

**NACHI**

**Robot**

Catalog 2012



*Superior speed makes all the difference in the world*

# Automotive Robot Series



# *Industrial Robot Series*

*Cutting edge solutions available world-wide*

## **Two mainstays of the manufacturing world**

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NACHI-FUJIKOSHI started building robots in 1968 by leveraging hydraulic control technologies and automation know-how it accumulated in the machine tool industry since its' inception in 1928. Since then, NACHI-FUJIKOSHI has been introducing products built upon its' technological excellence and innovative strength, that accurately respond to market demands. Nowadays, as an irreplaceable partner, NACHI-FUJIKOSHI is working on automotive production lines, with the power and vision to lead the industrial machinery field. NACHI-FUJIKOSHI has grown and advanced, earning the trust and respect of their customers around the world. The world comes to NACHI-FUJIKOSHI for all its' robotic needs, from compact, precise operations to lifting heavy loads for a full range of assembly and welding solutions. NACHI-FUJIKOSHI robots are evolving with customers processes, to meet the challenge of the world's future automation needs.

## [NACHI-FUJIKOSHI Robot Lineup: Automotive Industry]

These robots are used to build cars.  
They support welding and stamping processes.

### Ultra-fast spot welding robot **SRA 166/210**

Providing higher speeds with enhanced motion, SRA greatly improves productivity by shortening cycle times 30% (compared to its' predecessor) through improvements in three areas: weight reduction, higher rigidity and faster controls. The compact design allows for high density robot installations, plus maintenance is streamlined for easy inspection and repair. The lighter weight manipulator, using the latest in motor drive controls, reduces power consumption 15% over competing models, thereby reducing the robots' environmental impact.



### Options

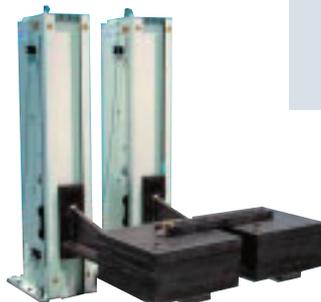


- **Full-circle rotary worktable for heavy loads**

Large capacity 4-ton model is available, 2-ton is standard.

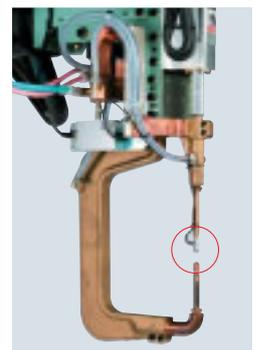
- **Lifter**

Up to 4 pillars can simultaneously lift long, heavy loads smoothly. Available sizes from 700mm to 1300mm maximum stroke.



- **Servo-gun with weld pressure feedback**

Improves weld quality and allows users to collect weld history data.



- **Offline teaching and automatic compensation system**

Ultra-small camera provides high-accuracy compensation. This makes precision welding possible.

# Automotive Robot Series



Arc welding robot NB04/04L

## NB04/04L NV06/06L

By housing the arc welding cable in the arm, this robot allows great freedom of design for arc welding cell layouts, and also provides for smooth and steady wire feed during operation.



Press handling robot  
**ST210TP**

Super rigid design with vibration damping control increases this robots' speed. Newly developed 7<sup>th</sup> axis arm for handling sheet metal between presses makes this robot ideal for press tending applications.

## Seam welding

- **Synchronized rotation of electrodes**

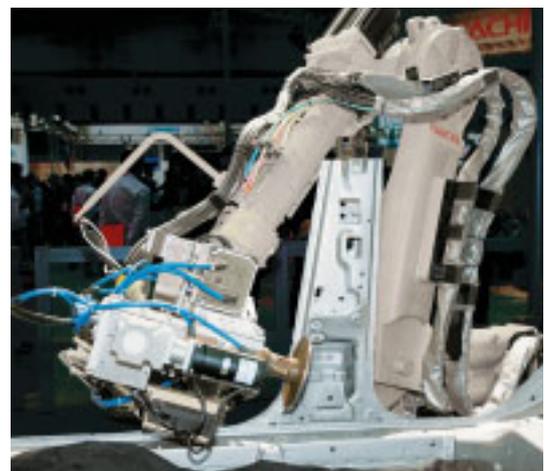
Rolling electrodes are synchronized plus the rotational speed of the rolling electrodes is matched to variations in the robot's speed. This makes it easy to synchronize robot movements and rolling electrode operations.

- **Electrode dress function**

Rotation of just the electrode ring can be done when the robot is stopped during electrode dress operations.

- **Change welding conditions according to speed**

A maximum of 5 different welds and speeds can be programmed during one continuous weld.



## [NACHI-FUJIKOSHI Robot Lineup: Industrial Machinery]

### ■ Handling robots

Our product lineup includes technological elements such as vision sensors, flexible hands and robots to satisfy the more demanding applications in material handling and assembly.



Smooth action 7-axis robot arm  
**MR20/20L**

7-axis configuration handles complex motions, the robot can work flexibly in locations that other robots cannot. This robots compact body really helps to fit into confined spaces in very restricted layouts.



Smooth action 7-axis robot arm  
**MR35/50**

7-axis construction allows robots to be used in places that are small or obstructed. IP67 rating is standard, so they can be used in various environments to improve productivity through robotic automation.

### FLEXhand

Multi-purpose gripper for handling robots

#### • Large and flexible programmable stroke

- Adjustable stroke grips a wide variety of work pieces
- Picks up irregularly shaped parts
- Force control for optimal grasping strength

#### • Useful measuring functions

- Automatically detects the size of work pieces
- Differentiates among work pieces

#### • Flexible grip strength control

- Grasps fragile, irregularly shaped parts

#### • Anti-drop function

- Safely maintains its' grasp at power off so parts are not dropped (optional brake)

#### • Low power consumption, environmentally friendly

- Low operation cost, no pneumatics
- Save even more power with optional brake (servo grip then apply the brake)



FH360-01 (3 fingers)



FH150F2-01 (2 fingers)



FH150F3-01 (3 fingers)

# Industrial Robot Series



VS05G

Compact, high-precision handling robot

## **VS05G/B/W/BW** **VS05LG/B/W/BW**

Top speed and accuracy in its class make it perfect for work that demands accuracy, such as precision assembly and machine loading.



