INVERTER WELDING POWER SUPPLY

IP-100D/200D

OPERATION MANUAL

AMADA®

Y02M0821E-04

Thank you for purchasing our Inverter Welding Power Supply **IP-100D/200D**.

- This operation manual explains its method of operation and precautions for use.
- Before using, read this operation manual carefully; after reading, save it in a proper place where you can easily access.

Contents

1. Special Precautions

(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.

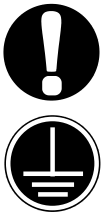
⚠ WARNING

Denotes operations and practices that may result in serious injury or loss of life if not correctly followed.

⚠ CAUTION

Denotes operations and practices that may result in personal injury or damage to the equipment if not correctly followed.

These symbols denote "prohibition". They are warnings about actions out of the scope of the warranty of the product.



These symbols denote actions which operators must take.

Each symbol with a triangle denotes that the content gives notice of DANGER, WARNING or CAUTION to the operator.

⚠ DANGER

Do not touch the interior of the Power Supply unnecessarily

Since very high voltages are applied to the interior of this Power Supply, it is very dangerous to touch it unnecessarily. You may touch it only when you replace the battery. When inspecting the interior of the Power Supply, be sure to turn off the Main Breaker of the Power Supply. (For details, see **6. Replacing Battery**.)

Never disassemble, repair or modify the Power Supply

These actions can cause electric shock and fire. Do not do anything other than the maintenance described in the operation manual.

Never burn, destroy, cut, crush or chemically decompose the Power Supply

This product incorporates parts containing gallium arsenide (GaAs).

⚠ WARNING

Do not put your hands between the electrodes

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

Do not touch any welded part or electrodes during welding and just after welding finished

The welded part of a workpiece, electrodes and arm are very hot.
Do not touch them; otherwise you may be burnt.

Ground this Power Supply

If the Power Supply is not grounded, you may get an electric shock when fault occurs, or electricity leaks.

Apply 3-Phase, 180–240 V AC power supply

Application of a voltage out of the specified range can cause fire and electric shock.

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 tense any cable. The power cable and connecting cables may be broken, and that can cause electric shock and fire. If any part needs to be repaired or replaced, consult us 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 us 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 shop 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 surface flash and expulsion directly during welding, your eyes may be damaged.

⚠ CAUTION

Do not splash water on the Power Supply

Water splashed over the electric parts can cause electric shock and short circuits.

Use proper tools (wire strippers, pressure wire connectors, etc) for termination of the connecting cables

Do not cut the conductor of wire. A flaw on it can cause fire and electric shock.

Install the Power Supply on firm and level surface

If the Power Supply falls or drops, injury may result.

Do not place a water container on the Power Supply

If water spills, insulation will deteriorate, and this may cause electric leak and fire.

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

If such a cover is used, it may be overheated and burn.

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) Precautions for Handling

- When transporting or moving the Power Supply, do not lay it down. Also, handle the Power Supply with care so as not to make an impact such as drop on it.

- Install this Welding Power Supply on a firm, level, horizontal surface. If it is inclined, malfunction may result.

- Do not install this Welding Power Supply in the following:
  - Damp places where humidity is higher than 90%,
  - Hot or cold places where temperatures are above 45°C or below 0°C,
  - Places near a high noise source,
  - Places where chemicals are handled,
  - Places where water will be condensed,
  - Dusty places, and
  - Places at an altitude above 1000 meters.

- Clean the exterior of the Welding Power Supply with a soft, dry cloth or one wet with a little water. If it is very dirty, use diluted neutral detergent or alcohol. Do not use paint thinner, benzine, etc., since they can discolor or deform the Welding Power Supply.

- Do not put a screw, a coin, etc., in the Welding Power Supply, since they can cause a malfunction.

- Operate the Welding Power Supply according to the method described in this operation manual.

- Operate the switches and buttons carefully by hand. If they are operated roughly or with the tip of a screwdriver, a pen, etc., this will cause malfunction or damage.

- The Power Supply is not equipped with auxiliary power such as an outlet for lighting.

- The cable to supply power, the welding head, and the secondary cable for connecting the welding head with the Power Supply are separately needed to use the Power Supply.

- The I/O signal line to start the Power Supply is not attached. Prepare the crimp-on terminal and line for wiring to the terminal block.

(3) On Disposal

This product incorporates parts containing gallium arsenide (GaAs). At the time of disposal, separate it from general industrial waste or domestic waste and carry out the disposal in accordance with applicable laws and regulations.

2. Features

The **IP-100D/200D** is an inverter type of compact Precise Resistance Welding Power Supply which realizes excellent weldability and operation, and is provided with Constant Current Control Function accommodating to various kinds of workpieces.

- **Sixty-three (63) types of welding schedules can be registered**

  Once a welding schedule is registered, it can be invoked by one key operation only. When the welding schedules which will be used frequently are registered, you do not need to enter the schedules each time when you operate.

- **Welding schedules can easily be set with four (4) keys**

  No troublesome operation is requested at all. Setting of the welding schedule is done by means of four keys ◁ ▷ + — only.

- **Monitor facility is helpful for stable quality control**

  IP-100D/200D monitors welding current.
  When actual welding current is beyond the monitoring range setting, then error signal will be output to inform the user of occurrence of abnormal welding promptly.

- **Automatic switching of screen display**

  Normally, monitor panel displays the settings of welding schedules. However, the display will automatically be switched to the monitoring values of the current when welding current flows.

- **Good-looking and easy-to-see screen display**

  Because high-intensity LCD (Liquid Crystal Display) is employed, the display can be seen clearly even in the gloom.

- **Sheet panel is sufficiently resistive to dust and oil mist**

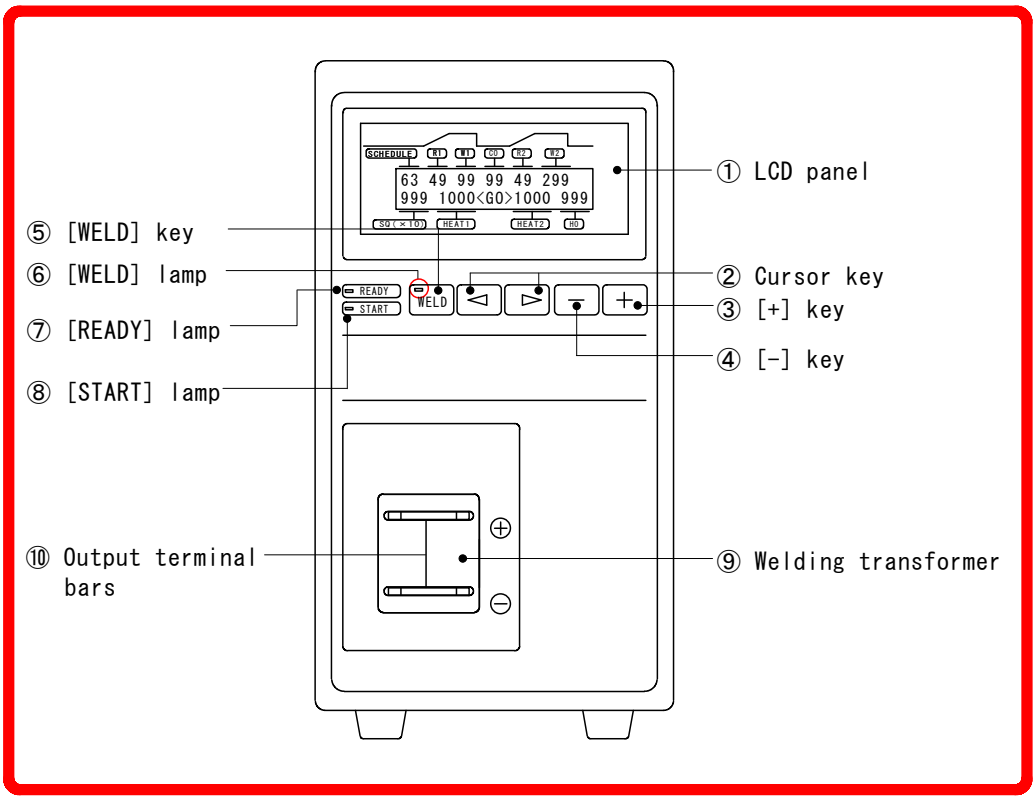
  Stain can be removed very easily and therefore clean external view can be maintained for a long time.

- **Built-in welding transformer**

  Permits the small-sized Welding Power Supply.

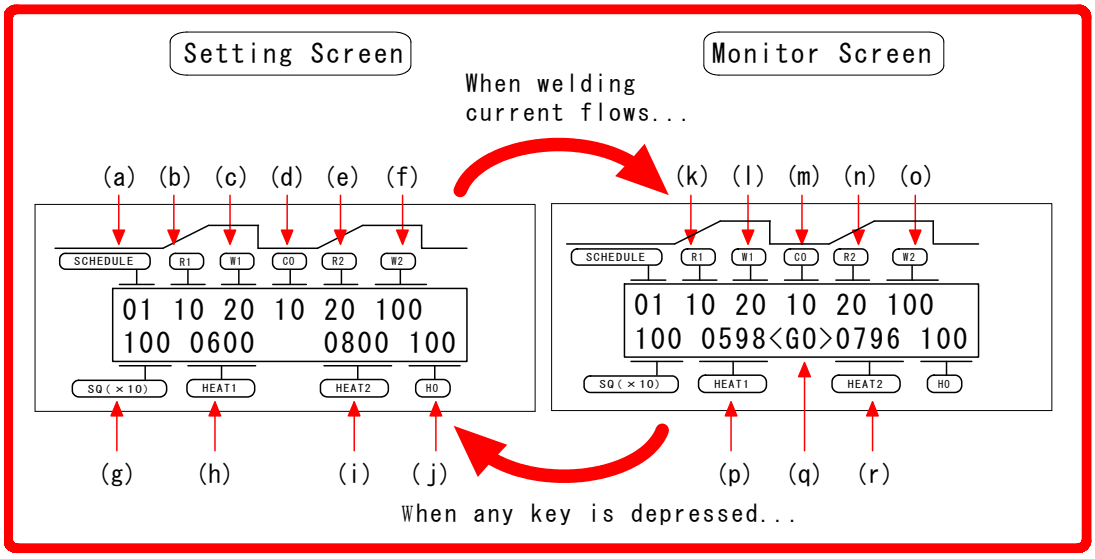
3. Name and Functions of Each Section

(1) Front Panel



① LCD Panel

This is the display panel to check the status of operation of **IP-100D/200D**.
This display appears when [POWER] main circuit breaker is turned on.
LCD Display Panel displays Setting Screen that is used to set each item of the welding conditions and Monitor Screen that is used to indicate measured values of the welding current actually flowed. When any one of key is pressed in the Monitor Screen, the screen will be switched to the Setting Screen.



(a) SCHEDULE

Sets and indicates the Welding Schedule Numbers. The number of settings of the welding schedule to be registered is sixty-three (63), ranging from Nos. 01 to 63.

(b) R1

Sets and indicates the Upslope time (00 to 49 ms) given in the first stage of welding.

The Upslope time is:
The time from the start of current to the time when the current reaches the current setting. If set current flows from the start of welding, it may be resulted in explosion. Welding current is increased gradually in order to prevent generation of explosion, and this process is called Upslope.

(c) W1

Sets and displays the weld time (00 to 99 ms) in the first stage of welding. R1 time is included in this weld time.

(d) CO (Cooling time)

Sets and displays the period of time (00 to 99 ms) to cool down the workpiece after shutting down welding current upon completion of the first stage welding.

(e) R2

Sets and indicates the Upslope time (00 to 49 ms) given in the second stage of welding.

(f) W2

Sets and displays the weld time (000 to 299 ms) in the second stage of welding. R2 time is included in this weld time.

(g) SQ (Squeeze Time)

Sets and indicates Squeeze Time (000 to 999 x 10 ms).
This function is ready when the Software switch (SW5) is set to “1”.

(h) HEAT1

Sets and displays the current in the first stage of welding.
IP-100D: 0100 to 1300 A
IP-200D: 0400 to 2500 A

(i) HEAT2

Sets and displays the current in the second stage of welding.
IP-100D: 0100 to 1300 A
IP-200D: 0400 to 2500 A

(j) HO (Hold time)

Sets and displays the length of time (000 to 999 ms) to hold workpiece after turning off welding current upon completion of the second stage welding.
This function is ready when the Software switch (SW5) is set to “1”.

(k) R1

On monitor screen, displays the first stage upslope time during which the welding current actually flowed within R1 time. (If WELD STOP has been input, the actual weld time is displayed.)

(l) W1

On monitor screen, displays the weld time during which the welding current actually flowed within W1 time. (If WELD STOP has been input, the actual weld time is displayed.)

(m) CO

On monitor screen, displays the time during which the welding current actually flowed within CO time. (If WELD STOP has been input, the actual cool time is displayed.)

(n) R2

On monitor screen, displays the second stage upslope time during which the welding current actually flowed within R2 time. (If WELD STOP has been input, the actual weld time is displayed.)

(o) W2

On monitor screen, displays the weld time during which the welding current actually flowed within W2 time. (If WELD STOP has been input, the actual weld time is displayed.)

(p) HEAT1

On monitor screen, displays the measured welding current in the first stage of welding.

(q) <GO> / <NG> / <>**: Monitor current is average value or
[GO] / [NG] / [**]: Monitor current is peak value (*)
(displayed on the Monitor Screen only)

The Setting Screen is automatically switched to Monitor Screen when welding is complete. <GO> or [GO] will be displayed if the of actual current is within the monitoring range set in HEAT1 and HEAT2. On the other hand, <NG> or [NG] will be displayed if the magnitude of actual current is outside the monitoring range. (See **5. Basic Operation** (1) ⑪ for the monitoring range.)
If Monitor Upper/Lower Limit is set to one of the followings, < * * > or [**] will be displayed:

- When setting +0% or –0%. (No monitor upper/lower limit)
- Both the first and second stage welds are set to 0 ms. (No weld time)

* For selecting average and peak values, see **5. Basic Operation** (1) ⑫.

(r) HEAT2

On monitor screen, displays the measured welding current in the second stage of welding.

② ◁ ▷ **[Cursor] Keys**

Move the cursor (_) on the Setting Screen. The figures selected by the cursor can be changed. Furthermore, when this key is pressed during abnormal conditions, trouble signal output that indicates abnormal condition is turned off.

③ ＋ **[+] Key**

Changes the number selected by the cursor. Every time the key is depressed, the number increases. Furthermore, when this key is pressed during abnormal conditions, trouble signal output that indicates abnormal conditions is turned off.

④ － **[-] Key**

Changes the number selected by the cursor. Every time the key is depressed, the number decreases. Furthermore, when this key is pressed during abnormal conditions, trouble signal output that indicates abnormal conditions is turned off.

