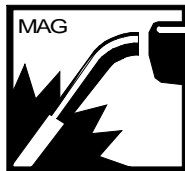




OWNER'S MANUAL

FOR



XD400

MODEL: CPXD-400 C0104(415V)

DO NOT DESTROY

IMPORTANT: Read and understand the entire contents of this manual, with special emphasis on the safety material throughout the manual, before installing, operating, or maintaining this equipment. This equipment and this manual are for use only by persons trained and experienced in the safety operation of welding equipment. Do not allow untrained persons to install, operate or maintain this equipment. Contact your distributor if you do not fully understand this manual.

DAIHEN Corporation WELDING PRODUCTS DIVISION

March 2, 2007

Upon contact, advise **MODEL** and **MANUAL NO.**

Notice : Machine export to Europe

This product does not meet the requirements specified in the EC Directives which are the EU safety ordinance that was enforced starting on January 1, 1995. Please make sure that this product is not allowed to bring into the EU after January 1, 1995 as it is.

The same restriction is also applied to any country which has signed the EEA accord.



Please ask us before attempting to relocate or resell this product to or in any EU member country or any other country which has signed the EEA accord.

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1. SAFETY INFORMATION


The following safety alert symbols and signal words are used throughout this manual to identify various hazards and special instructions.


 WARNING	WARNING gives information regarding possible personal injury or loss of life.
 CAUTION	CAUTION refers to minor personal injury or possible equipment damage.

2. ARC WELDING SAFETY PRECAUTIONS


 WARNING
ARC WELDING can be hazardous.
<ol style="list-style-type: none">1. PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. Be sure to:<ul style="list-style-type: none">• Keep children away.• Keep pacemaker wearers away until consulting a doctor.2. Read and understand the summarized safety information given below and the original principal information that will be found in the PRINCIPAL SAFETY STANDARDS.3. Have only trained and experienced persons perform installation, operation, and maintenance of this equipment.4. Use only well maintained equipment. Repair or replace damaged parts at once.
ARC WELDING is safe when precautions are taken.


2. ARC WELDING SAFETY PRECAUTIONS (continued)

	ELECTRIC SHOCK can kill.
<p>Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuits are electrically live whenever the output is on. The power line and internal circuits of this equipment are also live when the line disconnect switch is on. When arc welding all metal components in the torch and work circuits are electrically live.</p> <ol style="list-style-type: none">1. Do not touch live electrical parts.2. Wear dry insulating gloves and other body protection that are free of holes.3. Insulate yourself from work and ground using dry insulating mats or covers.4. Be sure to disconnect the line disconnect switch before installing, changing torch parts or maintaining this equipment.5. Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.6. Keep all panels and covers of this equipment securely in place.7. Do not use worn, damaged, undersized, or poorly spliced cables.8. Do not touch electrode and any metal object if POWER switch is ON.9. Do not wrap cables around your body.10. Turn off POWER switch when not in use.	


	ARC RAYS can burn eyes and skin: FLYING SPARKS AND HOT METAL can cause injury. NOISE can damage hearing.
<p>Arc rays from the welding process produce intense heat and strong ultraviolet rays that can burn eyes and skin.</p> <p>Noise from some arc welding can damage hearing.</p> <ol style="list-style-type: none">1. Wear face shield with a proper shade of filter (See ANSI Z 49.1 listed in PRINCIPAL SAFETY STANDARDS) to protect your face and eyes when welding or watching a welder work.2. Wear approved safety goggles. Side shields recommended.3. Use protective screens or barriers to protect others from flash and glare: warn others not to look at the arc.4. Wear protective clothing made from durable, flame-resistant material (wool and leather) and foot protection.5. Use approved earplugs or earmuffs if noise level is high. Chipping and grinding can cause flying metal. As welds cool, they can throw off slag.6. Wear approved face shield or safety goggles. Side shields recommended.7. Wear proper body protection to protect skin.	


2. ARC WELDING SAFETY PRECAUTIONS (continued)

	WELDING can cause fire and explosion.
<p>Sparks and spatter fly off from the welding arc. The flying sparks and hot metal, spatter, hot base metal, and hot equipment can cause fire and explosion. Accidental contact of electrode or welding wire to metal object can cause sparks, overheating, or fire.</p> <ol style="list-style-type: none">1. Protect yourself and others from flying sparks and hot metals.2. Do not weld where flying sparks can strike flammable material.3. Remove all flammables within 10m (33ft) of the welding arc. If this is not possible, tightly, cover them with approved covers.4. Be alert that welding sparks and hot metals from welding can easily pass through cracks and openings into adjacent areas.5. Watch for fire, and keep a fire extinguisher nearby.6. Be aware that welding on a ceiling, floor, bulkhead, or partition can ignite a hidden fire.7. Do not weld on closed containers such as tanks or drums.8. Connect base metal side cable as close to the welding area as possible to prevent the welding current from traveling along unknown paths and causing electric shock and fire hazards.9. Remove stick electrode from holder or cut off welding wire at contact tip when not in use.10. Does not use the welding power source for other than arc welding.11. Wear oil-free protective garments such as leather gloves, a heavy shirt, cuffless trousers, boots, and a cap.12. A loose cable connection can cause sparks and excessive heating.13. Tighten all cable connections.14. When there is an electrical connection between a work piece and the frame of wire feeder or the wire reel stand, are may be generated and cause damage by a fire if the wire contacts the frame or the work piece.	

	FUMES AND GASES can be hazardous to your health.
<p>Arc welding produce fumes and gases. Breathing these fumes and gases can be hazardous to your health.</p> <ol style="list-style-type: none">1. Keep your head out of the fumes. Do not breathe the fumes.2. Ventilate the area and/or use exhaust at the arc to remove welding fumes and gases.3. If ventilation is poor, use an approved air-supplied respirator.4. Read the Material Safety Data Sheets (MSDS) and the manufacturer's instructions on metals, consumables, coatings, and cleaners.5. Do not weld or cut in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.6. Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Shielding gases used for welding can displace air causing injury or death. Be sure the breathing air is safe.	

2. ARC WELDING SAFETY PRECAUTIONS (continued)

	<p>CYLINDER can explode if damaged.</p>
<p>A shielding gas cylinder contains high-pressure gas. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.</p> <ol style="list-style-type: none">1. Use only correct shielding gas cylinders, gas regulator, hoses, and fittings designed for the specific application; maintain them in good condition.2. Protect compressed gas cylinders from excessive heat, mechanical shock, and arcs.3. Keep the cylinder upright and securely chained to a stationary support or a rack to prevent falling or tipping.4. Keep cylinders away from any welding or other electrical circuit.5. Never touch cylinder with welding electrode.6. Read and follow instructions on compressed gas cylinders, associated equipment, and the CGA publication P-1 listed in PRINCIPAL SAFETY STANDARDS.7. Turn face away from valve outlet when opening cylinder valve.8. Keep protective cap in place over valve except when gas cylinder is in use or connected for use.9. Do not disassemble or repair the gas regulator except for the person authorized by the manufacturer of them.	

	<p>Rotating parts may cause injuries. Be sure to observe the following.</p>
<p>If hands, fingers, hair or clothes are put near the fan's rotating parts or wire feeder's feed roll, injuries may occur.</p> <ol style="list-style-type: none">1. Do not use this equipment if the case and the cover are removed.2. When the case is removed for maintenance/inspection and repair, certified or experienced operators must perform the work. Erect a fence, etc. around this equipment to keep others away from it.3. Do not put hands, fingers, hair or clothes near the rotating fans or wire feed roll.	

2. ARC WELDING SAFETY PRECAUTIONS (continued)



ARC WELDING work areas are potentially hazardous.

FALLING or MOVING machine can cause serious injury.

1. When hanging the welding power source by a crane, do not use the carrying handle.
2. Put the welding power source and wire feeder solidly on a flat surface.
3. Do not pull the welding power source across a floor laid with cables and hoses.
4. Do not put wire feeder on the welding power source.
5. Do not put the welding power source and wire feeder where they will pit or fall.

WELDING WIRE can cause puncture wounds.

1. Do not press gun trigger until instructed to do so.
2. Do not point gun toward any part of the body, other people, or any metal when threading welding wire.

PRINCIPAL SAFETY STANDARDS

Arc welding equipment – Installation and use, Technical Specification IEC 62081, from International Electro technical Commission

Arc welding equipment Part 1: Welding power sources IEC 60974-1, from International Electro technical Commission

Safety in Welding and Cutting, ANSI Standard Z49.1, from American Welding Society.

Safety and Health Standards, OSHA 29 CFR 1910, from Superintendent of Documents, U.S. Government Printing Office.

Recommended Practices for Plasma Arc Cutting, American Welding Society Standard AWS C5.2, from American Welding Society.

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, American Welding Society Standard AWS F4.1, from American Welding Society.

National Electrical Code, NFPA Standard 70, from National Fire Protection Association.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association.

Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales.

Safe Practices For Occupation And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute.

Cutting And Welding Processes, NFPA Standard 51B, from National Fire Protection Association.

NOTE: The codes listed above may be improved or eliminated. Always refer to the updated codes.

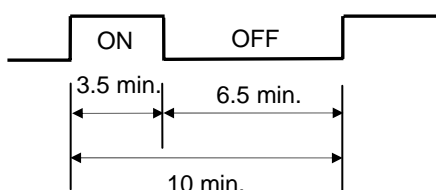
3. GENERAL NOTICE OF OPERATION

3.1 Rated duty cycle



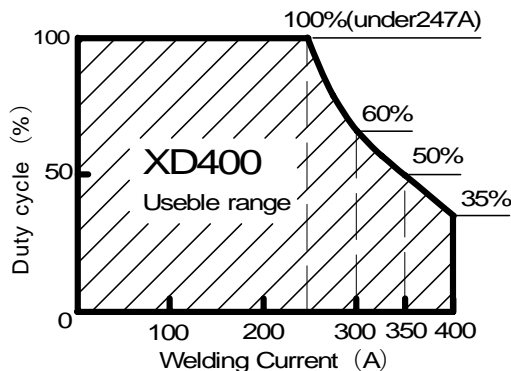
CAUTION

- Use this welding power source at or under the rated duty cycle. If exceeding the rated duty cycle, the welding machine may be damaged.
- Rated duty cycles of the welding power source are as listed below.
XD400: 35% (400A 34V),
- The duty cycle of 35% means the way the machine is rested for 3.5 minutes after 6.5 minutes of continuous welding at the rated current.



Operation cycle of 35% duty cycle

- Failure to observe duty cycle limitations may result in temperature inside the welding power source exceeding the tolerance, which may contribute to premature welding machine failure or product damage.
- The figures shown right indicate the relation between welding current and duty cycle. Use the welding machine within its usable range, following the duty cycle for the welding current.
- The duty cycle of the welding power source is also limited by the duty cycles of accessories combined with such as welding torches. Use the welding machine within the lowest rated duty cycle of the accessories.



3.2 Combination of welding power source and other welding machines



CAUTION

- Use the welding power source combined with only specified wire feeder. (See SPECIFICATIONS).
- Plug only the specified wire feeder or remote control into the receptacle of the wire feeder or the remote control. Failure to do so may result in product damage.

4. SPECIFICATIONS AND ACCESSORIES

4.1 Specifications

Model	CPXD-400
Rated input voltage	3φ 415 ±10%
Rated input power	20.0kVA, 18.3kW
Rated input current	28A
Rated output current	400A
Rated load voltage	36V
Output current range	50 – 400A
Output voltage range	15 – 36V
Max. no-load voltage	58V
Rated duty cycle	35%
Temperature rise	160°C
Temperature range	-10°C – + 40°C
Mass	115kg
External dimensions	380(W)×798(D)×730(H)
Degree of protection	IP21S

4.2 Wire feeder

Model	CMXL-2302 [U5364] (Binzel Connection)	
Wire size (mmφ)	(0.8),(0.9), 1.0, 1.2, (1.4), (1.6)	
Wire type	Solid, Flux	
Wire feeder	Max. 18m / min.	
Wire reel	Shaft dia.	50mm
	Outside dia.	MAX.300mm
	Width	103mm
Wire mass	MAX. 20kg	
Mass	40 14kg	

Note: optional accessories are required for wire sizes in ().

4.3 Welding torch




ALXANDER BINZEL TORCH
TERM BINZEL TORCH

4.4 Standard accessories (welding power source)




Specification	XD400	Quantity
Remote control box	C0104K00	1
Cartridge fuse	RO24-4A 500V	1
Glass enclosed fuse	10A 250V	1
	5A 250V	1
	2A 250V	1
Hexagon bolt	M8-20	2


5. TRANSPORTATION AND INSTALLATION

5.1 Transportation

 WARNING	
Observe the following to prevent troubles during transportation and breakage of the welding power source.	
	<ul style="list-style-type: none"> ● Do not touch live electrical parts inside and outside of the welding power source. ● When carrying or transferring the welding power source, be sure to turn OFF input power supply by line disconnect switch.
	<ul style="list-style-type: none"> ● When lifting the welding power source with a crane, surely fit the case and the cover, and firmly tighten the eyebolts. ● Lift the welding power source in single with two wires. If the welding power source, the wire feeder, etc. are lifted at once, dropping may occur. ● When carrying the welding power source with a fork lift, etc., surely provide wheel stoppers.

5.2 Installation

 WARNING	
In installing the welding power source, observe the followings to prevent occurrence of fires by welding and physical damage by fumes and gases.	
	<ul style="list-style-type: none"> ● Do not install the welding power source near combustible materials and inflammable gas. ● Remove combustible materials not to be struck by the spatter. If not removed, cover them with the noncombustible cover.
	<ul style="list-style-type: none"> ● For preventing gas-poisoning at choking, use local exhaust equipment or protectors for respiration that are prescribed by safety regulations. ● In welding at narrow space, ventilate the place sufficiently or wear the protectors for respiration, and work under supervision by a trained supervisor.

 CAUTION	
<ul style="list-style-type: none"> ● After installing the welding power source, provide wheel stoppers. ● Do not put any heavy substances on the top of the welding power source. ● Do not cover the ventilation port of the welding power source. ● Fix the gas cylinder to the special gas cylinder stand. 	

INSTALLATION PLACE

- Observe the following when selecting a installation place.
 - Separate the machine more than 30cm from wall or other machine.(fig.2)
 - Less humidity, dirt and dust. And do not expose welding power source to direct sunlight, wind and rain.
 - Install the power source on the strong and stable surface.
 - Ambient temperature is $-10^{\circ}\text{C} - +40^{\circ}\text{C}$
 - Do not enter the metal foreign matter. (spatter etc.)
 - Install where arc is protected from wind.
 (Use a wind shield to protect arc from wind, otherwise blow hole may be caused.)

