
Maintenance Manual for DT33030CS 90035-02211



Preface

Model Description

This manual is applicable to the following models:

Model	Type
DT33030CS	Modular Online UPS

Using an object

For qualified technical support engineer or Maintenance engineer only.

Notice

1. No part of this manual may be reproduced or transmitted in any form or by any means without the prior written permission of the company.
2. The manual will update irregularly, due to the product upgrading or other reasons.

Unless otherwise agreed the manual is only used as guide for technical support engineer or Maintenance engineer, all of information contained in this manual make no warranty expressed or implied.

Safety Precautions

Before handling, installation, operation, maintenance, please read the instruction manual carefully and follow all safety precautions in the manual. If neglected, it may cause personal injury or equipment damage, or even death.

The Company will not be liable for injuries and equipment damage caused by your company or your company's customers not following the safety precautions in the instruction manual.

Safety Message Definition

Danger: Serious human injury or even death may be caused, if this requirement is ignored.

Warning: Human injury or equipment damage may be caused, if this is requirement is ignored.

Attention: Equipment damage, loss of data or poor performance may be caused, if this requirement is ignored.

Commissioning Engineer: The engineer who installs or operates the equipment should be well trained in electricity and safety, and familiar with the operation, debug, and maintenance of the equipment.

Warning Label

The warning label indicates the possibility of human injury or equipment damage, and advised the proper step to avoid the danger. In this manual, there are three types of warning labels as below.

Labels	Description
 Danger	Serious human injury or even death may be caused, if this requirement is ignored.
 Warning	Human injury or equipment damage may be caused, if this requirement is ignored.
 Attention	Equipment damage, loss of data or poor performance may be caused, if this requirement is ignored.

Safety Instruction

 Danger	◆ Performed only by commissioning engineers. ◆ This UPS is designed for commercial and industrial applications only, and is not intended for any use in life-support devices or system.
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 Warning	◆ Read all the warning labels carefully before operation, follow the instructions.
	◆ When UPS is running, do not touch the surface with this label, to avoid scald.
	◆ ESD sensitive components inside the UPS, anti-ESD measure should be taken before handling.

Move & Installation

 Danger	◆ Keep the equipment away from heat source or air outlets. ◆ Use dry powder extinguisher only, liquid extinguisher can result in electric shock.
 Warning	◆ Do not install the UPS on flammable materials and avoid close contact or adhesion of flammable materials by the UPS. ◆ Please connect the brake options (brake resistance, brake unit or feedback unit) according to the wiring diagram. ◆ Do not start the system if any damage or abnormal parts founded. ◆ Do not contact UPS with wet material, hands to avoid electric shock.
 Attention	◆ Use proper facilities to handle and install the UPS. Shielding shoes, protective clothes and other protective facilities are necessary to avoid injury. ◆ During positioning, keep the UPS way from shock or vibration. ◆ Install the UPS in proper environment. ◆ Avoid screws, cables, and other conductive objects from falling into the UPS.

Debug & Operate

	◆ Make sure the grounding cable is well connected before connecting the power cables, the grounding cable and neutral cable must be in accordance with the local and national codes practice. ◆ Before moving or re-connecting the cables, make sure to cut off all the input power sources, and wait for at least 10 minutes for internal discharge. Use a multi-meter to measure the voltage on terminals and ensure the voltage is lower than 36V before operation.
	◆ Do not disconnect and close the UPS input power frequently. ◆ The earth leakage current of load will be carried by RCCB or RCD. ◆ Initial check and inspection should be performed after long time storing of UPS.

Maintenance & Replacement

	◆ All the equipment maintenance and servicing procedures involving internal access need special tools and should be carried out only by trained personnel. The components that can only be accessed by opening the protective cover with tools cannot be maintained by user. ◆ This UPS full complies with “IEC62040-1-1-General and safety requirements for use in operator access area UPS” . Dangerous voltages are present within the battery box. However, the risk of contact with these high voltages is minimized for non-service personnel. Since the component with dangerous voltage can only be touched by opening the protective cover with a tool, the possibility of touching high voltage component is minimized. No risk exists to any personnel when operating the equipment in the normal manner, following the recommended operating procedures in this manual.
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- ◆ Please tighten the screws with appropriate torque.
- ◆ When maintaining and replacing components, UPS and components must be avoided from contacting or accompanying flammable materials.
- ◆ In the process of maintenance and component replacement, anti-static measures must be taken for UPS and internal devices.

Battery Safety



- ◆ All the battery maintenance and servicing procedures involving internal access need special tools or keys and should be carried out only by trained personnel.
- ◆ When connected together The battery terminal voltage will exceed 400Vdc and is potentially lethal.
- ◆ Battery manufacturers supply details of the necessary precautions to be observed when working on, or in the vicinity of, a large bank of battery cells. These precautions should be followed implicitly at all times. Particular attention should be paid to the recommendations concerning local environmental conditions and the provision of protective clothing, first aid and fire fighting facilities.
- ◆ The life of the battery shortens with the increase of ambient temperature. Replacing the battery regularly ensures that the UPS is working properly and guarantees sufficient backup time.
- ◆ Replace the batteries only with the same type and the same number, or it may cause explosion or poor performance.
- ◆ When connecting the battery, the voltage at the battery end will exceed the dangerous voltage of 400Vdc, in order to avoid electric shock and injury, please observe the following warnings when replacing the battery:
 - Eye protection should be worn to prevent injury from electrical arcs;
 - Remove the finger ring, watch, necklace, bracelet, any other metal jewelry;
 - Use insulated tools;
 - Wear protective overalls and rubber gloves;
 - Do not place metal tools or similar metal parts on the battery;
 - Disconnect the load before removing the battery

	connection terminal. ● Please do not expose the battery to fire, causing an explosion on one side, endangering personal safety; ● Please do not short-circuit the positive and negative poles of the battery, which will cause electric shock or fire. ● If electrolyte comes into contact with the skin, the affected area should be washed immediately with water.
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Disposal

 Warning	◆ The components in the UPS contain heavy metals, and the UPS must be treated as industrial waste after disposal.
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Symbol Description

Symbol	Description
 Note	◆ Indicates a supplement or emphasis on the main text.

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1. Product structure

1.1 Product appearance

The DT33030CS appearances are shown in Fig 1-1 and Fig 1-2



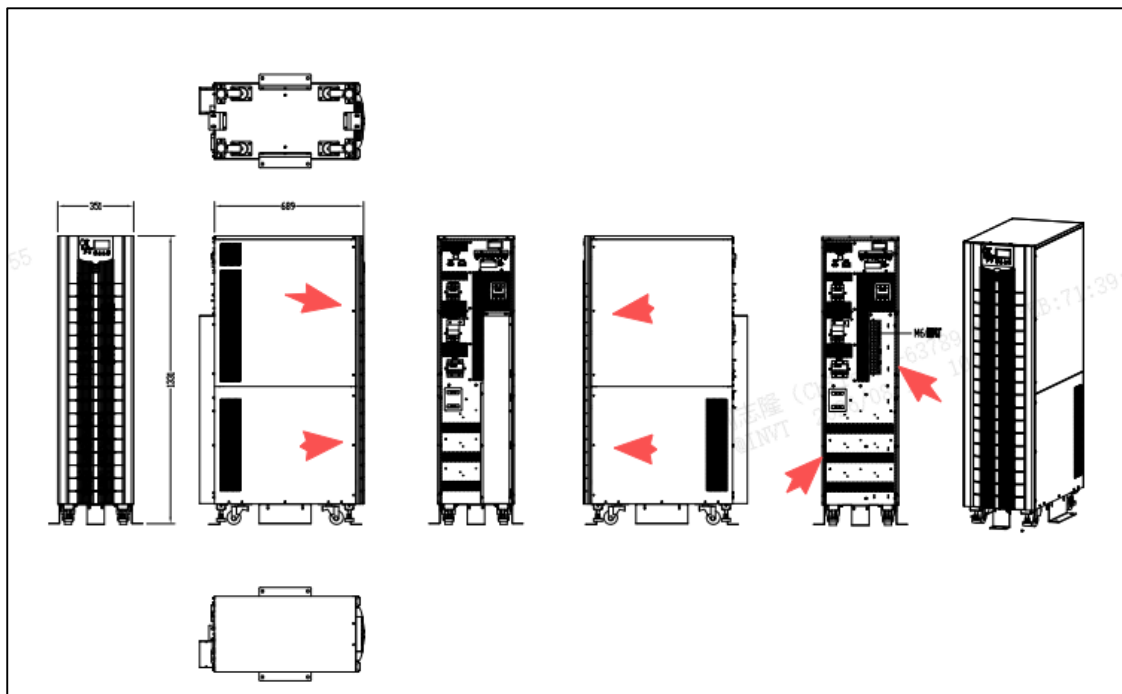
Fig 1-1: Front View



Fig 1-2: Rear View

1.2 Disassembly

Remove side screws



1.3 Inner Structure

The DT33030CS consisting of follow parts: input power board, rectifier control board, rectifier PFC power board, inverter power board inverter control board and output power board. The DT33030CS right half part and left half part are shown in Fig 1-3 and Fig 1-4.

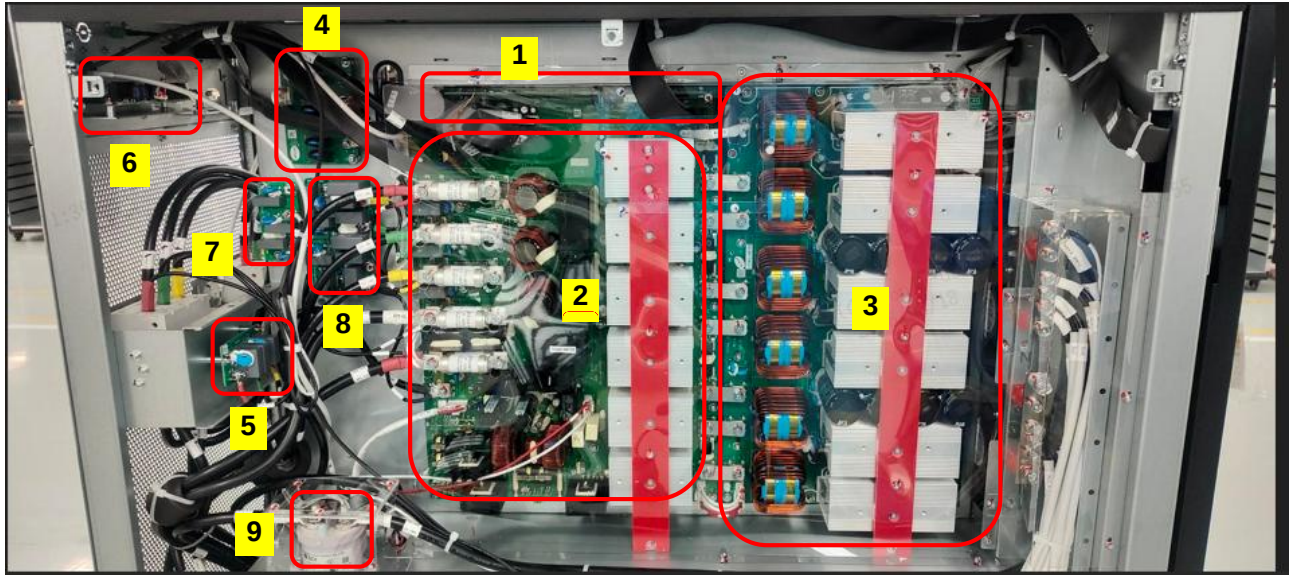


Fig 1-3: left half part

- | | |
|---|----------------------------|
| 1. Rectifier control board | 6. Dry node board |
| 2. Input power board | 7. 3-way Y capacitor board |
| 3. Rectifier PFC power board | 8. 4-channel EMI board |
| 4. Surge Input / Lightning Protection Board | 9. Battery contactor |
| 5. 3-phase Y capacitor board | |

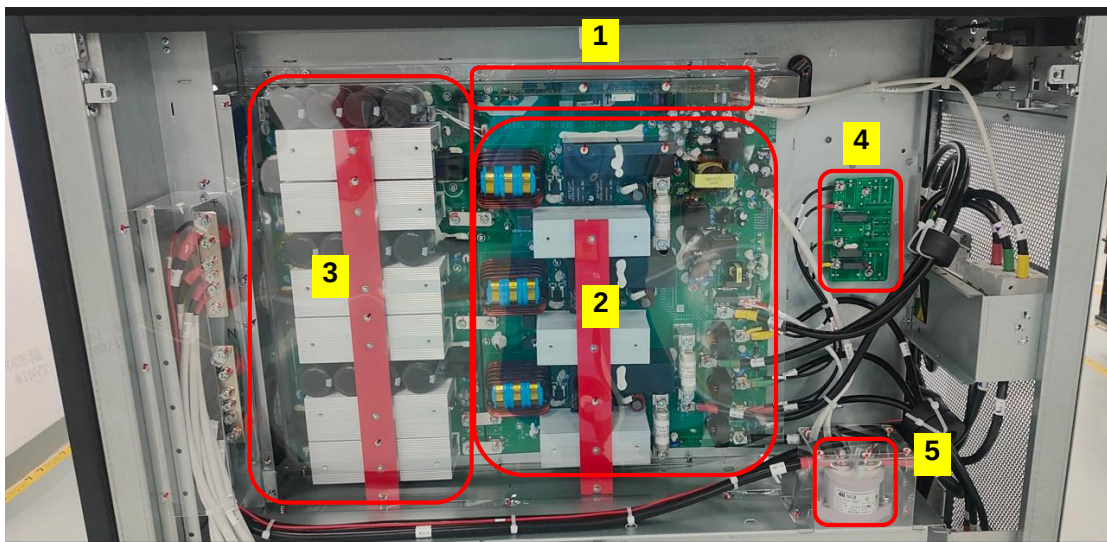


Fig 1-4: right half part

- | | |
|---------------------------|------------------------|
| 1. Inverter control board | 4. 4-channel EMI board |
| 2. Output power board | 5. Battery contactor |
| 3. Inverter power board | |

2. UPS Topology and Operational principle

2.1 Topology

The UPS system diagram and UPS topology are shown in Fig 2-1 Fig 2-2 .

