



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-A6007-CB-1  
**Date of issue**.....: 2019-09-26  
**Total number of pages** .....: 54

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



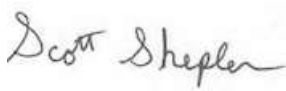
**Name of Test Laboratory** .....: UL RTP  
**preparing the Report** .....: 12 Laboratory Drive, Research Triangle Park , NC, 27709, USA

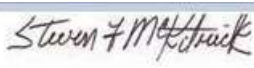

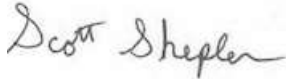
**Test specification:**  
**Standard** .....: IEC 62368-1:2014 (Second Edition)  
**Test procedure** .....: CB Scheme  
**Non-standard test method**.....: N/A

**Test Report Form No.**.....: IEC62368\_1B  
**Test Report Form(s) Originator** .....: UL(US)  
**Master TRF**.....: 2014-03

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The test results presented in this report relate only to the object tested.  
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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 Converter	
Trade Mark	: TDK 	
Manufacturer	: TDK-LAMBDA AMERICAS INC SUITE 100 3320 MATRIX DR RICHARDSON TX 75082 UNITED STATES	
Model/Type reference	: iQKzz***A%%V-#xx(-R)  where zz represents input voltage between 36-56 Vdc input, or may be replaced by 4N indicating narrow range. *** may be three digit numbers to denote rated output current. 000 to 093 to represent 0A - 93A respectively. %%V represents rated output voltage between 8Vdc – 12Vdc. Note that the third digit is preceded by a decimal point. Example 120 implies 12.0 Volts. and # is any alphanumeric character indicates possible safety affecting and xx indicates a number or alphanumeric character which affects non safety related features. Optional –R indicated RoHS compliance	
Ratings	: Optional  36-56Vdc input, 24A max input current Rated Output Voltage: 8Vdc – 12Vdc Rated Output - 93A, Max	
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).....		Steven F. McKitrick / Tester	
Witnessed by (name + signature).....		Mengis Tesfay / Project Handler	
Approved by (name + 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 + signature).....			
Witnessed by (name + signature).....			
Approved by (name + signature) .....			
Supervised by (name + signature) .....			

<p><b>List of Attachments (including a total number of pages in each attachment):</b></p> <p>National Differences (30 pages) Enclosures (14 pages)</p>	
<p><b>Summary of testing:</b></p>	
<p><b>Tests performed (name of test and test clause):</b></p> <p>CLASSIFICATION OF ELECTRICAL ENERGY SOURCES (5.2, 5.7) ELECTRIC STRENGTH TEST (5.4.9) 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)</p>	<p><b>Testing Location:</b> CBTL: UL RTP, 12 Laboratory Drive, Research Triangle Park , NC, 27709, USA</p>
<p><b>Tests performed (name of test and test clause):</b></p> <p>CLASSIFICATION OF ELECTRICAL ENERGY SOURCES (5.2, 5.7) ELECTRIC STRENGTH TEST (5.4.9) 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)</p>	<p><b>Testing Location:</b> CTF Stage 2: TDK-LAMBDA AMERICAS INC SUITE 100 3320 MATRIX DR RICHARDSON TX 75082 UNITED STATES</p>
<p><b>Summary of compliance with National Differences:</b> <b>List of countries addressed:</b> AU,NZ, JP, EU Group Differences, US,CA</p> <p><input checked="" type="checkbox"/> <b>The product fulfils the requirements of:</b> EN 62368-1:2014 + A11:2017</p>	

**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***  
**iQK4N090A112V-1U9-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.

