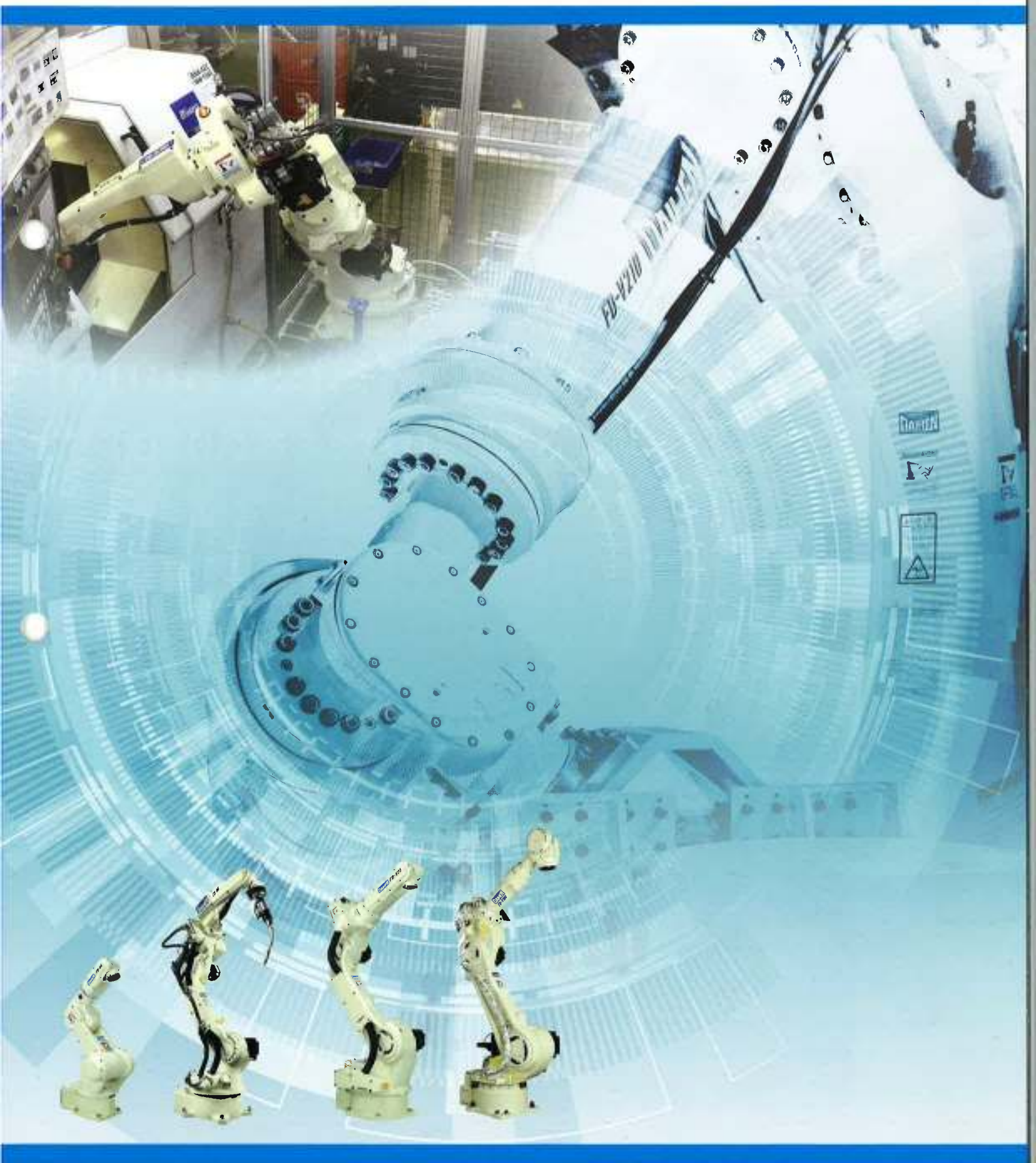
DAIHEN

Almega Friendly series II

Robot Product Catalog



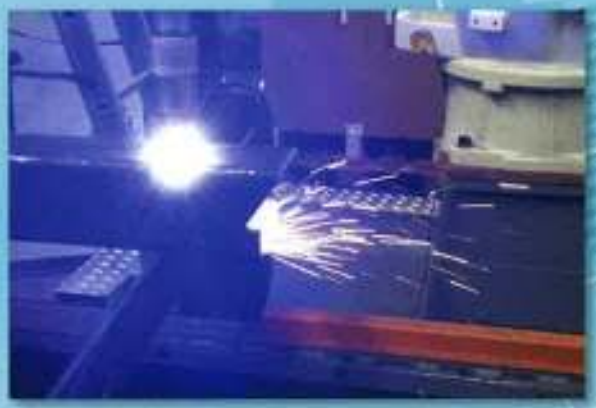
Arc welding robot

Arc welding (jig less)

Synchro-Feed

Laser cutting

DAIHEN Robot s
demands of fac



Plasma cutting

TIG welding

Spot welding

Handling robot

3D Vision Sensor

2D Vision Sensor

Palletizing system

Picking

Conveyor picking

olutions meet the
tory automation.

Sealing

Edge trimming

Transfer between presses

Fitting

FD19 CONTROLLER The limitless potential of extensive "connectivity"

Meet the demands from introduction to advanced automation.

Easily "connects" with peripheral equipment
Simple connection to the host system by built-in PLC

High-performance built-in software PLC

Graphical interface offers the functionality of popular PLCs.

OPC

"Connects" with IoT remote service

- Remote TP
- Remote Diagnosis
- Remote Software update

"Connecting" Variation
Compact body and high expandability

- Built-in amplifier and external 2-axis unit
- Supports high-capacity (7kW) motors

Increased number of "connectable" motors

Improved "connectivity" with welders

Greatly improved synchronization with welders

Simultaneous welding with multiple robots yields greatly improved quality.

Enhance your system by "connecting" commercial peripherals.

- 2D/3D Vision System
- Offline teaching system
- Laser oscillator

3D Vision System

Offline teaching system

Revolutionary Ease of Use

Clear and legible screen

Higher contrast with clearer details

FD11 FD19

Comfortable touch-typing

Embossed main keys

Lightweight with ergonomic grip

15% lighter + enhanced grip design = 66% less arm fatigue

TEACH PENDANT

Tablet-like operation

Menu icons

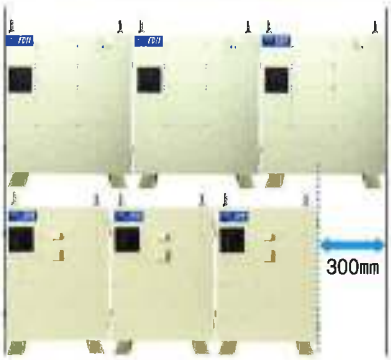
Scroll screen by swipe operation

Touch screen keypad for numeric entry

Enhanced Basic Performance

Small footprint

25% narrower than the previous model
Ideal for high-density installations



FD19 CONTROLLER

Complies with the latest international safety standards.

Supports multiple safety control standards for emergency stop: Cat. 4, PLe, and SIL3.

Optimized for high-precision laser & plasma processing

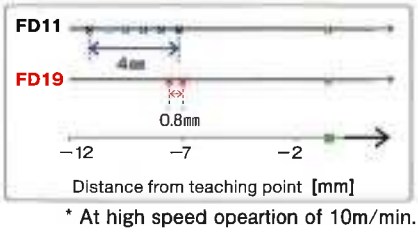
Six times faster synchronization with external devices for high-precision laser and plasma processing

Laser oscillator

I/O signal control

High-precision robot FD-A20

80% reduced! the variation in the position of signal output.



* At high speed opeartion of 10m/min.

Safer working environment

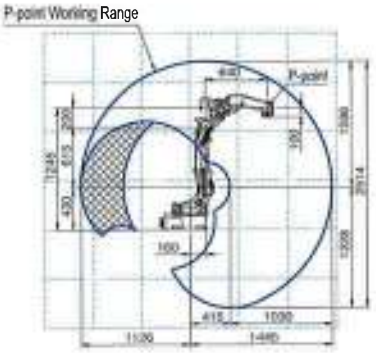
- RMU* constantly monitors robot movement.
- Restricts robot movement when worker is present in a shared area.

