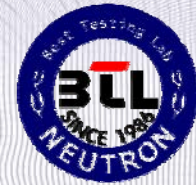


# CE

## CERTIFICATE OF COMPLIANCE



Ref No.: [NEI-LVD-1-S1005042](#)

Date of Issue: [June 7, 2010](#)

The product listed in follows is conformity with Low Voltage Directive 2006/95/EC in order to comply with the requirements in the Council Directive 2006/95/EC relating to electrical equipment designed for use within certain voltage limits.

<b>Equipment</b>	<b>Uninterruptible Power Supply (UPS)</b>
<b>Model No.</b>	<b>SP3600, SP3600-UW, SP3600-SW, SP1200, SP1200-UW, SP1200-SW, SP2400, SP2400-UW, SP2400-SW, SP5000, SP5000-UW, SP5000-SW, SP6000, SP6000-UW, SP6000-SW, SP8000, SP8000-UW, SP8000-SW</b>
<b>Trade Name</b>	<b>OPTI-UPS, OPTI-Solar</b>
<b>Applicant</b>	<b>OPTI INTERNATIONAL CORPORATION</b>
<b>Address</b>	<b>7F, No. 192, Lien Chen Rd., Chung Ho City, Taipei County, Taiwan 235.</b>

For the safety evaluation of the compliance with this Directive 2006/95/EC, the following standard were applied:

[IEC 62040-1-1:2002](#)

[EN 62040-1-1:2003](#)

The test data, data evaluation and equipment configuration contained in our test report (Ref No.: [NEI-LVD-1-S1005042](#)) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TÜV and TAF according to the ISO-17025 quality assessment standard and technical standard(s). The test data contained in the referenced test report relate only to the EUT sample and item(s) tested.

Jackie Chiu  
Authorized Signatory

### Neutron Engineering Inc.

B1, No. 37, Lane 365, YangGuang St., NeiHu District 114., Taipei, Taiwan.

TEL : +886-2-26573299 FAX : +886-2-26573331





## EU Declaration of Conformity

Product : Uninterruptible Power Supply (UPS)  
Type Designation : SP3600, SP3600-UW, SP3600-SW, SP1200,  
SP1200-UW, SP1200-SW, SP2400, SP2400-UW,  
SP2400-SW, SP5000, SP5000-UW, SP5000-SW,  
SP6000, SP6000-UW, SP6000-SW, SP8000,  
SP8000-UW, SP8000-SW  
Manufacturer : OPTI INTERNATIONAL CORPORATION  
Manufacturer Address : 7F, No. 192, Lien Chen Rd., Chung Ho City, Taipei  
County, Taiwan 235.

The product above is conformity with Low Voltage Directive 2006/95/EC in order to comply with the requirements in the Council Directive 2006/95/EC relating to electrical equipment designed for use within certain voltage limits.

For the safety evaluation of the compliance with this Directive 2006/95/EC, the following standard were applied:

IEC 62040-1-1:2002

EN 62040-1-1:2003

The following manufacturer / within Europe is responsible for this declaration:

Company Name: \_\_\_\_\_

Company Address: \_\_\_\_\_

Name: \_\_\_\_\_

Position: \_\_\_\_\_

Legal Signature: \_\_\_\_\_

Place: \_\_\_\_\_

Date: \_\_\_\_\_



# NEUTRON ENGINEERING INC.

## TEST REPORT

EN 62040-1-1

### Uninterruptible power systems (UPS) –

### Part 1-1: General and safety requirements for UPS used in operator access areas

Report Reference No. ....: NEI-LVD-1-S1005042

Tested by (+ signature) .....: Andrew Lin

*Andrew Lin*

Approved by (+ signature).....: Fred Chiu

*Fred Chiu*

Date of issue.....: Jun 7, 2010

Contents .....: 37 pages

#### Testing laboratory

Name .....: **Neutron Engineering Inc.**

Address .....: B1, No.37, Lane 365, YangGuang St., NeiHu District 114, Taipei, Taiwan.

#### Applicant

Name .....: **OPTI INTERNATIONAL CORPORATION**

Address .....: 7F, No. 192, Lien Chen Rd., Chung Ho City, Taipei County, Taiwan 235.

#### Manufacturer

Name .....: **OPTI INTERNATIONAL CORPORATION**

Address .....: 7F, No. 192, Lien Chen Rd., Chung Ho City, Taipei County, Taiwan 235.

#### Test specification

Standard .....: IEC 62040-1-1:2002

EN 62040-1-1:2003

Test procedure .....: Service of CE Marking in LVD

Non-standard test method.....: N/A

#### Test Report Form/blank test report

Test Report Form No.....: IEC62040\_1\_1A

Master TRF.....: Dated 2003-03

#### Testing

Date of receipt of test item. ....: May. 2010

Date(s) of performance of test.....: May. 2010

#### Test item

Description.....: Uninterruptible Power Supply (UPS)

Trademark .....: OPTI-UPS, OPTI-Solar

Model and/or type reference .....: SP3600, SP3600-UW, SP3600-SW, SP1200, SP1200-UW, SP1200-SW, SP2400, SP2400-UW, SP2400-SW, SP5000, SP5000-UW, SP5000-SW, SP6000, SP6000-UW, SP6000-SW, SP8000, SP8000-UW, SP8000-SW



# NEUTRON ENGINEERING INC.

Page 2 of 37

Rating(s).....: i/p: 220-240Vac, 50/60Hz, 1 $\Phi$ . o/p: 220-240Vac, 50/60Hz, 1 $\Phi$ , 3600VA, 2400W
--



# NEUTRON ENGINEERING INC.

**Test item particulars**

Equipment mobility ..... : stationary  
 Connection to the mains..... : permanently connected  
 Operating condition ..... : Continuous  
 Mains supply tolerance (%) or absolute mains +10, -10  
 supply values ..... :  
 Tested for IT power systems ..... : N.A.  
 IT testing, phase-phase voltage (V) ..... : N.A.  
 Class of equipment..... : Class I  
 Protection against ingress of water ..... : IPX0  
 Mass of equipment (kg)..... : Approx. 25 kg

**Test case verdicts**

Test case does not apply to the test object..... : N/A  
 Test item does meet the requirement ..... : P(ass)  
 Test item does not meet the requirement ..... : F(ail)  
 Test case has not been checked ..... : —

**General remarks**

This test report shall not be reproduced except in full without the written approval of the testing laboratory.  
 The test results presented in this report relate only to the item tested.  
 "(see appended table)" refers to a table appended to the report.  
 Throughout this report a comma is used as the decimal separator.  
 Standard IEC 62040-1-1:2002 is to be used in conjunction with IEC 60950-1:2001, which is referred to in this TRF by "RD".



# NEUTRON ENGINEERING INC.

Page 4 of 37

## General product information:

- The equipment models SP3600, SP3600-UW, SP3600-SW, SP1200, SP1200-UW, SP1200-SW, SP2400, SP2400-UW, SP2400-SW, SP5000, SP5000-UW, SP5000-SW, SP6000, SP6000-UW, SP6000-SW, SP8000, SP8000-UW and SP8000-SW are on-line type uninterruptible power supply with sine wave o/p for general supply of office equipment.
- The UPS is designed as primary type, therefore, creepage distances and clearances of this UPS from input, output, battery, charger circuit and control circuits to the sub-D connector of the PC interface is dimensioned for reinforced insulation by suitable distance through insulation, clearances and creepage distances.
- The microprocessor controls several functions, the inverter output and charger protection.
- The enclosure is made of metal parts with thermoplastic touch control front panel that is fixed to the front metal chassis by screws and snap-fits. The UPS can be controlled by touch buttons that are located on the front control panel.
- Specified maximum ambient temperature is 40°C.
- The test samples were pre-production samples without serial numbers.
- All models are identical except for model designation for marketing purpose.
- Unless otherwise specified, all tests were performed on model SP3600 to represent the other similar models.
  
