

PICK & PLACE SOLUTIONS



» Delta solution integrated into the Sysmac platform

» Washdown and hygienic Delta robot

» SCARA series expanded with new belt-less models

Delta and SCARA solutions

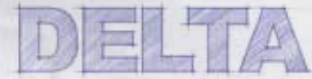
With more than 50 years experience in machine automation and with special focus on the Packaging industry, we offer a new wide range of solutions ideal for Pick & Place applications.

The new solutions centred on Delta robots allow you to build very high through-put machines that handle more than one hundred picking operations per minute.

With more than 70 robot models, the SCARA based solutions are excellent when you face heavy part handling in combination with high speed cycles.

All the Omron Pick & Place solutions are fully integrated with our wide product portfolio making the modular design of your machines even easier. The high performance and reliability of our products represent the cornerstone of our mechatronics solutions, that can also be provided with advanced vision systems to detect the positions of the products to be handled and to inspect them simultaneously.

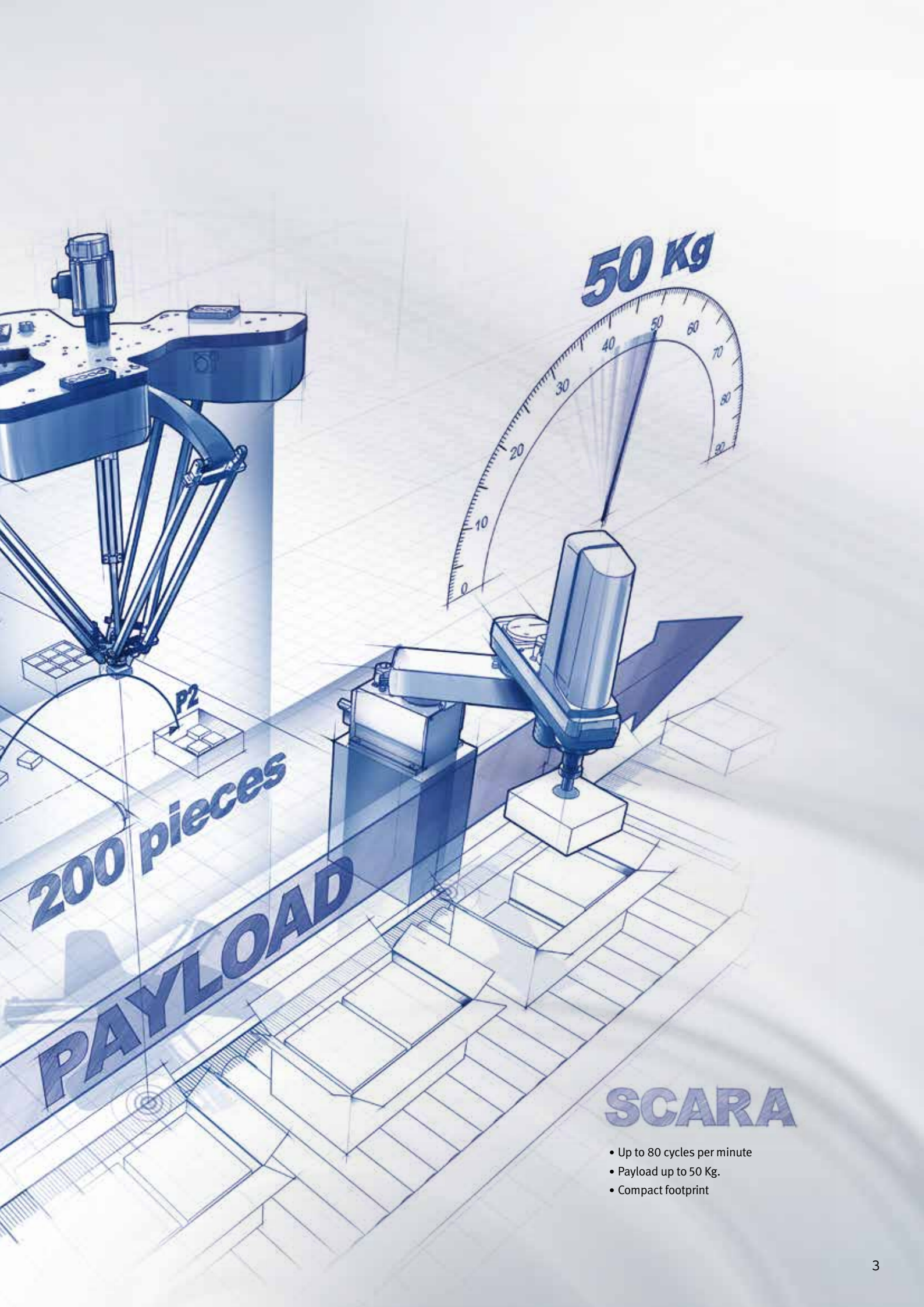
The vision systems have been specially designed and optimised for Pick & Place applications. The FQ-M and FZM1 vision systems provide seamless integration with the Omron automation architecture and implement new algorithms that are able to detect the positions of multiple pieces in the field of view in a very short time.