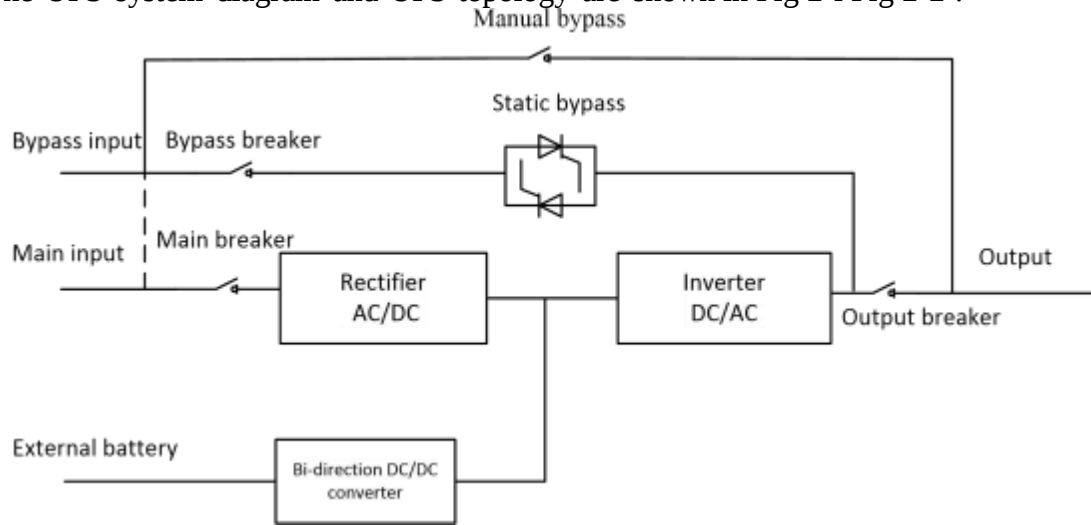


Fig 2-1: UPS system diagram

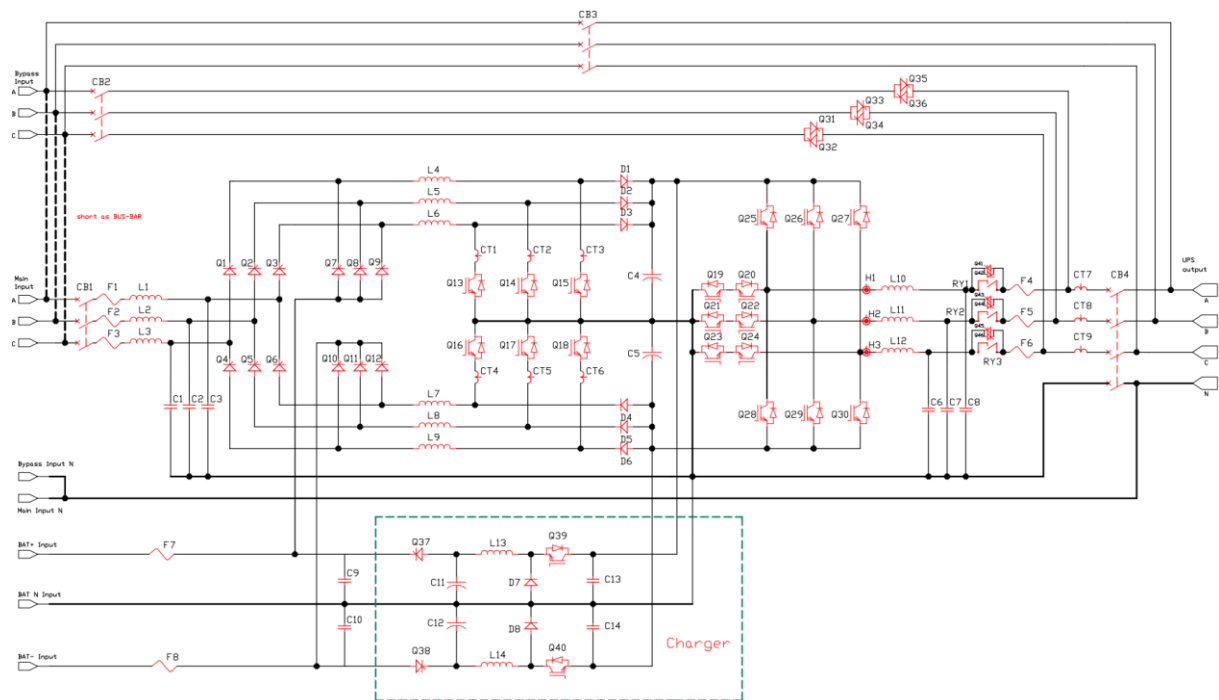


Fig 2-2: UPS topology

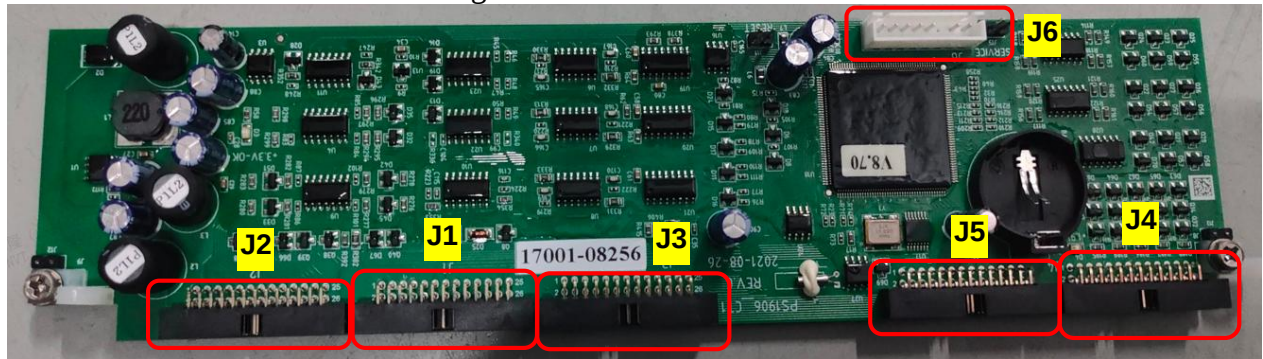
3. Components introduction and Service

3.1 Rectifier Control Board

3.1.1 The detailed introduction of rectifier control board

The detailed introduction of rectifier control board is shown in Fig 3-1:

Fig 3-1 Rectifier control board 17001-08256



J4: Rectifier IGBT driver port

J3: Bat PFC current Bus Bat voltage
detect port

J5: Display and indicator light signals
port

J6: Data writing and downloading ports

J1: Power supply, paralleling signal port

J2: SCI_A Communication port Input voltage
detect port

3.2 Input power board

3.2.1 The detailed introduction of input power board

The detailed introduction of input power board (17001-06139) is shown in Fig 3-2 ,Fig 3-3 and Fig 3-4:

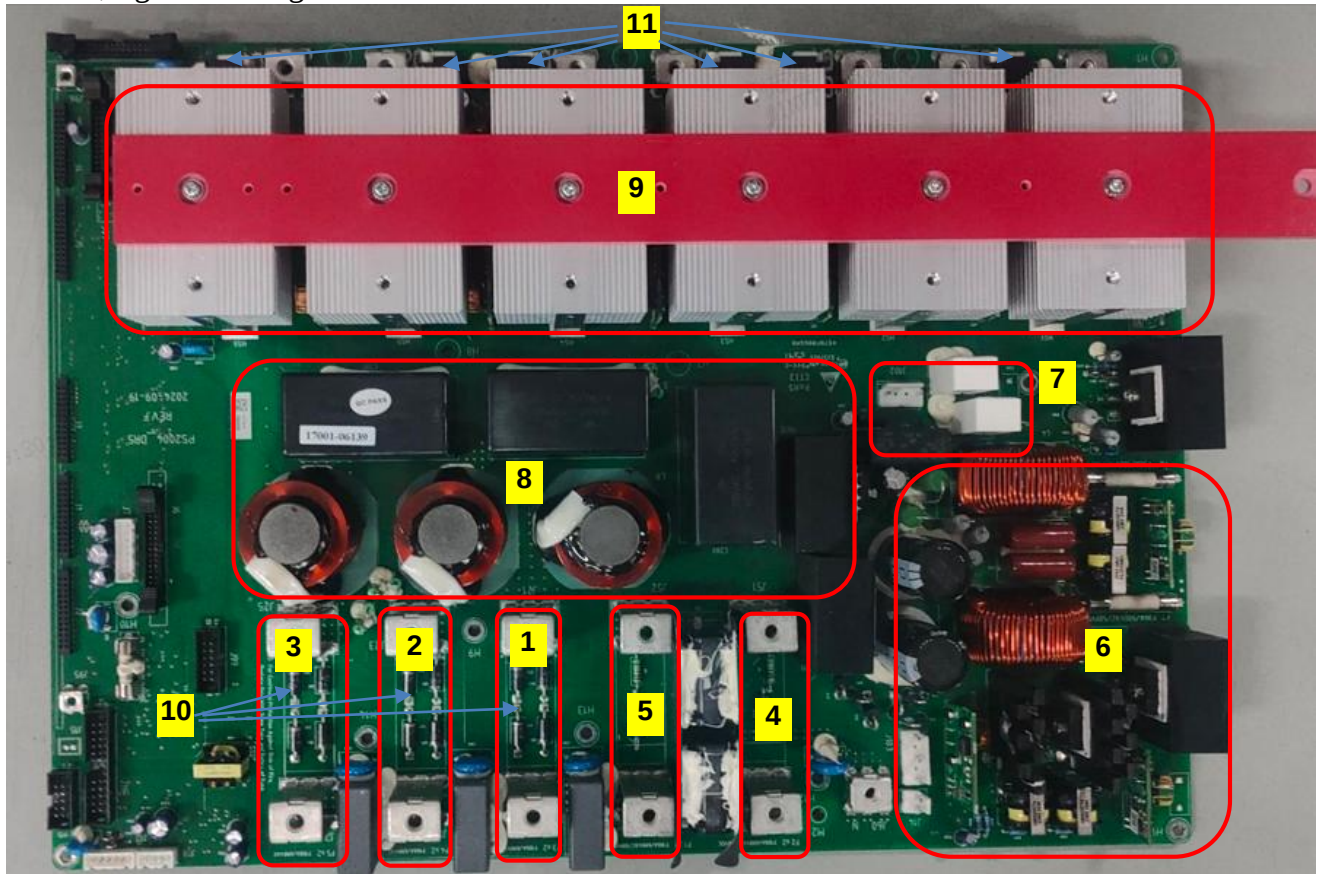


Fig 3-2: Input power board front view

- | | |
|---------------------------------|---------------------------|
| 1: F3, Main input A phase fuses | 7: Battery cold start |
| 2: F5, Main input B phase fuses | 8: input filter |
| 3: F4, Main input C phase fuses | 9: Input & Battery SCR |
| 4: F2, Battery + fuses | 10: VCC_COMM Power Supply |
| 5: F1, Battery - fuses | 11: PFC Hall |
| 6: Charger | |

