Service Manual No.C0056-1

SERVICE MANUAL

DAIHEN DC arc welding power source

DYNA AUTO

XD350/500

CPXD- 350 C0056
CPXD- 500 C0052

NOTE: Ther is a case that contents of thes service munual is different from the latest information by revision after product shipment. Use the owner's manual of this procuct together.

DAIHEN Corporation WELDING PRODUCTION DIVISION

Aug.11.2006

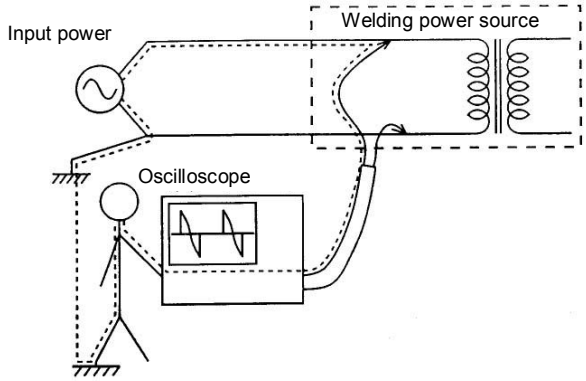
1. Caution in maintenance

1.1 To avoid electric shock and accident

When checking internal power source, turn off the primary side of line disconnect switch and the control power source switch, wait more than 3 minuets and check that the built-in cooling fan stops completely then carry out checking. And be careful not to turn on these switches by mistake during check.

Be in particular careful where the place indicated “High voltage danger”.

According to measuring instrument oscilloscope and so on the like, terminal for measurement and case are connected electrically. When checking internal welding machine by these measuring instrument, be careful not to cause an electric shock accident.



1.2 Handling of printed circuit board

(1) Do not to touch the potentiometer which fixed by white pen on the printed circuit board. It cause to trouble in welding machine.
(2) Insert all printed circuit board certainly to take a lock of circuit board support for attachment.
(3) Insert connector with matching connector number or wiring number certainly to take a lock. Do not to pull the wire when pulling connector. Carry out pulling and inserting connector after turning off the power source switch.
(4) Do not leave the place where static electricity is easy to generate because CMOS-IC that is poor at static is used.
(5) Reduce the number of times as much as possible that pulling and inserting connector and adjustment of the potentiometer.

1. Caution in maintenance (continued)

1.3 Handling of main circuit component

(1) When attaching thyristor module to heat sink, apply micro computer and fix by designated torque.
(2) Use torque of specific value also to clamp terminal.

1.4 In case of insulation resistance test

When measuring insulation resistance and testing withstand voltage, follow the steps below.

(1) Disconnect the primary cable to the switch box and welding cable for isolating welding power source.
(2) Remove earth cable (line No.80 which is between C2 and C3) of output terminal from the case. Then insulate this earth cable due to not touch the case.
(3) Short-circuit the contact interval (line No. 1, 4) of magnet switch.
(4) Turn on the control power source S1.

Be sure to reconnect the cables after carrying out measurement of insulation resistance and withstand voltage test.

1.5 Only to check operation of sequence

When only to check operation of sequence, follow the steps below.

(1) Turn off the control power source.
(2) Take off CN23, 24 on PCB C0045Q.
(3) Turn on the control power source and check the operation.

Be sure to reconnect the cables after checking.

1.6 Investigate the WARNING cause

There are any WARNING in the welding machine, narrow down a cause refer to" Welding error table" and "Troubleshooting". Then settle the WARNING refer to "Checking method for WARNING"

2. Function of each printed circuit board

2.1 Function of printed circuit board and mounting position

Printed circuit board PART No.	Function	Mounting position
C0056P (CPXD-350) C0052P (CPXD-500)	・Microcomputer control Sequence control Constant voltage control Welding control WARNING protection Input voltage change revision 50/60Hz identification ・Zero-cross detective circuit ・Input voltage detective circuit ・Primary voltage detective circuit ・Emergency stop detective circuit	Fan frame (CPXD-350) Chassis (CPXD-500)
C0045Q (Common in all models)	・Power source circuit ・Governor circuit ・Thyristor drive circuit ・Short-circuit detective circuit ・Relay circuit	
P10174X (Common in all models)	・Remote control one-line circuit ・CM-2301 / 2302 reshuffling	

“C0056P and C0052P” is showing to “C0056P” in page following than this.
When using the other type of machine, read the manual with rearranging “C0056P” to “PCB No. suitable for the type of machine”.

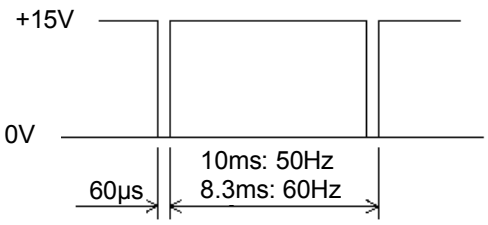
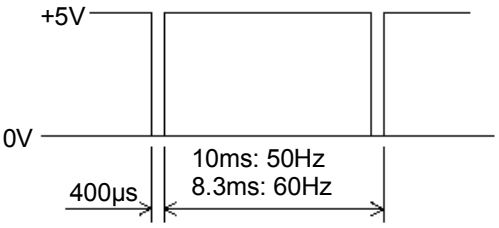
2. Function of each printed circuit board (continued)

2.2 Operation of check terminal on printed circuit board

T : is measured by tester

S : is measured by oscilloscope

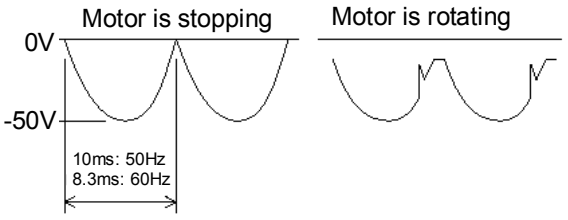
2.2.1 Check terminal on printed circuit board PC0056P

No.	Signal name	Explanation
CH1	0V	Ground
CH2	+ 5V	T: CH1-, CH2+ +5V
CH3	- 15V	T: CH1+, CH3- +15V
CH4	+ 15V	T: CH1-, CH4+ +15V
CH5	Feed quantity setting	T: CH1-, CH5+ Voltage changes between 5 from 1V according to current knob of remote control.
CH6	SCR trigger 3	S: CH1-, CH6+ Pulse waveform such as the figure below. 
CH7	SCR trigger 2	S: CH1-, CH7+ Pulse waveform such as the figure below. (Same as CH6)
CH8	SCR trigger 3	S: CH1-, CH8+ Pulse waveform such as the figure below. (Same as CH6)
CH9	Zero-cross 1	S: CH1-, CH9+ Pulse waveform such as the figure below. 
CH10	Zero-cross 2	S: CH1-, CH10+ Pulse waveform such as the figure below. (Same as CH9)
CH11	Zero-cross 3	S: CH1-, CH11+ Pulse waveform such as the figure below. (Same as CH9)
CH12	Input voltage	T: CH1-, CH12+ When rated input voltage, become 2.6V(CPXD-350) and 4,0V (CPXD-500). It changes in proportion an input voltage.
CH13	Output current	T: CH1-, CH13+ Voltage changes between 10 from 0V according to output current. Voltage is 10V when current is 1000A.
CH14	Current detection	T: CH1-, CH14+ When output current is detected, voltage is 0V and when it is not so, 5V.

2. Function of each printed circuit board (continued)

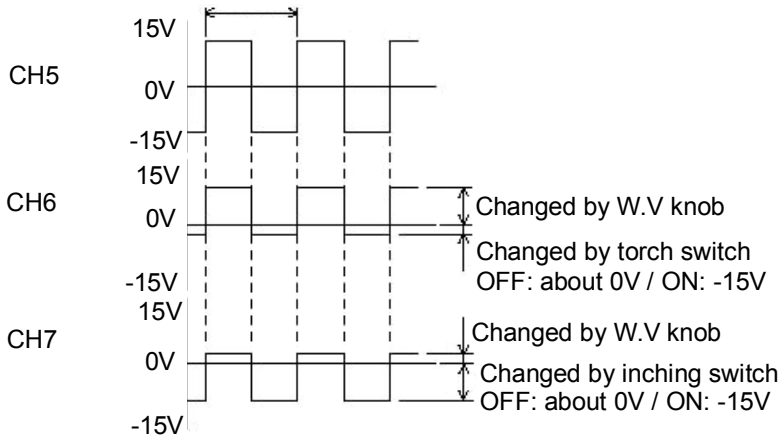
2.2 Operation of check terminal on printed circuit board (continued)

2.2.2 Check terminal on printed circuit board C0045Q

No.	Signal name	Explanation
CH1	0V	Ground
CH2	+5V	T: CH1-, CH2+ +15V
CH3	-15V	T: CH1+, CH3- +15V
CH4	+15V	T: CH1-, CH4+ +15V
CH5	+24V	T: CH1-, CH5+ +24V
CH6	24V(supporting wire)	T: CH1-, CH6+ +24V
CH7	Governor SCR-K	S: CH1-, CH7+ Pulse waveform such as the figure below. 
CH8	TS	T: CH1-, CH8+ +15V (TS is OFF), 0V (TS is ON)
CH9	GAS	T: CH1-, CH9+ +24V (When gas is stopping), 0V (When gas is releasing).
CH10	Short-circuit detection	T: CH1-, CH10+ 15V (When short-circuit), 0V (When outputting voltage)

2.2.3 Check terminal on printed circuit board P10174X

No.	Signal name	Explanation
CH1	0V	Ground
CH2	+15V	T: CH1-, CH2+ +15V
CH3	-15V	T: CH3-, CH1+ +15V
CH4	Missing number	
CH5	Exchanging signal	S: CH1-, CH5+ Pulse waveform such as the figure below.
CH6	TS / WV	S: CH1-, CH6+ Pulse waveform such as the figure below.
CH7	Inching / WC	S: CH1-, CH7+ Pulse waveform such as the figure below.
CH8	Vref	T: CH1-, CH8+ 0~+5V
CH9	Iref	T: CH1-, CH9+ 0~+5V



2. Function of each printed circuit board (continued)

2.3 Adjustment resistance of printed circuit board and meaning of jumper switch.

Adjustment resistance of printed circuit board C0056P

No.	Signal name	Explanation
R13	Pre-flow time	Adjust pre-flow time. Normal position is full of turning left.
R14	Post-flow time	Adjust post-flow time. Normal position is full of turning left.
R15	Anti-stick time	Adjust anti-stick time. Normal position is full of turning left.
R16	Anti-stick voltage	Adjust anti-stick voltage. Normal position is full of turning left.
R17	Output adjustment	For fine adjustment of ignition phase. Normal position is full of turning left.
R18	Crater repetition period (Only for XD500, 600)	Adjust crater repetition period. Normal position is full of turning left.
R70	Slow-down speed	Adjust slow-down speed.

Jumper switch of printed circuit board C0056P

No.	Signal name	Explanation
S1-1	Simple substance inspection	Use for simple substance inspection of printed circuit board. Use it in regular OFF.
S1-2	Initial current	Initial current function is possible to use with turning to ON when crater is ON or REPEAT.
S1-3	Wire feeder exchange function	Set it suitable for wire feeder. Refer to page 19 about setting.
S1-4	Extra heating function	Turn to ON, and MS is ON, regular voltage outputs to AC100V receptacle. Turn to OFF, MS becomes OFF after the welding end in about five minutes
S1-5	Wire feeder exchanging function	Set it suitable for wire feeder. Refer to page 19 about setting.
S1-6	Including inspection	Turn to ON, checking whether switch of remote control or panel is operating normally is possible. In this time , welding is out of use.
S1-7	Out of use	Use it in regular OFF.
S1-8	Select ammeter	Set it suitable for type of machine. CPXD-350 : OFF CPXD-500 : ON

2. Function of each printed circuit board (continued)

2.3 Adjustment resistance of printed circuit board and meaning of jumper switch (continued)

Adjustment resistance of printed circuit board C0045Q

No.	Signal name	Explanation
R11	Max. feed speed adjustment	Mode1, current knob is Max. position and connecting with CM-2302: 170 rpm (Setting is done at the shipment)

Jumper switch of printed circuit board C0045Q

No.	Signal name	Explanation
J1	Short-circuit detective terminal	Normal side is +② terminal. +① terminal is out of use.

