

MZ series

CATALOG



Model Overview



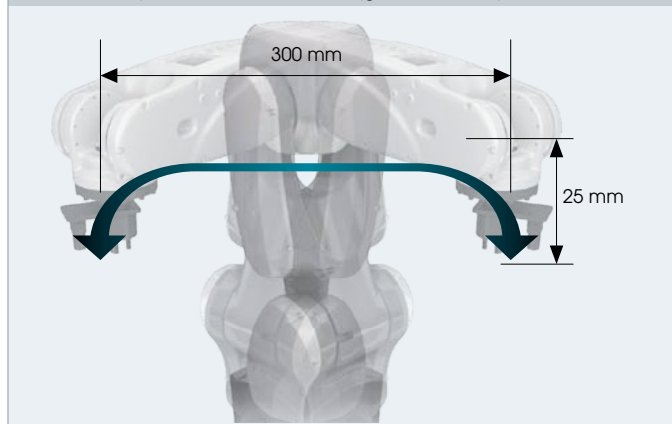
Characteristics

Top Perform High Speed

Maximum speed of each axis is the top in this class

■ Contributing to improvement of productivity by high speed

Standard Cycle Time Evaluation (go and back) ^{*1}

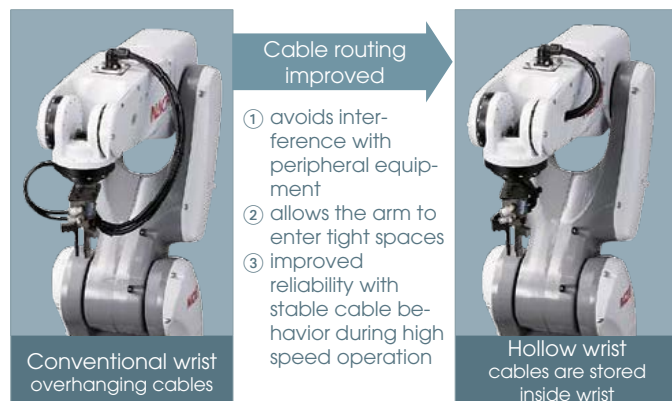


Robot Type	Cycle Time
MZ03EL	0.58 s
MZ04	0.34 s
MZ04E	1.42 s
MZ07	0.31 s
MZ07L	0.38 s

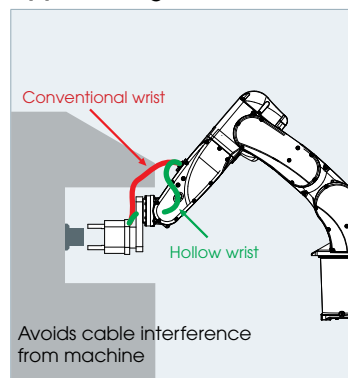
*1: Payload is 1kg. This may vary according to the robot program and installation.

Smart Cable Routing

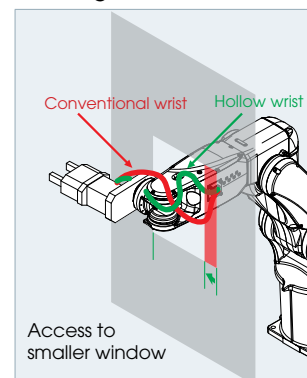
Cable and tubes can be routed through hollow wrist



Approaching to machine



Entering into cover



Lightweight Compact Body

The lightweight and compact robot arm helps to keep the equipment simple and saves space.

The MZ04 robot is designed to be compact. The installation area is half that of the MZ07 or the MZ03EL (DIN-A5 paper size).



Compact & Flexible Installation

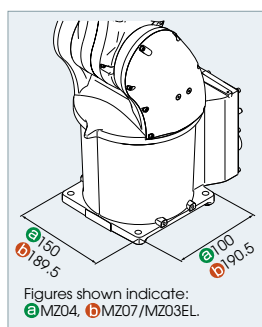
Compact installation space

- Small bottom design enables compact installation.

Cable connection from bottom side

Option

- More compact installation
- Robot can be installed close to behind wall.
- Cables can be stored inside robot riser.



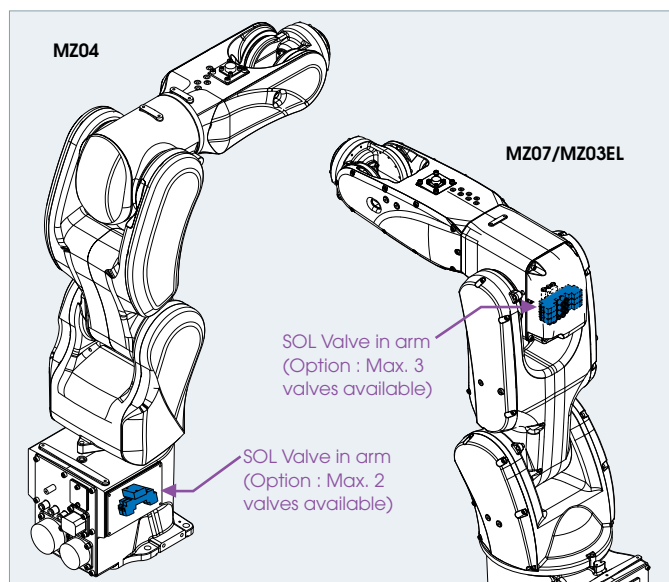
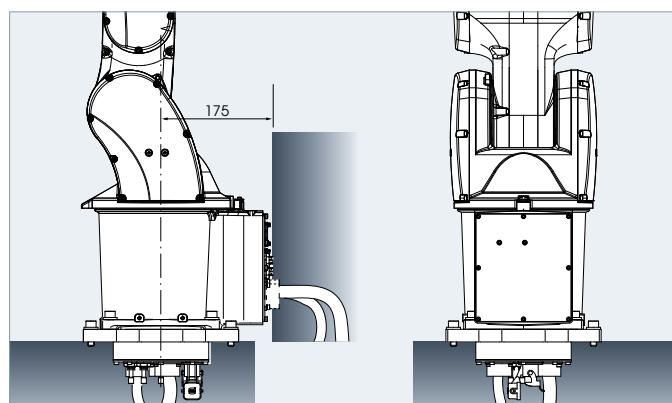
Available to all-round mounting



Pneumatic valves inside robot arm

Option

- Solenoid valves can be installed inside the robot arm.



