NACHI

# Robot

Total Robot Catalog

HANDLING

PALLETIZING

CLEAN-ROOM

WELDING

SPECIFICATION

# NACHI-FUJIKOSHI's industrial robots are making innovations manufacturing throughout the

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 high-speed, high precision operations to lifting heavy loads used in a full range of assembly work and welding solutions. NACHI-FUJIKOSHI'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.


**MZ04**

in

world.


EZ03

## Contents



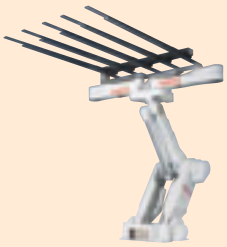
**Icon key**

- 7 — Number of controlled axes
- 200 ~ 400 — Payload capacity
- 2700 ~ 3100 — Maximum reach

# NACHI'S FULL ROBOT SERIES LINEUP

NACHI's full robot series lineup supports worksites throughout the world of manufacturing with the latest in technology.

| Process and application | HANDLING | | | | |
|---|---|---|---|---|---|
| | EZ/ES | MZ | MC/MR | ST-TP | MC and SC Heavy Loader |
| |  |  |  |  |  |
| | ▶P.5·P6<br>Number of controlled axes: 4 or 6 axes<br>Payload capacity: 2 to 12kg<br>Maximum reach : 350 to 850mm | ▶P.6<br>Number of controlled axes: 5 or 6 axes<br>Payload capacity: 3.5 to 7kg<br>Maximum reach : 541 to 1,102mm | ▶P.7<br>Number of controlled axes: 6 or 7 axes<br>Payload capacity: 10 to 70kg<br>Maximum reach : 1,260 to 2,050mm | ▶P.8·P9<br>Number of controlled axes: 6 or 7 axes<br>Payload capacity: 80 to 100kg<br>Maximum reach : 3,106mm | ▶P.9·P10<br>Number of controlled axes: 6 axes<br>Payload capacity: 280 to 700kg<br>Maximum reach : 2,771 to 3,972mm |
| Spot and seam welding | | | | | ● |
| Arc welding | | | ● | | |
| Die casting | | ● | ● | | ● |
| Resin molding | ● | ● | ● | | ● |
| Press operation handling | | ● | ● | ● | |
| Machine loading | | ● | ● | | ● |
| Deburring and polishing | ● | ● | ● | | |
| Sealing | ● | ● | ● | | |
| General assembling | ● | ● | ● | | |
| Tightening nuts | ● | ● | ● | | |
| Picking, aligning, packaging | ● | ● | ● | | |
| Shipping and receiving (palletizing) | ● | | ● | | ● |
| Measuring, inspection, testing | ● | ● | ● | | ● |
| Material handling | ● | ● | ● | ● | ● |
| Glass substrate loading | | | | | |

| PALLETIZING | CLEAN-ROOM | | WELDING | | |
|---|---|---|---|---|---|
| LP/MC470P/MC500P | ST-C/SC-C | SJ | SRA-H/SRA | NB/NV | |
|  ▶P.11<br>Number of controlled axes: 4 or 5 or 6 axes<br>Payload capacity: 130 to 500kg<br>Maximum reach : 2,771 to 3,210mm |  ▶P.12<br>Number of controlled axes: 6 axes<br>Payload capacity: 133 to 400kg<br>Maximum reach : 2,654 to 3,623mm |  ▶P.12<br>Number of controlled axes: 4 or 5 axes<br>Payload capacity: 25 to 120kg |  ▶P.13·P14<br>Number of controlled axes: 6 axes<br>Payload capacity: 100 to 250kg<br>Maximum reach : 1,634 to 3,734mm |  ▶P.15<br>Number of controlled axes: 6 axes<br>Payload capacity: 4 to 6kg<br>Maximum reach : 1,402 to 2,008mm | Field |
| | | | ● | | Automotive, automotive parts, metalworking, agricultural machinery, construction machinery |
| | | | | ● | |
| | | | ● | | Automotive parts, plastic, electric and electronics |
| | | | ● | | |
| | | | ● | | Automotive, automotive parts, machine tools, plastic, pharmaceuticals and cosmetics, electric and electronics, metalworking, chemistry, medical equipment, foodstuffs, agricultural machinery, construction machinery |
| | ● | | ● | | |
| | | | ● | | |
| | | | | | |
| | | | ● | | |
| | | | ● | | |
| | | | | | |
| ● | | | ● | | |
| | | | | | |
| ● | ● | | ● | | |
| | ● | ● | | | Electric and electronics |

# HANDLING

Machine loading, picking, loading, palletizing, assembling, deburring/polishing, and sealing

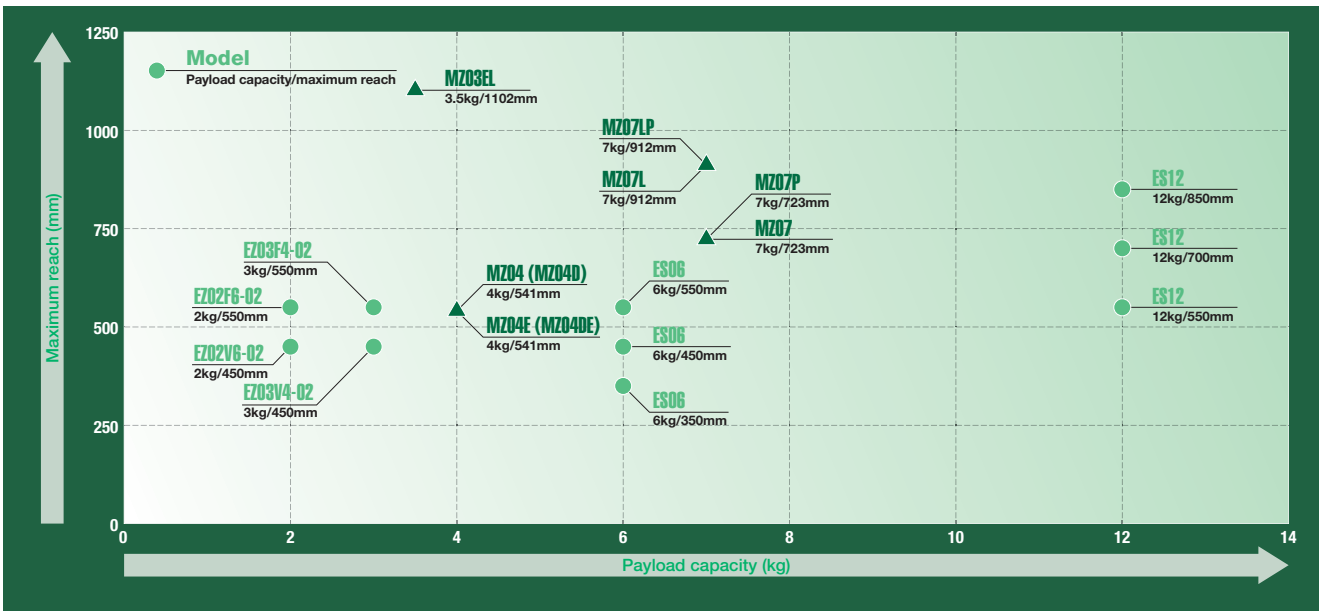
**Solving your automation needs for assembly, loading, and other jobs with a lineup of high performance and highly functional product applications such as vision sensors and our FLEXhand series for our high-speed and high precision robots.**

WING SLICER Type

## EZ series

- EZ03V4-02
- EZ03F4-02
- EZ02V6-02
- EZ02F6-02


The EZ are high-speed, horizontally articulated robots 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 hollow construction to the end of the wrist, capable of housing wires internally. The internal wire routing for the tooling significantly increases cabling reliability. The SCARA family has multiple models with varying reach and payload to support a variety of equipment operations.



World's fastest lightweight compact robot

# MZ Series

▲MZ03EL
▲MZ04
▲MZ04D
▲MZ04E
▲MZ04DE
▲MZ07
▲MZ07L
▲MZ07P
▲MZ07LP

5,6 | 3,5 ~ 7 | 541 ~ 1102


World's fastest lightweight compact robot, Dust-proof and drip-proof specifications, Multiple installation orientations provide flexibility to automate a variety of processes for an all-around compact high performance robot.
Hollow wrist construction with an internal path for wiring providing a streamlined profile for working in confined spaces.

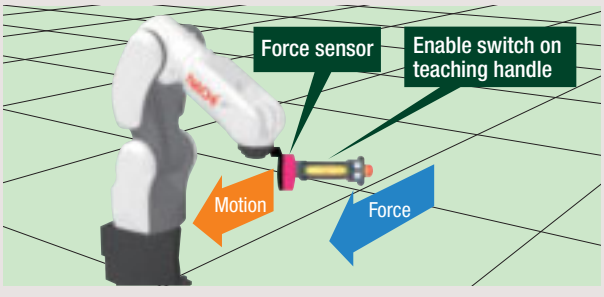



## Options

### Direct teaching

The robots can be moved directly with the teaching handle, by using the enable switch, mounted on the end of the robot. This is a function for teaching the robots operating positions.
You can easily move the robots through intuitive operations, without training and experience on the robot teach pendant. Diagonal movements that were not possible through the teach pendant's key operations are now possible.

*The direct teach and RMU (robot monitoring unit) options are required.



Powerful and compact multi-purpose robot

# MC Series


- MC10S
- MC10L
- MC12S
- MC20
- MC35
- MC50
- MC70

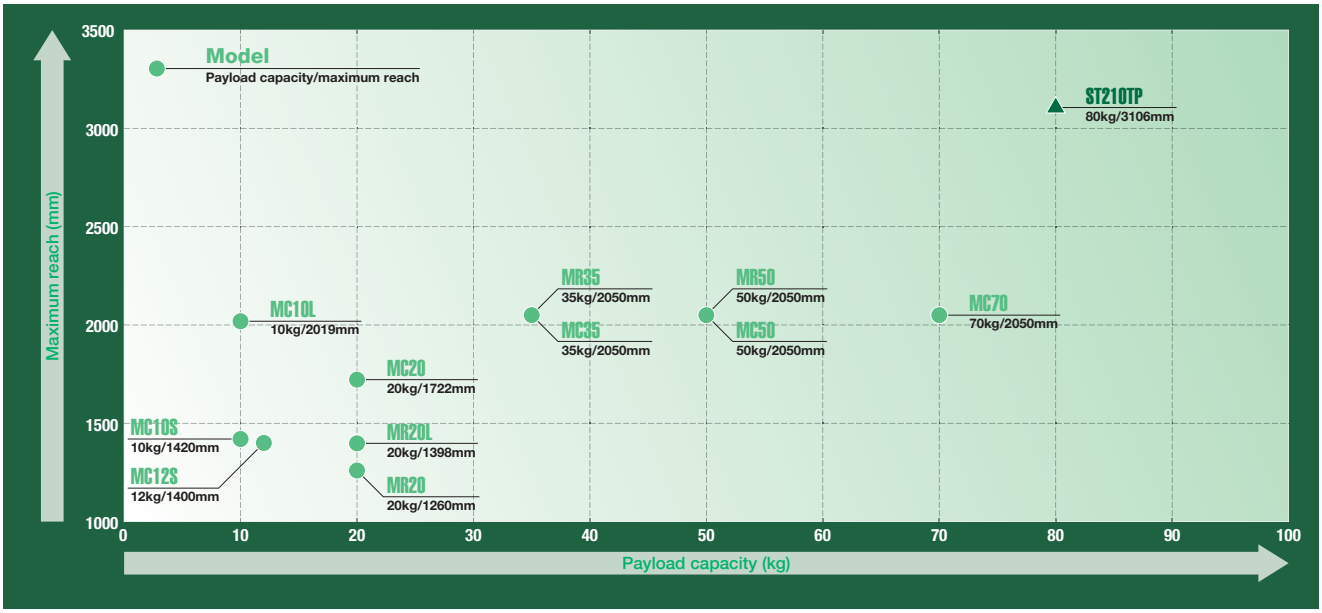

High dust and water protection, combined with outstanding performance and a full range of functions to handle a variety of applications make these robots ideally suited for a variety of production environments.

Flexible motion “Arm” robot with 7-axes

# MR Series


- MR20
- MR20L
- MR35
- MR50


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.



Press operation handling robots

# ST210TP

▲ST210TP-01(with press arm)
▲ST210TP-02 (without press arm)

6,7 | 80 ~ 100 | 3106

Highly rigid design with vibration dampening give this robot its great speed.
Newly developed specialized press arm attachment gives this robot a much larger reach that can be used for a maximum eight meter press pitch. Moves parts horizontally at high speed.



## Options

### FLEXhand FH360, FH150-F2, FH150-F3

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.

