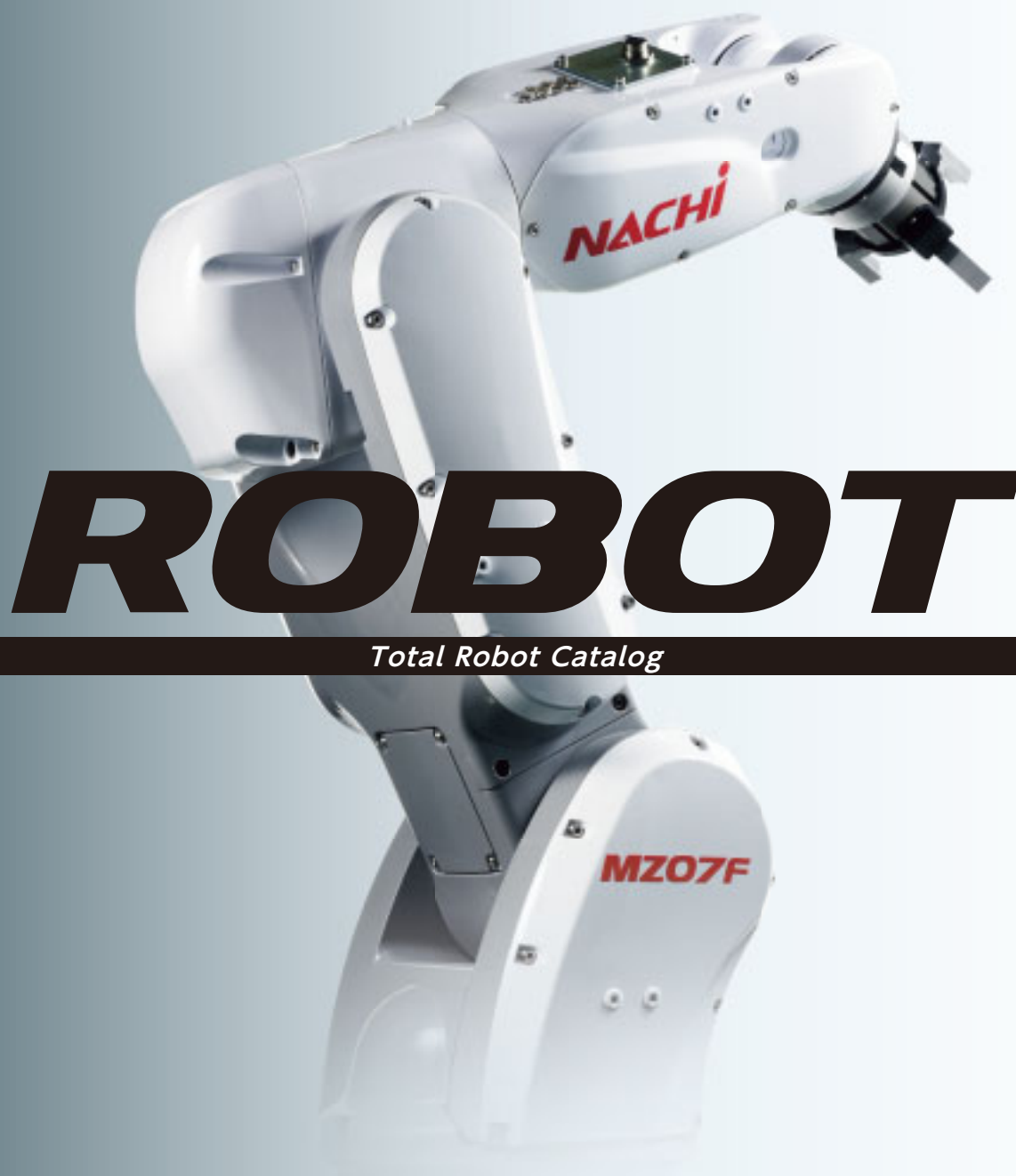


**NACHI**



# ***ROBOT***

*Total Robot Catalog*



## ***FORM FOLLOWS FUNCTION***

NACHI-FUJIKOSHI leveraged know-how from their hydraulic and machine tool divisions to become the first Japanese manufacturer of industrial robots in 1968.

Since then, NACHI-FUJIKOSHI has been introducing products built on its technological excellence and innovative strength to accurately respond to market demands. Currently NACHI-FUJIKOSHI has many partnerships with Automotive and General industries. Through these partnerships and the delivery of world class products NACHI-FUJIKOSHI has earned a high level of respect among these industries around the world.

From highspeed, high precision operations to lifting heavy loads used in a full range of assembly work and welding solutions. NACHI's robots are innovating production facilities with their incredible speed.

We will continue to evolve with customers to meet the challenge of the world's automation needs.





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LINEUP 3-4

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**HANDLING** 5  
Machine Loading, Picking  
Loading, Palletizing  
Assembly  
Deburring/Polishing  
Sealing

---

**PALLETIZING** 15

---

**WELDING** 17

---

**CLEAN-ROOM** 19

---

**OPTIONS** 20  
**PACKAGED PRODUCT  
CONTROLLERS**

---

**LIST OF SPECIFICATIONS** 25





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**SUPPORT SOFTWARE/  
FEATURES** 40

---

**SUPPORT SYSTEMS** 41  
**WORLD SERVICE NETWORK**

# LINEUP

		HANDLING			
		MZ	MC/MR	CZ	EC
Process and application	Field				
Number of controlled axes		5 or 6 axes	6 or 7 axes	6 axes	4 axes
Payload capacity		1 to 25kg	10 to 70kg	10kg	6kg
Maximum reach		350 to 1,882mm	1,260 to 2,050mm	1,300mm	500 to 700mm
Page Number		5	8	9	11
Spot welding/ Seam welding	Automotive Automotive parts		●		
Arc welding	Metalworking Agricultural machinery Construction machinery		●		
Die casting	Automotive parts	●	●	●	
Resin molding	Plastics Electric and electronics	●	●	●	
Press operation handling					
Machine loading		●	●	●	
Deburring/Polishing		●	●		
Sealing	Automotive Automotive parts Machine tools Plastics	●	●	●	
General Assembly	Pharmaceuticals and cosmetics Electric and electronics	●	●	●	●
Bolt tightening	Metalworking Chemistry	●	●	●	●
Picking, aligning, packaging	Medical equipment Foodstuffs Agricultural machinery	●	●	●	●
Shipping and receiving (palletizing)	Construction machinery	●	●	●	
Measuring, inspection, testing		●	●	●	●
Material handling		●	●	●	●
Glass substrate loading	Electric and electronics				

HANDLING		PALLETIZING		WELDING	CLEAN-ROOM
EZ	MC and SC Heavy Loader	LP/MC	SRA-H/SRA	ST-C	
					
4 axes	6 axes	4 or 5 or 6 axes	6 axes	6 axes	
3kg	280 to 1000kg	130 to 500kg	100 to 250kg	133 to 210kg	
450 to 550mm	2,771 to 3,972mm	2,771 to 3,756mm	1,634 to 3,383mm	2,654 to 2,674mm	
12	13	15	17	19	
	●		●		
			●		
	●		●		
	●		●		
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	●	●	●		
●	●				
●	●	●	●		
				●	

# Handling robot

- Machine loading
- Picking
- Loading
- Assembly
- Palletizing
- Deburring/Polishing
- Sealing



## High speed/High precision compact robot

# MZ SERIES

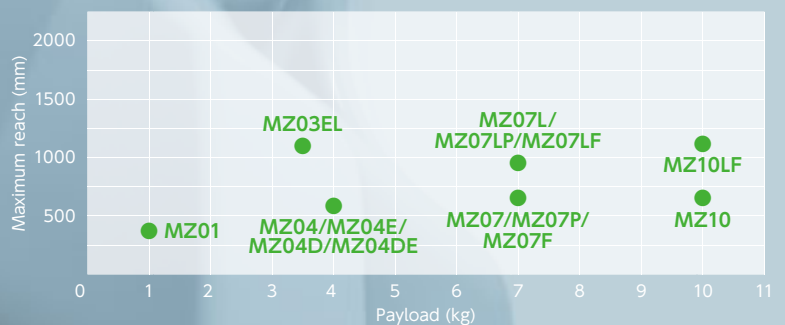
High speed/High precision compact robot available in protection against dust and water, multiple installation orientations.

Large selection of payload from 1 to 25kg.

The internal wire routing for the tooling significantly increases cabling reliability so that operations in a narrow space are possible.

Wide operating range improves productivity and also high spec/performance applications such as vision sensor are available.

Meets various automation needs.





## MZ01

High speed and high precision  
1kg compact robot.

- Number of controlled axes 6 axes
- Payload 1kg
- Maximum reach 350mm

## MZ04

Downsizes facility with light-weight compact body.  
Sophisticated and flowing form.  
Smooth surface design, easy to clean covers.

- Number of controlled axes 6 axes
- Payload 4kg
- Maximum reach 541mm



## MZ03EL

Maximum reach 1,102mm with 3.5kg payload.  
Compact long arm robot.

- Number of controlled axes 6 axes
- Payload 3.5kg
- Maximum reach 1,102mm



## MZ07/MZ07L

Meets various automation needs with various options.

- Number of controlled axes 5 or 6 axes
- Payload 7kg
- Maximum reach MZ07 : 723mm  
MZ07L: 912mm



## MZ07F/MZ07LF <sup>NEW</sup>

Achieves even higher speed and precision while MZ07 series features, lightweight, compact body, and hollow wrist are maintained.

- Number of controlled axes 6 axes
- Payload 7kg
- Maximum reach MZ07F : 723mm  
MZ07LF: 912mm

## MZ10

10 kg payload with the same dimensions and workspace as MZ07.

- Number of controlled axes 6 axes
- Payload 10kg
- Maximum reach 723mm



## MZ10LF <sup>NEW</sup>

Achieves payload improvement, longer reach, and higher speed and precision while MZ07 series features, lightweight, compact body, and hollow wrist are maintained.

- Number of controlled axes 6 axes
- Payload 10kg
- Maximum reach 1,202mm





## **NEW** MZ12/MZ12H

IP 67 equivalent (dust-proof, moisture-resistant), with rust proof/coolant resistant paint. Powerful and slim multi purpose compact robot.

- Number of controlled axes 6 axes
- Payload 12kg
- Maximum reach 1,454mm



## MZ25

Supports various applications with large operating range and powerful wrist.

- Number of controlled axes 6 axes
- Payload 25kg
- Maximum reach 1,882mm



Hollow wrist



Picking



Deburring/Polishing



Machine loading



Assembly



Powerful and compact multi-purpose robot

# MC SERIES

High dust-proof and moisture-resistant, combined with outstanding performance and a full range of functions to handle a variety of applications make these robots ideally suited for a variety of production environments.

- Number of controlled axes 6 axes
- Payload 10 to 70kg
- Maximum reach 2,019 to 2,050mm



Flexible motion "Arm" robot with 7-axes

# MR SERIES

With a programmable pose, this 7-axis arm design can handle complex motions to flexibly work in processes that other robots cannot. The compact robot arm greatly reduces the amount of space needed for installations.

- Number of controlled axes 7 axes
- Payload 20 to 50kg
- Maximum reach 1,260 to 2,050mm



Press operation handling robot

# ST210TP

High rigid design with vibration dampening gives this robot its great speed. This newly developed specialized press arm attachment gives this robot a much larger reach that can be used for a press pitch of up to eight meters. Moves parts horizontally at high speed.

- Number of controlled axes 7 axes
- Payload 80kg
- Maximum reach 3,106mm



Handling/Transfer



Press-tending

# Collaborative robot

Picking  
Assembling support  
Assembly  
Machine loading

People-friendly collaborative robot

## **CZ10**

Nachi's slim arm collaborative, CZ10 has several people-friendly functions and structures. Safety fences are not required and makes it easier to install a robot with various applications.



### People-friendly design

People-friendly design with rounded arms and gap between joints.





## CZ10

- Number of controlled axes 6 axes
- Payload 10kg
- Maximum reach 1,300mm



### Functional safety, Intrinsic safety

#### Dual safety

1. Functional safety: Stops when detecting contact with person.
2. Intrinsic safety: Designed not to pinch person.



### Easy Programming

Intuitive teaching by moving the robot arm by a hand.



