Test Report issued under the responsibility of:

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

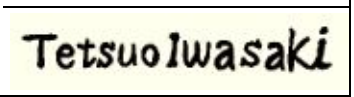
Report Reference No ..... :	4786910622-4
Date of issue ..... :	2015-08-03
Total number of pages ..... :	236
CB Testing Laboratory ..... :	UL Japan, Inc.
Address ..... :	4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan
Applicant's name ..... :	TDK-LAMBDA CORP
Address ..... :	NAGAOKA TECHNICAL CENTER 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

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.

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 ..... :	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 ..... :	HWS1500-xy x = 3, 5, 6, 7, 12, 15, 24, 36, 48, 60 y = /CO, /HD, /LNF (for x=24, 36, 48), /LNF3K (for x=24), or blank (for all suffix x)
Ratings ..... :	Input: AC 100-240 V, 50/60 Hz, 15 A for model HWS1500-3y 20 A for other models Output: HWS1500-3y: 3.3Vdc (2.64 – 3.96 Vdc), 300 A (max. 990 W) HWS1500-5y: 5Vdc (4.0 – 6.0 Vdc), 300 A (max. 1500 W) HWS1500-6y: 6Vdc (4.8 – 7.2 Vdc), 250 A (max. 1500 W) HWS1500-7y: 7.5Vdc (6.0 – 9.0 Vdc), 200 A (max. 1500 W) HWS1500-12y: 12Vdc (9.6 – 14.4 Vdc), 125 A (max. 1500 W) HWS1500-15y: 15Vdc (12.0 – 18.0 Vdc), 100 A (max. 1500 W) HWS1500-24y: 24Vdc (19.2 – 28.8 Vdc), 65 A (max. 1560 W) when input is 100-180 Vac and 70 A (max. 1680 W) when input is 180-240 Vac, also following peak output applied: peak current 105 A (max. 2520 W), max. 10 sec., duty 35% when input is 180-240 Vac. HWS1500-36y: 36Vdc (28.8 – 43.2 Vdc), 42 A (max. 1512 W) when input is 100-180 Vac and 46.5 A (max. 1674 W) when input is 180-240 Vac, also following peak output applied: peak current 70 A (max. 2520 W), max. 10 sec., duty 35% when input is 180-240 Vac. HWS1500-48y: 48Vdc (38.4 – 52.8 Vdc), 32 A (max. 1536 W) HWS1500-60y: 60Vdc (48 – 66 Vdc), 25.6 A (max. 1536 W) when input is 100-180 Vac and 28 A (max. 1680 W) when input is 180-240 Vac, also following peak output applied: peak current 42 A (max. 2520 W), max. 10 sec., duty 35% when input is 180-240 Vac.

Testing procedure and testing location:		
[x]	**CB Testing Laboratory**	
	Testing location / address ..... :	UL Japan, Inc. 4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan
[ ]	**Associated CB Test Laboratory**	
	Testing location / address ..... :	
	Tested by (name + signature) ..... :	Ayano Matsumoto 
	Approved by (name + signature) ... :	Tetsuo Iwasaki 
[ ]	**Testing Procedure: TMP/CTF Stage 1**	
	Testing location / address ..... :	
	Tested by (name + signature) ..... :	
	Approved by (name + signature) ... :	
[ ]	**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 (24 pages)
Enclosures (137 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)	
	SELV Reliability Test Including Hazardous Voltage Measurements (2.2.2, 2.2.3, 2.2.4)	
	Protective Bonding I (2.6.3.4, 2.6.1)	
	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)	
	Heating (4.5.1, 1.4.12, 1.4.13)	
	Ball Pressure (4.5.5, 4.5)	
	Touch Current (Single-Phase; TN/TT System) (5.1, Annex D)	
	Electric Strength (5.2.2)	
	Component Failure (5.3.1, 5.3.4, 5.3.7)	
	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		

Test item particulars :		
Equipment mobility	:	for building-in
Connection to the mains	:	not directly connected to the mains
Operating condition	:	continuous
Access location	:	restricted access location
Over voltage category (OVC)	:	OVC II
Mains supply tolerance (%) or absolute mains supply values	:	±10%
Tested for IT power systems	:	Yes
IT testing, phase-phase voltage (V)	:	230V (for Norway)
Class of equipment	:	Not classified, Class I construction
Considered current rating of protective device as part of the building installation (A)	:	30 A
Pollution degree (PD)	:	PD 2
IP protection class	:	IPX0
Altitude of operation (m)	:	≤ 3000 m
Altitude of test laboratory (m)	:	< 1000 m
Mass of equipment (kg)	:	3.5 kg (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	:	2008-08-16 to 2008-08-22, 2008-10-21 to 2008-10-23

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:

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 ..... Yes

When differences exist, they shall be identified in the General Product Information section.

