

PICK & PLACE SOLUTION



- » NJ Machine Controller with new robotics algorithms
- » Wide range of Delta robots

Delta vs SCARA solution

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.

Omron Pick & Place solution 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 FH 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.





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.

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



Washdown 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



Washdown Mini Delta robot

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

Accurax G5 Servo motors

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

NJ Robotics

SYSMAC
always in control

NJ Robotics

Robot	Cycle time
8 Delta	2 ms
4 Delta	1 ms

Delta Robot Series



Delta robot XL

- Rated Working range: $\varnothing$ 1300 x 400 mm
- Max. Payload: 2Kg
- Cycle time 25/305/25 mm (0.1 Kg): Up to 120 cycle/min.
- IP65



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 Machine Controller enhanced with robotics functionality

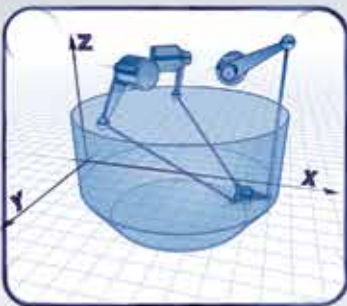
Advanced robotics functionality integrated in the NJ machine controller fully operates up to 8 robots within 2 msec. This system responds to the most demanding Pick & Place applications even at variable conveyor speed conditions. The latest control algorithms developed in the NJ reduce vibrations. These ensure the smoothest TCP trajectories when handling the required products at higher through-put.



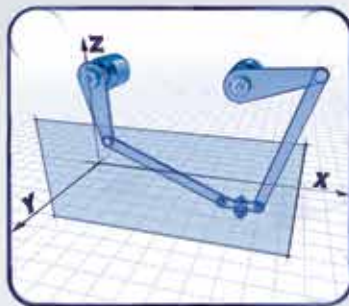
NJ Robotics CPU

Delta Robot Kinematics

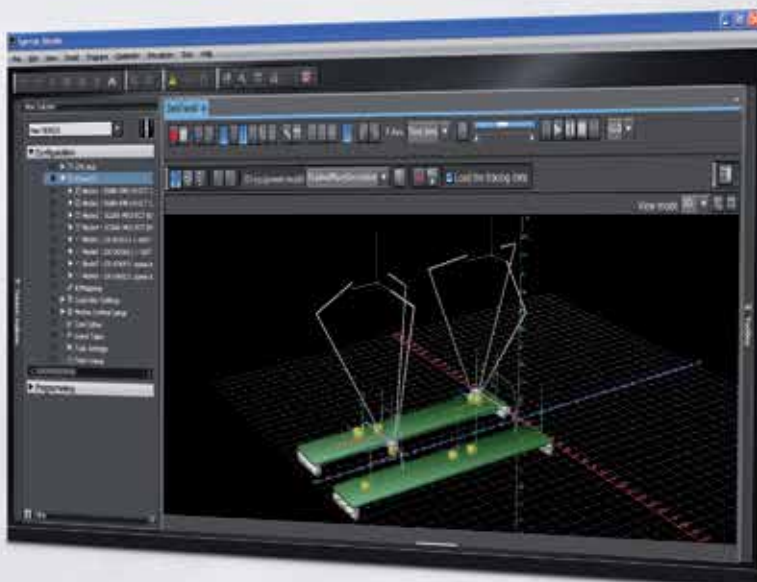
- Delta-3/3R and Delta-2 kinematics supported
- Rotational axis for Delta-3R can be controlled separately or embedded into the Delta kinematics (4 x 4 matrix)
- Automatic workspace check
- Ability to control Omron's robots as well as 3rd party mechanics



