



DAIHEN Inc.

ADVANCED WELDING & ROBOTIC SYSTEMS

FD-B4, FD-B4L, FD-V6, FD-V6L, FD-B15, 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.

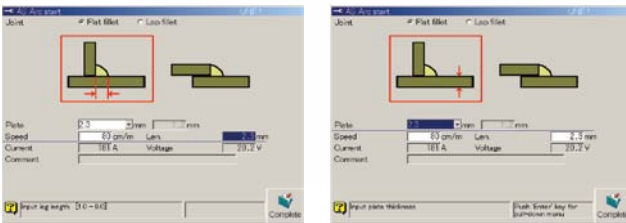
Smooth backups
USB memory slot makes data saving and reading easy.



Smooth welding

Welding condition guide function

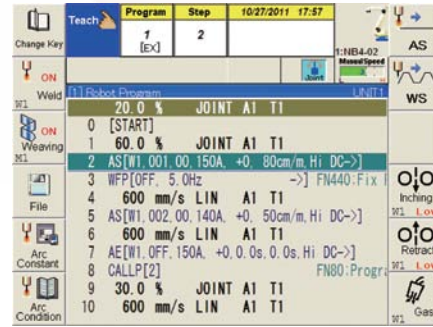
Helps you find better welding conditions with one-touch operation.



Smooth operation

Improved display

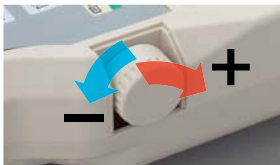
By improving the display of characters, the display is easier to read.



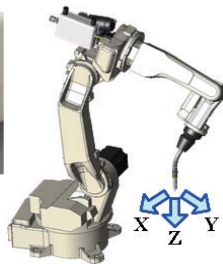
Smooth operation

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.



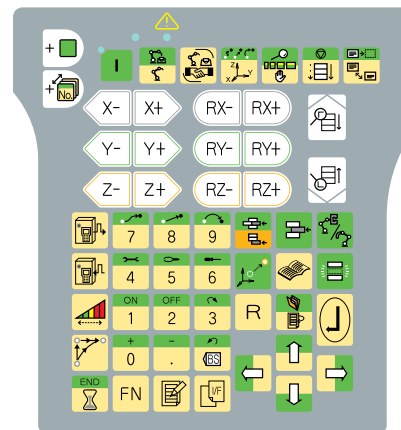
Turn jog dial



Smooth operation

Iconified operation buttons

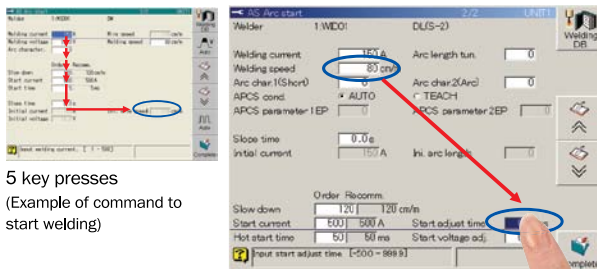
By improving the display of characters, the display is easier to read.



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.

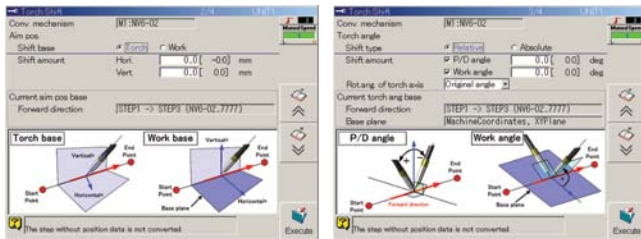


Smart CONTROLLER FD 11

Smart welding

Improved operability

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



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.

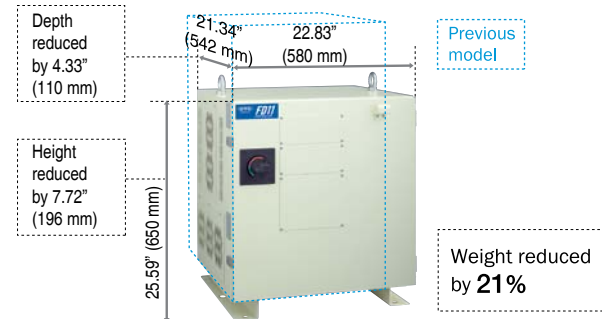
By greatly reducing residual vibrations, high speed approaches are possible.



Downsized

Improved space utilization

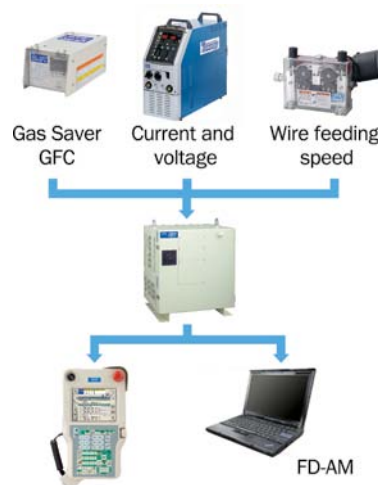
Height of the controller has been reduced.