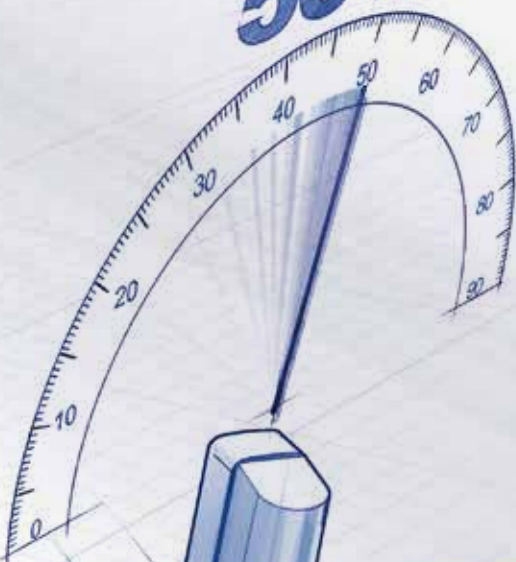
DELTA

- Up to 200 cycles per minute
- Payload up to 3 Kg.





50 Kg



200 pieces

P2

PAYLOAD

SCARA

- Up to 80 cycles per minute
- Payload up to 50 Kg.
- Compact footprint

Delta Robot Solution

The fastest picking system integrated in the Sysmac platform

The combination of high performance servo motors with the kinematics of Delta robots, allows you to achieve the maximum throughput in your Pick & Place applications. The NJ Robotics controller is able to keep control of all motion devices in the machine, including single axis, simple groups of axes and robot control, by providing independent or synchronized movements.

The synchronization with the multiple conveyors can be fully programmed thanks to a powerful command developed specially for Pick & Place applications that use a Delta robot.

NJ Robotics

Robot	Cycle time
8 Delta	2 ms
4 Delta	1 ms

Benefits

- Robot control integrated in the NJ Robotics controller
- Control of up to 8 robots by one controller
- High through-put can be achieved by using the Delta robot, more than 200 cycle/min per robot

FQ-M Vision sensor

NJ Robotics



Delta Robot Series



Washdown Delta robot

- Rated working range: Ø 1100 x 450 mm
- Max. Payload: 3 Kg
- Cycle time 25/305/25 mm (0.1 Kg): Up to 150 cycle/min

Accurax G5 Servo motors

- High frequency response of 2 kHz
- 17 bit absolute encoder
- Low cogging torque



SYSTMAC
always in control



Delta robot

- Rated working range: \varnothing 1100 x 400 mm
- Max. Payload: 2Kg
- Cycle time 25/305/25mm (0.1Kg):
Up to 150 cycle/min.



Mini Delta robot

- Rated working range: \varnothing 500 x 155mm /
 \varnothing 450 x 135mm (with rotational axis)
- Max. Payload: 1Kg
- Cycle time 25/305/25mm (0.1Kg):
Up to 200 cycle/min.

Delta Robot Solution

The NJ Robotics controller represents the core of this system architecture and is based on the EtherCAT bus, providing the highest motion performance for demanding picking applications. The Delta robot arms use the G5 servo motors to reduce the settling time thanks in part to the high frequency response of 2Khz of this high-end servo model , representing the best choice for positioning tasks. The FQ-M vision sensor is designed for motion applications and is able to detect the position of several pieces moving on a conveyor, in a very short time in order to increase the overall through-put of the machine.



Product overview

Robot



Delta Robot Series

Specifications

- Robot control integrated in the NJ robotics
- Control of up to 8 robots by one controller
- Degrees of freedom: 3 + 1 (rotational axis optional)
- Up to 200 cycle per minute
- Model Range from 450 to 1100 mm
- Payload range: 1 to 3 Kg
- IP class range: IP65, IP67 hygienic design

Reference list	Description
R6Y3110H03067NJ5	Washdown Delta robot 3 axes + 1 rot. axis with high inertia
R6Y3110L03067NJ5	Washdown Delta robot 3 axes + 1 rot. axis
R6Y30110S03067NJ5	Washdown Delta robot 3 axes
CR_UGD4_R	Delta robot 3 axes + 1 rot. axis
CR_UGD4_NR	Delta robot 3 axes
CR_UGD4MINI_R	Mini Delta robot 3 axes + 1 rot. axis
CR_UGD4MINI_NR	Mini Delta robot 3 axes

Controller



NJ Robotics

- Up to 64 axes motion control
- Scalable control: CPUs for 16, 32 and 64 axes
- Up to 8 Delta robots
- EtherCAT and EtherNet/IP ports embedded
- Conforms to IEC 61131-3 standards

Reference list	Description
NJ501-4500	64 axes
NJ501-4400	32 axes
NJ501-4300	16 axes
NJ501-4310*	16 axes

* The NJ501-4310 CPU only supports one Delta robot.