Delta -3



Delta -2



Sysmac Studio 3D simulation

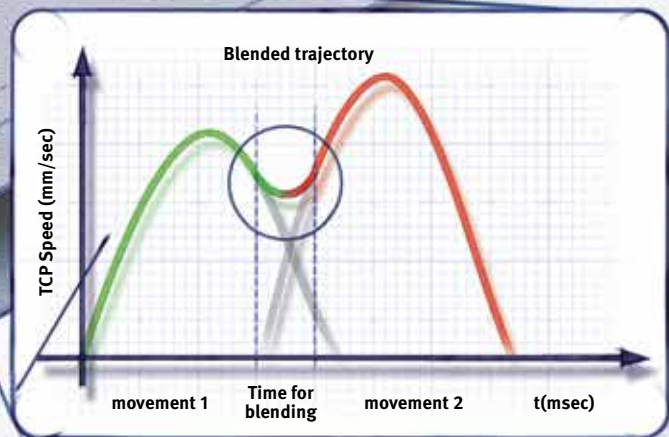
- Reducing commissioning time has never been easier... with the 3D simulator integrated in the Sysmac Studio, visualizing and reproducing the Delta robot trajectory is possible through the offline programming tool

Conveyor tracking function with position offset option

- Possibility of overriding the robot's trajectory while already synchronized with the conveyor
- This function allows pre-defined patterns (as shown by the figure on the right) to be reproduced on the robot's trajectory and applied to the desired product
- Combined with the Omron's new FH vision system, patterns captured with a camera can immediately be generated on the robot's trajectory giving the user complete flexibility on the manufacturing process

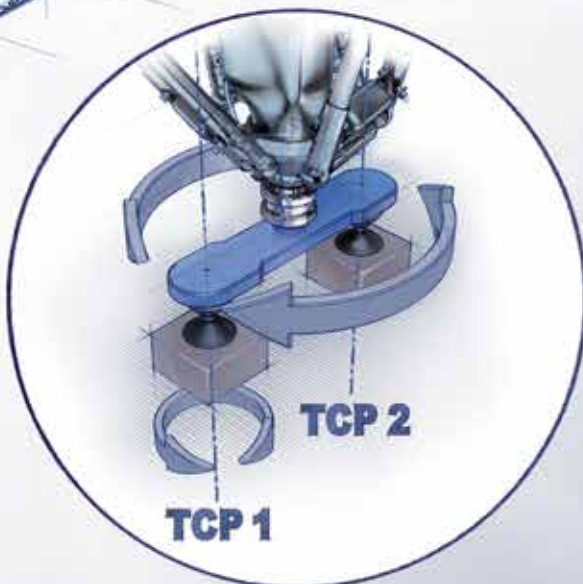


**PATENT
PENDING**



Smoothness transition modes

- Smoother transition modes achieved by merging the robotics commands to ensure a non-stop Pick & Place application
- The system calculates the smoothest overlap to increase through-put and efficiency according to the distance or time set by user
- Up to 8 commands can be buffered



Multiple TCP's Managements

- Possibility to manage up to 16 different tools per robot
- Rotation around the TCP - Tool Center Point - varies from a range of diverse easily programmable options adjusting to the application... i.e. shortest path, fixed directions, etc.

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

- Up to 200 cycles per minute
- Model Range from 450 to 1300 mm
- Payload range: 1 to 3 Kg
- IP class range: IP65, IP67 hygienic design

Reference list	Description
R6Y31110H03067NJ5	Washdown Delta robot 3 axes + 1 rot. axis with high inertia
R6Y31110L03067NJ5	Washdown Delta robot 3 axes + 1 rot. axis
R6Y30110S03067NJ5	Washdown Delta robot 3 axes
CR_UGD4MINI_R_TS	Washdown Mini Delta robot 3 axes + 1 rot. axis
CR_UGD4MINI_NR_TS	Washdown Mini Delta robot 3 axes
CR_UGD4_XL_R	Delta robot XL 3 axes + 1 rot. axis
CR_UGD4_XL_NR	Delta robot XL 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

