

PULSETIG® WELDING POWER SUPPLY

MAWA-300A ^{EU}

OPERATION MANUAL



Thank you for purchasing the Amada Miyachi PULSETIG® Welding Power Supply
MAWA-300A.

This operation manual describes its method of operation and precautions for use.
 Read this operation manual carefully prior to use. Store appropriately for ready reference.

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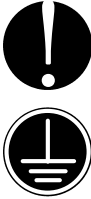

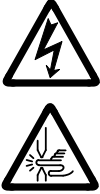
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1. Special Notes

(1) Safety Precautions

Before using, read "Safety Precautions" carefully to understand the correct method of use.

- These precautions are shown for safe use of our products and for prevention of damage or injury to operators or others. Be sure to read each of them, since all of them are important for safety.
- The meaning of the words and symbols is as follows.

 DANGER Denotes operations and practices that may imminently result in serious injury or loss of life if not correctly followed.	 These symbols denote "prohibition". They are warnings about actions out of the scope of the warranty of the product.
 WARNING Denotes operations and practices that may result in serious injury or loss of life if not correctly followed.	 These symbols denote actions which operators must take.
 CAUTION Denotes operations and practices that may result in personal injury or damage to the equipment if not correctly followed.	 Each symbol with a triangle denotes that the content gives DANGER, WARNING or CAUTION to the operator.

**DANGER****Do not touch the inside of the Power Supply except as instructed.**

The interior of this Power Supply carries high voltage. It is very dangerous to touch any parts except as instructed. Do not touch.

When inspecting the interior of the Power Supply, be sure to turn off the power source of the Power Supply and wait for at least 5 minutes.

**Never disassemble, attempt to repair, or modify the Power Supply.**

These actions can cause electric shock and fire. Perform only the maintenance described in the operation manual.

**Do not perform welding with holding the torch with your hand.**

High voltage is applied at the exposed part of torch electrode during welding. Do not perform welding with holding the torch with your hand; an electric shock may result.

**Replace electrodes after turning off the Power Supply.**

Replace electrodes after turning off the Power Supply; an electric shock may result.

 **WARNING**


Do not insert your fingers or hands between torch/electrode and workpiece.

When welding, keep your fingers and hands away from the electrodes.



Do not touch any welded part or electrode during welding or just after completion of welding.

The welded parts of a workpiece, electrodes, and the arm are very hot. Do not touch them; burns may result.

Also, high voltage is applied at the exposed part of torch electrode during welding. Do not touch it; an electric shock may result.



Ground the equipment.

If the Power Supply is not grounded, you may receive an electric shock in the event of malfunction or current leak. Be sure to perform grounding work. 400V AC of input voltage: at least class C, 200V AC of input voltage: at least class D



Connect the specified cables securely.

Cables of insufficient current capacities and loose connections can cause fire and electric shock.



Do not damage the power cable and connecting cables.

Do not tread on, twist, or apply force to any cable. Doing so may cause the power cable and connecting cables to become broken, leading to electric shock and fire.



Do not use any damaged power cable, connecting cable, or plug.

Failure to observe this precaution can lead to electric shock, short circuit, or fire.

If any part must be replaced or requires repair, consult Amada Miyachi Co., Ltd. or your distributor.



Stop the operation if any trouble occurs.

Continuous operation after occurrence of a trouble such as burning smell, abnormal sound, abnormal heat, smoke, etc. can cause electric shock and fire.

If such a trouble occurs, immediately consult Amada Miyachi Co., Ltd. or your distributor.



Persons with pacemakers must stay clear of the welding machine.

A person who uses a pacemaker must not approach the welding machine or walk around the welding site while the welding machine is in operation, without being permitted by his/her doctor. The welding machine generates a magnetic field and has effects on the operation of the pacemaker while it is turned on.



Protective gear must be worn.

Put on protective gear such as protective gloves, long-sleeve jacket, leather apron, etc. Surface flash and expulsion can burn the skin if they touch the skin.



Wear protective glasses.

If you look at the arc light directly during welding, your eyes may be damaged. Also, if any surface flash and expulsion gets in your eye, you may lose your eyesight.



CAUTION

**Apply the specified supply voltage.**

Application of a voltage outside the specified range may result in fire or electric shock.

**Do not allow water to come in contact with the equipment.**

Water on the electric parts can cause electric shock and short circuit.

**Use proper tools (wire strippers, pressure wire connectors, etc.) for terminal treatment of the connecting cables.**

Do not cut the wire conductor; fire or electric shock may result.

**Install the equipment on a firm and level surface.**

Injury may result if the equipment falls or is dropped.

**Do not sit on or place objects on the Power Supply.**

Failure to observe this precaution may lead to malfunction.

**Keep combustible matter away from the Power Supply.**

Surface flash and expulsion may ignite combustible matter. If it is impossible to remove all combustible matter, cover it with non-combustible material.

**Do not cover the Power Supply with a blanket, cloth, etc.**

Do not cover the Power Supply with a blanket, cloth, etc. while it is in use. The cover may be overheated and burned.

**Do not use this Power Supply for purposes other than welding.**

Use of this Power Supply in a manner other than specified can cause electric shock and fire.

**Use ear protectors.**

Loud noises can damage hearing.

**Keep a fire extinguisher nearby.**

Keep a fire extinguisher in the welding shop in case of fire.

**Maintain and inspect the Power Supply periodically.**

Maintain and inspect the Power Supply periodically, and repair any damage nearby before starting operation.

(2) Safety Precautions to be Followed



To avoid serious accident, fully observe the following points.

- This Power Supply was designed and manufactured with safety in mind, but be sure to follow the precautions in this operation manual when using it. If not followed, serious accident causing loss of life or serious injury may result.
- For input-side power source construction, installation site selection, handling, storage and piping of high-pressure gas, storage of products after welding, and waste disposal, etc., follow regulations and your in-house standards.
- Keep any unauthorized people out of the Power Supply and welding site.
- A person who uses a pacemaker must not approach the welding machine or walk around the welding site while the welding machine is in operation, without being permitted by his/her doctor. The welding machine generates a magnetic field and has effects on the operation of the pacemaker while it is turned on.
- To ensure safety, installation, maintenance, and repair of this Power Supply must be made by qualified personnel or personnel familiar with the Power Supply.
- To ensure safety, the personnel who operates this Power Supply must understand this operation manual and acquire knowledge and skills of safe handling.
- Do not use this Power Supply for purposes other than welding.



To avoid electric shock, fully observe the following points.

- * Touching to the charged portion causes fatal electric shock or burns.
- * This Power Supply carries high voltage (approx. 10 kV) for arc start. Approaching or touching output terminal, electrode, ungrounded case, or ungrounded workpiece causes an electric shock.
- Do not touch the charged portion such as output terminal cable conductor, electrode, ungrounded case, and ungrounded workpiece.
- To prevent case and workpiece or jig electrically connected to workpiece, etc. from being electrically charged, personnel certified as electrical worker must perform grounding work in accordance with regulations (Technical Standards for Electric Equipment).
- The longer the cable, the greater the risk of electric shock. Do not extend the torch-side cable and the workpiece-side cable more than necessary.
- When the capacitor is connected between output terminals, the risk of electric shock is increased. Do not connect the capacitor between output terminals.
- Each output terminal can be still charged even after the input voltage is turned off. Before the output-side connection or change of connection, connect each output terminal to ground.
- Before replacing electrodes, be sure to turn off the input power.
- When other equipment is connected to the output terminal, the equipment is damaged. If you touch the equipment, you can get an electric shock. Do not connect other equipment between output terminals.
- For installation and maintenance check, be sure to turn off the input power with switch in switch box and wait for at least 3 minutes. Since the capacitor may be charged even if the input power is turned off, confirm that there is no charging voltage before operation.
- Always confirm that the insulator of torch and welding cable resists high voltage (approx. 10 kV).
- Do not use cables of insufficient current capacities, damaged, or exposed conductor.
- Be sure to tighten and isolate the cable connection.
- Do not use the Power Supply with its case or cover removed.
- Do not use torn or wet gloves. Always use dry insulating gloves.
- When working in high places, use a safety rope.
- Maintain and inspect the Power Supply periodically, and repair any damage nearby before starting operation.
- When not in use, turn off the power to all equipments.



To protect people from gas, fume, and oxygen deficiency produced during welding, use exhaust ventilation and protective device, etc.

- * Welding in narrow spaces can cause suffocation from oxygen deficiency.
- * Inhalation of gas or fume produced during welding can cause health damage.
- In places set by regulations (Ordinance on the Prevention of Oxygen Deficiency, etc.), provide adequate ventilation or use a breathing apparatus, etc. to avoid gas poisoning or suffocation.
- To avoid dust hazards or poisoning caused by fume, use local exhaust ventilation or put on respiratory protective device set by regulations (Ordinance on Industrial Safety and Hygiene, Ordinance on Prevention of Hazards due to Dust).
- When a welding is performed at the base such as tank, boiler, and belly of a ship, heavier-than-air gas such as carbon dioxide gas and argon gas stays at the bottom. In such places, be sure to provide adequate ventilation or use a breathing apparatus, etc. to avoid oxygen deficiency.
- For welding in narrow spaces, be sure to provide adequate ventilation or use a breathing apparatus, etc. in addition to performing a work under the supervision of trained observer.
- Do not perform welding near degreasing, cleaning, and spray works. Performing welding near such works can produce harmful gas.
- For coated steel welding, be sure to provide adequate ventilation or put on respiratory protective device. (Welding coated steel can produce harmful gas.)



DANGER

To avoid fire and explosion, fully observe the following points.

- * Spatter and hot workpiece immediately after welding can cause fire.
- * If a cable is loosely connected or a contact portion on the workpiece-side current pathway is insufficient, heat generated by welding can cause a fire.
- * When an arc is struck at a container for combustible material such as gasoline, explosion may result.
- * Closed tank, pipe, etc. can be ruptured when welded.
- Remove combustible matter to keep flying spatters out of it. If it is impossible to remove all combustible matter, cover it with non-combustible material.
- Do not perform welding near combustible gas.
- Keep combustible matter away from hot workpiece immediately after welding.
- When welding ceiling, floor, or wall, remove combustible matter located on the hidden side.
- Be sure to tighten and isolate the cable connection.
- Connect the workpiece-side cable as close to the welding portion.
- Do not weld gas pipe holding gas or closed tank or pipe.
- Keep a fire extinguisher in the welding shop in case of fire.
- When there is an electrical connection between frame of feeder or wire reel stand and workpiece and wire touches the frame or workpiece, arc is generated and burnout and fire may result.



To prevent gas cylinder from falling and gas regulator from bursting, fully observe the following points.

- * If the gas cylinder falls, a serious accident may result.
- * High-pressure gas is put in the gas cylinder. If mishandled, high-pressure gas is belched and may result in a serious accident.
- * If an improper gas regulator is used for the gas cylinder, it bursts and may result in a serious accident.
- When handling the gas cylinder, follow regulations and your in-house standard.
- For the gas regulator attached to the gas cylinder, use such one dedicated to high-pressure gas cylinders.
- Special knowledge is required for disassembling and repairing the gas regulator. Disassembling or repairing it must be only by authorized operators.
- Before using, read the operation manual for gas regulator and follow the precautions.
- Do not expose the gas cylinder to high temperatures.
- Secure the gas cylinder to the dedicated gas cylinder stand.
- When opening the valve of the gas cylinder, keep your face away from the outlet.
- When not using the gas cylinder, be sure to put the protective cap on it.
- Do not put the welding torch on the gas cylinder or keep electrode in contact with the gas cylinder.



CAUTION

To protect people from arc light source, spatter and slag, and noise produced during welding, put on protective device.

- * Arc light source can irritate the eyes or burn the skin.
- * Spatter and slag can damage the eyes or burn the skin.
- * Noises can damage hearing.
- When monitoring the welding site or welding, wear an eye protector with sufficient scale or protective masks for welding.
- To protect eyes from spatter and slag, wear protective glasses.
- When welding, put on protective gear such as leather protective gloves for welding, long-sleeve jacket, leg cover, leather apron, etc.
- Put up protective curtains around the welding site to protect people's eyes from arc light source.
- For loud noises, use ear protectors.



CAUTION

To avoid being hurt by rotating part, fully observe the following points.

- * When you approach the rotating part such as fan and feed roller of wire feeder, etc., your hand, finger, hair, clothes, etc. can be caught in and result in injury.
- Do not use the Power Supply with its case or cover removed.
- When removing the case for maintenance or repair, qualified personnel or personnel familiar with the Power Supply must be made the work. Also, put a fence around Power Supply to keep any unauthorized people out of the area.
- Keep hand, finger, hair, clothes, etc. away from rotating fan and feed roller.

(1) Connecting the extension cable

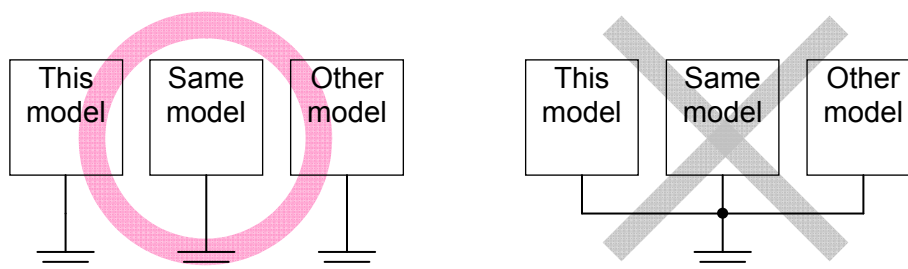
The longer the torch-side cable, the greater the capacitance between earth and cable. Electric discharge on human body increases the risk of electric shock. Use the torch-side cable of 10 m long or shorter. Insulating the connection unsafely delays in starting arc.

(2) Measurement of output terminal voltage

High voltage of the start circuit is applied to the output terminal of the Power Supply. Never measure voltage by directly connecting general voltmeter or oscilloscope to output terminal or between torch and workpiece, otherwise measurers can get an electric shock or measuring instruments can be broken.

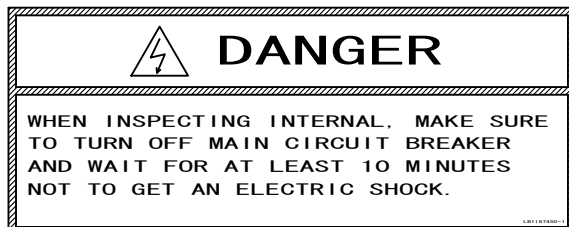
(3) Precautions for Handling

- Any work on this Power Supply must be performed only by personnel with sufficient knowledge and experience regarding an inverter-type welding power supply.
- Install this Power Supply on a firm and level surface. Operation on an incline may result in malfunction.
For ventilation, provide 15-cm clearances at the intake and exhaust.
- Transporting this Power Supply requires a minimum of two people. Be sure to hold the underside when transporting. Holding a projection such as the terminal cover may cause damage.
- Do not install the Power Supply in the following locations:
 - Damp areas (where the humidity is higher than 90%),
 - areas where temperatures are above 40°C or below 5°C
 - areas near a high noise source,
 - areas where chemicals are handled,
 - areas where water may condense,
 - dusty areas,
 - areas exposed to large amounts of vibration or shock, and
 - areas at an altitude above 1000 meters.
- Clean the exterior of the Power Supply using a soft, dry cloth or one slightly dampened with water. If the Power Supply is very dirty, use diluted neutral detergent or alcohol. Do not use paint thinner, benzene, etc., as they may discolor or deform the Power Supply.
- Do not insert a screw, coin, etc. into the Power Supply, as they may cause malfunction.
- Operate the Power Supply in accordance with the method described in this operation manual.
- Press switches/buttons carefully by hand. Handling them roughly (using a screwdriver or the tip of pen) may result in a malfunction or failure.
- Press switches/buttons one at a time. Pressing more than one switch/button at a time may result in a malfunction or failure.
- Do not ground this model with the same model or other models, as it may cause malfunction.



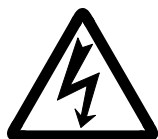
(4) Warning Labels for Safety

On the main body are warning labels for safety. Their locations and meanings are as noted below.

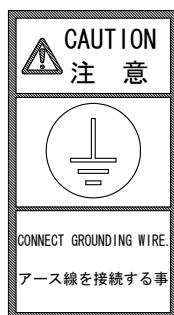


Location: Power Supply interior, side
surface of protective cover
(both sides)

Meaning: **Shock hazard**



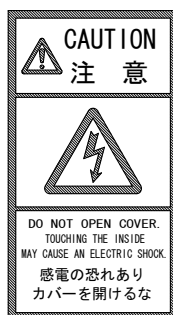
Location: Output cover top
Meaning: **Shock hazard**



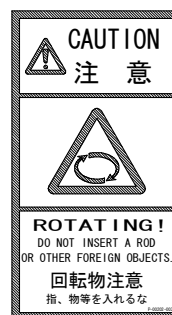
Location: Power supply top, front

Meaning:

Caution for grounding
connection



Shock hazard



Caution for rotating object
such as fan



Location: Power supply top and side,
back (both sides)

Meaning: **Shock hazard**



Location: Rear panel, lower part
Meaning: **Shock hazard**

(5) CE Marking

This Power Supply can conform to CE marking. There are the following restrictions to conform to CE marking.

- The Class A equipment is not intended for use in residential locations where electrical power is provided by the public low-voltage supply system. There may be potential difficulties in ensuring electromagnetic compatibility in those locations, due to conducted as well as radiated disturbances.
- This equipment does not comply with IEC 61000-3-12. If it is connected to a public low voltage system, it is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment may be connected.

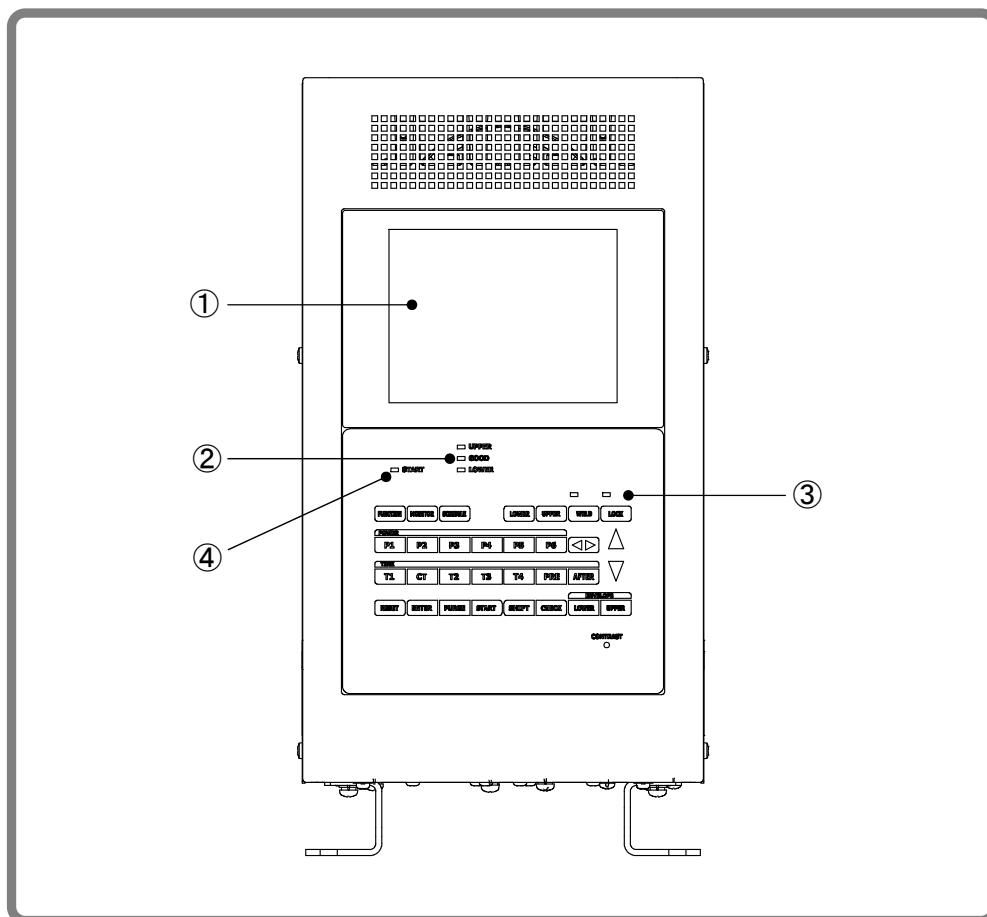
2. Features

The Amada Miyachi **MAWA-300A** is a PULSETIG[®] welding power supply. The power supply is compact and convenient to transport or reposition. A monitor function is provided to enable judgment of defective or non-defective welding.

- Welding-current monitoring function for judgment of weld quality
- Constant-current control for stable weld quality
- Use of an inverter allows for high power factor and stable power conditions
- Easy setting of a variety of items through the menu selection system
- Three protective functions for maximum ease of operation
 - Torch short-circuit detection function
 - Thermostat-fault detection function
 - Self diagnostics
- In addition to high-voltage trigger function, the touch start function is provided as arc start-up method.