Servo system



Accurax G5 servo system

- High frequency response of 2 kHz
- Safety conforming to ISO13849-1
- Advanced tuning algorithm
- Delta robot: 1.5 kW servo drive
- Mini Delta robot: 400 W servo drive

Accurax G5 servo motor

Mini Delta

- 17 bit absolute encoder
- 230 VAC 400W servo motor with brake
- Low cogging torque



Delta

- 17 bit absolute encoder
- 230 VAC 1 kW servo motor with brake for the arms
- 230 VAC 50, 100 or 1000 W servo motors for the rotational axis
- Low cogging torque

Vision



FQM series

- Camera, vision and connectivity in one
- Compact vision sensor
- Designed for high speed pick and place
- Encoder tracking and smart calibration function
- Fast and powerful object recognition



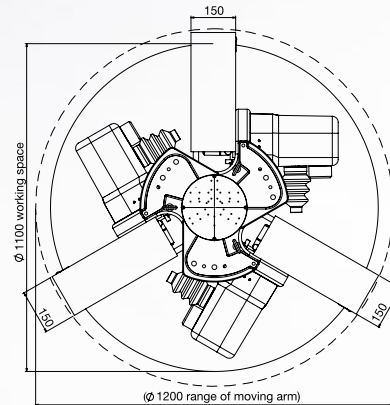
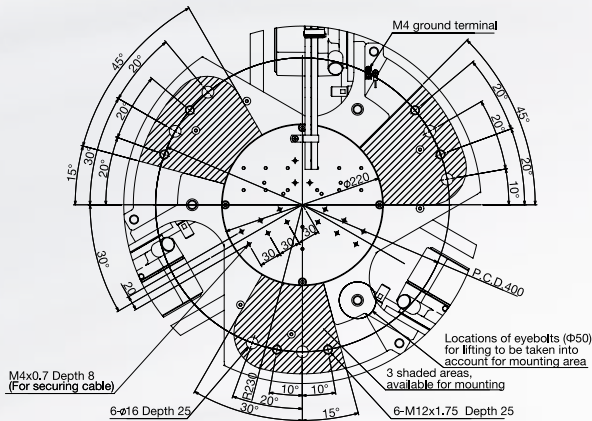
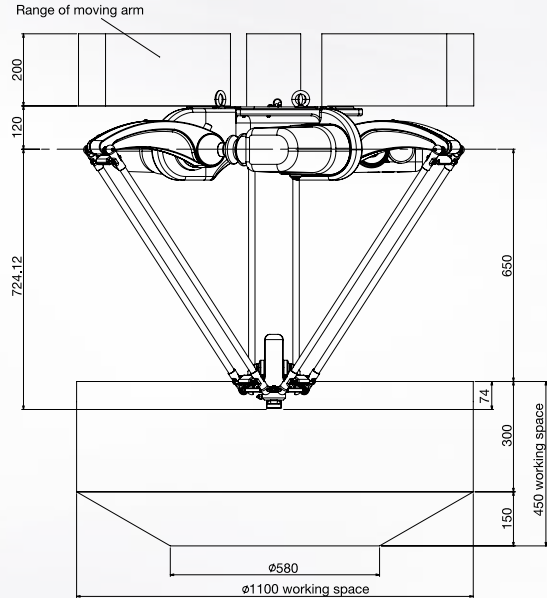
Xpectia FZM1

- Stable measurements under changing conditions
- Wide variety of positioning measurement methods
- Simple auto calibration
- Flexible camera installation

Note: Please contact your OMRON representative for detailed specs and ordering information.

