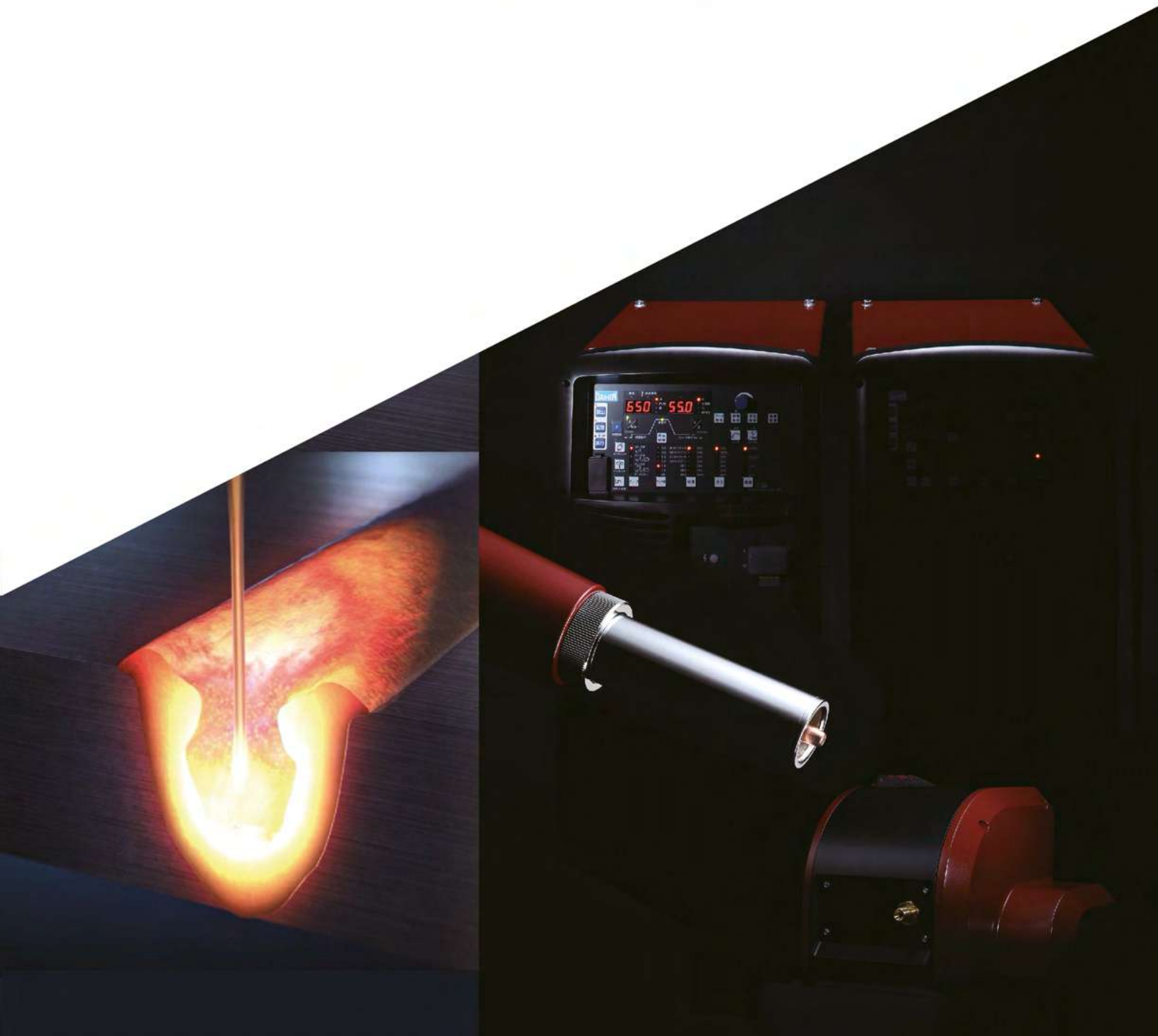
OTC
DAIHEN Corporation

High-Current, Buried-Arc Transfer Welding

B-Arc



B-Arc Welding System Maximizes the Potential of High-Current Buried Arc.

