating time (OFF to ON state)	50 ms max. (Safety input: ON) 100 ms max. (Logical AND connection input: ON)	50 ms max. (Safety input: ON)	30 ms max.
Response time (ON to OFF state)	15 ms max.		10 ms max.
Durability	Electrical	–	
	Mechanical	–	
Ambient temperature	-10°C +55°C (with no icing or condensation)		



Compact non-contact door switch/ flexible safety unit

Electronic detection mechanism for better stability in non-contact door switch operation.

- Stable operation reduces controller errors caused by unstable doors.
- Connect up to 30 non-contact door switches with LED indicators to one controller.
- Reversible switch provides flexibility in installation.
- Two-colour LED indicator enables easier maintenance by identification of door status and cable disconnections.

Ordering information

Non-contact door switches (switch/actuator)

Classification	Auxiliary outputs	Cable length	Order code
Standard models	Semiconductor outputs *1	2 m	D40A-1C2
		5 m	D40A-1C5
		Pigtail with M12 connector 4-pole	D40A-1C015-F

*1 PNP open-collector semiconductor output.

Note: Must be used in combination with a G9SX-NS_ non-contactdoor switch controller.

Non-contact door switch controllers (Controllers for D40A)

Safety outputs *1	Auxiliary outputs *2	Logical AND connection input	Logical AND connection output	Max. OFF delay time *3	Rated voltage	Terminal block type	Order code	
								Instantaneous
2 (Semi-conductors)	0	2 (Semi-conductors)	1	1	-	24 VDC	Screw terminals	G9SX-NS202-RT
	2 (Semi-conductors)						3.0 s	Spring-cage terminals
							Screw terminals	G9SX-NSA222-T03-RT
							Spring-cage terminals	G9SX-NSA222-T03-RC

*1 P channel MOS FET transistor output

*2 PNP transistor output

*3 The OFF-delay time can be set in 16 steps as follows:
0/0.2/0.3/0.4/0.5/0.6/0.7/0.8/0.9/1.0/1.2/1.4/1.8/2.0/2.5/3.0 s

*4 The OFF-delayed output becomes an instantaneous output by setting the OFF-delay time to 0 s.

Specifications

Ratings/characteristics of non-contact door switches

Item	Model	D40A-1C_
Operating characteristics *1	Operating distance OFF→ON	5 mm min.
	Operating distance ON→OFF	15 mm max.
	Differential travel (max.)	20% of operating distance
Ambient operating temperature		-10 to 55°C (no icing or condensation)
Vibration resistance		10 to 55 to 10 Hz (single amplitude: 0.75 mm, double amplitude: 1.5 mm)
Shock resistance		300 m/s ² min.
Degree of protection		IP67
Material		PBT resin
Mounting method		M4 screws
Power consumption		0.6 W max.
Auxiliary outputs *2		24 VDC, 10 mA (PNP open-collector outputs)
LED indicators		Actuator not detected (red); actuator detected (yellow)
Connection cables		2 m, 5 m
Number of connectable switches		30 max. (wiring length: 100 m max.)

*1 This is the distance where the switch operates from OFF to ON when approaching and the distance where the switch operates from ON to OFF when separating when the switch and actuator target marks are on the same axis, and the sensing surfaces coincide.

*2 Turns ON when the actuator is approaching.

Ratings of non-contact door switch controllers

Power input

Item	G9SX-NS202- __	G9SX-NSA222-T03- __	G9SX-EX- __
Rated supply voltage	24 VDC		

Inputs

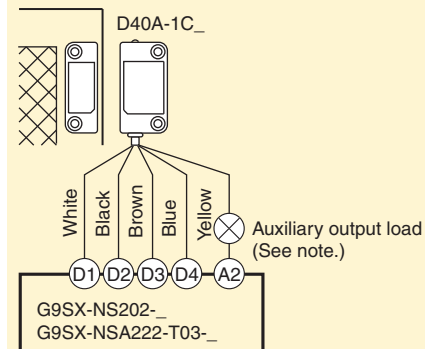
Item	G9SX-NS202- __ /G9SX-NSA222-T03- __
Safety input ^{*1}	Operating voltage: 20.4 VDC to 26.4 VDC, internal impedance: approx. 2.8 kΩ
Feedback/reset input	

^{*1} Only applies to the G9SX-NSA222-T03-_{_}. Refers to input other than that from the non-contact door switch.

Outputs

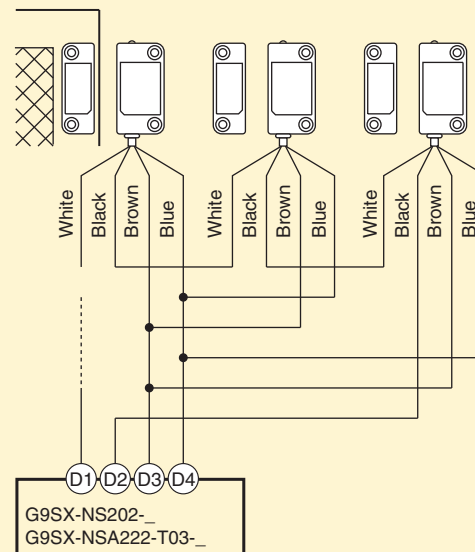
Item	G9SX-NS202- __ /G9SX-NSA222-T03- __
Instantaneous safety output OFF-delayed safety output	P channel MOS FET transistor output Load current: 0.8 A DC max.
Auxiliary output	PNP transistor output Load current: 100 mA max.

Non-contact door switch and non-contact door switch controller wiring Example: Wiring a single switch



Note: The auxiliary output load current must be 10 mA max.

Example: Wiring multiple switches Connect up to 30 Non-contact door switches





Safety guard switching unit

The safety controller to support maintenance mode of machinery in the safe way.

- Two operation modes to support:
 - Auto switching for applications where machine and worker co-operate.
 - Manual switching for applications with limitation in operation like maintenance.
- Clear and transparent segmentation of safety functions by use of unique "AND" connection
- Clear LED diagnosis of all in- and output signals for easy maintenance
- PLe according to EN ISO 13849-1 and SIL 3 according to EN 61508.

Ordering information

Enabling grip switches

Contact form			Order code
Enabling switch	Monitor switch	Pushbutton switch	
Two contacts	1NC (grip output)	None	A4EG-C000041
Two contacts	None	Emergency stop switch (2NC)	A4EG-BE2R041
Two contacts	None	Momentary operation switch (2NO)	A4EG-BM2B041

Safety guard switching units

Safety outputs ^{*1}		Auxiliary outputs ^{*2}	Logical AND connection input	Logical AND connection output	Max. OFF delay time ^{*3}	Rated voltage	Terminal block type	Order code
Instantaneous	OFF-delayed ^{*4}							
2 (Semi-conductors)	2 (Semi-conductors)	6 (Semi-conductors)	1	1	15 s	24 VDC	Screw terminals	G9SX-GS226-T15-RT
							Spring-cage terminals	G9SX-GS226-T15-RC

^{*1} P channel MOS FET transistor output

^{*2} PNP transistor output

^{*3} The OFF-delay time can be set in 16 steps as follows:

T15: 0, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 1, 1.5, 2, 3, 4, 5, 7, 10 or 15 s

^{*4} The OFF-delayed output becomes an instantaneous output by setting the OFF-delay time to 0 s.

Specifications

Ratings of guard switching unit

Power input

Item	G9SX-GS226-T15-__	G9SX-EX-__
Rated supply voltage	24 VDC	

Inputs

Item	G9SX-GS226-T15-__
Safety input	Operating voltage: 20.4 VDC to 26.4 VDC, internal impedance: approx. 2.8 kΩ
Feedback/reset input	
Mode selector input	

Outputs

Item	G9SX-G9SX-GS226-T15-__
Instantaneous safety output	P channel MOS FET transistor output
OFF-delayed safety output	Load current: 0.8 A DC max.
Auxiliary output	PNP transistor output Load current: 100 mA max.
External indicator outputs	P channel MOS FET transistor outputs Connectable indicators <ul style="list-style-type: none"> • Incandescent lamp: 24 VDC, 3 W to 7 W • LED lamp: 10 to 300 mA DC

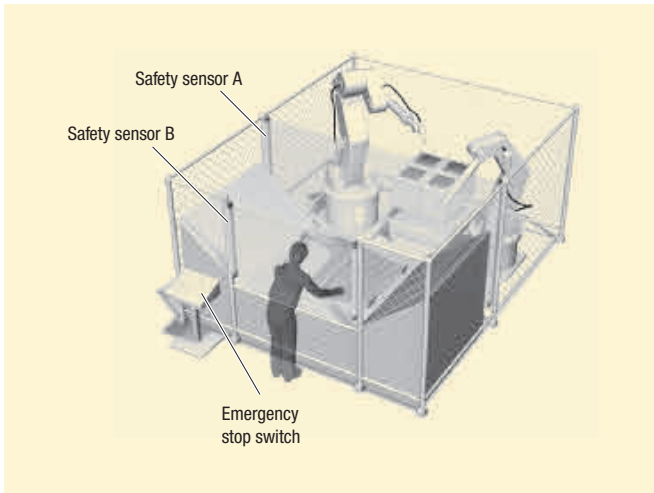
Application example

Automatic switching mode

Worker is loading and unloading the machine manually. When loading is finished, robot cycle is started manually by the worker. When robots return to their home position, loading cycle is selected automatically.

Loading condition: Safety sensor B is not active, safety sensor A is active because the robots are not allowed to move to the loading area while the worker loads the machine. So the worker is safe because safety sensor A is active.

Robot work condition: Safety sensor B is active, safety sensor A is not active because the worker is not allowed to move to the loading area when the robots work. So the worker is safe because safety sensor B stops the machine if he moves to the loading area.



Manual switching mode

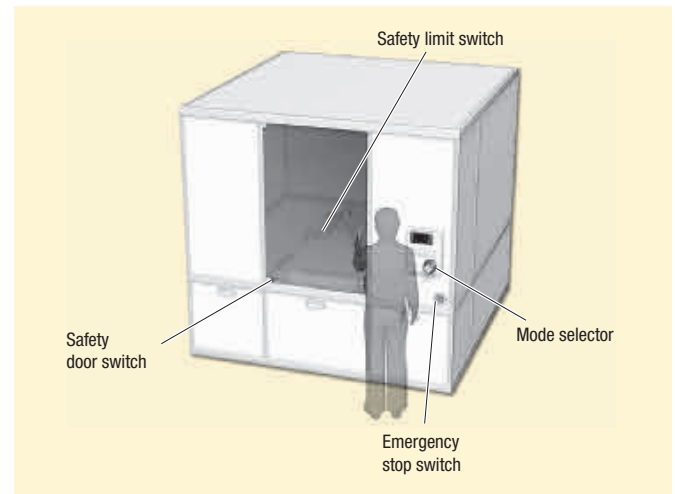
Worker has to do maintenance in this machine. While maintenance, it is necessary to move the machine in a limited way. The worker has to select automatic mode or manual mode manually by using the mode selector switch.

Operation steps:

- 1) Select maintenance mode by using the mode selector
- 2) Open the door to do the maintenance while the machine still is able to operate in a limited way (monitoring of limited movement by using the safety limit switch).
- 3) Close the cover after finishing maintenance
- 4) Select automatic mode by using the mode selector

E-Stop conditions:

- a) open the door while not in maintenance mode
- b) the machine actuates the limit switch (breaks the limit).
- c) the Enabling grip switch A4EG is actuated to stop the machine in emergency condition.



Limited speed monitoring unit



Safe limited speed monitoring unit for complete support of maintenance mode in machinery.

- Preset of limited speed frequency by using integrated preset switches
- Easy integration in G9SX-Systems by using unique logical "AND" connection
- Clear LED diagnosis of all in- and output signals for easy maintenance
- Applicable up to PLd according to EN ISO 13849-1 using Omron proximity sensors

Ordering information

Proximity sensors

Classification			Order code
Proximity sensor	Shielded	M8	E2E-X1R5F1
		M12	E2E-X2F1
		M18	E2E-X5F1
	Unshielded	M8	E2E-X2MF1
		M12	E2E-X5MF1
		M18	E2E-X10MF1

Ratings of limited speed monitoring unit

Safety outputs ^{*1}	Auxiliary outputs ^{*2}	Logical AND connection input	Rated voltage	Sensor power supply terminals	Terminal block type	Order code
Instantaneous						
4 (Semi-conductors)	4 (Semi-conductors)	1	24 VDC	2	Screw terminals	G9SX-LM224-F10-RT
					Spring-cage terminals	G9SX-LM224-F10-RC

*1 P channel MOS FET output

*2 PNP transistor output

Specifications

Ratings of limited speed monitoring unit

Power input

Item	G9SX-LM224-F10- _
Rated supply voltage	24 VDC

Inputs

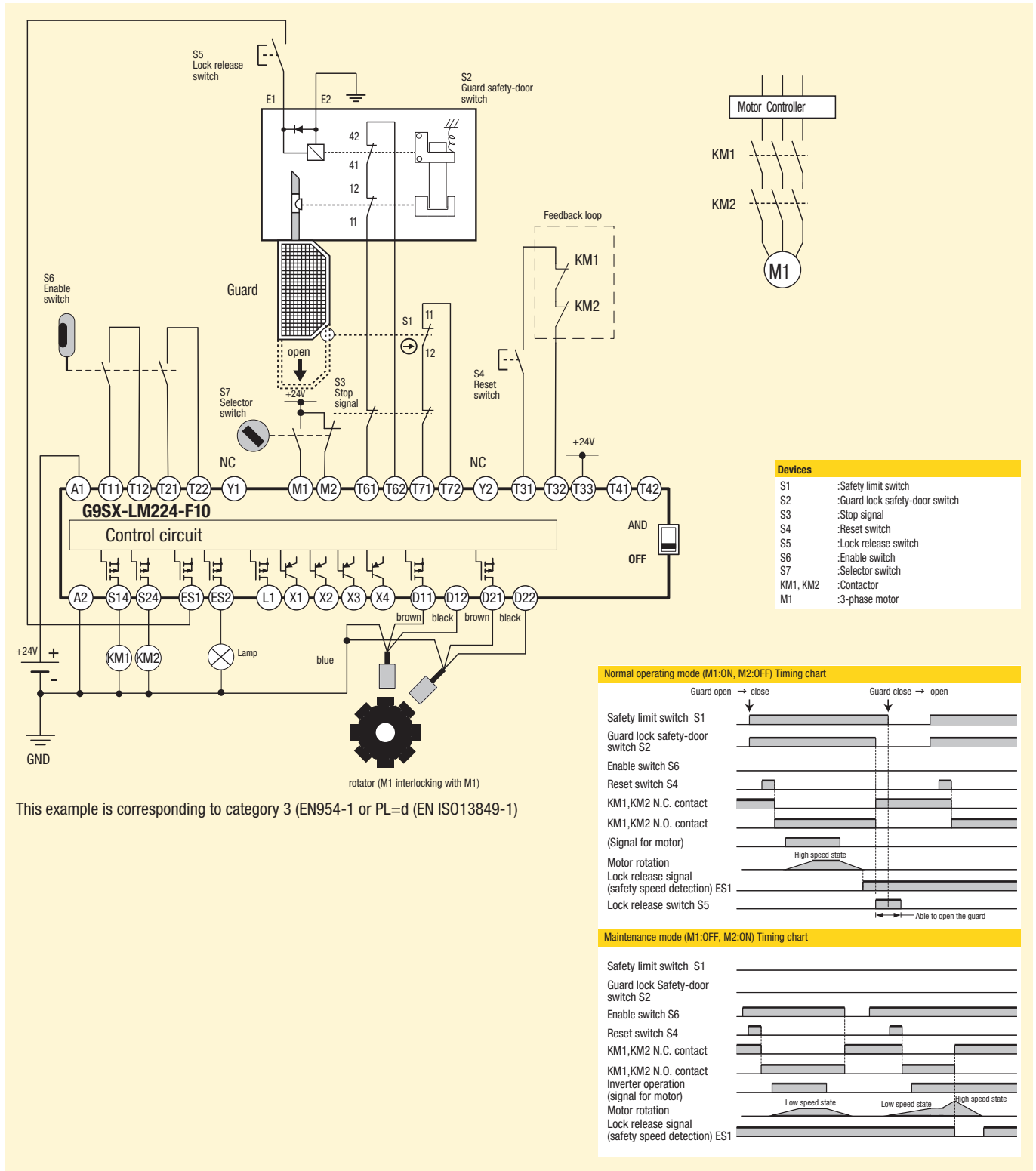
Item	G9SX-LM224-F10- _
Safety input	Operating voltage: 20.4 VDC to 26.4 VDC
Feedback/reset input	Internal impedance: approx. 2.8 kΩ
Mode selector input	
Rotation detection input	Operating voltage 20.4 VDC to 26.4 VDC Internal impedance: approx. 2.8 kΩ Input frequency: 1 kHz max.

Outputs

Item	G9SX-LM224-F10- _
Safety solid state output	P channel MOS FET transistor output Load current: 0.8 A DC max.
Safety speed detection output	P channel MOS FET transistor output Load current: 0.3 A DC max.
External indicator output	PNP transistor output Load current: 100 mA max.

Application example

Safe limited speed





Standstill monitoring unit

Safe standstill monitoring unit based on Back-EMF operation for two- and three-phase systems.

- Ready to use – covering all standard applications without additional setup
- Easy integration in star- and delta wiring
- Clear LED diagnosis of all in- and output signals for easy maintenance
- Applicable up to PLe according to EN ISO 13849-1

Ordering information

Safety standstill monitoring unit

Safety outputs *1	Auxiliary outputs *1	Power input Rated supply voltage	Terminal block type	Order code
Instantaneous				
3 (Semi-conductors)	2 (Semi-conductors)	24 VDC	Screw terminals	G9SX-SM032-RT
			Spring-cage terminals	G9SX-SM032-RC

*1 PNP transistor output

Specifications

Ratings of standstill monitoring unit

Power input

Item	G9SX-SM032-__
Rated supply voltage	24 VDC

Inputs

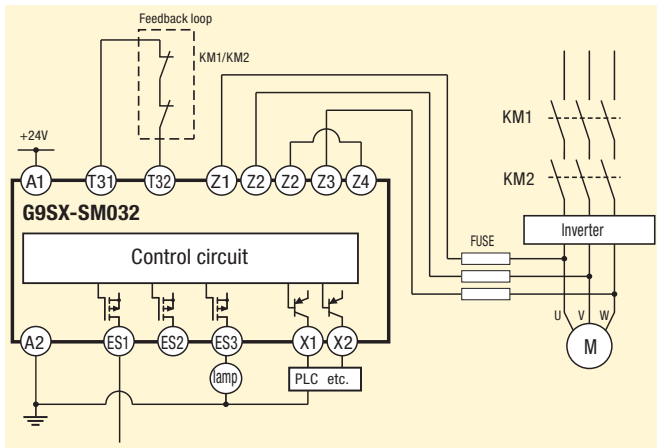
Item	G9SX-SM032-__
Input voltage	Standstill detection input (Z1-Z2/Z3-Z4) AC 415 Vrms + 10% max.
Maximum power supply frequency for AC induction motor	60 Hz max.
Internal impedance	Standstill detection input: approx. 660 kΩ EDM input: approx. 2.8 kΩ

Outputs

Item	G9SX-SM032-__
Safety standstill detection output	Sourcing output (PNP) Load current: 300 mA DC max.
Auxiliary output	Sourcing output (PNP) Load current: 100 mA DC max.

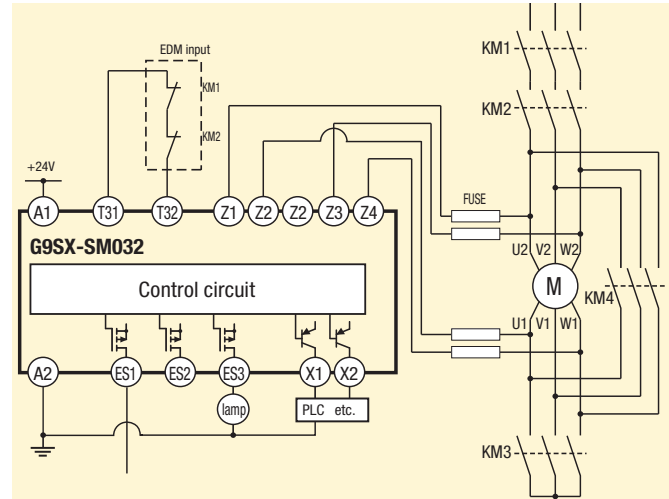
Application example

3-phase motor



Standstill detected

3-phase motor with star-delta wiring



Standstill detected

Standalone safety controller

The G9SP safety controller provides all local safety based in- and outputs and controls the safety application.

- Three CPU-types to suit different applications
- Clear diagnosis and monitoring via Ethernet or serial connection
- Memory cassette for easy duplication of configuration
- Unique programming software to support easy design, verification, standardization and reuse of the program.
- Certified according to PLe (EN ISO 13849-1) and SIL 3 (IEC 61508)



Ordering information

Appearance	Appearance description	Order code
Standalone safety controller	10 PNP safety inputs 4 PNP safety outputs 4 test outputs 4 PNP standard outputs	G9SP-N10S
	10 PNP safety inputs 16 PNP safety outputs 6 test outputs	G9SP-N10D
	20 PNP safety inputs 8 PNP safety outputs 6 test outputs	G9SP-N20S

Software

Appearance	Media	Applicable OS	Order code
G9SP configurator	Setup disk 1 license	Windows 2000	WS02-G9SP01-V1
	Setup disk 10 licenses	Windows XP	WS02-G9SP10-V1
	Setup disk 50 licenses	Windows Vista	WS02-G9SP50-V1
	Setup disk Site license	Windows 7	WS02-G9SPXX-V1

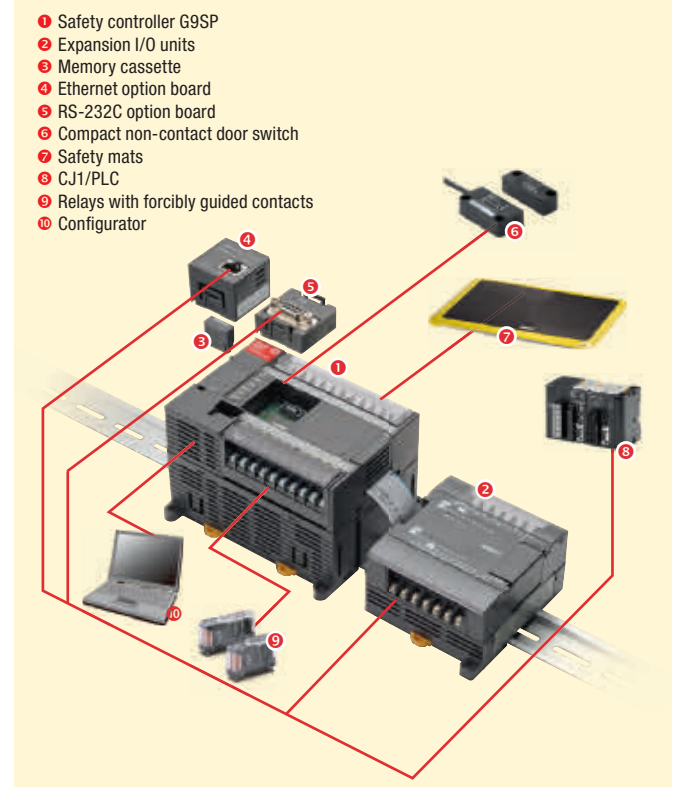
Expansion units (standard I/O)

Appearance	Type	Number of I/O		Model
		In	Out	
Expansion I/O unit	Sinking	12	8 (solid state)	CP1W-20EDT
	Sourcing	12	8 (solid state)	CP1W-20EDT1
	Sinking	-	32 (solid state)	CP1W-32ET
	Sourcing	-	32 (solid state)	CP1W-32ET1
I/O Connecting cable, 80 cm long				CP1W-CN811

Option units

Appearance	Order code
RS-232 option board	CP1W-CIF01
Ethernet option board (Ver. 2.0 or later)	CP1W-CIF41
Memory cassette	CP1W-ME05M
G9SP Status Display Touchscreen with 1.8 m cable	82614-0010 H-T40M-P
G9SP-N10S Display Kit (G9SP, Touchscreen, cable, CP1W-CIF01)	82612-0010 G9SP-N10S-SDK
G9SP-N10D Display Kit (G9SP, Touchscreen, cable, CP1W-CIF01)	82612-0020 G9SP-N10D-SDK
G9SP-N20S Display Kit (G9SP, Touchscreen, cable, CP1W-CIF01)	82612-0030 G9SP-N20S-SDK
G9SP-N10S kit with EtherNet/IP module	82608-0010 G9SP-N10S-EIP
G9SP-N10D kit with EtherNet/IP module	82608-0020 G9SP-N10D-EIP
G9SP-N20S kit with EtherNet/IP module	82608-0030 G9SP-N20S-EIP

G9SP configuration



Specifications

General specifications

Power supply voltage		20.4 to 26.4 VDC (24 VDC -15% +10%)
Consumption current	G9SP-N10S	400 mA (V1: 300 mA, V2: 100 mA)
	G9SP-N10D	500 mA (V1: 300 mA, V2: 200 mA)
	G9SP-N20S	500 mA (V1: 400 mA, V2: 100 mA)
Mounting method		35-mm DIN track
Ambient operating temperature		0°C +55°C
Ambient storage temperature		-20°C +75°C
Degree of protection		IP20 (IEC 60529)

Safety input specifications

Input type	Sinking inputs (PNP)
ON voltage	11 VDC min. between each input terminal and G1
OFF voltage	5 VDC max. between each input terminal and G1
OFF current	1 mA max.
Input current	6 mA

Safety output specifications

Output type	Sourcing outputs (PNP)
Rated output current	0.8 A max. per output*
Residual voltage	1.2 V max. between each output terminal and V2

Test output specifications

Output type	Sourcing outputs (PNP)
Rated output current	0.3 A max. per output*
Residual voltage	1.2 V max. between each output terminal and V1

Standard output specifications (G9SP-N10S)

Output type	Sourcing outputs (PNP)
ON Residual voltage	1.5 V max. (between each output terminal and V2)
Rated output current	100 mA max.*

*For details on the rated output current, please refer to the user manual of G9SP.

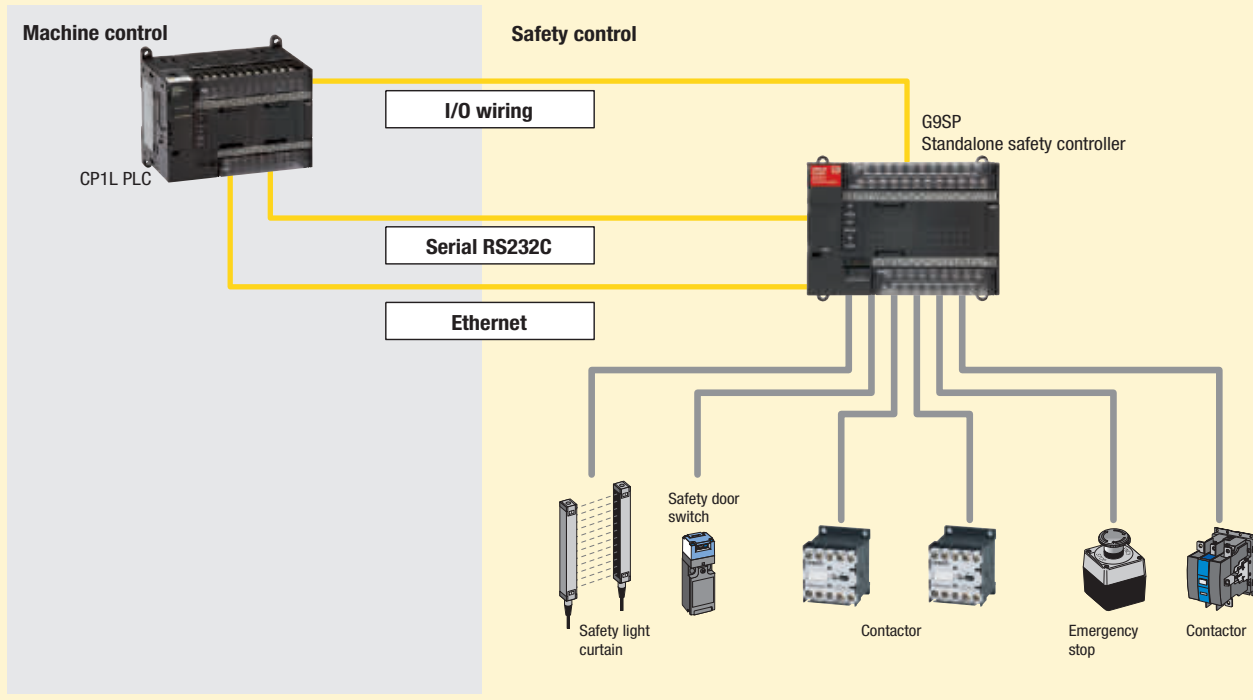
Control system integration

Safety - I/O-status becomes transparent

The standalone safety controller offers diagnosis information in 3 ways:

- 1) via parallel wiring
- 2) via serial RS232C interface (option)
- 3) via Ethernet interface (option).

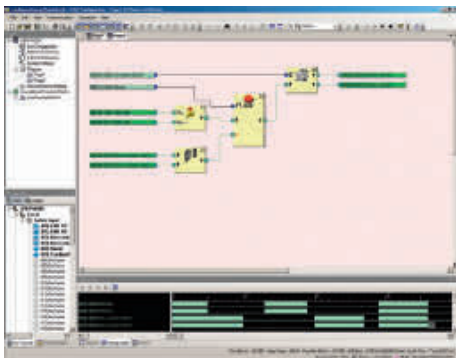
Information of all safety in- and outputs on the standard control system ensure minimum downtime of the machine.



G9SP configuration tool

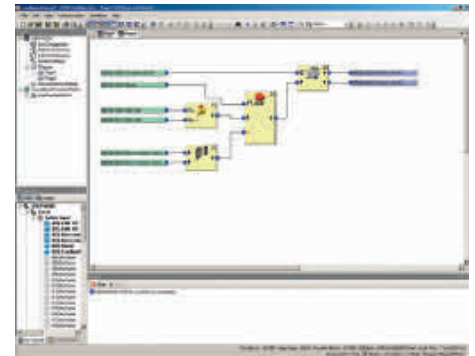


Easy setup and configuration is provided by a setup wizard supporting the hardware selection.



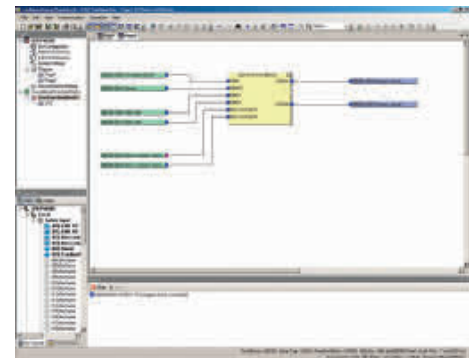
Integrated Simulator

All functions can be tested and simulated in the configuration tool, so there's no unnecessary additional workload for the engineer. In addition, on-line diagnosis reduces debug time to a minimum during implementation in the machine control system.



User-defined function blocks

Approved configuration elements such as a tested door monitoring solution can be easily stored as a user defined function block and re-used in future projects. This minimises the time it takes to create a new system configuration.



Knowledge-building

Existing configurations are the basis for new projects. The G9SP configuration tool supports re-use of existing and proven know-how in safety control, as well as user-defined function blocks. Which means no more repetition of effort, instead a growing library of safety solutions.



Safety network controller NE1A

The NE1A hosts the safety application program. All local and DeviceNet safety-based in- and outputs are monitored and controlled by the NE1A. It manages up to 32 DeviceNet safety slaves and can be seamlessly integrated in a standard DeviceNet system.

- Removable cage-clamp terminals for easy installation
- Predefined and certified function blocks for easy programming
- LED display and status LEDs for advanced diagnostics
- System status on DeviceNet for easy troubleshooting and predictive maintenance
- Easy scalability through the addition of DeviceNet safety devices

Ordering information

Appearance	Appearance description	Interface	Order code
Safety network controller	16 PNP inputs 8 PNP outputs 4 test outputs 254 function block programming removable cage clamp terminals	USB and DeviceNet safety	NE1A-SCPU01-V1
		Ethernet/IP and DeviceNet safety	NE1A-SCPU01-EIP
	40 PNP inputs 8 PNP outputs 8 test outputs 254 function block programming removable cage clamp terminals	USB and DeviceNet safety	NE1A-SCPU02
		Ethernet/IP and DeviceNet safety	NE1A-SCPU02-EIP

Software

Appearance	Appearance description	Order code
Safety network configurator	Installation disk (CD-ROM) IBM PC/AT compatible Windows 2000, Windows XP, Windows 7	WS02-CFSC1-E

Accessories

Appearance	Appearance description	Order code
Network router	Ethernet/IP - DeviceNet router	NE1A-EDR01
Programming console	CF-Card slot to store configuration USB-Interface for maintenance Touchscreen for easy troubleshooting	NE1A-HDY

Specifications

General specifications

DeviceNet communications power supply voltage	11 to 25 VDC (supplied from communications connector)	
Unit power supply voltage	20.4 to 26.4 VDC (24 VDC -15% +10%)	
I/O power supply voltage		
Consumption current	Communications power supply	24 VDC, 15 mA
	Internal circuit power supply	24 VDC, 230 mA
Mounting method	35-mm DIN track	
Ambient operating temperature	-10°C +55°C	
Ambient storage temperature	-40°C +70°C	
Degree of protection	IP20 (IEC 60529)	

Safety input specifications

Input type	Sinking inputs (PNP)
ON voltage	11 VDC min. between each input terminal and G1
OFF voltage	5 VDC max. between each input terminal and G1
OFF current	1 mA max.
Input current	4.5 mA

Safety output specifications

Output type	Sourcing outputs (PNP)
Rated output current	0.5 A max. per output
Residual voltage	1.2 V max. between each output terminal and V2

Test output specifications

Output type	Sourcing outputs (PNP)
Rated output current	0.7 A max. per output (see note.)
Residual voltage	1.2 V max. between each output terminal and V1



DeviceNet safety I/O terminal block family

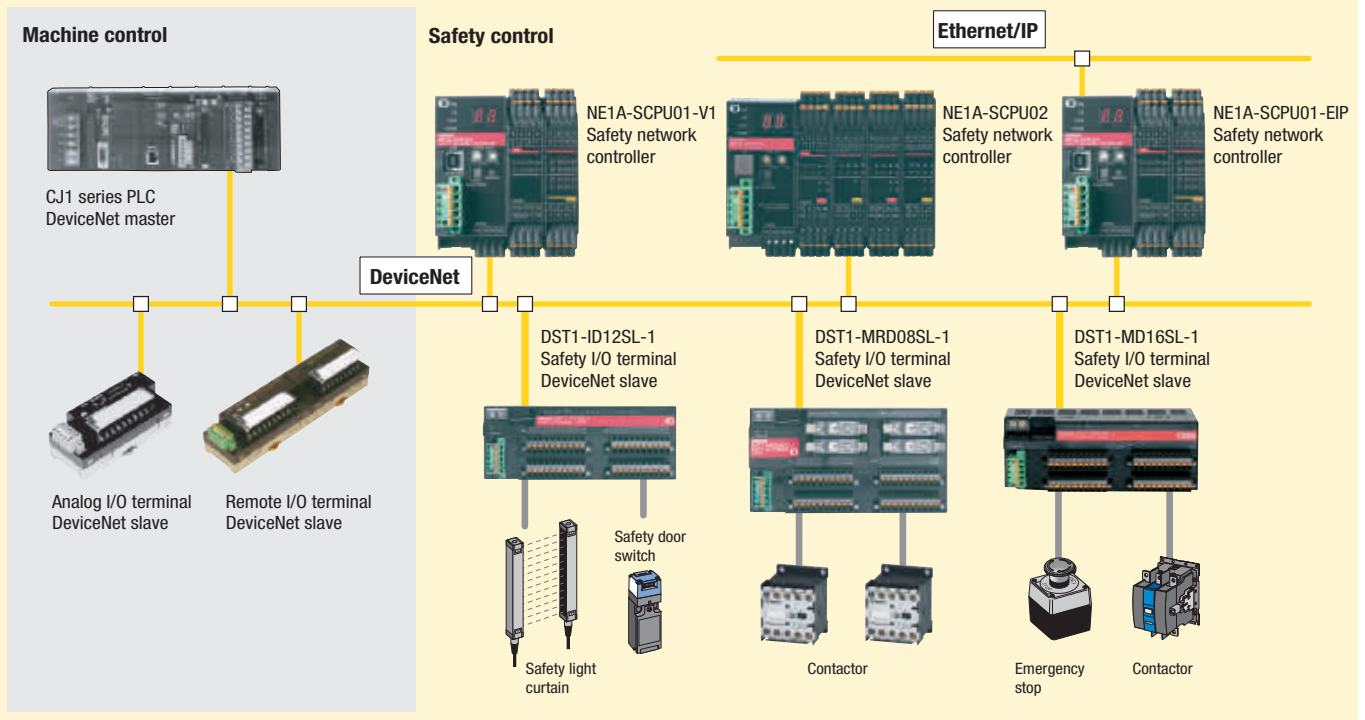
- Removable cage clamp terminals for easy installation
- Up to 12 inputs for safety signals
- 4 test pulse outputs to ensure crosstalk and short circuit detection
- Up to 8 safety outputs (solid state or relay)
- Status LEDs for advanced diagnostics
- Mixed mode operation (safety and standard) for all in- and outputs

Ordering information

Safety network

Expand safety I/O through networks

Safety components distributed over many different installation locations required long and complicated wiring. Replacing the wiring with a network between safety components greatly improves productivity.



Appearance	Appearance description	Order code
Input terminal	12 PNP inputs 4 Test outputs Removable cage clamp terminals	DST1-ID12SL-1
Mixed I/O terminal	8 PNP inputs 8 PNP outputs 4 Test outputs Removable cage clamp terminals	DST1-MD16SL-1
Mixed I/O terminal	4 PNP inputs 4 relay outputs (4×2-single pole) 4 Test outputs Removable cage clamp terminals	DST1-MRD08SL-1

Specifications

General specifications

DeviceNet communications power supply voltage	11 to 25 VDC (supplied from communications connector)
Unit power supply voltage	20.4 to 26.4 VDC (24 VDC -15% +10%)
I/O power supply voltage	
Consumption current	DST1-ID12SL-1/MD16SL-1: 100 mA
Communications power supply	DST1-MRD08SL-1: 110 mA
Mounting method	35-mm DIN track
Ambient operating temperature	-10°C +55°C
Ambient storage temperature	-40°C +70°C
Degree of protection	IP20 (IEC 60529)
Weight	DST1-ID12SL-1/MD16SL-1: 420 g
	DST1-MRD08SL-1: 600 g

Safety input specifications

Input type	Sinking inputs (PNP)
ON voltage	11 VDC min. between each input terminal and G1
OFF voltage	5 VDC max. between each input terminal and G1
OFF current	1 mA max.
Input current	6 mA

Safety output specifications

Output type	Sourcing outputs (PNP)
Rated output current	0.5 A max. per output
Residual voltage	1.2 V max. between each output terminal and V1

Test output specifications

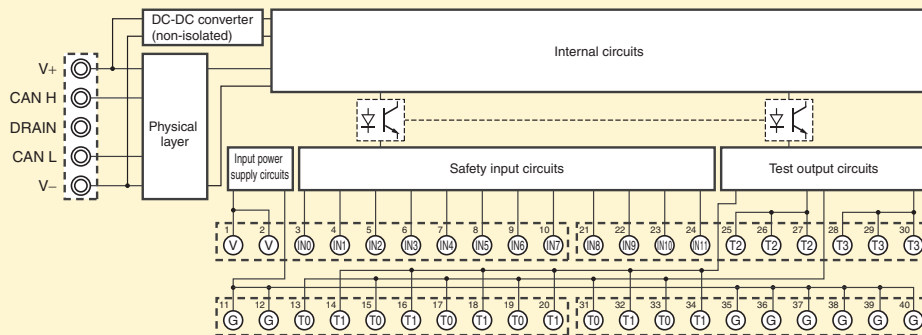
Output type	Sourcing outputs (PNP)
Rated output current	0.7 A max. per point
Residual voltage	1.2 V max. between each output terminal and V0

Safety output specifications for relay outputs

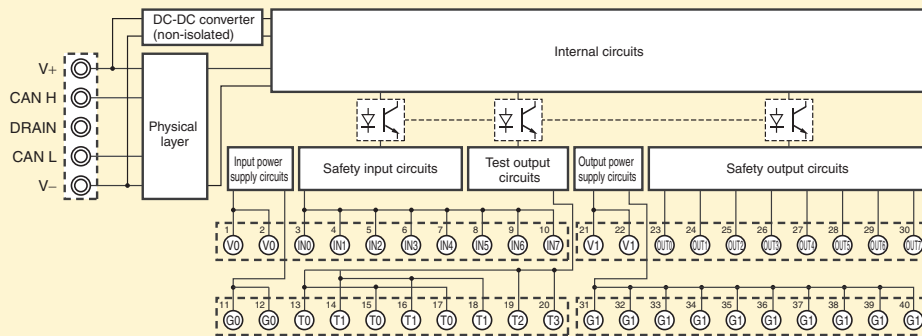
Relays	G7SA-2A2B, EN 50205 class A
Minimum applicable load	1 mA at 5 VDC
Rated load for a resistive load	240 VAC: 2 A, 30 VDC: 2 A
Rated load for an inductive load	2 A at 240 VAC (cosφ= 0.3), 1 A at 24 VDC
Mechanical life expectancy	5,000,000 operations min. (switching frequency of 7,200 operations/h)
Electrical life expectancy	100,000 operations min. (at rated load and switching frequency of 1,800 operations/h)

Safety I/O terminals

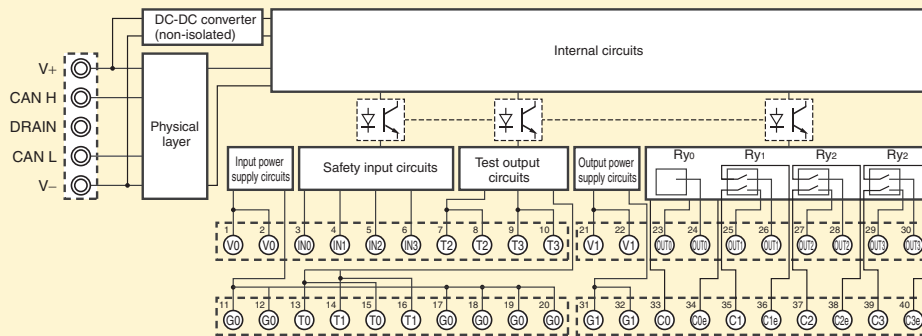
DST1-ID12SL-1



DST1-MD16SL-1



DST1-MRD08SL-1





Relays with forcibly guided contacts

The slim G7SA relay family with forcibly guided contacts is available as a four- or six-pole type in various contact combinations and offers reinforced insulation. Terminals are arranged for easy PCB layout. It can be soldered directly to a PCB or used together with the P7SA sockets.

- Forcibly guided contacts
- Conforms to EN 50205
- 6 A at 240 VAC and 6A at 24 VDC for resistive loads
- Reinforced insulation between inputs and outputs and poles
- 4- and 6-pole relays available

Ordering information

Relays with forcibly guided contacts

Type	Sealing	Poles	Contacts	Rated voltage	Order code
Standard	Flux-tight	4 poles	3PST-NO, SPST-NC	24 VDC ^{*1}	G7SA-3A1B
			DPST-NO, DPST-NC		G7SA-2A2B
		6 poles	5PST-NO, SPST-NC		G7SA-5A1B
			4PST-NO, DPST-NC		G7SA-4A2B
			3PST-NO, 3PST-NC		G7SA-3A3B

^{*1} 12 VDC, 21 VDC, 48 VDC are available on request.

Sockets

Type	LED indicator	Poles	Rated voltage	Order code
Track-mounting	Track mounting and screw mounting possible	4 poles	24 VDC	P7SA-10F-ND
		6 poles		P7SA-14F-ND
Back-mounting	PCB terminals	4 poles	-	P7SA-10P
		6 poles		P7SA-14P

Specifications

Coil

Rated voltage	Rated current	Coil resistance	Must-operate voltage	Must-release voltage	Max. voltage	Power consumption
24 VDC	4 poles: 15 mA 6 poles: 20.8 mA	4 poles: 1,600 Ω 6 poles: 1,152 Ω	75% max. (V)	10% min. (V)	110% (V)	4 poles: Approx. 360 mW 6 poles: Approx. 500 mW

Note: Refer to datasheet for details

Contacts

Load	Resistive load (cosφ = 1)	Load	Resistive load (cosφ = 1)
Rated load	6 A at 250 VAC, 6 A at 30 VDC	Max. switching current	6 A
Rated carry current	6 A	Max. switching capacity (reference value)	1,500 VA, 180 W
Max. switching voltage	250 VAC, 125 VDC		

Relays with forcibly guided contacts

Contact resistance	100 mΩ max. (The contact resistance was measured with 1 A at 5 VDC using the voltage-drop method.)	
Operating time ^{*1}	20 ms max.	
Response time ^{*1}	10 ms max. (The response time is the time it takes for the normally open contacts to open after the coil voltage is turned OFF.)	
Release time ^{*1}	20 ms max.	
Insulation resistance	100 MΩ min. (at 500 VDC) (The insulation resistance was measured with a 500 VDC megger at the same places that the dielectric strength was measured.)	
Dielectric strength ^{*2 *3}	Between coil contacts/different poles: 4,000 VAC, 50/60 Hz for 1 min (2,500 VAC between poles 3-4 in 4-pole Relays or poles 3-5, 4-6, and 5-6 in 6-pole Relays.) Between contacts of same polarity: 1,500 VAC, 50/60 Hz for 1 min	
Durability	Mechanical	10,000,000 operations min. (at approx. 36,000 operations/hr)
	Electrical	100,000 operations min. (at the rated load and approx. 1,800 operations/hr)
Min. permissible load ^{*4}	5 VDC, 1 mA (reference value)	
Ambient temperature ^{*5}	Operating: -40 to 85°C (with no icing or condensation)	
Ambient humidity	Operating: 35 to 85%	
Approved standards	EN61810-1 (IEC61810-1), EN50205, UL508, CSA22.2 No. 14	

^{*1} These times were measured at the rated voltage and an ambient temperature of 23°C. Contact bounce time is not included.

^{*2} Pole 3 refers to terminals 31-32 or 33-34, pole 4 refers to terminals 43-44, pole 5 refers to terminals 53-54, and pole 6 refers to terminals 63-64.

^{*3} When using a P7SA socket, the dielectric strength between coil contacts/different poles is 2,500 VAC, 50/60 Hz for 1 min.

^{*4} Min. permissible load is for a switching frequency of 300 operations/min.

^{*5} When operating at a temperature between 70°C and 85°C, reduce the rated carry current (6 A at 70°C or less) by 0.1 A for each degree above 70°C.

Note: The values listed above are initial values.

Please check Omron in the Internet for updated information on product reliability data and the SISTEMA libraries:
<http://industrial.omron.eu/safety>

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We have been supplying quality components for more than half a century

The huge installed base of our easy-to-use control components, is proof of our experience. Our control products with a display provide the clearest visibility and a perfect read-out. Omron, your single source for all your control components needs.

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E5_C – THE NEW STANDARD

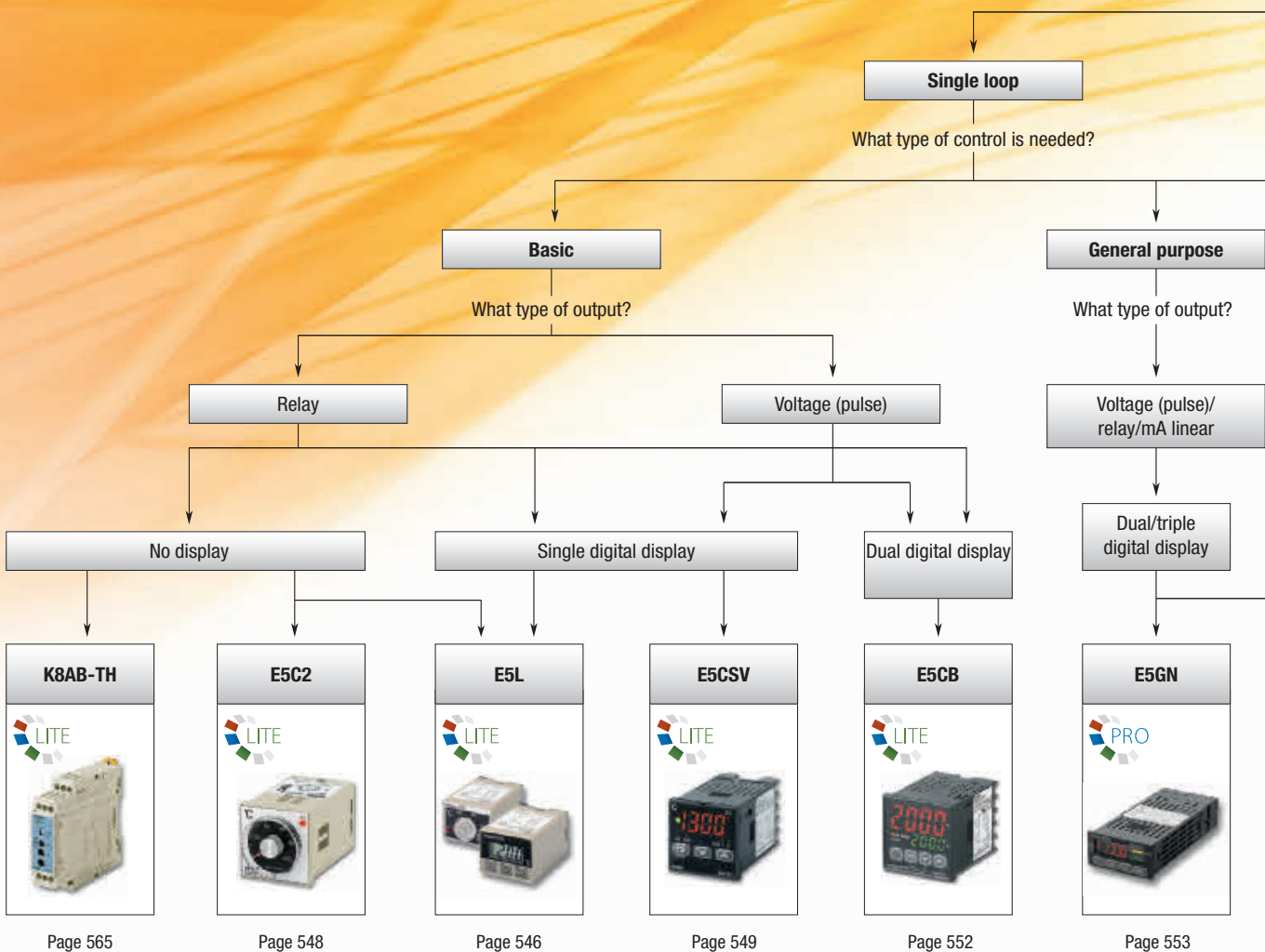
...in temperature control

Omron has been an active innovator in temperature control since introducing its first temperature controller in 1967. Now temperature control has taken a giant leap forward with Omron's next generation of controllers – the E_C, which set new global standards in the crucial areas of precision, user friendliness and control performance. The E_C series will save you time and effort in set-up and operation, while enabling faster and more accurate monitoring/control of your process. The high visibility display of the new series is also extremely easy to read and virtually eliminates any possibility for human error.



Always the latest news on:

industrial.omron.eu/en/news/product-news



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How many loops are required?

Multi-loop

What type of mounting is required?

Process

Advanced

On-panel

In-panel

Triple digital display

Triple digital display

Standard

SV programmer

Standard

SV programmer

E5_C

E5_N-H

E5_N-HT

E5_R

E5_R-T

CelciuX^o



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Selection table

Category		Alarm controller	Analogue/digital temperature controller	Analogue temperature controller	Compact digital temperature controller	Digital temperature controller			
Selection criteria									
	Model	K8AB-TH	E5L	E5C2	E5CSV	E5CB	E5GN	E5CC	
	Type	Basic line						Pro line	
	Panel	In-panel type			In- & on-panel type	On-panel type			
	Loops	-		Single loop					
Size	22.5 mm wide	45 × 35 mm	1/16 DIN	1/16 DIN	1/16 DIN	1/32 DIN	1/16 DIN		
Control mode	ON/OFF PID 2-PID ^{*1}	■ - -	■ - -	■ ■ ^{*2} -	■ - ■	■ - ■	■ - ■	■ - ■	
	Operation ^{*3}	-	H/C	H	H/C	H/C	H & C	H & C	
	Valve Control ^{*4}	-	-	-	-	-	-	-	
Features	Accuracy	±2%	±1°C	-	±0.5%	±0.5%	±0.3%	±0.3%	
	Auto-tuning Self-tuning	- -	- -	- -	■ ■	■ -	■ ■	■ ■	
	Transfer output	-	-	-	-	-	□	□	
	Remote input	-	-	-	-	-	-	□	
	Number of alarms	1	-	-	1	1	3	3	
	Heater alarm	-	-	-	-	-	□ ^{*5}	□ ^{*5}	
	IP rating front panel	IP20	IP40	IP40	IP65	IP66	IP66	IP66	
Display	Rotary switch	SV dial 3 digit LCD	SV dial	Single 3.5 digit	Dual 4 digit	Dual 4 digit (colour change)	Dual 4 digit		
Supply voltage	110/240 VAC	■	■	■	■	■	■	■	
	24 VAC/VDC	□	-	-	□	□	□	□	
Comms ^{*11}	RS-232 RS-485	- -	- -	- -	- -	- -	- □	- □	
	Event IP	■	-	-	-	-	□	□	
	QLP port ^{*6}	-	-	-	-	■ ^{*6}	■	■ ^{*7}	
	DeviceNet	-	-	-	-	-	-	-	
	Modbus	-	-	-	-	-	-	□ ^{*8}	
	PROFIBUS	-	-	-	-	-	-	□ ^{*9}	
	Modbus TCP	-	-	-	-	-	□ ^{*9}	□ ^{*9}	
ProfiNet	-	-	-	-	-	□ ^{*9}	□ ^{*9}		
Control output	Relay SSR	■ -	■ -	■ -	■ -	■ -	■ -	■ -	
	Voltage (pulse)	-	-	■	■	■	■	■	
	Linear voltage	-	-	-	-	-	-	■	
	Linear current	-	-	-	-	-	■	■	
Input type – linear	mA	-	-	-	-	-	■	■	
	mV	-	-	-	-	-	-	-	
	V	-	-	-	-	-	■	■	
Input type	Thermocouple	K	■	-	■	■	■	■	■
		J	■	-	-	■	■	■	■
		T	■	-	-	■	■	■	■
		E	■	-	-	-	-	■	■
		L	-	-	■	■	-	■	■
		U	-	-	-	■	-	■	■
		N	-	-	-	■	-	■	■
		R	■	-	-	■	■	■	■
		S	■	-	-	-	■	■	■
		B	■	-	-	-	-	■	■
	W	-	-	-	-	-	■	■	
PLII	■	-	-	-	-	■	■		
RTD	Pt100 Jpt100 THE	■ - -	- - ^{*10}	■ - ■	■ ■ □	■ - -	■ ■ -	■ ■ -	
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^{*1} 2-PID is Omron's easy to use high performance PID algorithm

^{*2} P only

^{*3} H = heat, H/C = heat or cool, H & C = heat and/or cool

^{*4} Valve control = relay up and down

^{*5} Heater alarm = heater burnout & SSR failure detection

^{*6} QLP: Quick Link Port to connected TC to PC using the smart USB cable E58-CIFQ1










^{*7} Quick link port using comm. cable E58-CIFQ2

^{*8} PROFIBUS-DP communication option via PRT1-SCU11

^{*9} EJ1N-HFU-ETN Serial Gateway

^{*10} SP sensor provided

Temperature controllers

Digital temperature controller				Digital process controller				
								
E5EC	E5AC	E5DC	CelciuX°	E5CN-H	E5EN-H/AN-H	E5_N-HT	E5_R	E5_R-T
Pro line			Pro ^{plus} line					
On-panel type		In-/On-panel type	In-panel type	On-panel type		Same specification as corresponding E5_N-H		
Single loop			Multi-loop	Single loop				
1/8 DIN	1/4 DIN	96 × 22,5 × 85 mm	31 × 96 mm	1/16 DIN	1/4, 1/8 DIN	On-panel type		
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H & C	H & C	H & C	H & C	H & C	H & C	E5AR: 1/4 DIN		
<input type="checkbox"/>	<input type="checkbox"/>	-	-	-	<input type="checkbox"/>	E5ER: 1/8 DIN		
±0.3%	±0.3%	±0.3%	±0.5%	±0.1%	±0.1%	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
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3	4	2	3	3	3	4		
<input type="checkbox"/> *5	<input type="checkbox"/> *5	<input type="checkbox"/> *5	<input type="checkbox"/> *11	<input type="checkbox"/> *5	<input type="checkbox"/> *5	-		
IP66	IP66	IP20	-	IP66	IP66	IP66		
Dual 4 digit	Triple 4 digit	Dual 3 digit	LED	Dual 5 digit (colour change)	Triple 5 digit (colour change)	Triple 5 digit		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
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Ideal for simple built-in control

This compact but powerful ON/OFF controller is provided with a sensor and is available in an analogue or digital version. Mounting is in-panel with a standard PTF14A-E socket.

- Available in 4 application specific ranges.
- Sensor provided to enable immediate usage.
- High capacity output of 10 A at 250 VAC for direct load switching.
- Simple operation and setting. Even simpler with digital model.

Ordering information

Model	Size (HxWxD)	Type	Control Method	Control Output	Order code
E5L-A_	35×45×64 mm	Plug-in	ON/OFF operation	Relay	E5L-A-30-20
					E5L-A-0-50
					E5L-A-0-100
					E5L-A-100-200
E5L-C_	35×40×64 mm	Plug-in	ON/OFF operation	Relay	E5L-C-30-20
					E5L-C-0-100
					E5L-C-100-200

Options (Order separately)

Sockets	
Type	Order code
Front-connecting Socket	PTF14A
	PTF14A-E

Specifications

Ratings		
Item	Model	
	E5L-A_	E5L-C_
Power supply voltage	100 to 240 VAC, 50/60 Hz	
Operating voltage range	85% to 110% of the rated supply voltage	
Power consumption	Approx. 3 VA	
Inputs	Element-interchangeable thermistor	
Control method	ON/OFF control	
Control output	SPDT contacts, 250 VAC, 10 A, $\cos\delta = 1$ (resistive load)	SPST-NO contacts, 250 VAC, 10 A, $\cos\delta = 1$ (resistive load)
Setting method	Analogue setting	
Indication method	No display	LCD digital display (character height: 12 mm)
Other functions		Setting protection (key protection) Input shift Direct/reverse operation
Indication accuracy	–	$\pm(1^\circ\text{C} + 1 \text{ digit})$ max.*
Setting accuracy	–	$\pm(1^\circ\text{C} + 1 \text{ digit})$ max.*
Hysteresis	-30 to 20°C models: Approx. 0.5 to 2.5°C (variable) 0 to 50°C models: Approx. 0.5 to 4°C (variable) 0 to 100°C models: Approx. 0.5 to 4°C (variable) 100 to 200°C models: Approx. 0.7 to 4°C (variable)	1 to 9°C (in increments of 1°C)
Repeat accuracy	1% FS max	–
Minimum scale (standard scale)	-30 to 20°C models and 0 to 50°C models: 5°C 0 to 100°C models and 100 to 200°C models: 10°C	–
Influence of temperature	–	$\pm([1\% \text{ of PV or } 2^\circ\text{C, whichever is greater}] + 1 \text{ digit})$ max.
Influence of voltage	–	–
Sampling period	–	2 s
Insulation resistance	100 MW max. (at 500 VDC)	
Dielectric strength	2,300 VAC, 50/60 Hz for 1 min (between charged terminals and uncharged metallic parts, between power supply terminals and input terminals, between power supply terminals and output terminals, and between input terminals and output terminals)	
Vibration (malfunction)	Frequency of 10 to 55 Hz, 0.5-mm double amplitude for 10 min each in X, Y, and Z directions	
Vibration (destruction)	Frequency of 10 to 55 Hz, 0.75-mm double amplitude for 2 h each in X, Y, and Z directions	
Shock (malfunction)	147 m/s ² , 3 times each in 6 directions	100 m/s ² , 3 times each in 6 directions
Shock (destruction)	294 m/s ² , 3 times each in 6 directions	
Electrical life expectancy (control output relay)	100,000 operations min (at maximum applicable load)	
Memory protection	–	Non-volatile memory (100,000 write operations)
Weight (Thermostat)	Approx. 80 g (Thermostat only)	
Degree of protection	Front panel: IP40, Terminals: IP00	
Approved standards	–	
Conformed standards	EN 61010-1 (IEC 61010-1), Pollution Degree 2, Overvoltage Category II	
EMC Directives	EMI: EN61326-1 Radiated EMI: EN55011 Group 1 Class A Conducted EMI: EN55011 Group 1 Class A EMS: EN61326-1 Electrostatic discharge immunity: EN61000-4-2 Electromagnetic field strength immunity: EN61000-4-3 Burst noise immunity: EN61000-4-4 Conducted disturbance immunity: EN61000-4-6 Surge immunity: EN61000-4-5 Voltage dip and power interruption immunity: EN61000-4-11	

* The accuracy of the accessory thermistor is not included.

Socket dimensions

Type	Size in mm (HxWxD)
PTF14A	78.5x45.5x30.0
PTF14A-E	78.5x45.5x33.0



Easy-to-use, basic temperature controller with analogue dial setting

Omron's basic ON/OFF or PD controller features an analogue setting dial. This compact, low-cost controller has a setting accuracy of 2% of full scale. It incorporates a plug-in socket allowing for DIN-rail or flush mounting.

- Compact, cost-effective controller
- Control mode: ON/OFF or PD
- Control output: relay
- Power supply: 100-120 / 200-240VAC
- Thermocouple K: 0 to 1200°C, L: 0 to 400°C, Pt100: -50 to 200°C

Ordering information

Setting method	Indication method	Control mode	Output	Order code			
				K (CA) chromel vs. alumel	L (IC) iron vs. constantan	Platinum resistance thermometer Pt100	Thermistor THE
Analogue setting	No indication	ON/OFF	Relay	E5C2-R20K	E5C2-R20L-D	E5C2-R20P-D	E5C2-R20G
		P	Relay	E5C2-R40K	E5C2-R40L-D	E5C2-R40P-D	

Note: Specify either 100/110/120 VAC or 200/220/240 VAC when ordering.

Input ranges	Thermocouple ^{*1}		Platinum resistance thermometer		Thermistor ^{*2}
	K (CA) chromel vs. alumel	L (IC) iron vs. constantan	Pt100	THE	
°C	0 to 200 (5), 0 to 300 (10), 0 to 400 (10), 0 to 600 (20), 0 to 800 (20), 0 to 1,000 (25), 0 to 1,200 (25)	0 to 200 (5), 0 to 300 (10), 0 to 400 (10), 5 to 450 (10)	-50 to 50 (2), -20 to 80 (2), 0 to 50 (1), 0 to 100 (2), 0 to 200 (5), 0 to 300 (10), 0 to 400 (10)		-50 to 50 (2) (6 kΩ at 0°C), 0 to 100 (2) (6 kΩ at 0°C), 50 to 150 (2) (30 kΩ at 0°C)

^{*1} Values in () are the minimum unit.

^{*2} Values in () are the thermistor resistive value.

Accessories

Functions	Order code
Front connecting socket with finger protection	P2CF-08-E
Back connecting socket (for flush mounting)	P3G-08
Finger protection cover (for P3G-08)	Y92A-48G
Protective front cover (IP66)	Y92A-48B

Specifications

Supply voltage	100/110/120 VAC or 200/220/240 VAC, 50/60 Hz
Thermocouple input type	K, L (with sensor break detection)
RTD input type	Pt100, THE
Control mode	ON/OFF or P control
Setting method	analogue setting
Output	Relay, SPDT, 3 A at 250 VAC
Life expectancy	Electrical: 100,000 operations min.
Setting accuracy	±2% FS max.
Hysteresis	Approx. 0.5% FS (fixed)
Proportional band	3% FS (fixed)
Reset range	5 ±1% FS min.
Control period	20 s
IP Rating front panel	IP40 (IP66 cover available)
IP rating terminals	IP00
Ambient temperature	-10 to 55°C
Size in mm (HxWxD)	48x48x96



The easy way to perfect temperature control

This multi-range 1/16 DIN controller with alarm function offers field-selectable PID control or ON/OFF control. The large, single display shows process value, direction of deviation from set point, output and alarm status.

- All setting fields configurable with switches
- Multi-input (Thermocouple/Pt100)
- Clearly visible 3.5 digit display with character height of 13.5 mm
- Control output: relay, voltage (for driving SSR)
- ON/OFF or 2-PID control with auto-tuning and self-tuning

Ordering information

Size in mm	Supply voltage	Number of alarm points	Control output	Order code
1/16 DIN 48Hx48Wx78D	100 to 240 VAC	1	Relay	E5CSV-R1T-500
			Voltage (for driving SSR)	E5CSV-Q1T-500
	24 VAC/VDC	1	Relay	E5CSV-R1TD-500
			Voltage (for driving SSR)	E5CSV-Q1TD-500

Note: Other models are available on request.