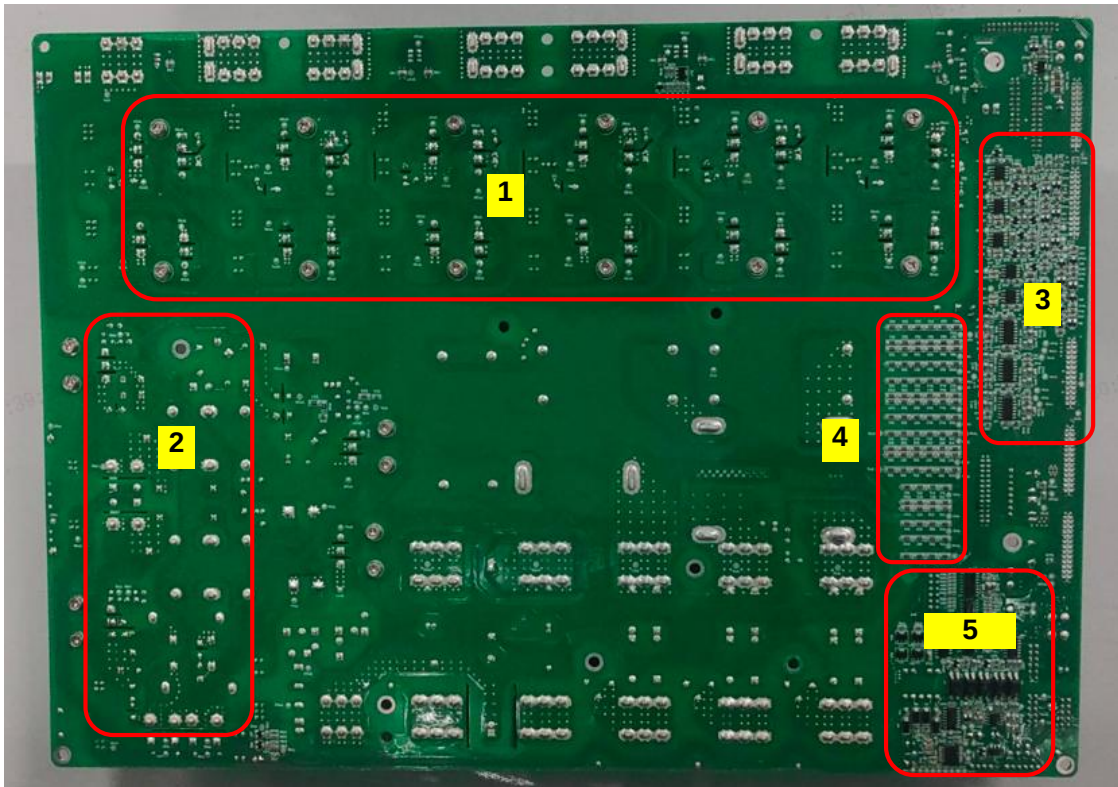


Fig 3-3: Input power board back view

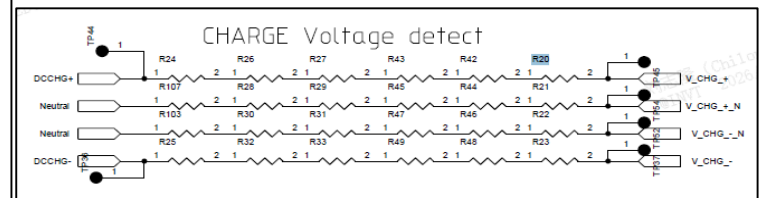
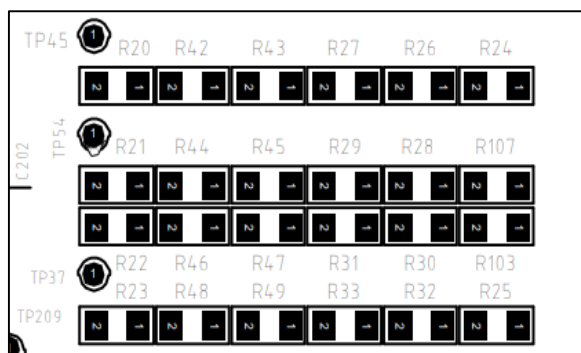
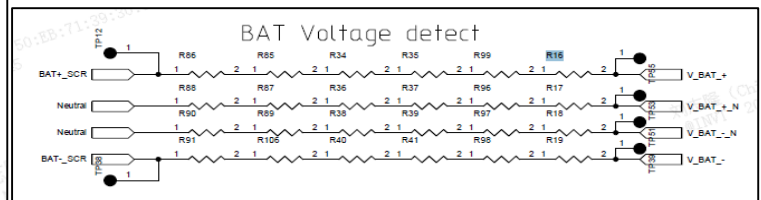
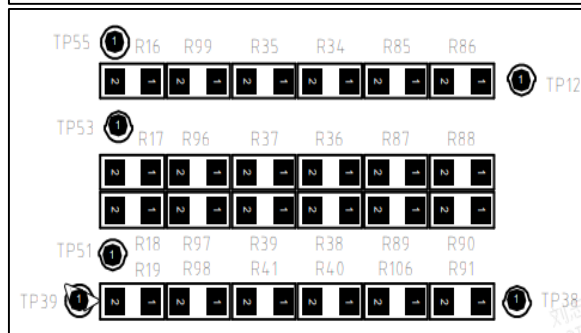
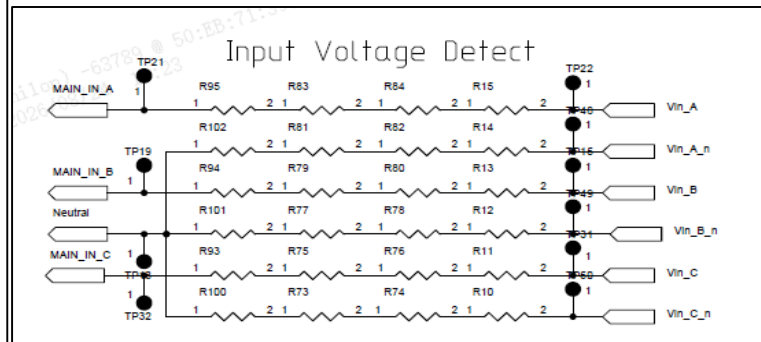
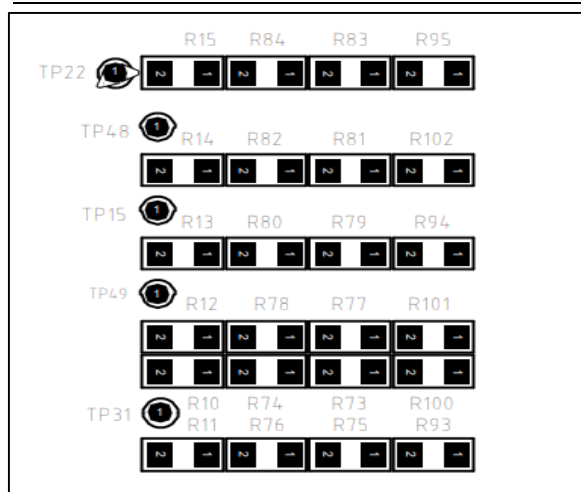
1: Input & Battery SCR

2: Charger

3: SCR driver , PFC CURRENT PROTECT CORRECT COEFFICIENT

4: Voltage detect

5: RS232 , RS485 &USB COMMUNIATION



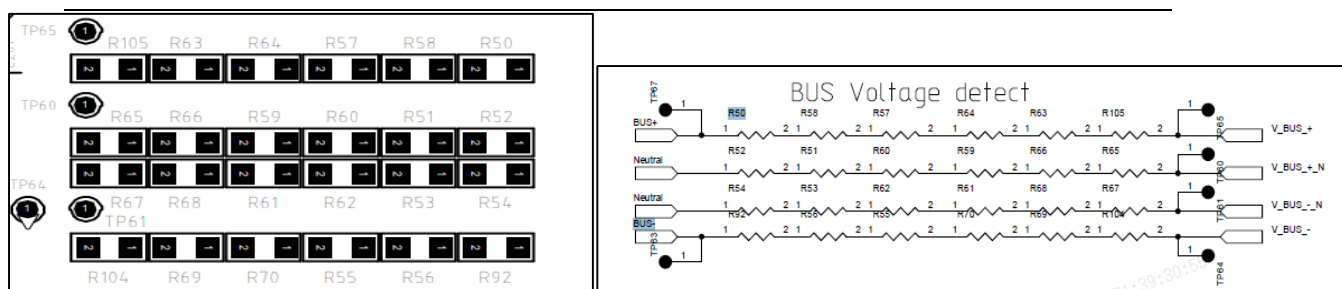
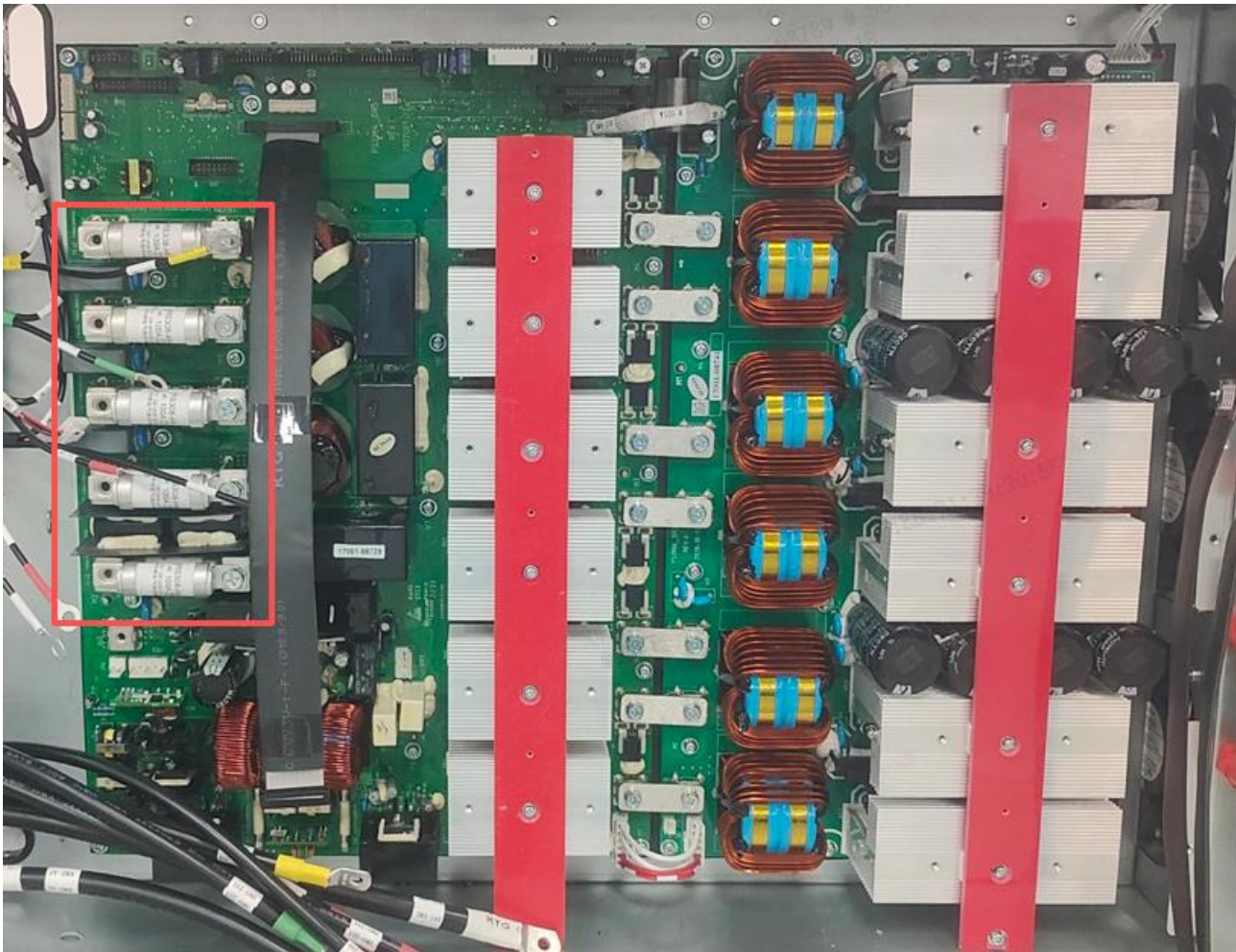


Fig 3-4: Voltage detect circuit

3.2.2 Detection of the main input Battery fuses



Test Input Phase A B C Battery Fuses; the circuit shall conduct.

Fig 3-5: Input and Battery fuses check points

No.	Description	Type	Checked components	Probe	Probe	Meter stall	Normal	Abnormal
1	Main input A	FUSE	F1	J2	J24	/	short	Open
2	Main input B	FUSE	F2	J3	J26	/	short	Open
3	Main input C	FUSE	F3	J4	J28	/	short	Open
4	Battery +	FUSE	F4, F6	J8	J29	/	short	Open
5	Battery -	FUSE	F5,F7	J10	J31	/	short	Open

The main purpose is to check whether these fuses are normal, as shown in the red boxes in the following picture.

3.2.3 Measure the continuity from the input fuse, battery fuse to the SCR output

test the continuity between the input fuse and the inductor.

Test the conduction between phase A of the input fuse and the positive and negative terminals of the inductor.

Resistance is infinite.

Then, test the conduction between phase B of the input fuse and the positive and negative terminals of the inductor.

Resistance is infinite.

Next, test the conduction between phase C of the input fuse and the positive and negative terminals of the inductor.

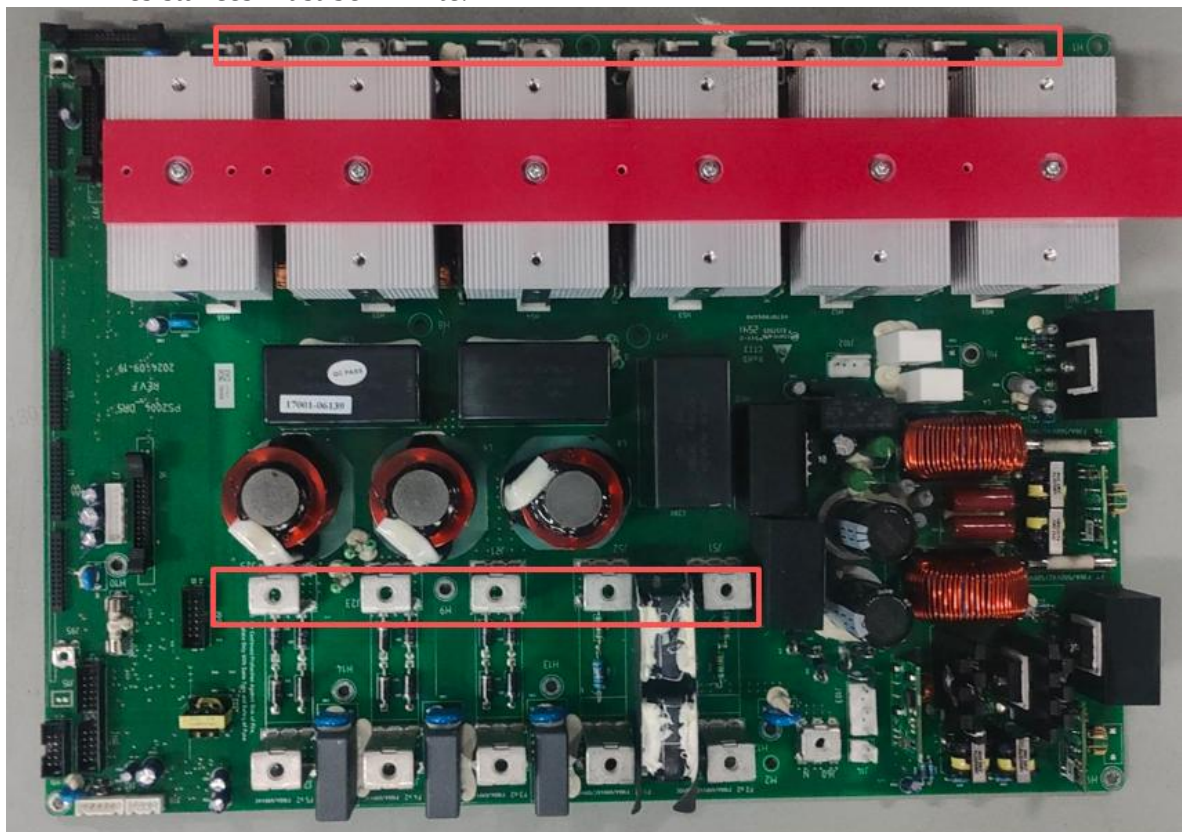
Resistance is infinite.

Finally, test the conduction between the positive terminal of the input battery fuse and the positive and negative terminals of the three-phase inductor.

All resistances must be infinite.

Last, test the conduction between the negative terminal of the input battery fuse and the positive and negative terminals of the three-phase inductor.

All resistances must be infinite.



The main purpose is to check whether these input SCRs are functioning properly, as shown in the red box in the following figure.