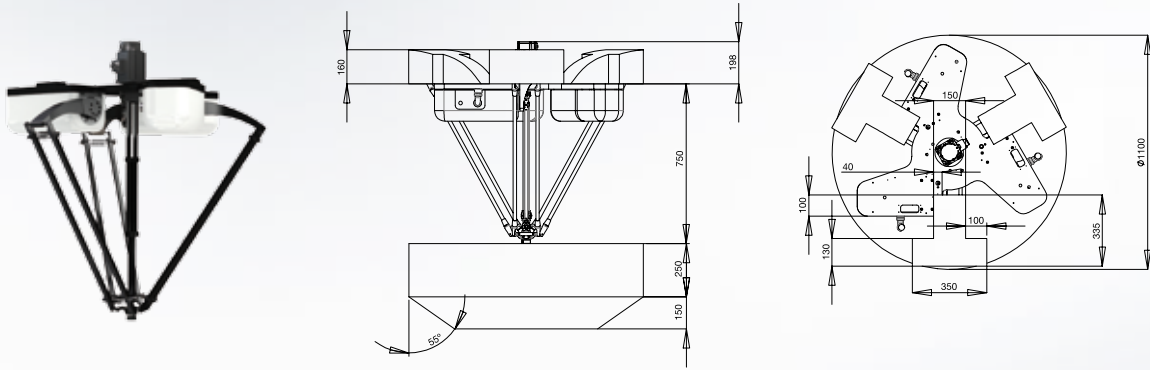
Delta Robot Series

Washdown Delta robot specifications



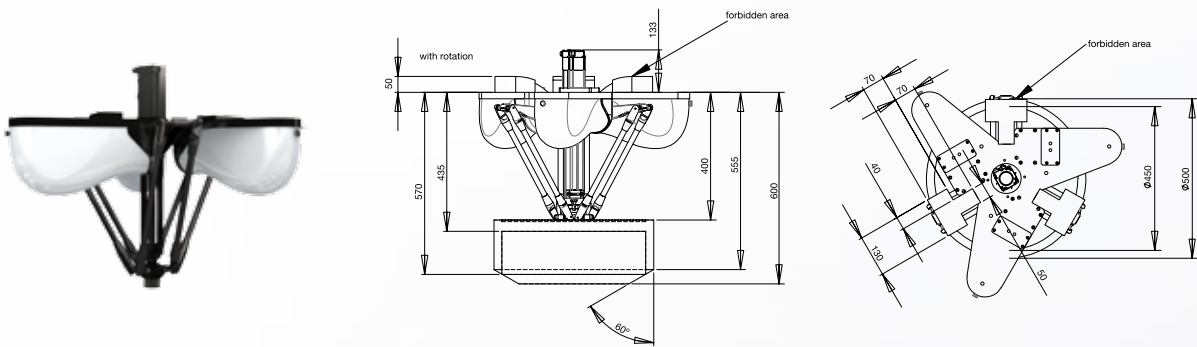
MODEL		R6Y31110H03067NJ5	R6Y31110L03067NJ5	R6Y30110S03067NJ5	
Working volume	X, Y axis (stroke)	Ø 1100 mm			
	Z axis (stroke) ^{*1}	300 mm (maximum Ø 1100 mm) / 450 mm (center Ø 580 mm)			
	θ axis (rotation angle)	±180 deg (default setting, it can be changed)		-	
Servo motor	Arm 1, 2, 3	Model	R88M-K1K030T-BS2		
		Capacity	1000 W		
	Rotational axis 4	Model	R88M-K10030T-S2	R88M-K05030T-S2	-
		Capacity	100 W	50 W	-
Repeatability ^{*1}	X, Y, Z axis	±0.2 mm			
	θ axis	±0.1 deg			
Maximum payload		3 kg			
Maximum through-put		150 CPM ^{*2}			
θ axis tolerable moment of inertia ^{*3}		0.035 kgm ²	0.01 kgm ²	-	
User tubing (outer diameter)		Ø 6			
Travel limit		1. Soft limit, 2. Mechanical stopper (X, Y, Z axis)			
Noise level		< 73.7 dB (A)			
Ambient temperature		0 to 45°C			
Relative humidity		Max. 85%			
Protection class		IP67			
Weight (kg)		75 kg			

Delta robot specifications



MODEL		CR_UGD4_R	CR_UGD4_NR
Working volume	X, Y axis (stroke)	Ø 1100 mm	
	Z axis (stroke) *1	250 mm (maximum Ø 1100 mm) / 400 mm (center Ø 580 mm)	
	θ axis (rotation angle)	±180 deg (default setting, it can be changed)	-
Servo motor	Arm 1, 2, 3	Model	R88M-K1K030T-BS2
		Capacity	1000 W
	Rotational axis 4	Model	R88M-K1K030T-BS2
		Capacity	1000 W
Repeatability *1	X, Y, Z axis	±0.3 mm	
	θ axis	±0.4 deg	-
Maximum payload		2 kg	
Maximum through-put		150 CPM *2	
θ axis maximum torque		According to the servo motor	-
User tubing (outer diameter)		Ø 8 *4	
Travel limit		1. Soft limit, 2. Mechanical stopper (X, Y, Z axis)	
Noise level		< 68 dB (A)	
Ambient temperature		5°C to 45°C	
Relative humidity		Max. 90%	
Protection class		IP65	
Weight (kg)		65 kg	

