
Riland Welder

REPAIR MANUAL

MIG SERIES

SHENZHEN RILAND ELECTRIC MFG. CO., LTD.

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FOREWORD

This manual is only fit for the repairer, who has only digital or pointer multi-meter but special instrument or equipment, to analyze the cause of malfunction, judge which parts of the machine are damaged, and find the right solution through malfunction phenomenon and measure data.

When malfunction occurs, uncover the case of machines and check if there is some part burned out or not.

Mainly check the following parts:

- A. Top PCB: MOSFET, control module, drive module, auxiliary power supply
- B. Center PCB: rectifying diode, transformer
- C. Bottom PCB: electrolytic capacitor, thermal resistor, voltage-sensitive resistor

If there is, replace the PCB directly.

How to use this manual?

This manual is provided to help you locate and repair possible machine malfunctions. Simply follow the three-step procedure listed below.

Step 1. Trouble (symptom)

Look under the column labeled "Trouble" (symptom). This column describes possible symptoms that the machine may exhibit. Find the listing that best describes the symptom that the machine is exhibiting.

Step 2. Analysis (possible cause)

The second column labeled "Analysis"(possible cause) lists the possibilities that may contribute to the machine symptom.

Step 3. Solution

This column provides a course of action for the possible cause.

If you do not understand or are unable to perform the recommended solution, contact your local dealer or supplier for further advice.

Note:

Please read and understand the instruction manual carefully before the operation of this equipment to ensure safety.

Please read and understand this repair manual carefully before the maintenance of this equipment to ensure safety.

Have a qualified electrician to do the maintenance and troubleshooting work.

Save this manual and keep it handy for quick reference.

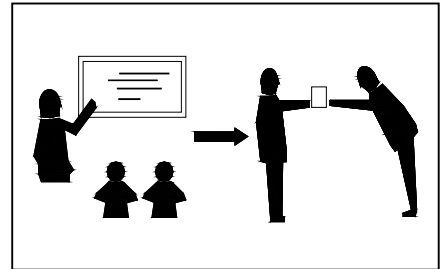
The contents of this manual may be revised without prior notice.

This repair manual is issued on 1st August 2006.

SAFETY

Welding and cutting is dangerous to the operator, people in or near the working area, and the surrounding, if the equipment is not correctly operated. Therefore, the performance of welding/cutting must only be under the strict and comprehensive observance of all relevant safety regulations. Please read and understand the instruction manual carefully before the installation and operation.

- The switching of function modes is possibly damaging to the equipment, while the welding operation is performed.
- Do not disconnect the electrode-holder cable with the equipment, before the performance of welding.
- A safety switch is necessary to prevent the equipment from electric leakage.
- Welding tools should be of high quality.
- Operators should be qualified.



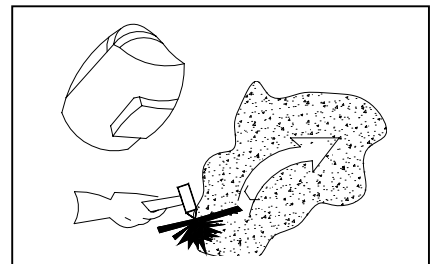
Electric shock: It can kill.

- Connect the earth cable according to standard regulation.
- Avoid all contact with live electrical parts of the welding circuit, electrodes and wires with bare hands. It is necessary for the operator to wear dry welding gloves while he/she performs the welding task.
- The operator should keep the work piece insulating from himself/herself.



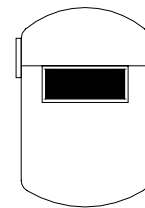
Smoke and gas generated while welding or cutting: harmful to people's health.

- Avoid breathing the smoke and gas generated while welding or cutting.
- Keep the working area in good ventilation.



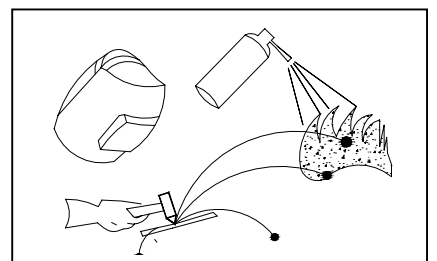
Arc rays: harmful to people's eyes and skin.

- Wear welding helmet, anti-radiation glasses and work clothes while the welding operation is performed.
- Measures also should be taken to protect people in or near the working area.



Fire hazard

- The welding splash may cause fire, thus remove flammable material away from the working place.
- Have a fire extinguisher nearby, and have a trained person ready to use it.

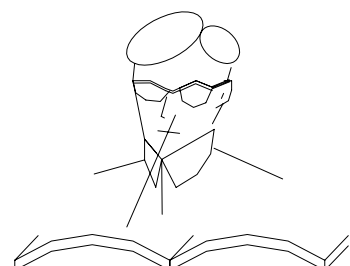


Noise: possibly harmful to people's hearing.

- Noise is generated while welding/cutting, wear approved ear protection if noise level is high.

Machine fault:

- Consult the instruction manual and this repair manual.
- Contact your local dealer or supplier for further advice.

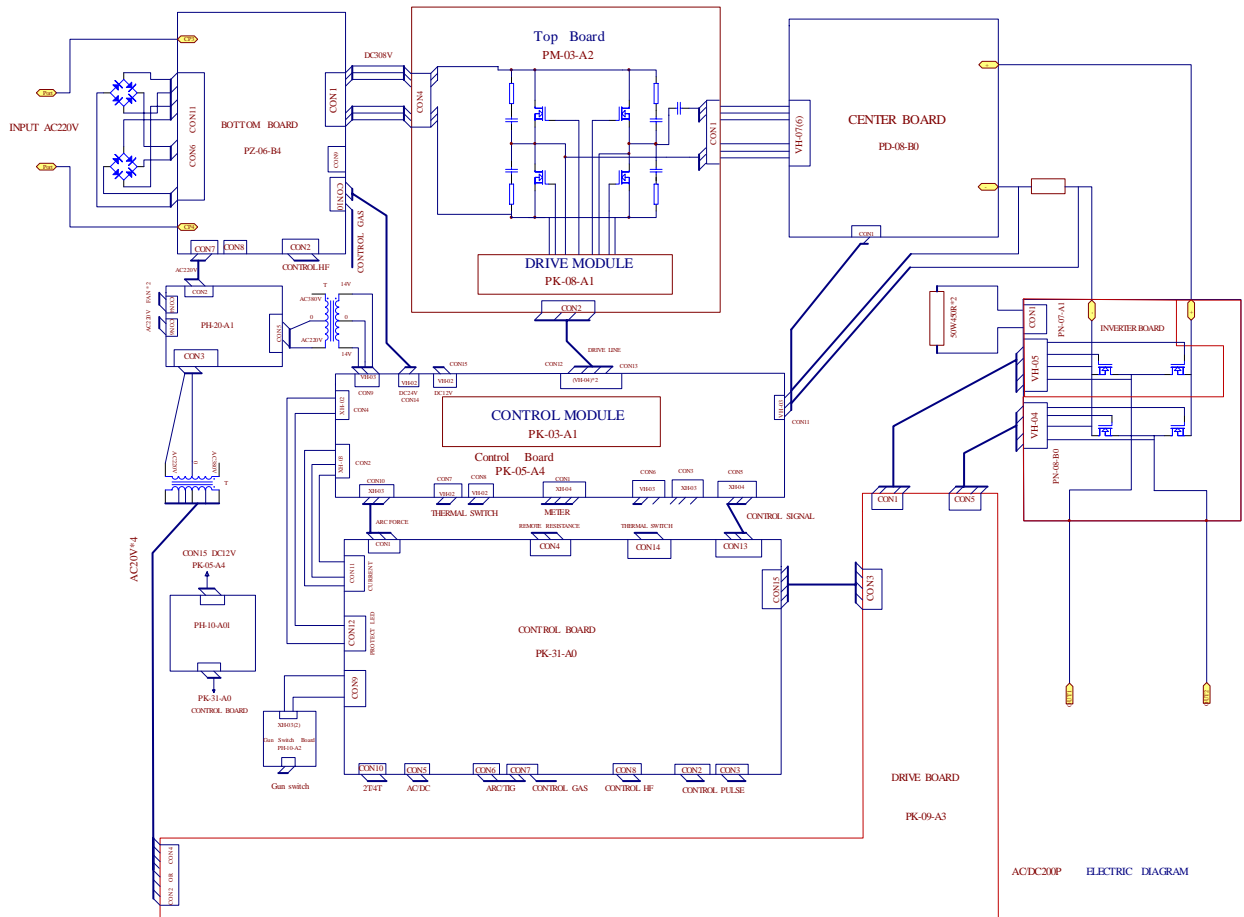


1. AC/DC200P

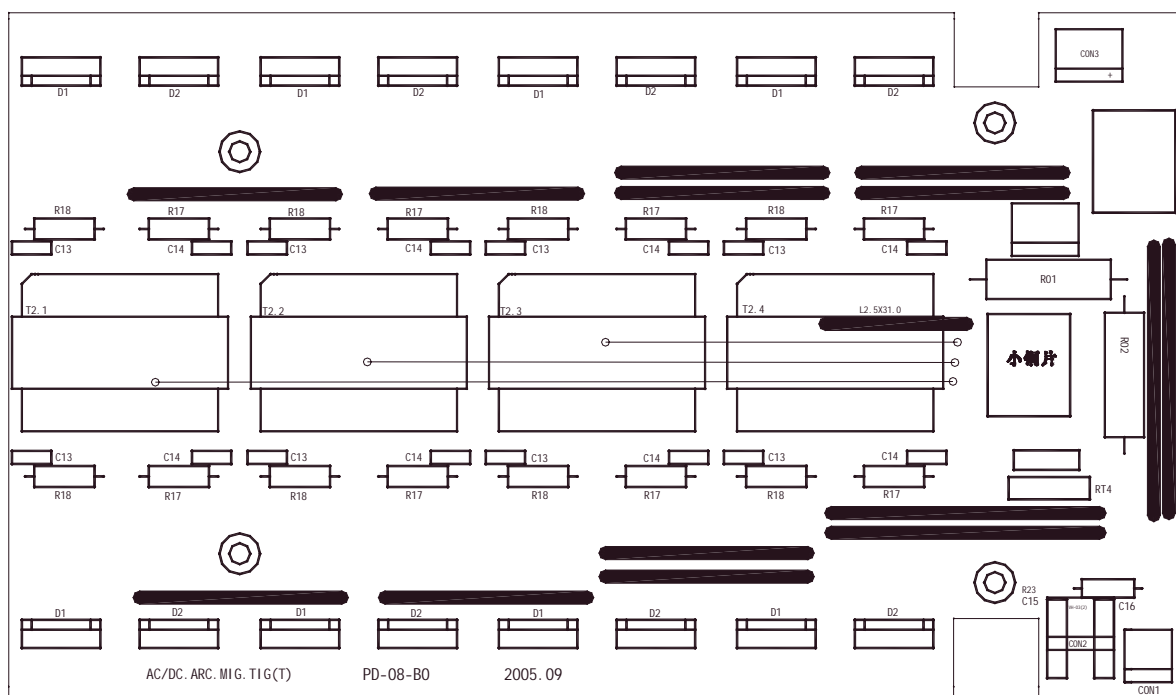
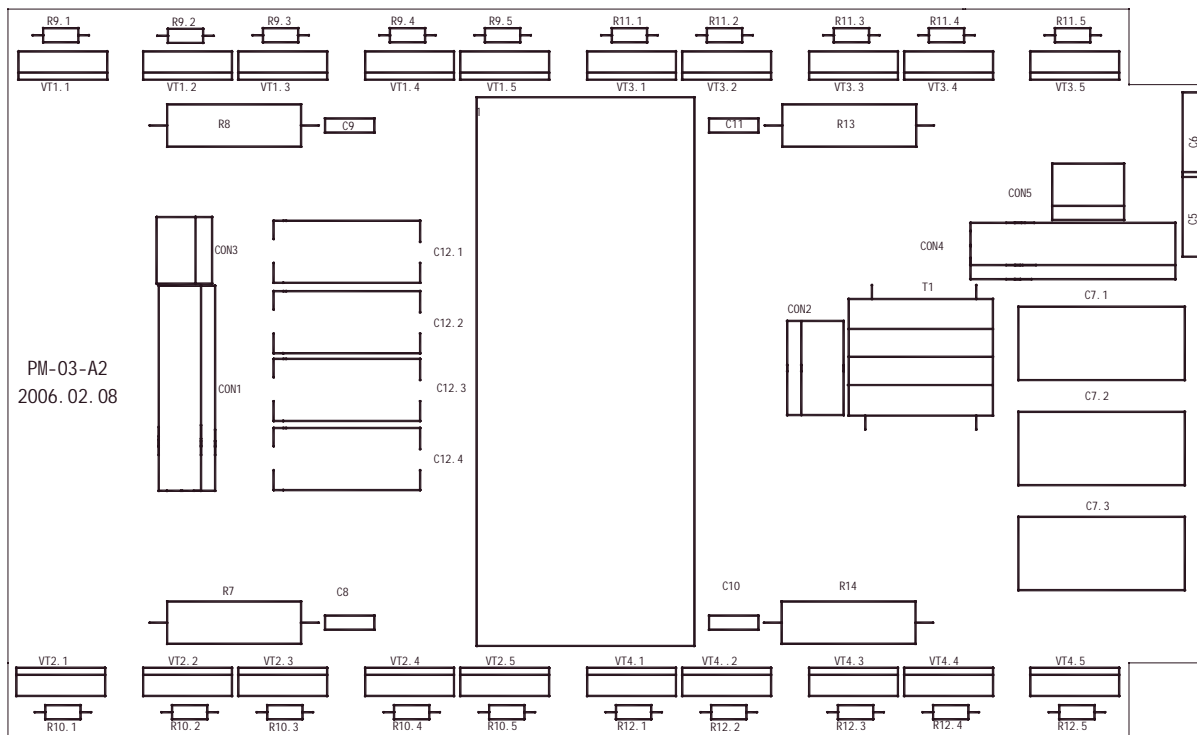
1.1 The structure drawing of AC/DC200P:

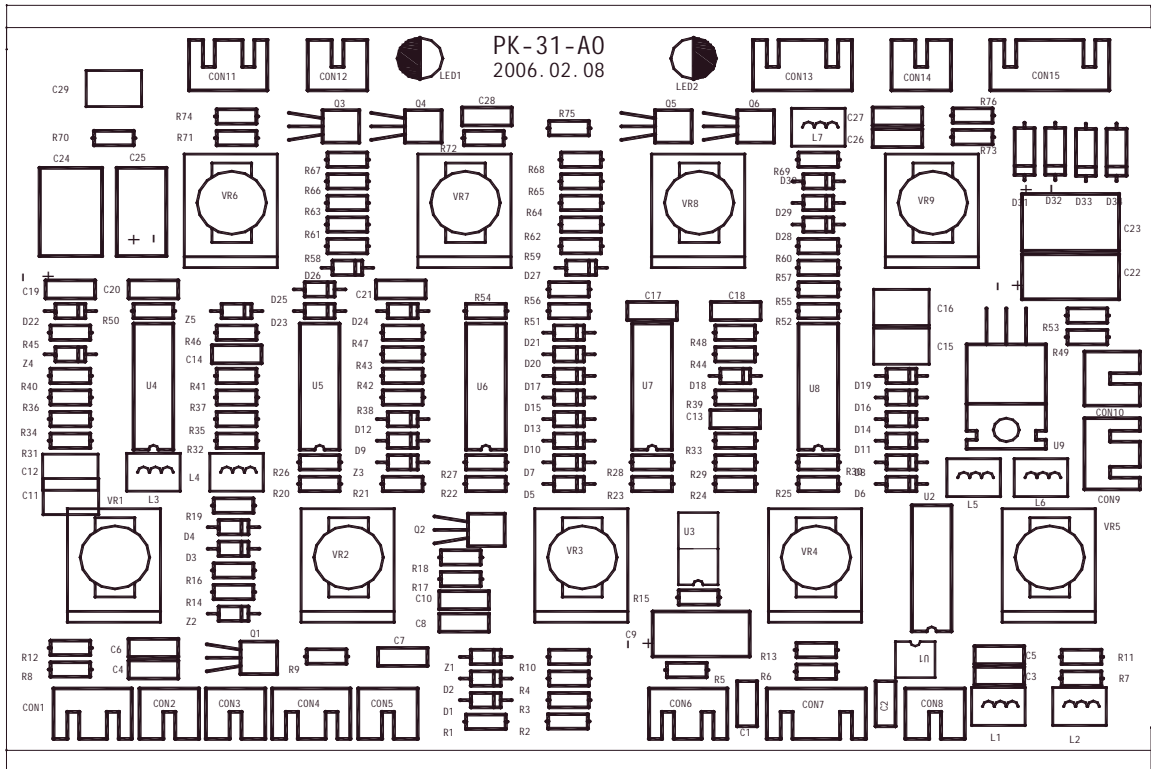
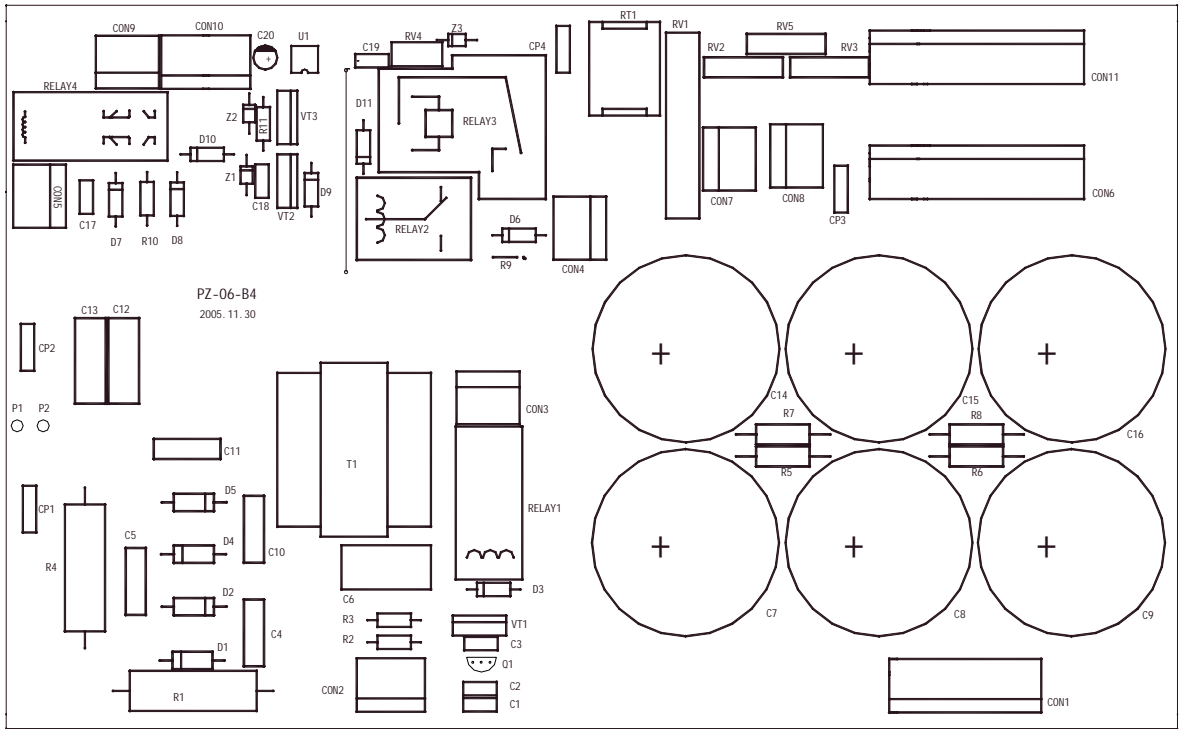
The structure of AC/DC200P is similar to that of AC/DC315P. (See the structure drawing of AC/DC315P on page 35.)

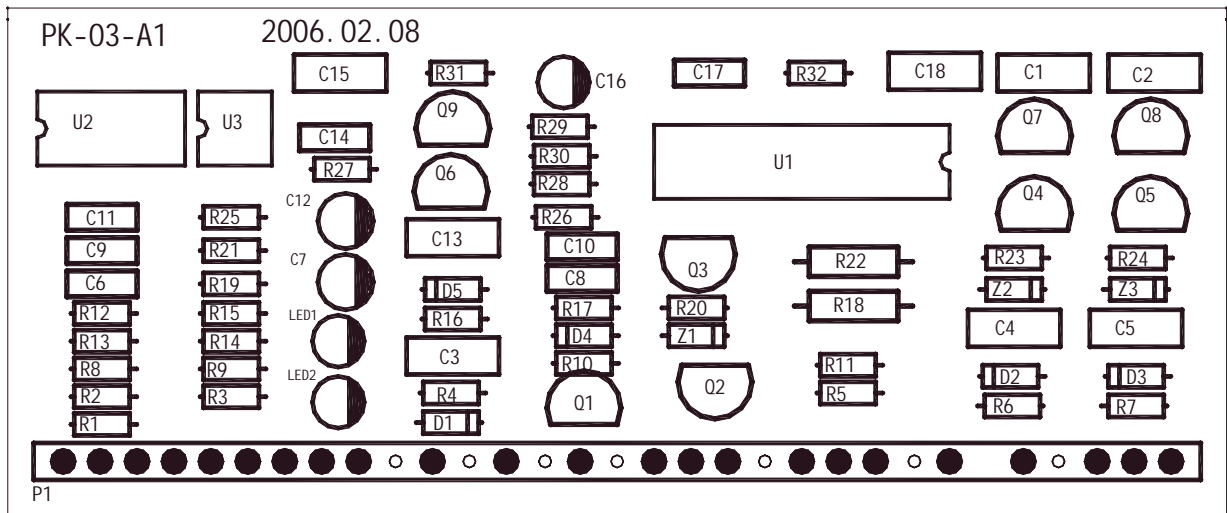
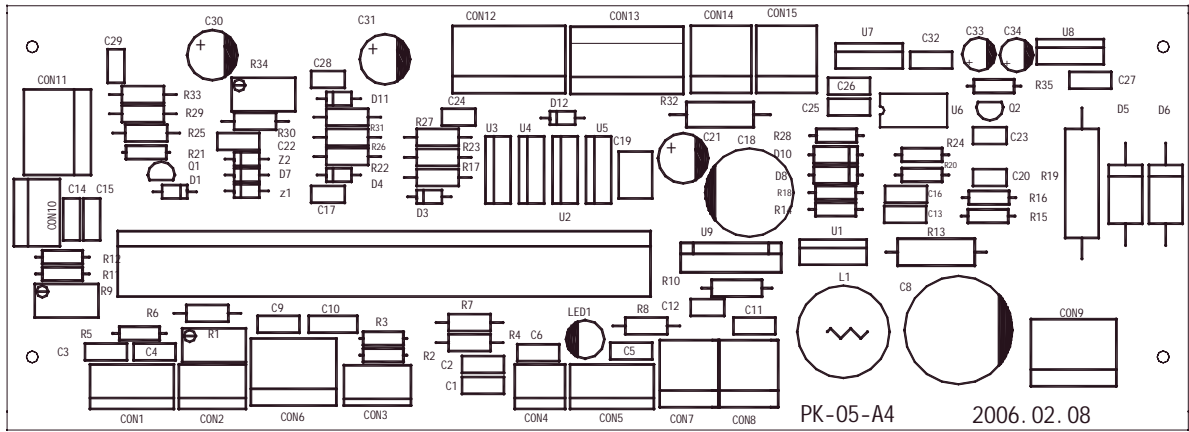
1.2 The general connection diagram of AC/DC200P:

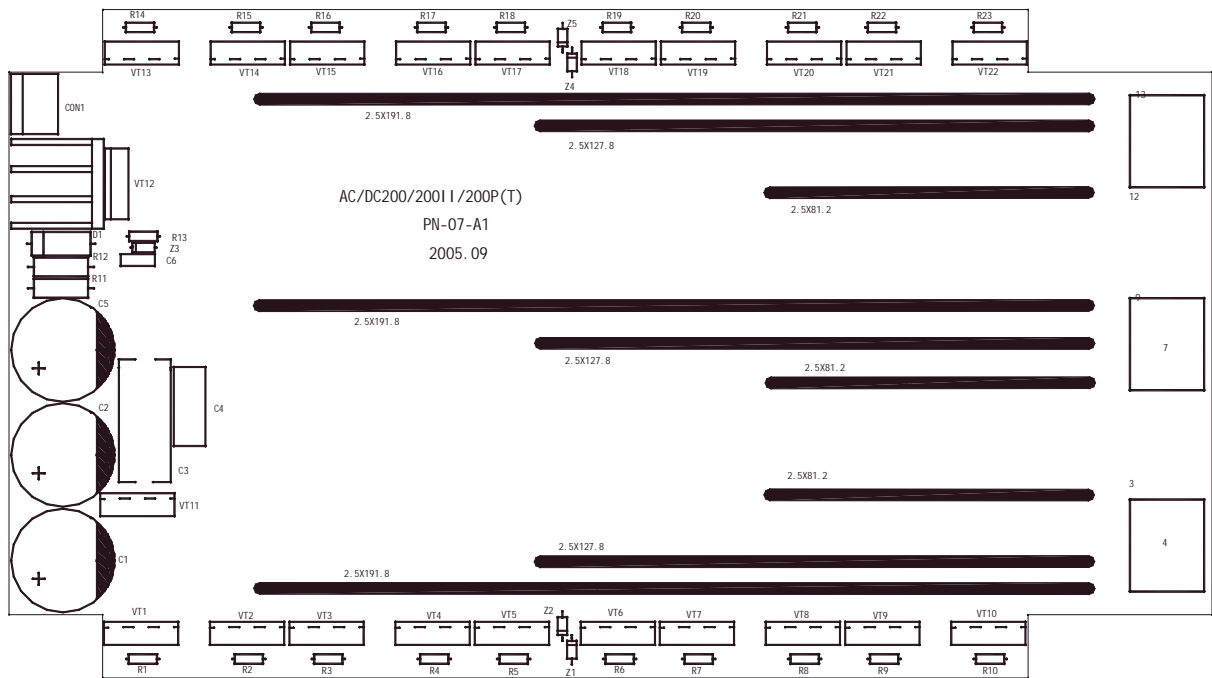
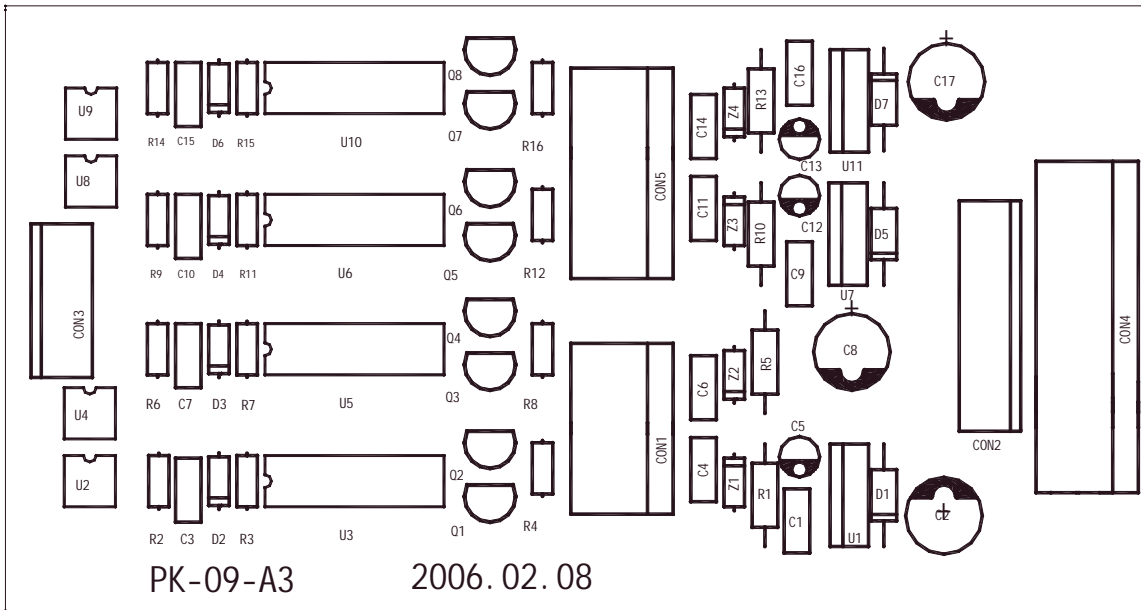