Picking



Assembling support



Assembly



Machine loading

# SCARA robot

## SCARA robot

# EC SERIES

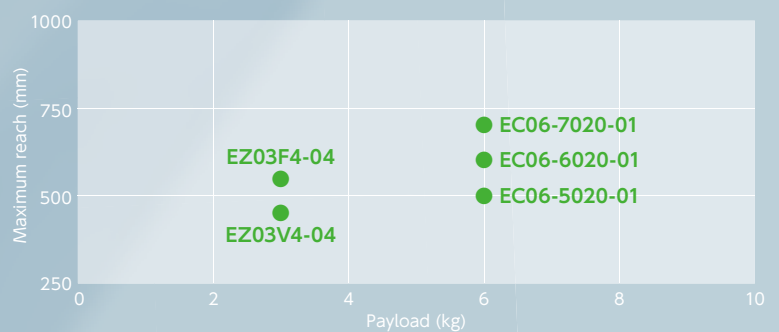
The EC06 series are simple structure robots with high-speed & high precision. They meet the needs for applications such as assembling & handling.

Maximum reach can be selected from 3 types; 500mm, 600mm, 700mm.

The tip axis is a hollow structure, therefore tube and wiring routing from the robot to the tool is simple.



- Number of controlled axes 4 axes
- Payload 6kg
- Maximum reach 500 to 700mm



## WING SLICER Type robot

**EZ** SERIES

The EZ series robots are high-speed, horizontally articulated & equipped with a space-saving vertical first axis.

They have a high speed, high accuracy structure that is excellent for applications such as assembly and handling. Cable routing is simplified by the hollow construction through the end of the wrist, capable of routing cables through.

The internal wire routing for the tooling significantly increases cabling reliability.

The Wing Slicer family has multiple models with varying reach and payload to support a variety of equipment operations.

**EZ03**

- Number of controlled axes 4 axes
- Payload 3kg
- Maximum reach 450 to 550mm



Packing



Inspection

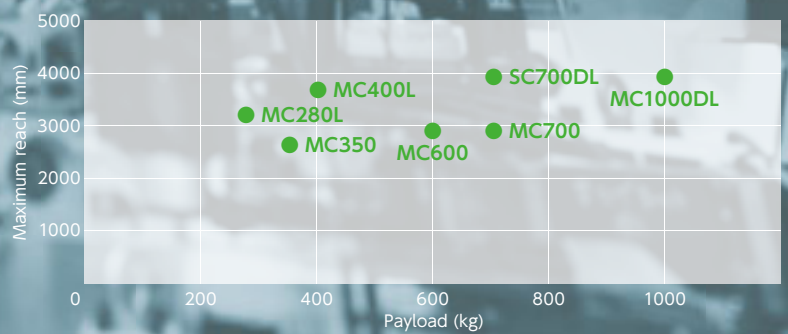
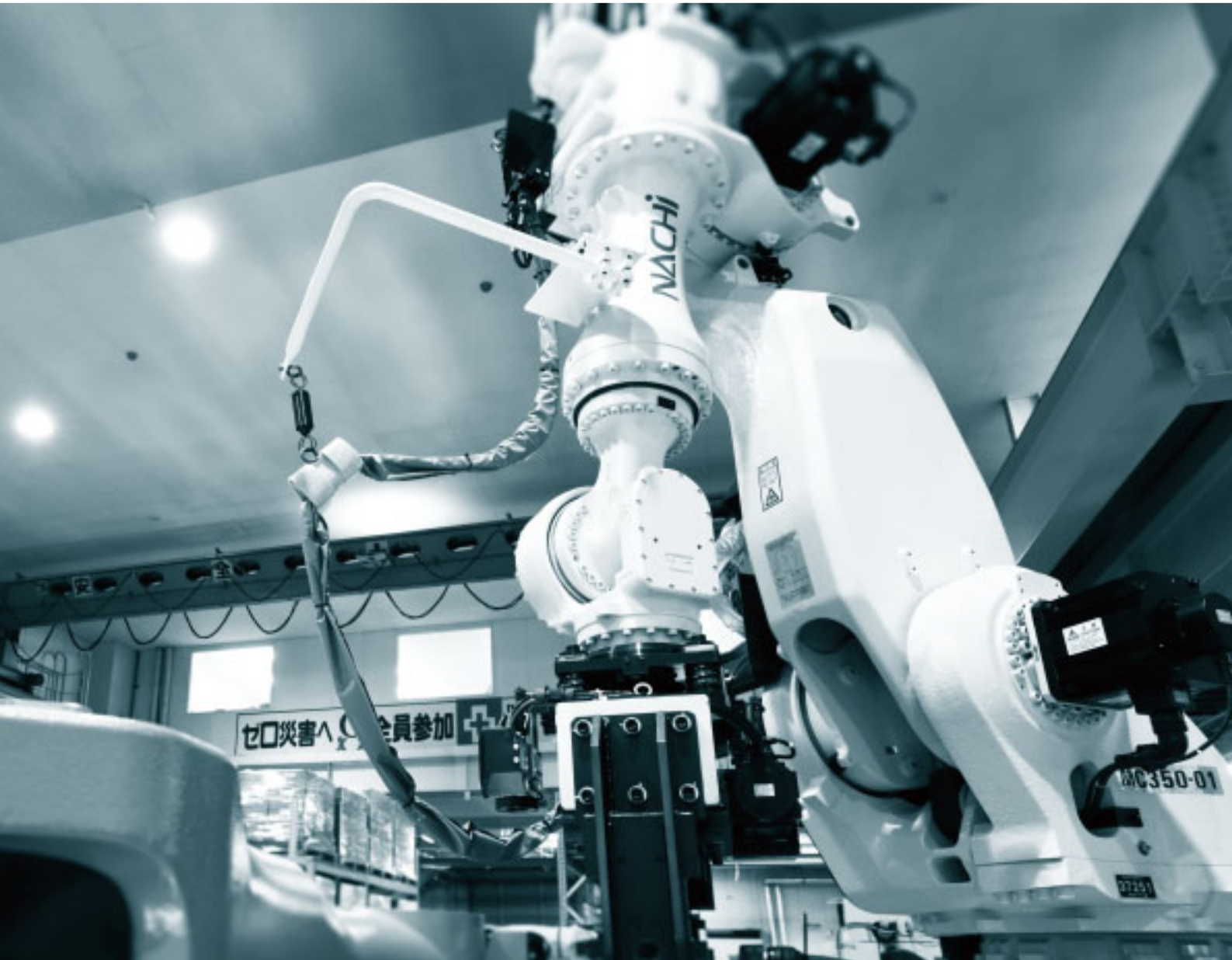


Assembling

# Super heavy loader robot

Automobiles' body handling etc.

With high wrist torque and large operating envelope, these robots are opening up a new era of heavy loading robots.



Super heavy loader robot

# MC HEAVY LOADER SERIES

Tool cables and hoses routed inside the hollow arm provides excellent life.



## MC1000DL

- Number of controlled axes 6 axes
- Payload 1,000kg
- Maximum reach 3,972mm



## MC600

- Number of controlled axes 6 axes
- Payload 600kg
- Maximum reach 2,890mm



## SC700DL

- Number of controlled axes 6 axes
- Payload 700kg
- Maximum reach 3,972mm

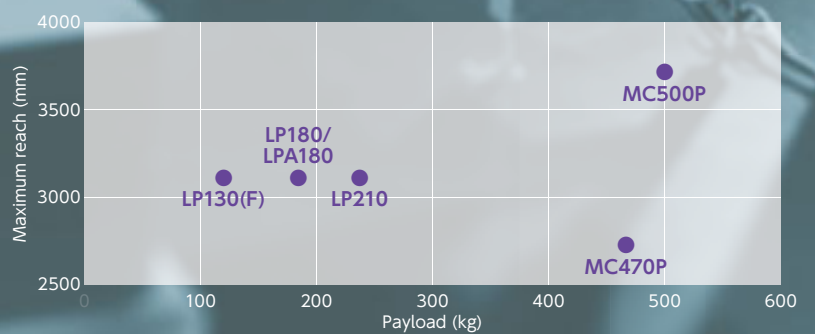
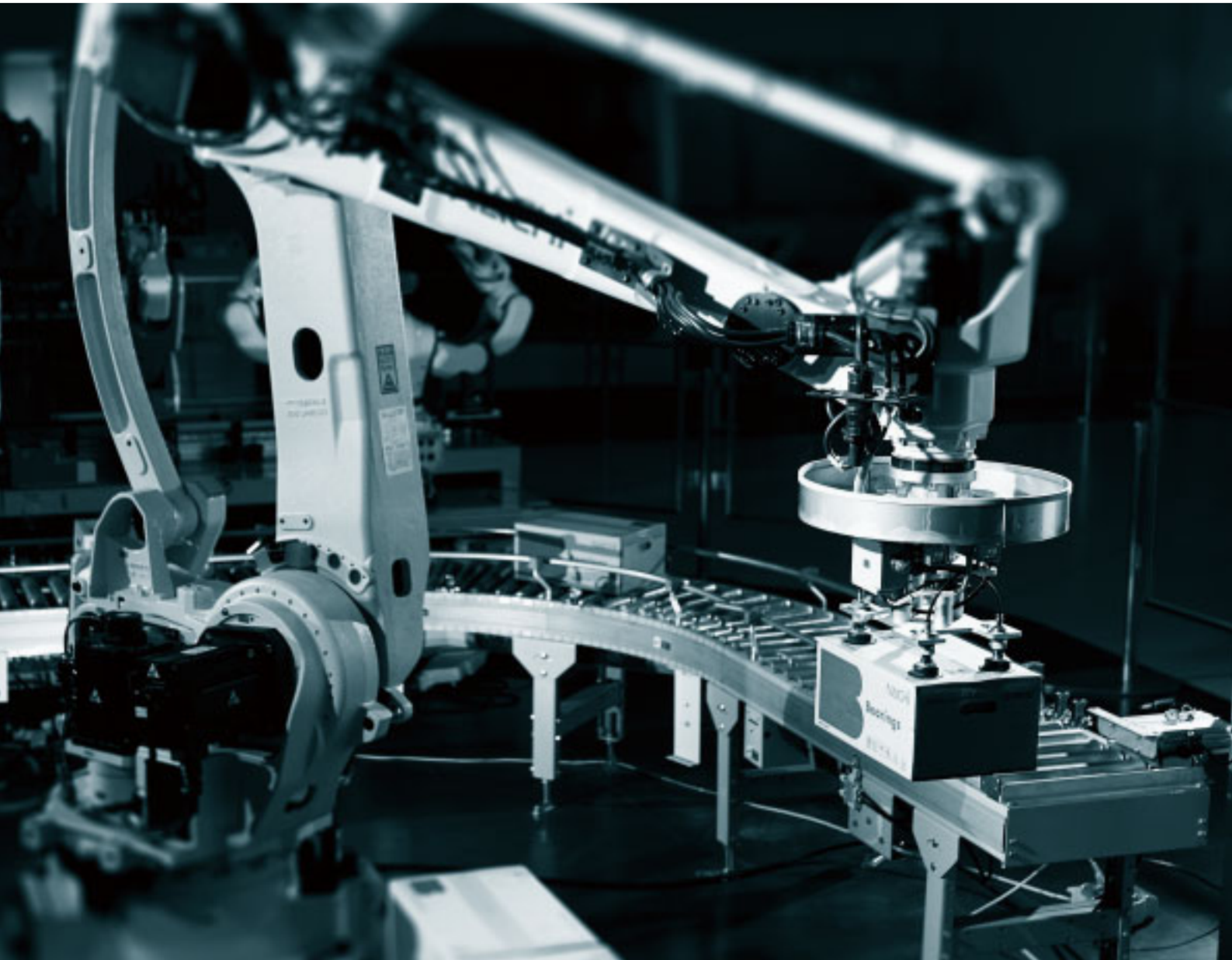
# SC HEAVY LOADER

The SC heavy loader robots, with huge load capacity and reach, are excellent for jobs that require heavy lifting. Their large vertical stroke allows more flexible production lines by replacing conventional specialized machinery, such as auto body lifters, with robots.