* Robot Monitoring Unit

Internal Torch Cable Type Ideal for Arc Welding

Internal cable type

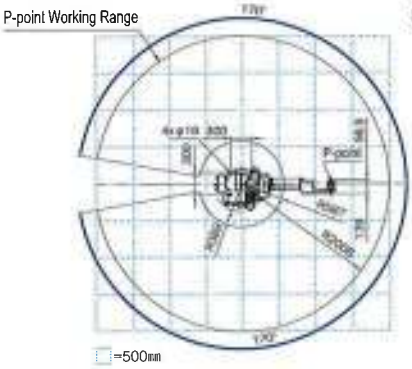
FD-B6



: For welding applications when floor-mounted : For other than the above

Internal cable type

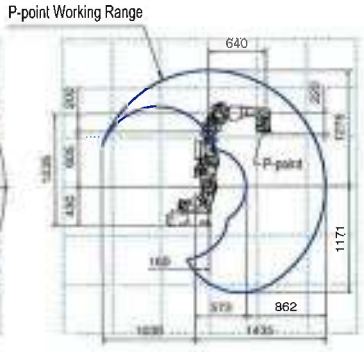
FD-B6L



Internal cable type

FD-B4S

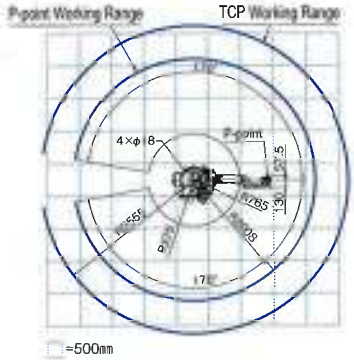
7-axis

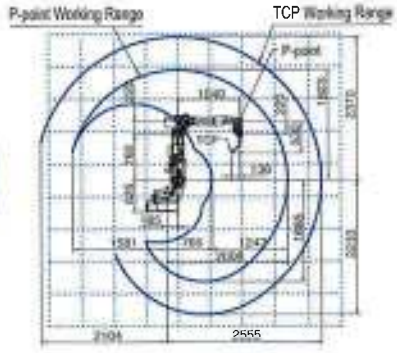


Internal cable type

FD-B4LS

7-axis





 Note: Depictions of some models in this publication may differ from the actual products.

*The figures below show working range of P-point with no torch mounted

Standard type

FD-V8

P-point Working Range

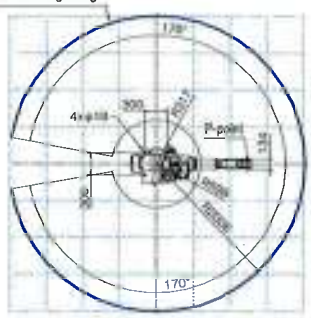
P-point Working Range

=500mm

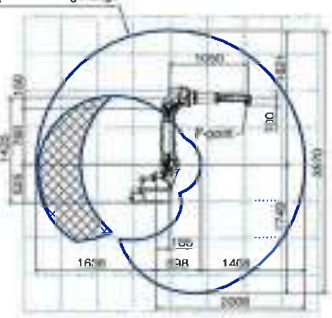
Standard type

FD-V8L

P-point Working Range



P-point Working Range



=500mm

: For welding applications when floor-mounted : For other than the above

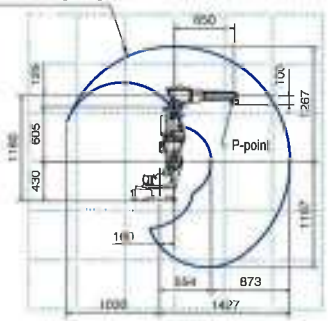
Standard type

FD-V6S

7-axis

P-point Working Range

P-point Working Range



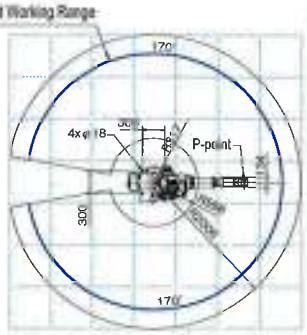
=500mm

Standard type

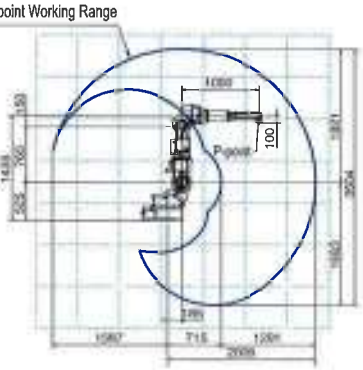
FD-V6LS

7-axis

P-point Working Range



P-point Working Range

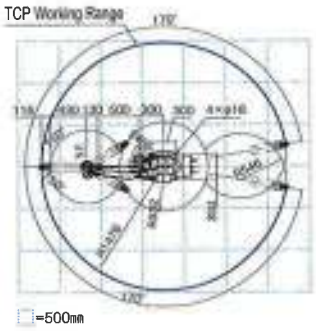


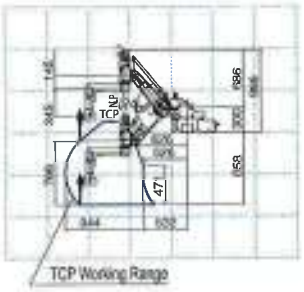
=500mm

Meets a Variety of Needs, from Space-Efficiency to High-Precision Robot

Space-efficient type

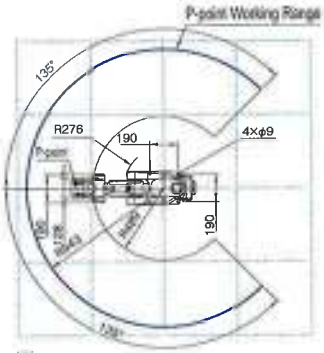
FD-G3

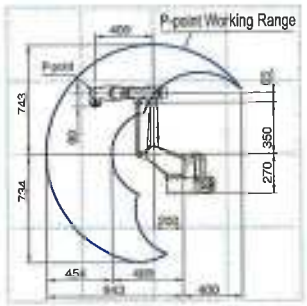




Compact & lightweight

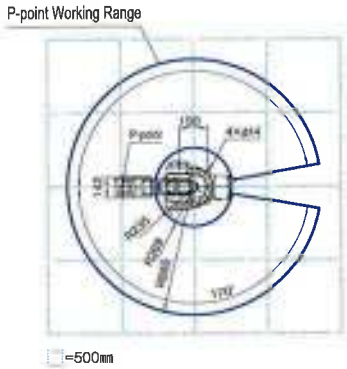
FD-S3

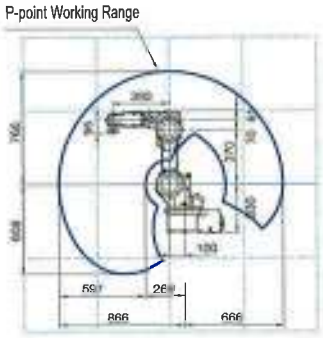




Compact & powerful

FD-H5

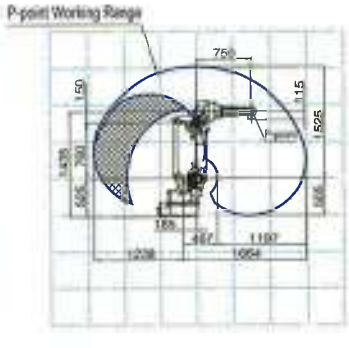




High-accuracy robot

FD-A20

Precise operation



: For welding applications when floor-mounted + : For other than the above

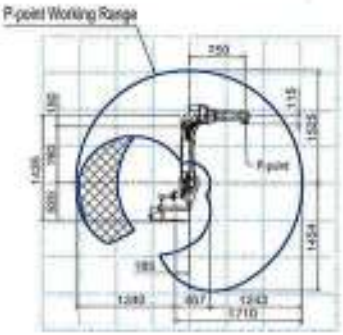
 Note: Depictions of some models in this publication may differ from the actual products.

Handles a Variety of Medium-to-High-Duty Tasks

* The figures below show working range of P-point with no torch mounted.

Versatile handling

FD-V25

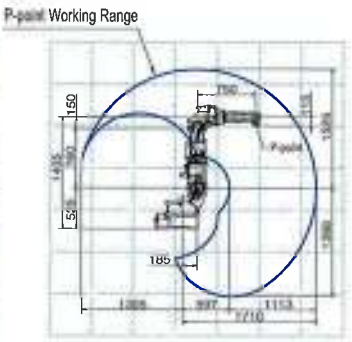


: For welding applications when floor-mounted + : For other than the above

Versatile handling

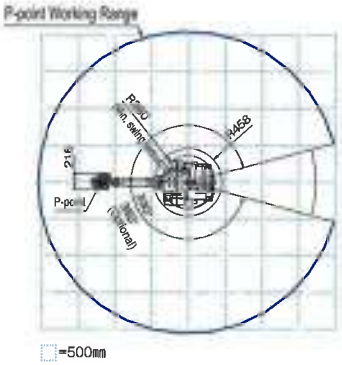
FD-V20S

7-axis



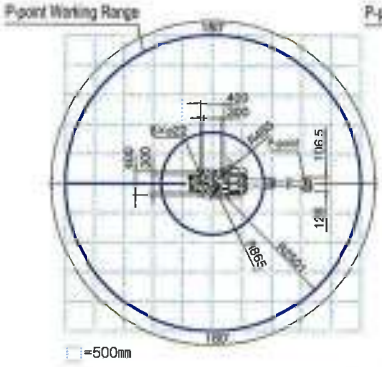
Versatile handling

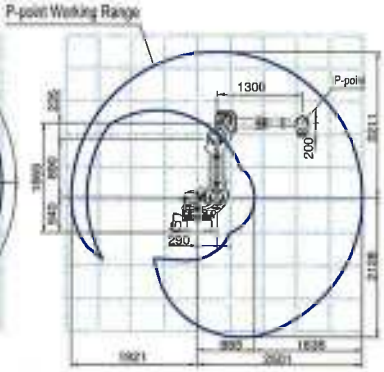
FD-V50



Versatile handling

FD-V80





: For welding applications when floor-mounted + : For other than the above

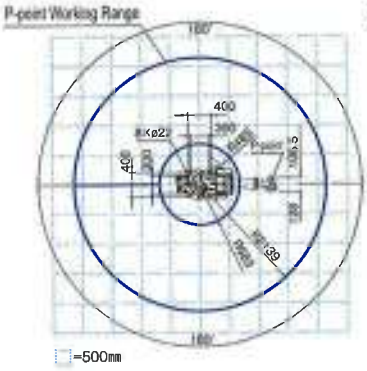
Handles a Variety of Medium-to-High-Duty Tasks