FH360-02 (3 fingers)

FH150F2-01 (2 fingers)

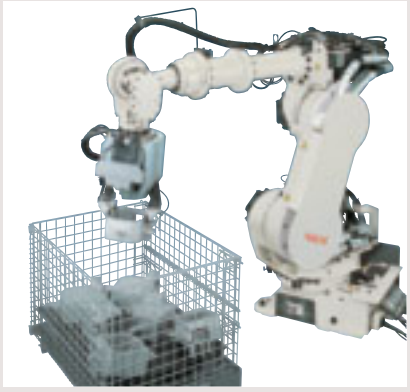
FH150F3-01 (3 fingers)

### 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.

### Vision sensor NV-Pro

Our vision sensor was developed in-house at NACHI. Excellent interfacing with robot because it is possible to check images, operations, and program the robot using the teach pendant.
Excellent for picking up parts that have not been positioned because robot is aware of part position in 2 or 3 dimensions. Can be equipped with functions to detect models of products (or detect abnormal products).

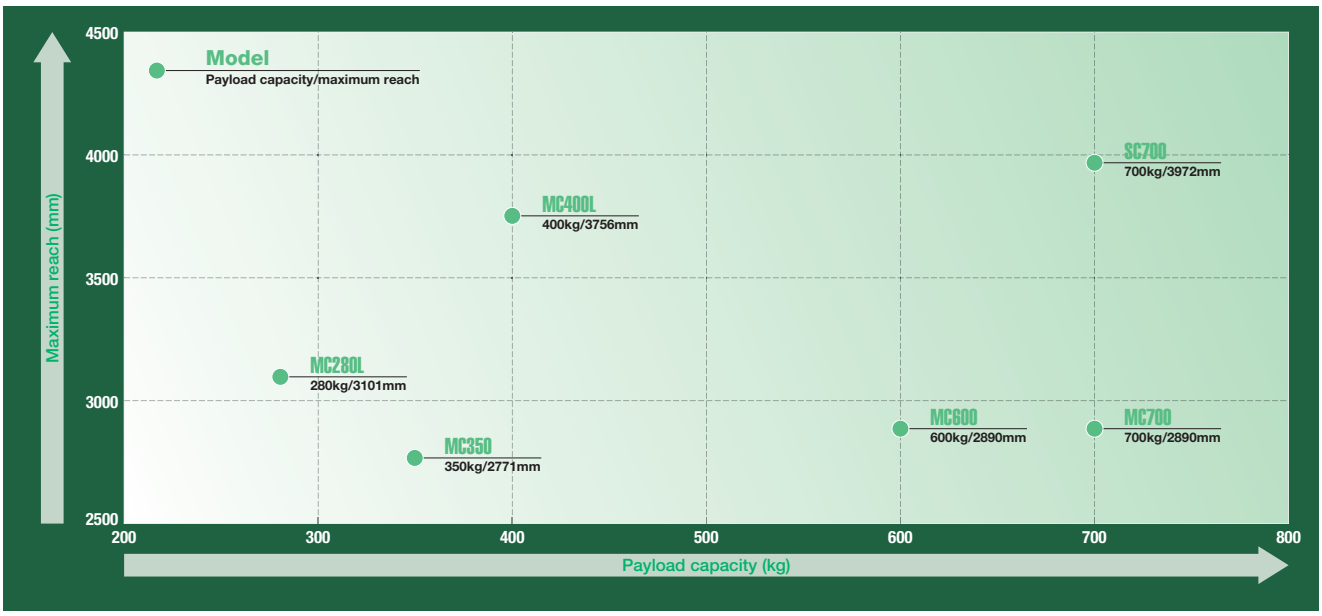


Heavy loader robot

# MC Heavy Loader Series

- MC280L
- MC350
- MC400L
- MC600
- MC700


With high wrist torque and large operating envelope, these robots are opening up a new era of heavy loading robots.
Simple construction has no counterweights or parallel linkage on MC350 and MC280L models.
Compact arm design requires minimal installation space for a heavy payload robot.
Welding cables and hoses routed inside hollow arms provides excellent life.



Super heavy loader robot

# SC Heavy Loader Series

●SC700


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 loaders, with robots.



Example application

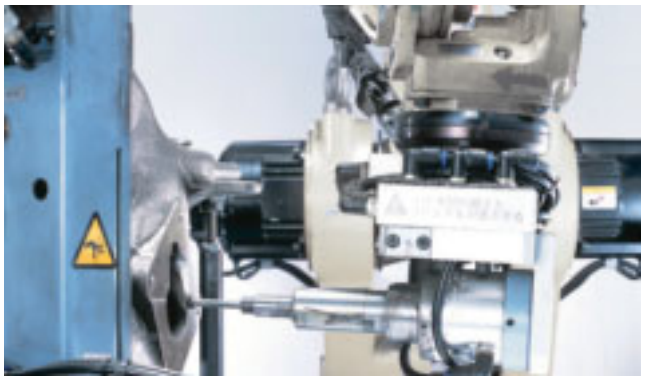
## Handling and transport

Robots load work pieces into machining centers and move parts between processes during parts manufacturing. A single robot can tend multiple machines by synchronizing the various cycle times. Selecting the right robot for the job means a compact operation with excellent maintainability.

Example application

## Deburring and polishing

Robots de-burr cast parts and machined parts and grind welding beads.
They maintain consistent quality without variations in polishing or left over burrs using our force control function.



Example application

## Press operation handling

Robots load and unload presses.
Frees workers from the dangerous job of handling the sharp edges of sheet metal parts.
Helps increase productivity by quickly loading parts ranging in size from large to small.

# PALLETIZING

**Palletizing robots**

By improving productivity, these robots handle manufacturing jobs and produce more parts in a shorter time
NACHI's palletizing robots help with intricate stacking work for shipping and receiving processes.

High-speed palletizing robot

## LP Series

- LP130
- LP180
- LP130F
- LP210


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.

Heavy loader palletizing robot

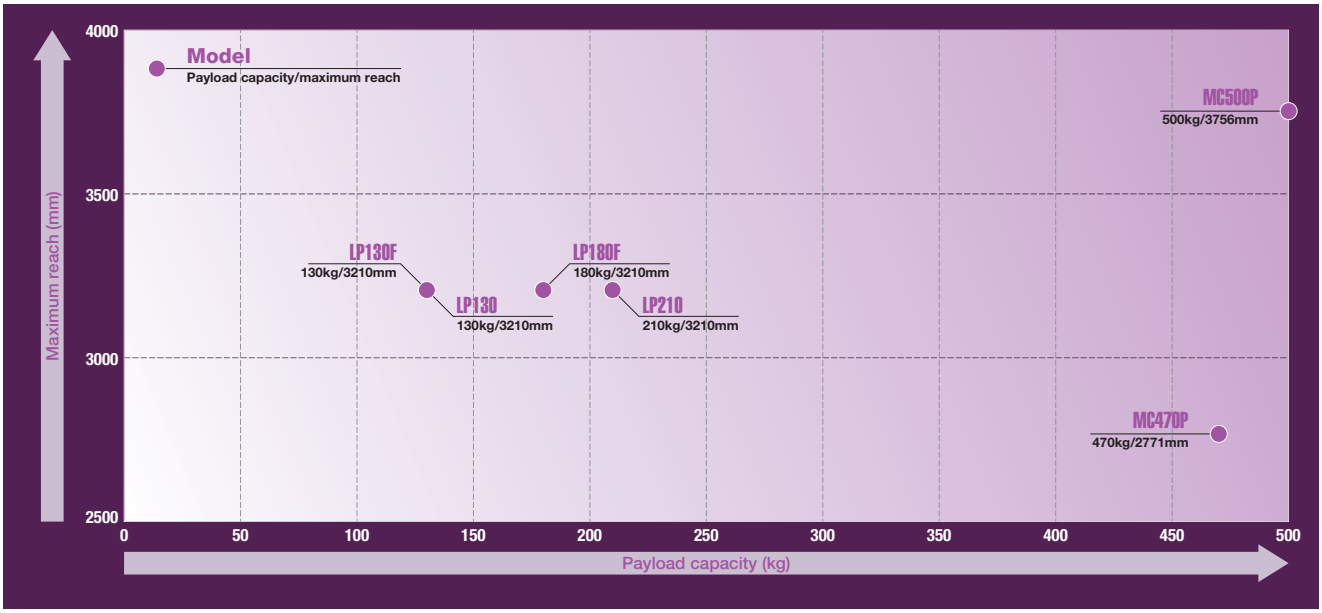
## MC470P/MC500P


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

**Example application**

### Palletizing

Robots stack goods of various sizes in specified patterns on pallets. They help to automate a wide range of logistics operations with their high speeds and variety of stacking patterns.



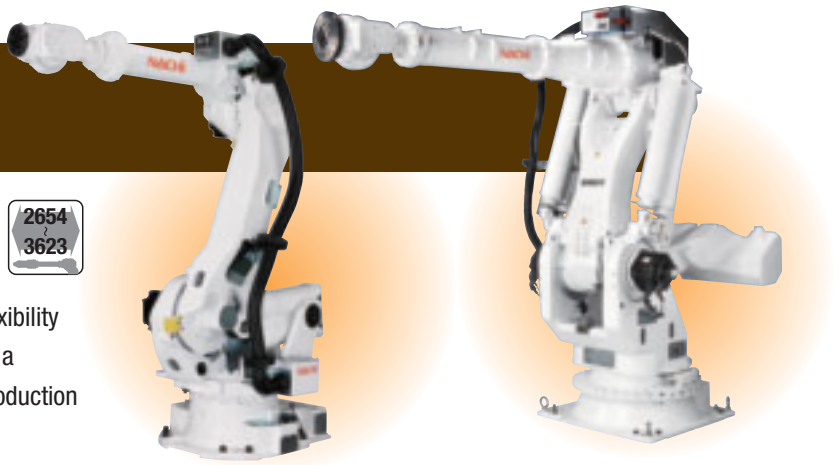
# CLEAN-ROOM

**Clean-room Robots**

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.

Clean-room loading robot

## ST-C/SC-C Series



- ST133CF
- ST210CF
- ST166CF
- SC400LC

6 axes | 133 ~ 400 kg | 2654 ~ 3623 mm

Six-axis articulated construction with excellent flexibility and a large reach make these robots excellent for a variety of loading work in large glass substrate production processes.

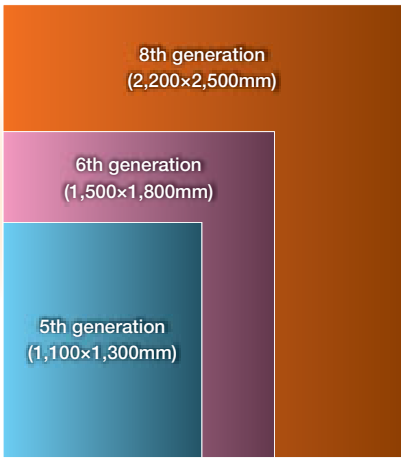
Robots for glass substrate loading

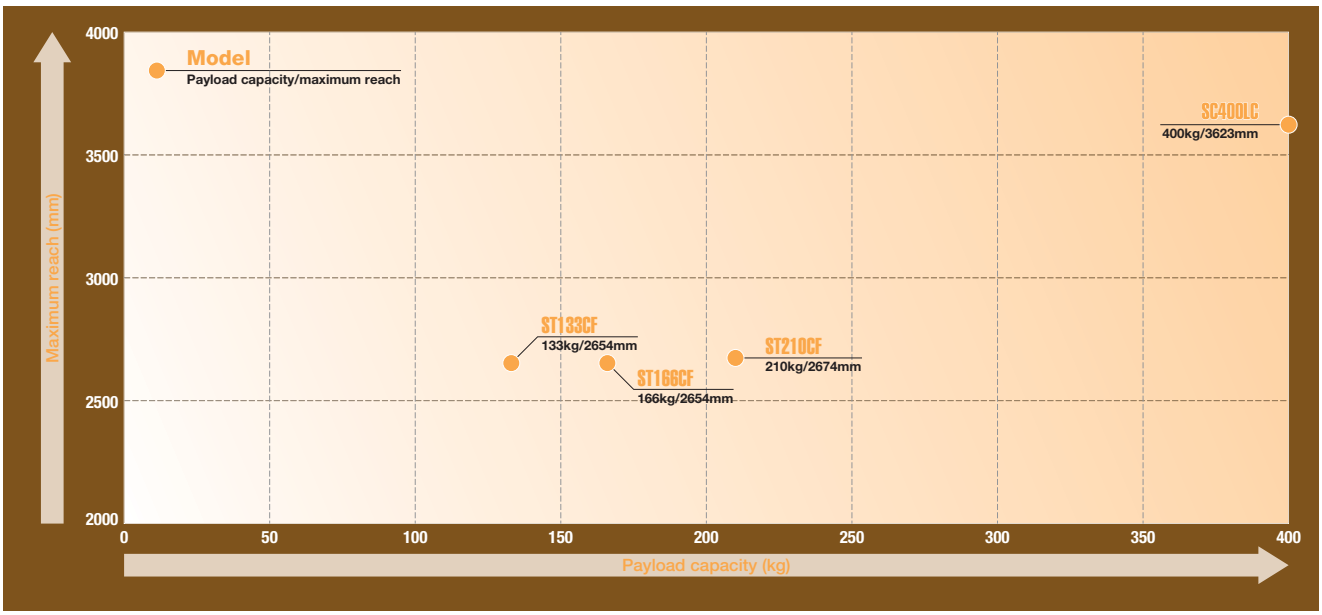
## SJ Series

- SJ80C
- SJ120C

4,5 axes | 25 ~ 120 kg

These robots have been loading large glass substrates for flat panel displays ranging from the fifth through the eighth generation. Our flexing and extending construction enables extremely clean performance, which is excellent for work in clean rooms where particle control is necessary.