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-B15



FD-V20



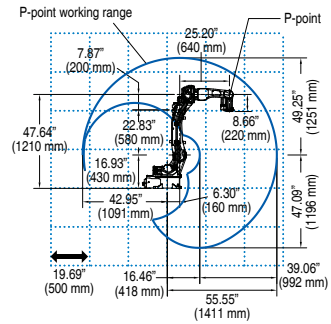
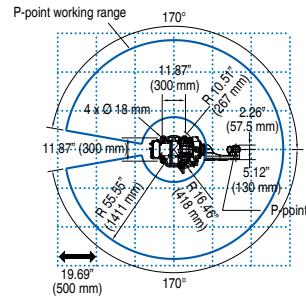
FD-H5



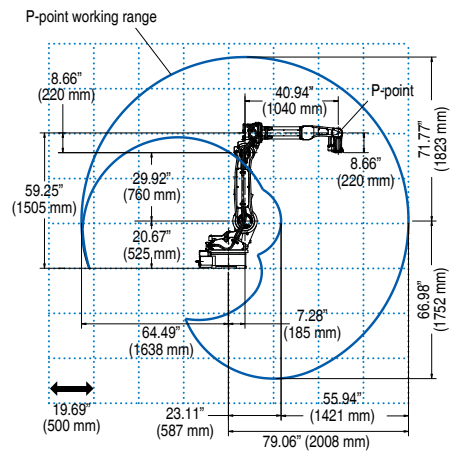
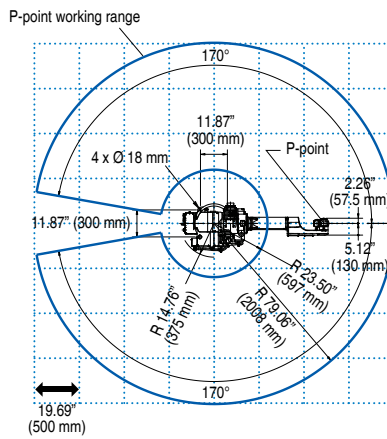
RANGE OF MOTION

Manipulator working range / Specifications

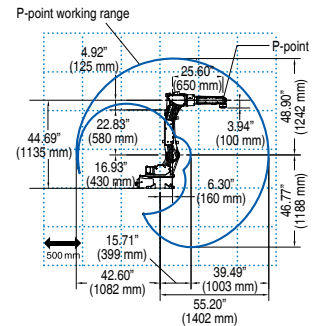
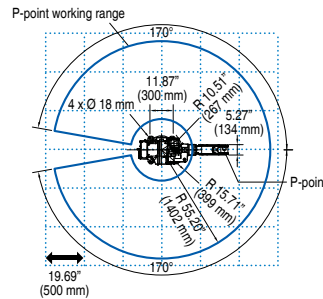
FD-B4 Standard



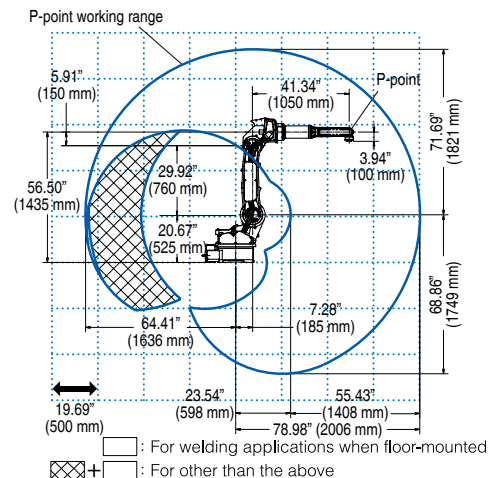
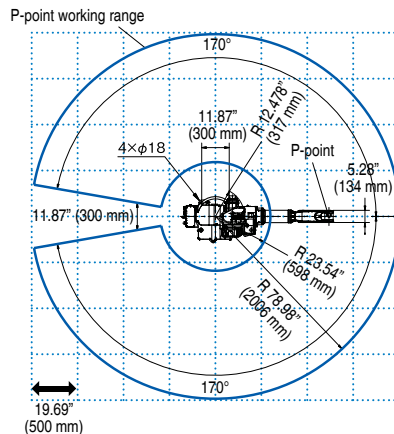
FD-B4L Long Reach



FD-V6 Standard

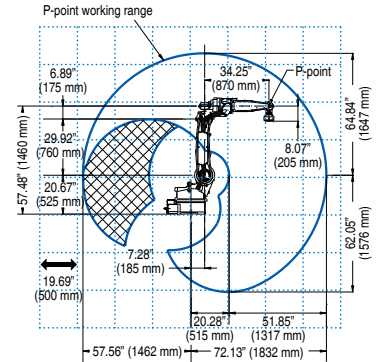
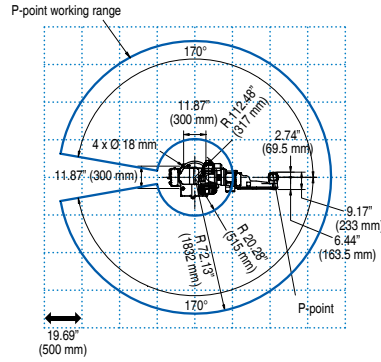