Adjustment resistance of printed circuit board P10174X

No.	Signal name	Explanation
R38	Vref fine adjustment	Use it to adjust when the voltage scale of remote control deviates from welding voltage greatly. Change J1 to “ADJ” when adjusting. It becomes lower with turning to an anti-clock and becomes highly with turning to a clock.
R39	Iref fine adjustment	Use it to adjust when the current scale of remote control deviates from welding current greatly. Change J2 to “ADJ” when adjusting. It becomes lower with turning to an anti-clock and becomes highly with turning to a clock.

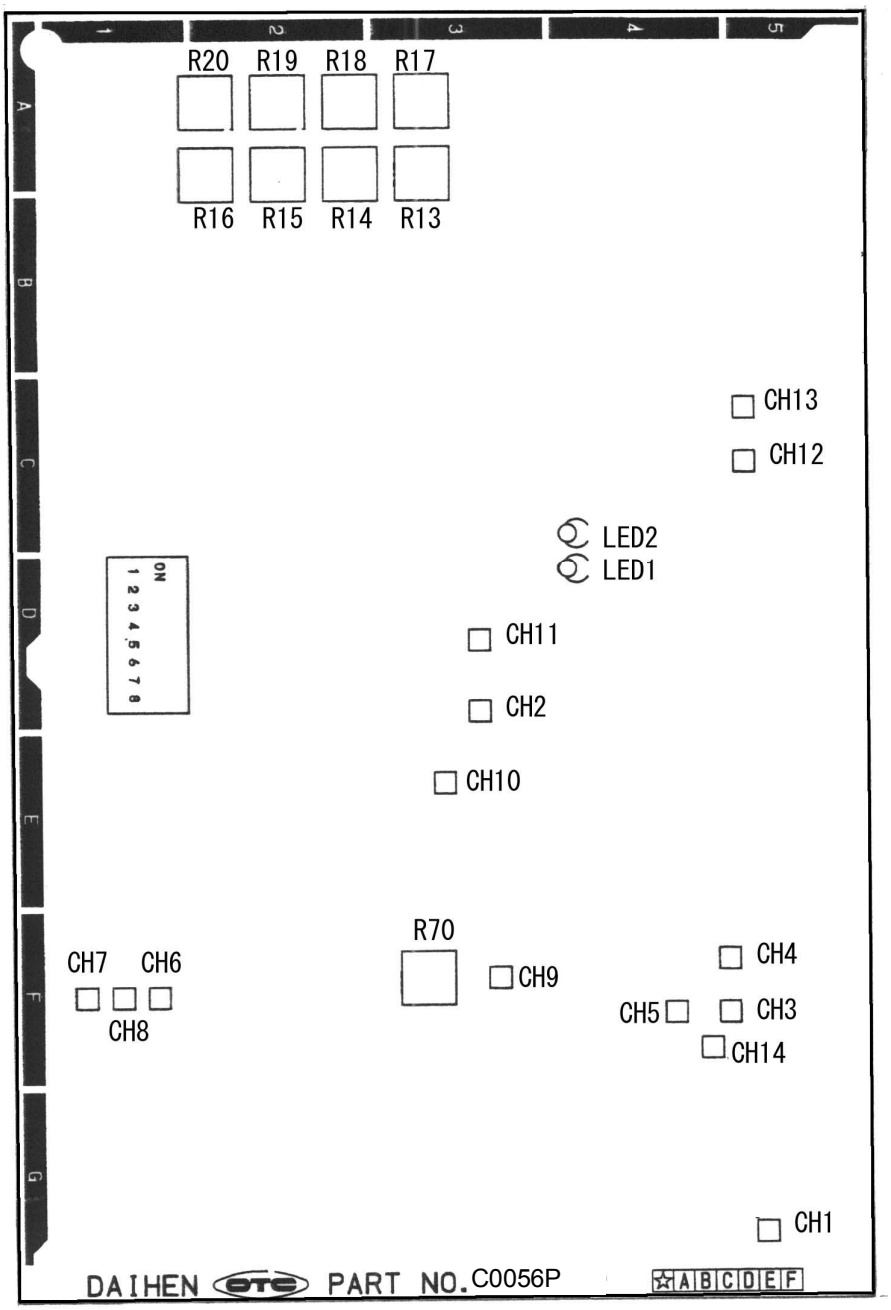
Jumper switch of printed circuit board P10174X

No.	Signal name	Explanation
J1	Vref Changing adjustment method	Change adjustment method of output voltage of Vref. It becomes normal value fixation with turning to “FIX” and adjustment with R38 is become possible with turning to “ADJ”. Normal position is “FIX”.
J2	Iref Changing adjustment method	Change adjustment method of output voltage of Iref. It becomes normal value fixation with turning to “FIX” and adjustment with R39 is become possible with turning to “ADJ”. Normal position is “FIX”.

2. Function of each printed circuit board (continued)

2.4 Check point position of each printed circuit board

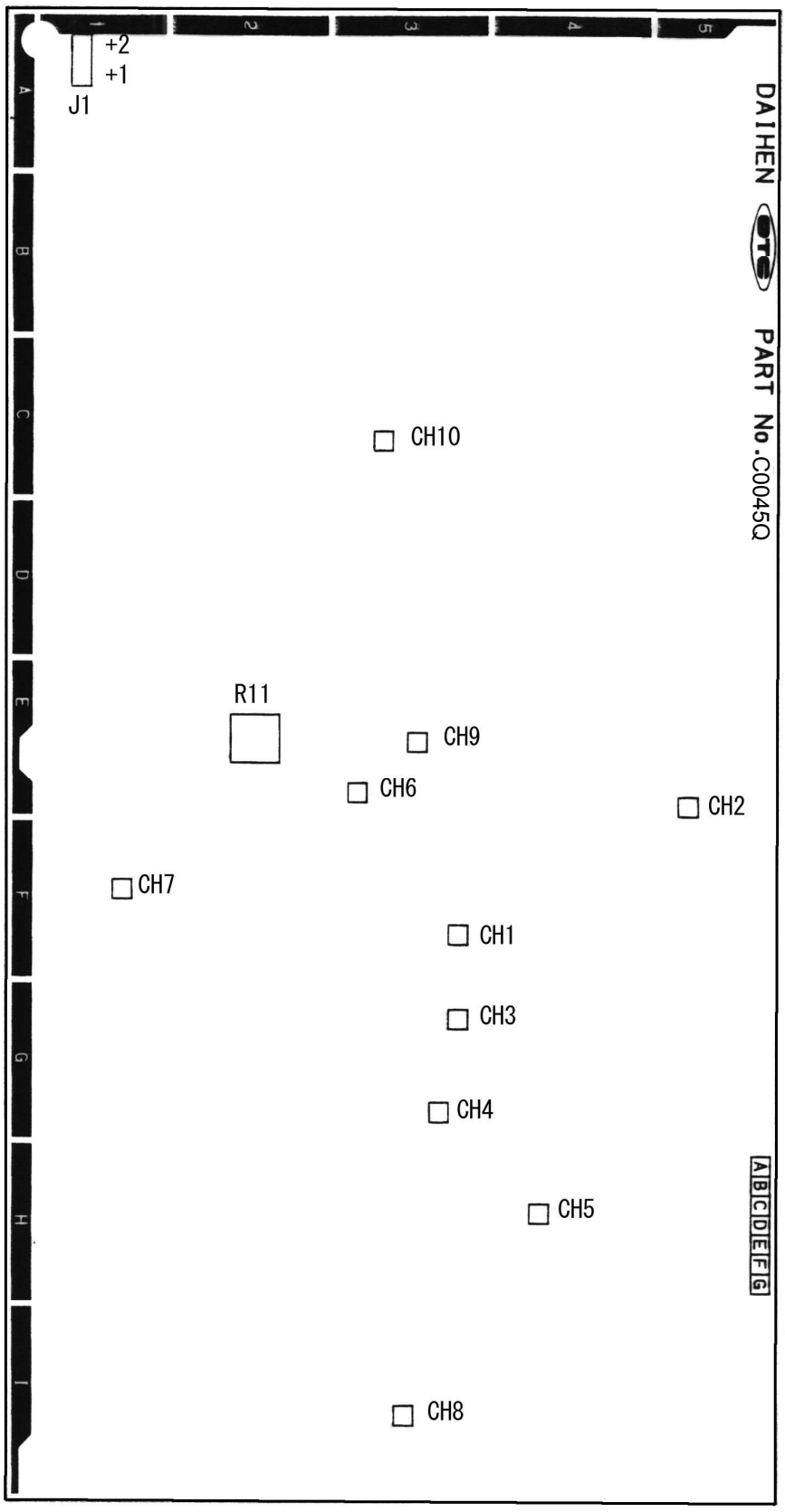
2.4.1 C0056P



2. Function of each printed circuit board (continued)

2.4 Check point position of each printed circuit board (continued)

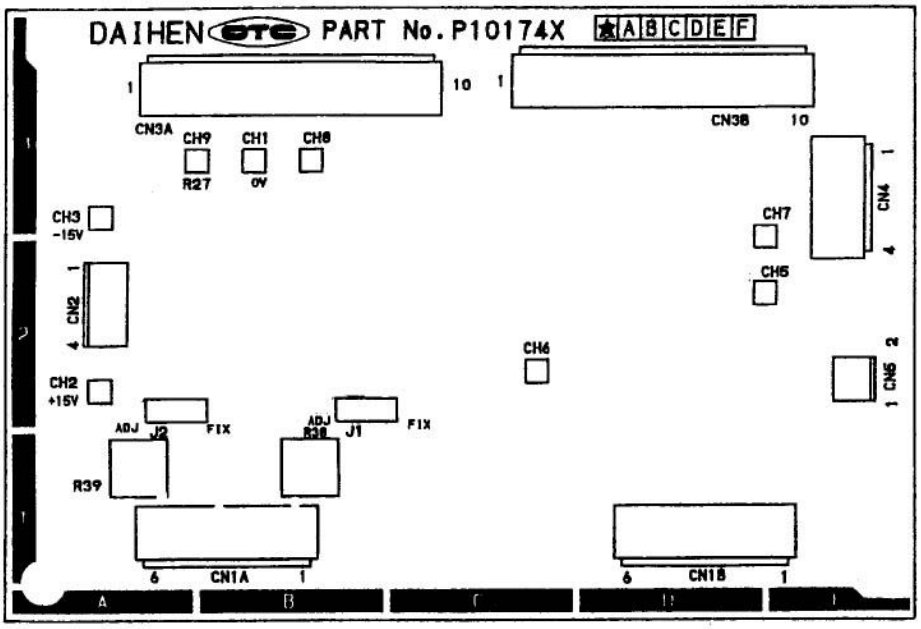
2.4.2 C0045Q



2. Function of each printed circuit board (continued)

2.4 Check point position of each printed circuit board (continued)

2.4.3 P10174X



3. Troubleshooting
3.1 WARNING lamp

When an error occurs, warning lamps on the front panel LED turns on or flashes, then the welding power source automatically stops. In this case, check the errors distinction by LED is possible.

● : OFF, ○ : Light, ◎ : Flash, △ : Flash two times

Error No.	Error	Front panel LED	LED 1 (red light)	LED 2 (green light)
①	Power supply frequency	○	○	○
②	Temperature	○	○	●
③	Input overvoltage	○	●	○
④	Shortage of input voltage	○	●	●
⑤	CO_2/MAG welding mode switch error	◎	○	○
⑥	Error before starting welding	◎	●	●
⑦	Gas check	◎	●	○
⑧	Output overcurrent	○	●	○
⑨	Microcomputer	△	○	●
⑩	Output voltage	△	●	○
⑪	Current detection	△	●	●

① Power supply frequency
When the POWER CONTROL switch on the front panel is turn on at unstable power supply frequency, the warning lamp comes on and the welding power source continues to stop operation. In this case, turn off the power switch and turn on again to cancel the error.

② Temperature error
When the duty cycle exceeds the rated duty cycle or the temperature exceeds 40˚C, the WARNING lamp flashes and the welding power source stops automatically. In this case, wait until the fan stops, with the CONTROL POWER switch turned on. When starting the welding operation again, use the welding machine lower the duty cycle or the welding current.

③ Input over voltage error
When input voltage goes beyond 460V, the WARNING lamp lights up and the welding power source stops automatically. Disconnect the CONTORL 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 the error, turn on the CONTORL POWER switch again after removing a cause of the error above.