MC12S



MC20

Powerful and compact multi-purpose robot

## **MC20/10L/12S** **MC35/50/70**

With top-of-class maneuverability, these robots have a full set of functions to accommodate a wide variety of applications.

Excellent protection against water ingress allows applications in machine tending operations.



MC35

### Vision sensor NV-Pro

- Vision sensor is built into the controller and is easy to use
- Automatic image exposure function improves robustness by a factor of four
- Improved hardware performance and faster I/O for quicker processing (60% faster for 2D and 80% faster for 3D compared to its' predecessor)

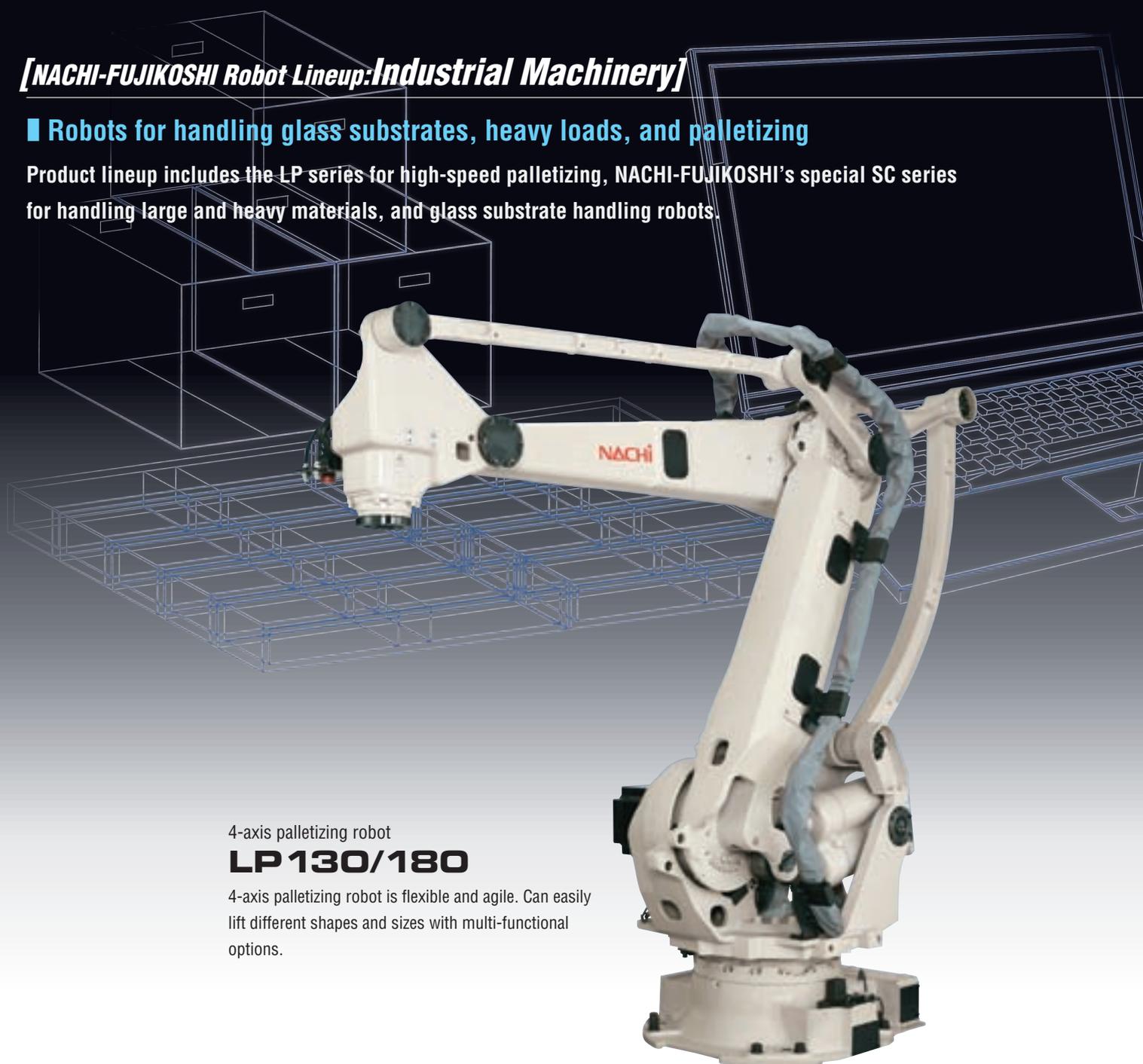


Visual sensor unit

## [NACHI-FUJIKOSHI Robot Lineup: Industrial Machinery]

### ■ Robots for handling glass substrates, heavy loads, and palletizing

Product lineup includes the LP series for high-speed palletizing, NACHI-FUJIKOSHI's special SC series for handling large and heavy materials, and glass substrate handling robots.



4-axis palletizing robot

### LP 130/180

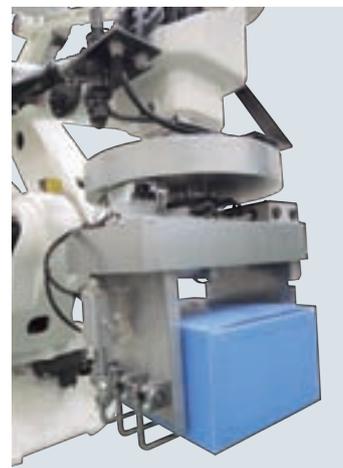
4-axis palletizing robot is flexible and agile. Can easily lift different shapes and sizes with multi-functional options.