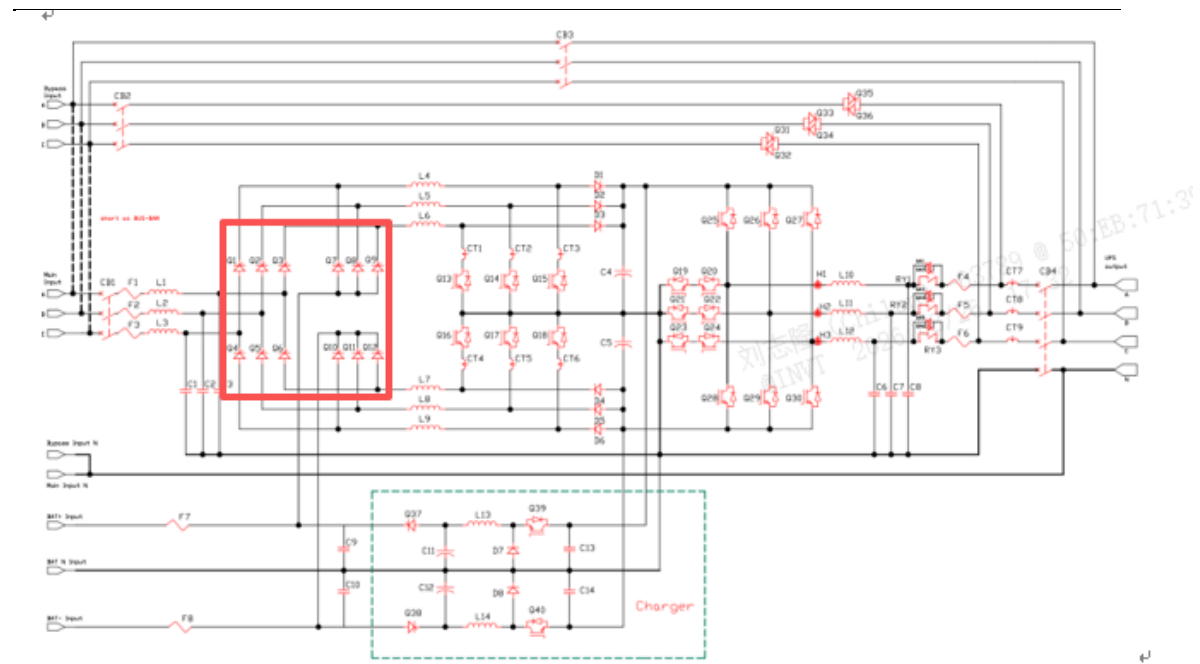


Fig 3-6: Input relay check points

No.	Description	Type	Checked components	Probe	Probe	Meter stall	Normal	Abnormal
1	AC Rectifier A phase	SCR	Q3,Q5	J21	J58,J53	/	Open	Short
2	AC Rectifier B phase	SCR	Q1,Q2	J23	J57,J54	/	Open	Short
3	AC Rectifier C phase	SCR	Q6,Q4	J25	J56, J55	/	Open	Short
4	Battery+ Rectifier	SCR	Q12,Q7,Q9	J51	J53,J54 ,J55	/	Open	Short
5	battery - Rectifier	SCR	Q10,Q8,Q11	J52	J58,J57 ,J56	/	Open	Short

3.2.4 Measure the continuity of the charger fuses and IGBTs

Test the continuity of the conduction of the IGBT in the charger Test whether the IGBT in the charger is working properly Place the black probe on the second pin of the IGBT Place the red probe on the third pin of the IGBT The reading on the multimeter should be approximately $0.3V \pm 0.1V$ Then place the red probe on the first pin of the IGBT The reading on the multimeter should be infinity The testing method for another IGBT is the same as the above steps check points are shown in Fig 3-7.

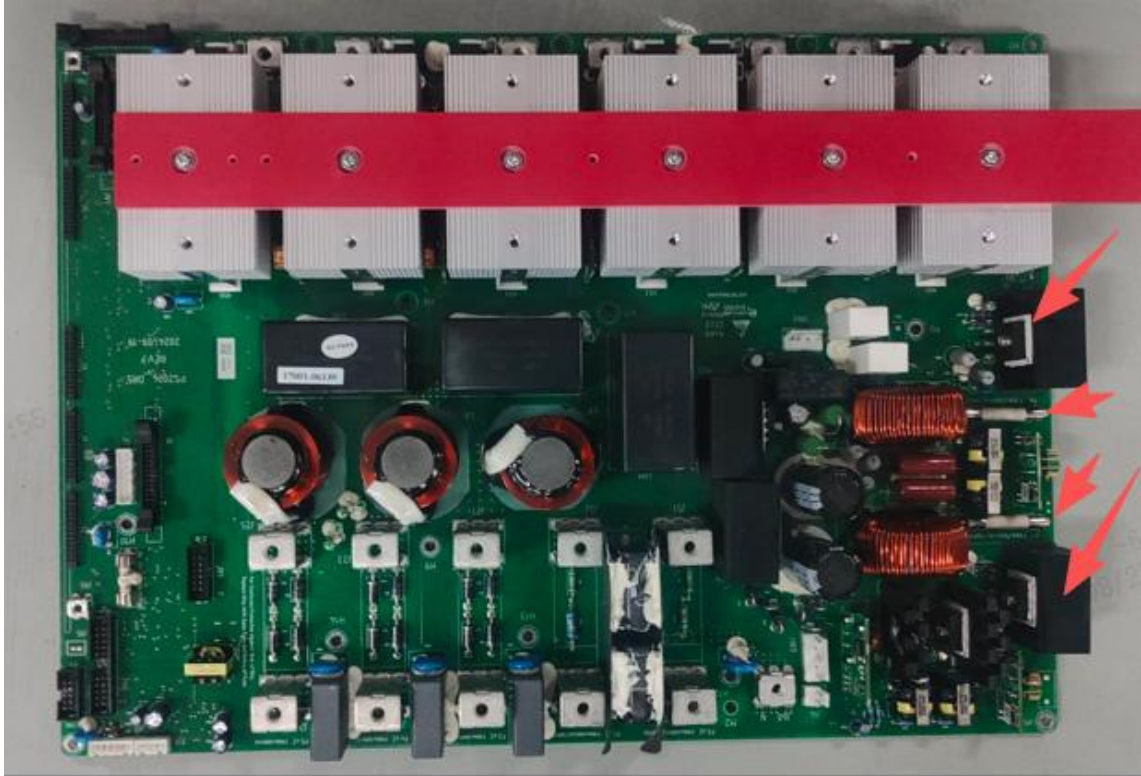


Fig 3-7

The main purpose is to check whether these charger fuses and IGBTs are functioning properly, as shown in the red box in the following picture.

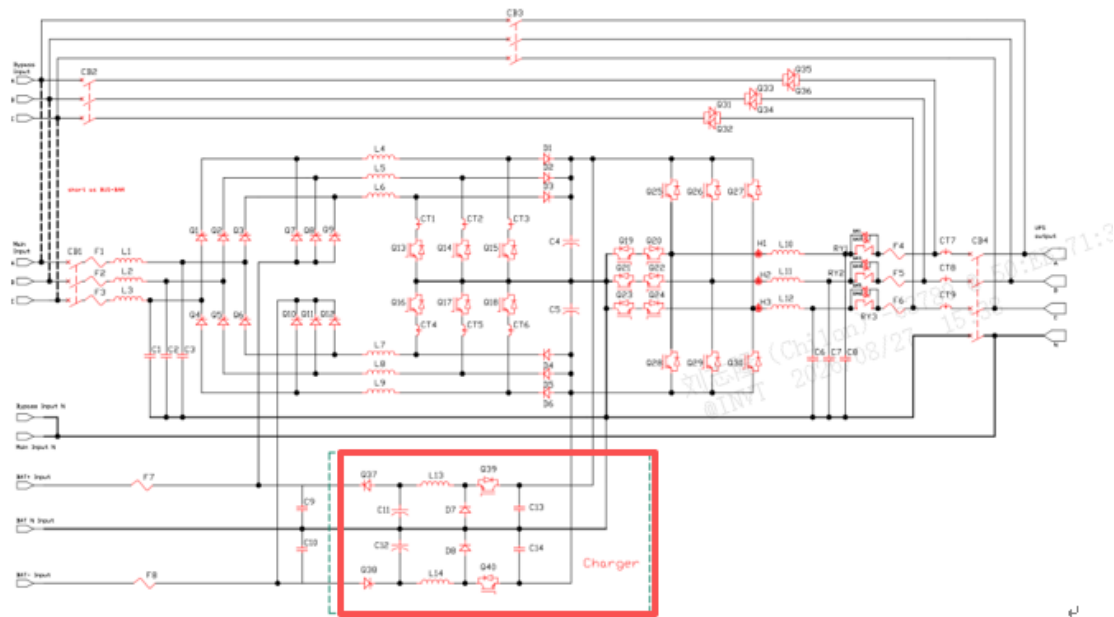


Fig 3-7: charger check points

No.	Description	Type	Checked components	Red Probe	Black Probe	Meter stall	Normal	Abnormal
1	charger fuses +	FUSE	F7	F7	F7	Ω	Short	Open
2	charger fuses -	FUSE	F8	F8	F8	Ω	Short	Open
3	charger IGBTs +	IGBT	Q27	The 3rd foot	The 2nd foot	V	0.3V $\pm 0.1V$	/
4	charger IGBTs -	IGBT	Q28	The 3rd foot	The 2nd foot	V	0.3V $\pm 0.1V$	/

3.3 Rectifier PFC Board (17001-06141)

3.3.1 The detailed introduction of rectifier PFC board

The detailed introduction of rectifier PFC board is shown in Fig 3-9:

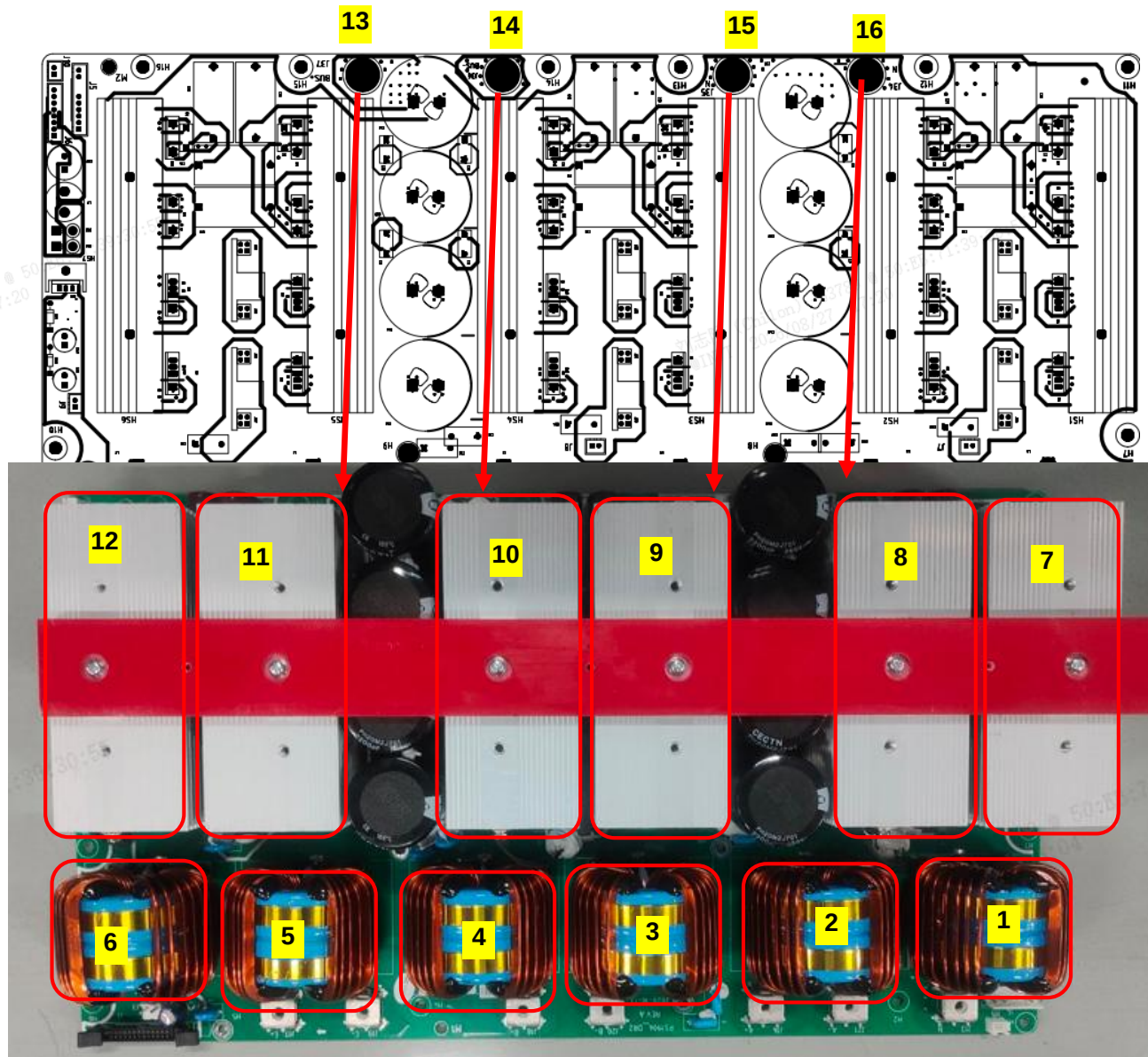


Fig3-9: Rectifier PFC board

1. L6: PFC A- inductance
2. L4: PFC A+ inductance
3. L5: PFC B- inductance
4. L3: PFC B+ inductance
5. L1: PFC C- inductance
6. L2: PFC C+ inductance

7. PFC A- IGBT diode
8. PFC A+ IGBT diode
9. PFC B- IGBT diode
10. PFC B+ IGBT diode
11. PFC C- IGBT diode
12. PFC C+ IGBT diode

13. J37 BUS+

14. J36 BUS-

15. J34 BUS-N

16. J35 BUS-N

3.3.2 Measure the quality of the rectifier IGBT

Test the quality of the rectifier IGBT

Connect the red probe to the negative bus terminal

Connect the black probe to the negative terminal of the rectifier A inductor

The reading on the multimeter should be approximately $0.3V \pm 0.1V$

Connect the black probe to the positive bus terminal

Connect the red probe to the positive terminal of the rectifier A inductor

The reading on the multimeter should be approximately $0.3V \pm 0.1V$

Connect the black probe to the N terminal of the bus

Connect the red probe to the positive terminal of the rectifier A inductor terminal

The reading on the multimeter should be approximately infinity

Connect the red probe of the multimeter to the N terminal of the bus bar

Connect the black probe to the negative terminal of the rectifier A inductor

The reading on the multimeter should be approximately infinity

Connect the black probe of the multimeter to the N terminal of the bus bar

Connect the red probe to the negative terminal of the rectifier A inductor

The reading on the multimeter should be approximately $0.3V \pm 0.1V$

Connect the red probe of the multimeter to the N terminal of the bus bar

Connect the black probe to the positive terminal of the rectifier A inductor

The reading on the multimeter should be approximately $0.3V \pm 0.1V$

The above six steps are used to test the rectifier boards A, B and C respectively.

