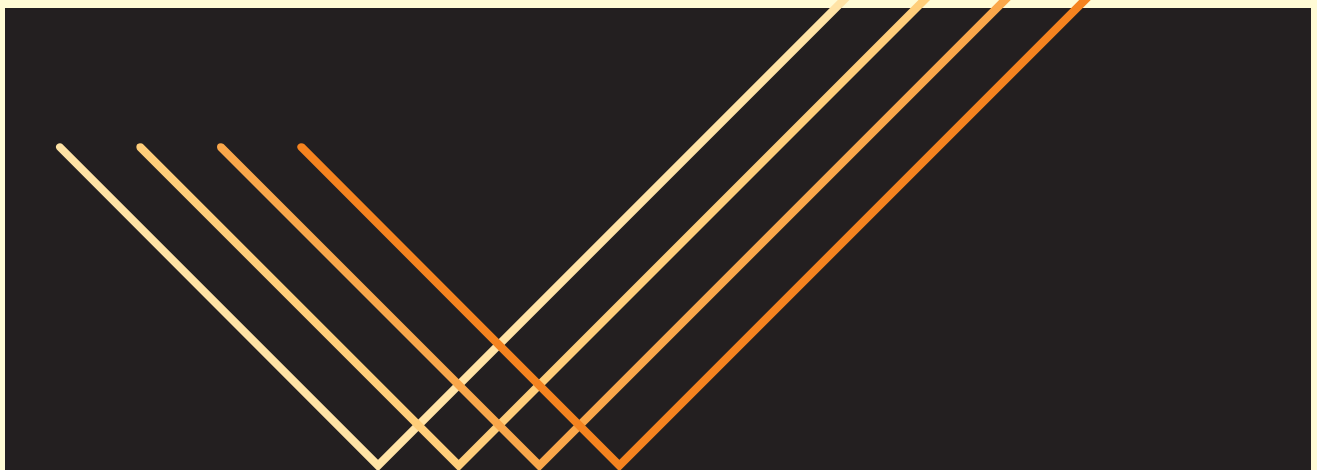
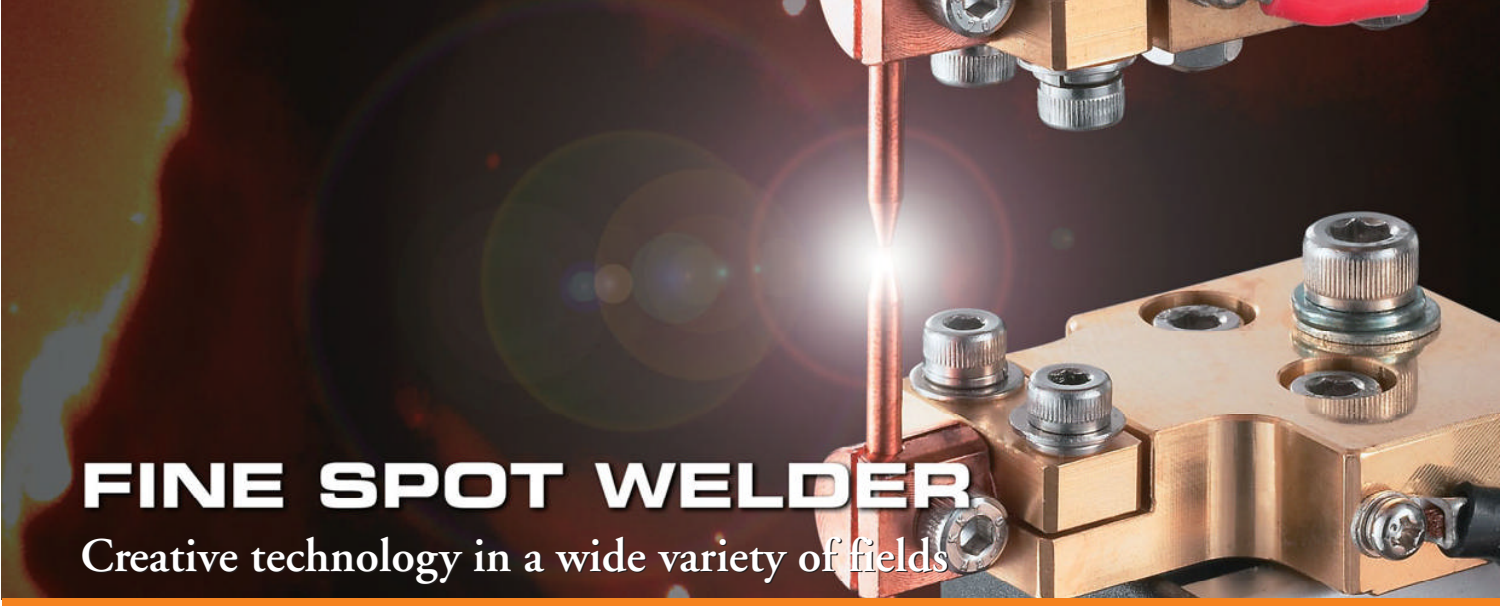


FINE SPOT WELDER CATALOGUE



Spirit Of Innovation

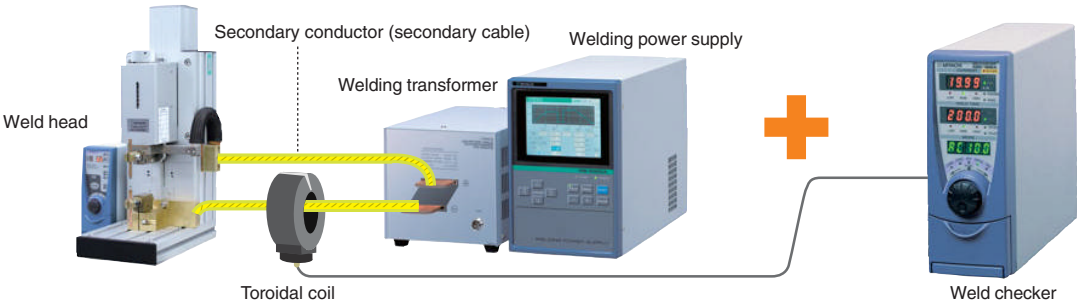


FINE SPOT WELDER

Creative technology in a wide variety of fields

Spot welding requires a “welding power supply,” a “welding transformer,” and a “weld head.” We also recommend a “weld checker” for weld quality control.

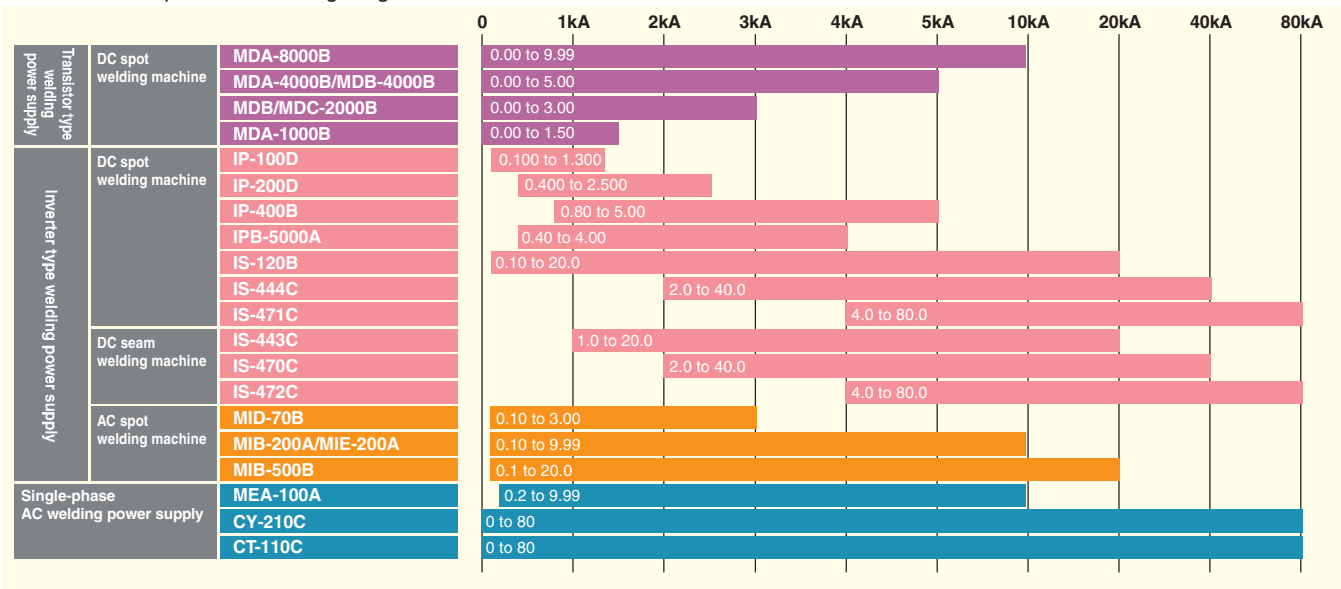
Spot welding system, composition example



The roles of each product

- Welding power supply : Controls the current and creates ones with the various waveforms required for different welding.
- Welding transformer : Converts the current generated by the power supply into the high current required for resistance welding.
- Weld head : This is a pressurizing electro-conductive mechanism that brings the electrodes in contact with the workpieces and, applies the force and current to the workpieces.
- Weld checker : Measures the current, voltage, applied force, etc., and aids the weld quality control.
- Toroidal coil : This is a sensor that detects the welding current.

Product lineup Current setting range



Advantages of transistor control

The current rises faster and the welding is clean.

