

**APPLICATION FOR LOW VOLTAGE DIRECTIVE**

**On Behalf of**

**INVT POWER SYSTEM (SHENZHEN) CO., LTD**

**Uninterruptible Power Systems**

**Model(s): RM300/30X、RM250/25X、RM200/20X**

**Prepared For : INVT POWER SYSTEM (SHENZHEN) CO., LTD  
5th Floor,1#Building,Gaofa Industrial Park, LongJing,  
Nanshan District, Shenzhen, China, 518055**

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<b>TEST REPORT</b> <b>IEC 62040-1</b> <b>Uninterruptible power systems (UPS) –</b> <b>Part 1: General and safety requirements for UPS</b>	
Report Reference No.....:	ES160523040S
Compiled by (name + signature).....:	Gary Zhang
Approved by (name + signature).....:	William Guo
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Testing Laboratory .....	EMTEK (Shenzhen) CO., LTD.
Address .....	Bldg 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China
Testing location / address .....	Same as above
<b>Applicant's name</b> .....:	INVT POWER SYSTEM (SHENZHEN) CO., LTD
Address .....	5th Floor, 1#Building, Gaofa Industrial Park, LongJing, Nanshan District, Shenzhen, China, 518055
<b>Test specification:</b>	
Standard .....	IEC 62040-1:2008 (First Edition) + Am 1:2013
Test procedure .....	Compliance with IEC 62040-1:2008 (First Edition) + Am 1:2013
Non-standard test method.....:	N/A
<b>Test Report Form No</b> .....:	IEC62040_1A
Test Report Form(s) Originator .....	TÜV Rheinland Japan Ltd.
Master TRF .....	Dated 2014-01
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<b>Test item description</b> .....	Uninterruptible Power Supply
Trade Mark .....	INVT
Manufacturer .....	INVT POWER SYSTEM (SHENZHEN) CO., LTD
Address .....	5th Floor, 1#Building, Gaofa Industrial Park, LongJing, Nanshan District, Shenzhen, China, 518055
Model/Type reference .....	RM300/30X, RM250/25X, RM200/20X
Ratings .....	See the rating labels



<b>Test item particulars</b> .....	
Equipment mobility .....	<input checked="" type="checkbox"/> movable <input type="checkbox"/> stationary <input type="checkbox"/> for building-in
Connection to the mains .....	<input type="checkbox"/> pluggable equipment <input checked="" type="checkbox"/> permanent connection <input type="checkbox"/> detachable power supply cord <input type="checkbox"/> non-detachable power supply cord
Operating condition .....	<input checked="" type="checkbox"/> continuous <input type="checkbox"/> rated operating / resting time:
Access location .....	<input checked="" type="checkbox"/> operator accessible <input type="checkbox"/> restricted access location
Over voltage category (OVC) .....	<input type="checkbox"/> OVC I <input checked="" type="checkbox"/> OVC II <input type="checkbox"/> OVC III <input type="checkbox"/> OVC IV <input type="checkbox"/> other:
Mains supply tolerance (%) or absolute mains supply values .....	380Vac(-10%), 415Vac(+10%) of input voltage considered
Tested for IT power systems .....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
IT testing, phase-phase voltage (V) .....	230V for Norway only
Class of equipment .....	<input checked="" type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Not classified
Considered current rating (A) .....	315A
Pollution degree (PD) .....	<input type="checkbox"/> PD 1 <input checked="" type="checkbox"/> PD 2 <input type="checkbox"/> PD 3
IP protection class .....	IP20
Altitude during operation (m) .....	Up to 2000
Altitude of test laboratory (m) .....	below 2000
Mass of equipment (kg) .....	Approx. 183kg
<b>Possible test case verdicts:</b>	
- test case does not apply to the test object.....	N/A N equal to N / A
- test object does meet the requirement.....	P (Pass)
- test object does not meet the requirement.....	F (Fail)
<b>Testing</b> .....	
Date of receipt of test item .....	N/A
Date(s) of performance of tests .....	N/A
<b>General remarks:</b>	
<p>The test results presented in this report relate only to the object tested.          This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.          "(see Enclosure #)" refers to additional information appended to the report.          "(see appended table)" refers to a table appended to the report.</p> <p>Throughout this report a comma (point) is used as the decimal separator.          Standard EN 62040-1:2008+A1:2013 is to be used in conjunction with EN 60950-1:2006, which is referred to in this TRF as "RD".</p>	

**General product information:**

This report is amended from previous report ES151023033S, dated Oct. 30, 2015, due to below amendments:

- **Updated LVD directive.**
- **Change label to: See copy of marking plate**

1. The equipment is an Uninterruptible Power Systems for general use with information technology equipment.

2. The UPS is designed as primary, therefore, clearances, creepage distances and distances through insulation from input, output, battery, control circuits to the RS232 of the PC interface are dimensioned for reinforced insulation and suitable distance through insulation. The test samples are pre-production without any serial number.

3. Model difference description:

All models are designed with same control logic, constructions, PCB Layout except for the quantity of UPS module, model name and ratings. All tests were performed on model RM300/30X which means the typical model.

**Summary of testing:**

The product has been tested according to standard EN 62040-1:2008+A1:2013





- Tests performed on the bench
- Maximum ambient temperature: 40°C
- Tested for moderate conditions
- EUT is designed for altitudes not exceeding 2000 m.

**Copy of marking plate:**





1. Rating label for model RM300/30X



2. Rating label for model RM250/25X

	<b>RM250/25X</b>
<b>Frame</b>	<b>250kVA 3Ø+N</b>
<b>RETE 1 - MAINS 1 - NETZ 1</b>	<b>3Ø+N</b>
Uin (Vac)	380/400/415
Iin (A)	360*
Frequenza - Frequency - Frequenz	50÷60Hz
<b>RETE 2 - MAINS 2 - NETZ 2</b>	<b>3Ø+N</b>
Uin (Vac)	380/400/415
Iin (A)	378*
Frequenza - Frequency - Frequenz	50÷60Hz
<b>USCITA - OUTPUT - AUSGANG</b>	<b>3Ø+N</b>
Uout (Vac)	380/400/415
Iout (A)	378*
Frequenza - Frequency - Frequenz	50÷60Hz
Potenza - Power rating - Leistung	250kVA/225kW (*:@380V)
<b>Icw</b>	<b>10 kA</b>
<b>BATTERIA - BATTERY - BATTERIE</b>	
Udc (Vdc)	+/- 240
Idc (A)	500
<b>N° Serie - Serial Number - Seriennummer</b>	
<b>Year of construction</b>	<b>2016</b>
5th Floor, 1# Buiding, Gaofa Industrial Park, Longjing, Nanshan District, Shenzhen, China ,518055	
 <b>Made in China</b>	 <b>242 kg</b>
<b>Service: <a href="http://www.invt-power.com">www.invt-power.com</a></b>	
	
<p>Manufacturer: INVT POWER SYSTEM (SHENZHEN) CO., LTD</p> <p>Address: 5th Floor, 1#Building, Gaofa Industrial Park, LongJing, Nanshan District, Shenzhen, China, 518055</p> <p>Importer: xxx</p> <p>Address: xxx</p> <p>Battery must be recycled.</p> <p>WARNING! Risk of electric shock.</p>	

### 3. Rating label for model RM200/20X

	<b>RM200/20X</b>
<b>Frame</b>	<b>200kVA 3Ø+N</b>
<b>RETE 1 - MAINS 1 - NETZ 1</b>	<b>3Ø+N</b>
Uin (Vac)	380/400/415
Iin (A)	288*
Frequenza - Frequency - Frequenz	50÷60Hz
<b>RETE 2 - MAINS 2 - NETZ 2</b>	<b>3Ø+N</b>
Uin (Vac)	380/400/415
Iin (A)	303*
Frequenza - Frequency - Frequenz	50÷60Hz
<b>USCITA - OUTPUT - AUSGANG</b>	<b>3Ø+N</b>
Uout (Vac)	380/400/415
Iout (A)	303*
Frequenza - Frequency - Frequenz	50÷60Hz
Potenza - Power rating - Leistung	200kVA/180kW (*:@380V)
<b>Icw</b>	<b>10 kA</b>
<b>BATTERIA - BATTERY - BATTERIE</b>	
Udc (Vdc)	+/- 240
I <sub>dc</sub> (A)	400
N° Serie - Serial Number - Seriennumber	
Year of construction	2016
5th Floor, 1# Buiding, Gaofa Industrial Park, Longjing, Nanshan District, Shenzhen, China ,518055	
 Made in China	 <b>242 kg</b>
<b>Service: <a href="http://www.invt-power.com">www.invt-power.com</a></b>	
 <p>Manufacturer: INVT POWER SYSTEM (SHENZHEN) CO., LTD          Address: 5th Floor, 1#Building, Gaofa Industrial Park, LongJing, Nanshan District, Shenzhen, China, 518055          Importer: xxx          Address: xxx          Battery must be recycled.          WARNING! Risk of electric shock.</p>	



4. Warning label on outer enclosures

**CAUTION**

**OPERATION INSTRUCTION**

HIGH LEAKAGE CURRENT, EARTH CONNECTION ESSENTIAL BEFORE CONNECTING UPS.  
DO NOT REMOVE COVERS. THIS SYSTEM IS TO BE SERVICED BY QUALIFIED  
SERVICE PERSONNEL ONLY.  
HAZARDOUS LIVE PARTS INSIDE THIS UPS ARE ENERGIZED FROM THE BATTERY SUPPLY EVEN WHEN THE AC  
INPUT POWER IS DISCONNECTED.  
SEE USER MANUAL FOR INSTALLATION,  
OPERATING AND MAINTENANCE INSTRUCTION

**DANGER**

RISK OF ELECTRIC SHOCK.  
DO NOT TOUCH UNINSULATED BATTERY TERMINAL.  
TEST BEFORE TOUCHING.  
DISCONNECTION OF THE EXTERNAL AC & DC SWITCHES IS REQUIRED FOR COMPLETE LOAD POWER OFF OR MAINTENANCE.

**OPERATION INSTRUCTION**


BATTERY VOLTAGE&CONNECTION MUST COMPLY WITH UPS SPECIFICATION.  
MANUAL BATTERY DISCHARGE RECOMMENDED FOR EVERY 3 MONTHS  
CONTINUOUS OPERATION WITHOUT ANY BATTERY DISCHARGE.  
WARRANTY VOID IF SERIAL NO.PLATE IS DAMAGED.

**WARNING: BACKFEED PROTECTION**

This system has a control signal available for use with an automatic device, externally located, to protect against  
backfeeding voltage through the mains Static Bypass circuit.If this protection is not used with the switchgear that is used to  
isolate the bypass circuit, a label must be added to the switchgear to advise service personnel that the circuit is connected to  
a UPS system.

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
4	GENERAL CONDITIONS FOR TESTS		P
4.3	Components		P
1.5.1/RD	General		
	Comply with IEC 62040-1 or relevant component standard	(see appended table 4.5)	P
1.5.2/RD	Evaluation and testing of components	Certified components are used in accordance with their ratings, certifications and they comply with applicable parts of this standard. Components not certified are used in accordance with their ratings and they comply with applicable parts of IEC 60950-1 and the relevant component standard. Components, for which no relevant IEC-standard exists, have been tested under the conditions occurring in the equipment, using applicable parts of IEC 60950-1.	P
1.5.3/RD	Thermal controls	No thermal control.	N
1.5.4/RD	Transformers	Transformers used are suitable for their intended application and comply with the relevant requirements of the standard.	P
1.5.5/RD	Interconnecting cables	Transformers used are suitable for their intended application and comply with the relevant requirements of the standard.	P
1.5.6/RD	Capacitors bridging insulation	X2 capacitors according to IEC 60384-14:1993.	P
1.5.7/RD	Resistors bridging insulation	Refer to below:	N
1.5.7.1/RD	Resistors bridging functional, basic or supplementary insulation	No bridging resistors	N
1.5.7.2/RD	Resistors bridging double or reinforced insulation between a.c. mains and other circuits	No resistors bridging double or reinforced insulation.	N
1.5.7.3/RD	Resistors bridging double or reinforced insulation between a.c. mains and antenna or coaxial cable	No bridging resistors	N
1.5.8/RD	Components in equipment for IT power systems	No Y-cap used.	N
4.6	Power interface		P

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.6.1/RD	AC power distribution systems	TN power system	P
1.6.2/RD	Input current	(see appended table 4.6)	P
4.6 1.6.4/RD	Neutral conductor	Neutral conductor is basic insulated from earth and body of the equipment.	P

4.7	Marking and instructions		P
4.7.1	General	See below.	P
4.7.2 1.7.1/RD	Power rating	The required marking is located on the outside surface of the equipment.	P
	Input rated voltage/range (V) .....	See rating labels	P
	Input rated current/range (A).....	See rating labels	P
	Input symbol for nature of supply (d.c.) .....	$\pm 240V$ 	P
	Input rated frequency/range (Hz) .....	50/60	P
	Number of Input phases and neutral.....	3 $\Phi$	P
	Output rated voltage/range (V) .....	See rating labels	P
	Output rated current/range (A) .....	Not marked.	N
	Output rated power factor, (if less than unity, or active power and apparent power or active power and rated current) .....	Not marked.	N
	Number of output phases and neutral.....	3 $\Phi$	P
	Output rated active power (W) .....	See rating labels	P
	Output rated apparent power (VA) .....	See rating labels	P
	Output symbol for nature of supply (d.c.) .....	No d.c. output.	N
	Output rated frequency/range (Hz) .....	50/60	P
	Ambient operating temperature range ( $^{\circ}C$ ).....	40 $^{\circ}C$	P
	Rated short-time withstand current (Icw) or rated conditional short-circuit current (Icc)	INVT POWER SYSTEM (SHENZHEN) CO., LTD	P
	Manufacturer's name or trademark or identification mark .....	See page 1	P
	Type/model or type reference .....	The equipment is Class I.	N
	Symbol for Class II equipment only .....	The additional marking does not give rise to misunderstandings.	P
	Other symbols .....	Refer to copy of marking plate.	P
	Certification marks .....	See caution label	P

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Instructions for units with automatic bypass / maintenance bypass, additional input a.c. supply, or external batteries, having text "See installation instructions before connecting to the supply" .....	The user manual contains information for operation, installation, servicing transport, storage and technical data.	P
4.7.3	Safety instructions	Considered	P
4.7.3.1	General	Installation instructions are available to the user in User's Manual.	P
4.7.3.2	Installation .....	Instruction manual provided. Not for restricted access location.	P
	Location in a restricted access location only ...:	Instruction manual provided.	P
	Permanent connector UPS .....	Not Pluggable type A or Pluggable type B UPS	N
	Pluggable type A or Pluggable type B UPS .....	The suitable information list in the user manual when operate the UPS. Not for restricted access location.	P
4.7.3.3	Operation.....	The instruction of maintenance is only included in the service manual.	P
4.7.3.4	Maintenance.....	Backfeed protection provided externally to the UPS.	P
4.7.3.5	Distribution related backfeed.....	No voltage selector	N
4.7.4 1.7.4/RD	Main voltage adjustment .....	No voltage selector	N
	Methods and means of adjustment; reference to installation instructions .....	Relevant information provided on the marking that is affixed near the outlets.	P
4.7.5 1.7.5/RD	Power outlets.....	Marking near holders for fuses.	P
4.7.6 1.7.6/RD	Fuse identification (marking, special fusing characteristics, cross-reference) .....	Refer below:	P
4.7.7 1.7.7/RD	Wiring terminals	The earthing terminal is marked with the standard earthing symbol (60417-2-IEC-5019) near the terminal.	P
1.7.7.1/RD	Protective earthing and bonding terminals .....	The AC terminal is marked with L, N, G symbol near the terminal.	P
1.7.7.2/RD	Terminals for a.c. mains supply conductors	AC main supplied	N
1.7.7.3/RD	Terminals for d.c. mains supply conductors	The terminal of batteries is marked with standard symbol (IEC 60417, No. 5005 and No. 5006).	P

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
4.7.8	Battery terminals :	See below	P
4.7.9 1.7.8/RD	Controls and indicators	The function of controls affecting safety is obvious without knowledge of language etc.	P
1.7.8.1/RD	Identification, location and marking :	For LCD provided, located on the front panel	P
1.7.8.2/RD	Colours :	The function switch is marked " " (IEC 60417-1 No. 5010).	P
1.7.8.3/RD	Symbols according to IEC 60417 :	No controls affecting safety are using figures.	N
1.7.8.4/RD	Markings using figures :	Only one external supply of hazardous voltage of energy	N
4.7.10 1.7.9/RD	Isolation of multiple power sources :	TN power system.	N
4.7.11 1.7.2.4/RD	IT power systems	Permanently connected equipment relies on the building installation for short-circuit protection or overcurrent protection.	P
4.7.12	Protection in building installation	Leakage current of the equipment does not exceed 3.5mA. However due to the connected load has influence on the overall earth leakage current, a corresponding statement was provided in the User's Manual.	P
	Rated short-time withstand current ( $I_{cw}$ ) .....:	No thermostats or other regulating devices.	N
	Rated conditional short circuit current ( $I_{cc}$ ) .....:	Instructions and markings shall be in a language acceptable for the country where the equipment is to be used.	—
	a) If higher $I_{cp}$ stated $\leq 10$ kA	The marking withstands required tests.	P
	a) If higher $I_{cp}$ stated $> 10$ kA	Marking is not on the removable parts.	P
4.7.13 5.1/RD	High leakage current (mA) .....:	The battery is not placed in an operator access area. The required warning is in the safety manual.	P
4.7.14 1.7.10/RD	Thermostats and other regulating devices	Instructions and markings are in English.	—

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
4.7.15 1.7.2.1/RD and 1.7.8.1/RD	Language(s) .....	Operator is not instructed to use a tool in order to gain access to operator access area.	N
4.7.16 1.7.11/RD	Durability of markings	No battery used	N
4.7.17 1.7.12/RD	Removable parts		N
4.7.18 1.7.13/RD	Replaceable batteries		N
	Language(s) .....		N
4.7.19 1.7.2.5/RD	Operator access with a tool.....		N
4.7.20	Battery		N
	Clearly legible information .....		N
	Battery type .....	No energy hazard in operator access area. Checked by means of the test finger.	P
	Nominal voltage of total battery (V) .....	Detailed information regarding installation provided in the User's Manual.	P
	Nominal capacity of total battery (optional) .....	Stated on rating user's manual.	P
	Warning label .....	Warning language with information: Caution: Lead-acid battery inside the enclosure, it may cause chemical hazard. The battery may presents a risk of electric shock and energy hazards. For disposal instructions for the battery, see user's manual.	P
	Instructions .....	The sufficient information about the battery was given in the user's manual.	P
2.1.1.5/RD	Protection against energy hazards	No energy hazard in operator access area. Checked by means of the test finger.	P
4.7.21 1.7.2.4/RD	Installation instructions	Detailed information regarding external interfaces (RS232 and USB port) provided in the User's Manual.	P
5	FUNDAMENTAL DESIGN REQUIREMENTS		P
5.1	Protection against electric shock and energy hazards		P

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.1.1 2.1.1/RD	Protection for UPS intended to be used in operator access areas	Refer below:	P
2.1.1.1/RD	Access to energized parts	There is adequate protection against operator contact with bare parts at ELV or hazardous voltage or parts separated from these with basic or functional insulation only (except protective earth). No hazardous voltages exceeding 1000V a.c. or 1500V d.c. Checked by test finger, test probe and test pin.	P
	Test by inspection :	Complies	P
	Test with test finger (Figure 2A) :	Complies	P
	Test with test pin (Figure 2B) :	Complies	P
	Test with test probe (Figure 2C) :	No TNV circuits	N
2.1.1.2/RD	Battery compartments	No TNV circuits in the battery compartments of battery cabinet.	N
2.1.1.3/RD	Access to ELV wiring	No internal wiring at ELV accessible to the operator.	N
	Working voltage ( $V_{peak}$ or $V_{rms}$ ); minimum distance through insulation (mm)		—
2.1.1.4/RD	Access to hazardous voltage circuit wiring	All accessible parts are separated from internal wiring at hazardous voltage by double or reinforced insulation.	N
2.1.1.5/RD	Energy hazards :	No energy hazard in operator access area. Checked by means of the test finger.	P
2.1.1.6/RD	Manual controls	No shafts of knobs etc. at ELV or hazardous voltage.	P
2.1.1.7/RD	Discharge of capacitors in equipment	The capacitance of the input circuits > 0.1 $\mu$ F, refer to list of critical components.	P
	Measured voltage (V); time-constant (s) :	(See appended table 5.1.1)	—
2.1.1.8/RD	Energy hazards – d.c. mains supply		P
	a) Capacitor connected to the d.c. mains supply :		P
	b) Internal battery connected to the d.c. mains supply :		N
2.1.1.9/RD	Audio amplifiers :	No such parts.	N

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.1.2 2.1.1.5 c) /RD	Protection for UPS intended to be used in service access areas	Checked by inspection, unintentional contact is unlikely during service operations.	N
	Hazardous energy level		N
5.1.3 2.1.1.5 c) /RD	Protection for UPS intended to be used in restricted access areas		N
	Hazardous energy level		N
5.1.4	Backfeed protection		—
	Shock hazard after de-energization of a.c. input for UPS	No shock hazard	P
	Measured voltage (V); time-constant (s) :		—
	Description of the construction:	Backfeed protection was provided externally to the UPS in the a.c. input line.	P
	Air gap is employed for backfeed protection	Not mandatory for pluggable UPS.	N
5.1.5	Emergency switching device	Not mandatory for pluggable UPS.	N
5.2	Requirements for auxiliary circuits		P
5.2.1 2.2/RD	Safety extra low voltage circuit - SELV	See below:	P
2.2.1/RD	General requirements	SELV limits are not exceeded under normal condition.	P
2.2.2/RD	Voltages under normal conditions (V) ..... :	Within SELV limits. (See appended table 5.2.1)	P
2.2.3/RD	Voltages under fault conditions (V) ..... :	Within SELV limits. (See appended table 5.2.1)	P
2.2.4/RD	Connection of SELV circuits to other circuits .. :	SELV circuits are only connected to other SELV and protective earth.	P
5.2.2 2.3/RD	Telephone network voltage circuits - TNV	Refer below:	N
2.3.1/RD	Limits	No TNV circuits, cl. 2.3/RD	N
	Type of TNV circuits :		—
2.3.2/RD	Separation from other circuits and from accessible parts		N
2.3.2.1/RD	General requirements		N
2.3.2.2/RD	Protection by basic insulation		N
2.3.2.3/RD	Protection by earthing		N



IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
2.3.2.4/RD	Protection by other constructions :		N
2.3.3/RD	Separation from hazardous voltages		N
	Insulation employed :		—
2.3.4/RD	Connection of TNV circuits to other circuits		N
	Insulation employed :		—
2.3.5/RD	Test for operating voltages generated externally		N
5.2.3 2.4/RD	Limited current circuits		N
2.4.1/RD	General requirements	No limited current circuits, cl. 2.4/RD.	N
2.4.2/RD	Limit values		N
	Frequency (Hz) :		—
	Measured current (mA) :		—
	Measured voltage (V) :		—
	Measured circuit capacitance (nF or $\mu$ F) :		—
2.4.3/RD	Connection of limited current circuits to other circuits		—
5.2.4 3.5/RD	External signalling circuits		N
3.5.1/RD	General requirements	Refer to below:	P
3.5.2/RD	Types of interconnection circuits :	Considered.	P
3.5.3/RD	ELV circuits as interconnection circuits	SELV circuits.	P
3.5.4/RD	Data ports for additional equipment	No ELV interconnections.	N
5.2.5 2.5/RD	Limited power source	Data ports (RS232 and USB) is signal port only, no test required.	P
	a) Inherently limited output	No limited power source.	N
	b) Impedance limited output		N
	c) Regulating network limited output under normal operating and single fault condition		N
	d) Overcurrent protective device limited output		N
	Max. output voltage (V), max. output current (A), max. apparent power (VA) ..... :		N
	Current rating of overcurrent protective device (A)		—
	Use of integrated circuit (IC) current limiters		—
5.3	Protective earthing and bonding		P
5.3.1	General	See below.	P

