parweld

WELDING THE FUTURE

XTM 221Di

Service Manual

Issue 5

Safety Warning

Before working on this machine ensure the power supply is switched off.

Only trained competent persons should work on this machine.

Warning HEAT SINK and parts of the Circuit Board are over 300V when the machine is powered up.

PARTS AND REPAIR BOOK XTM 221Di

1. Removing the cover

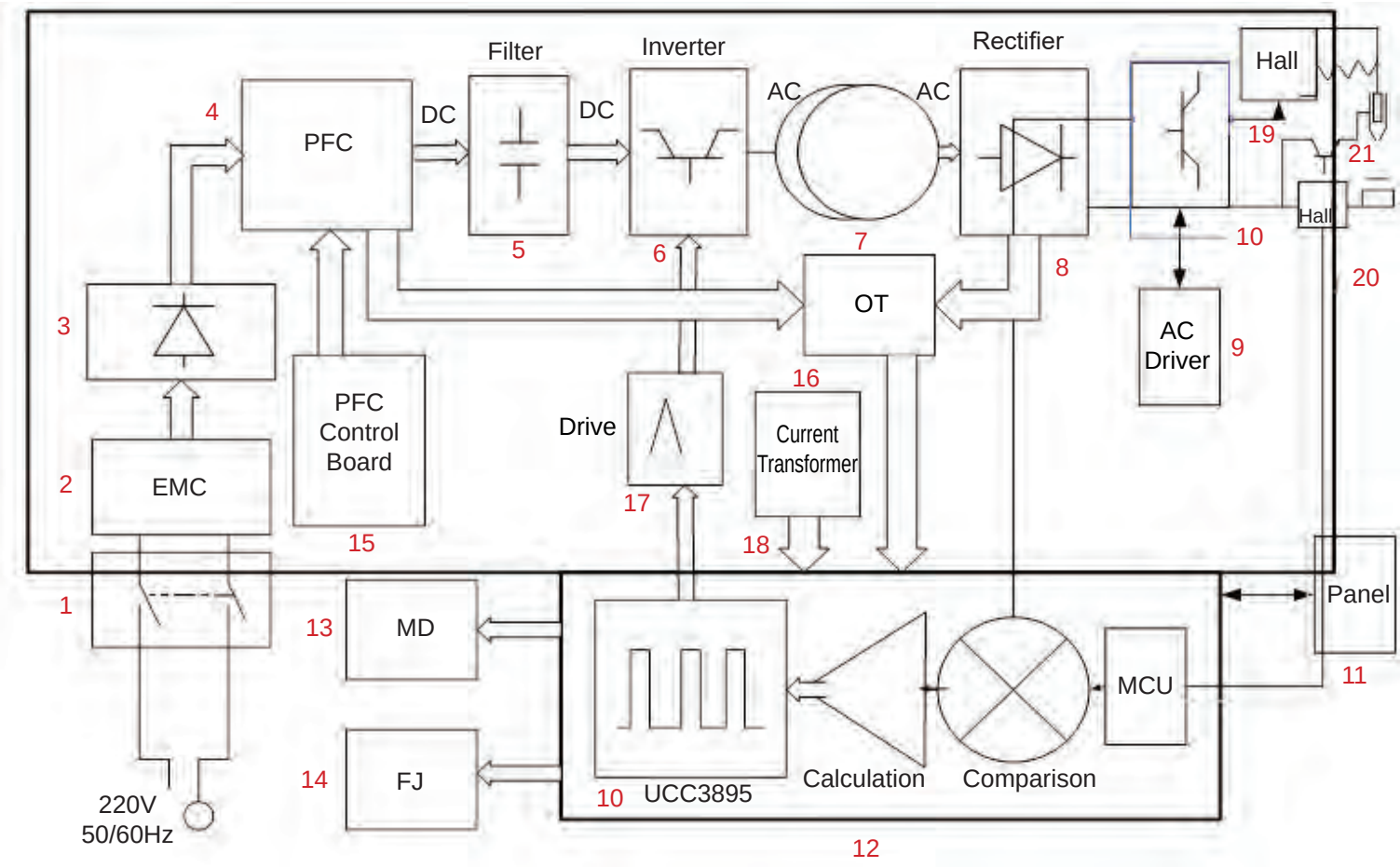
Remove the two socket screws (A) holding the top handle in place.

Remove the six pan head screws (B) from the top of the front and rear plastic panels.

Remove the three remaining hexagon head screws (C) holding the bottom of the cover.

Ease the front and rear plastic panels apart at the top to release and remove the cover.

1. ELECTRICAL PRINCIPLE DRAWING



2. PARTS INTRODUCTION

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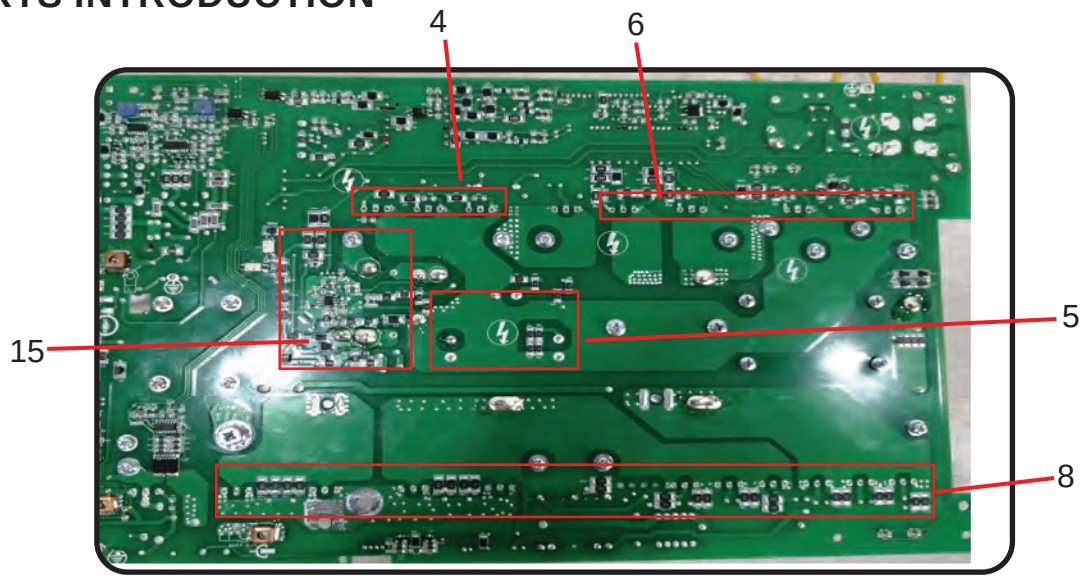
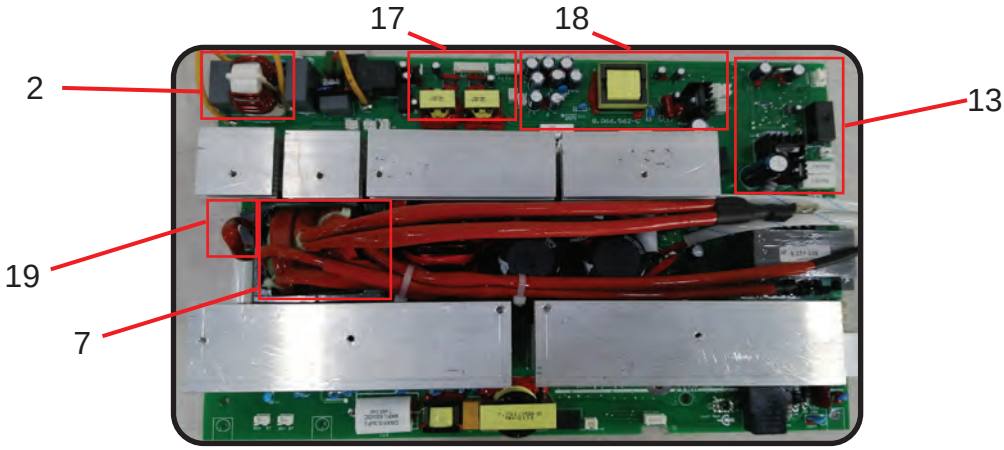
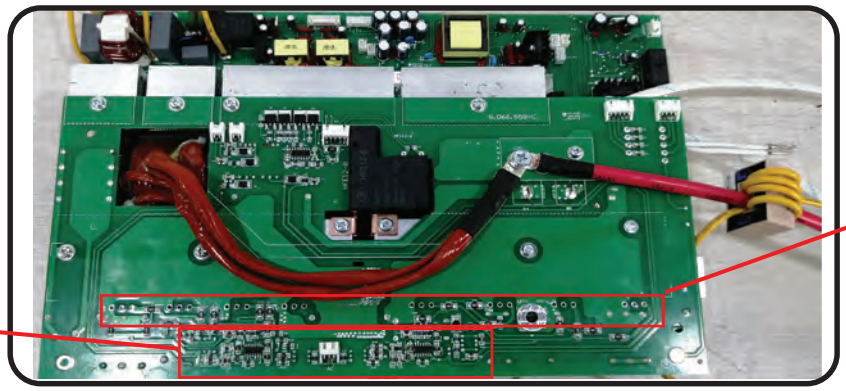
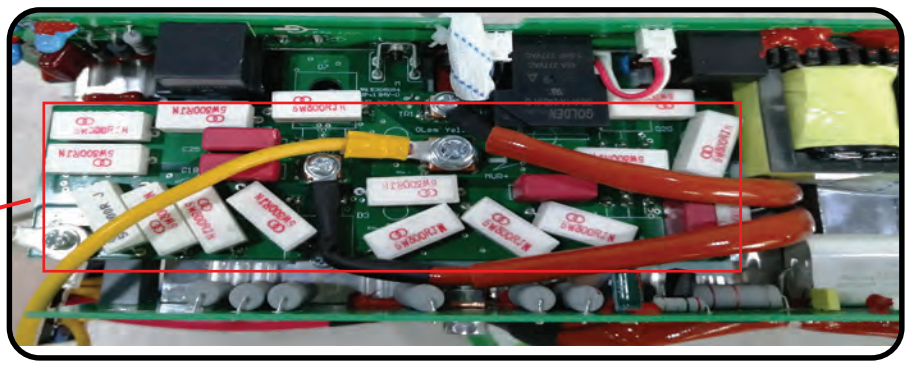