Mini Delta robot specifications



MODEL		CR_UGD4MINI_R	CR_UGD4MINI_NR
Working volume	X, Y axis (stroke)	Ø 500 mm	
	Z axis (stroke) *1	135 mm (maximum Ø 450 mm)	155 mm (maximum Ø 500 mm)
	θ axis (rotation angle)	±180 deg (default setting, it can be changed)	-
Servo motor	Arm 1, 2, 3	Model	R88M-K40030T-BS2
		Capacity	400 W
	Rotational axis 4	Model	R88M-K40030T-BS2
		Capacity	400 W
Repeatability *1	X, Y, Z axis	±0.2 mm	
	θ axis	±0.3 deg	-
Maximum payload		1 kg	
Maximum through-put		200 CPM *2	
θ axis maximum torque		According to the servo motor	-
User tubing (outer diameter)		Ø 8 *4	
Travel limit		1. Soft limit, 2. Mechanical stopper (X, Y, Z axis)	
Noise level		< 68 dB (A)	
Ambient temperature		5°C to 45°C	
Relative humidity		Max. 90%	
Protection class		IP65	
Weight (kg)		25 kg	

*1. This is the value at a constant ambient temperature. - *2. CPM: Cycle per minute. With 0.1 kg payload. When reciprocating 305 mm in horizontal and 25 mm in vertical directions. - *3. There are limits to acceleration coefficient settings. - *4. Only for the air suctioning. The air injection is not allowed.

SCARA Solution

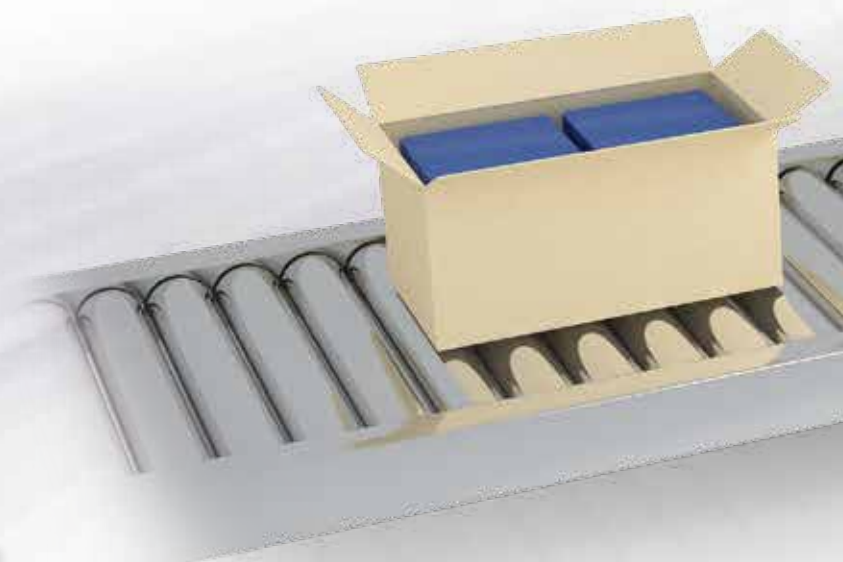
The flexible picking system

The wide reach and payload ranges allow you to choose the right robot type for your application. Special versions, such as clean-room and dust/drip-proof types enable installation in critical environments for applications in food and pharmaceutical industries.

High reliability is ensured by the simple mechanical structure of our SCARA robots that use a belt-less system in the XG series via a direct coupling between motors, gearboxes, arms and the shafts.

High reliability:

- Belt-less system
- Direct coupling
- Maintenance-free

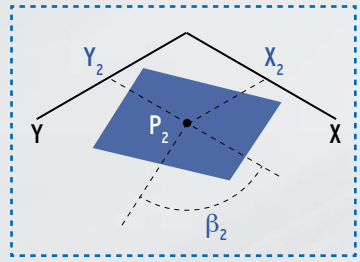


Benefits

- Higher reliability of SCARA robots (belt-less transmission on XG series, no electronic parts in movement)
- Higher precision and high speed
- Higher rigidity
- Easy integration of the FQ-M vision system

Object detection

The vision sensor calculates the coordinates of the pieces and sends the data to the robot controller via Ethernet.



