



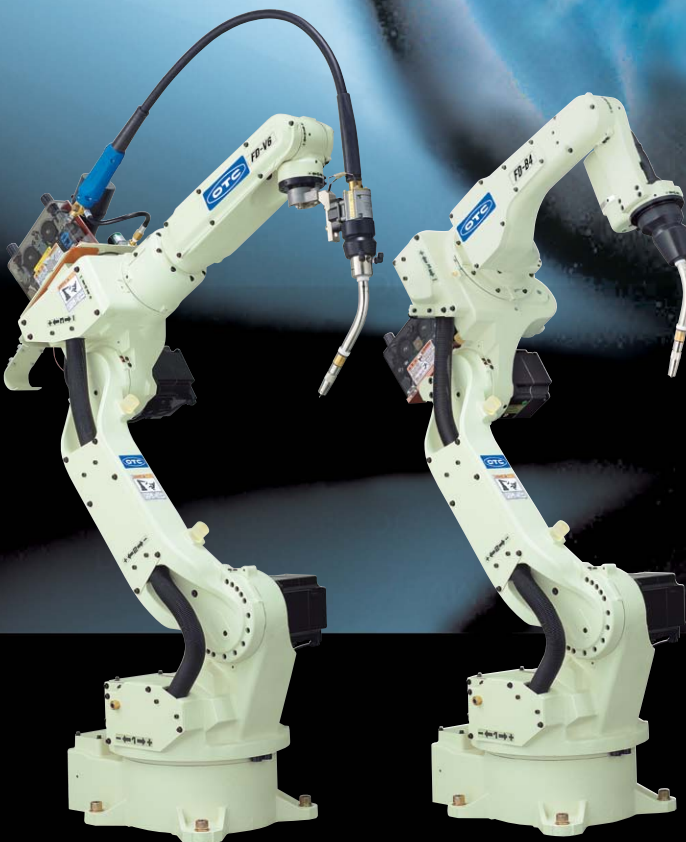
DAIHEN Inc.

