
INVERTER IV 5.6KW
Service manual

Table of contents

| | |
|--|----|
| 1. General information..... | 3 |
| 1.1 Getting start..... | 3 |
| 1.2 Basic topology introduction..... | 3 |
| 1.3 Overview the inverter..... | 4 |
| 1.4 PCB overview..... | 5 |
| 2. Troubleshooting..... | 6 |
| 2.1 How to do..... | 6 |
| 2.2 Check the fault information..... | 6 |
| 2.3 Fault condition..... | 7 |
| 2.4 Test step..... | 8 |
| 3. Checking and measuring guide..... | 9 |
| 3.1 Check the battery side components..... | 9 |
| 3.2 Check the bus side components..... | 15 |
| Check the buck circuit..... | 17 |
| 3.3 Check the INV full bridge..... | 19 |
| 3.4 Check the MPPT board..... | 21 |
| 4. Disassembling guide..... | 22 |
| 4.1 Open the case..... | 22 |
| 4.2 Remove the control board..... | 24 |
| 4.3 Remove the fan paper and the SCR board and the MPPT board..... | 25 |
| 4.4 Remove the main board..... | 26 |
| 5. Cables connection..... | 29 |

1. General information

1.1 Getting start

This manual is used as a checking and repairing guide for INFINI V IV 5.6KW model. Before read this manual, it's better to have some electrical or electronic background knowledge. With this guide, you can fix the inverter by yourself firstly.

There are five main parts of this guide:

General information: This part is the basic information of the inverter; you can start to know the inverter from this chapter.

Troubleshooting: This part will tell you how to do when you face a problem.

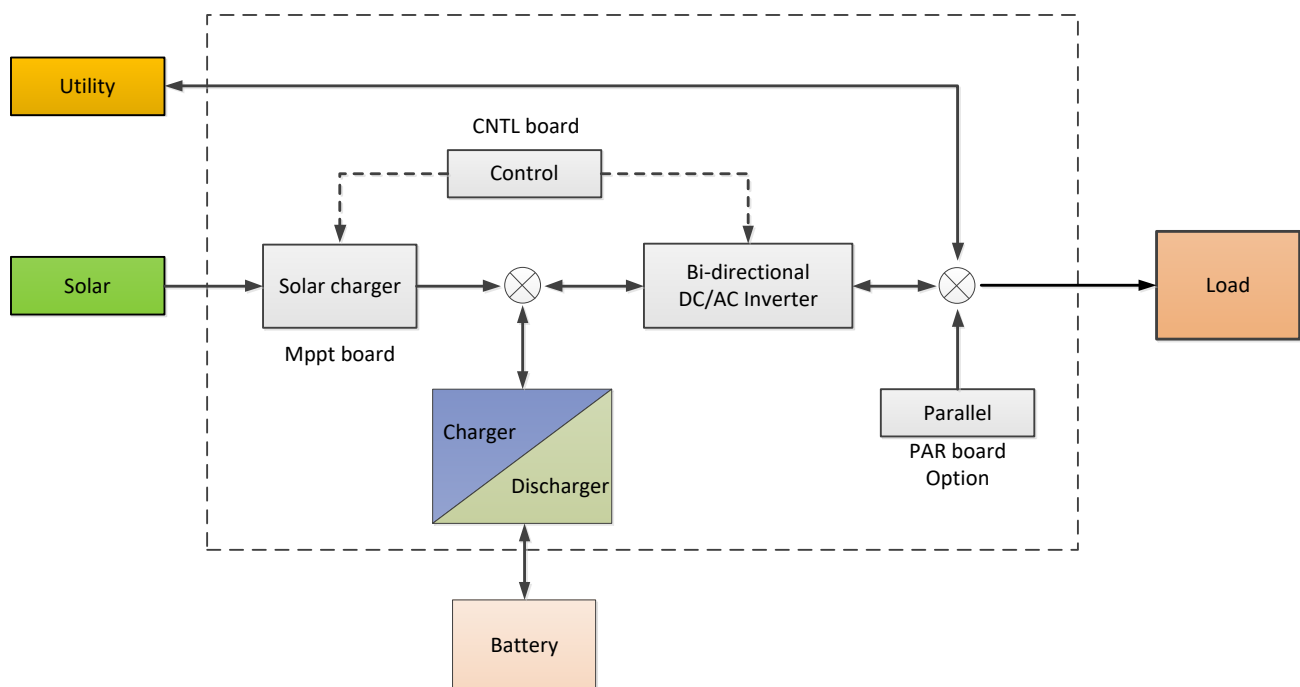
Checking and measuring guide: This part will teach you how to check or repair the inverter by measuring the critical components.

Assembling guide: This part teaches you how to take the board outside and fix the new one.

Cables connection: This part is a reference for cable connection.

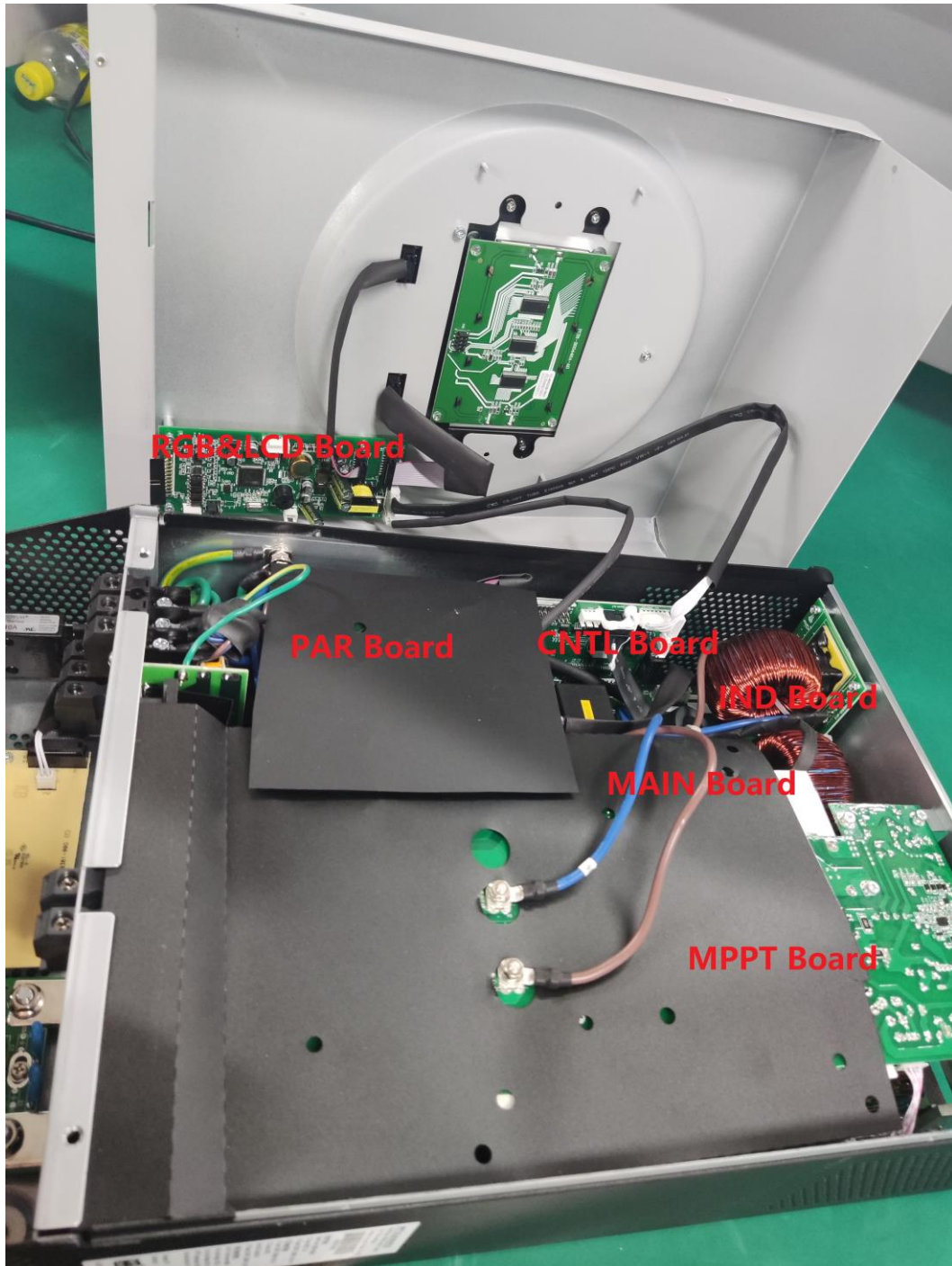
1.2 Basic topology introduction

The topology of the inverter shows as below:



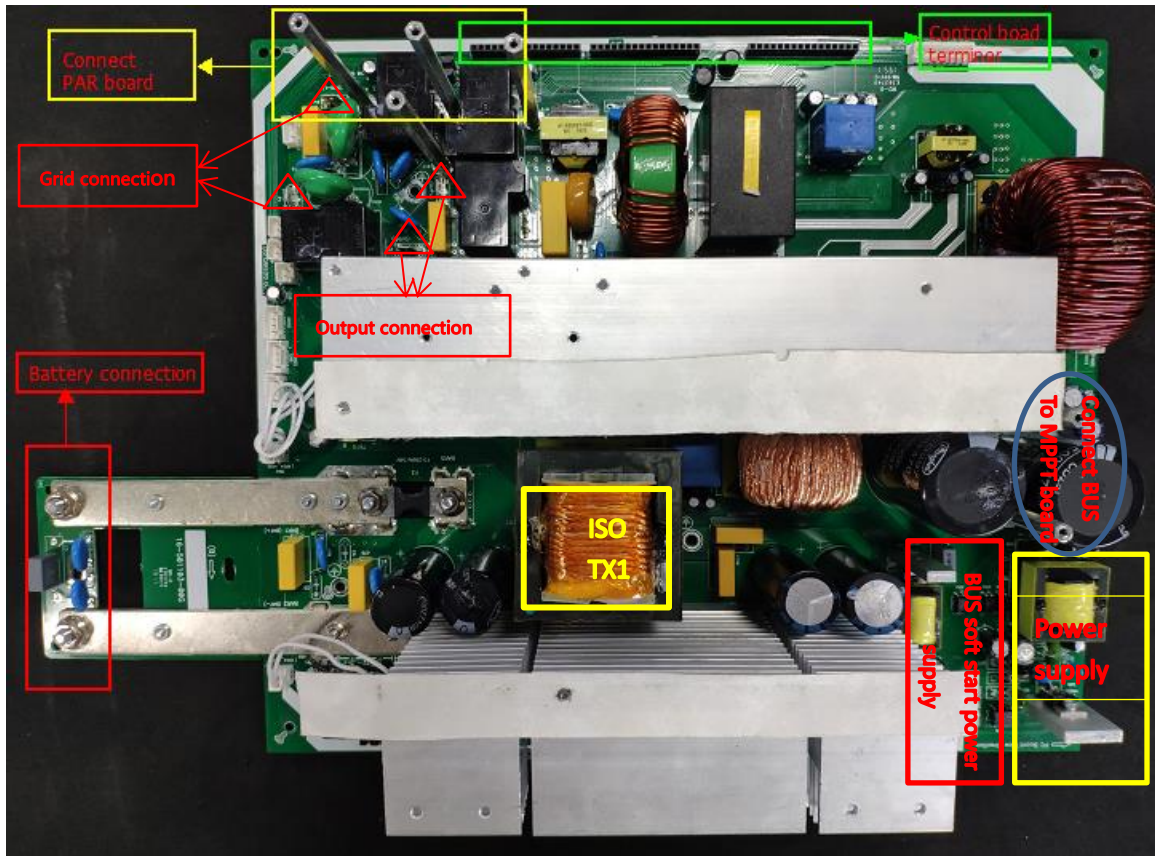
Compare with UPS or normal inverter, INVERTER combines a solar charger inside. Solar charger can be a supplement for battery when there is not grid or for saving energy purpose. And with the solar charger, the inverter can have more working modes than UPS. For detail information please refer to our user manual.

1.3 Overview the inverter

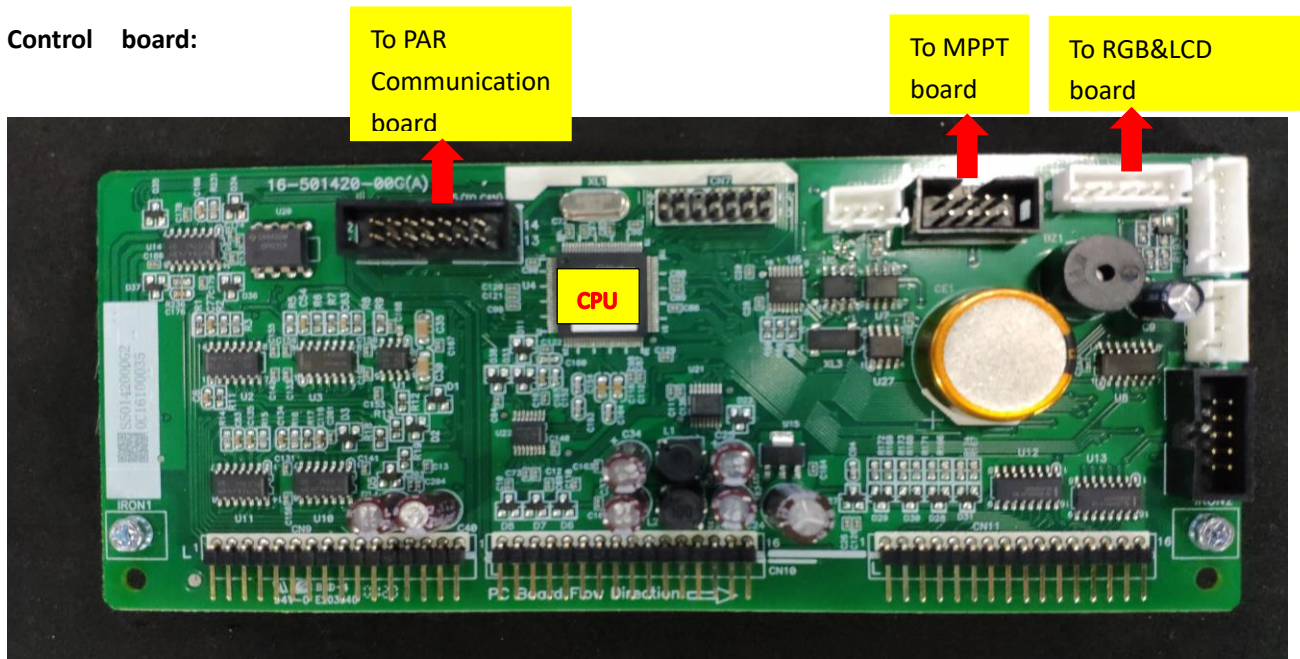


1.4 PCB overview

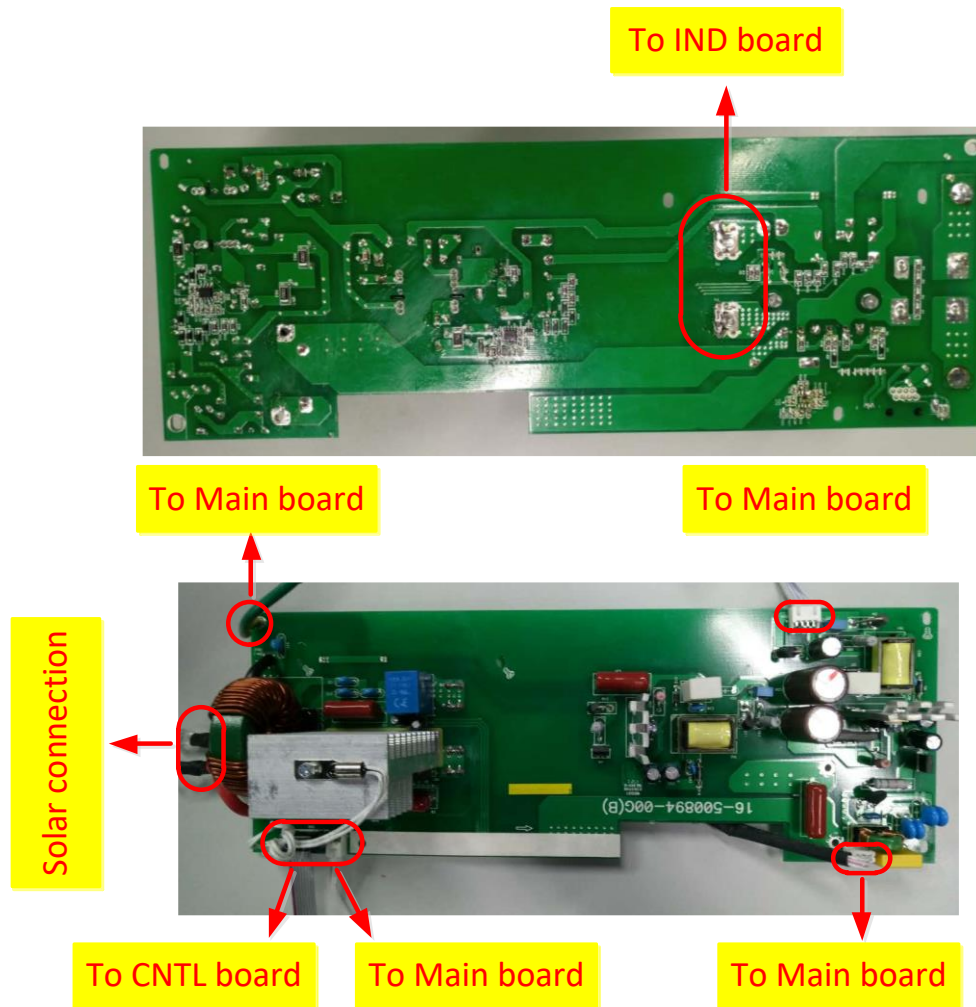
Main board:



Control board:



MPPT board:



2. Troubleshooting

2.1 How to do

When the inverter was faulty, normally there are two main symptoms:

- No display at all;
- Fault code or warning code on the LCD;

When the fault occurred, please help to record the fault information and follow "How to check" of part 2.3 to check the inverter, then feedback the checking result to the service center. It will be very helpful for solving the problem as soon as possible.

2.2 Check the fault information

Please follow the steps as below to find the issues!

Make sure that you can finish all the steps and feedback us the results. Or we may not be able to give you the right solution.

Step 1: Test the battery working mode.

Before turning on the inverter, only connect the battery with the inverter which means no solar input and

grid input. Turn on the switch, the LCD will light up and wait for the battery connecting to load.

If the connection is failed, please record the fault code.

Step 2: Test the grid bypass mode.

Before turning on the inverter, only connect the utility with the inverter. Without press any buttons, the LCD will light up. And wait for the utility connecting to load.

If the connection is failed, please record the fault code.

Step 3: Test the solar mode.

Before turning on the inverter, only connect the solar with the inverter. Without press any buttons, the LCD will light up. And wait for the solar connecting to load.

If the connection is failed, please record the fault code.

2.3 Fault condition

Note:

When open the top cover, please have a look first, are there any obviously damaged parts?

When take the main board out, please have a look around, are there any obviously damaged parts?

