



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-A6002-CB-1  
**Date of issue**.....: 2019-05-28 ; Amendment 1 : 2021-09-01  
**Total number of pages** .....: 21

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


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

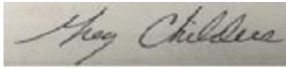

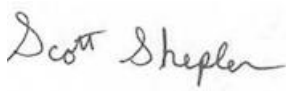
**Test specification:**  
**Standard** .....: IEC 62368-1:2014  
**Test procedure** .....: CB Scheme  
**Non-standard test method**.....: N/A

**TRF template used** .....: IECEE OD-2020-F1:2020, Ed.1.3  
**Test Report Form No.**.....: IEC62368\_1D  
**Test Report Form(s) Originator** .....: UL(US)  
**Master TRF**.....: Dated 2021-02-04

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**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 Power Supply	
Trade Mark(s) .....	None	
Manufacturer .....	TDK-LAMBDA AMERICAS INC SUITE 100 3320 MATRIX DR RICHARDSON TX 75082 UNITED STATES	
Model/Type reference .....	i7Azz***A%%V-#xx(-R)  Where where zz may be 4W or 2W or can be any two alpha numeric characters that represents input voltage between 4.5-60Vdc input,60A max input current *** represents rated output current between 0A - 70A, %%% represents rated output voltage between 0.8Vdc – 32Vdc # could be any alphanumeric character and xx indicates a number or alphanumeric character which do not affect safety related features May be followed by Optional –R indicating RoHS compliance	
Ratings .....	Optional  Input: 4.5 - 60 VDC, 60 A Max Output: 0.8 - 32 VDC, 70 A Max 750 Watts Max	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
<input checked="" type="checkbox"/> 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
<input type="checkbox"/> Testing procedure: CTF Stage 1:		
Testing location/ address .....		
Tested by (name, function, signature) .....		

Approved by (name, function, 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, function, signature) .....		Greg Childers / Tester	
Witnessed by (name, function, signature) ...:		Mengis Tesfay / Project Handler	
Approved by (name, function, signature).....:		Scott Shepler / Reviewer	
<input type="checkbox"/>	Testing procedure: CTF Stage 3:		
<input type="checkbox"/>	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 (2 pages)

Enclosures (2 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, 5.4.1.4,  
 6.3, 9.2)

SIMULATED ABNORMAL OPERATING  
 CONDITIONS (B.3)

SIMULATED SINGLE FAULT CONDITIONS (B.4)

**Tests performed (name of test and test clause):**

INPUT TEST: SINGLE PHASE (B.2.5)  
 NORMAL OPERATING CONDITIONS  
 TEMPERATURE MEASUREMENT (B.2.6, 5.4.1.4,  
 6.3, 9.2)

SIMULATED ABNORMAL OPERATING  
 CONDITIONS (B.3)

SIMULATED SINGLE FAULT CONDITIONS (B.4)

**Testing Location:**

**CBTL: UL RTP, 12 Laboratory Drive, Research  
 Triangle Park , NC, 27709, USA**

**Testing Location:**

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

**Summary of compliance with National Differences:**

**List of countries addressed:** Australia / New Zealand, EU Group and National Differences, Japan, USA / Canada

EU Group and National Differences applies to CENELEC member countries: Austria , Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom

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

**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.

**DETAIL A - SERIAL NUMBER DESCRIPTION**

**7Annn YYWW L ####**

Product ID Two digit One Character Increment:  
from Innoveta year / two Location Code four digit  
label database digit week (first character sequential  
of location code number  
string)

Rev	Revision History	DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED	SIGNATURES	DATE
1	Initial Release.	TOLERANCES ON: 1 PL DECIMAL: ± 0.015" 2 PL DECIMAL: ± 0.010" 3 PL DECIMAL: ± 0.005"	Electrical Engineer: Mechanical Engineer: <b>Ray Albrecht</b> PWB Design Engineer:	05/09/2019

Note	Note Description
1	Label Size: 0.300" x 0.200" Label material and compatible ribbon specified in referencing BOM.
2	Serial Number - See Detail A (Number shown is for example only)
3	Safety agency markings shall be included only if product is certified from that agency. Check database for latest certifications.
4	Product Code (Number shown is for example only)
5	Build Phase shall reflect the stage of the product. For pre-production and production builds, the Build Phase shall be left blank.
6	The Date Code shall be composed of the two digit year (YY), the two digit fiscal week (WW), and the location code (LL).
7	Barcode is Data Matrix, ECC200 Square format, with an X dimension of 6.67 mils (approx.), and contains the serial number.
8	Country of Origin
9	TDK-Lambda Corporate Logo
10	RoHS Compliance indicator. (Not shown unless product is completely compliant.)

