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.302**
Date of issue ..... :	**2025/11/10**
Total number of pages ..... :	**73 pages + Attachments**
Name of Testing Laboratory preparing the Report ..... :	TÜV Rheinland of North America, Inc., Pleasanton. 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 62368-1:2014
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_1D
Test Report Form(s) Originator .. :	UL(US)
Master TRF ..... :	Dated 2022-04-14

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. Pleasanton	
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 (39 pages)
Attachment 2: Photographs (4 pages)
Attachment 3: Enclosure Diagram (1 page)

Summary of testing:

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.302: No test performed 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) • Working Voltage Measurement Test (5.4.1.8) • 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, DK, US, AU, NZ, IT, JP

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

☒ **The product fulfils the requirements of EN 62368-1:2014+A11:2017, AS/NZS 62368.1:2018, DS/EN 62368-1:2014, CEI EN 62368-1:2016, J62368-1 (2020), CSA/UL 62368-1:2014**

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:

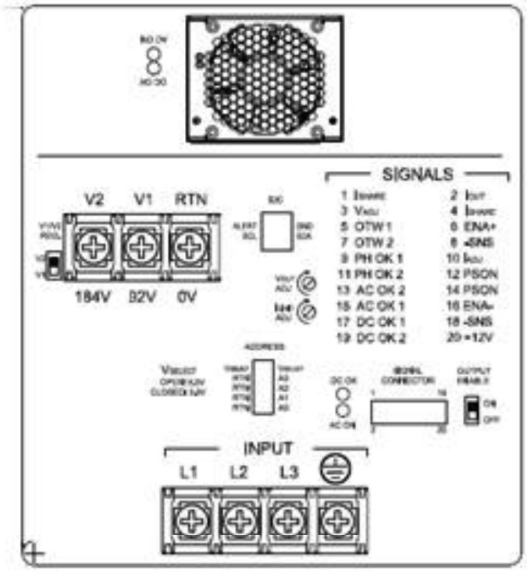
The uncertainties of measurement are calculated by the laboratory based on application of criteria given by OD-5014 for test equipment and application of test methods, decision sheets and operational procedures of IECEE.

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:	
Classification of use by ..... :	☐ Ordinary person ☒ Instructed person ☒ Skilled person ☐ Children likely to be present
Supply Connection ..... :	☒ AC Mains ☐ DC Mains ☐ External Circuit - 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 ☐ mating connector ☐ pluggable equipment type B - ☐ non-detachable supply cord ☐ appliance coupler ☒ permanent connection ☐ mating connector ☐ other:_____
Considered current rating of protective device as part of building or equipment installation ..... :	90A Installation location: ☐ building; ☒ equipment
Equipment mobility ..... :	☐ movable ☐ hand-held ☐ transportable ☐ stationary ☒ for building-in ☐ direct plug-in ☐ rack-mounting ☐ wall-mounted
Over voltage category (OVC) ..... :	☐ OVC I ☒ OVC II ☐ OVC III ☐ OVC IV ☐ other: _____
Class of equipment ..... :	☒ Class I ☐ Class II ☐ Class III ☐ Class II with functional earthing ☐ Not classifed
Access location ..... :	☐ restricted access location ☒ N/A Operator Accessible.
Pollution degree (PD) ..... :	☐ PD 1 ☒ PD 2 ☐ PD 3
Manufacturer's specified maxium operating ambient ..... :	50°C at full load, 60°C at 80% load, 70°C at 55% load
IP protection class ..... :	☒ IPX0 ☐ IP___
Power Systems ..... :	☒ TN ☐ TT ☐ IT - ____ $V_{L-L;}$ ☐ dc mains ☐ N/A
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) ..... :	☒ 3.9kg

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.302)** 2025/06/17 (Report US25X2IS.300)
Date (s) of performance of tests .....:	**N/A (Report US25X2IS.302)** 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:

Product Description –

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.