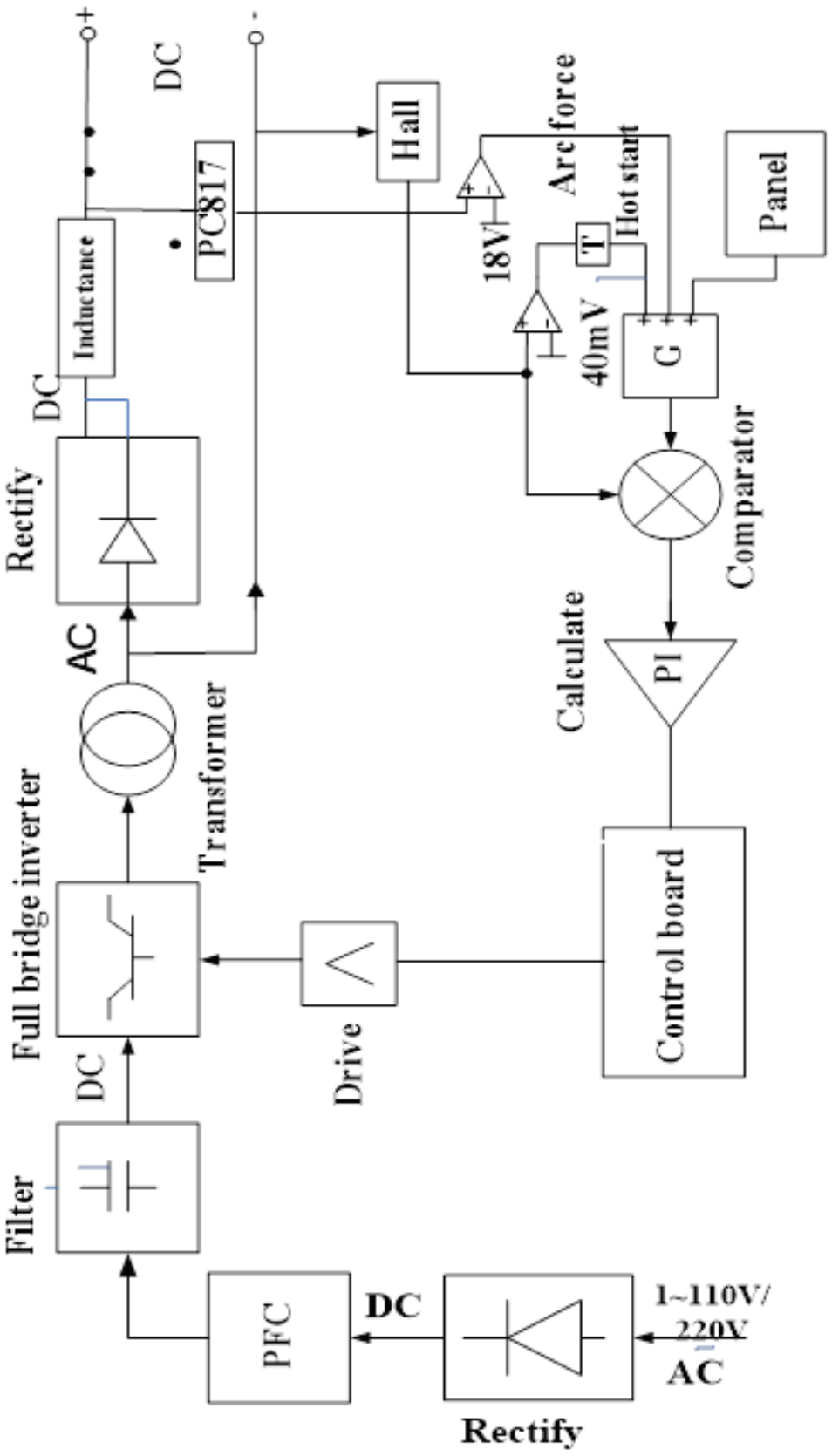


2. PARTS INTRODUCTION

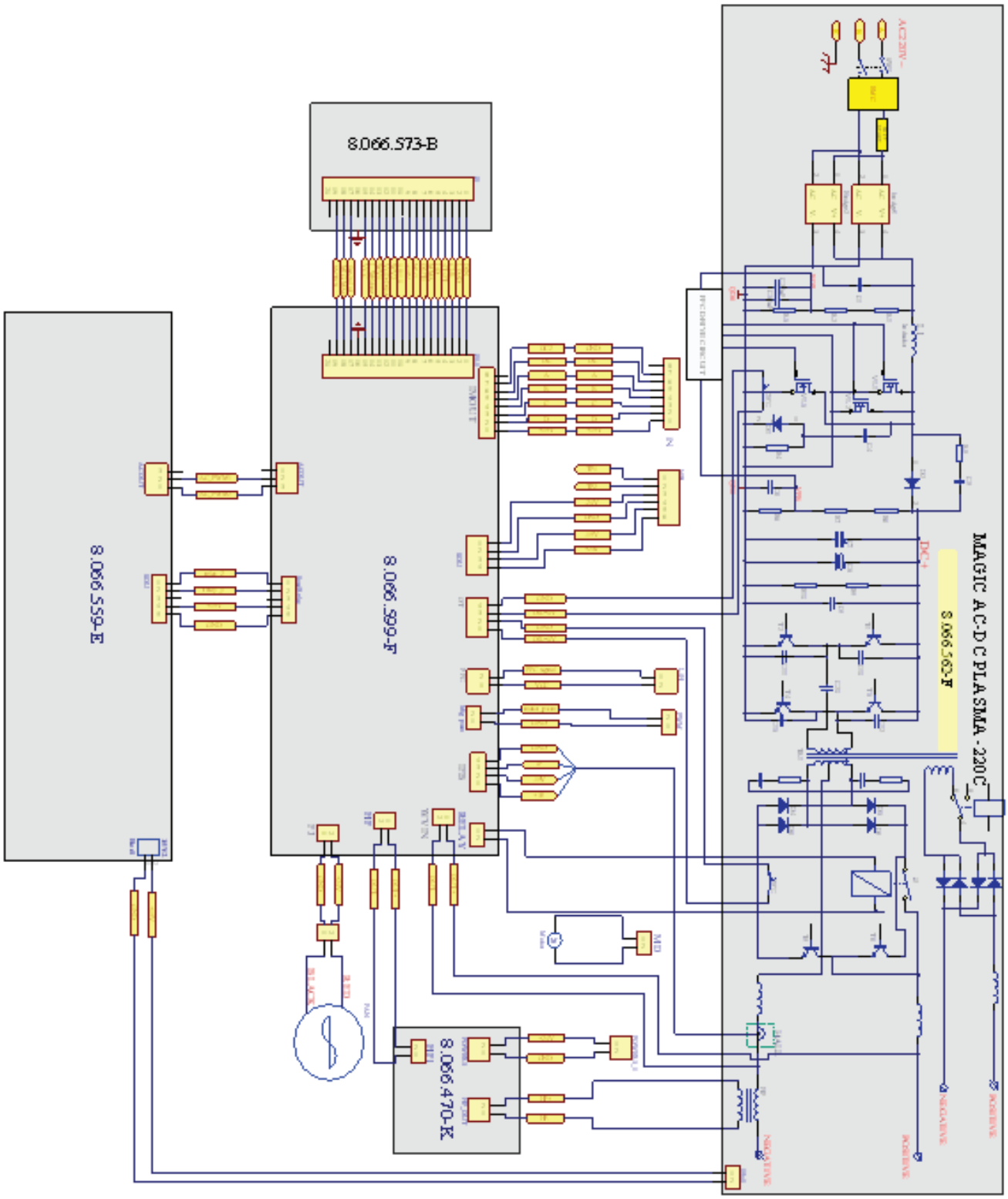
Item	Part	Description
1.	Power Source Switch	Located on the back panel it is used to switch the machine.
2	EMC	A filter composed of inductance, capacitor and Y2 capacitor.
3	Single Phase Rectifier	Single phase rectifier bridge composed of high voltage diode it rectifies AC to DC voltage.
4	PFC Boost Circuit	According to the PFC boost technology it improves the rectified voltage to almost 385V thereby increasing the power factor.
5	Main Capacitor	The electrolytic capacitor is used to store the energy after the rectifier. In addition it eliminates harmonics and reduces interference.
6	Inverter	Inverter boosts the voltage to a mid-frequency alternating current with adjustable pulse width.
7	Main Transformer	Reduces the voltage to acquire the correct value for welding.
8	MUR Phase Rectifier	It consists of a quick recovery diode and an absorption circuit to rectify the output back to DC.
9	Display Panel	Adjustment and display of welding parameters.
10	Second Inverter Drive	Invert the Output from DC into AC.
11	Second Inverter Control	Supply drive wave to AC IGBT.
12	Control Circuit	Controls the welding machine and ensures the reliability and stability of the output.
13	Motor Control Circuit	When MIG is chosen it supplies and adjusts the wire feeding.
14	Fan	Cools the inside of the machine.
15	PFC Control Circuit	It achieves PFC booster circuit.
16	Thermal	Detects overheating in the machine.
17	Drive Transformer	Provides stable power for inverter control.
18	Switching Power Supply	Supply circuit for the control circuit, PFC control circuit and motor power supply circuit.
19	Current Transformer	Monitors the current in the circuit. Prevents failure due to over current.
20	Euro Connector	Connection for MIG welding torch.
21	Gas Connector	Gas output for TIG welding.

22	Twist Lock Socket	Connection for TIG torch, MMA torch, and earth lead
23	Trigger Socket	Control socket for the TIG torch
24	Central Connector	For Plasma torch connection
25	Cut MUR	Rectifier and absorption circuit for cutting mode

3. SYSTEM OPERATION SCHEMATIC



4. SYSTEM SCHEMATIC



5. TEST PROCEDURES

MAIN PCB

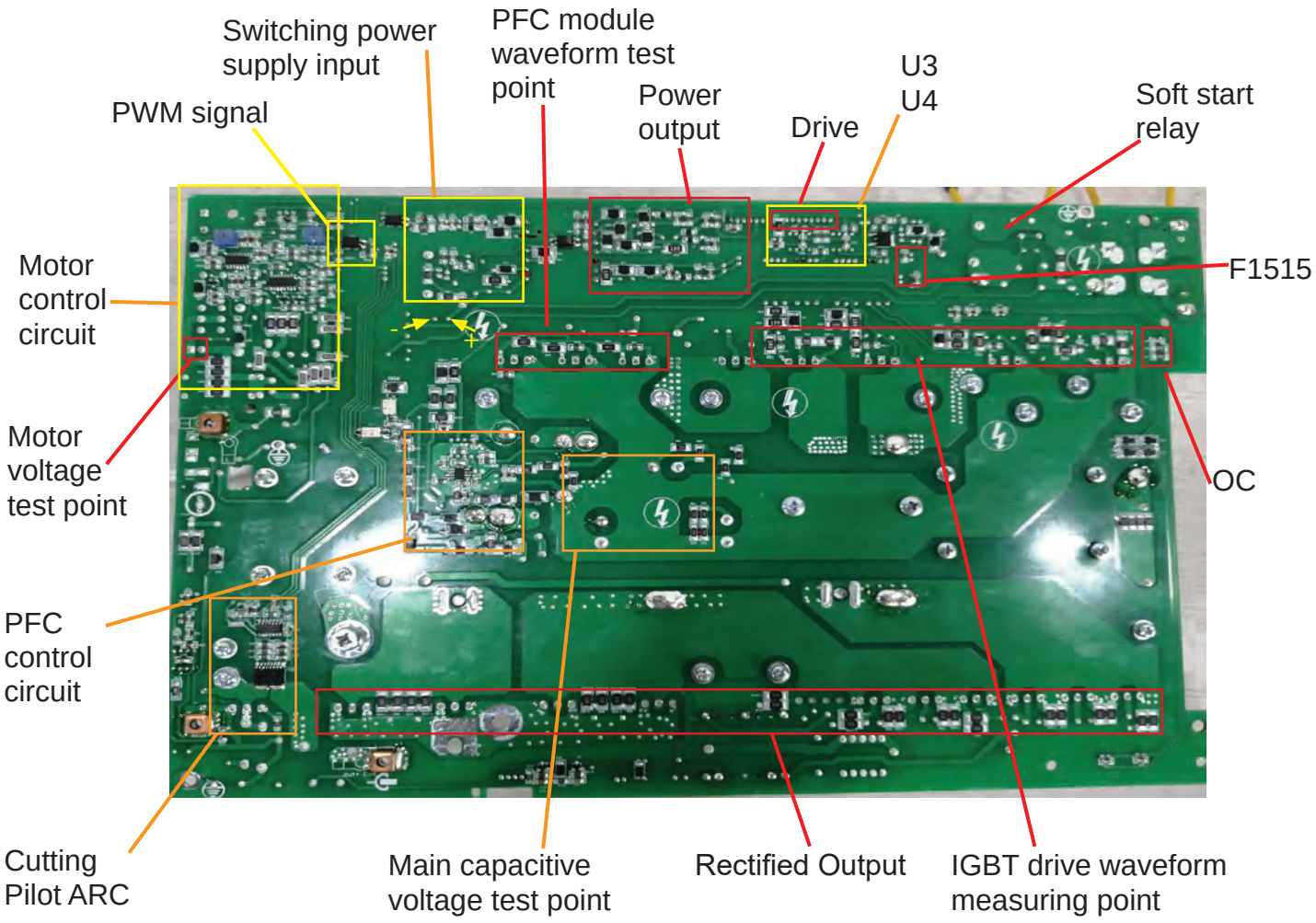
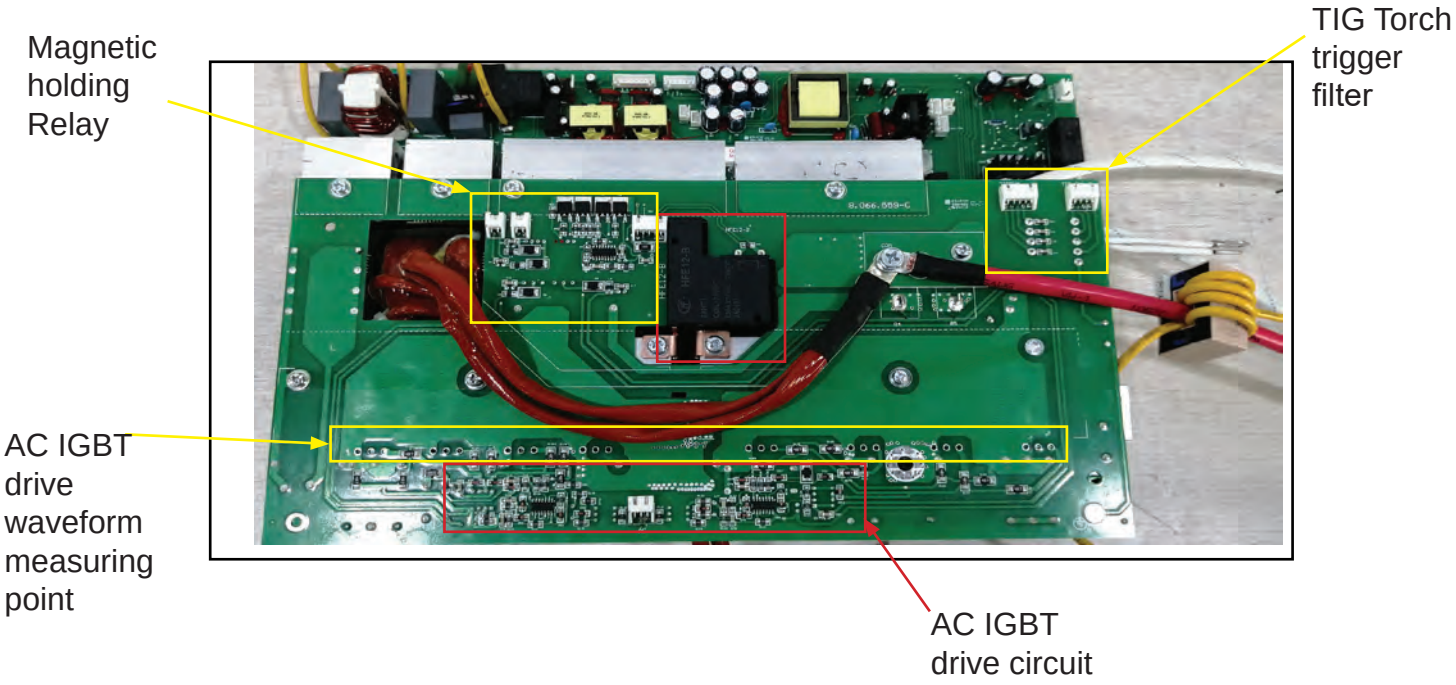
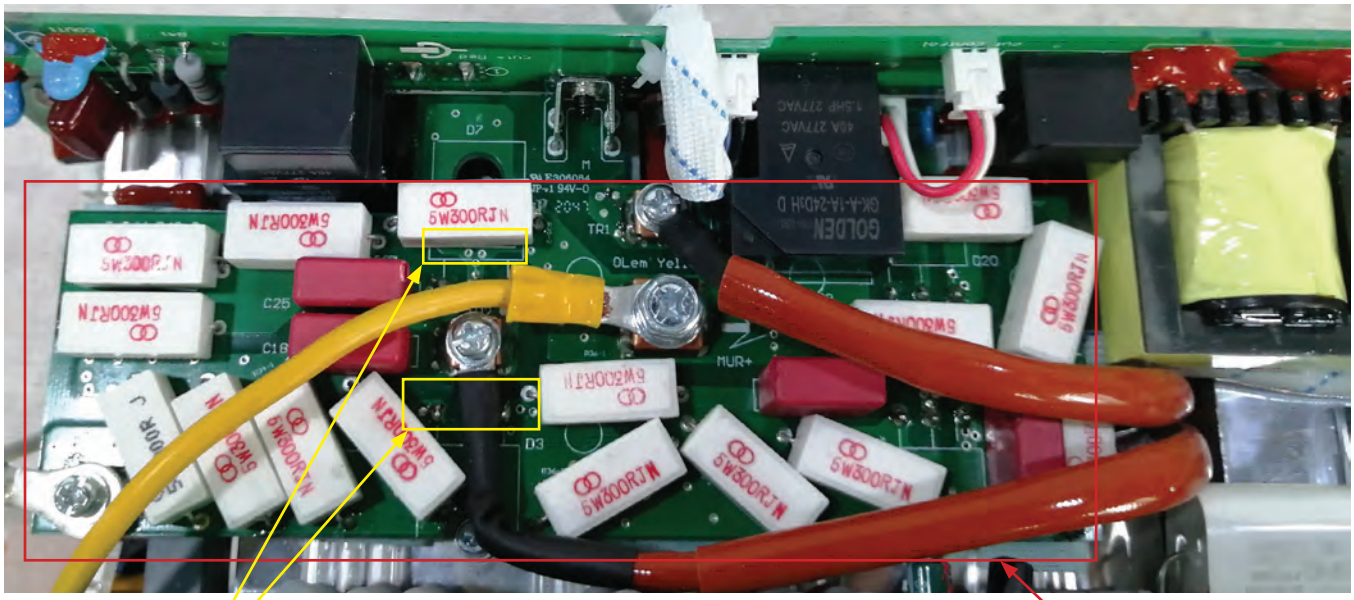


Fig 2.1





The main circuit functions and tests are shown above. This machine adopts the mode of switching power supply and main circuit. Therefore, the main circuit is more complex. To locate faults the follow the guidance in the following order. Specific fault condition can be divided into 5 categories:

1) The machine works normally, but there is intermittent loss of power. If this happens, check to see if the soft start relay is operating correctly. Measure to see if the relay coil voltage is 24V.