FD-V6L Long Reach



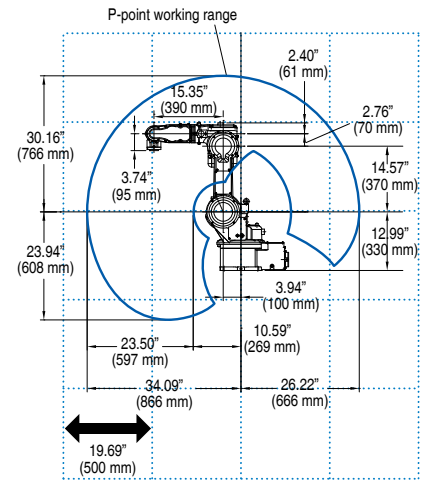
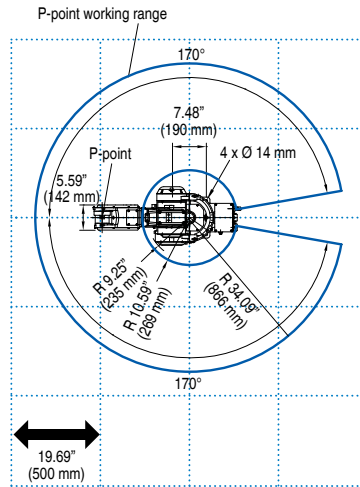
□ : For welding applications when floor-mounted
 ⊗ : For other than the above

FD-B15 Standard

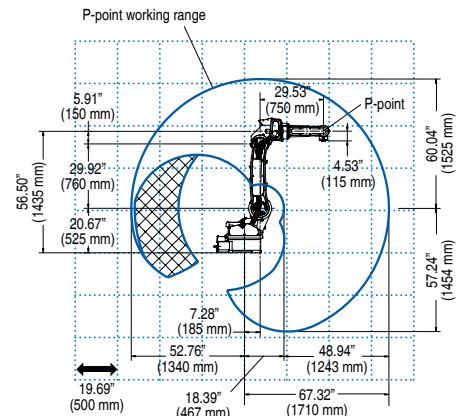
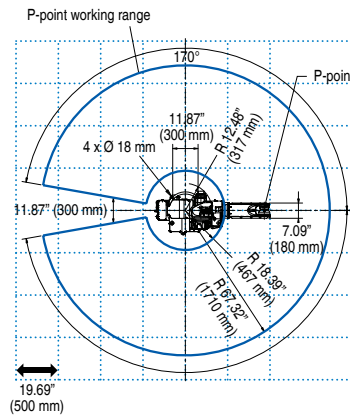


□ : For welding applications when floor-mounted
 ⊗+ □ : For other than the above

FD-H5 Compact

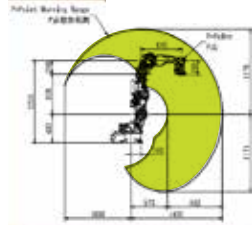


FD-V20 Standard



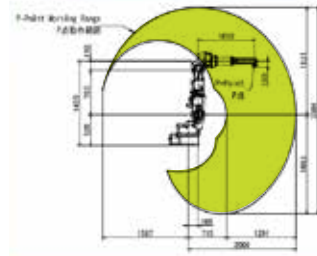
□ : For welding applications when floor-mounted
 ⊗+ □ : For other than the above

7-AXIS ULTRA-FLEX WELDING ROBOT



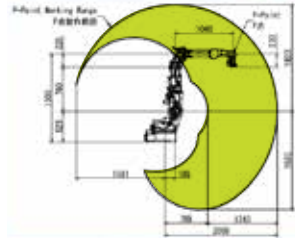
FD-NB4S

Reach	1435mm
Payload	4 Kg
Axes	7
Repeatability	±0.08mm



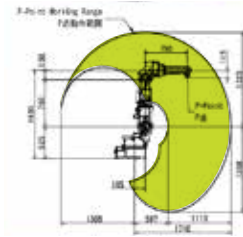
FD-NV6LS

Reach	2006mm
Payload	6 Kg
Axes	7
Repeatability	±0.08mm



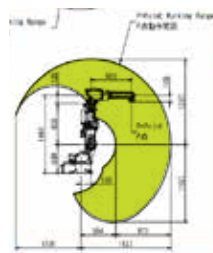
FD-NB4SLS

Reach	2008mm
Payload	4 Kg
Axes	7
Repeatability	±0.08mm



FD-NV20S

Reach	1710mm
Payload	20 Kg
Axes	7
Repeatability	±0.08mm



FD-NV6S

Reach	2008mm
Payload	4 Kg
Axes	7
Repeatability	±0.08mm



FD TEACHING PENDANT

Small And Light

The FD Teaching Pendant is 27% lighter and 40% smaller than our previous model, making tight spaces a non-issue and teaching sessions easier.