⑤ WELD **[WELD] Key**

When this key is depressed, the [WELD] lamp located upper left will illuminate to allow **IP-100D/200D** to flow welding current (However, when [WELD] (WELD ON/OFF) of [I/O] connector is in off position, current will not flow). When the key is pressed for 0.5 or more seconds while [WELD] lamp illuminates, the lamp will be turned off and **IP-100D/200D** cannot flow welding current. Furthermore, when this key is pressed during abnormal conditions, trouble signal output that indicates abnormal conditions is turned off.

⑥ **[WELD] Lamp**

Lights up when [WELD] key is depressed.
One of the requirements to turn on [READY] lamp.

⑦ **[READY] Lamp**

Lights up when the welding current is ready to flow.
If you want to confirm the operation of the connected equipment without allowing welding current to go through, be sure to confirm that this lamp extinguishes.
In order for the lamp to illuminate, all of the following conditions must be satisfied:

- [WELD] lamp illuminates.
- Pins 13 and 14 (WELD ON/OFF) of [I/O] connector, which are located on the rear panel, are on.
- No abnormal condition occurs.

⑧ **[START] Lamp**

Lights up when START signal is input.

⑨ **Welding Transformer**

Inverter transformer is built in.

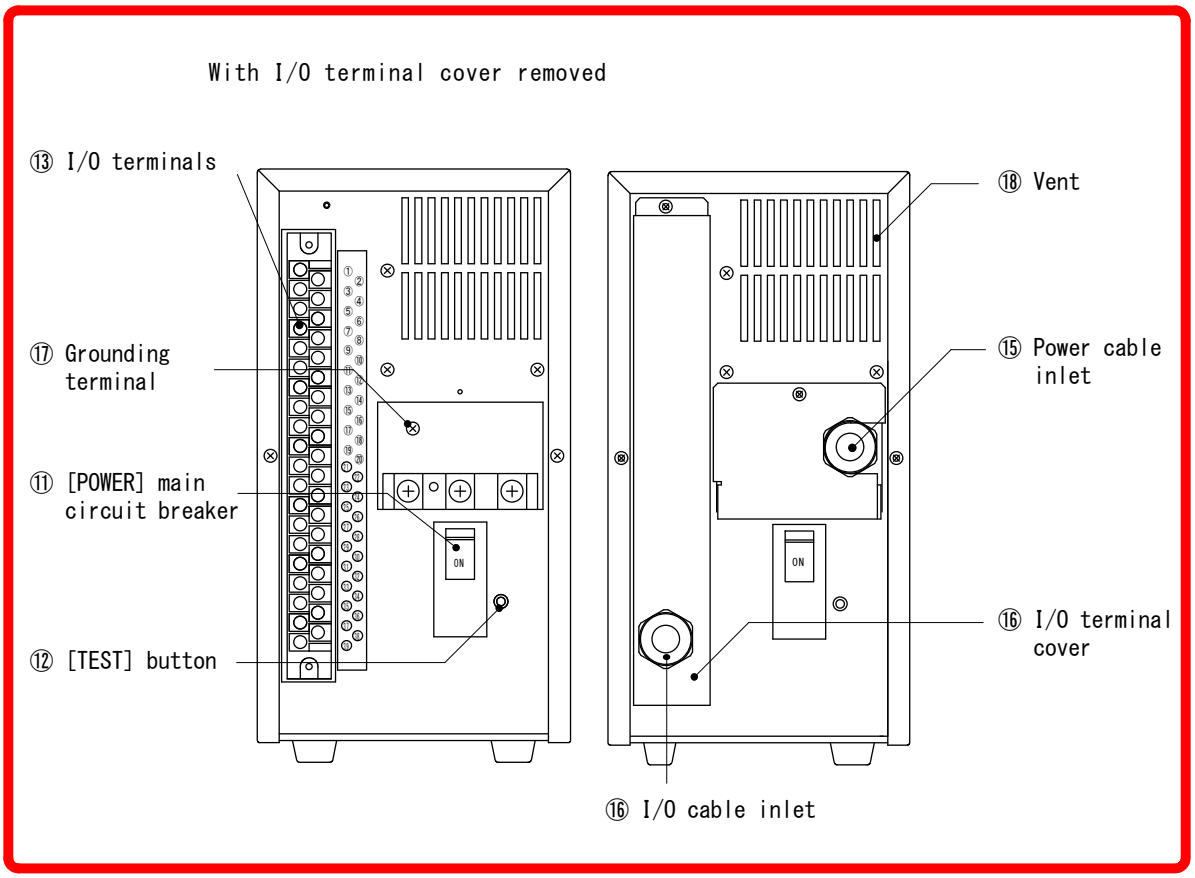
IP-100D: Maximum output current 1300 A
Rated capacity 1.4 kVA (open-circuit voltage 5.5 V)

IP-200D: Maximum output current 2500 A
Rated capacity 5.3 kVA (open-circuit voltage 8.1 V)

⑩ Output Terminal Bars

Output terminals of the welding transformer. The upper one is positive and lower one negative. The diameter of each hole is 8.5 mm. These terminals are connected to the welding head by the secondary cable.

(2) Rear Panel



⑪ [POWER] Main Circuit Breaker

Turns on and off **IP-100D/200D**. When the handle is pulled up to ON position, power supply is applied to its main body; pushed down to OFF position, power supply is disconnected.

⑫ [TEST] Button

Checks for inspection whether the [POWER] main circuit breaker functions normally. Check that when the button is pressed with a rod, the handle turns down to the half way between ON and OFF positions to turn off **IP-100D/200D**. After operation of [TEST] button, push down the handle to OFF position first, then, pull up to ON position.

CAUTION
Do not use the [TEST] button to turn off **IP-100D/200D** after completion of work.

⑬ I/O Terminals

Used to connect **IP-100D/200D** and external equipment. Connect signal wires as necessary.

⑭ I/O Cable Inlet

Pass the signal cable through this inlet and connect the cable to the I/O cable terminals.

⑮ Power Cable Inlet

Pass the Power Cable through this inlet and connect the cable to Power Cable Terminals.

Recommended Cable Spec.		
Power Cable	Rated voltage	300 V min.
	Number of cores	4
	Cross section	2 mm^2 min.

⑯ I/O Terminal Cover

Covers I/O terminals. Remove when connecting I/Os.

⑰ Grounding Terminal

For grounding. This is mounted behind the cover. Connect the grounding wire when connecting the power cable to the [POWER] main circuit breaker.

⑱ Vent

Cooling air for the interior of **IP-100D/200D** is sucked in through this vent.

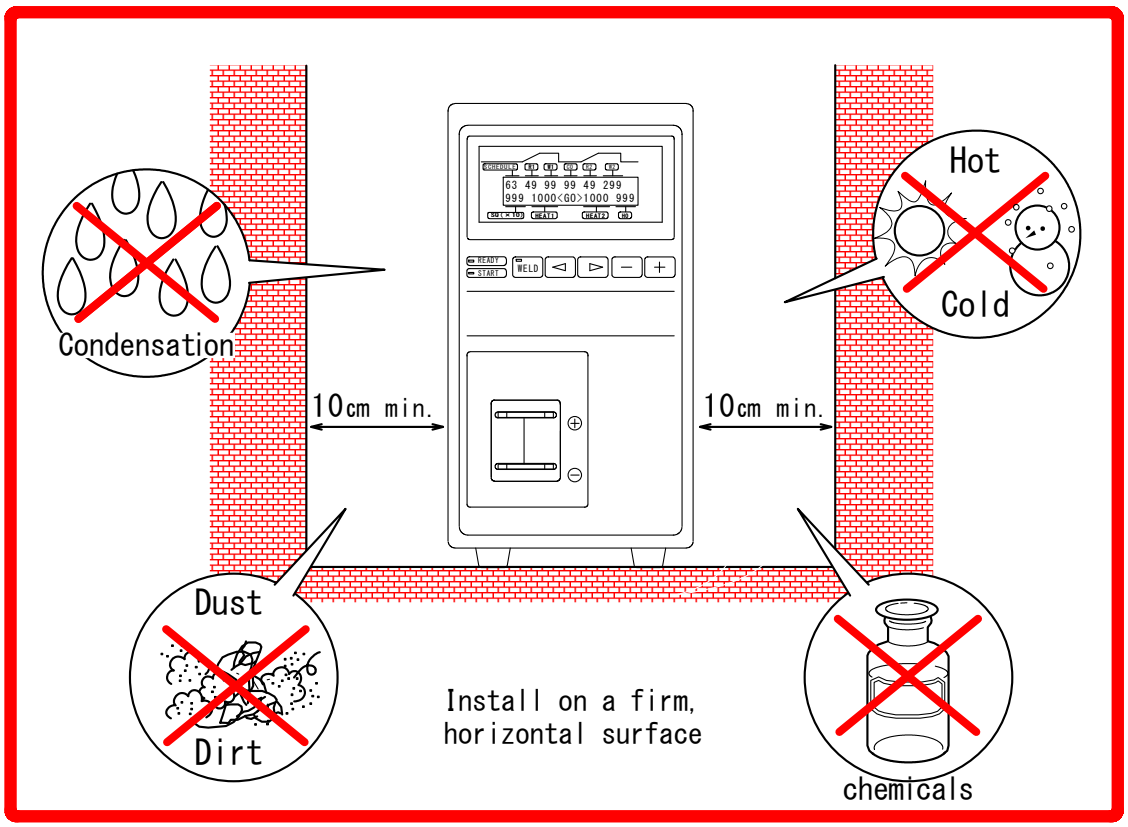
4. Installation and Connection

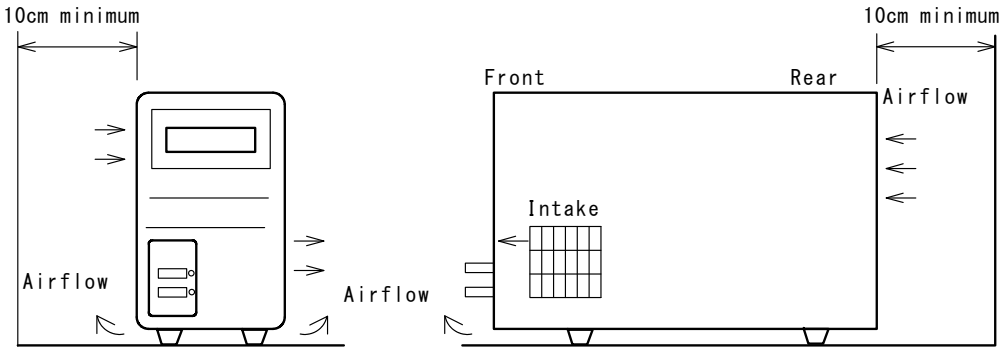
(1) Installation

Install the Power Supply in the following places. (See **1. Special Precautions** for details.)

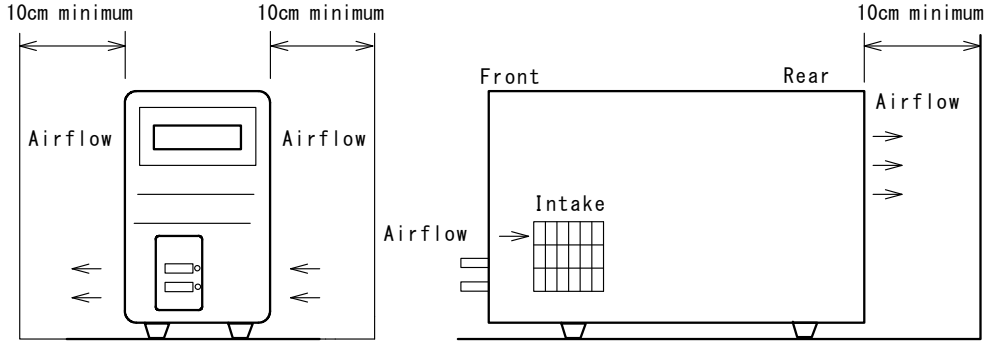
- Places containing less steam, humidity and dust.
- Well-ventilated places.
- Places where no chemicals are handled.
- Firm and horizontal surface.
- Places where it is not extremely hot or cold.
- Places where there is no splashed water.

Slits are provided on right, rear sides and bottom of **IP-100D/200D** for higher heat radiation efficiency. Install this Power Supply with a clearance of at least 10 cm from the side wall to extract the full performance.





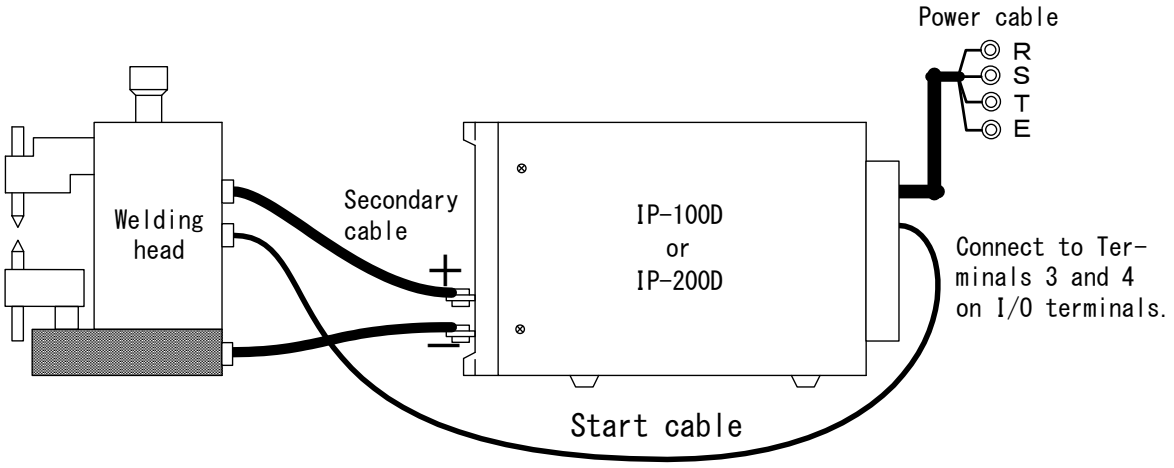
IP-100D installation clearance



IP-200D installation clearance

(2) Connection

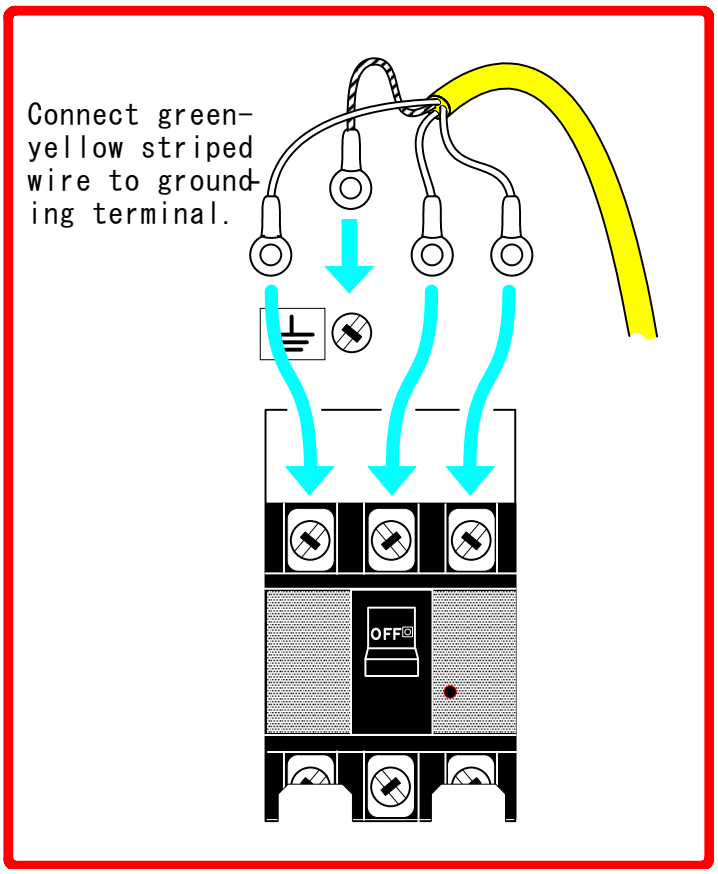
Connect **IP-100D/200D** to the welding head as shown below:



If the secondary cable is too long and thin, a sufficient welding current may not flow.