Versatile handling

FD-V100

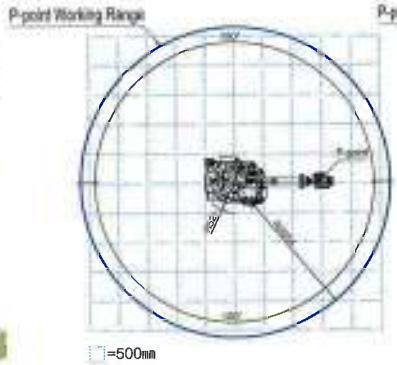
Versatile handling

FD-V130



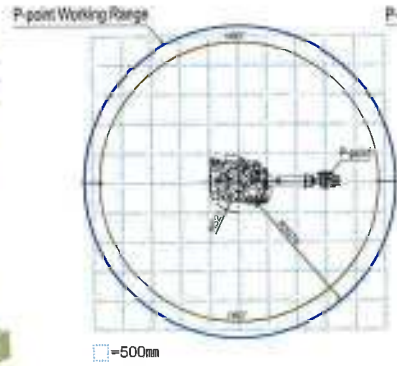
Versatile handling

FD-V166



Versatile handling

FD-V210

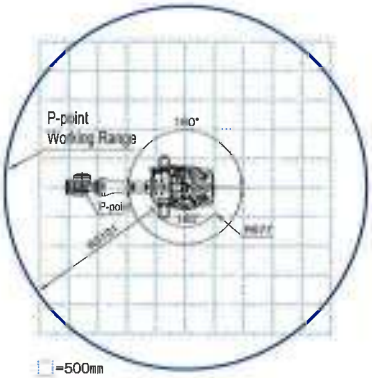


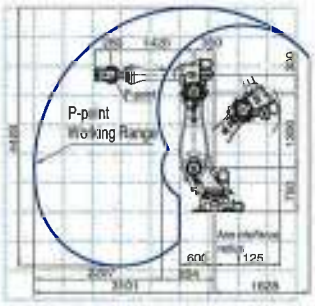
 Note: Depictions of some models in this publication may differ from the actual products.

* The figures below show working range of P-point with no torch mounted

Heavy-load type

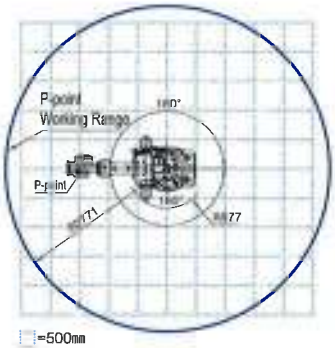
FD-V280L

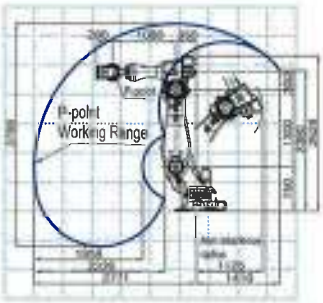




Heavy-load type

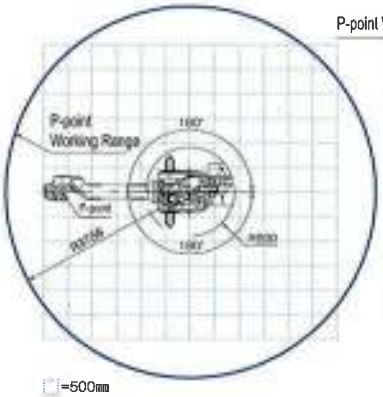
FD-V350





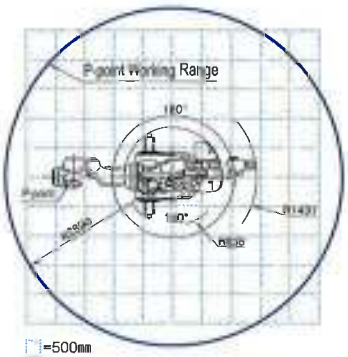
Heavy-load type

FD-V400L



Heavy-load type

FD-V600/V700



Specification

Manipulator Specifications

			FD-B6	FD-B6L	FD-B4S	FD-B4LS
Model			NB6	NB6L	NB4S	NB4LS
Structure			Vertically articulated type	Vertically articulated type	Vertically articulated type	Vertically articulated type
Number of Axes			6	6	7	7
Wrist Capacity			6kg	6kg	4kg	4kg
Positional Repeatability(Note 1)			±0.08mm	±0.08mm	±0.08mm	±0.08mm
Driving Method			AC servo motor	◀	◀	◀
Driving Capacity			3132W	4832W	3550W	5650W
Positional Feedback			Absolute encoder	◀	◀	◀
Working Range	Arm	J1 (Rotation 1)	±170°(±50°)(Note 2)	±170°(±50°) (Note 2)	±170°	±170°
		J2 (Front/back)	−155° to +90°(Note 3)	−155° to +100° (Note 3)	−145° to +70°	−145° to +75°
		J7 (Rotation 2)	–	–	±90°	±90°
		J3 (Up/down)	−170° to +245°(Note 4)	−170° to +190°	−170° to +142.6°	−170° to +154°
	Wrist	J4 (Swing)	±155°(±170°)(Note 5)	±155°(±170°)(Note 5)	±155°	±155°
		J5 (Bending)	−45° to +225°	−45° to +225°	−45° to +225°	−45° to +225°
		J6 (Twist)	±205°(±360°)(Note 5,6)	±205°(±360°)(Note 5,6)	±205°(Note 6)	±205°(Note 6)
Maximum Speed	Arm	J1 (Rotation 1)	4.19rad/s{240°/s} (3.32rad/s{190°/s})(Note 2)	3.40rad/s{195°/s} (3.05rad/s{175°/s})(Note 2)	3.66rad/s{210°/s}	3.40rad/s{195°/s}
		J2 (Front/back)	4.19rad/s {240°/s}	3.49rad/s {200°/s}	3.66rad/s{210°/s}	3.49rad/s{200°/s}
		J7 (Rotation 2)	–	–	3.14rad/s{180°/s}	2.79rad/s{160°/s}
		J3 (Up/down)	4.01rad/s {230°/s}	3.49rad/s {200°/s}	3.66rad/s{210°/s}	3.49rad/s{200°/s}
	Wrist	J4 (Swing)	7.50rad/s {430°/s}	7.50rad/s {430°/s}	7.33rad/s{420°/s}	7.33rad/s{420°/s}
		J5 (Bending)	7.50rad/s {430°/s}	7.50rad/s {430°/s}	7.33rad/s{420°/s}	7.33rad/s{420°/s}
		J6 (Twist)	11.00rad/s {630°/s}	11.00rad/s {630°/s}	10.5rad/s{600°/s}	10.5rad/s{600°/s}
Wrist Allowable Load	Allowable Moment	J4 (Rotation)	10.5N·m	10.5N·m	10.1 N·m	10.1 N·m
		J5 (Bending)	10.5N·m	10.5N·m	10.1 N·m	10.1 N·m
		J6 (Twist)	5.9N·m	5.9N·m	2.94 N·m	2.94 N·m
	Allowable Moment of Inertia	J4 (Rotation)	0.28kg·m²	0.28kg·m²	0.38 kg·m²	0.38 kg·m²
		J5 (Bending)	0.28kg·m²	0.28kg·m²	0.38 kg·m²	0.38 kg·m²
		J6 (Twist)	0.06kg·m²	0.06kg·m²	0.03 kg·m²	0.03 kg·m²
Arm Cross-sectional Area			3.59m²×340°	6.37m²×340°	2.57m² × 340°	5.28m² × 340°
Environmental Conditions			Temp: 0 to 45°C, Hmd: 20 to 80%RH (No Condensation)	◀	◀	◀
Mass (weight)			145kg	278 kg	189 kg	321 kg
Capacity of Upper Arm			10 kg(Note 7)	20kg(Note 7)	10 kg(Note 7)	10 kg(Note 7)
Installation Method			Floor-/Ceiling-/Wall-mounted	Floor-/Ceiling-/Wall-mounted	Floor-mounted	Floor-mounted
Paint Color			White (Munsell notation 10GY 9/1)	◀	◀	◀

Notes
1. Positional repeatability of the tool center point (TCP) value complies with the JIS-B-8432 Standard.
2. The value in the parentheses indicates the wall-mounting condition.
3. Working range of J6 axis may be restricted by the position of J5 axis.
4. When loading the Max. payload capacity as the end effector.
5. The capacity of the upper arm varies with the wrist capacity.
6. Working range of J2 axis may be restricted when wall-mounting.
7. The operation range of the J3 axis is restricted to −170 degrees to +205 degrees when floor-based welding is applied.
8. This value changes by placement and load conditions of a wrist.

*These specifications are subject to change without prior notice.