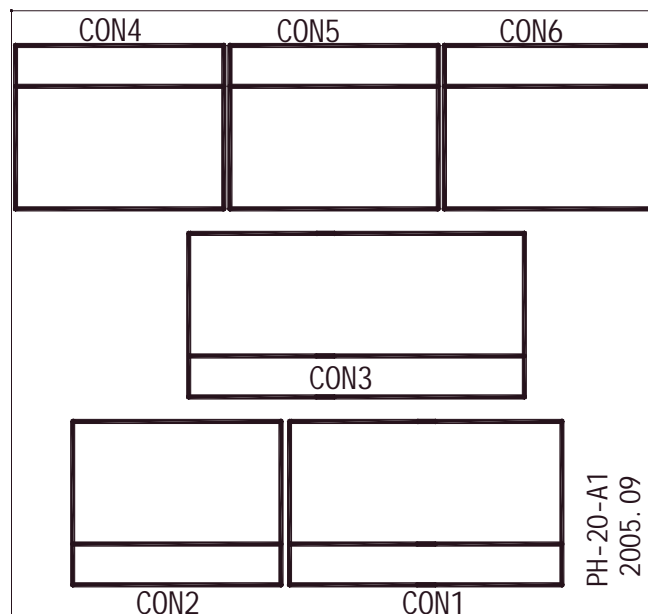
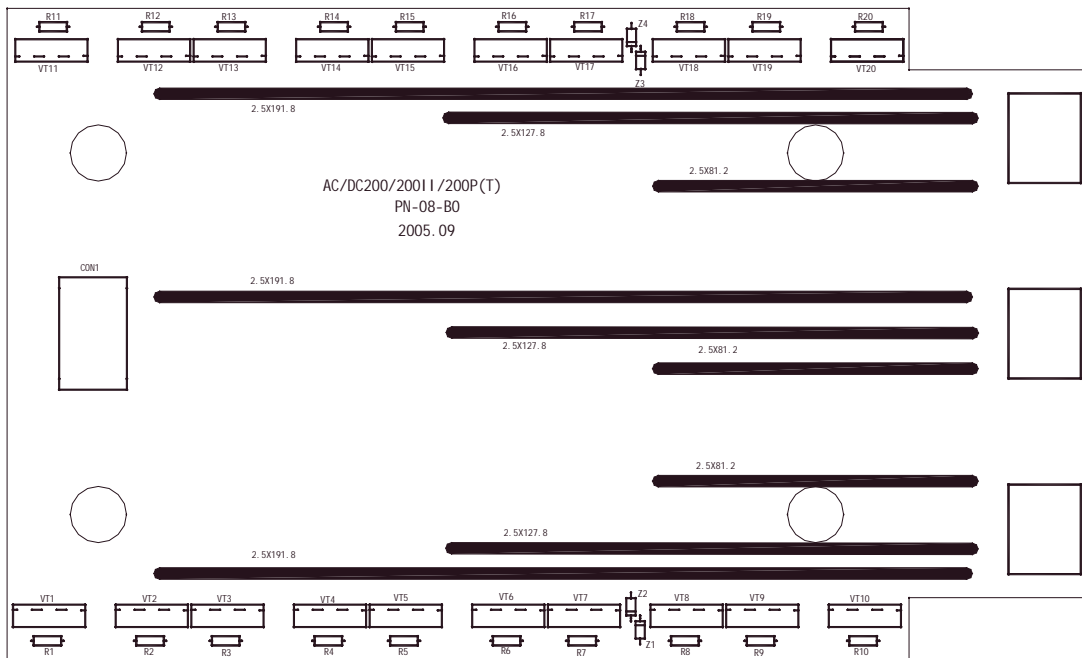
1.3 The diagram of AC/DC200P's top PCB PM-03-A2, center PCB PD-08-B0, bottom PCB PZ-06-B4, control panel PK-31-A0, low-voltage control PCB PK-05-A4, control module PK-03-A1, secondary drive PCB PK-09-A3, secondary inverter PCB PN-07-A1, PN-08-B0, power supply conversion PCB PH-20-A1, meter display preset PCB PH-10-A01:

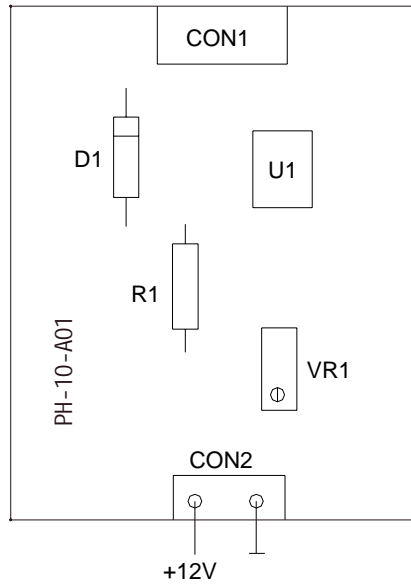












1.4 Troubleshooting of AC/DC200P:

Trouble	Analysis	Solution
1. Turn on the machine, no display of the meter, the fan doesn't work, no no-load voltage output in TIG/ARC mode.	a. The input voltage is abnormal. b. The power supply cable matching CP3/CP4 on bottom PCB PZ-06-B4 is disconnected, or the tie-in is damaged. c. The power supply switch may be damaged. d. The connecting cable matching socket CON1 — CON6 on power supply conversion PCB is in loose connection.	a. Check if the input voltage is AC 220V. b. Check. c. Replace the power supply switch if it's damaged. d. Check.

<p>2. Turn on the machine, the meter displays, press the welding torch switch in TIG mode, there is gas out and no HF, no no-load voltage output in ARC mode.</p>	<p>a. The connecting cable matching socket CON1 on bottom PCB PZ-06-A3 is in loose connection.</p> <p>b. The prime relay RELAY3 on bottom PCB PZ-06-A3 doesn't close well; the value of thermal resistor RT1 increases.</p> <p>c. The connecting cable matching rectifying bridge with socket CON11/CON6 is in loose connection.</p> <p>d. Some part on control module PK-03-A1 is damaged.</p> <p>e. Some part on control PCB PK-05-A4 is damaged.</p>	<p>a. Check if the voltage of socket CON1 is DC308V.</p> <p>b. Check and replace if necessary.</p> <p>c. Check.</p> <p>d. Check with a multi-meter if chip U1 is damaged. Check if the 16th pin of U1 is 5V. If it's not, replace the chip because U1 is damaged. Check if resistor R32, diode D2/D3/D4, zener diode Z1/Z2/Z3, audion Q2/Q3/Q4/Q5/Q6/Q7/Q9, thyristor Q1 or capacitor C17 is damaged.</p> <p>e. Check if MOSFET U2/U3/U4/U5 or resistor R32 is damaged.</p>
<p>3. Turn on the machine, the meter displays, but the thermal resistor RT1/RT2/RT3/RT5 on bottom PCB PZ-06-B4 heats and smokes after a while.</p>	<p>a. The connecting cable (+24V) matching socket CON10 on bottom PCB PZ-06-A4 with socket CON14 on control PCB PK-05-A4 is in loose connection.</p> <p>b. The relay RELAY3 on bottom PCB PZ-06-A4 is damaged.</p> <p>c. The auxiliary power supply part on control PCB PK-05-A4 is damaged.</p>	<p>a. Check.</p> <p>b. Check.</p> <p>c. Check with a multi-meter if chip U6, audion Q2, MOSFET U1, capacitor C23 or resistor R35 on control PCB PK-05-A4 is damaged.</p>

<p>4. Turn on the machine and it appears normal, there is no-load voltage output in ARC mode, press the welding torch in TIG mode and there is gas out, the malfunction LED is not on, no HF.</p>	<p>a. The connecting cable matching socket CON3 on top PCB PM-03-A2 with socket CON3 on bottom PCB PZ-06-B4 is in loose connection.</p> <p>b. High voltage silicon granule D1/D2/D4/D5 or high voltage output capacitor C12/C13 on bottom PCB PZ-06-B4 is damaged.</p> <p>c. The connecting cable is in loose connection with CP1/CP2 on bottom PCB.</p> <p>d. The discharge nozzle P1/P2 on bottom PCB has conglutination, excessive clearance or serious oxidation problem.</p> <p>e. The ARC/TIG conversion switch on the panel or chip U7 on control panel PK-31-A0 is damaged.</p> <p>f. The connecting cable matching socket CON8 on control PCB PK-31-A0 with socket CON2 on bottom PCB PZ-06-B4 is in loose connection, or HF relay RELAY1, audion Q1, MOSFET VT1 or diode D3 on bottom PCB is damaged.</p>	<p>a. Check.</p> <p>b. Check.</p> <p>c. Check.</p> <p>d. Adjust or replace it if necessary.</p> <p>e. Check and replace it if necessary.</p> <p>f. Check. Short-circuit socket CON2 on bottom PCB PZ-06-B4, then turn on the machine and press the manual switch. If there is no HF, there is something wrong with the HF circuit on bottom PCB. If there is, the inductor L1/L2, chip U1/U3 or resistor R6 on control PCB PK-31-A0 is damaged.</p>
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<p>5. Turn on the machine and it appears normal, press the welding torch switch and there is gas out, the malfunction LED is on, turn to ARC mode, the malfunction LED turns on.</p>	<p>a. Over-current protection occurs when welding is carried out.</p> <p>b. Over-heating protection occurs when welding is carried out.</p> <p>c. Some parts on top PCB, center PCB, or bottom PCB are damaged.</p>	<p>a. Turn off the machine for 5mins and restart.</p> <p>b. Stop the welding operation for 5mins, or the secondary inverter thermal switch is damaged.</p> <p>c. Check. Turn off the machine, pull out the connecting cable matching the socket CON3 on top PCB PM-03-A2 with the socket CON3 on bottom PCB PZ-06-B4, turn on the machine. If the malfunction LED is off, the transformer T1 is short-circuited or damaged. If it's on, turn off the machine, pull out the connecting cable matching socket CON1 on top PCB PM-03-A2, turn on the machine. If the malfunction LED is on, MOSFET VT1.1—/VT4.5 on top PCB or some parts on drive module PK-08-A1 are damaged; if it's off, transformer T2.1/T2.2/ T2.3/T2.4 or rectifying diode D1/D2 on PCB PD-08-B0 is damaged.</p>
<p>6. Turn on the machine and it appears normal, it can start arc in TIG mode, but the welding point appears black.</p>	<p>a. The magnet valve or the gas tube is blocked.</p> <p>b. The magnet valve is damaged.</p> <p>c. The connecting cable matching socket CON10 on bottom PCB PZ-06-A4 with socket CON7 on control panel PK-31-A0 is in loose connection.</p> <p>d. Some parts in magnet valve control circuit on bottom PCB PZ-06-B4 or some parts in magnet valve control circuit on control panel PK-31-A0 are damaged.</p> <p>e. The welding torch is damaged.</p> <p>f. The tungsten is of bad quality or the argon is impure.</p>	<p>a. Clear.</p> <p>b. Replace.</p> <p>c. Check.</p> <p>d. Check with a multi-meter if the MOSFET VT1, resistor R3/R2, diode D3 or audion Q1 on bottom PCB or audion Q1 on control PCB PK-31-A0 is damaged or if the magnet valve control cable matching the socket CON4 is disconnected.</p> <p>e. Remove the welding torch and the gas-electricity tie-in, and press the welding torch switch. If there is gas out, the welding torch is damaged. Replace it.</p> <p>f. Check and replace it if necessary.</p>

<p>7. The cutting current is unstable and out of control.</p>	<p>a. The connecting cable matching socket CON2 on control PCB PK-05-A4 with socket CON11 on control panel PK-31-A0 is in loose connection.</p> <p>b. The capacitor C14/C15/C16/C9/C7/C8 on bottom PCB PZ-06-B4 leaks or is damaged.</p> <p>c. The input cable or output cable is too slim and too long.</p> <p>d. Loose connection exists inside the machine, e.g. the remote control connecting cable matching socket CON4 on control panel.</p>	<p>a. Check and replace it if necessary.</p> <p>b. Check and replace it if necessary.</p> <p>c. Enlarge the cross section area of the cable.</p> <p>d. Check.</p>
<p>8. Turn on the machine but it strips.</p>	<p>a. The rectifying bridge matching the socket CON6/CON11 on bottom PCB PZ-06-B4 is damaged.</p> <p>b. The power supply cable is disconnected or short-circuited.</p>	<p>a. Replace.</p> <p>b. Check.</p>
<p>9. Adjust the decay potentiometer to the max value and release the welding torch switch, the gas shuts off and then no current output.</p>	<p>a. The diode D1/D2 or chip U3 on control panel PK-10-A1 is damaged.</p>	<p>a. Check and replace it if necessary.</p>
<p>10. Press the welding torch switch, there is HF discharge buzz, but no welding voltage output.</p>	<p>a. The earth cable of welding torch is in loose connection.</p> <p>b. The output terminal of the earth cable is in loose connection with gas-electricity tie-in or with center PCB PD-01-A2.</p>	<p>a. Check and replace it if necessary.</p> <p>b. Check and replace it if necessary.</p>
<p>11. The arc starting is bad in TIG mode.</p>	<p>a. The space between discharge nozzles P1 and P2 on bottom PCB PZ-06-B4 is too big or small, or their surface is badly oxidized.</p> <p>b. The high-voltage capacitor C12/C13 on bottom PCB is damaged, or the capacitance becomes smaller.</p> <p>c. The tungsten is of bad quality or the argon is impure.</p> <p>d. The welding torch is in loose connection.</p> <p>e. Incorrect turn rate or turn-to-turn electricity leakage problem exists in arc-starting coil matching CP1/CP2 on bottom PCB.</p>	<p>a. Adjust the space between them, or clear their surface.</p> <p>b. Check and replace it if necessary.</p> <p>c. Check and replace it if necessary.</p> <p>d. Check.</p> <p>e. Check.</p>

<p>12. Turn on the machine, and it appears normal, but the malfunction LED turns on once welding is carried out.</p>	<p>a. The connecting cable matching socket CON11 on control PCB PK-05-A4 with the output bypass is in loose connection.</p> <p>b. Loose contact exists in MOSFET VT1.1 — VT4.5 on top PCB PM-03-A2 or rectifying diode D1/D2 on center PCB PD-08-B1.</p> <p>c. Some parts on control module PK-03-A1 are damaged.</p>	<p>a. Check.</p> <p>b. Check with a multi-meter.</p> <p>c. Check if the chip U2 or audion Q9 on PK-03-A1 is damaged.</p>
<p>13. Turn on the machine, and there is HF.</p>	<p>a. Some parts in manual switch control circuit are damaged.</p> <p>b. The connecting cable matching socket CON8 on control panel PK-31-A0 with socket CON2 on bottom PCB PZ-06-B4 is in loose connection, or chip U1 on control panel PK-31-A0 is damaged.</p>	<p>a. Check with a multi-meter if chip U8 or diode D14/D18 on control panel PK-31-A0 is damaged. Disconnect the connecting cable matching socket CON9, and short-circuit both terminal of CON9, then check if the manual switch board PH-10-A1 is short-circuited.</p> <p>b. Check.</p>
<p>14. Incessant HF exists when welding is carried out.</p>	<p>a. The relay RELY1, audion Q1, diode D3, MOSFET VT1 on bottom PCB PZ-06-B4 or chip U1 on control panel PK-31-A0 is damaged.</p> <p>b. The connecting cable matching socket CON13 on control panel PK-31-A0 with socket CON5 on control PCB PK-05-A4.</p>	<p>a. Check and replace it if necessary.</p> <p>b. Check.</p>
<p>15. There is deviation between the preset value and real value of the show value of the meter.</p>	<p>a. The value of the variable resistor R9 on control PCB PK-05-A4 or VR1 on preset PCB PH-10-A01 changes.</p>	<p>a. Adjust. Methods: 1. Turn to ARC mode, adjust the value of variable resistor R9 on control PCB PK-05-A4 to make the show value of the meter is 200. 2. Turn to TIG mode, do not press the manual switch, adjust the value of variable resistor VR1 on preset PCB to make the show value of the meter is 200.</p>
<p>16. No pulse in the pulse mode.</p>	<p>a. The pulse conversion switch on the panel is damaged.</p> <p>b. The connecting cable matching socket CON2/CON3 on control panel PK-31-A0 with the pulse conversion switch is short-circuited, or chip U4, capacitor C4/C11, potentiometer VR2/VR3 or diode D24 is damaged.</p>	<p>a. Check and replace it if necessary.</p> <p>b. Check.</p>

17. When no-load in ARC mode, it appears normal in DC mode, but there is abnormal sound in AC mode.	a. Some of the MOSFET on the secondary inverter PCB PN-07-A1/PN-08-B0 is damaged.	a. Check. Method: Turn to ARC mode, then AC mode, turn off the machine after 3mins of no-load, touch the MOSFET on the secondary inverter PCB with your hand one by one. The extra hot ones are damaged.
18. No 4T state or 4T is inaccurate.	a. The 2T/4T conversion switch on the panel is damaged, or the connecting cable matching it with socket CON10 on control panel PK-31-A0 is in loose connection. b. Some part on control panel PK-31-A0 is damaged.	a. Check. b. Check if chip U8/U2, diode D6 or capacitor C2 on control panel is damaged.
19. No AC output in AC mode.	a. The AC/DC conversion switch on the panel is damaged. b. Some part on the control panel PK-31-A0 is damaged. c. Some part on the secondary drive PCB PK-09-A3 is damaged.	a. Check. b. Check if the diode D9/D2/D1, audion Q2, chip U6 or potentiometer VR4 on control panel is damaged. c. Check with a multi-meter if chip U2/U4/U8/U9/U3, audion Q1—Q8 or zener diode Z1/Z2/Z3/Z4 on drive PCB is damaged.
20. No AC sound when welding in AC mode.	a. The value of the resistor matching socket CON1 on inverter PCB PN-07-A1 varies. b. The MOSFET VT1, rectifying diode VT11, diode D1 or zener diode Z3 on inverter PCB PN-07-A1 is damaged.	a. Check and replace it if necessary. b. Check and replace it if necessary.
21. Press the welding torch switch, there is gas out, the show value of the meter is invariable, there is only small current, and the pre-flow time is variable.	a. The connecting cable matching socket CON11 on control panel PK-31-A0 with socket CON2 on control PCB PK-05-A4 is in loose connection. b. Some part on control panel PK-31-A0 is damaged.	a. Check. b. Check if chip U5, audion Q3/Q4 or potentiometer VR7 on control panel PK-31-A0 is damaged.
22. When the pulse conversion switch is in no-pulse mode, in ARC or TIG mode, the welding current is invariable, and there is only maximum current.	a. The diode D24 on control panel PK-31-A0 is damaged.	a. Check.

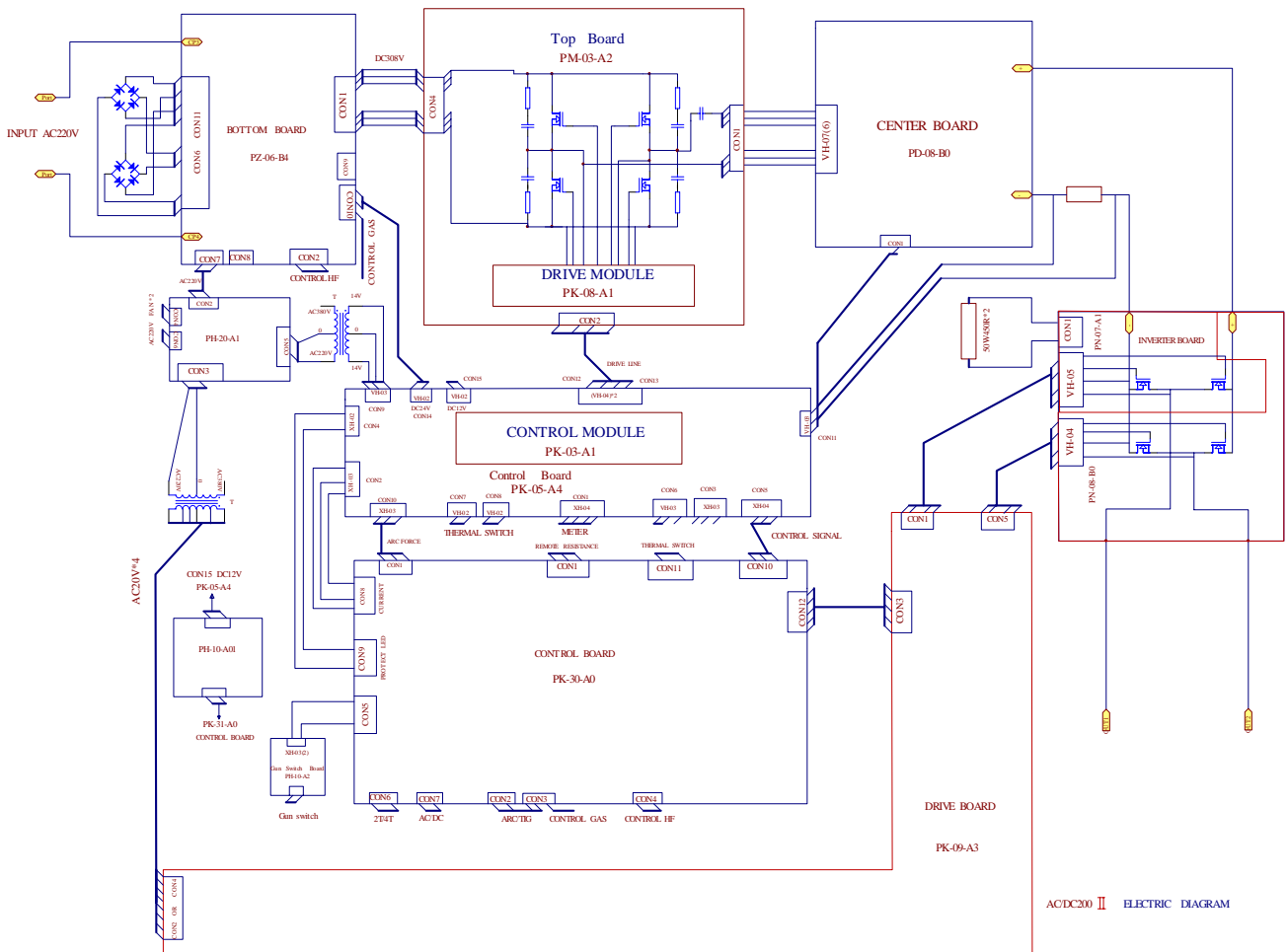
<p>23. Turn on the machine, the indicator of protection status is on because the voltage is too low.</p>	<p>a. The input voltage is too low or is unstable. b. The thermal switch matching socket CON14 on control panel PK-31-A0 is damaged. c. The connecting cable matching socket CON15 on control panel PK-31-A0 is in loose connection. d. The resistor R51/R44 or chip U6 on control panel PK-31-A0 is damaged.</p>	<p>a. Check. b. Check. c. Check. d. Check. Method: properly reduce the value of resistor R44.</p>
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2. AC/DC200

