Test Report issued under the responsibility of:

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

Report Reference No ..... :	E122103-A171-CB-1
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CB Testing Laboratory ..... :	UL Japan, Inc.
Address ..... :	4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan
Applicant's name ..... :	TDK-LAMBDA CORP
Address ..... :	NAGAOKA TECHNICAL CENTER R&D DIV 2704-1 SETTAYA-MACHI NAGAOKA-SHI NIIGATA 940-1195 JAPAN
Test specification:	
Standard ..... :	IEC 60950-1:2005 (Second Edition); Am1:2009 + Am2:2013
Test procedure ..... :	CB Scheme
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC60950_1F
Test Report Form originator ..... :	SGS Fimko Ltd
Master TRF ..... :	Dated 2014-02

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Test item description ..... :	Switching Power Supply
Trade Mark ..... :	TDK·Lambda
Manufacturer ..... :	TDK-LAMBDA CORP NAGAOKA TECHNICAL CENTER R&D DIV 2704-1 SETTAYA-MACHI NAGAOKA-SHI NIIGATA 940-1195 JAPAN
Model/Type reference ..... :	PFE500SA-abcd, PFE300SA-abcd, PFE700SA-48bcd, PFE500SA-28/TVK, PFE500SA-48/ES, PFE500SA-48/TES Suffix: a = 12, 28, 48. b = "/" or blank. c = T or blank. d = G or blank /TVK = No threads in the corner studs and auto-restart for over voltage protection and over temperature protection. /ES = Output / interface voltage is at SELV level. /TES = No threads in the corner studs and Output / interface voltage is at SELV level.
Ratings ..... :	Input: AC 100-240V, 50-60Hz, 5A (for PFE500SA-12bcd), 6A (for PFE500SA-28bcd, PFE500SA-48bcd, PFE500SA-28/TVK, PFE500SA-48/ES, PFE500SA-48/TES) 4A (for PFE300SA-abcd) 9.5A (for PFE700SA-48bcd) Output: PFE500SA-12: DC 12V (DC 9.6-14.4V), max. 33A, max. 396W PFE500SA-28, PFE500SA-28/TVK: DC 28V (DC 22.4-33.6V), max. 18A, max. 504W PFE500SA-48: DC 48V (DC 38.4-57.6V), max. 10.5A, max. 504W PFE500SA-48/ES, PFE500SA-48/TES: DC 48V (DC 38.4-51.0V), max. 10.5A, max. 504W PFE300SA-12: DC 12V (DC 9.6-14.4V), max. 25A, max. 300W PFE300SA-28: DC 28V (DC 22.4-33.6V), max. 10.8A, max. 302.4W PFE300SA-48: DC 48V (DC 38.4-57.6V), max. 6.3A, max. 302.4W PFE700SA-48: DC 51V (DC 50-57V), max. 14A, max. 714W

Testing procedure and testing location:		
[ ]	**CB Testing Laboratory**	
	Testing location / address .....:	
[ ]	**Associated CB Test Laboratory**	
	Testing location / address .....:	
	Tested by (name + signature) .....:	
	Approved by (name + signature)....:	
[x]	**Testing Procedure: TMP/CTF Stage 1**	
	Testing location / address .....:	UL Japan, Inc. 4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan
	Tested by (name + signature) .....:	Masatomo Takiyama
	Approved by (name + signature)....:	Tetsuo Iwasaki
[ ]	**Testing Procedure: WMT/CTF Stage 2**	
	Testing location / address .....:	
	Tested by (name + signature) .....:	
	Witnessed by (name + signature) ..:	
	Approved by (name + signature)....:	
[ ]	**Testing Procedure: SMT/CTF Stage 3 or 4**	
	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) .:	

List of Attachments

National Differences (27 pages)

Enclosures (42 pages)

Summary Of Testing

Unless otherwise indicated, all tests were conducted at UL Japan, Inc. 4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan.

