

APPLICATION FOR LOW VOLTAGE DIRECTIVE

On Behalf of

INVT POWER SYSTEM (SHENZHEN) CO., LTD

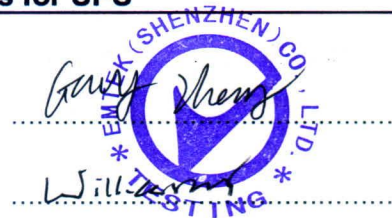
Uninterruptible Power Systems

Model(s): PM30X, PM25X, PM20X

**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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TEST REPORT IEC 62040-1 Uninterruptible power systems (UPS) – Part 1: General and safety requirements for UPS	
Report Reference No.....	ES160523062S
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
Test specification:	
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	PM30X, PM25X, PM20X
Ratings	See the rating labels



Test item particulars	
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)	>7Kg
Possible test case verdicts:	
- 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)
Testing	
Date of receipt of test item	N/A
Date(s) of performance of tests	N/A
General remarks:	
<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:

- **Update standard: EN 62040-1:2008+A1:2013**
- **Updated LVD directive.**
- **Change label to: See copy of marking plate**
- **Add. Input parameter: See copy of marking plate**
- **Change type name: PM30X, PM25X, PM20X**

1. The equipment is an on-line type uninterruptible power supply with sinewave O/P for general supply of office equipment.

2. Model difference description:

All models have the same constructions, circuit diagram and PCB layout. Only model name, appearance and the parameter of some parts are different. All tests were performed on model PM30 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 PM30X:

	PM30X
Module	30kVA 3Ø+N
RETE 1 - MAINS 1 - NETZ 1	3Ø+N
Uin (Vac)	380/400/415
Iin (A)	43*
Frequenza - Frequency - Frequenz	50÷60Hz
RETE 2 - MAINS 2 - NETZ 2	3Ø+N
Uin (Vac)	380/400/415
Iin (A)	--
Frequenza - Frequency - Frequenz	50÷60Hz
USCITA - OUTPUT - AUSGANG	3Ø+N
Uout (Vac)	380/400/415
Iout (A)	45*
Frequenza - Frequency - Frequenz	50÷60Hz
Potenza - Power rating - Leistung	30kVA/27kW (*:@380V)
Icw	6 kA
BATTERIA - BATTERY - BATTERIE	
Udc (Vdc)	+/- 240
Idc (A)	60
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	 34 kg
Service: www.invt-power.com	
 Manufacturer: INVT POWER SYSTEM(SHENZHEN)CO., LTD Address: 5th Floor,1#Building,Gaofa Industrial Park, LongJing, Nanshan District, Shenzhen, China, 518055 Importer: xxx Address: xxx Battery must be recycled. WARNING! Risk of electric shock.	

2. Rating label for model PM25X:

	PM25X
Module	25kVA 3Ø+N
RETE 1 - MAINS 1 - NETZ 1	3Ø+N
U _{in} (Vac)	380/400/415
I _{in} (A)	36*
Frequenza - Frequency - Frequenz	50÷60Hz
RETE 2 - MAINS 2 - NETZ 2	3Ø+N
U _{in} (Vac)	380/400/415
I _{in} (A)	--
Frequenza - Frequency - Frequenz	50÷60Hz
USCITA - OUTPUT - AUSGANG	3Ø+N
U _{out} (Vac)	380/400/415
I _{out} (A)	38*
Frequenza - Frequency - Frequenz	50÷60Hz
Potenza - Power rating - Leistung	25kVA/22.5kW (*:@380V)
I_{cw}	6 kA
BATTERIA - BATTERY - BATTERIE	
U _{dc} (Vdc)	+/- 240
I _{dc} (A)	50
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	 34 kg
Service: www.invt-power.com	
	
<p>Manufacturer: INVT POWER SYSTEM (SHENZHEN) CO., LTD Address: 5th Floor, 1#Building, Gaofa Industrial Park, LongJing, Nanshan District, Shenzhen, China, 518055 Importer: xxx Address: xxx Battery must be recycled. WARNING! Risk of electric shock.</p>	

3. Rating label for model PM20X:

	PM20X
Module	20kVA 3Ø+N
RETE 1 - MAINS 1 - NETZ 1	3Ø+N
U _{in} (Vac)	380/400/415
I _{in} (A)	29*
Frequenza - Frequency - Frequenz	50÷60Hz
RETE 2 - MAINS 2 - NETZ 2	3Ø+N
U _{in} (Vac)	380/400/415
I _{in} (A)	--
Frequenza - Frequency - Frequenz	50÷60Hz
USCITA - OUTPUT - AUSGANG	3Ø+N
U _{out} (Vac)	380/400/415
I _{out} (A)	30*
Frequenza - Frequency - Frequenz	50÷60Hz
Potenza - Power rating - Leistung	20kVA/18kW (*:@380V)
I_{cw}	6 kA
BATTERIA - BATTERY - BATTERIE	
U _{dc} (Vdc)	+/- 240
I _{dc} (A)	40
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	 34 kg
Service: www.invt-power.com	
	
<p>Manufacturer: INVT POWER SYSTEM(SHENZHEN)CO., LTD Address: 5th Floor, 1#Building, Gaofa Industrial Park, LongJing, Nanshan District, Shenzhen, China, 518055 Importer: xxx Address: xxx Battery must be recycled. WARNING! Risk of electric shock.</p>	

4. Warning label on outer enclosures

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	Transformers used are suitable for their intended application and comply with the relevant requirements of the standard and particularly Annex C/RD.	P
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	Between lines: X2 capacitor according to IEC 60192-14: 1993 with 21 days damp heat test was used. Between Line and PE: Y2 capacitors according to IEC 60192-14 with 21 days damp heat test was used.	P
1.5.7/RD	Resistors bridging insulation		P
1.5.7.1/RD	Resistors bridging functional, basic or supplementary insulation		P
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

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

1.5.8/RD	Components in equipment for IT power systems	No Y-cap used.	N
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4.6	Power interface		P
1.6.1/RD	AC power distribution systems	TN power system	P
1.6.2/RD	Input current	Highest normal load according to 1.2.2.1/RD for this equipment is the charging of empty battery and operation with the maximum specified output load. (see appended table 4.6)	P
4.6 1.6.4/RD	Neutral conductor	Neutral is insulated from earth with basic insulation throughout the equipment. O/P neutral is not isolated from I/P neutral.	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 $\overline{\text{---}}$	P
	Input rated frequency/range (Hz)	50/60	P
	Number of Input phases and neutral.....	3 Φ	P
	Output rated voltage/range (V)	See rating labels	P
	Output rated current/range (A)	See rating label	P
	Output rated power factor, (if less than unity, or active power and apparent power or active power and rated current)	Not marked.	N
	Number of output phases and neutral.....	3 Φ	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 _{cw}) or rated conditional short-circuit current (I _{cc})		N

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
	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
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	Software set.	P
	Methods and means of adjustment; reference to installation instructions	Software set.	P
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

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
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
4.7.9 1.7.8/RD	Controls and indicators	See below	P
1.7.8.1/RD	Identification, location and marking :	The earthing terminal is marked with the standard earthing symbol (60417-2-IEC-5019) near the terminal.	P
1.7.8.2/RD	Colours :	The earthing terminal is marked with the standard earthing symbol (60417-2-IEC-5019) near the terminal.	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 (I_{cw}):		N
	Rated conditional short circuit current (I_{cc}):		N
	a) If higher I_{cp} stated ≤ 10 kA		N
	a) If higher I_{cp} stated > 10 kA		N

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
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.	P
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 required markings placed on removable parts.	P
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.....	All areas containing hazard(s) are inaccessible to the operator.	P
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

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

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
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_{peak} or V_{rms}); minimum distance through insulation (mm)		
2.1.1.4/RD	Access to hazardous voltage circuit wiring	No operator accessible hazardous voltage circuit wiring.	N
2.1.1.5/RD	Energy hazards :		N
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 > 0.1uF, 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	The equipment is not connected to d.c. mains supply	N

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
	a) Capacitor connected to the d.c. mains supply :		N
	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
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) :	(see appended table 5.8)	P
	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	Backfeed protection was provided externally to the UPS in the a.c. input line.	P
5.1.5	Emergency switching device	Not mandatory for pluggable UPS.	N
5.2	Requirements for auxiliary circuits		N
5.2.1 2.2/RD	Safety extra low voltage circuit - SELV		N
2.2.1/RD	General requirements		N
2.2.2/RD	Voltages under normal conditions (V) :		N
2.2.3/RD	Voltages under fault conditions (V) :		N
2.2.4/RD	Connection of SELV circuits to other circuits .. :		N
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

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
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
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 μ F) :		
2.4.3/RD	Connection of limited current circuits to other circuits		N
5.2.4 3.5/RD	External signalling circuits		N
3.5.1/RD	General requirements		N
3.5.2/RD	Types of interconnection circuits :		N
3.5.3/RD	ELV circuits as interconnection circuits	No ELV interconnections.	N
3.5.4/RD	Data ports for additional equipment		N
5.2.5 2.5/RD	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) :		N
	Current rating of overcurrent protective device (A)		N
	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

IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
2.6.1/RD	Protective earthing	Reliable connection of relevant conductive parts to the PE terminal (via green/yellow insulated wires).	P
2.6.2/RD	Functional earthing	No functional earthing.	N
2.6.3/RD	Protective earthing and protective bonding conductors		P
2.6.3.1/RD	General	Compliance checked.	P
2.6.3.2/RD	Size of protective earthing conductors		P
	Rated current (A), cross-sectional area (mm ²), AWG :	(see appended tabel 4.5)	P
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 ²), AWG :	Refer to 2.6.3.4/RD.	—
	Protective current rating (A), cross-sectional area (mm ²), 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.	P
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

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Clause	Requirement + Test	Result - Remark	Verdict
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	No such screw	N
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		N
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		P
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

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Clause	Requirement + Test	Result - Remark	Verdict
5.5	Overcurrent and earth fault protection		P
5.5.1	General	See below.	P
2.7.3/RD	Short-circuit backup protection	Adequate protective device.	P
2.7.4/RD	Number and location of protective devices		P
2.7.5/RD	Protection by several devices	Only one protective device provided.	P
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

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Clause	Requirement + Test	Result - Remark	Verdict
	Initial asymmetric peak current ration (I_{pk} / I_{cw}) :	Icw: 6KA	P
	Minimum duration of prospective test current (cycles 50/60 Hz)	50Hz	P
5.5.4.3.2	Exemption from testing		P
5.6	Protection of personnel – Safety interlocks <i>(No safety interlock provided for operator protection since there are no liable hazards capable of harming the operator during operation).</i>		P
5.6.1	Operator protection	See below	N
2.8/RD	Safety interlocks	No safety interlocks.	N
2.8.1/RD	General principles		N
2.8.2/RD	Protection requirements		N
2.8.3/RD	Inadvertent reactivation		N
2.8.4/RD	Fail-safe operation		N
2.8.5/RD	Moving parts		N
2.8.6/RD	Overriding		N
2.8.7/RD	Switches and relays		N
2.8.7.1/RD	Contact gaps (mm) :		N
2.8.7.2/RD	Overload test		N
2.8.7.3/RD	Endurance test		N
2.8.7.4/RD	Electric strength test	(see appended table 8.2)	N
2.8.8/RD	Mechanical actuators		N
5.6.2	Service person protection	See below.	P
5.6.2.1	Introduction	Considered	P
5.6.2.2	Covers	It is unlikely that during the removal of any covers service personnel may touch hazardous voltage or energy.	P
5.6.2.3	Location and guarding of parts	Only the exchange of the battery is considered as possible servicing. A risk of injury is unlikely for the service personnel.	P
5.6.2.4	Parts on doors	The UPS is designed with only screwed enclosure parts.	P
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