Accessories

Type	Order code
Hard protective cover	Y92A-48B

Specifications

Supply voltage	100 to 240 VAC, 50/60 Hz or 24 VAC/VDC (depending on model)
Operating voltage range	85 to 110% of rated supply voltage
Power consumption	5 VA
Sensor input	Multi-input (thermocouple/platinum resistance thermometer): K, J, L, T, U, N, R, Pt100, JPt100
Control output	Relay output SPST-NO, 250 VAC, 3 A (resistive load)
	Voltage output (for driving SSR) 12 VDC, 21 mA (with short-circuit protection circuit)
Control method	ON/OFF or 2-PID (with auto-tune and self-tune)
Alarm output	SPST-NO, 250 VAC, 1 A (resistive load)
Setting method	Digital setting using front panel keys (functionality set-up with DIP switch)
Indication	7-segment digital display (character height: 13.5 mm) and deviation indicators
Ambient temperature	-10 to 55°C (with no condensation or icing)
Setting/indication accuracy	±0.5% of indication value or ±1 °C, whichever is greater ±1 digit max.
Hysteresis (for ON/OFF control)	0.2% FS (0.1% FS for multi-input (thermocouple/platinum resistance thermometer) models)
Proportional band (P)	1 to 999°C (automatic adjustment using AT/ST)
Integral time (I)	0 to 1,999 s (automatic adjustment using AT/ST)
Derivative time (D)	0 to 1,999 s (automatic adjustment using AT/ST)
Control period	2/20 s
Sampling period	500 ms
Electrical life expectancy	100,000 operations min. (relay output models)
Weight	Approx. 120 g (controller only)
Degree of protection	Front panel: Equivalent to IP66; rear case: IP20; terminals: IP00
Memory protection	EEPROM (non-volatile memory) (number of writes: 1,000,000)
Size in mm (HxWxD)	48x48x78



Best price performance ratio and user-friendliness combined with ergonomic design

- Readability up to 5 m - one of the biggest displays worldwide
- Simplicity in operation - configuration setup in 30 s
- Speed-up your application with a control period time of 250 ms
- Built to last and regulate precisely using Omron's unique 2-PID algorithm

Model number legend

E5CSL-□□
1 2

1. Control Output
R: Relay output: 250 VAC, 3 A
Q: Voltage output (for driving SSR): 12 VDC, 21 mA
2. Sensor type
TC: Thermocouple (K, J, T, R, or S)
P: Platinum resistance thermometer (Pt100)

E5CWL-□□1□
1 2 3

1. Control Output
R: Relay output: 250 VAC, 3 A
Q: Voltage output (for driving SSR): 12 VDC, 21 mA
2. Alarm
1: Relay output: 250 VAC, 1 A (resistive load)
3. Sensor type
TC: Thermocouple (K, J, T, R, or S)
P: Platinum resistance thermometer (Pt100)

E5EWL-□□1□
1 2 3

1. Control Output
R: Relay output: 250 VAC, 3 A
Q: Voltage output (for driving SSR): 12 VDC, 21 mA
2. Alarm
1: Relay output: 250 VAC, 1 A (resistive load)
3. Sensor type
TC: Thermocouple (K, J, T, R, or S)
P: Platinum resistance thermometer (Pt100)

Ordering information

Model	Size (W × H × D)	Power supply voltage	Input type	Alarm output	Control output	Order code
E5CSL	1/16 DIN 48 × 48 × 60	100 to 240 VAC	Thermocouple	None	Relay output	E5CSL-RTC
			Resistance thermometer		E5CSL-RP	
			Thermocouple		Voltage output (for driving SSR)	E5CSL-QTC
			Resistance thermometer		E5CSL-QP	
E5CWL	1/16 DIN 48 × 48 × 60	100 to 240 VAC	Thermocouple	1	Relay output	E5CWL-R1TC
			Resistance thermometer		E5CWL-R1P	
			Thermocouple		Voltage output (for driving SSR)	E5CWL-Q1TC
			Resistance thermometer		E5CWL-Q1P	
E5EWL	1/8 DIN 48 × 96 × 60	100 to 240 VAC	Thermocouple	1	Relay output	E5EWL-R1TC
			Resistance thermometer		E5EWL-R1P	
			Thermocouple		Voltage output (for driving SSR)	E5EWL-Q1TC
			Resistance thermometer		E5EWL-Q1P	

Accessories (Order separately)

Type	Remarks	Order code
Terminal cover	—	E53-COV19
Front panel (for E5CSL/E5CWL)	<ul style="list-style-type: none"> • This Front panel accessory is required to attach the Y92A-48B or Y92A-48D. • This Front panel accessory is only the frame. It does not include the plastic cover. 	E53-COV20
Adapter	<ul style="list-style-type: none"> • Use this Adapter when the Front panel has already been prepared for the E5B . • Only black is available. • Order separately. 	Y92F-45
	<ul style="list-style-type: none"> • Use for E5CSL/E5CWL only. • Provided with E5CSL/E5CWL. 	Y92F-49
	<ul style="list-style-type: none"> • Use for E5EWL only. • Provided with E5EWL. 	Y92F-51

Specifications

		E5CSL	E5CWL	E5EWL
Power supply voltage		100 to 240 VAC, 50/60 Hz		
Operating voltage range		85% to 110% of rated supply voltage		
Power consumption		3.5 VA		
Sensor input		Models with thermocouple inputs Thermocouple: K, J, T, R, or S Models with platinum resistance thermometer inputs Platinum resistance thermometer: Pt100		
Control output	Relay output	SPST-NO, 250 VAC, 3 A (resistive load), electrical life: 100,000 operations, minimum load: 5 V, 10 mA		
	Voltage output (for driving SSR)	Output voltage: 12 VDC +25%/–15% (PNP), max. load current: 21 mA, with short-circuit protection circuit		
Alarm output		–		
Control method		ON/OFF control or 2-PID control (with auto-tuning)		
Setting method		Digital setting using front panel keys		
Indication method		7-segment digital display and individual indicators Character height: 21.7 mm	7-segment digital display and individual indicators Character height: 16.2 mm (PV)	7-segment digital display and individual indicators Character height: E5EWL: 20 mm (PV)
Other functions		Temperature input shift, run/stop, protection functions, etc.		
Ambient operating temperature		–10 to 55°C (with no icing or condensation)		
Ambient operating humidity		25% to 85%		
Storage temperature		–25 to 65°C (with no icing or condensation)		
Dimensions (W × H × D)		48 × 48 × 64 mm		48 × 96 × 64 mm



Best price performance ratio and user-friendliness combined with ergonomic design

Thanks to a clear and easy-to-use menu structure, the E5CB General Purpose Controller is extremely user friendly. But despite very simply layered, the E5CB still offers a high performance inherited from the E5CN series. Even if no power is available, the E5CB can be powered and parameterized with only a few clicks using the free ThermoMini remote software.

- Set up your configuration in only 30 s
- Large display (16.2 mm) legible up to 5 m
- Built to last and regulate precisely with Omron unique 2-PID algorithm
- Easy and quick remote parameterization via free ThermoMini software
- Speed up your application with a sampling period time of 250 ms

Ordering information

Size	Power supply voltage	Input type	Alarm output	Control output	Order code
E5CB 48 × 48 mm	100 to 240 VAC	Thermocouple	1	Relay output	E5CB-R1TC
		Platinum resistance thermometer			E5CB-R1P
		Thermocouple		Voltage output (for driving SSR)	E5CB-Q1TC
		Platinum resistance thermometer			E5CB-Q1P
	24 VAC/VDC	Thermocouple		Relay output	E5CB-R1TCD
		Platinum resistance thermometer			E5CB-R1PD
		Thermocouple		Voltage output (for driving SSR)	E5CB-Q1TCD
		Platinum resistance thermometer			E5CB-Q1PD

Accessories

Option	Order code
USB-Serial conversion cable	E58-CIFQ2



Specifications

Power supply voltage	100 to 240 VAC 50/60 Hz, 24 VAC 50/60 Hz, or 24 VDC
Operating voltage range	85% to 110% of rated supply voltage
Power consumption	Approx. 3.5 VA (100 to 240 VAC) Approx. 3.5 VA (24 VAC) Approx. 2.5 W (24 VDC)
Sensor input	Models with thermocouple inputs Thermocouple: K, J, T, R, or S (JIS C 1602-1995, IEC60584-1) Models with platinum resistance thermometer inputs Platinum resistance thermometer: Pt100 (JIS C 1604-1997, IEC60751)
Control output	SPST-NO, 250 VAC, 3 A (resistive load), electrical life: 100,000 operations, minimum applicable load: 5 V, 10 mA Output voltage: 12 VDC +25%/–15% (PNP), max. load current: 21 mA, with short-circuit protection circuit
Alarm output	SPST-NO, 250 VAC, 1 A (resistive load), electrical life: 100,000 operations, minimum load: 5 V, 10 mA
Control method	ON/OFF control or 2-PID control (with auto-tuning)
Setting method	Digital setting using front panel keys
Indication method	7-segment digital display and individual indicators Character height: 16.2 mm (PV)
Other functions	Temperature input shift, run/stop, protection functions, etc.
Ambient operating temperature	–10 to 55°C (with no condensation or icing)/With a three-year guarantee: –10 to 50°C
Ambient operating humidity	25% to 85%
Storage temperature	–25 to 65°C (with no condensation or icing)
Size in mm (H × W × D)	48×48×65

Note: Other models (E5C_L/E5EW) with similar features but without USB communication are only available for "Emerging Countries". Please ask your local Sales representative for further information.



Compact and intelligent general purpose controllers

The E5GN general-purpose temperature controller is available in 24 x 48 mm DIN format. It has a high-intensity dual LCD display with a wide viewing angle and has a 3-colour PV change for easy status recognition.

- Control mode: ON/OFF or 2-PID
- Control output: relay, voltage (pulse) or linear current
- Power supply: 100/240 VAC or 24 VDC/VAC
- Clear and intuitive set-up and operation



Ordering information

Type	Input	Output	Fixed option	Alarms	Order code
48x24 mm model (includes supply voltage indication)					
On-panel	temperature (TC/Pt/mV)	relay	–	1 relay	E5GN-R1T-C AC100-240
			RS-485 communication		E5GN-R103T-C-FLK AC100-240
			2 Event inputs		E5GN-R1BT-C AC100-240
			–		E5GN-Q1T-C AC100-240
			RS-485 communication		E5GN-Q103T-C-FLK AC100-240
			2 Event inputs		E5GN-Q1BT-C AC100-240
		voltage (pulse)	–	E5GN-C1T-C AC100-240	
			RS-485 communication	E5GN-C103T-C-FLK AC100-240	
			2 Event inputs	E5GN-C1BT-C AC100-240	
			–	E5GN-R2T-C AC100-240	
			RS-485 communication	E5GN-R203T-C-FLK AC100-240	
			2 Event inputs	E5GN-R2BT-C AC100-240	
	current (linear)	–	E5GN-R2HT-C AC100-240		
		RS-485 communication	E5GN-Q2T-C AC100-240		
		2 Event inputs	E5GN-Q203T-C-FLK AC100-240		
		Heater Alarm	E5GN-Q2BT-C AC100-240		
		–	E5GN-Q2HT-C AC100-240		
		RS-485 communication	E5GN-Q103L-FLK AC100-240		
analogue (mA/V)	relay	RS-485 communication	1 relay	E5GN-R103L-FLK AC100-240	
		2 Event inputs		E5GN-Q103L-FLK AC100-240	
		Heater Alarm		E5GN-C1L-C AC100-240	
	voltage (pulse)	RS-485 communication		E5GN-R103LD-FLK AC/DC24	
		2 Event inputs		E5GN-Q103LD-FLK AC/DC24	
		Heater Alarm		E5GN-C1LD-C AC/DC24	

Note: - Output and Alarm Relays: 3 A/250 VAC, electrical life: 100,000 operations
 - Output voltage (pulse): 12 V, 21 mA (ie. to drive solid state relays)
 - Linear current: 0(4) to 20 mA
 - Heater alarm / HA = heater burnout + SSR short detection + SSR overcurrent
 - Voltage: Specify the power supply specifications (voltage) when ordering E5GN

Specifications

Supply voltage	100 to 240 VAC 50/60 Hz or 24 VAC, 50/60Hz; 24 VDC
Heater alarm	yes, optional, choice of 1 or 3 phase
Thermocouple input type	K, J, T, E, L, U, N, R, S, B, W or PL II
RTD input type	Pt100, JPt100
Linear input type	mV or "T" models mA and V on "L" models
Control mode	ON/OFF, 2-PID (heat or heat/cool)
Accuracy	Thermocouple ± 0.3% (E5CN-U ± 1%) Platinum resistance ± 0.2% Analogue input ± 0.2% FS
Auto-tuning	yes, 40% and 100% MV output limit selection. When using Heat/Cool: automatic cool gain adjustment
Self-tuning	yes
RS-232C	Only for AN/-EN: Optional, Protocol CompowayF or Modbus freely selectable
RS-485	optional, CompowayF or Modbus selectable
Event input	optional
QLP port (USB connection PC)	yes
Ambient temperature	-10 to 55°C
IP Rating front panel	IP66
Sampling period	250 ms

High performance & simplicity



The next generation E5_C temperature controller is setting a new global standard in terms of precision and user-friendly design. Best control performance, easy set-up and outstanding visibility of the white IP66 LCD display have been integrated into a spacing-saving housing with only 60 mm of depth.

- Fast and precise regulation: 50 ms sampling loop period time
- Easy to set up, and operate intuitively via CX-Thermo without power supply
- Best contrasty display using white LCD technology which is visible from a far distance and from any angle
- Useful alarm and diagnosis functions for secure operation
- Practical timer and logic operation functions eliminating the need of a PLC

Ordering information

E5CC (all models 3 auxiliary outputs)

Output	Option No.	Fixed option	Order code	
			110-240 VAC	24 VAC/VDC
Out1: Relay Out2: non	–	–	E5CC-RX3A5M-000	E5CC-RX3D5M-000
	001	Event input 2, Heater burnout SSR defect detection	E5CC-RX3A5M-001	E5CC-RX3D5M-001
	003	Communication 3-phase heater alarm	E5CC-RX3A5M-003	E5CC-RX3D5M-003
	005	Event input 4	E5CC-RX3A5M-005	E5CC-RX3D5M-005
	006	Event input 2, Transfer output	E5CC-RX3A5M-006	E5CC-RX3D5M-006
	007	Event input 2, Remote SP	E5CC-RX3A5M-007	E5CC-RX3D5M-007
Out1: Voltage (pulse) Out2: non	–	–	E5CC-QX3A5M-000	E5CC-QX3D5M-000
	001	Event input 2, Heater burnout SSR defect detection	E5CC-QX3A5M-001	E5CC-QX3D5M-001
	003	Communication 3-phase heater alarm	E5CC-QX3A5M-003	E5CC-QX3D5M-003
	005	Event input 4	E5CC-QX3A5M-005	E5CC-QX3D5M-005
	006	Event input 2, Transfer output	E5CC-QX3A5M-006	E5CC-QX3D5M-006
	007	Event input 2, Remote SP	E5CC-QX3A5M-007	E5CC-QX3D5M-007
Out1: Voltage (pulse) Out2: Voltage (pulse)	–	–	E5CC-QQ3A5M-000	E5CC-QQ3D5M-000
	001	Event input 2, Heater burnout SSR defect detection	E5CC-QQ3A5M-001	E5CC-QQ3D5M-001
	003	Communication 3-phase heater alarm	E5CC-QQ3A5M-003	E5CC-QQ3D5M-003
	005	Event input 4	E5CC-QQ3A5M-005	E5CC-QQ3D5M-005
	006	Event input 2, Transfer output	E5CC-QQ3A5M-006	E5CC-QQ3D5M-006
	007	Event input 2, Remote SP	E5CC-QQ3A5M-007	E5CC-QQ3D5M-007
Out1: Linear current Out2: non	–	–	E5CC-CX3A5M-000	E5CC-CX3D5M-000
	004	Event input 2, Communication	E5CC-CX3A5M-004	E5CC-CX3D5M-004
	005	Event input 4	E5CC-CX3A5M-005	E5CC-CX3D5M-005
	006	Event input 2, Transfer output	E5CC-CX3A5M-006	E5CC-CX3D5M-006
	007	Event input 2, Remote SP	E5CC-CX3A5M-007	E5CC-CX3D5M-007
	Out1: Linear current Out2: Voltage (pulse)	–	–	E5CC-CQ3A5M-000
001		Event input 2, Heater burnout SSR defect detection	E5CC-CQ3A5M-001	E5CC-CQ3D5M-001
003		Communication 3-phase heater alarm	E5CC-CQ3A5M-003	E5CC-CQ3D5M-003
005		Event input 4	E5CC-CQ3A5M-005	E5CC-CQ3D5M-005
006		Event input 2, Transfer output	E5CC-CQ3A5M-006	E5CC-CQ3D5M-006
007		Event input 2, Remote SP	E5CC-CQ3A5M-007	E5CC-CQ3D5M-007

Note: As well as these models other models are available on request. Please contact the local sales office for special requests.

E5EC/E5AC (all models 4 auxiliary outputs)

Output	Option No	Fixed option	Order code	
			110-240 VAC	24 VAC/VDC
Out1: Relay Out2: non	–	–	E5_C-RX4A5M-000	E5_C-RX4D5M-000
	009	Event input 2, Communication 3-phase heater alarm	E5_C-RX4A5M-009	E5_C-RX4D5M-009
	010	Event input 4, Heater burnout SSR defect detection	E5_C-RX4A5M-010	E5_C-RX4D5M-010
	011	Event input 6, Remote SP Heater burnout SSR defect detection, Transfer output	E5_C-RX4A5M-011	E5_C-RX4D5M-011
Out1: Voltage (pulse) Out2: non	–	–	E5_C-QX4A5M-000	E5_C-QX4D5M-000
	009	Event input 2, Communication 3-phase heater alarm	E5_C-QX4A5M-009	E5_C-QX4D5M-009
	010	Event input 4, Heater burnout SSR defect detection	E5_C-QX4A5M-010	E5_C-QX4D5M-010
	011	Event input 6, Remote SP Heater burnout SSR defect detection, Transfer output	E5_C-QX4A5M-011	E5_C-QX4D5M-011
Out1: Relay Out2: Relay	–	–	E5_C-RR4A5M-000	E5_C-RR4D5M-000
	009	Event input 2, Communication 3-phase heater alarm	E5_C-RR4A5M-009	E5_C-RR4D5M-009
	010	Event input 4, Heater burnout SSR defect detection	E5_C-RR4A5M-010	E5_C-RR4D5M-010
	011	Event input 6, Remote SP Heater burnout SSR defect detection, Transfer output	E5_C-RR4A5M-011	E5_C-RR4D5M-011
Out1: Voltage (pulse) Out2: Voltage (pulse)	–	–	E5_C-QQ4A5M-000	E5_C-QQ4D5M-000
	009	Event input 2, Communication 3-phase heater alarm	E5_C-QQ4A5M-009	E5_C-QQ4D5M-009
	010	Event input 4, Heater burnout SSR defect detection	E5_C-QQ4A5M-010	E5_C-QQ4D5M-010
	011	Event input 6, Remote SP Heater burnout SSR defect detection, Transfer output	E5_C-QQ4A5M-011	E5_C-QQ4D5M-011
Out1: Voltage (pulse) Out2: Relay	–	–	E5_C-QR4A5M-000	E5_C-QR4D5M-000
	009	Event input 2, Communication 3-phase heater alarm	E5_C-QR4A5M-009	E5_C-QR4D5M-009
	010	Event input 4, Heater burnout SSR defect detection	E5_C-QR4A5M-010	E5_C-QR4D5M-010
	011	Event input 6, Remote SP Heater burnout SSR defect detection, Transfer output	E5_C-QR4A5M-011	E5_C-QR4D5M-011
Out1: Linear current Out2: non	–	–	E5_C-CX4A5M-000	E5_C-CX4D5M-000
	004	Event input 2, Communication	E5_C-CX4A5M-004	E5_C-CX4D5M-004
	005	Event input 4	E5_C-CX4A5M-005	E5_C-CX4D5M-005
	013	Event input 6, Remote SP, Transfer output	E5_C-CX4A5M-013	E5_C-CX4D5M-013
	014	Event input 4, Communication Remote SP, Transfer output	E5_C-CX4A5M-014	E5_C-CX4D5M-014
Out1: Linear current Out2: Linear current	–	–	E5_C-CC4A5M-000	E5_C-CC4D5M-000
	004	Event input 2, Communication	E5_C-CC4A5M-004	E5_C-CC4D5M-004
	005	Event input 4	E5_C-CC4A5M-005	E5_C-CC4D5M-005
	013	Event input 6, Remote SP Transfer output	E5_C-CC4A5M-013	E5_C-CC4D5M-013
	014	Event input 4, Communication Remote SP, Transfer output	E5_C-CC4A5M-014	E5_C-CC4D5M-014
Out1: Linear current Out2: Voltage (pulse)	–	–	E5_C-CQ4A5M-000	E5_C-CQ4D5M-000
	009	Event input 2, Communication 3-phase heater alarm	E5_C-CQ4A5M-009	E5_C-CQ4D5M-009
	010	Event input 4, Heater burnout SSR defect detection	E5_C-CQ4A5M-010	E5_C-CQ4D5M-010
	011	Event input 6, Remote SP Heater burnout SSR defect detection, Transfer output	E5_C-CQ4A5M-011	E5_C-CQ4D5M-011
Out1: Relay ^{*1} Out2: Relay ^{*1}	–	–	E5_C-PR4A5M-000	E5_C-PR4D5M-000
	004	Event input 2, Communication	E5_C-PR4A5M-004	E5_C-PR4D5M-004
	014	Event input 4, Communication Remote SP, Transfer output	E5_C-PR4A5M-014	E5_C-PR4D5M-014

*1 Position proportional control model

E5DC (models with 0 or 2 auxiliary outputs)

Output	Option No	Fixed option	Order code	
			110-240 VAC	24 VAC/VDC
Out1: Relay	–	–	E5DC-RX2ASM-000	E5DC-RX2DSM-000
	002	Communication, Heater Burnout SSR defect detection	E5DC-RX2ASM-002	E5DC-RX2DSM-002
	015	Communication	E5DC-RX0ASM-015 ^{*1}	E5DC-RX0DSM-015 ^{*1}
	017	Event Input 1, Heater Burnout SSR defect detection	E5DC-RX2ASM-017	E5DC-RX2DSM-017
Out1: Voltage (pulse)	–	–	E5DC-QX2ASM-000	E5DC-QX2DSM-000
	002	Communication, Heater Burnout SSR defect detection	E5DC-QX2ASM-002	E5DC-QX2DSM-002
	015	Communication	E5DC-QX0ASM-015 ^{*1}	E5DC-QX0DSM-015 ^{*1}
	017	Event Input 1, Heater Burnout SSR defect detection	E5DC-QX2ASM-017	E5DC-QX2DSM-017
Out1: Linear current	–	–	E5DC-CX2ASM-000	E5DC-CX2DSM-000
	015	Communication	E5DC-CX0ASM-015 ^{*1}	E5DC-CX0DSM-015 ^{*1}
	015	Communication	E5DC-CX2ASM-015	E5DC-CX2DSM-015
	016	Event Input 1	E5DC-CX2ASM-016	E5DC-CX2DSM-016

*1 Auxiliary outputs are not possible for these models.

E5_C optional tools

Option	Order code
USB based configuration cable	E58-CIFQ2, E58-CIFQ2-E (for E5EC/E5AC/E5DC)
PC based configuration and tuning software	EST2-2C-MV4

Specifications

E5CC/E5EC/E5AC

	E5CC	E5EC	E5AC
Power supply voltage	A in model number: 100 to 240 VAC, 50/60 Hz D in model number: 24 VAC, 50/60 Hz; 24 VDC		
Operating voltage range	85% to 110% of rated supply voltage		
Power consumption	6.5 VA max. at 100 to 240 VAC, and 4.1 VA max. at 24 VAC or 2.3 W max. at 24 VDC	8.3 VA max. at 100 to 240 VAC, and 5.5 VA max. at 24 VAC or 3.2 W max. at 24 VDC	9.0 VA max. at 100 to 240 VAC, and 5.6 VA max. at 24 VAC or 3.4 W max. at 24 VDC
Sensor input	<ul style="list-style-type: none"> Temperature inputs Thermocouple: K, J, T, E, L, U, N, R, S, B, W, or PL II Platinum resistance thermometer: Pt100 or JPt100 Infrared temperature sensor (ES1B): 10 to 70°C, 60 to 120°C, 115 to 165°C, or 140 to 260°C Analog inputs Current input (mA): 4 to 20 or 0 to 20 Voltage input (V): 1 to 5, 0 to 5, or 0 to 10 		
Input impedance	Current input: 150 Ω max., Voltage input: 1 MΩ min. (Use a 1:1 connection when connecting the ES2-HB/THB.)		
Control method	ON/OFF control or 2-PID control (with auto-tuning)		
Indication accuracy	Thermocouple input: (±0.3% of indicated value or ±1°C, whichever is greater) ±1 digit max. Platinum resistance thermometer input: (±0.2% of indicated value or ±0.8°C, whichever is greater) ±1 digit max. Analog input: ±0.2% FS ±1 digit max. CT input: ±5% FS ±1 digit max.	Thermocouple input: (±0.3% of indicated value or ±1°C, whichever is greater) ±1 digit max. Platinum resistance thermometer input: (±0.2% of indicated value or ±0.8°C, whichever is greater) ±1 digit max. Analog input: ±0.2% FS ±1 digit max. CT input: ±5% FS ±1 digit max. Potentiometer input: ±5% FS ±1 digit max.	
Auto-Tuning	Yes, 40%/100% MV output limit selection. When using Heat/Cool: Automatic cool gain adjustment		
Self-Tuning	Yes		
Control outputs	Relay output	SPST-NO, 250 VAC, 3 A (resistive load), electrical life: 100,000 operations, minimum applicable load: 5 V, 10 mA	SPST-NO, 250 VAC, 5 A (resistive load), electrical life: 100,000 operations, minimum applicable load: 5 V, 10 mA
	Voltage output (for driving SSR)	Output voltage: 12 VDC ±20% (PNP), max. load current: 21 mA, with short-circuit protection circuit	Output voltage: 12 VDC ±20% (PNP), max. load current: 40 mA, with short-circuit protection circuit (The maximum load current is 21 mA for models with two control outputs.)
	Linear current output	4 to 20 mA DC/0 to 20 mA DC, load: 500 Ω max., resolution: approx. 10,000	
Auxiliary outputs	Number of outputs	3	4
	Output specifications	N.O. relay outputs, 250 VAC, Models with 3 outputs: 2 A (resistive load), electrical life: 100,000 operations, minimum applicable load: 5 V, 10 mA	N.O. relay outputs, 250 VAC, Models with 4 outputs: 2 A (resistive load), electrical life: 100,000 operations, minimum applicable load: 5 V, 10 mA
Event inputs	Number of inputs	2 or 4 or 6 max (depends on the model)	
	External contact input specifications	Contact input: ON: 1 kΩ max., OFF: 100 kΩ min. Non-contact input: ON: Residual voltage: 1.5 V max., OFF: Leakage current: 0.1 mA max. Current flow: approx. 7 mA per contact	
Setting method	Digital setting using front panel keys or via Remote Software CX-Thermo V4.5		
Indication method	11-segment digital display and individual indicators		

	E5CC	E5EC	E5AC
Multi SP	Up to eight set points (SP0 to SP7) can be saved and selected using event inputs, key operations, or serial communications.		
Other functions	Manual output, heating/cooling control, loop burnout alarm, SP ramp, other alarm functions, heater burnout detection (including SSR failure detection), 40% AT, 100% AT, MV limiter, input digital filter, self-tuning, temperature input shift, run/stop, protection functions, extraction of square root, MV change rate limit, logic operations, PV/SV status display, simple program, automatic cooling coefficient adjustment		
Ambient operating temperature	-10 to 55°C (with no condensation or icing)		
Ambient operating humidity	25% to 85%		
Storage temperature	-25 to 65°C (with no condensation or icing)		
Degree of protection	Front panel: IP66, Rear case: IP20, Terminals: IP00		
Sampling period	50 ms		
Size in mm (H×W×D)	48×48×64	48×96×64	96×96×64

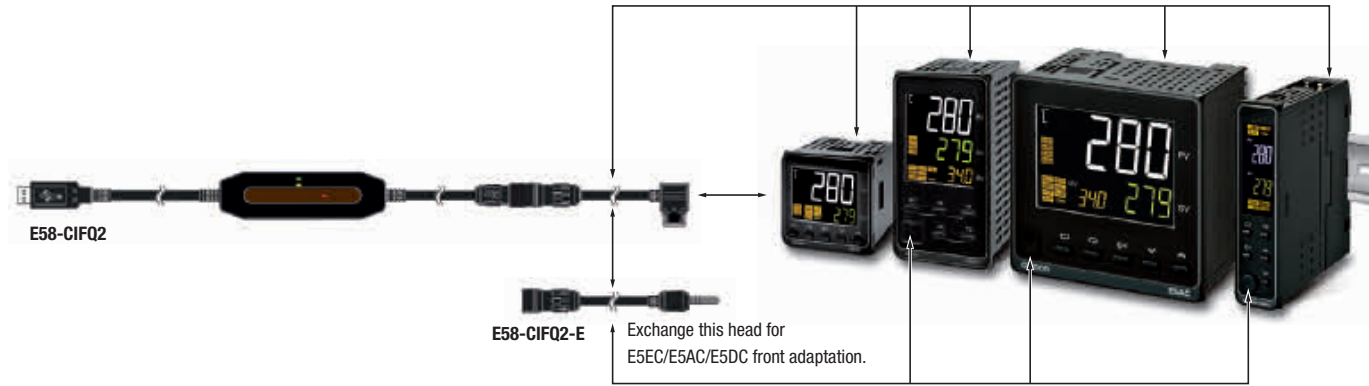
E5DC

		E5DC
Power supply voltage		A in model number: 100 to 240 VAC, 50/60 Hz D in model number: 24 VAC, 50/60 Hz; 24 VDC
Operating voltage range		85% to 110% of rated supply voltage
Power consumption		4.9 VA max. at 100 to 240 VAC, and 2.8 VA max. at 24 VDC or 1.5 W max. at 24 VDC
Sensor input		- Temperature inputs Thermocouple: K, J, T, E, L, U, N, R, S, B, W, or PL II Platinum resistance thermometer: Pt100 or JPt100 Infrared temperature sensor (ES1B): 10 to 70°C, 60 to 120°C, 115 to 165°C, or 140 to 260°C - Analog inputs Current input (mA): 4 to 20 or 0 to 20 Voltage input (V): 1 to 5, 0 to 5, or 0 to 10
Input impedance		Current input: 150 Ω max., Voltage input: 1 MΩ min. (Use a 1:1 connection when connecting the ES2-HB/THB.)
Control method		ON/OFF control or 2-PID control (with auto-tuning)
Indication accuracy		Thermocouple input: (±0.3% of PV or ±1°C, whichever is greater) ±1 digit max. Platinum resistance thermometer input: (±0.2% of PV or ±0.8°C, whichever is greater) ±1 digit max. Analog input: ±0.2% FS ±1 digit max. CT input: ±5% FS ±1 digit max.
Auto-Tuning		Yes, 40%/100% MV output limit selection. When using Heat/Cool: Automatic cool gain adjustment
Self-Tuning		Yes
Control outputs	Relay output	SPST-NO, 250 VAC, 3 A (resistive load), electrical life: 100,000 operations, minimum applicable load: 5 V, 10 mA
	Voltage output (for driving SSR)	Output voltage: 12 VDC ±20% (PNP), max. load current: 20 mA, with short-circuit protection circuit
	Linear current output	4 to 20 mA DC/0 to 20 mA DC, load: 500 Ω max., resolution: approx. 10,000
Auxiliary outputs	Number of outputs	2 (depends on model)
	Output specifications	SPST-NO relay outputs: 250 VAC, 2 A (resistive load), Electrical life: 100,000 operations, minimum applicable load: 5 V, 10 mA
Event inputs	Number of inputs	1 (depends on model)
	External contact input specifications	Contact input: ON: 1 kΩ max., OFF: 100 kΩ min. Non-contact input: ON: Residual voltage: 1.5 V max., OFF: Leakage current: 0.1 mA max. Current flow: approx. 7 mA per contact
Setting method		Digital setting using front panel keys
Indication method		11-segment digital displays and individual indicators Character height: PV 8.5 mm, SV: 8.0 mm
Multi SP		Up to eight set points (SP0 to SP7) can be saved and selected using event inputs, key operations, or serial communications.*1
Other functions		Manual output, heating/cooling control, loop burnout alarm, SP ramp, other alarm functions, heater burnout (HB) alarm (including SSR failure (HB) alarm), 40% AT, 100% AT, MV limiter, input digital filter, self tuning, robust tuning, PV input shift, run/stop, protection functions, extraction of square root, MV change rate limit, simple calculations, temperature status display, simple programming, moving average of input value, and display brightness setting
Ambient operating temperature		-10 to 55°C (with no condensation or icing), for 3-year warranty: -10 to 50°C (with no condensation or icing)
Ambient operating humidity		25% to 85%
Storage temperature		-25 to 65°C (with no condensation or icing)
Degree of protection		Main unit: IP20, Terminal unit: IP00
Sampling period		50 ms
Size in mm (H×W×D)		96×22.5×85

*1 Only two set points are selectable for event inputs.

USB communication cable E58-CIFQ2

	E5CC	E5EC	E5AC	E5DC
E58-CIFQ2	■	■	■	■
E58-CIFQ2-E	-	■	■	■





Universal compact digital process controllers

The E5_N-H series of process controllers take the proven concept of the general purpose E5_N series to a process level. Main features of the E5_N-H series are universal inputs, process outputs and options such as transfer output, remote set-point and setvalue programmer.

- Control mode: ON/OFF or 2-PID, Valve control on EN-H/AN-H
- Control output: relay, voltage (pulse), SSR, linear current and voltage
- Power supply: 100/240 VAC or 24 VDC/VAC
- Easy PC connection for parameter cloning, setting and tuning
- Clear and intuitive set-up and operation

Ordering information

Type	Input	Output	Fixed option	Alarms	Order code	
48x48 mm model (includes supply voltage indication)						
On-panel	Universal TC/Pt/mV mA/V	Relay output	SV programmer (8 programs of 32 segments)	3 software alarms 2 SUB outputs	E5CN-HR2M-500 AC100-240	E5CN-HR2MD-500 AC/DC24
		Voltage (pulse)			E5CN-HQ2M-500 AC100-240	E5CN-HQ2MD-500 AC/DC24
		Current output			E5CN-HC2M-500 AC100-240	E5CN-HC2MD-500 AC/DC24
		Linear voltage output			E5CN-HV2M-500 AC100-240	E5CN-HV2MD-500 AC/DC24
		Relay output			E5CN-HTR2M-500 AC100-240	E5CN-HTR2MD-500 AC/DC24
		Voltage (pulse)			E5CN-HTQ2M-500 AC100-240	E5CN-HTQ2MD-500 AC/DC24
		Current output			E5CN-HTC2M-500 AC100-240	E5CN-HTC2MD-500 AC/DC24
		Linear voltage output			E5CN-HTV2M-500 AC100-240	E5CN-HTV2MD-500 AC/DC24

Note: - Output and Alarm Relays: 3 A/250 VAC, electrical life: 100,000 operations
 - Output voltage (pulse): 12 V, 21 mA (ie. to drive solid state relays)
 - Linear current: 0(4) to 20 mA
 - Linear voltage output: 0 to 10 V

Accessories

E5CN-H option boards

(One slot available in each instrument)

Option			Order code
Event inputs			E53-CNBN2
Event inputs	Control output 2 Voltage (for driving SSR)		E53-CNQBN2
Event inputs		Heater burnout/SSR failure/ Heater overcurrent detection	E53-CNHBN2
Event inputs		Transfer output	E53-CNBFN2
Communications RS-232C	Control output 2 Voltage (for driving SSR)		E53-CN01N2
Communications RS-232C			E53-CNQ01N2
Communications RS-232C		Heater burnout/SSR failure/ Heater overcurrent detection	E53-CNH01N2
Communications RS-485			E53-CN03N2
Communications RS-485	Control output 2 Voltage (for driving SSR)		E53-CNQ03N2
Communications RS-485		Heater burnout/SSR failure/ Heater overcurrent detection	E53-CNH03N2
Communications RS-485		3-phase heater burnout/SSR failure/ Heater overcurrent detection	E53-CNH03N2
	Control output 2 Voltage (for driving SSR)	Transfer output	E53-CNQFN2
	Control output 2 Voltage (for driving SSR)	Heater burnout/SSR failure/ Heater overcurrent detection	E53-CNQHN2
	Control output 2 Voltage (for driving SSR)	3-phase heater burnout/SSR failure/ Heater overcurrent detection	E53-CNQHHN2

Control method	Auxiliary output	Control output 1/2	Heater burnout	Transfer output	Order code (includes supply voltage indication)			
					96x96 mm model	48x96 mm model		
Basic	2 alarm relays	none fitted, 2 slots	1-phase		E5AN-HAA2HBM-500 AC100-240	E5EN-HAA2HBM-500 AC100-240		
		none fitted, 2 slots			E5AN-HAA2HBMD-500 AC/DC24	E5EN-HAA2HBMD-500 AC/DC24		
		2 SSR output fitted			E5AN-HSS2HBM-500 AC100-240	E5EN-HSS2HBM-500 AC100-240		
		2 SSR output fitted			E5AN-HSS2HBMD-500 AC/DC24	E5EN-HSS2HBMD-500 AC/DC24		
		none fitted, 2 slots			3-phase	4 to 20 mA output	E5AN-HAA2HHBFM-500 AC100-240	E5EN-HAA2HHBFM-500 AC100-240
		none fitted, 2 slots					E5AN-HAA2HHBFMD-500 AC/DC24	E5EN-HAA2HHBFMD-500 AC/DC24
	2 SSR output fitted	E5AN-HSS2HHBFM-500 AC100-240	E5EN-HSS2HHBFM-500 AC100-240					
	2 SSR output fitted	E5AN-HSS2HHBFMD-500 AC/DC24	E5EN-HSS2HHBFMD-500 AC/DC24					
	3 alarm relays	none fitted, 2 slots	E5AN-HAA3BFM-500 AC100-240	E5EN-HAA3BFM-500 AC100-240				
	3 alarm relays	none fitted, 2 slots	E5AN-HAA3BFMD-500 AC/DC24	E5EN-HAA3BFMD-500 AC/DC24				
	Valve controller	2 alarm relays	2 relay output fitted		4 to 20 mA output	E5AN-HPRR2BM-500 AC100-240	E5EN-HPRR2BM-500 AC100-240	
						E5AN-HPRR2BMD-500 AC/DC24	E5EN-HPRR2BMD-500 AC/DC24	
			E5AN-HPRR2BFM-500 AC100-240			E5EN-HPRR2BFM-500 AC100-240		
			E5AN-HPRR2BFMD-500 AC/DC24			E5EN-HPRR2BFMD-500 AC/DC24		
						E5AN-HTAA2HBM-500	E5EN-HTAA2HBM-500 AC100-240	
						E5AN-HTAA2HBMD-500	E5EN-HTAA2HBMD-500 AC/DC24	
SV programmer (8 programs of 32 segments)	2 alarm relays	none fitted, 2 slots	1-phase	4 to 20 mA output	E5AN-HTAA2HHBFM-500	E5EN-HTAA2HHBFM-500		
						E5AN-HTAA2HHBFMD-500	E5EN-HTAA2HHBFMD-500	
						E5AN-HTAA2HHBFMD-500	E5EN-HTAA2HHBFMD-500	
	3 alarm relays					E5AN-HTAA3BFM-500	E5EN-HTAA3BFM-500	
						E5AN-HTAA3BFMD-500	E5EN-HTAA3BFMD-500	
						E5AN-HTAA3BFMD-500	E5EN-HTAA3BFMD-500	
SV programmer and valve controller	2 alarm relays	2 relay output fitted		4 to 20 mA output	E5AN-HTPRR2BM-500	E5EN-HTPRR2BM-500		
						E5AN-HTPRR2BMD-500	E5EN-HTPRR2BMD-500	
						E5AN-HTPRR2BFM-500	E5EN-HTPRR2BFM-500	
						E5AN-HTPRR2BFMD-500	E5EN-HTPRR2BFMD-500	

Note: - All E5EN-H/AN-H have 2 event inputs
 - All E5EN-H/AN-H have Remote Setpoint 4 to 20 mA input

Specifications E5CN-H/EN-H/AN-H

Supply voltage	100 to 240 VAC 50/60 Hz or 24 VAC, 50/60Hz; 24 VDC
Sensor input	Thermocouple: K, J, T, E, L, U, N, R, S, B, W or PL II Platinum resistance thermometer: Pt100 or JPt100 Current input: 4 to 20 mA or 0 to 20 mA Voltage input: 1 to 5 V, 0 to 5 V or 0 to 10 V
Control mode	ON/OFF, 2-PID and valve (PRR)
Accuracy	Thermocouple: ($\pm 0.1\%$ of indicated value or $\pm 1^\circ\text{C}$, whichever is greater) \pm digit max. *1 Platinum resistance thermometer: ($\pm 0.1\%$ of indicated value or $\pm 0.5^\circ\text{C}$, whichever is greater) ± 1 digit max. Analogue input: $\pm 0.1\%$ FS ± 1 digit max.
Auto-tuning	yes, 40% and 100% MV output limit selection. When using Heat/Cool: automatic cool gain adjustment
Self-tuning	yes
RS-232C/RS-422/RS-485	optional, CompoWayF or Modbus selectable
Event input	Optional (Standard 2 event input in EN-H/AN-H)
QLP port (USB connection PC)	yes
Ambient temperature	-10 to 55°C
IP Rating front panel	IP66
Sampling period	60 ms

E5AN-H/EN-H output option boards

(2 slots available in E5_N-HAA__-500 models:
SS models have 2 fixed SSR output modules)

Option	Order code
Relay	E53-RN
Voltage (pulse) PNP 12 VDC	E53-QN
Voltage (pulse) NPN 12 VDC	E53-Q3
Voltage (pulse) PNP 24 VDC	E53-Q4
Linear 4 to 20 mA	E53-C3N
Linear 0 to 20 mA	E53-C3DN
Linear 0 to 10 V	E53-V34N
Linear 0 to 5 V	E53-V35N

E5AN-H/EN-H option boards

(one slot available in each instrument)

Option	Order code
RS-232C communications (CompoWay/F/Modbus)	E53-EN01
RS-422 communications (CompoWay/F/Modbus)	E53-EN02
RS-485 communications (CompoWay/F/Modbus)	E53-EN03
event input	E53-AKB

E5AN-H/EN-H series optional tools

Option	Order code
USB PC based configuration cable	E58-CIFQ1
PC based configuration and tuning software	CX-Thermo
	EST2-2C-MV4





Fast, accurate and equipped for application specific needs

The E5_R series provides you with high accuracy inputs (0.01°C for Pt100) and a 50 ms sample and control cycle for all four loops. Its unique Disturbance Overshoot Reduction Adjustment ensures solid, robust control.

- Easy and clear read-out thanks to bright Liquid Crystal Display
- Exceptional versatility – multi-loop control, cascade control, and valve control
- Easy integration with DeviceNet, PROFIBUS or Modbus
- SV programmer optional, 32 programs with up to 256 segments



Ordering information

Functions	Loops	Input		Output		Comms	Order code	
		analogue	Event	Control	Alarm		96x96 mm	Supply voltage
standard	1	1	2	2 QC+Q	4R	–	E5AR-Q4B	AC100-240 or DC/AC 24
standard	1	1	2	2 QC+Q	4R	RS-485	E5AR-Q43B-FLK	AC100-240 –
standard	1	1	6	2 QC+Q	4R	RS-485	E5AR-Q43DB-FLK	AC100-240 –
standard	1	1	6	4 QC+Q+C+C	4R	RS-485	E5AR-QC43DB-FLK	AC100-240 or DC/AC 24
standard	max 2	2	4	2 QC+Q	4R	RS-485	E5AR-Q43DW-FLK	AC100-240 –
standard	max 2	2	4	4 QC+Q+QC+Q	4R	RS-485	E5AR-QQ43DW-FLK	AC100-240 or DC/AC 24
standard	max 4	4	4	4 QC+Q+QC+Q	4R	RS-485	E5AR-QQ43DWW-FLK	AC100-240 –
standard	1	1	2	2 C+C	4R	–	E5AR-C4B	AC100-240 or DC/AC 24
standard	1	1	2	2 C+C	4R	RS-485	E5AR-C43B-FLK	AC100-240 –
standard	1	1	6	2 C+C	4R	RS-485	E5AR-C43DB-FLK	AC100-240 –
standard	max 2	2	4	2 C+C	4R	RS-485	E5AR-C43DW-FLK	AC100-240 –
standard	max 4	4	4	4 C+C+C+C	4R	RS-485	E5AR-CC43DWW-FLK	AC100-240 or DC/AC 24
valve	1	1 + pot	4	2 R+R	4R	–	E5AR-PR4DF	AC100-240 or DC/AC 24
valve	1	1 + pot	4	4 R+R+QC+Q	4R	RS-485	E5AR-PRQ4DF-FLK	AC100-240 or DC/AC 24
standard	1	1	2	2 QC+Q	4R	DeviceNet	E5AR-Q4B-DRT	AC100-240 or DC/AC 24
standard	1	1	2	4 QC+Q+C+C	4R	DeviceNet	E5AR-QC4B-DRT	AC100-240 or DC/AC 24
standard	max 2	2	–	4 QC+Q+QC+Q	4R	DeviceNet	E5AR-QQ4W-DRT	AC100-240 or DC/AC 24
standard	1	1	2	2 C+C	4R	DeviceNet	E5AR-C4B-DRT	AC100-240 or DC/AC 24
standard	max 4	4	–	4 C+C+C+C	4R	DeviceNet	E5AR-CC4W-DRT	AC100-240 or DC/AC 24
valve	1	1 + pot	–	2 R+R	4R	DeviceNet	E5AR-PR4F-DRT	AC100-240 or DC/AC 24
valve	1	1 + pot	–	4 R+R+QC+Q	4R	DeviceNet	E5AR-PRQ4F-DRT	AC100-240 or DC/AC 24
SV programmer	1	1	2	2 QC+Q	4R	–	E5AR-TQ4B	AC100-240 or DC/AC 24
SV programmer	1	1	2	2 C+C	4R	–	E5AR-TC4B	AC100-240 or DC/AC 24
SV programmer	1	1	2	2 QC+Q	4R	RS-485	E5AR-TQ43B-FLK	AC100-240 –
SV programmer	1	1	2	2 C+C	4R	RS-485	E5AR-TC43B-FLK	AC100-240 –
SV programmer	1	1	10	2 QC+Q	10T	RS-485	E5AR-TQE3MB-FLK	AC100-240 –
SV programmer	1	1	10	2 C+C	10T	RS-485	E5AR-TCE3MB-FLK	AC100-240 –
SV programmer	1	1	10	4 QC+Q+C+C	10T	RS-485	E5AR-TQCE3MB-FLK	AC100-240 or DC/AC 24
SV programmer	max 2	2	4	2 QC+Q	4R	RS-485	E5AR-TQ43DW-FLK	AC100-240 –
SV programmer	max 2	2	4	2 C+C	4R	RS-485	E5AR-TC43DW-FLK	AC100-240 –
SV programmer	max 2	2	8	4 QC+Q+QC+Q	10T	RS-485	E5AR-TQQE3MW-FLK	AC100-240 or DC/AC 24
SV programmer	max 4	4	8	4 C+C+C+C	10T	RS-485	E5AR-TCCE3MWW-FLK	AC100-240 or DC/AC 24
SV programmer	max 4	4	8	4 QC+Q+QC+Q	10T	RS-485	E5AR-TQQE3MWW-FLK	AC100-240 –
SV programmer + valve	1	1 + pot	4	2 R+R	4R	–	E5AR-TPR4DF	AC100-240 or DC/AC 24
SV programmer + valve	1	1 + pot	8	4 R+R+QC+Q	10T	RS-485	E5AR-TPRQE3MF-FLK	AC100-240 or DC/AC 24

Note: - Voltage: Specify the power supply specifications (voltage) when ordering.

- Standard = heat and/or cool PID control, valve = valve positioning (relay up/down) (PRR)
- max 2 = 2 loops heat and/or cool or 1 loop cascade, ratio or remote SP
- max 4 = 4 loops heat and/or cool
- 1, 2 or 4 = number of analogue universal input 1 + pot = 1 universal and 1 slide wire feedback from valve
- QC = voltage (pulse) or current (switch), Q = voltage (pulse), C = current, 4R = 4 two pole relay, 2T = two transistor output NPN

Functions	Loops	Input		Output		Comms	Order code			
		analogue	Event	Control	Alarm		48x96 mm	Supply voltage		
standard	1	1	2	2	QC+Q	4R	–	E5ER-Q4B	AC100-240	or DC/AC 24
standard	1	1	2	2	QC+Q	4R	RS-485	E5ER-Q43B-FLK	AC100-240	–
standard	1	1	2	4	QC+Q+C+C	4R	RS-485	E5ER-QC43B-FLK	AC100-240	or DC/AC 24
standard	1	1	6	2	QC+Q	2T	RS-485	E5ER-QT3DB-FLK	AC100-240	–
standard	max 2	2	4	2	QC+Q	2T	RS-485	E5ER-QT3DW-FLK	AC100-240	or DC/AC 24
standard	1	1	2	2	C+C	4R	–	E5ER-C4B	AC100-240	or DC/AC 24
standard	1	1	2	2	C+C	4R	RS-485	E5ER-C43B-FLK	AC100-240	–
standard	1	1	6	2	C+C	2T	RS-485	E5ER-CT3DB-FLK	AC100-240	–
standard	max 2	2	4	2	C+C	2T	RS-485	E5ER-CT3DW-FLK	AC100-240	or DC/AC 24
valve	1	1 + pot	4	2	R+R	2T	–	E5ER-PRTDF	AC100-240	or DC/AC 24
valve	1	1 + pot	–	4	R+R+QC+Q	4R	RS-485	E5ER-PRQ43F-FLK	AC100-240	or DC/AC 24
standard	1	1	2	2	QC+Q	2T	DeviceNet	E5ER-QTB-DRT	AC100-240	or DC/AC 24
standard	max 2	2	–	2	QC+Q	2T	DeviceNet	E5ER-QTW-DRT	AC100-240	or DC/AC 24
standard	1	1	2	2	C+C	2T	DeviceNet	E5ER-CTB-DRT	AC100-240	or DC/AC 24
standard	max 2	2	–	2	C+C	2T	DeviceNet	E5ER-CTW-DRT	AC100-240	or DC/AC 24
valve	1	1 + pot	–	2	R+R	2T	DeviceNet	E5ER-PRTF-DRT	AC100-240	or DC/AC 24
SV programmer	1	1	2	2	QC+Q	4R	–	E5ER-TQ4B	AC100-240	or DC/AC 24
SV programmer	1	1	2	2	C+C	4R	–	E5ER-TC4B	AC100-240	or DC/AC 24
SV programmer	1	1	2	2	QC+Q	4R	RS-485	E5ER-TQC43B-FLK	AC100-240	or DC/AC 24
SV programmer	max 2	2	4	2	QC+Q	2T	RS-485	E5ER-TQT3DW-FLK	AC100-240	or DC/AC 24
SV programmer	max 2	2	4	2	C+C	2T	RS-485	E5ER-TCT3DW-FLK	AC100-240	or DC/AC 24
SV programmer + valve	1	1 + pot	4	2	R+R	2T	–	E5ER-TPRTDF	AC100-240	or DC/AC 24
SV programmer + valve	1	1 + pot	–	3	R+R + QC	4R	RS-485	E5ER-TPRQ43F-FLK	AC100-240	or DC/AC 24

Note: - Voltage: Specify the power supply specifications (voltage) when ordering.

- Standard = heat and/or cool PID control, valve = valve positioning (relay up/down) (PRR)
- max 2 = 2 loops heat and/or cool or 1 loop cascade, ratio or remote SP
- max 4 = 4 loops heat and/or cool
- 1, 2 or 4 = number of analogue universal input 1 + pot = 1 universal and 1 slide wire feedback from valve
- QC = voltage (pulse) or current (switch), Q = voltage (pulse), C = current, 4R = 4 two pole relay, 2T = two transistor output NPN

Accessories

Terminal covers	Order code
Terminal cover for E5AR	E53-COV14
Terminal cover for E5ER	E53-COV15

E5_R/E5_R-T optional tools

Option	Order code
PC based configuration and tuning software CX-Thermo	EST2-2C-MV4

Specifications

Thermocouple input type	K, J, T, E, L, U, N, R, S, B, W
RTD input type	Pt100
Linear input type	mA, V
Control mode	2-PID or ON/OFF control
Accuracy	±0.1% FS
Auto-tuning	yes
RS-485	optional
Event input	optional
Ambient temperature	-10 to 55°C
IP rating front panel	IP66
Sampling period	50 ms
Size in mm (HxWxD)	E5ER: 96x48x110 E5AR: 96x96x110



CelciuX^o - Multi-Loop temperature control – Control and Connectivity

CelciuX^o is designed to handle complex temperature profiles thanks to Omron's unique Gradient temperature Control (GTC) algorithm and to offer easy program-less communication with Omron and third-party PLCs and HMI. Above all, CelciuX^o incorporates all "simple to use" clever temperature control technology, like 2-PID, disturbance control and various ways of tuning.

- Interfaces to a wide range of industrial networks
- Reduced engineering due to Program-less communications, Smart Active Parts and Function Block Libraries
- Available with screw terminals and screw-less clamp terminals
- One unit handling various types of input, such as Pt, Thermocouple, mA, and V input
- Gradient Temperature Control (GTC)



Ordering information

Type	Control points	Control outputs	Auxiliary outputs	Other functions	Terminal	Order code
Basic unit	2	2 voltage (pulse)	2 transistor (NPN) ^{*1}	2 CT input ^{*2} + 2 event input	M3 screws	EJ1N-TC2A-QNHB
Basic unit	2	2 voltage (pulse)	2 transistor (NPN) ^{*1}	2 CT input ^{*2} + 2 event input	Screw-less clamp	EJ1N-TC2B-QNHB
Basic unit	2	2 current	2 transistor (NPN) ^{*1}	2 event input	M3 screws	EJ1N-TC2A-CNB
Basic unit	2	2 current	2 transistor (NPN) ^{*1}	2 event input	Screw-less clamp	EJ1N-TC2B-CNB
Basic unit	4	4 voltage (pulse)	–	–	M3 screws	EJ1N-TC4A-QQ
Basic unit	4	4 voltage (pulse)	–	–	Screw-less clamp	EJ1N-TC4B-QQ
High function unit	–	–	4 transistor (NPN)	4 event input	M3 screws	EJ1N-HFUA-NFLK
High function unit	–	–	4 transistor (NPN)	4 event input	Screw-less clamp	EJ1N-HFUB-NFLK
DeviceNet unit	–	–	–	–	Screw connector	EJ1N-HFUB-DRT
Ethernet unit ^{*3}	–	–	–	–	3 x RJ45	EJ1N-HFU-ETN
End unit ^{*4}	–	–	2 transistor (NPN)	–	M3 screws	EJ1C-EDUA-NFLK
End unit ^{*4}	–	–	2 transistor (NPN)	–	Removable Connector	EJ1C-EDUC-NFLK

^{*1} For heating/cooling control applications, the auxiliary outputs on the 2-point models are used for cooling control.

On the 4-point models, heating/cooling control can be performed for two input points only.

^{*2} When using the heater burnout alarm, purchase a Current Transformer (E54-CT1 or E54-CT3) separately.

^{*3} This unit mounts to the left of the CelciuX^o configuration and enables PROFINET or Modbus/TCP network connection. Combine the HFU-ETN with an EDU_-NFLK end unit to use with other devices supporting Modbus-RTU like E5_N temperature controllers and MX2 Inverters.

^{*4} An End unit is always required for connection to a Basic unit or an HFU. An HFU cannot operate without a Basic unit.

Type	Control points	Control outputs	Auxiliary outputs	Other functions	Terminal	Order code
Basic unit	2 (GTC)	2 voltage (pulse) ^{*1}	2 transistor (NPN)	2 CT input ^{*2}	M3 screws	EJ1G-TC2A-QNH
Basic unit	2 (GTC)	2 voltage (pulse) ^{*1}	2 transistor (NPN)	2 CT input ^{*2}	Screw-less clamp	EJ1G-TC2B-QNH
Basic unit	4 (GTC)	4 voltage (pulse) ^{*1}	–	–	M3 screws	EJ1G-TC4A-QQ
Basic unit	4 (GTC)	4 voltage (pulse) ^{*1}	–	–	Screw-less clamp	EJ1G-TC4B-QQ
High function unit	– (GTC)	–	4 transistor (NPN)	–	M3 screws	EJ1G-HFUA-NFLK
High function unit	– (GTC)	–	4 transistor (NPN)	–	Screw-less clamp	EJ1G-HFUB-NFLK
End unit ^{*3}	–	–	2 transistor (NPN)	–	M3 screws	EJ1C-EDUA-NFLK
End unit ^{*3}	–	–	2 transistor (NPN)	–	Removable Connector	EJ1C-EDUC-NFLK

^{*1} Heating/cooling control is not supported for gradient temperature control.

^{*2} When using the heater burnout alarm, use a Current Transformer (E54-CT1 or E54-CT3) (sold separately).

^{*3} An End-unit (EDU) is always required to connect an HFU and or a Basic TC unit for Communications and Power supply.

A GTC (Gradient Temperature Control) basic TC unit always requires a GTC HFU unit.

Accessories

Current transformer

Diameter	Order code
5.8 dia.	E54-CT1
12.0 dia.	E54-CT3

Communications and cables

Description	Order code
G3ZA connecting cable 5 meter	EJ1C-CBLA050
USB programming cable	E58-CIFQ1
PC based configuration and tuning software CX-Thermo	EST2-2C-MV4
PROFIBUS Gateway	PRT1-SCU11

Specifications

Item	Type	EJ1_-TC2	EJ1_-TC4
Power supply voltage		24 VDC	
Operating voltage range		85% to 110% of rated voltage	
Power consumption		4 W max. (at maximum load)	5 W max. (at maximum load)
Input (see note) ^{*1}		Thermocouple: K, J, T, E, L, U, N, R, S, B, W, PLII ES1B Infrared Thermosensor: 10 to 70°C, 60 to 120°C, 115 to 165°C, 140 to 260°C. Analogue input: 4 to 20 mA, 0 to 20 mA, 1 to 5 V, 0 to 5 V, 0 to 10 V Platinum resistance thermometer: Pt100, JPt100	
Input impedance		Current input: 150Ω max., voltage input: 1 MΩ min.	
Control outputs	Voltage output	Output voltage: 12 VDC ±15%, max. load current: 21 mA (PNP models with short-circuit protection circuit)	
	Transistor output	Max. operating voltage: 30 V, max. load current: 100 mA	–
	Current output	Current output range: 4 to 20 mA or 0 to 20 mA DC Load: 500 Ω max. (including transfer output) (Resolution: Approx: 2,800 for 4 to 20 mA DC, approx. 3,500 for 0 to 20 mA DC)	–
Event inputs	Input points	2	–
	Contact input	ON: 1 kΩ max., OFF: 100 kΩ min.	–
	Non-contact input	ON: Residual voltage: 1.5 V max., OFF: Leakage current: 0.1 mA max.	–
		Outflow current: approx. 4 mA per point	–
Number of input and control points		Input points: 2, control points: 2	Input points: 4, control points: 4
Setting method		Via communications	
Control method		ON/OFF control or 2-PID (with autotuning, selftuning, Heat & Cool autotuning and non-linear cool output selection)	
Other functions		Two-point input shift, digital input filter, remote SP, SP ramp, manual manipulated variable, manipulated variable limiter, interference overshoot adjustment, loop burnout alarm, RUN/STOP, banks, I/O allocations, etc.	
Alarm output		2 points via End unit	
Communication		RS-485, PROFIBUS, Modbus, DeviceNet	RS-485, PROFIBUS, Modbus, DeviceNet
Size in mm (WxHxD)		31x96x109	
Weight		180 g	
Ambient temperature range		Operating -10°C to 55°C, Storage -25°C to 65°C (with no icing or condensation)	
Ambient humidity range		Operating: 25% to 85% (with no condensation)	

*1 Inputs are fully multi-input. Therefore, platinum resistance thermometer, thermocouple, infrared thermosensor, and analogue input can be selected.

Dimensions

Item	Size in mm (HxWxD)
EJ1N-HFU_-NFL_	95.4x31.0x104.9/109.0
EJ1N-HFUB-DRT	90.9x31.0x82.2
EJ1C-EDU	95.4x15.7x76.2/79.7



Protect your heating application

This temperature monitoring relay was designed specially for monitoring abnormal temperatures to prevent excessive temperature increase and to protect equipment. K8AB-TH provides temperature monitoring in a slim design with a width of just 22.5 mm.

- Simple function settings using DIP switch
- Selectable alarm latch and SV setting protection
- Multi-input support for thermocouple or Pt100 sensor input
- Changeover relay: fail-safe selectable
- Alarm status identification with LED

Ordering information

Input type	Temperature setting range	Setting unit	Supply voltage	Size in mm (HxWxD)	Order code
Thermocouple/ Pt100	0 to 399°C/F	1°C/F	100 to 240 VAC	90x22.5x100	K8AB-TH11S AC100-240
			24 VAC/VDC		K8AB-TH11S AC/DC24
Thermocouple	0 to 1,800°C 0 to 3,200 °F ^{*1}	10°C/F	100 to 240 VAC		K8AB-TH12S AC100-240
			24 VAC/VDC		K8AB-TH12S AC/DC24

*1 Setting range depending on sensor type selected

Specifications

Item	100 to 240 VAC 50/60 Hz	24 VAC 50/60 Hz or 24 VDC
Allowable voltage range	85 to 110% of power supply voltage	
Power consumption	5 VA max.	2 W max. (24 VDC), 4 VA max. (24 VAC)
Sensor inputs	K8AB-TH11S Thermocouple: K, J, T, E; platinum-resistance thermometer: Pt100	K8AB-TH12S Thermocouple: K, J, T, E, B, R, S, PLII
Output relay	One SPDT relay (3 A at 250 VAC, resistive load)	
External inputs (for latch setting)	Contact input	ON: 1 kΩ max., OFF: 100 kΩ min.
	Non-contact input	ON residual voltage: 1.5 V max., OFF leakage current: 0.1 mA max. Leakage current: Approx. 10 mA
Setting method	Rotary switch setting (set of three switches)	
Indicators	Power (PWR): Green LED, relay output (ALM): Red LED	
Other functions	Alarm mode (upper limit/lower limit), output normally ON/OFF selection, output latch, setting protection, fail-safe operation selectable, temperature unit°C/°F	
Ambient operating temperature	-10 to 55°C (with no condensation or icing); for 3-year guarantee: -10 to 50°C	
Storage temperature	-25 to 65°C (with no condensation or icing)	
Setting accuracy	±2% of full scale	
Hysteresis width	2°C	
Output relay	Resistive load	3 A at 250 VAC (cosφ = 1), 3 A at 30 VDC (L/R = 0 ms)
	Inductive load	1 A at 250 VAC (cosφ= 0.4), 1 A at 30 VDC (L/R = 7 ms)
	Minimum load	10 mA at 5 VDC
	Maximum contact voltage	250 VAC
	Maximum contact current	3 A AC
	Maximum switching capacity	1,500 VA
	Mechanical life	10,000,000 operations
	Electrical life	Make: 50,000 times, break: 30,000 times
Sampling cycle	500 ms	
Weight	130 g	
Degree of protection	IP20	
Memory protection	Non-volatile memory (number or writes: 200,000)	
Safety standards	Approved standards	EN 61010-1
	Application standards	EN 61326 and EN 61010-1 (pollution level 2, overvoltage category II)
Crimp terminals	Two solid wires of 2.5 mm ² or two ferrules of 1.5 mm ² with insulation sleeves can be tightened together	
Case colour	Munsell 5Y8/1 (ivory)	
Case material	ABS resin (self-extinguishing resin)	
Mounting	Mounted to DIN-rail or with M4 screws	
Size in mm (HxWxD)	90x22.5x100	



Omron's intelligent PROFIBUS and CompoWay/F gateway

This gateway supports all CompoWay/F equipped products, including temperature controllers, digital panel indicators, etc. It can also be used for connecting MCW151-E and E5_K series.

- Cost-effectively integrates basic instruments into a PROFIBUS network
- Requires no complex protocol conversion writing
- Has function blocks for drag-and-drop configuration
- Connects up to 15 instruments to a single PROFIBUS point



Ordering information

Name	Order code
PROFIBUS remote terminal serial communications unit	PRT1-SCU11

Supports all CompoWay/F equipped units, but has "drag-and-drop" function blocks for

- E5AN/E5EN/E5CN/E5GN
- E5ZN and CelciuX^o (EJ1)
- E5AR/E5ER
- E5AK/E5EK

Specifications

Storage temperature	-20 to +75°C
Ambient temperature	0 to 55°C
Ambient humidity	10 to 90% (non-condensing)
EMC compliance	EN 50081-2, EN 61131-2
Power supply	+24 VDC (+10%/-15%) Current consumption 80 mA (typical)
Weight	125 g (typical)
Communication interface	RS-485 based PROFIBUS-DP RS-422A Host link RS-485 CompoWay/F RS-232C Peripheral Port supporting connection to thermotools
Size in mm (HxWxD)	90x40x65

ES1B



Achieve low-cost measurements with an infrared thermosensor

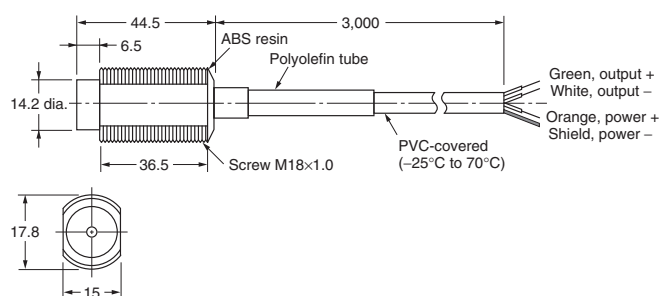
This infrared thermosensor provides an accurate, stable and cost-effective way to measure the temperature of objects. It behaves just like a standard K-type thermocouple, which enables it to operate with any temperature controller or alarm unit.

- Cost-effective infrared thermosensor
- Contactless, meaning no deterioration, unlike thermocouples
- 4 temperature ranges available: 10-70°C, 60-120°C, 115-165°C and 140-260°C
- Response speed 300 ms

Ordering information

Appearance and sensing characteristics	Specification	Order code
	10 to 70°C	ES1B 10-70C
	60 to 120°C	ES1B 60-120C
	115 to 165°C	ES1B 115-165C
	140 to 260°C	ES1B 140-260C

Dimensions (unit: mm)



Specifications

Power supply voltage	12/24 VDC								
Current consumption	20 mA max.								
Accuracy	<table border="1"> <tr> <td>±5°C</td> <td>±2% PV or ±2°C, whichever is larger</td> </tr> <tr> <td>±10°C</td> <td>±4% PV or ±4°C, whichever is larger</td> </tr> <tr> <td>±30°C</td> <td>±6% PV or ±6°C, whichever is larger</td> </tr> <tr> <td>±40°C</td> <td>±8% PV or ±8°C, whichever is larger</td> </tr> </table>	±5°C	±2% PV or ±2°C, whichever is larger	±10°C	±4% PV or ±4°C, whichever is larger	±30°C	±6% PV or ±6°C, whichever is larger	±40°C	±8% PV or ±8°C, whichever is larger
±5°C	±2% PV or ±2°C, whichever is larger								
±10°C	±4% PV or ±4°C, whichever is larger								
±30°C	±6% PV or ±6°C, whichever is larger								
±40°C	±8% PV or ±8°C, whichever is larger								
Reproducibility	±1% PV or ±1°C, whichever is larger								
Temperature drift	0.4°C/°C max.								
Receiver element	Thermopile								
Response speed	Approximately 300 ms at response rate of 63%								
Operating temperature	-25 to 70°C (with no icing or condensation)								
Allowable ambient humidity	35 to 85%								
Degree of protection	IP65								
Size in mm	head: 17.8 dia. x 44.5 (screw M18x1.0), cable 3,000								



Achieve Superior Environmental Resistance and a Wide Measurement Range of 0 to 400°C.

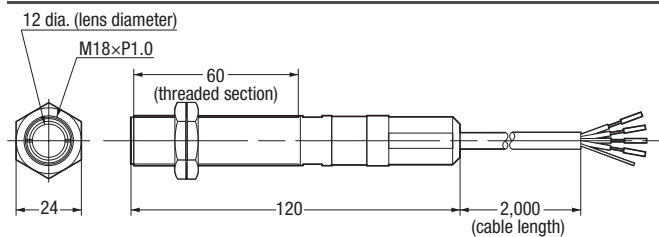
This infrared thermosensor provides an fast, accurate and very stable way to measure the temperature of objects. Its output provides a universal 4-20 mA, which enables it to operate with many temperature controllers or PLCs.

- Flexible placement with slim cylindrical shape and long focus with a distance of 500 mm and area diameter of 80 mm.
- The SUS body and silicon lens resist ambient operating temperatures of up to 70°C and resist dust and water to the equivalent of IP67.
- Fast measurement with high-speed response of 100 ms/90%.
- Strong resistance to noise with output of 4 to 20 mA.