# WELDING

**Spot welding, arc welding, and seam welding**

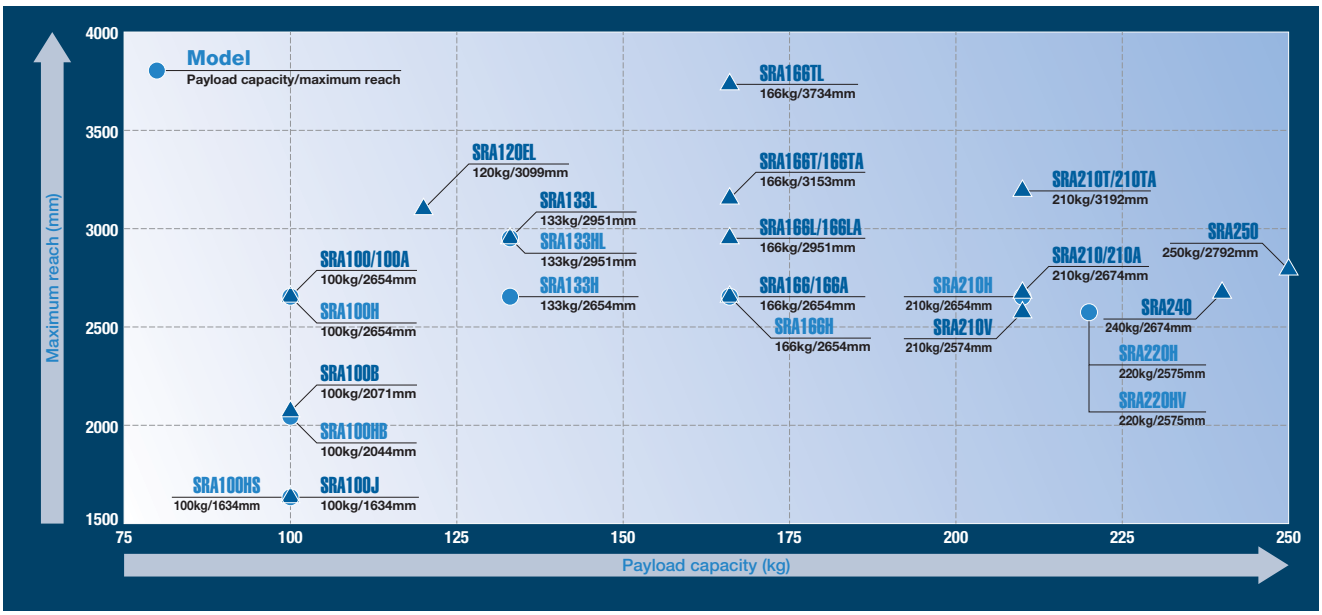
Welding robots are the central element of automobile production, especially the auto body welding lines.
The performance, functionality, and reliability of the NACHI lineup of spot welding robots are supporting the world of manufacturing.


Spot welding robot with built-in cables

## SRA-H Series

- SRA100HS
- SRA100HB
- SRA100H
- SRA133H
- SRA133HL
- SRA166H
- SRA210H
- SRA220H
- SRA220HV (Inverted mount)


The next generation of hollow arm construction spot welding robots.
Cables for 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.



Ultra-fast spot welding robot

# SRA Series

- ▲SRA100J-01
- ▲SRA100B-01
- ▲SRA100-01
- ▲SRA100-01A
- ▲SRA166-01
- ▲SRA166-01A
- ▲SRA210-01
- ▲SRA210-01A
- ▲SRA240-01
- ▲SRA250-01
- ▲SRA120EL-01
- ▲SRA133L-01
- ▲SRA166L-01
- ▲SRA166L-01A
- ▲SRA166T-01 (Shelf mount)
- ▲SRA166T-01A (Shelf mount)
- ▲SRA166TL-01 (Shelf mount)
- ▲SRA166TL-01A (Shelf mount)
- ▲SRA210T-01 (Shelf mount)
- ▲SRA210T-01A (Shelf mount)
- ▲SRA210V (Inverted mount)


Floor mount

The Ultimate Spot Welding Robot. Using higher speeds and vibration damping properties, we greatly improved productivity by shortening cycle times 30% (compared to our existing 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 latest in motor drive controls have reduced power consumption by 15% over existing models reducing environmental impact.

Shelf mount



Example application

## Spot welding

Spot welding guns are mounted on robots and used to spot weld steel. They are used to assemble auto bodies, parts, and frames. Welding guns are controlled by the robots so weld spatter does not occur for high quality welds and high productivity in a clean and quiet environment.

Arc Welding Robot

# NB/NV Series

- NB04
- NB04L
- NV06
- NV06L

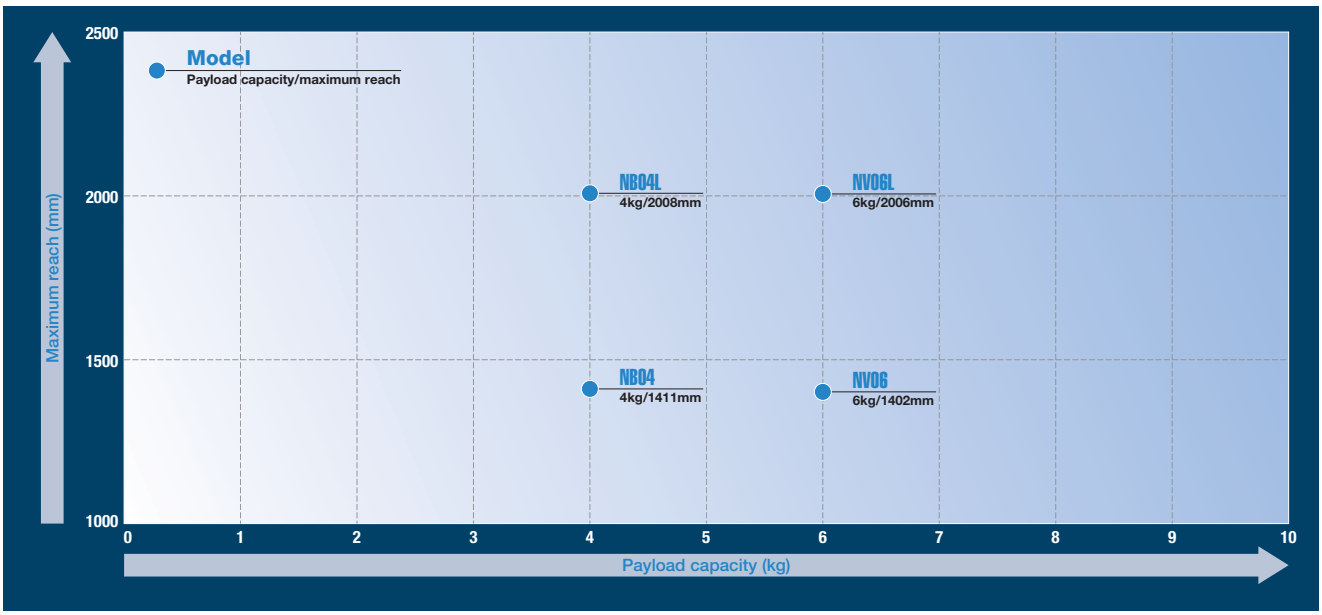
6 | 4 ~ 6 | 1402 ~ 2008

By housing the arc welding cable in the arm, these robots optimize layout by eliminating interference with peripheral equipment and they provide consistent wire feed.

Example application

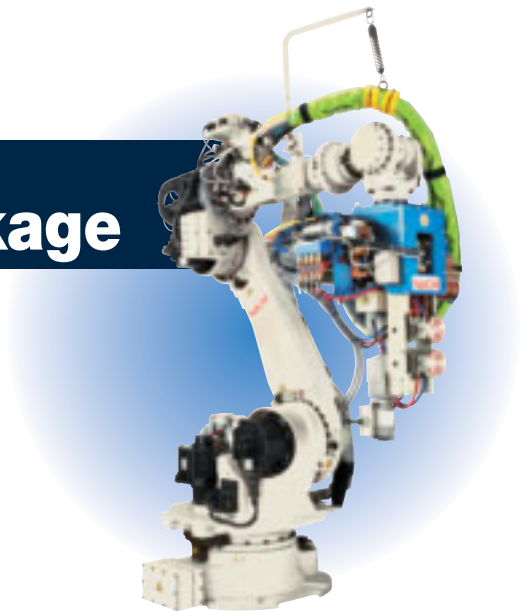
## Arc welding

Arc weld torches mounted on our robots are used to weld a variety of materials, from thin sheet metal to multiple layers of thick steel plate. These robots are used in producing ships, structural frames, auto components, houses and bridge parts.



Seam welding robots

# Robot seam welding package



## Seam welders are mounted on robots

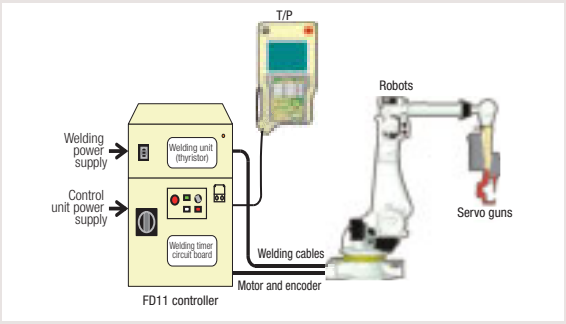
- Capable of seam welding on work surfaces in three dimensions
- Fast and consistent welding
- Equipped with various application functions such as electrode polishing, electrode wear compensation, and others

## Options

### Integrated timer
### Weld timer integrated in controller

**All-in-one package**

Package includes robot, timer, servo gun, and peripheral equipment.




### Slide

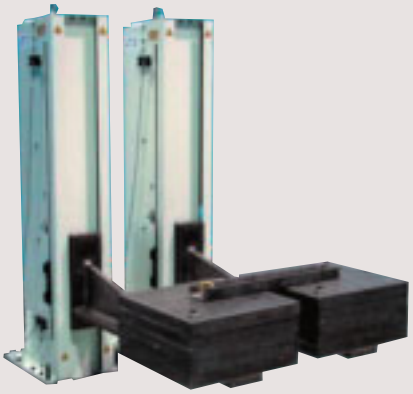
Slide controlled as an additional axis by the robot controller. Expands possibilities of automated systems and working envelope of robots.

### Revolving worktable TT2000/TT4000

Revolving table controlled as an additional axis by the robot controller. Full-circle revolving table holds heavy loads, such as fixtures, that helps streamline production processes with multi-operation configurations combining production of multiple types of products.

### Lifter LF Series

Lifter is controlled by the robot controller for vertical movement. Each pillar can handle up to 580 kg. A maximum of 4 pillars coordinate simultaneously to lift heavy and long items.



# CONTROLLER SUPPORT SOFTWARE

**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.**
**Also, the various support software helps with production processes by providing information on robot conditions and safe operation.**

## FD Controller

### Fast processing

High-speed CPU brings huge improvement to control performance such as cycle time, trajectory control, and internal processing time.

### Teach pendant is compact and lightweight

Compact and lightweight with re-tooled key operations.
Touch screen is standard equipment making operations even easier.

### Improved maintainability

Maintainability improved by integrating components revamping configuration. Faster parts replacement.

### Outstanding functionality

Excellent software functions carried over from AX controller. Easily adapts to many various applications.

### Full lineup of safety functions

Support for PL (Performance Level) d is standard. Compliant with American and European safety standards.