Simple Backup

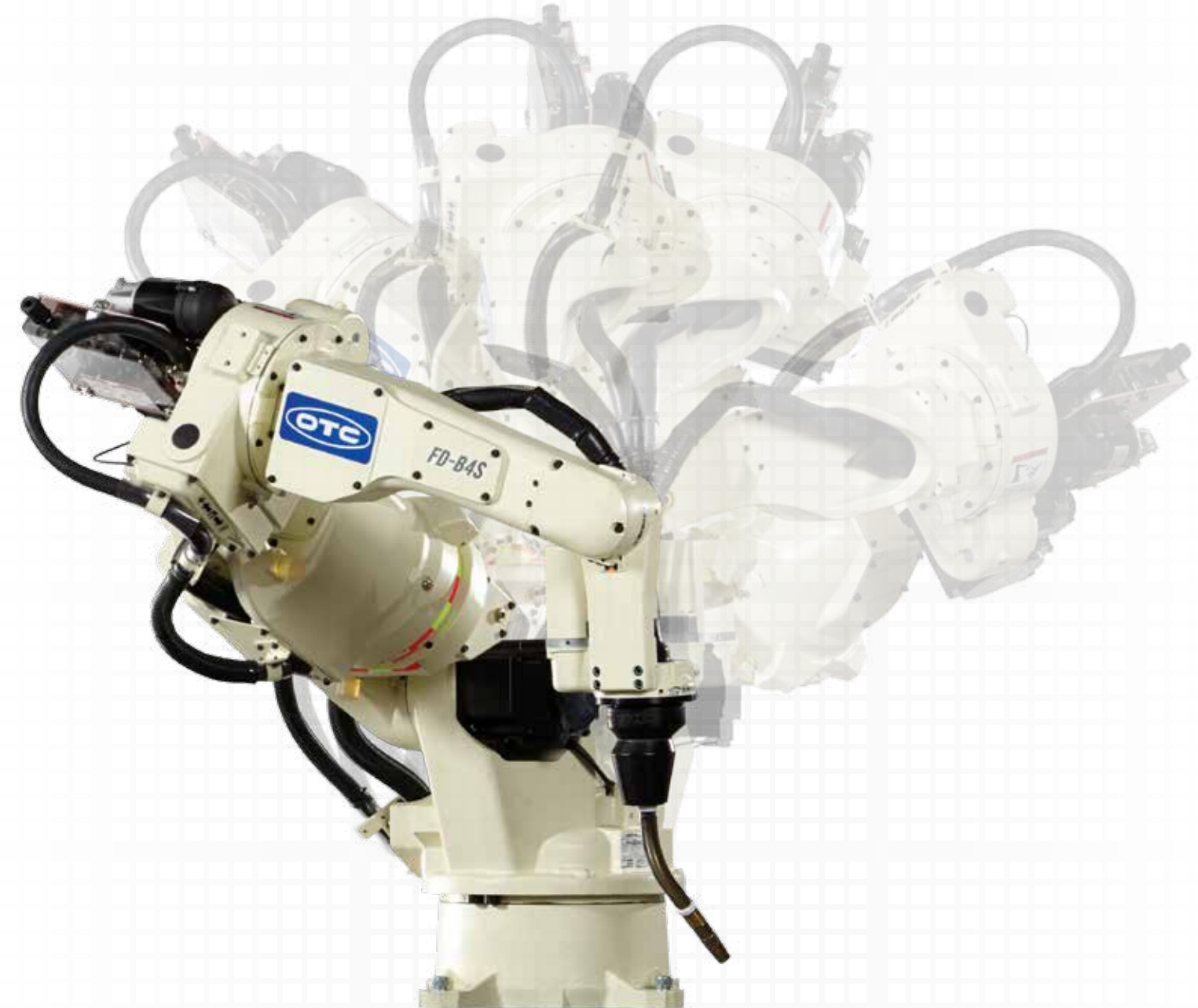
With this feature, you can now back up all data directly from the teaching pendant. A USB memory slot makes backing up data quick and easy.



FD11 Robot Controller

- Windows XP based open architecture
- Large memory capacity and 40 Input / 40 Output control signals
- Advanced PLC functions allow for ladder diagram editing directly through the teaching pendant
- Network capabilities – connects to Ethernet, DeviceNet, and PROFIBUS connections (may require additional hardware)

7-AXIS ULTRA-FLEX WELDING ROBOT



888-OTC-ROBO

www.daihen-usa.com

AVOIDS INTERFERENCE

HIGH-DENSITY INSTALLATION

OPTIMUM TEACHING

SPACE & COST SAVING

BUILT-IN CABLES

North American Corporation Headquarters

1400 Blausen Dr, Tipp City, Ohio 45371 / Phone: (937) 667-0800

Demonstration Centers

Novi, MI Branch Office
Davenport, IA Branch Office
Atlanta, GA Branch Office

Charlotte, NC Branch Office
Monterrey, Mexico Branch Office
Leon, Mexico Branch Office