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Clause	Requirement + Test	Result - Remark	Verdict
5.6.2.7	Capacitor banks	The capacitors provided can produce energy level way below 20 joules.	P
5.6.2.8	Internal batteries		N

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
2.10.3.8/RD	Transients from telecommunication networks and cable distribution systems :	No TNV circuits	N

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Clause	Requirement + Test	Result - Remark	Verdict
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		N
	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
	Two wires in contact inside wound component; angle between 45° and 90° :		N

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Clause	Requirement + Test	Result - Remark	Verdict
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	See below.	P
2.10.6.1/RD	Uncoated printed boards	(see appended table 5.7)	P
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	(see appended table 2.10.3 and 2.10.4)	P
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	Approved opto-couplers, see appended table 4.5	P
2.10.11/RD	Tests for semiconductor devices and cemented joints	No such device used.	N
2.10.12/RD	Enclosed and sealed parts	Approved opto-couplers, see appended table 4.5	P

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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	Electrical and earthing connections screwed two or more complete threads into metal. No screws of insulating material for electrical and earthing connections, or where supplementary or reinforced insulation could be impaired by a metal replacement.	P
3.1.7/RD	Insulating materials in electrical connections	All current carrying and safety earthing connections are metal to metal.	P
3.1.8/RD	Self-tapping and spaced thread screws	Self-tapping screws provided in inverter circuit and earthing bonding.	P
3.1.9/RD	Termination of conductors	All conductors are reliably secured by the use of solder pins or glue or other mechanical fixing means. No risk of stranded conductors coming loose.	P
	10 N pull test	Considered	P

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Clause	Requirement + Test	Result - Remark	Verdict
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		N
	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 ²), 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 :		N

6.3	Wiring terminals for external power conductors <i>(No wiring terminals for external power conductors)</i>		N
3.3/RD	Wiring terminals for connection of external conductors		N
3.3.1/RD	Wiring terminals		N
3.3.2/RD	Connection of non-detachable power supply cords		N
3.3.3/RD	Screw terminals		N
3.3.4/RD	Conductor sizes to be connected		N

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Clause	Requirement + Test	Result - Remark	Verdict
	Rated current (A), cord/cable type, cross-sectional area (mm ²)		N
3.3.5/RD	Wiring terminal sizes		N
	Rated current (A), type, nominal thread diameter (mm)		—
3.3.6/RD	Wiring terminal design		N
3.3.7/RD	Grouping of wiring terminals		N
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	70°C, no hazards.	P
4.2.8/RD	Cathode ray tubes	CRT(s) not used in the equipment.	N
	Picture tube separately certified :		—

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Clause	Requirement + Test	Result - Remark	Verdict
4.2.9/RD	High pressure lamps	No high pressure lamps in the equipment.	N
4.2.10/RD	Wall or ceiling mounted equipment; force (N) :	No wall or ceiling mounted equipment	N
7.4	Construction details		P
7.4.1	Introduction	Considered.	P
4.3.1/RD	Edges and corners	All edges and corners are rounded and/or smoothed.	P
4.3.2/RD	Handles and manual controls; force (N) :	No handles	N
4.3.3/RD	Adjustable controls	No adjustable controls.	N
4.3.4/RD	Securing of parts	No loosening of parts impairing creepage distances or clearances is likely to occur.	P
4.3.5/RD	Connection by plugs and sockets	No mismatch of connectors, plugs or sockets possible.	P
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.	N
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	(See appended table 7.7)	P
	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

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Clause	Requirement + Test	Result - Remark	Verdict
4.5.2/RD	Temperature tests	(See appended table 7.7)	P
	Normal load condition per Annex L :		
4.5.3/RD	Temperature limits for materials	(See appended table 7.7)	P
4.5.4/RD	Touch temperature limits	(See appended table 7.7)	P
4.5.5/RD	Resistance to abnormal heat :		P
7.4.2	Openings	(See appended table 7.4.2)	P
7.4.3	Gas Concentration	The ventilation by openings exceeds the required airflow. Refer to Annex M.	P
7.4.4	Equipment movement		P

7.5 4.7/RD	Resistance to fire		P
4.7.1/RD	Reducing the risk of ignition and spread of flame	Use of materials with the required flammability classes	P
	Method 1, selection and application of components wiring and materials	Method 1 is used. No excessive temperatures. No easily burning materials employed. Safety relevant components used within their specified temperature limits.	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	With having the following components: - Components in primary circuits - Insulated wiring - Semiconductor devices, transistors, diodes, integrated circuits - Resistors, capacitors, inductors The fire enclosure is required.	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	PCB rated V-0. See appended table.	P
4.7.3.2/RD	Materials for fire enclosures	Metal enclosure. (See appended table 4.3)	P
4.7.3.3/RD	Materials for components and other parts outside fire enclosures	No parts outside the fire enclosure.	N

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Clause	Requirement + Test	Result - Remark	Verdict
4.7.3.4/RD	Materials for components and other parts inside fire enclosures	Internal components except small parts are V-2, HF-2 or better.	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
7.6.8	Charging voltage		N
7.7	Temperature rise		P
4.5/RD	Thermal requirements	Considered	P
4.5.1/RD	General	See below.	P
4.5.2/RD	Temperature tests	(See appended table 7.7)	P
	Normal load condition per Annex L :		—
4.5.3/RD	Temperature limits for materials	(See appended table 7.7)	P
4.5.4/RD	Touch temperature limits	(See appended table 7.7)	P
4.5.5/RD	Resistance to abnormal heat :	(See appended table 7.4)	P
8	Electrical requirements and simulated abnormal conditions		P
8.1	General provisions for earth leakage		P
5.1.1/RD	General	Test conducted in accordance with Sub-clause 8.1	P
5.1.7/RD	Equipment with touch current exceeding 3,5 mA		P
8.2 5.2/RD	Electric strength		P
5.2.1/RD	General	(see appended table 8.2)	P
5.2.2/RD	Test procedure	(see appended table 8.2)	P
8.3	Abnormal operating and fault conditions		P
8.3.1	General	Considered.	P

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Clause	Requirement + Test	Result - Remark	Verdict
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	(See appended Annex C)	P
5.3.4/RD	Functional insulation :	Complies with a) and c).	P
5.3.5/RD	Electromechanical components	No electromechanical components in secondary circuits.	N
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
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

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Clause	Requirement + Test	Result - Remark	Verdict
3.5.1/RD	General requirements		N
3.5.2/RD	Types of interconnection circuits		N
3.5.3/RD	ELV circuits as interconnection circuits		N
3.5.4/RD	Data ports for additional equipment		N
2.1.3/RD	Protection in restricted access locations		N
2.3.1/RD	Limits		N
	Type of TNV circuits		
2.3.2/RD	Separation from other circuits and from accessible parts		P
2.3.2.1/RD	General requirements		P
2.3.2.2/RD	Protection by basic insulation		P
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

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Clause	Requirement + Test	Result - Remark	Verdict
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		
	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)		

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Clause	Requirement + Test	Result - Remark	Verdict
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
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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
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

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Clause	Requirement + Test	Result - Remark	Verdict
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		N
I.2	Test for pluggable UPS	Backfeed relay provided.	N
I.3	Test for permanently connected UPS		N
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		P
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		P
L.5.1	Test method		P
L.5.2	Connection of the non-linear reference load		
L.5.3	Connection of the non-linear reference load		N

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

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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 ¹⁾
Whole unit					
Enclosure	Various	Steel/Aluminium	--	--	--
Material of Front panel	Chi-Mei	PA-757	--	--	UL:E56070
Dc fan (four provided)	NMB	09225VA24QA L01	DC24V, 0.38A, 9.12W	--	UL:E89936
Insulation sheet 1	FORMEX	Formex GK-10	--	--	UL:E256266/E1 21855
Insulation sheet 2	FORMEX	Formex GK-25	--	--	UL:E256266/E1 21855
wire	Various	Various	---	---	UL:E314168
ON ASY01_PS1203_DR1 board					
SCR1, SCR2	SEMIKRON	SK45STA16	1600V,47A	--	UL : E63532
Fuse (F1,F2,F3)	MRO	RGS4-63A	690V,63A	IEC:60269-4	VDE
Fuse (F4,F5,F6,F7)	MRO	RGS4-100A	690V,100A	IEC:60269-4	VDE
PCB	Various	Various	V-0, 130°C	--	UL
ON ASY01_PS1203_DR2 board					
IGBT1, IGBT2, IGBT3	Vincotech	FZ06NBA075S A	600V,60A	--	UL NO.: E192116.
Current Transformer (T3, T7, T8, T9,T11,T12)	Boulder	UMX33CT1	Class B	--	Test with appliance
DC capacitor (C16,C17,C18, C19,C20,C21, C22,C23,C24, C25,C26,C27)	Jianghai	CD293-560UF	450V, 560uF, 85°C	--	UL:E227010
PCB	Various	Various	V-0, 130°C	--	UL
ON ASY01_PS1203_DR4 board					

IEC 62040-1					
Clause	Requirement + Test	Result - Remark	Verdict		
IGBT4, IGBT5, IGBT6	Vincotech	FZ06NIA075S A	600V,65A	--	UL:E192116
DC capacitor (C31,C32,C33, C34,C35,C36, C37,C38,C39, C40)	Jianghai	CD293-560UF	450V, 560uF, 85°C	--	UL:E227010
Y2 capacitor (C1,C2,C3,C4, C5,C6,C7)	Various	CD16- E2GA472MYG S	250VAC/ 4700pf	IEC 60384- 14	VDE:124321
PCB	Various	Various	V-0, 130°C	--	UL
ON ASY01_PS1203_EM1 board					
Hall (U1,U2,U3)	LEM	HAS 100-P	100A	--	Test with appliance
Relay (RLY1,RLY2,R LY3)	Hongfa	HF92F-024D- 2A11S	24VDC/ 250VAC/2A/30A	--	UL:E134517 VDE: 40016109
Transformer (T1,T2,T3)	SIDNA	UMS33D2T1	Class B	--	Test with appliance
Fuse (F1,F2,F3)	MRO	RGS4-100A	690V,100A	IEC:60269-4	VDE
Y2 capacitor (C1)	Various	CD16- E2GA472MYG S	250VAC/ 4700pf	IEC 60384- 14	VDE:124321
PCB	Various	Various	V-0, 130°C	--	UL
ON ASY01_PS1203_PW1 board					
Optocouplers (U1)	NEC	PS2561	--	--	UL:E72422, VDE:40008862
PCB	Various	Various	V-0, 130°C	--	UL
ON ASY01_PS1203_PW2 board					
DC capacitor (C11,C12)	Jianghai	CD293-220UF	450V, 220uF, 85°C	--	UL:E227010
Current Transformer (T1,T2,T3,T4))	SIDNA	UMS33CT4	Class B	--	Test with appliance
Transformer (T5)	SIDNA	UMS33D2T1	Class B	--	Test with appliance
PCB	Various	Various	V-0, 130°C	--	UL
ON ASY01_PS1203_PW3 board					