- The transfer voltage are:
  - Battery mode if i/p voltage less than 175V±5V or exceeding 295V±5V with more 90% full load.
  - Boost mode if i/p voltage less than 200V±5V
  - Buck mode if i/p voltage exceeding 270V±5V
- The external battery packs of UPS provided by manufacturer and replance by service personal only. For battery source see appended table 4.3.

## Additional information:

- This report is deem to reissue from S0804028A, issued 2008-10-01 and due to below items:
  - A. Add new models SP3600-UW, SP3600-SW, SP1200-UW, SP1200-SW, SP2400-UW, SP2400-SW, SP5000-UW, SP5000-SW, SP6000-UW, SP6000-SW, SP8000-UW and SP8000-SW
  - B. Add new trademark OPTI-Solar



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict
4	GENERAL CONDITIONS FOR TESTS		P
4.3	Components		P
1.5.1/RD	General	See below.	P
	Comply with IEC 60950-1 or relevant component standard	Components, which were found to affect safety aspects, comply with the requirements of this standard or with the safety aspects of the relevant IEC component standards (see appended table 4.3).	P
1.5.2/RD	Evaluation and testing of components	Components, which are certified to IEC and/or national standards, are applied correctly within their ratings. Components not covered by IEC standards are tested under the conditions present in the equipment.	P
1.5.4/RD	Transformers	Transformers used are suitable for their intended application and comply with the relevant requirements of the standard and particularly Annex C.	P
1.5.5/RD	Interconnecting cables	Connecting cables between main unit and battery banks are provided.	P
1.5.6/RD	Capacitors in primary circuits .....	Between lines: X2 capacitor according to IEC 60384-14:1993 with 21 days damp heat test was used.  Between line/neutral and PE: Y2 or Y1 capacitors according to IEC 60384-14:1993.	P
1.5.7/RD	Double insulation or reinforced insulation bridged by components	No bridging components used.	N/A
1.5.7.1/RD	General		N/A
1.5.7.2/RD	Bridging capacitors		N/A
1.5.7.3/RD	Bridging resistors		N/A
1.5.7.4/RD	Accessible parts		N/A
1.5.8/RD	Components in equipment for IT power systems	TN power systems only.	P
4.4	Power interface		P
1.6.1/RD	AC power distribution systems	TN power system only.	P



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict

1.6.2/RD	Input current	Highest normal load for this equipment is the charging of empty battery and operation with the maximum specified output load (see appended table 4.4)	P
4.4 1.6.4/RD	Neutral conductor	Neutral is clearly identified in the equipment. However, basic insulation is kept between earthed parts and L/N conductors.  Output neutral is not isolated from the input neutral.	P

4.5	Marking and instructions		P
4.5.1	General		P
4.5.2	Power rating	See below	P
	Input rated voltage/range (V).....:	AC220-240V	P
	Input rated current/range (A).....:	Not shown	N/A
	Input symbol for nature of supply (d.c.) .....	AC supply.	N/A
	Input rated frequency/range (Hz) .....	50/60Hz	P
	Output rated voltage/range (V) .....	AC220-240V	P
	Output rated current/range (A) .....	20A	P
	Number of output phases (1 $\phi$ - 3 $\phi$ ) with/without neutral.....:	1 $\phi$	P
	Output rated active power (W) .....	2400 W	P
	Output rated apparent power (VA) .....	3600 VA	P
	Output symbol for nature of supply (d.c.) .....	AC output.	N/A
	Rated frequency or rated frequency range (Hz):	50/60Hz	P
	Max. ambient operating temperature range (°C):		N/A
	Manufacturer's name or trademark or identification mark .....	OPTI-UPS, OPTI-Solar	P
	Type/model or type reference .....	SP3600, SP3600-UW, SP3600-SW, SP1200, SP1200-UW, SP1200-SW, SP2400, SP2400-UW, SP2400-SW, SP5000, SP5000-UW, SP5000-SW, SP6000, SP6000-UW, SP6000-SW, SP8000, SP8000-UW and SP8000-SW	P
	Symbol for Class II equipment only .....		N/A
	Other symbols .....		N/A



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict
	Certification marks .....	See copy of marking plate	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 unit.	N/A
4.5.3	Safety instructions	See below.	P
	Guidance for installation for operator and service person .....	"Instruction Manual" with directions regarding the maximum ambient temperature, electrical ratings, operation, description of interfaces, connection to the mains plus a note that the overall leakage current shall not exceed 3.5 mA.	P
	Warning label with text "Isolate uninterruptible power supply (UPS) before working on this circuit"	Text not required for this pluggable type unit.	N/A
4.5.4	Main voltage adjustment .....	No adjustment necessary.	N/A
1.7.4/RD	Supply voltage adjustment .....	No voltage adjustment.	N/A
	Methods and means of adjustment; reference to installation instructions .....	No voltage adjustment.	N/A
4.5.5 1.7.5/RD	Power outlets.....	The maximum apparent and active power of the standard outlets is indicated on the rating plate.	P
4.5.6 1.7.6/RD	Fuse identification (marking, special fusing characteristics, cross-reference) .....	Marking on the circuit breaker: 20A, 250VAC	P
4.5.7 1.7.7/RD	Wiring terminals		N/A
1.7.7.1/RD	Protective earthing and bonding terminals .....		N/A
1.7.7.2/RD	Terminal for a.c. mains supply conductors .....		N/A
1.7.7.3/RD	Terminals for d.c. mains supply conductors .....	AC mains supply.	N/A
4.5.8	Battery terminals .....	"+" and "-" are used for connection with right polarity.	P
4.5.9 1.7.8/RD	Controls and indicators	See below.	P
1.7.8.1/RD	Identification, location and marking .....	LEDs provided to indicate status of UPS, located on the front panel.	P
1.7.8.2/RD	Colours .....	See above. Colors are acceptable as only used for information (safety not impaired even if disregarded).	N/A



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict
1.7.8.3/RD	Symbols according to IEC 60417 .....	⊕, Ⓞ symbols used.	P
1.7.8.4/RD	Markings using figures .....	Not used.	N/A
4.5.10 1.7.9/RD	Isolation of multiple power sources .....	Single power source.	N/A
4.5.11	IT power systems	TN power system.	N/A
1.7.10/RD	IT power distribution systems	Not used.	N/A
4.5.12	Protection in building installations	Installation instruction requires protection devices against earth faults to be installed in the building installation circuit.	P
4.5.13 5.1/RD	High leakage current (mA) .....	Leakage current of the equipment does not exceed 3.5 mA.  However due to the connected load has influence on the overall earth leakage current a corresponding statement was provided in the "Instruction Manual".	N/A
4.5.14 1.7.11/RD	Thermostats and other regulating devices		N/A
4.5.15 1.7.12/RD	Language(s) .....	English "Instruction Manual" provided.	—
4.5.16 1.7.13/RD	Durability of markings	The labels were subjected to the permanence of marking test. The label was rubbed with cloth soaked with water for 15s and then again for 15s with the cloth soaked with petroleum spirit.  After this test there was no damage to the label. The marking on the label did not fade. There was neither curling nor lifting of the label edge.	P
4.5.17 1.7.14/RD	Removable parts	No required markings placed on removable parts.	P
4.5.18 1.7.15/RD	Replaceable batteries	Operator didn't replaceable battery except for service personal. Detailed instructions provided in the "Instruction Manual".	P
	Language(s) .....	English	—
4.5.19	Operator access with a tool.....	Operator is not instructed to	N/A