User friendly functions

Standard Specifications

Robot type **MZ0** **-01-** **-CFD-0000**

Arm variation

Mark 1	Mark 2	Specification	Notes
3	EL	3.5 kg payload, Standard arm	6 axes, Max reach 1102 mm
4	(none)	4 kg payload, Standard arm	6 axes, Max reach 541 mm
	D	4 kg payload, Standard arm	6 axes, Max reach 541 mm, IP67
	E	4 kg payload, Standard arm	6 axes, Max reach 541 mm, Low power type
7	(none)	7 kg payload, Standard arm	6 axes, Max reach 723 mm
	L	7 kg payload, Long arm	6 axes, Max reach 912 mm
	P	7 kg payload, Standard arm	5 axes, Max reach 723 mm (does not have J4)
	LP	7 kg payload, Long arm	5 axes, Max reach 912 mm (does not have J4)

Application variation

Mark	Specification	Solenoid valve			Signal wires	Notes
		MZ03EL	MZ04	MZ07		
0	Standard	Up to 3	Up to 2	Up to 3	10 wires	—
V	Vision sensor	Up to 2	Up to 1	Up to 2	10 wires	LAN cable, Light cable
U	Vision sensor (cross laser)	Up to 1	Up to 1	Up to 1	10 wires	LAN cable, Light cable, Laser cable
F	Force sensor	Up to 1	Up to 1	Up to 1	10 wires	6 freedom Force sensor cable
S	Additional axis	Up to 1	Up to 1	Up to 1	10 wires	1 motor and 1 encoder cable

Connection variation

Mark	Specification	Notes
0	Rear connection	Robot to controller cable is connected at robot rear
B	Bottom connection	Robot to controller cable is connected at robot bottom

Installation variation

Mark	Specification	Notes
0	Standard	J1 working envelope $\pm 30^\circ$ at wall mounting
W	Wall mount	J1 working envelope $\pm 170^\circ$ at wall mounting

Basic specification of robot

Item				Specification			
Robot Model				MZ03EL-02	MZ04-01	MZ07-01 (MZ07P-01)	MZ07L-01 (MZ07LP-01)
Construction				Articulated			
Number of Axis				6		6 (5)	
Drive System				AC Servodrive			
Max. Working Envelope	Arm	J1	Swivel	±170°	±170°		
		J2	Forward/Backward	-135° ~ 80°	-145° ~ +90°	-135° ~ +80°	
		J3	Upward/Downward	-155° ~ 270°	-125° ~ +280°	-136° ~ 270°	-139° ~ 270°
	Wrist	J4 ^{*3}	Rotation 2	±190°			
		J5	Bend	±120°			
		J6	Rotation 1	±360°			
Max. Speed ^{*4} [°/s]	Arm	J1	Swivel	300	480	450	300
		J2	Forward/ Backward	230	460	380	280
		J3	Upward/Downward	360	520	520	360
	Wrist	J4 ^{*3}	Rotation 2	550	560	550	
		J5	Bend	550	560	550	
		J6	Rotation 1	1000	900	1000	
Max. Payload [kg]		Wrist	3.5	4	7		
Allowable Static Loading Torque [N • m]		J4 ^{*3}	Rotation 2	6.0	8.86	16.6	
		J5	Bend	6.0	8.86	16.6	
		J6	Rotation 1	2.9	4.9	9.4	
Max. Allowable Moment of Inertia*1 [kg • m ²]		J4 ^{*3}	Rotation 2	0.12	0.2	0.47	
		J5	Bend	0.12	0.2	0.47	
		J6	Rotation 1	0.03	0.07	0.15	
Max. Reach [mm]				1102	541	723	912
Position Repeatability ^{*2} [mm]				±0.03	±0.02		±0.03
Ambient Temperature				0 ~ 45 °C			
Installation				Floor / Wall / Tilted / Inverted mount			
Dust Proof, Drip Proof				IP67	IP40 equivalent ^{*5}	IP67	
Robot Mass [kg]				39	26	30	32

1 (N • m)=1/9.8(kgf • m)

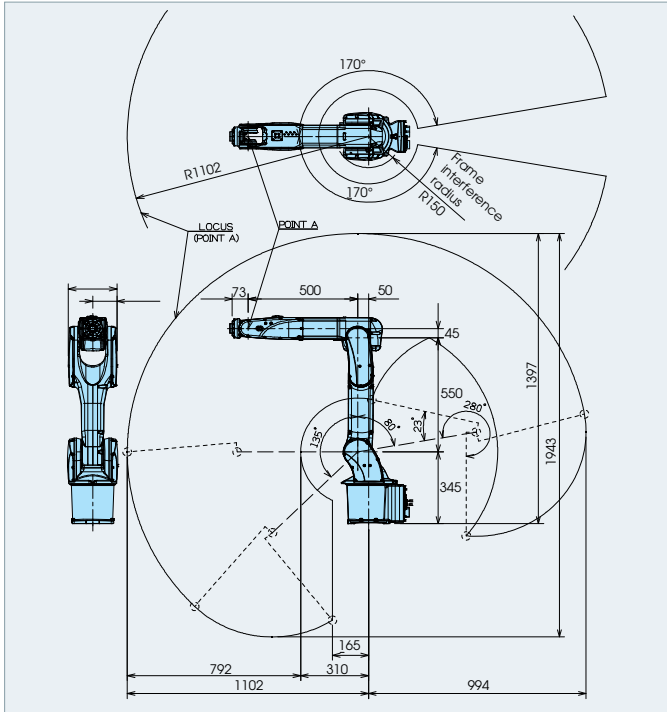
*1: Note that the allowable moment of inertia of wrist varies with the wrist load conditions.

*2: JIS B 8432 compliant. *3: MZ07P-01 and MZ07LP-01 don't have J4 axis.

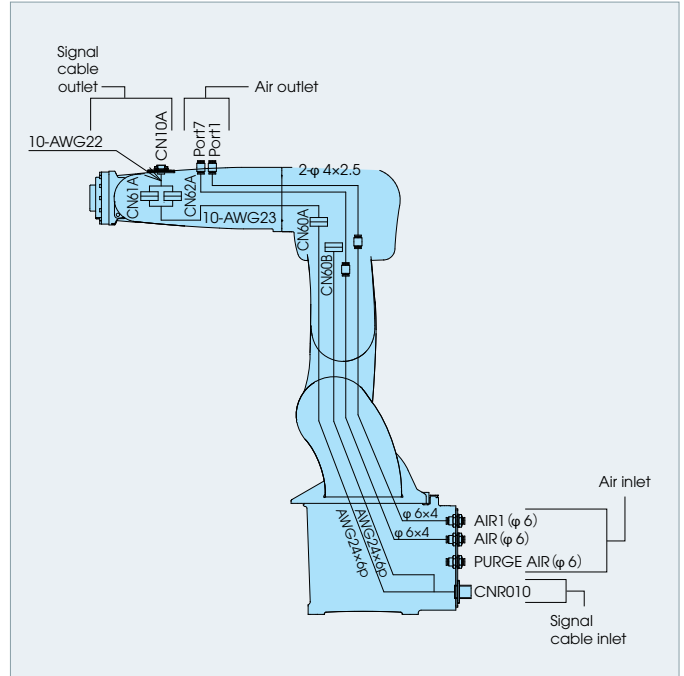
*4: The „Max. speed“ in this table is the available maximum value and will change depending on the workprogram and the wrist load condition.