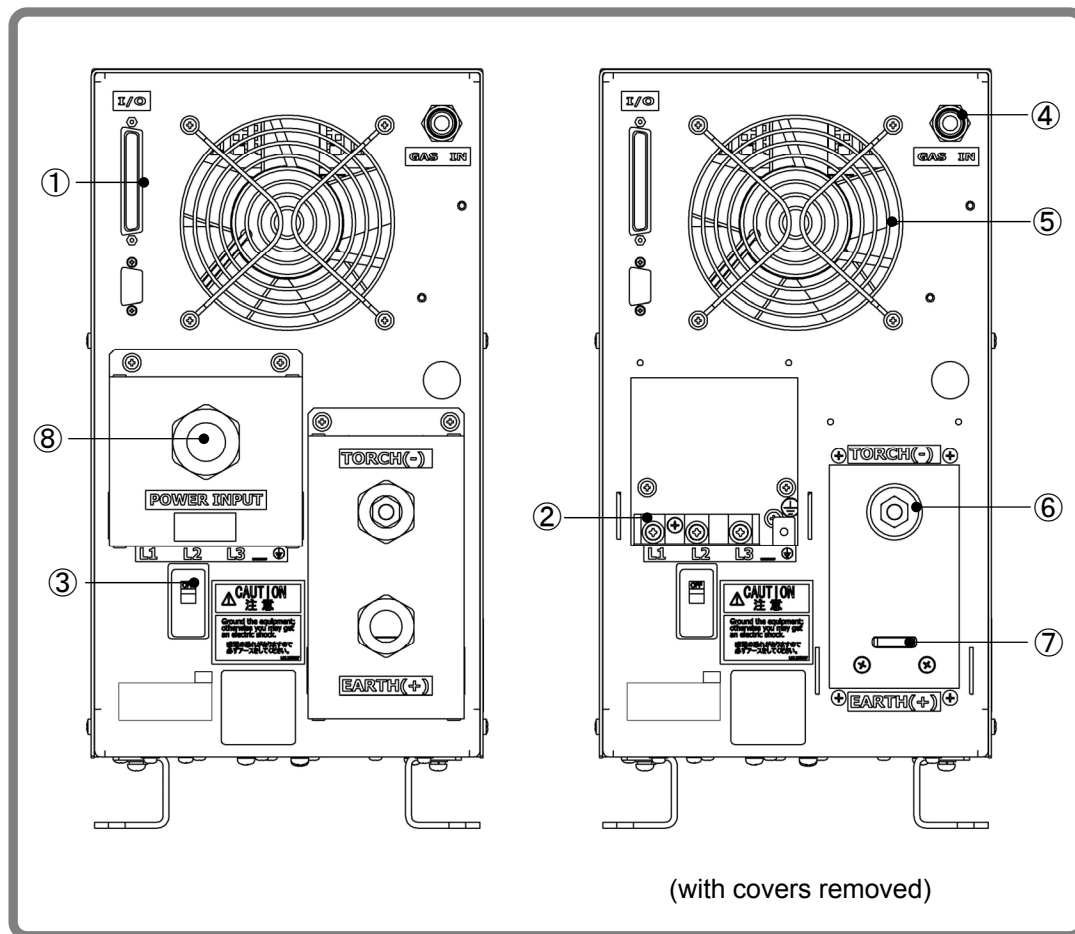
3. Name and Functions of Each Section

(1) Front Panel



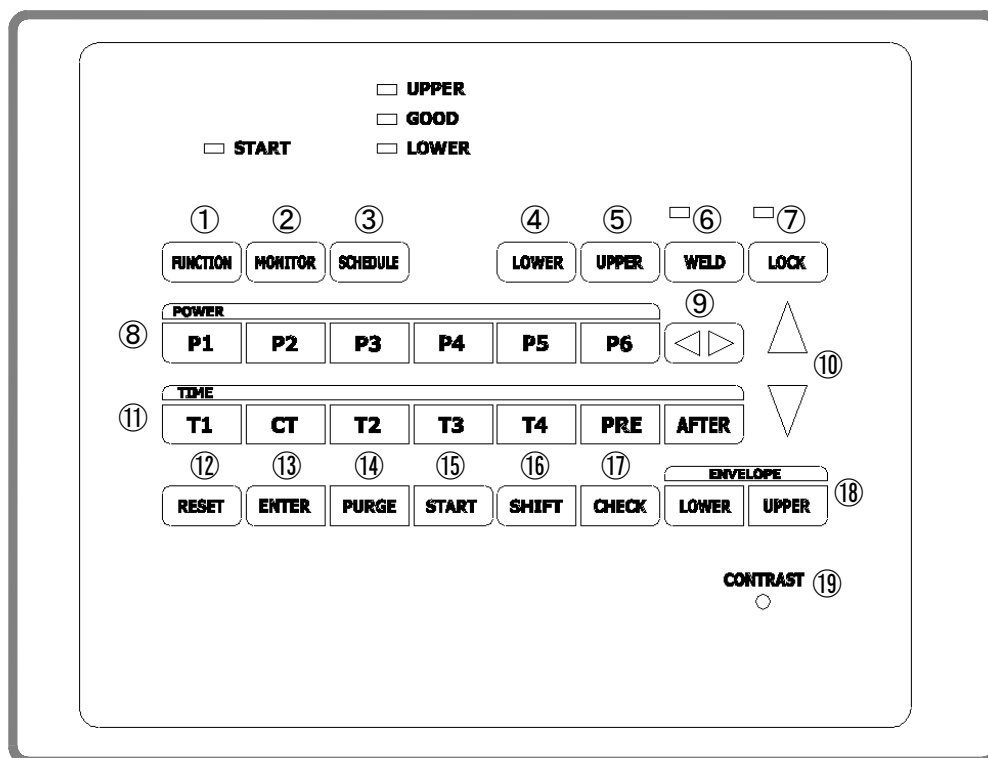
- ① LCD Display
Displays schedule settings, monitored values, error messages, etc.
- ② UPPER Lamp (red LED) / GOOD Lamp (green LED) / LOWER Lamp (red LED)
Displays the judgment result for WELD1 or WELD2 specified in "HIST." on the MONITOR SELECT screen (8.(5)).
 UPPER: Lights up when the measured current exceeds the upper limit for judgment.
 LOWER: Lights up when the measured current falls below the lower limit for judgment.
 GOOD: Lights up when the measured current falls within the range of upper/lower limit for judgment.
- ③ WELD Lamp (green LED) / LOCK Lamp (red LED)
When the WELD lamp is on, welding current cannot be output.
When the LOCK lamp is on, the panel cannot be controlled.
To control the panel, turn it off by the LOCK key.
- ④ START Lamp (green LED)
Lights up when the START key on the operation panel is effective.

(2) Rear Panel



- ① I/O Connector (D-Sub 37-pin, male)
An input/output connector to be used to control the welder with an external sequencer.
- ② Terminal Block for Welding Power Supply
For three-phase power supply. Mounting screws for connection are M5.
- ③ Welding Power Supply Breaker Lever
Pulling up this Lever supplies power; pushing down, disconnect power supply.
- ④ GAS IN
Gas inlet connector (φ8).
- ⑤ Cooling Fan
Fan to be used to cool the power supply.
- ⑥ TORCH
Connects the torch cable.
- ⑦ EARTH
Connects the torch earth cable.
- ⑧ Cable Gland (applicable cable diameter: φ11 to 21 mm)
Insert the cable and tighten the cap to fix the cable.

(3) Operation Panel



- ① **FUNCTION** Key
Displays the menu screen of detail settings.
- ② **MONITOR** Key
Displays the setting screen for monitor judgment.
- ③ **SCHEDULE** Key
Sets the schedule (welding condition) number.
Up to 127 schedules can be stored in total.
- ④ **LOWER** Key
Sets the lower limit of monitor judgment.
- ⑤ **UPPER** Key
Sets the upper limit of monitor judgment.
- ⑥ **WELD** Key
Turns ON/OFF of the welding current output. Press and hold the key for approx. 0.5 seconds to turn it ON. (ON when green LED lights up.) Also, the welding stops when this key is pressed during welding.
- ⑦ **LOCK** Key
Locks keys on the operation panel to avoid inputting by mistake. (Locked when red LED lights up.)

⑧ POWER

P1 to **P6** Keys
Sets the output current value.

⑨  Key

Moves cursor or selects function for settings.

⑩  Key

Moves between menu items or changes values for settings.

⑪ TIME

T1 Key

Sets the initial current time when using the touch start function.

CT Key

Sets the time between the first welding and the second welding (cooling time).

T2 to **T4** Keys

Sets the upslope time, weld time, and downslope time.

PRE Key

Sets the gas output time before welding.

AFTER Key

Sets the gas output time after welding.

⑫ **RESET** Key

Cancels the input contents for settings.

⑬ **ENTER** Key

Confirms the input contents for settings.

⑭ **PURGE** Key

Turns ON/OFF the gas manually. The gas automatically turns OFF approx. 15 seconds after turned ON.

⑮ **START** Key

Starts the welding via the operation panel. Press and hold the key for approx. 0.5 seconds to start.

⑯ **SHIFT** Key

Switches the first welding and the second welding when making setting on the normal screen.

⑰ **CHECK** Key

Checks the measures current waveform after welding.

⑱ ENVELOPE

LOWER / **UPPER** Key

Displays the setting screen of ENVELOPE monitor.

⑲ CONTRAST

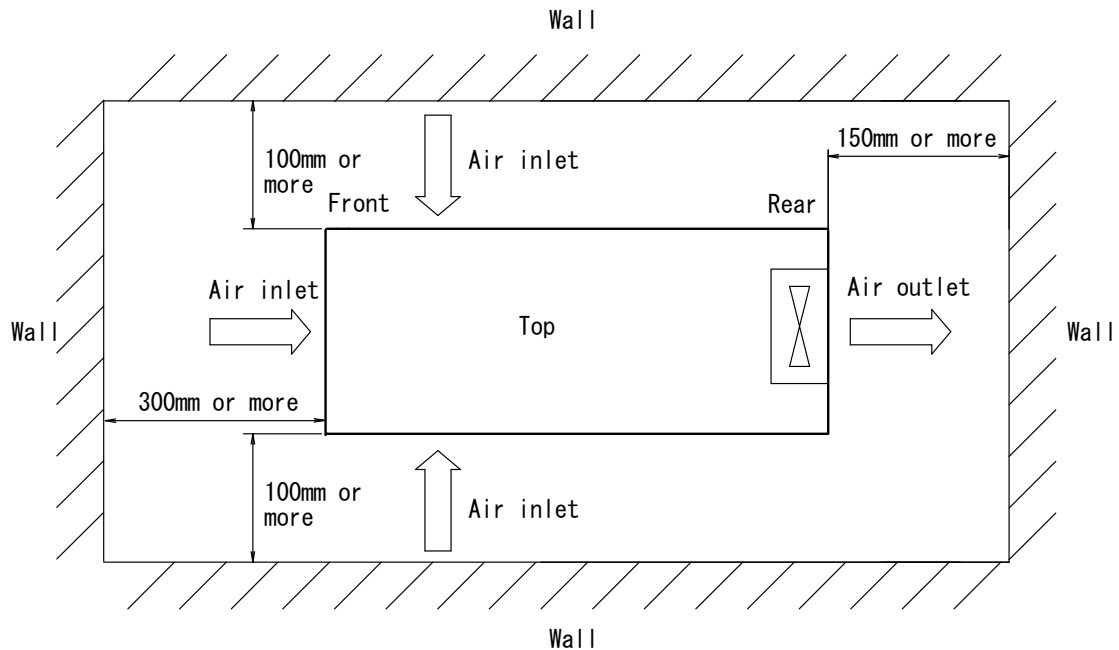
Adjusts the contrast of LCD with a slotted screwdriver.

4. Installation and Connections

(1) Installation

When the Power Supply is installed close to a wall, keep an enough space between the Power Supply and wall.



If the space is not enough, the temperature inside the Power Supply will become too high, and the OVER HEAT ERROR likely to occur.



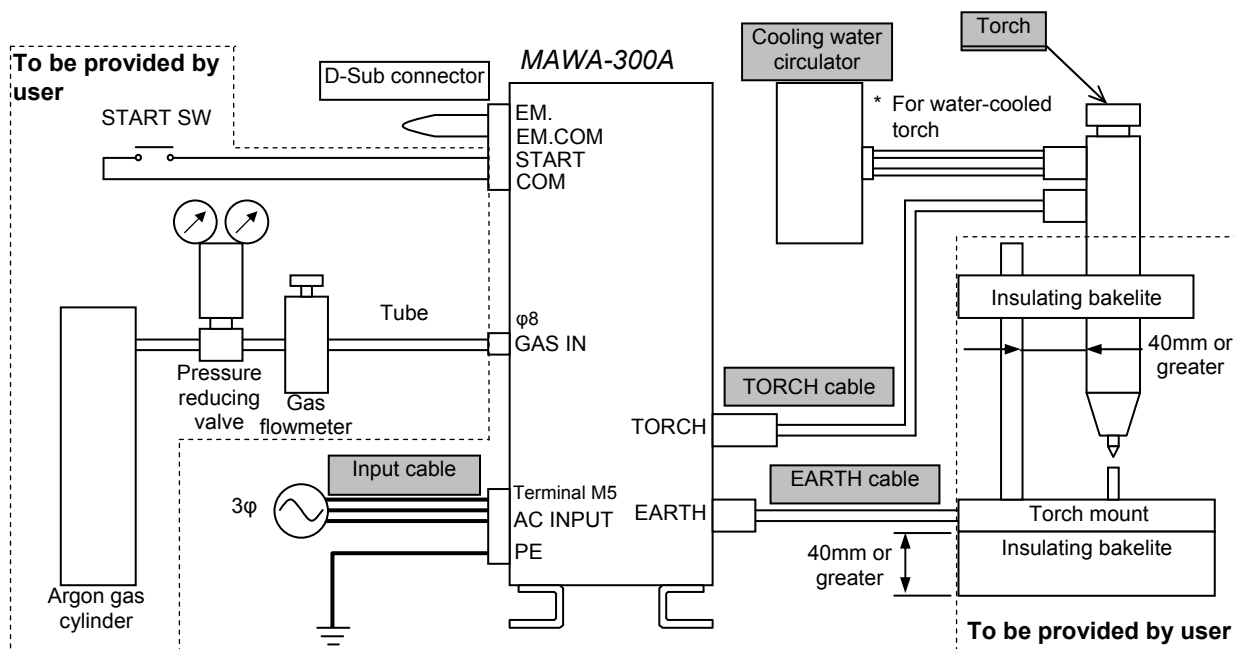
*** Maximum Duty Cycle**

The maximum duty cycle of the Power Supply is specified. Use the Power Supply within the specified rate.

(2) Connections

The standard connection is shown below.  Indicates accessories, and  indicates options. For options, contact Amada Miyachi Co., Ltd. (See 11. (2) Accessories and 11. (3) Options.)

Items other than accessories and options (argon gas, pressure reducing valve, gas flowmeter, tube, and torch mount) will be provided by user.



Important

- PE (Protective Earth) must be grounded.
- PE must be independently grounded. When PE of separate instrument is connected to this terminal, such an instrument may erroneously function by interference. See 1. (3) **Precautions for Handling**.
- To avoid a malfunction caused by noise, do not bundle the external I/O cable, the power cable, and the TORCH/EARTH cable. Also, keep them more than 100 mm apart from each other.
- The torch and torch mount must be electrically insulated. The space between the torch and torch mount must be 40 mm or greater.
- There is a solenoid valve inside of **MAWA-300A** to turn on/off the argon gas. At least 0.2 Mpa of pressure is required. However, the maximum allowable pressure is 0.6 Mpa. Set the flow rate to 5 liters/min or more according to the condition to use. (Use dry gas and connect the tube to prevent foreign matter, water and oil from flowing into piping.)
- Use the cooling water circulator for the water-cooled torch with more than 35 kcal/min of heat discharge (0.3 Mpa of discharge pressure and 2.1 to 2.2 liters of flowmeter when the torch is connected).
- Use the input power cable of more than 8 mm² wide.
* The clamp range of the cable gland of the input cover is 11 to 21 mm of cable diameter.
- Use the breaker with a capacity of more than 40 A.

* Pressure Reducing Valve and Gas Flowmeter

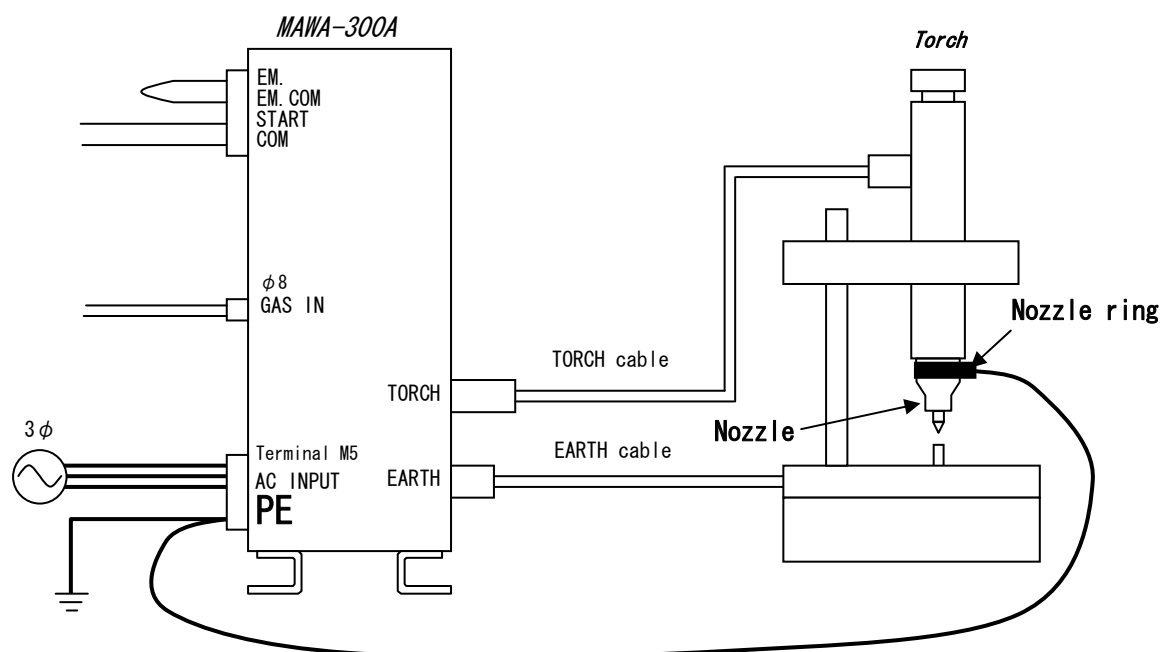
Manufacturer: YUTAKA ENGINEERING CORPORATION
Model Name: Pressure regulator with flowmeter
Model No.: FR-IIS-P

(3) Improvement of LOST

To improve LOST, Amada Miyachi Co., Ltd. have torches with mesh in nozzle and nozzle rings available. The torch with mesh has a metal mesh in the nozzle. When replacing the nozzle, purchase **nozzle (with mesh)** from Amada Miyachi Co., Ltd. For details, refer to the operation manual for torches.

Also, installing the nozzle ring to the nozzle may increase the probability of LOST. The nozzle ring is connected to the PE terminal of **MAWA-300A**. (The nozzle ring is attached to the torch purchased from Amada Miyachi Co., Ltd.)

* Since LOST is caused by multiple factors, it is not totally eliminated by these measures.



5. Interface

(1) Description of External I/O Signals

D-Sub connector (37-pin, male)

[Output signals]

Pin No.	Name	Description
1	VALVE_OUT_COM	Common for solenoid valve output.
2	VALVE_OUT	Solenoid valve output.
3	-	Not used.
4	-	Not used.
5	-	Not used.
6	SYNC_OUT1_E	Emitter output terminal for synchronous output.
7	SYNC_OUT1_C	Collector output terminal for synchronous output.
8	OUT5	User output terminal. (Initial value: UPPER WELD1 CURRENT)
9	OUT4	User output terminal. (Initial value: LOWER WELD1 CURRENT)
10	OUT3	User output terminal. (Initial value: END)
11	OUT2	User output terminal. (Initial value: READY)
12	OUT1	User output terminal. (Initial value: LOST)
13	OUT COM	Common for the output signals, ERROR, EM-STOP, END, NG, GOOD, and OUT1 to 5.
14	OUT COM	
15	EM-STOP	Output terminal for the emergency stop signal.
16	ERROR	Output when an error (overheat, overcurrent, etc.) occurs in MAWA-300A .
17	END	End signal output terminal. Output with pulse of the set time of 1 to 200 ms after welding.
18	NG	Welding NG signal. Turned ON when the value is out of the upper/lower limit of monitor judgment. Output with pulse of the set time of 1 to 200 ms after welding.
19	GOOD	Welding OK signal. Turned ON when the value is within the upper/lower limit of monitor judgment. Output with pulse of the set time of 1 to 200 ms after welding.
20	External I/O power supply COM	Common for the external I/O power supply.
21	External I/O power supply	Input terminal for the external I/O power supply.

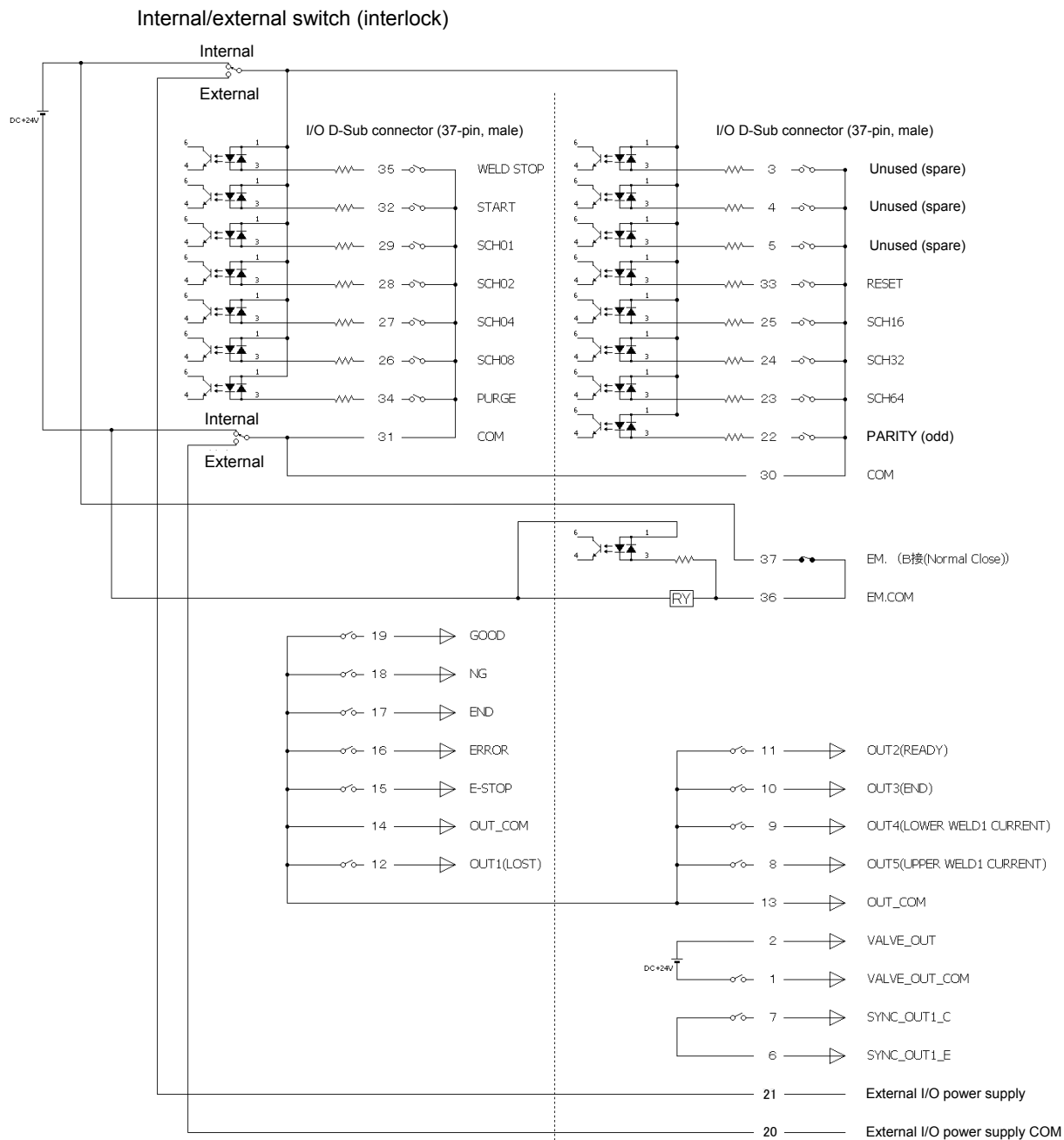
Note: For all output terminals, the contact rating is open-collector output, +24 V DC/20 mA.

[Input signals]

Pin No.	Name	Description
22	PARITY	Parity input terminal. Trouble caused by disconnection of schedule selection signal line can be detected with this signal. Set the schedule selection signal lines and the PARITY signal lines so that the total number of their closed lines is always odd. (See 10.(3) [SCHEDULE].)
23	SCH64	Schedule input terminals. 29 = Schedule 1, 28 = Schedule 2, 27 = Schedule 4, 26 = Schedule 8, 25 = Schedule 16, 24 = Schedule 32, 23 = Schedule 64 (See 10.(3) [SCHEDULE].)
24	SCH32	
25	SCH16	
26	SCH8	
27	SCH4	
28	SCH2	
29	SCH1	
30	COM	COM terminal (common for input terminals).
31	COM	
32	START	Welding start input terminal. The sequence starts when this terminal is closed.
33	RESET	Trouble/caution reset input terminal. The trouble or caution message is reset when this terminal is closed after the cause of trouble or caution is removed.
34	PURGE	The gas flows when this terminal is closed; stops when open.
35	WELD STOP	Close this terminal to stop the sequence halfway.
36	EM.COM	Common for the emergency stop.
37	EM.	The emergency stop input terminal.

