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 .....:	E220248-A6034-CB-1
Date of issue .....:	2022-02-07
Total number of pages.....:	57
Name of Testing Laboratory preparing the Report.....:	UL RTP 12 Laboratory Drive, Research Triangle Park , NC, 27709, USA
Applicant's name.....:	**TDK-LAMBDA AMERICAS INC**
Address .....:	**3000 TECHNOLOGY DR, SUITE 100** **PLANO TX 75074** **UNITED STATES**
Test specification:	
Standard .....:	IEC 62368-1: 2018
Test procedure.....:	CB Scheme
Non-standard test method.....:	N/A
TRF template used .....:	IECEE OD-2020-F1:2020, Ed.1.3
Test Report Form No.....:	IEC62368_1E
Test Report Form(s) Originator...:	UL(US)
Master TRF.....:	Dated 2021-02-04

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 .....:	DC to DC Converter
Trade Mark(s) .....:	TDK or TDK-Lambda
	TDK-Lambda
Manufacturer.....:	TDK-LAMBDA AMERICAS INC 3000 Technology Dr, Suite 100 Plano TX 75074 UNITED STATES
Model/Type reference .....:	DDA***(N or I)-%%%%-xxxx–(bbb); Where "***" represents rated output power between 0W and 999W, based on the installed dc-dc power unit's rating. N = non-isolated, I = operational insulation / isolated. %%%% denotes number of outputs, number of modules and polarity (e.g. S1PX = single unit, positive or D2PN = dual output, two modules, one positive and one negative output) xxxx indicates a number indicating magnitude of nominal voltage set point (e.g. 1205 = one 12V and 5V) bbb indicates feature set.. e.g. (on off logic, power good feature present)
Ratings .....:	Optional Input: 4.5 - 75 VDC range, Max 40.A; Output 0.5 - 52 VDC, 35 A Max, (Depending on DC converters employed.)

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**CB Testing Laboratory:**		
Testing location/ address .....:		UL RTP, 12 Laboratory Drive, Research Triangle Park , NC, 27709, USA	
Tested by (name, function, signature).....:		Mengis Tesfay / Project Handler	Mengis Tesfay
Approved by (name, function, signature) ..:		Scott Shepler / Reviewer	Scott Shepler
☐	**Testing procedure: CTF Stage 1:**		
Testing location/ address .....:			

Tested by (name, function, signature)..... :		
Approved by (name, function, signature) .. :		
☒ **Testing procedure: CTF Stage 2:**		
Testing location/ address ..... :	TDK-LAMBDA AMERICAS INC., 3320 MATRIX DR., SUITE 100, RICHARDSON TX 75082, USA	
Tested by (name, function, signature)..... :	Steven F McKitrick - / Tester	See original CBTR for signatures
Witnessed by (name, function, signature) . :	Mengis Tesfay / Project Handler	See original CBTR for signatures
Approved by (name, function, signature) .. :	Scott Shepler / Reviewer	See original CBTR for signatures
☐ **Testing procedure: CTF Stage 3:**		
☐ **Testing procedure: CTF Stage 4:**		
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):

National Differences (29 pages)
Enclosures (11 pages)

Summary of testing:

