



Test Report issued under the responsibility of:



TEST REPORT
IEC 60950-1
Information technology equipment – Safety –
Part 1: General requirements

Report Number .....: 1510059STO-001
Date of issue .....: 29 October 2015
Total number of pages .....: 98 pages

Applicant's name .....: TDK-Lambda Corporation
Address .....: 2704-1 Settaya-machi, Nagaoka-shi, Niigata, 940-1195 JAPAN

Test specification:

Standard .....: IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am 2:2013
Test procedure .....: 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

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General disclaimer:

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Test item description .....: DC-DC Converters
Trade Mark .....: TDK-Lambda
Manufacturer .....: TDK-Lambda Corporation
Model/Type reference .....: PH75F48-\*\*, PH150F48-\*\*, PH300F48-\*\*, PH150F48-5/SIM
(see also "Models" page 4)
Ratings .....: DC 36-76V---

<b>Testing procedure and testing location:</b>		
<input checked="" type="checkbox"/>	<b>CB Testing Laboratory:</b>	<b>Intertek Semko AB</b>
Testing location/ address .....		Torshamnsgatan 43, P.O. Box 1103, SE-164 22 Kista, SWEDEN
<input type="checkbox"/>	<b>Associated CB Testing Laboratory:</b>	
Testing location/ address .....		
Tested by (name + signature) .....		Bedran Nergiz 
Approved by (name + signature).....		Anna Karin Cedergren 
<input type="checkbox"/>	<b>Testing procedure: TMP/CTF Stage 1:</b>	
Testing location/ address .....		
Tested by (name + signature) .....		
Approved by (name + signature).....		
<input type="checkbox"/>	<b>Testing procedure: WMT/CTF Stage 2:</b>	
Testing location/ address .....		
Tested by (name + signature) .....		
Witnessed by (name + signature) .....		
Approved by (name + signature).....		
<input type="checkbox"/>	<b>Testing procedure: SMT/CTF Stage 3 or 4:</b>	
Testing location/ address .....		
Tested by (name + signature) .....		
Witnessed by (name + signature) .....		
Approved by (name + signature).....		
Supervised by (name + signature) .....		

<b>Summary of testing:</b>	
<b>Tests performed</b> (name of test and test clause): See test report	<b>Testing location:</b> See page 2
<b>Summary of compliance with National Differences:</b> <input checked="" type="checkbox"/> The product fulfils the requirements of EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013. Group- and national differences for the CENELEC countries have been considered during the testing.	
<b>Copy of marking plates:</b> (examples) 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.	

<b>Models included within the scope of this report</b>				
Model	Input, DC		Output, DC	
	V	A <sub>max</sub>	V	A <sub>max</sub>
-				
PH75F48-2	36-76	1.21	2	15
PH75F48-3	36-76	1.21	3	15
PH75F48-5	36-76	1.21	5	15
PH75F48-12	36-76	1.21	12	6.3
PH75F48-15	36-76	1.21	15	5
PH75F48-24	36-76	1.21	24	3.2
PH75F48-28	36-76	1.21	28	2.7
PH150F48-2	36-76	2.38	2	30
PH150F48-3	36-76	2.38	3	30
PH150F48-5	36-76	2.38	5	30
PH150F48-12	36-76	2.38	12	12.5
PH150F48-15	36-76	2.38	15	10
PH150F48-24	36-76	2.38	24	6.3
PH150F48-28	36-76	2.38	28	5.4
PH150F48-5/SIM	40-60	2.38	5	40
PH300F48-2	36-76	4.82	2	60
PH300F48-3	36-76	4.82	3	60
PH300F48-5	36-76	4.82	5	60
PH300F48-12	36-76	4.82	12	25
PH300F48-15	36-76	4.82	15	20
PH300F48-24	36-76	4.82	24	12.6
PH300F48-28	36-76	4.82	8	10.8
The above products may include /HKM, non-critical changes. Models PH300 with -5 and -12 may also include /OT (thermistor temperature raised by 20°C).				