#### Applications for palletizing robots

There is a wide range and variety of shapes, materials and handling methods necessary for palletizing applications. We provide a variety of standard grippers to meet the requirements for the various work pieces and pallet stacking conditions.



Work piece (object being moved): Sacks



Work piece (object being moved): Boxes

# Industrial Robot Series



SC400L

Robots for handling heavy loads

**SC300F**  
**SC400L**  
**SC500**  
**SC700**



SC500

SC700

Robots that can handle loads from 300 kg to 700 kg. In the past special equipment was needed to move auto bodies and engines, but now robots can handle large heavy objects.



SJ120C



SC400LC



ST133CF

Robots for moving glass substrates

**SJ80C**  
**SJ120C**  
**ST133CF/166CF/210CF**  
**SC400LC**

Clean-room robots handle 5th to 10th generation glass substrates. They are used in a variety of processes for glass substrate handling.

# FD Controller Software

Introducing the FD series intelligent robot controller with a Windows based OS.

Robots and any external axes are easily operated from the teach pendant. Vision sensors, force sensors, and control networks are also managed from the pendant.

The robot software includes many advanced functions and provides information on the robots operating condition and preventative maintenance.

## FD controller

### Fast processing

High speed CPU brings huge improvement to robot cycle times, line tracking and internal processing time performance.

### Teach Pendant is compact with high functionality

Lightweight and compact with re-tooled keys and improved ergonomics. Standard touch screen with HMI display makes operation simple and intuitive.

### Improved maintainability

We minimized controller components to maximize maintainability. Part replacement is quick and easy.

### Outstanding functionality

Excellent software functions carried over from AX controller. Easily adapts to a myriad of applications.

### Full safety function

Compliant with category 3 safety standards for USA and Europe.



### Controller basic specifications (Domestic specifications: FD11-0000)

Item	Specifications
Controlled axes	Simultaneous 6 axes (maximum 8 axes as option)
Servo motors	AC servo motors
Positioning	Absolute encoder
Programming system	Teaching, playback
Program number	9,999 programs
Memory capacity	256 MB (equivalent to 2,560,000 steps)
Memory format	Flash memory
External memory	USB memory supported (USB memory not included)
Operation panel	Mode switch (teaching/playback) Emergency stop button, operation setup button, start button, stop button
Safety functions	PLd (category 3 compliant)
Harness to robot controller	5 m (controller cable specifications)
User interface	User panels: On front, side, and inside door (Some panels may not be usable if hardware options are added)
Serial interface	RS232C 1ch
Construction	Fully enclosed cabinet
Protection	IP54 equivalent
Cooling method	Indirect cooling (heat exchanger)
Primary power supply specifications	200 VAC to 220 VAC $\pm 10\%$ (3 phase, 50/60 Hz) D type ground Breaker capacity 40 A, maximum current leakage 100 mA
Standby power <sup>*1</sup>	0.13 kVA (cooling fan on), 0.08 kVA (cooling fan off)
Ambient temperature	0 to 45°C (50/60 Hz)
Ambient humidity	20 to 85% (without condensation)
Exterior dimensions	W 580×D 542×H 590 (mm) (not including 60 mm height of feet)
Weight	Approx. 62 kg
Color	Munsell 10GY9/1

\*1: The standby power consumption is when in energy-saving mode. In energy-saving mode the brakes are locked, power to servo motors is turned off, and the robot holds its position. Refer to the basic specification sheet of a robot for the electric power requirements.

### Option specifications

Item	Specifications
Overseas compliance	North American specifications FD11-1101: ANSI/RIA compliant European specifications FD11-2101: CE mark compliant
Primary power voltage conversion (external dimensions of controller)	380/400/420/440/460/480 VAC $\pm 10\%$ (3 phase, 50/60 Hz) D type ground Breaker capacity 30 A, maximum current leakage 100 mA W 580×D 542×H 1,180 (mm) (not including 60 mm height of foot)
Harness to robot controller	Extension (total): 10 m, 15 m, 20 m, 25 m (controller cable specifications)
Additional axes	Gun axis, traverse axis, tool axis, hand axis
External memory	USB memory (1 GB)
Fieldbus	Device-Net, Profibus, FL-net, CC-Link and others supported Maximum 4 channels can be installed
Additional input/output signals	Input 32 points/output 32 points or input 64 points/output 64 points
Output signal relay contact specifications	32 or 64 points (I/O signals added and set to use)
Analog input/output	Input 2 channels, output 4 channels
Visual sensor function	Built-in visual sensor NV-Pro
Conveyor synchronizing function	Conveyor tracking control
Palletize function	Palletize and de-palletize support functions
Robot language	JIS SLIM language compliant
PLC function	Software PLC IEC 1131-3 compliant

### Teach pendant specifications

Item	Specifications
Display	5.7 inch color LCD (640×480 pixels, with backlight, 65,536 colors) Touch panel
Language specifications (Option)	Japanese English/Chinese/Korean
Enable SW	One-handed deadman switch, three positions, (left hand side)
Operation functions	Axis operation key, value input key, selection/function key, operation setup ON key, emergency stop button
External memory interface	USB port
Cable length (Option)	8 m (controller cable specifications) Extension (total): 15 m, 25 m (controller cable specifications)
Protection	IP65 equivalent
Exterior dimensions	W 170×H 300×D 65 (mm) (excluding hook and corner guard)
Weight	0.96 kg (excluding cable)