<b>TEST ITEM PARTICULARS:</b>	
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)	0.4
Classification of use by	Instructed person
Supply Connection	External Circuit - not Mains connected ES1
Supply % Tolerance	None
Supply Connection – Type	Not directly connected to Mains
Considered current rating of protective device as part of building or equipment installation	N/A A; equipment
Equipment mobility	for building-in
Over voltage category (OVC)	
Class of equipment	Not classified
Access location	for building in.
Pollution degree (PD)	PD 2
Manufacturer’s specified maximum operating ambient (°C)	
<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.....:	2019-09-10
Date (s) of performance of tests.....:	2019-09-10
<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 IEC60335-1:</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>
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**When differences exist; they shall be identified in the General product information section.**

<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
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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 iQK product family consists of high density DC-DC power converter modules intended to be used as a component in an end-user's power system. The input voltage range is from 36 – 56Vdc input. The output voltage range will be between 8V and 12V depending upon the differences within the model series.

**Model Differences**

All models are identical construction and employ the same PWB, same transformer with varying winding turns ratio, same transformer core set, and inductor core set.

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

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) : EUT is for building in. Testing was conducted with an external input line fast-acting 30 A fuse.
- 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 ES1 energy levels : All
- The following output circuits are at PS3 energy levels : All
- The maximum investigated branch circuit rating is : EUT is for building in. Testing was conducted with an external input line fast-acting 30 A fuse.
- 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 following magnetic devices (e.g. transformers or inductor) are provided with an OBJY2 insulation system with the indicated rating greater than Class A (105°C) : Transformer (T301) Bias transformer, with class F insulation. See Table 4.1.2 for details
- The maximum continuous power supply output (Watts) relied on forced air cooling from : fans within wind tunnel with Linear Flow of 602 LFM, 361.8 CFM
- The power supply was evaluated to be used at altitudes up to : "2,000 m"



<b>ENERGY SOURCE IDENTIFICATION AND CLASSIFICATION TABLE:</b>	
(Note 1: Identify the following six (6) energy source forms based on the origin of the energy.) (Note 2: The identified classification e.g., ES2, TS1, should be with respect to its ability to cause pain or injury on the body or its ability to ignite a combustible material. Any energy source can be declared Class 3 as a worse case classification e.g. PS3, ES3.)	
<b>Electrically-caused injury (Clause 5):</b> (Note: Identify type of source, list sub-assembly or circuit designation and corresponding energy source classification) Example: +5 V dc input <span style="float: right;">ES1</span>	
Source of electrical energy	Corresponding classification (ES)
Input (All Models)	ES1
Output (All Models)	ES1
<b>Electrically-caused fire (Clause 6):</b> (Note: List sub-assembly or circuit designation and corresponding energy source classification) Example: Battery pack (maximum 85 watts): <span style="float: right;">PS2</span>	
Source of power or PIS	Corresponding classification (PS)
Input, Internal, Output (All Models)	PS3
<b>Injury caused by hazardous substances (Clause 7)</b> (Note: Specify hazardous chemicals, whether produces ozone or other chemical construction not addressed as part of the component evaluation.) Example: Liquid in filled component <span style="float: right;">Glycol</span>	
Source of hazardous substances	Corresponding chemical
N/A	--
<b>Mechanically-caused injury (Clause 8)</b> (Note: List moving part(s), fan, special installations, etc. & corresponding MS classification based on Table 35.) Example: Wall mount unit <span style="float: right;">MS2</span>	
Source of kinetic/mechanical energy	Corresponding classification (MS)
N/A	--
<b>Thermal burn injury (Clause 9)</b> (Note: Identify the surface or support, and corresponding energy source classification based on type of part, location, operating temperature and contact time in Table 38.) Example: Hand-held scanner – thermoplastic enclosure <span style="float: right;">TS1</span>	
Source of thermal energy	Corresponding classification (TS)
PWB and Components	TS3 (for building in, to be addressed in the end product)
<b>Radiation (Clause 10)</b> (Note: List the types of radiation present in the product and the corresponding energy source classification.) Example: DVD – Class 1 Laser Product <span style="float: right;">RS1</span>	
Type of radiation	Corresponding classification (RS)
N/A	--

**ENERGY SOURCE DIAGRAM**

Indicate which energy sources are included in the energy source diagram. Insert diagram below

**ES**     **PS**     **MS**     **TS**     **RS**