


## IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

## CB TEST CERTIFICATE

Product	AC-DC Power Shelf
Name and address of the applicant	Bel Fuse Inc. 206 Van Vorst St., Jersey City, NJ 07302, USA
Name and address of the manufacturer	Bel Fuse Inc. 206 Van Vorst St., Jersey City, NJ 07302, USA
Name and address of the factory	BPS Asia Pacific Electronics (Shenzhen) Co., Ltd. Building #6, Nanming Road, Gongming Town Huahong Xintong Industrial Park Guangming District 518108 Shenzhen PEOPLE'S REPUBLIC OF CHINA <input checked="" type="checkbox"/> <a href="#">Additional Information on page 2</a>
Note: <i>When more than one factory, please report on page 2</i>	
Ratings and principal characteristics	Refer to page 2 of Certificate.
Trademark (if any)	 a bel group
Customer's Testing Facility (CTF) Stage used	CTF Stage 3
Model / Type Ref.	SPSTET4-02, SPSTET4-02N (maybe followed by alphanumeric characters indicating non-safety critical options)
Additional information (if necessary may also be reported on page 2)	Additionally the product was evaluated to the requirements of EN 62368-1:2014 <input checked="" type="checkbox"/> <a href="#">Additional Information on page 2</a>
A sample of the product was tested and found to be in conformity with	IEC 62368-1:2014
As shown in the Test Report Ref. No. which forms part of this Certificate	CB 170351-70196781

This CB Test Certificate is issued by the National Certification Body

CSA  
GroupCSA Group  
178 Rexdale Boulevard  
Toronto, ON M9W 1R3 Canada

Date: 2018-09-19

Signature: William Meng

Name and address of additional factories

**Bel Power Solutions, s.r.o.**  
ArealZTS Dubnica n.Vahom c.924  
01841 Dubnica nad Vahom  
**SLOVAKIA**

**WING MING CO LTD**  
DUTOU INDUSTRIAL ZONE, DUTOU, HUNG  
CHENG, ZHONGSHAN GUANZHOU, **CHINA**

Ratings and principal characteristics

SPSTET4-02, SPSTET4-02N:  
Input 1, 2, 3: 200-250 V , 34-29 A per input, 50/60 Hz  
Output: V1: 54.5Vdc 352 A max., V2: 12.0 Vdc, 21 A max  
Max output power: 19450 W

Additional information (if necessary)



Date: 2018-09-19

Signature: William Meng



Test Report issued under the responsibility of:



**TEST REPORT**  
**IEC 62368-1**  
**Audio/video, information and communication technology equipment**  
**Part 1: Safety requirements**

**Report Number**..... : CB 170351-70196781  
**Date of issue**..... : 2018-09-18  
**Total number of pages** ..... : 63

**Applicant's name** ..... : Bel Fuse Inc.  
**Address** ..... : 206 Van Vorst St., Jersey City, NJ 07302, USA

**Test specification:**  
**Standard**..... : IEC 62368-1:2014 (Second Edition)  
**Test procedure**..... : CB Scheme  
**Non-standard test method**..... : N/A

**Test Report Form No**..... : IEC62368\_1B  
**Test Report Form(s) Originator**..... : UL(US)  
**Master TRF**..... : 2014-03


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If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

**This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.**

**General disclaimer:**  
 The test results presented in this report relate only to the object tested.  
 This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory.  
 The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test Item description .....	AC-DC Power Shelf
Trade Mark .....	 a bel group
Manufacturer.....	Same as Applicant
Model/Type reference .....	SPSTET4-02, SPSTET4-02N (maybe followed by alphanumeric characters indicating non-safety critical options)
Rating .....	SPSTET4-02, SPSTET4-02N: Input 1, 2, 3: 200-250 V , 34-29 A per input, 50/60 Hz