Ordering information

Specification (measuring temperature range)	Order code
0 to 400°C	ES1C-A40

Dimensions (unit: mm)



Ratings and Characteristics

Item	Model	ES1C
Power supply voltage		12 to 24 VDC
Operating voltage range		90% to 110% of rated voltage
Current consumption		70 mA max.
Measuring temperature range		0 to 400°C
Measurement accuracy		0 to 200°C: ±2°C, 201 to 400°C: ±1% (emissivity: 0.95)
Response time		100 ms/90%
Reproducibility		±1°C of reading value
Emissivity		0.95 fixed
Current output		4 to 20 mA DC, Load: 250 Ω max.
Ambient temperature range		Operating: 0 to 70°C, Storage: -20 to 70°C (with no icing or condensation)
Ambient humidity range		Operating and storage: 35% to 85%
Vibration resistance (destruction)		1.5-mm amplitude at 10 to 55 Hz for 2 hours each in the X, Y, and Z directions
Weight		180 g
Degree of protection		Equivalent to IP67

EJ1N-HFU-ETN



Connect Modbus slaves to ETHERNET

The EJ1N-HFU-ETN provides the solution to connect a Celciux[®] in-panel multi-loop PID controller to PROFINET and Modbus/TCP. Although built on the Celciux[®] platform, this unit can be used as a gateway for discrete Modbus units when only using the EJ1N-EDU endplate.

- Connects Modbus serial slaves to PROFINET and Modbus/TCP
- Built for integration into the Celciux[®]
- Usable as a gateway for discrete units like E5_N-series temperature controllers and MX2 inverters.
- Flexible implementation with standard .gsd files



Ordering information

Name	Order code
ETHERNET to Serial Gateway	EJ1N-HFU-ETN

Specifications

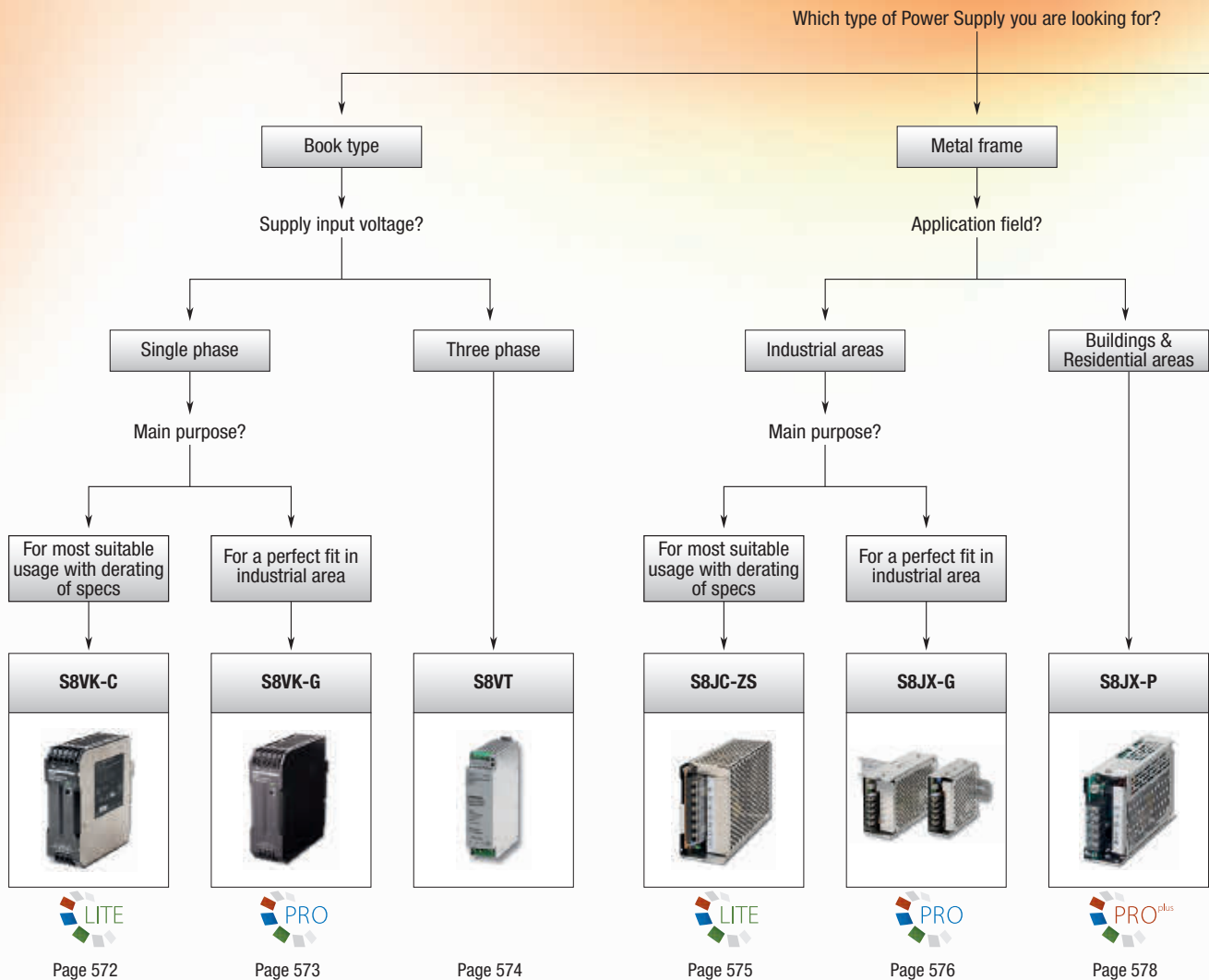
PROFINET	I/O Device
Conformance	Class A
Supported RT	Class 1
Minimum Update Rate	8 ms
Number of Modbus RTU nodes	31
Ambient operating temperature	-10°C to 55°C
Ambient operating humidity	25% to 85%
Storage temperature	-20°C to 65°C
Weight	170 g

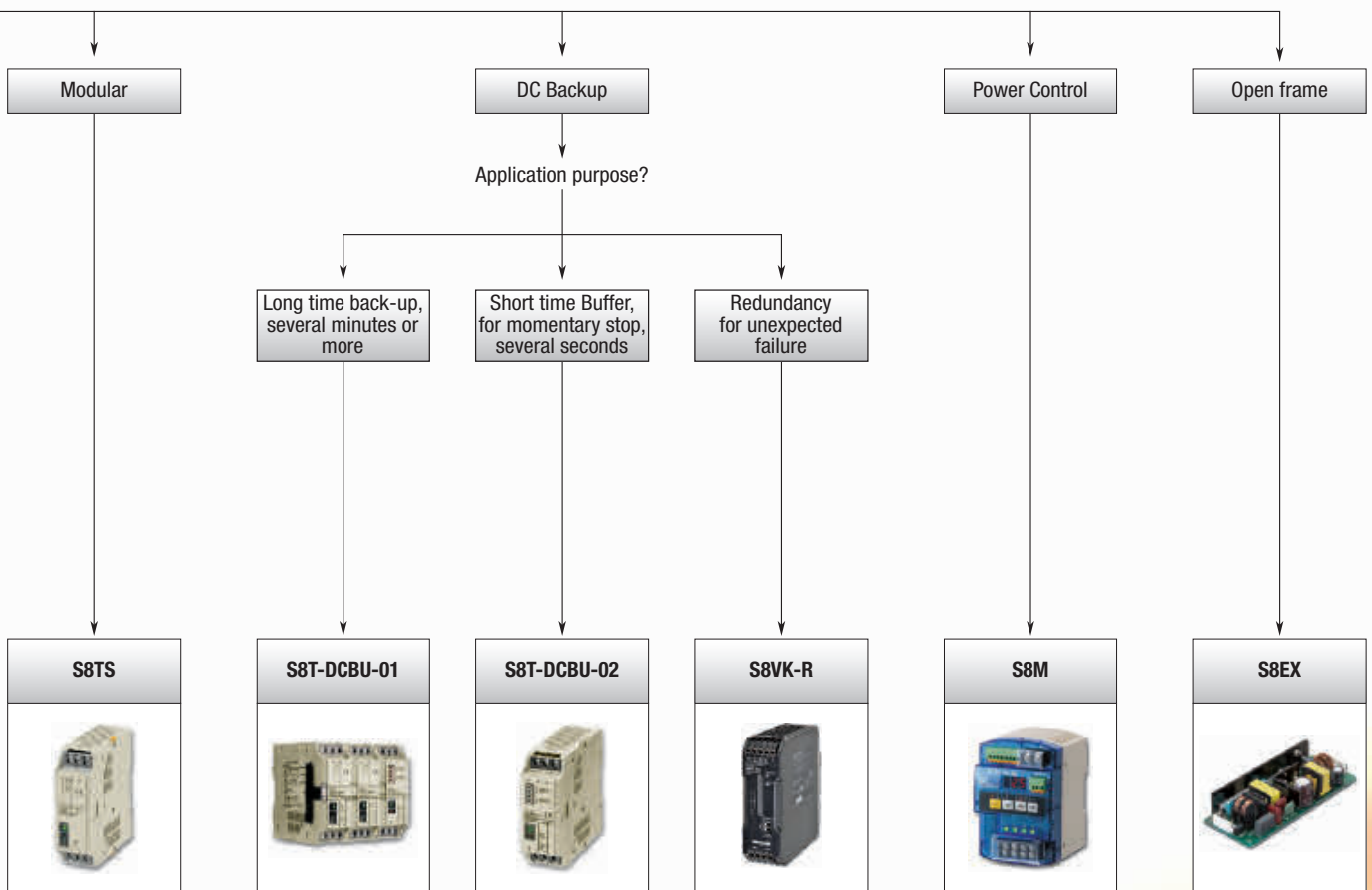
RELIABLE AND EASY OPERATION – WORLDWIDE

S8VK-G - The right power supply for your application





The S8VK-G offers a wide product range (from 15 W up to 480 W), in a very compact size. It is 13% smaller than comparable power supplies and the smallest on the market of its type.




- Wide operating temperature range (-40 to +70°C) to guarantee operation stability
- Double set of DC output terminals (three for the negative) to provide easy wiring
- High efficiency (90%) to reduce energy consumption
- Power Boost functionality (120%)
- Improved DIN-rail mounting clip to provide better vibration resistance and allow for easy installation





Selection table

Category		Book type power supply			Metal frame power supply						
Selection Criteria											
	Model	S8VK-G			S8VK-C	S8VT	S8JX-P				
	Type	Pro line			Lite line		Pro ^{plus} line				
	Phases	Single phase				Three phases	Single phase				
	Rated voltage	100 V to 240 VAC (90 to 350 VDC)			100 V to 240 VAC	3 × 340 V to 576 VAC	100 V to 240 VAC				
Power	Voltage	5 V	12 V	24 V	48 V	24 V		5 V	12 V	24 V	48 V
	15 W	■ 3 A	■ 1.2 A	■ 0.65 A	–						
	25 W	–									
	30 W	■ 5 A	■ 2.5 A	■ 1.3 A	–						
	35 W	–									
	50 W	–						■ 10 A	■ 4.2 A	■ 2.1 A	■ 1.1 A
	60 W	–	■ 4.5 A	■ 2.5 A	–	■ 2.5 A	–				
	90 W	–									
	100 W	–						■ 20 A	■ 8.5 A	■ 4.5 A	■ 2.1 A
	120 W	–		■ 5 A	–	■ 5 A	–				
	150 W	–						■ 30 A	■ 13 A	■ 6.5 A	■ 3.3 A
	180 W	–									
	240 W	–		■ 10 A	■ 5 A	■ 10 A	–				
	300 W	–						■ 60 A	■ 27 A	■ 14 A	■ 7 A
	350 W	–									
	480 W	–		■ 20 A	■ 10 A	■ 20 A	–				
	600 W	–						■ 120 A	■ 53 A	■ 27 A	■ 13 A
	960 W	–					■ 40 A	–			
	1,500 W	–									
	Features	Conforms to EN61000-3-2	■			–	■				
DC back-up		–									
Capacitor back-up		<input type="checkbox"/>				–		<input type="checkbox"/>			
Undervoltage alarm		–									
Overvoltage protection		■									
Overload protection		■									
DIN-rail mounting		■									
Screw mounting (with bracket)		■				–		■			
EMI Class B		■				–		■			
UL Class 2		■ 15 W, 30 W, 60 W only				–					
N+1 Redundancy		<input type="checkbox"/>				–					
Parallel operation	■ by 2 units				–	■ by 2 units		■ 300 W, 600 W only by 5 units			
Power Boost	■ 120%				–			■ 300 W, 600 W at 24 V 115%			
Page	573				572	574		578			

Category		Metal frame power supply									Modular		
Selection Criteria													
	Model	S8JX-G					S8JC-ZS				S8TS		
	Type	Pro line					Lite line						
	Phases	Single phase											
Power	Rated voltage	100 V to 240 V AC					200 V to 240 V AC				100 V to 240 V AC		
	Voltage	5 V	12 V	15 V	24 V	48 V	5 V	12 V	24 V	5 V	12 V	24 V	
	15 W	■ 3 A	■ 1.3 A	■ 1.0 A	■ 0.65 A	■ 0.35 A	■ 3 A	■ 1.3 A	■ 0.7 A	-	-	-	
	25 W	-	-	-	-	-	-	-	-	■ 5 A	-	-	
	30 W	-	-	-	-	-	-	-	-	-	■ 2.5 A	-	
	35 W	■ 7 A	■ 3 A	■ 2.4 A	■ 1.5 A	■ 0.75 A	■ 7 A	■ 3.0 A	■ 1.5 A	-	-	-	
	50 W	■ 10 A	■ 4.2 A	-	■ 2.1 A	■ 1.1 A	■ 10 A	■ 4.2 A	■ 2.1 A	-	-	-	
	60 W	-	-	-	-	-	-	-	-	-	■ 5 A	■ 2.5 A	
	90 W	-	-	-	-	-	-	-	-	-	■ 7.5 A	-	
	100 W	■ 20 A	■ 8.5 A	-	■ 4.5 A	■ 2.1 A	■ 20 A	■ 8.5 A	■ 4.5 A	-	-	-	
	120 W	-	-	-	-	-	-	-	-	-	■ 10 A	■ 5 A	
	150 W	■ 30 A	■ 13 A	-	■ 6.5 A	■ 3.3 A	■ 30 A	■ 12.5 A	■ 6.5 A	-	-	-	
	180 W	-	-	-	-	-	-	-	-	-	-	■ 7.5 A	
	240 W	-	-	-	-	-	-	-	-	-	-	■ 10 A	
	300 W	■ 60 A	■ 27 A	-	■ 14 A	■ 7 A	-	-	-	-	-	-	
	350 W	-	-	-	-	-	■ 60 A	■ 29 A	■ 14.6 A	-	-	-	
	480 W	-	-	-	-	-	-	-	-	-	-	-	
	600 W	■ 120 A	■ 53 A	-	■ 27 A	■ 13 A	-	-	-	-	-	-	
	960 W	-	-	-	-	-	-	-	-	-	-	-	
	1,500 W	-	-	-	-	-	-	-	-	-	-	-	
Features	Conformes to EN61000-3-2	-											
	DC back-up	-											
	Capacitor back-up	□											
	Undervoltage alarm	-											
	Oversvoltage protection	■											
	Overload protection	■											
	DIN-rail mounting	■											
	Screw mounting (with bracket)	-											
	EMI Class B	-											
	UL Class 2	■											
N+1 Redundancy	■												
Parallel operation	■ 300 W, 600 W only by 5 units					-				■			
Power Boost	-												
Page	576					575				579			

■ Standard □ Available - No/not available



The cost effective book type power supply

The S8VK-C Lite family is an ideal choice for cost-sensitive applications that require a dependable high-quality power supply. The S8VK-C have an universal 100 to 240 V 50/60 Hz input capability (DC input (90 to 350 VDC) also possible) and they are available with power ratings from 60 to 480 W.

- Operating temperature range of -25 to 60°C
- Double set of DC output terminals (three for the negative) provide easy wiring
- Overload and overvoltage protection
- Conforms to EN61204-3, EN55011 Class A

Ordering information

Type	Power ratings	Input voltage	Output voltage	Output current	Size (W × H × D) [mm]	Order code
Power supply Single-phase	60 W	Single phase 100 to 240 VAC	24 V	2.5 A	32 × 90 × 110	S8VK-C06024
	120 W		24 V	5 A	40 × 125 × 113	S8VK-C12024
	240 W	Allowable range: 85 to 264 VAC, 90 to 350 VDC	24 V	10 A	60 × 125 × 140	S8VK-C24024
	480 W		24 V	20 A	95 × 125 × 140	S8VK-C48024

Specifications

Item	60 W	120 W	240 W	480 W
Efficiency (Typ. at 230 VAC)	88%	89%	89%	92%
Input	Rated input voltage	100 to 240 VAC		
	Allowable range	85 to 264 VAC, 90 to 350 VDC		
Output	Voltage adjustment range (with V.ADJ)	-10% to 15%		
	Input variation influence	0.5% max. (at 85 to 264 VAC input, 100% load)		
	Load variation Influence	1.5% max, at 0% to 100% load		
	Temperature variation influence	0.05%/°C max.		
Overload protection	Yes			
Overvoltage protection	Yes			
Operating ambient temperature	-25 to 60°C (-13 to 140°F)			
Series operation	Yes, up to 2 units			
Parallel operation	No			
EMI	Conforms to EN 61204-3, EN 55011 Class A			
EMS	Conforms to EN 61204-3 high severity levels			
Approved standards	UL: UL 508 (Listing), UL 60950-1, cUL: CSA C22.2 No. 107.1 and No. 60950-1, EN/VDE: EN 50178 (=VDE0160), EN 60950-1 (=VDE0805)			
Degree of protection	IP20 by EN/IEC 60529			



The standard book type power supply

The standard S8VK-G Pro line is our “install and forget” option, offering longer lifetime, higher protection and more features. The S8VK-G offers a wide product range (from 15 up to 480 W), in a very compact package. There are models available for 5, 12, 24 and 48 VDC output voltage. DC input (90 to 350 VDC) is also available through the whole range.

- Wide operating temperature range (–40 to 70°C) that guarantees stable operation
- Double set of DC output terminals (three for the negative) provide easy wiring
- High efficiency 90% to reduce the energy consumption
- Power boost functionality (120%) for the right start of the application
- Improved DIN-rail mounting clip provides a better resistance to vibrations and allows easy installation (using one hand to mount in a flash)

Ordering information

Type	Power ratings	Input voltage	Output voltage	Output current	Size (W × H × D) [mm]	Order code
Power supply Single-phase	15 W	100 to 240 VAC Allowable range: 85 to 264 VAC, 90 to 350 VDC, 2 phases less than 240 VAC	5 V	3 A	22.5 × 90 × 90	S8VK-G01505
			12 V	1.2 A		S8VK-G01512
			24 V	0.65 A		S8VK-G01524
	30 W		32 × 90 × 90	5 V	5 A	S8VK-G03005
				12 V	2.5 A	S8VK-G03012
				24 V	1.3 A	S8VK-G03024
	60 W		32 × 90 × 110	12 V	4.5 A	S8VK-G06012
				24 V	2.5 A	S8VK-G06024
	120 W		40 × 125 × 113	24 V	5 A	S8VK-G12024
				24 V	10 A	S8VK-G24024
	240 W		60 × 125 × 140	48 V	5 A	S8VK-G24048
				24 V	20 A	S8VK-G48024
480 W	95 × 125 × 140	48 V	10 A	S8VK-G48048		

Specifications

Item	15 W	30 W	60 W	120 W	240 W	480 W
Efficiency (Typ. at 230 VAC)	80% (24 V)	86% (24 V)	88% (24 V)	89% (24 V)	92% (24 V)	93% (24 V)
Input	Rated input voltage	100 to 240 VAC				
	Allowable range	85 to 264 VAC, 90 to 350 VDC. 2 phases less than 240 VAC				
Output	Voltage adjustment range (with V.ADJ)	–10% to 15%				
	Input variation influence	0.5% max. (at 85 to 264 VAC input, 100% load)				
	Load variation influence	3.0% max. (5 V), 2.0% max. (12 V), 1.5% max. (24, 48 V), at 0% to 100% load				
	Temperature variation influence	0.05%/°C max.				
Overload protection	Yes, 130% of rated current typ.					
Power Boost	120% of rated current					
Overvoltage protection	Yes					
Operating ambient temperature	–40 to 70°C (–40 to 158°F)					
Series operation	Yes, up to 2 units					
Parallel operation	Yes, up to 2 units					
EMI	Conforms to EN 61204-3, EN 55011 Class B					
EMS	Conforms to EN 61204-3 high severity levels					
Harmonic current emissions	Conforms to EN 61000-3-2					
Approved standards	UL: UL 508 (Listing), UL 60950-1, cUL: CSA C22.2 No. 107.1 and No. 60950-1, UL 1310 Class 2 output for 15 W, 30 W, 60 W EN/VDE: EN 50178 (=VDE0160), EN 60950-1 (=VDE0805), Lloyd's Register					
Fulfilled standards	SELV (EN 60950-1/EN 50178/UL 60950-1), PELV(EN 60204-1,EN 50178), Safety of power transformers (EN 61558-2-16) , EN 50274 for terminal parts					
Degree of protection	IP20 by EN/IEC 60529					



Compact 3-phase input power supply

To make the compact power supply range complete we have our 3-phase S8VT series, which give you the best power to footprint ratio. The range exists of 4 models with wattage of 120, 240, 480 and 960 all at 24 VDC. This version is constructed from a very robust metal housing and all models are DIN-rail mounting. The input range cover 3 phase voltage input from 340 to 576 VAC and single phase DC input from 480 to 810 VDC.

- 5, 10, 20 and 40 A; 24 VDC output
- 3-phase input (340 to 576 VAC) or 1-phase 480 to 810 VDC
- Compact design with best footprint on the market
- UL60950 (CSA22.2-60950), UL508 listing (CSA22.2-14) and CE
- Parallel and serial operation possible (all models)

Ordering information

Power ratings	Output voltage	Output current	Size in mm (H × W × D)	Order code
120 W	24 V	5 A	125 × 45 × 130	S8VT-F12024E
240 W	24 V	10 A	170 × 45 × 130	S8VT-F24024E
480 W	24 V	20 A	170 × 100 × 130	S8VT-F48024E
960 W	24 V	40 A	170 × 195 × 130	S8VT-F96024E

Specifications

Item	5 A	10 A	20 A	40 A
Efficiency	88%	90%	91%	91%
Voltage range	340 to 576 VAC 3 AC resp, 480 to 810 VDC (1 phase)			
Output voltage	Voltage adjustment	22.5 to 26.4 VDC min.		
	Ripple	100 mV max.		
	Input variation	±0.5% max.		
	Temperature influence	Less than 0.05%/°C		
Overload protection	yes			
Overvoltage protection	yes			
Output indicator	yes (green)			
Weight	750 g	1.0 kg	1.8 kg	3.3 kg
Series operation	yes (for 2 units)			
Parallel operation	yes (for 2 units)			



Cost effective range with CE marking

The S8JC-ZS Lite family of metal framed power supplies is our best standard power supply for material cost reduction. The range covers 15 W, 35 W, 50 W, 100 W, 150 W and 350 W models and all are available with 5, 12 or 24 VDC output voltages.

- CE marking
- Overload and over voltage protection
- Conforms to EN 61204-3, EN 55011 Class A

Ordering information

Power ratings	Output voltage	Output current	Size in mm (H × W × D)	Order code
15 W	5 V	3.0 A	97 × 36 × 79.5	S8JC-ZS01505CD-AC2
	12 V	1.3 A		S8JC-ZS01512CD-AC2
	24 V	0.7 A		S8JC-ZS01524CD-AC2
35 W	5 V	7 A	98.3 × 38 × 129	S8JC-ZS03505CD-AC2
	12 V	3.0 A		S8JC-ZS03512CD-AC2
	24 V	1.5 A		S8JC-ZS03524CD-AC2
50 W	5 V	10 A	98.3 × 38 × 129	S8JC-ZS05005CD-AC2
	12 V	4.2 A		S8JC-ZS05012CD-AC2
	24 V	2.1 A		S8JC-ZS05024CD-AC2
100 W	5 V	20 A	98 × 50 × 159	S8JC-ZS10005CD-AC2
	12 V	8.5 A	97.6 × 38 × 159	S8JC-ZS10012CD-AC2
	24 V	4.5 A		S8JC-ZS10024CD-AC2
150 W	5 V	30 A	98 × 43 × 199	S8JC-ZS15005CD-AC2
	12 V	12.5 A	98 × 50 × 159	S8JC-ZS15012CD-AC2
	24 V	6.5 A		S8JC-ZS15024CD-AC2
350 W	5 V	60 A	115 × 50 × 193.6	S8JC-ZS35005CD-AC2
	12 V	29 A		S8JC-ZS35012CD-AC2
	24 V	14.6 A	115 × 50 × 194.8	S8JC-ZS35024CD-AC2

Specifications

Item	15 W	35 W	50 W	100 W	150 W	350 W
Efficiency (Typ.)	80% (24 V)	84% (24 V)	83% (24 V)	87% (24 V)	87% (24 V)	84% (24 V)
Input	Rated input voltage	200 to 240 VAC				
	Allowable range	185 to 264 VAC				
Output	Voltage adjustment range(with V.ADJ)	±10%				
	Overload protection	Yes, 105% of rated current				
Overvoltage protection	Yes					
Operating ambient temperature	-20 to 60°C (-4 to 140°F)					
Series operation	No					
Parallel operation	No					
Fulfilled standards	EN 50178 (CE mark by self declaration)					



Slim and economic power supply

The S8JX-G is Omron's cost effective power supply delivering Omron's quality and reliability. The range of this Power Supply covers up to 600 W, the output voltages are 5, 12, 15, 24 or 48 VDC. The low profile and multiple mounting options help you reduce panel space. With a minimum life expectancy of 10 years and protection against over-voltage, over-current and short circuiting, the S8JX-G has the reliability you expect from Omron.

- Wide range in DC-output voltage (5 V, 12 V, 15 V, 24 V and 48 V) and wattage (15 to 600 W)
- LED indication power ON
- Over-voltage, over-current, and short circuit protection
- Vibration resistance 4,5 g
- All models can be DIN-rail mounted
- Approvals: UL, cUL, UL508 Listed, SEMI F47, VDE

Ordering information

Power ratings	Output voltage	Output current	Size in mm (H × W × D)	Order code
15 W	5 V	3 A	91 × 40 × 90	S8JX-G01505CD
	12 V	1.3 A		S8JX-G01512CD
	15 V	1 A		S8JX-G01515CD
	24 V	0.65 A		S8JX-G01524CD
	48 V	0.35 A		S8JX-G01548CD
35 W	5 V	7 A	92 × 40 × 100	S8JX-G03505CD
	12 V	3 A		S8JX-G03512CD
	15 V	2.4 A		S8JX-G03515CD
	24 V	1.5 A		S8JX-G03524CD
	48 V	0.75 A		S8JX-G03548CD
50 W	5 V	10 A	92 × 40 × 100	S8JX-G05005CD
	12 V	4.2 A		S8JX-G05012CD
	24 V	2.1 A		S8JX-G05024CD
	48 V	1.1 A		S8JX-G05048CD
100 W	5 V	20 A	92 × 50 × 150	S8JX-G10005CD
	12 V	8.5 A		S8JX-G10012CD
	24 V	4.5 A		S8JX-G10024CD
	48 V	2.1 A		S8JX-G10048CD
150 W	5 V	30 A	92 × 60 × 178	S8JX-G15005CD
	12 V	13 A	92 × 60 × 178	S8JX-G15012CD
	24 V	6.5 A	92 × 50 × 150	S8JX-G15024CD
	48 V	3.3 A	92 × 50 × 150	S8JX-G15048CD
300 W	5 V	60 A	92 × 110 × 164.5	S8JX-G30005CD
	12 V	27 A	92 × 110 × 164.5	S8JX-G30012CD
	24 V	14 A	92 × 110 × 167	S8JX-G30024CD
	48 V	7 A	92 × 110 × 167	S8JX-G30048CD
600 W	5 V	120 A	92 × 150 × 160	S8JX-G60005C
	12 V	53 A		S8JX-G60012C
	24 V	27 A		S8JX-G60024C
	48 V	13 A		S8JX-G60048C

Specifications

Item	15 W	35 W	50 W	100 W	150 W	300 W	600 W	
Efficiency (Typ. at 230 VAC)	81% (24 V)	84% (24 V)	86% (24 V)	88% (24 V)	90% (24 V)	88% (24 V)	84% (24 V)	
Input	Rated input voltage	100 to 240 VAC					100 to 120 VAC/200 to 240 VAC, Switchable	
	Allowable range	85 to 264 VAC, 80 to 370 VDC (DC is not applicable for the safety standards.)					85 to 132 VAC/170 to 264 VAC	
Output	Voltage adjustment range (with V.ADJ)	-10% to 15% for 5 V to 24 V, $\pm 10\%$ for 48 V (with V.ADJ)						
	Input variation influence	0.4% max. (at 85 to 264 VAC input, 100% load)						
	Load variation influence	0.8% max. at 0% to 100% load						
	Temperature variation influence	0.05%/°C max.						
Overload protection	Yes, 105% to 160% of rated current							
Overvoltage protection	Yes							
Operating ambient temperature	-10 to 60°C (14 to 140°F)							
Series operation	Yes, up to 2 units					Yes, up to 2 units		
Parallel operation	No					Yes, up to 5 units		
EMI	Conforms to EN 61204-3, EN 55011 Class A							
EMS	Conforms to EN 61204-3 high severity levels							
Approved standards	UL: UL 508 (Listing), UL 60950-1, cUL: CSA C22.2 No. 107.1 and No. 60950-1, EN/VDE: EN 50178 (=VDE0160), EN 60950-1 (=VDE0805)					UL: UL 508 (Recognition), UL 60950-1, cUR: CSA C22.2 No. 107.1 and No. 60950-1, EN/VDE: EN 50178 (=VDE0160), EN 60950-1 (=VDE0805)		
Fulfilled standards	EN 50274 for terminal parts							



EMI Class B and Power Factor Correction

The main improvements provided by the S8JX-P models are harmonic current suppression/PFC (Power Factor Correction) and EMI EN55011 Class B compliant. In addition, further functionalities have been implemented (applies only to 300 and 600 W models):

- Remote sensing, to compensate for voltage drops on the load lines
- Remote control, using an external signal allows to turn the output ON and OFF without removing the input voltage
- Alarm output, informing about PS errors, such as fan failure or insufficient voltage

Ordering information

Power ratings	Output voltage	Output current	Size in mm (H × W × D)	Order code
50 W	5 V	10 A	92 × 42 × 129	S8JX-P05005CD
	12 V	4.2 A		S8JX-P05012CD
	24 V	2.1 A		S8JX-P05024CD
	48 V	1.1 A		S8JX-P05048CD
100 W	5 V	20 A	92 × 42 × 159	S8JX-P10005CD
	12 V	8.5 A		S8JX-P10012CD
	24 V	4.5 A		S8JX-P10024CD
	48 V	2.1 A		S8JX-P10048CD
150 W	5 V	30 A	92 × 42 × 159	S8JX-P15005CD
	12 V	13 A		S8JX-P15012CD
	24 V	6.5 A		S8JX-P15024CD
	48 V	3.3 A		S8JX-P15048CD
300 W	5 V	60 A	92 × 71 × 165	S8JX-P30005CD
	12 V	27 A		S8JX-P30012CD
	24 V	14 A		S8JX-P30024CD
	48 V	7 A		S8JX-P30048CD
600 W	5 V	120 A	92 × 110 × 165	S8JX-P60005CD
	12 V	53 A		S8JX-P60012CD
	24 V	27 A		S8JX-P60024CD
	48 V	13 A		S8JX-P60048CD

Specifications

Item	50 W	100 W	150 W	300 W	600 W
Efficiency (Typ. at 230 VAC)	82% (24 V)	87% (24 V)	88% (24 V)	87% (24 V)	85% (24 V)
Input	Rated input voltage	100 to 240 VAC			
	Allowable range	85 to 264 VAC, 80 to 370 VDC (DC is not applicable for the safety standards.)			
Output	Voltage adjustment range (with V.ADJ)	-10% to 15% for 5 V to 24 V, ±10% for 48 V (with V.ADJ)		-10% to 15% for 12 V and 24 V, ±10% for 5 V and 48 V	
	Input variation influence	0.4% max. (at 85 to 264 VAC input, 100% load)			
	Load variation influence	0.8% max. at 0% to 100% load			
	Temperature variation influence	0.05%/°C max.			
Overload protection	Yes, 105% to 160% of rated current				
Power Boost	-			115% of rated current for 24 V only	
Overvoltage protection	Yes				
Operating ambient temperature	-10 to 70°C (14 to 158°F)				
Series operation	Yes, up to 2 units				
Parallel operation	No			Yes, up to 5 units	
EMI	Conforms to EN 61204-3, EN 55011 Class B				
EMS	Conforms to EN 61204-3 high severity levels				
Harmonic current emissions	Conforms to EN61000-3-2				
Approved standards	UL: UL508 (Listing), UL60950-1, cUL: CSA C22.2 No. 107.1 and No. 60950-1, EN/VDE: EN 50178 (=VDE0160), EN 60950-1 (=VDE0805),				
Fulfilled standards	EN 50274 for Terminal parts				



Industrial use, modular power supply for multiple configurations

The S8TS is an expandable power supply; standard units can easily be snapped together in parallel to provide you with ultimate flexibility. Expandable up to 4 units, it can deliver a total power of 240W at 24VDC or a multi-output configuration.

- Improves system reliability by building up N+1 redundancy
- Standard unit; 60 W at 24 VDC, 30 W at 12 VDC and 25 W at 5 VDC
- Battery back-up unit protects against power outage (see accessories)
- Buffer unit protects against power glitches and outage (see accessories)
- EMI Class B, UL Class 2, UL Class 1 division 2

Ordering information

Basic block		Order code			
Output voltage	Output current	Screw terminal type		Connector terminal type	
		With bus line connectors ^{*1}	Without bus line connectors ^{*2}	With bus line connectors ^{*1}	Without bus line connectors ^{*2}
24 V	2.5 A	S8TS-06024-E1 ^{*3}	S8TS-06024	S8TS-06024F-E1	S8TS-06024F
12 V	2.5 A	S8TS-03012-E1	S8TS-03012	S8TS-03012F-E1	S8TS-03012F
5 V	5 A	–	S8TS-02505	–	S8TS-02505F

^{*1} One S8T-BUS01 connector and one S8T-BUS02 connector are included as accessories.

^{*2} Bus line connectors can be ordered separately if necessary.

^{*3} Conforms to EMI class B with DC minus terminal ground.

Accessories

Bus line connector		
Type	Number of connectors	Order code
AC line + DC line bus (For parallel operation)	1 connector	S8T-BUS01
	10 connectors ^{*1}	S8T-BUS11
AC line bus (For series operation or isolated operation)	1 connector	S8T-BUS02
	10 connectors ^{*2}	S8T-BUS12

^{*1} One package contains 10 S8T-BUS01 connectors.

^{*2} One package contains 10 S8T-BUS02 connectors.

Specifications

Item	5 V models		24/12 V models	
	Single operation		Single operation	Parallel operation
Efficiency	62% min.		24 V models: 75%, 12 V models: 70% min.	
Power factor	0.8 min.		24 V models: 0.9 min., 12 V models: 0.8 min.	
Input voltage	100 to 240 VAC, (85 to 264 VAC), single-phase			
Output voltage	Voltage adjustment	5 V ±10% min.		
	Ripple	2% (p-p) max.		24 V models: 22 to 28 V, 12 V models: 12 V ±10% min.
	Input variation	0.5% max.		2% (p-p) max.
	Temperature influence	0.05%/°C max. (with rated input, 10 to 100% load)		–
Overcurrent protection	105 to 125% of rated load current, inverted L drop, automatic reset			
Overvoltage protection	yes		yes	yes
Output indicator	yes (green)		yes (green)	yes (green)
Weight	450 g max.		450 g max.	450 g max.
Series operation	yes		yes	yes
Parallel operation	no		yes	yes
Size in mm (HxWxD)	120x43x120			



Open frame power supply, the best to build-in small equipment

The S8EX is a open frame power supply to mount on small equipment directly. The wide variation of output voltage and Power boost function 200% can contribute the down sizing of equipment and the standardization of power supply

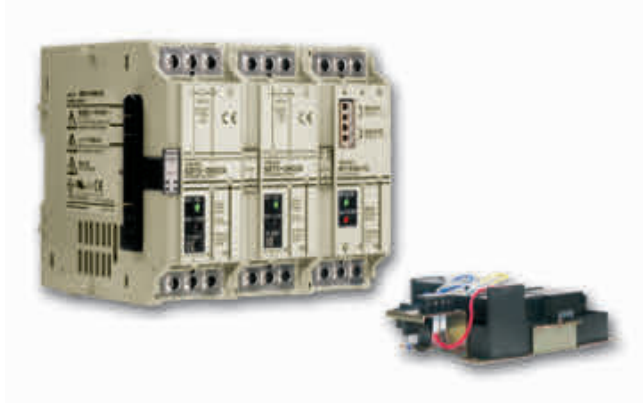
- 200% Power boost function
- Connector terminals
- Various installations are possible.
- Wide operation temperature range: -10 to 70°C

Ordering information

Power ratings	Input voltage	Output voltage	Output current	Size (W × H × D) [mm]	Order code
15 W	100 to 240 VAC	5 V	3 A	50 × 22 × 105	S8EX-N01505
		12 V	1.3 A		S8EX-N01512
		15 V	1 A		S8EX-N01515
		24 V	0.7 A		S8EX-N01524
		48 V	0.32 A		S8EX-N01548
30 W		5 V	6 A	50 × 27 × 105	S8EX-N03005
		12 V	2.5 A		S8EX-N03012
		15 V	2 A		S8EX-N03015
		24 V	1.3 A		S8EX-N03024
		48 V	0.65 A		S8EX-N03048
50 W		5 V	10 A	50 × 28.5 × 132	S8EX-BP05005
		12 V	4.3 A		S8EX-BP05012
		24 V	2.1 A		S8EX-BP05024
		48 V	1.1 A		S8EX-BP05048
100 W		5 V	20 A	62 × 35.5 × 155	S8EX-P10005
	12 V	8.5 A	S8EX-BP10012		
	24 V	4.3 A	S8EX-BP10024		
	48 V	2.1 A	S8EX-BP10048		
150 W	5 V	30 A	75 × 37.5 × 160	S8EX-P15005	
	12 V	12.5 A		S8EX-BP15012	
	24 V	6.3 A		S8EX-BP15024	
	48 V	3.2 A		S8EX-BP15048	
240 W	24 V	10 A	84 × 42.5 × 180	S8EX-BP24024	
	36 V	6.7 A		S8EX-BP24036	
	48 V	5 A		S8EX-BP24048	

Specifications

Specification	15 W	30 W	50 W	100 W	150 W	240 W
Efficiency (Typ at 200 VAC)	78% (24 V)	86% (24 V)	85% (24 V)	86% (24 V)	87% (24 V)	90% (24 V)
Input	Rated Input Voltage	100 to 240 VAC				
	Allowable range	85 to 264 VAC				
Output	Voltage adjustment range (with V.ADJ)	±10%				
	Input variation influence	0.5% max. (at 85 to 264 VAC input, 100% load)				
	Load variation influence	2.0% max. (5 V), 1.5% max. (12, 24, 36, 48 V), at 0 to 100% load				
	Temperature variation influence	0.05%/°C max.				
Overload protection	Yes, 105 to 160% of rated current					
Power Boost	-		150% of rated current (5 V of 50 W, 12 V) 200% of rated current (24 V, 36 V, 48 V)			
Overvoltage protection	Yes					
Operating ambient temperature	-10 to 70°C (14 to 158°F)					
EMI	Conforms to EN 61204-3, EN55011 Class B					
EMS	Conforms to EN 61204-3 high severity levels					
Harmonic current emissions	Conforms to EN 61000-3-2					
Approved Standards	UL: UR 60950-1, cUR: CSA C22.2 No.60950-1, EN/VDE: EN 50178 (=VDE 0160), EN 60950-1 (=VDE 0805)					



S8T-DCBU-01

The S8T-DCBU-01 battery backup block supplies 24 VDC for a fixed period of time during AC input outages to considerably improve system reliability.

- Supplies 24 VDC for a long period of time during AC input outages
- For system reliability improvement
- Block power supply basic block is connected by the bus line connector
- Simple system configuration
- Alarms indicated on main unit and via alarm signal output

Ordering information

Product	Input voltage	Output voltage	Output current			Order code
DC back-up block	24 to 28 VDC	24 V	3.7 A/8 A			S8T-DCBU-01
Battery holder	–	–	–			S82Y-TS01
Product	Input voltage	Output voltage	Output current	Type	Order code	
Basic block (use together with the DC back-up block)	100 to 240 VAC	24 V	2.5 A	Screw terminal type	With bus line connectors	S8TS-06024-E1
					Without bus line connectors	S8TS-06024
				Connector terminal type	With bus line connectors	S8TS-06024F-E1
					Without bus line connectors	S8TS-06024F
Product	Back-up time	Overcurrent protection operating point selector				Order code
Battery	8 min./3.7 A	5.7 A (typ.)	–	LC-R122R2PG		
	4 min./8.0 A	5.7 A (typ.)	11.7 A (typ.)	LC-R123R4PG		

Note: The S8TS DC back-up block is for S8TS power supplies only.

Specifications

Item	Size in mm (HxWxD)
S8T-DCBU-01	120x43x130
Battery holder	82x185.7x222.25



S8T-DCBU-02

Prevents equipment stoppage, data loss and other problems resulting from momentary power failures. One S8T-DCBU-02 buffer block provides a back-up time of 500 ms at an output current of 2.5 A. Can be wired to the 24 VDC output from any switch mode power supply.

- Connects to all Omron power supplies: S8TS, S8VS, S82J, S82K, S8VM, S8PE
- Connects to both single-phase and three-phase power supplies
- Connects to an S8TS power supply via an S8T-BUS03 bus line connector
- Parallel connection up to 4 units to increase back-up time and capacity
- Complies with Semi F47-0200 standard

Ordering information

Input voltage	Output voltage (during back-up operation)	Output current	Order code
24 VDC (24 to 28 VDC)	22.5 V	2.5 A	S8T-DCBU-02

Accessories

Type	Number of connectors	Order code
DC bus line connector (for use with S8TS only)	1 connector	S8T-BUS03
	10 connectors	S8T-BUS13

Specifications

Item	Size in mm(HxWxD)
S8T-DCBU-02	120x43x120



Redundancy Unit, contributes to build high reliable systems

The S8VK-R is a redundancy unit used with S8VK Power Supply series. This unit consists of 2 main diodes and additional function to build the redundancy of Power supply and can save your design time by the combination of S8VK series with high reliability.

- Redundancy operating LED for the status confirmation
- A signal output for failure detection of power supplies
- By adjusting the power supply voltage to light up Balance LED the lifetime of power supplies will be more than twice.
- Wide operation temperature range: -40 to 70°C

Ordering information

Input voltage	Output current	Size (W × H × D) [mm]	Order code
5 to 30 VDC	10 A	32 × 90 × 110	S8VK-R10
10 to 60 VDC	20 A	40 × 125 × 113	S8VK-R20

Specifications

Type	S8VK-R10	S8VK-R20
Rated Input Voltage	5 to 30 V	10 to 60 V
Output Current	10 A	20 A
Voltage Drop	0.7 V max at 10 A	0.9 V max at 20 A
Operation Temperature range	-40 to 70°C	-40 to 70°C
Safety Standard	UL 60950-1, UL 508, cURus, cULus, EN 50178, EN 60950-1	
Signal output	30 VDC 50 mA max by Photo MOS Relay	
Redundancy OK Indicator	LED (Green), The function to know the both of PS operate normally.	
Voltage Balance Indicator	LED (Green), The function to help to get the balance of 2 unit PS output voltage	
Grounding terminal	-	Yes, One for Chassis grounding



Digital multi circuit protector for DC output of power supply

The S8M turns your machine directly into UL Class 2 compliant, maximum tripping current is 3,8 A per channel (adjustable). This unit controls up to 4 circuits. On top of this you will get startup/shutdown–sequence control, display and alarm functions, like voltage, output current, runtime, and over temperature and external reset. These functions can be set by using the front buttons or with the free support tool software. These settings can be protected.

- 4 circuit protection up-to 4 A per channel
- UL Class 2 (max. 3.8 A)
- Emergency stop by external signal
- Optimize use of available power through start-up sequence
- Maintenance control

Ordering information

Input voltage	Communications	UL class 2 output	Size (W × H × D) [mm]	Order code
24 VDC	–	–	75 × 115 × 94	S8M-CP04
	RS-232C	–		S8M-CP04-R
	–	Compliant		S8M-CP04-RS

Specifications

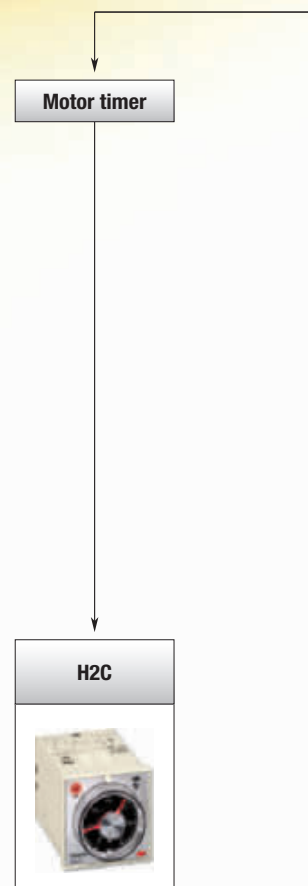
Type		S8M-CP04	S8M-CP04-R	S8M-CP04-RS
Input characteristics	Rated input voltage	24 VDC (19.2 to 26.4 VDC)		
	Allowable input current	17.0 A max.		16.0 A max
	Power consumption	10 W max		15 W max
Output characteristics	Number of branches	4		
	Max tripping current	4.0 A		3.8 A
	Adjustable tripping range	0.5 to 4.0 A in 0.1 A units		0.5 to 3.8 A in 0.1 A units
	Internal voltage drop	0.5V max at 4 A		0.7V max at 3.8 A
Approved Standards		UL: UL508(Listing), UR 60950-1 cUL, cUR: CSA C22.2 No. 107.1 and No.60950-1 EN/VDE: EN 50178 (=VDE 0160), EN 60950-1 (=VDE 0805)		UL: UL508(Listing, Class 2 per UL 1310), UR 60950-1 cUL, cUR: CSA C22.2 No. 107.1 and No.60950-1 EN/VDE: EN 50178 (=VDE 0160), EN 60950-1 (=VDE 0805)

WHEN TIMING ACCURACY MATTERS!

H5CX – The most complete digital timer

The H5CX series offers multiple-functions and -timing ranges for precise timing control, as well as real twin-timing and memory function. These and other added-value features ensure that the H5CX covers almost every possible user requirement in timers.

- 15 different time functions
- Three colour display value, red, orange or green
- Models with instantaneous contact outputs
- 0.001 s to 9999 h, 10 ranges





Which type of timer is needed?

Analogue

Digital

Which mounting method is required?

DIN-rail

Plug/front

Which size is required?

Which size is required?

17.5 mm

22.5 mm

48x24 mm

48x48 mm

H3DS

H3DK

H3YN

H3CR

H8GN
timer/counter

H5CX



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Selection table

Category		Analogue solid state timer											
Selection criteria													
	Model	H3DS-M	H3DS-S	H3DS-A	H3DS-F	H3DS-G	H3DS-X	H3DK-M	H3DK-S	H3DK-F	H3DK-G	H3DK-H	
	Mounting	DIN-rail											
	Size	17.5 mm						22.5 mm					
Type	Multi-functional			Twin timer	Star-delta	Two-wired	Multi-functional			Twin timer	Star-delta	Power OFF-delay	
Contact configuration	Time limit	■	■	■	■	■	■	■	■	■	■	■	
	Instantaneous	-	-	-	-	-	-	■	■	-	-	-	
	Programmable contacts	-	-	-	-	-	-	■	■	-	-	-	
	14 pins	-	-	-	-	-	-	-	-	-	-	-	
	11 pins	-	-	-	-	-	-	-	-	-	-	-	
	8 pins	-	-	-	-	-	-	-	-	-	-	-	
	Screw terminals	■	■	■	■	■	■	■	■	■	■	■	
	Screw-less clamp terminals	□	□	□	□	□	□	-	-	-	-	-	
Screw-less clamp sockets	-	-	-	-	-	-	-	-	-	-	-		
Inputs	Voltage input	□	□	□	-	-	-	□	□	-	-	-	
	Transistor	-	-	-	-	-	-	-	-	-	-	-	
Outputs	Relay	■	■	■	■	■	-	■	■	■	■	■	
	SCR	-	-	-	-	-	■	-	-	-	-	-	
	Relay output type	SPDT	■	■	■	■	-	□	■	■	■ (2x)	■	
		SPST-NO	-	-	-	-	■ (2x)	-	-	-	-	-	
		DPDT	-	-	-	-	-	-	□	■	-	-	
4PDT	-	-	-	-	-	-	-	-	-	-			
Features	Time range	Total time range	0.1 s to 120 h	1 s to 120 h	2 s to 120 h	0.1 s to 12 h	1 s to 120 s	0.1 s to 120 h	0.1 s to 1,200 h	0.1 s to 1,200 h	0.1 s to 1,200 h	1 s to 120 s	0.1 s to 120 s
		Number of sub ranges	7	7	7	6	2	7	12	12	8	2	2 (model dependent)
	Supply voltage	24 to 230 VAC or 24 to 48 VDC	24 to 230 VAC or 24 to 48 VDC	24 to 230 VAC or 24 to 48 VDC	24 to 230 VAC or 24 to 48 VDC	24 to 230 VAC or 24 to 48 VDC	24 to 230 VAC or 24 to 48 VDC	24 to 230 VAC or 24 to 48 VDC	24 to 240 VAC/DC or 12 VDC	24 to 240 VAC/DC or 12 VDC	24 to 240 VAC/DC or 12 VDC	24 to 240 VAC/DC, 240 to 440VAC, 12 VDC	100 to 120 VAC, 200 to 240 VAC, 24 to 48 VAC/DC
	Number of operating modes	8	4	1	2	1	1	8	4	1	1	1	1
Functions	ON-delay	■	■	-	-	-	■	■	■	-	-	-	
	Flicker OFF start	■	-	-	■	-	-	■	-	■	-	-	
	Flicker ON start	■	■	-	■	-	-	■	■	■	-	-	
	Signal ON-/OFF-delay	■	-	-	-	-	-	■	-	-	-	-	
	Signal OFF-delay	■	-	-	-	-	-	■	-	-	-	■	
	Interval (signal or power start)	■	■	-	-	-	-	■	■	-	-	-	
	One-shot output (ON-delay)	■	■	-	-	-	-	■	■	-	-	-	
	ON-delay (fixed)	-	-	■	-	-	-	-	-	-	-	■	-
	Independent ON/OFF time setting	-	-	-	-	-	-	-	-	-	-	-	-
Re-marks	Star-delta	-	-	-	-	■	-	-	-	-	-	-	
	Transistor	-	-	-	-	-	■	-	-	-	-	-	
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Category		Analogue solid state timer					Digital timer		Motor timer	
Selection criteria										
	Model	H3YN	H3CR-A	H3CR-F	H3CR-G	H3CR-H	H5CX	H8GN	H2C	
	Mounting	Socket/on panel								
	Size	21.5 mm	1/16 DIN					1/32 DIN	1/16 DIN	
Type	Miniature	Multi-functional	Twin timer	Star-delta	Power OFF-delay	Multi-functional	Preset counter/timer	Motor timer		
Contact configuration	Time limit	■	■	■	■	■	■	■	■	
	Instantaneous	-	■	-	■	■	■	-	■	
	Programmable contacts	-	-	-	-	-	■	■	-	
	14 pins	■	-	-	-	-	-	-	-	
	11 pins	-	□	□	□	□	□	-	□	
	8 pins	■	□	□	□	□	□	-	□	
	Screw terminals	-	-	-	-	-	□	■	□	
	Screw-less clamp terminals	-	-	-	-	-	-	-	-	
Inputs	Screw-less clamp sockets	□	-	-	-	-	-	-	-	
	Voltage input	-	□	-	-	-	-	-	-	
Outputs	Transistor	-	□	-	-	-	□	-	-	
	Relay	■	□	■	■	■	□	■	■	
	SCR	-	-	-	-	-	-	-	-	
	Relay output type	SPDT	-	□	-	-	□	□	■	■
		SPST-NO	-	-	-	■ (2x)	-	-	-	-
		DPDT	□	□	■	-	□	-	-	-
4PDT		□	-	-	-	-	-	-	-	
Features	Time range	Total time range	0.1 s to 10 h (model dependent)	0.05 s to 300 h, 0.1 s to 600 h (model dependent)	0.05 s to 30 h or 1.2 s to 300 h (model dependent)	0.5 s to 120 s	0.05 s to 12 s, 1.2 s to 12 min	0.001 s to 9999 h (configurable)	0.000 s to 9999 h (configurable)	0.2 s to 30 h
		Number of sub ranges	2	9	14	4	4	10	9	15
	Supply voltage	24, 100 to 120, 200 to 230 VAC, 12, 24, 48, 100 to 110, 125 VDC	100 to 240 VAC, 100 to 125 VDC, 24 to 48 VAC, 12 to 48 VDC	100 to 240 VAC, 12 VDC, 24 VAC/DC, 48 to 125 VDC	100 to 120 VAC, 200 to 240 VAC	100 to 120 VAC, 200 to 240 VAC, 24 VAC/DC, 48 VDC, 100 to 125 VDC	100 to 240 VAC, 24 VAC, 12 to 24 VDC	24 VDC	24, 48, 100, 110, 115, 120, 200, 220, 240 VAC	
	Number of operating modes	4	6 (model dependent)	-	1	1	15	6	2	
Functions	ON-delay	■	□	-	-	-	■	■	■	
	Flicker OFF start	■	□	■	-	-	■	■	-	
	Flicker ON start	■	□	■	-	-	■	-	-	
	Signal ON-/OFF-delay	-	□	-	-	-	■	-	-	
	Signal OFF-delay	-	□	-	-	■	■	■	■	
	Interval (signal or power start)	■	□	-	-	-	■	■	-	
	One-shot output (ON-delay)	-	□	-	-	-	■	-	-	
	ON-delay (fixed)	-	-	-	-	-	■	-	-	
	Independent ON/OFF time setting	-	-	-	-	-	■	■	-	
Re-remarks	Star-delta	-	-	-	■	-	-	-	-	
	Transistor	-	□	-	-	-	■	-	-	
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■ Standard □ Available - No/not available



DIN-rail mounted, standard 17.5 mm wide solid state timer range

This broad range of timers includes many functionalities and has a wide AC/DC power supply range. Models with screwless clamp connection available.

- 17.5 mm width, modular 45 mm
- DIN-rail mounting
- 24-48 VDC and 24-230 VAC
- 0.1 s to 120 h, 7 ranges

Ordering information

Type	Supply voltage	Control output	Time setting range	Operating modes	Order code	
					Screw terminal type	Screw-less clamp type
Multi-functional timer	24 to 230 VAC (50/60 Hz)/ 24 to 48 VDC	SPDT	0.1 s to 120 h	ON-delay, flicker OFF start, flicker ON start, signal ON/OFF-delay, signal OFF-delay, interval, one-shot	H3DS-ML	H3DS-MLC
Standard timer				ON-delay, flicker ON start, interval, one-shot	H3DS-SL	H3DS-SLC
Single function timer				ON-delay	H3DS-AL	H3DS-ALC
Twin timer		Relay SPDT	0.1 s to 12 h	Flicker OFF start, flicker ON start	H3DS-FL	H3DS-FLC
Star-delta timer	24 to 230 VAC/VDC (50/60 Hz)	2x Relay SPST-NO	1 s to 120 s	Star-delta	H3DS-GL	H3DS-GLC
Two-wired timer		SCR output	0.1 s to 120 h	ON-delay	H3DS-XL	H3DS-XLC

Specifications

Terminal block	Screw terminal type: Clamps two 2.5 mm ² max. bar terminals without sleeves Screw-less clamp type: Clamps two 1.5 mm ² max. bar terminals without sleeves
Mounting method	DIN-rail mounting
Operating voltage range	85 to 110% of rated supply voltage
Power reset	Minimum power-off time: 0.1 s, 0.5 s for H3DS-G
Reset voltage	2.4 VAC/VDC max., 1.0 VAC/VDC max. for H3DS-X
Voltage input	Max. permissible capacitance between input lines (terminals B1 and A2): 2,000 pF Load connectable in parallel with inputs (terminals B1 and A1) H-level: 20.4 to 253 VAC/20.4 to 52.8 VDC L-level: 0 to 2.4 VAC/VDC
Control output	Contact output: 5 A at 250 VAC with resistive load (cosφ = 1) 5 A at 30 VDC with resistive load (cosφ = 1)
Ambient temperature	Operating: -10 to 55°C (with no icing) Storage: -25 to 65°C (with no icing)
Accuracy of operating time	±1% max. of FS (±1% ±10 ms max. at 1.2 s range)
Setting error	±10% ±50 ms max. of FS
Influence of voltage	±0.7% max. of FS (±0.7% ±10 ms max. at 1.2 s range)
Influence of temperature	±5% max. of FS (±5% ±10 ms max. at 1.2 s range)
Life expectancy (not H3DS-X)	Mechanical: 10 million operations min. (under no load at 1,800 operations/h) Electrical: 100,000 operations min. (5 A at 250 VAC, resistive load at 360 operations/h)
Size in mm(HxWxD)	80x17.5x73



DIN-rail mounted, standard 22.5 mm wide solid state timer range

The H3DK series of timers provides a wide AC/DC power supply and time range to reduce the number of items.

- Size in mm (HxWxD): 79x22.5x100
- DIN-rail mounting
- 12 VDC and 24-240 VAC/VDC (except -H). 240-440 VAC for -G
- Wide time setting range: 0.10 s - 1,200 h (except -H and -G), 12 ranges (for -M and -S)

Ordering information

Type	Supply voltage	Control output	Time setting range	Operating modes	Order code
Multi-functional standard timers	12 VDC	SPDT	0.1 s to 1200 h	ON-delay, flicker OFF start, flicker ON start, signal ON/OFF-delay, signal OFF-delay, interval, one-shot	H3DK-M1A DC12
		DPDT		H3DK-M2A DC12 ^{*1}	
	SPDT	ON-delay, flicker ON start, interval, one-shot		H3DK-S1A DC12	
	DPDT	H3DK-S2A DC12 ^{*1}			
	24 to 240 VAC/VDC	SPDT		ON-delay, flicker OFF start, flicker ON start, signal ON/OFF-delay, signal OFF-delay, interval, one-shot	H3DK-M1 AC/DC24-240
		DPDT		H3DK-M2 AC/DC24-240 ^{*1}	
SPDT		ON-delay, flicker ON start, interval, one-shot	H3DK-S1 AC/DC24-240		
DPDT		H3DK-S2 AC/DC24-240 ^{*1}			
Twin timer	12 VDC	SPDT	0.1 s to 12 h	Flicker OFF start, flicker ON start	H3DK-FA DC12
	24 to 240 VAC/VDC				H3DK-F AC/DC24-240
Star-delta timer	12 VDC	2x SPDT	1 to 120 s	Star-delta	H3DK-GA DC12
	24 to 240 VAC/VDC				H3DK-G AC/DC24-240
	240 to 440 VAC				H3DK-GE AC/DC240-440
Power OFF-delay timer	24 to 48 VAC/VDC	SPDT	1 to 120 s	Signal OFF-delay	H3DK-HBL AC/DC24-48
			0.1 to 12 s	H3DK-HBS AC/DC24-48	
	100 to 120 VAC		1 to 120 s	H3DK-HCL AC100-120V	
	200 to 240 VAC		0.1 to 12 s	H3DK-HCS AC100-120V	
			1 to 120 s	H3DK-HDL AC200-240V	
			0.1 to 12 s	H3DK-HDS AC200-240V	

^{*1} One output can be set to instantaneous.

Specifications

Operating voltage range	85 to 110% of rated supply voltage (90 to 110% for the 12 VDC models).
Power reset	Minimum power-off time: H3DK-M/S, H3DK-F: 0.1 s, H3DK-G: 0.5 s. (Not for H3DK-H)
Reset voltage	10% of rated voltage. (Not for H3DK-H)
Voltage input (H3DK-M/-S)	24 to 240 VAC/DC: H-level 20.4 to 264 VAC/VDC, L-level 0 to 2.4 VAC/VDC. 12 VDC: H-level 10.8 to 13.2 VDC, L-level 0 to 1.2 VDC.
Control output	Contact output: 5 A at 250 VAC with resistive load ($\cos\phi = 1$), 5 A at 24 VDC (30 VDC for -M/-S) with resistive load (not for H3DK-GE)
Ambient temperature	Operating: -20 to 55°C (with no icing), storage: -40 to 70°C (with no icing)
Accuracy of operating time	$\pm 1\%$ of FS max. ($\pm 1\% \pm 10$ ms max. at 1.2 s range)
Setting error	$\pm 10\%$ of FS ± 0.05 s max.
Minimum input signal width	50 ms (start input) (Only for H3DK-M/S)
Influence of voltage	$\pm 0.5\%$ of FS max. ($\pm 0.5\% \pm 10$ ms max. at 1.2 s range). For H3DK-G: $\pm 0.5\%$ of FS max.
Influence of temperature	$\pm 2\%$ of FS max. ($\pm 2\% \pm 10$ ms max. at 1.2s range). For H3DK-G: $\pm 2\%$ of FS max.
Life expectancy	Mechanical: 10 million operations min. (under no load at 1,800 operations/h) Electrical: 100,000 operations min. (5 A at 250 VAC, resistive load at 360 operations/h)
Degree of protection	IP30 (terminal block: IP20)
Terminal block	Clamps two 2.5 mm ² max. bar terminals without sleeves
Size in mm (HxWxD)	79x22.5x100



Miniature timer with multiple time ranges and multiple operating modes

H3YN features 4 multi-operating modes: ON-delay, interval, flicker ON start and flicker OFF start.

- Size in mm (HxWxD): 28x21.5x52.6
- Plug-in
- All supply voltages available
- 0.1 s to 10 h
- DPDT (5A) or 4PDT (3A)

Ordering information

Supply voltage	Functions	Time-limit contact	Order code	
			Short-time range model (0.1 s to 10 min)	Long-time range model (0.1 min to 10 h)
12 VDC	ON-delay Interval Flicker ON Flicker OFF	DPDT	H3YN-2 12DC	H3YN-21 12DC
24 VAC			H3YN-2 24AC	H3YN-21 24AC
24 VDC			H3YN-2 24DC	H3YN-21 24DC
100 to 120 VAC			H3YN-2 100-120AC	H3YN-21 100-120AC
200 to 230 VAC			H3YN-2 200-230AC	H3YN-21 200-230AC
12 VDC			4PDT	H3YN-4 12DC
24 VAC		H3YN-4 24AC		H3YN-41 24AC
24 VDC		H3YN-4 24DC		H3YN-41 24DC
100 to 120 VAC		H3YN-4 100-120AC		H3YN-41 100-120AC
200 to 230 VAC		H3YN-4 200-230AC		H3YN-41 200-230AC

Accessories

Connecting socket

Timer	DIN-rail mounting/ front-connecting socket	Back-connecting socket PCB terminal
H3YN-2/-21	PYF08A, PYF08A-N, PYF08A-E	PY08-02
H3YN-4/-41	PYF14A, PYF14A-N, PYF14A-E	PY14-02

Hold-down clips

Applicable socket	Order code
PYF08A, PYF08A-N, PYF08A-E, PYF14A, PYF14A-N, PYF14A-E	Y92H-3 (pair)
PY08, PY08-02, PY14-02	Y92H-4

Specifications

Item	H3YN-2/-4	H3YN-21/-41
Time ranges	0.1 s to 10 min (1 s, 10 s, 1 min, or 10 min max. selectable)	0.1 min to 10 h (1 min, 10 min, 1 h, or 10 h max. selectable)
Rated supply voltage	24, 100 to 120, 200 to 230 VAC (50/60 Hz) 12, 24, 48, 100 to 110, 125 VDC	
Pin type	Plug-in	
Operating mode	ON-delay, interval, flicker OFF start, or flicker ON start (selectable with DIP switch)	
Operating voltage range	85 to 110% of rated supply voltage (12 VDC: 90 to 110% of rated supply voltage)	
Reset voltage	10% min. of rated supply voltage	
Control outputs	DPDT: 5 A at 250 VAC, resistive load ($\cos\phi = 1$), 4PDT: 3 A at 250 VAC, resistive load ($\cos\phi = 1$)	
Accuracy of operating time	$\pm 1\%$ FS max. (1 s range: $\pm 1\% \pm 10$ ms max.)	
Setting error	$\pm 10\% \pm 50$ ms FS max.	
Reset time	Min. power-opening time: 0.1 s max. (including halfway reset)	
Influence of voltage	$\pm 2\%$ FS max.	
Influence of temperature	$\pm 2\%$ FS max.	
Ambient temperature	Operating: -10 to 50°C (with no icing), storage: -25 to 65°C (with no icing)	
Degree of protection	IP40	
Size in mm (HxWxD)	28x21.5x52.6	



DIN 48x48 mm multi-functional timer series

This elaborate range of solid state timers provides you with a multi-functional timer, twin timer, star-delta timer and a power OFF-delay timer.

- 48x48 mm front-panel/plug-in
- High-/low-voltage models (except -H and -G)
- 0.05 s to 300 h (except -H and -G)
- DPDT, 5A at 250VAC
- Transistor 100mA at 30VDC

Ordering information

Output	Number of pins	Supply voltage	Time range	Operating mode	Order code
Relay DPDT	11	100 to 240 VAC/100 to 125 VDC	0.05 s to 300 h	ON-delay, flicker OFF start, flicker ON start, signal ON/OFF-delay, signal OFF-delay, interval	H3CR-A 100-240AC/100-125DC
Transistor		24 to 48 VAC/12 to 48 VDC			H3CR-A 24-48AC/12-48DC
Relay DPDT	8	100 to 240 VAC/100 to 125 VDC	0.05 s to 300 h	ON-delay, flicker ON start, interval, one-shot	H3CR-A8 100-240AC/100-125DC
Transistor		24 to 48 VAC/12 to 48 VDC			H3CR-A8 24-48AC/12-48DC
Relay SPDT		100 to 240 VAC/100 to 125 VDC	H3CR-A8S 24-48AC/12-48DC		
		24 to 48 VAC/VDC	H3CR-A8E 100-240AC/100-125DC		
Relay DPDT	11	100 to 240 VAC	0.05 s to 30 h	Flicker OFF start	H3CR-F 100-240AC
		24 VAC/VDC			H3CR-F 24AC/DC
	8	100 to 240 VAC	0.05 s to 30 h	Flicker ON start	H3CR-F8 100-240AC
		24 VAC/VDC			H3CR-F8 24AC/DC
	11	100 to 240 VAC	0.05 s to 30 h	Star-delta	H3CR-FN 100-240AC
		24 VAC/VDC			H3CR-FN 24AC/DC
	8	100 to 240 VAC	0.05 s to 30 h	Star-delta	H3CR-F8N 100-240AC
		24 VAC/VDC			H3CR-F8N 24AC/DC
Time-limit contact and instantaneous contact	8	100 to 120 VAC	0.05 to 12 s	Power OFF-delay	H3CR-G8EL 100-120AC
		200 to 240 VAC			H3CR-G8EL 200-240AC
DPDT	8	100 to 120 VAC	0.05 to 12 s	Power OFF-delay	H3CR-H8LS 100-120AC
		200 to 240 VAC			H3CR-H8LS 200-240AC
		24 VAC/VDC	0.05 to 12 m		H3CR-H8LS 24AC/DC
		100 to 120 VAC	0.05 to 12 m		H3CR-H8LM 100-120AC
		200 to 240 VAC			H3CR-H8LM 200-240AC
		24 VAC/VDC			H3CR-H8LM 24AC/DC

Accessories

Name/specifications	Order code
Flush-mounting adapter	Y92F-30
Protective cover	Y92A-48B
Front connecting socket	8-pin, finger-safe type, DIN-rail
	P2CF-08-E
Front connecting socket	11-pin, finger-safe type, DIN-rail
	P2CF-11-E
Back connecting socket	8-pin
	P3G-08
	11-pin
	P3GA-11

Name/specifications	Order code	
Time setting ring	Setting a specific time	Y92S-27
	Limiting the setting range	Y92S-28
Panel cover	Light grey (5Y7/1)	Y92P-48GL
	Black (N1.5)	Y92P-48GB

Specifications

Accuracy of operating time	±0.2% FS max. (±0.2% ±10 ms max. in a range of 1.2 s)
Influence of voltage	±0.2% FS max. (±0.2% ±10 ms max. in a range of 1.2 s)
Influence of temperature	±1% FS max. (±1% ±10 ms max. in a range of 1.2 s)
Ambient temperature	Operating: -10 to 55°C (with no icing), storage: -25 to 65°C (with no icing)
Life expectancy	Mechanical: 20,000,000 operations min. (under no load at 1,800 operations/h)
	Electrical: 100,000 operations min. (5 A at 250 VAC, resistive load at 1,800 operations/h)
Size in mm (HxWxD)	48x48x66.6 (H3CR-A, -F), 48x48x78 (H3CR-G, -H)
Setting error	±5% FS ±50 ms
Degree of protection	IP40 (panel surface)
Weight	Approx. 90 g



The most complete digital standard timer on the market

H5CX offers you the most complete series of products on the market today. Based on extensive customer research, these new timers have been designed with value added features that users both need and appreciate.