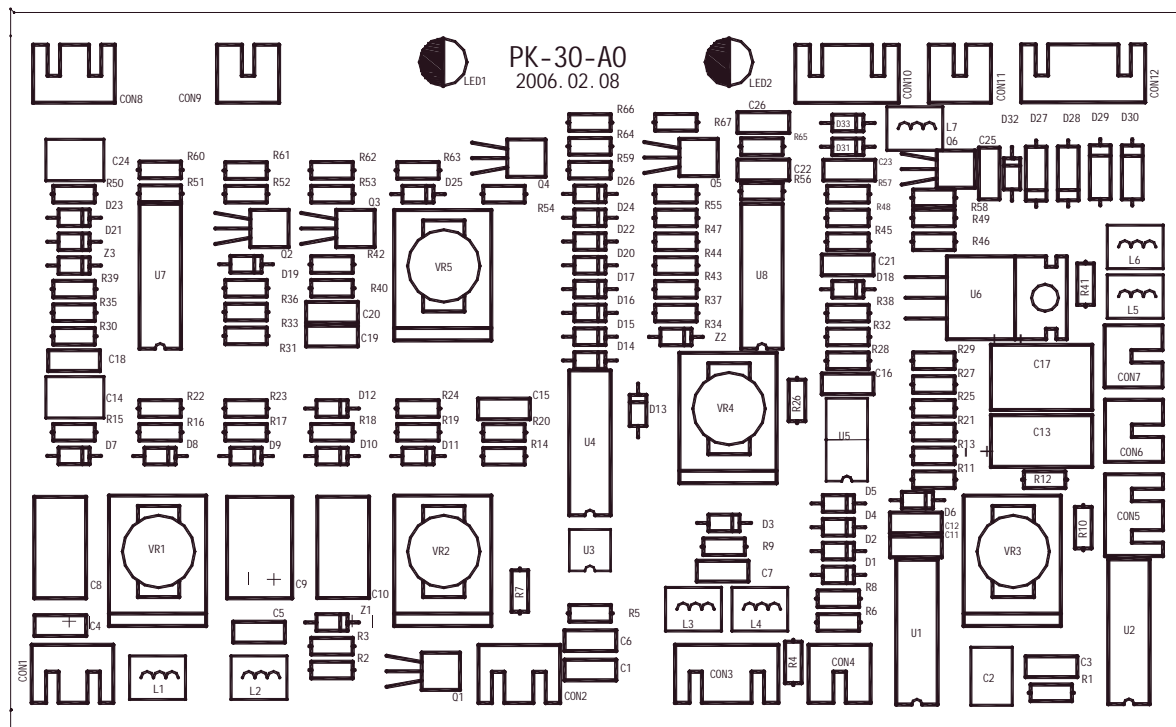
2.1 The structure drawing of AC/DC200 :

(Lack for the moment)

2.2 The general connection diagram of AC/DC200 :



2.3 The diagram of AC/DC200 's control panel PK-30-A0:



2.4 Troubleshooting of AC/DC200 :

Trouble	Analysis	Solution
<p>1. Turn on the machine, there is no display of the meter, the fan doesn't work, no no-load voltage output in ARC/TIG mode.</p>	<p>a. The input voltage is abnormal.</p> <p>b. The power supply cable matching CP3/CP4 on bottom PCB PZ-06-B4 is disconnected, or the tie-in is damaged.</p> <p>c. The power supply switch may be damaged, or it's not closed.</p> <p>d. The connecting cable matching socket CON1-CON6 on power supply conversion PCB PH-20-A1 is in loose connection.</p>	<p>a. Check if the input voltage is AC 220V.</p> <p>b. Check.</p> <p>c. Check.</p> <p>d. Check.</p>

<p>2. Turn on the machine, the meter displays, press the welding torch switch in TIG mode, there is gas out and no HF, no no-load voltage output in ARC mode.</p>	<p>a. The connecting cable matching socket CON1 on bottom PCB PZ-06-B4 is in loose connection.</p> <p>b. The prime relay RELY3 on bottom PCB PZ-06-B4 doesn't close well; the value of thermal resistor RT1 increases.</p> <p>c. The connecting cable matching socket CON11/CON6 on bottom PCB PZ-06-B4 with the rectifying bridge is in loose connection.</p> <p>d. Some part on control module PK-03-A1 is damaged.</p> <p>e. Some part on control PCB PK-05-A4 is damaged.</p>	<p>a. Check. Make sure the voltage of socket CON1 is DC308V.</p> <p>b. Check and replace if necessary.</p> <p>c. Check.</p> <p>d. Check with a multi-meter if chip U1 on PK-03-A1 is damaged. Method: Check if the output voltage of the 16th pin of U1 is 5V. If it's not, U1 is damaged. Check if audion Q2/Q3/Q4/Q5/Q6/Q7/Q9, thyristor Q1, diode D2/D3/D4, zener diode Z1/Z2/Z3, capacitor C17 or resistor R32 is damaged.</p> <p>e. Check if MOSFET U2/U3/U4/U5 or resistor R32 is damaged.</p>
<p>3. Turn on the machine, the meter displays, but the thermal resistor RT1/RV2/RV3/RV5 on bottom PCB PZ-06-B4 heats and smokes after a while.</p>	<p>a. The connecting cable (+24V) matching socket CON10 on bottom PCB PZ-06-A4 with socket CON14 on control PCB PK-05-A4 is in loose connection.</p> <p>b. The relay RELAY3 on bottom PCB PZ-06-A4 is damaged.</p> <p>c. The auxiliary power supply part on control PCB PK-05-A4 is damaged.</p>	<p>a. Check.</p> <p>b. Check.</p> <p>c. Check with a multi-meter if chip U6, audion Q2, MOSFET U1, capacitor C23 or resistor R35 on control PCB PK-05-A4 is damaged.</p>

<p>4. Turn on the machine and it appears normal, there is no-load voltage output in ARC mode, press the welding torch in TIG mode and there is gas out, the malfunction LED is not on, no HF.</p>	<p>a. The connecting cable matching socket CON3 on top PCB PM-03-A2 with socket CON3 on bottom PCB PZ-06-B4 is in loose connection.</p> <p>b. High voltage silicon granule D1/D2/D5/D4 or high voltage output capacitor C12/C13 on bottom PCB PZ-06-B4 is damaged.</p> <p>c. CP1/CP2 is disconnected with the bottom PCB.</p> <p>d. The discharge nozzles P1/P2 on bottom PCB have conglutination, excessive clearance or serious oxidation problem.</p> <p>e. The ARC/TIG conversion switch on the panel or the chip U4 on control panel PK-30-A0 is damaged.</p> <p>f. The connecting cable matching socket CON4 on control PCB PK-30-A0 with socket CON2 on bottom PCB PZ-06-B4 is in loose connection, or HF relay RELAY1, audion Q1, MOSFET VT1 or diode D3 on bottom PCB is damaged.</p>	<p>a. Check.</p> <p>b. Check.</p> <p>c. Check.</p> <p>d. Adjust or replace it if necessary.</p> <p>e. Check and replace it if necessary.</p> <p>f. Check. Method: short-circuit the socket CON2 on bottom PCB PZ-06-B4, turn on the machine, and press the manual switch. If there isn't HF, the HF circuit on bottom PCB goes wrong. If there is, the inductor L3/L4, chip U5/U3 or resistor R9 on control PCB PK-30-A0 is damaged.</p>
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<p>5. Turn on the machine and it appears normal, press the welding torch switch and there is gas out, the malfunction LED is on, the malfunction LED turns on when turning to ARC mode.</p>	<p>a. Over-current protection occurs when welding is carried out.</p> <p>b. Over-heating protection occurs when welding is carried out.</p> <p>c. Some parts on top PCB, center PCB, or bottom PCB are damaged.</p>	<p>a. Turn off the machine for 5mins and restart.</p> <p>b. Stop the welding operation for 5mins, or the secondary inverter thermal switch is damaged.</p> <p>c. Check. Method: turn to TIG mode, turn off the machine, and pull out the connecting cable matching the socket CON3 on top PCB PM-03-A2 with the socket CON3 on bottom PCB PZ-06-B4, then turn on the machine. If the malfunction LED is off, the transformer T1 is short-circuited or damaged. If it's on, turn off the machine, pull out the connecting cable matching socket CON1 on top PCB PM-03-A2, turn on the machine. If malfunction LED is on, MOSFET VT1.1—/VT4.5 on top PCB or some part on drive module PK-08-A1 is damaged; if off, transformer T2.1/T2.2/T2.3/T2.4 or rectifying diode D1/D2 on PCB PD-08-B0 is damaged.</p>
<p>6. Turn on the machine and it appears normal, it can start arc in TIG mode, but the welding point appears black.</p>	<p>a. The magnet valve or the gas tube is blocked.</p> <p>b. The magnet valve is damaged.</p> <p>c. The connecting cable matching socket CON10 on bottom PCB PZ-06-B4 with socket CON3 on control panel PK-30-A0 is in loose connection.</p> <p>d. Some part in magnet valve control circuit on bottom PCB PZ-06-B4 or some part in magnet valve control valve circuit on control panel PK-30-A0 is damaged.</p> <p>e. The welding torch is damaged.</p> <p>f. The tungsten is of bad quality or the argon is impure.</p>	<p>a. Clear.</p> <p>b. Replace.</p> <p>c. Check.</p> <p>d. Check with a multi-meter if the MOSFET VT1, resistor R3/R2, diode D3 or audion Q1 on bottom PCB or audion Q1 on control PCB PK-30-A0 is damaged or if the magnet valve control cable matching the socket CON4 is disconnected.</p> <p>e. Remove the welding torch and the gas-electricity tie-in, and press the welding torch switch. If there is gas out, the welding torch is damaged. Replace it.</p> <p>f. Check and replace it if necessary.</p>

<p>7. The welding current is unstable and out of control.</p>	<p>a. The connecting cable matching the socket CON2 on the control PCB PK-05-A4 with socket CON8 on control panel PK-30-A0 is in loose connection.</p> <p>b. The capacitor C14/C15/C16/C9/C7/C8 on bottom PCB PZ-06-B4 leaks or is damaged.</p> <p>c. The input cable or output cable is too slim and too long.</p> <p>d. Loose connection exists inside the machine, e.g. the connecting cable matching socket CON1 with the remote control.</p>	<p>a. Check and replace it if necessary.</p> <p>b. Check and replace it if necessary.</p> <p>c. Enlarge the cross section area of the cable.</p> <p>d. Check.</p>
<p>8. Turn on the machine but it strips.</p>	<p>a. The rectifying bridge matching the socket CON6/CON11 on bottom PCB PZ-06-B4 is damaged.</p> <p>b. The power supply cable is disconnected or short-circuited.</p>	<p>a. Replace.</p> <p>b. Check.</p>
<p>9. In TIG mode, adjust the decay potentiometer to the max value and release the welding torch switch, the gas shuts off and then no current output.</p>	<p>a. The audion Q4, resistor R54/R59/R63 or chip U8 on control PCB PK-30-A0 is damaged.</p>	<p>a. Check and replace it if necessary.</p>
<p>10. Press the welding torch switch, there is HF discharge buzz, but no welding voltage output.</p>	<p>a. The earth cable of welding torch is in loose connection.</p> <p>b. The output terminal of the earth cable is in loose connection with gas-electricity tie-in.</p>	<p>a. Check and replace it if necessary.</p> <p>b. Check and replace it if necessary.</p>
<p>11. The arc starting is bad in TIG mode.</p>	<p>a. The space between discharge nozzles P1 and P2 on bottom PCB PZ-06-B4 is too big or small, or their surface is badly oxidized.</p> <p>b. The high-voltage capacitor C12/C13 on bottom PCB is damaged, or the capacitance becomes smaller.</p> <p>c. The tungsten is of bad quality or the argon is impure.</p> <p>d. The welding torch is in loose connection.</p> <p>e. Incorrect turn rate or turn-to-turn electricity leakage problem exists in arc-starting coil matching CP1/CP2 on bottom PCB.</p>	<p>a. Adjust the space between them, or clear their surface.</p> <p>b. Check and replace it if necessary.</p> <p>c. Check and replace it if necessary.</p> <p>d. Check.</p> <p>e. Check.</p>

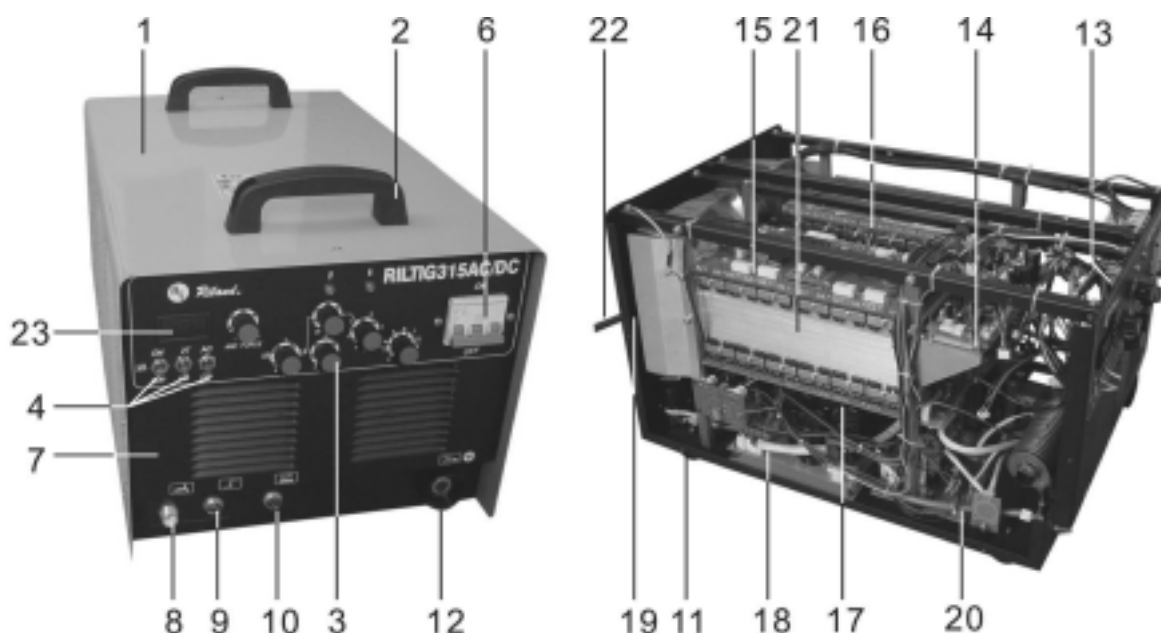
<p>12. Turn on the machine, and it appears normal, but the malfunction LED turns on once welding is carried out.</p>	<p>a. The connecting cable matching socket CON11 on control PCB PK-05-A4 with the output bypass is in loose connection.</p> <p>b. Loose contact exists in MOSFET VT1.1-VT4.5 on top PCB PM-03-A2 or rectifying diode D1/D2 on center PCB PD-08-B0.</p> <p>c. Some part on control module PK-03-A1 is damaged.</p>	<p>a. Check.</p> <p>b. Check with a multi-meter.</p> <p>c. Check if the chip U2 or audion Q9 on PK-03-A1 is damaged.</p>
<p>13. Turn on the machine, and there is HF.</p>	<p>a. Some parts in manual switch control circuit on bottom PCB are damaged.</p> <p>b. The connecting cable matching socket CON4 on control panel PK-30-A0 with socket CON2 on bottom PCB PZ-06-B4 is short-circuited or in loose connection, or chip U3 on control panel PK-30-A0 is damaged.</p>	<p>a. Check with a multi-meter if chip U1 or diode D1/D2 on control panel PK-30-A0 is damaged. Disconnect the connecting cable matching socket CON5, short-circuit both terminal of socket CON5 and check if the manual switch board PH-10-A1 is short-circuited.</p> <p>b. Check.</p>
<p>14. Incessant HF exists when welding is carried out.</p>	<p>a. The relay RELAY1, audion Q1, diode D3, MOSFET VT1 on bottom PCB PZ-06-B4 or chip U3 on control panel PK-30-A0 is damaged.</p> <p>b. The connecting cable matching socket CON10 on control panel PK-30-A0 with socket CON5 on control PCB PK-05-A4 is in loose connection.</p>	<p>a. Check and replace it if necessary.</p> <p>b. Check.</p>
<p>15. There is deviation between the preset value and real value of the show value of the meter.</p>	<p>a. The value of the variable resistor R9 on control PCB PK-05-A4 or VR1 on preset PCB PH-10-A01 changes.</p>	<p>a. Adjust. Methods: 1. Turn to ARC mode, adjust the value of variable resistor R9 on control PCB PK-05-A4 to make the show value of the meter is 200. 2. Turn to TIG mode, do not press the manual switch, adjust the value of variable resistor VR1 on preset PCB to make the show value of the meter is 200.</p>
<p>16. No welding voltage output in ARC mode, but it's normal in TIG mode.</p>	<p>a. The ARC/TIG conversion switch on the panel is damaged.</p> <p>b. The connecting cable matching socket CON2/CON3 on control panel PK-30-A0 with ARC/TIG conversion switch is in loose connection, or chip U4, resistor R7 or diode D3 is damaged.</p>	<p>a. Check and replace it if necessary.</p> <p>b. Check.</p>

<p>17. When no-load in ARC mode, it appears normal in DC mode, but there is abnormal sound in AC mode.</p>	<p>a. Some of the MOSFET on the secondary inverter PCB PN-07-A1/PN-08-B0 is damaged.</p>	<p>a. Check. Method: Turn to ARC mode, then AC mode, turn off the machine after 3mins of no-load, touch the MOSFET on the secondary inverter PCB with your hand one by one. The extra hot ones are damaged.</p>
<p>18. No 4T state or 4T is inaccurate.</p>	<p>a. The 2T/4T conversion switch on the panel is damaged, or the connecting cable matching it with socket CON6 on control panel PK-30-A0 is in loose connection.</p> <p>b. Some part on control panel PK-30-A0 is damaged.</p> <p>c. Interfered by the manual switch PCB.</p>	<p>a. Check.</p> <p>b. Check if chip U1/U2, diode D4 or capacitor C2 on control panel is damaged.</p> <p>c. The porcelain capacitor 102/2KV on the manual switch PCB is damaged.</p>
<p>19. No AC output in AC mode.</p>	<p>a. The AC/DC conversion switch on the panel is damaged.</p> <p>b. Some part on the control panel PK-30-A0 is damaged.</p> <p>c. Some part on the secondary drive PCB PK-09-A3 is damaged.</p>	<p>a. Check.</p> <p>b. Check if the diode D18/D11/D10, audion Q6, chip U8 or potentiometer VR2 on control panel PK-30-A0 is damaged.</p> <p>c. Check with a multi-meter if chip U2/U4/U8/U9/U3, audion Q1-Q8 or zener diode Z1/Z2/Z3/Z4 on drive PCB is damaged.</p>
<p>20. No AC sound when welding in AC mode.</p>	<p>a. The value of the resistor matching socket CON1 on inverter PCB PN-07-A1 varies.</p> <p>b. The MOSFET VT1, rectifying diode VT11, diode D1 or zener diode Z3 on inverter PCB PN-07-A1 is damaged.</p>	<p>a. Check and replace it if necessary.</p> <p>b. Check and replace it if necessary.</p>
<p>21. Press the welding torch switch, there is gas out, the show value of the meter is invariable, there is only small current, and the pre-flow time is variable.</p>	<p>a. The connecting cable matching socket CON8 on control panel PK-30-A0 with socket CON2 on control PCB PK-05-A4 is in loose connection.</p> <p>b. Some part on control panel PK-30-A0 is damaged.</p>	<p>a. Check.</p> <p>b. Check if chip U7, audion Q3/Q2 or potentiometer VR5 on control panel PK-30-A0 is damaged.</p>

<p>22. Turn on the machine, the indicator of protection status is on because the voltage is too low.</p>	<p>a. The input voltage is too low or is unstable.</p> <p>b. The thermal switch matching socket CON11 on control panel PK-30-A0 is damaged.</p> <p>c. The connecting cable matching socket CON12 on control panel PK-30-A0 is in loose connection.</p> <p>d. The resistor R47/R44 or chip U8 on control panel PK-30-A0 is damaged.</p>	<p>a. Check.</p> <p>b. Check.</p> <p>c. Check.</p> <p>d. Check. Method: properly reduce the value of resistor R47.</p>
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3. WSE200

3.1 The structure drawing of WSE200:

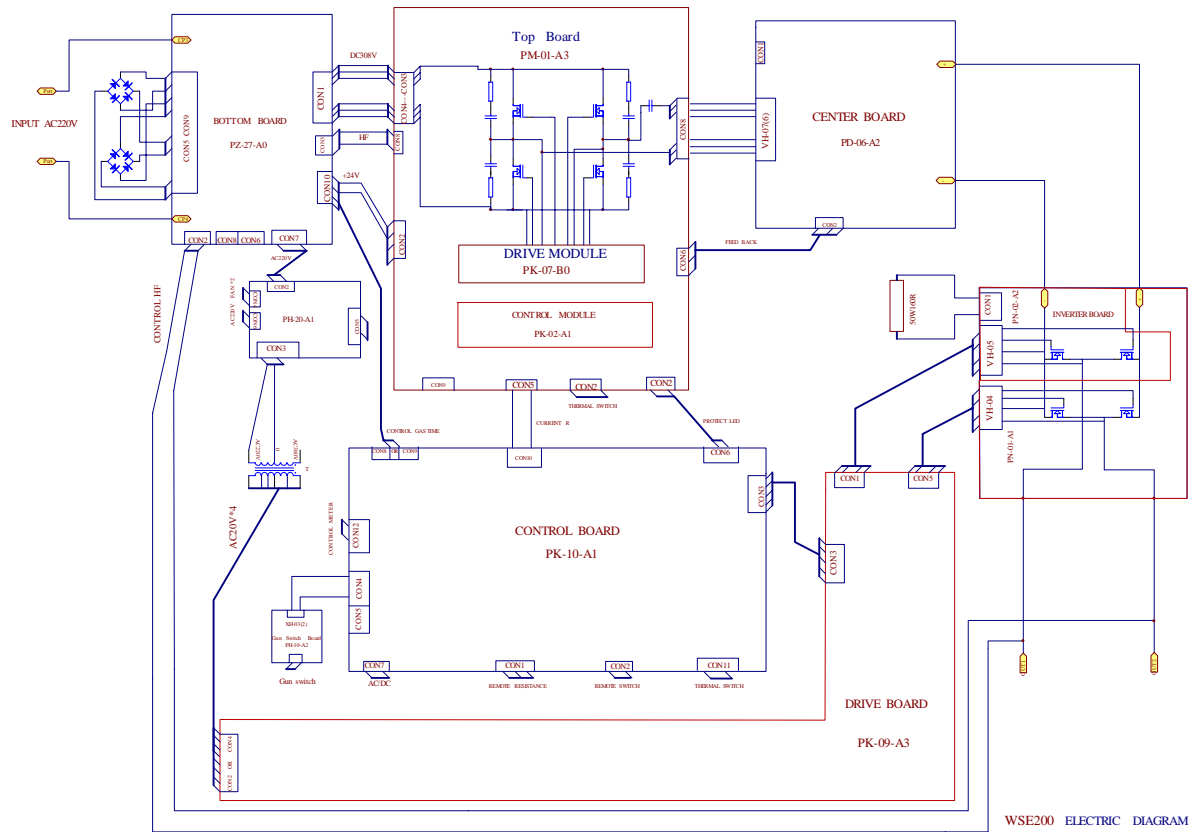


The structure of WSE200 is similar to that of RILTIG315AC/DC. (See the above structure drawing.)

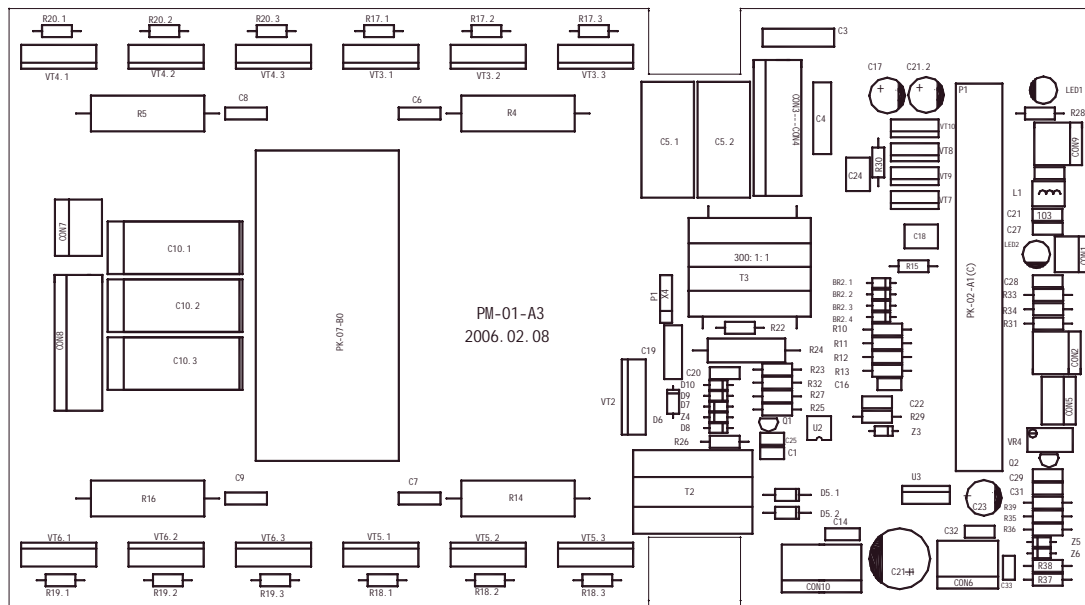
No.	Description	No.	Description	No.	Description
1	Cover	9	Pilot-socket (2 pins)	17	Center PCB
2	Handle	10	Pilot-socket (3 pins)	18	Inverter PCB 2
3	Button	11	Rubber foot	19	Fan
4	Function switch	12	Coupling socket	20	HF PCB
5	Function switch	13	Panel PCB	21	Heat sink
6	Main switch	14	Control PCB	22	Input cable
7	Front panel	15	Top PCB (left)	23	Digital meter
8	Fast-socket	16	Inverter PCB 1		

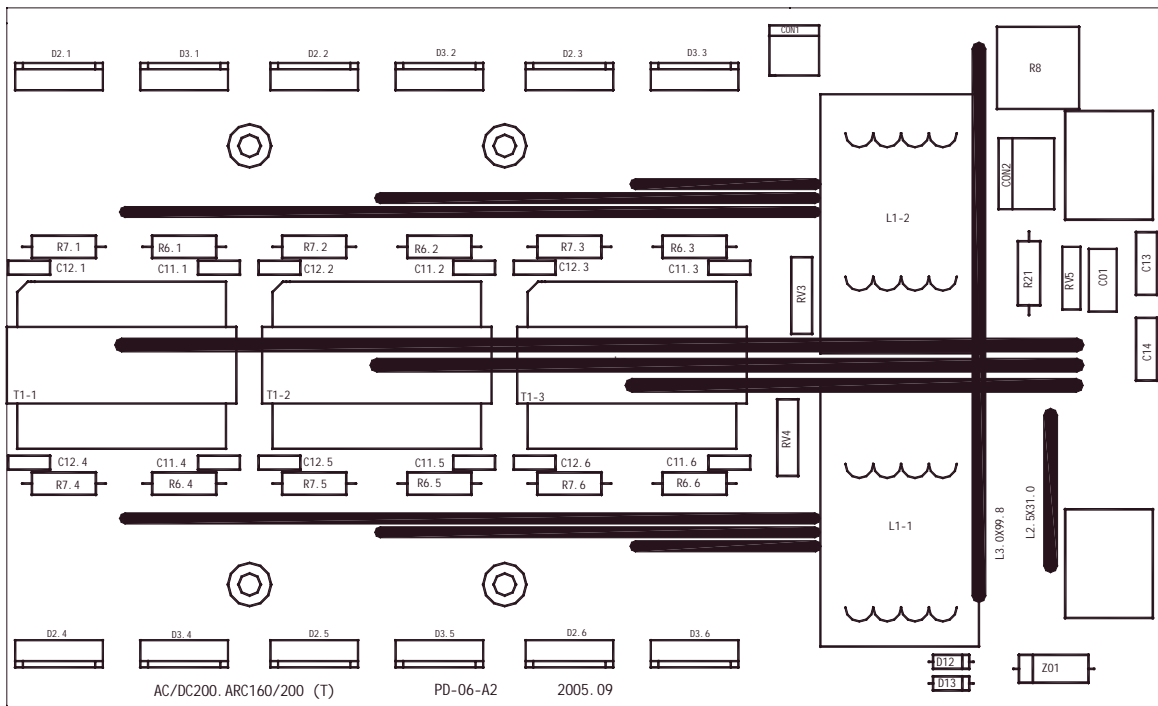
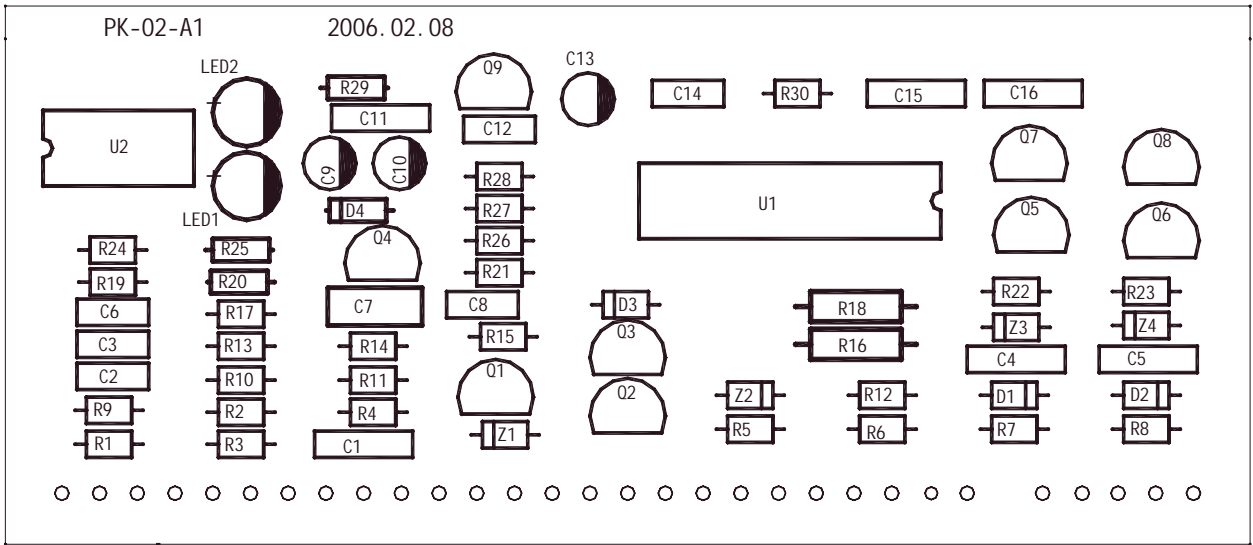
Note: WSE200 is without No.20 HF PCB.