B-Arc welding is created with unique welding system and innovated control technology.

The high-output welding system enables high-current welding, and the precise waveform control technology stabilizes a buried arc. The system with control technology creates B-Arc welding with high-current buried arc.

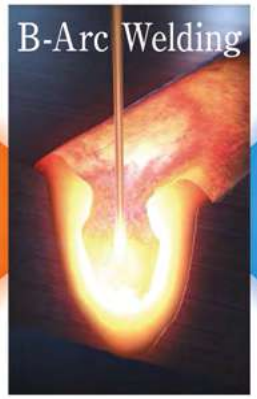
Introduction of B-Arc welding system

High-output welding system

High-output power source: 750A rated output current

High-speed, wire-feed system: 70m/min wire feed rate

High-current, water-cooled welding torch: 750A rated current



Waveform control technology for stabilization

Welbee stabilizes a buried arc, controls waveform precisely

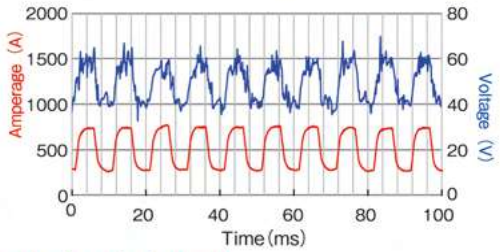
Welbee: LSI, dedicated to welding control

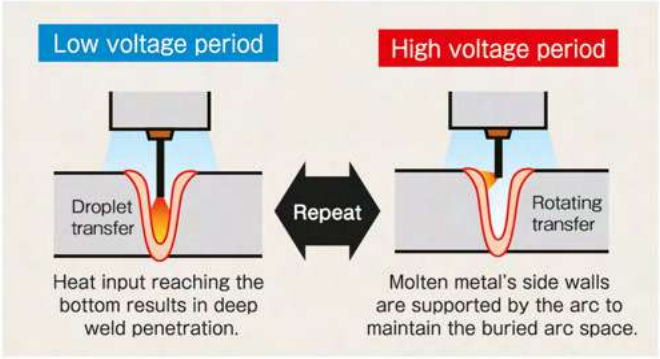
Welbee Precisely controls waveform, successfully stabilizes a high-current buried arc.

Stabilizing buried arc at high-current is difficult. Nevertheless, DAIHEN has mastered the process by utilizing technology in the Welbee precise waveform control. It's the first of its kind.

Low frequency modulated voltage control

Daihen control technology controls droplet transfer and rotating transfer by repeating low and high voltage ranges periodically, to stabilize both deep penetration and buried-arc space.

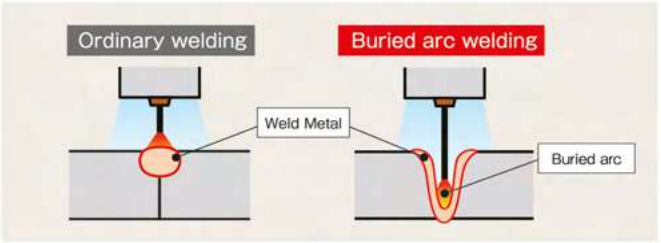




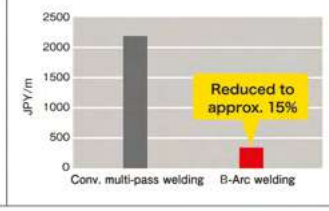
What is buried arc:

"Buried arc" defines an arc generating state, that a high-current arc forces welding wire into molten weld metal.
It results in deep weld penetration because the base metal is heated deeply.