	Output: V1: 54.5 Vdc 352 A max. V2: 12.0 Vdc 21 A max Max output power: 19450 W
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Testing procedure and testing location:		
<input type="checkbox"/>	CB Testing Laboratory:	CSA Group - Taiwan Canadian Standards Association (Far East Operations) Ltd.
Testing location/ address .....		No.26, Fuxing 3rd Road, Guishan District, Taoyuan City 333, Taiwan Chinese Taipei.
<input type="checkbox"/>	Associated CB Testing Laboratory:	
Testing location/ address .....		
Tested by (name + signature).....:		
Approved by (name + signature) .....		
<input type="checkbox"/>	Testing procedure: TMP/CTF Stage 1	
Testing location/ address .....		
Tested by (name + signature).....:		
Approved by (name + signature) .....		
<input type="checkbox"/>	Testing procedure: WMT/CTF Stage 2	
Testing location/ address .....		
Tested by (name + signature).....:		
Witnessed by (name + signature) .....		
Approved by (name + signature) .....		
<input checked="" type="checkbox"/>	Testing procedure: SMT/CTF Stage 3 or 4	BPS Asia Pacific Electronics (Shenzhen) Co., Ltd.
Testing location/ address .....		Building# 6, Nanming Road, Gongming Town Huahong Xintong Industrial Park Guangming District 518108 Shenzhen China
Tested by (name + signature).....:		Editha Vergara / Compliance Tam Leader 
Approved by (name + signature) .....		Allen Huang / Reviewer 
Supervised by (name + signature).....:		Cary Hsieh / Certifier 

**List of Attachments (including a total number of pages in each attachment):**

1 Photos	( 7 pages )
2 PWB Drawings	( 17 pages )
3 Construction Drawings	( 9 pages )
4 Installation Instruction	( 6 pages )
5 National Differences	( 44 pages )

**Summary of testing:**
**Tests performed (name of test and test clause):**

5.2 – Classification of electrical energy sources  
 5.4.1.4, 6.3.2, 9.0, B.2.6 – Temperature measurements  
 5.4.1.10.3 – Ball pressure test of thermoplastics  
 5.4.2.2, 5.4.2.4, 5.4.3 – Minimum clearances/creepage distances  
 5.4.8 – Humidity conditioning  
 5.4.9 – Electric strength test  
 5.5.2.2 – Capacitor Discharge  
 5.6.6.2 – Resistance of protective conductors and terminations  
 5.7 – Prospective touch voltage, touch current and protective conductor current  
 5.7.2.2, 5.7.4 - Earthed accessible conductive part  
 6.2.2 – Electrical power sources (PS) measurement for classification  
 B.2.5 – Input test  
 B.3 – Abnormal operating condition tests  
 B.4 – Fault condition tests  
 T – Mechanical and Stress Relief test

**Testing location:**

Building# 6, Nanming Road, Gongming Town  
 Huahong Xintong Industrial Park Guangming District  
 518108 Shenzhen China

**Summary of compliance with National Differences:**
**List of countries addressed**

**CENELEC member countries (EU group differences): Austria (AT), Belgium (BE), Bulgaria (BG), Croatia (HR), Cyprus (CY), the Czech Republic (CZ), Denmark (DK), Estonia (EE), Finland (FI), Former Yugoslav Republic of Macedonia (MK), France (FR), Germany (DE), Greece (GR), Hungary (HU), Iceland (IS), Ireland (IE), Italy (IT), Latvia (LV), Lithuania (LT), Luxembourg (LU), Malta (MT), the Netherlands (NL), Norway (NO), Poland (PL), Portugal (PT), Romania (RO), Slovakia (SK), Slovenia (SI), Spain (ES), Sweden (SE), Switzerland (CH), Turkey (TR) and the United Kingdom (GB).**

**Australia (AU), Canada (CA), New Zealand (NZ), United States (US)**

**The product fulfils the requirements of national and group differences according to EN 62368-1:2014+A11:2017**

**The product fulfils the requirements of national differences according to CSA C22.2 No. 62368-1-14, UL 62368-1, 2<sup>nd</sup> edition**




**The product fulfils the requirements of national differences according to AS/NZS 62368.1:2018**

**Copy of marking plate:**

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

电源 AC-DC Power Shelf 型号 Model/Modèle: SPSTET4-02N

Input/Entrée: 200 - 250 V $\sim$ , 50/60 Hz 输入 1,2,3: 34 - 29 A per input.	Made in China
Output/Sortie: V1: 54.5 V $\equiv$ , 352 A 输出 V2: 12.0 V $\equiv$ , 21 A	V001 W1818
Max. output power: 19450 W	Bel SN/Numéro de série:
MAC Address: 70:B3:D5:CA:A0:1E	420242981200100001




   See installation instructions for loading conditions.  
Consulter les instructions d'installation pour les conditions de chargement.

