



Test Report issued under  
the responsibility of:



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

**Report Reference No** .....: E122103-A137-CB-2

Date of issue .....: 2015-06-25

Total number of pages .....: 65

**CB Testing Laboratory** .....: UL Japan, Inc.

Address .....: 4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan

**Applicant's name** .....: TDK-LAMBDA CORP  
NAGAOKA TECHNICAL CENTER

Address .....: 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 .....	<b><i>TDK-Lambda</i></b>
Manufacturer .....	TDK-LAMBDA CORP NAGAOKA TECHNICAL CENTER R&D DIV 2704-1 SETTAYA-MACHI NAGAOKA-SHI NIIGATA 940-1195 JAPAN
Model/Type reference .....	HWS15A-3, HWS15A-5, HWS15A-12, HWS15A-15, HWS15A-24, HWS15A-48 Maybe followed by suffix "abcd" (a is /, b is HD, c is A, d is FG, DIN; and "abcd" may be blank).
Ratings .....	Input: AC100-240 V, 50-60 Hz, 0.3 A (for Model HWS15A-3) and 0.4 A (for all models except for Model HWS15A-3)

<b>Testing procedure and testing location:</b>	
<input checked="" type="checkbox"/> <b>CB Testing Laboratory</b>	Testing location / address .....: UL Japan, Inc. 4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan
<input type="checkbox"/> <b>Associated CB Test Laboratory</b>	Testing location / address .....:
	Tested by (name + signature) .....: Tetsuo Iwasaki
	Approved by (name + signature).....: Masatomo Takiyama
	<i>T. Iwasaki</i>
	<i>M. Takiyama</i>
<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) .....:
	Approved by (name + signature).....:
	Supervised by (name + signature) ..:
<input type="checkbox"/> <b>Testing Procedure: RMT</b>	Testing location / address .....:
	Tested by (name + signature) .....:
	Approved by (name + signature).....:
	Supervised by (name + signature) ..:

<b>List of Attachments</b>	
National Differences (27 pages)	
Enclosures (39 pages)	
<b>Summary Of Testing</b>	
Unless otherwise indicated, all tests were conducted at UL Japan, Inc. 4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan.	
<b>Tests performed (name of test and test clause)</b>	<b>Testing location / Comments</b>
Input: Single-Phase (1.6.2)	

Energy Hazard Measurements (2.1.1.5, 2.1.2, 1.2.8.10)

Capacitance Discharge (2.1.1.7)

Calculated time-constant was less than 1 sec.

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

Protective Bonding II (2.6.3.4, 2.6.1)

Humidity (2.9.1, 2.9.2, 5.2.2)

40±2°C, 93±2%, 120hours.

Determination of Working Voltage; Working Voltage Measurement (2.10.2)

Thin Sheet Material (2.10.5.9, 2.10.5.10, 2.10.5.6)

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)

ANNEX C.1-Transformer Abnormal Operation Test was considered representative of this test.

#### Summary of Compliance with National Differences:

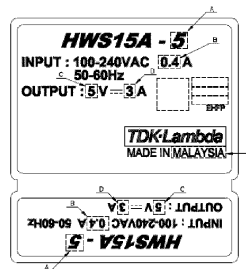
Countries outside the CB Scheme membership may also accept this report.

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**

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.



MODEL	A	B	C	D
HWS15-3 EHPF	3	0.3	3.3	3
HWS15-5 EHPF	5	0.4	3	3
HWS15-12 EHPF	12	0.4	12	1.3
HWS15-15 EHPF	15	0.4	15	1
HWS15-24 EHPF	24	0.4	24	0.65
HWS15-48 EHPF	48	0.4	48	0.33

E: COUNTRY OF MANUFACTURE WILL BE SHOWN, JAPAN, MALAYSIA OR CHINA.

<b>Test item particulars :</b>	
Equipment mobility .....	for building-in
Connection to the mains .....	N/A
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 .....	Class I (earthed)
Considered current rating of protective device as part of the building installation (A) .....	20 A
Pollution degree (PD) .....	PD 2
IP protection class .....	IP X0
Altitude of operation (m) .....	Up to 4000 m
Altitude of test laboratory (m) .....	approximately 10 to 20 m
Mass of equipment (kg) .....	0.19 Kg
<b>Possible test case verdicts:</b>	
- 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)
<b>Testing:</b>	
Date(s) of receipt of test item .....	2013-05-14, 2013-05-16, 2013-05-23, 2013-06-06, 2013-07-16, 2013-08-20, 2014-09-29
Date(s) of Performance of tests .....	2013-06-07 to 2013-06-24, 2013-07-22 to 2013-07-24, 2013-08-26, 2014-10-03, 2014-10-06
<b>General remarks:</b>	
"(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.	
<b>Manufacturer's Declaration per Sub Clause 4.2.5 of IEC 60950-1:</b>	
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.	
<b>Name and address of Factory(ies):</b>	WUXI TDK-LAMBDA ELECTRONICS CO LTD NO 6 XING CHUANG ER LU WUXI JIANGSU 214028 CHINA  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

TDK-LAMBDA CORP  
2704-1 SETTAYA-MACHI NAGAOKA-SHI NIIGATA-KEN 940-  
1195 JAPAN

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 215622 JIANGSU CHINA

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

## GENERAL PRODUCT INFORMATION:

### Report Summary

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

### Product Description

The product covered in this report is building-in type switching power supply having a single output circuit.

