

APPLICATION FOR LOW VOLTAGE DIRECTIVE

On Behalf of

INVT POWER SYSTEM (SHENZHEN) CO., LTD

Uninterruptible Power Systems

**Model(s): RM010/10B, RM015/15B, RM020/10B, RM030/20B, RM040/10B,
RM045/15B, RM060/20B**

**Prepared For : INVT POWER SYSTEM (SHENZHEN) CO., LTD
5th floor, 1# Building, Gaofa Industrial Park, Longjing, Na
nshan District, Shenzhen, China, 518055**

**Prepared By : EMTEK (Shenzhen) Co., Ltd.
Bldg 69, Majialong Industry Zone, Nanshan District,
Shenzhen, Guangdong, China
Tel: +86-755-26954280
Fax: +86-755-26954282**

TEST REPORT

EN 62040-1

Uninterruptible power systems (UPS) – Part 1: General and safety requirements for UPS

Report Reference No.....	ES160523069S
Compiled by (name + signature).....	James Dan
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_1C
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 5th floor, 1# Building, Gaofa Industrial Park, Longjing, Nanshan District, Shenzhen, China, 518055
Factory.....	INVT POWER SYSTEM (SHENZHEN) CO., LTD Area A, Juyuan Industrial Park, Fengtang Avenue, Fuyong, Baoan District, Shenzhen, China



Model/Type reference: RM030/10B, RM045/15B, RM060/20B

Ratings: See the page 5 rating label

Test item particulars	
Equipment mobility	<input type="checkbox"/> movable <input checked="" 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	-10%, +10%
Tested for IT power systems	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
IT testing, phase-phase voltage (V)	NA
Class of equipment	<input checked="" type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Not classified
Considered current rating (A)	92A
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
- 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 is to be used in conjunction with EN 60950-1:2006, which is referred to in this TRF as "RD".</p>	

General product information:
<p>1. The equipment is an Uninterruptible Power Systems for general use with information technology equipment.</p> <p>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</p>

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 UPS module, model name and ratings.

4. This report is amended from previous report ES151023031S, dated Nov. 04, 2014, due to below amendments:

- Update the LVD directive from 2006/95/EC to 2014/35/EU.
- Update the marking plate.





Summary of testing:

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

- **Tests performed on the bench**
- **Maximum ambient temperature: +40°C**
- **Tested for moderate conditions**
- **EUT is designed for altitudes not exceeding 2000 m.**
- **This series of UPS generally uses the same circuit diagrams, therefore, input tests were conducted on all model with different Input/output ratings. Unless otherwise specified, other tests are conducted on model RM 060/20B considered the worst condition.**

Copy of marking plate





1. Rating label for model RM060/20B

	RM060/20B
Frame	60kVA 3Ø+N
RETE 1 - MAINS 1 - NETZ 1	3Ø+N
U _{in} (Vac)	380/400/415
I _{in} (A)	87*
Frequenza - Frequency - Frequenz	50÷60Hz
RETE 2 - MAINS 2 - NETZ 2	3Ø+N
U _{in} (Vac)	380/400/415
I _{in} (A)	91*
Frequenza - Frequency - Frequenz	50÷60Hz
USCITA - OUTPUT - AUSGANG	3Ø+N
U _{out} (Vac)	380/400/415
I _{out} (A)	91*
Frequenza - Frequency - Frequenz	50÷60Hz
Potenza - Power rating - Leistung	60kVA/54kW (*:@380V)
I_{cw}	10 kA
BATTERIA - BATTERY - BATTERIE	
U _{dc} (Vdc)	+/- 240
I _{dc} (A)	120
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	 280 kg
Service: www.invt-power.com	
 Manufacturer: INVT POWER SYSTEM (SHENZHEN) CO., LTD Address: 5# Building, Gaofa Industrial Park, Longjing, Nanshan District, Shenzhen, China, 518055 Importer: xxxxxx Address: xxxxxx	

2. Rating label for model RM045/15B

	RM045/15B
Frame	45kVA 3Ø+N
RETE 1 - MAINS 1 - NETZ 1	3Ø+N
Uin (Vac)	380/400/415
Iin (A)	65*
Frequenza - Frequency - Frequenz	50÷60Hz
RETE 2 - MAINS 2 - NETZ 2	3Ø+N
Uin (Vac)	380/400/415
Iin (A)	68*
Frequenza - Frequency - Frequenz	50÷60Hz
USCITA - OUTPUT - AUSGANG	3Ø+N
Uout (Vac)	380/400/415
Iout (A)	68*
Frequenza - Frequency - Frequenz	50÷60Hz
Potenza - Power rating - Leistung	45kVA/40.5kW (*:@380V)
Icw	10 kA
BATTERIA - BATTERY - BATTERIE	
Udc (Vdc)	+/- 240
I dc (A)	90
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	 280 kg
Service: www.invt-power.com	
 Manufacturer: INVT POWER SYSTEM (SHENZHEN) CO., LTD Address: 5# Building, Gaofa Industrial Park, Longjing, Nanshan District, Shenzhen, China, 518055 Importer: xxxxxx Address: xxxxxx	

3. Rating label for model RM030/10B

	RM030/10B
Frame	30kVA 3Ø+N
RETE 1 - MAINS 1 - NETZ 1	3Ø+N
Uin (Vac)	380/400/415
Iin (A)	44*
Frequenza - Frequency - Frequenz	50÷60Hz
RETE 2 - MAINS 2 - NETZ 2	3Ø+N
Uin (Vac)	380/400/415
Iin (A)	46*
Frequenza - Frequency - Frequenz	50÷60Hz
USCITA - OUTPUT - AUSGANG	3Ø+N
Uout (Vac)	380/400/415
Iout (A)	46*
Frequenza - Frequency - Frequenz	50÷60Hz
Potenza - Power rating - Leistung	30kVA/27kW (*:@880V)
Icw	10 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	 280 kg
Service: www.invt-power.com	
 Manufacturer: INVT POWER SYSTEM (SHENZHEN) CO., LTD Address: 5# Building, Gaofa Industrial Park, Longjing, Nanshan District, Shenzhen, China, 518055 Importer: xxxxxx Address: xxxxxx	

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.

EN 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
4	GENERAL CONDITIONS FOR TESTS		P
4.3	Components		P
1.5.1/RD	General		
	Comply with IEC 62040-1 or relevant component standard	(see appended table 4.5)	P
1.5.2/RD	Evaluation and testing of components	Certified components are used in accordance with their ratings, certifications and they comply with applicable parts of this standard. Components not certified are used in accordance with their ratings and they comply with applicable parts of IEC 60950-1 and the relevant component standard. Components, for which no relevant IEC-standard exists, have been tested under the conditions occurring in the equipment, using applicable parts of IEC 60950-1.	P
1.5.3/RD	Thermal controls	No thermal control.	N
1.5.4/RD	Transformers	Transformers used are suitable for their intended application and comply with the relevant requirements of the standard.	P
1.5.5/RD	Interconnecting cables	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

EN 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	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.)	===	P
	Input rated frequency/range (Hz)	50/60	P
1.7.1/RD	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
1.7.1/RD	Number of output phases and neutral	3Φ & 1Φ	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})	10KA	P
	Manufacturer's name or trademark or identification mark	INVT	P
	Type/model or type reference	See page 1	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	Refer to copy of marking plate.	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

EN 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

EN 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	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
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.	—
4.7.16 1.7.11/RD	Durability of markings	The marking withstands required tests.	P
4.7.17 1.7.12/RD	Removable parts	Marking is not on the 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

EN 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
	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 installation 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
2.1.1.1/RD	Access to energized parts	There is adequate protection against operator contact with bare parts at ELV or hazardous voltage or parts separated from these with basic or functional insulation only (except protective earth). No hazardous voltages exceeding 1000V a.c. or 1500V d.c. Checked by test finger, test probe and test pin.	P
	Test by inspection :	Complies	P
	Test with test finger (Figure 2A) :	Complies	P
	Test with test pin (Figure 2B) :	Complies	P
	Test with test probe (Figure 2C) :	No TNV circuits	N
2.1.1.2/RD	Battery compartments	No TNV circuits in the battery compartments of battery cabinet.	N
2.1.1.3/RD	Access to ELV wiring	No internal wiring at ELV accessible to the operator.	N

EN 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Working voltage (V _{peak} or V _{rms}); minimum distance through insulation (mm)		—
2.1.1.4/RD	Access to hazardous voltage circuit wiring	All accessible parts are separated from internal wiring at hazardous voltage by double or reinforced insulation.	N
2.1.1.5/RD	Energy hazards :	No energy hazard in operator access area. Checked by means of the test finger.	P
2.1.1.6/RD	Manual controls	No shafts of knobs etc. at ELV or hazardous voltage.	P
2.1.1.7/RD	Discharge of capacitors in equipment	The capacitance of the input circuits > 0.1 μF, 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
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
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

EN 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
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
	Insulation employed :		—
2.3.5/RD	Test for operating voltages generated externally		N
	Test with test probe (Figure 2C) :		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 µF) :		—
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

EN 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
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)		—

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
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 ²), 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 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) :		—

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Clause	Requirement + Test	Result - Remark	Verdict
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
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

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Clause	Requirement + Test	Result - Remark	Verdict
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
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

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Clause	Requirement + Test	Result - Remark	Verdict
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)		P
	Prospective test current/(r.m.s) (A)		P
	Typical power factor		P
	Initial asymmetric peak current ration (I_{pk} / I_{cw}) . :	I_{cw} : 10KA	P
	Minimum duration of prospective test current (cycles 50/60 Hz)		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

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Clause	Requirement + Test	Result - Remark	Verdict
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		N
5.6.2.6	Moving parts	Checked by inspection, unintentional contact is unlikely during service operations.	P
5.6.2.7	Capacitor banks	No Capacitor banks.	N
5.6.2.8	Internal batteries	The terminals of the battery connections are isolated and covered so that it is unlikely to bridge the terminals of the battery during servicing or its replacement.	P

5.7 2.10/RD	Clearances, creepage distances and distances through insulation		P
2.10.1/RD	General	See below.	P
2.10.1.1/RD	Frequency	Considered.	P
2.10.1.2/RD	Pollution degrees	II	P
2.10.1.3/RD	Reduced values for functional insulation	The functional insulations comply with 5.3.4/RD a) and c)	P
2.10.1.4/RD	Intervening unconnected conductive parts	Considered.	P
2.10.1.5/RD	Insulation with varying dimensions	No such transformer used.	P
2.10.1.6/RD	Special separation requirements	Special separation is not used.	N
2.10.1.7/RD	Insulation in circuits generating starting pulses	No such circuit generating starting pulses.	N
2.10.2/RD	Determination of working voltage	(See appended table 5.7)	P

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Clause	Requirement + Test	Result - Remark	Verdict
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
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

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Clause	Requirement + Test	Result - Remark	Verdict
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
	Electric strength test		—
2.10.5.10 /RD	Thin sheet material – alternative test procedure		N
	Electric strength test		—
2.10.5.11 /RD	Insulation in wound components	See cl. 2.10.5.12/RD	N
2.10.5.12 /RD	Wire in wound components	No wound components.	N
	Working voltage :		—
	a) Basic insulation not under stress :		N
	b) Basic, supplementary, reinforced insulation :		N
	c) Compliance with Annex U :		N
	Two wires in contact inside wound component; angle between 45° and 90° :		N
2.10.5.13 /RD	Wire with solvent-based enamel in wound components	No wire with solvent-based enamel in wound components.	N
	Electric strength test	(see appended table 8.2)	—
	Routine test		N
2.10.5.14 /RD	Additional insulation in wound components	No additional insulation used.	N
	Working voltage :		—
	- Basic insulation not under stress :		N
	- Supplementary, reinforced insulation :		N
2.10.6/RD	Construction of printed boards	See below.	N
2.10.6.1/RD	Uncoated printed boards	(see appended table 5.7)	P
2.10.6.2/RD	Coated printed boards	No such part.	N
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	PCB layout does not serve as insulation barrier.	N
	Distance through insulation		N
	Number of insulation layers (pcs) :		N
2.10.7/RD	Component external terminations	No such part.	N

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Clause	Requirement + Test	Result - Remark	Verdict
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		N
2.10.8.2/RD	Thermal conditioning		N
2.10.8.3/RD	Electric strength test		—
2.10.8.4/RD	Abrasion resistance test		N
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