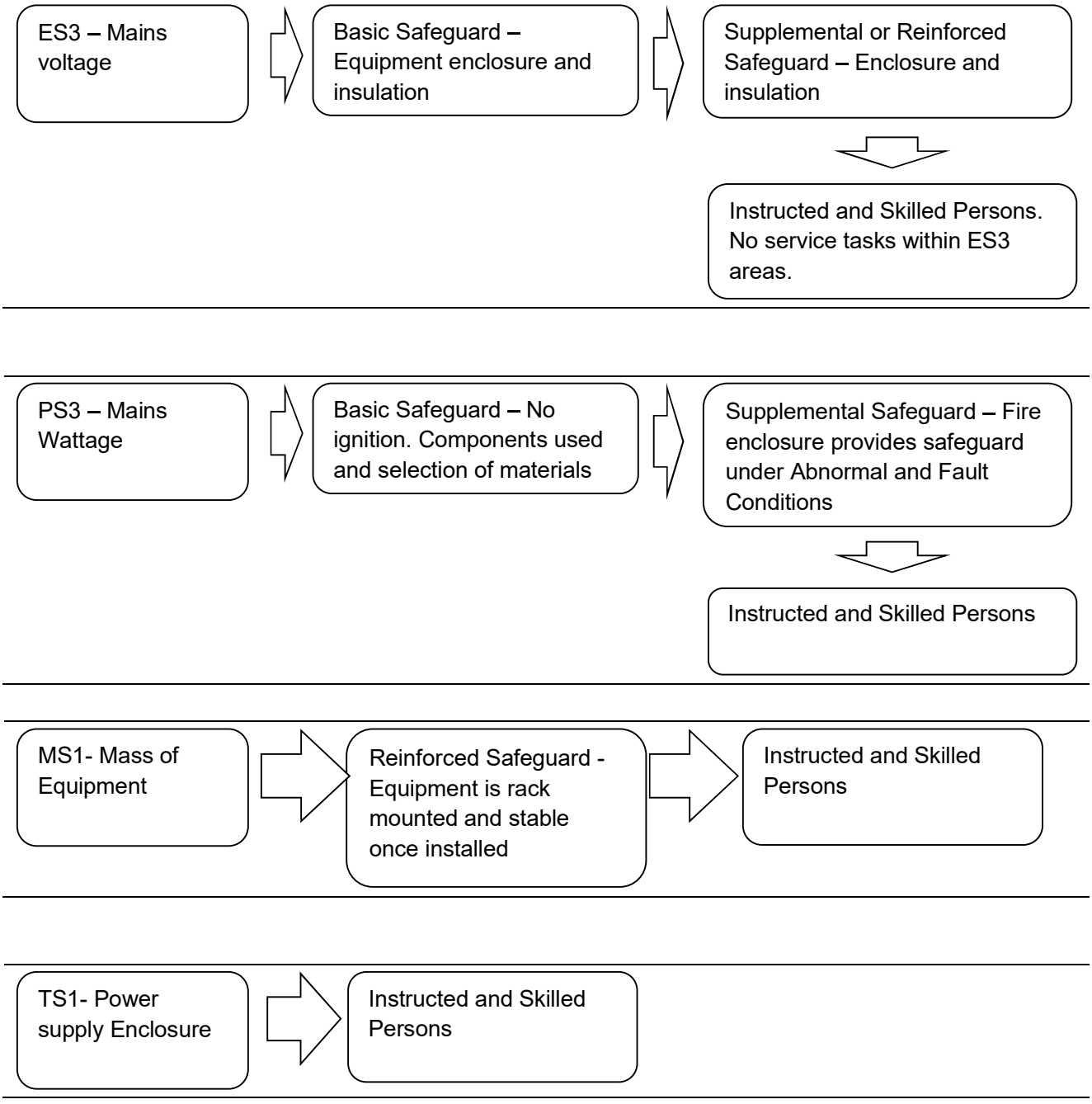
Model Differences: N/A
Additional application considerations – (Considerations used to test a component or sub-assembly): N/A
History of CB report: US25X2IS.300: Original evaluation to IEC/EN 62368-1, 2nd Edition. **US25X2IS.302: This report covers the update correction of the output electrical rating. No additional testing is considered necessary.**