2.2.1. Not working at all/ No display

| | |
|-----------------|--|
| Description | The inverter couldn't startup completely. |
| Possible reason | 1. SPS module damaged. |
| How to check | 1. Firstly, please measure the resistor between BAT+ and BAT-. If it is not shorted, only connect the inverter with battery, and press "ON" button, could the inverter startup? If not, please check the fan. 2. If the LCD couldn't light up and fan doesn't work, please disconnect all the wires and open the top cover, and then take the main board outside by following part 4. |
| How to solve | Replace the main board. |

2.2.2. 09 fault

| | |
|-----------------|---|
| Description | Bus soft start fails. |
| Possible reason | DC-DC module was damaged. |
| How to check | Check the main board by following "3.1~3.4"; |
| How to solve | Repair the main board or replace it directly. |

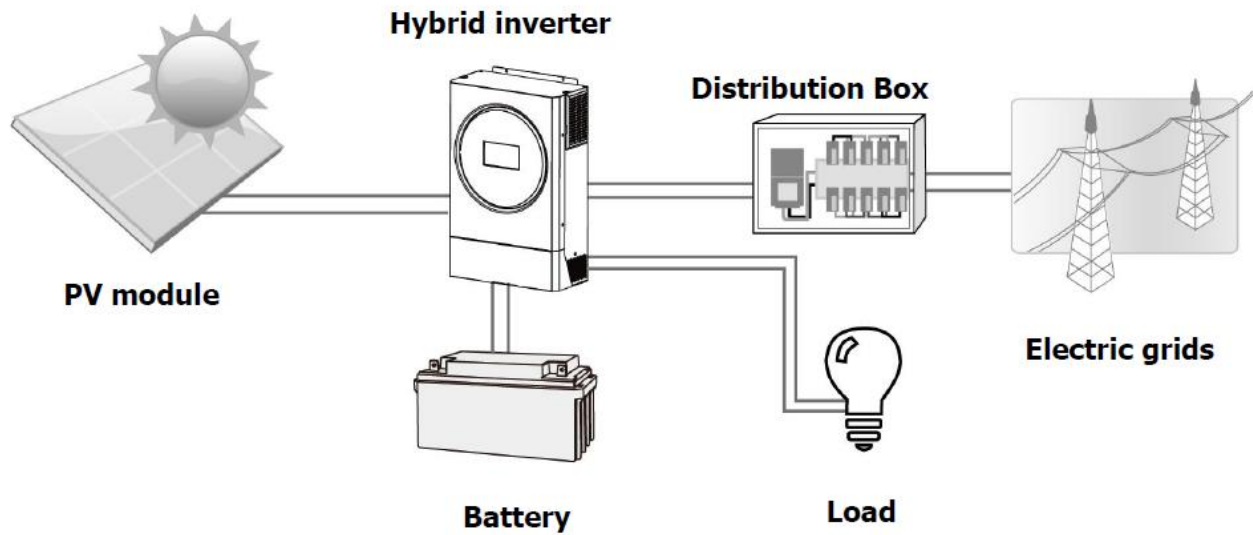
2.2.3. 56 fault

| | |
|-----------------|---|
| Description | Battery couldn't be detected. |
| Possible reason | Wire connection or fuse was burnt. |
| How to check | 1. Check the wire connection, the priority of the battery cable; 2. Check the main board by following "3.1". |
| How to solve | Repair the main board or replace it directly. |

2.4 Test step

After replacing all defected components, testing steps can be used to confirm the repair result and the reliability of the Inverter.

Set up the testing system as below:



3. Checking and measuring guide

3.1 Check the battery side components

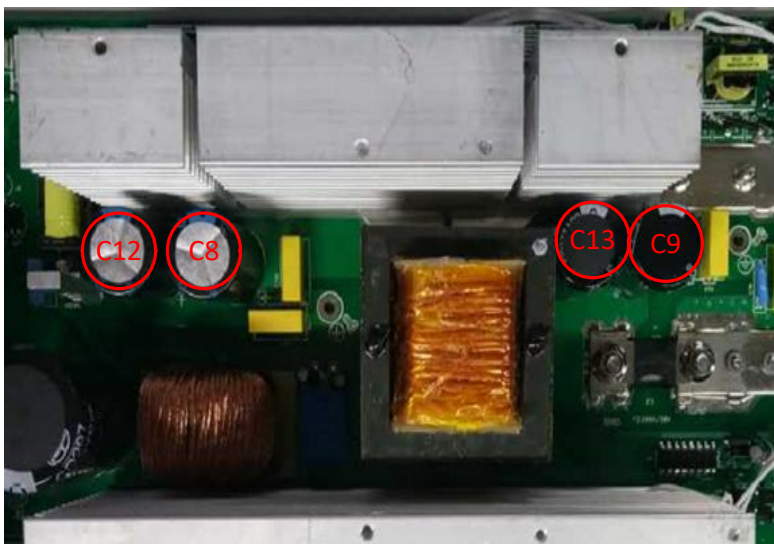
Fuse and capacitors

F3



| Parts | Attribute | Reference values | Failure status |
|-------|-----------|------------------|----------------|
| F3 | Resistor | 0 ohm | Open |

C9/C13/C8/C12

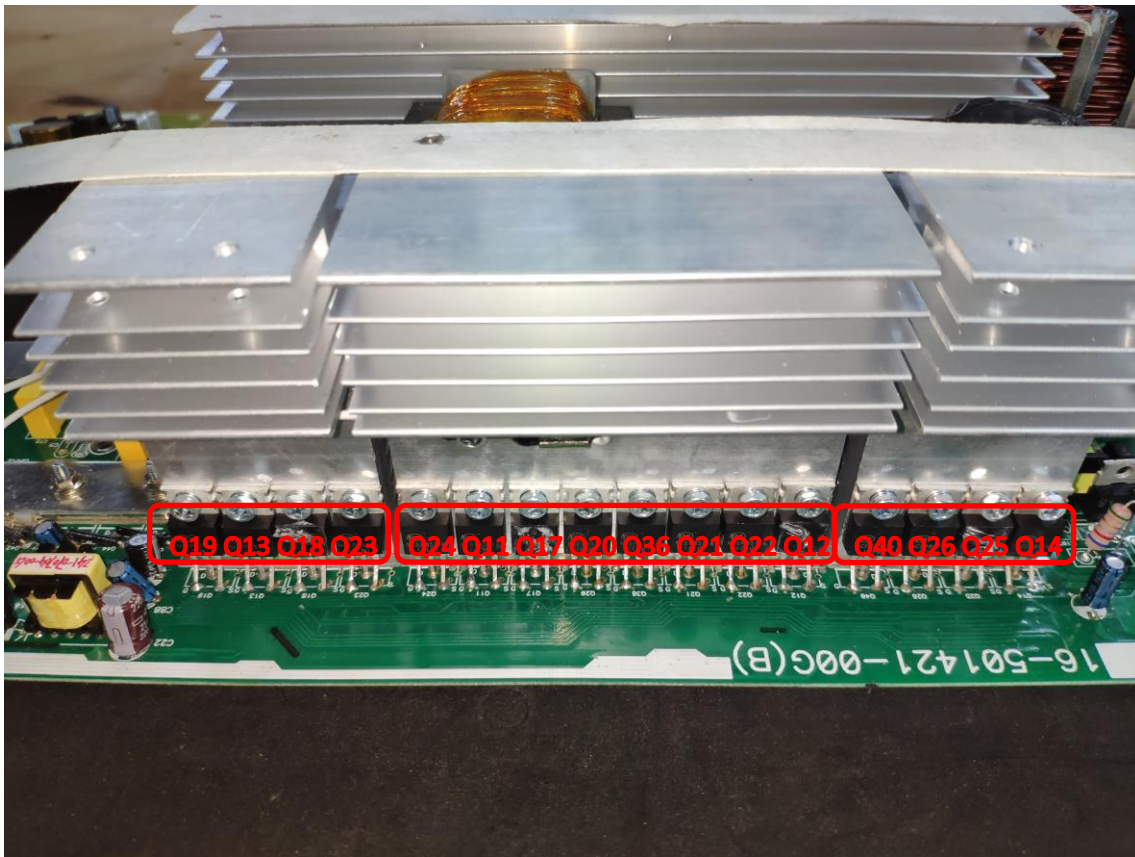


If the capacitors explode as below, they need to be replaced.



Power devices

DC/DC MOSFET: Q19/Q13/Q18/Q23 & Q24/Q11/Q17/Q20 & Q36/Q21/Q22/Q12 & Q40/Q26/Q25/Q14



| Parts | Attribute | Reference values | Failure status |
|-------|-----------------------|------------------------------------|--------------------|
| All: | Resistor ¹ | GS: 10.7K GD: 228K DS: 0.91M | Short or explosion |
| | Diode | SD: 0.43V DS: OL | |

Note1: When you use the multimeter to measure the resistor of the transistor, because of the capacitor in the circuit, it will cause the changing of the values when you measure the DS and GD. So we recommend

you measure the diode forward voltage of SD, and the resistor of GS. These two values can reflect the situation of the transistor more correctly.

Note: If one or more of them were damaged, please replace all of them.