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

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Clause	Requirement + Test	Result - Remark	Verdict
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
	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 :	Only one connection.	P
6.3	Wiring terminals for external power conductors		P
3.3/RD	Wiring terminals for connection of external conductors		P

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Clause	Requirement + Test	Result - Remark	Verdict
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 ²)	Conductor size will be connected according to installation manual.	—
3.3.5/RD	Wiring terminal sizes		P
	Rated current (A), type, nominal thread diameter (mm)		—
3.3.6/RD	Wiring terminal design		P
3.3.7/RD	Grouping of wiring terminals		P
3.3.8/RD	Stranded wire		N
7	Physical requirements		P
7.1	Enclosure	The enclosure is not used to carry current, nor any part serves as functional part.	P
7.2 4.1/RD	Stability		P
	Angle of 10°	All models of the UPS do not overbalance when tilted to an angle of 10 degree.	P
	Test force (N) :	250N applied to UPS for model RM060B	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

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

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

7.6	Battery location		N
7.6.1	Battery location and installation	No internal batteries provided	N
7.6.2	Accessibility and maintainability		N
7.6.3	Distance		N
7.6.4	Case insulation		N
7.6.5	Wiring		N

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

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Clause	Requirement + Test	Result - Remark	Verdict
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	No TNV circuits	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	(see appended table 9)	N
6.2.2.2/RD	Steady-state test	(see appended table 9)	N
6.2.2.3/RD	Compliance criteria		N
6.3/RD	Protection of the telecommunication wiring system from overheating		N
	Max. output current (A)		—
3.5/RD	Interconnection of equipment		N
3.5.1/RD	General requirements		N
3.5.2/RD	Types of interconnection circuits		N
3.5.3/RD	ELV circuits as interconnection circuits		N
3.5.4/RD	Data ports for additional equipment		N
2.1.3/RD	Protection in restricted access locations		N
2.3.1/RD	Limits		N
	Type of TNV circuits		—
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

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Clause	Requirement + Test	Result - Remark	Verdict
	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		—
	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		—

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Clause	Requirement + Test	Result - Remark	Verdict
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)		P
B.1/RD	General requirements	All fans are separately certified, see list of critical components. Only fan block test performed, for temperature, see fault condition tests	P
	Position		—
	Manufacturer		—
	Type		—
	Rated values		—

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Clause	Requirement + Test	Result - Remark	Verdict
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)		—
	Electric strength test: test voltage (V)		—
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)		—
C/RD	Annex C, Transformers (see 1.5.4/RD and 5.3.3/RD)		N
	Position		—
	Manufacturer		—
	Type		—
	Rated values		—
	Method of protection		—
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

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Clause	Requirement + Test	Result - Remark	Verdict

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		N
I.3	Test for permanently connected UPS		P
I.4	Load-induced change of reference potential		N
I.5	Solid-state backfeed protection (see clause 7.1-7.5 of IEC 62040-2 and clause 7.1-7.2 of IEC 62040-3)		N

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Clause	Requirement + Test	Result - Remark	Verdict
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	Worst case power factors as specified by the manufacturer maintained during the relevant tests.	—
L.4	Reference capacitive-resistive loads		N
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
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
			—

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Clause	Requirement + Test	Result - Remark	Verdict
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

Tables

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						
Metal enclosure	Various	Steel/Aluminium	--	--	--	
Material of Front panel	Chi-Mei	PA-757	--	--	UL:E56070	
Breaker 1	Nader (Liangxin)	NDM2-125L/3300	660V,250A	IEC 60947-2	TÜV :AN 50079178 0001	
Breaker 2	Nader (Liangxin)	NDM2-125L/3021 125A	660V,250A	IEC 60947-2	TÜV :AN 50079178 0001	
Breaker 3	Nader (Liangxin)	NDM2-125/4000B 125A	660V,250A	IEC 60947-2	TÜV :AN 50079178 0001	
Breaker 4	Nader (Liangxin)	NDM2Z-125A	250V,125A	--	TUV:R 50163083	
Current Transformer (CT)	HAIGUANG	UMS33CT3	CLASS F	--	Test with appliance	
AC fan (two provided)	YEN SUN	FD248025EB-N(2R9)	DC24V, 0.14A, 3.36W	--	TÜV : R50027591	
SCR (three provided)	SEMIKRON	SKKT106/16E	1600V,106A	--	UL : E63532	
Input/output wire	Various	Various	Min. 50mm ² , 600V, 105°C	--	UL	
Internal wire (connect to external battery)	Various	Various	Min. 75mm ² , 600V, 105°C	--	UL	
On SNT_PCB_3320_ZJ board,						
PCB	Various	Various	V-0, 130°C	UL 94	UL	
On SNT_PCB_3320_FJ board,						
PCB	Various	Various	V-0, 130°C	UL 94	UL	
On SNT_PCB_3320_DY board,						
DC capacitor (C7, C8)	NANTONG JIANGHAI CAPACITOR FACTORY	CD293-220uF	450V, 220uF, 85°C	--	UL: E227010	
Y2 capacitor 1 (C3, C4, C5, C6, C59, C60)	TDK-EPC Corporation, Capacitors Group	CD	250VAC, 4700pF	IEC 60384-14	VDE:124321	

Tables

(Alternative)	Various	Various	250VAC, 4700pF	IEC 60384- 14	VDE
Y2 capacitor 2 (C11, C12, C61)	Various	Various	250VAC/ 2200pF	IEC 60384- 14	VDE
Optocouplers (U2)	NEC	PS2561	Dti>0.4mm	--	UL:E72422 VDE: 40008862
Transformer 1 (T1)	SIDNA	UMS33P1T2	CLASS B	--	Test with appliance
Transformer 2 (T2)	SIDNA	UMS33P1T1	CLASS B	--	Test with appliance
PCB	Various	Various	V-0, 130°C	--	UL
On PCB_3320_MN1					
Optocouplers (U82, U88, U89, U90, U112, U118, U119)	NEC	PS2561	Dti>0.4mm	--	UL:E72422 VDE:40008862
Y2 capacitor 1 (C646,C677)	Various	Various	250VAC, 4700pF	IEC 60384- 14	VDE:124321
PCB	Various	Various	V-0, 130°C	--	UL
On PCB_3320_KY1					
PCB	Various	Various	V-0, 130°C	--	UL
On SNT_PCB_3320_QD board,					
PCB	Various	Various	V-0, 130°C	--	UL
On PCB_PS1312_DR7					
Y2 capacitor (C4, C5)	Various	Various	250VAC, 4700pF	IEC 60384- 14	VDE:124321
Transformer (T1,T2,T3)	SIDNA	UMS33P1T2	CLASS B	--	Test with appliance
PCB	Various	Various	V-0, 130°C	--	UL
On SNT_PCB_3320_CR board					
X2 capacitor (C8, C9, C10)	Various	Various	275VAC, 0.22UF	IEC 60384-14	VDE: 94714
Y2 capacitor (C4, C5, C6, C7)	Various	Various	250VAC, 2200pF	IEC 60384-14	VDE:12006
PCB	Various	Various	V-0, 130°C	--	UL
On SNT_PCB_3320_FR board					

Tables

Y2 capacitor (C5, C6, C7, C8, C9, C10, C11, C12, C13, C14)	Various	Various	250VAC, 2200pF	IEC 14 60384-	VDE:12006
X2 capacitor (C1, C2, C3, C4)	Various	Various	275VAC, 0.22uF	IEC 14 60384-	VDE: 94714
PCB	Various	Various	V-0, 130°C	--	UL
On SNT_PCB_3320_GJ board					
Optocouplers (U5,U6, U7, U8, U9, U10, U11, U12, U13, U14)	NEC	PS2561	Dti>0.4mm	--	UL:E72422 VDE:40008862
Relay (RLY1, RLY2, RLY3)	SONG CHUAN	892-1CC-C	24VDC, 240VAC, 5A	--	UL:E88991 VDE:40006318
PCB	Various	Various	V-0, 130°C	--	UL
On PCB_PS1310_DT1 board					
Fuse(F1,F2)	BUSSMANN	BK/ABC-V-30	250VAC;30A	----	UL E19180
PCB	Various	Various	V-0, 130°C	--	UL
On PCB_PS1310_DT2 board					
PCB	Various	Various	V-0, 130°C	--	UL
PM Module					
Whole unit					
Enclosure	Various	Steel/Aluminium	--	--	--
Material of Front panel	Chi-Mei	PA-757	--	--	UL:E56070
Insulation sheet	bornsun	NOMEX410		--	UL:E34739
AC fan (four provided)	YEN SUN	FD248025EB-N(2R9)	DC24V, 0.14A, 3.36W	--	TÜV : R50027591
AC connector	flyaford	JMD29	---	---	UL:E227185
wire	Various	Various	---	---	UL:E314168
ON SNT_ASY_3320_GL board					
SCR (S1, S2)	SEMIKRON	SK45STA16	1600V,47A	--	UL : E63532
IGBT1, IGBT2, IGBT1	Vincotech	FZ06NBA030S A	600V,30A	--	UL NO.: E192116.
IGBT 4	Vincotech	FZ06NBA050S A	600V,50A	--	UL NO.: E192116.

Tables

Current Transformer (T2, T3, T4, T5)	SIDNA	UMS33CT4	CLASS F	--	Test with appliance
Transformer (T6)	SIDNA	UMS33D2T1	CLASS F	--	Test with appliance
Hall (H1,H2,H4,H5, H6)	LEM	HX50-P	50A	--	Test with appliance
Fuse (F5, F6, F7, F8, F9, F10, F11)	littelfuse	KLKD	32A, 500V	--	UL: E10480
DC capacitor 1 (C86,C87,C88, C89,C90,C91, C92,C93)	Jianghai	CD293-560UF	450V, 560uF, 85°C	--	UL:E227010
DC capacitor 2 (C96,C97)	Jianghai	CD293-220uF	450V, 220uF, 85°C	--	UL:E227010
PCB	Various	Various	V-0, 130°C	--	UL
On SNT_ASY_3320_FG board					
IGBT (U6, U7, U8)	Vincotech	FZ06NIA050S A	600V,50A	--	UL NO.: E192116.
Hall (U9,U10,U11)	LEM	HX50-P	50A	--	Test with appliance
DC capacitor (C1,C2,C4,C5, C6,C7,C8,C93)	Jianghai	CD293-560UF	450v/85°C	--	UL:E227010
Relay (RLY1,RLY2,RLY3)	hongfa	HF92F-024D-2A11S	24VDC/ 250VAC/2A/30A	--	UL:E134517 VDE : 40016109
Y2 capacitor (C53,C54,C55, C56,C57,C58, C59)	Various	CD16-E2GA472MYG S	250VAC/ 4700pf	IEC 60384-14	VDE:124321
Fuse (F1, F2, F3)	littelfuse	KLKD	32A, 500V	--	UL: E10480
PCB	Various	Various	V-0, 130°C	--	UL
On SNT_ASY_3320_ZK board					
Y2 capacitor (C360,C361,C410)	Various	Various	250VAC, 4700pF	IEC 60384-14	VDE:124321
PCB	Various	Various	V-0, 130°C	--	UL
On SNT_ASY_3320_CK board					
Y2 capacitor (C142,C143,C586)	Various	Various	250VAC, 4700pF	IEC 60384-14	VDE:124321
PCB	Various	Various	V-0, 130°C	--	UL

Tables

On SNT_ASY_3320_DG board					
Inductor (L1,L2,L4,L5,L6,L7,L8,L9)	taicheng	UMS33L1	CLASS H	--	Test with appliance
Inductor (L10,L11,L12)	taicheng	UMS33L2	CLASS H	--	Test with appliance
PCB	Various	Various	V-0, 130°C	--	UL
On SNT_ASY_3320_DY board					
DC capacitor (C7,C8)	Jianghai	CD293-220uF	450V, 85°C	--	UL:E227010
Y2 capacitor (C3,C4,C5,C6,C59,C60)	Various	Various	250VAC, 4700pF	IEC 60384-14	VDE:124321
Y2 capacitor (C11,C12,C61)	Various	Various	250VAC, 2200pF	IEC 60384-14	VDE:12006
Optocouplers (U2)	NEC	PS2501L-1-L	--	--	UL:E72422, VDE:40008862
Transformer (T1)	SIDNA	UMS33P1T2	CLASS B	--	Test with appliance
Transformer (T2)	SIDNA	UMS33P1T1	CLASS B	--	Test with appliance
PCB	Various	Various	V-0, 130°C	--	UL
On SNT_ASY_3320_FS board					
Optocouplers (U1)	NEC	PS2561	--	--	UL:E72422, VDE:40008862
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
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.					