# Palletizing robot

High-speed palletizing robot  
Heavy loader palletizing robot

NACHI's palletizing robots help with intricate palletizing of boxes, crates and sacks for shipping and receiving processes.





## High-speed palletizing robot

# LP SERIES

The LP series of specialized palletizing robots do large movements quickly. They can stack products, such as cardboard boxes, or products in bags, such as foodstuffs or chemicals, onto pallets at high speeds. Loaded with palletizing functions, they can handle a wide variety of stacking patterns.

■ Number of controlled axes	4 axes
■ Payload	130 to 210kg
■ Maximum reach	3,210mm



## Heavy loader palletizing robot

# MC SERIES

This robot has enough lifting power to handle jobs of loading and stacking beverages, bricks, plastic resins, concrete and other heavy goods.

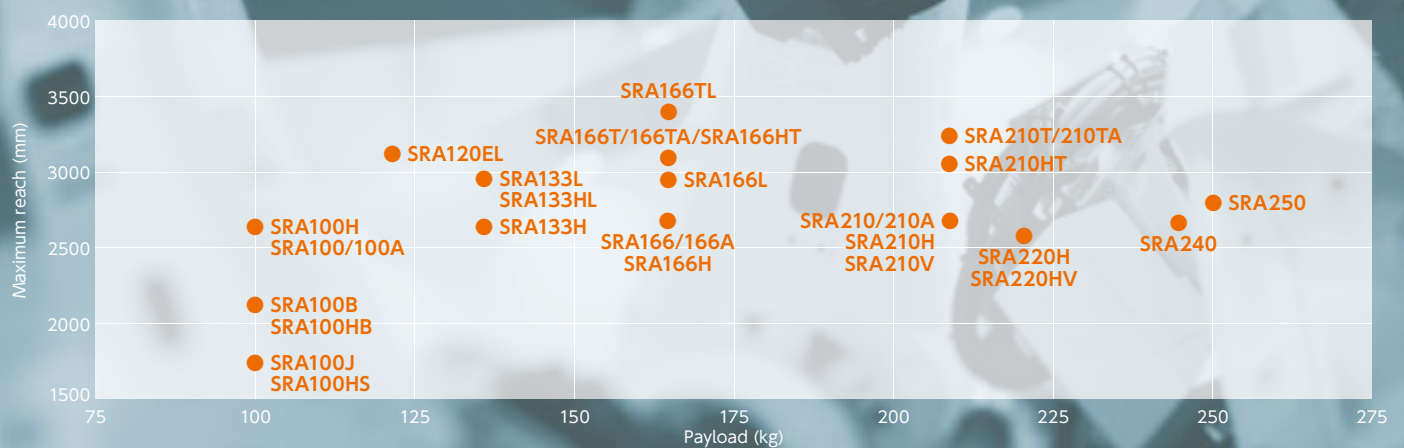
■ Number of controlled axes	5 or 6 axes
■ Payload	470 to 500kg
■ Maximum reach	2,771 to 3,756mm



Palletizing

# Spot welding robot

Welding robots are the central element of automobile production, especially the auto body welding lines. The performance, functionality, and reliability of the NACHI lineup of spot welding robots are supporting the world of manufacturing.



## Spot welding robot with built-in cables

# SRA-H SERIES

The next generation of hollow arm spot welding robots. Cables and hoses for the welding gun are fully enclosed to increase cable reliability and improve rate of operation. Provides a cleaner profile for installing directly in the assembly line and improves operational accuracy of offline programming, including welding cables. This hollow arm model is now available in shelf mount version for 166 kg & 210 kg payloads.

- Number of controlled axes 6 axes
- Payload 100 to 220kg
- Maximum reach 1,634 to 2,951mm



## Ultra-fast spot welding robot

# SRA SERIES

The Ultimate Spot Welding Robot. Using higher speeds and vibration damping properties, we greatly improved productivity by shortening cycle times 30% (compared to our previous models) improvements were made in three areas, weight reduction, higher rigidity, and faster controls. The compact design allows for high density installation layouts and maintenance is streamlined making periodic inspections and parts replacement easy to do. The lighter weight and the latest in motor drive controls have reduced power consumption by 15% over previous models reducing environmental impact.

- Number of controlled axes 6 axes
- Payload 100 to 250kg
- Maximum reach 1,634 to 3,383mm



Spot welding

# Clean-room robot

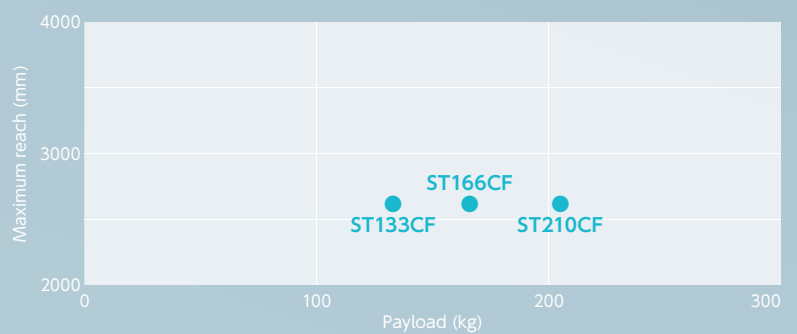
## Clean-room loading

Our series of clean-room robots suppress the dust created by arm movements and are designed to be used in clean rooms. These high-performance loading robots support the heart of the flat panel display production process.

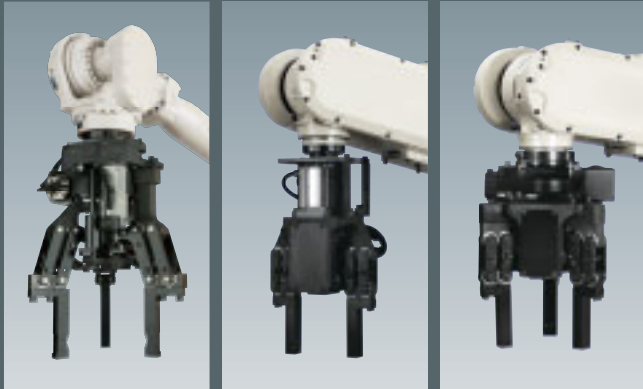
# ST-C SERIES



- Number of controlled axes 6 axes
- Payload 133 to 210kg
- Maximum reach 2,654 to 2,674mm



# OPTIONS



## FLEXhand

Servo hand controlled as an additional axis by the robot controller. Capable of handling many shapes without changing the hand. This is an excellent tool for small-lot multiple item production.



## Compact vision sensor NVsmart

Integrated A1:D58, lighting, and image processing equipment to save space and wiring. Processing speed is also improved 2.5 times compared with the conventional one. It can be configured and monitored on teach pendant and also supports additional control of external cameras. It is possible to recognize mixed workpieces, and supports character recognition, barcode recognition, OCR.



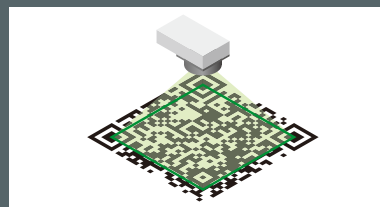
## Force sensor

This function controls the robot by accurately detecting the applied force. This powerful tool makes it possible for robots to do delicate operations at high speed, such as following, pushing, loading (press fitting), detecting position and phase during assembly and production processes.



## Position posture recognition

Posture can be correctly recognized even when various workpieces are mixed.



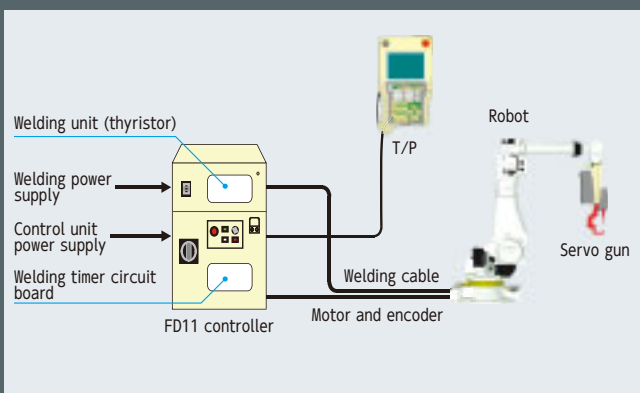
## Barcode recognition

Recognizes barcodes/QR codes without additional equipment such as QR Code Scanners.



## Cooperation with teach pendant

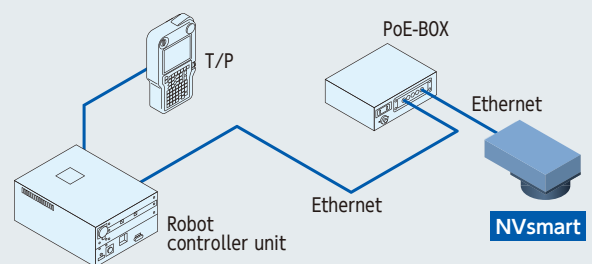
Vision setting and monitoring can be set through robot teach pendant.



## Integrated timer Weld timer integrated in controller

All-in-one package  
Package includes robot, timer, servo gun, and peripheral equipment. Easy weld condition setup. Ideal for welding quality control.

## NVsmart System Configuration Diagram



# Packaged Product

## Connector insertion application

The new visual control application enables high-speed and high-precision insertion of FPC and FFC for various applications such as smartphones and in-vehicle displays.

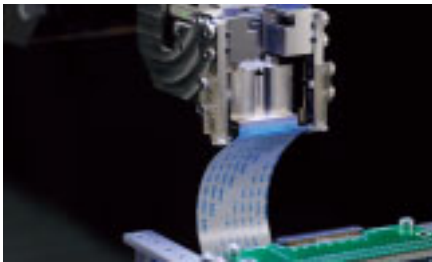


### High-precision and high-speed operation

- Our original visual control enables high-speed, high-precision insertion into the connector.
- Performs real-time scanning and repeats measurements and movements until the target point is reached. Follow-up correction is possible even if the target point deviates during movement.
- Since a force sensor is not used, connector insertion time is greatly reduced.

### Equipped with traceability function as standard\*

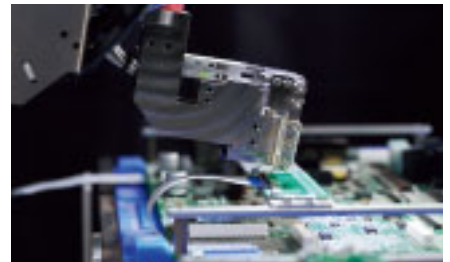
- Visual inspection results at the time of insertion and completion are saved as image data.
  - Equipped with a QR code reader function as standard, it is possible to manage and record inspection results and link to image data.
- \* USB port expansion cable (optional) and USB flash drive (Customer Prepared) are required.



Grip



Insert



Inspection

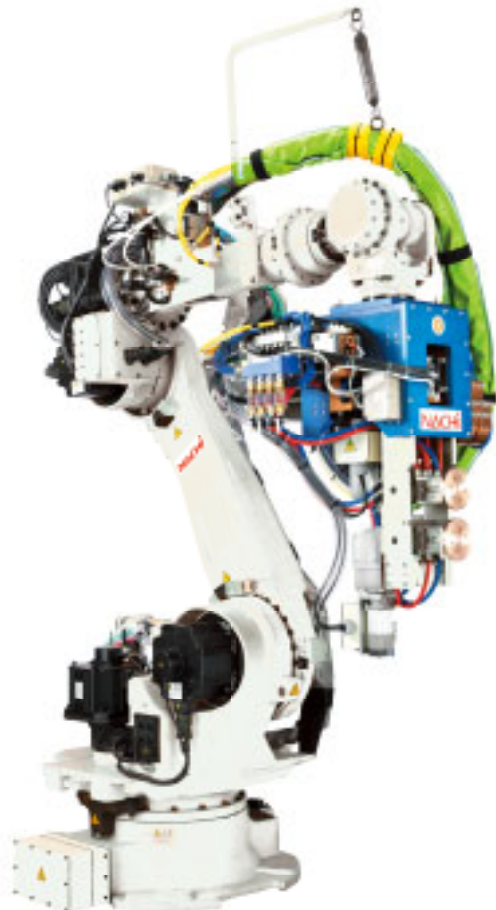
### WEB VIDEO

You can watch videos of use cases of connector insertion application on smartphones and mobile phones.