④ Shortage of input voltage error
When input voltage falls below 320V, the warning lamp lights, then the welding power source automatically stop operation. In this case disconnect the switch and confirm there is no failure, then turn on the switch again.

⑤ CO_2/MAG welding mode switch error
When unavailable mode numbers are set while pressing the CO_2/MAG welding mode switch on the front panel, the WARNING lamp flashes and the welding power source keep stopping.
In this case, setting back to the normal setting is removing abnormal.

3. Troubleshooting (continued)
3.1 WARNING lamp (continued)

⑥ Error before starting welding machine
When the CONTROL POWER switch is turned on while the TORCH switch is on, the warning lamp flashes (Flash 1) and the welding power source keep stopping. Turn off the TORCH switch to cancel the error.

⑦ Gas check error
When more than two minutes has passed while the GAS CHECK switch is turned to the CHECK side, the warning lamp flashes (Flash 1), then the welding power source stops automatically. To cancel Gas check error, set the GAS CHECK switch to WELD. (WARNING indication is same as Shortage water pressure.)

⑧ Error in output over current
When more than two-seconds over current or short-circuit is continued, the warning lamp lights up and welding machine automatically stops. In this case, turn off the CONTROL POWER switch and make sure to see if welding current does not exceed the rated output current or contact between tip and base metal or short-circuit of output (cables). To cancel this error, solve the cause of error, then turn on the CONTROL POWER switch again.

⑨ Error in microcomputer
When an error is detected in microcomputer, the warning lamp flashes two times. After the warning lamp flashes, the welding machine automatically stops.

⑩ Trouble of output voltage
When the TORCH switch is turned off and voltage on the output terminals presents, the WARNING lamps flashes (Flash 2) and the welding machine automatically stop welding. In case of welding same work piece with several welding machines, turn off the power switch and check whether wire or torch cable contact with base metal or output cable of other welding machine. If there are some contacts, make sure removing them and turn the switch on. If abnormal still exist, check to make sure if main thyristor or an electromagnetic contactor is not broken by using a tester, after turning off the POWER switch. To cancel this error, turn on the main power switch again after solving the cause of the error. (If voltage on from outside, the welding machine automatically stop welding. This WARNING is occurred the place there are plural power sources, check that not to contact with the near side plus line of power source.)

⑪ Current detection error
Loose or breaking wiring between a hall element (CT) and a printed circuit board C0056P, warning lamp lights up and welding power source automatically stops. In this case, turn off the POWER switch and check for the trouble of wiring. After solving the cause of trouble, turn on the CONTROL POWER switch again to cancel the error.

3. Troubleshooting (continued)

3.2 Check of main circuit parts

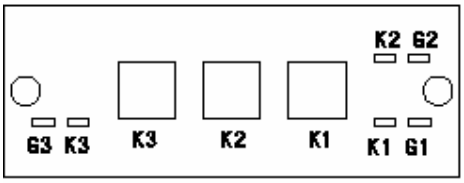
When check of main circuit parts, be caution “1.1 To avoid electric shock and accident” in particular.

And resistance value in the list is changed by internal resistance of tester (digital tester in particular) that is used. So regard as it is standard.

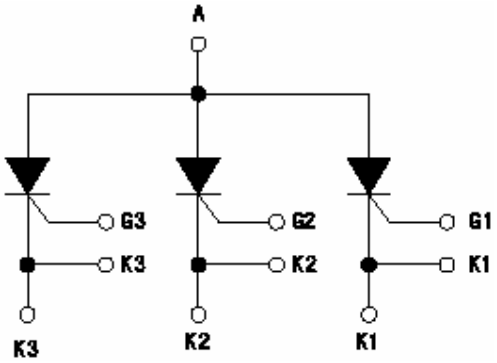
3.2.1 Thyristor module

Tester red (+)	Tester black (+)	Measured value(Ω)
K1	K2	∞
G1	G2	∞
A	K1	∞
K1	A	∞
A	G1	∞
G1	A	∞
G1	K1	20
K1	G1	20

A-G2, A-K2, A-G3, A-K3 are same as this list.



A is heat sink attachment side.



3. Troubleshooting (continued)
3.3 Welding error table

Error	Cause	Checkpoint
No arc is generated.	No voltage applied between torch and base metal.	Complete connection of base metal and torch cable.
		Fuse of input power disconnect switch. Complete connection of input cables.
		No WARNING lamp lights.
		Control cable and socket.
		Settings of this welding power source match wire feeder and remote control. (Check the connections of P10174X match wire feeder connected to this welding power source.)
	Wire will not be fed.	Fuse of input power disconnect switch. Complete connection of input cable.
		No WARNING lamp lights.
		Control cable and socket.
		Pressure lever of wire feeder.
		Settings of this welding power source match wire feeder and remote control. (Check the connections of P10174X match wire feeder connected to this welding power source.)
Bad arc start	Improper welding conditions	Settings of current and voltage.
		Welding mode and wire diameter set.
		Distance between torch and base metal.
	Incomplete power supply	No insulator on surface of base metal.
		Complete connection of base metal and torch cable.
		Tip worn out.
Unstable arc and rough welding bead	Incomplete power supply	Complete connection of base metal and torch cable.
		Tip worn out.
	Improper welding conditions	Current, voltage, amount of gas flow and welding speed.
		Welding mode and wire diameter properly set.
	Wire not smoothly fed.	Pressure adjustment of wire.
		Parts matching your wire diameter.
		Hole of tip not damaged.
		No built-up dusts in liner.
		Conduit not too bent.
	Dirty wire and base metal	No oil on base metal.
		No rust on wire.
	Air in shield gas	Cap nut of gas hose not loosen.
		No holes in gas hose.
	Arc blow occurs.	Taking measures to prevent arc blow

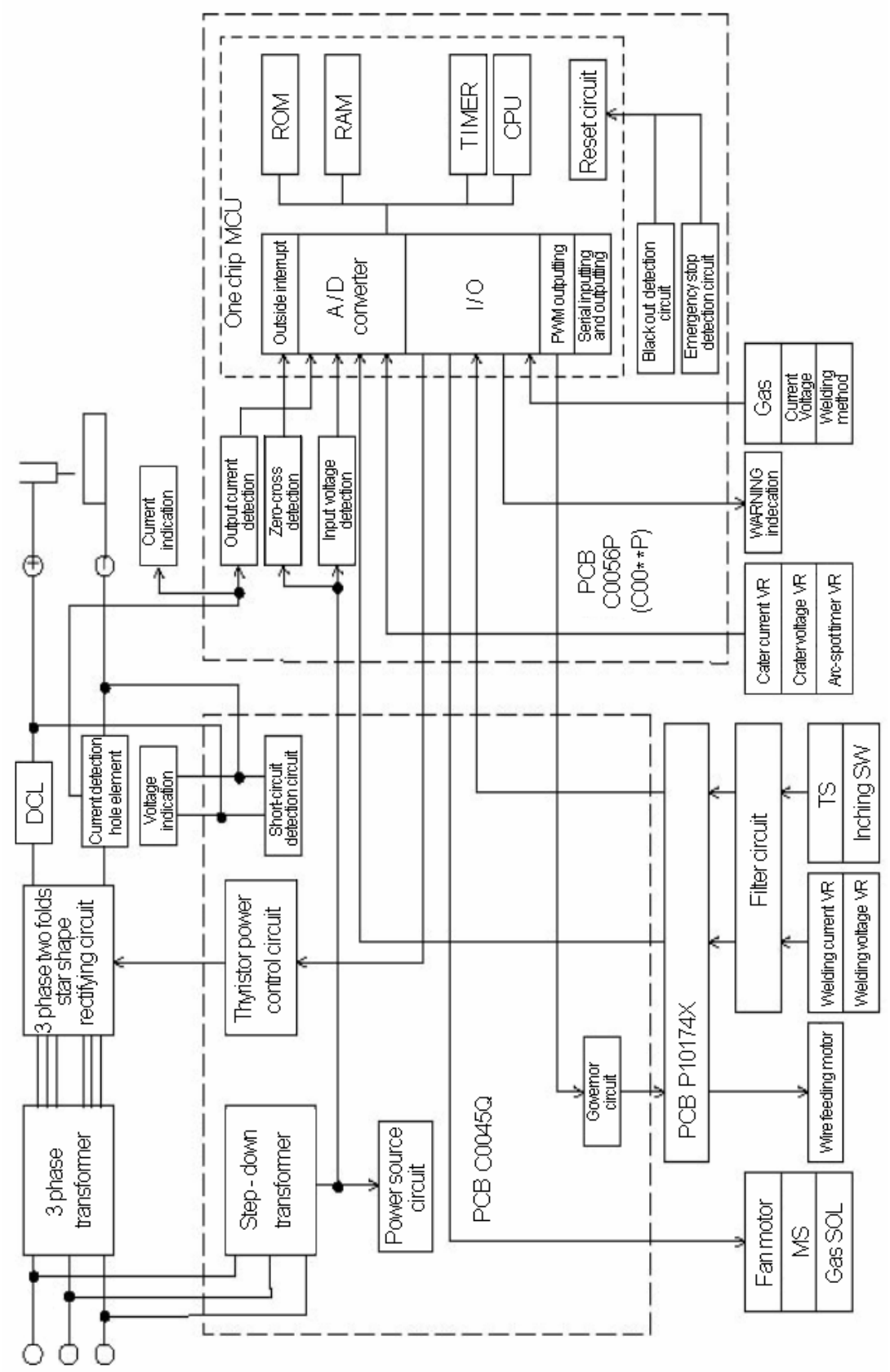
3. Troubleshooting (continued)
3.4 Troubleshooting

No.	Trouble		Cause	Solution
1	Main POWER lamp PL1 will not light.	Fan FM rotates when CONTROL POWER switch S1 turns on.	Trouble of PL1 lamp.	Check the PL1.
		Fan FM will not rotate when CONTROL POWER switch S1 turns on.	Line disconnect switch (or NF) is not turned on.	Check power box.
			Lack phase or poor connection of input cable (U or V phase)	Check the input cable.
2	WARNING lamp PL3 (yellow light) lights up. (Check of 3.1 is no problem.)	When turning on CONTROL POWER switch S1.	Trouble of thermostat THP1.	Replace thermostat THP1.
			Poor insertion of CN14 or CN15 on PCBPC0045Q.	Completely insert CN14 or CN15 on C0045Q.
			Short-circuit control cable of wire feeder.	Check control cable. (TS line)
		During welding.	Fan FM does not rotate.	Refer No.3.
			Excess of duty cycle.	Observe the rated duty cycle.
			Overheat inside welding power source.	Cool down after checking the cause.
3	Fan FM will not rotate when turning on the CONTROL POWER switch S1. (On no pre-heat function setting, fan automatically stops, when welding machine keeps to stop operation while CONTROL POWER switch turned on.)	Main POWER lamp PL1 does not light up.	Refer to No.1.	-
		Main POWER lamp PL1 lights up.	Trouble of CONTROL POWER switch S1.	Replace power switch S1.
			Blown fuse F1.	After checking cause of the trouble, replace the fuse F1.
			Trouble of fan FM.	Replace the fan FM.
			Trouble of P.C.B. (control circuit.)	After checking C0056P and C0045Q, replace them if needed.
4	Shield gas does not stop.		Trouble of P.C.B. (gas control circuit.)	After checking C0056P and C0045Q, replace them if needed.
			Trouble of gas electromagnetic valve SOL.	Replace SOL.
5	Shield gas does not come out when torch switch TS is turned on. Fan FM rotates and WARNING lamp PL3 is off.	Shield gas does not come out, when S3 is set to CHECK side.	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 gas electromagnetic SOL.
			Blown fuse F1 on C0045Q.	Replace F1 after checking cause of the trouble.
			Trouble of electromagnetic contactor MS.	Replace electromagnetic contactor MS.
			Trouble of P.C.B. (gas control circuit)	After checking C0056P and C0045Q, replace them if needed.
			Trouble of wrong connection of P.C.B. (remote control circuit)	After checking P10174X and the wiring on this, replace them if needed.
		Shield gas is generated, when S3 is set to GAS CHECK side.	Trouble of torch switch TS.	Replace the torch switch TS.
			Breaking of control cable of wire feeder or poor contact of receptacle.	After checking the cable and the receptacle (line of torch switch), replace them if needed.