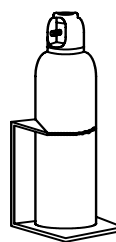


Fig.1

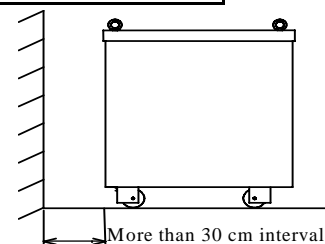


Fig.2

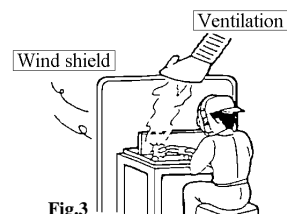



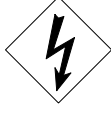



Fig.3

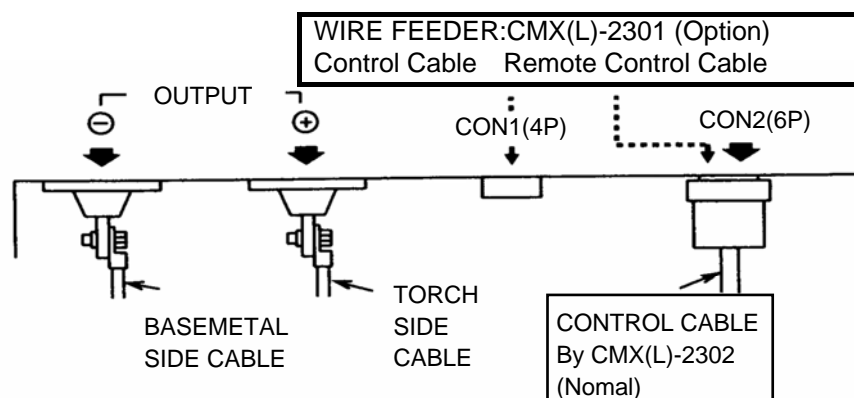
6. CONNECTION PROCEDURE

 WARNING	
	To avoid electric shock, follow the below instructions.
<p>Do not touch the charging parts, as this will result in fatal shock and severe burn.</p> <ul style="list-style-type: none"> ● Do not touch the charging parts of the equipment. ● Have a qualified person connect the case of the welding power source grounded. ● With all of the line disconnect switches turned off, install and ground the welding machine. ● Do not use the cable with lack of capacity or the seriously damaged cable. ● Tighten firmly and insulate the connection of cables. ● Be sure to use the case or the cover of the welding power source after connecting cables. 	

 WARNING	
	<ul style="list-style-type: none"> ● Output power is applied to output terminals at welding. Do not touch the output terminals while torch or holder other than your welding process is connected to the welding power source. This may result in a serious electric shock or burn. Connect the only torch or holder matching your welding process to output terminals of the welding power source. (Do not connect more than two torches or holders to the output terminals of the welding power source.) ● With the line disconnect switch disconnected, make external connections. ● Firmly tighten the connections of cables. ● After connection of the cables, close the front cover.

 CAUTION	
<ul style="list-style-type: none"> ● When CMX(L)-2301 (connected to optional remote control) is used, switch the connections inside power source. (See 8.4.3 for details) ● Connect the only wire feeder or remote control listed in 8.4.3 the receptacles of the welding power source (CON1 and CON2). Failure to do so may result in damage of the welding power source. 	

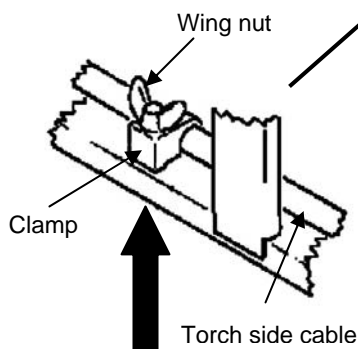
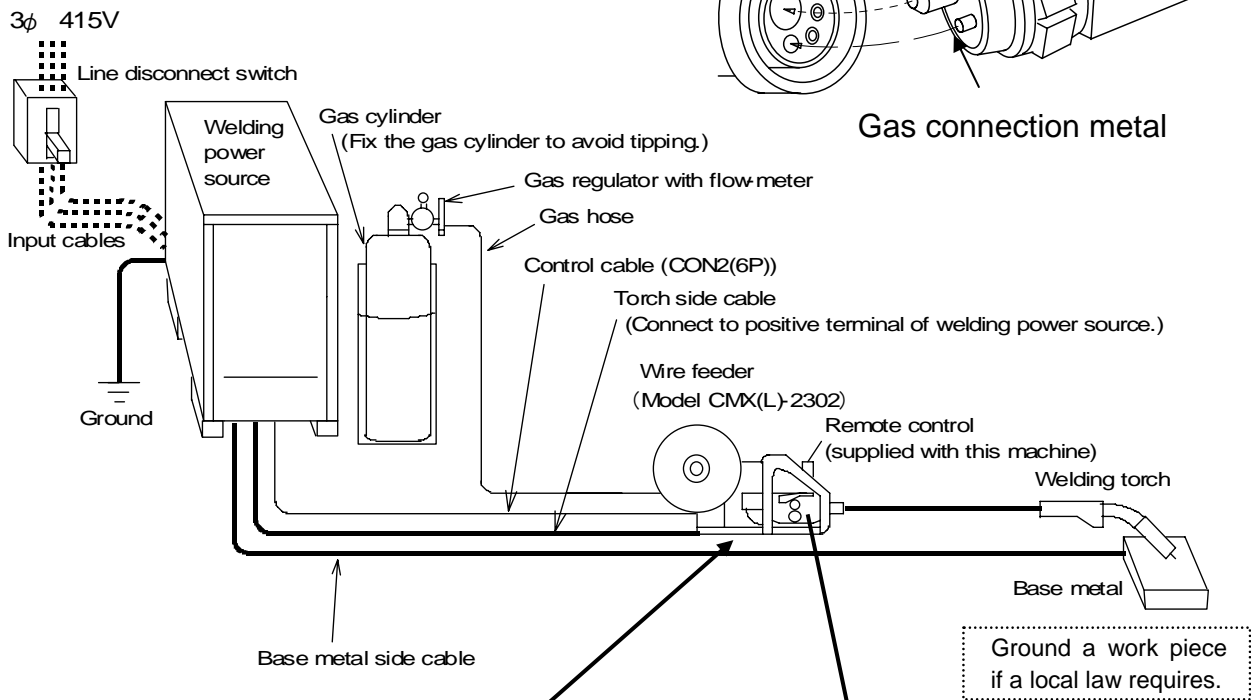
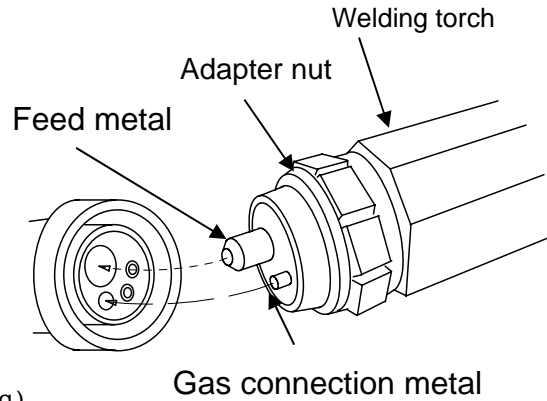
6.1 Output connection of welding power source



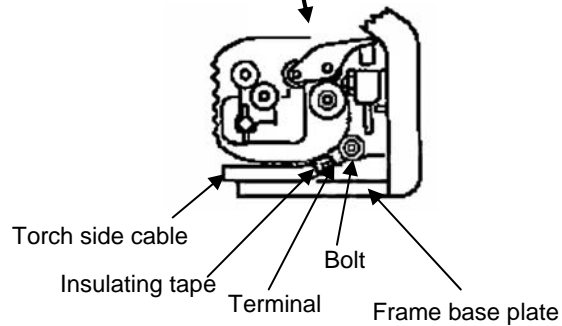
6. CONNECTION PROCEDURE (Continued)

6.1 Output connection of welding power source (Continued)

Check if feed metal and gas connection metal are completely inserted into welding torch, and if the adapter nut is smoothly inserted into the welding torch before connecting a wire feeder with a welding torch. (Forcible insertion may result in damage of the threads of the metal.)

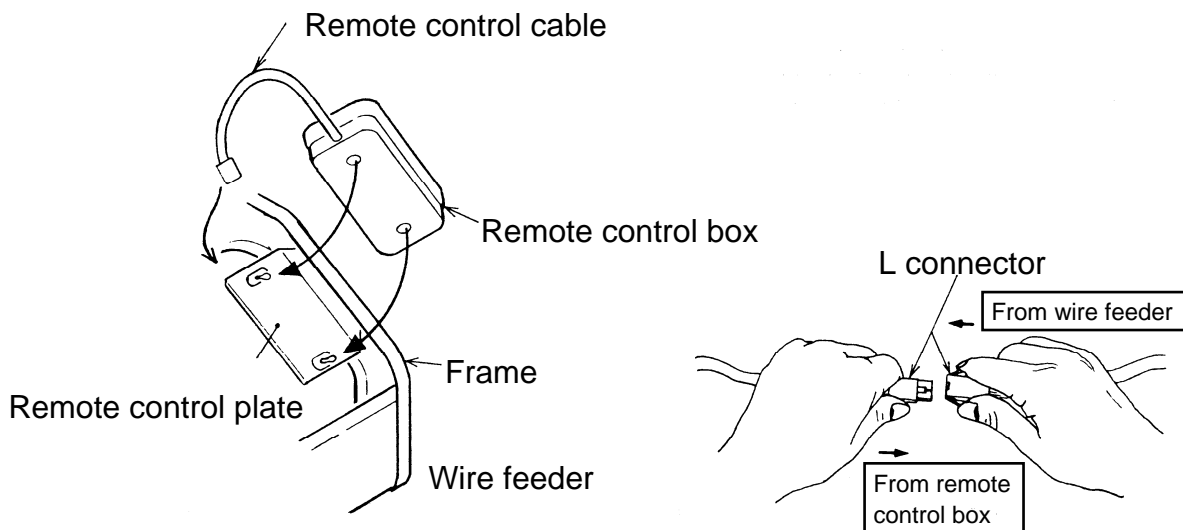


Note: Clamp the power cable and fix it with the wing nut.





6. CONNECTION PROCEDURE (Continued)

6.2 Mounting and connecting remote control



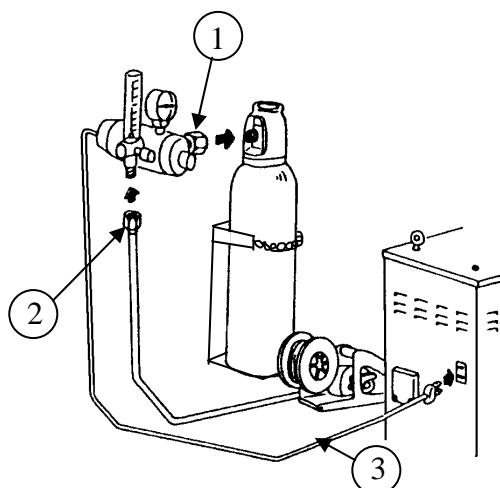
Note: Place the remote control cable under the remote control plate and connect to the L connector of the wire feeder. The connected cable should be set within the frame area.

6.3 Connection of gas hose

 WARNING	
	<p>● You may suffer from danger of suffocation caused by lack of oxygen when shield gas keep drifting in a closed place. Be sure to turn off the shield gas at the main when the welding power source is not used.</p>

 CAUTION	
<p>● Be sure to connect the gas hose after fixing to the stand, as toppling of gas cylinder may cause physical injuries.</p>	



Connect the gas hose, following the steps below.





1. Fix the gas cylinder nut to the gas cylinder with a monkey wrench.
2. Connect the gas hose to the outlet coupling with a monkey wrench.
3. Plug the power cable for a heater into the receptacle for 100V heater. The heater can be used for gas flow regulator only. Do not use it for any other purpose.

6. CONNECTION PROCEDURE (Continued)

6.4 Grounding and connection of input side

 WARNING	
	Observe the followings to prevent the electrical shock.
<p>In touching the live electrical part, critical electric shock and burn may occur.</p> <ul style="list-style-type: none"> ● Do not touch live electrical parts inside and outside of the welding power source. ● Grounding to the case of the welding power source should be performed by persons qualified in electric work according to laws and regulations. ● Be sure to turn off the line disconnect switch before connecting. ● Securely attach the case and cover after connecting cables. ● When the welding power source is used at place with high humidity such as in work site or on the steel plate and steel structure, provide the breaker with function of leakage current sensing. 	

 CAUTION	
<ul style="list-style-type: none"> ● Be sure to ground the welding power source. ● Grounding cable thickness: Over your input cable. 	
<p>If the welding power source not grounded is used, voltage is generated in the case through the capacitor between the welding power source input circuit and the case or floating capacity (electrostatic capacity naturally generated between the input conductor and the case metal). When you touch the case, you will get an electric shock. Be sure to ground the case of the welding power source.</p>	

 CAUTION	
<ul style="list-style-type: none"> ● Be sure to install a switch with fuse or a circuit breaker (for motor) at the input side of each welding machine. ● Capacity of commercial input and current of fuse or circuit breaker 	

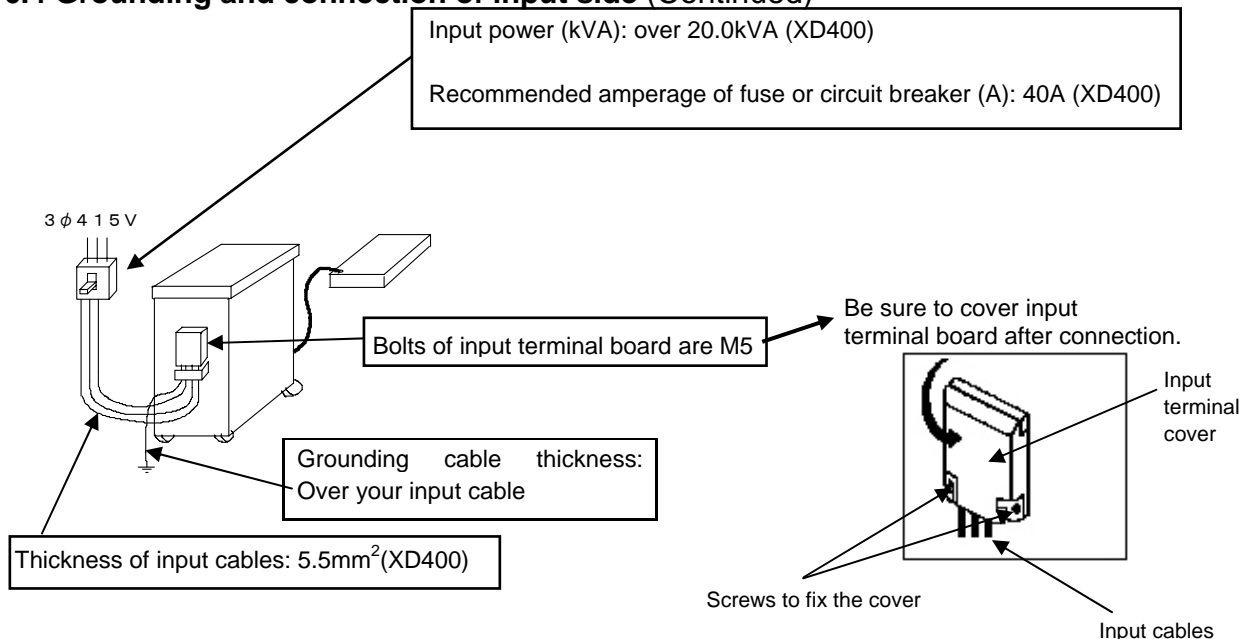
	XD400
Power voltage and phase	415V, Three phase
Power voltage range	373V – 456V
kVA	Over 20.0kVA
Current of fuse or circuit breaker	40A

NOTE:

1) When starting the welding machine, inrush current (exciting rush current) flows to power source system instantaneously. The current depends on impedance inside of the power supply system. The circuit breaker for a motor is designed for being seldom tripped by the instantaneous inrush current. But even the breaker with the recommended current rating may trip due to the relation between its characteristics and the currents listed above. If the circuit breaker trips when starting the machine, use the breaker with higher amperage.