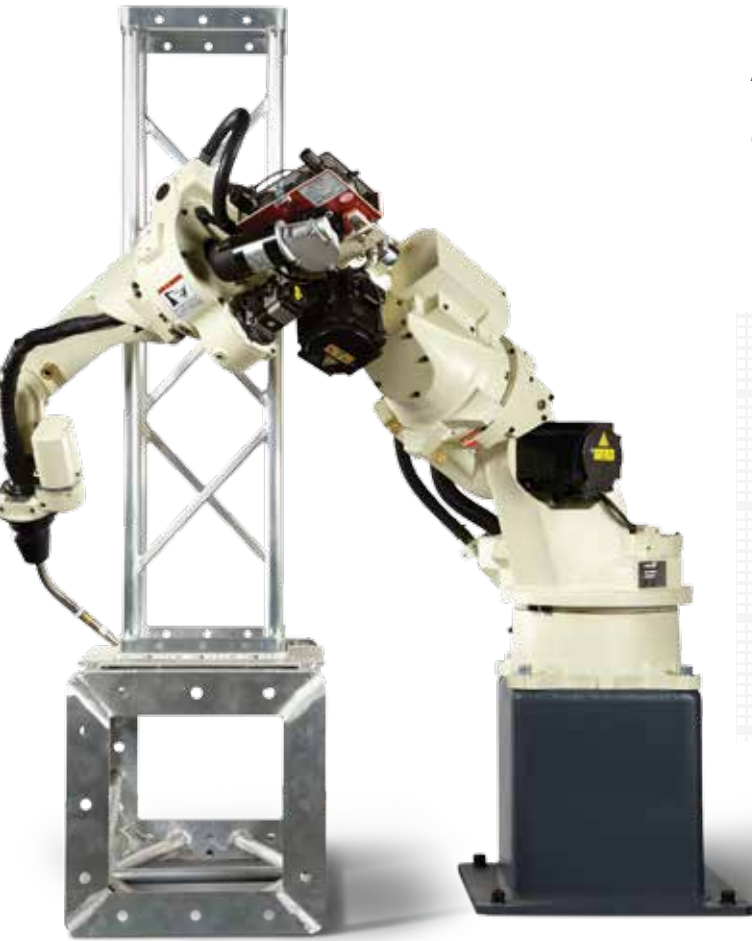
Member of DAIHEN Group

DAIHEN Inc.

www.daihen-usa.com



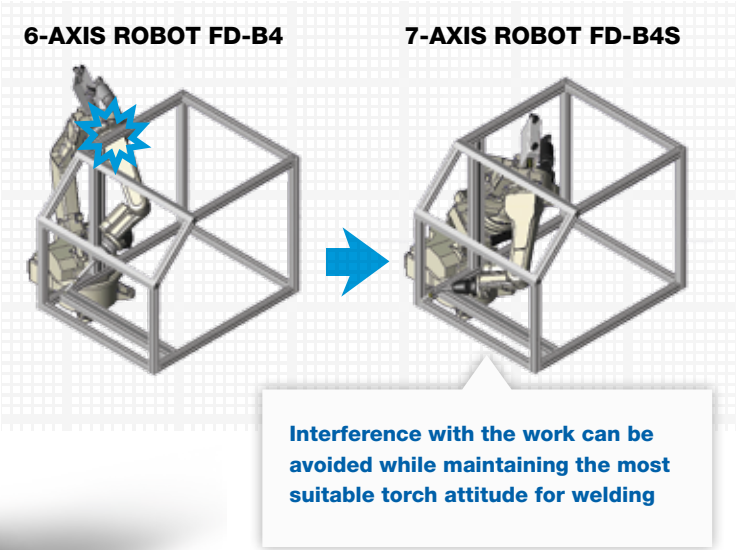
THE 7-AXIS ROBOT PROVIDES UNMATCHED FREEDOM OF MOVEMENT



AVOIDS INTERFERENCE

Interference with tooling and/or work is easily avoided.

- Rotation of the seventh axis enables interference avoidance without changing the position and/or attitude of the tool.
- Maintaining the optimum attitude at all times results in the enhancement of weld quality.



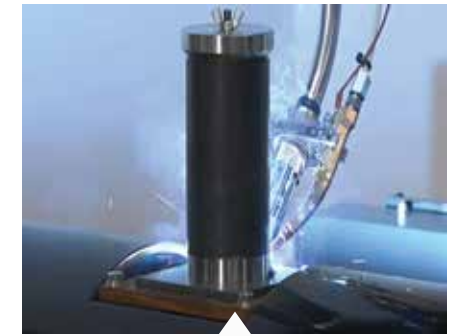
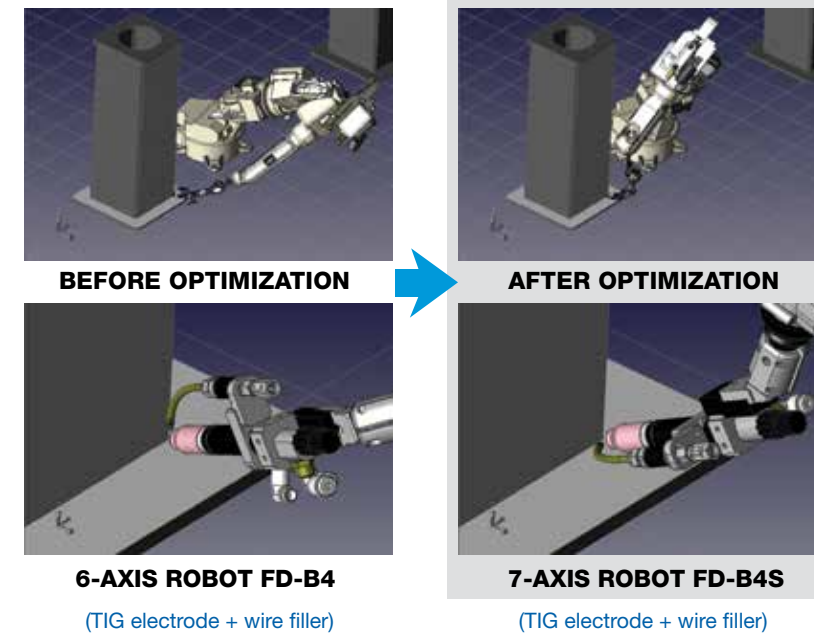
OPTIMUM TEACHING

Easy teaching, even for a two-electrode torch.

