



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-A6006-CB-1
Date of issue.....: 2019-09-18
Total number of pages: 60

Applicant's name.....: **TDK-LAMBDA AMERICAS INC**
Address: **SUITE 100**
3320 MATRIX DR
RICHARDSON TX 75082
UNITED STATES

Name of Test Laboratory: UL RTP
preparing the Report: 12 Laboratory Drive, Research Triangle Park , NC, 27709, USA


Test specification:
Standard: IEC 62368-1:2014 (Second Edition)
Test procedure: CB Scheme
Non-standard test method.....: N/A


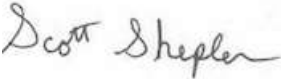
Test Report Form No.....: IEC62368_1B
Test Report Form(s) Originator: UL(US)
Master TRF.....: 2014-03

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Test Item description	: DC-DC Converter
Trade Mark	TDK 
Manufacturer	TDK-LAMBDA AMERICAS INC SUITE 100 3320 MATRIX DR RICHARDSON TX 75082 UNITED STATES
Model/Type reference	i6A series, (See model matrix) Models i6A24***A%%V-0xx(-R), where 24 represents nominal input voltage, with a 9-40Vdc input *** represents rated output current between 0A - 14A, %%% represents rated output voltage between 0.6Vdc – 28Vdc and 0xx indicates a number or alphanumeric character which affects non safety related features Optional –R indicated RoHS compliance i6A24***A%%V-Nxx(-R) where 24 represents nominal input voltage, with a 9-40Vdc input where *** represents rated output current between 0A - 8A, %%% represents rated output voltage between -0.6Vdc – -30Vdc and Nxx indicates a number or alphanumeric character which affects non safety related features. The “N” indicates the output voltage polarity is inverted with respect to the input voltage polarity. Optional –R indicated RoHS compliance i6A4W***A%%V-0xx(-R) where 4W represents input voltage between 9-55Vdc input *** represents rated output current between 0A - 20A, 4W represents input voltage between 9-55Vdc input %%% represents rated output voltage between 0.6Vdc – 15Vdc and 0xx indicates a number or alphanumeric character which affects non safety related features. Optional –R indicated RoHS compliance
Ratings	Optional: Model i6A24***A%%V-0xx(-R), Input: 9-40Vdc, 15 A Output: 0.6 VDC to 28 VDC, 14 A max, 250W

		Model i6A24***A%%V-Nxx(-R) Input: 9-40Vdc, 15 A Output: 0.6 VDC to -30 VDC, 8 A max, 75W Model i6A4W***A%%V-0xx(-R) Input: 9-55Vdc, 16.5 A Output: 0.6 VDC to 15 VDC, 20 A max, 250W
Testing procedure and testing location:		
<input checked="" type="checkbox"/>	CB Testing Laboratory:	
Testing location/ address		UL RTP, 12 Laboratory Drive, Research Triangle Park , NC, 27709, USA
Tested by (name + signature).....:		Mengis Tesfay / Project Handler
Approved by (name + signature)		Scott Shepler / Reviewer
		
		
<input type="checkbox"/>	Testing procedure: CTF Stage 1	
Testing location/ address..... :		
Tested by (name + signature).....:		
Approved by (name + signature)		
<input checked="" type="checkbox"/>	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 + signature).....:		See previously issued VDE CBTR for names, functions, and signatures / --
Witnessed by (name + signature).....:		See previously issued VDE CBTR for names, functions, and signatures / --
Approved by (name + signature)		See previously issued VDE CBTR for names, functions, and signatures / --

<input type="checkbox"/>	Testing procedure: CTF Stage 3	
<input type="checkbox"/>	Testing procedure: CTF Stage 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):

National Differences (30 pages)

Enclosures (27 pages)

Summary of testing:

Tests performed (name of test and test clause):

INPUT TEST: SINGLE PHASE (B.2.5)

NORMAL OPERATING CONDITIONS TEMPERATURE MEASUREMENT (B.2.6)

SIMULATED ABNORMAL OPERATING CONDITIONS (B.3)

SIMULATED SINGLE FAULT CONDITIONS (B.4)

Testing Location:

**CTF Stage 2: TDK-LAMBDA AMERICAS INC
SUITE 100
3320 MATRIX DR
RICHARDSON TX 75082
UNITED STATES**

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. Testing correlation explanation provided in Enclosure.