Name and address of Factory(ies): TDK-LAMBDA CORP
2704-1 SETTAYA-MACHI

NAGAOKA-SHI
NIIGATA 940-1195 JAPAN

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

TDK-LAMBDA MALAYSIA SDN BHD
LOT 2 & 3, BATU 9 3/4
KAWASAN PERINDUSTRIAN
BANDAR BARU JAYA GADING
26070 KUANTAN MALAYSIA

ALPS LOGISTICS FACILITIES CO LTD
593-1 NISHIOOHASHI
TSUKUBA-SHI
IBARAKI-KEN 305-0831 JAPAN

Wuxi TDK-Lambda Electronics Co Ltd
NO 6
XING CHUANG ER LU
WUXI
JIANGSU 214028 CHINA

SENDAN ELECTRONICS MFG CO LTD
1010 HABUSHIN
NANTO-SHI
TOYAMA-KEN 939-1756 JAPAN

ZHANGJIAGANG HUA YANG ELECTRONICS CO LTD
TONGXIN RD
ZHAOFENG ECONOMIC DEVELOPMENT ZONE
LEYU TOWN
ZHANGJIAGANG
JIANGSU 215622 CHINA

GENERAL PRODUCT INFORMATION:

Report Summary

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

Product Description

The product is a switching power supply intended for building in to an end product.

Model Differences

HWS1500 series are identical except for output rating, winding of Transformer T201, PWB Board and minor components. Models HWS1500-3y, -5y, -6y, -7y are provided with PWB Board No. PDA-033# and the other models are provided PWB Board No. PDA-009# and different shape of insulation sheets.

Definition of variable(s):

Variable:	Range of variable:	Content:
x	3, 5, 6, 7, 12, 15, 24, 36, 48, or 60	Output voltage
y	/CO, /HD, /LNF or blank	/CO: thin coating on solder side of PWB /HD: thin coating on the both sides of PWB /LNF: different output derating and different Fan /LNF3K: altitude during operation of 3000m. blank: No thin coating on PWB

Unless otherwise stated, tests were conducted on models HWS1500-5, -7 and models HWS1500-12, -24, -36, -48, -60 considered to represent the worst case condition the respective tests.

Additional Information

This report is a reissue of CBTR Ref. No.:12027308 001, CB Test Certificate Ref. No.JPTUV-045665.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.

Sample Received date is 2011-01-25.
Construction review was conducted on 2011-02-14.

Abbreviations used in the report.
- built-in application: B/I

Technical Considerations

- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: 50°C for 100% load except for models HWS1500-3x, -5y and y = /LNF, 40°C for 100% load for models HWD1500-3y, -5y, 70°C for 50% except for y=/LNF, 30°C for 100% load, 50°C for 60% load, 70°C for 20% load for y = /LNF and y = /LNF3K.

- The product is intended for use on the following power systems: TN

- The product was investigated to the following additional standards: EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + A2:2013 (which includes all European national differences, including those specified in this test report).

Engineering Conditions of Acceptability

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

- The following Production-Line tests are conducted for this product: Electric Strength

- The end-product Electric Strength Test is to be based upon a maximum working voltage of: Primary-Earthed Dead Metal: 736 Vpk.

- The following secondary output circuits are SELV: Outputs of Models HWS1500-3, HWS1500-5, HWS1500-6, HWS1500-7, HWS1500-12, HWS1500-15, HWS1500-24, HWS1500-36, and HWS1500-48.

- The power supply terminals and/or connectors are: Suitable for factory wiring only
- The maximum investigated branch circuit rating is: 30 A
- The investigated Pollution Degree is: 2
- Proper bonding to the end-product main protective earthing termination is: Required
- The following input terminals/connectors must be connected to the end product supply neutral: Terminal 2 of Terminal Block (TB1)
- 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): T2 (Class B), T201 (Class F) for Models HWS1500-3, HWS1500-5, HWS1500-6, HWS1500-7, HWS1500-12, HWS1500-15, HWS1500-24, HWS1500-36, and HWS1500-48, T201 (Class H) for Models HWS1500-12, HWS1500-15, HWS1500-24, HWS1500-36, HWS1500-48 and HWS1500-60 (Class H), T700 (Class E)
- The following end-product enclosures are required: Fire, Electrical

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)