



Test Report issued under  
the responsibility of:



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

**Report Reference No** .....: E122103-A144-CB-3

Date of issue .....: 2017-05-10

Total number of pages .....: 87

**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 .....	RWS300B-5, RWS300B-12, RWS300B-15, RWS300B-24, RWS300B-28, RWS300B-36, and RWS300B-48  Maybe followed by suffix "abcdef" ("a" is "/", "b" is "R", "c" is "CO2", "d" is "FG", "e" is "DIN", "f" is "H" (for RWS300B-24); and "a", "b", "c", "d", "e" and "f" may be blank)
Ratings .....	Input: 100-240 Vac, 50-60 Hz, 3.3 A (for Model RWS300B-5) and 3.8 A (for Models RWS300B-12, RWS300B-15, RWS300B-24, RWS300B-28, RWS300B-36, and RWS300B-48)

<b>Testing procedure and testing location:</b>	
<input checked="" type="checkbox"/>	<p><b>CB Testing Laboratory</b>                  Testing location / address .....: UL Japan, Inc. 4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan</p> <p><input type="checkbox"/> <b>Associated CB Test Laboratory</b>                  Testing location / address .....:                  Tested by (name + signature) .....: Ayano Matsumoto, Project Handler <span style="float: right;"><i>A. Matsumoto</i></span>                  Approved by (name + signature).....: Tetsuo Iwasaki, Reviewer <span style="float: right;"><i>T. Iwasaki</i></span></p>
<input type="checkbox"/>	<p><b>Testing Procedure: TMP/CTF Stage 1</b>                  Testing location / address .....:                  Tested by (name + signature) .....:                  Approved by (name + signature).....:</p>
<input type="checkbox"/>	<p><b>Testing Procedure: WMT/CTF Stage 2</b>                  Testing location / address .....:                  Tested by (name + signature) .....:                  Witnessed by (name + signature) ...:                  Approved by (name + signature).....:</p>
<input type="checkbox"/>	<p><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) ..:</p>
<input type="checkbox"/>	<p><b>Testing Procedure: RMT</b>                  Testing location / address .....:                  Tested by (name + signature) .....:                  Approved by (name + signature).....:                  Supervised by (name + signature) ..:</p>

<b>List of Attachments</b>	
National Differences (57 pages)	
Enclosures (38 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)

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)

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)

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)

Locked-Rotor Overload for DC Motors in Secondary Circuits (Annex B.7)

**Summary of Compliance with National Differences:**

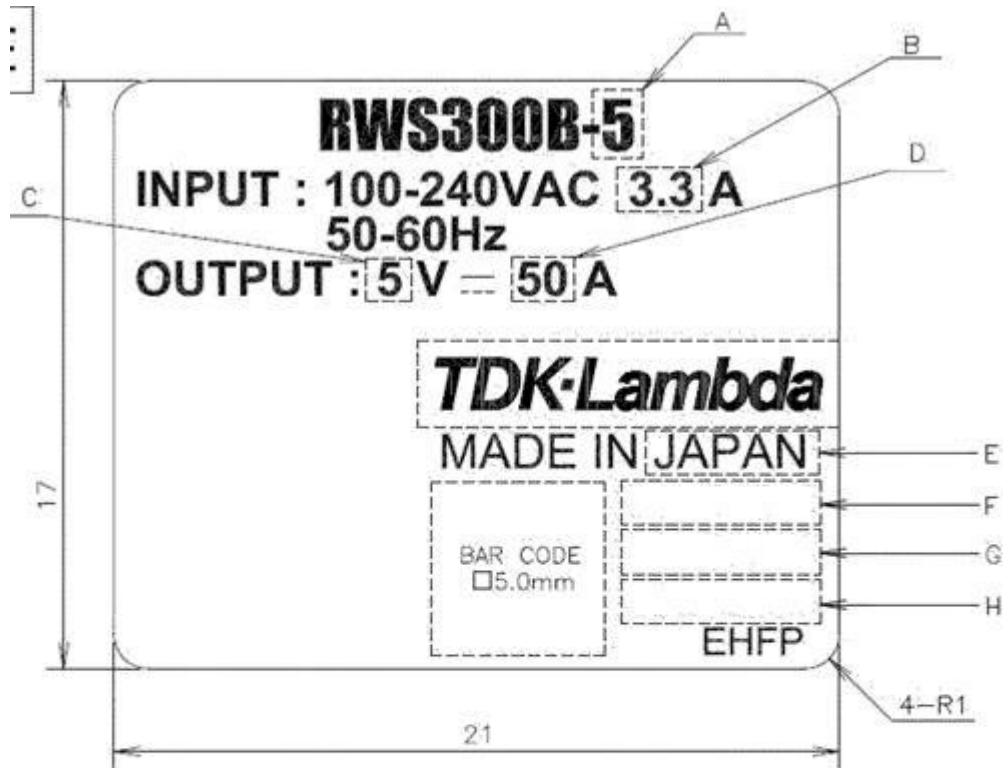
Countries outside the CB Scheme membership may also accept this report.