Tests performed (name of test and test clause):	**Testing Location:** **CTF Stage 2: TDK-LAMBDA AMERICAS INC.,** **3320 MATRIX DR., SUITE 100,** **RICHARDSON TX 75082, USA**
B.2.5 – INPUT TEST: SINGLE PHASE	Testing conducted in accordance with IEC62368-1, 2nd Edition, CAN/CSA-C22.2 NO. 62368-1 2nd Ed, Issued December 1, 2014, and UL 62368-1 2nd Ed, Issued December 1, 2014, was considered representative to the test required per UL62368-1, 3rd Ed December 13, 2019; CAN/CSA-C22.2 No. 62368-1, 3rd Ed December 13, 2019; and IEC62368-1:2018, 3rd Ed. Test was covered under E220248-A6001-CB.
B.1.5, B.2.6, 5.4.1.4, 6.3, 9.3 - NORMAL OPERATING CONDITIONS TEMPERATURE MEASUREMENT	Testing conducted in accordance with IEC62368-1, 2nd Edition, CAN/CSA-C22.2 NO. 62368-1 2nd Ed, Issued December 1, 2014, and UL 62368-1 2nd Ed, Issued December 1, 2014, was considered representative to the test required per UL62368-1, 3rd Ed December 13, 2019; CAN/CSA-C22.2 No. 62368-1, 3rd Ed December 13, 2019; and IEC62368-1:2018, 3rd Ed. Test was covered under E220248-A6001-CB.
B.3 - SIMULATED ABNORMAL OPERATING CONDITIONS	Testing conducted in accordance with IEC62368-1, 2nd Edition, CAN/CSA-C22.2 NO. 62368-1 2nd Ed, Issued December 1, 2014, and UL 62368-1 2nd Ed, Issued December 1, 2014, was considered representative to the test required per UL62368-1, 3rd Ed December 13, 2019; CAN/CSA-C22.2 No. 62368-1, 3rd Ed December 13, 2019; and IEC62368-1:2018, 3rd Ed. Test was covered under E220248-A6001-CB.
B.4 - SIMULATED SINGLE FAULT CONDITIONS	Testing conducted in accordance with IEC62368-1, 2nd Edition, CAN/CSA-C22.2 NO. 62368-1 2nd Ed, Issued December 1, 2014, and UL 62368-1 2nd Ed, Issued December 1, 2014, was considered representative to the test required per UL62368-1, 3rd Ed December 13, 2019; CAN/CSA-C22.2 No. 62368-1, 3rd Ed December 13, 2019; and IEC62368-1:2018, 3rd Ed. Test was covered under E220248-A6001-CB.
ANNEX F.3.10 – TEST FOR THE PERMANENCE OF MARKINGS	Testing conducted in accordance with IEC62368-1, 2nd Edition, CAN/CSA-C22.2 NO. 62368-1 2nd Ed, Issued December 1, 2014, and UL 62368-1 2nd Ed, Issued December 1, 2014, was considered representative to the test required per UL62368-1, 3rd Ed December 13, 2019; CAN/CSA-C22.2 No. 62368-1, 3rd Ed December 13, 2019; and IEC62368-1:2018, 3rd Ed. Test was covered under E220248-A6001-CB.

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

EU Group and National Differences, USA / Canada

☒ **The product fulfils the requirements of** EN IEC 62368-1:2020+A11:2020

Statement concerning the uncertainty of the measurement systems used for the tests

☐ **Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:**

Procedure number, issue date and title:

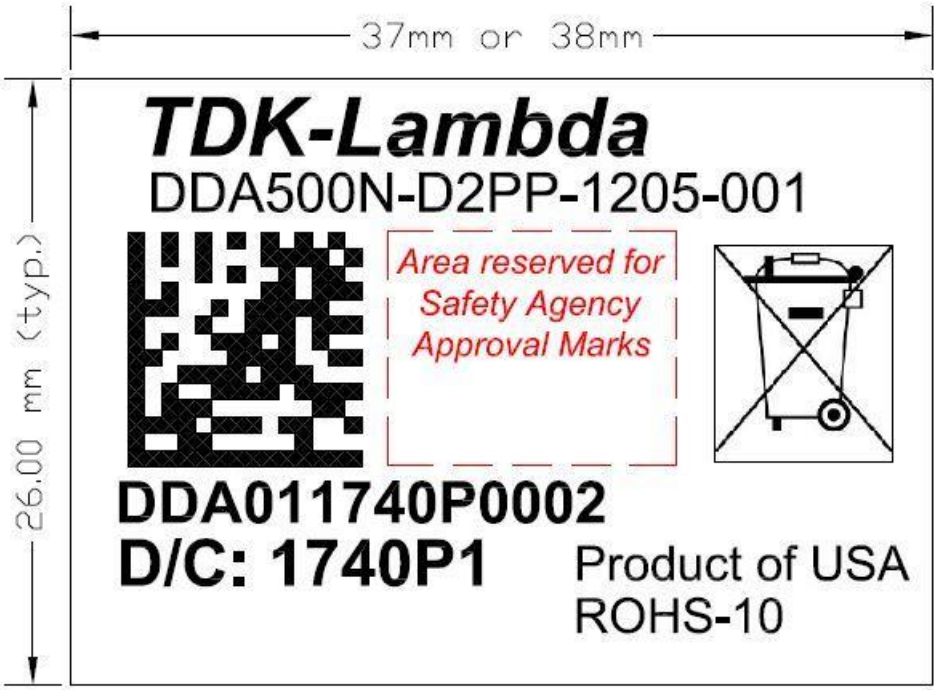
Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

☒ **Statement not required by the standard used for type testing**

(Note: When IEC or ISO standard requires a statement concerning the uncertainty of the measurement systems used for tests, this should be reported above. The informative text in parenthesis should be delete in both cases after selecting the applicable option)

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.