Scan to read more features of B-Arc welding



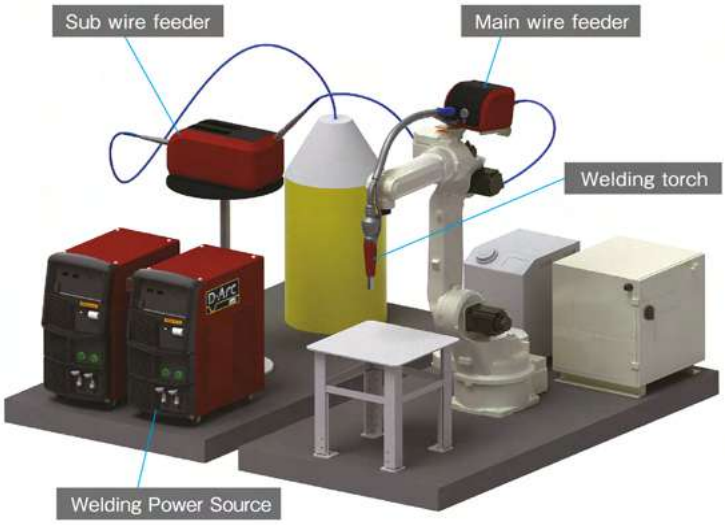
High-efficiency welding achieved by one-pass welding on up to 19-mm thick steel plate creates.

Comparison	Conv. multi-pass welding	B-Arc welding	Welding cost (1-m weld length)
Welding procedure	6 passes 	1pass  ※With backing	

Product Features

Various specifications are available depending on the application

Robot/Automated machine spec.



Rated wire feed speed: 70m/min

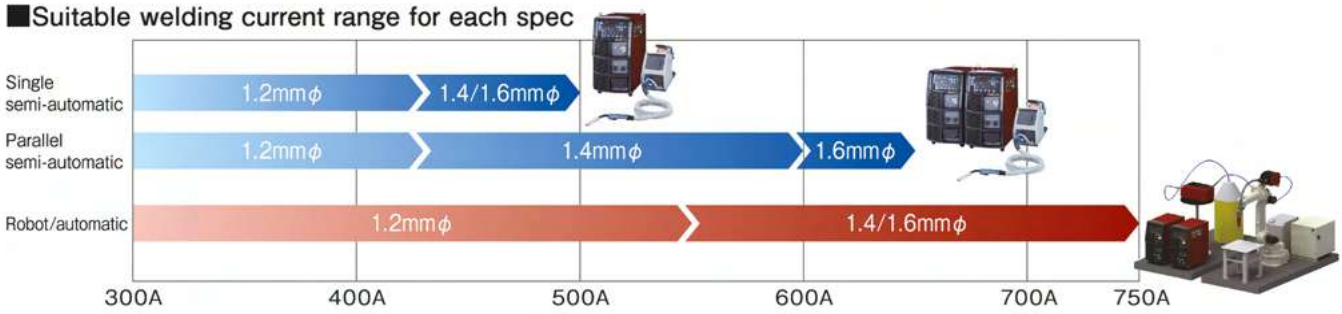
Semi-automatic spec.

Single configuration or Parallel configuration operable according to application.

Single Configuration　　Parallel Configuration

Rated wire feed speed: 22m/min

■Suitable welding current range for each spec



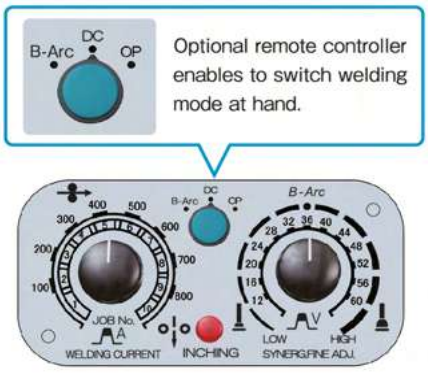
*Figures in the bar chart show wire diameters.
*Duty cycle differs depending on torch rating.
*Optional when the welding current is 650A or more.

