

**APPLICATION FOR LOW VOLTAGE DIRECTIVE**

**On Behalf of**

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

**Uninterruptible Power Systems**

**Model(s): RM600/30X, RM500/25X, RM400/20X**

**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.....	ES160523059S
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
Applicant's name.....	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
Test Report Form No.....	IEC62040_1A
Test Report Form(s) Originator .....	TÜV Rheinland Japan Ltd.
Master TRF .....	Dated 2014-01
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Test item description .....	Uninterruptible Power Systems
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 .....	RM600/30X, RM500/25X, RM400/20X
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 checked="" type="checkbox"/> Yes <input type="checkbox"/> No
IT testing, phase-phase voltage (V) .....	N/A
Class of equipment .....	<input checked="" type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Not classified
Considered current rating (A) .....	900A
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) .....	620Kg
<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 ES150423306S, dated May 28, 2015, due to below amendments:

**- 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 RM600/30X which means the typical model.





**Summary of testing:**

The product has been tested according to standard EN 62040-1: 2008.





- 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 RM600/30X:

	<b>RM600/30X</b>
<b>Frame</b>	<b>600kVA 3Ø+N</b>
<b>RETE 1 - MAINS 1 - NETZ 1</b>	<b>3Ø+N</b>
Uin (Vac)	380/400/415
Iin (A)	864*
Frequenza - Frequency - Frequenz	50÷60Hz
<b>RETE 2 - MAINS 2 - NETZ 2</b>	<b>3Ø+N</b>
Uin (Vac)	380/400/415
Iin (A)	908*
Frequenza - Frequency - Frequenz	50÷60Hz
<b>USCITA - OUTPUT - AUSGANG</b>	<b>3Ø+N</b>
Uout (Vac)	380/400/415
Iout (A)	908*
Frequenza - Frequency - Frequenz	50÷60Hz
Potenza - Power rating - Leistung	600kVA/540kW (*:@380V)
<b>Icw</b>	<b>18 kA</b>
<b>BATTERIA - BATTERY - BATTERIE</b>	
Udc (Vdc)	+/- 240
Idc (A)	1200
<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>660 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.</p>	

2. Rating label for model RM500/25X:

	<b>RM500/25X</b>
<b>Frame</b>	<b>500kVA 3Ø+N</b>
<b>RETE 1 - MAINS 1 - NETZ 1</b>	<b>3Ø+N</b>
Uin (Vac)	380/400/415
Iin (A)	720*
Frequenza - Frequency - Frequenz	50÷60Hz
<b>RETE 2 - MAINS 2 - NETZ 2</b>	<b>3Ø+N</b>
Uin (Vac)	380/400/415
Iin (A)	757*
Frequenza - Frequency - Frequenz	50÷60Hz
<b>USCITA - OUTPUT - AUSGANG</b>	<b>3Ø+N</b>
Uout (Vac)	380/400/415
Iout (A)	757*
Frequenza - Frequency - Frequenz	50÷60Hz
Potenza - Power rating - Leistung	500kVA/450kW (*:@380V)
<b>Icw</b>	<b>18 kA</b>
<b>BATTERIA - BATTERY - BATTERIE</b>	
Udc (Vdc)	+/- 240
Idc (A)	1000
N° Serie - Serial Number - Seriennummer	
Year of construction	2016
5th Floor, 1# Buiding, Gaofa Industrial Park, Longjing, Nanshan District, Shenzhen, China ,518055	
 Made in China	 <b>660 kg</b>
<b>Service: <a href="http://www.invt-power.com">www.invt-power.com</a></b>	
 <b>Manufacturer: INVT POWER SYSTEM(SHENZHEN)CO., LTD</b> <b>Address: 5th Floor, 1#Building, Gaofa Industrial Park, LongJing, Nanshan District, Shenzhen, China, 518055</b> <b>Importer: xxx</b> <b>Address: xxx</b> <b>Battery must be recycled.</b>	

3. Rating label for model RM400/20X:

	<b>RM400/20X</b>
<b>Frame</b>	<b>400kVA 3Ø+N</b>
<b>RETE 1 - MAINS 1 - NETZ 1</b>	<b>3Ø+N</b>
U <sub>in</sub> (Vac)	380/400/415
I <sub>in</sub> (A)	576*
Frequenza - Frequency - Frequenz	50÷60Hz
<b>RETE 2 - MAINS 2 - NETZ 2</b>	<b>3Ø+N</b>
U <sub>in</sub> (Vac)	380/400/415
I <sub>in</sub> (A)	606*
Frequenza - Frequency - Frequenz	50÷60Hz
<b>USCITA - OUTPUT - AUSGANG</b>	<b>3Ø+N</b>
U <sub>out</sub> (Vac)	380/400/415
I <sub>out</sub> (A)	606*
Frequenza - Frequency - Frequenz	50÷60Hz
Potenza - Power rating - Leistung	400kVA/360kW (*:@380V)
<b>I<sub>cw</sub></b>	<b>18 kA</b>
<b>BATTERIA - BATTERY - BATTERIE</b>	
U <sub>dc</sub> (Vdc)	+/- 240
I <sub>dc</sub> (A)	800
<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	
 Made in China	 <b>660 kg</b>
<b>Service: <a href="http://www.invt-power.com">www.invt-power.com</a></b>	
 <b>Manufacturer: INVT POWER SYSTEM(SHENZHEN)CO., LTD</b> <b>Address: 5th Floor, 1#Building, Gaofa Industrial Park, LongJing, Nanshan District, Shenzhen, China, 518055</b> <b>Importer: xxx</b> <b>Address: xxx</b> <b>Battery must be recycled.</b>	

#### 4. Warning label on outer enclosures

##### **WARNING**

CHARGED CAPACITORS  
DISCHARGE TIME 5 MINUTES AFTER DISCONNECTION OF UPS AND BATTERY

##### **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	No safety isolating transformer.	N
1.5.5/RD	Interconnecting cables	The interconnecting cable to PC is carrying only SELV voltage on a low energy level.	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 antenna or coaxial cable.	N
1.5.8/RD	Components in equipment for IT power systems	No Y-cap used.	N
4.6	Power interface		P
1.6.1/RD	AC power distribution systems	TN power system	P
1.6.2/RD	Input current	(see appended table 4.6)	P

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
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.) .....	±240V	P
	Input rated frequency/range (Hz) .....	50/60	P
	Number of Input phases and neutral.....	3Φ	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.....	3Φ	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 (°C).....	40°C	P
	Rated short-time withstand current (I <sub>cw</sub> ) or rated conditional short-circuit current (I <sub>cc</sub> )		N
	Manufacturer's name or trademark or identification mark .....	See rating label	P
	Type/model or type reference .....	See rating label	P
	Symbol for Class II equipment only .....	The equipment is Class I.	N
	Other symbols .....	The additional marking does not give rise to misunderstandings.	P
	Certification marks .....	CE	P
	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" .....	See caution label	P

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
4.7.3	Safety instructions	The user manual contains information for operation, installation, servicing transport, storage and technical data.	P
4.7.3.1	General	Considered	P
4.7.3.2	Installation .....	Installation instructions are available to the user in User's Manual.	P
	Location in a restricted access location only ...:	Instruction manual provided. Not for restricted access location.	P
	Permanent connector UPS .....	Instruction manual provided.	P
	Pluggable type A or Pluggable type B UPS .....	Not Pluggable type A or Pluggable type B UPS	N
4.7.3.3	Operation.....	The suitable information list in the user manual when operate the UPS. Not for restricted access location.	P
4.7.3.4	Maintenance.....	The instruction of maintenance is only included in the service manual.	P
4.7.3.5	Distribution related backfeed.....	Backfeed protection provided externally to the UPS.	P
4.7.4 1.7.4/RD	Main voltage adjustment .....	No voltage selector	N
	Methods and means of adjustment; reference to installation instructions .....	No voltage selector	N
4.7.5 1.7.5/RD	Power outlets.....	Relevant information provided on the marking that is affixed near the outlets.	P
4.7.6 1.7.6/RD	Fuse identification (marking, special fusing characteristics, cross-reference) .....	Marking near holders for fuses.	P
4.7.7 1.7.7/RD	Wiring terminals	Refer below:	P
1.7.7.1/RD	Protective earthing and bonding terminals .....	The earthing terminal is marked with the standard earthing symbol (60417-2-IEC-5019) near the terminal.	P
1.7.7.2/RD	Terminals for a.c. mains supply conductors	The AC terminal is marked with L, N, G symbol near the terminal.	P
1.7.7.3/RD	Terminals for d.c. mains supply conductors	AC main supplied	N
4.7.8	Battery terminals :	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
4.7.9 1.7.8/RD	Controls and indicators	See below	P
1.7.8.1/RD	Identification, location and marking :	The function of controls affecting safety is obvious without knowledge of language etc.	P
1.7.8.2/RD	Colours :	For LCD provided, located on the front panel	P
1.7.8.3/RD	Symbols according to IEC 60417 :	The function switch is marked " " (IEC 60417-1 No. 5010).	P
1.7.8.4/RD	Markings using figures :	No controls affecting safety are using figures.	N
4.7.10 1.7.9/RD	Isolation of multiple power sources :	Only one external supply of hazardous voltage of energy (via appliance inlet).	N
4.7.11 1.7.2.4/RD	IT power systems	TN power system.	N
4.7.12	Protection in building installation	Permanently connected equipment relies on the building installation for short-circuit protection or overcurrent protection.	P
	Rated short-time withstand current (/cw) .....:		N
	Rated conditional short circuit current (/cc) .....		N
	a) If higher Icp stated ≤ 10 kA		N
	a) If higher Icp stated > 10 kA		N
4.7.13 5.1/RD	High leakage current (mA) .....:	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
4.7.14 1.7.10/RD	Thermostats and other regulating devices	No thermostats or other regulating devices.	N
4.7.15 1.7.2.1/RD and 1.7.8.1/RD	Language(s) .....:	Instructions and markings shall be in a language acceptable for the country where the equipment is to be used. English user manual provided.	

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
4.7.16 1.7.11/RD	Durability of markings	The label was subjected to the permanence of marking test. The label was rubbed with cloth soaked with water for 15s and then again for 15s with the cloth soaked with petroleum spirit. After this test there was no damage to the label. The marking of the label did not fade. There was neither curling nor lifting of the label edge.	P
4.7.17 1.7.12/RD	Removable parts	No such parts.	N
4.7.18 1.7.13/RD	Replaceable batteries	The battery is not placed in an operator access area. The required warning is in the safety manual.	P
	Language(s) .....	Instructions and markings are in English.	
4.7.19 1.7.2.5/RD	Operator access with a tool.....:	Operator is not instructed to use a tool in order to gain access to operator access area.	N
4.7.20	Battery	No battery used	N
	Clearly legible information .....		N
	Battery type .....		N
	Nominal voltage of total battery (V) .....		N
	Nominal capacity of total battery (optional) .....		N
	Warning label .....		N
	Instructions .....		N
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 and connection of supply and loads provided in the user's manual.	P
5	FUNDAMENTAL DESIGN REQUIREMENTS		P
5.1	Protection against electric shock and energy hazards		P
5.1.1 2.1.1/RD	Protection for UPS intended to be used in operator access areas	Refer below:	P

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
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	Inside the battery compartment only primary circuits.	N
2.1.1.3/RD	Access to ELV wiring	No internal wiring at ELV accessible to the operator.	N
	Working voltage (V <sub>peak</sub> or V <sub>rms</sub> ); 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 > 0.1µF, 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
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

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

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Insulation employed :		
2.3.5/RD	Test for operating voltages generated externally		N
5.2.3 2.4/RD	Limited current circuits	No limited current circuits, cl. 2.4/RD.	N
2.4.1/RD	General requirements		N
2.4.2/RD	Limit values		
	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		N
5.2.4 3.5/RD	External signalling circuits	Refer to below:	P
3.5.1/RD	General requirements	Considered.	P
3.5.2/RD	Types of interconnection circuits :	SELV circuits.	P
3.5.3/RD	ELV circuits as interconnection circuits	No ELV interconnections.	N
3.5.4/RD	Data ports for additional equipment	Data ports (RS232 and USB) is signal port only, no test required.	P
5.2.5 2.5/RD	Limited power source	No limited power source.	N
	a) Inherently limited output		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) .....		
	Current rating of overcurrent protective device (A)		
	Use of integrated circuit (IC) current limiters		N

5.3	Protective earthing and bonding		P
5.3.1	General	See below.	P
2.6/RD	Provisions for earthing and bonding	See below.	P
2.6.1/RD	Protective earthing	Accessible conductive parts are reliably connected to protective earth.	P
2.6.2/RD	Functional earthing	No functional earthing.	N
2.6.3/RD	Protective earthing and protective bonding conductors	See below.	P



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Clause	Requirement + Test	Result - Remark	Verdict
2.6.3.1/RD	General	See below.	P
2.6.3.2/RD	Size of protective earthing conductors	Refer below:	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	Interconnected equipment is properly earthed.	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.	N
2.6.5.3/RD	Disconnection of protective earth	It is not possible to disconnect protective earth without disconnecting mains	P
2.6.5.4/RD	Parts that can be removed by an operator	No operator removable parts with protective earth connection except supply cord.	P
2.6.5.5/RD	Parts removed during servicing	Protective earthed parts cannot be removed in a way which impair safety.	P
2.6.5.6/RD	Corrosion resistance	No risk of corrosion	P
2.6.5.7/RD	Screws for protective bonding	Adequate connection of protective bonding	P

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Clause	Requirement + Test	Result - Remark	Verdict
2.6.5.8/RD	Reliance on telecommunication network or cable distribution system	Protective earthing does not rely on a telecommunication network.	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
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

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Clause	Requirement + Test	Result - Remark	Verdict
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
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 ( $I_{pk} / I_{cw}$ ) ..	$I_{cw} \leq 18KA$	P
	Minimum duration of prospective test current (cycles 50/60 Hz) .....	50Hz	P
5.5.4.3.2	Exemption from testing		N

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Clause	Requirement + Test	Result - Remark	Verdict
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
5.6.2.5	Component access	No component access during operation mode necessary.	N
2.8.3/RD	Inadvertent reactivation	No servicing in operation mode necessary.	N
5.6.2.6	Moving parts	No hazardous moving parts.	N
5.6.2.7	Capacitor banks	The capacitors provided can produce energy level way below 20 joules.	P

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Clause	Requirement + Test	Result - Remark	Verdict
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
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

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Clause	Requirement + Test	Result - Remark	Verdict
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
	a) Basic insulation not under stress :		—
	b) Basic, supplementary, reinforced insulation :		N
	c) Compliance with Annex U :		N

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Clause	Requirement + Test	Result - Remark	Verdict
	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

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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
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



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Clause	Requirement + Test	Result - Remark	Verdict
	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 <i>(No wiring terminals for external power conductors)</i>		P
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
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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	Adequate protection against risk of fire, electric shock, injury to persons and hazardous energy level.	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	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.	—
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

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Clause	Requirement + Test	Result - Remark	Verdict
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) ..... :		N
	Is considered to cause pain, not injury. b) ..... :		N
	Considered to cause injury. c) ..... :		N
4.4.5.2	Protection for users		N
	Use of symbol or warning ..... :		N
4.4.5.3	Protection for service persons		N
	Use of symbol or warning ..... :		N
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

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Clause	Requirement + Test	Result - Remark	Verdict
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		N
7.4.4	Equipment movement	No castors provided.	N

7.5	Resistance to fire		P
4.7/RD			
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
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

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Clause	Requirement + Test	Result - Remark	Verdict
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		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	No motors	N
5.3.3/RD	Transformers	No isolating transformer.	N
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
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		P

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Clause	Requirement + Test	Result - Remark	Verdict
5.3.9.2/RD	After the tests		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	This power supply is not considered for connection to TNV.	P
3.5.2/RD	Types of interconnection circuits .....	Interconnection circuits of SELV through the connector. No ELV interconnection circuits.	P
3.5.3/RD	ELV circuits as interconnection circuits		N
3.5.4/RD	Data ports for additional equipment	Data ports (RJ45 and USB) is signal port only, no test required.	N
2.1.3/RD	Protection in restricted access locations		N
2.3.1/RD	Limits		N
	Type of TNV circuits .....		
2.3.2/RD	Separation from other circuits and from accessible parts		N

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Clause	Requirement + Test	Result - Remark	Verdict
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 .....		
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	Ringling 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
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 .....		

