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-A6025-CB-1
Date of issue .....:	2021-12-07
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

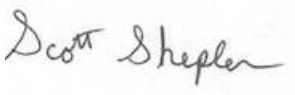
If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

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-DC Converter
Trade Mark(s) .....:	TDK
Manufacturer.....:	TDK-LAMBDA AMERICAS INC 3000 TECHNOLOGY DR, SUITE 100 PLANO TX 75074 US
Model/Type reference .....:	i3A4W***A%%%V-0xx(-R) Where 4W represents input Voltage between 9 - 53 VDC 10 A Max input current *** represents rated output current between 0 A - 10A, %%% represents rated output voltage between 0 V dc to 30 Vdc. and 0xx indicates a number of alphanumeric characters to denote non safety features. It may also be followed by optional "-R " to denote RoHS compliance. Model examples: i3A4W005A150V-0xx(-R) i3A4W008A033V-0xx(-R)
Ratings .....:	Optional: Rated input Voltage 9-53 VDC Rated Input Current 10 A Rated Power 100 W Rated output: 30 VDC max; 10 A max.

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	
Approved by (name, function, signature) ..:	Scott Shepler / Reviewer	
☐ **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 SUITE 100 3320 MATRIX DR RICHARDSON TX 75082 UNITED STATES	
Tested by (name, function, signature)..... :	Steve McKitrick / Tester	See original CBTR for signatures
Witnessed by (name, function, signature) . :	P. Mobs / Project Handler	See original CBTR for signatures
Approved by (name, function, signature) .. :	K. Kreuzer / 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 (58 pages)	
Summary of testing:	
Tests performed (name of test and test clause):	**Testing Location:** **CTF Stage 2: TDK-LAMBDA AMERICAS INC** **SUITE 100** **3320 MATRIX DR** **RICHARDSON TX 75082** **UNITED STATES**
B.2.5 – INPUT TEST: SINGLE PHASE	Testing conducted in accordance with IEC 60950-1:2005 (Second Edition), Am1:2009 + Am2:2013; UL 60950-1, 2nd Edition, 2014-10-14; and CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10, and was deemed equivalent to the test required by 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. This test was also 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.
B.1.5, B.2.6, 5.4.1.4, 6.3, 9.3 - NORMAL OPERATING CONDITIONS TEMPERATURE MEASUREMENT	Testing conducted in accordance with IEC 60950-1:2005 (Second Edition), Am1:2009 + Am2:2013; UL 60950-1, 2nd Edition, 2014-10-14; and CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10, and was deemed equivalent to the test required by 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. This test was also 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.
B.3 - SIMULATED ABNORMAL OPERATING CONDITIONS	Testing conducted in accordance with IEC 60950-1:2005 (Second Edition), Am1:2009 + Am2:2013; UL 60950-1, 2nd Edition, 2014-10-14; and CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10, and was deemed equivalent to the test required by 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. This test was also 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.
B.4 - SIMULATED SINGLE FAULT CONDITIONS	Testing conducted in accordance with IEC 60950-1:2005 (Second Edition), Am1:2009 + Am2:2013; UL 60950-1, 2nd Edition, 2014-10-14; and CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10, and was deemed equivalent to the test required by 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. This test was also 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.

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	--
Classification of use by	Instructed person
Supply Connection	not mains connected: ES1
Supply tolerance	None
Supply connection – type	For building in. To be considered in end system
Considered current rating of protective device	N/A
Equipment mobility	for building-in
Over voltage category (OVC)	OVC I
Class of equipment	Not Classified
Special installation location	N/A 0
Pollution degree (PD)	PD 2
Manufacturer's specified Tma (°C)	25
IP protection class	IPX0
Power systems	--
Altitude during operation (m)	2000 m or less
Altitude of test laboratory (m)	180 m m
Mass of equipment (kg)	0.1
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 .....:	2017-02-20, 2019-09-04
Date (s) of performance of tests .....:	2017-02-20 to 2017-05-16, 2019-09-04
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 US

TDK-LAMBDA MALAYSIA SDN BHD
PLO33 KAWASAN PERINDUSTRIAN SENAI
SENAI JOHOR 81400 Malaysia

General product information and other remarks:

Product Description

EUT is high density non-Isolated DC-DC Converter modules. The converters are provided with input terminal pins for factory installation onto a printed wiring board with a connection to a dc source of supply and output terminal pins.

Model Differences

All models are identical except for minor changes to the components based upon the output voltage rating of the unit.

Additional Information

This report is based on CB report references E220248-A6005-CB-1 and CB Test Certificate Ref. US-34429-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.

Marking label provided represents all models in series.

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) : For building in. To be considered in end system. Device was evaluated with a 20 A external overcurrent protective device.
- Mains supply tolerance (%) or absolute mains supply : No direct connection
- The equipment disconnect device is considered to be : To be considered in end system
- 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 : All input and output
- The following output circuits are at PS3 energy levels : Outputs: 1.8 Vdc, 2.5 Vdc and 3.3 Vdc
- The maximum investigated branch circuit rating is : For building in. To be considered in end system. Device was evaluated with a 20 A external overcurrent protective device.
- The investigated Pollution Degree is : 2
- The following end-product enclosures are required : Fire, Electrical
- A heating test shall be considered in the end product. The PWB is rated 130°C.