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
2.6/RD	Provisions for earthing and bonding	Appliance coupler and outlets used	P
2.6.1/RD	Protective earthing	Reliable connection of relevant conductive parts to the PE terminal (via green/yellow insulated wires).	P
2.6.2/RD	Functional earthing		N
2.6.3/RD	Protective earthing and protective bonding conductors	Through appliance coupler and outlets used	P
2.6.3.1/RD	General	Compliance checked.	P
2.6.3.2/RD	Size of protective earthing conductors	Appliance inlet used	P
	Rated current (A), cross-sectional area (mm <sup>2</sup> ), AWG :	(see appended tabel 4.5)	
2.6.3.3/RD	Size of protective bonding conductors	Refer to 2.6.3.4/RD.	P
	Rated current (A), cross-sectional area (mm <sup>2</sup> ), AWG :	Refer to 2.6.3.4/RD.	
	Protective current rating (A), cross-sectional area (mm <sup>2</sup> ), AWG :	Refer to 2.6.3.4/RD.	
2.6.3.4/RD	Resistance of earthing conductors and their terminations; resistance (Ω), voltage drop (V), test current (A), duration (min) :	(See appended table 5.3.1)	P
2.6.3.5/RD	Colour of insulation :	All insulated protective earth conductors are used colored green and yellow.	P
2.6.4/RD	Terminals	See below.	P
2.6.4.1/RD	General	See below.	P
2.6.4.2/RD	Protective earthing and bonding terminals	Adequate protective earth connection, see also Sub-clause 2.6.3.4/RD and 3.3/RD	P
	Rated current (A), type, nominal thread diameter (mm) :		
2.6.4.3/RD	Separation of the protective earthing conductor from protective bonding conductors	Separate PE and protective bonding conductor used.	N
2.6.5/RD	Integrity of protective earthing	See below.	P
2.6.5.1/RD	Interconnection of equipment	The unit has its own earthing connection. PE terminals of outlets reliably connected to PE terminal of unit	P
2.6.5.2/RD	Components in protective earthing conductors and protective bonding conductors	There are no switches or overcurrent protective devices in the protective earthing / bonding conductors.	P
2.6.5.3/RD	Disconnection of protective earth	Appliance inlet used	P

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
2.6.5.4/RD	Parts that can be removed by an operator	Appliance inlet, earthing connected before and disconnected after hazardous voltage. No other operator removable parts.	P
2.6.5.5/RD	Parts removed during servicing	It is not necessary to disconnect earthing except for the removal of the earthed part itself.	P
2.6.5.6/RD	Corrosion resistance	All safety earthing connections in compliance with Annex J.	P
2.6.5.7/RD	Screws for protective bonding	No such screw	N
2.6.5.8/RD	Reliance on telecommunication network or cable distribution system	Protective earthing is not rely on cable distribution system.	N
5.3.2 2.6.1/RD	Protective earthing	Accessible conductive parts are reliably connected to protective earth terminal	P
2.10/RD	Clearances, creepage distances and distances through insulation	See clause 5.7	P
4.2/RD	Mechanical strength	See clause 7.3	P
5.2/RD	Electric strength	See clause 8.2	P
5.3.3	Protective bonding	Refer also to 2.6.3.4/RD	P

5.4	AC and d.c. power isolation		P
5.4.1	General	See below.	P
3.4/RD	Disconnection from the mains supply	See below.	P
3.4.1/RD	General requirement	Considered	P
3.4.2/RD	Disconnect devices	Circuit breaker used	P
3.4.3/RD	Permanently connected equipment		P
3.4.4/RD	Parts which remain energized	No parts remain energized after the disconnect device is pull out.	N
3.4.5/RD	Switches in flexible cords	No such construction.	N
3.4.6/RD	Number of poles - single-phase and d.c. equipment	three-phase equipment	N
3.4.7/RD	Number of poles - three-phase equipment		P
3.4.8/RD	Switches as disconnect devices	Permanently connected equipment.	N
3.4.9/RD	Plugs as disconnect devices		N
3.4.10/RD	Interconnected equipment	Warning label provided on both the UPS, that both units must be disconnected before service. See copy of marking.	P

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
3.4.11/RD	Multiple power sources	Only one external supply of hazardous voltage or energy	N
5.4.2	Disconnect devices	Permanently connected equipment.	N

5.5	Overcurrent and earth fault protection		P
5.5.1	General	See below.	P
2.7.3/RD	Short-circuit backup protection	Adequate protective device.	P
2.7.4/RD	Number and location of protective devices .....		P
2.7.5/RD	Protection by several devices	Only one protective device provided.	N
2.7.6/RD	Warning to service personnel :	Hazard may be still present in the equipment after the input circuit breaker opens. However, as it is considered that the plug to the mains will be disconnected during service work. No markings were needed.	N
5.5.2	Basic requirements	Equipment relies on circuit breaker of the wall outlet installation protection of the building installation in regard to L, N short circuit and for L to PE earth fault. Over current protection is provided by the built-in device breaker.	P
5.5.3	Battery circuit protection	See below.	P
5.5.3.1	Overcurrent and earth fault protection	See below.	P
5.5.3.2	Location of protective device	The fuses are directly located behind the supply wire from the battery. The charger located in the battery circuit before the fuses. For the charger circuit there are no hazardous condition under any simulated fault conditions. (see also "Fault condition tests")	P
5.5.3.3	Rating of protective device	See below.	P
5.3.1/RD	Protection against overload and abnormal operation	(see appended table 8.3)	P
5.5.4	Short-time withstand current		P
5.5.4.1	General		P
5.5.4.2	Modes of operation		P
5.5.4.3	Test procedure		P

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.5.4.3.1	General application		P
	Rated UPS output current/(r.m.s) (A) .....	See product specification	P
	Prospective test current/(r.m.s) (A) .....	See product specification	P
	Typical power factor .....	See product specification	P
	Initial asymmetric peak current ration ( $I_{pk} / I_{cw}$ ) ..	$I_{cw}$ : 10KA	P
	Minimum duration of prospective test current (cycles 50/60 Hz) .....	50Hz	P
5.5.4.3.2	Exemption from testing		P
5.6	Protection of personnel – Safety interlocks <i>(No safety interlock provided for operator protection since there are no liable hazards capable of harming the operator during operation).</i>		P
5.6.1	Operator protection	See below	N
2.8/RD	Safety interlocks	No safety interlocks.	N
2.8.1/RD	General principles		N
2.8.2/RD	Protection requirements		N
2.8.3/RD	Inadvertent reactivation		N
2.8.4/RD	Fail-safe operation		N
2.8.5/RD	Moving parts		N
2.8.6/RD	Overriding		N
2.8.7/RD	Switches and relays		N
2.8.7.1/RD	Contact gaps (mm) :		N
2.8.7.2/RD	Overload test		N
2.8.7.3/RD	Endurance test		N
2.8.7.4/RD	Electric strength test	(see appended table 8.2)	N
2.8.8/RD	Mechanical actuators		N
5.6.2	Service person protection	See below.	P
5.6.2.1	Introduction	Considered	P
5.6.2.2	Covers	It is unlikely that during the removal of any covers service personnel may touch hazardous voltage or energy.	P
5.6.2.3	Location and guarding of parts	Only the exchange of the battery is considered as possible servicing. A risk of injury is unlikely for the service personnel.	P
5.6.2.4	Parts on doors	The UPS is designed with only screwed enclosure parts.	P

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.6.2.5	Component access	No component access during operation mode necessary.	N
2.8.3/RD	Inadvertent reactivation		N
5.6.2.6	Moving parts	Checked by inspection, unintentional contact is unlikely during service operations.	P
5.6.2.7	Capacitor banks	No Capacitor banks.	N
5.6.2.8	Internal batteries	The terminals of the battery connections are isolated and covered so that it is unlikely to bridge the terminals of the battery during servicing or its replacement.	P

5.7 2.10/RD	Clearances, creepage distances and distances through insulation		P
2.10.1/RD	General	See below.	P
2.10.1.1/RD	Frequency .....	Considered.	P
2.10.1.2/RD	Pollution degrees .....	II	P
2.10.1.3/RD	Reduced values for functional insulation	The functional insulations comply with 5.3.4/RD a) and c)	P
2.10.1.4/RD	Intervening unconnected conductive parts	Considered.	P
2.10.1.5/RD	Insulation with varying dimensions	No such transformer used.	P
2.10.1.6/RD	Special separation requirements	Special separation is not used.	N
2.10.1.7/RD	Insulation in circuits generating starting pulses	No such circuit generating starting pulses.	N
2.10.2/RD	Determination of working voltage	(See appended table 5.7)	P
2.10.2.1/RD	General	See below.	P
2.10.2.2/RD	RMS working voltage	(See appended table 5.7)	P
2.10.2.3/RD	Peak working voltage	(See appended table 5.7)	P
2.10.3/RD	Clearances	See below.	P
2.10.3.1/RD	General	See below.	P
2.10.3.2/RD	Mains transient voltages	See below.	P
	a) AC mains supply .....	Equipment is Overvoltage Category II.	P
	b) Earthed d.c. mains supplies .....	Not intended for d.c. mains supplies	N
	c) Unearthed d.c. mains supplies :	Not intended for d.c. mains supplies	N
	d) Battery operation :	Dedicated battery used.	P
2.10.3.3/RD	Clearances in primary circuits	(see appended table 5.7)	P

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
2.10.3.4/RD	Clearances in secondary circuits	(see appended table 5.7)	P
2.10.3.5/RD	Clearances in circuits having starting pulses	No such circuit generating starting pulses.	N
2.10.3.6/RD	Transients from a.c. mains supply :	Considered.	P
2.10.3.7/RD	Transients from d.c. mains supply :	Not connected to d.c. mains supply.	N
2.10.3.8/RD	Transients from telecommunication networks and cable distribution systems :	No TNV circuits	N
2.10.3.9/RD	Measurement of transient voltage levels	Measurement not relevant	N
	a) Transients from a mains supply		N
	For an a.c. mains supply :		N
	For a d.c. mains supply :		N
	b) Transients from a telecommunication network :		N
2.10.4/RD	Creepage distances	(see appended table 5.7)	P
2.10.4.1/RD	General	See below.	P
2.10.4.2/RD	Material group and comparative tracking index	Material IIIb is used.	P
	CTI tests .....	CTI rating for all material of min. 100.	—
2.10.4.3/RD	Minimum creepage distances	(see appended table 5.7)	P
2.10.5 /RD	Solid insulation	Considered.	P
2.10.5.1/RD	General	See below.	P
2.10.5.2/RD	Distances through insulation	(see appended table 5.8)	P
2.10.5.3/RD	Insulating compound as solid insulation	Approved opto-couplers, see appended table 4.5	P
2.10.5.4/RD	Semiconductor devices	No semiconductor devices.	N
2.10.5.5/RD	Cemented joints	No cemented joint.	N
2.10.5.6/RD	Thin sheet material – General	See below.	P
2.10.5.7/RD	Separable thin sheet material	(see appended table 5.8)	P
	Number of layers (pcs).		—
2.10.5.8/RD	Non-separable thin sheet material	Not used.	N
2.10.5.9/RD	Thin sheet material – standard test procedure		N
2.10.5.10 /RD	Thin sheet material – (Alternative) test procedure		—
	Electric strength test		N
2.10.5.11 /RD	Insulation in wound components		—
2.10.5.12 /RD	Wire in wound components	See cl. 2.10.5.12/RD	N
	Working voltage :	No wound components.	N

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
	a) Basic insulation not under stress :		—
	b) Basic, supplementary, reinforced insulation :		N
	c) Compliance with Annex U :		N
	Two wires in contact inside wound component; angle between 45° and 90° :		N
2.10.5.13 /RD	Wire with solvent-based enamel in wound components		N
	Electric strength test	No wire with solvent-based enamel in wound components.	N
	Routine test	(see appended table 8.2)	—
2.10.5.14 /RD	Additional insulation in wound components		N
	Working voltage :	No additional insulation used.	N
	- Basic insulation not under stress :		—
	- Supplementary, reinforced insulation :		N
2.10.6/RD	Construction of printed boards		N
2.10.6.1/RD	Uncoated printed boards	See below.	N
2.10.6.2/RD	Coated printed boards	(see appended table 5.7)	P
2.10.6.3/RD	Insulation between conductors on the same inner surface of a printed board	No such part.	N
2.10.6.4/RD	Insulation between conductors on different layers of a printed board	No such part.	N
	Distance through insulation	PCB layout does not serve as insulation barrier.	N
	Number of insulation layers (pcs) :		N
2.10.7/RD	Component external terminations		N
2.10.8/RD	Tests on coated printed boards and coated components	No such part.	N
2.10.8.1/RD	Sample preparation and preliminary inspection	No such part.	N
2.10.8.2/RD	Thermal conditioning		N
2.10.8.3/RD	Electric strength test		N
2.10.8.4/RD	Abrasion resistance test		—
2.10.9/RD	Thermal cycling		N
2.10.10/RD	Test for Pollution Degree 1 environment and insulating compound		N
2.10.11/RD	Tests for semiconductor devices and cemented joints	Approved opto-couplers, see appended table 4.5	P
2.10.12/RD	Enclosed and sealed parts	No such device used.	N



IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict

6	Wiring, connections and supply		P
6.1	General	Considered.	P
6.1.1	Introduction	Considered.	P
3.1/RD	General	See below.	P
3.1.1/RD	Current rating and overcurrent protection	Adequate cross sectional areas on internal wiring and interconnecting cables.	P
3.1.2/RD	Protection against mechanical damage	Wireways are smooth and free from edges. Wires are adequately fixed to prevent excessive strain on wire and terminals and avoiding damage to the insulation of the conductors.	P
3.1.3/RD	Securing of internal wiring	Internal wiring is secured against excessive strain, loosening of terminals and damage to the conductor insulation.	P
3.1.4/RD	Insulation of conductors	Insulation on internal conductors is considered to be of adequate quality and suitable for the application and the working voltage involved.	P
3.1.5/RD	Beads and ceramic insulators	No beads or similar ceramic insulators on conductors.	N
3.1.6/RD	Screws for electrical contact pressure	No such screw.	N
3.1.7/RD	Insulating materials in electrical connections	No contact pressure through insulating material.	N
3.1.8/RD	Self-tapping and spaced thread screws	Thread-cutting or space thread screws are not used for electrical connections.	N
3.1.9/RD	Termination of conductors	Terminations can't become displaced so that clearances and creepage distances can be reduced.	P
	10 N pull test	Considered	P
3.1.10/RD	Sleeving on wiring	Sleeves can only be removed by breaking or cutting.	P
6.1.2	Dimensions and rating of busbars and insulated conductors		P

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
6.2	Connection to power		P
6.2.1	General provisions for connection to power		P
3.2.2/RD	Multiple supply connections	Only one supply connections.	P
3.2.3/RD	Permanently connected equipment	Screw terminal used.	P
	Number of conductors, diameter of cable and conduits (mm) :		—
3.2.4/RD	Appliance inlets	No appliance inlet.	N
3.2.5/RD	Power supply cords	No provided.	N
3.2.5.1/RD	AC power supply cords		N
	Type :		—
	Rated current (A), cross-sectional area (mm <sup>2</sup> ), AWG :		—
3.2.5.2/RD	DC power supply cords	Not used.	N
3.2.6/RD	Cord anchorages and strain relief		N
	Mass of equipment (kg), pull (N) :		—
	Longitudinal displacement (mm) :		—
3.2.7/RD	Protection against mechanical damage		N
3.2.8/RD	Cord guards		N
	Diameter or minor dimension D (mm); test mass (g) :		—
	Radius of curvature of cord (mm) :		—
6.2.2	Means of connection :	Screw terminal used.	P
	More than one supply connection :	Only one connection.	P
6.3	Wiring terminals for external power conductors		N
3.3/RD	Wiring terminals for connection of external conductors		P
3.3.1/RD	Wiring terminals	Each phase and output with separate terminal of same type screw. Screw terminal for cable lug only used for earthing	P
3.3.2/RD	Connection of non-detachable power supply cords		N
3.3.3/RD	Screw terminals	Screw terminals used	P
3.3.4/RD	Conductor sizes to be connected	Conductor size will be connected according to installation manual.	P

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Rated current (A), cord/cable type, cross-sectional area (mm <sup>2</sup> ) .....	Conductor size will be connected according to installation manual.	—
3.3.5/RD	Wiring terminal sizes		P
	Rated current (A), type, nominal thread diameter (mm) .....		—
3.3.6/RD	Wiring terminal design		P
3.3.7/RD	Grouping of wiring terminals		P
3.3.8/RD	Stranded wire		N
7	Physical requirements		P
7.1	Enclosure	The enclosure is not used to carry current, nor any part serves as functional part.	P
7.2 4.1/RD	Stability		P
	Angle of 10	All models of the UPS do not overbalance when tilted to an angle of 10 degree.	P
	Test force (N) :	250N applied to UPS for model HT33120	P
7.3 4.2/RD	Mechanical strength		P
4.2.1/RD	General	Complies with the requirement also after tests described below are applied.	P
4.2.2/RD	Steady force test, 10 N	No hazard, ref. comment in appended table 5.7, 2.10.4/RD.	—
4.2.3/RD	Steady force test, 30 N	No internal enclosure	N
4.2.4/RD	Steady force test, 250 N	No hazard. The test is performed on all sides of enclosure.	P
4.2.5/RD	Impact test	See below.	P
	Fall test	No hazard as result from the steel sphere fall test.	P
	Swing test	No hazard as result from the steel sphere swing test.	P
4.2.6/RD	Drop test; height (mm):	Drop test not applicable	N
4.2.7/RD	Stress relief test	Metal enclosure.	—

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
4.2.8/RD	Cathode ray tubes	CRT(s) not used in the equipment.	N
	Picture tube separately certified :		—
4.2.9/RD	High pressure lamps	No high pressure lamps in the equipment.	N
4.2.10/RD	Wall or ceiling mounted equipment; force (N) :	No wall or ceiling mounted equipment	N

7.4	Construction details		P
7.4.1	Introduction	Considered.	P
4.3.1/RD	Edges and corners	All edges and corners are rounded and/or smoothed.	P
4.3.2/RD	Handles and manual controls; force (N) ..... :	No handles	N
4.3.3/RD	Adjustable controls	No adjustable controls.	N
4.3.4/RD	Securing of parts	No loosening of parts impairing creepage distances or clearances is likely to occur.	P
4.3.5/RD	Connection by plugs and sockets	No outlet provided.	N
4.3.7/RD	Heating elements in earthed equipment	No heating elements provided.	N
4.3.11/RD	Containers for liquids or gases	The equipment does not contain flammable liquids or gases.	N
4.4/RD	Protection against hazardous moving parts	No moving parts.	P
4.4.1/RD	General	DC fan located at secondary circuit. The enclosure of the unit provide as fan guard. Test finger applied to openings. No fan blade accessible.	P
4.4.2/RD	Protection in operator access areas :	See 4.4.1	P
4.4.3/RD	Protection in restricted access locations :	Not for restricted access locations.	P
4.4.4/RD	Protection in service access areas	See 4.4.1	P
4.4.5/RD	Protection against moving fan blades	Considered	P
4.4.5.1/RD	General	See below.	P
	Not considered to cause pain or injury. a) ..... :	(See appended table 7.7)	P
	Is considered to cause pain, not injury. b) ..... :		—
	Considered to cause injury. c) ..... :	(See appended table 7.7)	P
4.4.5.2	Protection for users	(See appended table 7.7)	P
	Use of symbol or warning ..... :		P
4.4.5.3	Protection for service persons	(See appended table 7.4.2)	P
	Use of symbol or warning ..... :		N

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
4.5/RD	Thermal requirements	No castors provided.	N
4.5.1/RD	General	See below.	P
4.5.2/RD	Temperature tests	(See appended table 7.7)	P
	Normal load condition per Annex L :		
4.5.3/RD	Temperature limits for materials	(See appended table 7.7)	P
4.5.4/RD	Touch temperature limits	(See appended table 7.7)	P
4.5.5/RD	Resistance to abnormal heat :		P
7.4.2	Openings	(See appended table 7.4.2)	P
7.4.3	Gas Concentration	The ventilation by openings exceeds the required airflow. Refer to Annex M.	P
7.4.4	Equipment movement		N

7.5 4.7/RD	Resistance to fire		P
4.7.1/RD	Reducing the risk of ignition and spread of flame	See below.	P
	Method 1, selection and application of components wiring and materials	Method 1 is used. (See appended table 7.5)	P
	Method 2, application of all of simulated fault condition tests		N
4.7.2/RD	Conditions for a fire enclosure	See below.	P
4.7.2.1/RD	Parts requiring a fire enclosure	The fire enclosure is required to cover all parts.	P
4.7.2.2/RD	Parts not requiring a fire enclosure	The fire enclosure is required to cover all parts.	N
4.7.3/RD	Materials	See below.	P
4.7.3.1/RD	General	Considered.	P
4.7.3.2/RD	Materials for fire enclosures	Metal enclosure. (See appended table 4.3)	N
4.7.3.3/RD	Materials for components and other parts outside fire enclosures	No parts outside the fire enclosure.	N
4.7.3.4/RD	Materials for components and other parts inside fire enclosures	Other materials inside fire enclosure are minimum V-2 material. Battery enclosure is of HB.	P
4.7.3.5/RD	Materials for air filter assemblies	No air filters in the equipment.	N
4.7.3.6/RD	Materials used in high-voltage components	No parts exceeding 4kV.	N

7.6	Battery location		N
7.6.1	Battery location and installation	No internal batteries provided	N
7.6.2	Accessibility and maintainability		N

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
7.6.3	Distance		N
7.6.4	Case insulation		N
7.6.5	Wiring		N
7.6.6	Electrolyte spillage		N
7.6.7	Ventilation		N
7.6.8	Charging voltage		N
7.7	Temperature rise		P
4.5/RD	Thermal requirements	Considered	P
4.5.1/RD	General	See below.	P
4.5.2/RD	Temperature tests	(See appended table 7.7)	P
	Normal load condition per Annex L ..... :		—
4.5.3/RD	Temperature limits for materials	(See appended table 7.7)	P
4.5.4/RD	Touch temperature limits	(See appended table 7.7)	P
4.5.5/RD	Resistance to abnormal heat ..... :	(See appended table 7.4)	P
8	Electrical requirements and simulated abnormal conditions		P
8.1	General provisions for earth leakage		P
5.1.1/RD	General	Test conducted in accordance with Sub-clause 8.1	P
5.1.7/RD	Equipment with touch current exceeding 3,5 mA		P
8.2 5.2/RD	Electric strength		P
5.2.1/RD	General	(see appended table 8.2)	P
5.2.2/RD	Test procedure	(see appended table 8.2)	P
8.3	Abnormal operating and fault conditions		P
8.3.1	General	Considered.	P
5.3.1/RD	Protection against overload and abnormal operation	(See appended table 8.3)	P
5.3.2/RD	Motors	(See appended Annex B)	P
5.3.3/RD	Transformers	(See appended Annex C)	P
5.3.4/RD	Functional insulation :	Complies with a) and c).	P
5.3.5/RD	Electromechanical components	No electromechanical components in secondary circuits.	N

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.3.9/RD	Compliance criteria for abnormal operating and fault conditions	No fire or molten metal occurred and no deformation of enclosure during the tests. No reduction of clearance and creepage distances. Electric strength test is made on basic, supplementary and reinforced insulation.	P
5.3.9.1/RD	During the tests	(See appended table 8.3)	P
5.3.9.2/RD	After the tests	(See appended table 8.3)	P
8.3.2	Simulation of faults	(See appended table 8.3)	P
8.3.3	Conditions for tests	(See appended table 8.3)	P

9 6/RD	Connection to telecommunication networks		N
6.1/RD	Protection of telecommunication network service persons, and users of other equipment connected to the network, from hazards in the equipment		N
6.1.1/RD	Protection from hazardous voltages		N
6.1.2/RD	Separation of the telecommunication network from earth		N
6.1.2.1/RD	Requirements		N
	Supply voltage (V) .....		
	Current in the test circuit (mA) .....		
6.1.2.2/RD	Exclusions .....		N
6.2/RD	Protection of equipment users from overvoltages on telecommunication networks		N
6.2.1/RD	Separation requirements		N
6.2.2/RD	Electric strength test procedure		N
6.2.2.1/RD	Impulse test		N
6.2.2.2/RD	Steady-state test		N
6.2.2.3/RD	Compliance criteria		N
6.3/RD	Protection of the telecommunication wiring system from overheating		N
	Max. output current (A) .....		
3.5/RD	Interconnection of equipment		N
3.5.1/RD	General requirements		N
3.5.2/RD	Types of interconnection circuits .....		N
3.5.3/RD	ELV circuits as interconnection circuits		N
3.5.4/RD	Data ports for additional equipment		N
2.1.3/RD	Protection in restricted access locations		N
2.3.1/RD	Limits		N
	Type of TNV circuits .....		