• **Basic specifications for controller**

| Item | Specifications |
|---|---|
| Controllable axes | 6 |
| Maximum controllable axes | 8 |
| External dimensions (mm) | 580(W)×542(D)×590(H) |
| Position reader | Absolute encoder |
| Programming system | Teaching playback |
| Operating panel | Mode switch (teach/playback), emergency stop button, motors on button, start button and stop button |
| Cable between robot and control panel | 5m (controller cable specification) |
| User interface | User panel: On back, side and inside door |
| Protection rating | IP54 |
| Power supply | 3Φ 200-220VAC: Class-D grounding, breaker 40A, max. leakage 100mA |
| Ambient temperature/humidity | 0 to 40 °C (50/60Hz) 20 to 85% (without condensation) |
| Robot monitoring function | PL d (Cat. 3) |

• **Controller options**

| Item | Specifications |
|---|---|
| Overseas compliance | North America: ANSI/RIA, Europe: CE |
| Power voltage converter (External dimensions) | AC380/400/420/440/460/480V (3Φ 50/60Hz) Class-D grounding, breaker 30A, max. leakage 100mA (580mm(W)×542mm(D)×1,180mm(H)) |
| Cable between robot and control panel | Extension (total): 10m, 15m, 20m, 25m |
| External memory | USB memory (1 GB) |
| Additional axes | Gun, slider, jig and hand |
| Fieldbus | DeviceNet, PROFIBUS, FL-net, CC-Link and others. Maximum 4 channel can be installed. |
| Additional input/output signals | 32/32 or 64/64 point |
| Output relay contact specifications | 32 or 64 point |
| Analog input/output | 2/4 point |
| Vision sensor | NV-Pro |
| Conveyer tracking function | Conveyer tracking control |
| Palletize function | Palletize and de-palletize |
| Robot language | JIS SLIM |
| PLC function | Software PLC IEC 1131-3 |

• **Teach pendant display specifications**

| Item | Specifications |
|---|---|
| Display | 5.7 inch VGA color LCD touch panel |
| Language | Japanese (Chinese, hiragana, katakana and alphanumeric characters) Option: English/Chinese/Korean |
| Enable SW | One-handed enable switch, three positions, (left hand side) |
| Optional functions | Axis operation key, value input key, selection/function key, motors on key, emergency stop |
| External memory interface | USB port |
| Cable length | 8m. Option: extension (total) 15, 25m |
| Protection rating | IP65 |
| External dimensions (mm) | 170(W)×300(D)×65(T) |
| Weight | 0.96 kg (exclude cable) |

## CFD controller (for MZ series only)

### Compact cabinet

Just 369 mm wide. Can be stored inside robot riser.

### Wide-variety of applications supported

- Supports addition of one axis (slide axis, jig axis, etc.)
- Vision sensor NV-Pro
- Force sensor applications
- Built in software PLC
- Protective box for controller (dust proof, drip proof)

• **Basic specifications for controller**

| Item | Specifications |
|---|---|
| Controllable axes | 6 |
| Maximum controllable axes | 7 |
| External dimensions (mm) | 369(W)×490(D)×186(H) |
| Protection rating | IP20 |
| Power supply | Single phase/3Φ AC200-230V |
| Ambient temperature/humidity | 0 to 40 °C (50/60Hz) 20 to 85% (without condensation) |

• **Controller options**

| Item | Specifications |
|---|---|
| Additional axes | One is possible. |
| External memory | USB memory (1 GB) |
| Fieldbus | DeviceNet, PROFIBUS, EtherCAT, CC-Link and others. EtherCAT and CC-Link are only compatible as a slave. |
| Digital I/O | Maximum 64/64 point |
| Vision sensor | NV-Pro |
| Robot monitoring function | SIL3, PL e |

# CFDL controller (for EZ series only)

## Just 369 mm wide
## Multi-controller CFDL can be placed within the support structure.

- It can control up to 4 robot unit.
- Emergency stop and operation switches are provided for each 4 unit independently. (they can work in synchronous manner too.)

**• Basic specifications for controller**

| Item | Specifications | | |
|---|---|---|---|
| Model | CFDL1-0000 | CFDL2-0000 | CFDL4-0000 |
| Maximum controllable units | 1 | 2 | 4 |
| Maximum controllable axes | 6 axes/unit | | |
| Teach pendant | Option | | |
| Operating switches | Emergency stop and mode switching | | |
| Relay unit | 8 point | | |
| External dimensions (mm) | 369(W)×490(D)×186(H) | | 369(W)×560(D)×263(H) |
| Protection rating | IP20 | | |
| Power supply | Single phase/3φ AC200-230V | | |
| Ambient temperature/humidity | 0 to 40 °C (50/60Hz) 20 to 85% (without condensation) | | |

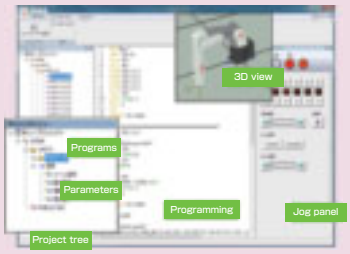
**• Controller options**

| Item | Specifications | | |
|---|---|---|---|
| Model | CFDL1-0000 | CFDL2-0000 | CFDL4-0000 |
| External memory | USB memory (1 GB) | | |
| PCI option | 2 slots | 1 slot | |
| Fieldbus | DeviceNet, PROFIBUS,EtherCAT, CC-Link and others. EtherCAT and CC-Link are only compatible as a slave. | | |
| Digital I/O | Maximum 64/64 point | | |
| Software PLC | Yes | | |
| Vision sensor | Yes | | |
| Brake release | Brake release mode | | |
| Overseas compliance | UL, CE, KCs | | |

# Easy to use functional configuration

## Programming tool PC-based Teaching Tool — Standard

- Software for robot setting, programming and debugging.
  - – User can manage setting and program files based on the project.
  - – Exclusive editor for robot language
  - – User can easily manage and input signal, position and parameter.
  - – User can control the robot without teach pendant.




## User task functions — Standard

- Possible to program processes in parallel with robot operations

**Application example**

– 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

## Graphic User Interface Flex-GUI — Options

- Customizable teach pendant screen menu.
- Works as a system operation console which can control peripheral devices.

## Supports a variety of fieldbuses — Options

- DeviceNet (master and slave)
- EtherNet/IP (master and slave)
- EtherCAT (slave)
- CC-Link (master and slave)
- PROFIBUS (master and slave)
- PROFINET (slave)



## Offline programming tools Robot simulator — Options

- Excellent for initial studies for installing robots

Can be used as an operation instruction tool

**FD on Desk Regular (option)**
– Offline programming
– Working envelope & layout considerations
– Cycle time simulation
– PLC programming editing

**FD on Desk Pro (option)**
– Create programs from CAD
– Multiple control units supported

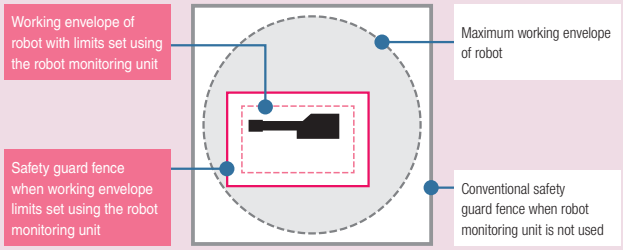
*The MZ series now has FD on Desk Light (CFD controller only) as standard equipment. (Functions are the same as FD on Desk Regular)

## Robot Monitoring Unit RMU — Options

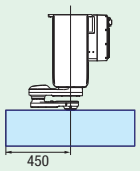
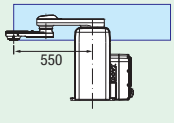
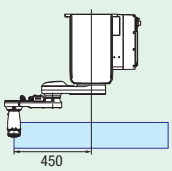
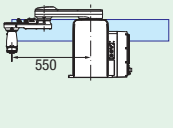
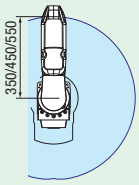
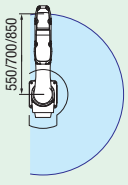
- Safety control unit monitors robot conditions (position and speed)
- Possible to reduce costs and space

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

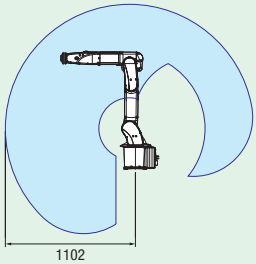
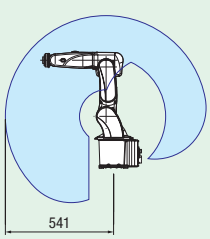
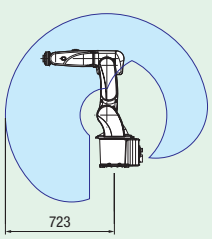
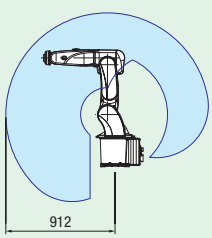


# LIST OF SPECIFICATIONS

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | |  | |  | |  | |
| Model | | | | EZ03V4-02 | EZ03F4-02 | EZ02V6-02 | EZ02F6-02 | ES06 | ES12 |
| No. of axes | | | | 4 | | 6 | | 4 | |
| Max. working envelope | Arm | J1 | Swivel 1 | 250/150mm[*3] | | 250/150mm[*4] | | ±170° | |
| | | J2 | Horizontal | ±170° | | | | ±145° | ±145°[*5] |
| | | J7 | Swivel 2 | – | | | | – | |
| | | J3 | Vertical | ±180° | ±145° | ±180° | ±145° | 200/340mm | 350/450mm |
| | Wrist | J4 | Rotation 2 | ±360° | | ±190° | | ±360° | |
| | | J5 | Bend | – | | ±110° | | – | |
| | | J6 | Rotation 1 | – | | ±360° | | – | |
| Max. speed | Arm | J1 | Swivel 1 | 1,400/1,200mm/s[*3] | | 1,200/1,000mm/s[*4] | | 400°/s | 420°/s[*5] |
| | | J2 | Horizontal | 450°/s | | | | 670°/s | 450°/s |
| | | J7 | Swivel 2 | – | | | | – | |
| | | J3 | Vertical | 720°/s | | | | 2,400mm/s | 2,800mm/s |
| | Wrist | J4[*1] | Rotation 2 | 2,400°/s | | 1,200°/s | | 2,500°/s | 2,400°/s |
| | | J5 | Bend | – | | 720°/s | | – | |
| | | J6 | Rotation 1 | – | | 720°/s | | – | |
| Maximum load | | Wrist | | 3 kg (2 kg rated) | | 2kg (1 kg rated) | | 6 kg (3 kg rated) | 12 kg (3 kg rated) |
| | | Load capacity on forearm | | – | | – | | – | |
| | | Upper of J3 | | – | | – | | – | |
| Allowable static load torque for wrist | J4 | Rotation 2 | | – | | – | | – | |
| | J5 | Bend | | – | | – | | – | |
| | J6 | Rotation 1 | | – | | – | | – | |
| Allowable moment of inertia for wrist | J4 | Rotation 2 | | 0.05kg·m$^2$ | | 0.03kg·m$^2$ (0.013kg·m$^2$ rated) | | 0.12kg·m$^2$ | 0.3kg·m$^2$ |
| | J5 | Bend | | – | | 0.03kg·m$^2$ (0.013kg·m$^2$ rated) | | – | |
| | J6 | Rotation 1 | | – | | 0.01kg·m² (0.001kg·m² rated) | | – | |
| Maximum reach | | | | 450mm | 550mm | 450mm | 550mm | 350/450/550mm | 550/700/850mm |
| Position repeatability | | | | ±0.014mm | | ±0.02mm | | ±0.012mm | ±0.015mm |
| Ambient temperature[*2]/humidity | | | | 0 to 45°C/20 to 85%RH (without condensation) | | | | 0 to 40°C/45 to 85%RH (without condensation) | |
| Vibration | | | | 0.5 G or less (4.9m/s$^2$) | | | | | |
| Installation | | | | Inverted mount | Floor mount | Inverted mount | Floor mount | | |
| Dust proof, Drip proof | | | | IP20 (OP : IP65) | | | | | |
| Weight | | | | 42kg | 43kg | 44kg | 45kg | 36/37kg | 65/67/69kg |
| Power consumption | | | | 0.4KVA | | | | | |
| 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: 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.
*4: There are two types of maximum operating envelopes: 250 mm and 150 mm. The 250 mm has a maximum speed of 1,200 mm/s. The 150 mm has a maximum speed of 1,000 mm/s. *5: Different in 850 mm arm.