3.4 Troubleshooting (continued)

No.	Trouble		Cause	Solution
6	Wire will not be fed when the torch switch TS is turned on.	When pressing the Inching switch, wire will not be fed.	Breaking of control cable of wire feeder or poor contact of receptacle.	After checking cable and receptacle (line of feed motor), replace them if needed.
			Blown fuse F2.	After checking causes of the trouble, replace the fuse F2 if needed.
			Trouble of R2.	After checking causes of the trouble, replace the R2 if needed.
			Trouble of SCR3.	After checking causes of the trouble, replace the SCR3 if needed.
			Trouble of wire feed motor.	Check the wire feed motor.
			Trouble of P.C.B. (motor circuit)	After checking C0056P or C0045Q, replace them if needed.
			Trouble of P.C.B. (remote control circuit) or incorrect connection.	After checking P10174X and the wiring, replace them if needed.
7	Output voltage will not be generated when torch switch TS is turned on.		Trouble of P.C.B. (control circuit).	After checking C0056P or C0045Q, replace them if needed.
			Trouble of thyristor SCR1 and 2.	Replace by new thyristor SCR1 and 2.
			Poor insertion of CN4, 23, 24 on C0045Q, and CN8 on C0056P.	Completely insert the connectors.
			Trouble of P.C.B. (remote control circuit) or wrong connection.	After checking P10174X and the wiring, replace them if needed.
8	Being out of control welding machine causes large current flow.		Trouble of thyristor SCR1 or 2.	Replace the thyristor SCR1 or 2 if needed.
			Trouble of hall element CT.	Replace the current detector CT.
			Check wire number [1]~[3], [8]~[13], [17], [21]~[26].	Check the wiring.
			Trouble of P.C.B. (control circuit and thyristor C0056P, ignition circuit C0045Q)	After checking C0056P and C0045Q, replace them if needed.
9	Welding current and voltage can not be set.		Breaking of remote control cable or poor contact of receptacle.	After checking the cable and the receptacle, replace them if needed.
			Trouble of variable resistor R5 and R6 to set current and voltage of remote control.	Replace the R5 and R6 if needed.
			Trouble of P.C.B. (control circuit).	After checking C0056P and C0045Q, replace them if needed.
10	No transition from slow-down speed to wire feeding speed at welding.		Trouble of hall element CT.	Replace the current detector CT.
			Trouble of P.C.B. (control circuit).	After checking C0056P and C0045Q, replace them if needed.
11	Self-holding can not be set.		Trouble of crater-filler switch S7.	After checking S7, replace it if needed.
			Trouble of P.C.B. (control circuit).	After checking PCB1 or PCB2, replace it if needed.
12	Penetration control is not usable	Condition does not match during welding	Trouble of hall element CT.	Replace the current detector CT.
		Penetration control SW does not work if turning to “ON”.	Trouble of switch S8.	After checking S8, replace it if needed.
			Setting of current is law.	Penetration control does not work with law current so set to over 200A.

4. Block diagram



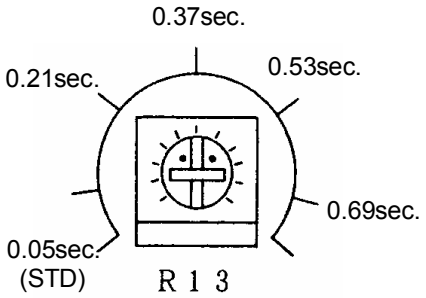
5. Correspondence for user needs expect for a standard

5.1 Using initial current control

Initial current control is “OFF” at the shipment but it becomes usable by turning C0056P (C0052P) S1 No.2 to “ON”.

5.2 Changing pre-flow time (For CO_2/MAG)

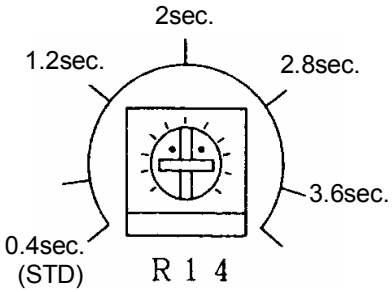
Pre-flow time is 0.05 sec. at the shipment but it becomes usable to adjust time by R13 on C0056P.



5.3 Changing post-flow time

Post-flow time is 0.4 sec. at the shipment but it becomes usable to adjust time by R14 on C0056P.

.



5.4 Changing wire feeder

Set C0056P and P10174X suitable for wire feeder like the list below.

CPXD-350,500

Wire feeder model	C0056P		P10174X CN1,3	Remarks
	S1-3	S1-5		
CM-2302	OFF	OFF	A side	Factory setting
CM-2301	ON	OFF	B side	
CML-2302	OFF	ON	A side	
CML-2301	ON	ON	B side	

● If making a mistake in setting

Mistake in dip switch:

Scale of remote control and the fact current and voltage is not suitable.

Mistake in connection of PC board:

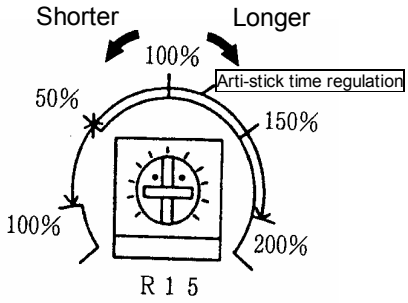
Welding machine is not operation even if push torch switch or inching button.

In this case, WARNING is not indicated so check connection and setting is correct.

5. Correspondence for user needs expect for a standard (continued)

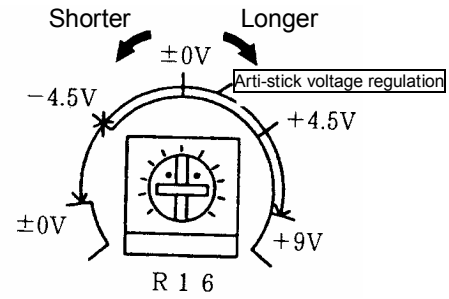
5.5 Changing anti-stick time

Anti-stick time is 0.3~0.5 sec. at the shipment but it becomes usable to adjust time by R15 on C0056P.
Anti-stick time is changed by welding method, wire diameter and current setting.



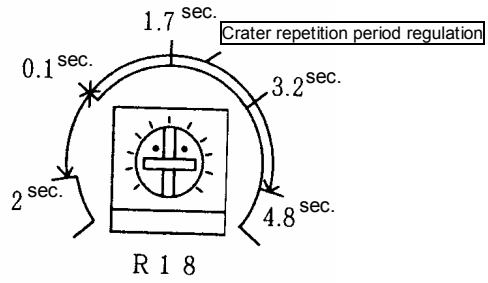
5.6 Changing anti-stick voltage

Anti-stick voltage is 15~18V at the shipment but it becomes usable to adjust time by R16 on C0056P.
Anti-stick voltage is changed by welding method and wire diameter.



5.7 Changing crater repetition period

Crater repetition period is 2 sec. at the shipment but it becomes usable to adjust time by R18 on C0056P.



5.8 Using AC100V heater receptacle

Extra heating is necessary to use gas regulator with heater, turn S1 No.4 to “ON” when use AC100V heater receptacle.
Turn S1 No.4 to “OFF” when not to use heater receptacle. An energy saving function is operating.

Function of S1 No.4

ON: MS, AC100V and fan keep “ON”
OFF: MS, AC100V turn off 5 seconds after the welding end and fan turn off 6 seconds after the welding end.

Factory setting

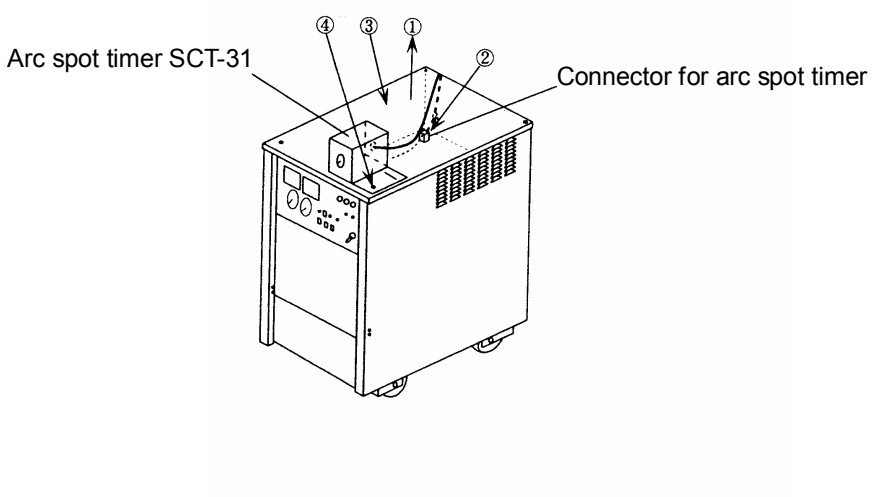
CPXD-350: OFF
CPXD-500: ON

5. Correspondence for user needs expect for a standard (continued)

5.9 Using arc spot timer

Arc spot timer SCT-31

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 fan frame.
2. Lead in cables connected with arc spot timer through grommet with film 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.)

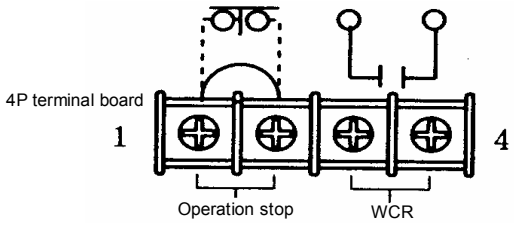


When using arc spot timer, initial current, self-hold and crater are not operating.

5. Correspondence for user needs expect for a standard (continued)

5.10 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.
- When opening these terminals, it stops emergency and stop operation.
- When close these terminals, it cancels emergency stop and start operation.

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

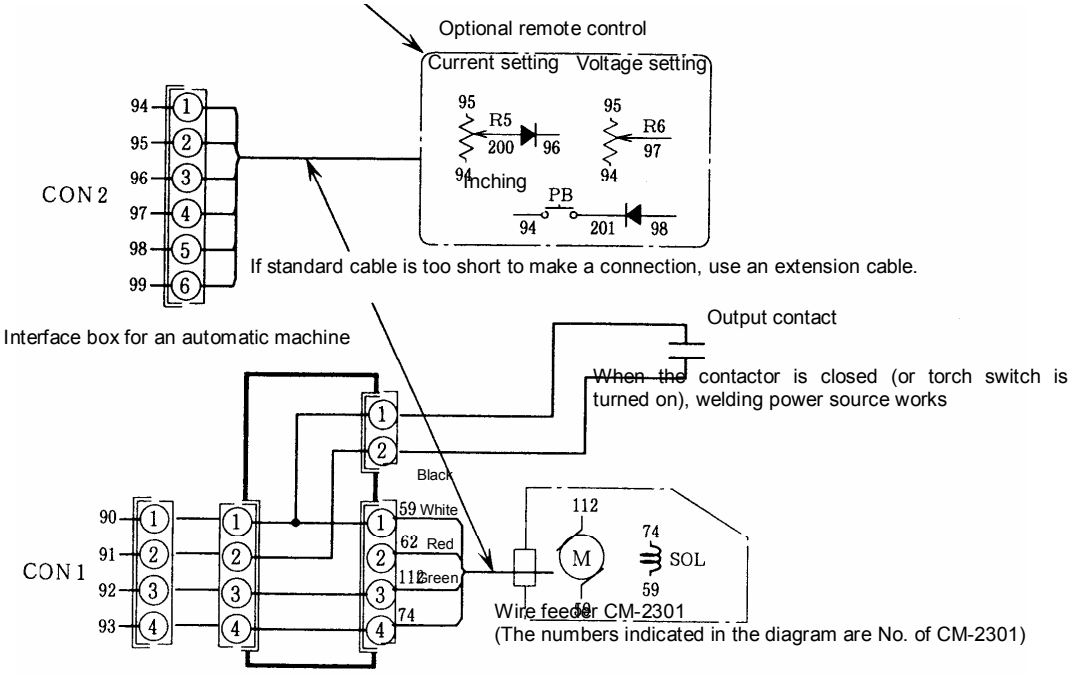
*To hold operation stop, use the switch with a function to suspend operation stop.

5.11 Connection with an automatic machine

When this welding power source is connected to an automatic machine, use internal terminals described in 5.9, remote control receptacle and wire feeder receptacle.

