



Test Report issued under the responsibility of:



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

Report Number: 1510051STO-001
 Date of issue: 26 October 2015
 Total number of pages: 71 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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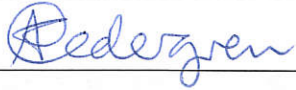
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General disclaimer:

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	DC-DC Converters
Trade Mark	TDK-Lambda
Manufacturer	TDK-Lambda Corporation
Model/Type reference	PH50S24-**, PH100F24-** (see also "Models" page 4)
Ratings	DC input 18-36V ⁻⁻⁻ , 3.65-7.31A DC output 2-28V ⁻⁻⁻ , 1.8-20A (see also "Models" page 4)

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

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Summary of testing:	
Tests performed (name of test and test clause): See test report	Testing location: See page 2
Summary of compliance with National Differences: <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.	
Copy of marking plate: (example) 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.	

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Models included within the scope of this report			
Model	Rated I/P	Rated O/P	Rated O/P
-	Current (A)	Current (A)	Voltage (V)
PH50S24-3.3	3.65	10.0	3.3
PH50S24-5	3.65	10.0	5.0
PH50S24-12	3.65	4.2	12.0
PH50S24-15	3.65	3.4	15.0
PH50S24-24	3.65	2.1	24.0
PH50S24-28	3.65	1.8	28.0
PH100F24-2	7.31	20.0	2.0
PH100F24-3	7.31	20.0	3.0
PH100F24-5	7.31	20.0	5.0
PH100F24-12	7.31	8.4	12.0
PH100F24-15	7.31	6.7	15.0
PH100F24-24	7.31	4.2	24.0
PH100F24-28	7.31	3.6	28.0
The models above may include: Suffix /PI indicates the four corner studs are not threaded. Standard models have threaded corner studs.			

Test item particulars.....:	
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 18-36Vdc 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)	<0.100
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.....	See "General remarks" below
Date (s) of performance of tests.....	See "General remarks" below
General remarks:	
<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. 1017497 dated 6 August 2010, and Test Report No. 1218100 dated 30 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>	

General Product Information:

- a) These products shall be installed in accordance with the requirements of IEC 60950-1, EN 60950-1 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. 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:-
PH50S24-* = F7AH, 250V
PH100F24-* = F15AH, 250V
During assessment of these products the following fuses were used:
PH50S24-* = F8AH, 250V
PH100F24-* = F15AH, 250V
The prospective short circuit current of the supply source used for test was 120A.
The breaking capacity and voltage rating are subject to the end use application.
- g) T101 for model PH50S and T101/T102 for PH100F use triple insulated wire with an insulation class for the transformers of class F.

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