3.1.1. Drivers (This part is only used for repair checking)

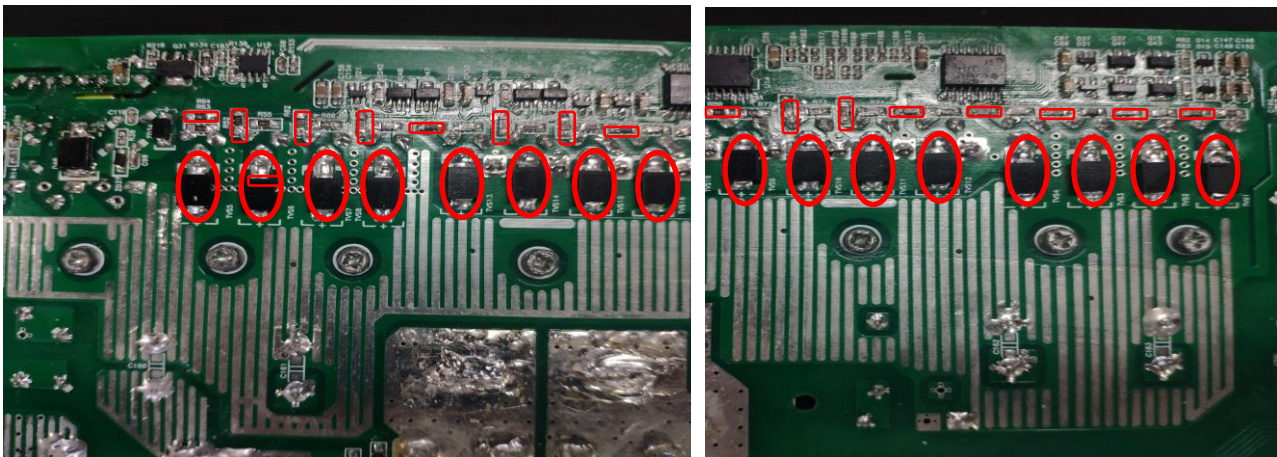
Note: Drivers usually need to be checked when users want to repair the boards. Because when power devices were damaged, the high voltage will rush to driver circuit through the gates of power devices.

The reference of the resistors list as below:

R64/R52/R62/R81/ R76/R41/R59/R70/ R80/R78/R75/R42/ R93/R92/R87/R53

TVS5/ TVS6/ TVS7/ TVS8/ TVS13/ TVS14/ TVS15/ TVS16/ TVS9/TVS10/ TVS11/ TVS12/

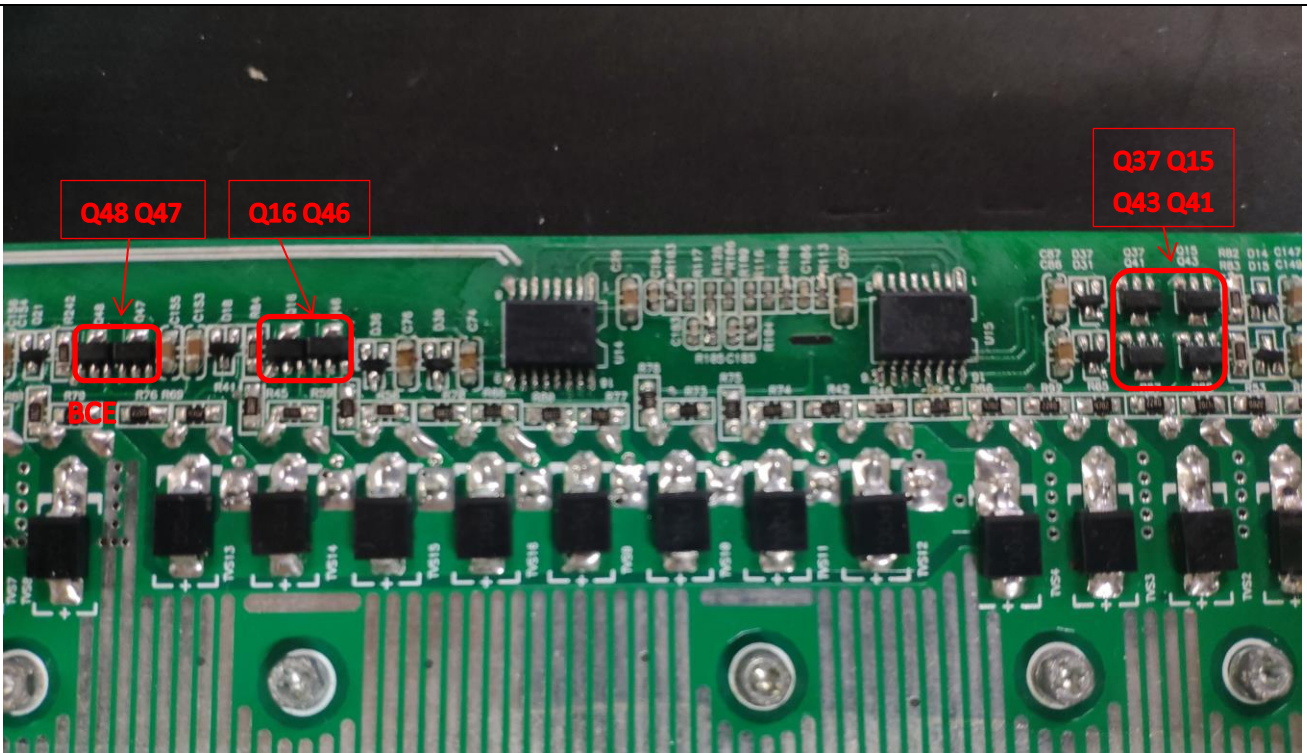
TVS4/ TVS3/ TVS3/ TVS1/



Use multimeter to measure each resistor, find the burnt resistors and replace them; don't need to replace them all.

| Parts | Attribute | Reference values | Failure status |
|------------|-----------|------------------|----------------------|
| All: 22ohm | Resistor | 22 ohm | Open or other values |
| TVS1-16 | Diode | + To - : 0.42V | Short or explosion |

If the resistors need to be replaced, please also check the driver transistors and control IC.



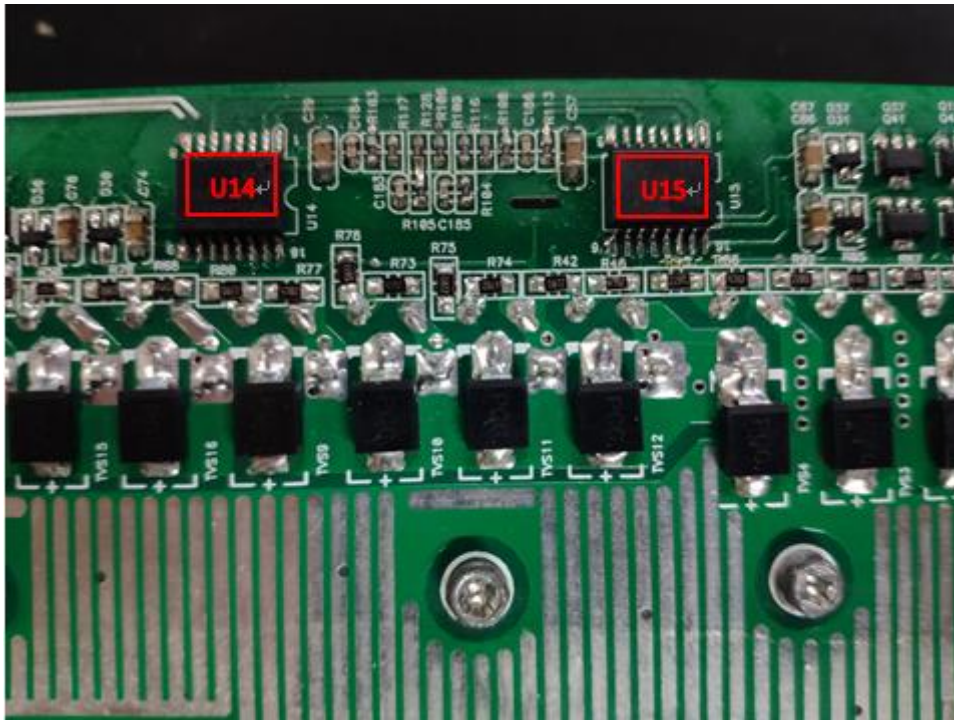
The Q47and Q46 are 11-400011-00G (TR 2A 50V NPN SOT-89)

The Q48and Q16 are 11-400010-00G (TR 3A 50V PNP SOT-89)

The Q37and Q41 are 11-400011-00G (TR 2A 50V NPN SOT-89)

The Q15and Q43 are 11-400010-00G (TR 3A 50V PNP SOT-89)

| Parts | Attribute | Reference values | Failure status |
|-----------------|-----------|-------------------------------------|--------------------|
| Q47/Q46/Q37/Q41 | Resistor | BE: 125K BC: 100K CE: OL | Short or explosion |
| | Diode | BE: 0.55V BC: 0.49V CE: OL | |
| Q48/Q16/Q15/Q43 | Resistor | BE: 12k BC: OL CE: 277.3k | Short or explosion |
| | Diode | BE: 0.55V BC: 1.57L CE: 0.29V | |

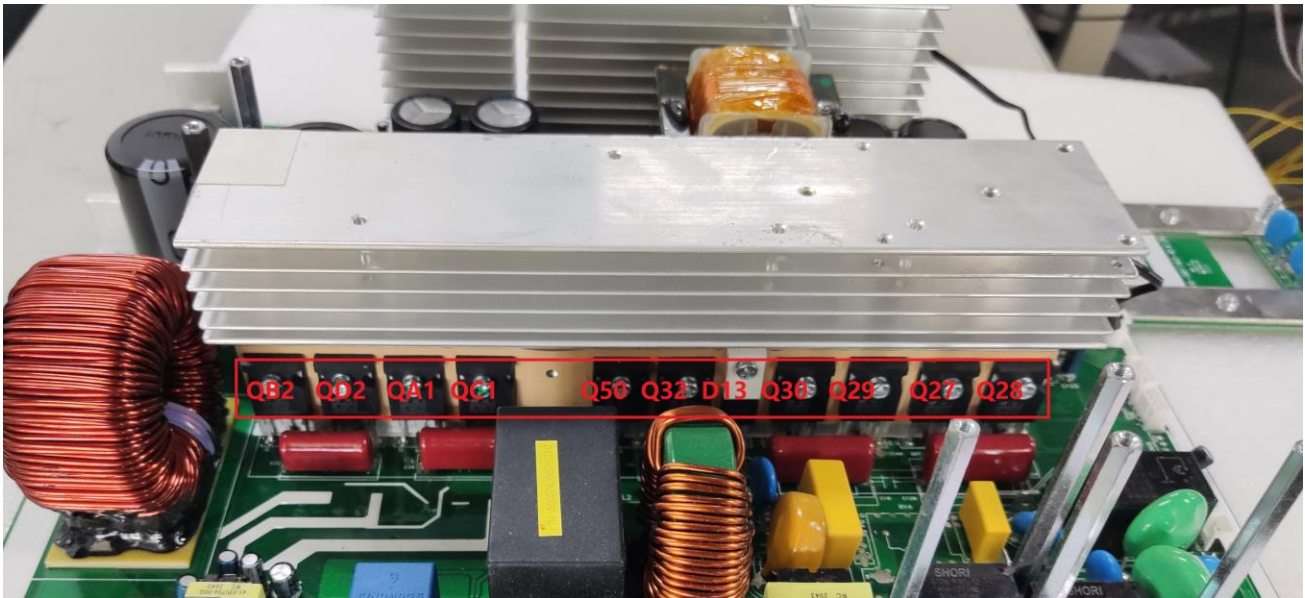


| Parts | Attribute | Reference values | Failure status |
|---|-----------|--|--------------------|
| U14/U15 | Resistor | Pin14TOP Pin16: 22- 25k Pin9TOP Pin11: 22-25k | Short or explosion |
| Note: If you are not sure about these components, we recommend you replacing them all. | | | |