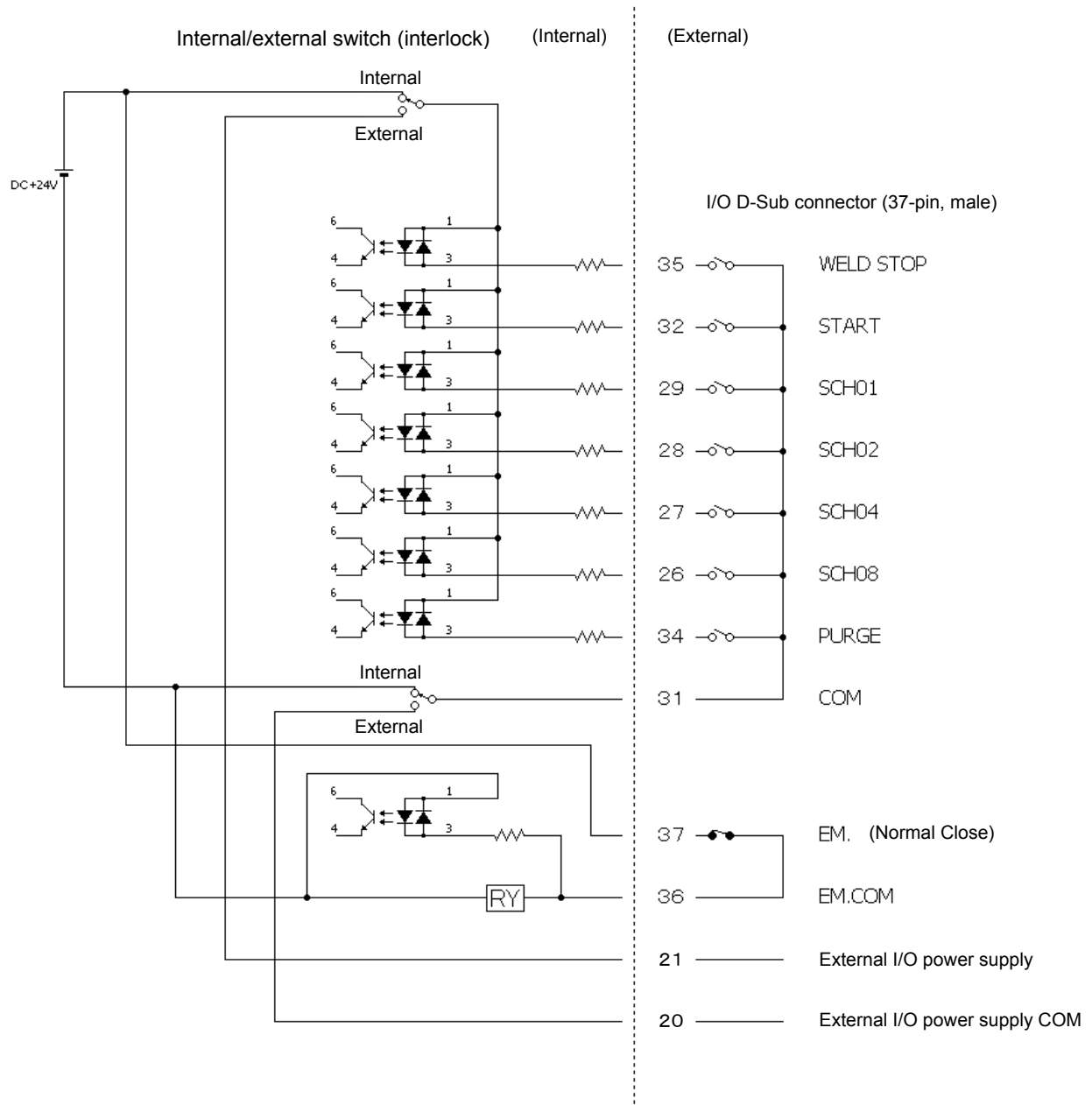
Note: Choose a switch with a capacity of +24V DC/300 mA or more between input pins 36 and 37. For all other input terminals, the contact rating is photo-coupler input, +24 V DC/5 mA.

(2) Connection Diagram for External I/O Signals

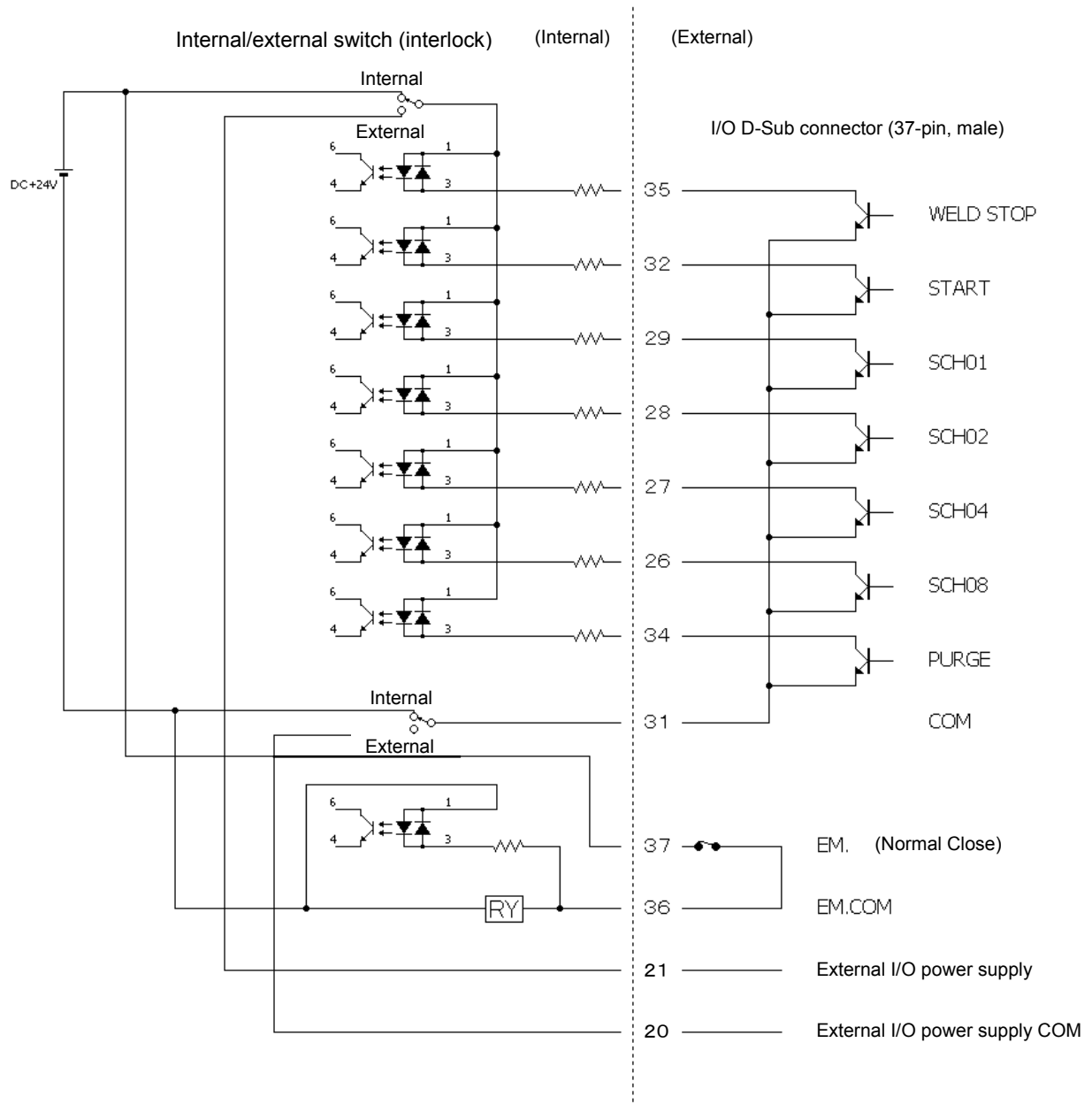


(3) Connection of Input Signals

① Connection with equipment having a contact input



② Connection with equipment featuring NPN open collector output (when using internal power supply)



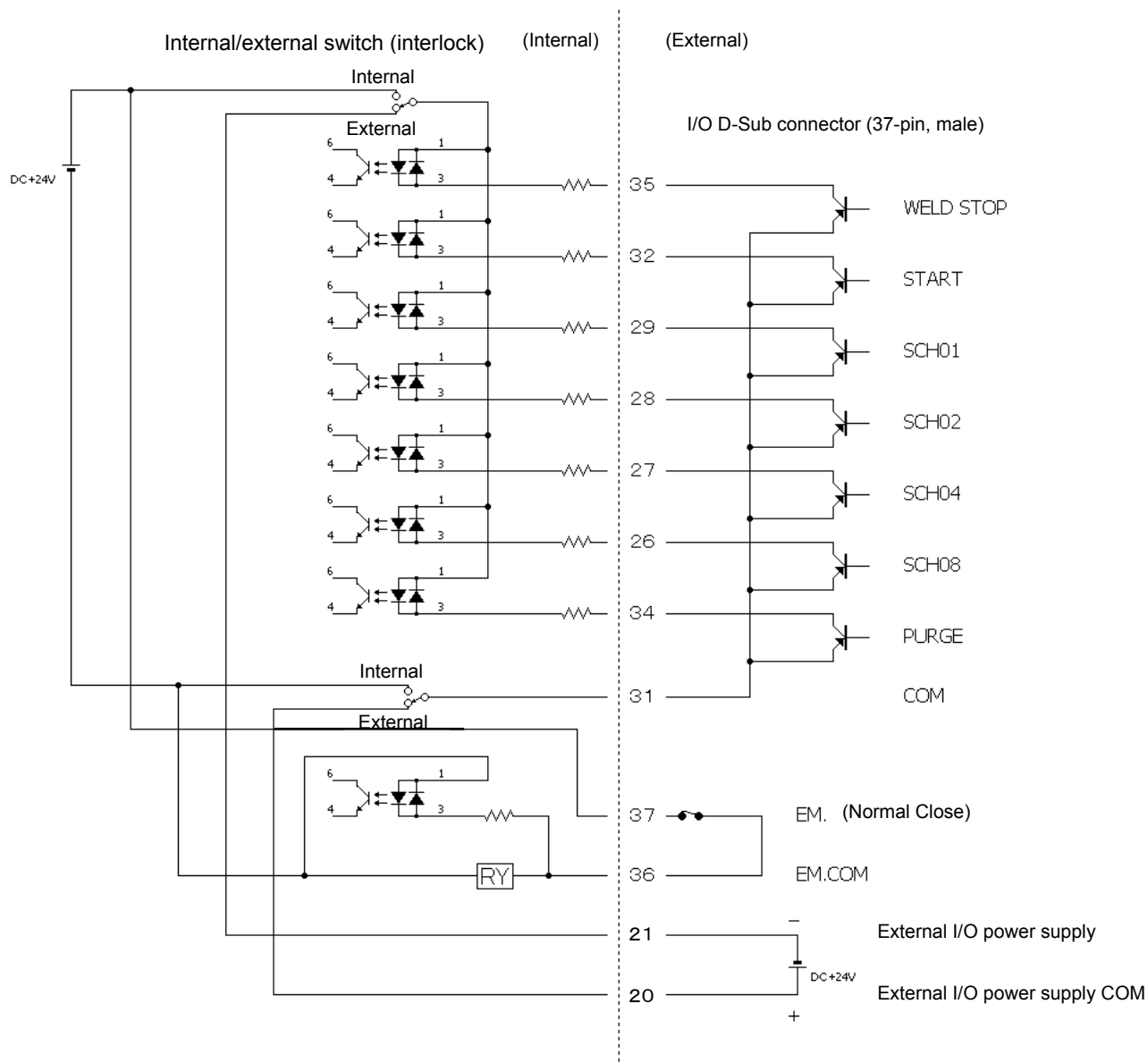
③ Connection with equipment featuring PNP current output (when using external power supply)

Set the internal/external switch (interlock) to the “external” position. (See [How to set the internal/external switch].)

The switch is located at the inside of chassis. Open the chassis cover to set the switch.

Connect the negative side of an external 24 V DC power supply to pin 21.

Connect the positive side of an external 24 V DC power supply to pin 20.



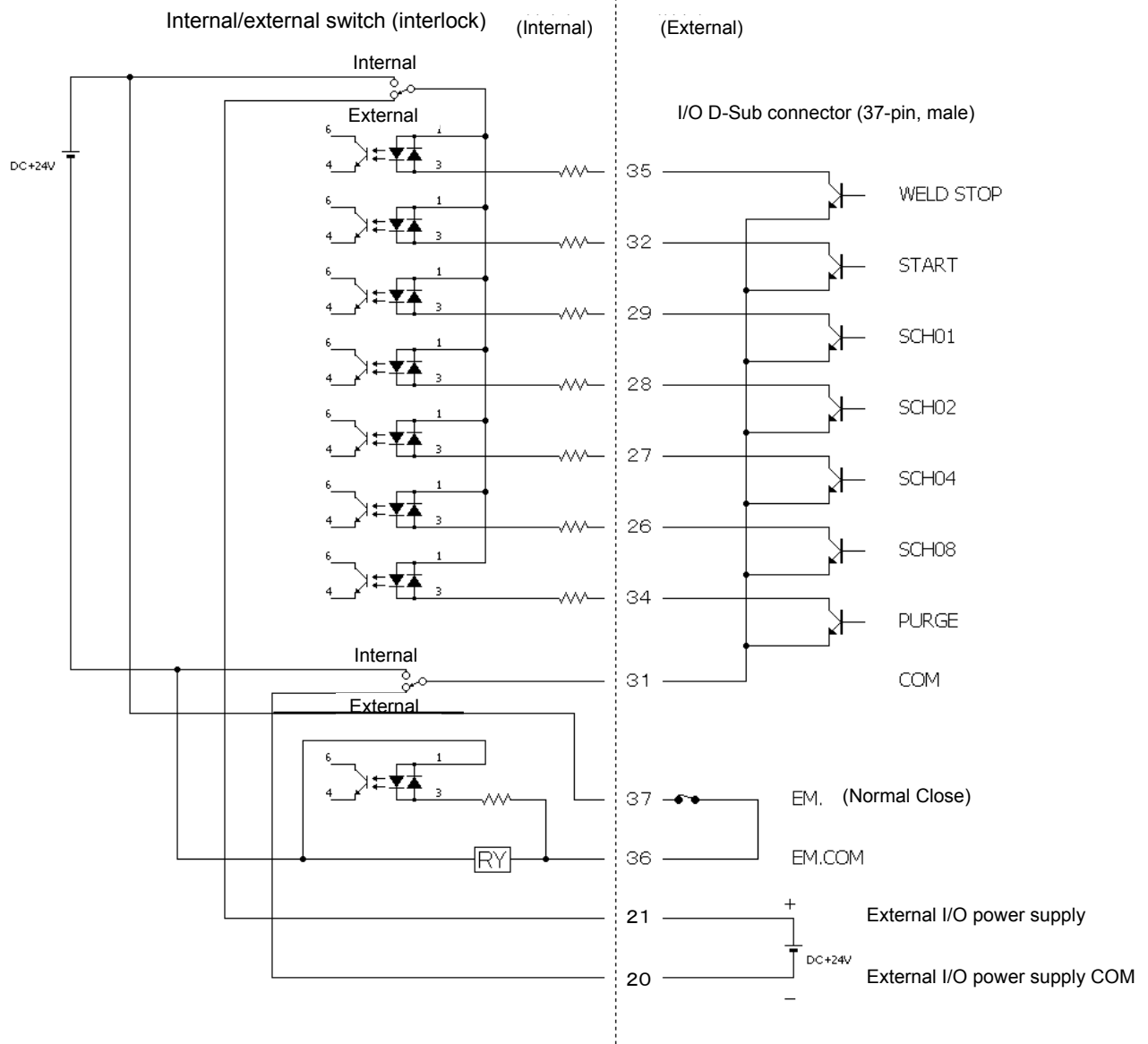
④ Connection with equipment featuring NPN open collector output (when using external power supply)

Set the internal/external switch (interlock) to the “external” position. (See [How to set the internal/external switch].)

The switch is located at the inside of chassis. Open the chassis cover to set the switch.

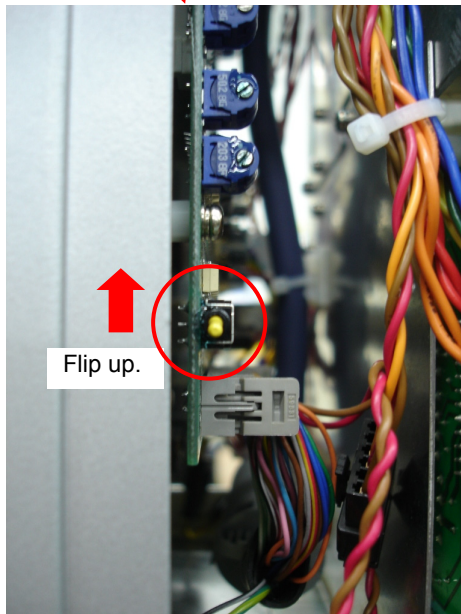
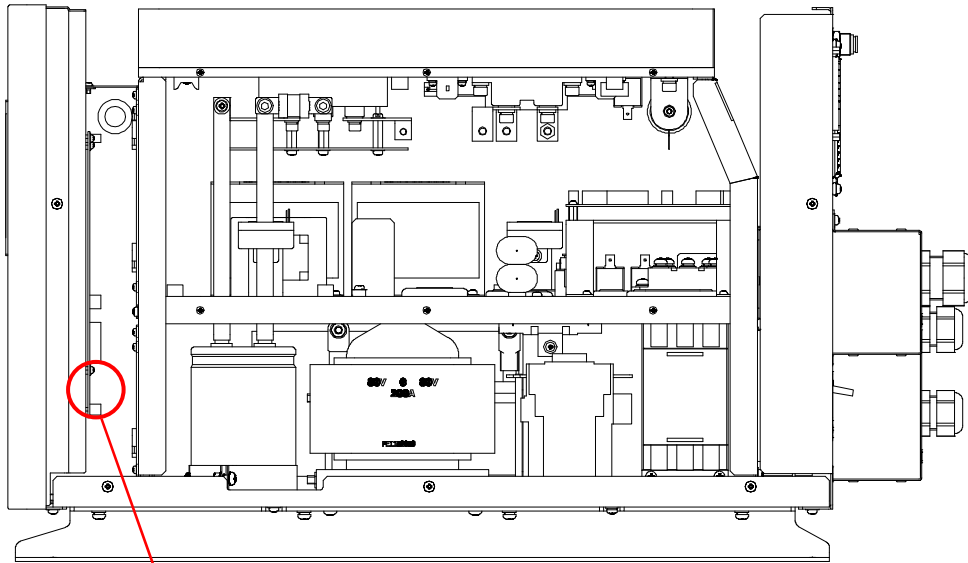
Connect the positive side of an external 24 V DC power supply to pin 21.

Connect the negative side of an external 24 V DC power supply to pin 20.



[How to set the internal/external switch]

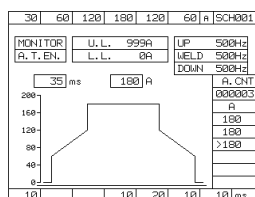
For connection ③ or ④, set the yellow internal/external switch on the right side of the front panel to the “external” position. To set it to “external”, flip up the SW1.



7. Screen Transition

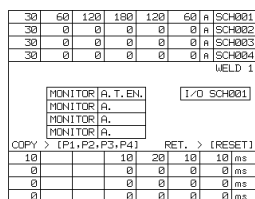
(1) Screen Type

(Screen with input items for setting)



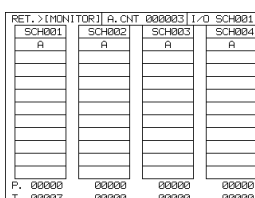
Normal screen

(Schedule, Pre-flow time, After-flow time, Upslope time, Weld time, Downslope time, Initial current, Upslope initial current, Upslope final current, Welding current, Downslope initial current, Downslope final current, Weld time lower limit, Weld time lower limit, Welding current upper limit, Welding current lower limit, Envelope waveform upper limit, and Envelope waveform lower limit)



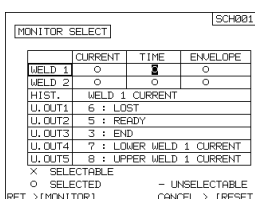
EDIT screen

(Copy between schedules)



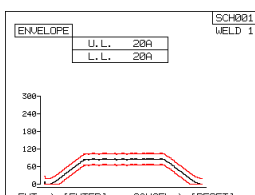
MULTI screen

(Weld count and Preset count)



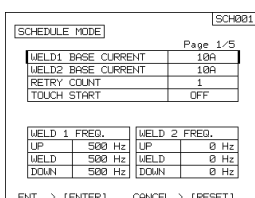
MONITOR SELECT screen

(First welding monitor judgment selection, Second welding monitor judgment selection, History display selection, User output 1 selection, User output 2 selection, User output 3 selection, User output 4 selection, and User output 5 selection)



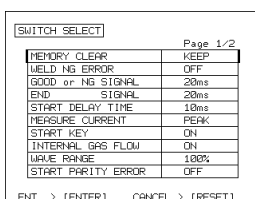
ENVELOPE screen

(Envelope waveform display, Envelope waveform upper limit, and Envelope waveform lower limit)



SCHEDULE MODE screen

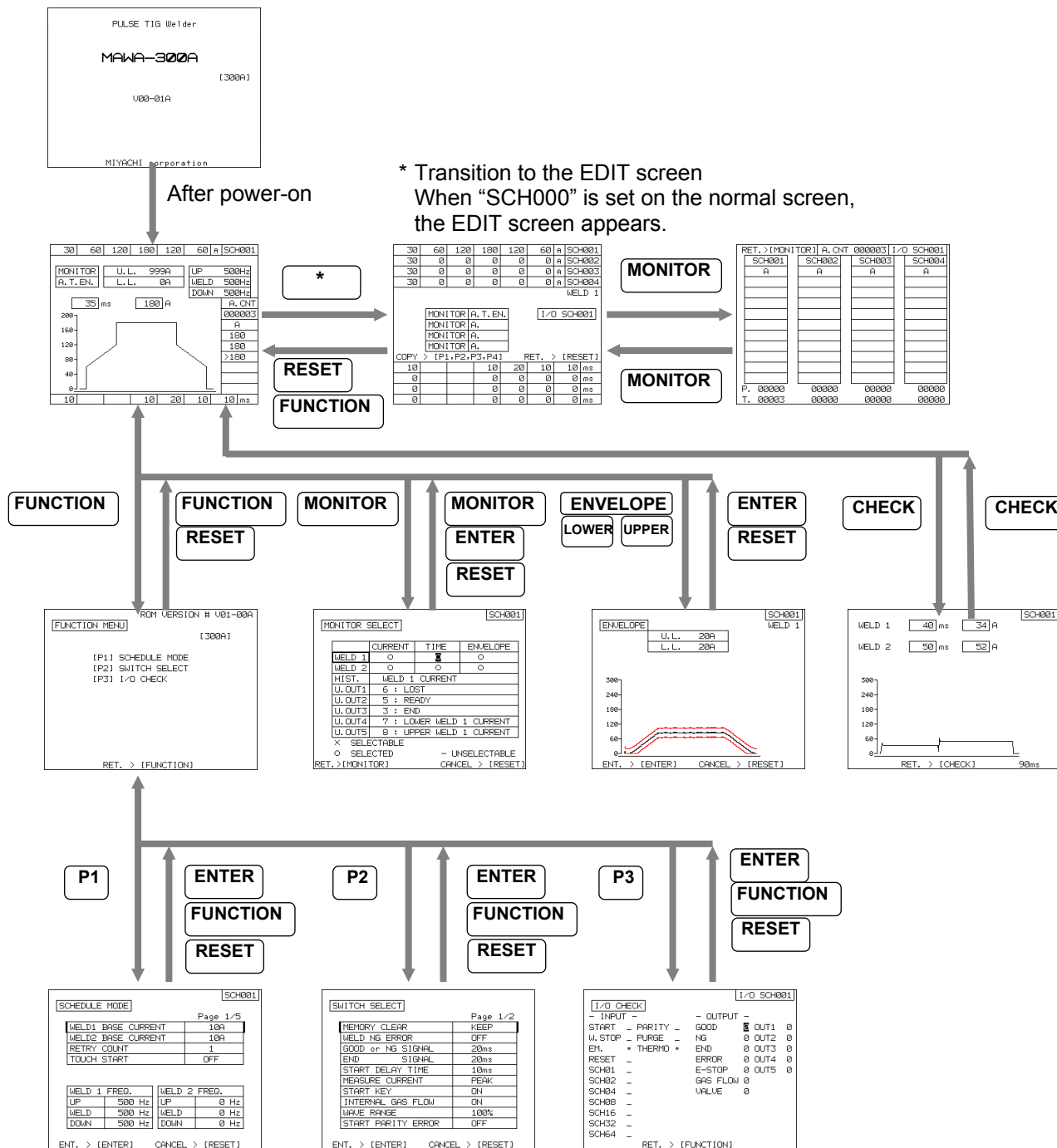
(First welding base current, Second welding base current, Number of retry count, Touch start function, Pulse ON/OFF, Weld pulse ON time, Weld pulse OFF time, Upslope pulse ON time, Upslope pulse OFF time, Downslope pulse ON time, and Downslope pulse OFF time)





SWITCH SELECT screen

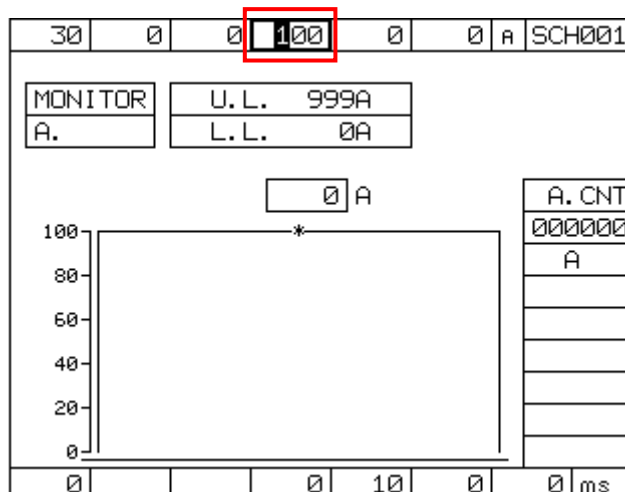
(Memory clear, Monitor error ON/OFF, GOOD/NG output time, END output time, Input acceptance time, Current measurement method (average, peak, effective), START key enable/disable selection, Gas control internal/external, waveform display 50%/100% selection, Start parity error ON/OFF, Torch short-circuit error ON/OFF, Trigger output ON/OFF, and Continue current function ON/OFF)

(2) Screen Transition



Note) Pages can be changed with the  /  key the SCHEDULE MODE screen and the SWITCH SELECT screen.