■List of welding modes

Welding process	Shielding gas	Applicable welding wire	Wire dia. (mmφ)		
			1.2	1.4	1.6
B-Arc	CO_2	Mild steel solid	○	○	○
DC	CO_2	Mild steel solid	○	○	○
		Mild Steel Cored	○	○	○
		Stainless Cored	○	–	○
	MAG	Mild steel solid	○	○	○
	MIG	Stainless solid	○	–	○

CO_2/MAG/MIG mode is also equipped for DC

※When using semi-automatic specifications, DC gouging and DC Stick can be used as options.



Product Features

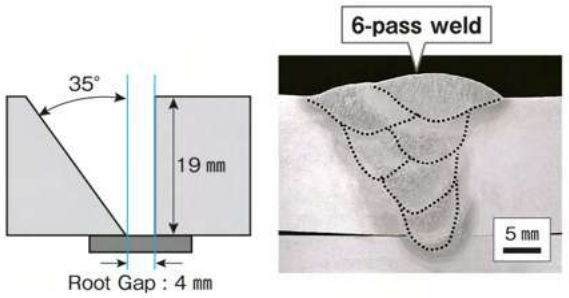
Semi-automatic spec.

Welding current at approx. 500A

Achieve high-efficiency welding on thick-plate

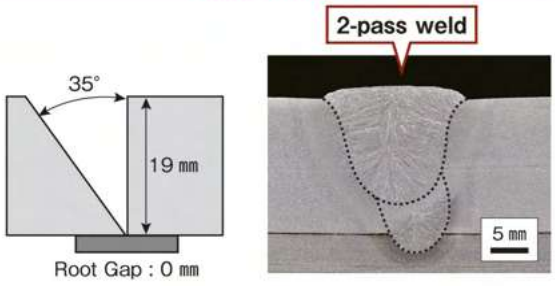
By applying B-Arc mode to multi-layer welding at welding current range (500A) for semi-automatic welding, 19-mm thick plates can be welded with two passes, thereby welding efficiency can be improved.

Example of conventional welding procedure



Weld pass	1~6 pass
Welding current	300A
Arc voltage	30V
Wire feed rate	7.2m/min

B-Arc welding



Weld pass	1st pass	2nd pass
Welding current	**500A**	**440A**
Arc voltage	42.5V	39.5V
Wire feed rate	15.9m/min	13.0m/min

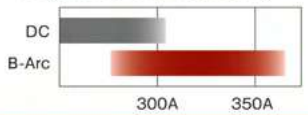
B-Arc reduces the number of weld passes by **1/3** times compare to conventional process.

Welding current at approx. 350A

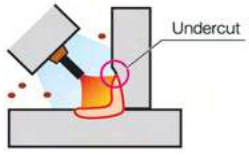
B-Arc mode creates high-quality welding.

On B-Arc mode with buried arc, welding current can be increased without undercut welding defect occurs, therefore a higher welding current can be used compare to on conventional DC mode.

■Comparison of suitable welding current range for horizontal fillet welding



DC



With conventional DC mode, the use of high current causes a broaden arc, generates undercut.

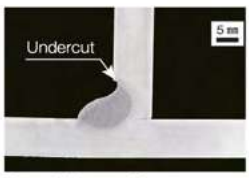
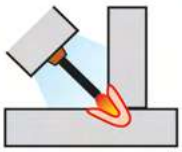


Plate thickness ; 9mm
Welding current ; 320A
Arc voltage ; 35V
Welding speed ; 45cm/min
Weaving ; ±3mm/2Hz

B-Arc



With B-Arc mode, an arc generates deeply in the base metal, so undercut is unlikely to occur and welding with fewer spatter is possible.

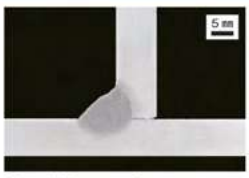
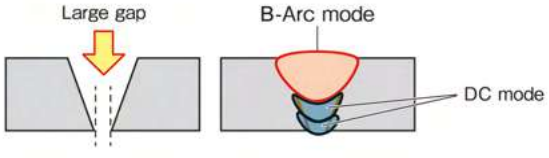


Plate thickness ; 9mm
Welding current ; 320A
Arc voltage ; 31.5V
Welding speed ; 45cm/min
Weaving ; ±3mm/2Hz

Example of applicable combination of welding modes

For a workpiece that has a root gap and no backing can be applied, DC mode can be used for 1st and 2nd layers, and B-Arc mode can be used for 3rd and subsequent layers, thereby reducing the number of passes in multilayer welding.