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict

1.7.16/RD		use a tool in order to gain access to operator access areas.	
4.5.20	Battery	Pluggable equipment type B UPS with integral batteries.	P
	Clearly legible information .....	Warning label containing below described information placed closed batteries in UPS. Information clearly legible.	P
	Battery type .....	Refer to the copy of the warning marking plates.	P
	Nominal voltage of total battery (V) .....	Refer to the copy of the warning marking plates.	P
	Nominal capacity of total battery (optional) .....	Refer to the copy of the warning marking plates.	P
	Warning label .....	Warning label with information closed internal batteries: <ul style="list-style-type: none"> <li>• Chemical hazard</li> <li>• Risk of electric shock and energy hazard</li> </ul> Reference for maintenance and disposal to user's manual Access by service personnel only.	P
	Instructions .....	Instructions provided in "Instruction Manual".	P
4.5.21	Installation instructions	Detailed information regarding external interfaces (RS232) in the "Instruction Manual".	P

5	FUNDAMENTAL DESIGN REQUIREMENTS		P
5.1	Protection against electric shock and energy hazards		P
2.1.1.2/RD	Battery compartments .....	Battery not operator accessible.	N/A
2.1.1.4/RD	Access to hazardous voltage circuit wiring	Insulation of internal wiring not operator accessible.	N/A
2.1.1.5/RD	Energy hazards .....	No energy hazard at operator accessible SELV interface (RS232 port).	P
2.1.1.6/RD	Manual controls	No conductive controls or alike provided.	P



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict

5.1.1	Operator access	See below.	P
	category a)	Operator access to SELV circuits only.	P
	category b)	No operator access to any of the listed circuits and parts.	P
5.1.2 2.1.1.3/RD	Access to ELV wiring	No ELV wiring in operator accessible area.	N/A
	Working voltage ( $V_{peak}$ or $V_{rms}$ ); minimum distance (mm) through insulation		—
5.1.3	Discharge of capacitors in the primary circuit	Less than 0.1 $\mu F$ .	N/A
2.1.1.7/RD	Discharge of capacitors in equipment		N/A
	Time-constant (s); measured voltage (V).....:		—
5.1.4	Backfeed protection	See below.	—
	Description of the construction .....	Complied.	P
5.1.5	Emergency switching device	No emergency switching device for the load required.	N/A

5.2	Insulation		P
2.2.3.1/RD	Separation by double insulation or reinforced insulation (method 1)	SELV circuits separated according to method 1. For details see appended tables 5.2.	P
2.2.3.2/RD	Separation by earthed screen (method 2)	Same as above.	N/A
2.2.3.3/RD	Protection by earthing of the SELV circuit (method 3)	Same as above.	N/A

5.3	Limited current circuits		N/A
2.4.1/RD	General requirements		N/A
2.4.2/RD	Limit values		N/A
	Frequency (Hz).....:		—
	Measured current (mA) .....		—
	Measured voltage (V) .....		—
	Measured capacitance ( $\mu F$ ) .....		—
2.4.3/RD	Connection of limited current circuits to other circuits		N/A

5.4	Provisions for protective earthing		P
2.6/RD	Provisions for earthing and bonding	See below.	P
5.4.1 2.6.1/RD	Protective earthing	Reliable connection of relevant conductive parts to	P



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict

		the PE terminal via green/yellow insulated wires.	
5.4.1 2.10/RD	Clearances, creepage distances and distances through insulation	See appended tables 5.1.2, 5.8 and 9.	P
5.4.1 4.2.3/RD	Steady force test, 30 N	See appended tables 5.1.2, 5.8 and 9.	P
5.4.1 5.3/RD	Abnormal operating and fault conditions	See appended table 8.3.	P
5.4.2	Bonding		N/A

5.5	AC and d.c. power isolation		P
2.6.2/RD	Functional earthing	See below.	P
2.6.3/RD	Protective earthing and protective bonding conductors	See subclause 2.6.3.3/RD.	P
2.6.3.1/RD	General	Not provided.	N/A
2.6.3.2/RD	Size of protective earthing conductors		N/A
	Rated current (A), cross-sectional area (mm <sup>2</sup> ), AWG .....		—
2.6.3.3/RD	Size of protective bonding conductors	See below.	P
	Rated current (A), cross-sectional area (mm <sup>2</sup> ), AWG .....	20A, 12 AWG or 2.5mm <sup>2</sup>	—
2.6.3.4/RD	Resistance (Ω) of earthing conductors and their terminations, test current (A) .....	See appended table 5.4.	P
2.6.3.5/RD	Colour of insulation .....	Green/yellow wire from terminal block to metal chassis.	P
2.6.4/RD	Terminals		N/A
2.6.4.1/RD	General		N/A
2.6.4.2/RD	Protective earthing and bonding terminals		N/A
	Rated current (A), type and nominal thread diameter (mm) .....		—
2.6.4.3/RD	Separation of the protective earthing conductor from protective bonding conductors	Both protective bonding conductors use separate terminals (bolts).	N/A
2.6.5/RD	Integrity of protective earthing	See below.	P
2.6.5.1/RD	Interconnection of equipment	This unit has it's own earthing connection. PE terminals of terminal block reliably connected to metal chassis. PE terminal of unit connector to metal chassis.	P
2.6.5.2/RD	Components in protective earthing conductors	No switch or overcurrent	P



# NEUTRON ENGINEERING INC.

Page 12 of 37

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict
	and protective bonding conductors	protective device in protective bonding conductors.	
2.6.5.3/RD	Disconnection of protective earth		N/A
2.6.5.4/RD	Parts that can be removed by an operator		N/A
2.6.5.5/RD	Parts removed during servicing	It is not necessary to disconnect earthing except for the removal of the earthed part itself.	P
2.6.5.6/RD	Corrosion resistance	All safety earthing connections in compliance with Annex J.	P
2.6.5.7/RD	Screws for protective bonding	No self tapping screws are used.	P
2.6.5.8/RD	Reliance on telecommunication network or cable distribution system	Not intend to connected with telecommunication network or cable distribution system for the integrity of protective earthing.	N/A
5.5.1	Disconnect devices		N/A
5.5.2	Three-phase equipment	EUT is single-phase equipment.	N/A
	Interrupting neutral and phase conductors		N/A
5.5.3	Switch as a disconnect device	See subclause 5.5.1.	N/A
1.7.8/RD	Controls and indicators		N/A
1.7.8.1/RD	Identification, location and marking .....		N/A
1.7.8.2/RD	Colours .....		N/A
1.7.8.3/RD	Symbols according to IEC 60417 .....		N/A
1.7.8.4/RD	Markings using figures .....		N/A
5.5.4	Multiple power sources	Receives power form the AC mains and - in case of AC mains failure - from the built-in batteries. No marking required.	N/A
5.5.5	Ungrounded conductors	Ungrounded battery, the external battery DC supply of the UPS can be disconnected by the quick connectors of the battery in both poles.	P
5.6	Overcurrent and earth fault protection		P
2.7.3/RD	Short-circuit backup protection	Building installation is considered as providing short-circuit backup	P



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict

		protection.	
2.7.4/RD	Number and location of protective devices .....	Over current protection by one built-in circuit-breaker. Protection devices in the building installation considered to provide sufficient protection against earth faults.	P
2.7.5/RD	Protection by several devices	Only one protection device provided.	N/A
2.7.6/RD	Warning to service personnel.....:	No double-pole fusing inside this UPS.	N/A
5.6.1	Basic requirements	Equipment relies on 20 A rated circuit breaker of the wall protection of the building installation in regard to L to N short-circuit. Over current protection is provided by the built-in circuit-breaker.	P
5.6.2	Battery circuit protection	Protection against overcurrent by one fuse in the plus pole of the battery supply circuit. Battery separated from primary circuits by reinforced insulation. However earth faults will be covered by devices in the building installation.	P
5.6.3	Location of protective device	The charger circuit is located in front of the fuse. For the charger circuit there are no hazardous conditions under any simulated fault conditions (see appended table 8.3).	P
5.6.4	Rating of protective device	See below.	P
5.3.1/RD	Protection against overload and abnormal operation	(see appended table 8.3)	P

5.7	Protection of personnel – Safety interlocks		P
5.7.1	Operator protection	No safety interlocks provided for operator protection since there are no liable hazards capable of harming the operator during operation.	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