### Teach pendant display



Multi-window display assists easy operation

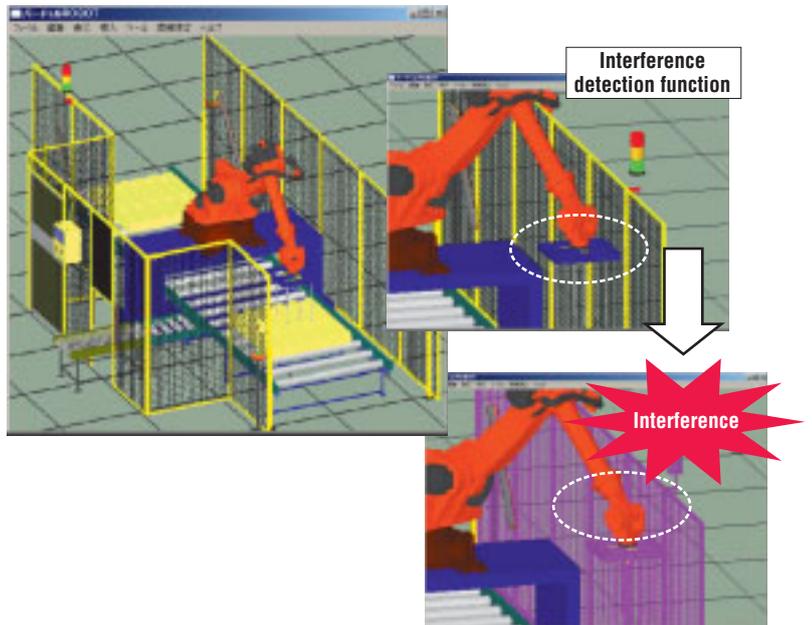
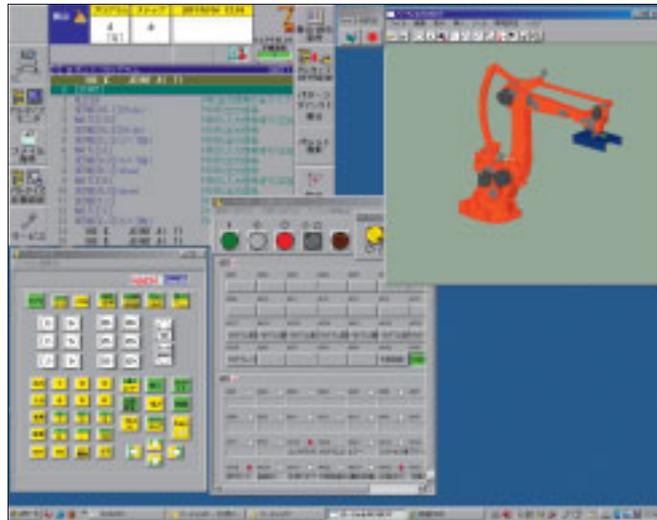


### FD on Desk

#### Puts the brains of the robot controller right on your office computer!

FD on Desk provides an actual portion of the robot control software in a format operable on your desktop PC. Use this software to:

- Analyze a robot program and check for interferences prior to installation
- Precisely determine the cycle time of a robot program
- Make and edit the ladder logic for the robot software PLC
- Learn the operation of Nachi robots
- Learn many other features and functions



# Products that support a wide range of applications

Our industrial robots are used to automate manufacturing processes in a wide range of applications. NACHI-FUJIKOSHI robots are hard at work in all aspects of manufacturing, such as automotive assembly lines where they weld auto bodies, move materials, de-burr, assemble and install parts.

## Spot welding

Spot welding guns are used by robots to weld sheet metal parts, manufacturing auto bodies, frames, and their sub-assemblies. The gun pressure is controlled by the robots to eliminate weld spatter, making high quality welds with high productivity while creating a clean and quiet work environment.



## 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 busily producing ships, structural frames, auto components, houses and bridge parts.



## Seam welding

New compact seam welders are available with our robots. The two electrode discs are speed controlled during welding to synchronize with the robot motion. It is now possible to weld the seams on large complex three dimensional work-pieces, such as automobile bodies. Continuous welds are stronger and welding cycle times are shorter.



## Press tending

Robots are used to load and unload presses. They can handle a range of parts for both tandem and transfer presses, relieving human workers from dangerous jobs while improving productivity moving parts at faster speeds.



## Handling and transport

Robots load work pieces into machining centers and transport parts between processes during machining operations. A single robot can tend multiple machines by synchronizing their cycle times. Selecting the right robot for the job will result in a minimized line footprint with excellent maintainability.



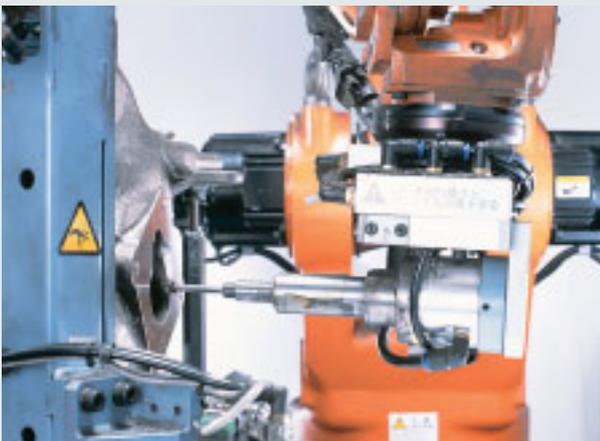
## Palletizing

Robots stack a variety of goods of many sizes and shapes in specified patterns on pallets. Robots help automate logistic operations in a wide range of operations with high throughput and flexibly programmable stacking patterns.



## Deburring and polishing

Robots deburr cast and machined parts, and grind weld beads. They maintain consistent quality, even in processes where variations of burr size and weld bead size are common.