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a bel group  
www.belfuse.com/power-solutions

IP20  
**Engineering Sample**

电源 AC-DC Power Shelf 型号 Model/Modèle: SPSTET4-02

Input/Entrée: 200 - 250 V $\sim$ , 50/60 Hz 输入 1,2,3: 34 - 29 A per input.	Made in China
Output/Sortie: V1: 54.5 V $\equiv$ , 352 A 输出 V2: 12.0 V $\equiv$ , 21 A	V001 W1818
Max. output power: 19450 W	Bel SN/Numéro de série:
	420242981200100001

   See installation instructions for loading conditions.  
Consulter les instructions d'installation pour les conditions de chargement.

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IP20  
**Engineering Sample**

	<b>WARNING</b> <b>AVERTISSEMENT</b>
	Risk of electric shock! Multiple power source. Disconnect all power sources before servicing! Risque de choc électrique! Plusieurs sources d'alimentation. Débrancher toutes les sources d'alimentation avant l'entretien!
	Hot surface possible! Be careful. Surface chaude possible! Soyez prudent.
	High touch current. Connect to earth before connecting to supply. Courant de contact élevé. Connecter à la terre avant de connecter à l'alimentation.
	<b>This side up, Heavy</b> <b>Ce côté vers le haut, Lourd</b>

<b>TEST ITEM PARTICULARS:</b>	
Classification of use by.....:	<input checked="" type="checkbox"/> Ordinary person <input checked="" type="checkbox"/> Instructed person <input checked="" type="checkbox"/> Skilled person <input type="checkbox"/> Children likely to be present
Supply Connection.....:	<input checked="" type="checkbox"/> AC Mains <input type="checkbox"/> DC Mains <input type="checkbox"/> External Circuit - not Mains connected - <input type="checkbox"/> ES1 <input type="checkbox"/> ES2 <input checked="" type="checkbox"/> ES3
Supply % Tolerance .....	<input checked="" type="checkbox"/> +10%/-10% <input type="checkbox"/> +20%/-15% <input type="checkbox"/> ___%/ ___% <input type="checkbox"/> None
Supply Connection – Type .....	<input type="checkbox"/> pluggable equipment type A - <input type="checkbox"/> non-detachable supply cord <input type="checkbox"/> appliance coupler <input type="checkbox"/> direct plug-in <input type="checkbox"/> mating connector <input type="checkbox"/> pluggable equipment type B - <input type="checkbox"/> non-detachable supply cord <input type="checkbox"/> appliance coupler <input type="checkbox"/> permanent connection <input type="checkbox"/> mating connector <input checked="" type="checkbox"/> other: to be determined at end product evaluation(Primary terminal block used)
Considered current rating of protective device as part of building or equipment installation.....:	40 A per input Installation location: <input checked="" type="checkbox"/> building; <input type="checkbox"/> equipment
Equipment mobility .....	<input type="checkbox"/> movable <input type="checkbox"/> hand-held <input type="checkbox"/> transportable <input type="checkbox"/> stationary <input checked="" type="checkbox"/> for building-in <input type="checkbox"/> direct plug-in <input type="checkbox"/> rack-mounting <input type="checkbox"/> wall-mounted
Over voltage category (OVC) .....	<input type="checkbox"/> OVC I <input checked="" type="checkbox"/> OVC II <input type="checkbox"/> OVC III <input type="checkbox"/> OVC IV <input type="checkbox"/> other: _____
Class of equipment .....	<input checked="" type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Class III
Access location .....	<input checked="" type="checkbox"/> restricted access location <input type="checkbox"/> N/A
Pollution degree (PD) .....	<input type="checkbox"/> PD 1 <input checked="" type="checkbox"/> PD 2 <input type="checkbox"/> PD 3
Manufacturer's specified maxium operating ambient:	45°C at full load. 55°C at V1 derated load.
IP protection class .....	<input checked="" type="checkbox"/> IPX0 <input type="checkbox"/> IP___
Power Systems .....	<input checked="" type="checkbox"/> TN <input type="checkbox"/> TT <input type="checkbox"/> IT - ___ V <sub>L-L</sub>
Altitude during operation (m) .....	<input type="checkbox"/> 2000 m or less <input checked="" type="checkbox"/> 4000 m
Altitude of test laboratory (m) .....	<input type="checkbox"/> 2000 m or less <input checked="" type="checkbox"/> 38 m
Mass of equipment (kg) .....	<input checked="" type="checkbox"/> 8 kg (shelf only), 25 kg (6 PSU installed)
<b>POSSIBLE TEST CASE VERDICTS:</b>	
- test case does not apply to the test object..... :	N/A
- test object does meet the requirement .....	P (Pass)