If the test results are normal, then proceed to the next step.

If there are any abnormalities, it indicates a fault and the corresponding rectifier board needs to be replaced.

The main purpose is to check whether these rectifier IGBTs are functioning properly, as shown in the red box in the following figure. check points are shown in Fig 3-10.

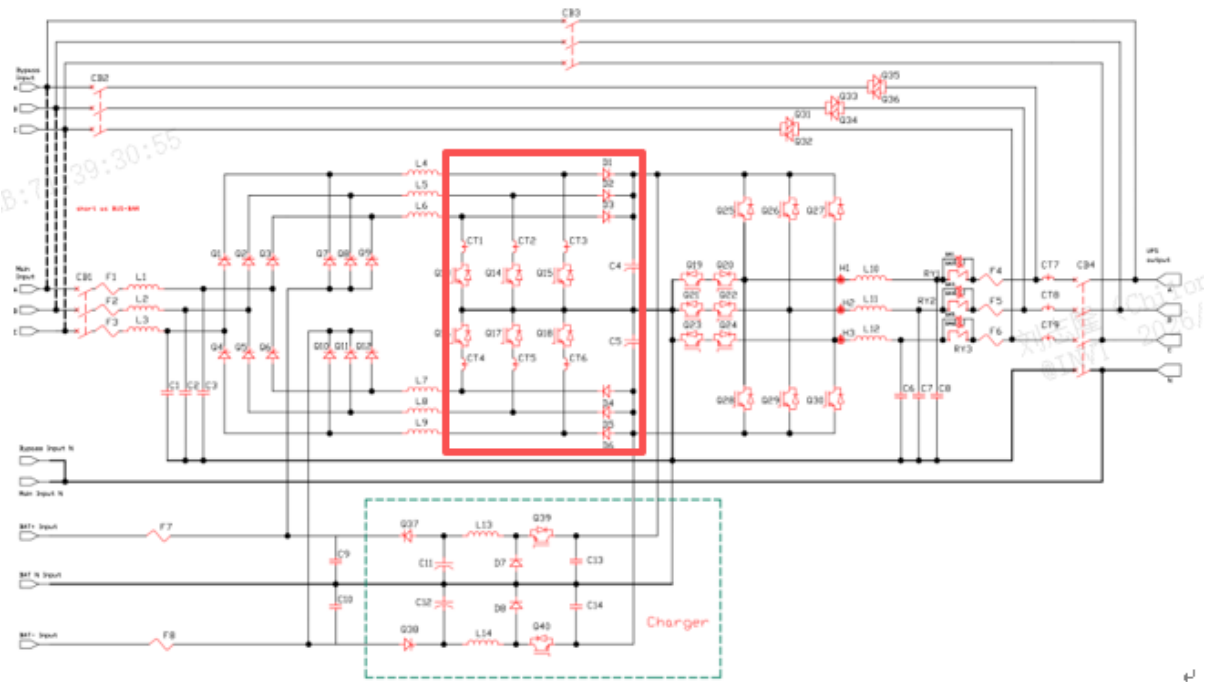


Fig 3- 10: Rectifier PFC board diodes check points

No.	Description	Type	Checked components	Red Probe	Black Probe	Meter stall	Normal
1	PFC A+	Diode	D2,D8	J16	J37 Bus+	V	0.30-0.40
2		IGBT	Q1,Q2	J34,Bus-N	J16	V	0.30-0.40
3	PFC A-	Diode	D1,D7	J36 Bus-	J21	V	0.30-0.40
4		IGBT	Q4,Q6	J21	J34,Bus-N	V	0.30-0.40
5	PFC B+	Diode	D6,D12	J18	J37 Bus+	V	0.30-0.40
6		IGBT	Q12,Q10	J34,Bus-N -	J18	V	0.30-0.40
7	PFC B-	Diode	D5,D11	J36 Bus-	J20	V	0.30-0.40
8		IGBT	Q3,Q5	J20	J34,Bus-N -	V	0.30-0.40
9	PFC C+	Diode	D4,D10	J17	J37 Bus+	V	0.30-0.40
10		IGBT	Q8,Q11	J34,Bus-N -	J17	V	0.30-0.40
11	PFC C-	Diode	D3,D9	J36 Bus-	J19	V	0.30-0.40
12		IGBT	Q7,Q9	J19	J34,Bus-N -	V	0.30-0.40

3.4 Inverter Control Board 17001-05835

3.4.1 The detailed introduction of inverter control board

The detailed introduction of inverter control board is shown in Fig 3-14:

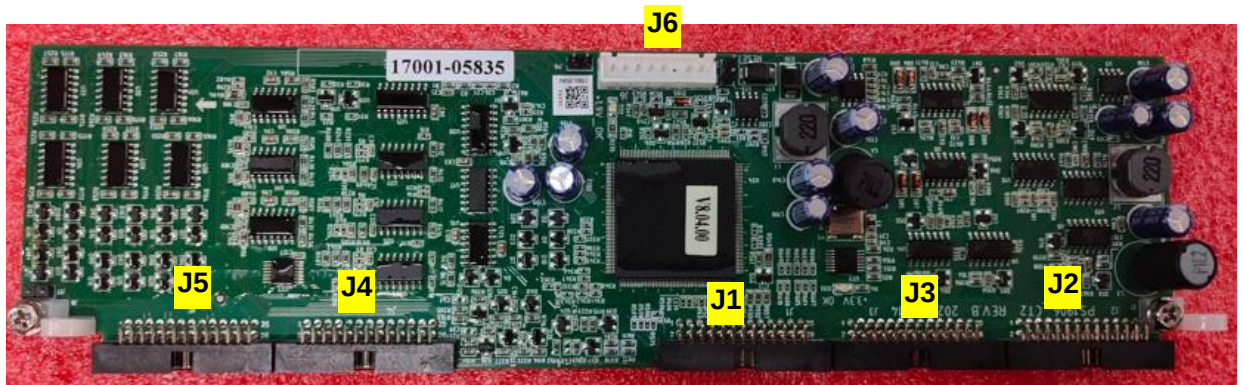


Fig 3-14: Inverter control board

J6: SCI_A Communication port
J3: INV, BUS-t voltage detect port
J2: Output voltage detect port

J4: Signal bus port
J1: Inverter current detect port
J5: Inverter IGBT driver port

3.5 Inverter Power Board 17001-06373

3.5.1 The detailed introduction of inverter power board

The detailed introduction of inverter power board is shown in Fig 3-15:

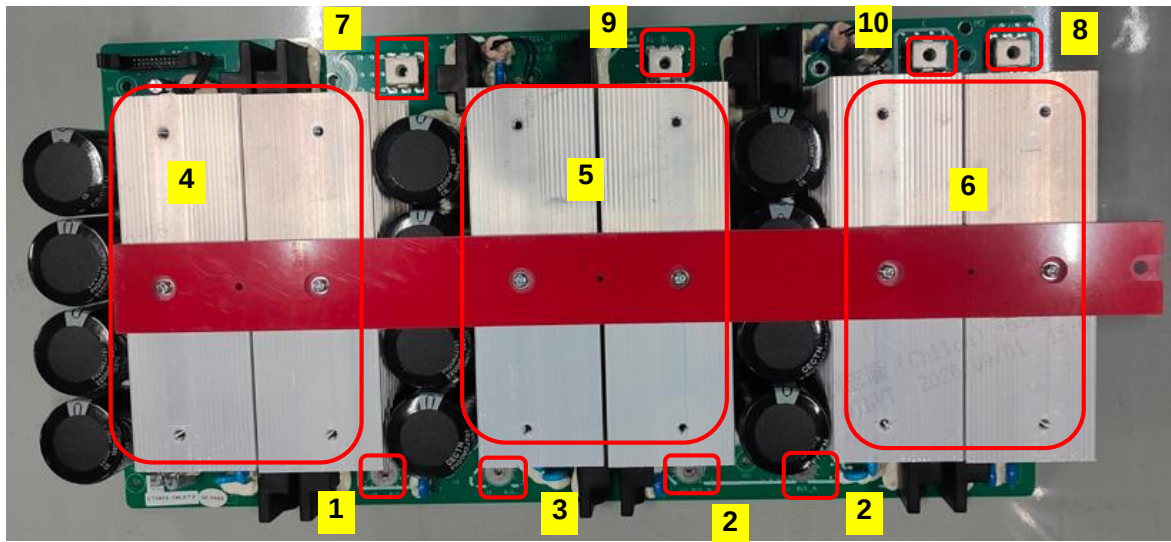


Fig 3-15: Inverter power board

- | | |
|---------------|---------------|
| 1. J38 BUS+ | 6. INV_C IGBT |
| 2. J40, J41 N | 7. J5, INV_A |
| 3. J39 BUS- | 8. J3 N |
| 4. INV_A IGBT | 9. J4 INV_B |
| 5. INV_B IGBT | 10. J7, INV_C |

3.5.2 Detection of inverter power board IGBT

Test Inverter IGBT Performance

Take Phase A inverter inductor as test object:

1. Connect red probe to negative bus terminal, black probe to terminal of Phase A inverter inductor. Multimeter reading shall be approx. $0.3V \pm 0.1V$.
2. Connect black probe to positive bus terminal, red probe to terminal of Phase A inverter inductor. Multimeter reading shall be approx. $0.3V \pm 0.1V$.
3. Connect black probe to N terminal of bus bar, red probe to terminal of Phase A inverter inductor. Multimeter shows infinite resistance.
4. Connect red probe to N terminal of bus bar, black probe to terminal of Phase A inverter inductor. Multimeter shows infinite resistance.

Repeat above 4 groups of tests for Phase B and Phase C inverter boards separately.

Judgment Rule

If all readings are normal, finish static test.

If any abnormality appears, the corresponding inverter board is faulty and needs replacement.

Test Purpose

Verify inverter IGBTs work properly; test points are marked with red boxes on schematic. check points are shown in Fig 3-16

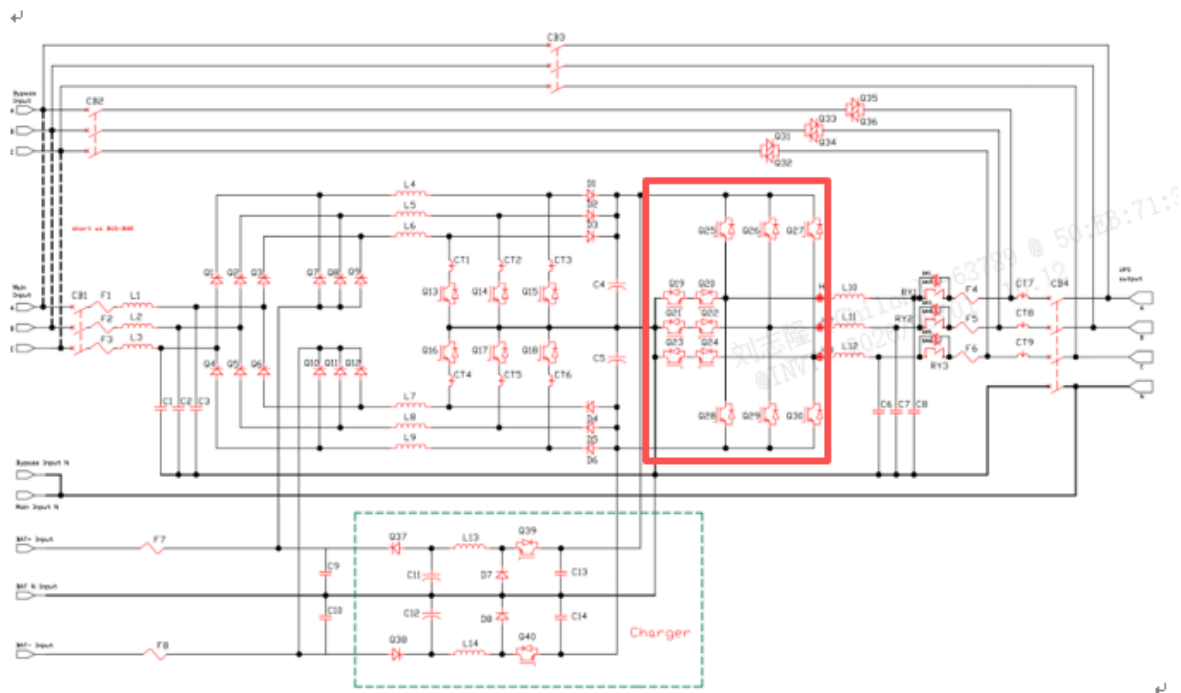


Fig 3- 16: inverter IGBT check points

No.	Description	Type	Checked components	Red Probe	Black Probe	Meter stall	Normal
1	Inverter A+ phase IGBT	IGBT	Q1, Q3	J5, INV_A	J38,BUS +	V	0.35-0.45
2	Inverter A- phase IGBT	IGBT	Q8,Q10	J39,BUS-	J5, INV_A	V	0.35-0.45
3	Inverter A - N phase IGBT	IGBT	Q4,Q5,Q6,Q7	J40, J41 N	J5, INV_A	V	∞
4	Inverter A - N phase IGBT	IGBT	Q4,Q5,Q6,Q7	J5, INV_A	J40, J41 N	V	∞
5	Inverter B+ phase IGBT	IGBT	Q11, Q13	J4 ,INV_B	J38,BUS +	V	0.35-0.45
6	Inverter B- phase IGBT	IGBT	Q18,Q20	J39,BUS-	J4 ,INV_B	V	0.35-0.45
7	Inverter B - N phase IGBT	IGBT	Q14,Q18	J40, J41 N	J4 ,INV_B	V	∞
8	Inverter B - N phase IGBT	IGBT	Q15,Q17	J4 ,INV_B	J40, J41 N	V	∞
9	Inverter C+ phase IGBT	IGBT	Q21, Q23	J7, INV_C	J38,BUS +	V	0.35-0.45
10	Inverter C- phase IGBT	IGBT	Q28,Q30	J39,BUS-	J7, INV_C	V	0.35-0.45
11	Inverter C - N phase IGBT	IGBT	Q24,Q26	J40, J41 N	J7, INV_C	V	∞
12	Inverter C - N phase IGBT	IGBT	Q25,Q27	J7, INV_C	J40, J41 N	V	∞