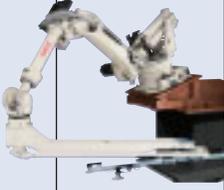


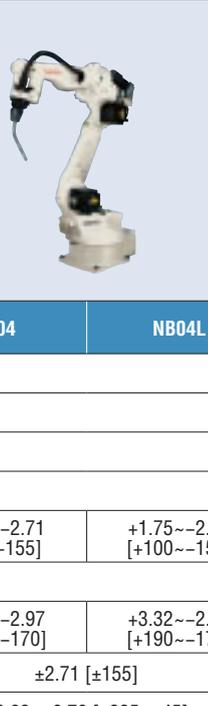
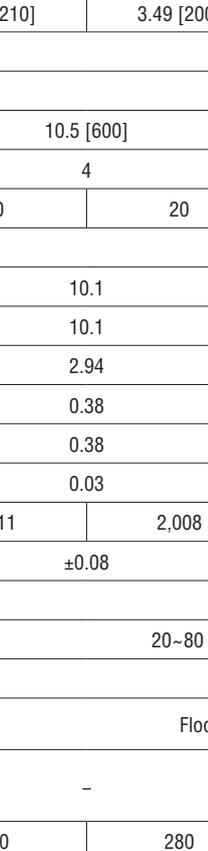
## Assembly

Two robots are installed side by side, operated by a single controller to work in tandem without interfering, for a high efficiency assembly operation. Force sensors are used to automate close tolerance assembly operations.



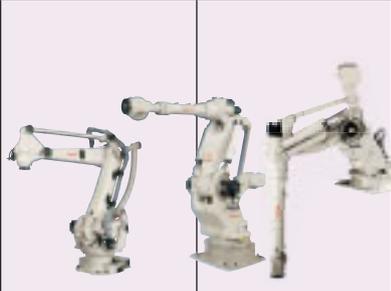
# Specifications

									
Model			SRA166-01	SRA210-01	SRA166-01A	SRA210-01A	ST100	ST70L	ST210TP
Construction			Vertical articulation						
No. of axes			6						7
Drive method			AC servo type						
Max. operating area (rad [°])	Arm	J1 Swivel 1	±3.14 [±180]				±2.62 [±150]		±3.14 [±180]
		J2 Back & forth	+1.05~-1.40 [+60~-80]		+1.05~-1.40 [+60~-80]		+1.05~-2.09 [+60~-120]		+2.09~-0.61 [+120~-35]
		J7 Swivel 2	-				-		±1.13[±65]
	Wrist	J3 Up & down	+2.62~-2.56 [+150~-146.5]		+2.62~-2.56 [+150~-146.5]		+1.57~-2.18 [+90~-125]	+1.57~-2.04 [+90~-117]	+3.67~-1.68 [+210~-96]
		J4 Rotation 2	±6.28 [±360]		±3.67 [±210]		±6.28 [±360]		±6.28 [±360]
		J5 Bend	±2.36 [±135]	±2.27 [±130]	±2.09 [±120]		±2.36 [±135]		±2.09 [±120]
	J6 Rotation 1	±6.28 [±360]		±3.58 [±205]		±6.28 [±360]		±6.28 [±360]	
Max. velocity (rad/s [°/s])	Arm	J1 Swivel 1	2.18 [125]	2.01 [115]	2.18 [125]	2.01 [115]	1.57 [90]		1.92 [110]
		J2 Back & forth	2.01 [115]	1.83 [105]	2.01 [115]	1.83 [105]	1.57 [90]		1.57 [90]
		J7 Swivel 2	-				-		2.09 [120]
	Wrist	J3 Up & down	2.11 [121]	1.97 [113]	2.11 [121]	1.97 [113]	1.57 [90]		1.66 [95]
		J4 Rotation 2	3.14 [180]	2.44 [140]	3.14 [180]	2.44 [140]	2.27 [130]		2.27 [130]
		J5 Bend	3.02 [173]	2.32 [133]	3.02 [173]	2.32 [133]	2.27 [130]		2.27 [130]
	J6 Rotation 1	4.54 [260]	3.49 [200]	4.54 [260]	3.49 [200]	3.14 [180]		4.36 [250]	
Loading weight (kg)	Wrist		166	210	166	210	100	70	80
	Load capacity arm 1		45		15		Max. 25		30
	J3 forearm		-				-		-
Allowable static load torque for wrist (N·m)	J4 Rotation 2	951	1,337	951	1,337	818	584	-	
	J5 Bend	951	1,337	951	1,337	818	584	-	
	J6 Rotation 1	490	720	490	720	411	294	-	
Allowable moment of inertia for wrist (kg·m <sup>2</sup> )	J4 Rotation 2	88.9	141.1	88.9	141.1	96.3	85.1	J7 axis rotation 80	
	J5 Bend	88.9	141.1	88.9	141.1	96.3	85.1		
	J6 Rotation 1	45.0	79.0	45.0	79.0	43.0	36.7		
Maximum reach (mm)			2,654	2,674	2,654	2,674	1,634	1,871	-
Repeatability (mm)			±0.1	±0.15	±0.1	±0.15	±0.3		±0.3
Ambient temperature (°C)			0~45						
Ambient humidity (% RH)			20~85 (without condensation)						
Vibration (G)			Max. 0.5						
Installation			Floor mount				Floor mounted		Scaffold mount (installed at 20° angle)
Environmental resistance			Wrist has IP67 equivalence				-		Wrist has IP67 and main body has IP54 equivalence
Weight (kg)			960	990	1,060	1,090	760	790	1,650