Location Code Table	
P1 - TDK-Lambda Americas Richardson, Tx. USA	
M1 - TDK-Lambda, Senai, Malaysia	

<b>TDK-Lambda</b>	
Copyright 2019 TDK-Lambda Americas, Inc.	
Title: i7A Label Specification	
SIZE: A	Drawing No. i7A_LBL_01
SCALE: 6:1	Revision 01
SHEET: 1 of 1	

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.

<b>TEST ITEM PARTICULARS:</b>	
Classification of use by	Instructed person
Supply Connection	External Circuit - not Mains connected
Supply % Tolerance	None. Declared range.
Supply Connection – Type	Not connected to Mains
Considered current rating of protective device as part of building or equipment installation	40 A. External fuse to be provided in the end product. A; equipment
Equipment mobility	for building-in
Over voltage category (OVC)	OVC II
Class of equipment	Not classified
Access location	N/A
Pollution degree (PD)	PD 2
Manufacturer’s specified maximum operating ambient (°C)	85°C, per client's provided de-rating curve
IP protection class	IPX0
Power Systems	N/A
Altitude during operation (m)	2000 m or less
Altitude of test laboratory (m)	2000 m or less
Mass of equipment (kg)	0.10
<b>POSSIBLE TEST CASE VERDICTS:</b>	
- 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)
<b>TESTING:</b>	
Date of receipt of test item..... :	2021-08-09
Date (s) of performance of tests..... :	2021-08-09
<b>GENERAL REMARKS:</b>	
<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>	
<b>Manufacturer’s Declaration per sub-clause 4.2.5 of IEC60068-2-1:</b>	
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"/> <b>Yes</b> <input type="checkbox"/> <b>Not applicable</b>

<b>When differences exist; they shall be identified in the General product information section.</b>	
<b>Name and address of factory (ies) .....</b>	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
<b>GENERAL PRODUCT INFORMATION:</b>	
<b>Report Summary</b>	
The original report was modified on 2021-09-01 to include the following changes/additions: Technical Amendment 1 - Addition of alternate rating of non-isolating DC to DC modules with low voltage ranges of 9 – 15 VDC, 60 A current input, and output rating of 5VDC, 70 Units AND 9 – 18 VDC, 60 A current input and output ratings of 6.67 VDC, 60A on low input range 8 Vdc, 50 A rating on high ranges were added. Limited testing was conducted.	
<b>Product Description</b>	
The i7A 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 not exceeding ES1 level. The input ranges from 4.5 - 60Vdc input at 60 A max. The output voltage will be adjustable between 0.8V to 32Vdc.	
<b>Model Differences</b>	
All models within the series are similar except for input rating, output rating, and size of inductor.	
<b>Additional application considerations – (Considerations used to test a component or sub-assembly) -</b>	
Technical Amendment 1 - Addition of alternate rating of non-isolating DC to DC modules with low voltage ranges of 9 – 15 VDC, 60 A current input, and output rating of 5VDC, 70 Units AND 9 – 18 VDC, 60 A current input and output ratings of 6.67 VDC, 60A on low input range 8 Vdc, 50 A rating on high ranges were added. Limited testing was conducted.	
Marking label provided represents all models in series.	
<b>Technical Considerations</b>	



- The product was submitted and evaluated for use at the maximum ambient temperature (T<sub>ma</sub>) permitted by the manufacturer's specification of : 25°C. See derating curve for more details
- 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) : External fast blow 40 A fuse to be provided in the end product.
- Mains supply tolerance (%) or absolute mains supply values : No direct connection
- The equipment disconnect device is considered to be : For building in
- The following are available from the Applicant upon request : Installation (Safety) Instructions / Manual
- The product was investigated to the following additional standard : 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
- The following output circuits are at PS3 energy levels : All
- 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 maximum continuous power supply output (Watts) relied on forced air cooling from : Ranging from 5.2 to 70 CFM depending on ambient, and load. See Derating Curve
- The power supply was evaluated to be used at altitudes up to : "2,000 m"
- Test was conducted using fast blow external fuse rated 40 A. External fuse employed shall comply with IEC 60127.
- Heating Test need to re-conducted as part of an end product evaluation to ensure the max temperature of 130 C is not exceeded.