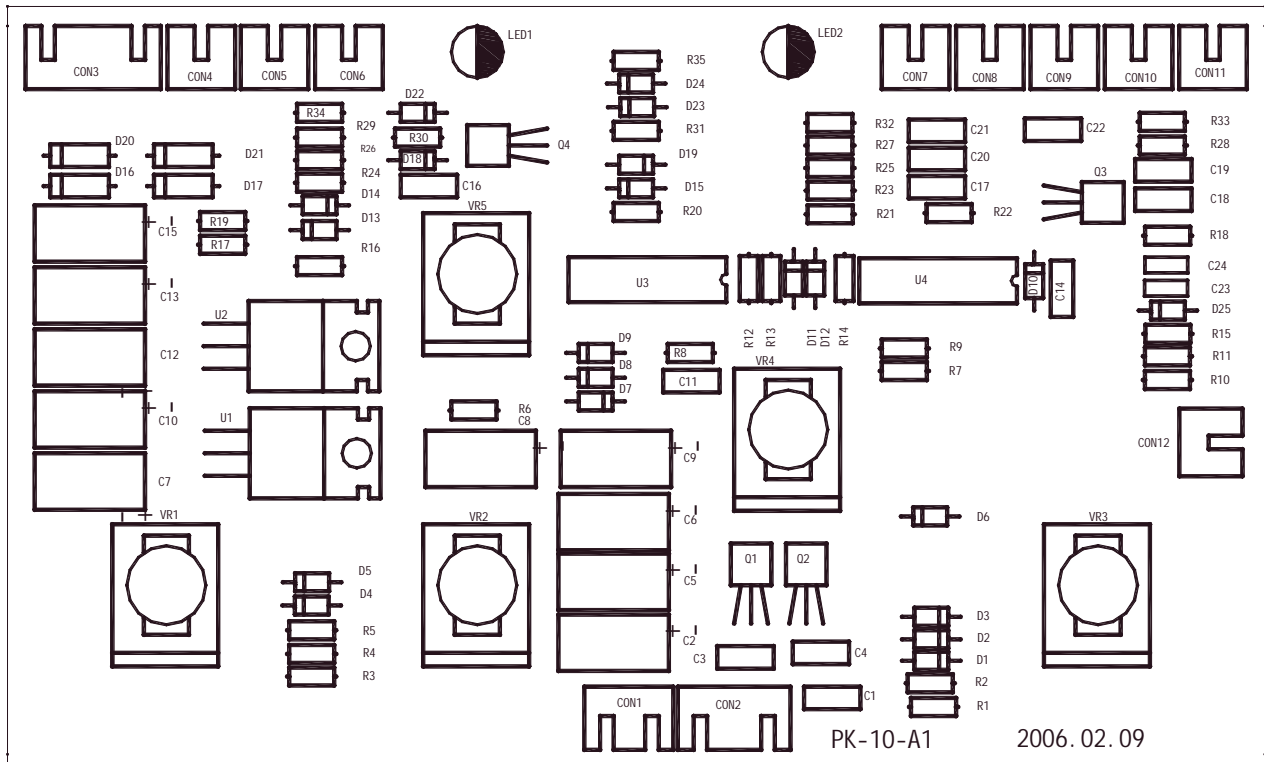
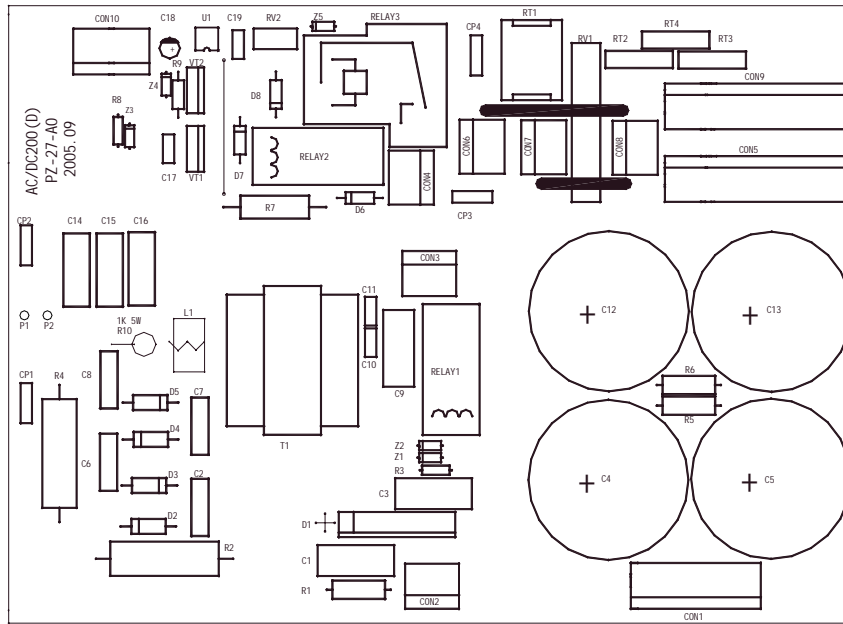
3.2 The general connection diagram of WSE200:

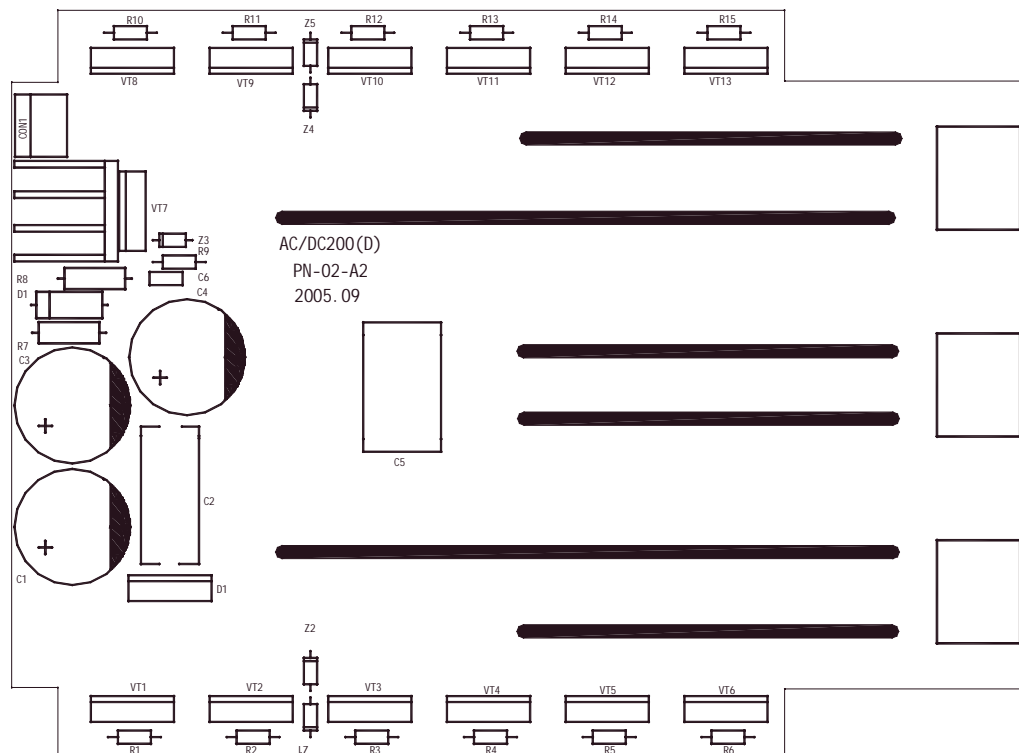
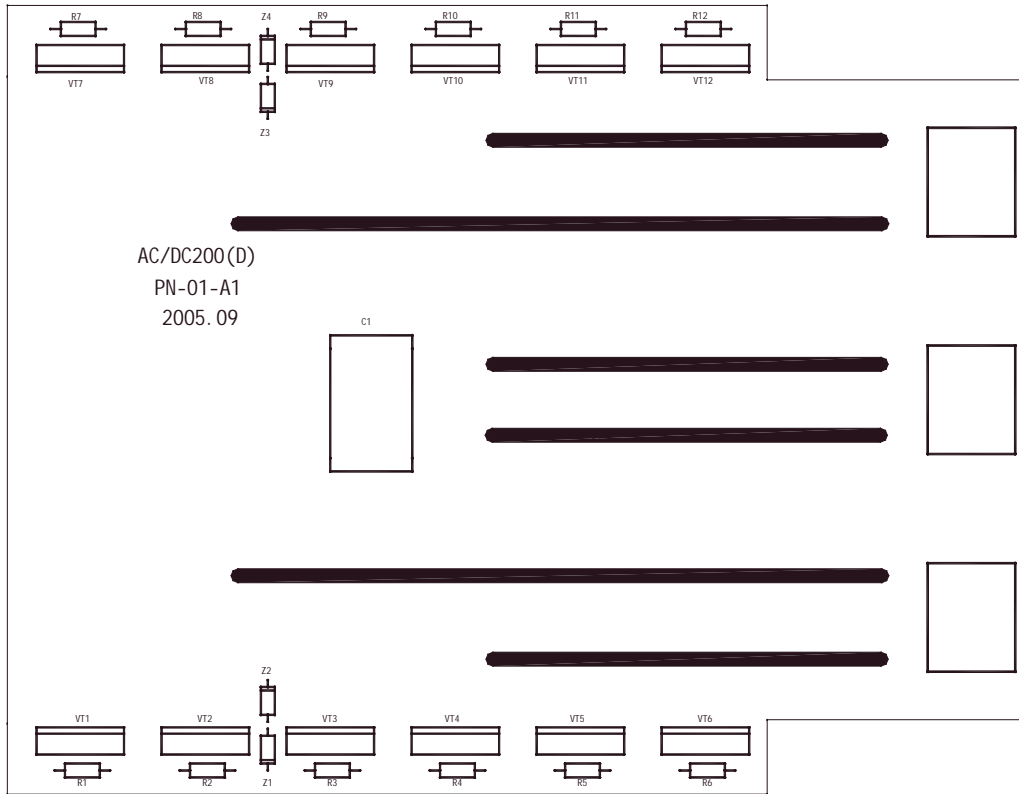


3.3 The diagram of WSE200's top PCB PM-01-A3, control module PK-02-A1, center PCB PD-06-A2 and secondary inverter PCB PN-01-A1 and PN-02-A2:









3.4 Troubleshooting of WSE200:

Trouble	Analysis	Solution
<p>1. Turn on the machine, the power indicator is not on, the fan doesn't work, no no-load voltage output.</p>	<p>a. The input voltage is abnormal.</p> <p>b. The power supply cable is not in good connection with CP3/CP4 on bottom PCB PZ-27-A0, or the tie-in is damaged.</p> <p>c. The power supply switch may be damaged or unclosed.</p> <p>d. The connecting cable matching socket CON1-CON6 on power supply conversion PCB PH-20-A1 is in loose connection.</p>	<p>a. Check if the input voltage is AC 220V.</p> <p>b. Check.</p> <p>c. Check and replace it if necessary.</p> <p>d. Check.</p>
<p>2. Turn on the machine, the power indicator is on, press the welding torch switch in TIG mode, there is gas out, no HF, and no no-load voltage output.</p>	<p>a. The connecting cable matching socket CON1 on bottom PCB PZ-27-A0 is in loose connection.</p> <p>b. The prime relay RELAY3 on bottom PCB PZ-27-A0 doesn't close well; the value of resistor RT1-RT4 increases.</p> <p>c. The connecting cable matching socket CON5/CON9 on bottom PCB PZ-27-A0 with rectifying bridge is in loose connection.</p> <p>d. Some part on control module PK-02-A1 is damaged.</p> <p>e. Some part on top PCB PM-01-A3 is damaged.</p>	<p>a. Check and make sure the voltage of socket CON1 is DC308V.</p> <p>b. Check and replace if necessary.</p> <p>c. Check.</p> <p>d. Check with a multi-meter if chip U1 on PK-02-A1 is damaged. Check if the 16th pin of U1 is 5V. If it's not, replace the chip because U1 is damaged. Check if diode D1/D2/D3, audion Q1/Q2/Q3/Q4/Q5/Q6/Q7/Q8/Q9 or zener diode Z1/Z2/Z3/Z4 is damaged.</p> <p>e. Check if MOSFET VT7-VT10, resistor R15 or manostat U3 is damaged.</p>
<p>3. Turn on the machine, the power indicator turns on, but the thermal resistor RT1-RT4 on bottom PCB PZ-27-A0 heats and smokes after a while.</p>	<p>a. The connecting cable (+24V) matching socket CON10 on bottom PCB PZ-27-A0 with socket CON10 on top PCB PM-01-A3 is in loose connection.</p> <p>b. The relay RELAY3 on bottom PCB PZ-27-A0 is damaged.</p> <p>c. The auxiliary power supply part on top PCB PM-01-A3 is damaged.</p>	<p>a. Check.</p> <p>b. Check.</p> <p>c. Check with a multi-meter if resistor R22/R24, MOSFET VT2, diode D6/D8/D7/D9/D10, zener diode Z3/Z4, OC U2 or audion Q1 on top PCB PM-01-A3 is damaged.</p>

<p>4. Turn on the machine and it appears normal, press the welding torch and there is gas out, the malfunction LED is not on, no HF, and there is no-load voltage output.</p>	<p>a. The connecting cable matching socket CON7 on top PCB PM-01-A3 with socket CON3 on bottom PCB PZ-27-A0 is in loose connection.</p> <p>b. High voltage silicon granule D3/D2/D5/D4 or high voltage output capacitor C14/C15/C16 on bottom PCB PZ-27-A0 is damaged.</p> <p>c. CP1/CP2 is disconnected with the bottom PCB.</p> <p>d. The discharge nozzles P1/P2 on bottom PCB have conglutination, excessive clearance or serious oxidation problem.</p> <p>e. The connecting cable matching socket CON2 on bottom PCB PZ-27-A0 with both output terminal is in loose connection, or HF relay RELAY1, zener diode Z1/Z2, bridge D1 or resistor R1/R3 on bottom PCB is damaged.</p>	<p>a. Check.</p> <p>b. Check.</p> <p>c. Check.</p> <p>d. Adjust or replace it if necessary.</p> <p>e. Check.</p>
<p>5. Turn on the machine, and it appears normal, press the welding torch switch and there is gas out, the malfunction LED is on.</p>	<p>a. Over-current protection occurs when welding is carried out.</p> <p>b. Over-heating protection occurs when welding is carried out.</p> <p>c. Some parts on top PCB, center PCB, or bottom PCB are damaged.</p>	<p>a. Turn off the machine for 5mins and restart.</p> <p>b. Stop the welding operation for 5mins, or the secondary inverter thermal switch is damaged.</p> <p>c. Check. Turn off the machine, pull out the connecting cable matching the socket CON7 on top PCB PM-01-A3 with the socket CON3 on bottom PCB PZ-27-A0, turn on the machine. If the malfunction LED is off, the transformer T1 is short-circuited or damaged. If it's on, turn off the machine, pull out the connecting cable matching socket CON8 on top PCB PM-01-A3, turn on the machine. If the malfunction LED is on, MOSFET VT3.123/VT4./VT5./VT6. on top PCB or some part on drive module PK-07-B0 is damaged; if it's off, transformer T1-1/T1-2/T1-3 or rectifying diode D2.1/D3.5/D3.6 on center PCB PD-05-A2 is damaged.</p>

<p>6. Turn on the machine and it appears normal, it can start arc, but the welding point appears black.</p>	<p>a. The magnet valve or the gas tube is blocked.</p> <p>b. The magnet valve is damaged.</p> <p>c. The connecting cable matching socket CON4 on bottom PCB PZ-27-A0 with socket CON8/CON9 on control panel PK-10-A1 is in loose connection.</p> <p>d. Some part in the magnet valve control circuit on bottom PCB PZ-27-A0 or on control panel PK-10-A1 is damaged.</p> <p>e. The welding torch is damaged.</p> <p>f. The tungsten is of bad quality or the argon is impure.</p>	<p>a. Clear.</p> <p>b. Replace.</p> <p>c. Check.</p> <p>d. Check with a multi-meter if the relay RELAY4, MOSFET VT1, resistor R8, diode D7 or zener diode Z3 on bottom PCB or audion Q3 on control PCB PK-10-A1 is damaged or if the magnet valve control cable matching the socket CON4 is disconnected.</p> <p>e. Remove the welding torch and the gas-electricity tie-in, and press the welding torch switch. If there is gas out, the welding torch is damaged. Replace it.</p> <p>f. Replace them if necessary.</p>
<p>7. The welding current is unstable and out of control.</p>	<p>a. The connecting cable matching socket CON10 on control panel PK-10-A1 with socket CON5 on top PCB PM-01-A3 is in loose connection.</p> <p>b. The capacitor C4/C5/C12/C13 on bottom PCB PZ-27-A0 leaks or is damaged.</p> <p>c. The input cable or output cable is too slim and too long.</p> <p>d. Loose connection exists inside the machine.</p>	<p>a. Check and replace it if necessary.</p> <p>b. Check and replace it if necessary.</p> <p>c. Enlarge the cross section area of the cable.</p> <p>d. Check.</p>
<p>8. Turn on the machine but it strips.</p>	<p>a. The rectifying bridge matching the socket CON5/CON9 on bottom PCB PZ-27-A0 is damaged.</p> <p>b. The power supply cable is disconnected or short-circuited.</p>	<p>a. Replace.</p> <p>b. Check.</p>
<p>9. Adjust the value of the decay potentiometer to the maximum and release the welding torch switch, the gas valve shuts off, and no current output.</p>	<p>a. The diode D1/D2 or chip U3 on control panel PK-10-A1 is damaged.</p>	<p>a. Check and replace it if necessary.</p>
<p>10. Press the welding torch switch, there is HF discharge buzz, but no welding voltage output.</p>	<p>a. The earth cable of welding torch is in loose connection.</p> <p>b. The output terminal of the earth cable is in loose connection with gas-electricity tie-in.</p>	<p>a. Check and replace it if necessary.</p> <p>b. Check and replace it if necessary.</p>

<p>11. The arc starting is bad.</p>	<p>a. The space between discharge nozzles P1 and P2 on bottom PCB PZ-27-A0 is too big or small, or their surface is badly oxidized.</p> <p>b. The high-voltage capacitor C14/C15/C16 on bottom PCB is damaged, or the capacitance becomes smaller.</p> <p>c. The tungsten is of bad quality or argon is impure.</p> <p>d. The welding torch is loose or broken.</p> <p>e. Incorrect turn rate or turn-to-turn electricity leakage problem exists in arc-starting coil matching CP1/CP2 on bottom PCB.</p>	<p>a. Adjust the space between them, or clear their surface.</p> <p>b. Check and replace it if necessary.</p> <p>c. Check and replace it if necessary.</p> <p>d. Check.</p> <p>e. Check.</p>
<p>12. Turn on the machine, and it appears normal, but the malfunction LED turns on once welding is carried out.</p>	<p>a. The connecting cable matching socket CON6 on top PCB PM-01-A3 with socket CON2 on center PCB PD-06-A2 is in loose connection.</p> <p>b. Loose contact exists in MOSFET VT1.1-VT4.5 on top PCB PM-01-A3 or rectifying diode D1/D2 on center PCB PD-06-A2.</p> <p>c. Some part on control module PK-02-A1 is damaged.</p>	<p>a. Check.</p> <p>b. Check with a multi-meter.</p> <p>c. Check if the chip U2 or audion Q9 on PK-02-A1 is damaged.</p>
<p>13. Turn on the machine, and there is HF.</p>	<p>a. Some parts in manual switch control circuit on bottom PCB are damaged.</p> <p>b. The connecting cable matching socket CON3 on control panel PK-10-A0 with socket CON3 on AC drive PCB PK-09-A3 is in loose connection, or chip U3/U4 or diode D11/D12/D14/D15 on control panel PK-10-A1 is damaged.</p> <p>c. Some MOSFET on inverter PCB PN-01-A1/PN-02-A2 is damaged.</p>	<p>a. Check with a multi-meter if chip U3, diode D18/D22 or audion Q4 on control panel PK-10-A1 is damaged. Disconnect the connecting cable matching socket CON5/4, and check if the manual switch board PH-10-A1 is short-circuited.</p> <p>b. Check.</p> <p>c. Check with a multi-meter one by one.</p>
<p>14. Incessant HF exists when welding is carried out.</p>	<p>a. The relay RELAY1 or zener diode Z1/Z2 on bottom PCB PZ-27-A0 is damaged.</p> <p>b. Some part on inverter PCB PN-02-A2 is damaged.</p>	<p>a. Check and replace it if necessary.</p> <p>b. Check if rectifying diode D1, MOSFET VT7, zener diode Z3 or resistor matching socket CON1 on PN-02-A2 is damaged.</p>

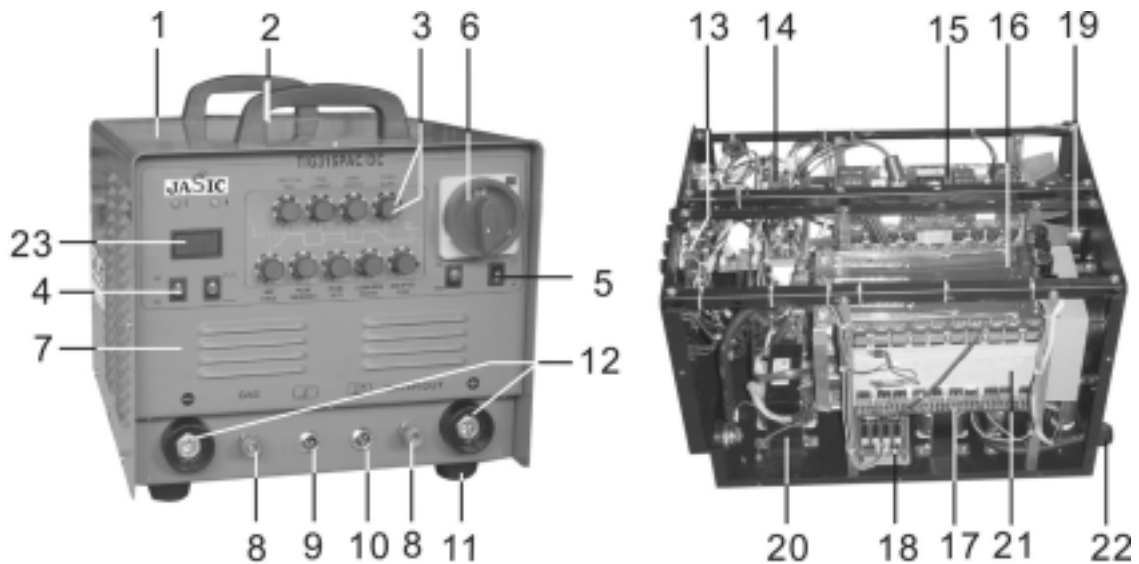
15. Press the manual switch, when no-load, it appears normal in DC mode, but there is abnormal sound in AC mode.	a. Some MOSFET on the secondary inverter PCB PN-01-A1/PN-02-A2 is damaged.	a. Check. Method: Press the manual switch, turn to AC mode, turn off the machine after 3mins of no-load, touch the MOSFET on the secondary inverter PCB with your hand one by one. The extra hot ones are damaged.
16. No AC output in AC mode.	a. The AC/DC conversion switch on the panel is damaged. b. Some part on the control panel PK-10-A1 is damaged. c. Some part on the secondary drive PCB PK-09-A3 is damaged.	a. Check. b. Check if the diode D23/D24, chip U4 or potentiometer VR2 on control panel PK-10-A1 is damaged. c. Check with a multi-meter if chip U2/U4/U8/U9/U3, audion Q1-Q8 or zener diode Z1/Z2/Z3/Z4 on drive PCB is damaged.
17. No AC sound when welding in AC mode.	a. The value of the resistor matching socket CON1 on inverter PCB PN-02-A2 varies. b. The MOSFET VT7, rectifying diode D1 or zener diode Z3 on inverter PCB PN-02-A2 is damaged.	a. Check and replace it if necessary. b. Check and replace it if necessary.
18. Press the welding torch switch, there is gas out, there is only small current, and the pre-flow time is variable.	a. The connecting cable matching socket CON10 on control panel PK-10-A1 with socket CON5 on top PCB PM-01-A3 is in loose connection. b. Some part on control panel PK-10-A1 is damaged. c. The remote control conversion switch on the panel is damaged.	a. Check. b. Check if audion Q1/Q2 or potentiometer VR5 on control panel PK-10-A1 is damaged. c. Check.
19. Turn on the machine, the indicator of protection status is on because the voltage is too low.	a. The input voltage is too low or is unstable. b. The thermal switch matching socket CON11 on control panel PK-10-A1 is damaged. c. The connecting cable matching socket CON3 on control panel PK-10-A1 is in loose connection. d. The resistor R17/R19 or chip U4 on control panel PK-10-A1 is damaged.	a. Check. b. Check. c. Check. d. Check. Method: properly reduce the value of resistor R17.
20. The tungsten is badly burned out in ARC mode.	a. The value of clean width potentiometer VR2 on control panel PK-10-A1 is adjusted too big.	a. Adjust the clean width smaller, or parallel connect a resistor of 200K or so with resistor R3 on control panel PK-10-A1.

