Test Report issued under the responsibility of:

TÜVRheinland®

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

Report Number..... :	US25X2IS.001
Date of issue ..... :	2025/11/07
Total number of pages ..... :	84 + Attachments
Name of Testing Laboratory preparing the Report ..... :	TUV Rheinland of North America, Inc. 1279 Quarry Lane, Ste. A, Pleasanton, CA 94566 USA
Applicant's name ..... :	TDK-Lambda Americas Inc.
Address ..... :	1669 Brandywine Ave., Chula Vista, CA 91911
Test specification:	
Standard ..... :	IEC 62368-1:2018
Test procedure..... :	CB Scheme
Non-standard test method..... :	N/A
TRF template used ..... :	IECEE OD-2020-F1:2021, Ed.1.4
Test Report Form No. ..... :	IEC62368_1E
Test Report Form(s) Originator.... :	UL(US)
Master TRF ..... :	Dated 2022-04-14

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 .....:	Power Supply
Trade Mark(s) .....:	TDK·Lambda
Manufacturer.....:	Same as applicant
Model/Type reference .....:	TPS4500-92/184-xxx (x = A-Z, 0-9, blank)
Ratings .....:	Input: 3 phase AC 400-480V, 50-60Hz, 9A per phase, 5300W Output: a) DC 57-100Vdc, 50A max. b) DC 114-200Vdc, 25A max. 4600W max total

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☐ **CB Testing Laboratory:**	TUV Rheinland of North America, Inc	
Testing location/ address ..... :	1279 Quarry Lane, Ste. A, Pleasanton, CA 94566 USA	
Tested by (name, function, signature) ..... :		
Approved by (name, function, signature) .. :		
☐ **Testing procedure: CTF Stage 1:**	N/A	
Testing location/ address ..... :		
Tested by (name, function, signature) ..... :		
Approved by (name, function, signature) .. :		
☒ **Testing procedure: CTF Stage 2:**	TDK-Lambda Americas Inc	
Testing location/ address ..... :	1669 Brandywine Ave., Chula Vista, CA 91911	
Tested by (name, function, signature)	Anthony Villasenor/ Product Safety Engineer	A Villasenor
Witnessed by (name, function, signature) . :	Dan Aquino/ Sr. Test Engineer	
Approved by (name, function, signature) .. :	Arun Kumar/ Report Authorizer	
☐ **Testing procedure: CTF Stage 3:**	N/A	
☐ **Testing procedure: CTF Stage 4:**	N/A	
Testing location/ address ..... :		
Tested by (name, function, signature) ..... :		
Witnessed by (name, function, signature) . :		
Approved by (name, function, signature) .. :		
Supervised by (name, function, signature) :		

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

Attachment 1: National Differences (43 pages)

Attachment 2: Photographs (4 pages)

Attachment 3: Enclosure Diagram (1 page)

Summary of testing:

No testing was deemed required. The test data was taken from the TUV CB Report US25X2IS.300 in accordance with IEC 62368-1, 2nd Edition.

The product was tested on a bench top with full load which drew the output power to the max. rated value. Refer to body of report and appended tables for details of each test.

Tests performed (name of test and test clause):	**Testing location:**
Report US25X2IS.001: No testing required	
Report US25X2IS.300: • Input Test (B.2.5) • Stored Discharge on Capacitors Test (5.5.2.2) • Resistance of protective conductors and terminations (5.6.6.2) • Humidity Test (5.4.8) • Temperature Test (5.4.1.4, 6.3.2, 9.0, B.2.6) • Ball Pressure Test (5.4.1.10.3) • Earthed Accessible Conductive Part Test (5.7.2, 5.7.4) • Electric strength Test (5.4.9) • Minimum Clearances/Creepage distance (5.4.2.2, 5.4.2.4, 5.4.3) • Abnormal Operation Condition Test (B.3) • Fault Condition Tests (B.4) • Limited Power Source (Q.1)	TDK-Lambda Americas, Inc. 1669 Brandywine Ave., Chula Vista, CA 91911

Summary of compliance with National Differences (List of countries addressed):

EU Group Differences, EU Special National Conditions, CA, US, AU/NZ, JP

Explanation of used codes: CA = Canada, US = United States of America, AU/NZ = Australia/New Zealand, JP = Japan

☒ **The product fulfils the requirements of EN IEC 62368-1:2020+A11:2020, CSA/UL 62368-1:2019, AU/NZ 62368.1:2022, J62368-1:2023**

Use of uncertainty of measurement for decisions on conformity (decision rule) :

☒ No decision rule is specified by the IEC standard, when comparing the measurement result with the applicable limit according to the specification in that standard. The decisions on conformity are made without applying the measurement uncertainty ("simple acceptance" decision rule, previously known as "accuracy method").