Since the materials of micro-parts are metals with low thermal resistance, the current must rise faster in a short period of time than with normal resistance welding. There are various types of resistance welding power supplies, including AC power supplies, capacitor power supplies, transistor power supplies, and inverter power supplies. As Figure 1 shows, those that provide the fast rise in the welding current and allow the control over the current are transistor type and inverter type welding power supplies. These two types are

more suitable than the other types for the welding of micro-parts, which require precise welding current control in shorter periods of time. Of these two, the transistor type welding power supply can make welding current flow directly in the workpiece from the power supply without using a welding transformer. Consequently the rise of the current and the response are quicker than that of an inverter type welding power supply, which requires the current to flow through a welding transformer.

Advantages of inverter control

Excellent thermal efficiency and fast welding time.

Resistance welding generates heat in the workpieces to melt and bond them by making current flow through the location of the weld. The amount of heat Q (J) generated is expressed in the following equation.

$$Q = I^2 R T$$

I (A) = Welding current R (Ω) = Resistance at the welded part T (s) = Welding time

As this shows, the amount of heat generated is proportional to the square of the current.

Here, we compare the current waveforms for the AC inverter type and for the commonly used single-phase AC type power supplies. (See Figure 2) With the single-phase AC type, the current goes to 0 every half the cycle, and because the phase control creates a blank period, the supply of heat becomes intermittent. However, with inverter type, there is no blank period so the heat can be supplied continuously. In addition, since the same effective current amount can be obtained with a lower peak than that by the single-phase AC type (Figure 3), the efficiency of the inverter type is better, and welding can be achieved in a shorter period of time. Therefore, the thermal impact around the nugget is reduced and the finish would be better.

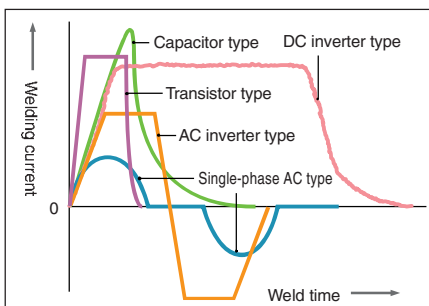


Figure 1. Current Waveform with different Type of Power Supplies

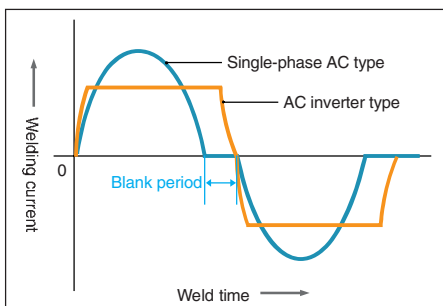


Figure 2. Single-Phase AC Type and AC Inverter Type Waveforms (at 50Hz)

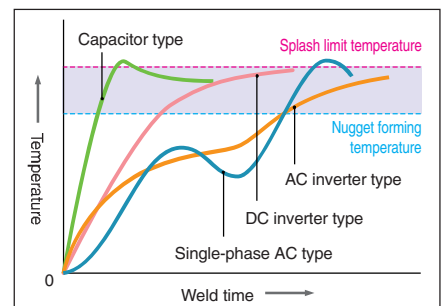


Figure 3. Welding Section Temperature Model

Types of power supply

Transistor type welding power supply

Since this type of power supply can precisely control the output current with transistors, "expulsion" can be suppressed and ultra-precise welding is possible. Since the current control speed is fast, this type is often used for welding ultra-fine wires (such as light bulb filaments). It is also the optimum choice for welding high-resistance materials. (molybdenum, tungsten, etc)

DC inverter type welding power supply

A DC inverter welding power supply does not have the blank period in the current wave form unlike an AC type does, so it can heat continuously and efficiently. Therefore it makes the thermal efficiency good, so the welding can be accomplished faster in minimum power consumption. In addition, the inverter type's fast feedback control ensures the stable welding quality in which the splash effect does not occur easily. Thus it makes an ultra-precise welding would become possible. Since the transformer be made compact, it becomes suitable for mounting on automation machinery.

AC inverter type welding power supply

In addition to the advantageous feature of "Inverter", which is a stable welding quality due to an excellent thermal efficiency, this type power supply causes less Peltier (polarity) effect in welding and also AC welding transformer can be used together with it. Therefore it is best for fusing.

AC welding power supply

This type is the most widely used. Since the structure is simple, it is easy to handle, hard to be broken and less expensive. However, the thermal efficiency is not so good, and it often give a thermal impact on the workpiece occurs easily. Thus this type is not preferable for ultra-precise welding. It is often used for welding of iron materials, which are relatively easy to weld.

Capacitor type welding power supply

Since the electricity is charged in a capacitor before the discharge for welding, it can provide a high current on welding. So this type of power supply can be used on aluminum, copper, and other materials which has a good thermal conductivity. Because the electricity is once accumulated in the capacitors, even if the input power were small, it can provide sufficient current to make a stable welding. On the other hand, the current rises so fast and the rate cannot be controlled, so the possibility of expulsion increase.

WELDING POWER SUPPLIES

Transistor type welding power supply MD Series

MDA-8000B / MDA-4000B / MDA-1000B (Standard type)

MDB-4000B / MDB-2000B (Polarity interchangeable type)

MDC-2000B (2-channel interchangeable type)

Beautiful finish with micro-welding because of a short welding time.



MDA-4000B

MDA-8000B

Fast current rises.

Since the welding current rises 4.5 times faster than that with the past welders, high quality welding can be accomplished in a short period of time on small work piece.

No welding transformer needed

The welding current is directly controlled with fast switching by transistor, so no welding transformer is required.

Built-in pre-check function

Applying current on the workpiece before the main current, it is possible to judge whether or not there is a workpiece set on the electrodes, and to evaluate the status of workpiece.

Three control types to choose from

You can choose from three types of control - "constant current," "constant voltage," or "constant voltage and current" - to suit the workpieces.

Interchangeable polarity type

This can eliminate the Peltier effect (polarity effect) and provide uniform nugget diameters on series welding.

2-channel type

With this type, can provide cost reduction and space saving for time difference welding.

* Compared with the conventional model MD-1500E

For DC spot welding and fusing

DC inverter welding power supply IPB-5000A

The stability of the welding power supply has been improved again!

Four control types to choose from

You can choose from four control types, "secondary constant current," "constant voltage," "constant power" and "combination of constant voltage and current," which makes the optimum welding conditions possible.

Communication functions to be a standardized equipment

RS-232C/RS-485 (selectable) communications make it possible to set and monitor the welding configuration from an external device such as PC.

Transformer switching function

Five welders can be controlled with one power supply by connecting an external transformer switch.

Supports 3-phase 200V and 400V welding power supplies

The welding transformer supports 3-phase 200-240V or 380-480V (configured at the factory), so that it can take different power spec world wide.

Power stop function

A constant fusing penetration would become possible by an optional displacement monitoring function.

Faster rise in welding current

Since the welding current rises 6 times faster than that with the conventional welders*, micro workpieces can be welded in a short period of time.

Maximum welding current of 4000A

Because of the fast current rise, this power supply support for short-time/large-current welding applications.

Reduced welding current ripple

Current ripple is reduced to 1/3 of that with the conventional model.* With the same effective current, this model can suppress the peak current in low value unlike the conventional models.

* Compared to the conventional model, IP-217A

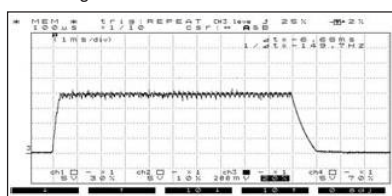


ITD-360B6

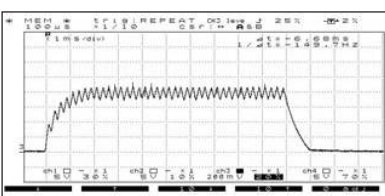
IPB-5000A

Welding power supply waveform comparison

● Welding current: 4000A ● Weld time = 10ms



IPB-5000A/ITD-360B6 (Current rise time = 0.3ms)

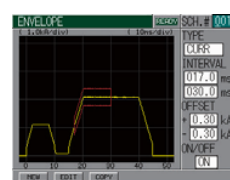


[Conventional model] IP-217A/IT-510B (Current rise time = 1.8ms)

Envelope function

With this function, the actual wave form is judged good/bad comparing with an "envelope" waveform, which provides the permissible range.

The envelope waveform is determined based either on a standard waveform (average welding waveform) or on a monitored waveforms.



For DC spot welding and fusing

DC inverter welding power supply IS-120B

Compact, with forced air cooling. Excellent for frequent usage.



Six control types to choose from

You can choose from "constant power," "secondary constant current effective value," "primary constant current peak value," "primary constant current average value," "constant voltage," or "constant phase" to attain stable welding quality.

Three, feedback modes selectable

You can monitor the power, the current, and the voltage.

Stable fusing achieved by an interrupt function

An inverter type welding power supply and a weld checker (with a displacement monitor) is connected and displacement amount at the electrode (penetration amount) is set in the weld checker. When the displacement amount reaches the set level, a signal will be sent out to trigger the interrupt function and stops the current. This enables the fusing with stable displacement.

Four protective functions you can use with confidence

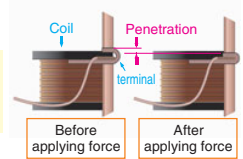
Over-current detection, no-power and no-voltage detection, temperature control failure detection, self-diagnostics function

Selectable weld time units

Either "ms" or cycle are chosen.

Supports multi-product welding with 15 welding criteria

Using the interrupt function
It keeps the penetration uniform.



DC-TECH IS-444C / IS-471C

High-speed inverter type welding power supply using high-capacity IGBT.



Control frequencies to choose from

The frequency can be switched (600Hz, 800Hz, or 1kHz)

Five control types to choose from

You can choose from "constant power," "secondary constant current effective value," "primary constant current peak value," "primary constant current average value," and "constant phase" to attain stable welding quality.

Three monitoring items to choose from

You can monitor the power, current, or voltage.

