Test Report issued under the responsibility of:

VDE

TEST REPORT

IEC 60950-1

Information technology equipment – Safety – Part 1: General requirements

Report Number. .....:	**207809-CI3-3**	CB DE1- 9640/A2
Date of issue .....:	**2015-03-12**	
Total number of pages.....	**128**	
Applicant's name.....:	TDK-Lambda Americas Inc.	
Address .....:	3320 Matrix Drive, Richardson, TX, 75082	
Test specification:		
Standard .....:	DIN EN 60950-1 (VDE 0805-1):2014-08 EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013 IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am 2:2013	
Test procedure .....:	VDE ÜG, CB Scheme	
Non-standard test method.....:	N/A	
Test Report Form No.....:	IEC60950_1F	
Test Report Form(s) Originator.....:	SGS Fimko Ltd	
Master TRF .....:	Dated 2014-02	

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 ..... :	Component DC DC Converter for use with IT Equipment
Trade Mark ..... :	TDK and/or INNOVETA and/or TDK·Lambda
Manufacturer ..... :	TDK-Lambda Americas Inc. 3320 Matrix Drive, Richardson, TX, 75082
Model/Type reference ..... :	iFB– Series (See model matrix page 3)

10004095 ..... Structure of type name: 10004560 ..... Type difference:	Optional "-R" appended to product code to indicate ROHS compliance.eg**.** iFB48050A120V -0### -R
Ratings ..... :	
10003893 Rated voltage……..…..:	DC 36 - 75 V DC 36 - 60 V (ELV/SELV) DC 36 - 75 V(TNV), max. 19 A (SELV) See model Matrix, page 3
10004017 Rated current……..…..:	Max. 19 A, See model Matrix, page 3
10004112 Rated power……..…..:	Max. Output Power 600 W, See model Matrix, page 3
10004029 Rated frequency……..…..:	DC
10003951 Output voltages and currents……..…..:	DC 8.0 – 12.0 V, 58 A, 600 W max. (SELV) See model Matrix, page 3
Supplementary information: The above listing was introduced only for internal VDE administration process.	

MODEL #	Input Voltage (V)	Max Input Current (1)	Output Voltage (2)	Output Current	max. Output Power
iFB48050A120V-xxx	36 -75	18.7 A	12 V	50 A	600 W
iFB48042A120V-xxx	36 -75	15 A	12 V	42 A	500 W
iFB48050A108V-xxx	36 -75	16.5 A	10.8 V	50 A	540 W
iFB48058A096V-xxx	36 -75	18.5 A	9.6 V	58 A	557 W
iFB48055A096V-xxx	36 -75	16 A	9.6 V	55 A	528 W
iFB48058A083V-xxx	36 -75	15 A	8.3 V	58 A	481 W

The DC-DC Converters are not internally fused. An external input line fuse is required. The external fuse ratings see data sheets (Appendix 7)

The label includes: Optional "-R" appended to product code to indicate ROHS compliance.eg**.** iFB48050A120V -0### -R

Testing procedure and testing location:			
☒	**CB Testing Laboratory:**	VDE Prüf- und Zertifizierungsinstitut GmbH VDE *Testing and Certification Institute*	
Testing location/ address.....:		Section CI3 Merianstrasse 28, D-63069 Offenbach, Germany	
☐	**Associated CB Testing Laboratory:**		
Testing location/ address.....:			
Tested by (name + signature).....:		(authorization of test report)	
Approved by (name + signature).....:			
☐	**Testing procedure: TMP/CTF Stage 1:**		
Testing location/ address.....:			
Tested by (name + signature).....:			
Approved by (name + signature).....:			
☒	**Testing procedure: WMT/CTF Stage 2:**		
Testing location/ address.....:		TDK-Lambda Americas Inc. 3320 Matrix Drive, Suite 100, Richardson, Texas 75082, USA WMT/CTF Stage 2 (TDAP, VDE File No. 2520400-9501-0001)	
Tested by (name + signature).....:		Steve McKitrick	Steven J McKitrick
Witnessed by (name + signature).....:		Günter Straube	G. Straube
Approved by (name + signature).....:		Richard Mallmann	R. Mallmann
☐	**Testing procedure: SMT/CTF Stage 3 or 4:**		
Testing location/ address.....:			
Tested by (name + signature).....:			
Witnessed by (name + signature).....:			
Approved by (name + signature).....:			
Supervised by (name + signature).....:			

List of Attachments (including a total number of pages in each attachment):		
Appendix No.	Description	Page(s)
1	Photos	125 - 1 28

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
1.5 Components 1.6 Power interface 1.7 Marking and instructions 2.2 SELV circuits 2.9 Electrical insulation 2.10 Clearances, creepage distances and distances through insulation 3.1 General 4.3 Design and construction 4.4 Protection against hazardous moving parts 4.5 Thermal requirements 4.7 Resistance to fire 5.2 Electric strength 5.3 Abnormal operating and fault conditions **See main test report**	**TDK-Lambda Americas Inc.** **3320 Matrix Drive, Suite 100, Richardson, Texas 75082, USA** **WMT (TDAP under File No. 2520400-9501-0001)**

