CE LVD
TEST REPORT

For

Helios Series Solar Inverter

Model No.:	**Helios-242MCP, Helios-243MCP, Helios-482MCP, Helios-483MCP, Helios-485MCP**
Applicant :	**ZHEJIANG BOU NEW ENERGY TECHNOLOGY CO., LTD.** **Haichao Road, Houyan Village, Wengyang Street, Yueqing, Wenzhou**
Manufacturer :	**ZHEJIANG BOU NEW ENERGY TECHNOLOGY CO., LTD.** **Haichao Road, Houyan Village, Wengyang Street, Yueqing, Wenzhou**
Issued By :	**Global-Standard Testing Service Co., Ltd.** **Room 1911-1914, Noble Plaza, Qian Jin 1st Road, Bao An district, Shenzhen, Guangdong, China.**
Tel :	**+86 755 33663599**
Email :	**market@gstslab.com**
Report Number :	**J01.12.0150S**
Issued Date :	**June 8, 2017**
Date of Report :	**June 8, 2017**

Note:

1. The test data and result is based on the tested sample only.
2. Please verify information in the report on GST web: www.gstslab.com through report number.
3. All rights reserve, the pirate edition investigates necessarily! This report shall not be reproduced unless under the authority of Global-Standard Testing Service Co., Ltd.

TEST REPORT EN 62040-1 Uninterruptible power systems– Part 1: General and safety requirements for power inverter	
Report reference No. ……..…	J01.12.0150S
Testing laboratory ……	Global-Standard Testing Service Co., Ltd.
Location……	Room 1911-1914, Noble Plaza, Qian Jin 1st Road, Bao An district,Shenzhen, Guangdong, China.
Applicant……..	ZHEJIANG BOU NEW ENERGY TECHNOLOGY CO., LTD.
Address:……..	Haichao Road, Houyan Village, Wengyang Street, Yueqing, Wenzhou
Manufacturer……..	ZHEJIANG BOU NEW ENERGY TECHNOLOGY CO., LTD.
Address:……..	Haichao Road, Houyan Village, Wengyang Street, Yueqing, Wenzhou
Standards……	EN 62040-1:2008+A1:2013 EN 62109-1:2010 EN 62109-2:2011
Procedure deviation……..	N/A
Non-standard test method……	N/A
Type of test equipment ……	Helios Series Solar Inverter
Trade mark……..	CNBOU®
Model/Type designation……	Helios-242MCP, Helios-243MCP, Helios-482MCP, Helios-483MCP, Helios-485MCP
Rating……..	Input: 48VDC, Max.104A, Max. 5000W Output: 230VAC, 50Hz, 22A
Test item particulars:	N/A
Equipment mobility	Stationary
Operating Condition	Continuous
Tested for IT power systems	No
IT testing, phase-phase voltage (V)	N.A.
Class of equipment	Class I equipment
Protection against ingress of water	IP20

Possible test case verdicts :	
test case does not apply to the test object	N(/A.)
test object does meet the requirement	P(ass)
test object does not meet the requirement	F(ail)

Name and address of the testing laboratory :

Global-Standard Testing Service Co., Ltd.
Room 1911-1914, Noble Plaza, Qian Jin 1st Road, Bao An district,Shenzhen, Guangdong, China.

Tested by : Sean Xiao — June 8, 2017
Signature — Date

Sean Xiao / Engineer
Name/title

Reviewed by : Peter Chen — June 8, 2017
Signature — Date

Peter Chen / Project Engineer
Name/title

Approved by : Tim Sun — June 8, 2017
Signature — Date

Global-Standard Testing Service Co.,Ltd. APPROVED

Tim Sun / Manager
Name/title

General remarks:	
"(see remark #)" refers to a remark appended to the report. "(see appended table)" refers to a table appended to the report. Throughout this report a comma is used as the decimal separator. 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 testing laboratory. Until otherwise specified, all tests are done under normal ambient condition 25℃±10℃, Max RH: 75% and air pressure of 860 mbar to 1060 mbar.	Attached with: Attachment - A. Photo Documentation
The test samples were pre-production samples without serial numbers. This report shall not be reproduced except in full without the written approval of the testing laboratory. This report covers Helios-242MCP, Helios-243MCP, Helios-482MCP, Helios-483MCP, Helios-485MCP. Test data for HELIOS-485MCP represent all models in this test report, which is conditioned with Max. current, power consumption and the test result was pass. The test result presented in this report relate only to the object tested. The samples tested comply with the requirements of this standard; The standard EN 62109-1 and EN 62109-2 have been considered with referance to EN 62040.	

Label

Helios Series Solar Inverter
Model: HELIOS-485MCP
Rating : Input: 48VDC, Max.104A, Max. 5000W
Output: 230VAC, 50Hz, 22A

ZHEJIANG BOU NEW ENERGY TECHNOLOGY CO., LTD.

Note:

1.Due to similarity of the labels, only above label was listed;

2,All models have the same marking plate except for the model name and Output rating;

3.The height of WEEE directive mark is at least 7mm,and others directive mark are at least 5mm

4	GENERAL CONDITIONS FOR TESTS		P
4.5	Components		P
	Comply with IEC 62040-1 or relevant component standard	Components, which were found to affect safety aspects, comply with the requirements of this standard or within the safety aspects of the relevant IEC component standards (see appended table 4.5).	P
1.5.2/RD	Evaluation and testing of components	Components that are certified to IEC and/or national standards are used correctly within their ratings. Components not covered by IEC standards are tested under the conditions present in the equipment.	P
1.5.3/RD	Thermal controls		P
1.5.4/RD	Transformers		P
1.5.5/RD	Interconnecting cables	No interconnecting cables.	N/A
1.5.6/RD	Capacitors bridging insulation	X-capacitors and Y-capacitors comply with IEC60384-14	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		N/A
1.5.7.3/RD	Resistors bridging double or reinforced insulation between a.c. mains and antenna or coaxial cable		N/A
1.5.8/RD	Components in equipment for IT power systems		N/A
4.6	Power interface		P
1.6.1/RD	AC power distribution systems		P
1.6.2/RD	Input current	(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		P

4.7.2	Power rating		P
	Input rated voltage/range (V) ..... :	See marking	P
	Input rated current/range (A) ..... :	See marking	P
	Input symbol for nature of supply (d.c.) ..... :	See marking	P
	Input rated frequency/range (Hz) ..... :	See marking	P
1.7.1/RD	Number of Input phases and neutral ..... :	Single phase	P
	Output rated voltage/range (V) ..... :	See marking	P
	Output rated current/range (A) ..... :	See marking	P
	Output rated power factor, (if less than unity, or active power and apparent power or active power and rated current) ..... :	See marking	P
1.7.1/RD	Number of output phases and neutral ..... :	Single phase	P
	Output rated active power (W) ..... :	See marking	P
	Output rated apparent power (VA) ..... :	See marking	P
	Output symbol for nature of supply (d.c.) ..... :	See marking	P
	Output rated frequency/range (Hz) ..... :	See marking	P
	Ambient operating temperature range (C) ..... :		P
	Manufacturer's name or trademark or identification mark ..... :	ZHEJIANG BOU NEW ENERGY TECHNOLOGY CO., LTD.	P
	Type/model or type reference ..... :		P
	Symbol for Class II equipment only ..... :		N/A
	Other symbols ..... :	The additional marking does not give rise to misunderstandings.	P
	Certification marks ..... :		N/A
	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" ..... :	Text not required for this	N/A
4.7.3	Safety instructions		P
4.7.3.1	General		P
4.7.3.2	Installation ..... :	Installation instructions in user manual	P
	Location in a restricted access location only ... :		N/A

	Permanent connector UPS ..... :		N/A
	Pluggable type A or Pluggable type B UPS .... :		N/A
4.7.3.3	Operation ..... :		P