- Size in mm (HxWxD): 48x48x59 to 78 mm
- Three colour display value, red, green or orange
- Models with Instantaneous Contact Outputs
- 0.001 s to 9999 h, 10 ranges
- Input NPN, PNP and contact

Ordering information

Output type	Supply voltage	Functions	External connection	Size in mm (HxWxD)	Inputs	Order code
Contact output	100 to 240 VAC	A: Signal ON-delay	Screw terminals	48x48x84	Signal, Reset, Gate (NPN/PNP inputs)	H5CX-A-N
	12 to 24 VDC/24 VAC	A-1: Signal ON-delay 2 A-2: Power ON-delay 1		48x48x65		H5CX-AD-N
Transistor output	100 to 240 VAC	A-3: Power ON-delay 2	Screw terminals	48x48x84	Signal, Reset, Gate (NPN/PNP inputs)	H5CX-AS-N
	12 to 24 VDC/24 VAC	b: Repeat cycle 1		48x48x65		H5CX-ASD-N
Contact output	100 to 240 VAC	b-1: Repeat cycle 2	11-pin socket	48x48x69.7	Signal, Reset, Gate (NPN/PNP inputs)	H5CX-A11-N
	12 to 24 VDC/24 VAC	d: Signal OFF-delay E: Interval				H5CX-A11D-N
Transistor output	100 to 240 VAC	F: Cumulative	11-pin socket	48x48x69.7	Signal, Reset, Gate (NPN/PNP inputs)	H5CX-A11S-N
	12 to 24 VDC/24 VAC	Z: ON/OFF-duty adjustable flicker				H5CX-A11SD-N
Contact output	100 to 240 VAC	toff: Twin timer OFF start	8-pin socket	48x48x69.7	Signal, Reset (NPN inputs)	H5CX-L8-N
	12 to 24 VDC/24 VAC	ton: Twin timer ON start				H5CX-L8D-N
Transistor output	100 to 240 VAC	A-2: Power ON-delay 1 b: Repeat cycle 1 E: Interval Z: ON/OFF-duty adjustable flicker	8-pin socket	48x48x69.7	Signal, Reset (NPN inputs)	H5CX-L8S-N
	12 to 24 VDC/24 VAC					toff: Twin timer OFF start 1 ton: Twin timer ON start 1
Contact output Models with instantaneous contact outputs	100 to 240 VAC	A-2: Power ON-delay 1 b: Repeat cycle 1 E: Interval Z: ON/OFF-duty adjustable flicker	8-pin socket	48x48x69.7	Signal, Reset (NPN inputs)	H5CX-L8E-N
	12 to 24 VDC/24 VAC					toff: Twin timer OFF start 1 ton: Twin timer ON start 1
Transistor output	12 to 24 VDC	A: Signal ON-delay 1 F: Cumulative	Screw terminals	48x48x65	Signal, Reset, Gate (NPN/PNP inputs)	H5CX-BWSD-N

Accessories

Name	Order code	
Flush-mounting adapter	Y92F-30	
Waterproof packing	Y92S-29	
Front-connecting socket	8-pin, finger safe type 11-pin, finger safe type	P2CF-08-E P2CF-11-E
Back-connecting socket	8-pin	P3G-08
	11-pin	P3GA-11
Hard cover	Y92A-48	
Soft cover	Y92A-48F1	
Front panels (4-digit models)	Light gray	Y92P-CXT4G
	White	Y92P-CXT4S

Specifications

Item	H5CX-A_	H5CX-A11_	H5CX-L8_
Display	7-segment, negative transmissive LCD		
	Present value: 12 mm high characters red, orange or green (programmable)		
	Set value: 6 mm high characters, green		
Digits	4 digits		
Total time range	0.001 s to 9,999 h (configurable)		
Timer mode	Elapsed time (Up), remaining time (Down) (selectable)		
Input signals	Signal, reset, gate		Signal, reset
Key protection	Yes		
Memory backup	EEPROM (overwrites: 100,000 times min.) that can store data for 10 years min.		
Ambient temperature	Operating: -10 to 55°C (no icing or condensation), side-by-side mounting: -10 to 50°C		
Case colour	Black (N1.5)		



DIN-sized (48x48) motor timer with variable time ranges

This motor timer series provides you with many features, such as ON-delay, time indicator, moving pointer and synchronous motor. Moreover, the LED indicator shows the time operation, time range and the rated voltage.

- DIN-sized 48x48mm
- Front-panel/plug-in/DIN-rail
- All supply voltages available
- 0.2 s to 30 h
- SPDT, 6A at 250VAC

Ordering information

Operation/resetting system	Internal connection	Terminal	Time-limit contact	Instantaneous contact	Time range code	Order code
Time-limit operation/ electric resetting	Separate motor and clutch connection	11-pin socket	SPDT	SPDT	1.25 s to 30 h in 5 ranges	H2C-RSA 110AC
						H2C-RSA 220AC
						H2C-RSA 24AC
					0.2 s to 6 h in 5 ranges	H2C-RSB 110AC
						H2C-RSB 220AC
						H2C-RSB 24AC
					0.5 s to 12 h in 5 ranges	H2C-RSC 110AC
						H2C-RSC 220AC
						H2C-RSC 24AC
Time-limit operation/ self-resetting	Separate motor and clutch connection	11-pin socket	SPDT	SPDT	1.25 s to 30 h in 5 ranges	H2C-SA 110AC
						H2C-SA 220AC
						H2C-SA 24AC
					0.2 s to 6 h in 5 ranges	H2C-SB 110AC
						H2C-SB 220AC
						H2C-SB 24AC
					0.5 s to 12 h in 5 ranges	H2C-SC 110AC
						H2C-SC 220AC
						H2C-SC 24AC

Note: Other voltages available on request

Accessories

Name/specifications	Order code	Name/specifications	Order code
DIN-rail mounting/ front-connecting socket	8-pin, finger safe type	P2CF-08-E	Hold-down clip (pair) For PL08 and PL11 sockets Y92H-1
	11-pin, finger safe type	P2CF-11-E	
Back-connecting socket	8-pin, screw terminal	P3G-08	For PF085A socket Y92H-2
	11-pin	P3GA-11	Flush mounting adapter Y92F-30
			Time setting ring Y92A-Y1

Specifications

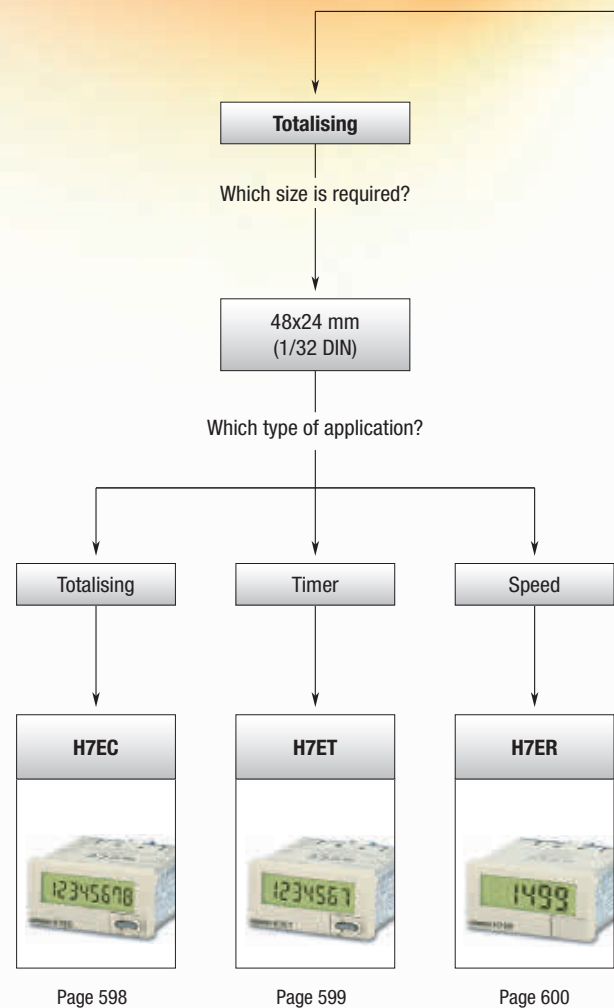
Operating voltage range	85 to 110% of rated supply voltage
Reset voltage	10% max. of rated supply voltage
Reset time	Min. power-opening time: 0.5 s, min. pulse width: 0.5 s
Control outputs	6 A at 250 VAC, resistive load (cosφ = 1)
Mounting method	Flush mounting (except for H2C-F/-FR models), surface-mounting, DIN-rail mounting
Life expectancy	Mechanical: 10,000,000 operations min. Electrical: 500,000 operations min.
Motor life expectancy	20,000 h
Accuracy of operating time	±0.5% FS max. (±1% max. at 0.2 to 6 s for the time range code B or at 0.5 to 12 s for the time range code C)
Setting error	±2% FS max.
Reset time	0.5 s max.
Influence of voltage	±1% FS max.
Influence of temperature	±2% FS max.
Ambient temperature	Operating: -10 to 50°C
Case colour	Light grey (Munsell 5Y7/1)
Degree of protection	IP40 (panel surface)
Size in mm (HxWxD)	48x48x77.5

MULTI-FUNCTIONAL PRESET COUNTER

H7CX – Designed with value added features

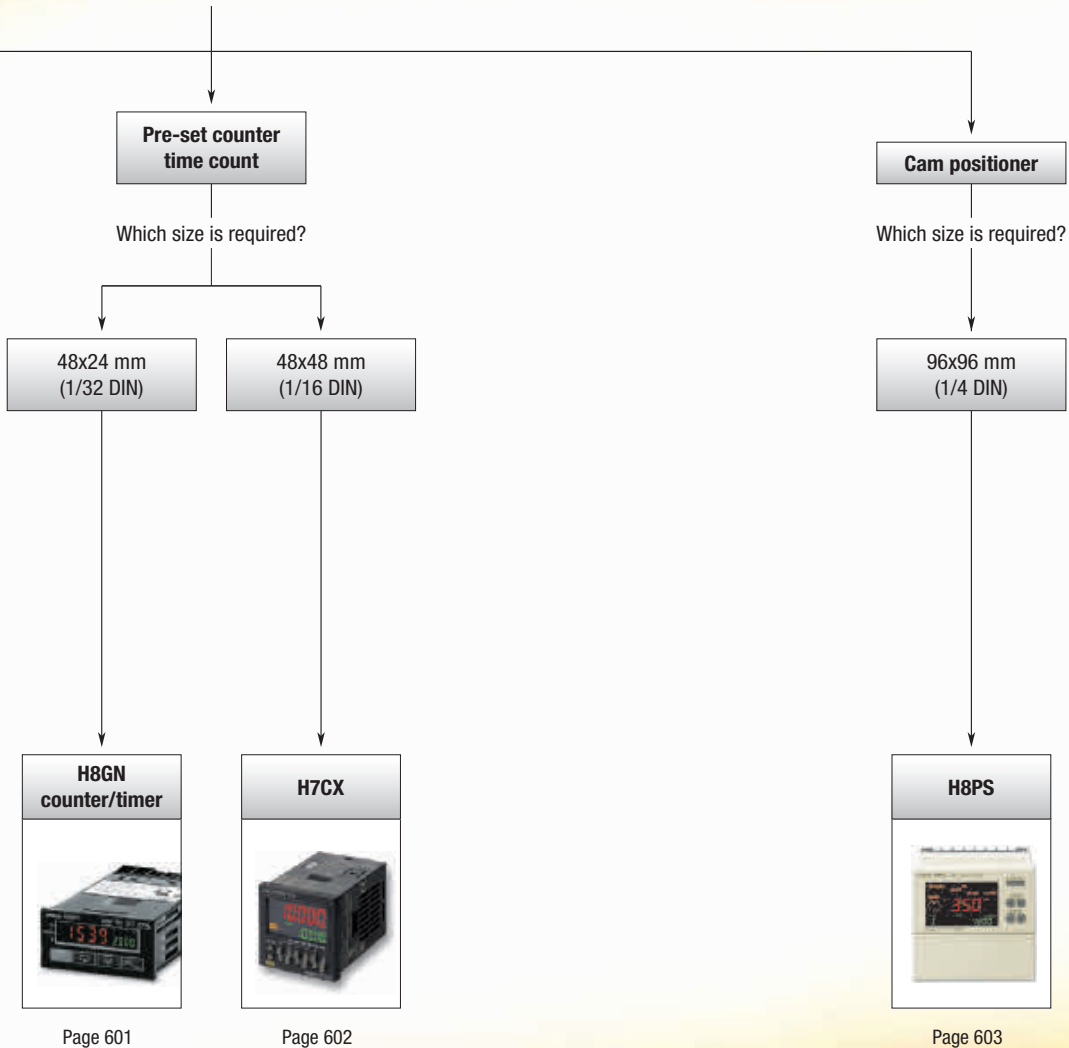
The H7CX series offers the ultimate in versatility and intuitive programming.

- 7 basic functions in one
- Switching colour on threshold, green, orange & red
- Twin counter mode
- 12 different outputs modes
- Display 6 digits from -100 K +1 up to 1 M -1





What is the type of counting application?









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Selection table

Category		Self-powered total	Self-powered timer	Self-powered tachometer
Selection criteria				
	Model	H7EC	H7ET	H7ER
	Display	LCD		
	Size	1/32 DIN		
Outputs	Control outputs	–	–	–
	5 stage	–	–	–
	Total	■	■	–
	Time	–	■	–
	Preset	–	–	–
	Batch	–	–	–
	Dual	–	–	–
	Tachometer	■	–	■
Inputs	Control inputs	No-voltage, PNP/NPN, DC-voltage, AC/DC multi-voltage	No-voltage, PNP/NPN, DC-voltage, AC/DC multi-voltage	No-voltage, PNP/NPN
	Dual operation	–	–	–
Features	Number of digits	8	7	4 or 5
	NPN/PNP switch	■	■	■
	Back-lit	□	□	□
	External reset	■	■	–
	Manual reset	■	■	–
	Number of banks	–	–	–
	Built-in sensor power supply	–	–	–
	IP rating	IP66	IP66	IP66
Terminals	Screw terminals	■	■	■
	PCB terminals	–	–	–
	11-pin socket	–	–	–
Supply voltage	100 to 240 VAC	–	–	–
	12 to 24 VDC	–	–	–
	24 VDC	□	□	□
	Comms	–	–	–
Functions	Up	■	■	–
	Down	–	–	–
	Up/down	–	–	–
	Reversible	–	–	–
	Speed	0 to 30 Hz or 0 to 1 kHz	–	1 or 10 kHz
	Counting range	0 to 99999999	0.0 h to 999999.9 h <--> 0.0 h to 3999 d 23.9 h or 0 s to 999 h 59 min 59 s <--> 0.0 min to 9999 h 59.9 min	1000 s ⁻¹ or 1000 min ⁻¹ ; 1000 s ⁻¹ or 1000 min ⁻¹ <--> 10000 min ⁻¹
Colour	Beige	■	■	■
	Black	■	■	■
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Counter type		Pre-set counter/timer	Pre-set counter	Cam positioner
Selection criteria				
	Model	H8GN	H7CX	H8PS
	Display	LCD negative transmissive		LCD negative transmissive
	Size	1/32 DIN	1/16 DIN	1/4 DIN
Outputs	Control outputs	1 relay (SPDT)	1 relay (SPDT), transistor	NPN or PNP, cam outputs 8/16/32, run out, tachometer
	5 stage	■	□	–
	Total	■	□	–
	Time	■	–	–
	Preset	■	□	–
	Batch	■	□	–
	Dual	■	□	–
Inputs	Tachometer	–	□	–
	Control inputs	No-voltage	No-voltage, PNP/NPN	Encoder
Features	Dual operation	■	■	□
	Number of digits	PV: 4, SV: 4	PV: 4, SV: 4 or PV: 6, SV: 6	7
	NPN/PNP switch	–	■	–
	Back-lit	–	■	■
	External reset	■	■	–
	Manual reset	■	■	–
	Number of banks	4	–	8 (16- and 32-output models only)
	Built-in sensor power supply	–	■	–
Terminals	IP rating	IP66	IP66	IP40
	Screw terminals	■	■	■
	PCB terminals	–	–	■
Supply voltage	11-pin socket	–	□	–
	100 to 240 VAC	–	■	–
	12 to 24 VDC	–	■	–
	24 VDC	■	–	■
Functions	Comms	□	–	–
	Up	■	■	–
	Down	■	■	–
	Up/down	–	■	–
	Reversible	■	■	–
	Speed	0 to 30 Hz or 0 to 5 kHz	0 to 30 Hz or 0 to 5 kHz	–
	Counting range	-999 to 9999	-99999 to 999999	–
Colour	Beige	–	–	■
	Black	■	■	–
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■ Standard

□ Available

– No/not available

Self-powered LCD totaliser



The H7E series is available with large display with 8.6 mm character height. It includes models with backlight for improved visibility in dimly lit places. The H7E family includes total counters, time counters, tachometers and PCB mounted counters.

- Size in mm (HxWxD): 24x48x55.5, 1/32 DIN size housing
- 8 digits, 8.6 mm character height
- Black or light-grey housing
- Dual input speed: 30 Hz <-> 1 kHz
- Short body: all models have a depth of 48.5 mm

Ordering information

Count input	Max. counting speed	Display	Order code	
			Light grey body	Black body
No-voltage	30 Hz <-> 1 kHz (switchable)	7-segment LCD	H7EC-N	H7EC-N-B
PNP/NPN universal DC voltage input	30 Hz <-> 1 kHz (switchable)	7-segment LCD	H7EC-NV	H7EC-NV-B
		7-segment LCD with backlight	H7EC-NV-H	H7EC-NV-BH
AC/DC multi-voltage input	20 Hz	7-segment LCD	H7EC-NFV	H7EC-NFV-B

Specifications

Item	H7EC-NV- /H7EC-NV-_H	H7EC-NFV-_	H7EC-N-_
Operating mode	Up type		
Mounting method	Flush mounting		
External connections	Screw terminals, optional wire-wrap terminals		
Number of digits	8		
Display	7-segment LCD with or without backlight, zero suppression (character height: 8.6 mm)		
Max. counting speed	30 Hz/1 kHz	20 Hz	30 Hz/1 kHz
Case colour	Light grey or black (-B models)		
Attachment	Waterproof packing, flush mounting bracket		
Supply voltage	Backlight model: 24 VDC (0.3 W max.) (only for backlight) No-backlight model: Not required (powered by built-in battery)	Not required (powered by built-in battery)	
Count input	High (logic) level: 4.5 to 30 VDC Low (logic) level: 0 to 2 VDC (input impedance: Approx. 4.7 kΩ)	High (logic) level: 24 to 240 VAC/VDC, 50/60 Hz Low (logic) level: 0 to 2.4 VAC/VDC, 50/60 Hz	No voltage input Maximum short-circuit impedance: 10 kΩ max. Short-circuit residual voltage: 0.5 V max. Minimum open impedance: 750 kΩ min.
Reset input		No voltage input Maximum short-circuit impedance: 10 kΩ max. Short-circuit residual voltage: 0.5 V max. Minimum open impedance: 750 kΩ min.	
Minimum signal width	20 Hz: 25 ms, 30 Hz: 16.7 ms, 1 KHz: 0.5 ms		
Reset system	External reset and manual reset: Minimum signal width of 20 ms		
Ambient temperature	Operating: -10 to 55°C (with no condensation or icing), storage: -25 to 65°C (with no condensation or icing)		
Degree of protection	Front-panel: IP66, NEMA4, terminal block: IP20		
Battery life (reference)	7 years min. with continuous input at 25°C (lithium battery)		
Size in mm (HxWxD)	24x48x55.5		



Self-powered time counter

The H7E series is available with large display with 8.6mm character height. It includes models with backlight for improved visibility in dimly lit places. The H7E family includes total counters, time counters, tachometers and PCB mounted counters.

- Size in mm (HxWxD) 24x48x55.5, 1/32 DIN size housing
- 7 digits, 8.6mm character height
- Black or light-grey housing
- Dual time range 999999.9h <-> 3999d23.9h or 999h59m59s <-> 9999h59.9m

Ordering information

Timer input	Display	Order code			
		Time range 999999.9h <-> 3999d23.9h (switchable)		Time range 999h59m59s <-> 9999h59.9m	
		Light grey body	Black body	Light grey body	Black body
No-voltage input	7-segment LCD	H7ET-N	H7ET-N-B	H7ET-N1	H7ET-N1-B
PNP/NPN universal DC voltage input	7-segment LCD	H7ET-NV	H7ET-NV-B	H7ET-NV1	H7ET-NV1-B
DC voltage input	7-segment LCD with backlight	H7ET-NV-H	H7ET-NV-BH	H7ET-NV1-H	H7ET-NV1-BH
AC/DC multi-voltage input	7-segment LCD	H7ET-NFV	H7ET-NFV-B	H7ET-NFV1	H7ET-NFV1-B

Specifications

Item	H7ET-NV - /H7ET-NV - H	H7ET-NFV -	H7ET-N -
Operating mode	Accumulating		
Mounting method	Flush mounting		
External connections	Screw terminals		
Display	7-segment LCD with or without backlight, zero suppression (character height: 8.6 mm)		
Number of digits	7		
Case colour	Light grey or black (-B models)		
Attachment	Waterproof packing, flush mounting bracket, time unit labels		
Supply voltage	Backlight model: 24 VDC (0.3 W max.) (for backlight) No-backlight model: Not required (powered by built-in battery)	Not required (powered by built-in battery)	
Timer input	High (logic) level: 4.5 to 30 VDC Low (logic) level: 0 to 2 VDC (Input impedance: Approx. 4.7 kΩ)	High (logic) level: 24 to 240 VAC/VDC, 50/60 Hz Low (logic) level: 0 to 2.4 VAC/VDC, 50/60 Hz	No voltage input Maximum short-circuit impedance: 10 kΩ max. Short-circuit residual voltage: 0.5 V max. Minimum open impedance: 750 kΩ min.
Reset input		No voltage input Maximum short-circuit impedance: 10 kΩ max. Short-circuit residual voltage: 0.5 V max. Minimum open impedance: 750 kΩ min.	
Minimum pulse width	1 s		
Reset system	External reset and manual reset: Minimum signal width of 20 ms		
Ambient temperature	Operating: -10 to 55°C (with no condensation or icing), storage: -25 to 65°C (with no condensation or icing)		
Time accuracy	±100 ppm (25°C)		
Degree of protection	Front-panel: IP66, NEMA4 with waterproof packing, terminal block: IP20		
Battery life (reference)	10 years min. with continuous input at 25°C (lithium battery)		
Size in mm (HxWxD)	24x48x55.5		

Self-powered tachometer



The H7E series is available with large display with 8.6mm character height. It includes models with backlight for improved visibility in dimly lit places. The H7E family includes total counters, time counters, tachometers and PCB mounted counters.

- Size in mm (HxWxD) 24x48x53.5, 1/32 DIN size housing
- 5 digits, 8.6mm character height
- Black or light-grey housing
- Dual revolution display

Ordering information

Count input	Display	Order code			
		Max. revolutions displayed (applicable encoder resolution)			
		1,000 s ⁻¹ (1 pulse/rev.) 1,000 min ⁻¹ (60 pulse/rev.)		1,000.0 s ⁻¹ (10 pulse/rev) 1,000.0 min ⁻¹ (600 pulse/rev) <-> 10,000 min ⁻¹ (60 pulse/rev) (switchable)	
		Light grey body	Black body	Light grey body	Black body
No-voltage input	7-segment LCD	H7ER-N	H7ER-N-B		
PNP/NPN universal	7-segment LCD	H7ER-NV	H7ER-NV-B	H7ER-NV1	H7ER-NV1-B
DC voltage input	7-segment LCD with backlight	H7ER-NV-H	H7ER-NV-BH	H7ER-NV1-H	H7ER-NV1-BH

Specifications

Item	H7ER-NV1-_/H7ER-NV1-_H	H7ER-NV-_/H7ER-NV-_H	H7ER-N- _
Operating mode	Up type		
Mounting method	Flush mounting		
External connections	Screw terminals, wire-wrap terminals		
Display	7-segment LCD with or without backlight, zero suppression (character height: 8.6 mm)		
Number of digits	5	4	
Max. revolutions displayed	1,000.0 s ⁻¹ (when encoder resolution of 10 pulse/rev is used) 1,000.0 min ⁻¹ (when encoder resolution of 600 pulse/rev is used) <-> 10,000 min ⁻¹ (when encoder resolution of 60 pulse/rev is used) (switchable with switch)	1,000 s ⁻¹ (when encoder resolution of 1 pulse/rev is used) 1,000 min ⁻¹ (when encoder resolution of 60 pulse/rev is used)	
Attachment	Waterproof packing, flush mounting bracket, revolution unit labels		
Supply voltage	Backlight model: 24 VDC (0.3 W max.) (for backlight lit) No-backlight model: Not required (powered by built-in battery)		Not required (powered by built-in battery)
Count input	High (logic) level: 4.5 to 30 VDC Low (logic) level: 0 to 2 VDC (Input impedance: Approx. 4.7 kΩ)		No voltage input Maximum short-circuit impedance: 10 kΩ max. Short-circuit residual voltage: 0.5 V max. Minimum open impedance: 750 kΩ min.
Max. counting speed	10 kHz	1 kHz	
Minimum signal width	10 kHz: 0.05 ms, 1 kHz: 0.5 ms		
Ambient temperature	Operating: -10 to 55°C (with no condensation or icing), storage: -25 to 65°C (with no condensation or icing)		
Degree of protection	Front-panel: IP66, NEMA4 with waterproof packing, terminal block: IP20		
Battery life (reference)	7 years min. with continuous input at 25°C (lithium battery)		
Size in mm (HxWxD)	24x48x53.5		



World's smallest compact preset counter/timer

The H8GN is a 1/32 DIN timer and counter in one. It is simple to switch between the timer and counter functions. During operation it is also possible to switch the display to monitor the totalising count value in 8 digits. Many sophisticated functions come as standard with H8GN.

- Size in mm (HxWxD) 24x48x83, 1/32 DIN size housing
- 8 digit display, 4 value and 4 set value
- Front mounting
- -999 to 9999
- 24 VDC

Ordering information

Functions		Supply voltage	Output	Order code	
Counter	Timer			Communications	
				No communications	RS-485
Counter: Up/down/reversible, 4 digits, N, F, C or K output modes Total counter: 8 digits	A: ON-delay B: Flicker D: Signal OFF-delay E: Interval F: Accumulative Z: ON/OFF-duty adjustable flicker	24 VDC	Contact output (SPDT)	H8GN-AD	H8GN-AD-FLK

Specifications

Rated supply voltage		24 VDC
Operating voltage range		85 to 110% of rated supply voltage
Power consumption		1.5 W max. (for max. DC load) (inrush current: 15 A max.)
Mounting method		Flush-mounting
External connections		Screw terminals (M3 screws)
Terminal screw tightening torque		0.5 Nm max.
Attachment		Waterproof packing, flush-mounting bracket
Display		7-segment, negative transmissive LCD; time display (h, min, s); CMW, OUT, RST, TOTAL Present value (red, 7 mm high characters); set value (green, 3.4 mm high characters)
Digits		PV: 4 digits, SV: 4 digits, when total count value is displayed: 8 digits (zeros suppressed)
Memory backup		EEPROM (non-volatile memory) (number of writes: 100,000 times)
Counter	Maximum counting speed	30 Hz or 5 kHz
	Counting range	-999 to 9,999
	Input modes	Increment, decrement, individual, quadrature inputs
Timer	Timer modes	Elapsed time (up), remaining time (down)
Inputs	Input signals	For counter: CP1, CP2, and reset For timer: Start, gate, and reset
	Input method	No-voltage input (contact short-circuit and open input) Short-circuit (ON) impedance: 1 k Ω max. (approx. 2 mA runoff current at 0 Ω) Short-circuit (ON) residual voltage: 2 VDC max. Open (OFF) impedance: 100 k Ω min. Applied voltage: 30 VDC max.
	Start, reset, gate	Minimum input signal width: 1 or 20 ms (selectable)
	Power reset	Minimum power-opening time: 0.5 s
Control output		SPDT contact output: 3 A at 250 VAC/30 VDC, resistive load ($\cos\phi = 1$)
Minimum applied load		10 mA at 5 VDC (failure level: P, reference value)
Reset system		External, manual, and power supply resets (for timer in A, B, D, E, or Z modes)
Sensor waiting time		260 ms max. (inputs cannot be received during sensor wait time if control outputs are turned OFF)
Timer function	Accuracy of operating time and setting error (including temperature and voltage effects)	Signal start: $\pm 0.03\% \pm 30$ ms max. Power-ON start: $\pm 0.03\% \pm 50$ ms max.
Ambient temperature	Operating storage	-10 to 55°C (with no icing or condensation)
		-25 to 65°C (with no icing or condensation)
Case colour		Rear section: Grey smoke; front section: N1.5 (black)
Degree of protection		Panel surface: IP66 and NEMA Type 4X (indoors); rear case: IP20, terminal block: IP20
Size in mm (HxWxD)		24x48x83



The most complete digital standard counter on the market

H7CX offers you the most complete series of products on the market today. Based on extensive customer research, these new counters have been designed with value added features that users both need and appreciate.

- Size in mm (HxWxD) 48x48x59 to 78mm 1/16 DIN size housing
- Three colour display value, red, green or orange
- Twin counter mode
- 6 digit model -99,999 to 999,999, set value -99,999 to 999,999 or 0 to 999,999
- Input contact, NPN or PNP

Ordering information

Type	External connection	Sensor power supply	Supply voltage	Output type	Digits	Size in mm (HxWxD)	Order code
1-stage counter 1-stage counter with total counter 2-stage counter 1-stage counter with batch counter Dual counter (addition/subtraction) Tachometer Twin counter	Screw terminal	12 VDC	100 to 240 VAC	Contact and transistor output	6	48x48x84	H7CX-AU-N
			12 to 24 VDC/24 VAC	Transistor output (2x)			H7CX-AUD1-N
			100 to 240 VAC	Contact output (2x)			H7CX-AUSD1-N
			12 to 24 VDC/24 VAC				H7CX-AW-N
							H7CX-AWD1-N
1-stage counter 1-stage counter with total counter	11-pin socket	12 VDC	100 to 240 VAC	Contact output	6	48x48x69.7	H7CX-A11-N
			12 to 24 VDC/24 VAC				H7CX-A11D1-N
			100 to 240 VAC	Transistor output			H7CX-A11S-N
			12 to 24 VDC/24 VAC				H7CX-A11SD1-N
	Screw terminal		100 to 240 VAC	Contact output		48x48x84	H7CX-A-N
		100 to 240 VAC	Transistor output			H7CX-AS-N	

Accessories

Name	Order code
Flush-mounting adapter	Y92F-30
Waterproof packing	Y92S-29
DIN-rail mounting/front-connecting socket	11-pin, finger safe type P2CF-11-E
Back-connecting socket	11-pin P3GA-11
	Finger safe terminal cover for P3GA-11 Y92A-48G
Hard cover	Y92A-48
Soft cover	Y92A-48F1
Front panels (4-digit models)	Light gray Y92P-CXC4G
	White Y92P-CXC4S
Front panels (6-digit models)	Light gray Y92P-CXC6G
	White Y92P-CXC6S

Specifications

Display	7-segment, negative transmissive LCD
Digits	6-digits: -99,999 to 999,999, SV range: -99999 to 999999 or 0 to 999999
Max. counting speed	30 Hz or 5 kHz (selectable, ON/OFF ratio 1:1)
Input modes	Increment, decrement, increment/decrement (UP/DOWN A (command input), UP/DOWN B (individual inputs), or UP/DOWN C (quadrature inputs))
Control output	Contact output: 3 A at 250 VAC/30 VDC, resistive load (cosφ = 1) Minimum applied load: 10 mA at 5 VDC Transistor output: NPN open collector, 100 mA at 30 VDC Residual voltage: 1.5 VDC max. (approx. 1V) Leakage current: 0.1 mA max.
Key protection	Yes
Decimal point adjustment	Yes (rightmost 3 digits)
Sensor waiting time	290 ms max.
Memory backup	EEPROM (overwrites: 100,000 times min.) stores data 10 years min.
Ambient temperature	Operating: -10 to 55°C (-10 to 50°C when mounted side by side)
Case colour	Black (N1.5) (Optional Front Panels are available to change the Front Panel colour to light gray or white.)
Life expectancy	Mechanical: 10,000,000 operations min. Electrical: 100,000 operations min. (3 A at 250 VAC, resistive load)
Degree of protection	Panel surface: IP66, NEMA 4 (indoors), and UL Type 4X (indoors)



Compact, easy-to-use cam positioner

The H8PS provides high speed operation at 1,600 r/min and high-precision settings to 0.5° ensuring widespread application. H8PS features a highly visible display with back-lit negative transmissive LCD. Advance angle compensation function compensates for output delays.

- 96 to 121.2Hx96Wx60.6 to 67.5D mm
- Front-panel / DIN-rail
- 24 VDC
- 8-, 16- and 32-outputs
- NPN/PNP 100 mA at 30 VDC

Ordering information

Number of outputs	Mounting method	Output configuration	Bank function	Size in mm (HxWxD)	Order code
8-outputs	Flush-mounting	NPN transistor output	No	96x96x67.5	H8PS-8B
		PNP transistor output			H8PS-8BP
	Front-mounting/DIN-rail mounting	NPN transistor output		96x96x60.6	H8PS-8BF
		PNP transistor output			H8PS-8BFP
16-outputs	Flush-mounting	NPN transistor output	Yes	96x96x67.5	H8PS-16B
		PNP transistor output			H8PS-16BP
	Front-mounting/DIN-rail mounting	NPN transistor output		121.2x96x60.6	H8PS-16BF
		PNP transistor output			H8PS-16BFP
32-outputs	Flush-mounting	NPN transistor output	Yes	96x96x67.5	H8PS-32B
		PNP transistor output			H8PS-32BP
	Front-mounting/DIN-rail mounting	NPN transistor output		121.2x96x60.6	H8PS-32BF
		PNP transistor output			H8PS-32BFP

Encoders

Type	Resolution	Cable length	Order code
Economy	256	2 m	E6CP-AG5C-C 256 2M
Standard	256	1 m	E6C3-AG5C-C 256 1M
		2 m	E6C3-AG5C-C 256 2M
	360		E6C3-AG5C-C 360 2M
	720		E6C3-AG5C-C 720 2M
Rigid	256	2 m	E6F-AG5C-C 256 2M
	360		E6F-AG5C-C 360 2M
	720		E6F-AG5C-C 720 2M

Accessories

Name	Specification	Order code
Discrete wire output cable	2 m	Y92S-41-200
Connector-type output cable	2 m	E5ZE-CBL200
Support software	CD-ROM	H8PS-SOFT-V1
USB cable	A miniB, 2 m	Y92S-40
Parallel input adapter	Two units can operate in parallel	Y92C-30
Protective cover		Y92A-96B
Watertight cover		Y92A-96N
DIN-rail mounting base		Y92F-91

Encoder accessories

Name	Specification	Order code
Shaft coupling for the E6CP	Axis: 6 mm dia.	E69-C06B
Shaft coupling for the E6C3	Axis: 8 mm dia.	E69-C08B
Shaft coupling for the E6F	Axis: 10 mm dia.	E69-C10B
Extension cable	5 m (same for E6CP, E6C3, and E6F)	E69-DF5

Specifications

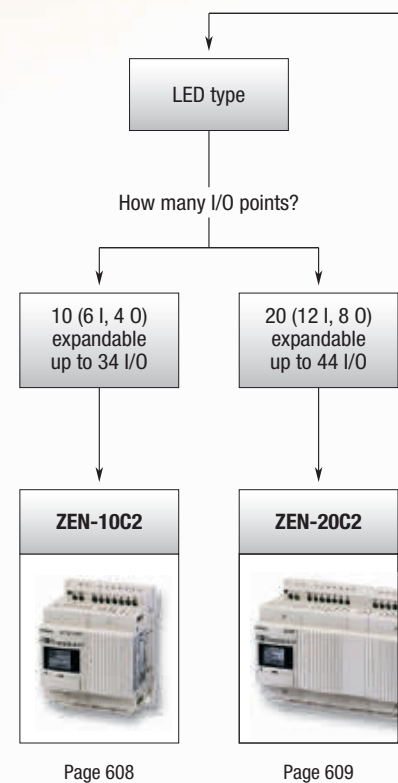
Rated supply voltage	24 VDC		
Inputs	Encoder input	8-output models: None; 16-/32-output models: Bank inputs 1/2/4, origin input, start input	
	External inputs	Input signals	8-output models: None; 16-/32-output models: Bank inputs 1/2/4, origin input, start input
		Input type	No voltage inputs: ON impedance: 1 kΩ max. (leakage current: Approx. 2 mA at 0 Ω) ON residual voltage: 2 V max., OFF impedance: 100 kΩ min., applied voltage: 30 VDC max. Minimum input signal width: 20 ms
Number of banks	8 banks (for 16-/32-output models only)		
Display method	7-segment, negative transmissive LCD (main display: 11 mm (red), sub-display: 5.5 mm (green))		
Memory backup method	EEPROM (overwrites: 100,000 times min.) that can store data for 10 years min.		
Ambient operating temperature	-10 to 55°C (with no icing or condensation)		
Storage temperature	-25 to 65°C (with no icing or condensation)		
Ambient humidity	25 to 85%		
Degree of protection	Panel surface: IP40, rear case: IP20		
Case colour	Light grey (Munsell 5Y7/1)		

FLEXIBLE AUTOMATION EXPANDED

ZEN-C4 – More flexibility with RS-485 communication

Our range is extended with a communication model. Now you have the possibility to connect several ZEN in a network environment. This will enhance the ZEN series to solve even more applications.

- RS-485 communication
- To connect up to 32 units
- Easy CompoWayF protocol





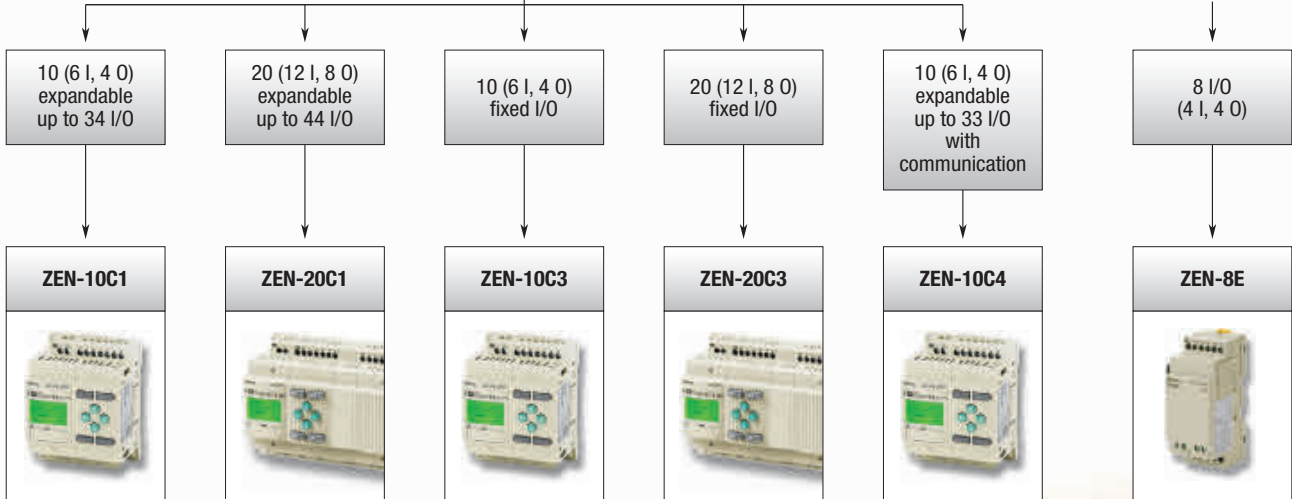
What functionality is required?

Display type with buttons, calendar and clock

Expansion unit

How many I/O points?

How many extra I/O points?



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Model	ZEN-10C	ZEN-20C		
Type	CPU unit	CPU unit		
Features C1	With LCD Display, program/control buttons, calendar and real-time clock	With LCD display, program/control buttons, calendar and real-time clock		
Features C2	With LED indication Logic control Programming by software	With LED indication Logic control Programming by software		
Features C3	Same as C1 but not expandable.	Same as C1 but not expandable.		
Features C4	Same as C1 but instead of one output relay you get RS-485 communication.	–		
Features Starter kits	Complete set with C1 CPU including software, cable and manual	–		
Number of I / O points	10 expandable up to 34 I/O (C4 up to 33 I/O)	20 expandable up to 44 I/O		
Inputs	6	12		
Inputs/power supply	100 to 240 VAC or 12 to 24 VDC	100 to 240 VAC or 12 to 24 VDC		
Outputs	4 relays (C4 = 3 relays) or 4 transistors	8 relays or 8 transistors		
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Flexible automation

The ZEN-10C offers simple logic control in a choice of four CPU units. Expansion is possible on three of these CPU's of up to 34 I/O whereas the fourth (C3 Units) is fixed at 10 I/O. All DC models have analogue input and a high-speed counter input up to 150 Hz.

- DC input/supply units have analogue input + high speed counter
- The ZEN-10C4 has RS-485 communication
- Expansion available with relay output or transistor output
- ZEN-Kits the best choice to start!

Ordering information

Name	Number of I/O points	Inputs (I)/ power supply	Outputs (Q)	Type	LCD, buttons (B), calendar and clock	Analogue input/ comparators (A)	8-digit counter (F)/ comparators (G)	No. of bits 16	No. of bits 8	Size in mm (HxWxD)	Order code		
CPU units	10 Expandable up to 34 I/O	6	100 to 240 VAC	4	Relays	LCD	yes	–	Work bits (M) Holding bits (H) Timers (T) Counters (C) Weekly timers (@) LCD display (D) Timer/counter comparator (P)	Holding timers (#) Button input (B)	90x70x56	ZEN-10C1AR-A-V2	
						LED	–	–				ZEN-10C2AR-A-V2	
		12 to 24 VDC	LCD	yes	yes / 4	yes / 4	ZEN-10C1DR-D-V2						
			LED	–	yes / 4	yes / 4	ZEN-10C2DR-D-V2						
		Transistors	LCD	yes	yes / 4	yes / 4	ZEN-10C1DT-D-V2						
			LED	–	yes / 4	yes / 4	ZEN-10C2DT-D-V2						
	Fixed I/O	100 to 240 VAC	3	Relays	LCD	yes	–	yes / 4				ZEN-10C3AR-A-V2	
					LCD	yes	yes / 4	yes / 4				ZEN-10C3DR-D-V2	
		12 to 24 VDC	LCD/Comm.	yes	–	yes / 4	ZEN-10C4AR-A-V2						
			LCD/Comm.	yes	yes / 4	yes / 4	ZEN-10C4DR-D-V2						
		10 Expandable up to 33 I/O	100 to 240 VAC	3	Relays	LCD	yes	–				yes / 4	ZEN-10C1AR-A-V2
						LCD/Comm.	yes	yes / 4				yes / 4	ZEN-10C1DR-D-V2
ZEN kit		Set containing CPU unit (ZEN-10C1AR-A-V2), connecting cable, ZEN support software and manual.									ZEN-KIT01-EV4		
		Set containing CPU unit (ZEN-10C1DR-D-V2), connecting cable, ZEN support software and manual.									ZEN-KIT02-EV4		

Specifications

Item	Specifications	
	ZEN-10C_AR-A-V2	ZEN-10C_D_-D-V2
Power supply voltage	100 to 240 VAC, 50/60 Hz	12 to 24 VDC (DC ripple rate: 5%)
Rated power supply voltage	85 to 264 VAC	10.8 to 28.8 VDC
Power consumption	9 VA max.	4 W max.
Inrush current	3 A max.	30 A max.
Ambient temperature	0°C to 55°C (-25°C to 55°C for ZEN-10C2 models (LED))	
Ambient storage	-20°C to 55°C (-40°C to 75°C for ZEN-10C2 models (LED))	
Control method	Stored program control	
I/O control method	Cyclic scan	
Programming language	Ladder diagram	
Program capacity	96 lines (3 input conditions and 1 output per line)	
LCD display	12 characters x 4 lines, with backlight (LCD-type CPU unit only)	
Operation keys	8 (4 cursor keys and 4 operation keys) (LCD-type CPU unit only)	
Super-capacitor holding time	2 days min. (25°C)	
Battery life (ZEN-BAT01)	10 years min. (25°C)	
Calendar & Clock function	Accuracy: ± 15 s/month (at 25°C)	

Accessories

Name	Description	Order code
Memory Cassette	EEPROM (for data security and copying)	ZEN-ME01
Battery unit	Battery (keeps time, date and bit values for 10 years at 25°C)	ZEN-BAT01
Connecting Cable	For the programming software, RS-232C cable, 9-way 'D' connector for PC	ZEN-CIF01
USB-Serial conversion cable	USB-Serial conversion cable (to be used in combination with ZEN-CIF01)	CS1W-CIF31
ZEN support software	Runs on Windows ME, 2000, XP, NT4.0 Service Pack 3, Vista	ZEN-SOFT01-V4



Extended flexible automation

Ideal for small-scale control applications, the ZEN-20C provides an economical alternative to discrete timers, counters and general purpose relays. With 12 Inputs and 8 relay or transistor Outputs, and expansion possibilities of up to 44 I/O on C1 and C2 models, the ZEN-20C offers extended flexibility, with features such as calendar and real time clock functionality.

- ZEN-20C1/C2 expandable up to 44 I/Os
- ZEN DC units have analogue input 0-10 VDC
- DC models have as well high speed counter 150 Hz
- Expansion available with relay output or transistor output

Ordering information

Name	Number of I/O points	Inputs (I)/ power supply	Outputs (O)	Type	LCD, buttons (B), calendar and clock	Analogue input/ comparators (A)	8-digit counter (F)/ comparators (G)	No. of bits 16	No. of bits 8	Size in mm (HxWxD)	Order code		
CPU units	20	12	100 to 240 VAC	8	Relays	LCD	yes	–	–	Work bits (M) Holding bits (H) Button input (B) Timers (T) Counters (C) Weekly timers (@) LCD display (D) Timer/counter comparator (P)	Holding timers (#) Button input (B)	90x122.5 x56	ZEN-20C1AR-A-V2
						LED	–	–	ZEN-20C2AR-A-V2				
						LCD	yes	yes / 4	yes / 4				ZEN-20C1DR-D-V2
						LED	–	yes / 4	yes / 4				ZEN-20C1DR-D-V2
	Expandable up to 44 I/O	12 to 24 VDC	Transistors	LCD	yes	yes / 4	yes / 4	ZEN-20C1DT-D-V2					
				LED	–	yes / 4	yes / 4	ZEN-20C2DT-D-V2					
				LCD	yes	–	yes / 4	ZEN-20C3AR-A-V2					
				LCD	yes	yes / 4	yes / 4	ZEN-20C3DR-D-V2					
Fixed I/O	100 to 240 VAC	Relays	LCD	yes	–	yes / 4	ZEN-20C1AR-A-V2						
			LCD	yes	yes / 4	yes / 4	ZEN-20C3DR-D-V2						
			LCD	yes	–	yes / 4	ZEN-20C1AR-A-V2						
			LCD	yes	yes / 4	yes / 4	ZEN-20C3DR-D-V2						
Fixed I/O	12 to 24 VDC	Relays	LCD	yes	–	yes / 4	ZEN-20C1AR-A-V2						
			LCD	yes	yes / 4	yes / 4	ZEN-20C3DR-D-V2						
			LCD	yes	–	yes / 4	ZEN-20C1AR-A-V2						
			LCD	yes	yes / 4	yes / 4	ZEN-20C3DR-D-V2						

Specifications

Item	Specifications	
	ZEN-20C_AR-A-V2	ZEN-20C_D_-D-V2
Power supply voltage	100 to 240 VAC, 50/60 Hz	12 to 24 VDC (DC ripple rate: 5%)
Rated power supply voltage	85 to 264 VAC	10.8 to 28.8 VDC
Power consumption	11 VA max.	5 W max.
Inrush current	4 A max.	30 A max.
Ambient temperature	0°C to 55°C (-25°C to 55°C for ZEN-20C2 models (LED))	
Ambient storage	-20°C to 55°C (-40°C to 75°C for ZEN-20C2 models (LED))	
Control method	Stored program control	
I/O control method	Cyclic scan	
Programming language	Ladder diagram	
Program capacity	96 lines (3 input conditions and 1 output per line)	
LCD display	12 characters x 4 lines, with backlight (LCD-type CPU unit only)	
Operation keys	8 (4 cursor keys and 4 operation keys) (LCD-type CPU unit only)	
Super-capacitor holding time	2 days min. (25°C)	
Battery life (ZEN-BAT01)	10 years min. (25°C)	
Calendar & Clock function	Accuracy: ± 15 s/month (at 25°C) if applicable	

Accessories

Name	Description	Order code
Memory Cassette	EEPROM (for data security and copying)	ZEN-ME01
Battery unit	Battery (keeps time, date and bit values for 10 years at 25°C)	ZEN-BAT01
Connecting Cable	For the programming software, RS-232C cable, 9-way 'D' connector for PC	ZEN-CIF01
USB-Serial conversion cable	USB-Serial conversion cable (to be used in combination with ZEN-CIF01)	CS1W-CIF31
ZEN support software	Runs on Windows ME, 2000, XP, NT4.0 Service Pack 3, Vista	ZEN-SOFT01-V4



ZEN Expansion units

To scale-up your ZEN application we provide three different expansion units in only 35 mm width ZEN housing. All expansion units have standard 4 inputs and 4 outputs. You can add maximum 3 expansion units to one CPU.

- 4 inputs, 100 to 240VAC or 12 to 24VDC
- 4 outputs, either relays or transistors (only DC models)
- DIN-rail mounting
- Size in mm (HxWxD): 90x35x56

Ordering information

Name	Number of I/O points	Inputs (X)/ power supply	Outputs (Y)	Size in mm (HxWxD)	Order code
Expansion I/O units	8	4 100 to 240 VAC 12 to 24 VDC	4 Relays	90x35x56	ZEN-8E1AR
			4 Transistors		ZEN-8E1DR
					ZEN-8E1DT

Specifications

Item	Specifications	
	ZEN-8E1AR	ZEN-8E1D_
Power supply voltage	100 to 240 VAC, 50/60 Hz	12 to 24 VDC (DC ripple rate: 5% max.)
Rated power supply voltage	85 to 264 VAC	10.8 to 28.8 VDC
Power consumption	4 VA max.	2 W max.
Inrush current	1.5 A max.	15 A max.
Ambient temperature	0°C to 55°C (-25°C to 55°C for ZEN-10C2 models (LED))	
Ambient storage	-20°C to 55°C (-40°C to 75°C for ZEN-10C2 models (LED))	



ZEN Power Supply

The ZEN Power Supply has the same compact housing as our 10 I/O CPU units. With a current/wattage output of 1.3 A/30 W it covers enough power to supply the DC ZEN itself and the eventually used sensors. If needed parallel operation is possible.

- Output voltage 24 VDC
- Output current 1.3 A
- Capacity 30 W
- Allows parallel operation
- Size in mm (HxWxD): 90x70x56

Ordering information

Power rating	Inputs voltage	Output current	Order code
30 W	100 to 240 VAC	1.3 A	ZEN-PA03024

Specifications

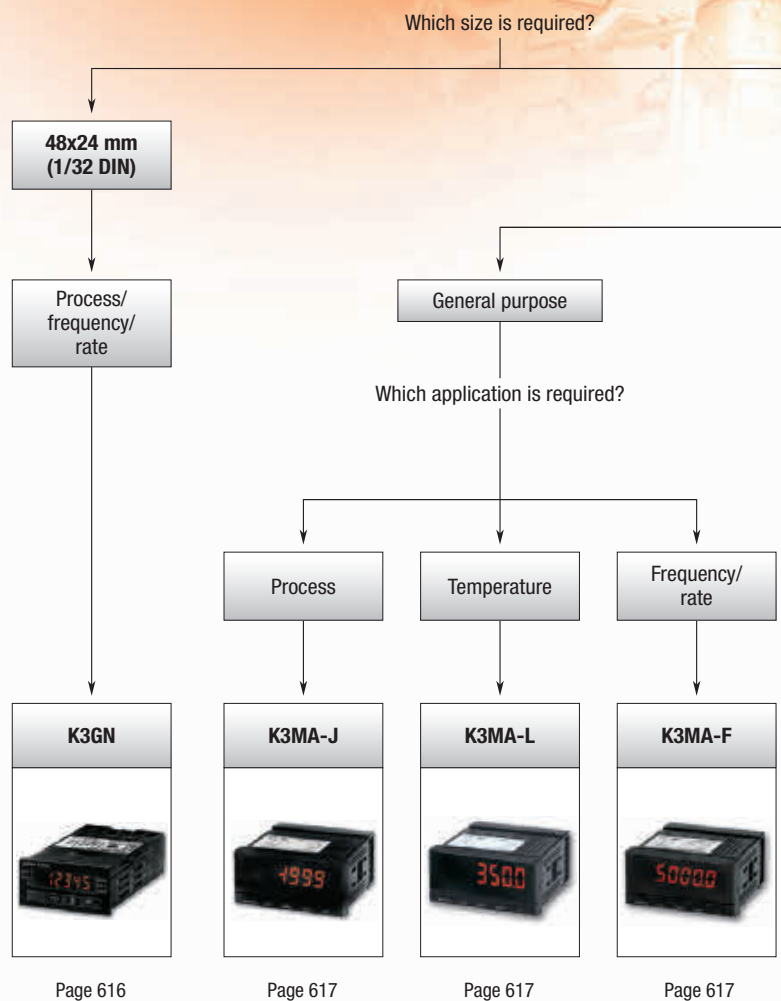
Item	Specifications	
Power rating	30 W	
Efficiency	80% min. (24 V)	
Input voltage	100 to 240 VAC (85 to 264 VAC), single-phase	
Output voltage	Voltage adjustment	±10% to ±15% (with V. ADJ) min. of rate output voltage
	Ripple	2% (p-p) max. (-25°C to -10°C: 4% max.)
	Input variation	0.5% max.
	Temperature	0.05% / °C max.
Overload protection	105% to 135% of rated load current, inverted L drop, intermittent	
Overvoltage protection	yes	
Input Current	100 V	0.8 A max.
	200 V	0.45 A max.
Output indicator	yes (green)	
Weight	240 g max.	
Operating temperature	-10°C to 60°C	
Parallel operation	yes (2 units max.)	

LOOKING FOR PERFECT MEASURING & READ-OUT?

K3HB-V – For perfect weighing

With our K3HB series we cover a wide range of applications. One of them is the weighing indicator which performs perfect measurement in any weighing application. The instrument can be equipped with a load-cell power supply of 10V/100 mA. Several option boards for communication, contact output boards or event inputs are also available. On top of these you can get direct DeviceNet communication.

- High speed sampling 20 ms
- Equipped with position meter
- Two colour display for easy recognition

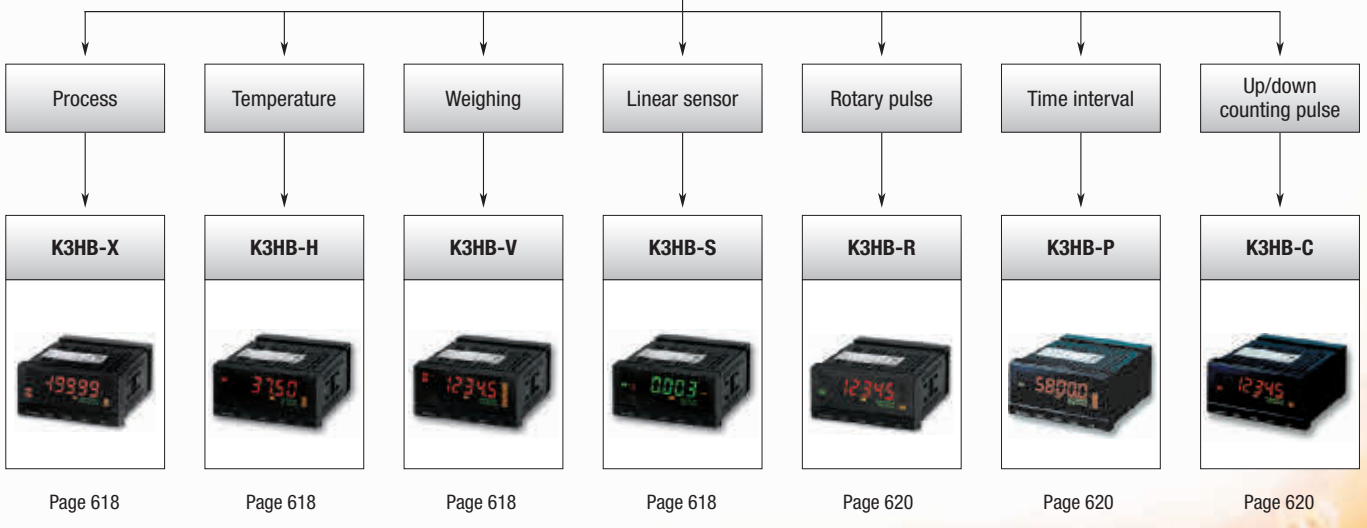









96x48 mm
(1/8 DIN)

Advanced

Which application is required?



Selection table

Category		Multifunctional digital panel indicator	Process indicator	Temperature indicator	Frequency/rate indicator	Process indicator
Selection criteria						
	Model	K3GN	K3MA-J	K3MA-L	K3MA-F	K3HB-X
	Size	1/32 DIN	1/8 DIN			
Features	Colour change display	■	■	■	■	■
	Number of digits	5	5	4	5	5
	Leading zero suppression	■	■	■	■	■
	Forced zero function	■	■	■	■	■
	Min./max. hold function	■	■	■	■	■
	Average processing	■	■	■	■	■
	User selectable inputs	■	■	■	■	■
	Start-up compensating time	■	–	–	■	–
	Key protection	■	■	■	■	■
	Decimal point position setting	■	■	■	■	■
	Accuracy	±0.1% of full scale	±0.1% of full scale	±0.1% of full scale	±0.1% of full scale	±0.1% of full scale (DC voltage & DC current), ±0.5% of full scale (AC voltage & AC current)
	Input range	0 to 20 mA, 4 to 20 mA or 0 to 5 V, 1 to 5 V, -5 to 5 V, -10 to 10 V or 0 to 30 Hz or 0 to 5 kHz	0 to 20 mA, 4 to 20 mA or 0 to 5 V, 1 to 5 V, -5 to 5 V, -10 to 10 V	Pt100, JPt100 or thermocouple K, J, T, E, L, U, N, R, S, B	0 to 30 Hz or 0 to 5 kHz	0.000 to 10.000 A, 0.0000 to 199.99 mA, -199.99 to 199.99 mA, 4.000 to 20.000 mA, 0.0 to 400.0 V, 0.0000 to 1.999 V, -199.99 to 199.99 V, 1.0000 to 5.0000 V
	Sample rate	250 ms	250 ms	500 ms	–	20 ms
Features	Remote/local processing, parameter initialisation, programmable output configuration, process value hold	Teaching, comparative output pattern selection, parameter initialisation, programmable output configuration, process value hold	Programmable output configuration, process value hold	Teaching, comparative output pattern selection, programmable output configuration, process value hold	Scaling, teaching, averaging, output hysteresis, output OFF-delay, output test, bank selection, reset, comparative output	
Sensor power supply	–	–	–	■	□	
Front protection	IP rating	IP66	IP66	IP66	IP66	IP66
	Supply voltage	24 VDC	24 VAC/VDC or 100 to 240 VAC	24 VAC/VDC or 100 to 240 VAC	24 VAC/VDC or 100 to 240 VAC	100 to 240 VAC or 24 VAC/VDC
Inputs	NPN	■	–	■	■	□
	PNP	■	–	■	■	□
	Temperature	–	–	–	–	–
	Contact	–	–	–	■	–
	Voltage pulse	–	–	–	■	–
	Load cell	–	–	–	–	–
	DC voltage	■	■	■	–	□
	DC current	■	■	–	–	□
Outputs	AC voltage	–	–	–	–	□
	AC current	–	–	–	–	□
	Relay	■	■	■	■	□
	NPN	■	–	–	–	□
	PNP	■	–	–	–	□
	Linear	–	–	–	–	□
BCD	–	–	–	–	–	
Comms	■	–	–	–	□	
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Temperature indicator	Weighing indicator	Linear sensor indicator	Up/down counting pulse indicator	Time interval indicator	Rotary pulse indicator
K3HB-H	K3HB-V	K3HB-S	K3HB-C	K3HB-P	K3HB-R
1/8 DIN				-	-
■	■	■	■	■	■
5	5	5	5	5	5
■	■	■	■	■	■
■	■	■	■	■	■
■	■	■	■	■	■
■	■	■	■	■	■
■	■	■	■	■	■
-	-	-	-	-	■
■	■	■	■	■	■
■	■	■	■	■	■
Thermocouple: ±0.3% of full scale, Pt-100: ±0.2% of full scale	±0.1% of full scale	One input: ±0.1% of full scale, two inputs: ±0.2% of full scale		±0.08% rgd ±1 digit	±0.006% rgd ±1 digit ±0.02% rgd ±1 digit
Pt100, thermocouple K, J, T, E, L, U, N, R, S, B, W	0.00 to 199.99 mV, 0.000 to 19.999 mV, 100.00 mV, 199.99 mV	0 to 20 mA, 4 to 20 mA, 0 to 5 V, -5 to 5 V, -10 to 10 V	No voltage contact: 30 Hz, voltage pulse: 50 kHz, open collector: 50 kHz	No voltage contact: 30 Hz, voltage pulse: 50 kHz, open collector: 50 kHz	No voltage contact: 30 Hz, voltage pulse: 50 kHz, open collector: 50 kHz
20 ms	20 ms	0.5 ms	-	-	-
Scaling, teaching, averaging, output hysteresis, output OFF-delay, output test, bank selection, reset, comparative output	Scaling, teaching, averaging, output hysteresis, output OFF-delay, output test, bank selection, reset, comparative output	Scaling, 2-input calculation, teaching, averaging, output hysteresis, output OFF-delay, output test, bank selection, reset, comparative output	Scaling, measurement operation selection, output hysteresis, output OFF-delay, output test, display value selection, display colour selection, key protection, bank selection, display refresh period, maximum/minimum hold, reset	Scaling, measurement operation selection, output hysteresis, output OFF-delay, output test, teaching, display value selection, display colour selection, key protection, bank selection, display refresh period, maximum/minimum hold, reset	Scaling, measurement operation selection, averaging, previous average value comparison, output hysteresis, output OFF-delay, output test, teaching, display value selection, display colour selection, key protection, bank selection, display refresh period, maximum /minimum hold, reset
□	□	□	□	□	□
IP66	IP66	IP66	IP66	IP66	IP66
100 to 240 VAC or 24 VAC/VDC	100 to 240 VAC or 24 VAC/VDC	100 to 240 VAC or 24 VAC/VDC	100 to 240 VAC or 24 VAC/VDC	100 to 240 VAC or 24 VAC/VDC	100 to 240 VAC or 24 VAC/VDC
□	□	□	■	■	■
□	□	□	■	■	■
■	-	-	-	-	-
-	-	-	-	-	-
-	-	-	■	■	■
-	■	-	-	-	-
-	-	■	-	-	-
-	-	■	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
□	□	□	□	□	□
□	□	□	□	□	□
□	□	□	□	□	□
□	□	□	□	□	□
-	-	-	□	□	□
□	□	□	□	□	□
618			620		

■ Standard □ Available - No/not available



Compact and intelligent digital panel meter

The K3GN is able to cover a wide variety of applications with its 3 main functions: process meter, RPM processor/tachometer and digital data display for PC/PLC. Configuration is easy and the design is advanced and compact.

- Process indicator DC voltage/current
- RPM process/tachometer
- Digital data display for PC/PLC
- Very compact 1/32 DIN housing: Size in mm (HxWxD): 24x48x83mm
- 5-digit display with programmable display colour, in red or green

Ordering information

Input type	Supply voltage	Output	Order code	
			No communications	RS-485
DC voltage/current, NPN	24 VDC	Dual relays (SPST-NO)	K3GN-NDC 24 DC	K3GN-NDC-FLK 24 DC
		Three NPN open collector	K3GN-NDT1 24 DC	K3GN-NDT1-FLK 24 DC
DC voltage/current, PNP		Dual relays (SPST-NO)	K3GN-PDC 24 DC	K3GN-PDC-FLK 24 DC
		Three PNP open collector	K3GN-PDT2 24 DC	K3GN-PDT2-FLK 24 DC

Specifications

Supply voltage	24 VDC
Operating voltage range	85 to 110% of the rated supply voltage
Power consumption	2.5 W max. (at max. DC load with all indicators lit)
Ambient temperature	Operating: -10 to 55°C (with no condensation or icing) Storage: -25 to 65°C (with no condensation or icing)
Display refresh period	Sampling period (sampling times multiplied by number of averaging times if average processing is selected)
Max. displayed digits	5 digits (-19999 to 99999)
Display	7-segment digital display, character height: 7.0 mm
Polarity display	"-" is displayed automatically with a negative input signal
Zero display	Leading zeros are not displayed
Scaling function	Programmable with front-panel key inputs (range of display: -19999 to 99999). The decimal point position can be set as desired.
External controls	HOLD: (measurement value held) ZERO: (forced-zero)
Hysteresis setting	Programmable with front-panel key inputs (0001 to 9999)
Other functions	Programmable colour display Selectable output operating action Teaching set values Average processing (simple average) Lockout configuration Communications writing control (communications output models only)
Output	Relays: 2 SPST-NO Transistors: 3 NPN open collector 3 PNP open collector Combinations: Communications output (RS-485) + relay outputs Communications output (RS-485) + transistor outputs Communications output (RS-485) + transistor outputs (3 PNP open collector)
Communications	Communications function: RS-485
Delay in comparative outputs (transistor outputs)	750 ms max.
Degree of protection	Front-panel: NEMA4X for indoor use (equivalent to IP66) Rear case: IEC standard IP20 Terminals: IEC standard IP20
Memory protection	Non-volatile memory (EEPROM) (possible to rewrite 100,000 times)
Size in mm (HxWxD)	24x48x80



Highly visible LCD display with 2 colour (red and green) LEDs

The K3MA series comes with a process meter, a frequency/rate meter and a temperature meter of either 100 to 240 VAC or 24 VAC/VDC. All are equipped with the same quality display and have the same short depth of 80 mm.

