



Test Report issued under the responsibility of:



**TEST REPORT**  
**IEC 62368-1**  
**Audio/video, information and communication technology equipment**  
**Part 1: Safety requirements**

<b>Report Number</b> .....	E220248-A6026-CB-1
<b>Date of issue</b> .....	2021-12-07
<b>Total number of pages</b> .....	58
<b>Name of Testing Laboratory preparing the Report</b> .....	UL RTP 12 Laboratory Drive, Research Triangle Park , NC, 27709, USA
<b>Applicant's name</b> .....	<b>TDK-LAMBDA AMERICAS INC</b>
<b>Address</b> .....	<b>3000 TECHNOLOGY DR, SUITE 100</b> <b>PLANO TX 75074</b> <b>UNITED STATES</b>

<b>Test specification:</b>	
<b>Standard</b> .....	IEC 62368-1: 2018
<b>Test procedure</b> .....	CB Scheme
<b>Non-standard test method</b> .....	N/A

<b>TRF template used</b> .....	IECEE OD-2020-F1:2020, Ed.1.3
<b>Test Report Form No</b> .....	IEC62368_1E
<b>Test Report Form(s) Originator</b> .....	UL(US)
<b>Master TRF</b> .....	Dated 2021-02-04

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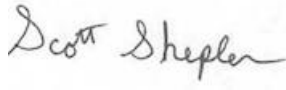
**General disclaimer:**

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.



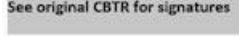
<p><b>Test Item Description</b> .....</p>	<p>DC-To-DC Converters</p>
<p><b>Trade Mark(s)</b> .....</p>	<p>TDK or TDK-Lambda    </p>
<p><b>Manufacturer</b> .....</p>	<p>TDK-LAMBDA AMERICAS INC          3000 TECHNOLOGY DR, SUITE 100          PLANO TX 75074 UNITED STATES</p>
<p><b>Model/Type reference</b> .....</p>	<p>GQA24***A%%V-xxx -R, (PR); -R indicating RoHS compliance, or -(007) for unpotted or (-0P7) for potted.</p> <p>Where:</p> <ul style="list-style-type: none"> <li>- 24 represents nominal input voltage, with a 18-36 Vdc input, Max Input Current 9 A dc;</li> <li>- *** represents rated output current between 0 A - 2.5 A, *** maybe 1 to 3 digits, note that last digit is preceded by decimal point.</li> <li>- %%% represents rated output voltage, 48 Vdc nominal, Note that the third digit is preceded by a decimal point. Example 120 implies 12.0 Volts. with Max Output Power of 120 W</li> <li>- xxx represents alphanumeric characters which indicates non safety related feature set options</li> <li>- Optional -R indicating RoHS compliance, or (-007) for unpotted, or (-0P7) for potted)</li> </ul> <p>GQA2W***A%%V-xxx-R, (PR); -R indicating RoHS compliance, or -(007) for unpotted or (-0P7) for potted.</p> <p>Where:</p> <ul style="list-style-type: none"> <li>- 2W represents nominal input voltage, with a 9 36 Vdc input, with a Max Input Current of 23 A</li> <li>- *** represents rated output current between 4.28 A - 28 A; *** maybe 1 to 3 digits, note that last digit is preceded by decimal point.</li> <li>- %%% represents rated output voltage between, 5 Vdc -28 Vdc, with Max Output Power of 150 W. Note that the third digit is preceded by a decimal point. Example 120 implies 12.0 Volts. with Max Output Power of 120 W.</li> <li>- xxx represents alphanumeric characters which indicates non safety related feature set options</li> <li>- Optional -R indicating RoHS compliance, or (-007) for unpotted, or (-0P7) for potted)</li> </ul>
<p><b>Ratings</b> .....</p>	<p>Optional</p> <p>Rated Input: 36 VDC Max, 23 A Max</p>

Rated output: 48 VDC Max, 28 A Max, 150 W Max.

**Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):**

<input checked="" type="checkbox"/>	<b>CB Testing Laboratory:</b>	
<b>Testing location/ address .....</b>		UL RTP, 12 Laboratory Drive, Research Triangle Park , NC, 27709, USA
<b>Tested by (name, function, signature).....</b>		Mengis Tesfay / Project Handler 
<b>Approved by (name, function, signature) ..</b>		Scott Shepler / Reviewer 

<input type="checkbox"/>	<b>Testing procedure: CTF Stage 1:</b>	
<b>Testing location/ address .....</b>		
<b>Tested by (name, function, signature).....</b>		
<b>Approved by (name, function, signature) ..</b>		

<input checked="" type="checkbox"/>	<b>Testing procedure: CTF Stage 2:</b>	
<b>Testing location/ address .....</b>		TDK-LAMBDA AMERICAS INC SUITE 100 3320 MATRIX DR RICHARDSON TX 75082 UNITED STATES
<b>Tested by (name, function, signature).....</b>		Steve McKittrick / Tester 
<b>Witnessed by (name, function, signature) ..</b>		P. Mobs / Project Handler 
<b>Approved by (name, function, signature) ..</b>		K. Kreuzer / Reviewer 

<input type="checkbox"/>	<b>Testing procedure: CTF Stage 3:</b>	
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 4:</b>	
<b>Testing location/ address .....</b>		
<b>Tested by (name, function, signature).....</b>		
<b>Witnessed by (name, function, signature) ..</b>		
<b>Approved by (name, function, signature) ..</b>		
<b>Supervised by (name, function, signature) :</b>		

<p><b>List of Attachments (including a total number of pages in each attachment):</b></p> <p>National Differences (29 pages) Enclosures (67 pages)</p>	
<p><b>Summary of testing:</b></p>	
<p><b>Tests performed (name of test and test clause):</b></p> <p>5.4.1.8 – DETERMINATION OF WORKING VOLTAGE</p> <p>5.4.7, 5.4.1.5.3 – TESTS FOR SEMICONDUCTOR COMPONENTS AND CEMENTED JOINTS</p> <p>5.4.9 – ELECTRIC STRENGTH TEST</p> <p>B.2.5 – INPUT TEST: SINGLE PHASE</p> <p>B.1.5, B.2.6, 5.4.1.4, 6.3, 9.3 - NORMAL OPERATING CONDITIONS TEMPERATURE MEASUREMENT</p> <p>B.3 - SIMULATED ABNORMAL OPERATING CONDITIONS</p>	<p><b>Testing Location:</b> <b>CBTL: UL RTP, 12 Laboratory Drive, Research Triangle Park , NC, 27709, USA</b></p>
<p><b>Tests performed (name of test and test clause):</b></p> <p>5.4.7, 5.4.1.5.3 – TESTS FOR SEMICONDUCTOR COMPONENTS AND CEMENTED JOINTS</p> <p>5.4.9 – ELECTRIC STRENGTH TEST</p> <p>B.2.5 – INPUT TEST: SINGLE PHASE</p>	<p><b>Testing Location:</b> <b>CTF Stage 2: TDK-LAMBDA AMERICAS INC SUITE 100</b> <b>3320 MATRIX DR</b> <b>RICHARDSON TX 75082</b> <b>UNITED STATES</b></p> <p>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. This test was also considered representative to the test required per UL62368-1, 3rd Ed December 13, 2019; CAN/CSA-C22.2 No. 62368-1, 3rd Ed December 13, 2019; and IEC62368-1:2018, 3rd Ed.</p> <p>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. This test was also considered representative to the test required per UL62368-1, 3rd Ed December 13, 2019; CAN/CSA-C22.2 No. 62368-1, 3rd Ed December 13, 2019; and IEC62368-1:2018, 3rd Ed.</p> <p>Testing conducted in accordance with IEC 60950-1:2005 (Second Edition), Am1:2009 + Am2:2013; UL 60950-1,</p>

B.1.5, B.2.6, 5.4.1.4, 6.3, 9.3 - NORMAL OPERATING CONDITIONS TEMPERATURE MEASUREMENT

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. This test was also considered representative to the test required per UL62368-1, 3rd Ed December 13, 2019; CAN/CSA-C22.2 No. 62368-1, 3rd Ed December 13, 2019; and IEC62368-1:2018, 3rd Ed.

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. This test was also considered representative to the test required per UL62368-1, 3rd Ed December 13, 2019; CAN/CSA-C22.2 No. 62368-1, 3rd Ed December 13, 2019; and IEC62368-1:2018, 3rd Ed.