2) Machine module failure

The machine is a 1~110V, 1~220V. dual voltage compound machine. This module can be divided into four parts. Various tests are shown in the Fig 2.1. Replace the damaged module after checking measurements in accordance with the following. Diode /IGBT Tests

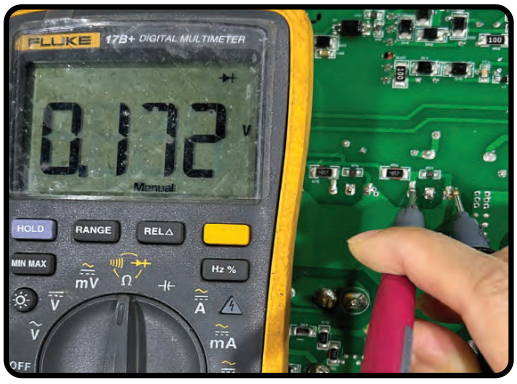
5. TEST PROCEDURES

TESTING PREPARATION

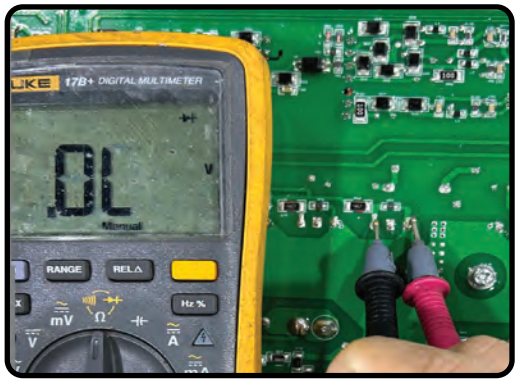
- Firstly, power must be turned off
- Start the test after 5 minutes of power off
- Set the multimeter to diode to test.
- Testing time must be above 3 seconds to get a stable reading

2.1) PFC booster module (2x IGBT side by side)

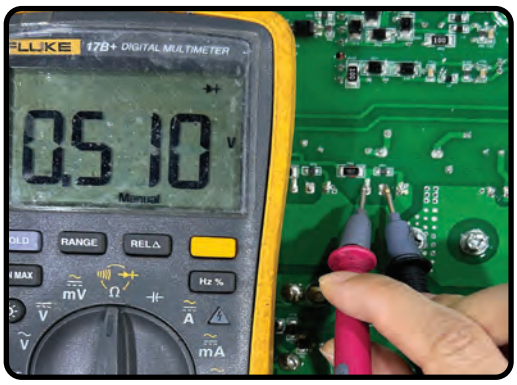
The following readings will be displayed if the IGBT module is in working order, otherwise it is faulty.



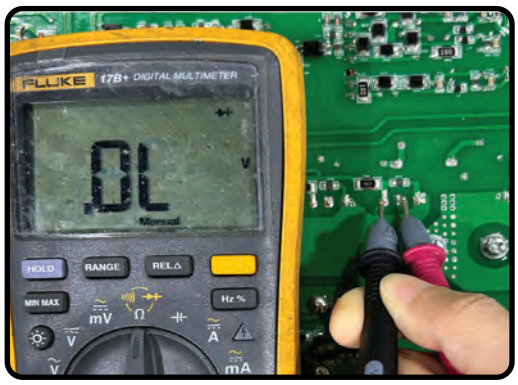
IGBT Test
Gate (Red) - Emitter (Black)



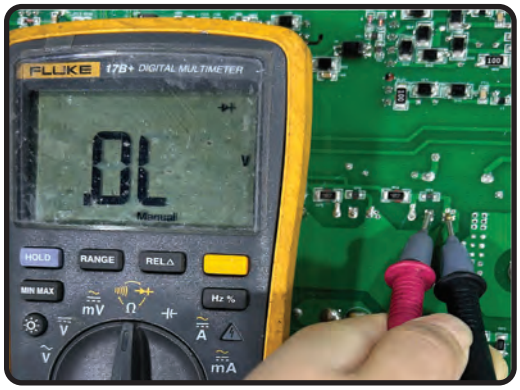
IGBT Test
Emitter (Red) - Gate (Black)



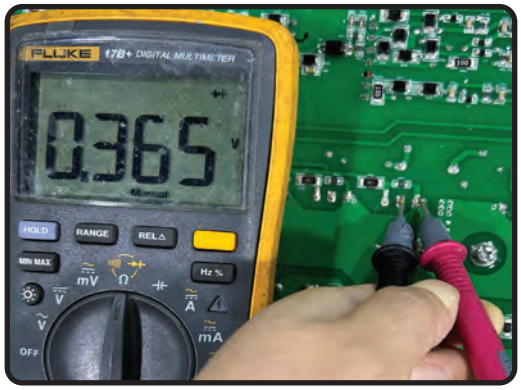
IGBT Test
Gate (Red) - Collector (Black)



IGBT Test
Collector (Red) - Gate (Black)



IGBT Test
Collector (Red) - Emitter (Black)

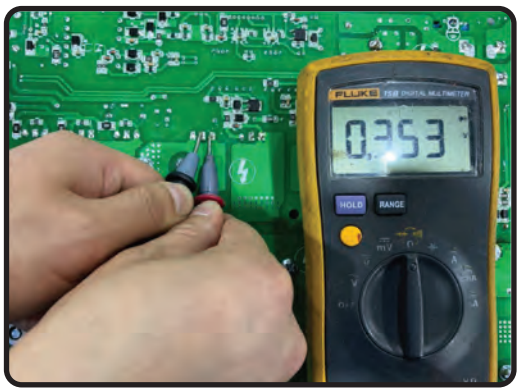


IGBT Test
Emitter (Red) - Collector (Black)

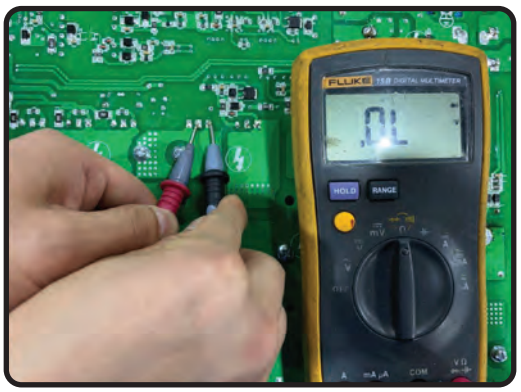
5. TEST PROCEDURES

2.2) Isolating diode (2 off side by side)

The following readings will be displayed if the diode module is in working order, otherwise it is faulty.



Diode Test
Positive Pole (Red) - Negative Pole (Black)

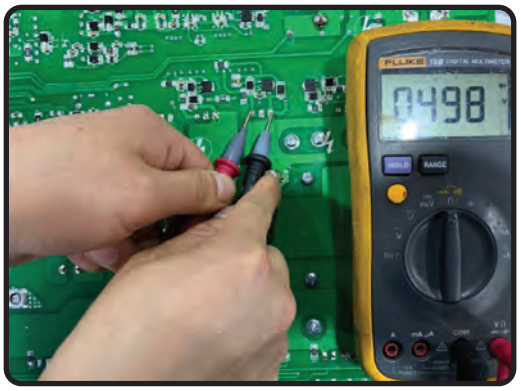


Diode Test
Negative Pole (Red) - Positive Pole (Black)

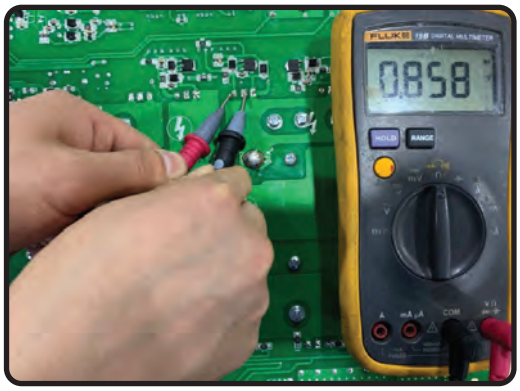
2.3) Inverter module (2 off side by side)

The following readings will be displayed if the IGBT module is in working order, otherwise it is faulty. Replace the module according to the test result.

IGBT Test
Emitter (Red) - Gate (Black)



IGBT Test
Gate (Red) - Emitter (Black)



IGBT Test
Gate (Red) - Collector (Black)

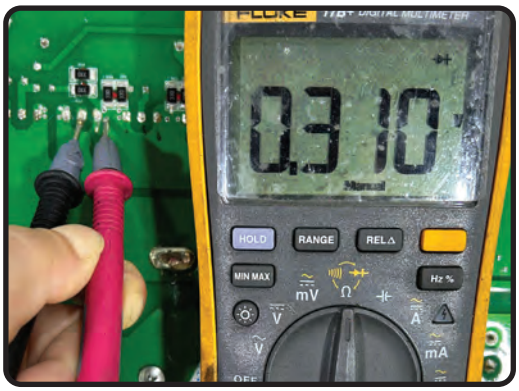
IGBT Test
Collector (Red) - Gate (Black)

5. TEST PROCEDURES

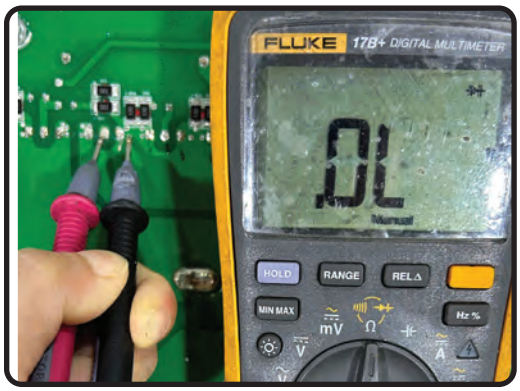
IGBT Test
Collector (Red) - Emitter (Black)

IGBT Test
Emitter (Red) - Collector (Black)

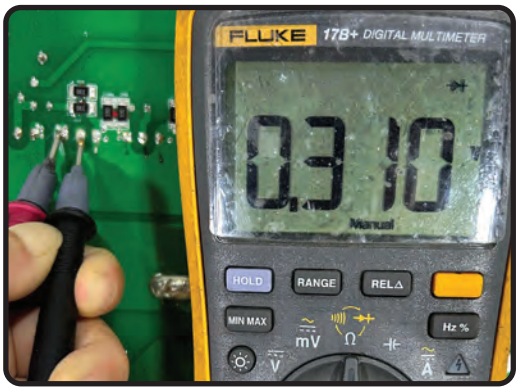
2.4) Output MUR



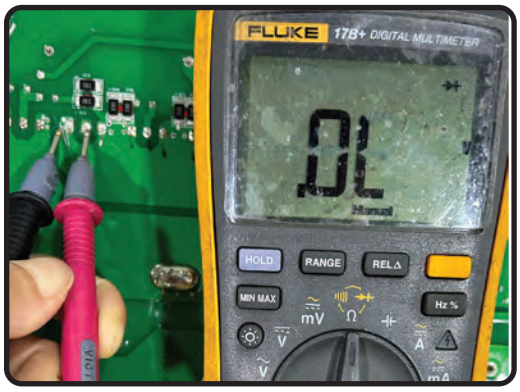
Quick Recovery Test
Positive Pole (Red) - Negative pole (Black)



Quick Recovery Test
Negative Pole (Red) - Positive Pole (Black)



Quick Recovery Test
Positive Pole (Red) - Negative pole (Black)

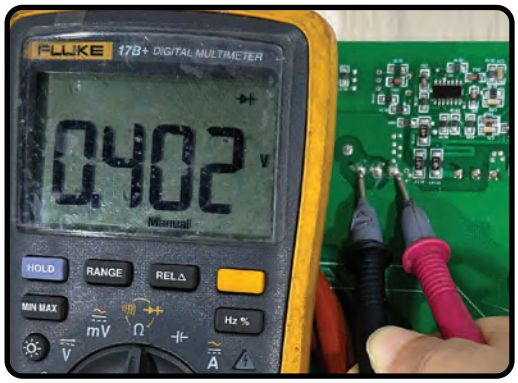


Quick Recovery Test
Negative Pole (Red) - Positive Pole (Black)

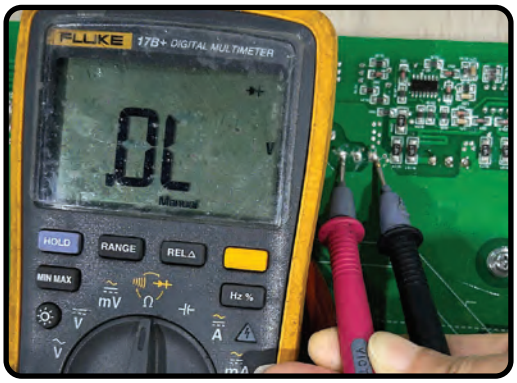
5. TEST PROCEDURES

2.5) Second Inverter (AC) IGBT

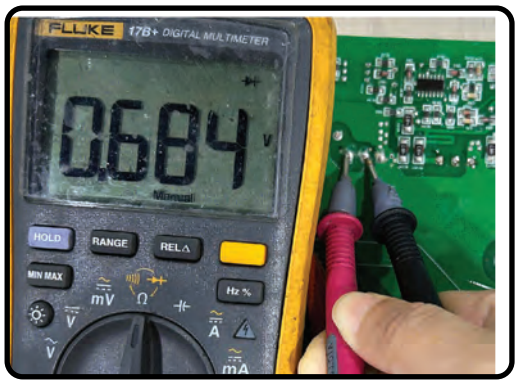
If you get the following value the IGBT module is good, otherwise it is broken and needs replacing.



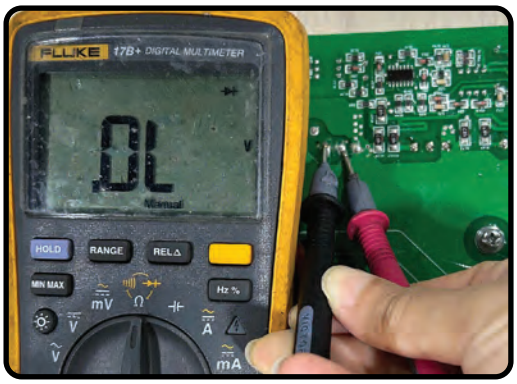
IGBT Test
Emitter (Red) - Gate (Black)



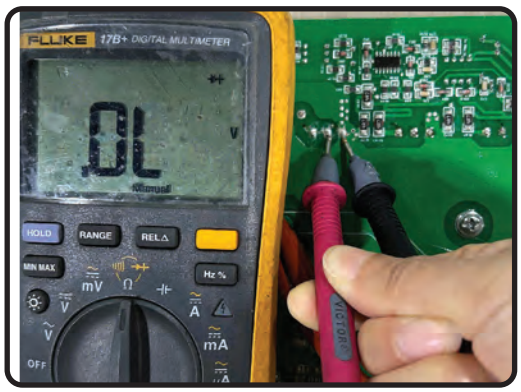
IGBT Test
Gate (Red) - Emitter (Black)



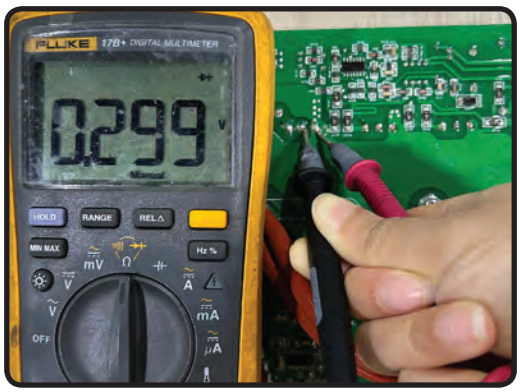
IGBT Test
Gate (Red) - Collector (Black)



IGBT Test
Collector (Red) - Gate (Black)



IGBT Test
Collector (Red) - Emitter (Black)

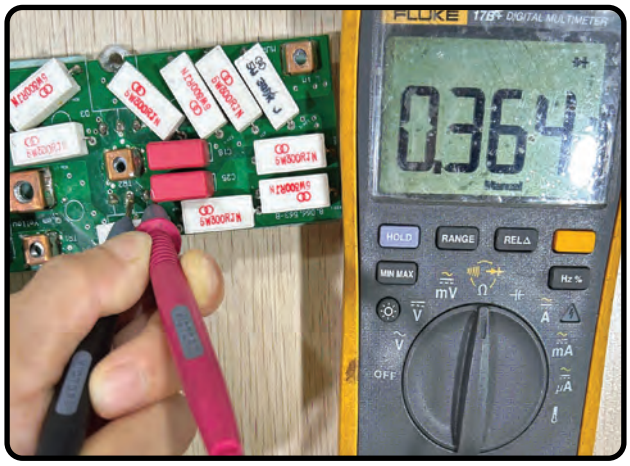


IGBT Test
Emitter (Red) - Collector (Black)

