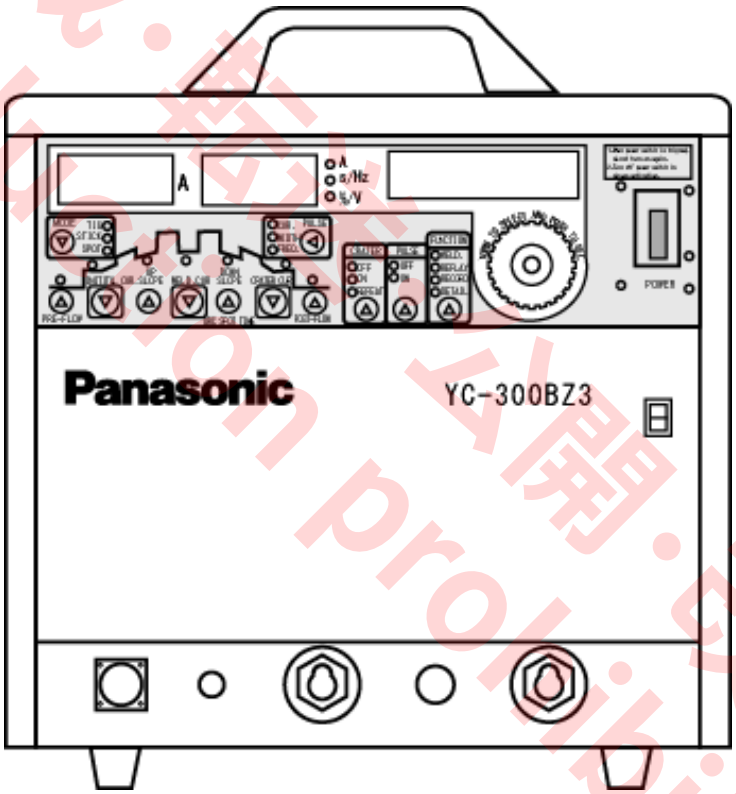
Panasonic

Operating Instructions

DC TIG Welding Power Source

Model No. **YC-300BZ3YHD**



Fully digital and inverter controlled TIG welding

- 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.

OMCTT5621EAA01

2301

♦Features

- It is excellent in reproducing the welding conditions because it is fully digital.
- It can store and recreate up to 64 welding conditions.
- Its enhanced communication function enables introduction of information technology into the welding sites.
- It is compact and lightweight. (Weight: 36 kg)
- It comes with a fingertip joint for connecting the base material cable.

♦Signal Words and Safety Symbols

Signal Words		Safety Symbols (Examples)	
⚠ 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

Our company 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 our company. 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 our company.
- 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 misusage, 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 our company.
- 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.

- This operating instructions manual is based on the information as of January, 2023.
- The information in this operating instructions manual is subject to change without notice.
- English version is the original instructions.

♦Cautions about electromagnetic disturbance

(1) Extra precaution may be required when welding power source is used in a domestic establishment.

(2) Before installing welding equipment, the user shall make an assessment of potential Electromagnetic problems in the surrounding area as below.
   (a) Other supply cables, control cables, signaling and telephone cables; above, below and adjacent to the welding equipment;
   (b) Radio and television transmitters and receivers;
   (c) Computer and other control equipment;
   (d) Safety critical equipment, e.g. guarding of industrial equipment;
   (e) The health of the people around, e.g. the use of the pacemaker and hearing aids;
   (f) Equipment used for calibration or measurement;
   (g) The immunity of other equipment in the environment; the user shall ensure that other equipment being used in the environment is compatible; this may require additional protection measures;
   (h) The time of day that welding or other activities are to be carried out.

(3) The user shall be observe to reduce emission disturbance as below.
   (a) Welding equipment should be connected to mains supply according to the manufacture's recommendations.
   (b) Welding equipment should be routinely maintained according to the manufacture's recommendations.
   (c) The welding cables should be kept as short as possible and should be positioned close together, running at or close to the floor level.
   (d) Confirm to connection of all metallic component in the welding installation and adjacent to it should be considered for safety.
   (e) The work-piece should be connected to earth for electric safety.
   (f) Selective screening and shielding of other cables and equipment in the surrounding area may alleviate problems of interference. Screening of entire welding installation may be considered for special applications.

(4) The user should take the responsibility with respect to interference from welding.

♦About “Turkish RoHS Regulation”

EEE Yönetmeliğine Uygundur.	EEE Complies with Directive of Turkey.

♦About “Ukrainian RoHS Regulation”

English	Declaration of Conformity with the requirements of Technical Regulation on the Restriction Of the use of certain Hazardous Substances in Electrical and Electronic Equipment (adopted by Order №1057 of Cabinet of Ministers of Ukraine) The Product is in conformity with the requirements of Technical Regulation on the Restriction Of the use of certain Hazardous Substances in electrical and electronic equipment (TR on RoHS). The content of hazardous substance with the exemption of the applications listed in the Annex №2 of TR on RoHS: 1. Lead (Pb) - not over 0,1wt % or 1000wt ppm; 2. Cadmium (Cd) - not over 0,01wt % or 100wt ppm; 3. Mercury (Hg) - not over 0,1wt % or 1000wt ppm; 4. Hexavalent chromium (Cr6+) - not over 0,1wt % or 1000wt ppm; 5. Polybrominated biphenyls (PBBs) - not over 0,1wt % or 1000wt ppm; 6. Polybrominated diphenyl ethers (PBDEs) - not over 0,1wt % or 1000wt ppm.
Ukrainian	Декларація про Відповідність Вимогам Технічного Регламенту Обмеження Використання деяких Небезпечних Речовин в електричному та електронному обладнанні (затвердженого Постановою №1057 Кабінету Міністрів України) Виріб відповідає вимогам Технічного Регламенту Обмеження Використання деяких Небезпечних Речовин в електричному та електронному обладнанні (ТР ОВНР). Вміст небезпечних речовин у випадках, не обумовлених в Додатку №2 ТР ОВНР, : 1. свинець(Pb) – не перевищує 0,1wt % ваги речовини або в концентрації до 1000 частин на мільйон; 2. кадмій (Cd)– не перевищує 0,01wt % ваги речовини або в концентрації до 100 частин на мільйон; 3. ртуть(Hg) – не перевищує 0,1wt % ваги речовини або в концентрації до 1000 частин на мільйон; 4. шестивалентний хром (Cr6+) – не перевищує 0,1wt % ваги речовини або в концентрації до 1000 частин на мільйон; 5. полібромбіфеноли (PBB) – не перевищує 0,1% ваги речовини або в концентрації до 1000 частин на мільйон; 6. полібромдефенілові ефіри (PBDE) – не перевищує 0,1wt % ваги речовини або в концентрації до 1000 частин на мільйон.
Russian	Декларация о Соответствии Требованиям Технического Регламента об Ограничении Использования некоторых Вредных Веществ в электрическом и электронном оборудовании (утверждённого Постановлением №1057 Кабинета Министров Украины) Изделие соответствует требованиям Технического Регламента об Ограничении Использования некоторых Вредных Веществ в электрическом и электронном оборудовании (ТР ОИВВ). Содержание вредных веществ в случаях, не предусмотренных Дополнением №2 ТР ОИВВ: 1. свинец (Pb) – не превышает 0,1wt % веса вещества или в концентрации до 1000 миллионных частей; 2. кадмий (Cd) – не превышает 0,01wt % веса вещества или в концентрации до 100 миллионных частей; 3. ртуть (Hg) – не превышает 0,1wt % веса вещества или в концентрации до 1000 миллионных частей; 4. шестивалентный хром (Cr6+)– не превышает 0,1wt % веса вещества или в концентрации до 1000 миллионных частей; 5. полибромбифенолы (PBB) – не превышает 0,1wt % веса вещества или в концентрации до 1000 миллионных частей; 6. полибромдифеноловые эфиры (PBDE) – не превышает 0,1wt % веса вещества или в концентрации до 1000 миллионных частей.

♦Table of Contents

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) Only educated and/or skilled persons who well understand this welding power source should install, operate, maintain and repair the unit.
(6) 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) 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.
(2) 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. Do not use undersized, worn, damaged or bare wired cables.
(3) Connect cables completely and insulate connection parts.
(4) Keep all cases, panels and covers securely in place.
(5) Do not handle the welding power source with torn or wet gloves.
(6) Wear safety harness in case of working above floor level.
(7) Turn off all equipment when not in use.
(8) Perform periodic checks without fail and repair or replace any damaged parts before using the power source.
(9) In case of AC arc welding in a confined area or above floor level, check related national, state and local codes and regulations for any special treatment and comply with it if any.

Electromagnetic disturbance

Observe the following instructions to prevent the electromagnetic disturbance due to weld current or high frequency at arc start.

(1) Pacemaker wearers should consult their doctor before going near arc welding. Magnetic fields can affect pacemakers.
(2) Peripheral electronics or safety device may cause electromagnetic disturbance. Ground all of such devices without fail. Provide an electromagnetic shielding if necessary.
(3) Weld cable should be as short as possible and also lay it as near to the floor or ground as possible if not on.
(4) Never provide grounding of base metal and welding machine in common.
(5) Do not operate the torch switch if not necessary.

Ventilation and protective equipment

Oxygen deficit, fume and gas generated during welding can be hazardous.

(1) When conducting welding in the bottom of the tank, boiler or hold as well as legally-defined sites, use a local exhauster specified by the applicable laws and regulations (occupational safety and health regulation, rules on preventing suffocation or etc.) or wear protective breathing gear.
(2) To prevent dust injury or poisoning by the fume generated during welding, use a local exhauster specified by the applicable law (occupational safety and health regulation, rules on preventing injury by inhaled dust or etc.), or wear protective breathing gear.
If a protective breathing gear is used, it is recommended to use one with an electric fan with high protection performance.
(3) When conducting welding in a confined area, make sure to provide sufficient ventilation or wear protective breathing gear and have a trained supervisor observe the workers.
(4) Do not conduct welding at a site where degreasing, cleaning or spraying is performed. Conducting welding near the area where any of these types of work is performed can generate toxic gases.
(5) When welding a coated steel plate, provide sufficient ventilation or wear protective breathing gear. (Welding of coated steel plates generates toxic fume and gas.)

⚠ WARNING

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) When welding a ceiling, floor or wall, remove all flammables including ones located in hidden places.
(5) Wire the cables correctly and connect them tightly. Insulate the connected parts surely so that no exposed conductive part touches the cases or housings. (Poor cable connection or incomplete current path on the base metal side, such as steel, if any, can cause fire due to the heat generated by energization.)
(6) Connect the base metal cable as close to the welding position as possible. (If not, unexpected current path may be created, which can cause fire due to the heat generated by energization.)
(7) 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.
(8) Do not weld a sealed tank or a pipe that contains a gas.
(9) Keep a fire extinguisher near the welding site for an emergency.

⚠ CAUTION

Installing shielding (curtain etc.)

Arc flash, flying spatter and slugs 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) Wear protective glasses to protect your eyes from spatter or slugs.
(3) 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.
(4) Install a protective curtain around the welding manipulator site to prevent the arc flash from entering the eyes of people in the surrounding area.

Noise

Noise from some processes or equipment can damage hearing.

(1) Follow the local regulations and wear ear protection, such as ear plug or hear muff.
(2) The larger the welding current is, the larger the noise becomes.

Gas cylinder and gas flow regulator

Overturn of gas cylinder and blowout of gas flow regulator can cause injury.

(1) The gas cylinder must be handled properly according to the applicable law and in-house standards.
(2) Use the gas flow regulator that is supplied or recommended by our company.
(3) Read the instruction manual of the gas regulator prior to using it, observe the cautions in the manual
(4) Secure the gas cylinder to a dedicated gas cylinder stand.
(5) Do not expose the gas cylinder to high temperature.
(6) When opening the valve of the gas cylinder, do not bring your face close to the discharge outlet.
(7) When the gas cylinder is not used, be sure to install a protective cap.
(8) Do not hang the welding torch on the gas cylinder, or touch the gas cylinder with the electrode.

Rotating parts

Rotating parts can cause injury.

(1) Keep away from rotating parts such as cooling fans, feed roller of the wire feeder, or hand, finger(s) hair or part of your clothes may be caught by the parts resulting in injury.
(2) Keep all covers, panels and cases closed when using the product.
(3) Maintenance work and repair should be perform only by educated and/or skilled persons who thoroughly understand welding machines. While performing maintenance or repair work, provide fence or the like around the welding machine so that unauthorized person can not come close carelessly.

Against insulation deterioration

Insulation deterioration can cause fire of welding power source.

(1) Keep enough distance from welding power source when performing welding or grinding work so as to prevent such spatters or iron particles from getting into the power source.
(2) Perform check and maintenance work periodically so as to prevent insulation deterioration due to accumulated dust or dirt.
(3) When spatters or iron particles get into the welding power source, turn off the power switches of the welding power source and power distribution box, and then blow out.

2. Rated Specifications

Rated input voltage		VAC	400
Number of Phase			3
Rated frequency		Hz	50/60Hz (Common)
Rated input			10.5 kVA (9.5 kW)
Efficiency		%	86 (300 A / 40 V)
Idle state power consumption		W	26
Rated output current	TIG, SPOT	A	DC 300
	STICK	A	DC 250
Rated output voltage	TIG, SPOT	V	DC 22
	STICK	V	DC 30
Duty cycle		%	40
Output current adjustment range*	TIG, SPOT	A	4 – 300
	STICK	A	4 – 250
Maximum non-load voltage		V	DC 74 V
Up slope time		s	0 - 10 (Increment: 0.1s)
Down slope time		s	0 - 10 (Increment: 0.1s)
Pre-flow time		s	0 - 10 (Increment: 0.1s)
Post-flow time		s	0 - 30 (Increment: 0.1s)
Pulse frequency		Hz	0.8 - 500 (0.8 - 9.9Hz: In increments of 0.1Hz) (10 - 99Hz: In increments of 1Hz) (100 - 500Hz: In increments of 10Hz)
Pulse width		%	5 - 95
Arc spot time		s	0.1 - 5 (Increment: 0.1s)
Control system			IGBT inverter method
Crater control system			Selectable from 3 modes of crater controls; “ON”. “OFF” or “Repeat”
High-frequency-wave generating equipment			High frequency arc start type
Communication function			RS-232C, RS-422
Memory function			64ch storage and reproduction
Robot interface function			Enables communication with our “G2” Panarobo controller.
Cooling system			Forced air-cooling
Type of insulation			Class H
Dimension (W x D x H)		mm	380 x 510 x 410
Mass		kg	36
Protection grade			IP 21S
Protection class			-
List of equivalent			-

*: As arc is stable in the low current range, select an appropriate welding condition.

2.1 Standard accessories

Name	Product number	Q’ty	Remarks
Gas hose	CWG30101	1	TBV6 x 11, 3m
Hose band	WHB12	1	Gas regulator side
Torch switch connector	CN70AP2P	1	
Fingertip joint	D1XSK50	1	For output (base metal) cable: Plug
Binding band	ALT150M	2	

2.2 Duty cycle

Do not use this product at any usage rate over the rated duty cycle.

- The rated duty cycle for this product is 100%.
  "The duty cycle is 100% at the rated output" means that the power source can maintain operation continuously with the rated output current without overheating.
- When using the product in combination with other devices, such as the welding torch, etc., use it at the lowest rated duty cycle among those devices

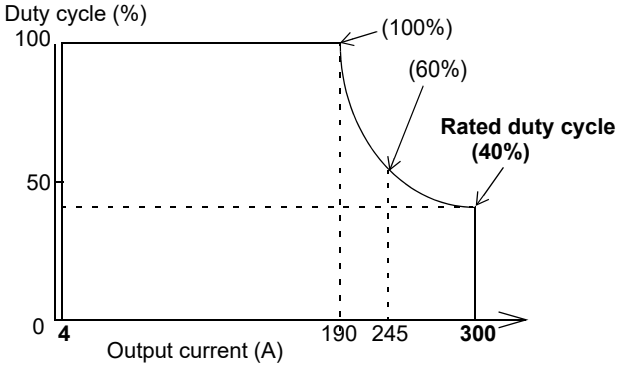
< Note >

Using a product at a duty cycle over the rated duty cycle may increase the equipment temperature over the permissible maximum, which cause the error (Err-13).