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Clause	Requirement + Test	Result - Remark	Verdict
	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
B/RD	Annex B, Motor tests under abnormal conditions (see 4.7.2.2/RD and 5.3.2/RD)		N
B.1/RD	General requirements	No motors	N
	Position ..... :		N
	Manufacturer ..... :		N



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Clause	Requirement + Test	Result - Remark	Verdict

	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
	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

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Clause	Requirement + Test	Result - Remark	Verdict
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
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	Backfeed relay provided.	P
I.3	Test for permanently connected UPS		N

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Clause	Requirement + Test	Result - Remark	Verdict
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
M.1	General		N
M.2	Normal conditions		N
M.3	Blocked conditions		N
M.4	Overcharge conditions		N

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Clause	Requirement + Test	Result - Remark	Verdict
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

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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 conformity <sup>1)</sup>
Whole unit					
Breaker	LS	LS/ABE803b/800A	400VAC,800A	IEC:60947-3	--
Varistor	Semikron	SKKT570_16E	1600V;570A	--	UL
Current Transformer ( three provided)	Boulder	UMS33CT3	Class B	--	Test with appliance
Fuse( three provided)	Holly	50CF F8AH 250V	8A 250V	--	VDE
AC fan	EBMPAPST	R2E225BD9209	AC230V, 50Hz, 0.6A, 135W	--	CE
Insulation sheet	FORMEX	Formex GK-10	--	--	UL:E256266/E121855
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	HCMR201- 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 ASY01_PS1203_DR6 board					
Optocouplers (U2, U3)	NEC	PS2561	--	--	UL:E72422, VDE:40008862
FUSE(F1, F2, F3)	Holly	65NM070H	250VAC/ 7A	--	VDE UL
Relay(RLY1, RLY2)	SONG CHUAN	894H-2AH1-F- C	12VDC 10A	--	VDE UL
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	65NM070H	7A, 500V	--	VDE UL
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
<sup>1)</sup> an asterisk indicates a mark which assures the agreed level of surveillance.					

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Clause	Requirement + Test	Result - Remark	Verdict

4.6	TABLE: electrical data (in normal conditions)					P
Fuse#	Irated(A)	U(V)	P(W)	I(A)	P(VA)	Condition/status
Tested on model RM600/30X						
Input breaker	--	342V/50Hz	540013	865	600420	Charging of empty batteries and rated output load.
Input breaker	--	342V/60Hz	540010	865	600410	Ditto
Input breaker	900	380V/50Hz	540020	818	600430	Ditto
Input breaker	900	380V/60Hz	540016	817	600423	Ditto
Input breaker	900	415V/50Hz	540026	749	600420	Ditto
Input breaker	900	415V/60Hz	540013	749	600426	Ditto
Input breaker	--	456.5V/50Hz	540000	681	600423	Ditto
Input breaker	--	456.5V/60Hz	540006	681	600433	Ditto
Note(s): Please measure the input currents with normal load.						

5.1.3	TABLE: discharge of capacitors in the primary circuit				P
Condition	$\tau_{calculated}$ (s)	$\tau_{measured}$ (s)	t u → 0V(s)	Comments	
Tested on model I RM600/30X					
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):					
1. Relevant discharge resistance: discharged through circuit					

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Clause	Requirement + Test	Result - Remark	Verdict

5.1.4	TABLE: Backfeed protection test			P
Condition	Voltage measured (V)/current (mA)			Comments
	L1-N	L1-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: distance through insulation measurements			P
distance through insulation di at/of:	Up (V)	test voltage (V)	required di(mm)	di (mm)
Optocoupler (reinforced insulation)	<420	3000Va.c.	0.4	>0.4 <sup>1)</sup>

Note(s):

1). Approved component. For details refer to table 4.3. Tested on model RM600/30X

5.2.1 and 2.2.3/RD	TABLE: insulation / SELV voltage measurement		N
Location	Voltage measured (V)	Comments	

Note(s): No any voltage in RS232 circuit side exceeding SELV limits during normal / abnormal operation. No test necessary.

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

Note(s): test during battery mode. Output measured with a 2 kΩ resistor as load.



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Clause	Requirement + Test	Result - Remark	Verdict
5.2.5 and 2.5/RD	TABLE: Limited power source measurement		N
	Limits	Measured	Verdict

5.3.1 and 2.6.3.4/RD	TABLE: provisions for protective earthing		P
Location	Resistance measured(mΩ) / voltage drop(V)	Comments	
Tested on model RM600/30X			
I/P earth →O/P earth	1V	Test current of __900__A for __8__min.	
I/P earth →metal enclosure	1V	Ditto	
I/P earth →earth on PCB	1V	Ditto	
Note: The Voltage drop shall not exceed 2.5V.			

5.5 and 8.3	TABLE: Abnormal operating and fault conditions		P
	ambient temperature (°C)	See below	
	model/type of power supply	Integral part of equipment.	
	manufacturer of power supply	See below	
	rated markings of power supply	See page 4	

No.	component No.	fault	test voltage (V)	test time	fuse no.	fuse current (A)	Result
charger board							
1	Q1 (c-e)	s-c	415	1s	--	-	UPS output and the charger normally, Q1 damaged, no hazards. Charge voltage: 376V , Output voltage: 397.3V.
2	Q1(g-e)	s-c	415	1s	--	-	UPS output and the charger normally, recoverable after fault removed, no hazards. Charge voltage:376V , Output voltage: 397.3V.

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Clause	Requirement + Test	Result - Remark	Verdict				
No.	component No.	fault	test voltage (V)	test time	fuse no.	fuse current (A)	Result
3	Q1(c-g)	s-c	415	1s	--	-	UPS output and the charger normally, Q1 damaged , no hazards. Charge voltage: 376V , Output voltage: 397.3V.
DR2 board							
4	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: 376V , Output voltage: 397.3V.
5	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: 376V , Output voltage: 397.3V.
6	A+ IGBT (g-e)	s-c	415	10min	F1	--	UPS output and the charger operate normally, recoverable after fault removed, no hazards. Charge voltage: 376V , Output voltage: 397.3V.
7	Bus Voltage detecting resistor R31	s-c	415	10min	--	--	UPS work normally, no hazards. Charge voltage: 376V , Output voltage: 397.3V.
8	Bus Voltage detecting resistor R31	o-c	415	10min	--	--	UPS work normally, no hazards. Charge voltage: 376V , Output voltage: 397.3V.

IEC 62040-1							
Clause	Requirement + Test	Result - Remark	Verdict				
No.	component No.	fault	test voltage (V)	test time	fuse no.	fuse current (A)	Result
9	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: 376V , Output voltage: 397.3V.
MN1 board							
10	Transformer T1 pin 9-10	s-c	415	10min	F1	--	UPS output and the charger operate normally, no hazards. Charge voltage: 376V , Output voltage: 397.3V.
11	Opto coupler U25 (pin1-2)	s-c	415	10min	---	--	UPS work normally, no hazards. Charge voltage: 376V , Output voltage: 397.3V.
12	Opto coupler U25 (pin3-4)	s-c	415	10min	--	--	UPS work normally, no hazards. Charge voltage: 376V , Output voltage: 397.3V.
13	Opto coupler U25 pin1	O-c	415	10min	--	--	UPS work normally, no hazards. Charge voltage: 376V , Output voltage: 397.3V.
14	Opto coupler U25 pin3	O-c	415	10min	--	--	UPS work normally, no hazards. Charge voltage: 376V , Output voltage: 397.3V.
15	D54	s-c	415	10min	--	--	UPS work normally, no hazards. Charge voltage:376V , Output voltage: 397.3V.
Whole unit							
16	Output	s-c	415	1s	--	--	UPS output shut down immediately, the charger operate normally, no hazards. Charge voltage: 376V , Output voltage: 0V.

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Clause	Requirement + Test	Result - Remark	Verdict

No.	component No.	fault	test voltage (V)	test time	fuse no.	fuse current (A)	Result
17	Output	s-c	battery	1s	--	--	UPS output shut down immediately, no hazards. Charge voltage: 0V, Output voltage: 0V.
18	Output	o-l	415	15min	--	--	UPS output shut down at condition of 5min at 100% load + 5min at 117% load + 2s at 133% load.
19	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.
20	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.
21	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.
22	Fan	Lock ed	415	30mins	--	--	UPS shut down at temperature protection, after the temperature is below 60°C, UPS open up. Repeat the cycle continuously.
23	Fan	Lock ed	Battery mode	30mins	--	--	UPS shut down at temperature protection, after the temperature is below 60°C, UPS open up. Repeat the cycle continuously.

Note(s):

s-c means short circuit. o-l means overload. o-c means open circuit. Tested on model RM600/30X

5.7 2.10.2/ RD	TABLE: working voltage measurement	P	
Location	RMS voltage (V)	Peak voltage (V)	comments
Tested on model RM600/30X			

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Clause	Requirement + Test	Result - Remark	Verdict

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
U11 pin2-pin3	20	8	Ditto
U11 pin2-pin4	20	8	Ditto

Note: Vin=415V, 50Hz Test model for RM600/30X.

5.7 and 2.10.4/RD	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	

IEC 62040-1						
Clause	Requirement + Test	Result - Remark			Verdict	
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 DR2 PCB						
PE (H6)-J1 traces	<420	<250	2.0	4.8	2.5	4.8
PE (H21)-L9 traces	<420	<250	2.0	8.2	2.5	8.2
PE (H14)-L7 traces	<420	<250	2.0	5.4	2.5	5.4
PE (H7)-L14 traces	<420	<250	2.0	5.4	2.5	5.4
PE (H1)-L1 traces	<420	<250	2.0	4.7	2.5	4.7
Parts Pin-bottom metal enclosure (PE)	<420	<250	2.0	>2.0 #	2.5	>2.5 #
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
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

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

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> <p>3.) Test model for RM600/30X.</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	
Primary to earth (mains input & output conductor to earth)		1500Vac		No	
Supplementary information: TESTED ON MODEL RM600/30X					

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	0.8	
Battery Connector		125	1.0	

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

Note(s):  
 1. Other relevant thermoplastic parts are Phenolic type that is accepted without further tests for test temperatures not exceeding 125°C

7.4.2 4.6.1/RD and 4.6.2/RD	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 5° angles.		
Back	9.6*24.8mm	Ventilation openings provided. No hazardous parts within 5° angles.		
Note(s): Tested on model RM600/30X				

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	5VA

7.7	TABLE A: maximum temperature rises			P
	test voltage (V) :	See below.		--
	T1 (°C) :	--		--
	T2 (°C) :	--		--

Temperature rise T of part/at:	T(°C) :			required T
	456.5V/50 Hz	342V/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
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



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

Temperature rise T of part/at:	T(°C) :			required T
	456.5V/50 Hz	342V/50Hz	(Battery mode)	
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	55.2	57.3	59.4	110
Transformer (T1) core on MN1 board	55.4	54.7	54.3	110
Opto coupler on MN1 board	51.9	52.7	52.1	100
PCB near transformer T1 on MN1 board	53.6	55.7	57.6	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
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	--

Supplementary information:

Temperature T of winding:	t1 (°C)	R1 (Ω)	t2 (°C)	R2 (Ω)	T (°C)	Allowed Tmax (°C)	Insulation class
--	--	--	--	--	--	--	--

Supplementary information:

The maximum ambient temperature permitted by the manufacturer's specification is 40°C. Tested on model RM600/30X

8.1, 5.1.1/RD	TABLE: Touch current measurement					P
Condition	L→terminal A	N→terminal A	Freq. (Hz)	Limit (mA)	Comments	
Tested on model RM600/30X						
Unit on	5.2	5.2	60	3.5	Switch "e" open, L to PE, no load	
Unit on	5.2	5.2	60	3.5	Switch "e" open, N to PE, no load	
Unit on	0.03	0.03	60	0.25	Switch "e" close, L to RS232 port	

IEC 62040-1					
Clause	Requirement + Test			Result - Remark	Verdict
Unit on	0.03	0.03	60	0.25	Switch "e" close, N to RS232 port.
Note(s) : Test voltage: 456V/60Hz					

C.2	Safety isolation transformer				P
Construction details:					
Transformer part name: T1 on CNTL board					
Manufacturer: See appended table 1.5.1					
Type: See appended table 1.5.1					
Recurring peak voltage				20Vpeak	
Required clearance for reinforced insulation (from table 2H and 2J)				4.0	
Effective voltage rms				8Vrms	
Required creepage distance for reinforced insulation (from table 2L)				5.0	
Measured min. creepage distance					
Location		inside (mm)	outside (mm)		
Primary winding/pin to secondary winding/pin		5.8	6.2		
Primary winding/pin to core		2.8	2.8		
Secondary winding/pin to core		2.8	2.8		
Measured min. clearances					
Location		inside (mm)	outside (mm)		
Primary winding/pin to secondary winding/pin		5.8	6.2		
Primary winding/pin to core		2.5	2.5		
Secondary winding/pin to core		2.5	2.5		
Construction:					
Concentrically wound transformer design, core size EE-16. N1, N2 are primary winding which is wound around the internal side of the bobbin. 3 layers of mylar tapes are used to separate primary and secondary windings. N3, N4, N5 are secondary windings on outer side of bobbin. Margin tape with width of 2.8mm is used on both side of bobbin and each winding layer. Tubing is used on every winding exits to the bare pins on bobbin.					
Pin numbers					
Prim.		1-2, 3-4			
Sec.		6-7, 9-10			
Bobbin					

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
Material			
Thickness		0.7mm	
Electric strength test			
With 4242Vdc. after humidity treatment			
Result		Pass	

M		N
	Ventilation of battery compartments	
	The required dimension for the ventilation will be calculated with the following formula:	
	$A > K1 * Q$ with $Q = (0.054 \text{ m}^3/\text{Ah}) * n * I * C$ where: K1 : constant factor of $28 \text{ h} * \text{cm}^2/\text{m}^3$ Q : airflow in $\text{m}^3/\text{h}$ n : number of battery cells I : constant factor (0.2A/100Ah for valve regulated lead acid batteries) C : nominal capacity of the battery	
	Model: n : C : $A > 28 * \text{cm}^2/\text{m}^3 * (0.054\text{m}^3/\text{Ah}) * n * (0.2 \text{ A}/100\text{Ah}) * C = \text{cm}^2$	
	Verdict	
	The size of the ventilation openings exceeds the required airflow by far (as well as the UPS).	