List of countries addressed: AR, AT, AU, BE, BY, CA, CH, CN, CZ, DE, DK, ES, EU, FI, FR, GB, HU, IL, IN, IT, JP, KR, MY, NL, NO, NZ, PL, SA, SE, SG, SI, SK, UA, 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	MODEL CODE
RWS300B-5 EHFP	5	3.3	5	50	GEV
RWS300B-12 EHFP	12	3.8	12	25	GEW
RWS300B-15 EHFP	15	3.8	15	20	HAZ
RWS300B-24 EHFP	24	3.8	24	12.5	GEX
RWS300B-28 EHFP	28	3.8	28	11	---
RWS300B-36 EHFP	36	3.8	36	8.4	HB1
RWS300B-48 EHFP	48	3.8	48	6.3	GEY

<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 .....	Yes
IT testing, phase-phase voltage (V) .....	230 V
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) .....	less than 3000 m
Altitude of test laboratory (m) .....	approximately 10 to 20 m
Mass of equipment (kg) .....	approximately 0.9 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 .....	2013-07-03, 2014-02-07, 2014-02-18, 2016-06-24, 2016-09-06, 2017-04-26
Date(s) of Performance of tests .....	2013-07-10 to 2013-08-07, 2014-02-13 to 2014-02-20, 2014-02-24, 2016-07-05 to 2016-07-11, 2016-09-09 to 2016-09-12, 2017-04-28
<b>General remarks:</b>	
<p>"(see Enclosure #)" refers to additional information appended to the report.  "(see appended table)" refers to a table appended to the report.</p> <p>Throughout this report a point is used as the decimal separator.</p>	
<b>Manufacturer's Declaration per Sub Clause 4.2.5 of IEC 60950-1:</b>	
<p>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 .....</p> <p>When differences exist, they shall be identified in the General Product Information section.</p>	
<b>Name and address of Factory(ies):</b>	WUXI TDK-LAMBDA ELECTRONICS CO LTD NO6 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  
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NIIGATA-KEN 940-1195 JAPAN

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

ALPS LOGISTICS FACILITIES CO LTD  
36-1 KASUMINOSATO  
AMI-MACHI  
INASHIKI-GUN  
IBARAKI-KEN 300-0396  
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 Test Report is building-in type switching power supply with a single output circuit.