Summary of compliance with National Differences: **List of countries addressed**				
The product has been tested according to standard IEC 60950-1:2005 (2nd Edition); am1:2009 / EN 60950-1:2006/A11:2009/A1:2010/A12:2011 and those deviations taken into account of				
☐ CENELEC common modifications		☒ United Kingdom	☐	☐
☒ Finland	☒ Denmark	☒ Ireland	☐	☐
☒ Sweden	☒ Germany	☒ Spain	☐	☐
☒ Norway	☒ Switzerland	☐	☐	☐
☒ **CB Bull. NATIONAL DIFFERENCES IEC 60950-1:2005 (2nd Edition)**				
☒ Switzerland	☒ Finland	☒ Norway	☒ USA	☐
☒ Germany	☒ United Kingdom	☒ Sweden	☐ Israel	☐
☒ Denmark	☒ Ireland	☒ Group Differences	☐ Australia	☐
☒ Spain	☐ Korea	☒ Canada	☐ New Zealand	☐
For national and cenelec differences refer to main test report ☒ **The product fulfils the requirements of** DIN EN 60950-1 (VDE 0805-1):2014-08 EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013 IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am 2:2013				

Test item particulars.....:	
Equipment mobility.....:	[] movable [] hand-held [] transportable [] stationary [x] for building-in [] direct plug-in
Connection to the mains.....:	[] pluggable equipment [] type A [] type B [] permanent connection [] detachable power supply cord [] non-detachable power supply cord [x] not directly connected to the mains
Operating condition.....:	[x] continuous [] rated operating / resting time:
Access location .....:	[] operator accessible [] restricted access location
Over voltage category (OVC) .....:	[] OVC I [] OVC II [] OVC III [] OVC IV [X] other: DC supplied
Mains supply tolerance (%) or absolute mains supply values .....:	
Tested for IT power systems .....:	[] Yes [x] No
IT testing, phase-phase voltage (V) .....:	
Class of equipment .....:	[] Class I [] Class II [X] Class III [] Not classified
Considered current rating of protective device as part of the building installation (A) .....:	
Pollution degree (PD) .....:	[] PD 1 [x] PD 2 [] PD 3
IP protection class .....:	IPX0
Altitude during operation (m) .....:	≤ 2000 m
Altitude of test laboratory (m) .....:	app. 180m
Mass of equipment (kg) .....:	<18kg

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 .....:	2015-02-17
Date (s) of performance of tests.....:	2015-02-17 to 2015-03-12

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 see VDE construction form 131 ..... :	☒ **Yes** ☐ **Not applicable (one factory)**

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) ..... :	30014661 TDK-Lambda Americas Inc. 3320 Matrix Drive, Suite 100, Richardson, Texas 75082, USA 30017287 TDK-Lambda Malaysia Sdn. Bhd. PLO 33 Kawasan Perindustrian Senai; Locked Bag No. 110; SENAI, JOHOR 81400; Johor; Malaysia

General product information:

Operating Conditions:
Units are components within customers end-use system. Input to converters is DC 36 – 75 V
The units were tested with a maximum continuous output. (Refer to previous Testreport)
The Electrical and Fire Enclosures are to be provided by the end product.
The power models are not internally fused. An external input line normal blow fuse with a max. value of 20 A is required.

Product Overview:
The 48 V nominal input iFB product family consists of high density DC-DC power converter modules intended to be purchased and used as a component in an end-user's power system. The input voltage range is from **DC 36 – 75 V**. The output voltage range from DC 8 V to 12 V depending upon the model number. The product is available in one mechanical configuration – the iFB
The rated output current will be up to 58 A., the output power max. 600 W (see previous Test Report for details).
The maximum temperature is specified with 120 °C at reference point (T2)
This DC-DC power converter module provides **Basic insulation**, between input and output.

The DC-DC Converters are not internally fused. An external input line fuse is required. The external fuse ratings see data sheets (Appendix 7)

Information/comments:
Tests were performed on models of the highest power code:
iFB48050A120V and iFB48058A096V tests performed by previous Test Report. For the upgrade are no tests required.

Model Differences: See attached model matrix (Appendix 3)
The label includes:
Optional "-R" appended to product code to indicate ROHS compliance.eg**.** iFB48050A120V -0### -R
For more detail and test results see previous Test Reports

Abbreviations used in the report:

- normal conditions	**N.C**.	- single fault conditions	**S.F.C**
- functional insulation	**OP**	- basic insulation	**BI**
- double insulation	**DI**	- supplementary insulation	**SI**
- between parts of opposite polarity	**BOP**	- reinforced insulation	**RI**

Indicate used abbreviations (if any)

Information to test report reference No. :	
VDE Test- and Certification Institute GmbH Merianstrasse 28 D - 63069 Offenbach	DIN EN 60950-1 (VDE 0805-1):2014-08 EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013 IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am 2:2013

Test item description:	Component DC-DC Converters for building-in in IT-equipment
Made by :	TDK-Lambda Americas Inc. 3320 Matrix Drive, Richardson, TX, 75082
Trade mark :	TDK and/or INOVETA and/or TDK·Lambda
Model/type ref. :	iFB Series
Rated :	Input: D DC 36 - 75 V DC 36 - 60 V (ELV/SELV) DC 36 - 75 V(TNV), max. 19 A (SELV) See model Matrix, page 3 Output: DC 8 -12 V, max. 58 A, max. 600 W (SELV) See model Matrix, page 3

Commission received from	Steve.Mc Kitrick	Date:	2015-01-16

Modification on the appliance:

1.	Testing to: DIN EN 60950-1 (VDE 0805-1):2014-08 EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013 IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am 2:2013