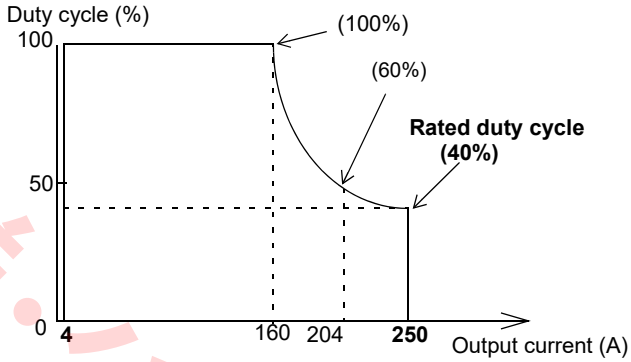
* When an output other than rated value is used.

$$\text{Allowable duty cycle (\%)} = \left(\frac{\text{Rated output current}}{\text{Actual output current}}\right)^2 \times \text{Rated duty cycle (\%)}$$

- TIG welding

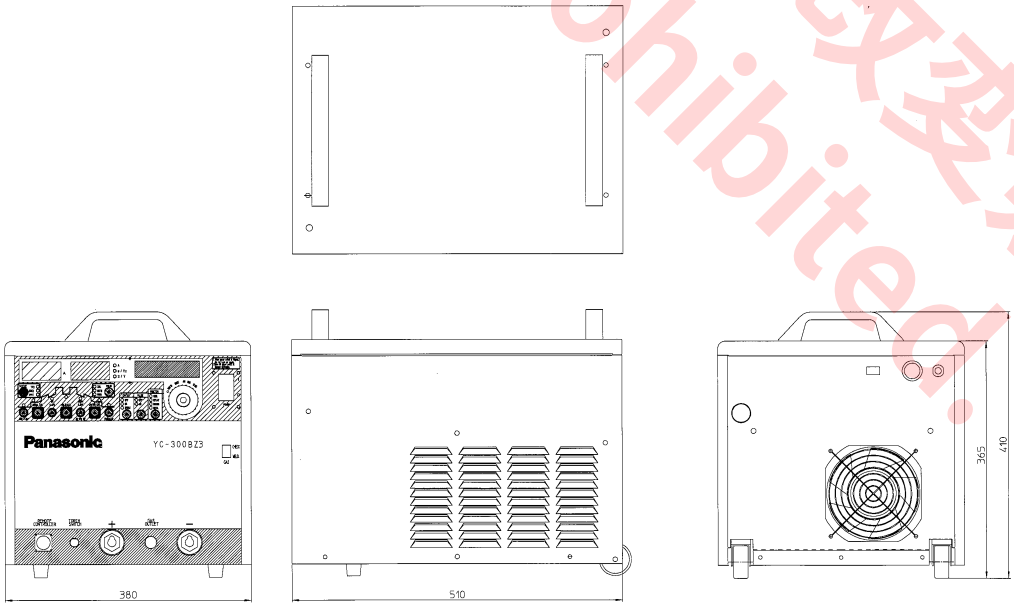


- Stick welding



For your reference:
Duty cycle: The percentage ratio of loading time to full time. A cycle of the full time shall be 10 minutes.
Rated duty cycle: means the rate of use when loading the rated output current intermittently at the rated input voltage of the rated frequency. Regarding the engine-driven welding power unit, however, it means when driving it at the rated number of revolution.

2.3 Dimensions



3. Installation

3.1 Installation site

(1) Locate indoors only, where the floor is capable of supporting the weight of the product.

(2) Avoid exposure to the direct sun light or the rain or water spray.
<Note> If exposed to the rain or water spray, or dew condensation occurred, dry the product before using it.

(3) Ambient temperature
(a) During welding operation: -10 °C to 40 °C
(b) During transportation/storage: -20 °C to 55 °C

(4) Humidity relative to temperature
(a) Up to 50 % at 40 °C.
(b) Up to 90 % at 20 °C.

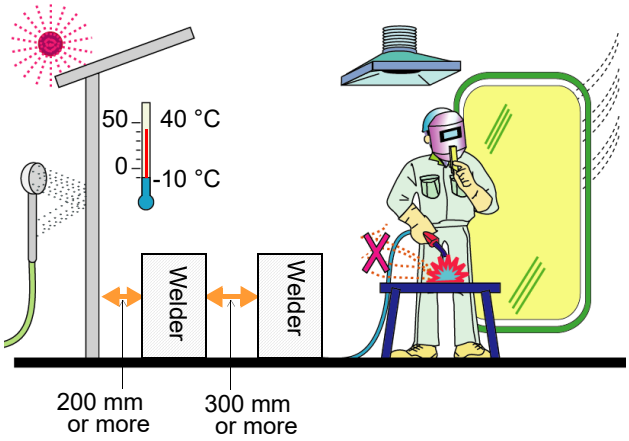
(5) Altitude above sea level: Up to 1000 m.

(6) Spacing
(a) From the wall: 200 mm or more.
(b) Between welders installed side-by-side: 300 mm or more.

(7) Avoid wind to the arc.
(Provide windshields.)

(8) Free from abnormal amounts of dust, acid, corrosive gases or substances etc. other than those generated by the welding process.

(9) Avoid places where the metallic substances or combustible foreign materials can get into the welder through the air inlets.

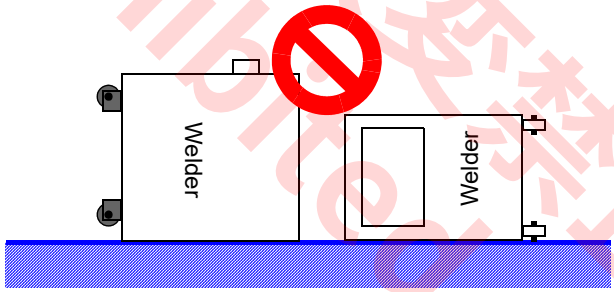


Attention

When the product is installed on the floor where it is too low to operate, customers are required to prepare a table to mount the product on. Such table should be provided with flanges on the mounting surface to prevent the product to slide off the table.

(10) Inclination to installation surface: Max 10°.
<Note> When installing the product on a inclined surface, make sure to scotch the casters. Or the casters to move unexpectedly.

(11) Do not place the product rear-side down or side-surface down to use.



3.2 Power supply equipment

⚠ CAUTION

Observe the following to prevent burnout, destruction of parts and unstable arc.

Input voltage	400 VAC
Input current	15 A
Input protective devices (Breaker, fuse etc.)	Type and capacity to be applied should conform to all national and local codes.
Cable cross section area for input cable and ground wire	Type and size of cables to be applied should conform to all national and local codes.

Note

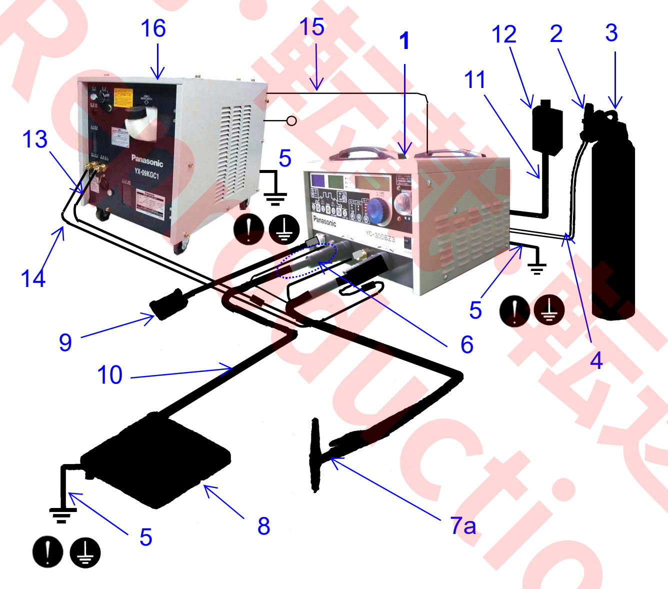
- This Class A equipment is not intended for use in residential locations where the electrical power is provided by the public low-voltage supply system. There can be potential difficulties in ensuring electromagnetic compatibility in those locations, due to conducted as well as radiated radio-frequency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

4. Configuration

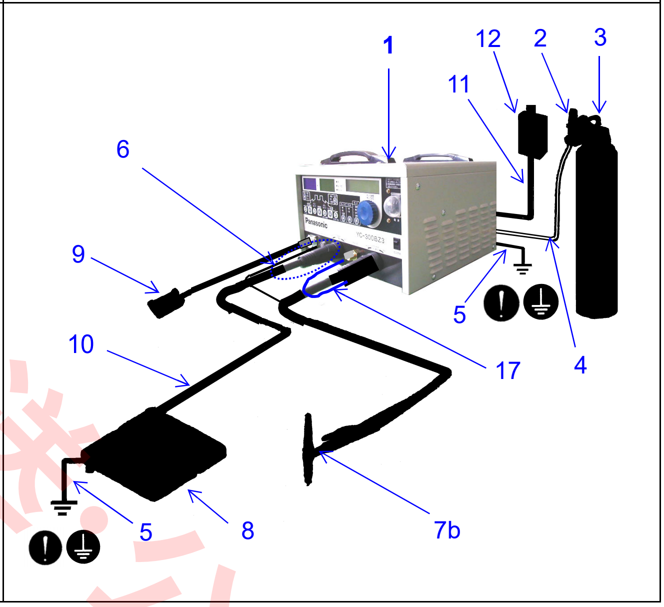
4.1 TIG welding

- Customers are required to prepare the items other than marked as “This product” or “Accessory”.
- The items marked with “*” are available as peripheral equipment (optional items), with separate sales. (See section “Peripheral equipment”).
- For arc spot welding, configurations are the same as the followings.
  In case of arc spot welding, it is necessary to prepare “Arc spot nozzle” separately.

When using the special water-cooling torch



When using the special air-cooling torch



No.	Item	Remarks
1	Welding power source	This product
2	Argon gas regulator	*
3	Argon gas	
4	Gas hose	Accessory
5	Grounding wire	
6	Fingertip joint*4	Accessory
7a	Water-cooling TIG welding torch*1 *4	*
7b	Air-cooling TIG welding torch*1 *4	*
8	Base metal	
9	Remote controller	*
10	Base metal cable*2	
11	Input power cable	
12	Distribution box	
13	Supply water hose	
14	Return water hose	
15	Flow-rate switch cable	
16	Cooling water unit and cooling water*3	*
17	Gas hose*5	

*1 In the case of arc spot welding, use the special arc spot nozzle.

*2 Connect it to the output cable of the base metal if necessary.

*3 Do not put the cooling water system on top of the welding power unit.

*4 Welding torch and fingertip joint
Make sure to use the Panasonic genuine products only.
Or the connection part may be burnt due to poor contact.

*5 The gas hose lead-out point of the air-cooling TIG welding torch is different from that of the water-cooling TIG welding torch.

Note

About “Base metal cable”

To prevent overheat of the cable and provide with proper welding, prepare a cable which is <u>a welding cable or cabtire cable (excluding the class-1 cabtire cable and vinyl cabtire cable) of 38mm² or more</u>

About “Water-cooling welding torch”

In case of using water cooled welding torch, make sure to supply cooling water while using the torch.Failure to follow the instruction can damage the torch.

4.2 Stick welding

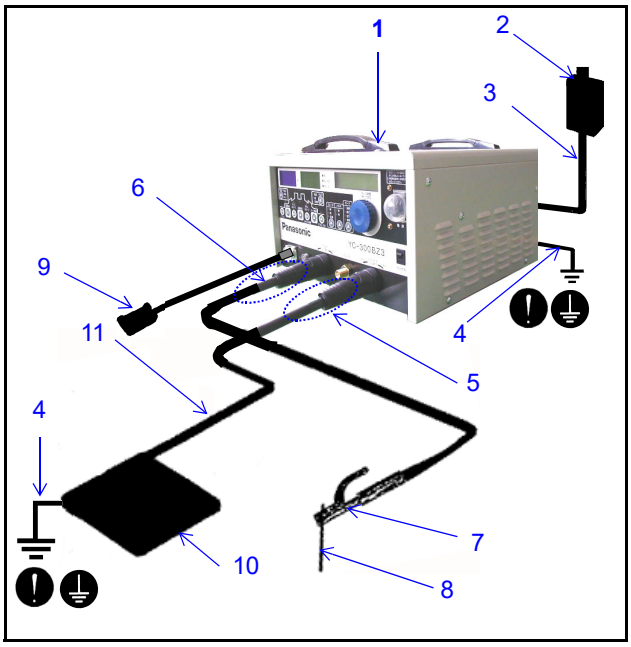
- Customers are required to prepare the items other than marked as “This product” or “Accessory”.
- The items marked with “*” are available as peripheral equipment (optional items), with separate sales. (See section “Peripheral equipment”).

Note

(1) Fingertip joint
Make sure to use the Panasonic genuine products only. Or the connection part may be burnt due to poor contact.

(2) Base metal cable
To prevent overheat of the cable and provide with proper welding, prepare a cable which is a welding cable or cabtire cable (excluding the class-1 cabtire cable and vinyl cabtire cable) of 38mm2 or more

(3) The polarity between the electrode holder ((13)) and the base material shown in the above figure is electrode positive (DCEP), as normally applied to stick welding. (Depending on the types of work, it is required to change the polarity.)



No.	Item	Remarks	No.	Item	Remarks
1	Welding power source	This product	7	Electrode holder	
2	Distribution box		8	Welding electrode	
3	Input power cable		9	Remote controller	*
4	Grounding wire		10	Base metal	
5	Fingertip joint	Accessory	11	Base metal cable*2	
6	Fingertip joint*1	*			

*1 Prepare the fingertip joint (CWC00180) to connect to the cable from the electrode holder.

*2 Connect it to the output cable of the base metal if necessary.

Notice **About stick welding**

- In case of stick welding operatin, please check ans operate in the follwoing order.

(1) Refer to section "9.3 STICK welding operation" on page 43.
(2) When using the remote controller (See section 4.3.6 on page 19), and connect the remote controller before performing the following procedure.
(3) Select “STICK” using the “MODE” button (See section 5.1 on page 20).
(In case that the “STICK” has already been selected before connecting the remote controller, turn off the power and connect the remote controller, and then turn the power back on again.)

- Once “STICK” is selected, you can only change modes or adjust welding current.
It is not possible to execute TIG/SPOT welding related settings as they are unrelated to the stick welding.
- In case of having a remote controller been connected, welding current can only be adjusted by the “Welding cur. Adj.” volume of the remote controller.
Jog dial (See section 5.1 on page 20) operation is not valid. Volumes or switches other than “Welding cur. Adj.” on the remote controller are not valid.

4.3 Peripheral equipment (Optional items)

4.3.1 TIG Welding torch

1) Special torch (Fingertip joint)

Air-cooling 200A torch	Water-cooling 300A torch
YT-20TS1TAG (4 m)	YT-30TSW1TAG (4 m)
YT-20TS1TAH (8 m)	YT-30TSW1TAH (8 m)

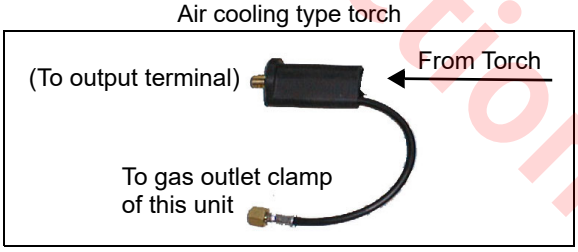
2) Type-1.8 TIG welding torch

You are required to purchase the torch connection adapter separately.

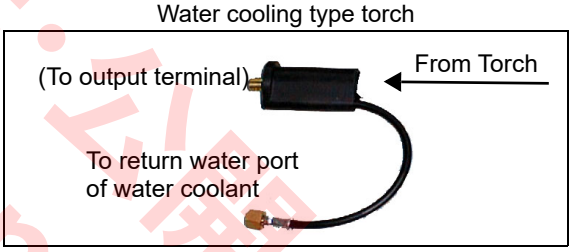
TIG welding torch (Non-fingertip joint)	Torch connection adapter		
	Product number	Replacement cable clamp	Control cable assembly
YT-08TS1, YT-088T YT-12TS1, YT-12TP1, YT-128T(P) YT-15TS1, YT-15TP1, YT-158T(P)	YX-151AJ1J1	TJM00046	TWX00018
YT-20TS1, YT-208T	YX-201AJ1	TJM00038	TWX00018
YT-20TSW1 YT-30TSW1, YT-30TPW1 YT-208TW, YT-208TPW YT-308TW, YT-308TPW	YX-301A J1	TJM00041	TWX00018

<Replacement cable clamp>

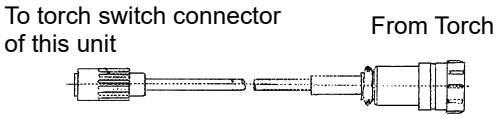
Air cooling type torch



Water cooling type torch

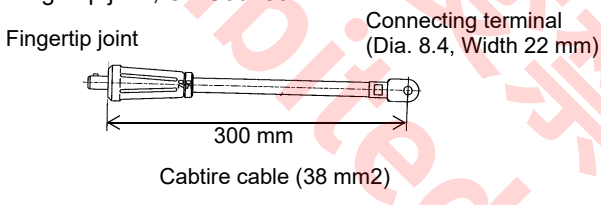


<Control cable assembly; TWX00018>



- When using any TIG welding torch other than those described in the above items (1) and (2):
  You are required to purchase a terminal adapter; CWC00180 as well as the control cable assembly (TWX00018) separately. (One piece each)

<Fingertip joint; CWC00180>



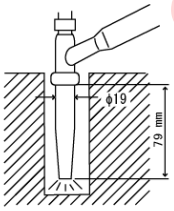
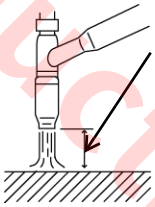
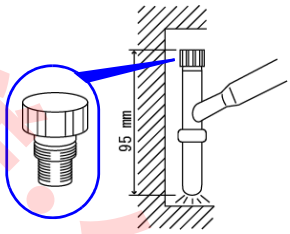
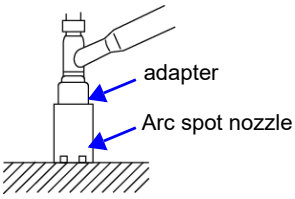
3) Tungsten electrode for TIG welding

YWCe-2*	YWLa-2*	Dia. (mm)	Length (mm)
YN-05C2S	YN-05L2S	0.5	150
YN-10C2S	YN-10L2S	1.0	150
YN-16C2S	YN-16L2S	1.6	150
YN-20C2S	YN-20L2S	2.0	150
YN-24C2S	YN-24L2S	2.4	150
-	YN-30L2S	3.0	150
YN-32C2S	YN-32L2S	3.2	150
YN-40C2S	YN-40L2S	4.0	150
YN-48C2S	YN-48L2S	4.8	150

*: YWCe-2: Tungsten with 2%Cerium trioxide
YWLa-2: Tungsten with 2% Lanthanum trioxide

Note
See also section “Appendix: Tungsten electrode”.