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict

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
5.7.2	Service person protection	No adjustments or measurements inside the equipment are necessary while the unit is energized. For battery(ies) see subclause 5.7.2.7 below.	P
5.7.2.1	Covers		N/A
5.7.2.2	Location and guarding of parts		N/A
5.7.2.3	Parts on doors		N/A
5.7.2.4	Component access		N/A
2.8.3/RD	Inadvertent reactivation		N/A
5.7.2.5	Moving parts		N/A
5.7.2.6	Capacitor banks	No capacitor banks	N/A
5.7.2.7	Internal batteries	Risk of short-circuiting minimized by design of used battery source and corresponding terminals and wiring methods used.	P

5.8 2.10/RD	Clearances, creepage distances and distances through insulation		<b>P</b>
2.10.1/RD	General	See 2.10.3/RD, 2.10.4/RD and 2.10.5/RD.	P
2.10.2/RD	Determination of working voltage	Unit was connected to a 240V TN power system . See appended table 5.8.	P
2.10.3/RD	Clearances	See below, Annex G was not considered.	P
2.10.3.1/RD	General	Annex F/RD and minimum clearances considered.	P



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict
2.10.3.2/RD	Clearances in primary circuits	See appended table 5.8 and 9.	P
2.10.3.3/RD	Clearances in secondary circuits	Subclause 5.3.4/RD considered.	N/A
2.10.3.4/RD	Measurement of transient voltage levels	Normal transient voltage considered (overvoltage category II for primary circuit) and stated in installation manual.	N/A
2.10.4/RD	Creepage distances	See appended table 5.8 and 9.	P
	CTI tests .....	CTI rating for all materials of min. 100.	—
2.10.5/RD	Solid insulation	Insulation provided in safety isolation transformers	P
2.10.5.1/RD	Minimum distance through insulation		N/A
2.10.5.2/RD	Thin sheet material		N/A
	Number of layers (pcs) .....		—
	Electric strength test		—
2.10.5.3/RD	Printed boards	Not applied for.	N/A
	Distance through insulation		N/A
	Electric strength test for thin sheet insulating material		—
	Number of layers (pcs) .....		N/A
2.10.5.4/RD	Wound components		N/A
	Number of layers (pcs) .....		N/A
	Two wires in contact inside wound component; angle between 45° and 90° .....		N/A
2.10.6/RD	Coated printed boards	No coated printed boards.	N/A
2.10.6.1/RD	General		N/A
2.10.6.2/RD	Sample preparation and preliminary inspection		N/A
2.10.6.3/RD	Thermal cycling		N/A
2.10.6.4/RD	Thermal ageing (°C) .....		N/A
2.10.6.5/RD	Electric strength test		—
2.10.6.6/RD	Abrasion resistance test		N/A
	Electric strength test		—
2.10.7/RD	Enclosed and sealed parts .....	No hermetically sealed component.	N/A
	Temperature $T_1 = T_2 + T_{ma} - T_{amb} + 10K$ (°C) .....		N/A



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict

2.10.8/RD	Spacings filled by insulating compound .....		N/A
	Electric strength test	Electric strength test was performed during the component approval.	—
2.10.9/RD	Component external terminations	See appended table 5.8 and 9.	P
2.10.10/RD	Insulation with varying dimensions	No reduction of distances considered.	N/A

5.9	External signalling circuits		N/A
2.3/RD	TNV circuits		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
	Insulation employed .....		—
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

5.10 2.5/RD	Limited power sources		N/A
	Inherently limited output		N/A
	Impedance limited output		N/A
	Overcurrent protective device limited output		N/A
	Regulating network limited output under normal operating and single fault condition		N/A
	Regulating network limited output under normal operating conditions and overcurrent protective device limited output under single fault condition		N/A
	Output voltage (V), output current (A), apparent power (VA)..... :		—
	Current rating of overcurrent protective device (A) .....		—

6	WIRING, CONNECTIONS AND SUPPLY		P
6.1 3.1/RD	General		P



# NEUTRON ENGINEERING INC.

Page 17 of 37

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict
3.1.1/RD	Current rating and overcurrent protection	<p>All internal wires are UL recognized wiring which is PVC insulated and rated:</p> <ol style="list-style-type: none"> <li>1. VW-1, 105°C, 300 V (for flat cables connecting)</li> <li>2. VW-1, 105 °C, 600 V (other wiring)</li> </ol> <p>Internal wiring gauge is suitable for current intended to be carried.</p> <p>Internal wiring for primary power distribution protected against overcurrent by built-in circuit-breaker.</p>	P
3.1.2/RD	Protection against mechanical damage	Wires do not touch sharp edges and heatsinks, which could damage the insulation and cause hazard.	P
3.1.3/RD	Securing of internal wiring	Internal wires are secured by solder pins, cable ties, screw-type terminals and quick connect terminals 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. For the insulation material see subclause 3.1.1/RD.	P
3.1.5/RD	Beads and ceramic insulators	Not used.	N/A
3.1.6/RD	Screws for electrical contact pressure	No screws used to provide electrical contact pressure.	N/A
3.1.7/RD	Insulating materials in electrical connections	All current carrying and safety earthing connections are metal to metal.	P
3.1.8/RD	Self-tapping and spaced thread screws	No self- tapping or spaced thread screws used for connection of current-carrying parts.	P
3.1.9/RD	Termination of conductors	All conductors are reliably secured by use of solder-pins or glue or other mechanical fixing means.	P
	10 N pull test	Test performed and passed.	P
3.1.10/RD	Sleeving on wiring	Sleeving used for flat cable of	P



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict

		CN2 to provide supplementary insulation.	
--	--	--	--

6.2	Connection to power		N/A
3.2.2/RD	Multiple supply connections		N/A
3.2.3/RD	Permanently connected equipment	See below.	P
	Number of conductors, diameter (mm) of cable and conduits .....	3G, 2.5mm <sup>2</sup> .	—
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		N/A
	Type.....		—
	Rated current (A), cross-sectional area (mm <sup>2</sup> ), AWG .....		—
3.2.5.2/RD	DC power supply cords		N/A
3.2.6/RD	Cord anchorages and strain relief		N/A
3.2.7/RD	Protection against mechanical damage		N/A
3.2.8/RD	Cord guards		N/A
	D (mm); test mass (g) .....		—
	Radius of curvature of cord (mm).....		—
6.2.1	Means of connection .....		N/A
	More than one supply connection .....	Only one supply connection provided.	N/A

6.3	Wiring terminals for external power conductors		N/A
3.3.1/RD	Wiring terminals		N/A
3.3.2/RD	Connection of non-detachable power supply cords		N/A
3.3.3/RD	Screw terminals		N/A
3.3.4/RD	Conductor sizes to be connected		N/A
	Rated current (A), cord/cable type, cross-sectional area (mm <sup>2</sup> ) .....		—
3.3.5/RD	Wiring terminal sizes		N/A
	Rated current (A), type and nominal thread diameter (mm) .....		—
3.3.6/RD	Wiring terminals design		N/A
3.3.7/RD	Grouping of wiring terminals		N/A
3.3.8/RD	Stranded wire		N/A



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict

7	PHYSICAL REQUIREMENTS		P
7.1	Enclosure	Enclosure not used to carry current. Enclosure completely enclosing hazardous parts.	P
7.2	Stability		N/A
4.1/RD	Angle of 10°		N/A
	Test: force (N).....:		N/A