European group differences and national differences of EN 62040-1																																																															
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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>: "Laitte 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



Fig. 2 –Rear view



Pictures



Fig. 3 –Inside 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

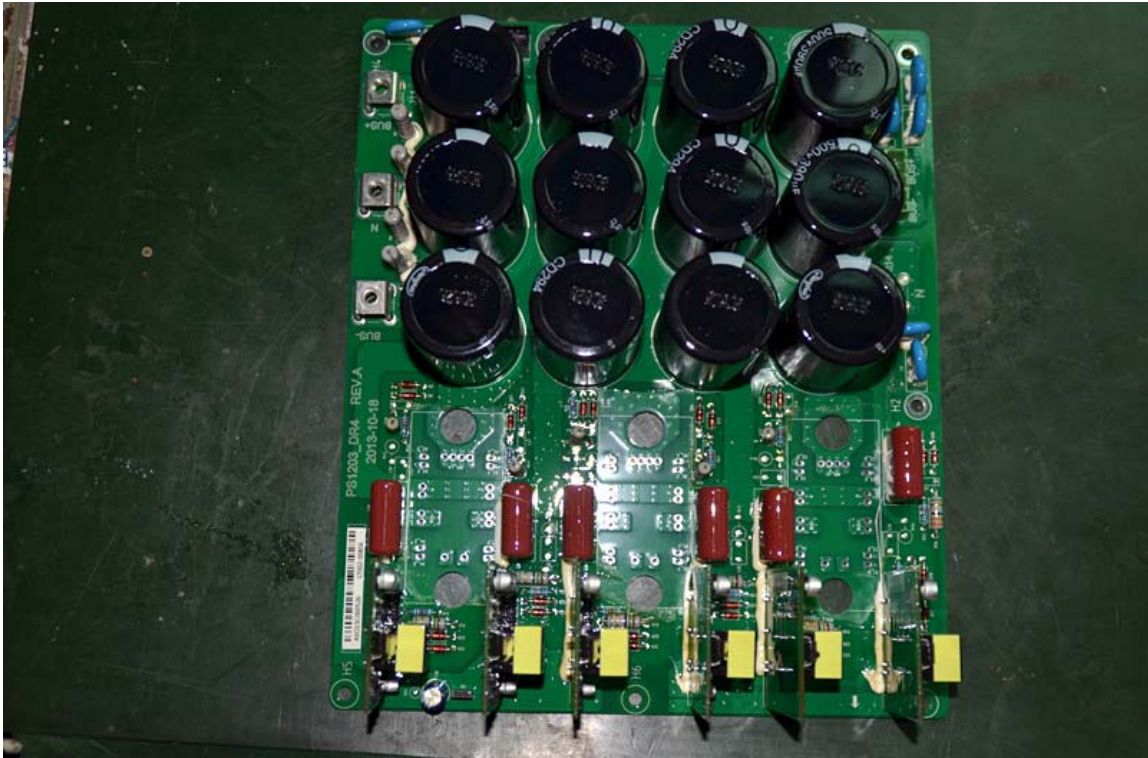


Fig. 8 –PS1203 DR4 component view(I)