3.6 Output Power Board 17001-06140

3.6.1 The detailed introduction of output power board

The detailed introduction of output power board is shown in Fig 3-19 Fig 3-20 and Fig 3-21:

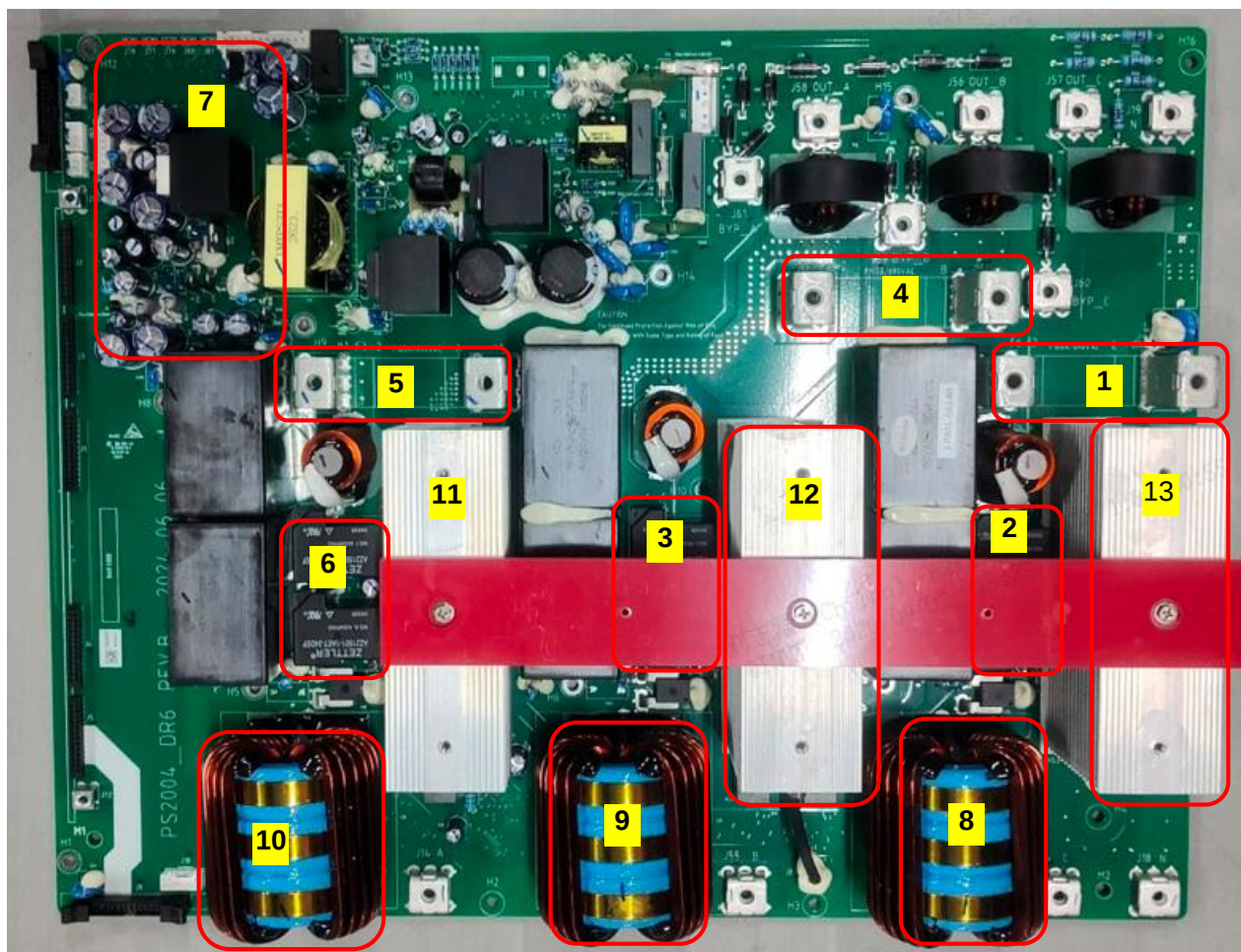


Fig 3-19: Output power board front view

- | | |
|-------------------------------------|--------------------------------------|
| 1. Output C phase fuse; | 6. RLY1 RLY2: Output A phase relay; |
| 2. RLY5 RLY6: Output C phase relay; | 7. Aux power circuit; |
| 3. RLY3 RLY4: Output B phase relay; | 8. L22: Inverter C phase inductance; |
| 4. Output B phase fuse; | 9. L21: Inverter B phase inductance; |
| 5. Output A phase fuse; | 10. L1: Inverter A phase inductance; |
| | 11, 12, 13. BYP A phase SCR |
| | BYB B phase SCR |
| | BYC C phase SCR |

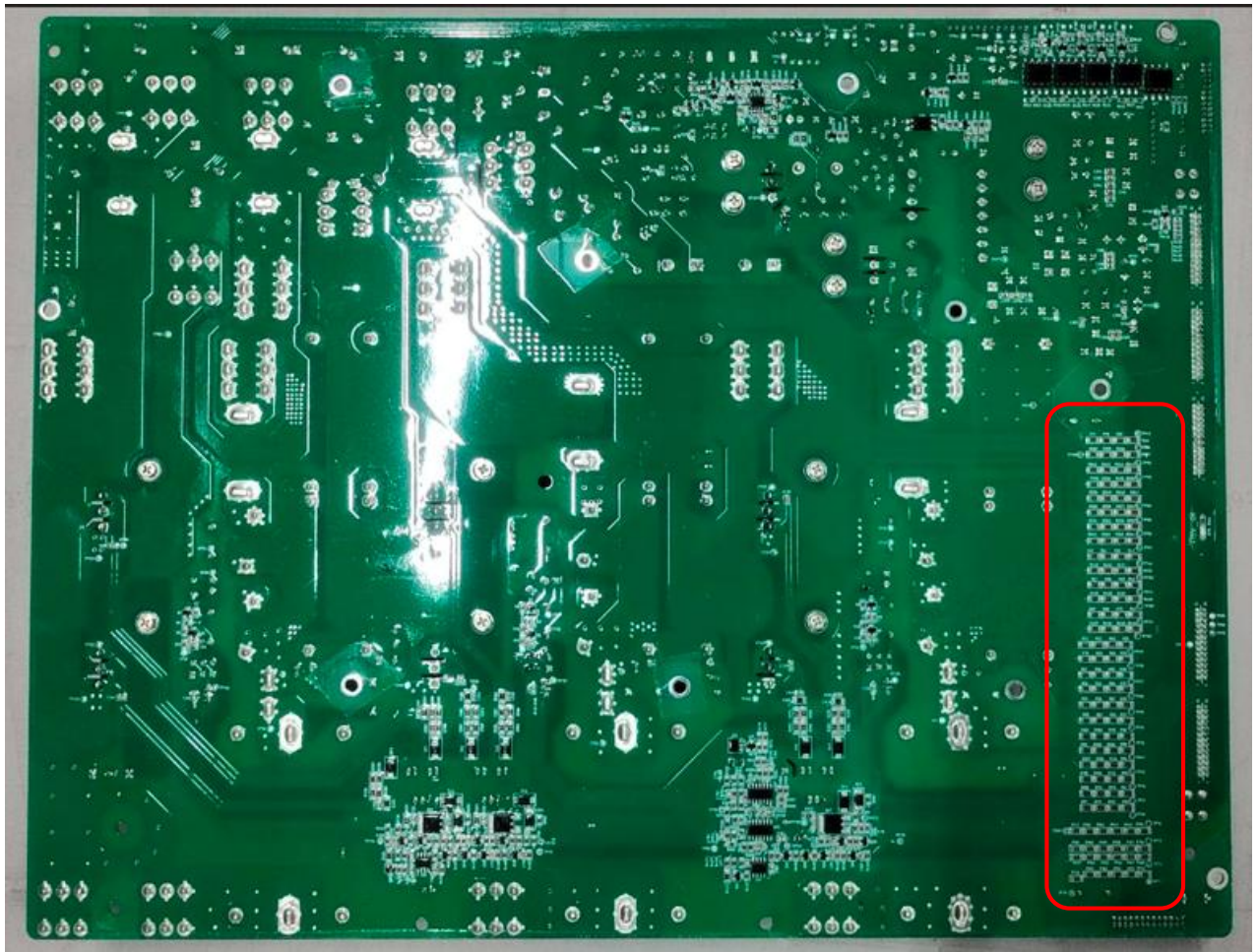


Fig 3-20: Output power board back view

3.6.2 Detection of output power board fuse

Prepare a multimeter ahead of time in order to detect the resistance of the fuses. Switch the multimeter to Resistance Channel, if the resistance is less than 0.07 ohm, it means the fuses with good condition. And if the resistance is infinite or no value, the fuses should be damaged.

The output power board fuses check points are shown in Fig 3-22.

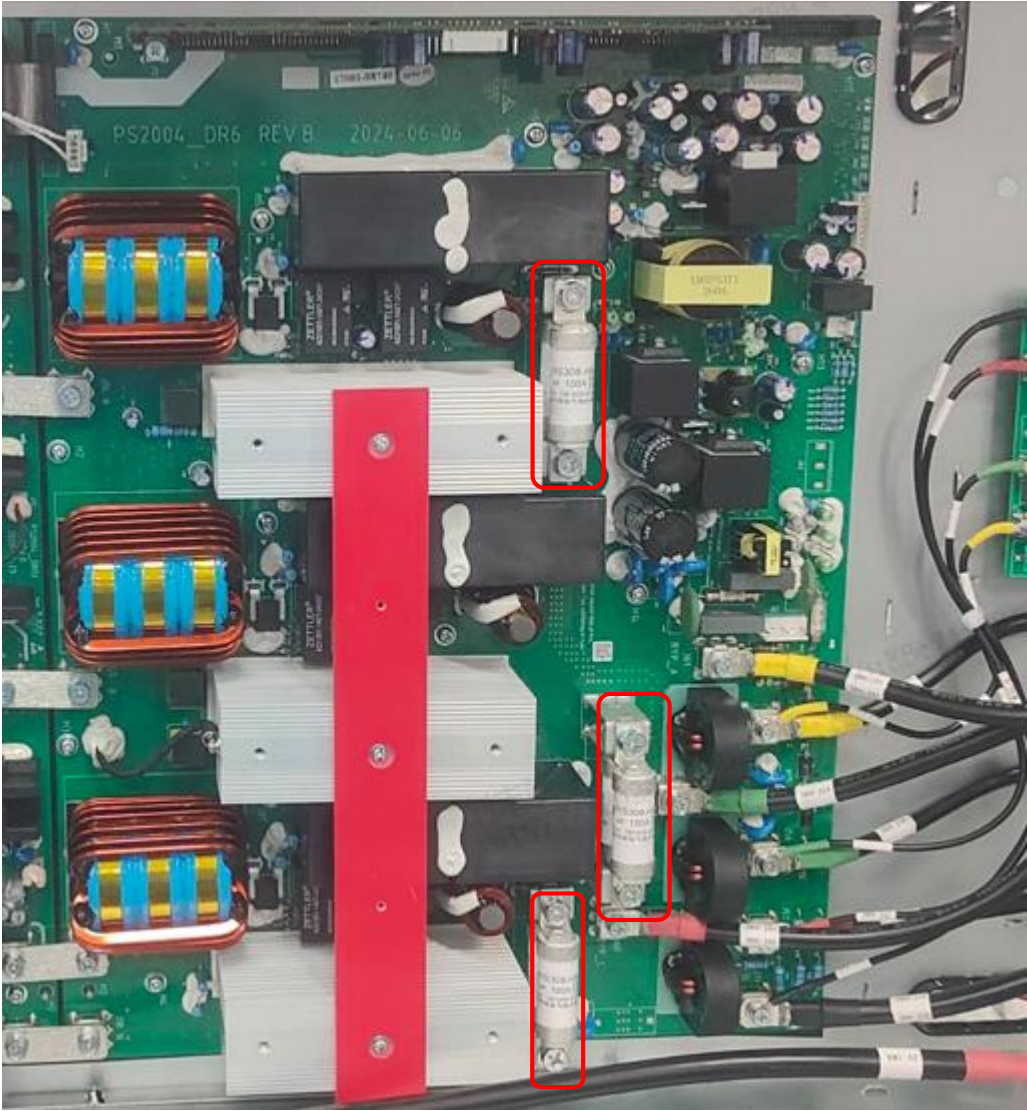


Fig 3-22: Output fuses check points

No.	Description	Type	Checked components	Probe	Probe	Meter stall	Normal	Abnormal
1	Output A	FUSE	F3	J47	J48	/	Short	Open
2	Output B	FUSE	F7	J53	J51	/	Short	Open
3	Output C	FUSE	F6	J52	J50	/	Short	Open

3.6.3 Detection of output power board relay

Measure Continuity from Output Terminals to Inverter Fuses

Test conductive path between output terminals and inverter fuses:

1. Place black probe on Phase A output fuse, red probe on Phase A output terminal for testing.

2. If open-circuited, proceed to next test; if conductive, replace the output relay.

Repeat the above test sequence for Phase B, C inverter fuses and corresponding output terminals.

The output relay check points are shown in Fig 3-23.