Use the optional remote control.

(Make connections, following the schematic diagram shown below, when the optional remote control is not used.)

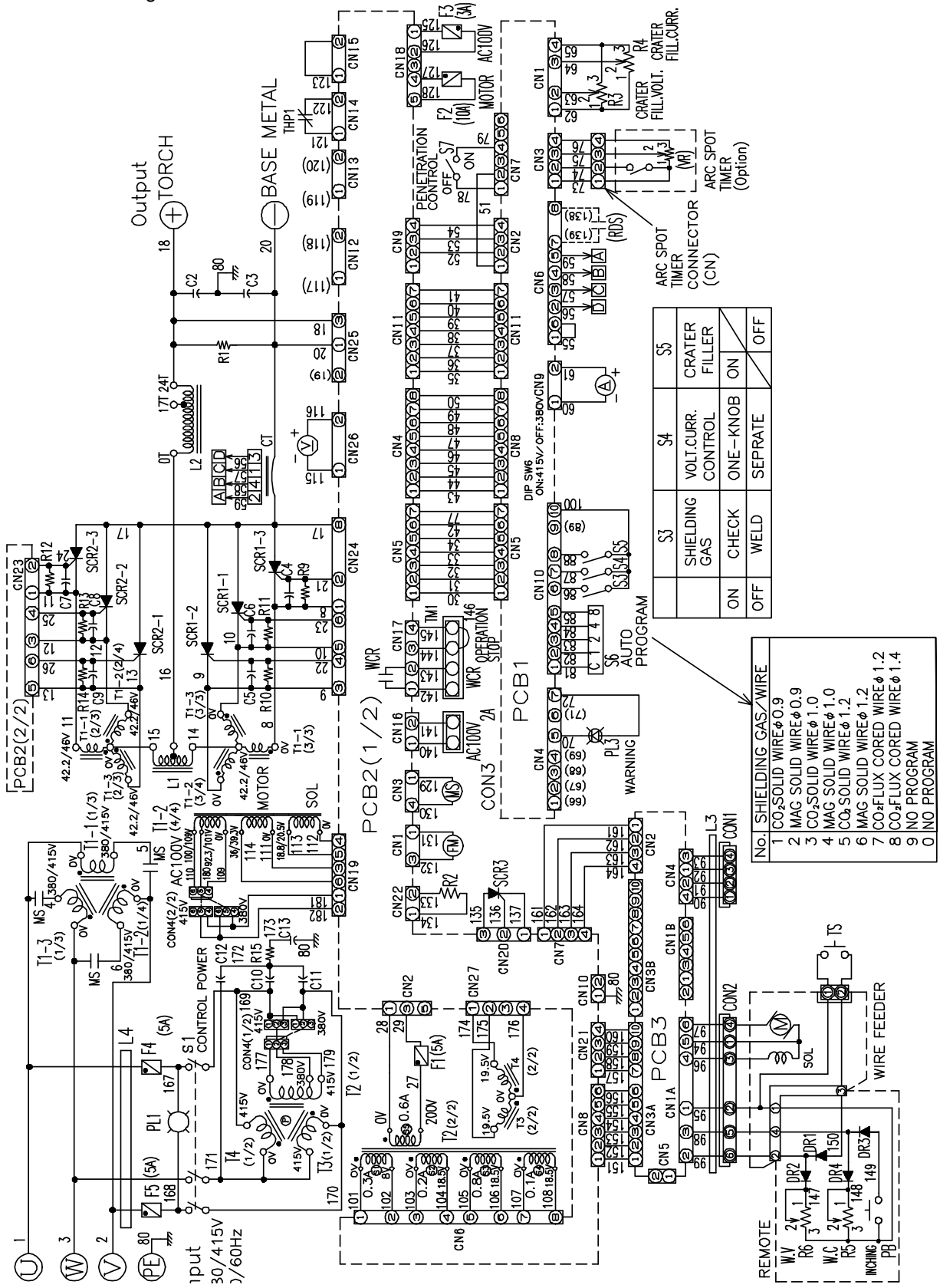


5.12 Special correspondence ROM

MCU (micro controller) used in this machine is type that CPU (calculation unit) and ROM (memory to house programs) are incorporate to one chip so it is impossible to change only ROM. Then if using special correspondence which includes changing software, exchange includes printed circuit board.

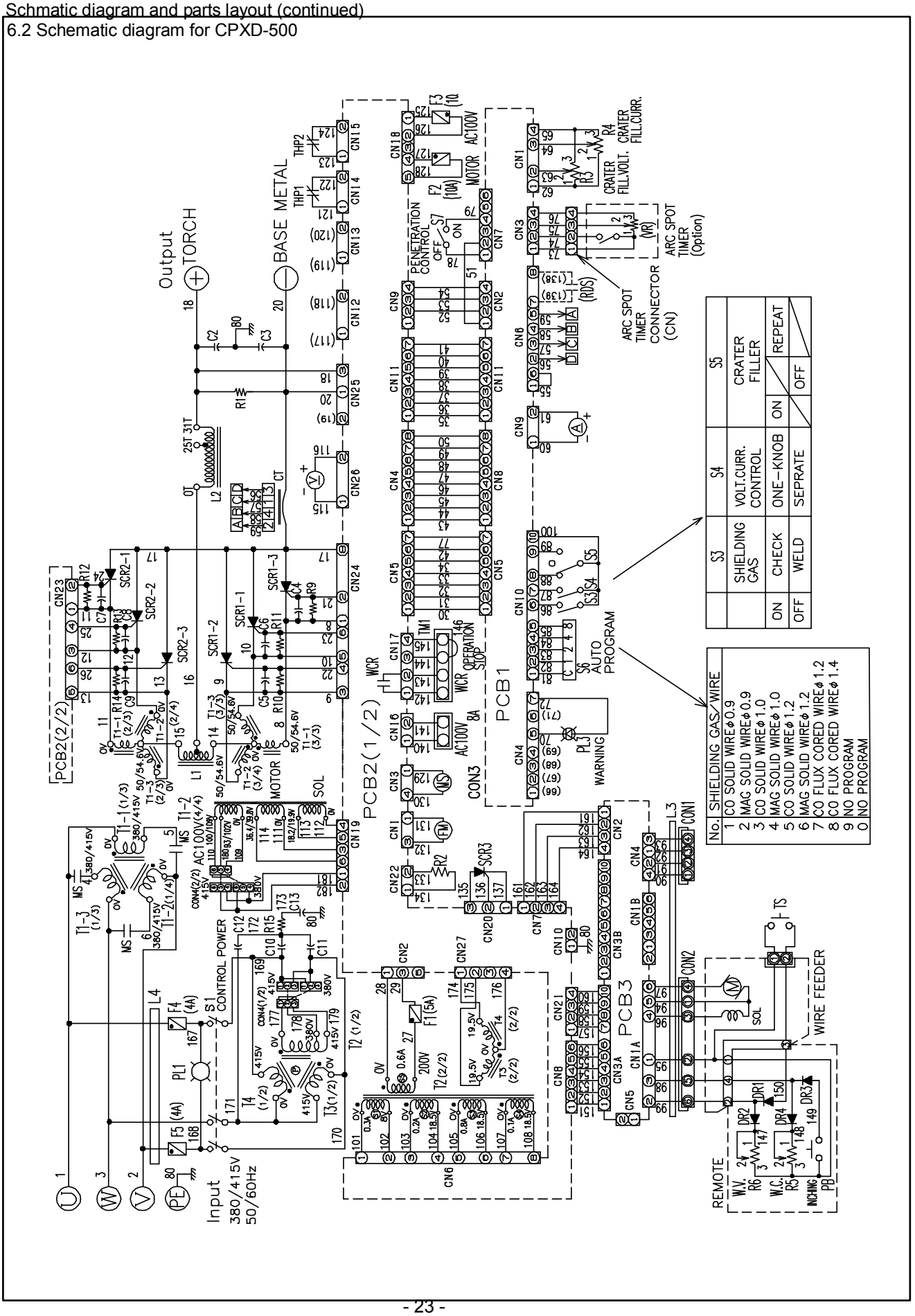
6. Schematic diagram and parts layout

6.1 Schematic diagram for CPXD-350

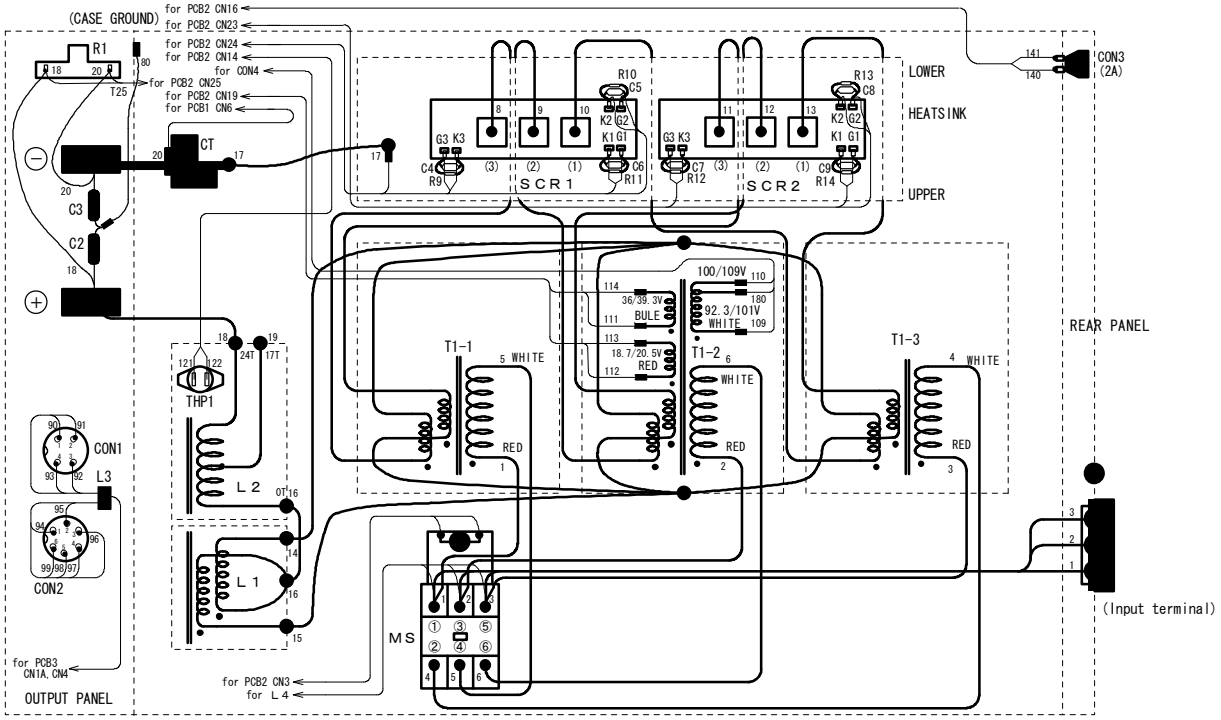


6. Schmatic diagram and parts layout (continued)

6.2 Schematic diagram for CPXD-500



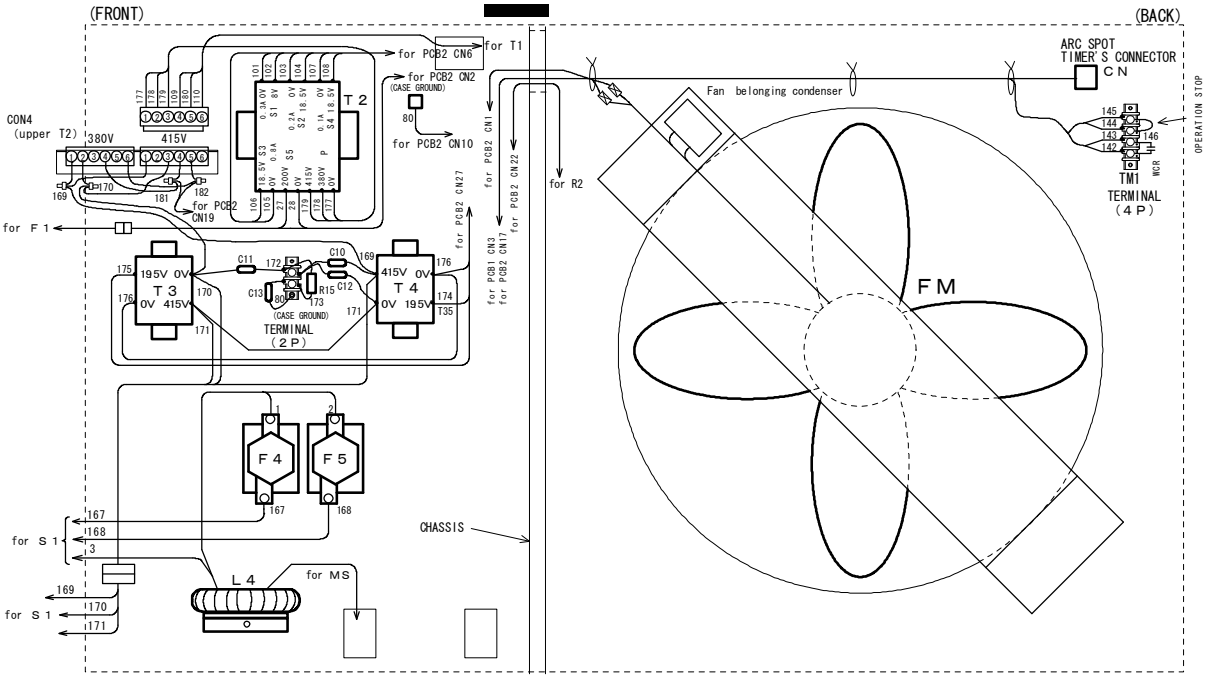
6. Schmatic diagram and parts layout (continued)
6.3 Parts layout for CPXD-350