4.7.3.4	Maintenance ..... :	Stated in user's manual	P
4.7.3.5	Distribution related backfeed ..... :		P
4.7.4 1.7.4/RD	Main voltage adjustment ..... :	No necessary adjustment	P
	Methods and means of adjustment; reference to installation instructions ..... :		N/A
4.7.5 1.7.5/RD	Power outlets ..... :		P
4.7.6 1.7.6/RD	Fuse identification (marking, special fusing characteristics, cross-reference) ..... :		P
4.7.7 1.7.7/RD	Wiring terminals		P
1.7.7.1/RD	Protective earthing and bonding terminals ..... :	The bonding terminal is marked with standard symbol near the terminal.	P
1.7.7.2/RD	Terminals for a.c. mains supply conductors		P
1.7.7.3/RD	Terminals for d.c. mains supply conductors	The external battery connection terminal is marked according to clause 1.7.7.1, in addition to polarity marking.	P
4.7.8	Battery terminals ..... :	Indicate the polarity according to IEC 60417	P
4.7.9 1.7.8/RD	Controls and indicators		P
1.7.8.1/RD	Identification, location and marking ..... :		P
1.7.8.2/RD	Colours ..... :		P
1.7.8.3/RD			P
1.7.8.4/RD	Markings using figures ..... :	No figures used	N/A
4.7.10 1.7.9/RD	Isolation of multiple power sources ..... :		P
4.7.11 1.7.2.4/RD	IT power systems		N/A
4.7.12	Protection in building installation	The protection does not rely upon building installation. The protection is provided by circuit	N/A

		breaker.	

4.7.13 5.1/RD	High leakage current (mA) ..... :	The leakage current less than 5.0mA	P
4.7.14 1.7.10/RD	Thermostats and other regulating devices		N/A
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	No removable parts provided	N/A
4.7.18 1.7.13/RD	Replaceable batteries	The required warning is in the safety manual	P
	Language(s) ..... :		--
4.7.19 1.7.2.5/RD	Operator access with a tool ..... :	No such operator access	N/A
4.7.20	Battery		N/A
	Clearly legible information ..... :		N/A
	Battery type ..... :		N/A
	Nominal voltage of total battery (V) ..... :		N/A
	Nominal capacity of total battery (optional) ..... :		N/A
	Warning label ..... :		N/A
	Instructions ..... :		N/A

2.1.1.5/RD	Protection against energy hazards		P
4.7.21 1.7.2.4/RD	Installation instructions		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		N/A
2.1.1.1/RD	Access to energized parts		P
	Test by inspection ..... :		P
	Test with test finger (Figure 2A) ..... :	The test finger can't touch any hazards live parts	P
	Test with test pin (Figure 2B) ..... :	The test pin can't touch any hazards live parts	P
	Test with test probe (Figure 2C) ..... :		N/A
2.1.1.2/RD	Battery compartments		N/A
2.1.1.3/RD	Access to ELV wiring	No ELV wiring	N/A
	Working voltage (Vpeak or Vrms); minimum distance through insulation (mm)		--
2.1.1.4/RD	Access to hazardous voltage circuit wiring	No hazardous voltage circuit in operator access area	N/A
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 conductive shafts of operating knobs, handles, levers and the like	N/A

2.1.1.7/RD	Discharge of capacitors in equipment	Permanent connection equipment	N/A
	Measured voltage (V); time-constant (s) ..... :		--
2.1.1.8/RD	Energy hazards – d.c. mains supply		N/A
	a) Capacitor connected to the d.c. mains supply .. :		N/A
	b) Internal battery connected to the d.c. mains supply ..... :		N/A
2.1.1.9/RD	Audio amplifiers ..... :		N/A
5.1.2 2.1.1.5 c) /RD	Protection for UPS intended to be used in service access areas		N/A
	Hazardous energy level	No energy hazard in operator access area.	P

5.1.3 2.1.1.5 c) /RD	Protection for UPS intended to be used in restricted access areas		N/A
	Hazardous energy level		N/A
5.1.4	Backfeed protection		--
	Shock hazard after de-energization of a.c. input for UPS		N/A
	Measured voltage (V); time-constant (s) ..... :	The voltage drop to 0V after 15s	--
	Description of the construction ..... :	L-N simultaneously disconnected by circuit breaker with gap of 4.4mm	P
5.1.5	Emergency switching device		P

5.2	Requirements for auxiliary circuits		P
5.2.1 2.2/RD	Safety extra low voltage circuit - SELV		P
2.2.1/RD	General requirements		P
2.2.2/RD	Voltages under normal conditions (V) ..... :	(See appended table 5.2.1)	P
2.2.3/RD	Voltages under fault conditions (V) ..... :	(See appended table 5.2.1)	P
2.2.4/RD	Connection of SELV circuits to other circuits .. :		P
5.2.2 2.3/RD	Telephone network voltage circuits - TNV		N/A
2.3.1/RD	Limits		N/A
	Type of TNV circuits ..... :		--
2.3.2/RD	Separation from other circuits and from accessible parts		N/A
2.3.2.1/RD	General requirements		N/A
2.3.2.2/RD	Protection by basic insulation		N/A
2.3.2.3/RD	Protection by earthing		N/A

2.3.2.4/RD	Protection by other constructions ..... :		N/A
2.3.3/RD	Separation from hazardous voltages		N/A
	Insulation employed ..... :		--
2.3.4/RD	Connection of TNV circuits to other circuits		N/A
	Insulation employed ..... :		--
2.3.5/RD	Test for operating voltages generated externally		N/A
	Test with test probe (Figure 2C) ..... :		N/A
5.2.3 2.4/RD	Limited current circuits		N/A
2.4.1/RD	General requirements		N/A

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/A
5.2.4 3.5/RD	External signalling circuits		P
3.5.1/RD	General requirements		P
3.5.2/RD	Types of interconnection circuits ..... :		P
3.5.3/RD	ELV circuits as interconnection circuits	No ELV interconnection circuits	N/A
3.5.4/RD	Data ports for additional equipment		N/A
5.2.5 2.5/RD	Limited power source		P
	a) Inherently limited output		N/A
	b) Impedance limited output		N/A
	c) Regulating network limited output under normal operating and single fault condition		P

	d) Overcurrent protective device limited output		N/A
	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		P
2.6/RD	Provisions for earthing and bonding		P
2.6.1/RD	Protective earthing		P
2.6.2/RD	Functional earthing	Functional earthing is separated from hazardous voltages by basic insulation and protective earth.	P
2.6.3/RD	Protective earthing and protective bonding conductors		P
2.6.3.1/RD	General		P
2.6.3.2/RD	Size of protective earthing conductors	Power supply cord not provided with the equipment.	N/A
	Rated current (A), cross-sectional area (mm^2), AWG ..... :		--
2.6.3.3/RD	Size of protective bonding conductors	See below	P
	Rated current (A), cross-sectional area (mm^2), AWG ..... :		--
	Protective current rating (A), cross-sectional area (mm^2), AWG ..... :		--
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 ..... :	Green/Yellow insulated protective bonding conductors are provided.	P

2.6.4/RD	Terminals		P
2.6.4.1/RD	General		P

2.6.4.2/RD	Protective earthing and bonding terminals	The equipment is provided with a connection terminal and the test of sub-clause 2.6.3.4/RD was performed for protective bonding conductor and their terminals	P
	Rated current (A), type, nominal thread diameter (mm) ..... :		--
2.6.4.3/RD	Separation of the protective earthing conductor from protective bonding conductors	The equipment is provided with a connection terminal	P
2.6.5/RD	Integrity of protective earthing		P
2.6.5.1/RD	Interconnection of equipment		N/A
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		N/A
2.6.5.5/RD	Parts removed during servicing		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/A
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		P
4.2/RD	Mechanical strength		P
5.2/RD	Electric strength		P
5.3.3	Protective bonding		P

