



CO<sub>2</sub>/MAG Automatic Welding Machine

# M350L · M350 · M500

## Welbee Inverter



# Welbee

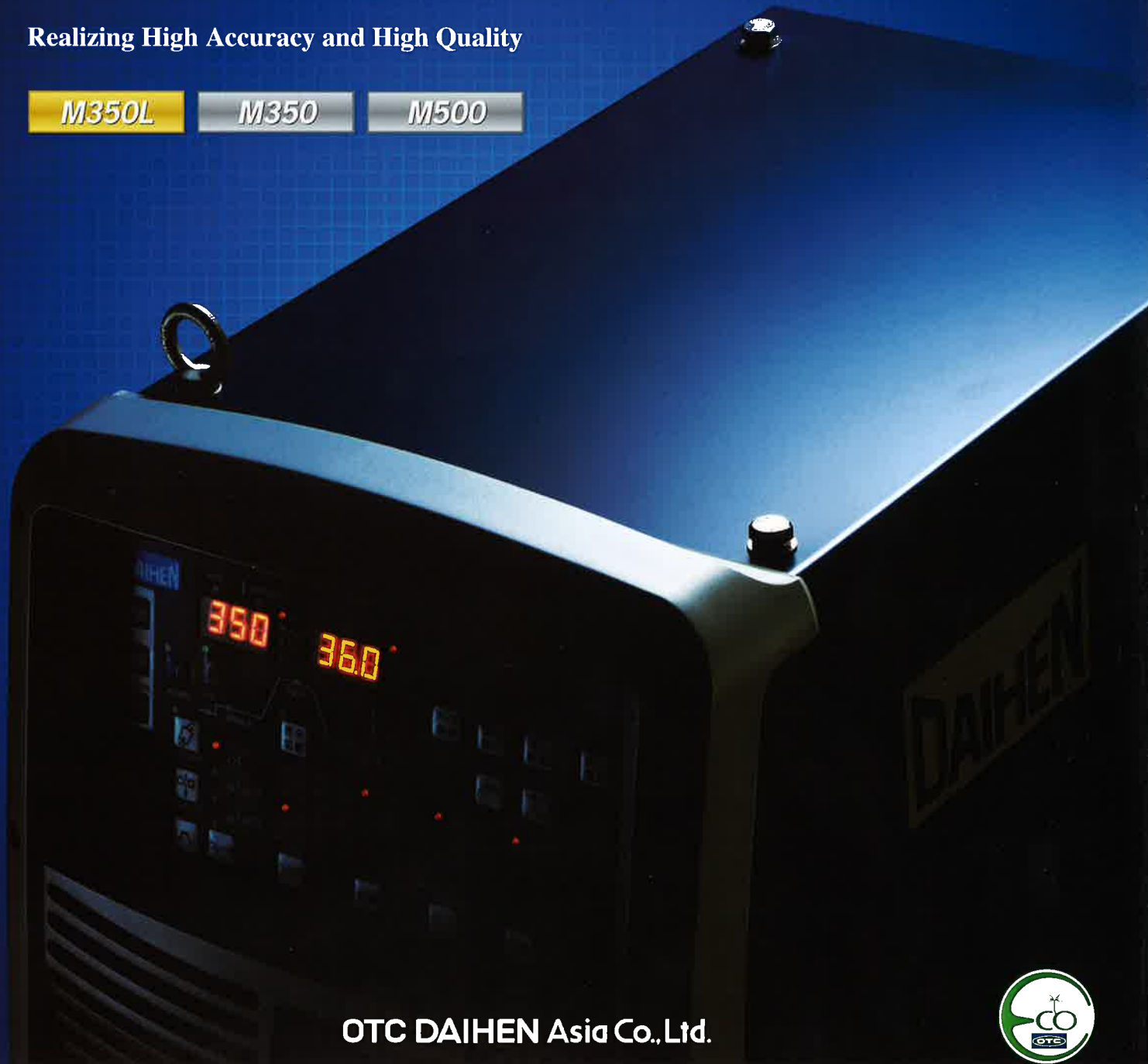
## New Generation Digital Welding Machine

Realizing High Accuracy and High Quality

M350L

M350

M500



# Opening windows to new world of welding!

## Welding control LSI **Welbee**



### be smart

#### Significant improvement in welding performance

Realization of a flat and beautiful weld bead appearance

Realization of a low spatter generation equivalent to MAG welding even by CO<sub>2</sub> welding

M350L



Reduction by up to **80%** at 200A

#### Smart quality control realized by IT introduction

Welding conditions and work results can be easily controlled by USB.