FQ-M
Vision sensor

SCARA robot

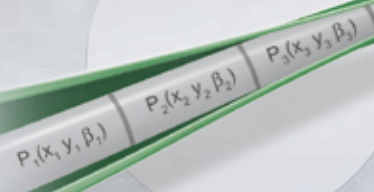
Encoder feedback

P₁

P₂

P₃

SCARA controller



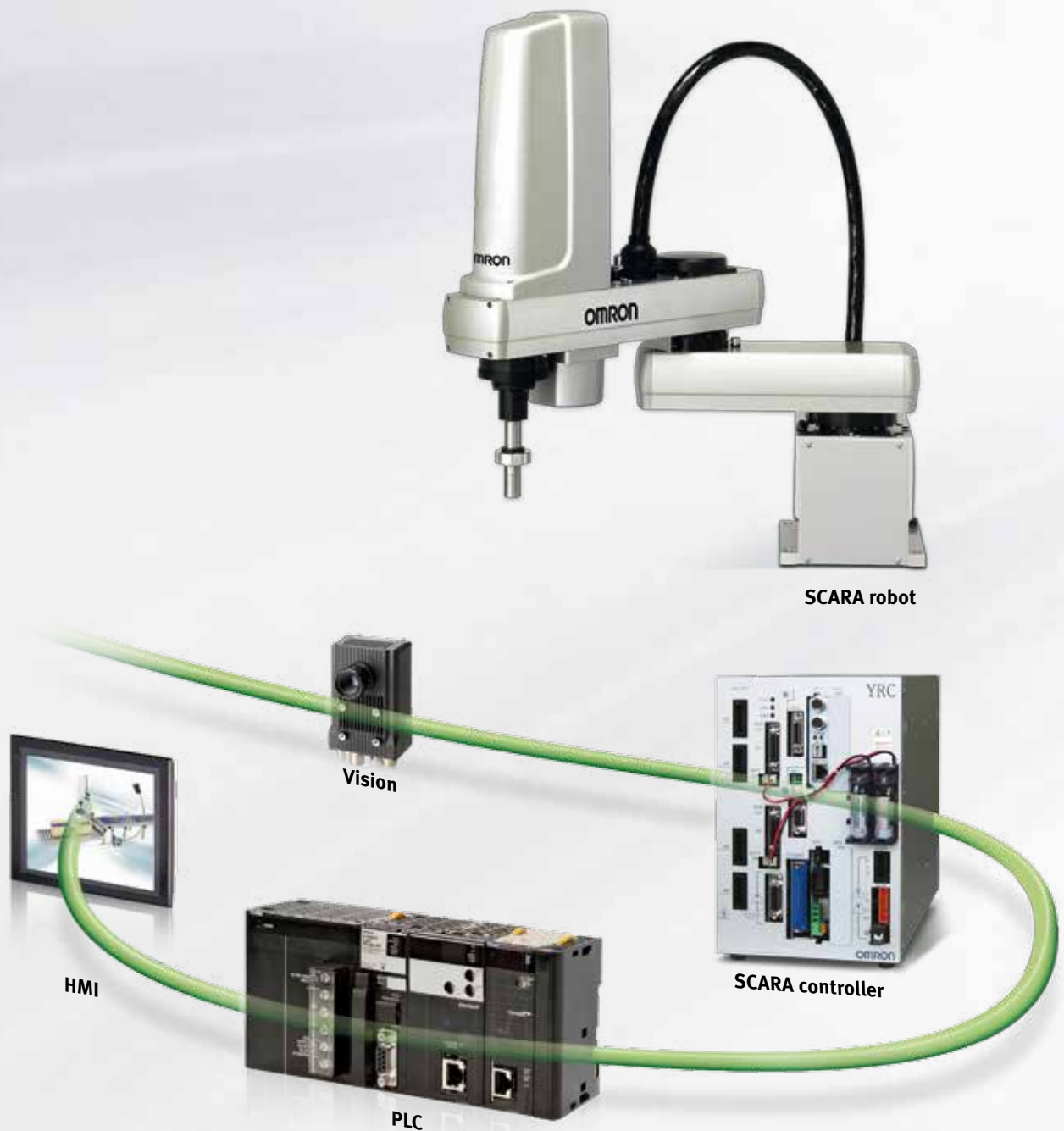
Flexible Data Format

The FQ-M vision sensor provides a customisable data output format simplifying the programming manner of the robot controller.

SCARA Solution

Simplify your machines and reduce manufacturing time using a SCARA robot solution. Flexibility and a wide range of products allows you to choose exactly the right model for your needs.

A vision system can be easily connected via Ethernet to the SCARA controller thanks to the built-in communication and the system can be fully controlled by our PLC that provides a wide set of functions together with the reliability found in all Omron products.



Product overview

Robot



SCARA robots

- Wide Reach range up to 1200mm radius
- Wide Payload range up to 50Kg
- Versions available for Clean-room C10, IP65 and special mounting type
- High reliability (no belts in XG series, no electronic parts in movement)
- Minimum maintenance
- Higher rigidity

Controller



SCARA controller

- Compact design
- Dedicated robotic functions for Pick & Place and conveyor tracking.
- Simple programming by teaching pendant and software.
- One controller type for all the robot models.