Stable fusing achieved by an interrupt function

Compact and light but excellent for frequent usage

Selectable weld time units

Supports multi-product welding with 15 weld schedules (With options, up to 127 weld schedules can be programmed.)

For DC seam welding and roll spot welding

DC-TECH IS-443C / IS-470C / IS-472C

Flexible support for system integration.



High speed adaptive feedback

The fast control enables consistent seam welding and a roll spot welding. There are three types of current control; effective value control using primary current feedback, peak value control, and constant phase control.

Control frequencies to choose from

The frequency can be switched. (600Hz, 800Hz, or 1kHz)

Three welding current settings

The appropriate welding current could be set to meet the variation of workpieces' conditions, which differ by the position, at the beginning, the middle and the end, and the variation with the number of workpieces.

The program unit, which makes it easy to integrate to automation equipments

Up to 7 weld schedules could be set to support multiple welding conditions.

Built-in current monitor

For DC spot welding and fusing

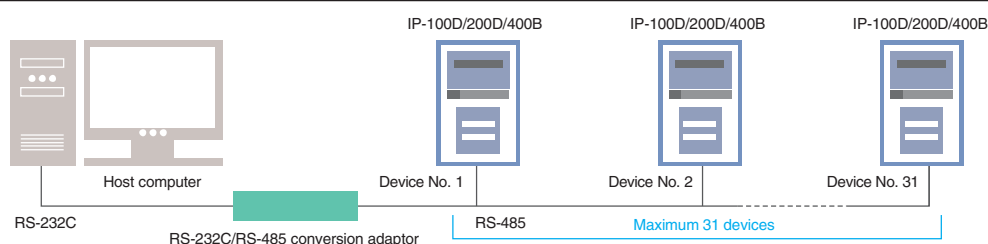
DC inverter welding power supply IP-100D / IP-200D / IP-400B

Provides the superior welding quality of an inverter type at a reasonable price



- ✓ This type uses primary constant current. So it has fast current rises.
- ✓ 4kHz high-speed adaptive feedback
- ✓ Simple operation by a few operating buttons
- ✓ Up to 63 weld schedules to support multi welding conditions
- ✓ Communication facility is equipped on standard.

The communications function



Using an externally connected PC, weld schedules can be read out and reprogrammed. In addition, monitoring data and error codes can be viewed from the PC.

For AC precision spot welding and series welding

AC inverter welding power supply MID-70C

For small part precision spot welding and series welding



- ✓ Panel setting type. Handy for work at your fingertips
- ✓ The weld time is set in a millisecond order.
- ✓ 8-levels of weld current frequency settings are available. (from 50 to 250Hz)
- ✓ Up to 31 weld schedules to support multi welding conditions
Since registered weld schedule can be loaded with one key operation, work efficiency has been improved.
- ✓ Weld current monitoring function enables stable quality control
Actual weld current is monitored so as to ensure it to stay in the preset range.
- ✓ The current range setting can be selected.
1000A: 100 to 1000A
3000A: 300 to 3000A
- ✓ Interrupt function (See Page 4.)



Transformer for 250Hz
MTH-52A3

For AC spot welding and fusing

AC inverter welding power supply MIB-200A / MIB-500B

Complete support for automated production. For the insulated wire welding and the fusing of electrical parts



- ✓ Separate program unit (MA-627) that is convenient for being integrated in an automated equipment, allows programming to be carried out at your fingertips
- ✓ The weld time is set by cycle.
- ✓ The weld current frequency can be set at 17 different levels in the range from 50 to 250Hz.
- ✓ With constant current control (primary current), stable welding current is always available.
- ✓ Interrupt function (See Page 4.)
- ✓ Ideal AC welding with minimum dust and scorching to be caused
- ✓ Two monitoring items to choose from (current, voltage)

AC Dedicated for insulated wire welding

AC inverter welding power supply **MIE-200A**

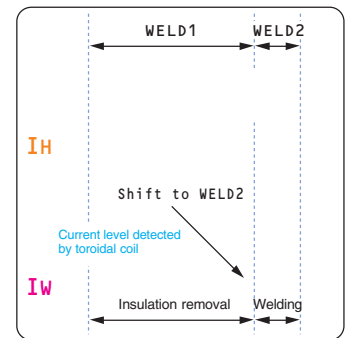
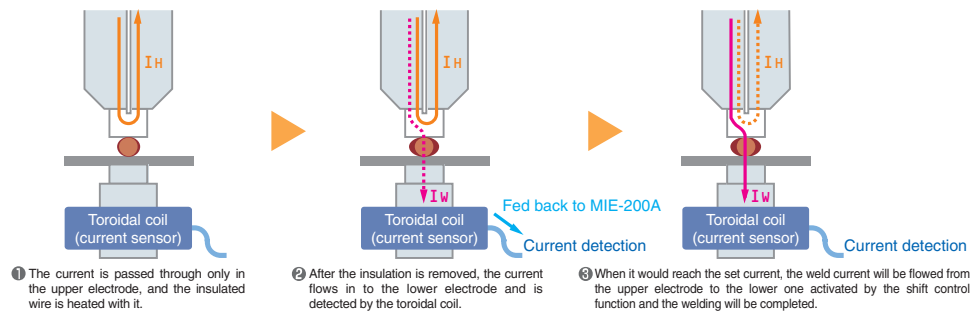
Stable welding on insulated wire based on a shift control® function



- ✓ The current is switched with precise timing, so the weld finish is beautiful.
- ✓ There is no need for insulation peeling pre-processing.
- ✓ Main welding, as opposed to pseudo-joining (pressure welding)
After the insulation is peeled off, the power supply switches to large current for welding.

- ✓ Constant current (primary current) control
- ✓ The weld current frequency can be set at 17 different levels in the range from 50 to 250Hz.
- ✓ Supports a variety of insulated wires
PVF(polyvinyl formal), UEW(polyurethane), EIW(polyester imide), AIW(polyamide imide), PIW(polyimide), PEW(polyester)

Shift control® function



AC Reflow power supply

AC inverter reflow power supply **MIC-70B**

A new type of joining that does not require temperature control in msec. order or removing agents.

- ✓ The rise-time is not affected by power supply's voltage fluctuation.
- ✓ Uniform temperature rise
- ✓ The optimum parameters are recognized automatically.
- ✓ 3 types of thermocouples
J and E types 100-600°C and K type 100-900°C
- ✓ Temperature control that holds down variation



AC Resistance welding power supply

Single-phase AC welding power supply **MEA-100A**

- ✓ 4 different welding current controls enables an appropriate welding that matches for the workpiece.
Multi-cycle welding and secondary constant current control, multi-cycle welding and power supply voltage fluctuation compensation, single-cycled welding and power supply voltage fluctuation compensation, half-cycle welding and power supply voltage fluctuation compensation.
- ✓ An automatic maximum current configuration.
The max. current setting is automatically configured through test run, in order to optimise the performance of the device.
- ✓ The welding current is monitored using the a toroidal coil.
The upper and lower current limits can be fixed. This will aid the quality control.
- ✓ Support for export
CE and CCC supported. There are also 480V version for USA.

Resistance welding power supply for precision resistance welding on small workpieces.



AC timer

Timer **CY-210C / CT-110C**

- ✓ Easy-to-read LED display
- ✓ Current monitoring and conduction-angle monitoring functions has been equipped.
- ✓ 15 weld schedules and nine current steps
- ✓ A panel cover to protect from oil mist.
- ✓ 3-step power-on system (upslope and downslope)
- ✓ Three counters to make it easy to be operated.
- ✓ Primary and secondary constant current and power supply voltage fluctuation compensation can be selected.

Various welding schedules can be handled with simple operations.



WELD CHECKER

Why is a welding ammeter necessary?

The necessity for welding quality control with fine spot welding

Fine spot welding quality is determined by the following four factors.

1. Current 2. Weld time 3. Applied force 4. Diameter of the electrode tip

In order to maintain stable welding quality, it is necessary to check each of these four factors. However, except for the electrode tip diameter, it is not possible to check the three factors visually. Therefore, it is necessary to measure and monitor them with a Weld Checker* and manage them correctly.

* Weld Checker is Miyachi's trademark.

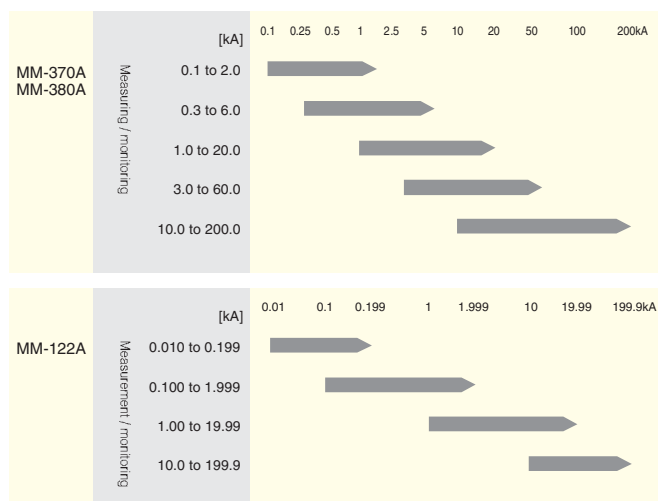
Measures high current in a shorter period of time.

Because high current is flew in a short period of time in various waveforms, a welding ammeter that is specially designed for measuring the welding current waveforms and the current values must be used.

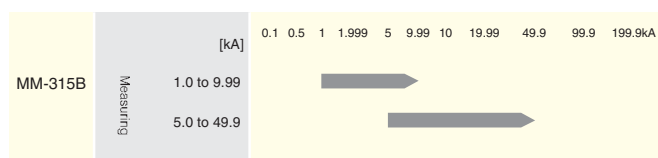
Measuring and monitoring can be restricted to the required range.