FD-V8	FD-V8L	FD-V6S	FD-V6LS
NV8	NV8L	NV6S	NV6LS
Vertically articulated type	Vertically articulated type	Vertically articulated type	Vertically articulated type
6	6	7	7
8kg	8kg	6kg	6kg
±0.08mm	±0.08mm	±0.08mm	±0.08mm
◀	◀	◀	◀
3016W	5000W	3600W	6000W
◀	◀	◀	◀
±170° (±50°) (Note 2)	±170° (±50°) (Note 2)	±170°	±170°
−155° to +90°	−155° to +100°	−145° to +70°	−145° to +75°
–	–	±90°	±90°
−170° to +190°	−170° to +260°	−170° to +149°	−170° to +160° (Note 4)
±180°	±180°	±180°	±180°
−50° to +230°	−50° to +230°	−50° to +230°	−50° to +230°
±360° (Note 6)	±360° (Note 6)	±360° (Note 6)	±360° (Note 6)
4.19rad/s {240°/s} (3.32rad/s {190°/s}) (Note 2)	3.40rad/s (3.05) {195°/s (175°/s)}	3.66rad/s {210°/s}	3.40rad/s {195°/s}
4.19rad/s {240°/s}	3.49rad/s {200°/s}	3.66rad/s {210°/s}	3.49rad/s {200°/s}
–	–	3.14rad/s {180°/s}	2.79rad/s {160°/s}
4.01rad/s {230°/s}	3.49rad/s {200°/s}	3.66rad/s {210°/s}	3.49rad/s {200°/s}
7.50rad/s {430°/s}	7.50rad/s {430°/s}	7.33rad/s {420°/s}	7.33rad/s {420°/s}
7.50rad/s {430°/s}	7.50rad/s {430°/s}	7.33rad/s {420°/s}	7.33rad/s {420°/s}
11.00rad/s {630°/s}	10.99rad/s {630°/s}	10.82rad/s {620°/s}	10.82rad/s {620°/s}
17.6N·m	17.6N·m	11.8 N·m	11.8 N·m
17.6N·m	17.6N·m	9.8 N·m	9.8 N·m
7.8N·m	7.8N·m	5.9 N·m	5.9 N·m
0.43kg·m²	0.43kg·m²	0.30 kg·m²	0.30 kg·m²
0.43kg·m²	0.43kg·m²	0.25 kg·m²	0.25 kg·m²
0.09 kg·m²	0.09kg·m²	0.06 kg·m²	0.06 kg·m²
3.11m²×340°	7.48m²×340°	2.58m²×340°	5.40m²×340°
◀	◀	◀	◀
140 kg	273kg	178 kg	316 kg
10 kg (Note 7)	20kg (Note 7)	10 kg (Note 7)	20 kg (Note 7)
Floor-/Ceiling-/Wall-mounted	Floor-/Ceiling-/Wall-mounted	Floor-mounted	Floor-mounted
◀	◀	◀	◀

Specification

Manipulator Specifications

			FD-G3	FD-S3	FD-H5	FD-A20
Model			NG3	NS3	NH5	NA20
Structure			Horizontally articulated type	Vertically articulated type	Vertically articulated type	Vertically articulated type
Number of Axes			5	6	6	6
Wrist Capacity			3kg	3kg	5kg	20kg
Positional Repeatability (Note 1)			±0.08mm	±0.08mm	±0.05mm	±0.07mm
Driving Method			AC servo motor	◀	◀	◀
Driving Capacity			1400W	390W	1440W	7900W
Positional Feedback			Absolute encoder	◀	◀	◀
Working Range	Arm	J1 (Rotation 1)	±170°	±135° (±45°) (Note 2)	±170°	±170°
		J2 (Front/back)	±50°	−160° to +65°	−125° to +90°	−70° to +60°
		J7 (Rotation 2)	–	–	–	–
		J3 (Up/down)	±150°	−130° to 125°	−140° to +245°	−140° to +240° (Note 4)
	Wrist	J4 (Swing)	±210°	±180°	±190°	±180°
		J5 (Bending)	±130°	−40° to +220°	−30° to +210°	−50° to +230°
		J6 (Twist)	–	±360° (Note 6)	±360° (Note 6)	±360° (Note 6)
Maximum Speed	Arm	J1 (Rotation 1)	2.09rad/s {120°/s}	1.05rad/s {60°/s}	3.49rad/s {200°/s} (2.79rad/s {160°/s}) (Note 2)	3.40 rad/s {195°/s}
		J2 (Front/back)	2.79rad/s {160°/s}	1.05rad/s {60°/s}	3.49rad/s {200°/s}	3.32 rad/s {190°/s}
		J7 (Rotation 2)	–	–	–	–
		J3 (Up/down)	4.19rad/s {240°/s}	1.05rad/s {60°/s}	4.54rad/s {260°/s}	3.14 rad/s {180°/s}
	Wrist	J4 (Swing)	9.42rad/s {540°/s}	3.14rad/s {180°/s}	6.63rad/s {380°/s}	6.98 rad/s {400°/s}
		J5 (Bending)	9.42rad/s {540°/s}	3.14rad/s {180°/s}	6.63rad/s {380°/s}	6.98 rad/s {400°/s}
		J6 (Twist)	–	3.14rad/s {180°/s}	8.90rad/s {510°/s}	10.5 rad/s {600°/s}
Wrist Allowable Load	Allowable Moment	J4 (Rotation)	–	7.94 N·m	11.9 N·m	43.7Nm
		J5 (Bending)	2.5N·m	6.47 N·m	11.9 N·m	43.7Nm
		J6 (Twist)	–	4.12 N·m	5.2 N·m	19.6Nm
	Allowable Moment of Inertia	J4 (Rotation)	0.074 kg·m²	0.219 kg·m²	0.303 kg·m²	1.09kgm²
		J5 (Bending)	0.037 kg·m²	0.145 kg·m²	0.303 kg·m²	1.09kgm²
		J6 (Twist)	–	0.059 kg·m²	0.061 kg·m²	0.24kgm²
Arm Cross-sectional Area			0.69m² × 340°	0.82m² × 270°	1.22m² × 340°	3.32m²×340°
Environmental Conditions			Temp: 0 to 45°C, Hmd: 20 to 80%RH (No Condensation)	◀	◀	◀
Mass (weight)			144 kg	31 kg	58 kg	355 kg
Capacity of Upper Arm			40 kg	1 kg	1 kg	20 kg (Note 7)
Installation Method			Floor-mounted	Floor-/Ceiling-/Wall-mounted	Floor-/Ceiling-/Wall-mounted	Floor-/Ceiling-mounted
Paint Color			White (Munsell notation 10GY 9/1)	◀	◀	◀
IP code			–	–	–	–

Notes
1. Positional repeatability of the tool center point (TCP) value complies with the JIS-B-8432 Standard.
2. The value in the parentheses indicates the wall-mounting condition.
3. Working range of J6 axis may be restricted by the position of J5 axis.
4. When loading the Max. payload capacity as the end effector.
5. The capacity of the upper arm varies with the wrist capacity.
6. Working range of J2 axis may be restricted when wall-mounting.
7. The operation range of the J3 axis is restricted to −170 degrees to +205 degrees when floor-based welding is applied.
8. This value changes by placement and load conditions of a wrist.

* These specifications are subject to change without prior notice.

FD-V25	FD-V20S	FD-V50	FD-V80
NV25	NV20S	NV50	NV80
Vertically articulated type	Vertically articulated type	Vertically articulated type	Vertically articulated type
6	7	6	6
25kg	20kg	50kg	80kg
±0.07mm	±0.08mm	±0.07mm	±0.08mm
◀	◀	◀	◀
5600W	6600W	14750W	15100W
◀	◀	◀	◀
±170°(±50°) (Note 2)	±170°	±165 °	±180°
−155° to +100° (Note 3)	−145° to +75°	+80° to −135 °	−155° to +90°
–	±90°	–	–
−170° to +260° (Note 4)	−170° to +160°	+260° to −146 °	−185° to +220°
±180°	±180°	±360°	±360°
−50° to +230°	−50° to +230°	±125°	−35° to +215°
±360° (Note 6)	±360°(Note 6)	±450°	±360°
3.40rad/s{195°/s} (3.05rad/s{175°/s})	3.40rad/s{195°/s}	3.14 rad/s{180°/s}	2.44rad/s{140°/s}
3.32rad/s{190°/s}	3.32rad/s{190°/s}	3.14 rad/s{180°/s}	1.92rad/s{110°/s}
–	2.79rad/s{160°/s}	–	–
3.14rad/s{180°/s}	3.14rad/s{180°/s}	3.14 rad/s{180°/s}	2.44rad/s{140°/s}
6.98rad/s{400°/s}	6.98rad/s{400°/s}	4.45 rad/s{255°/s}	3.05rad/s{175°/s}
6.98rad/s{400°/s}	6.98rad/s{400°/s}	4.45 rad/s{255°/s}	3.05rad/s{175°/s}
10.47rad/s{600°/s}	10.5rad/s{600°/s}	6.46 rad/s{370°/s}	4.45rad/s{255°/s}
52.6N·m	43.7 N·m	210 N·m	433 N·m
52.6N·m	43.7 N·m	210 N·m	430 N·m
24.5N·m	19.6 N·m	130 N·m	294 N·m
1.24kg·m²	1.09 kg·m²	30 kg·m²	31.4 kg·m²
1.24kg·m²	1.09 kg·m²	30 kg·m²	31.4 kg·m²
0.33kg·m²	0.24 kg·m²	12 kg·m²	11.9 kg·m²
5.27m²	3.91m² × 340°	7.4 m² × 330°	9.53m² × 360°
◀	◀	◀	◀
278 kg	321 kg	640 kg	780 kg
10 kg (Wrist capacity: 25kg)(Note 7)	5 kg(Note 7)	15 kg(Note 7)	50 kg
Floor-/Ceiling-/Wall-mounted	Floor-mounted	Floor-mounted	Floor-/Ceiling-mounted
◀	◀	◀	◀
–	–	–	Wrist axes:IP65/67 Base axes:IP54