4) Special nozzle

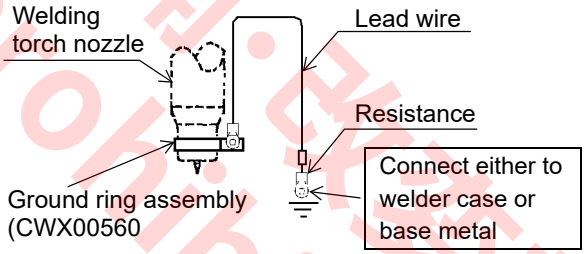
Long nozzle	Nozzle for gas lens (GL)Note	Torch cap S	Arc spot nozzle
Good for welding of deep section.	Good for welding of those that require high shielding performance, such as titanium and special alloy.	Good for welding of narrow area.	By attaching this nozzle to a standard torch, arc spot welding becomes facile.
			

Note: For “nozzle for gas lens”, it is necessary to prepare collet body and nozzle packing for gas lens.

5) Ground ring assembly (CWX00560)

If the arc spark is insufficient, you can install this ground ring to improve it. (For details, see the instruction manual supplied with the ground ring assembly.)

Note
In case of installing for the first time, please consult Panasonic representatives.
(An installation error may cause damage to the torch, or may not improve the arc start.)



4.3.2 Extension cable (available on request)

- Use an extension cable when the welding torch cable is not long enough. (It is connected between the welding torch and this product.)

< Note >

Extension cables cannot be interconnect. (Use one extension cable only.)

- Make sure to lay out an extension cable in an extended form. (Using an extension cable in a collide form may be a cause of unstable arching.)
- To use an extension cable, it is necessary to purchase one each of the terminal adapter (CWC00180) and the control cable assembly (TWX00018) separately.
- When connecting the special torch to an extension cable, remove the replacement cable clamp attached to the welding machine side of the special torch. (Remove the rubber cover of the replacement cable clamp, and the screw appears. Remove that screw, and the replacement cable clamp comes off.

< Note >

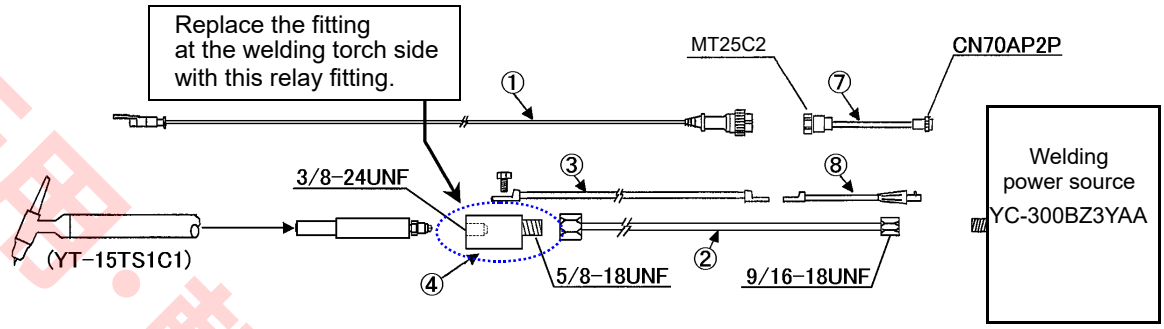
The torch connection side of the extension cable employs a screw connection. As the special torch with the replacement cable clamp removed also employs a screw connection, it can be connected with the extension cable)

		Extension cable		
Applicable torches	Cable length	5 m	10 m	15 m
Air-cooling	YT-15TS1 YT-15TS1C1	TWU15125	TWU15126	TWU15127
	YT-20TS1TAG*1 YT-20TS1TAH*1 YT-20TS1 YT-20TS1C1 YT-208T YT-208TC1	TWU20131	TWU20132	TWU20133
Water-cooling	YT-30TSW1TAG*1 YT-30TSW1TAH*1 YT-30TSW1 YT-30TSW1C1 YT-208TW YT-208TWC1 YT-308TW YT-308TWC1	TWU30132	TWU30133	TWU30134*2

*1: Special torch
*2: Refer to the “Example of extension cable connection” on the next page.

<Examples of extension cable connection>

1) Connecting to torch; YT-15TS1C (150A, air cooled, 8m)



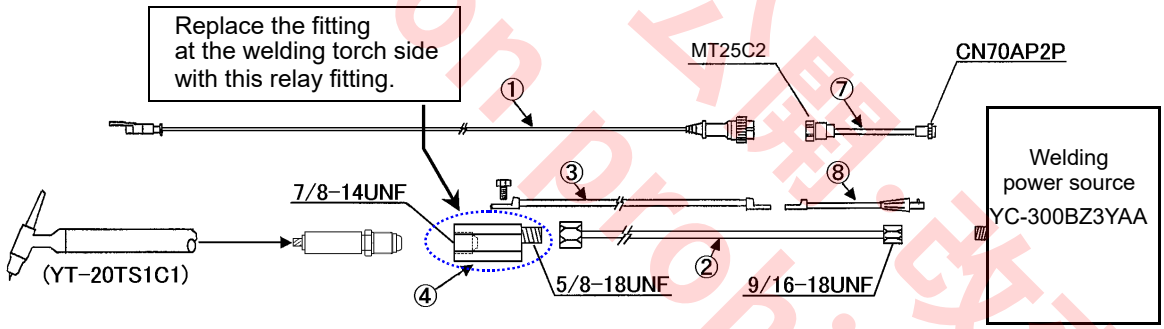
- Extension cable (TWU15127)

1. Gas hose	YX-503TKC(15)24 m	1 pc.
2. Current cable	YSH7.5 x 1B (Orange)15 m	1 pc.
3. Relay fitting	38 mm^2 ..... 15 m	1 pc.
4. Return water hose	TJM15110	1 pc.

- Optional items for connecting extension cables (“MUST” items)

7. Control cable assembly	TWX00018 ... 0.3 m	1 pc.
8. Terminal adapter	CWC00180 .. 0.3 m	1 pc.

2) Connecting to torch; YT-20TS1C (200A, air cooled, 8m)



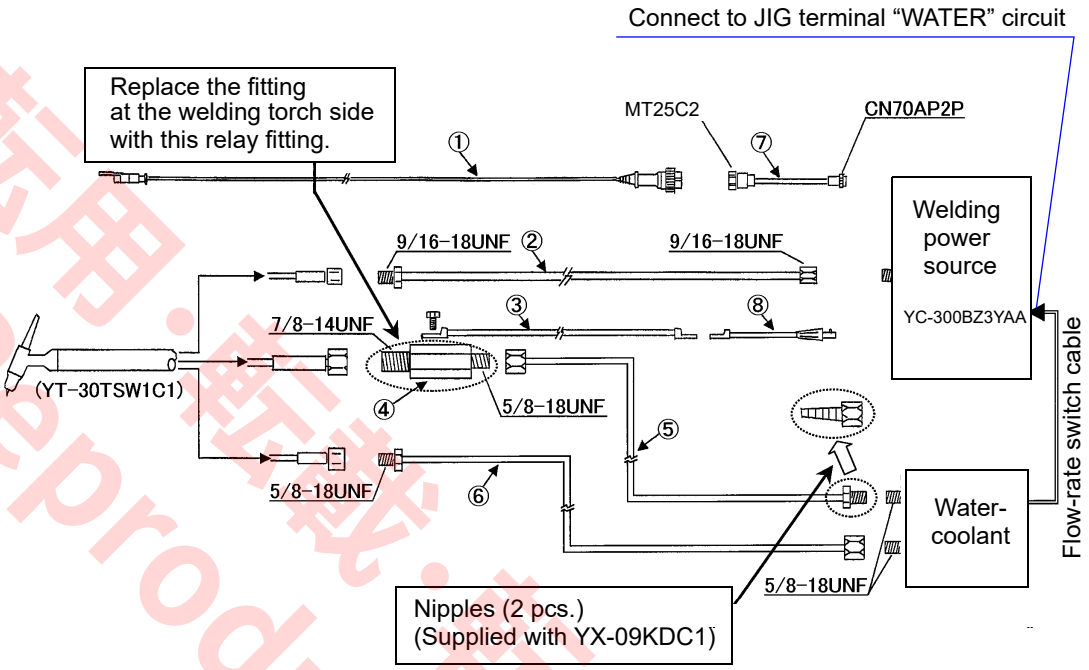
- Extension cable (TWU20133)

1. Gas hose	YX-503TKC(15)24 m	1 pc.
2. Current cable	YSH7.5 x 1B (Orange)15 m	1 pc.
3. Relay fitting	38 mm^2 ..... 15 m	1 pc.
4. Return water hose	TJM20106	1 pc.

- Optional items for connecting extension cables (“MUST” items)

7. Control cable assembly	TWX00018 ... 0.3 m	1 pc.
8. Terminal adapter	CWC00180 .. 0.3 m	1 pc.

3) Connecting to torch; YT-30TSW1C1 (300A, water cooled, 8m)



- Extension cable (TUWU30134)

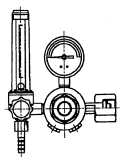
1. Gas hose	YX-503TKC(15)24 m	1 pc.
2. Current cable	YSH7.5 x 1B (Orange)15 m	1 pc.
3. Relay fitting	38 $mm.^2$ ..... 15 m	1 pc.
4. Return water hose	TJM30106	1 pc.
5. Supply water hose	6 x 1B (Blue rubber hose)15 m.	1 pc.
6. Gas hose	6 x 1B (Blue rubber hose)15 m.	1 pc.

- Optional items for connecting extension cables (“MUST” items)

7. Control cable assembly	TWX00018....0.3 m	1 pc.
8. Terminal adapter	CWC00180 ...0.3 m	1 pc.

4.3.3 Argon gas regulator (YX-251A)

- The maximum flow rate is 25L/min.



4.3.4 Cooling water unit and cooling water

(1) Cooling water unit; YX-09KGC1
Make sure to use water cooling unit to prevent torch burnout.

- With built-in flow switch.
- Coolant water capacity: 9 litters.
- Connect the flow switch cable to “WATER” terminal of the JIG terminal block.

4.3.5 Cooling water

Use our genuine cooling-water (Pana-coolant K; CWU00098), that keeps its quality for a long time.

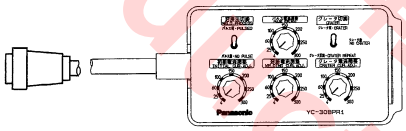
- Operating temperature: -20 to +90ºC
  (As for welding torch, use it at 50ºC or less.)
- Unit: 10-litter polyurethane container.
- See the operating instructions of PANACOOLANT" for usage and disposal

4.3.6 Potentiometer-type remote control unit (YC-30BPR1, YC-30BMR1)

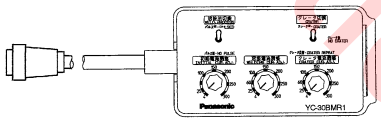
Note **TIG welding remote control unit**

The conventional YC-301URTRK1 cannot be used. (Due to the difference in connectors and signal lines)

YC-30BPR1



YC-30BMR1



(1) The remote control unit enables you to set the presence, absence or repeat of the crater control and the presence or absence of the pulse control*, and to adjust the initial current, welding current and crater current at a distance. (Cable length: 5 m)
(*: Settings and adjustment are available with YC-30BPR1 only. As for YC-30BMR1, use the welding power source to adjust them.)

< Note >

- After connection of the remote control unit, such setting and adjustment can be done via the remote control unit only.
- After connecting the remote controller to the welding power source, the power source recognizes the remote controller in about two seconds. Once the remote controller is recognized, the LED indicator displays "<REMO>".
  If the torch switch is turned on before displaying the "<REMO>" on the LED indicator, the welding current set in the welding power source is applied.

(2) To have a current value displayed when adjusting each current, switch the LCD display to the screen of each current item. Then, the current value of each item appears on the set-value display.
* Details: See chapter 6 (Name and function of each part) and chapter 9 (Operation).
* It is also possible to make the adjustment of each current without switching the LCD display to the screen of each current item. (In that case, however, no current value appears on the set-value display.)

(3) As the analog input is employed for the input of current values from the remote control unit, current values appearing on the set-value display may vary by about plus or minus 1A. (It becomes stable if you change the position of a potentiometer slightly.)

4.3.7 External equipment connection unit (YX-CB009Y**)

This unit is to connect the welding power source with an external equipment (sequencer), and to reproduce the welding conditions stored in this welding power source using the external device. * The external device (sequencer) is not included in this unit.

- When using this unit, see section "Connection: connecting to external equipment connection unit".

* Please contact Panasonic representatives for more information, such as detail specifications.

5. Names and Functions

⚠ CAUTION

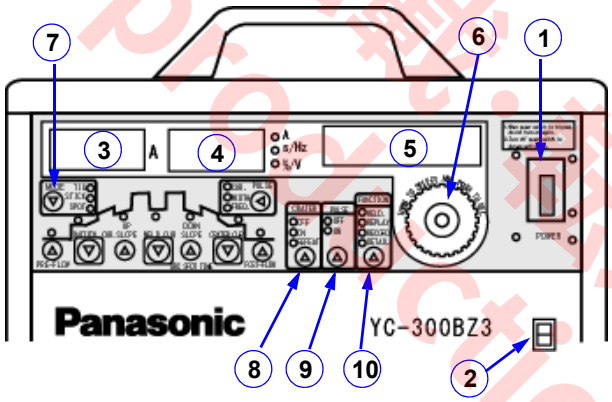
About power switch:

- When the power switch is turned off automatically, do not turn it on again. (Consult Panasonic representatives.)
- When activating a power generator, turn off the power switch.

5.1 Front panel

For details of functions, see section “Welding conditions” or “Operation”.

5.1.1 Data display/setting section and welding conditions selecting section

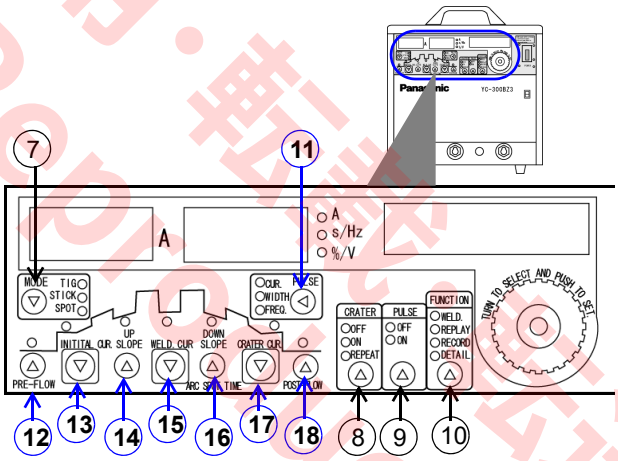


1	**“POWER” switch (NFB)** Turns the power supply on and off. Turn it on and off from outside of the case. The lever position at the time of tripping (means that the switch is turned off automatically due to over-current) is same as the off position.
2	**Gas supply switch** Normally set it to the “WELD” side. Switch it to the “CHECK” side when you would like to check the gas flow rate.
3	**Digital ammeter** Indicates welding current values during the welding. (Displays an average current value measured during the period of 0.4 second in amperes in increments of 1A) Due to a rounding error, a resulting value may vary within the range of ±1A. As this ammeter is designed to display an average current value measured during the period of 0.4 second, it may not be able to follow the variation of current quickly enough when the current changes frequently during the pulse welding, etc. Indicates an “Err” (error) mark in case of a trouble.
4	**Set-value display** Indicates the set values[*1] of current (A), time (S), frequency (Hz), pulse width(%), etc. The unit display lamp changes according to the type of indicated set values. (i.e. “A” is lit for current display.) Depending on the “DETAIL” settings, it indicates the “Output voltage”. Indicates an “Err” (error) number in case of a trouble.
5	**LCD display** This is the information display area. Indicates condition-setting items in letters. Indicates error contents in letters in case of a trouble.
6	**Jog dial** This is a dial to carry out the function of a potentiometer (setup of current and time). For example, to set welding current to 125A, turn the dial to the right (increase) or to the left (decrease) until such a value is indicated (on the set-value display). **Note:** Turning the jog dial without discretion may result in the change of a set value for the item currently indicated on the LCD display. Use the press button function of the jog dial in the following situation. In the reproduction, storage or details mode (See item (9) in the right column.)
7	**“MODE” selection button** Select a desired welding method (TIG, STICK or SPOT).
8	**“CRATER” selection button** * The button is effective when the “MODE” (7) is set to “TIG”. Selects a desired crater control (OFF, ON or REPEAT).
9	**“PULSE” selection button** * The button is effective when the “MODE” (7) is set to “TIG”. Specify pulse to be OFF or ON.