6. CONNECTION PROCEDURE (Continued)

6.4 Grounding and connection of input side (Continued)



6.5 Precautions for use on an engine generator or an auxiliary power source of engine welder

CAUTION

Observe the following to prevent troubles of the welder in using an engine generator or an auxiliary power source of engine generator and engine welder.

- Set the voltage of engine generator to 415~456V during no-load running. If output voltage is set too high, failure of welding power source results.
- Set the output frequency of engine generator to the frequency of this welding power source.
- Unlike commercial power source, engine generator is slow in recovering voltage when load variations occur. Therefore, output voltage drops excessively when current varies suddenly due to arc start, and that may cause loss of arc. (However, a welding machine will not fail due to such conditions.) To prevent this, the capacity of engine generator must be more than twice the rated input (VA) of a welding machine. Especially, engine generator with a damper winding is recommended. Contact the manufacture of engine generator whether the engine generator is provided with a damper winding.
- If one engine generator is used for two or more welding machines, loss of arc is likely to occur due to the influence of respective welding machines.
- Use only the auxiliary power source whose voltage waveform is improved. (Contact the engine manufacture for details.)

7. LOCATION AND FUNCTION OF CONTROL

7.1 Front panel

CAUTION

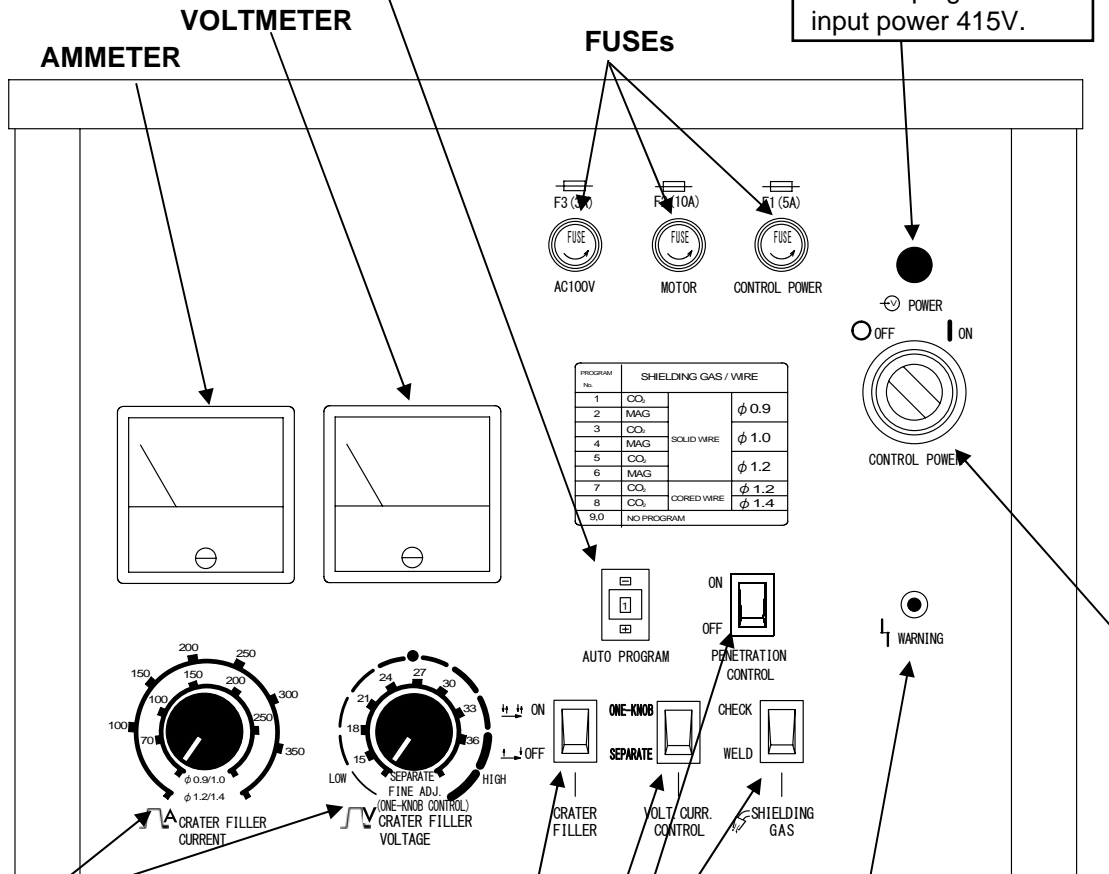
● With the welding power source stopped, use the switches or knobs on this front panel.

AUTO PROGRAM switch

To select a welding process and a wire size while pressing + or – button. Set to only the numbers listed on the next page. Refer to the table of auto program switch on the next page.

POWER lamp

This lamp lights when input power 415V.



CRATER FILLER CURRENT / VOLTAGE adjusting knobs

To set current and voltage when filling in a crater.

CRATER FILLER switch (ON/OFF)

Switch this switch to ON or REPEAT when filling in a crater. Refer to “8.1 Crater-filler setting” for details.

VOLT.CURR. CONTROL switch

Refer to “7.2 Remote control” for details of this switch.

PENETRATION CONTROL switch

To control penetration. (Refer to 8.2)

WARNING lamp

When an error is detected, this lamp lights or flickers, then output stops. Refer to “8.3 When errors occur” for details and cancellation of the error.

CONTROL POWER switch

When this switch is turned on, all indicators instantly come on and fan starts rotating.

SHIELDING GAS switch

To control the amount of gas flow. Switch this switch to WELD when welding. Torch switch is not available as long as SHIELDING GAS switch is set to CHECK.

7. LOCATION AND FUNCTION OF CONTROL (Continued)

7.1 Front panel (continued)

● AUTO PROGRAM switch (CO₂ / MAG)

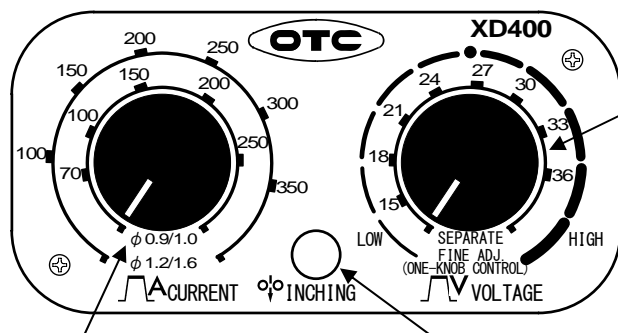
PROGRAM No.	XD400		
	Welding process	Type of wire	Wire size. (mmφ)
1	CO ₂	SOLID	0.9
2	MAG		
3	CO ₂		
4	MAG		
5	CO ₂		
6	MAG		
7	CO ₂	FLUX CORED	1.2
8	CO ₂		1.4
9	NO PROGRAM		
0			

⚠ CAUTION

● Don't set except for the program number of 1 - 8 for XD400.

7.2 Remote control box

A remote control is supplied with this welding power source.



VOLTAGE adjusting knob

- SEPARATE adjustment
 - To adjust welding voltage.
- ONE KNOB adjustment
 - Set this knob in the position marked “•” for optimum welding voltage. Turn this knob clockwise for higher voltage and counterclockwise for lower voltage. (Decide an optimum setting by experimentally generating arc.)

CURRENT adjusting knob

- To set welding current or change the feeding rate of the wire.

INCHING button

- To feed a wire. Turn the welding current adjusting knob to change a wire feeding speed.

●SEPARATE adjustment

Welding current/voltage can be set individually when the VOLT.CURR.CONTROL switch is set to SEPARATE.

●ONE KNOB adjustment

When the VOLT. CURR.CONTROL switch on the front panel is set to ONE-KNOB, welding voltage is automatically set only by turning the CURRENT adjusting knob. To make a fine adjustment of welding voltage, turn the VOLTAGE adjusting knob.

Note: When any wire feeders or extension cables other than CMX(L)-2301 are used, actual current and voltage may be different from the scales of current and voltage control.

8. WELDING OPERATION

8.1 Crater-filler setting

- Three types of welding operation, crater-filler off, crater-filler on, and crater-filler repeat, can be performed by switching the CRATER-FILLER switch on the front panel.

ON/OFF	Main purposes	Timing chart
OFF	<ul style="list-style-type: none"> • Tack welding • Repetition of short welding • Welding a thin plate 	<p style="text-align: center;">ON</p> <p>• Do not turn off the torch switch while main welding.</p>
ON	<ul style="list-style-type: none"> • Filling in a depression (crater) left at the termination of the weld • Welding an average plate 	<p style="text-align: center;">ON OFF ON OFF</p> <p>• Welding power source is self-held when torch switch is turned off during welding. Do not turn off the torch switch during the crater-filler period. • Set crater-filler conditions by switching the CRATER-FILLER switch on the front panel.</p>

8. WELDING OPERATION (Continued)

8.2 Controlling penetration

For conventional CO₂/MAG welding, when the arc length changes, then the welding current changes and the base metal penetration depth or bead width also changes. Setting PENETRATION CONTROL switch on the front panel to “ON” causes the wire feeding speed to be automatically controlled to provide a constant current at all times even when the arc length changes. As a result, an effect of reducing a change in the base metal penetration depth or bead width is obtained. Particularly, when the penetration depth needs to be constant, set PENETRATION CONTROL switch to “ON.”


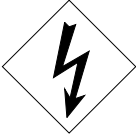
- Range where this function is able to use is shown below.

Type of wire	Wire size	Current range
SOLID	0.9mm	150 – 200A
	1.0mm	
	1.2mm	170 – 400A
	1.4mm	170 – 400A
	1.6mm	170 – 400A
FLUX CORED	1.2mm	170 – 300A
	1.4mm	170 – 400A
	1.6mm	170 – 400A




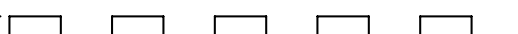


- Upper side of the welding current listed above is maximum limit when using the penetration control.

8. WELDING OPERATION (Continued)

8.3 When errors occur

 WARNING	
	Observe the following to prevent electrical shock.
<p>When touching live electrical parts, critical electric shock and burn may occur.</p> <p>● Do not touch live electrical parts inside or outside of the welding power source.</p> <p>● Grounding to the case of the welding power source should be performed by persons qualified electric work and according to the laws and regulations in your area. Be sure to turn off the line disconnect switch before connecting.</p>	

● When an error occurs, warning lamps (yellow light) on the front panel and LED1 (red light) or LED2 (green light) on P.C.B.1 light or flicker, then the welding power source automatically stops. In this case, check the errors in the table below and “10.2 Troubleshooting” in this manual.

- (ON)  _____
- (OFF)  _____
- ⊙ (Flicker 1)  
- △ (Flicker 2)   1Sec. cycle

Error No.	Error	WARNING lamp on the front panel (yellow light)	P.C.B. 1	
			LED 1 (red light)	LED 2 (green light)
①	Power supply frequency error	○	○	○
②	Temperature error	○	○	●
③	Input over-voltage error	○	●	○
④	Shortage of input voltage error	○	●	●
⑤	AUTO PROGRAM switch error	⊙	○	○
⑥	Error before starting welding machine	⊙	●	●
⑦	Gas check error	⊙	●	○
⑧	Output over-current error	⊙○	●	●○
⑨	Microcomputer error	△	○	●
⑩	Output voltage error	△	●	○
⑪	Current detection error	△	●	●

① Power supply frequency error

When the CONTROL POWER switch of the front panel turns on and in the case of the frequency of input voltage is not stabilizing, The WARNING lamp lights and the welding power source stops automatically. When turn off CONTROL POWER

② Temperature error

When the duty cycle exceeds the rated duty cycle or 40C°, the WARNING lamp lights and the welding power source stops automatically. In this case, wait for while. When starting the welding operation again, lower the duty cycle or the welding current.

8. WELDING OPERATION (Continued)

8.3 When errors occur (Continued)

- ③ Input over-voltage error
When input voltage goes beyond 518V, the WARNING lamp lights and the welding power source stops automatically. Disconnect the CONTROL POWER switch and measure the input voltage with such a measuring instrument as a tester to check to make sure if excessively high voltage is not output. To eliminate this error, again turn on the CONTROL POWER switch after solving a cause of the error above.
- ④ Shortage of input voltage error
When input voltage falls off below 327V, the WARNING lamp lights and the welding power source stops automatically. This error is canceled automatically when the input voltage returns to 371V over.
- ⑤ AUTO PROGRAM switch error
When the AUTO PROGRAM switch was fitted to the program number that is not able to use it the WARNING lamp flickers (Flicker 1) and the welding power source does not act. Fit to number that can use the AUTO PROGRAM switch, to cancel the error.
- ⑥ Error before starting welding machine
When the CONTROL POWER switch was turned on while the TORCH switch is on, the WARNING lamp flickers (Flicker 1) and the welding power source does not act. Turn off the TORCH switch to cancel the error.
- ⑦ Gas check error
When the SHIELDING GAS switch is set to the CHECK for more than 2 minutes, the WARNING lamp flickers (Flicker 1) and the welding power source stops automatically. To cancel Gas check error, set the SHIELDING GAS switch to WELD.
- ⑧ Output over-current error
When over-current and short circuit continues for more than 2 seconds during welding, the WARNING lamp flickers and the welding power source stops automatically. In this case, turn off the CONTROL POWER switch. Confirm the next error point. The chip is contacting with base metal. Output cable is short-circuiting. Turn on the POWER switch once again, after the cause of error is removed.
- ⑨ Microcomputer error
When there is error in the microcomputer, the WARNING lamp flickers (Flicker 2) and the welding power source stops automatically.
- ⑩ Output voltage error
When output voltage is out in the condition that the torch switch is turned off, The WARNING lamp flickers (Flicker 2) and the welding power source stops automatically. In this case, Turn off the CONTROL POWER switch. Confirm whether the electromagnetic contactor and the thyristor are breakdown or not by using tester etc.. The error is canceled when it puts in the CONTROL POWER switch, after an error cause is removed.
- ⑪ Current detection error
When the wiring between a hall element current detector (CT) and a printed circuit board (P.C.B.1) breaks off or this wiring comes off, the WARNING lamp flickers (Flicker 2) and the welding power source stops automatically. In this case, Cut the control power switch. Confirm whether there is not obstacle in wiring. The error is canceled when it puts in the CONTROL POWER switch, after an error cause is removed.