FQ-M



- 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

FH

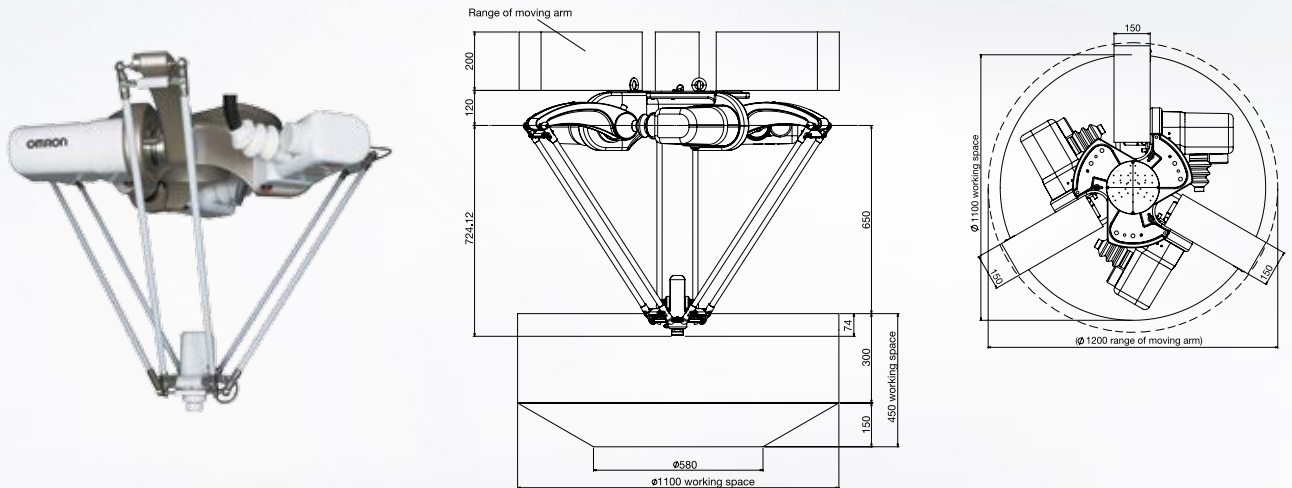


- Powerful 4-core i7 parallel processor
- High speed CMOS camera
- Up to 8 high resolution cameras
- Advanced shape search technology

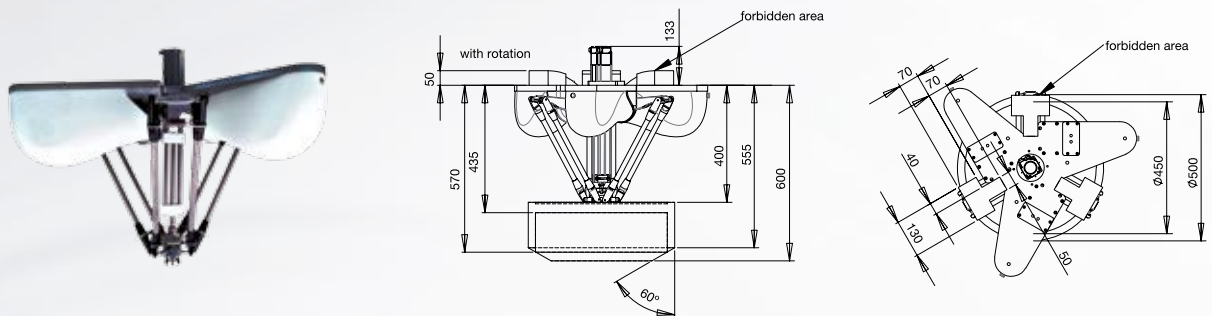
Note: Please contact your OMRON representative for detailed specs and ordering information.