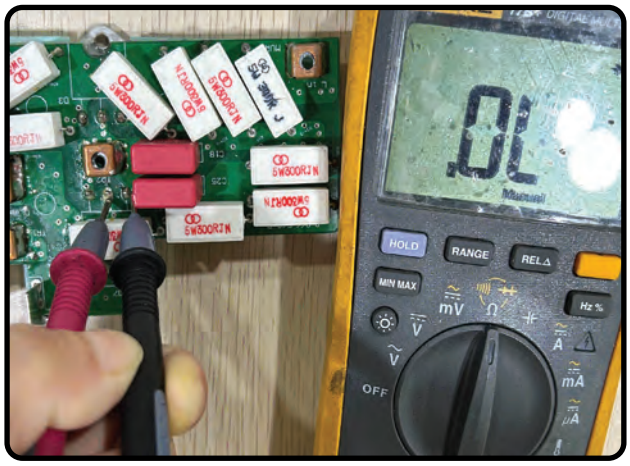
5. TEST PROCEDURES

2.6) PLASMA MUR

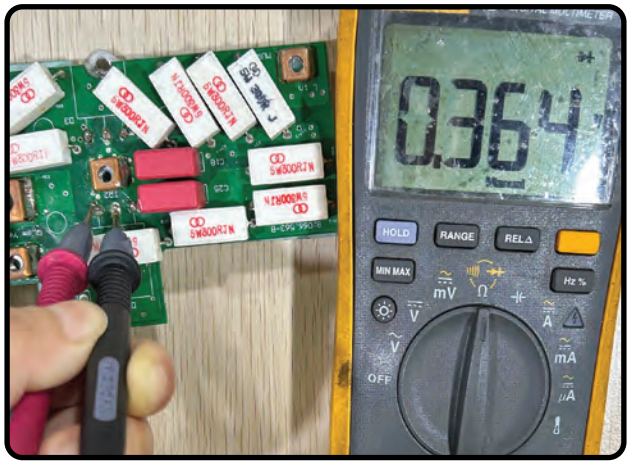
If you get the following value,s the MUR is OK otherwise it is broken and needs replacing.



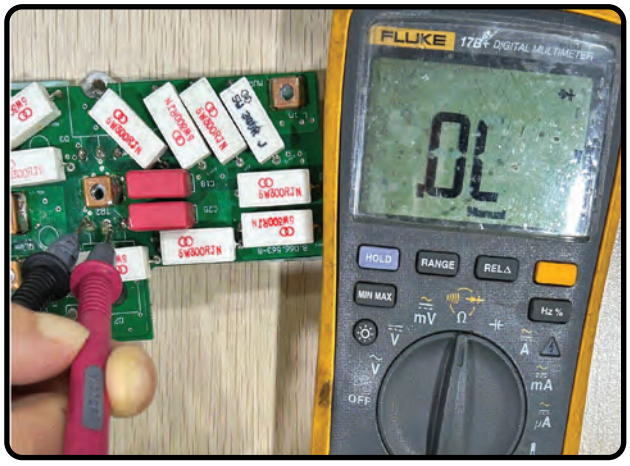
Quick recovery Diode Test
Positive (Red) - Negative (Black)



Quick recovery Diode Test
Negative (Red) - Positive (Black)



Quick recovery Diode Test
Positive (Red) - Negative (Black)



Quick recovery Diode Test
Negative (Red) - Positive (Black)

5. TEST PROCEDURES

3) Start the machine, display does not switch on.
The main power supply does not work but the module is not visibly damaged.

Take off the main circuit board (Fig 2.1) connect to an external DC power supply to a designated spot which is labelled in Fig 2.1. Distinguish negative and positive pole and remove 0Ω resistance.

Turn on the external power supply (DC310V) , check whether the output voltage of the power supply to the control card is correct. ±24V. If the power supply is incorrect, check whether the switch power is working properly. The small 6 pin socket SOU +24V,+15V,GND,-24 which is printed on 8.066.562-F PCB;The small 2 pin socket Opwer1 and Opwer2 +24V which is printed on 8.066.562-F PCB. If, Check whether the switch power is working properly.
If the power supply is normal,Check whether the control panel is working properly and the panel wiring is correct As shown in figure 2.6, The fault of control board to see in next section

Fig 2.7 Display Panel

When the power output is normal, test the 8-core drive output wave. If drive output is normal, Measure the output of U3 and U4 and test whether the drive module is normal, check them in sequence.

4) Drive and display are normal. The output has no-load voltage its voltage can't reach correct value.

This situation is generally caused by the failure of the PFC control circuit. Firstly, measure whether the voltage of the main capacitor is around 385V.If PFC work normally, check negative pole output's contraction and output dummy load resistance. If the voltage of the main capacitor is less than 385V,check PFC control circuit.

Take off high voltage
Test switch power supply voltage after rectifier. Test whether the power supply of F1515 is normal. When the power supply is normal, one side of two 68K resistance connected with7 pin of U1 another side connected to 5 and 6 pin of U1.Then test the drive of pin 8 footprint of U1if it is wrong, change U1. Finally, test R38 output waveform. If the waveform is wrong change U2, else check the drive resistance and PFC IGBT.

5) MMA is normal, MIG feeding wires is abnormal

MMA works normally indicates main loop and control loop are normal. In this condition, check the motor circuit .Firstly, According to the motor voltage test point measurement, the motor voltage is controlled and the output is normal. If they are correct. Check the motor. else check the following principles one by one.

a) Boot in MIG state, adjust the panel to feed wires knob. Test the output of each pin of U02 is normal and controllable, if it is correct, motor control circuit has some problems, else control board is abnormal. The plate failure is shown in the next section.

b) Test the following points according to the schematic diagram

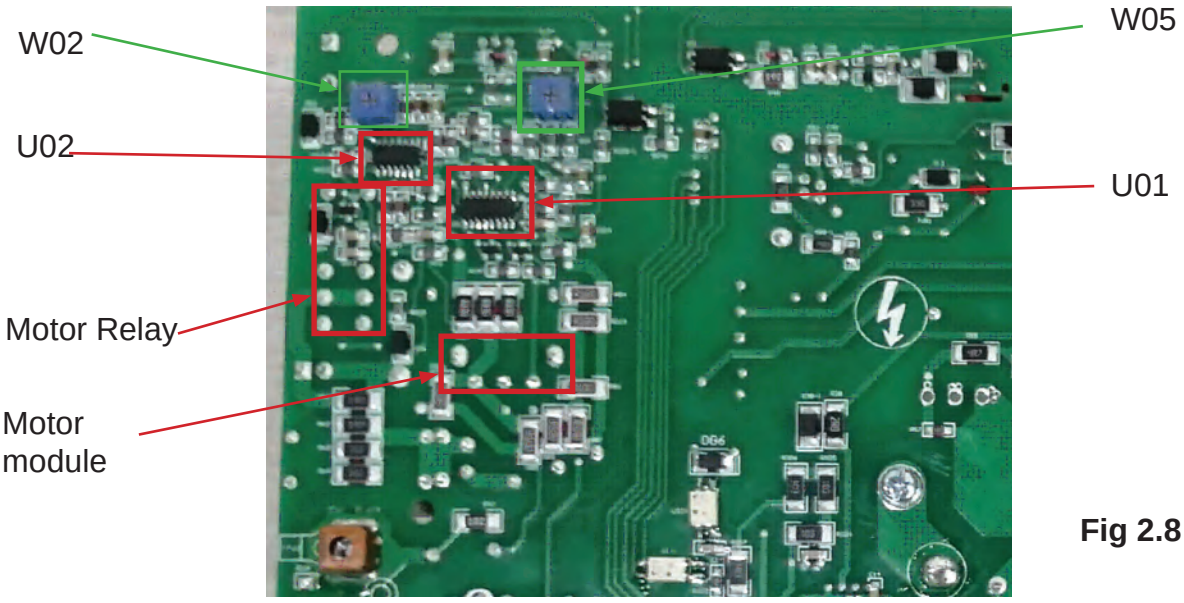


Fig 2.8

FIG. 2-8 Schematic diagram of motor test

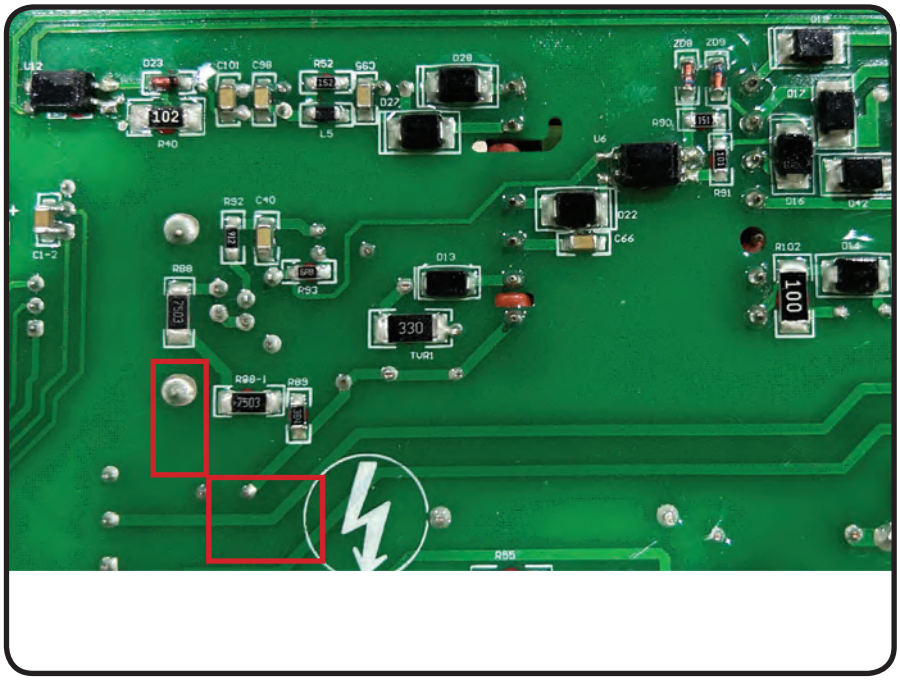
5. TEST PROCEDURES

I, Measure whether the motor module is damaged
II, Switch the panel welding mode to MIG mode, and measure whether the motor relay can is switching properly.
III, Adjust the control panel motor speed control knob to measure the output voltage of the 7 pin of U02, check the voltage is controlled.
IV, Measure the pulse width of the 11 and 14 feet of U01 can be adjusted with the wire feeding.
V, Measure whether the voltage of the motor is controllable, which is 4.2V to 24V

According to the above test analysis replace the corresponding devices. If the above is normal, but the motor is out of proportion or uncontrollable, check whether the ZD13 direction is correct and whether D019 is removed.

6) The machine is over voltage error

I) Measure the value of this three resistors, the value of them is 750k, 750k, 390k.



5. TEST PROCEDURES

II) Measure the voltage in the capacitor as show in the picture, the voltage is 430V, if it is exceed, please check the input power, if it is OK, the change the 390k (footprint:1206) until the voltage is normal.

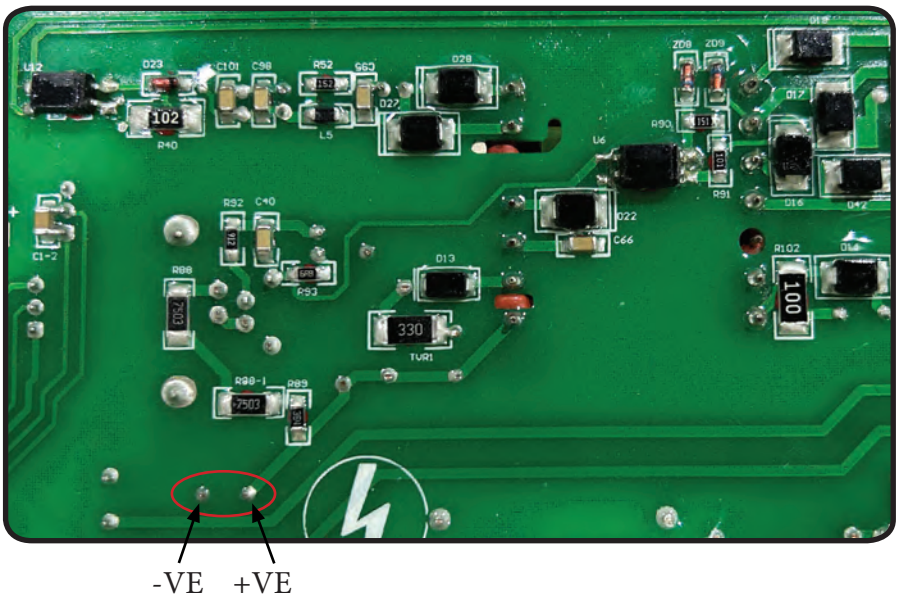
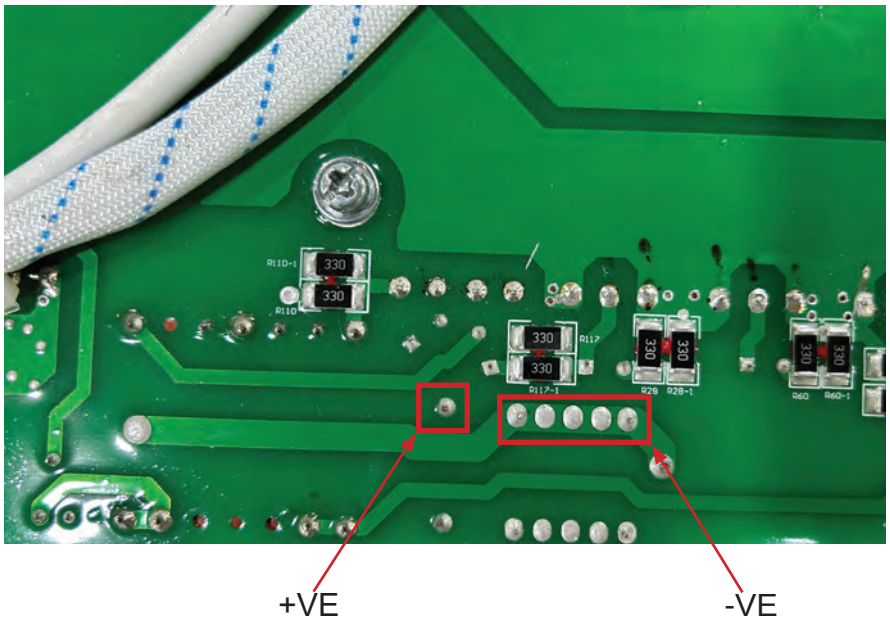