9. WELDING CONDITIONS

9.1 CO₂ welding condition tables

9.1.1 Example welding conditions of horizontal fillet

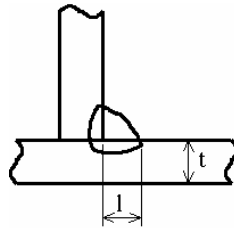


Plate thickness t (mm)	Leg length l (mm)	Wire size (mm ϕ)	Welding current (A)	Arc voltage (V)	Welding speed (cm/min)	CO ₂ gas flow rate (ℓ /min)
1.2	2.5–3.0	0.9–1.0	70–100	18–19	50–60	10–15
1.6	2.5–3.0	0.9–1.2	90–120	18–20	50–60	10–15
2.0	3.0–3.5	0.9–1.2	100–130	19–20	50–60	15–20
2.3	3.0–3.5	1.0–1.2	120–140	19–21	50–60	15–20
3.2	3.0–4.0	1.0–1.2	130–170	19–21	45–55	15–20
4.5	4.0–4.5	1.2	190–230	22–24	45–55	15–20
6.0	5.0–6.0	1.2	250–280	26–29	40–50	15–20
9.0	6.0–7.0	1.2	280–300	29–32	35–40	15–20
12.0	7.0–8.0	1.2	300–340	32–34	30–35	20–25

9.1.2 Example welding conditions of down fillet

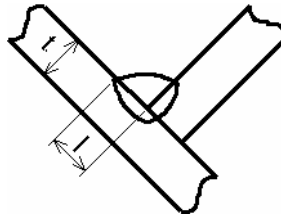


Plate thickness t (mm)	Leg length l (mm)	Wire size (mm ϕ)	Welding current (A)	Arc voltage (V)	Welding speed (cm/min)	CO ₂ gas flow rate (ℓ /min)
1.2	2.5–3.0	0.9, 1.0	70–100	18–19	50–60	10–15
1.6	2.5–3.0	0.9–1.2	90–120	18–20	50–60	10–15
2.0	3.0–3.5	1.0, 1.2	100–130	19–20	50–60	15–20
2.3	3.0–3.5	1.0, 1.2	120–140	19–21	50–60	15–20
3.2	3.0–4.0	1.0, 1.2	130–170	20–22	45–55	15–20
4.5	4.0–4.5	1.2	200–250	23–26	45–55	15–20
6.0	5.0–6.0	1.2	280–300	29–32	40–50	15–20
9.0	6.0–8.0	1.2	300–350	32–34	40–45	15–20
12.0	10.0–12.0	1.2	320–350	33–36	25–35	20–25

9. WELDING CONDITIONS (Continued)

9.1 CO₂ welding condition tables (Continued)

9.1.3 Example welding conditions of I shape butt (without backing ring)

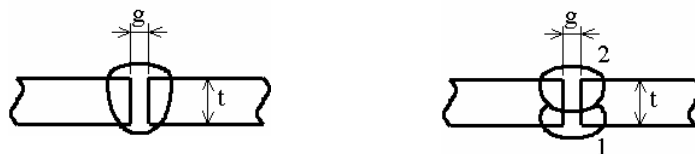


Plate thickness t (mm)	Root gap g (mm)	Wire size (mmφ)	Welding current (A)	Arc voltage (V)	Welding speed (cm/min)	CO ₂ gas flow rate (ℓ/min)	Number of layers	
1.2	0	0.9, 1.0	70–80	17–18	45–55	10	1	
1.6	0	0.9, 1.0	80–100	18–19	45–55	10–15	1	
2.0	0–0.5	0.9, 1.0	100–110	19–20	50–55	10–15	1	
2.3	0.5–1.0	1.0, 1.2	110–130	19–20	50–55	10–15	1	
3.2	1.0–1.2	1.0, 1.2	130–150	19–21	40–50	10–15	1	
4.5	1.2–1.5	1.2	150–170	21–23	40–50	10–15	1	
6.0	1.2–1.5	1.2	220–260	24–26	40–50	15–20	Front 1 Back 1	2
9.0	1.2–1.5	1.2	320–340	32–34	45–55	15–20	Front 1 Back 1	2

9.1.4 Example welding conditions of single and double grooves

Plate thickness t (mm)	Bevel shape	Root gap g (mm)	Root face h (mm)	Wire size (mmφ)	Welding current (A)	Arc voltage (V)	Welding speed (cm/min)	CO ₂ gas flow rate (ℓ/min)	Number of layers		
12		0–0.5	4–6	1.2	300–350	32–35	30–40	20–25	Front	2	
					300–350	32–35	45–50	20–25	Back		
				1.6	380–420	36–39	35–40	20–25	Front		
					380–420	36–39	45–50	20–25	Back		
16		0–0.5	4–6	1.2	300–350	32–35	25–30	20–25	Front	2	
					300–350	32–35	30–35	20–25	Back		
				1.6	380–420	36–39	30–35	20–25	Front		
					380–420	36–39	35–40	20–25	Back		
16		0	4–6	1.2	300–350	32–35	30–35	20–25	Front	2	
					300–350	32–35	30–35	20–25	Back		
				1.6	380–420	36–39	35–40	20–25	Front		
					380–420	36–39	35–40	20–25	Back		
19		0	5–7	1.6	400–450	36–42	25–30	20–25	Front	2	
					400–450	36–42	25–30	20–25	Back		
				1.6	400–420	36–39	45–50	20–25	Front 1		3
					400–420	36–39	35–40	20–25	Back 2		
25		0	5–7	1.6	400–420	36–39	40–45	20–25	Front 1	3	
					420–450	39–42	30–35	20–25	Back 1		

9. WELDING CONDITIONS (Continued)

9.1 CO₂ welding condition tables(Continued)

9.1.5 Lap fillet welding

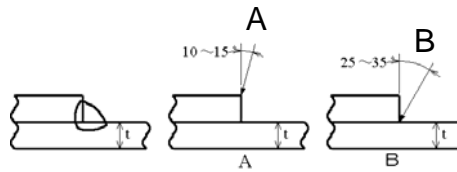


Plate Thickness t (mm)	Wire size (mmφ)	Welding current (A)	Welding voltage (V)	Welding speed (cm/min)	Mark position	CO ₂ gas flow rate (ℓ/min)
1.2	0.8-1.0	80-100	18-19	45-55	A	10-15
1.6	0.8-1.2	100-120	18-20	45-55	A	10-15
2.0	1.0-1.2	100-130	18-20	45-55	A or B	15-20
2.3	1.0-1.2	120-140	19-21	45-50	B	15-20
3.2	1.0-1.2	130-160	19-22	45-50	B	15-20
4.5	1.2	150-200	21-24	40-45	B	15-20

9.2 Example welding conditions of MAG short arc

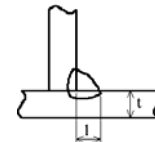
Material : Soft steel

Gas : Ar + CO₂ (10-15 ℓ/min)

Joint Geometry	Plate thickness (mm)	Wire size (mmφ)	Gap (mm)	Welding current (A)	Arc voltage (V)	Welding speed (cm/min)
Butt	1.0	0.8-1.0	0	50-55	13-15	40-55
	1.2	0.8-1.0	0	60-70	14-16	30-50
	1.6	0.8-1.0	0	100-110	16-17	40-60
	2.3	1.0-1.2	0-1.0	110-120	16-17	30-40
	3.2	1.0-1.2	1.0-1.5	120-140	16-17	25-30
	4.0	1.0-1.2	1.5-2.0	150-170	17-18	20-30


9.3 Example welding conditions of CO₂ (Flux cored wire)

Horizontal fillet welding



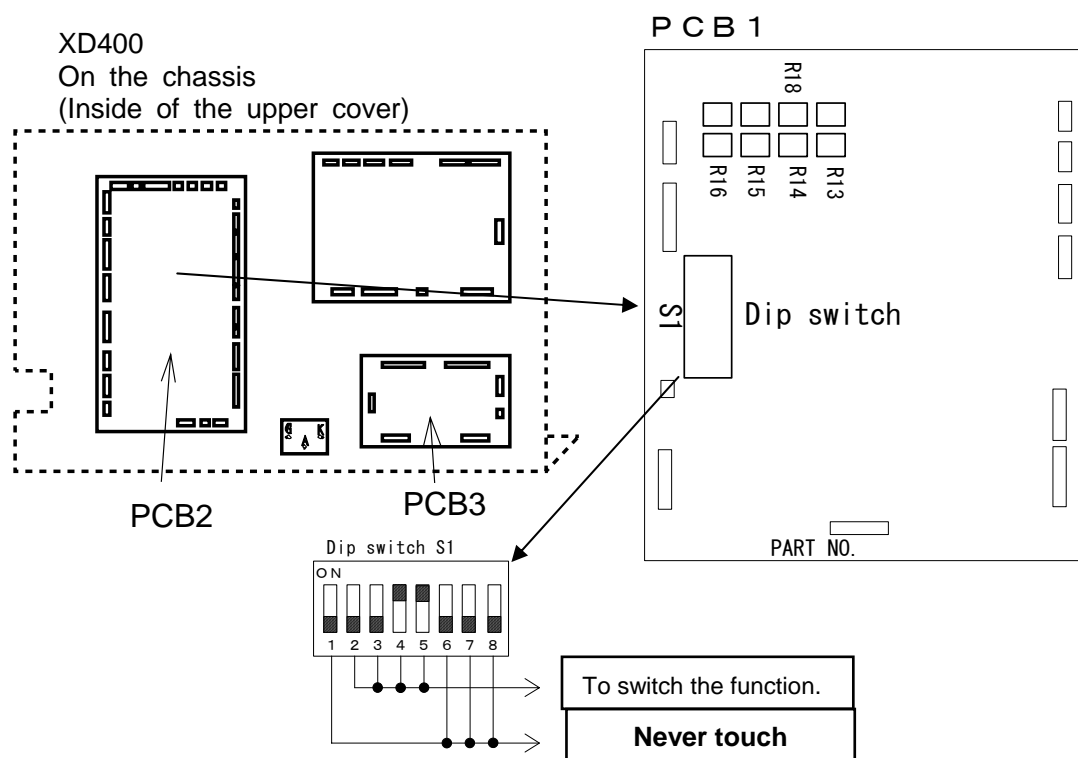
Length of leg l (mm)	Wire diameter(mm)	Current(A)	Voltage(V)	Speed(cm/min)
4	1.2	250	27	50
	1.4	330	29	100
	1.6	350	31	105
5	1.2	270	29	50
	1.4	330	30	90
	1.6	370	33	90
6	1.2	270	29	45
	1.4	330	31	80
	1.6	380	34	80
7	1.2	280	30	40
	1.4	350	32	50
	1.6	380	34	65
8	1.2	300	31	30
	1.4	350	33	45
	1.6	380	34	52
9	1.2	320	32	30
	1.4	350	34	40
	1.6	380	34	40

10. APPLIED FUNCTION (Continued)

⚠ WARNING	
	Observe the following to prevent the electrical shock.
<p>When touching live electrical parts, critical electric shock and burn may occur.</p> <ul style="list-style-type: none"> ● Do not touch live electrical part inside and outside of the welding power source. ● Grounding to the case of the welding power source should be performed by persons qualified in electric work according to laws and regulations. ● Be sure to turn off the line disconnect switch before connecting. 	

10.1 Function of the switches and their adjustments

⚠ CAUTION	
<ul style="list-style-type: none"> ● When change-over the short socket or dip switch on P.C.B., turn off the control power switch of the front panel. And be sure to turn off the line disconnect switch. ● Never touch the variable resistor on P.C.B. with white painting. 	
<p>● Variable resistors and dip switches are located on C0053P or K5374P(Common use), which are called “PCB1”, inside the welding power source. By changing the settings of resistors and dip switches, different functions can be chosen.</p>	



Dip switch S1		factory-set
2	Initial current	OFF
3	Supporting specific wire feeder	OFF
4	Preheating	ON
5	Wire feeder switch CM / CML	ON

- Do not touch any other dip switch.

10. APPLIED FUNCTION (Continued)

10.1 Function of the switches and their adjustments(Continued)

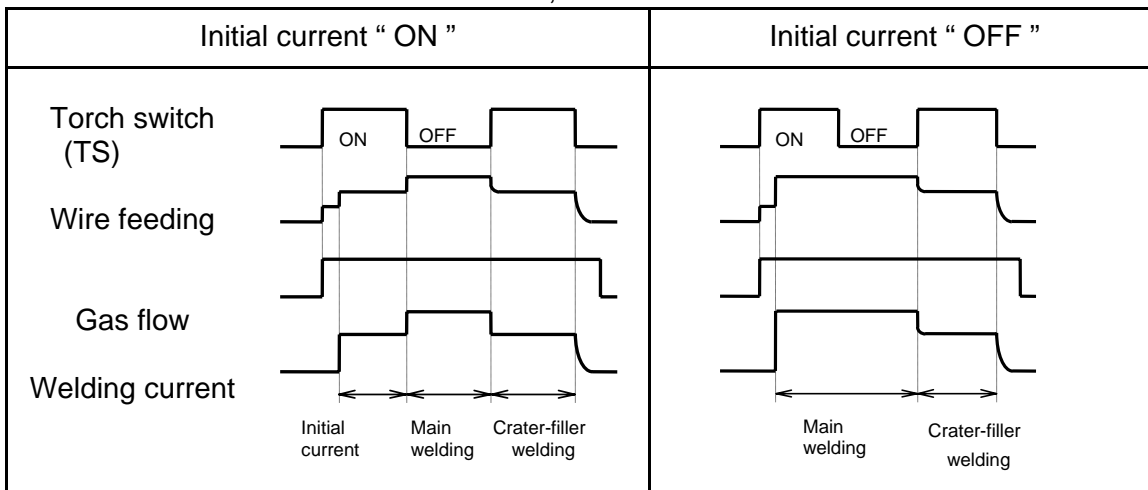
10.1.1 Initial current function

- Welding starts, following the same conditions as crater filler.
- Initial currents of XD400 are factory-set to OFF.
- Set S1 #2 on P.C.B. 1 to ON to use initial current.