In resistance welding in general, the beginning and end part of the applied current would not affect the resulting weld strength. By monitoring the welding current in a specific range where nugget is formed, the more effective management of the welding current would become possible ignoring the less important parts of the current applied to the workpieces.

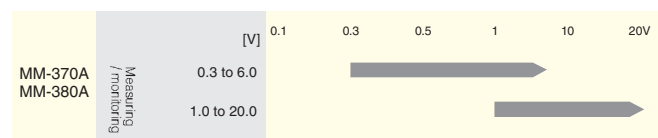
Current measuring and monitoring range



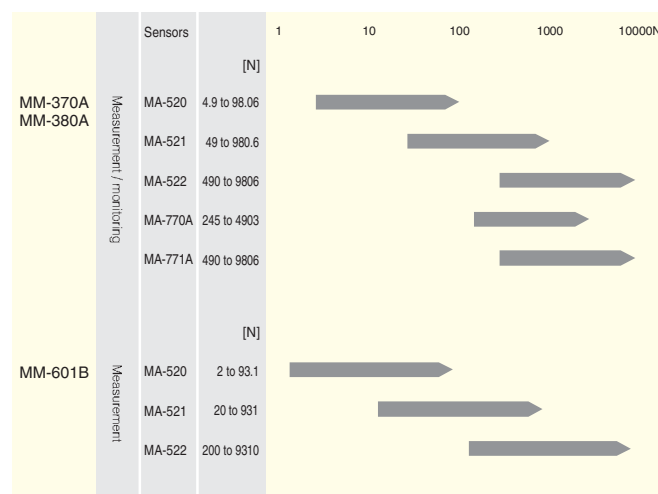
Current measuring



The voltage measurement between each electrodes' tips. The monitoring range



Applied force measuring. The monitoring range



Supported resistance welding types

Precision welding: Current less than 2000A
General welding: Current 2000A or greater

Models	Single-phase AC type		Single-phase rectified type	Three-phase rectified type	Seam *	Pulsation	DC inverter		AC inverter		Capacitor
	Precision welding	General welding					Precision welding	General welding	Precision welding	General welding	
MM-370A	○	○	○	○	○	○	○	○	○	○	○
MM-380A	○	○	○	○	○	○	○	○	○	○	○
MM-122A	○	○	○	○*	○	○	○	○	○	○	○
MM-315B	○	○	○	○		○	○	○			

* Intermittent seam only

Measuring and monitoring factors

Models	Function			Current	Voltage	Weld time	Applied force	Displacement between electrodes
	Measuring	Monitoring	Print					
MM-370A	○	○	○	○	○	○	△	△
MM-380A	○		△	○	○	○	○	
MM-122A	○	○	△	○		○		
MM-315B	○			○		○		
MM-601B	○						○	

△ Option

Weld Checker® MM-370A

Weld Tester® MM-380A

The current, voltage, weld time, applied force*, displacement*, and external input voltage* can be measured.

* Option (Displacement measuring is with MM-370A only)



- ✔ Supports various welding power supplies from single-phase AC type to transistor type
- ✔ 4.7-inch color LCD display.
- ✔ Attains various welding waveforms without using an oscilloscope.
- ✔ Function for printing measured values and waveforms is standardized (for the MM-380A, this function is supported in the BL-58RII, which is sold separately)
- ✔ Measured data can be transferred to a PC.
- ✔ Supporting multiple languages (Japanese, English, Chinese, German, French, Spanish)
- ✔ Using the optional sensor for current and force (MA-770A/MA-771A), it is possible simultaneously to measure the welding current and the applied force during welding.

Resistance welding monitor MM-122A

Advanced-function, high-precision welding monitor that supports for a variety of welding current waveforms



- ✔ Cyclical and accurate display of the welding time for AC inverter welding
- ✔ Light and compact body. Fast measuring speed, and easy installation
- ✔ Simple operation
Simple "turn" and "press" operations with a single button.
- ✔ You could select the measuring unit from "ms" or "Cycle" on measuring welding time.

- ✔ Communication facility is equipped on standard.
Measured values can be transferred to a PC and the evaluation criteria can be changed from the PC. RS232C, RS-485 standard
- ✔ The configured setting, measured figures, etc. can be printed out with the optional printer, which is extremely convenient for welding management.



Weld Tester® MM-315B

Portable and multi-functional



- ✔ Low-price, multi-functional, ultra-compact welding current measuring unit
- ✔ The welding current and the weld time can be configured.
- ✔ The conduction angle can also be set.
- ✔ Large, easy-to-view LCD display
- ✔ Non-volatile memory employed in MM-315A would hold the configuration even on flat battery.
- ✔ The panel sheet resists dust and oil mist

Portable force gauge MM-601B

Portable, high-precision force gauge



- ✔ This measures the applied force at the electrodes using load-cell sensors.
- ✔ A wide range of measurements (from 0.20daN to 931daN) can be accomplished simply by replacing the sensors.
- ✔ Automatic sensor detection
- ✔ The measurement unit can be switched between kg and daN. (1daN = 10N)
- ✔ Large, easy-to-view LCD display.

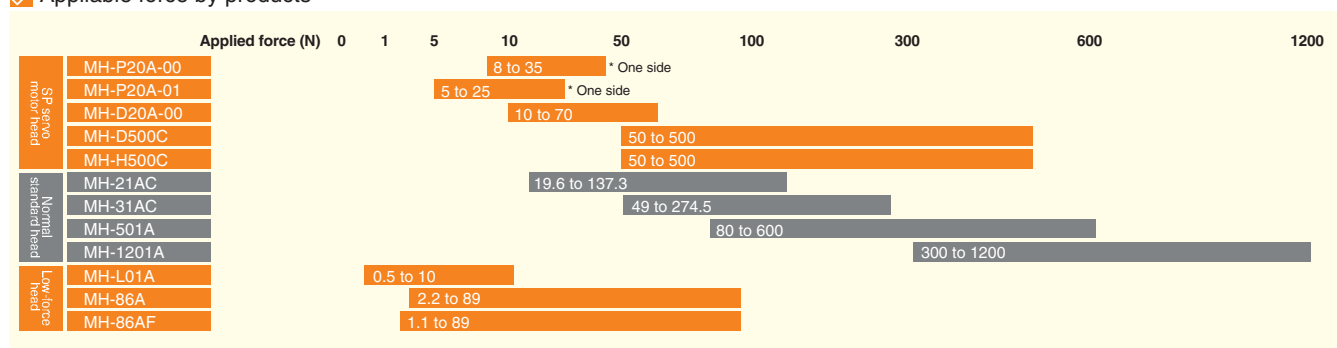
- ✔ One-touch zero calibration.
- ✔ The panel sheet resists dust and oil mist

Sensor specifications

Model	MA-520	MA-521	MA-522
Measuring range	0.2 to 9.31daN	2.0 to 93.1daN	20 to 931daN
Rated load	9.31daN	93.1daN	931daN
Measurement accuracy	±3% of rated load		
Mass	180g	190g	250g

WELDING HEAD

✓ Applicable force by products



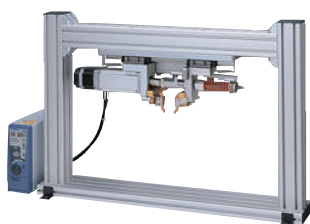
SP servo motor head series

MH-D500C / MH-H500C / MH-D20A / MH-P20A

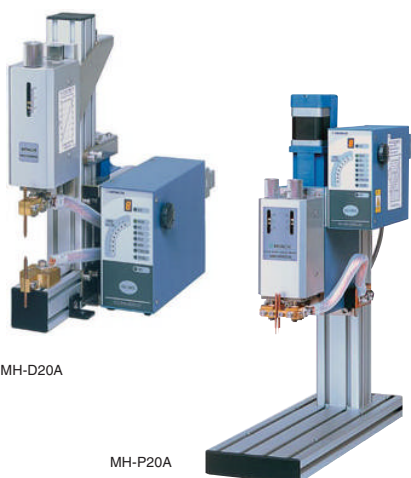
“Touch of feeling,” like operating a foot-operated weld head!



MH-D500C



MH-H500



MH-D20A

MH-P20A

✓ Constant welding quality would be achieved regardless of the operator's skill

Thanks to the servo motor drive, stable weld quality can be achieved regardless of the operator, unlike foot-operated types that require a lot of skill.

✓ Constant applied-force is always achieved.

Thanks to the spring pressurization and servo motor control, you can always weld with constant pressure even in repetitive welding action. In addition, since the applied force is stable regardless of the electrode length, there is no need for precise adjustment of the electrode extension after replacing the electrode.

✓ Configuring operations

Operating conditions are set with the dedicated control unit. The operations are simple: just “turn” and “press” the encoder.

✓ Simple-to-set motor drive

The pressurization system is driven by a motor, so there is no need for fitting pipe works for air transfer. Therefore, installation and moving are easy and you can lay out your plant to better suit your needs.

✓ Head with load cell (optional)

The applied force during the pressurization can be displayed on the color LCD. It can be set to emit signal to weld when the force reached to a set value.

✓ Soft touch pressurization

After the electrode moves from the start point to the middle point at the set speed, it slowly contacts the workpiece. This gentle contact which suppress the impact on the workpiece can reduce deformation of the welded material and extend the electrode service life.

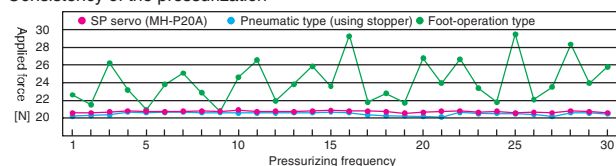
✓ Effective motion of the electrodes

In continuous welding, the electrode does not return to the start point, but it moves between the middle point and the welding point, so the welding time can be shortened.