10	**“FUNCTION” selection button** Select an operation “mode”. WELD: To set welding conditions (using buttons 7 to 9) and conduct welding operation. REPLAY: To reproduce stored welding conditions. RECORD: To store the current welding condition. DETAIL: To set control functions of this product.

*1:See section “Settings” for how to display welding voltage.
In the case of a welding voltage, indicates the welding voltage (between output terminals of this product) during the welding operation not the set value.

5.1.2 Welding conditions setting buttons section



When the “mode” selection is set to “welding”, the display lamp of the welding-condition setting button section turns on according to the set details of the welding-condition selecting section In other words, the display lamp for sections, to which welding conditions are required to be set, is turned on.]

The display lamp indicated above (indicated within __) normally remains turned on. When pressing a button corresponding to the display lamp, which is turned on, that display lamp starts flashing, the LCD display indicates the name of that item, and the set-value display indicates a set current value. (By turning the jog dial at this point, the set value can be changed.)

Note

Do not turn the jog dial without discretion. (Doing so may result in the change of the present set value.)
The above operation also applies to the welding mode. (If the display lamp is flashing, a set value can be changed even during the welding operation. When there is no need to do so, press the jog dial, and the display lamp is turned on. Then, it becomes impossible to change the set value by means of the jog dial. Therefore, it serves the prevention of an operation error.)

11	**PULSE:** * The button is effective when “PULSE” (9) is set to “ON”. Specify “CUR. (pulse current)”, “WIDTH (pulse width)” or “FREQ. (frequency)” to set each parameter for pulsed welding.
12	**PRE-FLOW:** Sets the time from when the torch is turned ON until when the output voltage is turned ON (i.e. arc start). Make sure to set it so that the shield gas covers the welding area before the start of arc.
13	**INITIAL CUR.:** * The button is effective when “CRATER” (8) is set to “ON” or “REPEAT”. Sets the current value for starting the welding.
14	**UP SLOPE:** * The button is effective when “CRATER” (8) is set to “ON” or “REPEAT”. Sets the time for increasing the welding current gradually to the set value after the initial current.
15	**Welding current:** Sets the welding current.

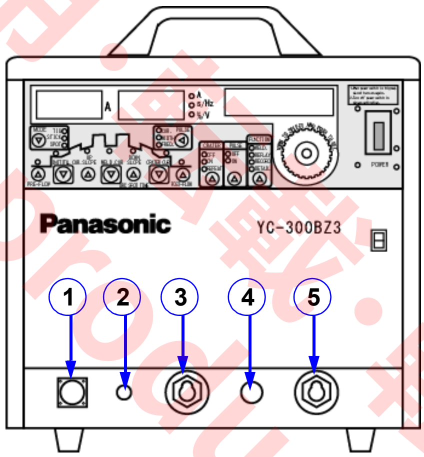
16	**DOWN SLOPE:** * The button is effective when “CRATER” (8) is set to “ON” or “REPEAT”. Sets the time for decreasing the welding current gradually and having the crater current started after the self-holding is turned off. **ARC SPOT TIME:** * The button is effective when the “MODE” (7) is set to “SPOT”. Sets arc spot time.
17	**CRATER CUR.:** * The button is effective when “CRATER” (8) is set to “ON” or “REPEAT”. Sets the crater current.
18	**POST-FLOW:** Sets a period of time for the shield gas to keep flowing after the output voltage is turned off (i.e. arc stop).

5.1.3 Switches and rear side

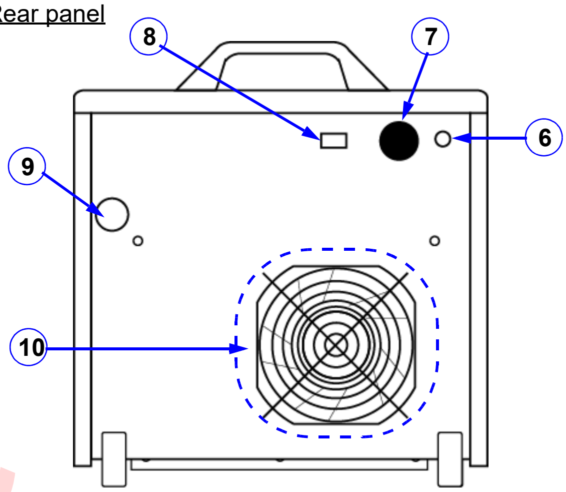
WARNING

When removing or replacing a fuse:
To prevent an accident caused by an electric shock, make sure to turn the power switch off before such removal or replacement

Front panel



Rear panel



1	**REMOTE CONTROLLER outlet:** Connect the plug of the remote controller (separately sold).
2	**TORCH SWITCH outlet:** Connect the plug of the torch switch.
3	**+ terminal (for base metal) (Fingertip joint):** For TIG or SPOT welding. Connect the fingertip joint of the base metal cable. After inserting the plug, turn clockwise until the connector is fastened.
4	**GAS OUTLET:** (Screw size: 9/16-18UNF) For TIG or SPOT welding. Connect the joint of the gas hose from the welding torch.
5	**- terminal (for torch) (Fingertip joint):** For TIG or SPOT welding. Connect the fingertip joint of the TIG torch cable. After inserting the plug, turn clockwise until the connector is fastened.

6	**Gas inlet:** (Screw size: 9/16-18UNF) Connect the shield gas for welding from the gas regulator completely. * Air incorporation may affect the welding result.
7	**Wiring port** (Covered with grommet): To insert wires, make a cut in the grommet.
8	**D-SUB connector (for robot):**
9	**Input power terminal:]**
10	**Cooling fan air-outlet:** This is the cooling fan air-outlet to cool this product. Do not leave any obstacles near this outlet.

6. Connection

Important

- The installation shall be done by qualified installation personnel and should conform to all national and local codes.
- Type and capacity of protection devices, such as breaker and fuse, to be applied should conform to all national and local codes.
- Type and size of cables to be applied should conform to all national and local codes.

⚠ WARNING

Touching current carrying parts may cause a fatal accident like an electric shock, burn injury and so on. To prevent physical accidents like an electric shock, burn injury and so on, make sure to observe the followings.

- Make sure to turn off the switches of this product and the distribution box before starting connections.
- Do not perform any connection work with moistened hands.
- Make sure to insulate all bare current-carrying parts like joints and so on by tape, etc.
- Do not strain cables, or let them make contact with the welding arc area.
- For safety reasons, make sure to provide this product and base material with grounding work done by qualified electricians.
  * In case of using a water coolant, the water coolant should also be provided it with grounding work.

⚠ CAUTION

Observe the followings to prevent a fire caused by overheat of cables.

- Use cables at least with specified thickness.
- Fasten all cable connections securely.

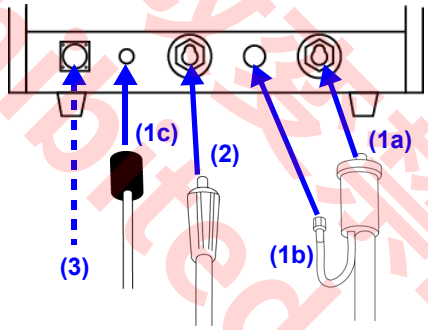
6.1 Connecting output cables for TIG or SPOT welding

This section explains the connection in case of using a special torch.

* In case of using other torches and/or extension cables: see section “Configuration: Peripheral equipment”.

- Connect the cables in the order shown in the following table referring the figure on the right.
- The polarity relation between the torch and base material is electrode minus (DCEN).

	Name	Connect to (Power source side)
1	Weld torch side	
(1a)	Torch cable	- terminal (for torch) (*)
(1b)	Air cooling type torch: Gas hose	GAS OUTLET
	Water cooling type torch: Return water hose	Return water port of Water coolant
(1c)	Torch switch	TORCH SWITCH outlet
2	Base metal cable	+ terminal (for base metal) (*)
3	Remote controller (Optional unit)	REMOTE CONTROLLER outlet



(*) Insert it into the “(-)/(+) terminal” in line with the guide respectively, and turn it clockwise until it is locked.

Note

About the base metal cable

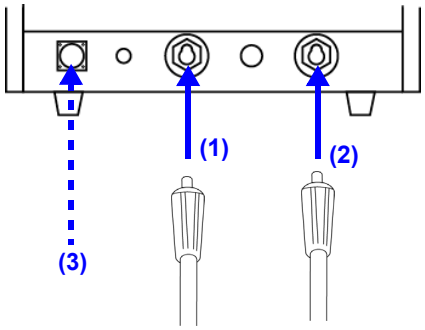
Connect the attached fingertip joint (D1XSK50) to the base metal cable that is a welding cable or cabtire cable (excluding the class-1 cabtire cable and vinyl cabtire cable) of 38mm^2 or more.

6.2 Connecting output cables for STICK welding

- Connect the cables in the order shown in the following table referring the figure on the right.
- The polarity relation between the welding rod holder and base material is electrode plus (DCEN) unless otherwise instructed by the applied electrode.

	Name	Connect to (Power source side)
1	Welding rod holder cable	+ terminal (for base metal) (*)
2	Base metal cable (Attach the fingertip joint)	- terminal (for torch) (*)
3	Remote controller (Optional unit)	REMOTE CONTROLLER outlet

(*) Insert it into the "(-)/(+) terminal" in line with the guide respectively, and turn it clockwise until it is locked.



Note

It is necessary that connection of the welding rod holder cable is the fingertip joint. If not used, please purchase the fingertip joint (CWC00180) separately and attach it to the cable before connecting to the power source.

Note

• About welding rod holder cable

It is necessary that connection of the welding rod holder cable is the fingertip joint. If not used, please purchase the terminal adapter (CWC00180) separately and attach it to the cable before connecting to the power source.

• About the base metal cable

Connect the attached fingertip joint (CWC00180) to the base metal cable that is a welding cable or cabtire cable (excluding the class-1 cabtire cable and vinyl cabtire cable) of 38mm^2 or more.

6.3 Connecting input cables

Important Connect the input power unit after completing the output side connection.

6.3.1 Connecting grounding wire and input power cable

⚠ CAUTION

Water supply pipes, building iron frames, etc. do not serve as sufficient ground (earth). Do not connect any grounding wire to them.

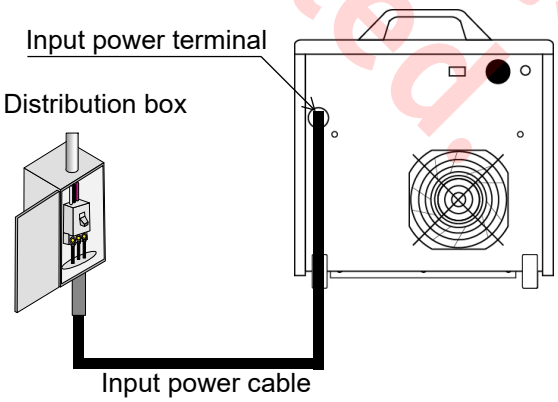
⚠ WARNING

- Install one distribution box each for this product.
- Make sure to turn off the power distribution box first.

(1) Turn off power at the distribution box.
(2) Connect the other end of the input power cable to the load-side terminal of the switch of the distribution box.
(3) Provide the grounding terminal of the distribution box.

(For reference)

Input power cable size: 5.5 mm^2 or more.



6.4 Connecting gas regulator

⚠ WARNING

This is a high-pressure gas apparatus. Its mishandling may cause a physical accident, such as the direct hit of parts due to the high-pressure gas.
Make sure to read the instruction manual of the gas regulator carefully before connection.

Note **About shield gas**

- Use the high-purity welding argon gas JISK1105 (99.9% or more in purity) as a TIG welding shield gas.
- Incorporation of impurities, such as oxygen, moisture, nitrogen, etc., into the argon gas may deteriorate the shield performance and eventually reduce the welding quality.

6.4.1 Connecting procedures

(1) Attach the gas regulator to the gas bottle
* Prior to attaching them, clean their mouthpieces.
* Fasten the tightening nut with a monkey spanner, etc. securely.

(2) Connect the gas hose (accessory) to the gas hose joint of the gas regulator.
*Fasten it with the supplied hose band securely.

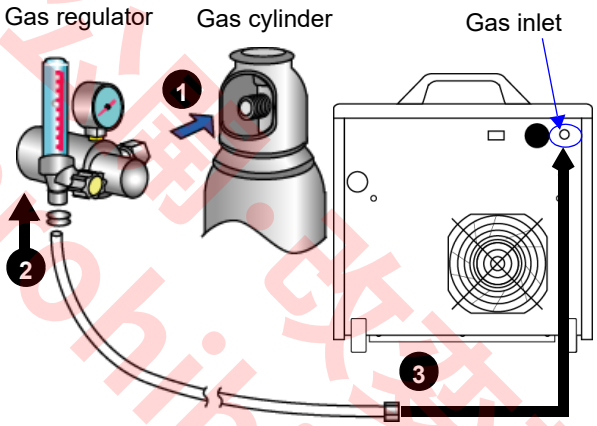
(3) Connect the other end of the gas hose to the “gas inlet” joint on the rear face of this product.
(* Screw size: U9/16. Thread 18)

6.4.2 Connecting procedures

(1) Attach the gas regulator to the gas bottle
* Prior to attaching them, clean their mouthpieces.
* Fasten the tightening nut with a monkey spanner, etc. securely.

(2) Connect the gas hose (accessory) to the gas hose joint of the gas regulator.
* Fasten it with the supplied hose band securely.

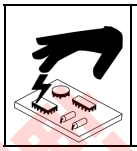
(3) Connect the other end of the gas hose to the “gas inlet” joint on the rear face of this product.
(* Screw size: U9/16. Thread 18)



<To increase the maximum gas flow-rate>

- The factory-set inside diameter of “gas outlet” joint is 1.0mm, and the maximum flow-rate is set to 20L/min.
- To increase the maximum flow rate, remove the setscrew(*) inside the “gas outlet” joint.
  Eventually, the maximum flow rate is set to 45L/min. However, the gas regulator shall also be replaced with that prepared for the maximum flow rate of 45L/min.
  (*) : It can be removed from the front of the “gas outlet” joint with a slotted screwdriver.

6.5 Connecting with jig(s)



When touching a printed circuit board, observe the following item to prevent electrostatic destruction of the printed circuit board.
Before starting an operation, for example, touch any metal part of the case with your hand to discharge static electricity

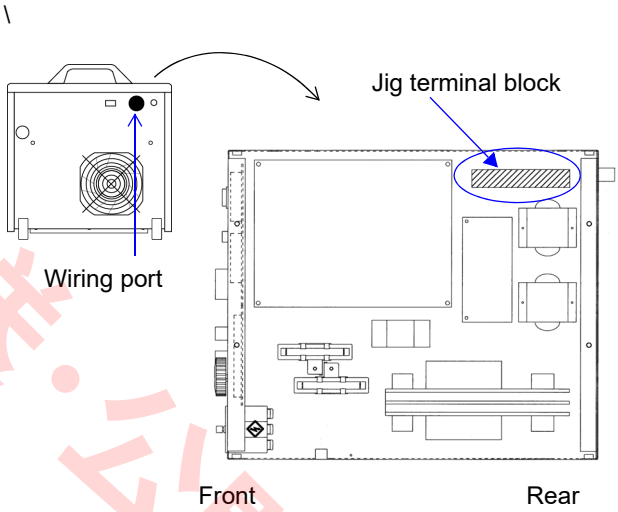
- Use it to send out a command for the emergency stop or temporary stopping from a jig or a robot to this product.
- Use it to provide a jig or a robot with the current detection signal or pulse signal of this product, use the jig terminal.

Note
Keep the signal lines from a jig and/or a robot away from the welding arc area, the welding torch, the base-material-side cable, etc. to prevent troubles caused by incorporation of the high frequency wave.
Keep the wiring length within 10 m.

6.5.1 Connections

- Location of jig terminal block

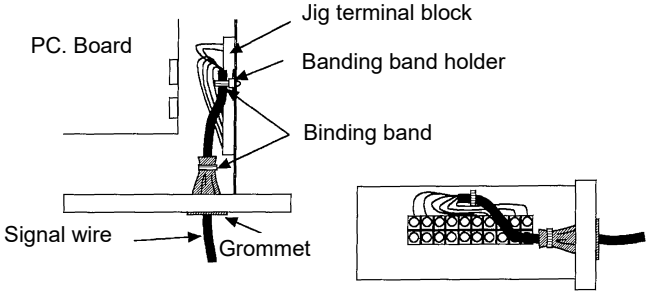
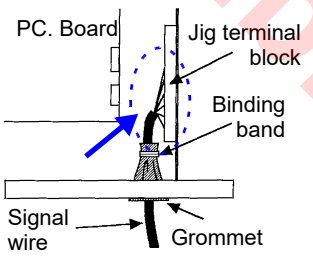
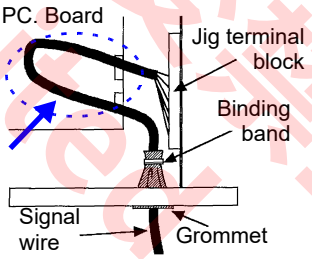
Remove the top panel (attached with loosen four machine screws) to access the jig terminal block. It is located near the inner rear panel.