5.4	AC and d.c. power isolation	P

5.4.1	General		P
3.4/RD	Disconnection from the mains supply	Circuit breaker used for disconnection AC mains supply. User instruction require the DC supply disconnection device shall be provided in the battery cabinet	P
3.4.1/RD	General requirement		P
3.4.2/RD	Disconnect devices	Circuit breaker used for disconnection AC mains supply. User instruction require the DC supply disconnection device shall be provided in the battery cabinet	P
3.4.3/RD	Permanently connected equipment	Circuit breaker incorporated in the equipment	P
3.4.4/RD	Parts which remain energized		P
3.4.5/RD	Switches in flexible cords		N/A
3.4.6/RD	Number of poles - single-phase and d.c. equipment	Disconnect device disconnects all poles simultaneously	P
3.4.7/RD	Number of poles - three-phase equipment		N/A
3.4.8/RD	Switches as disconnect devices	There is no switch acting as disconnect devices	N/A
3.4.9/RD	Plugs as disconnect devices		N/A
3.4.10/RD	Interconnected equipment		N/A
3.4.11/RD	Multiple power sources		P
5.4.2	Disconnect devices	Instructions at each disconnect device	P

5.5	Overcurrent and earth fault protection		P
5.5.1	General		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		N/A
2.7.6/RD	Warning to service personnel ..... :		N/A
5.5.2	Basic requirements	Protective devices are integrated in the equipment	P

5.5.3	Battery circuit protection		P
5.5.3.1	Overcurrent and earth fault protection		P
5.5.3.2	Location of protective device		P
5.5.3.3	Rating of protective device		P
5.3.1/RD	Protection against overload and abnormal operation	(see appended table 8.3)	P

5.6	Protection of personnel – Safety interlocks		P
5.6.1	Operator protection		N/A
2.8/RD	Safety interlocks		N/A
2.8.1/RD	General principles		N/A
2.8.2/RD	Protection requirements		N/A
2.8.3/RD	Inadvertent reactivation		N/A
2.8.4/RD	Fail-safe operation		N/A
2.8.5/RD	Moving parts		N/A
2.8.6/RD	Overriding		N/A
2.8.7/RD	Switches and relays		N/A
2.8.7.1/RD	Contact gaps (mm) ..... :		N/A
2.8.7.2/RD	Overload test		N/A
2.8.7.3/RD	Endurance test		N/A
2.8.7.4/RD	Electric strength test		N/A
2.8.8/RD	Mechanical actuators		N/A
5.6.2	Service person protection	No adjustment or measurement inside the equipment is necessary while the unit is energized.	P
5.6.2.1	Introduction		N/A
5.6.2.2	Covers		N/A
5.6.2.3	Location and guarding of parts		N/A
5.6.2.4	Parts on doors		N/A
5.6.2.5	Component access		N/A
2.8.3/RD	Inadvertent reactivation		N/A
5.6.2.6	Moving parts		N/A
5.6.2.7	Capacitor banks	Capacitor discharge less than 1s	N/A

5.6.2.8	Internal batteries	No internal battery	N/A

5.7 2.10/RD	Clearances, creepage distances and distances through insulation		P
2.10.1/RD	General		P
2.10.1.1/RD	Frequency ..... :		P
2.10.1.2/RD	Pollution degrees ..... :	Pollution degrees II	P
2.10.1.3/RD	Reduced values for functional insulation	According to the requirements of 5.3.4 c/RD)	P
2.10.1.4/RD	Intervening unconnected conductive parts	No unconnected conductive parts	N/A
2.10.1.5/RD	Insulation with varying dimensions		N/A
2.10.1.6/RD	Special separation requirements		N/A
2.10.1.7/RD	Insulation in circuits generating starting pulses		N/A
2.10.2/RD	Determination of working voltage	The rms and the peak voltages were measured for the equipment. The equipment was connected to TN power system (See appended table 5.7)	P
2.10.2.1/RD	General		P
2.10.2.2/RD	RMS working voltage	Max. Vrms=230V	P
2.10.2.3/RD	Peak working voltage	Max. Vpeak=321V	P

2.10.3/RD	Clearances	See below, Annex G/RD was not considered	P
2.10.3.1/RD	General		P
2.10.3.2/RD	Mains transient voltages		P
	a) AC mains supply ..... :		N/A
	b) Earthed d.c. mains supplies ..... :	48VDC	P
	c) Unearthed d.c. mains supplies ..... :		N/A
	d) Battery operation ..... :		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		P
2.10.3.5/ RD	Clearances in circuits having starting pulses		N/A
2.10.3.6/ RD	Transients from a.c. mains supply ..... :		P
2.10.3.7/ RD	Transients from d.c. mains supply ..... :		N/A
2.10.3.8/ RD	Transients from telecommunication networks and cable distribution systems ..... :		N/A
2.10.3.9/ RD	Measurement of transient voltage levels		N/A
	a) Transients from a mains supply		N/A
	For an a.c. mains supply ..... :		N/A
	For a d.c. mains supply ..... :		N/A
	b) Transients from a telecommunication network . :		N/A

2.10.4/RD	Creepage distances	(see appended table 5.7)	P
2.10.4.1/RD	General		P
2.10.4.2/RD	Material group and comparative tracking index		P
	CTI tests ..... :	Material group IIIa and IIIb	--
2.10.4.3/RD	Minimum creepage distances	(see appended table 5.7)	P
2.10.5/RD	Solid insulation	See bleow	P
2.10.5.1/RD	General		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		N/A
2.10.5.4/RD	Semiconductor devices		N/A
2.10.5.5/RD	Cemented joints		N/A
2.10.5.6/RD	Thin sheet material – General		N/A
2.10.5.7/RD	Separable thin sheet material		N/A
	Number of layers (pcs) ..... :		--
2.10.5.8/RD	Non-separable thin sheet material		N/A
2.10.5.9/RD	Thin sheet material – standard test procedure		N/A
	Electric strength test		--
2.10.5.10/RD	Thin sheet material – alternative test procedure		N/A
	Electric strength test		--
2.10.5.11/RD	Insulation in wound components	No wound components provided	N/A

2.10.5.12 /RD	Wire in wound components	No wound components provided	N/A
	Working voltage ..... :		--
	a) Basic insulation not under stress ..... :		N/A
	b) Basic, supplementary, reinforced insulation :		N/A
	c) Compliance with Annex U ..... :		N/A
	Two wires in contact inside wound component; angle between 45 and 90 ..... :		N/A
2.10.5.13 /RD	Wire with solvent-based enamel in wound components		N/A
	Electric strength test		--
	Routine test		N/A
2.10.5.14 /RD	Additional insulation in wound components		N/A
	Working voltage ..... :		--
	- Basic insulation not under stress ..... :		N/A
	- Supplementary, reinforced insulation ..... :		N/A
2.10.6/R D	Construction of printed boards		P
2.10.6.1/ RD	Uncoated printed boards		P
2.10.6.2/ RD	Coated printed boards		N/A
2.10.6.3/ RD	Insulation between conductors on the same inner surface of a printed board		N/A
2.10.6.4/ RD	Insulation between conductors on different layers of a printed board		N/A
	Distance through insulation		N/A
	Number of insulation layers (pcs) ..... :		N/A
2.10.7/R D	Component external terminations		N/A
2.10.8/R D	Tests on coated printed boards and coated components		N/A
2.10.8.1/ RD	Sample preparation and preliminary inspection		N/A
2.10.8.2/ RD	Thermal conditioning		N/A

2.10.8.3/ RD	Electric strength test		--
2.10.8.4/ RD	Abrasion resistance test		N/A
2.10.9/R D	Thermal cycling		N/A
2.10.10/ RD	Test for Pollution Degree 1 environment and insulating compound		N/A
2.10.11/ RD	Tests for semiconductor devices and cemented joints		N/A
2.10.12/ RD	Enclosed and sealed parts		N/A

6	Wiring, connections and supply		P
6.1	General		P
6.1.1	Introduction		P
3.1/RD	General		P
3.1.1/RD	Current rating and overcurrent protection	All internal wires and interconnecting cables possess adequate cross-sectional areas for their intended application and all internal wirings are adequately insulated	P
3.1.2/RD	Protection against mechanical damage	Wires do not touch sharp edges and heatsinks which could damage the insulation and cause hazards	P
3.1.3/RD	Securing of internal wiring	Internal wires are secured reliably by solder-pin, hooking-in, soldering and heat shrinkable tubing so that a loosening of the terminal connection is unlikely.	P
3.1.4/RD	Insulation of conductors	The insulation of the individual conductors is suitable for the application and the working voltage	P
3.1.5/RD	Beads and ceramic insulators	The equipment does not have any beads or similar insulators	N/A
3.1.6/RD	Screws for electrical contact pressure		P
3.1.7/RD	Insulating materials in electrical connections	No contact pressure through insulating material	P
3.1.8/RD	Self-tapping and spaced thread screws		N/A