- 1/8 DIN size housing
- Highly visible, negative transmissive backlit LCD display
- 14.2 mm high characters
- 5 digits (-19,999 to 99,999), K3MA-L: 4 digits
- Front-panel IP66

Ordering information

Indicator	Supply voltage	Input type & ranges	Output	Order code
Process meter	100 to 240 VAC	DC voltage: 0 to 5 V, 1 to 5 V, -5 to 5 V, -10 to 10 V	2 relay contact outputs (SPST-NO)	K3MA-J-A2 100-240VAC
	24 VAC/VDC	DC current: 0 to 20 mA, 4 to 20 mA	2 relay contact outputs (SPST-NO)	K3MA-J-A2 24VAC/VDC
Temperature meter	100 to 240 VAC	Platinum-resistance thermometer: Pt100, JPt100 or thermocouple K, J, T, E, L, U, N, R, S, B	1 relay contact output (SPDT)	K3MA-L-C 100-240VAC
	24 VAC/VDC		1 relay contact output (SPDT)	K3MA-L-C 24VAC/VDC
Frequency/rate meter	100 to 240 VAC	Rotary pulse: No voltage: 0.05 to 30.00 Hz; open collector: 0.1 to 5000.0 Hz	2 relay contact outputs (SPST-NO)	K3MA-F-A2 100-240VAC
	24 VAC/VDC		2 relay contact outputs (SPST-NO)	K3MA-F-A2 24VAC/VDC

Accessories

Type	Order code
Splash-proof soft cover	K32-49SC
Hard cover	K32-49HC

Specifications

Item	100-240 VAC models	24 VAC/VDC models
Supply voltage	100 to 240 VAC	24 VAC (50/60 Hz), 24 VDC
Operating voltage range	85 to 110% of the rated supply voltage	
Power consumption (under maximum load)	6 VA max.	4.5 VA max. (24 VAC) 4.5 W max. (24 VDC)
Ambient temperature	Operating: -10 to 55°C (with no condensation or icing) Storage: -25 to 65°C (with no condensation or icing)	
Weight	Approx. 200 g	
Display	7-segment digital display, character height: 14.2 mm	
Polarity display	"-" is displayed automatically with a negative input signal	
Zero display	Leading zeros are not displayed	
Hold function	Max. hold (maximum value), min. hold (minimum value)	
Hysteresis setting	Programmable with front-panel key inputs (0001 to 9,999)	
Delay in comparative outputs	1 s max.	
Degree of protection	Front-panel: NEMA4X for indoor use (equivalent to IP66) Rear case: IEC standard IP20 Terminals: IEC standard IP00 + finger protection (VDE 0106/100)	
Memory protection	Non-volatile memory (EEPROM) (possible to rewrite 100,000 times)	
Size in mm (HxWxD)	48x96x80	



Process, temperature, weighing and linear sensor indicators

These indicators with analogue input feature a clear and easy-to-use colour change display. All models are equipped with an IP66 housing. K3HB series is high speed, with a sample rate of 50 Hz, and even 2,000 Hz for K3HB-S

- Position meter indication for easy monitoring
- Optional DeviceNet, RS-232C, RS-485
- Double display, with 5 digits, in two colours
- 1/8 DIN size housing

Ordering information

Type of indicator	Input sensor type and range	Supply voltage	Order code
Process indicator K3HB-X	AC current input, from 0.000 to 10.000 A, 0.0000 to 19.999 mA	100 to 240 VAC	K3HB-XAA 100-240VAC
		24 VAC/VDC	K3HB-XAA 24VAC/VDC
	DC current input, from ±199.99 mA, to 4.000 to 20.000 mA	100 to 240 VAC	K3HB-XAD 100-240VAC
		24 VAC/VDC	K3HB-XAD 24VAC/VDC
	AC voltage input, from 0.0 to 400.0 V to 0.0000 to 1.999 V	100 to 240 VAC	K3HB-XVA 100-240VAC
		24 VAC/VDC	K3HB-XVA 24VAC/VDC
	DC voltage input, from ±199.99 V to 1.0000 to 5.0000 V	100 to 240 VAC	K3HB-XVD 100-240VAC
		24 VAC/VDC	K3HB-XVD 24VAC/VDC
Temperature indicator K3HB-H	Temperature input Pt100, thermocouple K, J, T, E, L, U, N, R, S, B, W	100 to 240 VAC	K3HB-HTA 100-240VAC
		24 VAC/VDC	K3HB-HTA 24VAC/VDC
Weighing indicator K3HB-V	Load cell input (DC low voltage input), 0.00 to 199.99 mV, 0.000 to 19.999 mV, 100.00 mV, 199.999 mV	100 to 240 VAC	K3HB-VLC 100-240 VAC
		24 VAC/VDC	K3HB-VLC 24VAC/VDC
Linear sensor indicator K3HB-S	DC process input, 0 to 5 V, 1 to 5 V, -5 to 5 V, -10 to 10 V, 0 to 20 mA, 4 to 20 mA	24 VAC/VDC	K3HB-SSD AC/DC24
		100 to 240 VAC	K3HB-SSD AC100-240

Option boards

Sensor power supply/output boards

Slot	Output	Sensor power supply	Communications	Applicable indicator types	Order code				
B	Relay	PASS: SPDT	12 VDC ±10%, 80 mA	–	K3HB-X, -H, -S	K33-CPA ^{*1}			
		Linear current		DC0(4) - 20 mA	–	K3HB-X, -H, -S	K33-L1 A ^{*2}		
				Linear voltage	DC0(1) - 5 V, 0 to 10 V	–	K3HB-X, -H, -S	K33-L2A ^{*2}	
	–				–	–	K3HB-X, -H, -S	K33-A ^{*2}	
	–	–		–	RS-232C	K3HB-X, -H, -S	K33-FLK1 A ^{*2}		
	–	–		–	RS-485	K3HB-X, -H, -S	K33-FLK3A ^{*2}		
	Relay	PASS: SPDT		10 VDC ±5%, 100 mA	–	K3HB-V	K33-CPB ^{*1}		
		Linear current			DC0(4) - 20 mA	–	K3HB-V	K33-L1B ^{*2}	
					Linear voltage	DC0(1) - 5 V, 0 to 10 V	–	K3HB-V	K33-L2B ^{*2}
		–				–	–	K3HB-V	K33-B ^{*2}
		–			–	–	RS-232C	K3HB-V	K33-FLK1B ^{*2}
		–			–	–	RS-485	K3HB-V	K33-FLK3B ^{*2}

Relay/transistor output boards

Slot	Output	Communications	Order code	
C	Relay	H/L: SPDT each	–	K34-C1
		HH/H/LL/L: SPST-NO each	–	K34-C2
	Transistor	NPN open collector: HH/H/PASS/L/LL	–	K34-T1
		PNP open collector: HH/H/PASS/L/LL	–	K34-T2
	–	–	DeviceNet	K34-DRT ^{*2}

Event input boards

Slot	Input type	Number of points	Communications	Order code
D	NPN open collector	5	M3 terminal blocks	K35-1
		8	10-pin MIL connector	K35-2
	PNP open collector	5	M3 terminal blocks	K35-3
		8	10-pin MIL connector	K35-4

^{*1} CPA/CPB can be combined with relay outputs only.

^{*2} Only one of the following can be used by each digital indicator: RS-232C/RS-485 communications, a linear output, or DeviceNet communications. K3HB has got three slots for option boards: Slot B, slot C and slot D.

Accessories

Type	Order code
Special cable (for event inputs with 8-pin connector)	K32-DICN

Specifications

Power supply voltage		100 to 240 VAC (50/60 Hz), 24 VAC/VDC, DeviceNet power supply: 24 VDC		
Allowable power supply voltage range		85 to 110% of the rated power supply voltage, DeviceNet power supply: 11 to 25 VDC		
Power consumption		100 to 240 V: 18 VA max. (max. load), 24 VAC/DC: 11 VA/7 W max. (max. load)		
Display method		Negative LCD (backlit LED) display 7-segment digital display (character height: PV: 14.2 mm (green/red); SV: 4.9 mm (green))		
Ambient operating temperature		-10 to 55°C (with no icing or condensation)		
Display range		-19,999 to 99,999		
Weight		Approx. 300 g (base unit only)		
Degree of protection	Front-panel	Conforms to NEMA 4X for indoor use (equivalent to IP66)		
	Rear case	IP20		
	Terminals	IP00 + finger protection (VDE0106/100)		
Memory protection		EEPROM (non-volatile memory), number of rewrites: 100,000		
Event input ratings	Contact	ON: 1 kΩ max., OFF: 100 kΩ min.		
	No-contact	ON residual voltage: 2 V max., OFF leakage current: 0.1 mA max., load current: 4 mA max. Maximum applied voltage: 30 VDC max.		
Output ratings	Transistor output	Maximum load voltage	24 VDC	
		Maximum load current	50 mA	
		Leakage current	100 μA max.	
	Contact output (resistive load)	Rated load	5 A at 250 VAC, 5 A at 30 VDC	
		Rated through current	5 A	
		Mechanical life expectancy	5,000,000 operations	
		Electrical life expectancy	100,000 operations	
	Linear output	Allowable load impedance	500 Ω max. (mA); 5 kΩ min. (V)	
		Resolution	Approx. 10,000	
Output error		±0.5% FS		
Size in mm (HxWxD)		48x96x100		



Rotary pulse, timer interval and up/down counting pulse indicators

These indicators with analogue input feature a clear and easy-to-use colour change display. All models are equipped with an IP66 housing. K3HB-R and -C are high-speed, with a sample rate up to 50 kHz.

- Position meter indication for easy monitoring
- Optional DeviceNet, RS-232C, RS-485
- Double display, with 5 digits, in two colours
- 1/8 DIN size housing

Ordering information

Type of indicator	Input ranges	Supply voltage	Input sensor	Order code
Rotary pulse indicator K3HB-R	No voltage contact: 30 Hz max. Voltage pulse: 50 kHz max. Open collector: 50 kHz max.	100 to 240 VAC	NPN input/voltage pulse	K3HB-RNB 100-240VAC
		24 VAC/VDC		K3HB-RNB 24VAC/VDC
		100 to 240 VAC	PNP input	K3HB-RPB 100-240VAC
		24 VAC/VDC		K3HB-RPB 24VAC/VDC
Timer interval indicator K3HB-P		100 to 240 VAC	NPN	K3HB-PNB 100-240VAC
		24 VAC/VDC	PNP	K3HB-PPB 100-240VAC
Up/down counting pulse indicator K3HB-C		100 to 240 VAC	NPN	K3HB-CNB 100-240VAC
		24 VAC/VDC	PNP	K3HB-CPB 24VAC/VDC

Option boards

Sensor power supply/output boards

Slot	Output	Sensor power supply	Communications	Order code	
B	Relay	PASS: SPDT	12 VDC ±10%, 80 mA	K33-CPA ^{*1}	
	Linear current	DC0(4) - 20 mA		K33-L1 A ^{*2}	
	Linear voltage	DC0(1) - 5 V, 0 to 10 V		K33-L2A ^{*2}	
	-	-		K33-A ^{*2}	
	-	-		RS-232C	K33-FLK1 A ^{*2}
	-	-		RS-485	K33-FLK3A ^{*2}

Relay/transistor output boards

Slot	Output	Communications	Order code	
C	Relay	H/L: SPDT each	K34-C1	
		HH/H/LL/L: SPST-NO each	K34-C2	
	Transistor	NPN open collector: HH/H/PASS/L/LL	K34-T1	
		PNP open collector: HH/H/PASS/L/LL	K34-T2	
	-	-	DeviceNet	K34-DRT ^{*2}
	BCD + transistor	NPN open collector: HH/H/PASS/L/LL	-	K34-BCD

Event input boards

Slot	Input type	Number of points	Communications	Order code
D	NPN open collector	5	M3 terminal blocks	K35-1
		8	10-pin MIL connector	K35-2
	PNP open collector	5	M3 terminal blocks	K35-3
		8	10-pin MIL connector	K35-4

^{*1} CPA can be combined with relay outputs only.

^{*2} Only one of the following can be used by each digital indicator: RS-232C/RS-485 communications, a linear output, or DeviceNet communications.
K3HB has got three slots for option boards: Slot B, slot C and slot D.

Accessories

Type	Order code
Special cable (for event inputs with 8-pin connector)	K32-DICN
Special BCD output cable	K32-BCD

Specifications

Power supply voltage		100 to 240 VAC (50/60 Hz), 24 VAC/VDC, DeviceNet power supply: 24 VDC		
Allowable power supply voltage range		85 to 110% of the rated power supply voltage, DeviceNet power supply: 11 to 25 VDC		
Power consumption		100 to 240 V: 18 VA max. (max. load), 24 VAC/DC: 11 VA/7 W max. (max. load)		
Display method		Negative LCD (backlit LED) display 7-segment digital display (character height: PV: 14.2 mm (green/red); SV: 4.9 mm (green))		
Ambient operating temperature		-10 to 55°C (with no icing or condensation)		
Display range		-19,999 to 99,999		
Weight		Approx. 300 g (base unit only)		
Degree of protection	Front-panel	Conforms to NEMA 4X for indoor use (equivalent to IP66)		
	Rear case	IP20		
	Terminals	IP00 + finger protection (VDE0106/100)		
Memory protection		EEPROM (non-volatile memory), number of rewrites: 100,000		
Event input ratings	Contact	ON: 1 kΩ max., OFF: 100 kΩ min.		
	No-contact	ON residual voltage: 2 V max., OFF leakage current: 0.1 mA max., load current: 4 mA max. Maximum applied voltage: 30 VDC max.		
Output ratings	Transistor output	Maximum load voltage	24 VDC	
		Maximum load current	50 mA	
		Leakage current	100 μA max.	
	Contact output (resistive load)	Rated load	5 A at 250 VAC, 5 A at 30 VDC	
		Rated through current	5 A	
		Mechanical life expectancy	5,000,000 operations	
		Electrical life expectancy	100,000 operations	
	Linear output	Allowable load impedance	500 Ω max. (mA); 5 kΩ min. (V)	
		Resolution	Approx. 10,000	
Output error		±0.5% FS		
Size in mm (HxWxD)		48x96x100		

WHEN RELIABLE SWITCHING MATTERS

The switching solution for all your applications!

Wherever mechanical, operator or electrical driven switching needs to be performed we offer a wide range of solutions. For example: for high frequency switching applications the best solution is with our solid state relays. Furthermore, we offer monitoring relays, which on threshold conditions, take the proper switching action.

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NON-BENDABLE!

G2RV-SL500 – Reduce wiring time by using push-in technology and cross bars

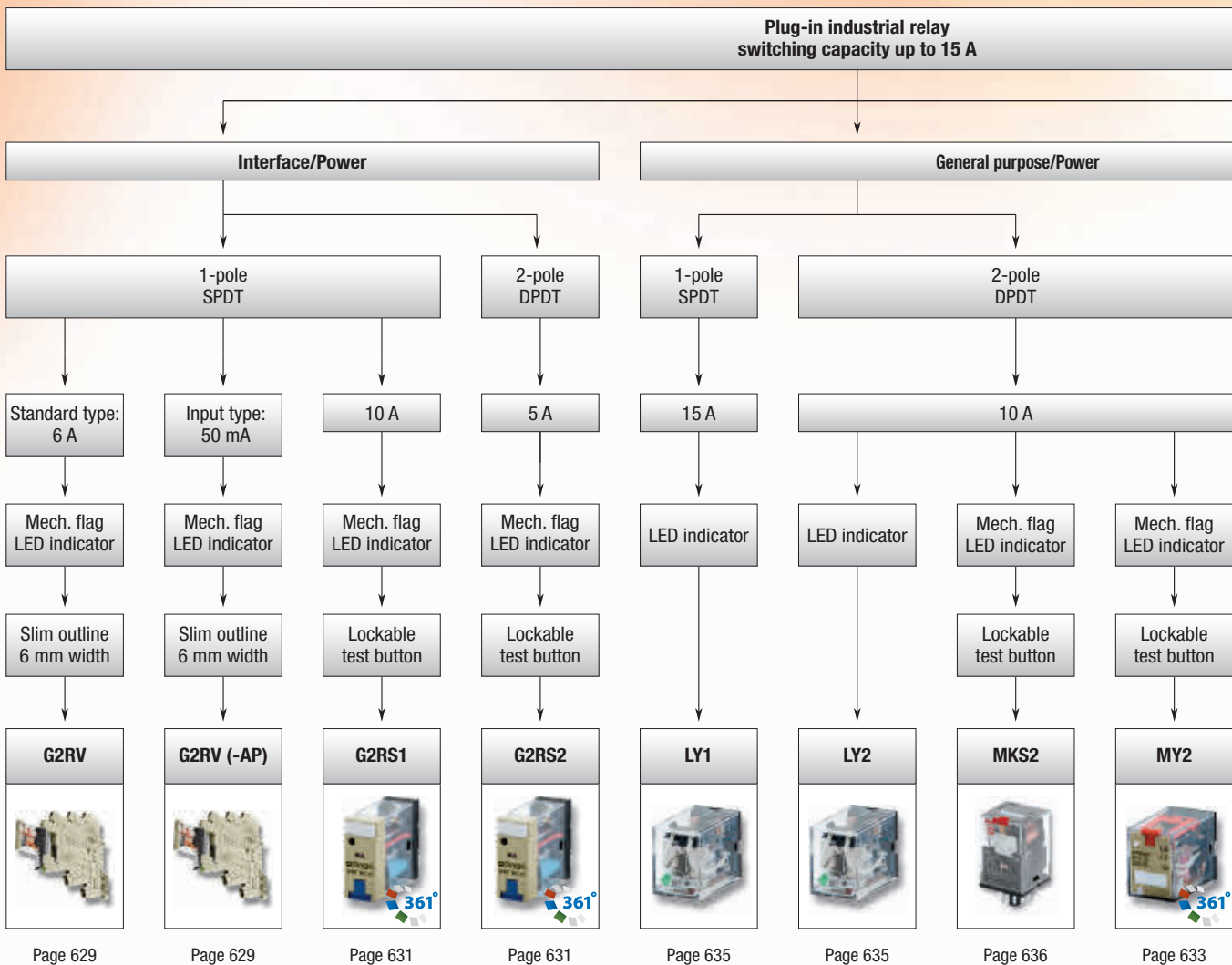
With the G2RV-SL500 series only 2 steps are required to achieve a reliable connection between wire and terminal. Just remove the isolation and push in the wire. Cross bars make your life even easier, as they can be tailored by breaking pins away to meet your configuration requirements.

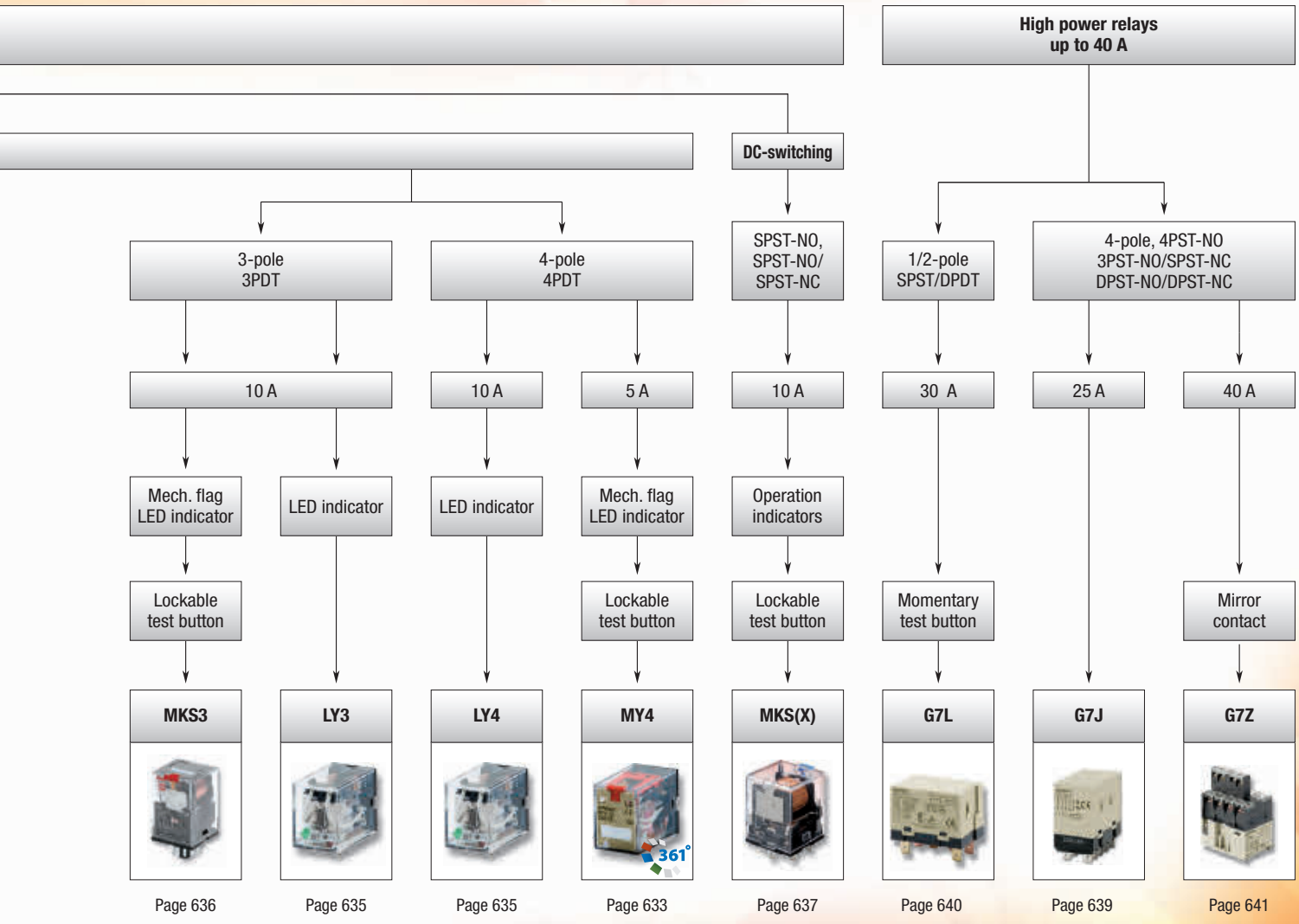
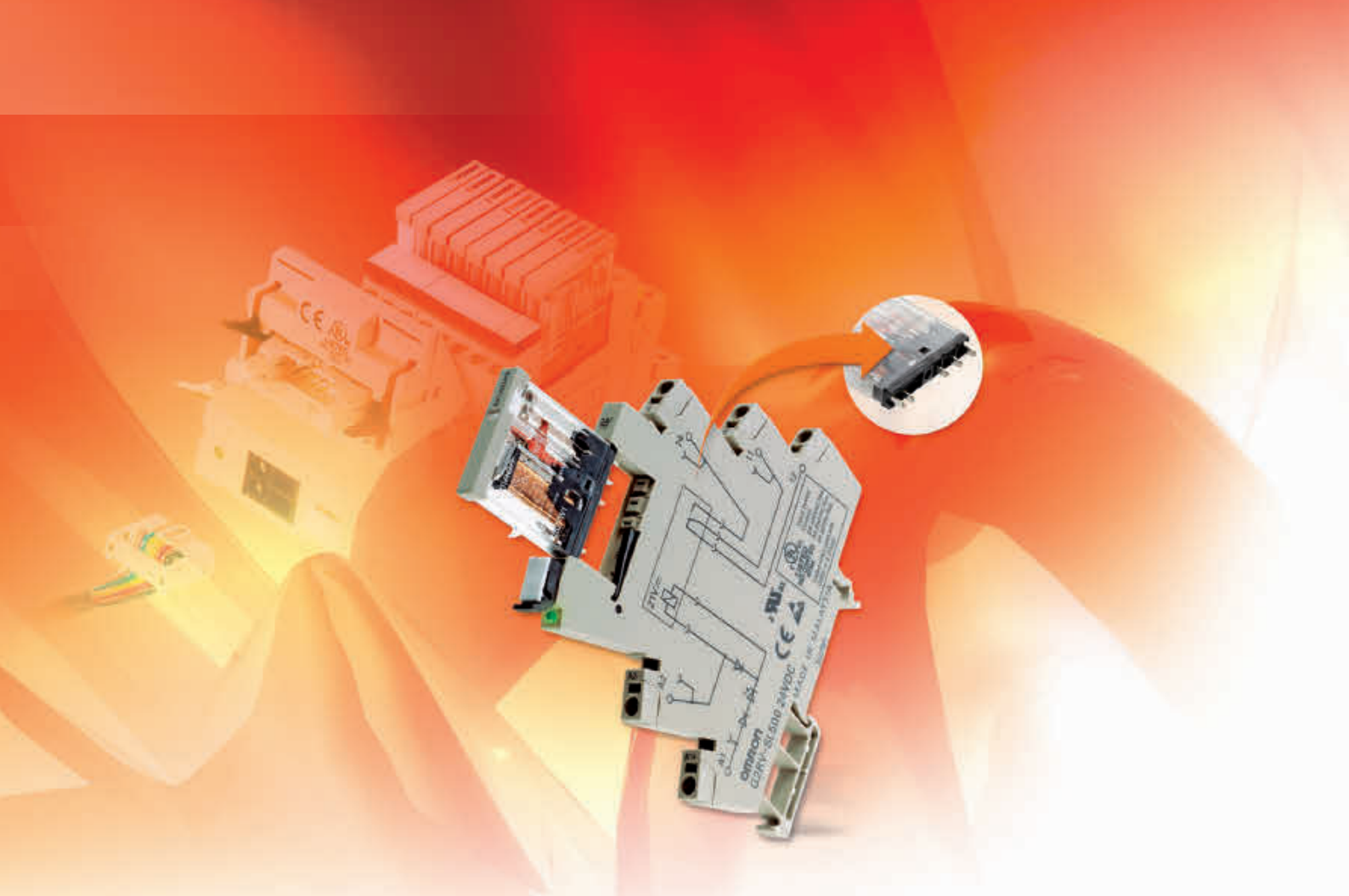
- No tools required
- Fits stranded wires (with ferrules) 0.5 - 2.5 mm²
- Fits solid wires 0.5 - 4.0 mm²






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Selection table

Category		Interface/Power				General purpose/Power		
Selection criteria								
	Family	G2RV		G2R--S		MY		
	1-pole	■	■	■	–	–	–	
	2-pole	–	–	–	■	–	–	
	3-pole	–	–	–	–	–	–	
	4-pole	–	–	–	–	■	■	
	Contact configuration	SPDT	SPDT	SPDT	DPDT	DPDT	4PDT	4PDT bifurcated
	Contact material	AgSnIn	AgSnIn + gold plating	AgSnIn	AgSnIn	Ag	AgNi + Au	AgNi + Au
	Max. switching current	6 A	50 mA	10 A	5 A	10 A	5 A	5 A
	Min. switching current	10 mA at 5 VDC	1 mA at 100 mVDC	100 mA at 5 VDC	10 mA at 5 VDC	1 mA at 5 VDC	1 mA at 1 VDC	0.1 mA at 1 VDC
	Gold clad/plate	–	■	□	□	–	■	■
Width max. (Relay only)	5.2 mm	5.2 mm	13.0 mm	13.0 mm	21.5 mm	21.5 mm	21.5 mm	
Features	LED indication	■	■	□	□	□	□	
	Mechanical flag	■	■	■	■	■	■	
	Momentary testbutton	–	–	–	–	–	–	
	Momentary/Lockable testbutton	–	–	□	□	□	□	
	Label	□	□	□	□	□	□	
	Diode (DC coil)	■	■	□	□	□	□	
	Varistor (AC coil)	–	–	–	–	–	–	
	CR network (AC coil)	■	■	–	–	□	□	
Wiring to socket	Screw (plate clamp)	–	–	□	□	□	□	
	Screw (box clamp)	□	□	□	□	□	□	
	Screw-less clamp	□	□	□	□	□	□	
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Category		High power relays								
Selection criteria										
	Family	G7J			G7L		G7Z			
	1-pole	–	–	–	–	■	–	–	–	
	2-pole	–	–	–	–	■	–	–	–	
	3-pole	–	–	–	–	–	–	–	–	
	4-pole	■	■	■	■	–	–	■	■	
	Contact configuration	4PST-NO	4PST-NO	3PST-NO/SPST-NC	DPST-NO/DPST-NC	SPST-NO	DPST-NO	4PST-NO	3PST-NO/SPST-NC	DPST-NO/DPST-NC
	Max. switching current	25 A	25 A	25 A	25 A	30 A	25 A	40 A	40 A	40 A
	Min. permissible load	100 mA at 24 VDC	100 mA at 24 VDC	100 mA at 24 VDC	100 mA at 24 VDC	100 mA at 5 VDC	100 mA at 5 VDC	2 A at 24 VDC	2 A at 24 VDC	2 A at 24 VDC
	Auxiliary contact block mirror contact	–	–	–	–	–	–	■	■	■
	Momentary testbutton	–	–	–	–	□	□	–	–	–
Relay terminals	Screw	□	□	□	□	□	□	□	□	
	Quick-connect	□	□	□	□	□	–	–	–	
	PCB terminals	□	□	□	□	□	–	–	–	
	Screw	–	–	–	–	–	□	□	□	
Mounting	DIN rail	–	–	–	–	–	□	□	□	
	Clip (screw)	□	□	□	□	□	–	–	–	
	Flange (screw)	□	□	□	□	□	–	–	–	
	DIN rail (adapter)	–	–	–	–	□	–	–	–	
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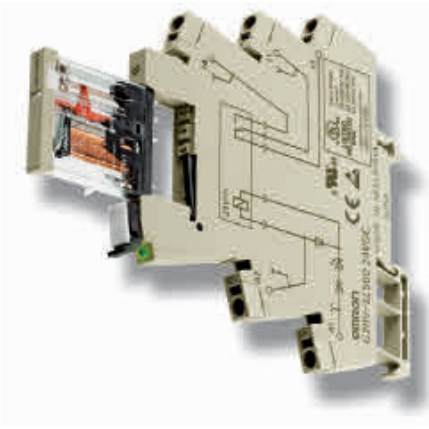
Category		General purpose/Power								
Selection criteria										
	Family	LY				MKS		MKS(X)		
	1-pole	■	-	-	-	-	-	■	-	
	2-pole	-	■	-	-	-	■	-	■	
	3-pole	-	-	-	■	-	-	■	-	
	4-pole	-	-	-	-	■	-	-	-	
	Contact configuration	SPDT	DPDT	DPDT bifurcated	3PDT	4PDT	DPDT	3PDT	SPST-NO	SPST-NO/SPST-NC
	Contact material	AgSnIn	AgSnIn	AgSnIn	AgSnIn	AgSnIn	AgSnIn	AgSnIn	AgSnIn	AgSnIn
	Max. switching current	15 A	10 A	7 A	10 A	10 A	10 A	10 A	10 A, 220 VDC; 15 A, 250 VAC	5 A, 220 VDC; 15 A, 250 VAC
	Min. switching current	100 mA at 5 VDC	100 mA at 5 VDC	10 mA at 5 VDC	100 mA at 5 VDC	100 mA at 5 VDC	10 mA at 1 VDC	10 mA at 1 VDC	10 mA at 24 VDC	10 mA at 24 VDC
	Gold clad/plate	-	□	■	-	-	-	-	-	-
	Width max. (Relay only)	21.5 mm	21.5 mm	21.5 mm	31.5 mm	41.5 mm	34.5 mm	34.5 mm	34.5 mm	34.5 mm
Features	LED indication	□	□	□	□	□	□	□	□	
	Mechanical flag	-	-	-	-	-	■	■	-	
	Momentary testbutton	-	-	-	-	-	-	-	-	
	Momentary/Lockable testbutton	-	-	-	-	-	□	□	□	
	Label	-	-	-	-	-	□	□	-	
	Diode (DC coil)	□	□	□	□	□	□	□	Optional for socket	Optional for socket
	Varistor (AC coil)	-	-	-	-	-	□	□	-	
CR network (AC coil)	-	□	□	-	-	-	-	-		
Wiring to socket	Screw (plate clamp)	□	□	□	□	□	□	□	□	
	Screw (box clamp)	-	-	-	-	-	□	□	-	
	Screw-less clamp	-	-	-	-	-	-	-	-	
	Page	635					636		637	

■ Standard

□ Available

- No/not available





Non-bendable! Unique 6 mm relay with strong mechanical pins

Drawing on years of experience, G2RV industrial slim relays have been added to the product portfolio. With a width of 6 mm, they offer significant space saving without compromising relay reliability or features. Push-in terminals and a full range of accessories are available for simplifying wiring and saving time

- Large plug-in pins – excellent connection
- LED/mechanical flag – check operation
- Transparent housing – check condition
- Slim outline – space saving
- Push-in/accessories – simple wiring
- Special input type with gold plated contacts
- G3RV compatible

Ordering information

Relay	Input voltage	Order code	
		Screw terminals	Push-in terminals
Standard type	12 VDC	G2RV-SL700-12 VDC	G2RV-SL500-12 VDC
	24 VDC	G2RV-SL700-24 VDC	G2RV-SL500-24 VDC
	24 VAC/VDC	G2RV-SL700-24 VAC/VDC	G2RV-SL500-24 VAC/VDC
	48 VAC/VDC	G2RV-SL700-48 VAC/VDC	G2RV-SL500-48 VAC /VDC
	110 VAC	G2RV-SL700-110 VAC	G2RV-SL500-110 VAC
	230 VAC	G2RV-SL700-230 VAC	G2RV-SL500-230 VAC
Input type	12 VDC	G2RV-SL700-AP 12 VDC	G2RV-SL500-AP 12 VDC
	24 VDC	G2RV-SL700-AP 24 VDC	G2RV-SL500-AP 24 VDC
	24 VAC/VDC	G2RV-SL700-AP 24 VAC/VDC	G2RV-SL500-AP 24 VAC/VDC
	48 VAC/VDC	G2RV-SL700-AP 48 VAC/VDC	G2RV-SL500-AP 48 VAC/VDC
	110 VAC	G2RV-SL700-AP 110 VAC	G2RV-SL500-AP 110 VAC
	230 VAC	G2RV-SL700-AP 230 VAC	G2RV-SL500-AP 230 VAC

Accessories

Type	Description	Order code
Cross bar	2-pole	P2RVM-020_
Cross bar	3-pole	P2RVM-030_
Cross bar	4-pole	P2RVM-040_
Cross bar	10-pole	P2RVM-100_
Cross bar	20-pole	P2RVM-200_
PLC interface	Connect 8 relays and PLC output	P2RVC-8-0-F
PLC interface	Connect 8 relays and PLC input	P2RVC-8-I-F
Label	Plastic, for mounting on socket	R99-15 for G2RV
Label (Sticker)	Paper for mounting on socket or relay	R99-16 for G2RV
Separating plate	Provides isolation between adjacent relays to achieve 400 V isolation	P2RV-S
Relay only	Maintenance part for G2RV-SL-series 12 VDC	G2RV-1-S DC11
Relay only	Maintenance part for G2RV-SL-series 24 VDC and 24 VAC/VDC	G2RV-1-S DC21
Relay only	Maintenance part for G2RV-SL-series 48 VAC/VDC and 110, 230 VAC	G2RV-1-S DC48
Relay only	Maintenance part for G2RV-SL-AP series 12 VDC	G2RV-1-S-AP DC11
Relay only	Maintenance part for G2RV-SL-AP series 24 VDC and 24 VAC/VDC	G2RV-1-S-AP DC21
Relay only	Maintenance part for G2RV-SL-AP series 48 VAC/VDC and 110, 230 VAC	G2RV-1-S-AP DC48

Note: _ Select colour: R=Red, S=Blue, B=Black

Interface cables

PLC brand	PLC type	Number of I/O	I/O type	Cable length	Order code				
Omron	CJ1	32	Digital Output (MIL)	1.0 m	P2RV-4-100C				
				2.0 m	P2RV-4-200C				
				3.0 m	P2RV-4-300C				
				5.0 m	P2RV-4-500C				
			Digital Input (Fujitsu)	1.0 m	P2RV-4-100IFC				
				2.0 m	P2RV-4-200IFC				
				3.0 m	P2RV-4-300IFC				
				5.0 m	P2RV-4-500IFC				
			Digital Input (MIL)	1.0 m	P2RV-4-100IMC				
				2.0 m	P2RV-4-200IMC				
				3.0 m	P2RV-4-300IMC				
				5.0 m	P2RV-4-500IMC				
	GRT1 SmartSlice	8	Digital Output	0.5 m	P2RV-A050C-OMR GRT1				
				1.0 m	P2RV-A100C-OMR GRT1				
			Digital Input	0.5 m	P2RV-A050IC-OMR GRT1				
				1.0 m	P2RV-A100IC-OMR GRT1				
NX	8	Digital Output	0.5 m	P2RV-A050C-OMR NX					
			1.0 m	P2RV-A100C-OMR NX					
		Digital Input	0.5 m	P2RV-A050IC-OMR NX					
			1.0 m	P2RV-A100IC-OMR NX					
Siemens	S7/300	32	Digital Input and Digital Output	2.0 m	P2RV-200C-SIM S7/300				
				2.5 m	P2RV-250C-SIM S7/300				
				3.0 m	P2RV-300C-SIM S7/300				
				5.0 m	P2RV-500C-SIM S7/300				
	S7/400	32	Digital Input and Digital Output	2.0 m	P2RV-200C-SIM S7/400				
				2.5 m	P2RV-250C-SIM S7/400				
				3.0 m	P2RV-300C-SIM S7/400				
				5.0 m	P2RV-500C-SIM S7/400				
				Multi purpose (flying leads)	All	8	Digital Input and Digital Output	1.0 m	P2RV-A100C
								2.0 m	P2RV-A200C
3.0 m	P2RV-A300C								
5.0 m	P2RV-A500C								

Specifications

Coil ratings

Item	Standard type	Input type* ¹
Contact form	SPDT	
Input voltage	12, 24 VDC, 24, 48 VAC/VDC, 110, 230 VAC	
Rated load	6 A at 250 VAC 6 A at 30 VDC	50 mA at 30 VAC 50 mA at 36 VDC
Max. switching voltage	400 VAC, 125 VDC	30 VAC, 36 VDC
Max. switching current	6 A	50 mA
Max. switching power	1,500 VA/180 W (resistive load)	
Min. permissible load	10 mA at 5 VDC	1 mA at 100 mVDC
Mechanical durability	5 Million operations min.	
Electrical durability (rated load)	100 K operations (typical)	5 Million operations min.
Dielectric strength	4,000 VAC, 50/60 Hz for 1 min between coil and contacts; 1,000 VAC, 50/60 Hz for 1 min between contacts of same polarity	
Ambient temperature	-40 to 55°C	
Approved standards	UL, IEC/VDE, Lloyd's, and CE marking	
Size in mm (H×W×D)	92.7×106.3×6.2 (push-in type) 97.4×106.3×6.2 (screw type)	

*¹If a gold layer is destroyed, contact ratings of standard type are applicable



Plug-in relay with enhanced features covers a wide range of applications

G2RS series, which comes as standard with a mechanical indicator and nameplate covering a wide range of interface applications.

Optionally available with gold clad contacts and diode, whilst the socket and crossbar range are offering a maximum of flexibility during installation.

- SPDT type 10A / DPDT type 5 A
- Mechanical Flag, LED indicator and momentary / lockable testbutton optional
- Transparent housing
- Screwless clamp terminal sockets available
- Space saving – 16 mm width (including sockets)

Ordering information

Contact form	Diode	LED indicator	Test button	Gold clad 3 µm	Order code	Common coil voltages ^{*1}			
					(___ = coil voltage + AC/DC)	DC	AC		
SPDT (1-pole)	no	no	no	no	G2R-1-S___(S)	24	230		
					G2R-1-SN___(S)	12, 24	24, 110, 230		
		yes	no	yes	no	G2R-1-SNI___(S)	12, 24	12, 24, 110, 230	
						G2R-1-SNI-AP3___(S)	–	230	
	yes	no	yes	no	G2R-1-SND___(S)	12, 24	–		
					G2R-1-SNDI___(S)	24	–		
		yes	no	yes	yes	G2R-1-SNDI-AP3___(S)	24	–	
						G2R-1-SNDI-AP3___(S)	24	–	
DPDT (2-pole)	no	no	no	no	G2R-2-S___(S)	24	24, 110, 240		
					G2R-2-SN___(S)	12, 24, 48	24, 110, 230		
					G2R-2-SN-AP3___(S)	24	–		
		yes	no	yes	no	G2R-2-SNI___(S)	12, 24	12, 24, 110, 230	
						G2R-2-SNI-AP3___(S)	–	230	
						G2R-2-SNI-AP3___(S)	–	230	
	yes	no	yes	no	no	G2R-2-SD___(S)	–	–	
						G2R-2-SND___(S)	12, 24	–	
						G2R-2-SND-AP3___(S)	24	–	
		yes	no	yes	yes	no	G2R-2-SNDI___(S)	12, 24	–
							G2R-2-SNDI-AP3___(S)	24	–
							G2R-2-SNDI-AP3___(S)	24	–

*1 Other coil voltages available. Please see specifications.

Sockets & accessories

For type	Order code										
	DIN rail										
	Screwless clamp					Screw (plate clamp)		Screw (box clamp)			PCB
	Socket	Clip	Cross bar AC type	Cross bar DC type	Name plate	Socket	Socket	Clip	Name plate	Socket	Soldering
G2R-1-S	P2RF-05-S	P2CM-S	P2RM-SR	P2RM-SB	R99-11	P2RF-05-E	P2RF-05-ESS	P2CM-ESS	PYC-TR	P2R-05P	
G2R-2-S	P2RF-08-S	P2CM-S	P2RM-SR	P2RM-SB	R99-11	P2RF-08-E	P2RF-08-ESS	P2CM-ESS	PYC-TR	P2R-08P	

Specifications

Coil ratings

Rated voltage	Must operate voltage	Must release voltage	Max. voltage	Power consumption (approx.)
AC 24 V, 110 V, 120 V, 230 V, 240 V	80% max.	30% max.	110%	0.9 VA (60 Hz)
DC 6 V, 12 V, 24 V, 48 V	70% max.	15% max.	110%	0.53 W

Contact ratings

Number of poles	1-pole		2-pole	
	Resistive load (cosφ = 1)	Inductive load (cosφ = 0.4; L/R = 7)	Resistive load (cosφ = 1)	Inductive load (cosφ = 0.4; L/R = 7)
Rated load	10 A at 250 VAC 10 A at 30 VDC	7.5 A at 250 VAC 5 A at 30 VDC	5 A at 250 VAC 5 A at 30 VDC	2 A at 250 VAC 3 A at 30 VDC
Rated carry current	10 A		5 A	
Max. switching voltage	440 VAC, 125 VDC		380 VAC, 125 VDC	
Max. switching current	10 A		5 A	
Max. switching power	2,500 VA, 300 W	1,875 VA, 150 W	1,250 VA, 150 W	500 VA, 90 W
Failure rate (reference value)	100 mA at 5 VDC		10 mA at 5 VDC	
Mechanical life	AC: 10,000,000 operations min., DC: 20,000,000 operations min.			
Electrical life	100,000 operations min.			

Technical data

Item	1-pole	2-pole
Contact material	AgSnIn	
Operating time	15 ms max.	15 ms max.
Release time	AC: 10 ms max., DC: 5 ms max.	AC: 15 ms max., DC: 10 ms max.
Dielectric strength	5,000 VAC (coil-contact)	5,000 VAC (coil-contact)
Ambient temperature	Operating: -40 to 70°C (no icing or condensation)	
Size in mm (HxWxD)	35.5x13x29	



Versatile plug-in relay that sets the standard

Over 500 million pieces of this mini power relay have been manufactured since its introduction and have successfully been used in many different applications. Bifurcated contacts optionally are available to achieve reliable low current switching during the entire electrical life. Full range of sockets covering mounting by screw, box clamp and screw-less clamp method.

- DPDT type 10 A / 4PDT type 5 A
- Mechanical flag, LED indicator and momentary / lockable testbutton optional
- Transparent housing
- Low power switching (1 mA at 5 VDC) / Bifurcated 4PDT (0.1 mA at 1 VDC)
- Screw-less clamp terminal sockets available

Ordering information

Contact form	Diode	LED indicator	Lockable test button	Order code (___ = coil voltage + AC/DC)		Common coil voltages *1	
				 13 A1 14 A2	 13 A1 14 A2	DC	AC
DPDT	no	no	no	MY2___(S)	–	12, 24	12, 24, 48/50, 110/120, 220/240
DPDT		yes		MY2N___(S)	–	12, 24	24, 110/120, 220/240
DPDT	yes			MY2N-D2___(S)	–	24	–
DPDT	no		yes	MY2IN___(S)	–	12, 24, 48	12, 24, 110/120, 220/240
DPDT				–	MY2IN1___(S)	12, 24	–
DPDT	yes			MY2IN-D2___(S)	–	24	–
DPDT				–	MY2IN1-D2___(S)	24	–
4PDT	no	no	no	MY4___(S)	–	12, 24, 48, 100/110, 125	12, 24, 48/50, 110/120, 220/240
4PDT		yes		MY4N___(S)	–	12, 24, 48, 100/110	24, 110/120, 220/240
4PDT	yes			MY4N-D2___(S)	–	12, 24	–
4PDT	no		yes	MY4IN___(S)	–	12, 24, 48	12, 24, 48/50, 110/120, 220/240
4PDT				–	MY4IN1___(S)	12, 24, 48	–
4PDT	yes			MY4IN-D2___(S)	–	24	–
4PDT				–	MY4IN1-D2___(S)	24, 48	–

*1 Other coil voltages available. Please see specifications.

Note:- MY4 also available with bifurcated contacts => example MY4Z
 - MY2 and MY4 AC 110/120, 220/240 types also available with suppression => example MY4N-CR

Sockets & accessories

Input terminals separated from output terminals

For type	Order code					Box clamp			
	Screw-less clamp					Socket	Metal spring clip	Plastic holding clip	Label
	Socket	Clip	Cross bar AC type	Cross bar DC type	Name plate				
MY2	PYF08S	PYCM-08S	PYDM-08SR	PYDM-08SB	R99-11	PYF14-ESS	PYC-0	PYC-35	PYCTR1
MY4	PYF14S	PYCM-14S	PYDM-14SR	PYDM-14SB	R99-11	PYF14-ESS	PYC-0	PYC-35	PYCTR1

Combined input/output terminals

Order code	Order code				Box clamp			
	Screw terminal				Socket	Metal spring clip	Plastic holding clip	Label
	Socket	Clip (set = 2 pcs)	Clip for MY2IN (set = 2 pcs)	Clip for MY2IN (set = 2 pcs)				
MY2	PYF08A-N	PYC-A1		PYC-E1	PYF14-ESN	PYC-0	PYC-35	PYCTR1
MY4	PYF14A-N	PYC-A1			PYF14-ESN	PYC-0	PYC-35	PYCTR1

Specifications

Coil ratings

Rated voltage	Must operate voltage	Must release voltage	Max. voltage	Power consumption (approx.)
	% of rated voltage			
AC 6 V, 12 V, 24 V, 48/50 V 110/120 V, 220/240 V	80% max	30% min.	110%	1.0 to 1.2 VA (60 Hz)
		10% min.		0.9 to 1.1 VA (60 Hz)
DC 6 V, 12 V, 24 V, 48 V, 100/110 V				0.9 W

Contact ratings

Item	2-pole		4-pole		4-pole (bifurcated)	
	Resistive load ($\cos\phi = 1$)	Inductive load ($\cos\phi = 0.4$; L/R = 7)	Resistive load ($\cos\phi = 1$)	Inductive load ($\cos\phi = 0.4$; L/R = 7)	Resistive load ($\cos\phi = 1$)	Inductive load ($\cos\phi = 0.4$; L/R = 7)
Rated load	5 A at 250 VAC	2 A at 250 VAC	3 A at 250 VAC	0.8 A at 250 VAC	3 A at 250 VAC	0.8 A at 250 VAC
	5 A at 30 VDC	2 A at 30 VDC	3 A at 30 VDC	1.5 A at 30 VDC	3 A at 30 VDC	1.5 A at 30 VDC
Rated carry current	10 A		5 A			
Max. switching voltage	250 VAC, 125 VDC		250 VAC, 125 VDC			
Max. switching current	10 A		5 A			
Max. switching power	2,500 VA, 300 W	1,250 VA, 300 W	1,250 VA, 150 W	500 VA, 150 W	1,250 VA, 150 W	500 VA, 150 W
Failure rate (reference value)	5 VDC at 1 mA		1 VDC at 1 mA		1 VDC at 100 μ A	
Mechanical life	AC: 50,000,000 operations min., DC: 100,000,000 operations min.			20,000,000 operations min.		
Electrical life	500,000 operations min.		200,000 operations min.		100,000 operations min.	

Technical data

Item	2-pole	4-pole
Contact Material:	Ag	AgNi + Au
Operating time	20 ms max.	
Release time	20 ms max.	
Dielectric strength	2,000 VAC	
Ambient temperature	Operating: -55 to 70°C (no icing)	
Size in mm (HxWxD)	28x21.5x36	

Dimension relay + socket

Type	Size in mm (HxWxD)
PYF08S + MYS	90x23.2x38.2
PYF08A-E + MYS	76x23x31
PYF08A-N + MYS	73x22x30
PYF14S + MYS	89.2x31x36.5
PYF14A-E + MYS	76x29.5x31
PYF14A-N + MYS	73x29.5x30
PYF14-ESN + MYS	82x27x80 (incl. plastic holding clip PYC-35)
PYF14-ESS + MYS	83x27x82 (inc. plastic holding clip PYC-35)



Miniature 15 A power relay

LY-series comes in SPDT, DPDT, 3PDT and 4PDT types covering depending on the number of poles 10 or even 15A rated load. Bifurcated contacts available for DPDT configuration only, whilst the optional Diodes for DC and CR circuit for AC coils are available for all plug-in types.

- SPDT type 15 A / DPDT, 3PDT and 4PDT type 10 A
- Led indicator optional
- Transparent housing
- Suppression by optional Built-in Diodes (DC only) or CR network (AC-types)
- DIN rail mounting by socket. PCB and Flange mounting available

Ordering information

Contact form	LED indicator	Diode	Terminals			Order code *1 (___ = coil voltage + AC/DC)	Common coil voltages*2	
			Plug-in/solder	PCB	Upper-mounting plug-in/solder		DC	AC
SPDT (1 pole)	no	no	yes	no	no	LY1 ___	24	–
SPDT (1 pole)	yes	yes				LY1N-D2 ___	24	–
DPDT (2 pole)	no	no				LY2 ___	12, 24, 100/110	24, 100/110, 110/120, 220/240
DPDT (2 pole)			no		yes	LY2F ___	–	220/240
DPDT (2 pole)	yes	yes	yes		no	LY2N-D2 ___	24	–
3PDT (3 pole)	no	no				LY3 ___	24	–
4PDT (4 pole)						LY4 ___	12, 24, 100/110, 125	24, 100/110, 230
4PDT (4 pole)	yes	yes				LY4N-D2 ___	24	–

*1 For other options like CR suppression, please see specifications.
 *2 Other coil voltages available. Please see specifications.

Sockets & accessories

	Order code			
	DIN rail		PCB	
	Screw		Soldering	
For type	Socket	Clip (set = 2 pcs)	Socket	Clip (set = 2 pcs.)
LY1/LY2	PTF08A-E	PYC-A1	PT08-0	PYC-P
LY2 CR-type	PTF08A-E	Y92H-3	PT08-0	PYC-1
LY3	PTF11A-E	PYC-A1	PT11-0	PYC-P
LY4	PTF14A-E	PYC-A1	PT14-0	PYC-P

Dimension relay & socket

Type	Size in mm (HxWxD)
PTF08A-E + LY	78.5x28.5x71
PTF11A-E + LY	78.5x37x71
PTF14A-E + LY	78.5x45.5x71

Specifications

Coil ratings

Poles	Rated voltage	Must operate voltage	Must release voltage	Max. voltage	Power consumption (approx.)
1 or 2	AC 6 V, 12 V, 24 V, 50 V	80% max.	30% min.	110%	1.0 to 1.2 VA (60 Hz)
	100/110 V, 110/120 V, 200/220 V, 220/240 V				0.9 to 1 VA (60 Hz)
3	DC 6 V, 12 V, 24 V, 48 V, 100/110 V	80% max.	30% min.	110%	0.9 W
	AC 6 V, 12 V, 24 V, 50 V, 100/110 V, 200/220 V				1.6 to 2.0 VA (60 Hz)
4	DC 6 V, 12 V, 24 V, 48 V, 100/110 V	80% max.	30% min.	110%	1.4 W
	AC 6 V, 12 V, 24 V, 50 V, 100/110 V, 200/220 V				1.95 to 2.5 VA (60 Hz)
4	DC 6 V, 12 V, 24 V, 48 V, 100/110 V	80% max.	30% min.	110%	1.5 W

Technical data

Contact material	Ag3SnIn
Operating time	25 ms max.
Release time	25 ms max.
Dielectric strength	1,000 VAC
Ambient temperature *1	-25 to 70°C

*1 See datasheet for more details.

Contact ratings

Relay	Single contact 1-pole		Single contact 2-, 3- or 4-pole		Bifurcated contacts 2-pole	
	Resistive load (cosφ = 1)	Inductive load (cosφ = 0.4; L/R = 7)	Resistive load (cosφ = 1)	Inductive load (cosφ = 0.4; L/R = 7)	Resistive load (cosφ = 1)	Inductive load (cosφ = 0.4; L/R = 7)
Rated load	110 VAC at 15 A 24 VDC at 15 A	110 VAC at 10 A 24 VDC at 7 A	110 VAC at 10 A 24 VDC at 10 A	110 VAC at 7.5 A 24 VDC at 5 A	110 VAC at 5 A 24 VDC at 5 A	110 VAC at 4 A 24 VDC at 4 A
Rated carry current	15 A		10 A		7 A	
Max. switching voltage	250 VAC, 125 VDC		250 VAC, 125 VDC		250 VAC, 125 VDC	
Max. switching current	15 A		10 A		7 A	
Max. switching power	1,700 VA 360 W	1,100 VA 170 W	1,100 VA 240 W	825 VA 120 W	550 VA 120 W	440 VA 100 W
Failure rate (reference value)	100 mA at 5 VDC		100 mA at 5 VDC		10 mA at 5 VDC	
Mechanical life	AC: 50,000,000 operations min., DC: 100,000,000 operations min.					
Electrical life	1-, 3-, 4-pole: 200,000 operations min., 2-pole: 500,000 operations min.					



Exceptionally reliable general purpose relay with 8 or 11 plug-in pins for round sockets

MK relay breaks compared to its size relatively large currents. The AgSnIn contacts ensure long electrical lifetime (min. 100,000 operations). Wide switching range from 10 mA at 1 VDC upto 10 A at 250 VAC.

- 8-pin DPDT and 11-pin 3PDT contact types
- Switching current up to 10 A
- Lockable test button for easy testing
- Temperature rating from -40°C up to 60°C

Ordering information

Contact form	Mechanical indicator & lockable test button	LED indicator	Diode	Order code ^{*1} (___ = coil voltage + AC/DC)	Common coil voltages ^{*2}	
					DC	AC
DPDT (2-pole)	yes	no	no	MKS2PI	12, 24, 110	24, 110, 230
		yes	no	MKS2PIN	24	24, 230
3PDT (3-pole)		no	no	MKS3PI-5	12, 24, 48, 110	12, 24, 110, 230
		yes	yes	MKS3PI-D-5	24	N/A
	no	no	no	MKS3PIN-5	12, 24	24, 110, 230
		yes	yes	MKS3PIN-D-5	24	N/A

^{*1} Many various terminal arrangements possible, please see specifications.

^{*2} Other coil voltages available. Please see specifications.

Sockets & accessories

For type	Order code		
	DIN rail		
Socket	Screw		Box clamp
	Clip (set= 2 pcs.)	Socket	Socket
MKS2	PF083A-E	PFC-A1	- PF083A-D
MKS3	PF113A-E	PFC-A1	PF113A-N PF113A-D

Specifications

Coil ratings

Rated voltage	Must operate voltage	Must release voltage	Max. voltage	Power consumption (approx.)
AC	6 V, 12 V, 24 V, 100 V, 110 V, 120 V, 200 V, 220 V, 230 V, 240 V	80% max.	30% min.	110%
DC	6 V, 12 V, 24 V, 48 V, 100 V, 110 V		15% min.	2.3 VA (60 Hz) 2.7 VA (50 Hz) 1.4 W

Contact ratings

Load	2- or 3-pole	
	Resistive load (cosφ = 1)	Inductive load (cosφ = 0.4; L/R = 7)
Contact material	AgSnIn	
Rated load	NO: 10 A at 250 VAC NC: 5 A at 30 VDC	7 A at 250 VAC
Rated carry current	10 A	
Max. switching voltage	250 VAC, 250 VDC	-
Max. switching current	10 A	
Max. switching power	2,500 VA/ 300 W	1,250 VA/150 W
Mechanical life	5,000,000 operations min.	
Electrical life	100,000 operations min.	

Technical data

Operating time	AC: 20 ms max., DC: 30 ms max.
Release time	20 ms max. (40 ms max. for built-in Diode relays)
Dielectric strength	2,500 VAC (coil-contact)
Ambient temperature	Operating: -40 to 60°C (with no icing or condensation)
Size in mm (HxWxD)	34.5x34.5x53.3

Dimension relay & socket

Type	Size in mm (HxWxD)
PF083A-E + MKS	56x41x77.8 (incl. clip)
PF113A-E + MKS	56x42.8x87.8 (incl. clip)
PF___A-D + MKS	65x38x80.3



Power relay that can switch 220 VDC, 10 A (resistive load)

The MK-S(X) is the smallest relay in the world that can switch 220 VDC 10 A resistive load. Applications in loads are encountered.

- Suitable for DC-switching
- DC load switching up to 10 A; 220 VDC (resistive load)
- AC load models are capable of switching up to 15 A; 250 VAC (resistive load)
- SPST-NO/SPST-NC contact form enables contact welding detection
- Lockable test button for easy testing

Ordering information

Models for DC loads

Contact form	LED indicator & lockable test button	Order code (___ = coil voltage + AC/DC)	Common coil voltages *1	
			DC	AC
SPST-NO (1-pole)	yes	MKS1XTIN-10	12, 24, 48, 110, 220	24, 110, 230
SPST-NO/SPST-NC (2-pole)	yes	MKS2XTIN-11	12, 24, 48, 110, 220	24, 110, 230

*1 Other coil voltages available. Please see specifications.

Models for AC loads

Contact form	LED indicator & lockable test button	Order code (___ = coil voltage + AC/DC)	Common coil voltages *1	
			DC	AC
SPST-NO (1-pole)	yes	MKS1TIN-10	12, 24, 48	24, 110, 230
SPST-NO/SPST-NC (2-pole)	yes	MKS2TIN-11	12, 24, 48	24, 110, 230

*1 Other coil voltages available. Please see specifications.

Sockets & accessories

Order code				
DIN rail			PCB	
Screw				
Socket		Clip (set= 2 pcs.)		Socket
No built-in diode	Built-in diode			Clip (set= 2 pcs.)
P7MF-06	P7MF-06-D	PYC-A2		P7M-06P
				PYC-A2

Specifications

Coil ratings

Rated voltage		Must operate voltage	Must release voltage	Max. voltage	Power consumption (approx.)
AC	24 V, 100 V, 110 V, 120 V, 200 V, 220 V, 230 V, 240 V	80% max.	30% min. (60 Hz) 25% min. (50 Hz)	110%	2.3 VA (60 Hz) 2.7 VA (50 Hz)
DC	12 V, 24 V, 48 V, 110 V, 220 V		15% min.		1.5 W

Contact ratings

Model	Models for DC Loads						Models for AC Loads	
	MKS1XT(I)(N)-10			MKS2XT(I)(N)-11			MKS1T(I)(N)-10	MKS2T(I)(N)-11
Contact form	SPST-NO			SPST-NO/SPST-NC			SPST-NO	SPST-NO/SPST-NC
Load	Resistive load		Inductive load L/R = 7 ms	Resistive load		Inductive load L/R = 7 ms	Resistive load	Resistive load
	DC13 class			DC13 class				
Contact configuration	NO	Double-break			Double-break			Double-break
	NC	-			Single-break			Single-break
Contact material	AgSnIn			AgSnIn			AgSnIn	AgSnIn
Rated load	NO	10 A, 220 VDC	5 A, 220 VDC	0.4 A, 220 VDC	5 A, 220 VDC	3 A, 220 VDC	0.2 A, 220 VDC	15 A, 250 VAC
	NC	-			2 A, 220 VDC	0.3 A, 220 VDC	0.1 A, 220 VDC	5 A, 250 VAC
Rated carry current	NO	10 A			5 A			15 A
	NC	-			2 A			5 A
Max. switching voltage	NO	220 VDC			220 VDC			250 VAC
	NC	-			-			250 VAC
Max. switching current	NO	10 A			5 A			15 A
	NC	-			2 A			5 A
Max. switching capacity (reference value)	NO	2,200 W	-	-	1,100 W	-	-	3,750 VA
	NC	-			440 W	-	-	1,250 VA

Note: These values apply to a switching frequency of 30 times per minute for DC Load models and 20 times per minute for AC Load models.

Technical data

Operating time	AC: 20 ms max., DC: 30 ms max.
Release time	20 ms max.
Dielectric strength	2,500 VAC (coil-contact)
Ambient temperature	Operating: -40 to 60°C (with no icing or condensation)
Size in mm (HxWxD)	34.5x34.5x52.1
Mechanical endurance	1,000,000 operations min. (at 18,000 operations/hr)
Electrical endurance^{*1}	100,000 operations min. (at rated load and maximum switching frequency)

^{*1} Measured at an ambient temperature of 23°C



High capacity, high dielectric strength 4 pole power relay

G7J series developed for switching resistive, inductive as well as motor loads. No contact chattering for momentary voltage drops up to 50% of rated voltage. High dielectric strength (4KV) between coil and contacts as well as between different polarity contacts.

- 25 A Rated current
- 4PST-NO, 3PST-NO / SPST-NC or DPST-NO / DPST-NC
- Bifurcated contacts optional
- Terminals: Screw, Quick-connect or PCB pins
- Mounting by insertion into a clip or just by screws (flange type)

Ordering information

Contact form	Mounting		Terminal			Order code ^{*1} (___ = coil voltage + AC/DC)	Common coil voltages ^{*2}	
	PCB	W-bracket mounting	PCB	Quick-connect	Screw		DC	AC
4PST-NO	yes	no	yes	no	no	G7J-4A-P___	12, 24	200/240
	no	yes	no		yes	G7J-4A-B___	24	–
3PST-NO/SPST-NC	yes	no	yes	no	no	G7J-4A-T___	12, 24	200/240
	no	yes	no		yes	G7J-3A1B-P___	24	–
DPST-NO/SPST-NC				yes	no	G7J-3A1B-B___	24	–
DPST-NO/DPST-NC	yes	no	yes	no		G7J-3A1B-T___	24	200/240
						G7J-2A2B-P___	24	–

^{*1} For other options like bifurcated contacts, please see specifications.

^{*2} Other coil voltages available. Please see specifications.

Accessories

For type	Order code
	W-bracket
G7J Screw terminal type	R99-04 for G5F
G7J Quick Connect type	

Specifications

Coil ratings

Rated voltage		Must operate voltage	Must release voltage	Max. voltage	Power consumption (approx.)
AC	24, 50, 100 to 120, 200 to 240	75% max.	15% min.	110%	1.8 to 2.6 VA
DC	6, 12, 24, 48, 100		10% min.		2.0 W

Contact ratings

Item	4-pole		
	Resistive load cosφ = 1	Inductive load cosφ = 0.4	Resistive load
Rated load	NO: 25 A at 220 VAC (24 A at 230 VAC) NC: 8 A at 220 VAC (7.5 A at 230 VAC)		NO: 25 A at 30 VDC NC: 8 A at 30 VDC
Rated carry current	NO: 25 A (1 A), NC: 8 A (1 A)		
Max. switching voltage	250 VAC		125 VDC
Max. switching current	NO: 25 A (1 A), NC: 8 A (1 A)		
Mechanical life	1,000,000 operations min.		
Electrical life	100,000 operations min.		

Note: Values between () indicate bifurcated contact specification.

Technical data

Contact material	Ag alloy
Operating time	50 ms max.
Release time	50 ms max.
Dielectric strength	4,000 VAC
Ambient temperature	Operating: -25 to 60°C (no icing)



High capacity, high dielectric strength 1 or 2 pole general purpose power relay

G7L fits many applications from motor driver and power supply switching in office equipment to switching controller for air-conditioning compressor. No contact chattering for momentary voltage drops up to 50% of rated voltage. G7L series can be mounted on DIN-rail by using separate adaptor, whilst relay is connected by screw or quick-connect terminals.

- SPST-NO – 30 A
- DPST-NO – 25 A
- Wide input range AC coils 100-120, 200-240 V at either 50 or 60 Hz
- Terminals: Screw, Quick-connect or PCB pins
- Mounting by insertion into a clip, by screws (flange type) or by DIN-rail adaptor

Ordering information

Contact form	Mounting					Terminals			Order code ^{*1} (___ = Coil Voltage + AC/DC)	Common Coil Voltages ^{*2}	
	PCB	DIN-rail front connecting socket	DIN Rail adaptor	Flange (screw)	E-bracket mounting	PCB	Quick-connect	Screw		DC	AC
SPST-NO	no	yes	yes	no	yes	no	yes	no	G7L-1A-T ___	24	100/120, 200/240
DPST-NO									G7L-2A-T ___	12, 24	24, 100/120, 200/240
SPST-NO		no	no	yes	no				G7L-1A-TUB ___	–	100/120, 200/240
DPST-NO									G7L-2A-TUB ___	24	24, 200/240
	yes			no		yes	no	yes	G7L-2A-BUB ___	–	200/240
						yes		no	G7L-2A-P ___	24	–

^{*1} For other options like bifurcated contacts, please see specifications.

^{*2} Other coil voltages available. Please see specifications.

Accessories

For type	Order code			
	DIN-rail front connecting socket	DIN Rail adaptor	E-Bracket mounting	Coverplate electric shock protection
G7L Screw terminal type	–	P7LF-D	R99-07G7L	P7LF-C
G7L Quick Connect type	P7LF-06	P7LF-D	R99-07G7L	–

Specifications

Coil Ratings

Rated voltage	Rated current	Coil resistance	Must operate voltage	Must release voltage	Max. voltage	Power consumption (approx.)
AC (–)	12 V	142 mA	75% max. of rated voltage	15% min. of rated voltage	110% of rated voltage	1.7 to 2.5 VA (60 Hz)
	24 V	71 mA				
	50 V	34 mA				
	100 to 120 V	17.0 to 20.4 mA				
	200 to 240 V	8.5 to 10.2 mA				
DC (=)	6 V	317 mA	75% max. of rated voltage	15% min. of rated voltage	110% of rated voltage	1.9 W
	12 V	158 mA				
	24 V	79 mA				
	48 V	40 mA				
	100 V	19 mA				

Note: 1. The rated current and coil resistance are measured at a coil temperature of 23°C with tolerances of $\pm 15\%/20\%$ for AC rated current and $\pm 15\%$ for DC coil resistance.

2. Performance characteristic data are measured at a coil temperature of 23°C.

3. ~ indicates AC and = indicates DC (IEC417 publications).

Contact Ratings

Model	G7L-1A-TJ/G7L-1A-BJ		G7L-2A-TJ/G7L-2A-BJ		G7L-1A-P/G7L-2A-P	
	Resistive load ($\cos \phi = 1$)	Inductive load ($\cos \phi = 0.4$)	Resistive load ($\cos \phi = 1$)	Inductive load ($\cos \phi = 4.4$)	Resistive load ($\cos \phi = 1$)	Inductive load ($\cos \phi = 4.4$)
Rated load	30 A, 220 VAC (–)	25 A, 220 VAX (–)	25 A, 220 VAC (–)		20 A, 220 VAC (–)	
Rated carry current	30 A		25 A		20 A	
Max. switching voltage	250 VAC (–)					
Max. switching current	30 A		25 A		20 A	
Max. switching power	6,600 VAC (–)	5,500 VAC (–)	5,500 VAC (–)		4,400 VAC (–)	
Failure rate ^{*1} (reference value)	100 mA, 5 VDC (=)					

^{*1} P level: $\lambda_{60} = 0.1 \times 10^{-6}/\text{operation}$



Compact 160 Amp Power Relay

G7Z series provides a compact, cost efficient solution for applications such as inverters, UPS, solar and fuel-cell battery circuits. Relay in combination with auxiliary contact block meets EN 60947-4-1. Coil ratings are available in 12 and 24 VDC. Power consumption is less than 4 watts.