Fig 3.1

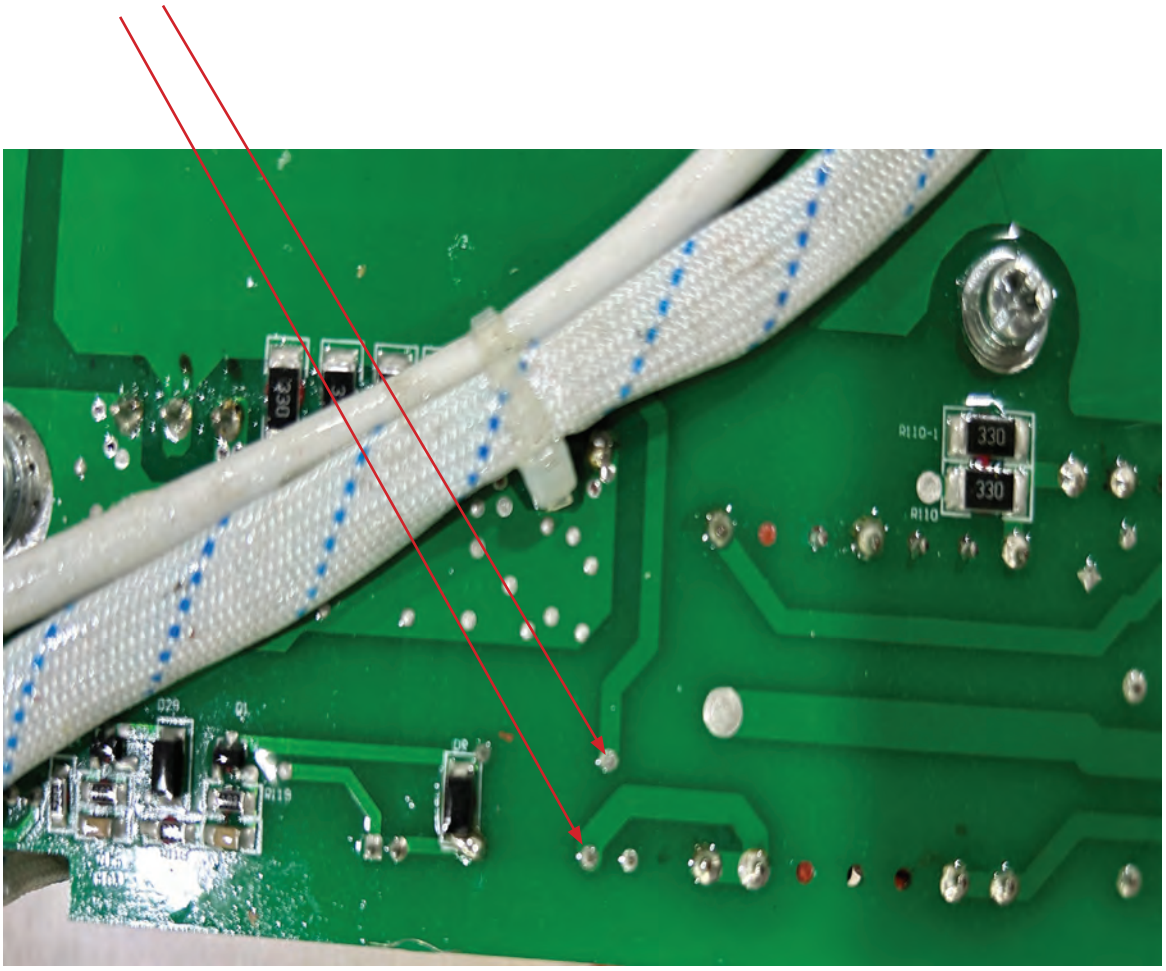
7) ARC is abnormal in AC TIG mode

If the voltage is not correct, when measured as below,the correct voltage is around 230V DC, please check according to the following



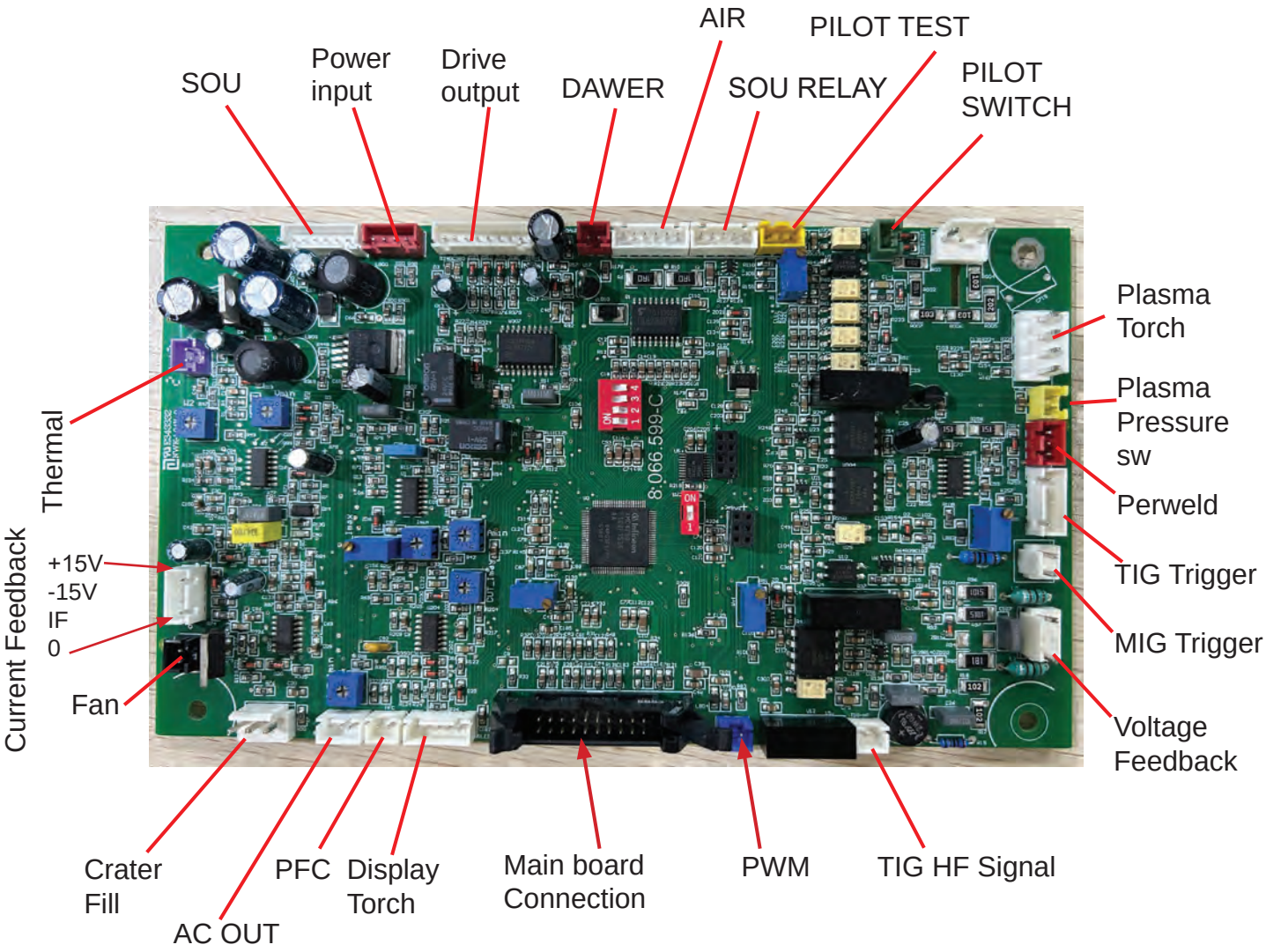
5. TEST PROCEDURES

Use multimeter in diode mode and measure across the 2 points



5. TEST PROCEDURES

Control board



(1) SOU Header Pin function Signal
1 24V -24 VDC
2 0VDC 0 VDC
3 15V +15 VDC
4 24V +24 VDC
Connects to sou on 8.066.562-F PCB

(2) Control_power Header Pin function Signal
1 0VDC 0 VDC
2 Auxiliary voltage relay +24 VDC
3 Cut relay control 0 VDC
4 24V +24 VDC
Connects to control_power on 8.066.562-F PCB

DRIVE Header Pin Pin function Signal
1 +15V 15 VDC
2 IGBT pwm drive signal D, 15V p-p square wave 12 VDC pk
3 IGBT pwm drive signal C, 15V p-p square wave 12 VDC pk
4 IGBT pwm drive signal B, 15V p-p square wave 12 VDC pk
5 IGBT pwm drive signal A, 15V p-p square wave 12 VDC pk
6 Rectified primary of current transformer 15 VDC pk
7 0V 0 VDC
8 No connection N/C
Connects to IMOUT on 8.066.562-F PCB

DAWR Header Pin Pin function Signal
1
2

AIR Header Pin Pin function Signal
1 MIG Solenoid negative 0 VDC
2 24V +24 VDC
3 TIG Solenoid negative 0 VDC
4 24V +24 VDC
5 CUT Solenoid negative 0 VDC
5 24V +24 VDC

SOU/RELAY Header Pin Pin function Signal
1 Magnetic holding Relay control signal
2 Magnetic holding Relay control signal
3 No connection N/C
4 15V +15 VDC
5 0V 0 VDC
Connects to SOU on 8.066.559-E PCB

PILOT_Test Header Pin Pin function Signal
1 5V +5 VDC
2 PILOT current signal
3 0V 0 VDC
Connects to transf_IFB1 on 8.066.562-F PCB

Plasma Torch Header Pin Pin function Signal
1 Plasma GUN nozzle test signal
2 Plasma GUN nozzle test signal
Connects to SOU on 8.066.562-F PCB

Cut voltage feedback, WVIN Header Pin Pin function Signal
1 Positive welding terminal positive VDC
2 No connection n/c
3 Negative welding terminal 0 VDC
Connects to terminal Negative and Positive of CUT

Plasma torch _GUN Header Pin Pin function Signal
1 CUT-gun switch
2 CUT-gun switch
3 CUT-gun test signal
4 CUT-gun test signal
Connects to the CUT aviation plug ON front panel

QY Header Pin Pin function Signal
1 CUT-gas pressure test signal
2 CUT-gas pressure test signal
(12)perweld Header Pin Pin function Signal
1 15V +15 VDC
2 0V 0 VDC
3 gun signal
(13) TIGGUN Header Pin Pin function Signal
1 0V 0 VDC
2 Tig gun switch signal
3 15V +15 VDC
4 remote/pedal signal
5 0V 0 VDC
Connects to the TIGGUN ON 8.066.559-E PCB
(14)MIG_GUN Header Pin Pin function Signal
1 MIG-gun switch
2 MIG-gun switch
Connects to the MIG aviation plug ON front panel
(15)WVIN Header Pin Pin function Signal
1 Positive welding terminal
2 No connection n/c
3 Negative welding terminal
Connects to terminal Negative and Positive
(16)TIG-HF Header Pin Pin function Signal
1 TIG-HF switch signal in TIG mode
2 TIG-HF switch signal in TIG mode
Connects to the HF ON 9.066.470-M PCB

(17) Mig-pwm Header Pin Pin function Signal
1 0VDC 0 VDC
2 Motor pwm drive signal 5VDCpk
Connects to the PWM on 8.066.562-F PCB
(18) J3 Header Pin Pin function Signal

(19) OLED-Gun Header Pin Pin function Signal
1 +5VDC 5 VDC
2 OW_BUS signal
3 OW_pull signal
4 0VDC 0 VDC
5 Gun switch

5. TEST PROCEDURES

CONTROL PCB

PFC Header Pin Pin function Signal
1 0VDC 0 VDC
2 PFC test signal
Connects to the L/H on 8.066.562-F PCB

ACOUT Header Pin Pin function Signal
1 AC IGBT pwm drive signal 5VDCpk
2 AC IGBT pwm drive signal 5VDCpk
Connects to the AC on 8.066.559-E PCB

CR Header Pin Pin function Signal
1 0V 0 VDC
2 Wiper 10k Burnback potentiometer(0 ~ 5 VDC)
3 +5V 5 VDC
Connects to 10k Burnback potentiometer

FAN Header Pin Pin function Signal
1 0V (When the Fan is running)
2 24VDC +24 VDC
Connects to the Fan on rear panel

Current feedback IFB Header Pin Pin function Signal
1 +15V +15 VDC
2 -15V -15 VDC
3 Current sensor signal
4 0V 0 VDC Connects to welding output current sensor

Thermal (OT) Header Pin Pin function Signal
1 0V 0 VDC
2 thermal signal
Connects to the OT on 8.066.562-F PCB

5. TEST PROCEDURES

The control board is the core of the whole machine, it directly determines the stability, safety and reliability of the machine. Its wires are shown in the figure above. In practical application, the control board failure is more common in the following types.
(1) Abnormal power supply of control panel, the display panel does not work.
The control panel power supply is the center of the entire control panel. If the main circuit is normal. After connecting the power. Whether the switch power supply is +24V +15V -24V, the 3 pin of U802 and 2 or 4 pin of U15 are normal, If abnormal, please replace the correct chip.

Feedback current.

Pin	Electrical Connection	typical values
1	Connect	+15V +15V
2	Connect	-15V -15V
3	Feedback current input	
4	GND	

Table 2-1

Power supply.

Pin	Electrical Connection	typical values
1	connect +24V power supply	+24V
2	connect +15V power supply	+15V
3	GND	
4	connect -24Vpower supply	-24V

Table 2-2

(2) Control panel driver output has exception
Switch the panel to MMA state, According to the pie chart, Test whether 15 pin of drive chip UCC3895 power supply is correct, whether 13, 14, 17, 18 pin output pulse is normal, and whether the voltage of 20 pin is normal nor adjust IMIN, Imax. If the driver is still not, replace UCC3895.
Drive:

Pin	Electrical Connection	typical values
1	connect VCC +15V	+15V
2	connect D pulse output of UCC3895	6V (See figure 4.5 for oscilloscope)
3	connect C pulse output of UCC3895	6V (See figure 4.5 for oscilloscope)
4	connect B pulse output of UCC3895	6V (See figure 4.5 for oscilloscope)
5	connect A pulse output of UCC3895	6V (See figure 4.5 for oscilloscope)
6	connect over-current protectionOC	0~4V
7	GND	

Table 2-3

Use the oscilloscope to measure the 13, 14, 17 and 18 pins of UCC3895, get the waveform as shown below.This indicates that the control panel is working normally, Otherwise, please replace UCC3895 or replace the control board.