Switch S1 #2 to ON to use initial current function, and to OFF when the current is not used.

- Set the CRATER-FILLER switch on the front panel to ON to use initial current function. When the switch is set to OFF, initial current function does not work.



10.1.2 Preheating function

- Preheating function is factory-set to ON. When 100V AC receptacle for heater is not used, set this function to OFF. This results in more effective energy conservation.
(When the preheating function is set to ON, 100V AC is always applied to the receptacle. But when the function is OFF, 100V AC is sporadically applied according to settings of the switches. No control of the switches while the preheating function is off makes a fan stop automatically after 6 minutes.)

CAUTION

- Heat up for more than 5 minutes before welding operation when using a gas flow regulator with a heater. Failure to do so may cause damage of gas flow regulator. Refer to an operation manual supplied with a gas flow regulator.

- Switch S1 #4 to ON to make use of preheating function.



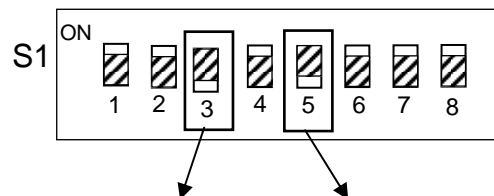
Switch #4 to ON when using 100V AC for heater, and to OFF when is not used.

10. APPLIED FUNCTION (Continued)

10.1 Function of the switches and their adjustments(Continued)

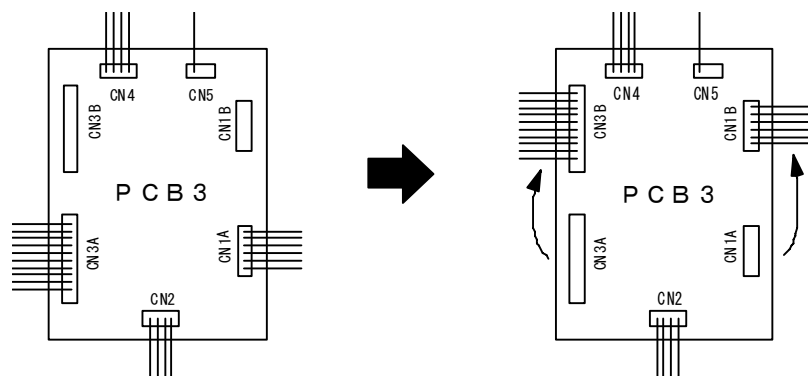
10.1.3 Wire feeder switching function

- Wire feeder switching function is factory-set to the wire feeders shown below.



For CMX-2302 type wire feeder	“OFF” side	“OFF” side
For CMXL-2302 type wire feeder	“OFF” side	“ON” side
For CMX-2301 type wire feeder	“ON” side	“OFF” side
For CMXL-2301 type wire feeder	“ON” side	“ON” side

- Insert CN1A and CN3A which are connector housings mounted on P.C.B.3 into CN1B and CN3B.



For CMX(L)-2302

For CMX(L)-2301

CAUTION

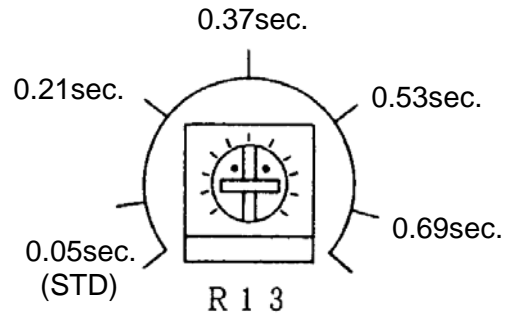
- Completely connect them until the connector clicks. Failure to do so may result in damage of P.C.B and the main body.

10. APPLIED FUNCTION (Continued)

10.1 Function of the switches and their adjustments(Continued)

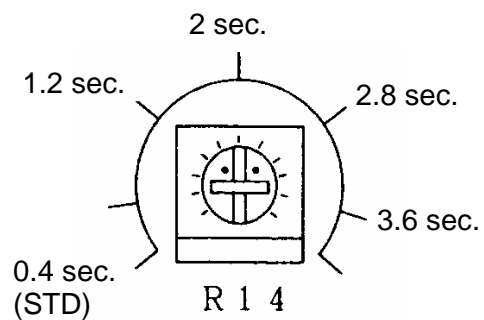
10.1.4 Changing pre-flow period (For CO₂/MAG)

Pre-flow period is factory-set to 0.05 sec. Turn the variable reactor R13 clockwise to adjust the pre-flow period. The relation between setting positions of the variable reactor and pre-flow period is almost the same as the figure shown right.



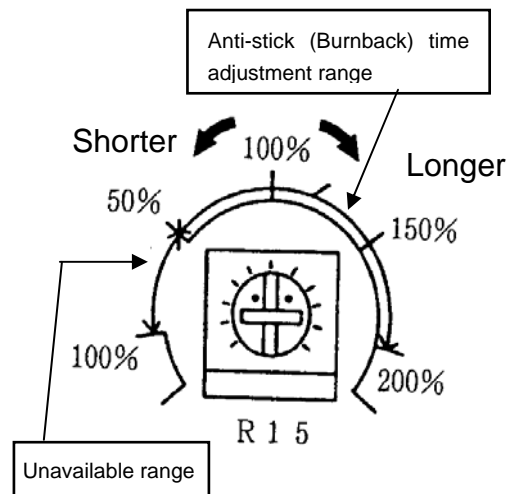
10.1.5 Changing post-flow period

Default setting of pre-flow period is 0.4 sec. Turning the variable reactor R14 in the clockwise direction to adjust the post-flow period. The relation between setting positions of the variable reactor and post-flow period is almost the same as the figure shown right.



10.1.6 Changing anti-stick time

- Anti-stick time is the processing time that prevents electrode wire from depositing the base metal at the end of welding.
- Anti-stick time is factory-set to the correct conditions to match welding method or wire diameter. The anti-stick time can be adjusted by turning variable resistor R15 on P.C.B. clockwise. The relation between setting positions of variable resistor and anti-stick time is almost the same as the figure shown right.
- Simultaneous moving a torch with release of the torch switch may result in failure of anti-stick treatment and protrusion of wire caused by inertia of motor.

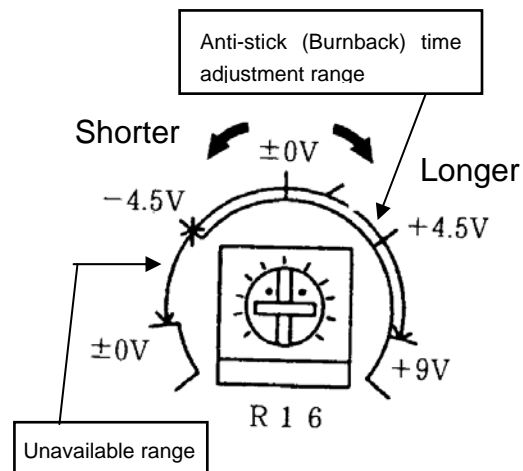


10. APPLIED FUNCTION (Continued)

10.1 Function of the switches and their adjustments(Continued)

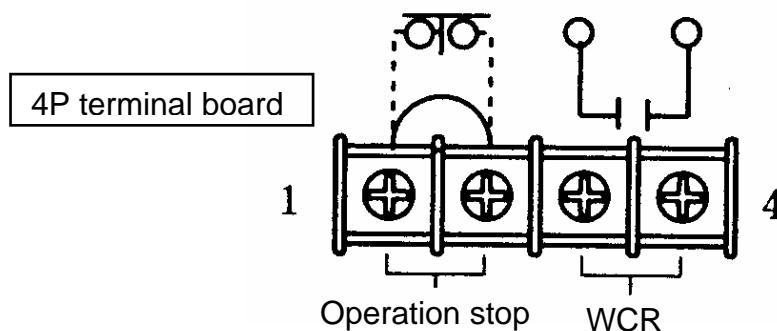
10.1.7 Changing anti-stick voltage

- Anti-stick voltage is output voltage that is produced when preventing electrode wire from depositing the base metal.
- Anti-stick voltage has been adjusted to proper welding method and wire diameter prior to the shipment of the welding machine. The voltage can also be set by turning the variable resistor R16 on P.C.B. The relation between setting positions of variable resistor and anti-stick voltage is almost the same as the figure shown right.



10.2 Connection between internal terminals and an automatic machine

- 4P terminal board mounted on a fan frame, which is used for connection to an automatic machine, is located inside the upper cover of the welding power source. And also, when external connection cables are led in, let the cables through a grommet with film located at the rear side of the welding machine.



These two terminals are used for external operation stop.

- Open these terminals to stop operation, close the terminals to start operation.

These two terminals, which will become contact while welding current is flowing, are used to detect welding current. Contact capacity: 110V AC, 0.3A or less.

- Prepare a switch with the function to suspend operation stop, if necessary.

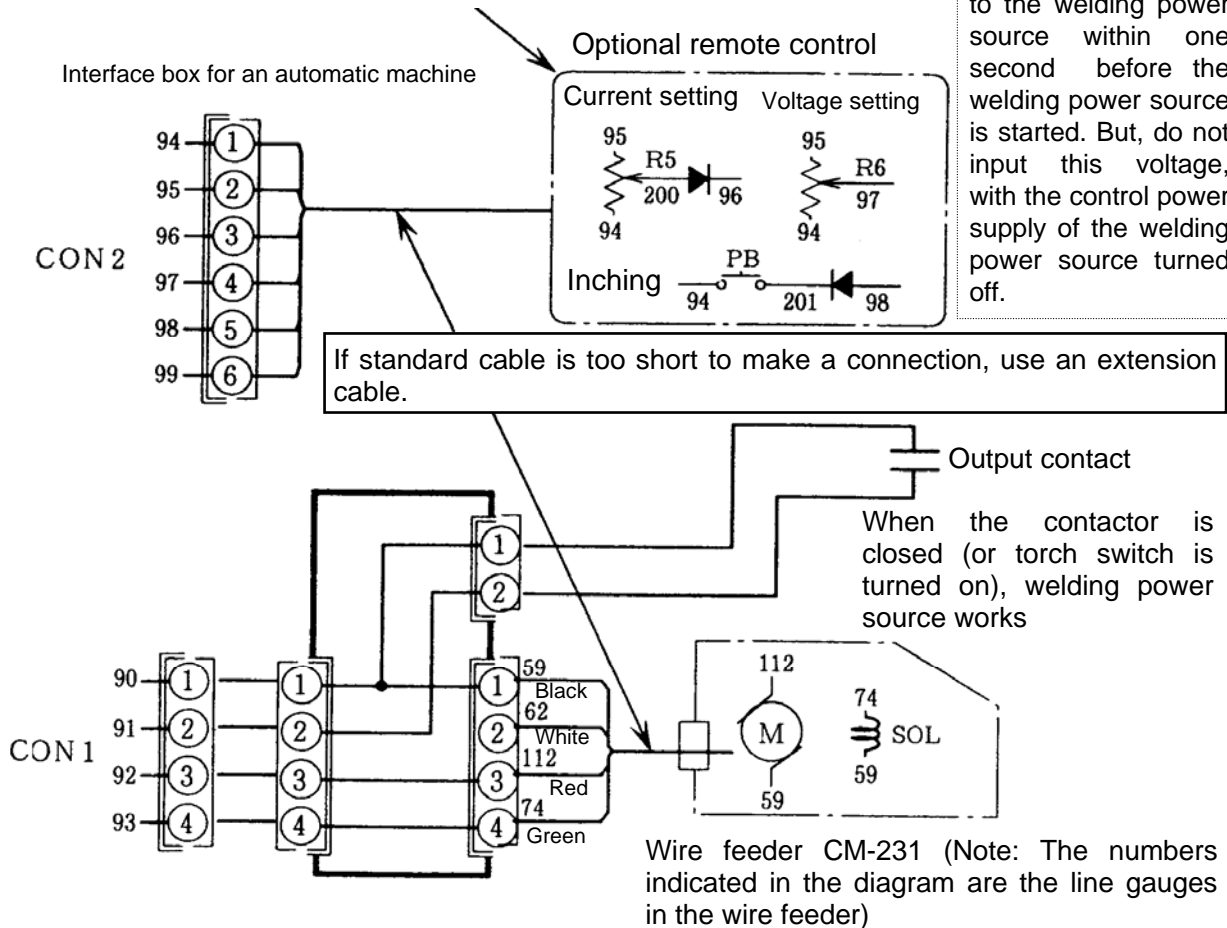
10. APPLIED FUNCTION (Continued)

10.3 Connection with an automatic machine

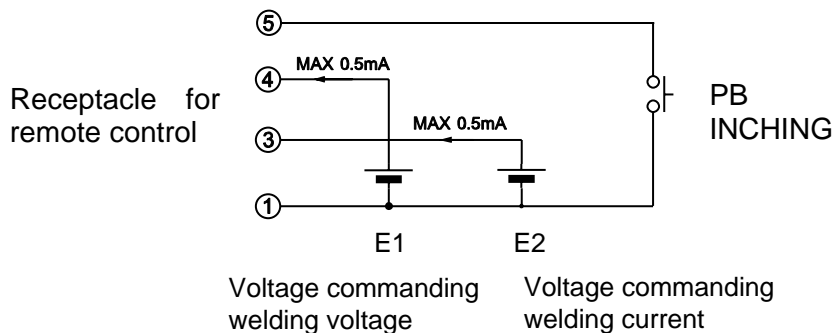
- When combining an automatic machine with this welding power source, use the internal terminals, CON1, and CON2 after making the internal connections (see Section 10.1.3).

Use the optional remote control to connect to an automatic machine. (Make connections, following the schematic diagram shown below, when the optional remote control is not used.)

In the case where welding current and voltage can be set by applying 0 to 15V between 1 and 3, 1 and 4., input voltage to the welding power source within one second before the welding power source is started. But, do not input this voltage, with the control power supply of the welding power source turned off.



- If necessary, input the welding current setting signal and the welding voltage setting signal as follows.