Pictures

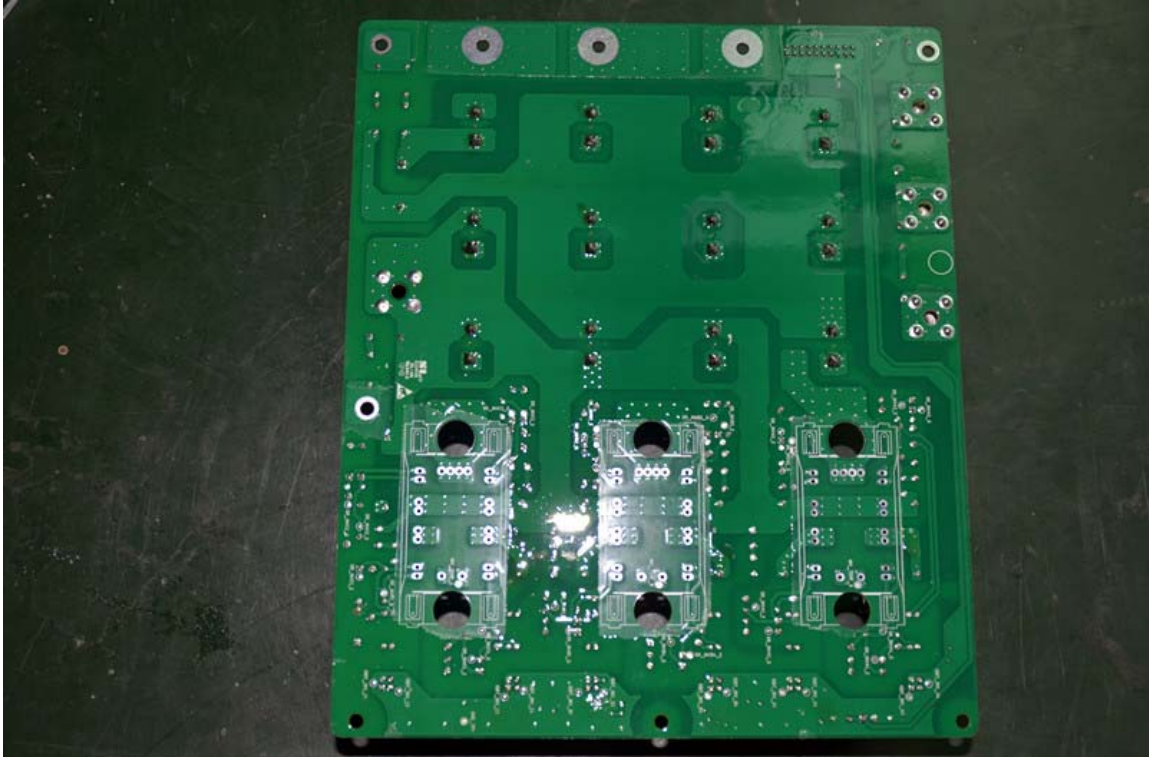


Fig. 9 –PS1203 DR4 trace view

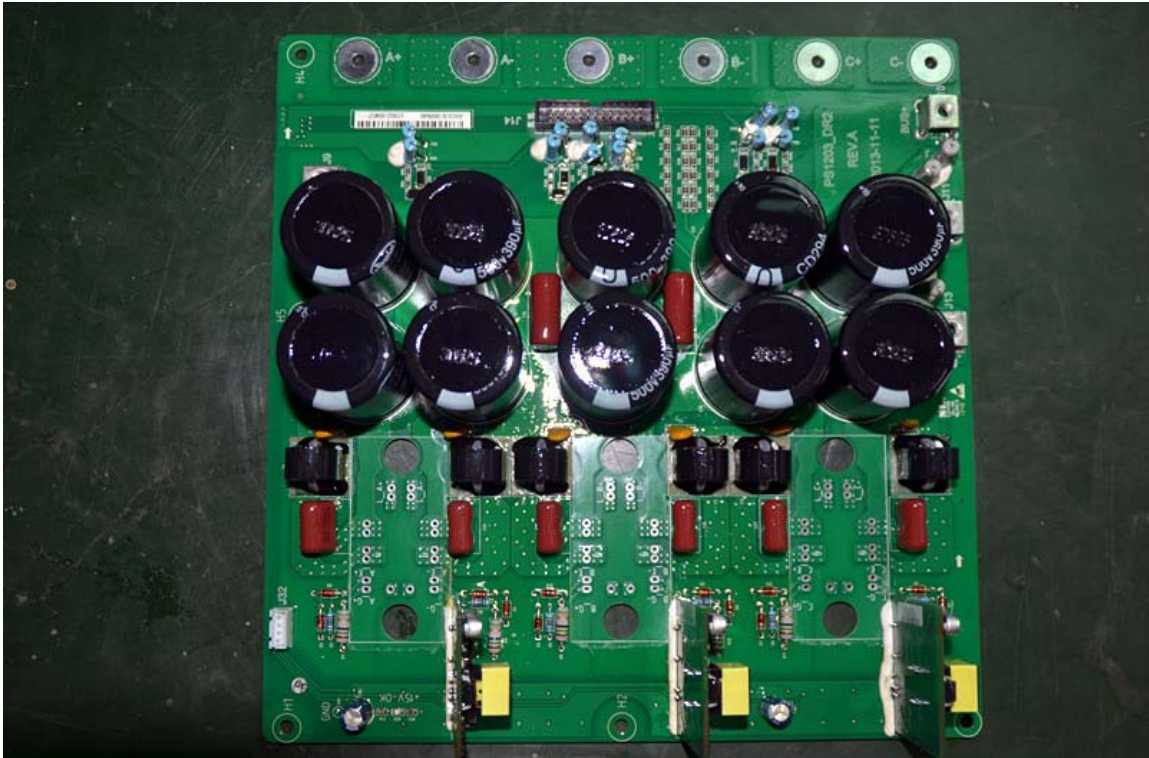


Fig. 10 –PS1203 DR2 component view

*Pictures*

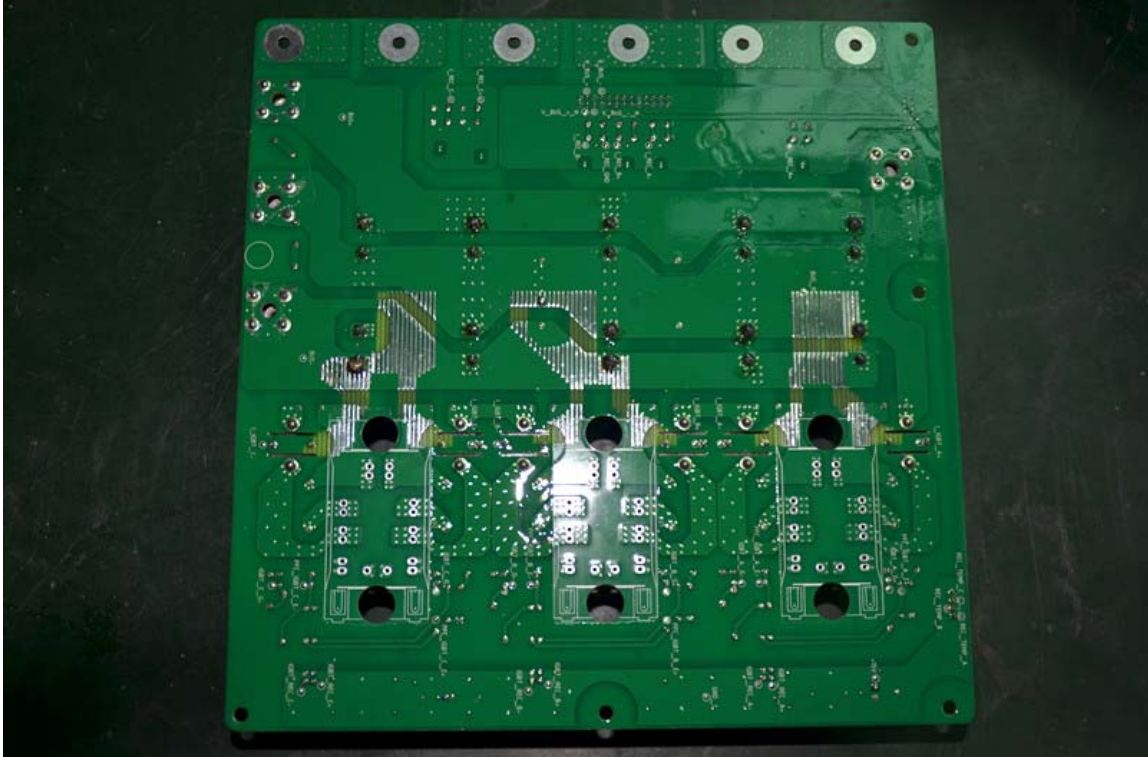


Fig. 11 –PS1203 DR2 trace view

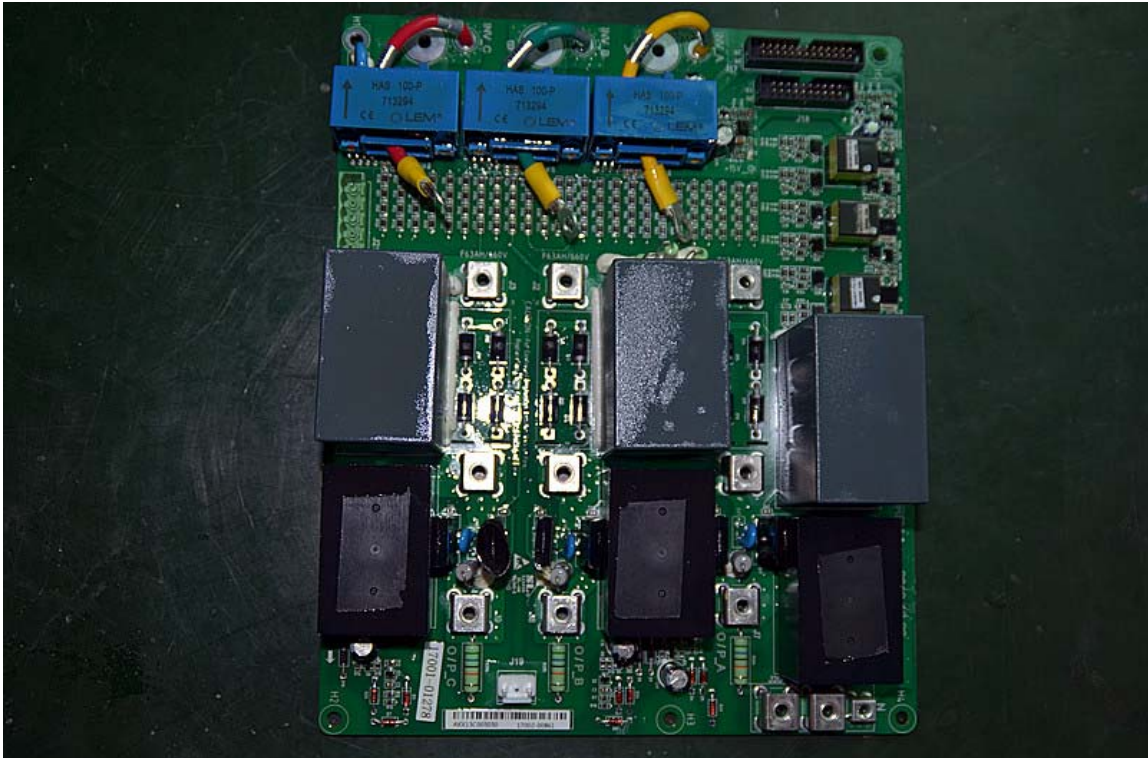


Fig. 12 –PS1203 EM1 component view



Pictures

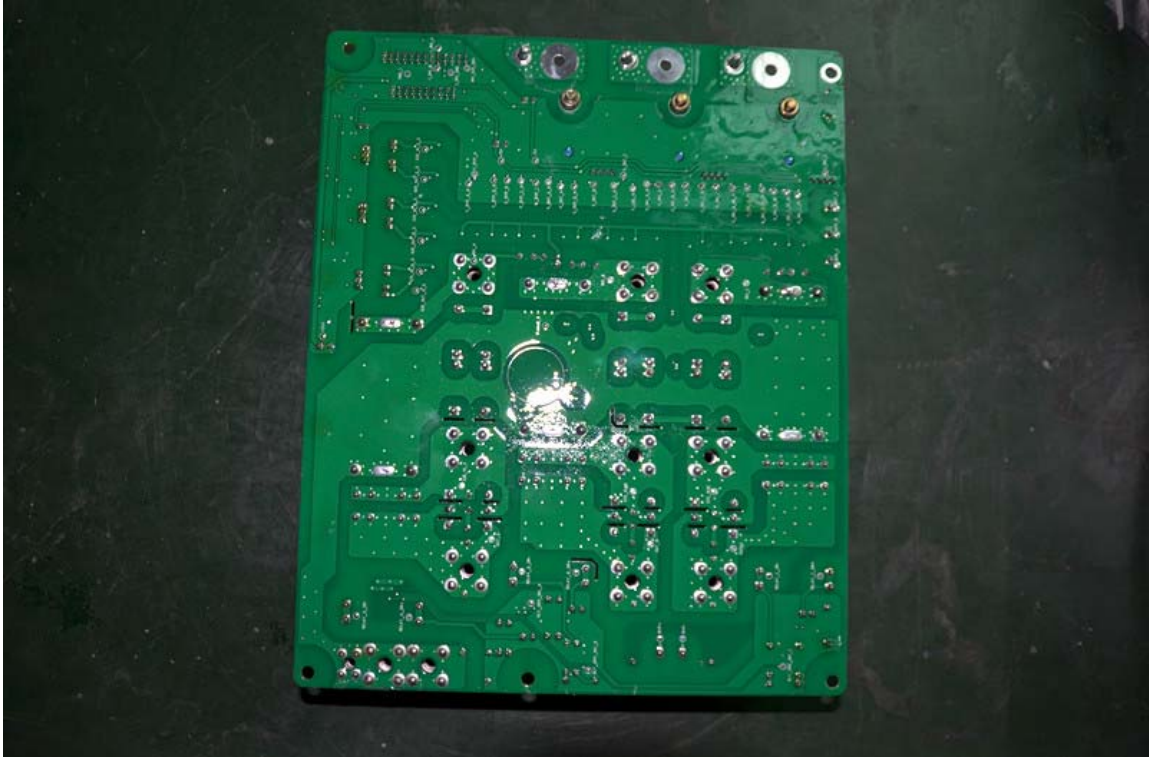


Fig.13 –PS1203 EM1 trace view

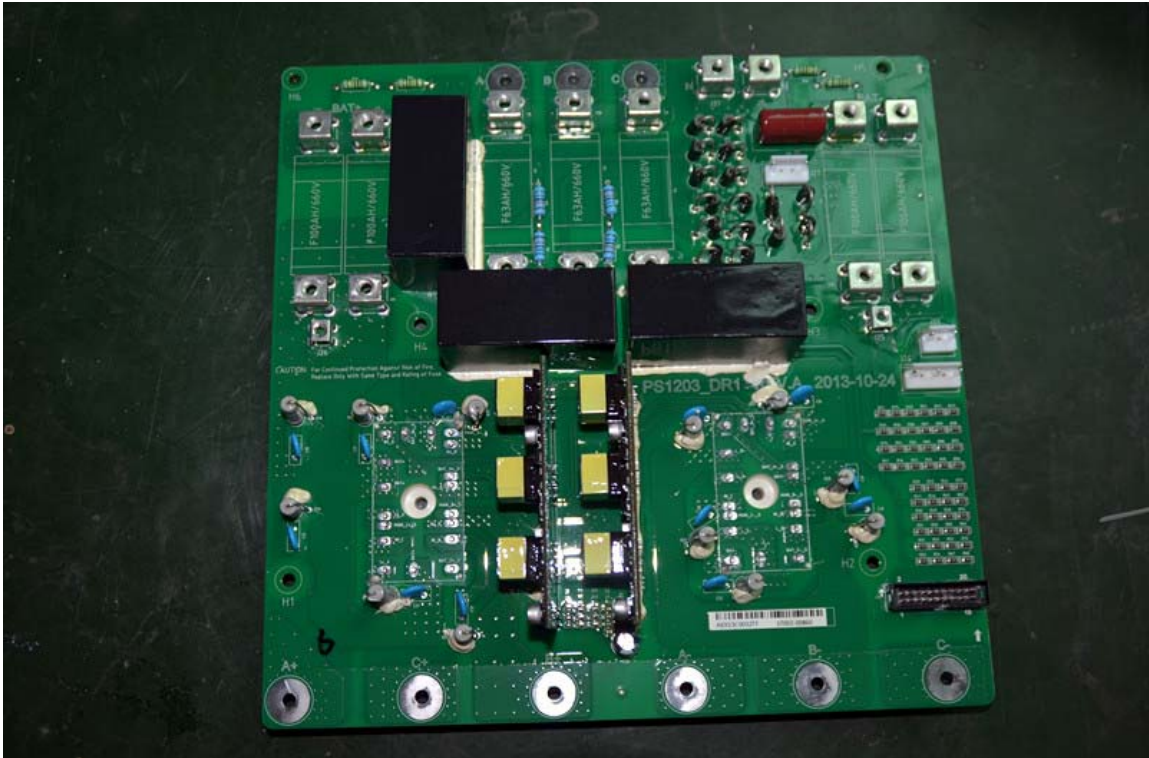


Fig. 14 –PS1203 DR1 component view

*Pictures*

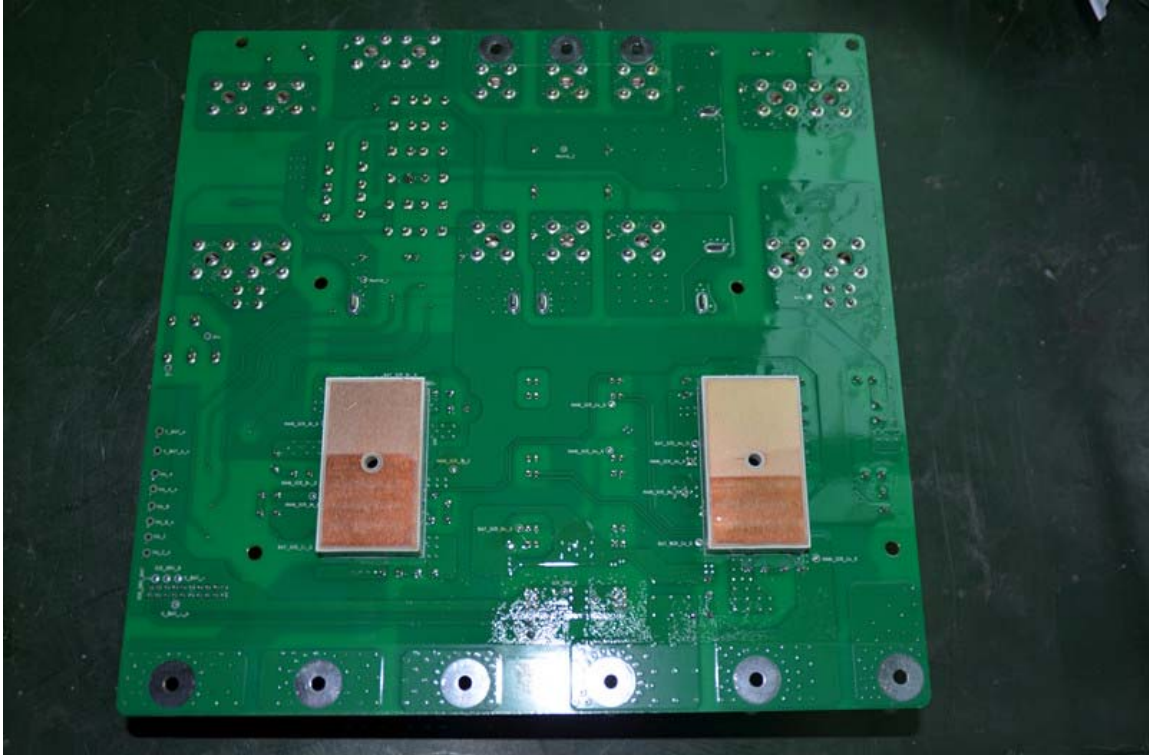


Fig. 15 –PS1203 DR1 trace view