Specification

Manipulator Specifications

			FD-V100	FD-V130	FD-V166	FD-V210
Model			NV100	NV130	NV166	NV210
Structure			Vertically articulated type	Vertically articulated type	Vertically articulated type	Vertically articulated type
Number of Axes			6	6	6	6
Wrist Capacity			100kg	100kg	166kg	210kg
Positional Repeatability (Note 1)			±0.08mm	±0.08mm	±0.1mm	±0.15mm
Driving Method			AC servo motor	◀	◀	◀
Driving Capacity			15100W	15100W	18kW	18kW
Positional Feedback			Absolute encoder	◀	◀	◀
Working Range	Arm	J1 (Rotation 1)	±180°	±180°	±180°	±180°
		J2 (Front/back)	−155° to +90°	−155° to +90°	−80° to +60°	−80° to +60°
		J3 (Up/down)	−185° to +220°	−185° to +220°	−146.5° to +150°	−146.5° to +150°
	Wrist	J4 (Swing)	±360°	±360°	±360°	±360°
		J5 (Bending)	−35° to +215°	−35° to +215°	±135°	±130°
		J6 (Twist)	±360°	±360°	±360°	±360°
Maximum Speed	Arm	J1 (Rotation 1)	2.44rad/s{140°/s}	2.44rad/s{140°/s}	2.18rad/s{125°/s}	2.01rad/s{115°/s}
		J2 (Front/back)	1.92rad/s{110°/s}	1.92rad/s{110°/s}	2.01rad/s{115°/s}	1.83rad/s{105°/s}
		J3 (Up/down)	2.44rad/s{140°/s}	2.44rad/s{140°/s}	2.11rad/s{121°/s}	1.97rad/s{113°/s}
	Wrist	J4 (Swing)	3.05rad/s{175°/s}	3.05rad/s{175°/s}	3.14rad/s{180°/s}	2.44rad/s{140°/s}
		J5 (Bending)	3.05rad/s{175°/s}	3.05rad/s{175°/s}	3.02rad/s{173°/s}	2.32rad/s{133°/s}
		J6 (Twist)	4.45rad/s{255°/s}	4.45rad/s{255°/s}	4.54rad/s{260°/s}	3.49rad/s{200°/s}
Wrist Allowable Load	Allowable Moment	J4 (Rotation)	721 N·m	721 N·m	951 N·m	1,337 N·m
		J5 (Bending)	721 N·m	721 N·m	951 N·m	1,337 N·m
		J6 (Twist)	294 N·m	294 N·m	490 N·m	720 N·m
	Allowable Moment of Inertia	J4 (Rotation)	60.0 kg·m²	60.0 kg·m²	88.9 kg·m²	141.1 kg·m²
		J5 (Bending)	60.0 kg·m²	60.0 kg·m²	88.9 kg·m²	141.1 kg·m²
		J6 (Twist)	33.7 kg·m²	33.7 kg·m²	45.0 kg·m²	79.0 kg·m²
Arm Cross-sectional Area			7.56m² × 360°	6.83m² × 360°	6.58m²×360°	6.67m²×360°
Environmental Conditions			Temp: 0 to 45°C, Hmd: 20 to 80%RH (No Condensation)	◀	◀	◀
Mass (weight)			770kg	765kg	1010kg	1040kg
Capacity of Upper Arm			50kg	50kg	45kg (90kg max.) (Note 7)	45kg (90kg max.) (Note 7)
Installation Method			Floor-/Ceiling-mounted	Floor-/Ceiling-mounted	Floor-mounted	◀
Paint Color			White (Munsell notation 10GY 9/1)	◀	◀	◀
IP code			Wrist axes:IP65/67 Base axes:IP54	◀	–	–

Notes
1. Positional repeatability of the tool center point (TCP) value complies with the JIS-B-8432 Standard.
2. The value in the parentheses indicates the wall-mounting condition.
3. Working range of J6 axis may be restricted by the position of J5 axis.
4. When loading the Max. payload capacity as the end effector.
5. The capacity of the upper arm varies with the wrist capacity.
6. Working range of J2 axis may be restricted when wall-mounting.
7. The operation range of the J3 axis is restricted to −170 degrees to +205 degrees when floor-based welding is applied.
8. This value changes by placement and load conditions of a wrist.

* These specifications are subject to change without prior notice.

FD-V280L	FD-V350	FD-V400L	FD-V600	FD-V700
NV280L	NV350	NV400L	NV600	NV700
Vertically articulated type	Vertically articulated type	Vertically articulated type	Vertically articulated type	Vertically articulated type
6	6	6	6	6
280kg	350kg	400kg	600kg	700kg
±0.2mm	±0.2mm	±0.3mm	±0.3mm	±0.3mm
◀	◀	◀	◀	◀
30kW	◀	27kW	◀	◀
◀	◀	◀	◀	◀
±180°	±180°	±180°	±180°	±180°
−100° to +40°	−100° to +40°	−105° to +60°	−105° to +60°	−105° to +60°
−147° to +130°	−180° to +130°	−130° to +30°	−140° to +30°	−140° to +30°
±360°	±360°	±210°	±210°	±210°
±125°	±125°	±120°	±120°	±120°
±360°	±360°	±210°(±360°)(Note 8)	◀	◀
1.83rad/s{105°/s}	1.83rad/s{105°/s}	1.57rad/s {90°/s}	1.57rad/s {90°/s}	1.40rad/s {80°/s}
1.83rad/s{105°/s}	1.66rad/s {95°/s}	1.57rad/s {90°/s}	1.57rad/s {90°/s}	1.40rad/s {80°/s}
1.66rad/s {95°/s}	1.66rad/s {95°/s}	1.57rad/s {90°/s}	1.57rad/s {90°/s}	1.40rad/s {80°/s}
2.09rad/s{120°/s}	1.92rad/s{110°/s}	1.92rad/s{110°/s}	1.92rad/s{110°/s}	1.74rad/s{100°/s}
2.09rad/s{120°/s}	1.92rad/s{110°/s}	1.92rad/s{110°/s}	1.92rad/s{110°/s}	1.74rad/s{100°/s}
3.49rad/s{200°/s}	3.14rad/s{180°/s}	3.14rad/s{180°/s}	3.14rad/s{180°/s}	2.79rad/s{160°/s}
1921 N·m	2750 N·m	3450 N·m	3450 N·m	3450 N·m
1921 N·m	2750 N·m	3450 N·m	3450 N·m	3450 N·m
988 N·m	1235 N·m	1725 N·m	1725 N·m	1725 N·m
400kg·m²	400kg·m²	600kg·m²	600kg·m²	600kg·m²
400kg·m²	400kg·m²	600kg·m²	600kg·m²	600kg·m²
250kg·m²	250kg·m²	400kg·m²	400kg·m²	400kg·m²
8.72m²×360°	6.77m²×360°	10.72m²×360°	6.60m²×360°	6.60m²×360°
◀	◀	◀	◀	◀
1660kg	1620 kg	3050 kg	2850 kg	3320 kg
25kg max.(Note 7)	50kg max.(Note 7)	50kg max.(Note 7)	50kg max.(Note 7)	25kg max.(Note 7)
◀	◀	◀	◀	◀
◀	◀	◀	◀	◀
Wrist axes:IP67P Base axes:IP54P	◀	◀	◀	◀

Positioner

Peripheral Equipment Jig Positioner

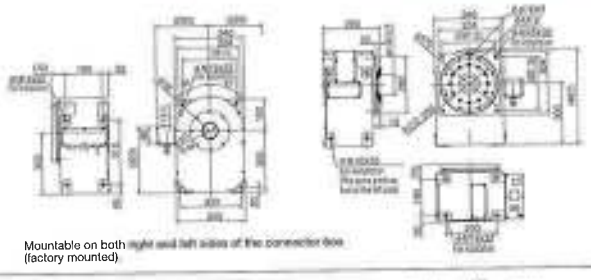
- 8 models of positioners available from 250 kg to 1,000 kg payload capacity.
- Operation of the positioner is totally controlled by the robot teaching pendant. Positioners can be operated indenpendently or synchronized with the robot.
- High accuracy operation is made possible by the same AC servo motor and non-backlash reduction gear that is used for the robot.
- Synchronized motion when using with the OTC robot.

Positioner

Positioner Headstock 1PB Series

- Can be used to build varied jig systems with a large degree of positioning flexibility.
- A hole through the center of the rotary table, enabling cables and hoses to be routed through easily.