IEC 62040-1					
Clause	Requirement + Test	Result - Remark	Verdict		
DC capacitor (C7,C8)	Jianghai	CD293-220UF	450V, 220uF, 85°C	--	UL:E227010
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_CT1 board					
Y2 capacitor (C265,C266,C 267)	Various	CD16-E2GA472MYG S	250VAC/ 4700pf	IEC 60384-14	VDE:124321
PCB	Various	Various	V-0, 130°C	--	UL
ON ASY01_PS1203_CP2 board					
Inductor (L1,L2,L3,L4,L 5,L6)	Boluodaxin	UMX33L1	CLASS H	--	Test with appliance
PCB	Various	Various	V-0, 130°C	--	UL
ON ASY01_PS1203_CP3 board					
Inductor (L1,L2,L3)	Boluodaxin	UMX33L2	CLASS H	--	Test with appliance
PCB	Various	Various	V-0, 130°C	--	UL
ON ASY01_PS1203_CP4 board					
Inductor (L1,L2,L3)	Boulder	UMX33L3	CLASS H	--	Test with appliance
PCB	Various	Various	V-0, 130°C	--	UL
On SNT_ASY_3320_ZQ board					
Transformer (T1)	SIDNA	UMS33D1T1	CLASS B		Test with appliance
PCB	Various	Various	V-0, 130°C	--	UL

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Clause	Requirement + Test	Result - Remark	Verdict

On SNT_ASY_3320_FQ board					
Transformer (T1,T3,T4)	SIDNA	UMS33D2T1	CLASS B	--	Test with appliance
PCB	Various	Various	V-0, 130°C	--	UL
¹⁾ an asterisk indicates a mark which assures the agreed level of surveillance.					

4.6	TABLE: electrical data (in normal conditions)					P
Fuse#	Irated(A)	U(V)	P(W)	I(A)	P(VA)	Condition/status
Model: PM30						
Circuit breaker	--	342V/50Hz	27008	48.41	30208	Charging of empty batteries and rated output load .
Circuit breaker	--	342V/60Hz	27007	48.40	30201	Ditto
Circuit breaker	55	380V/50Hz	27012	45.77	30211	Ditto
Circuit breaker	55	380V/60Hz	27010	45.78	30213	Ditto
Circuit breaker	55	415V/50Hz	27014	41.94	30201	Ditto
Circuit breaker	55	415V/60Hz	27008	41.95	30204	Ditto
Circuit breaker	--	456.5V/50Hz	27001	38.12	30193	Ditto
Circuit breaker	--	456.5V/60Hz	27004	38.13	30198	Ditto
Note(s): Please measure the input currents with normal load.						

5.1.3	TABLE: discharge of capacitors in the primary circuit				P
Condition	tcalculated (s)	tmeasured (s)	t u→ 0V(s)	Comments	
Power switch on (L1-N)	--	8	12	Vi= _376_ Vp, 37% of Vi= _139_ Vp, No load applied	
Power switch on (L2-N)	--	8	12	Vi= _376_ Vp, 37% of Vi= _139_ Vp, No load applied	
Power switch on (L3-N)	--	8	12	Vi= _376_ Vp, 37% of Vi= _139_ Vp, No load applied	

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Clause	Requirement + Test	Result - Remark	Verdict	
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				

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 N					
distance through insulation di at/of:			Up (V)	test voltage (V)	required di(mm)
--			--	--	--
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						P
condition	Location	Voltage (V)	Current (mA)	Freq. (kHz)	Limit (mA)	Comments	

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Clause	Requirement + Test			Result - Remark		Verdict
L1-N	0.22	0.13	50Hz	0.7	Normal condition	
N-PE	0.12	0.08	50Hz	0.7	Normal condition	
L1-PE	0.23	0.12	50Hz	0.7	Normal condition	
Note(s): test during battery mode. Output measured with a 2 kΩ resistor as load.						

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							

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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
1	Q1 (c-e)	s-c	415	1s	--	--	UPS output and the charger normally, Q1 damaged, no hazards. Charge voltage: 576V, 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:576V, Output voltage: 397.3V.
3	Q1(c-g)	s-c	415	1s	--	--	UPS output and the charger normally, Q1 damaged , no hazards. Charge voltage: 576V, 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: 576V, 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: 576V, 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: 576V, Output voltage: 397.3V.
7	Bus Voltage detecting resistor R31	s-c	415	10min	--	--	UPS work normally, no hazards. Charge voltage: 576V, 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
8	Bus Voltage detecting resistor R31	o-c	415	10min	--	--	UPS work normally, no hazards. Charge voltage: 576V, Output voltage: 397.3V.
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: 576V, Output voltage: 397.3V.
Whole unit							
10	Output	s-c	415	1s	--	--	UPS output shut down immediately, the charger operate normally, no hazards. Charge voltage: 576V, Output voltage: 0V.
11	Output	s-c	battery	1s	--	--	UPS output shut down immediately, no hazards. Charge voltage: 0V, Output voltage: 0V.
12	Output	o-l	415	15min	--	--	UPS output shut down at condition of 5min at 100% load + 5min at 117% load + 2s at 133% load.
13	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.
14	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.
15	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.

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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
16	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.
17	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	N	
Location	RMS voltage (V)	Peak voltage (V)	comments
--	--	--	--
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 (m m)	required dcr(mm)	dcr (mm)
Whole unit						
PS1203 CT1 PCB						
Under C142 traces	<420	<250	2.0	7.8	2.5	7.8
Under C143 traces	<420	<250	2.0	6.7	2.5	6.7
PS1203 EM1 PCB						
Under C83 traces	<420	<250	2.0	5.8	2.5	5.8
Under C53 traces	<420	<250	2.0	7.5	2.5	7.5
Under C57 traces	<420	<250	2.0	7.7	2.5	7.7
PE –J2 Pin	<420	<250	2.0	4.7	2.5	4.7
IGBT metal-heatsink (PE)	<420	<250	2.0	6.0	2.5	6.0
C7 Pin-heatsink (PE)	<420	<250	2.0	9.3	2.5	>9.3

IEC 62040-1						
Clause	Requirement + Test	Result - Remark			Verdict	
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
<p>Note(s):</p> <p>1.) A minimum clearance of 1.75mm for each contact pair had been provided (required according to sub-clause 5.1.4: 1.4mm minimum).</p> <p>2.) Shrink tubings are used to cover internal wires.</p>						

5.8, 2.1.1.3/R Dand 2.10.5.1 /RD	TABLE: electric strength tests, impulse tests and voltage surge tests	P
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IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict

test voltage applied between:	test voltage (V)	Breakdown Yes / No
Primary to earth (mains input & output conductor to earth)	1500Va.c.	No
Supplementary information: All model		

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)	
--	--	--	
Note(s):			

7.4.2 4.6.1/RD and 4.6.2/RD	TABLE: openings		P
Location	Size (mm)	Comments	
Front	Diameter=89mm	4 round opening for ventilation of DC fan and covered by fan guard.	
Side	None	--	
Rear	Diameter=2.8mm	Numerous for ventilation	
Top/bottom	None	--	
Note(s):			

7.5	TABLE: resistance to fire			N
Part	Manufacturer of material	Type of material	Thickness (mm)	Flammability class
--	--	--	--	--

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

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

	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 connector	55.6	56.9	56.4	70
DC connector	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
X Capacitor on DR1 board	55.5	56.1	56.3	100
PCB near R on DR1 board	50.8	55.5	57.9	130
Transformer (T1) coil on MN1 board	51.3	52.6	54.2	110
Transformer (T1) core on MN1 board	50.0	49.6	49.8	110
Opto coupler on MN1 board	49.9	50.7	50.1	100
PCB near transformer T1 on MN1 board	48.6	48.7	49.6	130
Transformer (T1) coil on Charger board	48.2	48.8	48.8	110
Transformer (T1) core on Charger board	52.1	52.2	53.4	110
Transformer on DR2 board	59.6	60.0	52.3	110
Transformer on DR2 board	55.4	54.3	53.8	110
Inductor on CP3 board	55.2	55.1	51.3	110
Output relay on EM1 board	52.1	52.2	53.4	85
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
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IEC 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict

Condition	L→terminal A	N→terminal A	Freq. (Hz)	Limit (mA)	Comments
Unit on	2.30	2.71	60	3.5	Switch "e" open, L to PE, no load
Unit on	2.30	2.71	60	3.5	Switch "e" open, N to PE, no load
Unit on	0.005	0.005	60	0.25	Switch "e" close, L to RS232 port
Unit on	0.005	0.005	60	0.25	Switch "e" close, N to RS232 port.

Note(s) : Test voltage: 456V/60Hz

C.2	Safety isolation transformer		N
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			
Required clearance for reinforced insulation (from table 2H and 2J)			
Effective voltage rms			
Required creepage distance for reinforced insulation (from table 2L)			
Measured min. creepage distance			
Location		inside (mm)	outside (mm)
Primary winding/pin to secondary winding/pin			
Primary winding/pin to core			
Secondary winding/pin to core			
Measured min. clearances			
Location		inside (mm)	outside (mm)
Primary winding/pin to secondary winding/pin			
Primary winding/pin to core			
Secondary winding/pin to core			
Construction:			

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

M	Ventilation of battery compartments	N
	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 m^3/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).	