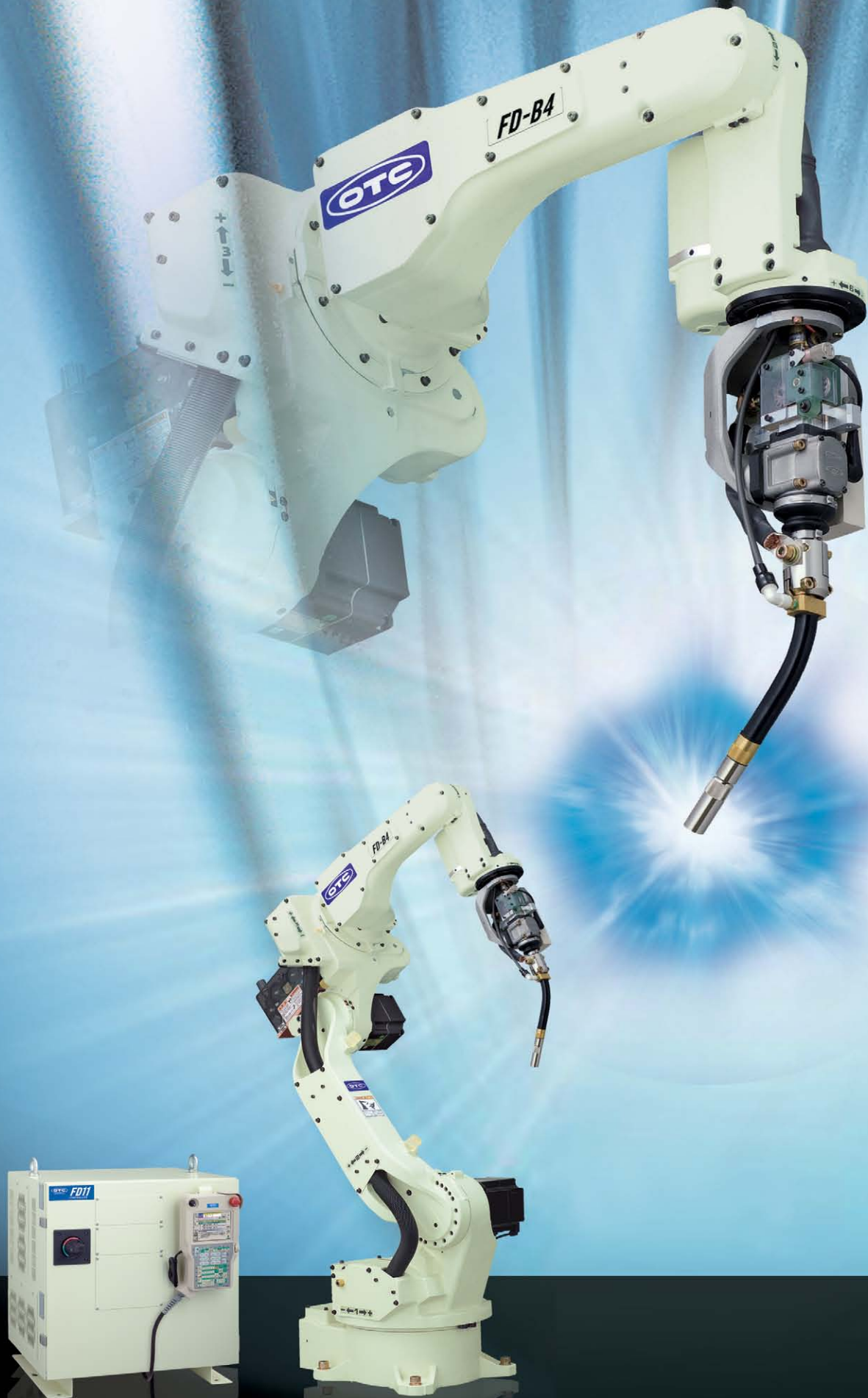
# ADVANCED WELDING & ROBOTIC SYSTEMS

*FD-B4, FD-B4L, FD-V6, FD-V6L, FD-H5, and FD-V20*



## **COMPLETE ROBOTIC ARC WELDING SYSTEMS**





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





# CHANGING THE FUTURE OF MANUFACTURING

The ideal solution for automation of welding



**Intuitive Operation**  
Touch panel and jog dial ensure easy operation.



**Quality Control Functions**  
Easy quantitative management of welding procedures.



**Compact and Eco-Friendly**  
Space-saving design with reduced standby power consumption.



# Smooth Operation TEACH PENDANT



**Compact and light weight**  
27% lighter than previous model, making teaching sessions easier.  
40% smaller than previous model, making it easier to handle in tight spaces.

**Smooth teaching**  
Touch panel provides simple operation.  
Jog dial allows simple adjustment.

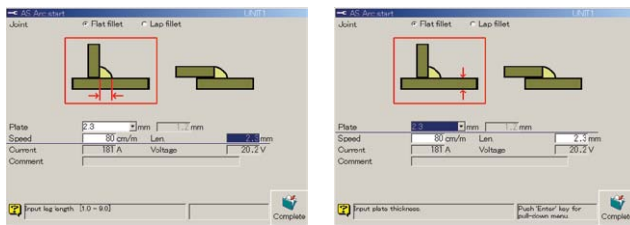
**Smooth backups**  
USB memory slot makes data saving and reading easy.



## Smooth welding

### Welding condition guide function

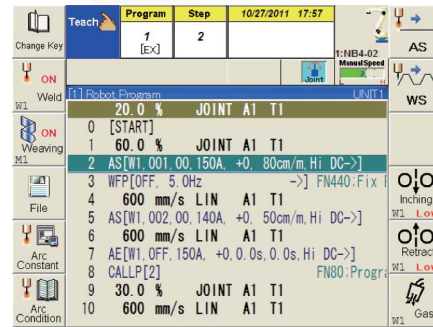
Helps you find better welding conditions with one-touch operation.



## Smooth operation

### Improved display

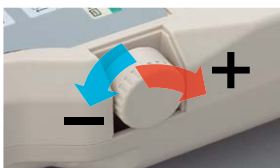
By improving the display of characters, the display is easier to read.