Tests performed (name of test and test clause)	**Testing location / Comments**
Input: Single-Phase (1.6.2)	

Energy Hazard Measurements (2.1.1.5, 2.1.2, 1.2.8.10)

SELV Reliability Test Including Hazardous Voltage Measurements (2.2.2, 2.2.3, 2.2.4, Part 22 6.1)

Humidity (2.9.1, 2.9.2, 5.2.2)

Determination of Working Voltage; Working Voltage Measurement (2.10.2)

Transformer and Wire /Insulation Electric Strength (2.10.5.13)

Steady Force (4.2.1 - 4.2.4)

Heating (4.5.1, 1.4.12, 1.4.13)

Ball Pressure (4.5.5, 4.5)

Electric Strength (5.2.2)

Abnormal Operation (5.3.1 - 5.3.9)

Transformer Abnormal Operation (5.3.3, 5.3.7b, Annex C.1)

Power Supply Output Short-Circuit/Overload (5.3.7)

Summary of Compliance with National Differences:

Countries outside the CB Scheme membership may also accept this report.

List of countries addressed: CA, DE, DK, EU, FI, GB, KR, SE, SI, US

The product fulfills the requirements of: EN 60950-1:2006 + A1:2010 + A11:2009 + A12:2011 + A2:2013

Copy of Marking Plate - Refer to Enclosure titled Marking Plate for copy.

Test item particulars :	
Equipment mobility ..... :	for building-in
Connection to the mains ..... :	not directly connected to the mains
Operating condition ..... :	continuous
Access location ..... :	N/A (for building-in)
Over voltage category (OVC) ..... :	OVC II
Mains supply tolerance (%) or absolute mains supply values ..... :	+10%, -10%
Tested for IT power systems ..... :	No
IT testing, phase-phase voltage (V) ..... :	N/A
Class of equipment ..... :	Not classified, Class I construction
Considered current rating of protective device as part of the building installation (A) ..... :	16 A (for Europe), 20 A (for Canada and USA)
Pollution degree (PD) ..... :	PD 2
IP protection class ..... :	N/A
Altitude of operation (m) ..... :	Up to 3048 meters (10,000ft)
Altitude of test laboratory (m) ..... :	less than 2000 meters
Mass of equipment (kg) ..... :	0.2 (approx.)
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:	
Date(s) of receipt of test item ..... :	N/A
Date(s) of Performance of tests ..... :	2013-09-01, 2013-11-01, 2014-03-01, 2014-10-14
General remarks:	
"(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 point is used as the decimal separator.	
Manufacturer's Declaration per Sub Clause 4.2.5 of IECEE 02:	Yes
The application for obtaining a CB Test Certificate includes more than one factory 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 ..... When differences exist, they shall be identified in the General Product Information section.	
Name and address of Factory(ies):	TDK-LAMBDA CORP NAGAOKA TECHNICAL CENTER 2704-1 SETTAYA-MACHI NAGAOKA-SHI NIIGATA-KEN 940-1195 JAPAN

TDK-LAMBDA MALAYSIA SDN BHD
PLO33 KAWASAN PERINDUSTRIAN 81400 SENAI JOHOR
MALAYSIA

WUXI TDK-LAMBDA ELECTRONICS CO LTD
NO 6 XING CHUANG ER LU
WUXI JIANGSU 214028
P.R. CHINA

GENERAL PRODUCT INFORMATION:

Report Summary

All applicable tests according to the referenced standard(s) have been carried out.

Product Description

The product tested is a Build-in type Switching Power Supply for use in general office environment (host equipment is not specified).
Aluminum baseplate PCB is used for mounting the power components and securing an external heatsink.

Output:
PFE500SA-12: DC 12V (DC 9.6-14.4V), max. 33A, max. 396W
PFE500SA-28, PFE500SA-28/TVK: DC 28V (DC 22.4-33.6V), max. 18A, max. 504W
PFE500SA-48: DC 48V (DC 38.4-57.6V), max. 10.5A, max. 504W
PFE500SA-48/ES, PFE500SA-48/TES: DC 48V (DC 38.4-51.0V), max. 10.5A, max. 504W
PFE300SA-12: DC 12V (DC 9.6-14.4V), max. 25A, max. 300W
PFE300SA-28: DC 28V (DC 22.4-33.6V), max. 10.8A, max. 302.4W
PFE300SA-48: DC 48V (DC 38.4-57.6V), max. 6.3A, max. 302.4W
PFE700SA-48: DC 51V, max. 14A, max. 714W

This report is a reissue of CBTR Ref. No.: 50007719 001 and 50007719 002, CB Test Certificate Ref. No. JPTUV-056078 and JPTUV-056078-M1. Based on the previously conducted testing and the review of product technical documentation including photos, schematics, wiring diagrams and similar, has been determined that the product continues to comply with the standard"

Model Differences

See enclosure 7-02 for details.