Robot/Automated machine spec.

Welding current at approx. 600A

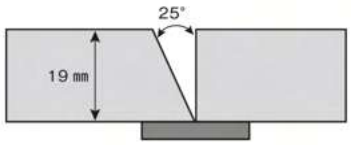
Robot/Automatic welding system maximizes the potential of B-Arc mode.

Using B-Arc on robot/automatic welding system, forms high accurate weld beads, maximizes welding current. Also, 20 mm or thicker plates can be welded by multilayer welding.

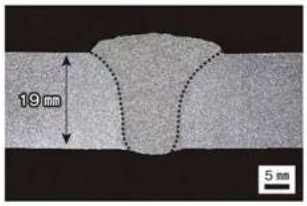
■Examples of welding procedure

Item	Condition
Plate thick.	19㎜
Groove shape	Single bevel
Root gap	0㎜
Backing	Ceramic
Welding amp.	580A
Arc voltage	48V
Welding speed	24cm/min

Groove shape

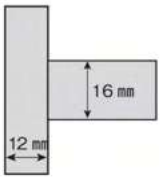


Macrograph

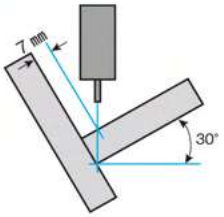


Item	Condition
Plate thick.	12㎜/16㎜
Groove shape	Square
Root gap	0㎜
Backing	None
Welding amp.	Face:530A, Back:440A
Arc voltage	Face:43V, Back:38V
Welding speed	30cm/min

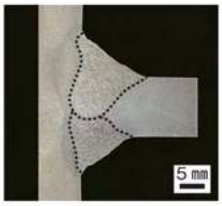
Joint configuration



Welding position



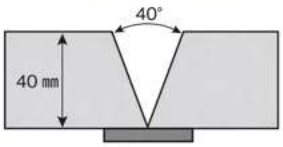
Macrograph



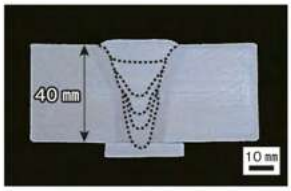
Item	Condition
Plate thick.	40㎜
Groove shape	V-groove (40deg)
Root gap	0㎜
Backing	Steel
Welding amp.	1~4L:580A, 5L:480A
Arc voltage	1~4L:45.5V, 5L:38V
Welding speed	30cm/min

Groove shape

B

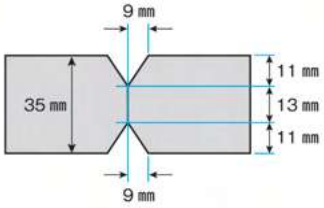


Macrograph

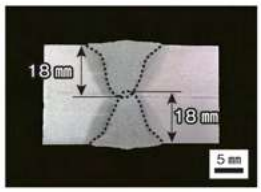


Item	Condition
Plate thick.	35㎜
Groove shape	Double-V groove
Root gap	0㎜
Backing	None
Welding amp.	620A
Arc voltage	47V
Welding speed	30cm/min

