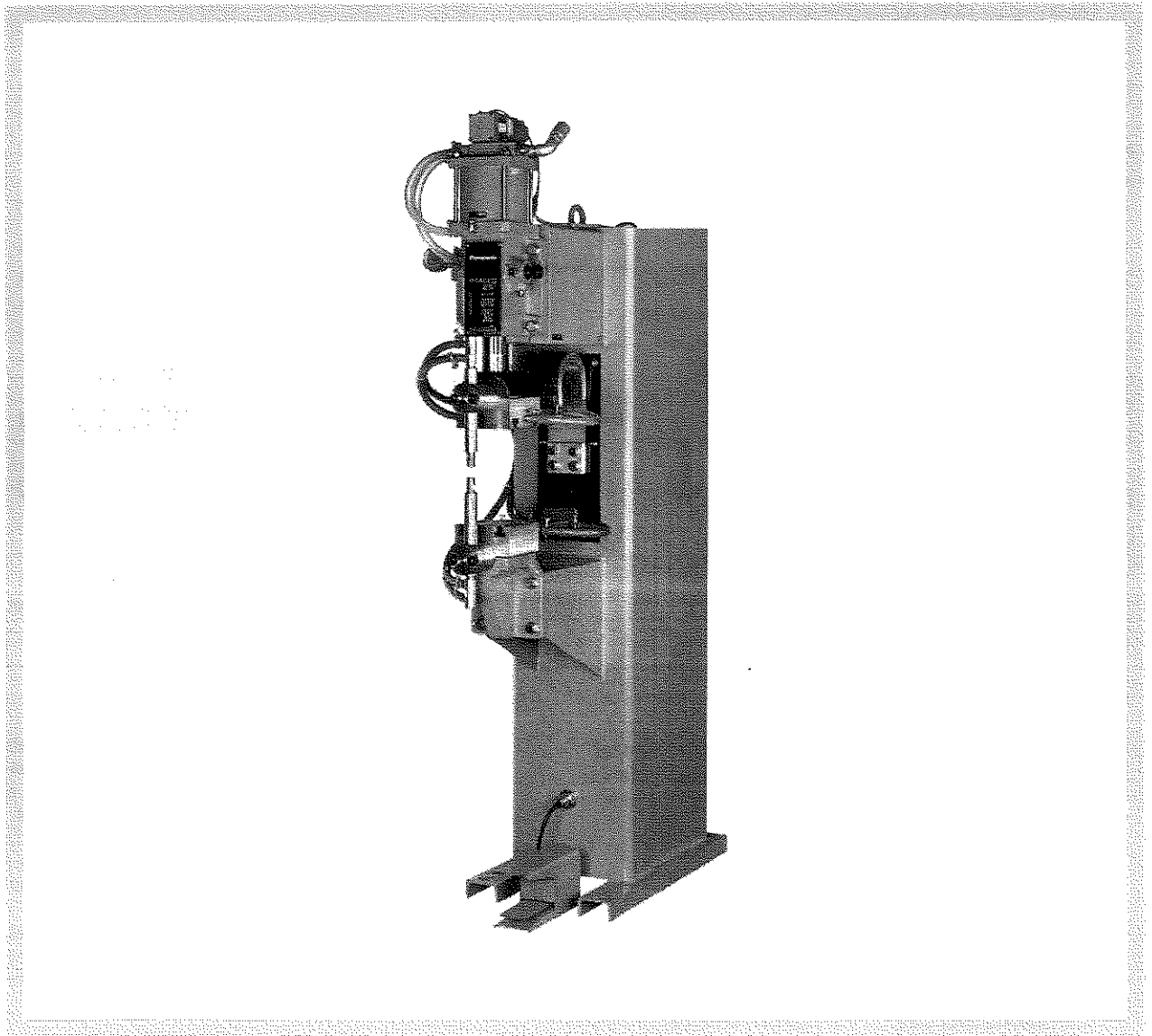


Panasonic®

Operating Instructions Resistance Welding Machine

Model No. **YR-355CM2YGH**



Before operating this product, please read the instructions carefully and save this manual for future use.

- First of all, please read "Safety precautions" or "Safety manual."

OMRT6618E04

Introduction







◆ Introduction

This document is the operating instructions of resistance welding machine.

◆ Features

- **Impact noise at pressurizing is reduced**, thanks to adjustable pressure head speed.
- **Clean work environment** is obtainable, thanks to application of unrefueled cylinder that does not emit oil contained air in the atmosphere.
- **Stable welding operation with reduced electrode tip slippage** is available, thanks to application of rigid and strong body.
- **Simple connection** between the product and the controller - use just one connector and three bolts.

◆ Signal Words and Safety Symbols

Signal Words		Safety Symbols	
 DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.		Indicates a prohibited action.
 WARNING	Indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.		Indicates a mandatory action.
 CAUTION	Indicates a potentially hazardous situation, which, if not avoided, could result in minor injury or property damage.		Indicates a hazard alert.

◆ Disclaimer

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- Any problem arising out of any Force Majeure, including but not limited to, act of God.
- Any malfunction or defect of this Product that is directly or indirectly the result of any malfunction or defect of one or more related parts or products that are not supplied by PSFS. Or any problem arising out of, or directly or indirectly attributable to, the combination of this Product with any other product, equipment, devices or software that is not supplied by PSFS.
- Any problem arising out of, or directly or indirectly attributable to, user's failure to strictly carry out or follow all of the conditions and instructions contained in this instruction manual, or user's misuse, mishandle, operational miss or abnormal operation.
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- This operating instructions manual is based on the information as of January, 2018.
- The information in this operating instructions manual is subject to change without notice.
- English version is the original.

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Safety Precautions

1. Safety Precautions

WARNING

Welding power source

Observe the following instructions to prevent the hazard.

- (1) Never use the welding power source for other than welding purpose. (e.g. Never attempt to use the welding power source for pipe thawing.)
- (2) It is very important to comply with all instructions, safety warnings, cautions and notes mentioned. Failure to do so can result in serious injury or even death.
- (3) Work of driving source at the input side, selecting work site, handling, storage and piping of high pressure gas, storage of welded products and also disposal of waste should be performed according to the operating instruction and national, state and local codes and regulations.
- (4) Prevent any unauthorized personnel to enter in and around the welding work area.
- (5) Magnetic fields from high currents can affect pacemaker operation. If you wear a pacemaker, consult your physician before going near welding operations.
- (6) Only educated and/or skilled persons who well understand this welding power source should install, operate, maintain and repair the unit.
- (7) Only educated and/or skilled persons who well understand the operating instruction of the unit and are capable of safe handling should perform operation of the unit.

Against electric shock



Observe the following instructions to prevent the hazard.

- (1) Do not touch any charged parts except secondary conductors.
- (2) Do not touch both ends of the secondary conductor at a time. Failure to follow the instruction can cause electric shock.
- (3) Grounding of the case of the welding power and base metal or a jig electrically connected to the base metal must be performed by educated and/or skilled persons.
- (4) Before installation or maintenance work, turn off power at the power box, wait it for at least five minutes to discharge capacitors. Significant voltage may exist on capacitors after turning off power at the power box so it is imperative to check to make sure that no charged voltage present at capacitors before touching any parts.
- (5) Do not use undersized, worn, damaged or bare wired cables.
- (6) Connect cables completely and insulate connection parts.
- (7) Keep all cases, panels and covers securely in place.
- (8) Do not handle the welding power source with torn or wet gloves.
- (9) Turn off all equipment when not in use.

- (10) Perform periodic checks without fail and repair or replace any damaged parts before using the power source.
- (11) As for coolant water, use quality water with few sediment and 5 kΩ·cm or more in resistance.
- (12) Use big enough size of cables and hoses for applied power and pressure.

Space between electrodes



Observe the following instructions to prevent injuries.

- (1) Do not put your hands, fingers or arms in the gap between electrodes, or part of your body may be caught by the electrodes resulting in injury or bone fracture.
- (2) Prior to turning on power or supplying compressed air, confirm safety around the welding machine.
- (3) Turn off all equipment including compressed air and coolant water if not in use.

Against fire, explosion or blowout



Observe the following cautions to prevent fires explosion or blow-out.

- (1) Remove any combustible materials at and near the work site to prevent them from being exposed to the spatter. If they cannot be relocated, cover them with a fireproofing cover.
- (2) Do not conduct welding near combustible gases. Do not place the welding power source near combustible gases, otherwise, such gases may catch fire from a spark of electricity inside the welding power source as it is electric equipment.
- (3) Do not bring the hot base metal near combustible materials immediately after welding.
- (4) Properly connect cables and insulate connected parts. Improper cable connections or touching of cables to any electric current passage of the base metal, such as steel beam, can cause fire.
- (5) Keep a fire extinguisher near the welding site for an emergency.

Disassembly inhibition



Do not disassemble or remodel the product. It may cause fire, electric shock or breakdown.

- (1) For repair work, contact Panasonic representatives.
- (2) In case of internal inspection or removal or installation of a part inside the product if necessary, follow the operating instructions.

CAUTION

Installing shielding (curtain etc.)



Welding flash, flying spatter, slugs, and noise generated during welding can damage your eyes, skin and hearing.

- (1) When welding or monitoring welding, wear safety glasses with sufficient light blocking performance or use a protective mask designed for welding operation.

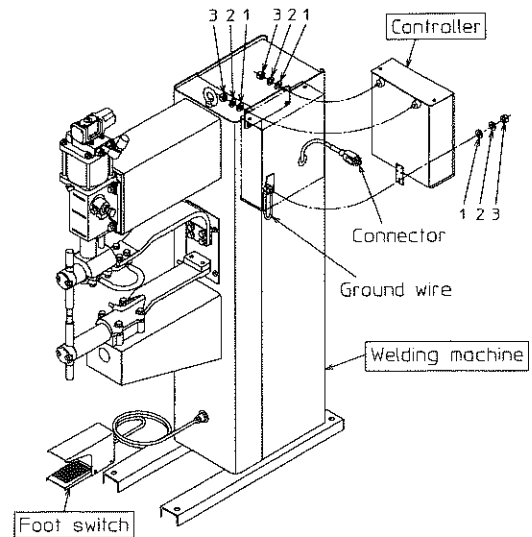
- (2) When welding or monitoring welding wear protective clothes designed for welding operation, such as leather gloves, leg cover and leather apron, and also wear long-sleeve shirts.
- (3) Install a protective curtain around the welding manipulator site to prevent the arc flash from entering the eyes of people in the surrounding area.
- (4) Be sure to wear noise-proof protective equipment if the noise level is high.

2. Prior to Installation

2.1 Configuration

- Set the plain washer (1) and spring washer (2) as per the figure on the right, and fix them with the hexagon nut (3) using a spanner.
- Insert the connector into the rear side of the controller. (Please refer to the operating instructions of the controller.)

No.	Description
1	Plain washer (6 Dia.)
2	Spring washer (6 Dia.)
3	Hexagon nut (M6)

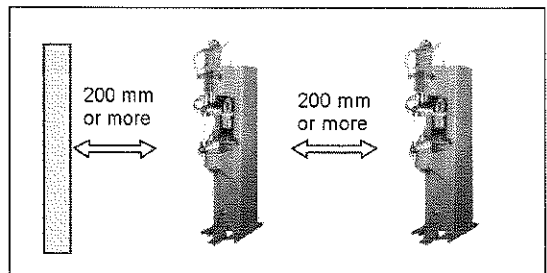
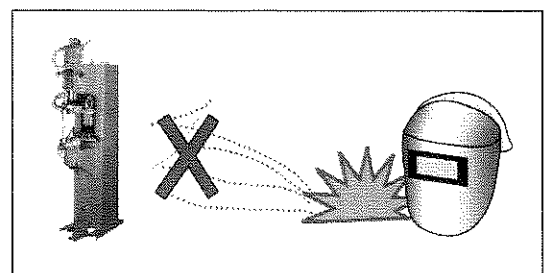
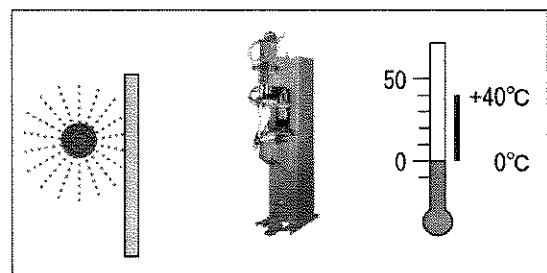


2.2 Installation site

- (1) An indoor free from exposure to direct sunlight or rain.
- (2) A site whose ambient temperature is within the range of 0 to 40 °C (no freezing).
- (3) A site with low humid and less dust.
- (4) A site free from oil, noxious corrosive or combustible gas and combustibles.
- (5) The place where there is no possibility of getting foreign substance (metal) into the inside of the welding machine.
- (6) Maintain an appropriate distance of 200 mm or more from any wall or other devices, or between welding machines installed side-by-side.
- (7) A site free from source of electromagnetic wave noise, such as TIG welding machine.
- (8) Altitude above sea level: Up to 1 000 m.
- (9) A site where the power-supply transformer (substation) is within 20 m.
- (10) Select a flat floor and install with anchor bolts (diameter: 5/8") firmly.
- (11) In case of installing the welding machine in combination with welding jig(s), make sure to insulate the welding machine body and jig(s) completely.

Note

Do not lay control cables, such as start I/O signal cables, near the source of electromagnetic wave noise, such as the TIG welding machine. Failure to follow the instruction can cause malfunction.



Prior to Installation

2.3 Installed capacity

Welding power source	Rated input voltage	VAC	380 (361 VAC or more when power is on.)
	Power capacity ^(*1)	kVA	Equivalent to the rated input (See section "Rated specifications.")
	Switch capacity	-	2P, 500 V, 100 A or more
	Fuse capacity	A	100
	Connecting cable (Cross section)	mm ²	22 or more
Control power source	Rated input voltage	VAC	380 (Down to 100 VAC)
	Connecting cable (Cross section)	mm ²	1.25 or more
Cooling water ^(*2)	Pressure	MPa	0.196 to 0.29 (2 -3 kgf/cm ²)
	Flow rate	L/min	2 or more
	Temperature	°C	30 or less (No freezing)
	Resistivity	kΩ·cm	5 or more
	Supply hose (Bore)	mm	10, 12
	Drain hose (Bore)	mm	10, 12
Compressed air	Air compressor	kW	2.2 or more
	Pressure	MPa	0.49 to 0.69 (5 - 7 kgf/cm ²)
	Supply hose (Bore)	mm	10, 12
Ground connection	Conductor	mm ²	14 or more

(*1) Select the installed power capacity and input cable so that the voltage at the power input terminal when power is on is always 361 VAC or more. For details please consult the electric worker who is in charge.

(*2) As cooling water, select a good quality water free from impurities especially sodium.

Note

Make sure to secure the water flow rate at the specified value or more at any time. If the flow rate falls below the specified value, the product will be damaged.

3. Rated Specifications

3.1 Welding machine body

Model number		YR-355CM2YGH	
Rated input		kVA	35
Rated input voltage		VAC	Single phase, 380
Rated frequency		Hz	50
Spot	Max. rated input (*)	kVA	73
	Duty cycle	%	11.5
	Max. short circuit current	A	16 000
	Max. welding current	A	14 400
	Throat dimensions (W x D)	mm	170 X 400
Projection	Max. rated input	kVA	89
	Duty cycle	%	7.7
	Max. short circuit current	A	19 500
	Max. welding current	A	17 600
	Throat dimensions (W x D)	mm	170 X 300
Max. electrode pressure		kN	4.9 (500 kgf) at 0.49 MPa (5.0 kgf/cm ²) air
Electrode stroke		mm	20, 60
Electrode tip		mm	16 (Dia.), 1/5 (Taper)
Platen dimensions		mm	120 (Square), 80 (T groove pitch)
Cooling water flow rate		L/min	2
Mass		kg	255

(*) "Max rated input" indicates the value when 90 % of the max. welding current is applied with the duty cycle for the max welding current.

3.2 Foot switch (RSU35002)

Outside dimensions (WxDxH)	83 x 225 x 115 (mm) (Body only)
Mass	1.6 kg (Including cable)
Cable length	1.1 m

3.3 Accessories

Part name	Part number	Q'ty	Note
Hexagon bolt (M10 x 25)	XVH10C25FJ	2	For fixing input cables
Washer (M10)	XWF10FJ	4	
Nut with SW	XNGZ10SWFJ	2	
Hexagon wrench (For M12)	HWK10	1	
T-nut (For M10)	RMN01001	8	
Hose joint (For 10-dia.)	UJH00902	1	

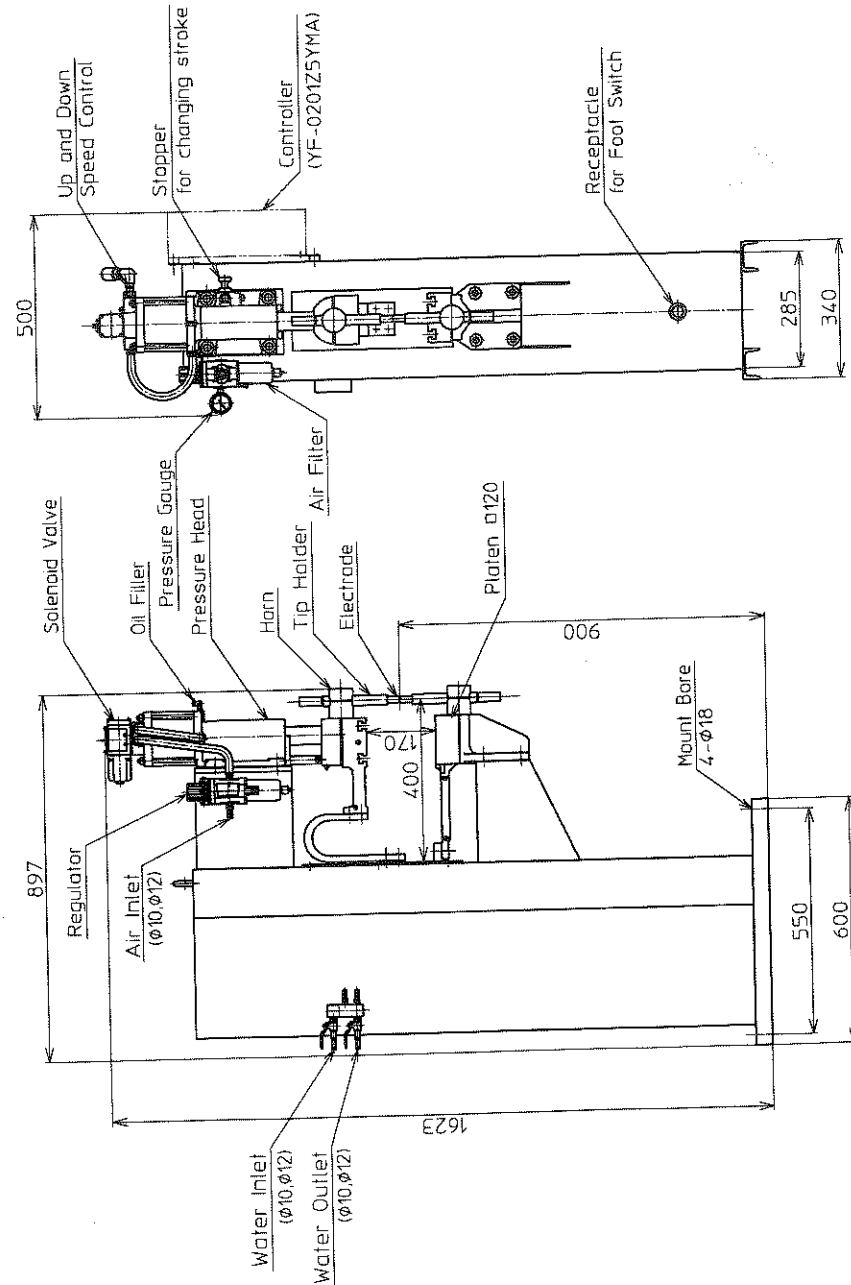
Rated Specifications

3.4 Controller

Part name	Part number	Q'ty	Note
Controller	YF-0201Z5YMA	1	-

* For details, please refer to the attached operating instructions for the controller.