3.2 Check the bus side components

Power devices

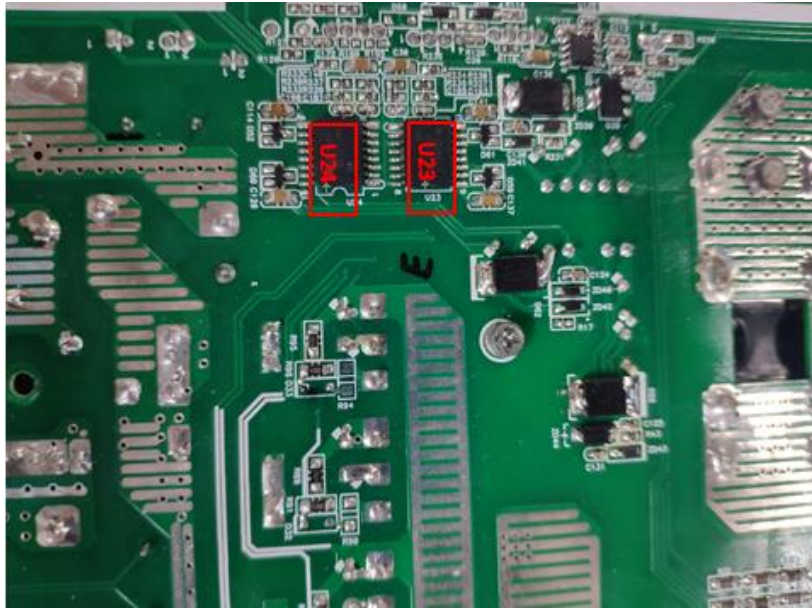
DC/DC IGBT: Q30/Q29/Q27/Q28



| Parts | Attribute | Reference values | Failure status |
|-----------------|-----------------------|--------------------------------------|--------------------|
| Q27/Q28/Q29/Q30 | Resistor ¹ | GE: 22.2 K GC: 206.5k CE:1.06M | Short or explosion |
| | Diode | EC: 0.35V CE: OL | |

Note1: When you use the multimeter to measure the resistor of the transistor, because of the capacitor in the circuit, it will cause the changing of the values when you measure the CE and GE. So we recommend you measure the diode forward voltage of EC, and the resistor of GE. These two values can reflect the situation of the transistor more correctly.

Note: If one or more of them were damaged, please replace all of them.

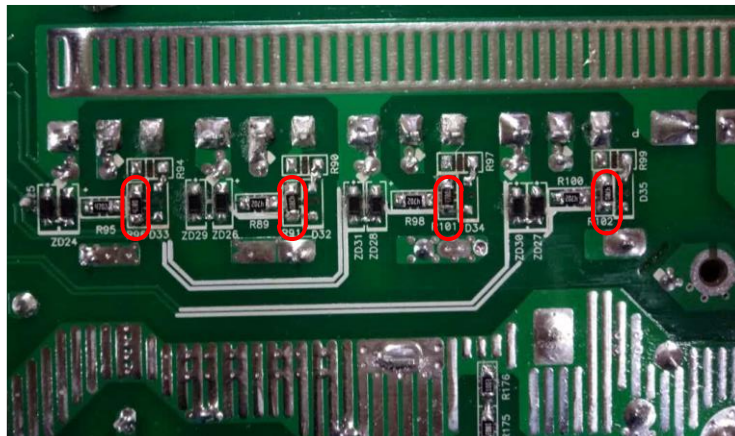


| Parts | Attribute | Reference values | Failure status |
|---------|-----------|--|--------------------|
| U23/U24 | Resistor | Pin14TOPin16: 22- 25k Pin9TOPin11: 22-25k | Short or explosion |

Note: If you are not sure about these components, we recommend you replacing them all.

Drivers (This part is only used for repair checking)

Meanwhile, we also need to check the driver tubes of these power tubes.



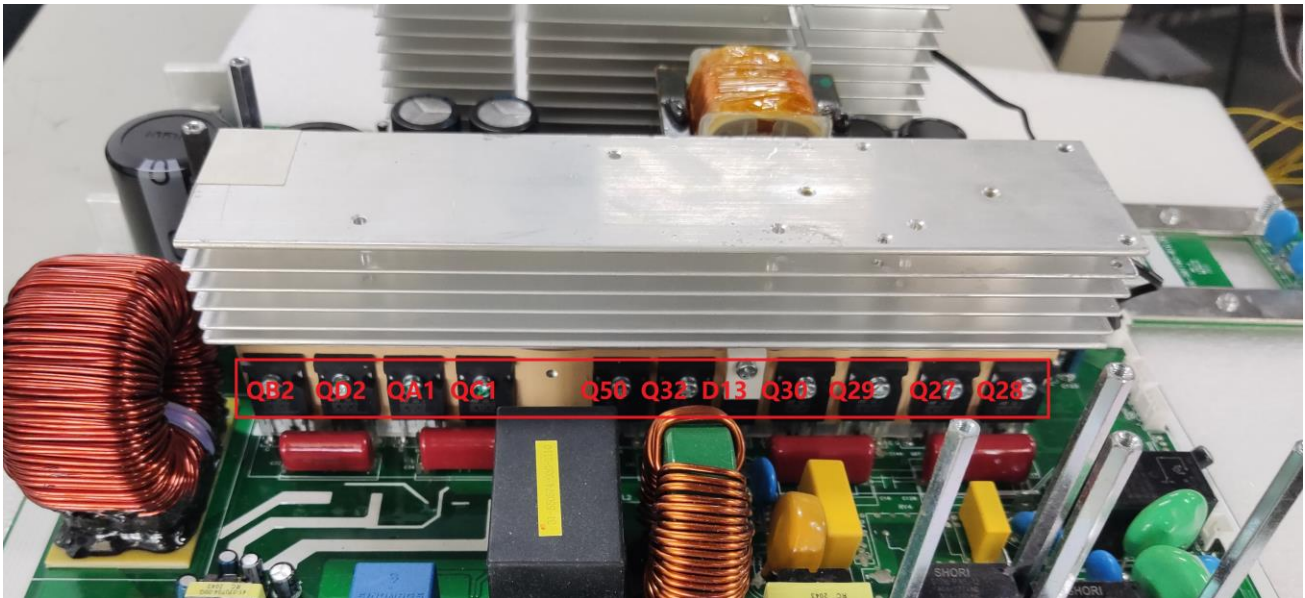
| Parts | Attribute | Reference values | Failure status |
|-------------------|-----------|------------------|----------------------|
| R91/R102/R96/R101 | Resistor | 47 ohm | Open or other values |

Note2: When test the diode; please remove the R90/R99/R94/R97 from the board, or the test result is not right.

Check the buck circuit

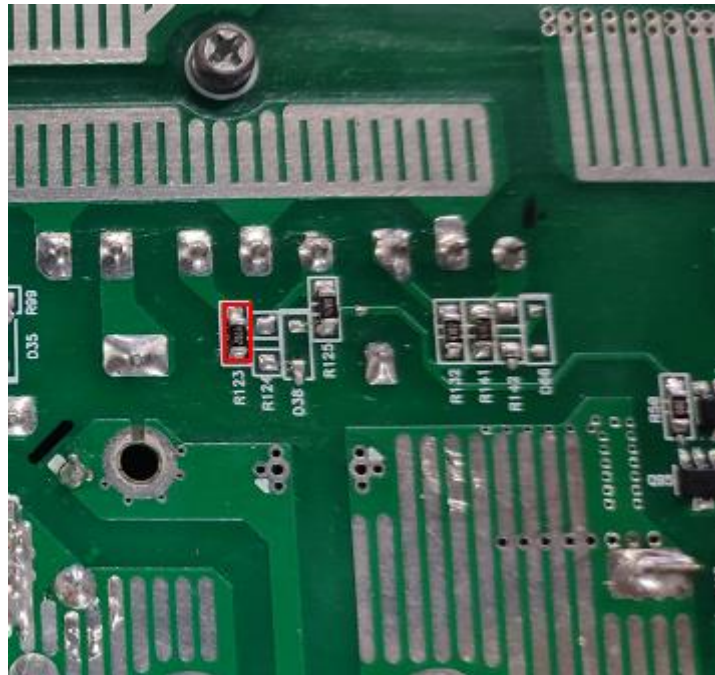
Power devices

BUCK MOSFET and Diode: Q32 /Q50/ D13



| Parts | Attribute | Reference values | Failure status |
|---------|-----------|--|--------------------|
| Q32/Q50 | Resistor | GE: 23.5 K GC: 189K CE: 150-250K | Short or explosion |
| | Diode | SD or CE: 0.355V DS or EC: OL | |
| D13 | Resistor | + to -: 175K - to +: OL | |
| | Diode | + to -: 0.39V - to +: OL | |

