Test Report issued under the responsibility of:

Intertek

TEST REPORT

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

Report Number ..... :	**1017226**
Date of issue ..... :	4 August 2010
Total number of pages	73
CB Testing Laboratory ..... :	**Intertek Semko AB**
Address ..... :	Torshamnsgatan 43, P.O. Box 1103, SE-164 22 Kista, SWEDEN
Applicant's name ..... :	**TDK-LAMBDA Corp Nagaoka Technical Center**
Address ..... :	2701 Togawa Settaya Nagaoka-shi, Niigata 940-1195 JAPAN
Manufacturer's name ..... :	**TDK-Lambda Corporation**
Address ..... :	2701 Togawa Settaya Nagaoka-shi, Niigata 940-1195 JAPAN
Test specification:	
Standard ..... :	**IEC 60950-1:2005 (2:nd Edition); Am 1:2009**
Test procedure ..... :	CB Scheme
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	**IEC60950_1B**
Test Report Form(s) Originator ..... :	SGS Fimko Ltd
Master TRF ..... :	Dated 2010-04

If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

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.

Test item description ..... :	DC-DC converters
Trade Mark ..... :	**TDK-Lambda**
Manufacturer ..... :	TDK-Lambda Corporation
Model/Type reference ..... :	PH300S280-**/***, PH600S280-**/*** (See page 7)
Ratings ..... :	200-400V⎓

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Testing procedure and testing location:		
☒ **CB Testing Laboratory:**	**Intertek Semko AB**	
Testing location/ address ..... :	Torshamnsgatan 43, P.O. Box 1103, SE-164 22 Kista, SWEDEN	
☐ **Associated CB Laboratory:**		
Testing location/ address ..... :		
Tested by (name + signature) ..... :	Henrik Brolin	
Approved by (name + signature) ..... :	Kjell Fredriksson	
☐ Testing procedure: **TMP**		
Testing location/ address ..... :		
Tested by (name + signature) ..... :		
Approved by (name + signature) ..... :		
☐ Testing procedure: **WMT**		
Testing location/ address ..... :		
Tested by (name + signature) ..... :		
Witnessed by (name + signature) .... :		
Approved by (name + signature) ..... :		
☐ Testing procedure: **SMT**		
Testing location/ address ..... :		
Tested by (name + signature) ..... :		
Approved by (name + signature) ..... :		
Supervised by (name + signature) ... :		
☐ Testing procedure: **RMT**		
Testing location/ address ..... :		
Tested by (name + signature) ..... :		
Approved by (name + signature) ..... :		
Supervised by (name + signature) ... :		

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List of Attachments (including a total number of pages in each attachment):

Page 1-52 IEC 60950-1 Test Report.
Page 63-73 European group differences and national differences
Appendix Transformer Specification . : 19 pages
Appendix Photos ..... : 2 pages

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
See test report	See page 2

Summary of compliance with national differences

Group differences and national differences for the CENELEC countries according to:
EN 60950-1:2006 /A11:2009/A1:2010 have been checked and verified.

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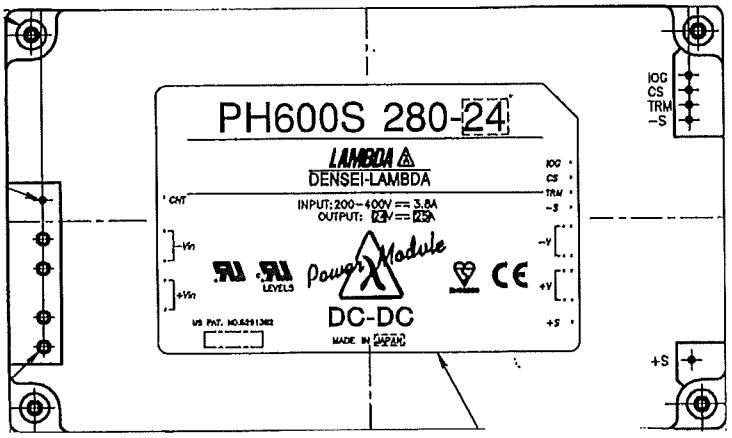
Copy of marking plate



Note. Manufacture name changed to: TDK-Lambda

Test item particulars .....:	
Equipment mobility .....:	[] movable [] hand-held [] transportable [] stationary [x] for building-in [] direct plug-in
Connection to the mains .....:	[] pluggable equipment [] type A [] type B [x] permanent connection [] detachable power supply cord [] non-detachable power supply cord [] not directly connected to the mains
Operating condition.....:	[x] continuous [] rated operating / resting time:
Access location .....:	[] operator accessible [] restricted access location [x] for building into a host equipment
Over voltage category (OVC) .....:	[] OVC I [x] OVC II [] OVC III [] OVC IV [] other:
Mains supply tolerance (%) or absolute mains supply values .....:	Not applicable, Voltage range 200-400Vdc
Tested for IT power systems .....:	[] Yes [x] No

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IT testing, phase-phase voltage (V) ..... :	N/A
Class of equipment ..... :	[x] Class I [] Class II [] Class III [] Not classified
Considered current rating of protective device as part of the building installlation (A) ..... :	16
Pollution degree (PD) ..... :	[] PD 1 [x] PD 2 [] 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 (or N)
- test object does meet the requirement ..... :	P (Pass)
- test object does not meet the requirement ..... :	F (Fail)

Testing ..... :

Date of receipt of test item ..... :	2 August 2010
Date(s) of performance of tests ..... :	-

General remarks:

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 testing laboratory.
"(see Enclosure #)" refers to additional information appended to the report.
"(see appended table)" refers to a table appended to the report.

Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

Manufacturer's Declaration per sub-clause 6.2.5 of IECEE 02:

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 ..... :	Comment: Will be provided by the manufacturer upon requesting by the authorities.

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) ..... :	**TDK-Lambda (Malaysia) Sdn. Bhd.** PLO33 Locked Bag No. 110, Kawasan Perindustrian Senai 81400 Senai Johor, Darul Takzim, MALAYSIA **TDK-Lambda Corporation** Nagaoka Technical Center 2701 Togawa, Settaya, Nagaoka, Niigata, 940-1195, JAPAN **Wuxi TDK-Lambda Electronics Co., Ltd.** Lot 107 Wuxi Singapore Ind. Park, Xing Chuang Erlu Wuxi Jiangsu, 214028, CHINA

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General product information:

a) Test results in this report are based on the previously issued test reports from BSI with ref. Nos. 249/4925050/1 of 5. Based on reports from SET Laboratory with report number SMTN0137. A new test report has been issued due to the upgrade of test standard and some minor editorial modifications.

b) These products shall be installed in accordance with the requirements of IEC 60950-1, EN 60950-1 for the end use application. The DC to DC converters were tested with the heatsink mounted below the baseplate of the converters (worst case).

c) 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. T101/T102 use triple insulated wire with an insulation class for the transformers of Class H.

d) These products must be installed in a restricted access location accessible to authorised competent personnel only. These products were assessed for Reinforced insulation between input and output assuming a 250Vac mains supply. These converters may have a mains derived DC supply attached to the input and provide a SELV output. All outputs are an energy hazard except for PH300S280-3.3 unit. To maintain the SELV output under fault conditions, the output must be connected to earth in the final application.

e) The operation of these DC to DC converters is subject to the end customer maintaining the baseplate at or below the following values during operation.
PH300S280-3.3, -5:- 100°C at 100% load
PH300S280-12, 15, 24, 28, 48:- 90°C at 100% load, 100°C at 83% load.
PH300S280-48/EM:- 65°C at 100% load, 100°C at 70% load.
PH600S280 series:- 85°C 100% load, 100°C at 80% load.

In accordance with the instructions, the baseplate temperature measurement point is as follows:-
PH300S280 series:- Centre of the baseplate.
PH600S280 series:- 30mm from the input end, along the centre line.

f) The DC to DC converters have not been assessed for an IT power system.

g) 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.

h) The recommended input fuse ratings within the instructions were as follows:-
PH300S280-* = F5AH, 250V
PH600S280-* = F10AH, 250V
The breaking capacity and voltage rating are subject to the end use application.

Summary of Testing:

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

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General product information:
(continue)

Models included within the scope of this report

	Input		Output	
Model	V dc	A	V dc	A
PH300S280-3.3	200-400	1.9	3.3	50
PH300S280-5	200-400	1.9	5	50
PH300S280-12	200-400	1.9	12	25
PH300S280-15	200-400	1.9	15	20
PH300S280-24	200-400	1.9	24	12.5
PH300S280-28	200-400	1.9	28	10.8
PH300S280-48	200-400	1.9	48	6.3
PH300S280-48/HKM	200-400	1.9	48	6.3
PH300S280-48/EM	200-400	1.9	48	7.9
PH600S280-3.3	200-400	3.8	3.3	100
PH600S280-5	200-400	3.8	5	100
PH600S280-12	200-400	3.8	12	50
PH600S280-12/WE	200-400	3.8	12	50
PH600S280-15	200-400	3.8	15	40
PH600S280-15/WE	200-400	3.8	15	40
PH600S280-24	200-400	3.8	24	25
PH600S280-24/WE	200-400	3.8	24	25
PH600S280-28	200-400	3.8	28	21.5
PH600S280-28/WE	200-400	3.8	28	21.5
PH600S280-28/33	200-400	3.8	33	18.24
PH600S280-48	200-400	3.8	48	12.5
PH600S280-48/WE	200-400	3.8	48	12.5
PH600S280-48/EM	200-400	3.8	48	12.5
PH600S280-48/HKM	200-400	3.8	48	12.5

All models may also be marked with /PI after the output voltage marking. The /PI difference being that the corner studs are not threaded and for the standard models the studs are threaded.

All models may include suffix /T, corner studs are not threaded with an inside diameter of 0.1mm less than standard model.

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