(3) Example of Setting a Value



Changing a value:

The place, which is highlighted, shows the cursor position. To change the value, press the ▲ key to increase or the ▼ key to reduce.

Moving the cursor position:

Press the ◀ key to move in the left and the ▶ key to move in the right (framed in red box).

Confirming the setting:

When the ENTER key or the key of item to set is pressed, the highlighted cursor disappears and the setting is confirmed.

Example) Pre-flow setting

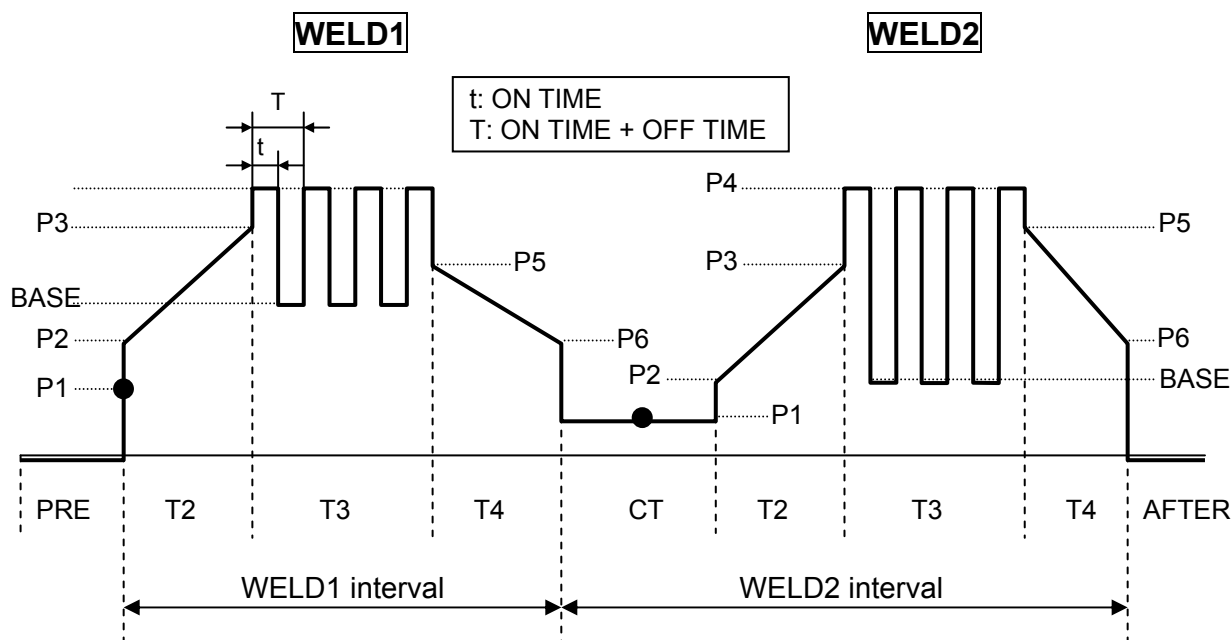
Press the PRE key → Enter a value → Press the ENTER key or the PRE key

Note) When the welding condition is set or changed, bold lines are displayed on the both sides of the liquid crystal display, and the welding condition is updated during this time.

Since the data is written in the internal flash memory, the data is not normally written if the power is turned off during update, and "E08 FLASH MEMORY ERROR" can occur when the power is turned on again. When turning off the power, confirm that the data writing has been complete.

8. Setting

(1) Waveform Setting



PRE	Pre-flow (time to spray the gas before welding)
T2	Upslope time
T3	Weld time
T4	Downslope time
CT	Cooling time
AFTER	After-flow (time to spray the gas after welding)

* Pulse modulation is applied to T2, T3, and T4.

* $T2 + T3 + T4 \leq 2000$ ms

* When T2, T3, and T4 in the WELD1 interval are set to 0, WELD2 does not work properly. A setting of WELD2 only cannot be used.

WELD1	P1	Initial current (between PRE and T2)
	P2	Upslope initial current
	P3	Upslope final current
	P4	Pulse current
	P5	Downslope initial current
	P6	Downslope final current
	BASE1	Base current time of T2, T3, and T4 ($P1 < BASE1$: current value)
WELD2	P1	Initial current of WELD2 (in CT)
	P2	Upslope initial current
	P3	Upslope final current
	P4	Pulse current
	P5	Downslope initial current
	P6	Downslope final current
	BASE2	Base current time of T2, T3, and T4

(2) Normal Screen

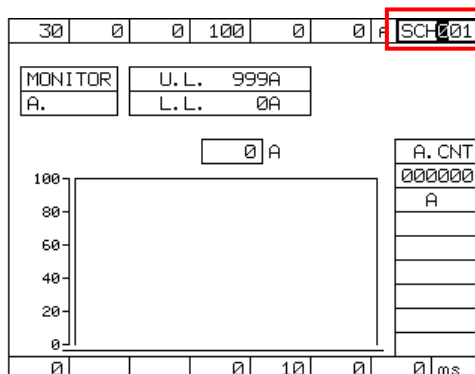
Each item in the second welding is set in the same way as the first welding. (Settings of ①schedule, ②pre-flow, ③after-flow are common.)

For switching to the second welding, see **6.(2) Second Welding Screen**.

When the start signal is input, the current is output with the welding condition of the displayed schedule.

①Setting schedules

Sets the welding conditions.



① From the screen shown in the left, press the **SCHEDULE** key.

You can enter a value.

② Enter a value and press the **SCHEDULE** key again or the **ENTER** key.

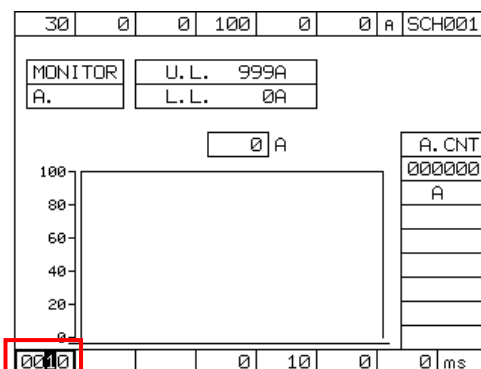
SCH001 to **SCH127**: Normal screen of each schedule

SCH000: EDIT screen. (For details of EDIT screen, see **8.(3) EDIT Screen**.)

③ The program display shows the screen for the welding schedule you entered.

②Setting the pre-flow

Sets the gas flow time before welding.



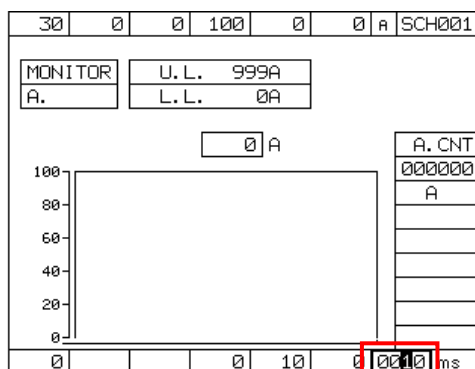
① From the screen shown in the left, press the **PRE** key.

You can enter a value.

② Enter a value and press the **PRE** key again or the **ENTER** key.

③Setting the after-flow

Sets the gas flow time after welding.

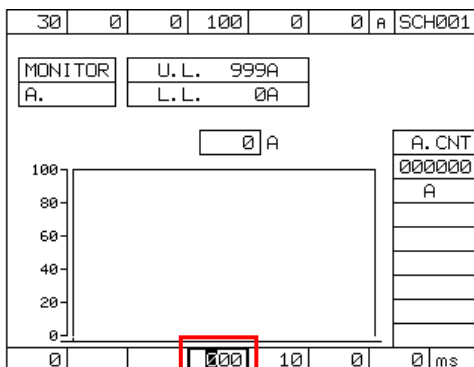


① From the screen shown in the left, press the **AFTER** key.

You can enter a value.

② Enter a value and press the **AFTER** key again or the **ENTER** key.

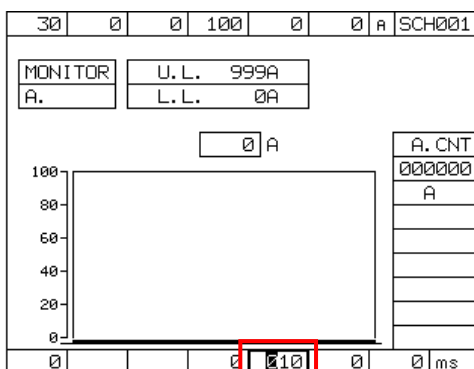
- ④ Setting the upslope time
Sets the upslope time of welding.



- ① From the screen shown in the left, press the **T2** key.
You can enter a value.

- ② Enter a value and press the **T2** key again or the **ENTER** key.

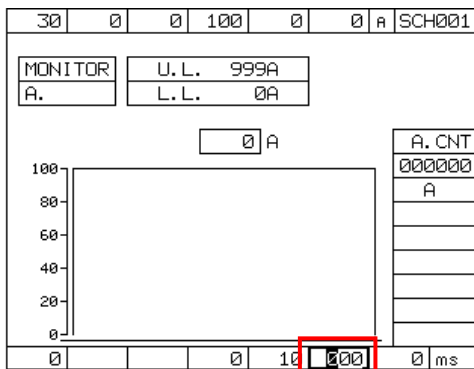
- ⑤ Setting the weld time
Sets the weld time.



- ① From the screen shown in the left, press the **T3** key.
You can enter a value.

- ② Enter a value and press the **T3** key again or the **ENTER** key.

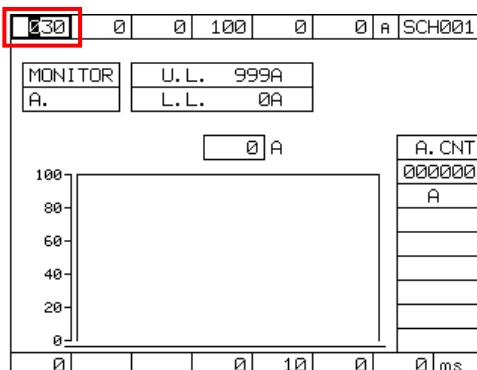
- ⑥ Setting the downslope time
Sets the downslope time of welding.



- ① From the screen shown in the left, press the **T4** key.
You can enter a value.

- ② Enter a value and press the **T4** key again or the **ENTER** key.

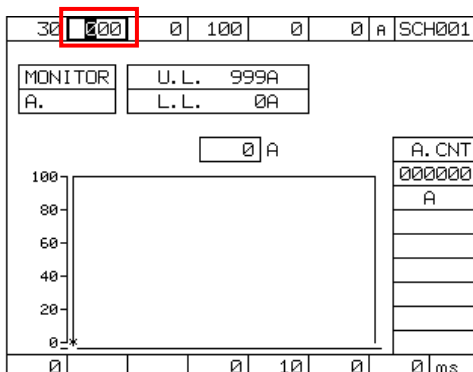
⑦ Setting the initial current value
Sets the initial current value.



① From the screen shown in the left, press the **P1** key.
You can enter a value.

② Enter a value and press the **P1** key again or the **ENTER** key.

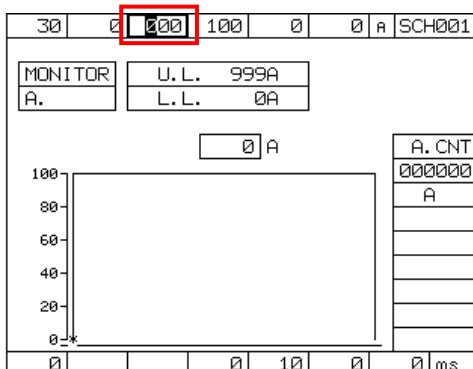
⑧ Setting the upslope initial current value
Sets the current value of upslope start.



① From the screen shown in the left, press the **P2** key.
You can enter a value.

② Enter a value and press the **P2** key again or the **ENTER** key.

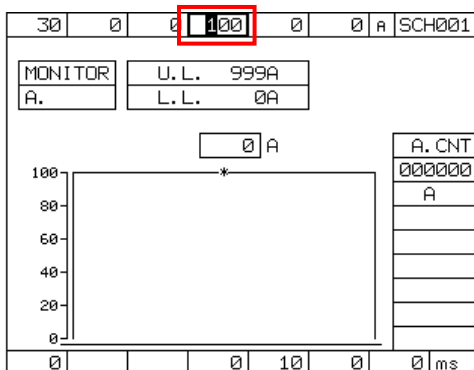
⑨ Setting the upslope final current value
Sets the current value of upslope end.



① From the screen shown in the left, press the **P3** key.
You can enter a value.

② Enter a value and press the **P3** key again or the **ENTER** key.

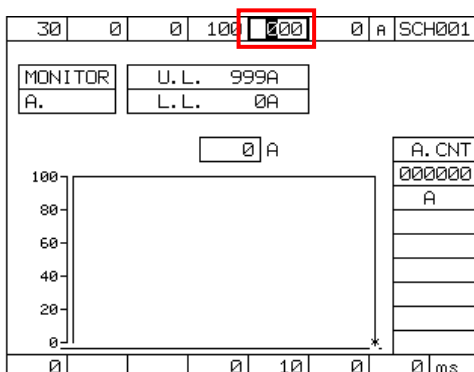
- ⑩ Setting the welding current value
Sets the welding current value.



- ① From the screen shown in the left, press the **P4** key.
You can enter a value.

- ② Enter a value and press the **P4** key again or the **ENTER** key.

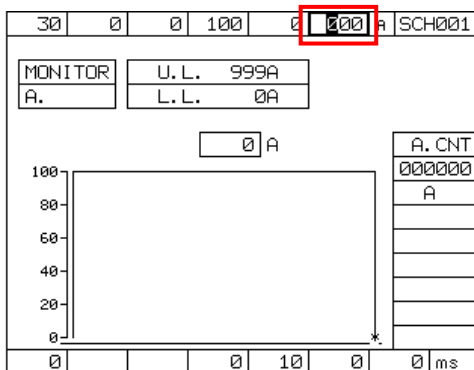
- ⑪ Setting the downslope initial current value
Sets the current value of downslope start.



- ① From the screen shown in the left, press the **P5** key.
You can enter a value.

- ② Enter a value and press the **P5** key again or the **ENTER** key.

- ⑫ Setting the downslope final current value
Sets the current value of downslope end.

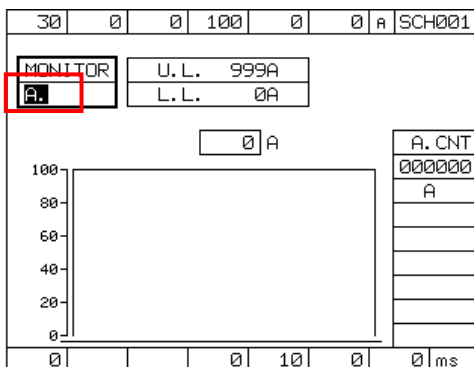


- ① From the screen shown in the left, press the **P6** key.
You can enter a value.

- ② Enter a value and press the **P6** key again or the **ENTER** key.

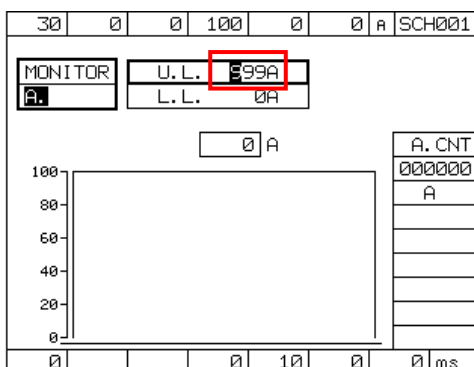
⑬ Setting the upper limit of welding current

Sets the upper limit of welding current for monitor judgment.



- ① From the screen shown in the left, press the **UPPER** key.
You can select a type for the monitor judgment.

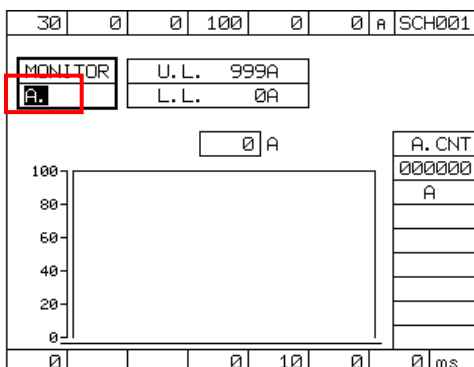
- ② Select **[A.]** with the **◀▶** key and press the **UPPER** key again.



- ③ Enter a value and press the **UPPER** key again or the **ENTER** key.

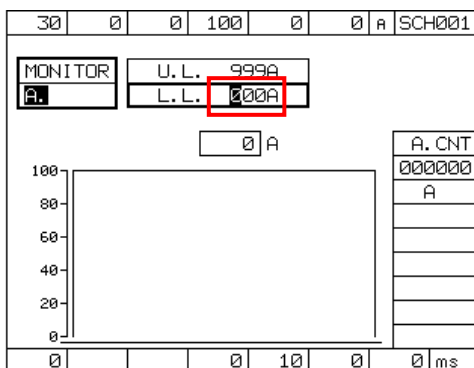
⑭ Setting the lower limit of welding current

Sets the lower limit of welding current for monitor judgment.



- ① From the screen shown in the left, press the **LOWER** key.
You can select a type for the monitor judgment.

- ② Select **[A.]** with the **◀▶** key and press the **LOWER** key again.

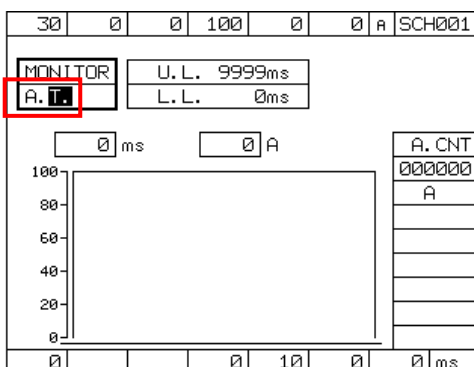


- ③ Enter a value and press the **LOWER** key again or the **ENTER** key.

⑮ Setting the upper limit of weld time

Sets the upper limit of weld time for monitor judgment.

When the TIME is selected for monitor judgment is set on the MONITOR SELECT screen, the judgment of weld time upper/lower limit can be set. See **8.(5) MONITOR SELECT Screen**.



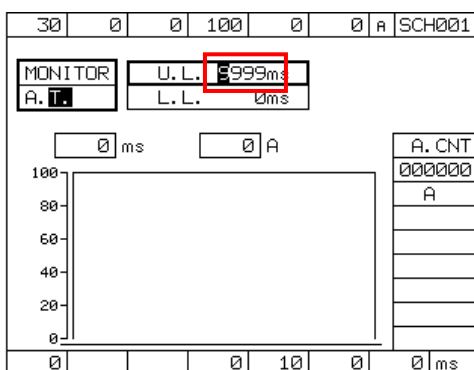
① From the screen shown in the left, press the

UPPER key.

You can select a type for the monitor judgment.

② Select **[T.]** with the **◀▶** key and press the

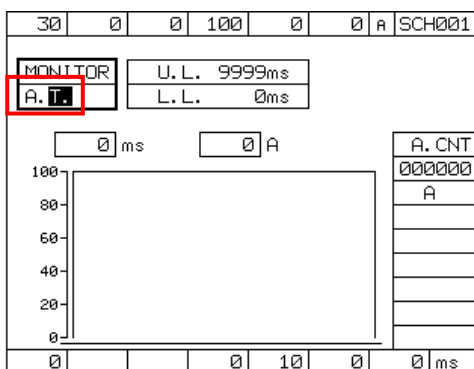
UPPER key again.



③ Enter a value and press the **UPPER** key again or the **ENTER** key.

⑯ Setting the lower limit of weld time

Sets the lower limit of weld time for monitor judgment.



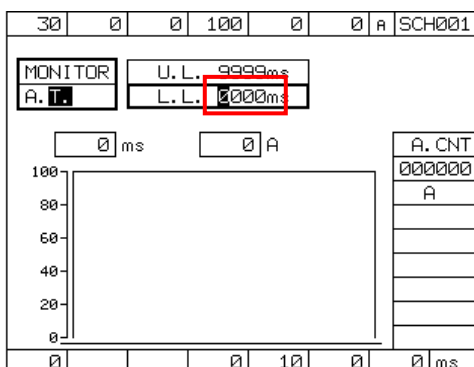
① From the screen shown in the left, press the

LOWER key.

You can select a type for the monitor judgment.

② Select **[T.]** with the **◀▶** key and press the

LOWER key again.