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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																																																												
ZA	<p>NORMATIVE REFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR CORRESPONDING EUROPEAN PUBLICATIONS</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>-¹⁾</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>-¹⁾</td> <td>Degrees of protection provided by enclosures (IP Code)</td> <td>EN 60529 + corr. May</td> <td>1991²⁾ 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>-¹⁾</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>-¹⁾</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>2002²⁾</td> </tr> <tr> <td>IEC 61008-1 (mod)</td> <td>-¹⁾</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>2004²⁾ 2007</td> </tr> <tr> <td>IEC 61009-1 (mod)</td> <td>-¹⁾</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>2004²⁾ 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>¹⁾ Undated reference. ²⁾ Valid edition at date of issue.</p>	Publication	Year	Title	EN/HD	Year	IEC 60364-4-42	- ¹⁾	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	- ¹⁾	Degrees of protection provided by enclosures (IP Code)	EN 60529 + corr. May	1991 ²⁾ 1993	IEC 60664	Series	Insulation coordination for equipment within low-voltage systems	EN 60664	Series	IEC/TR 60755	- ¹⁾	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	- ¹⁾	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 ²⁾	IEC 61008-1 (mod)	- ¹⁾	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 ²⁾ 2007	IEC 61009-1 (mod)	- ¹⁾	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 ²⁾ 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
ZB ANNEX (normative)			
SPECIAL NATIONAL CONDITIONS (EN)			
<p>The FI, NO and SE - SNCs originate from IEC 60950-1 2nd 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 Finland, Norway and Sweden, 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 Finland: "Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan"</p> <p>In Norway: "Apparatet må tilkoples jordet stikkontakt"</p> <p>In Sweden: "Apparaten skall anslutas till jordat uttag"</p>		P
4.7.11	<p>In Norway, 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 Finland, Norway and Sweden 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 – Overview (I)



Fig. 2 – Overview (II)

Pictures



Fig. 3 –Inside view I



Fig. 4 – Inside view II

Pictures



Fig. 5 –PS1203 DR4 component view(I)