3.5 Dimensions



(Unit: mm)

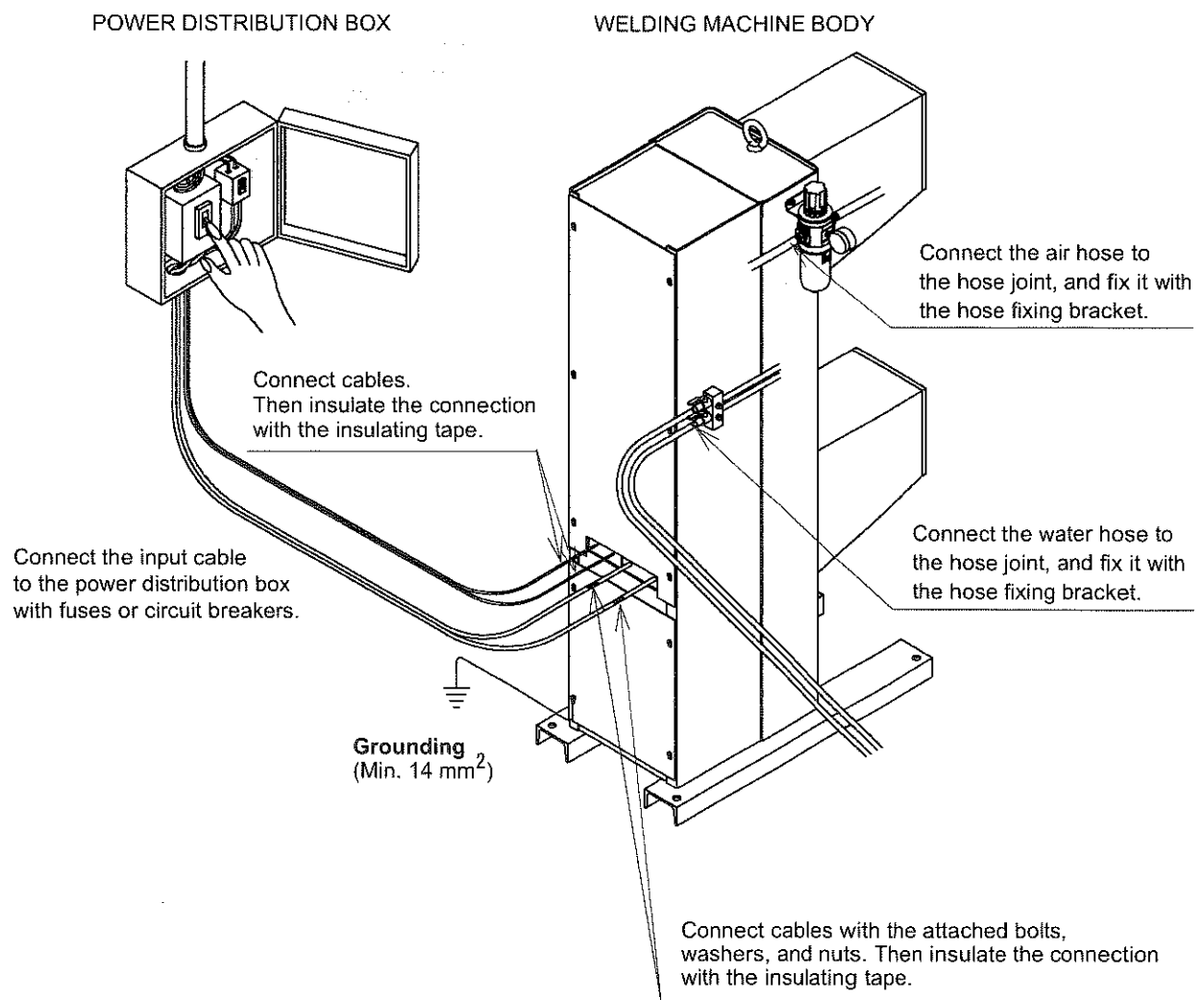
4. Connection

WARNING

- To prevent an electric shock be sure to turn off the switch at the power distribution box before performing connection work.
- Do not touch electrical parts or so with a wet hand.

4.1 Connecting welding power source

- Prior to connection work, check and confirm that power switch of the power distribution box is turned off.
- Prepare one power box for one welding machine. Do not share a power box with two or more welding machines.
- Electrical connection and grounding works must be performed by a qualified person.
- Make sure to use a cable with the specified diameter or larger.
- Connect cables firmly.



Connection

4.2 Connecting cooling water hose

- Connect the water hose firmly to make the connection watertight.
- A stop valve is provided on the supply water side. After operation, make sure to close the valve to stop the cooling water supply.
- As water hose, select one that withstands pressure of 0.29 MPa (3 kgf/cm²)
- Use good quality cooling water whose electrical resistivity is 5 kΩ·cm or more, and with few deposits.

4.3 Connecting compressed air pipe

- Connect the air supply hose to the air supply port at the upper part of the welding machine, and fix it with the hose tightening bracket tight enough to prevent air leakage.
- As compressed air hose, select one that withstands pressure of 0.69 MPa (7 kgf/cm²) or more.
- Make sure to secure the air pressure at 0.49-0.69 MPa (5-7 kgf/cm²) at any time. Please note that the smaller the capacity of the compressor or pipe size is, the slower the movements of the pressure head become.

- Compressed air from an compressor usually contains various kinds of impurities. The more the compressed air contains impurities, the shorter the service life of the air compressor becomes. Try to remove water, tar, carbon and oil mist from the compressed air with the main piping facilities of the factory. If removal of those impurities is not available, attach a filter for mist to the exit side (pressure head side) of the regulator with filter.

Note

Recommended filter is "F*-8-W-Y" (product of CKD) ("*" represents the body size, such as "3000" for 1/4" and "4000" for 1/2".)

As the filter is a 0.3 μm filter, it can protect welding machine. However, please note that accumulation of large amount of mist can cause clogging of the filter, which slows down the pressure operation. Perform regular maintenance work without fail and replace the filter elements with a new one if needed. (Part number of the filter element: F*-ELEMENT-Y)

4.4 Connecting foot switch

Connect the plug of the foot switch to the receptacle at the bottom of the front panel, and fix it.

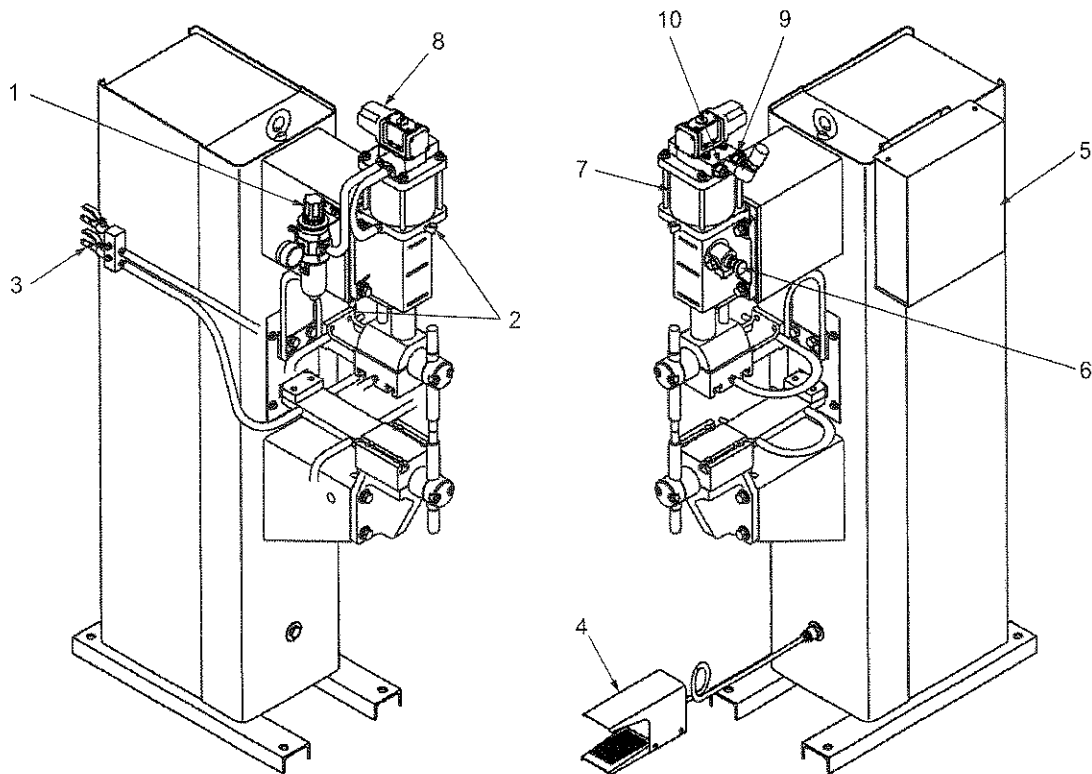
4.5 Grounding

Welding machine shall be grounded to protect operators from electric shock in case of fall of dielectric resistance.

- Grounding work must be performed by a qualified person.
- Make sure to provide grounding work for the rated input voltage of the applied welding machine, which conforms to the national and local code where the welding machine is installed.
- Provide a wire for grounding whose sectional area is 14 mm² or larger.

5. Names and Functions


- Location and shape of each unit may vary with models.
Please refer to section "3.5 Dimensions".



No.	Name	Functions
1	Regulator with filter	Filter removes impurity in the air, and the regulator controls the compressed air pressure. Turn the regulator handle clockwise (CW) to increase air pressure and CCW to reduce the air pressure.
2	Oil filler	Lubricate the upper electrode through it to smoothen the movement. Lubricate with the specified amount of the specified oil. (See "Maintenance".)
3	Cooling water joint	Connect a hose to supply water to cool down the electrode part and transformer. (Fasten the hose tight to avoid water leakage.) Supply good-quality water whose electrical resistivity is 5 kΩ·cm or more.
4	Foot switch	Press the foot switch to start welding operation.
5	Controller	It specifies welding conditions. For details, see the operating instructions of the controller.
6	Stroke selector	It switches the stroke of the upper electrode. Push in or pull out the stopper while keeping the upper electrode down.
7	Pressure head	It presses the work to be welded by moving the upper electrode.(Unrefuel type)
8	Solenoid valve	It turns on/off the air pressure according to the motion signal to move the upper electrode.
9	Up-speed controller	It is to adjust up-speed of the upper electrode. Turn it clockwise (CW) to slow down and turn it counter-clockwise (CCW) to speed up.
10	Down-speed controller	It is to adjust down-speed of the upper electrode. Turn it clockwise (CW) to slow down and turn it counter-clockwise (CCW) to speed up.



6. Operation

6.1 Checking cooling water flow and temperature

 CAUTION
Open the supply water valve and check if the cooling water flows.

Ensure to keep the temperature of the cooling water at 30 °C or below at any time, especially if you are applying forced-circulation cooling. Please note that in case cooling water supply is insufficient or the temperature of the cooling water exceeds 30°C, the thermostat works before it reaches the rated duty cycle and stops welding current or operation itself.

6.2 Adjusting electrode pressure

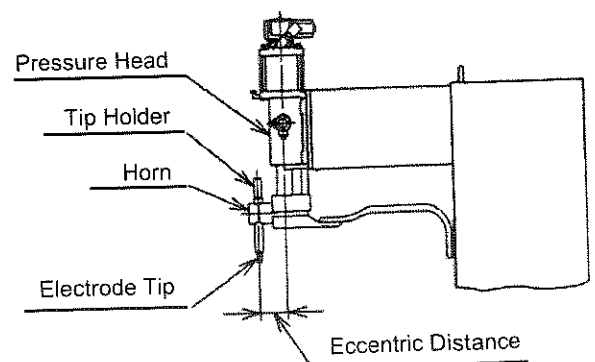
 WARNING	
	Do not put your hand(s) or finger(s) into the space between the electrodes. Or part of your body may be caught by the electrodes resulting in injury or bone fracture.

Step on the foot switch and keep the electrode in the down position, and then either push in or pull out the pressure head stopper to adjust the electrode stroke. For easy adjustment, set the switch of the controller to the side for electrode adjustment before stepping on the foot switch, then the electrode stays in the down position while the foot switch is being pressed. (For details please refer to the operating instructions of the controller.)


6.3 Changing pressure structure

In case of changing the pressure structure, including the upper electrode tip, tip holder, horn and so on, pay attention to the de centering size (see the figure on the right) of the pressure head.

When you double the decentralizing size from the current one (standard size), reduce the supply air pressure to half (0.245 MPa) or below. Setting the supply air pressure above it can damage the pressure head.



6.4 Adjusting electrode stroke

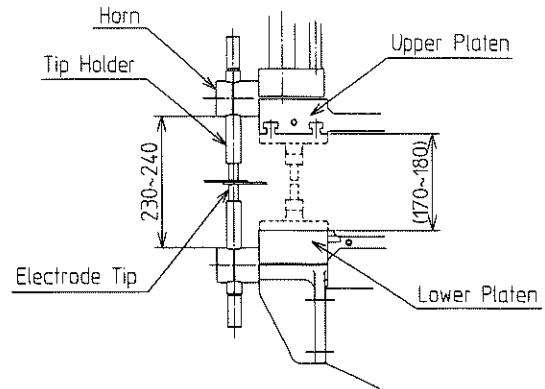
⚠ WARNING	
	Do not put your hand(s) or finger(s) into the space between the electrodes. Or part of your body may be caught by the electrodes resulting in injury or bone fracture.

Step on the foot switch and keep the electrode in the down position, and then either push in or pull out the pressure head stopper to adjust the electrode stroke.

For easy adjustment, set the switch of the controller to the side for electrode adjustment before stepping on the foot switch, then the electrode stays in the down position while the foot switch is being pressed. (For details please refer to the operating instructions of the controller.)

6.5 Adjusting spaces between tip holders and platens

Adjust the length of the electrode so that the space between the upper and lower horns or the upper and lower platens create the space as per the figure on the right when the workpiece to be welded is inserted between the electrodes and pressed.



6.6 Adjusting up-speed/down-speed of electrode

With the adjusting volt in the cylinder cover of the pressure head, you can adjust the electrode speed rate (both up and down) freely. Turn clockwise to slow down and turn counter-clockwise to speed up.

Adjust them to a proper speed and fix the bolt with the lock nut after adjustment.

6.7 Electrode pressure table

Air pressure	MPa (kgf/cm ²)	0.098 (1)	0.196 (2)	0.29 (3)	0.39 (4)	0.49 (5)
500-kgf pressure head	kN (kgf)	0.98 (100)	2.06 (210)	3.09 (315)	4.12 (420)	5.1 (520)

Operation

6.8 Changing structure

Do not attempt to change structure or specification of the unit. If necessary, consult Panasonic representatives.

Note

- In case of installing a welding jig to the welding machine body, make sure to insulate between the jig and electrode and between the jig and the conductor, or between jig and the body case completely. Incomplete insulation can damage the jig by the shunted welding current into the jig.
 - * Magnetic material of the jig around the electrode can cause the output current to drop.
- Please note that we shall have no obligation for any incidents or defects in Products that have been caused by modification performed by users, even though such incidents or defects have been occurred within the applicable warranty period.

6.9 Notes on machine downtime

- Make sure to shut off the cooling water if the welding machine is not in use. If low-temperature cooling water is supplied to the machine in hot season, the moist in the air changes to condensed water droplet on the water-cooling parts, such as welding transformer, conductor and hose. Such condensed water droplet can cause dielectric degradation. Shut off the cooling water flow all the time except at welding.
- In cold region, drain the cooling water completely after welding operation. Remaining cooling water, if any, may freeze and cause water-cooling parts and/or hoses to burst. To drain the cooling water completely, blow the compressed air through the water supply port.
- During machine downtime including night time, adjust the regulator with filter of the welding machine body to set the pressure to "0" MPa (0 kgf/cm²). Failure to follow the instruction can cause pooling of oil mist and the like, which causes trouble.

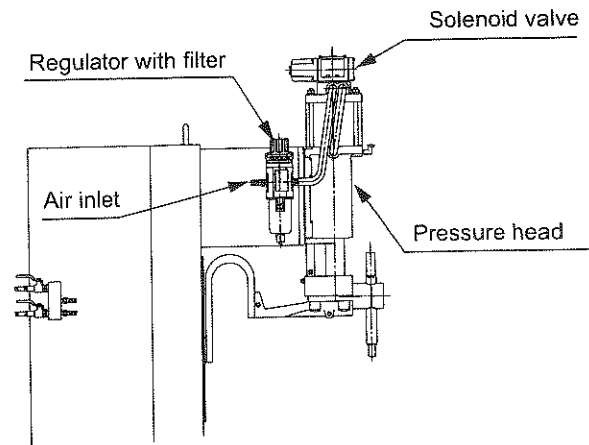
7. Maintenance and Inspection

7.1 Daily inspection

⚠ WARNING

Prior to maintenance and inspection work, make sure to turn off the power switch of the power distribution box unless it is necessary to perform inspections while supplying current. Failure to follow the instruction can cause serious injury, such as electric shock and burn injury.

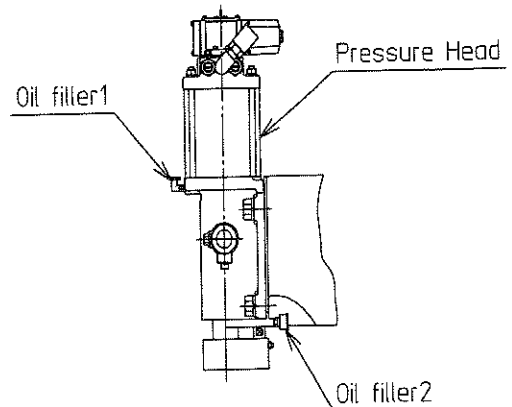
Daily inspection is very important to maintain and well utilize the features of the welding machine and to secure safety operation everyday. As daily inspection, check the movements of the pressure head and the end of the electrode chip for wear, and clean or replace the filter regulator as needed. Use Panasonic genuine replacement parts to secure performance and function of the welding machine.



Check item	Check points
Regulator with filter	<ul style="list-style-type: none"> • Check if water is pooled. • Check for clogged filter. • Check if the pressure gauge functions.
Solenoid valve	<ul style="list-style-type: none"> • Check if the solenoid valve makes sound during operation. • Check for abnormal noise.
Pressure head	<ul style="list-style-type: none"> • Check for looseness and creaks during operation. • Check if the operating speed is slowed down. (Also check regulator with filter and solenoid valve.)

7.1.1 Pressure head

- Lubrication
 - (1) Fill the "Oil filler1" with machine oil once a day.
 - (2) Fill the "Oil filler2" with the Lithium soap-base grease #2 once a week.



Maintenance and Inspection

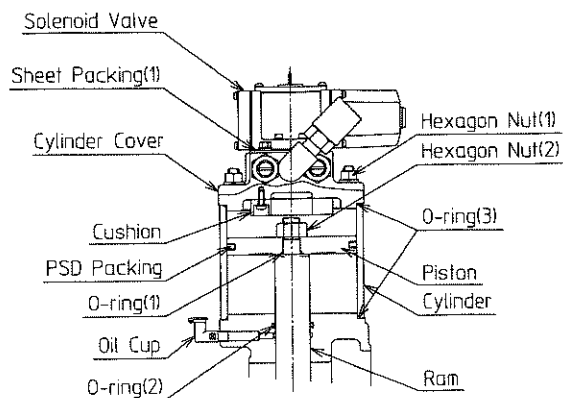
● Air leakage

While the welding machine is in stop state (electrode is in the up position), set the air pressure to 0.49 MPa (5 kgf/cm²) and check if air leaks from the air exhaust port. If air leaks, check the following points.

- If air leaks from the air exhaust port, check PSD packing and O-ring(1) inside of the pressure head.
- If air leaks from the oil cup, check the O-ring (2) inside of the pressure head.

Note

- (1) To disassemble the welding machine:
Remove the air hose, and then remove the hexagon nuts (1), cylinder cover, cylinder, hexagon nut (2), piston and ram in this order.
- (2) If abnormality is observed:
Replace the packings and O-rings.
Refer to the table on the right for applied part numbers for replacement.
- (3) To re-assemble the unit:
Observe the following instructions and reassemble in the reverse order of the disassembly.
 - Wipe off dirt and dust completely, and then apply grease or machine oil over the inner surface of the cylinder, O-rings and periphery of the ram.
 - Assemble parts with caution not to scratch the O-rings.
 - Fasten the hexagon nuts (1) gradually and alternatively. Do not fasten one hexagonal nut completely at one time.
 - When installing the air hose, work with caution to prevent dirt and dust from getting into the piping system.



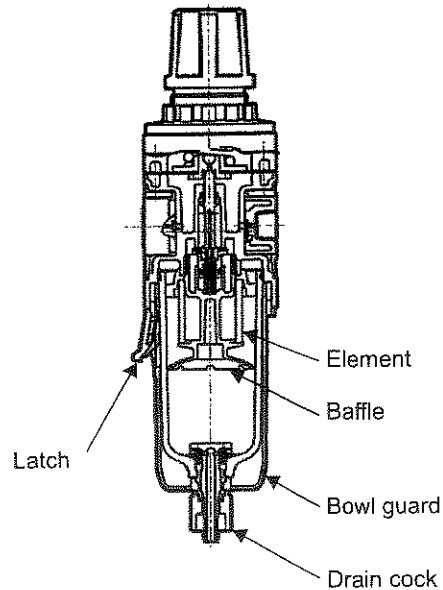
Structure of Pressure Head.

<Applied Packing and O-ring>

Name	500-kgf pressure head
Sheet packing (1)	For VS4120
PSD packing	PSD120
O-ring (1)	JIS B2401-P16
O-ring (2)	JIS B2401-P32
O-ring (3)	S120

7.1.2 Regulator with filter

- Prior to mounting or removing the filter cup, make sure to turn off the air.
- Cleaning the air filter
Turn the drain cock in the direction of "0" to empty the filter of pooled impure substance before such substance is collected up to the baffle (drain upper limit). Turn the drain cock in the direction of "S" to stop drain. Use a mild detergent to clean the cup.
- If pressure operation becomes slow due to clogging of the filter element, clean the filter element or replace it with a new one.
To access the filter element, while pressing the latch, turn the bowl guard with bowl about 45 degrees and remove them. Then, turn the baffle to the left and remove it from the F.R unit main body.
- Re-assemble the filter cup in reverse order.
Check to make sure the latch is fit in the dent part of the main body.



7.1.3 Shaping the end of electrode tip

Shape of the end of the electrode tip is one of the critical welding conditions. Using an electrode tip having too small diameter at the end can make a hole in the work-piece to be welded. Or use of an electrode tip whose end diameter is too large can cause poor or no welding joint after welding operation. Therefore, it is important to keep the end of the electrode tip in good shape all the time either with a machine or manually, especially after welding aluminum or plated sheet steel. During aluminum or plated sheet steel welding operation, the end of the electrode tip picks up metals, which can cause stiffness degradation or poor appearance of the welded part. So make sure to shape the end of the electrode tip and grind it after such welding operation.