- test object does not meet the requirement..... :	F (Fail)
<b>TESTING:</b>	
Date of receipt of test item..... :	2018-03-10
Date (s) of performance of tests..... :	2018-04-20 to 2018-04-25
<b>GENERAL REMARKS:</b>	
<p>"(See Enclosure #)" refers to additional information appended to the report.                  "(See appended table)" refers to a table appended to the report.</p> <p>Throughout this report a <input type="checkbox"/> comma / <input type="checkbox"/> point is used as the decimal separator.</p>	
<b>Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:</b>	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided .....	<input checked="" type="checkbox"/> <b>Yes</b> <input type="checkbox"/> <b>Not applicable</b>
<b>When differences exist; they shall be identified in the General product information section.</b>	
<b>Name and address of factory (ies)..... :</b>	<p><b>BPS Asia Pacific Electronics (Shenzhen) Co., Ltd.</b>                  Building #6, Nanming Road, Gongming Town                  Huahong Xintong Industrial Park                  Guangming District                  518108 Shenzhen                  PEOPLE'S REPUBLIC OF CHINA</p> <p><b>Bel Power Solutions, s.r.o.</b>                  ArealZTS Dubnica n.Vahom c.924                  01841 Dubnica nad Vahom                  SLOVAKIA</p> <p><b>WING MING CO LTD</b>                  DUTOU INDUSTRIAL ZONE, DUTOU, HUNG CHENG,                  ZHONGSHAN GUANZHOU, CHINA</p>
<b>GENERAL PRODUCT INFORMATION:</b>	
<p><b>Report History –</b>                  New certification.</p> <p><b>Product Description –</b>                  The subject models are component type AC-DC power shelves for use in Information Technology Equipment and intended for building-in.                  The power shelf can be configured with up to six hot-swap capable TET4000-48-069RA or TET4000-48-069RAXXXX, TET4000-48-069RAS441 AC-DC power supplies which are operating on redundant mode, powered from three single-phase AC input through input terminals. The outputs of power supplies are connected at the power shelf. The power shelf has two DC outputs V1: 54.5Vdc and V2: 12 Vdc.                  The power shelf equipped with/without a Network Attached Controller (NAC) which provide monitoring and functions through Ethernet.</p>	

**Model Differences –**

SPSTET4-02 is base model.

SPSTET4-02N is exactly same as SPSTET4-02, except equipped an assembly NAC (Network Attached Controller) board which only contain secondary on model SPSTET4-02N.

**Additional application considerations – (Considerations used to test a component or sub-assembly) –**

1. Suitability of the equipment enclosure as a Fire, Mechanical and Electrical Enclosure is to be determined in the end use installation.
2. The acceptability of this report in countries that have not declared national differences to IEC 62368-1: 2014 at the time this report was issued will be up to the discretion of the Recognizing NCB upon submittal of this report.
3. The subject model is certified only as a component of other ITE equipment, where the suitability of the combination is to be determined by the accepting NCB.
4. Installation instructions and equipment markings related to safety shall be provided in a language acceptable in the country in which the equipment is to be installed.
5. Evaluated for use at max. 50°C ambient temperature, in a Pollution Degree 2 environment.
6. Evaluated as Class I (earthed equipment). Reliable connection to protective earth shall be provided in the end use installation.
7. Spacings were evaluated for an operating altitude of 4000m, a factor of 1.29 applied based on IEC 60664-1.
8. Safety isolating transformers employ an insulation system designated Class B, evaluated to UL 1446,
9. The output connector is not suitable for field wiring, it is only intended for connection to the mating connectors of the end-use equipment.
10. Measurement for Radio Frequency interference is not evaluated. Compliance with the CISPR requirements is to be determined by the Recognizing NCB.
11. Unit is evaluated at V1 output maximum 352 A output load at 45°C ambient and linearly derated to 264A at maximum 55°C ambient. Temperature tests shall be considered for specific installation conditions in the end system.