USB ports equipped as standard.

Expansibility in data control by mounting the expansion board (Optional)

### be tough

#### Pursuing durability and maintainability

High dust resistance | Easy maintenance

Easy connection to an external unit



# Welding Best Electronic Engine



**Welding control LSI "Welbee" which can realize a significant improvement in welding performance and in enhancement of IT**

Evolution to nanotechnology can be attained by introducing "Welbee" uniquely developed by DAIHEN. "Welbee" can make a precise waveform control by faithfully providing feedback of the ultra high-speed sampled welding current and voltage, realizing a high precision and a high quality welding. In addition, you can also make a smart welding control using USB or LAN.

## Abundant product lineups meeting various applications

Low spatter welding model

**M350L**



Low spatter welding model realizing a high productivity by reducing spatter generation

Standard welding model

**M350**



**M500**

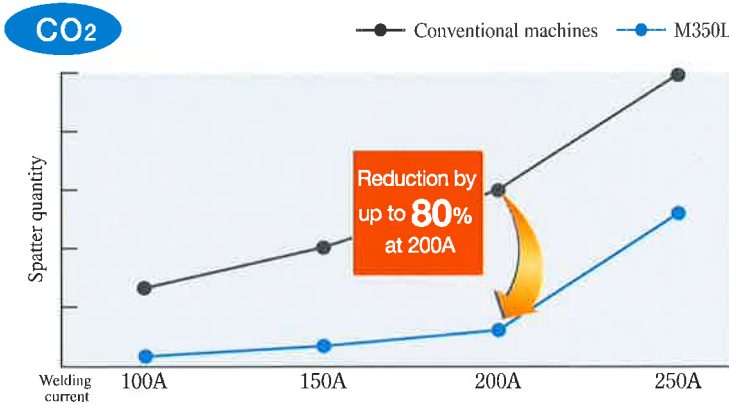


Standard welding model realizing a high quality welding in every situation

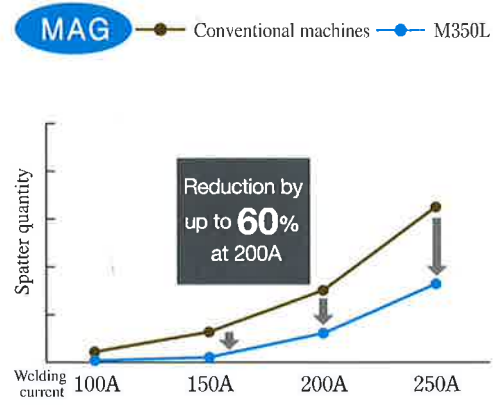
# M350L

## Low spatter welding model realizing a high productivity by reducing spatter generation

Significant reduction of spatter generation not only in a low current range but also in mid and high current ranges



Realization of a low spatter generation equivalent to MAG welding even by CO2 welding



Reducing spatters to the utmost limit even by MAG welding

Furthermore, adhesion of generated spatters to a base material or a jig can be reduced due to the small particle forms. As a result, you can significantly reduce man hours for removing spatters, leading to reduction in the frequency of cleanup works for the nozzle.



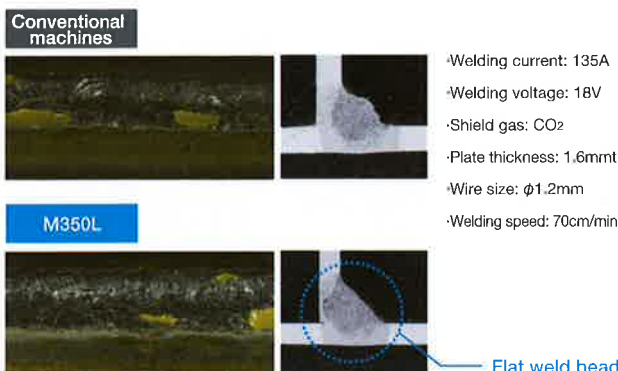
Steep reduction of large spatters

Spatter particle size	Less than 0.2mm	0.2mm-0.5mm	0.5mm or more
Influence on a base material or a jig	Spatters that do not adhere	Spatters that can be removed easily even when they adhere	Spatters that require a chisel for their removal after they once adhered
Conventional machines			
M350L			
Welding current: 200A	Welding speed: 50cm/min	Wire size: $\phi$ 1.2mm	
Shield gas: CO <sub>2</sub>	Welding time: 2.5minutes		