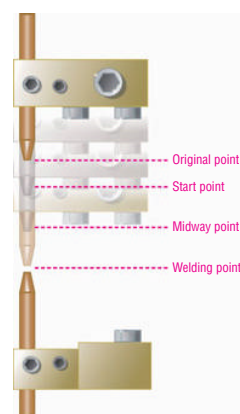
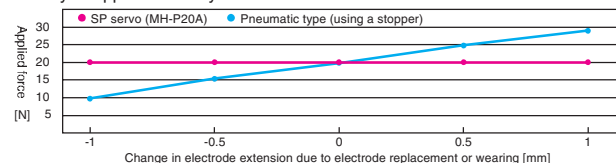
✓ Suppress the dust generation

The built-in pressuring spring can respond quickly to catch-up with the expansion and contraction of the work piece during being welded, which reduces the generation of dust.

Consistency of the pressurization



Stability of applied force by different electrode extensions



Typical electrode by different applications

Material of electrode	Features and use	JIS Z 3234
Copper-chromium	This is the type most commonly used for resistance welding. It is used for welding soft steel plates, zinc coated steel, stainless steel plates, etc.	2 type
High-strengthened copper-beryllium	The electrical and thermal conductivity are not as good as those of chrome copper. However, it has the higher mechanical strength and has the higher hardness at normal- and high-temperature. This type of electrode is used for welding heat-resistant steel, stainless steel, etc.	3 type
Alumina dispersion-strengthened copper	High electric and thermal conductivity, however the hardness at high-temperature is similar or less than that of general copper-chromium. This type of electrode is used for welding zinc coated steel plates and nickel, etc.	5 type
Tungsten	The characteristic resistance is relatively high and the hardness is also high. This type of electrode is used for copper, brass, and cross wire welding.	—
Molybdenum	The characteristics are resemble to that of tungsten, but it has good processability.	—

Pneumatic weld head series

MH-501A / MH-1201A

High-pressurization weld head using air pressure

- ✓ Thanks to the built-in pressurization spring, the electrode tracks the melting quickly.
- ✓ The supplied power voltage of the solenoid valve is 100VAC or 24VDC.
- ✓ By using a direct overhead pressurizing mechanism, sideways slippage of the electrode during welding is minimized.
- ✓ The setting of the applied force is adjusted by the pressure from the air regulator.
- ✓ Compact, yet provides maximum pressurization of 1200N (120kgf)
- ✓ Displacement gauge can be installed. (optional)
- ✓ A pressurization sensor can be installed to display the actual force been applied. (optional)



MH-501A

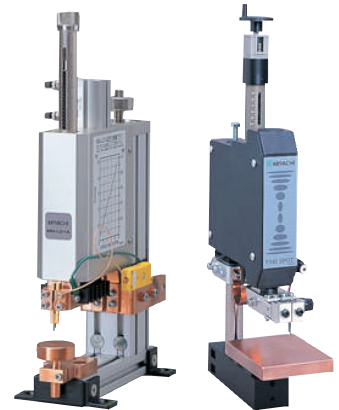
Small pressurization welding head series

MH-L01A / MH-86A • 86AF

Spot welding and reflow soldering

- ✓ Two types of driving methods are available: a pneumatic and a foot-operation.
- ✓ It ensures that the pre-set force is applied to the workpieces on applying the electricity.
- ✓ Upper/lower limit stopper mechanisms (For the MH-L01A, a lower limit stopper only)

Since the up/down strokes can be restricted by the upper/lower limit stoppers, the total welding times can be reduced.



MH-L01A

MH-86AF

General weld head series

MH-21AC / MH-31AC

Provides stable resistance welding with high reliability at a reasonable price

- ✓ Superior tracking
The moving section of the head is light in weight and, unnecessary movement is eliminated, so it catch-up with an expansion and contraction of the workpiece during welding.
- ✓ Pneumatic system
The air pressure driven system makes automation easy.
(* Optional for the MH-21AC and MH-31AC)
- ✓ Durable structure
Superior durability provides stable welding quality with excellent reliability.



MH-31AC

Parallel head

MK-P10C

Mountable on the MH-21AC and MH-31AC

- ✓ The weld force is achieved by independent springs.
- ✓ The welding start signal can be extracted by a micro-switch.
- ✓ Three types of variable electrode holders (Electrode rod = ϕ 3mm, \square 3mm, ϕ 4mm)



Other peripheral equipment



MK-105A
Pneumatic (upper section)
pressurization unit
(for the MH-21AC and MH-31AC)



MK-106A
Cylinder drive unit
(For the MK-105A)

Transistor type welding power supply specifications

Model name	MDA-8000B	MDA-4000B	MDA-1000B	MDB-4000B	MDB-2000B	MDC-2000B
Type	Standard type			Polarity switching type		2-channel type
Power supply voltage	Single-phase, 100 to 120VAC or single-phase, 200 to 240VAC 50/60Hz					
Maximum power consumption	340W	300W		340W	300W	
Maximum welding current	9990A	5000A	1500A	5000A	3000A	
Maximum welding voltage	30V					
Control method	Constant current control type / constant voltage control type / constant current and constant voltage control type					
Timer setting (31 schedules)	Squeeze	000 - 999ms / 000 - 999ms×10	000 - 999ms	000 - 999ms / 000 - 999ms×10	000 - 999ms	
	Precheck welding	0.00 - 1.00ms				
	Precheck judgment time	2ms (Fixed)				
	Upslope	0.00 - 9.99ms (Included in weld) *1 (Included in weld 1) *2				
	Weld (1-step welding mode) / Weld 1,2 (2-step welding mode)	0.00 - 9.99ms				
	Cool (for 2-step welding mode only)	0.00 - 9.99ms				
	Downslope	0.00 - 9.99ms (Included in weld) *1 (Included in weld 2) *2				
Hold	000 - 999ms					
Current setting time	000 - 999A (1A unit Min. 200A *3)	000 - 999A (1A unit Min. 100A *3)	000 - 500A (1A unit Min. 50A *3)	000 - 999A (1A unit Min. 100A *3)	000 - 999A (1A unit Min. 50A *3)	
	0.00 - 9.99kA (0.01kA unit Min. 0.40kA *3)	0.00 - 5.00kA (0.01kA unit Min. 0.40kA *3)	0.00 - 1.50kA (0.01kA unit Min. 0.30kA *3)	0.00 - 5.00kA (0.01kA unit Min. 0.40kA *3)	0.00 - 3.00kA (0.01kA unit Min. 0.60kA *3)	
Voltage setting time	0.00 - 9.99V (0.01V unit Min. 0.30V *4)					
Precheck function (31 schedules) Current upper / lower limit settings				000 - 999A	0.00 - 9.99kA	
Comparator function (31 schedules)	Current upper / lower limit settings			000 - 999A	0.00 - 9.99kA	
	Voltage upper / lower limit settings			0.00 - 9.99V		
	Power upper / lower limit settings			0.00 - 9.99kW 0.0 - 99.9kW		
Monitor display	Weld 1 and 2 (Average current / average voltage), weld 1 and 2 (Peak current / peak voltage), weld 1 and 2 (Average power / average resistance), current, voltage, power, resistance waveform, schedule number					
Dimensions (mm) *5	172(W)×390(D)×400(H)	172(W)×390(D)×269(H)	172(W)×390(D)×269(H)	172(W)×390(D)×400(H)	172(W)×390(D)×269(H)	
Mass	28kg	18kg	15kg	28kg	18kg	

*1: 1-step welding mode *2: 2-step welding mode *3: Minimum welding current *4: Minimum voltage *5: Projections on the rear not included

DC inverter type welding power supply specifications

Model name	For spot welding (welding transformer built-in)		For spot welding (welding transformer option)	
	IP-100D	IP-200D	IP-400B	IPB-5000A
Power supply voltage *1	3-phase 180 to 240VAC 50/60Hz		3-phase 180 to 240VAC 50/60Hz	3-phase 200 to 240 / 380 to 480VAC 50/60Hz
Control frequency	4kHz		4kHz	5kHz
Maximum current output	—		200A	5kA
Maximum welding power supply	1300A	2500A	5000A (when used with IT-513B)	4000A (when used with ITB-7808B)
Rated capacity	1.4kVA	5.3kVA	15kVA (when used with IT-513B)	17.4kVA (when used with ITB-7808B)
Control method	Primary constant current		Primary constant current	Secondary constant current / constant voltage / constant power / constant current and constant voltage
Welding schedules	63 schedules		63 schedules	127 schedules
Timer setting	Squeeze delay	—	—	0000 - 9999ms
	Squeeze	0000 - 9990ms *2	0000 - 9990ms *2	0000 - 9999ms
	Rise1,2	00 - 49ms	00 - 49ms	000 - 500ms
	Weld1,2	WELD1: 00 - 99ms WELD2: 000 - 299ms	WELD1: 00 - 99ms WELD2: 000 - 299ms	000 - 500ms
	Cool	00 - 99ms	00 - 99ms	00 - 99.8ms
	Hold	000 - 999ms *2	000 - 999ms *2	000 - 999ms
Welding current setting (HEAT1,2)	100 - 1300A	400 - 2500A	0.80 - 5.00kA	0.40 - 4.00kA
Current monitor	Monitoring or monitoring Off with 0 to ±49% upper / lower limit range relative to set current		0.00 - 9.99kA	0.00 - 9.99kA
Displacement monitor	—		—	—29.999mm to +29.999mm
Dimensions (mm) *3	142(W)×400(D)×269(H)	172(W)×400(D)×269(H)	142(W)×400(D)×269(H)	172(W)×390(D)×269(H)
Mass	10kg	12kg	9.5kg	15kg

*1: Set at the factory *2: When the software switch (SW5) setting is 1, SQ and HOLD function. *3: Projections on the rear not included