															
NB04		NB04L		NV06		NV06L		MR20		MR20L		MR35		MR50	
Virtual articulation															
6								7							
AC servo type															
±2.97 [±170]								±3.14 [±180]				±2.88 [±165]			
+1.57~-2.71 [+90~-155]		+1.75~-2.71 [+100~-155]		+1.57~-2.71 [+90~-155]		+1.75~-2.71 [+100~-155]		+0.96~-2.09 [+55~-120]							
-								±3.14 [±180]				±3.32 [±190]			
+3.14~-2.97 [+180~-170]		+3.32~-2.97 [+190~-170]		+3.32~-2.97 [+190~-170]		+3.58~-2.97 [+205~-170]		+2.35~-2.89 [+135~-166]				+2.44~-2.55 [+140~-146]			
±2.71 [±155]				±3.14 [±180]				±3.14 [±180]				±6.28 [±360]			
+3.93~-0.79 [±225~-45]				+4.01~-0.87 [±230~-50]				±2.35 [±135]		±2.42 [±139]		±2.18 [±125]			
±3.58 [±205]				±6.28 [±360]				±6.28 [±360]				±7.84 [±450]			
3.66 [210]		3.40 [195]		3.66 [210]		3.40 [195]		2.96 [170]				3.14 [180]		3.05 [175]	
3.66 [210]		3.49 [200]		3.66 [210]		3.49 [200]		2.96 [170]				3.05 [175]		2.44 [140]	
-								2.96 [170]				2.27 [130]			
3.66 [210]		3.49 [200]		3.66 [210]		3.49 [200]		2.96 [170]				3.14 [180]		2.88 [165]	
7.33 [420]								4.36 [250]		6.28 [360]		5.32 [305]		4.45 [255]	
7.33 [420]								4.36 [250]		6.28 [360]		5.32 [305]		4.45 [255]	
10.5 [600]				10.82 [620]				5.23 [300]		10.5 [600]		7.33 [420]		6.46 [370]	
4				6				20 (max. 30)		20		35		50	
10		20		10		20		-							
-								-				15			
10.1				11.8				80.8		49		160		210	
10.1				9.8				80.8		49		160		210	
2.94				5.9				44.1		23.5		90		130	
0.38				0.3				6.0		1.6		16		30	
0.38				0.25				6.0		1.6		16		30	
0.03				0.06				2.3		0.8		5		12	
1,411		2,008		1,402		2,006		1,260		1,398		2,050			
±0.08				±0.08				±0.06				±0.07			
0~45															
20~80 (without condensation)								20~85 (without condensation)							
Max. 0.5															
Floor (OP: ceiling, wall)								Floor, ceiling				Floor (OP: inverted, wall, inclined)			
-				wrist is IP54 equivalent				IP65 equivalent				IP67 equivalent			
170		280		160		280		230				745			

1[rad]=180/π[°], 1[N·m]=1/9.8[kgf·m]

# Specifications

															
Model			MC20	MC10L	MC12S	MC35	MC50	MC70	VS05G	VS05LG	LP130-01	LP180-01	SC300F	SC400L	
Construction			Vertical articulation												
No. of axes			6						4		6				
Drive method			AC servo type												
Max. operating area (rad [°])	Arm	J1 Swivel 1	±3.14 [±180]			±2.88 [±165]			±2.97 [±170]		±3.14 [±180]		±2.62 [±150]		
		J2 Back & forth	+1.05~-2.53 [+60~-145]			+1.39~-2.35 [+80~-135]			+1.75~-2.36 [+100~-135]		+0.71~-1.65 [+41~-95]		+1.31~-1.31 [+75~-75]	+1.83~-0.44 [+105~-25]	
		J3 Up & down	±4.22~-2.84 [+242~-163]	±4.22~-2.69 [+242~-154]	±4.54~-2.55 [+260~-146]		±4.10~-2.15 [+235~-123]	±4.35~-2.16 [+249~-124]	±0.30~-2.04 [+17~-117]		±0.52~-2.18 [+30~-125]	±2.09~-0.44 [+120~-25]			
	Wrist	J4 Rotation 2	±3.14 [±180]			±6.28 [±360]			±3.32 [±190]		±6.28 [±360]		±6.28 [±360]	±5.24 [±300]	
		J5 Bend	±2.42 [±139]			±2.18 [±125]			±2.09 [±120]		-		±2.18 [±125]	±2.09 [±120]	
		J6 Rotation 1	±6.28 [±360]			±7.84 [±450]			±6.28 [±360]		-		±6.28 [±360]	±6.28 [±360]	
Max. velocity (rad/s [°/s])	Arm	J1 Swivel 1	2.96 [170]	2.62 [150]	3.49 [200]	3.23 [185]	3.14 [180]	3.05 [175]	4.58 [262]	3.05 [175]	2.27 [130]	2.01 [115]	1.66 [95]	1.40 [80]	
		J2 Back & forth	2.96 [170]			3.14 [180]			2.53 [145]	4.19 [240]	3.49 [200]	2.01 [115]	1.75 [100]	1.48 [85]	1.40 [80]
		J3 Up & down	2.96 [170]			3.32 [190]	3.14 [180]	2.88 [165]	5.24 [300]	3.49 [200]	2.01 [115]	1.83 [105]	1.48 [85]	1.40 [80]	
	Wrist	J4 Rotation 2	6.28 [360]	6.46 [370]	5.32 [305]	4.45 [255]	4.10 [235]	5.24 [300]		6.98 [400]		6.28 [360]	1.92 [110]	1.57 [90]	
		J5 Bend	6.28 [360]	6.46 [370]	5.32 [305]	4.45 [255]	4.10 [235]	5.24 [300]		-		1.92 [110]	1.57 [90]		
		J6 Rotation 1	10.5 [600]	12.2 [700]	7.33 [420]	6.46 [370]	6.11 [350]	8.37 [480]		-		3.14 [180]	2.53 [145]		
Loading weight (kg)	Wrist	20 (max. 22)	10	12	35	50	70	5		130	180	300	400		
	Load capacity arm 1	-			-			-		25		20	10		
	J3 forearm	-			15			-		-		-	30		
Allowable static load torque for wrist (N·m)	J4 Rotation 2	49	24.5	28	160	210	300	11.9		-		1,666	1,960		
	J5 Bend	49	24.5	28	160	210	300	11.9		-		1,666	1,960		
	J6 Rotation 1	23.5	12	13	90	130	150	3.9		-		686	980		
Allowable moment of inertia for wrist (kg·m <sup>2</sup> )	J4 Rotation 2	1.6		1.3	16	30		0.295		50	69	96.3	200		
	J5 Bend	1.6		1.3	16	30		0.295		-		96.3	200		
	J6 Rotation 1	0.8	0.7	0.47	5	12		0.045		-		16.3	147		
Maximum reach (mm)			1,722	2,019	1,400	2,050			653	854	3,210		2,534	3,623	
Repeatability (mm)			±0.06			±0.07			±0.02 (Center of tool attachment surface)	±0.03 (Center of tool attachment surface)	±0.3	±0.4	±0.5		
Ambient temperature (°C)			0~45						0~40		0~45				
Ambient humidity (% RH)			20~85 (without condensation)						20~90 (without condensation)		20~85 (without condensation)				
Vibration (G)			Max. 0.5												
Installation			Floor, ceiling			Floor (OP: inverted, wall, inclined)			Floor, ceiling		Floor mounted		Shelf		
Environmental resistance			IP65 equivalent			Wrist: IP67 equivalence Main body: IP54 equivalence (OP: IP65/67 equivalence)			Standard (OP: dust/drip proof)		-				
Weight (kg)			220	225	210	640			35	36	1,150		1,800	3,800	
Clean rating **			-												