When finishing connection to the welding head, connect the power cable to **IP-100D/200D** (see drawing below).

① Remove the cover for the [POWER] main circuit breaker on the rear panel.
② Connect the power cable to the [POWER] main circuit breaker.
③ Connect the grounding wire to the grounding terminal.
④ Pass the power cable through the power cable inlet, and re-mount the cover.



⑤ Connect the other side of the power cable to the breaker on your switchboard.
Recommended breaker is as follows:

IP-100D: 5A
IP-200D: 15A

5. Basic Operation

CAUTION
Before operation, check that the display screen and lamps are turned on normally and the fan motor is operated.

(1) Welding Schedule Setting

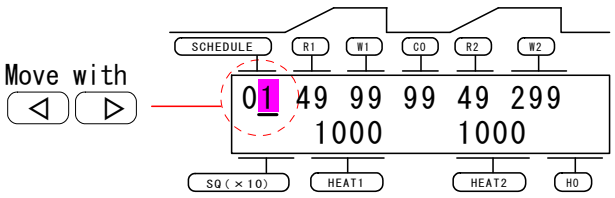
ATTENTION
Programming is inhibited if Terminals 15 and 18 of I/O terminals are shorted, and welding schedule cannot be set. Open the circuit between Terminals 15 and 18 to set the welding schedules.

① Setting Welding Schedule Number

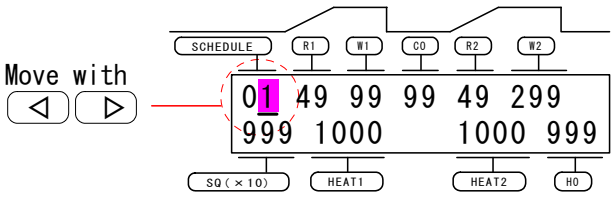
Press [Cursor] to move the cursor (__) to SCHEDULE. Select Welding Schedule No. (one of 1 to 63) with [+] and [-] keys.

【Schedule Setting Screen】

i) When SQ and HOLD functions are not selected
(When Software switch “SW5” is set to 0)



ii) When SQ and HOLD functions are selected
(When Software switch “SW5” is set to 1)



② Setting SQ Time

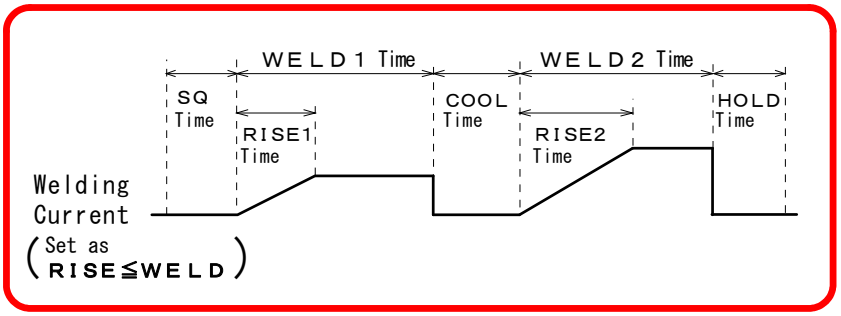
Press [Cursor] to move the cursor to SQ (x10). Set Squeeze Time with [+] and [-] keys. Ten times the displayed figure is set to Squeeze Time.
This function is ready when the Software switch (SW5) is set to “1”.

③ Setting RISE 1 Time

Press [Cursor] to move the cursor to R1. Press [+] and [-] to set RISE 1 Time.

④ Setting WELD 1 Time

Press [Cursor] to move the cursor to W1. Press [+] and [-] to set the first stage Weld Time.



ATTENTION

WELD Time includes RISE Time. Set these times as follows:

RISE 1 ≦ WELD 1 and RISE 2 ≦ WELD 2

Any other settings are prohibited because no proper welding can be expected.

⑤ Setting COOL Time

Press [Cursor] to move the cursor to CO. Press [+] and [-] to set COOL.

⑥ Setting RISE 2 Time

Press [Cursor] to move the cursor to R2. Press [+] and [-] to set RISE 2.

⑦ Setting WELD 2 Time

Press [Cursor] to move the cursor to W2. Press [+] and [-] to set the second stage Weld Time.

⑧ Setting HOLD Time

Press [Cursor] to move the cursor to HO. Press [+] and [-] to set the Hold Time. This function is ready when the Software switch (SW5) is set to “1”.

⑨ Setting HEAT 1 Current

Press [Cursor] to move the cursor to HEAT1. Press [+] and [-] to set the first stage Welding Current.

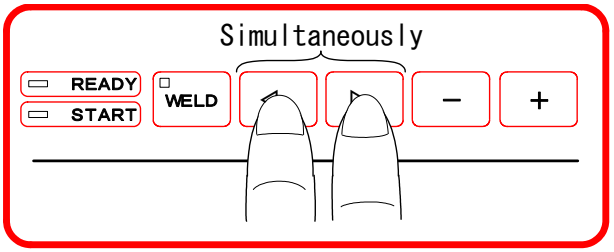
⑩ Setting HEAT 2 Current

Press [Cursor] to move the cursor to HEAT2. Press [+] and [-] to set the second stage Welding Current.

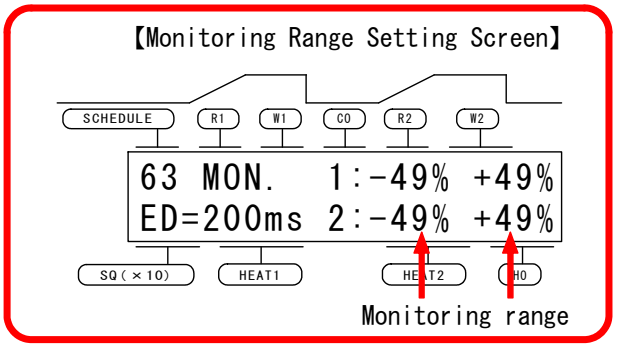
⑪ Setting the Monitoring Range and the End Signal Output Time of Monitor Function

IP-100D/200D monitors the difference between the current values set in ⑨ and ⑩, and the actual current. Error signal is output if the difference exceeds the monitoring range (tolerance). Although the monitoring range is factory set to ±0% at the time of shipment from the factory, it can be changed by the unit of 1% in the range of +01 – +49% and -01 – -49% by following the procedures described below.

i) Press both cursor keys [◁] [▷] simultaneously for at least 0.5 seconds.



ii) When the screen appears on the LCD Panel as shown, move the cursor with [Cursor] to the figures below MON.



iii) Change the monitoring range with [+] and [-] keys.

SCHEDULE	Selects Schedule No.
1:-**%	Sets the upper limit of the first stage monitor current for each Schedule No.
1:+**%	Sets the lower limit of the first stage monitor current for each Schedule No.
2:-**%	Sets the upper limit of the second stage monitor current for each Schedule No.
2:+**%	Sets the lower limit of the second stage monitor current for each Schedule No.

NB: If all settings are set to 00%, upper/lower judgment is not made.

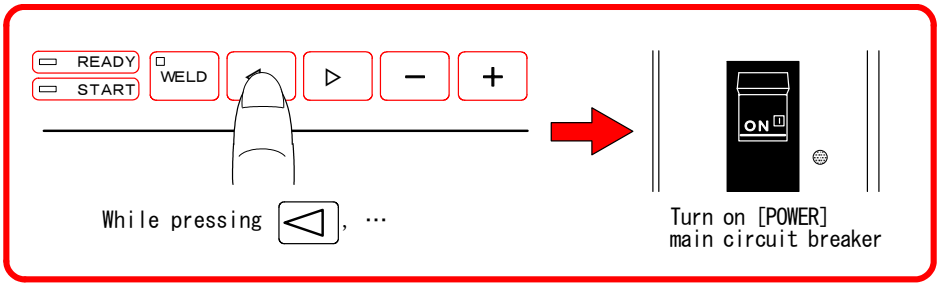
iv) End signal output time (ED)
Sets the output time of the [END] signal. (Common to all schedules.)
The setting range is 010 to 200 ms. It can be set by the unit of 10 ms.
The initial setting is 200 ms.
If 0ms is set, “ED=+STms” is displayed. The [END] signal is kept outputting while the [START] signal is input.

v) Press both cursor keys [◁] [▷] simultaneously for at least 0.5 seconds again to return to Schedule setting screen.

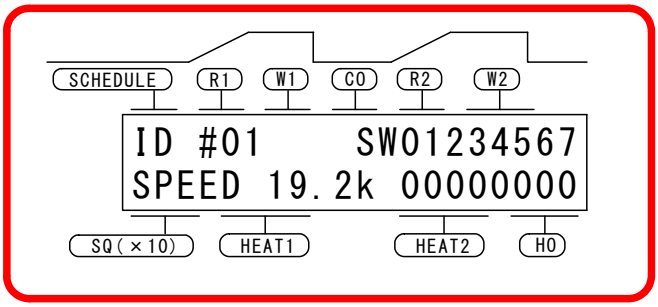
⑫ Setting Serial Communication Condition and Software Switch

By changing the setting of Serial Communication Condition and Software Switch, function of **IP-100D/200D** can be altered. Change the function according to the following procedures.

i) While pressing [Cursor] key ◁, turn on [POWER] main circuit breaker.



ii) When the screen appears on the LCD panel as shown, move the cursor with [Cursor]. When this screen appears, Start is not accepted. Also, even when any key is pressed, the screen will not change.

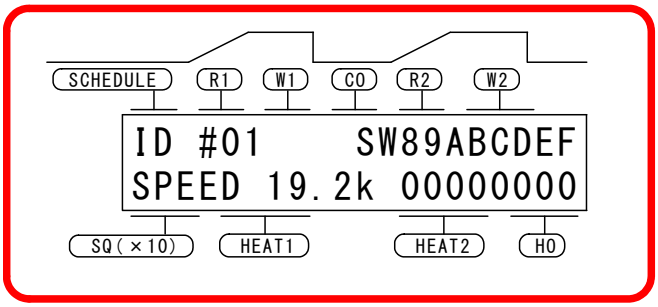


iii) Press [+] or [-] key to set numerical value.

	Setting	Function
ID #	01–31	Sets Device # of RS-485 communication. (See **11. External Communication Specifications**.)
SPEED	9.6 kbps 19.2 kbps 38.4 kbps	Sets baud rate. Select one of three baud rates.
SW0		Sets start-input stabilize time. (See **8. Timing Chart**.)
	0	Weld sequence starts 20 ms after Start Signal input.
	1	Weld sequence starts 5 ms after Start Signal input.
	2	Weld sequence starts 1 ms after Start Signal input.
SW1		Selects parity check. (See **7. Interface** (4).)
	0	No parity check.
	1	Odd parity check.

	Setting	Function
SW2		Selects external communication function. (See **11. External Communication Specifications**.)
	0	No external communication.
	1	Single-directional mode RS-485 outputs data after [END] signal has been output. (Monitor data or trouble data) The next Start signal is not accepted during external communication. Schedule data cannot be set in this mode.
	2	Bidirectional mode Schedule can be set/reading and monitor data and trouble item can be read by host computer.
SW3		Selects Restart method when monitor trouble has occurred.
	0	Next Start signal overrides monitor trouble and weld sequence starts.
	1	When monitor trouble occurs, Start signal is not accepted unless you reset [NG] output by one of the following: • To input [RESET] signal. • To press Panel Key on the front.
SW4		Selects monitor current. (See **5. Basic Operation** (3).)
	0	Average current during weld time is displayed as monitored current.
	1	Peak current is displayed as monitored current.
SW5		Selects ON/OFF of SQ and HOLD functions.
	0	SQ and HOLD functions are not selected. Their values are not displayed on LCD panel.
	1	SQ and HOLD functions are selected. Their values are displayed on LCD panel.
SW6		Selects the contact of the error signal.
	0	b contact
	1	a contact
SW7		Can move the cursor and change numerical figure. No effect on function.

iv) Press [Cursor] key [▷] with the cursor positioned on SW7 or [Cursor] key [◁] with the cursor positioned on the left portion of ID# to display the screen on the LCD panel as shown. Set Software Switches SW8 to SWF.
To return to the settings for SW0 to SW7, press [Cursor] key [◁] with the cursor positioned on SW8 or [Cursor] key [▷] with the cursor positioned on SWF.



v) Press [+] or [-] key to set numerical value.

	Setting	Function
SW8		Selects start-input specification. (See **8. Timing Chart**.)
	0	Performs the sequence to the last as you set even if the Start input is turned off in the middle of sequence.
	1	Ends the sequence when the Start input is turned off in the middle of sequence.
SW9–F		Can move the cursor and change numerical figure. No effect on function.

vi) Turn off the [POWER] main circuit breaker once and turn on again. The LCD panel returns to Schedule setting screen. Now, Serial Communication Condition and Software Switch settings are completed.

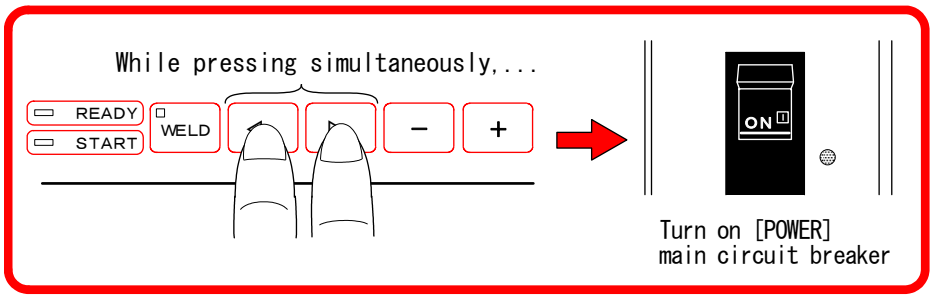
ATTENTION
The setting of Software Switch will remain unless you change it. When you re-set, turn off the [POWER] main circuit breaker once and repeat the procedures from **i)**.