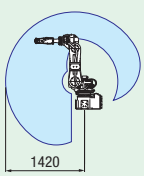
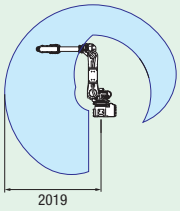
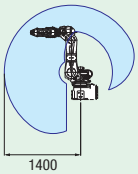
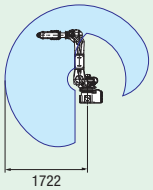
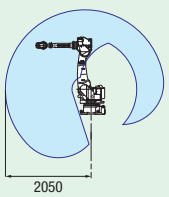


| MZ03EL | MZ04(MZ04D) | MZ04E(MZ04DE) | MZ07(MZ07P) | MZ07L(MZ07LP) |
|---|---|---|---|---|
| 6 | | | 6(5) | |
| ±170° | | | | |
| –135～+80° | –145～+90° | | –135～+80° | |
| – | | | | |
| –155～+270° | –125～+280° | | –136～+270° | –139～+270° |
| ±190° | | | | |
| ±120° | | | | |
| ±360° | | | | |
| 300°/s | 480°/s | 200°/s | 450°/s | 300°/s |
| 230°/s | 460°/s | 150°/s | 380°/s | 280°/s |
| – | | | | |
| 360°/s | 520°/s | 190°/s | 520°/s | 360°/s |
| 550°/s | 560°/s | | 550°/s | |
| 550°/s | 560°/s | | 550°/s | |
| 1,000°/s | 900°/s | | 1000°/s | |
| 3.5kg | 4kg | | 7kg | |
| – | | | | |
| – | | | | |
| 6.0N·m | 8.86N·m | | 16.6N·m | |
| 6.0N·m | 8.86N·m | | 16.6N·m | |
| 2.9N·m | 4.9N·m | | 9.4N·m | |
| 0.12kg·m$^2$ | 0.2kg·m$^2$ | | 0.47kg·m$^2$ | |
| 0.12kg·m$^2$ | 0.2kg·m$^2$ | | 0.47kg·m$^2$ | |
| 0.03kg·m$^2$ | 0.07kg·m$^2$ | | 0.15kg·m$^2$ | |
| 1,102mm | 541mm | | 723mm | 912mm |
| ±0.03mm | ±0.02mm | | ±0.02mm | ±0.03mm |
| 0 to 45℃/20 to 85% RH (without condensation) | | | | |
| 0.5 G or less | | | | |
| Floor, wall, inverted, tilted mount | | Floor, inverted mount | Floor, wall, inverted, tilted mount | |
| IP67 equivalent | IP40 equivalent*6 | | IP67 equivalent | |
| 39kg | 26kg | 25kg | 30kg | 32kg |
| 0.4KVA | | | | |
|   |   | |   |   |

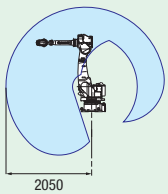
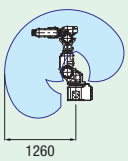
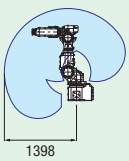
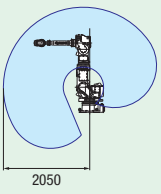
*6: MZ04 and MZ04E have IP40 equivalence. MZ04D and MZ04DE have IP67 (dust proof and water proof) equivalence.

1[N·m]=1/9.8[kgf·m]

# LIST OF SPECIFICATIONS

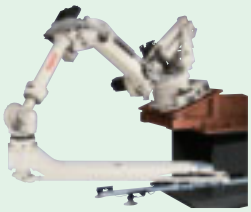
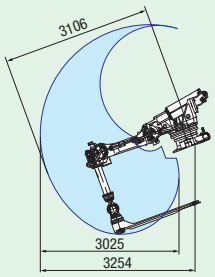
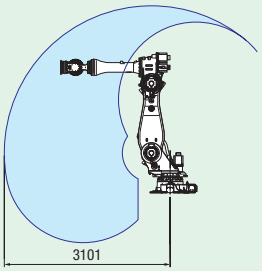
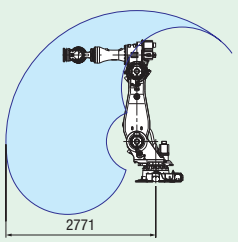
| Model | | | | MC10S | MC10L | MC12S | MC20 | MC35 | MC50 |
|---|---|---|---|---|---|---|---|---|---|
| | | | |  |  |  |  |  | |
| No. of axes | | | | 6 | | | | | |
| Max. working envelope | Arm | J1 | Swivel 1 | ±180° | | | | ±165° | |
| | | J2 | Horizontal | −145～+60° | | | | −135～+80° | |
| | | J7 | Swivel 2 | – | | | | | |
| | | J3 | Vertical | −148～+242° | −163～+242° | −154～+242° | −163～+242° | −146～+260° | |
| | Wrist | J4 | Rotation 2 | ±190° | ±180° | | | ±360° | |
| | | J5 | Bend | ±120° | ±139° | | | ±125° | |
| | | J6 | Rotation 1 | ±360° | | | | ±450° | |
| Max. speed | Arm | J1 | Swivel 1 | 200°/s | 150°/s | 200°/s | 170°/s | 185°/s | 180°/s |
| | | J2 | Horizontal | 170°/s | | | | 180°/s | |
| | | J7 | Swivel 2 | – | | | | | |
| | | J3 | Vertical | 170°/s | | | | 190°/s | 180°/s |
| | Wrist | J4 | Rotation 2 | 400°/s | 360°/s | 370°/s | 360°/s | 305°/s | 255°/s |
| | | J5 | Bend | 400°/s | 360°/s | 370°/s | 360°/s | 305°/s | 255°/s |
| | | J6 | Rotation 1 | 800°/s | 600°/s | 700°/s | 600°/s | 420°/s | 370°/s |
| Maximum load | | Wrist | | 10kg | | 12kg | 20 (max. 22) kg | 35kg | 50kg |
| | | Load capacity on forearm | | – | | | | 15kg | |
| | | Upper of J3 | | – | | | | | |
| Allowable static load torque for wrist | | J4 | Rotation 2 | 22N·m | 24.5N·m | 28N·m | 49N·m | 160N·m | 210N·m |
| | | J5 | Bend | 22N·m | 24.5N·m | 28N·m | 49N·m | 160N·m | 210N·m |
| | | J6 | Rotation 1 | 11N·m | 12N·m | 13N·m | 23.5N·m | 90N·m | 130N·m |
| Allowable moment of inertia for wrist | | J4 | Rotation 2 | 0.7kg·m$^2$ | 1.6kg·m$^2$ | 1.3kg·m$^2$ | 1.6kg·m$^2$ | 16kg·m$^2$ | 30kg·m$^2$ |
| | | J5 | Bend | 0.7kg·m$^2$ | 1.6kg·m$^2$ | 1.3kg·m$^2$ | 1.6kg·m$^2$ | 16kg·m$^2$ | 30kg·m$^2$ |
| | | J6 | Rotation 1 | 0.2kg·m$^2$ | 0.7kg·m$^2$ | 0.47kg·m$^2$ | 0.8kg·m$^2$ | 5kg·m$^2$ | 12kg·m$^2$ |
| Maximum reach | | | | 1,420mm | 2,019mm | 1,400mm | 1,722mm | 2,050mm | |
| Position repeatability | | | | ±0.06mm | | | | ±0.07mm | |
| Ambient temperature*1/humidity | | | | 0 to 45˚C/20 to 85% RH (without condensation) | | | | | |
| Vibration | | | | 0.5 G or less | | | | 0.5 G or less | |
| Installation | | | | Floor, inverted mount | | | | Floor mount (OP: inverted, wall, tilted) | |
| Dust proof, Drip proof | | | | Wrist has IP67 and main body has IP65 equivalent | IP65 equivalent | | | Wrist: IP67 equivalent, main body: IP54 equivalent (OP: IP65/67 equivalent) | |
| Weight | | | | 198Kg | 225Kg | 210Kg | 220Kg | 640Kg | |
| Power consumption | | | | 1.5KVA | 1.7KVA | | | 5.0KVA | |
| Working envelope | | | |  |  |  |  |  | |

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

| MC70 | MR20 | MR20L | MR35 | MR50 |
|---|---|---|---|---|
| 6 | 7 | | | |
| ±165° | ±180° | | ±165° | |
| −135～+80° | −120～+55° | | | |
| – | ±180° | | ±190° | |
| −146～+260° | −166～+135° | | −146～+140° | |
| ±360° | ±180° | | ±360° | |
| ±125° | ±135° | ±139° | ±125° | |
| ±450° | ±360° | | ±450° | |
| 175°/s | 170°/s | | 180°/s | 175°/s |
| 145°/s | 170°/s | | 175°/s | 140°/s |
| – | 170°/s | | 130°/s | |
| 165°/s | 170°/s | | 180°/s | 165°/s |
| 235°/s | 250°/s | 360°/s | 305°/s | 255°/s |
| 235°/s | 250°/s | 360°/s | 305°/s | 255°/s |
| 350°/s | 300°/s | 600°/s | 420°/s | 370°/s |
| 70kg | 20 (max. 30) kg | 20kg | 35kg | 50kg |
| 15kg | — | | 15kg | |
| — | | | | |
| 300N·m | 80.8N·m | 49N·m | 160N·m | 210N·m |
| 300N·m | 80.8N·m | 49N·m | 160N·m | 210N·m |
| 150N·m | 44.1N·m | 23.5N·m | 90N·m | 130N·m |
| 30kg·m$^2$ | 6.0kg·m$^2$ | 1.6kg·m$^2$ | 16kg·m$^2$ | 30kg·m$^2$ |
| 30kg·m$^2$ | 6.0kg·m$^2$ | 1.6kg·m$^2$ | 16kg·m$^2$ | 30kg·m$^2$ |
| 12kg·m$^2$ | 2.3kg·m$^2$ | 0.8kg·m$^2$ | 5kg·m$^2$ | 12kg·m$^2$ |
| 2,050mm | 1,260mm | 1,398mm | 2,050mm | |
| ±0.07mm | ±0.06mm | | ±0.07mm | |
| 0 to 45°C/20 to 85% RH (without condensation) | | | | |
| 0.5 G or less | | | | |
| Floor mount (OP: inverted, wall, tilted) | Floor, inverted mount | | Floor mount (OP: inverted, wall, tilted) | |
| Wrist: IP67 equivalent, main body: IP54 equivalent (OP: IP65/67 equivalent) | IP65 equivalent | | IP67 equivalent | |
| 640Kg | 230Kg | | 745Kg | |
| 5.0KVA | 1.0KVA | | 4.1KVA | |
|  2050 |  1260 |  1398 |  2050 | |

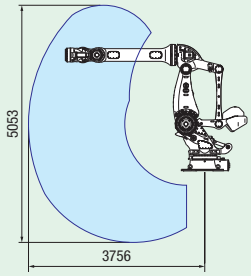
1[N·m]=1/9.8[kgf·m]

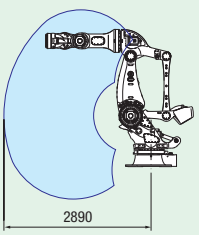
# LIST OF SPECIFICATIONS

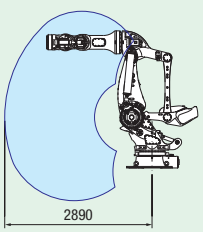
| | | | | | | |
|---|---|---|---|---|---|---|
| | | | |  |  | |
| Model | | | | ST210TP-01 | MC280L | MC350 |
| No. of axes | | | | 7 | 6 | |
| Max. working envelope | Arm | J1 | Swivel 1 | ±180° | ±180° | |
| | | J2 | Horizontal | –35～+120° | −100～+40° | |
| | | J7 | Swivel 2 | ±65° | — | |
| | | J3 | Vertical | –96～+210° | −147～+130° | −180～+130° |
| | Wrist | J4 | Rotation 2 | ±360° | ±360° | |
| | | J5 | Bend | ±120° | ±125° | |
| | | J6 | Rotation 1 | ±360° | ±360° | |
| Max. speed | Arm | J1 | Swivel 1 | 110°/s | 105°/s | |
| | | J2 | Horizontal | 90°/s | 105°/s | 95°/s |
| | | J7 | Swivel 2 | (Press arm link) 120°/s | — | |
| | | J3 | Vertical | 95°/s | 95°/s | |
| | Wrist | J4 | Rotation 2 | 130°/s | 120°/s | 110°/s |
| | | J5 | Bend | 130°/s | 120°/s | 110°/s |
| | | J6 | Rotation 1 | 250°/s | 200°/s | 180°/s |
| Maximum load | | | Wrist | 80kg | 280kg | 350kg |
| | | | Load capacity on forearm | 30kg | 25kg | 50kg |
| | | | Upper of J3 | — | — | |
| Allowable static load torque for wrist | | J4 | Rotation 2 | — | 1,921N·m | 2,750N·m |
| | | J5 | Bend | — | 1,921N·m | 2,750N·m |
| | | J6 | Rotation 1 | — | 988N·m | 1,235N·m |
| Allowable moment of inertia for wrist | | J4 | Rotation 2 | J7 axis rotation 80 kg·m$^2$ | 400kg·m$^2$ | |
| | | J5 | Bend | | 400kg·m$^2$ | |
| | | J6 | Rotation 1 | | 250kg·m$^2$ | |
| Maximum reach | | | | 3,106mm | 3,101mm | 2,771mm |
| Position repeatability | | | | ±0.3mm | ±0.2mm | |
| Ambient temperature*1/humidity | | | | 0 to 45℃/20 to 85% RH (without condensation) | | |
| Vibration | | | | 0.5 G or less | | |
| Installation | | | | Shelf mount (installed at 20° angle) | Floor mount | |
| Dust proof, Drip proof | | | | Wrist has IP67 and main body has IP54 equivalent | | |
| Weight | | | | 1,650kg | 1,660kg | 1,620kg |
| Power consumption | | | | 7.0KVA | 9.0KVA | 8 .6KVA |
| Working envelope | | | |  |  |  |