7.1.4 About cables

Part	Checking points	Note
Input cables	<ul style="list-style-type: none"> • Check connections at I/O terminals of input protective device of the power distribution box for looseness. • Check fuses for loose connection. • Check connections at input terminals of the power source for looseness. • Check insulator all over the input cables for any signs of wear or damage and exposure. 	<p>Inspection must be performed with appropriate safety precautions relative to the work environment to secure safety of operators and operation.</p> <p>(1) Daily check: Brief and general (2) Periodical check: Detailed and careful</p>
Ground cables	Check the ground cable for welding power source for disconnection or poor connection.	Check daily to ensure safety against an unexpected accident from electrical leak.

Maintenance and Inspection

7.2 Periodical inspection

WARNING

- To prevent an electric shock be sure to turn off the switch at the power distribution box before performing inspection work.
- Do not touch electrical parts or so with a wet hand.

Daily inspection is not enough to maintain performance of the welding machine over the years. Periodical inspection is detail inspection including cleaning and inspection of inner area of welding machine body which should be performed carefully. Generally perform the periodical inspection every six months. In dusty and oily working area where dust can easily get into the welding machine body, it is recommended to perform the periodical inspection every three months.

Part name	Check points	Frequency (Reference only)
Connections and fastening parts	Disassemble connection parts of welding transformer secondary side, secondary conductor and horn feeder panel, and then grind their contact parts. Make sure to grind the contact parts without fail as contact failure can cause degradation of welding performance.	Twice a year
Path of the cooling water	Blow compressed air in the path of the cooling water through the water supply port to remove water stain.	Once a month
Thyristor inside the welding machine body	Dust the thyristor at the upper part of inside of the welding machine body and its proximity regularly. Attachment of such collected dust, if a lot, can cause an error of dielectric withstanding voltage shortage.	-
Welding machine body and peripherals	Check items especially those not included in the daily inspection, such as, odor, discolorations, trace of heat generation and connections inside of the machine, and also retighten bolts/nuts if necessary.	-
Cables	Input cables and ground cables. Check the check points for the daily inspection carefully and thoroughly.	-
Consumable parts	Relay contacts on the input main circuit and on the P.C. Board have electrically and mechanically service life. Check them as consumable parts at every periodical inspection, and replace them if necessary. Make sure to replace with Panasonic genuine parts.	-

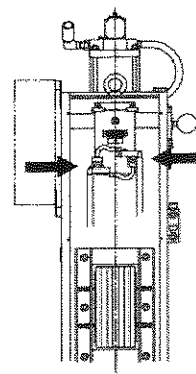
7.2.1 Notes on withstand voltage test and insulation resistance measurement

CAUTION

Only person who is well known electric knowledge of welding machine and experienced the test can operate these high voltage test. If not, please contact local Panasonic welding distributors.

Since this welding machine employs semiconductor components in the main circuit, inadvertent execution of withstand voltage test or measurement of insulation resistance may cause machine failure.

Before performing the test or measurement, be sure to short circuit the semiconductors (between A and K of SCR 1 and 2) indicated by the arrow in the figure on the right.



Rear side of welding machine
(Without rear cover)

7.2.2 About electrical leakage breaker

CAUTION

In case of using an earth leakage breaker to the input cable, make sure to use one for welding.

8. Troubleshooting

⚠ WARNING
Prior to taking measures, make sure to turn off the power switch of the power distribution box. Failure to follow the instruction can cause serious injury, such as electric shock and burn injury.

⚠ CAUTION
Do not turn on the power switch of the power distribution box with the covers open. The “covers” include the covers of the controller and the rear panel of the welding machine.

8.1 Initial diagnosis of abnormality

It would be a premature diagnosis to conclude as failure in the welding machine whenever an abnormal situation, such as welding operation is not available, welding is not stable or welding result is not acceptable, occur. In many cases, such abnormalities are caused by very simple reasons, such as blown fuse, loosened connection, wrong settings, breaking of cable, crack in air hose or omission of switching operation.

It is recommended to check several items for possible causes of abnormalities before asking assistance for repair.

The following table shows the initial diagnosis of welding abnormalities. Follow the instruction in the table and check items accordingly when an abnormality occurs.

Abnormality		Power is turned on but welding machine does not run.	welding machine runs but does not weld.	Welding result is not good.
Check parts	Check items			
Magnetic contactor and input protection device	<ul style="list-style-type: none"> • Switching ON/OFF • Blown fuse • Loose connection 	Check	-	-
Input cable	<ul style="list-style-type: none"> • Cable condition (possible breakage) • Loose connection • Signs of overheat 	Check	Check	-
Switches on operation panel of the controller	<ul style="list-style-type: none"> • Power switching ON/OFF • Wrong setting of selection switches 	Check	Check	Check
Foot switch and Control cable	<ul style="list-style-type: none"> • Breaking of wire (fatigue due to bending) • Signs of heavy falling object 	Check	-	-
Surface condition of base metal	<ul style="list-style-type: none"> • Oil, stain, rust, or coating film on the surface of base metal 	-	-	Check
Regulator	<ul style="list-style-type: none"> • Insufficient air pressure • Air leakage 	Check	-	Check
Solenoid valve	<ul style="list-style-type: none"> • Breakage of SOL coil • Contact failure of cord connector 	Check	-	-

8.2 Troubleshooting

Error	Probable causes	Remedy
Power switch is on: No operation	Insufficient air pressure.	<ul style="list-style-type: none"> Adjust the air pressure to 0.098 MPa (1 kgf/cm²) or higher. Regulator failure → Repair or replace it.
	Air pressure is OK.	<ul style="list-style-type: none"> Air leak at O ring → Replace O ring. Insufficient lubrication at pressure head → Lubricate.
	Solenoid valve failure.	<ul style="list-style-type: none"> Manually operable → Breaking of coil of solenoid valve → Replace it. → Connector: Poor connection → Repair it. No manual operation → Spring failure → Replace it.
	Start switch failure.	<ul style="list-style-type: none"> Switch failure → Replace it. Breaking of cord → Repair or replace it. Failure in motion position of the micro-switch → Adjust it. Soldered metal plug came unstuck → Repair it.
	Control/welding power is OFF.	<ul style="list-style-type: none"> Check power fuse and controller fuse. → Replace fuse(s). Check wiring. → Connect connector(s) firmly.
	Thermostat is on	<ul style="list-style-type: none"> Check if the cooling water amount is enough. → Supply enough cooling water. Clean the cooling water path. Check if the duty cycle is within the rating. → Lower the duty cycle.
	P.C. Board failure	<ul style="list-style-type: none"> Replace the P.C. Board.
Operate: No welding	P.C. Board failure	<ul style="list-style-type: none"> Check if the gate signal of the thyristor is ON. If the signal is on, replace the P.C. Board.
	Thyristor failure	<ul style="list-style-type: none"> Check the gate signal of the thyristor. If the gate signal is on, replace the thyristor.
Welding does not stop	P.C. Board failure	<ul style="list-style-type: none"> Adjust the weld time knob. See if the gate signal goes off, if not, replace the P.C. Board.
	Thyristor failure	<ul style="list-style-type: none"> Check the gate signal. If the signal goes off when the welding operation ends, replace the thyristor.

◆ Measures for other errors

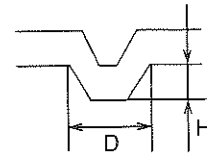
Abnormalities	Countermeasures
Fuse has blown	Replace the fuse with a new one specified in the parts list. After the replacement, if the replaced fuse blows when power is turned on, turn off the power and ask the shop you purchased the welding machine from or Panasonic representatives for repair.
PC board failure	Turn off the power and ask the shop you purchased the welding machine from or Panasonic representatives for repair.
Other parts failure	Purchase a replacement according to the provided parts list and replace it.
Abnormalities other than parts failure	Check the cause of failure and correct it. (wrong or incomplete connection and so on.)

9. Welding Condition Tables

1) Mild steel: Spot welding conditions

Welding condition (Class)		B class									
Thickness (work)	(mm)	0.4	0.5	0.6	0.8	1.0	1.2	1.6	2.0	2.3	3.2
Electrode pressure	(kN)	0.74	0.88	0.98	1.23	1.47	1.72	2.35	2.94	3.63	4.90
	(kgf)	75	90	100	125	150	175	240	300	370	500
Power ON time	(Cycle)	10	11	13	15	20	23	30	36	44	60
Welding current	(A)	4500	5000	5500	6500	7200	7700	9100	10300	11300	12900
Electrode tip diameter	(mm)	3.2	3.5	4.0	4.5	5.0	5.5	6.3	7.0	7.8	9.0

2) Mild steel: Projection welding conditions

Thickness (work)		(mm)	0.6	0.8	1.0	1.2	1.6	2.0	(*) Projection shape 
Schedule A	Electrode pressure	(kN)	0.69	0.88	1.27	1.72	2.60	3.58	
		(kgf)	70	90	130	175	265	365	
	Power ON time	(Cycle)	3	4	5	7	10	14	
	Welding current	(A)	4500	6200	7700	8800	10600	12200	
Schedule C	Electrode pressure	(kN)	0.39	0.54	0.69	0.88	1.47	2.16	
		(kgf)	40	55	70	90	150	220	
	Power ON time	(Cycle)	6	9	14	18	27	36	
Projection shape (*)	H: Height	(mm)	0.64	0.76	0.89	1.02	1.14	1.27	
	D: Diameter	(mm)	2.29	2.67	3.05	3.56	4.06	4.57	

• "Schedule A" is for one point welding, and "Schedule C" is for three or more points welding.

Values in the above table are for one point. Therefore, multiply the value by the number of welding points.

3) Stainless steel: Spot welding conditions

Welding condition (Class)		B class									
Thickness (work)	(mm)	0.4	0.5	0.6	0.8	1.0	1.2	1.6	2.0	2.4	3.2
Electrode pressure	(kN)	1.47	1.86	2.16	2.94	3.92	4.90	6.86	8.82	10.78	14.70
	(kgf)	150	190	220	300	400	500	700	900	1100	1500
Power ON time	(Cycle)	4	4	5	6	7	8	11	14	16	20
Welding current	(A)	3000	3800	4700	6200	7600	9000	11500	13500	15500	19000
Electrode tip diameter	(mm)	3.2	3.5	4.0	4.5	5.0	5.5	6.3	7.0	7.8	9.0

If the tensile strength of the base metal is stronger than 1.03 kN/mm² (105 kgf/mm²), reduce welding current by 10 - 20 %.

4) Nut welding conditions

		Square nut (4 projection points)					Weld nut (3 projection points)				
Welding condition (Class)		B					B				
Nut size	(mm)	12	12	12	8	8	10	10	10	6	6
Thickness (counterpart)	(mm)	1.2	2.3	4.0	1.2	2.3	1.2	2.3	4.0	1.2	2.3
Electrode pressure	(kN)	3.63	3.92	4.12	2.65	2.84	3.43	3.63	4.02	2.65	2.84
	(kgf)	370	400	420	270	290	350	370	410	270	290
Power ON time	(Cycle)	6	6	6	6	6	6	6	6	6	6
Welding current	(A)	14000	15000	16500	9500	10500	13000	14000	15500	9500	10500

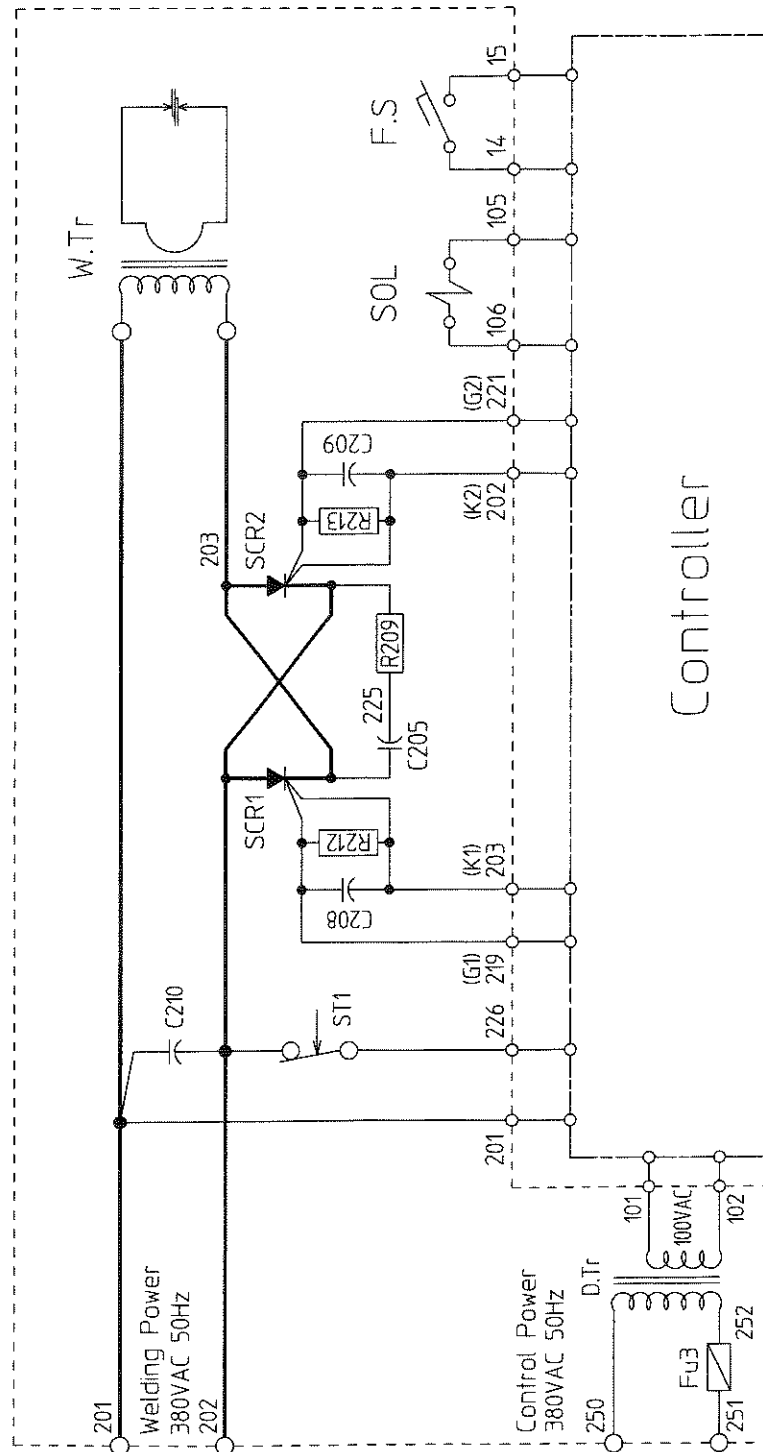
Note

(1) The above condition tables are for reference use only. Based on the values on the table, perform test welding and adjust conditions depending on the results, such as appearance and tensile strength.

(2) The above conditions are for 60 Hz. In case of using 50 Hz, adjust the values on the above table by multiplying the value by 5/6. However, for controllers that use a volume to adjust frequency to "continuous", use the values on the list as it is. (Do not multiply it by 5/6.)

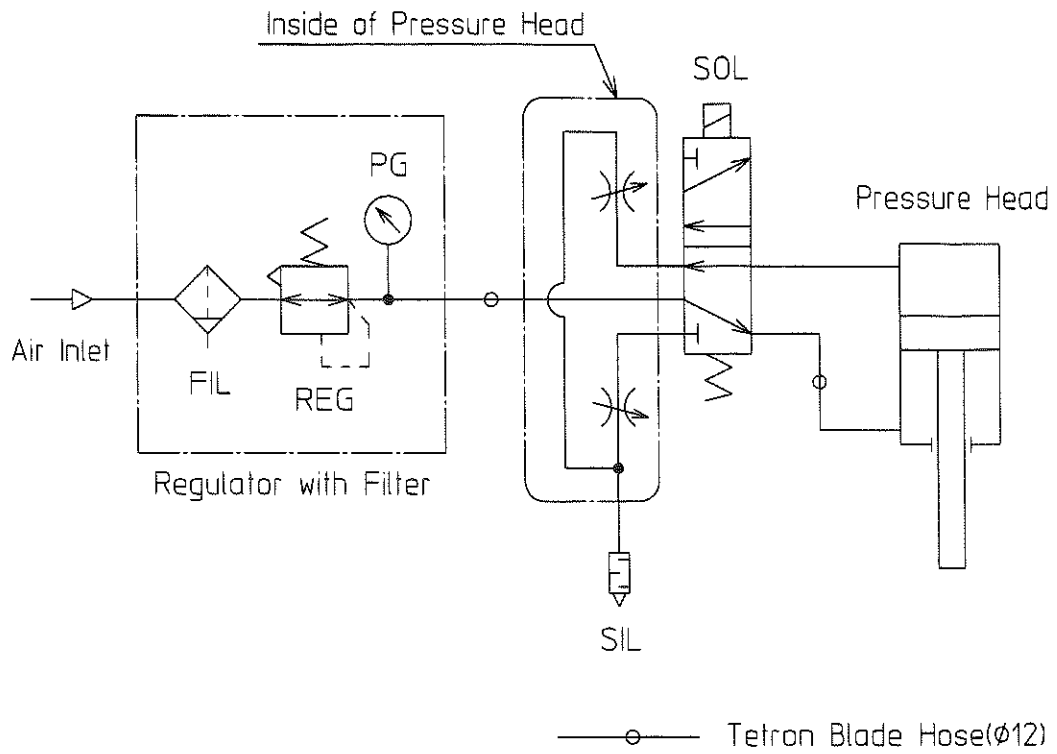
10. Circuit Diagram

10.1 Welding machine body

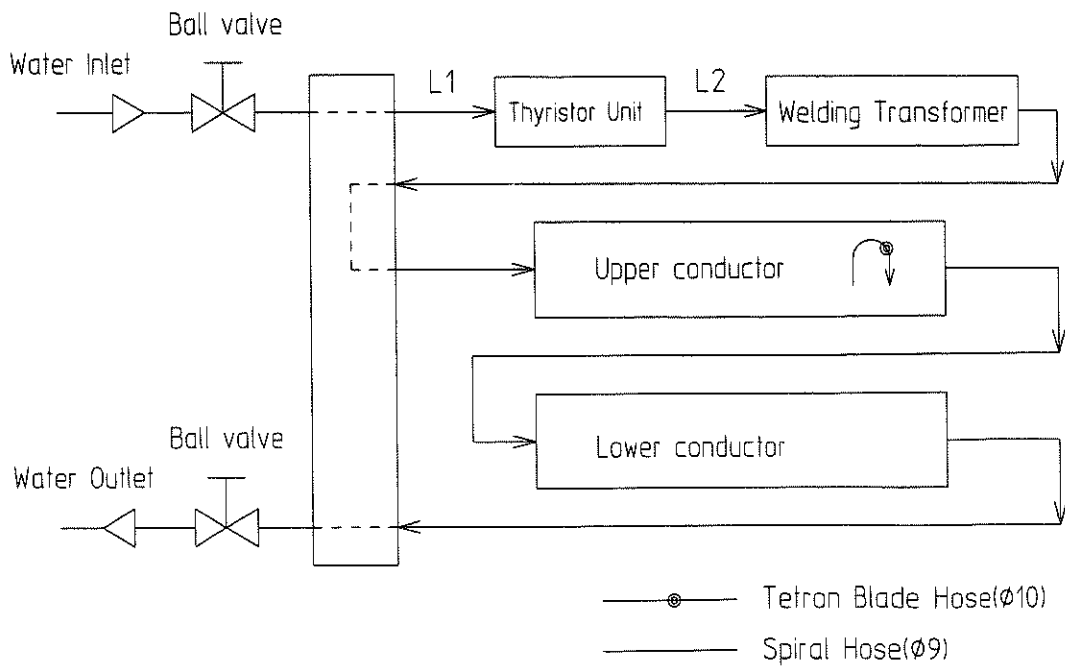


Circuit Diagram

10.2 Air piping system



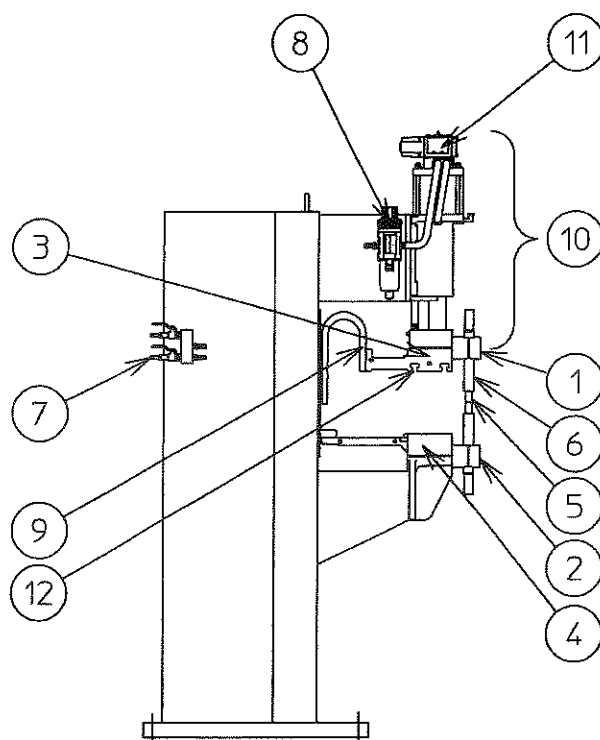
10.3 Water piping system



(Note) The hose length of L1 and L2 is set to 1200 mm each.