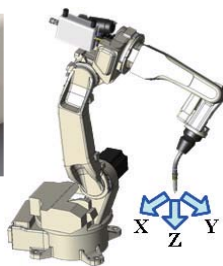
## Smooth operation

### Jog dial

It is possible to scroll through teaching programs, make an adjustment to wire aiming position, and to do wire inching and retract movement with jog dial. Jog dial can provide intuitive operation for multiple items.



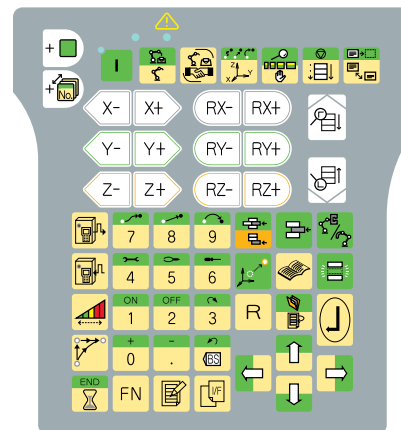
Turn jog dial



## Smooth operation

### Iconified operation buttons

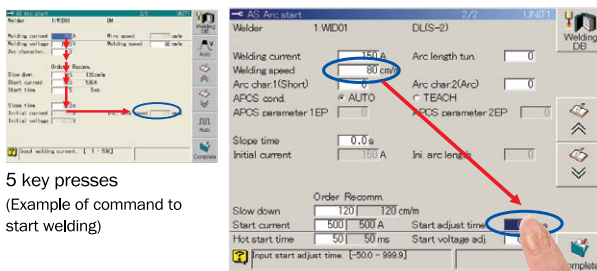
By improving the display of characters, the display is easier to read.



## Smooth operation

### One-touch access

The touch panel realizes one-touch access to teaching items, reducing the number of times keys are pressed.



5 key presses  
(Example of command to start welding)

1 key press



### Electric conservation

Up to 50% reduction in power consumption using the power conservation mode (energy conservation timer function and external servo OFF function).

### Minimal maintenance

Addition of axes is simple and fast. 30% fewer parts.

### Space conservation

20% less volume than previous model. Additional clearance above the controller.

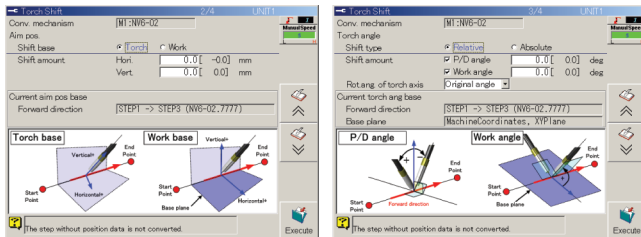


# Smart CONTROLLER FD 11

### Smart welding

#### Improved operability

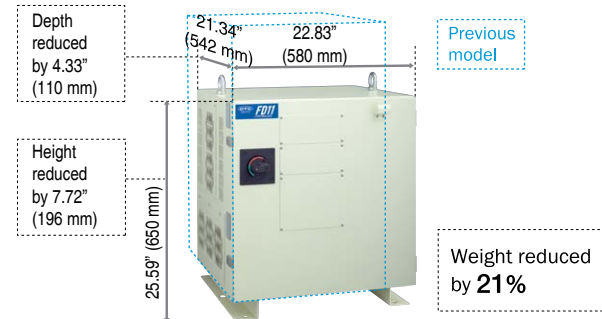
Correcting teaching to improve welding quality is made possible in a shorter amount of time.



### Downsized

#### Improved space utilization

Height of the controller has been reduced.



### Smart welding

#### Improved movement performance

By increasing the robot response speed to weld start signals, arc start failures are reduced and high quality bead appearance is achieved.