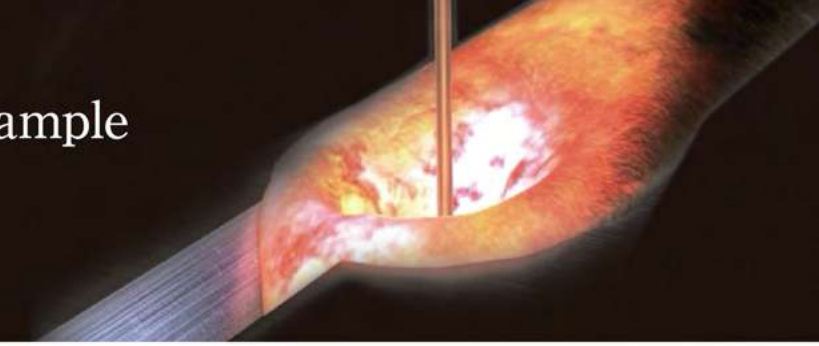
Groove shape



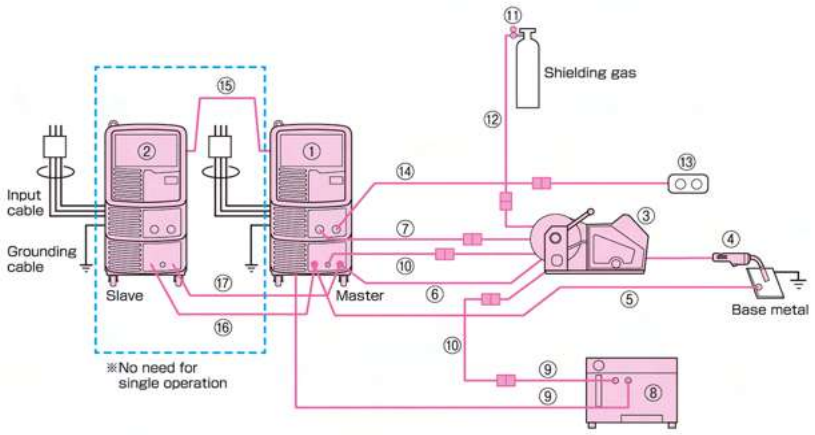
Macrograph



Equipment configuration example



Semi-automatic spec.

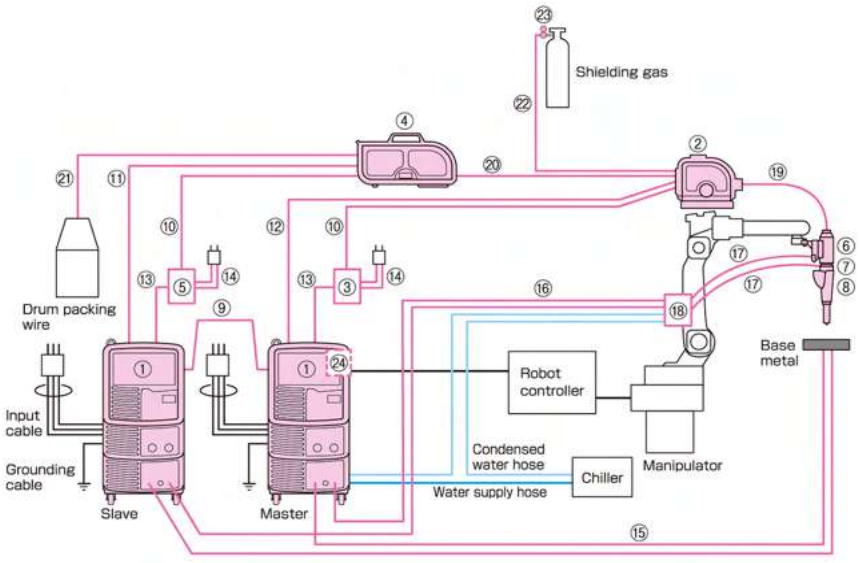


Name of parts	Part No. (Model)
① Power source (Maser)	WB-DPS
② Power source (Slave)	WB-DPS
③ Wire feeder	CMW-7403
④ Welding torch	BTW500-50
⑤ Power cable, 7 m	BKPT-6007
⑥ Power cable, 10 m	BKPT-6012
⑦ Feeder control cable, 10 m	BKCPJ-1010
⑧ Water pump	PU-701
⑨ Water hoses	BBPU-3002
⑩ Water hoses (for ext.)	BKWR-0610
⑪ Gas regulator	※1
⑫ Gas hose (for ext.), 10 m	BKGG-0610
⑬ Remote controller	K8036Z00
⑭ Remote controller ext. cable	BKCPJ-0610
⑮ Communication cable (PS to PS) ※2	BKCDP-01
⑯ Power cable (PS to PS), 2 m ※2	BKPT-3802
⑰ Power cable (PS to PS), 2 m ※2	BKPT-3802

※1 Depending on the area in which a power source is used, the specification is different.