*5: IP67 specifications can be selected as an option for the MZ04.

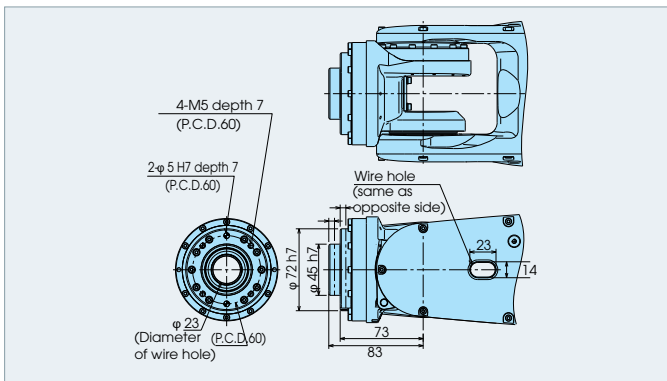
Robot dimensions and Working envelope



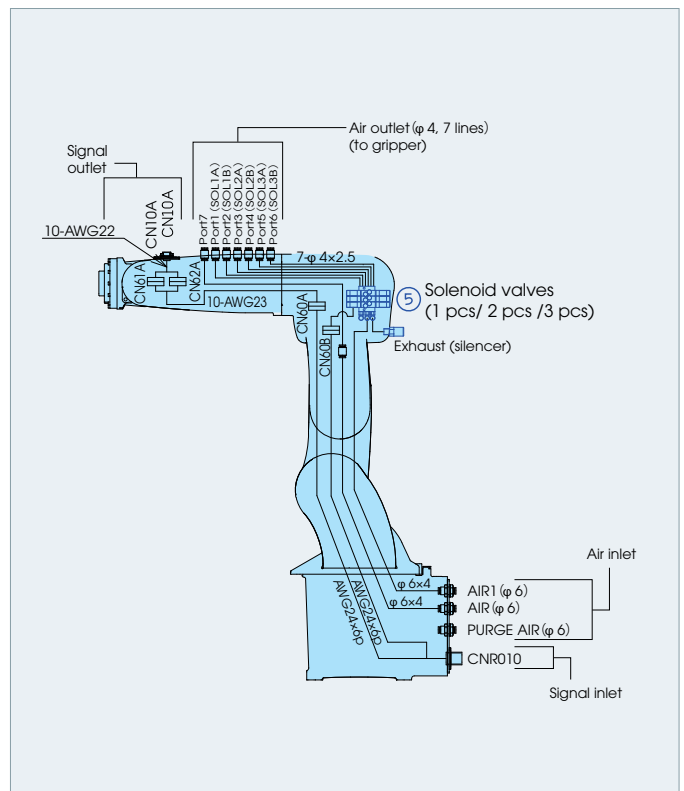
Wiring and tubing inside arm (standard)



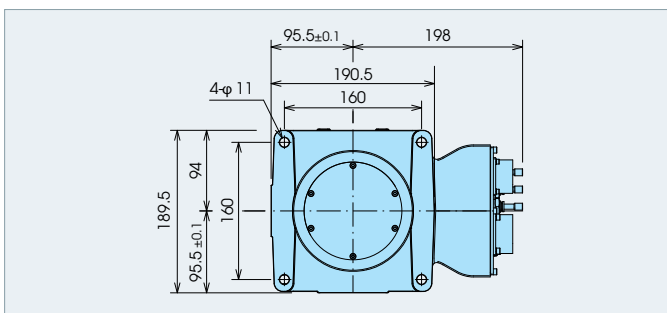
Wrist dimensions



Wiring and tubing in robot arm (when SOL installed in arm)