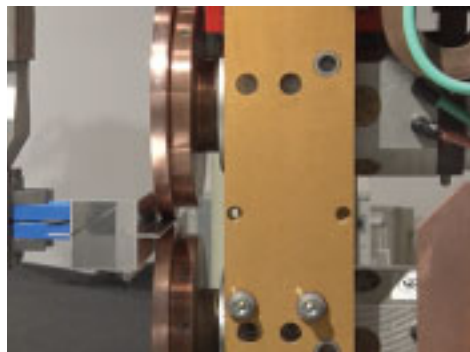
## Machine loading cell

- Machine loading automation package with 6 axes articulated robot
- Automated workpiece supply and removal for a machine tool with minimum design
- Operation Screens, I/O Settings, and standard robot programs are preinstalled
- Space-saving design that can be placed anywhere
- Suitable in an environment where chips, coolant, etc. are present.
- Securing maintenance space for a machine tool with slide robot evacuation device.
- Flexible support for other customizations.



## Robot seam welding package

- Capable of seam welding on work surfaces in three dimensions
- Fast and consistent welding
- Equipped with various application functions such as electrode polishing, electrode wear compensation, and others



### Seam welding?

Seam welding is a welding technique for parts that need airtight joints such as automotive fuel tanks and has been attracting attention. Two roller electrodes rotate on the surface of materials supplying electric current and thus, continuous weld joint is formed. The continuity of arc welding and the low cost of spot welding are compatible at a high level. NACHI was the only company in the world to successfully install a seam welder on a robot.

# CONTROLLERS

Introducing the intelligent robot controller based on Windows.

Robots and additional axis are easy to operate by using the teach pendant. Vision and force sensors, as well as networks, are managed in one place.



Item	Specifications	
<b>Basic specifications for controller</b>		
Controllable axes	6	
Maximum controllable axes	8	7
External dimensions (mm)	310(W)x250(D)x160(H) Exclude rubber feet, switches/connectors	369(W)x490(D)x186(H) Exclude rubber feet, switches/connectors
Position reader	Absolute encoder	
Programming system	Teaching playback	
Operating panel	Mode switch (teach/playback), emergency stop button	
Cables between robot and control panel	2m, 5m, 10m, 15m, 20m (connector type) extension (total) 25m	
Additional slot	PCIe×2 slots	PCI×2 slots
PLC function	Software PLC IsaGRAF 6	Software PLC IsaGRAF 4
Protection class	IP20 equivalent	
Power supply	Single phase 200–230VAC, 50/60Hz, D grounding, max. leakage 10mA	Single phase/3φ 200–230VAC, 50/60Hz, D grounding, max. leakage 10mA
Ambient temperature/humidity	0 to 45°C (50/60Hz) 20 to 85% (No dew or frost allowed)	
Safety function	Safety sequence PLd, category 3 (ISO 13849 -1: 2015)	Safety sequence PLd, Category 3 compliant
Overseas compliance	Europe: CE, South Korea: KCs	Option
<b>Controller options</b>		
Overseas compliance	-	North America: UL, Europe: CE, South Korea: KCs
Power voltage converter	Single phase 100 VAC, 50/60 Hz	
External storage	USB Flash Drive (1 GB)	
Additional axes	Additional 2 axes	Additional 1 axis
Fieldbus	EtherNet/IP, EtherCAT, Profinet, CC-Link and others. Maximum 4 channels can be installed.	
Additional input/output signals	Additional compact I/O board: Maximum 16/16 point, Additional I/O board: Maximum 64/64 point	Additional compact I/O board: Maximum 8/8 point, Additional I/O board: Maximum 64/64 point
Output signals	Additional compact I/O board : Relay contact output, Additional I/O board: Transistor output	Transistor output (Additional compact I/O board: Relay contact output compatible)
Analog input/output	-	
Vision sensor	NVsmart	NV-Pro, NVsmart
Conveyor tracking function	Conveyor tracking control	
Palletize function	Palletizing control function	
Robot language	JIS B 8439 SLIM compliant	
Robot monitoring function	-	Safety sequence PLe, category 4 (ISO 13849-1:2015) Position/speed monitoring function PLd, category 3 (ISO 13849-1:2015)

## Teach pendant

Item	Specification	
	CFDs/FD18/FD20	CFD
Display	5.7 inch VGA color LCD touch panel	
Language	Japanese (Kanji, Hiragana, Katakana, Alphanumeric) English/Chinese/Korean option*: German/Italian/Spanish/Taiwanese	Japanese (Kanji, Hiragana, Katakana, Alphanumeric) English/Chinese/Korean/German/Italian/Spanish
Enable SW	One-handed enable switch, three positions, (left hand side)	
Operation function	Axis operation key, value input key, selection/function key, motors on key, emergency stop	
External storage interface	USB port	
Cable length	8m, 15m, 20m, 25m, 30m (connector type)	4m (connector type), 5m/10m/15m cable extendable
Protection class	IP65 equivalent	
External dimensions (mm)	163(W)x74.5(D)x353(H)	175(W)x65(D)x326(H)
Weight	0.9kg	1.0kg

\* Included in the standard specification for CFDs controller









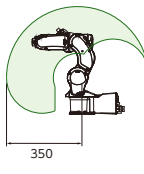
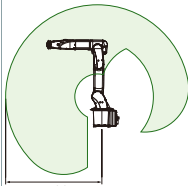
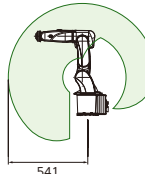
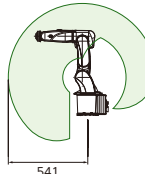
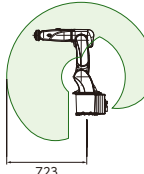
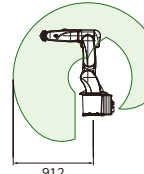
FD controller **FD18**

FD controller **FD20**



Item	Specifications	
<b>Basic specifications for controller</b>		
Controllable axes	6	
Maximum controllable axes	8	
External dimensions (mm)	300(W)x600(D)x530(H) Excluded Casters (50mm), Switches/connectors	580(W)x532(D)x490(H) Excluded Casters (50mm), Switches/connectors
Position reader	Absolute encoder	
Programming system	Teaching playback	
Operating panel	Mode switch (teach/playback), emergency stop button	
Cables between robot and control panel	2m, 5m, 10m, 15m, 20m, 25m (connector type) extension (total) 25m	5m, 10m, 15m, 20m, 25m (connector type)
User interface	User panel : On back	
Additional slot	PCIx2 slots	PCIx3 slots
PLC function	Software PLC IEC1131-3 compliant	
Protection class	IP54 equivalent	
Power supply	3φ 200-230VAC, 50/60Hz, D grounding, breaker 40A, max. leakage 100mA	
Ambient temperature/humidity	0 to 45° C (50/60Hz) 20 to 85% (No dew or frost allowed)	
Safety function	Safety sequence :PLe (category 4)	
<b>Controller options</b>		
Overseas compliance	North America: CSA/UL, Europe: CE	
Power voltage converter	380/400/420/440/460/480VAC (3φ 50/60Hz) D grounding, breaker 30A, max. leakage 100mA Transformer BOX size: W300xD600xH430 Casters (90mm), Switches/connectors not included Size when controller and transformer BOX are connected: W300xD600xH960 Casters (90mm), Switches/connectors not included	380/400/420/440/460/480VAC (3φ 50/60Hz) D grounding, breaker 30A, max. leakage 100mA Built-in transformer
External storage	USB Flash Drive (1 GB)	
Additional axes	Gun, slider, jig and gripper	
Fieldbus	DeviceNet, CC-Link, CC-Link IE Field and others. Maximum 4 channels can be installed.	
Additional input/output signals	Additional compact I/O board: Maximum 14/10 point, Additional I/O board: Maximum 32/32 point	Additional compact I/O board: Maximum 14/10 point, Additional I/O board: Maximum 64/64 point
Output signals	Relay contact specifications cations 32 point	Relay contact specifications cations 64 point
Analog input/output	2/4 point	
Vision sensor	NV-Pro	
Conveyor tracking function	Conveyor tracking control	
Palletize function	Palletize and de-palletize	
Robot language	JIS SLIM compliant	
Robot monitoring function	Position/speed monitoring function:PLd (category 3)	

# LIST OF SPECIFICATIONS




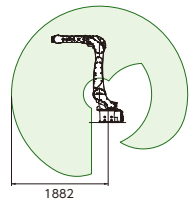
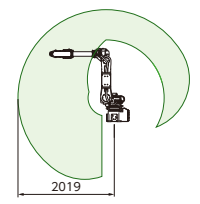
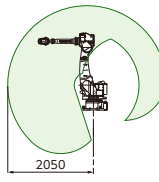
		MZ01	MZ03EL	MZ04 (MZ04D)	MZ04E (MZ04DE)	MZ07 (MZ07P)	MZ07L (MZ07LP)		
									
No. of axes		6				6(5)*1			
Max. working envelope	Arm	J1 Swivel 1	±170°						
		J2 Horizontal	-90~+85°	-135~+80°	-145~+90°		-135~+80°		
		J7 Swivel 2	-						
	Wrist	J3 Vertical	-111~+175°	-155~+270°	-125~+280°		-136~+270°	-139~+270°	
		J4*1 Rotation 2	±145°	±190°				±190° (-)	
		J5 Bend	±125°	±120°					
		J6 Rotation 1 ±360°							
Max. speed	Arm	J1 Swivel 1	320° /s	300° /s	480° /s	200° /s	450° /s	300° /s	
		J2 Horizontal	320° /s	230° /s	460° /s	150° /s	380° /s	280° /s	
		J7 Swivel 2	-						
	Wrist	J3 Vertical	375° /s	360° /s	520° /s	190° /s	520° /s	360° /s	
		J4*1 Rotation 2	600° /s	550° /s	560° /s		550° /s (-)		
		J5 Bend	600° /s	550° /s	560° /s		550° /s		
		J6 Rotation 1 600° /s		1,000° /s		900° /s			
Maximum load	Wrist	1kg	3.5kg	4kg		7kg			
	Load capacity on forearm	0.25kg	-						
Allowable static load torque for wrist	J4*1 Rotation 2	0.9N·m	6N·m	8.86N·m		16.6N·m (-)			
	J5 Bend	0.9N·m	6N·m	8.86N·m		16.6N·m			
	J6 Rotation 1	0.78N·m	2.9N·m	4.9N·m		9.4N·m			
Allowable moment of inertia for wrist	J4*1 Rotation 2	0.008kg·m <sup>2</sup>	0.12kg·m <sup>2</sup>	0.2kg·m <sup>2</sup>		0.47kg·m <sup>2</sup> (-)			
	J5 Bend	0.008kg·m <sup>2</sup>	0.12kg·m <sup>2</sup>	0.2kg·m <sup>2</sup>		0.47kg·m <sup>2</sup>			
	J6 Rotation 1	0.006kg·m <sup>2</sup>	0.03kg·m <sup>2</sup>	0.07kg·m <sup>2</sup>		0.15kg·m <sup>2</sup>			
Maximum reach	350mm		1,102mm	541mm		723mm	912mm		
Pose repeatability	±0.02mm		±0.03mm	±0.02mm		±0.02mm	±0.03mm		
Ambient temperature*2/ humidity	0 to 40°C/20 to 85% RH (without condensation)		0 to 45°C/20 to 85% RH (without condensation)						
Vibration	0.5 G or less								
Installation	Floor, wall, inverted, tilted mount				Floor, inverted mount		Floor, wall, inverted, tilted mount		
Ingress protection	IP40 equivalent	IP67 equivalent	IP40 equivalent*3		IP67 equivalent				
Weight	10kg*4	39kg	26kg*4	25kg*4	36kg*4	38kg*4			
Power consumption	0.4kVA								
Supported Controller	CFD/CFDs	CFD/CFDs	CFD/CFDs	CFD/CFDs	CFD/CFDs	CFD/CFDs	CFD/CFDs		
Working envelope									