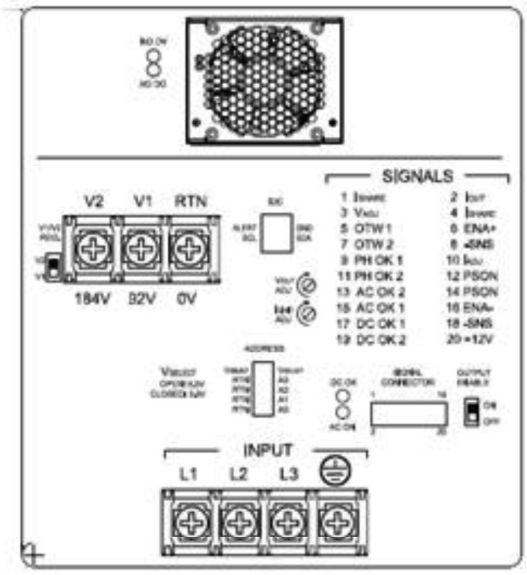
☐ Other: (to be specified, for example when required by the standard or client, or if national accreditation requirements apply)

Information on uncertainty of measurement:
The uncertainties of measurement are calculated by the laboratory based on application of criteria given by OD-5014 for test equipment and application of test methods, decision sheets and operational procedures of IECEE.
IEC Guide 115 provides guidance on the application of measurement uncertainty principles and applying the decision rule when reporting test results within IECEE scheme, noting that the reporting of the measurement uncertainty for measurements is not necessary unless required by the test standard or customer.

Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

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.



"Caution: High Touch Current" or equivalent word/text placed to the equipment adjacent to the equipment supply connection

Test item particulars:	
Product group ..... :	☐ end product ☒ built-in component
Classification of use by ..... :	☐ Ordinary person ☐ Children likely present ☒ Instructed person ☒ Skilled person
Supply connection ..... :	☒ AC mains ☐ DC mains ☐ not mains connected: ☐ ES1 ☐ ES2 ☐ ES3
Supply tolerance ..... :	☒ +10%/-10% ☐ +20%/-15% ☐ + %/ - % ☐ None
Supply connection – type ..... :	☐ pluggable equipment type A - ☐ non-detachable supply cord ☐ appliance coupler ☐ direct plug-in ☐ pluggable equipment type B - ☐ non-detachable supply cord ☐ appliance coupler ☐ permanent connection ☐ mating connector ☒ other: Building In
Considered current rating of protective device ..... :	☒ 90 A; Location: ☐ building ☒ equipment ☐ N/A
Equipment mobility ..... :	☐ movable ☐ hand-held ☐ transportable ☐ direct plug-in ☐ stationary ☒ for building-in ☐ wall/ceiling-mounted ☐ SRME/rack-mounted ☐ other:
Overvoltage category (OVC) ..... :	☐ OVC I ☒ OVC II ☐ OVC III ☐ OVC IV ☐ other:
Class of equipment ..... :	☒ Class I ☐ Class II ☐ Class III ☐ Not classified ☐
Special installation location ..... :	☒ N/A ☐ restricted access area ☐ outdoor location ☐
Pollution degree (PD) ..... :	☐ PD 1 ☒ PD 2 ☐ PD 3
Manufacturer's specified T_{ma} ..... :	50°C at full load, 60°C at 80% load, 70°C at 55% load ☐ Outdoor: minimum °C
IP protection class ..... :	☒ IPX0 ☐ IP___
Power systems ..... :	☒ TN ☐ TT ☐ IT - V_{L-L} ☐ not AC mains
Altitude during operation (m) ..... :	☐ 2000 m or less ☒ 4000 m
Altitude of test laboratory (m) ..... :	☐ 2000 m or less ☒ 50 m
Mass of equipment (kg) ..... :	3.9 kg

Possible test case verdicts:	
- test case does not apply to the test object ....:	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement....:	F (Fail)
Testing:	
Date of receipt of test item .....:	N/A (Report US25X2IS.001) 2025/06/17 (Report US25X2IS.300))
Date (s) of performance of tests .....:	N/A (Report US25X2IS.001) 2025/06/17 – 2025/06/20 (Report US25X2IS.300)
General remarks:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. **Throughout this report a ☐ comma / ☒ point is used as the decimal separator.** ☐ **This Test Report Form contains requirements according to IEC/ISO ….. Standard dated ….. and includes** Corrigendum dated ……. (Note: The above text maybe removed if not applicable)	
Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:	
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 .....:	☐ **Yes** ☒ **Not applicable**
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies) ..... :	TDK-Lambda Malaysia Sdn Bhd Lot 2 & 3, Batu 9 3/4 Kawasan Perindustrian Bandar Baru Jaya Gading 26070 Kuantan, Malaysia

General product information and other remarks:

The equipment is a switch-mode power supply. It is fully enclosed, with single output and with forced air cooling.