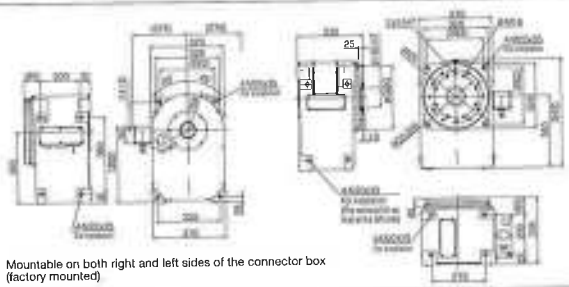
1PB250



Mountable on both right and left sides of the connector box (factory mounted)

Model Name	A2PB252-E
Max. Payload Capacity	250 kg
Rotating Speed	2.6 rad/s {150°/s}
Allowable Rotating Torque	206 N·m
Position Repeatability	±0.1 mm (Position at R300 mm)
Stop Position	Random
Mass (Weight)	110 kg

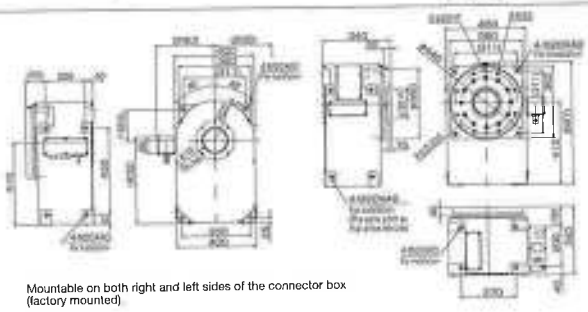
1PB500



Mountable on both right and left sides of the connector box (factory mounted)

Model Name	A2PB502-E
Max. Payload Capacity	500 kg
Rotating Speed	2.1 rad/s {120°/s}
Allowable Rotating Torque	490 N·m
Position Repeatability	±0.1 mm (Position at R300 mm)
Stop Position	Random
Mass (Weight)	170 kg

1PB1000



Mountable on both right and left sides of the connector box (factory mounted)

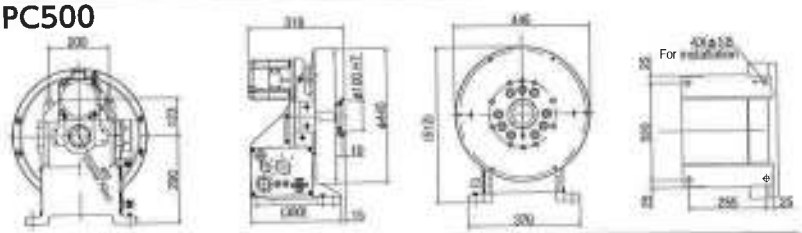
Model Name	A2PB1002-E
Max. Payload Capacity	1000 kg
Rotating Speed	1.3 rad/s {72°/s}
Allowable Rotating Torque	1078 N·m
Position Repeatability	±0.1 mm (Position at R300 mm)
Stop Position	Random
Mass (Weight)	220 kg

Positioner

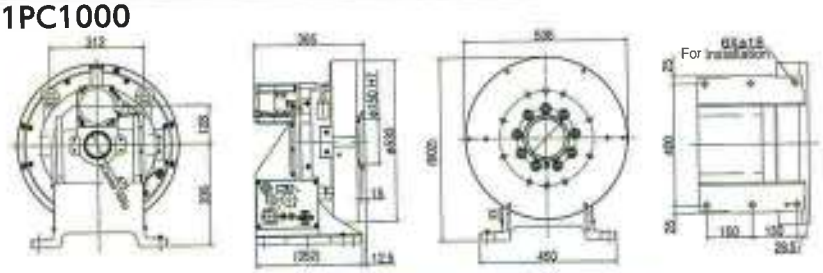
Positioner Headstock 1PC Series

- Designed for Compact, lightweigt and easy installation.
- A hole through the center of the rotary table, enabling cables and hoses to be routed through easily.

1PC500



1PC1000



1PC500

Model Name	PC501	PC1001
Max. Payload Capacity	500kg	1000kg
Rotating Speed	2.1dad/s{120°/s}	1.3dad/s{72°/s}
Allowable Rotating Torque	490N·m	1078N·m
Position Repeatability	±0.1 mm (Position at R300 mm)	±0.1 mm (Position at R300 mm)
Stop Position	Random	Random
Mass (Weight)	110kg	193kg

Positioner

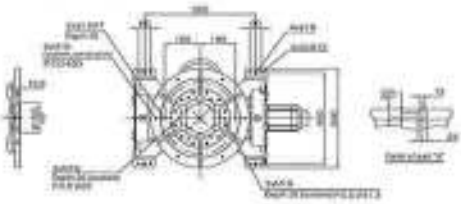
2-Axes Double Support Positioner 2PF Series

- High-speed motion increases production efficiency. An increase in the maximum rotation speed of the tilting axis by 2.5 times and in rotation axis by two times was achieved in comparison with the conventional machine 300 kg payload type.

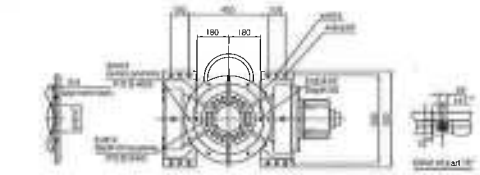
2PF300・500・1000

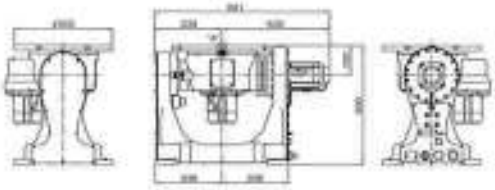
2PF1000

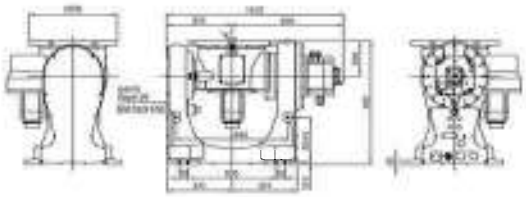
2PF300・500



2PF1000





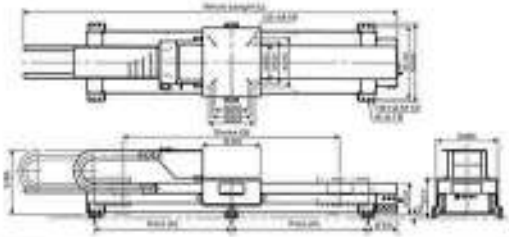


Model Name	A2PF301-ENN	A2PF501-ENN	A2PF1001-ENN
Max. Payload Capacity	300 kg	500 kg	1000 kg
Rotating Speed	3.1 rad/s {180°/s}	2.8 rad/s {162°/s}	2.9 rad/s {166°/s}
Tilting Speed	2.2 rad/s {125°/s}	1.5 rad/s {84°/s}	1.4 rad/s {82°/s}
Rotating Torque	294 N·m	392 N·m	882 N·m
Tilting Torque	882 N·m	1347 N·m	3704 N·m
Position Repeatability	±0.08 mm (Position at R250 mm)	±0.08 mm (Position at R250 mm)	±0.08 mm (Position at R250 mm)
Stop Position	Random	Random	Random
Mass (Weight)	260 kg	260 kg	470 kg

- Sliders are available in 12 models with strokes between 1 m and 6.9 m.
- Employment of an AC servo motor and non-backlash reduction gear provides the same high accuracy operation as that of robots.
- Combination with the OTC robot allows synchronized operation.
- The cable bearer is provided in the center of the slider, which allows space-saving installation.

Slider

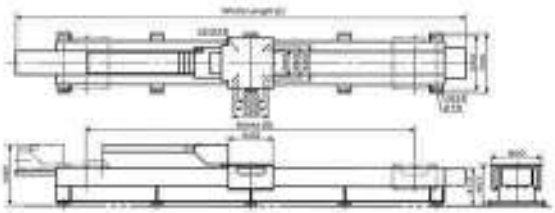
Linear Sliders (Light Duty) Model 1SB



- A maximum of 330 kg can be loaded.
- Dust-proof structure prevents spatter, oil and dust from entering.

Slider

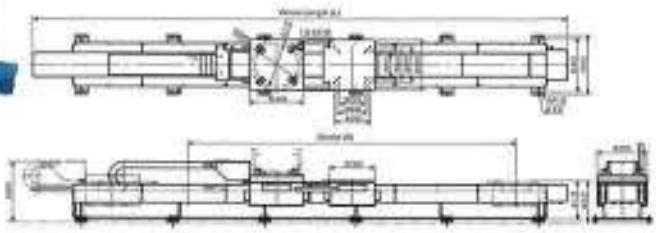
Linear Sliders (Standard Duty) Model 1SR



- Standard Duty with a maximum loading weight of 330 kg
- Dust-proof structure prevents spatter, oil and dust from entering.

Slider

Linear Sliders (with Carriage Duty) Model 1SR-P



- The wire pack can be mounted on the truck connected to the robot-mounting part.
- Dust-proof structure prevents spatter, oil and dust from entering.