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. Testing correlation explanation provided in Enclosure.

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. Testing correlation explanation provided in Enclosure.

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. Testing correlation explanation provided in Enclosure.

Summary of compliance with National Differences:

List of countries addressed: AU,NZ, JP, EU Group Differences, US,CA

The product fulfils the requirements of: EN 62368-1:2014 + A11:2017

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.

TDK-Lambda
I6A24014A033V-001-R

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 ES1
Supply % Tolerance	None
Supply Connection – Type	To be considered in end system
Considered current rating of protective device as part of building or equipment installation	N/A
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)	25
IP protection class	IPX0
Power Systems	N/A
Altitude during operation (m)	2000 m or less
Altitude of test laboratory (m)	Approximately 105m m
Mass of equipment (kg)	0.02
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.....:	2015-01-06, 2017-03-29, 2019-08-20
Date (s) of performance of tests.....:	2015-01-16 to 2015-01-22, 2017-03-29, 2019-08-20
GENERAL REMARKS:	
<p>"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report.</p> <p>Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.</p>	
Manufacturer’s Declaration per sub-clause 4.2.5 of IEC60335-1:	

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 :	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> Not applicable
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When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) :	TDK-LAMBDA AMERICAS INC SUITE 100 3320 MATRIX DR RICHARDSON TX 75082 UNITED STATES TDK-LAMBDA MALAYSIA SDN BHD PLO33 KAWASAN PERINDUSTRIAN SENAI 81400 SENAI JOHOR MALAYSIA
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GENERAL PRODUCT INFORMATION:

Report Summary

All applicable tests according to the referenced standard(s) have been carried out.

Product Description

The i6A product family consists of high density, 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 input ranges from 9 – 55Vdc input. The output voltage will be adjustable between -30 V to 30V. The rated output power will be 250W or less.

Model Differences

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

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

This report is based on VDE CB report references 207721-AS3-1, and amendment CB report references 237556-CI3-1 and CB Test Certificate Ref. DE1-55140, and DE1-55140/A1 respectively which was previously evaluated to UL/CSA/IEC 60950-1, 2nd edition, + Amendment 1 & 2. 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 test required per 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. Testing correlation explanation provided in Enclosure.

All original sample and test dates are noted in the testing portion of this report. No testing was conducted on 2017-03-29, 2019-08-20 as these dates are dates referenced for construction review only. Construction Review dated 2019-08-20 was done at the CBTL

Marking label provided represents all models in series.

Technical Considerations

- The product was submitted and evaluated for use at the maximum ambient temperature (T_{ma}) permitted by the manufacturer's specification of : 25 °C
- The product is intended for use on the following power systems : No direct connection
- Mains supply tolerance (%) or absolute mains supply values : 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 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 ES1 energy levels : All output
- The following output circuits are at PS3 energy levels : All
- The maximum investigated branch circuit rating is : 30 A
- The investigated Pollution Degree is : 2
- The following end-product enclosures are required : Mechanical, Fire, Electrical
- The power supply was evaluated to be used at altitudes up to : "2,000 m"
- The terminals and/or connectors are: Suitable for factory wiring only
- The following components require special consideration during end-product Thermal (Heating) tests due to the indicated maximum temperature measurements during component-level testing: The PWB is rated 130°C. ,
- The Normal Temperature Test for the Model i6A4W***A%%V-0xx was performed with 500 LFM external cooling. The manufacture's datasheet should be consulted regarding de-rating when less external airflow is provided.