Tables

4.4 1.6.2/RD	TABLE: electrical data (in normal conditions)					P
Fuse#	I _{rated} (A)	U(V)	P(W)	P(VA)	I(A)	Condition/status
Tested on model RM060B						
Input breaker	--	342V/50Hz	60262	60468	96.9	Charging of empty batteries and rated output load 60kVA/48kW.
Input breaker	91	380V/50Hz	60267	60473	91.6	Ditto
Input breaker	91	400V/50Hz	60264	60470	87.6	Ditto
Input breaker	91	415V/50Hz	60269	60478	84.0	Ditto
Input breaker	--	456.5V/50Hz	60273	60480	76.4	Ditto
Input breaker	--	342V/60Hz	60260	60462	96.9	Ditto
Input breaker	91	380V/60Hz	60264	60470	91.6	Ditto
Input breaker	91	400V/60Hz	60263	60468	87.6	Ditto
Input breaker	91	415V/60Hz	60265	60475	84.0	Ditto
Input breaker	--	456.5V/50Hz	60270	60473	96.3	Ditto
Note(s):						

5.1.1 and 2.1.1.7/RD	TABLE: discharge of capacitors in the primary circuit				P
Condition	τ _{calculated} (s)	τ _{measured} (s)	t _{u→0V} (s)	Comments	
Tested on model RM060B					
Power switch on (L1-N)	--	8	12	V _i =_376___V _p , 37% of V _i =_139___V _p , No load applied	
Power switch on (L2-N)	--	8	12	V _i =_376___V _p , 37% of V _i =_139___V _p , No load applied	
Power switch on (L3-N)	--	8	12	V _i =_376___V _p , 37% of V _i =_139___V _p , No load applied	

Tables

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				

5.2.1 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 ¹⁾
Note(s): 1). Approved component. For details refer to table 4.3.					

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.						

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 RM060B					

Tables

I/P earth →O/P earth	1V	Test current of ___320___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.		

5.8 2.10.2/RD	TABLE: working voltage measurement					P
Location	RMS voltage (V)	Peak voltage (V)	comments			
Tested on model RM060B						
On SNT_PCB_3320_JK PCB						
U82 pri to sec	20	8	Normal operation at rated load			
U88 pri to sec	20	8	Ditto			
U89 pri to sec	20	8	Ditto			
U90 pri to sec	20	8	Ditto			
U118 pri to sec	20	8	Ditto			
U119 pri to sec	20	8	Ditto			
On SNT_PCB_3320_GJ PCB						
U6 pri to sec	20	8	Normal operation at rated load			
U14 pri to sec	20	8	Ditto			
U8 pri to sec	20	8	Ditto			
U5 pri to sec	20	8	Ditto			
U10 pri to sec	20	8	Ditto			
U7 pri to sec	20	8	Ditto			
U9 pri to sec	20	8	Ditto			
U11 pri to sec	20	8	Ditto			
U12 pri to sec	20	8	Ditto			
U13 pri to sec	20	8	Ditto			
Note: Vin=415V, 50Hz						

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						
SNT_PCB_3320-QD PCB						
PE (H5)-J3 Pin	<420	<250	2.0	4.5	2.5	4.5
PE (H4)-R50 Pin	<420	<250	2.0	11.5	2.5	11.5
PE (H1)-R32 Pin	<420	<250	2.0	7.3	2.5	7.3

Tables

PE (H3)-D37 Pin	<420	<250	2.0	11.5	2.5	11.5
Q4 Pin-bottom metal enclosure (PE)	<420	<250	2.0	4.5	2.5	>4.5
SNT_PCB_3320-GJ 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
RLY3 Pin-bottom metal enclosure (PE)	<420	<250	2.0	7.3	2.5	>7.3
Primary trace-secondary trace under optocouplers (U5, U7, U8, U9, U10, U12, U13)	<420	<250	4.0	5.8	5.0	5.8
Primary trace-secondary trace under optocoupler (U6)	<420	<250	4.0	4.8	5.0	>10
Primary trace-secondary trace under optocoupler (U14)	<420	<250	4.0	4.8	5.0	5.0
SNT_PCB_3320-JK PCB						
PE (H5)-RS-232 Pin	<420	<250	2.0	3.8	2.5	3.8
Under C646 traces	<420	<250	2.0	6.2	2.5	6.2
Under C646 traces	<420	<250	2.0	7.3	2.5	7.3
U108 Pin-bottom metal enclosure (PE)	<420	<250	2.0	6.2	2.5	>6.2
Primary-secondary (C579 Pin-C492 Pin)	<420	<250	4.0	6.0	5.0	6.0
Primary-secondary (C534 Pin-R713 Pin)	<420	<250	4.0	6.4	5.0	6.4
SNT_PCB_3320-FR PCB						
Under C5, C10 traces	<420	<250	2.0	5.1	2.5	5.1
Under C11, C12 traces	<420	<250	2.0	5.2	2.5	5.2
PE (H1)-J1 Pin	<420	<250	2.0	6.2	2.5	6.2
PE (H4)-J3 Pin	<420	<250	2.0	6.2	2.5	6.2
C16 Pin-bottom metal enclosure (PE)	<420	<250	2.0	4.9	2.5	>4.9
SNT_PCB_3320-CR PCB						
PE (H3)-C8 Pin	<420	<250	2.0	10.2	2.5	10.2
PE (H2)-R2 Pin	<420	<250	2.0	11.6	2.5	11.6
C9 Pin-bottom metal enclosure (PE)	<420	<250	2.0	4.6	2.5	>4.6
SNT_PCB_3320-DY PCB						
Under C11, C61 traces	<420	<250	2.0	5.0	2.5	5.0

Tables

Under C3, C4 traces	<420	<250	2.0	7.6	2.5	7.6
Under C12 traces	<420	<250	2.0	4.6	2.5	4.6
PE (H4)-R85 Pin	<420	<250	2.0	5.6	2.5	5.6
PE (H3)-R86 Pin	<420	<250	2.0	5.6	2.5	5.6
C7 Pin-bottom metal enclosure (PE)	<420	<250	2.0	4.0	2.5	>4.0
SNT_PCB_3320-CQ PCB						
Under C4 traces	<420	<250	2.0	7.6	2.5	7.6
Under C5 traces	<420	<250	2.0	7.6	2.5	7.6
PE (H4)-J3 Pin	<420	<250	2.0	5.6	2.5	5.6
PE (H3)-J8 Pin	<420	<250	2.0	8.8	2.5	8.8
J7 Pin-bottom metal enclosure (PE)	<420	<250	2.0	5.5	2.5	>5.5
SNT_PCB_3320-JP PCB						
C8 Pin- metal enclosure (PE)	<420	<250	2.0	3.1	2.5	3.1
Note(s):						
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).						
2.) Shrink tubings are used to cover internal wires.						

5.8 2.1.1.3/RD and 2.10.5.1 /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 ¹⁾	
Note(s):					
1). Approved component. For details refer to table 4.3.					

6, 8.2 and 9	TABLE: electric strength tests, impulse tests and voltage surge tests			P
test voltage applied between:	test voltage (V)		breakdown Yes / No	
All models				
Primary to Secondary (mains input & output conductor to sub-D connector)	3000Va.c.		No	
Primary to earth (mains input & output conductor to earth)	1500Va.c.		No	

Tables

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 TX2	125	0.8	
Battery Connector	125	1.0	
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):			

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: Temperature test					P
	Supply voltage (V)	342V/50Hz	456.5V/50 Hz	0V (Battery mode)		—
	Ambient T _{min} (°C)	--	--	--	--	—
	Ambient T _{max} (°C)	--	--	--	--	—
Maximum measured temperature T of part/at::		T (°C)			Allowed T _{max} (°C)	
Tested on model RM060B						
Whole unit						

Tables

Input wire (phase A/ battery)	62	58	63		105-(40-25)
Battery wire '+'	51	51	56		105-(40-25)
Fan	53	--	--		70-(40-25)
Top enclosure	55	--	--		70-(40-25)
Front panel	55	--	--		95-(40-25)
Input breaker	71	63	62		70-(40-25)
Output breaker	64	63	63		70-(40-25)
SCR (Phase R)	90	83	70		130-(40-25)
On SNT_PCB_3320_DY PCB					
T2 winding	71	--	--		110-(40-25)
U2	64	--	--		100-(40-25)
X2 capacitor (C1)	62	--	--		100-(40-25)
L1 coil	84	--	--		130-(40-25)
PCB near Q1	93	--	--		130-(40-25)
X2 capacitor (C59)	65	--	--		100-(40-25)
On SNT_PCB_3320_JK PCB					
U82	67	--	--		100-(40-25)
U88	67	--	--		100-(40-25)
U89	67	--	--		100-(40-25)
U90	67	--	--		100-(40-25)
U118	67	--	--		100-(40-25)
U119	67	--	--		100-(40-25)
On SNT_PCB_3320_GJ PCB					
U6	63	--	--		100-(40-25)
U14	63	--	--		100-(40-25)
U8	64	--	--		100-(40-25)
U5	65	--	--		100-(40-25)
U10	63	--	--		100-(40-25)
U7	64	--	--		100-(40-25)
U9	65	--	--		100-(40-25)
U11	63	--	--		100-(40-25)
U12	63	--	--		100-(40-25)
U13	63	--	--		100-(40-25)
On SNT_PCB_3320_CQ PCB					
T1 winding	90	--	--		110-(40-25)
Ambient	25.2	25.1	25.0		--
Backup time	120	120	25min		--

Tables

Temperature T of winding:	t ₁ (°C)	R ₁ (Ω)	t ₂ (°C)	R ₂ (Ω)	T (°C)	Allowed T _{max} (°C)	Insulation class
Supplementary information: The maximum ambient temperature permitted by the manufacturer's specification is 40°C.							

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 RM060B						
Unit on	5.2	5.2	60	--	Switch "e" open, L to PE, no load	
Unit on	5.2	5.2	60	--	Switch "e" open, N to PE, no load	
Unit on	0.03	0.03	60	0.25	Switch "e" close, L to RS232 port	
Unit on	0.03	0.03	60	0.25	Switch "e" close, N to RS232 port.	
Note(s) : Test voltage: 456.5V/60Hz						

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 h * cm ² /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).	

Appendix 1

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

EN 62040-1, GROUP DIFFERENCES (CENELEC common modifications EN)																																																															
Clause	Requirement + Test	Result - Remark	Verdict																																																												
Contents	Add the following annexes: Annex ZA (normative) Normative references to international publications with their corresponding European publications Annex ZB (normative) Special national conditions		P																																																												
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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Appendix 1

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

<p style="text-align: center;">ZB ANNEX (normative)</p> <p style="text-align: center;">SPECIAL NATIONAL CONDITIONS (EN)</p>			
<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: "Laitte 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 tilkopling 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 – Front view for 2.0m high case model