Note: The above markings are the minimum requirements required by the safety lab. For the final production samples, the additional markings which do not give rise to misunderstanding may be added.

Test item particulars:	
Product group	end product
Classification of use by	Ordinary person
Supply Connection	not mains connected: ES1
Supply tolerance	None
Supply connection – type	Not directly connected to Mains. For building in
Considered current rating of protective device	N/A - Consider in end product installation. A;
Equipment mobility	for building-in
Over voltage category (OVC)	OVC II OVC II
Class of equipment	Not Classified
Special installation location	N/A 0
Pollution degree (PD)	PD 2
Manufacturer's specified Tma (°C)	25°C
IP protection class	IPX0
Power systems	not AC mains
Altitude during operation (m)	2000 m or less
Altitude of test laboratory (m)	2000 m or less
Mass of equipment (kg)	0.25kg
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 .....:	2018-05-23, 2018-05-28
Date (s) of performance of tests .....:	2018-05-30, 2018-06-07
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.**	
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 AMERICAS INC 3000 Technology Dr, Suite 100 Plano TX 75074 UNITED STATES TDK-LAMBDA MALAYSIA SDN BHD PLO33 KAWASAN PERINDUSTRIAN SENAI 81400 SENAI JOHOR MALAYSIA

General product information and other remarks:

Product Description

The DC to DC converter DDA product family consists of PCB, one or two separately certified DC-DC converter modules and installed in a mounting DIN enclosure. The enclosure is intended to be purchased and mounted on a DIN rail and used as a component in an end-user's power system. The equipment shall be supplied from a DC source that provides double/reinforced insulation from AC mains.

Model Differences

All models within series constructed the same except for the internal DC to DC converter module employed. Rating and model designation are also dependent on converter module employed.

Additional Information

This report is based on CB report references E220248-A6001-CB-1, Amendment 1, and Correction 1, with CB Test Certificate Ref. US-32195-UL, US-32195-M1-UL, and US-32195-A1-UL respectively, which was previously evaluated to UL 62368-1, 2nd Edition, 2014-12-01, CSA C22.2 No. 62368-1- 14, 2nd Edition, 2014-12, and IEC 62368-1:2014.

Testing conducted in accordance with UL 62368-1, 2nd Edition, 2014-12-01, CSA C22.2 No. 62368-1-14, 2nd Edition, 2014-12, and IEC 62368-1:2014, was deemed equivalent to the test required per UL62368-1, 3rd Ed December 13, 2019; CAN/CSA-C22.2 No. 62368-1, 3rd Ed December 13, 2019; and IEC62368-1:2018, 3rd Ed.

All original sample and test dates are noted in the testing portion of this report.

The nameplate included in the report is representative of all models covered under this report.

Technical Considerations

- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of : 25°C
- The product is intended for use on the following power systems : No direct connection
- Considered current rating of protective device as part of the building installation (A) : To be considered in end product installation.
- Mains supply tolerance (%) or absolute mains supply : No direct connection
- The equipment disconnect device is considered to be : No direct connection to Mains
- The following are available from the Applicant upon request : Installation (Safety) Instructions / Manual
- The product was investigated to the following additional standard : EN IEC 62368-1:2020+A11:2020

Engineering Conditions of Acceptability

When installed in an end-product, consideration must be given to the following:

- The following output circuits are at ES1 energy levels : None
- The following output circuits are at PS3 energy levels : All
- The maximum investigated branch circuit rating is : To be considered in end product installation.
- The investigated Pollution Degree is : 2
- The following end-product enclosures are required : Electrical, Fire
- The maximum continuous power supply output (Watts) relied on forced air cooling from : 504 W fan at 30.5 cfm applied to 63 cm away on the side of unit.
- The power supply was evaluated to be used at altitudes up to : "2,000 m"
- The output voltage range will be between 0.6V and 40Vdc
- depending upon the converter employed.