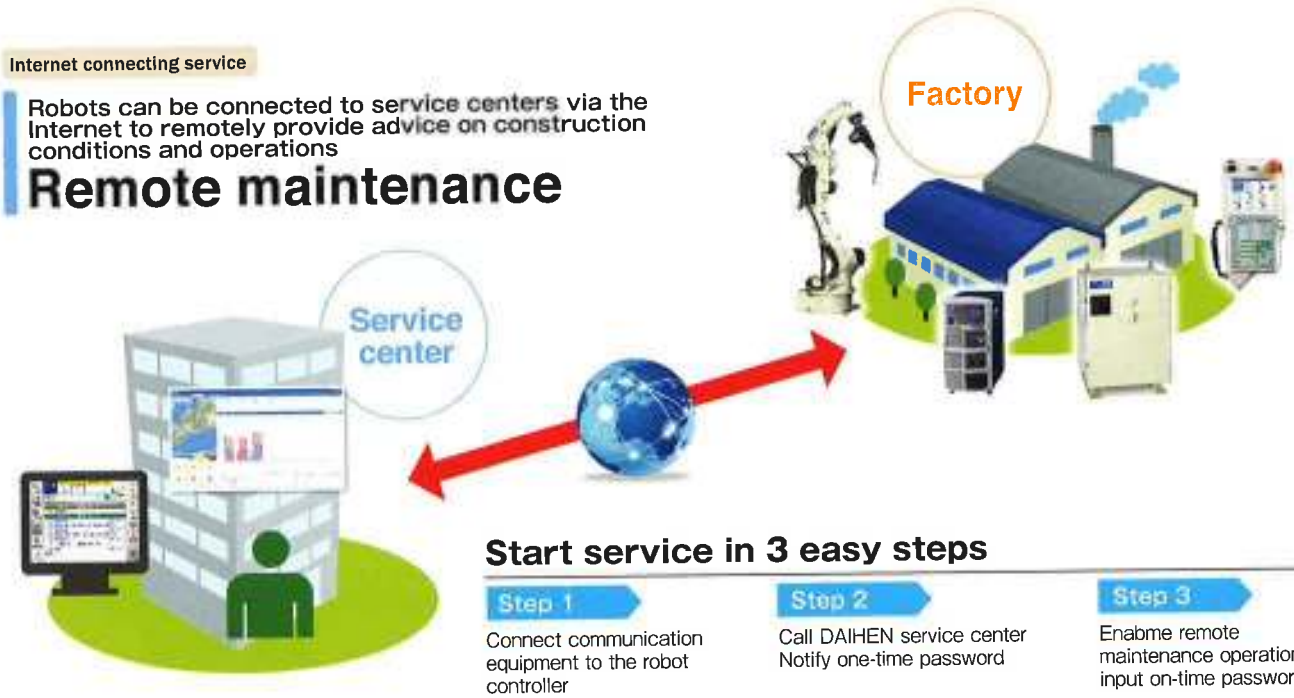
	Model 1SB		Model 1SR					Model 1SR-P				
Model Name	A2SB102-E, A2SB202-E		A2SR292-E, A2SR392-E, A2SR492-E, A2SR592-E, A2SR692-E					A2SR19P2-E, A2SR29P2-E, A2SR39P2-E, A2SR49P2-E, A2SR59P2-E				
Stroke Length	1 m, 2 m		2.9 m, 3.9 m, 4.9 m, 5.9 m, 6.9 m					1.9 m, 2.9 m, 3.9 m, 4.9 m, 5.9 m				
Max. Moving Speed	0.3 m/s		0.295 m/s					0.295 m/s				
Max. Mounting Capacity	330 kg		330 kg					660 kg (330 kg for each table)				
Position Repeatability	±0.1 mm		±0.1 mm					±0.1 mm				
	A2SB102-J	A2SB202-J	A2SR292-J	A2SR392-J	A2SR492-J	A2SR592-J	A2SR692-J	A2SR19P2-J	A2SR29P2-J	A2SR39P2-J	A2SR49P2-J	A2SR59P2-J
Stroke S (mm)	1000	2000	2900	3900	4900	5900	6900	1900	2900	3900	4900	5900
Whole Length L (mm)	2510	3510	4500	5500	6500	7500	8500	4500	5500	6500	7500	8500
Mass (kg)	450	550	650	750	850	950	1050	800	900	1000	1100	1200

* Ensure that the total mass of the manipulator and other peripherals does not exceed the payload capacity.

Internet connecting service

Robots can be connected to service centers via the Internet to remotely provide advice on construction conditions and operations

Remote maintenance



Start service in 3 easy steps

Step 1
Connect communication equipment to the robot controller

Step 2
Call DAIHEN service center
Notify one-time password

Step 3
Enabme remote maintenance operation and input on-time password

■ Customer preparations

The internet connection environment will be prepared by the customer

LTE router
- Data communication SIM card
- LAN cable

※Recomended:UD-LT1/EX(Made by IO data)(Consumable goods)

Smartphone
※Use tetherling function of Android phone.
(USB cable)

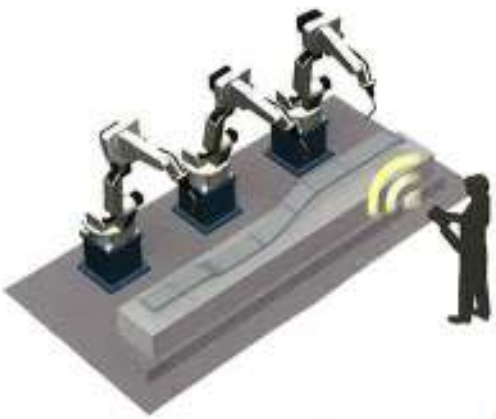
Internal LAN
- Internet connection
- LAN cable

1)Data communication charges will be borne by the customer.
2)This system uses communication equipment, so it may not be possible to use the function as intended due to communication status or interference.

Wireless teach pendant

Enables robot to be operated wirelessly. Supports all current models.

WiTP Wireless Teach Pendant



Reduced Teaching Burden

Because no bulky cable is required, the operator can perform teaching with ease while moving about effortlessly.

Operates Multiple Robots with a Single Pendant

To switch between robots, simply select the desired robot number with the pendant and perform identification steps according to the guide.

Certified for Wireless Operation — An Industry First

Features the servo block function activated by a robot emergency stop button and an enable switch.

This device has already been certified by TÜV SÜD as meeting the IEC61508 SIL2 and ISO 13849 Cat. 3 PL d standards for functional safety.
Certification No.: Z10 14 08 88597 003

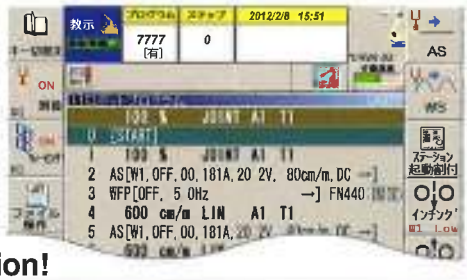
Feature available beginning February 2020.

PC software

High-accuracy/high-performance teaching & simulation achieved by the same operation as that of robot!

Offline teaching system FD-ST

Fully compatible with the controller FD19

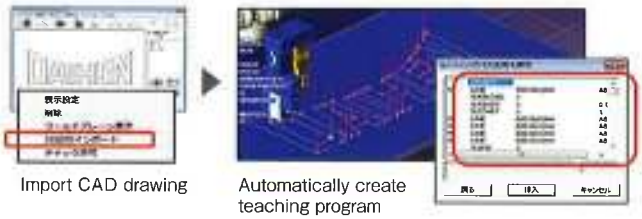


This teaching system can be operated by the same operation of the robot controller FD19. If OTC standard robot system is provided, the setup can be completed only by reading the backup data.

New function realizing simplified operation!

Cooperation with CAD

Automatically generates teaching program from CAD data. And direct trasfer to the robot controller.



Import CAD drawing

Automatically create teaching program

Handling support

Simulate attach/detach action of work piece. Reduce the verification time of actual robot.

Product line simulation

The multiple ROBOT teaching and simulation output on the PC and possible to teaching and verification for cooperation of these robots.

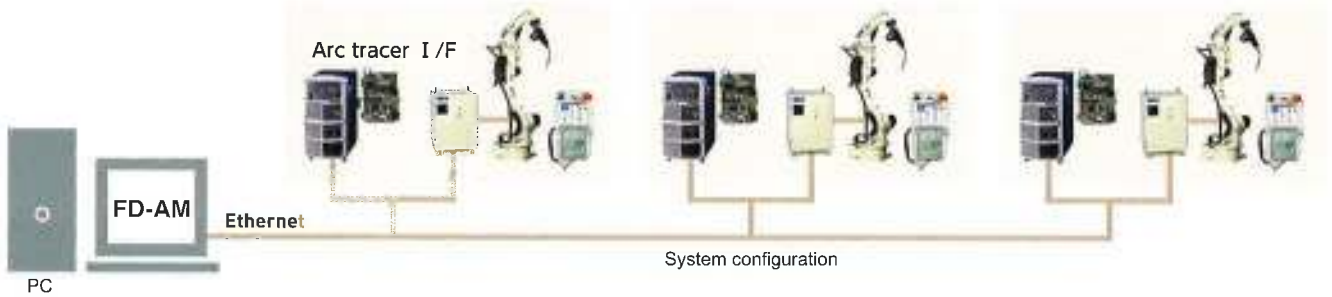
PC software

PC-based Welding Quality Control

Robot Welding Control System FD-AM

Simple configuration and collect all welding data.

With the teach pendant, the operator can monitor conditions during the welding process and even record welding data on a PC. This makes it possible to manage all aspects of welding, including "when, where, what and how."