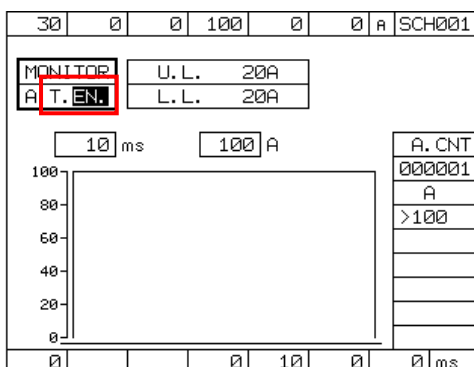


③ Enter a value and press the **LOWER** key again or the **ENTER** key.

⑰ Setting the upper limit of envelope waveform

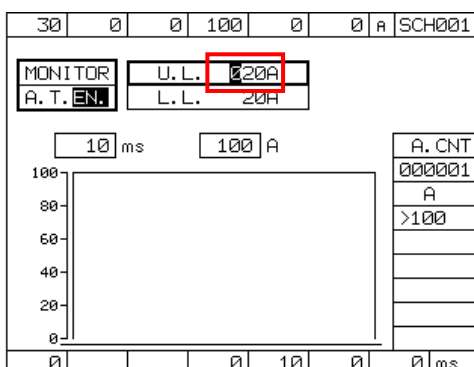
Sets the upper limit of envelope waveform for monitor judgment.

When an envelope waveform is set on the ENVELOPE screen, the judgment of envelope waveform upper/lower limit can be set. See 8.(6) **ENVELOPE Screen**.



- ① From the screen shown in the left, press the **UPPER** key.
You can select a type for the monitor judgment.

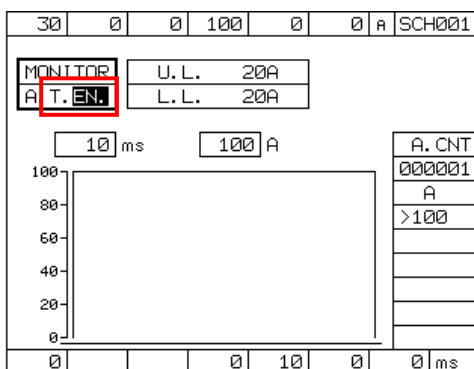
- ② Select **[EN.]** with the **◀▶** key and press the **UPPER** key again.



- ③ Enter a value and press the **UPPER** key again or the **ENTER** key.

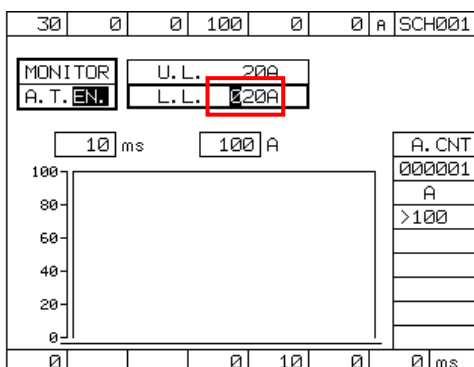
⑱ Setting the lower limit of envelope waveform

Sets the lower limit of envelope waveform for monitor judgment.



- ① From the screen shown in the left, press the **LOWER** key.
You can select a type for the monitor judgment.

- ② Select **[EN.]** with the **◀▶** key and press the **LOWER** key again.



- ③ Enter a value and press the **LOWER** key again or the **ENTER** key.

(3) EDIT Screen

① EDIT screen

On the EDIT screen, you can check settings — the welding current at the upper lines, the monitor judgment selection at the middle lines, and the weld time at the lower lines. The first welding and the second welding can be switched and checked with the **[SHIFT]** key.

The current is output with the welding condition of the schedule selected by schedule input terminals. See **10.(3) Changing the Schedule**.

10	0	50	50	50	0	A	SCH001
10	0	0	0	0	0	A	SCH002
10	0	0	0	0	0	A	SCH003
10	0	0	0	0	0	A	SCH004
WELD 1							
MONITOR		A. T. EN.		I/O SCH001			
MONITOR		A.					
MONITOR		A.					
MONITOR		A.					
COPY > [P1, P2, P3, P4] RET. > [RESET]							
0		0	10	10	10	0	ms
0		0	0	0	0	0	ms
0		0	0	0	0	0	ms
0		0	0	0	0	0	ms

- ① When “**SCH000**” is set for the welding schedule on the normal screen, the EDIT screen appears. For details of the normal screen, see **8.(2) Normal Screen**.

Note) “**I/O SCH001**” shows the schedule signal number currently input on the terminal block.

② Checking the contents of schedule

You can check the contents — the welding current, the monitor judgment selection, and the weld time of each schedule.

10	0	50	50	50	0	A	SCH001
10	0	0	0	0	0	A	SCH002
10	0	0	0	0	0	A	SCH003
10	0	0	0	0	0	A	SCH004
WELD 1							
MONITOR		A. T. EN.		I/O SCH001			
MONITOR		A.					
MONITOR		A.					
MONITOR		A.					
COPY > [P1, P2, P3, P4]				RET. > [RESET]			
0		0	10	10	10	0	ms
0		0	0	0	0	0	ms
0		0	0	0	0	0	ms
0		0	0	0	0	0	ms

- ① From the screen shown in the left, press the **[SCHEDULE]** key.

- ② Enter a value and press the **[SCHEDULE]** key again.

10	0	0	0	0	0	A	SCH031
10	0	0	0	0	0	A	SCH032
10	0	0	0	0	0	A	SCH033
10	0	0	0	0	0	A	SCH034
WELD 1							
MONITOR		A.		I/O SCH001			
MONITOR		A.					
MONITOR		A.					
MONITOR		A.					
COPY > [P1, P2, P3, P4]				RET. > [RESET]			
0		0	0	0	0	0	ms
0		0	0	0	0	0	ms
0		0	0	0	0	0	ms
0		0	0	0	0	0	ms

- ③ Four schedules with the entered number and three consecutive numbers are displayed.

③ Copying a schedule

Press the **P1**, **P2**, **P3**, or **P4** key to copy a schedule.

10	0	50	50	50	0	A	SCH001
10	0	0	0	0	0	A	SCH002
10	0	0	0	0	0	A	SCH003
10	0	0	0	0	0	A	SCH004
SCH001 > 001 COPY > [ENTER] WELD 1							
MONITOR		A. T. EN.				I/O SCH001	
MONITOR		A.					
MONITOR		A.					
MONITOR		A.					
COPY > [P1, P2, P3, P4] RET. > [RESET]							
0		0	10	10	10	0	ms
0		0	0	0	0	0	ms
0		0	0	0	0	0	ms
0		0	0	0	0	0	ms

- ① The copy source schedules correspond to the **P1**, **P2**, **P3**, and **P4** keys in the order from the top line. In the screen shown in the left, keys correspond to schedules as follows.

P1	key : SCH001
P2	key : SCH002
P3	key : SCH003
P4	key : SCH004

When the key corresponding to the copy source schedule number is pressed, the copy destination schedule number can be input. Enter a value.

Note) "I/O SCH001" shows the schedule signal number currently input on the terminal block.

10	0	50	50	50	0	A	SCH001
10	0	0	0	0	0	A	SCH002
10	0	0	0	0	0	A	SCH003
10	0	0	0	0	0	A	SCH004
SCH001 -> 003 COPY ?							WELD 1
YES > [ENTER]							NO > [RESET]
MONITOR		A. T. EN.			I/O SCH001		
MONITOR		A.					
MONITOR		A.					
MONITOR		A.					
COPY > [P1, P2, P3, P4]							RET. > [RESET]
0		0	10	10	10	0	ms
0		0	0	0	0	0	ms
0		0	0	0	0	0	ms
0		0	0	0	0	0	ms

- ② When the **ENTER** key is pressed after the value of copy source schedule is input, "YES / NO" appears for confirmation.

YES / **ENTER** key : Copies a schedule.

NO / **RESET** key : Ends without copying.

10	0	50	50	50	0	A	SCH001
10	0	0	0	0	0	A	SCH002
10	0	50	50	50	0	A	SCH003
10	0	0	0	0	0	A	SCH004
SCH001 -> 003 COPY OK							WELD 1
MONITOR		A. T. EN.				I/O SCH001	
MONITOR		A.					
MONITOR		A. T. EN.					
MONITOR		A.					
COPY > [P1, P2, P3, P4]							RET. > [RESET]
0		0	10	10	10	0	ms
0		0	0	0	0	0	ms
0		0	10	10	10	0	ms
0		0	0	0	0	0	ms

- ③ After a schedule is copied to the its destination schedule, the copy ends with displaying "COPY OK".

- ④ To return to the normal screen, press the **FUNCTION** key.

③ Setting the preset count

Displays the preset count of each schedule in the line P., and the total count of each schedule in the line T. "A.CNT 000000" at the top line shows all count (sum of total counts of all schedules).

The reset count of each schedule can be set.

When the total count value for each schedule becomes equal to the preset count value set in advance after welding, the "COUNT UP ERROR" error occurs since then even if the start signal is input and the start is not accepted.

Press the **P1**, **P2**, **P3**, or **P4** key to set the preset count.

RET. > [MONITOR]		A. CNT	000000	I/O	SCH001
SCH001	SCH002	SCH003	SCH004		
A	A	A	A		
P.	00000	00000	00000	00000	00000
T.	00000	00000	00000	00000	00000

① In the screen shown in the left, keys correspond to schedules as follows.

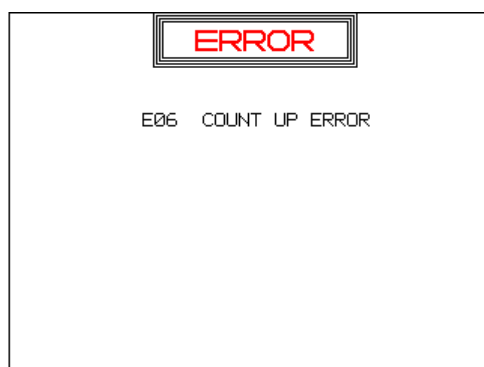
P1	key : SCH001
P2	key : SCH002
P3	key : SCH003
P4	key : SCH004

When any one of keys is pressed, the preset count value for each schedule can be entered. Enter a value.

Note) "I/O SCH001" shows the schedule signal number currently input on the terminal block.

RET. > [MONITOR]		A. CNT	000005	I/O	SCH003
SCH001	SCH002	SCH003	SCH004		
A	A	A	A		
P.	00000	00000	00005	00000	00000
T.	00000	00000	00005	00000	00000

② The screen is as shown in the left until the total count value becomes equal to the preset count value.



③ When the start signal is input after the total count value becomes equal to the preset count value, the "COUNT UP ERROR" error screen is displayed, as shown in the left.

The error is recovered by pressing the **RESET** key, but the error screen is displayed again without outputting the welding current even if the start signal is input.

To start welding again, reset the total count to zero.

In the next step, how to reset the total count to zero is explained.

④ Resetting the total count to zero

You can reset the total count of each schedule to zero.

Press the **T1**, **CT**, **T2**, or **T3** key to reset the total count to zero.

RET.>[MONITOR] A.CNT 00005 I/O SCH003			
SCH001	SCH002	SCH003	SCH004
A	A	A	A
P. 00000	00000	00005	00000
T. 00000	00000	00005	00000

In the screen shown in the left, keys correspond to schedules as follows.

T1 key : **SCH001**

CT key : SCH002

T2 key : **SCH003**

T3 key : **SCH004**

When any one of keys is pressed, the total count of each schedule is reset to zero.

RET.>[MONITOR]		A.CNT	000005	I/O	SCH003
SCH001	SCH002	SCH003	SCH004		
A	A	A	A		
P. 00000	00000	00005	00000		
T. 00000	00000	00000	00000		

①In the screen shown in the left, the total count

“**SCH003**” is reset to zero by pressing the T2 key.

RET. >[MONITOR]		A. CNT	000000	I/O	SCH003
SCH001	SCH002	SCH003	SCH004		
A	A	A	A		
P. 00000	00000	00005	00000		
T. 00000	00000	00000	00000		

② To reset the all count to zero, press the **T4** key. In the screen shown in the left, "**A.CNT 00005**" is reset to zero.

③ To reset total counts of all schedules and the all count to zero, press the **PRE** key.

(5) MONITOR SELECT Screen

On the MONITOR SELECT screen, select the monitor judgment method, the presence or absence of measured current value history display, and I/O user outputs for each schedule.

	CURRENT	TIME	ENVELOPE
WELD 1	○	8	—
WELD 2	×	○	—
HIST.	WELD 1 CURRENT		
U. OUT1	6 : LOST		
U. OUT2	5 : READY		
U. OUT3	3 : END		
U. OUT4	7 : LOWER WELD 1 CURRENT		
U. OUT5	8 : UPPER WELD 1 CURRENT		

× SELECTABLE
 ○ SELECTED — UNSELECTABLE
 RET. > [MONITOR] CANCEL > [RESET]

① From the normal screen, press the **MONITOR** key to display the screen.

② Set or select each item with **◀▶**, **▲**, and **▼** keys and press the **ENTER** key to confirm or the **RESET** key to cancel the setting.

③ Press the **MONITOR** key to return to the normal screen.

WELD 1: Chooses whether or not to perform monitor judgment for items CURRENT, TIME, and ENVELOPE with ○ or ×. When ○ is selected for two or more items, "NG" is output when either one gets outside the range of upper/lower limit of monitor judgment.

WELD 2: Chooses whether or not to perform monitor judgment for items CURRENT, TIME, and ENVELOPE with ○ or ×. When ○ is selected for two or more items, "NG" is output when either one gets outside the range of upper/lower limit of monitor judgment.

HIST.: Chooses which one to display for history, output current values of "first welding" (**WELD 1 CURRENT**) or those of "second welding" (**WELD 2 CURRENT**).

U.OUT1 to U.OUT5: Chooses signals from the following signals arbitrarily for the external outputs "U.OUT1" to "U.OUT5".

1: GOOD

Output for the set time when the welding judgment is GOOD.

2: NG

Output for the set time when the welding judgment NG.

3: END

Output for the set time when the welding is complete.

4: ERROR

Output when an error (overheat, overcurrent, etc.) occurs in **MAWA-300A**.

5: READY

Output when welding is ready.

6: LOST

Kept outputting at LOST.

7: LOWER WELD 1 CURRENT

Output for the set time when the measured current value of first welding falls below the lower limit of current for judgment.

8: UPPER WELD 1 CURRENT

Output for the set time when the measured current value of first welding exceeds the upper limit of current for judgment.

9: LOWER WELD 1 TIME

Output for the set time when the weld time of first welding falls below the lower limit of time for judgment.

10: UPPER WELD 1 TIME

Output for the set time when the weld time of first welding exceeds the upper limit of time for judgment.

11: LOWER WELD 1 ENVELOPE

Output for the set time when the measured current waveform of the first welding falls below the lower limit of current waveform for judgment.

12: UPPER WELD 1 ENVELOPE

Output for the set time when the measured current waveform of the first welding exceeds the upper limit of current waveform for judgment.

13: LOWER WELD 2 CURRENT

Output for the set time when the measured current value of second welding falls below the lower limit of current for judgment.

14: UPPER WELD 2 CURRENT

Output for the set time when the measured current value of second welding exceeds the upper limit of current for judgment.

15: LOWER WELD 2 TIME

Output for the set time when the weld time of second welding falls below the lower limit of time for judgment.

16: UPPER WELD 2 TIME

Output for the set time when the weld time of second welding exceeds the upper limit of time for judgment.

17: LOWER WELD 2 ENVELOPE

Output for the set time when the measured current waveform of the second welding exceeds the lower limit of current waveform for judgment.

18: UPPER WELD 2 ENVELOPE

Output for the set time when the measured current waveform of the second welding exceeds the upper limit of current waveform for judgment.

19: TORCH SHORT

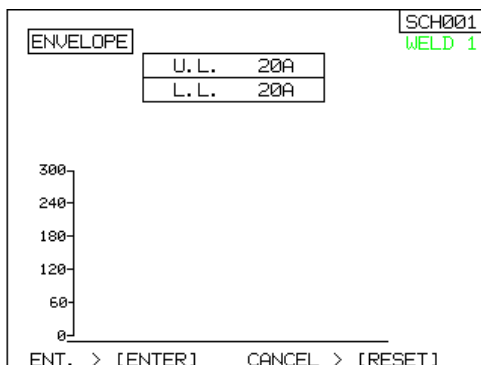
Kept outputting with error display when the welding starts with the torch kept in contact with the workpiece. To enable this function, set DETECT TORCH SHORT to ON on the SWITCH SELECT screen (see **8.(8)**).

20: SYNC. OUT

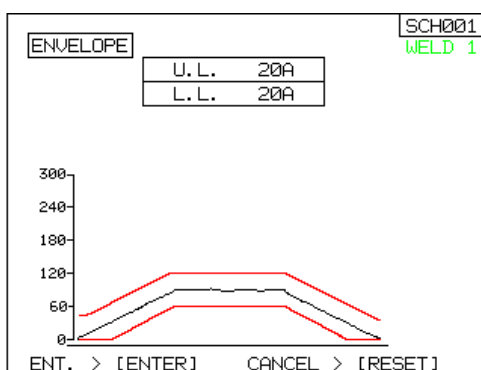
Output between the pre-flow output and welding end.

(6) ENVELOPE Screen

Sets the waveform upper limit and lower limit of each schedule with the reference measured current waveform, and makes a monitor judgment by comparing to the waveform.

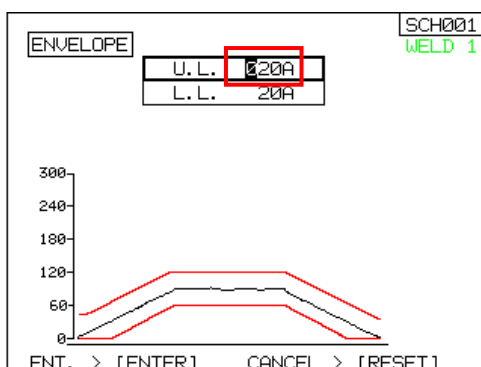


- ① From the normal screen, press the **UPPER** key or the **LOWER** key of **ENVELOPE** at the lower right of the operation panel to display the screen shown in the left.



- ② As the screen shown in the left, when the welding is performed on the ENVELOPE screen, in addition to the measured current waveform, waveforms for monitor judgment are displayed in red, which are the upper limit which is 20 A higher than the measured current waveform and lower limit which is 20 A lower than the measured current waveform. When the measured current exceeds these red lines, it is judged as NG.

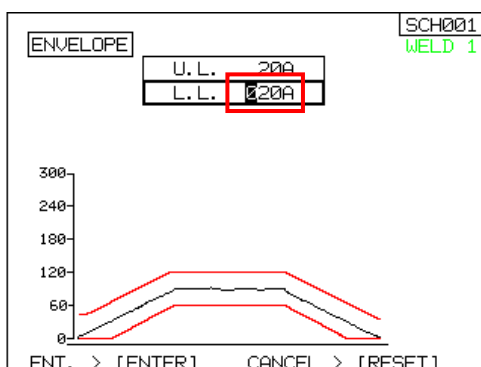
Note) The screen is updated after each welding. Repeat welding workpiece until a good waveform can be obtained.



- ③ To enter a value for upper current value, press the **UPPER** key.

- ④ Enter a value and press the **UPPER** key again.

Note) The waveform for the UPPER setting over 310 A is displayed as 310 A.



- ⑤ To enter a value for lower current value, press the **LOWER** key.

- ⑥ Enter a value and press the **LOWER** key again.

- ⑦ Press the **ENTER** key to confirm or the **RESET** key to cancel the setting. Then, the program display returns to the normal screen.

Note) The waveform for the LOWER setting below 0 A is displayed as 0 A.

(7) SCHEDULE MODE Screen

Screen of more detailed setting for each schedule. Sets the presence or absence of pulse modulation in first welding and second welding, pulse modulation ON/OFF time, base current, retry number triggered at LOST, the presence or absence of torch touch start, upslope/downslope pulse modulation ON/OFF time. See **8.(1) Waveform Setting**.

SCHEDULE MODE		SCH001	
Page 1/5			
WELD1 BASE CURRENT	10A		
WELD2 BASE CURRENT	10A		
RETRY COUNT	1		
TOUCH START	OFF		
WELD 1 FREQ.	WELD 2 FREQ.		
UP	0 Hz	UP	0 Hz
WELD	0 Hz	WELD	0 Hz
DOWN	0 Hz	DOWN	0 Hz
ENT. > [ENTER] CANCEL > [RESET]			

① Press the **FUNCTION** key on the normal screen to display "FUNCTION MENU", and then press the **P1** key to select "SCHEDULE MODE".

② Set or select each item with **◀▶**, **▲**, and **▼** keys and press the **ENTER** key to confirm or the **RESET** key to cancel the setting.

③ After confirming items with the **ENTER** key, press the **ENTER** key again or the **FUNCTION** key to return to "FUNCTION MENU".

WELD1 BASE CURRENT : 0 to 300A Sets the base current of first welding.

*The value lower than the initial current (P1) can not be set.

WELD2 BASE CURRENT : 0 to 300A Sets the base current of second welding.

RETRY COUNT : 01 to 05 Sets the retry number triggered at LOST.

TOUCH START : ON/OFF Sets the touch start function to ON/OFF.

SCHEDULE MODE		SCH001	
Page 2/5			
WELD1 PULSE	ON		
WELD1 WELD ON TIME	1.4ms		
WELD1 WELD OFF TIME	0.6ms		
WELD 1 FREQ.	WELD 2 FREQ.		
UP	0 Hz	UP	0 Hz
WELD	500 Hz	WELD	0 Hz
DOWN	0 Hz	DOWN	0 Hz
ENT. > [ENTER] CANCEL > [RESET]			

④ When times are set to ON TIME and OFF TIME and PULSE is set to ON, the frequency is displayed.

In the screen shown in the left, the frequency of the time set WELD1 WELD ON TIME and WELD1 WELD OFF TIME is displayed in WELD 1 FREQ..

WELD1 PULSE : ON/OFF

Turns on/off the pulse modulation for weld time in first welding.

WELD1 WELD ON TIME : 0.0 to 999.9ms Sets the ON time of pulse modulation in first welding.

WELD1 WELD OFF TIME : 0.0 to 999.9ms Sets the OFF time of pulse modulation in first welding.

SCHEDULE MODE		SCH001	
Page 3/5			
WELD1 UP.SLP ON TIME	0.0ms		
WELD1 UP.SLP OFF TIME	0.0ms		
WELD1 DN.SLP ON TIME	0.0ms		
WELD1 DN.SLP OFF TIME	0.0ms		
WELD 1 FREQ.	WELD 2 FREQ.		
UP	0 Hz	UP	0 Hz
WELD	0 Hz	WELD	0 Hz
DOWN	0 Hz	DOWN	0 Hz
ENT. > [ENTER] CANCEL > [RESET]			

WELD1 UP.SLP ON TIME : 0.0 to 999.9ms

Sets the ON time of pulse modulation in first welding upslope.

WELD1 UP.SLP OFF TIME : 0.0 to 999.9ms

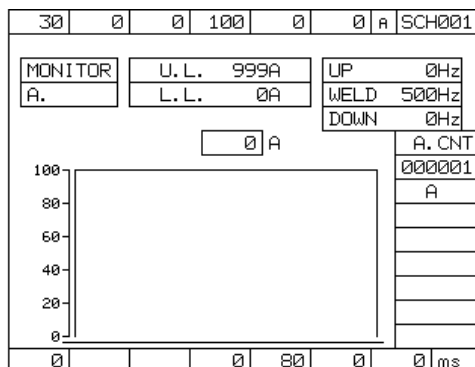
Sets the OFF time of pulse modulation in first welding upslope.

WELD1 DN.SLP ON TIME : 0.0 to 999.9ms

Sets the ON time of pulse modulation in first welding downslope.