ENERGY SOURCE IDENTIFICATION AND CLASSIFICATION TABLE:	
(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.	
Electrically-caused injury (Clause 5): (Note: Identify type of source, list sub-assembly or circuit designation and corresponding energy source classification) Example: +5 V dc input ES1	
Source of electrical energy	**Corresponding classification (ES)**
Primary circuit	ES3
Power supply output	ES3
Electrically-caused fire (Clause 6): (Note: List sub-assembly or circuit designation and corresponding energy source classification) Example: Battery pack (maximum 85 watts): PS2	
Source of power or PIS	**Corresponding classification (PS)**
Mains circuit	PS3
Output	PS3
Injury caused by hazardous substances (Clause 7) (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	
Source of hazardous substances	**Corresponding chemical**
N/A	-
Mechanically-caused injury (Clause 8) (Note: List moving part(s), fan, special installations, etc. & corresponding MS classification based on Table 35.) Example: Wall mount unit MS2	
Source of kinetic/mechanical energy	**Corresponding classification (MS)**
Mass of equipment	MS1
Sharp edges	MS1
Thermal burn injury (Clause 9) (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	
Source of thermal energy	**Corresponding classification (TS)**
Accessible surface	TS1
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	-

ENERGY SOURCE DIAGRAM

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

☒ **ES** ☒ **PS** ☒ **MS** ☒ **TS** ☐ **RS**



OVERVIEW OF EMPLOYED SAFEGUARDS				
Clause	**Possible Hazard**			
5.1	Electrically-caused injury			
Body Part (e.g. Ordinary)	Energy Source (ES3: Primary Filter circuit)	Safeguards		
		Basic	Supplementary	Reinforced (Enclosure)
Instructed and Skilled Persons	ES3: primary circuit	Enclosure	Earth	Insulation/ Enclosure
Instructed and Skilled Persons	ES3: power supply output	Enclosure	Earth	Insulation/ Enclosure
6.1	Electrically-caused fire			
Material part (e.g. mouse enclosure)	Energy Source (PS2: 100 Watt circuit)	Safeguards		
		Basic	Supplementary	Reinforced
Input	PS3: Mains circuits	Components and selection of materials	Equipment Enclosure	Insulation/ Enclosure
Output	PS3: Output	Components and selection of materials	Equipment Enclosure	Insulation/ Enclosure
7.1	Injury caused by hazardous substances			
Body Part (e.g., skilled)	Energy Source (hazardous material)	Safeguards		
		Basic	Supplementary	Reinforced
No hazardous substances present in the product.	-	-	-	-
8.1	Mechanically-caused injury			
Body Part (e.g. Ordinary)	Energy Source (MS3:High Pressure Lamp)	Safeguards		
		Basic	Supplementary	Reinforced (Enclosure)
Instructed and Skilled Persons	MS1: Mass of Equipment	Enclosure	-	-
Instructed and Skilled Persons	MS1: Sharp Edges	Enclosure	-	-
9.1	Thermal Burn			
Body Part (e.g., Ordinary)	Energy Source (TS2)	Safeguards		
		Basic	Supplementary	Reinforced
Instructed and Skilled Persons	TS1: Accessible surfaces	Enclosure	-	-
10.1	Radiation			
Body Part (e.g., Ordinary)	Energy Source (Output from audio port)	Safeguards		
		Basic	Supplementary	Reinforced
No ionizing radiation produced in the product.	-	-	-	-
Supplementary Information:				
(1) See attached energy source diagram for additional details.				
(2) "N" – Normal Condition; "A" – Abnormal Condition; "S" Single Fault				