※2 No need for single operation.

Robot/Automated machine spec.



Name of parts	Part No. (Model)
① Power source (Maser/Slave)	WB-DPS
② Pull feeder	DF-PL-E
③ AC servo wire feed control device (for pull feeder)	DFC-PL
④ Push feeder	DF-PS-E
⑤ AC servo wire feed control device (for push feeder)	DFC-PS
⑥ Welding torch	DTWH6500S
⑦ Shock sensor	SSV-R
⑧ Torch attachment bracket	L10620F00
⑨ Communication Cable (PS to PS)	BKCDP-01
⑩ Control cable (for motor and encoder)	BKCDM-10
⑪ Control cable (for Angle sensor line)	BKCDA-10
⑫ Control cable (for gas electromagnetic power line)	BKCDV-10
⑬ Communication cable	BKCDC-02
⑭ Power cable, 2set	BKPD-05
⑮ Power cable, 10 m, 2set	BKPT-8012
⑯ Power cable, 10 m, 2set	BKPT-8012
⑰ Water cooling power cable	U6205D00
⑱ Connection block	K-8026
⑲ Single-wire power cable	L-10621
⑳ Conduit (push feeder to pull feeder)	L10597E00
㉑ Conduit (push feeder to drum packing wire)	L10599B00
㉒ Gas hose, 20 m	BKGG-0620
㉓ Gas regulator	※1
㉔ Interface unit ※2	IFR-101WB IFR-800EI IFR-800PB

※1 Depending on the area in which a power source is used, the specification is different.

※2 When connecting to another company's robot or automatic machine

Specification

■Input Power Capacity and Cables Specifications

Model		WB-DPS (Single) ※1
Input voltage		340 to 460 V
Phase		Three phase
Input power capacity		30 kVA or more
Protective device	Fuse	50 A
	No-fuse breaker (or leakage breaker) ※2	50 A
Input side power cable		10mm² or more to 38mm² or less
Base metal/Feeder power cable ※3		60mm² or more
Grounding cable		10mm² or more to 38mm² or less

※1 Be sure to install a switch with fuse or a circuit breaker (for motor) to the input side of each welding power source.
※2 When using a no-fuse breaker, use a motor breaker.
※3 One is required for one welding power source.
● Depending on the area in which a power source is used, the specification is different.

Spec for semi-auto equipment

Product name	Item	Specifications			
Power source	Model	WB-DPS			
	Rated input voltage	400V (50/60 Hz)			
	Input voltage range	340 to 460 V			
	Number of phases	Three phases			
	Rated input	28.3KVA (26.0kW)	24.8KVA (22.8kW)	44.1kVA (39.9kW)	50.4kVA (46.4kW)
	Welding method	B-Arc (Single)	DC (Single)	B-Arc (Parallel)	DC (Parallel)
	Rated duty cycle	50%	60%	100%	100%
	Rated output current	500A		650A	750A
	Rated load voltage	45V	39V	55V	
	Output current range	30 to 500A		50 to 650A	50 to 750A
	Rated output voltage range	15.5 to 45V		16.5 to 55V	
	Maximum no-load voltage	109 V			
	External dimensions	W395 × D710 × H810 mm (w/o protruding portions of eyebolts, etc)			
	Mass	79 kg			
Wire feeder	Model	CMW-7403			
	Use	For semi-auto welding			
	Wire diameter ※4	1.2,(1.4),1.6 mm			
	Wire feeding speed	Max 22 m/min			
	External dimensions	W254 × D611 × H393 mm			
	Mass	14kg			
Welding torch	Model	BTW500-50 (30)			
	Wire diameter ※4	(1.2),(1.4),1.6 mm			
	Rated current	CO_2:500A MAG:450A			
	Duty cycle	100%			
	cooling system	Water cooling			
	cable length	5m (3m)			
Feeder unit side power cable	Model	BKPT-6012			
	Cable size	60 mm²			
Base metal side power cable	Model	BKPT-6007			
	Cable size	60 mm²			
Power cable (PS to PS)	Model	BKPT-3802			
	Cable size	38 mm²			
Communication cable (PS to PS)	Model	BKCDP-01			
Control cable	Model	BKCPJ-1010			
Gas regulator	Model	※5			
Water-cooled pump	Model	PU-701			
	Water hose	BBPU-3002			
	Water hoses (for ext.)	BKWR-0610			