<b>Test item particulars.....:</b>	
Equipment mobility.....:	<input type="checkbox"/> movable <input type="checkbox"/> hand-held <input type="checkbox"/> transportable <input type="checkbox"/> stationary <input checked="" type="checkbox"/> for building-in <input type="checkbox"/> direct plug-in
Connection to the mains.....:	<input type="checkbox"/> pluggable equipment <input type="checkbox"/> type A <input type="checkbox"/> type B <input checked="" type="checkbox"/> permanent connection <input type="checkbox"/> detachable power supply cord <input type="checkbox"/> non-detachable power supply cord <input type="checkbox"/> not directly connected to the mains
Operating condition.....:	<input checked="" type="checkbox"/> continuous <input type="checkbox"/> rated operating / resting time:
Access location .....	<input type="checkbox"/> operator accessible <input type="checkbox"/> restricted access location <input checked="" type="checkbox"/> for building into a host equipment
Over voltage category (OVC) .....	<input type="checkbox"/> OVC I <input checked="" type="checkbox"/> OVC II <input type="checkbox"/> OVC III <input type="checkbox"/> OVC IV <input type="checkbox"/> other:
Mains supply tolerance (%) or absolute mains supply values .....	Not applicable, Voltage range 36-76Vdc Max. Voltage range 40-60Vdc Max.
Tested for IT power systems .....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
IT testing, phase-phase voltage (V) .....	N/A
Class of equipment .....	<input checked="" type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Class III <input type="checkbox"/> Not classified
Considered current rating of protective device as part of the building installation (A) .....	16
Pollution degree (PD) .....	<input type="checkbox"/> PD 1 <input checked="" type="checkbox"/> PD 2 <input type="checkbox"/> PD 3
IP protection class .....	IPX0
Altitude during operation (m) .....	<2000
Altitude of test laboratory (m) .....	<2000
Mass of equipment (kg) .....	<0.250
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.....	See "General remarks" below
Date of receipt of test item.....	-
Date (s) of performance of tests.....	See "General remarks" below
<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.          The test results and all data in this report are derived from previously issued Test Report No. <b>1017488</b> dated 6 August 2010, and Test Report No. 1218102 dated 29 August 2012, issued by Intertek Semko AB. A new report has been issued due to update of the standard IEC 60950-1, to include Am 2: 2013.          No additional test has been conducted.          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 IECEE 02:</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"/> Yes <input type="checkbox"/> Not applicable																
When differences exist; they shall be identified in the "General product information" section.																	
<b>Name and address of factories..... :</b> TDK-Lambda (Malaysia) Sdn. Bhd. PLO33 Locked Bag No. 110 Kawasan Perindustrian Senai 81400 Senai Johor, Darul Takzim, <b>MALAYSIA</b>  TDK-Lambda Corporation Nagaoka Technical Center 2704-1 Settaya-machi, Nagaoka, Niigata 940-1195 <b>JAPAN</b>  Wuxi TDK-Lambda Electronics Co., Ltd. No.6 Xing Chuang Er lu Wuxi Jiangsu, 214028 <b>CHINA</b>																	
<b>Abbreviations used in the report:</b> <table style="width:100%; border:none;"> <tr> <td style="width:33%;">- normal conditions</td> <td style="width:33%;">N.C.</td> <td style="width:33%;">- single fault conditions</td> <td style="width:15%;">S.F.C</td> </tr> <tr> <td>- functional insulation</td> <td>OP</td> <td>- basic insulation</td> <td>BI</td> </tr> <tr> <td>- double insulation</td> <td>DI</td> <td>- supplementary insulation</td> <td>SI</td> </tr> <tr> <td>- between parts of opposite polarity</td> <td>BOP</td> <td>- reinforced insulation</td> <td>RI</td> </tr> </table> Indicate used abbreviations (if any)		- 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
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This Test Report replaces previously issued, see table below.

**REVISION TABLE**

Date	Report ref.	Clause	Modification of the appliance
29 Oct. 2015	1510059STO-001	-	Basic Test Report



**General Product Information:**

- a) These products shall be installed in accordance with the requirements of IEC 60950-1:2005, EN 60950-1:2006 for the end use application. The DC to DC converters were tested with the heatsink mounted below the baseplate of the converters (worst case).
- b) The DC to DC converter baseplate shall be properly bonded to earth ground in the end use product as this unit was investigated for Class I construction. Subject to application, this may not be necessary.
- c) This product must be installed within a host equipment and only be accessible to authorised competent personnel. These products were assessed for reinforced insulation between input and output and basic insulation between input and earth assuming a 250Vac mains supply. These converters may have a mains derived DC supply attached to the input and provide a SELV output. The PH300F48 units are an energy hazard. To maintain the SELV output under fault conditions, the output must be connected to earth in the final application.
- d) The operation of these DC to DC converters is subject to the end customer maintaining the baseplate at 85°C or below during operation.
- e) The input and output connectors are not acceptable for field wiring connections and are only intended for connection to a PCB inside the end use equipment.
- f) The recommended input fuse ratings within the instructions were as follows:-  
PH75F48-\* = F5AH, 250V  
PH150F48-\* = F10AH, 250V  
PH300F48-\* = F20AH, 250V  
The breaking capacity and voltage rating are subject to the end use application.
- g) T1, T101/T102 use triple insulated wire with an insulation class for the Transformers of F or H. The baseplate temperature must not exceed 85 degrees Celsius. This temperature limit governs the working ambient temperature.

**Ratings:-**

- PH75F48 series. 100% load, 85°C baseplate.  
PH150F48 series. 100% load, 85°C baseplate.  
PH300F48 series. 100% load, 85°C baseplate.

These products have been assessed for Class 1, Pollution Degree 2, Material Group IIIB, Overvoltage Category II, Altitude up to 2000 metres, maximum baseplate temperature 85°C.

**Testing Environment:**

- Ambient temperature: 15°C to 30°C  
Relative humidity: 25% to 75%  
Air pressure: 86 kPa to 106 kPa