DC inverter type welding power supply specifications

Model name	For spot welding and fusing			For seam welding and roll spot welding		
	IS-120B	IS-444C	IS-471C	IS-443C	IS-470C	IS-472C
Power supply voltage *1	3-phase 220 / 400 / 440 / 480VAC ±10% —15% 50/60Hz (IS-120B can also use 240 / 380V)					
Control frequency	Switchable among 1kHz, 800Hz, and 600Hz					
Maximum output current	200A (8% duty cycle)	500A (15% duty cycle)	1000A (12% duty cycle)	500A (15% duty cycle)	1000A (12% duty cycle)	2000A (12% duty cycle)
Control method	Primary constant current (peak value, effective value) Secondary constant current, constant power, constant voltage, constant phase	Primary constant current (peak value, effective value), secondary constant current, constant current, constant power, constant phase	Primary constant current (peak value, effective value), secondary constant current, constant current, constant power, constant phase	Primary constant current (peak value, effective value), constant phase		
Welding schedules	15 schedules (64 schedules *4)	15 schedules (127 schedules *4)	7 schedules			
Timer setting	ms mode	cycle mode	ms mode			
	Squeeze delay	0000 - 9999ms	000 - 999cyc	—		
	Squeeze	0000 - 9999ms	000 - 999cyc	0000 - 9999ms		
	Delay	—	—	000 - 999ms		
	Weld 1,2 *2	000 - 600ms	00 - 30cyc	000 - 600ms *3		
	Upslope	000 - 400ms	00 - 20cyc	000 - 400ms		
	Downslope	—	—	—		
	Cool	000 - 999ms	00 - 99cyc	000 - 999ms		
	Off	0010 - 9990ms (10ms unit)	00 - 99cyc	—		
	Pulsation	1 - 9	—	—		
Heat setting	0.1 - 20.0kA	2.0 - 40.0kA	4.0 - 80.0kA	1.0 - 20.0kA	2.0 - 40.0kA	4.0 - 80.0kA
	0.1 - 20.0kW	2.0 - 40.0kW	4.0 - 80.0kW	—	—	—
	0.10 - 9.99V	—	—	—	—	—
	10.0 - 99.9%					
Current monitor (upper / lower limit setting range)	0.00 - 9.99kA or 0.00 - 20.0kA	00.0 - 40.0kA	00.0 - 80.0kA	00.0 - 20.0kA	00.0 - 40.0kA	00.0 - 80.0kA
Voltage monitor (upper / lower limit setting range)	0.00 - 9.99V			—		
Power monitor (upper / lower limit setting range)	00.0 - 20.0kW			—		
Pulse width monitor	10 to 100%			10 to 100%		
Cooling system	Forced air cooling	Water cooling Flow 2 ℓ / min. Water temperature 35°C max.	Water cooling Flow 2 ℓ / min. Water temperature 35°C max.	Water cooling Flow 2 ℓ / min. Water temperature 35°C max.	Water cooling Flow 2 ℓ / min. Water temperature 35°C max.	Water cooling Flow 2 ℓ / min. Water temperature 35°C max.
Dimensions (mm) *5	186(W)×506(D)×269(H)	300(W)×510(D)×670(H)	300(W)×665(D)×670(H)	300(W)×510(D)×670(H)	300(W)×665(D)×670(H)	597(W)×665(D)×735(H)
Mass	15kg	45kg	63kg	45kg	63kg	126kg

*1: Set at the factory *2: Includes upslope and downslope. *3: WELD1 only *4: Optional *5: Projections on the rear not included

AC inverter type welding power supply specifications

	For precision spot welding and series welding	For insulated wire welding	For spot welding and fusing	
Model name	MID-70C	MIE-200A	MIB-200A	MIB-500B
Power supply voltage *1	3-phase 220VAC +10%—15%, 3-phase 400VAC +10% 50/60Hz		3-phase 220 / 240 / 380 / 400 / 440 / 480VAC +10%—15% 50/60Hz	
Output frequency	The welding current and frequency can be selected from the table below. (However, No. 01 is supported only for 50Hz transformers.)		The welding current and frequency can be selected from the table below. (However, No. 00 to 03 is supported only for 50Hz transformers.)	
	number	[Hz]	number	[Hz]
	01	50	04	100
	02	60	05	125
	03	80	06	160
Control frequency	4kHz		1kHz	
Maximum output current	70A (4% duty cycle)		200A (8% duty cycle)	
Control method	Primary constant current peak value control		500A (15% duty cycle)	
Welding schedules	31 schedules		15 schedules	
Timer setting	Squeeze delay		0000 - 9999ms	
	Squeeze		0000 - 9999ms	
	Upslope / Rise 1		00.0 - 99.5cyc	
	Rise 2		000 - 999ms	
	Weld 1, 2 / Curr 1, 2		00.0 - 99.5cyc	
	Cool		00.0 - 99.5cyc	
	Downslope		00.00 - 99.5cyc	
	Hold		000 - 999ms	
	Off		0000 - 9990 (10ms unit)	
	Pulsation		1 to 9	
Heat setting / Power supply setting	100 to 1000A / 300 to 3000A (Manual switching)		0.10 to 9.99kA	
Current monitor (upper/lower limit setting range)	±1% to ±49% of setting value		0.00 to 9.99kA	
Voltage monitor (upper/lower limit setting range)	—		0.00 - 9.99V	
Weld count monitor	—		00 - 99times	
Cooling system	Forced air cooling		Water cooling (6 ℓ / min)	
Dimensions (mm) *2	142(W)×400(D)×269(H)		186(W)×506(D)×269(H)	
Mass	10kg		15kg	

*1: Set at the factory *2: Projections on the rear not included

Model name	MEA-100A
Power supply voltage *1	Single-phase Automatic switching (The voltage can be switched, but the factory setting is fixed.)
Maximum capacity	20kVA (10% duty cycle, 200VAC Input) / 26kVA (10% duty cycle, 400VAC Input) / 31kVA (10% duty cycle, 480VAC Input)
Control method	1. Secondary constant current control type 2. Power supply voltage fluctuation compensation control type
Welding current control	1. Multi - cycle welding 2. Single - cycle welding 3. Half - cycle welding
Control speed	Half - cycle
Current accuracy	For secondary constant current control ±2% max. of power supply voltage fluctuation ±10% ±2% max. of load fluctuation ±10% For power supply voltage fluctuation compensation control ±3% max. of power supply voltage fluctuation ±10%
Timer setting (31 schedules)	Multi - cycle welding Squeeze, weld 1, cool, weld 2, hold, 0 - 99cycles Upslope 1, upslope 2, downslope 0 - 9cycles Pulsation 1 - 9times Single - cycle welding Squeeze, 0 - 99cycles First-half wave, second-half wave 0.5cycle Half - cycle welding Squeeze, 0 - 99cycles Half wave 0.5cycle
Current value setting range (31 schedules)	For secondary constant current control Current value 1, current value 2...0.20 - 9.99kA (0.01kA unit) For power supply voltage fluctuation compensation control Current value 1, current value 2...0.0 - 99.9kA (0.1% unit)
Current monitoring (31 schedules)	For secondary constant current control Upper limit setting: +1 to +49% Lower limit setting: -1 to -49% For power supply voltage fluctuation compensation control Upper limit setting: 0.01 - 9.99kA (0.01kA unit) Lower limit setting: 0.01 - 9.99kA (0.01kA unit)
Options	Toroidal coil MB-35E (Required for secondary constant current control)
Operating environment	Temperature = 0 to 45℃ Humidity = 90% max.(No condensation)
Power consumption	For standby 15W max.
Dimensions (mm) *2	142(W)×300(D)×269×(H)
Mass	6.5kg

*1: Set at the factory *2: Projections on the rear not included

Timer specifications

Model name	CY-210C	CT-110C
Welding power supply voltage *1	220 / 230 / 240 / 380 / 400 / 415 / 440 / 460 / 480VAC —25% +10% 50/60Hz	
Control power supply voltage *1	100 / 120 / 220 / 230 / 240VAC ±20% 50/60Hz	
Control method	Primary or secondary current feedback type constant current control through thyristor phase control or Power supply voltage fluctuation compensation control type	
Timer setting	15 schedules "SQUEEZE," "WELD II," "COOL II," "WELD III," "SLOPE II," "HOLD," "OFF" 00 - 99cycles "SLOPE I," 0 - 9cycles "WELD I" "COOL I" 0 - 9cycles "WELD I" "COOL I" 00 - 99cycles	
Pulsation count	Switching used with Off mode 0 - 9 times	
Current setting range	1.0 - 80.0kA (Maximum current setting: 5.0 - 80.0kA)	
Control speed	Secondary current feedback type constant current control 1/2 cycle (Requires toroidal coil) Primary current feedback type constant current control 1cycle (Requires CT coil) Power supply voltage fluctuation compensation control 1cycle	
Current accuracy	For secondary current feedback type constant current control a) ±2% max. of welding power supply voltage fluctuation +10%—15% b) ±2% max. of resistance load fluctuation ±15% c) ±2% max. of induction load fluctuation ±15% (Accuracy based on error relative to full scale.)	
Weld force output	Either 2-series control power supply voltage (1A max.) or 24VDC (0.6A max.)	
Step up	2 series, 9 stages	1 series, 9 stages
Current monitor (Only for constant current control)	Counter 0 - 9999 Current increase ratio 50 - 200% of the set current in 1% step a) Upper limit setting: 0 - 49% 15 schedules b) Lower limit setting: 0 - 49% 15 schedules (Not monitored if set to 0%)	
Conduction angle monitor *2	0 - 180 degree 15 schedules (Not monitored if set to 0)	
Interlock input	Standby for power at close-contact (Also serves as weld point monitor set input)	
Interlock output	Contact that closes two cycles before welding and that opens at the same time as the end of the welding period (Contact capacity 100VAC, 0.5A)	
Error output	If any of the abnormalities below occur, the contact closes and the LED display lamp lights up. a) Self-diagnosis error g) No-power-supply error b) Start input error h) Current upper-and -lower-limit error c) Current-setting error i) Conduction angle error d) Current stepper-up ratio setting error j) Total counter-up e) Thermostat error k) Insufficient weld count (CY-210C only) f) Thyristor short-circuit error l) Step-up completion	
Dimensions (mm) *3	355(W)×250(D)×110(H)	110(W)×250(D)×355(H)
Mass	4.5kg	