Fig. 2 –Rear view for 2.0m high case model

Pictures



Fig. 3 –Inside view (I) for 2.0m high case model



Fig. 4 – Inside view (II) for 2.0m high case model

Pictures

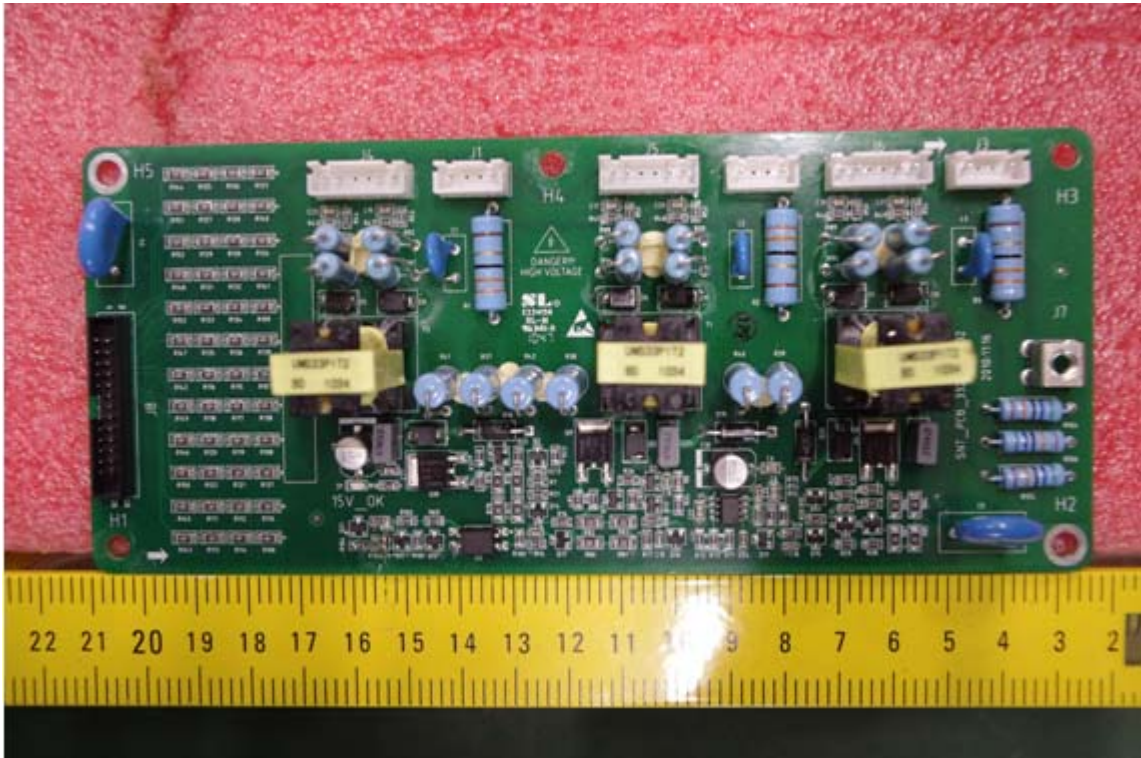


Fig.5 – Board SNT_3320_PCB_CQ, components side view

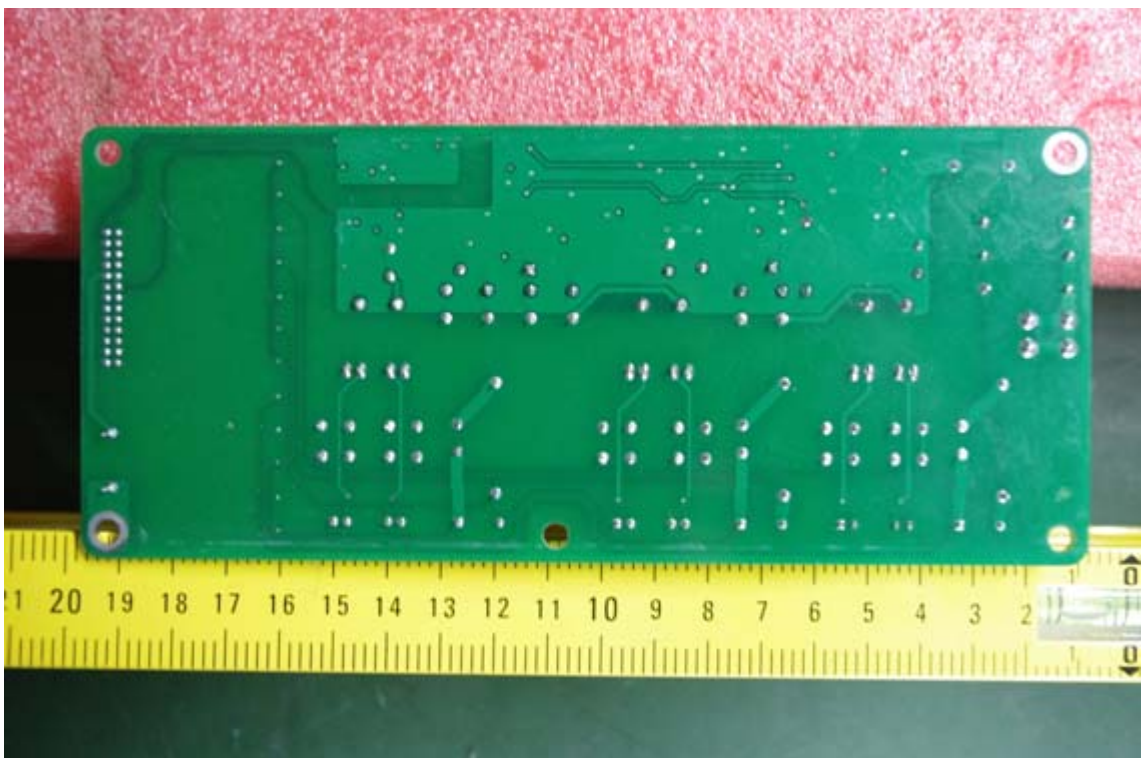


Fig.6 – Board SNT_3320_PCB_CQ, traces side view

Pictures



Fig. 7 – Board SNT_3320_PCB_DY, components side view

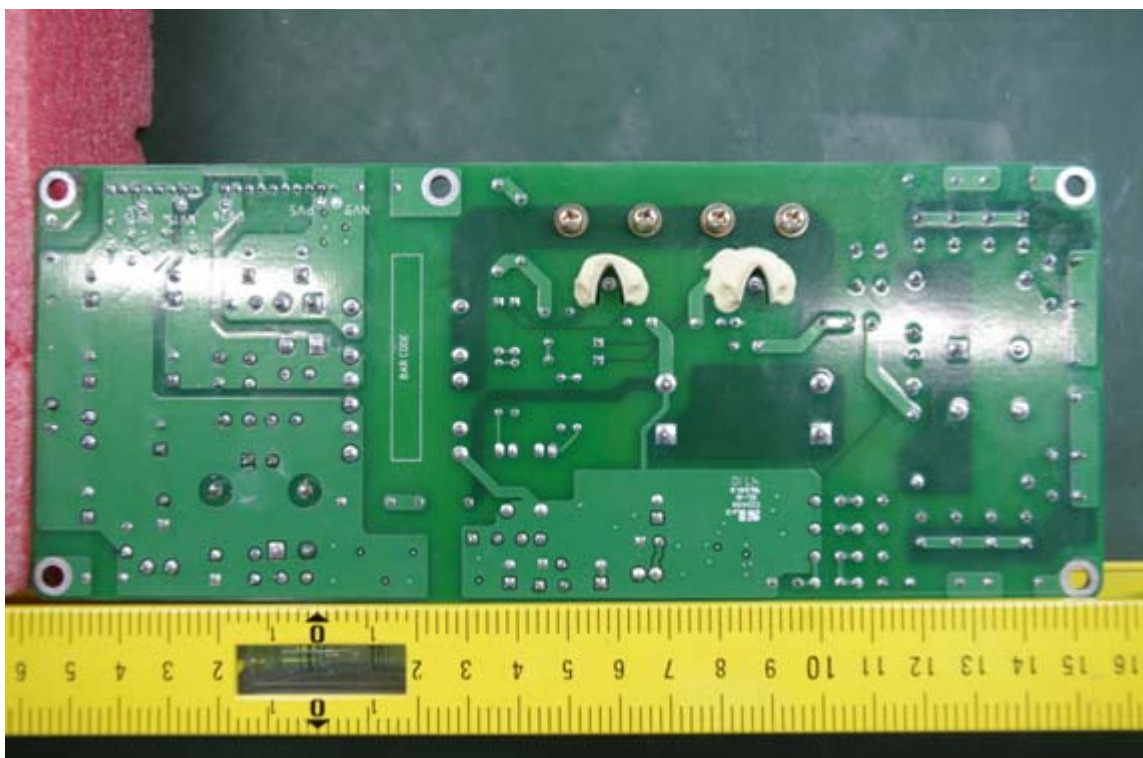