10. APPLIED FUNCTION (Continued)



WARNING

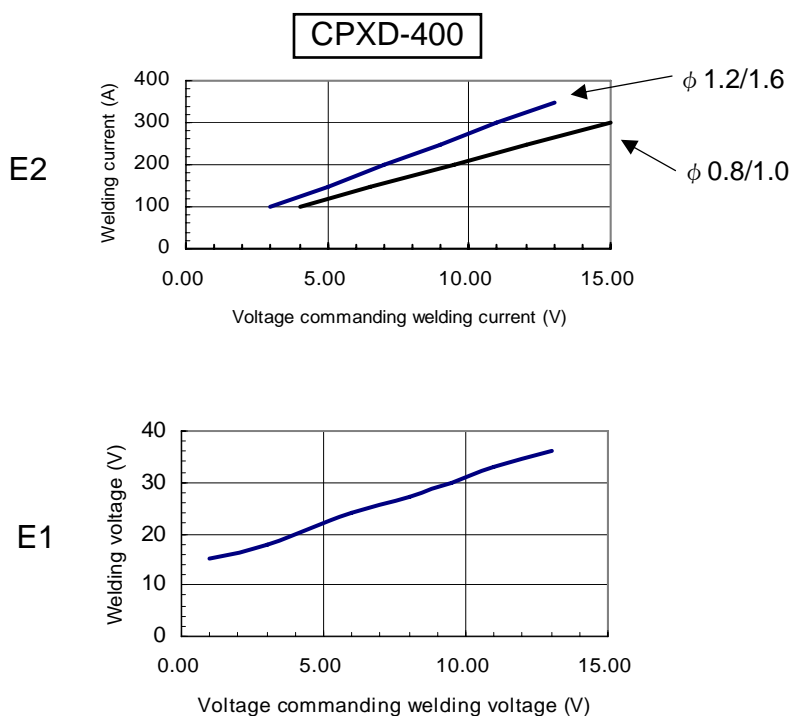
Supply each setting signal within the limits of 0 to +15V.
Using setting signal over +15V may cause control circuit of welding power source to be damaged.



CAUTION

Set and input E1 and E2 100msec. before setting signal inputting securely. If inputting after or at the same time, arc start may be bad.

The below charts show the relation between welding voltage and voltage commanding welding current (or voltage) for "SEPARATE" adjustment. Welding current and welding voltage may vary depending on wire extension or input cable. Therefore, utilize the charts shown below as rough standard.



- The graphs above are valid in "SEPARATE" mode of CURR.VOLT.CONTROL.
- As for the above graph, make the rough standard.

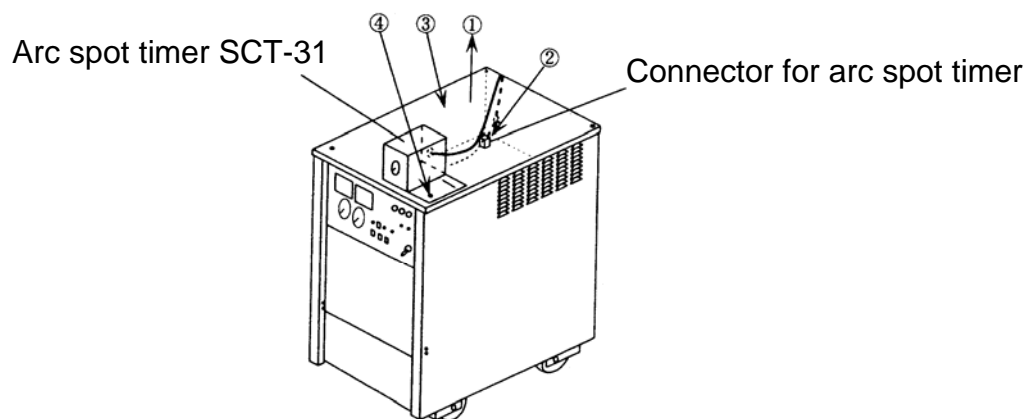
10. APPLIED FUNCTION (Continued)

10.4 Using optional accessory

(1) Arc spot timer

●SCT-31(E2422)



1. Remove the bolts fastening the upper cover of the welding power source to open the cover. Connectors for arc spot timer is located close to 4P terminal board on fun frame.
2. Lead in cables connected with arc spot timer through grommet with filter on the rear side of the welding machine to insert into the connectors.
3. Close the upper cover of the welding machine.
4. Bolt the arc spot timer together with the upper cover. (See the figure shown below.)





●When using arc spot timer

- Use a remote control to set welding conditions of arc spot
- Keep the TORCH switch on during arc spot welding. (When the TORCH switch is turned off, welding stops.)

11. MAINTENANCE AND REPAIR

 WARNING	
	Observe the following to prevent electrical shock.
<ul style="list-style-type: none">● Do not touch live electrical parts inside or outside of the welding power source.● Turn off the control power switch and line disconnect switch before maintenance, and wait for three minutes to discharge capacitors inside of the welding power source.● Perform the maintenance checks periodically and if any damaged parts are found, only use the welding power source after troubleshooting or repairing.● This welding power source should be operated by only person that read and understood the contents of this owner's manual and have knowledge and skills for safely handling the welding power source.● Only certified operators should maintain, inspect, or repair the welding power source. Install a fence around the welding power source to keep others away from it.	

 CAUTION	
	Rotating parts may cause injuries. Be sure to observe the following.
<ul style="list-style-type: none">● Only certified operators should maintain, inspect, or repair the welding power source.● Install a fence around the welding power source to keep others away from it.● Do not put your hands, fingers, hair and clothes near the fans and wire feed roll rotating.	

11.1 Maintenance

Periodical checking

Periodically check the welding power source to ensure the safety of the machine and the efficiency of work.

- Daily check if
 - ① The welding power source for abnormal vibration, buzzing noise or smells.
 - ② Abnormal heating of cable connections.
 - ③ The fan in the welding power source begins rotating smoothly when the control power switch is on.
 - ④ The function of the switches
 - ⑤ The cables are connected and insulated completely.
 - ⑥ The breaks in cables.
- Check once every 6 months if
 - ① the machine is cleaned, removing the case cover and spraying humid-free air on each part of the machine once every 6 months.
 - ② the case of welding machine is completely grounded.
 - ③ connection and insulation of cables from the line disconnect switch, input side and output side of welding power source are complete, and no rust on the connection.

11. MAINTENANCE AND REPAIR (Continued)

11.2 Troubleshooting

No.	Trouble		Cause	Solution
1	POWER lamp PL1 doesn't light.	Fan FM rotates when CONTROL POWER switch connected.	Trouble of PL1.	Check PL1.
		Fan will not rotate when CONTROL POWER switch S1 connected.	Line disconnect switch of power box not connected.	Check power box.
			Lack phase or poor connection of input cable (U or V phase)	Check input cable.
			Breaking of fuse F1,F4,F5	Replace by new fuse F1,F4,F5 after checking cause of the trouble.
2	WARNING lamp PL3 (yellow light) lights.	When turning on CONTROL POWER switch S1.	Trouble of thermostat THP1 or THP2.	Replace by new thermostat THP1 or THP2.
			Poor insertion of CN14 or CN15 on P.C.B. 2.	Completely insert CN14 or CN15 on PCB2.
			Trouble of TORCH switch.	Replace TORCH switch TS.
			Short-circuit control cable of wire feeder.	Check control cable. (TS line).
	During welding.	Fan FM won't rotate.	Refer to No.3.	
		Excess of duty cycle.	Use within the rated duty cycle.	
		Overheat inside welding power source.	Cool down after checking the cause.	
3	Fan FM will not rotate when turning on CONTROL POWER switch S1. (Fan automatically stops, when welding machine keeps no operation and CONTROL POWER switch turned on.)	POWER lamp PL1 does not light.	Refer to No.1.	
		POWER lamp PL1 light.	Trouble of CONTROL POWER switch S1.	Replace by new CONTROL POWER switch S1.
	Breaking of fuse F1,F4,F5.		Replace by new fuse F1,F4,F5 after checking cause of the trouble.	
	Trouble of fan FM.		Replace by new fan FM.	
	4	Shield gas will not stop.		Trouble of P.C.B. (gas control circuit.)
Trouble of gas electromagnetic valve SOL.				Replace SOL.
5	Shield gas is not generated when flicking on TORCH switch TS when Fan FM is rotating and WARNING lamp PL2 is off.	Shield gas is not generated, when S3 is set to CHECK.	Trouble of wrong connection of P.C.B. (remote control circuit)	Replace by new P.C.B.3 and wiring on the P.C.B.3 after checking them.
			Discharge valve of gas cylinder is closed. Or shortage of gas pressure.	Open gas valve and check gas pressure.
			Trouble of gas electromagnetic valve SOL.	Replace by new gas electromagnetic valve SOL.
			Breaking of F1 on P.C.B.2.	Replace F1 on P.C.B.2 after checking cause of the trouble.
			Trouble of electromagnetic contactor MS.	Replace electromagnetic contactor MS.
			Trouble of P.C.B. (gas control circuit)	Replace P.C.B.1 or P.C.B.2 after checking it.
	Shield gas is generated, when S3 is set to CHECK.	Trouble of TORCH switch.	Replace TORCH switch TS.	
Breaking of control cable of wire feeder or poor contact of receptacle.		Replace by new the control cable and receptacle after checking them.		

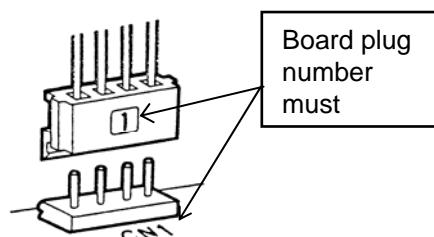
11. MAINTENANCE AND REPAIR (Continued)

11.2 Troubleshooting (Continued)

No.	Trouble		Cause	Solution
6	Wire will not be fed when TORCH switch TS is turned on.	Shield gas is not generated.	Refer to No.5.	
		Wire will not be fed when pressing Inching button.	Breaking of control cable of wire feeder or poor contact of receptacle.	Replace by new control cable and receptacle after checking them. (wire feed motor line)
			Breaking of fuse F2.	Replace by new fuse F2 after checking cause of the trouble.
			Trouble of R2.	Replace by new R2 after checking cause of the trouble.
			Trouble of SCR3.	Replace by new SCR3 after checking cause of the trouble.
			Trouble of wire feed motor.	Check the wire feed motor.
Trouble of P.C.B. (motor circuit)	Replace by new P.C.B.1 and P.C.B.2 after checking them.			
7	Output voltage will not be generated when TORCH switch TS is turned on.	Shield gas is not generated.	Refer to No.5.	
		Voltage is not output, if welding mode is switched.	Trouble of P.C.B. (control circuit).	Check and replace by new P.C.B.1 and P.C.B.2.
			Trouble of thyristor SCR1 and SCR2.	Replace by new thyristor SCR1 and SCR2.
			Poor insertion of CN4, 23, 24 on P.C.B. 2, and CN8 on P.C.B.1.	Complete insertion of the connectors.
8	Welding current is too high and out of control.	Trouble of thyristor SCR1 and SCR2.	Replace by new thyristor SCR1 and SCR2.	
		Trouble of current detector CT.	Replace by new current detector CT.	
		Check wiring numbers 1-3, 8-13, 17, 21-26.	Check the wiring.	
		Trouble of P.C.B. (control circuit and thyristor ignition circuit)	Replace by new P.C.B. 1 or P.C.B.2 after checking it.	
9	Welding current and voltage can not be set.	Breaking of remote control cable or poor contact of receptacle.	Replace cable and receptacle after checking them.	
		Trouble of variable resistor R5 and R6 to set current and voltage of remote control.	Replace by new R5 and R6.	
		Trouble of P.C.B. (control circuit).	Replace by new P.C.B.1 or P.C.B.2 after checking them.	
10	No transition from slow-down speed to wire feeding speed at welding.	Trouble of current detector CT.	Replace by new current detector CT.	
		Trouble of P.C.B. (control circuit).	Replace by new P.C.B.1 or P.C.B.2 after checking them.	
11	Self-holding of crater-filler can not be set.	Trouble of crater-filler switch S5.	Replace by new S5 after checking S5.	
		Trouble of P.C.B. (control circuit).	Replace by new P.C.B.1 or P.C.B.2 after checking them.	

11.3 Caution on replacement of P.C.B.

● Board plug number



Match board plug number printed on P.C.B. with corresponding number indicated on board plug.

Securely connect board plug to the P.C.B. until it clicks. If the connection is loose or disconnected, P.C.B. may be damaged.

11. MAINTENANCE AND REPAIR (Continued)

11.3 Caution on replacement of P.C.B. (Continued)

●Exchange of PCB1

P.C.B.C0053P00 is able to use it for PCB1. And also P.C.B.K5374P is able to use it for common repair part as P.C.B.1 for XD 400. However, the microcontroller is not included in the composition parts of P.C.B.K5374P.

Therefore, prepare the microcontroller for each welding power source.

That is "C0053X00" for "XD400".

In the case P.C.B.K5374P is used in P.C.B. .1 of the repair welding power source, remove the microcontroller that is connected to P.C.B.K5374P and transfer to IC-socket of P.C.B. of a new replacement part.