※4 When using a wire with the diameter indicated in the parentheses, an optional part is necessary.
※5 Depending on the area in which a power source is used, the specification is different.

Standard accessories

Product name	Part No. (Model)
●Power source	WB-DPS
Feed roll (1.4/1.6)	2 (K5439B01)
Parallel connection parts	1 (K8116C00)
Allen wrench No.8	1
Pan head machine screw	4
●Wire feeder	CMW-7403
Gas hose	1
Water hose	2
●Welding torch	BTW500-50
Heat Shield	1 (U6257E00)

Options

■Extension cable

Name of parts	Part No. (Model)			
	5m	10m	15m	20m
Power cable	BKPT-6007	BKPT-6012	BKPT-6017	BKPT-6022
Gas hose	BKGG-0605	BKGG-0610	BKGG-0615	BKGG-0620
Feeder control cable (10-core)	BKCPJ-1005	BKCPJ-1010	BKCPJ-1015	BKCPJ-1020
Analog remote control cable	BKCPJ-0605	BKCPJ-0610	BKCPJ-0615	BKCPJ-0620
Water hose	BKWR-0605	BKWR-0610	BKWR-0615	BKWR-0620

■Analog remote control

Product name	Part No. (Model)
Analog remote control	K8116B00

■Heat shield (Wide)

Product name	Part No. (Model)
Heat shield	U6257F00

■Interface for robots by other manufacturer

Product name	Part No. (Model)
Interface	IFR-101WB

■Welbee Fieldbus connection tool

Product name	Part No. (Model)
For EtherNet/IP	IFR-800EI
For PROFIBUS	IFR-800PB

■Wire feeder/welding torch for robots and automatic machine

Product name	Item	Specifications	
Pull feeder	Model	DF-PL	
	Wire diameter	(1.2) ,1.4, (1.6) mm	
	Wire feeding speed	Max 70 m/min	
	External dimensions	W328 × D297 × H266 mm	
	Mass	9 kg	
Push feeder	Model	DF-PS	
	Wire diameter	(1.2) ,1.4, (1.6) mm	
	Wire feeding speed	Max 70 m/min	
	External dimensions	W268 × D646 × H322 mm	
	Mass	19 kg	
Welding torch (straight)	Model	DTWH6500S	
	Wire diameter	(1.2) ,1.4, (1.6) mm	
	Rated current	750 A	
	Duty cycle	100%	
	Cooling system	Water cooling	
Welding torch (curved)	Model	DTWH6500H	
	Wire diameter	(1.2) ,1.4, (1.6) mm	
	Rated current	750 A	
	Duty cycle	100%	
	Cooling system	Water cooling	

Specification

Peripheral equipment

■Chiller

Product name	Item	Specifications
Chiller	Cooling capacity	5 kW or more (At 25 degrees)
	Water flow rate	4 L/min or more

■Cleaning kit (Nozzle cleaning, wire cutter)

Product name	Part No. (Model)
Cleaning kit	CLK-01

In accordance with DAIHEN's policy of make continuing improvements, design and/or specifications are subject to change without notice and without any obligation on the part of manufacturer.

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