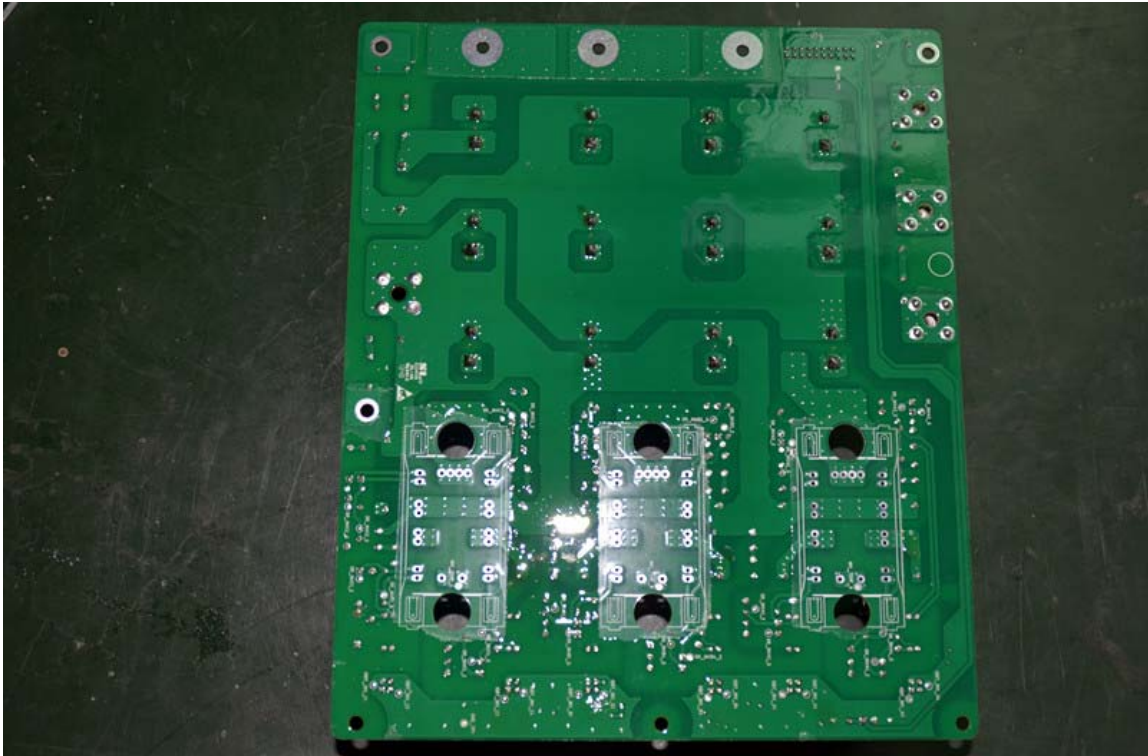


Fig. 6 –PS1203 DR4 trace view

Pictures

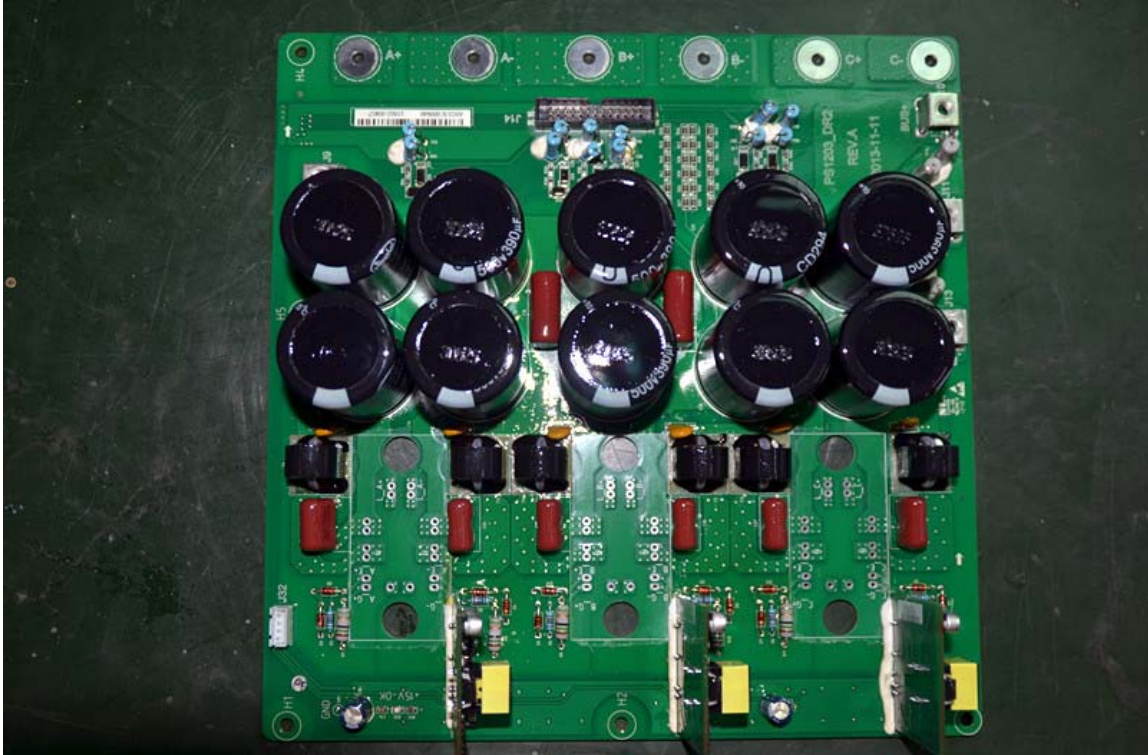


Fig. 7 –PS1203 DR2 component view

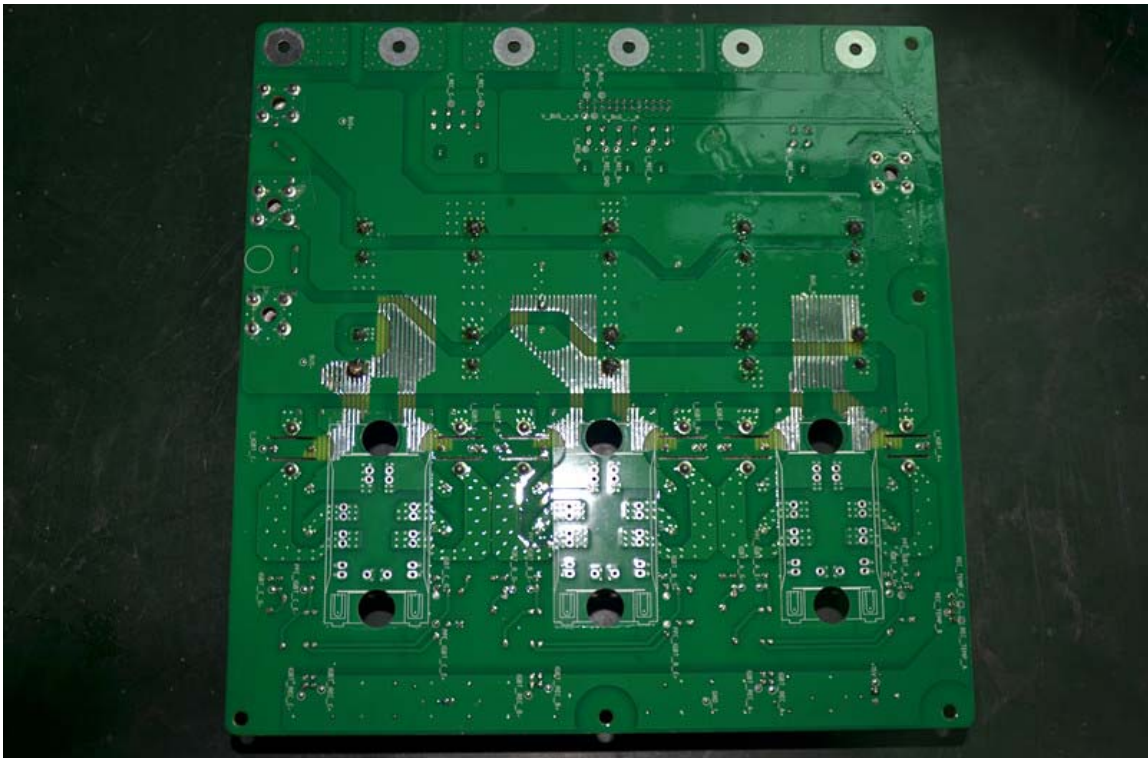


Fig. 8 –PS1203 DR2 trace view

Pictures

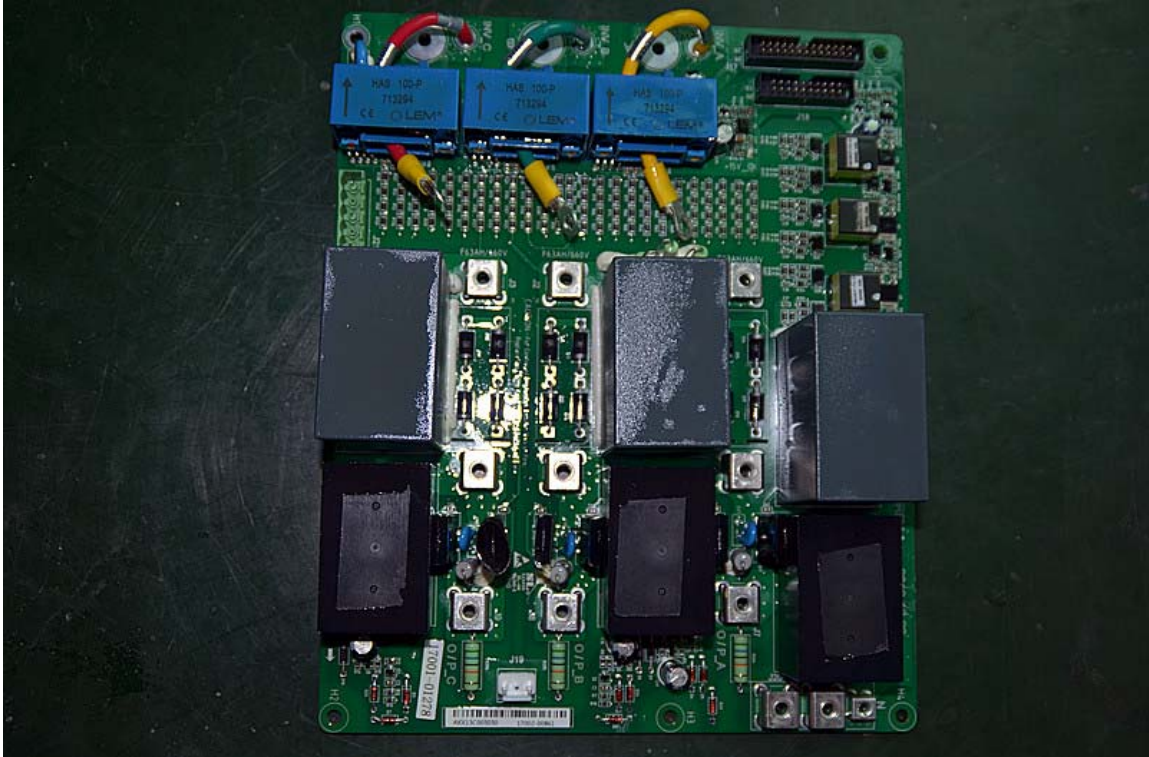


Fig. 9 –PS1203 EM1 component view

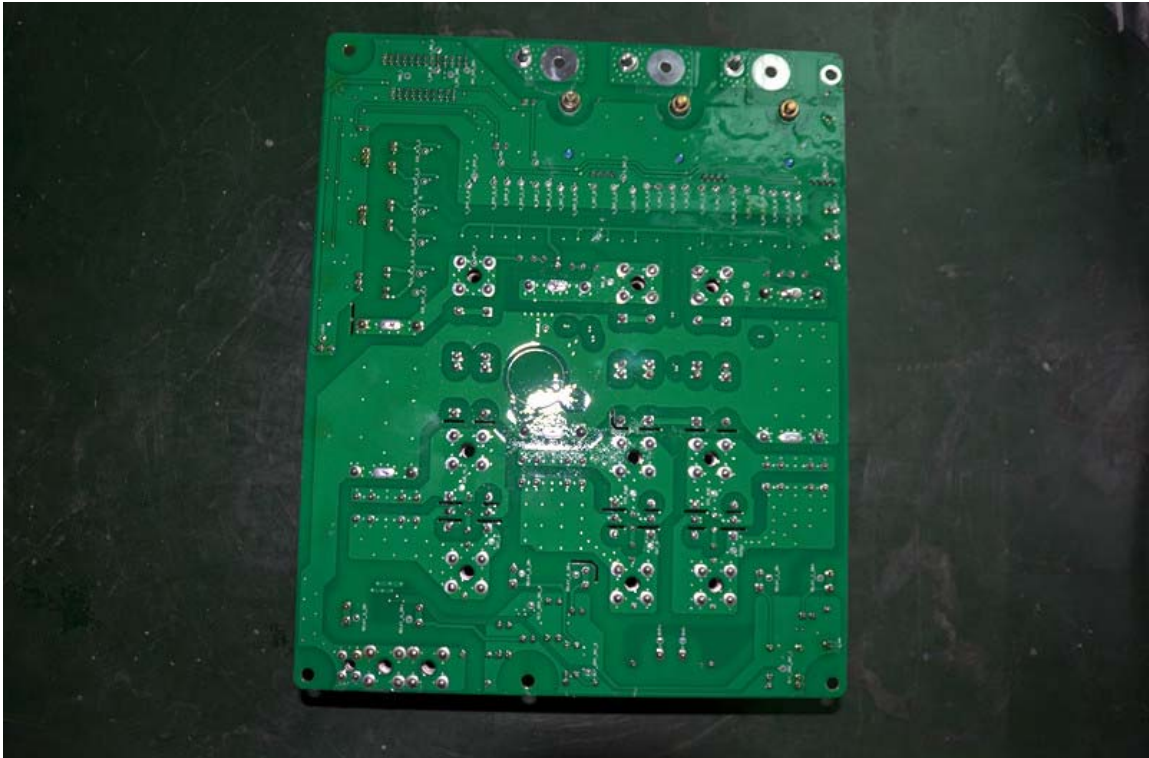


Fig.10 –PS1203 EM1 trace view

Pictures