5. TEST PROCEDURES

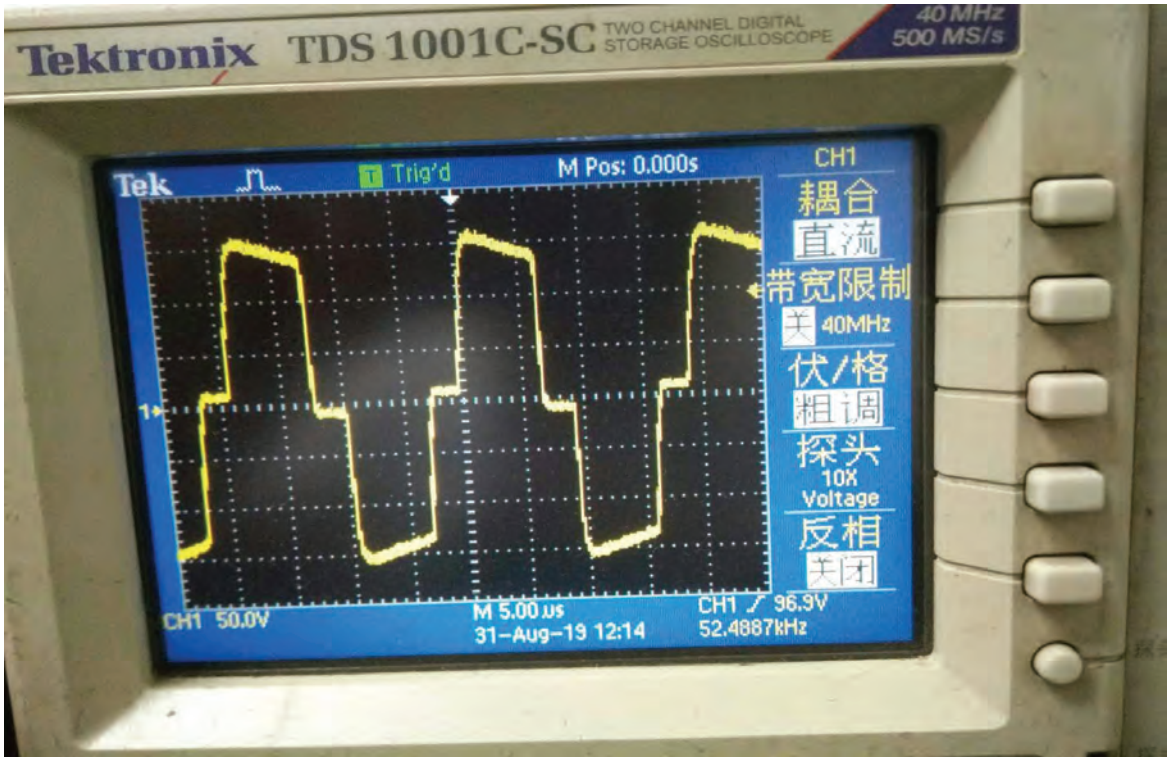


FIG 2-9

Fan, gun switch, and air valve don't work, Voltage feedback has failure
According to the corresponding fault, test the output signal of the single chip and the decoupling feedback signal. If abnormal, replace the corresponding opt coupler.

MOD: When burn process, 2-pin and 3 pin should be shorted.

Voltage feedback:Voltage feedback is consistent with panel display voltage.
AIR: Pin 1, 2 connect with the MIG valve signal: Pin 3, 4 connect with TIG air valve. Pin 5, 6 connect with CUT air valve .

Temperature alarm input:test voltage between pin 1 and 2 or 3 and 4 by multimeter, check whether the voltage is 15V.
Gun switch:Connect to TIG, MIG gun switch.

Number	Barrier	Possible Cause	Overhauling Method
1	Turn on the power switch, the front panel is not bright and the fan turn.	Front panel fault.	Check the front panel circuit.
		LCD fault.	Replace.
		Internal power board fault.	Repair or replace the power plate.
2	Turn on the power switch, the front panel is bright and the fan does not turn.	A foreign body is stuck in the fan.	Clear fan an test again .
		The fan startup capacitor is damaged.	Replace.
		Fan motor failure.	Replace fan.
3	Turn on the power switch, the front panel is not bright and the fan does not turn.	No voltage input.	Check for power input.
		Fuse burn-out or air switch damaged.	Replace.
4	No no-load voltage output MMA.	Internal failure of welder	Overhaul main circuit and printed circuit board accessories
5	No gas output TIG.	The argon bottle does not been opened or air pressure is insufficient.	Open the argon cylinder valve door or replace the argon bottle.
		No solenoid valve control signal output.	Repair or replace the pulp board.
		There is debris in the electromagnetic valve.	Remove and remove debris.
		The solenoid valve is broken.	Replace.
6	Argon is in circulation all the time.	There is debris in the electromagnetic valve.	Remove and remove debris.
		The solenoid valve is broken.	Replace.

Number	Barrier	Possible Cause	Overhauling Method
		The electromagnetic valve control signal is not controlled.	Repair or replace the pulp board.
		Behind the front panel, the air supply time adjustment switch is broken.	Repair or replace.
7	The welding current value is not adjustable.	The welding current potentiometer loose contact or front panel is damaged.	Repair or replace the welding current potentiometer.
		Power board control circuit or hall sensor is bad.	Repair power board or replace hall and power board.
8	The molten pool is not deep enough.	The welding current value is too low.	Increase welding current setting value.
		Arc too long during welding.	Adopt short arc operation.
9	There is no gas output when pressing the function button and changing the cutting mode.	Gas valve is defective or power supply is missing.	Test the voltage of gas valve .If the voltage measured is +24V, check the cable connected to the gas valve, gas valve needs to be replaced if the cable is OK. If the voltage is not +24V, the following measurement are required.
10	No arc output or cutting arc break but no alarm display when depress the torch trigger.	The torch is not suitable or the gas pressure is too high. Or the drive of pilot arc is broken.	Use the correct type of torch which is suitable for the machine.
			Check the internal torch and change the parts necessary.
			Gas pressure is too high and adjust the input gas to a correct range.
			Check the control board and invert board.

Number	Barrier	Possible Cause	Overhauling Method
			Check the IGBT and IC MIC 4424 of pilot arc.
11	There is no-load voltage but no arc output when depress the torch trigger.	The pilot arc or the invert part has some problems. Or check the consumables.	Check whether the IGBT of pilot arc is good.
			Check the invert part of main board.
			Check the torch consumables and insure the nozzle is in good contact with the electrode.
12	There is pilot arc output but can not be transferred to cutting arc when depress the torch trigger to contact the torch with the work piece.	The invert part has some problems. Or unstable connection between the earth cable and work piece.	Check the connection between the earth cable and work piece.
			Check the test cable between control board and invert board.
			Keep a proper distance between the torch and work piece.
13	The output voltage is too low, unstable or inadequate.		Check all input and output connection cables.
			Make sure that work cable is properly connected to a clean and dry area of work piece.
			Make sure that the input voltage is correct according to the nameplate.
			Keep a proper distance between the torch and work piece.
			Check the invert part of main board.

Number	Barrier	Possible Cause	Overhauling Method
14	The pilot arc is hard to ignite but easy to go out.		Change the nozzle, electrode or torch cap which may be worn.
			The air pressure is too high, adjust it to correct range.
			Check the main board and control board
15	Output is restricted and can not be controlled.		Check all input and output connection cables.
			Make sure that work cable is properly connected to a clean and dry area of work piece.
			Check the part of inverter board.
16	Overheat protection.	The welding current is too high.	Reduce welding current output value.
		It's been used for too long.	Reduce load duration of use.
		The thermal relay or wire is broken.	Replace the relay or line.
	Over Voltage protection.	the supply is unstable.	Access stable voltage supply.
	Under-voltage protection.	The supply is unstable or defective.	Access stable voltage supply.
		Voltage is stable.	Supply part of the contact bad or the main board bad.
	Over current protection.	Abnormal current in the main circuit.	check main circuit board and drive board.

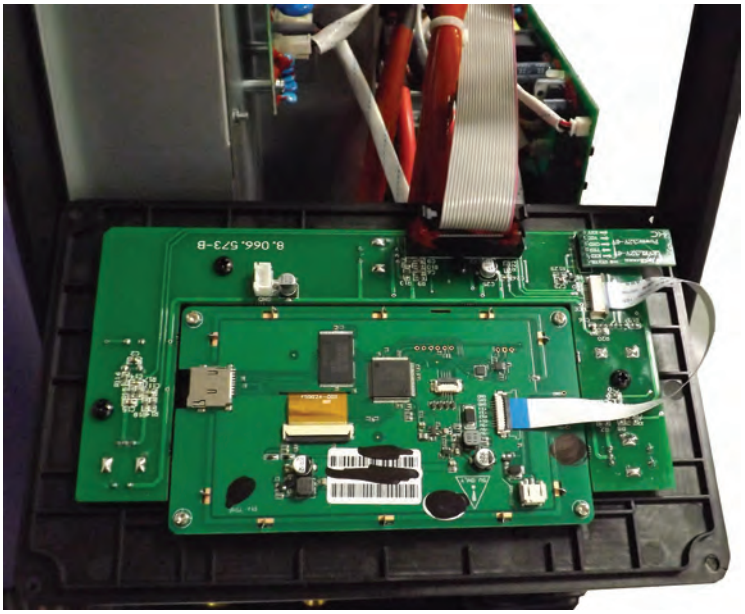
6. SOFTWARE UPDATE

The machine contains 2 sets of up-datable software. The first data set is the screen images that are displayed by the front panel. The second data set is the program of the MCU which controls the logic of operation of the machine. For both these operations you need XTPROG cable kit. Please note normal SD card will not function correctly it must be the one from the kit.

a) Screen Image Update

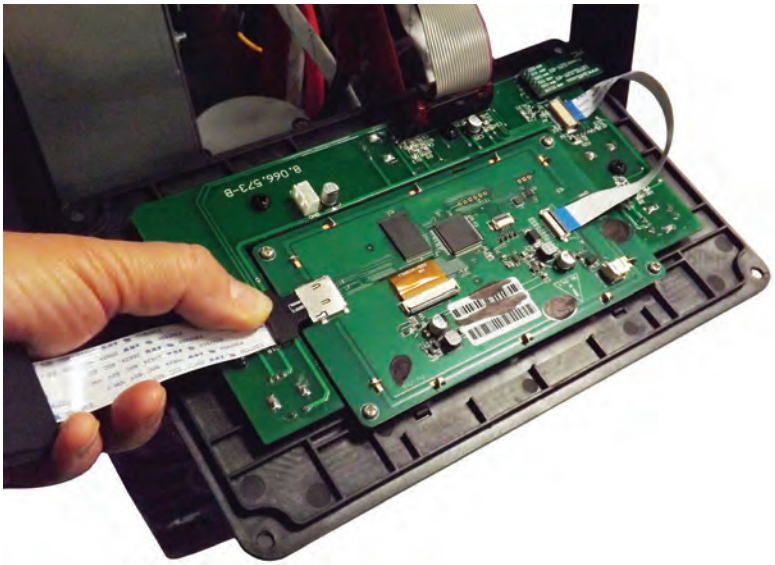
Step 1

Make sure the machine is switched off, then undo the 4 Display Panel Screws and release the screen from the machine.



Step 2

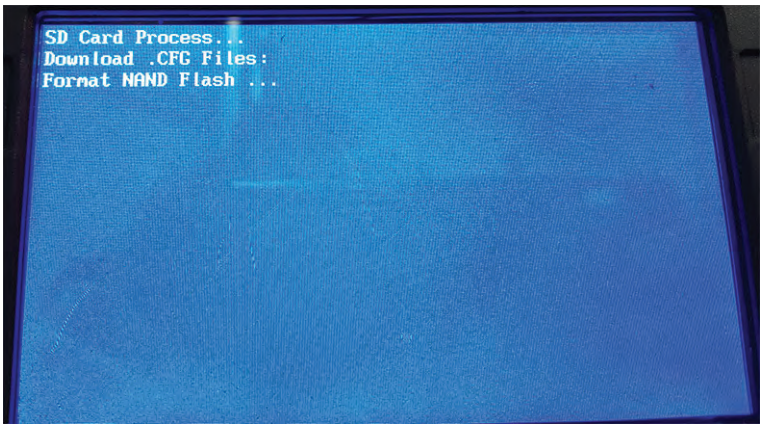
Insert the micro SD connector complete with SD card loaded with the DWIN_SET folder into the socket on the display PCB as shown below. If this is loose and does not stay in position, you may need to hold it in place.



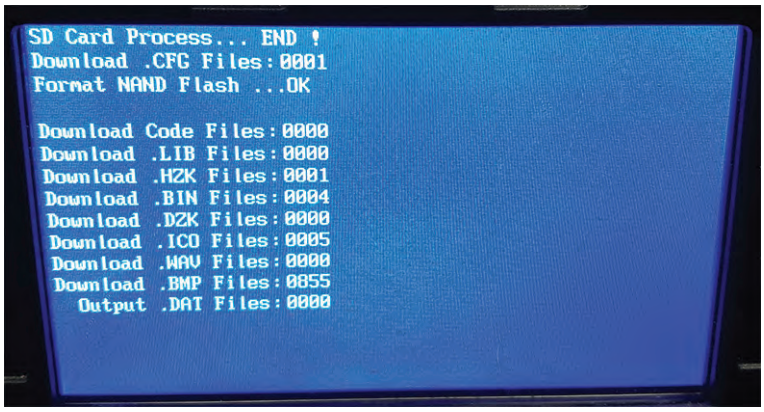
6. SOFTWARE UPDATE

Step 3
Switch the machine on. The screen will go blue as shown below. After about 2.5 minutes, screen images will start to load; you will see them paging through on the screen. When the screen goes back to the end blue screen shown below, the loading of the screen images is complete.

Starting Blue Screen



End Blue Screen



Step 4
Switch the machine off, and remove the SD connector from the PCB. Assemble the screen panel back into the machine and switch the machine on to display the correct screens.

6. SOFTWARE UPDATE

b) MCU program update

Step 1
Load a chip computer program to the control board using the FMC8FX program from a PC or laptop. You will need the XT-PROG cable kit.

On the control PCB, set the DIP switch shown in Fig 3.8 to ON. Connect one end of the lead in the cable kit to the PC / laptop and the other end to the small PCB in the cable kit. Then insert the small PCB into the black socket located by the dip switches, in the orientation shown in Fig 3.9. Switch on the machine. In the software open the required Hex file, and upload. After upload, switch the machine off.

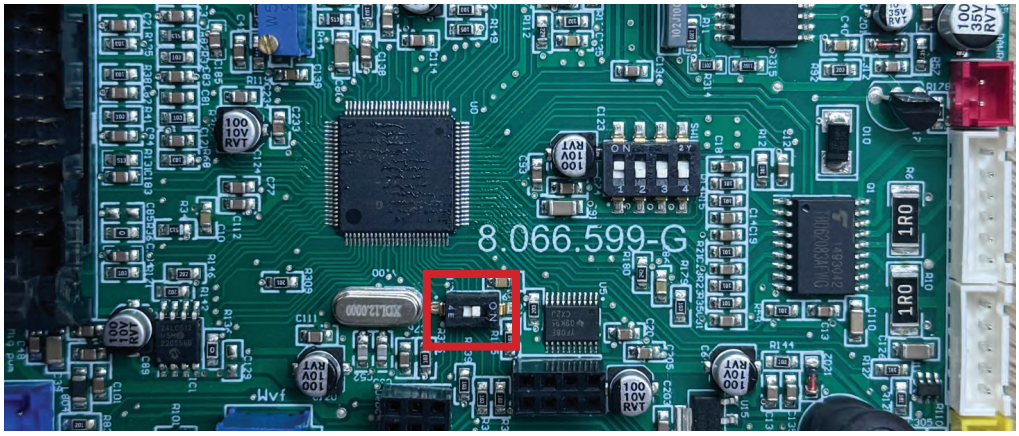


Fig 3.8

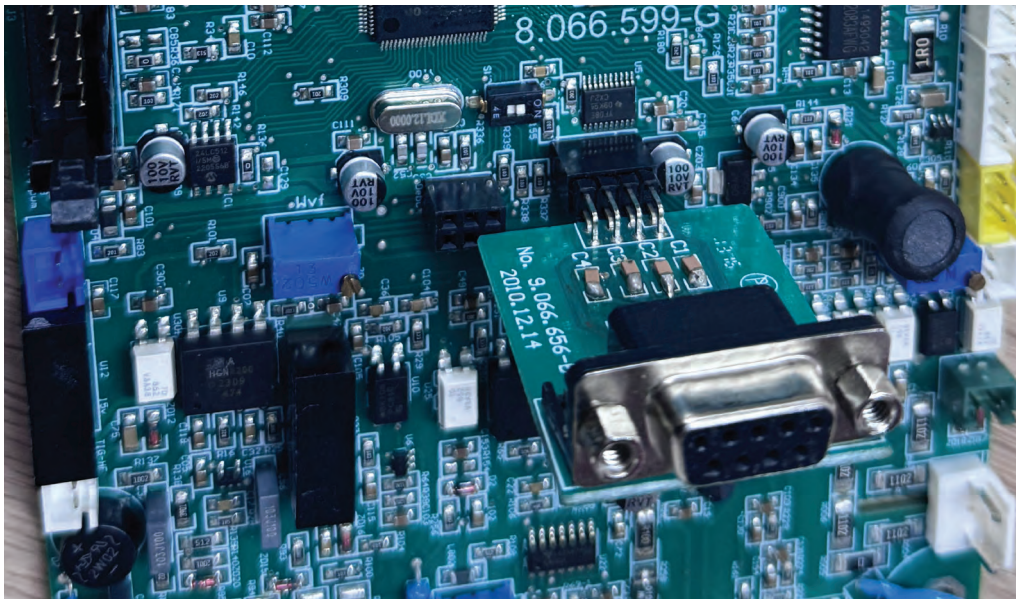


Fig 3.9

Step 2
Activating the software change. To do this set the DIP switch shown in Fig 3.8 to OFF. The machine is now ready to use. Switch on the machine.