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
2.3.2/RD	Separation from other circuits and from accessible parts		N
2.3.2.1/RD	General requirements		N
2.3.2.2/RD	Protection by basic insulation		N
2.3.2.3/RD	Protection by earthing		N
2.3.2.4/RD	Protection by other constructions .....		N
2.3.3/RD	Separation from hazardous voltages		N
	Insulation employed .....		
2.3.4/RD	Connection of TNV circuits to other circuits		N
	Insulation employed .....		
2.3.5/RD	Test for operating voltages generated externally		N
2.6.5.8/RD	Reliance on telecommunication network or cable distribution system		N
2.10.3.3/RD	Clearances in primary circuits	(see appended table 5.7)	N
2.10.3.4/RD	Clearances in secondary circuits	(see appended table 5.7)	N
2.10.4/RD	Creepage distances		N
2.10.4.1/RD	General		N
2.10.4.2/RD	Material group and comparative tracking index		N
	CTI tests .....		N
2.10.4.3/RD	Minimum creepage distances		N
M/RD	ANNEX M, CRITERIA FOR TELEPHONE RINGING SIGNALS (see 2.3.1/RD)		N
M.1/RD	Introduction		N
M.2 /RD	Method A		N
M.3/RD	Method B		N
M.3.1/RD	Ringing signal		N
M.3.1.1/RD	Frequency (Hz) .....		
M.3.1.2/RD	Voltage (V) .....		
M.3.1.3/RD	Cadence; time (s), voltage (V) .....		
M.3.1.4/RD	Single fault current (mA) .....		
M.3.2/RD	Tripping device and monitoring voltage .....		N
M.3.2.1/RD	Conditions for use of a tripping device or a monitoring voltage		
M.3.2.2/RD	Tripping device		N
M.3.2.3/RD	Monitoring voltage (V) .....		N
A/RD	Annex A, Tests for resistance to heat and fire		N



IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
A.1/RD	Flammability test for fire enclosures of movable equipment having a total mass exceeding 18 kg, and of stationary equipment (see 4.7.3.2/RD)		N
A.1.1/RD	Samples .....		
	Wall thickness (mm).....		
A.1.2/RD	Conditioning of samples; temperature (°C) .....		N
A.1.3/RD	Mounting of samples .....		N
A.1.4/RD	Test flame (see IEC 60695-11-3)		N
	Flame A, B, C or D .....		
A.1.5/RD	Test procedure		N
A.1.6/RD	Compliance criteria		N
	Sample 1 burning time (s) .....		
	Sample 2 burning time (s) .....		
	Sample 3 burning time (s) .....		
A.2/RD	Flammability test for fire enclosures of movable equipment having a total mass not exceeding 18 kg, and for material and components located inside fire enclosures (see 4.7.3.2/RD and 4.7.3.4/RD)		N
A.2.1/RD	Samples, material.....		
	Wall thickness (mm).....		
A.2.2/RD	Conditioning of samples; temperature (°C) .....		N
A.2.3/RD	Mounting of samples .....		N
A.2.4/RD	Test flame (see IEC 60695-11-4)		N
	Flame A, B or C .....		
A.2.5/RD	Test procedure		N
A.2.6/RD	Compliance criteria		N
	Sample 1 burning time (s) .....		
	Sample 2 burning time (s) .....		
	Sample 3 burning time (s) .....		
A.2.7/RD	(Alternative) test acc. to IEC 60695-11-5, cl. 5 and 9		N
	Sample 1 burning time (s) .....		
	Sample 2 burning time (s) .....		
	Sample 3 burning time (s) .....		
A.3/RD	Hot flaming oil test (see 4.6.2/RD)		N
A.3.1/RD	Mounting of samples		N
A.3.2/RD	Test procedure		N
A.3.3/RD	Compliance criterion		N

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
B/RD	Annex B, Motor tests under abnormal conditions (see 4.7.2.2/RD and 5.3.2/RD)		P
B.1/RD	General requirements	All fans are separately certified, see list of critical components. Only fan block test performed, for temperature, see fault condition tests	P
	Position .....		N
	Manufacturer .....		N
	Type .....		N
	Rated values .....		N
B.2/RD	Test conditions		N
B.3/RD	Maximum temperatures		N
B.4/RD	Running overload test		N
B.5/RD	Locked-rotor overload test		N
	Test duration (days) .....		N
	Electric strength test: test voltage (V) .....		N
B.6/RD	Running overload test for d.c. motors in secondary circuits		N
B.6.1/RD	General		N
B.6.2/RD	Test procedure		N
B.6.3/RD	(Alternative) test procedure		N
B.6.4/RD	Electric strength test; test voltage (V) .....		N
B.7/RD	Locked-rotor overload test for d.c. motors in secondary circuits		N
B.7.1/RD	General		N
B.7.2/RD	Test procedure		N
B.7.3/RD	(Alternative) test procedure		N
B.7.4/RD	Electric strength test; test voltage (V) .....		N
B.8/RD	Test for motors with capacitors		N
B.9/RD	Test for three-phase motors		N
B.10/RD	Test for series motors		N
	Operating voltage (V) .....		N
C/RD	Annex C, Transformers (see 1.5.4/RD and 5.3.3/RD)		N
	Position .....	No isolating transformer.	N
	Manufacturer .....		N
	Type .....		N
	Rated values .....		N

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Method of protection .....		N
C.1/RD	Overload test		N
C.2/RD	Insulation		N
	Protection from displacement of windings .....		N
D/RD	Annex D, Measuring instruments for touch current tests (see 5.1.4/RD)		P
D.1/RD	Measuring instrument		P
D.2/RD	(Alternative) measuring instrument		N
E/RD	Annex E, Temperature rise of a winding (see 1.4.13/RD)		N
F/RD	Annex F, Measurements of clearances and creepage distance (see 2.10/RD and Annex G/RD)		P
G/RD	Annex G, (Alternative) method for determining minimum clearances		N
G.1/RD	Clearances		N
G.1.1/RD	General		N
G.1.2/RD	Summary of the procedure for determining minimum clearances		N
G.2/RD	Determination of mains transient voltage (V)		N
G.2.1/RD	AC mains supply .....		N
G.2.2/RD	Earthed d.c. mains supplies .....		N
G.2.3/RD	Unearthed d.c. mains supplies .....		N
G.2.4/RD	Battery operation .....		N
G.3/RD	Determination of telecommunication network transient voltage (V) .....		N
G.4/RD	Determination of required withstand voltage (V)		N
G.4.1/RD	Mains transients and internal repetitive peaks :		N
G.4.2/RD	Transients from telecommunication networks . :		N
G.4.3/RD	Combination of transients		N
G.4.4/RD	Transients from cable distribution systems		N
G.5/RD	Measurement of transient voltages (V)		N
	a) Transients from a mains supply		N
	For an a.c. mains supply		N
	For a d.c. mains supply		N
	b) Transients from a telecommunication network		N
G.6/RD	Determination of minimum clearances .....		N

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
H	Annex H, Guidance on protection against ingress of water and foreign objects (see IEC 60529)		N
I	Annex I, Backfeed protection test		P
I.1	General		P
I.2	Test for pluggable UPS		N
I.3	Test for permanently connected UPS		P
I.4	Load-induced change of reference potential		N
I.5	Solid-state backfeed protection (see clause 7.1-7.5 of IEC 62040-2 and clause 7.1-7.2 of IEC 62040-3)		N
J/RD	Annex J, Table of electrochemical potentials (see 2.6.5.6/RD)		P
	Metal(s) used .....	Copper plated with tin and soldering lead.	
K/RD	Annex K, Thermal controls (see 1.5.3/RD and 5.3.8/RD)		N
K.1/RD	Making and breaking capacity		N
K.2 /RD	Thermostat reliability; operating voltage (V) ... :		N
K.3/RD	Thermostat endurance test; operating voltage (V) .....		N
K.4/RD	Temperature limiter endurance; operating voltage (V) .....		N
K.5/RD	Thermal cut-out reliability		N
K.6/RD	Stability of operation		N
L	Annex L, Reference loads		P
L.1	General		P
L.2	Reference resistive load		N
L.3	Reference inductive-resistive load		
L.4	Reference capacitive-resistive loads	Worst case power factors as specified by the manufacturer maintained during the relevant tests.	P
L.5	Reference non-linear load		N
L.5.1	Test method		N
L.5.2	Connection of the non-linear reference load		
L.5.3	Connection of the non-linear reference load		N
M	Annex M, Ventilation of battery compartments		N

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
M.1	General		N
M.2	Normal conditions		N
M.3	Blocked conditions		N
M.4	Overcharge conditions		N
N	Annex N, Minimum and maximum cross-sections of copper conductors suitable for connection (see 6.3)		N
U/RD	Annex U, Insulated winding wires for use without interleaved insulation (see 2.10.5.4/RD)		N
V/RD	Annex V, AC POWER DISTRIBUTION SYSTEMS (see 1.6.1/RD)		P
V.1/RD	Introduction		P
V.2/RD	TN power distribution systems	See sub-clause 1.6.1/RD.	P
V.3/RD	TT power distribution systems		P
V.4/RD	IT power distribution systems		P

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict

4.5	TABLE: list of critical components				P
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity1)
Whole unit					
Breaker	SOCOMEK	SIRCO CD 500A(2600304 9)	400VAC,500A	IEC:60947-3	--
Varistor (SCR1 SCR2 SCR3)	Semikron	SKKT323/16E	1600V;323A	--	UL:E63532
Current Transformer ( three provided)	Boulder	UMS33CT3	Class B	--	Test with appliance
Fuse( three provided)	Rixing	5C 3.15A 250V	3.15A 250V	--	VDE
Dc fan (four provided)	NMB	09225VA24QA L01	DC24V, 0.38A, 9.12W	--	UL:E89936
Insulation sheet	FORMEX	Formex GK-10	--	--	UL:E256266/E1 21855
wire	Various	Various	---	---	UL:E314168
ON ASY01_PS1203_PW3 board					
DC capacitor (C7,C8)	Jianghai	CD293-220UF	450V, 220uF, 85°C	--	UL
Optocouplers (U2)	NEC	PS2561	--	--	UL:E72422, VDE:40008862
Current Transformer (T2)	SIDNA	USS11CT2	Class B	--	Test with appliance
Transformer (T1)	SIDNA	UMS33P1T2	Class B	--	Test with appliance
Transformer (T3)	Boulder	UMXPS3T1	Class B	--	Test with appliance
Y2 capacitor (C3,C4,C5,C6, C59,C60 )	Various	CD16- E2GA472MYG S	250VAC/ 4700pF	IEC 60384- 14	VDE:124321
Y2 capacitor (C11,C12,C61)	Various	CS11- E2GA222MYN S	250VAC/ 2200pF	IEC 60384- 14	VDE:124321
PCB	Various	Various	V-0, 130°C	--	UL
ON ASY01_PS1203_MN1 board					

IEC 62040-1					
Clause	Requirement + Test		Result - Remark		Verdict
Transformer (T1)	Boulder	UMX33MN1T 1	Class B	--	Test with appliance
Fuse (F1)	LITTLFUSE	50CF F630mAH 250V	250V,630mA	--	VDE
PCB	Various	Various	V-0, 130°C	--	UL
ON ASY01_PS1203_TF3 board					
Optocouplers (U6-U13,U19)	NEC	PS2561	--	--	UL:E72422, VDE:40008862
Optocouplers (U6-U13,U19)	AVAGO	HCNR201- 550E	--	--	UL: E55361
Relay (RLY1, RLY2, RLY3 ,RLY4)	Hongfa	892-1CC-C- 24VDC	24VDC,5A	--	UL:E134517
PCB	Various	Various	V-0, 130°C	--	UL
ON SNT_ASY_3320_CQ_03 board					
Optocouplers (U2)	NEC	PS2561	--	--	UL:E72422, VDE:40008862
Y2 capacitor (C4,C5)	Various	CD16- E2GA472MYG S	250VAC/ 4700pF	IEC 60384- 14	VDE:124321
Transformer (T1,T2,T3)	SIDNA	UMS33P1T2	Class B	--	Test with appliance
PCB	Various	Various	V-0, 130°C	--	UL
ON ASY01_PS1203_EM2 board					
Y2 capacitor (C4,C5,C6,C7)	Various	CS11- E2GA222MYN S	250VAC/ 2200pF	IEC 60384- 14	VDE:124321
Fuse (F1,F2,F3)	Holly	6FF070H2 7A500V	7A, 500V	IEC:60127	--
PCB	Various	Various	V-0, 130°C	--	UL
ON SNT_ASY_3320_FR_01 board					
Y2 capacitor (C5,C6,C7,C8, C9,C10,C11,C 12,C13,C14)	Various	CS11- E2GA222MYN S	250VAC/ 2200pF	IEC 60384- 14	VDE:124321
PCB	Various	Various	V-0, 130°C	--	UL
1) an asterisk indicates a mark which assures the agreed level of surveillance.					

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict

4.6	TABLE: electrical data (in normal conditions)					P
Fuse#	I <sub>rated</sub> (A)	U(V)	P(W)	I(A)	P(VA)	Condition/status
Tested on model RM300/30X						
Input breaker	--	342V/50Hz	270008	432.71	300210	Charging of empty batteries and rated output load .
Input breaker	--	342V/60Hz	270007	432.71	300205	Ditto
Input breaker	450	380V/50Hz	270012	409.11	300215	Ditto
Input breaker	450	380V/60Hz	270010	409.10	300213	Ditto
Input breaker	450	415V/50Hz	270014	375.02	300211	Ditto
Input breaker	450	415V/60Hz	270008	375.01	300214	Ditto
Input breaker	--	456.5V/50Hz	270001	340.91	300213	Ditto
Input breaker	--	456.5V/60Hz	270004	340.92	300218	Ditto
Note(s): Please measure the input currents with normal load.						

5.1.1 and 2.1.1.7/RD	TABLE: discharge of capacitors in the primary circuit				P
Condition	$\tau$ calculated (s)	$\tau$ measured (s)	t <sub>u→0V</sub> (s)	Comments	
Tested on model I RM300/30X					
Power switch on (L1-N)	--	6	12	Vi= 376__Vp, 37% of Vi= 139__Vp, No load applied	
Power switch on (L2-N)	--	6	12	Vi= 376__Vp, 37% of Vi= 139__Vp, No load applied	
Power switch on (L3-N)	--	6	12	Vi= 376__Vp, 37% of Vi= 139__Vp, No load applied	
Power switch on (N-PE)	--	<1V	12	Vi= 376__Vp, 37% of Vi= 139__Vp, No load applied	
Note(s):					



IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict

5.1.4	TABLE: Backfeed protection test			P
Condition	Voltage measured (V)/current (mA)			Comments
	L-N	L-G	N-G	
No load	0.238V	11.2V	10.9V	Battery mode, Normal
Full load	0.334V	11.2V	10.9V	Ditto
No load	0.182V	0.134V	0.176V	Battery mode, Abnormal condition ( On DR4 Board PIN 15、 17 of U2__ short circuit)
Full load	0.196V	0.134V	0.176V	Battery mode, Abnormal condition ( On DR4 Board PIN 15、 17 of U2__ short circuit)
Note(s):				

5.2.1 and 2.2.2/RD	TABLE: SELV measurement (under normal conditions)			P
Transformer	Location	Voltage (max.) (V)		Voltage Limitation Component
		V peak	V d.c.	
Optocoupler (reinforced insulation)	<420	3000Va.c.	0.4	>0.4 1)
Supplementary information: 1). Approved component. For details refer to table 4.3.				

5.2.1 and 2.2.3/RD	TABLE: SELV measurement (under fault conditions)		N
Location	Voltage (max.) (V)	Comments	
Supplementary information:			

5.2.3 and 2.4.2/RD	TABLE: Limited current circuit measurement					N
Location	Voltage (V)	Current (mA)	Freq. (kHz)	Limit (mA)	Comments	
Supplementary information:						

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict

5.2.5 and 2.5/RD	TABLE: Limited power source measurement			N
		Limits	Measured	Verdict
According to Table 2B/2C (normal condition)				
	current (in A)			
	apparent power (in VA)			
According to Table 2B/2C (single fault condition)				
	current (in A)			
	apparent power (in VA)			
Supplementary information:				

5.3.1 and 2.6.3.4/RD	TABLE: Resistance of earthing measurement			P
	Location	Resistance measured (m?)/ voltage drop(V)	Comments	
Tested on model RM300/30X				
	I/P earth →O/P earth	1V	Test current of <u>  900  </u> A for <u>  8  </u> min.	
	I/P earth →metal enclosure	1V	Ditto	
	I/P earth →earth on PCB	1V	Ditto	
Supplementary information:				

7.5 and 8.3	TABLE: fault condition tests					P
	ambient temperature (°C) .....					25°C,if not otherwise stated
	model/type of power supply .....					See below
	manufacturer of power supply .....					See nameplate for details
	rated markings of power supply .....					See nameplate for details
component No.	fault	test voltage (V)	test time	fuse No.	fuse current (A)	result
charger board						
Q1 (c-e)	s-c	415	1s	--	-	UPS output and the charger normally, Q1 damaged, no hazards. Charge voltage: 276V, Output voltage: 397.3V.

IEC 62040-1						
Clause	Requirement + Test				Result - Remark	Verdict
Q1(g-e)	s-c	415	1s	--	-	UPS output and the charger normally, recoverable after fault removed, no hazards. Charge voltage: 276V, Output voltage: 397.3V.
Q1(c-g)	s-c	415	1s	--	-	UPS output and the charger normally, Q1 damaged , no hazards. Charge voltage: 276V, Output voltage: 397.3V.
DR2 board						
A+ IGBT(c-e)	s-c	415	1s	F1	--	UPS output and the charger operate normally, fuse F1 opened, IGBT module of A phase damaged, no hazards. Charge voltage: 276V, Output voltage: 397.3V.
A+ IGBT (c-g)	s-c	415	1s	F1	--	UPS output and the charger operate normally, fuse F1 opened, IGBT module of A phase damaged, no hazards. Charge voltage: 276V, Output voltage: 397.3V.
A+ IGBT (g-e)	s-c	415	10min	F1	--	UPS output and the charger operate normally, recoverable after fault removed, no hazards. Charge voltage: 276V, Output voltage: 397.3V.
Bus Voltage detecting resistor R31	s-c	415	10min	--	--	UPS work normally, no hazards. Charge voltage: 276V, Output voltage: 397.3V.
Bus Voltage detecting resistor R31	o-c	415	10min	--	--	UPS work normally, no hazards. Charge voltage: 276V, Output voltage: 397.3V.
BUS E-capacitor	s-c	415	1s	F1,F2,F3	--	UPS output and the charger operate normally, fuse F1/F2/F3 opened, IGBT module of A/B/C phase damaged, no hazards. Charge voltage: 276V, Output voltage: 397.3V.
MN1 board						
Transformer T1 pin 9-10	s-c	415	10min	F1	--	UPS output and the charger operate normally, no hazards. Charge voltage: 276V, Output voltage: 397.3V.

IEC 62040-1						
Clause	Requirement + Test			Result - Remark		Verdict
Opto coupler U25 (pin1-2)	s-c	415	10min	---	--	UPS work normally, no hazards. Charge voltage: 276V, Output voltage: 397.3V.
Opto coupler U25 (pin3-4)	s-c	415	10min	--	--	UPS work normally, no hazards. Charge voltage: 276V, Output voltage: 397.3V.
Opto coupler U25 pin1	O-c	415	10min	--	--	UPS work normally, no hazards. Charge voltage: 276V, Output voltage: 397.3V.
Opto coupler U25 pin3	O-c	415	10min	--	--	UPS work normally, no hazards. Charge voltage: 276V, Output voltage: 397.3V.
D54	s-c	415	10min	--	--	UPS work normally, no hazards. Charge voltage: 276V, Output voltage: 397.3V.
Whole unit						
Output	s-c	415	1s	--	--	UPS output shut down immediately, the charger operate normally, no hazards. Charge voltage: 276V, Output voltage: 0V.
Output	s-c	battery	1s	--	--	UPS output shut down immediately, no hazards. Charge voltage: 0V, Output voltage: 0V.
Output	o-l	415	15min	--	--	UPS output shut down at condition of 5min at 100% load + 5min at 117% load + 2s at 133% load.
Output	o-l	Battery mode	15min	--	--	UPS output shut down at condition of 5min at 100% load + 5min at 117% load + 2s at 133% load.
Ventilation openings	Block-ed	415	30min.	--	--	UPS shut down at temperature protection, after the temperature is below 60°C, UPS open up. Repeat the cycle continuously.
Ventilation openings	Block-ed	Battery mode	30min	--	--	UPS shut down at temperature protection, after the temperature is below 60°C, UPS open up. Repeat the cycle continuously.

IEC 62040-1						
Clause	Requirement + Test				Result - Remark	Verdict
Fan	Locked	415	30mins	--	--	UPS shut down at temperature protection, after the temperature is below 60°C, UPS open up. Repeat the cycle continuously.
Fan	Locked	Battery mode	30mins	--	--	UPS shut down at temperature protection, after the temperature is below 60°C, UPS open up. Repeat the cycle continuously.
<b>Note(s):</b> s-c means short circuit. o-l means overload. o-p means open circuit.						