3.1.9/RD	Termination of conductors	Terminations cannot 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		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		P
3.2.3/RD	Permanently connected equipment		P
	Number of conductors, diameter of cable and conduits (mm) ..... :		--
3.2.4/RD	Appliance inlets		N/A
3.2.5/RD	Power supply cords		N/A
3.2.5.1/RD	AC power supply cords	Connection terminal was used	N/A
	Type ..... :		--
	Rated current (A), cross-sectional area (mm²), AWG ..... :		--
3.2.5.2/RD	DC power supply cords		N/A
3.2.6/RD	Cord anchorages and strain relief		N/A
	Mass of equipment (kg), pull (N) ..... :		--
	Longitudinal displacement (mm) ..... :		--
3.2.7/RD	Protection against mechanical damage		N/A
3.2.8/RD	Cord guards		N/A
	Diameter or minor dimension D (mm); test mass (g) ..... :		--
	Radius of curvature of cord (mm) ..... :		--
6.2.2	Means of connection ..... :		P
	More than one supply connection ..... :		P

6.3	Wiring terminals for external power conductors		P
3.3/RD	Wiring terminals for connection of external conductors	Connection terminal	P
3.3.1/RD	Wiring terminals		P
3.3.2/RD	Connection of non-detachable power supply cords		N/A
3.3.3/RD	Screw terminals		P
3.3.4/RD	Conductor sizes to be connected		P
	Rated current (A), cord/cable type, cross-sectional area (mm2) ..... :		--
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		P

7	Physical requirements		P
7.1	Enclosure	The enclosure is not used to carry current, no any part serves as functional part	P

7.2 4.1/RD	Stability		P
	Angle of 10		P
	Test force (N) ..... :	The floor-standing unit does not tip over when a force of 75N is applied respectively in any direction except upwards and do not overbalance when a downward force of 800N is applied	P

7.3 4.2/RD	Mechanical strength		P
4.2.1/RD	General		P
4.2.2/RD	Steady force test, 10 N	10 N were applied to components. No any hazards	--
4.2.3/RD	Steady force test, 30 N		N/A

4.2.4/RD	Steady force test, 250 N	No hazard. The test is performed at all sides of enclosure	P

4.2.5/RD	Impact test	500g steel ball falls freely from1.3m on back enclosure, no access to hazardous parts.	P
	Fall test		P
	Swing test		P
4.2.6/RD	Drop test; height (mm) ..... :		N/A
4.2.7/RD	Stress relief test		--
4.2.8/RD	Cathode ray tubes		N/A
	Picture tube separately certified ..... :		--
4.2.9/RD	High pressure lamps		N/A
4.2.10/RD	Wall or ceiling mounted equipment; force (N) . :		N/A

7.4		Construction details	P
7.4.1	Introduction		P
4.3.1/RD	Edges and corners	The outer surface of the apparatus is smoothed	P
4.3.2/RD	Handles and manual controls; force (N) ..... :		N/A
4.3.3/RD	Adjustable controls		N/A

4.3.4/RD	Securing of parts	Electrical and mechanical connections can be expected to withstand usual mechanical stress. No loosening or clearance and creepage impairing distances likely to occur	P
4.3.5/RD	Connection by plugs and sockets	input: Terminal provided output: Approved AC socket outlet provided	P
4.3.7/RD	Heating elements in earthed equipment	No heating elements provided	N/A
4.3.11/RD	Containers for liquids or gases		N/A
4.4/RD	Protection against hazardous moving parts	No hazardous moving parts within the equipment	N/A
4.4.1/RD	General		N/A
4.4.2/RD	Protection in operator access areas ..... :		N/A
4.4.3/RD	Protection in restricted access locations ..... :		N/A
4.4.4/RD	Protection in service access areas		N/A
4.5/RD	Thermal requirements		P
4.5.1/RD	General		P
4.5.2/RD	Temperature tests	(see appended table 7.7)	P
	Normal load condition per Annex L ..... :		P
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
7.4.2	Openings	No top and bottom openings. Openings of front on metal chassis: - round holes, each opening is 3.0mm in diameter The opening area is 133mm by 154mm Openings of side on metal chassis: - round holes, each opening is 3.0mm in diameter The opening area is 54mm by 456mm Hazardous parts are not located within 5° vertical projection of openings	P
7.4.3	Gas Concentration		N/A
7.4.4	Equipment movement	75N applied, the unit does not move	P
7.5 4.7/RD	Resistance to fire		P
4.7.1/RD	Reducing the risk of ignition and spread of flame	Method 1	P
	Method 1, selection and application of components wiring and materials	Selection and application of components, wiring and materials which reduce the possibility of ignition and spread of flame by the use of fire enclosure (see appended table 7.5)	P
	Method 2, application of all of simulated fault condition tests		N/A
4.7.2/RD	Conditions for a fire enclosure		P
4.7.2.1/RD	Parts requiring a fire enclosure	A fire enclosure covers all parts	P
4.7.2.2/RD	Parts not requiring a fire enclosure		N/A
4.7.3/RD	Materials		P
4.7.3.1/RD	General	Components and materials have adequate flammability classification. See appended table 1.5.1	P

4.7.3.2/RD	Materials for fire enclosures	Fire enclosure materials is 5VA and metal	P
4.7.3.3/RD	Materials for components and other parts outside fire enclosures		N/A

4.7.3.4/RD	Materials for components and other parts inside fire enclosures	PCB are rated V-0. Other materials inside fire enclosure are minimum V-2 material or better	P
4.7.3.5/RD	Materials for air filter assemblies	No air filters in the equipment	N/A
4.7.3.6/RD	Materials used in high-voltage components	No parts exceeding 4kV	N/A

7.6	Battery location		P
7.6.1	Battery location and installation		N/A
7.6.2	Accessibility and maintainability		N/A
7.6.3	Distance		N/A
7.6.4	Case insulation		N/A
7.6.5	Wiring		N/A
7.6.6	Electrolyte spillage		N/A
7.6.7	Ventilation		N/A
7.6.8	Charging voltage	See fault condition tests	P

7.7	Temperature rise		P
4.5/RD	Thermal requirements		P
4.5.1/RD	General		P
4.5.2/RD	Temperature tests	(see appended table 7.7)	P
	Normal load condition per Annex L ..... :	(see appended table 7.7)	P
4.5.3/RD	Temperature limits for materials	(see appended table 7.7)	P
4.5.4/RD	Touch temperature limits	(see appended table 7.7)	P
4.5.5/RD	Resistance to abnormal heat ..... :	(see appended table 7.4)	P

8	Electrical requirements and simulated abnormal conditions		P
8.1	General provisions for earth leakage		P
5.1.1/RD	General		P
5.1.7/RD	Equipment with touch current exceeding 3,5 mA	Less than 3.5mA	N/A

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		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/A
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
8.3.2	Simulation of faults		P
8.3.3	Conditions for tests		P

9 6/RD	Connection to telecommunication networks		N/A
6.1/RD	Protection of telecommunication network service persons, and users of other equipment connected to the network, from hazards in the equipment		N/A
6.1.1/RD	Protection from hazardous voltages		N/A
6.1.2/RD	Separation of the telecommunication network from earth		N/A
6.1.2.1/RD	Requirements		N/A
	Supply voltage (V) ..... :		--
	Current in the test circuit (mA) ..... :		--

6.1.2.2/RD	Exclusions ..... :		N/A

6.2/RD	Protection of equipment users from overvoltages on telecommunication networks		N/A
6.2.1/RD	Separation requirements		N/A
6.2.2/RD	Electric strength test procedure		N/A
6.2.2.1/RD	Impulse test	(see appended table 9)	N/A
6.2.2.2/RD	Steady-state test	(see appended table 9)	N/A
6.2.2.3/RD	Compliance criteria		N/A