Reduction of production man hours

## Realization of a flat and beautiful weld bead appearance

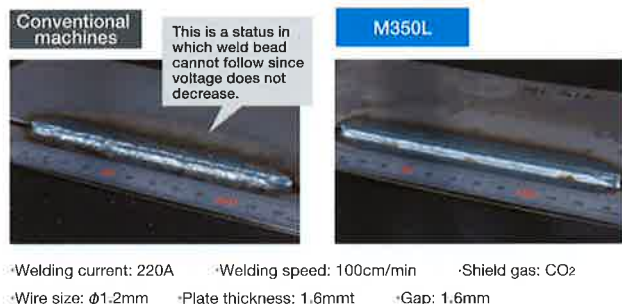
A weld pool becomes moderate by urging short circuit in a fixed cycle, realizing a flat weld bead with a uniform weld bead end.



Realization of a flat weld bead appearance with an excellent heat input and a deep penetration

## Realization of a further increase in speed due to expansion of the conditional tolerance

Tolerance of the lower limit voltage is expanded and spatter generation is reduced even in a high speed welding, realizing a high quality welding.



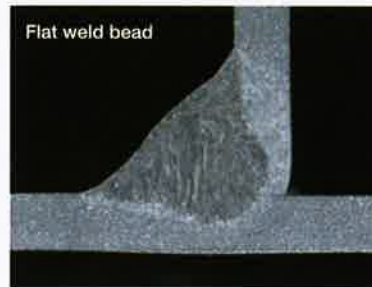
Reduction in frequency of undercut occurrence and humping in a high speed welding

M350  
M500

## Standard welding model realizing a high quality welding in every situation

### Significant improvement in the arc stability in from a low current range to a high current range

A high performance welding for a wide scope from semi-automatic to automatic machines can be realized by making the optimal and fine waveform control according to carefully divided applications (standard/high speed/extension).



- Welding current: 130A
- Welding voltage: 16.5V
- Shield gas: MAG
- Plate thickness: 1.6mmt

Uniform and beautiful weld bead appearance with a small amount of spatters

A stable arc is realized even in wire extension change or in weaving welding for a single-V groove joint.



- Welding current: 300A
- Welding voltage: 30V
- Wire size:  $\phi$ 1.2mm, Mild steel flux cored
- Plate thickness: 9mmt
- Weaving frequency: 2.5Hz Oscillation: 1.5mm

Realization of a flat weld bead appearance with fewer uneven sections on the surface

### A further increase in speed is realized by mounting a high speed welding mode

A beautiful weld bead appearance and less voltage fluctuation are realized even in a high speed welding in which a minute fluctuation of arc is likely to cause a weld bead appearance defect.

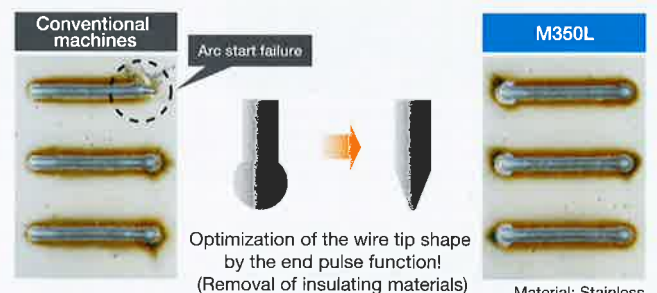


- Welding current: 250A
- Welding voltage: 25V
- Welding speed: 100cm/min
- Wire size:  $\phi$ 1.2mm

You can easily widen the weld bead width and expand a target tolerance shift.

### Arc start performance is improved by an evolved digital start

The startup performance in stainless mode is significantly improved by the digital turbo start and the end pulse function unique to DAIHEN which can optimize the wire tip shape.