SCR CONECTION

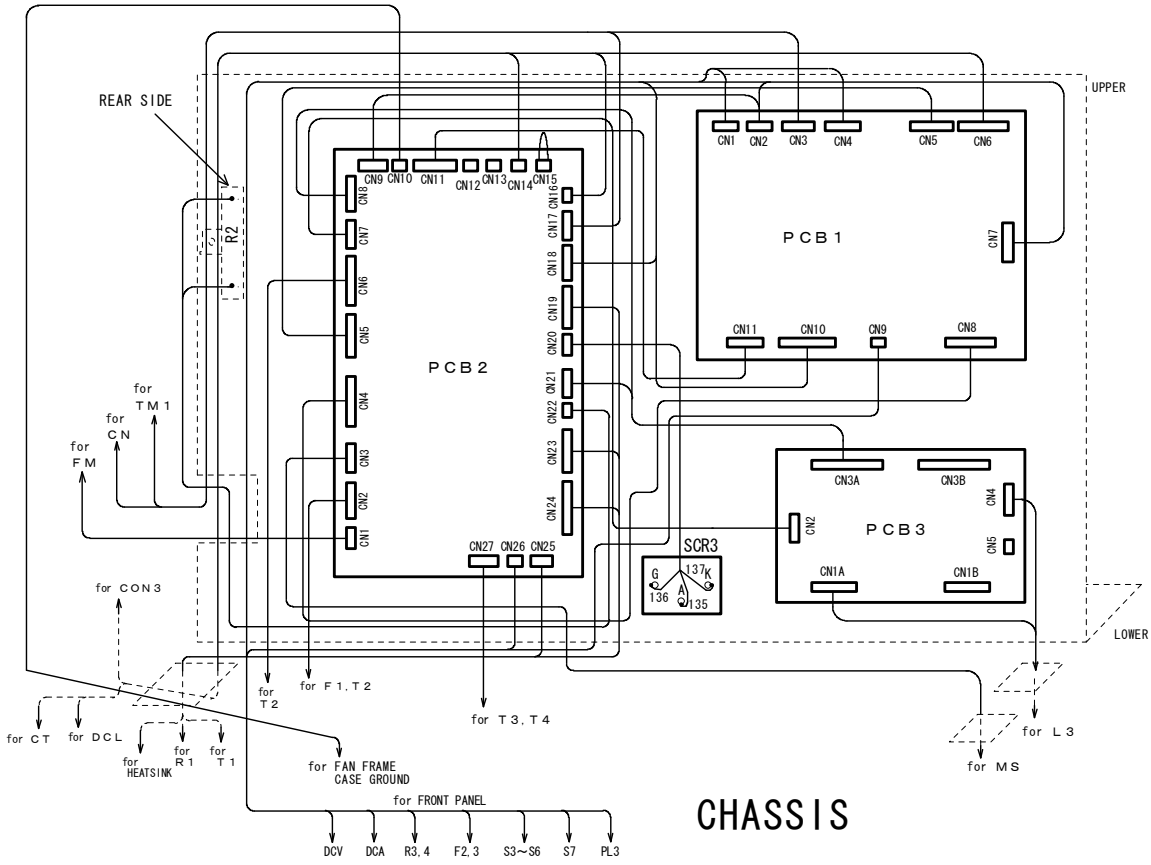
SCR TERMINAL	WIRE NUMBER	WIRE COLOR	CONNECTOR PIN NUMBER	SCR TERMINAL	WIRE NUMBER	WIRE COLOR	CONNECTOR PIN NUMBER
SCR1-1 G1	23	YELLOW	CN24 ⑥	SCR2-1 G1	26	YELLOW	CN23 ⑥
SCR1-1 K1	10	RED	CN24 ⑤	SCR2-1 K1	13	RED	CN23 ⑤
SCR1-2 G2	22	YELLOW	CN24 ④	SCR2-2 G2	25	YELLOW	CN23 ④
SCR1-2 K2	9	WHITE	CN24 ③	SCR2-2 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				