- Switching current 160 A (40 A rating / 4-pole / IEC-AC1)
- Switching voltage 440 VAC
- Safety function with mirror contacts in various configurations
- Power consumption less than 4 Watts
- Low Switching Noise (70 dB)

Ordering information

Relay with Auxiliary Contact Block (for Screw Terminals)

Contact configuration		Rated voltage	Order code
Relay	Auxiliary contact block		
4PST-NO	DPST-NO	12, 24 VDC	G7Z-4A-20Z
	SPST-NO/SPST-NC		G7Z-4A-11Z
	DPST-NC		G7Z-4A-02Z
3PST-NO/SPST-NC	DPST-NO		G7Z-3A1B-20Z
	SPST-NO/SPST-NC		G7Z-3A1B-11Z
	DPST-NC		G7Z-3A1B-02Z
DPST-NO/DPST-NC	DPST-NO		G7Z-2A2B-20Z
	SPST-NO/SPST-NC		G7Z-2A2B-11Z
	DPST-NC		G7Z-2A2B-02Z

Specifications

Coil ratings

Rated voltage	Rated current	Coil resistance	Must operate voltage % of rated voltage	Must release voltage	Max. voltage	Power consumption (approx.)
12 VDC	333 mA	39 Ω	75% max.	10% min.	110%	Approx. 3.7 W
24 VDC	154 mA	156 Ω				

Note: - Rated current and coil resistance were measured at a coil temperature of 23°C with coil resistance of ±15%.

- Operating characteristics were measured at a coil temperature of 23°C.

- The maximum allowable voltage is the maximum value of the fluctuation range for the Relay coil operating power supply and was measured at an ambient temperature of 23°C.

Contact Ratings - Relay

Item	G7Z-4A- _Z, G7Z-3A1B- _Z, G7Z-2A2B- _Z		
	Resistive load	Inductive load cos phi = 0.3	Resistive load L/R = 1 ms
Contact structure	Double break		
Contact material	Ag alloy		
Rated load	NO	40 A at 440 VAC	22 A at 440 VAC
	NC	25 A at 440 VAC	10 A at 440 VAC
Rated carry current	NO	40 A	22 A
	NC	25 A	10 A
Maximum contact voltage	480 VAC		
Maximum contact current	NO	40 A	
	NC	25 A	
Maximum switching capacity	NO	17,600 VA	9,680 VA
	NC	11,000 VA	4,400 VA
Failure rate P value (reference value)	2 A at 24 VDC		

Note: The ratings for the auxiliary contact block mounted on the G7Z are the same as those for the G7Z3 auxiliary contact block.

Contact Ratings - Auxiliary Contact Block

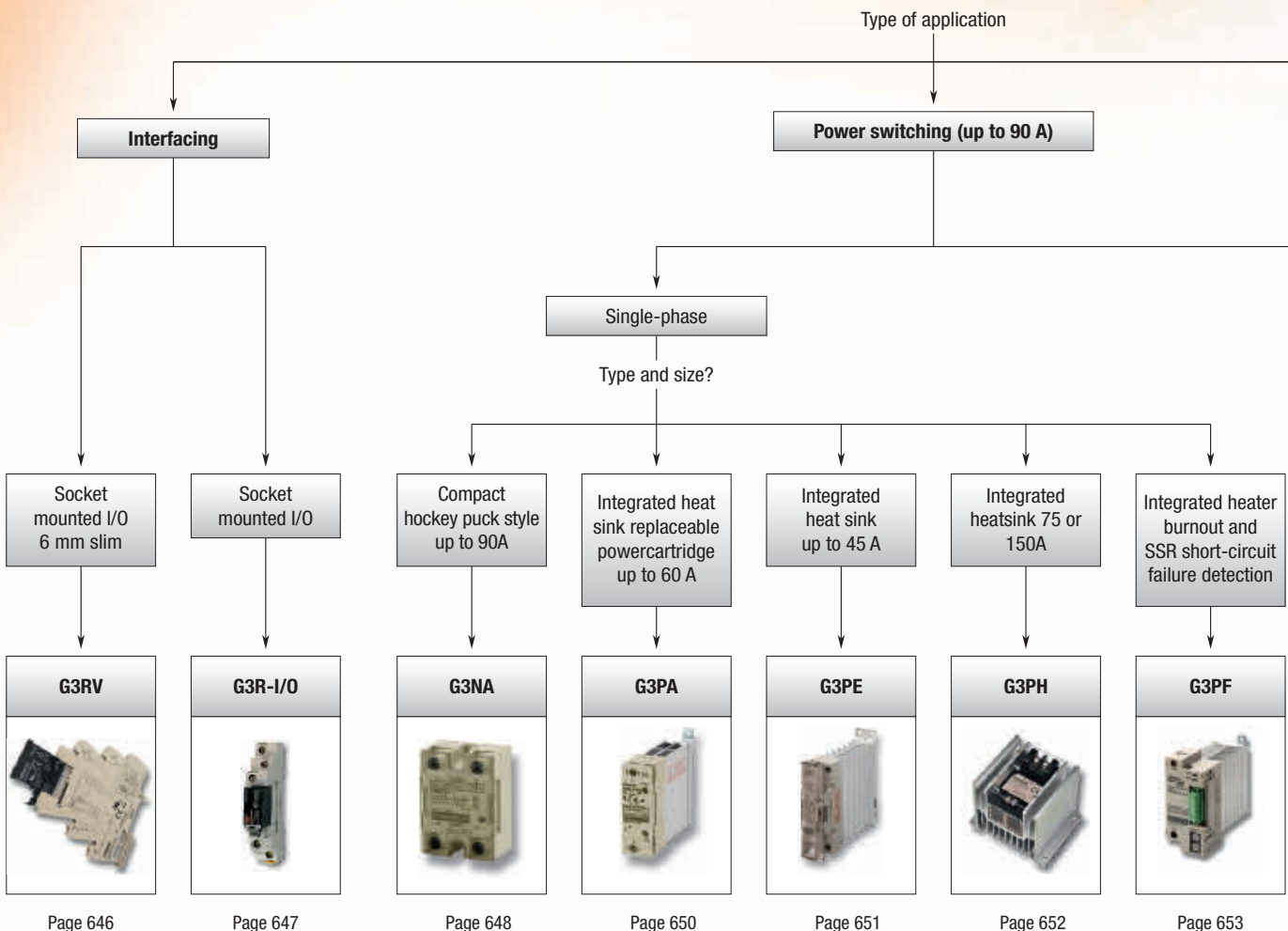
Item	G7Z-4A- _Z, G7Z-3A1B- _Z, G7Z-2A2B- _Z		
	Resistive load	Inductive load cos phi = 0.3	Resistive load L/R = 1 ms
Contact structure	Double break		
Contact material	Au clad + Ag		
Rated load	1 A at 440 VAC	0.5 A at 440 VAC	5 A at 110 VDC
Rated carry current	1 A		
Maximum contact voltage	480 VAC		
Maximum contact current	1 A		
Maximum switching capacity	440 VA	220 VA	110 W
Failure rate P value (reference value)	1 mA at 5 VDC		

COMPACT SOLID STATE RELAYS

G3_ series – Reliable interfacing and power switching

With a wide variety of output currents and voltages, our control-panel mounted types of power switching SSRs are available with (G3PE & G3PH) and without (G3NA) built-in heat-sink. The compact SSRs for I/O Interfacing G3RV & G3R offer high-speed models (G3R).

- Industrial 6 mm 'slim' SSR which is G2RV compatible (G3RV)
- G2RS compatible high-speed interface solutions (G3R-I/O)
- G3NA with 5-90 A output current, G3PB up to 45 A
- Output voltages up to 480 VAC / 200 VDC available on G3NA
- Effectively absorbing of external surge thanks to the built-in varistor





Power controlling

Three-phase

Integrated heat sink up to 45 A

G3PE



Page 651

Single phase

Integrated heat sink up to 60 A

G3PW



Page 654

Multi channel up to 8 solid state relays







G3ZA



Page 655

Selection table

Category		Control panel mounting type				
Selection criteria						
	Model	G3RV	G3R-I/O	G3NA	G3PA	
	Type of load	Output module (interface)	Input Module (interface)	Output Module (interface)	Normal resistive heaters Motor control	Normal resistive heaters
	1-phase control	–	–	–	■	■
	2-phase control	–	–	–	–	–
	3-phase control	–	–	–	–	–
	Function	Signal switching	Signal switching	Signal switching	Heater control, motor control	Heater control
	Max. current rating	2 A (AC); 3 A (DC)	100 mA	2 A	90 A	60 A
	Load voltage/ current [VAC]					
24 to 240	–	–	–	■	■	
100 to 240	■	–	■	–	–	
200 to 480	–	–	–	■	■	
Load voltage/ current [VDC]						
5 to 200	3 to 26.4	4 to 32	■	■	–	
Input voltages [VDC or VAC]	5 to 24 VDC	–	■	■	■	■
	12 to 24 VDC	12 VDC ±10%; 24 VDC ±10%	■	–	–	■
	24 VAC	■ 24 VAC/DC ±10%	–	–	–	■
	100 to 120 VAC	■ 110 VAC ±10%	■	–	■	–
	200 to 240 VAC	■ 230 VAC ±10%	■	–	■	–
	Analogue input	–	–	–	–	–
Features	Built-in heat sink	–	–	–	–	■
	Zero-cross	□	–	□	■	■
	Built-in varistor	–	–	–	■	■
	LED operation indicator	■	■	■	■	■
	Protective cover	NA	NA	NA	■	■
	3-phase loads via 3 single-phase SSRs	NA	NA	NA	■	■
	Replaceable power cartridge	–	–	–	–	■
	Alarm output	NA	NA	NA	–	–
	Built-in failure detection	NA	NA	NA	–	–
	SSR open circuits detection	NA	NA	NA	–	–
	SSR short circuits detection	NA	NA	NA	–	–
	Mounting	DIN-rail	■	–	–	■
Screw		–	–	–	■	■
Mounting socket		■	■	■	–	–
	Page	646	647	648	650	

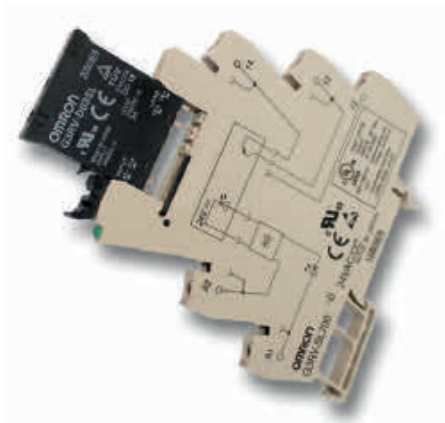
Control panel mounting type				Power regulator	
					
G3PE	G3PE	G3PH	G3PF	G3PW	G3ZA
Normal resistive heaters	Normal resistive heaters	Normal resistive & lamp heaters	Normal resistors	Alloy heater Pure metal heater, nonmetal heater (Constant-current models recommended.)	Depends on the SSR used Distributes loop/control output levels (mV%) to SSRs
■	–	■	■	■	Depends on the SSR used
–	■	–	–	–	Depends on the SSR used
–	■	–	–	–	Depends on the SSR used
Heater control	Heater control	(Lamp) heater control	Heater control and diagnostics	Single-phase power control	Intelligent power control
45 A	45 A	150 A	35 A	60 A	Depends on the SSR used
–	–	–	–	–	–
■	■	■	■	■	■
■	■	■ (180 to 480)	■	–	■ 400 to 480
–	–	–	–	–	–
–	–	■	–	–	–
■	■	–	■	–	–
–	–	–	–	–	–
–	–	■ (100 to 240 VAC)	–	–	–
–	–	■ (100 to 240 VAC)	–	–	–
–	–	–	–	4 to 20 mA DC, 1 to 5 VDC	–
■	□	■	■	■	–
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651		652	653	654	655

■ Standard

□ Available

– No/not available

NA Not applicable



The World's First Industrial Slim Relay

- G2RV compatible
- LED indicator built in SSR
- Push-in terminals and accessories for easy wiring

Ordering information

Zero cross function	Input Rated voltage (operating voltage)	Rated current			Must operate voltage	Must release voltage	Output			Type of connection	Order code
		AC		DC			Rated load voltage (load voltage range)	Load current	Inrush current		
		50 Hz	60Hz								
-	24 VAC/DC (21.6 to 26.4 VAC/DC)	10.7 mA	11.1 mA	4.3 mA	21.6 V	1 V	5 to 24 VDC (3 to 26.4 VDC)	100 µA to 3 A	30 A (60 Hz, 1 cycle)	Screw	G3RV-SL700-D AC/DC24
-	24 VAC/DC (21.6 to 26.4 VAC/DC)	10.7 mA	11.1 mA	4.3 mA	21.6 V	1 V	5 to 24 VDC (3 to 26.4 VDC)	100 µA to 3 A	30 A (60 Hz, 1 cycle)	Push-in	G3RV-SL500-D AC/DC24
Yes	24 VAC/DC (21.6 to 26.4 VAC/DC)	20 mA	21 mA	11 mA	21.6 V	1 V	100 to 240 VAC (75 to 264 VAC)	0.1 A to 2 A	30 A (60 Hz, 1 cycle)	Screw	G3RV-SL700-A AC/DC24
Yes	24 VAC/DC (21.6 to 26.4 VAC/DC)	20 mA	21 mA	11 mA	21.6 V	1 V	100 to 240 VAC (75 to 264 VAC)	0.1 A to 2 A	30 A (60 Hz, 1 cycle)	Push-in	G3RV-SL500-A AC/DC24
-	230 VAC (207 to 253 VAC)	6.8 mA	8.1 mA	-	207 V	1 V	5 to 24 VDC (3 to 26.4 VDC)	100 µA to 3 A	30 A (60 Hz, 1 cycle)	Screw	G3RV-SL700-D AC230
-	230 VAC (207 to 253 VAC)	6.8 mA	8.1 mA	-	207 V	1 V	5 to 24 VDC (3 to 26.4 VDC)	100 µA to 3 A	30 A (60 Hz, 1 cycle)	Push-in	G3RV-SL500-D AC230

Note: Ratings at an ambient temperature of 25°C

Accessories

Type	Description	Order code
Cross bar	2-pole	P2RVM-020_
Cross bar	3-pole	P2RVM-030_
Cross bar	4-pole	P2RVM-040_
Cross bar	10-pole	P2RVM-100_
Cross bar	20-pole	P2RVM-200_
PLC interface	Connect 8 relays and PLC output	P2RVC-8-O-F
Label	Plastic, for mounting on socket	R99-15 for G2RV
Label (Sticker)	Paper for mounting on socket or relay	R99-16 for G2RV
Separating plate	Provides isolation between adjacent relays to achieve 400 V isolation	P2RV-S

Note: _ Select colour: R=Red, S=Blue, B=Black

Specifications

Order code	G3RV-SL700/500-A	G3RV-SL700/500-D
Isolation	Triac	Mosfet
Output ON voltage drop	1.6 V rms max.	0.9 V max.
Leakage current	5 mA max. (at 200 VAC 50/60 Hz)	10 µA max. (at 24 VDC)
Operating indicator	Yes	
Ambient temperature	Storage	-30~+100°C (with no icing or condensation)
	Operating	-30~+55°C (with no icing or condensation)



Compact SSR for I/O interface with high dielectric strength requirements

High-speed models with optimum input ratings for a variety of sensors are available, as well as input and output modules that can be used instead of the G2RS. Use a coupler conforming to VDE 0884 and assuring an I/O dielectric strength of 4,000V.

- 1.5 and 2A output current
- 5 to 200VDC/100 to 240VAC output voltages
- Compatible with G2RS electromechanical relays
- DIN-rail mounting via sockets
- Operation indicator to confirm input

Ordering information

Input module

Response speed	Input				Output		Size in mm (HxWxD)	Order code
	Rated voltage (operating voltage)	Input current	Must operate voltage	Must release voltage	Logic level supply voltage	Logic level supply current		
–	100 to 240 VAC (60 to 264 VAC)	15 mA max.	60 VAC max.	20 VAC min.	4 to 32 VDC	0.1 to 100 mA	29x13x28 (90.5x16x61 in combination with P2RF-05-E mounting socket)	G3R-IAZR1SN-UTU
High-speed (1 kHz)	5 VDC (4 to 6 VDC)	8 mA max.	4 VDC max.	1 VDC min.				
	12 to 24 VDC (6.6 to 32 VDC)		6.6 VDC max.	3.6 VDC min.				
Low-speed (10 Hz)	5 VDC (4 to 6 VDC)	8 mA max.	4 VDC max.	1 VDC min.				
	12 to 24 VDC (6.6 to 32 VDC)		6.6 VDC max.	3.6 VDC min.				

Note: Ratings at an ambient temperature of 25°C

Output module

Zero cross function	Input				Output			Size in mm (HxWxD)	Order code
	Rated voltage (operating voltage)	Input current	Must operate voltage	Must release voltage	Rated load voltage (load voltage range)	Load current*1	Inrush current		
Yes	5 to 24 VDC (4 to 32 VDC)	15 mA max.	4 VDC max.	1 VDC min.	100 to 240 VAC (75 to 264 VAC)	0.05 to 2 A	30 A (60 Hz, 1 cycle)	29x13x28 (90.5x16x61 in combination with P2RF-05-E mounting socket)	G3R-OA202SZN-UTU
No									G3R-OA202SLN-UTU
–		8 mA max.			5 to 48 VDC (4 to 60 VDC)	0.01 to 2 A	8 A (10 ms)		G3R-ODX02SN-UTU
–									48 to 200 VDC (40 to 200 VDC)

Note: Ratings at an ambient temperature of 25°C
*1 The minimum current value is measured at 10°C min.

Socket & accessories

Order code						
DIN rail					PCB	
Screwless clamp					Screw	Soldering
Socket	Clip	Cross bar AC type	Cross bar DC type	Name plate	Socket	Socket
P2RF-05-S	P2CM-S	P2RM-SR	P2RM-SB	R99-11	P2RF-05-E	P2R-05P

Specifications

Order code	Input module			Output module			
	G3R-IAZR1SN-UTU	G3R-IDZR1SN-UTU	G3R-IDZR1SN-1-UTU	G3R-OA202SZN-UTU	G3R-OA202SLN-UTU	G3R-ODX02SN-UTU	G3R-OD201SN-UTU
Isolation	Photocoupler			Phototriac		Photocoupler	
Operate time	20 ms max.	0.1 ms max.	15 ms max.	1/2 of load power source cycle + 1 ms max.	1 ms max.	1 ms max.	1 ms max.
Release time	20 ms max.	0.1 ms max.	15 ms max.	1/2 of load power source cycle + 1 ms max.		2 ms max.	2 ms max.
Response frequency	10 Hz	1 kHz	10 Hz	20 Hz	20 Hz	100 Hz	100 Hz
Output ON voltage drop	1.6 V max.	1.6 V max.	1.6 V max.	1.6 V max.	1.6 V max.	1.6 V max.	2.5 V max.
Leakage current	5 µA max.	5 µA max.	5 µA max.	1.5 mA max.	1.5 mA max.	1 mA max.	1 mA max.
Operation indicator	Yes						
Ambient temperature	Operating: -30 to 80°C (with no icing)						



Hockey puck style SSR with 5-90 A output currents

All models feature the same compact dimensions to provide a uniform mounting pitch. A built-in varistor effectively absorbs external surges. The operation indicator enables monitoring operation.

- 5-90 A output current
- 24-480 VAC/5-200VDC output voltages
- Built-in varistor
- Operation indicator (red LED)
- Protective cover for greater safety

Ordering information

Applicable output load	Zero cross function	Isolation	Rated input voltage	Must operate voltage	Must release voltage	Load current with/without heatsink at 40 °C	Size in mm (HxWxD)	Order code	
24 to 240 VAC	5 A	Yes	Phototriac	5 to 24 VDC	4 VDC max.	1 VDC min.	0.1 to 5 A/0.1 to 3 A	58x43x27	G3NA-205B-UTU DC5-24
			Photocoupler	100 to 120 VAC	75 VAC max.	20 VAC min.			G3NA-205B-UTU AC100-120
			Photocoupler	200 to 240 VAC	150 VAC max.	40 VAC min.			G3NA-205B-UTU AC200-240
	10 A		Phototriac	5 to 24 VDC	4 VDC max.	1 VDC min.	0.1 to 10 A/0.1 to 4 A	58x43x27	G3NA-210B-UTU DC5-24
			Photocoupler	100 to 120 VAC	75 VAC max.	20 VAC min.			G3NA-210B-UTU AC100-120
			Photocoupler	200 to 240 VAC	150 VAC max.	40 VAC min.			G3NA-210B-UTU AC200-240
	20 A	Phototriac	5 to 24 VDC	4 VDC max.	1 VDC min.	0.1 to 20 A/0.1 to 4 A	58x43x27	G3NA-220B-UTU DC5-24	
		Photocoupler	100 to 120 VAC	75 VAC max.	20 VAC min.			G3NA-220B-UTU AC100-120	
		Photocoupler	200 to 240 VAC	150 VAC max.	40 VAC min.			G3NA-220B-UTU AC200-240	
	40 A	Phototriac	5 to 24 VDC	4 VDC max.	1 VDC min.	0.1 to 40 A/0.1 to 6 A	58x43x27	G3NA-240B-UTU DC5-24	
		Photocoupler	100 to 120 VAC	75 VAC max.	20 VAC min.			G3NA-240B-UTU AC100-120	
		Photocoupler	200 to 240 VAC	150 VAC max.	40 VAC min.			G3NA-240B-UTU AC200-240	
50 A	Phototriac	5 to 24 VDC	4 VDC max.	1 VDC min.	0.1 to 50 A/0.1 to 6 A	58x43x27	G3NA-250B-UTU DC5-24		
	Photocoupler	100 to 120 VAC	75 VAC max.	20 VAC min.			G3NA-250B-UTU AC100-120		
	Photocoupler	200 to 240 VAC	150 VAC max.	40 VAC min.			G3NA-250B-UTU AC200-240		
75 A	Phototriac	5 to 24 VDC	4 VDC max.	1 VDC min.	1 to 75 A/1 to 7 A	58x43x30	G3NA-275B-UTU-2 DC5-24		
	Photocoupler	100 to 240 VAC	75 VAC max.	20 VAC min.			G3NA-275B-UTU-2 AC100-240		
90 A	Phototriac	5 to 24 VDC	4 VDC max.	1 VDC min.	1 to 90 A/1 to 7 A	58x43x30	G3NA-290B-UTU-2 DC5-24		
	Photocoupler	100 to 240 VAC	75 VAC max.	20 VAC min.			G3NA-290B-UTU-2 AC100-240		
5 to 200 VDC	10 A	No	Photocoupler	5 to 24 VDC	4 VDC max.	1 VDC min.	0.1 to 10 A/0.1 to 4 A	58x43x27	G3NA-D210B-UTU DC5-24
200 to 480 VAC	10 A	Yes	Photocoupler	100 to 240 VAC	75 VAC max.	20 VAC min.	0.2 to 10 A/0.2 to 4 A	58x43x27	G3NA-D210B-UTU AC100-240
			Photocoupler	5 to 24 VDC	4 VDC max.	1 VDC min.			G3NA-410B-UTU DC5-24
			Photocoupler	100 to 240 VAC	75 VAC max.	20 VAC min.	0.2 to 20 A/0.2 to 4 A	58x43x27	G3NA-410B-UTU AC100-240
			Photocoupler	5 to 24 VDC	4 VDC max.	1 VDC min.			G3NA-425B-UTU-2 DC5-24
			Photocoupler	100 to 240 VAC	75 VAC max.	20 VAC min.	0.2 to 40 A/0.2 to 6 A	58x43x30	G3NA-425B-UTU-2 AC100-240
			Photocoupler	5 to 24 VDC	4 VDC max.	1 VDC min.			G3NA-450B-UTU-2 DC5-24
	25 A	Photocoupler	100 to 240 VAC	75 VAC max.	20 VAC min.	0.2 to 40 A/0.2 to 6 A	58x43x30	G3NA-450B-UTU-2 AC100-240	
		Photocoupler	5 to 24 VDC	4 VDC max.	1 VDC min.			G3NA-475B-UTU-2 DC5-24	
		Photocoupler	100 to 240 VAC	75 VAC max.	20 VAC min.			G3NA-475B-UTU-2 AC100-240	
	50 A	Photocoupler	5 to 24 VDC	4 VDC max.	1 VDC min.	1 to 75 A/1 to 7 A	58x43x30	G3NA-490B-UTU-2 DC5-24	
		Photocoupler	100 to 240 VAC	75 VAC max.	20 VAC min.			G3NA-490B-UTU-2 AC100-240	
		Photocoupler	5 to 24 VDC	4 VDC max.	1 VDC min.			G3NA-490B-UTU-2 DC5-24	
75 A	Photocoupler	100 to 240 VAC	75 VAC max.	20 VAC min.	1 to 90 A/1 to 7 A	58x43x30	G3NA-490B-UTU-2 AC100-240		
	Photocoupler	5 to 24 VDC	4 VDC max.	1 VDC min.			G3NA-490B-UTU-2 DC5-24		
	Photocoupler	100 to 240 VAC	75 VAC max.	20 VAC min.			G3NA-490B-UTU-2 AC100-240		

Accessories

Name	Applicable SSRs	Size in mm (HxWxD) ^{*1}	Order code
One-touch mounting plates	–	NA	R99-12 FOR G3NA
Mounting bracket	G3NA-240B-UTU	NA	R99-11 FOR G3NA
Slim heat sink enabling DIN-rail mounting	G3NA-205B-UTU, G3NA-210B-UTU, G3NA-D210B-UTU, G3NA-410B-UTU	100x47x51	Y92B-N50
	G3NA-220B-UTU, G3NA-425B-UTU(-2)	100x75x100	Y92B-N100
	G3NA-240B-UTU, G3NA-250B-UTU	100x104x100	Y92B-N150
	G3NA-450B-UTU(-2)	190.5x130.5x100	Y92B-P250
	G3NA-275B-UTU(-2), G3NA-290B-UTU(-2), G3NA-475B-UTU(-2), G3NA-490B-UTU(-2)	172x110x150	Y92B-P250NF
Low-cost heat sink	G3NA-205B-UTU, G3NA-210B-UTU, G3NA-D210B-UTU, G3NA-220B-UTU, G3NA-410B-UTU, G3NA-425B-UTU(-2)	100x102x60	Y92B-A100
	G3NA-240-B-UTU	150x102x60	Y92B-A150N

^{*1} Size includes heat sink + G3NA SSR

Specifications

Operating voltage range	5 to 24 VDC: 4 to 32 VDC 100 to 120 VAC: 75 to 132 VAC 200 to 240 VAC: 150 to 264 VAC
Output ON voltage drop	G3NA-2: 1.6 V (RMS) max. G3NA-4: 1.8 V (RMS) max. G3NA-D2: 1.5 V max.
Leakage current	5 mA (100 V)/10 mA (200 V) G3NA-D2: 5 mA max. (200 VDC)
Load voltage range	200 to 480 VAC: 180 to 528 VAC 24 to 240 VAC: 19 to 264 VAC 5 to 200 VDC: 4 to 220 VDC
Ambient temperature	Operating: -30 to 80°C
Operate & release time	1/2 of load power source cycle + 1 ms max. (DC input) 1/2 of load power source cycle + 1 ms max. (DC input)
G3NA-D2	1 ms max. (DC input; release 5 ms), 30 ms max. (AC input)



Solid State Relays with exchangeable power cartridge

Optimum design of the heat sink has contributed to the downsizing of this product. The power element cartridges of the G3PA are easily replaceable for easy maintenance. G3PA can be mounted on a DIN-rail or using screws.

- 10-60 A output current
- 24-480 VAC output voltages
- Applicable with 3-phase loads
- Replaceable power element cartridges

Ordering information

Rated output load	Zero cross function	Rated input voltage	Operating voltage range	Input current impedance	Voltage level		Size in mm (HxWxD)	Order code	
					Must operate voltage	Must release voltage			
24 to 240 VAC	10 A	Yes	5 to 24 VDC	4 to 30 VDC	7 mA max.	4 VDC max.	1 VDC min.	100x27x100	G3PA-210B-VD DC5-24
								100x37x100	G3PA-220B-VD DC5-24
								100x47x100	G3PA-240B-VD DC5-24
								100x110x100	G3PA-260B-VD DC5-24
								100x27x100	G3PA-210B-VD AC24
								100x37x100	G3PA-220B-VD AC24
180 to 400 VAC	20 A	24 VAC	19.2 to 26.4 VAC	1.4 kΩ ±20%	19.2 VAC max.	4.8 VAC min.	100x27x100	G3PA-210B-VD AC24	
							100x37x100	G3PA-220B-VD AC24	
							100x47x100	G3PA-240B-VD AC24	
							100x110x100	G3PA-260B-VD AC24	
							100x27x100	G3PA-420B-VD DC12-24	
							100x37x100	G3PA-430B-VD DC12-24	
200 to 480 VAC	30 A	12 to 24 VDC	9.6 to 30 VDC	7 mA max.	9.2 VDC max.	1 VDC min.	100x37x100	G3PA-420B-VD-2 DC12-24	
							100x47x100	G3PA-430B-VD-2 DC12-24	
							100x110x100	G3PA-450B-VD-2 DC12-24	

Accessories

Replacement parts: Power device cartridges				
Load voltage range	Carry current	Applicable SSR	Order code	
19 to 264 VAC	10 A	G3PA-210B-VD DC5-24	G32A-A10-VD DC5-24	
		G3PA-210B-VD AC24	G32A-A10-VD AC24	
		20 A	G3PA-220B-VD DC5-24	G32A-A20-VD DC5-24
			G3PA-220B-VD AC24	G32A-A20-VD AC24
		40 A	G3PA-240B-VD DC5-24	G32A-A40-VD DC5-24
			G3PA-240B-VD AC24	G32A-A40-VD AC24
	60 A	G3PA-260B-VD DC5-24	G32A-A60-VD DC5-24	
		G3PA-260B-VD AC24	G32A-A60-VD AC24	
	150 to 440 VAC	20 A	G3PA-420B-VD DC12-24	G32A-A420-VD DC12-24
		30 A	G3PA-430B-VD DC12-24	G32A-A430-VD DC12-24
	180 to 528 VAC	20 A	G3PA-420B-VD-2 DC12-24	G32A-A420-VD-2 DC12-24
		30 A	G3PA-430B-VD-2 DC12-24	G32A-A430-VD-2 DC12-24
50 A		G3PA-450B-VD-2 DC12-24	G32A-A450-VD-2 DC12-24	

G32A-D__ enables 2 line switching of 3 phase configurations		
Current flow	Applicable SSR	Order code
10 A	G3PA-210B-VD, G3PA-210BL-VD, G3PA-220B-VD, G3PA-220BL-VD, G3PA-420B-VD, G3PA-420B-VD-2	G32A-D20
20 A		
30 A	G3PA-430B-VD, G3PA-430B-VD-2, G3PA-240B-VD, G3PA-240BL-VD	G32A-D40
40 A		

Specifications

Isolation	Phototriac coupler
Indicator	Yes
Ambient temperature	Operating: -30 to 80°C
Load voltage range	200 to 480 VAC: 180 to 528 VAC 24 to 240 VAC: 19 to 264 VAC 180 to 400 VAC: 150 to 440 VAC
Output ON drop	1.6 V (RMS) max.
Operate time	0.5 of load power source cycle + 1 ms max. (DC input, -B models) 1.5 of load power source cycle + 1 ms max. (AC input) 1 ms max. (-BL models)
Release time	0.5 of load power source cycle + 1 ms max. (DC input) 1.5 of load power source cycle + 1 ms max. (AC input)



Omron's G3PE compact industrial SSR with outstanding surge endurance

The G3PE features an original surge-pass circuit that gives outstanding surge endurance and protects the semiconductor device against voltages in excess of 30 kV.

- Single and three phase, 15-45 A output current
- 100-240 VAC and 200-480 VAC output voltages
- Models available without zero cross
- Improved surge dielectric strength for output circuits
- Terminal cover with finger protection
- Mount to DIN track or with screws

Ordering information

Phases	Rated voltage (operating voltage)	Rated output load	Permissible I^2t (half 60 Hz wave)	Applicable heater capacity AC1: resistive load	Size in mm (HxWxD)	Number of poles	Order code
1	100 to 240 VAC (75 to 264 VAC)	15 A (at 40°C)	121 A ² s	3 kW (at 200 VAC)	100x22.5x100	1	G3PE-215B DC12-24
		25 A (at 40°C)	260 A ² s	5 kW (at 200 VAC)		1	G3PE-225B DC12-24
		35 A	1,260 A ² s	7 kW (at 200 VAC)		1	G3PE-235B DC12-24
		45 A		9 kW (at 200 VAC)		1	G3PE-245B DC12-24
	200 to 480 VAC (180 to 528 VAC)	15 A (at 40°C)	128 A ² s	6 kW (at 400 VAC)	100x22.5x100	1	G3PE-515B DC12-24
		25 A (at 40°C)	1,350 A ² s	10 kW (at 400 VAC)	100x44.5x100	1	G3PE-525B DC12-24
		35 A		14 kW (at 400 VAC)		1	G3PE-535B DC12-24
		45 A	6,600 A ² s	18 kW (at 400 VAC)		1	G3PE-545B DC12-24
3	200 to 480 VAC (180 to 528 VAC)	15 A (at 40°C)	260 A ² s	12.5 kW (at 480 VAC)		100x80x155	3
		25 A (at 40°C)		20.7 kW (at 480 VAC)	120x80x155	3	G3PE-525B-3N DC12-24
		35 A	1,260 A ² s	29 kW (at 480 VAC)	140x80x155	3	G3PE-535B-3N DC12-24
		45 A		37.4 kW (at 480 VAC)	140x110x155	3	G3PE-545B-3N DC12-24
					100x80x155	2	G3PE-515B-2N DC12-24
					120x80x155	2	G3PE-525B-2N DC12-24
					140x80x155	2	G3PE-535B-2N DC12-24
					140x80x155	2	G3PE-545B-2N DC12-24

Specifications

Rated input voltage	12 to 24 VDC
Operating voltage range	9.6 to 30 VDC
Rated input current (impedance)	7 mA max. (zero cross models); 15 mA max. (models without zero cross)
Zero cross function	Yes
Must operate voltage	9.6 VDC max.
Must release voltage	1 VDC min.
Isolation method	Phototriac coupler
Operation indicator	Yes (yellow)
Load voltage range	200 to 480 VAC models: 180 to 528 VAC 100 to 240 VAC models: 75 to 264 VAC
Operate time	1/2 of load power source cycle +1 ms max.
Release time	1/2 of load power source cycle +1 ms max.
Leakage current	10 mA (at 200 VAC)
Ambient temperature	Operating: -30 to 80°C



High-power, load-control SSRs with high current of 75 or 150 A at 240 or 480 VAC

The G3PH high power SSRs are designed to switch heaters like alloyed metal heaters (NI-CR heaters f.i.) and lamp heaters (halogen heaters f.i.). It has a replaceable power cartridge in order to save maintenance costs. The easy-to-mount monoblock construction incorporates a heatsink.

- 75 or 150 A; 240 or 480 VAC
- Replaceable power elements
- Built-in operation indicator
- Zero-cross and non zero-cross models available
- Surge-pass circuit

Ordering information

Applicable output load ^{*1}	Zero cross function	Rated input voltage	Operating voltage	Inout current impedance	Voltage level		Size in mm (HxWxD)	Order code
					Must operate voltage	Must release voltage		
75 A, 100 to 240 VAC	Yes	5 to 24 VDC	4 to 30 VDC	(5 mA max.) ^{**2}	4 VDC max.	1.0 VDC max.	120x150x120	G3PH-2075B DC5-24
150 A, 100 to 240 VAC		100 to 240 VAC	75 to 264 VAC	41 kΩ ±20%	75 VAC max.	20 VAC max.		G3PH-2075B AC100-240
75 A, 100 to 240 VAC	No	5 to 24 VDC	4 to 30 VDC	(5 mA max.) ^{**2}	4 VDC max.	1.0 VDC max.	120x150x120	G3PH-2075BL DC5-24
		150 A, 100 to 240 VAC	5 to 24 VDC	4 to 30 VDC	(5 mA max.) ^{**2}	4 VDC max.		1.0 VDC max.
75 A, 180 to 480 VAC	Yes	5 to 24 VDC	4 to 30 VDC	(5 mA max.) ^{**2}	4 VDC max.	1.0 VDC max.	120x150x120	G3PH-5075B DC5-24
		150 A, 180 to 480 VAC	100 to 240 VAC	75 to 264 VAC	41 kΩ ±20%	75 VAC max.		20 VAC max.
75 A, 180 to 480 VAC	No	5 to 24 VDC	4 to 30 VDC	(5 mA max.) ^{**2}	4 VDC max.	1.0 VDC max.	120x150x120	G3PH-5075BL DC5-24
		150 A, 180 to 480 VAC	5 to 24 VDC	4 to 30 VDC	(5 mA max.) ^{**2}	4 VDC max.		1.0 VDC max.

^{*1} The applicable output load depends on the ambient temperature. For details, refer to datasheet.

^{**2} A constant-current circuit is used for the input current to the G3PH.

Accessories

Thyristor Module	Order code
Applicable output load ^{*1}	Applicable models
75 A, 75 to 264 VAC	G3PH-2075B(L)
150 A, 75 to 264 VAC	G3PH-2150B(L)
75 A, 150 to 520 VAC	G3PH-5075B(L)
150 A, 150 to 528 VAC	G3PH-5150B(L)
	G32A-P2075
	G32A-P2150
	G32A-P5075
	G32A-P5150

^{*1} The applicable output load depends on the ambient temperature. For details, refer to datasheet.

Specifications

Item	Model	G3PH-2075B	G3PH-2150B	G3PH-5075B	G3PH-5150B	G3PH-2075BL	G3PH-2150BL	G3PH-5075BL	G3PH-5150BL
Isolation		Photocoupler							
Operate time		1/2 of load power source cycle + 1 ms max. for DC input 3/2 of load power source cycle + 1 ms max. for AC input				1 ms max.			
Release time		1/2 of load power source cycle + 1 ms max. for DC input 3/2 of load power source cycle + 1 ms max. for AC input				1/2 of load power source cycle + 1 ms max.			
Output ON voltage drop		1,6 V (RMS) max.							
Leakage current		30 mA max. (at 200 VAC)		60 mA max. (at 400 VAC)		30 mA max. (at 200 VAC)		60 mA max. (at 400 VAC)	
Insulation resistance		100 MΩ min. (at 500 VDC)							
Dielectric strength		2,500 VAC, 50/60 Hz for 1 min							
Vibration resistance		10 to 55 to 10 Hz, 0,375-mm single amplitude (0,75-mm double amplitude)							
Shock resistance		500 m/s ²							
Ambient storage temperature		- 30 to 100°C (with no icing or condensation)							
Ambient operating temperature		- 30 to 80°C (with no icing or condensation)							
Ambient operating humidity		45% to 85%							



“Intelligent” SSR with Built-in current transformer which enables Heater Burnout and SSR Shortcircuit Failure Detection.

- Built-in Current Transformer (CT) helps reduce wiring steps.
- Detects the burnout of any one of a group of heaters.
- Detects the burnout of 3-phase heaters.
- Detects SSR short-circuit failures.
- Error detection level can be easily set with a switch.
- Three types of input terminals available: M3 terminals, screwless clamp terminals (detachable), or compact slotted screw terminals (detachable).
- Zero cross function.
- Operation indicator.

Ordering information

Applicable output load (See note.)		Input terminals	Alarm output	Size in mm (HxWxD)	Model
100 to 240 VAC	2 to 25 A	M3 terminals	1 output (Heater Burnout Detection, SSR Short-circuit Failure Detection, Common)	100x45x110	G3PF-225B
	2 to 35 A			100x55x130	G3PF-235B
200 to 480 VAC	2 to 25 A			100x45x110	G3PF-525B
	2 to 35 A			100x55x130	G3PF-535B
100 to 240 VAC	2 to 25 A	Screwless clamp terminals (detachable)	2 outputs (Heater Burnout Detection, SSR Short-circuit Failure Detection)	100x45x117	G3PF-225B-CTB
	2 to 35 A			100x55x137	G3PF-235B-CTB
200 to 480 VAC	2 to 25 A			100x45x117	G3PF-525B-CTB
	2 to 35 A			100x55x137	G3PF-535B-CTB

Note: The load current depends on the ambient temperature. Refer to datasheet for details.

Specifications

Order code	G3PF-225B	G3PF-235B	G3PF-525B	G3PF-535
Rated load voltage	100 to 240 VAC (50/60 Hz)		200 to 480 VAC (50/60 Hz)	
Operating voltage range	75 to 264 VAC, 50/60 Hz		180 to 528 VAC, 50/60 Hz	
Applicable load current*1	25 A (at 40°C)	35 A (at 40°C)	25 A (at 40°C)	35 A (at 40°C)
Minimum load current	2 A			
Inrush current resistance	220 A (60 Hz, 1 cycle)	430 A (60 Hz, 1 cycle)	220 A (60 Hz, 1 cycle)	430 A (60 Hz, 1 cycle)
Operate time	1/2 of load power source cycle + 1 ms max.			
Release time	1/2 of load power source cycle + 1 ms max.			
Main circuit	Output ON voltage drop	1.6 V (RMS) max.		1.8 V (RMS) max.
	Leakage current	10 mA max. (at 200 VAC)		20 mA max. (at 480 VAC)
Alarm output	Output ON voltage drop	1.5 V max.		
	Leakage current	1 mA max.		
Isolation resistance	100 MΩ min. (at 500 VDC)			
Dielectric strength	2,500 VAC, 50/60 Hz for 1 min.			
Vibration resistance	Destruction: 10 to 55 to 10 Hz, 0,35-mm single amplitude (0,7-mm double amplitude)			
Shock resistance	Destruction: 294 m/s ²			
Ambient storage temperature	-30 to 70°C (with no icing or condensation)			
Ambient operating temperature	-20 to 60°C (with no icing or condensation)			
Ambient operating humidity	45% to 85%			
Weight	Approx. 400 g	Approx. 630 g	Approx. 400 g	Approx. 630 g

*1 The load current depends on the ambient temperature.



Thyristor type single-phase power controller that enables precise temperature control

Compact and the possibility for side-by-side mounting for multiple units are the basics for this new generation of power controllers. Process value can be easily monitored via the 7-segment display on the front panel.

- Precise heater burnout detection
- Phase control or optimum cycle control
- RS-485 communications to set manipulated variables and monitor load current
- Total runtime monitoring
- Application with various loads: constant load resistance, variable load resistance

Ordering information

Applicable output load	Type	Contact terminal block	Heater burnout detection	Communications	Order code	
100 to 240 VAC	20 A	Standard	Screwless clamp terminal block	No	No	G3PW-A220EU-C
	45 A					G3PW-A245EU-C
	60 A					G3PW-A260EU-C
	20 A	Constant current		Yes	Yes	G3PW-A220EC-C-FLK
	45 A					G3PW-A245EC-C-FLK
	60 A					G3PW-A260EC-C-FLK
	20 A	Standard	Terminal block with small slotted screws	No	No	G3PW-A220EU-S
	45 A					G3PW-A245EU-S
	60 A					G3PW-A260EU-S
	20 A	Constant current		Yes	Yes	G3PW-A220EC-S-FLK
	45 A					G3PW-A245EC-S-FLK
	60 A					G3PW-A260EC-S-FLK

Accessories (Order separately)

Name	Resistive value	Display	Model
External Variable Resistor	2 kΩ	202	G32X-V2K

Specifications

Order code			Standard Models	Constant-current Models
			G3PW-A2_EU_	G3PW-A2_EC-_-FLK
Control method			Analogue input: Phase control or optimum cycle control Voltage ON/OFF input: ON/OFF control	
Maximum load capacity			Phase control: Linear (resistive) load, transformer primary-side control (flux density: 1.25 T max.) Optimum cycle control: Linear (resistive) load (Transformer primaryside control is not supported.)	
Output mode	Analogue input	Phase control	Proportional to phase angle (same as G3PX), proportional to square voltage, proportional to voltage	
		Optimum cycle control	Optimum cycle control (Output is switched to 100% or 0% each half cycle.)	
	Voltage ON/OFF input	ON/OFF control	Proportional to voltage control	



Multi-channel power controller for smarter SSR usage

The G3ZA receives manipulated variables generated by control loops or manual settings via a simple-to-wire RS-485. It regulates the heater power with high precision by driving up to eight standard SSRs. Moreover, the offset control reduces peak power in the supply net.

- Multi-channel power controller
- Controls up to eight standard solid state relays
- Easy integration with PLC
- Compact size
- Available with heater alarms (four channels) or without (eight channels)

Ordering information

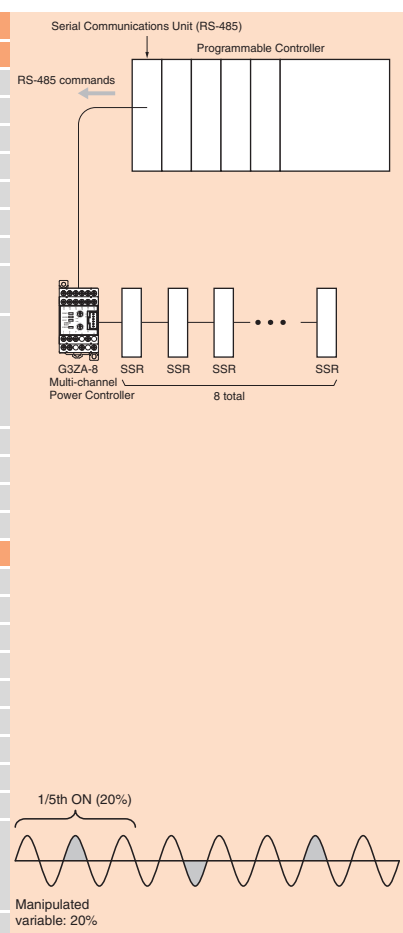
Name	Number of control channels	Heater alarm	Load power supply voltage	Order code
Multi-channel power controller	4	Supported	100 to 240 VAC	G3ZA-4H203-FLK-UTU
			400 to 480 VAC	G3ZA-4H403-FLK-UTU
	8	Not supported	100 to 240 VAC	G3ZA-8A203-FLK-UTU
			400 to 480 VAC	G3ZA-8A403-FLK-UTU

Accessories

Name	Hole diameter	Order code
Current transformer (CT)	5.8 dia.	E54-CT1
	12.0 dia.	E54-CT3

Specifications

Item	Load power supply voltage range	
	100 to 240 VAC	400 to 480 VAC
Power supply voltage	100 to 240 VAC (50/60 Hz)	
Operating voltage range	85 to 264 VAC	
Power consumption	16 VA max.	
Load power supply voltage	100 to 240 VAC	400 to 480 VAC
Load power supply voltage range	75 to 264 VAC	340 to 528 VAC
Manipulated variable input	0.0 to 100.0% (via RS-485 communications)	
Current transformer input	Single-phase AC, 0 to 50 A (primary current of CT)	
Trigger output	One voltage output for each channel, 12 VDC ±15%, max. load current: 21 mA (with built-in short-circuit protection circuit)	
Alarm output	NPN open collector, one output Max. applicable voltage: 30 VDC Max. load current: 50 mA Residual voltage: 1.5 V max. Leakage current: 0.4 mA max.	
Indications	LED indicators	
Ambient operating temperature	-10 to 55°C (with no icing or condensation)	
Ambient operating humidity	25 to 85%	
Storage temperature	-25 to 65°C (with no icing or condensation)	
Performance		
Current indication accuracy	±3 A (for models with heater burnout detection)	
Insulation resistance	100 MΩ min. (at 500 VDC) between primary and secondary	
Dielectric strength	2,000 VAC, 50/60 Hz for 1 min between primary and secondary	
Vibration resistance	Vibration frequency: 10 to 55 Hz, acceleration: 50 m/s ² in X, Y, and Z directions	
Shock resistance	300 m/s ² three times each in six directions along three axes	
Weight	Approx. 200 g (including terminal cover)	
Degree of protection	IP20	
Memory protection	EEPROM (non-volatile memory) (number of writes: 100,000)	
Installation environment	Overvoltage category III, pollution degree 2 (according to IEC 60664-1)	
Approved standards	UL508 (Listing), CSA22.2 No. 14 EN50178 EN61000-6-4 (EN55011: 1998, A1: 1999 Class A, Group 1) EN61000-6-2: 2001	
Size in mm (HxWxD)	76x45x111	



Optimum cycle control

- Optimum cycle control is performed by driving SSRs according to load power detection and trigger signals. (Zero-cross SSRs are used.)
- Noise is suppressed while ensure high-speed response by turning outputs ON and OFF each half cycle to achieve high-precision temperature control.

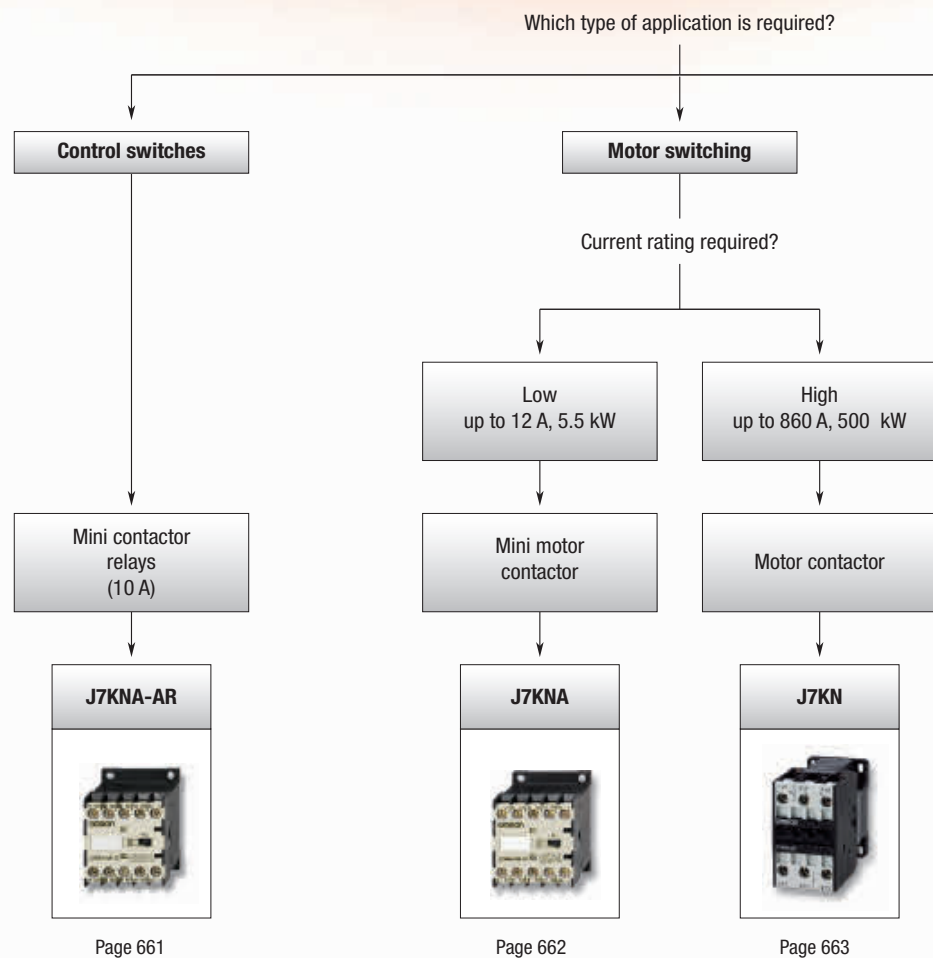
J7KN MOTOR CONTACTOR

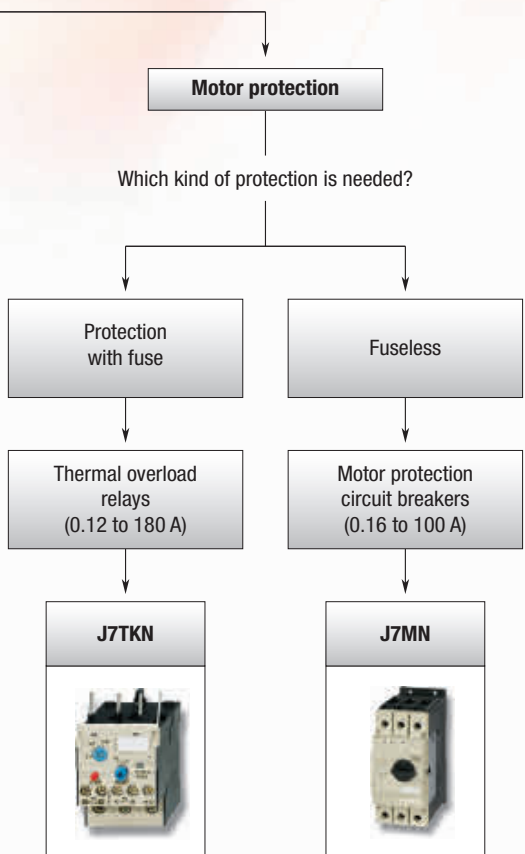
J7KN – Motor contactors

The popular J7KN series offers many outstanding benefits, such as space-saving, small footprint, great reliability, and an ambient temperature rating up to +90°C. But now we've replaced it with a completely new design that extends its application range and will make your life even easier.

The new J7KN 10D to 22D series has the same footprint and severe ambient temperature rating, but has an improved design affording better protection, easier maintenance plus an integrated auxiliary double contact suitable for switching electronic circuits (17 V, 5 mA).

- Basic units can be combined with auxiliary contacts (top/side mounting)
- 3-main-pole and 4-main-pole versions are possible
- The power range covers 4 to 500 kW
- Different coil voltages (AC and DC)
- J7KN-10D to J7KN-22D models have integrated auxiliary contact for electronic circuits (3-pole versions)












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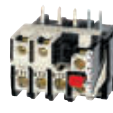



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Selection table

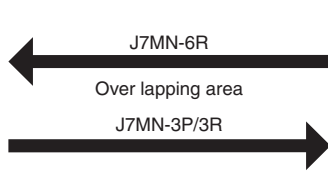
Category		Motor protection circuit breaker
MPCB		
	Type	J7MN-3P/3R
	Setting range current	0.16 - 32 A
	Number of ranges	16
	Auxiliary contact external	front 1 NO and 1 NC or 2 NO, side 1 NO and NC or 2 NO or 2 NC
Page	667	

Category		Contactors					
Contactors							
	Type	J7KNA-AR	J7KNA-09/12	J7KN(G)-10(D)	J7KN(G)-14(D)	J7KN(G)-18(D)	J7KN(G)-22(D)
	Maximum power AC3-380/415 V	–	4 kW or 5 kW	4 kW	5.5 kW	7.5 kW	11 kW
	Rated current AC3-380/415 V	10 A th	9/12 A	10 A	14 A	18 A	22 A
	Main contacts	4 in 4 configurations	3 or 4	3 or 4			
	Auxiliary contacts	Included	–	1	1 NO or 1 NC		
		External	4 in different combinations		4 contacts ^{*1}		
	Page	661	662	663		663	

Category		Thermal overload	
Thermal overload			
	Type	J7TKN-A	J7TKN-B
	Setting range D.O.L.	0.12 - 14 A	0.12 - 32 A
	Number of ranges	13	16
	Auxiliary contacts included	1 NO and 1 NC	1 NO and 1 NC
	Page	665	665

*1 Using J7KN with DC double wiring coils results in 1 aux. less

Motor protection circuit breaker



J7MN-6R		J7MN-9R	
26 - 63 A	63 - 100 A		
5	4		
front 1 NO and 1 NC or 2 NO, side 1 NO and NC or 2 NO or 2 NC			
667			

Contactors



J7KN(G)-24	J7KN(G)-32	J7KN(G)-40	J7KN-50	J7KN-62	J7KN-74	J7KN-90	J7KN-115
11 kW	15 kW	18.5 kW	22 kW	30 kW	37 kW	45 kW	55 kW
24 A	32 A	40 A	50 A	62 A	74 A	90 A	115 A
3			3			3	
front and side 8-contacts ^{*1}			front and side 8-contacts ^{*1}			front and side 11-contacts	
663			663			663	

Thermal overload







J7TKN-C	J7TKN-D	J7TKN-E
28 - 42 A	40 - 74 A	60 - 120 A
1	3	2
1 NO and 1 NC	1 NO and 1 NC	1 NO and 1 NC
665	665	665

*1 Using J7KN with DC double wiring coils results in 1 aux. less

Selection table

Category		Motor protection circuit breaker		
MPCB				
	Type			
	Setting range current			
	Number of ranges			
	Auxiliary contact external			
Page		663		

Category		Contactors		
Contactors				
				
	Type	J7KN-151	J7KN-176	J7KN-210
	Maximum power AC3-380/415 V	75 kW	90 kW	110 kW ^{*1}
	Rated current AC3-380/415 V	150 A	175 A	210 A
	Main contacts	3 or 4		3
	Auxiliary contacts	Included		–
	External		front and side 6-contacts	
Page		663		

Category		Thermal overload		
Thermal overload				
				
	Type	J7TKN-E	J7TKN-F	
	Setting range D.O.L.	60 - 120 A	120 - 180 A	
	Number of ranges	2	1	
	Auxiliary contacts included	1 NO and 1 NC	1 NO and 1 NC	
Page		665		

*1 For contactors up to 500 kW, 860 A (AC3; 380/415 VAC) please contact your local Omron representatives.



Main mini contactor relay, 4-pole

Three basic units can be combined with different additional auxiliary contacts. 4-pole, 6-pole and 8-pole versions in different configurations are possible as well as different coil voltages (AC and DC). Accessories such as suppressors are available.

- Mirror contacts
- Screw fixing and snap fitting (35 mm DIN-rail)
- Rated current = 10 A (I_{th})
- Suitable for electronic devices (DIN 19240)
- Finger proof (BGV A2)

Ordering information

Operation	Contacts		Distinctive number according to DIN EN 50011	Ratings		Thermal rated current I_{th} , A	Order code	Coil voltage ^{*1} , replace ___ with:							
	NO	NC		AC15 230 V A	400 V A			VAC			VDC				
4-pole, with screw terminals															
AC	4	0	40 E	3	2	10	J7KNA-AR-40 ___	24	110	230	–	–			
	3	1	31 E	3	2	10	J7KNA-AR-31 ___	24	110	230	–	–			
	2	2	22 E	3	2	10	J7KNA-AR-22 ___	24	110	230	–	–			
DC solenoid	4	0	40 E	3	2	10	J7KNA-AR-40 ___	–	–	–	24D	110D			
	3	1	31 E	3	2	10	J7KNA-AR-31 ___	–	–	–	24D	110D			
	2	2	22 E	3	2	10	J7KNA-AR-22 ___	–	–	–	24D	110D			
DC solenoid with diode	4	0	40 E	3	2	10	J7KNA-AR-40 ___	–	–	–	24VS	–			
	3	1	31 E	3	2	10	J7KNA-AR-31 ___	–	–	–	24VS	–			
	2	2	22 E	3	2	10	J7KNA-AR-22 ___	–	–	–	24VS	–			

*1 Other coil voltages available on request

Accessories

Contacts		Ratings		Thermal rated current	Order code
NO	NC	AC15 230 V A	400 V A	I_{th} , A	
1	1	3	2	10	J73KN-A-11
0	2	3	2	10	J73KN-A-02
4	0	3	2	10	J73KN-A-40
2	2	3	2	10	J73KN-A-22
0	4	3	2	10	J73KN-A-04

Specifications

Suffix to contactor type e.g. J7KNA-09-10-24	Voltage marking at the coil for		Rated control voltage U_s range for			
	50 Hz	60 Hz	50 Hz		60 Hz	
	V	V	min. V	max. V	min. V	max. V
24	24	24	22	24	24	24
110	110 to 115	120 to 125	110	115	120	125
230	220 to 230	240	220	230	240	250



Motor contactors from 4 to 5.5 kW for normal duty switching

This modular system consists of main contactors and additional contact blocks. The basic units can be combined with auxiliary contacts (top mounting). Reversed versions, including integrated mechanical interlock, are available as well as 3-main-pole and 4-main-pole versions.

- 4 kW and 5.5 kW versions are available
- Different coil voltages (AC and DC)
- Mini and normal-size versions are available
- The contactors can be mounted with screw fixing and snap fitting on a DIN-rail
- All components are finger proof

Ordering information

Operation	Poles	Rating AC2, AC3				Rated current		Auxiliary contact		Overload relay	Size in mm (H × W × D)	Order code	Coil voltage ^{*1} , replace ___ with:				
		380 V 400 V 415 V kW	500 V kW	660 V 690 V kW	AC3	AC1	NO	NC	VAC								
		4	4	4	400 V A	690 V A			24				110	230	400	VDC	
AC/DC solenoid	3	4	4	4	9	20	1	0	J7TKN-A	57.5 × 45 × 49	J7KNA-09-10___	24	110	230	400	24D	
		5.5	5.5	5.5	12	20	0	1	J7TKN-A			J7KNA-09-01___	24	110	230	400	24D
	4	4	4	9	20	1	0	J7TKN-A	J7KNA-12-10___			24	110	230	400	24D	
	5.5	5.5	5.5	12	20	0	1	J7TKN-A	J7KNA-12-01___			24	110	230	400	24D	
DC solenoid with diode	3	4	4	4	9	20	1	0	J7TKN-A	57.5 × 45 × 49	J7KNA-09-10___	24	110	230	400	24D	
		5.5	5.5	5.5	12	20	0	1	J7TKN-A			J7KNA-09-01___	24	110	230	400	24D
	4	4	4	9	20	1	0	J7TKN-A	J7KNA-12-10___			24	110	230	400	24D	
	5.5	5.5	5.5	12	20	0	1	J7TKN-A	J7KNA-12-01___			24	110	230	400	24D	
AC/DC solenoid with reversing contactors	3	4	4	4	9	20	0	1	J7TKN-A	57.5 × 94.5 × 50	J7KNA-09-01 R___	24	110	230	400	24D	
		5.5	5.5	5.5	12	20	0	1	J7TKN-A			J7KNA-12-01 R___	24	110	230	400	24D
	4	4	4	9	20	0	1	J7TKN-A	J7KNA-09-01 R___			24	110	230	400	24VS	
	5.5	5.5	5.5	12	20	0	1	J7TKN-A	J7KNA-12-01 R___			24	110	230	400	24VS	

*1 Other coil voltages available on request

Accessories

Auxiliary contacts				
Contacts		Rated current		Order code
NO	NC	AC15 230 V	400 V	
1	1	3 A	2 A	J73KN-AM-11
0	2	3 A	2 A	J73KN-AM-02
2	2	3 A	2 A	J73KN-AM-22
Auxiliary contacts for reversing contactors				
1	1	3 A	2 A	J73KN-AM-11V
1	1	3 A	2 A	J73KN-AM-11X
Link modules between MPCB & contactors				
For MPCB J7MN-3P/J7MN-3R				J77MN-VKA-3
Insulated wiring system for J7KNA-09-01-R...(D) and J7KNA-12-01-R...(D)				
Reversing Starter Connector for Mini Reversing Contactors, mechanical interlocked				J74-WKR-A

Specifications

Suffix to contactor type e.g. J7KNA-09-10-24	Voltage marking at the coil for		Rated control voltage U _s range for			
	50 Hz V	60 Hz V	50 Hz min. V	max. V	60 Hz min. V	max. V
24	24	24	22	24	24	24
110	110 to 115	120 to 125	110	115	120	125
230	220 to 230	240	220	230	240	250

Main contacts	J7KNA-09-___	J7KNA-12-___
Rated insulation voltage U _i	690 VAC	690 VAC
Making capacity I _{eff} at U _s = 690 VAC	165 A	165 A
Breaking capacity I _{eff} cos φ = 0,65	400 VAC	100 A
	500 VAC	90 A
	690 VAC	80 A
Mechanical life AC operated	5 × 10 ⁶	5 × 10 ⁶
DC operated	15 × 10 ⁶	15 × 10 ⁶
Short time current	10 s current	96 A
		120 A



Motor contactors from 4–500 kW for normal and heavy-duty switching

This modular system consists of main contactors and additional contact blocks. The basic units can be combined with auxiliary contacts. DC-DC versions, integrated mechanical interlock, are available as well as 3-main-pole and 4-main-pole versions.