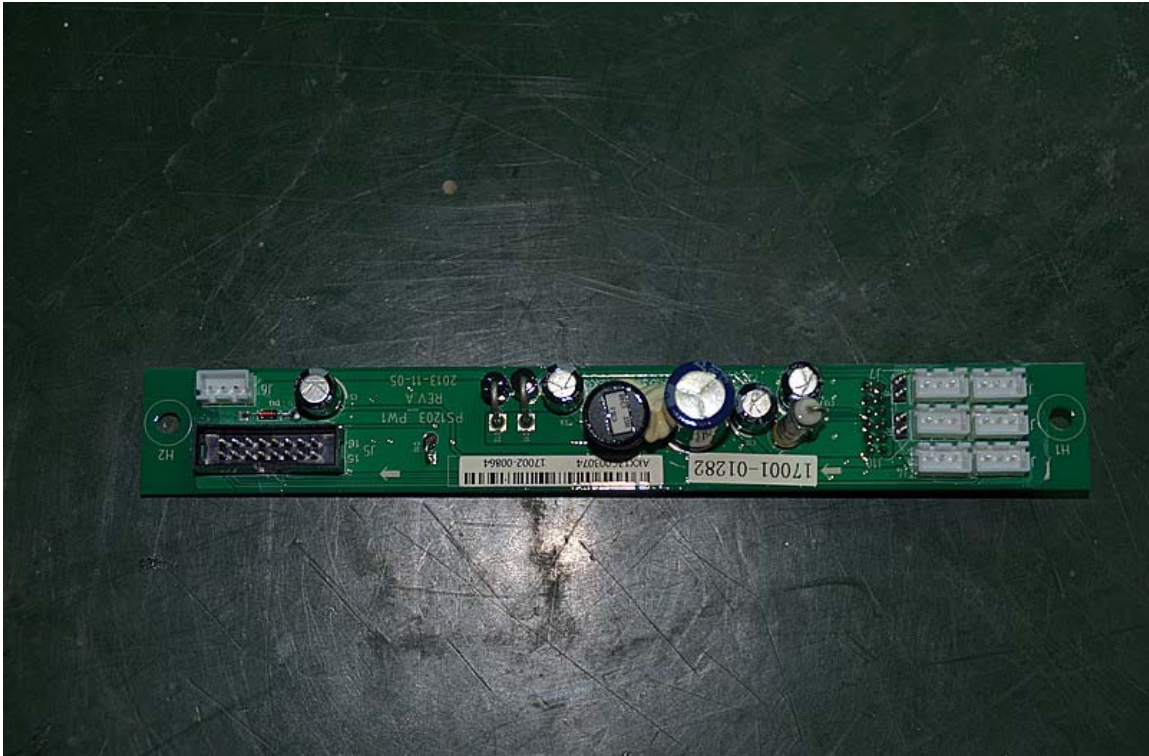


Fig. 16 –PS1203 PW1 component view



*Pictures*

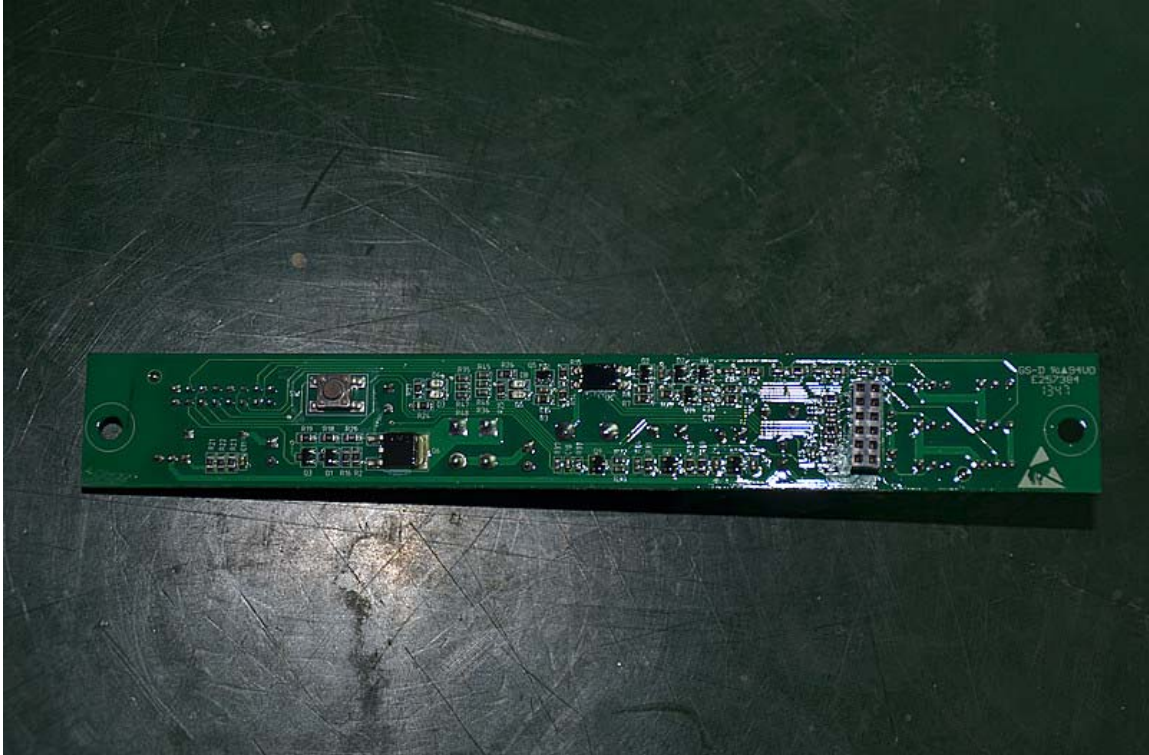


Fig. 17 –PS1203 PW1 trace view

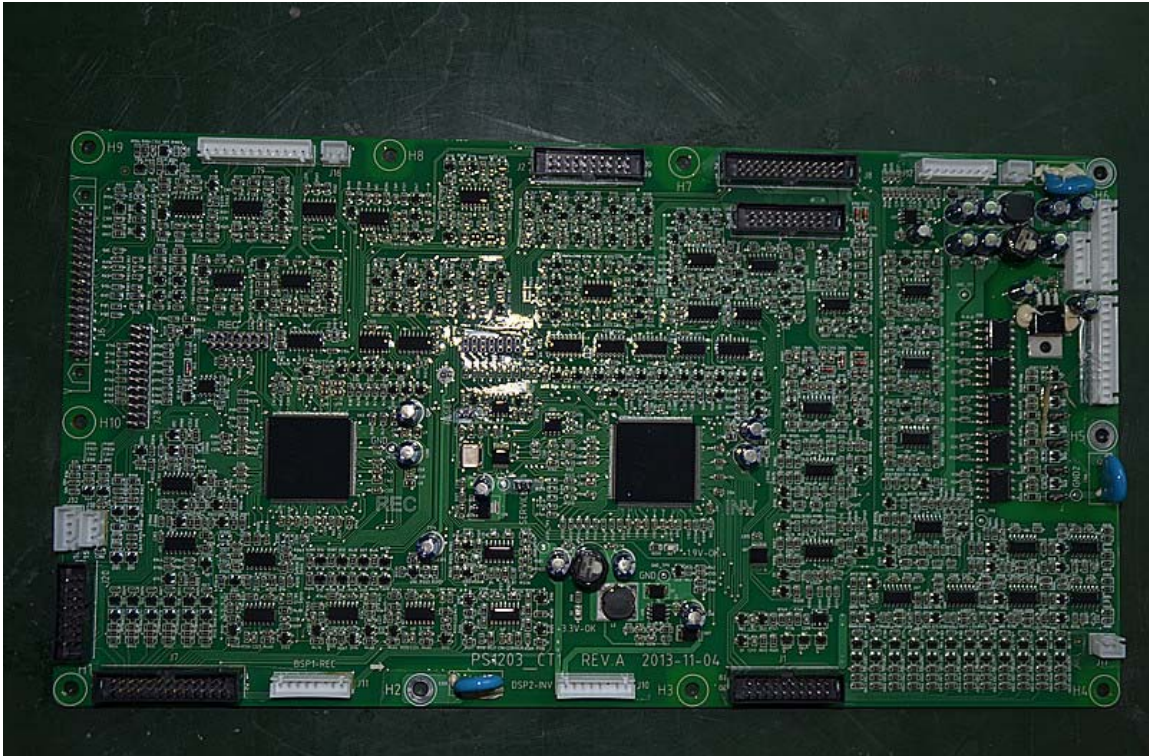


Fig. 18 –PS1203 CT1 component view



Pictures

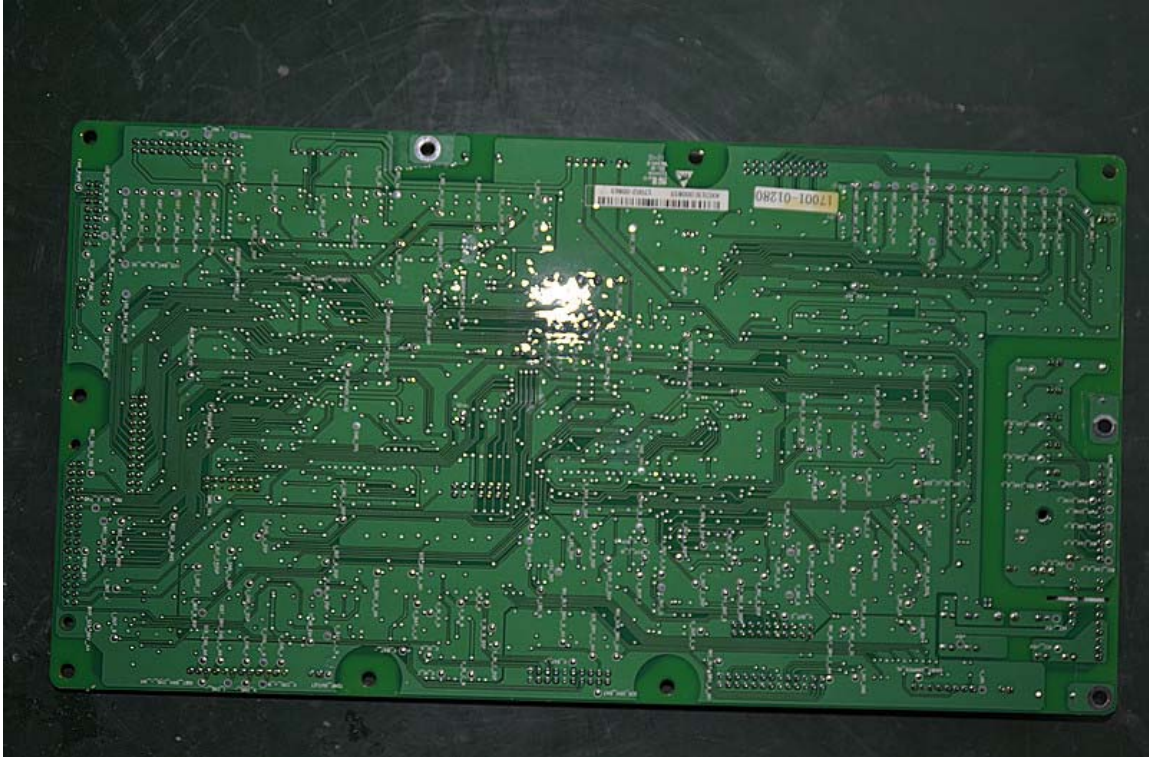


Fig. 19 –PS1203 CT1 trace view

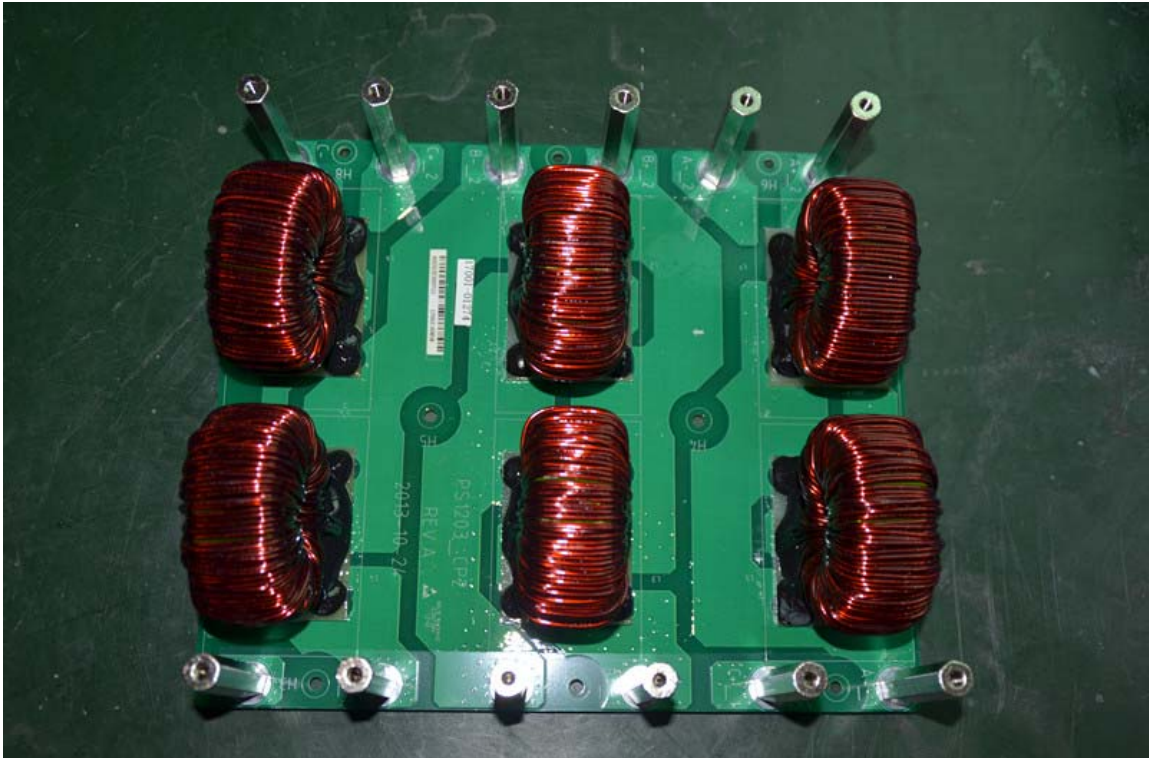


Fig. 20 –PS1203 CP2 component view

Pictures

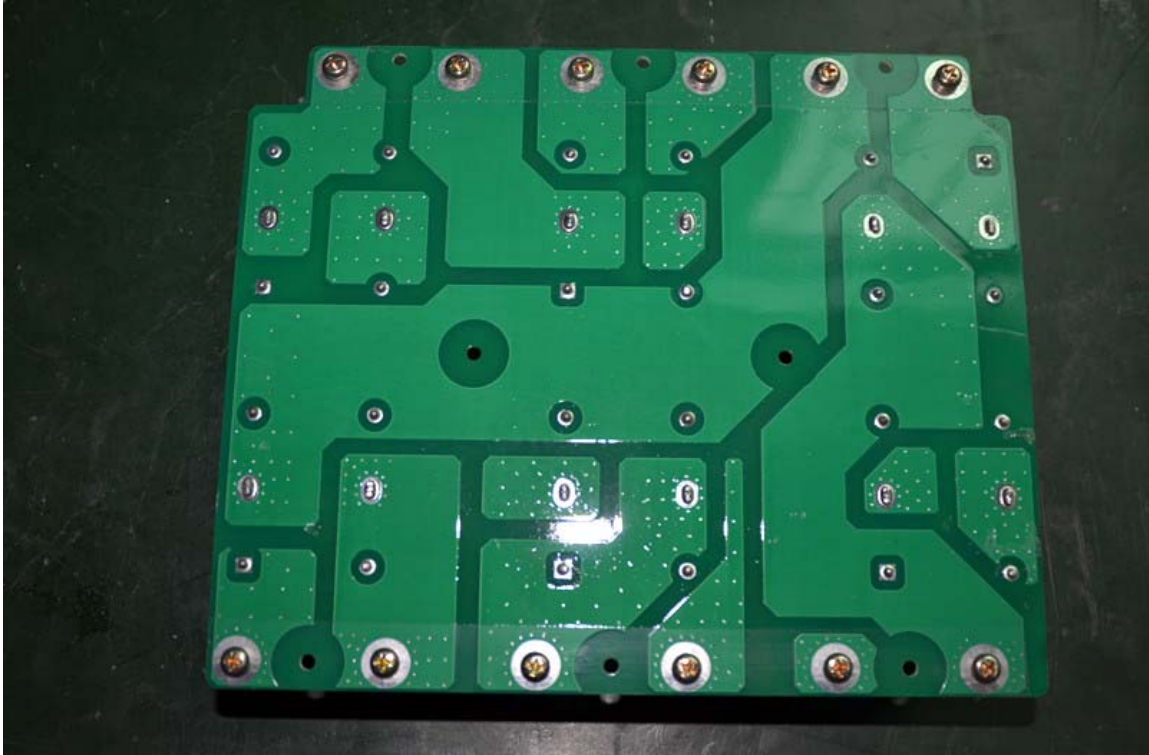


Fig. 21 –PS1203 CP2 trace view

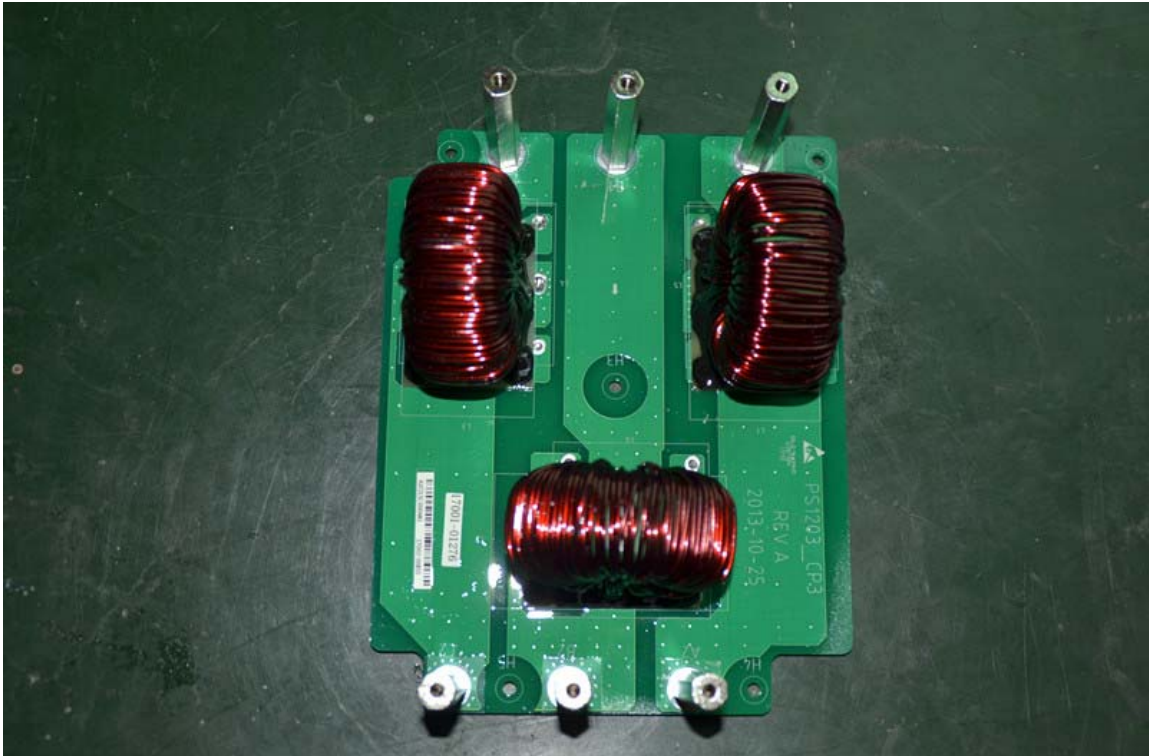


Fig. 22 –PS1203 CP3 component view