5.7 and 2.10.2/RD	TABLE: working voltage measurement			P
Location	RMS voltage (V)	Peak voltage (V)	comments	
Tested on model RM300/30X				
T1 pin1-pin6	20	6	Normal operation at rated load	
T1 pin1-pin7	19	7	Ditto	
T1 pin1-pin9	18	8	Ditto	
T1 pin1-pin10	20	6	Ditto	
T1 pin2-pin6	20	7	Ditto	
T1 pin2-pin7	20	8	Ditto	
T1 pin2-pin9	19	6	Ditto	
T1 pin2-pin10	18	7	Ditto	
T1 pin3-pin6	20	8	Ditto	
T1 pin3-pin7	20	6	Ditto	
T1 pin3-pin9	20	7	Ditto	
T1 pin3-pin10	20	8	Ditto	
T1 pin4-pin6	19	6	Ditto	
T1 pin4-pin7	18	7	Ditto	
T1 pin4-pin9	20	8	Ditto	
T1 pin4-pin10	20	8	Ditto	
U11 pin1-pin3	19	6	Ditto	
U11 pin1-pin4	18	7	Ditto	

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
U11 pin2-pin3	20	8	Ditto
U11 pin2-pin4	20	8	Ditto
Note: Vin=415V, 50Hz			

5.7 and 2.10.4/R D	TABLE: clearance and creepage distance measurements						P
clearance cl and creepage distance dcr at/of:	Up (V)	U r.m.s. (V)	required cl (mm)	cl (mm)	required dcr (mm)	dcr (mm)	
Whole unit							
PS1203 CT1 PCB							
Under C142 traces	<420	<250	2.0	7.8	2.5	7.8	
Under C143 traces	<420	<250	2.0	6.7	2.5	6.7	
PS1203 EM1 PCB							
Under C83 traces	<420	<250	2.0	5.8	2.5	5.8	
Under C53 traces	<420	<250	2.0	7.5	2.5	7.5	
Under C57 traces	<420	<250	2.0	7.7	2.5	7.7	
PE -J2 Pin	<420	<250	2.0	4.7	2.5	4.7	
IGBT metal-heatsink (PE)	<420	<250	2.0	6.0	2.5	6.0	
C7 Pin-heatsink (PE)	<420	<250	2.0	9.3	2.5	>9.3	
Parts(C1, C3, C4, C5, C6, C7, C8, C93, C94)-top metal enclosure (PE)	<420	<250	2.0	3.7	2.5	3.7	
PS1203 DR4 PCB							
PE (H1)-D53 Pin	<420	<250	2.0	5.4	2.5	5.4	
PE (H2)-C64 Pin	<420	<250	2.0	5.6	2.5	5.6	
PE (H5)-J13 traces	<420	<250	2.0	6.3	2.5	6.3	
PE (H4)-J22 traces	<420	<250	2.0	4.8	2.5	4.8	
PE (H3)-R194/J34 Pin	<420	<250	2.0	7.2	2.5	7.2	
IGBT metal-heatsink (PE)	<420	<250	2.0	6.0	2.5	6.0	
Parts(C100, C101, C102)-heatsink (PE)	<420	<250	2.0	7.5	2.5	>7.5	
Parts(C86, C87, C88, C89, C90, C91, C92, C93, C94)-top metal enclosure (PE)	<420	<250	2.0	3.7	2.5	3.7	

IEC 62040-1						
Clause	Requirement + Test	Result - Remark				Verdict
Parts(C96, C97)-top metal enclosure (PE)	<420	<250	2.0	2.7	2.5	2.7
PS1203 PW1 PCB						
PE (H1)-D2 Pin	<420	<250	2.0	4.2	2.5	4.2
PS1203 MN1 PCB						
PE (H1)-J2 Pin	<420	<250	2.0	4.1	2.5	4.1
PE (H2)-J10 Pin	<420	<250	2.0	2.8	2.5	2.8
PE (H3)-RLY1 Pin	<420	<250	2.0	5.3	2.5	5.3
PE (H4)-U18 Pin	<420	<250	2.0	3.8	2.5	3.8
Primary trace-secondary trace under optocouplers (U9, U10, U12, U13)	<420	<250	4.0	5.8	5.0	5.8
Primary trace-secondary trace under transformer (T1)	<420	<250	4.0	5.8	5.0	5.8
<p>Note(s):</p> <p>1.) A minimum clearance of 1.75mm for each contact pair had been provided (required according to sub-clause 5.1.4: 1.4mm minimum).</p> <p>2.) Shrink tubings are used to cover internal wires.</p>						

5.8, 2.1.1.3/R Dand 2.10.5.1 /RD	TABLE: electric strength tests, impulse tests and voltage surge tests	P
test voltage applied between:	test voltage (V)	breakdown Yes / No
Primary to Secondary (mains inlet&outlet conductor to USB port and RS232 port)	3000Vac	No
Primary to earth (mains inlet&outlet conductor to earth)	1500Vac	No
Primary winding to secondary winding of transformer T1 on MN1 Board	3000Vac	No
Primary winding to core of transformer T1 on MN1 Board	1500Vac	No
Secondary winding to core of transformer T1 on MN1 Board	1500Vac	No
1 layer insulation tape used in transformer T1 on MN1 Board	3000Vac	No
Primary to Secondary (mains input & output conductor to sub-D connector)	3000Vac	No

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Primary to earth (mains input & output conductor to earth)	1500Vac	No
Supplementary information:			

7.4, 4.5.5/RD	TABLE: Ball pressure test of thermoplastic parts		N
	Allowed impression diameter (mm) .....	≤ 2 mm	—
Part	Test temperature (°C)	Impression diameter (mm)	
Bobbin of T1	125	0.9	
Battery Connector	125	1.0	
Supplementary information:			

7.4.2	TABLE: openings		P
Location	Size (mm)	Comments	
Top	None	No openings.	
Bottom	None	No openings.	
Side	None	No openings.	
Front	6.5mm round openings	Ventilation openings provided. No hazardous parts within 5o angles.	
Back	9.6*24.8mm	Ventilation openings provided. No hazardous parts within 5o angles.	
Note(s):			

7.5	TABLE: resistance to fire			P
Part	Manufacturer of material	Type of material	Thickness (mm)	Flammability class
Material of Front panel	CHI MEI CORPORATION	PA-765A(+)	Min, thickness 2.1mm	--

7.7	TABLE A: maximum temperature rises		P
	test voltage (V) :	See below.	--



IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict

	T1 (°C) :	--		--
	T2 (°C) :	--		--
Temperature rise dT of part/at:	Tmax (°C)			allowed Tmax (°C)
	198V/50Hz	264V/50Hz	Battery mode	
Enclosure (plastic panel)	53.2	43.5	40.4	95
Enclosure (metal)	54.4	46.1	47.2	70
AC terminal	55.6	56.9	56.4	70
DC terminal	55.3	54.2	53.6	70
Tested on model RM300/30X	50	48		130
DC Fan	57.2	57.3	57.6	--
Battery wire '+'	52.3	41.2	55.8	105
Primary wire	52.6	52.8	55.7	105
X Capacitor on DR1 board	55.5	56.1	56.3	100
PCB near R on DR1 board	50.8	55.5	57.9	130
Transformer (T1) coil on MN1 board	51.3	52.6	54.2	110
Transformer (T1) core on MN1 board	50.0	49.6	49.8	110
Opto coupler on MN1 board	49.9	50.7	50.1	100
PCB near transformer T1 on MN1 board	48.6	48.7	49.6	130
Transformer (T1) coil on Charger board	48.2	48.8	48.8	110
Transformer (T1) core on Charger board	52.1	52.2	53.4	110
Transformer on DR2 board	59.6	60.0	52.3	110
Transformer on DR2 board	55.4	54.3	53.8	110
Inductor on CP3 board	55.2	55.1	51.3	110
Output relay on EM1 board	52.1	52.2	53.4	85

IEC 62040-1					
Clause	Requirement + Test			Result - Remark	Verdict

Safety relay on EM1 board	54.4	53.6	54.8	85			
E capacitor on DR2 board	50.6	48.1	40.9	105			
PCB near U2 on DR2 board	60.4	57.9	60.8	130			
Ambient	40	40	40	--			
Temperature T of winding:	R1 (Ω)	R2 (Ω)	T1 (°C)	T2 (°C)	T(°C)	Allowed Tmax (°C)	Insulation class
--	--	--	--	--	--	--	--

**Note(s):**

The temperatures were measured under worst case normal mode defined in 1.2.2.1/RD and as described in sub-clause 1.6.2/RD and at voltages as described above.

8.1	TABLE: earth leakage current				P
Condition	L → terminal A (mA)	N → terminal A (mA)	Limit (mA)	Comments	
<b>Tested on model RM300/30</b>					
Unit on	5.2	5.2	3.5	Switch "e" open, L to PE, no load	
Unit on	5.2	5.2	3.5	Switch "e" open, N to PE, no load	
Unit on	0.03	0.03	0.25	Switch "e" close, L to RS232 port	
Unit on	0.03	0.03	0.25	Switch "e" close, N to RS232 port.	
Supplementary information: Supply with 302.5V/50Hz.					

C.2	Safety isolation transformer	P
Construction details:		
Transformer: T1 on CNTL boar		
Mfr.: see table 1.5.1		
Type: see table 1.5.1		
All transformers are identical except for type designation, and wire gauge and number of turns in secondary winding.		
Recurring peak voltage	20Vpeak	
Required clearance for reinforced insulation (from table 2K and 2L)	4.0	

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Effective voltage rms	8Vrms	
	Required creepage for reinforced insulation (from table 2N )	5.0	
Measured min. creepages			
	Location	inside (mm)	outside (mm)
	prim-sec	5.8	6.2
	prim-core	2.8	2.8
	sec-core	2.8	2.8
	prim-prim	%	%
Measured min. clearances			
	Location	inside (mm)	outside (mm)
	prim-sec	5.8	6.2
	prim-core	2.5	2.5
	sec-core	2.5	2.5
	prim-prim	%	%
Construction:			
Concentric windings on EE16 type core. At least one layer insulation between primary and secondary windings. The primary windings and secondary winding were soldered to lead pins moulded in bobbin.			
Pin numbers			
	Prim.	1-2, 3-4	
	Sec.	6-7, 9-10	
Bobbin			
	Material		
	Thickness	0.7mm	
Electric strength test			
With AC 3000V after humidity treatment			
Result			

M	Ventilation of battery compartments	P
	The required dimension for the ventilation openings will be calculated with the following formula:	
	$A > K1 * Q$ with $Q = (0.054 \text{ m}^3/\text{Ah}) * n * I * C$	

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
	<p>where:</p> <p>K1 : constant factor of <math>28 \text{ h} \cdot \text{cm}^2/\text{m}^3</math></p> <p>Q : airflow in <math>\text{m}^3/\text{h}</math></p> <p>n : number of battery cells</p> <p>I : constant factor (0,2A/100Ah for valve regulated lead acid batteries)</p> <p>C : nominal capacity of the battery</p>		
	<p>With the specific data for the UPS the following dimension for the ventilation openings is required:</p>		
	<p>External battery pack</p> <p>n : 6</p> <p>C : 9</p> <p><math>A &gt; 28 \text{ h} \cdot \text{cm}^2/\text{m}^3 \cdot (0.054 \text{ m}^3/\text{Ah}) \cdot n \cdot 0.2 \text{ A}/100 \text{ Ah} \cdot C</math></p> <p><math>A &gt; 0.027 \text{ cm}^2</math></p>		
			Verdict
	<p>The size of ventilation openings in battery cabinet exceeds the required airflow by far.</p>		

Appendix 1

European group differences and national differences of EN 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict

<b>EN 62040-1, GROUP DIFFERENCES (CENELEC common modifications EN)</b>																																																															
Clause	Requirement + Test	Result - Remark	Verdict																																																												
Contents	Add the following annexes: Annex ZA (normative) Normative references to international publications with their corresponding European publications Annex ZB (normative) Special national conditions		P																																																												
<b>ZA</b>	<p><b>NORMATIVE REFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR CORRESPONDING EUROPEAN PUBLICATIONS</b></p> <p>The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.</p> <p>Note: When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD Applies.</p> <table border="1"> <thead> <tr> <th>Publication</th> <th>Year</th> <th>Title</th> <th>EN/HD</th> <th>Year</th> </tr> </thead> <tbody> <tr> <td>IEC 60364-4-42</td> <td>-<sup>1)</sup></td> <td>Electrical installations of buildings - Part 4-42: Protection for safety - Protection against thermal effects</td> <td>-</td> <td>-</td> </tr> <tr> <td>IEC 60417</td> <td>Data-base</td> <td>Graphical symbols for use on equipment</td> <td>-</td> <td>-</td> </tr> <tr> <td>IEC 60529</td> <td>-<sup>1)</sup></td> <td>Degrees of protection provided by enclosures (IP Code)</td> <td>EN 60529 + corr. May</td> <td>1991<sup>2)</sup> 1993</td> </tr> <tr> <td>IEC 60664</td> <td>Series</td> <td>Insulation coordination for equipment within low-voltage systems</td> <td>EN 60664</td> <td>Series</td> </tr> <tr> <td>IEC/TR 60755</td> <td>-<sup>1)</sup></td> <td>General requirements for residual current operated protective devices</td> <td>-</td> <td>-</td> </tr> <tr> <td>IEC 60950-1 (mod)</td> <td>2005</td> <td>Information technology equipment - Safety - Part 1: General requirements</td> <td>EN 60950-1</td> <td>2006</td> </tr> <tr> <td>IEC 61000-2-2</td> <td>-<sup>1)</sup></td> <td>Electromagnetic compatibility (EMC) - Part 2-2: Environment - Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems</td> <td>EN 61000-2-2</td> <td>2002<sup>2)</sup></td> </tr> <tr> <td>IEC 61008-1 (mod)</td> <td>-<sup>1)</sup></td> <td>Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCB's) - Part 1: General rules</td> <td>EN 61008-1 + A11</td> <td>2004<sup>2)</sup> 2007</td> </tr> <tr> <td>IEC 61009-1 (mod)</td> <td>-<sup>1)</sup></td> <td>Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBO's) - Part 1: General rules</td> <td>EN 61009-1 + corr. July + A11</td> <td>2004<sup>2)</sup> 2006 2008</td> </tr> <tr> <td>IEC 62040-2</td> <td>2005</td> <td>Uninterruptible power systems (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements</td> <td>EN 62040-2 + corr. November</td> <td>2006 2006</td> </tr> <tr> <td>IEC 62040-3 (mod)</td> <td>1999</td> <td>Uninterruptible power systems (UPS) - Part 3: Method of specifying the performance and test requirements</td> <td>EN 62040-3</td> <td>2001</td> </tr> </tbody> </table> <p><sup>1)</sup> Undated reference. <sup>2)</sup> Valid edition at date of issue.</p>	Publication	Year	Title	EN/HD	Year	IEC 60364-4-42	- <sup>1)</sup>	Electrical installations of buildings - Part 4-42: Protection for safety - Protection against thermal effects	-	-	IEC 60417	Data-base	Graphical symbols for use on equipment	-	-	IEC 60529	- <sup>1)</sup>	Degrees of protection provided by enclosures (IP Code)	EN 60529 + corr. May	1991 <sup>2)</sup> 1993	IEC 60664	Series	Insulation coordination for equipment within low-voltage systems	EN 60664	Series	IEC/TR 60755	- <sup>1)</sup>	General requirements for residual current operated protective devices	-	-	IEC 60950-1 (mod)	2005	Information technology equipment - Safety - Part 1: General requirements	EN 60950-1	2006	IEC 61000-2-2	- <sup>1)</sup>	Electromagnetic compatibility (EMC) - Part 2-2: Environment - Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems	EN 61000-2-2	2002 <sup>2)</sup>	IEC 61008-1 (mod)	- <sup>1)</sup>	Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCB's) - Part 1: General rules	EN 61008-1 + A11	2004 <sup>2)</sup> 2007	IEC 61009-1 (mod)	- <sup>1)</sup>	Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBO's) - Part 1: General rules	EN 61009-1 + corr. July + A11	2004 <sup>2)</sup> 2006 2008	IEC 62040-2	2005	Uninterruptible power systems (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements	EN 62040-2 + corr. November	2006 2006	IEC 62040-3 (mod)	1999	Uninterruptible power systems (UPS) - Part 3: Method of specifying the performance and test requirements	EN 62040-3	2001		—
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European group differences and national differences of EN 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
<b>ZB ANNEX (normative)</b>			
<b>SPECIAL NATIONAL CONDITIONS (EN)</b>			
<p>The FI, NO and SE - SNCs originate from IEC 60950-1 2<sup>nd</sup> Edition, which is the reference document (RD) for IEC 62040-1. The national requirements are included in IEC 62040-1 through the following statement in the scope of the standard:  <i>“National requirements additional to those in IEC 60950-1 apply and are found as notes under relevant clauses of the RD.”</i></p> <p>The national requirements have not been specifically listed in the EN 62040-1:2008.            If demanded, CLC/TC 22X will be requested to take proper measures to complete EN 62040-1 with Annexes ZB containing the SNCs as presented below.</p> <p>EN 62040-1:2008 supersedes EN 62040-1-1:2003. As a reference, see also SNCs for Finland, Norway and Sweden as included in the earlier EN 62040-1-1:2003</p>			
Clause	Requirement + Test	Result - Remark	Verdict
4.7.3	<p>In <b>Finland, Norway and Sweden</b>, when safety relies upon connection to the safety earth (see 5.3), a pluggable equipment type A UPS shall have a marking on the equipment, stating that the UPS must be connected to an earthed mains socket-outlet.</p> <p>The marking text in the applicable countries shall be as follows:</p> <p>In <b>Finland</b>: "Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan"</p> <p>In <b>Norway</b>: "Apparatet må tilkoples jordet stikkontakt"</p> <p>In <b>Sweden</b>: "Apparaten skall anslutas till jordat uttag"</p>		P
4.7.11	<p>In <b>Norway</b>, because of a widely used IT power system, equipment shall be designed or modified for connection to such a system and shall be marked by a label with the following wording in Norwegian:            "Apparatet er egnet for tilkøpling til et IT forsyningsnett"</p>		P
9	<p>In <b>Finland, Norway and Sweden</b> requirements of 6.1.2.1 and 6.1.2.2 in Annex ZB of EN 60950-1:2001 apply.</p>		P

Pictures



Fig. 1 – Front view for 1.6m high case model



Fig. 2 –Rear view for 1.6m high case model

Pictures



Fig. 3 –Inside view (I) for 1.6m high case model side view



Fig. 4 – Single module overview (I)



Pictures



Fig. 5 –Single module overview (II)

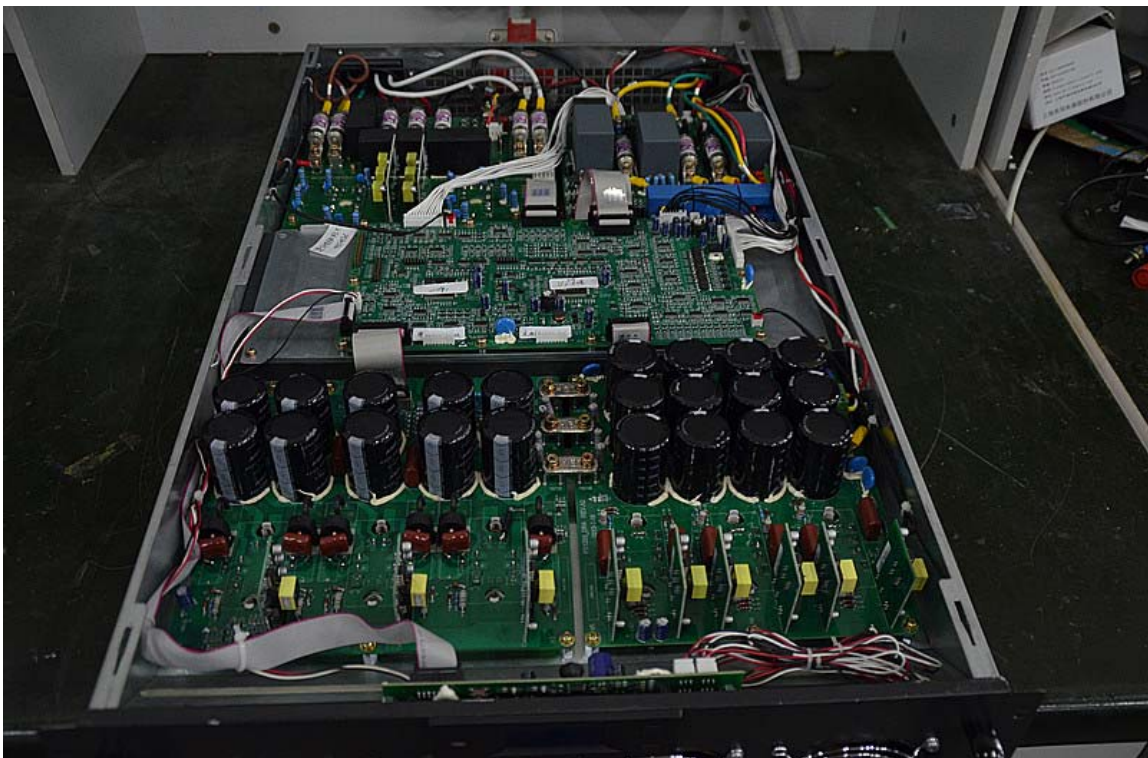


Fig. 6 –Inside view I



Pictures



Fig. 7 – Inside view II



Fig. 8 –PS1203 DR4 component view(I)