- Cautions at wiring

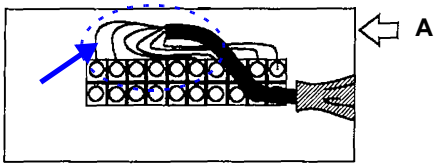
(1) **Wiring port (with grommet cover)** (Rear side):
Lead in the signal wires from jigs through this wire port. (See the below note for details.)
(2) **Jumper:** When using a terminal with a short-circuit line inserted, make sure to remove the short-circuit line from that terminal. (Otherwise, that terminal does not work properly.)
(3) **Open terminals:** Do not use them.

Note
When leading in the wires through the grommet
Observe the following instructions.
- Route the wires not to touch to any other parts or board inside the welding power source.
- Bind the binding band holder and the grommet with the attached binding band.

Good wiring	Bad wiring	
	 Too tightly wired. Risk of breaking of wire.	 Too loose and wire touches the PC. Board. Risk of malfunction

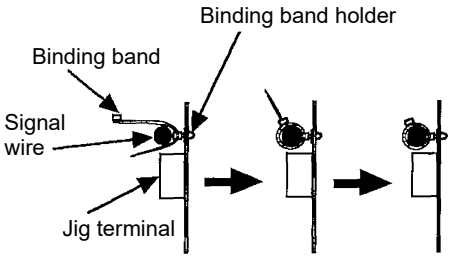
• Wiring procedures

(1) Connect the wires to the jig terminals
Route it so that the end part of the wire can be placed on the binding band holder.

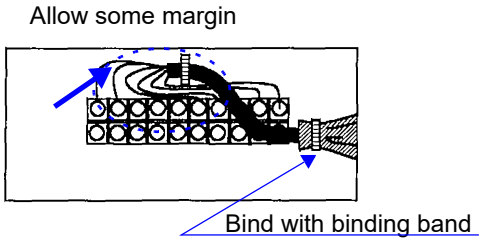


(2) Pass the binding band through the binding band holder, and then connect the signal wires.

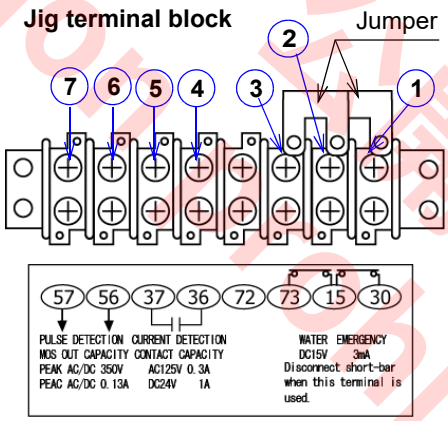
<View from A>



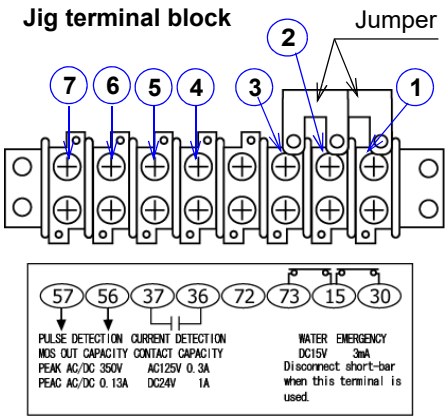
(3) Allow some margin to the wires and bind them to the grommet.



● Function of each terminal



	Terminal #	Terminal name	Functions	Note
INPUT	1	Emergency stop	**Remove the jumper between the terminals 1 and 2 before connection.** • Open between those terminals and the welding power supply comes to an emergency stop. • To restart, close those terminal and then turn on power switch again.	Open: 15 VDC Close: 3mA DC (approx.)
	2	Water circuit	**Remove the jumper between the terminals 2 and 3 before connection.** • Open between those terminals and the welding power supply stops the output. • Connect the flow switch of the cooling water. • To restart, close those terminal and then turn on power switch again.	Open: 15 VDC Close: 3mA DC (approx.)
	3			



	Terminal #	Terminal name	Functions	Note
OUTPUT	4	Current detect	• Output current (Initial current, welding current including pulse current and base current, and crater current) flows between those terminals. • The terminals are connected with normally open contact at the relay on the PC board. • The terminals are closed when the output current is detected. Application: Use it to start a device at the jig side, such as robot, synchronously with the current detection.	Contact capacity (Resistive load): DC: 24V, 1A AC: 125V, 0.3A * Never operate over the capacity.
	5			
	6	Pulse detect	• Output current (Initial current, welding current including pulse current and base current, and crater current) flows between those terminals. • The terminals are connected with normally open contact at the photo MOS relay on the PC board. • The terminals are closed in synchronization with the pulse output current only.	Contact capacity (Peak AC and DC) Load voltage: 350 V Load current: 0.13 A * Never operate over the capacity.
	7			

6.6 Connecting with Robot

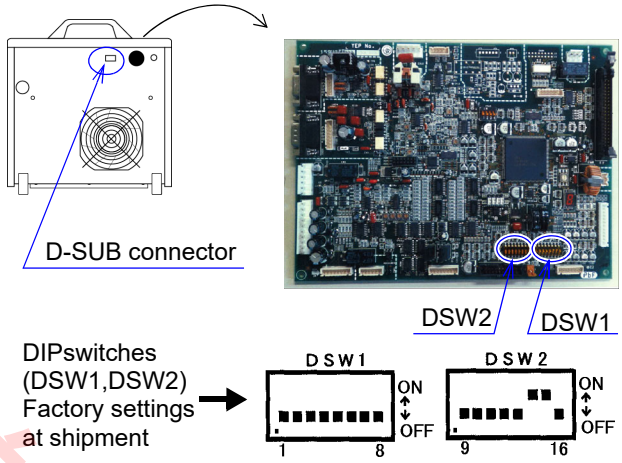
Use it in case of perform welding operation using our industrial robot “VR-2 series” by connecting to a G2 controller.
(For details, see manuals of individual products.)

Note
Keep the signal lines from a jig and/or a robot away from the welding arc area, the welding torch, the base-material-side cable, etc. to prevent troubles caused by incorporation of the high frequency wave.
Keep the wiring length within 10m.

6.6.1 Connection

Connect the communication cable from a robot to the D-SUB connector on the rear panel.
And switch the DIP switch (DSW1) No.6 to the ON side.

	Connecting connector	DIPswitch (DSW1)
Robot	D-SUB connector	#6: ON



6.7 Connecting with external device connecting unit (YX-CB009Y**)

Use it to select a stored welding condition page using the connected external device, such as sequencer.
(For details, see manual of the external device connecting unit.)

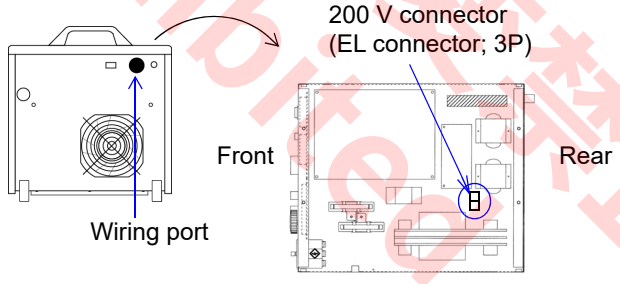
Note
Keep the signal lines from a jig and/or a robot away from the welding arc area, the welding torch, the base-material-side cable, etc. to prevent troubles caused by incorporation of the high frequency wave.
Keep the wiring length within 10 m.

6.7.1 Connection

- Lead in the harnesses or cables from the connecting unit through the wiring port.
- Connect the flat cable to the connector CN17 on the PC Board (ZUEP1594).
- Connect the jig harnesses to the emergency stop terminal and the current detection terminal of the jig terminal block. (See section “Connecting with jigs”.)
- Connect the Over-200 V harness of the optional unit YX-CB009 to MCB (6P) side of the 200 V harness and other side connector (3P) goes to the 200 V connector. (See figure on the right.)
- To enable this function, set the DIP switch; DSW 2, #10 to the ON side.

< Note >

Keep the DSW2-10 in the OFF position if this function is not used.



7. Preparation and termination processing

7.1 Preparation

7.1.1 Use of protective equipment

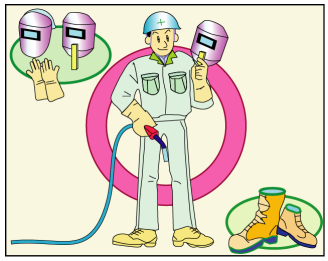
⚠ WARNING

To protect you and other people from gases, fumes and lack of oxygen that may be generated during the welding operation, make sure to prepare ventilation facilities and use protective equipment, etc.

- Welding operations in narrow spaces may cause asphyxia due to lack of oxygen.
- Prepare ventilation facilities to prevent the inhalation of gases and fumes generated during the welding operation. Otherwise, wear a respirator.

⚠ CAUTION

To protect you and other people from arc light, flying spatters, slag, and arc noises generated by welding, use protective equipment.



- Wear leather gloves and safety shoes to protect the exposed parts of your eyes and skin.
- Prepare light-shielding glasses or a welding face-shield with a light-shielding filter plate appropriate to the applied welding current.

7.1.2 Pre-operation check

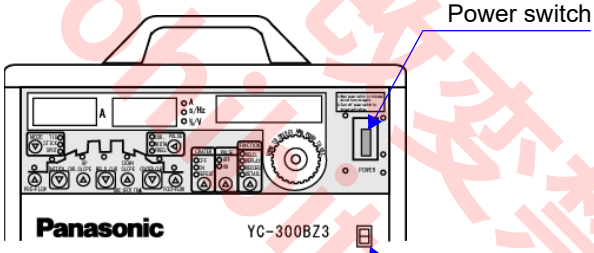
• Check if all connections are correct and complete.
(Refer to sections “Configurations!” and “Connection”.)

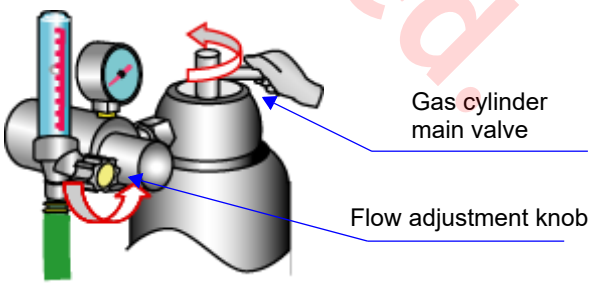
7.1.3 Turning ON power

(1) Turn on the switch of the distribution box.
(2) Turn on the “POWER” switch.

7.1.4 Adjusting gas flow rate

(1) Place the “Gas supply” switch in the “CHECK” position.
(2) Open the main valve of the gas cylinder. (Make sure that the flow adjustment knob is at the side of [SHUT] before opening the main switch.)
(3) Turn the flow adjustment knob in the direction of [OPEN], and adjust it until the flow meter indicates the required value.
(4) After completion of the flow rate, place the “Gas supply” switch in the “WELD” position.





7.2 Termination processing (steps after welding operation)

7.2.1 Shutting off gas

(1) Close the main valve of the gas bottle.
(2) Perform the “gas purge” to take the residual pressure out of the pipe.

7.2.2 Shutting off power

Important	To allow the inside of this product to cool down, turn the power off at least 5 minutes after the completion of welding operations.

(1) Turn off “POWER” switch.
(2) Turn off the power to the distribution box.

7.2.3 Precautions for use of water-cooling torch in winter season

In case the special cooling water (Pana-coolant K) is not used, do not forget to take freeze-proofing measures after every welding operation to prevent possible breakage of the water coolant or welding torch caused by freezing. (For example: Take the cooling water out of the water-circulating path including the flow rate switch.)

8. Settings

8.1 DETAIL settings

8.1.1 Factory settings

The following table shows the functions and default setting of each set item.

Set item	Default setting	Choice	Description
V Disp Status	O	OFF	It is not possible to display output voltage.
		ON	The welding current screen and the output voltage screen appear on the LCD display alternately every time the “WELD. CUR.” button is pressed. • In case the output voltage screen is shown on the display, the set-value display indicates an output voltage during the welding operation. • Welding current can be changed even if the LCD display shows the output voltage screen.
Hot Cur Level	-	-	For better arc start, the level of instantly-applied current at arc start is selectable.
		Low	Suitable when using an electrode with a small diameter.
	O	Standard	-
		High(*1)	Suitable when using an electrode with a large diameter.
Crater End Type	-	-	The weld end method at crater control ”repeat” can be selected.
	O	Normal	Terminates the welding by withdrawing a torch.
		Torch switch(*2)	Welding is terminated when the torch switch is turned on and off within 0.5 second in the crater control mode.
E.L. ShortStatus	O	OFF	During the welding operation, the output continues even if an electrode is short-circuited.
		ON	During the welding operation, the output stops when an electrode is short-circuited. (The gas post-flow continues to function as usual after termination of the output.)
	-	-	• Regardless of this settings, the gas after-flow operates as usual to cool down the work and the electrode after stopping the output. • To reset, release the short circuit between the electrode and base metal. If the torch switch is in the OFF position, the power source recovers automatically after gas after-flow operation.
Disp Hold Time	O	0.0 S to 10.0 S	This is the time period to keep the display of an average current value obtained between 2 seconds and 1 second before termination of welding, at the time of the termination of welding. Set range is from 0.0 to 10.0 in increments of 0.1 second.
Electric shock prevention		OFF	In STICK welding, the electric shock prevention function does not function.
	O	ON	In STICK welding, the electric shock prevention function functions.
Arc drive(*2)	O	0 % to 90 %	This is a setting for arc drive with respect to the welding current set value in STICK welding. Set range is from 0 to 90 in increments of 1 percent. Set “0%” for no arc drive.
Refresh interval	O	0 s to 30 s	This is the re-write interval of the liquid crystal display. Set range is from 0 to 30 in increments of 1 second. Normally keep it to “0”. Should garbled characters appear on the liquid crystal display, rewrite a desirable time interval.

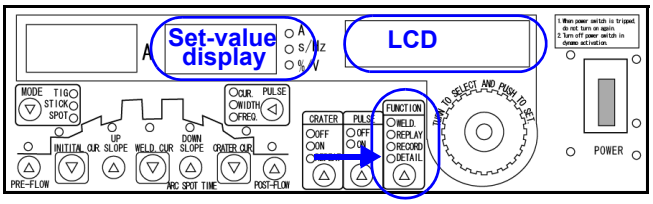
(*1):In case of using a thin erectrode, setting to “High” causes the erectrode to wear out quickly.

(*2):Usually, when you turn off the torch switch, the time lag occurs by 0.5 second in switching from the crater current to the welding current.

(*3):It increases the welding current by the preset value when it detects the state that the electrode comes close to short-circuiting to prevent deposit of the welding electrode.

8.1.2 How to check settings

(1) Set the “FUNCTION” button on the front panel to “DETAIL”.
Then “V Disp Status” is display on the LDC.
(2) Press the JOG dial until the set item you would like to check is displayed.
(3) Repeat the step (2) to check all the set items you would like to check.
(4) Switch the “FUNCTION” button to “WELD”.



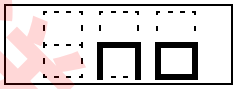
8.1.3 How to change settings.

	Operation	Remarks
(1)	Set “FUNCTION” button to “DETAIL.”	First, “**V Disp Status**” is displayed on the LCD.
(2)	Press the JOG dial until the set item you would like to change is displayed.	-
(3)	Turn the JOG dial until the required set item appears.	Turn the JOG dial either clockwise or counter-clockwise. The **“Set-value” display** indicates set content if that is value or on/off.
(4)	Press the JOG dial.	The present set content is stored and the next set item is displayed.
(5)	Then, repeat the procedure from (2) through (4) to change all the set values you would like to change.	
(6)	Switch the “FUNCTION” button to “WELD”.	

8.1.4 How to restore the original factory settings of this product

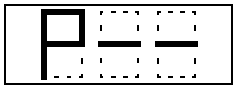
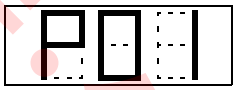
- The following table shows how to restore the original factory-setting. (Underlined bold character in the “LCD” column indicates the cursor position.)
- Once the original factory settings are restored, the current settings are eliminated unless they are stored in the memory.
- For any important welding conditions, store them in the memory (see section “Storing welding conditions”.) or write them in the “Welding conditions memorandum” in Appendix.

Note
If you are confused during the operation, turn the power off, and redo the operations from item (1) again.

	Operation	Set-value display	LCD
1	Hold down the JOG dial, and while holding it down, turn on the “POWRE” switch.		Rescue Menu YC-300B Series Then indication changes to **1** Set Defaults? No
2	Press the JOG dial to determine the choice. * When you turn the JOG dial without pressing down, the screen displays the next set item. In that case, turn it further until the desired set item reappears.		1 Set Defaults? N**o** (Cursor flashes.)
3	Press the JOG dial.		1 Set Defaults? N**o**
4	Turn the JOG dial and have “YES” displayed.		
5	Press the JOG dial		Are you sure? * * * **_** (Cursor flashes.)
6	Turn the JOG dial and have “YES” displayed.		
7	Press the JOG dial to complete.		Welding Current

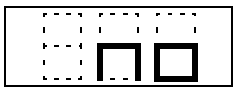
8.1.5 Memory deletion

If you would like to delete any welding conditions that you programmed, follow the below steps.