*1: Set at the factory *2: This can not be used with power supply voltage fluctuation compensation control. *3: Projections not included

Weld Checker® specifications

Model name		MM-370A			MM-380A	
Current	Measurement range	①0.100 - 2.000kA ②0.30 - 6.00kA ③1.00 - 20.00kA ④3.0 - 60.0kA ⑤10.0 - 200.0kA				
	Measurement value	Arithmetic mean effective value, maximum value (peak value)				
	Measurement accuracy	For range ①③⑤ $\pm (1\%rdg + 9 - 20dgt)$ For range ②④ $\pm (1\%rdg + 3 - 7dgt) *1$				
Voltage	Measurement range	⑦0.30 - 6.00V ⑧1.0 - 20.0V				
	Measurement value	Arithmetic mean effective value, maximum value (peak value)				
	Measurement accuracy	$\pm (1\%rdg + 3dgt)$				
Welding time	Measurement range	AC mode 50Hz: 0.5 - 500.0CYC				

*1: Depends on the control power supply type *2: Projections on the rear not included

Model name		MM-122A									
Measure ment	Current	Measurement range	0.010 - 0.199kA (Only when 10x sensitivity coil used) 0.100 - 1.99kA 1.00 - 19.9kA 10.0 - 199.9kA								
		Measurement value	The peak value of the total welding or arithmetic mean effective value in the measured range can be measured.								
		Measurement display	4-digit digital display (7-segment LED)								
		Measurement range setting	31 schedules Measurement range: 2 seconds max. AC 50Hz: 000 to 200 cycles DC 0000 to 2000ms (Standard mode) 60Hz: 000 to 240 cycles 0.50 to 25.00ms (Short-time mode) 250Hz: 000 to 500 cycles (AC inverter)								
		Measurement accuracy	Effective value $\pm (2\%rdg + 4dgt) *1$, Peak value $\pm (2\%rdg + 10dgt)$								
	Time	Detection method	Toroidal coil								
		Welding cycle / Pulsewidth	Measurement time is 2 seconds max. Single-phase AC type 0.5 - 100 cycle (50Hz) / 0.5 - 120 cycle (60Hz), AC inverter type 0.5 - 500 max. cycle (depending on welding current frequency) or 0.50 - 2000ms (until half time of I_p for TH)								
		Measure ment time									
		Measure ment display	4-digit digital display (7-segment LED)								
		Detection method	Toroidal coil								
	Conduction angle	Measurement range	30 - 180° Maximum conduction angle within welding time								
		Measurement accuracy	$\pm 5\%$ of full scale								
		Detection method	Toroidal coil								
	Power supply voltage measurement value	Effective value	Cycle display: Arithmetic mean effective value for each half cycle ms display: Arithmetic mean effective value for each 1ms Transistor type: Effective value from start to end Capacitor type: Effective value from start of welding start to TH								
		Peak value	Maximum peak value during entire welding time								
	Monito ring	Welding current	Upper/lower limit 31 schedule setting Setting range 0 to Maximum measurement range								
		Welding time	Upper/lower limit 31 schedule setting Setting range 0 to Maximum measurement range								
		No-current detection	No current flows when welding current is below the starting sensitivity or the current value is 1.5% or less of full scale. However, the close contact signal must be input externally while the force is applied.								
		Judgment display	The corresponding lamp (LED) lights up for each item, upper limit, lower limit, and appropriate.								
		Judgment output	[GOOD], [NG-H], and [NG-L] semiconductor relay								
	Printer	Impulse setting	0 - 9 (Sets the location for measuring pulsation welding.)								
		Counter	99999 max. 5 digits								
		Printer	Option (BL-58RⅡ) Measured and displayed current value, welding time, judgment result, schedule number and conduction angle, all cycle, schedule data, counter values								
		Step up	1 - 9 steps								
		Communications output	RS-232C/RS-485 Measured and displayed current value, welding time, judgment result, counter value and schedule data send and receive								
	Power supply	Power supply voltage	Single-phase 100 - 240VAC $\pm 10\%$ (50/60Hz) or 24VDC $\pm 10\%$								
		Operating ambient temperature	0 - 40°C								
		Power consumption	12W max.								
		Dimensions (mm) *2	70(W)×246(D)×190(H)								
		Mass	1.9kg								

*1: rdg: Read value (2% of displayed measurement value) dgt: One count of digital display (3dgt = There is an error of 3 counts in the final digit.) *2: Projections not included

Weld Tester® specifications

Model name		MM-315B	
Current	Measurement range	1.00 - 9.99kA (Lo range) 5.0 - 49.9kA (Hi range)	
	Measurement value	Arithmetic mean effective value of measurement range	
	Measurement accuracy	AC DC	
		Lo range: $\pm 1\%rdg + 9dgt$ Hi range: $\pm 1\%rdg + 3dgt$ Lo range: $\pm 1\%rdg + 15dgt$ Hi range: $\pm 1\%rdg + 5dgt$	
	Start	1 - 99 cycle	
Time	End	2% or less of full scale	75% or less of previous cycle
	Measurement range	1 - 99 cycle	1 - 40 cycle / 0.01 - 0.80 seconds
	Measurement accuracy	± 0 cycle / ± 0.01 seconds	
Conduction angle measurement		30 - 180 degrees	Measurement accuracy ± 9 degrees
Multi-step welding		9 steps (With memory function)	
Power supply		Nickel-hydrogen battery 1.2V X 4 (4.8V) Can be used for 10 consecutive hours.	
Dimensions (mm) *		74(W)×30(D)×164(H)	
Mass		500g (Including four nickel-hydrogen batteries)	

* Projections not included

Welding Head specifications

Model name		MH-D500C	MH-H500C
Head type		Direct welding head	Horizontal type welding head
Electrode driving method		Servomotor	
Electrode force		50 - 500N: Stepless adjustment (Approx. 5 - 50kgf)	
Weld force method		Spring forced	
Electrode holder		Select $\phi 6$ or $\phi 8mm$	Holder standard equipment, dedicated electrodes (optional)
Electrode diameter		Select $\phi 6$ or $\phi 8mm$	
Stroke distance		45mm (Minimum resolution: 0.1mm)	
Throat depth		100mm	—
Number of welding schedules		31 schedules (Externally switchable type)	
Electrode movement speed		Start point \leftrightarrow Midway point, Welding point \rightarrow Midway point: 8 levels (Can be set for each schedule) Midway point \rightarrow Welding point: 4 levels (Can be set for each schedule)	
Hold time setting		7 levels (100, 200, 300, 400, 500, 1000, 2000ms), Waiting for END signal	
Communication		RS-232C / RS-485 (can be switched) 9600bps (Transfer speed)	
Power supply voltage		100 - 240VAC $\pm 10\%$ 50/60Hz	
Welding current		3000A (at 2% duty cycle)	
Dimensions (mm)		Head section: 160(W)×290(D)×468.5 (H) Head controller section: 70(W)×245.5(D)×185 (H)	Head section: 886(W)×180(D)×493 (H) Head controller section: 70(W)×245.5(D)×185 (H)
Mass *		19kg	21kg

* Includes control unit

Welding Head specifications

Model name		MH-501A	MH-1201A
Actuation type		Air-actuated	
Electrode force		80 - 600N (Approx. 8 - 60kgf): Stepless adjustment	300 - 1200N (Approx. 30 - 120kgf): Stepless adjustment
Weld force method		Spring forced	
Electrode diameter		$\phi 8mm$ (With water-cooled electrode holder) *	
Stroke distance		35mm	
Throat depth		74mm	
Solenoid power supply voltage		100VAC 50/60Hz or 24VDC	
Welding current		10000A (at 2% duty cycle)	
Feed air pressure		0.5MPa or more, 0.7MPa or less	
Dimension (mm)		210(W)×308(D)×708(H)	210(W)×308(D)×714(H)
Mass		30kg	

* Please feel free to consult with us about other electrodes.

Force gauge specifications

Model name		MM-601B	
Measurement range		0.20 - 9.50kgf / 0.20 - 9.31daN (MA-520)	2.0 - 95.0kgf / 2.0 - 93.1daN (MA-521) 20 - 950kgf / 20 - 931daN (MA-522)
Measurement accuracy		$\pm 3\%$ of full scale	
Display function		Decimal point and unit display: Automatic display according to measurement range Overload display: "OVER!" display and intermittent buzzer Charge request display: "BATTERY" display flashes	
Automatic power OFF		If no key is pressed for about 7 minutes, the power goes Off.	
External hold input		Measurement value held by external contact input	
Analog output		Voltage output 4mV / count Load resistance 5k Ω or more	
Sensor (option)		MA-520 MA-521 MA-522	
Power supply		Nickel-hydrogen battery 1.2V x 4 (4.8V)	
Dimensions (mm) *		74(W)×30(D)×164(H)	
Mass		500g (Including leather case)	