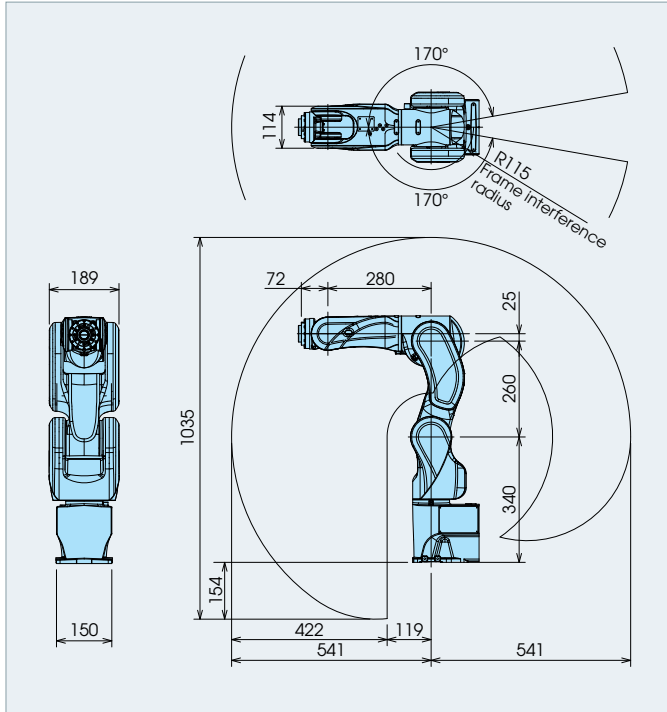
Robot base dimensions



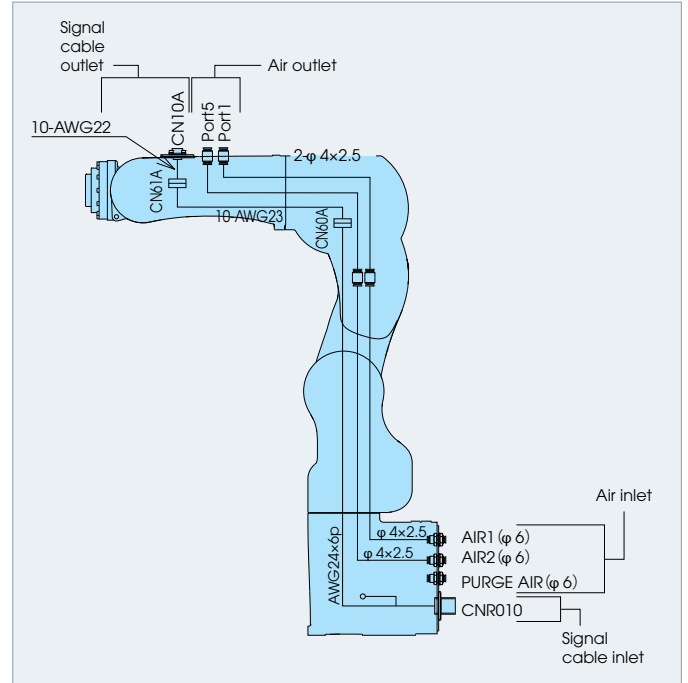
Standard Specifications

MZ04

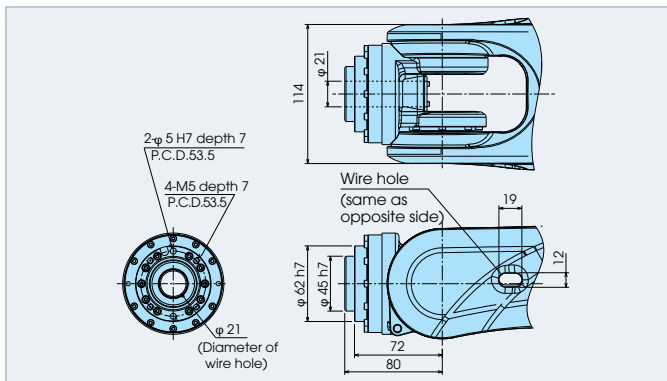
Robot dimensions and working envelope



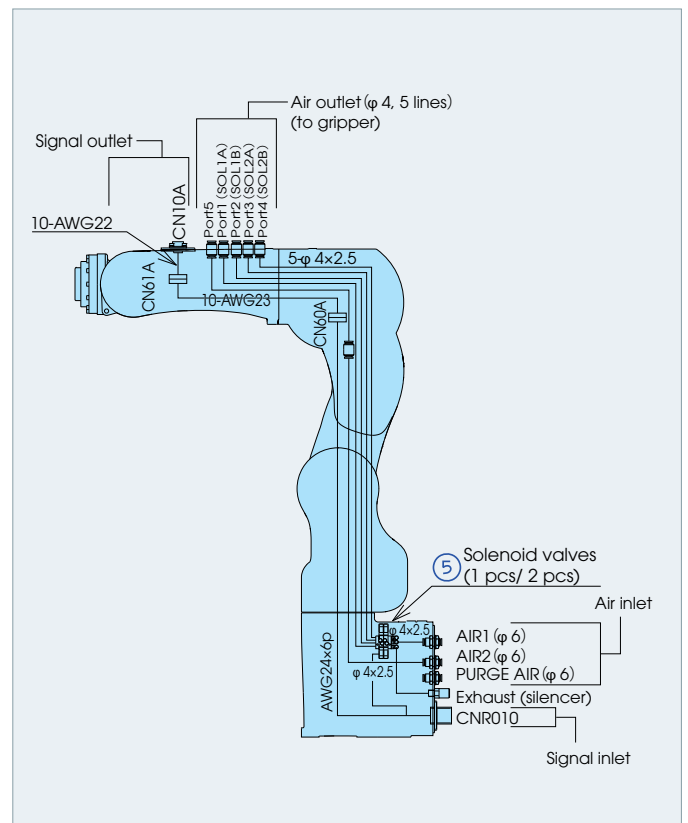
Wiring and tubing inside arm (standard)



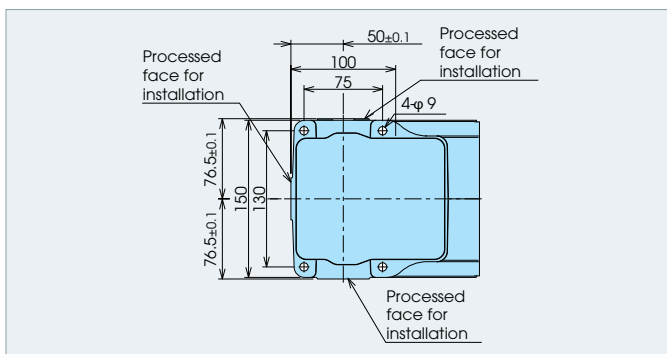
Wrist dimensions



Wiring and tubing in robot arm (when SOL installed in arm)

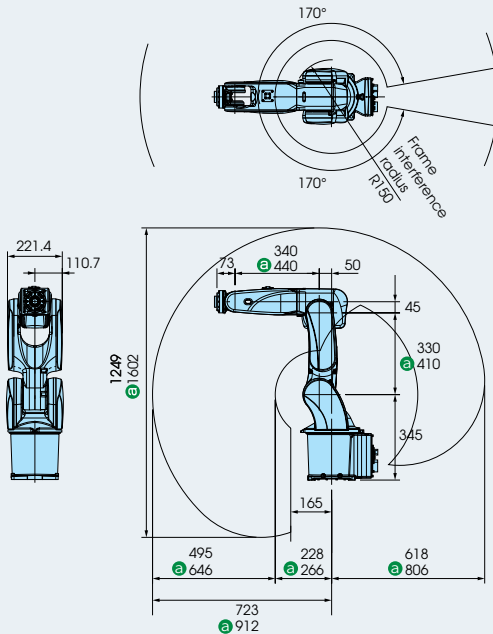


Robot base dimensions

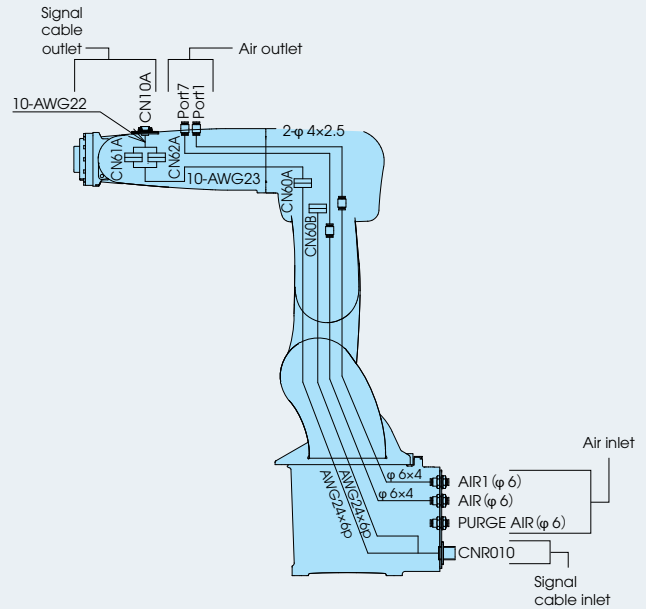


Robot dimensions and working envelope

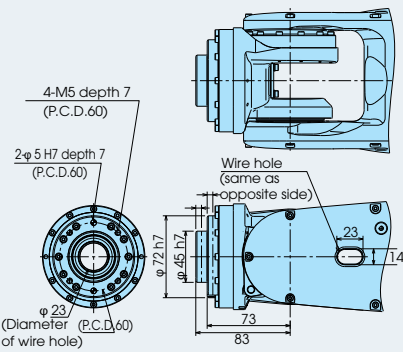
Figures shown indicate: MZ07 and  MZ07L



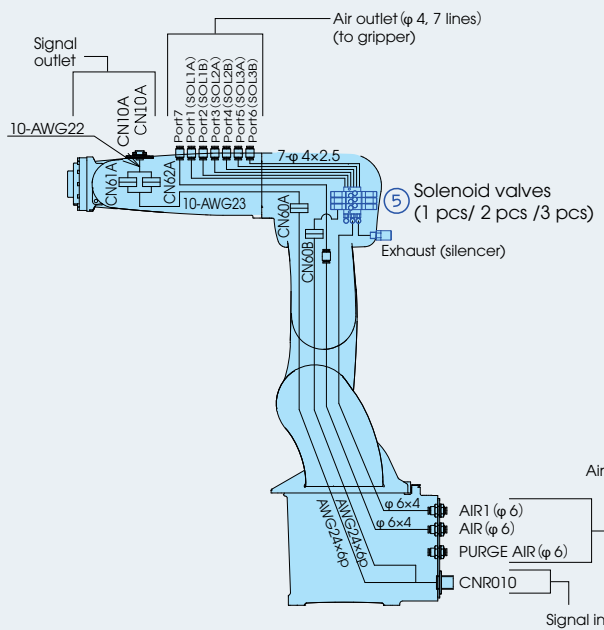
Wiring and tubing inside arm (standard)