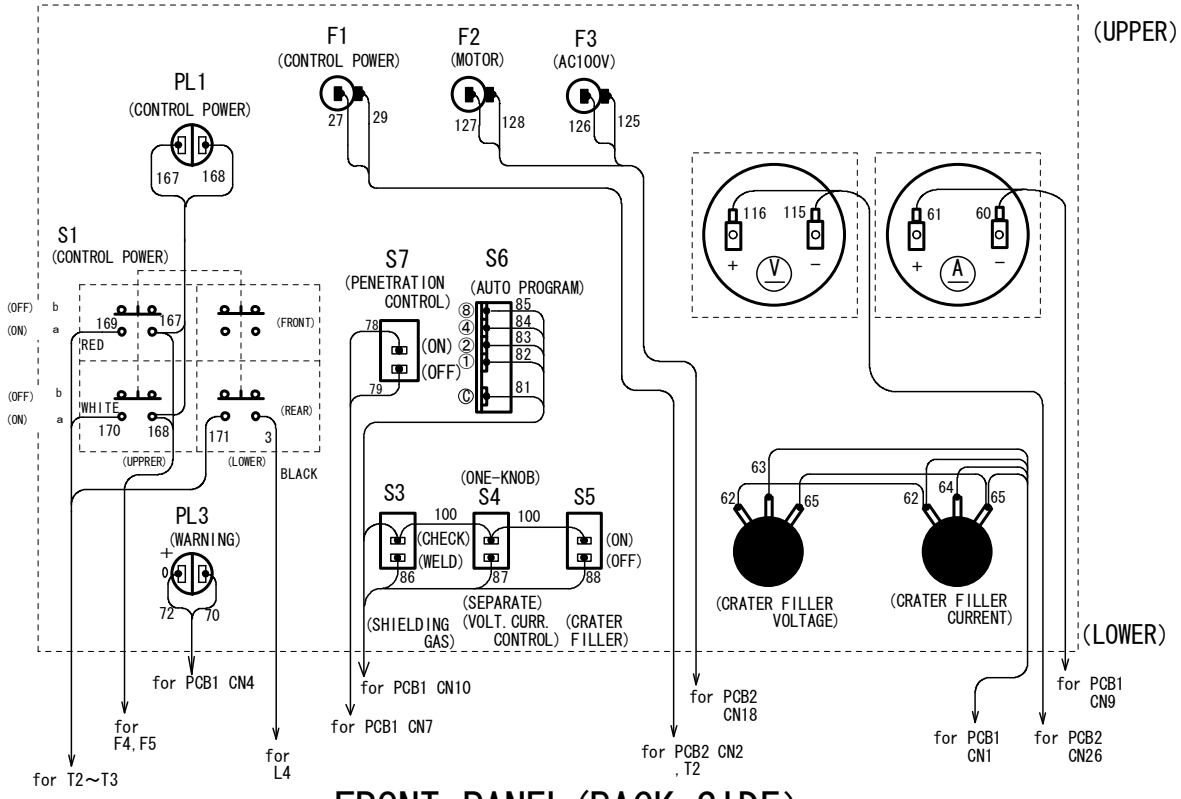
FRAME



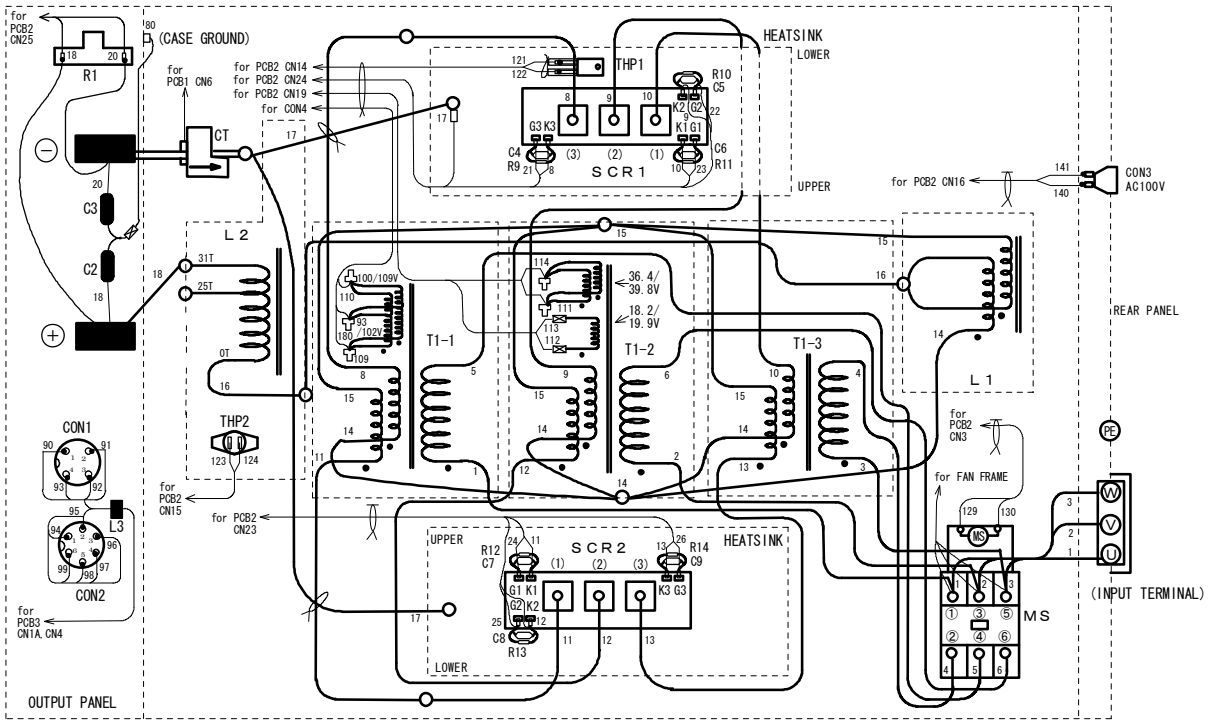
FAN FRAME

6. Schmatic diagram and parts layout (continued)
6.3 Parts layout for CPXD-350 (continued)



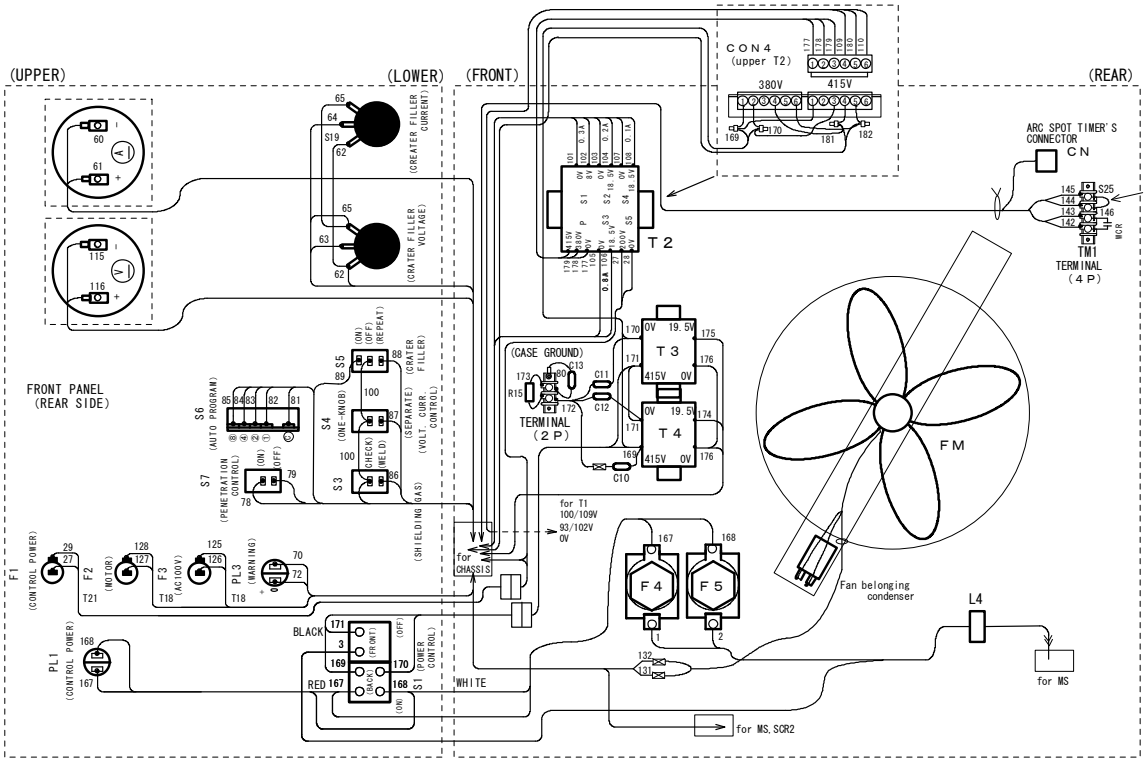


6. Schmatic diagram and parts layout (continued)
6.4 Parts layout for CPXD-500

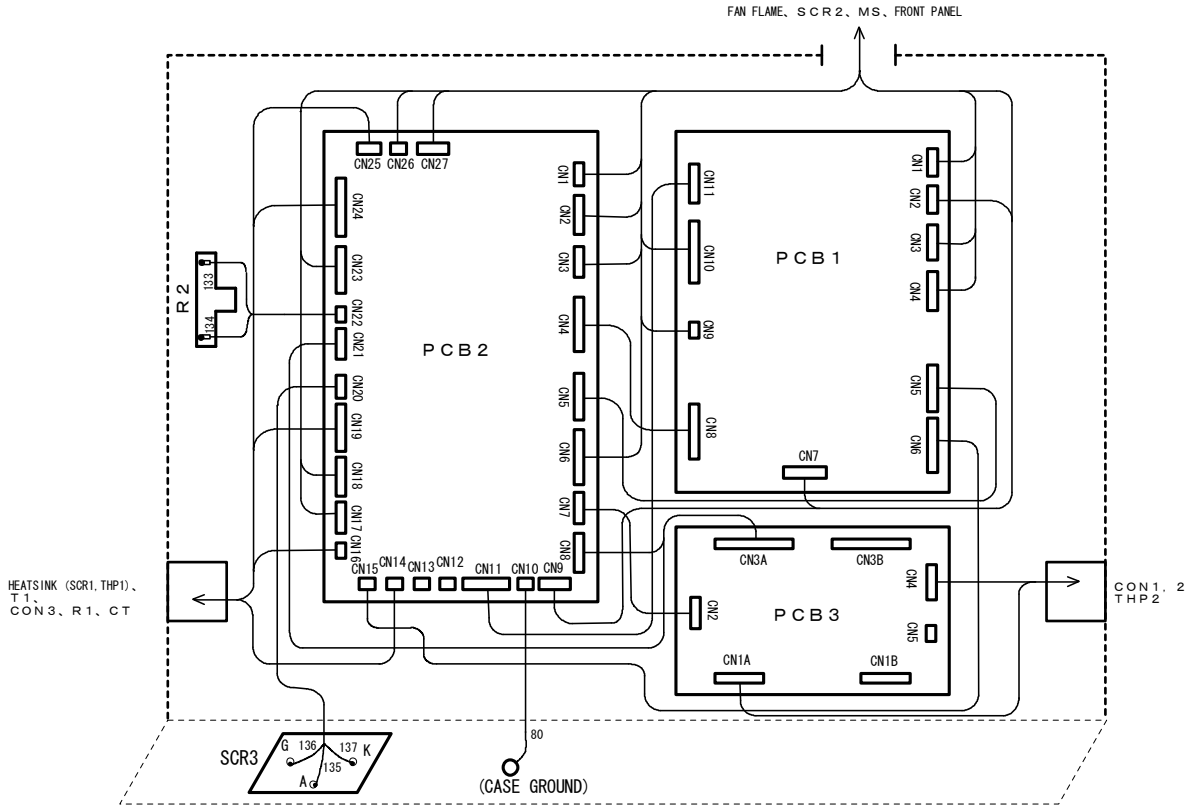


SCR CONECTION

SCR TERMINAL	WIRE NUMBER	WIRE COLOR	CONNECRTOR PIN NUMBER	SCR TERMINAL	WIRE NUMBER	WIRE COLOR	CONNECRTOR PIN NUMBER
SCR1-1 G1	23	YELLOW	CN24 ⑥	SCR2-1 G1	24	YELLOW	CN23 ②
SCR1-1 K1	10	RED	CN24 ⑤	SCR2-1 K1	11	BLACK	CN23 ①
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	26	YELLOW	CN23 ⑥
SCR1-3 K3	8	BLACK	CN24 ①	SCR2-3 K3	13	RED	CN23 ⑤
SCR1, 2 A	17	BLUE	CN24 ⑧				

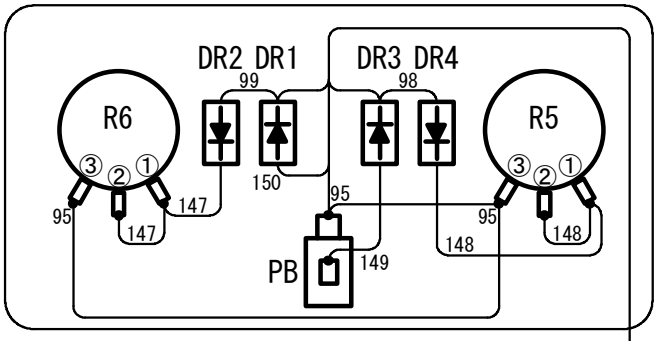


6. Schmatic diagram and parts layout (continued)
6.4 Parts layout for CPXD-500 (continued)

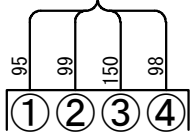


CHASSIS

(view from the back side)



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



4P CONNECTOR

REMOTE (XD350,500)

7. 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
				XD350	XD500	
T1	C0049B00	3-phase transformer	C0049B00		1	On side frame
	C0053B00		C0053B00	1		
L1, L2	C0056C00	Inter-phase and DC reactor	C0056C00	1		
L1	C0049C00	Inter-phase reactor	C0049C00		1	
L2	C0049D00	DC reactor	C0049D00		1	
MS	4340-122	Electromagnetic contactor	SC-N2S/G Z405 AC200V (C.C.C)		1	Under fan frame
	4340-123		SC-N2 AC200V (C.C.C)	1		
F1	4610-003	Glass enclosed fuse	250V 5A	1	1	On front panel
F2	4610-004		250V 10A	1	1	
F3	4610-004		250V 10A		1	
	4610-002		250V 3A	1		
	4610-128	Fuse holder	HF-008	3	3	
S1	100-0073	Switch	KDHCT-10A	1	1	
S3, 4	4254-118	Switch	DS-850K-F1-00 (Black)	2	2	
S5	4254-119		DS-850C-F1-00 (Black)		1	
	4254-118		DS-850K-F1-00 (Black)	1		
S6	4252-015	Rotary thumb switch	A7BS-206-1	1	1	
	4739-369	One-touch fixture	A7B-M-1	1	1	
S7	4254-118	Switch	DS-850K-F1-00 (Black)	1	1	
PL1	4600-342	Neon lamp	N46010A7KR-01	1	1	
PL3	4600-345	Neon lamp	N46010A7KR-01	1	1	
V	4401-016	DC voltmeter	209390-HT/Z DC75V	1	1	
A	4403-049	DC ammeter	209390-HT/Z 600A/1MA		1	
	4403-127		209390-HT/Z 400A/1MA	1		
R3, 4	4501-039	Variable resistor	RV24YN20SB 5KΩ	2	2	
	4735-008	Knob	K2195(Small)	2	2	
FM	100-0077	Fan motor	SF-200-20-4R		1	On fan frame
	100-0104		SF-200-10-4D	1		
T2	W-W05031	Aux. transformer	W-W05031	1	1	
T3,4	W-W05020		W-W05020	2	2	
L4	C0045V00	Choke coil	C0045V00		1	
	C0056V00		C0056V00	1		
F4,5	4610-010	Screw fuse	RO24-4A 500V	2	2	
	4610-122	Fuse base	FB24(16E) 500V/25A	2	2	
R15	4509-125	Resistor	RS2B 470ΩJ	1	1	
C10-13	4517-452	Capacitor	2kV 0.0022MF	4	4	
SCR1, 2	4530-149	Thyristor module	W-W00873	2	2	On Heat sink
THP1	4614-051	Thermostat	67L090		1	
	4258-016	Thermostat	US-602AXTTL 120˚C	1		On DC reactor
R9 - R14	4805-036	Resistor	RD1/4S 1kΩJ	6	6	On Thyristor module
C4 - C9	4518-402	Capacitor	50V 0.47μF	6	6	

7. Parts list (continued)

Symbol	Parts No.	Description	Specifications	Q'ty		Location
				XD350	XD500	
THP2	4258-016	Thermostat	US-602AXTTL 120˚C		1	On DC reactor
CT	4406-017	Hole current detector	L03S400D15	1	1	On output terminal board
R1	4509-821	Resistor	40SH 100ΩKA	1	1	
R2	4509-805	Resistor	40SH 1ΩKA	1	1	On Chassis
C2,3	4517-401	Capacitor	0.01μF 2kV	2	2	On output terminal board
L3	P10194U00	Common mode choke	P10194U00		1	
	C0053U00	Common mode choke	C0053U00	1		
CON1	4730-006	Receptacle	DPC25-4BP	1	1	
CON2	4730-010	Receptacle	DPC25-6BP	1	1	
	K3927B00	Secondary terminal	K3927B00		2	
	K2851B00	Secondary terminal	K2851B00	2		
CON5	4732-017	AC plug	AC-T04FB04	1	1	On rear panel
	K3904B00	Input terminal board	K3904B00	1	1	
	K3904C00	Input terminal cover	K3904C00	1	1	
SCR3	4530-412	Thyristor	SG25AA20	1	1	
(P.C.B.1)	K5374P00	P.C.B.	K5374P00	(1)	(1)	On Chassis
	C0052X00	Micro-controller "On P.C.B.K5374P00"	C0052X00		(1)	On P.C.B K5374P00
	C0056X00		C0056X00	(1)		
P.C.B.1	C0052P00	P.C.B.	C0052P00		1	On Chassis
	C0056P00	P.C.B.	C0056P00	1		
P.C.B.2	C0045Q00	P.C.B.	C0045Q00	1	1	
	4610-009	Fuse	250V 2A	1	1	On P.C.B.2
P.C.B.3	P10174X00	P.C.B.	P10174X00	1	1	On Chassis
R5, 6	4501-039	Resistor	RV24YN20SB 5kΩ	2	2	On Remote control
	4735-007	Knob(Large)	K2195 (Large)	2	2	
DR1 ,2	4531-710	Diode	D1N60	2	2	
PB	4250-077	Press button switch	A2A-4R	1	1	

8. Supplement

This is not a guarantee value. Use as reference data.

●Setting of one-knob

Welding voltage is output voltage when center of one-knob. (A real value changes by ejector)
Flax cored (FCW) is XD500.
Value is not changed if turning current knob to right more the point of Max. time to rotate (170 / 212rpm).