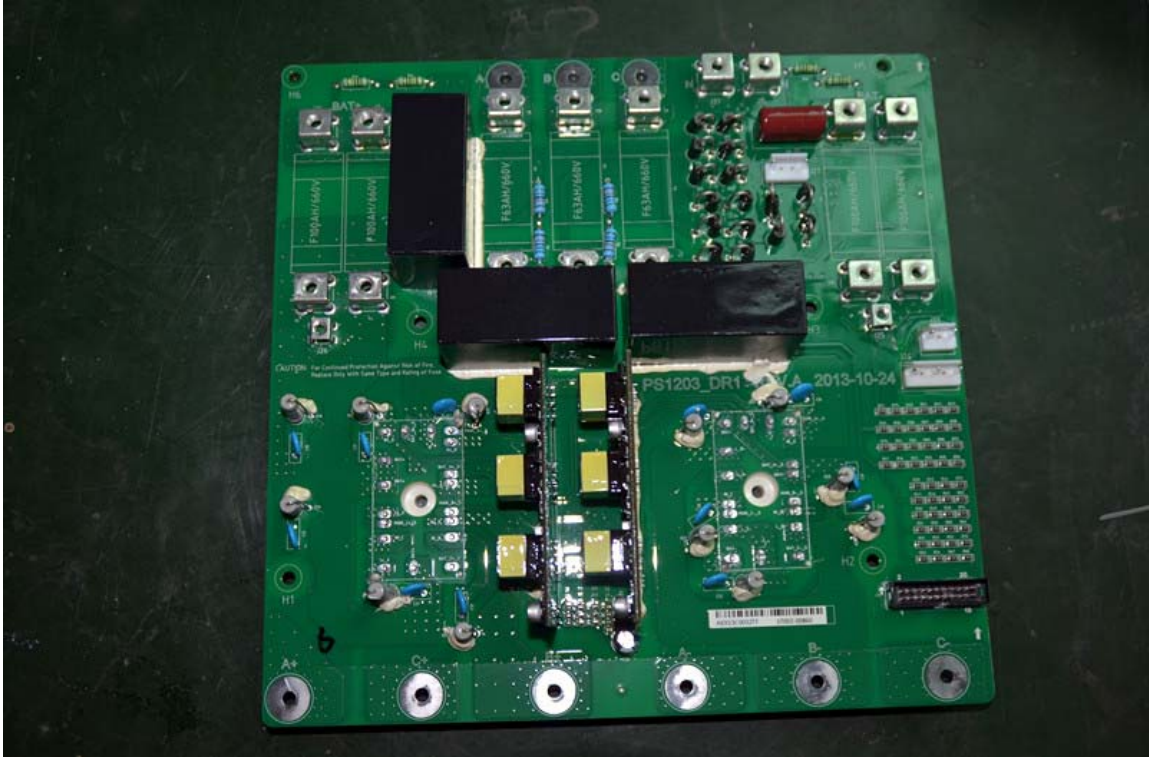


Fig. 11 –PS1203 DR1 component view

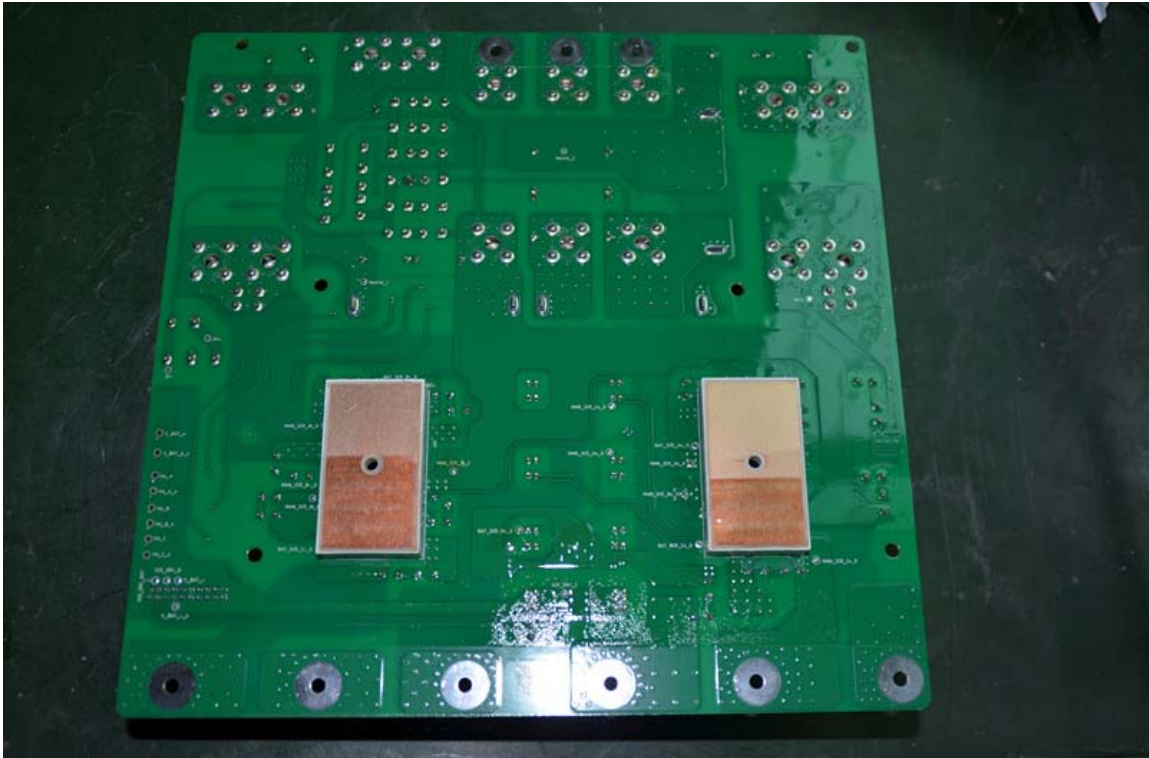


Fig. 12 –PS1203 DR1 trace view

Pictures

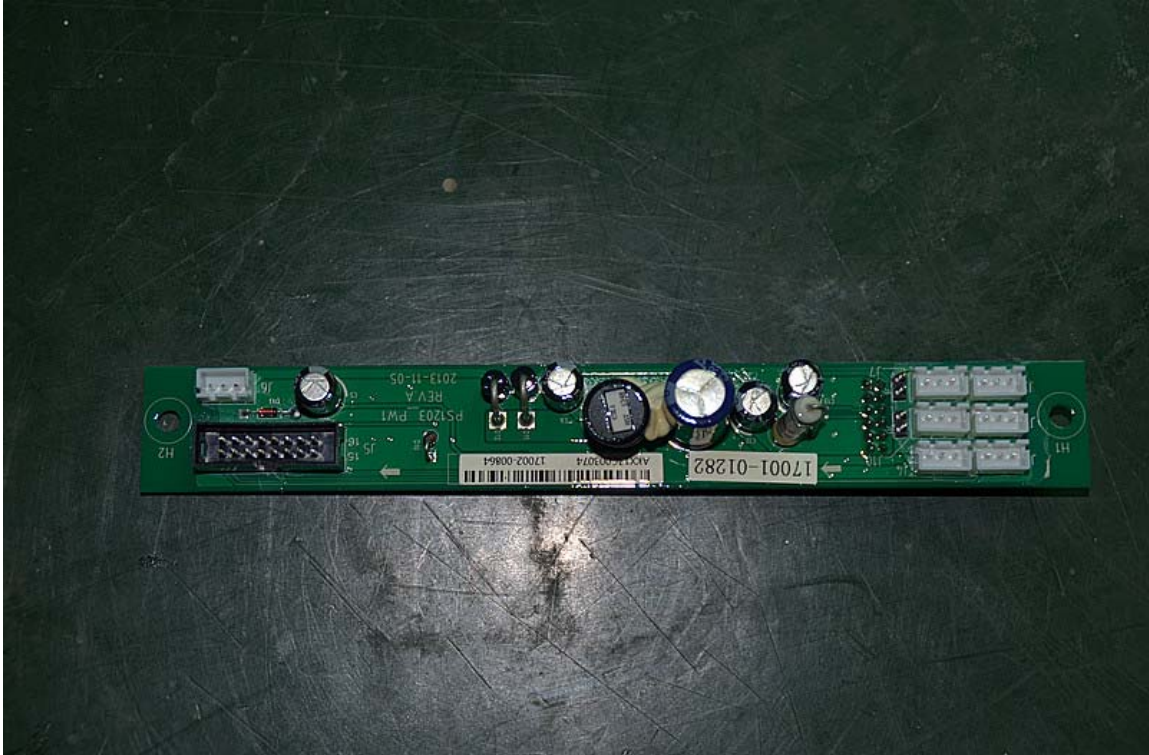


Fig. 13 –PS1203 PW1 component view

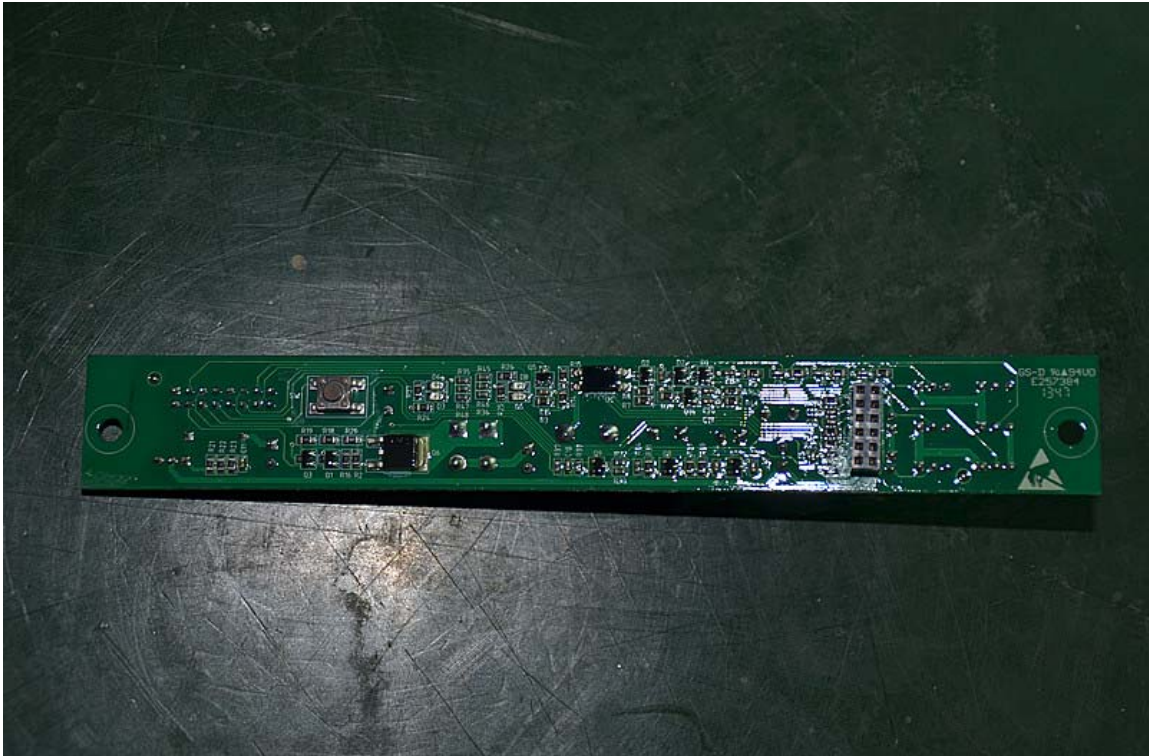


Fig. 14 –PS1203 PW1 trace view

Pictures

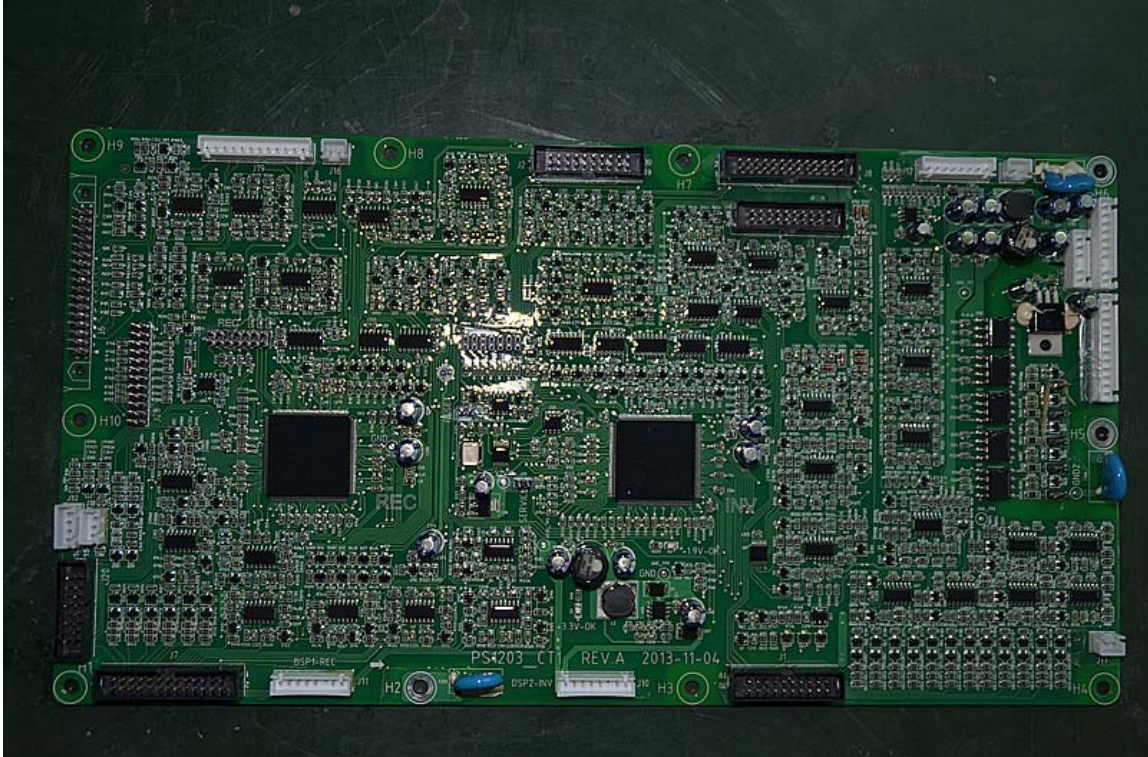


Fig. 15 –PS1203 CT1 component view