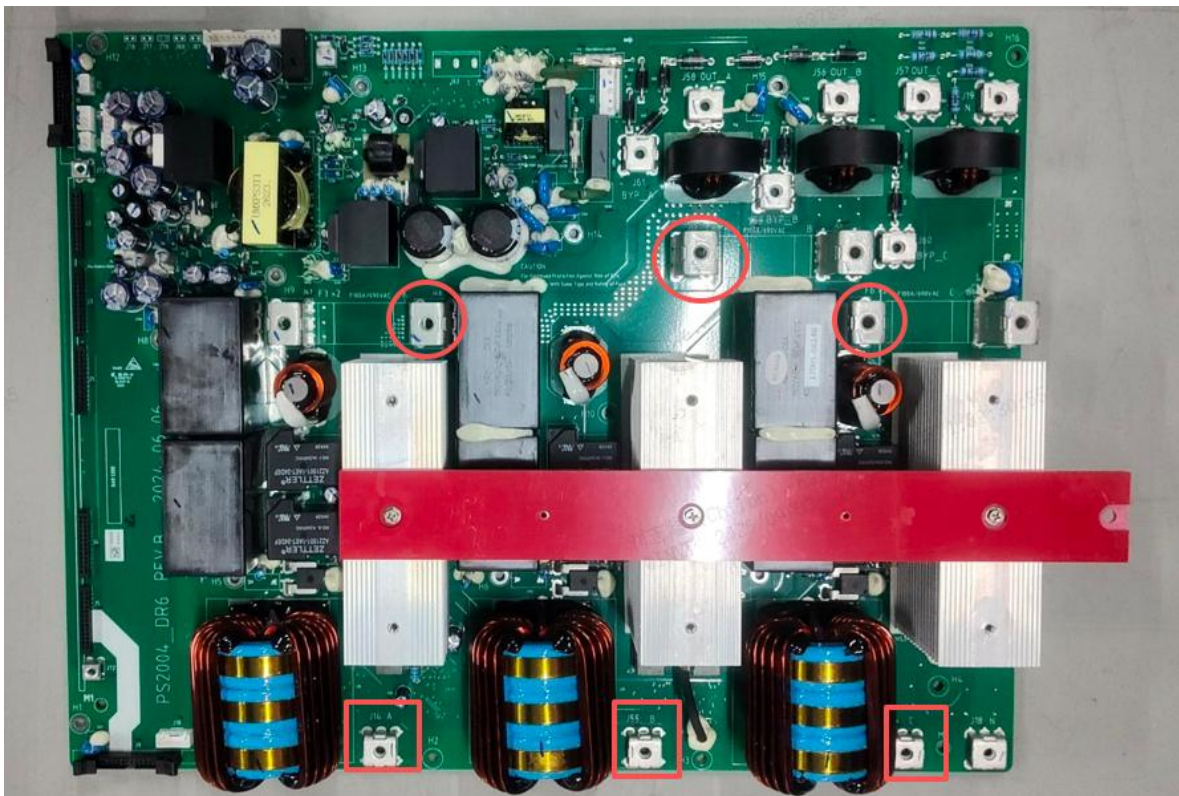
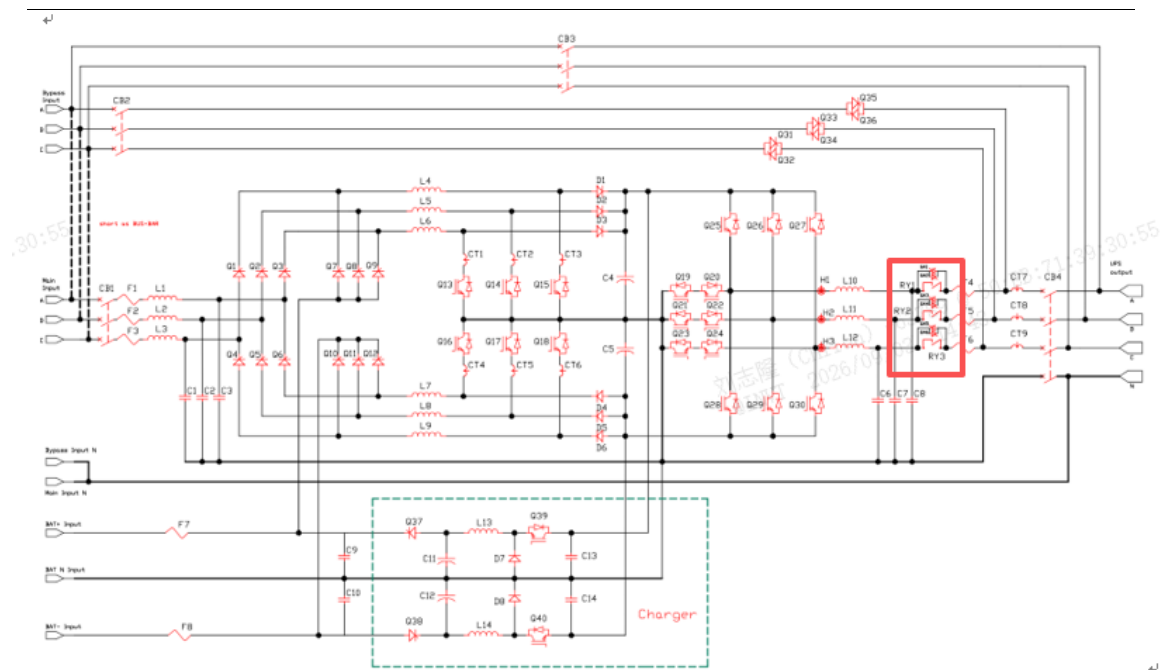


Fig 3-23: Output relay check points

No.	Description	Type	Checked components	Probe	Probe	Meter stall	Normal	Abnormal
1	Output A phase	Relay	RLY1, RLY2	J14	J47	/	Open	Short
2	Output B phase	Relay	RLY4, RLY3	J55	J53	/	Open	Short
3	Output C phase	Relay	RLY5, RLY6	J54	J52	/	Open	Short

Test Purpose

Check if output relays function normally; test points are marked with red boxes on schematic



3.6.4 Detection of output voltage detect resistances

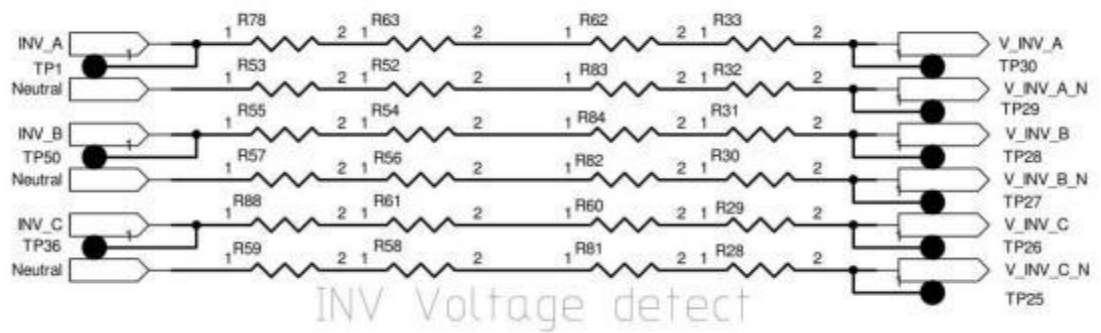
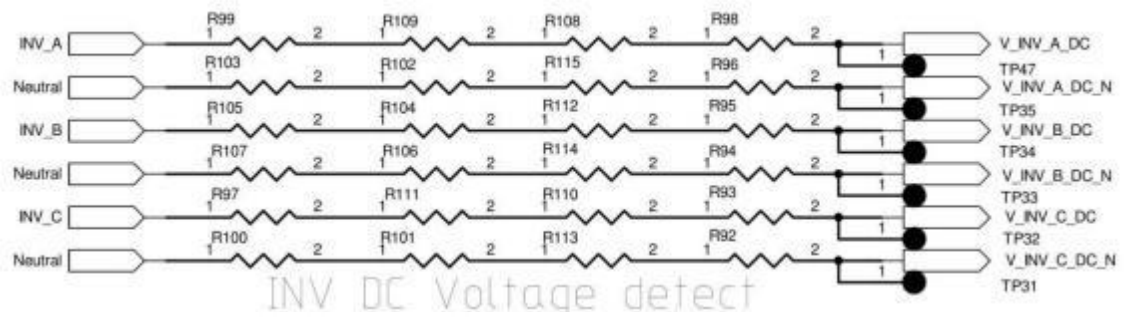
The following is UPS sampling resistance check form, use the multimeter to test voltage check circuit resistance. During the test, should pay attention to the influence of the three- proofing paint.

The output voltage check points are shown in Fig 3-24.

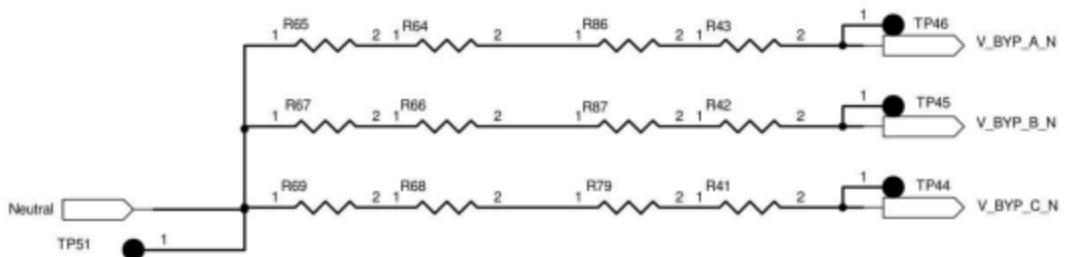
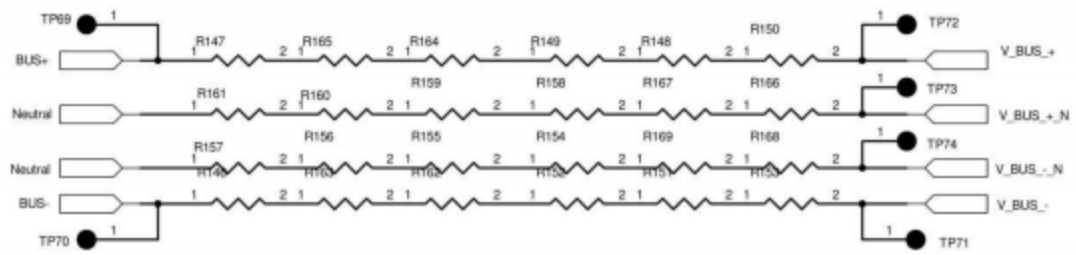
Fig 3-24: Output voltage check points

No.	Description	Type	Checked components	Probe	Probe	Meter stall	Normal	Abnormal
1	INV_C_DC_N	Resistor	R100, R101, R113, R92	TP31	J18	Ω	1M	$\pm 1\%$
2	INV_C_DC	Resistor	R97, R111, R110, R93	TP32	J20	Ω	1M	$\pm 1\%$
3	INV_B_DC_N	Resistor	R107, R106, R14, R94	TP33	J18	Ω	1M	$\pm 1\%$
4	INV_B_DC	Resistor	R105, R104, R112, R95	TP34	J17	Ω	1M	$\pm 1\%$
5	INV_A_DC_N	Resistor	R103, R102, R115, R96	TP47	J18	Ω	1M	$\pm 1\%$
6	INV_A_DC	Resistor	R99, R109, R108, R98	TP38	J16	Ω	1M	$\pm 1\%$
7	INV_C_N	Resistor	R59, R58, R81, R28	TP25	J18	Ω	2M	$\pm 1\%$
8	INV_C	Resistor	R88, R61, R60, R29	TP26	J20	Ω	2M	$\pm 1\%$
9	INV_B_N	Resistor	R57, R56, R82, R30	TP27	J18	Ω	2M	$\pm 1\%$
10	INV_B	Resistor	R55, R54, R84, R31	TP28	J17	Ω	2M	$\pm 1\%$
11	INV_A_N	Resistor	R53, R52, R83, R32	TP29	J18	Ω	2M	$\pm 1\%$
12	INV_A	Resistor	R78, R63, R62, R33	TP30	J16	Ω	2M	$\pm 1\%$
13	BUS+_N	Resistor	R161, R160, R159, R158, R167, R166	TP73	TP18	Ω	3M	$\pm 1\%$
14	BUS_+	Resistor	R147, R165, R164, R149, R148, R150	TP72	TP69	Ω	3M	$\pm 1\%$
15	BUS_-N	Resistor	R157, R156, R155, R154, R169, R168	TP74	TP18	Ω	3M	$\pm 1\%$
16	BUS_-	Resistor	R146, R163, R162, R152, R151, R153	TP71	TP70	Ω	3M	$\pm 1\%$
17	BYP_A_N	Resistor	R65, R64, R86, R43	TP46	J18	Ω	2M	$\pm 1\%$
18	BYP_B_N	Resistor	R67, R66, R87, R42	TP45	J18	Ω	2M	$\pm 1\%$
19	BYP_C_N	Resistor	R69, R68, R79, R41	TP44	J18	Ω	2M	$\pm 1\%$
20	LBS_N	Resistor	R71, R70, R80, R40	TP43	J18	Ω	2M	$\pm 1\%$
21	OUT_A_N	Resistor	R73, R72, R85, R38	TP41	J18	Ω	2M	$\pm 1\%$
22	OUT_A	Resistor	R45, R77, R76, R39	TP42	J48	Ω	2M	$\pm 1\%$
23	OUT_B_N	Resistor	R89, R46, R47, R36	TP39	J18	Ω	2M	$\pm 1\%$
24	OUT_B	Resistor	R44, R75, R74, R37	TP40	J46	Ω	2M	$\pm 1\%$
25	OUT_C_N	Resistor	R90, R50, R51, R34	TP37	J18	Ω	2M	$\pm 1\%$
26	OUT_C	Resistor	R91, R48, R49, R35	TP38	J45	Ω	2M	$\pm 1\%$

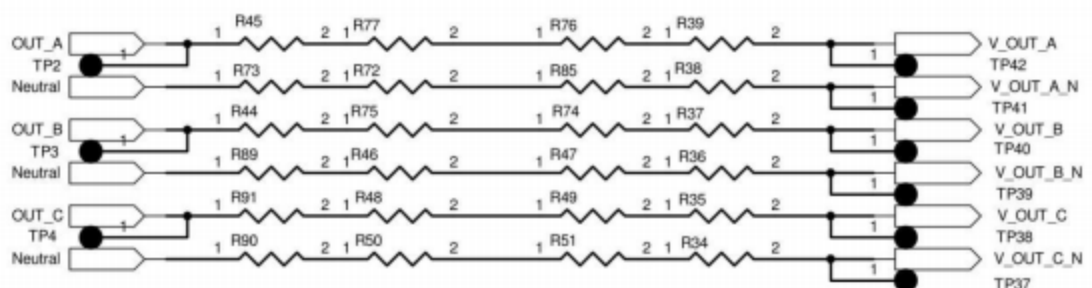
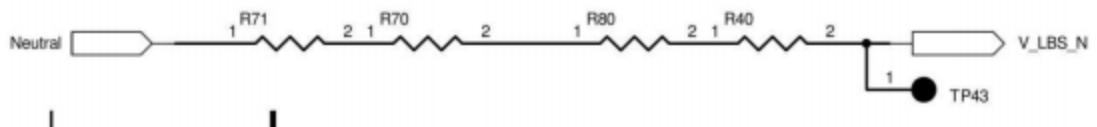
The following is voltage detect circuit diagram



BUS Voltage detect



BYP Voltage detect



OUTPUT Voltage detect

3.6.5 Measure whether the bypass SCR is normal

Note: The bypass circuit breaker should be closed.