⑬ If another Welding Conditions become necessary

Repeat the operations described in ①–⑫ again to set necessary welding schedules. Up to sixty-three (63) welding schedules can be registered. For your convenience, Schedule Table is provided in **13. Schedule Data Table**.

⑭ Initializing the Schedule Setting / Copying the Schedule

i) While pressing both [Cursor] keys ◁ ▷ simultaneously, turn on the [POWER] main circuit breaker.



ii) LCD panel will belike this:

Data Initialize screen ①

```
1 : DATA  CLEAR
            PUSH  [>] KEY
```

When the number on the cursor ( ) is switched to 2 or 3 with [+] and [-] keys, the screen will belike these:

Schedule Copy screen ①

```
2 : SCHEDULE  COPY
            PUSH  [>] KEY
```

End screen

```
3 : END
            PUSH  [>] KEY
```

([START] is not accepted while these three screens are displayed.)

Press the [Cursor] key ▷ on Data Initialize screen ① or Schedule Copy screen ① to go to the next screen (see **iii)** and **iv)**).

iii) Initializing data

Press the [Cursor] key [▷] on the Data Initialize screen ① to go to the Data Initialize screen ②.

Data Initialize screen ②

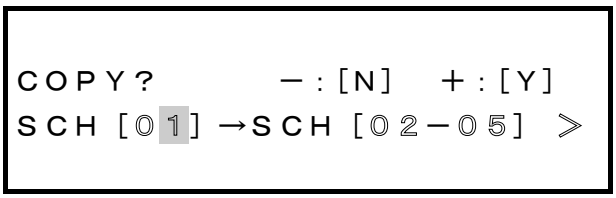
Press [-] key to return to the Data Initialize screen ①.
Also, press [+] key to initialize the welding schedule data and go to the Data Initialize screen ③.

Data Initialize screen ③

Press the [Cursor] key [▷] to return to the Data Initialize screen ①.

iv) Copying the schedule

Press the [Cursor] key [▷] on the Schedule Copy screen ① to go to the Schedule Copy screen ②.



Schedule Copy screen ②

Press the [Cursor] key to move the cursor ( ), input the value with [+] and [-] keys and select the schedule to copy and to be copied. (In the example above, the data of the Schedule 1 is copied to the Schedules 2 to 5.)

Move the cursor to ⩾ and press [-] key to return to the Schedule Copy screen ①. Also, Move the cursor to ⩾ and press [+] key to copy the schedule and go to the Schedule Copy screen ③.

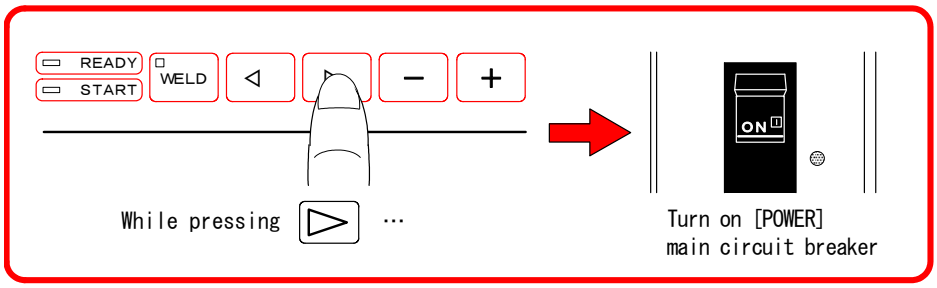
Schedule Copy screen ③

Press [-] key to return to the Schedule Copy screen ①. Also, press [+] key to return to the Schedule Copy screen ② and copy the other schedule.

v) Press the [Cursor] key [▷] on the end screen to finish initializing data or copying schedule. The screen changes to the Schedule Setting screen.

⑮ LCD contrast setting screen

i) While pressing [Cursor] key [▷], turn on the [POWER] main circuit breaker.



ii) LCD panel will belike this:

NB: [START] is not accepted while this screen is displayed.

Change the value on the cursor ( ) with [+] and [-] keys to adjust contrast of LCD. 16 levels of brightness are selectable.

01 (dark) – 16 (bright)

The higher the setting is, the larger the number of “<>” is.

When this screen appears, Start is not accepted. Also, even when any key is pressed, the screen will not change.

(2) Welding

Check that the [READY] lamp is on. (See **3. Name and Functions of Each Section** (1) ⑦ for the conditions to light it up.)

① When determining the welding schedule with LCD panel (Panel control)

Move the cursor to SCHEDULE to select desired Welding Schedule No. (01–63). Open SCH.1, SCH.2, SCH.4, SCH.8, SCH.16 and SCH.32 of [I/O] connector (Schedule signals), then input Start signal. Welding starts in accordance with the Welding Schedule NO. displayed on LCD panel.

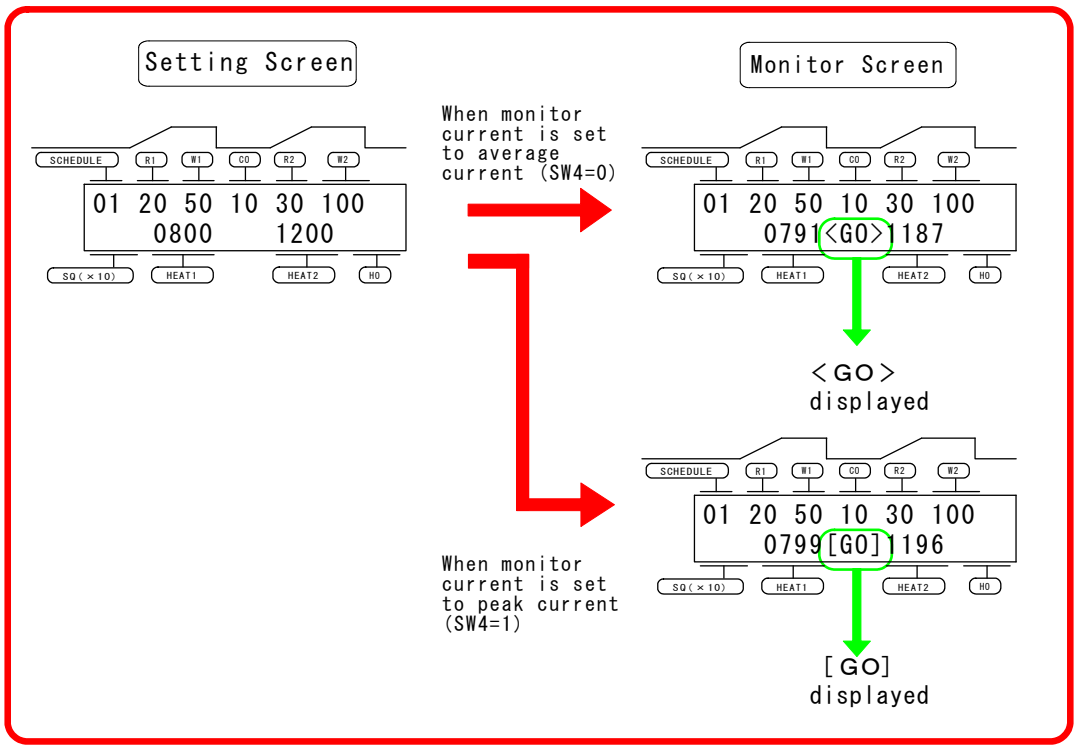
② When determining the welding schedule with external signal (External control)

Each Welding Schedule No. (01–63) can be selected externally by combining the Schedule signals. (See **7. Interface**.) After determining the Welding Schedule, input Start signal. If Welding Schedule NO. 0 is selected (If all of SCH.1, SCH.2 SCH.4, SCH.8, SCH.16 and SCH.32 are opened), welding is performed according to the Welding Schedule NO. indicated on the LCD panel.

(3) Monitored Current Display

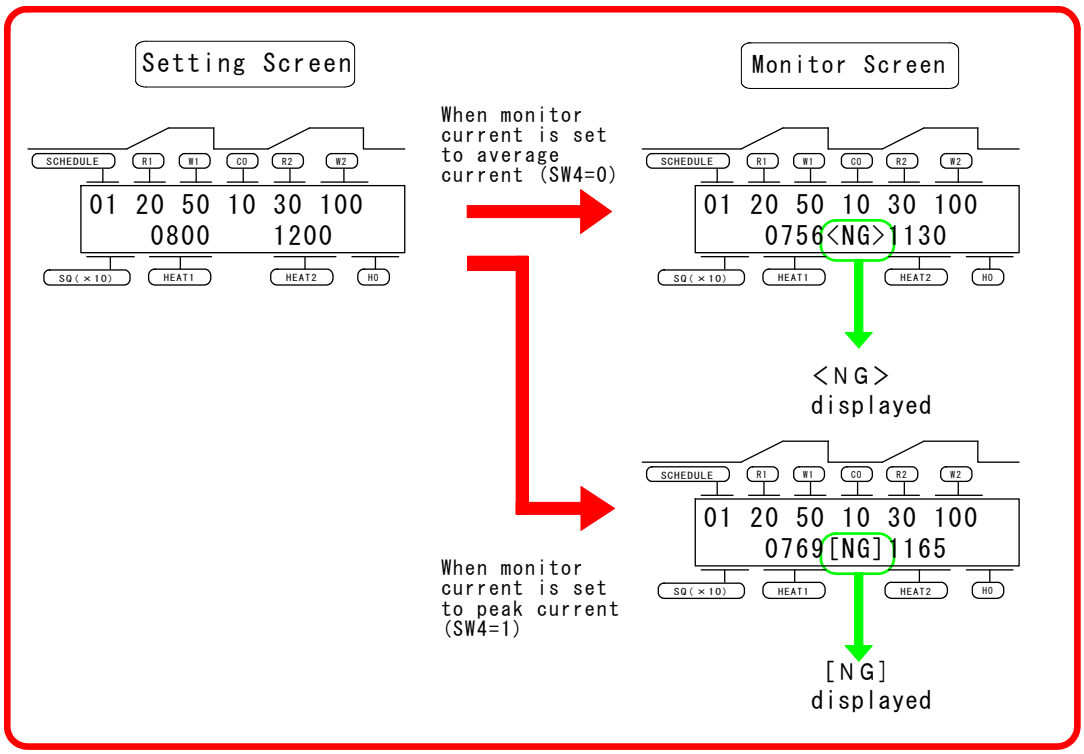
After delivering the welding current, **IP-100D/200D** automatically displays the magnitude of flowed current (monitored value) on LCD Panel. The display on the screen changes according to the monitored value.

① When the monitored value is within the monitoring range of setting value



<GO> or [GO] is displayed on the monitor screen to indicate that **IP-100D/200D** is working normally. When any of the [Cursor], [+], [-], and [WELD] is pressed at this time, the Setting screen appears.
Also, the display of monitor current can be switched to the average value or peak value by SW4 setting. <GO> is displayed when average value is set and [GO] is displayed when peak value is set. (See **5. Basic Operation** (1) ⑫.)

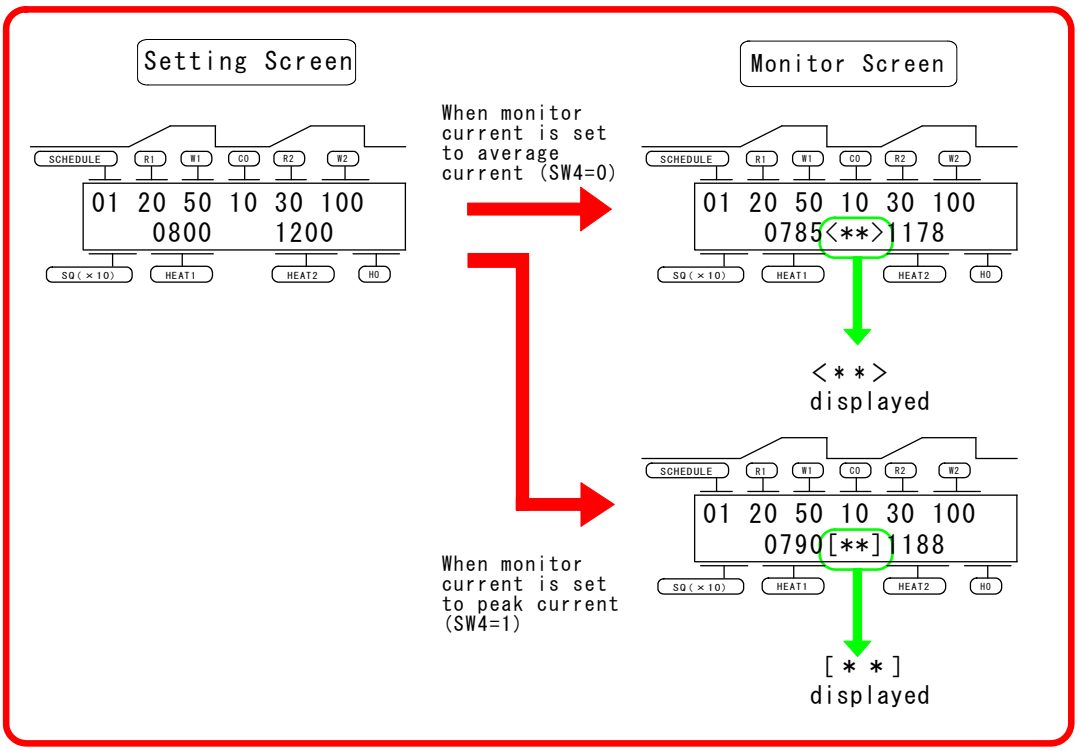
② When the monitored value is out of the monitoring range of setting value



When either monitored value of HEAT 1 or HEAT 2 is out of the monitoring range, <NG> or [NG] is displayed on the monitor screen to show that the trouble has occurred during welding. If Reset signal or Start signal is input externally, or any one of [Cursor], [+], [-], and [WELD] is pressed at this time, the state of “NG” is reset and the Setting screen appears.

NB: If Software Switch SW3 is set to “1”, [START] is not accepted when “NG” is being displayed. . (See **5. Basic Operation** (1) ⑫.)

③ When monitoring range of welding current is set to 00%



When either of upper and lower limits (-**% and +**%) is set to 00%, monitored value is displayed but judgment is not made. When any of the [Cursor], [+], [-], and [WELD] is pressed at this time, the Setting screen appears.