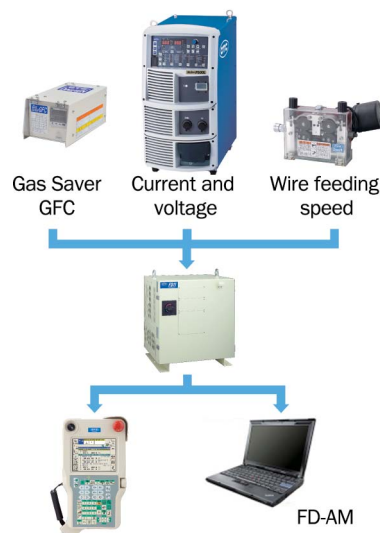
By greatly reducing residual vibrations, high speed approaches are possible.



### Smart welding

#### Increased reliability

When a welding error occurs, troubleshooting can be done easily, leading to reduced downtime.



Easy troubleshooting (optional) when a welding error occurs, data is backed up automatically. This helps find the cause of the trouble, leading to reduced downtime.

Traceability can be done easily (optional) by connecting a computer.

*Fast, Precise*

# **WELDING ROBOTS**



**FD-B4**



**FD-B4L**



**FD-V6**





**FD-V6L**



**FD-V20**



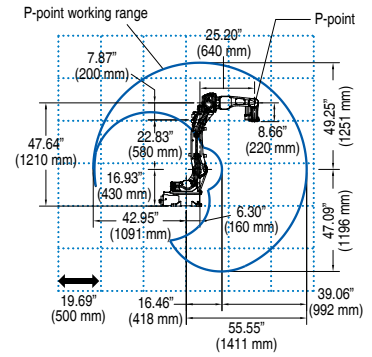
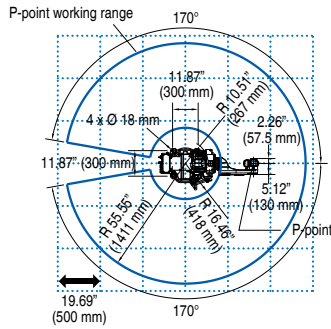
**FD-H5**



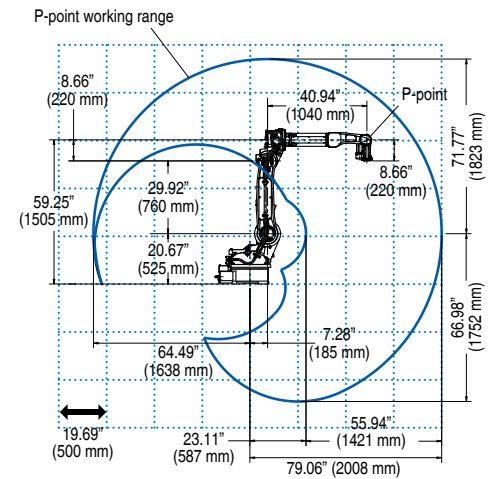
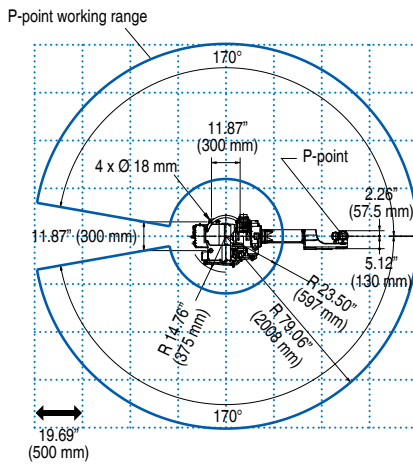
# RANGE OF MOTION

## Manipulator working range / Specifications

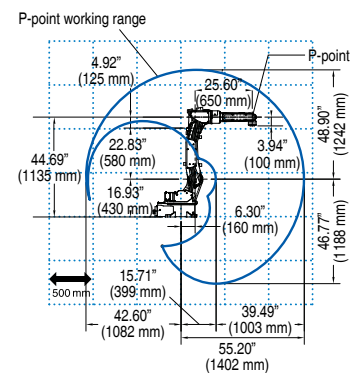
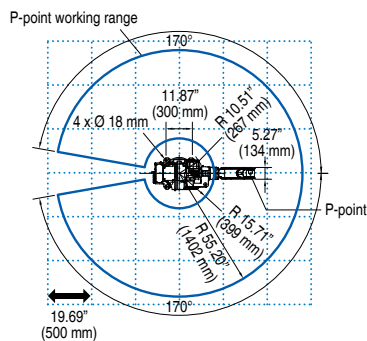
### FD-B4 Standard