- Basic units can be combined with auxiliary contacts (top/side mounting)
- 3-main-pole and 4-main-pole versions are possible
- The power range covers 4 to 500 kW
- Different coil voltages (AC and DC)
- J7KN-10D to J7KN-22D models have integrated auxiliary contact for electronic circuits (3-pole versions)

Ordering information

Operation	Poles	AC3 400 V rated motor current	Rating AC2, AC3			Rated current AC1 690 V A	Auxiliary contact		Overload relay	Size in mm (H × W × D)	Order code	Coil voltage ^{*1} , replace ___ with:								
			380 V 400 V 415 V kW	500 V kW	660 V 690 V kW		NO	NC				VAC			VDC					
AC or DC	3	10 A	4	5.5	5.5	25	1	0	J7TKN-B	67 × 45 × 82.5	J7KN-10D-10___	24	110	230	400	24D	110D			
			4	5.5	5.5	25	0	1				J7KN-10D-01___	24	110	230	400	24D	110D		
		14 A	5.5	7.5	7.5	25	1	0				J7KN-14D-10___	24	110	230	400	24D	110D		
			5.5	7.5	7.5	25	0	1				J7KN-14D-01___	24	110	230	400	24D	110D		
		18 A	7.5	10	10	32	1	0				J7KN-18D-10___	24	110	230	400	24D	110D		
			7.5	10	10	32	0	1				J7KN-18D-01___	24	110	230	400	24D	110D		
		22 A	11	10	10	32	1	0				J7KN-22D-10___	24	110	230	400	24D	110D		
			11	10	10	32	0	1				J7KN-22D-01___	24	110	230	400	24D	110D		
		24 A	11	15	15	50	0	0				J7TKN-C	78 × 45 × 104.5	J7KN-24___	24	110	230	400	24D	110D
			15	18.5	18.5	65	0	0							J7KN-32___	24	110	230	400	24D
		40 A	18.5	18.5	18.5	80	0	0				J7TKN-D	112 × 60 × 113	J7KN-40___	24	110	230	400	24D	110D
															24	110	230	400	24D	110D
		50 A	22	30	30	110	0	0				J7TKN-E	155 × 90 × 136	J7KN-50___	24	110	230	400	24D	110D
															24	110	230	400	24D	110D
62 A	30	37	37	120	0	0	J7TKN-F	290 × 110 × 162	J7KN-62___	24	110	230	400	24D	110D					
										24	110	230	400	24D	110D					
74 A	37	45	45	130	0	0	J7TKN-G	200 × 145 × 208	J7KN-74___	24	110	230	400	24D	110D					
										24	110	230	400	24D	110D					
AC and DC ^{*2}	3	90 A	45	55	55	160	0	0	J7TKN-B	67 × 45 × 82.5	J7KN-90___ ^{*2}	24	110	230	400	24	110			
			55	75	75	200	0	0				J7KN-115___ ^{*2}	24	110	230	400	24	110		
		150 A	75	75	75	230	0	0				J7KN-151___ ^{*2}	24	110	230	400	24	110		
		175 A	90	90	90	250	0	0				J7KN-176___ ^{*2}	24	110	230	400	24	110		
210 A	110	160	160	350	0	0	—	J7KN-210___ ^{*2}	24	110	230	400	24	110						
DC operated solenoid motor contactor	3	10 A	4	5.5	5.5	25	1	0	J7TKN-B	67 × 45 × 82.5	J7KNG-10-10___	—	—	—	—	24D	110D			
			4	5.5	5.5	25	0	1				J7KNG-10-01___	—	—	—	—	24D	110D		
		14 A	5.5	7.5	7.5	25	1	0				J7KNG-14-10___	—	—	—	—	24D	110D		
			5.5	7.5	7.5	25	0	1				J7KNG-14-01___	—	—	—	—	24D	110D		
		18 A	7.5	10	10	32	1	0				J7KNG-18-10___	—	—	—	—	24D	110D		
			7.5	10	10	32	0	1				J7KNG-18-01___	—	—	—	—	24D	110D		
		22 A	11	10	10	32	1	0				J7KNG-22-10___	—	—	—	—	24D	110D		
			11	10	10	32	0	1				J7KNG-22-01___	—	—	—	—	24D	110D		
24 A	11	15	15	50	0	0	J7TKN-B	78 × 45 × 104.5	J7KNG-24___	—	—	—	—	24D	110D					
	15	18.5	18.5	65	0	0	J7TKN-C			J7KNG-32___	—	—	—	—	24D	110D				
40 A	18.5	18.5	18.5	80	0	0	J7KNG-40___	—	—	—	—	24D	110D							

^{*1} Other coil voltages available on request

^{*2} Universal current (AC and DC)

Operation	Poles	AC3 400 V rated motor current	Rating AC2, AC3		Rated current	Auxiliary contact		Overload relay	Size in mm (H × W × D)	Order code	Coil voltage *1, replace ___ with:					
			380 V 400 V 415 V kW	AC1 400 V kW		AC1 690 V A	NO				NC	VAC			VDC	
AC and DC ^{*2}	4	10 A	4	17.5	25	0	0	-	67 × 45 × 82.5	J7KN-10D-4___ ^{*2}	24	110	230	400	24	110
		14 A	5.5	17.5	25	0	0			J7KN-14D-4___ ^{*2}	24	110	230	400	24	110
		18 A	7.5	22	32	0	0			J7KN-18D-4___ ^{*2}	24	110	230	400	24	110
		22 A	11	22	32	0	0			J7KN-22D-4___ ^{*2}	24	110	230	400	24	110
DC solenoid motor contactor		10 A	4	17.5	25	0	0		67 × 45 × 82.5	J7KNG-10-4___	-	-	-	-	24D	110D
		14 A	5.5	17.5	25	0	0			J7KNG-14-4___	-	-	-	-	24D	110D
		18 A	7.5	22	32	0	0			J7KNG-18-4___	-	-	-	-	24D	110D
		22 A	11	22	32	0	0			J7KNG-22-4___	-	-	-	-	24D	110D
AC		150 A	75	159	230	0	0		170 × 110 × 162	J7KN-151-4___	24	110	230	400	-	-
		175 A	90	173	250	0	0			J7KN-176-4___	24	110	230	400	-	-

*1 Other coil voltages available on request

*2 Universal current (AC and DC)

Accessories

Auxiliary contact blocks	Rated operational current			Contacts		Order code
	AC15 230 V A	AC15 400 V A	AC1 690 V A	NO	NC	
Suitable for: J7KN-10D... to -74...	3	2	10	1	-	J73KN-B-10
	3	2	10	-	1	J73KN-B-01
	3	2	10	1	-	J73KN-B-10U
	3	2	10	-	1	J73KN-B-01U
	6	4	25	1	-	J73KN-B-10A
	6	4	25	-	1	J73KN-B-01A
J7KN-151... to -316...	3	2	10	1	1	J73KN-D-11F
	3	2	10	2	2	J73KN-D-22F
	3	2	10	1	1	J73KN-D-11S
J7KN-24... to J7KN-115	3	2	10	1	1	J73KN-C-11S
	3	2	10	2	2	J73KN-E-22
Pneumatic timers	Function	Time range	Contacts		Order code	
			NO	NC		
Suitable for: J7KN-10D... to -40...	ON-delay	0.1 to 40 s	1	-	J74KN-B-TP40DA	
	ON-delay	10 to 180 s	1	-	J74KN-B-TP180DA	
	OFF-delay	0.1 to 40 s	-	1	J74KN-B-TP40IA	
	OFF-delay	10 to 180 s	-	1	J74KN-B-TP180IA	
Mechanical interlocks	Interlocks contactor with contactor				Order code	
Mounting	Order code + Order code					
Horizontal	J7KN(G)-10D to -40 + J7KN(G)-10D to -40				J74KN-B-ML	
	J7KN-24 to -74 + J7KN-24 to -74				J74KN-C-ML	
	J7KN-90 to -115 + J7KN-90 to -115				J74KN-D2-ML	
	J7KN-151 to -316 + J7KN-151 to -316				J74KN-E-ML	

Suppressor units	Type		Applicable coil voltage	Order code
Suitable for contactors J7KNA(-AR)	AC/DC	RC-unit snap-on contactor	12 to 48 V	J74KN-D-RC24
	AC/DC		48 to 127 V	J74KN-D-RC110
	AC/DC		110 to 250 V	J74KN-D-RC230
J7KN10D-J7KN74	AC/DC	RC-unit snap-on contactor	12 to 48 V	J74KN-C2-RC24
	AC/DC		48 to 127 V	J74KN-C2-RC110
	AC/DC		110 to 230 V	J74KN-C2-RC230
	AC/DC		230 to 415 V	J74KN-C2-RC400
	AC/DC			
Additional terminals single pole	Cable cross-sections to clamp (mm ²)			Order code
Suitable for contactors	Solid or stranded	Flexible	Flexible with multi-core cable end	
J7KN50 - KN74	4 to 35	6 to 25	4 to 25	J74KN-LG-9030
J7KN151 - KN176	16 to 120	-	16 to 95	J74KN-LG-11224
Terminal covers	Specification			Order code
Suitable for contactors	J7KN151 - KN176			J74KN-LG-10404
Marking systems	Specification			Order code
Description				
Marking plate	2-section without marking, divisible			J74KN-P487-1
Marking plate	4-section without marking, divisible			J74KN-P245-1

Specifications

Coil voltages	Suffix to contactor type:						
Contact type	24	48	110	180	230	400	500
J7KN-10D to J7KN-74	yes	yes	yes	yes	yes	yes	yes
J7KN-90 to J7KN-860	yes	yes	yes	-	yes	yes	-



Thermal overload relays for J7 contactors

J7TKN relays protect motors against thermal overload. They can be mounted on the contactor or separately. The relays comply with IEC 947 (single-phase sensitivity).

- Series of overload relays covering a setting range from 0.24 A to 220 A
- All components are finger proof

Ordering information

Applicable contactors	Setting range		Size in mm (H × W × D) (incl. standard J7KN[A] contactor)	Order code
	D.O.L. (A)	Star-delta (A)		
J7KNA-09..., J7KNA-12...	0.12 to 0.18	–	95 × 48.5 × 77	J7TKN-A-E18
	0.18 to 0.27	–		J7TKN-A-E27
	0.27 to 0.4	–		J7TKN-A-E4
	0.4 to 0.6	–		J7TKN-A-E6
	0.6 to 0.9	–		J7TKN-A-E9
	0.8 to 1.2	–		J7TKN-A-1E2
	1.2 to 1.8	–		J7TKN-A-1E8
	1.8 to 2.7	–		J7TKN-A-2E7
	2.7 to 4	–		J7TKN-A-4
	4 to 6	7 to 10.5		J7TKN-A-6
	6 to 9	10.5 to 15.5		J7TKN-A-9
J7KN-10D... to J7KN-40...	0.12 to 0.18	–	126.5 × 45 × 70 (J7KN-10D to J7KN-22D); 141.5 × 45 × 87.5 (J7KN-24 to J7KN-40)	J7TKN-B-E18
	0.18 to 0.27	–		J7TKN-B-E27
	0.27 to 0.4	–		J7TKN-B-E4
	0.4 to 0.6	–		J7TKN-B-E6
	0.6 to 0.9	–		J7TKN-B-E9
	0.8 to 1.2	–		J7TKN-B-1E2
	1.2 to 1.8	–		J7TKN-B-1E8
	1.8 to 2.7	–		J7TKN-B-2E7
	2.7 to 4	–		J7TKN-B-4
	4 to 6	7 to 10.5		J7TKN-B-6
	6 to 9	10.5 to 15.5		J7TKN-B-9
	8 to 11	14 to 19		J7TKN-B-11
	10 to 14	18 to 24		J7TKN-B-14
	13 to 18	23 to 31		J7TKN-B-18
J7KN-24... to J7KN-40...	23 to 24	30 to 41	J7TKN-B-24	
	23 to 32	40 to 55	J7TKN-B-32	
	28 to 42	48 to 73	J7TKN-C-42	
J7KN-50... to J7KN-74...	40 to 52	70 to 90	180 × 69 × 108	J7TKN-D-52
	52 to 65	90 to 112		J7TKN-D-65
	60 to 74	104 to 128		J7TKN-D-74
J7KN-90... to J7KN-115...	60 to 90	104 to 156	260 × 107 × 120	J7TKN-E-90
	80 to 120	140 to 207		J7TKN-E-120
J7KN-151... to J7KN-176...	120 to 180	208 to 312	290 × 110 × 162	J7TKN-F-180

Accessories

Sets for single mounting				
For overload relays	Cable cross-section to clamp (mm ²)			Order code
	Solid or stranded	Flexible	Flexible with multi-core cable	
J7TKN-AB ^{*1}	0.75 to 6	0.75 to 4	0.5 to 4	J74TK-M-AB
J7TKN-B	0.75 to 6	0.75 to 4	0.5 to 4	J74TK-SM

^{*1} To be used in combination with J7TKN-AB

Specifications

Type		J7TKN-A	J7TKN-B	J7TKN-C	J7TKN-D	J7TKN-E	J7TKN-F
Rated insulation voltage U_i		690 VAC					
Permissible ambient temperature	Operation	-25 to 60°C				750	1000
	Storage	-50 to 70°C					
Trip class according to IEC 947-4-1		10 A				20 A	10 A
Cable cross-section Main connector	Solid or stranded mm ²	0.75 to 6 0.75 to 2.5	0.75 to 6	0.75 to 10	4 to 35	–	–
	Flexible mm ²	0.75 to 4 0.5 to 2.5	1 to 4	0.75 to 6	6 to 25	–	–
	Flexible with multi-core cable end mm ²	0.5 to 2.5 0.5 to 1.5	0.75 to 4	0.75 to 6	4 to 25	–	–
Cables per clamp	Number	1 + 1	2	2	1	–	–
Auxiliary connector	Solid mm ²	0.75 to 2.5					
	Flexible mm ²	0.5 to 2.5					
	Flexible with multi-core cable end mm ²	0.5 to 1.5					
Cables per clamp	Number	2					
Auxiliary contacts							
Rated insulation voltage U_i	same potential	690 VAC					
	different potential	440 VAC		250 VAC		440 VAC	
Rated operational current I_e Utilization category AC15	24 V	5 A	3 A	4 A		5 A	3 A
	230 V	3 A	2 A	2.5 A	2.5 A	3 A	2 A
	400 V	2 A	1 A	1.5 A	1.5 A	2 A	1 A
	690 V	0.6 A	0.5 A	0.6 A			0.5 A
Rated operational current I_e Utilization category DC13	24 V	1.2 A	1 A	1.2 A			1 A
	110 V	0.15 A					
	220 V	0.1 A					
Short circuit protection (without welding 1 kA)	Highest fuse rating gL (gG)	6 A	4 A	6 A			4 A
Setting range		to 23 A	All	28 to 42 A	52 to 65 A	All	–
Power loss per current path (max.)	Minimum setting value	1.1 W	1.1 W	1.3 W	2.9 W	1.1 W	–
	Maximum setting value	2.3 W	2.3 W	3.3 W	4.5 W	2.5 W	–



J7MN motor protection circuit breakers from 0.10 A to 100 A

J7MN starters protect motors against thermal overload and short circuit. The J7MN can be equipped with additional auxiliary contacts, tripping indicator (alarm), undervoltage release and/or shunt release. All models can be locked for safe maintenance.

- Rated operational currents of 32 A for the rocker type
- Rated operational currents of 32 A, 63 A and 100 A for the rotary types
- Switching capacity is 100 kA/415 V up-to 13 A and 50 kA/415 V up-to 100 A
- Electrical/mechanical link modules available up-to 11 kW motor protection units
- All components are finger proof

Ordering information

Rated current in A	Suitable for motors 3 ~ 400 V kW	Current setting range		Short-circuit breaking capacity at 3 ~ 400 V kA	Size in mm (H × W × D)	Order code
		Thermal overload release A	Instantaneous short-circuit release A			
0.16	–	0.10–0.16	2.1	100	98 × 45 × 75	J7MN-3P-E16
0.25	0.06	0.16–0.25	3.3	100		J7MN-3P-E25
0.4	0.09	0.25–0.4	5.2	100		J7MN-3P-E4
0.63	0.18	0.4–0.63	8.2	100		J7MN-3P-E63
1	0.25	0.63–1	13	100		J7MN-3P-1
1.6	0.55	1–1.6	20.8	100		J7MN-3P-1E6
2.5	0.75	1.6–2.5	32.5	100		J7MN-3P-2E5
4	1.5	2.5–4	52	100		J7MN-3P-4
6	2.2	4–6	78	100		J7MN-3P-6
8	3	5–8	104	100		J7MN-3P-8
10	4	6–10	130	50		J7MN-3P-10
13	5.5	9–13	169	50		J7MN-3P-13
17	7.5	11–17	221	20		J7MN-3P-17
22	7.5	14–22	286	15		J7MN-3P-22
26	11	18–26	338	15		J7MN-3P-26
32	15	22–32	416	15		J7MN-3P-32
0.16	–	0.10–0.16	2.1	100	98 × 45 × 100	J7MN-3R-E16
0.25	0.06	0.16–0.25	3.3	100		J7MN-3R-E25
0.4	0.09	0.25–0.4	5.2	100		J7MN-3R-E4
0.63	0.18	0.4–0.63	8.2	100		J7MN-3R-E63
1	0.25	0.63–1	13	100		J7MN-3R-1
1.6	0.55	1–1.6	20.8	100		J7MN-3R-1E6
2.5	0.75	1.6–2.5	32.5	100		J7MN-3R-2E5
4	1.5	2.5–4	52	100		J7MN-3R-4
6	2.2	4–6	78	100		J7MN-3R-6
8	3	5–8	104	100		J7MN-3R-8
10	4	6–10	130	100		J7MN-3R-10
13	5.5	9–13	169	100		J7MN-3R-13
17	7.5	11–17	221	50		J7MN-3R-17
22	7.5	14–22	286	50		J7MN-3R-22
26	11	18–26	338	50		J7MN-3R-26
32	15	22–32	416	50		J7MN-3R-32
26	12.5	18–26	338	50	140 × 55 × 144	J7MN-6R-26
32	15	22–32	416	50		J7MN-6R-32
40	18.5	28–40	520	50		J7MN-6R-40
50	22	34–50	650	50		J7MN-6R-50
63	30	45–63	819	50	165 × 70 × 171	J7MN-6R-63
63	30	45–63	819	50		J7MN-9R-63
75	37	55–75	975	50		J7MN-9R-75
90	45	70–90	1170	50		J7MN-9R-90
100	–	80–100	1300	50		J7MN-9R-100

Accessories

Description	Version	For circuit breaker	Order code
Transverse auxiliary contact block			
Contact block	1 NO + 1 NC	All	J77MN-11F
	2NO		J77MN-20F
	2NC		J77MN-02F
Auxiliary contact block for left hand side mounting (max. 2 pc. per circuit breaker)			
Contact block (9 mm)	1 NO + 1 NC	All	J77MN-11S
	2NO		J77MN-20S
	2NC		J77MN-02S
Signalling switch for left hand side mounting (max. 1 pc. per circuit breaker)			
Signalling switch (18 mm)	1 NO + 1 NC any tripping condition	–	J77MN-TA-11S
	1 NO + 1 NC short circuit tripping condition	–	J77MN-T-11S
Undervoltage releases for right hand side mounting (max 1 pc. per circuit breaker)			
Trips the circuit breaker when the voltage is interrupted. Prevents the motor from being restarted accidentally when the voltage is restored, suitable for EMERGENCY STOP according to VDE 0113	AC 50 Hz	AC 60 Hz	–
	24 V	28 V	J77MN-U-24
	110–127 V	120 V	J77MN-U-110
	220–230 V	240–260 V	J77MN-U-230
	240 V	277 V	J77MN-U-240
	380–400 V	440–460 V	J77MN-U-400
	415–440 V	460–480 V	J77MN-U-415
Shunt releases for right hand side mounting (max 1 pc. per circuit breaker)			
Trips the circuit breaker when the release coil is energized	AC 50 Hz	AC 60 Hz	–
	24 V	28 V	J77MN-S-24
	110–127 V	120 V	J77MN-S-110
	220–230 V	240–260 V	J77MN-S-230
	240 V	277 V	J77MN-S-240
	380–400 V	440–460 V	J77MN-S-400
	415–440 V	460–480 V	J77MN-S-415
Terminal block			
Terminal block	Up to 600 V according to UL 489 not for transverse auxiliary contact block	J7MN-3R	J77MN-TB32
		J7MN-9R	J77MN-TB100

Insulated 3-Phase Busbar System IP20

Description	Connection type	Version	For Units (MPCB)	Type
3-phase busbars; modular spacing = 45 mm	Spade	for 2 units	J7MN-3P; J7MN-3R	J77MN-CPM-3-45-2S
		for 3 units		J77MN-CPM-3-45-3S
		for 4 units		J77MN-CPM-3-45-4S
		for 5 units		J77MN-CPM-3-45-5S
Line side terminal 3-pole, connection from above; conductor cross-section solid or stranded 6–25 mm ² with end sleeve 4–16 mm ²	Spade	acc. IEC/EN 60947-1, 60947-2, 60947-4-1 and VDE 0660	J7MN-3P; J7MN-3R	J77MN-BTC-63-SE
Line side terminal 3-pole, connection from above; conductor cross-section solid or stranded 6–25 mm ² with end sleeve 4–16 mm ²	Spade	up to 600 V acc. UL 489	J7MN-3P; J7MN-3R	J77MN-BTC-63-SEV
Shrouds for unused terminals on busbar system	Spade		J7MN-3P; J7MN-3R	J77MN-TA-63S

Specifications

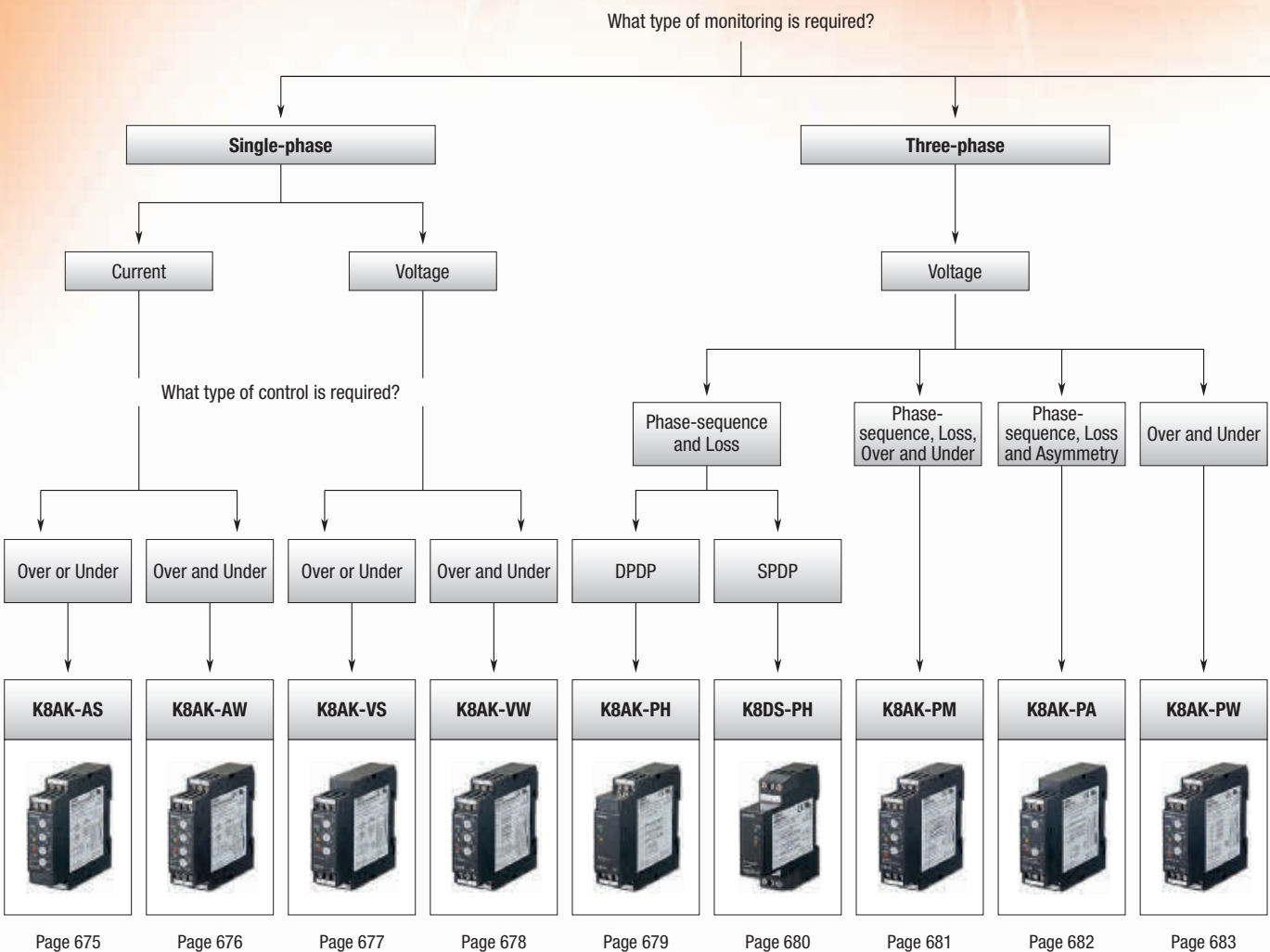
Type		J7MN-3P	J7MN-3R	J7MN-6R	J7MN-9R
Number of poles		3	3	3	3
Max. rated current I_{nmax} (= max. rated operational current I_o)	A	32	32	63	100
Permissible ambient temperature	Storage/transport	-50 to 80°C			
	Operation	-20 to 60°C			
Rated operational voltage U_e	V	690			
Rated frequency	Hz	50/60			
Rated insulation voltage U_i	V	690			
Rated impulse withstand voltage U_{imp}	kV	6			
Utilization category	IEC 60 947-2 (circuit breaker)	A			
	IEC 60 947-4-1 (motor starter)	AC-3			
Class	According to IEC 60 947-4-1	10			
Degree of protection	According to IEC 60 529	IP20	IP20	IP20	IP20
Phase failure sensitivity	According to IEC 60 947-4-1	Yes			
Explosion protection	According to EC Directive 94191EC	Yes			
Isolator characteristics	According to IEC 60 947-3	Yes			
Main and EM. STOP switch characteristics	According to IEC 60 204-1 (VDE113)	Yes			
Safe isolation between main and auxiliary circuits According to DIN VDE 0106 Part 101	Up to 400 V + 10%	Yes			
	Up to 415 V + 5%	Yes			
Mechanical endurance	Operating cycles	100,000	100,000	50,000	50,000
Electrical endurance		100,000	100,000	25,000	25,000
Max. operating frequency per hour (motor starts)	1/h	25	25	25	25

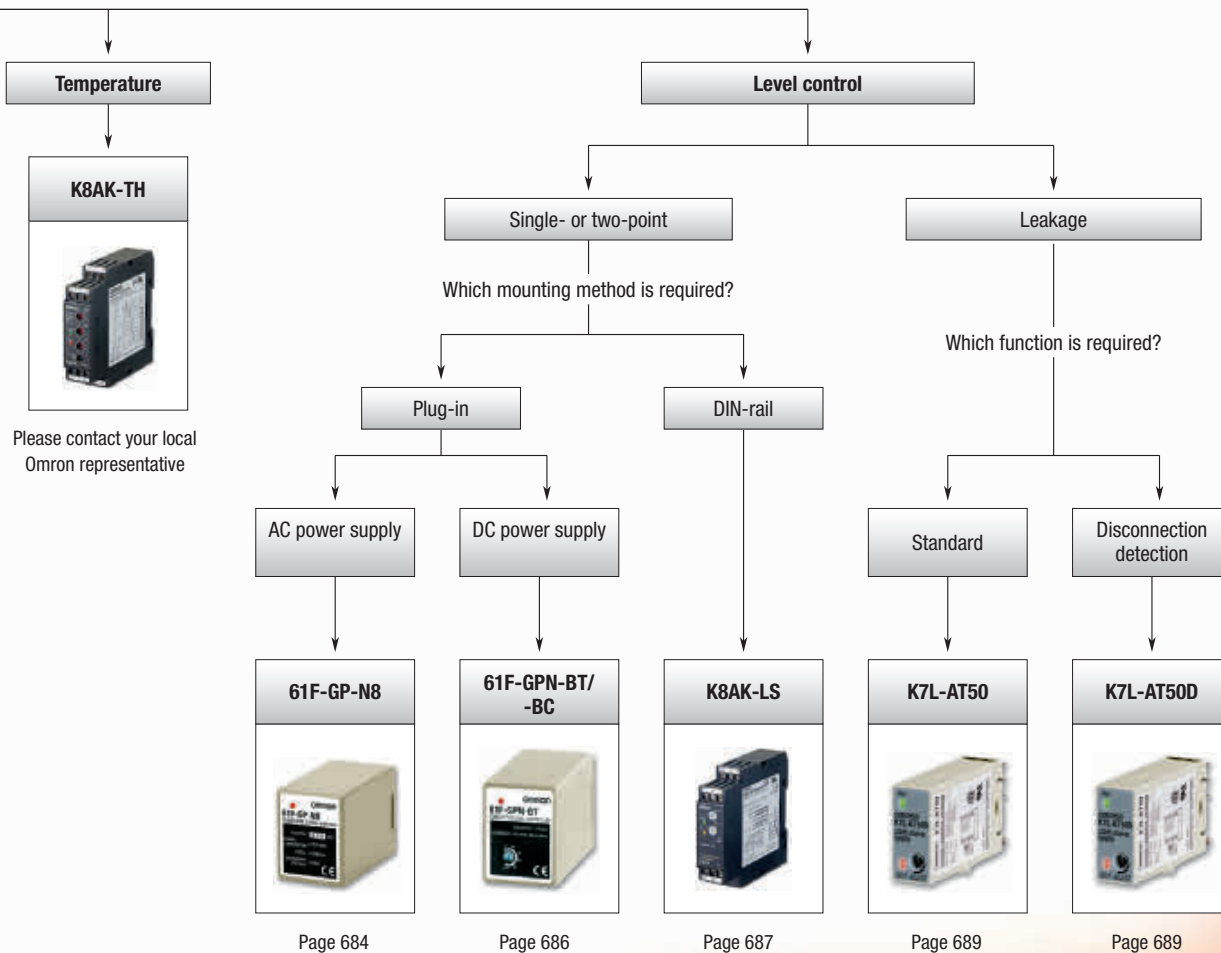
THE COMPLETE MONITORING RANGE

K8 series – The smart way to protect your system

The K8 series offers you a flexible and complete one-stop shopping solution!
 This monitoring range can be split into models for single-phase current and single-phase voltage, three-phase voltage, conductive level and a temperature alarm unit.

- 1-phase: full-span of range setting, all models with timer function
- 3-phase: wide range of global voltage settings
- Easy-to-set parameters





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Selection table

Category		1-phase current		1-phase voltage		Phase-sequence phase-loss		3-phase phase-sequence phase-loss	3-phase asymmetry and phase-sequence phase-loss
Selection criteria									
	Model	K8AK-AS	K8AK-AW	K8AK-VS	K8AK-VW	K8AK-PH	K8DS-PH	K8AK-PM	K8AK-PA
	Specialty	Ideal for current monitoring for industrial heaters and motors.		Ideal for voltage monitoring for industrial facilities and equipment.		Ideal for phase-sequence and phase-loss monitoring for industrial facilities and equipment.		Ideal for monitoring 3-phase power supplies for industrial facilities and equipment.	Ideal for 3-phase voltage asymmetry monitoring for industrial facilities and equipment.
	Sensing range (configurable)	20 mA to 8 A, 100 or 200 A with Current transformer		1 V to 600 V		Same as supply voltage			
Supply voltage AC	24 VAC	■	■	■	■	-	-	-	-
	100 VAC	-	-	-	-	-	-	-	-
	110 VAC	-	-	-	-	-	-	-	-
	115 VAC	-	-	-	-	-	-	-	-
	120 VAC	-	-	-	-	-	-	-	-
	200 VAC	-	-	-	-	-	-	-	-
	220 VAC	-	-	-	-	-	-	-	-
	230 VAC	-	-	-	-	-	-	-	-
	240 VAC	-	-	-	-	-	-	-	-
	100 to 240 VAC	■	■	■	■	-	-	-	-
	200 to 480 VAC	-	-	-	-	■	■	-	-
	200 to 240 VAC	-	-	-	-	-	-	■ (-PM1, 3-wire)	■ (-PA1, 3-wire)
	115 to 138 VAC	-	-	-	-	-	-	■ (-PM1, 4-wire)	■ (-PA1, 4-wire)
380 to 480 VAC	-	-	-	-	-	-	■ (-PM2, 3-wire)	■ (-PA2, 3-wire)	
220 to 277 VAC	-	-	-	-	-	-	■ (-PM2, 4-wire)	■ (-PA2, 4-wire)	
Supply voltage DC	24 VDC	■	■	■	■	-	-	-	-
	12 to 24 VDC	-	-	-	-	-	-	-	-
Control output	Transistor NPN	-	-	-	-	-	-	-	-
	Transistor PNP	-	-	-	-	-	-	-	-
	Relay	■ (1 SPDT)	■ (2 SPDT)	■ (1 SPDT)	■ (2 SPDT)	■ (1 DPDT)	■ (1 SPDT)	■ (2 SPDT)	■ (1 SPDT)
Features	LED operation indicator	■	■	■	■	■	■	■	■
	Adjustable sensitivity	-	-	-	-	-	-	-	-
	Electrode types	-	-	-	-	-	-	-	-
	Page	675	676	677	678	679	680	681	682

3-phase voltage	Conductive level controller				Liquid leakage sensor amplifier	
						
K8AK-PW	61F-GP-N8	61F-GPN-BT	61F-GPN-BC	K8AK-LS	K7L-AT50	K7L-AT50D
Ideal for monitoring 3-phase power supplies for industrial facilities and equipment.	Single or two-point	AC sine wave between electrodes for stable detection with no electrolysis	AC sine wave between electrodes for stable detection with no electrolysis	Ideal for level control for industrial facilities and equipment	Sensor amplifier, AC sine wave between electrodes for stable detection with no electrolysis	Sensor amplifier with disconnection detection function
Same as supply voltage	4 to 50 kΩ	0 to 100 kΩ	1 to 100 kΩ	10 to 100 kΩ	0 to 50 MΩ	1 to 50 MΩ
-	<input type="checkbox"/>	-	-	<input type="checkbox"/>	-	-
-	<input type="checkbox"/>	-	-	-	-	-
-	<input type="checkbox"/>	-	-	-	-	-
-	-	-	-	-	-	-
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-	<input type="checkbox"/>	-	-	-	-	-
-	-	-	-	■	-	-
-	-	-	-	-	-	-
■ (-PW1, 3-wire)	-	-	-	-	-	-
■ (-PW1, 4-wire)	-	-	-	-	-	-
■ (-PW2, 3-wire)	-	-	-	-	-	-
■ (-PW2, 4-wire)	-	-	-	-	-	-
-	-	■	■	<input type="checkbox"/>	-	-
-	-	-	-	-	<input type="checkbox"/>	<input type="checkbox"/>
-	-	-	■	-	■	■
-	-	-	-	-	■	■
■ (2 SPDT)	■	■	■	■ (1 SPDT)	-	-
■	■	■	■	■	■	■
-	-	■	■	-	■	■
-	Electrode holder: PS-_S, PS-31, BF-1 and BS-1			-	Liquid leakage sensor band F03-16PE	
683	684	686		687	689	

■ Standard □ Available - No/not available





Single-phase current relay


These single-phase current relays monitor over- and undercurrents. Manual resetting and automatic resetting are supported by one relay. The start-up lock and operating time can be set separately. The relay warning status is easily monitored with the LED indicator.

- Single-phase current relay
- In 22.5 mm wide industrial housing
- Under or over control
- Supply voltages: 24 VAC/DC, 100 to 240 VAC
- Easy wiring with ferrules

Ordering information

Measuring current	Supply voltage	Order code
2 to 20 mA AC/DC, 10 to 100 mA AC/DC, 50 to 500 mA AC/DC	24 VAC/DC	K8AK-AS1 24 VAC/DC
	100 to 240 VAC	K8AK-AS1 100-240 VAC
0.1 to 1 A AC/DC, 0.5 to 5 A AC/DC, 0.8 to 8 A AC/DC	24 VAC/DC	K8AK-AS2 24 VAC/DC
	100 to 240 VAC	K8AK-AS2 100-240 VAC
10 to 100 A AC, 20 to 200 A AC	24 VAC/DC	K8AK-AS3 24 VAC/DC
	100 to 240 VAC	K8AK-AS3 100-240 VAC

Accessories

Current transformer	Input range	Applicable relay	Order code
	10 to 100 A AC, 20 to 200 A AC	K8AK-AS3	K8AC-CT200L

Note: The K8AK-AS3 is designed to be used in combination with the K8AC-CT200L (direct input not possible)

Specifications

Ambient operating temperature		-20 to 60°C (with no condensation or icing)
Storage temperature		-25 to 65°C (with no condensation or icing)
Operating voltage range		85% to 110% of rated operating voltage
Rated power supply frequency		50/60 Hz±5 Hz (AC power supply)
Output relays (1 × SPDT, normally closed operation)	Resistive load	5 A at 250 VAC or at 30 VDC
	Maximum contact voltage	250 VAC or 30 VDC
	Maximum contact current	5 A
	Maximum switching capacity	1,250 VA, 150 W
Mechanical life		10,000,000 operations
Electrical life		50,000 operations at 5 A, 250 VAC or 30 VDC
Degree of protection		Terminal section: IP20
Case material		PC and ABS
Weight		Approx. 150 g
Operating power	Isolated power supply	2.0 VA/1.1 W max. at 24 VAC/DC, 4.6 VA max. at 100 to 240 VAC
Operate (SV)	Operating value setting range	10% to 100% of maximum measuring current
	Operating value	100% operation at set value
Reset (HYS.)	Hysteresis	5% to 50% of operating value
	Resetting method	Manual reset/automatic reset (switchable) Manual reset: Turn OFF operating power for 1 s or longer
Operating time (T)		0.1 to 30 s
Operating power ON lock (LOCK)		0 to 30 s (The startup lock timer starts when the input has reached approximately 30% or more of the set value.) Note: Enabled only for overcurrent operation
Repeat error	Operating value	±0.5% full scale (at 25°C and 65% humidity, rated power supply voltage, DC or 50/60 Hz sine wave input)
	Operating time	±50 ms (at 25°C and 65% humidity, rated power supply voltage)
Input frequency range	K8AK-AS1/-AS2	DC input or AC input (45 to 65 Hz)
	K8AK-AS3	AC input (45 to 65 Hz)
Overload capacity	K8AK-AS1/-AS2	Continuous input at 120% of maximum input, 1 s at 150%
	K8AK-AS3	Continuous input at 120%, 30 s at 200%, and 1 s at 600% with an OMRON CT (K8AC-CT200L)
Indicators		Power (PWR): Green LED, relay output (RY): Yellow LED, alarm outputs (ALM): Red LED
Applicable standards	Conforming standards	EN 60947-5-1 Installation environment (pollution level 2, installation category III)
	EMC	EN 60947-5-1
	Safety standards	UL 508 (Recognition), Korean Radio Waves Act (Act 10564), CSA and CCC
Size in mm (H × W × D)		90 × 22.5 × 100



Single-phase current relay, window type


These single-phase current relays monitor over- and undercurrents. Manual resetting and automatic resetting are supported by one relay. The start-up lock and operating time can be set separately. The relay warning status is easily monitored with the LED indicator.

- Single-phase current window relay
- In 22.5 mm wide industrial housing
- Under and over control
- Supply voltages: 24 VAC/DC, 100 to 240 VAC
- Easy wiring with ferrules

Ordering information

Measuring current	Supply voltage	Order code
2 to 20 mA AC/DC, 10 to 100 mA AC/DC, 50 to 500 mA AC/DC	24 VAC/DC	K8AK-AW1 24 VAC/DC
	100 to 240 VAC	K8AK-AW1 100-240 VAC
0.1 to 1 A AC/DC, 0.5 to 5 A AC/DC	24 VAC/DC	K8AK-AW2 24 VAC/DC
	100 to 240 VAC	K8AK-AW2 100-240 VAC
10 to 100 A AC, 20 to 200 A AC	24 VAC/DC	K8AK-AW3 24 VAC/DC
	100 to 240 VAC	K8AK-AW3 100-240 VAC

Accessories

Current transformer	Input range	Applicable relay	Order code
	10 to 100 A AC, 20 to 200 A AC	K8AK-AW3	K8AC-CT200L

Note: The K8AK-AW3 is designed to be used in combination with the K8AC-CT200L (direct input not possible)

Specifications

Ambient operating temperature		-20 to 60°C (with no condensation or icing)
Storage temperature		-25 to 65°C (with no condensation or icing)
Operating voltage range		85% to 110% of rated operating voltage
Rated power supply frequency		50/60 Hz±5 Hz (AC power supply)
Output relays (1 × SPDT, normally closed operation)	Resistive load	5 A at 250 VAC or at 30 VDC
	Maximum contact voltage	250 VAC or 30 VDC
	Maximum contact current	5 A
	Maximum switching capacity	1,250 VA, 150 W
Mechanical life		10,000,000 operations
Electrical life		50,000 operations at 5 A, 250 VAC or 30 VDC
Degree of protection		Terminal section: IP20
Case material		PC and ABS
Weight		Approx. 150 g
Operating power	Isolated power supply	2.0 VA/1.1 W max. at 24 VAC/DC, 4.6 VA max. at 100 to 240 VAC
Operate (SV)	Operating value setting range	10% to 100% of maximum measuring current
	Operating value	100% operation at set value
Reset (HYS.)	Hysteresis	5% of operating value (fixed)
	Resetting method	Manual reset/automatic reset (switchable) Manual reset: Turn OFF operating power for 1 s or longer
Operating time (T)		0.1 to 30 s
Operating power ON lock (LOCK)		0 to 30 s (The startup lock timer starts when the input has reached approximately 30% or more of the set value.) Note: Enabled only for overcurrent operation
Repeat error	Operating value	±0.5% full scale (at 25°C and 65% humidity, rated power supply voltage, DC or 50/60 Hz sine wave input)
	Operating time	±50 ms (at 25°C and 65% humidity, rated power supply voltage)
Input frequency range	K8AK-AW1/-AW2	DC input or AC input (45 to 65 Hz)
	K8AK-AW3	AC input (45 to 65 Hz)
Overload capacity	K8AK-AW1/-AW2	Continuous input at 120% of maximum input, 1 s at 150%
	K8AK-AW3	Continuous input at 120%, 30 s at 200%, and 1 s at 600% with an OMRON CT (K8AC-CT200L)
Indicators		Power (PWR): Green LED, relay output (RY): Yellow LED, alarm outputs (ALM): Red LED
Applicable standards	Conforming standards	
	EN 60947-5-1 Installation environment (pollution level 2, installation category III)	
	EMC	
Safety standards		EN 60947-5-1 UL 508 (Recognition), Korean Radio Waves Act (Act 10564), CSA and CCC
Size in mm (H × W × D)		90 × 22.5 × 100



Single-phase voltage relay

These single-phase voltage relays are for monitoring over- and undervoltages. Manual resetting and automatic resetting are supported by one relay. Relay warning status can easily be monitored using the LED indicator.

- Single-phase voltage relay
- In 22.5 mm wide industrial housing
- Under or over control
- Supply voltages: 24 VAC/DC, 100 to 240 VAC
- Easy wiring with ferrules

Ordering information

Measuring current	Supply voltage	Order code
1 to 10 VAC/DC, 3 to 30 VAC/DC, 15 to 150 VAC/DC	24 VAC/DC	K8AK-VS2 24 VAC/DC
	100 to 240 VAC	K8AK-VS2 100-240 VAC
20 to 200 VAC/DC, 30 to 300 VAC/DC, 60 to 600 VAC/DC	24 VAC/DC	K8AK-VS3 24 VAC/DC
	100 to 240 VAC	K8AK-VS3 100-240 VAC

Specifications

Ambient operating temperature		-20 to 60°C (with no condensation or icing)
Storage temperature		-25 to 65°C (with no condensation or icing)
Operating voltage range		85% to 110% of rated operating voltage
Rated power supply frequency		50/60 Hz±5 Hz (AC power supply)
Output relays (1 × SPDT, normally closed operation)	Resistive load	5 A at 250 VAC or at 30 VDC
	Maximum contact voltage	250 VAC or 30 VDC
	Maximum contact current	5 A
	Maximum switching capacity	1,250 VA, 150 W
	Mechanical life	10,000,000 operations
Electrical life		50,000 operations at 5 A, 250 VAC or 30 VDC
Degree of protection		Terminal section: IP20
Case material		PC and ABS
Weight		Approx. 150 g
Operating power	Isolated power supply	2.0 VA/1.1 W max. at 24 VAC/DC, 4.6 VA max. at 100 to 240 VA
Operate (SV)	Operating value setting range	10% to 100% of maximum measuring voltage
	Operating value	100% operation at set value
Reset (HYS.)	Hysteresis	5% to 50% of operating value
	Resetting method	Manual reset/automatic reset (switchable) Manual reset: Turn OFF operating power for 1 s or longer
Operating time (T)		0.1 to 30 s
Power ON lock (LOCK)		1 s or 5 s (Switched using DIP switch) (value when input rapidly changes from 0 to 100%. The operating time is the shortest at this point)
Repeat accuracy	Operating value	±0.5% full scale (at 25°C and 65% humidity, rated power supply voltage, DC or 50/60 Hz sine wave input)
	Operating time	±50 ms (at 25°C and 65% humidity, rated power supply voltage)
Input frequency		40 to 500 Hz
Overload capacity		Continuous input at 115% of maximum input, 10 s at 125% (up to 600 VAC)
Indicators		LED power (PWR): Green LED, relay output (RY): Yellow LED, alarm output (ALM): Red LED
Applicable standards	Conforming standards	EN 60947-5-1 Installation environment (pollution level 2, installation category III)
	EMC	EN 60947-5-1
	Safety standards	UL 508 (Recognition), Korean Radio Waves Act (Act 10564), CSA and CCC
Size in mm (H × W × D)		90 × 22.5 × 100



Single-phase voltage relay, window type

For monitoring over- and undervoltages simultaneously. Manual resetting and automatic resetting are supported by one relay. Separate settings and outputs are supported for over- and undervoltages. Relay warning status can easily be monitored with the LED indicator.

- Single-phase voltage window relay
- In 22.5 mm wide industrial housing
- Under and over, low/low or high/high control
- Supply voltages: 24 VAC/DC, 100 to 240 VAC
- Easy wiring with ferrules

Ordering information

Measuring current	Supply voltage	Order code
1 to 10 VAC/DC, 3 to 30 VAC/DC, 15 to 150 VAC/DC	24 VAC/DC	K8AK-VW2 24 VAC/DC
	100 to 240 VAC	K8AK-VW2 100-240 VAC
20 to 200 VAC/DC, 30 to 300 VAC/DC, 60 to 600 VAC/DC	24 V AC/DC	K8AK-VW3 24 VAC/DC
	100 to 240 VAC	K8AK-VW3 100-240 VAC

Specifications

Ambient operating temperature		-20 to 60°C (with no condensation or icing)
Storage temperature		-25 to 65°C (with no condensation or icing)
Operating voltage range		85% to 110% of rated operating voltage
Rated power supply frequency		50/60 Hz±5 Hz (AC power supply)
Output relays (2 × SPDT, normally closed operation)	Resistive load	5 A at 250 VAC or at 30 VDC
	Maximum contact voltage	250 VAC or 30 VDC
	Maximum contact current	5 A
	Maximum switching capacity	1,250 VA, 150 W
	Mechanical life	10,000,000 operations
Electrical life		50,000 operations at 5 A, 250 VAC or 30 VDC
Degree of protection		Terminal section: IP20
Case material		PC and ABS
Weight		Approx. 150 g
Operating power	Isolated power supply	2.0 VA/1.1 W max. at 24 VAC/DC, 4.6 VA max. at 100 to 240 VAC
Operation (AL1 and AL2)	Operating value setting range	10% to 100% of maximum measuring voltage
	Operating value	100% operation at set value
Reset (HYS.)	Hysteresis	5% of operating value (fixed)
	Resetting method	Manual reset/automatic reset (switchable) Manual reset: Turn OFF operating power for 1 s or longer
Operating time (T)		0.1 to 30 s
Power ON lock (LOCK)		1 s or 5 s (Switched using DIP switch)
Indicators		Power (PWR): Green LED, relay output (RY): Yellow LED, alarm outputs (ALM 1/2): Red LED
Repeat accuracy	Operating value	±0.5% full scale (at 25°C and 65% humidity, rated power supply voltage, DC or 50/60 Hz sine wave input)
	Operating time	±50 ms (at 25°C and 65% humidity, rated power supply voltage)
Input frequency		40 to 500 Hz
Overload capacity		Continuous input at 115% of maximum input, 10 s at 125% (up to 600 VAC)
Applicable standards	Conforming standards	EN 60947-5-1 Installation environment (pollution level 2, installation category III)
	EMC	EN 60947-5-1
	Safety standards	UL 508 (Recognition), Korean Radio Waves Act (Act 10564), CSA and CCC
Size in mm (H × W × D)		90 × 22.5 × 100



3-phase sequence, phase loss relay

The K8AK-PH1 monitoring relay is designed to monitor 3-phase 3-wire supplies. It simultaneously monitors phase sequence and phase loss during start up as well as phase loss during operation. The output relay releases when alarm conditions are detected, and the warning status can easily be monitored using the LED indicator. Suitable for industrial facilities and equipment.

- Monitors phase sequence and phase-loss simultaneously
- Measuring range: 200 to 480 VAC
- Power supply voltage is the same as measuring voltage
- Operation reaction time: 0.1 s maximum

Ordering information

Rated input voltage	Order code
200 to 480 VAC	K8AK-PH1

Specifications

Ambient operating temperature		-20 to 60°C (with no condensation or icing)
Storage temperature		-25 to 65°C (with no condensation or icing)
Altitude		2,000 m max.
Input frequency		50/60 Hz (AC power supply)
Output relays (1 × DPDT, normally closed operation)	Resistive load	5 A at 250 VAC or at 30 VDC
	Maximum contact voltage	250 VAC or 30 VDC
	Maximum contact current	5 A
	Maximum switching capacity	1,250 VA, 150W
	Mechanical life	10,000,000 operations
	Electrical life	50,000 operations at 5 A, 250 VAC or 30 VDC
Degree of protection		Terminal section: IP20
Case material		PC and ABS
Weight		Approx. 130 g
Rated input voltage		Three-phase, three-wire mode, 200 to 480 VAC
Reversed phase and phase loss operating time		0.1 s max.
Resetting method		Automatic reset
Overload capacity		Continuous input: 528 VAC
Indicators		Power (PWR): Green LED, relay output (RY): Yellow LED
Applicable standards	Conforming standards	EN 60947-5-1 Installation environment (pollution level 2, installation category III)
	EMC	EN 60947-5-1
	Safety standards	UL 508 (Recognition), Korean Radio Waves Act (Act 10564), CSA and CCC
Size in mm (H × W × D)		90 × 22.5 × 100



3-phase sequence, phase loss relay

The K8DS-PH1 is a monitoring relay designed at 17.5 mm slim by simplified functions for 3-phase 3 wire supplies. It simultaneously monitors phase sequence and phase loss during start up as well as phase loss during operation. The output relay releases when alarm conditions are detected, and the warning status can easily be monitored using the LED indicator.

- Monitors phase sequence and phase-loss simultaneously
- Measuring range: 200 to 480 VAC
- Power supply voltage is the same as measuring voltage
- Operation reaction time: 0.1 s maximum

Ordering information

Rated input voltage	Order code
200 to 480 VAC	K8DS-PH1

Specifications

Ambient operating temperature		-20 to 60°C (with no condensation or icing)
Storage temperature		-25 to 65°C (with no condensation or icing)
Altitude		2,000 m max.
Input frequency		50/60 Hz (AC power supply)
Output relays (1 × SPDT, normally closed operation)	Resistive load	5 A at 250 VAC or at 30 VDC
	Maximum contact voltage	250 VAC or 30 VDC
	Maximum contact current	5 A
	Maximum switching capacity	1,250 VA, 150 W
	Mechanical life	10,000,000 operations
Electrical life		50,000 operations at 5 A, 250 VAC or 30 VDC
Degree of protection		Terminal section: IP20
Case material		PC and ABS
Weight		Approx. 60 g
Rated input voltage		Three-phase, three-wire mode, 200 to 480 VAC
Reversed phase and phase loss operating time		0.1 s max.
Resetting method		Automatic reset
Overload capacity		Continuous input: 500 VAC
Indicators		Power (PWR): Green LED, relay output (RY): Yellow LED
Applicable standards	Conforming standards	EN 60947-5-1 Installation environment (pollution level 2, installation category III)
	EMC	EN 60947-5-1
	Safety standards	UL 508 (Recognition), Korean Radio Waves Act (Act 10564), CSA and CCC
Size in mm (H × W × D)		80 × 17.5 × 73



3-phase voltage, phase sequence, phase loss relay

K8AK-PM monitors overvoltages, undervoltages, phase sequence and phase loss for 3-phase, 3-wire or 4-wire power supplies, in one unit. This relay features a switch setting for 3-phase, 3-wire or 3-phase, 4-wire power supply.

- Worldwide power specifications supported by one unit
- Phase sequence, phase loss: Operation reaction time 0.1 s maximum
- Overvoltages or undervoltages: Operation time setting from 0.1 to 30 s
- Relay warning status can easily be monitored using the LED indicator
- Easy wiring with ferrules

Ordering information

Rated input		Order code
3-phase 3-wire mode	200, 220, 230, 240 VAC	K8AK-PM1
3-phase 4-wire mode	115, 127, 133, 138 VAC	
3-phase 3-wire mode	380, 400, 415, 480 VAC	K8AK-PM2
3-phase 4-wire mode	220, 230, 240, 277 VAC	

Specifications

Ambient operating temperature		-20 to 60°C (with no condensation or icing)
Storage temperature		-25 to 65°C (with no condensation or icing)
Input frequency		50/60 Hz (AC power supply)
Output relays (2 × SPDT, normally closed operation)	Resistive load	5 A at 250 VAC or at 30 VDC
	Maximum contact voltage	250 VAC or 30 VDC
	Maximum contact current	5 A
	Maximum switching capacity	1,250 VA, 150 W
	Mechanical life	10,000,000 operations
	Electrical life	50,000 operations at 5 A, 250 VAC or 30 VDC
Degree of protection		Terminal section: IP20
Case material		PC and ABS
Weight		Approx. 150 g
Rated input voltage	K8AK-PM1	3-phase, 3-wire mode: 200, 220, 230, 240 VAC, 3-phase, 4-wire mode: 115, 127, 133, 138 VAC
	K8AK-PM2	3-phase, 3-wire mode: 380, 400, 415, 480 VAC, 3-phase, 4-wire mode: 220, 230, 240, 277 VAC
Operation (overvoltage or undervoltage)	Operating value setting range	Overvoltage = -30% to 25% of maximum rated input voltage ^{*1} Undervoltage = -30% to 25% of maximum rated input voltage ^{*1}
	Operating value	100% operation at set value
Reset (HYS.)	Hysteresis	5% of operating value (fixed)
	Resetting method	Automatic reset
Operating time (T)	Overvoltage/undervoltage	0.1 to 30 s
	Phase-sequence, phase-loss	0.1 s max.
Power ON lock (LOCK)		1 s or 5 s (Changed with the DIP switch)
Overload capacity		Continuous input at 115% of maximum input, 10 s at 125% (up to 600 VAC)
Repeat accuracy	Operating value	±0.5% full scale (at 25°C and an ambient humidity of 65% at the rated power supply voltage, DC or 50/60 Hz sine wave input)
	Operating time	±50 ms (at 25°C and 65% humidity, rated power supply voltage)
Indicators		Power (PWR): Green LED, relay output (RY): Yellow LED, alarm outputs (ALM 1/2): Red LED
Applicable standards	Conforming standards	EN 60947-5-1 Installation environment (pollution level 2, installation category III)
	EMC	EN 60947-5-1
	Safety standards	UL 508 (Recognition), Korean Radio Waves Act (Act 10564), CSA and CCC
Size in mm (H × W × D)		90 × 22.5 × 100

^{*1} The rated input voltage is switched with a switch



3-phase asymmetry, phase sequence, phase loss relay

Monitors voltage asymmetry, phase sequence and phase loss for 3-phase 3-wire or 4-wire power supplies, in one unit.

- Worldwide power specifications supported by one unit
- Phase sequence, phase loss: Operation reaction time 0.1 s maximum
- Asymmetry: Operation time setting from 0.1 to 30 s
- Reset method: Automatic
- Power ON lock: 1 s or 5 s

Ordering information

Rated input		Order code
3-phase 3-wire mode	200, 220, 230, 240 VAC	K8AK-PA1
3-phase 4-wire mode	115, 127, 133, 138 VAC	
3-phase 3-wire mode	380, 400, 415, 480 VAC	K8AK-PA2
3-phase 4-wire mode	220, 230, 240, 277 VAC	

Specifications

Ambient operating temperature		-20 to 60°C (with no condensation or icing)
Storage temperature		-25 to 65°C (with no condensation or icing)
Altitude		2,000 m max.
Input frequency		50/60 Hz (AC power supply)
Output relays (1 × SPDT, normally closed operation)	Resistive load	5 A at 250 VAC or at 30 VDC
	Maximum contact voltage	250 VAC or 30 VDC
	Maximum contact current	5 A
	Maximum switching capacity	1,250 VA, 150 W
	Mechanical life	10,000,000 operations
	Electrical life	50,000 operations at 5 A, 250 VAC or 30 VDC
Degree of protection		Terminal section: IP20
Case material		PC and ABS
Weight		Approx. 130 g
Rated input voltage	K8AK-PA1	3-phase, 3-wire mode: 200, 220, 230, 240 VAC, 3-phase, 4-wire mode: 115, 127, 133, 138 VAC
	K8AK-PA2	3-phase, 3-wire mode: 380, 400, 415, 480 VAC, 3-phase, 4-wire mode: 220, 230, 240, 277 VAC
Asymmetry operation (ASY.)	Operating value setting range	Asymmetry rate: 2% to 22%
	Operating value	100% operation at set value Asymmetry operating value = rated input voltage x asymmetry set value [%] The asymmetry operation will function when the difference between the highest and lowest voltage phases equals or exceeds the asymmetry operating value
Reset (HYS.)	Hysteresis	5% of operating value (fixed)
	Resetting method	Automatic reset
Operating time (T)	Asymmetry	0.1 s to 30 s
	Phase-sequence, phase-loss	0.1 s max.
Power ON lock (LOCK)		1 s or 5 s (Changed with the DIP switch)
Overload capacity		Continuous input at 115% of maximum input, 10 s at 125% (up to 600 VAC)
Repeat accuracy	Operating value	±0.5% full scale (at 25°C and an ambient humidity of 65% at the rated power supply voltage, DC or 50/60 Hz sine wave input)
	Operating time	±50 ms (at 25°C and 65% humidity, rated power supply voltage)
Indicators		Power (PWR): Green LED, relay output (RY): Yellow LED, alarm outputs (ALM 1/2): Red LED
Applicable standards	Conforming standards	EN 60947-5-1 Installation environment (pollution level 2, installation category III)
	EMC	EN 60947-5-1
	Safety standards	UL 508 (Recognition), Korean Radio Waves Act (Act 10564), CSA and CCC
Size in mm (H × W × D)		90 × 22.5 × 100



3-phase voltage relay

Monitors overvoltages and undervoltages for 3-phase 3-wire or 4-wire power supplies, in one unit. Switch setting for 3-phase 3-wire or 3-phase 4-wire power supply.

- Overvoltages or undervoltages: Operation time setting from 0.1 to 30 s
- Relay warning status can easily be monitored using the LED indicator
- Separate outputs possible for overvoltages and undervoltages
- Reset method: Automatic
- Power ON lock: 1 s or 5 s

Ordering information

Rated input		Order code
3-phase 3-wire mode	200, 220, 230, 240 VAC	K8AK-PW1
3-phase 4-wire mode	115, 127, 133, 138 VAC	
3-phase 3-wire mode	380, 400, 415, 480 VAC	K8AK-PW2
3-phase 4-wire mode	220, 230, 240, 277 VAC	

Specifications

Ambient operating temperature		-20 to 60°C (with no condensation or icing)
Storage temperature		-25 to 65°C (with no condensation or icing)
Altitude		2,000 m max.
Voltage fluctuation rang		85% to 110% of rated input voltage
Input frequency		50/60 Hz (AC power supply)
Output relays (2 × SPDT, normally closed operation)	Resistive load	5 A at 250 VAC or at 30 VDC
	Maximum contact voltage	250 VAC or 30 VDC
	Maximum contact current	5 A
	Maximum switching capacity	1,250 VA, 150 W
	Mechanical life	10,000,000 operations
	Electrical life	50,000 operations at 5 A, 250 VAC or 30 VDC
Degree of protection		Terminal section: IP20
Case material		PC and ABS
Weight		Approx. 150 g
Rated input voltage	K8AK-PW1	3-phase, 3-wire mode: 200, 220, 230, 240 VAC, 3-phase, 4-wire mode: 115, 127, 133, 138 VAC
	K8AK-PW2	3-phase, 3-wire mode: 380, 400, 415, 480 VAC, 3-phase, 4-wire mode: 220, 230, 240, 277 VAC
Operation (overvoltage and undervoltage)	Operating value setting range	Overvoltage = -30% to 25% of maximum rated input voltage ^{*1} Undervoltage = -30% to 25% of maximum rated input voltage ^{*1}
	Operating value	100% operation at set value
Reset (HYS.)	Hysteresis	5% of operating value (fixed)
	Resetting method	Automatic reset
Operating time (T)	Overvoltage/undervoltage	0.1 to 30 s
Power ON lock (LOCK)		1 s or 5 s (Changed with the DIP switch)
Overload capacity		Continuous input at 115% of maximum input, 10 s at 125% (up to 600 VAC)
Repeat accuracy	Operating value	±0.5% full scale (at 25°C and an ambient humidity of 65% at the rated power supply voltage, DC or 50/60 Hz sine wave input)
	Operating time	±50 ms (at 25°C and 65% humidity, rated power supply voltage)
Indicators		Power (PWR): Green LED, relay output (RY): Yellow LED, alarm outputs (ALM 1/2): Red LED
Applicable standards	Conforming standards	
	EN 60947-5-1 Installation environment (pollution level 2, installation category III)	
	EMC	EN 60947-5-1
	Safety standards	UL 508 (Recognition), Korean Radio Waves Act (Act 10564), CSA and CCC
Size in mm (H × W × D)		90 × 22.5 × 100

*1 The rated input voltage is switched with a switch



Compact plug-in (8-pin) level controller

The 61F-GP-N8 can be used for single- or two-point level control of conductive materials, both liquids and solids. These products are equipped with a red LED operation indicator.

- Low-voltage (AC) electrodes (8 VAC or 24 VAC)
- Operation range: 4 to 15 k Ω , 70 to 300 k Ω
- Detection method: Conductive
- Probes need to be ordered separately
- Conforms to EMC and LVD directives, UL/CSA approved

Ordering information

Application	Type	Order code
Ordinary purified water or sewage water	General purpose type	61F-GP-N8 24AC
		61F-GP-N8 110AC
		61F-GP-N8 230AC
Ordinary purified water, where the distance between sewage pumps and water tanks or between receiver tanks and supply tanks is long or where remote control is required	Long-distance type	2 km
		4 km
	High sensitivity type	61F-GP-N8L 24AC 2KM
		61F-GP-N8L 110AC 2KM
		61F-GP-N8L 230AC 2KM
		61F-GP-N8L 24AC 4KM
Liquids with high specific resistance such as distilled water	High sensitivity type	61F-GP-N8L 110AC 4KM
		61F-GP-N8L 230AC 4KM
		61F-GP-N8H 24AC
Liquids with low specific resistance such as salt water, sewage water, acid chemicals, alkali chemicals	Low sensitivity type	61F-GP-N8H 110AC
		61F-GP-N8H 230AC
		61F-GP-N8D 24AC
Ordinary purified or sewage water, with two-wired-type electrode holder (incorporating a resistor of 6.8 k Ω)	Two-wired type	61F-GP-N8D 110AC
		61F-GP-N8D 230AC
		61F-GP-N8R 24AC
DIN-rail mounting socket		61F-GP-N8R 110AC
Back-connecting socket		61F-GP-N8R 230AC
		PF083A-E
		PL08

Accessories

Electrode holders					
Applications	Mounting style	Insulator material	Max. temperature	Number of electrodes	Order code
For city water and other general use. Easy-to-replace separate versions for maintenance.	Flange	Phenol resin	70°C	3	PS-3S
When mounting space is limited. Special 3-pole holder of small size and light weight.	Screw	Phenol resin		3, 300 mm 3, 1,000 mm	PS-31-300MM PS-31-1000MM
Use for sewage, sea water, etc., having a low specific resistance.	Flange	Ceramics	150°C (without water drips or vapour on the electrode holder surface)	1	BF-1
For resistance to high pressure. Use in tanks with high temperature or pressure.	Screw	PTFE	250°C (without water drips or vapour on the surface of the electrode holder)	1	BS-1
Electrode separators				Number of electrodes	Order code
				1	F03-14 1P
				3	F03-14 3P
Electrodes, connecting, and lock nuts					
Applicable liquids	Material	Component	Indication mark	Inscription	Order code
Purified city water, industrial water, sewage	Equivalent to SUS 304 (AISI-304)	Electrode (1 m long)	1 line	–	F03-01 SUS201
		Connecting nut	–	–	F03-02 SUS201
		Lock nut	–	–	F03-03 SUS201
Purified city water, industrial water, sewage, dilute alkaline solution	SUS316 (AISI-316)	Electrode (1 m long)	2 lines	–	F03-01 SUS316
		Connecting nut	–	6	F03-02 SUS316
		Lock nut	–	316	F03-03 SUS316

Specifications

Item	61F-GP-N8	61F-GP-N8L	61F-GP-N8H	61F-GP-N8D	61F-GP-N8R
Supply voltage	24, 100, 110, 120, 200, 220, 230 or 240 VAC; 50/60 Hz				
Operating voltage range	85 to 110% of rated voltage				
Interelectrode voltage	8 VAC		24 VAC	8 VAC	
Interelectrode current	Approx. 1 mA AC max.		Approx. 0.4 mA AC max.	Approx. 1 mA AC max.	
Power consumption	Approx. 3.5 VA max.				
Response time	Operate: 80 ms max., release: 160 ms max.				
Cable length	1 km max.	2 km max. 4 km max.	50 m max.	1 km max.	800 m max.
Control output	1 A, 250 VAC (inductive load: $\text{Cos}\phi = 0.4$), 3 A, 250 VAC (resistive load)				
Ambient temperature	Operating: -10 to 55°C				
Life expectancy	Electrical: 100,000 operations min., mechanical: 5,000,000 operations min				
Size in mm (HxWxD)	49.9x38x70				



Compact plug-in (11-pin) level controller (DC supply)

This controller is for single- or two-point level control. 24 VDC supply allows for usage in locations without AC power supply. Relay contact chattering usually caused by waves has been eliminated by using open collector output, reducing contact wear.

- Adjustable sensitivity: Operation range: 0 to 100 k Ω
- Red LED for operation indicator
- Conforms to EMC and LVD directives
- UL/CSA approved
- Probes need to be ordered separately

Ordering information

Product name	Output	Order code
Conductive level controller	Open collector (NPN)	61F-GPN-BT 24VDC
	Relay contact (SPST-NO)	61F-GPN-BC 24VDC
Front socket		PF113A-E

Accessories

Electrode holders					
Applications	Mounting style	Insulator material	Max. temperature	Number of electrodes	Order code
For city water and other general use. Easy-to-replace separate versions for maintenance.	Flange	Phenol resin	70°C	3	PS-3S
When mounting space is limited. Special 3-pole holder of small size and light weight.	Screw	Phenol resin		3, 300 mm 3, 1000 mm	PS-31-300MM PS-31-1000MM
Use for sewage, sea water, etc., having a low specific resistance.	Flange	Ceramics	150°C (without water drips or vapour on the electrode holder surface)	1	BF-1
For resistance to high pressure. Use in tanks with high temperature or pressure.	Screw	PTFE	250°C (without water drips or vapour on the surface of the electrode holder)	1	BS-1
Electrode separators				Number of electrodes	Order code
				1	F03-14 1P
				3	F03-14 3P
Electrodes, connecting, and lock nuts					
Applicable liquids	Material	Component	Indication mark	Inscription	Order code
Purified city water, industrial water, sewage	Equivalent to SUS 304 (AISI-304)	Electrode (1 m long)	1 line	–	F03-01 SUS201
		Connecting nut	–	–	F03-02 SUS201
		Lock nut	–	–	F03-03 SUS201
Purified city water, industrial water, sewage, dilute alkaline solution	SUS316 (AISI-316)	Electrode (1 m long)	2 lines	–	F03-01 SUS316
		Connecting nut	–	6	F03-02 SUS316
		Lock nut	–	316	F03-03 SUS316

Specifications

Item	61F-GPN-BT	61 F-GPN-BC
Rated voltage	24 VDC	
Allowable voltage range	85 to 110% of the rated voltage	
Interelectrode voltage	5 VAC max.	
Error	For scale of 0: +10 k Ω , for scale of 100: \pm 10 k Ω	
Release resistance	200% max. of the operation resistance	
Switching between supply and drainage	Terminals 7 and 8 open: Automatic drainage operation; terminals 7 and 8 shorted: Automatic supply operation	
Output specifications	Open collector (NPN) 30 VDC, 100 mA max.	SPST-NO; 5 A, 240 VAC (resistive load) 2 A, 240 VAC (inductive load: $\cos\phi = 0.4$)
Life expectancy	–	Electrical: 100,000 operations min. Mechanical: 20,000,000 operations min.
Wiring distance	100 m max.	
Ambient operating temperature	–10 to 55°C	
Response time	Operating: 1.5 s max., releasing: 3.0 s max.	
Size in mm (HxWxD)	49.9x38x70	



22.5 mm wide conductive level controller

The K8AK-LS1 is a conductive level controller in a 22.5 mm wide industrial housing. Via DIP switches its function (supply or drainage) can be selected. This product is for single- or two-point level control.