7. CALIBRATION

Firstly, push the 4 pin DIP switch shown in Fig 4.0 below to 1/2=ON, 3/4=OFF to put the machine into calibration mode.

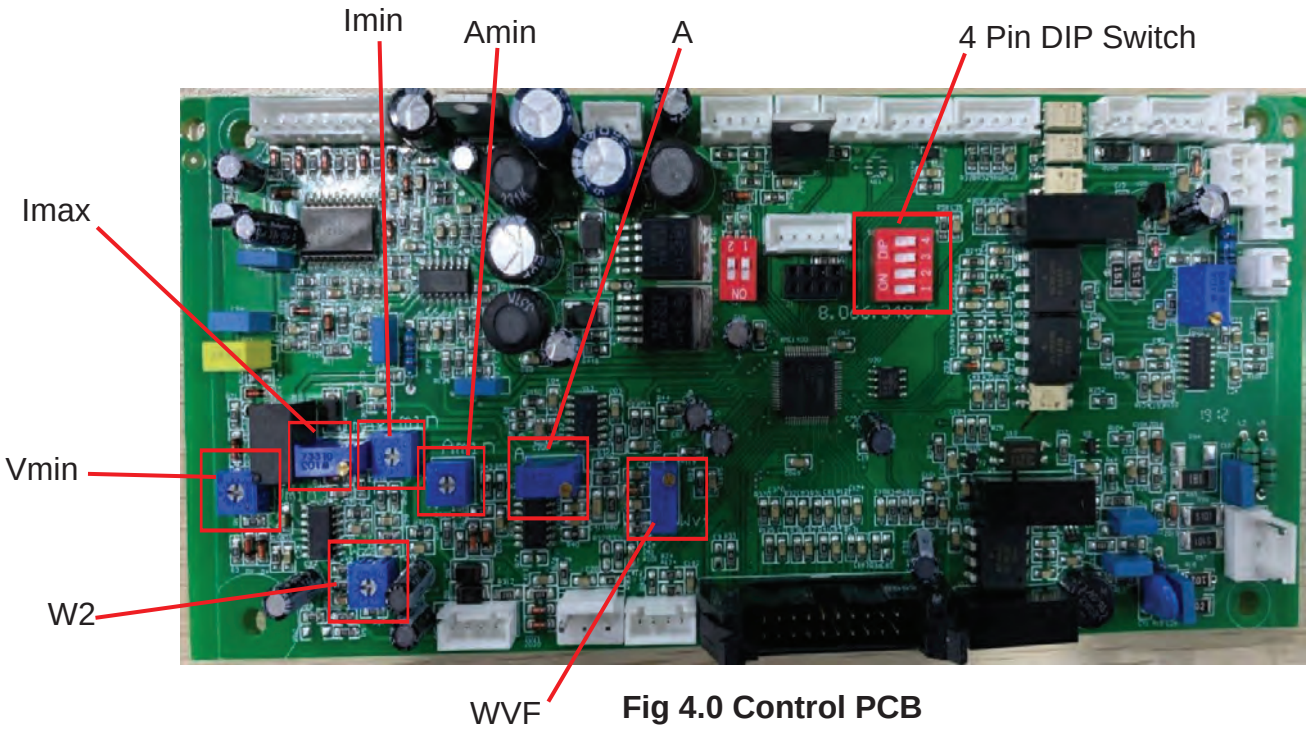


Fig 4.0 Control PCB

The display will be in MMA mode, with the amperage adjustable on the left hand knob. Pressing the centre knob once toggles to the MIG mode where the voltage can be adjusted on the right hand knob.

On the Control PCB, in MMA idle mode (No load) OCV value should be calibrated from control PCB pot WVF to 50V±2.

In MMA loading mode, minimum output current should be calibrated from control pot Imin to 10A, minimum display current should be calibrated from control pot Amin to 10A; maximum output current should be calibrated from control pot Imax to 200A. Maximum display current should be calibrated from control pot A to make sure the display max is the same as the actual output max current 200A.

In MIG mode with load connected, minimum output voltage should be calibrated from control pot Vmin 10V (load current should be more than 60A), maximum output voltage should be calibrated from control pot W2 on Fig 3.2 to 27V.

7. CALIBRATION

In MIG mode, use tachometer to measure the motor speed, turn current pot on front panel to 3m/min, the motor min speed should be calibrated from the main PCB W02 to 30rpm±5, turn the current pot on front panel to 21m/min, the motor max speed should be calibrated from the main PCB W05 to 170r±5.

Finally, after calibrating all the pots on the control PCB and main PCB, push the 4 Pin DIP switch to 1=ON, 2, 3, 4=OFF. The machine will switch back into welding mode, calibration is complete.

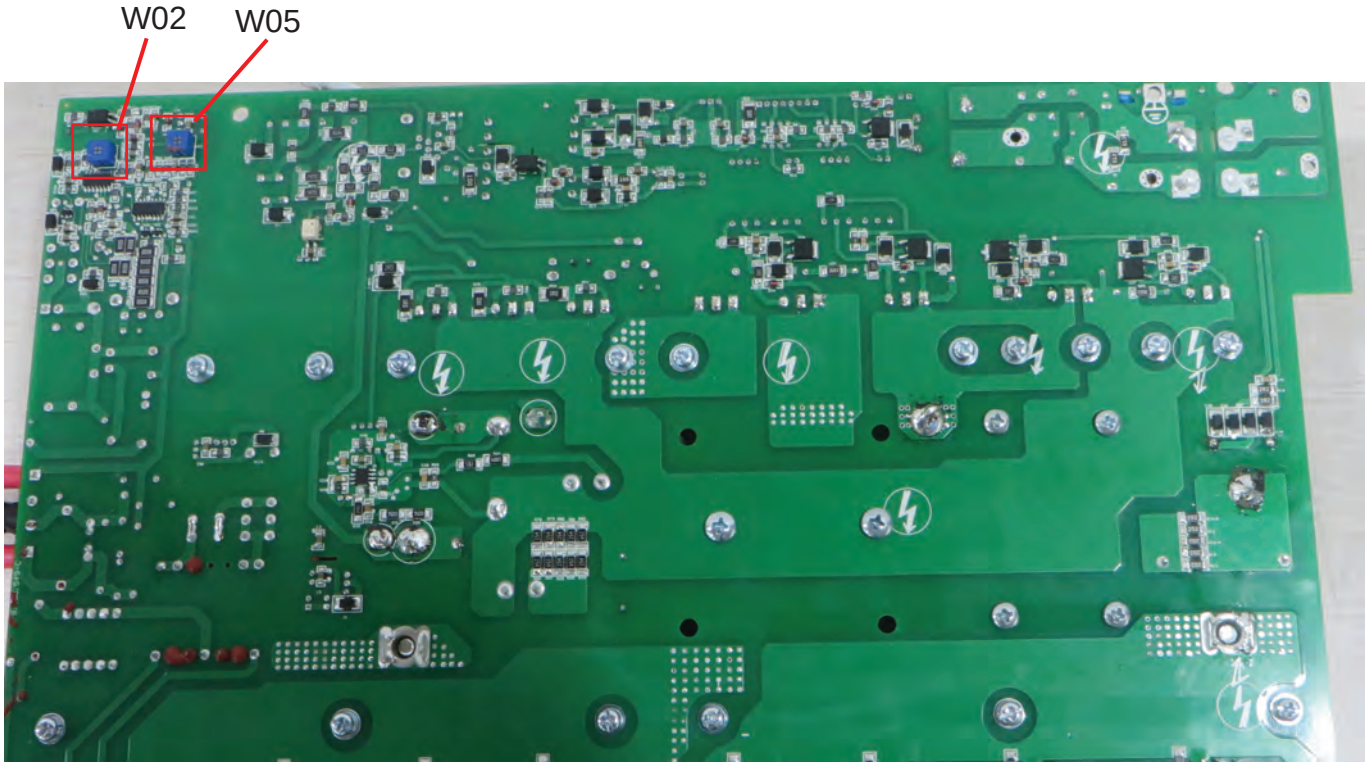


Fig 4.1 Main PCB

8. FAULT FINDING

Mode	Fault	Causes	
1	Internal	a. PCB board components installed incorrectly b. Connector screws loose, causing poor contact c. Voltage regulator, IGBT and other main components failure d. Input and output components installed incorrectly	
2	External	Environmental	a. Power supply fluctuations is too large b. Harsh environmental conditions c. Foreign body in the machine causing a short
		Handling	a. Damage during transport b. Incorrect operation c. Incorrect removal and replacement of the torch connection

Failure Modes 1:

When the power is turned on, the front panel is dimly lit and the fan turns.

Possible Cause	Testing Method and Repair
Front panel fault	Check the front panel circuit
LCD fault	Replace
Internal power board fault	Repair or replace the power board

Failure Modes 2:

When the power is turned on, the front panel is on but the fan does not turn.

Possible Cause	Testing Method and Repair
A foreign body is stuck in the fan blades	Remove the obstruction
The fan start-up capacitor is damaged	Replace
Fan motor failure	Replace fan

Failure Modes 3:

When the power is turned on, the front panel is dimly lit and the fan does not turn.

Possible Cause	Testing Method and Repair
Low voltage input	Check for power input
Fuse burnt out or Fan damaged	Replace

8. FAULT FINDING

Failure Modes 4:

No no-load voltage output (MMA).

Possible Cause	Testing Method and Repair
Internal failure of welder	Check main circuit and Control circuit board

Failure Modes 5:

No Gas output

Possible Cause	Testing Method and Repair
The argon bottle has not been opened or the air pressure is insufficient	Open the argon cylinder valve or replace the argon bottle
No solenoid valve control signal output	Repair or replace the control board
There is debris on the electromagnetic valve	Remove valve and clear debris
The solenoid valve is broken	Replace

Failure Modes 6:

Gas is on all the time.

Possible Cause	Testing Method and Repair
The solenoid valve is stuck open	Replace
The electromagnetic valve control signal is not controlled	Repair or replace the control board
The air supply time adjustment switch (located behind the front panel) is broken	Repair or replace

Failure Modes 7:

The welding current value is not adjustable.

Possible Cause	Testing Method and Repair
The welding current potentiometer has a loose contact or there is front panel damage	Repair or replace the welding current potentiometer
The power board control circuit or the hall sensor is faulty	Repair power board or replace hall sensor and power board

8. FAULT FINDING

Failure Modes 8:

The weld is weak.

Possible Cause	Testing Method and Repair
The welding current value is too low	Increase the welding current setting value

Failure Modes 9:

Warning, overheat protection

Possible Cause	Testing Method and Repair
The welding current is too high	Reduce welding current output value
It has been used for too long	Reduce load duration (use intermittently
The thermal relay or wire is broken	Replace the relay or wire

Failure Modes 10:

Warning, over-voltage protection

Possible Cause	Testing Method and Repair
The power supply to the machine is unstable	Access a stable power supply

Failure Modes 11:

Warning, under-voltage protection

Possible Cause	Testing Method and Repair
The power supply to the machine is unstable	Access a stable power supply
	Check the main circuit power supply part of the main board

Failure Modes 12:

Machine shuts down and reboots when starting to weld

Possible Cause	Testing Method and Repair
The power supply to the machine is unstable, or overvotage protection circuit in machine is out of calibration	Access a stable power supply , if still defective check the voltage on the DC bus capacitor when the machine faults should be 420V. If not change value of R99 (0.66W 430K-450K)
	Check the main circuit power supply part of the main board

9. PARAMETERS

Process	Feature	XTM 211Di	
	Input Voltage	110V+/10%	230V+/-10%
	Hz	50/60	
	Phases	1	
	KVA	3.7	
	Generator Size	7 KVA	
	No-load Voltage (V)	45V	
	Wire Drive	2 Roll	
	Fuse Rating (A)	32	16
	IP Rating	IP23S	
	Weight (Kg)	27.8	
MIG	DC Input Current (A)	39.1	30.0
	DC Input effective Current (A)	21.4	15.0
	DC Welding Current (A)	10~140	10~200
	Welding Voltage (V)	14.5~21	14.5~24
TIG	DC Input Current (A)	30.5	22.5
	DC Input effective Current (A)	20.5	11.3
	AC Input Current (A)	30.5	21.5
	AC Input effective Current (A)	18.0	10.7
	DC Welding Current (A)	10~140	10~200
	AC Welding Current (A)	10~140	10~200
	Welding Voltage (V)	10.4~15.6	10.4~18.8
MMA	DC Input Current (A)	34.9	30.8
	DC Input effective Current (A)	20.6	15.4
	AC Input Current (A)	33.8	31.4
	AC Input effective Current (A)	20.0	15.7
	DC Welding Current (A)	10~110	10~200
	AC Welding Current (A)	10~110	10~200
	Welding Voltage (V)	20.4~24.4	20.4~28