6.3/RD	Protection of the telecommunication wiring system from overheating		N/A
	Max. output current (A) ..... :		--
3.5/RD	Interconnection of equipment		N/A
3.5.1/RD	General requirements		N/A
3.5.2/RD	Types of interconnection circuits ..... :		N/A
3.5.3/RD	ELV circuits as interconnection circuits		N/A
3.5.4/RD	Data ports for additional equipment		N/A
2.1.3/RD	Protection in restricted access locations		N/A
2.3.1/RD	Limits		N/A
	Type of TNV circuits ..... :		--
2.3.2/RD	Separation from other circuits and from accessible parts		N/A
2.3.2.1/RD	General requirements		N/A
2.3.2.2/RD	Protection by basic insulation		N/A
2.3.2.3/RD	Protection by earthing		N/A
2.3.2.4/RD	Protection by other constructions ..... :		N/A
2.3.3/RD	Separation from hazardous voltages		N/A
	Insulation employed ..... :		--
2.3.4/RD	Connection of TNV circuits to other circuits		N/A
	Insulation employed ..... :		
2.3.5/RD	Test for operating voltages generated externally		N/A
2.6.5.8/RD	Reliance on telecommunication network or cable distribution system		N/A

2.10.3.3/ RD	Clearances in primary circuits		N/A
2.10.3.4/ RD	Clearances in secondary circuits		N/A
2.10.4/R D	Creepage distances		N/A
2.10.4.1/ RD	General		N/A
2.10.4.2/ RD	Material group and comparative tracking index		N/A
	CTI tests ..... :		--
2.10.4.3/ RD	Minimum creepage distances		N/A

M/RD	ANNEX M, CRITERIA FOR TELEPHONE RINGING SIGNALS (see 2.3.1/RD)		N/A
M.1/RD	Introduction		N/A
M.2 /RD	Method A		N/A
M.3/RD	Method B		N/A
M.3.1/RD	Ringing signal		N/A
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/A
M.3.2.1/ RD	Conditions for use of a tripping device or a monitoring voltage		--
M.3.2.2/ RD	Tripping device		N/A
M.3.2.3/ RD	Monitoring voltage (V) ..... :		N/A

A/RD	Annex A, Tests for resistance to heat and fire		N/A
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
A.1.1/RD	Samples ..... :		--
	Wall thickness (mm) ..... :		--
A.1.2/RD	Conditioning of samples; temperature (C) ..... :		N/A
A.1.3/RD	Mounting of samples ..... :		N/A
A.1.4/RD	Test flame (see IEC 60695-11-3)		N/A
	Flame A, B, C or D ..... :		--
A.1.5/RD	Test procedure		N/A
A.1.6/RD	Compliance criteria		N/A
	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
A.2.1/RD	Samples, material ..... :		--
	Wall thickness (mm) ..... :		--
A.2.2/RD	Conditioning of samples; temperature (°C) ..... :		N/A
A.2.3/RD	Mounting of samples ..... :		N/A
A.2.4/RD	Test flame (see IEC 60695-11-4)		N/A
	Flame A, B or C ..... :		--
A.2.5/RD	Test procedure		N/A
A.2.6/RD	Compliance criteria		N/A
	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/A
	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
A.3.1/RD	Mounting of samples		N/A

A.3.2/RD	Test procedure		N/A
A.3.3/RD	Compliance criterion		N/A

B/RD	Annex B, Motor tests under abnormal conditions (see 4.7.2.2/RD and 5.3.2/RD)		N/A
B.1/RD	General requirements		N/A
	Position ..... :		N/A
	Manufacturer ..... :		N/A
	Type ..... :		N/A
	Rated values ..... :		N/A
B.2/RD	Test conditions		N/A
B.3/RD	Maximum temperatures		N/A
B.4/RD	Running overload test		N/A
B.5/RD	Locked-rotor overload test		N/A
	Test duration (days) ..... :		N/A
	Electric strength test: test voltage (V) ..... :		N/A
B.6/RD	Running overload test for d.c. motors in secondary circuits		N/A
B.6.1/RD	General		N/A
B.6.2/RD	Test procedure		N/A
B.6.3/RD	Alternative test procedure		N/A
B.6.4/RD	Electric strength test; test voltage (V) ..... :		N/A
B.7/RD	Locked-rotor overload test for d.c. motors in secondary circuits		N/A
B.7.1/RD	General		N/A

B.7.2/RD	Test procedure		N/A
B.7.3/RD	Alternative test procedure		N/A
B.7.4/RD	Electric strength test; test voltage (V) ..... :		N/A
B.8/RD	Test for motors with capacitors		N/A
B.9/RD	Test for three-phase motors		N/A
B.10/RD	Test for series motors		N/A
	Operating voltage (V) ..... :		-N/A

C/RD	Annex C, Transformers (see 1.5.4/RD and 5.3.3/RD)		P
	Position ..... :	Primary to SELV	P
	Manufacturer ..... :	Yueqing Bou New Energy Technology Co., Ltd.	--
	Type ..... :		--
	Rated values ..... :	CLASS F	--
	Method of protection ..... :	By protective circuit	--
C.1/RD	Overload test		P
C.2/RD	Insulation		P
	Protection from displacement of windings ..... :	Secured by tubing and bobbin.	P

D/RD	Annex D, Measuring instruments for touch current tests (see 5.1.4/RD)		P
D.1/RD	Measuring instrument	Figure D.1/RD used	P
D.2/RD	Alternative measuring instrument		N/A

E/RD	Annex E, Temperature rise of a winding (see 1.4.13/RD)	N/A

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/A
G.1/RD	Clearances	N/A
G.1.1/RD	General	N/A
G.1.2/RD	Summary of the procedure for determining minimum clearances	N/A
G.2/RD	Determination of mains transient voltage (V)	N/A
G.2.1/RD	AC mains supply ..... :	N/A
G.2.2/RD	Earthed d.c. mains supplies ..... :	N/A

G.2.3/RD	Unearthed d.c. mains supplies ..... :	N/A
G.2.4/RD	Battery operation ..... :	N/A

G.3/RD	Determination of telecommunication network transient voltage (V) ..... :		N/A
G.4/RD	Determination of required withstand voltage (V)		N/A
G.4.1/RD	Mains transients and internal repetitive peaks :		N/A
G.4.2/RD	Transients from telecommunication networks . :		N/A
G.4.3/RD	Combination of transients		N/A
G.4.4/RD	Transients from cable distribution systems		N/A
G.5/RD	Measurement of transient voltages (V)		N/A
	a) Transients from a mains supply		N/A
	For an a.c. mains supply		N/A
	For a d.c. mains supply		N/A
	b) Transients from a telecommunication network		N/A
G.6/RD	Determination of minimum clearances ..... :		N/A

H	Annex H, Guidance on protection against ingress of water and foreign objects (see IEC 60529)	P

I	Annex I, Backfeed protection test		P
I.1	General		P
I.2	Test for pluggable UPS		N/A
I.3	Test for permanently connected UPS		N/A
I.4	Load-induced change of reference potential		P
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/A

J/RD	Annex J, Table of electrochemical potentials (see 2.6.5.6/RD)		N/A
	Metal(s) used ..... :		--

K/RD	Annex K, Thermal controls (see 1.5.3/RD and 5.3.8/RD)		N/A
K.1/RD	Making and breaking capacity		N/A
K.2 /RD	Thermostat reliability; operating voltage (V) .... :		N/A
K.3/RD	Thermostat endurance test; operating voltage (V) ..... :		N/A

K.4/RD	Temperature limiter endurance; operating voltage (V) ..... :		N/A
K.5/RD	Thermal cut-out reliability		N/A
K.6/RD	Stability of operation		N/A

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		P
L.5	Reference non-linear load		P
L.5.1	Test method		P
L.5.2	Connection of the non-linear reference load		--
M	Annex M, Ventilation of battery compartments		N/A
M.1	General		N/A
M.2	Normal conditions		N/A

M.3	Blocked conditions		N/A
M.4	Overcharge conditions		N/A

N	Annex N, Minimum and maximum cross-sections of copper conductors suitable for connection (see 6.3)		P

U/RD	Annex U, Insulated winding wires for use without interleaved insulation (see 2.10.5.4/RD)		N/A