\* Maximum speeds are maximum values, they will vary depending on the wrist load conditions and operating program.  
 \*1: For the 5-axis specifications (MZ07P and MZ07LP), the configuration does not have the J4 axis. \*2: Using at 1,000 m or lower sea level. Ambient temperature has limitations when allowable altitude is exceeded.  
 \*3: MZ04 and MZ04E have IP40 equivalence. MZ04D and MZ04DE have IP67 (dust proof and water proof) equivalence.  
 \*4: Wall mount Rear Connection Type: +4kg (MZ04\* Series), +6kg (MZ07\* Series) / Bottom Connection Type: +6kg (MZ04\* Series), +8kg (MZ07\* Series), +2.5kg (MZ01)  
 \*5: Operating range is limited when mounted on a wall or tilted. (Example: #1-axis operating range is ±30° for wall mount)






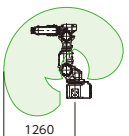
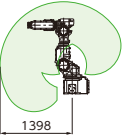
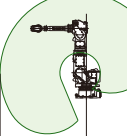
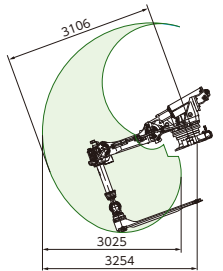
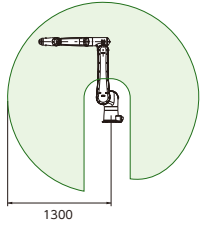
MZ07F		MZ07LF		MZ10		MZ10LF		MZ12		MZ12H	
6											
±170°											
-135~+80°						-160~+90°					
-											
-136~+270°		-139~+270°		-136~+270°				-147~+210°			
±190°											
±120°						±140°					
±360°											
450° /s				300° /s				260° /s			
380° /s		280° /s		250° /s		200° /s		230° /s			
-											
520° /s		360° /s		360° /s		330° /s		260° /s			
550° /s				450° /s				470° /s			
550° /s				340° /s				470° /s			
1000° /s				700° /s		740° /s		700° /s		740° /s	
7kg				10kg				12kg			
-											
16.9N·m				17.9N·m		20N·m		25N·m		26.5N·m	
16.9N·m				17.9N·m		20N·m		25N·m		26.5N·m	
9.4N·m				10.4N·m		10.4N·m		9.8N·m		12N·m	
0.49kg·m <sup>2</sup>				0.47kg·m <sup>2</sup>		0.6kg·m <sup>2</sup>		0.7kg·m <sup>2</sup>		0.9kg·m <sup>2</sup>	
0.49kg·m <sup>2</sup>				0.47kg·m <sup>2</sup>		0.6kg·m <sup>2</sup>		0.7kg·m <sup>2</sup>		0.9kg·m <sup>2</sup>	
0.15kg·m <sup>2</sup>				0.15kg·m <sup>2</sup>		0.2kg·m <sup>2</sup>		0.2kg·m <sup>2</sup>		0.3kg·m <sup>2</sup>	
723mm		912mm		723mm		1,202mm		1,454mm			
±0.015mm		±0.02mm		±0.03mm		±0.025mm		±0.04mm			
0 to 45°C/20 to 85% RH (without condensation)											
0.5 G or less											
Floor, wall, inverted, tilted mount*5				Floor, inverted mount				Floor, inverted, tilted mount			
IP67 equivalent											
41kg		43kg		36kg		55kg		150kg		155kg	
0.6kVA		0.7kVA		0.4kVA		0.7kVA		1.8kVA			
CFDs		CFDs		CFD/CFDs		CFDs		CFD		CFD	

1 [N·m] = 1/9.8 [kgf·m]

# LIST OF SPECIFICATIONS


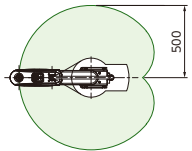
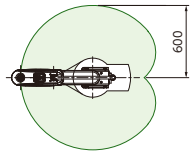
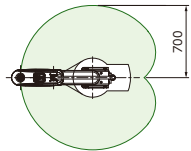
		MZ25	MC10L	MC35	MC50	MC70	
							
No. of axes		6		6			
Max. working envelope	Arm	J1 Swivel 1	±170°	±180°	±165°		
		J2 Horizontal	-150~+105°	-145~+60°	-135~+80°		
		J7 Swivel 2	-	-	-		
	Wrist	J3 Vertical	-161~+289°	-163~+242°	-146~+260°		
		J4 Rotation 2	±190°	±180°	±360°		
		J5 Bend	±145°	±139°	±125°		
Max. speed	Arm	J6 Rotation 1	±360°	±360°	±450°		
		J1 Swivel 1	210° /s	150° /s	185° /s	180° /s	175° /s
		J2 Horizontal	185° /s	170° /s	180° /s		145° /s
	Wrist	J7 Swivel 2	-	-	-		
		J3 Vertical	270° /s	170° /s	190° /s	180° /s	165° /s
		J4*1 Rotation 2	420° /s	360° /s	305° /s	255° /s	235° /s
Maximum load	J5 Bend	420° /s	360° /s	305° /s	255° /s	235° /s	
	J6 Rotation 1	672° /s	600° /s	420° /s	370° /s	350° /s	
Allowable static load torque for wrist	Wrist	25kg	10kg	35kg	50kg	70kg	
	Load capacity on forearm*2	-	-	15kg			
	J4 Rotation 2	52N·m	24.5N·m	160N·m	210N·m	300N·m	
Allowable moment of inertia for wrist	J5 Bend	52N·m	24.5N·m	160N·m	210N·m	300N·m	
	J6 Rotation 1	32N·m	12N·m	90N·m	130N·m	150N·m	
	J4 Rotation 2	2.4kg·m <sup>2</sup>	1.6kg·m <sup>2</sup>	16kg·m <sup>2</sup>	30kg·m <sup>2</sup>		
Maximum reach	J5 Bend	2.4kg·m <sup>2</sup>	1.6kg·m <sup>2</sup>	16kg·m <sup>2</sup>	30kg·m <sup>2</sup>		
	J6 Rotation 1	1.3kg·m <sup>2</sup>	0.7kg·m <sup>2</sup>	5kg·m <sup>2</sup>	12kg·m <sup>2</sup>		
Pose repeatability	Maximum reach	1,882mm	2,019mm	2,050mm			
Ambient temperature*3/ humidity	Pose repeatability	±0.05mm	±0.06mm	±0.07mm			
Vibration	Ambient temperature*3/ humidity	0 to 45°C/20 to 85% RH (without condensation)					
Installation	Vibration	0.5 G or less					
Ingress protection	Installation	Floor, inverted, tilted mount	Floor, inverted mount	Floor mount (OP: inverted, wall, tilted)			
Weight	Ingress protection	IP67 equivalent	IP65 equivalent	Wrist: IP67 equivalent, main body: IP54 equivalent (OP: IP65/67 equivalent)			
Power consumption	Weight	250kg	225kg	640kg			
Supported Controller	Power consumption	2.55kVA	1.7kVA	5kVA			
Working envelope	Supported Controller	FD18	FD18	FD18	FD18	FD18	
	Working envelope						
			1882	2019	2050		

\* Maximum speeds are maximum values, they will vary depending on the wrist load conditions and operating program.  
 \*1: For the 5-axis specifications (MZ07P and MZ07LP), the configuration does not have the J4 axis.  
 \*2: This value changes by placement and load conditions of a wrist.  
 \*3: Using at 1,000 m or lower sea level. Ambient temperature has limitations when allowable altitude is exceeded.

MR20		MR20L		MR35		MR50		ST210TP-01		CZ10	
											
		7						7		6	
±180°		-120~+55°		±165°				±180°		±170°	
±180°				±190°				(Press arm link) ±65°		-75~+225°	
-166~+135°				-146~+140°				-96~+210°		-77~+227°	
±180°				±360°				±360°		±180°	
±135°		±139°		±125°				±120°		±170°	
±360°				±450°				±360°		±360°	
170° /s				180° /s		175° /s		110° /s		120° /s	
170° /s				175° /s		140° /s		90° /s		120° /s	
170° /s				130° /s				(Press arm link) 120° /s		-	
170° /s				180° /s		165° /s		95° /s		180° /s	
250° /s		360° /s		305° /s		255° /s		130° /s		180° /s	
250° /s		360° /s		305° /s		255° /s		130° /s		180° /s	
300° /s		600° /s		420° /s		370° /s		250° /s		180° /s	
20kg				35kg		50kg		80kg		10kg	
-				15kg				30kg		-	
80.8N·m		49N·m		160N·m		210N·m		-		25.9N·m	
80.8N·m		49N·m		160N·m		210N·m		-		25.9N·m	
44.1N·m		23.5N·m		90N·m		130N·m		-		5.9N·m	
6kg·m <sup>2</sup>		1.6kg·m <sup>2</sup>		16kg·m <sup>2</sup>		30kg·m <sup>2</sup>		J7 axis rotation 80kg·m <sup>2</sup>		0.75kg·m <sup>2</sup>	
6kg·m <sup>2</sup>		1.6kg·m <sup>2</sup>		16kg·m <sup>2</sup>		30kg·m <sup>2</sup>				0.75kg·m <sup>2</sup>	
2.3kg·m <sup>2</sup>		0.8kg·m <sup>2</sup>		5kg·m <sup>2</sup>		12kg·m <sup>2</sup>				0.08kg·m <sup>2</sup>	
1,260mm		1,398mm		2,050mm				3,106mm		1,300mm	
±0.06mm				±0.07mm				±0.3mm		±0.1mm	
0 to 45°C/20 to 85% RH (without condensation)											
0.5 G or less											
Floor, inverted mount				Floor mount (OP: inverted, wall, tilted)				Shelf mount (installed at 20° angle)		Floor, inverted mount	
IP65 equivalent				IP67 equivalent				-		IP65 equivalent	
230kg				745kg				1,650kg		61kg	
1kVA				4.1kVA				7kVA		1kVA	
FD18		FD18		FD18		FD18		FD18		CCZ	
											


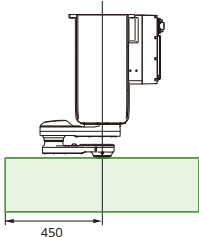
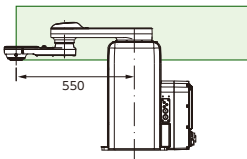
1[N·m] = 1/9.8[kgf·m]

# LIST OF SPECIFICATIONS

		EC06-5020-01	EC06-6020-01	EC06-7020-01
				
No. of axes		4		
Max. working envelope	J1 Swivel 1	±140°		
	J2 Swivel 2	±150°		
	J3 Vertical	200mm		
	J4 Rotation	±360°		
Max. speed	J1 Swivel 1	420° /s		
	J2 Swivel 2	720° /s		
	J3 Vertical	1,100mm/s		
	J4 Rotation	2660° /s		
Maximum Payload		6kg (3kg rated)		
Allowable moment of inertia for wrist	J4 Rotation	0.05kg·m <sup>2</sup> (0.01kg·m <sup>2</sup> rated)		
Maximum reach		500mm	600mm	700mm
Pose repeatability		±0.02mm		
Ambient temperature*/humidity		0 to 40°C/20 to 80% RH (without condensation)		
Vibration		0.5 G or less (4.9m/s <sup>2</sup> )		
Installation		Floor mount		
Ingress protection		IP20		
Weight		17kg	17kg	18kg
Power consumption		0.5kVA		
Supported Controller		CFD/CFDs	CFD/CFDs	CFD/CFDs
Working envelope				

\* Maximum speeds are maximum values, they will vary depending on the wrist load conditions and operating program.  
 \*1: Using at 1,000 m or lower sea level. Ambient temperature has limitations when allowable altitude is exceeded.