### FD-B4L Long Reach

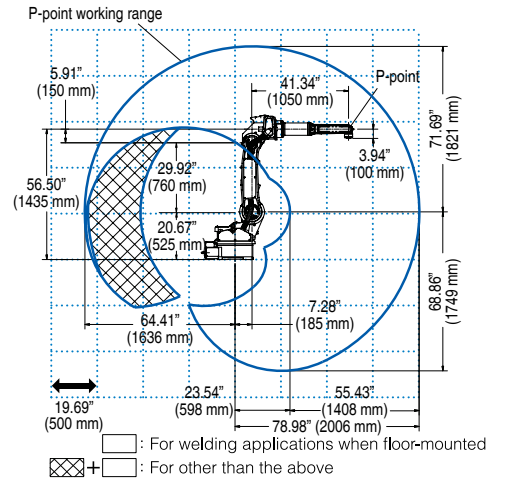
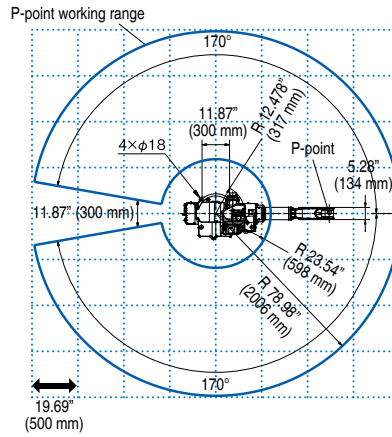


### FD-V6 Standard

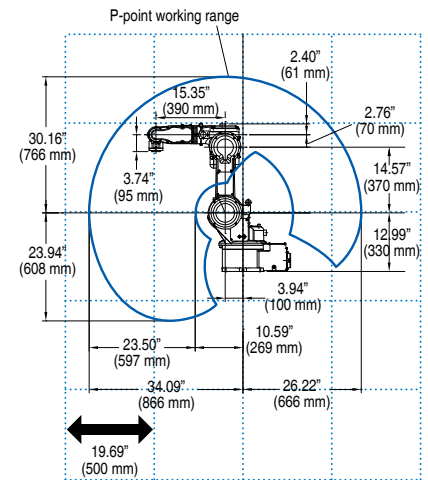
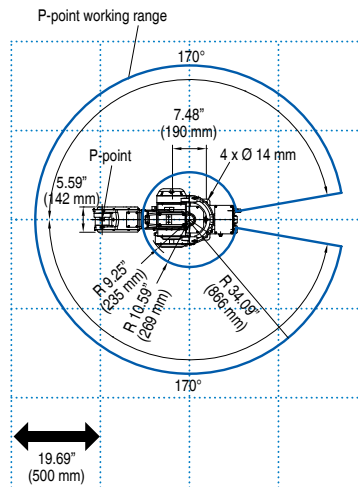




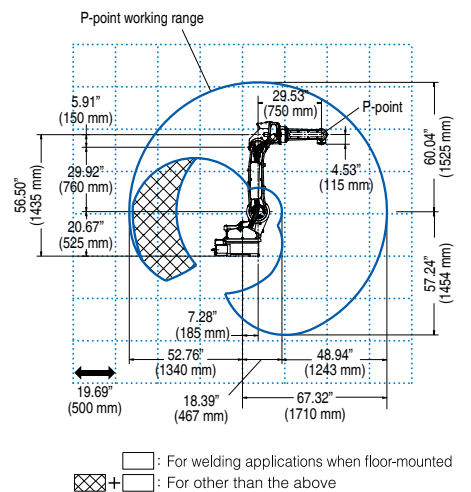
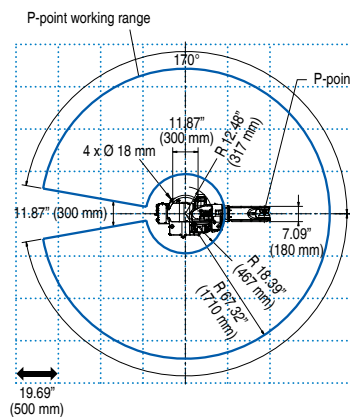
## FD-V6L Long Reach