21. The manual control is normal, but the pedal control goes wrong.	a. The panel conversion switch is damaged. b. The inching switch inside the pedal control is damaged. c. The potentiometer inside the pedal control is damaged. d. The connecting cable matching socket CON1/CON2 on control panel PK-10-A1 is in loose connection.	a. Check and replace it if necessary. b. Check and replace it if necessary. c. Check and replace it if necessary. d. Check.
22. The welding current is variable, but the maximum current is too big.	a. The audion Q1/12 on control panel PK-10-A1 is damaged.	a. Check and replace it if necessary.

4. AC/DC315P/250P

4.1 The structure drawing of AC/DC315P/250P

4.1.1 The structure drawing of AC/DC315P:

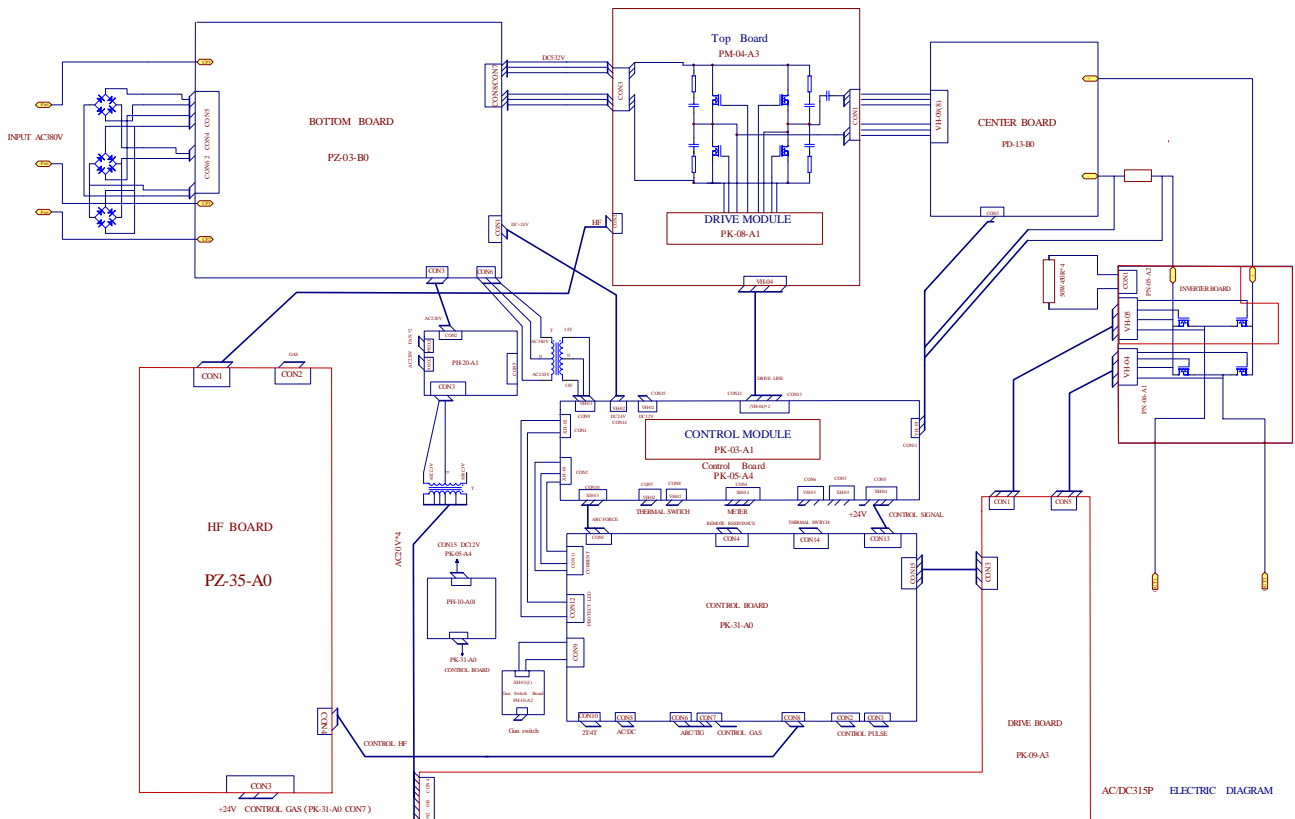


No.	Description	No.	Description	No.	Description
1	Cover	9	Pilot-socket (2 pins)	17	Inverter PCB 2
2	Handle	10	Pilot-socket (3 pins)	18	AC Driver PCB
3	Button	11	Rubber foot	19	Fan
4	Function switch	12	Coupling socket	20	Inductance
5	Function switch	13	Panel PCB	21	Heat sink
6	Main switch	14	Control PCB	22	Input cable
7	Front panel	15	Top PCB (left)	23	Digital meter
8	Fast-socket	16	Inverter PCB 1		

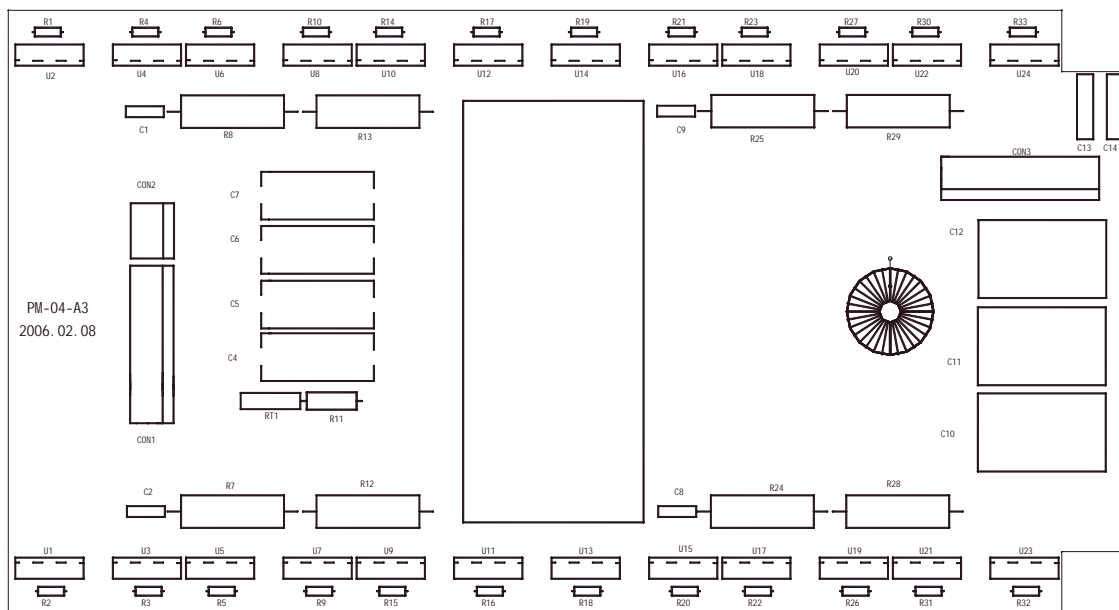
4.1.2 The structure drawing of AC/DC250P:

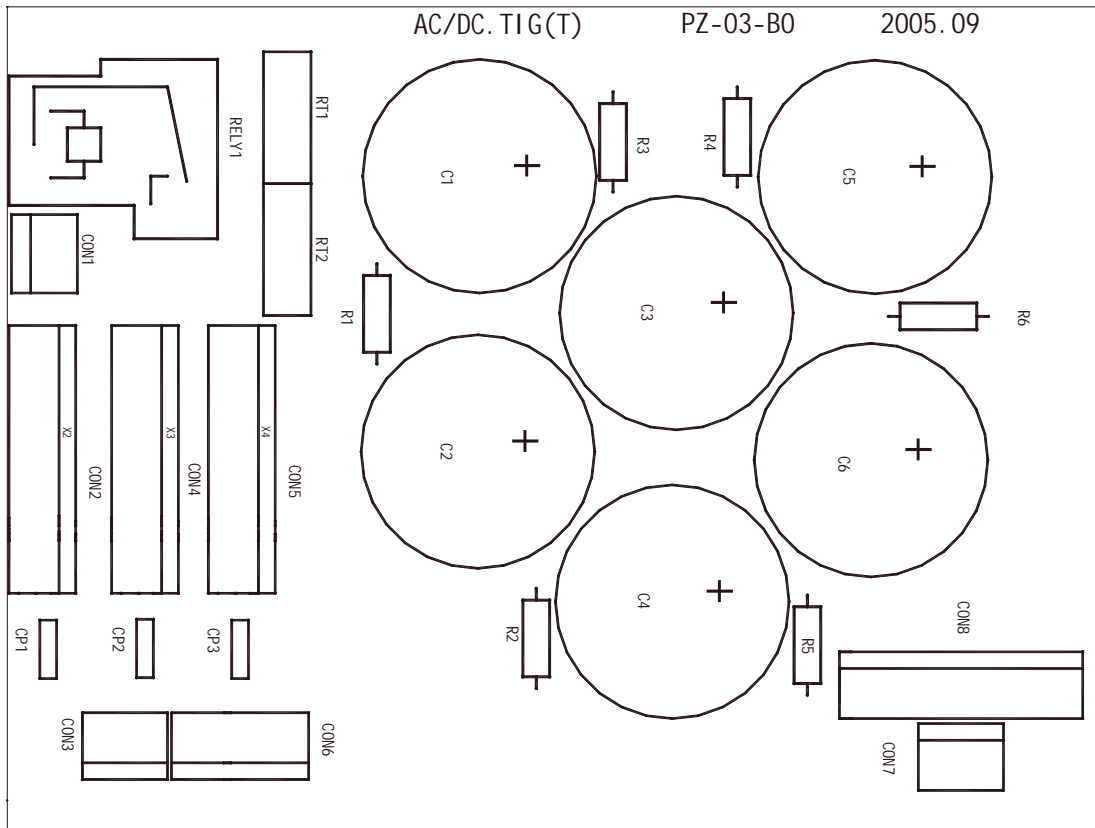
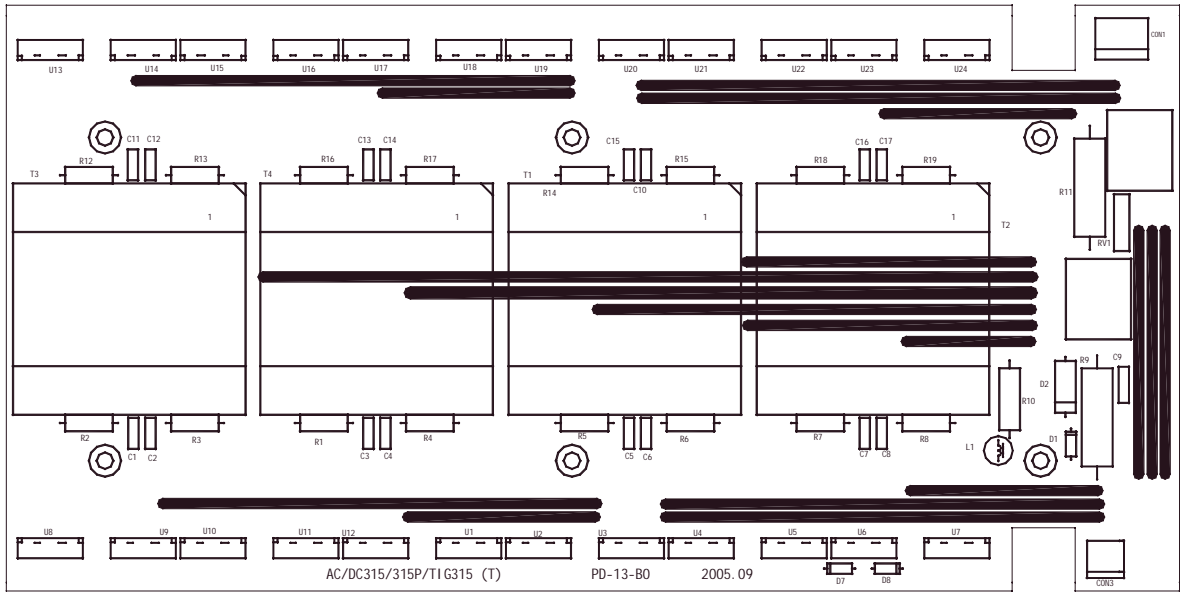
The structure of AC/DC250P is similar to that of AC/DC315P. (See the structure drawing of AC/DC315P on page)

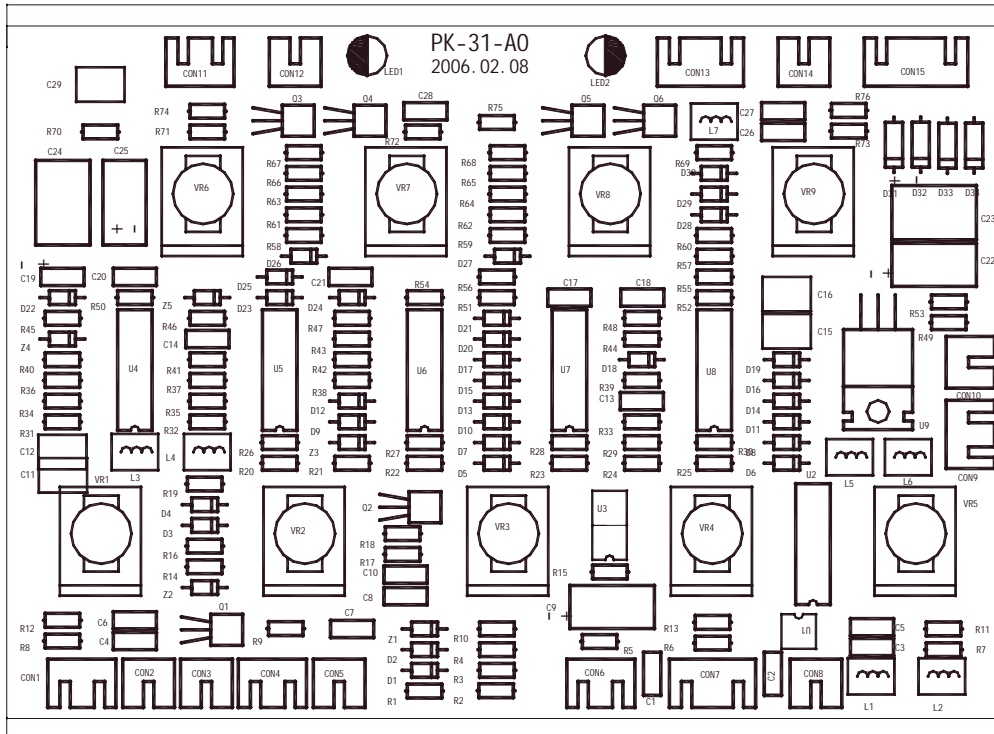
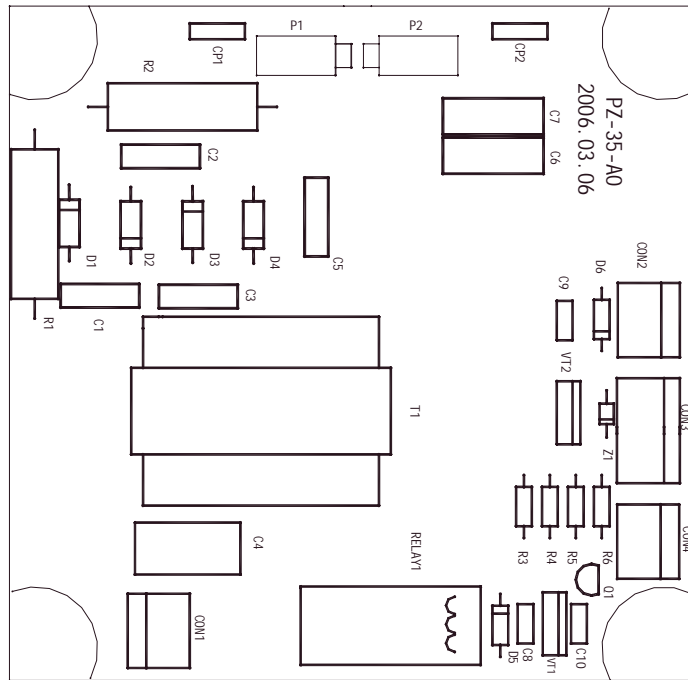
4.2 The general connection diagram of AC/DC315P/250P:

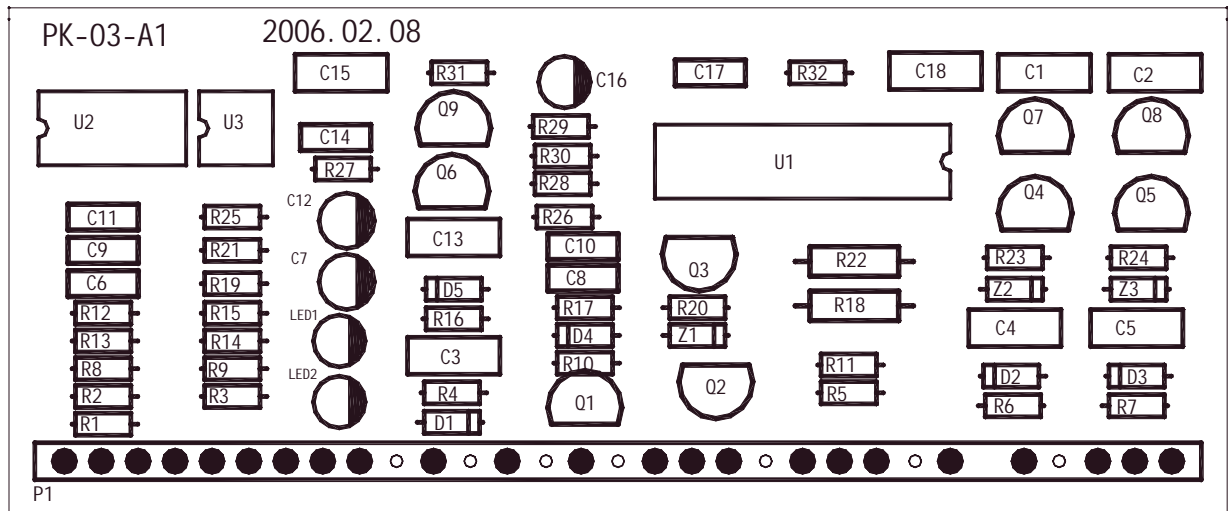
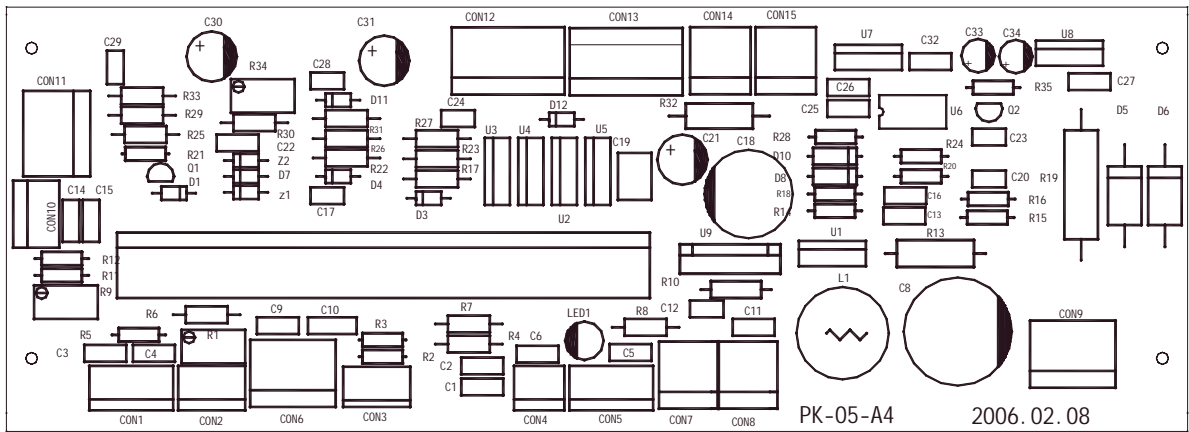


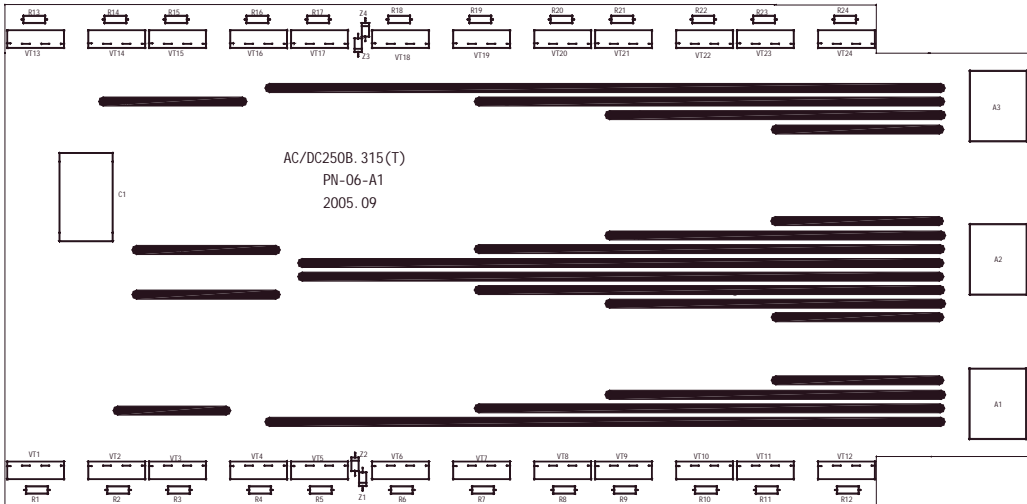
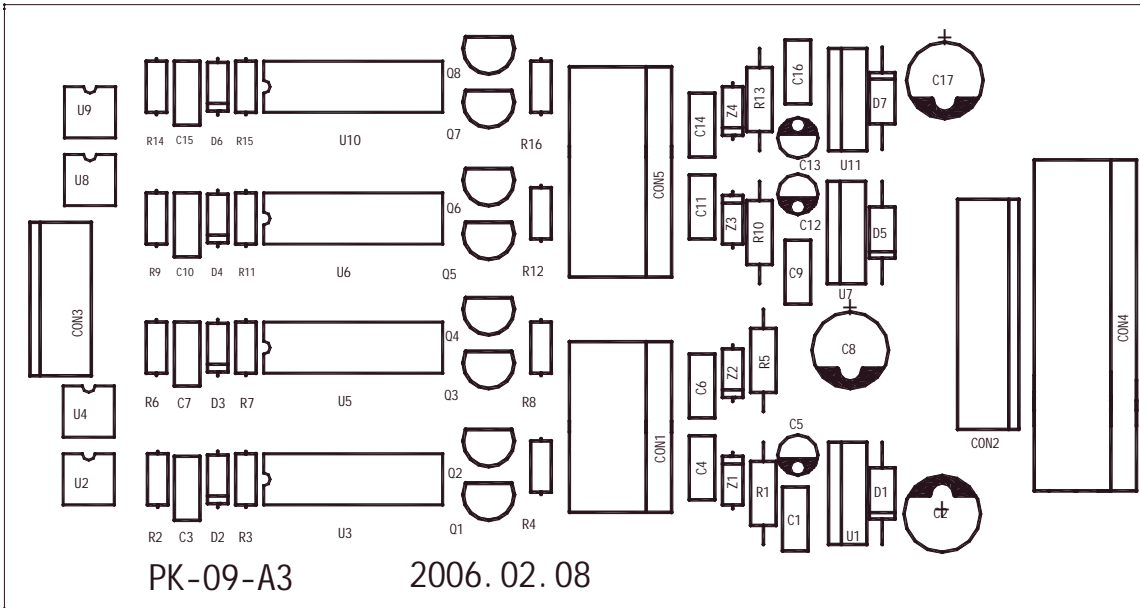
4.3 The diagram of AC/DC315P/250P's top PCB PM-04-A3, center PCB PD-13-B0, bottom PCB PZ-03-B0, HF PCB PZ-35-A0, control panel PK-31-A0, control PCB PK-05-A4, control module PK-03-A1, AC drive PCB PK-09-A3 and inverter PCB PN-05-A2 and PN-06-A1:

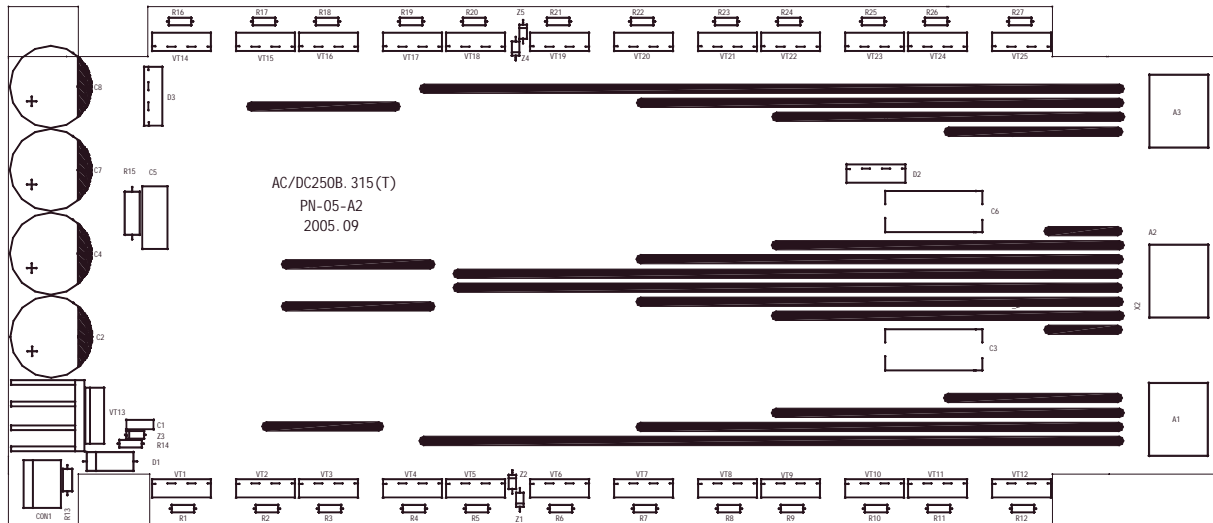












4.4 Troubleshooting of AC/DC315P/250P:

Trouble	Analysis	Solution
<p>1. Turn on the machine, no display of the meter, the fan doesn't work, no no-load voltage output in TIG/ARC mode.</p>	<p>a. The input voltage is abnormal.</p> <p>b. The power supply cable is not in good connection with CP1/CP3 on bottom PCB PZ-03-B0, or the tie-in is damaged.</p> <p>c. The power supply switch may be damaged or unclosed.</p> <p>d. The connecting cable matching socket CON1-CON6 on power supply conversion PCB PH-20-A1 is in loose connection.</p>	<p>a. Check if the input voltage is AC 380V.</p> <p>b. Check.</p> <p>c. Check and replace it if necessary.</p> <p>d. Check.</p>

<p>2. Turn on the machine, the meter displays, press the welding torch switch in TIG mode, there is gas out, no HF, turn to ARC mode, no no-load voltage output.</p>	<p>a. The connecting cable matching socket CON7/CON8 on bottom PCB PZ-03-B0 is in loose connection.</p> <p>b. The prime relay RELAY1 on bottom PCB PZ-03-B0 doesn't close well; the value of resistor RT1/RT2 increases.</p> <p>c. The connecting cable matching socket CON2/CON4/CON5 on bottom PCB PZ-03-B0 with rectifying bridge is in loose connection.</p> <p>d. Some part on control module PK-03-A1 is damaged.</p> <p>e. Some part on control PCB PK-05-A4 is damaged.</p>	<p>a. Check and make sure the voltage of socket CON1 is DC532V.</p> <p>b. Check and replace if necessary.</p> <p>c. Check.</p> <p>d. Check with a multi-meter if chip U1 on PK-03-A1 is damaged. Check if the 16th pin of U1 is 5V. If it's not, replace the chip because U1 is damaged. Check if diode D2/D3/D4, audion Q2/Q3/Q4/Q5/Q6/Q7/Q9, thyristor Q1, zener diode Z1/Z2/Z3, capacitor C17 or resistor R32 is damaged.</p> <p>e. Check if MOSFET U2/U3/U4/U5 or resistor R32 is damaged.</p>
<p>3. Turn on the machine, the meter displays, but the thermal resistor RT1/RT2 on bottom PCB PZ-03-B0 heats and smokes after a while.</p>	<p>a. The connecting cable (+24V) matching socket CON1 on bottom PCB PZ-03-B0 with socket CON14 on control PCB PK-05-A4 is in loose connection.</p> <p>b. The relay RELAY1 on bottom PCB PZ-03-B0 is damaged.</p> <p>c. The auxiliary power supply part on control PCB PK-05-A4 is damaged.</p>	<p>a. Check.</p> <p>b. Check.</p> <p>c. Check with a multi-meter if resistor R35, MOSFET U1, audion Q2, chip U6 or capacitor C32 on control PCB PK-05-A4 is damaged.</p>

<p>4. Turn on the machine and it appears normal, there is no-load voltage output in ARC mode, press the welding torch in TIG mode and there is gas out, the malfunction LED is not on, no HF.</p>	<ul style="list-style-type: none"> a. The connecting cable matching socket CON2 on top PCB PM-04-A3 with socket CON1 on HF PCB PZ-35-A0 is in loose connection. b. High voltage silicon granule D1/D2/D3/D4 or high voltage output capacitor C6/C7 on bottom PCB PZ-27-A0 is damaged. c. CP1/CP2 is disconnected with the HF PCB. d. The discharge nozzles P1/P2 on HF PCB have conglutination, excessive clearance or serious oxidation problem. e. The ARC/TIG conversion switch on the panel or chip U7 on control panel PK-31-A0 is damaged. f. The connecting cable matching socket CON8 on control PCB PK-31-A0 with socket CON4 on HF PCB PZ-35-A0 is in loose connection, or HF relay RELAY1, audion Q1, MOSFET VT1 or diode D5 on HF PCB is damaged. 	<ul style="list-style-type: none"> a. Check. b. Check. c. Check. d. Adjust or replace it if necessary. e. Check and replace it if necessary. f. Check. Method: short-circuit the socket CON4 on HF PCB PZ-35-A0, and turn on the machine, if no HF, the HF circuit on HF PCB goes wrong; if there is, the inductor L1/L2, chip U1/U3 or resistor R6 on control PCB PK-31-A0 is damaged.
<p>5. Turn on the machine, and it appears normal, press the welding torch switch and there is gas out, the malfunction LED is on. Turn to ARC mode, the malfunction LED turns on.</p>	<ul style="list-style-type: none"> a. Over-current protection occurs when welding is carried out. b. Over-heating protection occurs when welding is carried out. c. Some parts on top PCB, center PCB, or bottom PCB are damaged. 	<ul style="list-style-type: none"> a. Turn off the machine for 5mins and restart. b. Stop the welding operation for 5mins, or the secondary inverter thermal switch is damaged. c. Check. Turn off the machine, pull out the connecting cable matching the socket CON2 on top PCB PM-04-A3 with the socket CON1 on HF PCB PZ-35-B0, turn on the machine. If the malfunction LED is off, the transformer T1 on HF PCB is short-circuited or damaged. If it's on, turn off the machine, pull out the connecting cable matching socket CON1 on top PCB PM-04-A3, turn on the machine. If the malfunction LED is on, MOSFET U1-U24 on top PCB or some part on drive module PK-08-A1 is damaged; if it's off, transformer T1/T2/T3/T4 or rectifying diode U1/U24 on center PCB PD-13-B0 is damaged.

<p>6. Turn on the machine and it appears normal, it can start arc in TIG mode, but the welding point appears black.</p>	<p>a. The magnet valve or the gas tube is blocked.</p> <p>b. The magnet valve is damaged.</p> <p>c. The connecting cable matching socket CON3 on HF PCB PZ-35-A0 with socket CON7 on control panel PK-31-A0 is in loose connection.</p> <p>d. Some part in the magnet valve control circuit on HF PCB PZ-35-A0 or on control panel PK-31-A0 is damaged.</p> <p>e. The welding torch is damaged.</p> <p>f. The tungsten is of bad quality or the argon is impure.</p>	<p>a. Clear.</p> <p>b. Replace.</p> <p>c. Check.</p> <p>d. Check with a multi-meter if MOSFET VT2, diode D6, zener diode Z1 on HF PCB or audion Q1 on control PCB PK-31-A0 is damaged or if the magnet valve control cable matching the socket CON2 is disconnected.</p> <p>e. Remove the welding torch and the gas-electricity tie-in, and press the welding torch switch. If there is gas out, the welding torch is damaged. Replace it.</p> <p>f. Replace them if necessary.</p>
<p>7. The welding current is unstable and out of control.</p>	<p>a. The connecting cable matching socket CON2 on control PCB PK-05-A4 with socket CON11 on control panel PK-31-A0 is in loose connection.</p> <p>b. The capacitor C1/C2/C3/C4/C5/C6 on bottom PCB PZ-03-B0 leaks or is damaged.</p> <p>c. The input cable or output cable is too slim and too long.</p> <p>d. Loose connection exists inside the machine, e.g. the connecting cable matching socket CON4 on control panel with the remote control.</p>	<p>a. Check and replace it if necessary.</p> <p>b. Check and replace it if necessary.</p> <p>c. Enlarge the cross section area of the cable.</p> <p>d. Check.</p>
<p>8. Turn on the machine but it strips.</p>	<p>a. The rectifying bridge matching the socket CON2/CON4/CON5 on bottom PCB PZ-03-B0 is damaged.</p> <p>b. The power supply cable is disconnected or short-circuited.</p>	<p>a. Replace.</p> <p>b. Check.</p>
<p>9. When in TIG mode, adjust the value of the decay potentiometer to the maximum and release the welding torch switch, the gas valve shuts off, and no current output.</p>	<p>a. The diode D1/D2 or chip U3 on control panel PK-10-A1 is damaged.</p>	<p>a. Check and replace it if necessary.</p>

<p>10. Press the welding torch switch, there is HF discharge buzz, but no welding voltage output.</p>	<p>a. The earth cable of welding torch is in loose connection. b. The output terminal of the earth cable is in loose connection with gas-electricity tie-in.</p>	<p>a. Check and replace it if necessary. b. Check and replace it if necessary.</p>
<p>11. The arc starting is bad in TIG mode.</p>	<p>a. The space between discharge nozzles P1 and P2 on HF PCB PZ-34-A0 is too big or small, or their surface is badly oxidized. b. The high-voltage capacitor C3/C4 on HF PCB is damaged, or the capacitance becomes smaller. c. The tungsten is of bad quality or argon is impure. d. The welding torch is loose or broken. e. Incorrect turn rate or turn-to-turn electricity leakage problem exists in arc-starting coil matching CP1/CP2 on HF PCB.</p>	<p>a. Adjust the space between them, or clear their surface. b. Check and replace it if necessary. c. Check and replace it if necessary. d. Check. e. Check.</p>
<p>12. Turn on the machine, and it appears normal, but the malfunction LED turns on once welding is carried out.</p>	<p>a. The connecting cable matching socket CON11 on control PCB PK-05-A4 with the output bypass is in loose connection. b. Loose contact exists in MOSFET VT1-VT24 on top PCB PM-04-A3 or rectifying diode U1/U24 on center PCB PD-13-B0. c. Some part on control module PK-03-A1 is damaged.</p>	<p>a. Check. b. Check with a multi-meter. c. Check if the chip U2 or audion Q9 on PK-03-A1 is damaged.</p>
<p>13. Turn on the machine, and there is HF.</p>	<p>a. Some parts in manual switch control circuit are damaged. b. The connecting cable matching socket CON8 on control panel PK-31-A0 with socket CON4 on bottom PCB PZ-35-A0 is in loose connection, or chip U1 on control panel PK-31-A0 is damaged.</p>	<p>a. Check with a multi-meter if chip U8 or diode D14/D18 on control panel PK-31-A0 is damaged. Disconnect the connecting cable matching the socket CON9, short-circuit both terminal of socket CON9 and check if the manual switch board PH-10-A1 is short-circuited. b. Check.</p>

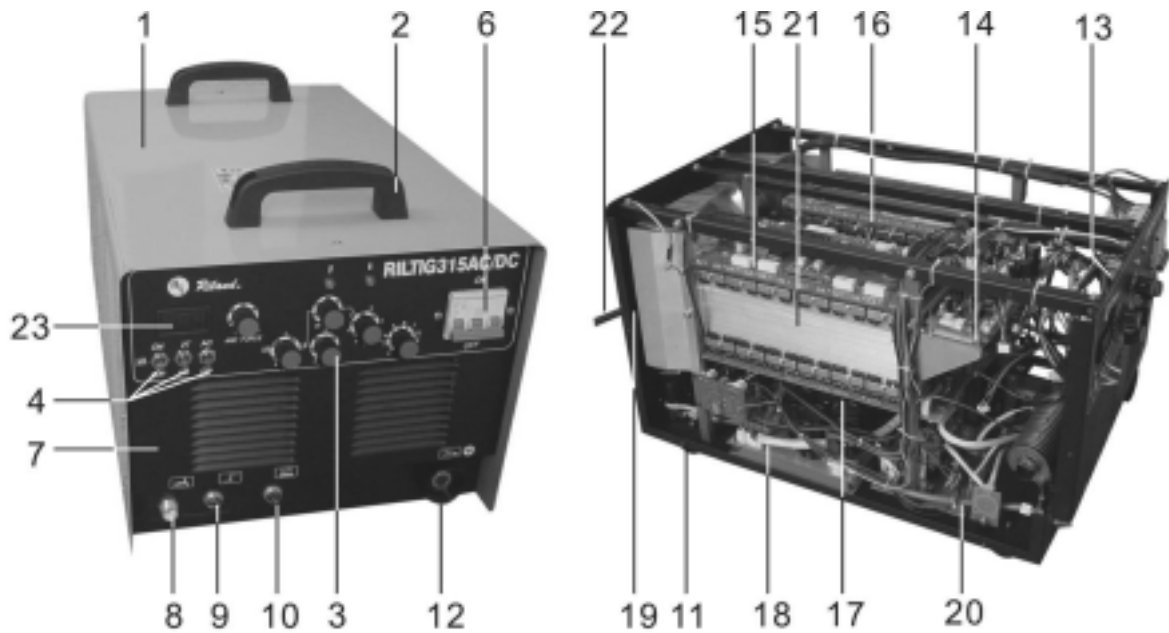
<p>14. Incessant HF exists when welding is carried out.</p>	<p>a. The relay RELAY1, audion Q1, diode D5, MOSFET VT1 on HF PCB PZ-35-A0 or chip U1 on control panel PK-31-A0 is damaged.</p> <p>b. The connecting cable matching socket CON13 on control panel PK-31-A0 with socket CON5 on control PCB PK-05-A4 is in loose connection.</p>	<p>a. Check and replace it if necessary.</p> <p>b. Check.</p>
<p>15. There is deviation between the preset value and real value of the show value of the meter.</p>	<p>a. The value of the variable resistor R9 on control PCB PK-05-A4 or VR1 on preset PCB PH-10-A01 changes.</p>	<p>a. Adjust. Methods: 1. Turn to ARC mode, adjust the value of variable resistor R9 on control PCB PK-05-A4 to make the show value of the meter be the value of the corresponding machine type. 2. Turn to TIG mode, do not press the manual switch, adjust the value of variable resistor VR1 on preset PCB PH-10-A0 to make the show value of the meter be the value of the corresponding machine type.</p>
<p>16. No pulse when in pulse mode.</p>	<p>a. The panel pulse conversion switch is damaged.</p> <p>b. The connecting cable matching socket CON2/CON3 on control panel PK-31-A0 with the pulse conversion switch is short-circuited, or chip U4, capacitor C4/C11, potentiometer VR2/VR3 or diode D24 is damaged.</p>	<p>a. Check and replace it if necessary.</p> <p>b. Check.</p>
<p>17. When no-load in ARC mode, it appears normal in DC mode, but there is abnormal sound in AC mode.</p>	<p>a. Some MOSFET on the secondary inverter PCB PN-05-A2/PN-06-A1 is damaged.</p>	<p>a. Check. Method: Turn to ARC mode, then AC mode, turn off the machine after 3mins of no-load, touch the MOSFET on the secondary inverter PCB with your hand one by one. The extra hot ones are damaged.</p>
<p>18. No 4T state or 4T is inaccurate.</p>	<p>a. The 2T/4T conversion switch on the panel is damaged, or the connecting cable matching it with socket CON10 on control panel PK-31-A0 is in loose connection.</p> <p>b. Some part on control panel PK-31-A0 is damaged.</p>	<p>a. Check.</p> <p>b. Check if chip U8/U2, diode D6 or capacitor C2 on control panel is damaged.</p>

19. No AC output in AC mode.	<ul style="list-style-type: none"> a. The AC/DC conversion switch on the panel is damaged. b. Some part on the control panel PK-31-A0 is damaged. c. Some part on the secondary drive PCB PK-09-A3 is damaged. 	<ul style="list-style-type: none"> a. Check. b. Check if the diode D9/D2/D1, chip U6, audion Q2 or potentiometer VR4 on control panel PK-31-A0 is damaged. c. Check with a multi-meter if chip U2/U4/U8/U9/U3, audion Q1-Q8 or zener diode Z1/Z2/Z3/Z4 on drive PCB is damaged.
20. No AC sound when welding in AC mode.	<ul style="list-style-type: none"> a. The value of the resistor matching socket CON1 on inverter PCB PN-05-A2 varies. b. The MOSFET VT13, rectifying diode D1/D3, resistor R14/R13 or zener diode Z3 on inverter PCB PN-05-A2 is damaged. 	<ul style="list-style-type: none"> a. Check and replace it if necessary. b. Check and replace it if necessary.
21. Press the welding torch switch, there is gas out, the show value of the meter is invariable, there is only small current, and the pre-flow time is variable.	<ul style="list-style-type: none"> a. The connecting cable matching socket CON11 on control panel PK-31-A0 with socket CON2 on control PCB PK-05-A4 is in loose connection. b. Some part on control panel PK-31-A0 is damaged. 	<ul style="list-style-type: none"> a. Check. b. Check if chip U5, audion Q3/Q4 or potentiometer VR7 on control panel PK-31-A0 is damaged.
22. When the pulse conversion switch is at no-pulse state, in ARC/TIG mode, the welding current is invariable, and there is only maximum current.	<ul style="list-style-type: none"> a. The diode D24 on control panel PK-31-A0 is damaged. 	<ul style="list-style-type: none"> a. Check and replace it if necessary.
23. Turn on the machine, the indicator of protection status is on because the voltage is too low.	<ul style="list-style-type: none"> a. The input voltage is too low or is unstable. b. The thermal switch matching socket CON14 on control panel PK-31-A0 is damaged. c. The connecting cable matching socket CON15 on control panel PK-31-A0 is in loose connection. d. The resistor R51/R44 or chip U6 on control panel PK-31-A0 is damaged. 	<ul style="list-style-type: none"> a. Check. b. Check. c. Check. d. Check. Method: properly reduce the value of resistor R44.
24. The tungsten is badly burned out in AC mode.	<ul style="list-style-type: none"> a. The value of AC clean width on the panel is adjusted too big. 	<ul style="list-style-type: none"> a. Adjust the clean width smaller.
25. The manual control is normal, but the pedal control goes wrong.	<ul style="list-style-type: none"> a. The connecting cable matching socket CON4 on control panel PK-31-A0 is in loose connection. b. Some part on control panel PK-31-A0 is damaged. 	<ul style="list-style-type: none"> a. Check. b. Check if diode D23, zener diode Z5, resistor R32/R35/R46 or inductor L3/L4 on control panel PK-31-A0 is damaged.

5. WSE250/315

5.1 The structure drawing of WSE250/315

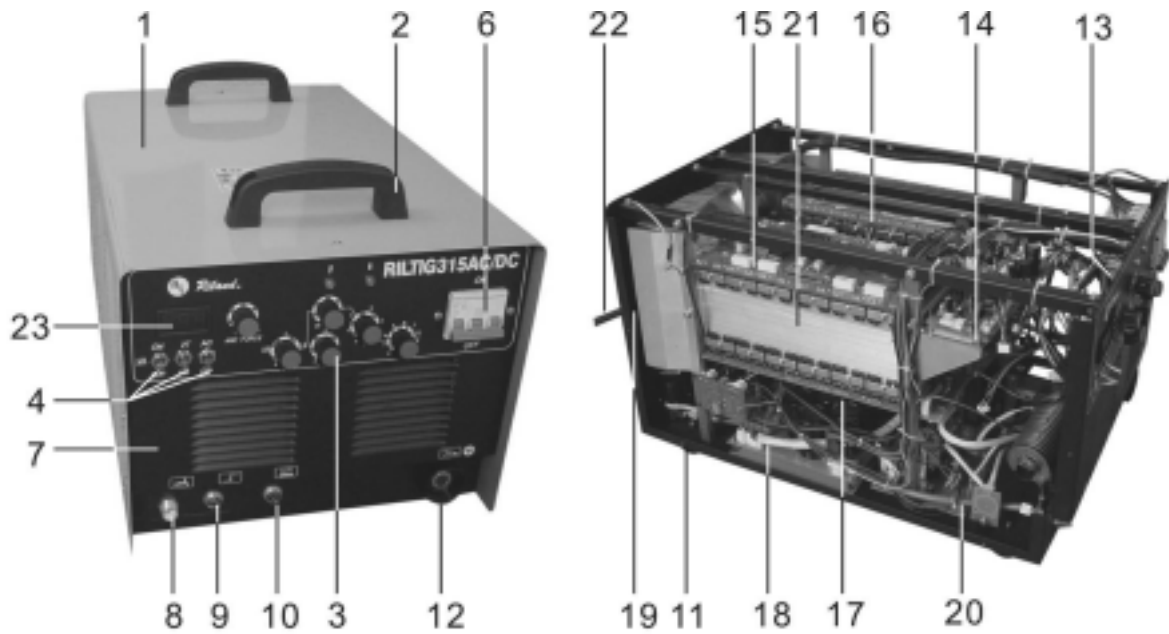
5.1.1 The structure drawing of WSE250



The structure of WSE250 is similar to that of RILTIG315AC/DC. (See the above structure drawing.)

No.	Description	No.	Description	No.	Description
1	Cover	9	Pilot-socket (2 pins)	17	Center PCB
2	Handle	10	Pilot-socket (3 pins)	18	Inverter PCB 2
3	Button	11	Rubber foot	19	Fan
4	Function switch	12	Coupling socket	20	HF PCB
5	Function switch	13	Panel PCB	21	Heat sink
6	Main switch	14	Control PCB	22	Input cable
7	Front panel	15	Top PCB (left)	23	Digital meter
8	Fast-socket	16	Inverter PCB 1		

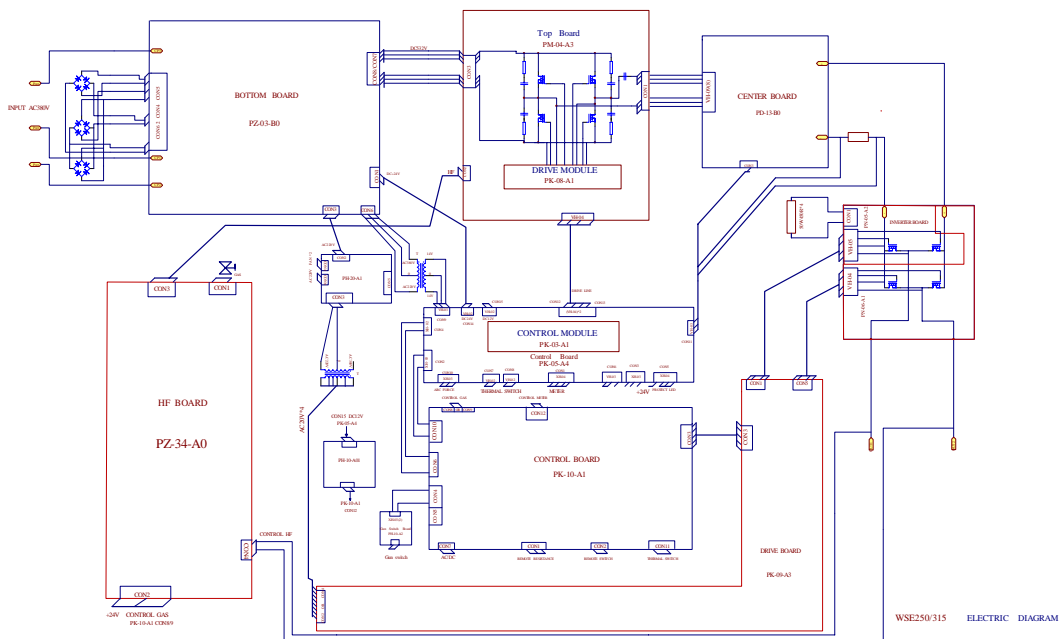
5.1.2 The structure drawing of WSE315



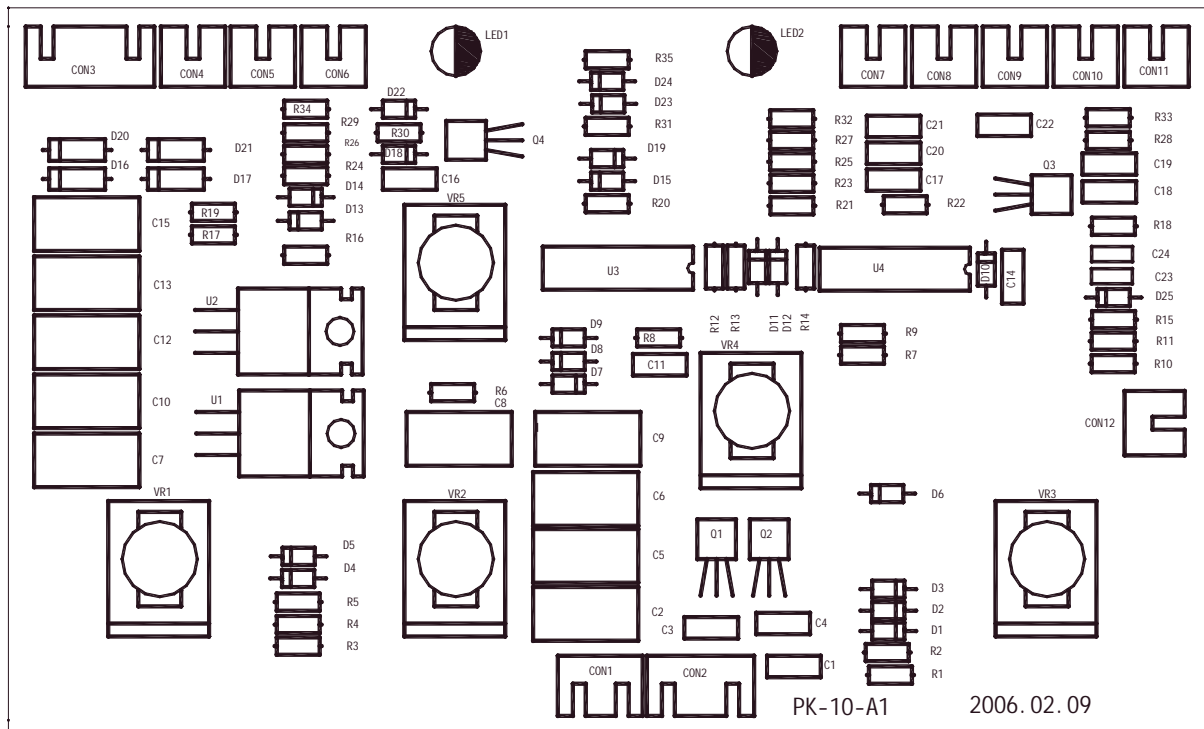
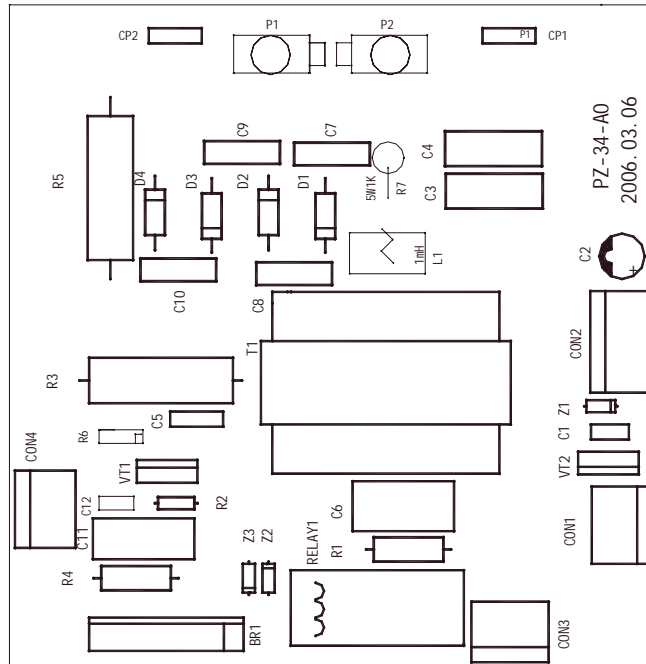
The structure of WSE315 is similar to that of RILTIG315AC/DC. (See the above structure drawing.)