1 [N·m] = 1/9.8 [kgf·m]

		EZ03V4-04		EZ03F4-04	
					
No. of axes		4			
Max. working envelope	J1 Vertical	250/150mm* <sup>2</sup>			
	J2 Swivel 1	±170°			
	J3 Swivel 2	±180°			±145°
	J4 Rotation	±360°			
Max. speed	J1 Vertical	1,400/1,200mm/s* <sup>2</sup>			
	J2 Swivel 1	450° /s			
	J3 Swivel 2	720° /s			
	J4 Rotation	2,400° /s			
Maximum Payload		3kg (2kg rated)			
Allowable moment of inertia for wrist	J4 Rotation	0.05kg·m <sup>2</sup>			
Maximum reach		450mm	550mm		
Pose repeatability		±0.014mm			
Ambient temperature* <sup>1</sup> / humidity		0 to 45°C/20 to 85% RH (without condensation)			
Vibration		0.5 G or less (4.9m/s <sup>2</sup> )			
Installation		Inverted mount	Floor mount		
Ingress protection		IP20			
Weight		40kg	41kg		
Power consumption		0.6kVA			
Supported Controller		CFD/CFDs	CFD/CFDs		
Working envelope					




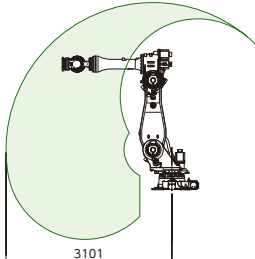
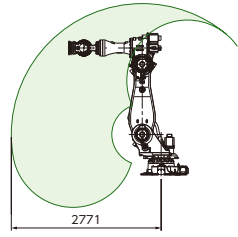
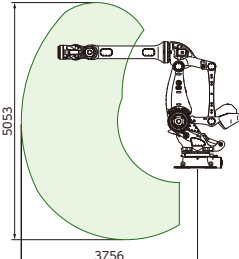
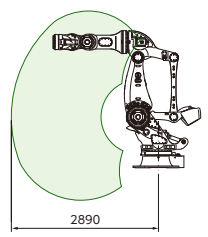
\* Maximum speeds are maximum values, they will vary depending on the wrist load conditions and operating program.

\*1: Using at 1,000 m or lower sea level. Ambient temperature has limitations when allowable altitude is exceeded.

\*2: There are two types of maximum operating envelopes: 250 mm and 150 mm. The 250 mm has a maximum speed of 1,400 mm/s. The 150 mm has a maximum speed of 1,200 mm/s.

1 [N·m] = 1/9.8 [kgf·m]

# LIST OF SPECIFICATIONS

		MC280L	MC350	MC400L	MC600	
						
No. of axes		6				
Max. working envelope	Arm	J1 Swivel 1	±180°			
		J2 Horizontal	-100~+40°	-105~+60°		
		J7 Swivel 2	-			
	Wrist	J3 Vertical	-147~+130°	-180~+130°	-130~+30°	-140~+30°
		J4 Rotation 2	±360°		±210°	
		J5 Bend	±125°		±120°	
Max. speed	Arm	J6 Rotation 1	±360°		±360° *1	
		J1 Swivel 1	105° /s		90° /s	
		J2 Horizontal	105° /s	95° /s	90° /s	
	Wrist	J3 Vertical	95° /s		90° /s	
		J4 Rotation 2	120° /s	110° /s		
		J5 Bend	120° /s	110° /s		
Maximum load	Wrist	280kg	350kg	400kg	600kg	
	Load capacity on forearm*2	25kg	50kg			
Allowable static load torque for wrist	J4 Rotation 2	1,921N·m	2,750N·m	3,450N·m		
	J5 Bend	1,921N·m	2,750N·m	3,450N·m		
	J6 Rotation 1	988N·m	1,235N·m	1,725N·m		
Allowable moment of inertia for wrist	J4 Rotation 2	400kg·m <sup>2</sup>		600kg·m <sup>2</sup>		
	J5 Bend	400kg·m <sup>2</sup>		600kg·m <sup>2</sup>		
	J6 Rotation 1	250kg·m <sup>2</sup>		400kg·m <sup>2</sup>		
Maximum reach	3,101mm	2,771mm	3,756mm	2,890mm		
Pose repeatability	±0.2mm		±0.3mm			
Ambient temperature*3/ humidity	0 to 45°C/20 to 85% RH (without condensation)					
Vibration	0.5 G or less					
Installation	Floor mount					
Ingress protection	-					
Weight	1,660kg	1,620kg	3,400kg	3,300kg		
Power consumption	9kVA	8.6kVA	19.3kVA			
Supported Controller	FD20	FD20	FD11	FD11		
Working envelope						




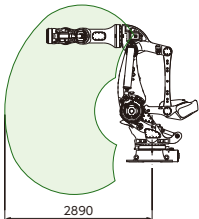
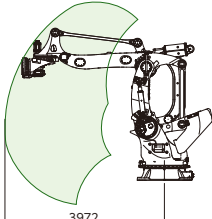
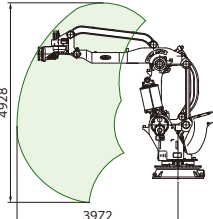
\*1: The initial settings are ±210°. When passing cable through the hollow part of the 6th axis, use a range of ±210°.

When a cable is not passed through, the operating envelope can be extended to a maximum of ±360°, depending on the usage conditions.

\*2: This value changes by placement and load conditions of a wrist.

\*3: Using at 1,000 m or lower sea level. Ambient temperature has limitations when allowable altitude is exceeded.



MC700	MC1000DL	SC700DL
		
6		
±180°	±160°	±160°
-105~+60°	-85~+45°	-85~+45°
-		
-140~+30°	-90~+45°	-90~+40°
±210°	-9.7~+90° (+9.7°)*4	-10~+90°
±120°	±125°*5	±125°
±360°*1	±9.7°	±10°
80°/s	45°/s	45°/s
80°/s	40°/s	30°/s
-		
80°/s	40°/s	30°/s
100°/s	20°/s*6	30°/s
100°/s	65°/s	50°/s
160°/s	70°/s	30°/s
700kg	1,000kg	700kg
25kg	-	-
3,450N·m	21,000N·m	13,800N·m
3,450N·m	-	3,920N·m
1,725N·m	4,410N·m	2,940N·m
600kg·m <sup>2</sup>	5,200kg·m <sup>2</sup>	3,000kg·m <sup>2</sup>
600kg·m <sup>2</sup>	4,000kg·m <sup>2</sup>	1,800kg·m <sup>2</sup>
400kg·m <sup>2</sup>	1,740kg·m <sup>2</sup>	1,000kg·m <sup>2</sup>
2,890mm	3,972mm	3,972mm
±0.3mm		±0.5mm
0 to 45°C/20 to 85% RH (without condensation)		
0.5 G or less		
Floor mount		
-		
3,320kg	9,000kg	7,000kg
9.3kVA	19kVA	7kVA
FD11	FD11	FD11
		





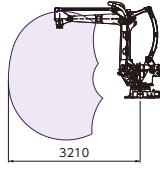
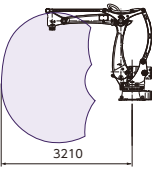
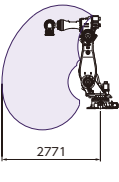
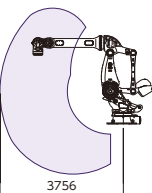
\*4: Max motion range of axis 4 varies due to the wrist payload weight. Wrist load 300 kg < -9.7°~+90°, Wrist load 300 kg ≥ -9.7°~+9.7°

\*5: In order to make axis 5 move, axis 4 must be in ±4° from ground level when payload is installed on the wrist.

\*6: Axis 4 speed achieves to this value when wrist payload is less than 300 kg and motion range is enough wide.

1 [N·m] = 1/9.8 [kgf·m]

# LIST OF SPECIFICATIONS





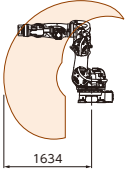
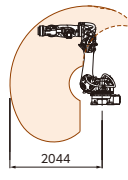
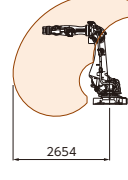
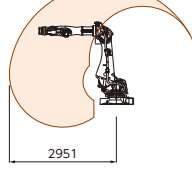
		LP130-01	LP130F	LP180-01	LP210	LPA180-01	MC470P	MC500P	
									
No. of axes		4					6	5	
Max. working envelope	Arm	J1 Swivel 1	±180°				±180°	±180°	
		J2 Horizontal	-95~+41°	-94.5~+40.7°	-95~+41°		-95~+45°	-100~+40°	-105~+60°
		J7 Swivel 2	-				-		
	Wrist	J3 Vertical	-117~+17°	-116.9~+17.2°	-117~+17°		-117.5~+17.5°	-180~+35°	-130~+30°
		J4 Rotation 2	±360°				±360°*1	-	
		J5 Bend	-				±125°*1	±120°	
						±360°			
Max. speed	Arm	J1 Swivel 1	130°/s	145°/s	115°/s	105°/s	140°/s	105°/s	90°/s
		J2 Horizontal	115°/s		100°/s		125°/s	95°/s	90°/s
		J7 Swivel 2	-				-		
	Wrist	J3 Vertical	115°/s		105°/s	100°/s	130°/s	95°/s	90°/s
		J4 Rotation 2	400°/s	535°/s	360°/s	300°/s	400°/s	110°/s	-
		J5 Bend	-				110°/s	110°/s	
		-				180°/s	180°/s		
Maximum load	Wrist	130kg		180kg	210kg	180kg	470kg	500kg	
	Load capacity on forearm*2	25kg				30kg	25kg		
Allowable static load torque for wrist	J4 Rotation 2	-				2,750N·m	-		
	J5 Bend	-				2,750N·m	3,450N·m		
	J6 Rotation 1	-				0N·m	1,725N·m		
Allowable moment of inertia for wrist	J4 Rotation 2	50kg·m <sup>2</sup>		69kg·m <sup>2</sup>	100kg·m <sup>2</sup>	69kg·m <sup>2</sup>	400kg·m <sup>2</sup>	-	
	J5 Bend	-				400kg·m <sup>2</sup>	600kg·m <sup>2</sup>		
	J6 Rotation 1	-				250kg·m <sup>2</sup>	400kg·m <sup>2</sup>		
Maximum reach		3,210mm				2,771mm	3,756mm		
Pose repeatability		±0.3mm		±0.4mm		±0.2mm	±0.3mm		
Ambient temperature*3/ humidity		0 to 45°C/20 to 85% RH (without condensation)							
Vibration		0.5 G or less							
Installation		Floor mount							
Ingress protection		IP50 equivalent	-	IP50 equivalent		-	-		
Weight		1,150kg				1,620kg	3,000kg		
Power consumption		6.2kVA				8.6kVA	9.7kVA		
Supported Controller		FD18	FD18	FD18	FD18	FD11	FD20	FD11	
Working envelope									

\*1: Software limits the downward vertical range of axis 5 to ±5°.  
 Axis 4 can move ±360° and axis 5 can move ±125° only when the encoder correction screen or software limit settings screen is open.

\*2: This value changes by placement and load conditions of a wrist.

\*3: Using at 1,000 m or lower sea level. Ambient temperature has limitations when allowable altitude is exceeded.