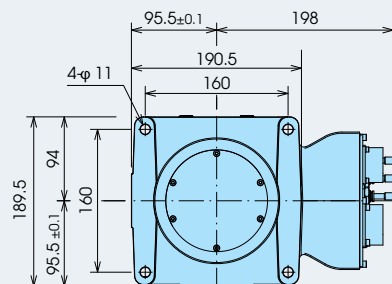
Wrist dimensions



Wiring and tubing in robot arm (when SOL installed in arm)



Robot base dimensions

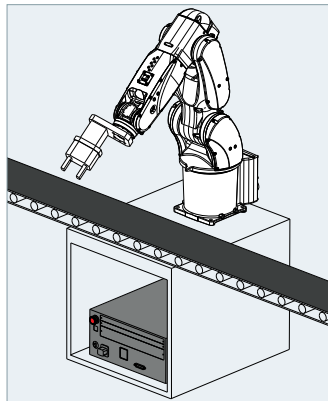


Standard Specifications

Controller

Compact Cabinet

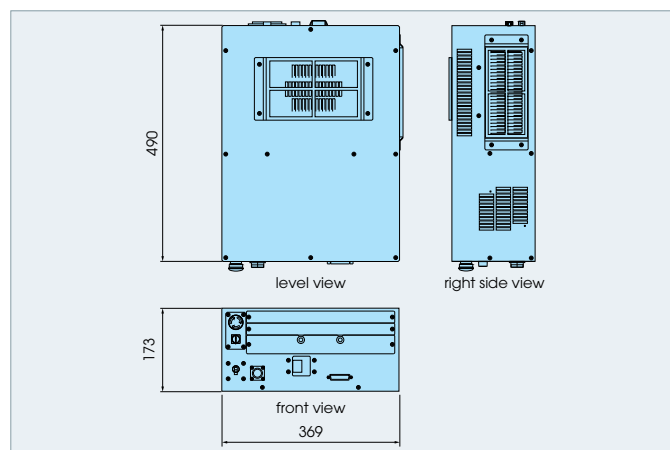
- Only 369 mm in width
- Could be installed inside robot riser



Basic specification of controller

Item		Specification
Controlled Axis		6-Axes
Maximum Control Axis		7-Axes
Safety Function		PLd Category-3
Teaching Method		Teach / Playback Robot Language
Program Number		9,999 programs
Memory Capacity		256 MB (2,560,000 program steps equivalent)
Teach Pendant	Smart TP	5.7" Color LCD Touch Panel, Cable Length: 4m
	Compact TP	Monochrome, 20 characters x 4 lines Display, Cable Length: 4 m
	Common	3 Position Enable SW, Emergency Stop Button
Operating Panel		Emergency Stop, Mode select switch (teach/playback)
Exclusive Safety Input		External Emergency Stop, Safety Plug, External Enable Switch, Protective Stop
Network		Ethernet
Memory Device		USB Port
External Dimension		369 mm(W)×490 mm(D)×173 mm(H)
Weight		Approx. 17 kg
Primary Power Supply		3-Phase AC200-230V ±10 % Single Phase AC200-230V ±10 %
Consuming Power		0.4 KVA
Dust Proof, Drip Proof		IP20
Ambient Temperature		0 ~ 40 °C
Ambient Humidity		20 ~ 85 % (Non-condensing)

Controller dimensions



Controller options

Item	Specification
Additional Axis	One additional axis is possible (Motor Capacity: up to 600W)
Fieldbus	DeviceNet, EtherNet/IP, PROFIBUS, PROFINET, CC-Link
Digital I/O	Up to 2p cs of 32 point/32 point I/O Board
	8 photo coupler input and 8 transistor output or 8 photo coupler input and 8 relay contact output
External Memory	USB Memory
Vision Sensor ^{*1}	NV-Pro
Robot Monitoring Unit ^{*1}	Category 4, SIL 3
Controller Protection Box	IP54 equivalent dust-proof and drip-proof box

*1: Another box is necessary.

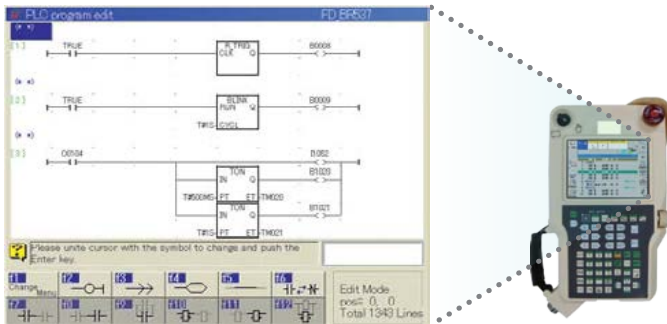
Characteristics

Controller

Software PLC

standard

- Control peripheral equipment by robot controller
- Simplifies system configuration to reduce cost



Offline Simulation Tool

FD on Desk Light

standard

- Best simulator of first for primary study

- Offline Programming
- Robot Layout Investigation
- Cycle Time Simulation
- PLC Ladder Editing
- Operation Training

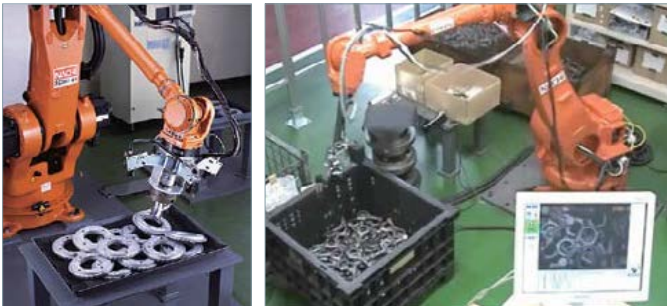


Various applications

Vision sensor NV-Pro

Option

- Operation by using teach pendant, high speed processing
- Various application available by 2D and 3D vision sensing, dimension measurement and parts type districting



Robot Monitoring Unit (RMU)

Option

- Safety unit to monitor robot position and speed
- Reducing cost and space saving

User graphical interface FlexGui

Option

- Customizing teach pendant display.
- Operator can use teach pendant as a system operating panel.