## FD-H5 Compact



## FD-V20 Standard



# SPECIFICATIONS

## Manipulator

		<b>FD-B4</b>	<b>FD-B4L</b>	<b>FD-V6</b>	<b>FD-V6L</b>	
Model		NB4	NB4L	NV6	NV6L	
Number of axes		6				
Maximum capacity		8.82 lbs (4 kg)	8.82 lbs (4 kg)	13.23 lbs (6 kg)	13.23 lbs (6 kg)	
Positional repeatability		±0.003" (±0.08 mm) <sup>(1)</sup>	±0.003" (±0.08 mm) <sup>(1)</sup>	±0.003" (±0.08 mm) <sup>(1)</sup>	±0.003" (±0.08 mm) <sup>(1)</sup>	
Horizontal Reach		55.55" (1411 mm)	79.06" (2008 mm)	55.29" (1402 mm)	78.98" (2006 mm)	
Vertical Reach		96.34" (2447 mm)	138.75" (3575 mm)	90.67" (2430 mm)	140.55" (3570 mm)	
Driving capacity		2550 W	4650 W	2600 W	5000 W	
Working Range	Arm	J1 (Rotation)	±170° (±50°) <sup>(2)</sup>	±170° (±50°) <sup>(2)</sup>	±170° (±50°) <sup>(2)</sup>	±170° (±50°) <sup>(2)</sup>
		J2 (Lower arm)	-155° to +90°	-155° to +100° <sup>(3)</sup>	-155° to +90°	-155° to +100° <sup>(3)</sup>
		J3 (Upper arm)	-170° to +180°	-170° to +190°	-170° to +190°	-170° to +260° <sup>(4)</sup>
	Wrist	J4 (Swing)	±155°	±155°	±180°	±180°
		J5 (Bending)	-45° to +225° <sup>(5)</sup>	-45° to +225° <sup>(5)</sup>	-50° to +230°	-50° to +230°
		J6 (Twist)	±205° <sup>(5)</sup>	±205° <sup>(5)</sup>	±360°	±360°
Motion speed	Arm	J1 (Rotation)	3.66 rad/s (210°/s) 3.32 rad/s (190°/s) <sup>(2)</sup>	3.40 rad/s (195°/s) 3.05 rad/s (175°/s) <sup>(2)</sup>	3.66 rad/s (210°/s) 3.32 rad/s (190°/s) <sup>(2)</sup>	3.40 rad/s (195°/s) 3.05 rad/s (175°/s) <sup>(2)</sup>
		J2 (Lower arm)	3.66 rad/s (210°/s)	3.49 rad/s (200°/s)	3.66 rad/s (210°/s)	3.49 rad/s (200°/s)
		J3 (Upper arm)	3.66 rad/s (210°/s)	3.49 rad/s (200°/s)	3.66 rad/s (210°/s)	3.49 rad/s (200°/s)
	Wrist	J4 (Swing)	7.33 rad/s (420°/s)	7.33 rad/s (420°/s)	7.33 rad/s (420°/s)	7.33 rad/s (420°/s)
		J5 (Bending)	7.33 rad/s (420°/s)	7.33 rad/s (420°/s)	7.33 rad/s (420°/s)	7.33 rad/s (420°/s)
		J6 (Twist)	10.5 rad/s (600°/s)	10.5 rad/s (600°/s)	10.82 rad/s (620°/s)	10.82 rad/s (620°/s)
Wrist allowable load	Allowable moment	J4 (Swing)	10.1 N•m	10.1 N•m	11.8 N•m	11.8 N•m
		J5 (Bending)	10.1 N•m	10.1 N•m	9.8 N•m	9.8 N•m
		J6 (Twist)	2.94 N•m	2.94 N•m	5.9 N•m	5.9 N•m
	Allowable moment of inertia	J4 (Swing)	0.38 kg•m <sup>2</sup>	0.38 kg•m <sup>2</sup>	0.30 kg•m <sup>2</sup>	0.30 kg•m <sup>2</sup>
		J5 (Bending)	0.38 kg•m <sup>2</sup>	0.38 kg•m <sup>2</sup>	0.25 kg•m <sup>2</sup>	0.25 kg•m <sup>2</sup>
		J6 (Twist)	0.03 kg•m <sup>2</sup>	0.03 kg•m <sup>2</sup>	0.06 kg•m <sup>2</sup>	0.06 kg•m <sup>2</sup>
Arm cross-sectional area		2.94 m <sup>2</sup> x 340°	6.37 m <sup>2</sup> x 340°	3.14 m <sup>2</sup> x 340°	7.48 m <sup>2</sup> x 340°	
Environmental conditions		32 to 113° F (0 to 45° C), 20 to 80% RH (no condensation)				
Mass / weight		340 lbs (154 kg)	611 lbs (277 kg)	317 lbs (144 kg)	602 lbs (273 kg)	
Maximum load of upper arm		22.05 lbs (10 kg) <sup>(6)</sup>	44.09 lbs (20 kg) <sup>(6)</sup>	22.05 lbs (10 kg) <sup>(6)</sup>	44.09 lbs (20 kg) <sup>(6)</sup>	
Installation method		Floor/Ceiling/Wall				
Paint color		White (Munsell notation 10GY 9/1)				