Pictures

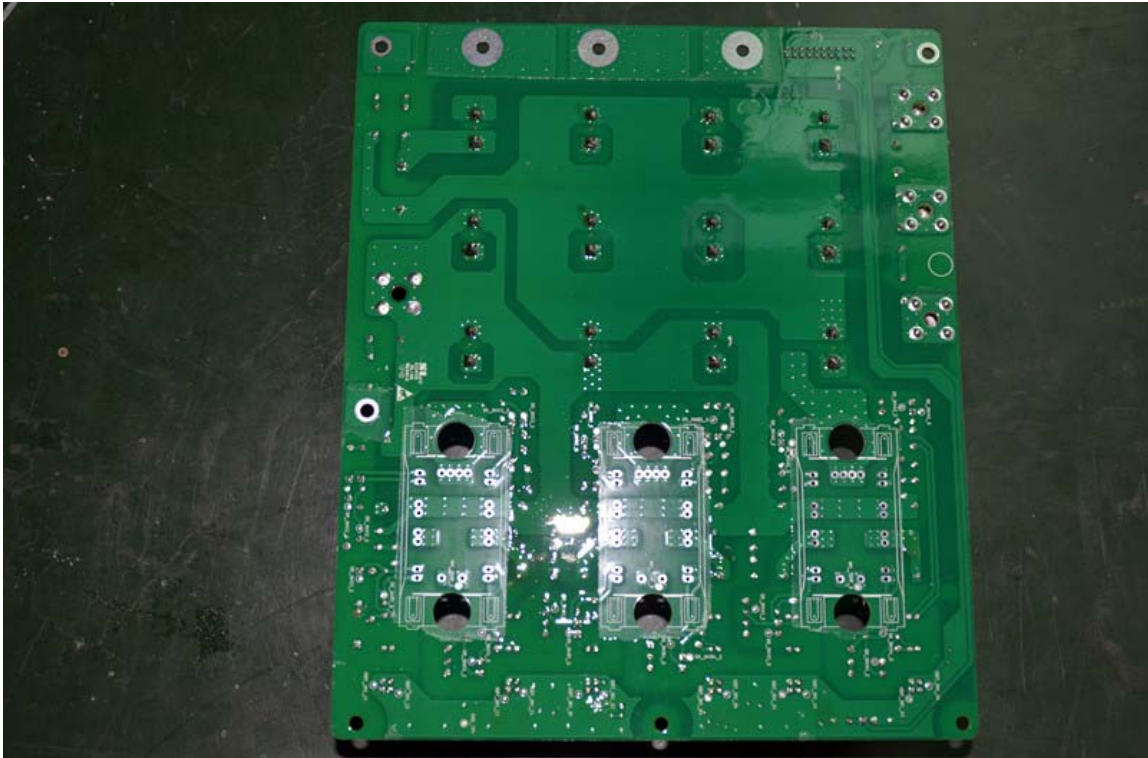


Fig. 9 –PS1203 DR4 trace view

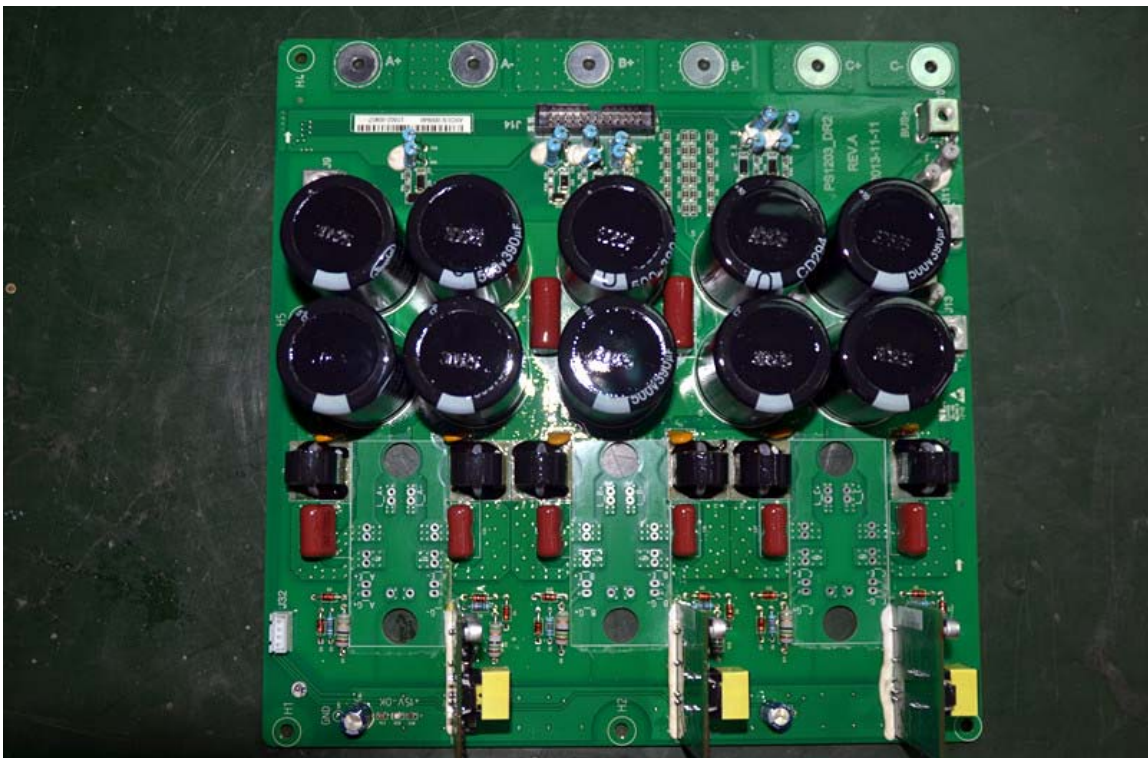


Fig. 10 –PS1203 DR2 component view

Pictures

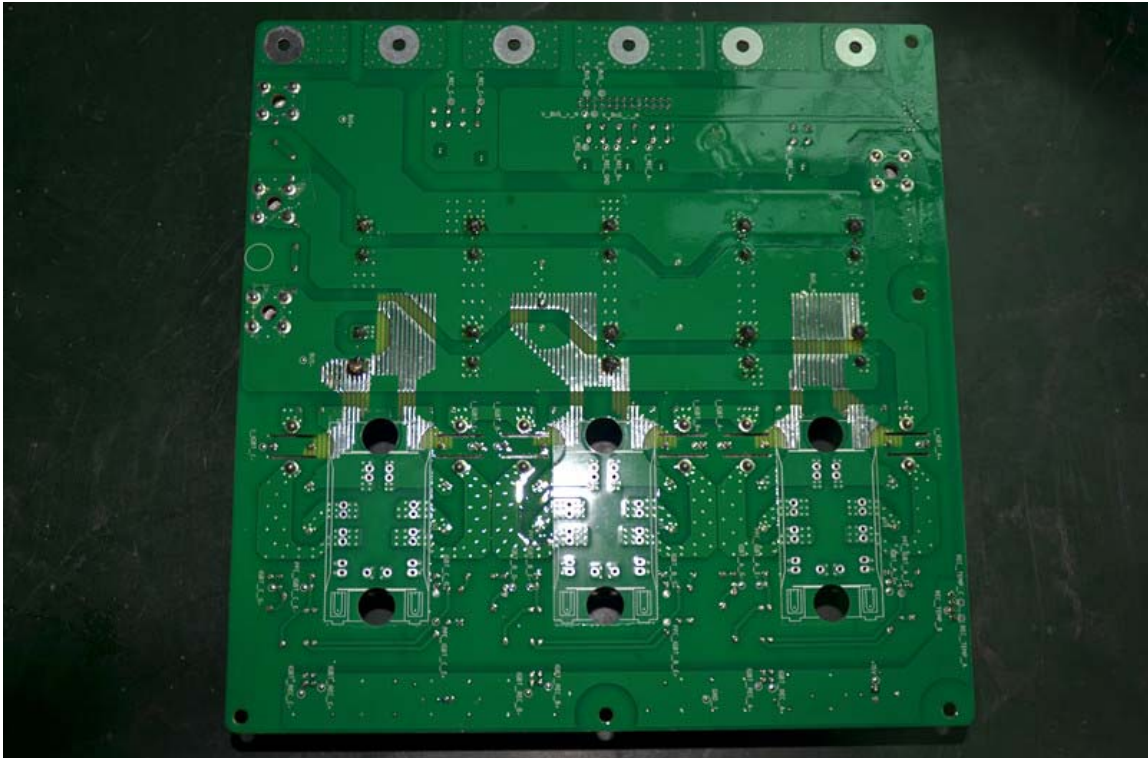


Fig. 11 –PS1203 DR2 trace view

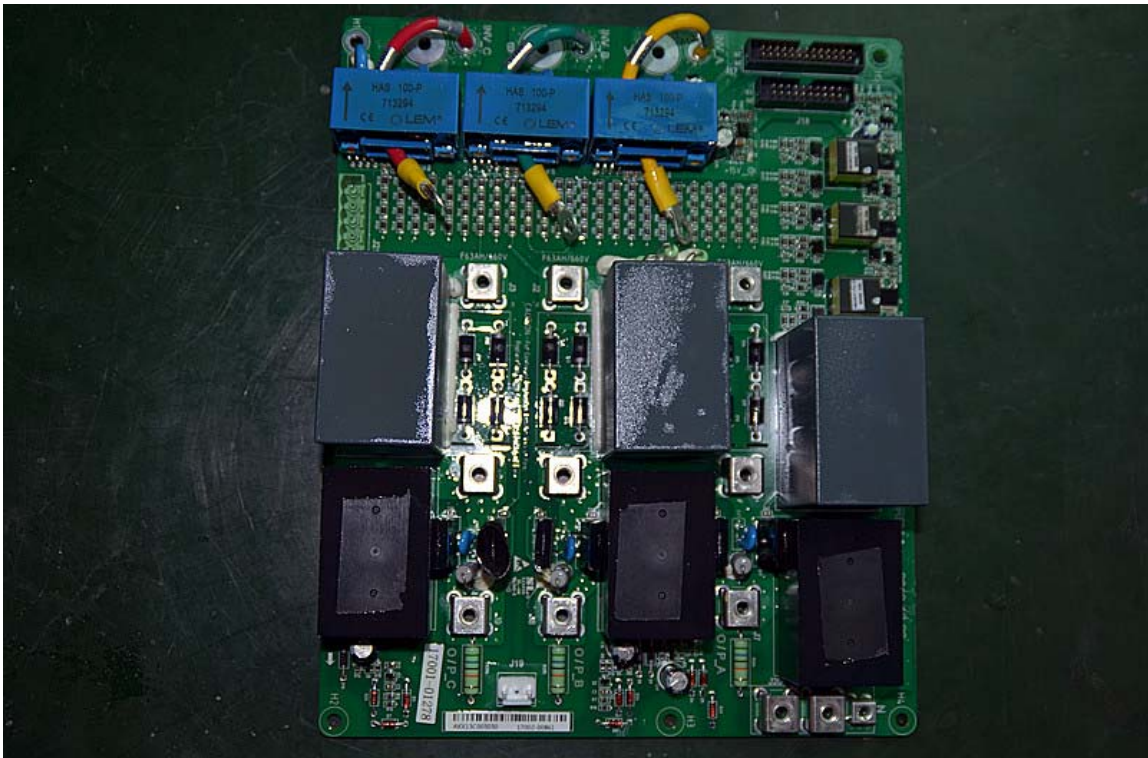


Fig. 12 –PS1203 EM1 component view



Pictures

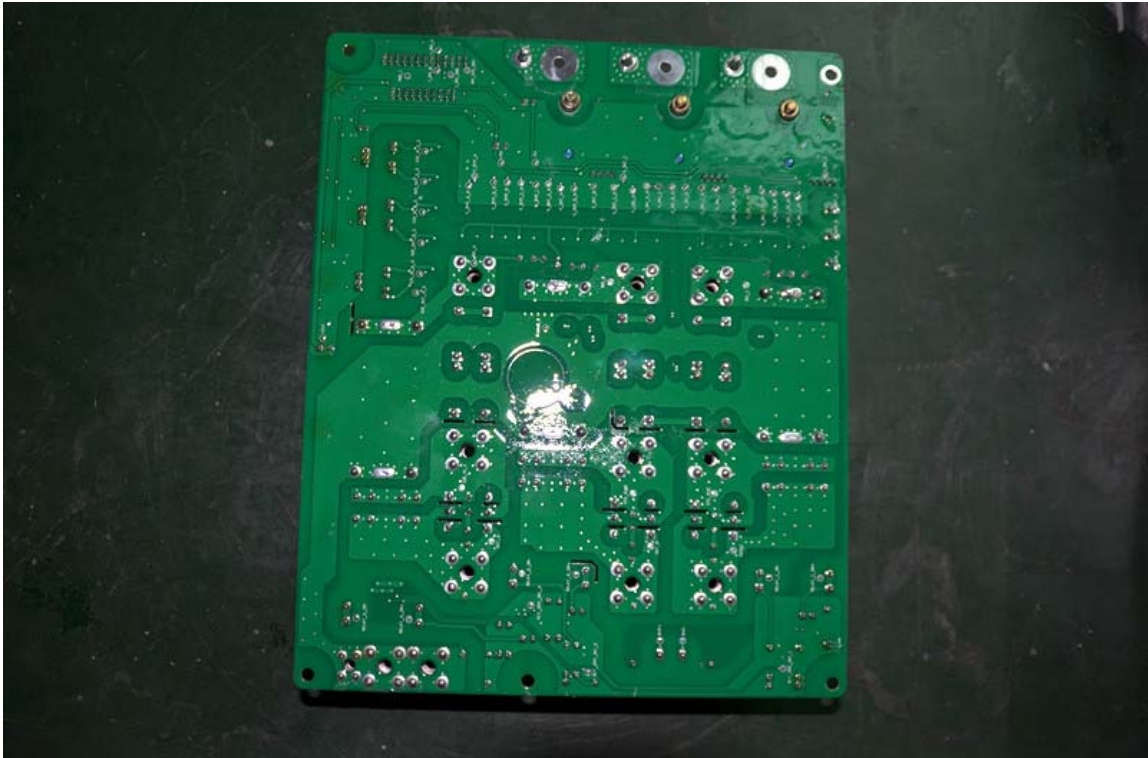


Fig.13 –PS1203 EM1 trace view

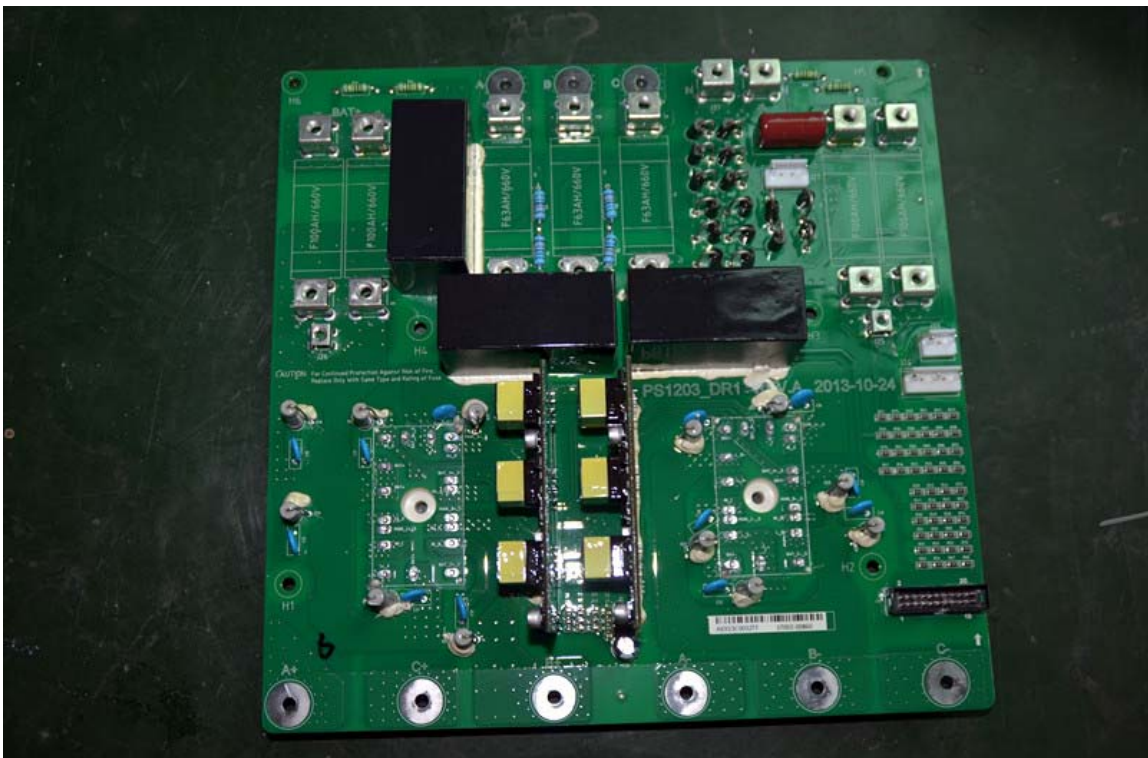


Fig. 14 –PS1203 DR1 component view

Pictures

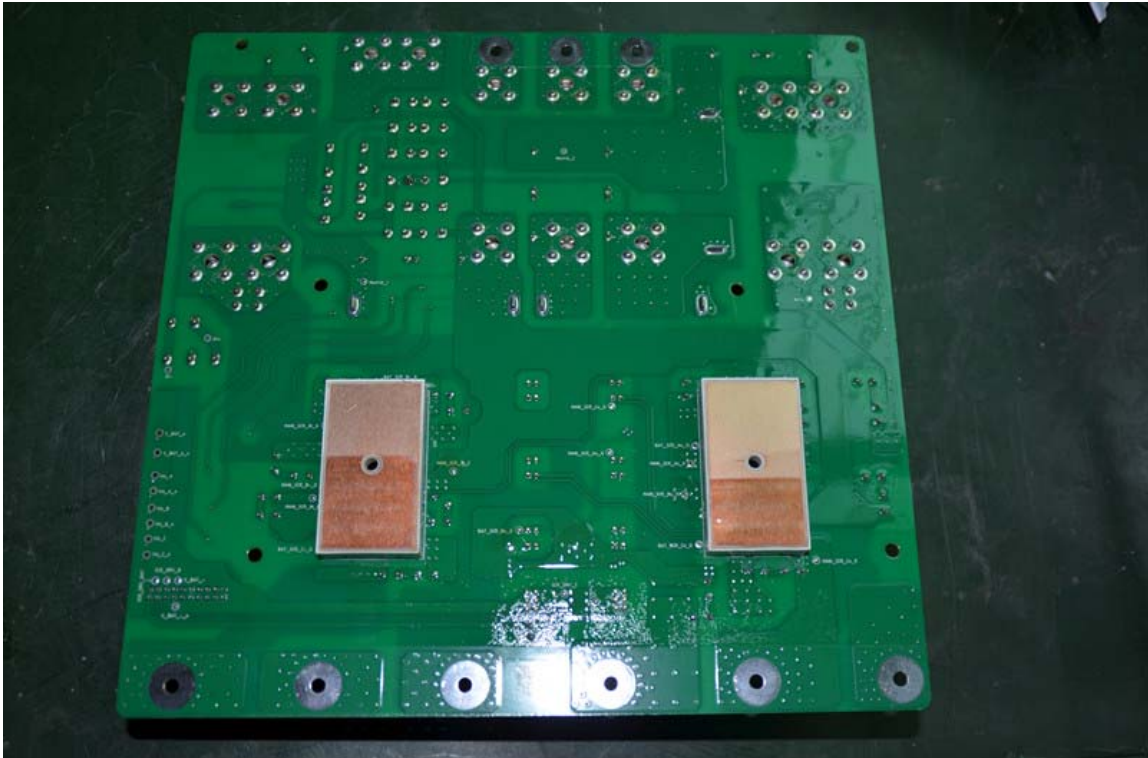


Fig. 15 –PS1203 DR1 trace view

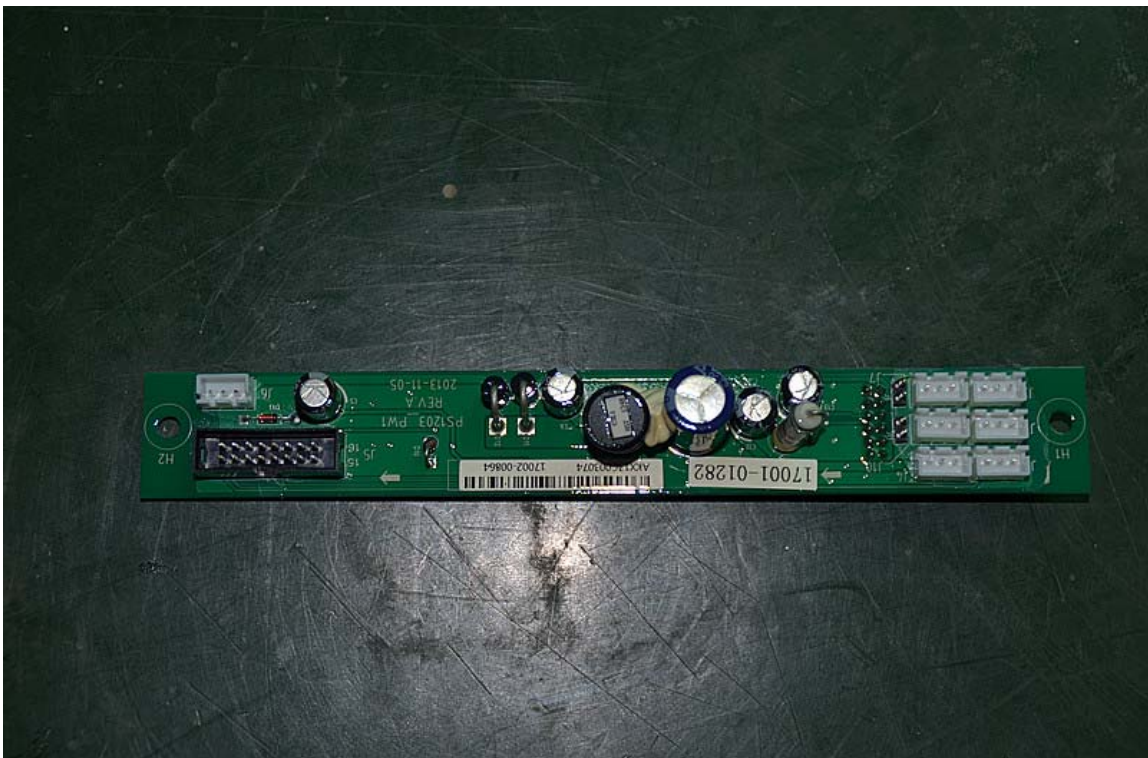


Fig. 16 –PS1203 PW1 component view



Pictures

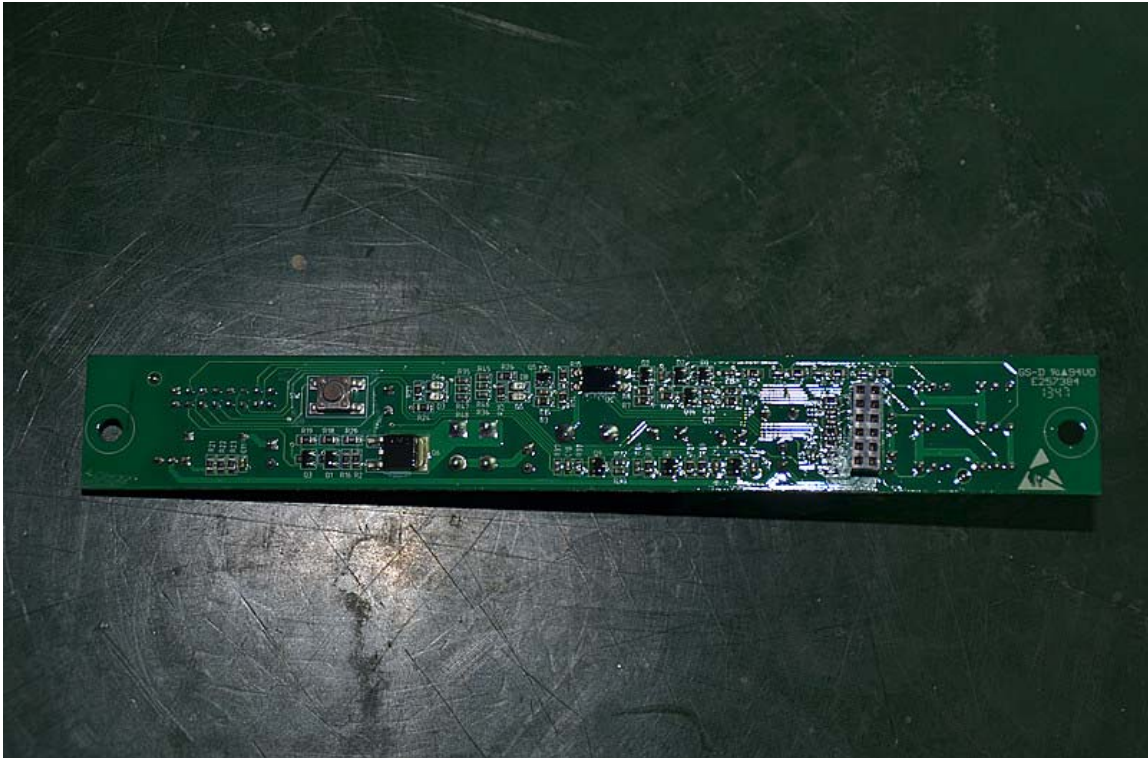