WELD1 DN.SLP OFF TIME : 0.0 to 999.9ms

Sets the OFF time of pulse modulation in first welding downslope.



⑤When PULSE is set to ON, the frequency is also displayed on the normal screen.

SCHEDULE MODE SCH001

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WELD2 PULSE		OFF
WELD2 WELD ON TIME	0.0ms	
WELD2 WELD OFF TIME	0.0ms	

WELD 1 FREQ.		WELD 2 FREQ.	
UP	0 Hz	UP	0 Hz
WELD	0 Hz	WELD	0 Hz
DOWN	0 Hz	DOWN	0 Hz

ENT. > [ENTER] CANCEL > [RESET]

WELD2 PULSE : ON/OFF

Turns on/off the pulse modulation for weld time in second welding.

WELD2 WELD ON TIME : 0.0 to 999.9ms

Sets the ON time of pulse modulation in second welding.

WELD2 WELD OFF TIME : 0.0 to 999.9ms

Sets the OFF time of pulse modulation in second welding.

SCHEDULE MODE SCH001

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WELD2 UP.SLP ON TIME	0.0ms
WELD2 UP.SLP OFF TIME	0.0ms
WELD2 DN.SLP ON TIME	0.0ms
WELD2 DN.SLP OFF TIME	0.0ms

WELD 1 FREQ.		WELD 2 FREQ.	
UP	0 Hz	UP	0 Hz
WELD	0 Hz	WELD	0 Hz
DOWN	0 Hz	DOWN	0 Hz

ENT. > [ENTER] CANCEL > [RESET]

WELD2 UP.SLP ON TIME : 0.0 to 999.9ms

Sets the ON time of pulse modulation in second welding upslope.

WELD2 UP.SLP OFF TIME : 0.0 to 999.9ms

Sets the OFF time of pulse modulation in second welding upslope.

WELD2 DN.SLP ON TIME : 0.0 to 999.9ms

Sets the ON time of pulse modulation in second welding downslope.

WELD2 DN.SLP OFF TIME : 0.0 to 999.9ms

Sets the OFF time of pulse modulation in second welding downslope.

(8) SWITCH SELECT Screen

Sets the detail settings common to schedules, not individual welding conditions.

SWITCH SELECT		Page 1/2
MEMORY CLEAR	KEEP	
WELD NG ERROR	OFF	
GOOD or NG SIGNAL	20ms	
END SIGNAL	20ms	
START DELAY TIME	10ms	
MEASURE CURRENT	AVE.	
START KEY	ON	
INTERNAL GAS FLOW	ON	
WAVE RANGE	100%	
START PARITY ERROR	OFF	

ENT. > [ENTER] CANCEL > [RESET]

SWITCH SELECT		Page 2/2
DETECT TORCH SHORT	OFF	
WORK TRIGGER	ON	
CONTINUE CURRENT	ON	

ENT. > [ENTER] CANCEL > [RESET]

① Press the **FUNCTION** key on the normal screen to display "FUNCTION MENU", and then press the **P2** key to select "SWITCH SELECT".

② Set or select each item with **◀▶**, **▲**, and **▼** keys and press the **ENTER** key to confirm or the **RESET** key to cancel the setting.

③ After confirming items with the **ENTER** key, press the **ENTER** key again or the **FUNCTION** key to return to "FUNCTION MENU".

MEMORY CLEAR : KEEP/CLEAR

WELD NG ERROR : ON/OFF

GOOD or NG SIGNAL : 1 to 200ms

END SIGNAL : 1 to 200ms

START DELAY TIME : 1 to 100ms

MEASURE CURRENT : AVE./PEAK/R.M.S.

START KEY : ON/OFF

INTERNAL GAS FLOW : ON/OFF

WAVE RANGE : 100%/50%

START PARITY ERROR : ON/OFF

DETECT TORCH SHORT : ON/OFF

WORK TRIGGER : ON/OFF

CONTINUE CURRENT : ON/OFF

When CLEAR is selected, all settings are initialized and the setting returns to KEEP.

Chooses whether to put the Power Supply in abnormal status when NG is given in monitor judgment.

Sets the pulse output time of external outputs, GOOD and NG signals.

Sets the pulse output time of external output, END signal.

Sets the delay time for the start signal to be established.

Chooses the measuring method for current measurement display from AVE. (average value), PEAK (peak value), and R.M.S. (effective value).

Chooses whether or not to enable the **START** key.

Chooses whether or not to enable the internal gas flow operation (PRE, AFTER).

Chooses 100% or 50% of the vertical display range on the ENVELOPE screen and CHECK screen.

Chooses whether or not to include the PARITY input signal when selecting a schedule with external inputs.

Odd parity specification. See also **10.(3) [SCHEDULE]**. Chooses whether or not to detect the torch short circuit right before welding.

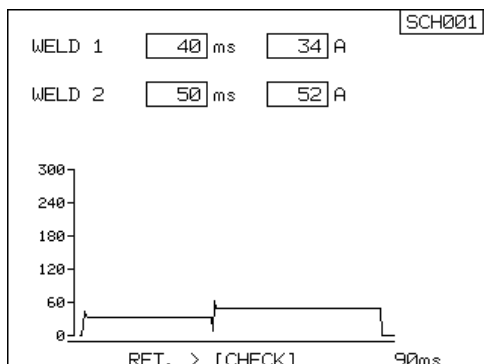
Chooses whether or not to operate the trigger output. However, trigger is not output regardless of this setting when the touch start is used.

Chooses whether or not to continue the welding when ark is shut off during welding.

(9) CHECK Screen

Displays current values and weld times of WELD1/WELD2, and the measured current waveform of welding.

The displayed item is selected on the MONITOR SELECT screen. See **8.(5) MONITOR SELECT Screen**.



① When the **CHECK** key is pressed after welding, the screen shown in the left is displayed. Press the **CHECK** key again to return to the previous screen.

(10) I/O CHECK Screen

Displays the status of input/output signals.

The screenshot shows the I/O CHECK screen with the following data:

- INPUT -		- OUTPUT -	
START	PARITY	GOOD	OUT1 0
W. STOP	PURGE	NG	OUT2 1
EM.	* THERMO *	END	OUT3 0
RESET		ERROR	OUT4 0
SCH01		E-STOP	OUT5 0
SCH02		GAS FLOW	0
SCH04		VALVE	0
SCH08			
SCH16			
SCH32			
SCH64			

The screen is labeled 'I/O CHECK' and 'I/O SCH000'. At the bottom, it says 'RET. > [FUNCTION]'. A red box highlights the 'GOOD' status under the 'OUTPUT' column.

- INPUT -

Displays name of each input terminal.

" _ " : Input terminal is in open-circuit status.

" * " : Input terminal is in short-circuit status.

- OUTPUT -

Displays name of each output terminals.

" 0 " : Output terminal is in open-circuit status.

" 1 " : Output terminal is in short-circuit status.

Open-circuit/short-circuit test can be done for each output terminal.

◀▶ key : Selects an output signal. The selected output signal is highlighted.

▲ key : Selects " 1 ", the short-circuit status.

▼ key : Selects " 0 ", the open-circuit status.

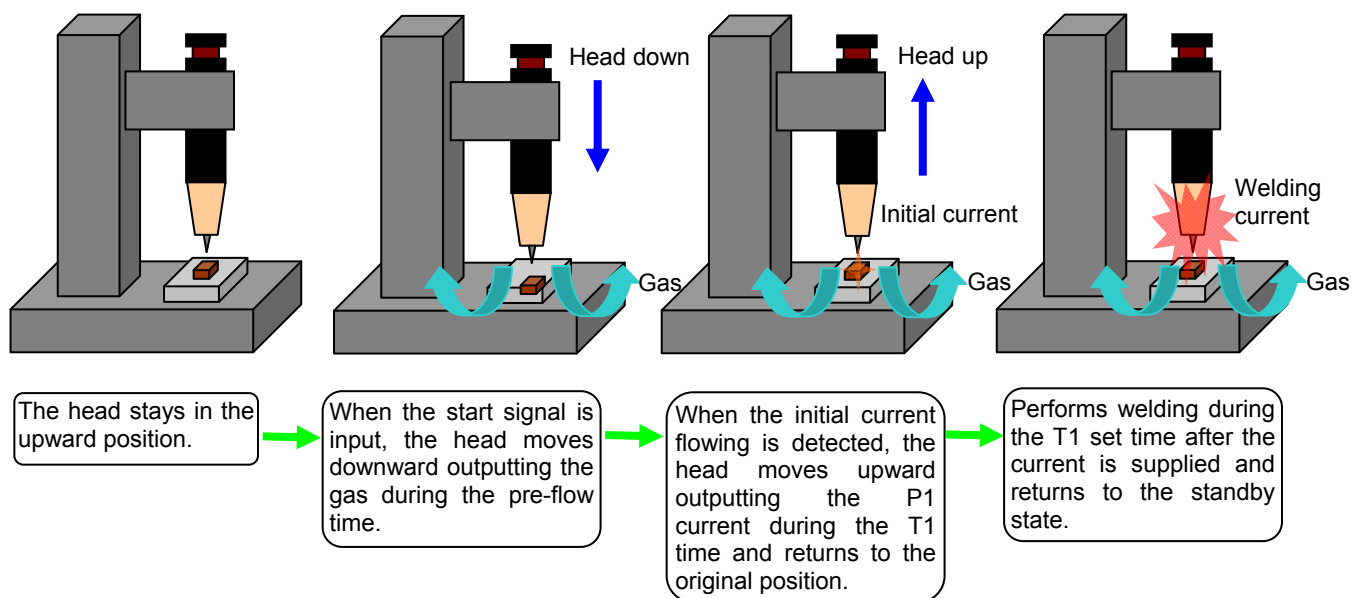
9. Touch Start

(1) Introduction

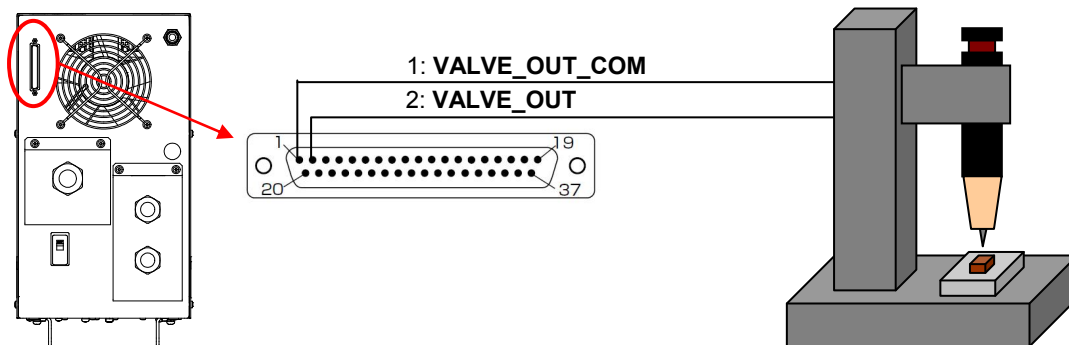
This Power Supply has the “touch start” function which supplies the initial current with bringing arc electrode in contact with workpiece in advance and keeps them the gap distance of arc discharge away to perform arc welding. This function has the following advantages:

- Requires no high voltage for air breakdown.
- LOST-resistant since arc discharge starts by touching.
- Easy to identify welding portion since arc discharge starts by touching.
- Reduces the influence of noise since high voltage is not produced.

(2) Operation



(3) Connection

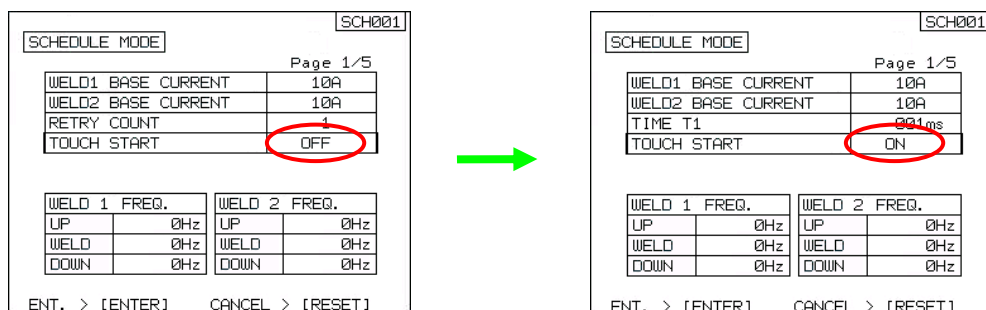


The VALVE_OUT output signal (37 pins, D-Sub connector, 1: VALVE_OUT_COM, 2: VALVE_OUT) on the rear of **MAWA-300A** is used. Connect the VALVE_OUT output signal to the signal input for moving the air-driven head or the servo-driven head upward/downward.

* The setting rating of VALVE_OUT output signal is +24V DC/70 mA or less.

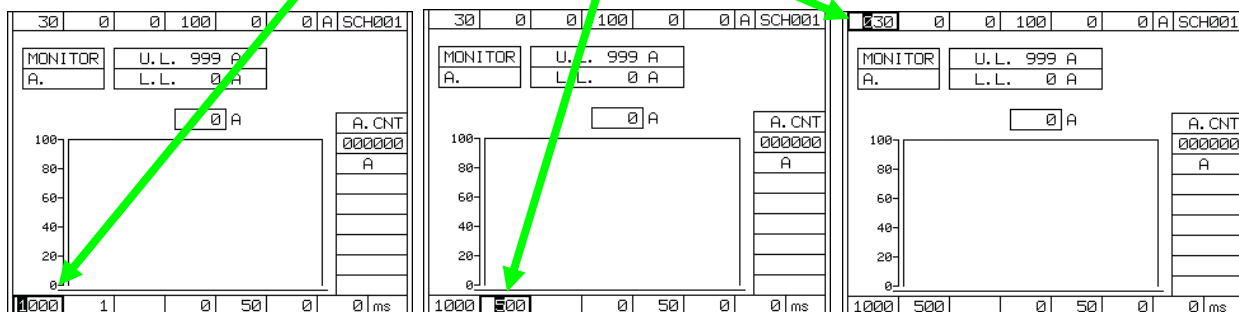
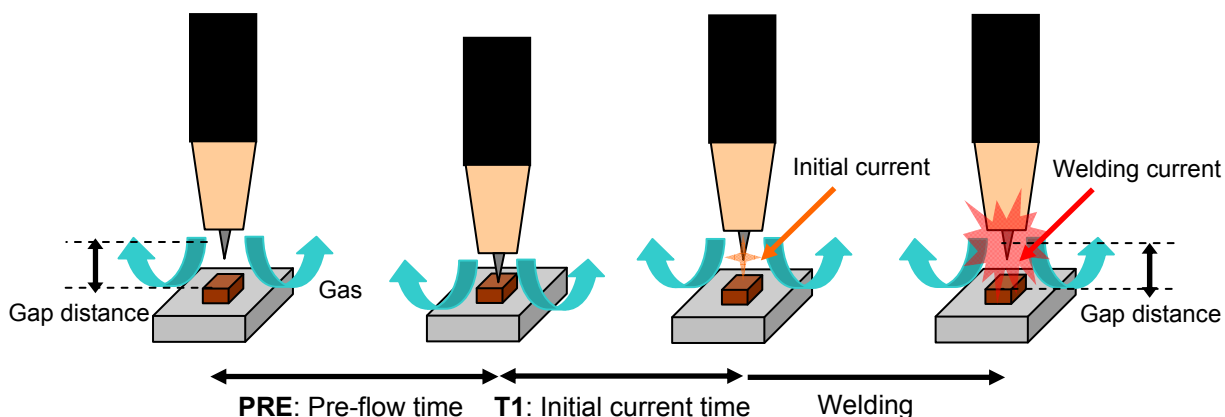
(4) Setting

This function can be used by switching **TOUCH START** from **OFF** to **ON** on the SCHEDULE MODE screen displayed from the FUNCTION MENU screen. At this time, **RETRY COUNT** automatically changes into **TIME T1** for the initial current time. **TIME T1** can be arbitrarily set on the normal screen.



(5) Adjustment

When operation starts, the head moves downward outputting the gas during the pre-flow time. After the pre-flow time, the head moves upward outputting the initial current during the initial current time. After the initial current time, the welding starts. Adjust enough initial current not to be lost and not to significantly affect the welding current. For the initial current time, set the time for gap distance to stop at the upward limit of head. Adjust the initial current time to match it with the automated machine state.

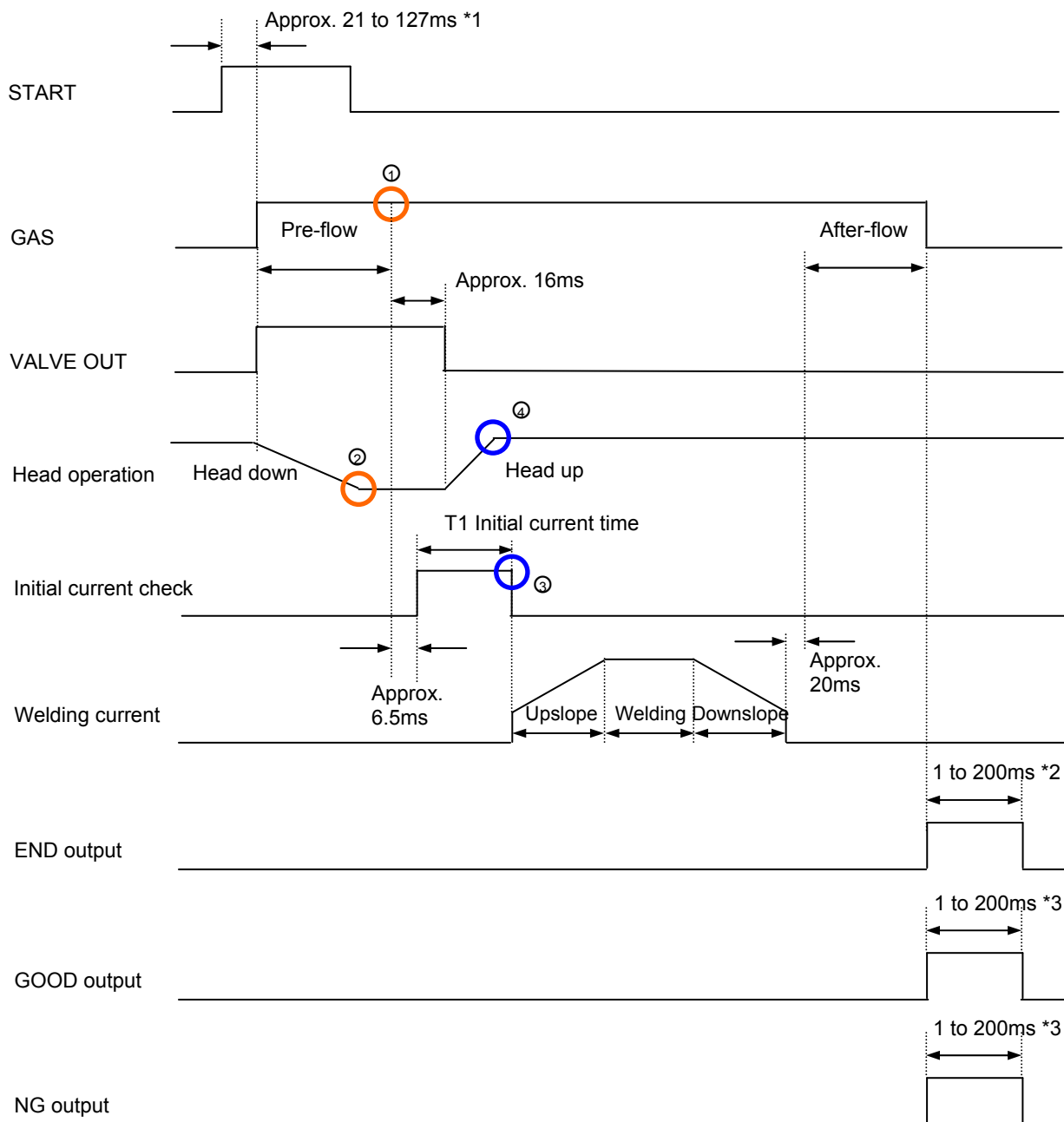


- ① PRE: Pre-flow time setting ② T1: Initial current time setting ③ P1: Initial current value setting

Repeat adjustments of ①, ②, ③, and gap distance to find optimum conditions.

Note: When the "touch start" function is used, the pre-flow time operates as the head-down time. Only when INTERNAL GAS FLOW is set to ON, the GAS switching valve is closed. When set to OFF, it does not operate.

(6) Timing Chart of Touch Start (Normal Operation)



Note: Connect the VALVE OUT output signal (37 pins, D-Sub connector, 1: VALVE_OUT_COM, 2: VALVE_OUT) to the solenoid valve input of the air-driven head or the head down/up input of the servo-driven head. To match with the head down/up time, distance between electrode and workpiece, production takt, etc, set pre-flow time, T1 time (initial current time), and P1 (initial current output value) to find optimum conditions.

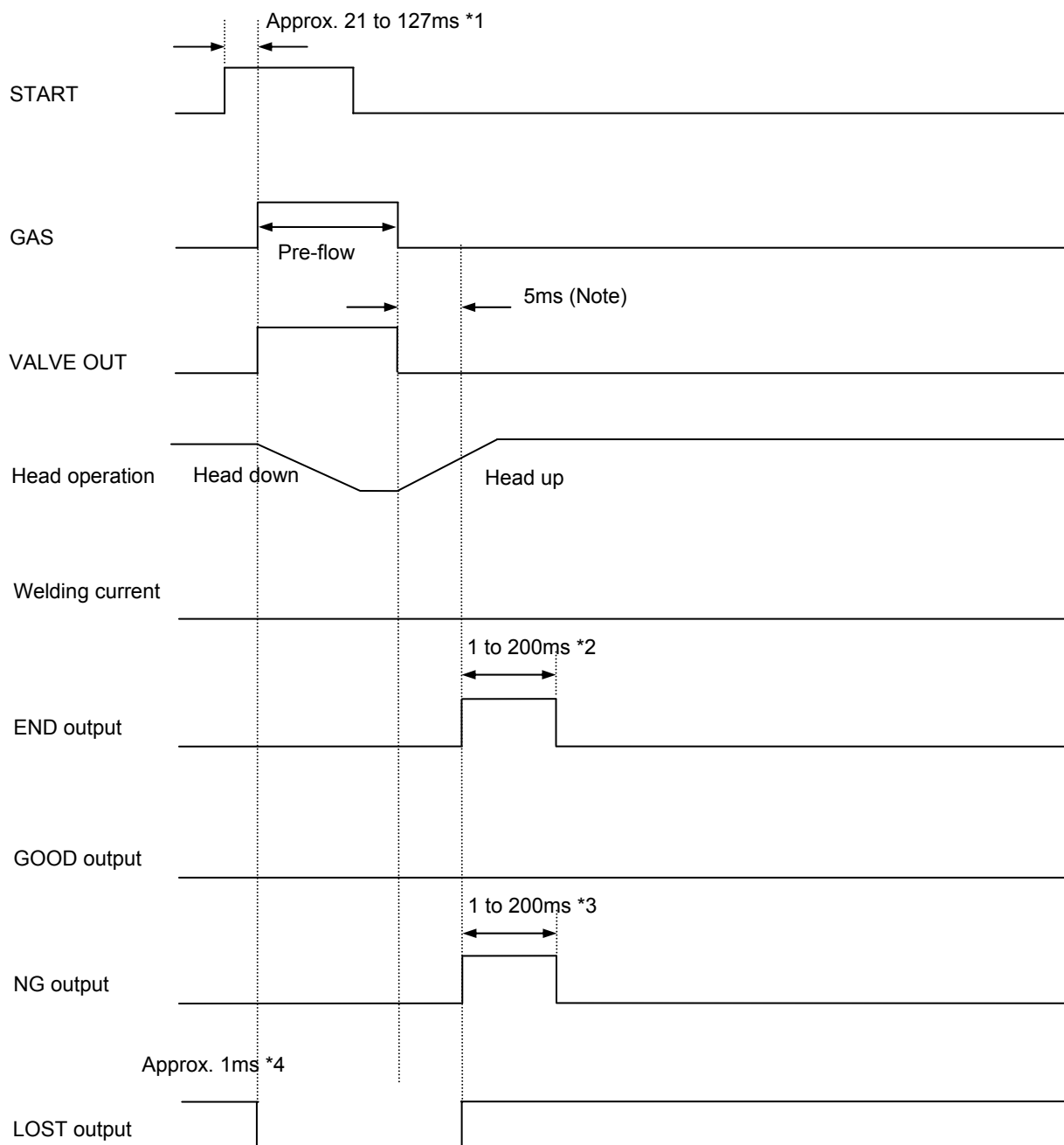
(In the example above, you can make the timing of ① short to ② with the PRE key. Also, you can make the timing of ③ short to ④ with the T1 key.)