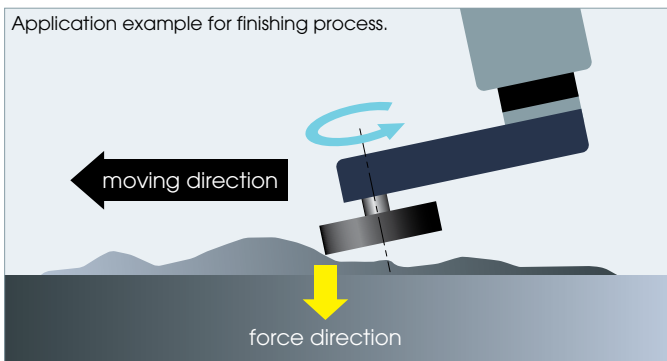


Force sensor

Option

- Assembling (inserting, following, phasing), polishing, deburring

Application example for finishing process.



Field bus

Option

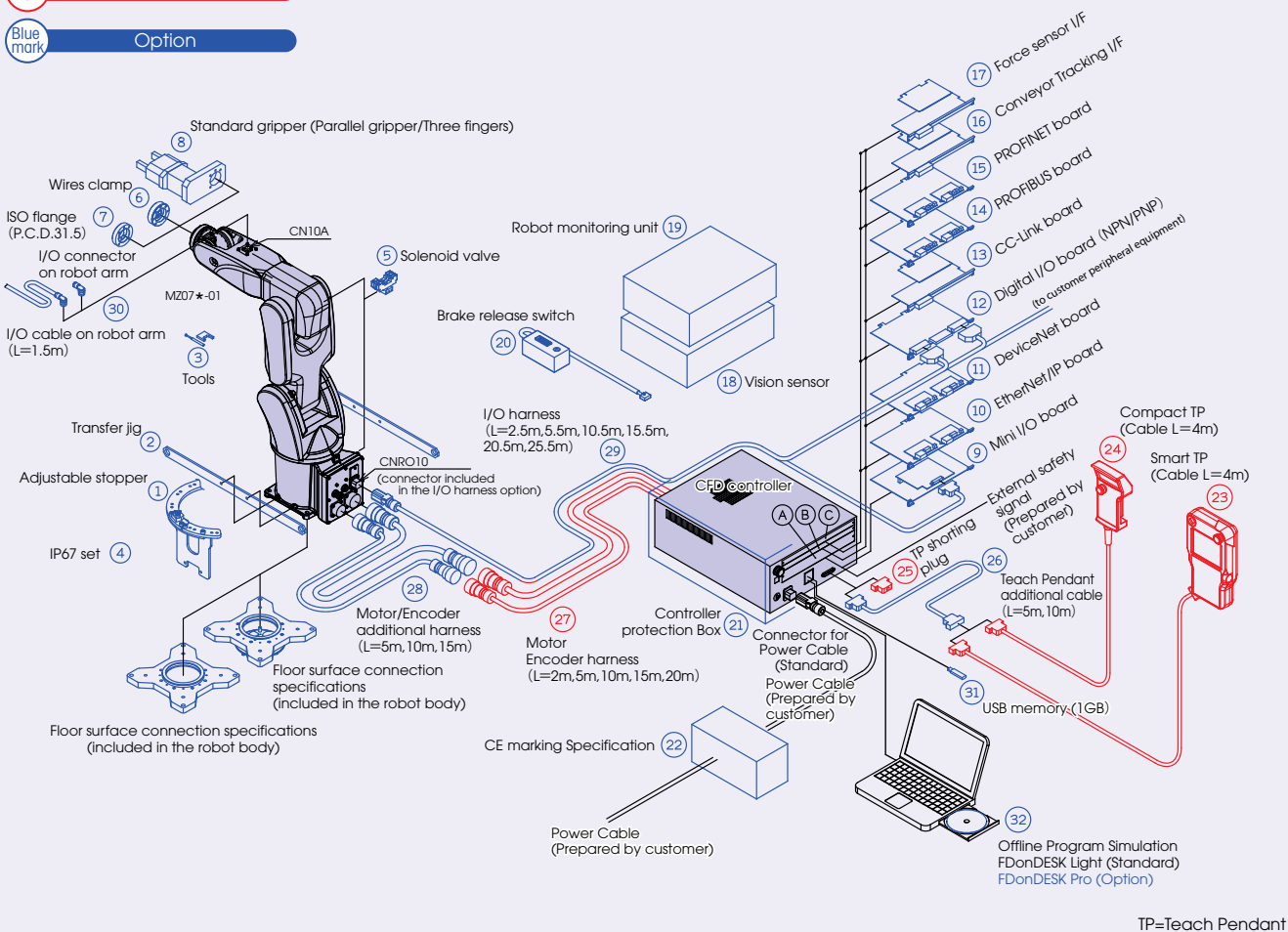
- DeviceNet (Master, Slave)
- EtherNet/IP (Master, Slave)
- CC-Link (Master, Slave)
- PROFIBUS (Master, Slave)
- PROFINET (Slave)

DeviceNet and EtherNet/IP is a trademark of ODVA (Open DeviceNet Vendor Association, Inc.).
CC-Link is a trademark of CC-Link Partner Association : CLPA.
PROFIBUS and PROFINET is a trademark of PROFIBUS & PROFINET International.

Options

Red mark selectable essential option

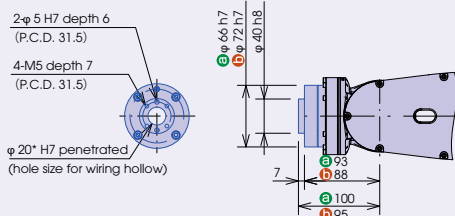
Blue mark Option



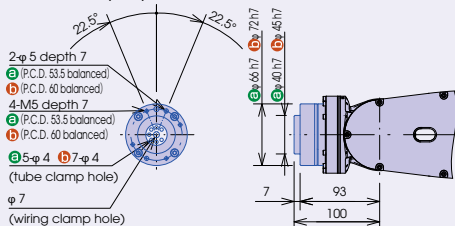
Wrist dimensions

ISO flange option ⑦

When ISO flange option is mounted, hollow size is reduced from $\phi 23$ to $\phi 20$