Fig. 17 –PS1203 PW1 trace view

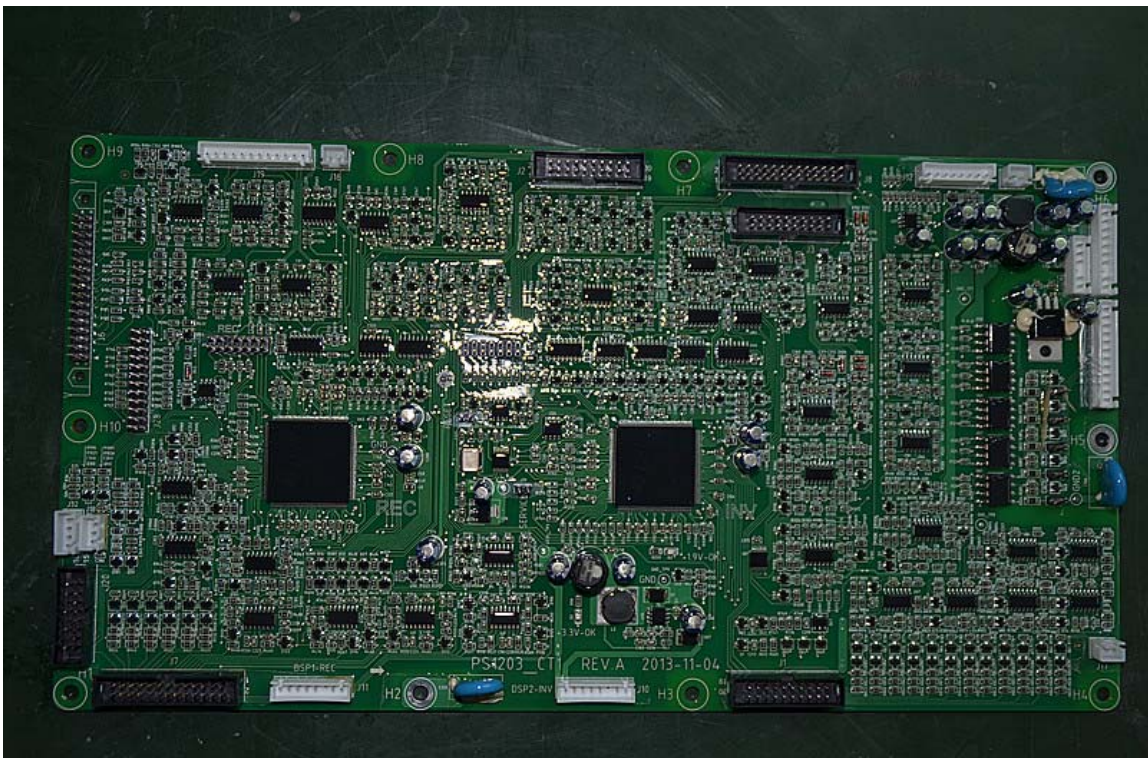


Fig. 18 –PS1203 CT1 component view



Pictures

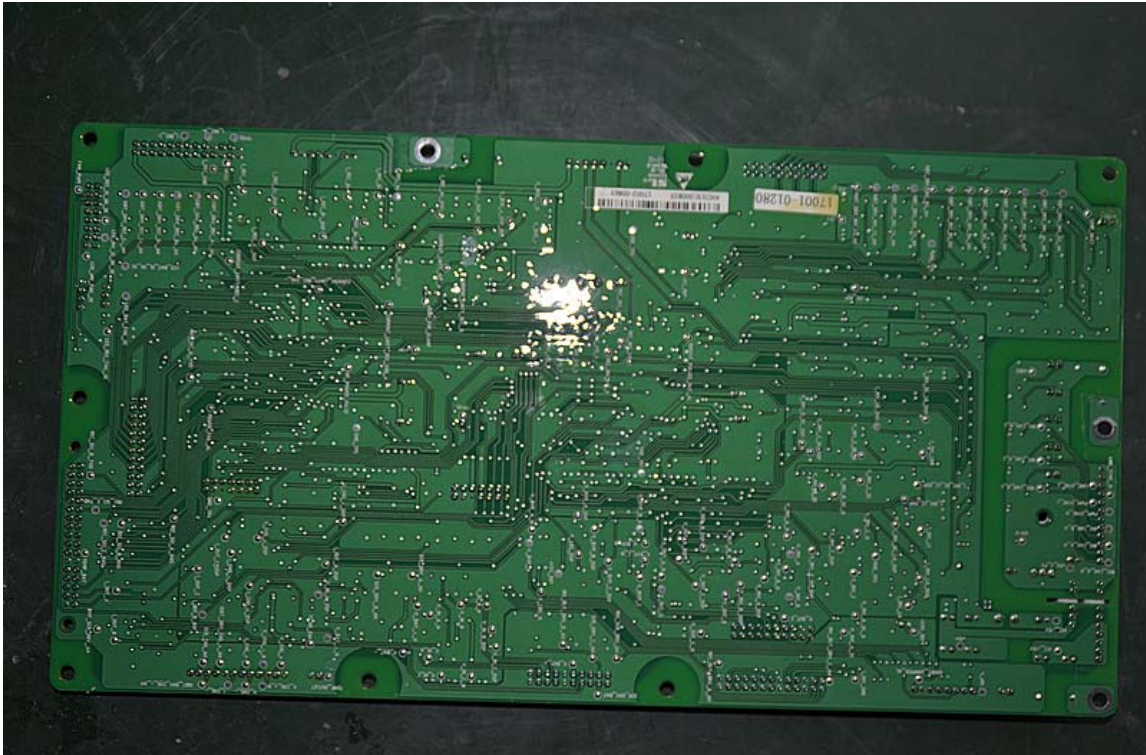


Fig. 19 –PS1203 CT1 trace view

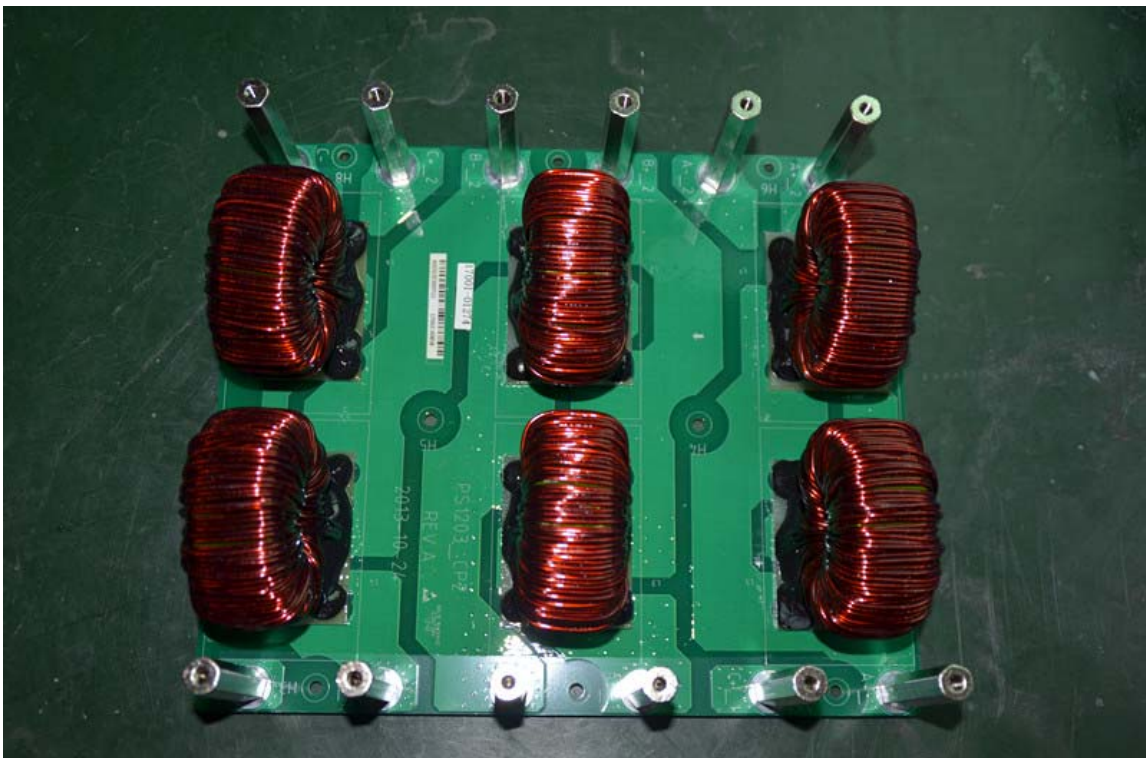


Fig. 20 –PS1203 CP2 component view



Pictures

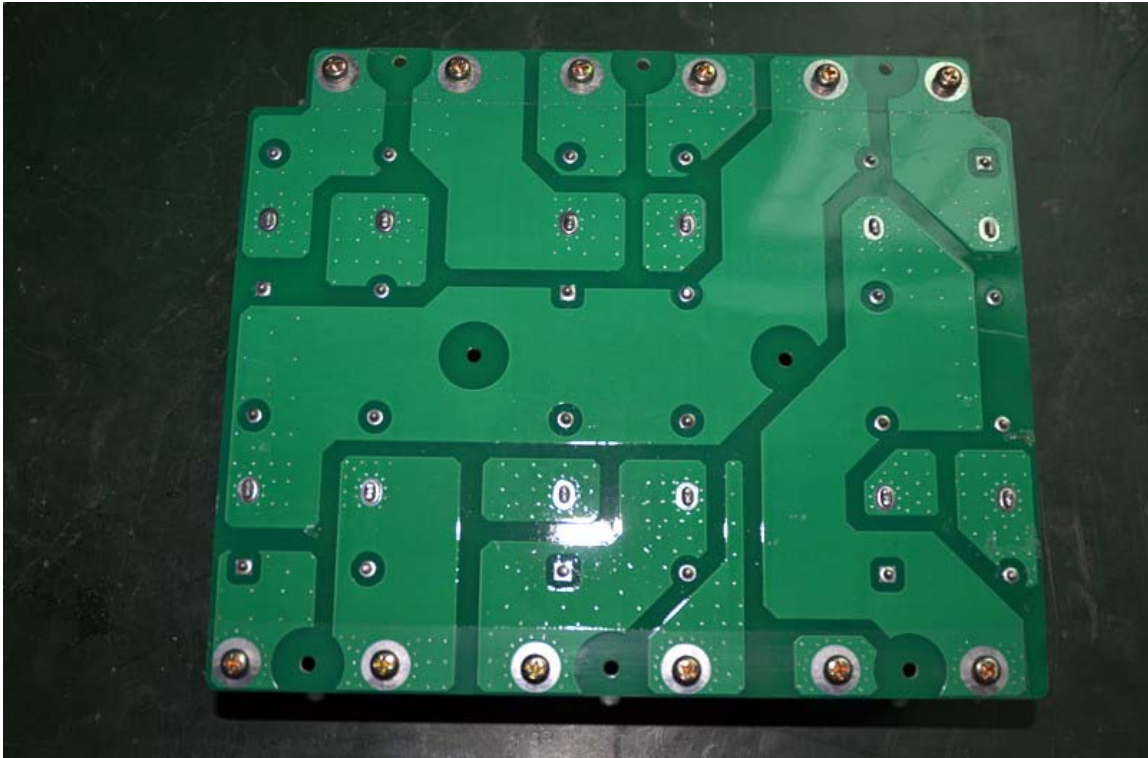


Fig. 21 –PS1203 CP2 trace view

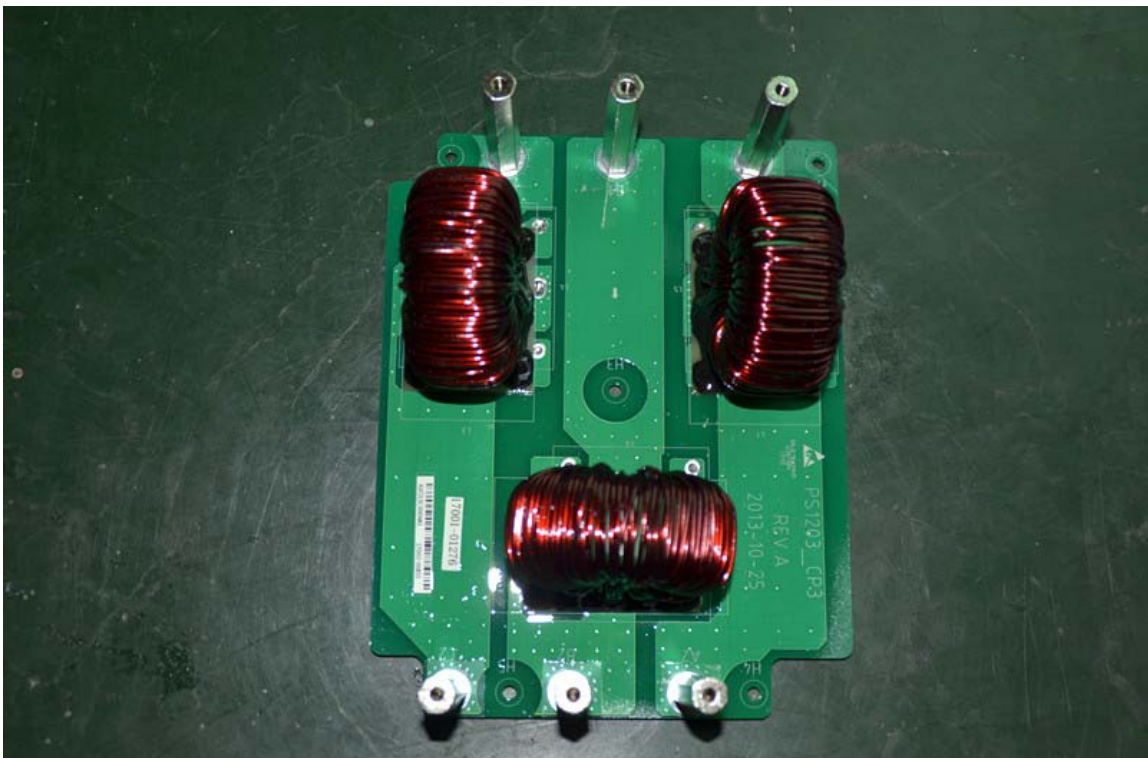


Fig. 22 –PS1203 CP3 component view

Pictures

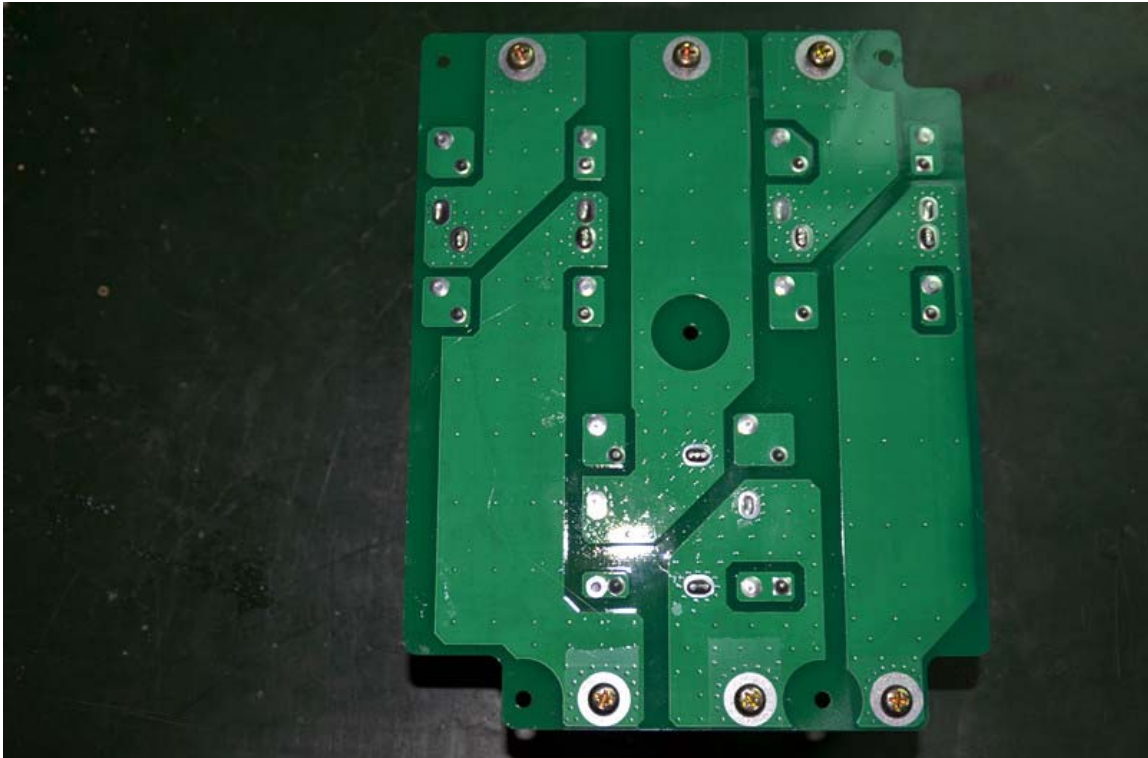


Fig. 23 –PS1203 CP3 trace view

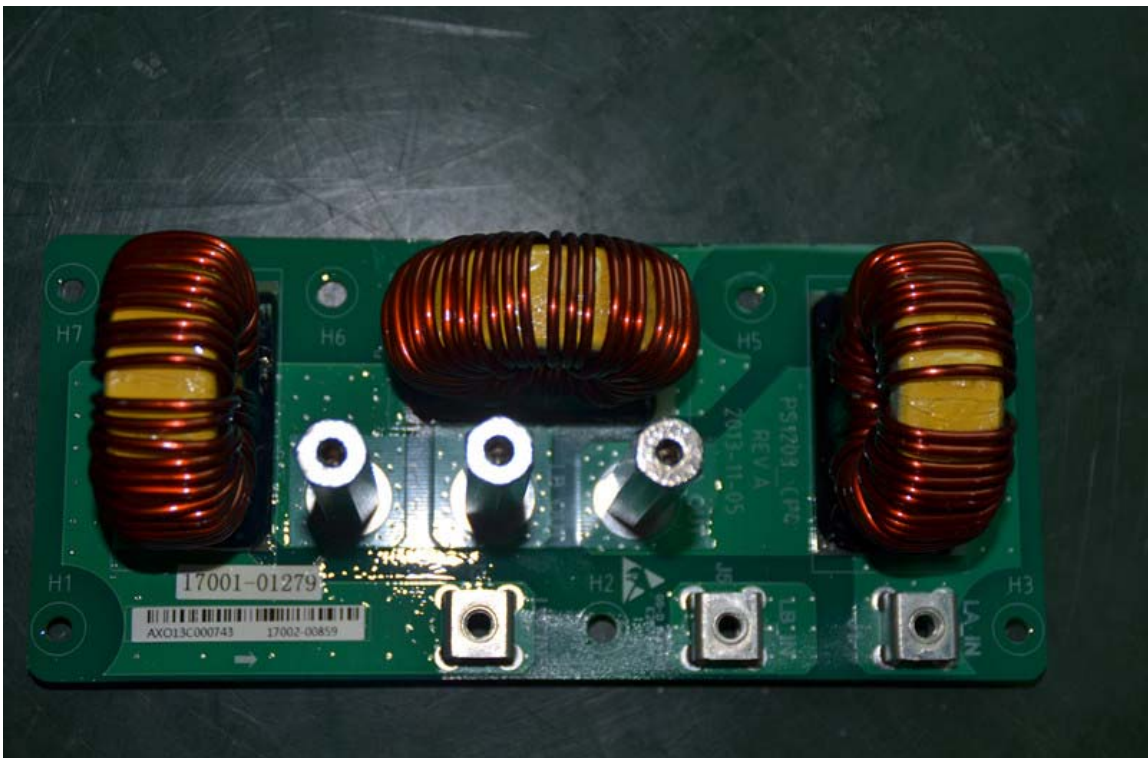


Fig. 24 –PS1203 CP4 component view



Pictures

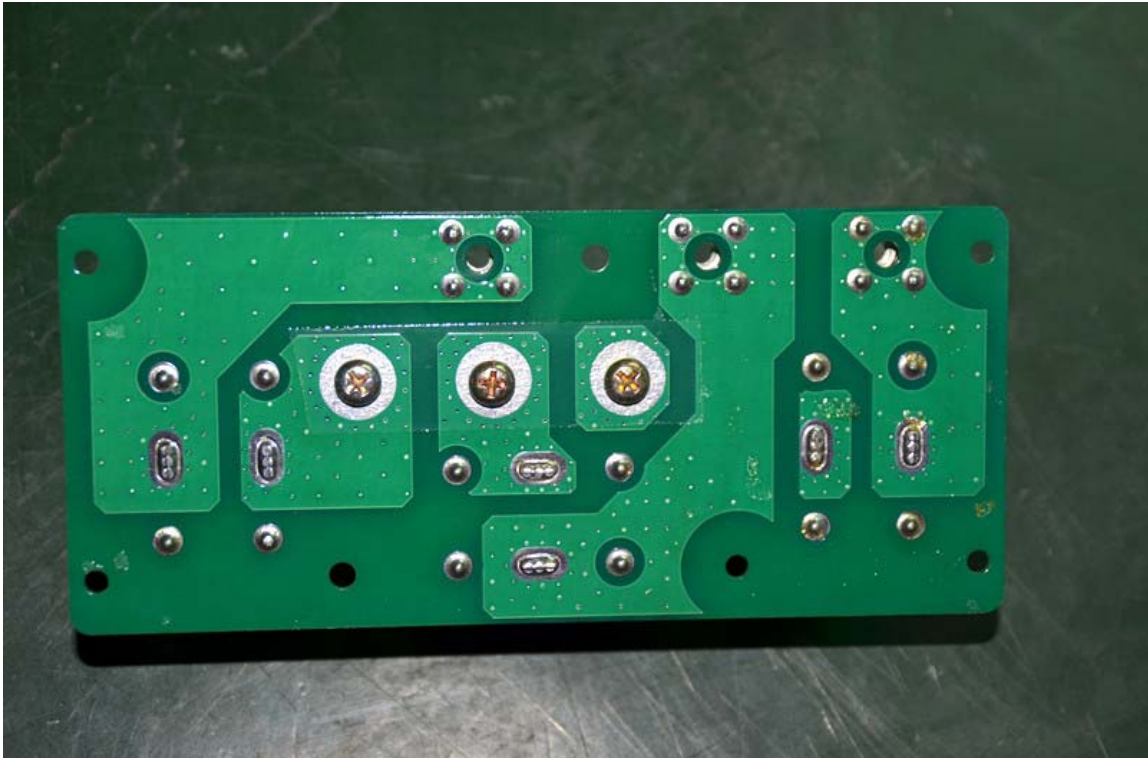


Fig. 25 –PS1203 CP4 trace view