	Operation	Set-value display	LCD display
1	Hold down the JOG dial, and while holding it down, turn on the “POWRE” switch.		Rescue Menu YC-300B Series Then indication changes to **1** Set Defaults? No
2	Turn the JOG dial until the screen on the right appears.		**2** Delete Page P - -
3	Press the JOG dial.		2 Delete Page P - -
4	Press the JOG dial. **Note** The screen on the right appears on the digital ammeter. 		
5	Turn the JOG dial to select a program number you want to delete. * Stored program numbers appear in series.	(When selecting “P01”) 	
6	Press the JOG dial.		Are you sure? * * * *
7	Turn the JOG dial and have “YES” displayed.		
8	Press the JOG dial. * To continue to delete the memories of other program numbers: Go to no (4).		2 Delete Page P - -
9	On completion of the desired deletion of program number memories, turn the power switch off.		

8.1.6 Memory lock

If it is not desired for anybody other than the administrator to conduct the storing operation, lock the stored memory in the following manner.

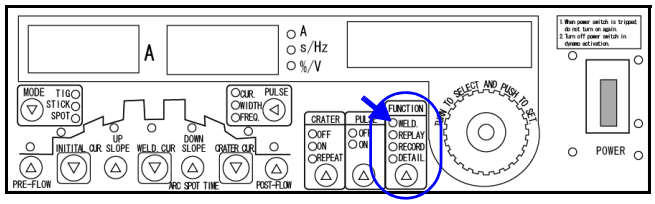
	Operation	Set-value display	LCD display
1	Hold down the JOG dial, and while holding it down, turn on the “POWRE” switch.		Rescue Menu YC-300B Series Then indication changes to **1** Set Defaults? No
2	Turn the JOG dial until the screen on the right appears.		**3** Lock Memory? No
3	Press the JOG dial.		3 Lock Memory? N**o**
4	Turn the JOG dial and have “YES” displayed.		
5	Press the JOG dial.		3 Lock Memory? Ye**s**
6	Turn the JOG dial and have “YES” displayed.		
7	Turn off the power to complete the operation.		

8.2 Welding conditions

8.2.1 Settings and checking

After trial of welding, if you want to have higher welding quality and performance, try to change the factory-set condition to suit such a welding condition as desired.

<Use the “Welding condition memorandum” (Appendix) to keep a note of the result after chang.>



	Operation	Remarks
(1)	Set “FUNCTION” button to “WELD.”	
(2)	With “MODE” button, select a desired weld method.	In case of “STICK”, see the below “Precautions for STICK welding”.
(3)	With “CRATER” button”, select a crater type.	When “TIG” is selected in the step (2).
(4)	With “PULSE” button”, select ON/OFF of pulsed welding.	When “TIG” is selected in the step (2).
(5)	Set (or check) the welding condition data. **Note** Avoid careless turning of the jog dial. (The current set value is modified.)	• You can press any button from the buttons corresponding to lighting indicator lamps. Press the button you want to set/check. The indicator lamp corresponding the button starts blinking, and the name of the item is displayed on the LCD. In addition, the current set value is displayed on the “Set value display. • At this time, turn the jog dial. The set value of the item can be modified. (You can modify the set value even during welding as long as the indicator lamp is blinking.) You can also modify setting of the welding current when the output voltage screen is displayed on the LCD. (See section “DETAIL settings”.) • The jog dial should be pressed preferably to prevent malfunction after setting.check of the item has been completed. Once the jog dial is pressed, the indicator lamp of the item starts to lighting, and the set value cannot be modified even if you turn the jog dial.

- **Note 1) Precautions for STICK welding**

> **⚠ CAUTION**
>
> To prevent an electric shock, touching any live parts of the electrode holder may cause a fatal electric shock and/or burns.

- Unless there is any particular inconvenience, use the product with the electric shock preventing function* set to the “ON” side. (Factory setting: ON) (* See section “Names and functions: Function setting devices” for details.)
- When no welding operation is required, keep the power switch turned off. (Or, set the welding method switch to any mode other than “STICK”.)

8.2.2 Welding condition setting table

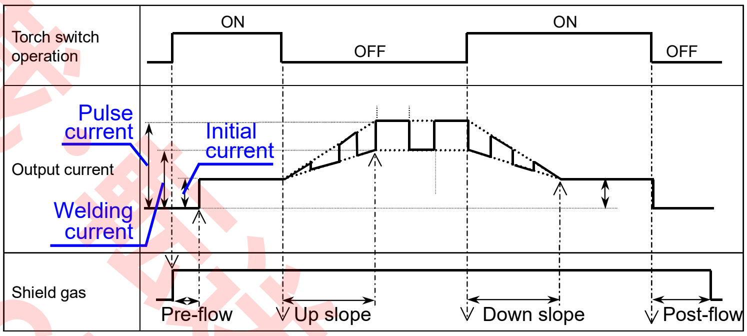
- Items marked with Δ in the following table are applicable if the PULSE selection button is set to “ON”.

Mode	Crater	Pre-flow time	Initial current	Up slope	Welding current	Down slope	Spot time	Crater time	Post-flow time	Pulse current	Pulse frequency	Pulse width
TIG	OFF	O	-	-	O	-	-	-	O	Δ	Δ	Δ
TIG	ON Repeat	O	O	O	O	O	-	O	O	Δ	Δ	Δ
SPOT	-	O	-	-	O	-	O	-	O	-	-	-
STICK	-	-	-	-	O	-	-	-	-	-	-	-

8.2.3 About welding conditions

- **Pre-flow time**
- **Initial current**
- **Up slope**
- **Welding current**
- **Down slope**
- **Crater current**
- **Post-flow time**
- **Pulse current**

Fig.1 In case of TIG welding with “Pulse” and “Crater”



- **Pulse frequency**

  Applicable if the PULSE selection button is set to “ON” in TIG MODE.

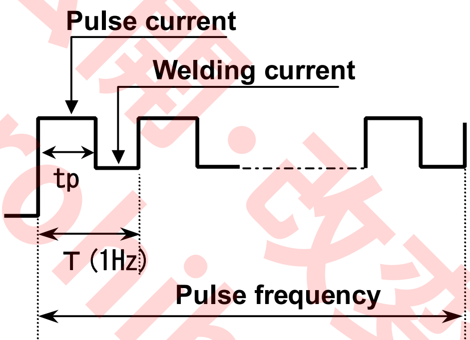
  It means the number of repeat times per second of the combined waveforms of pulse current and welding current (as shown in the following diagram as T(1Hz)).

- **Pulse width**

  Applicable if the PULSE selection button is set to “ON” in TIG MODE.

  With regard to the pulse frequency waveform, it is obtainable from the following formula as the ratio between pulse current width (“**tp**” in the right figure) and the total value of pulse current width and welding current width (“**T**” in the right figure).

  Pulse width (%)=(tp / T) x 100



8.2.4 Storing welding conditions

- Up to 64 welding conditions (P01 to P64) set by customers can be stored.
  Just reproduce your stored welding condition, and you can proceed with the welding immediately.
  <Use the "Welding condition memorandum" (Appendix) to keep a note of the conditions.>

Note
When the memory locking is on, no information can be stored.

	Operation	Set-value display	LCD display
1	Set "FUNCTION" button to "RECORD." **Note** The screen on the right appears on the digital ammeter. rEC	P--	JOG to Sel. No. Press to Confirm
2	Turn the JOG dial and select a program number to be stored. * Numbers starting with "P01" are indicated in order. (Numbers already stored flash.)		
	<New storage> • **Select a solidly lit (no-flash) number.**	(When solidly lit "P02" is selected.) P02	
	• Press the JOG dial, then the "FUNCTION" button automatically returns to "WELD."		
	<Overwriting> • **Select a number you want to overwrite (the number flashes)** **Note** The screen on the right appears on the digital ammeter. no	(When flashing "P01" is selected.) P01	Overwrite? (Y/N) JOG to YES/NO
	• Turn the JOG dial and have "YES" displayed.	YES	
	• Press the JOG dial, then the "FUNCTION" button automatically returns to "WELD."		

8.2.5 Reproducing welding conditions

- Welding can be done by reproduction of any desired condition selected from the stored welding conditions.
- A reproduced welding condition can be changed as desired. (Once changed, it turns to be different from the original condition any more.)
- To store any revised welding condition, use a new program number, or store it with the original number by overwriting unless any inconvenience is caused.

	Operation	Set-value display	LCD display
1	Set "FUNCTION" button to "PLAY." **Note** The screen on the right appears on the digital ammeter. PLY	P--	JOG to Sel. No. Press to Confirm
2	Turn the JOG dial and select a program number to be reproduced. * The stored program numbers are indicated in ascending order. (If there is no program stored, the display is still indicating "**P--**" when turning the JOG dial.	(In case of reproducing "P01") P01	
3	• Press the JOG dial to reproduce.		
	• To cancel the reproduction or if there is no program to reproduce, set "FUNCTION" button to "WELD".		

9. Operation

9.1 TIG Welding operation

⚠ WARNING

- Pressing the torch switch by mistake may cause an electric shock.
- When inspecting or replacing any torch parts, make sure to turn the power switch off in advance.

- The ON/OFF operation of the torch switch enables you to perform welding as shown in the following diagram.
- Turn the torch switch on with the torch put close to base material, the high frequency wave comes first, and arc follows.

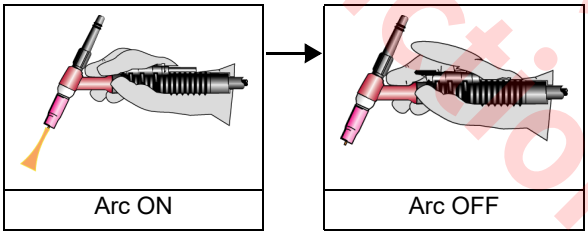
<Regarding the following diagrams>

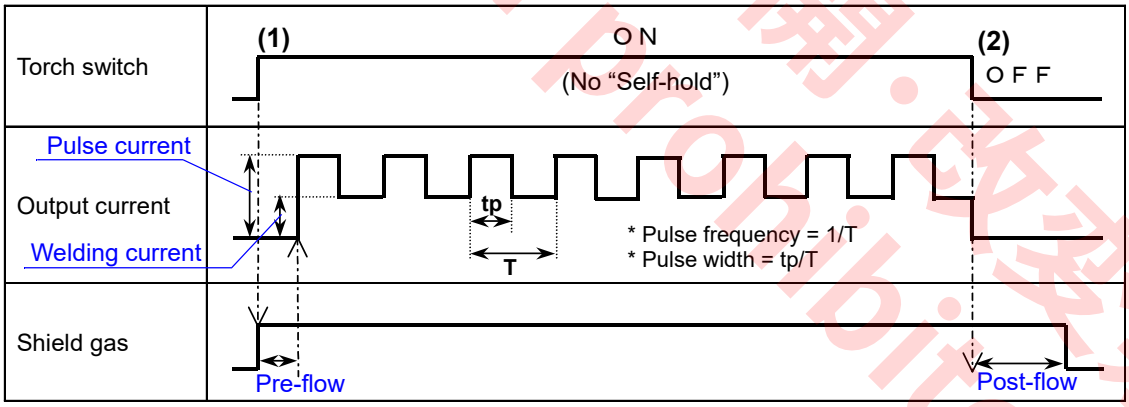
- They assume that values other than “0” is set as the pre-flow, post-flow, up slope and down slope times.
- They assume that the output current is set to pulse “ON”. (In the case of pulse “OFF”, there should be no pulse current or pulse width.)

1) “Crater: OFF” welding operation

- Use this welding mode mainly for tack welding, the repetition of short welding, and thin plate welding.
- Turn the torch switch on and off with the “Crater “ switch set to “OFF”, and welding arc starts and stops in synchronization with such switch operations. (There is no self-hold, initial current and crater current.)

(1) Torch: ON **(2) Torch: OFF**



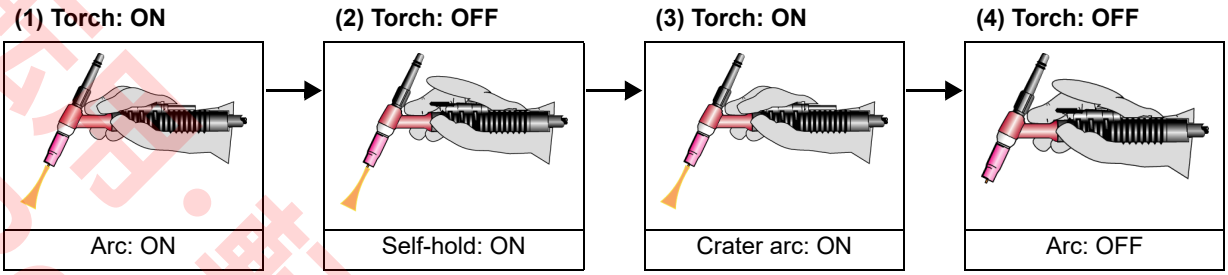


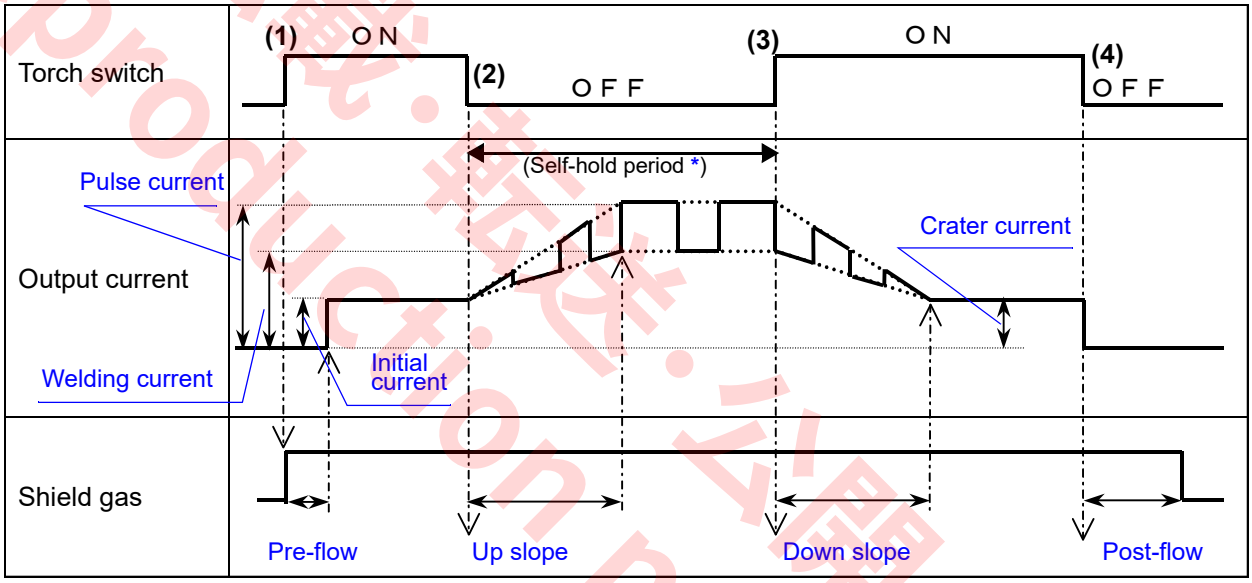
* Pulse frequency (1/T): Number of repeat times of this waveform per second (a section marked with T).

* Pulse width (tp/T): The proportion of Pulse Current Width (tp) to the total (T) of Pulse Current Width and Welding Current Width

2) “Crater: ON” welding operation

- This welding mode is used to fill in the crater of beads generated on the terminal end of welding of intermediate plates and thick plates.
- With the “Crater” switch set to “ON”, perform welding by repeating the ON/OFF cycle of the torch switch twice. (A period of self-maintenance exists. The crater current and the initial current are also available.)