6. Replacing Battery

IP-100D/200D comes with a built-in lithium battery for data storage.
The service life of this lithium battery is **approximately 5 years**.
Replace the battery, when it dies, observing the instructions below:
(Battery used: CR2450 or the equivalent)

If the battery is replaced, all the registered welding schedules are lost. As a backup measure, complete the Schedule Data Table (**13. Schedule Data Table**) including battery replacement date before removing the battery.

⚠ DANGER
Do not touch the interior of **IP-100D/200D** unnecessarily because very high voltages is applied. Always follow the procedures given below.

① Turn off the [POWER] main circuit breaker.

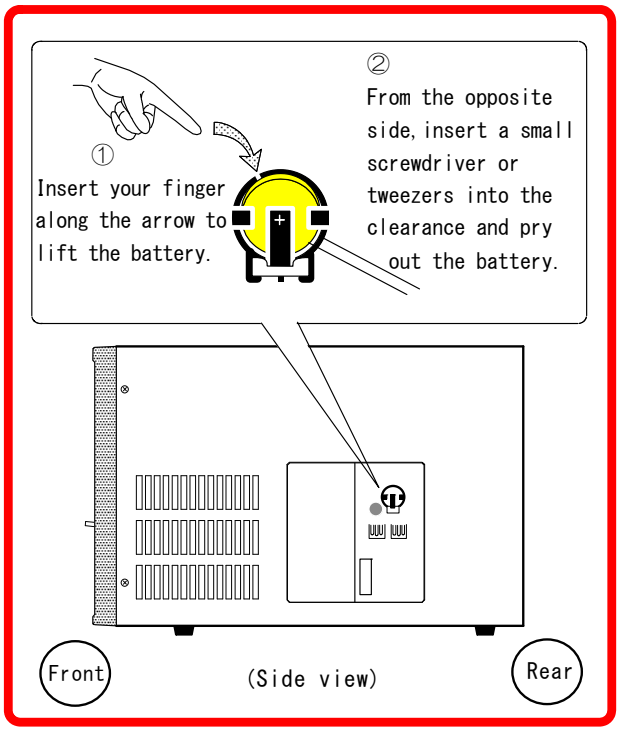
② Turn off a power-supplying breaker, such as a distribution breaker; then, disconnect the connecting cable from the Power Cable Terminals.

③ Use a screwdriver to remove the three screws (M3) from the right-side cover; remove the cover.

④ Replace the battery, observing the drawing below. Be sure not to cut the printed circuit board.

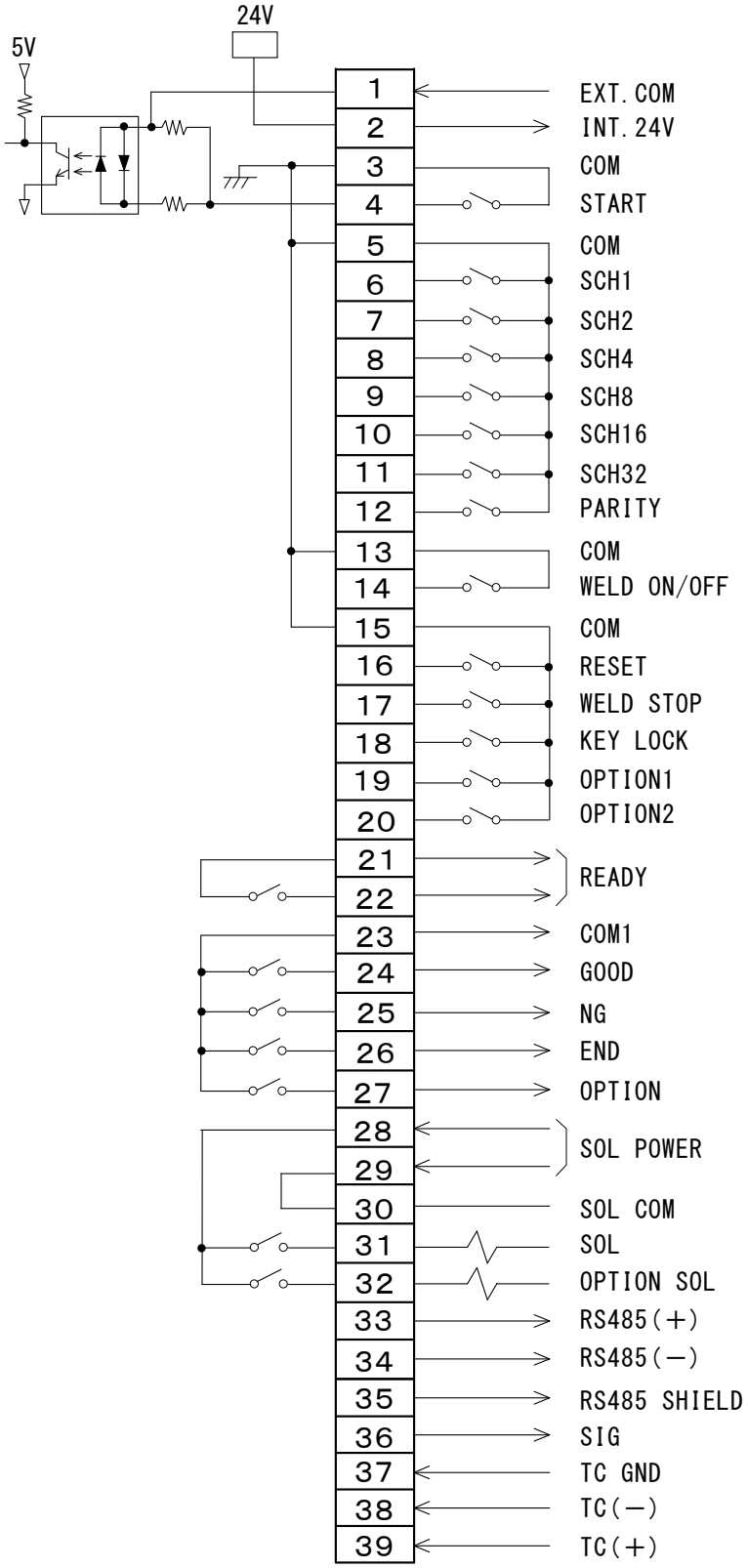
⑤ Re-place the side cover; secure it by tightening the screws.

⑥ Connect the power cable to the Power Cable Terminals.



7. Interface

(1) External I/O Signals



(2) Explanation on the External I/O Signals

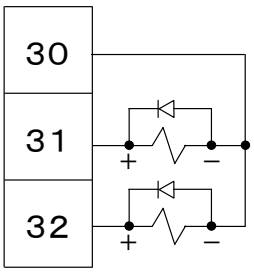
Terminal No.	Description
1	• When **IP-100D/200D** is connected to a contact or NPN open collector output-type device (when using the internal power supply), connect this terminal to Terminal 2. • If **IP-100D/200D** is connected to a NPN open collector output (when using an external power supply) or PNP current output-type device, connect this terminal to a 24V DC external power supply.
2	The output terminal for 24V DC power source generated in **IP-100D/200D**. This terminal is connected to Terminal 1 with a jumper wire on shipment. This power supply is for external input signals only. Do NOT use for any other purpose.
3	Common terminal for Start signal.
4	Start input terminal.
5	Common terminal for Schedule input and Parity.
6–11	Schedule input terminal. 6 = SCH 1, 7 = SCH 2, 8 = SCH 4, 9 = SCH 8, 10 = SCH 16, 11 = SCH 32
12	For parity check.
13	Common terminal for Weld On/Off signal.
14	Weld On/Off terminal. Input terminal for [WELD ON/OFF] signal. Opened → Weld Off (Shuts off the welding current.) Closed → Weld On (Flows the welding current.) For the welding current to flow, the [WELD] key on the front panel must also be ON.
15	Common terminal for schedule input signals.
16	Input terminal for Trouble Reset signal. Closing this circuit clears Trouble output [NG].
17	Input terminal to stop welding. If this circuit is closed, the welding sequence immediately halts and proceeds to Hold Time. A Weld Stop error occurs if the circuit is closed when [START] is input.
18	Prohibits programming. If this circuit is closed, you can change the Schedule No. and screen only and cannot set Schedule.
19, 20	For extension. Do NOT connect.

Terminal No.	Description
21*1, 22*1	Output terminal for [READY] signal. This signal outputs when the following is satisfied, i.e., **IP-100D/200D** is ready for welding. • [WELD] lamp on the front panel lights up. • [WELD ON/OFF] is closed. • Trouble signal [NG] is not output (excluding current monitor trouble).
23*1	Common terminal for [GOOD], [NG], [END] and [OPTION].
24*1	For Normal signal. Outputs while End signal is output when the result of welding is normal.
25*1	For Trouble output [NG]. Outputs when a trouble occurs, and when Hold Time ends if monitor trouble has occurred. Cancelled when the Trouble Reset signal [RESET] is input.
26*1	Outputs End signal. The signal is output for the time setting upon completion of sequence. This signal is output for Monitor Trouble. (See **5. Basic Operation** (1) ⑩.)
27	Unassigned. Do NOT connect.
28*3, 29*3	Input terminals for solenoid-driving power supply. Input 100V AC or 24V DC.
30*2, 3, 31*2, 3	For solenoid output. The voltage applied to Terminals 28 and 29 is output from the start of Squeeze Time to the end of Hold Time.
32	Optional solenoid. This terminal does not function with this system.
33–35	Output data for RS-485. 33 = +, 34 = -, 35 = Shield
36–39	Unassigned. Do NOT connect.

*1: Photo-MOS relay output capacity: 24V DC, 20 mA max.

*2: Output capacity for solenoid: 100V AC/24V DC, 500 mA max.

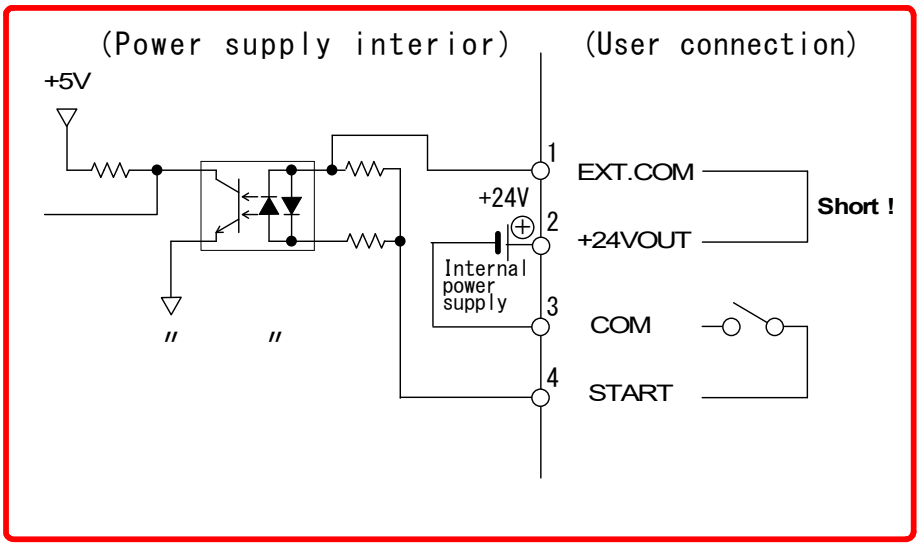
*3: When using 24V DC solenoid, install diodes on measures to prevent surge voltage.
Example) When inputting + to Terminal 28 and – to Terminal 29.



(3) Input Signal Connection

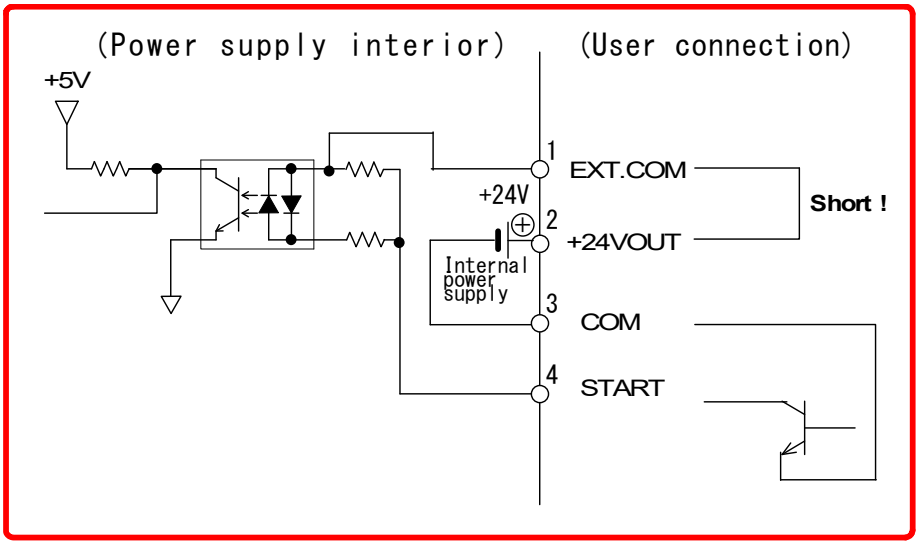
① **When Connecting to Contact Input Device**

Connect Terminals 1 and 2 with a jumper wire.



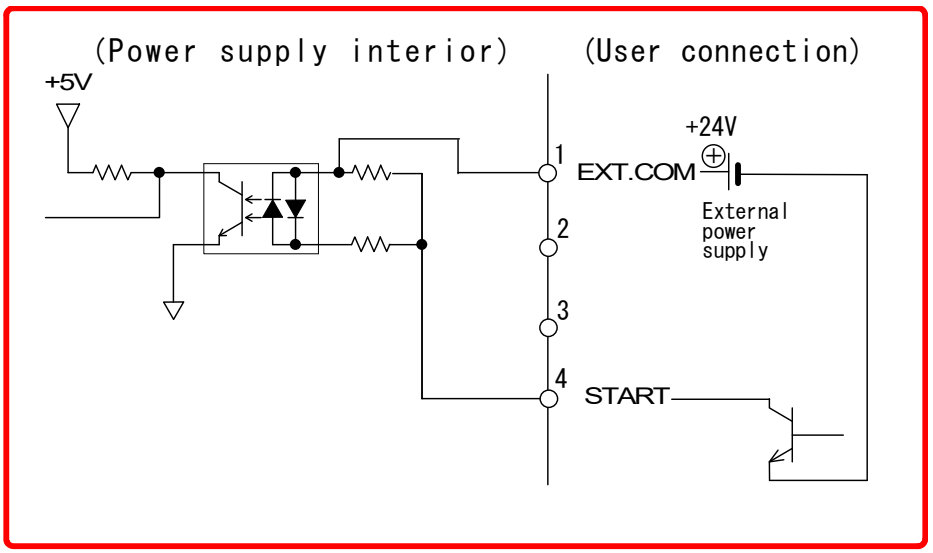
② **When Connecting to NPN Open Collector Output Device** (using the **internal** power supply)

To use the internal +24V power supply, connect Terminals 1 and 2 with a jumper wire.