- Time delay function up to 10 s
- Supply voltages: 24 VAC/DC and 100 to 240 VAC
- Control output: Relay 5 A at 250 VAC resistive load
- Probes cable length: Max. 100 m from controller
- LED indicator: Green for power ON, yellow for output relay

Ordering information

Supply voltage	Order code
24 VAC/VDC	K8AK-LS1 24VAC/DC
100 to 240 VAC	K8AK-LS1 100-240 VAC

Accessories

Electrode holders					
Applications	Mounting style	Insulator material	Max. temperature	Number of electrodes	Order code
For city water and other general use. Easy-to-replace separate versions for maintenance.	Flange	Phenol resin	70°C	3	PS-3S
When mounting space is limited. Special 3-pole holder of small size and light weight.	Screw	Phenol resin		3, 300 mm 3, 1000 mm	PS-31-300MM PS-31-1000MM
Use for sewage, sea water, etc., having a low specific resistance.	Flange	Ceramics	150°C (without water drips or vapour on the electrode holder surface)	1	BF-1
For resistance to high pressure. Use in tanks with high temperature or pressure.	Screw	PTFE	250°C (without water drips or vapour on the surface of the electrode holder)	1	BS-1
Electrode separators				Number of electrodes	Order code
				1	F03-14 1P
				3	F03-14 3P
Electrodes, connecting, and lock nuts					
Applicable liquids	Material	Component	Indication mark	Inscription	Order code
Purified city water, industrial water, sewage	Equivalent to SUS 304 (AISI-304)	Electrode (1 m long)	1 line	–	F03-01 SUS201
		Connecting nut	–	–	F03-02 SUS201
		Lock nut	–	–	F03-03 SUS201
Purified city water, industrial water, sewage, dilute alkaline solution	SUS316 (AISI-316)	Electrode (1 m long)	2 lines	–	F03-01 SUS316
		Connecting nut	–	6	F03-02 SUS316
		Lock nut	–	316	F03-03 SUS316

Specifications

Ambient operating temperature		-20 to 60°C (with no condensation or icing)
Storage temperature		-25 to 65°C (with no condensation or icing)
Operating voltage range		85% to 110% of rated operating voltage
Rated power supply frequency		50/60 Hz (AC power supply)
Output relays	Resistive load	5 A at 250 VAC or at 30 VDC
	Maximum contact voltage	250 VAC or 30 VDC
	Maximum contact current	5 A
	Maximum switching capacity	1,250 VA, 150 W
	Mechanical life	10,000,000 operations
Electrical life		50,000 operations at 5 A, 250 VAC or 30 VDC
Degree of protection		Terminal section: IP20
Case material		PC and ABS
Weight		Approx. 150 g
Operating resistance		10 kΩ to 100 kΩ (variable)
Reset resistance		250 kΩ max.
Response time		Approx. 0.1 to 10 s (variable)
Cable length		100 m max. with completely insulated (600 V) cabtire cable with 3 conductors (0.75 mm ²)
Indicators		Green LED: Power, Yellow LED: Control output
Applicable standards	Conforming standards	EN 61010-1 Installation environment (pollution level 2, installation category II)
	EMC	EN 61326-1
	Safety standards	EN 60664-1UL 508 (Recognition), Korean Radio Waves Act (Act 10564), CSA and CCC
Size in mm (H × W × D)		90 × 22.5 × 100



Ultra-miniature liquid leakage sensor amplifier

This very compact plug-in leakage controller fits into Omron's G2R 8-pin sockets (P2RF-08-E). K7L detects a wide variety of liquids, ranging from water to liquid chemicals with low conductivity.

- Operation range: Up to 50 M Ω
- Four sensing ranges available
- Detection method: Conductive
- Two LEDs: Green for power supplied, red for output indication
- Conforms to EMC and LVD Directives, UL/CSA approved

Ordering information

Product name	Characteristics	Order code
Liquid leakage sensor amplifier	Standard	K7L-AT50
	With disconnection function set	K7L-AT50D
	With disconnection function sensor amplifier only	K7L-AT50D-S

Product name	Characteristics	Order code	
Sensors	Sensing band	Standard model (material: Polyethylene)	F03-16PE 5M
		For temperature and chemical resistance (material: Polyethylene PTFE)	F03-16PT 5M
		For flexibility and superior workability (material: Plastic fiber braided cable)	F03-16SF 5M
		For flexibility and visual confirmation of leakage (material: Plastic fiber braided cable)	F03-16SFC 5M
	Point sensor	Easier to wipe off than the band type	F03-16PS
		Electrodes have PTFE coating to resist chemicals	F03-16PS-F

Accessories

Product name	Characteristics	Order code
Terminal blocks (10 pcs)		F03-20
DIN-rail mounted socket	With finger protection	P2RF-08-E
	Without finger protection	P2RF-08

Product name	Characteristics	Order code	
Mounting brackets and stickers	Sensing band stickers	Used for F03-16SF(C)	F03-25
		Used for F03-16PE (adhesive tape)	F03-26PES
		Used for F03-16PE (screws) (30 pcs)	F03-26PEN
		Used for F03-16PT (screws)	F03-26PTN
	Point sensor mounting brackets	Used for F03-16PS	F03-26PS

Specifications

Rated power supply voltage	12 to 24 VDC (allowable voltage fluctuation range: 10 to 30 VDC)
Operate resistance	0 Ω to 50 M Ω , variable Range 0: 0 to 250 k Ω Range 1: 0 to 600 k Ω Range 2: 0 to 5 M Ω Range 3: 0 to 50 M Ω
Release resistance	105% min. of operate resistance
Output configuration	NPN open-collector transistor output with 100 mA at 30 VDC max.
Wiring distance	Connecting cable: 50 m max. Sensing band length: 10 m max.
Ambient temperature	Operating: -10 to 55°C
Power consumption	1 W max.
Response time	Operate: 800 ms max., release: 800 ms max.
Weight	Approx. 14 g
Disconnection detection function (K7L-AT50D & K7L-AT50D-S only)	Detection signal: 10 VDC max., 200 ms, detection time: 10 s max. Release: By resetting the power supply
Size in mm (HxWxD)	28.8x12.8x46

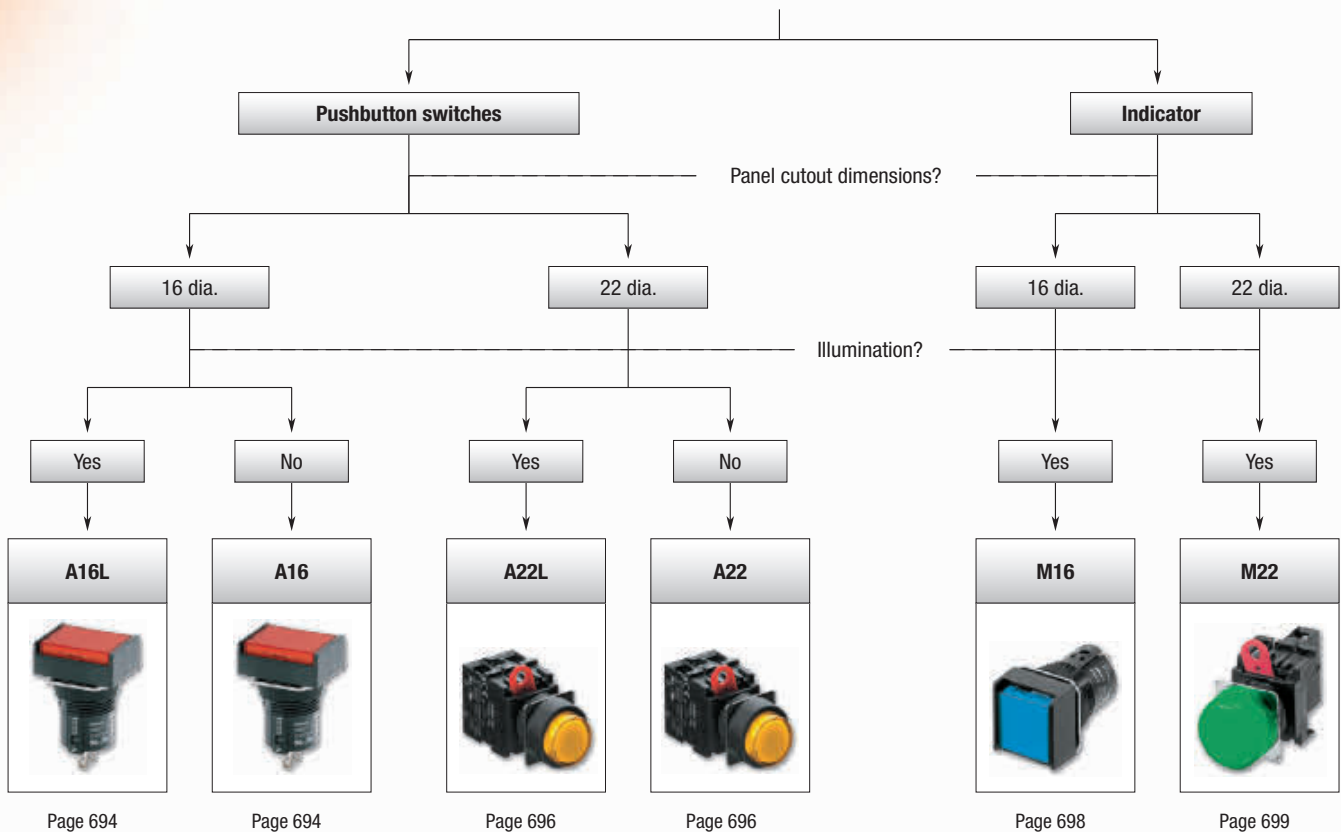
16 MM SUB-ASSEMBLED PUSHBUTTON SWITCHES

A165 – Full range with IP65 rating









All our 16 mm pushbuttons are upgraded to IP65 rating. This will increase the reliability of your application. The pushbuttons are very easy to assemble due to their modular construction: Pushbutton + case + lamp (if applicable) + switch.

- Wide range of models: rectangular, square & round
- With or without lamp
- Easy assembly and installation

Which application is required?





Category		Pushbutton switch		Indicator		
Selection criteria						
	Model	A16	A22	M16	M22	
	Mounting	Nut-mounting				
	Size	16 mm	22 mm	16 mm	22 mm	
	Shape					
Pushbutton colour	Incandescent lamp-lighted	Red	■	■	■	■
		Yellow	■	■	■	■
		Pure yellow	■		■	—
		Green	■	■	■	■
		White	■	■	■	■
		Blue	■	■	■	■
	LED-lighted	Red	■	■	■	■
		Yellow	■	■	■	■
		Pure yellow	■		■	—
		Green	■	■	■	■
		White	■	■	■	■
		Blue	■	■	■	■
	Non-lighted	Red	■	■	—	—
		Yellow	■	■	—	—
		Green	■	■	—	—
		White	■	■	—	—
		Blue	■	■	—	—
		Black	■	■	—	—
Features	Momentary operation	■	■	—	—	
	Self-holding	■	■	—	—	
	Number of contacts	2	6	—	—	
	IP rating	IP65				
Switch ratings [A]	Legend plate	■	■	■	■	
	125 VAC	5	10	—	—	
	250 VAC	3	6	—	—	
	30 VDC	3	10	—	—	
	Rated load	5 A at 125 VAC, 3 A at 250 VAC, 3 A at 30 VDC	10 A at 110 VAC, 6 A at 220 VAC	—	—	
Terminals	Solder	■	—	■	—	
	PCB	—	—	■	—	
	Screw-less Clamp	—	—	■	—	
Operating voltage	5 VDC	■	■	■	■	
	12 VDC	■	■	■	■	
	24 VDC	■	■	■	■	
Form	SPDT	■	—	—	—	
	DPDT	■	—	—	—	
	SPST-NO	—	■	—	—	
	SPST-NC	—	■	—	—	
	SPST-NO + SPST-NC	—	■	—	—	
	DPST-NO	—	■	—	—	
	DPST-NC	—	■	—	—	
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■ Standard □ Available — No/not available



16 mm pushbutton switch

These sub-assembled pushbutton switches have a modular construction: pushbutton + case + lamp (if applicable) + switch. A16 is a nut-mounted pushbutton switch with a short mounting depth of less than 28.5mm below panel.

- Wide variety of control and signal devices: lighted, non-lighted and buzzer
- Quick and easy assembly, snap-in switch
- Wide range of switching capacity from standard load to micro load
- High reliability, IP65
- UL, cUL, CSA and VDE approved, conforms to EN60947-5-1 and IEC947-5-1

Ordering information

Type	Colour	Order code		
		Degree of protection: Oil-resistant IP65		
		Rectangular	Square	Round
Non-lighted LED Incandescent lamp	Red	A165L-JR	A165L-AR	A165L-TR
	Yellow	A165L-JY	A165L-AY	A165L-TY
	Pure yellow	A165L-JPY	A165L-APY	A165L-TPY
	White	A165L-JW	A165L-AW	A165L-TW
	Blue	A165L-JA	A165L-AA	A165L-TA
Non-lighted	Black	A165L-JB	A165L-AB	A165L-TB
LED	Green	A165L-JGY	A165L-AGY	A165L-TGY
Non-lighted/incandescent lamp	Green	A165L-JG	A165L-AG	A165L-TG

Cases

Appearance	Classification		Order code	
			Oil-resistant IP65	
	Momentary operation	Rectangular (2-way guard)	A165-CJM	
		Square	A165-CAM	
		Round	A165-CTM	
	Alternate operation	Rectangular (2-way guard)	A165-CJA	
		Square	A165-CAA	
		Round	A165-CTA	

Switches

Appearance	Classification			Order code	
	Lighted/ non-lighted (common use)	Standard load/ microload (common use)	SPDT	Solder terminal	A16-1
			DPDT		A16-2
			SPDT	PCB terminal	A16-1P
			DPDT		A16-2P
			DPDT	Screw- less clamp	A16-2S

Switches with reduced voltage lighting




Appearance	Classification			Order code	
	100 V	Standard load/ microload (common use)	SPDT	Solder terminal	A16-T1-1
			DPDT		A16-T1-2
	100 V		DPDT	Screw-less clamp	A16-T1-2S
	200 V				A16-T2-2S

Lamps

Type	Colour	Order code		
		5 VDC	12 VDC	24 VDC
LED	Red	A16-5DSR	A16-12DSR	A16-24DSR
	Yellow	A16-5DSY	A16-12DSY	A16-24DSY
	Green	A16-5DSG	A16-12DSG	A16-24DSG
	White ^{*1}	A16-5DSW	A16-12DSW	A16-24DSW
	Blue	A16-5DA	A16-12DA	A16-24DA
Type		5 VAC/VDC	12 VAC/VDC	24 VAC/VDC
Incandescent lamp		A16-5	A16-12	A16-24

^{*1} Use the white LED together with white or pure yellow pushbuttons.

Accessories

Name	Appearance	Classification	Remarks	Order code
Switch guards		For rectangular models	Cannot be used with the dust cover	A16ZJ-5050
		For square and round models		A16ZA-5050
Dust covers		For rectangular models	Cannot be used with the switch guard	A16ZJ-5060
		For square models		A16ZA-5060
		For round models		A16ZT-5060
Panel plugs		For rectangular models	Used for covering the panel cutouts for future panel expansion	A16ZJ-3003
		For square models		A16ZA-3003
		For round models		A16ZT-3003

Specifications

Allowable operating frequency	Mechanical	Momentary operation: 120 operations/minute max. Alternate operation: 60 operations/minute max.
	Electrical	20 operations/minute max.
Durability	Mechanical	Momentary operation: 2,000,000 operations min. Alternate operation: 200,000 operations min.
	Electrical	100,000 operations min.
Ambient temperature		Operating: -10 to 55°C (with no icing or condensation) Storage: -25 to 65°C (with no icing or condensation)
Weight		Approx. 10 g (in the case of a lighted DPDT switch with solder terminals)
Size in mm (HxWxD)		Round/square: 18x18x28.5 rectangular: 18x24x28.5

Operating characteristics	Pushbutton switch	
	Oil-resistant IP65	
	SPDT	DPDT
Operating force (OF) max.	2.94 N	4.91 N
Releasing force (RF) min.	0.29 N	
Total travel (TT)	Approx. 3 mm	
Pretravel (PT) max.	2.5 mm	
Lock stroke (LTA) min.	0.5 mm	

Item		Screw-less clamp			
Recommended wire size		0.5 mm ² twisted wire or 0.8 mm dia. solid wire			
Usable wires and tensile strength	Twisted wire	0.3 mm ²	0.5 mm ²	0.75 mm ²	1.25 mm ²
	Solid wire	0.5 mm dia.	0.8 mm dia.	1.0 mm dia.	
	Tensile strength	10 N	20 N	30 N	40 N
Length of exposed wire		10 ± 1 mm			











22 mm pushbutton switch

The A22 comes in a wide variety of shapes and colours and is installable in 22-dia. or 25-dia. panel cutouts. The switch unit can be easily mounted. A22 is mounted using either open-type (fork-type) or closed-type (round-type) crimp terminals.




- Finger-protection mechanism on the switch unit are provided as a standard feature
- Increased wiring efficiency with three-row mounting of switch blocks
- IP65 oil-resistant (non-lighted models), IP65 (lighted models)
- Lighted and non-lighted, flat, projection and half- and full-guard versions
- EN60947-5-1, UL and cUL approved

Ordering information


Pushbutton

Illumination	Colour	Order code							
		Flat type	Projection type	Full-guard type	Half-guard type	Square/projection type	Square/full-guard type	Round/mushroom type (30-dia. head)	Round/mushroom type (40-dia. head)
									
Non-lighted	Red	A22-FR	A22-TR	A22-GR	A22-HR	A22-CR	A22-DR	A22-SR	A22-MR
	Green	A22-FG	A22-TG	A22-GG	A22-HG	A22-CG	A22-DG	A22-SG	A22-MG
	Yellow	A22-FY	A22-TY	A22-GY	A22-HY	A22-CY	A22-DY	A22-SY	A22-MY
	White	A22-FW	A22-TW	A22-GW	A22-HW	A22-CW	A22-DW	A22-SW	A22-MW
	Blue	A22-FA	A22-TA	A22-GA	A22-HA	A22-CA	A22-DA	A22-SA	A22-MA
	Black	A22-FB	A22-TB	A22-GB	A22-HB	A22-CB	A22-DB	A22-SB	A22-MB
Lighted	Red	–	A22L-TR	A22L-GR	A22L-HR	A22L-CR	A22L-DR	–	–
	Green	–	A22L-TG	A22L-GG	A22L-HG	A22L-CG	A22L-DG	–	–
	Yellow	–	A22L-TY	A22L-GY	A22L-HY	A22L-CY	A22L-DY	–	–
	White	–	A22L-TW	A22L-GW	A22L-HW	A22L-CW	A22L-DW	–	–
	Blue	–	A22L-TA	A22L-GA	A22L-HA	A22L-CA	A22L-DA	–	–
Buttonsize in mm		29.7 dia. x 12D	29.7 dia. x 19D	29.7 dia. x 19D	29.7 dia. x 12/18.5D	29.8 mm ² x 18D	29.8 mm ² x 18D	30 dia. x 32D	40 dia. x 32D

Switches

Switch operation	Contacts	Order code			
		Non-lighted models		Lighted models	
		Without voltage reduction unit		With voltage reduction unit	
				110 VAC	220 VAC
Momentary	SPST-NO	A22-10M	A22L-10M	A22L-10M-T1	A22L-10M-T2
	SPST-NC	A22-01M	A22L-01M	A22L-01M-T1	A22L-01M-T2
	SPST-NO + SPST-NC	A22-11M	A22L-11M	A22L-11M-T1	A22L-11M-T2
	DPST-NO	A22-20M	A22L-20M	A22L-20M-T1	A22L-20M-T2
	DPST-NC	A22-02M	A22L-02M	A22L-02M-T1	A22L-02M-T2
	Alternate	SPST-NO	A22-10A	A22L-10A	A22L-10A-T1
SPST-NC		A22-01A	A22L-01A	A22L-01A-T1	A22L-01A-T2
SPST-NO + SPST-NC		A22-11A	A22L-11A	A22L-11A-T1	A22L-11A-T2
DPST-NO		A22-20A	A22L-20A	A22L-20A-T1	A22L-20A-T2
DPST-NC		A22-02A	A22L-02A	A22L-02A-T1	A22L-02A-T2
					

Switch blocks

	Standard load	Order code
Switch blocks	SPST-NO	A22-10
	SPST-NC	A22-01
	DPST-NO	A22-20
	DPST-NC	A22-02

Lamp – LED

AC/DC	LED light	Order code			
		Operating voltage			
		6 V	12 V	24 V	24 V superbright
DC	Red	A22-6DR	–	–	–
	Green	A22-6DG	–	–	–
	Yellow ^{*1}	A22-6DY	–	–	–
	Blue	A22-6DA	–	–	–
AC	Red	A22-6AR	–	–	–
	Green	A22-6AG	–	–	–
	Yellow ^{*1}	A22-6AY	–	–	–
	Blue	A22-6AA	–	–	–
AC and DC	Red	–	A22-12AR	A22-24AR	A22-24ASR
	Green	–	A22-12AG	A22-24AG	A22-24ASG
	Yellow ^{*1}	–	A22-12AY	A22-24AY	A22-24ASY
	Blue	–	A22-12AA	A22-24AA	A22-24ASA

^{*1} Used when the pushbutton colour is yellow or white

Lamp - incandescent lamp

Order code		
Operating voltage		
5 VAC/VDC	12 VAC/VDC	24 VAC/VDC
A22-5	A22-12	A22-24

Accessories

Item		Remarks	Order code		
Lamp sockets	Direct lighting	Used when changing the lighting method (LED only)	A22-TN		
	Voltage-reduction lighting		220 VAC	A22-T2	
Mounting latches	For momentary models		Order mounting latches only when mounting switch blocks or lamp sockets are purchased individually A22-3200		
Legend plate frames	Large size	With snap-in legend plate, without text, black	Snap-in legend plate is acrylic A22Z-3333		
		Without snap-in legend plate	A22Z-3330		
Sealing caps	For projection models		Used to prevent dust or water from entering the operation unit (pushbutton, etc.), colour: Opaque, material: Silicon A22Z-3600T		
Three-throw spacer			Used when mounting three non-lighted switches A22Z-3003		
Control boxes (enclosures)	Exclusively for A22		One hole	Do not use DPST-NO or DPST-NC switches, material: Polycarbonate resin A22Z-B101	
			Two holes	A22Z-B102	
			Three holes	A22Z-B103	
Snap-in legend plates	Standard size	Without text	White	Attached to the standard-size legend plate frame, material: Acrylic A22Z-3443W A22Z-3443C A22Z-3443B-5 A22Z-3443B-6 A22Z-3443B-8 A22Z-3443B-9	
			Transparent		
		White text on black background	ON		
			OFF		
			DOWN		
	Large size	Without text	White		Attached to the large-size legend plate frame, material: Acrylic A22Z-3453W A22Z-3453C
			Transparent		
For emergency stop switch	60-dia. round plate with black letters on a yellow background	"EMERGENCY STOP" is engraved on the plate. Used as an emergency stop switch legend plate A22Z-3466-1			
	90-dia. round plate with black letters on a yellow background	A22Z-3476-1			
Lamp extractor			Rubber tool used to easily replace lamps A22Z-3901		
Tightening wrench			Tool used to tighten nuts from the back of the panel A22Z-3905		

Specifications

Recognized organization	Standards	File number
UL, cUL	UL508	E41515
-	EN60947-5-1	-

Contact ratings (standard load)

Rated carry current (A)	Rated voltage	Rated current (A)			
		AC15 (inductive load)	AC12 (resistive load)	DC13 (inductive load)	DC12 (resistive load)
10	24 VAC	10	10	-	-
	110 VAC	5	10	-	-
	220 VAC	3	6	-	-
	380 VAC	2	3	-	-
	440 VAC	1	2	-	-
	24 VDC	-	-	1,5	10
	110 VDC	-	-	0,5	2
	220 VDC	-	-	0,2	0,6
	380 VDC	-	-	0,1	0,2

Contacts (microload)

Rated applicable load	Minimum applicable load
50 mA at 5 VDC (resistive load)	1 mA at 5 VDC

LED indicators without voltage reduction unit

Rated voltage	Rated current	Operating voltage
6 VDC	60 mA (20 mA)	6 VDC ±5%
6 VAC	60 mA (20 mA)	6 VAC/VDC ±5%
12 VAC/VDC	30 mA (10 mA)	12 VAC/VDC ±5%
24 VAC/VDC	15 mA (10 mA)	24 VAC/VDC ±5%

Super-bright LED indicator

Rated voltage	Rated current	Operating voltage
24 VAC/VDC	15 mA	24 VAC/VDC ±5%

Incandescent lamp

Rated voltage	Rated current	Operating voltage
6 VAC/VDC	200 mA	5 VAC/VDC
14 VAC/VDC	80 mA	12 VAC/VDC
28 VAC/VDC	40 mA	24 VAC/VDC
130 VAC/VDC	20 mA	100 VAC/VDC

Voltage-reduction lighting

Rated voltage	Operating voltage	Applicable lamp (BA8S/13 gold)
110 VAC	95 to 115 VAC	LED Lamp (A22-24A_)
220 VAC	190 to 230 VAC	

Item		Pushbutton switches				Emergency stop switches		Knob-type selector switches		Key-type selector switch
		Non-lighted	Lighted	Non-lighted	Lighted	Non-lighted	Lighted	Non-lighted		
Allowable operating frequency	Mechanical	Momentary operation: 60 operations/minute max.		30 operations/minute max.		Manual release: 30 operations/minute max., automatic release: 30 operations/minute max.				
	Electrical	30 operations/minute max.				30 operations/minute max.				
Durability (number of operations min.)	Mechanical	Momentary operation: 5,000,000		Momentary operation: 300,000		500,000		100,000		500,000
	Electrical	500,000		300,000		500,000		100,000		500,000
Ambient temperature	Operating	-20 to 70°C	-20 to 55°C	-20 to 70°C	-20 to 55°C	-20 to 70°C		-20 to 55°C		-20 to 70°C
	Storage	-40 to 70°C		-40 to 70°C		-40 to 70°C		-40 to 70°C		-40 to 70°C
Degree of protection		IP65 (oil-resistant)	IP65	IP65 (oil-resistant)	IP65	IP65 (oil-resistant)		IP65		IP65 (oil-resistant)
Size in mm (in-panel only)		34Hx34Wx54.7D, 34Hx34Wx72.7D for DPST switches								



Indicators with a mounting aperture of 16 mm

The M16 series of nut-mounted indicators comes in rectangular, square and round versions. Due to its modular construction, assembly is quick and easy. M16 comes in a wide variety of control and signal devices with a wide range of switching capacities, from general load to micro load.

- LED, incandescent and neon lamp
- Snap-in switch unit
- Short mounting depth, less than 28.5 mm below panel
- High reliability, IP65
- UL, CSA and VDE approved, conforms to EN60947-5-1

Ordering information

Pushbutton

Type	Display colour	Order code		
		IP65 oil-resistant		
		Rectangular	Square	Round
LED Incandescent lamp	Red	A165L-JR	A165L-AR	A165L-TR
	Yellow	A165L-JY	A165L-AY	A165L-TY
	Pure yellow	A165L-JPY	A165L-APY	A165L-TPY
	White	A165L-JW	A165L-AW	A165L-TW
	Blue	A165L-JA	A165L-AA	A165L-TA
LED Incandescent lamp	Green	A165L-JGY	A165L-AGY	A165L-TGY
	Green	A165L-JG	A165L-AG	A165L-TG

Lamp

Type	Colour	Order code		
		Operating voltage		
		5 VDC	12 VDC	24 VDC
LED	Red	A16-5DSR	A16-12DSR	A16-24DSR
	Yellow	A16-5DSY	A16-12DSY	A16-24DSY
	Green	A16-5DSG	A16-12DSG	A16-24DSG
	White	A16-5DSW	A16-12DSW	A16-24DSW
	Blue	A16-5DA	A16-12DA	A16-24DA
Type		5 VAC/VDC	12 VAC/VDC	24 VAC/VDC
Incandescent lamp		A16-5	A16-12	A16-24

Case

Classification		Order code
IP65 oil-resistant	Rectangular	A165-CJM
	Square	A165-CAM
	Round	A165-CTM

Socket

Classification		Order code	
Solder terminals		M16-0	
PCB terminals		M16-0P	
Screw-less clamp		M16-S	
Solder terminals	Voltage-reduction lighting	100 V	M16-T1
		100 V	M16-T1-S
		200 V	M16-T2-S

Specifications

Allowable operating frequency	Mechanical	Momentary operation: 120 operations/minute max., alternate operation: 60 operations/minute max.
	Electrical	20 operations/minute max.
Durability	Mechanical	Momentary operation: 2,000,000 operations min., alternate operation: 200,000 operations min.
	Electrical	100,000 operations min.
Degree of contamination		3 (IEC947-5-1)
Ambient temperature		Operating: -10 to 55°C (with no icing or condensation) Storage: -25 to 65°C (with no icing or condensation)
Weight		Approx. 10 g (in the case of a lighted DPDT switch with solder terminals)
Size in mm		Round/square: 18Hx18Wx28.5D rectangular: 18Hx24Wx28.5D

Agency	Standards	File number
UL, cUL	UL508	E41515

Ratings

Superbright LED			
Rated voltage	Rated current	Operating voltage	Built-in limiting resistance
5 VDC	30 mA (15 mA)	5 VDC ±5%	33 Ω (68 Ω)
12 VDC	15 mA	12 VDC ±5%	270 Ω (560 Ω)
24 VDC	10 mA	24 VDC ±5%	1,600 Ω (2,000 Ω)

Incandescent lamp		
Rated voltage	Rated current	Operating voltage
6 VAC/VDC	60 mA	5 VAC/VDC
14 VAC/VDC	40 mA	12 VAC/VDC
28 VAC/VDC	24 mA	24 VAC/VDC



Nut-mounted, 22 mm indicator, with high visibility, illuminated buttons

The M22 series of indicators comes in 22 or 25 mm-diameter round versions. They can be easily mounted and removal of the socket unit is also easy. The finger protection mechanism on the lamp is provided as a standard feature. M22 indicators can be equipped with an LED or incandescent lamp.

- Available in 5 colours
- Super-bright LEDs for all versions
- Lamp sockets with or without transformers
- UL and cUL approved

Ordering information

Display

Appearance	IP65 oil-resistant	
	Colour of display	Order code
Round/flat	Red	M22-FR
	Green	M22-FG
	Yellow	M22-FY
	White	M22-FW
Square/projection	Blue	M22-FA
	Red	M22-CR
	Green	M22-CG
	Yellow	M22-CY
	White	M22-CW
	Blue	M22-CA

Socket unit

Order code	
Voltage-reduction circuits	
Without voltage reduction unit	With voltage reduction unit (220 VAC)
M22-00	M22-00-T2

Lamp

AC/DC	LED light	Operating voltage			
		6 V	12 V	24 V	24 V superbright
AC	Red	A22-6DR	—	—	—
	Green	A22-6DG	—	—	—
	Yellow	A22-6DY	—	—	—
	Blue	A22-6DA	—	—	—
DC	Red	A22-6AR	—	—	—
	Green	A22-6AG	—	—	—
	Yellow	A22-6AY	—	—	—
	Blue	A22-6AA	—	—	—
AC and DC	Red	—	A22-12AR	A22-24AR	A22-24ASR
	Green	—	A22-12AG	A22-24AG	A22-24ASG
	Yellow	—	A22-12AY	A22-24AY	A22-24ASY
	Blue	—	A22-12AA	A22-24AA	A22-24ASA
Incandescent lamp		6 VAC/VDC	12 VAC/VDC	24 VAC/VDC	100 VAC/VDC
		A22-5	A22-12	A22-24	A22-H1

Accessories

M22 uses the same accessories as A22. Please refer to the relevant information in the corresponding section for the A22.

Specifications

Recognized organization	Standards	File number
UL, cUL	UL508	E41515

LED lamp

Rated voltage	Rated current	Operating voltage
6 VDC	60 mA (20 mA)	6 VDC ±5%
6 VAC	60 mA (20 mA)	6 VAC ±5%
12 VAC/VDC	30 mA (10 mA)	12 VAC/VDC ±5%
24 VAC/VDC	15 mA (10 mA)	24 VAC/VDC ±5%

Incandescent lamp

Rated voltage	Rated current	Operating voltage
6 VAC/VDC	200 mA	5 V
14 VAC/VDC	80 mA	12 V
28 VAC/VDC	40 mA	24 V
130 VAC/VDC	20 mA	100 V

Superbright LED indicator

Rated voltage	Rated current	Operating voltage
24 VAC/VDC	15 mA	24 VAC/VDC ±5%

Voltage-reduction lighting

Rated voltage	Rated current	Operating voltage
110 VAC	95 to 115 VAC	LED lamp (A22-24_)
220 VAC	190 to 230 VAC	

Ambient temperature	Operating: -20 to 55°C, storage: -40 to 70°C
Degree of protection	IP65
Electric shock protection class	Class II
PTI (tracking characteristic)	175
Degree of contamination	3 (IEC947-5-1)
Size in mm	Button: 29.7 dia.x16D, switch: 34Hx34Wx54.7D

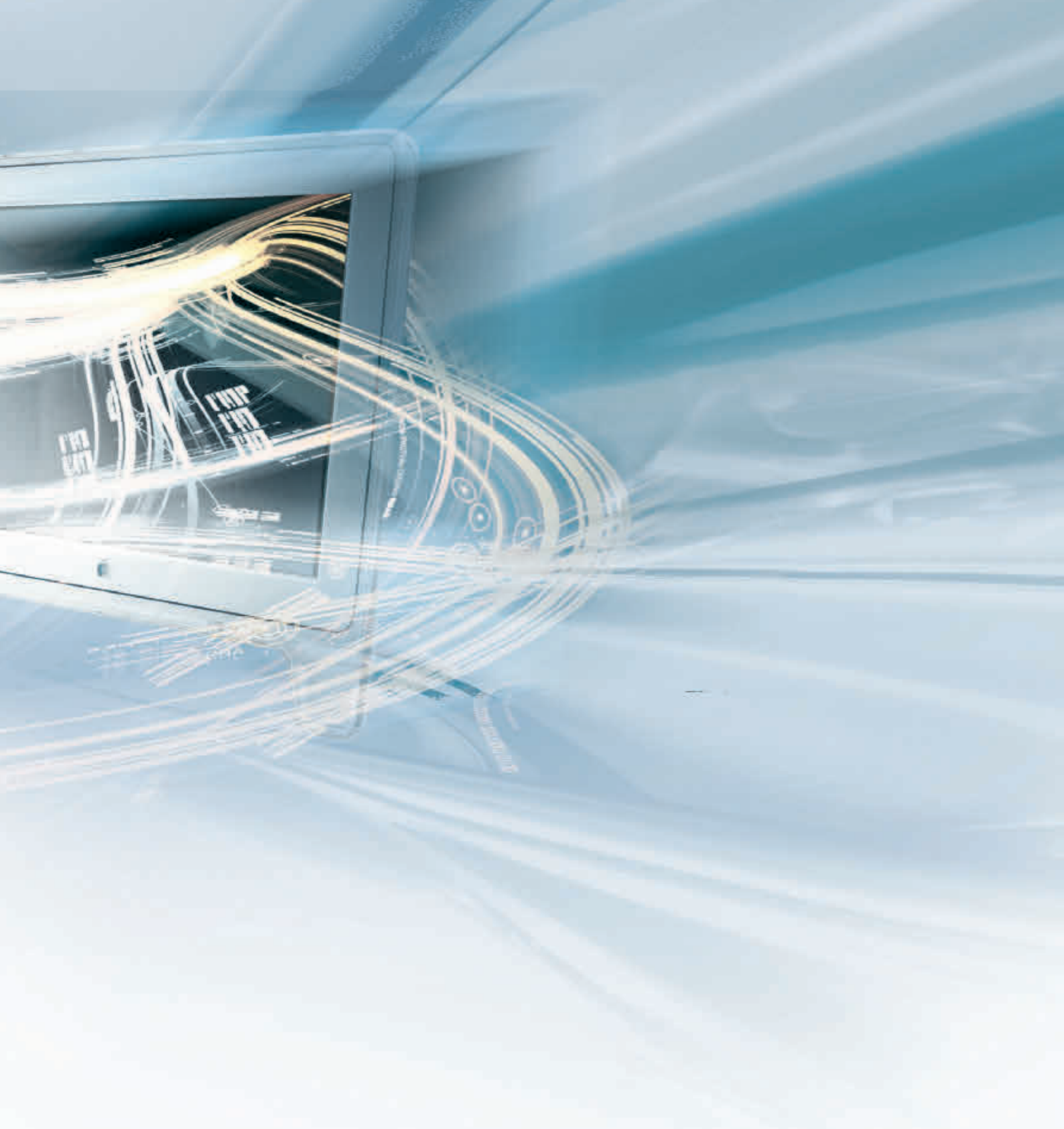
JUST CREATE

One Software

Our software solutions reduce complexity by providing an integrated environment enabling users to design a modular automation system. Our concept is to provide 'One Software' that is simple and easy to use. Through Smart Components our software embeds advanced knowledge to speed up the entire process: development, commissioning and maintenance.



Check for more software:
www.omron-industrial.com



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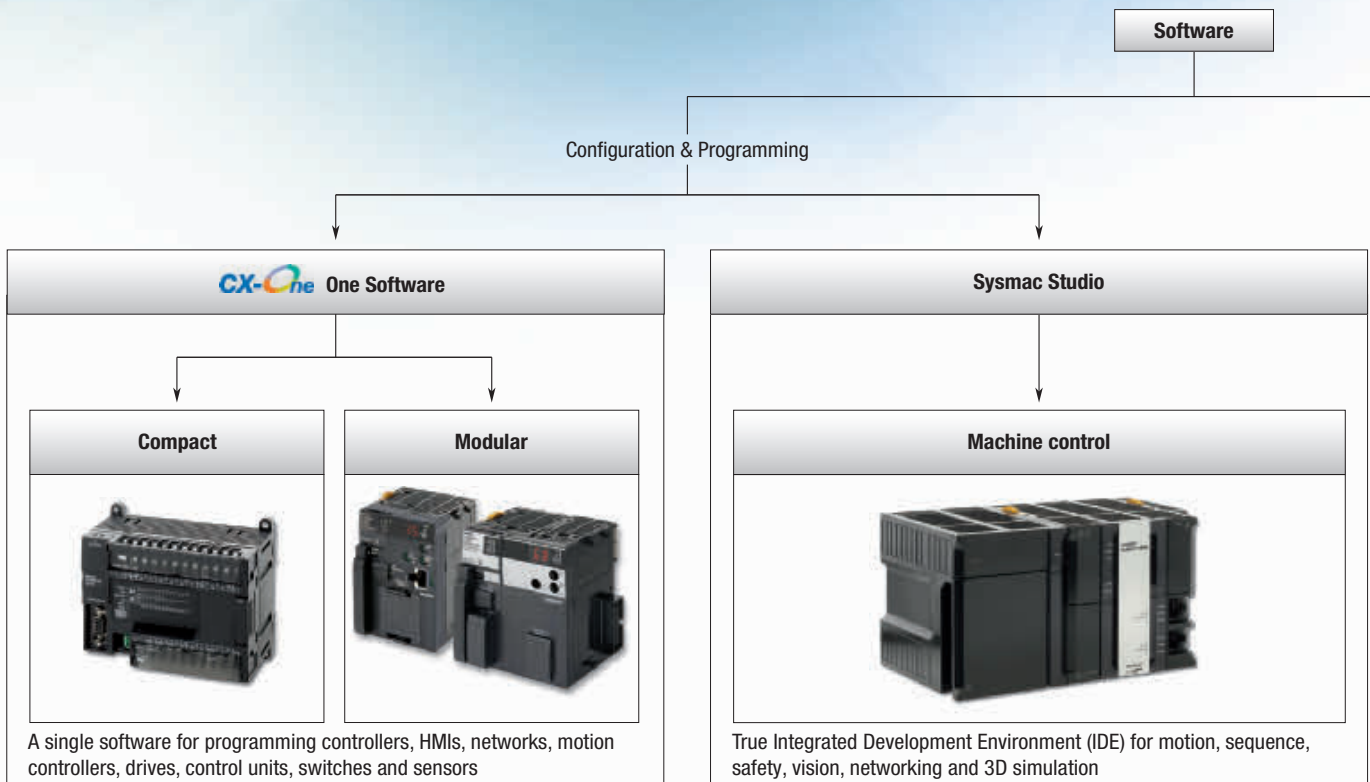
ONE SOFTWARE-ONE CONNECTION-ONE MINUTE

One software for all your automation needs

“One Software” is a key component of the overall architecture of Omron software. Whether for our Compact & Modular range or our new Sysmac platform, integration of software technologies brings value direct to the customer. These softwares integrate configuration, programming and monitoring in packages designed for those platforms. Integrated software gives you the power and efficiency to develop and create like never before.

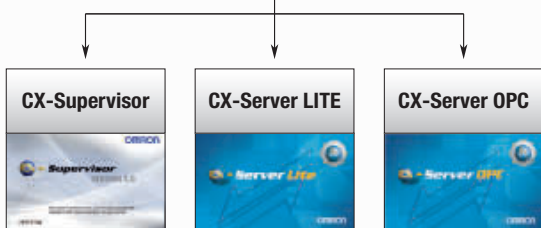


For more information visit:
www.sysmac.eu





Visualisation



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Integrated “One software” that covers all your requirements for complete machine automation

This single programming and configuration environment is an integrated software management tool called CX-One that enables the user to build, configure and program networks, PLCs, HMIs, motion control systems, drives, temperature controllers and sensors. The result of a single software is to reduce complexity of the configuration and allow automation systems to be programmed or configured with minimal training.

By registering a licence number at www.omron-industrial.com, users can benefit from free updates to their version of CX-One for 12 months free of charge. An automatic update service can notify users as soon as relevant updates are available.

CX-One is available as two types. FULL supporting all PLCs or LITE designed for our compact PLC range. Thus our integrated “One Software” applies to our complete portfolio.

Ordering information

CX-One FULL	Media	Order code
Single licence	Licence Only	CXONE-AL01-EV_
Three user licence	Licence Only	CXONE-AL03-EV_
Ten user licence	Licence Only	CXONE-AL010-EV_
Thirty user licence	Licence Only	CXONE-AL030-EV_
Fifty user licence	Licence Only	CXONE-AL050-EV_
Site licence	Licence Only	CXONE-AL0XX-EV_
Software on CDs	CD	CXONE-CD-EV_
Software on a DVD	DVD	CXONE-DVD-EV_
CX-One LITE	Media	Order code
Single user licence	Licence Only	CXONE-LT01-EV_
Software on CD	CD	CXONE-LTCD-EV_

Specifications

Subject	Indicator	Description
Programming	CX-Programmer	CX-Programmer provides one common PLC software platform for all types of Omron PLC controllers – from micro PLC's up to Duplex processor systems. It allows easy conversion and re-use of PLC code between different PLC types, and the full re-use of control programs created by older generation PLC programming software.
	CX-Simulator	A debugging environment equivalent to the actual PLC system environment can be achieved by simulating the operation of a CS/CJ Series PLC with a virtual PLC in the computer. CX-Simulator makes it possible to evaluate program operation, check the cycle time and reduce debugging time before the actual equipment is assembled.
	CX-Designer	CX-Designer is used to create screen data for NS-series Programmable Terminals. CX-Designer can also check the operation of the created screen data on the computer. CX-Designer enables efficient development process for screen creation, simulation and project deployment. Users can develop screens more efficiently with Easy-to-use Support Software. CX-Designer has about 1,000 standard functional objects with associated graphics and advanced functions, so even first-time users can create screens easily just by arranging functional objects in a screen.
Networks	CX-Integrator	CX-Integrator is the main configuration software for CX-One. It enables easy performance of many operations, such as monitoring the connection status of various networks, setting parameters, and diagnosing networks.
	CX-ConfiguratorFDT	Based on FDT/DTM technology, CX-ConfiguratorFDT can be used to configure devices from any vendor connected to a PROFIBUS network. This concept will later be expanded to support many more networks using this technology.
Motion & Drives	CX-Motion	CX-Motion can be used to create, edit, and print the various parameters, position data, and motion control programs (G code) required to operate Motion Controllers, transfer the data to the Motion Control units, and monitor operation of the Motion Control units. Increase productivity in every step of the motion control process, from development of the motion control program to system operation.
	CX-Drive	The complete current range of Omron Yaskawa inverters and servos is covered in this software with full access to all parameters (with 3 different operator levels available). An easy overview of parameters is also included which includes filters to show values that are: different from default, different from inverter, invalid setting. Graphical overviews are available to further assist with configuration of some more detailed parameters such as jump frequencies, v/f profiles and analogue setting.
	CX-Position	CX-Position simplifies every aspect of position control, from creating/editing the data used in Position Control units (NC units) to communicating online and monitoring operation. The software is equipped with functions that can improve productivity, such as automatically generating project data and reusing existing data.
Regulation and Switching	CX-Thermo	Omron's CX-Thermo support software has been specially developed for use with the company's E5CN, E5EN, E5GN, E5AN, E5CN-H, E5EN-H, E5AN-H, E5ZN, E5AR, E5ER and Celciux® temperature controllers. CX-Thermo enables faster parameter set-up, easier device adjustment and simpler maintenance. It dramatically reduces the time and effort needed to set and manage temperature control parameters.
	CX-Process	CX-Process simplifies every aspect of loop control, from creating/transferring function blocks to running the Boards/units and debugging (tuning PID parameters, etc.) operation. Function block programs can be created easily by pasting function blocks in the window and making software connections with the mouse.
Sensing	CX-Sensor	CX-Sensor allows configuration and monitoring of Omron's ZX range of sensors via a series of easy to use displays. The graphing dialog allows the outputs from several sensors to be reviewed and compared simultaneously, allowing configuration of complex processes. The software also includes a driver that allows sensor data to be accessed via an Omron serial control unit (SCU) and from other Omron applications such as CX-Supervisor. With the aid of Omron's CX-Server OPC application it is even possible to monitor sensor data in real time from Microsoft Excel.



Powerful Machine Visualisation

CX-Supervisor is dedicated to the design and operation of PC visualisation and machine control. It is not only simple to use for small supervisory and control tasks, but also offers a wealth of power for the design of the most sophisticated applications.

CX-Supervisor boasts powerful functions for a wide range of PC based HMI requirements. Simple applications can be created rapidly with the aid of a large number of predefined functions and libraries, and even very complex applications can be generated with a powerful programming language or VBScript™. CX-Supervisor has an extremely simple, intuitive handling and high user friendliness. Importing ActiveX® components makes it possible to create flexible applications and extend functionality.

CX-Supervisor now comes in two editions:

CX-Supervisor Machine Edition is the perfect choice for almost all machine visualization requirements. Supporting connection of up to 15 devices and up to 500 user definable points (array = 1 point), it is flexible and powerful enough for the control and supervision of a complete machine or an entire manufacturing process. And its easy-to-use Windows® Explorer-style development environment makes building the most sophisticated graphic interfaces simple.

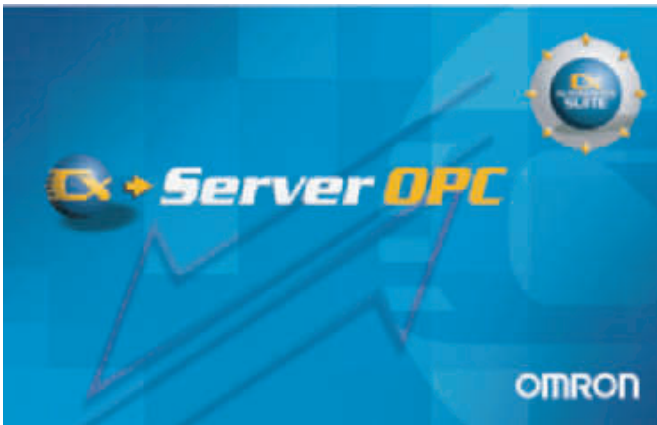
CX-Supervisor PLUS is for those exceptional cases where an application demands a higher number of devices or points than can be handled by CX-Supervisor Machine Edition. It otherwise shares all of the same power and features.

Ordering information

Description	Media	Order code
Developer & runtime (no protection included)	CD	CX-SUPERVISOR-V_ _
Developer upgrade (no protection included, requires licence of previous version)	CD	CX-SUPERVISOR-UPGR-V_ _
Machine Edition runtime including USB dongle protection	CD	CX-SUPERVISOR-RUN-ME-V_ _
PLUS Edition runtime including USB dongle protection	CD	CX-SUPERVISOR-RUN-PLUS-V_ _

Specifications

Feature	Supervisor	
	Machine Edition	Plus
ActiveX	Yes	Yes
VBScript	Yes	Yes
Recipes	Yes	Yes
Alarms	300	3000
Animation	Yes	Yes
Max Devices (PLCs etc)	20	256
OPC Connections	Yes	Yes
Max Points	500	8000
Max Regular Interval Scripts	10	100
Max Num Pages	100	500
Databases supported	MS Access	MS Access SQL, ODBC, MS Access, MS Excel. dBase, CSV



Omron's devices meet 'Open Integration'

CX-Server OPC provides a connection between the industry standard OPC interface specification and Omron's network architecture and controllers. CX-Server OPC allows any OPC compliant client software to interface easily with Omron.

The multi-vendor connectivity and information exchange capability of CX-Server OPC eliminates driver development issues.

CX-Server OPC includes an ActiveX OPC client control and a set of graphical components. Linking the graphical controls can be done without a single line of script. No programming knowledge is required!

Ordering information

Description	Media	Order code
CX-Server OPC	CD & Licence	CX-OPC-EV_

CX-Server LITE



Simple but effective connectivity

As a pair to our OPC product, CX-Server LITE is designed to meet a wide variety of programmers' needs from the simple to the advanced. Used to create PC-based simple HMI projects, CX-Server LITE allows designers of custom programs to send and receive PLC data and manipulate controllers within Omron networks.

Based on ActiveX technology, it is easy to add a communications control to a VB project or an Excel spreadsheet. Live data can be updated directly into a cell or range of cells.

CX-Server LITE includes a set of graphical components designed to connect to the communications control. Linking the graphical controls can be done without a single line of script. No programming knowledge is required!

Ordering information

Description	Media	Order code
CX-Server LITE	CD & Licence	CX-LITE-EV_



Sysmac Studio for machine creators

The Sysmac Studio provides one design and operation environment for configuration, programming, simulation and monitoring.

- One software for servo, inverter, vision and I/O
- Fully compliant with open standard IEC 61131-3
- Supports Ladder, Structured text and In-Line ST programming with a rich instruction set
- CAM editor for easy programming of complex motion profiles
- One simulation tool for sequence and motion in a 3D environment
- Advanced security function with 32 digit security password

Ordering information

Automation software

Please purchase a DVD and licenses the first time you purchase the Sysmac Studio. DVDs and licenses are available individually. The license does not include the DVD.

Product	Specifications			Order code
	Description	Number of licenses	Media	
Sysmac Studio Standard Edition Ver. 1.□□	The Sysmac Studio provides an integrated development environment to set up, program, debug and maintain NJ-series controllers and other machine automation controllers, as well EtherCAT slaves Sysmac Studio runs on the following OS: Windows XP (Service Pack 3 or higher, 32-bit version)/ Vista (32-bit version)/7 (32-bit/64-bit version)	– (Media only)	DVD ^{*1}	SYSMAC-SE200D
		1 license	–	SYSMAC-SE201L
		3 licenses	–	SYSMAC-SE203L
		10 licenses	–	SYSMAC-SE210L
		30 licenses	–	SYSMAC-SE230L
Sysmac Studio Vision Edition Ver. 1.□□ ^{*2}	Sysmac Studio Vision Edition is a limited license that provides selected functions required for FQ-M series vision sensor settings	50 licenses	–	SYSMAC-SE250L
		1 license	–	SYSMAC-VE001L
Sysmac Studio Measurement Sensor Edition Ver. 1.□□ ^{*3,*4}	Sysmac Studio Measurement Sensor Edition is a limited license that provides selected functions required for ZW-series displacement sensor settings	1 license	–	SYSMAC-ME001L
		3 licenses	–	SYSMAC-ME003L

^{*1} The same media is used for both the Standard Edition and the Vision Edition.

^{*2} With the Vision Edition, you can use only the setup functions for FQ-M series vision sensors.

^{*3} With the Measurement Sensor Edition, you can use only the setup functions for ZW-series displacement sensors.

^{*4} This product is a license only. You need the Sysmac Studio Standard Edition DVD media to install it.

Note: Site licenses are available for users who will run Sysmac Studio on multiple computers. Ask your OMRON sales representative for details.

Components

DVD (SYSMAC-SE200D)

Components	Details
Introduction	An introduction about components, installation/uninstallation, user registration and auto update of the Sysmac Studio is provided
Setup disk (DVD-ROM)	1

License (SYSMAC-SE2□□L/VE0□□L/ME0□□L)

Components	Details
License agreement	The license agreement gives the usage conditions and warranty for the Sysmac Studio
License card	A model number, version, license number and number of licenses are described
User registration card	Two cards are contained. One is for users in Japan and the other is for users in other countries

Included support software

DVD media of Sysmac Studio includes the following support software:

Included support software	Version	Outline
CX-Designer	Ver. 3.□□	The CX-Designer is used to create screens for NS-series PTs
CX-Integrator	Ver. 2.□□	The CX-Integrator is used to set up FA networks
CX-Protocol	Ver. 1.□□	The CX-Protocol is used for protocol macros for serial communications units
Network Configurator	Ver. 3.□□	The Network Configurator is used for tag data links on the built-in EtherNet/IP port

Outline of Major Standards



International Standards

International standards consist of the IEC standards related to electricity and the ISO standards related to other areas (e.g., machines and management).

IEC (International Electrotechnical Commission)

The IEC is a standardization commission founded in 1908 to promote unification and coordination of international standards relating to electricity. It is headquartered in Geneva, Switzerland.

Based on reports from member nations on the latest science technologies in those nations, IEC standards are issued as technological standards relating to electricity. Established international safety standards provided by various countries and accepted worldwide are based on IEC standards.

The IEC standards committees includes the CISPR (International Special Committee on Radio Interference) that makes standards for EMC (Electromagnetic Compatibility).

To simplify certification procedures for electrical devices and promote smooth international trade, there is an international scheme called CB Scheme (Certification Body Scheme), which is authorized by IEC standards. Based on the CB Scheme, safety tests on electrical devices are conducted and certificates are issued if the devices are proved to meet IEC standards.

ISO (International Organization for Standardization)

ISO is a standardization organization that started official activities in 1947 to promote international standards in all areas (e.g., machines and management) except for electricity, which is covered by the IEC, by issuing ISO standards. It is headquartered in Geneva, Switzerland.

North America

UL Standards (Underwriters Laboratories INC.)



LISTING MARK

A nonprofit organization established in 1894 by the American association of fire insurance companies. Underwriters Laboratories (abbreviated to UL hereafter) conducts certification testing on all kinds of electrical products. In many U.S. cities and states, UL certification is legally required on all electrical items sold. To obtain UL certification on an electrical product, all major internal components also require UL certification. UL offers two classifications of certification, the listing mark and the recognition mark. A Listing Mark constitutes the entire certification of a product. Products display the Listing Mark shown below.



RECOGNITION MARK

The Recognition Mark applies to the components used in a product, and therefore constitutes a more conditional approval of a product. Use of the Recognition Mark is not required for non-specified parts (e.g., specified parts such as microswitches) Products display the Recognition Mark shown below.



Since October 1992, UL has been recognized as a CO (council organization) and TO (test organization) by the SCC (Standard Council of Canada). This authorizes UL to conduct safety tests and certify products conforming to Canadian standards. The above marks are UL marks for products certifying that the products meet Canadian standards. The designs of the listing marks and recognition marks have been revised as shown below. These marks have been effective since January 1998. The previous marks are valid until November 2007.

Standards (Canadian Standards Association)



This association descended from a nonprofit, non-government standardization organization established in 1919. In addition to industrial standardization, the association now carries out safety testing on electrical products.

Standard development: The Canadian Standards Association

Product testing and certification: CSA International

This process is known as "certification," and consequently, CSA-certified equipment displays the mark shown below.

For detailed information please refer to:
<http://www.ia.omron.com/support/models/outline>

Europe

EN (European Norm) Standards

Of the EN standards related to electricity, standards beginning with "EN6" are based on IEC standards and those beginning with "EN55" are based on IEC-CISPR standards. Standards beginning with "EN5" are unique EU standards that do not exist in the IEC standards. The following marks of recognition are used by the Certification Bodies in European countries in accordance with EN standards.

Germany



VDE (Prüf- und Zertifizierungsinstitut GmbH)



TÜV Rheinland (Industrie Service GmbH)



TÜV Product Service

TÜV product services

Denmark



DEMCO (Danmarks Elektriske Materielkontrol)

Norway



NEMKO (Norges Elektriske Materielkontrol)

Finland



FIMKO (Finlands Material Kontroll)

United Kingdom



BSI (British Standards Institution, applicable to industrial products)



BEAB (British Electrotechnical Approvals Board, applicable to home electronics products)



ASTA (ASTA Certification Services, applicable to general products)

The Netherlands



KEMA (Keuring van Electrotechnische Materialen Nederland B. V.)

France



UTE (Union Technique De Electricite)

Italy



IMQ (Istituto Italiano del Marchio di Qualita)

Russia



GOST-R



TR CU certificate and declaration

Sweden



SEMKO (Svenska Elektriska Materielkontroll Anstalten)

Switzerland



SEV (Schweizerischer Electrotechnischer Verein)

EC (European Communities) Directives



In the EU (European Union), EC Directives are announced to instruct the creation of laws in the EU member countries. A product can display the CE Marking only when it conforms to all of the directives applicable to it, such as the New Approach Directives, which cover the Machinery Directive, Low Voltage Directive, and the EMC Directive. As a rule, EN standards announced as Harmonized Standards in the Official Journal of the European Communities are used to evaluate directive compliance.

China

CCC (China Compulsory Certification) Mark



As a result of China joining the WTO (World Trade Organization) in 2001, the previous Safety License System for Import Commodities and the Compulsory Supervision System for Product Safety Certification were combined to form the CCC. The change was announced on 3 December 2001 and implemented from 1 May 2002. Starting 1 August 2003, any products that have not received the CCC Mark are prohibited from import to or sale in China.

Products Subject to CCC Mark: 19 product sections consisting of 132 product categories
Applicable Standards: National Standards (GB: Guojia Biaozhun) (Standards related to electricity were based on IEC standards.)

CCC Mark: Display of the CCC Mark is legally required.

Japan

Electrical Appliance and Material Safety Law of Japan



Accompanying revisions to laws related to electrical appliances, the Electrical Appliance and Material Safety Law was switched to on 1 April 2001 and the previous Electrical Appliance and Material Control Law was abolished. New marks were also created for the Electrical Appliance and Material Safety Law.

The law covers 112 specified electrical appliances and materials and 340 non-specified electrical appliances and materials.



Article 2 of the Ordinance Concerning Technical Requirements for Electrical Appliances and Materials specifies technical requirements (IEC-J standards) harmonized with IEC standards.

Industry specific certifications

Marine Standards

There are more than 20 classification societies worldwide that individually work to create regulations and certify compliance. The IACS (International Association of Classification Societies) works as an international body currently consisting of 10 member classification societies plus 2 associate classification societies. The classification societies in the IACS certify and register 90% of the world's ships. The option to be classified is made by the owner of the ship; classification certification is undertaken by the shipyard at the request of the owner.

Classification certification has a close relationship to maritime insurance. Insurance underwriters will as a rule insure only ships that have been classified and refuse those without a certified classification. Therefore, automation devices used on ships must conform to classification standards of individual countries if so requested by the owner.

Although classification societies will often recognize portions of inspection data that have the same requirement from other classification societies, requirements and standards differ among the classification societies. Classification societies therefore they do not recognize certification from other classification societies. It is thus necessary to comply with the classification standards of the required classification society. If registration is required in more than one classification, then certification is required for both.

IACS Member Classification Societies

ABS (American Bureau of Shipping), BV (Bureau Veritas, France's classification society), CCS (China Classification Society), DNV (Det Norske Veritas, Norway's classification society), GL (Germanischer Lloyd, Germany's classification society), KR (Korean Register of Shipping), LR (Lloyd's Register of Shipping, Britain's classification society), NK (Nippon Kaiji Kyokai, Japan's classification society), RINA (Registro Italiano Navale, Italy's classification society), RS (Russian Maritime Register of Shipping)

IACS Associate Classification Societies

IRS (Indian Register of Shipping)

Other Classification Societies

CR (China Corporation Register of Shipping, Taiwan's classification society)

Food, Beverage and Pharma

For more information on standards used in the food, beverage and pharmaceutical industries refer to www.omron-industrial.eu.



















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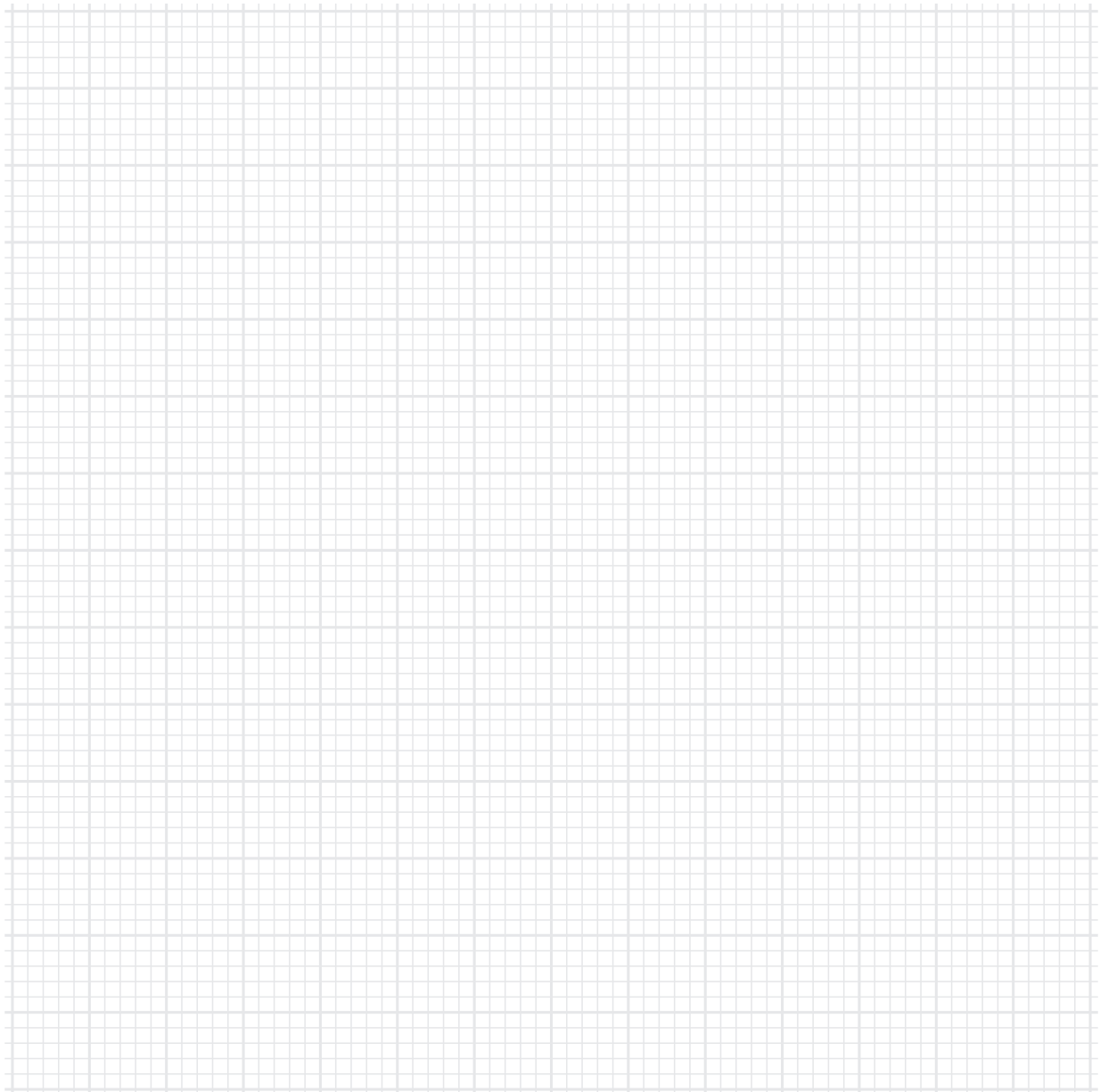
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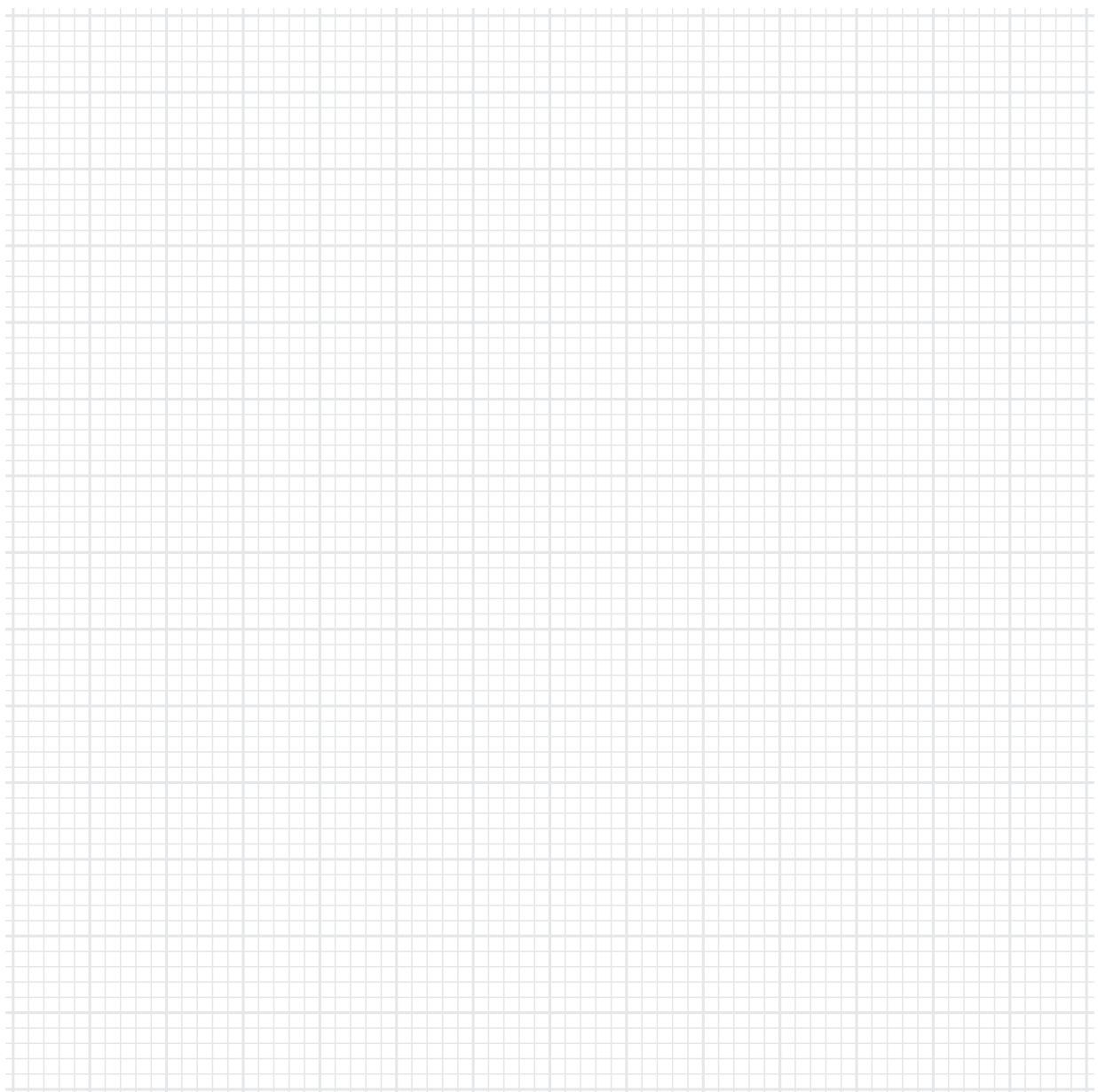
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