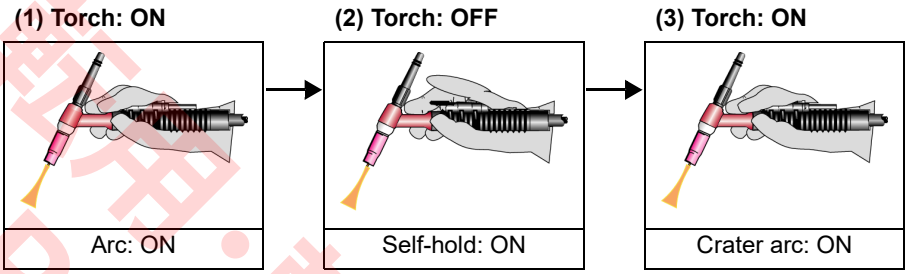


*** About Self-hold**

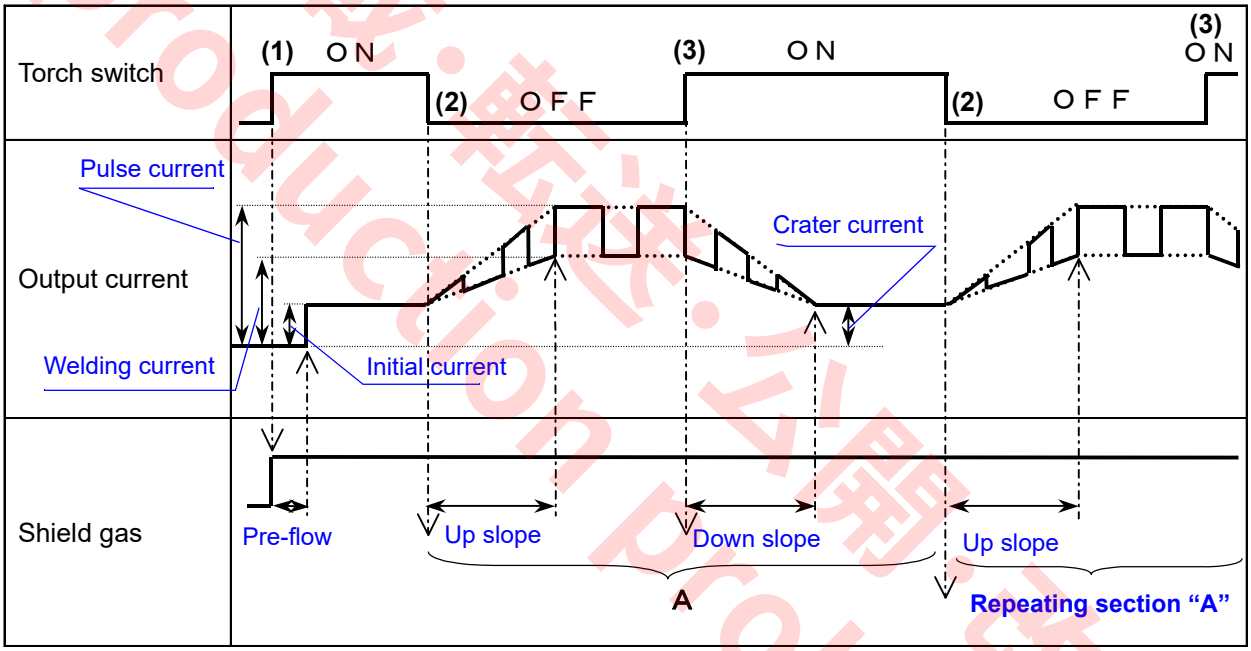
- Self-hold is reset if the arc cut occurs more than 0.5 second.
- To stop welding during “Self-hold” period, raise the torch until the arc is cut.

3) “Crater: REPEAT” welding operation

Unlike the aforementioned Crater “ON” welding, the same welding cycle is started from the beginning again on completion of Crater welding, and it is repeated from then on. (Raise the torch to stop the welding.)



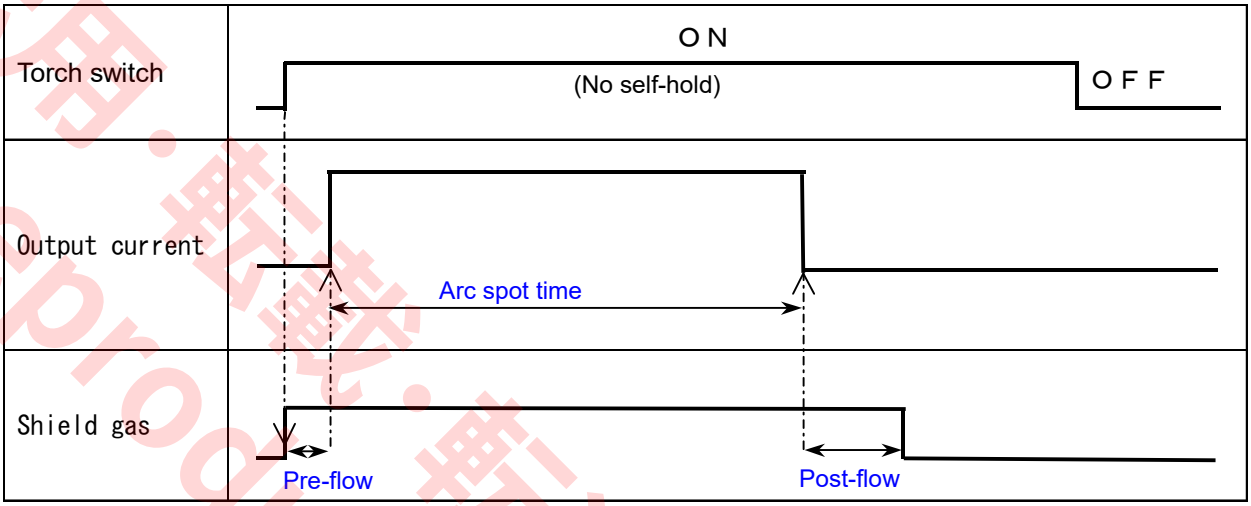
*** To stop welding**, raise the torch until arc is cut.



9.2 SPOT welding operation

- There is no pulse function in the case of the Spot welding.
- Even with the torch switch turned on, welding terminates when the arc spot time has elapsed.

Note
When the torch switch is turned off during the arc spot time, the welding operation is terminated immediately.



9.3 STICK welding operation

⚠ CAUTION

To prevent an electric shock, touching any live parts of the electrode holder may cause a fatal electric shock and/or burns.

- Unless there is any particular inconvenience, use the product with the electric shock preventing function* set to the "ON" side. (Factory setting: ON) (* See section "Names and functions: Function setting devices" for details.)
- When no welding operation is required, keep the power switch turned off. (Or, set the welding method switch to any mode other than "STICK".)

Bring the tip of a coated electrode into contact with the base material to have an arc generated.
(To stop the arcing, withdraw the tip of a coated electrode from the base material.)

Note
With regard to the DC stick welding, it may be difficult to perform the welding depending on the type of electrodes (ex. low-hydrogen type electrode, etc.) and/or welding methods. Therefore, it is recommended to perform a welding test in advance.

10. Maintenance and inspection

⚠ 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 making a daily check. (However, any external check made without touching current-carrying parts or their surrounding area is excluded.)

10.1 Daily check

- The daily check is important to make the most of the performance of this product and to secure the safety of daily operations.
- Perform the daily check for sections indicated in the following table, and conduct the cleaning and replacement of parts when necessary.
- For replacement of parts, make sure to use our genuine parts for Panasonic welding machine to keep its performance and functions

10.1.1 Welding machine (This product)

Check item		Check point	Remarks
Front	Control or display devices	Breakage or loose attachment. Operation or indication error.	If there is any defect, an inside check, additional fastening, parts replacement, etc. are required.
	Fingertip joint, Connector and gas outlet joint	Breakage or loose attachment.	
Rear	Input power terminal cover	If the cover is attached correctly.	
	Gas inlet joint	Breakage or loose attachment.	
	Cooling fan	If it makes any unusual rotation noise. If it generates cooling wind all right.	
Top & Sides panels	Handle	Breakage or loose attachment.	If there is any defect, additional fastening, parts replacement, etc. are required.
	Casters		
	Cases	Loose attachment.	
Overall	● Is there any trace of heat generation, such as discoloration, etc.? ● After power “ON” and during the welding operation: Are there any unusual vibrations, beats or odor?		If there is any unusual events, an inside check is required.

10.1.2 Cables and hoses

Check item		Check point	Remarks
Grounding wires	Of this product	If the grounding wires are removed or fastened securely.	To prevent a physical accident caused by electric leakage, make sure to check it.
	Of the base metal		
	Water coolant (if used)		
Input cables	Cable coating	Wear or damage.	To secure the physical safety and stable arc, check those cables in an appropriate manner according to the conditions of shop floors. Daily check: Quick and rough check Period check: Thorough check
Output cables	• If any current-carrying parts is exposed other than the base-material-side connection. • If any heavy items not placed on the cable.		
	Each connection	If it is fastened securely.	
	Cable coating	Wear or damage.	
	• If any current-carrying parts is exposed other than the base-material-side connection. • If any heavy items not placed on the cable.		
Remote controller and torch switch cables	Connector	If it is inserted completely.	
	• If any current-carrying parts is exposed other than the base-material-side connection. • If any heavy items not placed on the cable.		
Hoses	Joint	If it is fastened securely. In case a hose band is used, if there is any loose attachment.	If there is any defect, additional fastening, hose replacement, etc. are required.
	Hose band (if used)	Wear or damage.	
	If any heavy items not placed on the cable.		

10.2 Periodic check

⚠ WARNING

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

- To secure physical safety, only educated and/or skilled persons who well understand the welding power source should perform troubleshooting work.
- As for the inside check, make sure to conduct it at least 5 minutes after turning the power off in consideration of electric discharge from a capacitor.
- When removing the case's top panel, etc., take care so that no other person approaches this product without discretion (for example, by enclosing the product).

⚠ CAUTION

To prevent the electrostatic destruction of semiconductor parts and the printed circuit board, observe the following.

Allow static electricity to escape by, for example, touching the metal parts of the case with your hand before touching the equipment, the conductor of wire and/or the printed circuit board.

Notice **About cleaning of plastic parts**

- Plastic parts may be melted or deformed when they are subjected to organic solvent (benzine, toluene, kerosene, gasoline, etc.).
- When cleaning them, soak a soft cloth with a small amount of water or diluted mild detergent for home use, and wring it and use for wiping those parts.

- Daily checks are not enough to keep the proper performance of this product for a long time.
- In the regular check, a careful and detailed inspection including the checking and cleaning of the inside of this product is performed.
- As for the regular check, conducted it every 6 months normally.
  [If there is a mass of fine dust, oily smoke, etc. around this product, perform the regular check every 3 months as a guideline.]

10.2.1 Check guideline

- While details for checking are shown below table, consider any additional check items according to your conditions of use.

Check item	Guideline
Removal of inside dust	• Remove the top panel before cleaning. • Blow off internally-accumulated dirt and dust by compressed air without moisture included (dry air).
Overall check	• Remove the top panel before checking. • Check the followings and other items that are not covered by the daily check intensively. - The presence of odor, discoloration, and traces of heat generation - Loose connections - Additional fastening
Cables and hoses	• Regarding the grounding wire (for this product, base material, etc.), input and output cables, cables for the torch switch, remote control unit, etc., and hoses (for gases, and for water supply and drainage when using the water-cooling torch), check those items that are not covered by the daily check (See page 12-1) intensively.
Inspection and maintenance of consumable parts	• A cooling fan and electrolytic capacitor have a given electrical and mechanical life respectively. • [When they are used under the rated specifications, the life of the cooling fan is about 10,000 hours, and that of the electrolytic capacitor is about 8,000 hours. Their actual duration depends on how those items are used by customers.] • In case of a regular check, perform their inspection and maintenance on the basis that the cooling fan and the electrolytic capacitor are a kind of consumables. • When replacing them, make sure to use genuine parts for Panasonic welding machine to maintain the performance and functions of the product.
Change of cooling water for cooling water equipment	When using cooling water equipment, change its cooling water with fresh water regularly. (For details, follow the instruction manual of the cooling water equipment.)

10.2.2 [Time period for which customers-set conditions can be maintained]

In case this product is left unused, and if it is desired to maintain its set conditions, turn the power on once every two weeks for about 10 minutes. (No need to do welding)

It is about 3 weeks without the power turned on.
In about 3 weeks without the power turned on, each set condition returns to the factory setting.

10.3 Precautions for withstand voltage test and insulation resistance measurement

This product uses semiconductor components such as transistor. Executing withstand voltage test or insulation resistance measurement casually may cause serious physical injury or mechanical failure. In case of necessity, contact our sales distributors or Panasonic representatives.

♦Attention of sales distributors / Panasonic representatives

Prior to conducting withstand voltage test and insulation resistance test, prepare the followings and also connect ground wire (cross section: about 1.25 mm^2).

Area	Operation
Input power cable	Draw out the input power cable from the power box, and short the connecting terminals of the cable.
Output terminal of welding power source	Disconnect the cables connected to the output terminal except one for welding main circuit, and then short-circuit the output terminals with conductor cable.
Connecting connector	Disconnect all connecting cables and signal wires for external devices from jig terminal, welding torch, wire feeder connector, communication connector and so on.
Ground wire for case	Disconnect all ground wires inside of the case connected to the case.
Main circuit	Short-circuit between the emitter and collector of the main transistor IGBT, and between anode and cathode of the first diode and the secondary diode with conductor cable.
Fan	Disconnect all fun wires
Control circuit	Disconnect all connectors connected to the P.C. Board.

Note

After completion of the test(s) and prior to re-installing the case or cover, do the followings without fail.
- Remove all conductor cables for short-circuit.
- Reconnect all cables, connectors and ground wires that have been disconnected before the tests to the original condition.

Make sure to conduct the above. If the power has been turned on without removing the conductor cables for the test, the equipment may be burnt.

11. Troubleshooting

⚠ WARNING

Touching the current-carrying parts may cause a fatal electric shock or burn injury.
To prevent a physical accident, such as an electric shock, burn injury, etc., make sure to observe the followings.

- Only educated and/or skilled persons who well understand the welding power source should perform trouble-shooting work.
- Make sure to turn off power switches of this unit, distribution box and all other related devices for safety reasons before taking any actions for correcting an error.
- As for the inside inspection, make it at least 5 minutes after turning the power off in consideration of electric discharge from a capacitor.

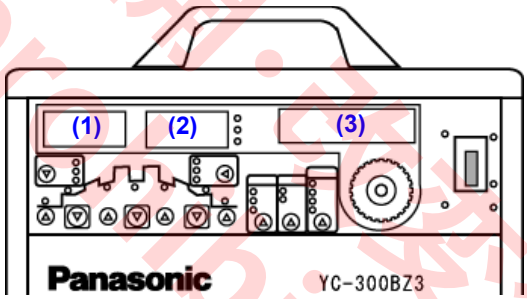
⚠ CAUTION

- When the power switch is turned off automatically, contact sales distributor or Panasonic representatives without turning it on again.
- The power switch uses a non-fuse circuit breaker. If over-current occurs for some reasons, the power is turned off automatically (tripping). Do not turn it on again.
- (It is ous to turn the power on again without removing the cause of such over-current.)

Notice **Do not turn the power on with the top panel and/or side panel of this product removed.**
The electromagnetic force may cause troubles (deformation, mechanical contact, etc.) to the inside devices and parts, and may break them and/or affect their functions and performance.

11.1 Error codes and messages

- This product is designed to indicate an error status on the displays ((1) to (3) in the figure on the right) on the front panel when an self-diagnosable error occurred. The error codes and status are shown in the following table.
- In the case of welding errors that are not covered in the following table, see “Troubleshooting” table.



(1)	(2)	(3)	Remedy
Err	Code	Message	
Err	-01	EmergencyStop	**An emergency stop signal was input from external equipment connected to the jig terminal.** • Turn off the power switch of this product, remove the causes of the emergency stop signal of the external equipment, and then turn the power on.
Err	-02	Sec. OverCurrent	It may be failure of this product. Please contact sales distributor or Panasonic representative.
Err	-03	Temp. Over Error	**The temperature inside this product has been increased.** • Do not turn the power off until the temperature inside this product is reduced. (When the inside is cooled down, such error indication disappears automatically.) • Remove the causes of such temperature increase (excessive usage ratio, the presence of foreign substances near the side ventilator and/or the rear air inlet, etc.).

(1)	(2)	(3)	Remedy
Err	Code	Message	
Err	-04	Pri. OverVoltage	**The input voltage has exceeded the permissible limit.** • Turn off the power of this product, set the input voltage to the rated voltage plus 10% or less, and then turn it on again.
Err	Code	Message	Remedy
Err	-05	Pri. Low Voltage	**The input voltage is lower than the permissible limit.** • Turn off the power of this product, set the input voltage to the rated voltage minus 10% or more, and then turn it on again.
Err	-06	Arc StartError	**The arc did not start within 30 seconds after the torch switch was turned on.** • Turn the torch switch off, and the error indication disappears automatically. • Refer to page 14-3, and remove the causes why the arc did not start accordingly.
Err	-07	TorchSW Error	**This product was switched on with the torch switch turned on.** • Turn off the power of this product and the torch switch, and then turn on only the power switch again. • As for the torch switch, turn it on at least 3 seconds after turning the power switch on for safety reasons.
Err	-08	Curr.DetectError	It may be failure of this product. Please contact sales distributor or Panasonic representative.
Err	-11	WaterCircuitErr	**A "WaterCircuitErr" signal was input from external equipment, such as cooling-water equipment, etc. connected to the jig terminal.** • When the input of the **"WaterCircuitErr"** signal is stopped, the error indication disappears automatically. • Check for the clogging of cooling-water equipment, the concentration of coolant solution, the bending of supply and return hoses for the torch cable, etc. to secure the flow rate of cooling water.
Err	-19	Electrode Short	**The electrode and the base metal are short-circuited during welding or at arc start.** • If the torch switch is OFF, then the error message is automatically cleared after after-flow operation. • When this error occurs, separate the base metal and the electrode.
Err	C30 | C39	A status is indicated according to each number indication.	Indicates the contents of a communication error between external devices (personal computer, etc.) and this product. • When this error occurs, turn off the power of the external device and this product. (Power reset)
-	-	CT Offset Error	It may be failure of this product. Please contact sales distributor or Panasonic representative.
-	-	System Mem.Fail!	

Notice **About "Err-06: Arc StartError**

When the arc does not start for more than 2 seconds after turning the torch switch on, the high frequency wave is generated intermittently for safety reasons on the basis that some failure (See page 14-3) has occurred, and after additional 30 seconds or more, the "Err-06 Arc start error" is indicated and the operation is stopped.

