



Test Report issued under  
the responsibility of:



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

**Report Reference No** .....: E122103-A154-CB-2  
**Date of issue** .....: 2015-08-10  
**Total number of pages** .....: 22

**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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<b>Test item description</b> .....	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 .....	RWS100B-5, RWS100B-12, RWS100B-15, RWS100B-24, and RWS100B-48  Maybe followed by suffix "abc" (a is /, b is CO2, c is FG, DIN; and "abc" may be blank).
Ratings .....	Input: 100-240 Vac, 50-60 Hz, 1.0 A (for Model RWS100B-5) and 1.3 A (for Models RWS100B-12, RWS100B-15, RWS100B-24, and RWS100B- 48)

<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
<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) ..:

*T. Iwasaki*  
 \_\_\_\_\_  
*M. Takiyama*  
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<b>List of Attachments</b>	
National Differences (0 pages)	
Enclosures (4 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)

Determination of Working Voltage; Working Voltage Measurement (2.10.2)

Transformer and Wire /Insulation Electric Strength (2.10.5.13)

Electric Strength (5.2.2)

**Summary of Compliance with National Differences:**

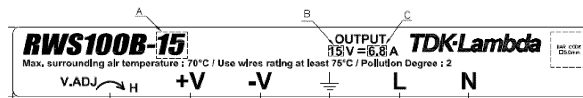
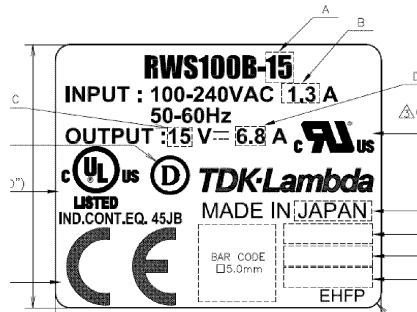
Countries outside the CB Scheme membership may also accept this report.

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	MODEL CODE
RWS100B-5 EHFP	5	5	14	GK4
RWS100B-12 EHFP	12	12	8.5	GK5
RWS100B-15 EHFP	15	15	6.8	***
RWS100B-24 EHFP	24	24	4.5	GK7
RWS100B-48 EHFP	48	48	2.1	GK8

**Test item particulars :**

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 3000 m
Altitude of test laboratory (m) .....	approximately 10 to 20 m
Mass of equipment (kg) .....	approximately 0.4 kg

**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 .....	2015-11-17
Date(s) of Performance of tests .....	2015-11-26 to 2015-11-30

**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 IEC 60950-1:**

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.

<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

The original report was modified on 2015-12-17 to include the following changes/additions:  
This report is only valid in conjunction with CB Test Report Ref. No. E122103-A154-CB-2.  
Amendment 1 report covers following modifications:

- Addition of new model RWS100B-15.

Only limited tests were considered necessary to perform because model RWS100B-15 is similar in construction and electrical character to model RWS100B-12.

### Product Description

The product covered in this Test Report is building-in type switching power supply with a single output circuit.

#### Output:

5 Vdc (4.5 Vdc - 5.75 Vdc), maximum 14 A (maximum 70 W) (for RWS100B-5)  
12 Vdc (10.8 Vdc - 13.8 Vdc), maximum 8.5 A (maximum 102 W) (for RWS100B-12)  
15 Vdc (13.5 Vdc - 17.25 Vdc), maximum 6.8 A (maximum 102 W) (for RWS100B-15)  
24 Vdc (21.6 Vdc - 27.6 Vdc), maximum 4.5 A (maximum 108 W) (for RWS100B-24)  
48 Vdc (43.2 Vdc - 52.8 Vdc), maximum 2.1 A (maximum 100.8 W) (for RWS100B-48)

### Model Differences

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

Standard model is Terminal Block model with Chassis and Cover.

And RWS100B Series maybe followed by suffix "abc" (a is /, b is CO2, c is FG, DIN; and "abc" may be blank).

1. CO2: Model with optional thin coating (QMJU2) on both sides of PWB.
2. FG: Model with Low Leakage (the capacitances for Primary - FG reduced).
3. DIN: Model with Cover and DinRail Mounting Bracket.

### Additional Information

The Clearances and Creepage Distances have additionally been assessed for suitability up to 3000 m elevation.

UL94 Standard has requirements that meet or exceed the relevant IEC requirements.

### Technical Considerations

- 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
- 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 end-product Electric Strength Test is to be based upon a maximum working voltage of: [Model RWS100B-5] Primary - Secondary: 464 Vrms and 812 Vpk / Primary - Ground: 415 Vrms and 768 Vpk , , [Model RWS100B-12] Primary - Secondary: 473 Vrms and 848 Vpk / Primary - Ground: 407 Vrms and 772 Vpk , , [Model RWS100B-15] Primary - Secondary: 497 Vrms and 836 Vpk / Primary - Ground: 425 Vrms and 760 Vpk , , [Model RWS100B-24] Primary - Secondary: 496 Vrms and 852 Vpk / Primary - Ground: 409 Vrms and 740 Vpk , , [Model RWS100B-48] Primary - Secondary: 535 Vrms and 1010 Vpk / Primary - Ground: 413 Vrms and 744 Vpk
- The following secondary output circuits are SELV: Output of Models RWS100B-5, RWS100B-12, RWS100B-15, RWS100B-24, and RWS100B-48
- The following secondary output circuits are at non-hazardous energy levels: Output of Models RWS100B-5, RWS100B-12, RWS100B-15, RWS100B-24, and RWS100B-48
- 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 OBJ2 insulation system with the indicated rating greater than Class A (105°C): Transformer (T1) (Class F)
- The following end-product enclosures are required: Electrical, Fire
- Line to Line Capacitor C1 have maximum 0.47 µF for capacitance. Line to Line Capacitor C4 have maximum 0.33 µF for capacitance. C1: 0.47µF and C4: 0.33µF were used in test. Therefore, consideration shall be given to conducting Capacitance Discharge Test in the end-product with respect to the variation in C1 and C4. --
- Line to ground Capacitors C2, C3 has maximum 2200 pF for capacitance. Primary to ground Capacitor C10 have maximum 3300 pF for capacitance. C2, C3: 2200pF and C10: 3300pF were used in test. Therefore, consideration shall be given to conducting Touch Current Test in the end-



product with respect to the variation in C2, C3 and C10. --

- Earth terminal provided on Terminal Block (TB1) has not been evaluated as protective earthing terminal. This component is intended to be connected to a protective earth via earthed parts of end-product. If protective earthing conductor is connected to the earth terminal on Terminal Block (TB1) in the end product, Limited Short-Circuit Test per CSA C22.2 No.04 shall be conducted. (for USA/Canada) --
- Model RWS100B-5 was tested with Output Voltage Range of 4.5 - 5.75 Vdc (maximum 70 W). Model RWS100B-12 was tested with Output Voltage Range of 10.8 - 13.8 Vdc (maximum 102 W)., Model RWS100B-15 was tested with Output Voltage Range of 13.5 - 17.25 Vdc (maximum 102 W)., Model HWS100B-24 was tested with Output Voltage Range of 21.6 - 27.6 Vdc (maximum 108 W). , Model RWS100B-48 was tested with Output Voltage Range of 43.2 - 52.8 Vdc (maximum 100.8 W). , --

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)