Fig. 8 – Board SNT_3320_PCB_DY, traces side view

Pictures

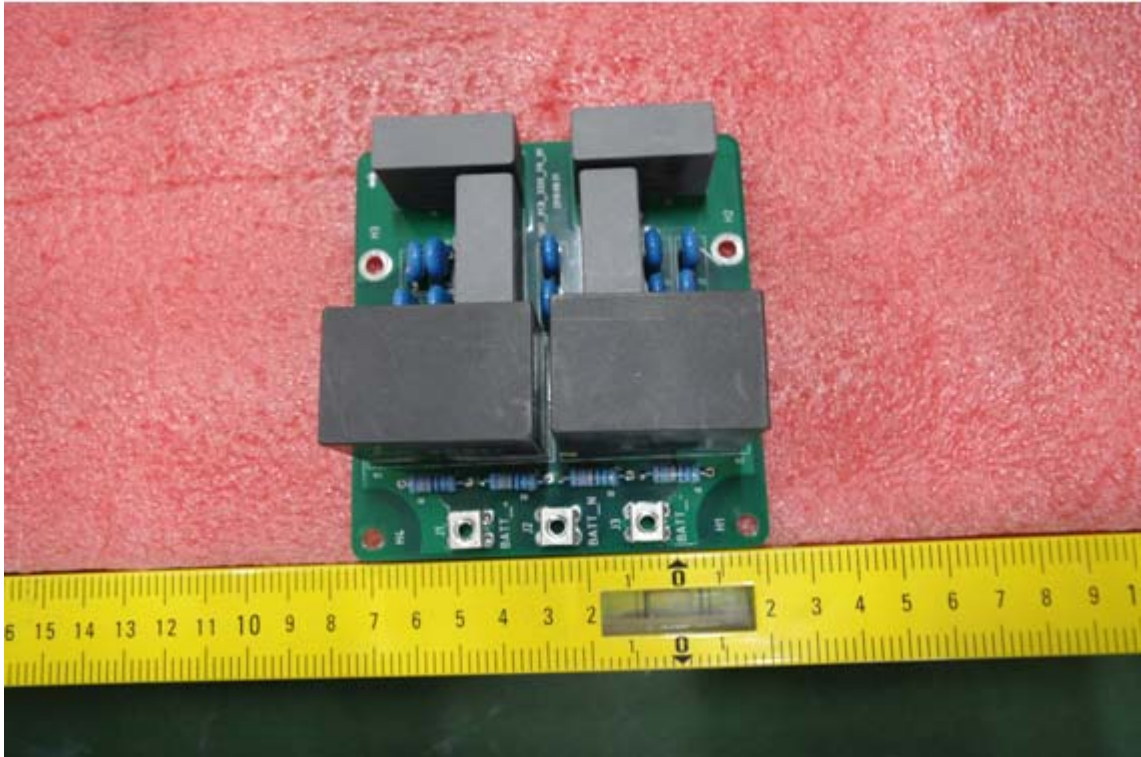


Fig. 9 –Board SNT_3320_PCB_FR, components side view

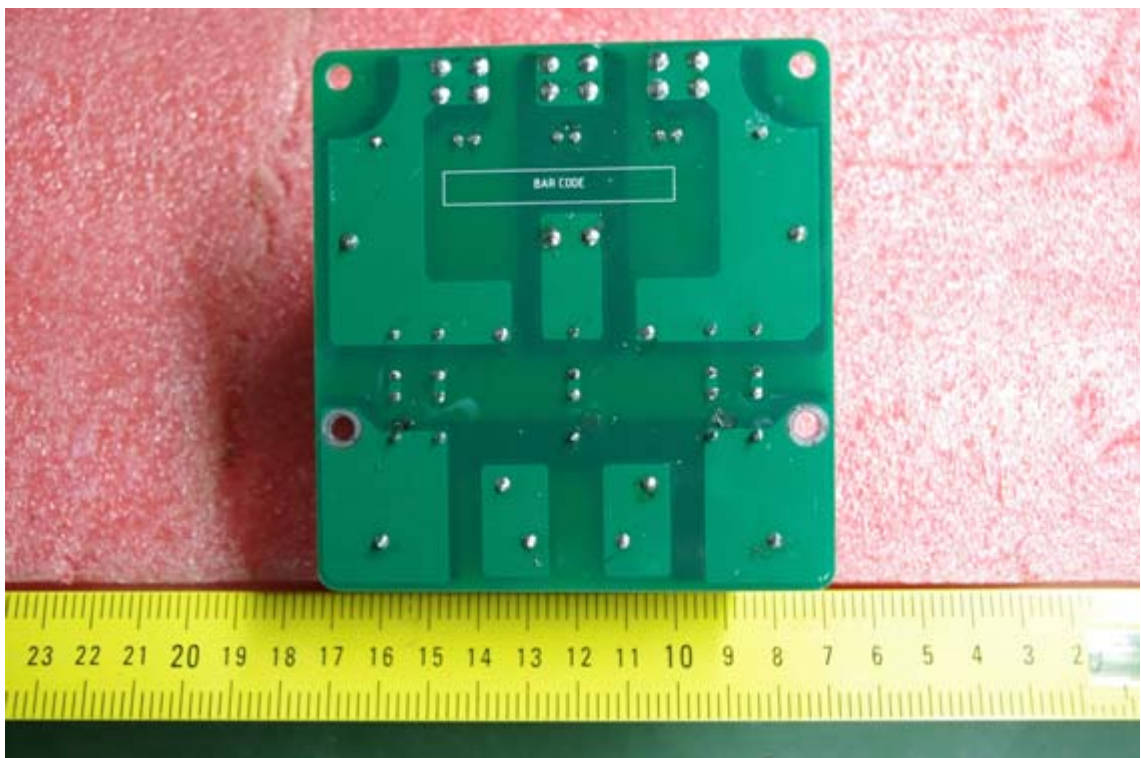


Fig.10 –Board SNT_3320_PCB_FR, traces side view

Pictures

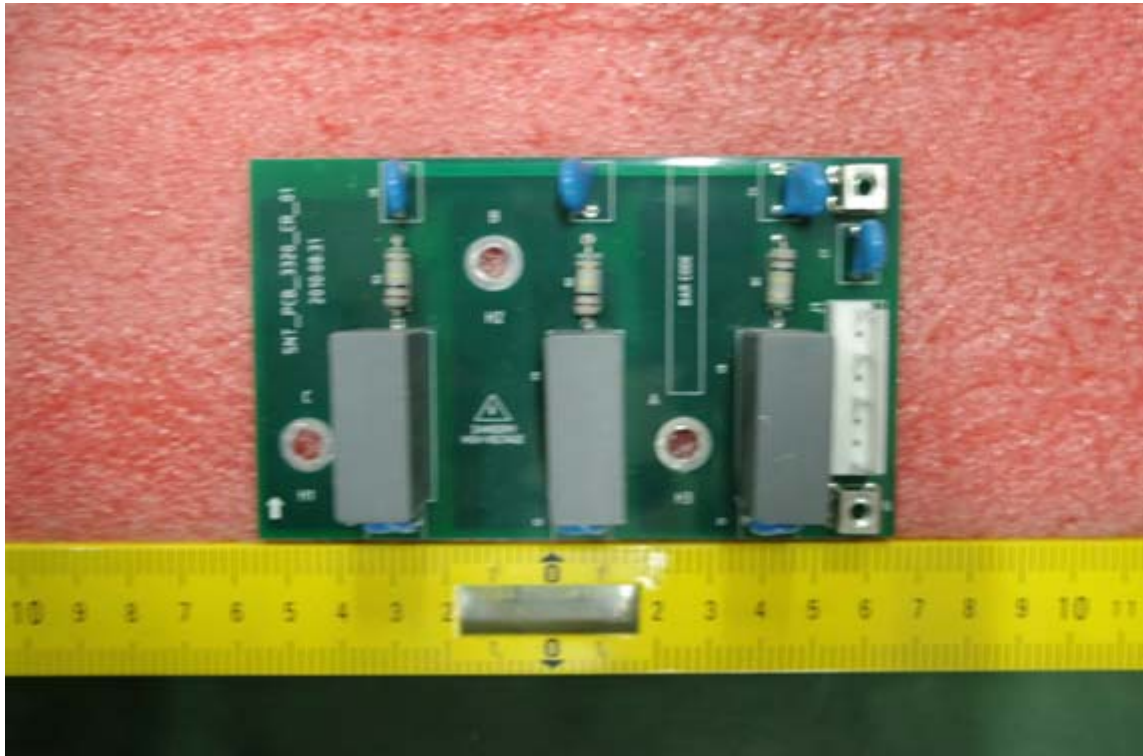


Fig.11 –Board SNT_PCB_3320_CR, components side view

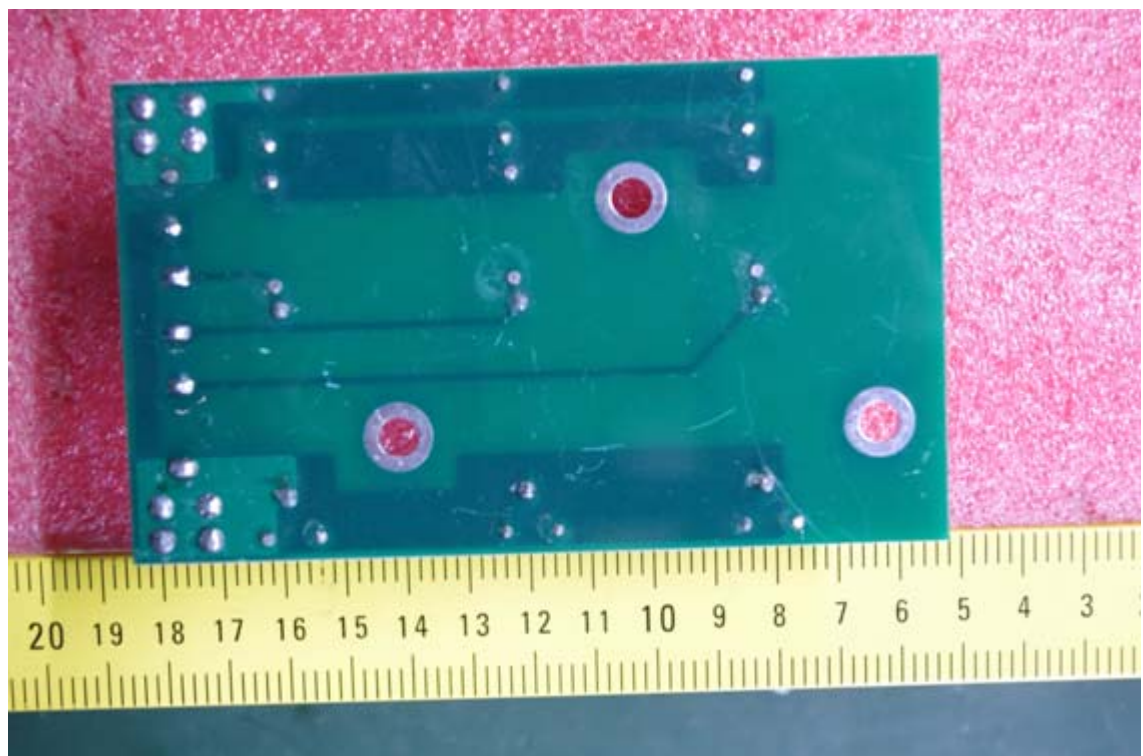


Fig.12 –Board SNT_PCB_3320_CR, traces side view

Pictures

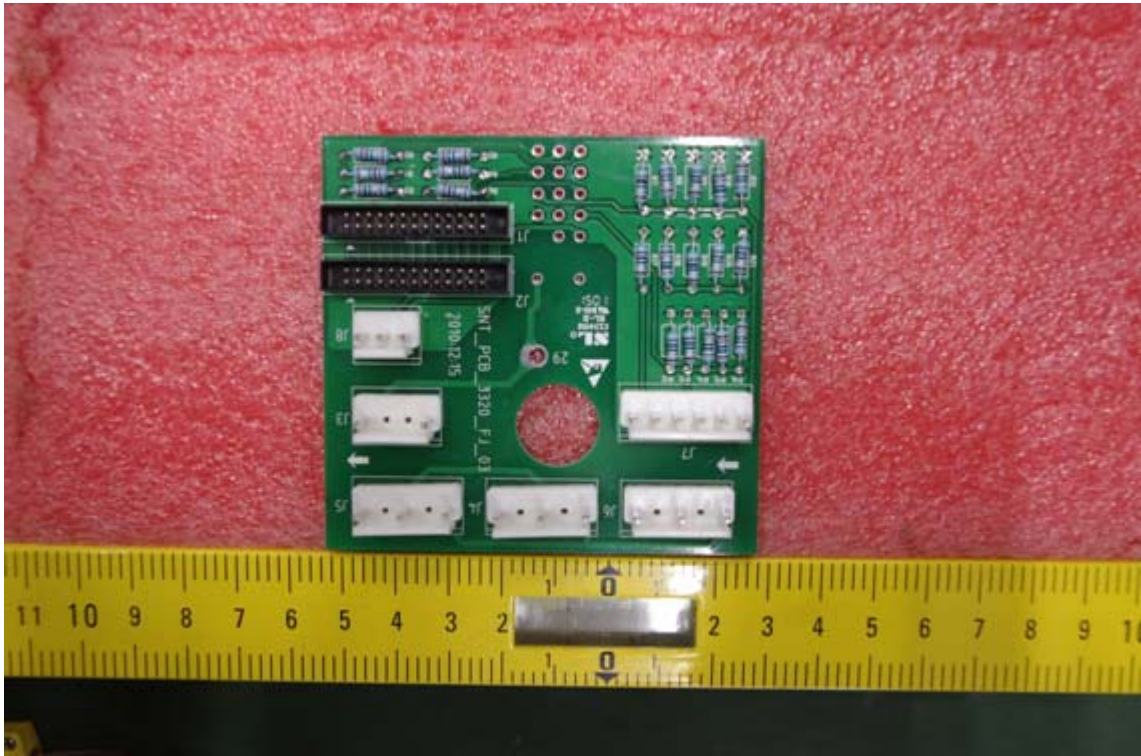