Teaching a welding line only to the leading torch **automatically corrects the position and attitude** of the robot so the following torch will also follow the same welding line.

Changing the torch attitude without changing the arm attitude provides freedom from interference even after the automatic correction.

Example of optimum attitude teaching with a two-electrode torch

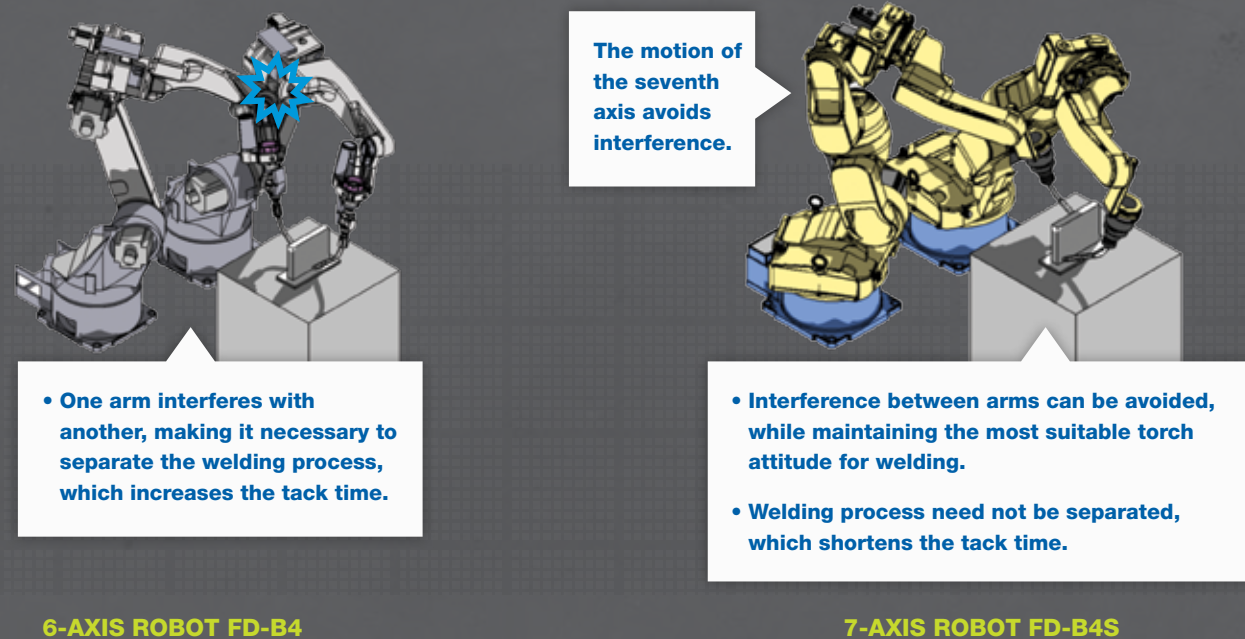


(Cold Tandem GMAW)

HIGH-DENSITY INSTALLATION

Multiple 7-axis robots create a compact production line.

Thanks to **flexible attitude changes** by using the seventh axis, robots can easily move around obstructions. Placing multiple robots in close proximity allows for efficient integration and can shorten the manufacturing process.

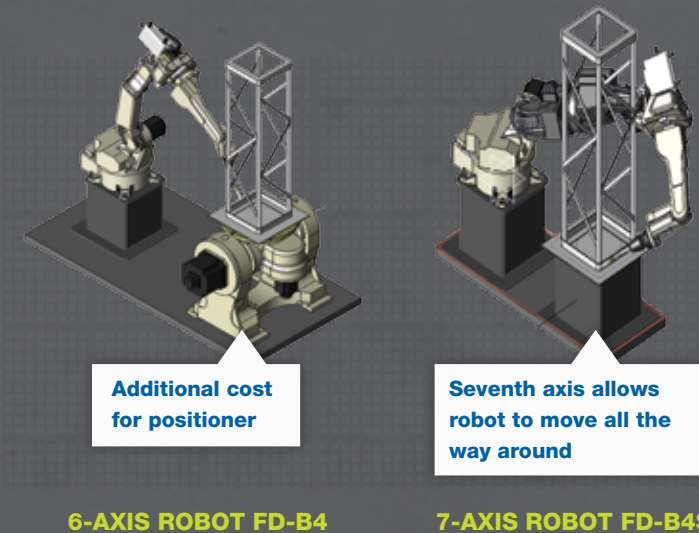


SPACE & COST SAVING

The seventh axis may eliminate the need for additional positioners.

Rotation of the seventh axis enables a **flexible attitude change** when moving around obstructions.