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	Single-phase TN power system considered and used for the testing.	P

4.5	TABLE: List of critical components				P
Object/part no.	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity
Breaker	Various	Various	250V, 40A	--	CE
Input wire	Various	Various	105℃, 8AWG	--	UL E20489
Relay	Ningbo Forward Relay Co., Ltd	HT90-DC24V-C	250VAC/ 30VDC, 30A	--	TUV
X-capacitor	Shantou High-new Technology Development Zone Songtian Enterprise Co., Ltd.	MPX	AC275V, Max. 2.2uF, X2, 85℃	--	TUV R50136379 0001
Varistor	Shantou High-New Technology Dev. Zone Songtian Enterprise Co., Ltd.	14K471	50A	-	VDE 40023049
Connection terminal (material)	SABIC INNOVATIVE PLASTICS B V	945(GG)	V-0,120 C	--	UL E45329
AC Fan	SUNONWEALTH ELECTRIC MACHINE INDUSTRY CO LTD	DP201A	Input: 24-48VDC, 0.65A	--	UL
Transformer (T1)	Yueqing Bou New Energy Technology Co., Ltd.	Various	Class F	--	Test with appliance
-Primary lead wire	ZHONG SHAN YONG ROI ELECTRIC FACTORY CO LTD	1015	105℃,12AWG	--	UL E204893
-Heat-shrinkable tube	Guangzhou kaiheng K & S co. Ltd	K-2	125℃	--	UL E214175
-Winding	SUNTEN ELECTRIC EQUIPMENT CO LTD PANYU BRANCH	TS MW35-C	200℃	--	UL E210986
-Bobbin	GUANGZHOU BETTER NEW MATERIALS CO LTD	DMD	155℃	--	UL E316816

EN 62040-1

-Varnish	QUALIPOLY CHEMICAL CORP	1032 DOH	130℃	--	UL E213437
-Secondary lead wire	ZHONG SHAN YONG ROI ELECTRIC FACTORY CO LTD	1015	105℃,12AWG	--	UL E204893
-Alternative	SANSHUI CITY HENGDA ELECTRICAL CO LTD	1015	105℃,12AWG	--	UL E229361
-Silicon tube	SHENZHEN WAHCHANGWEI INDUSTRIAL CO LTD	SGS	VW-1,150℃	--	UL E233804
Current fuse (fuse1)	Zhongshan Lanbao Electrical Appliances Co., Ltd.	25 series	25A, 250V	--	VDE
PCB	ZHANGJIAGANG SINCERE ELECTRONIC CO LTD	SEL-01	V-0,130℃	--	UL E338826
Socket outlet	Zhe Jiang Bei Er Jia Electronic Co., Ltd	ST-A02	250V, 25A	--	VDE 40007930
Supplementary information: 1. An asterisk indicates a mark that assures the agreed level of surveillance.					

4.6, 1.6.2/RD		TABLE: Electrical data (in normal conditions)				P
U (V)	I (A)	Irated (A)	P (W)	Fuse #	Ifuse (A)	Condition/status
DC48V	101.6	104	4836	Circuit breaker	101.6	Max. normal load
Supplementary information: The measured consumption at rated supply voltage shall not exceed the marked value by more than 10%.						

5.1.1 and 2.1.1.7/RD	TABLE: discharge of capacitors in the primary circuit		N/A
Condition	calculated(s)	measured (s)	t u 0V (s)	Comments
Note(s):				

5.2.1 and 2.2.2/RD	TABLE: SELV measurement (under normal conditions)			P
Transformer	Location	Voltage (max.) (V)		Voltage Limitation Component
L1	L1 (Pin1-2)	45.4	--	L1
L1	L1 (Pin2-4)	46.5	--	L1
L2	L2 (Pin1-2)	45.6	--	L2
L2	L2 (Pin2-4)	44.7	--	L2
L3	L3 (Pin1-4)	46.3	--	L3
RY1	RY1 output	46.2	--	RY1
RY2	RY2 output	46.5	--	RY2
RY3	RY3 output	45.8	--	RY3
RY4	RY4 output	46.2	--	RY4
Supplementary information:				

5.2.1 and 2.2.3/RD	TABLE: SELV measurement (under fault conditions)	P
Location	Voltage (max.) (V)	Comments
L1 (Pin1-2)	45.3	--

L1 (Pin2-4)	46.5	--
L2 (Pin1-2)	44.2	--
L2 (Pin2-4)	44.7	--
L3 (Pin1-4)	45.4	--
RY1 output	44.3	--
RY2 output	46.8	--
RY3 output	42.5	--
RY4 output	45.0	--
RY5 output	44.5	--

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

5.2.5 and 2.5/RD	TABLE: Limited power source measurement		N/A
	Limits	Measured	Verdict
According to Table 2B/2C (normal condition)			
current (in A)			
apparent power (in VA)			
According to Table 2B/2C (single fault condition)			
current (in A)			
apparent power (in VA)			
Supplementary information: the test conducted on RS 232 port, single fault the power inverter shutdown, RS 232 port shutdown			

5.3.1 and 2.6.3.4/RD	TABLE: Resistance of earthing measurement	P
Location	Resistance measured (m)	Comments

Between I/P earth and far away metal enclosure	26	--
Between I/P earth and O/P earth	47	--
Supplementary information:		

5.5 and 8.3			TABLE: Abnormal operating and fault conditions			P
	Ambient temperature (°C) ..... :			See below		
	Power source for EUT: Manufacturer, model/type, output rating			--		
Component No.	Fault	Supply voltage (V)	Test time	Fuse #	Fuse current (A)	Observation
Fan	Locked	48Vdc	10 min	F1, F2,	102.4	Unit work continuously, No hazards. Max. temperature: not exceed the limited.
Output	OL	48Vdc	4H	F1, F2,	102.5	Unit work continuously, No hazards. Max. temperature: Not exceed the limited
Output	Shorted	48Vdc	1s	Circuit breaker	0	Output Shutdown, output circuit breaker operation, no hazards
Opening	Blocked	48Vdc	10 min	F1, F2	102.4	Unit work continuously, No hazards. Max. temperature: Not exceed the limited
Transforme r output	Shorted	48Vdc	1s	Circuit breaker	0	The input decrease to 0.8A, output is shutdown, recoverable when the fault removed. No hazards
On power board						

EN 62040-1

D1	Shorted	48Vdc	10mins	Circuit breaker	95.7	Normal operation, no any hazards
C14	Shorted	48Vdc	10mins	Circuit breaker	97.4	Normal operation, no any hazards
D8	Shorted	48Vdc	10mins	Circuit breaker	68.9	Normal operation, no any hazards
D9	Shorted	48Vdc	10mins	Circuit breaker	84.3	Normal operation, no any hazards

On inverter board						
U1 (Pin 2-3)	Shorted	48Vdc	10mins	F1, F2	--	No output No hazards
U1 (Pin 2-5)	Shorted	48Vdc	10mins	F1, F2	--	No output, No hazards
U1 (Pin 7-10)	Shorted	48Vdc	10mins	F1, F2	--	No output, No hazards
Q1 (G-D)	Shorted	48Vdc	10mins	F1, F2	--	No output, No hazards
Q1 (G-S)	Shorted	48Vdc	10mins	F1, F2	--	No output, No hazards
Q1 (Pin S-D)	Shorted	48Vdc	10mins	F1, F2	--	No output, no recoverable. No hazards
Supplementary information:						

5.7 and 2.10.4/RD		TABLE: Clearance and creepage distance measurements		P		
Clearance (cl) and creepage distance (cr) at/of/between:	U peak (V)	U r.m.s. (V)	Required cl (mm)	cl (mm)	Required cr (mm)	cr (mm)
L and N of connection terminal	320	235	3.0	6.0	2.5	8.6
L/N and PE of connection terminal	319	235	3.0	6.0	2.5	9.7
Primary live parts and metal enclosure	332	234	3.0	6.0	2.5	12.5
Primary live parts and earthed trace (on power board)	332	233	3.0	6.0	2.5	9.8
Primary live parts and secondary SELV, on trace	461	243	6.0	9.5	5.0	11.4
Transformer primary and secondary	462	245	6.0	9.5	5.0	12.8
Transformer primary and	462	251	6.0	9.5	2.5	11.5

core						
Transformer secondary and core	442	255	6.0	9.5	2.5	12.4
Output live parts and metal enclosure	343	235	6.0	9.5	2.5	11.6
Output live parts and accessible parts	347	235	6.0	9.5	5.0	10.7
Output live parts and SELV circuit	343	233	6.0	9.5	2.5	12.1