<b>ENERGY SOURCE IDENTIFICATION AND CLASSIFICATION TABLE:</b>	
(Note 1: Identify the following six (6) energy source forms based on the origin of the energy.) (Note 2: The identified classification e.g., ES2, TS1, should be with respect to its ability to cause pain or injury on the body or its ability to ignite a combustible material. Any energy source can be declared Class 3 as a worse case classification e.g. PS3, ES3.)	
<b>Electrically-caused injury (Clause 5):</b> (Note: Identify type of source, list sub-assembly or circuit designation and corresponding energy source classification) Example: +5 V dc input	
ES1	
<b>Source of electrical energy</b>	<b>Corresponding classification (ES)</b>
Primary circuits supplied by AC mains	ES3
54.5 Vdc output	ES1
12.0 Vdc output	ES1
<b>Electrically-caused fire (Clause 6):</b> (Note: List sub-assembly or circuit designation and corresponding energy source classification) Example: Battery pack (maximum 85 watts):	
PS2	
<b>Source of power or PIS</b>	<b>Corresponding classification (PS)</b>
Primary circuits supplied by AC mains	PS3
54.5 Vdc output	PS3
12 Vdc output	PS3
<b>Injury caused by hazardous substances (Clause 7)</b> (Note: Specify hazardous chemicals, whether produces ozone or other chemical construction not addressed as part of the component evaluation.) Example: Liquid in filled component	
Glycol	
<b>Source of hazardous substances</b>	<b>Corresponding chemical</b>
N/A	N/A
<b>Mechanically-caused injury (Clause 8)</b> (Note: List moving part(s), fan, special installations, etc. & corresponding MS classification based on Table 35.) Example: Wall mount unit	
MS2	
<b>Source of kinetic/mechanical energy</b>	<b>Corresponding classification (MS)</b>
Sharp edges and corners	MS1
Equipment mass: 8 kg (shelf only), 25 kg (6 PSU installed)	MS2
Moving fan blades (evaluated as a part of power supplies)	MS2
<b>Thermal burn injury (Clause 9)</b> (Note: Identify the surface or support, and corresponding energy source classification based on type of part, location, operating temperature and contact time in Table 38.) Example: Hand-held scanner – thermoplastic enclosure	
TS1	
<b>Source of thermal energy</b>	<b>Corresponding classification (TS)</b>
Circuit / component inside unit	TS3
All accessible parts not be touched to operate the equipment (<1 s).	TS1

**ENERGY SOURCE IDENTIFICATION AND CLASSIFICATION TABLE:**

**Radiation (Clause 10)**

(Note: List the types of radiation present in the product and the corresponding energy source classification.)