B.3 - SIMULATED ABNORMAL OPERATING CONDITIONS

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. This test was also considered representative to the test required per UL62368-1, 3rd Ed December 13, 2019; CAN/CSA-C22.2 No. 62368-1, 3rd Ed December 13, 2019; and IEC62368-1:2018, 3rd Ed.

**Summary of compliance with National Differences (List of countries addressed):**

EU Group and National Differences, USA / Canada

**The product fulfils the requirements of EN IEC 62368-1:2020+A11:2020**

**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.



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>	
Product group	--
Classification of use by	Instructed person
Supply Connection	not mains connected: ES1
Supply tolerance	None
Supply connection – type	No direct connection to Mains
Considered current rating of protective device	N/A, No direct connection to Mains A; N/A
Equipment mobility	for building-in
Over voltage category (OVC)	OVC I
Class of equipment	Not Classified
Special installation location	N/A 0
Pollution degree (PD)	PD 2
Manufacturer’s specified Tma (°C)	25
IP protection class	IPX0
Power systems	--
Altitude during operation (m)	2000 m or less
Altitude of test laboratory (m)	App 105 m
Mass of equipment (kg)	0.088
<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 .....	2016-08-01, 2019-11-13
Date (s) of performance of tests .....	2016-08-01 to 2016-09-05, 2019-11-13
<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 IEC 60070-02:</b>	

<p>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 .....</p>	<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.**

<p><b>Name and address of factory (ies) .....</b></p>	<p>TDK-LAMBDA AMERICAS INC          3000 TECHNOLOGY DR, SUITE 100          PLANO TX 75074 UNITED STATES</p> <p>TDK-LAMBDA MALAYSIA SDN BHD          PLO33 KAWASAN PERINDUSTRIAN SENAI          SENAI JOHOR 81400 Malaysia</p>
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**General product information and other remarks:**

**Product Description**  
 The product is a component type DC to DC power module with a planar power transformer. The converter is provided with input terminal pins for factory installation onto a printed wiring board with a connection to a dc source of supply and output terminal pins. The product employs a multilayer PWB planar transformer.

**Model Differences**  
 The GQA product is available in four mechanical configurations that both use the same transformer core set and output filter inductor core set except for the air gap and number of turns embedded in the pcb. The four mechanical configurations use the same pcb and part set, the difference between them is the physical size of the base plate that is mounted on the unit. One house-keeping transformer is used in GQA platform. The house keep magnetic is used to deliver the drive pulses and bias power across the isolation boundary from secondary to the primary side.

All models are similar except for input rating, output rating, and number of turns for the power transformer.

**Additional Information**  
 This report is based on CB report references E220248-A6010-CB-1 and CB Test Certificate Ref. US-34826-UL, respectively which was previously evaluated to UL 62368-1, 2nd Edition, 2014-12-01, CSA C22.2 No. 62368-1-14, 2nd Edition, 2014-12, and IEC 62368-1:2014. Testing conducted in accordance with IEC UL 62368-1, 2nd Edition, 2014-12-01, CSA C22.2 No. 62368-1-14, 2nd Edition, 2014-12, and IEC 62368-1:2014, was deemed equivalent to the test required per UL62368-1, 3rd Ed December 13, 2019; CAN/CSA-C22.2 No. 62368-1, 3rd Ed December 13, 2019; and IEC62368-1:2018, 3rd Ed.

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 (T<sub>ma</sub>) 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) : N/A. For building in.
- Mains supply tolerance (%) or absolute mains supply : 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 standard : EN IEC 62368-1:2020+A11:2020

### **Engineering Conditions of Acceptability**

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

- The following product-line tests are conducted for this product : Electric Strength
- The following output circuits are at ES1 energy levels : All
- The following output circuits are at PS3 energy levels : Output Terminal
- The investigated Pollution Degree is : 2
- The following end-product enclosures are required : Electrical, Fire
- The output circuit is considered PS3
- Heating Test shall be evaluated in end product.
- Classification of PIS has not been conducted. Therefore, all electrical components and conductors including printed wirings were assumed to be arcing/resistive PIS.
- Unit intended for building-in and supplied power from secondary circuit which is isolated from primary circuit by double or reinforced insulation.