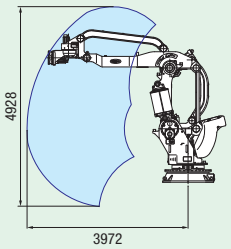
*1: Using at 1,000 m or lower sea level. Ambient temperature has limitations when allowable altitude is exceeded.
*2: The initial settings are ±210°. When passing cable through the hollow part of the 6th axis, use a range of ±210°.
When a cable is not passed through, the operating envelope can be extended to a maximum of ±360°, depending on the usage conditions.

| MC400L | MC600 | MC700 | SC700 |
|---|---|---|---|
| 6 | | | |
| ±180° | | | ±160° |
| −105～+60° | | | −85～+45° |
| – | | | – |
| −130～+30° | −140～+30° | | −90～+40° |
| ±210° | | | −10～+90° |
| ±120° | | | ±125° |
| ±360°*2 | | | ±10° |
| 90°/s | | 80°/s | 45°/s |
| 90°/s | | 80°/s | 30°/s |
| – | | | – |
| 90°/s | | 80°/s | 30°/s |
| 110°/s | | 100°/s | 30°/s |
| 110°/s | | 100°/s | 50°/s |
| 180°/s | | 160°/s | 30°/s |
| 400kg | 600kg | 700kg | 700kg |
| 50kg | Max. 50 kg | Max. 25 kg | — |
| – | | | — |
| 3,450N·m | | | 13,800N·m |
| 3,450N·m | | | 3,920N·m |
| 1,725N·m | | | 2,940N·m |
| 600kg·m$^2$ | | | 3,000kg·m$^2$ |
| 600kg·m$^2$ | | | 1,800kg·m$^2$ |
| 400kg·m$^2$ | | | 1,000kg·m$^2$ |
| 3,756mm | 2,890mm | | 3,972mm |
| ±0.3mm | | | ±0.5mm |
| 0 to 45℃/20 to 85% RH (without condensation) | | | |
| 0.5 G or less | | | |
| Floor mount | | | |
| IP54 equivalent | | | Wrist has IP67 and main body has IP54 equivalent |
| 3,050kg | 2,850kg | 3,300kg | 7,000kg |
| 19.3KVA | 19.3KVA | 19.3KVA | 7.0KVA |



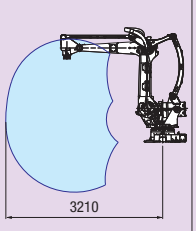
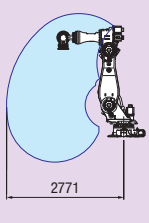
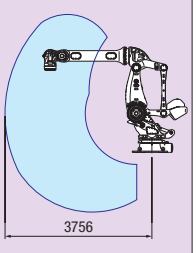




1 [N·m] = 1/9.8 [kgf·m]

# LIST OF SPECIFICATIONS





| Model | | | | LP130–01 | LP130F | LP180–01 | LP210 | 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° | –95～+41° | | –100～+40° | –105～+60° |
| | | J7 | Swivel 2 | – | | | | — | |
| | | J3 | Vertical | –117～+17° | –116～+17° | –117～+17° | | –180～+35° | –130～+30° |
| | Wrist | J4 | Rotation 2 | ±360° | | | | ±360°[*2] | — |
| | | J5 | Bend | – | | | | ±125°[*2] | ±120° |
| | | J6 | Rotation 1 | – | | | | ±360° | Max :±360° Value of initial settings:±210°[*3] |
| Max. speed | Arm | J1 | Swivel 1 | 130°/s | 145°/s | 115°/s | 105°/s | 105°/s | 90°/s |
| | | J2 | Horizontal | 115°/s | | 100°/s | | 95°/s | 90°/s |
| | | J7 | Swivel 2 | – | | | | — | |
| | | J3 | Vertical | 115°/s | | 105°/s | 100°/s | 95°/s | 90°/s |
| | Wrist | J4 | Rotation 2 | 400°/s | 535°/s | 360°/s | 300°/s | 110°/s | — |
| | | J5 | Bend | – | | | | 110°/s | 110°/s |
| | | J6 | Rotation 1 | – | | | | 180°/s | 180°/s |
| Maximum load | | Wrist | | 130kg | | 180kg | 210kg | 470kg | 500kg |
| | | Load capacity on forearm | | 25kg | | | | 30kg | Max. 25 kg |
| | | Upper of J3 | | — | | | | — | |
| 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$^2$ | | 69kg·m$^2$ | 100kg·m$^2$ | 400kg·m$^2$ | — |
| | | J5 | Bend | — | | | | 400kg·m$^2$ | 600kg·m$^2$ |
| | | J6 | Rotation 1 | — | | | | 250kg·m$^2$ | 400kg·m$^2$ |
| Maximum reach | | | | 3,210mm | | | | 2,771mm | 3,756mm |
| Position repeatability | | | | ±0.3mm | | ±0.4mm | | ±0.2mm | ±0.3mm |
| Ambient temperature[*1]/humidity | | | | 0 to 45˚C/20 to 85% RH (without condensation) | | | | | |
| Vibration | | | | 0.5 G or less | | | | | |
| Installation | | | | Floor mount | | | | | |
| Dust proof, Drip proof | | | | IP54 equivalent | | | | Wrist has IP67 and main body has IP54 equivalent | IP54 equivalent |
| Weight | | | | 1,150kg | | | | 1,620kg | 3,000kg |
| Power consumption | | | | 6.2KVA | | | | 8.6KVA | 9.7KVA |
| Working envelope | | | |  | | | |  |  |

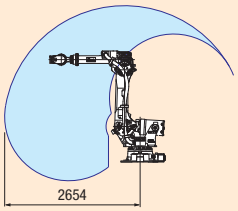
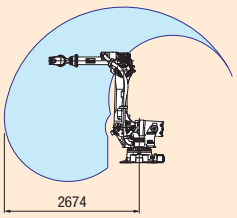
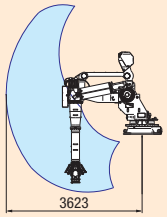


*1: Using at 1,000 m or lower sea level. Ambient temperature has limitations when allowable altitude is exceeded.

1 [N·m] = 1/9.8 [kgf·m]

*2: 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.

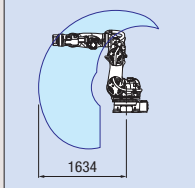
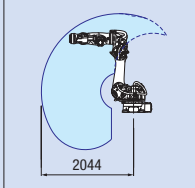
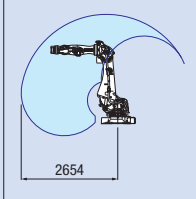
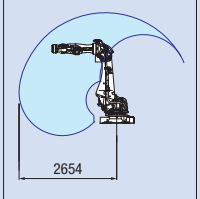
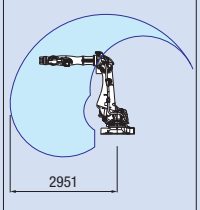
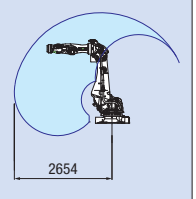
*3: The initial settings are ±210°. When passing cable through the hollow part of the 6th axis, use a range of ±210°. When a cable is not passed through, the operating envelope can be extended to a maximum of ±360°, depending on the usage conditions.

| Model | | | | ST133CF | ST166CF | ST210CF | SC400LC |
|---|---|---|---|---|---|---|---|
| No. of axes | | | | 6 | | | |
| Max. working envelope | Arm | J1 | Swivel 1 | ±165° | | | ±150° |
| | | J2 | Horizontal | −80〜+60° | | | −25〜 +105° |
| | | J7 | Swivel 2 | − | | | |
| | | J3 | Vertical | −137〜+150° | | | −25〜+120° |
| | Wrist | J4 | Rotation 2 | ±360° | | | ±300° |
| | | J5 | Bend | ±135° | | ±130° | ±120° |
| | | J6 | Rotation 1 | ±360° | | | |
| Max. speed | Arm | J1 | Swivel 1 | 130°/s | 110°/s | 100°/s | 80°/s |
| | | J2 | Horizontal | 130°/s | 110°/s | 90°/s | 68°/s |
| | | J7 | Swivel 2 | − | | | |
| | | J3 | Vertical | 130°/s | 110°/s | 95°/s | 80°/s |
| | Wrist | J4 | Rotation 2 | 230°/s | 170°/s | 130°/s | 90°/s |
| | | J5 | Bend | 230°/s | 170°/s | 130°/s | 90°/s |
| | | J6 | Rotation 1 | 305°/s | 260°/s | 200°/s | 145°/s |
| Maximum load | | Wrist | | 133kg | 166kg | 210kg | 400kg |
| | | Load capacity on forearm | | 70kg | | Max. 70 kg | 10kg |
| | | Upper of J3 | | — | | | 30kg |
| Allowable static load torque for wrist | | J4 | Rotation 2 | 745N·m | 951N·m | 1,337N·m | 1,960N·m |
| | | J5 | Bend | 745N·m | 951N·m | 1,337N·m | 1,960N·m |
| | | J6 | Rotation 1 | 411N·m | 490N·m | 720N·m | 980N·m |
| Allowable moment of inertia for wrist | | J4 | Rotation 2 | 60.9kg·m$^2$ | 88.9kg·m$^2$ | 141.1kg·m$^2$ | 200kg·m$^2$ |
| | | J5 | Bend | 60.9kg·m$^2$ | 88.9kg·m$^2$ | 141.1kg·m$^2$ | 200kg·m$^2$ |
| | | J6 | Rotation 1 | 30.2kg·m$^2$ | 45.0kg·m$^2$ | 79.0kg·m$^2$ | 147kg·m$^2$ |
| Maximum reach | | | | 2,654mm | | 2,674mm | 3,623mm |
| Position repeatability | | | | ±0.2mm | | ±0.3mm | ±0.5mm |
| Ambient temperature*1/humidity | | | | 10 to 45℃/20 to 85% RH (without condensation) | | | |
| Vibration | | | | 0.5 G or less | | | |
| Installation | | | | Floor mount | | | Shelf mount |
| Dust proof, Drip proof | | | | — | | | |
| Weight | | | | 1,120kg | | 1,160kg | 3,800kg |
| Power consumption | | | | 4.2KVA | | | 6.7KVA |
| Clean rating*2 | | | | Class 6 | | | |
| Working envelope | | | |   | |   |   |

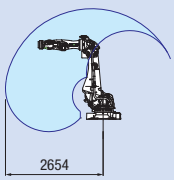
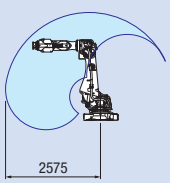
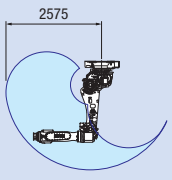
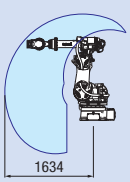
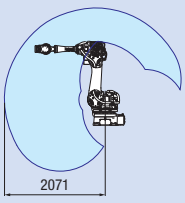
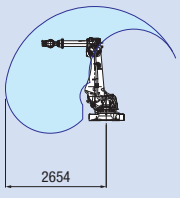
*1: Using at 1,000 m or lower sea level. Ambient temperature has limitations when allowable altitude is exceeded.
*2: Clean rating complies with ISO 14644−1

1[N·m]=1/9.8[kgf·m]