7.3	Mechanical strength		P
4.2.1/RD	General	Tests performed and passed. Results see below. After tests, unit complied with the requirements of sub-clauses 2.1.1/RD, 2.6.1/RD and 2.10/RD.	P
4.2.2/RD	Steady force test, 10 N	10 N applied to all components other than enclosure.	P
4.2.3/RD	Steady force test, 30 N	No such compartments. Battery compartment not operator access area.	N/A
4.2.4/RD	Steady force test, 250 N	250 N applied to outer enclosure. No energy or other hazards.	P
4.2.5/RD	Impact test	See below.	P
	Fall test	No hazard as result from steel ball fall test.	P
	Swing test	No hazard as result from steel ball swing test.	P
4.2.6/RD	Drop test	Not required for this equipment.	N/A
4.2.7/RD	Stress relief test	Test performed at 70 °C and passed.	P
4.2.8/RD	Cathode ray tubes	No CRT in the unit.	N/A
	Picture tube separately certified.....:		N/A
4.2.9/RD	High pressure lamps	No high pressure lamp provided.	N/A
4.2.10/RD	Wall or ceiling mounted equipment; force (N) .:		N/A

7.4	Construction details		P
-----	----------------------	--	---



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict
4.3.1/RD	Edges and corners	Edges and corners of the enclosure are rounded.	P
4.3.2/RD	Handles and manual controls; force (N).....:	No handles or manual controls provided. No axial pull applied to push-buttons.	N/A
4.3.3/RD	Adjustable controls	No adjustable controls provided.	N/A
4.3.4/RD	Securing of parts	Mechanical fixings in such a way designed that they will withstand mechanical stress occurring in normal use.	P
4.3.5/RD	Connection of plugs and sockets		N/A
4.3.6/RD	Direct plug-in equipment	Not direct plug-in type.	N/A
	Dimensions (mm) of mains plug for direct plug-in .....		N/A
	Torque and pull test of mains plug for direct plug-in; torque (Nm); pull (N).....:		N/A
4.3.7/RD	Heating elements in earthed equipment	No heating elements provided.	N/A
4.3.8/RD	Batteries (see also 4.5.20)	Lead-acid battery protected against overcharging and over-discharging by regulating network. Performance evaluated during the abnormal operation test. Details see in table 8.3.	P
4.3.9/RD	Oil and grease	Insulation in intended use not considered to be exposed to oil or grease.	N/A
4.3.10/RD	Dust, powders, liquids and gases	The equipment in intended use not considered to be exposed to dust, powders, liquids and gases. For the ventilation of the lead-acid battery refer to table N.4.	P
4.3.11/RD	Containers for liquids or gases	No container for liquids or gases provided.	N/A
4.3.12/RD	Flammable liquids .....	No flammable liquids provided.	N/A
	Quantity of liquid (l) .....		N/A
	Flash point (°C) .....		N/A
4.3.13/RD	Radiation; type of radiation .....	No ionizing radiation.	N/A
4.3.13.1/RD	General	See below.	P



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict

4.3.13.2/RD	Ionizing radiation	No ionizing radiation present.	N/A
	Measured radiation (pA/kg) .....		—
	Measured high-voltage (kV) .....		—
	Measured focus voltage (kV) .....		—
	CRT markings .....		—
4.3.13.3/RD	Effect of ultraviolet (UV) radiation on materials	No UV radiation present.	N/A
	Part, property, retention after test, flammability classification .....		N/A
4.3.13.4/RD	Human exposure to ultraviolet (UV) radiation ..		N/A
4.3.13.5/RD	Laser (including LEDs)	See below.	P
	Laser class .....	Emission of indicator LEDs far below the limiting value of LED Class 1.	—
4.3.13.6/RD	Other types .....		N/A
7.4.1	Openings	See appended table 7.4.1.	P
7.4.2	Gas concentration	For the ventilation of the lead-acid battery refer to table N.4.	P
7.4.3	Equipment movement	No castors provided.	N/A

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	Use of materials with the required flammability classes.	P
	Method 2, application of all of simulated fault condition tests		N/A
4.7.2/RD	Conditions for a fire enclosure	See below.	P
4.7.2.1/RD	Parts requiring a fire enclosure	With having the following components: a) Components in primary circuits b) Insulated wiring c) Semiconductor devices, transistors, diodes, integrated circuits d) Resistors, capacitors, inductors the fire enclosure is required.	P
4.7.2.2/RD	Parts not requiring a fire enclosure		N/A



# NEUTRON ENGINEERING INC.

Page 22 of 37

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict

4.7.3/RD	Materials		P
4.7.3.1/RD	General	PCB rated accordingly. For details see table 4.3.	P
4.7.3.2/RD	Materials for fire enclosures	Protective enclosure with no decorative parts. Front panel and LED panel of this unit with flammability class 5VB, other enclosure is metal.	P
4.7.3.3/RD	Materials for components and other parts outside fire enclosures	See subclause 4.7.2/RD.	N/A
4.7.3.4/RD	Materials for components and other parts inside fire enclosures	Internal components except small parts are V-2, HF-2 or better.  Batteries have a flammability class of HB (or better).	P
4.7.3.5/RD	Materials for air filter assemblies	No air filters provided.	N/A
4.7.3.6/RD	Materials used in high-voltage components	No high voltage components provided.	N/A

7.6	Battery location		P
7.6.1	Accessibility and maintainability	Maintenance free batteries used. The battery is connected by quick connect terminals (no necessary tightening).	P
7.6.2	Vibration	No requirements declared by the battery manufacturer.	N/A
7.6.3	Distance	The temperature of the electrolyte and the gas emission are within the limits of this standard (see appropriate subclauses).	P
7.6.4	Insulation	No Ni-Cd battery used inside.	N/A
7.6.5	Wiring	The protection of connection wiring complies with subclause 3/RD.	P
7.6.6	Electrolyte spillage	Sealed maintenance free batteries provided with an unlikely emission of electrolyte (VRLA type).	P
7.6.7	Ventilation	For the ventilation of the lead-acid battery refer to table N.4.	P
7.6.8	Charging voltages	See appended table 8.3.	P



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict

7.7	Temperature rise		P
	Maximum temperatures	See appended table 7.7 (A).	P
4.5.2/RD	Resistance to abnormal heat	See appended table 7.7 (B).	P

8	ELECTRICAL REQUIREMENTS AND SIMULATED ABNORMAL CONDITIONS		P
8.1 5.1.1/RD	General	See subclause 5.1.2/RD below.	P
8.1.1	Earth leakage current	EUT has only one mains connection. However, total touch current is depending on interconnected equipment.	P
5.1.2/RD	Equipment under test (EUT)	Touch current of the equipment does not exceed 3.5 mA.  However due to the connected load has influence on the overall touch current a corresponding statement was provided in the "Instruction Manual".	P
5.1.7/RD	Equipment with touch current exceeding 3.5 mA :		N/A
8.1.2	Pluggable equipment type B UPS		N/A
3.2.5/RD	Power supply cords		N/A
3.2.5.1/RD	AC power supply cords		N/A
	Type..... :		—
	Rated current (A), cross-sectional area (mm <sup>2</sup> ), AWG..... :		—
3.2.5.2/RD	DC power supply cords		N/A

8.2	Electric strength		P
5.2.1/RD	General	See appended table 5.8.	P
5.2.2/RD	Test procedure	See appended table 5.8.	P

8.3	Abnormal operating and fault conditions		P
5.3.1/RD	Protection against overload and abnormal operation	See appended table 8.3.	P
5.3.2/RD	Motors	Approved AC and DC fan used.	N/A
5.3.3/RD	Transformers	With the shorted o/p of the transformers no high	P



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict

		temperatures of the transformers were recorded. See appended Annex C.	
5.3.4/RD	Functional insulation.....:	Method c). Test results see appended table 8.3.	P
5.3.5/RD	Electromechanical components	No electromechanical component (except for approved relays) provided.	N/A
5.3.8/RD	Compliance criteria for abnormal operating and fault conditions	No fire propagated beyond the equipment. No molten metal was emitted. Electric strength tests from primary to SELV/enclosure (with foil) and primary to PE were passed.	P
8.3.1	Simulation of faults	See appended table 8.3.	P
8.3.2	Conditions for tests	See appended table 8.3.	P