11. Spare Parts List

11.1 Welding machine body



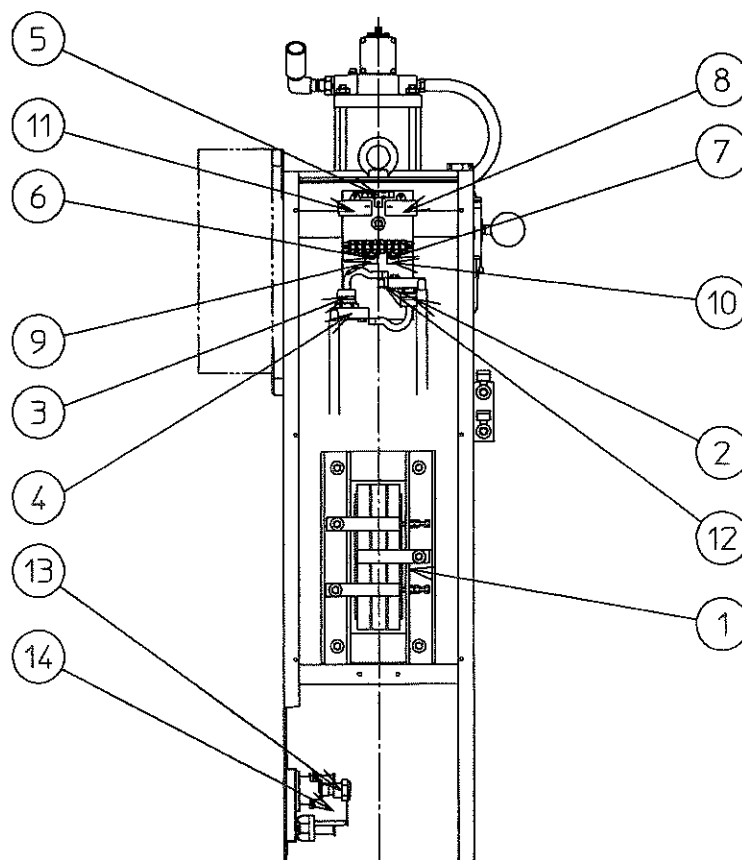
No.	Symbol	Part name	Part code	Q'ty	Note
①	-	Upper horn	RCH06001	1	
②	-	Lower horn	RCH06001	1	
③	-	Upper platen	RCP35004	1	
④	-	Lower platen	RCP35002	1	
⑤	-	Electrode tip	RET01601	2	16 (Dia.), 1/5(Taper)
⑥	-	Tip holder	REH35001	2	(REU01601)
⑦	-	Manifold unit	RJM35008	1	
⑧	-	Regulator with filter	W3000-459445	1	With a pressure gauge.
⑨	-	Flexible conductor	RCF35003	1	
⑩	-	Pressure head ass'y	RPH35005	1	
⑪	SOL	Solenoid valve	VS4124X68	(1)	
⑫	-	T-nut	RMN01001	8	

Note

- Solenoid valve is included in the pressure head assembly.
- T-nuts are included as accessories.

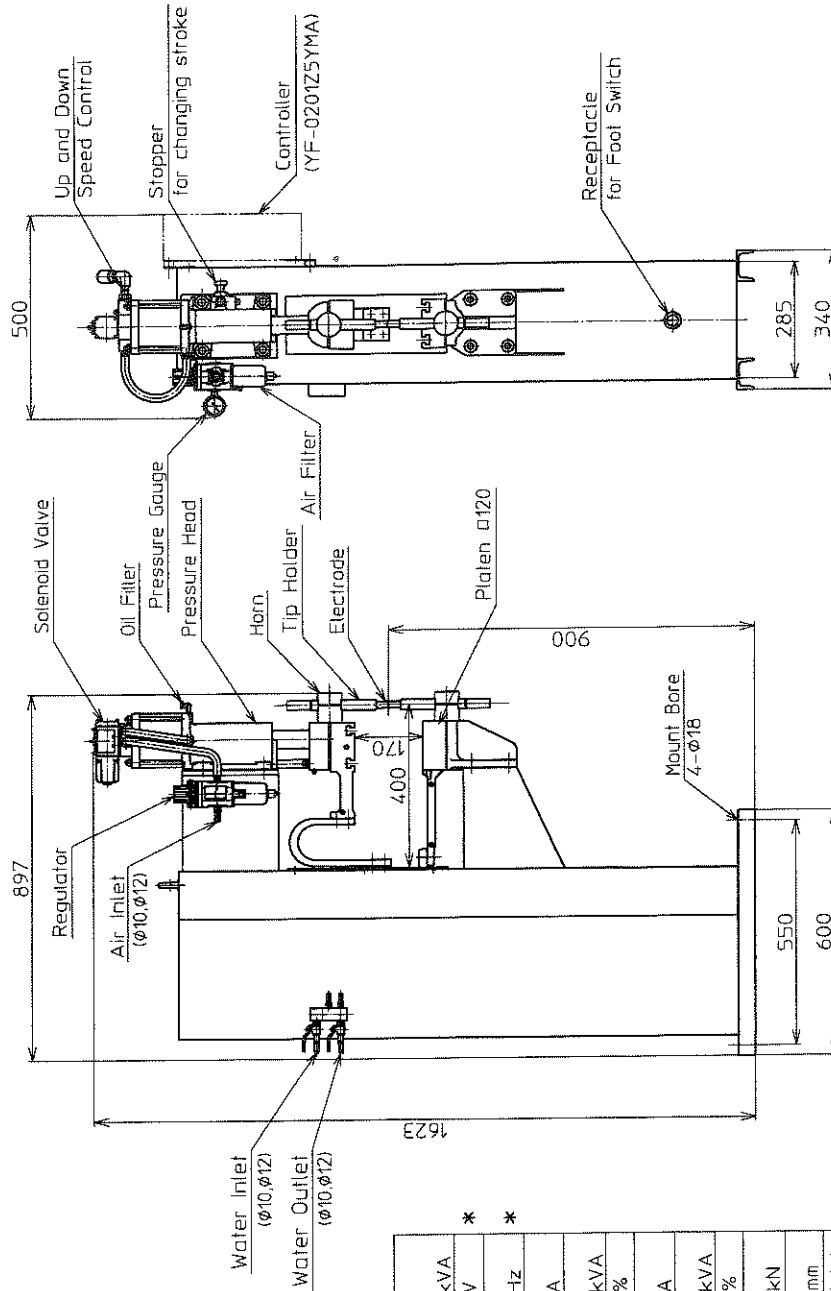
Spare Parts List

11.2 Welding machine body (Inside)



No.	Symbol	Part name	Part code	Q'ty	Note
①	W.Tr	Welding transformer	RTU35004	1	
②	SCR1	Thyristor 1	178RS120F	1	
③	SCR2	Thyristor 2	178RS120F	1	
④	-	Thyristor fitting	RFM00002	2	
⑤	R209	Resistor	SFW10E150	1	10 W, 15 Ω
⑥	R212	Resistor	ERDS1TJ102T	1	1/2 W, 1 kΩ
⑦	R213	Resistor	ERDS1TJ102T	1	1/2 W, 1 kΩ
⑧	C205	Capacitor	JS501105QA1	1	500 V, 1 μF
⑨	C208	Capacitor	ECQM1H104KZ	1	50 V, 0.1 μF
⑩	C209	Capacitor	ECQM1H104KZ	1	50 V, 0.1 μF
⑪	C210	Capacitor	JS501105QA1	1	500 V, 1 μF
⑫	ST1	Thermostat	5003F55CB7A	1	
⑬	Fu3	Fuse	AFAC3	1	3 A
⑭	D.Tr	Transformer	UTU5094	1	

12. Customized Specifications



Specification
AC Type

Rated Capacity (at 50% Duty cycle)	35 kVA
Rated Input Volt	380 V
Rated Frequency	50 Hz
Short Circuit Current	16000 A
Std Maximum Input	73 kVA
Duty cycle	11.5 %
Short Circuit Current	19500 A
Std Maximum Input	89 kVA
Duty cycle	7.7 %
Electrode Pressure	4.9 (500kgf) kN
Electrode Stroke	20,60 mm
Cooling Water Rate	2 L/min
Mass	255 kg
Electrode Tip	φ16X50 mm Taper1/5
Tip Holder	φ25X160 mm
Horn	φ60 mm
Platen	φ120 mm

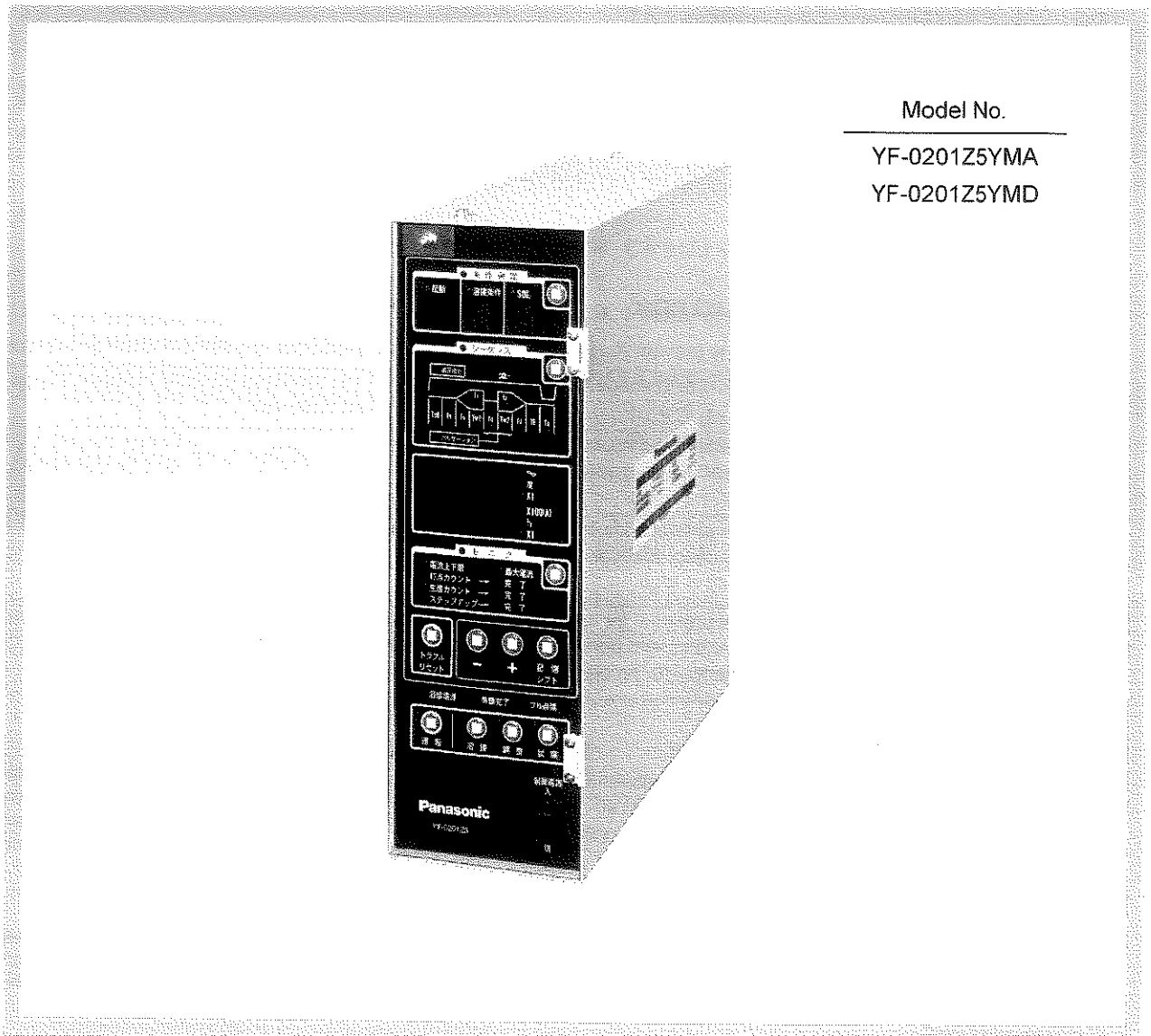
* Special Specification
Input 380V 50Hz
Step-down Transformer(380V → 100V) is installed.
English Version
Controller: YF-0201Z5YMA

(Unit: mm)

Panasonic®

Operating Instructions Controller for Resistance Welders

Model No. **YF-0201Z5Yseries**



Model No.

YF-0201Z5YMA

YF-0201Z5YMD

- Before operating this product, please read the instructions carefully and save this manual for future use. Please also read the operating instructions of peripheral equipment.
- First, please read the "Safety Precautions".

English version is the original instructions.

OMRT6557E20

(OMRT6787E)

1704

Introduction

◆ Introduction

This is the operating instructions for YF-0201Z5 series. First of all, please read and understand this operating instruction for proper and safe operation.

◆ Features







- A wide selection of welding sequences and functions. (15 conditions, 2-step welding with 9-pulsation)
- Current incrementing function (selectable between step-up and signal-up) enabling the longer service life of the electrode and facilitating the electrode control.
- Production counter and welding counter (increment/decrement type) to control the production and to prevent careless errors.
- External input/output terminals facilitating for use with a robot or automatic welding machine.

◆ About safety

First of all, please read and understand "Safety Manual" and operating instructions provided with the robot thoroughly for proper and safe operation of our robots.

◆ Warning symbols for safe usage

Each symbol describes things to be observed to prevent you and other personnel from hazardous conditions or damage to property.

The followings explains hazardous conditions or damages that are classified into the following three levels.		The following symbols indicates things to be observed.	
 DANGER	A hazardous situations including death or serious personal injury is imminent.		Things that MUST NOT be performed.
 WARNING	The potential for a hazardous accident including death or serious personal injury is high.		Things that MUST be performed.
 CAUTION	The potential for hazardous accident including light personal injury and/or the potential for property damage are high.		Things attention must be paid to.

◆ Disclaimer

Panasonic Smart Factory Solutions Co., Ltd. (hereinafter called "PSFS") and its affiliates (including any subcontractor, sales company or agent) shall not assume or undertake any responsibility or liability of the followings:

- Any problem arising out of, or directly or indirectly attributable to, the failure of user to carry out those normal installation, normal maintenance, normal adjustment and periodical check of this Product.
- Any problem arising out of any Force Majeure, including but not limited to, act of God.
- Any malfunction or defect of this Product that is directly or indirectly the result of any malfunction or defect of one or more related parts or products that are not supplied by PSFS. Or any problem arising out of, or directly or indirectly attributable to, the combination of this Product with any other product, equipment, devices or software that is not supplied by PSFS.
- Any problem arising out of, or directly or indirectly attributable to, user's failure to strictly carry out or follow all of the conditions and instructions contained in this instruction manual, or user's misuse, mishandle, operational miss or abnormal operation.
- Any problem arising out of this Product or the use of it, the cause of which is other than the foregoing but is also not attributable to PSFS.
- Any claim of a third party that this Product infringes the intellectual property rights of such third party that are directly or indirectly caused by User's use of this Product and relate to the method of production.

ANY LOST PROFITS OR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING FROM ANY MALFUNCTION, DEFECT OR OTHER PROBLEM OF THIS PRODUCT.

- The description of this manual is based on the contents as of April, 2017.
- The contents of this manual are subject to change without further notice.

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Safety precautions

1. Safety precautions

WARNING

Welding power source

Observe the following instructions to prevent the hazard.

- (1) Never use the welding power source for other than welding purpose. (e.g. Never attempt to use the welding power source for pipe thawing.)
- (2) It is very important to comply with all instructions, safety warnings, cautions and notes mentioned. Failure to do so can result in serious injury or even death.
- (3) Work of driving source at the input side, selecting work site, handling, storage and piping of high pressure gas, storage of welded products and also disposal of waste should be performed according to the operating instruction and national, state and local codes and regulations.
- (4) Prevent any unauthorized personnel to enter in and around the welding work area.
- (5) Magnetic fields from high currents can affect pacemaker operation. If you wear a pacemaker, consult your physician before going near welding operations.
- (6) Only educated and/or skilled persons who well understand this welding power source should install, operate, maintain and repair the unit.
- (7) Only educated and/or skilled persons who well understand the operating instruction of the unit and are capable of safe handling should perform operation of the unit.

Against electric shock



Observe the following instructions to prevent the hazard.

- (1) Do not touch any charged parts without secondary conductors.
- (2) Grounding of the case of the welding power and base metal or a jig electrically connected to the base metal must be performed by educated and/or skilled persons.
- (3) Before installation or maintenance work, turn off power at the power box, wait it for at least five minutes to discharge capacitors. Significant voltage may exist on capacitors after turning off power at the power box so it is imperative to check to make sure that no charged voltage present at capacitors before touching any parts.
- (4) Do not use undersized, worn, damaged or bare wired cables.
- (5) Connect cables completely and insulate connection parts.

- (6) Keep all cases, panels and covers securely in place.
- (7) Do not handle the welding power source with torn or wet gloves.
- (8) Turn off all equipment when not in use.
- (9) Perform periodic checks without fail and repair or replace any damaged parts before using the power source.
- (10) As for coolant water, use quality water with few sediment and 5000 W·cm or more in resistance.
- (11) Use big enough size of cables and hoses for applied power and pressure.

Space between electrodes



Observe the following instructions to prevent injuries.

- (1) Do not put your hands, fingers or arms in the gap between electrodes, or part of your body may be caught by the electrodes resulting in injury or bone fracture.
- (2) Prior to turning on power or supplying compressed air, confirm safety around the welding machine.
- (3) Turn off all equipment including compressed air and coolant water if not in use.

Against fire, explosion or blowout



Observe the following cautions to prevent fires explosion or blowout.

- (1) Remove any combustible materials at and near the work site to prevent them from being exposed to the spatter. If they cannot be relocated, cover them with a fireproofing cover.
- (2) Do not conduct welding near combustible gases. Do not place the welding power source near combustible gases, otherwise, such gases may catch fire from a spark of electricity inside the welding power source as it is electric equipment.
- (3) Do not bring the hot base metal near combustible materials immediately after welding.
- (4) Properly connect cables and insulate connected parts. Improper cable connections or touching of cables to any electric current passage of the base metal, such as steel beam, can cause fire.
- (5) Keep a fire extinguisher near the welding site for an emergency.

CAUTION

Installing shielding (curtain etc.)



Welding flash, flying spatter, slugs, and noise generated during welding can damage your eyes, skin and hearing.

- (1) When welding or monitoring welding, wear safety glasses with sufficient light blocking performance or use a protective mask designed for welding operation.

- (2) When welding or monitoring welding wear protective clothes designed for welding operation, such as leather gloves, leg cover and leather apron, and also wear long-sleeve shirts.
- (3) Install a protective curtain around the welding manipulator site to prevent the arc flash from entering the eyes of people in the surrounding area.
- (4) Be sure to wear noise-proof protective equipment if the noise level is high.

2. Specifications

Attention

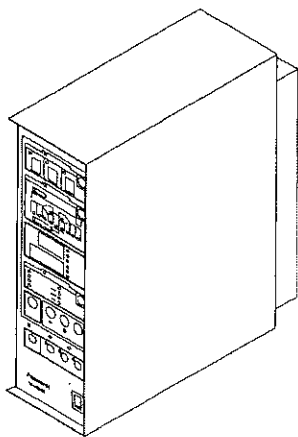
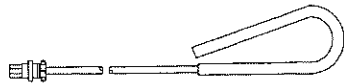
- After the initial installation or replacing welding power source, make sure to set the maximum current value of the applied welding power source.
- If the set value and the maximum current value differ greatly, current won't be supplied correctly.

2.1 Rated specifications

Model number	-	YF-0201Z5YMA / YMD
Rated control power (*) (Allowable range)	VAC	100 (±10 %)
Welding power (*) (Allowable range)	VAC	220/440 selectable (-20 % to +10 %)
Rated frequency	Hz	50/60, auto switching
Main circuit switching method	-	Phase control by thyristor
Dimensions	mm	111 (W) x 300 (D) x 338 (H)
Mass	kg	5
Accessory	-	Toroidal coil (FTU02002): 1 set

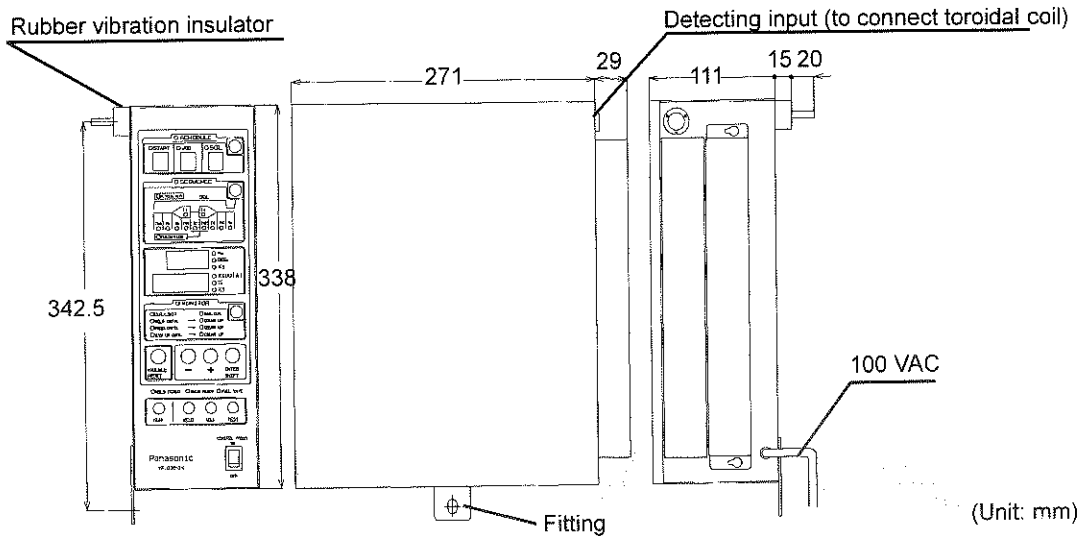
(*) It is necessary to apply power to both controller and welding machine to operate this controller. Settings can be performed while only the controller is turned on.