# LIST OF SPECIFICATIONS

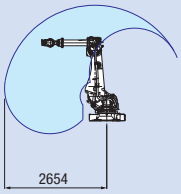
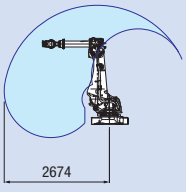
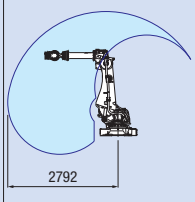
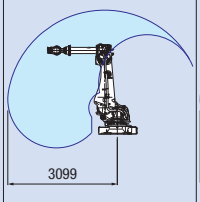
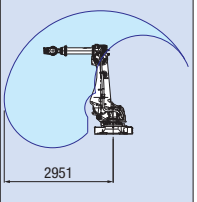
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | |  |  |  |  |  |  |
| Model | | | | SRA100HS | SRA100HB | SRA100H | SRA133H | SRA133HL | SRA166H |
| No. of axes | | | | 6 | | | | | |
| Max. working envelope | Arm | J1 | Swivel 1 | ±180° | | | | | |
| | | J2 | Horizontal | −120～+60° | | −80～+60° | | | |
| | | J7 | Swivel 2 | — | | | | | |
| | | J3 | Vertical | −125～+90° | −151～+90° | −146.5～+150° | | −133.4～+150° | −146.5～+150° |
| | Wrist | J4 | Rotation 2 | ±210° | | | | | |
| | | J5 | Bend | ±125° | | | | | |
| | | J6 | Rotation 1 | ±210° | | | | | |
| Max. speed | Arm | J1 | Swivel 1 | 136°/s | | 125°/s | 120°/s | 115°/s | 120°/s |
| | | J2 | Horizontal | 115°/s | | | 110°/s | 105°/s | 110°/s |
| | | J7 | Swivel 2 | — | | | | | |
| | | J3 | Vertical | 160°/s | | 121°/s | 118°/s | 113°/s | 115°/s |
| | Wrist | J4 | Rotation 2 | 210°/s | 225°/s | 210°/s | | | 175°/s |
| | | J5 | Bend | 175°/s | | | | | 171°/s |
| | | J6 | Rotation 1 | 310°/s | 315°/s | 310°/s | | | 280°/s |
| Maximum load | | Wrist | | 100kg | | | 133kg | | 166kg |
| | | Load capacity on forearm | | 20kg | | | | | |
| | | Upper of J3 | | — | | | | | |
| Allowable static load torque for wrist | | J4 | Rotation 2 | 830N・m | 650N・m | 830N・m | | | 960N・m |
| | | J5 | Bend | 830N・m | 650N・m | 830N・m | | | 960N・m |
| | | J6 | Rotation 1 | 441N・m | 315N・m | 441N・m | | | 520N・m |
| Allowable moment of inertia for wrist | | J4 | Rotation 2 | 85kg・$m^2$ | | | | | 100kg・$m^2$ |
| | | J5 | Bend | 85kg・$m^2$ | | | | | 100kg・$m^2$ |
| | | J6 | Rotation 1 | 45kg・$m^2$ | | | | | 50kg・$m^2$ |
| Maximum reach | | | | 1,634mm | 2,044mm | 2,654mm | | 2,951mm | 2.654mm |
| Position repeatability | | | | ±0.1mm | | | | ±0.15mm | ±0.1mm |
| Ambient temperature*1/humidity | | | | 0 to 45˚C/20 to 85% RH (without condensation) | | | | | |
| Vibration | | | | 0.5 G or less | | | | | |
| Installation | | | | Floor mount | | | | | |
| Dust proof, Drip proof | | | | IP54 equivalent | | | | | |
| Weight | | | | 690kg | 750kg | 1,040kg | | 1,070kg | 1,100kg |
| Power consumption | | | | 7.0KVA | | | | | |
| Working envelope | | | |  |  |  |  |  |  |

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

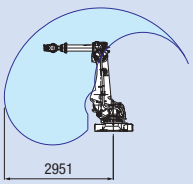
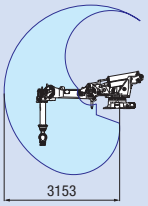
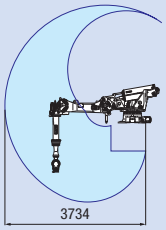
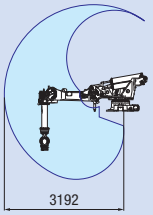
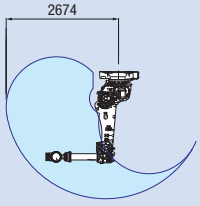
| | | | | | |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| **SRA210H** | **SRA220H** | **SRA220HV−01** | **SRA100J−01** | **SRA100B−01** | **SRA100−01(100−01A)** |
| 6 | | | 6 | 6 | 6 |
| ±180° | | ±165° | ±180° | ±180° | ±180° |
| −80～+60° | | | −120～+60° | −120～+60° | −80～+60° |
| — | | | — | — | — |
| −146.5～+150° | −154～+150° | | −125～+90° | −150～+180° | −146.5～+150° |
| ±210° | | | ±360° | ±360° | ±360° |
| ±125° | ±130° | | ±135° | ±135° | ±135° |
| ±210° | | | ±360° | ±360° | ±360° |
| 115°/s | | | 136°/s | 136°/s | 136°/s |
| 105°/s | | | 115°/s | 110°/s | 135°/s |
| — | | | — | — | — |
| 113°/s | | | 160°/s | 130°/s | 135°/s |
| 130°/s | | | 240°/s | 240°/s | 240°/s |
| 130°/s | | | 233°/s | 233°/s | 233°/s |
| 205°/s | | | 351°/s | 351°/s | 351°/s |
| 210kg | 220kg | | 100kg | 100kg | 100kg |
| 20kg | 20 (max. 45) kg | | 25 (max. 45) kg | 25 (max. 45) kg | 45 (max. 90) kg |
| — | | | — | — | — |
| 1337N·m | | | 580N·m | 580N·m | 580N·m |
| 1337N·m | | | 580N·m | 580N·m | 580N·m |
| 720N·m | | | 290N·m | 290N·m | 290N·m |
| 200kg·$m^2$ | 141.1kg·$m^2$ | | 45kg·$m^2$ | 45kg·$m^2$ | 60kg·$m^2$ |
| 200kg·$m^2$ | 141.1kg·$m^2$ | | 45kg·$m^2$ | 45kg·$m^2$ | 60kg·$m^2$ |
| 155kg·$m^2$ | 79.0kg·$m^2$ | | 22.7kg·$m^2$ | 22.7kg·$m^2$ | 30kg·$m^2$ |
| 2,654mm | 2,575mm | | 1,634mm | 2,071mm | 2,654mm |
| ±0.15mm | | | ±0.1mm | ±0.1mm | ±0.1mm |
| 0 to 45℃/20 to 85% RH (without condensation) | | | | | |
| 0.5 G or less | | | | | |
| Floor mount | | Inverted mount | Floor mount | | |
| IP54 equivalent | | | Wrist has IP67 and main body has IP54 equivalent | | |
| 1,100kg | | | 670kg | 690kg | 960kg |
| 7.0KVA | | | | | |
|  |  |  |  |  |  |

1[N·m]=1/9.8[kgf·m]

# LIST OF SPECIFICATIONS

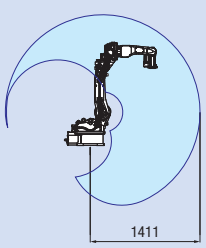
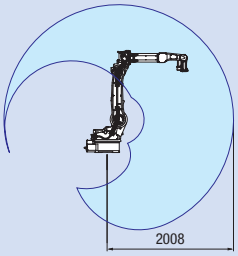
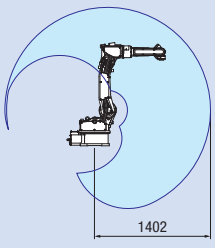
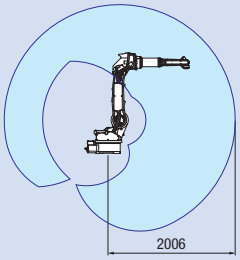
| Model | | | | SRA166-01(166-01A) | SRA210-01(210-01A) | SRA240-01 | SRA250-01 | SRA120EL-01 | SRA133L-01 |
|---|---|---|---|---|---|---|---|---|---|
| No. of axes | | | | 6 | | | | 6 | |
| Max. working envelope | Arm | J1 | Swivel 1 | ±180° | | | | ±180° | |
| | | J2 | Horizontal | –80～+60° | | | | –80～+60° | |
| | | J7 | Swivel 2 | – | | | | – | |
| | | J3 | Vertical | –146.5～+150° | | | –140～+150° | –127.7～+150° | –133.4～+150° |
| | Wrist | J4 | Rotation 2 | ±360(±210)° | | ±360° | | ±360° | |
| | | J5 | Bend | ±135(±120)° | ±130(±120)° | ±130° | | ±135° | |
| | | J6 | Rotation 1 | ±360(±205)° | | ±360° | | ±360° | |
| Max. speed | Arm | J1 | Swivel 1 | 125°/s | 115°/s | 105°/s | 100°/s | 115°/s | 125°/s |
| | | J2 | Horizontal | 115°/s | 105°/s | 90°/s | | 105°/s | 115°/s |
| | | J7 | Swivel 2 | – | | | | – | |
| | | J3 | Vertical | 121°/s | 113°/s | 100°/s | 95°/s | 113°/s | 121°/s |
| | Wrist | J4 | Rotation 2 | 180°/s | 140°/s | 130°/s | 125°/s | 140°/s | |
| | | J5 | Bend | 173°/s | 133°/s | 125°/s | | 173°/s | |
| | | J6 | Rotation 1 | 260°/s | 200°/s | 195°/s | 190°/s | 260°/s | |
| Maximum load | | Wrist | | 166kg | 210kg | 240kg | 250kg | 120kg | 133kg |
| | | Load capacity on forearm | | 45 (max. 90) kg | | 20 (max. 45) kg | | 45 (max. 90) kg | |
| | | Upper of J3 | | – | | | | – | |
| Allowable static load torque for wrist | | J4 | Rotation 2 | 951N·m | 1,337N·m | | | 687N·m | 800N·m |
| | | J5 | Bend | 951N·m | 1,337N·m | | | 687N·m | 800N·m |
| | | J6 | Rotation 1 | 490N·m | 720N·m | | | 353N·m | 400N·m |
| Allowable moment of inertia for wrist | | J4 | Rotation 2 | 88.9kg·m$^2$ | 141.1kg·m$^2$ | | 225.4kg·m$^2$ | 60kg·m$^2$ | 76kg·m$^2$ |
| | | J5 | Bend | 88.9kg·m$^2$ | 141.1kg·m$^2$ | | 225.4kg·m$^2$ | 60kg·m$^2$ | 76kg·m$^2$ |
| | | J6 | Rotation 1 | 45kg·m$^2$ | 79.0kg·m$^2$ | | 196kg·m$^2$ | 30kg·m$^2$ | 38kg·m$^2$ |
| Maximum reach | | | | 2,654mm | 2,674mm | | 2,792mm | 3,099mm | 2,951mm |
| Position repeatability | | | | ±0.15mm | | ±0.2mm | | ±0.15mm | |
| Ambient temperature*1/humidity | | | | 0 to 45°C/20 to 85% RH (without condensation) | | | | | |
| Vibration | | | | 0.5 G or less | | | | | |
| Installation | | | | Floor mount | | | | | |
| Dust proof, Drip proof | | | | Wrist has IP67 and main body has IP54 equivalent | | | | | |
| Weight | | | | 960/1,060kg | 990/1,090kg | 990kg | 1,030kg | 985kg | 980kg |
| Power consumption | | | | 7.0KVA | | | | | |
| Working envelope | | | |  |  | |  |  |  |

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

|  |  | | |  |
|---|---|---|---|---|
| SRA166L–01(166L–01A) | SRA166T–01(166T–01A) | SRA166TL–01(166TL–01A) | SRA210T–01(210T–01A) | SRA210V |
| 6 | 6 | | | 6 |
| ±180° | ±180° | | | ±165° |
| –80～+60° | –65～+120° | | | –80～+60° |
| – | – | | | – |
| –133.4～+150° | –106～+210° | –90～+210° | –106～+210° | –146.5～+150° |
| ±360° | ±360(±210)° | ±360° | ±360(±210)° | ±360° |
| ±135° | ±135(±120)° | ±135° | ±130(±120)° | ±130° |
| ±360° | ±360(±205)° | | | ±360° |
| 115°/s | 110°/s | 105°/s | 100°/s | 115°/s |
| 105°/s | 110°/s | 90°/s | | 105°/s |
| – | – | | | – |
| 113°/s | 115°/s | | 100°/s | 113°/s |
| 140°/s | 180°/s | 140°/s | 140°/s | 140°/s |
| 173°/s | 173°/s | | 133°/s | 133°/s |
| 260°/s | 260°/s | | 200°/s | 200°/s |
| 166kg | 166kg | | 210kg | 210kg |
| 45 (max. 90) kg | 45 (max. 90) kg | | | 45 (max. 90) kg |
| – | – | | | – |
| 951N·m | 951N·m | | 1,337N·m | 1,337N·m |
| 951N·m | 951N·m | | 1,337N·m | 1,337N·m |
| 490N·m | 490N·m | | 720N·m | 720N·m |
| 88.9kg·$m^2$ | 88.9kg·$m^2$ | | 141.1kg·$m^2$ | 141.1kg·$m^2$ |
| 88.9kg·$m^2$ | 88.9kg·$m^2$ | | 141.1kg·$m^2$ | 141.1kg·$m^2$ |
| 45.0kg·$m^2$ | 45.0kg·$m^2$ | | 79.0kg·$m^2$ | 79.0kg·$m^2$ |
| 2,951mm | 3,153mm | 3,734mm | 3,192mm | 2,574mm |
| ±0.15mm | ±0.1mm | ±0.15mm | | ±0.15mm |
| 0 to 45°C/20 to 85% RH (without condensation) | | | | |
| 0.5 G or less | | | | |
| Floor mount | Shelf mount | | | Inverted mount |
| Wrist has IP67 and main body has IP54 equivalent | | | | |
| 980kg | 1,210(1,310)kg | 1,240kg | 1,250(1,350)kg | 990kg |
| 7.0KVA | 7.0KVA | 7.0KVA | | 7.0KVA |
|  |  |  |  |  |