Fig.13 - Board SNT_PCB_3320_FJ, component side view

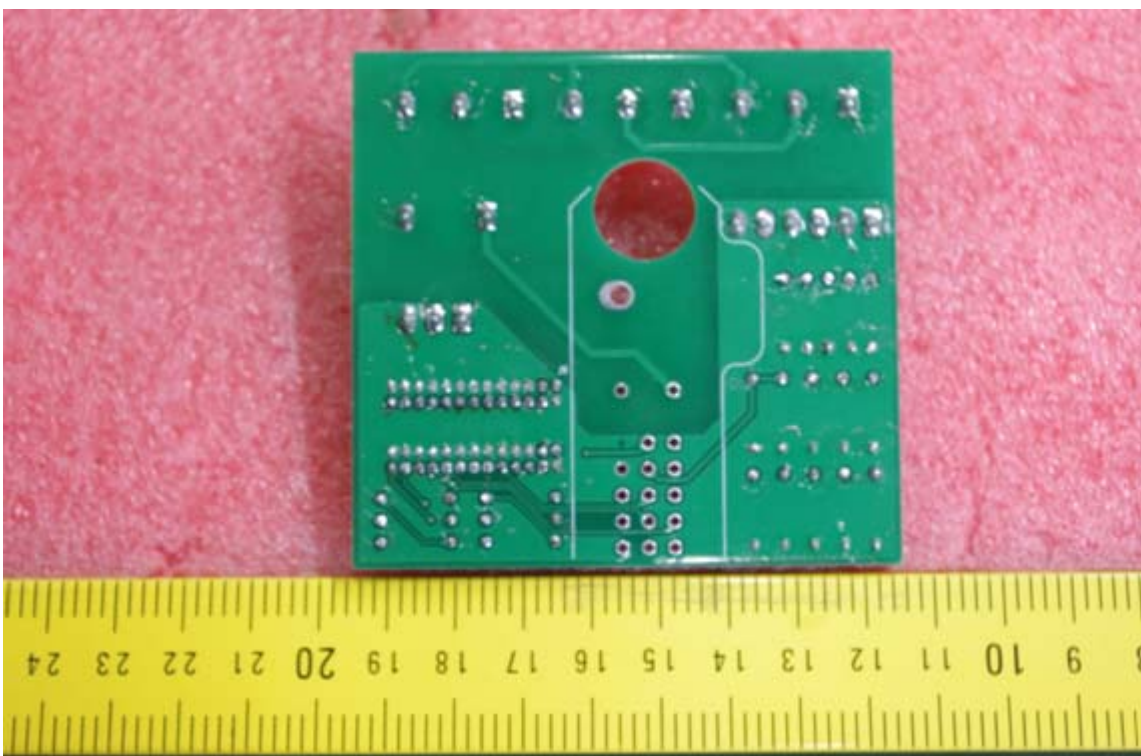


Fig.14 – Board SNT_PCB_3320_FJ, trace side view

Pictures

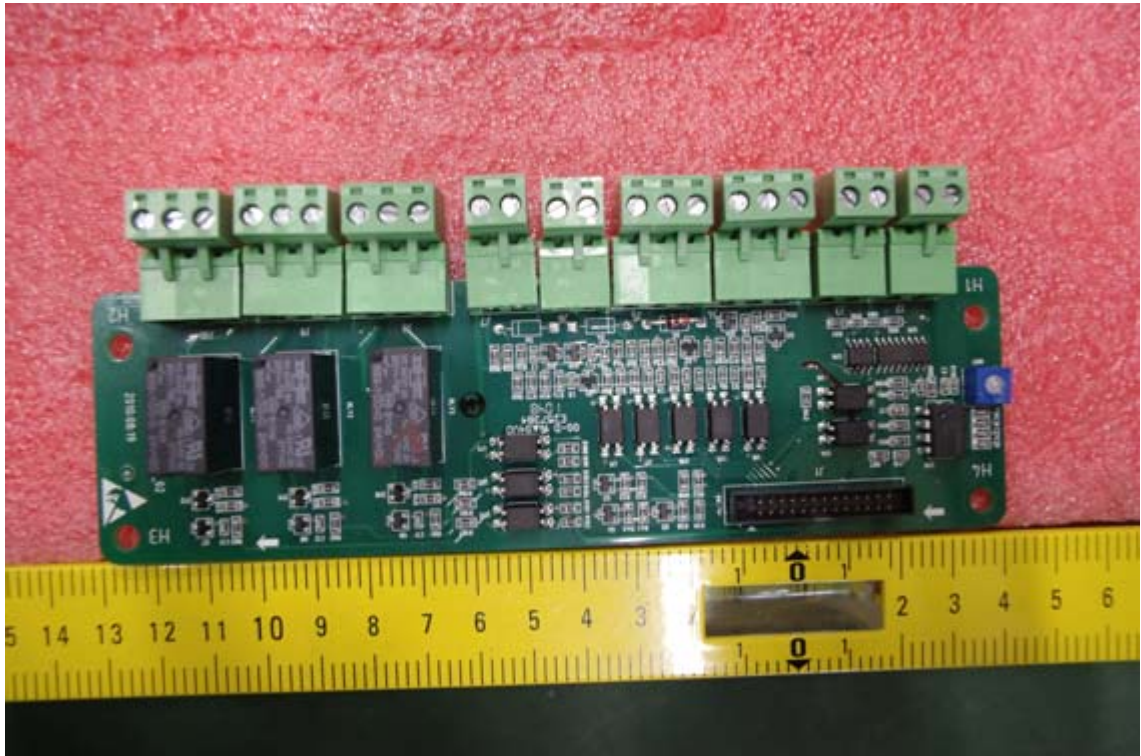


Fig.15–Board SNT_PCB_3320_GJ, component side view

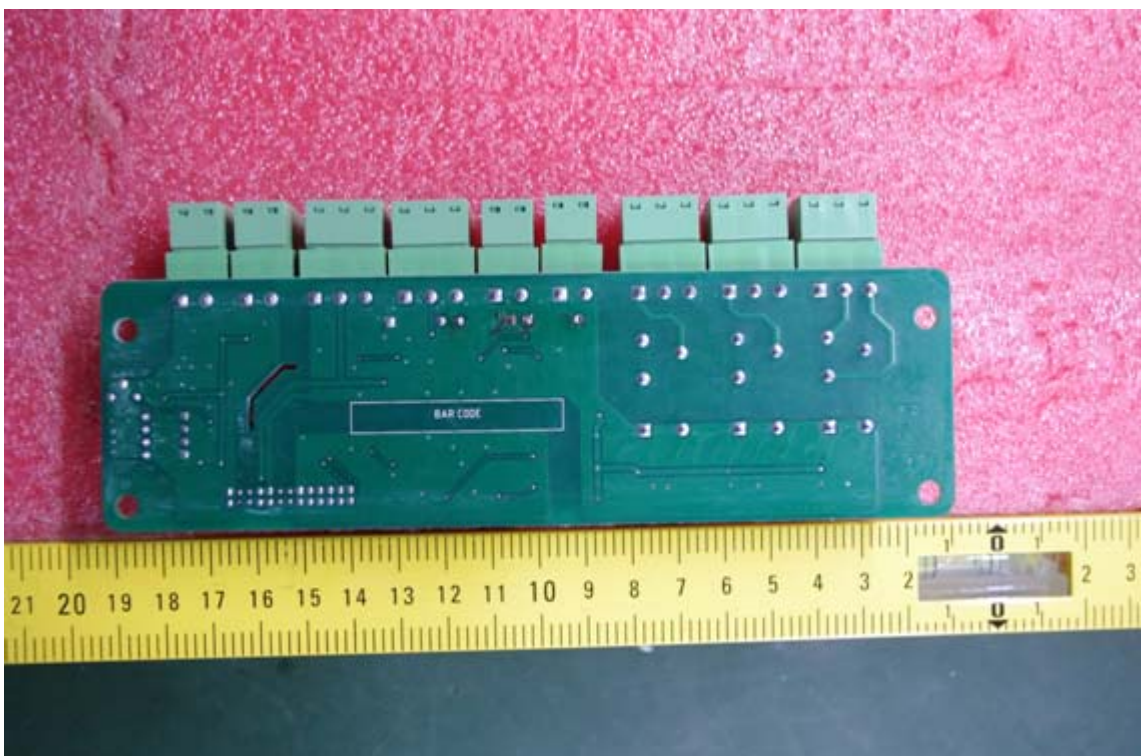


Fig.16 –Board SNT_PCB_3320_GJ, traces side view

Pictures

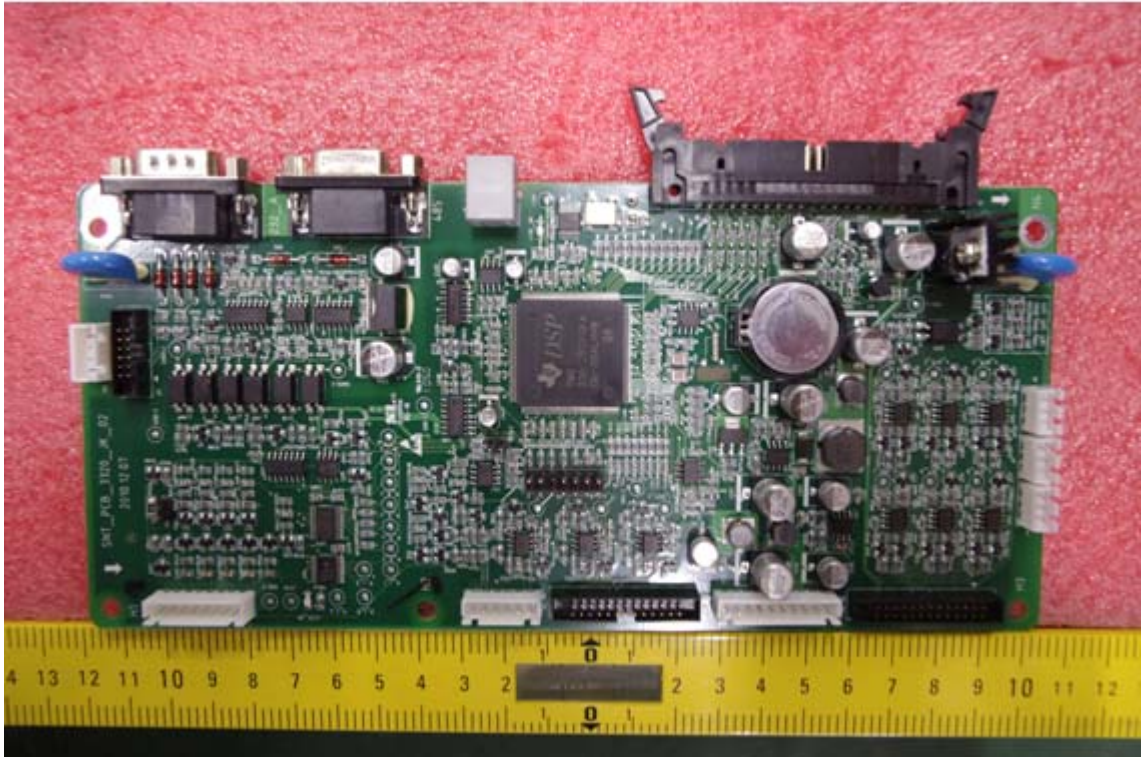


Fig.17 –Board SNT_PCB_3320_JK, component side view

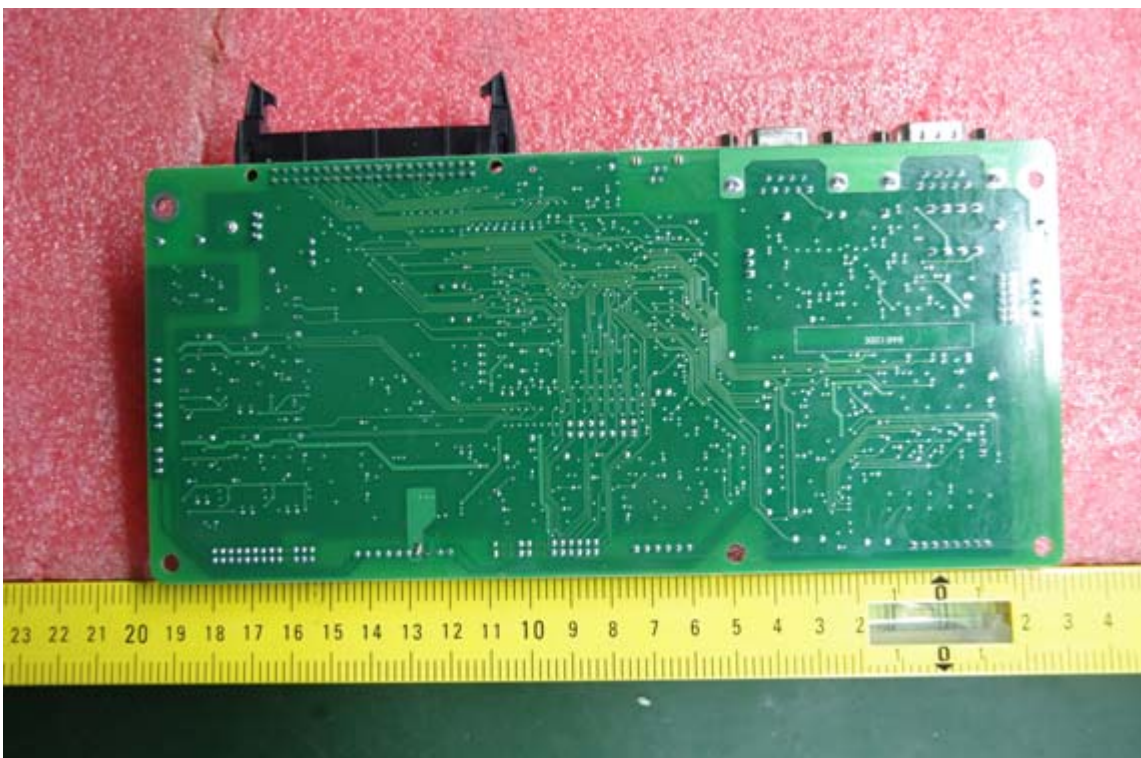