2.2 Appearance

This product	Accessory
	<p>Toroidal coil (FTU02002)</p> 

Specifications

2.3 Dimensions



2.4 Performance

(1) Current control range

Lower limit of the constant current control range is 30 % of the maximum output current of the applied welding machine. (As for the maximum current setting, set the maximum current of the applied welding machine.)

● Constant current control

- Welding current setting range: 1 500 A to 50 000 A
- Primary current control range: 1 600 A or less (Primary constant current ^{Note})

● Supply voltage compensation control

- 30 to 100 % of the maximum current value of the welding machine

(2) Control speed

- Secondary constant current control: Switching between 0.5 cycle and 1 cycle
- Primary constant current control: 1 cycle
- Supply voltage compensation control: 1 cycle
- Initial response: 2 cycles

(3) Compensation accuracy (an error to the full scale current value.)

● Constant current control

- With respect to "Supply voltage fluctuation" ($\pm 10\%$): $\pm 2\%$ or less
- With respect to "Resistance load fluctuation" ($\pm 10\%$): $\pm 2\%$ or less
- With respect to "Inductive load fluctuation" ($\pm 10\%$): $\pm 2\%$ or less
- With respect to "Ambient temperature change" (0-40 °C): $\pm 3\%$ or less

● Supply voltage fluctuation compensation control

- With respect to "Supply voltage fluctuation" ($\pm 10\%$): $\pm 5\%$ or less

Note

In case of "Primary constant current", the current becomes out of control range if "the maximum current" divided by "welding transformer turn ratio" exceeds 1 600 A.

3. Installation

3.1 Installation site

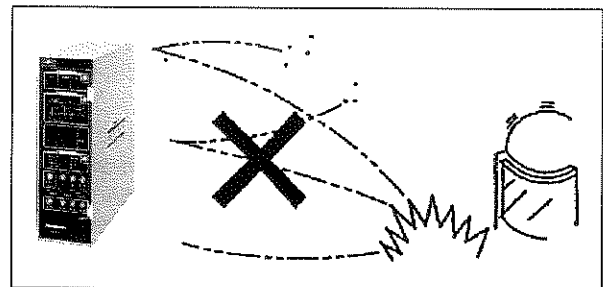
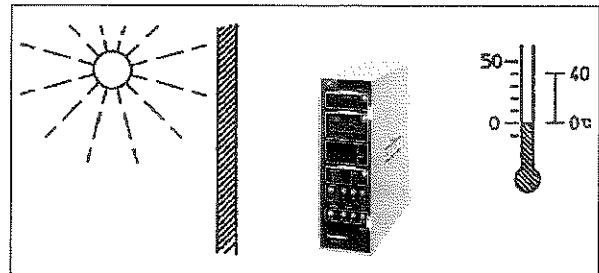


CAUTION

This product is designed for indoor use only.
Do not install it in any places subject to rain or water spray.

- (1) Indoors, not subject to direct sunlight or rain, with less moisture and dust.
- (2) Ambient temperature: 0 °C to 40 °C and free from freezing.
- (3) Places where no toxic, corrosive or explosive gas exists.
- (4) Places where the product is not likely to take in metallic foreign substances.
- (5) Places where no electromagnetic wave noise is to be generated.

* If the product is installed near the noise generation source, the noise may invite malfunction. Install the product carefully not to lay the control cables, such as input/output signal cable for start input, near the noise source.



Note

- When this machine is newly installed or when the welding machine is replaced with another one, set the maximum current value suitable for the applied welding machine. (Please note the setting of significantly unsuitable maximum current value causes improper current to flow.)
- The retention period of the backup data memory is one month. If the data is lost due to long-term stoppage, turn on the power switch, charge the backup capacitor for about five minutes, and then enter the data again.

3. Installation

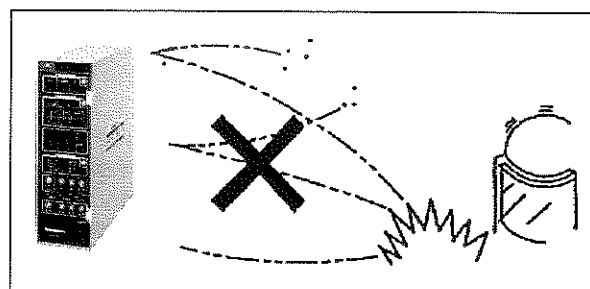
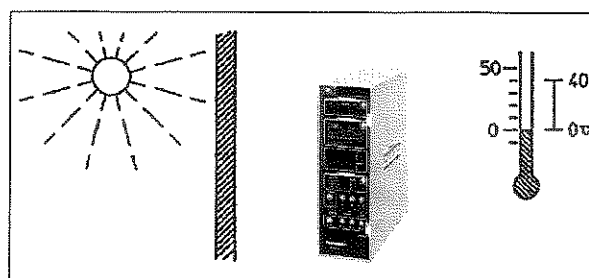
3.1 Installation site

⚠ CAUTION

This product is designed for indoor use only.
Do not install it in any places subject to rain or water spray.

- (1) Indoors, not subject to direct sunlight or rain, with less moisture and dust.
- (2) Ambient temperature: 0 °C to 40 °C and free from freezing.
- (3) Places where no toxic, corrosive or explosive gas exists.
- (4) Places where the product is not likely to take in metallic foreign substances.
- (5) Places where no electromagnetic wave noise is to be generated.

* If the product is installed near the noise generation source, the noise may invite malfunction. Install the product carefully not to lay the control cables, such as input/output signal cable for start input, near the noise source.



Note

- When this machine is newly installed or when the welding machine is replaced with another one, set the maximum current value suitable for the applied welding machine. (Please note the setting of significantly unsuitable maximum current value causes improper current to flow.)
- The retention period of the backup data memory is one month. If the data is lost due to long-term stoppage, turn on the power switch, charge the backup capacitor for about five minutes, and then enter the data again.

Installation

3.2 Connections

⚠ WARNING

Prior to connection work, turn off power to the line disconnect device and all input power.

⚠ CAUTION

Do not perform connection work with wet hands.

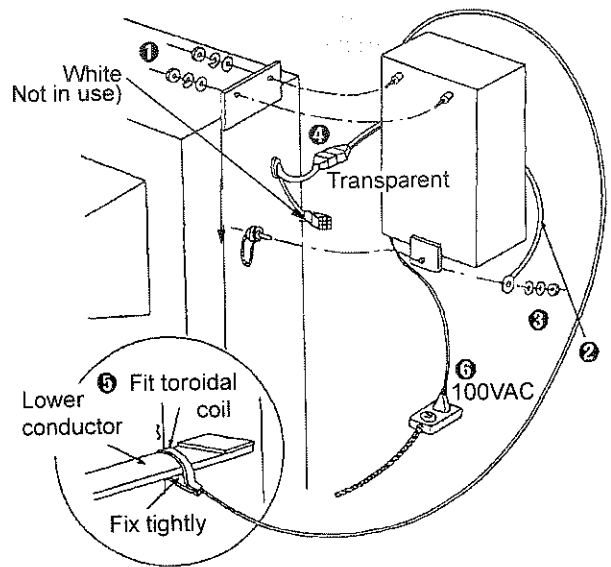
Note Make sure that only qualified persons or persons who are familiar with welding machines take case of the connection work.

3.2.1 Mounting on the welding machine

- (1) Tighten the each wire with flat washer, spring washer and hexagon nut. (M6) Fit the grounding wire (green) to the welding machine.
- (2) Connect the connector.

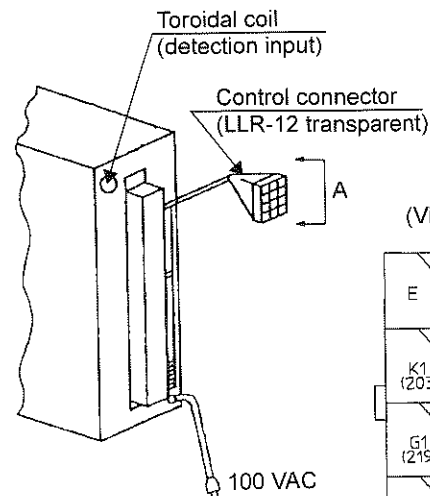
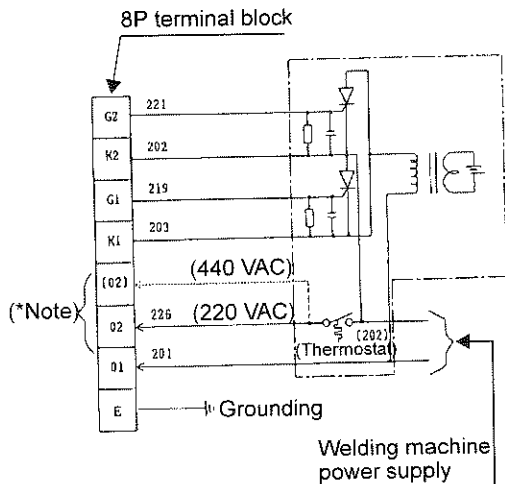
<Note>
If the welding machine is provided with two connectors, make sure to connect to the transparent one. As for the other connector (white one), as it is not used, insulate it with vinyl tape or the like.
- (3) Fit the toroidal coil. (See lower right figure for detail.)

Note: If "C.T." is provided as accessory (instead of "toroidal coil"), see section "When the primary constant current system is selected" in "Applied function".
- (4) (Connect the input cable (100 VAC) to the 100 VAC power supply.



Note

- The welding power supply voltage is factory set to 220 VAC at shipment. In case of using it at 440 VAC, it is necessary to change the connection of wire #226 to the 8P terminal block at the rear side of this product. (from "02" to "(02)"). (See below figure for detail.)
- Do not lay control cables (input/output signal for starting input) near noise source, such as the TIG arc welding machine. Otherwise, the product may malfunction due to the noise.



(View from A)

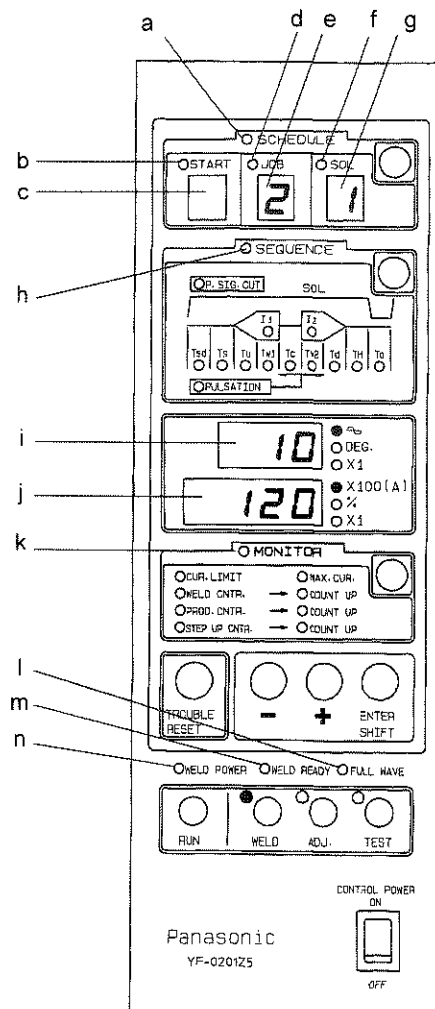
	1	5	9
E	01 (201)	02 (226)	
K1 (203)	2	6	10
		K2 (202)	15
G1 (219)	3	7	11
		G2 (221)	14
	4	8	12
		105	106

4. Basic operation

4.1 Names and functions

4.1.1 Operation panel

1) Lamps and indicators

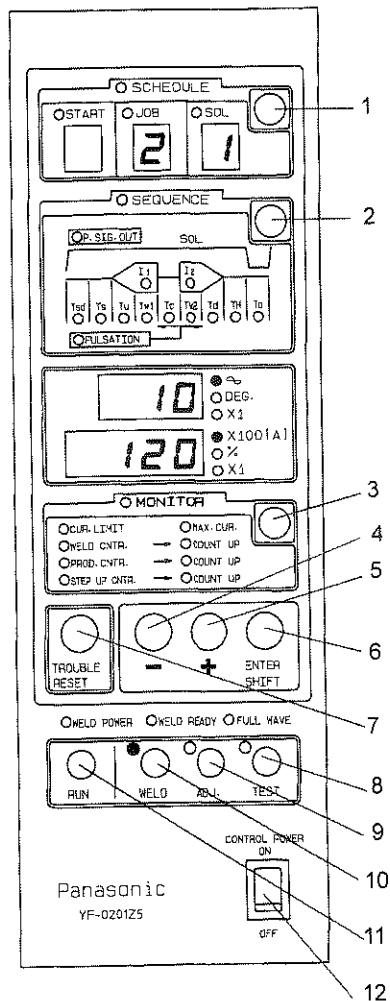


- a. SCHEDULE lamp
Lights when the schedule (job No. setting) mode is selected.
- b. START lamp
Lights when the starting No. is selected in the schedule mode.
- c. Starting No. indicator
Shows the starting No. (1 to 4).
- d. JOB lamp
Lights when the job No. is selected in the schedule or sequence mode.
- e. Job No. indicator
Shows the job (welding sequence) No. (1 to 9, A to F).
- f. SOL lamp
Lights when the SOL No. is selected in the sequence mode.
- g. SOL No. indicator
Shows the SOL No. (I or II).
- h. SEQUENCE lamp
Lights when the sequence mode is selected.
- i. Data indicator A
Shows the data during operation (welding cycle, conduction angle, welding count and trouble code) and various data in the sequence and monitor modes.
- j. Data indicator B
Shows the data during the operation (welding current, product count and trouble code^(*)), the mode during the operation and various data in the sequence and monitor modes.
- k. MONITOR lamp
Lights when the monitor mode is selected.
- l. FULL WAVE lamp
Lights when the welding current reaches the limit and current larger than it cannot be carried.
- m. WELD READY lamp
Lights when the machine enters operation mode while the power to the controller and the welding machine are on.
- n. WELD POWER lamp
Lights when the power to the welding machine is turned on.

(*) : When the error code is 09s, the indicator displays the last digit of the code. (For example, if the error code is "09-1" the indicator displays "1".)

Basic operation

2) Keys



1. SCHEDULE mode select key
Enables to set welding conditions
2. SEQUENCE mode select key
Enables to set sequence data
3. MONITOR mode select key
Enables to set monitor data
4. "-" key
Pressing this key decrements the number by the minimum unit. Keeping pressing it changes the number fast.
5. "+" key
Pressing this key increments the number by the minimum unit. Keeping pressing it changes the number fast.
6. ENTER/SHIFT key
Pressing this key stores the data and changes the panel display to the next step. Keeping pressing it changes the display fast.
When this key is pressed together with "TROUBLE RESET" key, the data is stored while the panel display returns to one step before.
7. TROUBLE RESET key
Use it reset the trouble state.
8. TEST key
Enables to test the welding sequence. The preset sequence is executed when the start input is turned on, however, the welding current does not flow. "CH2" is displayed on the data indicator B.
9. ADJ key
Enables the adjustment. Only the pressing operation is performed while the starting input is on. Use this mode for electrode positioning and dressing. "CH1" is displayed on the data indicator B.
10. WELD key
Enables to start the preset welding sequence. When the start input is turned on, the welding sequence is executed.
11. RUN key
Use it to switch to the operation mode. Press this key for about one second to switches the mode to "Operation" mode.
12. CONTROL POWER key
Turns ON/OFF the 100VAC input power of this product.

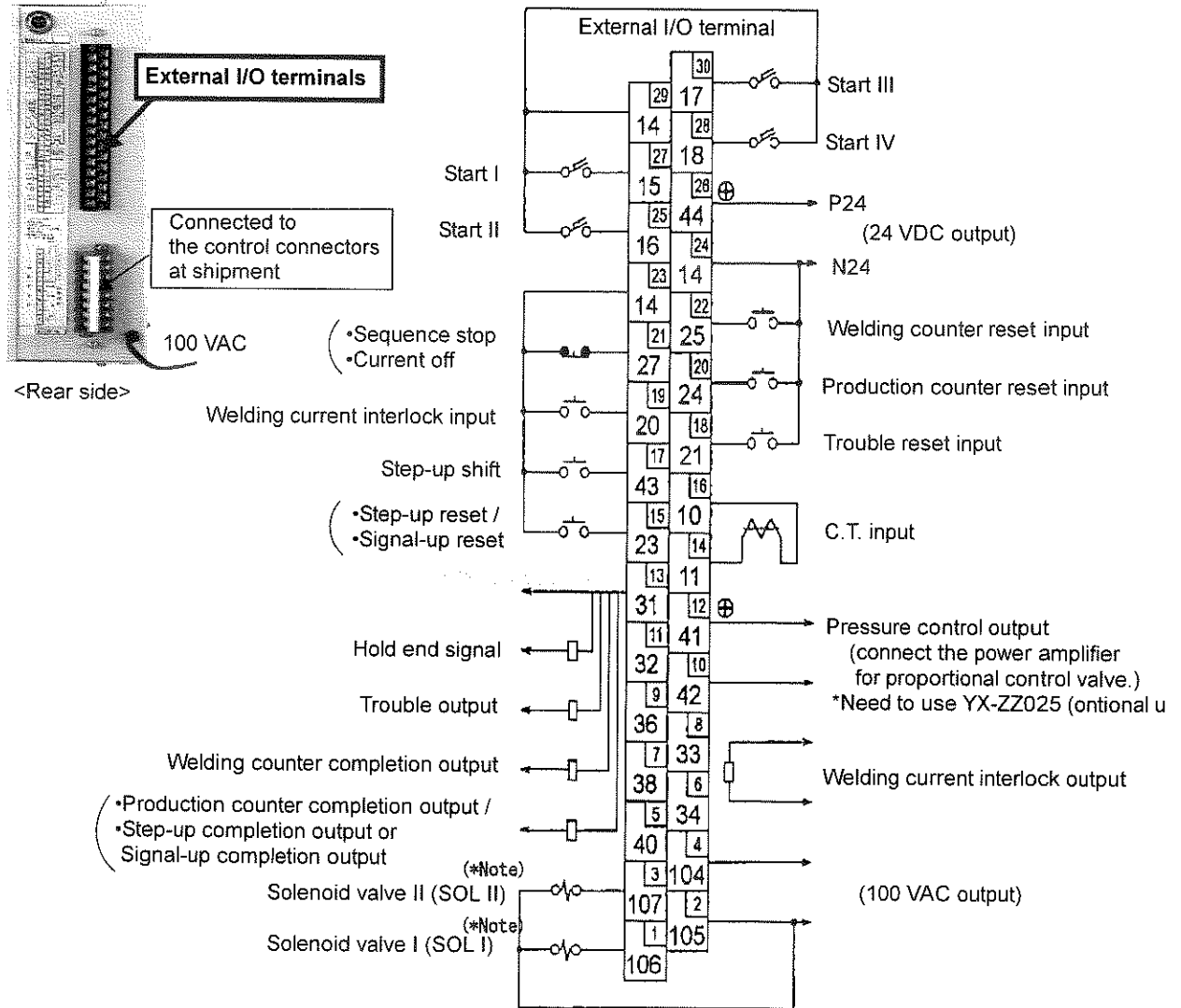
4.1.2 Rear panel

1) External input/output terminals

- Location and arrangement

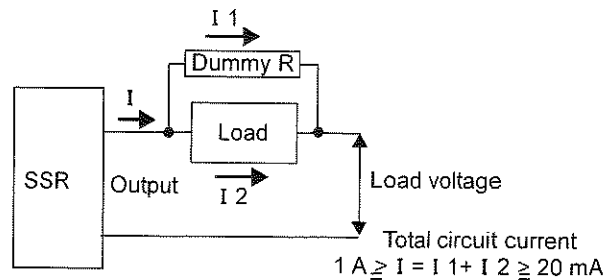
* See also the circuit diagram for connection work.

The external input/output terminals are located at the rear side of the product.



(*Note)

As SOL I and SOL II are SSR outputs, they output 100VAC even in the waiting (or standby) state. Minimum load current of the circuit is 10mA. If the product is used below the minimum load current value, the remnant voltage may cause malfunctions. In case of using in such condition, connect a dummy resistor in parallel with the load and keep the total circuit current (that flows load and dummy resistor) at 20 mA to 1 A.



Basic operation

● External input terminals

Name	Description	Switch means
● Start I	<ul style="list-style-type: none"> • Short-circuit the terminals to start welding operation. • With 4-schedule start mode: welding condition corresponding to the start input. • With 15-schedule start mode: those four start inputs are used as binary code to select a welding condition. 	DIP switch: DSW1-1 (To select a starting mode)
● Start II		
● Start III		
● Start IV		
● Sequence stop / Current off	<ul style="list-style-type: none"> • Normally it is short-circuited. • Open the terminals for "sequence stop" or "current off" depending on the DIP switch setting. 	DIP switch: DSW1-9 (To select a current off mode.)
● Welding current inter- lock input	<ul style="list-style-type: none"> • It keeps the welding current to flow while receiving the interlock signal from another machine without moving onto up-slope state. 	-
● Step-up shift	<p><When DIPswitch setting is for "Step-up" mode> Input to shift to the next step.</p> <p><When DIPswitch setting is for "Signal-up" mode> Input to increase the welding current by the preset incremental rate.</p>	DIP switch: DSW1-10 (To select a current incremental method.)
● Step-up reset or ● Signal-up reset	<ul style="list-style-type: none"> • An input to reset the "Step-up" or "Signal up" counter to zero. • Use the input when needed such as at the time the electrode tip is replaced. 	DIP switch: DSW1-10 (To select a current incremental method.)
● Welding counter reset input	<ul style="list-style-type: none"> • An input to reset the welding counter to zero. 	-
● Production counter reset input	<ul style="list-style-type: none"> • An input to reset the production counter to zero. 	-
● Trouble reset input	<ul style="list-style-type: none"> • An input to reset the trouble output (excluding error [12]). 	-
● C.T. input*	<ul style="list-style-type: none"> • An input to be used when "Primary constant current" is selected as current detecting system. • In that case, connect CT to this terminal. (CT type: FTU02003) 	DIP switch: DSW1-6 (To select a current detecting system.)