*1: Approx. 21–26 ms + START DELAY TIME setting value. See **8.(8) SWITCH SELECT Screen**.

*2: END SIGNAL setting value. See **8.(8) SWITCH SELECT Screen**.

*3: GOOD OR NG SIGNAL setting value. See **8.(8) SWITCH SELECT Screen**.

(7) Timing Chart of Touch Start (at LOST)



Note: In this interval, the initial current is checked.

When the electrode is not contacted with the workpiece or the initial current can not be detected since the electrode is contacted with insulator or nonconductive pathway, **MAWA-300A** does not perform a welding and judges it as LOST.

*1: Approx. 21–26 ms + START DELAY TIME setting value. See **8.(8) SWITCH SELECT Screen**.

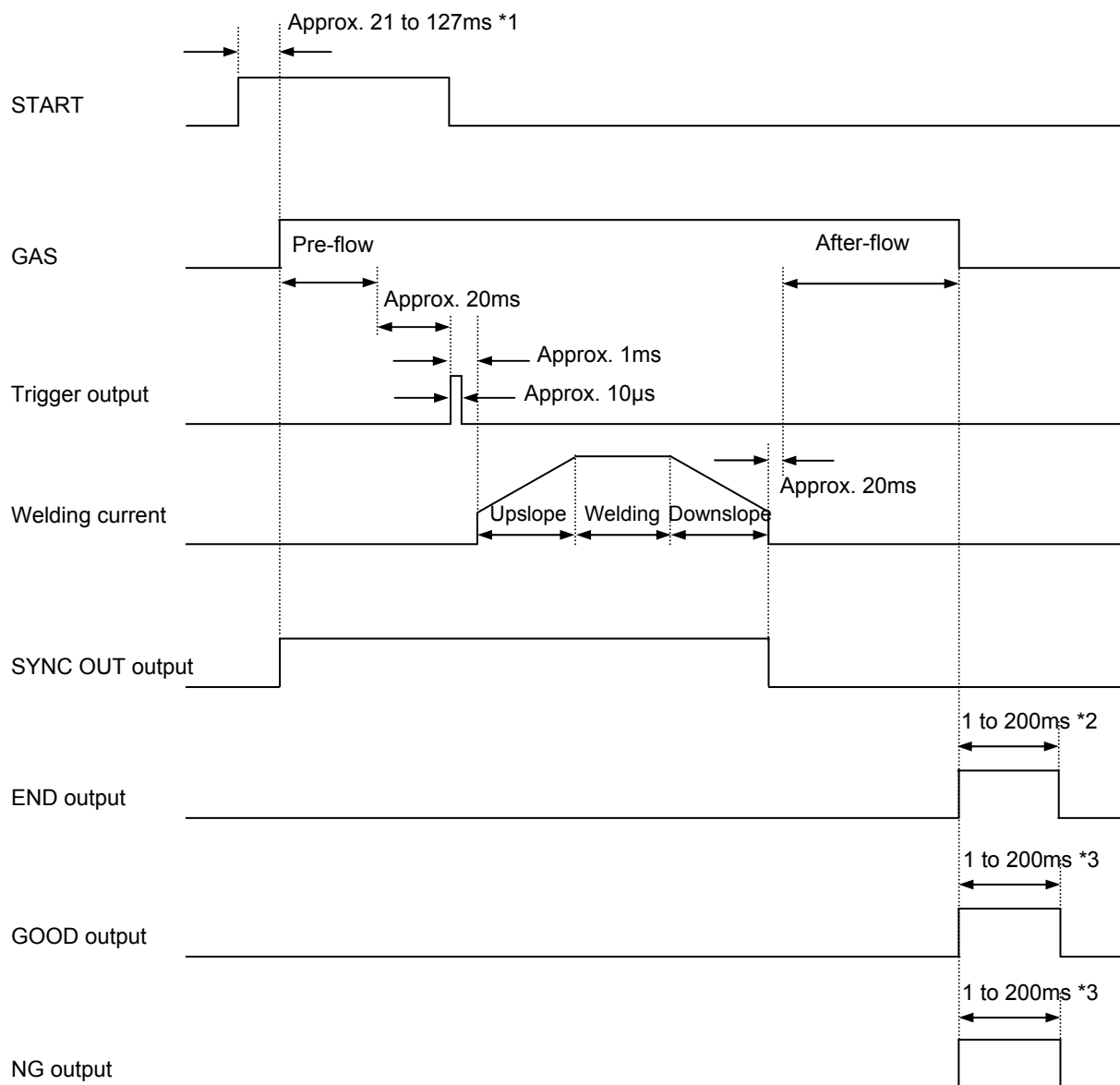
*2: END SIGNAL setting value. See **8.(8) SWITCH SELECT Screen**.

*3: GOOD OR NG SIGNAL setting value. See **8.(8) SWITCH SELECT Screen**.

*4: Turned off after next start.

10. Timing Chart

(1) Normal Operation



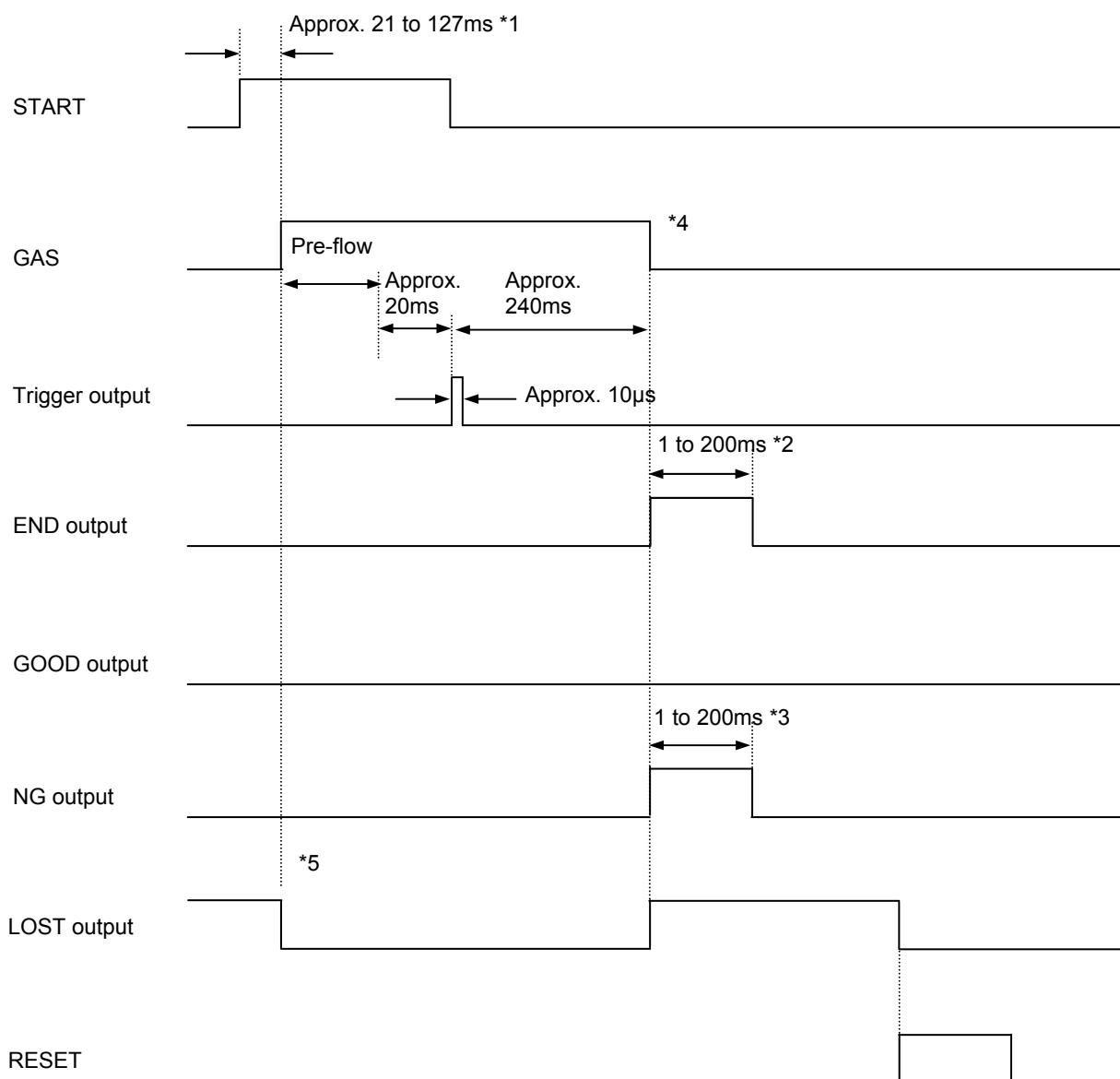
*1: Approx. 20–26 ms + START DELAY TIME setting value. See **8.(8) SWITCH SELECT Screen**.

*2: END SIGNAL setting value. See **8.(8) SWITCH SELECT Screen**.

*3: GOOD OR NG SIGNAL setting value. See **8.(8) SWITCH SELECT Screen**.

(2) Retry

① LOST: When the number of retry operations is 0



*1: Approx. 20–26 ms + START DELAY TIME setting value. See **8.(8) SWITCH SELECT Screen**.

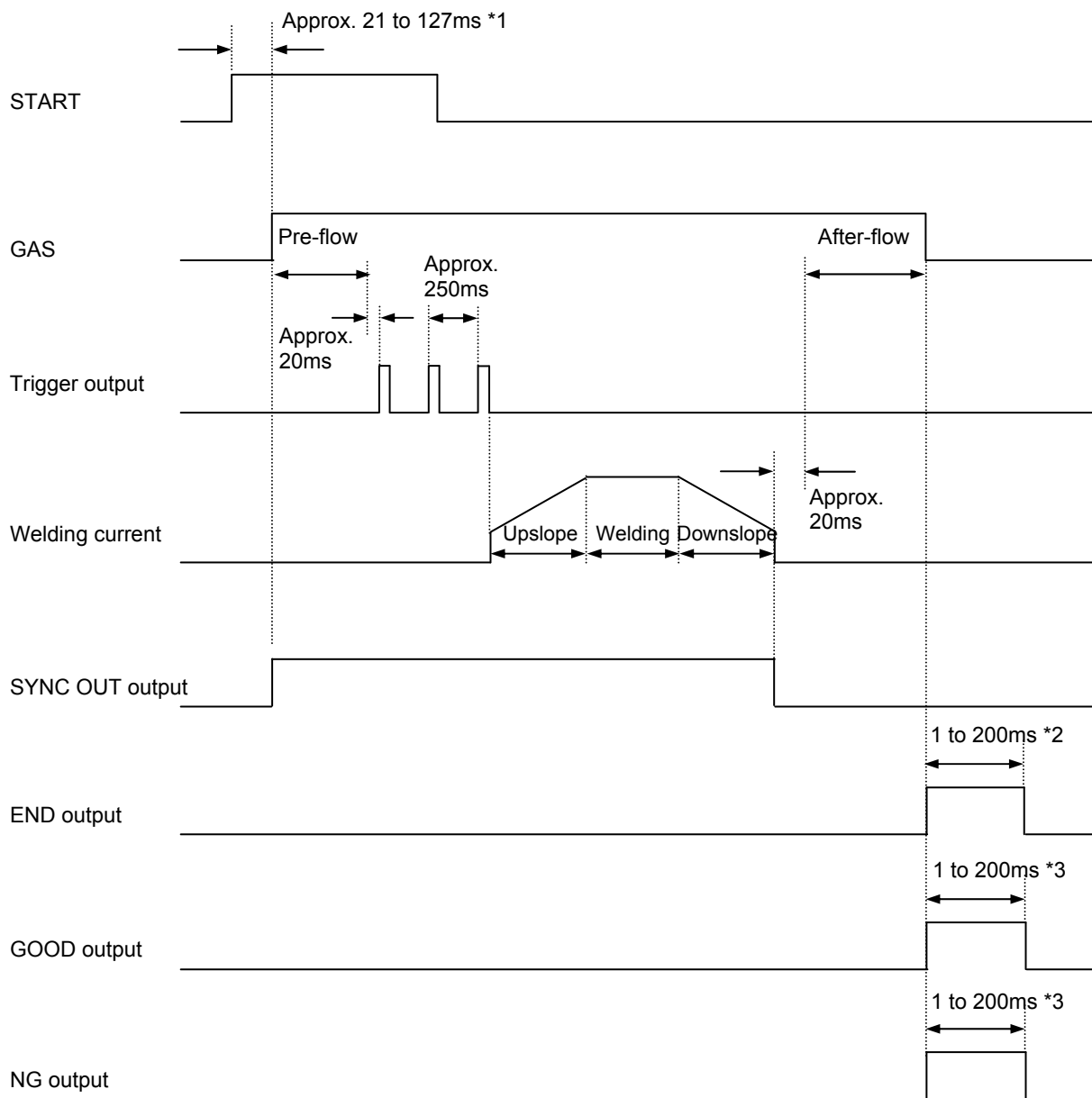
*2: END SIGNAL setting value. See **8.(8) SWITCH SELECT Screen**.

*3: GOOD OR NG SIGNAL setting value. See **8.(8) SWITCH SELECT Screen**.

*4: When the initial current check (P1) is 25 A or less, the LOST output is turned on, and the Gas Outlet is shut off.

*5: Turned off after next start.

② When the retry number is 2 and the arc welding is successfully done

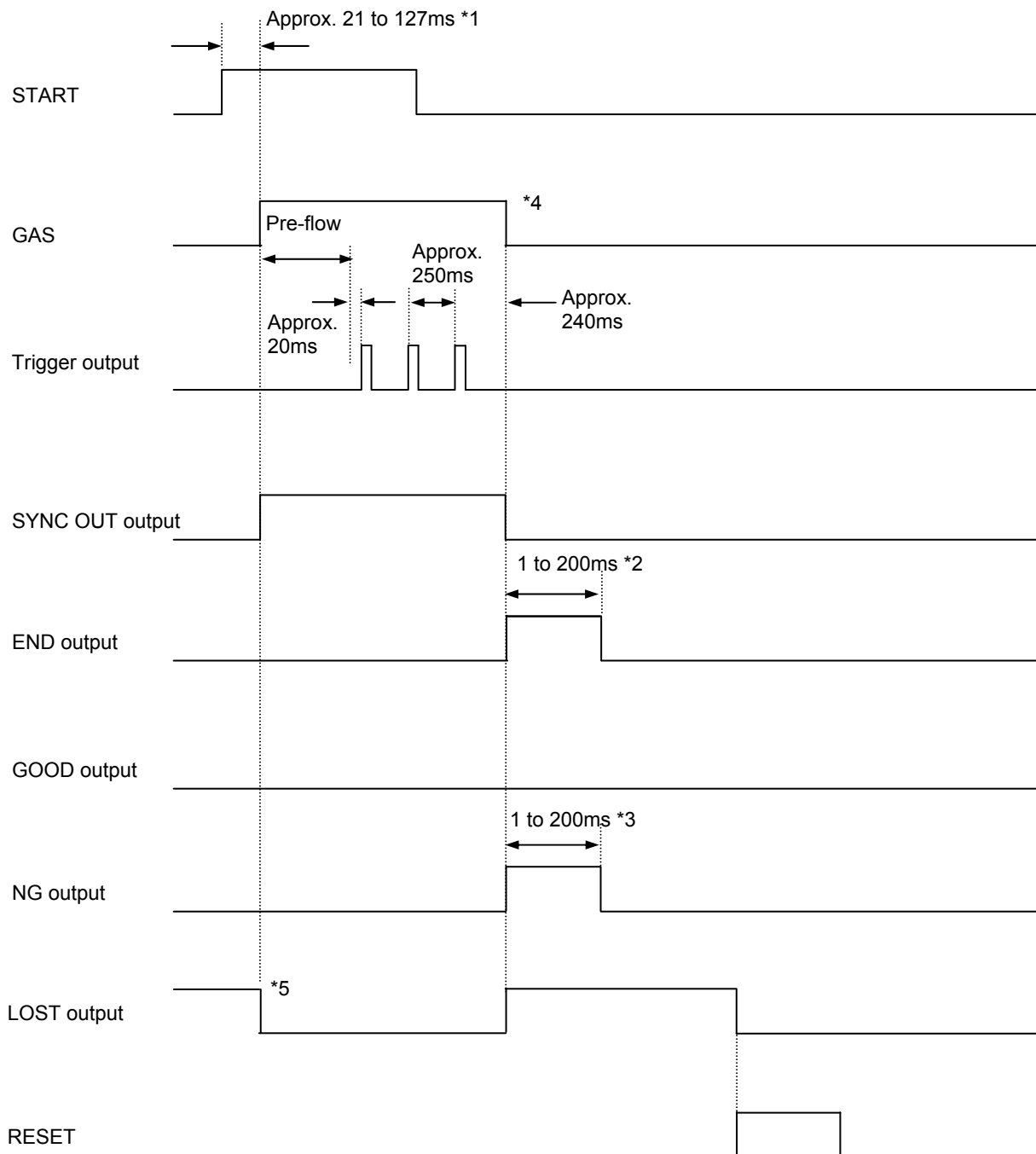


*1: Approx. 20–26 ms + START DELAY TIME setting value. See 8.(8) **SWITCH SELECT** Screen.

*2: END SIGNAL setting value. See 8.(8) **SWITCH SELECT** Screen.

*3: GOOD OR NG SIGNAL setting value. See 8.(8) **SWITCH SELECT** Screen.

③ When the retry number is 2 and the arc welding is not done (LOST)



*1: Approx. 20–26 ms + START DELAY TIME setting value. See **8.(8) SWITCH SELECT Screen**.

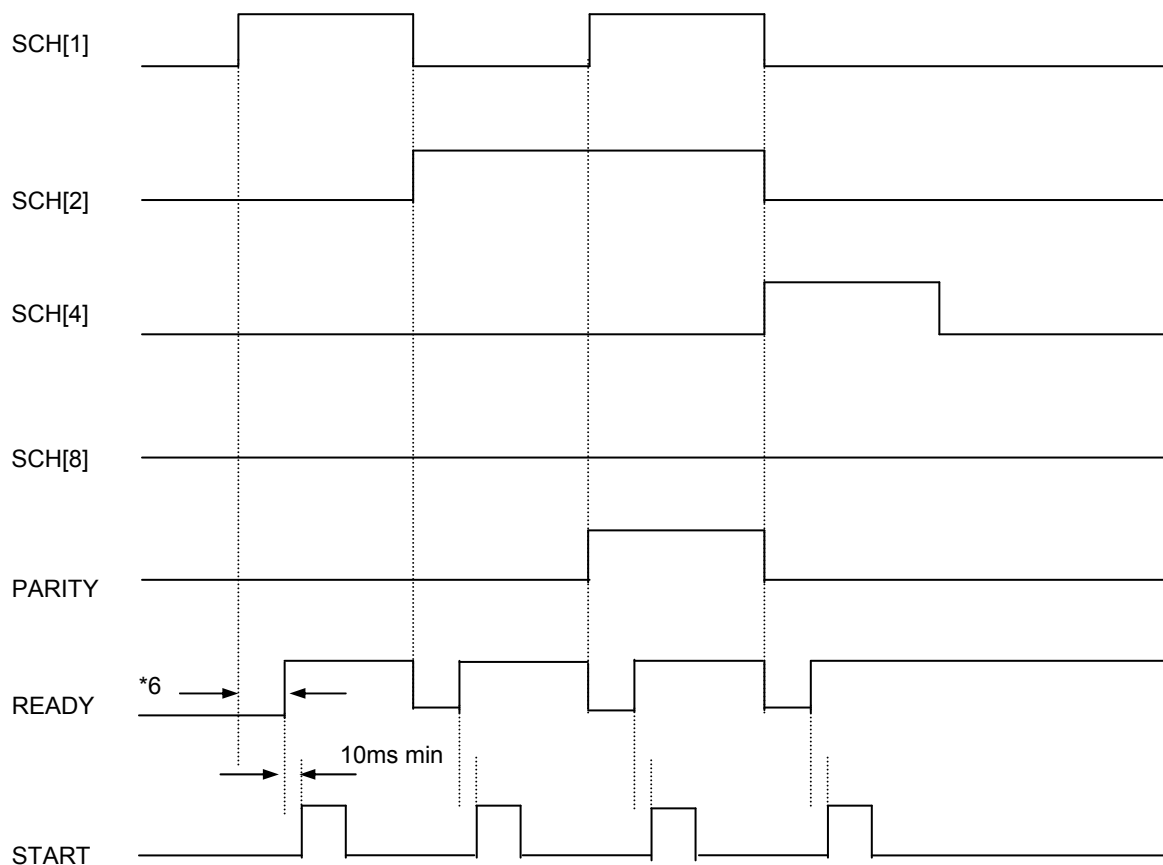
*2: END SIGNAL setting value. See **8.(8) SWITCH SELECT Screen**.

*3: GOOD OR NG SIGNAL setting value. See **8.(8) SWITCH SELECT Screen**.

*4: When the initial current check (P1) is 25 A or less, the LOST output is turned on, and the Gas Outlet is shut off.

*5: Turned off after next start.

(3) Changing the Schedule



Note: The above timing chart shows the SCH# change from 1, 2, 3, to 4. Before turning on the START signal, set the SCH[1] to SCH[64] and PARITY. Then **confirm that the READY signal**, followed by the START signal turn-on.

When the START signal is turned on before READY becomes valid, the error message “**NOT READY ERROR**” appears.

You can select whether to use the PARITY signal or not by setting ON/OFF for START PARITY ERROR on the SWITCH SELECT screen displayed from the FUNCTION MENU screen.

To change the schedule, display the EDIT or MULTI screen.

*6: The time from when SCH# is switched till when READY signal becomes valid changes depending on the weld time setting of the destination schedule.