Drivers (This part is only used for repair checking)

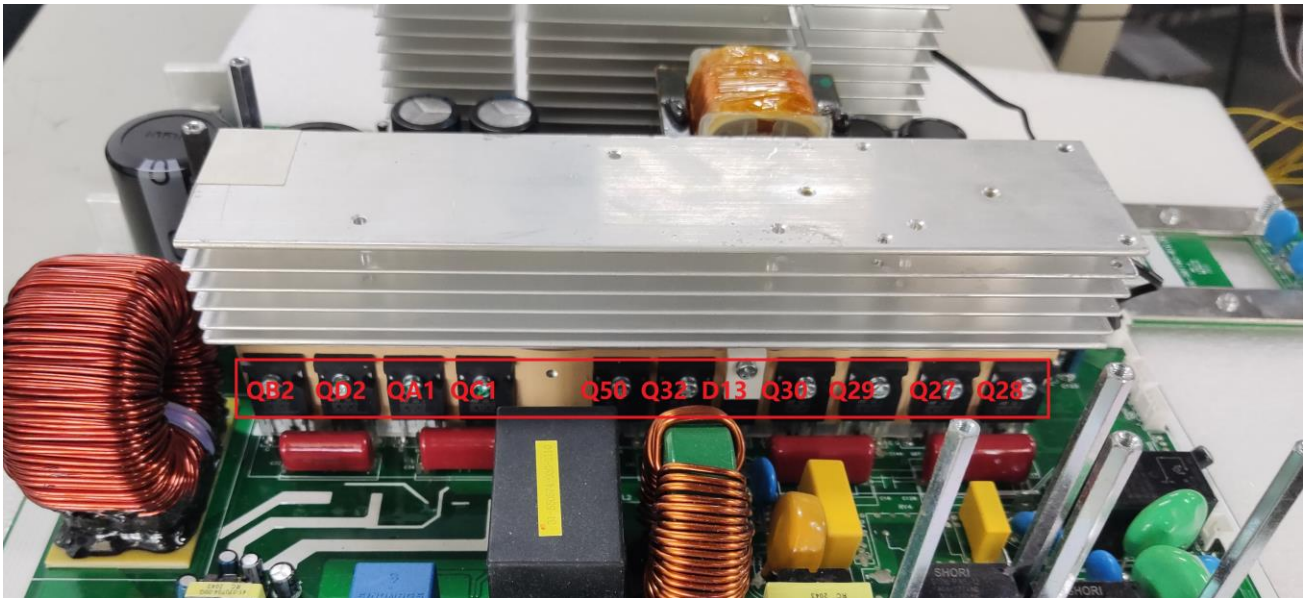


| Parts | Attribute | Reference values | Failure status |
|--|-----------|------------------|----------------------|
| R125 | Resistor | 47 ohm | Open or other values |
| Note: When test the diode; please remove the R124 from the board, otherwise the test result is not right. | | | |

3.3 Check the INV full bridge

Power devices

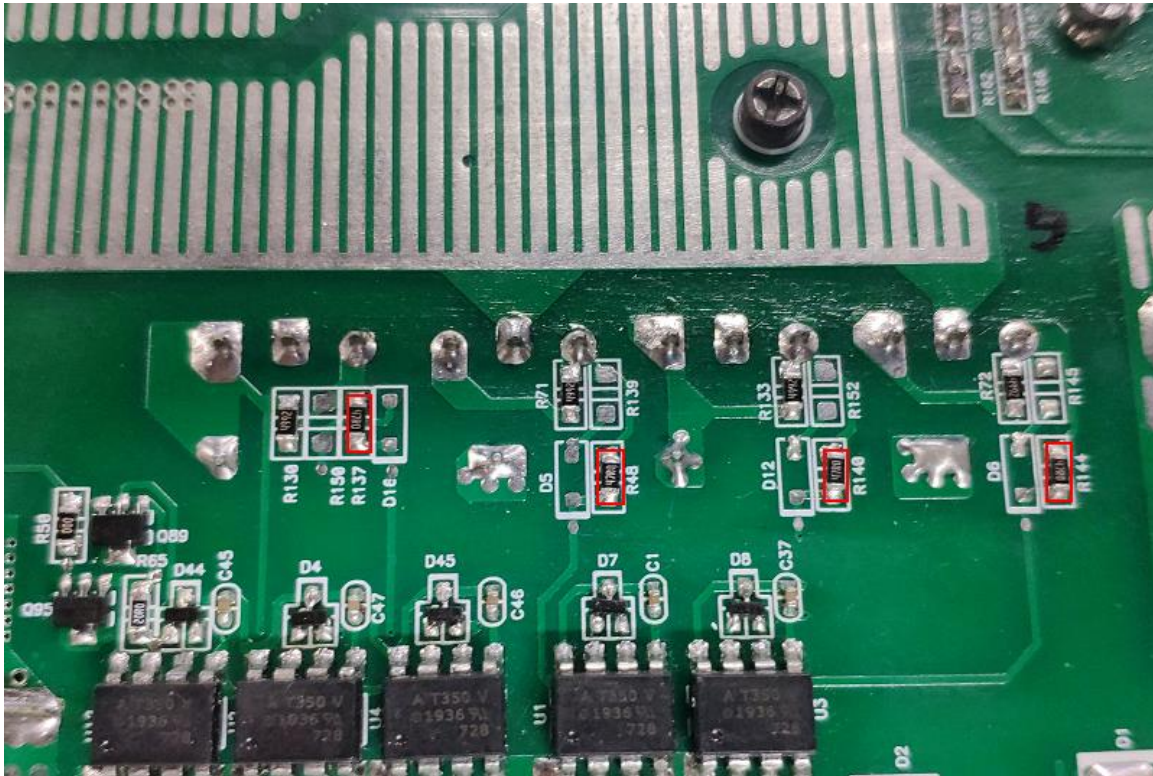
INV IGBT: QB2/QD2/QA1/QC1



| Parts | Attribute | Reference values | Failure status |
|-----------------|-----------|------------------------------------|--------------------|
| QB2/QD2/QA1/QC1 | Resistor | GE: 22.5K GC: 227k CE: 10.5M | Short or explosion |
| | Diode | EC: 0.37V CE: OL | |

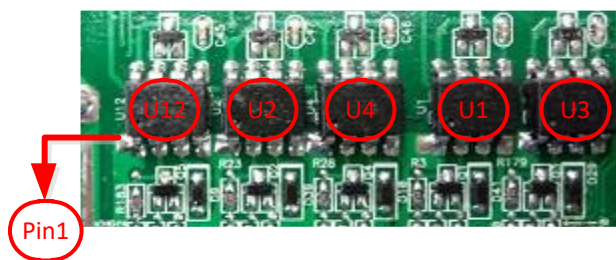
Note1: If one or more of them were damaged, please replace all of them.

Drivers



| Parts | Attribute | Reference values | Failure status |
|--------------------|-----------|------------------|----------------------|
| R137/R48/R140/R144 | Resistor | 47 ohm | Open or other values |

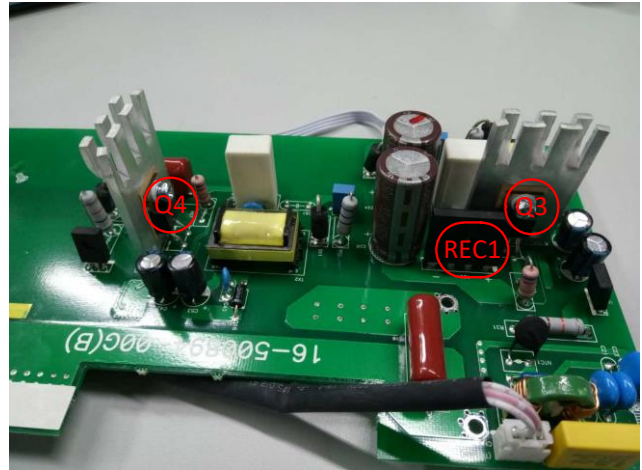
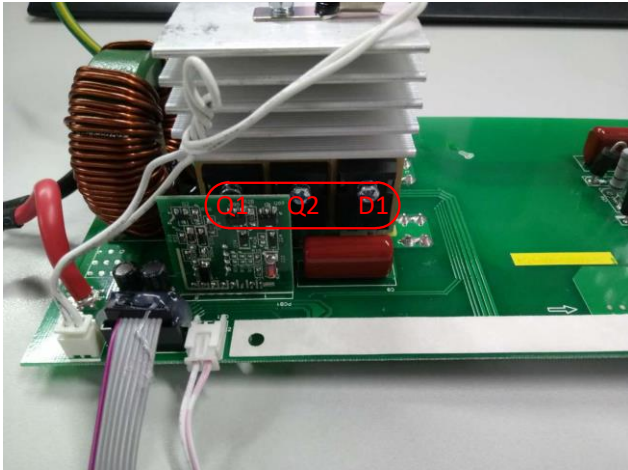
Optocoupler: U12/U2/U4/U1/U3



| Parts | Attribute | Reference values | Failure status |
|-----------------|-----------|--|--------------------|
| U1/U2/U3/U4/U12 | Resistor | PIN8 TO PIN5: 0.976M PIN7 TO PIN5: 0.976M | Short or explosion |