Mode	Setting	Current setting (A)								
		40	60	80	100	120	140	160	180	200
CO_2 0.8mm	Speed (rpm)	21	31	43	60	99	119	170	---	---
	Welding voltage (V)	17.0	18.5	19.0	20.0	22.0	24.0	27.0	---	---
MAG 0.8mm	Speed (rpm)	21	35	49	69	91	106	145	---	---
	Welding voltage (V)	15.0	17.0	18.0	19.0	20.0	21.0	23.0	---	---
CO_2 0.9mm	Speed (rpm)	17	21	28	39	54	80	93	124	148
	Welding voltage (V)	17.0	18.0	18.5	19.0	19.5	21.0	23.5	25.0	26.5
MAG 0.9mm	Speed (rpm)	16	20	30	41	61	73	93	112	137
	Welding voltage (V)	15.0	15.5	17.0	18.0	19.0	20.0	21.0	22.0	24.0
CO_2 1.0mm	Speed (rpm)	14	16	24	32	46	59	81	103	119
	Welding voltage (V)	17.0	18.0	18.5	19.0	20.0	22.5	25.0	27.0	28.0
MAG 1.0mm	Speed (rpm)	14	17	23	31	43	52	63	81	94
	Welding voltage (V)	14.0	14.5	15.0	16.0	16.5	17.0	18.0	21.0	22.0

8. Supplement (continued)

Mode	Setting	Current setting (A)											
		50	100	150	200	250	300	350	400	450	500	550	600
CO_2 1.2mm	Speed (rpm)	14	20	36	71	99	134	170	200	---	---	---	---
	Welding voltage (V)	16	18	20	25	30	35	40	46	---	---	---	---
MAG 1.2mm	Speed (rpm)	14	18	31	67	93	130	170	190	---	---	---	---
	Welding voltage (V)	14	16	18	22	28	33	37	42	---	---	---	---
FCW 1.2mm	Speed (rpm)	14	32	57	89	138	170	---	---	---	---	---	---
	Welding voltage (V)	16	18	19	25	31	34	---	---	---	---	---	---
MCW 1.2mm	Speed (rpm)	14	27	49	74	110	148	212	---	---	---	---	---
	Welding voltage (V)	16	18	19	25	28	36	41	---	---	---	---	---
CO_2 1.4mm	Speed (rpm)	13	18	31	47	64	86	106	139	170	200	---	---
	Welding voltage (V)	16	18	20	24	28	31	35	40	44	49	---	---
MAG 1.4mm	Speed (rpm)	13	16	26	43	61	81	102	135	170	190	---	---
	Welding voltage (V)	13	15	17	20	24	29	33	36	40	44	---	---
FCW 1.4mm	Speed (rpm)	13	21	36	50	79	116	150	170	---	---	---	---
	Welding voltage (V)	16	18	19	24	28	31	35	38	---	---	---	---
MCW 1.4mm	Speed (rpm)	13	19	33	46	69	97	119	148	179	212	---	---
	Welding voltage (V)	16	18	20	24	28	31	35	38	41	45	---	---
CO_2 1.6mm	Speed (rpm)	12	15	19	32	44	58	72	87	107	135	161	185
	Welding voltage (V)	16	18	19	22	25	30	33	36	40	43	45	50
MAG 1.6mm	Speed (rpm)	12	13	17	30	42	56	70	83	103	130	150	175
	Welding voltage (V)	13	15	17	19	23	28	32	34	36	38	40	45
FCW 1.6mm	Speed (rpm)	12	16	24	35	50	69	97	125	160	---	---	---
	Welding voltage (V)	15	17	19	24	28	31	35	40	44	---	---	---
MCW 1.6mm	Speed (rpm)	12	16	24	34	47	65	83	100	141	173	212	---
	Welding voltage (V)	15	17	19	24	28	32	35	40	44	46	50	---
CO_2 2.0mm	Speed (rpm)	17	18	19	20	28	38	44	52	62	72	82	100
	Welding voltage (V)	14	16	18	22	25	28	31	35	39	43	46	50
MAG 2.0mm	Speed (rpm)	16	17	18	19	27	37	42	50	60	70	80	95
	Welding voltage (V)	12	14	16	20	24	26	29	33	35	38	43	47
FCW 2.0mm	Speed (rpm)	---	---	---	---	---	---	---	---	---	---	---	---
	Welding voltage (V)	---	---	---	---	---	---	---	---	---	---	---	---
MCW 2.0mm	Speed (rpm)	18	19	20	22	23	43	50	64	77	90	105	115
	Welding voltage (V)	14	16	18	22	26	28	31	34	39	43	47	50

9. Standard of current and voltage setting signal

When carrying out to control output current and voltage by outside connection, refer to the order voltage in the below as standard.
Input range of order voltage is between DC0~15V.
Check the direction of CN1 and CN3 on P10174X is “B” before input outside signal.

CPXD-350

Current setting (Use inside scale)

Output current (A)	Order voltage (V)
100	4.0
150	6.5
200	9.5
250	12.0
300	15.0

Current setting (Use outside scale)

Output current (A)	Order voltage (V)
100	3.0
150	5.0
200	7.0
250	9.0
300	11.0
350	13.0

Voltage setting (Use individual scale)

Output current (A)	Order voltage (V)
15	1.0
18	3.0
21	4.5
24	6.0
27	8.0
30	9.5
33	11.0
36	13.0

CPXD-500

Current setting (Use inside scale)

Output current (A)	Order voltage (V)
100	2.5
150	5.0
200	7.5
250	9.5
300	12.0
350	14.0

Current setting (Use outside scale)

Output current (A)	Order voltage (V)
100	2.0
150	3.5
200	5.0
250	6.5
300	8.0
350	9.5
400	11.0
450	12.5
500	14.0

Voltage setting (Use individual scale)

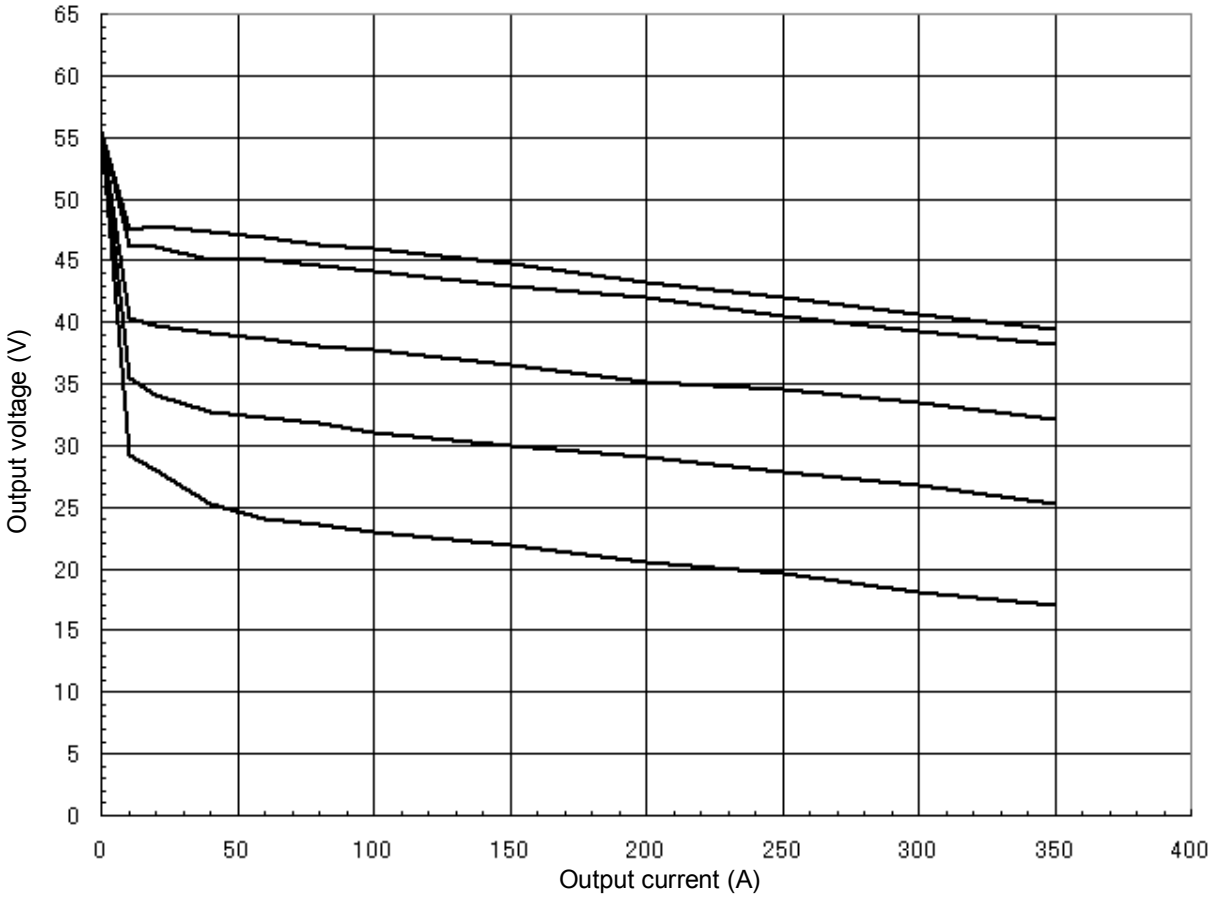
Output current (A)	Order voltage (V)
15	1.0
20	3.0
25	5.0
30	7.5
35	9.5
40	11.5
45	14.0

10. Outside characteristics

CPXD-350

The following data are things by the condition below.
Input voltage: 200V
Frequency: 60Hz
Mode: CO_2 solid, 1.2mm, Voltage individually adjustment

Standard voltage 1V		Standard voltage 2V		Standard voltage 3V		Standard voltage 4V		Standard voltage 5V	
Current (A)	Voltage (V)	Current (A)	Voltage (V)	Current (A)	Voltage (V)	Current (A)	Voltage (V)	Current (A)	Voltage (V)
0	55.6	0	55.5	0	55.5	0	55.6	0	55.6
10	29.3	10	35.5	10	40.3	10	46.2	10	47.5
20	28	20	34.1	20	39.7	20	46.1	20	47.8
40	25.2	40	32.7	40	39.1	40	45.1	40	47.3
60	24.1	60	32.2	60	38.6	60	45	60	46.9
80	23.6	80	31.8	80	38.1	80	44.6	80	46.3
100	23	100	31.1	100	37.7	100	44.1	100	45.9
150	21.9	150	30	150	36.5	150	43	150	44.8
200	20.5	200	29	200	35.2	200	42	200	43.3
250	19.6	250	27.8	250	34.6	250	40.5	250	42
300	18.1	300	26.8	300	33.5	300	39.3	300	40.7
350	17	350	25.3	350	32.1	350	38.2	350	39.4



10. Outside characteristics

CPXD-500

The following data are things by the condition below.
Input voltage: 200V
Frequency: 60Hz
Mode: CO_2 solid, 1.2mm, Voltage individually adjustment

Standard voltage 1V		Standard voltage 2V		Standard voltage 3V		Standard voltage 4V		Standard voltage 5V	
Current (A)	Voltage (V)	Current (A)	Voltage (V)	Current (A)	Voltage (V)	Current (A)	Voltage (V)	Current (A)	Voltage (V)
0	62.5	0	62.5	0	62.5	0	62.5	0	62.5
10	43	10	43	10	43	10	43	10	43
20	27.2	20	36	20	43.8	20	51	20	56.8
40	24.5	40	35	40	43.2	40	50.5	40	56.5
60	24	60	34.5	60	43	60	50.2	60	56
80	23.5	80	34	80	42.5	80	49.7	80	55.8
100	23	100	33.8	100	42.2	100	49.2	100	55.2
150	22.5	150	33.2	150	41.2	150	48.2	150	54.2
200	21.5	200	32.5	200	40.5	200	47.2	200	53.2
250	20.8	250	31.8	250	39.5	250	46.2	250	52.2
300	20	300	30.8	300	38.5	300	45.2	300	51.2
350	19	350	30	350	37.5	350	44.2	350	50.5
400	18	400	29	400	36.8	400	43.2	400	49.8
450	17	450	28	450	36	450	42.5	450	48.8
500	16	500	27	500	35.2	500	41.5	500	47.8