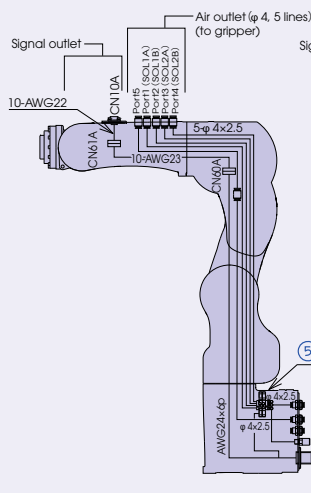
Wrist clamp option ⑥



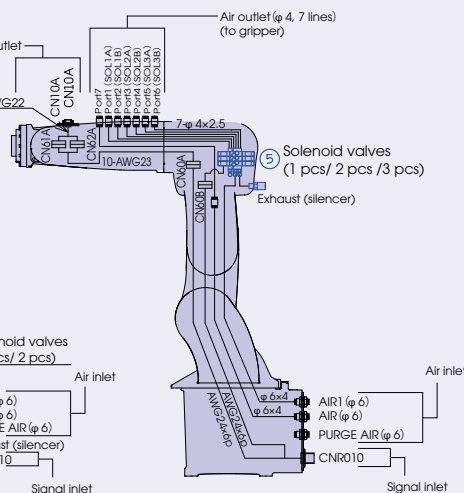
Figures shown indicate: ⑥ MZ04, ⑦ MZ07/MZ03EL

Wiring and tubing in robot arm (when SOL installed in arm)

MZ04



MZ07/MZ03EL



Option list

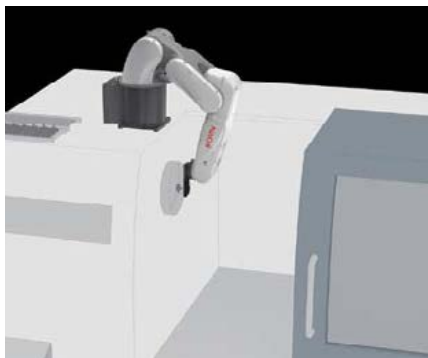
No.	Item	Specifications	Parts No.			Notes
			MZ03EL	MZ04	MZ07	
①	Adjustable stopper	Restriction of axis 1 to 3 working envelope	OP-S5-025	OP-S5-026	OP-S5-027	
②	Transfer jig	Common for crane transporting, inverted and wall mount	OP-S2-042	OP-S2-044	OP-S2-042	
③	Tools	Zeroing pin & Zeroing block	OP-T2-078	OP-T2-089	OP-T2-078	
④	IP67 set	Air purge unit in robot body	OP-H9-004	OP-H9-008	OP-H9-004	
⑤	Solenoid valve	1 valve 2 valves 3 valves	OP-H4-004 OP-H5-008 OP-H6-004	OP-H4-006 OP-H5-010 -	OP-H4-004 OP-H5-008 OP-H6-004	2 position double Pressure range : 0.1 to 0.5 MPa Coil voltage rating 24 VDC
⑥	Wires clamp	Clamp for wires and air tubes inside wrist hollow	OP-W3-012	OP-W3-016	OP-W3-012	MZ04: Air (φ 4, 5 lines), signal lines
⑦	ISO flange	ISO flange adapter (P.C.D.31.5)	OP-W2-012	OP-W2-013	OP-W2-012	
⑧	Standard gripper ^{*1}	Parallel gripper single S Parallel gripper double S Parallel gripper single M Three fingers single S Three fingers double S Three fingers single M Three fingers double M	OP-F10-002 OP-F10-003 OP-F10-004 OP-F10-005 OP-F10-006 OP-F10-007 OP-F10-008	OP-F10-009 - OP-F10-010 OP-F10-011 - OP-F10-012 -	OP-F10-002 OP-F10-003 OP-F10-004 OP-F10-005 OP-F10-006 OP-F10-007 OP-F10-008	Grip force 320N (air source 0.5 MPa) Stroke 24 mm Grip force 600N (air source 0.5 MPa) Stroke 30 mm Grip force 300N (air source 0.5 MPa) Stroke 8 mm Grip force 410N (air source 0.5 MPa) Stroke 10 mm
⑨	Mini I/O board	I/O Photo coupler 8 inputs / NPN Transistor 8 outputs I/O Photo coupler 8 inputs / Relay contact 8 outputs	CFD-OP150-A CFD-OP150-B			Mounted on sequence board of slot A
⑩	EtherNet/IP board	Master 1CH Slave 1CH Master 1CH + Slave 1CH Slave 2CH Master 2CH	CFD-OP130-A CFD-OP130-B CFD-OP130-C CFD-OP130-D CFD-OP130-E			Occupies (1) slot
⑪	DeviceNet board	Master 1CH Slave 1CH Master 1CH + Slave 1CH Slave 2CH Master 2CH	CFD-OP131-A CFD-OP131-B CFD-OP131-C CFD-OP131-D CFD-OP131-E			Occupies (1) slot
⑫	Digital I/O board	I/O Photo coupler 32 inputs / NPN Transistor 32 outputs I/O Photo coupler 64 inputs / NPN Transistor 64 outputs I/O Photo coupler 32 inputs / PNP Transistor 32 outputs I/O Photo coupler 64 inputs / PNP Transistor 64 outputs	CFD-OP125-A CFD-OP125-B CFD-OP151-A CFD-OP151-B			Occupies (1) slot Occupies (2) slots Occupies (1) slot Occupies (2) slots
⑬	CC-Link board	Both master and slave 1CH	CFD-OP98-B			Occupies (1) slot
⑭	PROFIBUS board	Master 1CH Slave 1CH Master 1CH + Slave 1CH Slave 2CH Master 2CH	CFD-OP132-A CFD-OP132-B CFD-OP132-C CFD-OP132-D CFD-OP132-E			Occupies (1) slot
⑮	PROFINET board	Slave 1CH Slave 2CH	CFD-OP136-B CFD-OP136-D			Occupies (1) slot
⑯	Conveyor Tracking I/F	RS422 Differential input encoder counter	CFD-OP47-A			Occupies (1) slot
⑰	Force sensor I/F	Force sensor unit for CFD (another box)	CFD-OP152-A			Occupies (1) slot
⑱	Vision sensor	Vision sensor unit for CFD (another box)	CFD-OP139-A			Cameras, lighting, and cables are available. Contact us for information.
⑲	Robot monitoring unit	Robot monitoring unit for CFD (another box)	CFD-OP145-A			
⑳	Brake release switch	Brake release switch (portable type)	FD11-OP90-E			
㉑	Controller protection BOX	Upgraded to IP54 equivalent by preparing dust-proof and drip-proof box	CFD-OP133-A			W540xD700xH270
㉒	UL specification	Some parts are replaced to conform to UL standard	CFD-UL-A			
	CE marking specification	CE marking compliant, separate unit	CFD-CE-A			
	KCs specification	Some parts are replaced to conform to Korean KCs standard	CFD-KCS-A			
㉓	Smart TP ^{*2}	Cable length 4 m	CFDTP-10-04M			
㉔	Compact TP ^{*2}	Cable length 4 m	MINITP-10-04M			These are selectable options. One of them must be selected.
㉕	TP shorting plug ^{*2}	To disconnect teach pendant	CFD-OP153-A			
㉖	Teach Pendant additional cable	5 m 10 m	CFDTP-RC05M CFDTP-RC10M			Only one cable can be added Both ends have a connector
㉗	Motor/Encoder harness	2 m 5 m 10 m 15 m 20 m	Z101C-J1-02-A Z101C-J1-05-A Z101C-J1-10-A Z101C-J1-15-A Z101C-J1-20-A			Connects robot to controller One of these options must be selected. Select one of them.
㉘	Motor/encoder additional harness (Flexible type extension harness)	5 m 10 m 15 m	Z102C-00-05-A, (Z102C-01-05-A) Z102C-00-10-A, (Z102C-01-10-A) Z102C-00-15-A, (Z102C-01-15-A)			One extension, 25 m maximum Both ends have a connector Select one the following models if a flexible type cable is required Z102C-01-**-A (** indicates length, 05 is 5 m, 10 is 10 m, and 15 is 15 m)
㉙	I/O harness (I/O harness for connecting to Mini I/O board)	2.5 m 5.5 m 10.5 m 15.5 m 20.5 m 25.5 m	IOCABLE-10-02M, (IOCABLE-40-02M) IOCABLE-10-05M, (IOCABLE-40-05M) IOCABLE-10-10M, (IOCABLE-40-10M) IOCABLE-10-15M, (IOCABLE-40-15M) IOCABLE-10-20M, (IOCABLE-40-20M) IOCABLE-10-25M, (IOCABLE-40-25M)			I/O cable between robot and controller. IOCABLE-10-**-M type Controller side is separate cable, so cable manufacturing and signal assignment must be done by customer. IOCABLE-40-**-M type Connector on both ends to directly connect CFD-OP150-A or B (Mini I/O board) of CFD controller.
㉚	I/O cable on robot arm	1.5 m	IOCABLE-20-01M			Tool side is separate cable. Manufacturing needs to be done by customer.
	I/O connector on robot arm	Connector only Soldering type	IOCABLE-20-00			This is connector only. Manufacturing needs to be done by customer.
㉛	USB memory	1 GByte	FD11-OP93-A			
㉜	FDonDESK Pro	Robot Program Simulator	FDonDESK Pro			Following utilities are added on „FDonDESK Light“ O Program creation utility from CAD data O Mukiti robot control