### NOTES:

- (1) The value of the positional repeatability is at the tool center point (TCP) in compliance with ISO 9283.
- (2) The value in parentheses indicates wall mounted.
- (3) Working range of J2 axis may be restricted when wall mounted.
- (4) The operation range of the J3 axis is restricted to -170° to +205° when floor based welding is applied.
- (5) Working range of the J6 axis may be restricted by the position of the J5 axis.
- (6) When loading, the maximum payload as the end effector.
- (7) This value changes according to placement and load conditions of the wrist.



# SPECIFICATIONS

## Controller / Teach pendant

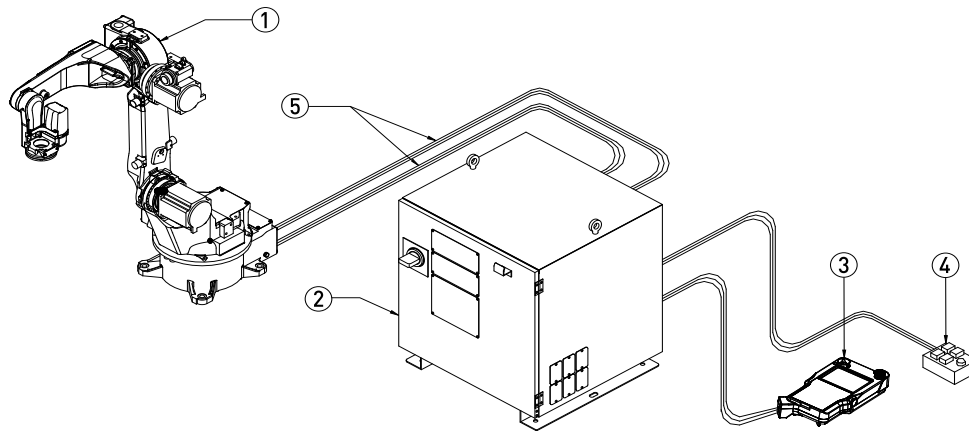
FD-H5	FD-V20
NH5	NV20
11.02 lbs (5 kg)	44.09 lbs (20 kg)
±0.002" (±0.05 mm) <sup>(1)</sup>	±0.003" (±0.07 mm) <sup>(1)</sup>
34.09" (866 mm)	67.32" (1710 mm)
54.1" (1374 mm)	117.28" (2979 mm)
1440 W	5600 W
+170°	±170° (±50°) <sup>(2)</sup>
-125° to +90°	-155° to +100°
-140° to +245°	-170° to +260° <sup>(4)</sup>
±190°	±180°
-30° to +210°	-50° to +230°
±360°	±360°
3.49 rad/s (200°/s)	3.40 rad/s (195°/s)
2.79 rad/s (160°/s) <sup>(2)</sup>	3.05 rad/s (175°/s) <sup>(2)</sup>
3.49 rad/s (200°/s)	3.32 rad/s (190°/s)
4.54 rad/s (260°/s)	3.14 rad/s (180°/s)
6.63 rad/s (380°/s)	6.98 rad/s (400°/s)
6.63 rad/s (380°/s)	6.98 rad/s (400°/s)
8.95 rad/s (510°/s)	10.5 rad/s (600°/s)
11.9 N•m	43.7 N•m
11.9 N•m	43.7 N•m
5.21 N•m	19.6 N•m
0.303 kg•m <sup>2</sup>	1.09 kg•m <sup>2</sup>
0.303 kg•m <sup>2</sup>	1.09 kg•m <sup>2</sup>
0.061 kg•m <sup>2</sup>	0.24 kg•m <sup>2</sup>
1.22 m <sup>2</sup> x 340°	5.27 m <sup>2</sup> x 340°
128 lbs (58 kg)	613 lbs (278 kg)
220 lbs (1 kg) <sup>(6)</sup>	44.09 lbs (20 kg) <sup>(6)</sup>