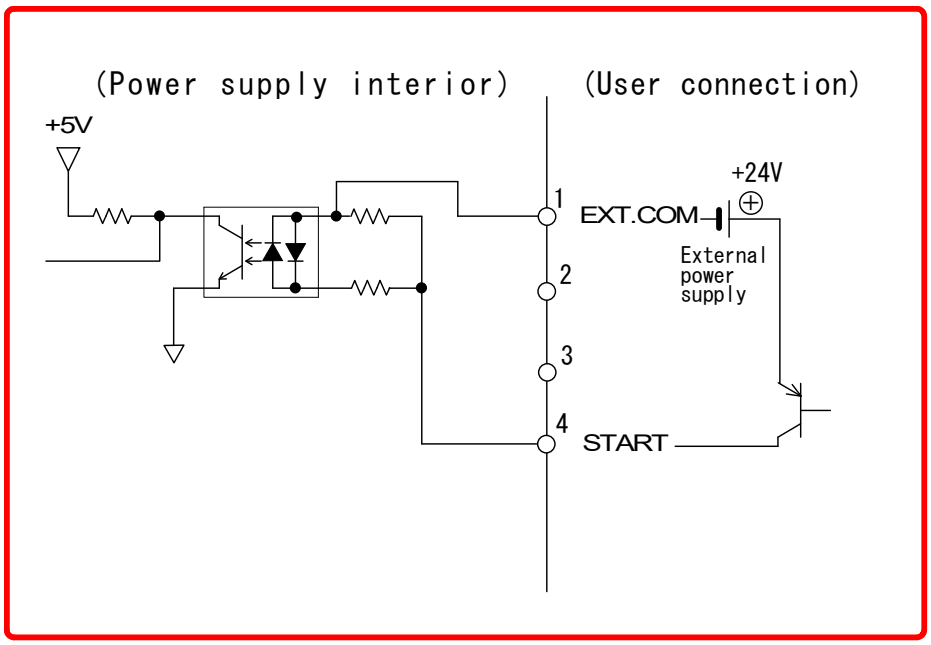
③ **When Connecting to NPN Open Collector Output Device** (using an **external** power supply)

Connect Terminal 1 to the "+" terminal of the external 24V DC power supply.



④ **When Connecting to PNP Current Output Type Device** (using an **external** power supply)

Connect Terminal 1 to the "-" terminal of the external 24V DC power supply.



(4) Determining Welding Schedule Number

63-Schedule Input

Select #1 to #63 schedules by opening and closing schedule input signals [SCH1], [SCH2], [SCH4], [SCH8], [SCH16] and [SCH32] on the rear-panel terminal block.

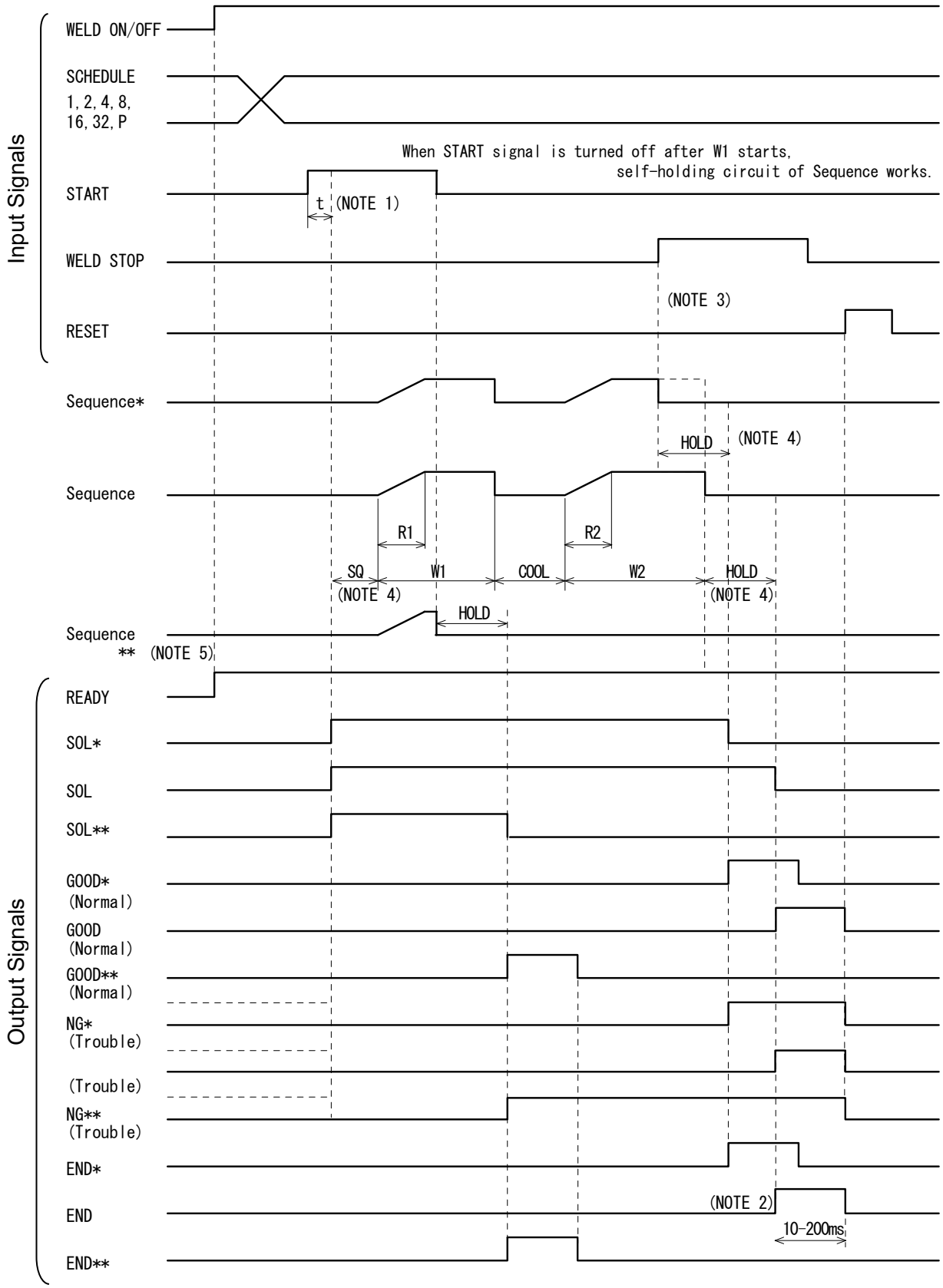
* For parity check, set SW1 of the Software Switch to “1”. (See **5. Basic Operation** (1) ⑫.) In addition to the Schedule signals, parity signal is provided so that error signal is output when the total number of input signals is even.

○: Closed Blank: Opened

Schedule No. #	SCH1	SCH2	SCH4	SCH8	SCH16	SCH32	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	○	○		○	○		○

Schedule No. #	SCH1	SCH2	SCH4	SCH8	SCH16	SCH32	Parity*
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			○		○	○	
53	○		○		○	○	○
54		○	○		○	○	○
55	○	○	○		○	○	
56				○	○	○	
57	○			○	○	○	○
58		○		○	○	○	○
59	○	○		○	○	○	
60			○	○	○	○	○
61	○		○	○	○	○	
62		○	○	○	○	○	
63	○	○	○	○	○	○	○

8. Timing Chart



*: The timing when WELD STOP is input.

**: The timing when SW8 is set to 1.

(NOTE 1): Input Schedule No. (SCH.) before Start signal is input. “t” is to stabilize time of Start signal. (1 ms, 5 ms or 20 ms can be selected by Software Switch (SW0).) (See **5. Basic Operation** (1) ⑫.)

(NOTE 2): When the monitor is in trouble condition, END signal is output.
In any trouble condition except above, no END signal is output. (10 to 200 ms with 10-ms increment can be set.) (See **5. Basic Operation** (1) ⑪.)

(NOTE 3): When WELD STOP is input during welding, welding stops and sequence ends.

(NOTE 4): SQ and HOLD are ready only when the setting for Software Switch (SW5) changes to 1 from 0.

(NOTE 5): If the setting for Software Switch (SW8) changes to 1 from 0, welding stops when Start signal turns off and sequence ends.

9. Troubleshooting

When abnormal condition occurs, message will be displayed on LCD Panel and NG signal indicating abnormal condition is output.

Memory Data Trouble	
Message	MEMORY TROUBLE 1!!
Time when Detected	When power is turned on.
Cause of Occurrence	Welding Schedule data differ from those programmed.
Resetting Method	Press any key on the front panel of the main body.
Measures	Check the program data after resetting [NG], and then correct wrong data if any. If memory troubles occur frequently, the lithium battery may be dead (life of the battery is five (5) years). Replace the battery according to **6. Replacing Battery**.

Memory Out-of-Range Trouble	
Message	MEMORY TROUBLE 2!!
Time when Detected	When power is turned on.
Cause of Occurrence	At least one of Welding Schedule data is out of range.
Resetting Method	Press any key on the front panel of the main body.
Measures	Check the program data after resetting [NG], and then correct wrong data if any. If memory troubles occur frequently, the lithium battery may be dead (life of the battery is five (5) years). Replace the battery according to **6. Replacing Battery**.

Parity Error	
Message	PARITY ERROR!!!
Time when Detected	When started.
Cause of Occurrence	The number of input Schedule signals (including parity) is even.
Resetting Method	Either input [RESET] signal or press any key on the front panel of the main body.
Measures	Have the number of input Schedule signals (including parity) odd.

Overheating Trouble	
Message	OVER HEAT !!!
Time when detected	When not starting.
Cause of Occurrence	**IP-100D/200D** itself is overheating extraordinary.
Resetting Method	Either input [RESET] signal or push any key on the front panel of the main body.
Measures	① Turn on [POWER] circuit breaker and leave the equipment as it is without starting. Main Body will be cooled down and thermostat will be reset. ② The duty cycle seems to be high. Check whether the equipment is being used under the appropriate duty cycle. ③ Check that the slits provided at the right side, rear, and bottom for being clogged by dust and trash. Clean them if necessary.

Overcurrent Trouble	
Message	OVER CURRENT !!!
Time when detected	During welding
Cause of Occurrence	Overcurrent flowed due to current control fault.
Resetting Method	Either input [RESET] signal or push any key on the front panel of the main body.
Measures	Broken switching element may be the cause. Consult us.

No-Current Trouble	
Message	NO CURRENT !!!
Time when detected	During welding (Judged when welding ends).
Cause of Occurrence	Monitored current is the half of pre-selected current or below.
Resetting Method	Either input [RESET] signal or press any key on the front panel of the main body.
Measures	Check for broken wire in the secondary of transformer or insulating material between welding electrodes.

Emergency Stop	
Message	EMERGENCY STOP !!
Time when detected	During welding
Cause of Occurrence	[WELD] is turned off during welding.
Resetting Method	Either input [RESET] signal or press any key on the front panel of the main body.
Measures	Turn on [WELD], then supply the welding current.

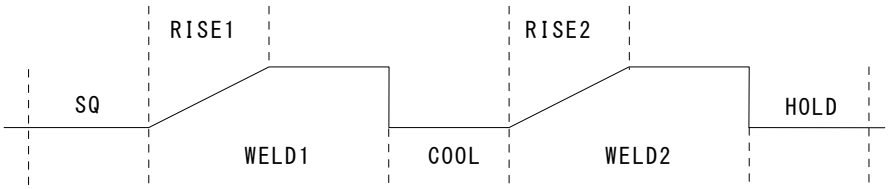
WELD STOP Input Trouble	
Message	STOP INPUT NG
Time when Detected	When started.
Cause of Occurrence	[WELD STOP] has been on when [START] is input.
Resetting Method	Either input [RESET] signal or press any key on the front panel of the main body.
Measures	Turn off [WELD STOP], then start.

Battery Voltage Trouble	
Message	LOW BATTERY VOLTAGE !
Time when Detected	When started.
Cause of Occurrence	The voltage of the lithium battery is low.
Resetting Method	Either input [RESET] signal or press any key on the front panel of the main body.
Measures	Replace the battery according to **6. Replacing Battery**.

Monitor Trouble	
Message	<NG>
Time when detected	When welding ends.
Cause of Occurrence	Monitored current is out of the monitoring range of the set value.
Resetting Method	Either input [RESET] or [START], or push any key on the front panel of the main body. (When Software Switch SW3 has been set to “1”, [START] is not accepted even if Monitor Trouble occurs. (See **5. Basic Operation** (1) ⑪.))
Measures	Check for workpiece, welder and welding power supply voltage.

10. Specifications

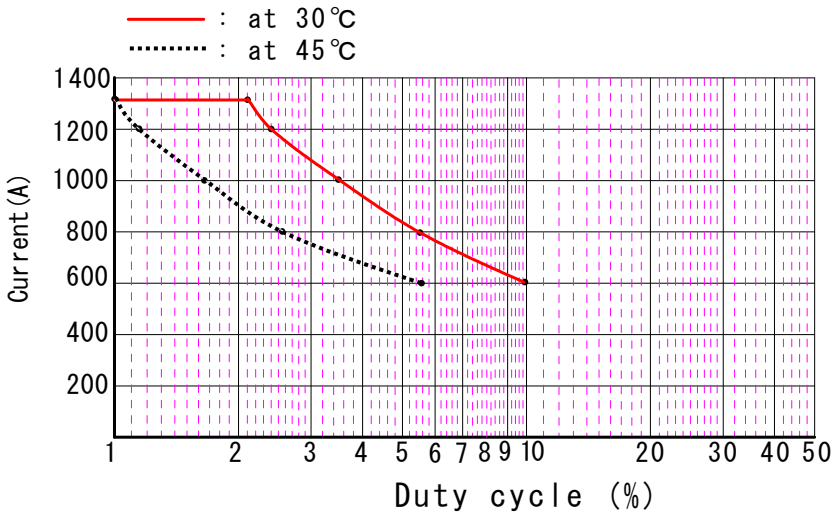
(1) Specifications

	IP-100D	IP-200D
Power supply	3-phase, 180–240V AC, 50/60 Hz	
Rated capacity	1.4 kVA	5.3 kVA
Output voltage	5.5 V	8.1 V
Maximum output current	1300 A (Built-in welding transformer)	2500 A (Built-in welding transformer)
Control frequency	4 kHz	
Maximum duty cycle	3.5% (1000 A) 2.4% (1200 A) 2.1% (1300 A) (at 30°C)	5.0% (2000 A) 4.0% (2250 A) 3.5% (2500 A) (at 45°C)
Control system	Constant-current control system	
Number of schedule setting	63 (1–63) Selectable by external signal or panel switch	
Timer setting range	SQ: 0000–9990 ms * RISE1: 00–49 ms RISE2: 00–49 ms WELD1: 00–99 ms WELD2: 000–299 ms COOL: 00–99 ms HOLD: 000–999 ms * * SQ and HOLD functions are ready when Software switch (SW5) is set to “1”.	
		