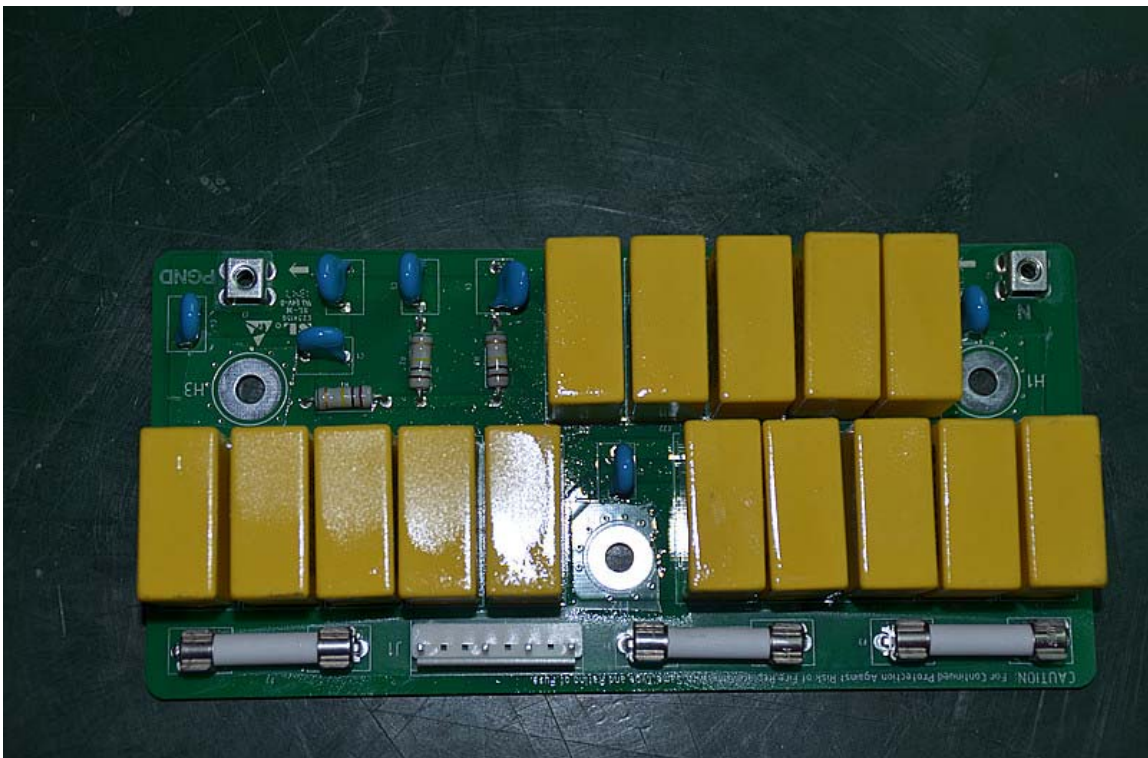


Fig. 26 –PS1203 EM2 component view

Pictures

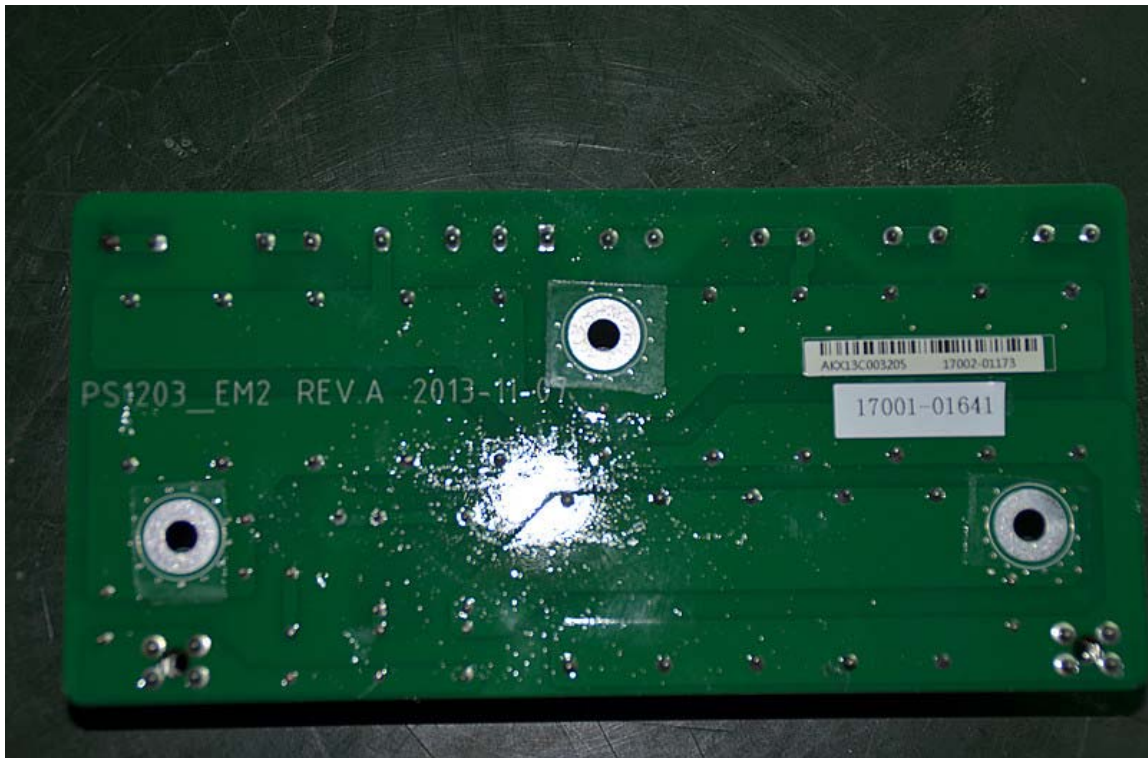


Fig. 27 –PS1203 EM2 trace view

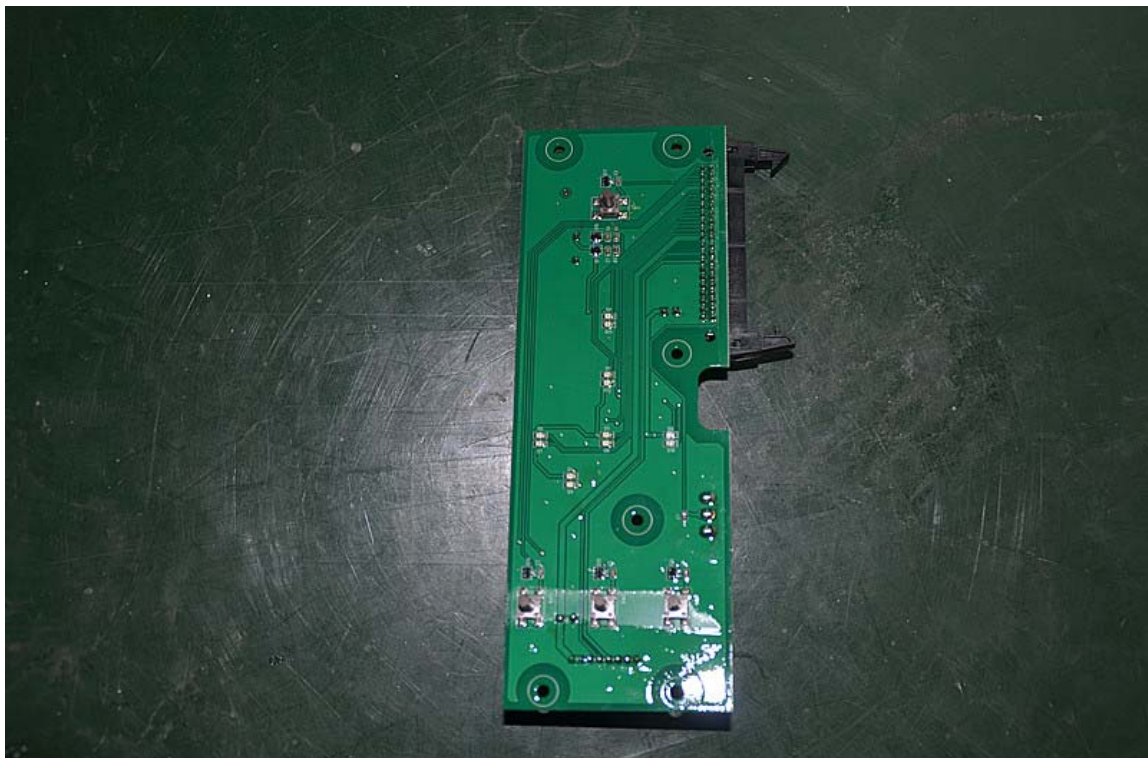


Fig. 28 –PS1203 KY1 component view



Pictures

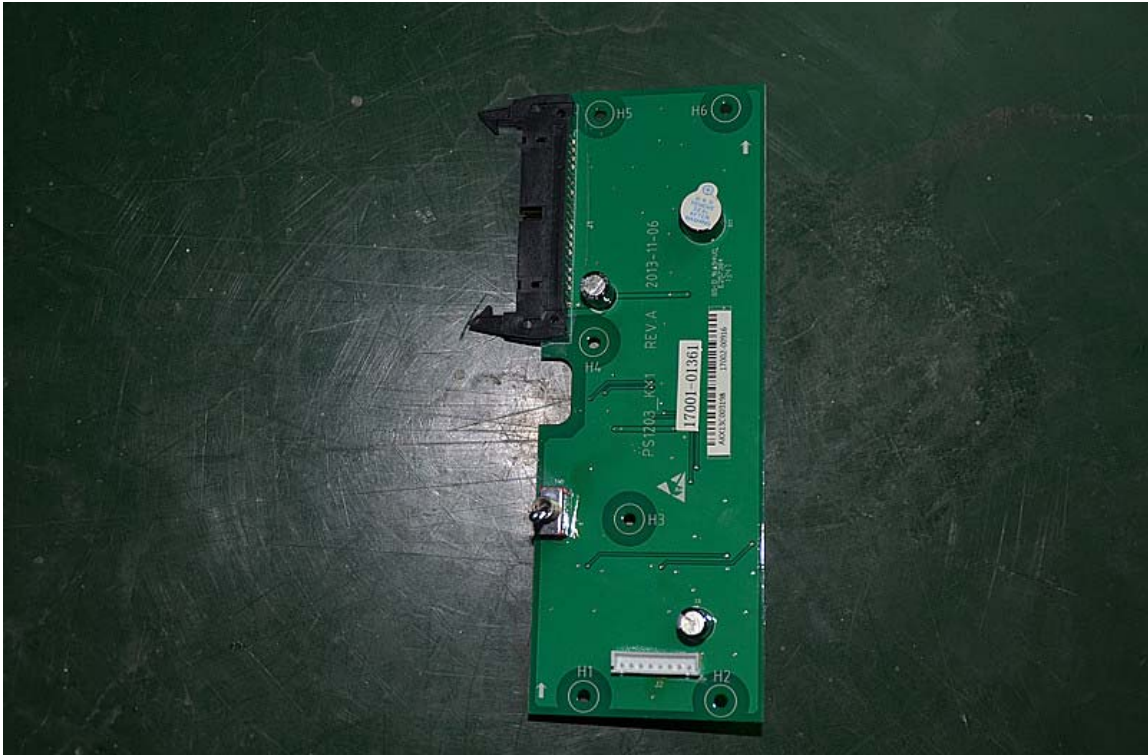


Fig. 29 –PS1203 KY1 trace view

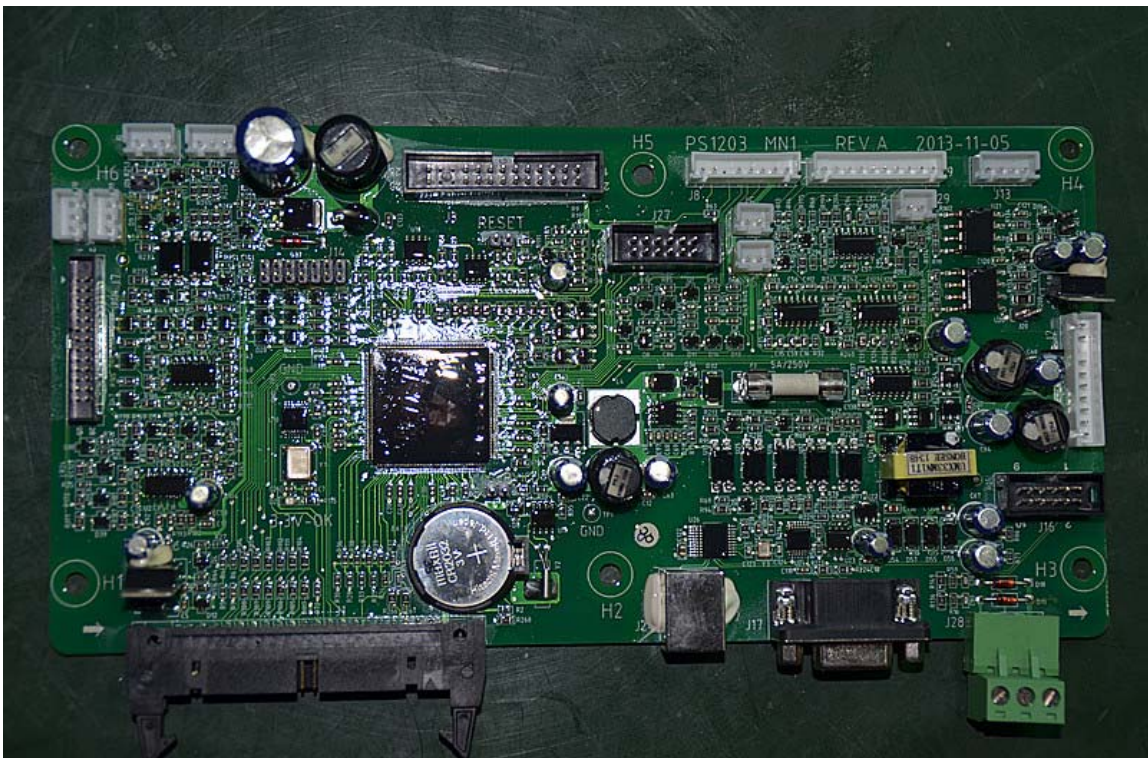


Fig. 30 –PS1203 MN1 component view



Pictures

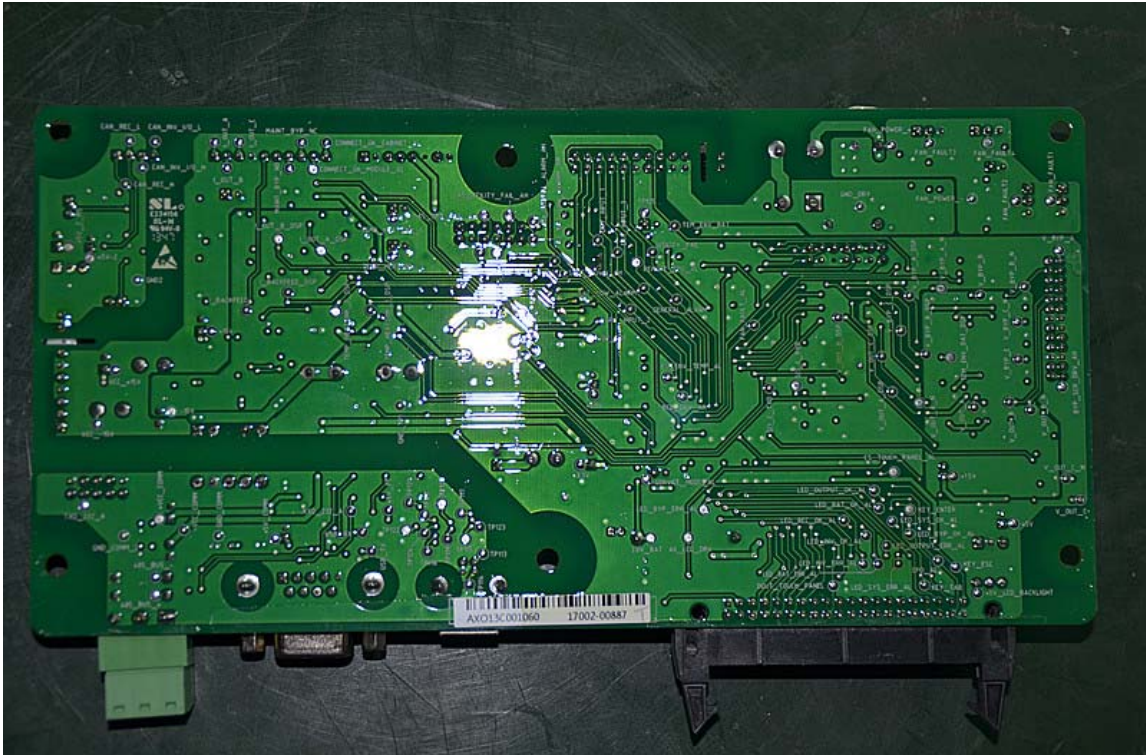


Fig. 31 –PS1203 MN1 trace view

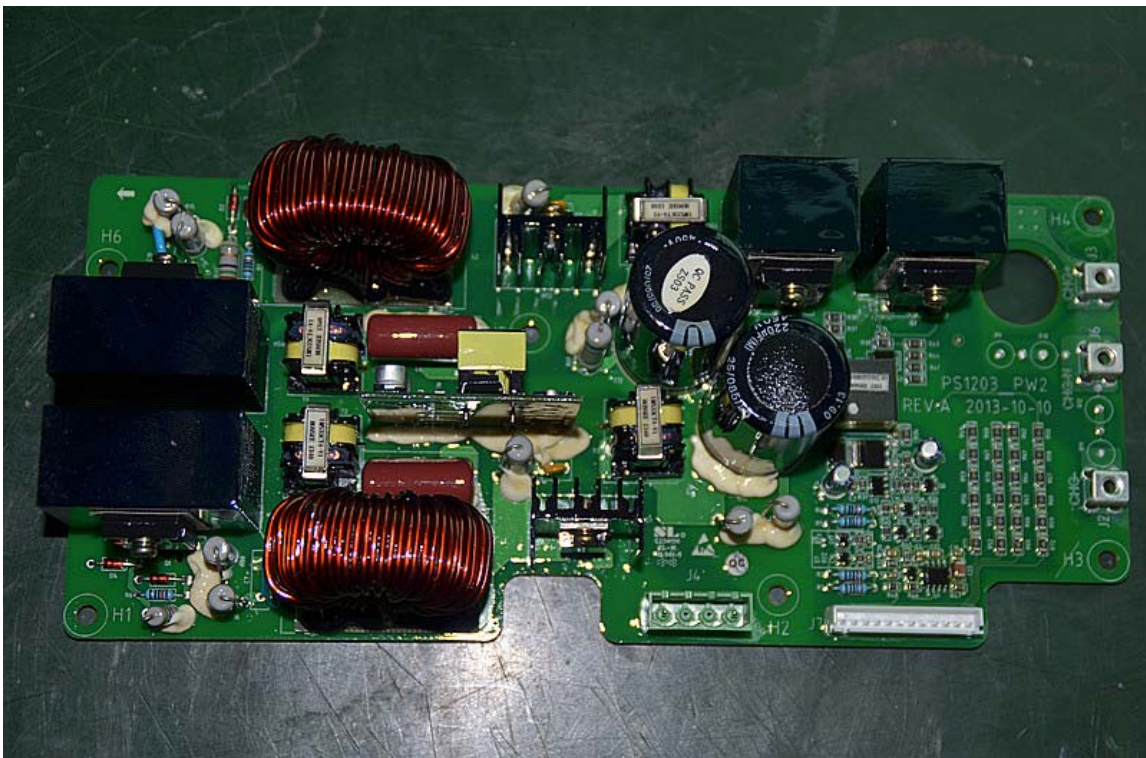


Fig. 32 –PS1203 PW2 component view



Pictures

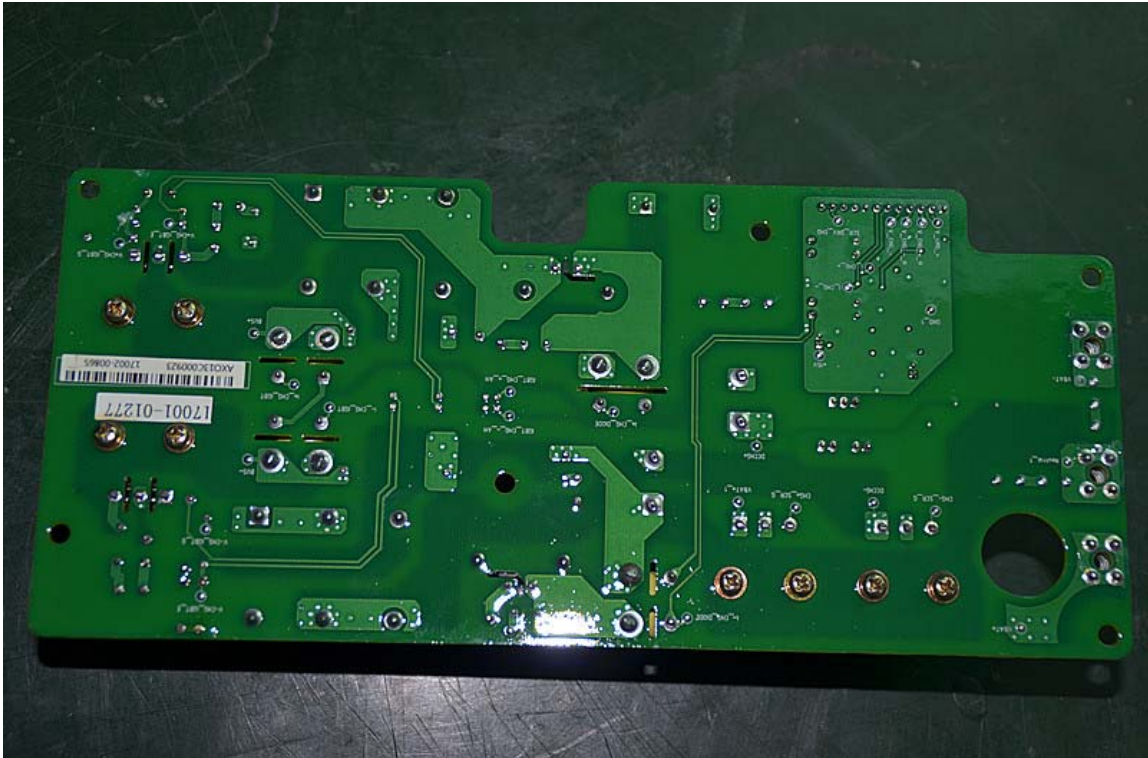


Fig. 33 –PS1203 PW2 trace view



Fig. 34 –PS1203 PW3 component view

Pictures

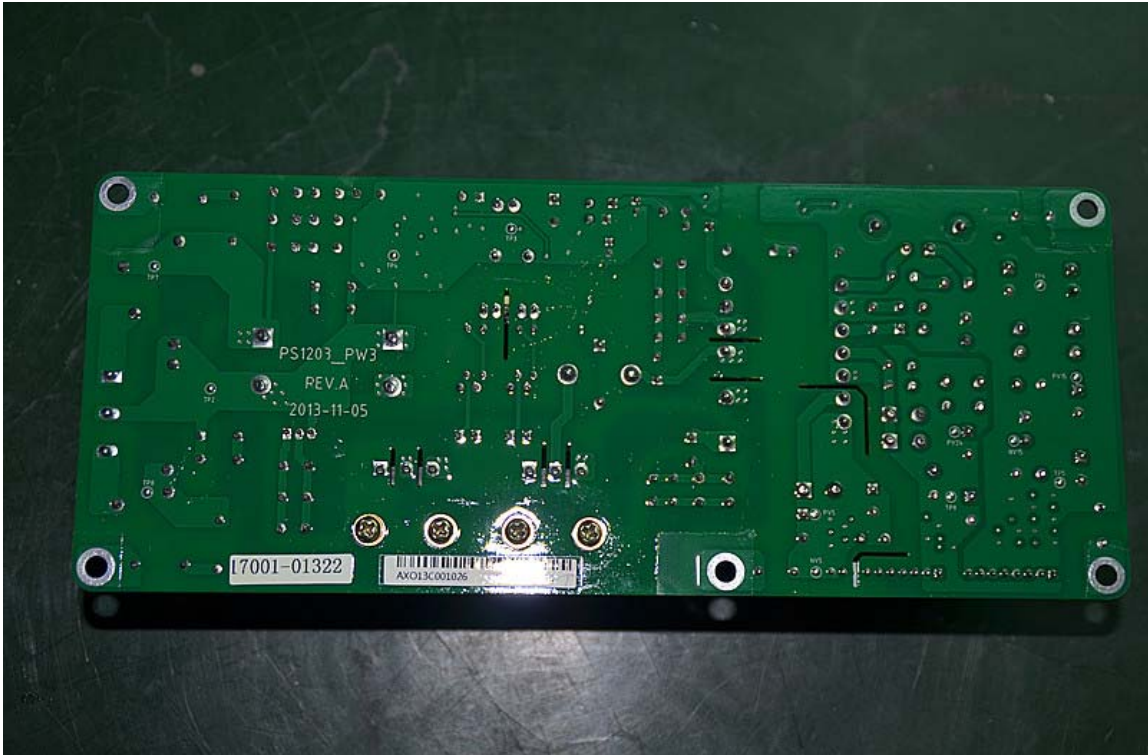