Models of PFE700SA-48bcd which all components, materials and constructions are totally identical to previous certified models of PFE500SA-48bcd except for model name, ratings, transformer T303 and marking plate.

Model PFE500SA-28/TVK is totally identical to model PFE500SA-28 except for model name, marking plate, no threads in the corner studs, auto-restart for over voltage protection and over temperature protection (the value of R93).

Models of PFE500SA-48/ES which all components, materials, constructions and output derating curve are totally identical to previous certified models of PFE500SA-48 except for model name, ratings, marking plate and output/ interface voltage is at SELV level.

Models of PFE500SA-48/TES which all components, materials, constructions and output derating curve are

totally identical to previous certified models of PFE500SA-48 except for model name, ratings, marking plate, no threads in the corner studs and output/ interface voltage is at SELV level.

Additional Information

The Clearances and Creepage Distances have additionally been assessed for suitability up to 3048m (10,000ft) elevation.

Product must be needed the following external components of the circuit functions and heatsink:
- Input Fuse (Client recommended rating, F15AH, 250V)
- Input Filter
- Electrolytic Capacitor(s) for the rectifying circuits of primary
- Smoothing electrolytic capacitor(s) for output circuits
- Heatsink secured on the product

Technical Considerations

- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: Product can be used in any orientation providing the baseplate PCB temperature does not exceed 85°C (for PFE500SA-12bcd), 100°C (for PFE500SA-28bcd, PFE500SA-28/TVK, PFE500SA-48bcd, PFE500SA-48/ES, PFE500SA-48/TES, PFE300SA-abcd and PFE700SA-48bcd) in host equipment. --
- The product is intended for use on the following power systems: TN --

Engineering Conditions of Acceptability

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

- The end-product Electric Strength Test is to be based upon a maximum working voltage of: rimary-Earthed Dead Metal: 338Vrms, 420Vpk, Primary-SELV: 302Vrms, 594Vpk
- The following secondary output circuits are SELV: output of PFE500SA-12bcd, PFE500SA-28bcd, PFE500SA-28/TVK, PFE500SA-48/ES, PFE500SA-48/TES, PFE300SA-12bcd and PFE300SA-28bcd.
- The following secondary output circuits are at hazardous energy levels: All output
- The power supply terminals and/or connectors are: Suitable for factory wiring only
- The maximum investigated branch circuit rating is: 20 A
- The investigated Pollution Degree is: 2
- Proper bonding to the end-product main protective earthing termination is: Required
- An investigation of the protective bonding terminals has: Not been conducted
- 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): T301 (Class H)
- The following end-product enclosures are required: Fire, Electrical
- The product was submitted and evaluated for use at the maximum operating temperature permitted by the manufacturer's specification of: 85°C of baseplate for PFE500SA-12bcd; 100°C of baseplate for PFE500SA-28bcd, PFE500SA-28/TVK, PFE500SA-48bcd, PFE500SA-48/ES, PFE500SA-48/TES, PFE300SA-abcd and PFE700SA-48bcd. Detailed refer to the instruction manual. --
- Test conducted with external R/C fuse, fast-blew type fuse & rated 250Vac, 15A. --
- Output PFE500SA-48bcd, PFE300SA-48bcd and PFE700SA-48bcd are not SELV. --

Abbreviations used in the report:

- normal condition	N.C.	- single fault condition	S.F.C
- operational insulation	OP	- basic insulation	BI
- basic insulation between parts of opposite polarity:	BOP	- supplementary insulation	SI
- double insulation	DI	- reinforced insulation	RI

Indicate used abbreviations (if any)