3.4 Check the MPPT board

Power devices

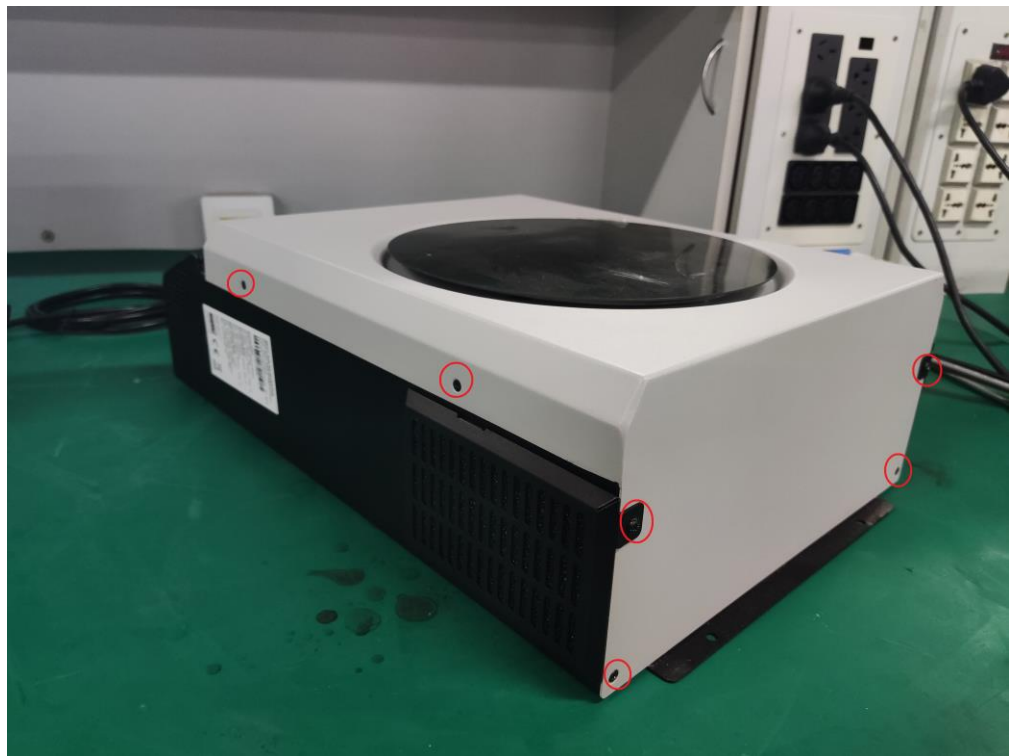


| Parts | Attribute | Reference values | Failure status |
|---------|-----------|--|--------------------|
| Q1, Q2, | Resistor | GS: 25k GD: 218K DS: OL | Short or explosion |
| | Diode | SD: 0.381V DS: OL | |
| D1 | Resistor | + to -: 202.8k - to +: OL | Short or explosion |
| | Diode | + to -: 0.389V - to +: OL | |
| REC1 | Resistor | + to -: 303.7k - to +: 0.7M | Short or explosion |
| | Diode | + to -: 0.535V - to +: OL | |
| Q4, Q3 | Resistor | GS: 20K-40K GD: 300K-400K DS: OL | Short or explosion |
| | Diode | SD: 0.532V DS: OL | |

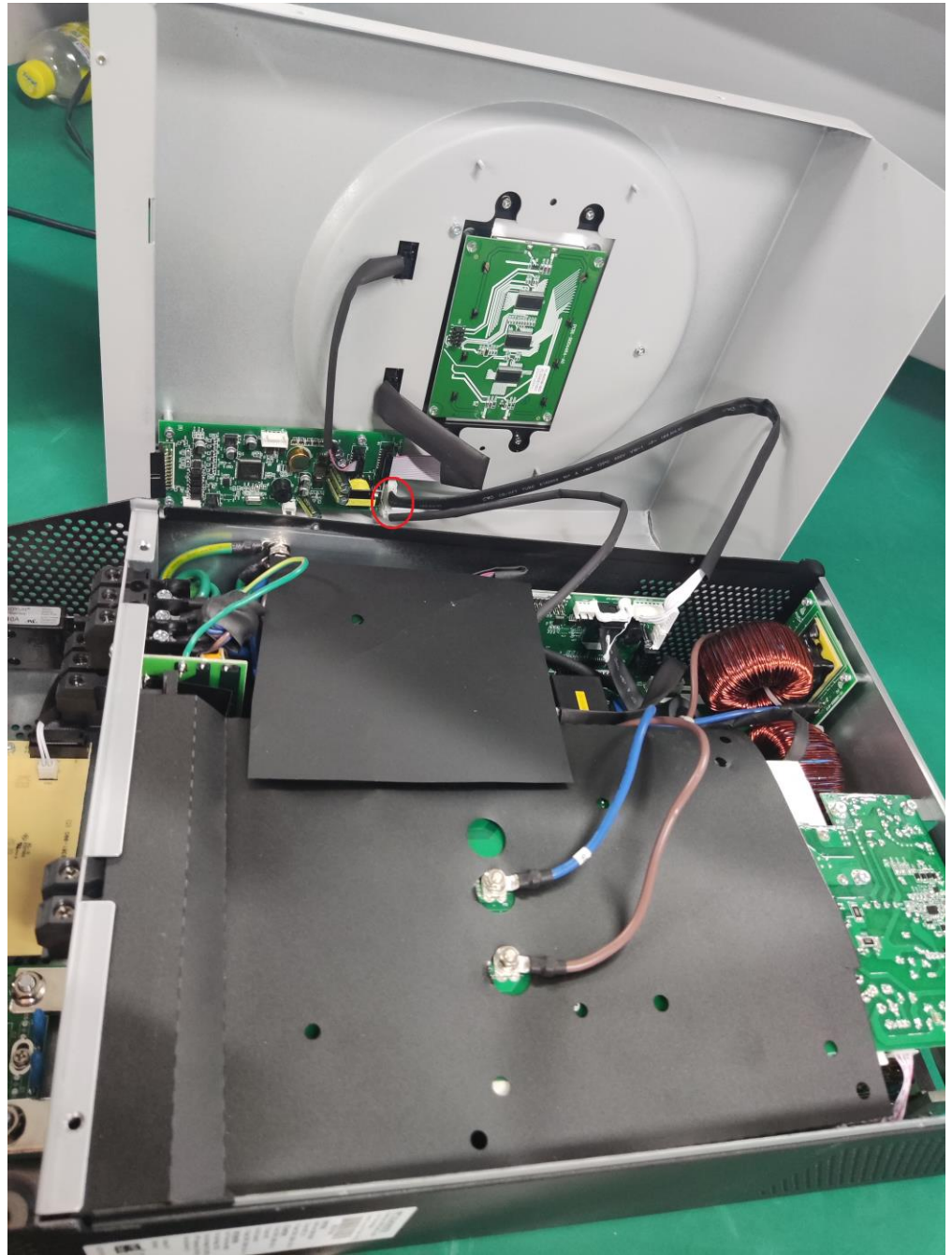
4. Disassembling guide

4.1 Open the case

Remove screws on the top cover

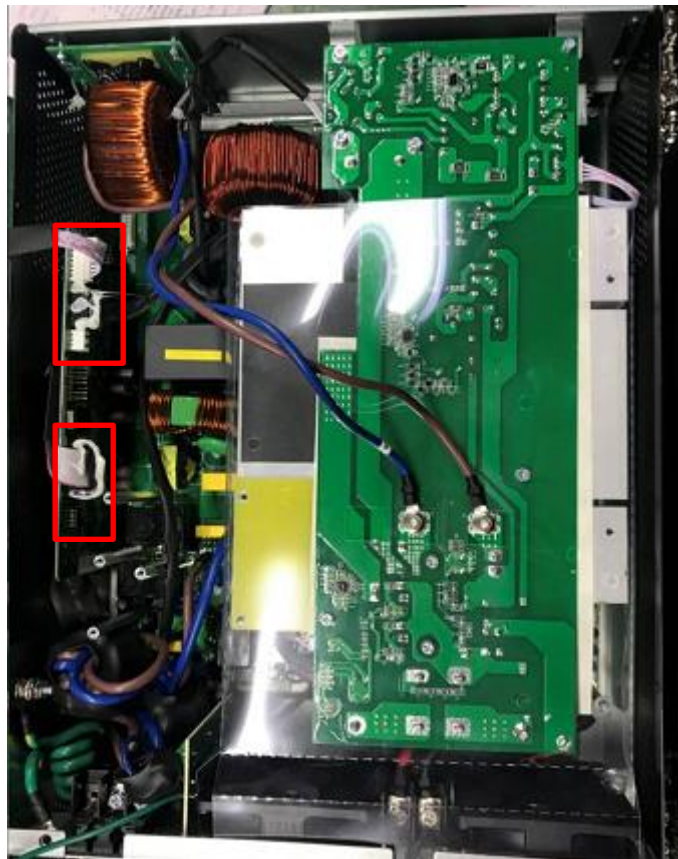


Open the top cover carefully, for there are two cables connected with RGB&LCD board.



4.2 Remove the control board

Remove the cables on the control board.



Remove the fixing screws.



Take out the control board.