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

1[rad]=180/m[°], 1[N·m]=1/9.8[kgf·m]

					
SC500	SC700	ST133CF	ST166CF	ST210CF	SC400LC
Vertical articulation					
6					
AC servo type					
±2.62 [±150]	±2.79 [±160]	±2.88 [±165]		±2.62 [±150]	
+0.96~-1.31 [+55~-75]	+0.79~-1.48 [+45~-85]	+1.05~-1.40 [+60~-80]		+1.83~-0.44 [+105~-25]	
+0.52~-2.18 [+30~-125]	+0.70~-1.57 [+40~-90]	+2.62~-2.40 [+150~-137]		+2.09~-0.44 [+120~-25]	
±5.24 [±300]	+1.57~-0.17 [+90~-10]	±6.28 [±360]		±5.24 [±300]	
±2.09 [±120]	±2.18 [±125]	±2.36 [±135]	±2.27 [±130]	±2.09 [±120]	
±6.28 [±360]	±0.17 [±10]	±6.28 [±360]			
1.40 [80]	0.79 [45]	2.27 [130]	1.92 [110]	1.75 [100]	1.40 [80]
1.40 [80]	0.52 [30]	2.27 [130]	1.92 [110]	1.57 [90]	1.19 [68]
1.40 [80]	0.52 [30]	2.27 [130]	1.92 [110]	1.66 [95]	1.40 [80]
1.57 [90]	0.52 [30]	4.01 [230]	2.97 [170]	2.27 [130]	1.57 [90]
1.57 [90]	0.87 [50]	4.01 [230]	2.97 [170]	2.27 [130]	1.57 [90]
2.53 [145]	0.52 [30]	5.32 [305]	4.54 [260]	3.49 [200]	2.53 [145]
500	700	133	166	210	400
30	-	Max. 70			10
-	-	-			30
1,960	13,800	745	951	1,337	1,960
1,960	3,920	745	951	1,337	1,960
980	2,940	411	490	720	980
200	3,000	60.9	88.9	141.1	200
200	1,800	60.9	88.9	141.1	200
147	1,000	30.2	45.0	79.0	147
2,703	3,972	2,654		2,674	3,623
±0.5		±0.2		±0.3	±0.5
0~45		10~45			10~30
20~85 (without condensation)					
Max. 0.5					
Floor mounted		Floor mounted		Shelf	
-					
3,000	7,000	1,120		1,160	3,800
-		Class 6			

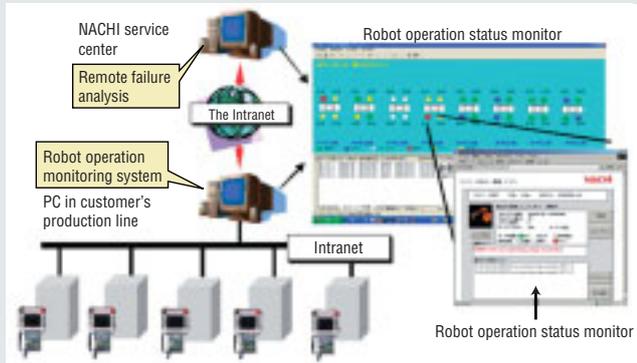
					
Model	SJ80C-18D SJ80C-24D SJ120C-28S SJ120C-28D				
No. of axes	4 3 4				
Drive method	AC servo type				
Max. operating area	X1(mm) Back & forth 1	3,670 (+1,905~-1,765)	4,480 (+2,250~-2,230)		
	X2(mm) Back & forth 2	3,670 (+1,905~-1,765)	-	4,480 (+2,250~-2,230)	
	$\theta$ (rad [°]) Rotating	+3.40~-2.53 [+195~-145]			
	Z(mm) Vertical	1,800	2,400	2,800	2,800
Max. velocity	X1(mm/s) Back & forth 1	3,000		3,600	
	X2(mm/s) Back & forth 2	3,000	-	3,600	
	$\theta$ (rad/s [°/s]) Rotating	3.14 [180]			
	Z(mm/s) Vertical	1,100	1,450	1,050	
Load capacity (kg)	X1 Back & forth 1	Max. 55		Max. 120	Max. 90
	X2 Back & forth 2	Max. 80		-	Max. 120
Allowable torque (N·m)	X1 Back & forth 1	410		780	
	X2 Back & forth 2	410	-	780	
Allowable moment of inertia (kg·m <sup>2</sup> )	X1 Back & forth 1	100		165	
	X2 Back & forth 2	100	-	165	
Repeatability (mm)	±0.3				
Ambient temperature (°C)	0~35				
Installation	Floor mounted				
Weight (kg)	1,100	1,150	1,680	1,880	
Clean rating	Class 4				