System configuration

■ Teach Pendant Monitor

Item	Details
Maximum sampling frequency (Maximum sampling cycle)	20 Hz (50 ms) Maximum sampling frequency can be set individually for each monitored parameter.
Monitored parameters (11 in total)	Electric current, voltage, feed load, feed speed (feed device), feed speed (measurement unit)*, feed motor electric current**, gas flow quantity*, gas pressure*, welding power supply primary-side voltage**, welding power supply internal temperature**, welding power supply fan rotation rate**
Indication style	Numerical values indicated with a wave pattern
Welding result indications	Mean value, maximum value, minimum value, welding time, welding distance

* Optional ** All models of the Welbee Invertor series only

■ FD-AM (PC software)

Item		Details
Maximum sampling frequency (Maximum sampling cycle)		10 Hz (Electric current & voltage: 100 µs, Other: 50 ms) Maximum sampling frequency can be set individually for each recorded parameter.
Recorded parameter	Commands (5 in total)	Electric current, voltage, feed load, feed speed (feed device)
	Monitored parameters (11 in total)	Feed speed (measurement unit)*, feed motor electric current**, gas flow quantity*, gas pressure*, welding power supply primary-side voltage**, welding power supply internal temperature**, welding power supply fan rotation rate**
Welding result indications	Real time	Mean value, maximum value, minimum value, welding time, welding distance
	History	Mean value, welding time, welding distance, welding abnormalities
Communication method		Via Ethernet. Features automatic connection and reconnection with robots.
Welding point identification		Robot control device name, program comment, work name, work serial number, welding section name
Abnormality monitoring function		Divergence from command value, deviation from rated value
Abnormality indication		Abnormal number and error message indication

*Optional ** All models of the Welbee Invertor series only

Sensors for Robots

Workpiece position detection sensor

Touch sensor FD-WD

Workpiece position detection sensor by touching the welding wire

- Applicable to all the workpieces with a medium thickness or thicker.
- Most inexpensive among all workpiece position detection sensors.
- Requires no separate sensor unit because this sensor has a built-in controller.
- Allows high-speed search at up to 360 cm/min.
- A separate sensor unit (optional) is ready for hardly energized surfaces such as rust and black scale.

Tracking sensor for CO_2/MAG welding

Arc sensor FD-AR

Automatic seam tracking by weaving

- This sensor allows correction of curved workpiece or thermal distortion which can't be corrected only by detecting workpiece position.
- Applicable to workpieces with medium thickness or thicker.
- Most inexpensive among all the tracking sensors.
- Easy to use from the viewpoints of interference of workpieces and maintenance because this sensor requires no additional parts around the t orch.

*Can't be used for tracking on aluminum.

Tracking sensor for TIG welding

TIG arc sensor FD-TR

Automatic seam tracking in TIG welding

- Allows arc length constant control (vertical tracking) in TIG.
- Allows stable execution of welding by keeping the arc length constant to the thermal distortion of thin plate.
- Allows high-accuracy tracking even in pulse TIG welding.
- Easy to use from the viewpoints of interference of workpieces and maintenance, because it requires no additional parts around the torch.

	Touch sensor FD-WD	Arc sensor FD-AR	TIG arc sensor FD-TR
Workpiece position detection	○ (The maximum two-way displacement detection rate per site is about 5 seconds.)	×	×
Seam tracking	×	○	○ (only vertical tracking)
Recognition of groove shape	×	×	×
Combination with other sensors	This sensor can be used together with an arc sensor or TIG arc sensor.	Combination use of the touch sensor and laser sensor is possible.	Combination use of the touch sensor and laser sensor is possible.
Applicable workpieces	Plate thickness: 3.2 mm or more	Plate thickness: 3.2 mm or more	(Plate thickness: 1.0 mm or more)
Accuracy	±1.0 mm (provided that the bend of wire does not change)	±1.0 mm (provided that arc and pool are stable)	±0.5 mm (when the electrode is not worn)
Workpiece material	All the materials and surfaces to be energized	Iron system, stainless steel system	All the materials which can be welded

Laser start point detection sensor

Laser search FD-QD

High-accuracy workpiece position detection sensor using laser

- Realizes higher speed and higher accuracy than those of the touch sensor.
- Allows high accuracy detection for a wide spectrum of applications from thin plate to medium thickness plate.
- Allows recognition of various welding joints by easy operation.
- Allows visual check of the recognition result using a teach pendant.
- Enables automatic change of the welding condition based on the recognition result.
- Can be used for applications other than welding.

High-speed and high-accuracy laser start point detection sensor

Laser Search FD-QF

High-speed workpiece position detection sensor using laser

- Thanks to the two-dimensional laser, the cross-section of a groove can be instantaneously detected without movement of the robot (detection time is 1/5 or less compared with that of a touch sensor).
- The high-speed and high-accuracy detection is highly adaptable to thin-plate welding.
- Also accommodates thick-plate applications with high accuracy thanks to improved environmental resistance.
- Enables automatic change of the welding condition based on the recognition result.

Laser tracking sensor

Laser sensor FD-QT

High accuracy welding line tracking by laser

- High accuracy 3D tracking for complex shape work piece.
- The sensor automatically adjusts optimal position and posture with simple teaching.
- Workpiece position detection
- For thin material and high accuracy
- Real time adjustment of welding conditions by adaptive control
- TIG welding also possible

	Laser search FD-QD	Laser Search FD-QF	Laser sensor FD-QT
Workpiece position detection	○ (The maximum two-way displacement detection rate per site is about 1.5 seconds)	○ (The maximum one-way displacement detection rate is about 0.3 seconds.)	○
Seam tracking	×	×	○
Recognition of groove shape	○	○	○
Combination with other sensors	This sensor can be used together with the touch sensor, arc sensor or TIG arc sensor.	This sensor can be used together with the touch sensor, arc sensor or TIG arc sensor.	Unnecessary (Welding line tracking and position detection is possible.)
Applicable workpieces	(Plate thickness: 1.0 mm or more)	(Plate thickness: 0.5 mm or more)	Plate thickness 0.1 mm or more
Accuracy	±0.5 mm (Search speed 100 cm/min or less For stand-alone robot)	±0.2 mm (provided that cross-sectional shape of detection area does not change)	±0.4mm (provided that cross-sectional shape of detection area does not change)
Workpiece material	The surface shall not be glossy (nonmetal is permitted)	The surface shall not be glossy (nonmetal is permitted)	The surface shall not be glossy (nonmetal is permitted).

Torch for robot

Achieving stable welding operation which enables prevention of welding interruption and reduction in costs of consumables

Forced pressurized power feeding torch (TCC torch)

This photo indicates the TCC torch RZ3500H equipped with a shock sensor SSB (optionally available)

Model		
RZ3500S/L/H	350A(350A)	80%(60%)
RZ3510S/L/H	350A(250A)	50%(50%)
RZW5000S/L/H	500A(400A)	70%(60%)

Deviation of wire position prevented

This torch improves the deviation of wire position by about 50 percent or more compared with the standard torch.

TCC Torch

Standard torch

Improved durability of the tip

Durability of the tip holder improved about 20 times or more compared with the standard robot tip.

Reliable power supply

Compared to a conventional standard torch, this offers improved welding quality thanks to the stable wired power supply.

Torch for robot

For improving welding quality

Compact servo torch

The photo indicates the full feeding unit equipped with a compact servo torch for CO2/MAG (MTXC-3541PS).

- Be sure to use the compact servo torch together with an assist feeder.
- We provide compact servo torches for CO2/MAG and for aluminum MIG.

CO2/MAG Welding Torch

Model		
MTXC-3541PS	350A(250A)	50%(50%)
MTXCW-5041PS	500A(300A)	70%(50%)

MIG Welding Torch

Model		
MTXCA-3041PS	300A	50%
MTCAW-4041PS	400A	70%

Excellent stability of wire feeding

Servo Torch

Conduit cable: 5 m

Standard torch

Conduit cable: 5 m

Welding current: 200A
Wire feeding speed: 12.6 m/min
Welding voltage: 24.0 V
Welding speed: 70 cm/min
Wire: A5356/φ1.2 mm
Base metal: A5052

Decrease in deviated wire position

The compact servo torch has realized reduction in deviated wire position to one third or lower compared with the standard torch (about 0.2 mm or less), and also reduction in welding defects such as bead deviation and burn through.

Optional software dedicated to servo torch

RS Control

RS control realizes secure arc start by instantaneously raising the wire which makes contact with the base metal, and allows reduction of spatters at the start of welding.

- The RS control is limited in applicable robot model, welding power source, and welding mode.
- This model requires optional software.

Welding peripherals

For automatic removal of spatters in the nozzle

Air blow kit

Only addition of the air blow kit to CO2/MAG standard torch enables quick-change into the air blow style tip body!

Advantages of air blow specification

- Automatic removal of spatters in the nozzle with air, prevention of welding interruption.
- Enhancement of the life of nozzle by cooling the nozzle with air, reduction in the running cost.

Note: Compatible with RT3500*, RT5000* and RZ35***

Torch for robot

Our bestselling CO2/MAG torch compatible with a shock sensor

Torch

Model RT3500H is shown mounted with optional SSV Shock Sensor Unit.

Model		
RT3500S/L/H	350A(350A)	80%(60%)
RT5000S/L/H	500A(350A)	50%(70%)
RTW5000S/L/H	500A(400A)	70%(60%)

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