* As for "Switch means", see section "Advanced function: Selecting functions" for details.

Note

Use no-voltage signal; such as no-voltage relay contact or open collector output, to short-circuit or open the input terminals. Applying voltage to the input terminal damage the P.C. Board.

● External output terminals

Name	Function	Switch means
● Hold end signal	<ul style="list-style-type: none"> An output that is turned on for 150 msec. (0.15 s) after the end of the hold time. This signal does not output when the trouble output is on. Normally open contact Load at resistance load: 24 VDC, 30 mA or less. 	-
● Trouble output	<ul style="list-style-type: none"> An output that is turned on when a major trouble occurs. Input the "Trouble reset input" to reset. (For error [12], turn off the control power switch and back on again to reset.) It is factory set to "normally open" at shipment. Load at resistance load: 24 VDC, 30 mA or less. 	JP1 (To select a contact type.)
● Welding counter completion output	<ul style="list-style-type: none"> An output that is turned on when the counter reaches the preset welding count. Input the "Welding counter reset input" to reset the counter to zero. Normally open contact Load at resistance load: 24 VDC, 30 mA or less. 	-
<ul style="list-style-type: none"> ● Production counter completion output or ● Step-up completion output or Signal-up completion output 	<p><When is set to "Production counter completion output" mode> the signal is turned on when the counter reaches the preset number of products.</p> <ul style="list-style-type: none"> Input the "Production counter reset input" to reset to zero. <p><When it is set to "Step-up completion output" mode> the signal is turned on when "step-up" or "Signal-up" (depending on the current incremental method setting) is completed</p> <ul style="list-style-type: none"> Input the "Step-up reset input" to reset the counter to zero. 	JP2 (To select a counter completion output type.) DIPswitch: DSW1-10 (To select a current incremental method.)
● Pressure control output	<ul style="list-style-type: none"> Connect the power amplifier when the proportional control valve (optional) is applied. *Need to use YX-ZZ025 (optional unit). 	DIP switch 2-1 (To use this function)
● Welding current interlock output	<ul style="list-style-type: none"> An output to interlock welding current with another unit. An output that is turned on while welding current is flowing (from the start of the up-slope to the end of the down-slope.) The signal does not output when the "Current off" is selected. Normally open contact Load at resistance load: 24 VDC, 30 mA or less. 	-
● SOL I (Solenoid valve 1)	Connect the solenoid valve for pressing (100 VAC) • As they are SSR output, 100 VAC is output even in ready state.	-
● SOL II (Solenoid valve 2)		-
● 24 VDC output	An auxiliary power for an external device. Make sure to use it at 100 mA or less. Do not use it to any device that generates noise. Polarity: 44 (positive), 14 (negative)	-
● 100 VAC output	An auxiliary power for an external device. Make sure to use it at 0.2 A or less. Do not use it to any device that generates noise.	-

* As for "Switch means", see section "Applied function: Selecting functions" for details.

Basic operation

4.2 Setting welding conditions

Welding conditions (see 10. Data sheet) can be set by turning on the CONTROL POWER (100VAC). However, to execute operation described in section "4.3 Starting the welding operation and 4.2.5 Adjustment and Test run, it is necessary to turn on both WELD POWER and CONTROL POWER.

When both power switches are turned on:

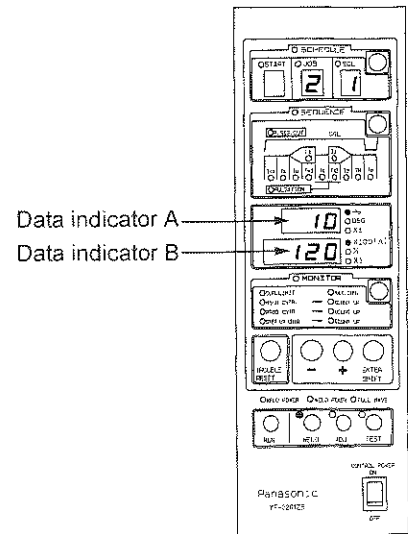
- "Data indicator A" indicates software version (3 digits)
- "Data indicator B" indicates software code (4 digits) for about 0.5 second.

* It is recommended to keep setting data on the data sheet in case of losing data.

Note

When "Memory error" (See 6. Troubleshooting) is displayed, all the setting data are reset to default values (the lowest of the set range).

Press the TROUBLE RESET key to clear the display, and then newly set the values. Refer to section 5.2 Checking of set data.



4.2.1 Maximum current and turn ratio of transformer

Operation	Lamp / indicator	Indication
(1) Selecting the sequence setting mode • Press the MONITOR mode select key.	•MONITOR lamp:	ON
	•CUR. LIMIT lamp:	ON
	•JOB lamp:	ON
	•Job No. indicator:	Currently stored job number.
(2) Setting the MAX. CUR. • Press the ENTER/SHIFT key until the MAX. CUR. lamp is turned on. • Select a number using "+" or "-" key. • Press ENTER/SHIFT key • Select a number using "+" or "-" key. <When secondary constant current is selected> <When primary constant current is selected>	MAX.CUR lamp:	ON
	Data indicator B	New maximum current.
	•MAX.CUR lamp:	OFF
	•x100(A)	OFF
	•JOB No. indicator:	Current SOL No.
	Data indicator B	New maximum current.
	•CUR. LIMIT lamp:	ON
	•JOB lamp:	ON
	•Job No. indicator:	Currently stored job number.
	•CUR. LIMIT lamp:	ON
	•x1 (bottom)	ON
	•Data indicator B	Currently stored transformer turn ratio.
(3) Setting the transformer turn ratio. <Only when primary constant current is selected> • Select a number using "+" or "-" key. • Press ENTER/SHIFT key	Data indicator B:	Selected transformer turn ratio.
	•Data indicator B:	OFF
	•"X1" (bottom) lamp:	OFF
	•CUR. LIMIT lamp:	ON
	•JOB lamp:	ON
	•Job No. indicator:	Currently stored job number.

4.2.2 Sequence mode

Operation	Lamp / indicator	Indication
(1) Selecting the sequence setting mode • Press the SEQUENCE mode select key.	•SEQUENCE lamp: •JOB lamp: •Job No. indicator:	ON ON "1"
(2) Selecting the job No. • Select a number using "+" or "-" key. • Press ENTER/SHIFT key	Job No. indicator: •JOB lamp: •SOL lamp: •SOL No. indicator:	Selected number OFF ON Current SOL No.
(3) Selecting the SOL No. • Select a number using "+" or "-" key. • Press ENTER/SHIFT key	SOL No. indicator: •SOL lamp: •SOL No. indicator: When the Pressure control" is ON •P.SIG.OUT lamp: •"X1" (upper) lamp: •Data indicator A: When the Pressure control" is OFF •"Tsd" lamp: •"∞" lamp: •Data indicator A:	Selected number OFF OFF When the Pressure control" is ON ON ON Currently stored pressure control output When the Pressure control" is OFF ON ON Currently stored squeeze delay time
(4) Setting the pressure control output. <When the Pressure control" is ON> • Select a number using "+" or "-" key. • Press ENTER/SHIFT key	Data indicator A: •P.SIG.OUT lamp: •"X1" (upper) lamp: •"Tsd" lamp: •"∞" lamp: •Data indicator A:	Selected number OFF OFF ON ON Currently stored squeeze delay time
(5) Setting the squeeze delay time. • Select a number using "+" or "-" key. • Press ENTER/SHIFT key	Data indicator A: •"Tsd" lamp: •"Ts" lamp: •Data indicator A:	Selected number OFF ON Currently stored squeeze time
(6) Setting the squeeze time. • Select a number using "+" or "-" key. • Press ENTER/SHIFT key	Data indicator A: •"Ts" lamp: •"Tu" lamp: •Data indicator A:	Selected number OFF ON Currently stored up-slope time
(7) Setting the up-slope time. • Select a number using "+" or "-" key. • Press ENTER/SHIFT key	Data indicator A: •"Tu" lamp: •"Tw1" lamp: •Data indicator A:	Selected number OFF ON Currently stored weld time 1

Note
The up-slope time is not included in the weld time 1. Therefore, setting "1" or above as the up-slope time while the weld time is set at "0" causes trouble.

Basic operation

- (8) **Operation**
 Setting the weld time 1.
 • Select a number using "+" or "-" key.
 • Press ENTER/SHIFT key

Lamp / indicator	Indication
Data indicator A:	Selected number
• "Tw1" lamp:	OFF
• "∞" lamp:	OFF
• Data indicator A:	OFF
• "I1" lamp:	ON
• "X100(A)" lamp:	ON
• Data indicator B:	Currently stored welding current 1

- (9) **Operation**
 Setting the welding current 1.
 • Select a number using "+" or "-" key.
 • Press ENTER/SHIFT key

Lamp / indicator	Indication
Data indicator B:	Selected number
• "I1" lamp:	OFF
• "X100 (A)" lamp:	OFF
• Data indicator B:	OFF
• "Tc" lamp:	ON
• "∞" lamp:	ON
• Data indicator A:	Currently stored cooling time

- (10) **Operation**
 Setting the cooling time.
 • Select a number using "+" or "-" key.
 • Press ENTER/SHIFT key

Lamp / indicator	Indication
Data indicator A:	Selected number
• "Tc" lamp:	OFF
• "Tw2" lamp:	ON
• Data indicator A:	Currently stored weld time 2

- (11) **Operation**
 Setting the weld time 2.
 • Select a number using "+" or "-" key.
 • Press ENTER/SHIFT key

Lamp / indicator	Indication
Data indicator A:	Selected number
• "Tw2" lamp:	OFF
• "∞" lamp:	OFF
• Data indicator A:	OFF
• "I2" lamp:	ON
• "X100 (A)" lamp:	ON
• Data indicator B:	Currently stored welding current 2

- (12) **Operation**
 Setting the Welding current 2.
 • Select a number using "+" or "-" key.
 • Press ENTER/SHIFT key

Lamp / indicator	Indication
Data indicator B:	Selected number
• "I2" lamp:	OFF
• "X100 (A)" lamp:	OFF
• Data indicator B:	OFF
• "Td" lamp:	ON
• "∞" lamp:	ON
• Data indicator A:	Currently stored down-slope time

- (13) **Operation**
 Setting the down-slope time.
 • Select a number using "+" or "-" key.
 • Press ENTER/SHIFT key

Lamp / indicator	Indication
Data indicator A:	Selected number
• "Td" lamp:	OFF
• "TH" lamp:	ON
• "∞" lamp:	Remains ON
• Data indicator A:	Currently stored hold time

Note

The down-slope time is not included in the hold time. Therefore, setting "1" or above as the down-slope time while the hold time is set at "0" causes trouble.

- (14) **Operation**
Setting the hold time.
 • Select a number using "+" or "-" key.
 • Press ENTER/SHIFT key

Lamp / indicator	Indication
Data indicator A:	Selected number
•"TH" lamp:	OFF
•"To" lamp:	ON
•Data indicator A:	Currently stored off time

- (15) **Operation**
Setting the off time.
 • Select a number using "+" or "-" key.
 • Press ENTER/SHIFT key

Data indicator A:	Selected number
•"To" lamp:	OFF
•"∞" lamp:	OFF
•PULSATION lamp:	ON
•"X1" (upper) lamp:	ON
•Data indicator A:	Currently stored number of pulsations

- (16) **Operation**
Setting the number of pulsations.
 • Select a number using "+" or "-" key.
 • Press ENTER/SHIFT key

Data indicator A:	Selected number
•PULSATION lamp:	OFF
•"X1" (upper) lamp:	OFF
•Data indicator A:	OFF
JOB lamp:	ON
•Job No. indicator:	Currently selected job No.

Basic operation

4.2.3 Schedule mode

In case start mode is set to "4-schedule", refer to the following procedure to allocate a welding condition number to each start input.

Note

For "15-schedule" start mode, it is not necessary to allocate welding condition, as combination of the start inputs directly specify a welding condition. For details, please refer to section "Advanced functions".

- (1) **Operation**
 Selecting the Schedule mode
 • Press the SCHEDULE mode select key.

Lamp / indicator Indication

•JOB lamp:	ON
•START lamp:	ON
•Start No. indicator:	"1"

- (2) **Operation**
 Selecting the job No. for "START I"
 • Press ENTER/SHIFT key
- Select a number using "+" or "-" key.
- Press ENTER/SHIFT key

•START lamp:	OFF
•JOB lamp:	ON
•Job No. indicator:	Currently stored job number.

Job No. indicator:	Selected number
--------------------	-----------------

•JOB lamp:	OFF
•Job No. indicator:	OFF
•START lamp:	ON

- (3) **Operation**
 Selecting the job No. for "START II"
 • Press "+".
- Press ENTER/SHIFT key
- Select a number using "+" or "-" key.
- Press ENTER/SHIFT key

•Start No. indicator:	"2"
-----------------------	-----

•START lamp:	OFF
•JOB lamp:	ON
•Job No. indicator:	Currently stored job number.

Job No. indicator:	Selected number
--------------------	-----------------

•JOB lamp:	OFF
•Job No. indicator:	OFF
•START lamp:	ON

* Repeat the procedure (3) to select the job numbers for Start III and Start IV.

4.2.4 Monitor mode

Operation	Lamp / indicator	Indication	
(1) Selecting the monitor mode • Press the MONITOR mode select key.	•MONITOR lamp:	ON	
	•CUR.LIMIT lamp:	ON	
(2) Selecting the job No. • Select a number using "+" or "-" key. • Press ENTER/SHIFT key	•JOB lamp:	ON	
	•Job No. indicator:	Currently stored job number.	
	Job No. indicator:	Selected number	
	•JOB lamp:	OFF	
	•"%" lamp:	ON	
	•Data indicator A:	"U"	
(3) Setting the current upper limit (%) • Select a number using "+" or "-" key. • Press ENTER/SHIFT key	•Data indicator B:	Currently stored current upper limit (%)	
	Data indicator B:	Selected number	
	•Data indicator A:	"L"	
	•Data indicator B:	Currently stored current lower limit (%)	
(4) Setting the current lower limit (%) • Select a number using "+" or "-" key. • Press ENTER/SHIFT key	Data indicator B:	Selected number	
	•CUR.LIMIT lamp:	OFF	
	•Job No. indicator:	OFF	
	•"%" lamp:	OFF	
	•Data indicators A, B:	OFF	
	•SOL lamp:	ON	
	•SOL No. indicator:	Currently stored SOL number	
	•WELD CNTR. lamp:	ON	
	(5) Selecting the SOL No. • Select a number using "+" or "-" key. • Press ENTER/SHIFT key	SOL No. indicator:	Selected number
		•SOL lamp:	OFF
•"X1" (upper) lamp:		ON	
•Data indicator A:		Currently stored welding counter set value.	
(6) Setting the welding counter • Select a number using "+" or "-" key. • Press ENTER/SHIFT key	Data indicator A:	Selected number	
	•WELD CNTR. lamp:	OFF	
	•"X1" (upper) lamp:	OFF	
	•Data indicator A:	OFF	
	•PROD.CNTR. lamp:	ON	
	•"X1" (lower) lamp:	ON	
•Data indicator B:	Currently stored production counter set value.		

Basic operation

- | Operation | Lamp / indicator | Indication |
|--|----------------------|---|
| (7) Setting the production counter <ul style="list-style-type: none"> • Select a number using "+" or "-" key. • Press ENTER/SHIFT key | Data indicator B: | Selected number |
| | •PROD.CNTR. lamp: | OFF |
| | •"X1" (lower) lamp: | OFF |
| <When the "Step-up" is selected> | •STEP UP CNTR. lamp: | ON |
| | •Data indicator A: | "S-0" |
| | •"% " lamp: | ON |
| | •Data indicator B: | "0"
(The current increment rate for step-up "0", which is fixed at "0" %.) |
| | | |
| (8) Setting the welding counter for step-up "0" (S0) <ul style="list-style-type: none"> • Press ENTER/SHIFT key | •"% " lamp: | OFF |
| | •"X1" (lower) lamp: | ON |
| | •Data indicator B: | Currently stored welding counter set value for S0. |
| | Data indicator B: | Selected number |
| | •"X1" (lower) lamp: | OFF |
| | •"% " lamp: | ON |
| | •Data indicator A: | "S-1" |
| | •Data indicator B: | Currently stored current incremental rate (%) for step-up "1" (S1) |
| (9) Setting the current incremental rate for step-up "1" (S1) <ul style="list-style-type: none"> • Select a number using "+" or "-" key. • Press ENTER/SHIFT key | Data indicator B: | Selected number |
| | •"% " lamp: | OFF |
| | •"X1" (lower) lamp: | ON |
| | •Data indicator B: | Currently stored welding counter set value for S1. |
| (10) Setting the welding counter for step-up "1" (S1) <ul style="list-style-type: none"> • Select a number using "+" or "-" key. • Press ENTER/SHIFT key | Data indicator B: | Selected number |
| | •"X1" (lower) lamp: | OFF |
| | •Data indicator A: | ON |
| | •"% " lamp: | "S-2" |
| | •Data indicator B: | Currently stored current incremental rate (%) for step-up "2" (S2) |
| (11) Setting the current incremental rate for step-up "2" (S2) | | |
| (12) Setting the welding counter for step-up "2" (S2)..... | | |
| (13) Setting the current incremental rate for step-up "3" (S3) | | |
| (14) Setting the welding counter for step-up "3" (S3)..... | | |
| (15) Setting the current incremental rate for step-up "4" (S4) | | |
| (16) Setting the welding counter for step-up "4" (S4)..... | | |

As for procedures (11) to (16), refer to the above procedures (9) and (10) and panel indications to complete those settings.

•STEP UP CNTR. lamp:	OFF
•"X1" (lower) lamp:	OFF
•Data indicator A:	OFF

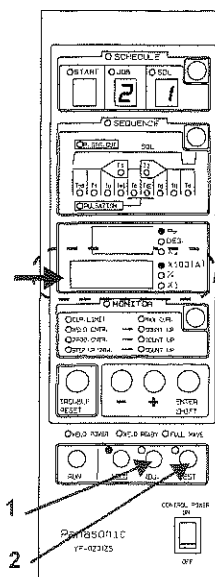
4.2.5 Adjustment and Test run

(1) Adjustment

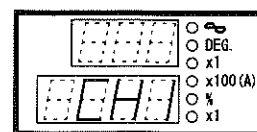
- Press "ADJ." key, then "CH1" is displayed on the "Data indicator B".
- Pressure is being applied while the foot switch is kept on.

(2) Test run

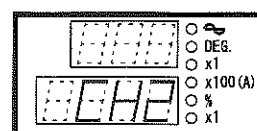
- Press "TEST" key, then "CH2" is displayed on the "Data indicator B".
- Turn on the foot switch to execute a series of welding sequence without applying welding current.



<Adjustment>



<Test run>



4.3 Starting the welding operation

Prior to operation, complete welding conditions settings.

- (1) Press RUN key.
- (2) Press WELD key
- (3) Turn ON the foot switch.
- (4) After completing welding operation, indicators show welding results.

The welding results shown in the figure are,

- Job No.: 2
- SOL No.: 1
- Welding current 1: 10 cycles, 12 000 A(*)

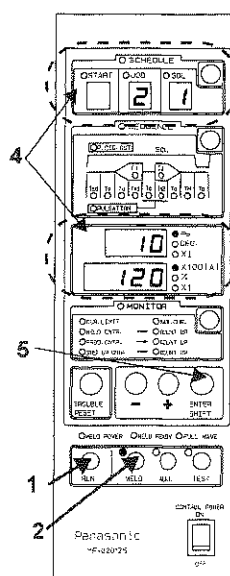
(*) : The current value is indicated after rounding the last two-digit as follows; If the last two-digit of the welding current is 44 or less, it is round down to "00", and if it is 45 or greater, it is rounded up to "100".

- (5) It is possible to change display indication by pressing the **ENTER** key.
See "Switching display indication" for the order of indication change.

Note

Do not turn off the "CONTROL POWER" while "START" input is in ON state. (In that case, turn ON the CONTROL POWER within 24 hours.)

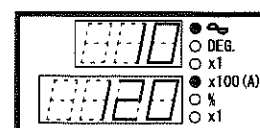
If the control power is turned off while the start input is on, the counter values of monitoring items, such as welding count, production count and step up count, are reset to the values before turning on the start input, therefore, those values on the indicators and the actual values may be different. Such difference won't be regarded as an error. As the welding current, is indicated by the average of the actual currents rounding



<Switching display indication>

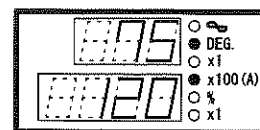
<Initial display>

- Welding cycle
- Welding current



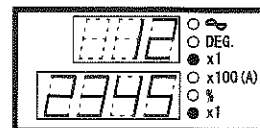
↓ "ENTER"

- Conduction angle
- Welding current



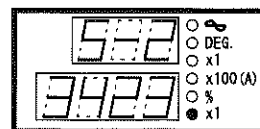
↓ "ENTER"

- Welding count
- Number of production



↓ "ENTER"

- Number of step-ups
- Remaining welding count



* Press "ENTER" to return to the initial display.

5. Maintenance and inspection

⚠ WARNING

Prior to connection work, turn off power to the line disconnect device and all input power, or serious injury, such as electrical shock or burn, may occur.

Note

Make sure that only qualified persons or persons who are familiar with welding machines take case of the maintenance and inspection work.