# Engineering Service Network

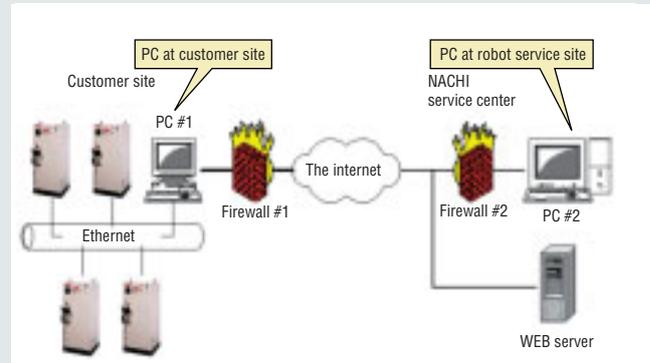
## Centralized robot monitoring system

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



## 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

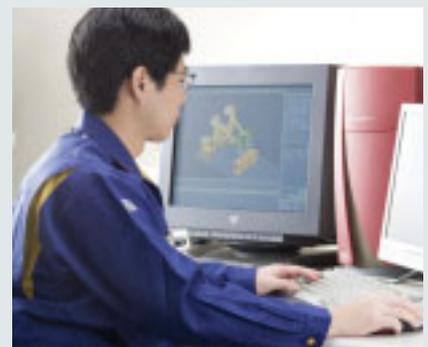


Teaching



Overhauls

replacement robots to keep your line operating during repairs.



Offline programming

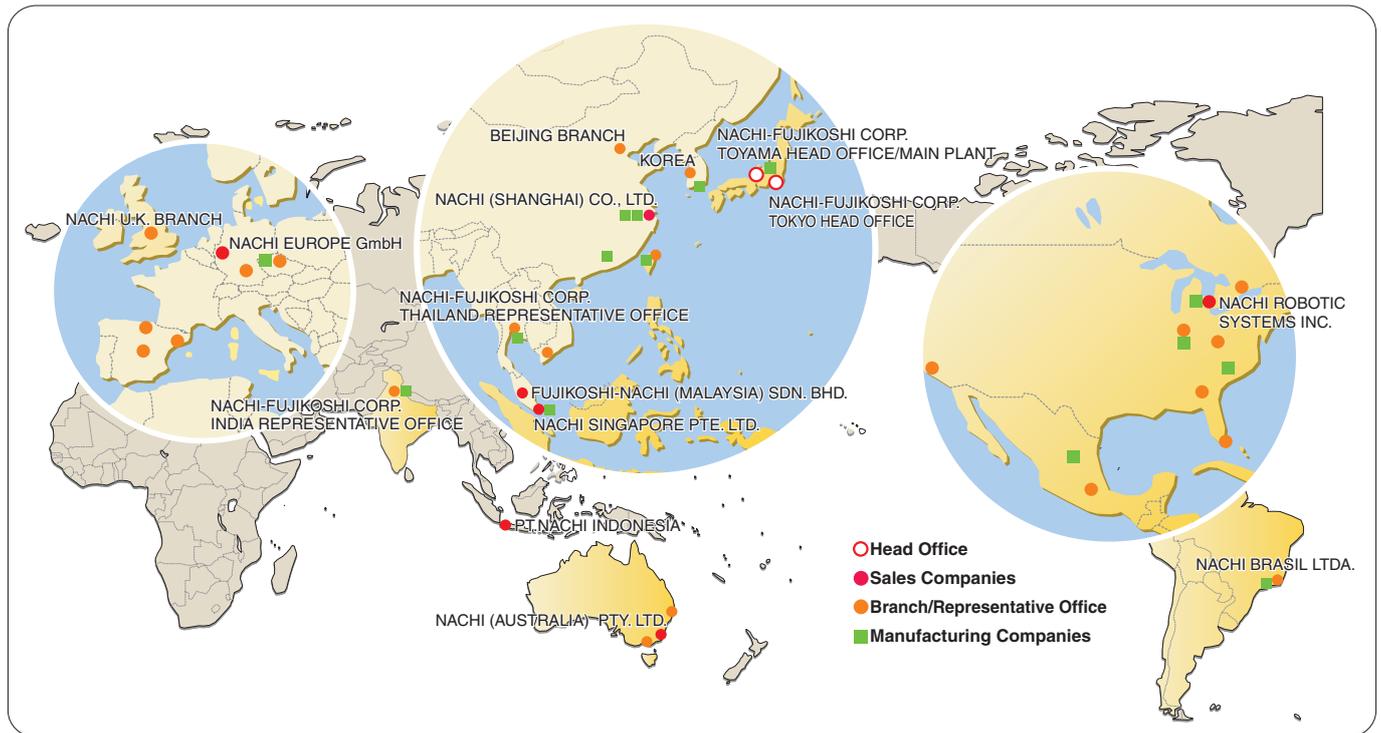
## Training

### Robot training course

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



# World Service Network



## Overseas subsidiaries

### AMERICA

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**TOKYO HEAD OFFICE** Shiodome Sumitomo Bldg. 17F, 1-9-2 Higashi-Shinbashi, Minato-ku, Tokyo 105-0021 Tel: 03-5568-5240 Fax: 03-5568-5236



### **Safety precautions**

- Before using the robots, 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 trouble or operating errors 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.
- 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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