#### Output:

3.3 V (2.97V-3.96V), maximum 3 A (maximum 9.9W) (for HWS15A-3),  
5 V (4.0V-6.0V), maximum 3 A (maximum 15.0W) (for HWS15A-5),  
12 V (9.6V-14.4V), maximum 1.3 A (maximum 15.6W) (for HWS15A-12),  
15 V (12.0V-18.0V), maximum 1.0 A (maximum 15.0W) (for HWS15A-15),  
24 V (19.2V-28.8V), maximum 0.65 A (maximum 15.6W) (for HWS15A-24),  
48 V (38.4V-52.8V), maximum 0.33 A (maximum 15.8W) (for HWS15A-48)

Maximum Output Power per Product Spec Sheet (See enclosure Id. 7-01 for details)

### Model Differences

Each model is identical, except for model designation, output rating, Transformer (T1), and secondary components.

Standard model is Terminal Block model without cover.

And HWS15A Series maybe followed by suffix "abcd" (a is /, b is HD, c is A, d is FG, DIN; and "abcd" may be blank).

1. HD: Model with optional Thin coating (QMJU2) on both component and solder side of PWB and maximum

operating temperature is 71°C

2. A: Model with metal cover.

3. FG: Model with Low Leakage (the capacitances for Primary - FG reduced).

4. DIN: Model with DinRail Mounting Bracket.

### Additional Information

This report is a re-issued report of CB Test Report Ref. No. E122103-A137-CB-1 (Amendment 1) due to following modification.

- Upgrade Standard.

This product has two types of PWB (Type PZA-081A and Type PZA-081C).

Difference by Type of PWB is only overvoltage protection circuit.

The Clearances and Creepage Distances have additionally been assessed for suitability up to 4000 m elevation.

Line to Line Capacitor C1 was used the following value in the range; C1: 0.22 uF.

Line to Ground Capacitor C3 was used the following value in the range; C3: 330 pF.

Primary to Ground Capacitor C4 was used the following value in the range; C3: 3300 pF.

UL Standard has requirements that meet or exceed the relevant IEC requirements.

### Technical Considerations

- 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).
- The product was submitted and evaluated for use at the maximum ambient temperature (T<sub>ma</sub>) permitted by the manufacturer's specification of: See enclosure Id. 7-01. --
- 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:

- Earth terminal provided on Terminal Block (TB1) has not been evaluated as protective earthing terminal. If the earth terminal connected to protective earthing in the end product, Limited Short-Circuit Test per CSA C22.2 No.04 shall be conducted. This component is intended to be connected to a protective earth of the end-product via Chassis. Protective bonding mark (60417-1-IEC-5017) is provided on PWB near Earth terminal in TB1, however, Limited Short-Circuit Test per CSA C22.2 No.04 has not been conducted. Therefore, protective earthing conductor or protective bonding conductor shall not be connected directly to the terminal block. --
- Model HWS15A-3 was tested with output Voltage Range of 2.97 - 3.96 Vdc (maximum 9.9 W), Model HWS15A-5 was tested with output Voltage Range of 4.0 - 6.0 Vdc (maximum 15 W), Model HWS15A-12 was tested with output Voltage Range of 9.6 - 14.4 Vdc (maximum 15.6 W), Model HWS15A-15 was tested with output Voltage Range of 12.0 - 18.0 Vdc (maximum 15 W), Model HWS15A-24 was tested with output Voltage Range of 19.2 - 28.8 Vdc (maximum 15.6 W), Model HWS15A-48 was tested with output Voltage Range of 38.4 - 52.8 Vdc (maximum 15.8 W), Adjustment of voltage was made via Variable Resistor (VR51). See enclosure Id. 7-03 for details. --
- Line to Line Capacitor C1 has maximum 0.22 uF range of capacitance. Therefore, consideration shall be given in conducting Capacitance Discharge Test in the end-product application with respect to the variation in C1. --



- Line to Ground Capacitor C3 has maximum 330pF range of capacitance. Primary to Ground Capacitor C4 has maximum 3300pF range of capacitance. Therefore, consideration shall be given in conducting Touch Current Test in the end product application with respect to the variation in C3 and C4. --
- The end-product Electric Strength Test is to be based upon a maximum working voltage of: [Model HWS15A-3] Primary - Secondary: 273 Vrms, 468 Vpk, Primary - Ground: 273 Vrms, 468 Vpk, [Model HWS15A-5] Primary - Secondary: 279 Vrms, 476 Vpk, Primary - Ground: 279 Vrms, 476 Vpk, [Model HWS15A-12] Primary - Secondary: 279 Vrms, 472 Vpk, Primary - Ground: 279 Vrms, 472 Vpk, [Model HWS15A-15] Primary - Secondary: 274 Vrms, 460 Vpk, Primary - Ground: 274 Vrms, 460 Vpk, [Model HWS15A-24] Primary - Secondary: 277 Vrms, 468 Vpk, Primary - Ground: 277 Vrms, 468 Vpk, [Model HWS15A-48] Primary - Secondary: 273 Vrms, 456 Vpk, Primary - Ground: 273 Vrms, 476 Vpk --
- The following secondary output circuits are SELV: Output of all models --
- The following secondary output circuits are at non-hazardous energy levels: Output of all models --
- 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): T1 (Class F) --
- The following end-product enclosures are required: Electrical and Fire --

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)