1 [N·m] = 1/9.8 [kgf·m]





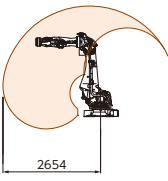
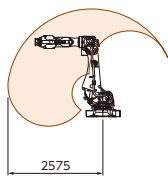
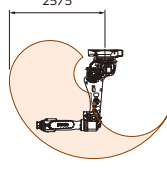
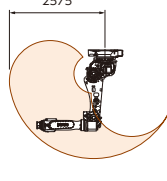
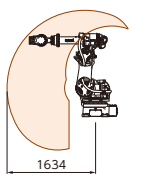
		SRA100HS	SRA100HB	SRA100H	SRA133H	SRA133HL	
							
No. of axes		6					
Max. working envelope	Arm	J1 Swivel 1	±180°		-80~+60°		
		J2 Horizontal	-120~+60°				
		J7 Swivel 2	-				
	Wrist	J3 Vertical	-125~+90°	-151~+90°	-146.5~+150°	-133.4~+150°	
		J4 Rotation 2			±210°		
		J5 Bend			±125°		
Max. speed	Arm	J1 Swivel 1	136°/s		125°/s	120°/s	115°/s
		J2 Horizontal	115°/s			110°/s	105°/s
		J7 Swivel 2			-		
	Wrist	J3 Vertical	160°/s		121°/s	118°/s	113°/s
		J4 Rotation 2	210°/s	225°/s	210°/s		
		J5 Bend			175°/s		
Maximum load	Wrist	100kg		133kg			
	Load capacity on forearm*1	20kg					
Allowable static load torque for wrist	J4 Rotation 2	830N·m	650N·m	830N·m			
	J5 Bend	830N·m	650N·m	830N·m			
	J6 Rotation 1	441N·m	315N·m	441N·m			
Allowable moment of inertia for wrist	J4 Rotation 2			85kg·m <sup>2</sup>			
	J5 Bend			85kg·m <sup>2</sup>			
	J6 Rotation 1			45kg·m <sup>2</sup>			
Maximum reach	1,634mm	2,044mm	2,654mm		2,951mm		
Pose repeatability	±0.06mm						
Ambient temperature*2/ humidity	0 to 45°C/20 to 85% RH (without condensation)						
Vibration	0.5 G or less						
Installation	Floor mount						
Ingress protection	IP54 equivalent						
Weight	690kg	750kg	1,040kg		1,070kg		
Power consumption	7kVA						
Supported Controller	FD18/FD20	FD18/FD20	FD18/FD20	FD18/FD20	FD18/FD20		
Working envelope							

\*1: This value changes by placement and load conditions of a wrist.

\*2: Using at 1,000 m or lower sea level. Ambient temperature has limitations when allowable altitude is exceeded.

1 [N·m] = 1/9.8 [kgf·m]



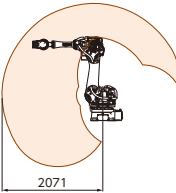
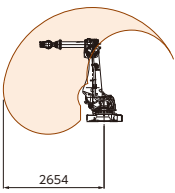
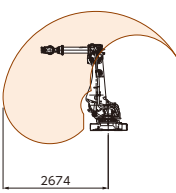
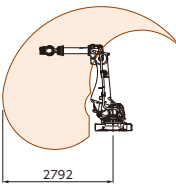
# LIST OF SPECIFICATIONS

		SRA166H	SRA210H	SRA220H	SRA220HV-01	SRA100J-01	
							
No. of axes		6					
Max. working envelope	Arm	J1 Swivel 1	±180°		±165°	±180°	
		J2 Horizontal	-80~+60°				
		J7 Swivel 2	-				
	Wrist	J3 Vertical	-146.5~+150°			-154~+150°	-125~+90°
		J4 Rotation 2	±210°				±360°
		J5 Bend	±125°		±130°		±135°
Max. speed	Arm	J1 Swivel 1	120° /s	115° /s		136° /s	
		J2 Horizontal	110° /s	105° /s		115° /s	
		J7 Swivel 2	-				-
	Wrist	J3 Vertical	115° /s	113° /s		160° /s	
		J4 Rotation 2	175° /s	130° /s		240° /s	
		J5 Bend	171° /s	130° /s		233° /s	
Maximum load	Wrist	166kg	210kg	220kg		100kg	
	Load capacity on forearm*1	20kg		20kg/Max.45kg		25kg/Max.45kg	
Allowable static load torque for wrist	J4 Rotation 2	960N·m	1337N·m		580N·m		
	J5 Bend	960N·m	1337N·m		580N·m		
	J6 Rotation 1	520N·m	720N·m		290N·m		
Allowable moment of inertia for wrist	J4 Rotation 2	100kg·m <sup>2</sup>	200kg·m <sup>2</sup>	141.1kg·m <sup>2</sup>		45kg·m <sup>2</sup>	
	J5 Bend	100kg·m <sup>2</sup>	200kg·m <sup>2</sup>	141.1kg·m <sup>2</sup>		45kg·m <sup>2</sup>	
	J6 Rotation 1	50kg·m <sup>2</sup>	155kg·m <sup>2</sup>	79kg·m <sup>2</sup>		22.7kg·m <sup>2</sup>	
Maximum reach	2,654mm			2,575mm	1,634mm		
Pose repeatability	±0.06mm			±0.15mm	±0.06mm		
Ambient temperature*2/ humidity	0 to 45°C/20 to 85% RH (without condensation)						
Vibration	0.5 G or less						
Installation	Floor mount			Inverted mount	Floor mount		
Ingress protection	IP54 equivalent				Wrist has IP67 and main body has IP54 equivalent		
Weight	1,100kg				670kg		
Power consumption	7kVA						
Supported Controller	FD18/FD20	FD18/FD20	FD18	FD18	FD18		
Working envelope							

\*1: This value changes by placement and load conditions of a wrist.



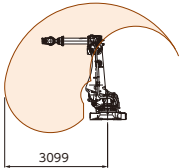
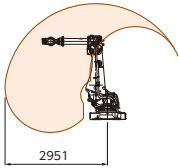
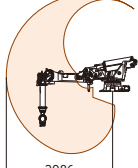
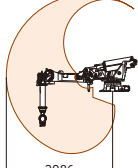
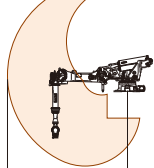
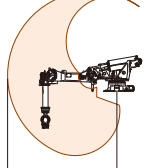
\*2: Using at 1,000 m or lower sea level. Ambient temperature has limitations when allowable altitude is exceeded.

\*3: Equipped with "A-Trac4" cable support on arm suitable for spot welding.

SRA100B-01	SRA100-01 (100-01A)*3	SRA166-01 (166-01A)*3	SRA210-01 (210-01A)*3	SRA240-01	SRA250-01
					
6	6	6			
±180°	±180°	±180°			
-120~+60°	-80~+60°	-80~+60°			
-	-	-			
-150~+180°	-146.5~+150°	-146.5~+150°			-140~+150°
±360°	±360 (±210)°	±360 (±210)°		±360°	
±135°	±135 (±120)°	±135(±120)°	±130(±120)°		±130°
±360°	±360 (±205)°	±360 (±205)°		±360°	
136° /s	136° /s	125° /s	115° /s	105° /s	100° /s
110° /s	135° /s	115° /s	105° /s	90° /s	
-	-	-			
130° /s	135° /s	121° /s	113° /s	100° /s	95° /s
240° /s	240° /s	180° /s	140° /s	130° /s	125° /s
233° /s	233° /s	173° /s	133° /s	125° /s	
351° /s	351° /s	260° /s	200° /s	195° /s	190° /s
100kg	100kg	166kg	210kg	240kg	250kg
25kg/Max.45kg	45kg/Max.90kg (15kg/Max.60kg)			20kg/Max.45kg	
580N·m	580N·m	951N·m	1,337N·m		
580N·m	580N·m	951N·m	1,337N·m		
290N·m	290N·m	490N·m	720N·m		
45kg·m <sup>2</sup>	60kg·m <sup>2</sup>	88.9kg·m <sup>2</sup>	141.1kg·m <sup>2</sup>		225.4kg·m <sup>2</sup>
45kg·m <sup>2</sup>	60kg·m <sup>2</sup>	88.9kg·m <sup>2</sup>	141.1kg·m <sup>2</sup>		225.4kg·m <sup>2</sup>
22.7kg·m <sup>2</sup>	30kg·m <sup>2</sup>	45kg·m <sup>2</sup>	79kg·m <sup>2</sup>		196kg·m <sup>2</sup>
2,071mm	2,654mm	2,654mm	2,674mm		2,792mm
±0.06mm					
0 to 45°C/20 to 85% RH (without condensation)					
0.5 G or less					
Floor mount					
Wrist has IP67 and main body has IP54 equivalent					
690kg	960 (1,060) kg		990 (1,090) kg	990kg	1,030kg
7kVA					
FD18/FD20	FD18/FD20	FD18/FD20	FD18/FD20	FD18/FD20	FD18/FD20
					
2071	2654		2674		2792

1 [N·m] = 1/9.8 [kgf·m]



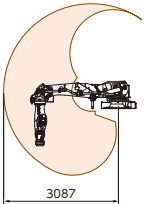
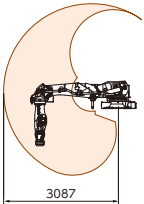
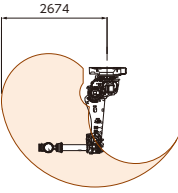
# LIST OF SPECIFICATIONS

		SRA120EL-01	SRA133L-01	SRA166L-01	SRA166T-01 (166T-01A)*3	SRA166TL-01	SRA210T-01 (210T-01A)*3	
								
No. of axes		6			6			
Max. working envelope	Arm	J1 Swivel 1	±180°			±180°		
		J2 Horizontal	-80~+60°			-65~+120°		
		J7 Swivel 2	-			-		
	Wrist	J3 Vertical	-127.7~+150°	-133.4~+150°		-106~+210°	-90~+210°	-106~+210°
		J4 Rotation 2	±360°			±360 (±210)°	±360°	±360 (±210)°
		J5 Bend	±135°			±135 (±120)°	±135°	±130 (±120)°
J6 Rotation 1	±360°			±360 (±205)°				
Max. speed	Arm	J1 Swivel 1	115° /s	125° /s	115° /s	110° /s	105° /s	100° /s
		J2 Horizontal	105° /s	115° /s	105° /s	110° /s	90° /s	
		J7 Swivel 2	-			-		
	Wrist	J3 Vertical	113° /s	121° /s	113° /s	115° /s		100° /s
		J4 Rotation 2	140° /s			180° /s	140° /s	140° /s
		J5 Bend	173° /s			173° /s		133° /s
J6 Rotation 1	260° /s			260° /s		200° /s		
Maximum load	Wrist	120kg	133kg	166kg	166kg		210kg	
	Load capacity on forearm*1	45kg/Max.90kg			45kg/Max.90kg (15kg/Max.60kg)			
Allowable static load torque for wrist	J4 Rotation 2	687N·m	800N·m	951N·m	951N·m		1,337N·m	
	J5 Bend	687N·m	800N·m	951N·m	951N·m		1,337N·m	
	J6 Rotation 1	353N·m	400N·m	490N·m	490N·m		720N·m	
Allowable moment of inertia for wrist	J4 Rotation 2	60kg·m <sup>2</sup>	76kg·m <sup>2</sup>	88.9kg·m <sup>2</sup>	88.9kg·m <sup>2</sup>		141.1kg·m <sup>2</sup>	
	J5 Bend	60kg·m <sup>2</sup>	76kg·m <sup>2</sup>	88.9kg·m <sup>2</sup>	88.9kg·m <sup>2</sup>		141.1kg·m <sup>2</sup>	
	J6 Rotation 1	30kg·m <sup>2</sup>	38kg·m <sup>2</sup>	45kg·m <sup>2</sup>	45kg·m <sup>2</sup>		79kg·m <sup>2</sup>	
Maximum reach	3,099mm	2,951mm		3,086mm	3,383mm	3,106mm		
Pose repeatability	±0.06mm			±0.08mm				
Ambient temperature*2/ humidity	0 to 45°C/20 to 85% RH (without condensation)							
Vibration	0.5 G or less							
Installation	Floor mount				Shelf mount			
Ingress protection	Wrist has IP67 and main body has IP54 equivalent							
Weight	985kg	980kg		1,210 (1,310) kg	1,240kg	1,250 (1,350) kg		
Power consumption	7kVA							
Supported Controller	FD18/FD20	FD18/FD20	FD18/FD20	FD18/FD20	FD18/FD20	FD18/FD20		
Working envelope								

\*1: This value changes by placement and load conditions of a wrist.


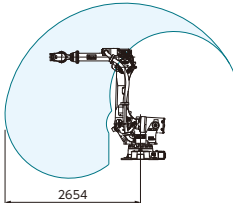
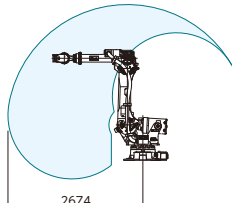
\*2: Using at 1,000 m or lower sea level. Ambient temperature has limitations when allowable altitude is exceeded.