No.	Description	No.	Description	No.	Description
1	Cover	9	Pilot-socket (2 pins)	17	Center PCB
2	Handle	10	Pilot-socket (3 pins)	18	Inverter PCB 2
3	Button	11	Rubber foot	19	Fan
4	Function switch	12	Coupling socket	20	HF PCB
5	Function switch	13	Panel PCB	21	Heat sink
6	Main switch	14	Control PCB	22	Input cable
7	Front panel	15	Top PCB (left)	23	Digital meter
8	Fast-socket	16	Inverter PCB 1		

5.2 The general connection diagram of WSE250/315:



5.3 The diagram of WSE250/315's HF PCB PZ-34-A0 and control panel PK-10-A1:



5.4 Troubleshooting of WSE250/315:

Trouble	Analysis	Solution
<p>1. Turn on the machine, no display of the meter, the fan doesn't work, no no-load voltage output in ARC/TIG mode.</p>	<p>a. The input voltage is abnormal.</p> <p>b. The input cable is not in good connection with CP3/CP2/CP1 on bottom PCB PZ-03-B0, or the tie-in is damaged.</p> <p>c. The power supply switch may be damaged or not closed.</p> <p>d. The connecting cable matching socket CON1-CON6 on power supply conversion PCB PH-20-A1 is in loose connection.</p>	<p>a. Check if the input voltage is AC 380V.</p> <p>b. Check.</p> <p>c. Check and replace the power supply switch if it's damaged.</p> <p>d. Check.</p>
<p>2. Turn on the machine, the meter displays, press the welding torch switch in TIG mode, there is gas out, no HF, turn to ARC mode, no no-load voltage output.</p>	<p>a. The connecting cable matching socket CON7/CON8 on bottom PCB PZ-03-B0 is in loose connection.</p> <p>b. The prime relay RELAY1 on bottom PCB PZ-03-B0 doesn't close well; the value of resistor RT1/RT2 increases.</p> <p>c. The connecting cable matching socket CON2/CON4/CON5 on bottom PCB PZ-03-B0 with rectifying bridge is in loose connection.</p> <p>d. Some part on control module PK-03-A1 is damaged.</p> <p>e. Some part on control PCB PK-05-A4 is damaged.</p>	<p>a. Check and make sure the voltage of socket CON1 is DC532V.</p> <p>b. Check and replace if necessary.</p> <p>c. Check.</p> <p>d. Check with a multi-meter if chip U1 on PK-03-A1 is damaged. Check if the 16th pin of U1 is 5V. If it's not, replace the chip because U1 is damaged. Check if diode D2/D3/D4, audion Q2/Q3/Q4/Q5/Q6/Q7/Q9, thyristor Q1, zener diode Z1/Z2/Z3, capacitor C17 or resistor R32 is damaged.</p> <p>e. Check if MOSFET U2/U3/U4/U5 or resistor R32 is damaged.</p>
<p>3. Turn on the machine, the meter displays, but the thermal resistor RT1/RT2 on bottom PCB PZ-03-B0 heats and smokes after a while.</p>	<p>a. The connecting cable (+24V) matching socket CON1 on bottom PCB PZ-03-B0 with socket CON14 on control PCB PK-05-A4 is in loose connection.</p> <p>b. The relay RELAY1 on bottom PCB PZ-03-B0 is damaged.</p> <p>c. The auxiliary power supply part on control PCB PK-05-A4 is damaged.</p>	<p>a. Check.</p> <p>b. Check.</p> <p>c. Check with a multi-meter if resistor R35, MOSFET U1, audion Q2, chip U6 or capacitor C32 on control PCB PK-05-A4 is damaged.</p>

<p>4. Turn on the machine and it appears normal, there is no-load voltage output in ARC mode, press the welding torch in TIG mode and there is gas out, the malfunction LED is not on, no HF.</p>	<ul style="list-style-type: none"> a. The connecting cable matching socket CON2 on top PCB PM-04-A3 with socket CON3 on HF PCB PZ-34-A0 is in loose connection. b. High voltage silicon granule D1/D2/D3/D4 or high voltage output capacitor C6/C7 on HF PCB PZ-34-A0 is damaged. c. CP1/CP2 is disconnected with the HF PCB. d. The discharge nozzles P1/P2 on HF PCB have conglutination, excessive clearance or serious oxidation problem. e. The ARC/TIG conversion switch on the panel is damaged. f. The connecting cable matching both output terminal with socket CON4 on HF PCB PZ-34-A0 is in loose connection, or HF relay RELAY1, zener diode Z2/Z3, MOSFET VT1 or resistor R4/R6 on HF PCB is damaged. 	<ul style="list-style-type: none"> a. Check. b. Check. c. Check. d. Adjust or replace it if necessary. e. Check and replace it if necessary. f. Check.
<p>5. Turn on the machine, and it appears normal, press the welding torch switch and there is gas out, the malfunction LED is on. Turn to ARC mode, the malfunction LED turns on.</p>	<ul style="list-style-type: none"> a. Over-current protection occurs when welding is carried out. b. Over-heating protection occurs when welding is carried out. c. Some parts on top PCB, center PCB, or bottom PCB are damaged. 	<ul style="list-style-type: none"> a. Turn off the machine for 5mins and restart. b. Stop the welding operation for 5mins, or the secondary inverter thermal switch is damaged. c. Check. Turn to TIG mode, turn off the machine, pull out the connecting cable matching the socket CON2 on top PCB PM-04-A3 with the socket CON3 on HF PCB PZ-34-A0, turn on the machine. If the malfunction LED is off, the transformer T1 on HF PCB is short-circuited or damaged. If it's on, turn off the machine, pull out the connecting cable matching socket CON1 on top PCB PM-04-A3, turn on the machine. If the malfunction LED is on, MOSFET U1-U24 on top PCB or some part on drive module PK-08-A1 is damaged; if it's off, transformer T1/T2/T3/T4 or rectifying diode U1/U24 on center PCB PD-13-B0 is damaged.

<p>6. Turn on the machine and it appears normal, it can start arc in TIG mode, but the welding point appears black.</p>	<p>a. The magnet valve or the gas tube is blocked.</p> <p>b. The magnet valve is damaged.</p> <p>c. The connecting cable matching socket CON2 on HF PCB PZ-34-A0 with socket CON8/CON9 on control panel PK-10-A1 is in loose connection.</p> <p>d. Some part in the magnet valve control circuit on HF PCB PZ-34-A0 or on control panel PK-10-A1 is damaged.</p> <p>e. The welding torch is damaged.</p> <p>f. The tungsten is of bad quality or the argon is impure.</p>	<p>a. Clear.</p> <p>b. Replace.</p> <p>c. Check.</p> <p>d. Check with a multi-meter if MOSFET VT2, zener diode Z1 on HF PCB, audion Q3 or resistor R31/R33 on control PCB PK-10-A1 is damaged or if the magnet valve control cable matching the socket CON1 is disconnected.</p> <p>e. Remove the welding torch and the gas-electricity tie-in, and press the welding torch switch. If there is gas out, the welding torch is damaged. Replace it.</p> <p>f. Replace them if necessary.</p>
<p>7. The welding current is unstable and out of control.</p>	<p>a. The connecting cable matching socket CON2 on control PCB PK-05-A4 with socket CON10 on control panel PK-10-A1 is in loose connection.</p> <p>b. The capacitor C1/C2/C3/C4/C5/C6 on bottom PCB PZ-03-B0 leaks or is damaged.</p> <p>c. The input cable or output cable is too slim and too long.</p> <p>d. Loose connection exists inside the machine.</p> <p>e. The panel remote control conversion switch is damaged.</p>	<p>a. Check and replace it if necessary.</p> <p>b. Check and replace it if necessary.</p> <p>c. Enlarge the cross section area of the cable.</p> <p>d. Check.</p> <p>e. Check.</p>
<p>8. Turn on the machine but it strips.</p>	<p>a. The rectifying bridge matching the socket CON2/CON4/CON5 on bottom PCB PZ-03-B0 is damaged.</p> <p>b. The power supply cable is disconnected or short-circuited.</p>	<p>a. Replace.</p> <p>b. Check.</p>
<p>9. When in TIG mode, adjust the value of the decay potentiometer to the maximum and release the welding torch switch, the gas valve shuts off, and no current output.</p>	<p>a. The audion Q5, resistor R64/R65/R68 or chip U6 on control panel PK-31-A0 is damaged.</p>	<p>a. Check and replace it if necessary.</p>

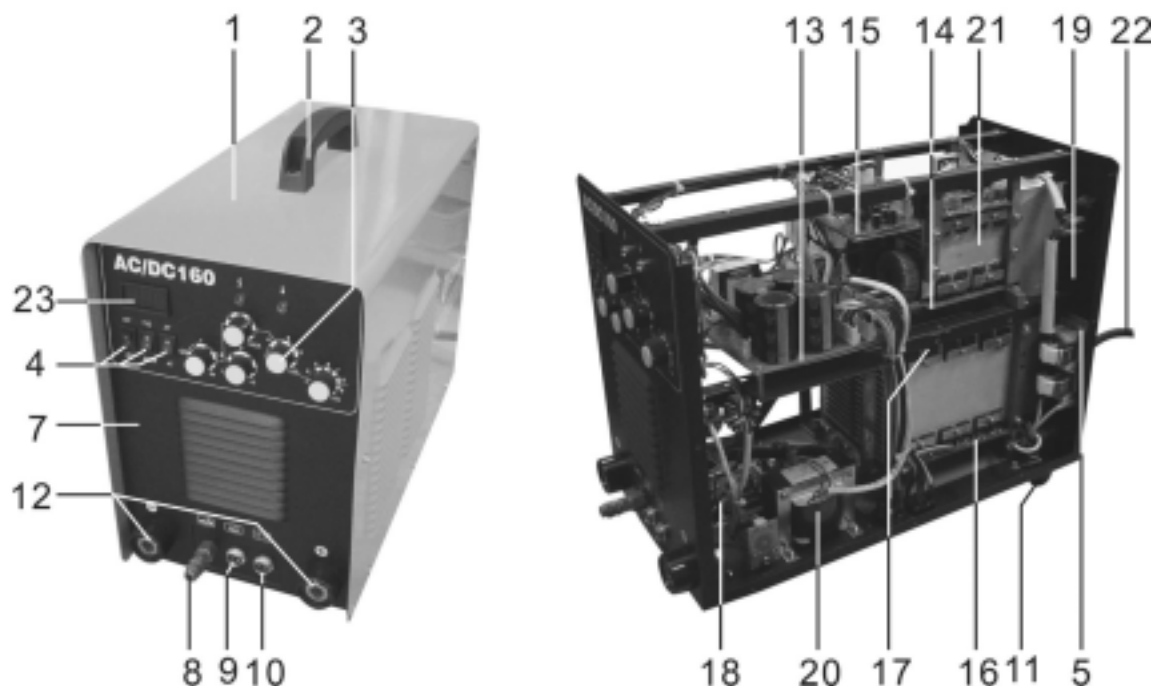
<p>10. Press the welding torch switch, there is HF discharge buzz, but no welding voltage output.</p>	<p>a. The earth cable of welding torch is in loose connection. b. The output terminal of the earth cable is in loose connection with gas-electricity tie-in.</p>	<p>a. Check and replace it if necessary. b. Check and replace it if necessary.</p>
<p>11. The arc starting is bad in TIG mode.</p>	<p>a. The space between discharge nozzles P1 and P2 on HF PCB PZ-35-A0 is too big or small, or their surface is badly oxidized. b. The high-voltage capacitor C6/C7 on HF PCB is damaged, or the capacitance becomes smaller. c. The tungsten is of bad quality or argon is impure. d. The welding torch is loose or broken. e. Incorrect turn rate or turn-to-turn electricity leakage problem exists in arc-starting coil matching CP1/CP2 on HF PCB.</p>	<p>a. Adjust the space between them, or clear their surface. b. Check and replace it if necessary. c. Check and replace it if necessary. d. Check. e. Check.</p>
<p>12. Turn on the machine, and it appears normal, but the malfunction LED turns on once welding is carried out.</p>	<p>a. The connecting cable matching socket CON11 on control PCB PK-05-A4 with the output bypass is in loose connection. b. Loose contact exists in MOSFET VT1-VT24 on top PCB PM-04-A3 or rectifying diode U1/U24 on center PCB PD-13-B0. c. Some part on control module PK-03-A1 is damaged.</p>	<p>a. Check. b. Check with a multi-meter. c. Check if the chip U2 or audion Q9 on PK-03-A1 is damaged.</p>
<p>13. Turn on the machine, and there is HF.</p>	<p>a. Some parts in manual switch control circuit are damaged. b. The connecting cable matching socket CON3 on control panel PK-10-A1 with socket CON3 on AC drive PCB PK-09-A3 is in loose connection, or chip U1/U4 or diode D11/D12/D14/D15 on control panel PK-10-A1 is damaged. c. Some MOSFET on inverter PCB PN-06-A0/PN-05-A2 is damaged.</p>	<p>a. Check with a multi-meter if chip U3, diode D18/D22 or audion Q4 on control panel PK-10-A1 is damaged. Disconnect the connecting cable matching the socket CON5/4, and check if the manual switch board PH-10-A1 is short-circuited. b. Check. c. Check.</p>

<p>14. Incessant HF exists when welding is carried out.</p>	<p>a. The relay RELAY1 or MOSFET VT1 on HF PCB PZ-34-A0 is damaged, or the value of variable resistor R6 varies.</p> <p>b. Some part on inverter PCB PN-05-A2 is damaged.</p>	<p>a. Check and replace it if necessary; adjust the value of resistor R6 smaller to make sure that there is no HF when welding.</p> <p>b. Check if rectifying diode D1/D3, zener diode Z3, MOSFET VT13 or resistor R14 is damaged.</p>
<p>15. There is deviation between the preset value and real value of the show value of the meter.</p>	<p>a. The value of the variable resistor R9 on control PCB PK-05-A4 or VR1 on preset PCB PH-10-A01 changes.</p>	<p>a. Adjust. Methods: 1. Turn to ARC mode, adjust the value of variable resistor R9 on control PCB PK-05-A4 to make the show value of the meter be the value of the corresponding machine type. 2. Turn to TIG mode, do not press the manual switch, adjust the value of variable resistor VR1 on preset PCB PH-10-A01 to make the show value of the meter be the value of the corresponding machine type.</p>
<p>16. When no-load in ARC mode, it appears normal in DC mode, but there is abnormal sound in AC mode.</p>	<p>a. Some MOSFET on the secondary inverter PCB PN-05-A2/PN-06-A1 is damaged.</p>	<p>a. Check. Method: Turn to ARC mode, then AC mode, turn off the machine after 3mins of no-load, touch the MOSFET on the secondary inverter PCB with your hand one by one. The extra hot ones are damaged.</p>
<p>17. No AC output in AC mode.</p>	<p>a. The AC/DC conversion switch on the panel is damaged.</p> <p>b. Some part on the control panel PK-10-A1 is damaged.</p> <p>c. Some part on the secondary drive PCB PK-09-A3 is damaged.</p>	<p>a. Check.</p> <p>b. Check if the diode D23/D24, chip U4 or potentiometer VR2 on control panel PK-10-A1 is damaged.</p> <p>c. Check with a multi-meter if chip U2/U4/U8/U9/U3, audion Q1-Q8 or zener diode Z1/Z2/Z3/Z4 on drive PCB is damaged.</p>
<p>18. No AC sound when welding in AC mode.</p>	<p>a. The value of the resistor matching socket CON1 on inverter PCB PN-05-A2 varies.</p> <p>b. The MOSFET VT13, rectifying diode D1/D3, resistor R14/R13 or zener diode Z3 on inverter PCB PN-05-A2 is damaged.</p>	<p>a. Check and replace it if necessary.</p> <p>b. Check and replace it if necessary.</p>

19. Press the welding torch switch, there is gas out, the show value of the meter is invariable, there is only small current, and the pre-flow time is variable.	a. The connecting cable matching socket CON10 on control panel PK-10-A1 with socket CON2 on control PCB PK-05-A4 is in loose connection. b. Some part on control panel PK-10-A1 is damaged.	a. Check. b. Check if chip U4, audion Q1/Q2 or potentiometer VR5 on control panel PK-10-A1 is damaged.
20. The welding current is variable, and the maximum current is too big.	a. The audion Q1/Q2 on control panel PK-10-A1 is damaged.	a. Check and replace it if necessary.
21. Turn on the machine, the indicator of protection status is on because the voltage is too low.	a. The input voltage is too low or is unstable. b. The thermal switch matching socket CON11 on control panel PK-10-A1 is damaged. c. The connecting cable matching socket CON3 on control panel PK-10-A1 is in loose connection. d. The resistor R17/R19 or chip U4 on control panel PK-10-A1 is damaged.	a. Check. b. Check. c. Check. d. Check. Method: properly reduce the value of resistor R17.
22. The tungsten is badly burned out in AC mode.	a. The value of AC clean width on the panel is adjusted too big.	a. Adjust the clean width smaller.
23. The manual control is normal, but the pedal control goes wrong.	a. The connecting cable matching socket CON1 on control panel PK-10-A1 is in loose connection, or the panel remote control matching socket CON2 is damaged. b. The potentiometer inside the pedal control or the toggle switch is damaged.	a. Check. b. Check.

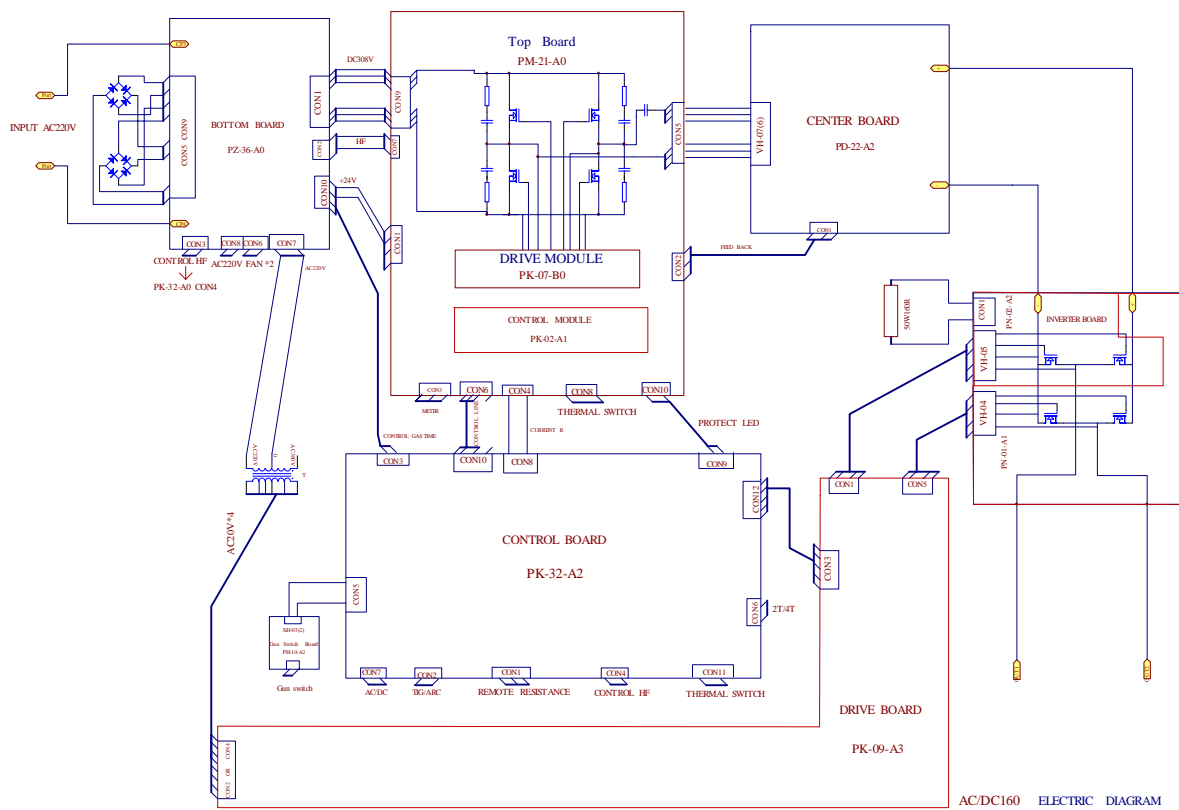
6. AC/DC160

6.1 The structure drawing of AC/DC160:

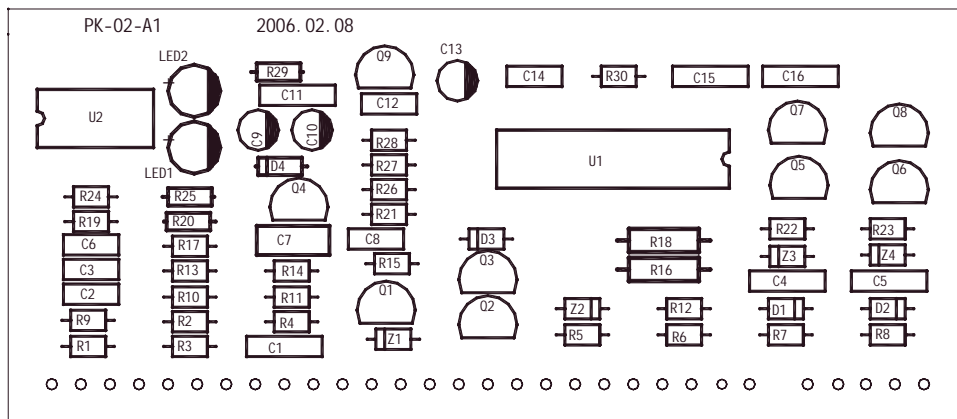
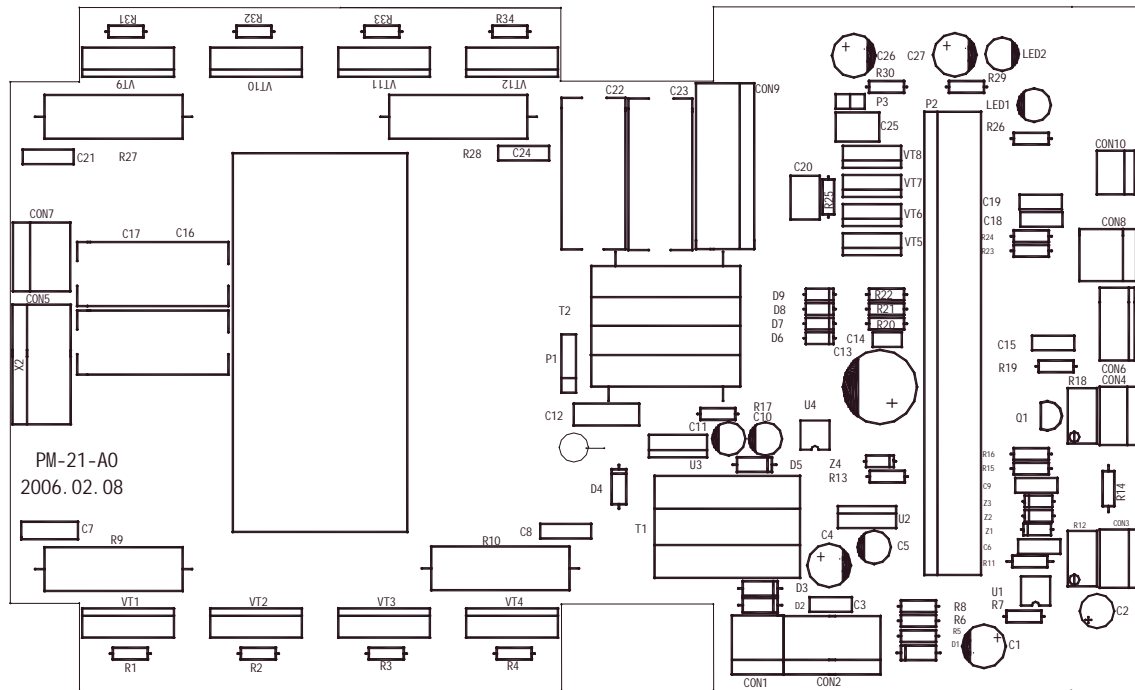