FD11 Controller	
Dimensions	Inches: 22.83 W x 21.34 D x 25.59 H mm: 580 W x 542 D x 650 H
Mass	Approximately 137 lbs (62 kg)
Ambient temperature range	32 to 113° F (0 to 45° C)
Ambient relative humidity range	20 to 80% RH (non condensing)
Power supply	3-phase 480/240 VAC ±10%, 50/60 Hz with integrated transformer
"General purpose physical I/O"	40 inputs, 40 outputs
Memory capacity	160,000 instructions by PTP instruction in a single mechanism
Number of task programs	9,999
External memory	USB (Robot Control: 1 slot, Teach Pendant: 1 slot)
Color	Munsell notation 10GY 9/1

Teach Pendant	
Dimensions	Inches: 6.89 W x 12.83 D x 3.19 H mm: 175 W x 326 D x 81 H
Mass	Approximately 2.4 lbs (1.08 kg)
Operation device	Axis keys, TP selector switch, jog dial, enable switch, operation ready ON key, emergency stop button, USB memory slot (1 slot)
Display	5.7 inches, 640x480 pixels, 65536 colors, touch panel, LED backlit
IEC protection class	IP65
Cable length	26.25 ft (8 m) standard 49.21 ft (15 m) optional

These specifications are subject to change without prior notice.

# BASIC CONFIGURATION



Number and Part Name	Model	Specification
① Manipulator	<b>NB4</b> (Model Type: NB42- <b>N E F U</b> )	<b>N</b> : Standard <b>C</b> : Chinese <b>E</b> : English <b>F</b> : Floor Type <b>C</b> : Ceiling Mounted <b>W</b> : Wall Mounted <b>N</b> : Standard <b>U</b> : UL
② Controller	<b>FD11</b> (Model Type: FD11- <b>U V O</b> ***)	<b>U</b> : UL <b>J</b> : Standard <b>V</b> : NV6, NB4 (Combination Manipulator Notation) <b>O</b> : No External Axis <b>P</b> : External 1 Axis <b>2</b> : External 2 Axes <b>4</b> : External 1 Axis × 2 <b>A</b> : Large Capacity External 1 Axis (Standard Case External Axis Spec.) *** Additional Case Spec.
③ Teach Pendant	<b>FDTPDDJU-2L**</b>	<b>**</b> : 08      8 m Spec. (Standard) 15      15 m Spec.
④ Operation Box	<b>FDOP-10**</b>	<b>1</b> : UL <b>O</b> : Standard <b>**</b> : 05      5 m Spec. (Standard) 10      10 m Spec. 15      15 m Spec.
⑤ Control Cable 1, 3 (Wire Harness)	<b>FDRB-10**</b>	<b>**</b> : 05      5 m Spec. (Standard) 10      10 m Spec. 15      15 m Spec.



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