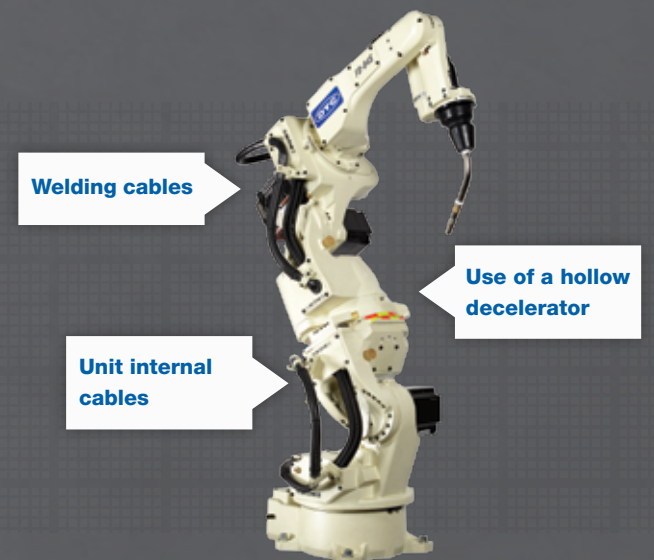
Access to a proper welding position is possible without using a positioner, **reducing installation area and costs** compared with a conventional 6-axis system.



BUILT-IN CABLES

Weld cables are housed in the J7-axis to avoid interference.

Both internal robot cables and **weld cables are built into the J7-axis**, making it possible to **use the movable full range** without interference affecting peripheral devices due to the irregular movement of externally wired cables.



SPECIFICATIONS

Manipulator

		FD-B4	FD-B4L	FD-V6	FD-V6L	
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) ⁽¹⁾	±0.003" (±0.08 mm) ⁽¹⁾	±0.003" (±0.08 mm) ⁽¹⁾	±0.003" (±0.08 mm) ⁽¹⁾	
Horizontal Reach		55.55" (1411 mm)	79.06" (2008 mm)	55.29" (1402 mm)	78.98" (2006 mm)	
Vertical Reach		96.34" (3575 mm)	138.75" (35.75 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°) ⁽²⁾	±170° (±50°) ⁽²⁾	±170° (±50°) ⁽²⁾	±170° (±50°) ⁽²⁾
		J2 (Lower arm)	-155° to +90°	-155° to +100° ⁽³⁾	-155° to +90°	-155° to +100° ⁽³⁾
		J3 (Upper arm)	-170° to +180°	-170° to +190°	-170° to +190°	-170° to +260° ⁽⁴⁾
	Wrist	J4 (Swing)	±155°	±155°	±180°	±180°
		J5 (Bending)	-45° to +225° ⁽⁵⁾	-45° to +225° ⁽⁵⁾	-50° to +230°	-50° to +230°
		J6 (Twist)	±205° ⁽⁵⁾	±205° ⁽⁵⁾	±360°	±360°
Motion speed	Arm	J1 (Rotation)	3.66 rad/s (210°/s) 3.32 rad/s (190°/s) ⁽²⁾	3.40 rad/s (195°/s) 3.05 rad/s (175°/s) ⁽²⁾	3.66 rad/s (210°/s) 3.32 rad/s (190°/s) ⁽²⁾	3.40 rad/s (195°/s) 3.05 rad/s (175°/s) ⁽²⁾
		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	J1 (Rotation)	10.1 N•m	10.1 N•m	11.8 N•m	11.8 N•m
		J2 (Lower arm)	10.1 N•m	10.1 N•m	9.8 N•m	9.8 N•m
		J3 (Upper arm)	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 ²	0.38 kg•m ²	0.30 kg•m ²	0.30 kg•m ²
		J5 (Bending)	0.38 kg•m ²	0.38 kg•m ²	0.25 kg•m ²	0.25 kg•m ²
		J6 (Twist)	0.03 kg•m ²	0.03 kg•m ²	0.06 kg•m ²	0.06 kg•m ²
Arm cross-sectional area		2.94 m ² x 340°	6.37 m ² x 340°	3.14 m ² x 340°	7.48 m ² 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) ⁽⁶⁾	44.09 lbs (20 kg) ⁽⁶⁾	22.05 lbs (10 kg) ⁽⁶⁾	44.09 lbs (20 kg) ⁽⁶⁾	
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 -1700 to +250) 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