Washdown Delta Robot Series

Washdown Delta robot specifications



Washdown Mini Delta robot specifications



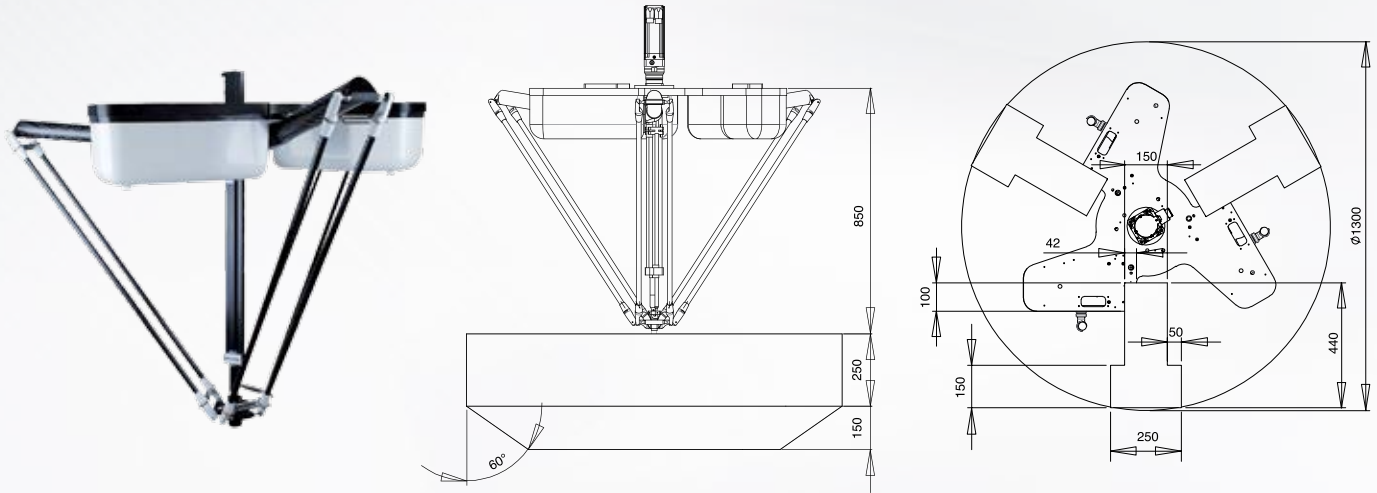
MODEL			R6Y31110H03067NJ5	R6Y31110L03067NJ5	R6Y30110S03067NJ5
Working volume	X, Y axis (stroke)		Ø 1100 mm		
	Z axis (stroke) ^{*1}		300 mm (maximum Ø 1100 mm) / 450 mm (center Ø 580 mm)		
	θ axis (rotation angle)		±180 deg (default s , it can be changed)		-
Servo motor	Arm 1, 2, 3	Model	R88M-K1K030T-BS2		
		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 kgm²	0.01 kgm²	-
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		

MODEL			CR_UGD4MINI_R_TS	CR_UGD4MINI_NR_TS
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	

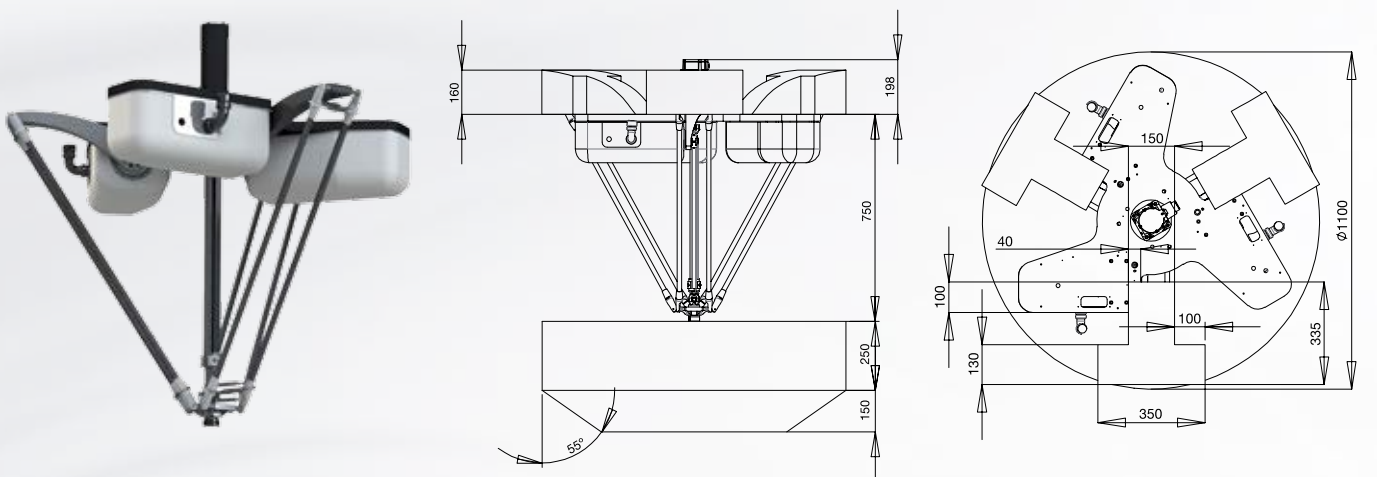
*1. This is the value at a constant ambient temperature. - *2. CPM: Cycle per minute. With 0.1 kg payload. When reciprocating 305 mm in horizontal and 25 mm in vertical directions. - *3. There are limits to acceleration coefficient settings. - *4. Only for the air suctioning. The air injection is not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