9	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
	Test 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		N/A
6.2.2.2/RD	Steady-state test		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).....:		—
	Current limiting method .....		—
1.4.8/RD	Normal operating voltages .....		N/A
1.4.11/RD	Power from a telecommunication network .....		N/A



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict

2.1.1/RD	Protection in operator access areas		N/A
2.1.1.1/RD	Access to energized parts		N/A
	Test by inspection .....		N/A
	Test with test finger .....		N/A
	Test with test pin .....		N/A
	Test with test probe .....		N/A
2.1.1.2/RD	Battery compartments .....		N/A
2.1.3/RD	Protection in restricted access locations		N/A

2.3/RD	TNV circuits		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
	Insulation employed .....		—
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
2.6.1/RD	Protective earthing		N/A
2.6.5.8/RD	Reliance on telecommunication network or cable distribution system		N/A
2.9.5/RD	Grade of insulation		N/A
2.10.3.3/RD	Clearances in secondary circuits		N/A
2.10.3.4/RD	Measurement of transient voltage levels		N/A
2.10.4/RD	Creepage distances		N/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

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



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict

M.3.1/RD	Ringling 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		N/A
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.1.6/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		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) .....		—



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict

	Sample 2 burning time (s) .....		—
	Sample 3 burning time (s) .....		—
A.2.7/RD	Alternative test acc. to IEC 60695-2-2, cl. 4 and 8		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)		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 .....		—
	Manufacturer .....		—
	Type .....		—
	Rated values .....		—
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) .....		—
	Electric strength test: test voltage (V) .....		—
B.6/RD	Running overload test for d.c. motors in secondary circuits		N/A
B.7/RD	Locked-rotor overload test for d.c. motors in secondary circuits		N/A
B.7.1/RD	Test procedure		N/A
B.7.2/RD	Alternative test procedure; test time (h) .....		N/A
B.7.3/RD	Electric strength test		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) .....		—

C/RD	ANNEX C, TRANSFORMERS (see 1.5.4/RD and 5.3.3/RD)		P
------	---	--	---



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict

	Position .....	See appended table 4.3.	—
	Manufacturer .....	See appended table 4.3.	—
	Type .....	See appended table 4.3.	—
	Rated values .....	See appended table 4.3.	—
	Method of protection.....	Circuit design (inherently)	—
C.1/RD	Overload test	See appended table 7.3/8.3.	P
C.2/RD	Insulation	See appended table C.2.	P
	Protection from displacement of windings.....	See appended table C.2.	P

D/RD	ANNEX D, MEASURING INSTRUMENTS FOR TOUCH-CURRENT TESTS (see 5.1.4/RD)		N/A
D.1/RD	Measuring instrument	Measuring instrument according to figure D.1 was used.	P
D.2/RD	Alternative measuring instrument	Not used.	N/A

E/RD	ANNEX E, TEMPERATURE RISE OF A WINDING (see 1.4.13/RD)		N/A
------	--	--	-----

F/RD	ANNEX F, MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES (see 2.10/RD)		P
------	---	--	---

G/RD	ANNEX G, ALTERNATIVE METHOD FOR DETERMINING MINIMUM CLEARANCES		N/A
G.1/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	DC mains supply		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.5/RD	Measurement of transient levels (V) .....		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)		N/A
---	--	--	-----

J/RD	ANNEX J, TABLE OF ELECTROCHEMICAL POTENTIALS (see 2.6.5.6/RD)		P
------	---	--	---



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict

	Metal used .....	Compliance	—
--	------------------	------------	---

K/RD	ANNEX K, THERMAL CONTROLS (see 1.5.3 and 5.3.7)		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, BACKFEED PROTECTION TEST		P
L.1	General	See L.2 below.	P
L.2	Test for pluggable equipment type A or pluggable equipment type B UPS	Backfeed relay provided. Even in case of a single fault the protection circuit acts within 4 ms and causes a unit shut down (touch current between "L" and "N" pins of plug is 0.2 mA).	P
L.3	Test for permanently connected UPS	Not applicable.	N/A
L.4	Single-fault conditions	See appended table 8.3.	P

M	ANNEX M, EXAMPLES OF REFERENCE LOAD CONDITIONS		P
M.1	General	See below.	P
M.2	Reference resistive load		N/A
M.3	Reference inductive-resistive load	Worst case power factors as specified by the manufacturer maintained during the relevant tests.	P
M.4	Reference capacitive-resistive loads		N/A
M.5	Reference non-linear load		N/A
M.5.1	Test method		N/A
M.5.2	Connection of the non-linear reference load		N/A

N	ANNEX N, VENTILATION OF BATTERY COMPARTMENTS		N/A
N.1	General	Sufficient openings and a suitable arrangement of components (circuit breaker) are provided in such a way	P



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict

		that a local concentration of hydrogen and oxygen is not possible. No requirement regarding the separation of operational arcing parts from battery vents/valves.	
N.2	Hydrogen concentration	See N.1 above.	P
N.3	Blocked conditions	No fans or other devices provided for ventilation purposes.	N/A
N.4	Overcharge test	See appended table N.4.	P

U/RD	ANNEX U, INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION (see 2.10.5.4/RD)		N/A
			—

X	ANNEX X, GUIDANCE FOR DISCONNECTION OF BATTERIES DURING SHIPMENT		N/A
X.1	Applicable products	Currently this annex is only informative.	N/A
X.2	Battery disconnection		N/A
X.3	Package labelling/markings		N/A
X.4	Damage inspection		N/A
X.5	The importance of safe handling procedures		N/A

Y/RD	ANNEX Y, ULTRAVIOLET LIGHT CONDITIONING TEST (see 4.3.13.3/RD)		N/A
Y.1/RD	Test apparatus .....		N/A
Y.2/RD	Mounting of test samples .....		N/A
Y.3/RD	Carbon-arc light-exposure apparatus .....		N/A
Y.4/RD	Xenon-arc light exposure apparatus .....		N/A



# NEUTRON ENGINEERING INC.

Page 31 of 37

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict

4.3	TABLE: List of critical components					P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity <sup>1)</sup>	
Battery cabinet (Optional)	Various	Various	24Vdc	UL1989	UL	
Enclosure	--	--	Metal, min. 1.4 mm thickness.	--	--	
Plastic enclosure of Control Panel	Various	Various	5VB, thickness 1.0 mm min.	UL 94	UL	
Terminal block	--	GGD-50 5P	Min. 40A, 250V	--	--	
I/P Circuit breaker	Rong Feng	RFLB series	20A, 250V	EN 60934: 2001	TUV	
DC fan (Two provided)	SUNON	KD1208PTS1 series	12Vdc, 1.8W	EN 60950-1	TUV	
AC fan	SUNON	DP201A	220-240Vac, 50/60Hz, 0.125/0.11A	EN 60335-2- 80:2003+A1 EN 60335- 1:2002+A1+A11+ A12	TUV	
Internal cover for DC or AC fan	--	--	V-2 min.	UL 94	UL	
Linear Transformer	Yi Huang	ST-02311-240013	Class A	--	--	
PCB	--	--	V-0 or better, 105 °C	UL 796	UL	
X-Cap (C45) (Optional)	Various	Various	Class X1, max. 0.1 uF, min. 250V, 85°C	IEC 60384- 14/1993	VDE	
Relay (RL2)	Song Chuan	832HA-1C-F-C series	24Vdc	EN 61810	UL, CQC	
Cap. (C4)	--	--	Min. 4.7 uF, 350Vac, 85°C	--	--	
Current choke (CT1)	--	4446-1910-3010	105°C	--	--	
<sup>1)</sup> An asterisk indicates a mark which assures the agreed level of surveillance						



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict

4.4	TABLE: electrical data (in normal conditions)					P
fuse #	Irated (A)	U (V)/Hz	P (W)	I (mA)	Ifuse (mA)	condition/status
--	--	198V50Hz	2028	10.29	10.29	Load: 1766.268VA
--	--	198V60Hz	2033	10.30	10.30	Load: 1760.85VA
--	20	220V50Hz	1987	9.06	9.06	Load: 1709.12VA
--	20	220V60Hz	1984	9.06	9.06	Load: 1709.12VA
--	20	240V50Hz	1961	8.2	8.2	Load: 1735.02VA
--	20	240V60Hz	1977	8.27	8.27	Load: 1735.02VA
--	--	254V50Hz	2076	8.17	8.17	Load: 1771.769VA
--	--	254V60Hz	2081	8.19	8.19	Load: 1771.769VA
--	--	264V50Hz	2062	7.86	7.86	Load: 1764.606VA
--	--	264V60Hz	2060	7.86	7.86	Load: 1764.606VA

Supplementary information:  
Test performed with empty batteries.