Daily inspection is inevitable to make the best use of the features of this product and to secure safe operation. Daily inspection includes the following parts, and also cleaning or parts replacement if necessary. As replacement

parts, it is recommended to use Panasonic genuine welding parts in order to maintain performance and mechanism.

5.1 Welding current adjustment

⚠ WARNING

Touching any current-carrying parts may cause a fatal electric shock or burn injury



- To prevent a fatal accident, such as an electric shock, burn injury, etc., make sure to observe the followings.
- Make sure to turn off the power switch and the switch of the distribution box before removing the top cover of this product.

The attached toroidal coil and this product are adjusted as a set to measure current. In case of using a toroidal coil other than the provided one, it is necessary to calibrate the measured current.

When the provided coil is used, or when the error is $\pm 3\%$ or more compared to the measurement by means of a calibrated ammeter, adjust the adjustment volume (VR3 or VR5) on the PC Board (ZUEP1386*A1) inside the product until the measurements match.

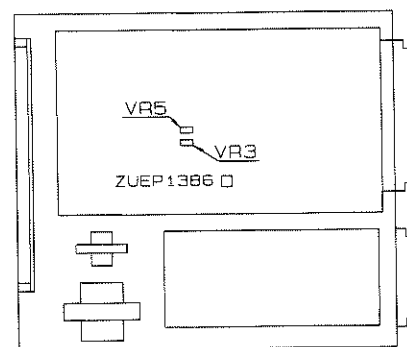
- Adjust VR3 for the primary constant current system
- Adjust VR5 for the secondary constant current system

Note

This product displays the average effective current value of the third cycle onwards excluding up-slop and down-slope. Please take this point into account in case of calibration by means of an ammeter.

Before the third cycle, the product displays the average effective current value up to that time.

(Front side)




5.2 Checking of set data

- Check if the welding condition set values (see 10. Data sheet) are correct (as intended) at the Check the welding conditions of this product at the prestart inspection.
- If the setting data in the memory contains abnormal value, such as a value that exceeds its set range and the control power switch is turned ON, the error message "Memory error" (see 6. Troubleshooting) is displayed

and all the setting data are reset to default values (the lowest of the set range).

- Prior to redo data settings, cancel the error by pressing the "TROUBLE RESET" key.
- It is recommended to keep setting data on the data sheet (see 10. Data sheet) in case of losing the data.

6. Troubleshooting

⚠ WARNING	
	<p>Touching any current-carrying parts may cause a fatal electric shock or burn injury</p> <ul style="list-style-type: none"> ● To prevent a fatal accident, such as an electric shock, burn injury, etc., make sure to observe the followings. ● Make sure to turn off the power switch and the switch of the distribution box before removing the top cover of this product.

Note Make sure that only qualified persons or persons who are familiar with welding machines take case of the maintenance and inspection work.

Refer to the following table to check the possible cause and treatment for the error. If the indicated treatment does not work, turn off the power switch and contact sales distributor or Panasonic representatives.

Error	Description	Time of judgement	Reset / Re-start / Treatment of output signal
[01] Current limit	The actual readout is compared to the setting value, and the actual readout is out of the setting range.(*1) (It is not detected during voltage compensation.)	At the end of hold time	Treatment for major troubles. (See below for details.)
[02] Full wave	Four consecutive cycles of full wave occurred during welding.		Treatment for minor troubles (*2) (Default setting) (Changeable to the treatment for major troubles.)
[03] No welding	When the total of three cycles (in case of the constant current control) and when the total of four cycles (in case of the power voltage compensation) of no welding occurred.	At detection	Treatment for major troubles. 1) Restart impossible. To restart, reset the error by turning on the reset input. 2) No output of the hold end signal. 3) Trouble output. 4) Buzzer goes off.
[04] Welding power error	The welding power is cut off during sequence operation.		
[05] SCR short-circuit	Current flows during the initial squeeze time.	At the initial squeeze time	
[06] Tip sticking	When the tip sticking function is selected, and the both upper and lower tips are stuck to work.	At detection	
[07] CT wire cut	When the primary constant current system is selected, and breaking of C.T. wire occurs.	When the starting input is turned on	
[08] Toroidal wire cut	When the secondary constant current system is selected, and breaking of toroidal coil occurs.		
[09] Setup error	See the next section for details.		
[10] Memory error	Data that exceeds the data upper/lower limit is stored.	When the control power is turned on.	
[11] Sequence stop	When the sequence stop function is selected, and the external sequence stop input it turned off (open).	At detection	

Troubleshooting

<p>[12] Hardware error</p>	<p>When a CPU error occurs.</p>	<p>At detection</p>	<p>1) Restart impossible. To restart, reset the error by turning the control power switch off and then back on again. 2) No output of the hold end signal. 3) Trouble output. 4) Buzzer goes off.</p>
<p>[90] Memory writing error</p>	<p>When writing of data to memory IC is failed. (*3)</p>	<p>At detection</p>	<p>1) Restart impossible. To restart, reset the error by turning on the reset input. 2) Trouble output. 3) Buzzer goes off.</p>

Note

(*1) Although the current indication shows the current readout from the hundreds place, the current readout down to the ones place digit is applied to compare to the setting value. Therefore, you may obtain different error output result with the same current indication. Example) Setting value: 8 000 A, Lower limit: 1 %

Readout	Error output	Current indication
7 921 A	OFF	79 (x100 A)
7 919 A	ON	79 (x100 A)

Whether the current is out of preset current limit is determined by the average effective current value of

the forth cycle onwards of the weld time 1 and 2. The current values of the first three cycles are not included.

(*2) Treatment for the minor troubles includes 1) restart to reset and 2) Output of hold end signal.

(*3) The "Memory writing error" does not affect the data, such as welding condition, WELD CNTR. PROD. CNTR and STEP UP CNTR. If the reset input does not cancel the error state, please contact Panasonic representatives.

● Setup errors

effective value

Error type	Contents
[09-1] Up-slope error	The up-slope time is set while the weld time 1 is set to "0" cycle.
[09-2] Down-slope error	The down-slope time is set while the weld time 2 is set to "0" cycle.
[09-3] Pulsation error	The pulsation time is set while the weld time 2 is set to "0" cycle.
[09-4] Over-current ^(Note)	Set values of the welding current 1 and 2 exceeds the maximum welding current, or in case of the primary constant current system, values whose the primary current exceeds 1600 A are set as welding current 1 and 2.
[09-5] Step-up setting error	The set value by means of step-up current incremental rate exceeds the maximum current.
[09-6] Data lower limit	The initial squeeze time is set to "3" cycles while the "initial delay time", "up-slope time", "weld time 1", "cooling time", "weld time 2", "down-slope time" and "hold time" are all set to "0" cycle.
[09-7] Tip sticking	Any of the following function is selected together with the tip sticking function. <ul style="list-style-type: none"> • Voltage fluctuation compensation control is selected • Current off is selected • Repetitive welding is selected
[09-8] Re-welding	When the re-welding function is selected, any of the following occurred. <ul style="list-style-type: none"> • Voltage fluctuation compensation control is selected • Current lower limit is not set. • Current off is selected.
[09-9] Current off	When the Current off is selected, the repetition welding is selected.

Note

- This error is not applicable when the "Voltage compensation" is selected.
- The primary constant current system is applied when both "Constant current compensation" and "Primary CT" are selected.

<Examples of trouble code indication >

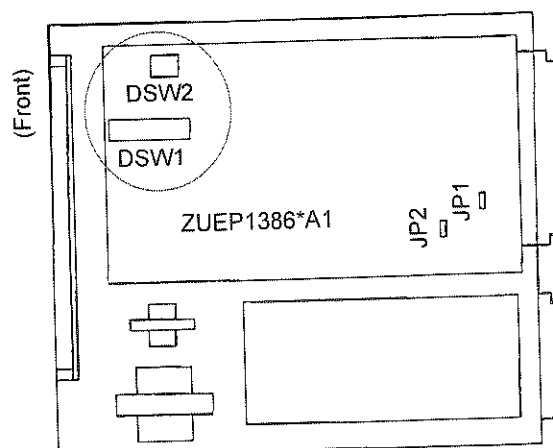
Trouble code	Data indication
02	Data indicator A <input type="text" value="02"/>
	Data indicator B <input type="text"/>
Each indicated number blinks.	
09-2	Data indicator A <input type="text" value="09"/>
	Data indicator B <input type="text" value="2"/>

7. Advanced functions

7.1 DIP switches (DSW1, DSW2) settings

- All the DIP switches are factory set to OFF side at shipment.
- Prior to changing the DIP switch settings, turn off both control power and welding power. Changing the DIP switch settings while those powers are on doesn't update the changes.
- Refer to the following table for description.

Select desirable functions with dip switches on the P.C. board ZUEP1386*A1.



DSW1			
No.	Function	ON	OFF
DSW1-1	Start mode	15 schedules (Binary code)	4 schedules
DSW1-2	Control speed ^(*1)	0.5 cycle	1 cycle
DSW1-3	Trouble mode	Major Trouble	Minor Trouble
DSW1-4	Start signal is held ^(*2)	at start of sequence	at start of welding
DSW1-5	Control mode	Voltage fluctuation compensa- tion control	Constant current control
DSW1-6	Selection of constant current ^(*1)	Primary CT	Secondary troidal
DSW1-7	Detection of tip sticking	Can be done	Non
DSW1-8	Re-weld mode	Can be done	Non
DSW1-9	Selection of current off	Current stop	Sequence stop
DSW1-10	Mode of increase current	Signal up	Step up

DSW2			
No.	Function	ON	OFF
DSW2-1	Pressure Ctrl	Can be done	Non
DSW2-2	Keep it to OFF at all times		
DSW2-3	Counter mode	Decrease	Increase

Note

- Turn off "Control Power Switch" before setting DIP switches.
- (*1) In case of using this product with
 - A single-phase AC type welder with the primary CT: Set [DSW1-2] OFF / [DSW1-6] ON.
 - A single-phase DC type welder: Set [DSW1-2] ON / [DSW1-6] ON.
- (*2) "Start signal is held" function is to select holding timing.

7.2 Functions

7.2.1 Functions to be set by DSW1

(1) DSW1-1: Starting mode

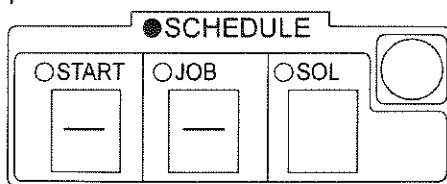
- 4-schedule mode: OFF
Inputting the starting input I, II, III or IV activates the welding sequence corresponding to the input. Set the conditions for each starting input in the schedule mode.

- 15-schedule mode: ON
Welding sequence is selected by means of the combination (binary code) of inputs of starting inputs I, II, III and IV.

Welding condition	Starting input			
	I	II	III	IV
1	○			
2		○		
3	○	○		
4			○	
5	○		○	
6		○	○	
7	○	○	○	
8				○
9	○			○
A		○		○
B	○	○		○
C			○	○
D	○		○	○
E		○	○	○
F	○	○	○	○

*The input marked with a circle (○) is set to ON

With the 15-schedule mode, when the schedule mode setting is completed, the following display appears.



(2) DSW1-2: Control speed

This switch determines the control speed for the secondary constant current control (when DSW1-5 and DSW1-6 are OFF).

Set this switch to OFF to one cycle response. Set this switch to ON to 0.5 cycle response.

< Note >

- For the primary CT with "Single-AC welding machine", set to OFF side. (one cycle).
- For the primary CT with single-phase DC welding power source, set to ON side (0.5 cycle).

(3) DSW1-3: Trouble mode

This switch determines if the full wave detection is treated in minor mode or major mode. (The other troubles are treated in the major trouble mode.)

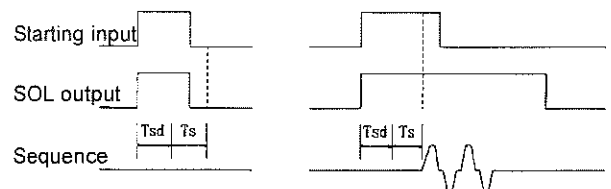
Set this switch to OFF for minor mode and ON for major mode.

	Minor trouble	Major trouble
Re-start	Available	-
Hold-end signal	Output	-
Trouble output	-	Available

(4) DSW1-4: Self-holding

- Self-holding at the start of welding: OFF

If the starting input is turned off before the squeeze time is completed, the solenoid valve is also turned off.



- Self-holding at the start of sequence: ON

Self-holding starts at the same time as starting input is accepted, and the welding sequence continues even if the starting input is turned off.

To release self-holding state (in case of emergency), set the DSW1-9 to OFF side and connect the emergency stop switch to the "Sequence stop/current off" input terminal.

(5) DSW1-5: Compensating method

- Constant current compensation mode: OFF

In this mode, select either "Secondary toroidal coil" or "Primary C.T." for the "current detecting method" (DSW1-6).

- Voltage compensation mode: ON

In this mode, the current is not monitored if the toroidal coil or C.T is not used. The current is monitored When the toroidal coil is used and the DSW1-6 is set to OFF (or when the C.T. is used and the DSW1-6 is set to ON), it monitors the current and detects troubles, specifically the full wave and no current state.

(6) DSW1-6: Current detecting method

- When this switch is set to OFF, the current is detected by the secondary toroidal coil. Connect the toroidal coil.

- When this switch is set to ON, the current is detected by the primary C.T. Install and connect the specified C.T.

Advanced functions

<Note>

In case of using this product to a single-phase AC welding machine with the primary C.T., set the "DSW1-2" to the OFF (1 cycle) side.

(7) DSW1-7: Tip stick detection

When this switch is set to ON, the tip stick detection is turned ON. When the SOL output is turned OFF by the completion of welding, SCR is ignited (at an angle of 130°) after 20 cycles (approx. 0.4 sec.) to check if the upper/lower electrodes and the work are stuck. (If tips are stuck, current flows.)

(8) DSW1-8: Re-welding

When this switch is set to ON and the current lower limit is set (to be set by customers), if welding current below the lower limit flows, after the holding time ends, the sequence is started with the up-slope time to re-weld after 10 cycles while keeping the SOL output ON. However, the re-welding can be performed only once.

- When "Re-welding" is executed, the "Hold-end signal" is output only once after the re-welding. At that time, "Trouble output" won't be output.

7.2.2 Functions to be set by DSW2

(1) DSW2-1: Pressure control

Set this switch to ON when the proportional control valve (optional) is applied.

* In that case, it is necessary to use pressure control unit (YX-ZZ025) (optional).

(2) DSW2-2: Checking

Make sure to keep this switch OFF. It is the switch for manufacturer's checking.

- Even though the welding current is still below the lower limit after re-welding, the "Trouble output" won't be output.
- #### (9) DSW1-9: Current off selection
- In case this switch is set to OFF, when the "Sequence stop/Current off" input terminals are open, the sequence stops and the "Trouble output" outputs.
 - In case this switch is set to ON, when the "Sequence stop/Current off" input terminals are open, it goes in "current off" state while keeping the sequence run as usual.
 - The monitor displays welding current and weld time until the "current off" is turned on.
- #### (10) DSW1-10: Current incremental method
- When this switch is set to OFF (Step-up mode), the welding is performed while increasing the welding current by the preset incremental rate at every welding point.
 - When this switch is set to ON (Signal-up mode), the welding is performed while increasing the welding current by the preset incremental rate at every step-up input.

(3) DSW2-3: Counter

This switch determines the counting method for welding counter and production counter. Set this switch to OFF to additive method, which displays accumulated welding/production count at the start of operation. Set this switch to ON to subtractive method, which displays remaining welding/production count at the start of operation.

7.3 Welding counter and Production counter

- (1) In the setting mode, set the SOL No., and then set welding count and number of products.
(The welding count and the number of products can be set for SOL I and SOL II separately.)
- (2) Press "RUN" key and press the "ENTER/SHIFT" key twice, then the welding count and the number of products are displayed on the data indicators A and B.
- (3) After that, every time welding is performed, the welding counter is increased by 1.
When the welding counter reaches the preset value,

the welding counter completion output is turned on, the "COUNT UP" lamp of the "WELD CNTR. (MONITOR)" lights, and the buzzer sounds.

- (4) At the same time (when the welding counter completion output is turned on), the production counter is increased by 1.
When the production counter reaches the preset value, the production counter completion output is turned on, the "COUNT UP" lamp of the "PROD. CNTR. (MONITOR)" lights, and the buzzer sounds.

Note

- Do not turn off the "CONTROL POWER" while "START" input is in ON state. (In that case, turn ON the CONTROL POWER within 24 hours.)
If the control power is turned off while the start input is on, the counter values of monitoring items, such as welding count, production count and step up count, are reset to the values before turning on the start input, therefore, those values on the indicators and the actual values may be different. Such difference won't be regarded as an error.
- After the welding counter or the production counter reaches the preset value, it is necessary to reset the counter to zero to turn on the next start.
 To reset, do either one of the followings.
 - (a) Turn on the appropriate reset input.
 - (b) Use front panel keys
For welding counter reset:
 Press "RUN" and "-" keys together.
For production counter reset:
 Press "RUN" and "+" keys together.

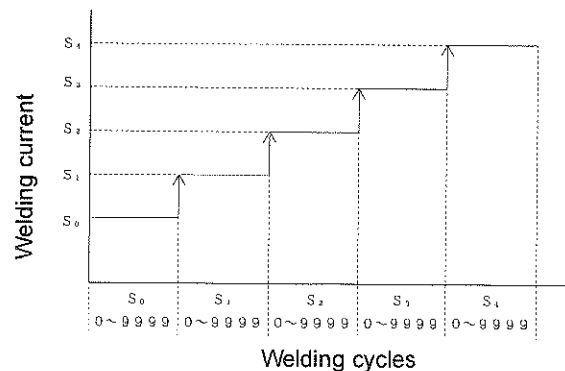
*If the counter value is changed after it reaches the preset value, the "COUNT UP" lamp is turned off.

- The values displayed as welding and production counter values are the accumulated values. To display remaining values (i.e. the subtractive method), set the DIP switch(DSW2-3) to the ON side.
- The counters function even if the welding is performed while ∞ and (A) are displayed.
- The counters do not function (do not count) in the "Current off" mode when the product is in the states of test run, current upper or lower limit, full wave (when the major trouble mode is selected), and no current flow.
- When the counters are not required, set "0" to the counter value. (The display for the counters becomes blank.)

7.4 Step-up

- (1) In the setting mode, set the SOL No., and then set the current incremental rate and welding count for each step. (The set-up conditions can be set for SOL I and SOL II separately.)
- (2) Press "RUN" key and press the "ENTER/SHIFT" key three times, then the current step-up number and the remaining welding count of the relevant step are displayed on the data indicators A and B.
 - After that, every time welding is performed, the welding counter is reduced by 1.
- (3) If the "+" key is pressed in the above (2) state, the current step-up is ended and the operation is shifted to the next step.
- (4) After completion of all welding count preset in S0 to S4, the step-up completion output turned on, the "COUNT UP" lamp of the "STEP-UP CNTR. (MONITOR)" lights, and the buzzer sounds.
 - After that, the operation continues in the step-up 4 (S4) state while maintaining the output until the "Step-up reset input" is turned on or the "step-up shift" input is turned on.

<Step-up procedure>



	Welding current
S0	Preset current value
S1	Preset current value $\times \left[1 + \frac{S_1U}{100} \right]$
S2	Preset current value $\times \left[1 + \frac{S_1U}{100} + \frac{S_2U}{100} \right]$
S3	Preset current value $\times \left[1 + \frac{S_1U}{100} + \frac{S_2U}{100} + \frac{S_3U}{100} \right]$
S4	Preset current value $\times \left[1 + \frac{S_1U}{100} + \frac{S_2U}{100} + \frac{S_3U}{100} + \frac{S_4U}{100} \right]$

<Note>

- "S1U" to "S4U" indicate the current incremental rate in each step. (0 to 25%)
- As for "S0", the current incremental rate is fixed at 0%.

Note

- The counter does not function (do not count) when the product is in no current state, in "Current off" mode and during the test run.
- When this function is not required, set "0" to both the current incremental rate and welding count

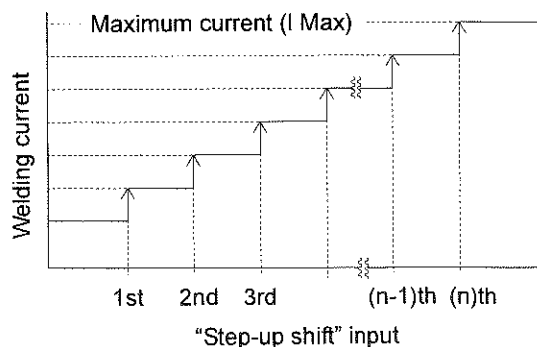
7.5 Signal-up

It is a function to increase the welding current at the preset current incremental rate every time the "Step-up shift" input is given.

This sequence is completed when the welding current reaches or exceeds the maximum current.

- (1) Set the DIP switch DSW1-10 to ON (selecting "Signal-up").
- (2) In the setting mode, set the SOL No., and then set the current incremental rate. (The set-up conditions can be set for SOL I and SOL II separately.)
- (3) Press "RUN" key and press the "ENTER/SHIFT" key three times, then the current accumulated current incremental rate is displayed.
- (4) When the welding current (based on the accumulated current incremental rate) reaches or exceeds the preset maximum current, the "Signal-up completion output" (the same output as that for the step-up completion) is turned on, the "COUNT UP" lamp of the "STEP-UP CNTR. (MONITOR)" lights, and the buzzer sounds.
 - After that, even if the "step-up shift" input is turned on, the input is ignored and the operation is continued at the maximum current while maintaining the output.
- (5) If the set value for the current incremental rate is changed, during the operation, the newly set incremental rate is added to the current accumulated current incremental rate.