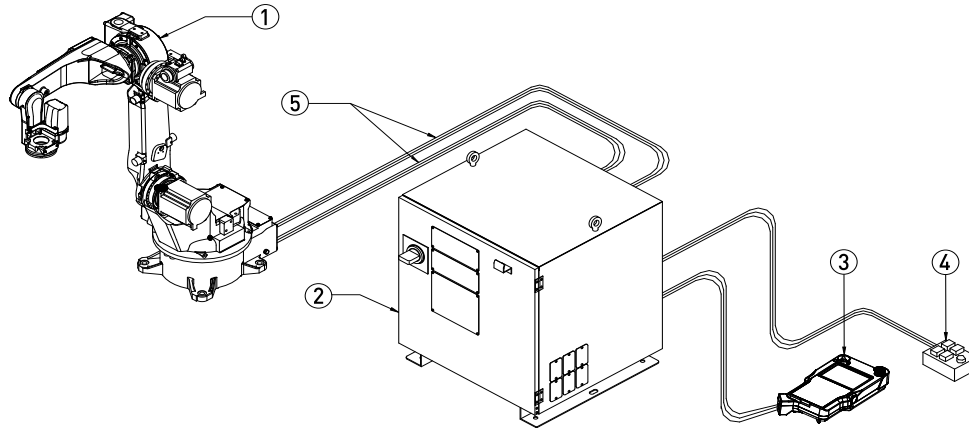
FD-B15	FD-H5	FD-V20
NB15	NI15	NV20
33.07 lbs (15 kg)	11.02 lbs (5 kg)	44.09 lbs (620 kg)
±0.003" (±0.08 mm) ⁽¹⁾	±0.002" (±0.05 mm) ⁽¹⁾	±0.003" (±0.07 mm) ⁽¹⁾
72.13" (1832 mm)	34.09" (866 mm)	67.32" (1710 mm)
126.89" (3224 mm)	54.1" (1374 mm)	117.28" (2979 mm)
5600 W	1440 W	5600 W
±170° (±50°) ⁽²⁾	+170°	±170° (±50°) ⁽²⁾
-155° to +100° ⁽³⁾	-125° to +90°	-155° to +100°
-170° to +305° ⁽⁴⁾	-140° to +245°	-170° to +260° ⁽⁴⁾
±155°	±190°	±180°
-37° to +217° ⁽⁵⁾	-30° to +210°	-50° to +230°
±205° ⁽⁵⁾	±360°	±360°
3.40 rad/s (195°/s)	3.49 rad/s (200°/s)	3.40 rad/s (195°/s)
2.88 rad/s (165°/s) ⁽²⁾	2.79 rad/s (160°/s) ⁽²⁾	3.05 rad/s (175°/s) ⁽²⁾
3.05 rad/s (175°/s)	3.49 rad/s (200°/s)	3.32 rad/s (190°/s)
3.32 rad/s (190°/s)	4.54 rad/s (260°/s)	3.14 rad/s (180°/s)
6.98 rad/s (400°/s)	6.63 rad/s (380°/s)	6.98 rad/s (400°/s)
6.11 rad/s (350°/s)	6.63 rad/s (380°/s)	6.98 rad/s (400°/s)
10.5 rad/s (600°/s)	8.90 rad/s (510°/s)	10.5 rad/s (600°/s)
39.0 N•m	11.9 N•m	43.7 N•m
39.0 N•m	11.9 N•m	43.7 N•m
7.36 N•m	5.21 N•m	19.6 N•m
1.05 kg•m ²	0.303 kg•m ²	1.09 kg•m ²
1.05 kg•m ²	0.303 kg•m ²	1.09 kg•m ²
0.04 kg•m ²	0.061 kg•m ²	0.24 kg•m ²
6.52 m ² x 340°	1.22 m ² x 340°	5.27 m ² x 340°
631 lbs (286 kg)	128 lbs (58 kg)	613 lbs (278 kg)
44.09 lbs (20 kg) ⁽⁶⁾	220 lbs (1 kg) ⁽⁶⁾	44.09 lbs (20 kg) ⁽⁶⁾

	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% -15%, 50/60 Hz with integrated transformer
"General purpose physical I/O"	40 inputs, 40 outputs (standard)
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 optional)
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 21 lbs (0.96 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	NB4 (Model Type: NB42- N E F U)	N : Standard C : Chinese E : English F : Floor Type C : Ceiling Mounted W : Wall Mounted N : Standard U : UL
② Controller	FD11 (Model Type: FD11- U V O ***)	U : UL J : Standard V : NV6, NB4 (Combination Manipulator Notation) O : No External Axis P : External 1 Axis 2 : External 2 Axes 4 : External 1 Axis x 2 A : Large Capacity External 1 Axis (Standard Case External Axis Spec.) *** Additional Case Spec.
③ Teach Pendant	FDT PDSJN-2L **	**: 08 8 m Spec. (Standard) 15 15 m Spec.
④ Operation Box	FDOP-10 **	1 : UL O : Standard **: 05 5 m Spec. (Standard) 10 10 m Spec. 15 15 m Spec.
⑤ Control Cable 1, 3 (Wire Harness)	FDRB-10 **	**: 05 5 m Spec. (Standard) 10 10 m Spec. 15 15 m Spec.

Inverter D SERIES

True digital welding machines designed meet all of your robotic arc welding needs



OTC DAIHEN INC.
(Headquarters)
1400 Blausner Dr.
Tipp City, OH 45371
Ph: 937-667-0800
Fax: 937-667-0885

OTC DAIHEN INC.
(Charlotte Branch)
5311 W. T. Harris Blvd., West
Charlotte, NC 28269

OTC DAIHEN INC.
(Atlanta Branch)
2964 Northeast Parkway NW
Atlanta, GA 30360

OTC DAIHEN INC.
(Detroit Branch)
22241 Roethel Drive,
Suite A
Novi, MI 48375

OTC DAIHEN, Inc. reserves the right to change specifications without notice.

© OTC DAIHEN, Inc. Printed in U.S.A.

Note This product and the technologies (including software) used in the product are subject to Catch-All Controls. When exporting any of them, verify the users, applications, etc. according to the applicable laws and regulations and take appropriate procedures such as applications for export permission to the Minister of Economy, Trade and Industry if required.

CAT. NO. R0004-A

•The information contained in this catalog is current as of August 2012 and is subject to revision without notice.