Conditions of Acceptability:

1. The equipment is considered to operate under the conditions of:
- Pollution Degree 2 environment
- Equipment mobility: Component for building-in
- Class of Equipment: Class I (grounded)
- Operating altitude: 4000 meters

2. Rated ambient 50°C at full load, 60°C at 80% load, 70°C at 55% load

3. The product is for building-in. Fire enclosure requirements must be addressed in the end product application.

4. Output is considered hazardous energy levels and must be addressed in the end product application.

5. Temperature test must be re-evaluated in the must be addressed in the end product application.

History of CB report:

US25X2IS.300: Original IEC 62368-1, 2nd Edition CB report evaluation.

US25X2IS.001: Original IEC 62368-1, 3rd Edition CB report evaluation.

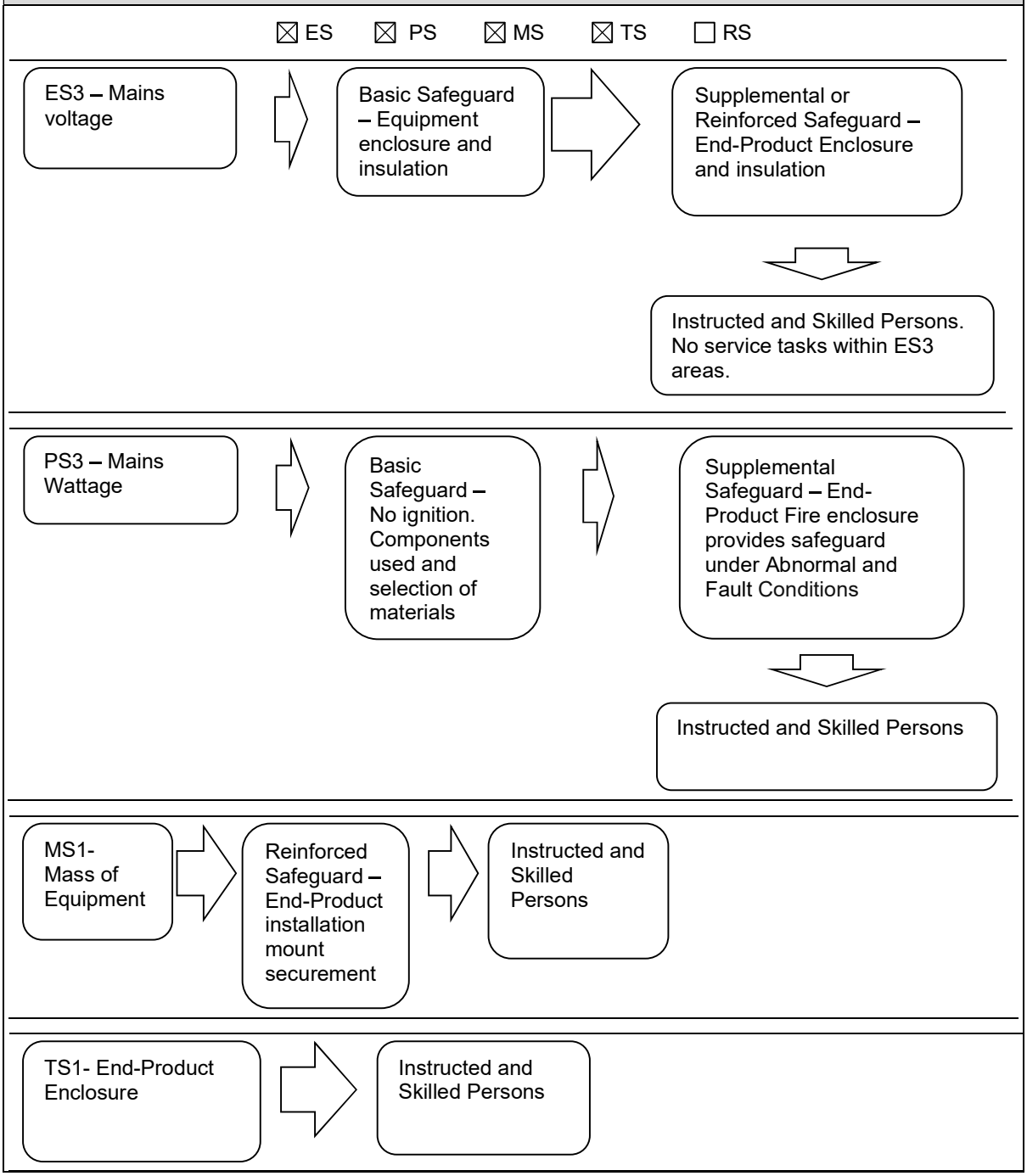
Note: Gaps in the report numbering are for reports reserved for TUV internal use and not applicable to the CB Scheme.