1[N·m]=1/9.8[kgf·m]

# LIST OF SPECIFICATIONS

| Model | | | | NB04 | NB04L | NV06 | NV06L |
|---|---|---|---|---|---|---|---|
| | | | |  | |  | |
| No. of axes | | | | 6 | | | |
| Max. working envelope | Arm | J1 | Swivel 1 | ±170° | | ±170° | |
| | | J2 | Horizontal | −155°～+90° | −155°～+100° | −155°～+90° | −155°～+100° |
| | | J7 | Swivel 2 | — | | — | |
| | | J3 | Vertical | −170°～+180° | −170°～+190° | −170°～+190° | −170°～+260° |
| | Wrist | J4 | Rotation 2 | ±155° | | ±180° | |
| | | J5 | Bend | −45°～+225° | | −50°～+230° | |
| | | J6 | Rotation 1 | ±205° | | ±360° | |
| Max. speed | Arm | J1 | Swivel 1 | 210°/s | 195°/s | 210°/s | 195°/s |
| | | J2 | Horizontal | 210°/s | 200°/s | 210°/s | 200°/s |
| | | J7 | Swivel 2 | — | | | |
| | | J3 | Vertical | 210°/s | 200°/s | 210°/s | 200°/s |
| | Wrist | J4 | Rotation 2 | 420°/s | | | |
| | | J5 | Bend | 420°/s | | | |
| | | J6 | Rotation 1 | 600°/s | | 620°/s | |
| Maximum load | | Wrist | | 4kg | | 6kg | |
| | | Load capacity on forearm | | 10kg | 20kg | 10kg | 20kg |
| | | Upper of J3 | | — | | | |
| Allowable static load torque for wrist | | J4 | Rotation 2 | 10.1N·m | | 11.8N·m | |
| | | J5 | Bend | 10.1N·m | | 9.8N·m | |
| | | J6 | Rotation 1 | 2.94N·m | | 5.9N·m | |
| Allowable moment of inertia for wrist | | J4 | Rotation 2 | 0.38kg·m$^2$ | | 0.30kg·m$^2$ | |
| | | J5 | Bend | 0.38kg·m$^2$ | | 0.25kg·m$^2$ | |
| | | J6 | Rotation 1 | 0.03kg·m$^2$ | | 0.06kg·m$^2$ | |
| Maximum reach | | | | 1,411mm | 2,008mm | 1,402mm | 2,006mm |
| Position repeatability | | | | ±0.08mm | | | |
| Ambient temperature*1/humidity | | | | 0 to 45˚C/20 to 85% RH (without condensation) | | | |
| Vibration | | | | 0.5 G or less | | | |
| Installation | | | | Floor, inverted, wall mount | | | |
| Weight | | | | 154kg | 277kg | 144kg | 273kg |
| Power consumption | | | | 1.5KVA | 2.4KVA | 1.5KVA | 2.4KVA |
| Working envelope | | | |  |  |  |  |

*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]

# 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.

Offline programming

# 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

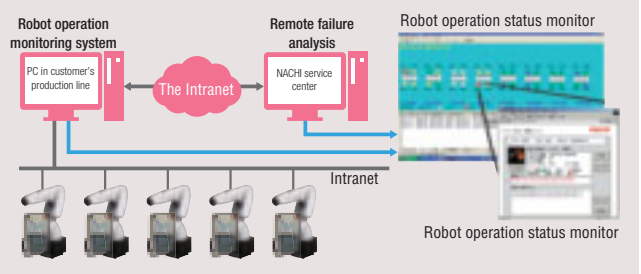
## Robot training course

NACHI provides a curriculum to train operators about robot operations, daily inspections, basic maintenance, and safety regulations.

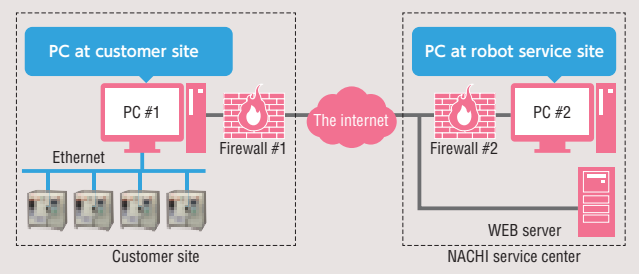
# Centralized robot monitoring system (AX controller only)

The centralized robot monitoring system offers monitoring of multiple robots connected by a network. The system supports preventative maintenance by collecting statistical data, operation history, and maintenance support data to keep the robots operating smoothly.

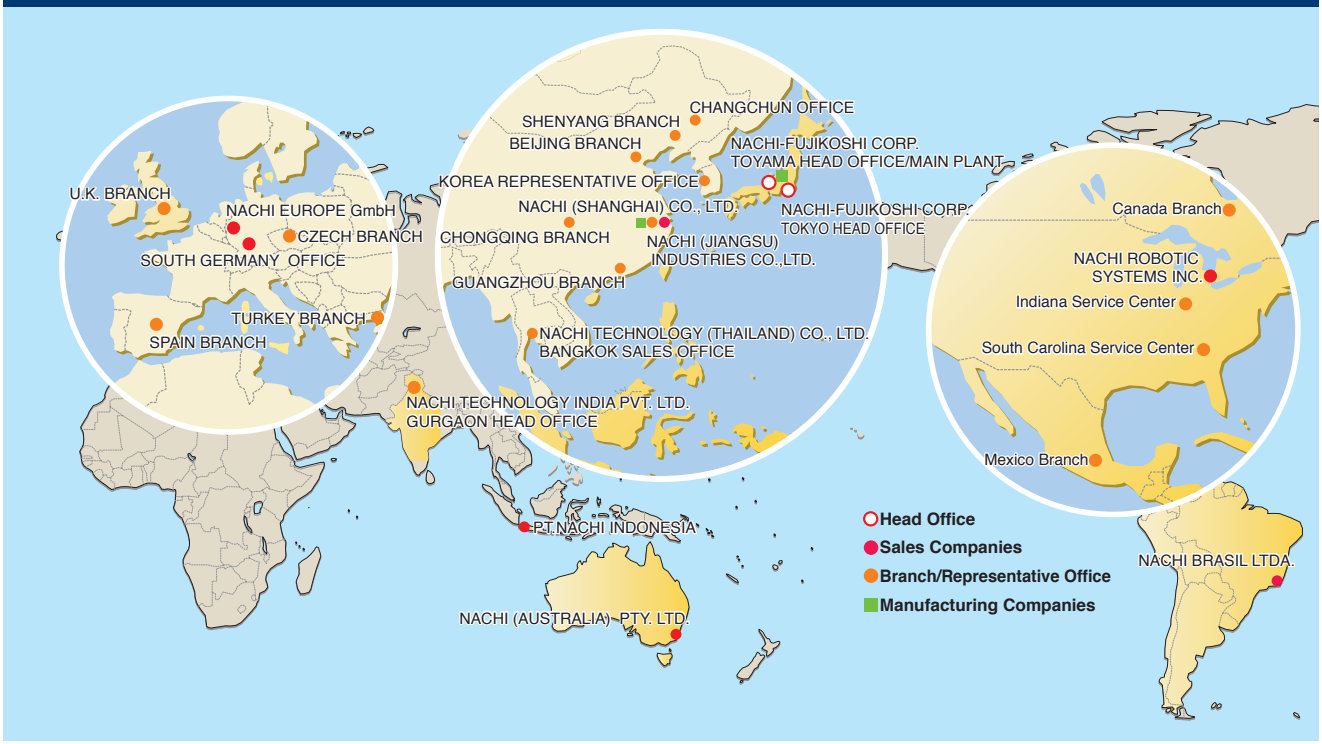
## Robot operation monitoring system




## Remote failure analysis



# World Service Network




## Overseas subsidiaries

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**South Carolina Service Center**
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Tel: +1-864-458-8000 Fax: +1-864-458-8256

**Canada Branch**
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Tel: +1-905-760-9542 Fax: +1-905-760-9477

**Mexico Branch**
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**NACHI BRASIL LTDA.**
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**CZECH BRANCH**
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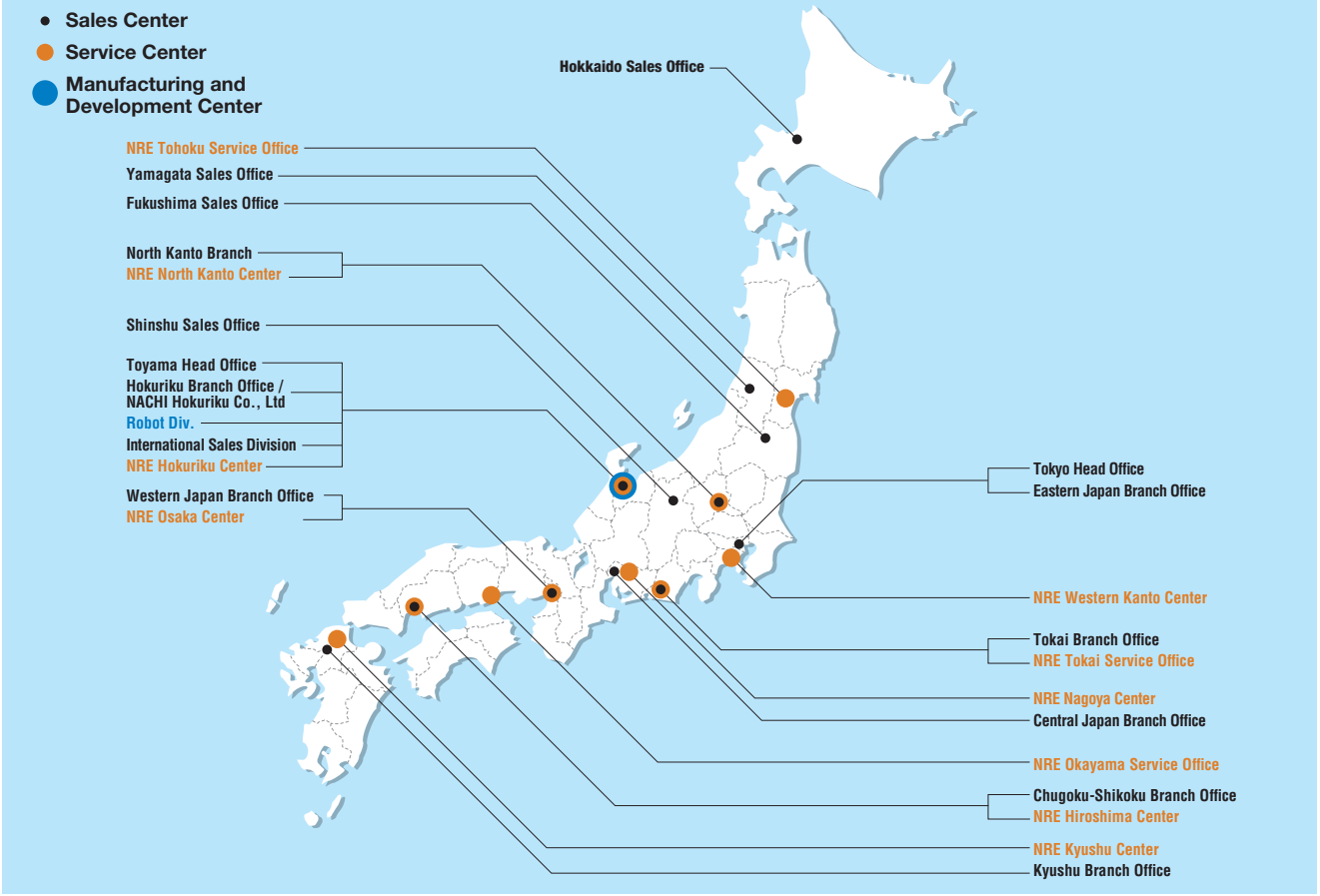
# Sales and Service Network in Japan

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# NACHI ROBOT CATALOG

NACHI-FUJIKOSHI CORP.

## 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.


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