Fig. 35 –PS1203 PW3 trace view

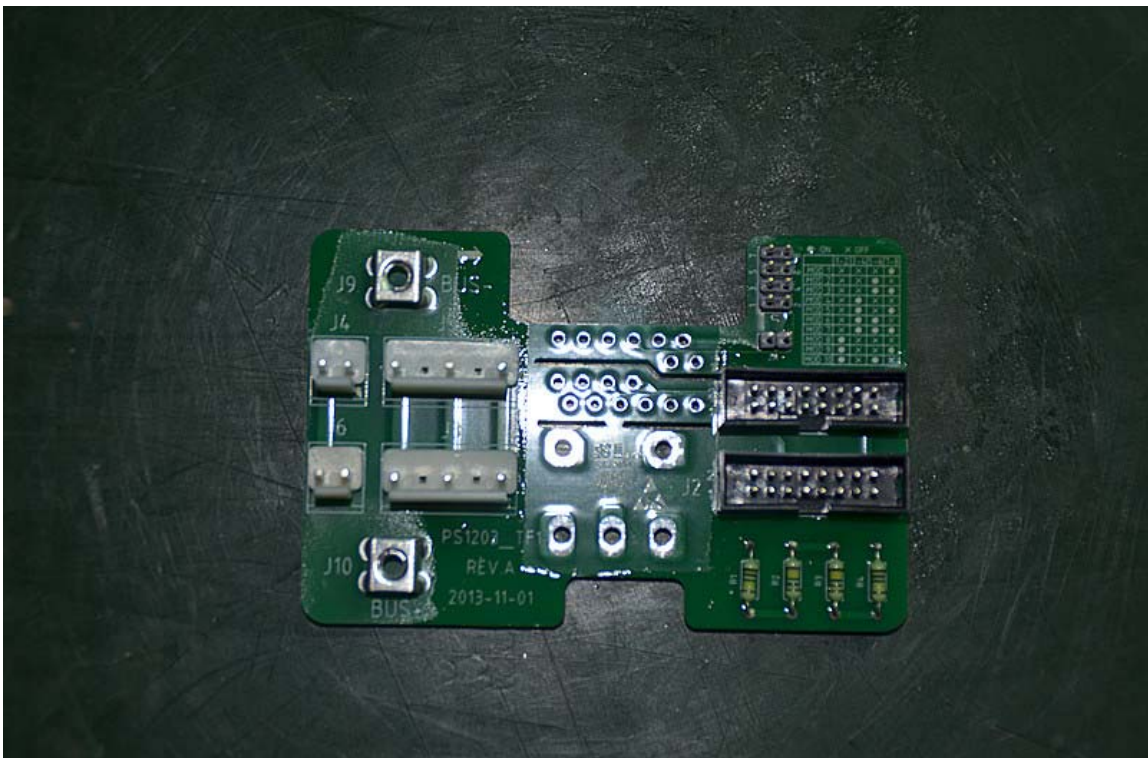


Fig. 36 –PS1203 TF1 component view



Pictures

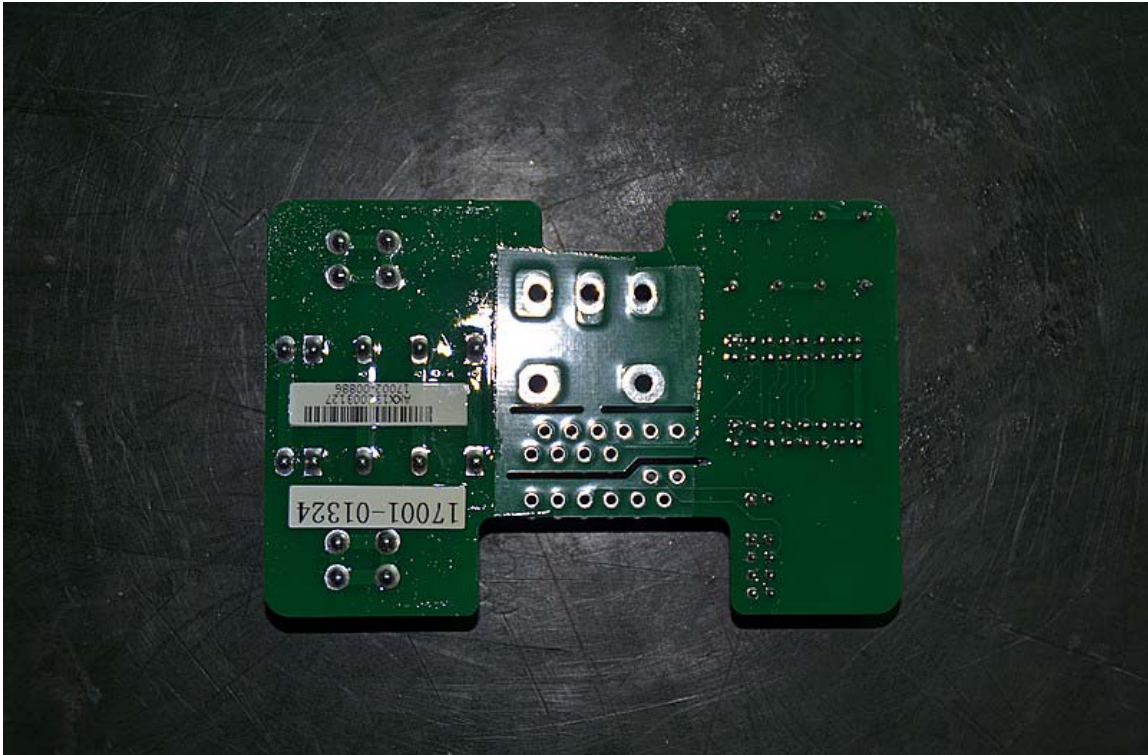


Fig. 37 –PS1203 TF1 trace view

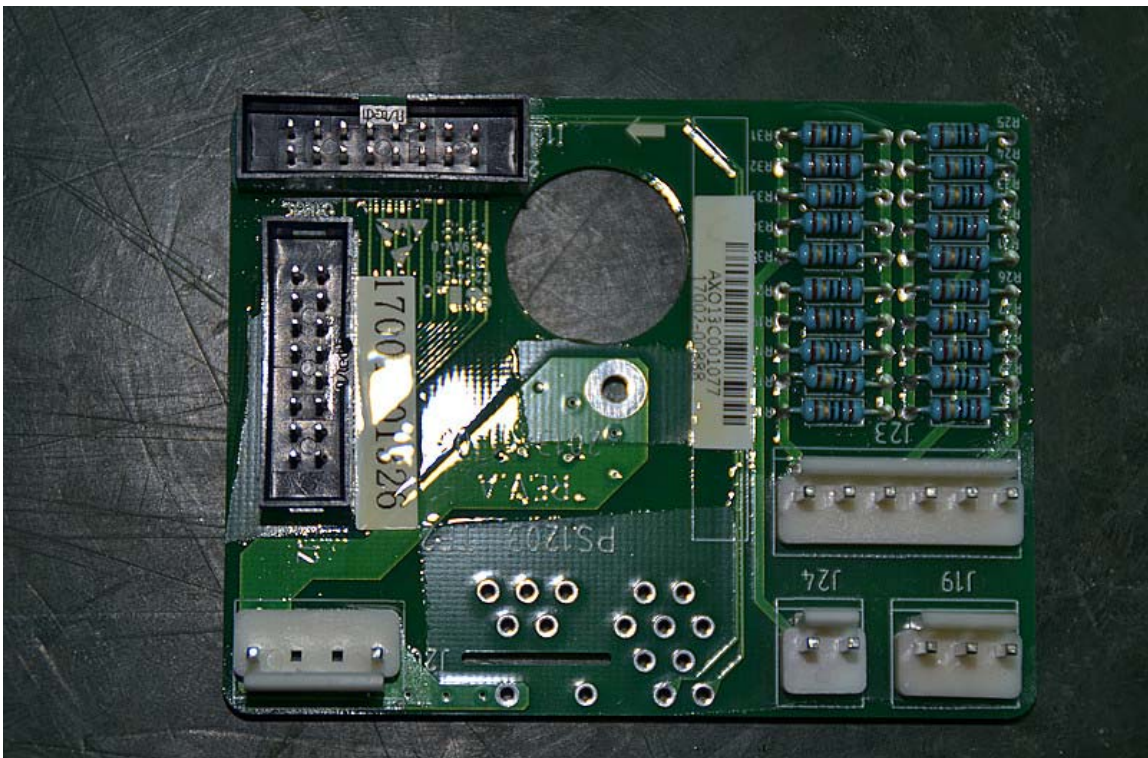


Fig. 38 –PS1203 TF2 component view



Pictures

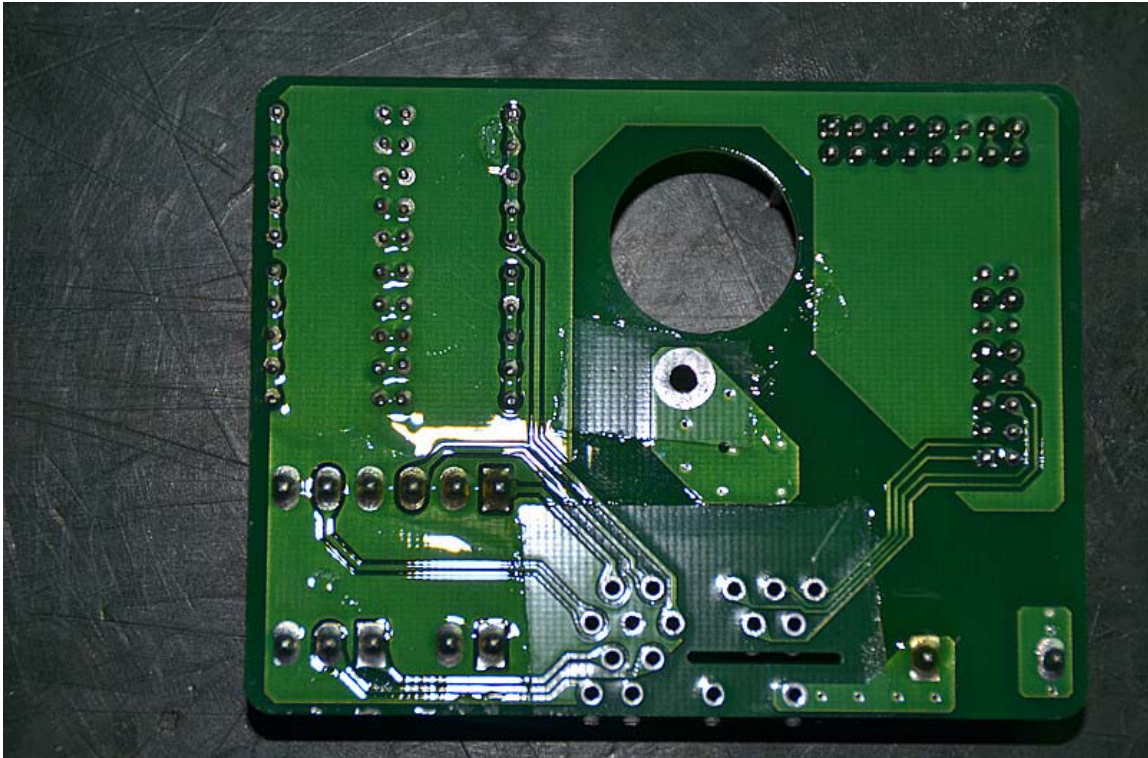


Fig. 39 –PS1203 TF2 trace view

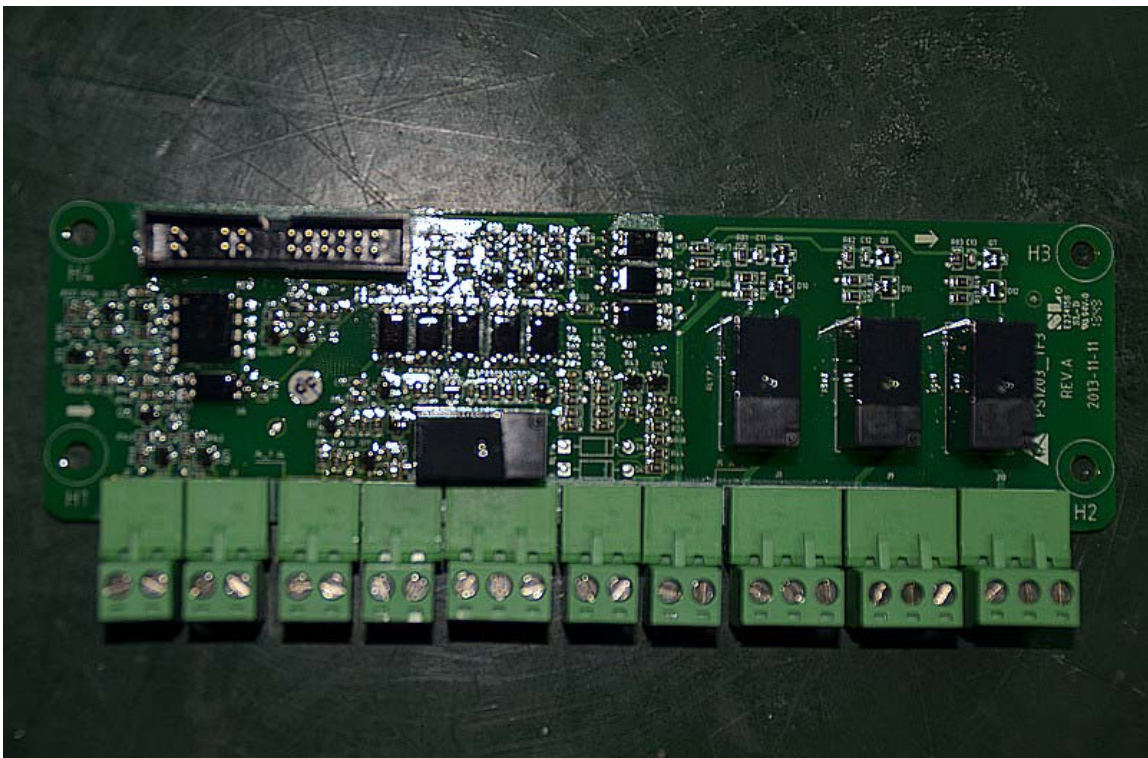


Fig. 40 –PS1203 TF3 component view



Pictures

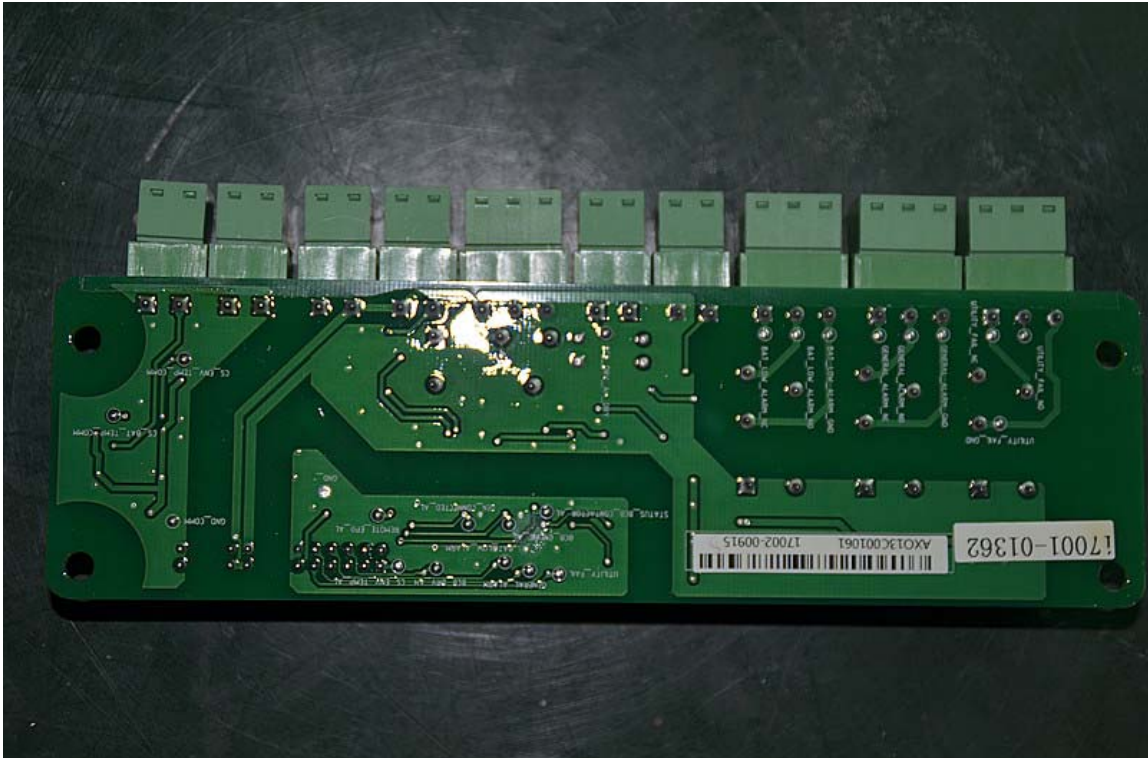


Fig. 41 –PS1203 TF3 trace view

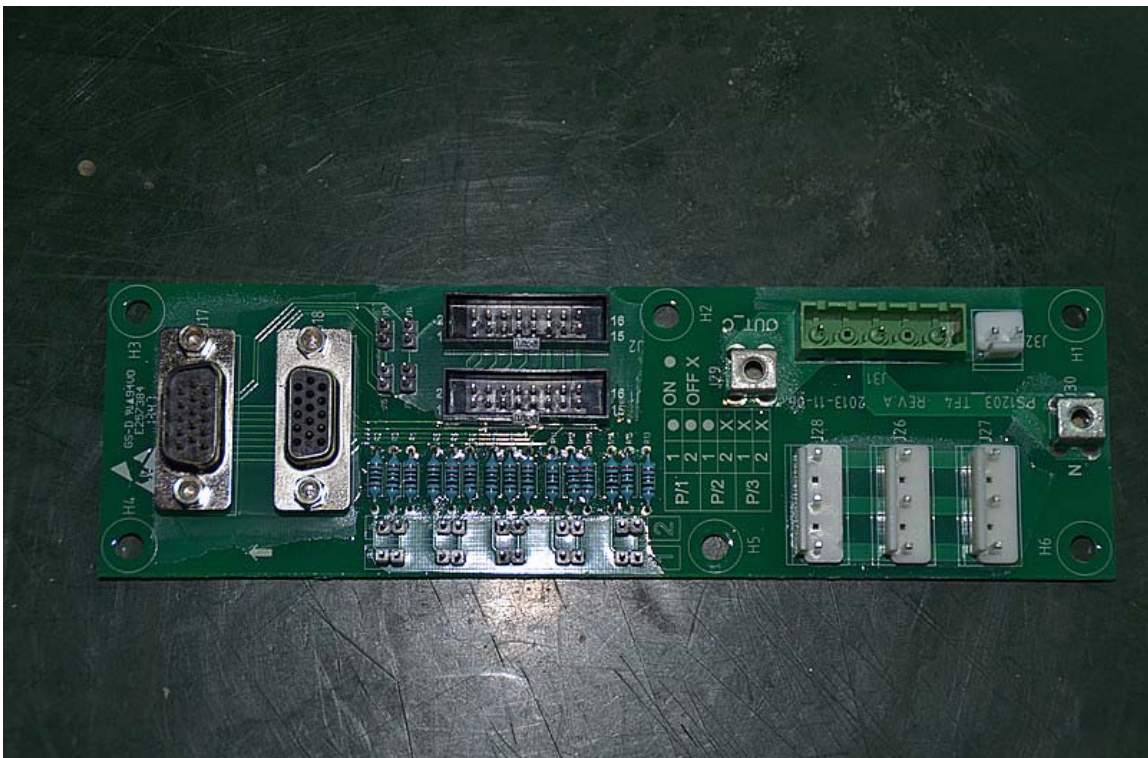


Fig. 42 –PS1203 TF4 component view

Pictures

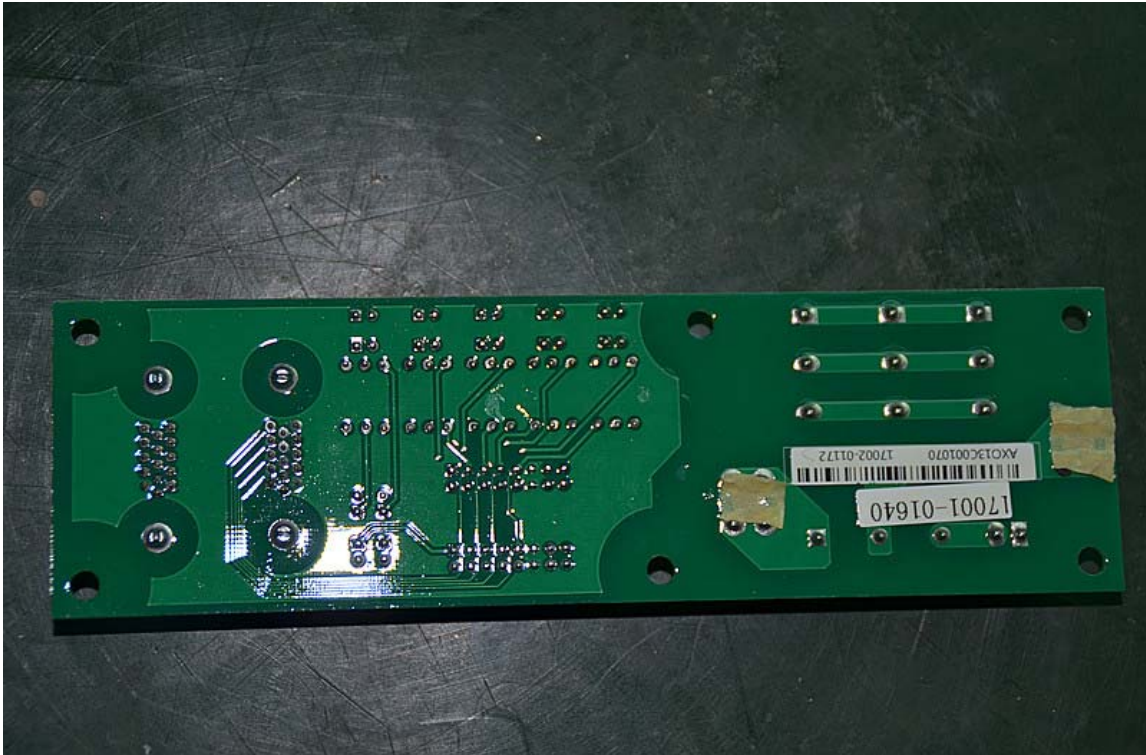


Fig. 43 –PS1203 TF4 trace view