Fig.18 –Board SNT_PCB_3320_GJ, traces side view

Pictures

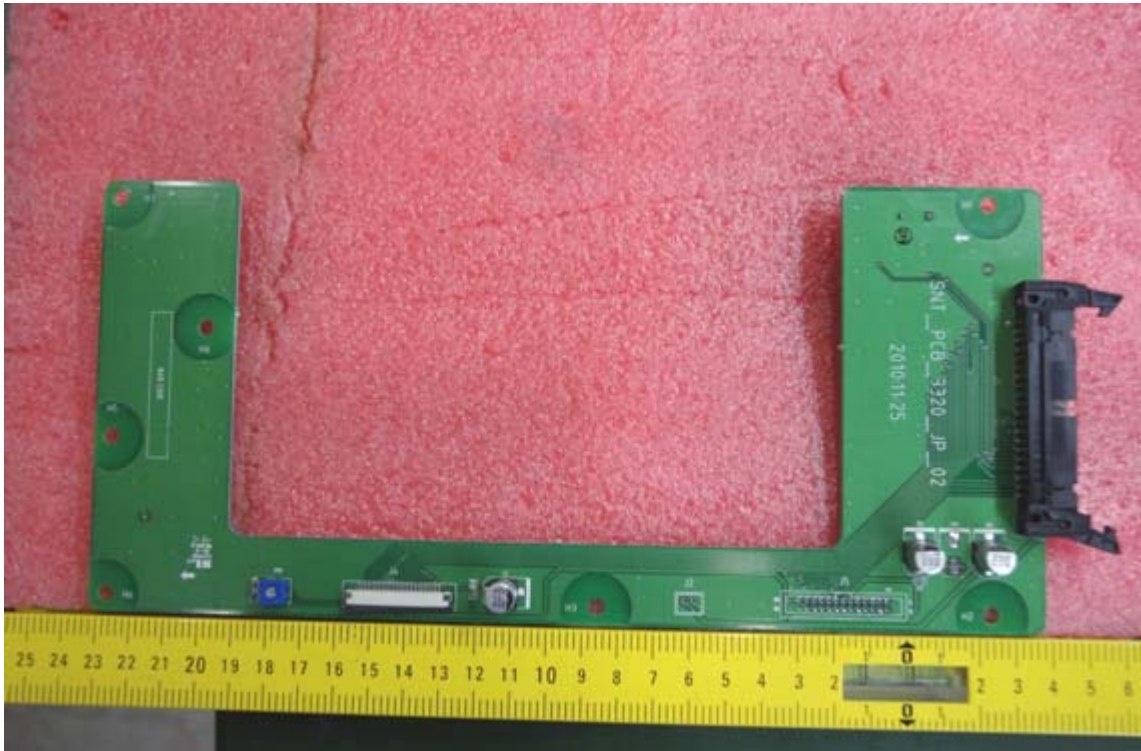


Fig.19 – Board SNT_PCB_3320_JP, component side view



Fig.20 –Board SNT_PCB_3320_JP, traces side view

Pictures

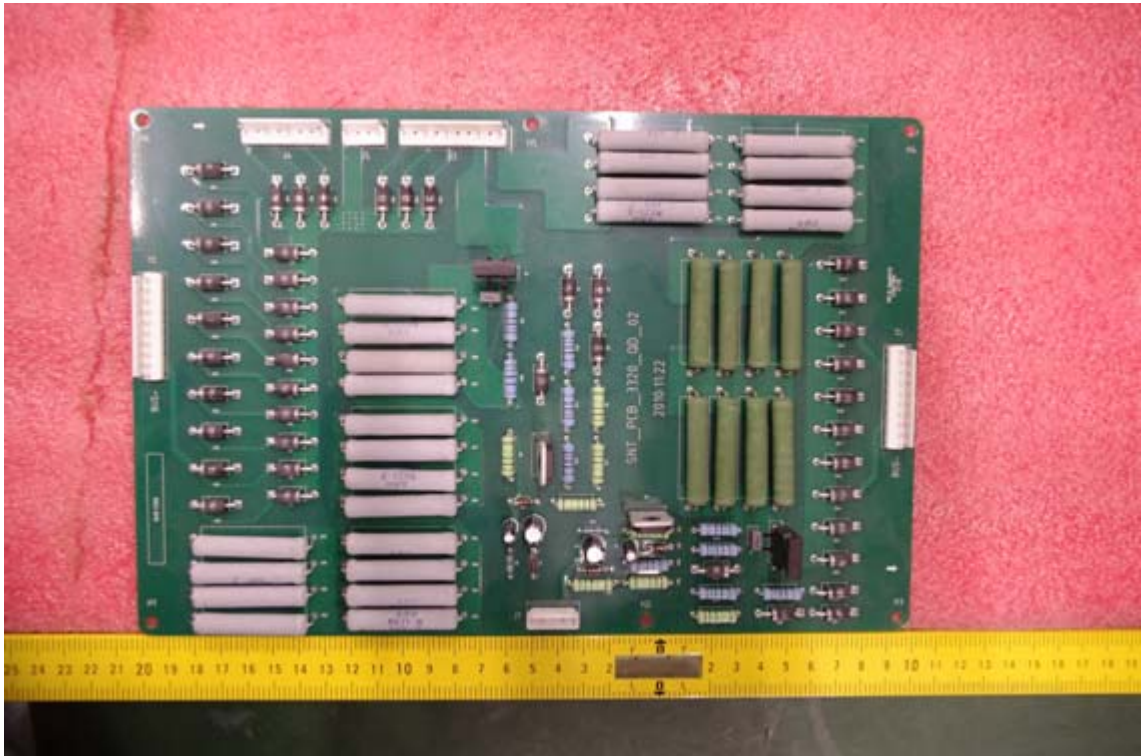


Fig.21 – Board SNT_PCB_3320_QD, component side view

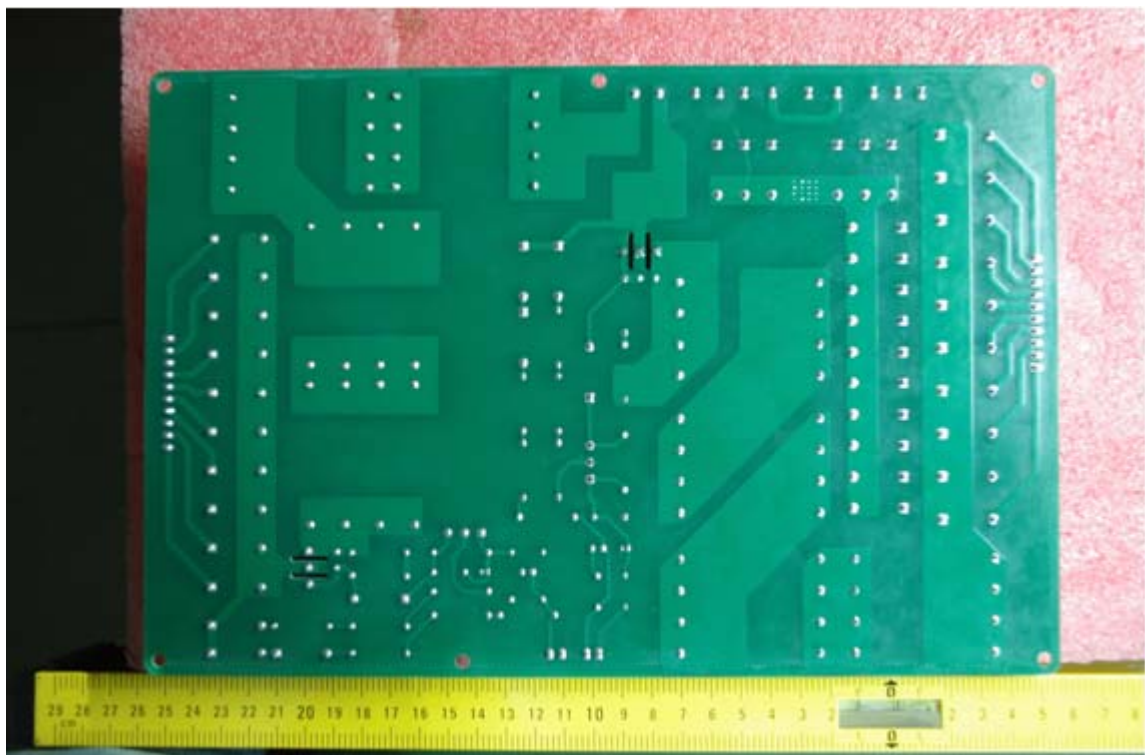


Fig.22 –Board SNT_PCB_3320_QD, traces side view

Pictures

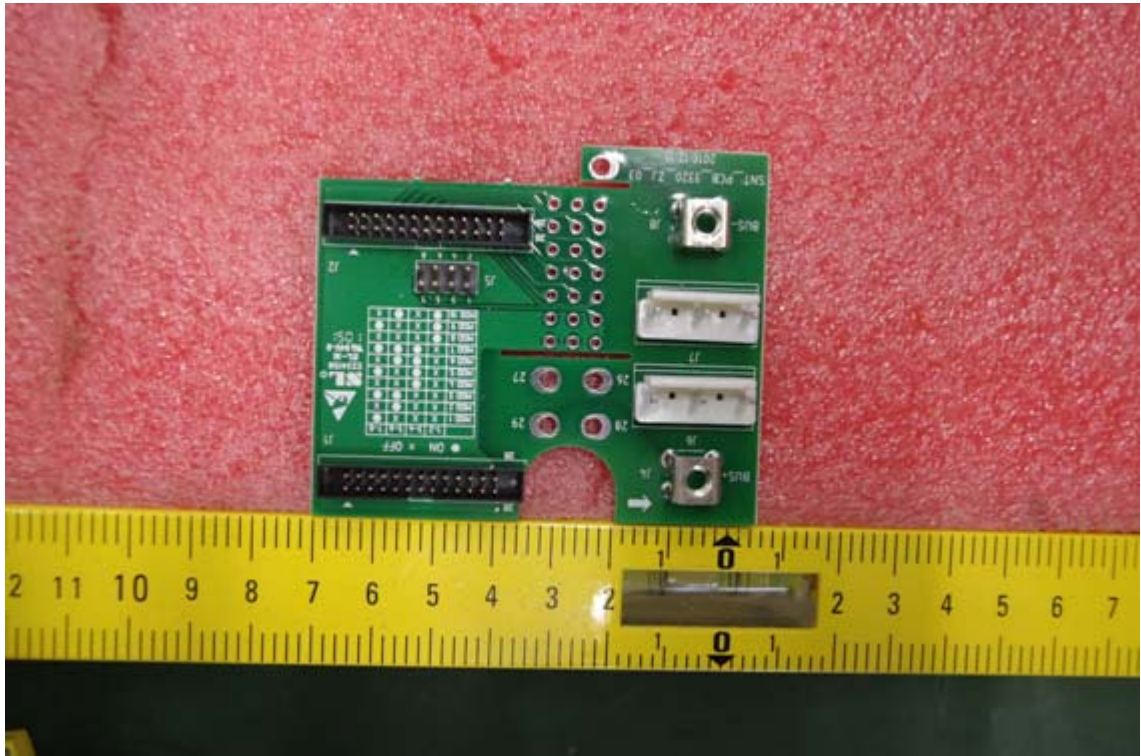


Fig.23 – Board SNT_PCB_3320_ZJ, component side view