5.1.2	TABLE: distance through insulation measurements				N/A
distance through insulation di at/of:	Up (V)	test voltage (V)	required di (mm)	di (mm)	

Note(s):

5.1.3	TABLE: discharge of capacitors in the primary circuit				N/A
Condition	τ calculated (s)	τ measured (s)	t u→ 0V (s)	Comments	

Note(s):

5.3 2.4/RD	TABLE: limited current circuits					N/A
Location	Voltage (V)	Current (mA)	Freq. (kHz)	Limit (mA)	Comments	



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict

Note(s):			

5.4 2.6.3.3/RD	TABLE: provisions for protective earthing		P
-------------------	---	--	---

Location	Resistance measured (mΩ)	Comments
Earth pin of Terminal block to chassis	4	12 Vac, 40 A, 2 mins.

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

5.8 and 9	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)
Primary component (with 10N) to earth (metal chassis).	420	250	2.0	>2.5	2.5	>2.5
Primary trace (with 10N) to earth (metal chassis).	420	250	2.0	>2.5	2.5	>2.5

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

5.8, 6, 8.2 and 9	TABLE: electric strength tests, impulse tests and voltage surge tests		P
-------------------	---	--	---

test voltage applied between:	test voltage (V) a.c. / d.c.	breakdown Yes / No
Primary to Earth	2121 Vdc	No
Primary to control panel	4242 Vdc	No

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

7.4.1 4.6.1/RD and 4.6.2/RD	TABLE: openings		P
--------------------------------------	-----------------	--	---

Location	Size (mm)	Comments
Top side	None	



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict

Location	Size (mm)	Comments
Right side	2.9 by 30	6 areas provided, each overall area is 33 mm by 30 mm. No any hazardous voltage or energy hazard conductive parts in 5° vertical
Left side	2.9 by 30	6 areas provided, each overall area is 33 mm by 30 mm. No any hazardous voltage or energy hazard conductive parts in 5° vertical
Front side	Max. 2.9 by 30	1 area provided, each overall area is 113 mm by 150 mm. No any hazardous voltage or energy hazard conductive parts in 5° vertical
Rear side	Max. 2.9 by 30	1 area provided, each overall area is 100 mm by 105 mm. No any hazardous voltage or energy hazard conductive parts in 5° vertical
	Φ88	For DC fan ventilation opening, and provided with an fan guard.
Bottom side	None	
Note(s):		

7.5 and 8.3	TABLE: fault condition tests	P
	ambient temperature (°C) ..... : 25	—
	model/type of power supply ..... : --	—
	manufacturer of power supply ..... : --	—
	rated markings of power supply ..... : --	—

component No.	fault	test voltage (V)	test time	fuse No.	fuse current (A)	result
Openings	Blocked	240	5 hr	--	--	Unit operated normally, no hazards. Transformer coil: 51.7°C, Ambient: 25.6°C
Rear DC Fan	locked	240	5 hr	--	--	Unit operated normally, no hazards. Transformer coil: 47.4°C, Ambient: 25.5°C
Secondary wiring of Linear transformer	Shorted	240	1 s	--	--	Circuit breaker opened immediately, no hazards.

Note(s):



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict

7.7	TABLE A: maximum temperatures					P
	test voltage (V) .....	See below	--	See below	--	--
	t <sub>amb1</sub> (°C) .....	--	--	--	--	--
	t <sub>amb2</sub> (°C) .....	--	--	--	--	--
maximum temperature T of part/at:		T (°C)				allowed T <sub>max</sub> (°C)
Test condition		Charging	Shift to 40 °C	Dis-charging	Shift to 40 °C	--
01. Transformer Coil		59.7	73.7	57	71.5	--
02. Transformer Core		49.1	63.1	44.5	59	--
03. CT1 coil		38.7	52.7	39	53.5	--
04. CT1 core		38.1	52.1	38.2	52.7	--
05. PWB near U3		43.4	57.4	39.3	53.8	--
06. PWB near Q17		36.3	50.3	38.1	52.6	--
07. PWB near Q32		37.1	51.1	43.3	57.8	--
08. Body of C24		39.7	53.7	49.6	64.1	--
09. Body of C4		37.2	51.2	36.1	50.6	--
10. Body of RL2		51.2	65.2	51.2	65.7	--
11. Enclosure near Transformer		36.6	50.6	37.3	51.8	--
12. Panel		33.4	47.4	33.5	48	--
13. Battery		28.2	42.2	31.1	45.6	--
14. Ambient		26	40	25.5	40	--
Test condition		Boost mode	Shift to 40 °C	Buck mode	Shift to 40 °C	--
01. Transformer Coil		59.7	73.7	57	71.5	--
02. Transformer Core		58.7	73.9	59.7	74.5	--
03. CT1 coil		47.8	63	48.3	63.1	--
04. CT1 core		37.4	52.6	40.5	55.3	--
05. PWB near U3		36.9	52.1	39.1	53.9	--
06. PWB near Q17		40.9	56.1	41.7	56.5	--
07. PWB near Q32		34	49.2	36.7	51.5	--
08. Body of C24		34.4	49.6	41.9	56.7	--
09. Body of C4		37.1	52.3	47.5	62.3	--
10. Body of RL2		35.3	50.5	38	52.8	--



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict

11. Enclosure near Transformer	51.1	66.3	50.5	65.3	--	70
12. Panel	35.5	50.7	36.5	51.3	--	95
13. Battery	32.1	47.3	32.1	46.9	--	--
14. Ambient	27.4	42.6	28.7	43.5	--	--

temperature T of winding:	R <sub>1</sub> (Ω)	R <sub>2</sub> (Ω)	T (°C)	allowed T <sub>max</sub> (°C)	insulation class

Note(s):

7.7	TABLE B: ball pressure test of thermoplastic parts	P
	allowed impression diameter (mm) ..... : ≤ 2 mm	—

part	test temperature (°C)	impression diameter (mm)
Terminal block	125	1.0

Note(s):

8.1.1	TABLE: earth leakage current	P
-------	------------------------------	---

Condition	L → terminal A (mA)	N → terminal A (mA)	Limit (mA)	Comments
System on	0.1	0.1	3.5	Terminal A to earth with switch "e" open
System on	0.005	0.005	3.5	Terminal A to panel with switch "e" close

Note(s):



# NEUTRON ENGINEERING INC.

EN 62040-1-1			
Clause	Requirement - Test	Result - Remark	Verdict

N.4	Ventilation of battery compartments		P
	The required dimension for the ventilation openings will be calculated with the following formula:		
	$A > K1 * Q$		
	with $Q = (0.054 \text{ m}^3/\text{Ah}) * n * I * C$		
	where:		
	K1 : constant factor of $28 \text{ h} * \text{cm}^2/\text{m}^3$		
	Q : airflow in $\text{m}^3/\text{h}$		
	n : number of battery cells		
	I : constant factor (0,2A/100Ah for valve regulated lead acid batteries)		
	C : nominal capacity of the battery		
	With the specific data for the UPS the following dimension for the ventilation openings is required:		
	n : 12		
	C : 7.2		
	$A > 28 \text{ h} * \text{cm}^2/\text{m}^3 * (0.054 \text{ m}^3/\text{Ah}) * n * 0.2 \text{ A}/100 \text{ Ah} * C$		
	$A > 0.27 \text{ cm}^2$		
	Verdict		
	The size of ventilation openings in UPS exceeds the required airflow by far.		