Notice **About "Err-05:Pri. LowVoltage" at power off**

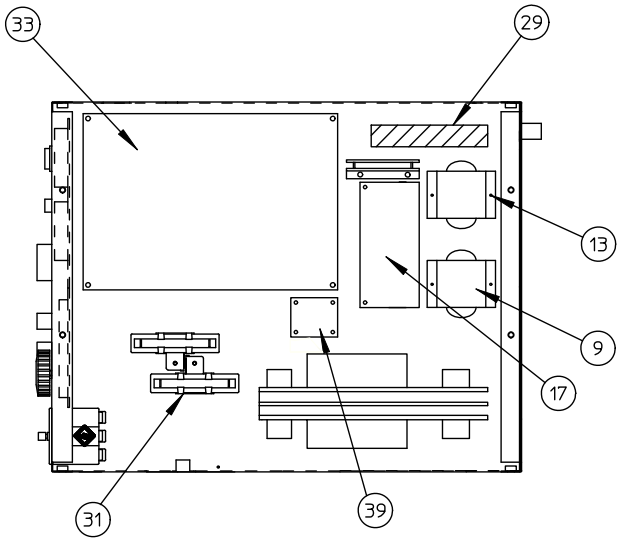
when turning the power off, it is not an error. (It is just indication of detection of the reduced primary voltage due to the power cutoff.)

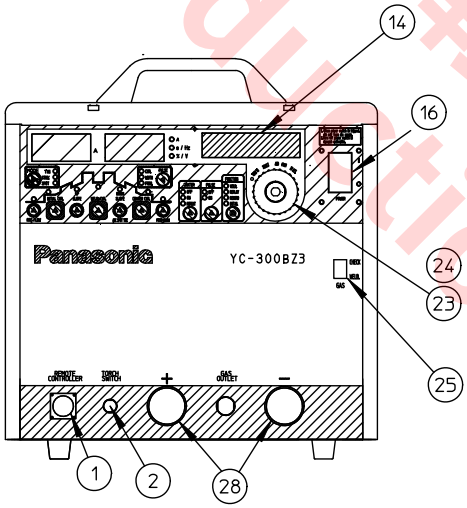
11.2 Troubleshooting table

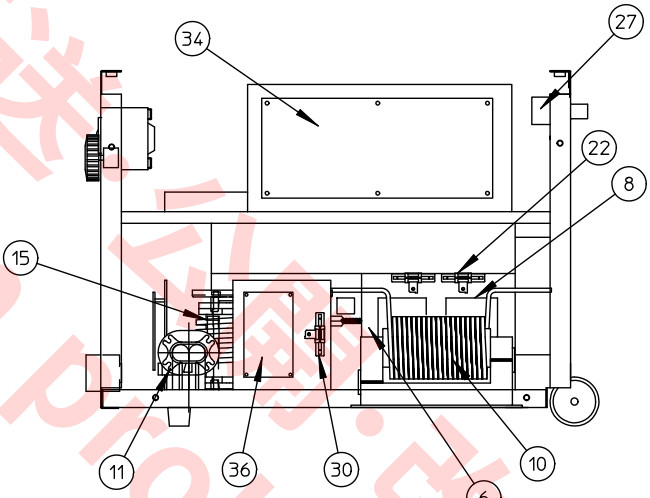
* In the case of welding errors without any error (Err) indication, refer to the following table to search for their causes.

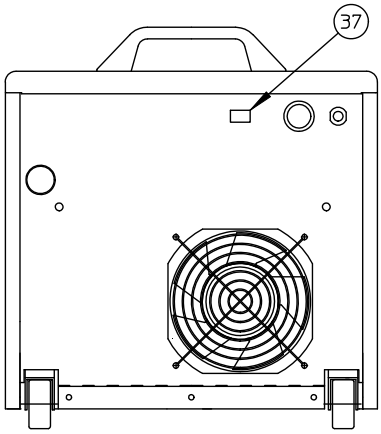
Check item	Probable causes	● Front panel display is not turned on	● Neither high frequency wave nor arc is generated.	● High frequency wave is generated without arc.	● Bead turns black.	● Lack of arc occurs.	● Insufficient arc start	● No gas supply	● Gas flows without stop
Distribution box (Input protection device)	• Switch is not ON. • Blown fuse. • Tripping of circuit breaker. • Loose connections.		O					O	O
Input cable	• Cable is disconnected or severed. • Loose connections. • No phase.		O					O	O
Switches	• Switch is not ON.		O					O	O
	• “GAS” switch is placed to “Purge”.	O							
Gas cylinder and Gas regulator	• Main cock is not open. • Gas nearly runs short. • Insufficient flow rate.		O	O	O	O	O		
	• Excessive flow rate.			O	O				
Gas hose (From gas cylinder to torch.)	• Loose connections • Hose is damaged.		O			O			
Torch cable	• Torch is bent at acute angle. • Coating is damaged. • Sign of insulation deterioration.		O	O		O			
	• Torch switch is not ON.							O	
Around the torch body	• Insufficient fastening of the collet. • Sizes of collet body, collet and electrode do not match. • Insufficient fastening of the torch body.					O	O		
	• Attach an earth ring ass’y.			O					
Cables on the base metal	• Insufficient cable size (sectional area.) • Loose connections • Poorly energized base metal.			O	O		O		
Welding conditions	• Check torch angle, distance between electrode and base metal once again.			O	O		O	O	
Default settings	• Try to set “**Hot Cur Level**” to “High”			O					
High frequency board	• High-frequency gap (electrode surface) is dirty.							O	

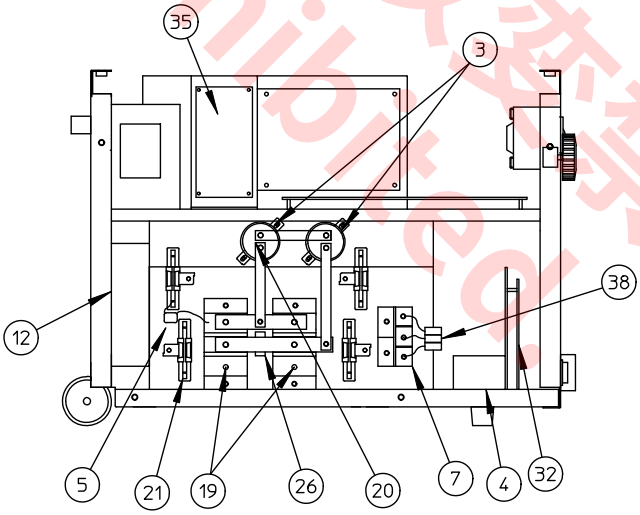
12. Parts list











Parts list

No.	Mark	Rescription	Part number	Q'ty	Note	Internal code
1	CO2	Receptacle	YCA5	1	For remote	NR2012RF
2	CO1	Receptacle	CN70AJ2P	1	For torch switch	CN70AJ2P
3	C1,C2	Capacitor	YCA23	2	F	RWE45LGSN102
4	C9	Capacitor	YCA12	1		SS351206PPQ1
5	C3,C4	Capacitor	CEX00002	2		CEX00002
5	C5,C6	Capacitor	CEX00105	2		CEX00105
6	CT1	CT	YCA6	1		TN300A4VB15A
7	D1	Diode	YCAD102	1		DF75LB160F
8	D2,D3	Diode	YCAD99	2		FRS300BA50F
9	T1		UTU21300	1		UTU21300
10	DCL	DCL	CLU00037	1		CLU00037
11	CC	C.C	CLU00038	1		CLU00038
12	FAN	Fan guard	MG15FG	1		MG15FG
		Cooling fan	UF15PC20BTH	1		UF15PC20BTH
13	T2	Control transformer	UTU21460	1		UTU21460
14	LCD	LCD	MTNS000361AA	1		MTNS000361AA
15	MTr	Main transformer	CTU00037	1		CTU00037
16	MCB	Power switch	YCA36	1		1EL30A480V/C
17	P2	PC board	ZUEP1370	1		ZUEP1370
19	Q1,Q2	IGBT	YMAD125	2		CM100DY24NFF
20	R1,R2	Resistor	CEX00101	2		CEX00101
21	R3-R6	Resistor	MFS40A100KN	4		MFS40A100KN
22	R7C7,R8C8	Snaber	CEX00084	2		CEX00084
23	SW1	Knob	CHT00004	1		CHT00004
24	SW1	Encoder	YCA11	1	Jog dial	RE21BARE100
25	SW2	Switch	SLE6A2	1	GAS CHECK	SLE6A2
26	TH	Thermal switch	0HD85B02	1		0HD85B02
27	SOL	Gas valve	CEX00092	1		CEX00092
28		Output terminal	YCA4	2		D1XBE50
29		Jig terminal	YMAD119	1		W123B8P
30	R11	Resistor	SFW20A151	1		SFW20A151
31	R9,R10	Resistor	SFW40A750	2		SFW40A750
32		PC board	ZUEP0998	3	TS, Rmt Filter	ZUEP0998
33		PC board	YEP10026	1	Main control	YEP10026
34		PC board	ZUEP12532A1	2	Filter	ZUEP12532A1
35		PC board	ZUE1363	1	Drive	ZUE1363
36		PC board	ZUE1364	1	HF	ZUE1364
37		D-SUB terminal	CWX00514	1		CWX00514
38	C20, C21, C22	Capacrtor	WSDEX00010	1		WSDEX00010
39		PC board	ZUEP0853B1	1	Relay	ZUEP0853B1
		Handle	YMW4	2		AP829-2
		Input cable	WSCWC00007	1		WSCWC00007
		Caster	YMW3	2		155R50
		Rubber foot	YCA19	2		C30FRB2320

13. Circuit diagram

14. Appendix

14.1 TIG Welding conditions table - (Reference)

- The list of TIG welding conditions (stainless steel) shown in this chapter is a reference value as a guideline for standard welding conditions.
- In actual welding operations, work out an appropriate condition in consideration of the shape of substances to be welded, a welding position, etc.
- In case arc is not stable in the low current range, refer to section "Troubleshooting."

TIG welding conditions table: Stainless steel (DC)

Thickness of base metal	Joint	Welding current (A)			Welding speed	FIller wire size (Dia.)	Gas flow rate
mm		Downward	Vertical	Upward	cm/ min	mm	L/ min
0.5	Butt	10 - 15	10 - 15	10 - 15	40	—	5
	Lap	10 - 15	10 - 15	10 - 15	20	1.0	5
	Fillet	10 - 20	10 - 20	10 - 20	40	—	5
1.0	Butt	30 - 40	30 - 40	30 - 40	15 - 40	1.2	5
	Lap	40 - 50	40 - 50	40 - 50	15 - 30	1.2	5
	Fillet	45 - 55	45 - 55	45 - 55	20 - 40	1.2	5
1.5	Butt	60 - 100	60 - 80	60 - 70	15 - 30	1.6	5
	Lap	60 - 100	80 - 100	80 - 90	15 - 30	1.6	5
	Fillet	60 - 80	60 - 70	60 - 70	20 - 40	1.6	5
	T-shape	70 - 90	70 - 90	70 - 90	10 - 20	1.6	5
2.5	Butt	100 - 120	90 - 110	90 - 110	20 - 30	1.6	7
	Lap	110 - 130	100 - 120	100 - 120	20 - 30	1.6	7
	Fillet	100 - 120	90 - 110	90 - 110	25 - 30	1.6	7
	T-shape	110 - 130	100 - 120	100 - 120	15 - 25	1.6	7
3.0	Butt	120 - 140	110 - 130	105 - 125	30	2.4	7
	Lap	130 - 150	120 - 140	120 - 140	25	2.4	7
	Fillet	120 - 140	110 - 130	115 - 135	30	2.4	7
	T-shape	130 - 150	115 - 135	120 - 140	25	2.4	7
4.5	Butt	200 - 250	150 - 200	150 - 200	25	2.4	7
	Lap	225 - 275	175 - 225	175 - 225	20	2.4	7
	Fillet	200 - 250	150 - 200	150 - 200	25	2.4	7
	T-shape	225 - 275	175 - 225	175 - 225	20	2.4	7
6.0	Butt	275 - 350	200 - 250	200 - 250	25	3.2	10
	Lap	300 - 375	225 - 275	225 - 275	20	3.2	10
	Fillet	275 - 350	200 - 250	200 - 250	25	3.2	10
	T-shape	300 - 375	225 - 275	225 - 275	20	3.2	10
12.0	Butt	350 - 450	225 - 275	225 - 275	15	4.0	10
	Lap	375 - 475	230 - 280	230 - 280	15	4.0	10
	Fillet	275 - 475	230 - 280	230 - 280	15	4.0	10

14.2 Tungsten welding rod

1) The following table shows tungsten electrode types commonly used for TIG welding.

Tungsten electrode type	Symbol	Applicable TIG welding method
Pure tungsten	YWP	AC TIG
Tungsten with 2 % Cerium trioxide	YWCe-2	DC TIG, AC TIG
Tungsten with 2 % Lanthanum trioxide	YWLa-2	DC TIG

<About “Symbol”>

- YWP: Pure tungsten.
- YWCe-2: Tungsten with 2%Cerium trioxide
- YWLa-2: Tungsten with 2% Lanthanum trioxide

2) Refer to the following table for the selection of tungsten electrode diameters.

Electrode size (Dia.) (mm ϕ)	Welding current (A)	
	Electrode minus (-) (DCEN)	**Electrode plus (+)** (DCEP)
0.5	5 - 20	
1.0	15 - 80	
1.6	70 - 150	10 - 20
2.4	150 - 250	15 - 30
3.2	250 - 400	25 - 40
4.0	400 - 500	40 - 55
4.8	500 - 800	55 - 80

14.3 TIG welding shield gas

- As for the TIG welding shield gas, use the welding argon gas.
- The incorporation of impurities, such as oxygen, moisture, nitrogen, etc. into the argon gas, can be a cause to blowholes, and reduces the quality of welding. (In AC TIG and MIX TIG, the cleaning activities also become less efficient, and the welding quality in bead appearance, penetration, etc. is considerably affected.)

14.4 Filler wire

- For the filler wire, material, which is same as base material, is used in general. In special cases including the welding of different metal, etc., select material depending on your purposes.
- As for the diameter of filler wire, an appropriate thickness is decided depending on the welding current in general.

Guideline for selecting filler wire diameter

Welding current (A)	Filler wire size (Dia.) (mm ϕ)
10 - 20	Up to 1.0
20 - 50	Up to 1.6
50 - 100	1.0 - 2.4
100 - 200	1.6 - 3.0
200 - 300	2.4 - 4.5

14.5 Welding conditions memorandum

It is recommended to keep a note of the user-created welding conditions for your convenience.

Those custom welding conditions in this unit by allocating a channel number to each of them.
* Put the data on the below “Program list” once stored.

Program number	Material to be welded	Remarks
		

Prepared on	Prepared by

	Welding method
	TIG
	SPOT
	STICK

	Crater
	OFF
	ON
	Repeat

	Pulse
	OFF
	ON

(Column with thick frame: for “Pulse ON” / “-”: NA)

Method	Crater	Pre-flow time	Initial current	Up slope	Welding current	Down slope	Spot time	Crater time	Post-flow time	Pulse current	Pulse frequency	Pulse width
DC TIG	OFF		-	-		-	-	-				
	ON, Repeat						-					
SPOT	-		-	-		-		-		-	-	-
STICK	-	-	-	-		-	-	-	-	-	-	-

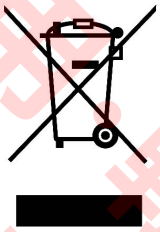
Factory setting item	Default settings	Set contents	MEMO
V Disp Status	OFF	OFF ON	
Hot Cur Level	Standard	Low Standard High	
Crater End Type	Normal	Normal Torch switch	
E.L. ShortStatus	OFF	OFF ON	
Disp Hold Time	0.0 s	__ s	
Electric shock prevention	ON	OFF ON	
Arc drive	0 %	__ s	
Refresh interval	0 s	__ s	

14.6 Program list

Program number	Material to be welded	Remarks	Prepared on	Prepared by
P01				
P02				
P03				
P04				
P05				
P06				
P07				
P08				
P09				
P10				
P11				
P12				
P13				
P14				
P15				
P16				
P17				
P18				
P19				
P20				
P21				
P22				
P23				
P24				
P25				
P26				
P27				
P28				
P29				
P30				

15. Information on Disposal

Information on Disposal for Users of Waste Electrical & Electronic Equipment (private households)



This symbol on the products and/or accompanying documents means that used electrical and electronic products should not be mixed with general household waste.

Please dispose of this item only in designated national waste electronic collection schemes, and not in the ordinary dust bin.

For business users in the European Union and UK

If you wish to discard electrical and electronic equipment, please contact your dealer or supplier for further information.

Information on Disposal in other Countries outside the European Union and UK

This symbol is only valid in the European Union and UK.
If you wish to discard this product, please contact your local authorities or dealer and ask for the correct method of disposal.

♦CRM List

CRM	Description	Part number
Tungsten	PC board	ZUEP1364

パナソニック コネクト株式会社
〒 561-0854　大阪府豊中市稲津町 3 丁目 1 番 1 号

Panasonic Connect Co., Ltd.
1-1, 3-chome, Inazu-cho, Toyonaka, Osaka 561-0854, Japan

Printed in Japan

OMCTT5621EAA01