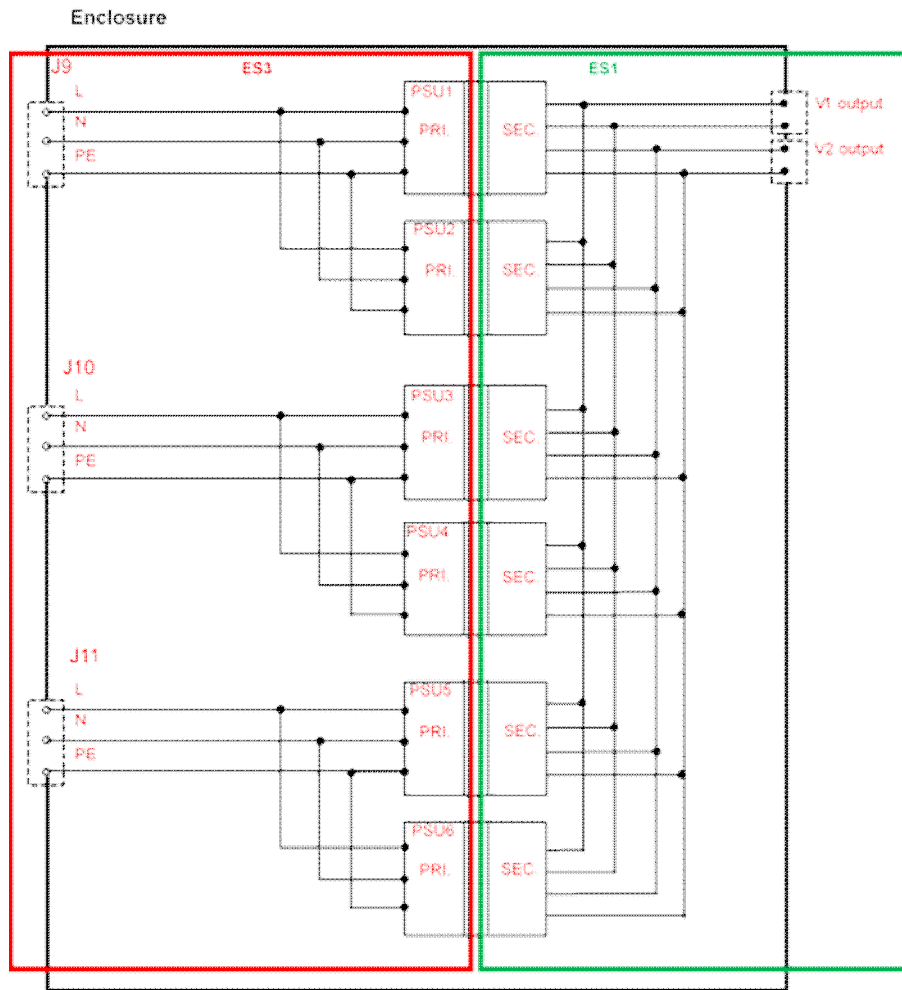
Example: DVD – Class 1 Laser Product

RS1

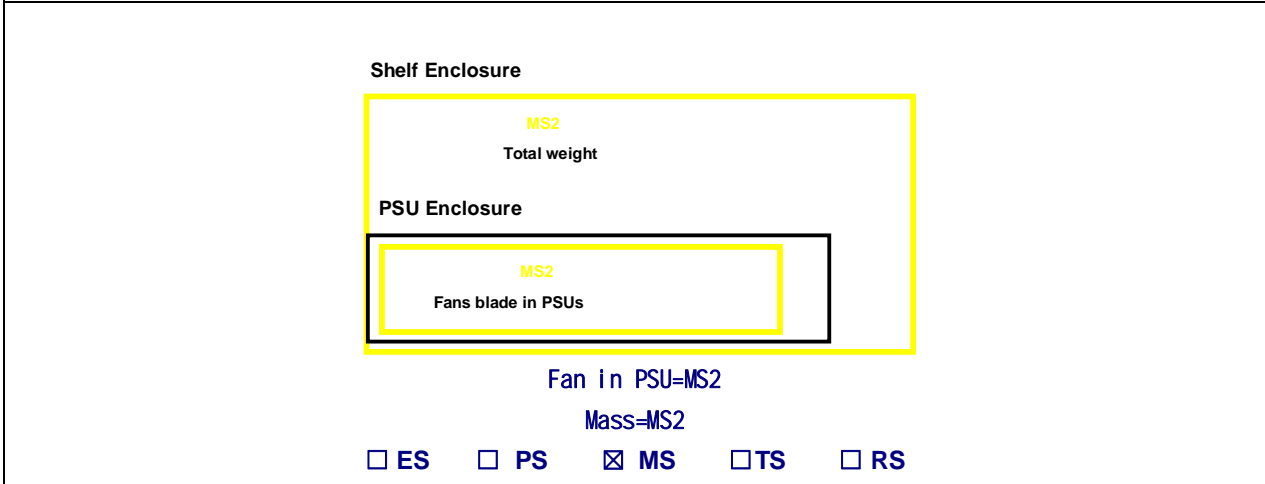
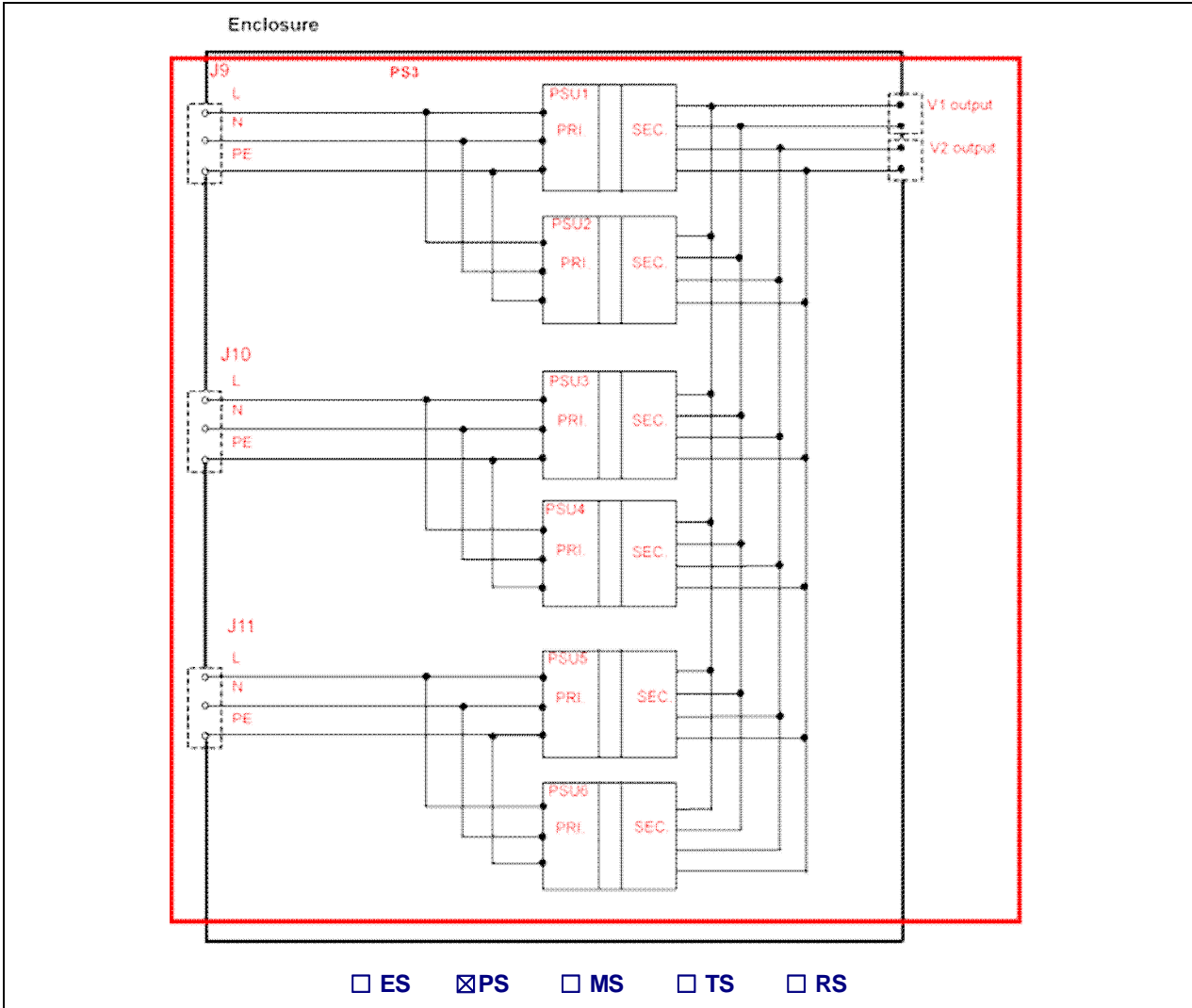
Type of radiation	Corresponding classification (RS)
N/A	N/A

**ENERGY SOURCE DIAGRAM**

Indicate which energy sources are included in the energy source diagram. Insert diagram below