5.8, 2.1.1.3/RD and 2.10.5.1/RD		TABLE: Distance through insulation measurements		P	
Distance through insulation (DTI) at/of:	U peak (V)	U r.m.s. (V)	Test voltage (V)	Required DTI (mm)	DTI (mm)
Bobbin of T1	344	240	3000	0.4	2.0
Bobbin of L1, L2	342	240	3000	0.4	1.2
Supplementary information:					

6, 8.2 and 9	TABLE: Electric strength tests, impulse tests and voltage surge tests		P
Test voltage applied between:	Voltage shape (AC, DC, impulse, surge)	Test voltage (V)	Breakdown Yes / No
Primary and secondary SELV circuit	AC	3000	No
Primary and PE	AC	3000	No
Primary and secondary of L1 (on	AC	3000	No

power board)			
Primary and core of L1 (on power board)	AC	3000	No
Secondary and core of L1 (on power board)	AC	3000	No
Primary and secondary of L2 (on power board)	AC	3000	No
Primary and core of L2 (on power board)	AC	3000	No
Secondary and core of L2 (on power board)	AC	3000	No
Primary and secondary of L3 (on power board)	AC	3000	No
Primary and core of L3 (on power board)	AC	3000	No
Secondary and core of L3 (on power board)	AC	3000	No
Transformer T1 primary and secondary	AC	3000	No
Transformer T1 primary and core	AC	3000	No
Transformer T1 secondary core	AC	3000	No
Output and metal enclosure	AC	3000	No
Output and other secondary SELV circuit	AC	3000	No
Supplementary information:			

7.4, 4.5.5/RD	TABLE: Ball pressure test of thermoplastic parts		P
	Allowed impression diameter (mm) ..... :	2 mm	--
Part	Test temperature (°C)		Impression diameter (mm)
Bobbin of transformer T1	125		0.83
Bobbin of L1, L2 and L3	125		0.95
Material of connection terminal	125		0.99
PCB	125		0.69
Supplementary information:			

EN 62040-1

7.4.2,	Table: Enclosure opening measurements	P
Location	Size (mm)	Comments
Front metal enclosure	3	Opening area is 133mm by 154mm
Side metal enclosure	3	Opening area is 54mm by 456mm
Supplementary information:		

7.5		Table: Resistance to fire		P	
Part	Manufacturer of material	Type of material	Thickness (mm)	Flammability class	Evidence
Metal enclosure	Various	Various	Min. 1.0	--	--
PCB	Various	Various	Min. 1.5mm	V-0	--
Display plastic	GUANGZHOU GANGYANGDA PLASTICS CO LTD	PC-B110F-CB2950	Min. 0.8mm	5VA	--
Display plastic	SHANGHAI 5ELEM MATERIAL SCIENTIFIC CO LTD	A370F(a)	Min. 0.8mm	5VA	--
Supplementary information:					

7.7	TABLE: Temperature test			P
	Supply voltage (V) ..... :	24VDC	230V/ 50Hz	
	Ambient T_{min} (C) ..... :	25.6	25.1	
	Ambient T_{max} (C) ..... :	26.1	25.8	
Maximum measured temperature T of part/at::		T (C)		Allowed T_{max} (C)
Input wire		77.2		105
Fan		84.7		90
Breaker (inside)		77.0		85
Breaker (outside)		64.1		85
T1 primary coil		89.2		130
T1 secondary coil		86.6		130
Enclosure outside near T1		55.4		80
L1 coil		73.5		130
L1 bobbin		68.2	75.2	130

PCB near U1	65.4		130

Temperature T of winding:	t_1 (°C)	R_1 ( )	t_2 (°C)	R_2 ( )	T (°C)	Allowed T_{max} (°C)	Insulation class
Supplementary information: Temperature test of transformer winding is determined by thermocouples, the limited values are reduced by 10°C							

8.1 TABLE: earth leakage current				P
Condition	L terminal A (mA)	N terminal A (mA)	Limit (mA)	Comments
Input L/N and metal enclosure	0.743	0.43	3.5	Switch “E” opened
Output L/N and metal enclosure	0.43	0.43	3.5	Switch “E” opened
Input L/N and panel (with metal foil)	0.01	0.01	0.25	Switch “E” closed
Output L/N and panel (with metal foil)	0.01	0.01	0.25	Switch “E” closed
Output L/N and metal enclosure (supplied by battery)	0.12	0.12	3.5	Switch “E” opened
Output L/N and panel with metal foil (supplied by battery)	0.01	0.01	0.25	Switch “E” closed
Supplementary information:				

C.2/RD Safety isolation transformer		P
Construction details:		
Transformer part name: T1		
Manufacturer: See appended table 4.3		
Type: See appended table 4.3		
Recurring peak voltage	420Vpk	
Required clearance for reinforced	4.0mm	
insulation (from table 2H and 2J)	Yes	
Effective voltage rms	230Vrms	
Required creepage distance for reinforced	5.0mm	
insulation (from table 2N)	Yes	

EN 62040-1

Measured min. creepage distance		
Location	inside (mm)	outside (mm)
Primary and secondary	11.2	11.2
Primary and core	11.2	11.2
Secondary and core	11.2	11.2
Measured min. clearances		
Location	inside (mm)	outside (mm)
Primary and secondary	11.2	11.2
Primary and core	11.2	11.2
Secondary and core	11.2	11.2
Construction:		
Pin numbers		
Prim.	Pin 1-4	
Sec.	Pin 5-9	
Bobbin		
Material	PHENOLIC	
Thickness	2.0mm	
Electric strength test		
With AC 3000V after humidity treatment		
Result	Pass	

M	Ventilation of battery compartments	N/A
	The required dimension for the ventilation openings will be calculated with the following formula:	
	A > K1 * Q	
	with Q = (0.054 m³/Ah) * n * I * C	

	where: K1 : constant factor of 28 h * cm²/m³ Q : airflow in m³/h n : number of battery cells I : constant factor (0,2A/100Ah for valve regulated lead acid batteries) C : nominal capacity of the battery	
	With the specific data for the UPS the following dimension for the ventilation openings is required:	
	n : ? C : ?	
	A > 28 h * cm²/m³ * (0.054 m³/Ah) * n * 0.2 A/100 Ah * C	
	A > ? cm²	
	Verdict	
	The size of ventilation openings in battery cabinet exceeds the required airflow by far (as well as the UPS).	

Attachment – A
Photo Documentation

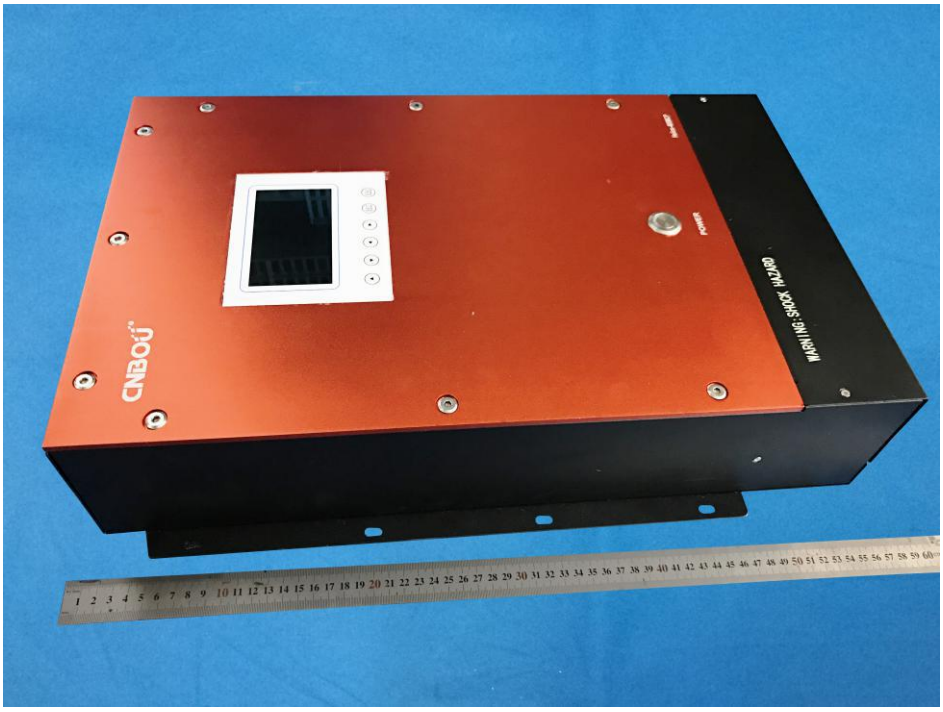
Photo 1 View: [√] Front [ ] Rear [ ] Right side [ ] Left side [ ] Top [ ] Bottom [ ] Internal	