Pictures

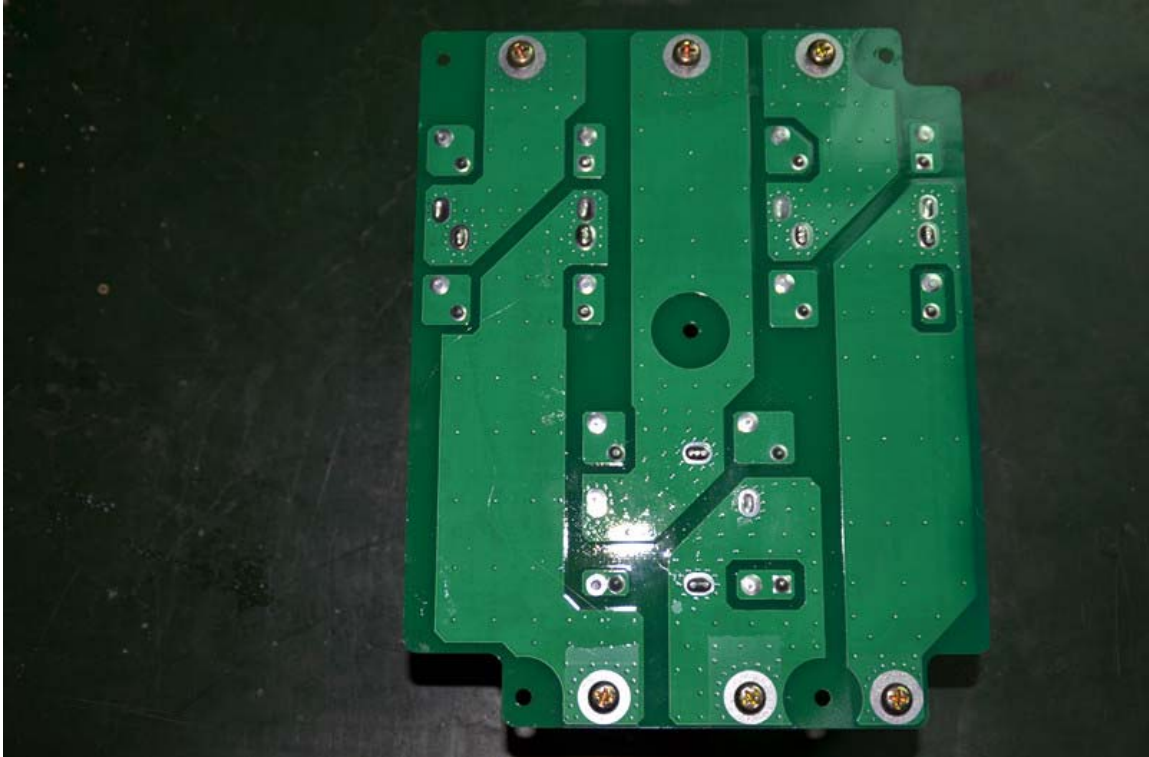


Fig. 23 –PS1203 CP3 trace view

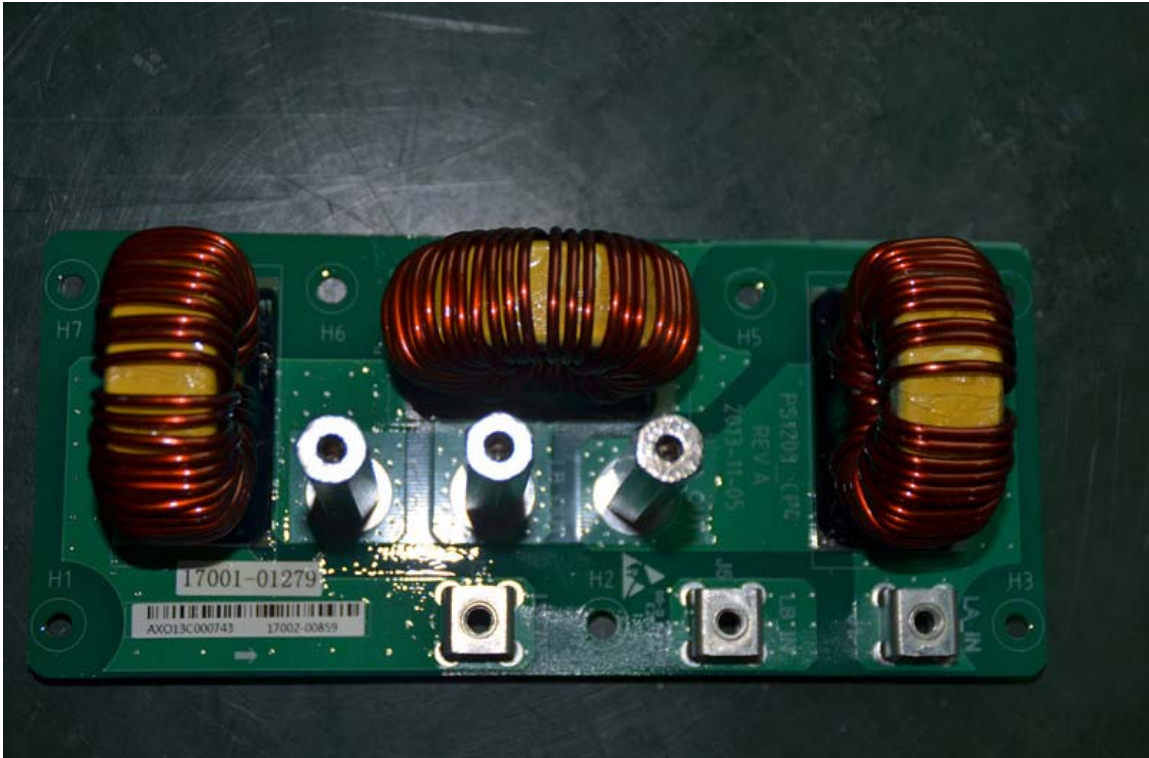


Fig. 24 –PS1203 CP4 component view

Pictures

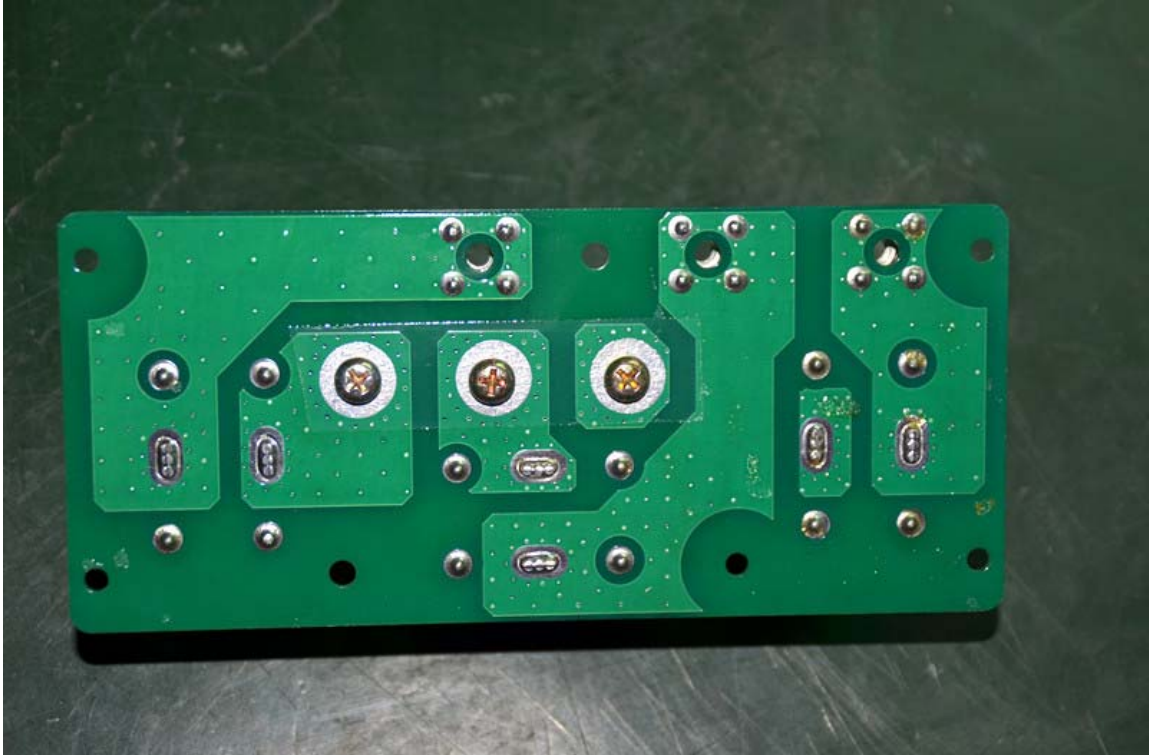


Fig. 25 –PS1203 CP4 trace view

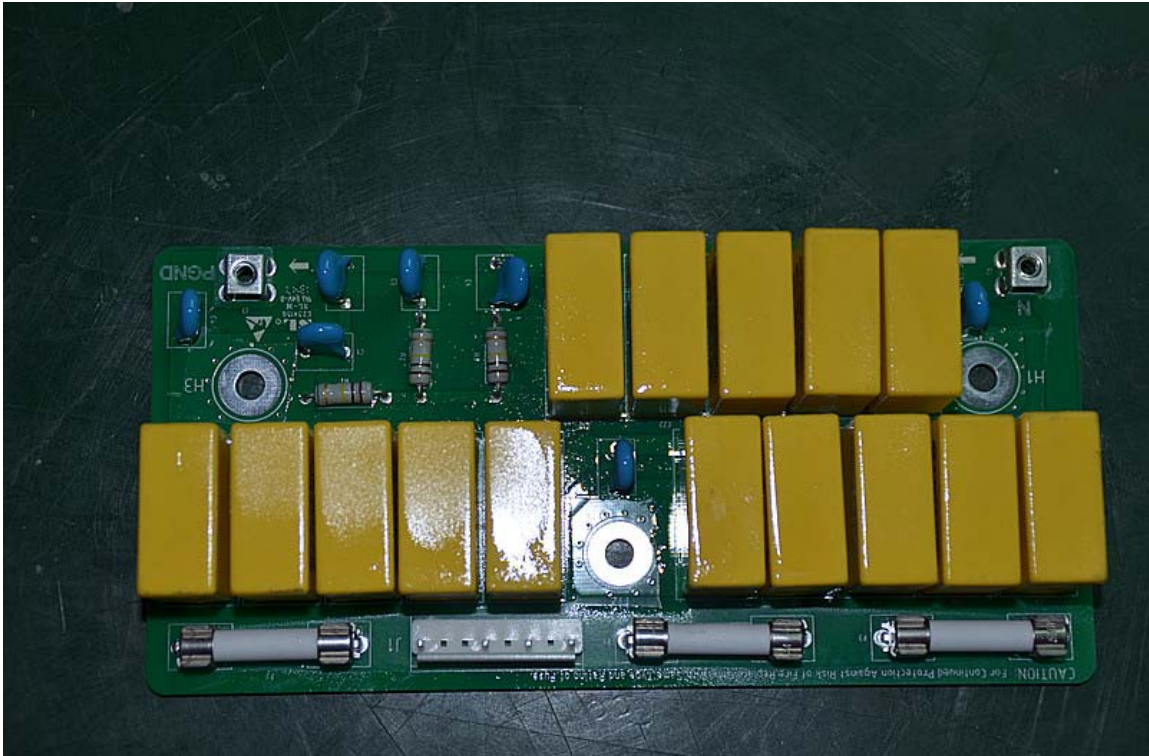


Fig. 26 –PS1203 EM2 component view



*Pictures*

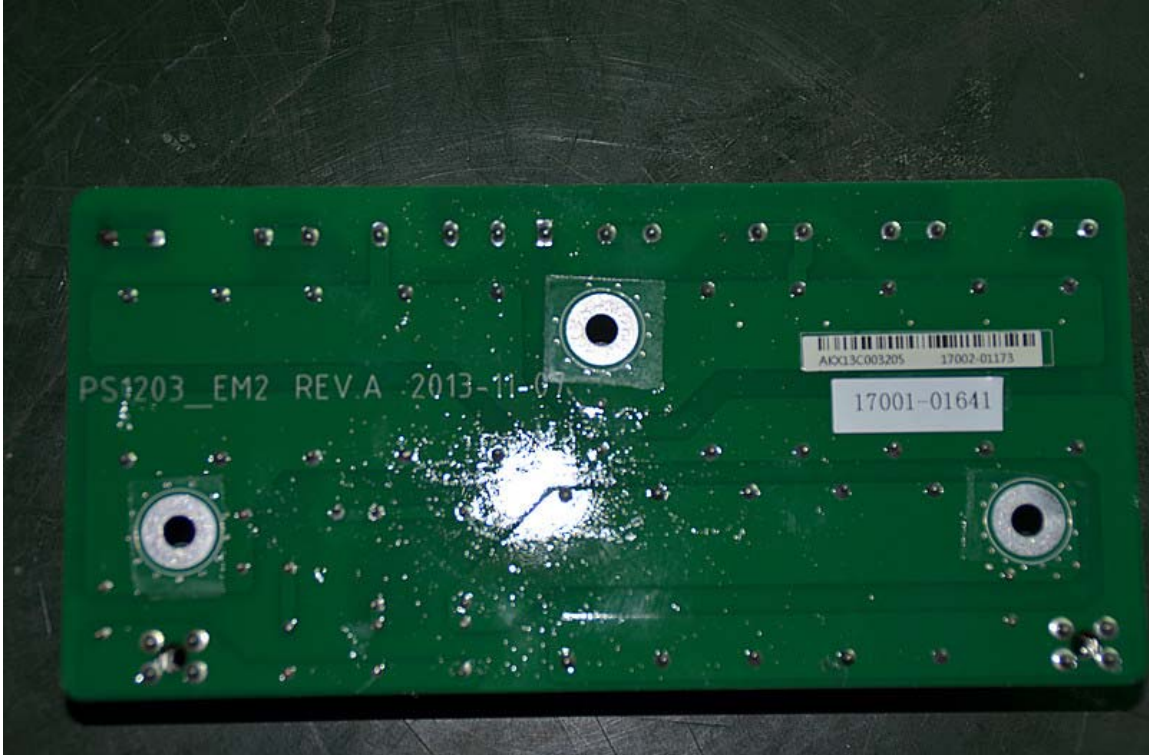


Fig. 27 –PS1203 EM2 trace view

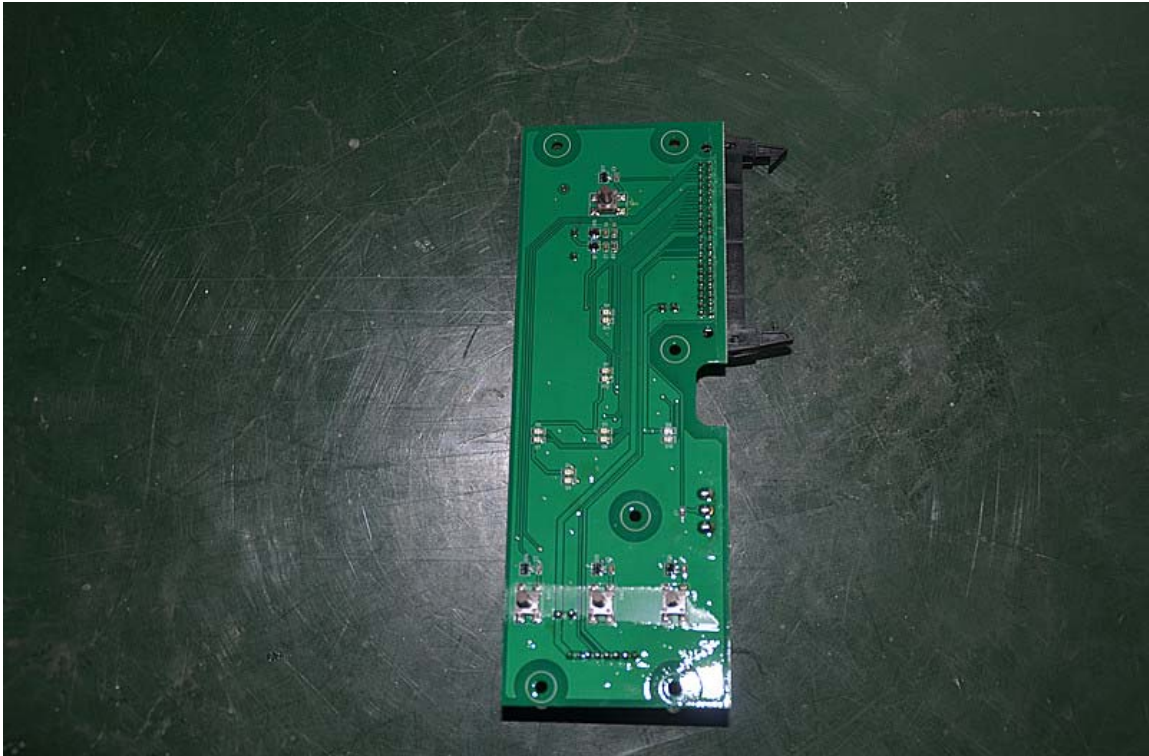


Fig. 28 –PS1203 KY1 component view

Pictures



Fig. 29 –PS1203 KY1 trace view