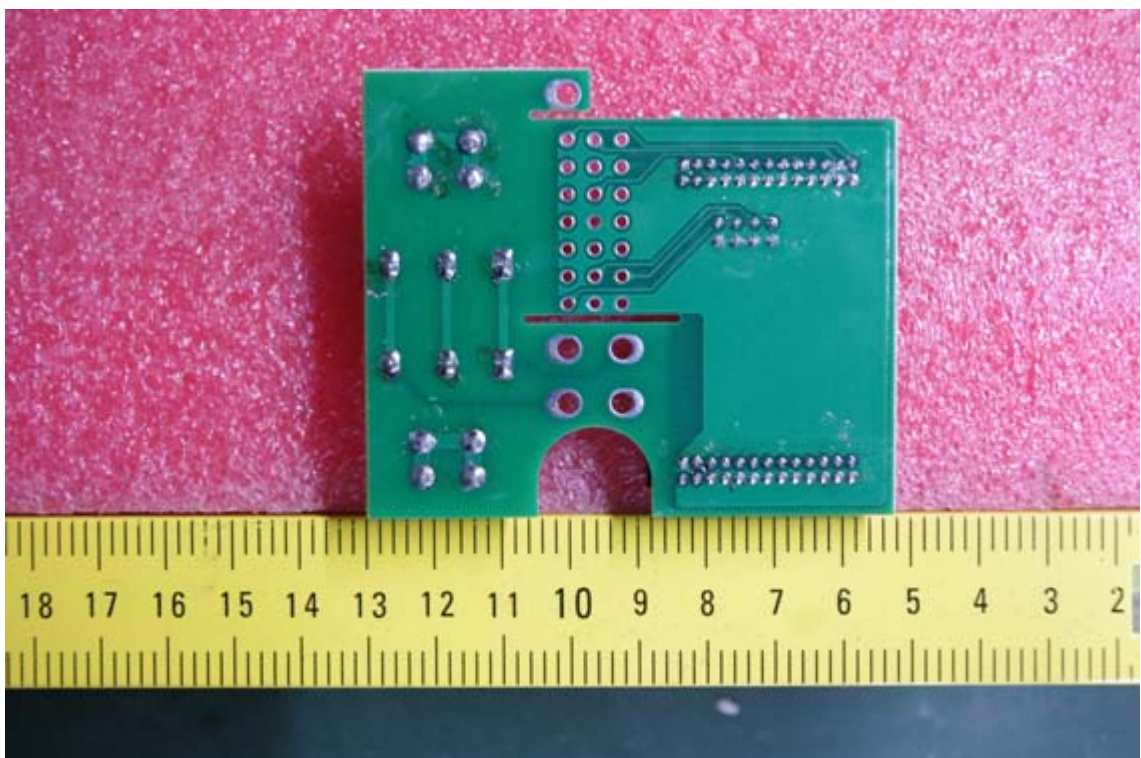


Fig.24 – Board SNT_PCB_3320_ZJ, traces side view

Pictures

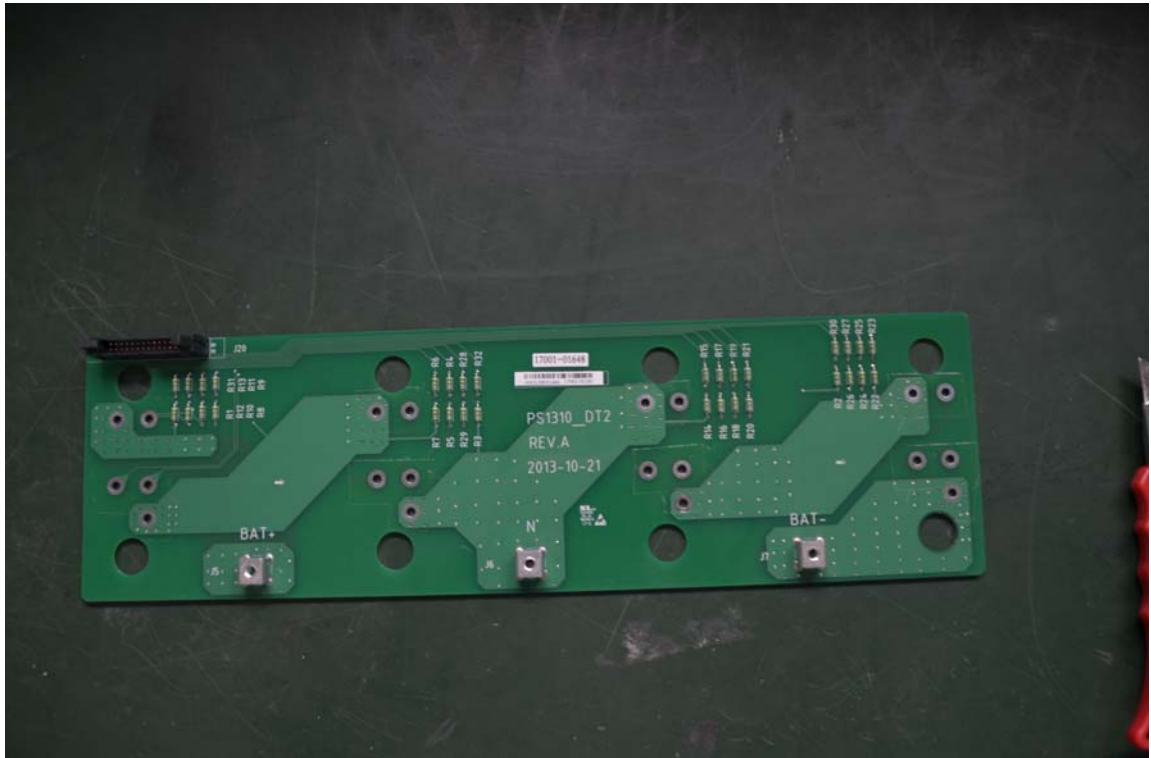


Fig.25 – Board PS1310_DT2, component side view

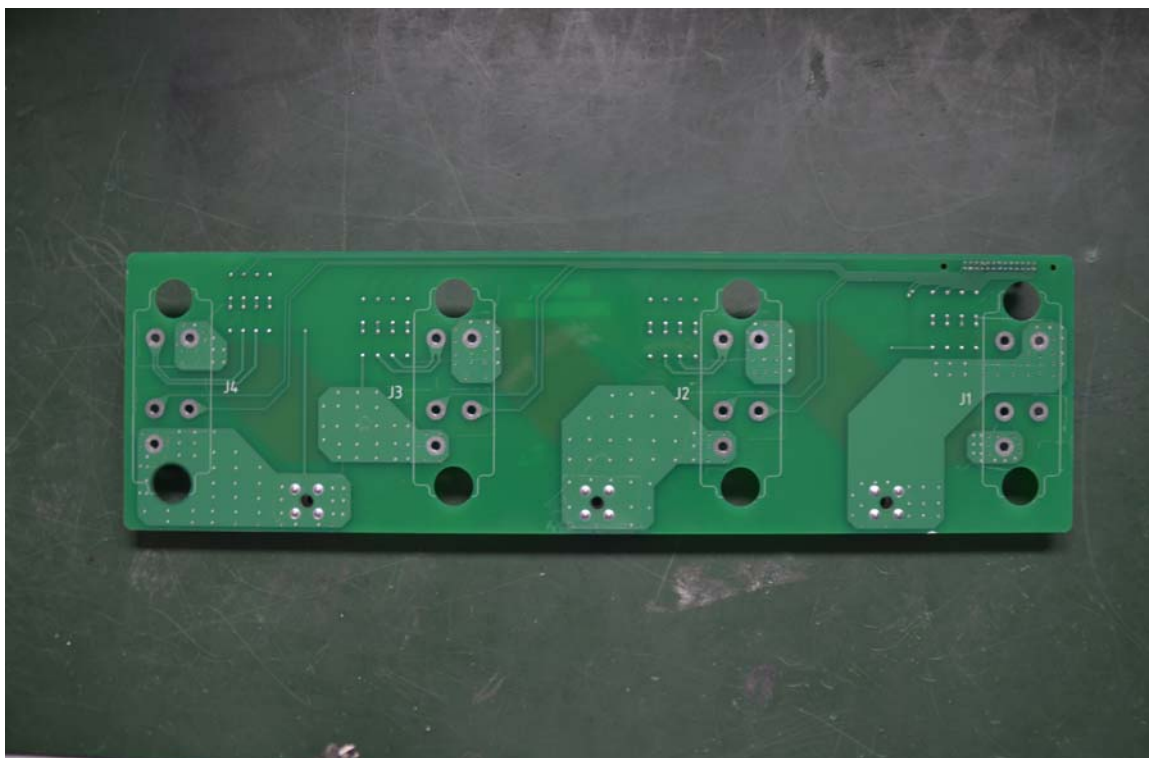


Fig.26 – Board PS1310_DT2, traces side view

Pictures

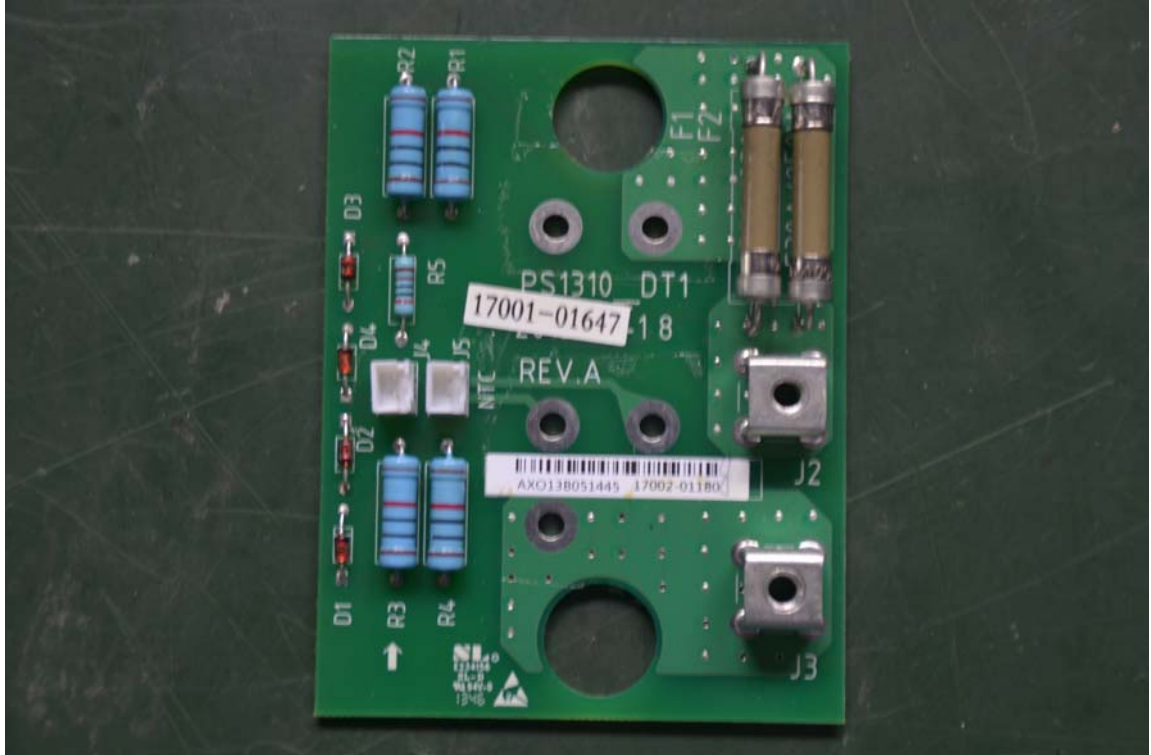


Fig.27 – Board PS1310_DT1, component side view

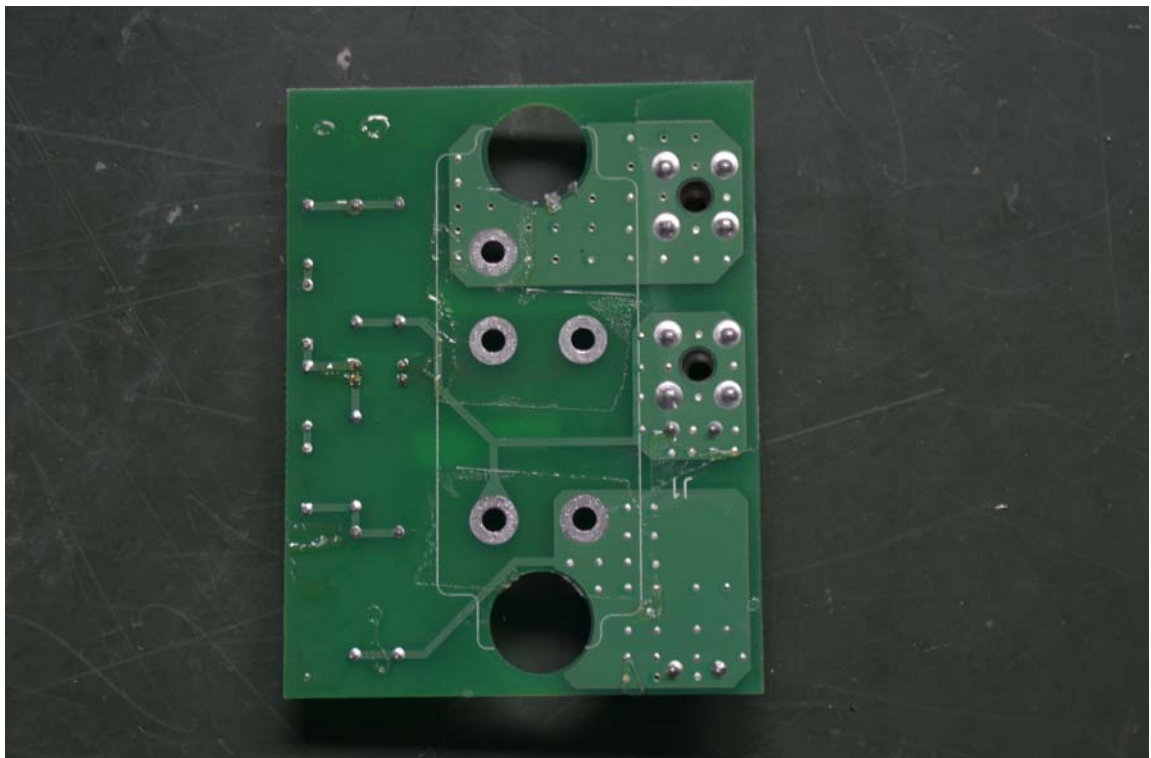


Fig.28 – Board PS1310_DT1, traces side view