Current setting range (peak value)	HEAT1: 100–1300 A HEAT2: 100–1300 A	HEAT1: 400–2500 A HEAT2: 400–2500 A
Current monitor (peak value)	Preselected current is monitored for upper and lower limit setting of fluctuation (±0% – ±49%)	
External input signals	・no-voltage contact input / transistor input / external power supply input ・Schedule selection 1, 2, 4, 8, 16, 32 (Schedules 1–63 in binary format) ・start input ・weld ON/OFF ・current stop ・inhibition of programming ・trouble reset ・parity	

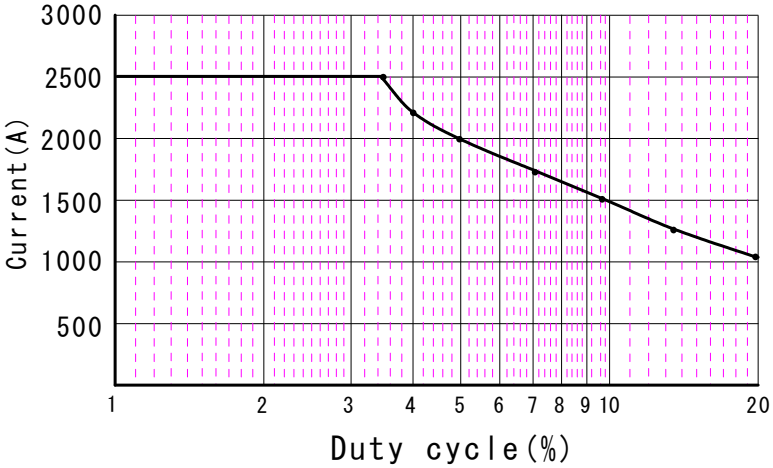
	IP-100D	IP-200D
External output signals	Ready signal Finish signal (Note: This is also output even when current monitor is faulty.) Trouble signal Normal signal Output capacity: 24V DC, 20 mA MAX (FET output)	
Memory backup battery	Lithium battery, Life: 5 years (after shipment)	
Operation environment	Temperature 0°–45°C and humidity 90% or less (Dew condensation not allowed), altitude 1000 meters or lower Caution: Use this product in the environment without conductive dust. If conductive dust enters in the product, this may result in a failure, electric shock, or fire. When using this product in this environment, make contact with us.	
Storage environment	Temperature -10°–55°C and dew condensation not allowed	
Heat-resistant class	E	
Case protection	IP20	
Outline dimensions	269 mm (H) × 142 mm (W) × 480 mm (D)	269 mm (H) × 172 mm (W) × 480 mm (D)
Mass	10 kg	12 kg
Accessories	① 3 m of power cable (4-core) : 1 piece ② Operation manual : 1 copy	

(2) Duty Cycle

IP-100D



IP-200D



(3) Board List for Maintenance

For repair or replacement, contact us.

Model / Board	IP-100D-00-00	IP-200D-00-00
Main control board	ME-1964-05S1	
Power board	ME-1739-01	ME-1780-00

11. External Communication Specifications

(1) Introduction

IP-100D/200D can be connected to a PC to allow schedule setting or to read monitor or status data on the PC.

(2) Data Transmission

① Transmission Mode
RS-485, Asynchronous, Half-Duplex

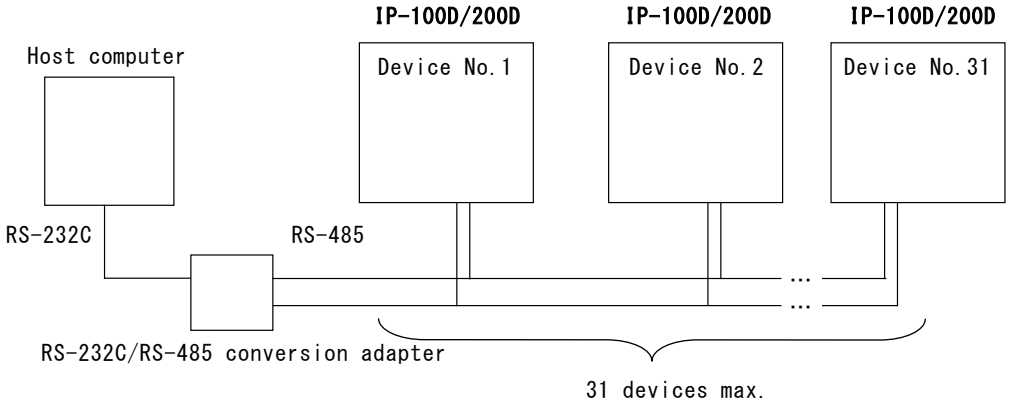
② Transmission Rate
9600, 19200, 38400 bps

③ Data Format

Start bit	1
Data bit	8
Stop bit	1
Parity bit	Even

④ Character Code
ASCII

(3) Configuration



Note 1: When controlling two or more Lasers with one host computer, register the device No. (ID #) for each device. For the device No. setting, see **5. Basic Operation**.

Note 2: Do not assign one number to more than one device. If one number is assigned to more than one device, data collision and inappropriate system operations may result.

Note 3: The RS-232C/RS-485 conversion adapter is not included in the accessories. It must be provided by the customer.

(4) Output Data

① When the single-directional communication mode (SW2=1) is selected
(Device No. is sent in this mode, but in a one-to-one relationship to host computer.)

i) Monitor data

Data strings: 01,63,49ms,99ms,1000A,49ms,299ms,1000A,[CR]
A B C D E F G H I

A: Device No.	Fixed to 2 digits (01–31)
B: Schedule No.	Fixed to 2 digits (01–63)
C: Monitor time of R1	Fixed to 4 digits (00ms–49ms)
D: Monitor time of W1	Fixed to 4 digits (00ms–99ms)
E: Monitor current of HEAT1	Fixed to 5 digits (0000A–2500A)
F: Monitor time of R2	Fixed to 4 digits (00ms–49ms)
G: Monitor time of W2	Fixed to 5 digits (000ms–299ms)
H: Monitor current of HEAT2	Fixed to 5 digits (0000A–2500A)
I: Carriage return code (0DH)	Insert [,] between data

ii) Error code

Character strings: 01,E08,E09,[CR]
A B C D

A: Device No.	Fixed to 2 digits (01–31)
B: Error code 1	
C: Error code 2	
D: Carriage return code (0DH)	Insert [,] between data

NB: When two or more errors occur, all error codes are sent.

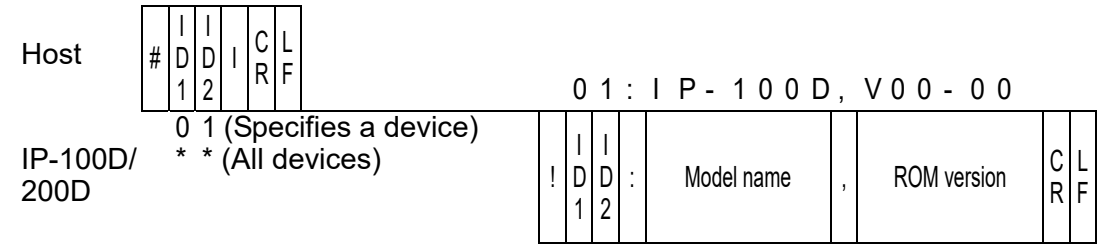
<Error code list>

Code No.	Contents	Code No.	Contents
E01	Memory trouble (Checksum error)	E08	WELD STOP input trouble
E02	Parity error	E10	Memory trouble (Out-of-range error)
E03	Overheating trouble	E11	Battery voltage trouble
E04	Overcurrent trouble	E12	Emergency stop
E05	No-current trouble	E13	Current trouble

② When the bidirectional communication mode (SW2=2) is selected

1.	Inquiry of Model name and ROM version	Code: # Device No. I

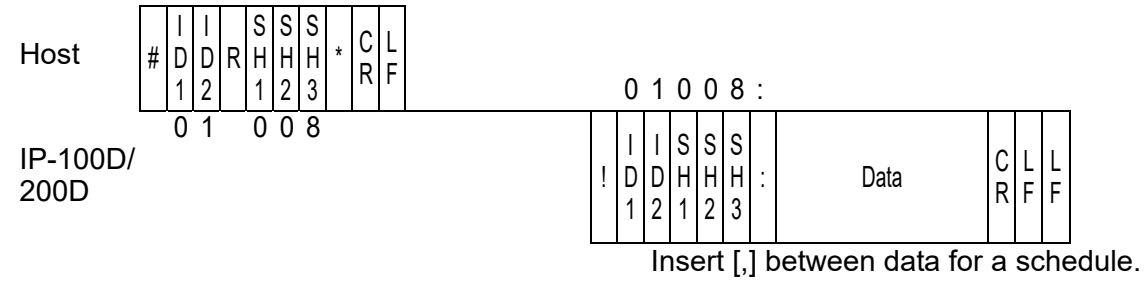
Example: Model name of Device No.01 and the ROM version → **IP-100D** and the ROM version is V00-00A.



i) ID1 and ID2 are Device No. Fixed to 2 digits. (ID1 = Ten's place, ID2 = One's place): Applicable to all the following
ii) When * is set for both ID1 and ID2, all devices connected reply.
When all devices reply, the timelag of reply time is ID×100ms.

2.	Schedule data reading	Code: # Device No. R Schedule No. *

Example: Read all data of Schedule No. "008" of the specified Device No.01.

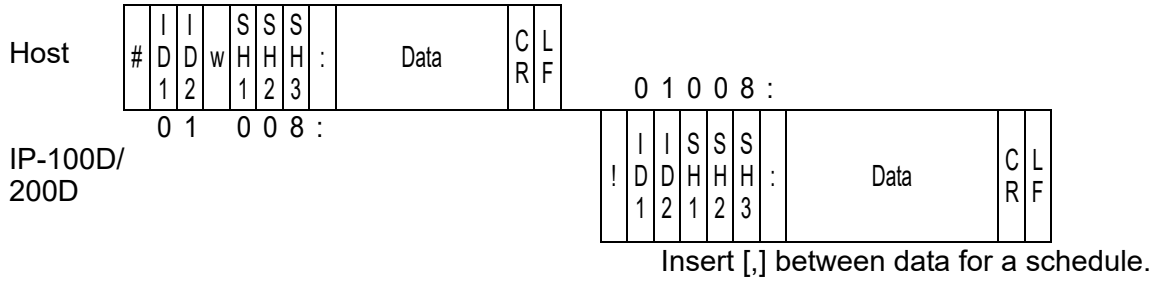


Insert [,] between data for a schedule.

i) SH1, SH2 and SH3 are schedule numbers.
Fixed to 3 digits (SH1 = Hundred's place, SH2 = Ten's place, SH3 = One's place)
When the schedule No. is "000", common schedules are read.
ii) For the order of the data for a schedule, see ③ **Data code list i)**.

3.	Schedule data setting	Cod e: # Device No. W Schedule No., Data

Example: Read a schedule for the specified Schedule No. "008".

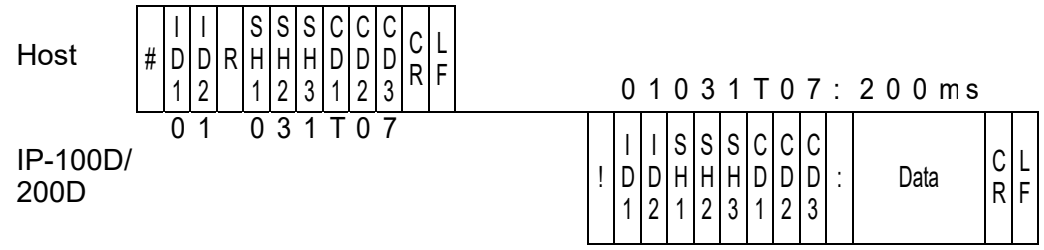


Insert [,] between data for a schedule.

i) SH1, SH2 and SH3 are schedule numbers.
Fixed to 3 digits (SH1 = Hundred's place, SH2 = Ten's place, SH3 = One's place)
When Schedule No. is "000", common schedules are set.
ii) For the order of the data for a schedule, see ③ **Data code list i)**.
iii) The set data is returned as a confirmation data.
When data which is outside the range is set, previous data is returned.

4.	Specified item reading	Code: # Device No. R Schedule No. Specified code

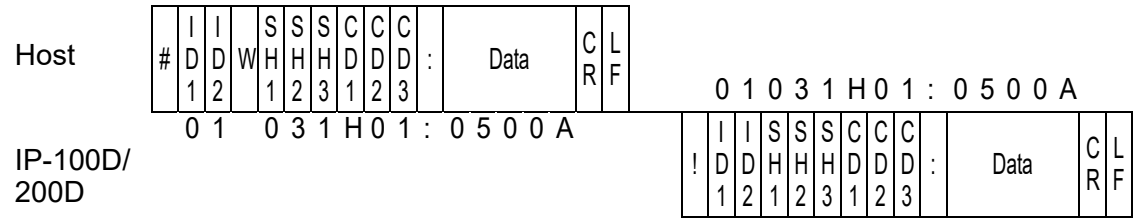
Example: Read Weld 2 time for Schedule No. “031” of Device No.01.



i) For CD1 (alphabet classified symbol), CD2 and CD3 (code classified number), see **③ Data code list ii)**.

5.	Specified item setting	Code: # Device No. W Schedule No. Specified code, Data

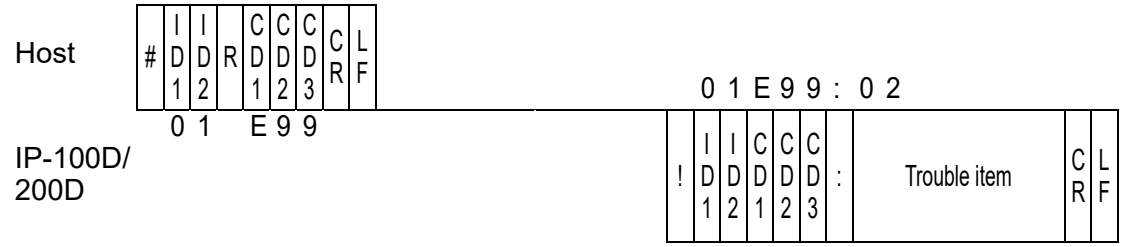
Example: Set Weld 1 current for Schedule No. “031” of Device No.01 to 500A.



i) The set data is returned as a confirmation data.
When data which is outside the range is set, previous data is returned.
ii) CD1 (alphabet classified symbol), CD2 and CD3 (code classified number), see **③ Data code list ii)**.