\*3: Equipped with "A-Trac4" cable support on arm suitable for spot welding.

SRA166HT-01		SRA210HT-01		SRA210V	
					
6		6		6	
±180°		±165°		±165°	
-65~+120°		-80~+60°		-80~+60°	
-		-		-	
-112~+210°		-146.5~+150°		-146.5~+150°	
±210°		±360°		±360°	
±125°		±130°		±130°	
±210°		±360°		±360°	
120° /s		115° /s		115° /s	
110° /s		105° /s		105° /s	
-		-		-	
115° /s		113° /s		113° /s	
175° /s		130° /s		140° /s	
171° /s		130° /s		133° /s	
280° /s		205° /s		200° /s	
166kg		210kg		210kg	
20kg		45kg/Max.90kg		45kg/Max.90kg	
960N·m		1,337N·m		1,337N·m	
960N·m		1,337N·m		1,337N·m	
520N·m		720N·m		720N·m	
100kg·m <sup>2</sup>		200kg·m <sup>2</sup>		141.1kg·m <sup>2</sup>	
100kg·m <sup>2</sup>		200kg·m <sup>2</sup>		141.1kg·m <sup>2</sup>	
50kg·m <sup>2</sup>		155kg·m <sup>2</sup>		79kg·m <sup>2</sup>	
3,087mm		2,674mm		2,674mm	
±0.08mm		±0.15mm		±0.15mm	
0 to 45°C/20 to 85% RH (without condensation)					
0.5 G or less					
Shelf mount			Inverted mount		
IP54 equivalent			Wrist has IP67 and main body has IP54 equivalent		
1,160kg			990kg		
7kVA					
FD18/FD20		FD18/FD20		FD18/FD20	
					

1 [N·m] = 1/9.8 [kgf·m]

# LIST OF SPECIFICATIONS

		ST133CF	ST166CF	ST210CF
				
No. of axes		6		
Max. working envelope	Arm	J1 Swivel 1	±165°	
		J2 Horizontal	-80~+60°	
		J7 Swivel 2	-	
	Wrist	J3 Vertical	-137~+150°	
		J4 Rotation 2	±360°	
		J5 Bend	±135°	±130°
Max. speed	Arm	J1 Swivel 1	130° /s	110° /s
		J2 Horizontal	130° /s	110° /s
		J7 Swivel 2	-	
	Wrist	J3 Vertical	130° /s	110° /s
		J4 Rotation 2	230° /s	170° /s
		J5 Bend	230° /s	170° /s
Maximum load	Wrist	133kg	166kg	210kg
	Load capacity on forearm*1	70kg		
Allowable static load torque for wrist	J4 Rotation 2	745N·m	951N·m	1,337N·m
	J5 Bend	745N·m	951N·m	1,337N·m
	J6 Rotation 1	411N·m	490N·m	720N·m
Allowable moment of inertia for wrist	J4 Rotation 2	60.9kg·m <sup>2</sup>	88.9kg·m <sup>2</sup>	141.1kg·m <sup>2</sup>
	J5 Bend	60.9kg·m <sup>2</sup>	88.9kg·m <sup>2</sup>	141.1kg·m <sup>2</sup>
	J6 Rotation 1	30.2kg·m <sup>2</sup>	45kg·m <sup>2</sup>	79kg·m <sup>2</sup>
Maximum reach	2,654mm		2,674mm	
Pose repeatability	±0.2mm		±0.3mm	
Ambient temperature*2/ humidity	10 to 45°C/20 to 85% RH (without condensation)			
Vibration	0.5 G or less			
Installation	Floor mount			
Ingress protection	-			
Weight	1,120kg		1,160kg	
Power consumption	4.2kVA			
Clean rating*3	Class 6			
Supported Controller	FD18	FD18	FD18	
Working envelope				

\*1: This value changes by placement and load conditions of a wrist.

\*2: Using at 1,000 m or lower sea level. Ambient temperature has limitations when allowable altitude is exceeded.

\*3: Clean rating complies with ISO 14644-1

1 [N·m] = 1/9.8 [kgf·m]



# SUPPORT SOFTWARE/FEATURES

Easier to use from introduction, to maintenance, various functions such as PC software and software PLC can be programmed and simulations are prepared.

## FD on Desk II (Programming PC software)

Simulation and offline programming product for NACHI robots

- FD on Desk II Pro Options
- FD on Desk II Regular Options
- FD on Desk II Light Standard \*CFD controller only

Grade	Pro		Regular		Light	Trial version (Demo Licence)
Type No.	FDONDESK2-PRO	FDONDESK2-PRO-D	FDONDESK2-REG	FDONDESK2-REG-D	-	-
Licence certification	Licence file	USB dongle	Licence file	USB dongle	Actual Robot Controller required	ASK
CFD	Offline mode	○	○	○	○	△
	Monitor mode	○	○	○	○	×
	View mode	○	○	○	○	×
FD	Offline mode	○	○	○	△	△
	Monitor mode	○	○	○	△	×
	View mode	○	○	○	△	×
Program generation function from CAD	○	○	×	×	×	×
Multiple controller operation	○	○	×	×	×	×
Save shape file	○	○	○	○	○	×

○ : Usableness  
 △ : Enable to use in operator level BEGINNER. (Applied to MZ, ES and EZ)  
 × : Unusableness

## FD on Desk III (Programming PC software)

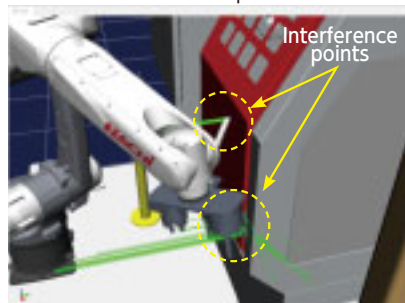
Options

PC software that makes it easy and smooth for robot applications with programming and simulation functions

- Supports reading of large-scale files such as peripheral devices.
- Visual programming



- High performance interference surveillance, video output function, etc.



## User task functions

Standard

Possible to program processes in parallel with robot operations

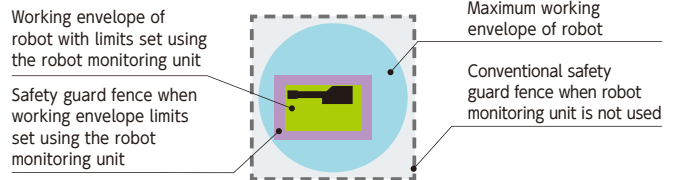
- Time consuming calculations and robot operations are processed in parallel to reduce cycle times
- Various statuses are shown on the screen on the teach pendant

## Robot Monitoring Unit RMU

Options

- Safety control unit monitors robot conditions (position and speed)
- Possible to reduce costs and space
- Facilities are safer because the positions and speeds of robots are monitored
- Limit working envelope of robot
- Minimize size of safety fences

Working envelope of robot and safety fence

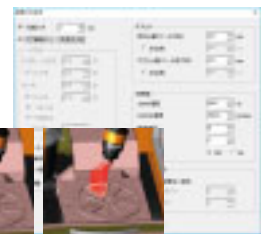


## FD-ST easy

Options

PC software that can teach robot operation programs and simulate operation program on a PC.

- Automatic path generation function specifies edges on the workpiece and automatically generate teaching points for robot to work with.
- Provides an advanced 3D Viewer for importing complex data, viewing scene graphs, and drawing in high definition



## Software PLC

Standard

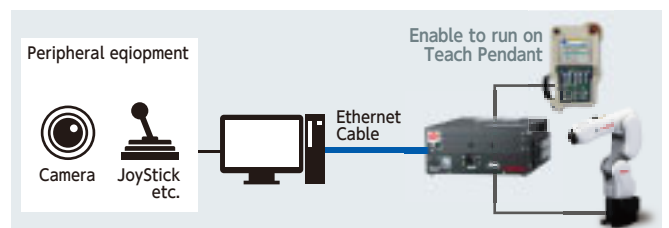
Incorporated PLC functionality into robot control software

- Eliminates the necessity of external PLC and reduces equipment costs
- Programming is also possible on teach pendant

## OpenNR-IF

Options

Development makes the system design with various devices easier.



Monitoring function of robot operation

- Indication of robot move command
- Acquisition of robot status (Input/output signals, Variables, Shift Values)

# SUPPORT SYSTEMS

## Robot systems

### System products

NACHI's system engineering team puts its wealth of experience to work for you, providing system solutions that are easy to use along with high-cost performance.

### Peripheral devices for the robot

NACHI provides proven highly-reliable robot application devices.

### Offline program system

Robot operations can be simulated before installation to check performance. Creating an operation program beforehand allows the robot to be directly installed in the assembly line.



## Post-installation service

### From setup through startup

NACHI's skilled technicians provide support during the installation process, from setup to connection, teaching, movement, and supervision, until the line is fully operational.

### Quick response to emergency calls

NACHI's specialized technicians are "on-call" to immediately respond to customer emergencies.

### Reliable support from remote locations

Robots can be operated remotely when placed online, allowing specialized service professionals to provide accurate support to worldwide locations.

### The right parts when you need them

Our service locations always have important maintenance parts in stock. We can deliver the parts you need quickly.

### Periodic inspections

As a trusted and reliable partner, NACHI performs periodic inspections to extend the life of your robot.

### Overhauls

NACHI provides a selection of services suited to the conditions of your robot and performs overhauls to ensure that your robot is always in the best condition. NACHI can also provide temporary replacement robots to keep your line operating during repairs.



Overhauls

## Training

### Robot training course

Fully utilize your Nachi robots, we have robot training classes which use our own curriculum to teach the basics of operating and maintaining robots.

We support a wide range of robots from compact MZ series to large robots and offer training classes tailored to your needs. We will flexibly comply to your request, please feel free to contact us.

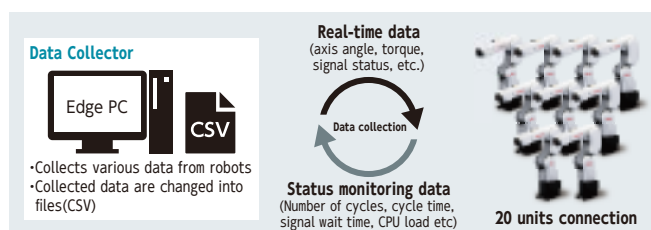


## NR: connect

Software enables to collection of robot operation data and visualizations.

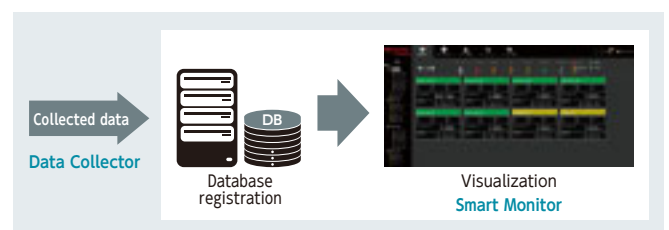
BY connecting robots to NR: connect, it is possible to collect, visualize operational status data and improve maintainability.

### Data Collector (Robot data collection software) Options



- Constantly monitor the error status of robot controller and automatically save the status when an error occurs
- The output data can be imported to the customer's core system, etc.

### Smart Monitor (robot data monitoring software) Options



- Display the data collected by Data Collector clearly on a screen
- Intuitive UI gives you easy access to the information you need so that robot operation status can be checked in real-time.
- When an error occurs, the operating status before and after the error is displayed graphically and makes it easy to understand the situation before and after the error.



### **Safety precautions**

- Before using any robot, review all documentation including operating instructions and other attached documents. Familiarize yourself with the contents in order to ensure proper robot operation.
- When a robot is to be used for an application where robot operation may directly threaten the life or cause physical harm to personnel, a careful examination of its intended use is required. Contact a NACHI-FUJIKOSHI sales representative to provide details of the intended use. Obtain proper training prior to operating robot.
- Photos used in this document show the robots without safety fences, equipment, and devices that are required to comply with the applicable laws and regulations for ensuring safety. These photos are only provided to illustrate what is being described.
- The external appearances, specifications, etc. of the products portrayed in this catalog are subject to change without notice due to improvements in performance.

<b>CATALOG NO.</b>	<b>R7001E-21</b>
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