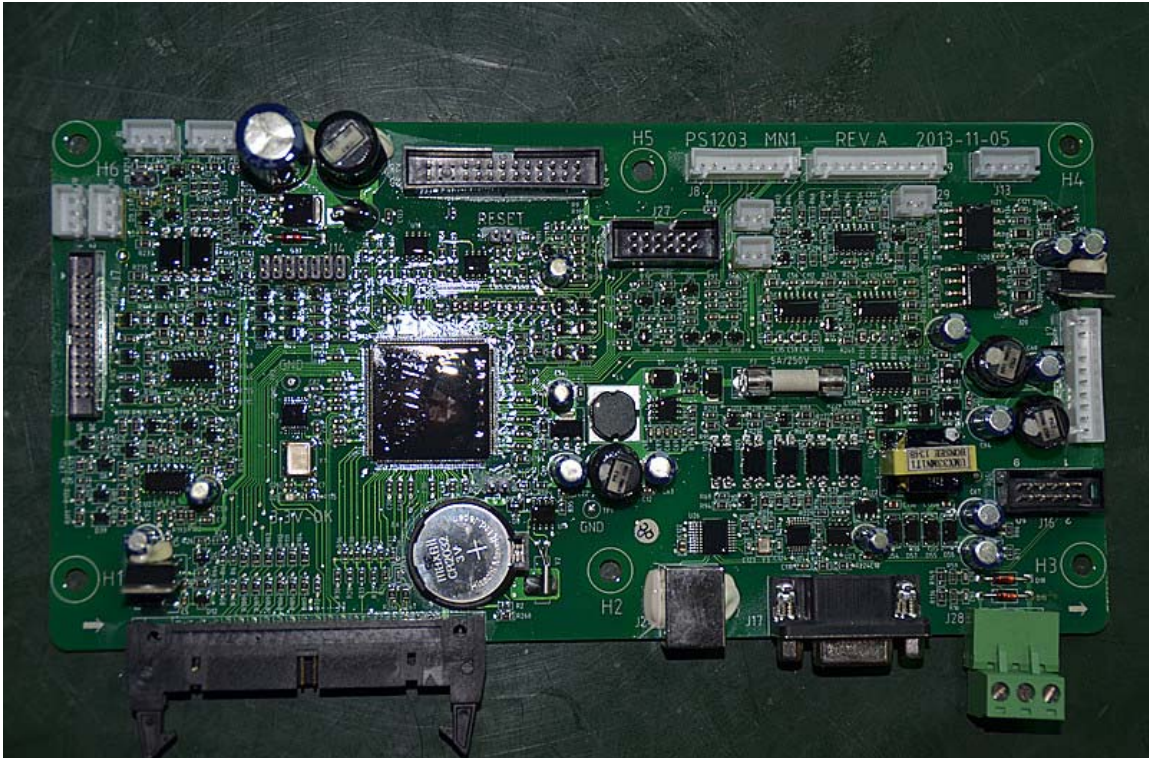


Fig. 30 –PS1203 MN1 component view



Pictures

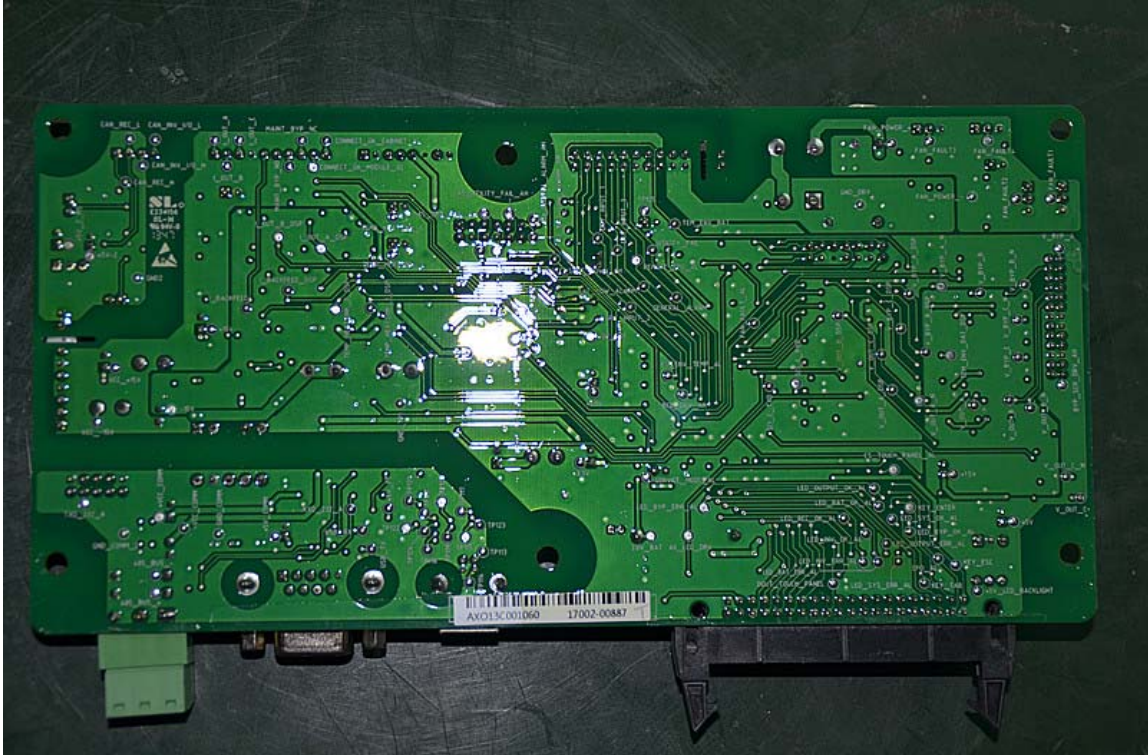


Fig. 31 –PS1203 MN1 trace view

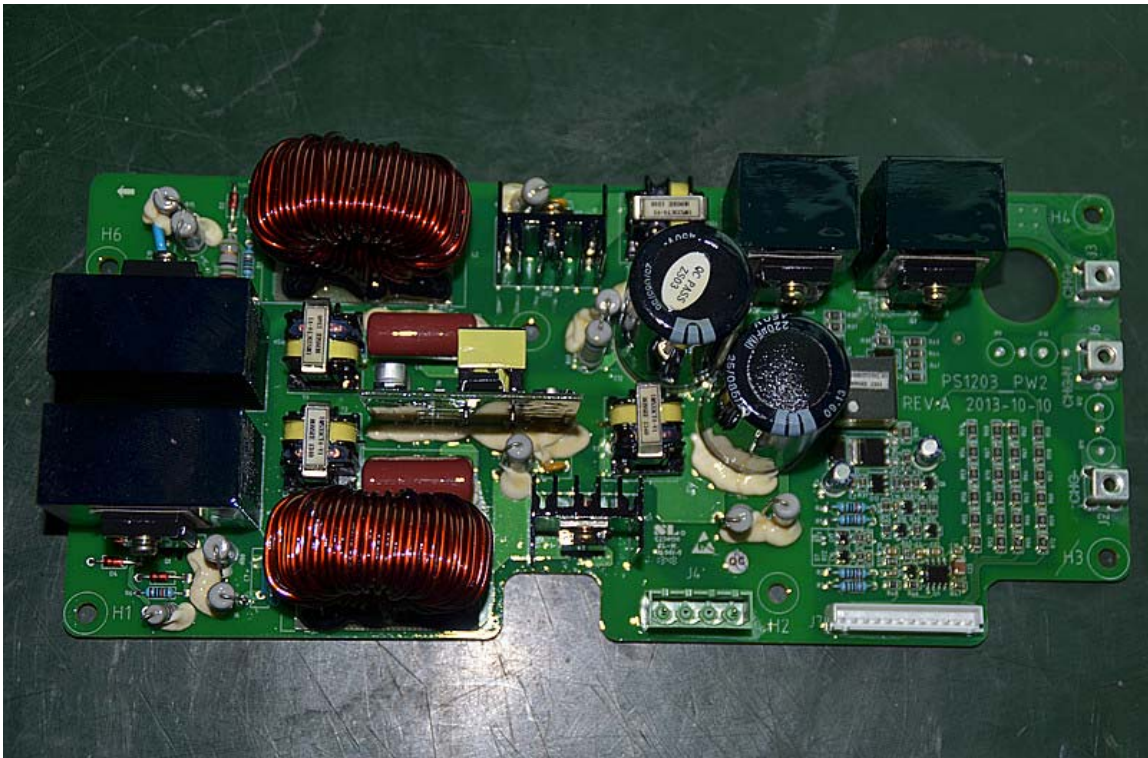


Fig. 32 –PS1203 PW2 component view



Pictures

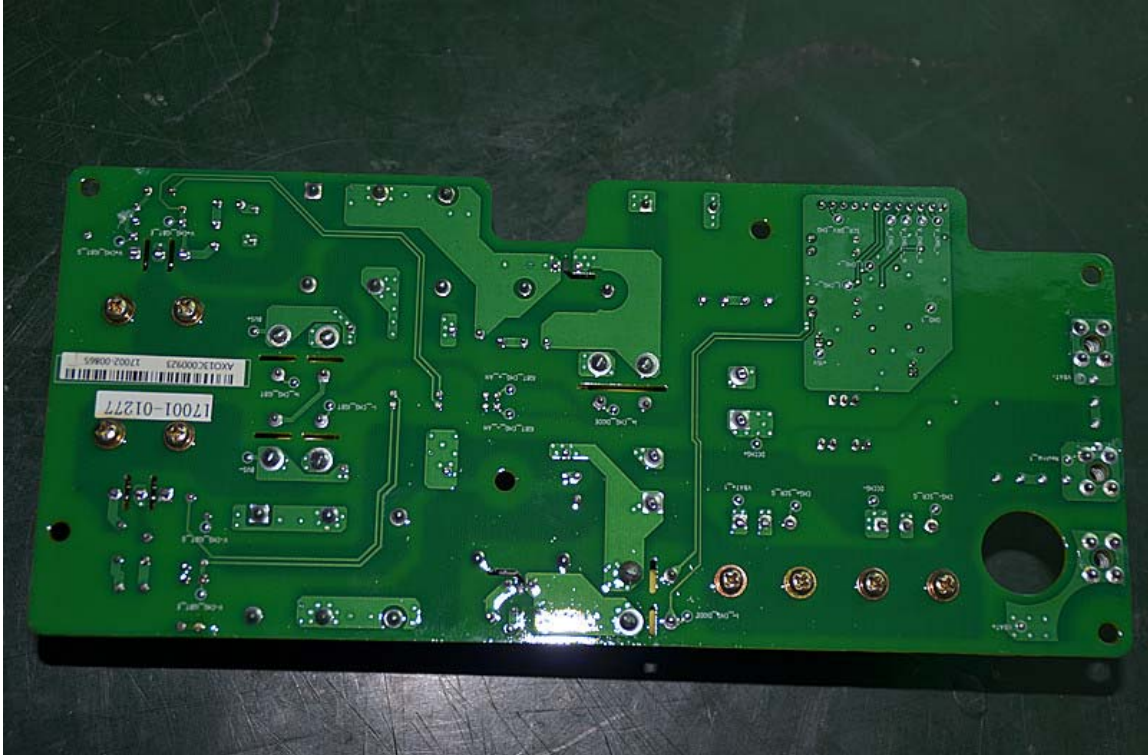


Fig. 33 –PS1203 PW2 trace view

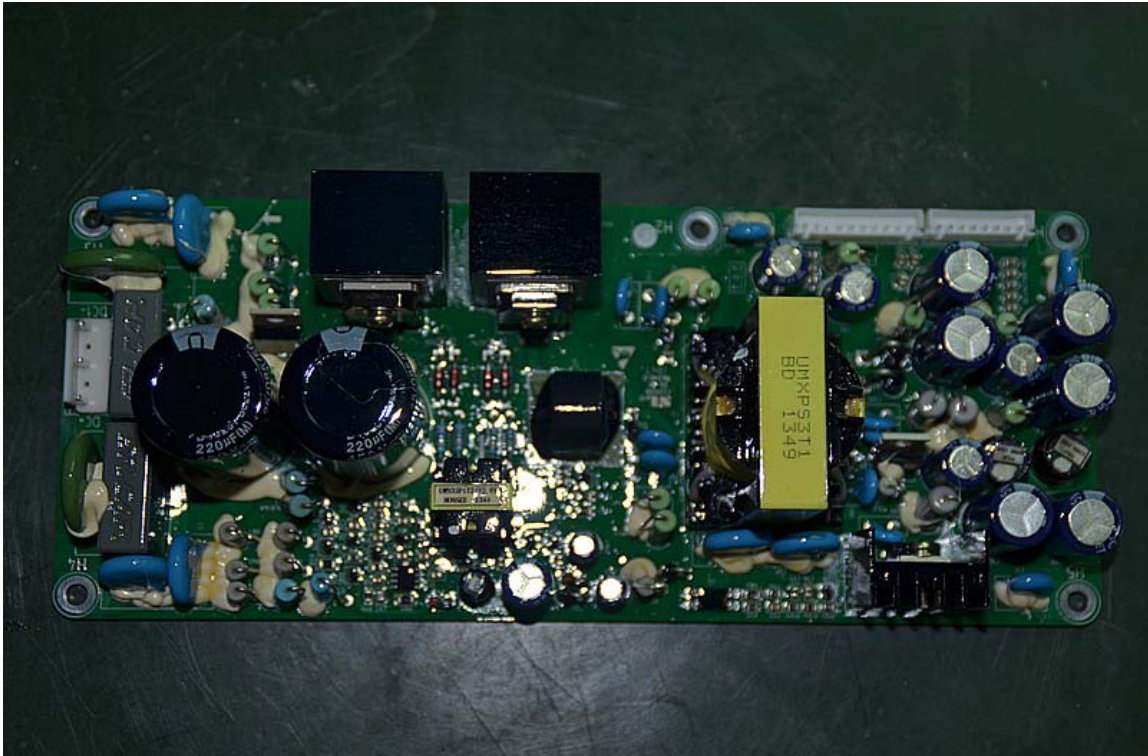


Fig. 34 –PS1203 PW3 component view

Pictures

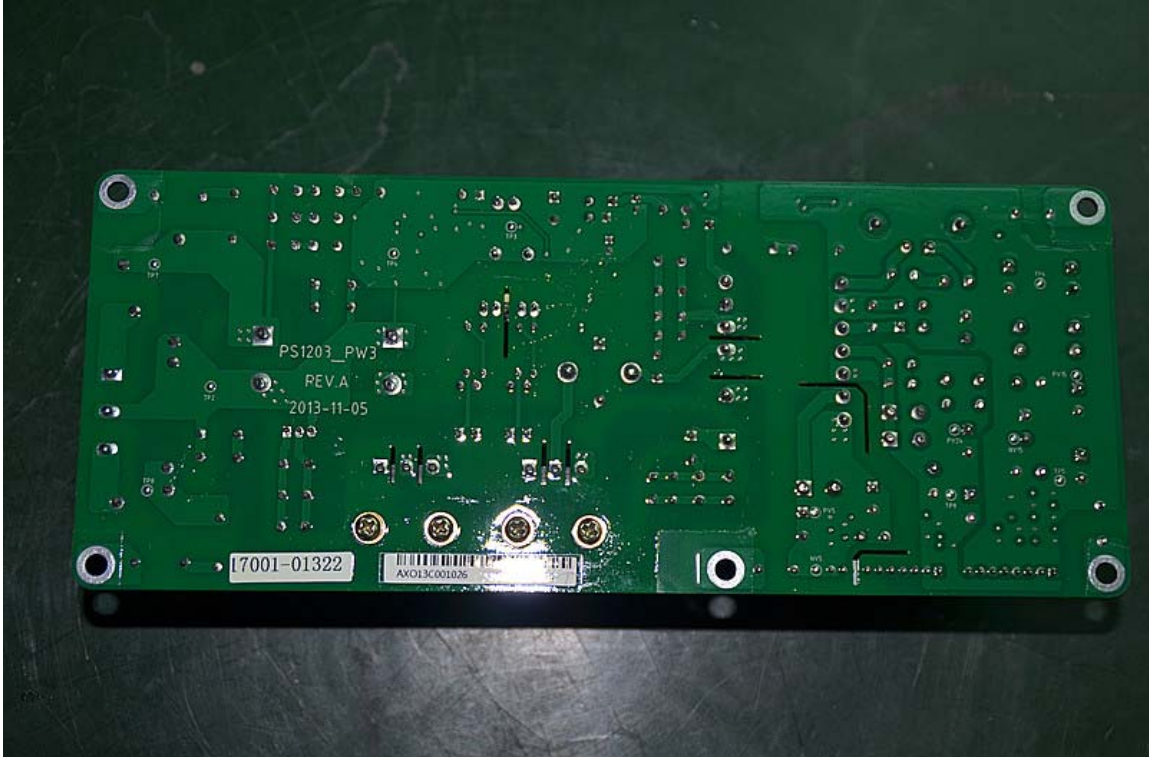


Fig. 35 –PS1203 PW3 trace view

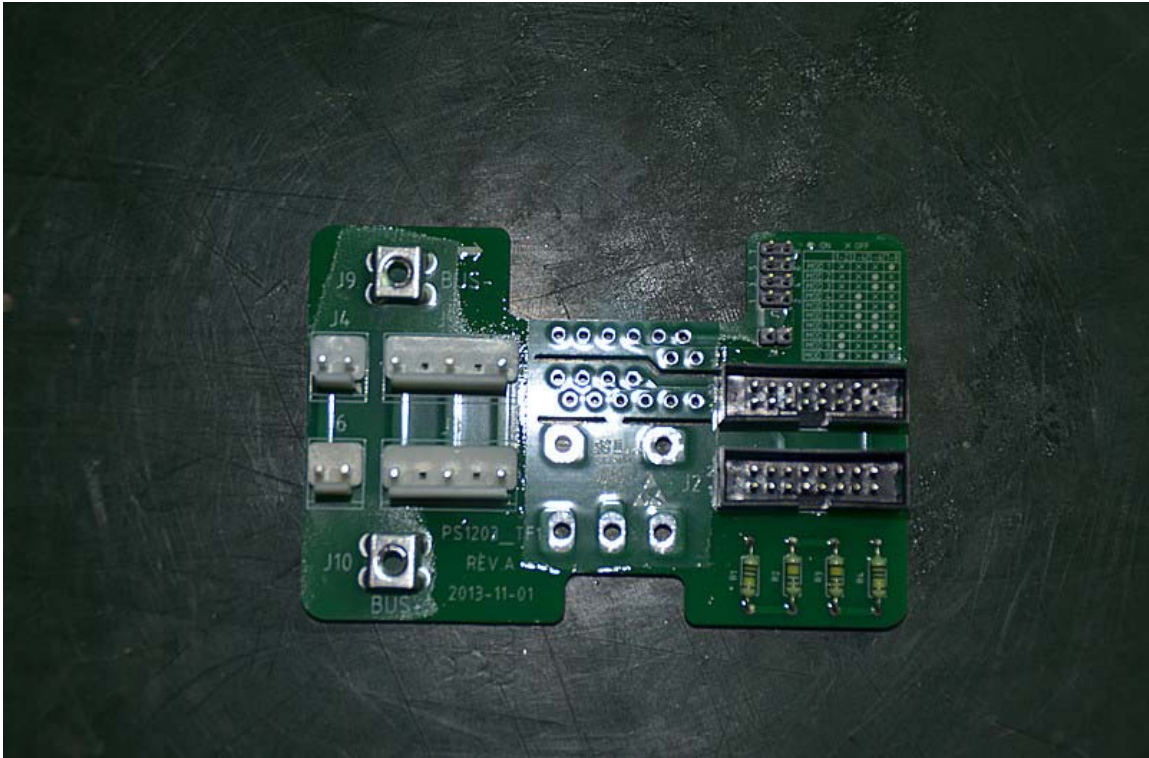


Fig. 36 –PS1203 TF1 component view



Pictures