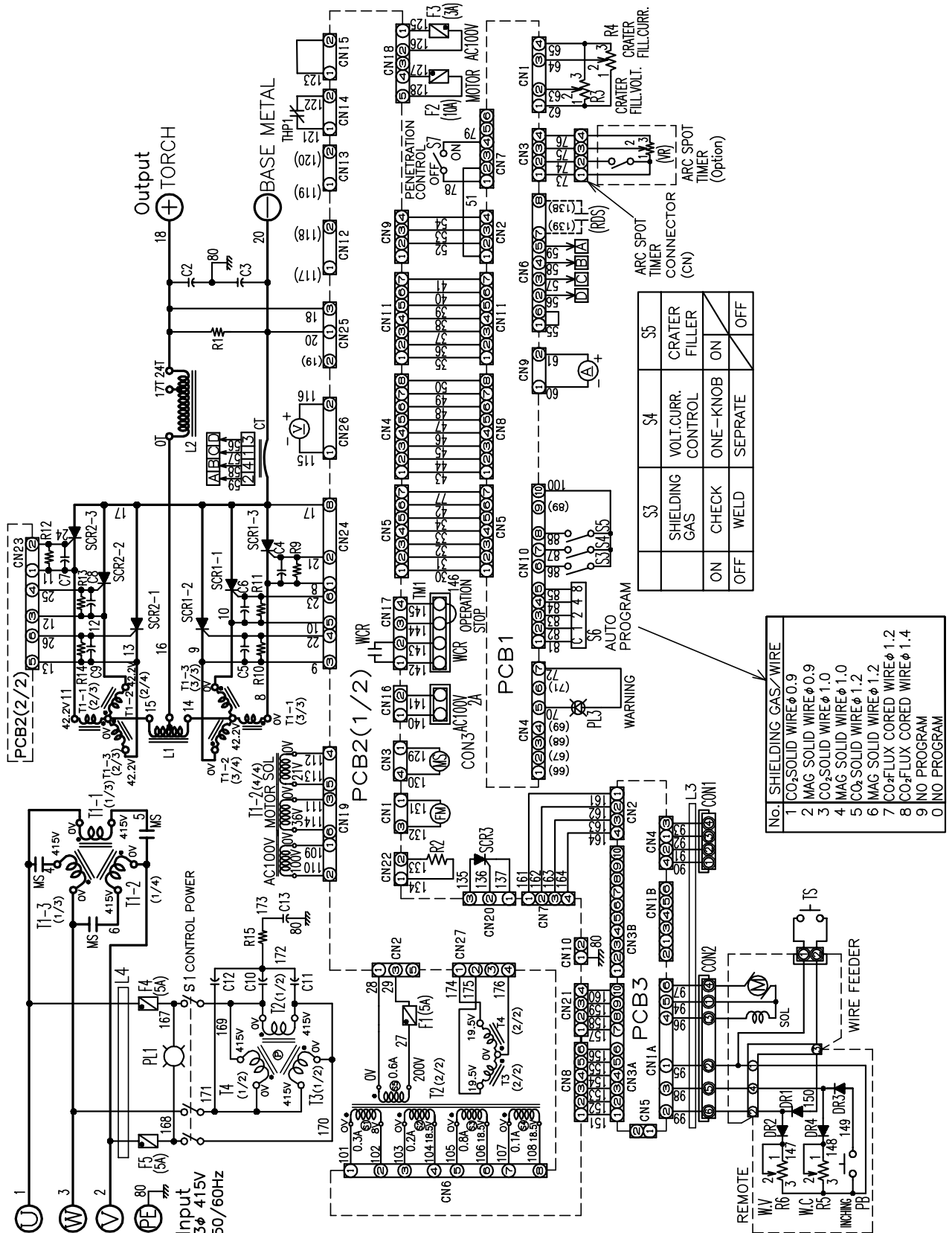
Confirm whether all the pin are connected or not, when you plug the microcontroller into IC-socket of P.C.B.. Also, confirm whether the connecting direction of the microcontroller be correct.

Exchange the short-socket "JP1" and "JP2" of P.C.B.K5374P to "XD" side.

Exchange the short-socket "JP3" of P.C.B.K5374P to "350A".

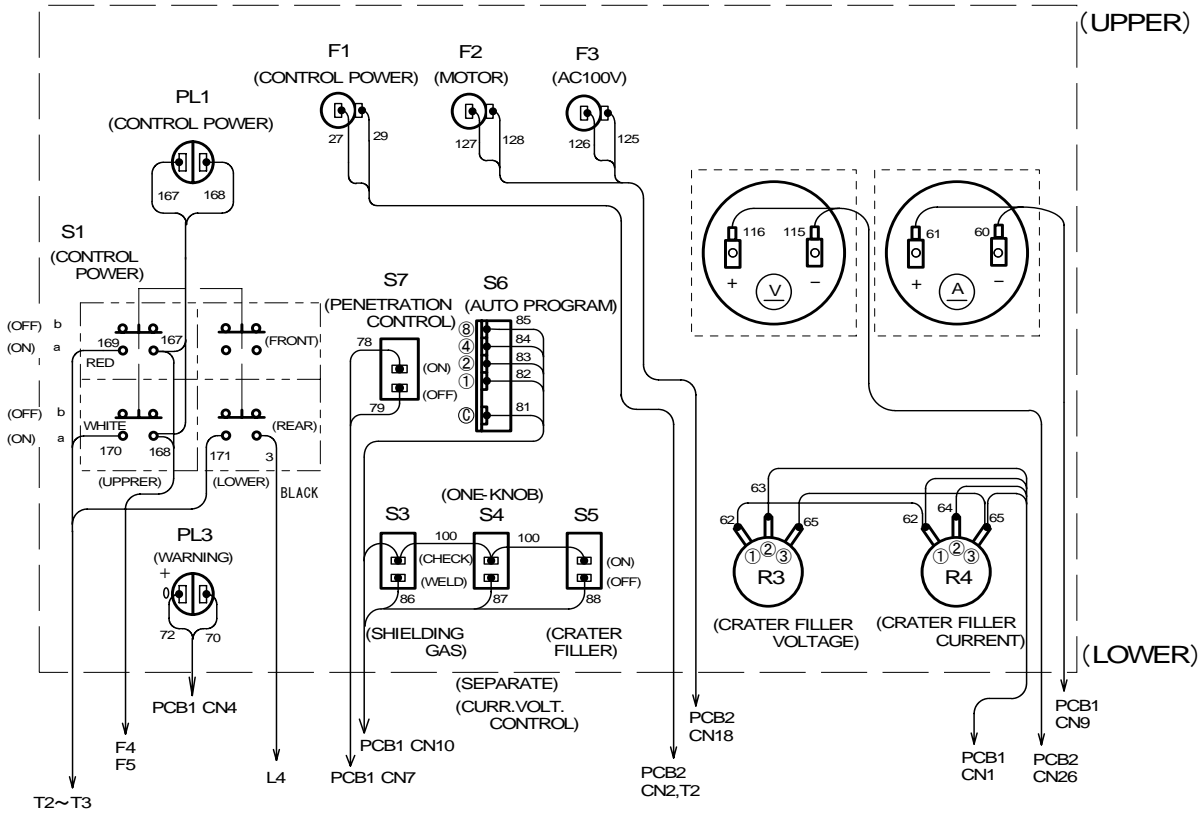
11. MAINTENANCE AND REPAIR (Continued)

11.4 Circuit figure

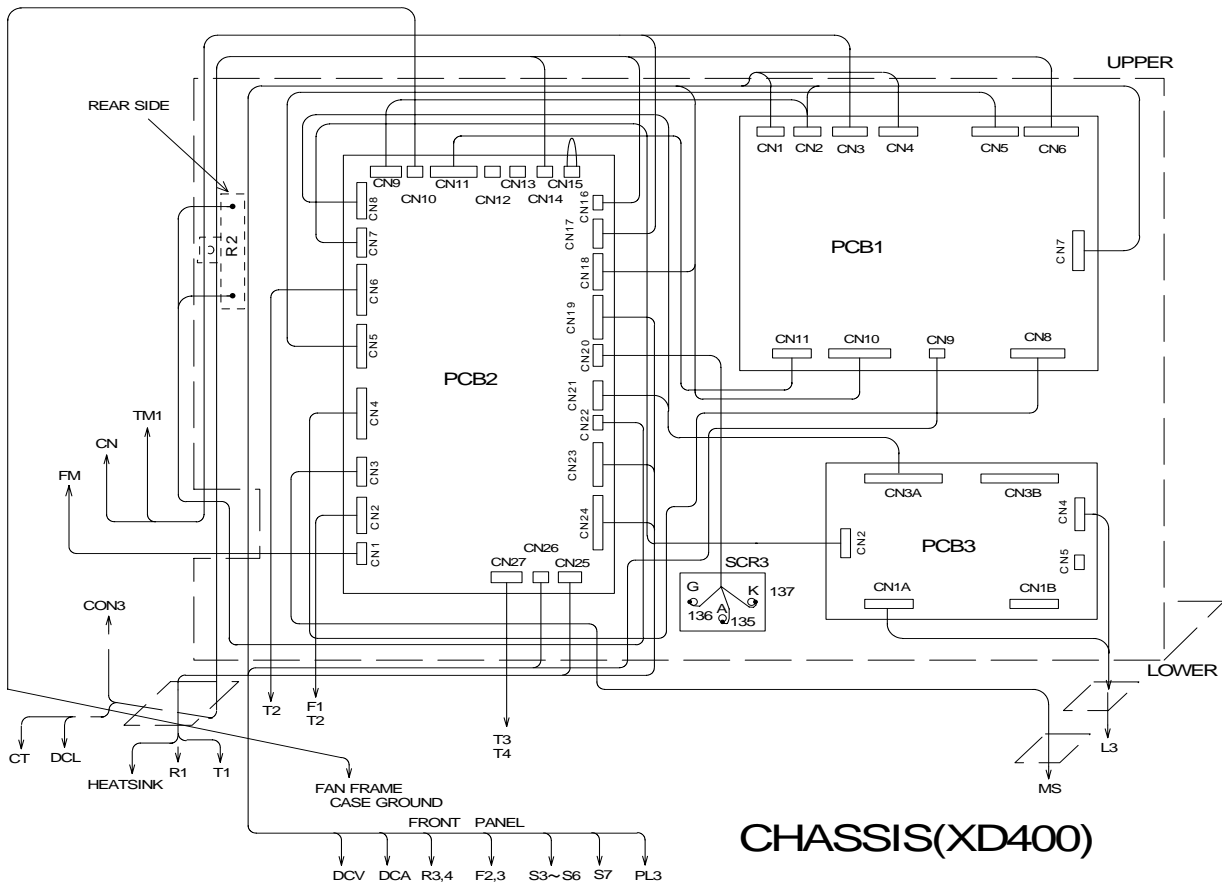


11. MAINTENANCE AND REPAIR (Continued)

11.5 Parts layout



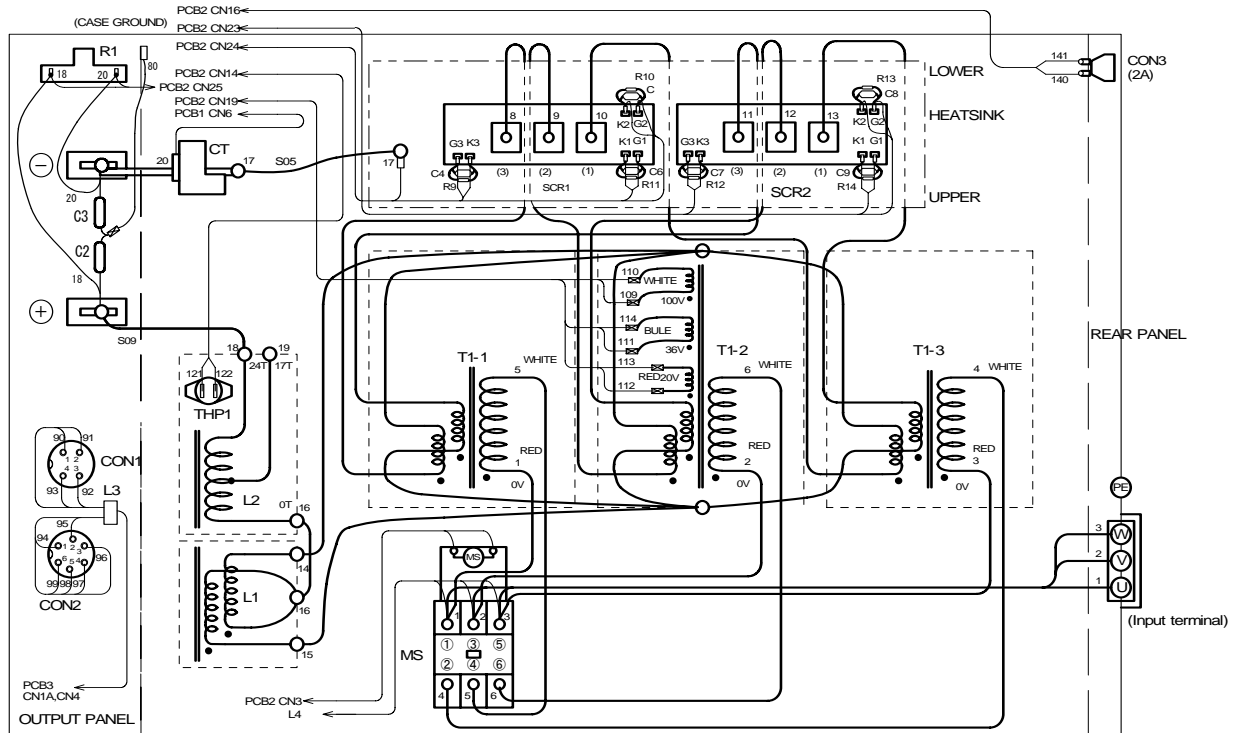
FRONT PANEL (BACK SIDE) (XD400)



CHASSIS(XD400)

11. MAINTENANCE AND REPAIR (Continued)

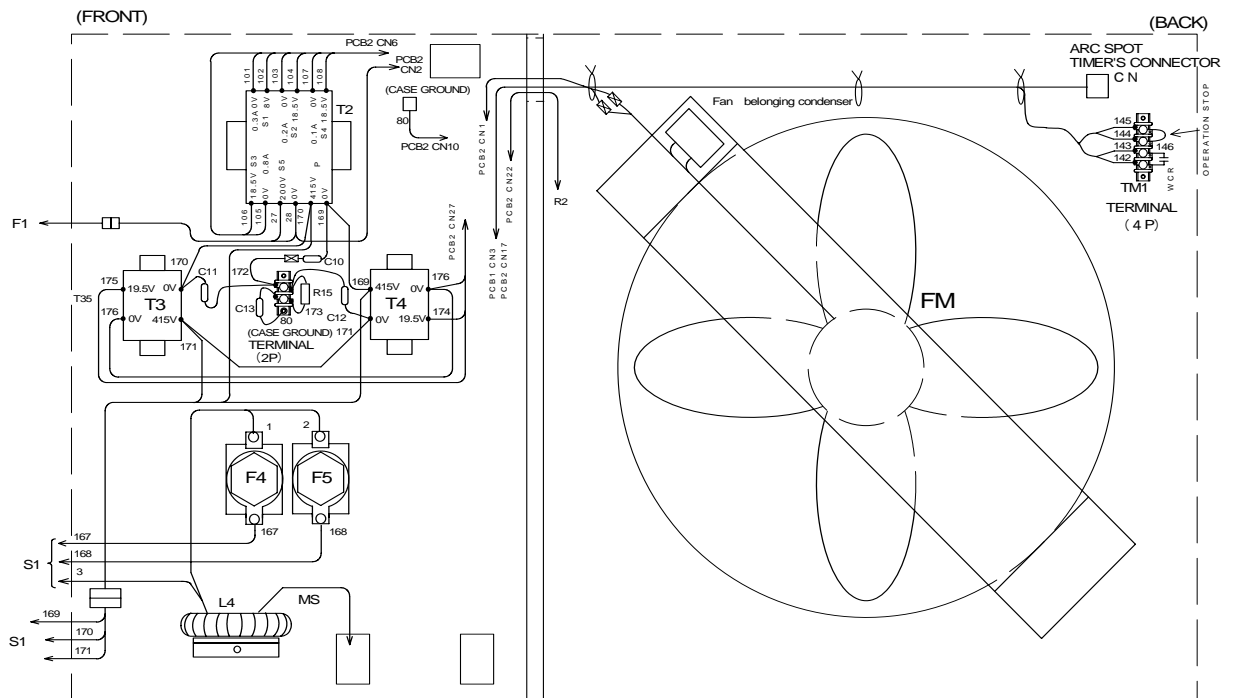
11.5 Parts layout (Continued)