* Projections not included

Model name	MH-D20A-00	MH-P20A-00	MH-P20A-01
Head type	For direct welding		For series welding
Electrode driving method	Servomotor		
Electrode force	10 - 70N: Stepless adjustment (Approx. 1 - 7kgf)	One side 8 - 35N: Stepless adjustment (Approx. 8 - 3.5kgf)	One side 5 - 25N: Stepless adjustment (Approx. 0.5 - 2.5kgf)
Weld force method	Spring forced		
Electrode holder	φ3mm	Select φ3 or φ4mm *1	
Electrode diameter	φ3mm	Select φ3 or φ4mm *1	
Stroke distance	45mm (Minimum resolution: 0.1mm)		
Throat depth	105mm	217mm	
Number of welding schedules	8 schedules (Externally switchable type for Schedule 1, 2, and 3)		
Electrode movement speed	Start point ⇄ Midway point, Welding point → Midway point: 8 levels (Can be set for each schedule) Midway point → Welding point: 4 levels (Can be set for each schedule)		
Hold time setting	7 levels (100, 200, 300, 400, 500, 1000, 2000ms), Waiting for END signal		
Power supply voltage	100 - 240VAC ±10% 50/60Hz		
Welding current	3000A (at 2% duty cycle)		
Dimensions (mm)	140(W)×270(D)×302.5(H)	162(W)×406(D)×466.5(H)	
Mass *2	4.5kg	8kg	

Welding head specifications

Model name	MH-21AC	MH-31AC
Electrode force	19.6 - 137.3N (Approx. 2 - 14kgf): Stepless adjustment	49 - 274.5N (Approx. 5 - 28kgf): Stepless adjustment
Weld force method	Spring forced	
Electrode diameter	φ4mm or φ6mm	φ8mm
Electrode driving method	Air-actuated *1 or foot-actuated *2	0.35Mpa min.
Stroke distance	20mm	
Throat depth	89mm	99mm
Solenoid power supply voltage	100 / 110 / 200 / 220VAC 24VDC *1	
Welding current	2000A (at 2% duty cycle)	3000A (at 2% duty cycle)
Supply air pressure	0.35 - 0.5Mpa *1	
Dimensions (mm) *3	70(W)×173(D)×287(H)	80(W)×205(D)×318(H)
Mass	3.5kg	5.5kg

*1: Option: Air pressure unit (MK-105A), Cylinder drive unit (MK-106A) *2: Option: Foot-operated pedal (MA-21) *3: Projections on the rear not included

Welding head specifications

Model name	MH-L01A-00	MH-L01A-01	MH-L01A-03	MH-L01A-04
Use	Reflow soldering		Spot welding	
Actuation type	Air-actuated *1	Foot-actuated *2	Air-actuated *1	Foot-actuated *2
Electrode force	0.5 - 10N: Stepless adjustment			
Weld force method	Spring forced			
Applicable electrodes	Heater electrode *3		Cr-Cu alloy (φ3mm) *3	
Stroke distance	12mm		90mm	
Throat depth (minimum)	81mm			
Maximum rated voltage	0.7kVA (at 3% duty cycle)			
Dimensions (mm) *4	80(W)×171(D)×310(H)			
Mass	2.1kg	2.0kg	2.1kg	2.0kg

*1: Option: Cylinder drive unit (MK-106A) *2: Options: Cable pedal (CP), *3: Options: Electrode *4: Projections on the rear not included

Welding transformer for DC inverter specifications

Model name	IT-513B (Inverter type transformer for IP-400B)	ITD-360B6 (Inverter type transformer for IPB-5000A)	ITB-780B6 (Inverter type transformer for IPB-5000A)
Supplied power voltage	180-240VAC	220VAC	440VAC
Rated voltage capacity	15kVA	10.2kVA	17.4kVA
Rated primary voltage	300V	300V	600V
No-load secondary voltage	10.0V	9V	13V
Transformer turn ratio	30:1	33:1	23:1
Input frequency	4kHz	5kHz	
Maximum welding current	5000A	3000A	4000A
Duty cycle (weld time)	4.5% (at 50ms)	5% (at 100ms)	4% (at 100ms)
Cooling system	Forced air cooling		
Dimensions (mm) *	195(W)×375(D)×180(H)	183(W)×323(D)×186(H)	190(W)×376(D)×183(H)
Mass	15kg	11kg	13kg

* Projections on the rear not included

Model name	Inverter type transformer for IS-120B					
	IT-510C	IT-511C	IT-512C	ITH-651B6W	MIR83-34560	ITG-1050B6W
Supplied power voltage	220VAC					
Rated voltage capacity	9kVA	10kVA	15.8kVA	26.8kVA	45kVA	40.7kVA
Rated primary voltage	300V					
No-load secondary voltage	6.9V	9.0V	10.7V / 12.5V	9.3V	8.3V	15V
Transformer turn ratio	43:1	33:1	28.1 / 24:1	32:1	36:1	40:1
Input frequency	1kHz					
Maximum welding current	4000A	3000A	4000A	7000A	13000A	7000A
Duty cycle (weld time)	5.5% (at 50ms)	7% (at 50ms)	5% (at 50ms)	8.5% (at 15 cycles)	10%	7.5%
Cooling system	Forced air cooling					
Maximum welding current (when using IS-120B)	4000A	3000A	4000A	6000A	7000A	7000A
Dimensions (mm) *	183(W)×322(D)×184(H)	183(W)×380(D)×184(H)	168(W)×293(D)×199(H)	96(W)×213.5(D)×155(H)	168(W)×334(D)×199(H)	96(W)×213.5(D)×155(H)
Mass	12kg	13kg	17.5kg	16kg	12kg	12kg

* Projections on the rear not included

Model name	Inverter type transformer for the IS-444C / IS-471C					
	ITH-651B6W	ITG-1050B6W	MIR-83-34560	MIR115-39060	MIR77-64560	MIR109-69060
Supplied power voltage	220VAC	440VAC	220VAC	440VAC	220VAC	440VAC
Rated voltage capacity	26.8kVA	40.7kVA	45kVA	90kVA	45kVA	90kVA
Rated primary voltage	300V	600V	300V	600V	300V	600V
No-load secondary voltage	9.3V	15V	8.3V	11.5V	8.3V	10.9V
Transformer turn ratio	32:1	64:1	20:1	40:1	36:1	55:1
Input frequency	1kHz					
Maximum welding current	7000A					
Duty cycle	8.5%	7.5%	13000A	18000A	13000A	18000A
Cooling system	Water cooling					
Maximum welding current (when using IS-444C)	7000A					
Maximum welding current (when using IS-471C)	7000A					
Dimensions (mm) *	168(W)×293(D)×199(H)	168(W)×334(D)×199(H)	96(W)×213.5(D)×155(H)	167(W)×435(D)×155(H)	96(W)×213.5(D)×155(H)	167(W)×365(D)×155(H)
Mass	16kg	21kg	12kg	23kg	12kg	21kg

* Projections on the rear not included

Example configuration of peripheral equipment For supplied power of 220VAC

Model name	IS-120B	IS-471C	IS-444C	IPB-5000A	IP-100D	IP-200D	IP-400B
Welding transformer	IT-510C / IT-511C / IT-512C / ITH-651B6W / MIR83-34560	ITH-651B6W / ITG-1050B6W / MIR83-34560 / MIR115-39060		ITD-360B6 / ITB-780B6	Transformer built-in		IT-513B
Welding head	MH-180A	MH-501A / MH-1201A		MH-21AC / MH-31AC / MH-D500C / MH-H500C	MH-21AC / MH-31AC		MH-21AC / MH-31AC / MH-501A / MH-1201A

Welding transformer for AC inverter type / single-phase AC type specifications

When the welding power supply is 200 / 220VAC, the transformers in the table below can be used.

Model name	MT-510AC	MT-520AC	MT-530A	MT-25	MTH-52A3 ★
Rated voltage capacity	1.0kVA	3.2kVA	6.0kVA	15.0kVA	2.0kVA
Rated primary voltage	200VAC ±10% 50/60Hz				
Rated secondary voltage	1.2 / 1.8 / 2.5 / 3.5V (For no load)	2.5 / 3.2 / 4.0 / 5.0V (For no load)	2.7 / 3.4 / 4.3 / 5.3V (For no load)	2.6 / 4.0V (Parallel welding) 5.3 / 8.0V (Series welding)	300VAC ±10% 250Hz
Transformer turn ratio	57:1	40:1	37:1	50:1 / 25:1	57:1
Maximum welding current	1600A	3700A	6600A	11000A	1000A
Duty cycle	1.5% max.				
Cooling system	Natural air cooling			Water cooling (4 ℓ / min)	Natural air cooling
Dimensions (mm) *	193(W)×264(D)×174(H)	182(W)×337(D)×199(H)	225(W)×341(D)×244(H)	180(W)×320(D)×240(H)	100(W)×154(D)×130(H)
Mass	20kg	35kg	44kg	60kg	4.5kg

For maximum welding current for the transformer standing-alone, and maximum welding current when combined with the welding power supply, see "How to find the maximum welding current" (below). * Projections on the rear not included ★ Can not be used with single-phase AC types.

Example configuration of peripheral equipment For supplied power of 220VAC

Model name	MID-70C	MIE-200A	MIB-200A	MIB-500B
Welding transformer	MT-510AC / MT-520AC / MTH-52A3	MT-510AC / MT-520AC / MT-530A / MT-25	MT-510AC / MT-520AC / MTH-52A3	MT-510AC / MT-530A / MT-25
Welding head	MH-P20A / MH-D20A / MH-L01A / MH-86AF / MH-86A / MH-80B / MH-21AC	MH-80B / MH-21AC / MH-31AC / MH-180A / MH-501A / MH-1201A	MH-180A / MH-501A / MH-1201A	

How to find the maximum welding current

The maximum welding current when the welding power supply and transformer are combined is the maximum output current for the welding power supply x the welding transformer turn ratio or the maximum welding current of the welding transformer, whichever is smaller.

Example: Combining MID-70C and MT-510AC
Welding power supply maximum output current: 70A
Welding transformer turn ratio: 57:1
Welding transformer maximum welding current: 1600A
70A x 57 = 3990A > 1600A
Maximum welding current = The smaller of the two values = 1600A

The appearance and performance are subject to change without notice for the sake of product improvement.