<Signal-up procedure>



	Welding current
0	Preset current value
1	Preset current value $\times \left[1 + \frac{S_u}{100} \right]$
2	Preset current value $\times \left[1 + \frac{S_u}{100} \times 2 \right]$
3	Preset current value $\times \left[1 + \frac{S_u}{100} \times 3 \right]$
:	
n-1	Preset current value $\times \left[1 + \frac{S_u}{100} \times (n-1) \right]$
n	Preset current value $\times \left[1 + \frac{S_u}{100} \times n \right]$

<Note>

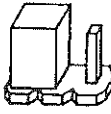
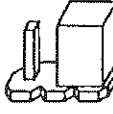
- "Su" indicates set value for the signal-up current incremental rate (0 - 9%).

7.6 Selecting functions

Use JP1, JP2 or DSW on the PC Board (ZUEP1386*A1) to select functions.

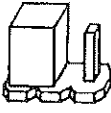
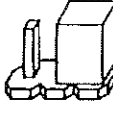
(1) JP1: short plug

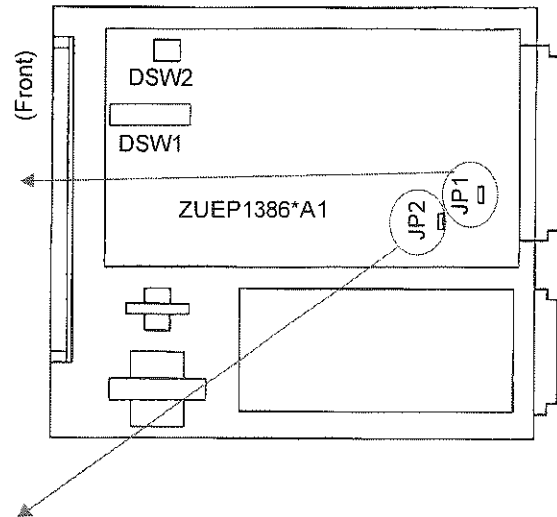
Set to select either "Normally open contact" or "Normally closed contact." for trouble output

Contact type	Normally open	Normally closed
Setting		
	Default setting	-

(2) JP2: Short plug

Set to select either "Production" or "Step-up" counter completion output.

Output type	Production counter completion output	Step-up (or signal-up) counter completion output
Setting		
	Default setting	-

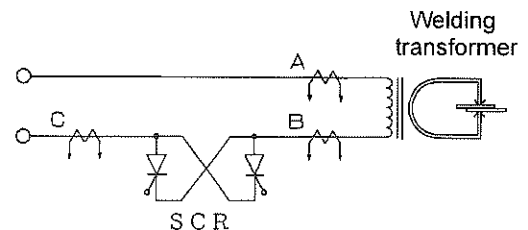


7.7 Installing the specific C.T.

When this product is used with a welding power source that is a primary constant current type or for a single-phase DC type, it is not possible to use the toroidal coil. In that case, it is necessary to use a **specific C.T.**; FTU02003 (C.T. with resistor). Depending on model numbers, the C.T. is provided as accessory. (See section "Distinctions".) If not, please prepare the specified C.T. separately.

1) Install C.T.

- Refer to the figure on the right to install the C.T. (model FTU02003) to the welding power source.



In case of installing for the first time, install it so that it passes through any one of the cables A, B and C.

2) Set the DSW1-6 (DIP switch) to the ON (Primary CT) side.

3) Set the DSW1-2 (DIP switch).

(a)	Primary constant current type welding machine	Set to OFF (1 cycle) side.
(b)	Single-phase DC type welding machine	Set to ON (0.5 cycle) side.

Advanced functions

4) Set the transformer turn ratio in the monitor mode.

If the winding ratio is unknown and when installing the CT to a Panasonic welding machine, calculate the turn ratio using the formula on the right and set it.

Set the calculated turn ratio and start the welding sequence and correct the turn ratio set value so that the set value and secondary current of the welding machine are equal.

Machine type	Formula
Single-phase AC	$n = I \div (P \times 1000 \div 0.9 \div V)$
Single-phase DC	$n = I \div (P \times 1000 \div 0.85 \div V)$

Where,

n: Transformer turn ratio

I(A): Maximum short-circuit current

P (kVA): Maximum welding input

V (V): Input voltage

5) Adjust the turn ratio

Set the calculated turn ratio and perform welding operation. Adjust the turn ratio until the current set value and secondary current value of the welding power source match.

Note

With a high current welding power source, detection input of CT may be halved. In that case, double the calculated turn ratio. (See the table <Reference> on the right.)

<Reference>

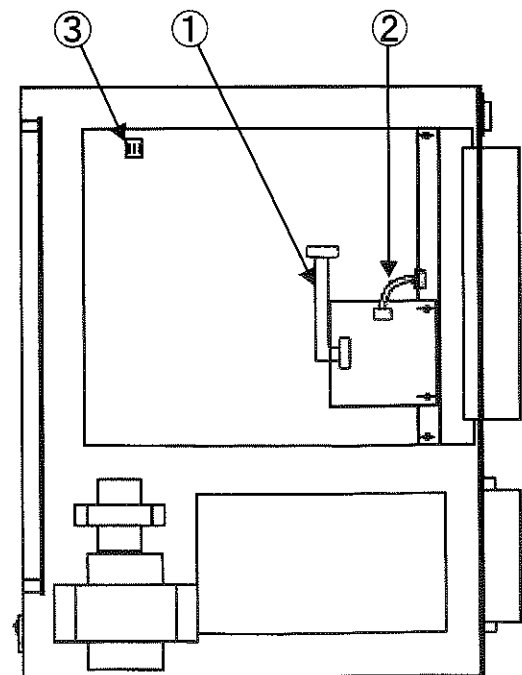
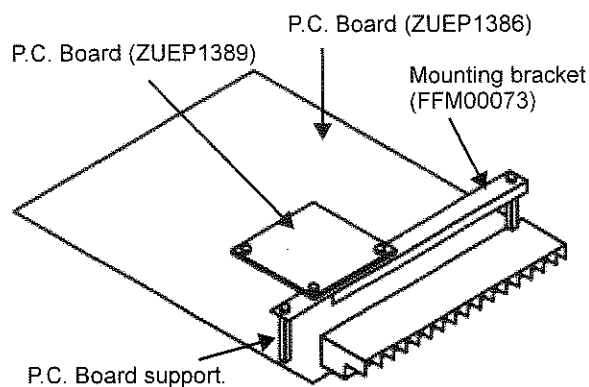
Welding power source model	Turn ratio to be set
YR-500CDS4	n: 57T ±4 [T]
YR-800CDS4	n: 64T ±5 [T]

7.8 Installing pressure control unit (sold separately)

In case of using an electropneumatic proportional valve, it is necessary to purchase the pressure control unit; YX-ZZ025 (available separately) and install it.

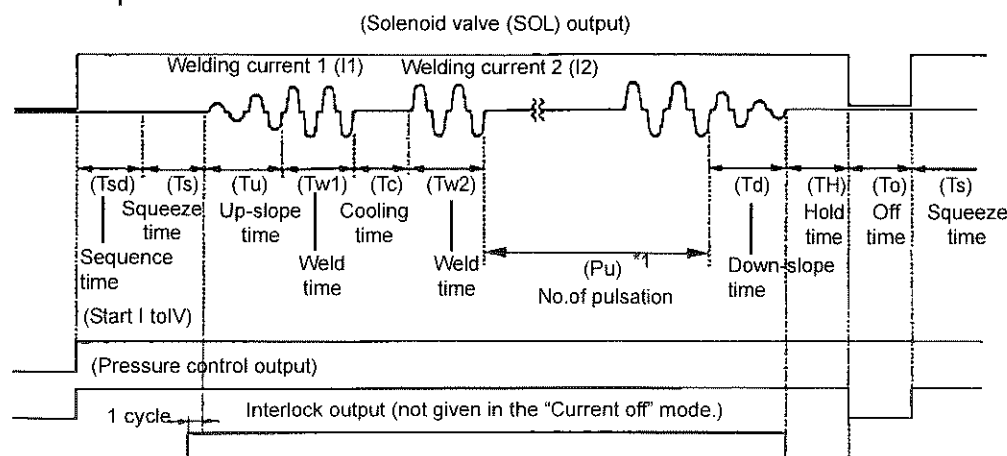
◆ Installation procedure

- (1) Loosen the two screws that fix the P.C. Board, and then attach the P.C. Board support to the P.C. board (ZUEP1386).
- (2) With M3 screws, fasten the mounting bracket; FFM00073, to the P.C. Board support, and then attach the P.C. Board; ZUEP1389.
- (3) Connect the tie line 1 to between CN1; ZUEP1389, and CN10; ZUEP1386, and the tie line 2 to between CN2; ZUEP1389 and CN12; ZUUEP1386.
- (4) Place the DIP switch(DSP2) No.1 to the ON position.



- ① : Tie line 1
- ② : Tie line 2
- ③ : DIP switch (DSW2)

7.9 Sequence chart



- When the hold time ends..... Hold time end output *2
- When a trouble is detected (at any time)..... Trouble output Off by trouble reset input
- When the welding counter reaches..... Welding counter completion output Off by welding counter reset input
- When the production counter reaches..... Production counter completion output Off by production counter reset input
- When the last step-up ends..... Step-up completion output Off by step-up reset input
- When the signal-up ends..... Signal-up completion output Off by signal-up reset input

Note *1: The Cooling time (Tc) and Weld time 2 (Tw2) are repeated by the preset number of pulsation (Pu).
 *2: In case of one-spot welding: it goes on for 150 msec after the first cycle after completing the hold time (TH).
 However, if the starting input is kept on, the hold time end output remains in the on state until the starting input is turned off.
 In case of repeated welding: it is kept on only for the off time (To).

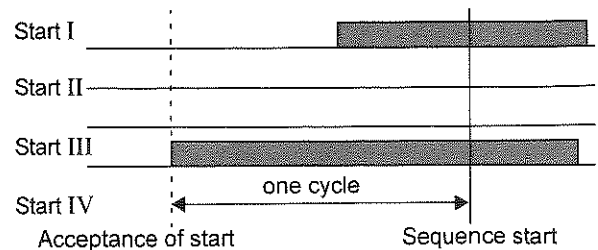
Advanced functions

7.10 Timing chart of accepting starting input

The starting input is checked for reconfirm in one cycle (welding power frequency) after having received the first starting input.

1) 4-schedule mode (DSW1-1: OFF)

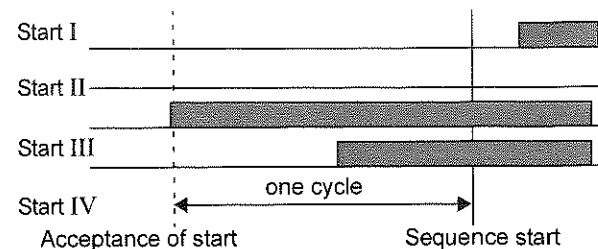
If there are more than one start inputs when it is checked for reconfirm, the start input of smaller start number takes priority, therefore, in the example on the right, the sequence is started with the start I.



2) 15-schedule mode (DSW1-1: ON)

The initial acceptance of start signal is detected in synchronized with the welding power frequency. The all start inputs that are in the on state in one cycle after the initial acceptance of start signal are applied to specify welding condition to call.

In this case, the "Start III" and "Start IV" are accepted, but not the start I" (it is ignored as the it in't input within one cycle after the initial acceptance of start signal), therefore, the sequence is started using the welding condition (job No.) C.



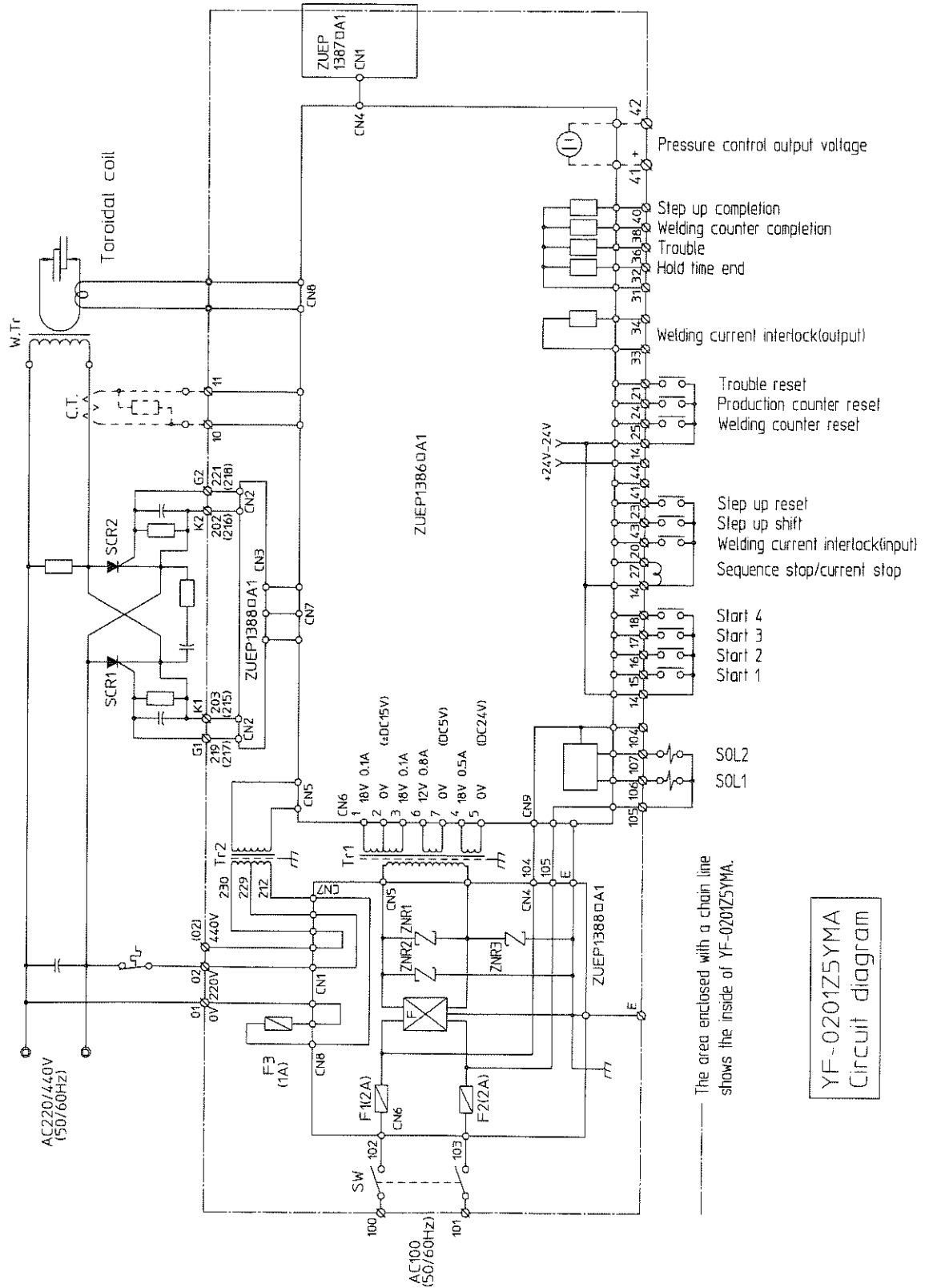
< Note >

- It is necessary to input all start inputs you need to specify a desired welding condition within one cycle after the initial acceptance of start signal.
- It may require two cycles at most of welding power frequency to start sequence after turning on the start input.

Note

- Do not turn off the "CONTROL POWER" while "START" input is in ON state. (In that case, turn ON the CONTROL POWER within 24 hours.)
If the control power is turned off while the start input is on, the counter values of monitoring items, such as welding count, production count and step up count, are reset to the values before turning on the start input, therefore, those values on the indicators and the actual values may be different. Such difference won't be regarded as an error.
- If a start input other than the accepted one is attempted during a sequence, the sequence is stopped.
 - * During self hold state, the sequence will be completed while accepting start signal(s).
 - * Re-start is accepted only after all start inputs are turned off.

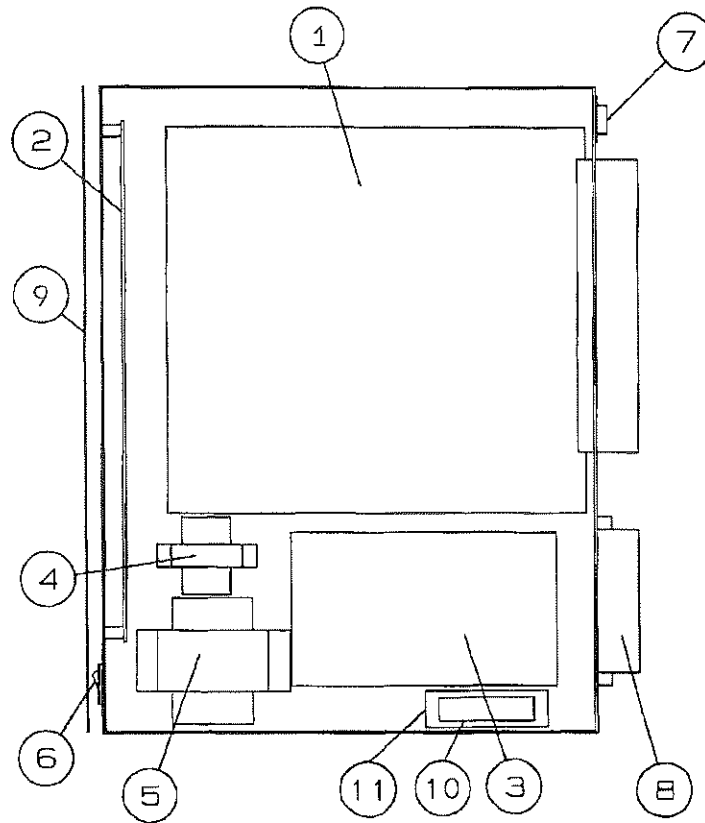
8.Circuit diagram



The area enclosed with a chain line shows the inside of YF-0201Z5YMA.

YF-0201Z5YMA
Circuit diagram

9. Parts list



No.	Name	Part code	Remarks
1	PC Board ^(*)	ZUEP1386*A1	Main control board
2	PC Board ^(*)	ZUEP1387*A1	Indication board
3	PC Board ^(*)	ZUEP1388*A1	Power board
4	Transformer	UTU21430	Control transformer
5	Transformer	UTU21421	Control transformer
6	Switch	DS850S00B	Power switch
7	Socket plug	12-3B	Toroidal coil connecting connector
8	Terminal	TS212PLB8P	
9	Front cover	FKP00003	
-	Rubber cushion	ME25-6	
-	Terminal block cover	FEK00001	
10	Fuse	YFA19	FLQ1: 500V, 1A
11	Fuse holder	YMAD128	FUNU30

(*) Difference from standard model: Full coating is applied to both sides of all P.C. Boards.

10.Data sheet

10.1 Data sheet 1

				JOb No.														
Set item	Symbol	Unit	Set range	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
SOL output	SOL		SOL I or SOL II															
Pressure control output	Pr	MPa	0.00 - 0.50															
Squeeze delay time	Tsd	Cycle	0 - 99															
Squeeze time	Ts	Cycle	3 - 99															
Up-slope time	Tu	Cycle	0 - 20															
Weld time 1	Tw1	Cycle	0 - 99															
Welding current 1 (Constant current compensation)	I1	A	15 - 500 X100															
Welding current 1 (Voltage compensation)			0 - 99															
Cooling time	Tc	Cycle	0 - 99															
Weld time 2	Tw2	Cycle	0 - 99															
Welding current 2 (Constant current compensation)	I2	A	15 - 500 X100															
Welding current 2 (Voltage compensation)			0 - 99															
Down-slope time	Td	Cycle s	0 - 20															
Hold time	TH	Cycle	0 - 99															
Off time	To	Cycle s	0 - 99 (*1)															
Number of pulsations	Pu	Time	0 - 9 (*2)															
MONITOR	Current upper limit	Iup	%	0 - 20														
	Current lower limit	Idn	%	0 - 20														

(*1): When the "Off time" is set at "0", one-spot welding will be executed, and it is set to "1" or above, repeated welding will be executed.

(*2): When the "Number of pulsations" is "n" (n≠0), the cooling time and weld time 2 are repeated (n+1) times, and the down-slope time occurs only after the (n+1)th weld time 2. When the weld time 2 is set to "0" cycle, it is not possible to set the number of pulsations to "1" or above. (Setting error)

Data sheet

10.2 Data sheet 2

Set item		Symbol	Set range	Data
Monitor	Maximum current	1 Max	50 - 500 (X100A)	
	Welding transformer turn ratio	TR	10.0 - 99.9	

					SOL	
Set item	Symbol	Unit	Set range	SOL I	SOL I	
Counter	Welding counter	Cw	-	0 - 99		
Step-up	Production counter	Cp	-	0 - 9999		
	S0 welding count	0	-	0 - 9999		
	S0 Current incremental rate		-	0 (Fixed)		
	S1 welding count	1	-	0 - 9999		
	S1 Current incremental rate		%	0 - 25		
	S2 welding count	2	-	0 - 9999		
	S2 Current incremental rate		%	0 - 25		
	S3 welding count	3	-	0 - 9999		
	S3 Current incremental rate		%	0 - 25		
	S4 welding count	4	-	0 - 9999		
S4 Current incremental rate	%		0 - 25			
Signal-up	Current incremental rate	Su	%	0 - 9		

Set item	Symbol	Set range	Data
Job No. selection	Start I	ST 1	1 - F
	Start II	ST 2	1 - F
	Start III	ST 3	1 - F
	Start IV	ST 4	1 - F

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As of April 1, 2020

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