Significant reduction of Arc start failure and prevention of weld bead lack at a start section

# Quality control by IT introduction and its expansibility

You can easily edit "Welding condition memory function" or its backup data with your PC since the USB port is equipped as standard.

Welding condition edit      Welding condition copy

Welding condition backup

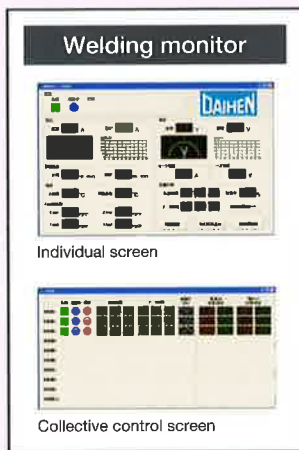


PC edit screen



## Welding monitor (Optional)

In addition, you can collect detailed data in large quantity through USB or the network by mounting the expansion board. Accordingly, you can confirm detailed information on when and what happened, and thereby can utilize this for improvement in quality control through traceability as well as for troubleshooting.



### Hardware requirements

- For Windows 7/Vista: Pentium 4 1GHz or more/RAM 1G byte or more/Screen 1024 x 768 or larger
- For Windows XP, 2000: Pentium M 1GHz or more/RAM 512M byte or more/Screen 1024 x 768 or larger
- \*A LAN connector (fixed cable) is necessary.

### Parameters in which data can be saved

Welding current (Setup)	Welding voltage (Setup)	Welding current (Measured value)	Welding voltage (Measured value)
Feeding speed	Startup signals	Input voltage at the primary side	Motor electric current
Inching signals	Power supply internal temperature	FAN revolution	

\*Refer to the attached standard specifications for details.

## Manufacturing products based on future perspectives

M350L

Reduction of spatter generation  
by up to **80%**

This welding machine can reduce the generating amount of spatters in mid and high current ranges by up to 80% if compared with the conventional digital inverter welding machines. You can also reduce the amount of industrial wastes, and thereby contribute to environmental maintenance.



M350L

Reduction of energy loss  
by about **10%**

With the unique inverter technology of DAIHEN, you can reduce the energy loss by about 10% if compared with the conventional machines.



Compatible to the  
**RoHS** standards

As an approach for earth environment protection, this welding machine is compatible to the Europe RoHS Directive which regulates limitations on the use of environmentally hazardous substances.



# Durability/maintainability, and easy connection operation

Dust penetration into the precision parts is reduced by about **98%!!**

## Welbee side flow structure

### High dust resistance

Improvement in reliability is realized by adopting a separation structure which prevents dust from entering into the area in which electronic components etc. were mounted.

### Easy maintenance

By making the revolution control of the cooling fan according to its duty cycle or ambient air temperature, this welding machine can prevent dust from entering to the minimum extent. In addition, you can easily clean up dirt and dust by air blowing them without opening the case.

Precision part area



## Adoption of a digital meter that has an excellent visibility even in a dark place

You can confirm not only the welding current and voltage under welding operation but also the average welding current and voltage after completing welding operation. In addition, you can easily take measures against troubles referring the error code display.



### 1. Welding condition memory function (100 conditions)

One-touch memory/regeneration function of welding conditions according to work pieces is available. Improvement in workability and repeatability of the welding conditions is realized.

### 2. Function key

Operators can easily set up a desired special function, since functions that were set up with the internal switches for welding power supply in the past can be set up on the front panel.

### 3. Selection of welding modes

A desired welding process and wire size can be easily set up on the touch panel. Taking a glance at the LED display will allow you to confirm the whole present settings.

### 4. Easy condition setup with a dial

Repeatability is also excellent since a precise setup by the unit of 1A or 0.1V has become possible.

### 5. Arc characteristics

You can set up a desired arc freely. According to usage environments, you can set up an optimal arc status.

### 6. Various kinds of function settings

You can also easily set up various kinds of functions to achieve a high-quality welding on the touch panel.

### 7. Optional modes

This welding machine can easily cope with welding for special materials by installing software as an optional mode to meet various needs from our customers.