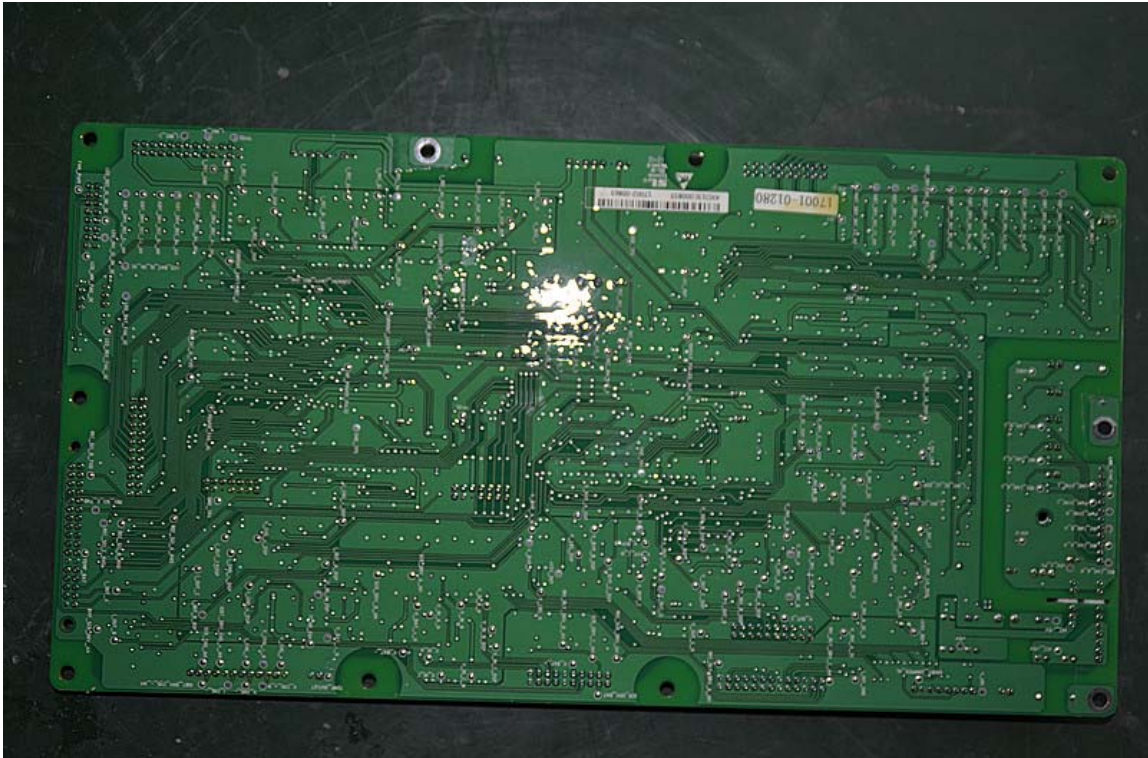


Fig. 16 –PS1206 CT1 trace view

Pictures



Fig. 17 –PS1203 PW2 component view

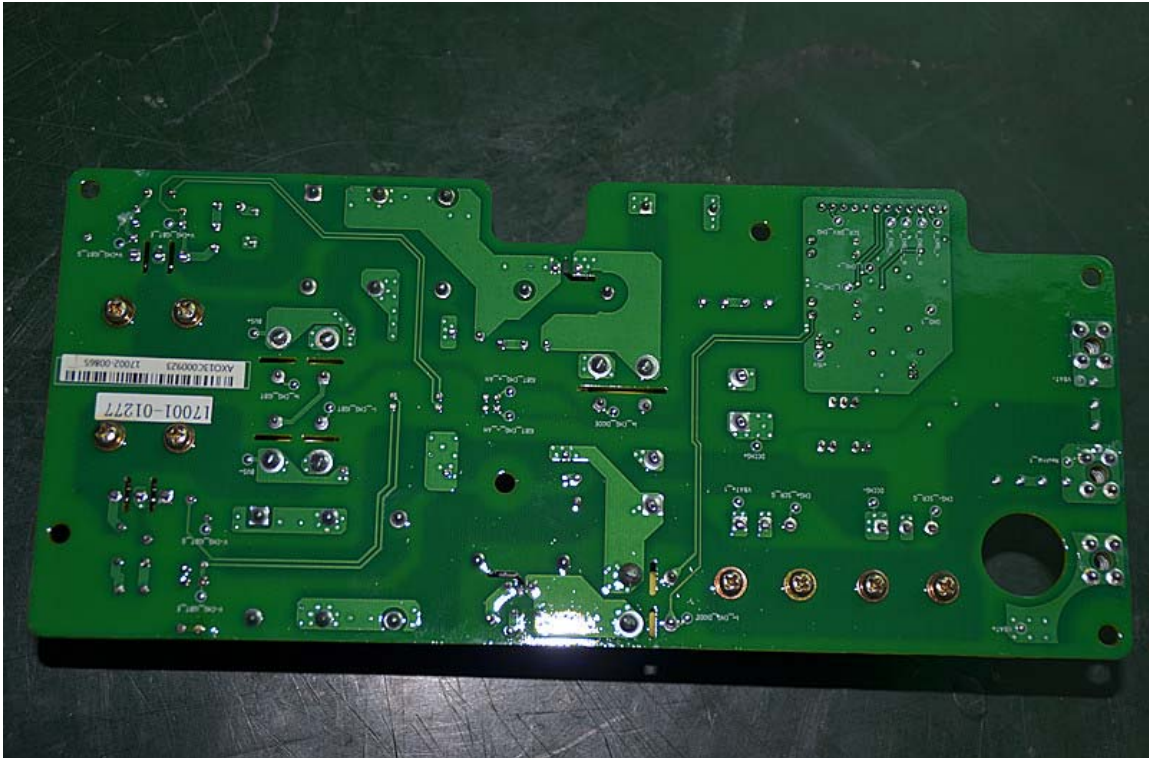


Fig. 18 –PS1203 PW2 trace view

Pictures



Fig. 19 –PS1203 PW3 component view

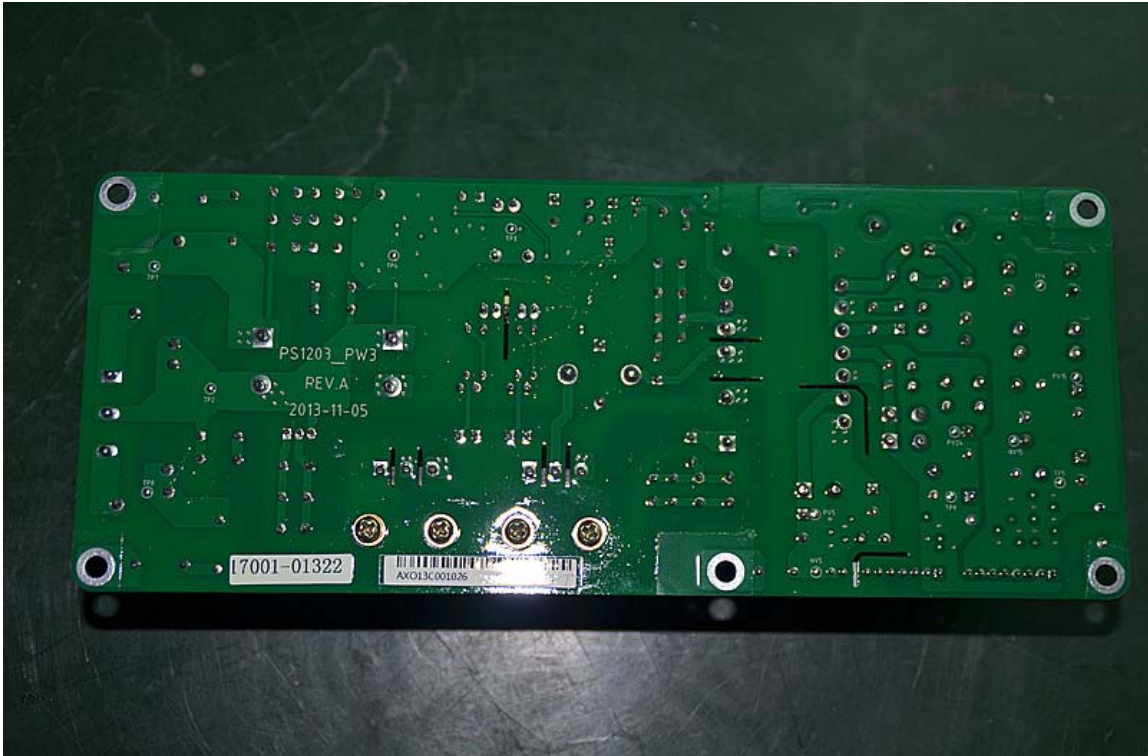


Fig. 20 –PS1203 PW3 trace view

Pictures

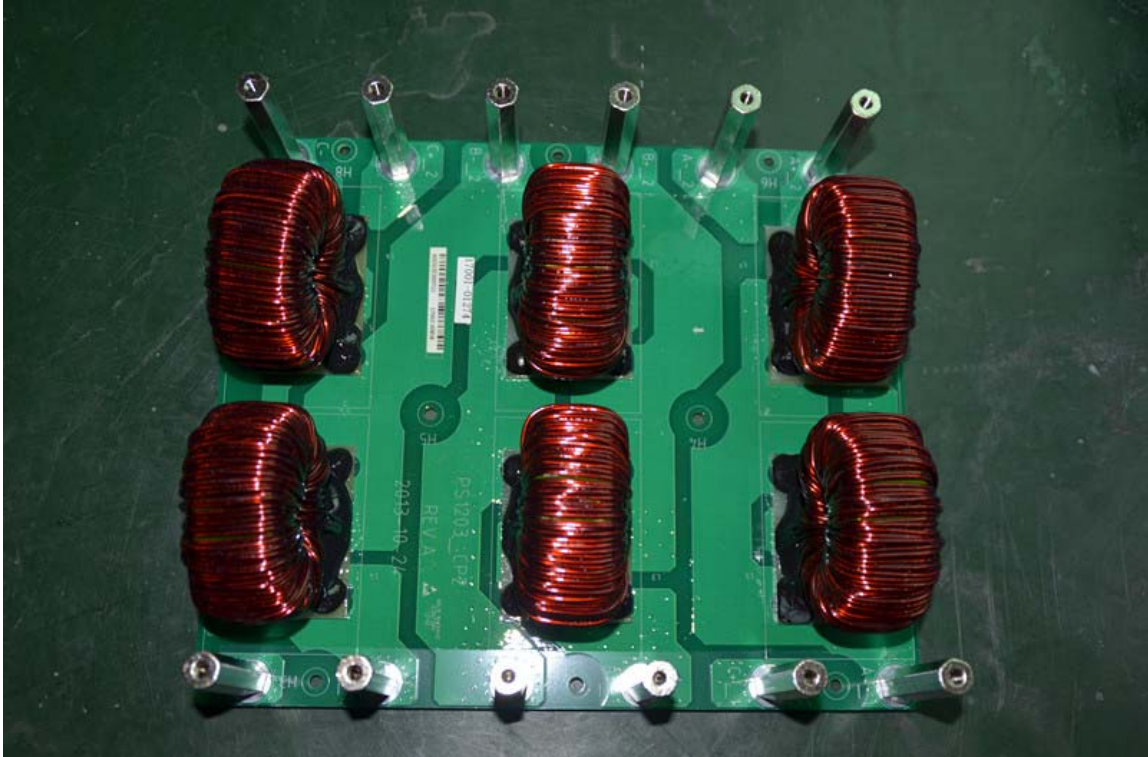


Fig. 21 –PS1203 CP2 component view