Total time of destination schedule	10 ms	100 ms	500 ms	1000 ms	2000 ms	4000 ms
Time before READY ON (approx.)	65 ms	496 ms	2.4 s	4.7 s	9.4 s	18.8 s

[SCHEDULE]

SCH#	Signal name	SCH[1]	SCH[2]	SCH[4]	SCH[8]	SCH[16]	SCH[32]	SCH[64]	PARITY
1		○							
2			○						
3		○	○						○
4				○					
5		○		○					○
6			○	○					○
7		○	○	○					
8					○				
9		○			○				○
10			○		○				○
11		○	○		○				
12				○	○				○
13		○		○	○				
14			○	○	○				
15		○	○	○	○				○
16						○			
17		○				○			○
18			○			○			○
19		○	○			○			
20				○		○			○
21		○		○		○			
22			○	○		○			
23		○	○	○		○			○
24					○	○			○
25		○			○	○			
26			○		○	○			
27		○	○		○	○			○
28				○	○	○			
29		○		○	○	○			○
30			○	○	○	○			○
31		○	○	○	○	○			
32							○		
33		○					○		○
34			○				○		○
35		○	○				○		
36				○			○		○
37		○		○			○		
38			○	○			○		
39		○	○	○			○		○
40					○		○		○
41		○			○		○		
42			○		○		○		
43		○	○		○		○		○
44				○	○		○		
45		○		○	○		○		○
46			○	○	○		○		○
47		○	○	○	○		○		
48						○	○		○
49		○				○	○		
50			○			○	○		
51		○	○			○	○		○
52				○		○	○		

10. Timing Chart

SCH#	Signal name	SCH[1]	SCH[2]	SCH[4]	SCH[8]	SCH[16]	SCH[32]	SCH[64]	PARITY
53		○		○		○	○		○
54			○	○		○	○		○
55		○	○	○		○	○		
56					○	○	○		
57		○			○	○	○		○
58			○		○	○	○		○
59		○	○		○	○	○		
60				○	○	○	○		○
61		○		○	○	○	○		
62			○	○	○	○	○		
63		○	○	○	○	○	○		○
64								○	
65		○						○	○
66			○					○	○
67		○	○					○	
68				○				○	○
69		○		○				○	
70			○	○				○	
71		○	○	○				○	○
72					○			○	○
73		○			○			○	
74			○		○			○	
75		○	○		○			○	○
76				○	○			○	
77		○		○	○			○	○
78			○	○	○			○	○
79		○	○	○	○			○	
80						○		○	○
81		○				○		○	
82			○			○		○	
83		○	○			○		○	○
84				○		○		○	
85		○		○		○		○	○
86			○	○		○		○	○
87		○	○	○		○		○	
88					○	○		○	
89		○			○	○		○	○
90			○		○	○		○	○
91		○	○		○	○		○	
92				○	○	○		○	○
93		○		○	○	○		○	
94			○	○	○	○		○	
95		○	○	○	○	○		○	○
96							○	○	○
97		○					○	○	
98			○				○	○	
99		○	○				○	○	○
100				○			○	○	
101		○		○			○	○	○
102			○	○			○	○	○
103		○	○	○			○	○	
104					○		○	○	
105		○			○		○	○	○
106			○		○		○	○	○
107		○	○		○		○	○	

10. Timing Chart

Signal name SCH#	SCH[1]	SCH[2]	SCH[4]	SCH[8]	SCH[16]	SCH[32]	SCH[64]	PARITY
108			○	○		○	○	○
109	○		○	○		○	○	
110		○	○	○		○	○	
111	○	○	○	○		○	○	○
112					○	○	○	
113	○				○	○	○	○
114		○			○	○	○	○
115	○	○			○	○	○	
116			○		○	○	○	○
117	○		○		○	○	○	
118		○	○		○	○	○	
119	○	○	○		○	○	○	○
120				○	○	○	○	○
121	○			○	○	○	○	
122		○		○	○	○	○	
123	○	○		○	○	○	○	○
124			○	○	○	○	○	
125	○		○	○	○	○	○	○
126		○	○	○	○	○	○	○
127	○	○	○	○	○	○	○	

○: Input signal turn-on

Trouble caused by disconnection of schedule selection signal line can be detected with the parity input signal. Set the schedule selection signal lines and the PARITY signal lines so that the total number of their closed lines is always odd. (START PARITY ERROR: ON setting)

11. Specifications

(1) Product Specifications

	MAWA-300A-00-01		MAWA-300A-00-02	
Input voltage	Three-phase, 400 V AC ±10% (50/60 Hz)		Three-phase, 200 V AC ±10% (50/60 Hz)	
Rated input	14.0 kVA		13.2 kVA	
Max. output current	300 A			
Control method	Secondary constant-current control Inverter-type (control frequency: approx. 25 kHz)			
Max. no-load voltage	95 V			
Starting voltage	360 V			
Rated load voltage	22 V (at 300 A welding)			
Duty cycle	5% (300 A), 10% (210 A), 20% (150 A), 30% (122 A), 40% (97 A), 50% (80 A) Max. duty cycle: 50% (80 A or less) *1			
Cooling method	Air cooled (fan motor)			
Supply gas	Argon 0.2 to 0.6 Mpa, Flow rate 5 liters/min or more (No foreign matter, water and oil flowing into piping)			
Case protection	IP21S			
Protective class	I			
CE marking	Compliant			
Display	Setting, display:	5.7 inch, color LCD		
	State indicator:	LED		
Operating environment	Ambient temp.:	+5 to +40°C		
	Humidity:	90% max. (no condensation)		
	Altitude:	1000 m max.		
	Pollution degree:	2		
Transportation and storage conditions	Ambient temp.:	-10 to +55°C		
	Humidity:	90% max. (no condensation)		
Dimensions	408 (H) mm x 211 (W) mm x 603 (D) mm (not including projection) 408 (H) mm x 211 (W) mm x 705 (D) mm (including the cable gland of terminal cover)			
Mass	Approx. 45 kg			
Number of schedules	127			
Time setting range	PRE (pre-flow):		0000 to 9990 (ms) 10 ms increments	
	WELD1	T1 (initial current):	000 to 999 (ms) *2	
		T2 (upslope):	000 to 999 (ms) *3	
		T3 (welding):	000 to 999 (ms)	
		T4 (downslope):	000 to 999 (ms)	
	WELD2	CT (cooling):	000 to 999 (ms)	
		T2 (upslope):	000 to 999 (ms) *3	
T3 (welding):		000 to 999 (ms)		
T4 (downslope):		000 to 999 (ms)		
AFTER (after-flow):		0000 to 9990 (ms) 10 ms increments		

Current setting range	Initial current WELD1 WELD2	P1: P2 to P6: P2 to P6:	000 to 330 A 000 to 330 A 000 to 330 A
Current accuracy	Setting accuracy: Repetition accuracy:		Within $\pm 5\%$ (F.S.) *4 (setting range: 30 to 300 A) Within 6% (F.S.) *4 (setting range: 30 to 300 A)
Current monitor	AVE. (average value) / PEAK (peak value) / R.M.S. (effective value)		
	U.L. (upper limit): L.L. (lower limit):		0 to 999 A 0 to 999 A
Current envelope	U.L. (upper limit by reference waveform): L.L. (lower limit by reference waveform):		0 to 300 A 0 to 300 A
Time monitor	U.L. (upper limit): L.L. (lower limit):		0 to 9999 ms 0 to 9999 ms
Pulse modulation function	WELD1 WELD2	UP.SLP/WELD/DN.SLP ON TIME: UP.SLP/WELD/DN.SLP OFF TIME: Base current: Modulation frequency setting:	000.0 to 999.0 (ms) 000.0 to 999.0 (ms) 000 to 300 A 0 to 5000 Hz (*) * The waveform (current value) exactly as set may not be obtained with the setting more than 1000 Hz.
Check screen	Measured welding waveform display:		WAVE RANGE (100% / 50%)
Weld count	Preset count: Total count: All count:		00000 to 99999 times (each welding schedule) 00000 to 99999 times (each welding schedule) 000000 to 999999 times (sum of all welding schedules)
Retry function	Re-start at LOST:		0 to 5 times
State indicator LED	UPPER: GOOD: LOWER: START: WELD: LOCK:		Excess monitor upper limit Welding OK Excess monitor lower limit Panel start key (enable/disable) Welding output (ON/OFF) Panel key operation (enable/disable)
Protect function	Emergency stop	EM. input open circuit	Main power shutdown, Welding current stop, Start inhibit
	Overcurrent protection	Primary current detection	Welding current stop (approx. 100 A peak) Fuse 30 A Circuit breaker 40 A
	Temperature protection	Internal temperature detection	Welding current stop, Start inhibit
	Torch contact	Contact detection between torch and workpiece	Welding current stop
	Start signal ON	Start signal ON detection during start-up	Start inhibit
	Self-diagnostic error	Performing a diagnostic on setting data	Start inhibit
	WELD NG	NG in monitor judgment	Start inhibit (ON/OFF settable)
	COUNT UP	Excess preset count	Start inhibit (ON/OFF settable)
	MEMORY	Flash memory error	Start inhibit

11. Specifications

Input/output signal	Input	START:	Welding start (settable from 1 to 100 ms for establishment time)
		RESET:	Error reset
		SCH1/2/4/8/16/32/64:	Schedule input (at MULTI or EDIT screen)
		PARITY:	Parity (ON/OFF settable)
		WELD STOP:	Welding interrupted
		PURGE:	Gas flow ON/OFF *5
		EM.:	Emergency stop
		The contact is rated at +24V DC/5 mA. However, only for EM., +24V DC/300 mA.	
	Output	GOOD:	Good welding (settable from 1 to 200 mA)
		NG:	Wrong welding (settable from 1 to 200 mA)
		END:	End (settable from 1 to 200 mA)
		ERROR:	Trouble
		EM-STOP:	Emergency stop
		SYNC-OUT:	Weld time synchronization (individual common)
		VALVE OUT:	Solenoid output for touch start (+24V DC)
		OUT1/2/3/4/5:	User-assigned output
Terminal shape		The contact is rated at +30V DC/50 mA or less. However, only for VALVE OUT, +24V DC/70 mA or less.	
		Input terminal:	L1, L2, L3, PE: M5
		Output terminal:	TORCH (-): 3/8-24UNF EARTH (+): $\phi 8$ (terminal 5 mm thick)
		GAS:	One-touch joint: $\phi 8$
		I/O:	D-Sub 37-pin (male), 2.6 mm screw

*1: The duty cycle of "JIS C9300-1 3.37" (load time for 10-minute cycle) is not applied.

*2: Only the touch start functions.

*3: $0 < T_2 + T_3 + T_4 \leq 2000$ ms for WELD1 and WELD2, respectively

*4: Subject to use the Amada Miyachi's specified torch and workpiece. F.S. is 300 A.

*5: Internal timer control and OR operation. Internal timer control function is ON/OFF settable.

(2) Accessories

Item	Model No.	Item No.	Q'ty
Operation manual CD-ROM	AS1158843(OM1169131+OM1169132)	1158843	1
MAWA D-Sub connector *1	AS1173665	1173665	1

*1: 37 pins, D-Sub connector with case. Short the emergency stop input (Pins 36 and 37).

(3) Options

For torches and electrodes, contact Amada Miyachi Co., Ltd.

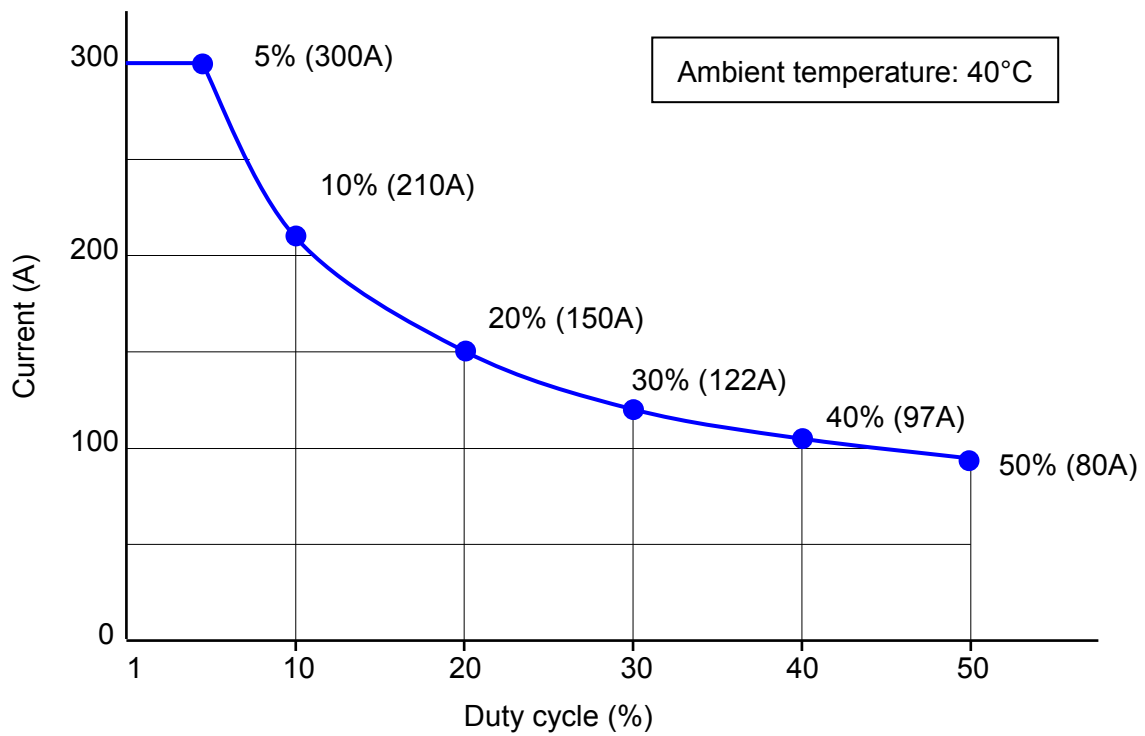
Item		Model No.	Item No.
Input cable *1	3 m	PK-1173375 3 m	1173375
	5 m	PK-1173376 5 m	1173376
	10 m	PK-1173377 10 m	1173377
Grounding cable	2 m	MB0909181-2	1159092
	3 m	MB0909181-3	1159093
	4 m	MB0909181-4	1159094
	5 m	MB0909181-5	1159095
Torch (with mesh) φ1.6	2 m	TA-23SSPC-2010-FL	1169585
	3 m	TA-23SSPC-3010-FL	1169586
	4 m	TA-23SSPC-4010-FL	1171186
Water-cooled torch (with mesh) φ2.4	2 m	TA-22SSPWC-2020-FL	1169608
		TA-200SSPWC-2020-FL	1171182
	3 m	TA-22SSPWC-3020-FL	1169609
		TA-200SSPWC-3020-FL	1171183
	4 m	TA-22SSPWC-4020-FL	1171185
		TA-200SSPWC-4020-FL	1171184
Lanthanum 1.5% Tungsten electrode	φ1.6	018321	1036043
	φ2.4	018323	1040440
Lanthanum 2% Tungsten electrode	φ1.6	φ1.6 mm (containing Lanthanum 2%)	1156518
	φ2.4	φ2.4 mm (containing Lanthanum 2%)	1156519
Cooling water circulator *2		WR-100	1173726

*1: Rated voltage U0/U: 450/750 V, 4 cores, 10 mm², cable diameter approx. 18 mm.

Crimp-style terminal on the welder side M5, Crimp-style terminal on the input side M6.

*2: Single-phase 200 V AC (50/60 Hz), power consumption: 200/240 W, heat discharge: 35 kcal/min, outline dimensions: 317 (W) x 533 (D) x 423 (H) mm, mass: 22 kg

(4) Duty Cycle Graph



Note) The duty cycle of “JIS C9300-1 3.37” (load time for 10-minute cycle) is not applied.

(5) Schedule Data Table

As needed, copy and use these pages.

① Normal screen

[illegible]

[illegible]

② EDIT

Item	P.
SCH#	
Initial value	00000

③ MONITOR SELECT

[illegible]

④ SCHEDULE MODE

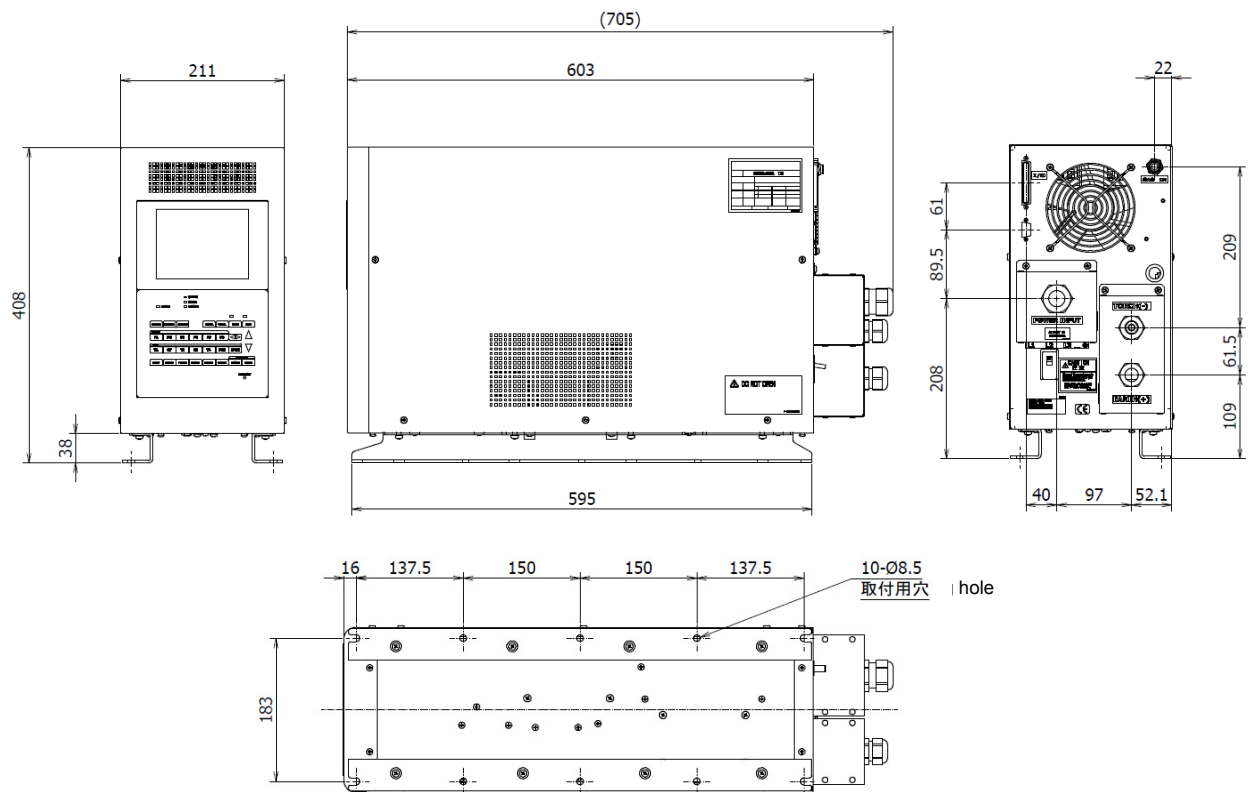
[illegible]

⑤ SWITCH SELECT

Item	Contents			Initial value
MEMORY CLEAR	KEEP	CLEAR		KEEP
WELD NG ERROR	ON	OFF		OFF
GOOD or NG SIGNAL	ms			20ms
END SIGNAL	ms			20ms
START DELAY TIME	ms			10ms
MEASURE CURRENT	AVE.	PEAK	R.M.S.	AVE.
START KEY	ON	OFF		ON
INTERNAL GAS FLOW	ON	OFF		ON
WAVE RANGE	100%	50%		100%
START PARITY ERROR	ON	OFF		OFF
DETECT TORCH SHORT	ON	OFF		ON
WORK TRIGGER	ON	OFF		ON
CONTINUE CURRENT	ON	OFF		ON

12. Outline Drawing

(Dimensions in mm)



13. Troubleshooting

(1) Error Message

Error Code	Description	Cause	Watching Session	Action to Take
E01	EMERGENCY STOP	The emergency stop is input.	During normal function	Confirm the emergency stop input.
E02	TORCH SHORT ERROR	The electrode and work are directly contacted. * Functions when the setting of DETECT TORCH SHORT is ON.	During pre-weld process	Keep electrode from workpiece to avoid contact.
E03	OVER HEAT ERROR	The inside of power supply is overheated due to excess duty cycle. * The key operation cannot be accepted until the internal thermostat is recovered.	During normal function	Decrease the duty cycle.
E04	OVER CURRENT ERROR	Overcurrent is flowing on the primary side.	During normal function	If there is no improvement, a part may be broken. Contact us for advice.
E05	WELD NG ERROR	When WELD NG ERROR is set to ON, the value exceeds each monitor upper/lower limit.	Right after welding	Confirm the status of weldment, equipment and each schedule setting.
E06	COUNT UP ERROR	The start signal is input with the count reached to the preset count.	During pre-weld process	Reset the count to zero or re-set the preset count.
E07	START SIGNAL ON	The power is turned on with the start signal input.	At power turn on	Confirm the start signal connection.
E08	FLASH MEMORY ERROR	There is an error in flash memory data of the internal circuit.	During normal function	If there is no improvement, a part may be broken. Contact us for advice.
E10	START PARITY ERROR	When the total number of the closed lines of schedule selection signal and PARITY signal is not odd, the start signal is input.	During pre-weld process	Set START PARITY ERROR to OFF or set the odd number of the closed lines.
E13	LOST ERROR	Failed to arc discharge.	At welding start	Do maintenance on electrode or workpiece. See 4.(3) Improvement of LOST.
E14	SET ERROR	The setting is out of the specified setting range of the welding condition.	At welding start	Re-set the value within the specified range.
E15	CURRENT LIMIT ER ERROR	The measured welding current is out of the set allowable range.	At welding start	Do maintenance on electrode or workpiece.
E16	CURRENT TIME LIMIT ERROR	The weld time of the measured welding current is out of the set allowable range.	At welding start	Do maintenance on electrode or workpiece.

(2) Alarming an Abnormal Welding Current and Weld Time

① Alarming an Abnormal Welding Current

30 ms

180 A

The color of the LCD is changed to red if the welding current exceeds the set upper limit or blue if it falls below the set lower limit, outputting a weld NG signal from the I/O connector.

② Alarming an Abnormal Weld Time

30 ms

180 A

The color of the LCD is changed to red if the weld time exceeds the set upper limit or blue if it falls below the set lower limit, outputting a weld NG signal from the I/O connector.

Note) In the current display of AVE. (average value) and R.M.S. (effective value) when the PULSE mode is set to ON, the current is displayed lower than the set peak current depending on the percentage set by duty (time) and base current.
(Maximum current is displayed when duty = 100% and base = peak current.)



AMADA MIYACHI CO., LTD.

EC Declaration of Conformity

The company/manufacturer: **AMADA MIYACHI CO., LTD.**
95-3, Futatsuka, Noda-City, 278-0016 JAPAN

Herewith declares in his own sole responsibility conformity of the product

Designation: **PULSETIG Welding Power Supply**
Types/Serial Number, etc.: **MAWA-300A**

With applicable regulations below

EC Directive: **Low Voltage Directiv 2006/95/EC**
EMC Directive **2004/108/EC**

Harmonized European/International Standards applied:

ISO 12100:2010, IEC 60204-1:2009, EN-55011:2007+A2:2007
EN 61000-4-2:2009, EN 61000-4-3:2006+A1:2008+A2:2010
EN 61000-4-5:2006, EN 61000-4-6:2009, EN 61000-4-11:2004
EN 61000-4-4:2004+A1:2010, IEC 61000-3-11:2000

Importer Distributor in EU:
(please place distributor/importer stamp here)

MIYACHI EUROPE CORPORATION
Lindberghstrasse 1, D-82178 Puchheim, GERMANY
Tel: + 49 8983 9403 - 0

Division:

AMADA MIYACHI CO., LTD.

Noda-City/Japan 2014-04-11
Place and Date

Mitsuaki Aoyama
Mitsuaki Aoyama / Quality guarantee general manager
Name/Signature/Position

Note: This Declaration certifies conformity with the above mentioned Directive(s), but gives no assurances of properties within the meaning of the Law concerning product liability and GPSG. It becomes invalid if any technical or other modification are carried out without manufacturers consent.