## Abundant welding modes

M350L

M350

Wire	Gas	Wire size (mmφ)
Mild steel solid	CO <sub>2</sub>	0.8, 0.9, 1.0, 1.2
	MAG	0.8, 0.9, 1.0, 1.2
Mild steel flux cored*	CO <sub>2</sub>	1.2, 1.4
Stainless flux cored*	CO <sub>2</sub>	0.9, 1.2
Stainless solid	MIG[2%O <sub>2</sub> ]	0.8, 0.9, 1.0, 1.2

\*The spatter reduction function does not operate due to the characteristics of the flux cored wire.

M500

Wire	Gas	Wire size (mmφ)
Mild steel solid	CO <sub>2</sub>	1.2, 1.4, 1.6
	MAG	1.2, 1.4, 1.6
Mild steel flux cored	CO <sub>2</sub>	1.2, 1.4, 1.6
Stainless flux cored	CO <sub>2</sub>	1.2, 1.6
Stainless solid	MIG[2%O <sub>2</sub> ]	1.2, 1.6

## Input Power Capacity and Cable Specifications

Items	Model Name	WB-M350L	WB-M350	WB-M500
Primary input voltage	V	400±15%	400±15%	400±15%
phase	-	Three phase	Three phase	Three phase
Input Power Capacity	kVA	15 or more	15 or more	25 or more
Fuse / Breaker Capacity	Type B Fuse	A	30	40
	Breaker	A	30	60
*1 Input side cable	mm <sup>2</sup>	6 or more to 38 or less (M6)	6 or more to 38 or less (M6)	10 or more to 38 or less (M6)
Base Metal / Feeder Power Cable	mm <sup>2</sup>	60	38	60
*1 Earth Ground cable	mm <sup>2</sup>	6 or more (M6)	6 or more (M6)	10 or more (M6)

\*1 Numerical value in a parenthesis indicates the size of the welding machine side pressure terminal.

## Optional accessories

### Extension cables

		5m	10m	15m	20m
Wire Feeder Power cable / Base Metal Power Cable	WB-M350L	(38mm <sup>2</sup> ) BKPDT-3807	BKPDT-3812	BKPDT-3817	BKPDT-3822
	WB-M350	(60mm <sup>2</sup> ) BKPDT-6007	BKPDT-6012	BKPDT-6017	BKPDT-6022
		(80mm <sup>2</sup> ) BKPDT-8007	BKPDT-8012	BKPDT-8017	BKPDT-8022
	WB-M500	(60mm <sup>2</sup> ) BKPT-6007	BKPT-6012	BKPT-6017	BKPT-6022
(80mm <sup>2</sup> ) BKPT-8007		BKPT-8012	BKPT-8017	BKPT-8022	
Gas Hose		BKGG-0605	BKGG-0610	BKGG-0615	BKGG-0620
Wire Feeder Control Cable (10pins)		BKCPJ-1005	BKCPJ-1010	BKCPJ-1015	BKCPJ-1020
Control cable for the analog remote control box (6cores)		BKCPJ-0605	BKCPJ-0610	BKCPJ-0615	BKCPJ-0620

\*In the case of using the extension cable, the standard power cable (2m) is not necessary.

\*In the case that this welding machine is used for an automatic machine or is used with an electric current value close to current rating, use a cable whose size is larger by one rank.

### Voltage detection cable

	5m	10m	15m	20m
Voltage detection cable	-	K5416N00	-	K5791E00

### Welding torch

Stainless steel MIG welding torch Use this type when carrying out stainless MIG welding.

Product name	WTS300-SD
Suitable wire diameter	( $\phi$ 0.9mm), ( $\phi$ 1.0mm), $\phi$ 1.2mm
Maximum welding current	300A
Duty cycle	50%
Cable length	3m

\*The power detection adaptor U5365P00, an optional item, is necessary. (Only for WB-M350L)

### Interface/wire feeder for robots of other manufactures

Product name	Model
Welding interface	IFR-101WB
Wire feeder	CMRE-741

\*Please consult our company for details in the case of connecting this welding machine with a robot manufactured by other manufactures.

Wire feeder	Model	CMRE-741
Suitable wire diameter	mm	(0.8), 0.9, 1.0, 1.2, (1.4), (1.6)
Wire used		A solid wire and flux wire
Wire feeding speed	m/min	22
Outside dimension (W x D x H)	mm	195 x 275 x 248 (Excluding cables)
Mass	kg	7

\*In the case of using a wire with the diameter indicated in the parenthesis, an optional part is necessary.