Logic



CJ2 PLC

- Robust and reliable modular PLC
- PTP or advanced motion control
- Up to 2560 I/O
- Open communication: supports master and slave units for Profibus, CAN, PROFINET, DeviceNet and EtherNet/IP



NJ Machine Controller

- Up to 64 axes motion control
- Scalable control: CPUs for 4, 8, 16, 32 and 64 axes
- EtherCAT and EtherNet/IP ports embedded
- Conforms to IEC 61131-3 standards
- Certified PLCopen Function Blocks for Motion Control

Vision



FQM series

- Camera, vision and connectivity in one
- Compact vision sensor
- Designed for high speed pick and place
- Encoder tracking and smart calibration function
- Fast and powerful object recognition



Xpectia FZM1

- Stable measurements under changing conditions
- Wide variety of positioning measurement methods
- Simple auto calibration
- Flexible camera installation

SCARA Series



STANDARD MODELS			XG series - Tiny type				XGL series - Low payload				
			R6YXG120	R6YXG150	R6YXG180	R6YXG220	R6YXGL250	R6YXGL350	R6YXGL400	R6YXGL500	R6YXGL600
Max. payload (kg)			1	1	1	1	5 (4)*1	5 (4)*1	5 (4)*1	5 (4)*1	5 (4)*1
Reach (mm)			120	150	180	220	250	350	400	500	600
Repeatability (mm)*2	X, Y	±(mm)	0.005	0.005	0.005	0.01	0.01	0.01	0.01	0.01	0.01
	Z	±(mm)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	R	±(°)	0.004	0.004	0.004	0.01	0.004	0.004	0.004	0.004	0.004
Axis specifications	X	Arm length (mm)	45	75	105	111	100	200	250	250	350
		Rotation range ±(°)	125	125	125	120	140	140	140	140	140
	Y	Arm length (mm)	75	75	75	109	150	150	150	250	250
		Rotation range ±(°)	145	145	145	140	144	144	144	144	144
	Z	Stroke (mm)	50	50	50	100	150	150	150	150	150
	R	Rotation range ±(°)	360	360	360	360	360	360	360	360	360
Maximum speed	X, Y	Combined (mm/s)	3300	3400	3300	3400	4500	5600	6100	5100	4900
	Z	(mm/s)	900	900	900	700	1100	1100	1100	1100	1100
	R	(°/s)	1700	1700	1700	1700	1020	1020	1020	1020	1020
Standard time cycle (sec)			0,33*3	0,33*3	0,33*3	0,46*3	0,49*4	0,49*4	0,49*4	0,59*4	0,63*4
Weight (kg)			6	6.1	6.2	7	14.5	15	15.5	17	18
Option	Tool flange		-	-	-	-	R6YACXGLF	R6YACXGLF	R6YACXGLF	R6YACXGLF	R6YACXGLF
	Open shaft		-	-	-	-	R6YACXGLS	R6YACXGLS	R6YACXGLS	R6YACXGLS	R6YACXGLS
Regeneration unit			N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	



SPECIAL MODELS			XSH series		XGS series (W=Wall mount type / U=Inverse mount type)								R6YXC180	R6YXC220						
			R6YXSH300	R6YXSH400	R6YXGS□500		R6YXGS□600		R6YXGS□700		R6YXGS□800		R6YXGS□900		R6YXGS□1000					
					W type	U type	W type	U type	W type	U type	W type	U type	W type	U type	W type	U type				
Max. payload (kg)			3	3	10	10	20	20	20	20	20	20	20	20	20	20	20	1	1	
Reach (mm)			300	400	500	600	700	800	900	1000	1000	1000	1000	1000	1000	1000	1000	180	220	
Repeatability (mm)*2	X, Y	±(mm)	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	
	Z	±(mm)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
	R	±(°)	0.005	0.005	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
Axis specifications	X	Arm length (mm)	175	225	200	300	300	400	500	600	600	600	600	600	600	600	600	71	111	
		Rotation range ±(°)	115	115	105	130	130	130	130	130	130	130	130	130	130	130	130	120	120	
	Y	Arm length (mm)	125	175	300	300	400	400	400	400	400	400	400	400	400	400	400	109	109	
		Rotation range ±(°)	140	140	125	145	130	145	150	150	150	150	150	150	150	150	150	140	140	
	Z	Stroke (mm)	150	150	200(300)	200(300)	200(400)	200(400)	200(400)	200(400)	200(400)	200(400)	200(400)	200(400)	200(400)	200(400)	200(400)	200(400)	100	100
	R	Rotation range ±(°)	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360
X, Y	Combined (mm/s)	4400	6000	7600	8400	8400	8400	9200	9900	10600	10600	10600	10600	10600	10600	10600	3300	3400		
Maximum speed	Z	(mm/s)	1000	1000	2300(1700)	2300(1700)	2300(1700)	2300(1700)	2300(1700)	2300(1700)	2300(1700)	2300(1700)	2300(1700)	2300(1700)	2300(1700)	2300(1700)	2300(1700)	700	700	
	R	(°/s)	1020	1020	1700 800	1700 800	920 480	920 480	920 480	920 480	920 480	920 480	920 480	920 480	920 480	920 480	920 480	1700	1700	
Standard time cycle (sec)			0,54*4	0,66*4	0,45*4	0,46*4	0,42*4	0,48*4	0,49*4	0,49*4	0,49*4	0,49*4	0,49*4	0,49*4	0,49*4	0,49*4	0,42*3	0,45*3		
Weight (kg)			15	15	26	27	51	53	55	57	57	57	57	57	57	57	6.5	6.5		
User wiring (sq x wires)			0.2 sq x 10 wires; Ø 4 x 3				0.2 sq x 20 wires; Ø 6 x 3								0.1 sq x 8 wires; Ø 3 x 2					
User tubing (Ø)															Class 10; Suct. vol. (NI/min) = 30;					
Regeneration unit			N.A.	N.A.	RGU3	RGU3	RGU3	RGU3	RGU3	RGU3	RGU3	RGU3	RGU3	RGU3	RGU3	RGU3	N.A.	N.A.		