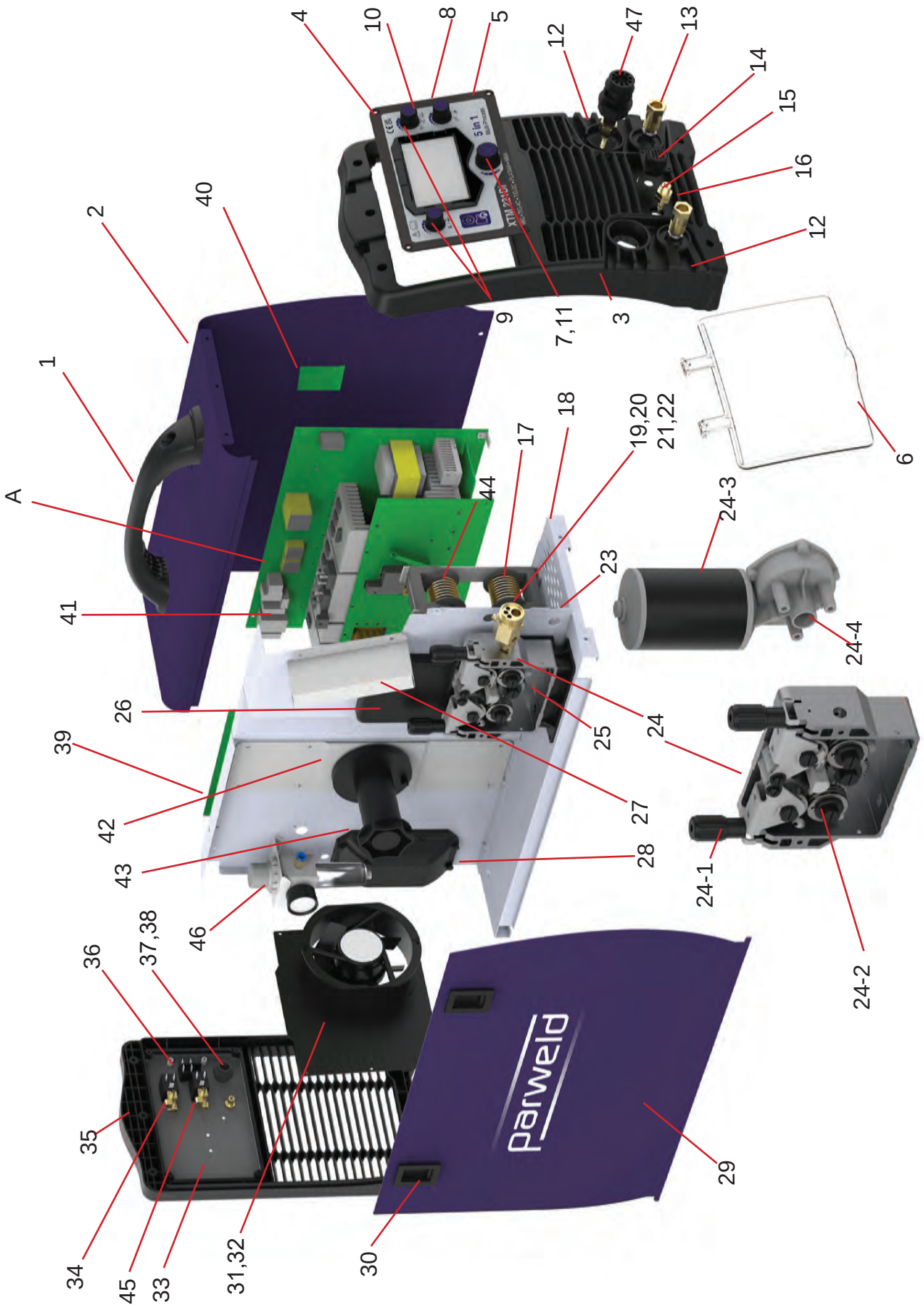
Duty Cycle (DC)

	110V input			230V input		
MIG	**30%**	**60%**	**100%**	**25%**	**60%**	**100%**
	140A	105A	80A	200A	160A	140A
TIG	**45%**	**60%**	**100%**	**25%**	**60%**	**100%**
	140A	125A	100A	200A	150A	120A
MMA	**35%**	**60%**	**100%**	**25%**	**60%**	**100%**
	110A	90A	70A	200A	140A	120A

Duty Cycle (AC)

	110V input			230V input		
TIG	**35%**	**60%**	**100%**	**25%**	**60%**	**100%**
	140A	120A	90A	200A	140A	115A
MMA	**35%**	**60%**	**100%**	**25%**	**60%**	**100%**
	110A	85A	70A	200A	140A	115A

10. EXPLODED VIEWS AND SPARE PART LISTS

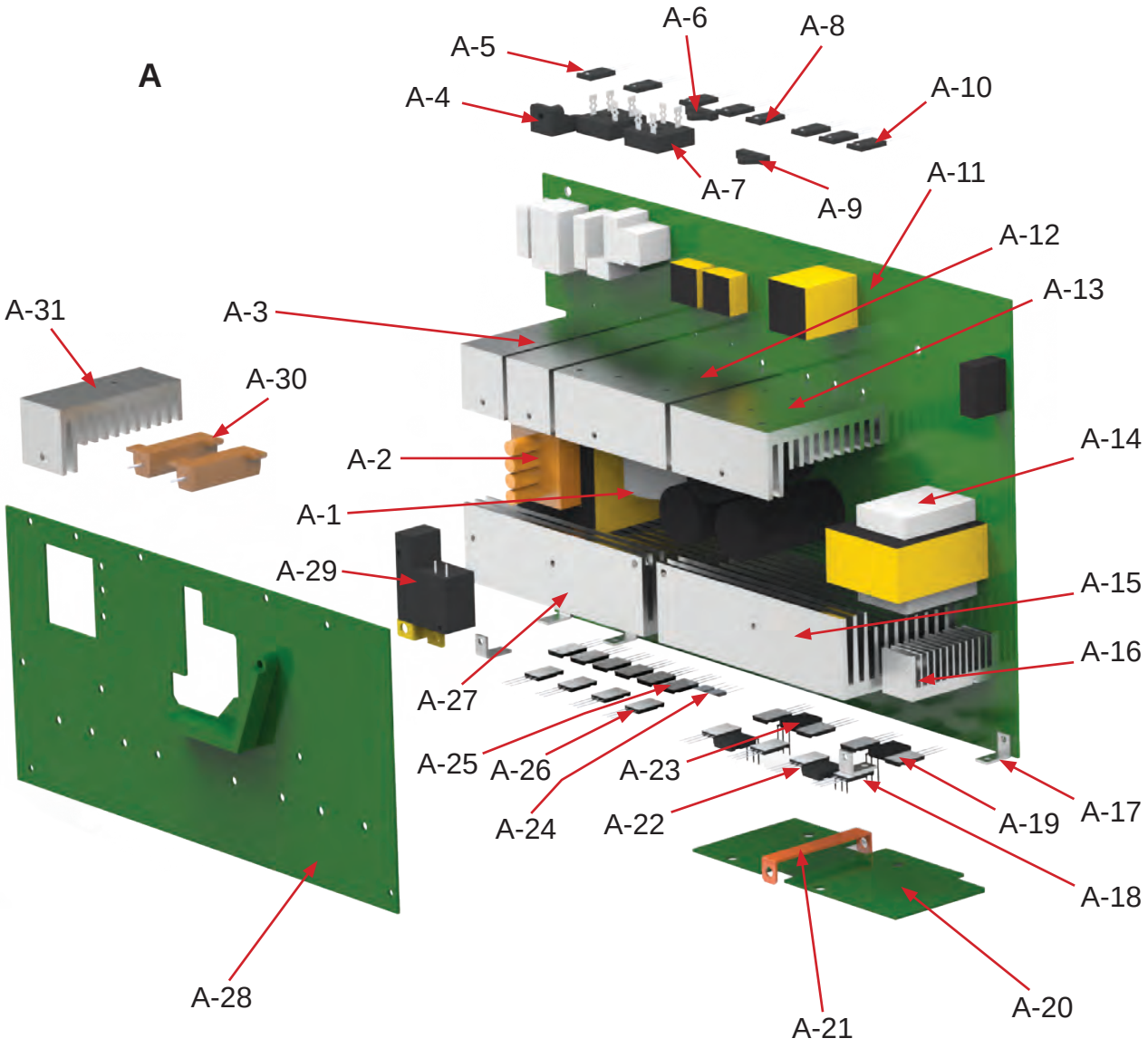


10. EXPLODED VIEWS AND SPARE PART LISTS

Item	Stock Code	Description
1	8253040	Handle
2	8301130-A-PRA20	Cover
3	8069926-C	Front Panel
4	8103988-D	Front Label
5	5122008-B	Display Assembly (See Page 32)
6	8305926	Protection Visor
7	7206477	Encoder (Process Selector)
8	7456119	Encoder (Inductance)
9	7206435	Encoder (Wire Speed/Post Gas)
10	7458046-C	Knob
11	7458043-C	Main Function Knob
12	8104217	Output Labels
13	7152315-A	35mm Dinse Socket
14	7132114-A	14 Pin Socket
15	8462028-I	Gas Connector
16	8104227	Output Label
17	6271104	HF Inductor
18	8055330-A	Base Panel
19	7667127	Euro Connector for MIG Torch
20	8177132	Connecting Rod
21	8178131	Wire Guide
22	8462300	Gas Connector
23	8124129-A	Middle Baffle / Plate
24	7710866	Wire Feed Unit Complete (-Motor)
24-1	7801160	Pressure Adjuster Assembly
24-2	7671650	Feed Roll Retaining Cap
24-3	7710750	Wire Feed Motor Only

Item	Stock Code	Description
24-4	7710750-KEY	Key for Wire Feed Motor Shaft
25	8081RM204	Wire Feeder Base Single Drive
26	8303720	Motor Protection Panel
27	8303130	Protective Cover
28	8052033-A	Fan Cover Panel
29	8050132-A-PRA20	Side Panel
30	7686300	Side Panel Lock
31	7720008	Fan
32	8122130	Fan Mounting Plate
33	8307130	Rear Panel Sealing Plate
34	7253018	Solenoid Valve
35	8068926	Rear Panel
36	7232735	Mains Switch
37	7154402-A	Power Cable
38	7155010	Power Cable Gland
39	5496599-F-1	Control PCB
40	5496470-K-5	HF PCB
41	7203046	Relay
42	8122121	Wire Mounting Plate
43	7803104	Wire Spool
44	6271102	HF Auxiliary Inductor
45	7253018	Solenoid Valve
46	7253410	Regulator with Oil/Water Trap
47	7667025	Central Connector

10. EXPLODED VIEWS AND SPARE PART LISTS



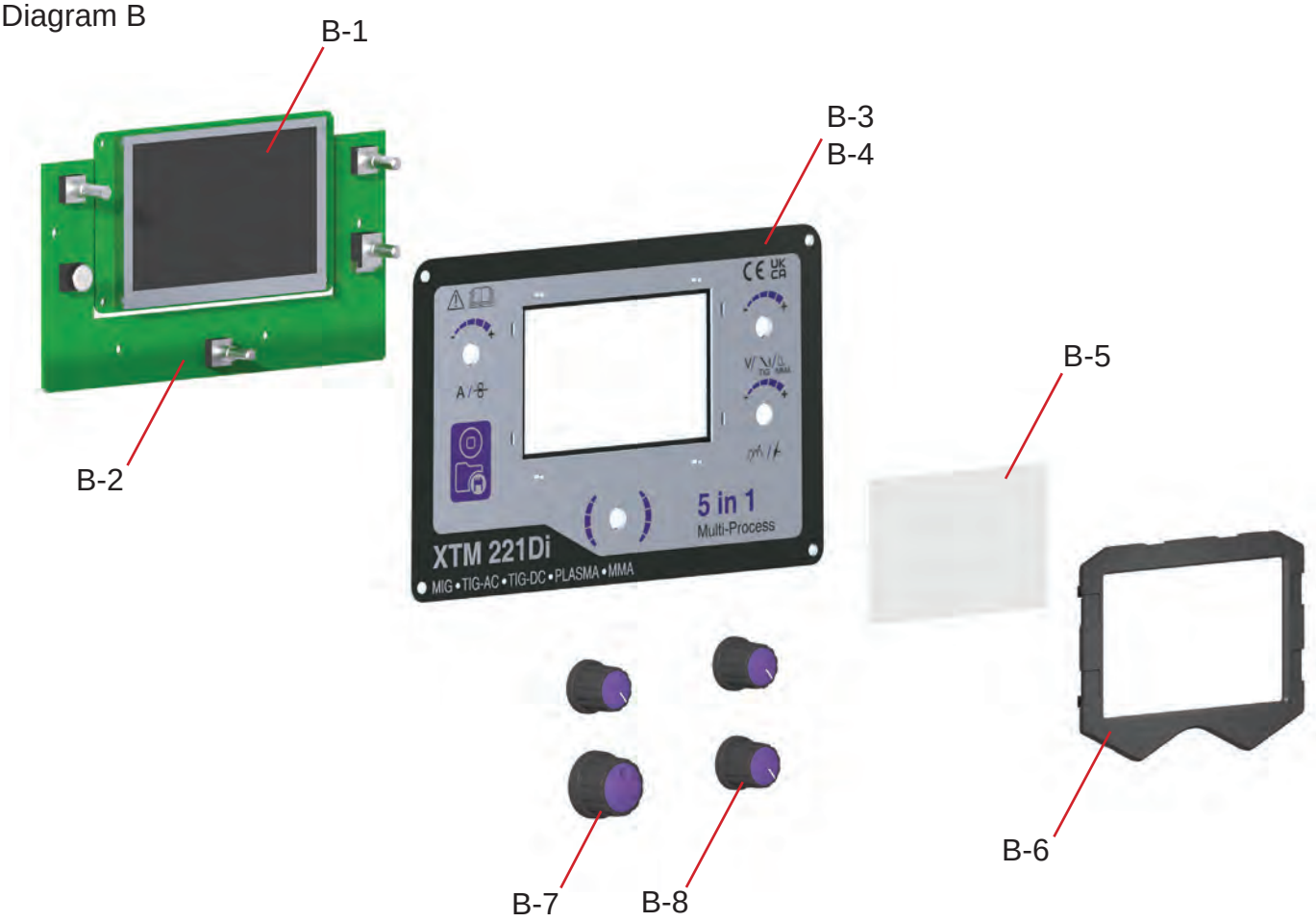
10. EXPLODED VIEWS AND SPARE PART LISTS

Item	Stock Code	Description	PCS
A	Power block 3.200.800-1A		
A-1	6190100-A	PFC Module	1
A-2	6185800-A	Main transformer	1
A-3	8425444	Heat sink (1)	2
A-4	8123620	Column support	9
A-5	7425533	Single tube IGBT module	4
A-6	7231280	Temperature sensor	2
A-7	7411010-C	Bridge of rectifier	2
A-8	7421538	Fast recovery diode	1
A-9	7231275	Heat sensitive relay	1
A-10	7425614	Single tube IGBT module	3
A-11	5496562-G	PCB motherboard	1
A-12	8425445	Heat sink (2)	1
A-13	8425446	Heat sink (3)	1
A-14	6271673	Inductance	1
A-15	8425448	Heat sink (5)	1
A-16	8425449	Heat sink (6)	1
A-17	8123641	Support column (1)	5
A-18	7425613	Single tube IGBT module	1
A-19	7421086	Fast recovery diode	4

Item	Stock Code	Description	PCS
A-20	5496563-B-1	5 and 1 MUR rectifier pcb board (blank)	1
A-21	8511800	Connecting copper bar	1
A-22	7231285	Temperature control unit	1
A-23	7421087	Fast recovery diode	4
	8713195	Insulating sleeve base	4
	8713197	Insulation block	4
A-24	7421115	Fast recovery diode	2
A-25	7421088	Fast recovery diode	6
A-26	7425617	Single tube IGBT module	8
A-27	8425447	Heat sink (4)	1
A-28	5496559-F-1	5 IN 1 AC motherboard blank	1
A-29	7203046	Relay	1
	8123949	Gasket	1
A-30	7445311	Aluminum shell heat dissipation resistance	2
A-31	8425450	Heat sink (7)	1
A-32	8713799	Insulation sheet 1 (NOT SHOWN)	1
A-33	8713800	Insulation sheet II (NOT SHOWN)	1

10. EXPLODED VIEWS AND SPARE PART LISTS

Diagram B



Item	Stock Code	Description
N/A	5122153-A	Display Assembly (includes all B numbers)
B-1	7122502	LCD Screen on PCB
B-2	5496698-B-1	Display Interface U Shape Board with Encoders
B-3	8306178-A	Plastic Fascia Plate
B-4	8103799-C2	Front Label
B-5	8303080	Transparent Protection Plate
B-6	8303572-A	Screen Bezel
B-7	7458043-C	Main Function Knob
B-8	7458046-C	Knob x 3

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