### Remote control box

Product name	Part number
Analog remote control box (3m)	K5416Z00

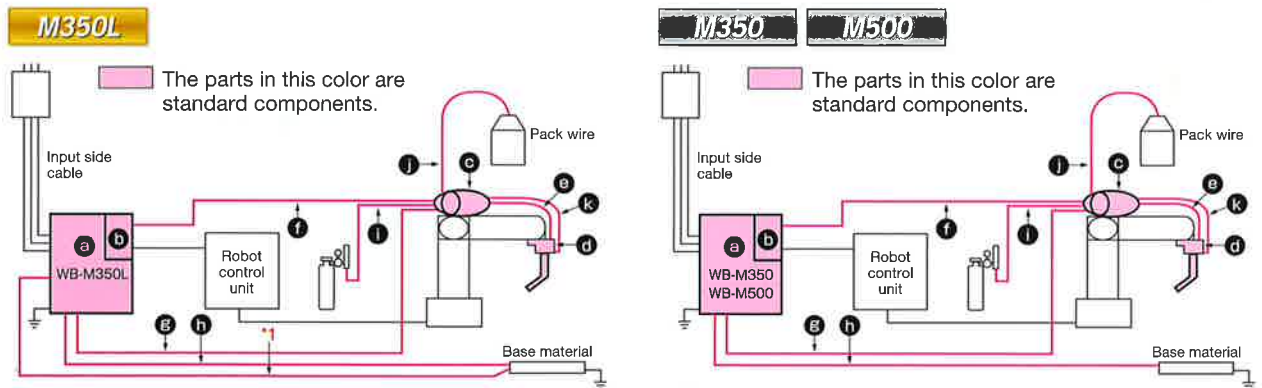


## Combination with a robot of other manufactures (In the case that a cable of 10m comes as a set)

Reduction in external wiring works is realized, since you only have to install an optional welding machine built-in type interface and special software in order to make connection to a robot of other manufactures.

This diagram shows only main structure components of the CO<sub>2</sub>/MAG specifications.

In the case of making connection to a robot of other manufactures or to an automatic machine, you have to confirm detailed specifications separately.



Product name	Model	Model	Model
<b>a</b> Welding power supply	WB-M350L	WB-M350	WB-M500
<b>b</b> Interface	IFR-101WB	IFR-101WB	IFR-101WB
<b>c</b> Wire feeder unit	CMRE-741	CMRE-741	CMRE-741
<b>d</b> Welding torch	K2331-type curved torch	K2331-type curved torch	K2331-type curved torch
<b>e</b> Coaxial Power cable	K5369 (1.1m), K5370 (1.2m)	K5369 (1.1m), K5370 (1.2m)	K5369 (1.1m), K5370 (1.2m)
<b>f</b> Feeder unit side control cable (10cores)	*2 BKCPJ-1010	*2 BKCPJ-1010	*2 BKCPJ-1010
<b>g</b> Feeder unit side power cable	*2 BKPDT-6012	*2 BKPDT-3812	*2 BKPT-6012
<b>h</b> Base material side power cable	*2 BKPDT-6012	*2 BKPDT-3812	*2 BKPT-6012
<b>i</b> Gas hose	*2 BKGG-0610	*2 BKGG-0610	*2 BKGG-0610
<b>j</b> Conduit	*3 Z318P50 (9/16-18UNF is for the mounting section of the guide adaptor.)	*3 Z318P50 (9/16-18UNF is for the mounting section of the guide adaptor.)	*3 Z318P50 (9/16-18UNF is for the mounting section of the guide adaptor.)
<b>k</b> Voltage detection cable (Torch side)	*4 K5416P00 (3m)	-	-

\*1. The length of the cable K5791G00 attached to the welding power supply unit is 5m. In the case that you need a cable of above 5m, please use an optional one.


\*2. Select a cable or a gas hose with a desired length from among 5m, 10m, 15m, and 20m.

\*3. When using the conduit of 7/16-20UNF, you have to use guide adaptor L7810D04 separately.