# NEUTRON ENGINEERING INC.

Page 1 of 4

Photo

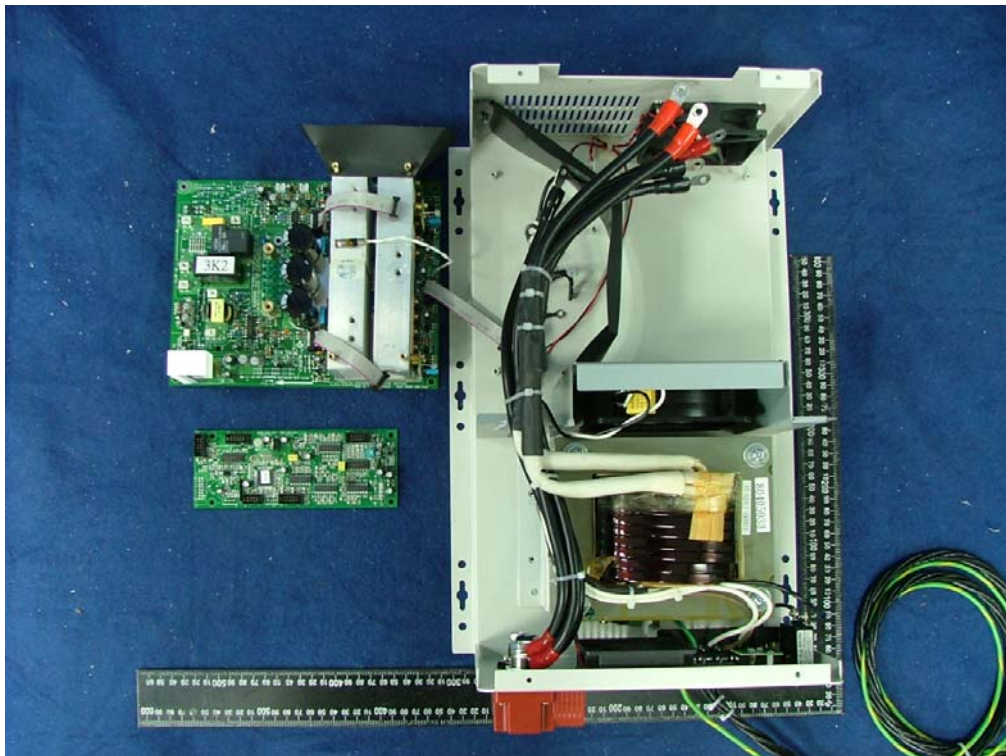




# NEUTRON ENGINEERING INC.

Page 2 of 4

Photo

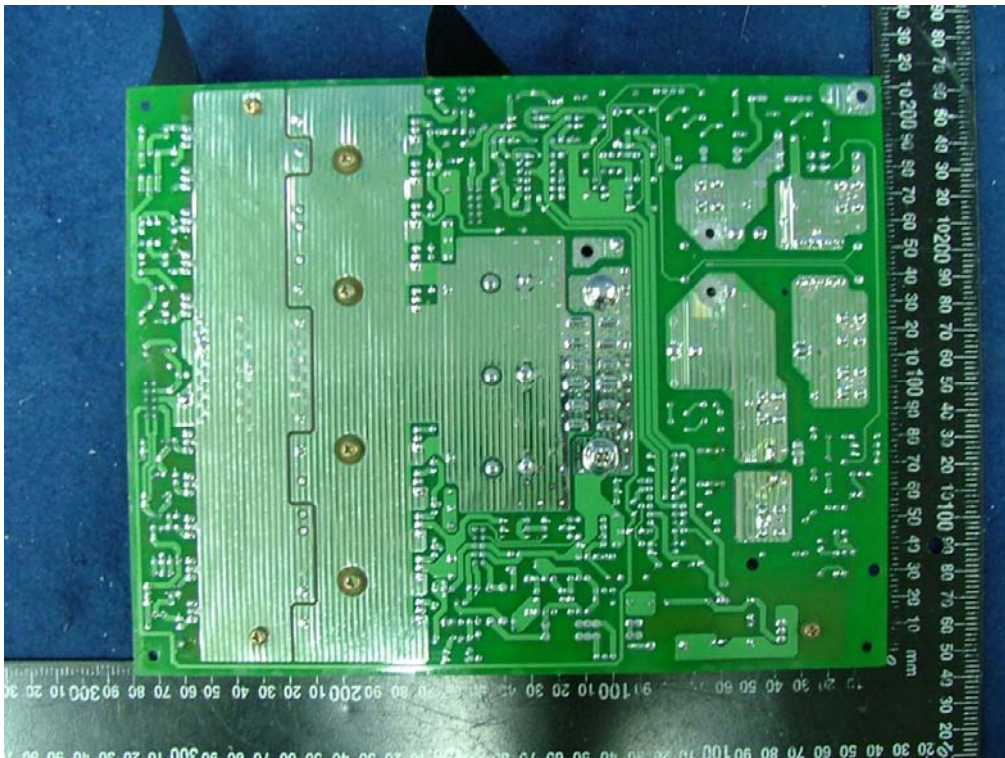
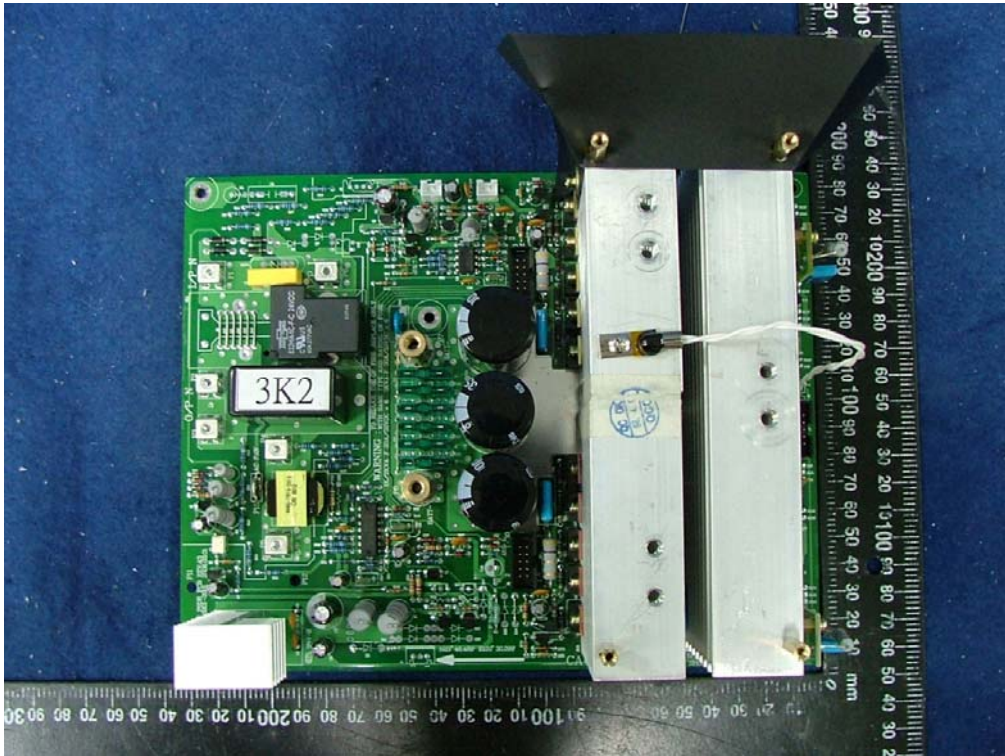




# NEUTRON ENGINEERING INC.

Page 3 of 4

Photo





# NEUTRON ENGINEERING INC.

Page 4 of 4

Photo