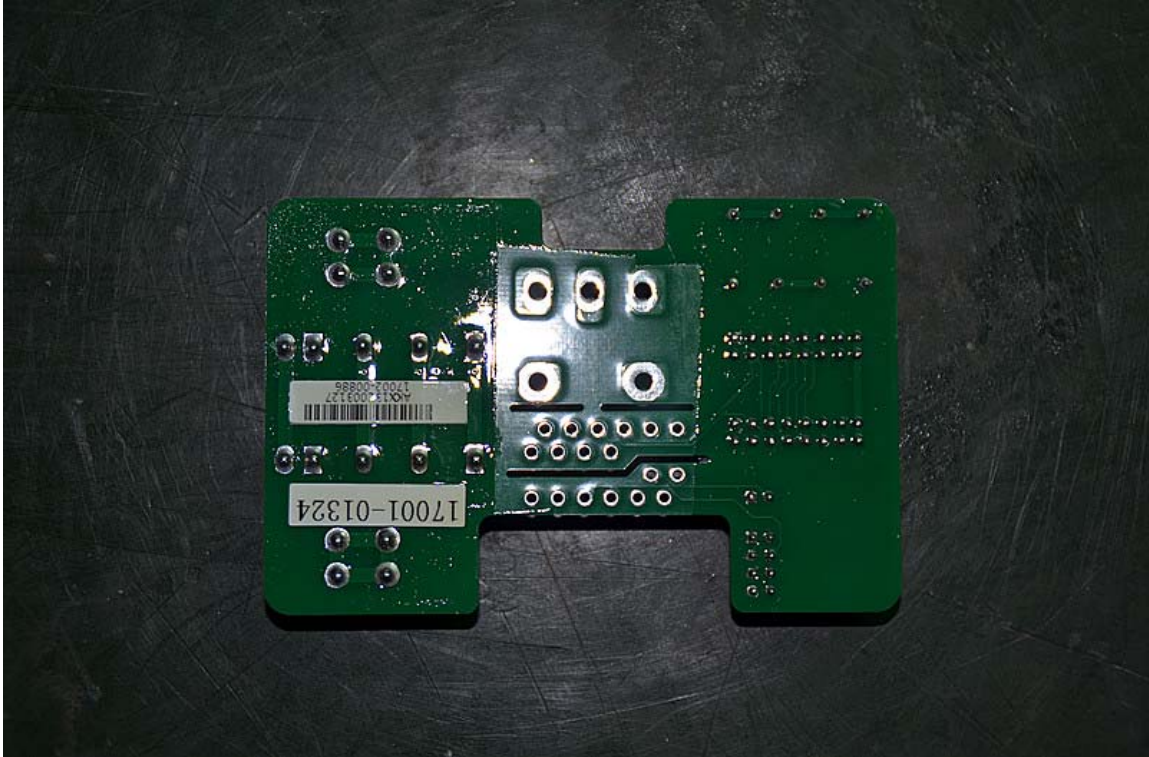


Fig. 37 –PS1203 TF1 trace view

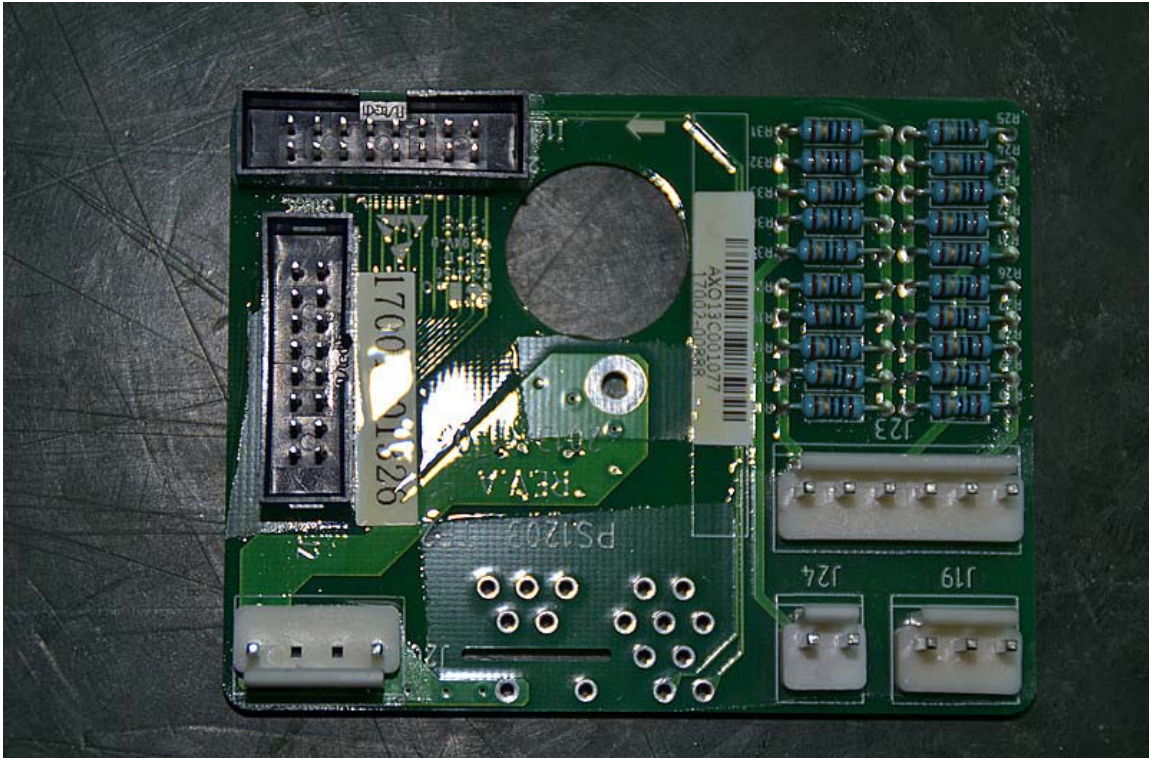


Fig. 38 –PS1203 TF2 component view



Pictures

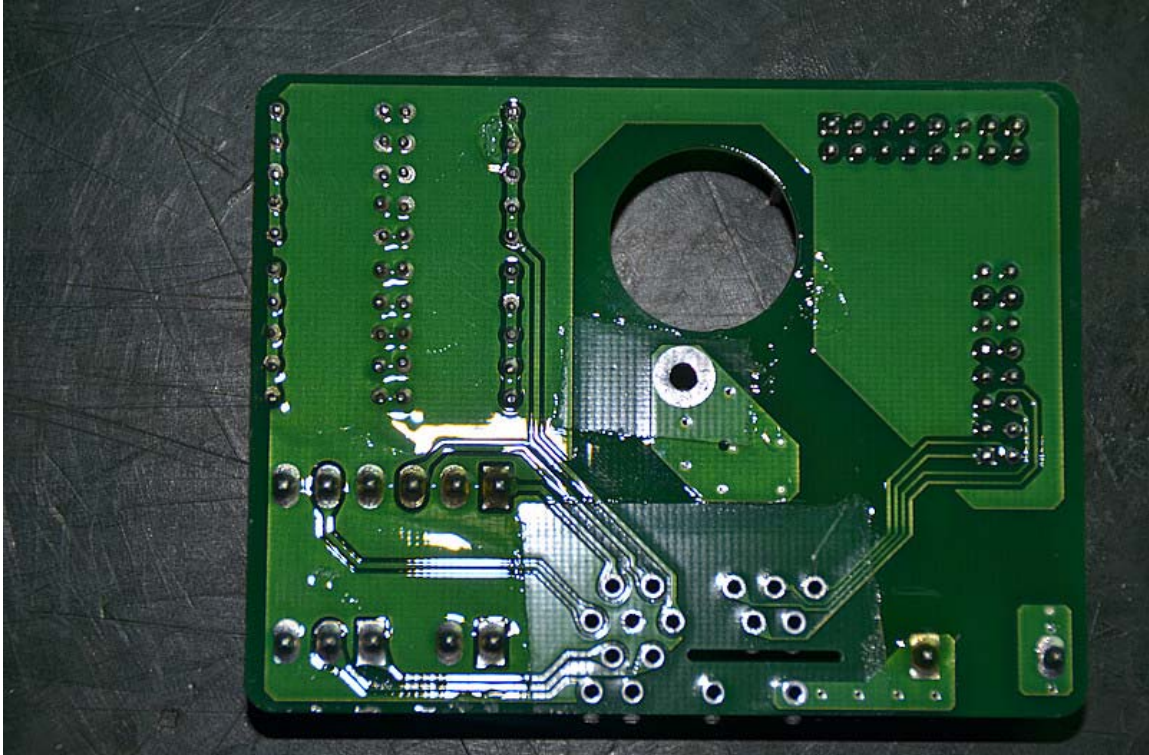


Fig. 39 –PS1203 TF2 trace view

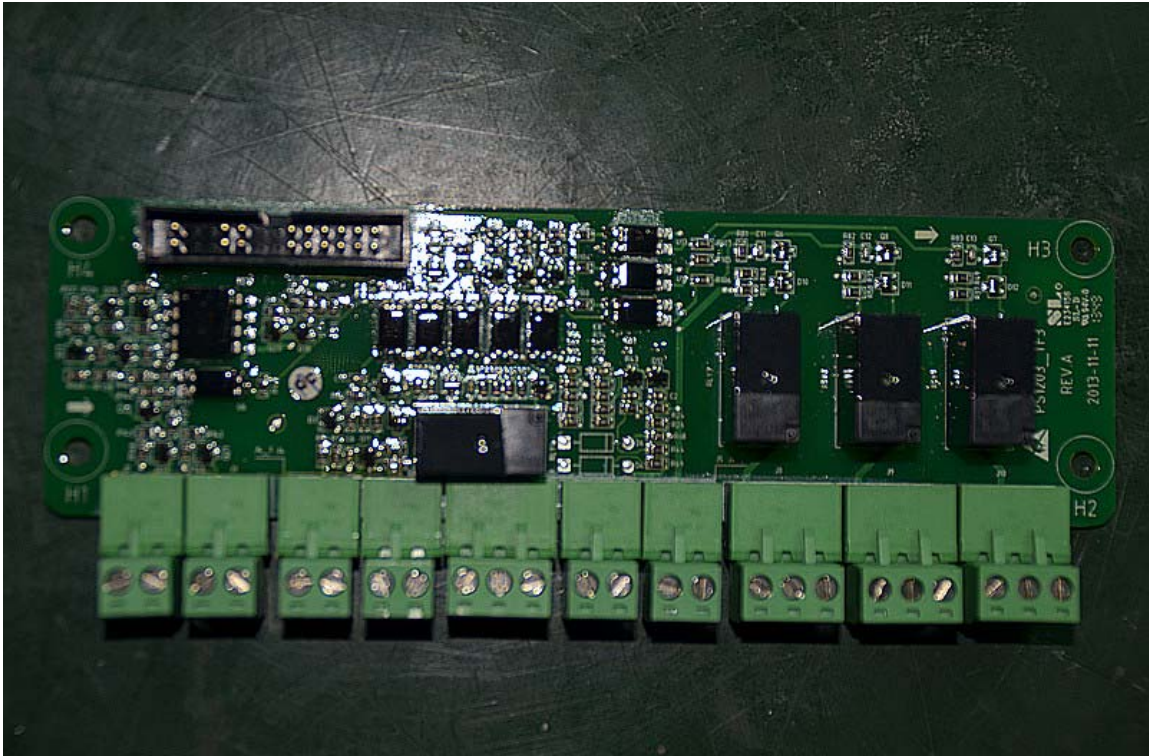


Fig. 40 –PS1203 TF3 component view



Pictures

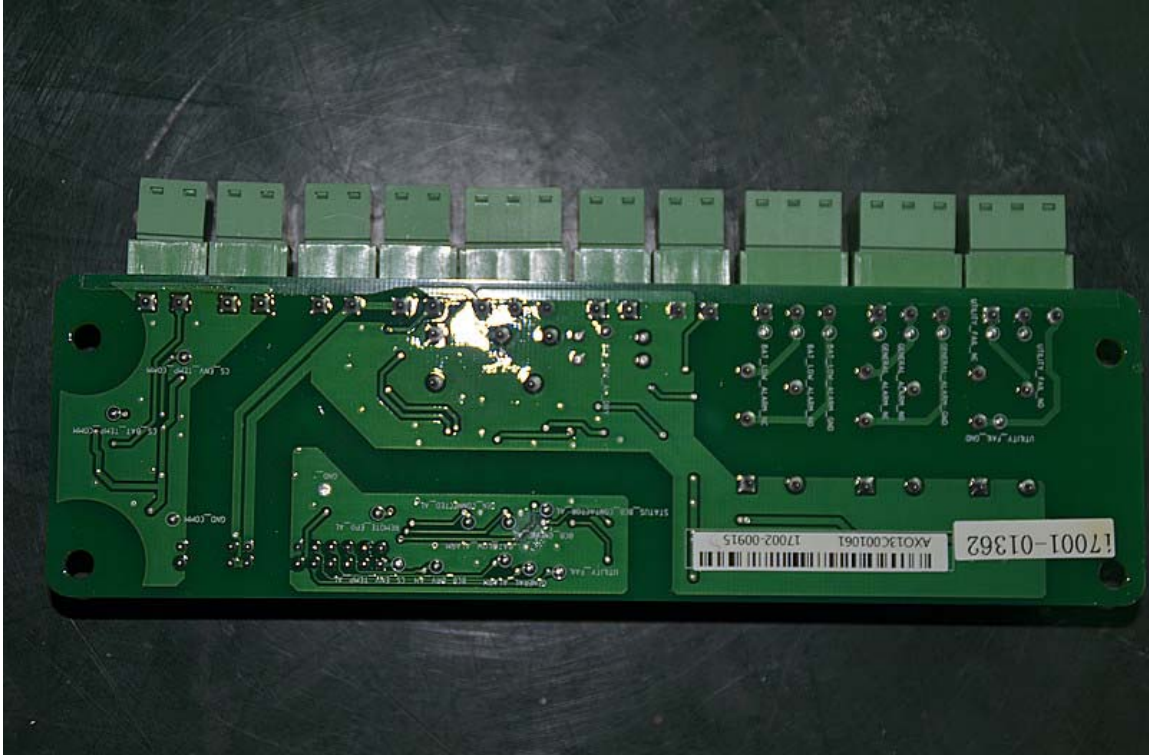


Fig. 41 –PS1203 TF3 trace view

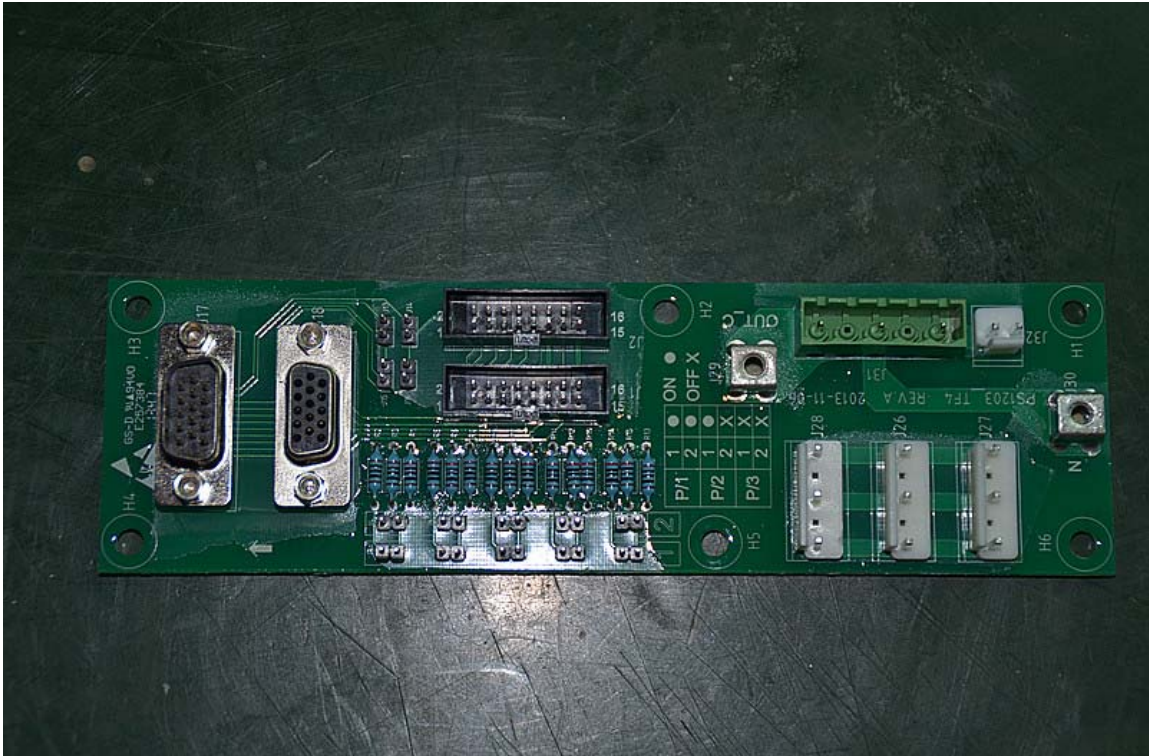


Fig. 42 –PS1203 TF4 component view

*Pictures*

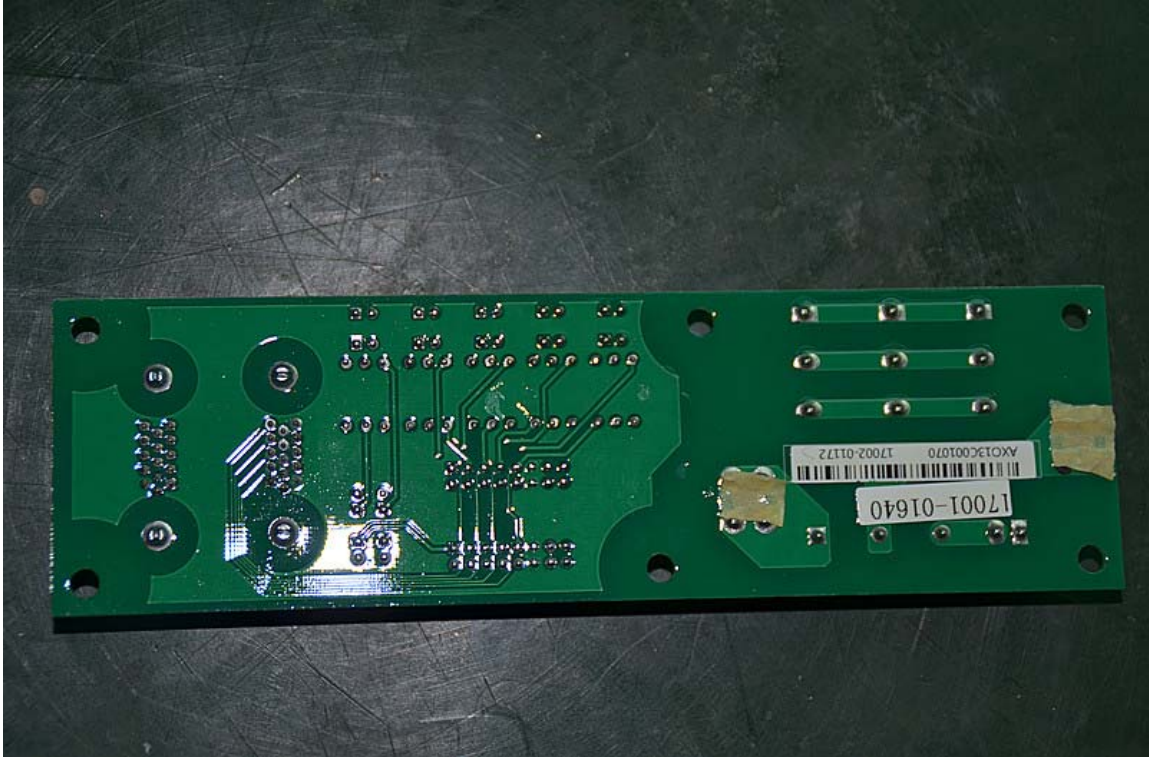


Fig. 43 –PS1203 TF4 trace view