OVERVIEW OF ENERGY SOURCES AND SAFEGUARDS				
Clause	**Possible Hazard**			
5	Electrically-caused injury			
Class and Energy Source (e.g. ES3: Primary circuit)	Body Part (e.g. Ordinary)	Safeguards		
		B	S	R
ES3: Instructed and Skilled Persons	primary circuit	Enclosure	Earth	Insulation/ Enclosure
ES3: Instructed and Skilled Persons	output circuit	Enclosure	Earth	Insulation/ Enclosure
6	Electrically-caused fire			
Class and Energy Source (e.g. PS2: 100 Watt circuit)	Material part (e.g. Printed board)	Safeguards		
		B	1st S	2nd S
PS3: Input	Mains circuits	Components and selection of materials	Equipment Enclosure	Insulation/ Enclosure
PS3: Output	Output	Components and selection of materials	Equipment Enclosure	Insulation/ Enclosure
7	Injury caused by hazardous substances			
Class and Energy Source (e.g. Ozone)	Body Part (e.g., Skilled)	Safeguards		
		B	S	R
No hazardous substances present in the product.	N/A	-	-	-
8	Mechanically-caused injury			
Class and Energy Source (e.g. MS3: Plastic fan blades)	Body Part (e.g. Ordinary)	Safeguards		
		B	S	R
MS1: Instructed and Skilled Persons	Mass of Equipment	Enclosure	-	-
MS1: Instructed and Skilled Persons	Sharp Edges	Enclosure	-	-
9	Thermal burn			
Class and Energy Source (e.g. TS1: Keyboard caps)	Body Part (e.g., Ordinary)	Safeguards		
		B	S	R
TS1: Instructed and Skilled Persons	Accessible surfaces	Enclosure	-	-
10	Radiation			
Class and Energy Source (e.g. RS1: PMP sound output)	Body Part (e.g., OrdiAnary)	Safeguards		
		B	S	R
No ionizing radiation produced in the product.	-	-	-	-
Supplementary Information: "B" – Basic Safeguard; "S" – Supplementary Safeguard; "R" – Reinforced Safeguard				

ENERGY SOURCE DIAGRAM

Optional. Manufacturers are to provide the energy sources diagram identify declared energy sources and identifying the demarcations are between power sources. Recommend diagram be provided included in power supply and multipart systems.

Insert diagram below. Example diagram designs are; Block diagrams; image(s) with layered data; mechanical drawings



IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

4	**GENERAL REQUIREMENTS**		P
4.1.1	Acceptance of materials, components and subassemblies	See appended table 4.1.2	P
4.1.2	Use of components	Certified components are used in accordance with their ratings, certifications and they comply with applicable parts of the standard. Components which are not Certified are used in accordance with their ratings and they comply with applicable parts of IEC/EN 62368-1 and applicable component standard. Components, for which no relevant IEC- standard exists, have been tested under the conditions occurring in the equipment, using applicable parts of IEC/EN 62368-1.	P
4.1.3	Equipment design and construction	Equipment is designed with appropriate safeguards. Hazardous parts are not accessible.	P
4.1.4	Specified ambient temperature for outdoor use (°C) .....:	Product is for building-in	N/A
4.1.5	Constructions and components not specifically covered		N/A
4.1.8	Liquids and liquid filled components (LFC)	No liquids or component type used in the construction	N/A
4.1.15	Markings and instructions	(See Annex F)	P
4.4.3	Safeguard robustness	Product is for building-in, to be determined during the end product application	N/A
4.4.3.1	General	See above	N/A
4.4.3.2	Steady force tests		N/A
4.4.3.3	Drop tests		N/A
4.4.3.4	Impact tests		N/A
4.4.3.5	Internal accessible safeguard tests		N/A
4.4.3.6	Glass impact tests	No glass used in the construction	N/A
4.4.3.7	Glass fixation tests	See above	N/A
	Glass impact test (1J)		N/A