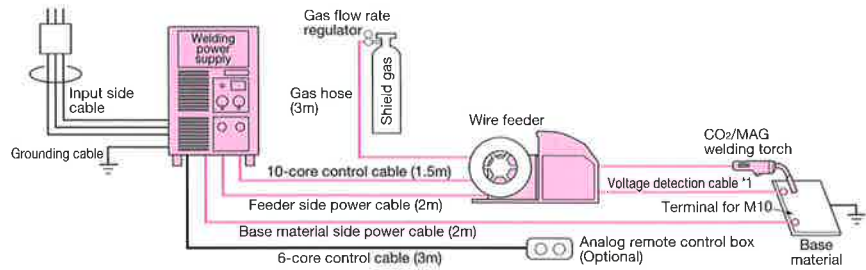
\*4. This is wiring for detecting the voltage at the tip of a torch. Please use this wiring after cutting it to a desired length. In the case that voltage cannot be detected from the tip of the torch, welding quality will get worse.



## Connection diagram

 The parts in this color are standard components.  
(CO<sub>2</sub>/MAG air cooling specification)

\*1 Use the voltage detection cable K5791G00 (5m) attached to the welding power supply unit.  
(Only for WB-M 350L)



## Standard specifications

General name		Welbee inverter M350L	Welbee Inverter M350	Welbee Inverter M500
Welding power supply	Model	WB-M350L	WB-M350	WB-M500
Rated input voltage	V	400	400	400
Number of phase		Three phase	Three phase	Three phase
Rated input	kVA	14.7 (13.6kW)	14.4 (13.3kW)	24.5 (22.6kW)
Rated duty cycle	%	60	60	100
Rated output welding current	A	350	350	500
Rated load voltage	V	31.5	31.5	39
Output welding current range	A	30~350	30~350	30~500
Output voltage range	V	12~36	12~36	12~45
Maximum no-load voltage	V	70	70	70
Dimensions (W x D x H)	mm	395 x 710 x 640 (without eyebolt)	395 x 710 x 640 (without eyebolt)	395 x 710 x 810 (without eyebolt)
Mass	kg	62	61	77
Feeder unit side power cable	Model	BKPDT-6002	BKPDT-3802	BKPT-6002
Cable size	mm <sup>2</sup>	60	38	60
Base material side power cable	Model	BKPDT-6002	BKPDT-3802	BKPT-6002
Cable size	mm <sup>2</sup>	60	38	60

Wire feeder	Model	CMV-7402	CM-7402
*Applicable wire diameter	mm	(0.8), 0.9, 1.0, 1.2, (1.4), (1.6)	(0.8), 0.9, 1.0, 1.2, (1.4), (1.6)
Wire used		Solid wire and flux wire	Solid wire and flux wire
Wire feeding speed	m/min	22	22
Dimensions (W x D x H)	mm	207x588x372	207x588x372
Mass	kg	13	13

CO <sub>2</sub> /MAG welding torch	Model	WT3500V-SD	WT3510V-SD	WT3500-SD	WT3510-SD	WT5000-SD
Rated welding current	A	350	350	350	350	500
*Suitable wire diameter	mm	(0.9, 1.0), 1.2	(0.9, 1.0), 1.2, (1.4)	(0.9, 1.0), 1.2	(0.9, 1.0), 1.2, (1.4)	(1.2), 1.4, (1.6)
Duty cycle	%	30	60	30	60	30
Cooling system		Air cooling	Air cooling	Air cooling	Air cooling	Air cooling
Cable length	m	3, (4.5, 6)	3, (4.5, 6)	3, (4.5, 6)	3, (4.5, 6)	3, (4.5, 6)

\*In the case of using a wire with the diameter indicated in the parenthesis, an optional part is necessary.

## Standard accessory

Welding power supply	WB-M350L	WB-M350	WB-M500
Voltage detection cable (5m)	1	-	-
Feed roll (1.4/1.6)	-	-	2
Outlet guide (1.2-1.6)	-	-	1
Hexagon rod spanner No.8	-	-	1 (for output terminals)
Wire feeder	CMV-7402	CM-7402	CM-7402
Gas hose (3m)	1	1	1

CO <sub>2</sub> /MAG welding torch	WT3500V-SD	WT3500-SD	WT5000-SD
Hexagon rod spanner (for M5)	1	1	1



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