SCR CONNECTION

SCR TERMINAL	WIRE NUMBER	WIRE COLOR	CONNECTOR PIN NUMBER	SCR TERMINAL	WIRE NUMBER	WIRE COLOR	CONNECTOR PIN NUMBER
SCR1-1 G1	23	YELLOW	CN24 ⑥	SCR2-1 G1	26	YELLOW	CN23 ⑥
SCR1-1 K1	10	RED	CN24 ⑤	SCR2-1 K1	13	RED	CN23 ⑤
SCR1-2 G2	22	YELLOW	CN24 ④	SCR2-2 G2	25	YELLOW	CN23 ④
SCR1-2 K2	9	WHITE	CN24 ③	SCR2-2 K2	12	WHITE	CN23 ③
SCR1-3 G3	21	YELLOW	CN24 ②	SCR2-3 G3	24	YELLOW	CN23 ②
SCR1-3 K3	8	BLACK	CN24 ①	SCR2-3 K3	11	BLACK	CN23 ①
SCR1.2 A	17	BULE	CN24 ⑧				

FRAME (XD400)

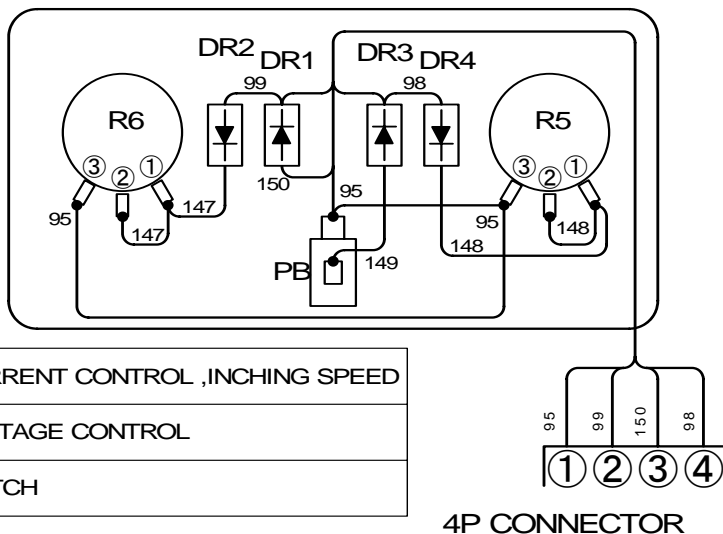


FAN FRAME (XD400)

11. MAINTENANCE AND REPAIR (Continued)

11.5 Parts layout (Continued)

(view from the back side)



R5	WELDING CURRENT CONTROL ,INCHING SPEED
R6	WELDING VOLTAGE CONTROL
PB	INCHING SWITCH

4P CONNECTOR

REMOTE

12. PARTS LIST

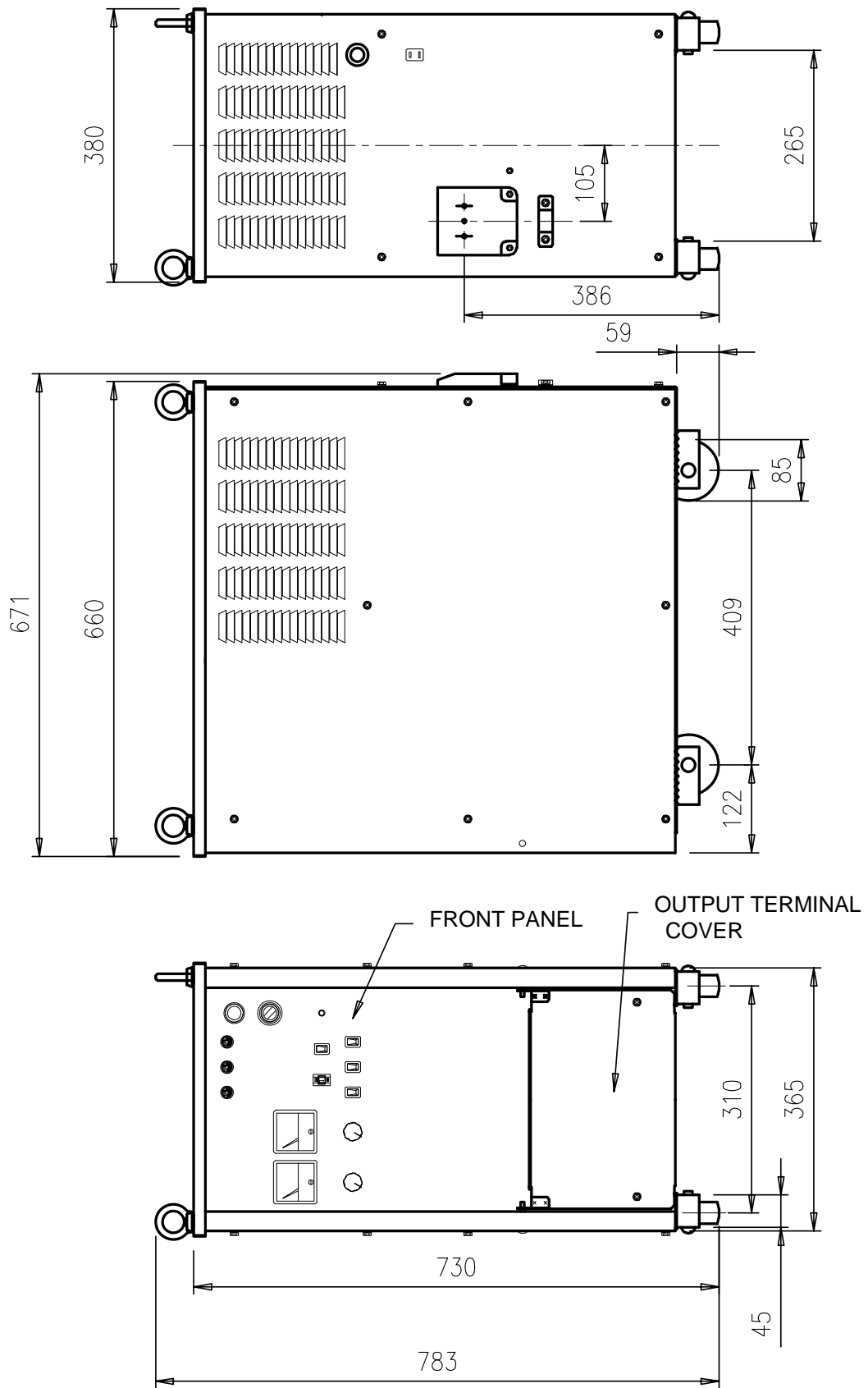
●Contact your local dealer to order parts. (See the back cover for telephone and fax numbers, and mailing address)

Symbol	Parts No.	Description	Specifications	Q'ty	Location	
				XD400		
T1	C0104B00	3-phase transformer	C0104B00	1	On side frame	
L1, L2	C0053C00	Inter-phase and DC reactor	C0053C00	1		
MS	4340-078	Electromagnetic contactor	SC-N2 AC200V	1	Under fan frame	
F1	4610-003	Glass enclosed fuse	250V 5A	1	On front panel	
F2	4610-004		250V 10A	1		
F3	4610-002		250V 3A	1		
	4610-128	Fuse holder	HF-008	3		
S1	100-0073	Switch	KDHCT-10A	1		
S3, 4	4254-118	Switch	DS-850K-F1-00 (Black)	2		
S5	4254-118		DS-850K-F1-00 (Black)	1		
S6	4252-015	Rotary thumb switch	A7BS-206-1	1		
	4739-369	One-touch fixture	A7B-M-1	1		
S7	4254-118	Switch	DS-850K-F1-00 (Black)	1		
PL1	4600-342	Neon lamp	N46010A7KW-01	1		
PL3	4600-345	LED lamp	DB-40BY	1		
V	4401-016	DC voltmeter	209390-HT/Z DC75V	1		
A	4403-127	DC ammeter	209390-HT/Z 400A/1MA	1		
R3, 4	4501-039	Variable resistor	RV24YN20SB 5K Ω	2		
	4735-008	Knob	K2195(Small)	2		
FM	100-0104	Fan motor	SF-200-10-4D	1	On fan frame	
T2	W-W05031	Aux. transformer	W-W05031	1		
T3,4	W-W05012		W-W05012	2		
L4	C0053V00	Choke coil	C0053V00	1		
F4,5	4612-010	Screw fuse	RO24-4A 500V	2		
	4610-122	Fuse base	FB24(16E)500V/25A	2		
R15	4509-125	Resistor	RS2B 470 Ω J	1		
C10-13	4517-452	Capacitor	2kV 0.0022MF	4		
SCR1, 2	4530-149	Thyristor module	W-W00873	2		On Heat sink
R9 - R14	4805-015	Resistor	RD1/4S 1k Ω J	6		On Thyristor module
C4 - C9	4518-402	Capacitor	50V 0.47 μ F	6		
THP1	4258-016	Thermostat	US-602AXTTL 120 $^{\circ}$ C	1	On DC reactor	
CT	4406-017	Hole current detector	L03S400D15	1	On output terminal board	
R1	4509-821	Resistor	40SH 100 Ω KA	1		
R2	4509-805	Resistor	40SH 1 Ω KA	1	On Chassis	

12. PARTS LIST (Continued)

Symbol	Parts No.	Description	Specifications	Q'ty	Location
				XD400	
C2,3	4517-401	Capacitor	0.01µF 2kV	2	On output terminal board
L3	C0053U00	Common mode choke	C0053U00	1	
CON1	4730-006	Receptacle	DPC25-4BP	1	
CON2	4730-010		DPC25-6BP	1	
	K2851B00	Secondary terminal	K2851B00	2	On rear panel
	4732-017	AC plug	AC-T04FB04	1	
	K3904B00	Input terminal board	K3904B00	1	
	K3904C00	Input terminal cover	K3904C00	1	
SCR3	4530-412	Thyristor	SG25AA20	1	On Chassis (references clause 10.3)
P.C.B1	K5374P00	P.C.B. and Micro-controller	K5374P00	1	
	C0053X00	"On P.C.B.K5374P00"	C0053X00	1	
	C0053P00	P.C.B	C0053P00	(1)	
P.C.B.2	C0045Q00	P.C.B	C0045Q00	1	On Chassis
P.C.B.3	P10174X00	P.C.B	P10174X00	1	
R5, 6	4501-039	Resistor	RV24YN20SB 5kΩ	2	On Remote control
	4735-007	Knob(Large)	K2195 (Large)	2	
DR1 ,2	4531-710	Diode	D1N60	2	
PB	4250-077	Press button switch	A2A-4R	1	

13. EXTERNAL VIEW

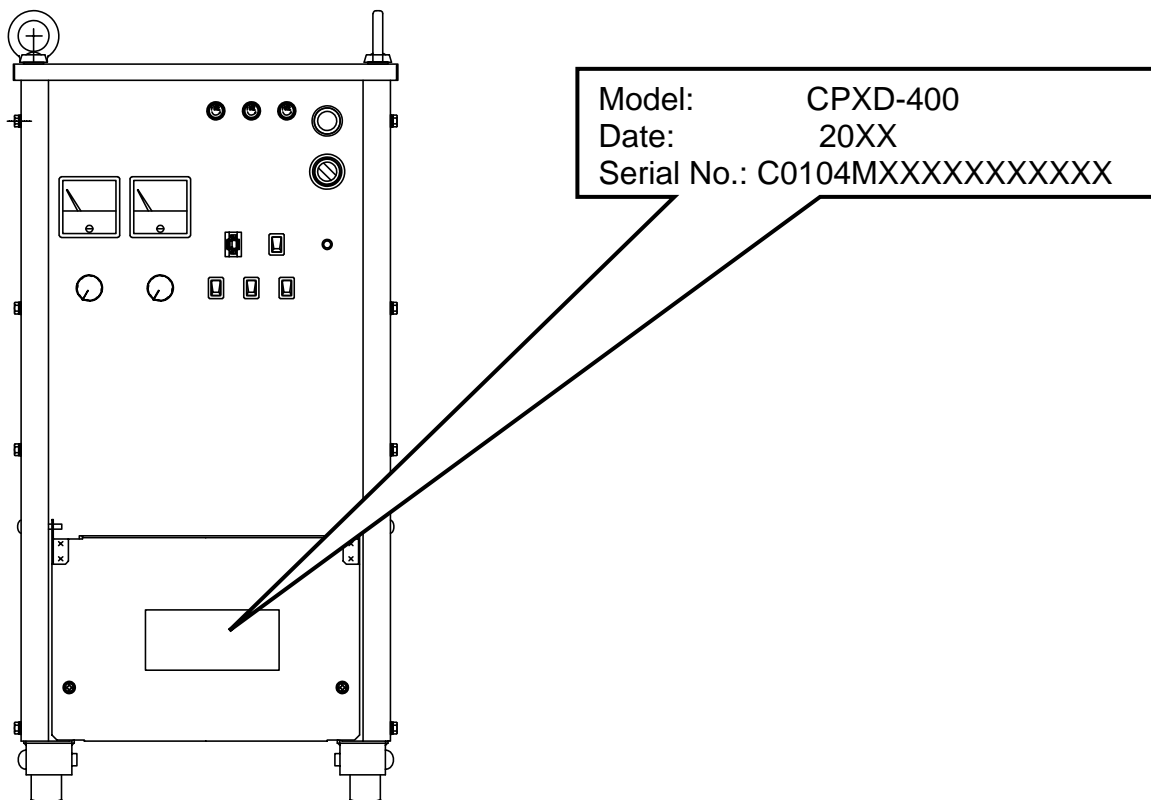


14. SERVICE AND SUPPORT

Please contact your local dealer for service. (See the back cover for telephone numbers, fax numbers, and mailing addresses.)

NOTE:

- 1) See Section 12, "MAINTENANCE AND TROUBLESHOOTING" before contacting your dealer for service.
- 2) When contacting your dealer for service, you are required to provide the following information:
 - Address
 - Name
 - Telephone number
 - Product model
 - Manufacture year
 - Serial number
 - Software version number
 - Details of troubles





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