Delta Robot Series

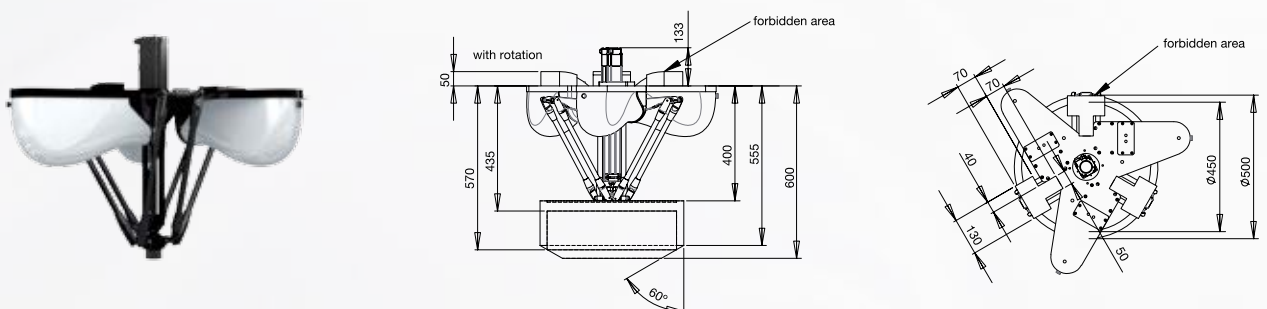
Delta robot XL specifications



Delta robot specifications



Mini Delta robot specifications



MODEL			CR_UGD4_XL_R	CR_UGD4_XL_NR
Working volume	X, Y axis (stroke)		Ø 1300 mm	
	Z axis (stroke) *1		250 mm (maximum Ø 1300 mm) / 400 mm (center Ø 875 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		±0.2 mm	
	θ axis		±0.3 deg	-
Maximum payload			2 kg	
Maximum through-put			120 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	

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	

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.

MEMO



Singapore Office:

OMRON ELECTRONICS PTE. LTD.

438A Alexandra Road, #05-05/08
(Lobby 2) Alexandra Technopark
Singapore 119967

Tel: (65) 6547 6789

Fax: (65) 6547 6769

E-mail: mktg_sg@ap.omron.com



Malaysia Office:

OMRON ELECTRONICS SDN. BHD.

1101 Level 11 Uptown 1
1 Jalan SS21/58 Damansara Uptown
47400 Petaling Jaya, Selangor
Malaysia

Tel: (60-3) 7688 2888

Fax: (60-3) 7688 2833

E-mail: my_enquiry@ap.omron.com



Thailand Office:

OMRON ELECTRONICS CO. LTD.

Rasa Tower 2 16th Floor
555 Phaholyothin Road
Chatuchak, Bangkok
10900, Thailand

Tel: (66-2) 937 0500

Fax: (66-2) 937 0501

CRM Call Centre: (66-2) 942 6700

E-mail: th_enquiry@ap.omron.com



Indonesia Office:

PT. OMRON ELECTRONICS

Menara Bidakara 1 Lantai 22
Jl. Jend. Gatot Subroto Kav. 71-73
Jakarta - 12870
Indonesia

Tel: (62-21) 2949 7500

Fax: (62-21) 2949 7555

E-mail: id_enquiry@ap.omron.com



Philippines Office:

OMRON ASIA PACIFIC PTE. LTD.

