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-A6036-CB-1
Date of issue.....:	2024-10-18 ; Amendment 1 : 2025-12-10
Total number of pages .....:	16
Name of Testing Laboratory preparing the Report .....:	UL Solutions RTP
Applicant's name.....:	**TDK-LAMBDA AMERICAS INC**
Address .....:	**3000 TECHNOLOGY DR, SUITE 100** **PLANO TX 75074** **UNITED STATES**
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

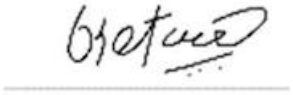
This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

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 .....:	DC-To-DC Converters
Trade Mark(s) .....:	TDK, TDK-Lambda
Manufacturer .....:	TDK-LAMBDA AMERICAS INC 3000 Technology Dr, Suite 100 Plano TX 75074 UNITED STATES
Model/Type reference .....:	i9Czz***A%%%V-xxx(-R) Where "zz" may be 4W or 2W OR can be any two alphanumeric characters that represents input voltage between 9 to 80 VDC, 60 A max current Where "***" may be rated output current up to max 30 A. Where "%%%" represent rated output voltage between 9.5 to 60 VDC and 'xxx" indicates a number of alphanumeric characters for non safety features. Optional "-R" may be to denote RoHS compliance i9Cyy&&&A###V-xxx(-R) Where "yy" may be 4W or 2W OR can be any two alphanumeric characters that represents input voltage between 9 to 60 VDC, 60 A max current Where "&&&" may be rated output current up to max 50 A. Where "###" represent rated output voltage between 5 to 36 VDC and 'xxx" indicates a number of alphanumeric characters for non safety features. Optional "-R" may be to denote RoHS compliance
Ratings .....:	Not required. Optional.

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	CB Testing Laboratory:		
Testing location/ address .....:		UL Solutions RTP 12 Laboratory Drive, Durham 27713, NC, USA	
Tested by (name, function, signature).....:		Edward Martin / Project Handler	
Approved by (name, function, signature).....:		Michael Lockhart / 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 3000 Technology Dr. Suite 100 Plano, TX 75074 USA	
Tested by (name, function, signature).....:	Ketan Patel / Tester	
Witnessed by (name, function, signature) ...:	Edward Martin / Project Handler	
Approved by (name, function, signature).....:	Michael Lockhart / Reviewer	
☐ 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 (0 pages)
Enclosures (31 pages)

Summary of testing:

Tests performed (name of test and test clause):	**Testing Location:**
	Unless otherwise noted, test are all conducted in CTF Stage 2: TDK-LAMBDA AMERICAS INC 3000 Technology Dr. Suite 100 Plano, TX 75074 USA
B.2.5 – INPUT TEST: SINGLE PHASE	
B.2.6, 5.4.1.4, 6.3, 9.2, B.1.6 – NORMAL OPERATING CONDITIONS TEMPERATURE MEASUREMENT	
B.3 – SIMULATED ABNORMAL OPERATING CONDITIONS	
B.4 – SIMULATED SINGLE FAULT CONDITIONS	

Summary of compliance with National Differences:

List of countries addressed: Australia - AU / New Zealand - NZ, EU Group Differences, Japan - JP, United States of America - US / Canada - CA

☒ **The product fulfils the requirements of:** AS/NZS 62368.1:2018,
EN 62368-1:2014+A11:2017,
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.

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:	
Classification of use by	Instructed person
Supply Connection	External Circuit - not Mains connected ES2
Supply % Tolerance	None
Supply Connection – Type	No direct connection to Mains. Considered in the end-product
Considered current rating of protective device as part of building or equipment installation	60 A; equipment
Equipment mobility	for building-in
Over voltage category (OVC)	OVC I
Class of equipment	Not classified
Access location	N/A
Pollution degree (PD)	PD 2
Manufacturer's specified maximum operating ambient (°C)	117 C at baseplate
IP protection class	IPX0
Power Systems	N/A
Altitude during operation (m)	5000 m
Altitude of test laboratory (m)	2000 m or less
Mass of equipment (kg)	0.08

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	2025-10-21
Date (s) of performance of tests	2025-11-18 to 2025-11-19

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:

Report Summary

The original report was modified on 2025-12-10 to include the following changes/additions:
Amendment 1 (Technical) – Update report E220248-A6036-CB-1 - Limited testing was deemed necessary to add model i9Cyy&&&A###V-xxx(-R) based on similarity to model i9Czz***A%%%V-xxx(-R). The new model is identical to previous except uses different inductor and thermistor to increase maximum output current rating from 30A to 50A. Product is derated such that the maximum output power is still the same 1500W. Additionally, no testing was deemed necessary to increase the maximum rated altitude from 2000m to 5000m.

Product Description

The i9C product family consists of non-isolated DC-DC power modules intended to be used as a component in an end-user's power system. The modules will be offered in multiple input voltage and output voltage ranges. The rated output power will be 1500W or less.

Model Differences

Model series i9Cyy&&&A###V-xxx(-R) is identical to model series i9Czz***A%%%V-xxx(-R) except for inductor, thermistor, and ratings.

All models within the series are similar except for input rating, output rating, and size of inductor.

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

Amendment 1 (Technical) – Update report E220248-A6036-CB-1 - Limited testing was deemed necessary to add model i9Cyy&&&A###V-xxx(-R) based on similarity to model i9Czz***A%%%V-xxx(-R). The new model is identical to previous except uses different inductor and thermistor to increase maximum output current rating from 30A to 50A. Product is derated such that the maximum output power is still the same 1500W. Additionally, no testing was deemed necessary to increase the maximum rated altitude from 2000m to 5000m.

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 : 117°C at baseplate
- 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) : N/A. For building in.
- Mains supply tolerance (%) or absolute mains supply values : No direct connection
- The equipment disconnect device is considered to be : N/A
- The following are available from the Applicant upon request : Installation (Safety) Instructions / Manual
- The product was investigated to the following additional standards : EN 62368-1:2014 + A11:2017

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

- The following output circuits are at ES2 energy levels : All
- The following output circuits are at PS3 energy levels : Output Terminal
- The investigated Pollution Degree is : 2
- An investigation of the protective bonding terminals has : not been conducted
- The following end-product enclosures are required : Electrical, Fire
- The units provide Functional Insulation only between input and output circuits.
- Tests conducted in wind tunnel with 900 lfm (550CFM). Heating Test shall be evaluated in end product. The following components require special consideration during end-product Thermal (Heating) tests: 117°C at baseplate.
- This component has been evaluated in 'control of fire spread' method assuming appropriate fire enclosure is provided in end product. Unless the fire enclosure is made of non-combustible or V-0 material, the separation from the PIS shall be considered
- Classification of PIS has not been conducted. Therefore, all electrical components and conductors including printed wirings were assumed to be arcing/resistive PIS.
- Power to the DC-DC Converter is intended to be supplied by isolated secondary circuitry in an end use application.
- Output voltage may be adjusted for up to the maximum fixed output power (i.e. maximum output current is decreased). When the output voltage is adjusted down, the maximum output current is fixed (i.e. available output power is decreased).
- ES Classification of EUT is to be verified during end product. Declared ES2, but the converter is non-isolating and it is to be used by Instructed or Skilled person.
- For models in the i9Cyy&&&A###V-xxx(-R) family, see the derating curves in enclosure 04-02.