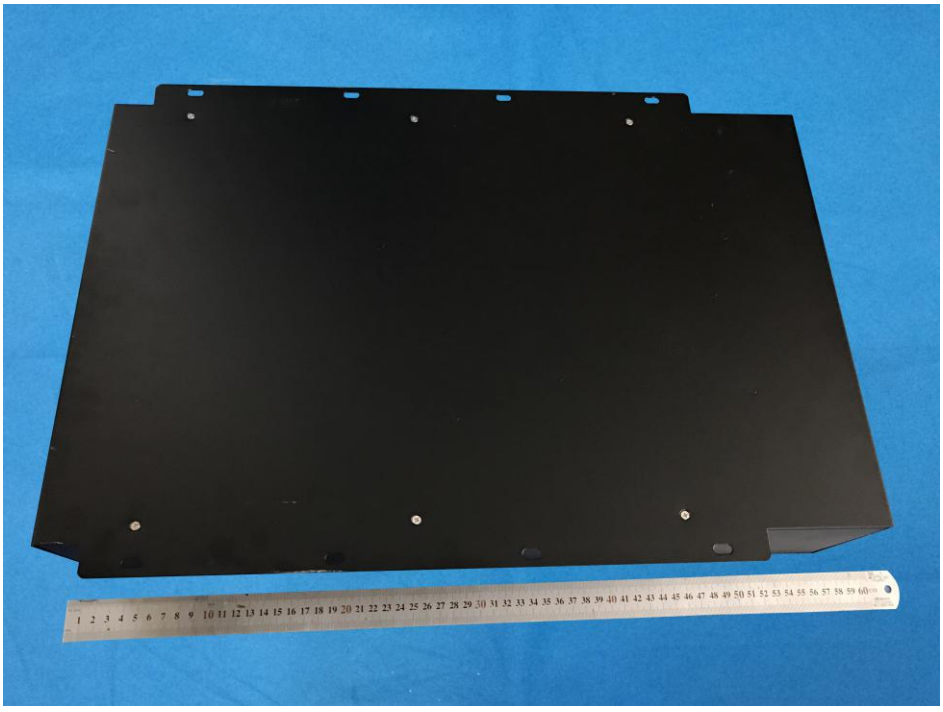
Photo 2 View: [ ] Front [√] Rear [ ] Right side [ ] Left side [ ] Top [ ] Bottom [ ] Internal	

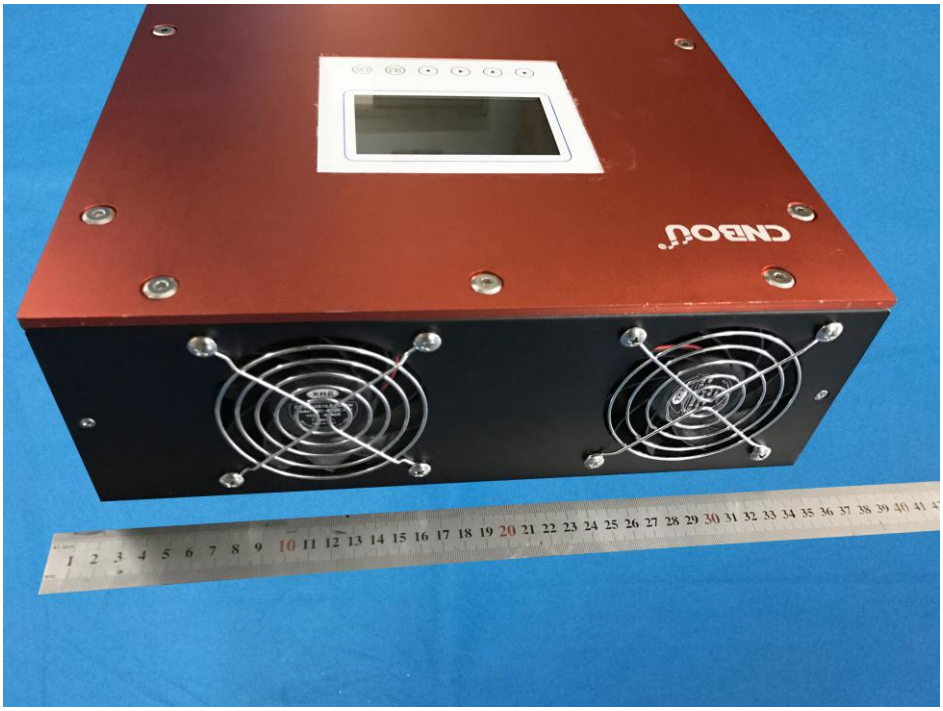
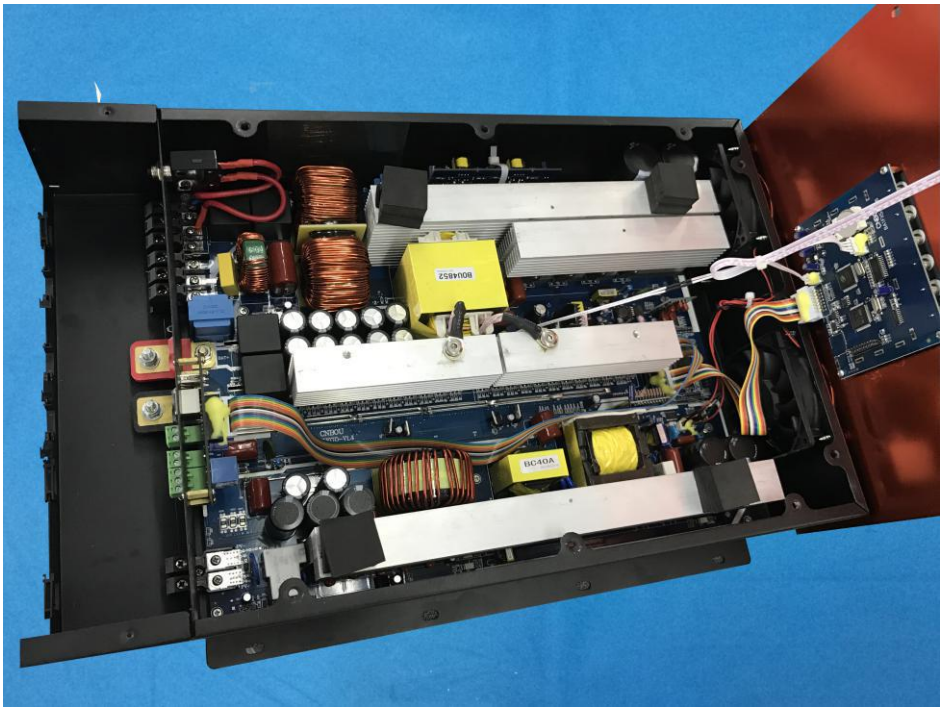
Photo 3 View: [ ] Front [ ] Rear [ ] Right side [ ] Left side [√] Top [ ] Bottom [ ] Internal	

Photo 4 View: [ ] Front [ ] Rear [ ] Right side [ ] Left side [ ] Top [ ] Bottom [√] Internal	

---END.---