MANILA REPRESENTATIVE OFFICE

2nd Floor, Kings Court II Building
2129 Do Chino Roces Avenue
Corner Dela Rosa Street
1231 Makati City, Metro Manila
Philippines

Tel: (63-2) 811 2831

Fax: (63-2) 811 2583

E-mail: ph_enquiry@ap.omron.com



Australia Offices:

Sydney Office:

OMRON ELECTRONICS PTY. LTD.

Unit 6, 108 Silverwater Road,
Silverwater
Sydney, New South Wales 2128
Australia

Tel: (61-2) 9878 6377

Fax: (61-2) 9878 6981

Toll Free: 1300 766 766

E-mail: au_enquiry@ap.omron.com

Melbourne Office:

OMRON ELECTRONICS PTY. LTD.

Suites G.03, Building B,
18-24 Ricketts Road,
Mt Waverley Victoria 3149
Australia

Tel: (61-3) 8588 2600

Fax: (61-3) 8588 2690

E-mail: au_enquiry@ap.omron.com

Brisbane Office:

OMRON ELECTRONICS PTY. LTD.

Unit 14, 1378 Lytton Road
Hemmant 4174, Queensland
Australia

Tel: (61-7) 3859 3900

Fax: (61-7) 3348 8701

E-mail: au_enquiry@ap.omron.com



New Zealand Office:

OMRON ELECTRONICS LTD.

65 Boston Road, Mt Eden
Private Bag 92620
Symonds Street, Auckland
New Zealand

Tel: (64-9) 358 4400

Fax: (64-9) 358 4411

E-mail: nz_enquiry@ap.omron.com



India Offices:

Mumbai Office:

OMRON AUTOMATION PVT. LTD.

THE QUBE, 5th Floor, Unit No. 501 - 504,
M V Road, Marol, Andheri East,
Mumbai 400059,
India

Tel: (91-22) 7128 8400

Fax: (91-22) 7115 5602

E-mail: in_enquiry@ap.omron.com

Bangalore Office:

OMRON AUTOMATION PVT. LTD.

Unit 401 – 402, 3rd Floor, Prestige Atrium,
No 1, Central Street, Civil Station,
Bangalore 560001,
India

Tel: (91-80) 6709 6400/6406

Fax: (91-80) 6709 6403/6408

E-mail: bangalore_enquiry@ap.omron.com

Gurgaon Office:

OMRON AUTOMATION PVT. LTD.

No.108 &103-106, 1/F, Sewa Corporation Park,
MG Road, Gurgaon, Haryana 122002
India

Tel: (91-124) 4921 700

Fax: (91-124) 4921 777

E-mail: newdelhi_enquiry@ap.omron.com



Vietnam Offices:

OMRON ASIA PACIFIC PTE. LTD.

HANOI REPRESENTATIVE OFFICE

9th floor, Mipecc Tower,
229 Tay Son, Dong Da, Hanoi, Vietnam

Tel: (84-4) 3556 3444

Fax: (84-4) 3556 3443

E-mail: hn_enquiry@ap.omron.com

HO CHI MINH REPRESENTATIVE OFFICE

2nd Floor, IWA, 102 A-B, Cong Quynh,
P. Pham Ngu Lao, Q1, TP. Ho Chi Minh
SR Vietnam

Tel: (84-8) 3920 4338

Fax: (84-8) 3920 4335

E-mail: hcm_enquiry@ap.omron.com

Asia Pacific Head Office:

OMRON ASIA PACIFIC PTE. LTD.

438A Alexandra Road
#05-05/08
(Lobby 2) Alexandra Technopark
Singapore 119967

Tel: (65) 6835 3011 Fax: (65) 6835 2711

E-mail: ask@ap.omron.com

Website: www.omron-ap.com

Authorized Distributor