*1: Grip force may vary according to the supplied air pressure (0.3 to 0.5 MPa) and finger length.

2: TP^{} means teach pendant.

All option is shipped with robot by kit (sub assembly). Please install it by customer after reading option install procedure.

Application Examples



Machine Loading



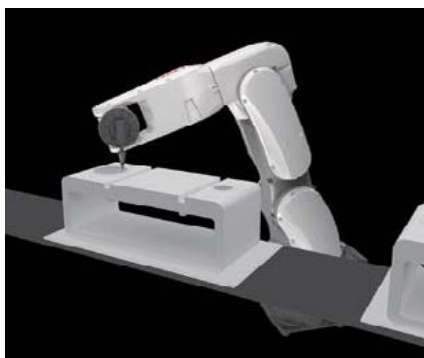
Picking



Packing/Casing



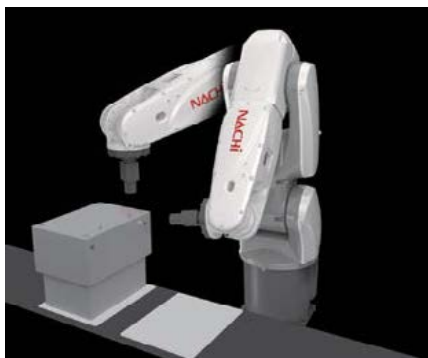
Assembling



Deburring



Finishing



Inspection



Sealing

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Tokyo Head Office

Shiodome Sumitomo Bldg. 17F 1-9-2 Higashi-shinbashi, Minato-ku, Tokyo 105-0021, JAPAN
Tel: +81-(0)3-5568-5245 Fax: +81-(0)3-5568-5236

Toyama Head Office

1-1-1 Fujikoshi-Honmachi, Toyama 930-8511, JAPAN
Tel: +81-(0)76-423-5111 Fax: +81-(0)76-493-5211

NACHI ROBOTIC SYSTEMS INC.

42775 West 9 Mile Road Novi, Michigan, 48375, U.S.A.
Tel: +1-248-305-6545 Fax: +1-248-305-6542
URL: <http://www.nachirobotics.com/> E-mail: Marketing@NachiRobotics.com

NACHI BRASIL LTDA. SAO PAULO BRANCH

Av. Paulista, 453, Primeiro Andar, Conj. 11, 12, 13 e 14, Cerqueira Cesar, Sao Paulo-SP,
CEP: 01311-000, BRASIL
Tel: +55-11-3284-9844 Fax: +55-11-3284-1751

NACHI EUROPE GmbH

Bischofstrasse 99, 47809, Krefeld, GERMANY
Tel: +49-(0)2151-65046-0 Fax: +49-(0)2151-65046-90 URL: <http://www.nachirobotics.eu/>

NACHI TECHNOLOGY (THAILAND) CO., LTD. BANGKOK SALES OFFICE

Unit 23/109(A), Fl.24th Sorachai Bldg., Sukhumvit 63 Road(Ekamai), Klongtonnua,
Wattana, Bangkok 10110, THAILAND
Tel: +66-2-714-0008 Fax: +66-2-714-0740

PT.NACHI INDONESIA

TEMPO PAVILION I, 7FL JL. HR Rasuna Said Kav.
10-11 Setiabudi Jakarta Selatan DKI Jakarta -12950, INDONESIA
Tel: +62-021-527-2841 Fax: +62-021-527-3029
URL: <http://www.nachi.co.id/>

NACHI-FUJIKOSHI CORP. KOREA REPRESENTATIVE OFFICE

3F A-Youn Digital Tower, 314-37, Seongsu-dong 2-ga, Seongdong-gu, Seoul,133-120, KOREA
Tel: +82-(0)2-469-2254 Fax: +82-(0)2-469-2264

NACHI KG TECHNOLOGY INDIA PVT. GURGAON HEAD OFFICE

Unit No.207, 2nd Floor, Sewa Corporate Park, MG Road,
Iffco Chowk, Gurgaon 122001, Haryana, INDIA
Tel: +91-(0)12-4450-2900 Fax: +91-(0)12-4450-9210

NACHI (AUSTRALIA) PTY. LTD. MELBOURNE OFFICE

38 Melverton Drive, Hallam, Victoria, 3803, AUSTRALIA
Tel: +61-(0)3-9796-4144 Fax: +61-(0)3-9796-3899
URL: <http://www.nachi.com.au/>

NACHI SINGAPORE PTE. LTD.

No.2 Joo Koon Way, Jurong Town, Singapore 628943, SINGAPORE
Tel: +65-65587393 Fax: +65-65587371

• The specifications are subject to changes without notice.

• In case that an end user uses this product for military purpose or production of weapon, this product may be liable for the subject of export restriction stipulated in the Foreign Exchange and Foreign Trade Act. Please go through careful investigation and necessary formalities for export.