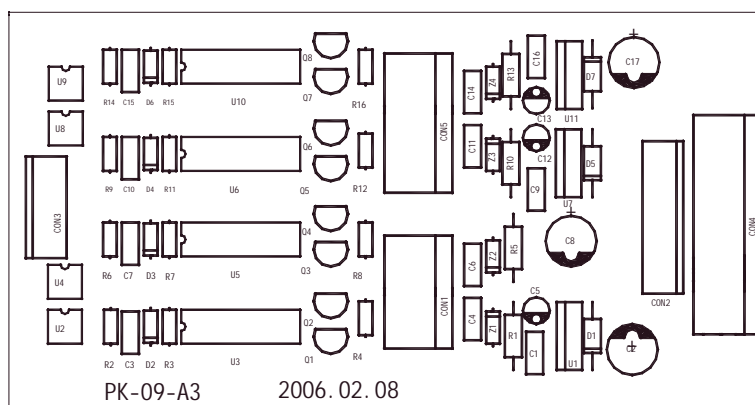
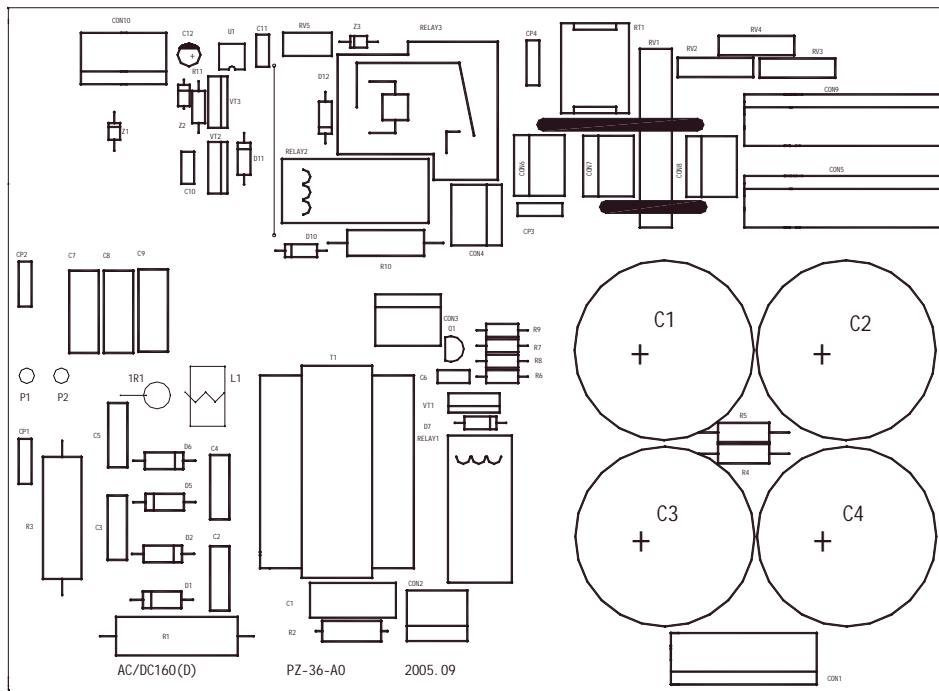
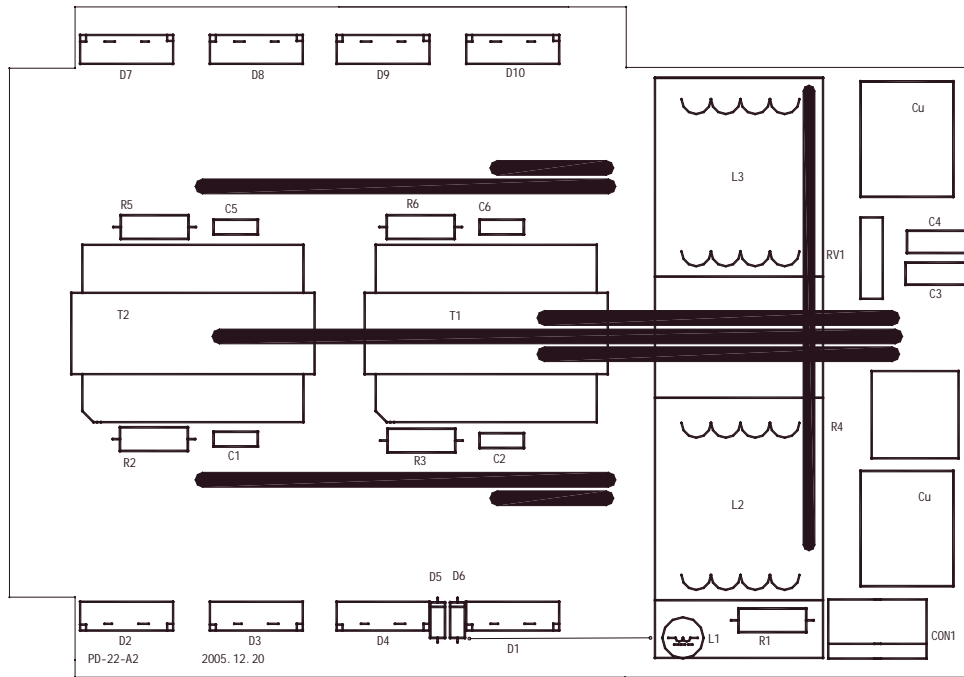
No.	Description	No.	Description	No.	Description
1	Cover	9	Pilot-socket (2 pins)	17	Inverter PCB 2
2	Handle	10	Pilot-socket (3 pins)	18	AC Driver PCB
3	Button	11	Rubber foot	19	Fan
4	Function switch	12	Coupling socket	20	Inductance
5	EMC PCB	13	Bottom PCB	21	Heat sink
6	Main switch	14	Center PCB	22	Input cable
7	Front panel	15	Top PCB	23	Digital meter
8	Fast-socket	16	Inverter PCB 1		

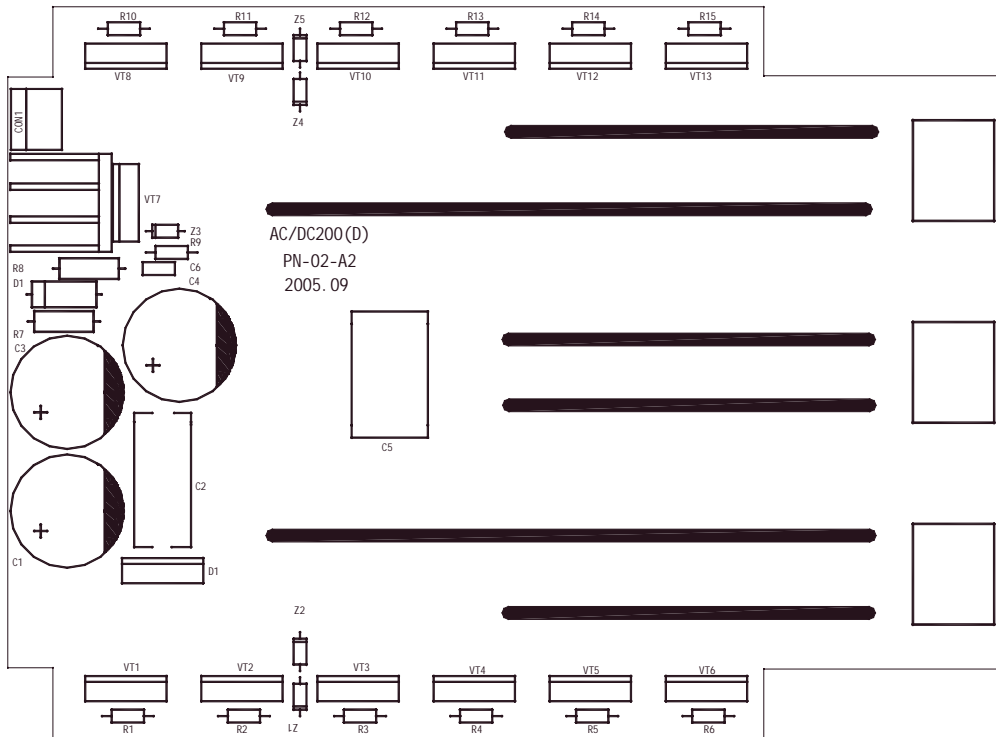
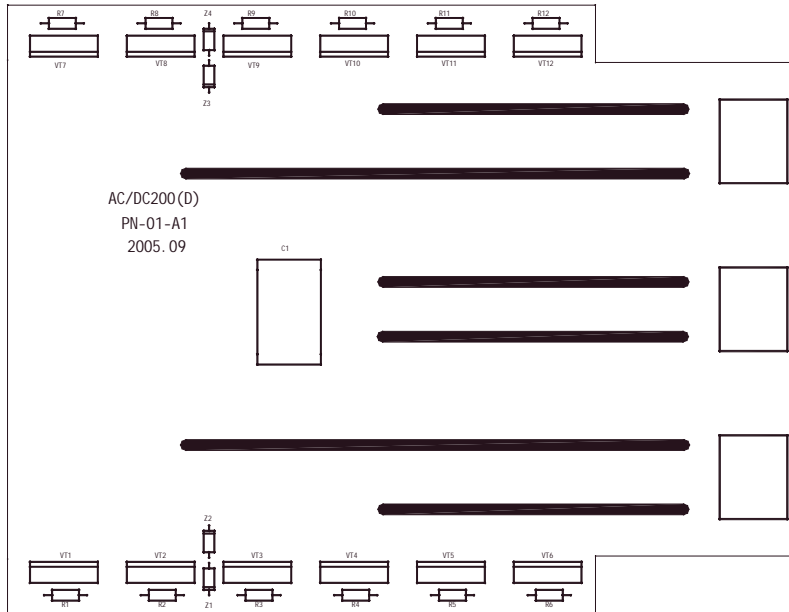
6.2 The general connection diagram of AC/DC160:

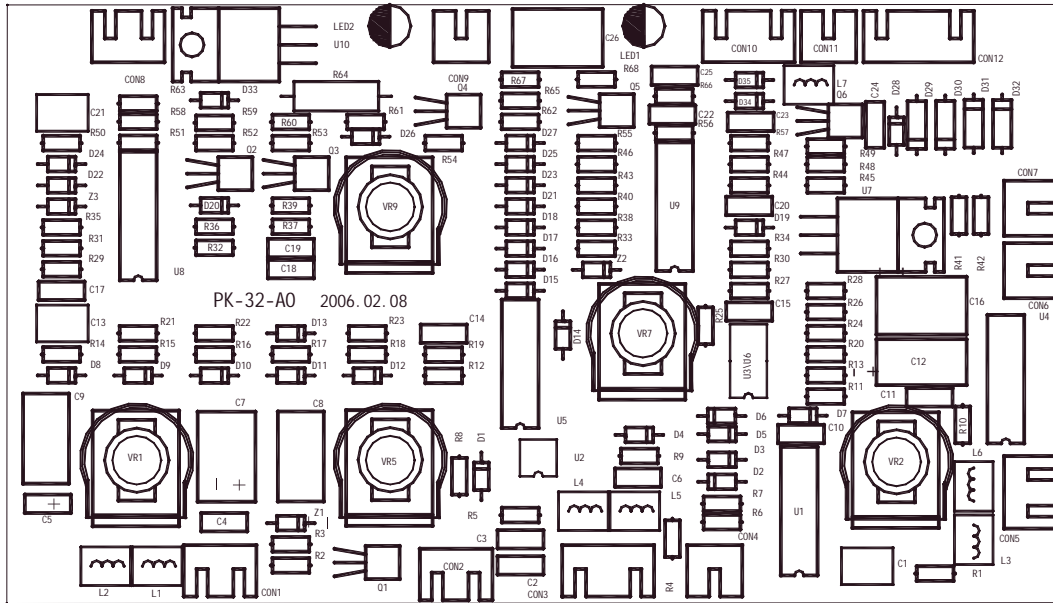


6.3 The diagram of AC/DC160's top PCB PM-21-A0, control module PK-02-A1, center PCB PD-22-A1, bottom PCB PZ-36-A0, AC drive PCB PK-09-A3, inverter PCB PN-01-A1/PN-02-A2 and control panel PK-32-A0:









6.4 Troubleshooting of AC/DC160:

Trouble	Analysis	Solution
<p>1. Turn on the machine, no display of the meter, the fan doesn't work, no no-load voltage output.</p>	<p>a. The input voltage is abnormal.</p> <p>b. The input cable is not in good connection with CP3/CP4 on bottom PCB PZ-36-A0, or the tie-in is damaged.</p> <p>c. The power supply switch may be damaged or not closed.</p> <p>d. The connecting cable matching socket CON6/CON7/CON8 on bottom PCB PZ-36-A0 is in loose connection.</p>	<p>a. Check if the input voltage is AC 220V.</p> <p>b. Check.</p> <p>c. Check and replace the power supply switch if it's damaged.</p> <p>d. Check.</p>

<p>2. Turn on the machine, the meter displays, press the welding torch switch in TIG mode, there is gas out, no HF, turn to ARC mode, no no-load voltage output.</p>	<p>a. The connecting cable matching socket CON1 on bottom PCB PZ-36-A0 is in loose connection.</p> <p>b. The prime relay RELAY3 on bottom PCB PZ-36-A0 doesn't close well; the value of resistor RT1/RT2/RT3/RT4 increases.</p> <p>c. The connecting cable matching socket CON5/CON9 on bottom PCB PZ-36-A0 with rectifying bridge is in loose connection.</p> <p>d. Some part on control module PK-02-A1 is damaged.</p> <p>e. Some part on top PCB PM-21-A0 is damaged.</p>	<p>a. Check and make sure the voltage of socket CON1 is DC308V.</p> <p>b. Check and replace if necessary.</p> <p>c. Check.</p> <p>d. Check with a multi-meter if chip U1 on PK-02-A1 is damaged. Check if the 16th pin of U1 is 5V. If it's not, replace the chip because U1 is damaged. Check if diode D1/D2/D3, audion Q1/Q2/Q3/Q5/Q6/Q7/Q8/Q9 or zener diode Z1/Z2/Z3/Z4 is damaged.</p> <p>e. Check if MOSFET VT5-VT8, pin P3 or manostat U2 is damaged.</p>
<p>3. Turn on the machine, the meter displays, but the thermal resistor RT1/RT2/VT3/VT4 on bottom PCB PZ-36-A0 heats and smokes after a while.</p>	<p>a. The connecting cable (+24V) matching socket CON10 on bottom PCB PZ-36-A0 with socket CON1 on top PCB PM-21-A0 is in loose connection.</p> <p>b. The relay RELAY3 on bottom PCB PZ-36-A0 is damaged.</p> <p>c. The auxiliary power supply part on top PCB PM-21-A0 is damaged.</p>	<p>a. Check.</p> <p>b. Check.</p> <p>c. Check with a multi-meter if resistor R17, diode D4/D5, chip U3 or OC U4 on top PCB PM-21-A0 is damaged.</p>

<p>4. Turn on the machine and it appears normal, press the welding torch and there is gas out, the malfunction LED is not on, no HF, but there is no-load voltage output.</p>	<ul style="list-style-type: none"> a. The connecting cable matching socket CON7 on top PCB PM-21-A0 with socket CON2 on bottom PCB PZ-36-A0 is in loose connection. b. High voltage silicon granule D1/D2/D5/D6 or high voltage output capacitor C7/C8/C9 on bottom PCB PZ-36-A0 is damaged. c. CP1/CP2 is disconnected with the bottom PCB. d. The discharge nozzles P1/P2 on bottom PCB have conglutination, excessive clearance or serious oxidation problem. e. The connecting cable matching socket CON 4 on control panel PK-32-A0 with socket CON3 on bottom PCB PZ-36-A0 is in loose connection, or HF relay RELAY1, MOSFET VT1, audion Q1, diode D7, resistor R6-R9, rectifying bridge D1 or resistor R1/R3 on bottom PCB is damaged. 	<ul style="list-style-type: none"> a. Check. b. Check. c. Check. d. Adjust or replace it if necessary. e. Check.
<p>5. Turn on the machine, and it appears normal, press the welding torch switch and there is gas out, the malfunction LED is on.</p>	<ul style="list-style-type: none"> a. Over-current protection occurs when welding is carried out. b. Over-heating protection occurs when welding is carried out. c. Some parts on top PCB, center PCB, or bottom PCB are damaged. 	<ul style="list-style-type: none"> a. Turn off the machine for 5mins and restart. b. Stop the welding operation for 5mins, or the secondary inverter thermal switch is damaged. c. Check. Turn off the machine, pull out the connecting cable matching the socket CON7 on top PCB PM-21-A0 with the socket CON2 on bottom PCB PZ-36-A0, turn on the machine. If the malfunction LED is off, the transformer T1 on bottom PCB is short-circuited or damaged. If it's on, turn off the machine, pull out the connecting cable matching socket CON5 on top PCB PM-21-A0, turn on the machine. If the malfunction LED is on, MOSFET VT1-4/VT9-12 on top PCB or some part on drive module PK-07-B0 is damaged; if it's off, transformer T1/T2 or rectifying diode D1-4/D7-10 on center PCB PD-22-A1 is damaged.

<p>6. Turn on the machine and it appears normal, it can start arc, but the welding point appears black.</p>	<p>a. The magnet valve or the gas tube is blocked.</p> <p>b. The magnet valve is damaged.</p> <p>c. The connecting cable matching socket CON10 on bottom PCB PZ-36-A0 with socket CON3 on control panel PK-32-A0 is in loose connection.</p> <p>d. Some part in the magnet valve control circuit on bottom PCB PZ-36-A0 or on control panel PK-32-A1 is damaged.</p> <p>e. The welding torch is damaged.</p> <p>f. The tungsten is of bad quality or the argon is impure.</p>	<p>a. Clear.</p> <p>b. Replace.</p> <p>c. Check.</p> <p>d. Check with a multi-meter if MOSFET VT2, diode D10/D11, zener diode Z1, relay RELAY2 on bottom PCB or audion Q1 on control PCB PK-32-A0 is damaged or if the magnet valve control cable matching the socket CON4 is disconnected.</p> <p>e. Remove the welding torch and the gas-electricity tie-in, and press the welding torch switch. If there is gas out, the welding torch is damaged. Replace it.</p> <p>f. Replace them if necessary.</p>
<p>7. The welding current is unstable and out of control.</p>	<p>a. The connecting cable matching socket CON8 on control panel PK-32-A0 with socket CON4 on top PCB PM-21-A0 is in loose connection.</p> <p>b. The capacitor C1/C2/C3/C4/ on bottom PCB PZ-36-A0 leaks or is damaged.</p> <p>c. The input cable or output cable is too slim and too long.</p> <p>d. Loose connection exists inside the machine.</p>	<p>a. Check and replace it if necessary.</p> <p>b. Check and replace it if necessary.</p> <p>c. Enlarge the cross section area of the cable.</p> <p>d. Check.</p>
<p>8. Turn on the machine but it strips.</p>	<p>a. The rectifying bridge matching the socket CON5/CON9 on bottom PCB PZ-36-A0 is damaged.</p> <p>b. The power supply cable is disconnected or short-circuited.</p>	<p>a. Replace.</p> <p>b. Check.</p>
<p>9. Adjust the value of the decay potentiometer to the maximum and release the welding torch switch, the gas valve shuts off, and no current output.</p>	<p>a. The audion Q4, resistor R54/R59 or diode D27 on control panel PK-32-A0 is damaged.</p>	<p>a. Check and replace it if necessary.</p>
<p>10. Press the welding torch switch, there is HF discharge buzz, but no welding voltage output.</p>	<p>a. The earth cable of welding torch is in loose connection.</p> <p>b. The output terminal of the earth cable is in loose connection with gas-electricity tie-in.</p>	<p>c. Check and replace it if necessary.</p> <p>d. Check and replace it if necessary.</p>

<p>11. The arc starting is bad.</p>	<p>a. The space between discharge nozzles P1 and P2 on bottom PCB PZ-36-A0 is too big or small, or their surface is badly oxidized.</p> <p>b. The high-voltage capacitor C7/C8/C9 on bottom PCB is damaged, or the capacitance becomes smaller.</p> <p>c. The tungsten is of bad quality or argon is impure.</p> <p>d. The welding torch is loose or broken.</p> <p>e. Incorrect turn rate or turn-to-turn electricity leakage problem exists in arc-starting coil matching CP1/CP2 on bottom PCB.</p>	<p>a. Adjust the space between them, or clear their surface.</p> <p>b. Check and replace it if necessary.</p> <p>c. Check and replace it if necessary.</p> <p>d. Check.</p> <p>e. Check.</p>
<p>12. Turn on the machine, and it appears normal, but the malfunction LED turns on once welding is carried out.</p>	<p>a. The connecting cable matching socket CON2 on top PCB PM-21-A0 with socket CON1 on center PCB PD-22-A2 is in loose connection.</p> <p>b. Loose contact exists in MOSFET VT1-4/VT9-12 on top PCB PM-21-A0 or rectifying diode U1-4/U7-10 on center PCB PD-22-A2.</p> <p>c. Some part on control module PK-02-A1 is damaged.</p>	<p>a. Check.</p> <p>b. Check with a multi-meter.</p> <p>c. Check if the chip U2 or audion Q9 on PK-02-A1 is damaged.</p>
<p>13. Turn on the machine, and there is HF.</p>	<p>a. Some parts in manual switch control circuit are damaged.</p> <p>b. The connecting cable matching socket CON12 on control panel PK-32-A0 with socket CON3 on AC drive PCB PK-09-A3 is in loose connection, or chip U5 or diode D16/D17/D20/D24/D26 on control panel PK-32-A0 is damaged.</p> <p>c. Some MOSFET on inverter PCB PN-01-A1/PN-02-A2 is damaged.</p>	<p>a. Check with a multi-meter if chip U1, diode D1/D2 on control panel PK-10-A1 is damaged. Disconnect the connecting cable matching the socket CON5, short-circuit CON5, and check if the manual switch board PH-10-A1 is short-circuited.</p> <p>b. Check.</p> <p>c. Check with a multi-meter one by one.</p>
<p>14. Incessant HF exists when welding is carried out.</p>	<p>a. The relay RELAY1, audion Q1 or MOSFET VT1 on bottom PCB PZ-36-A0 is damaged.</p> <p>b. Some part on inverter PCB PN-02-A2 is damaged.</p>	<p>a. Check and replace it if necessary.</p> <p>b. Check if rectifying diode D1, zener diode Z3, MOSFET VT7 or resistor matching socket CON1 is damaged.</p>

15. Press the manual switch, when no load, it appears normal in DC mode, but there is abnormal sound in AC mode.	a. Some MOSFET on the secondary inverter PCB PN-02-A2/PN-01-A1 is damaged.	a. Check. Method: Turn to ARC mode, then AC mode, turn off the machine after 3mins of no-load, touch the MOSFET on the secondary inverter PCB with your hand one by one. The extra hot ones are damaged.
16. No AC output in AC mode.	a. The AC/DC conversion switch on the panel is damaged. b. Some part on the control panel PK-32-A0 is damaged. c. Some part on the secondary drive PCB PK-09-A3 is damaged.	a. Check. b. Check if the diode D19, chip U9, potentiometer VR5 or audion Q6 on control panel PK-32-A0 is damaged. c. Check with a multi-meter if chip U2/U4/U8/U9/U3, audion Q1-Q8 or zener diode Z1/Z2/Z3/Z4 on drive PCB is damaged.
17. No AC sound when welding in AC mode.	a. The value of the resistor matching socket CON1 on inverter PCB PN-02-A2 varies. b. The MOSFET VT7, rectifying diode D1, or zener diode Z3 on inverter PCB PN-02-A2 is damaged.	a. Check and replace it if necessary. b. Check and replace it if necessary.
18. Press the welding torch switch, there is gas out, there is only small current, and the pre-flow time is variable.	a. The connecting cable matching socket CON8 on control panel PK-32-A0 with socket CON4 on top PCB PM-21-A0 is in loose connection. b. Some part on control panel PK-32-A0 is damaged.	a. Check. b. Check if chip U8, audion Q3/Q2 or potentiometer VR9 on control panel PK-32-A0 is damaged.
19. Turn on the machine, the indicator of protection status is on because the voltage is too low.	a. The input voltage is too low or is unstable. b. The thermal switch matching socket CON11 on control panel PK-32-A0 is damaged. c. The connecting cable matching socket CON12 on control panel PK-32-A0 is in loose connection. d. The resistor R46/R43 or chip U9 on control panel PK-32-A0 is damaged.	a. Check. b. Check. c. Check. d. Check. Method: properly reduce the value of resistor R46.
20. The tungsten is badly burned out in AC mode.	a. The value of clean width potentiometer VR5 on control panel PK-32-A0 is adjusted too big.	a. Adjust the clean width smaller, or parallel connect a resistor of 200K with resistor R18 on control panel PK-32-A1.

<p>21. The manual control is normal, but the pedal control goes wrong.</p>	<p>a. The conversion switch on the panel is damaged.</p> <p>b. The toggle switch inside the pedal control is damaged.</p> <p>c. The potentiometer inside the pedal control is damaged.</p> <p>d. The connecting cable matching socket CON1 on control panel PK-32-A0 is in loose connection.</p>	<p>a. Check.</p> <p>b. Check.</p> <p>c. Check.</p> <p>d. Check.</p>
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