6.	Trouble reading	Code: # Device No. R Specified code

Example: Read trouble item (trouble code) for Device No.01.



i) All troubles are read. (Insert [,] between trouble items.)
ii) When there is no trouble or troubles are reset, “00” is returned for trouble item.
iii) For CD1 (alphabet classified symbol), CD2 and CD3 (code classified number), see **③ Data code list ii)**.

③ Data code list

i) Schedule data

(Common schedule data <Schedule No.: 000>)

Item	Character strings	Contents
1	n,	Transmission rate (0: 9600 1: 19200 2: 38400) (*)
2	nnn,	END signal time (000–200) (unit: ms)
3	n,	SW0 (Start-input stabilize time 0: 20ms 1: 5ms 2: 1ms)
4	n,	SW1 (Parity check 0: ON 1: OFF)
5	n,	SW2 (Data communication 0: OFF 1: Send only 2: Send and receive) (*)
6	n,	SW3 (Restart method in monitor trouble 0: ON 1: OFF)
7	n,	SW4 (Monitor current 0: Average value 1: Peak value)
8	n,	SW5 (SQ and HOLD functions 0: ON 1: OFF) (*)
9	n,	SW6 (Error signal 0: b contact 1: a contact)
10	n,	SW7 (No function) (*)
11	n,	SW8 (Start input 0: Normal 1: Sequence ends when the function turns off)
12	n,	SW9 (No function) (*)
13	n,	SWA (No function) (*)
14	n,	SWB (No function) (*)
15	n,	SWC (No function) (*)
16	n,	SWD (No function) (*)
17	n,	SWE (No function) (*)
18	n,	SWF (No function) (*)
19	nn	LCD contrast (01–16)

(*) Items inhibited from setting (When setting a schedule, omit these items.)

(Data per schedule No. <Schedule No.: 001–063>)

Item	Character strings	Contents
1	nnnnms,	Squeeze time (0000–9990) (unit: 10ms) (**)
2	nnms,	Upslope 1 time (00–49) (unit: 1ms)
3	nnms,	Weld 1 time (00–99) (unit: 1ms)
4	nnms,	Cool time (00–99) (unit: 1ms)
5	nnms,	Upslope 2 time (00–49) (unit: 1ms)
6	nnnms,	Weld 2 time (000–299) (unit: 1ms)
7	nnnms,	Hold time (000–999) (unit: 1ms) (**)
8	nnnnA,	Weld 2 current (***)
9	nnnnA,	Weld 2 current (***)
10	nn%,	Weld 1 current upper limit (00–49) (unit: %)
11	nn%,	Weld 1 current lower limit (00–49) (unit: %)
12	nn%,	Weld 2 current upper limit (00–49) (unit: %)
13	nn%	Weld 2 current lower limit (00–49) (unit: %)

(**) When SW5 is set to 0, Squeeze time is fixed to 0000ms and Hold time is fixed to 000ms.

(***) **IP-100D**: 0100–1300A, **IP-200D**: 0400–2500A

ii) Specified item

1. Operation sequence time

Specified Code		Item	Note
T	01	Squeeze time	0000–9990 (unit: 10ms) (*)
	02	Upslope 1 time	00–49 (unit: 1ms)
	03	Weld 1 time	00–99 (unit: 1ms)
	05	Cool time	00–99 (unit: 1ms)
	06	Upslope 2 time	00–49 (unit: 1ms)
	07	Weld 2 time	000–299 (unit: 1ms)
	13	Hold time	000–999 (unit: 1ms) (*)

(*) When SW5 is set to 0, Squeeze time is fixed to 0000ms and Hold time is fixed to 000ms.

2. Current setting

Specified Code		Item	Note
H	01	Weld 1 current	(unit: A) (**)
	02	Weld 2 current	(unit: A) (**)

(**) **IP-100D**: 0100–1300A, **IP-200D**: 0400–2500A

3. Monitor data

Specified Code		Item	Note
M	00	Weld 1 monitor current	
	01	Weld 2 monitor current	
	23	Weld 1 monitor time	
	24	Weld 2 monitor time	
	26	Upslope 1 monitor time	
	27	Upslope 2 monitor time	

Note 1: When there is no monitor data, send “0”.
Note 2: Cannot be set since they are monitor data.

4. Monitor upper/lower limit judgment

Specified Code		Item	Note
N	00	Weld 1 monitor current upper limit	00–49 (unit: %)
	01	Weld 1 monitor current lower limit	00–49 (unit: %)
	02	Weld 2 monitor current upper limit	00–49 (unit: %)
	03	Weld 2 monitor current lower limit	00–49 (unit: %)

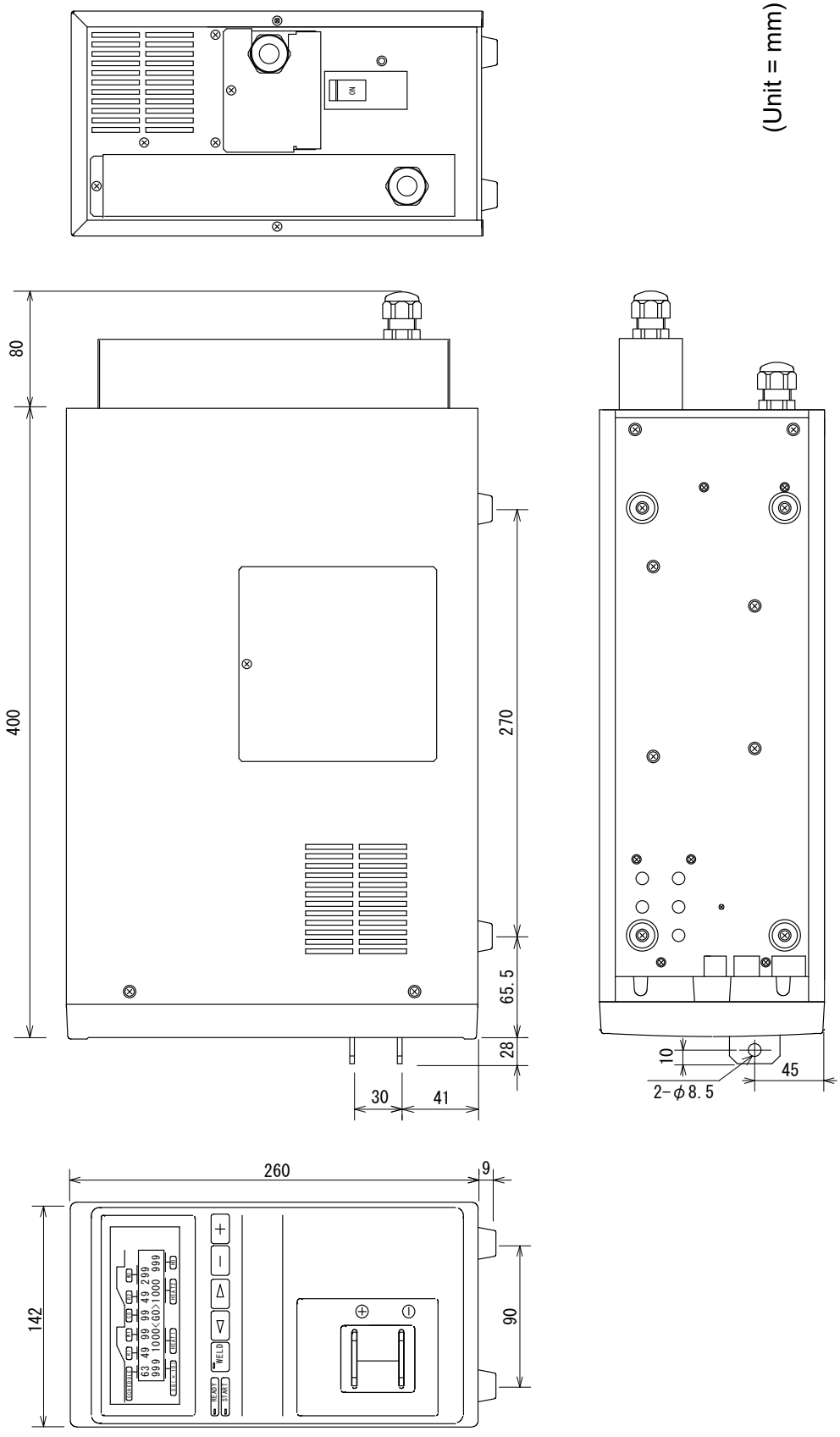
5. Error code

Specified Code		Data	Item	Note
E	00		Trouble reset	
	99		Trouble read	
		00	No trouble	
		01	Memory trouble (Checksum error)	
		02	Parity error	
		03	Overheating trouble	
		04	Overcurrent trouble	
		05	No-current trouble	
		08	Welding stop input error	
		10	Memory trouble (Out-of-range error)	
		11	Battery voltage trouble	
		12	Emergency stop	
		13	Current monitor trouble	

12. Outline Drawing

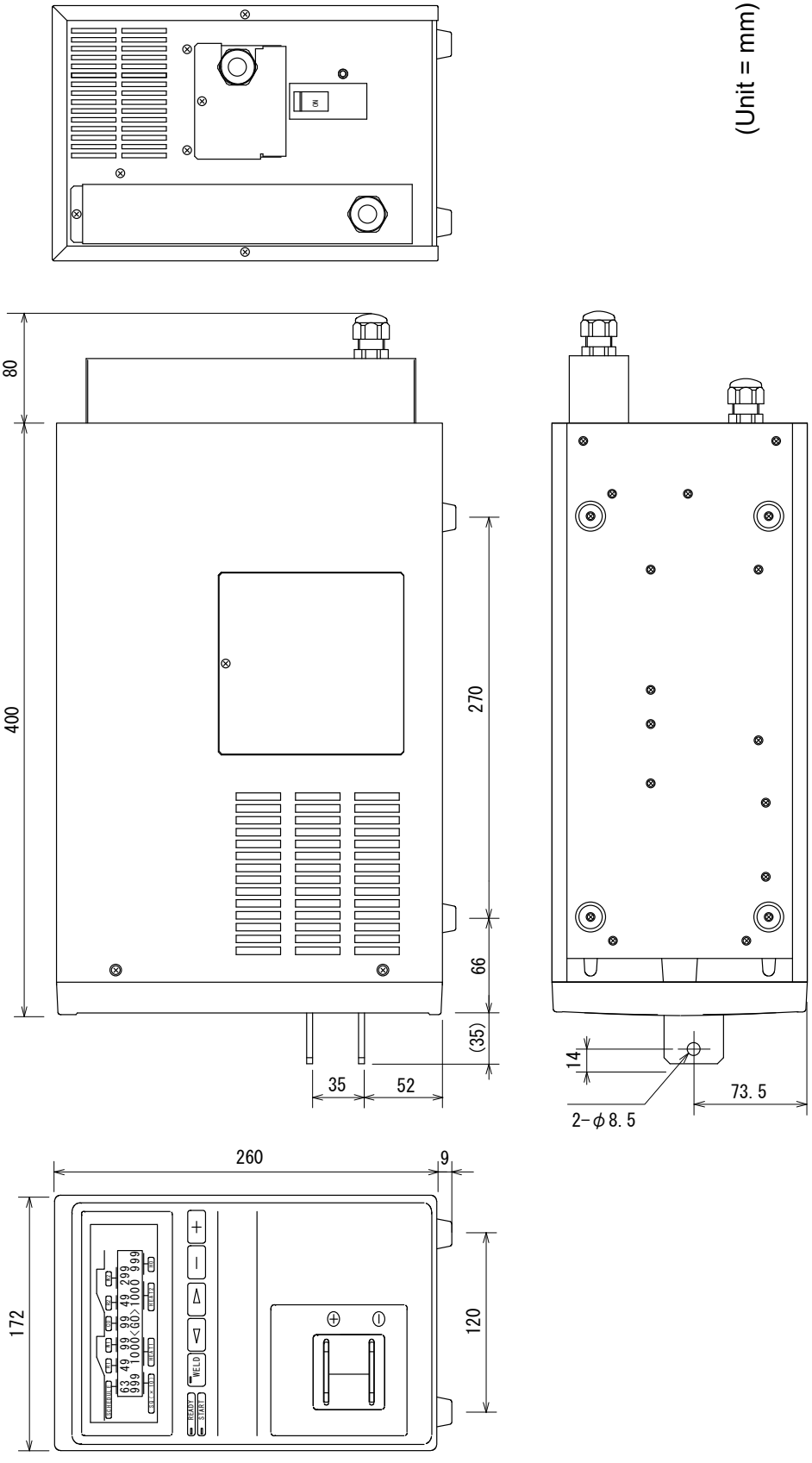
IP-100D

(Unit = mm)



IP-200D

(Unit = mm)



13. Schedule Data Table

Battery replacement date		
END SIG. (ms)		
RS-485	ID#	
	SPEED [kbps]	

SW0	0, 1, 2	SW4	0 , 1	SW8	0 , 1	SWC	0 , 1
SW1	0 , 1	SW5	0 , 1	SW9	0 , 1	SWD	0 , 1
SW2	0, 1, 2	SW6	0 , 1	SWA	0 , 1	SWE	0 , 1
SW3	0 , 1	SW7	0 , 1	SWB	0 , 1	SWF	0 , 1

ITEM ~~SCHEDULE #~~			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SQ		[×10ms]																
R1		[ms]																
W1 (Time)		[ms]																
HEAT1 (Current)		[A]																
CO		[ms]																
R2		[ms]																
W2 (Time)		[ms]																
HEAT2 (Current)		[A]																
HO		[ms]																
MONITOR LIMIT	1	HIGH [+%]																
		LOW [-%]																
	2	HIGH [+%]																
		LOW [-%]																

ITEM ~~SCHEDULE #~~			17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
SQ		[×10ms]															
R1		[ms]															
W1 (Time)		[ms]															
HEAT1 (Current)		[A]															
CO		[ms]															
R2		[ms]															
W2 (Time)		[ms]															
HEAT2 (Current)		[A]															
HO		[ms]															
MONITOR LIMIT	1	HIGH [+%]															
		LOW [-%]															
	2	HIGH [+%]															
		LOW [-%]															

ITEM \ SCHEDULE #			32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
SQ		[×10ms]																
R1		[ms]																
W1 (Time)		[ms]																
HEAT1 (Current)		[A]																
CO		[ms]																
R2		[ms]																
W2 (Time)		[ms]																
HEAT2 (Current)		[A]																
HO		[ms]																
MONITOR LIMIT	1	HIGH [+%]																
		LOW [-%]																
	2	HIGH [+%]																
		LOW [-%]																

ITEM \ SCHEDULE #			48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
SQ		[×10ms]																
R1		[ms]																
W1 (Time)		[ms]																
HEAT1 (Current)		[A]																
CO		[ms]																
R2		[ms]																
W2 (Time)		[ms]																
HEAT2 (Current)		[A]																
HO		[ms]																
MONITOR LIMIT	1	HIGH [+%]																
		LOW [-%]																
	2	HIGH [+%]																
		LOW [-%]																