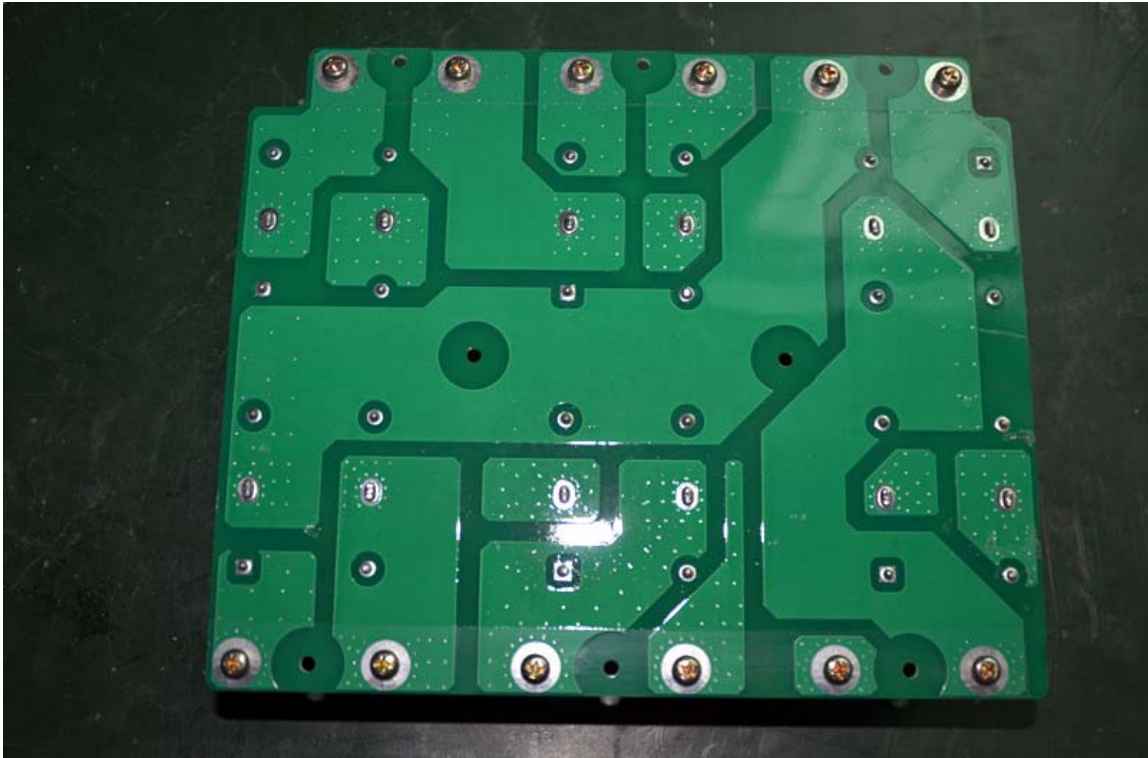


Fig. 22 –PS1203 CP2 trace view

Pictures

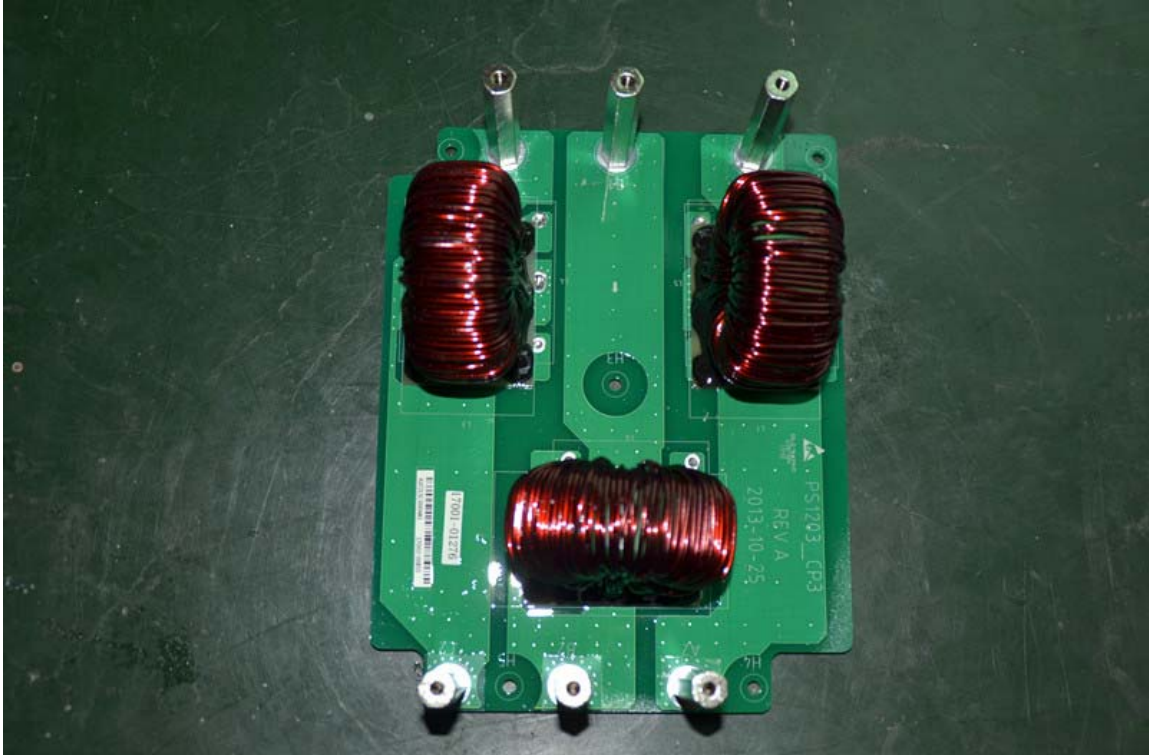


Fig. 23 –PS1203 CP3 component view

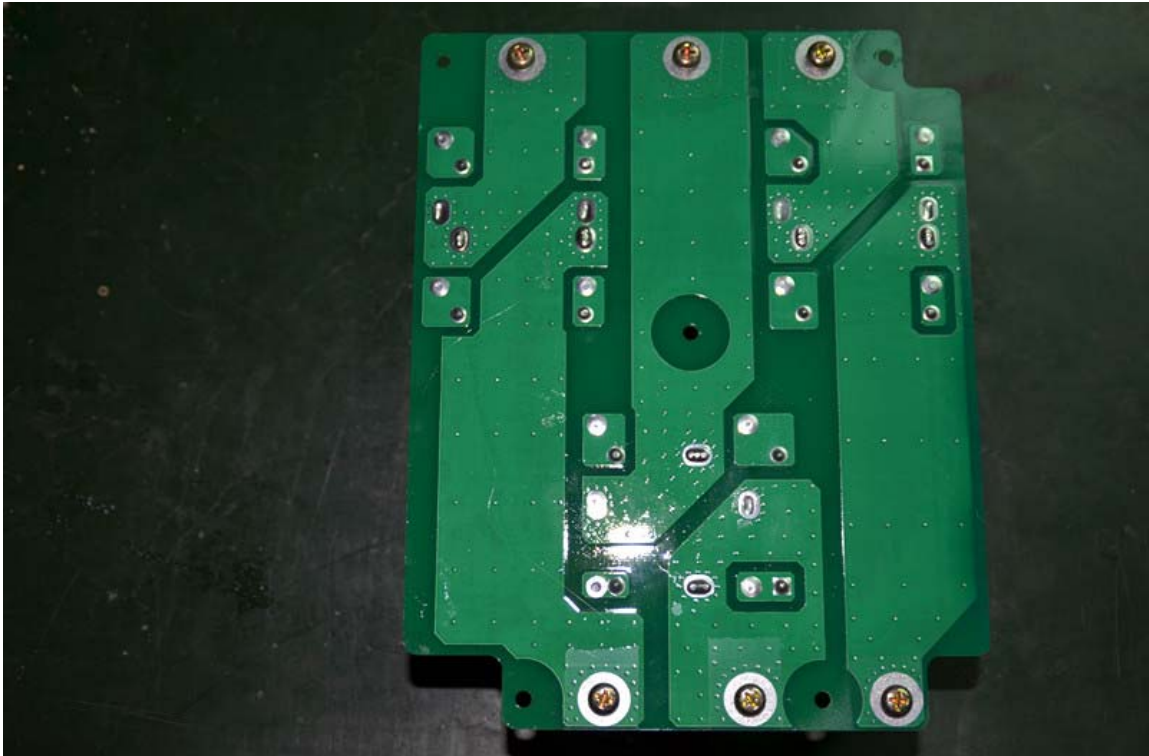


Fig. 24 –PS1203 CP3 trace view

Pictures

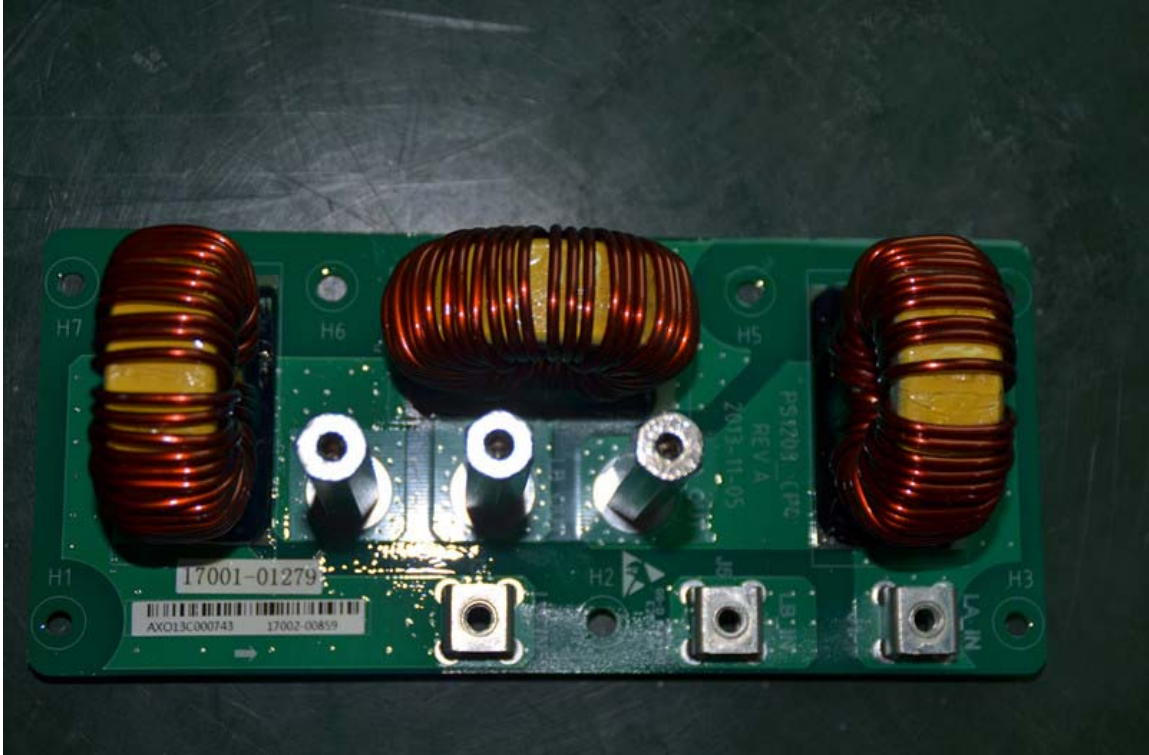


Fig. 25 –PS1203 CP4 component view

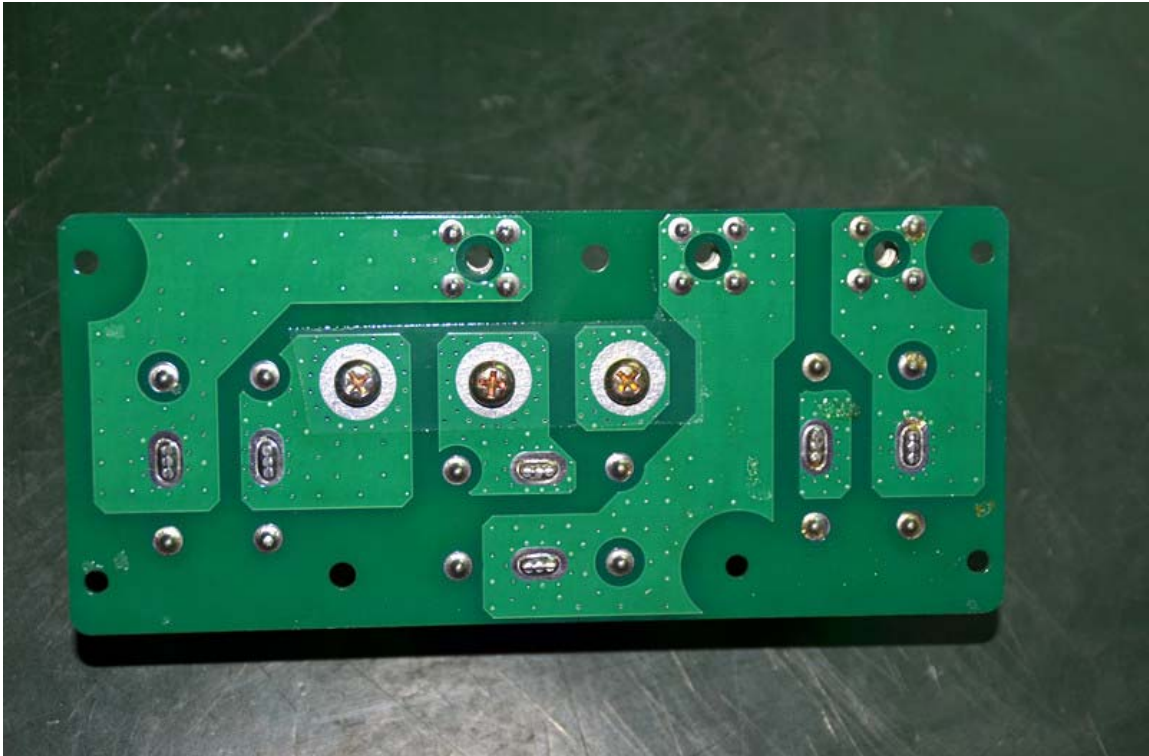


Fig. 26 –PS1203 CP4 trace view