*1 Maximum payload is 4kg when tool flange and hollow shaft options are installed. *2 This is the value at constant ambient temperature. *3 With 0.1 kg payload. When reciprocating 100mm in horizontal and 25mm in vertical directions. *4 With 2 kg payload. When reciprocating 300mm in horizontal and 25mm in vertical directions.



XG series							X series
R6YXG500	R6YXG600	R6YXGH600	R6YXG700	R6YXG800	R6YXG900	R6YXG1000	R6YXX1200
10	10	20	20	20	20	20	50
500	600	600	700	800	900	1000	1200
0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.05
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02
0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.005
200	300	200	300	400	500	600	600
130	130	130	130	130	130	130	125
300	300	400	400	400	400	400	600
145	145	150	150	150	150	150	150
200(300)	200(300)	200(400)	200(400)	200(400)	200(400)	200(400)	400
360	360	360	360	360	360	360	360
7600	8400	7700	8400	9200	9900	10600	7400
2300(1700)	2300(1700)	2300(1700)	2300(1700)	2300(1700)	2300(1700)	2300(1700)	750
1700	1700	1020	1020	1020	1020	1020	600
0,45*4	0,46*4	0,47*4	0,42*4	0,48*4	0,49*4	0,49*4	0,91*4
30	31	48(50)	50(52)	52(54)	54(56)	56(58)	124
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
RGU3	RGU3	RGU3	RGU3	RGU3	RGU3	RGU3	RGU2



XC series - Clean type								XP series - Dust-proof & drip-proof type							
R6YXCH250	R6YXCH350	R6YXCH400	R6YXC500	R6YXC600	R6YXC700	R6YXC800	R6YXC1000	R6YXP250	R6YXP350	R6YXP400	R6YXP500	R6YXP600	R6YXP700	R6YXP800	R6YXP1000
3	3	3	10	10	20	20	20	3	3	3	10	10	20	20	20
250	350	400	500	600	700	800	1000	250	350	400	500	600	700	800	1000
0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
125	225	225	250	350	350	450	550	125	225	225	250	350	350	450	550
115	115	115	120	120	120	120	120	115	115	115	120	120	120	120	120
125	125	175	250	250	350	350	450	125	125	175	250	250	350	350	450
130	128	143	142	145	145	145	145	130	130	140	145	145	145	145	145
150	150	150	200(300)	200(300)	200(400)	200(400)	200(400)	150	150	150	200(300)	200(300)	200(400)	200(400)	200(400)
360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360
4000	5000	6000	4900	5600	6700	7300	8000	4000	5000	6000	4900	5600	6700	7300	8000
1000	1000	1000	1700	1700	1700	1700	1700	1000	1000	1000	1700	1700	1700	1700	1700
1020	1020	1020	876	876	600	600	600	1020	1020	1020	876	876	600	600	600
0,54*4	0,54*4	0,66*4	0,53*4	0,56*4	0,57*4	0,57*4	0,6*4	0,54*4	0,54*4	0,66*4	0,53*4	0,56*4	0,57*4	0,57*4	0,6*4
16	16	16	31	33	57	58	59	15	15	15	30	32	56	57	58
0.2 sq x 10 wires; Ø 4 x 3			0.2 sq x 20 wires; Ø 6 x 3					0.2 sq x 10 wires; Ø 4 x 3			0.2 sq x 20 wires; Ø 6 x 3				
Class 10; Suction volume (NI/min) = 60;															
N.A.	N.A.	N.A.	RGU2	RGU2	RGU2	RGU2	RGU2	N.A.	N.A.	N.A.	RGU2	RGU2	RGU2	RGU2	RGU2

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