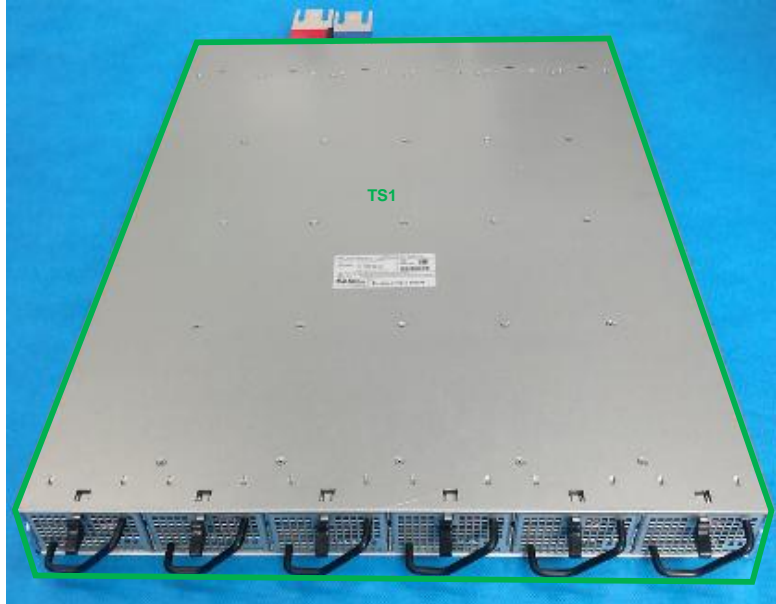
ES     PS     MS     TS     RS



**Shelf Enclosure**



**PSU Enclosure**



- ES
- PS
- MS
- TS
- RS

<b>OVERVIEW OF EMPLOYED SAFEGUARDS</b>				
<b>Clause</b>	<b>Possible Hazard</b>			
5.1	Electrically-caused injury			
Body Part (e.g. Ordinary)	Energy Source (ES3: Primary Filter circuit)	Safeguards		
		Basic	Supplementa ry	Reinforced (Enclosure )
Ordinary, instructed,	ES3: Primary circuits	Clearance/Cre epage distance	Protective earth conductor	--
Ordinary, instructed,	ES3: Main supply terminals	--	--	Complies with 5.5.2.2
Ordinary, instructed,	ES3: Primary circuits (components: bridging capacitors)	Certified Y2 capacitors (C33, C35, C37, C32, C34, C36)	Protective earth conductor	--
Skilled	ES3: Main supply terminals	--	Skill safeguard, Input terminal covered by insulator	--
6.1	Electrically-caused fire			
Material part (e.g. mouse enclosure)	Energy Source (PS2: 100 Watt circuit)	Safeguards		
		Basic	Supplementa ry	Reinforced
Entry of foreign objects	PS3	--	Dimensions of front panel (P.2.2) is fulfilled.  Side opening requirements of (draft) IEC62368-1 3 <sup>rd</sup> Ed. s/c 6.4.8.3.5 were applied to front panel ventilation openings	--
Internal combustible material (small parts mounted on PWB)	PS3	Complies with 6.3.1 (Refer to appended Tables 5.4.1.4, B.3 and B.4)	Metal enclosure provided. The PCB is of base material with flammability category V-0 material	--
Combustible material (outputs of equipment)	PS3	--	Appropriate flammability of material	--

			within fire enclosure which is to be provided with end product	
Enclosure (Metal chassis)	PS3: Primary and secondary circuits	See 6.3	Equipment safeguards (control of fire spread, metal enclosure)	--
7.1	Injury caused by hazardous substances			
Body Part (e.g., skilled)	Energy Source (hazardous material)	Safeguards		
		Basic	Supplementary	Reinforced
N/A	--	--	--	--
8.1	Mechanically-caused injury			
Body Part (e.g. Ordinary)	Energy Source (MS3:High Pressure Lamp)	Safeguards		
		Basic	Supplementary	Reinforced (Enclosure)
Ordinary Person	MS1: Sharp edges and corners (none)	--	--	--
Ordinary Person	MS2: 8 kg (shelf only), 25 kg (6 PSU installed)	Equipment for building-in, evaluated at end use equipment.	Equipment for building-in, evaluated at end use equipment.	--
Ordinary Person	MS2 (Moving fan blades in PSU)	Fan guard (Enclosure)	--	--
9.1	Thermal Burn			
Body Part (e.g., Ordinary)	Energy Source (TS2)	Safeguards		
		Basic	Supplementary	Reinforced
Ordinary/Instructed/Skilled Person	TS3: Circuit / component inside unit	See 5.4.1.4	Metal enclosure	--
Ordinary Person	TS1: All accessible parts (not be touched to operate the equipment (<1 s).)	--	--	--
10.1	Radiation			
Body Part (e.g., Ordinary)	Energy Source (Output from audio port)	Safeguards		
		Basic	Supplementary	Reinforced
--	--	--	--	--
Supplementary Information:				
(1) See attached energy source diagram for additional details.				
(2) "N" – Normal Condition; "A" – Abnormal Condition; "S" Single Fault				