Place the two probes of the multimeter on phase A of the bypass and the corresponding output phase A.

If the resistance is infinitely large, it is normal.

Place the two probes of the multimeter on phase B of the bypass and the corresponding output phase B.

If the resistance is infinitely large, it is normal.

Place the two probes of the multimeter on phase C of the bypass and the corresponding output phase C.

If the resistance is infinitely large, it is normal.

If there is a short circuit, the output board needs to be replaced.

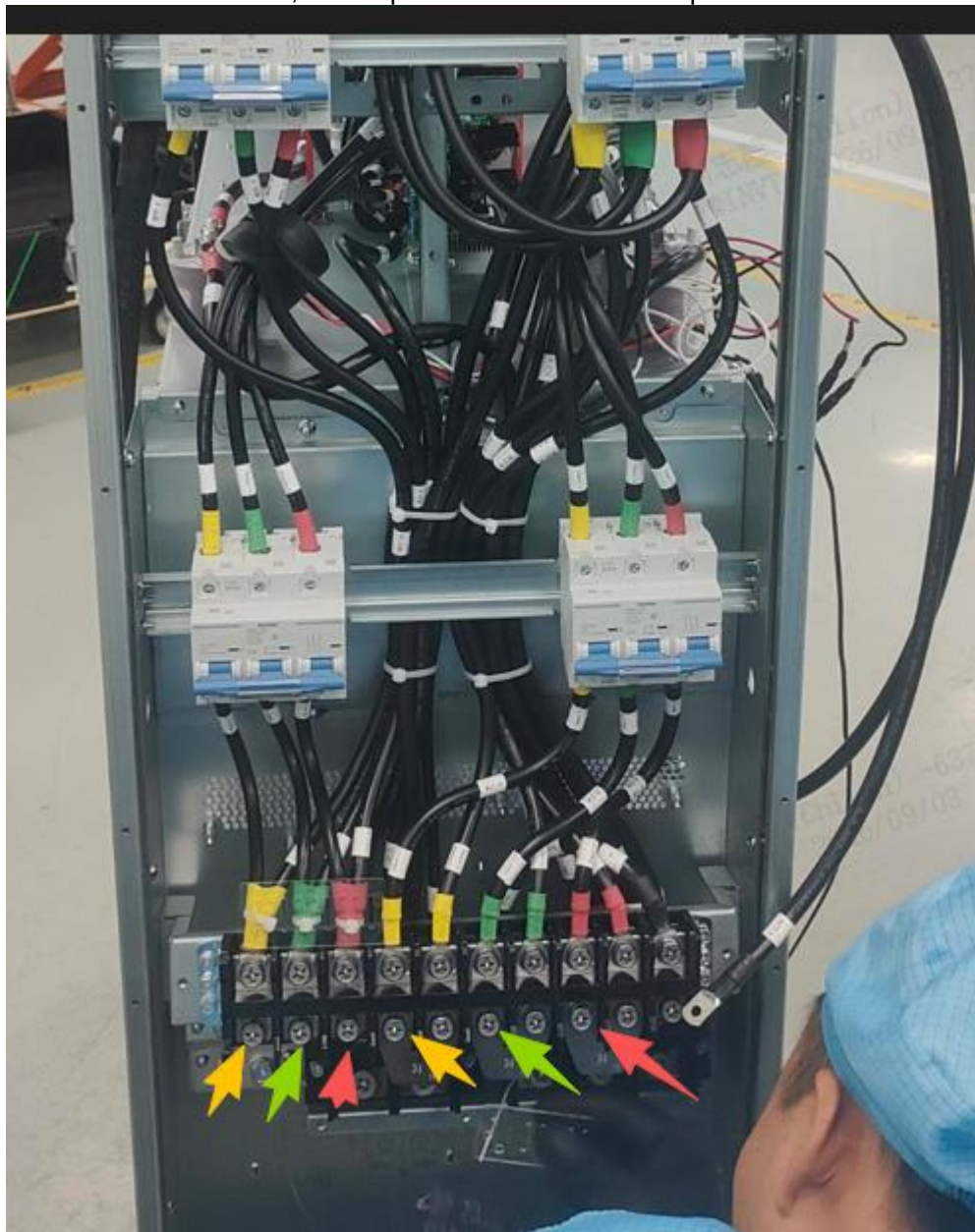
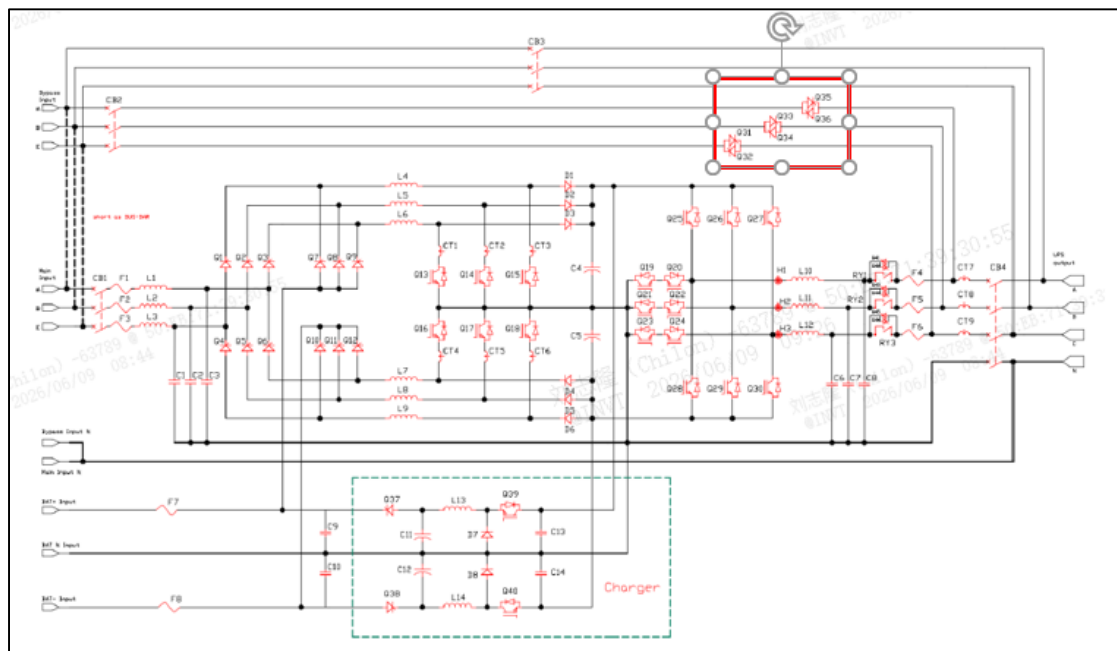


Fig 3-22: BYP SCR check points

No.	Description	Type	Checked components	Probe	Probe	Meter stall	Normal	Abnormal
1	BYP SCR A phase	SCR	Q24,Q19	INPUT BYP A	OUTPU / T A		Open	Short
2	BYP SCR B phase	SCR	Q23,Q22	INPUT BYP B	OUTPU / T B		Open	Short
3	BYP SCR C phase	SCR	Q21,Q20	INPUT BYP C	OUTPU / T A		Open	Short

The main purpose is to check whether these bypass SCR components are functioning properly, as shown in the red box in the following figure.



4. Maintenance

4.1 Trouble-shooting

When the UPS fault occurs, please prepare the following and contact to our after service engineers team.

1. Record the type and the serial number of the UPS.
2. Notice the status of LEDs on the front panel and check the present alarm.
3. Download the history log and S-CODE (notice: please select the correct type of ups).
4. Check the input and output cable and breaker.
5. Check whether there are any visible damage marks inside the machine.
6. The description of fault.

4.2 Common Faults and Maintenance

This section also indicates various UPS symptoms a user may encounter and provides a troubleshooting guide in the event the UPS develops a problem. Use the following information to determine whether external factors caused the problem and how to remedy the situation.

If the UPS triggers an alarm and the buzzer sounds, check alarm events via the "Log" menu on the LCD screen. After troubleshooting recoverable faults, attempt to manually clear the alarm on the "Operate" page. If the alarm remains active, refer to the table below and promptly contact our company's engineers.

NO.	Cause	Solution
1	No battery	● Check if the battery cables are connected correctly ● Check battery breaker or fuses are opened ● Check if batteries are damaged
2	Manual bypass on	Manual bypass is closed, the UPS will transfer to bypass and forbidden to transfer back to inverter
3	EPO	● Check if EPO is closed correctly ● Check if EPO is activated manually
4	Utility abnormal	UPS mains input is abnormal. ● Check if mains input is normal ● Check if mains input voltage and frequency is over the working range ● Check if mains input breaker or external input breaker is opened ● Check if the input phase sequence against Please recover mains input power, otherwise output will be shut down if battery is discharged to EOD

5	Bypass abnormal	● Check if bypass input power is abnormal ● Check if bypass input breaker is opened Please recover bypass input power, otherwise there will be no backup circuit when UPS is faulty
6	Bypass faulty	Bypass SCR is opened or shorted, please contact with local dealer
7	Bypass overload	Check the load and remove some no critical load until the load is below 95%
8	Bypass overload timeout	Bypass overload and timeout, UPS will shut down output
9	Over synchronization	Bypass voltage or frequency is over tracking range. There could be interruption if manually transfer to bypass or inverter is faulty
10	Over transfer times	Mains and battery or inverter and bypass transfer for 5 times in hour
11	Output shorted	Load is abnormal or output breaker is shorted. ● Check if load is abnormal and the faulty load is shutdown ● Check if output breaker is faulty If the faulty load is removed, please manually fault clear to restart UPS.
12	Rectifier fault	DC bus over voltage, low voltage, shorted or IGBT opened. Please manually clear the fault and if the fault is still on, please contact with local dealer
13	Inverter fault	Inverter voltage is abnormal, or inverter IGBT opened. Please manually clear the fault and if the fault is still on, please contact with local dealer
14	Rectifier over temperature	Rectifier heat sink is over temperature or the temp sensor is not connected correctly. ● Check if fans are working normally ● Check if anything block ventilation ● Check if the sensor is connected correctly ● Check if the environmental temp is over the range of UPS
15	Fan fault	One or more fans are faulty or blocked Check if all fans working normally Check if something blocks fan
16	Overload	Inverter is overload. Please remove numbers of no critical loads, or else UPS could transfer to bypass
17	Over load timeout	UPS will transfer to bypass and if bypass overload, output could be shutdown caused by bypass overload timeout. Please remove numbers of loads and the UPS will transfer back to inverter
18	Inverter over temperature	Inverter heat sink is over temperature or the temp sensor is not connected correctly. Check if fans are working normally Check if anything block ventilation Check if the sensor is connected correctly Check if the environmental temp is over the range of UPS

19	Manual transfer to bypass	If bypass is over synchronization range, output could be interrupted if manually transfer to bypass
20	Battery low	Remained battery capacity is low when in battery mode
21	Battery reversed	Check if battery cables are connected correctly Check if inverter cables of battery packs are connected correctly
22	Inverter protect	Inverter voltage abnormal or DC bus is over voltage. UPS will fault clear automatically. If not, please contact with local dealer
23	Parallel cables error	Check if all parallel communication cables are connected correctly
24	Charger fail	Charger is faulty or is not disconnected. Please contact with local dealer
25	Relay opened	Inverter relay is opened. Please contact with local dealer
26	Relay closed	Inverter relay is closed. Please contact with local dealer

5. Annexes

The attached is the required test items in the DT33030CS maintenance manual. Please download the document, fill in the relevant data and feedback to us each time you test.

A	B	C	D	E	F	G	H
No.	PCB board	Main component	Description	Normal Value	ActualValue	Status	Note
1	Input power board	Fuse	A phase input fuse	short			
			B phase input fuse	short			
			C phase input fuse	short			
			Battery + fuse	short			
			Battery - fuse	short			
		SCR	A phase rectifier SCR	OL MO			
			B phase rectifier SCR	OL MO			
			C phase rectifier SCR	OL MO			
			Battery + SCR	OL MO			
			Battery - SCR	OL MO			
		charger	charge + fuse	short			
			charge - fuse	short			
			charge + IGBT	0.35Vdc			
			charge - IGBT	0.35Vdc			
2	Rectifier PFC board	Diode	PFC A diode	0.35 Vdc			
			PFC B diode	0.35 Vdc			
			PFC C diode	0.35 Vdc			
		IGBT	A phase Rectifier IGBT	0.35 Vdc			
			B phase Rectifier IGBT	0.35 Vdc			
3	Inverter power board	IGBT	C phase Rectifier IGBT	0.35 Vdc			
			A phase inverter IGBT	0.35Vdc			
			B phase inverter IGBT	0.35Vdc			
6	Output power board	Fuse	C phase inverter IGBT	0.35Vdc			
			A phase output fuse	short			
			B phase output fuse	short			
		Relay	C phase output fuse	short			
			A phase output relay	OL MO			
			B phase output relay	OL MO			
7	BYP SCR	Relay	C phase output relay	OL MO			
			A phase BYP SCR	OL MO			
			B phase BYP SCR	OL MO			
			C phase BYP SCR	OL MO			



Annexes.
DT33030CS must