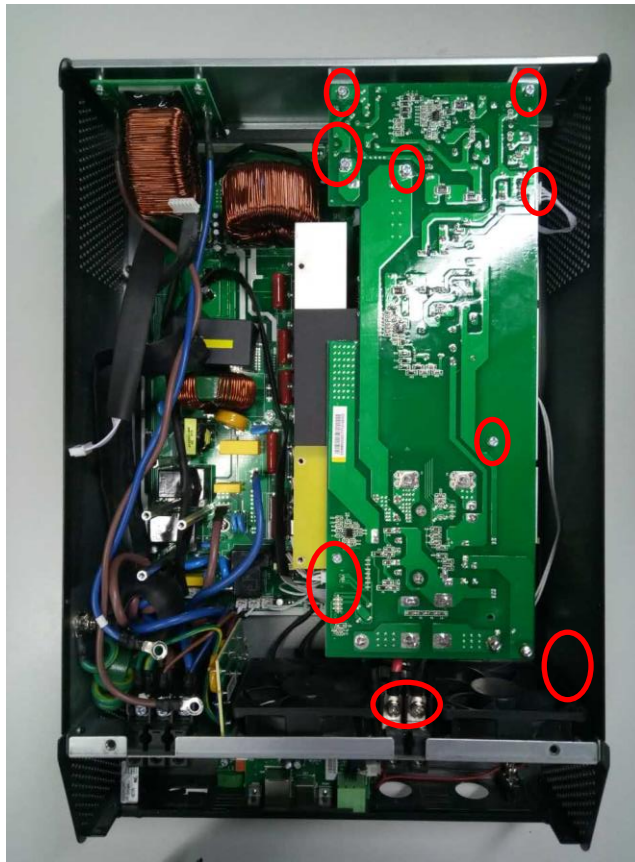
Note: When you put the new control board on the main board, please make sure that the connection is correct and tighten. Don't forget to put the screws and cables back.

4.3 Remove the fan paper and the SCR board and the MPPT board.

1. Take the plastic screws out.
2. Take two nuts out.
3. Take six screws out.
4. you can take the SCR board and the fan paper off.



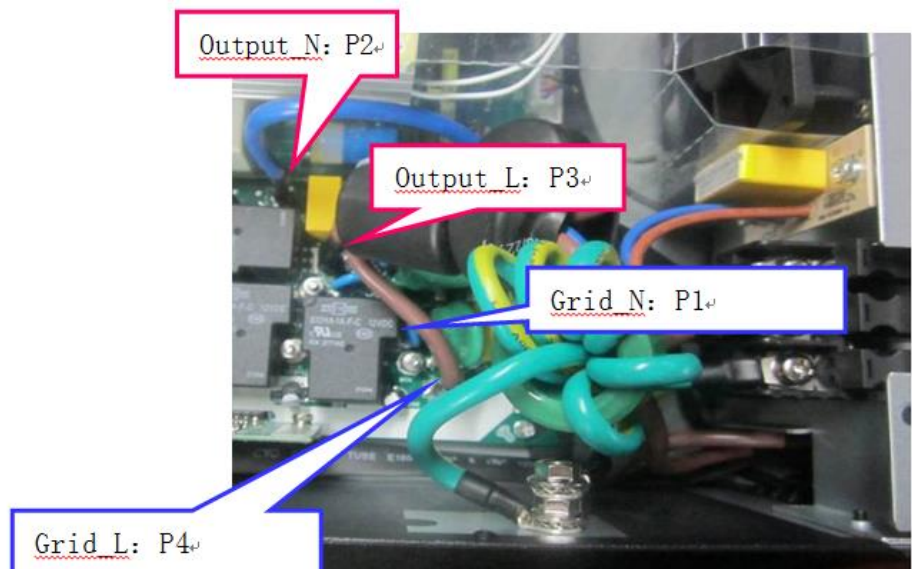
Remove the screws and the signal cables of the MPPT board , and you can take the MPPT board paper off.



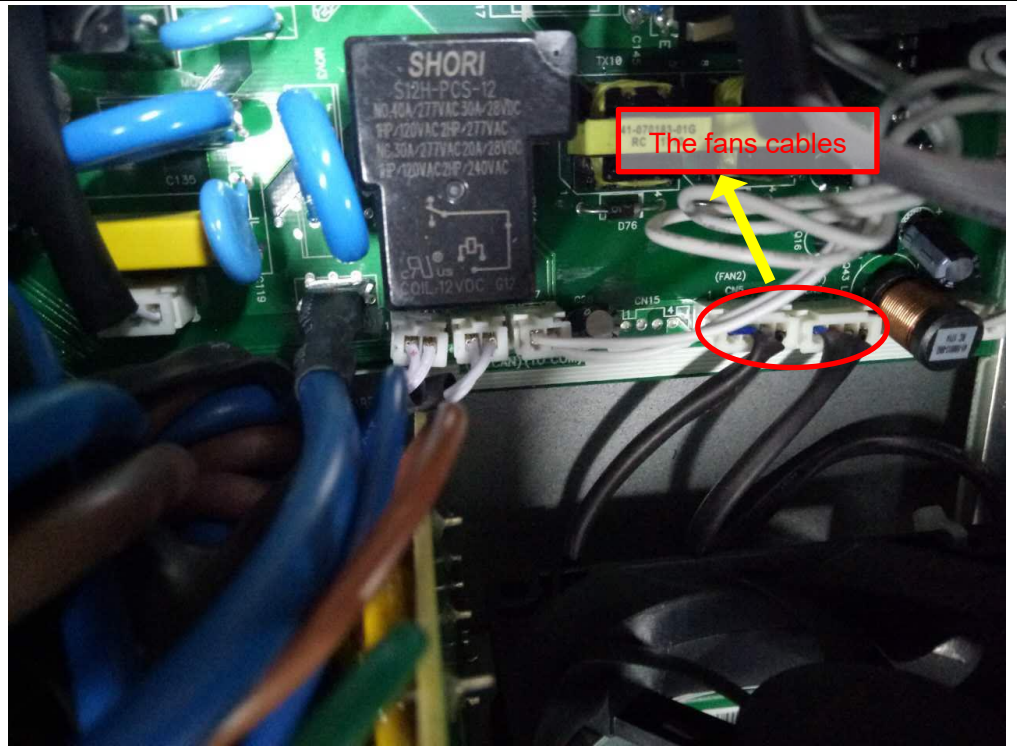
4.4 Remove the main board.

Note: Before replace the main board, please follow 4.2 ~ 4.4, remove the control board, MPPT board, and fans first.

Remove the power cables of AC output and input.
Brown cable is line;
blue cable is neutral.
Do not make the wrong polarity.

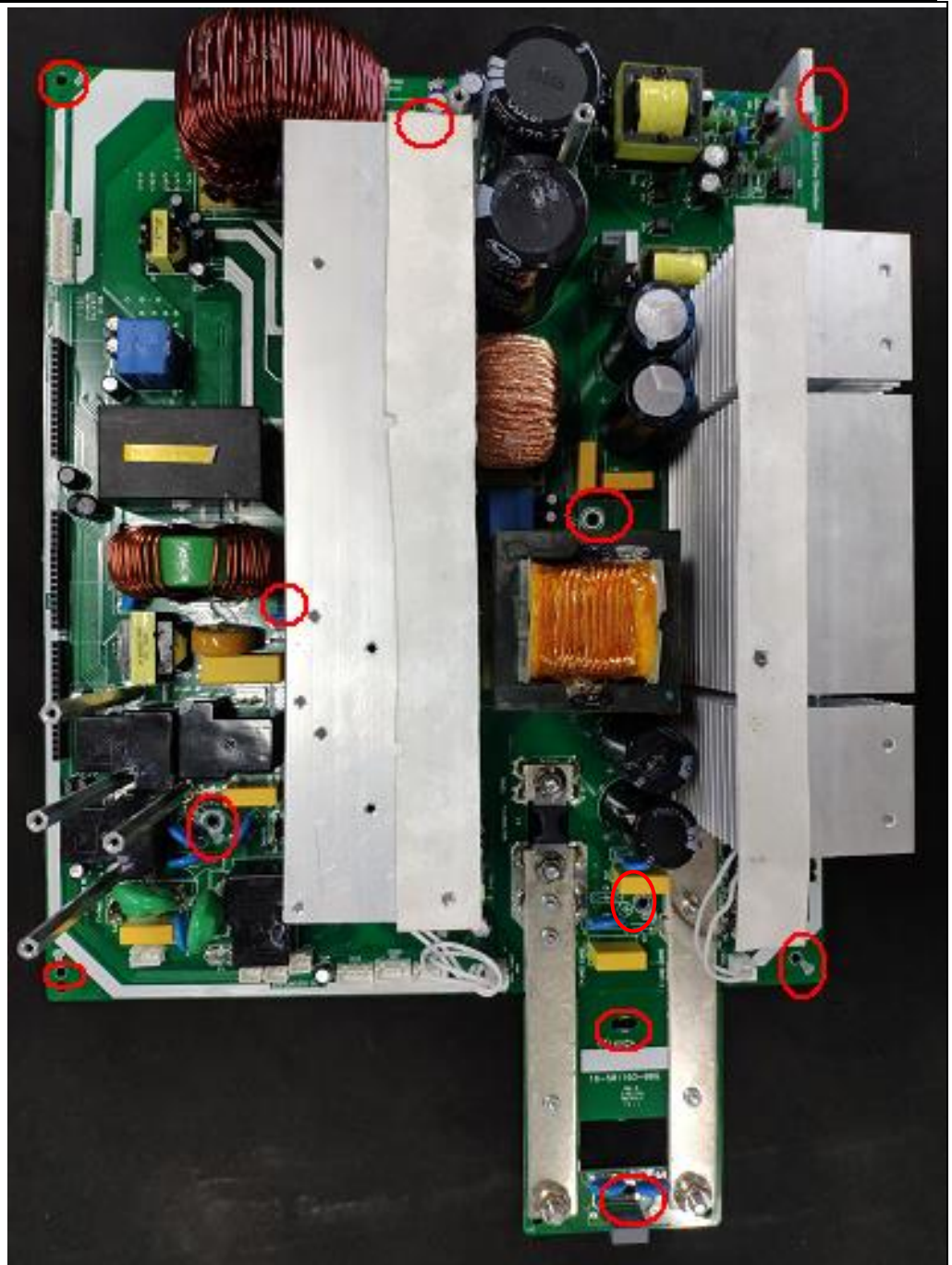


Remove the fans cables.



Remove the screws and the signal cables on the main board. And then you can take the main board out.

Note: There are nine screws to fix the main board.



5. Cables connection