#### Output:

5 Vdc (4.5 Vdc - 5.75 Vdc), maximum 50 A (maximum 250 W) (for Model RWS300B-5)  
12 Vdc (10.8 Vdc - 13.8 Vdc), maximum 25 A (maximum 300 W) (for Model RWS300B-12)  
15 Vdc (13.5 Vdc - 17.2 Vdc), maximum 20 A (maximum 300 W) (for Model RSW300B-15)  
24 Vdc (21.6 Vdc - 27.6 Vdc), maximum 12.5 A (maximum 300 W) (for Model RWS300B-24)  
24 Vdc (21.6 Vdc - 25.0 Vdc), maximum 12.5 A (maximum 300 W) (for Model RWS300B-24/H)  
28 Vdc (25.2 Vdc - 32.2 Vdc), maximum 11 A (maximum 308 W) (for Model RWS300B-28)  
36 Vdc (32.4 Vdc - 41.4 Vdc), maximum 8.4 A (maximum 302.4 W) (for Model RWS300B-36)  
48 Vdc (43.2 Vdc - 52.8 Vdc), maximum 6.3 A (maximum 302.4 W) (for Model RWS300B-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.

RWS300B Series maybe followed by suffix "abcdef". ("a" is "/", "b" is "R", "c" is "CO2", "d" is "FG", "e" is "DIN", "f" is "H" (for RWS300B-24); and "a", "b", "c", "d", "e" and "f" may be blank)

1. R: Model with optional ON/OFF control function. Photo Coupler (PC103) and the relating circuit was added.
2. CO2: Model with optional Thin Coating (QMJU2) on both component and solder side of PWB
3. FG: Model with Low Leakage (the capacitances between Primary - FG reduced).
4. DIN: Model with DinRail Mounting Bracket.
5. H: Model of long hold-up time.

### Additional Information

This report is a re-issued report of CB Test Report Ref. No. E122103-A144-CB-2 (Amendment 3) due to following modification.

- Addition of Models with suffix "H". The model RWS300B-24 with suffix "H" is identical to original model RWS300B-24 except for Transformer T1, Electrolytic Capacitor C6 and Derating Curve.

- Revise definition of models from Maybe followed by suffix "abcd" (a is /, b is R, c is CO2, d is FG, DIN, and "abcd" may be blank) to Maybe followed by suffix "abcdef" ("a" is "/", "b" is "R", "c" is "CO2", "d" is "FG", "e" is "DIN", "f" is "H" (for RWS300B-24); and "a", "b", "c", "d", "e" and "f" may be blank)

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.

In addition, following National Differences were considered:

- Russian Federation (RU)\*\*,
- Turkey (TR)\*\*,
- Serbia (RS)\*\*.

Note) \*\*: Only Group Differences.

### Technical Considerations

- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: See Enclosure Id. 7-01 and Id. 7-05.
- The product is intended for use on the following power systems: TN, IT
- 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 RWS300B-5] Primary - Secondary: 472 Vrms and 848 Vpk / Primary - Ground: 431 Vrms and 840 Vpk , [Model RWS300B-12] Primary - Secondary: 413 Vrms and 784 Vpk / Primary - Ground: 411 Vrms and 776 Vpk , [Model RWS300B-15] Primary - Secondary: 431 Vrms and 652 Vpk / Primary - Ground: 383 Vrms and 648 Vpk , [Model RWS300B-24] Primary - Secondary: 454 Vrms and 672 Vpk / Primary - Ground: 390 Vrms and 616 Vpk, [Model RWS300B-24/H] Primary - Secondary: 421 Vrms and 656 Vpk / Primary - Ground: 381 Vrms and 660 Vpk, [Model RWS300B-28 and Model RWS300B-36] Primary - Secondary: 448 Vrms and 672 Vpk / Primary - Ground: 391 Vrms and 632



Vpk , [Model RWS300B-48] Primary - Secondary: 456 Vrms and 664 Vpk / Primary - Ground: 388 Vrms and 612 Vpk

- The following secondary output circuits are SELV: Output of Models RWS300B-5, RWS300B-12, RWS300B-15, RWS300B-24, RWS300B-28, RWS300B-36, and RWS300B-48
- The following secondary output circuits are at hazardous energy levels: Output of Models RWS300B-5, RWS300B-12, RWS300B-15, RWS300B-24, RWS300B-28, RWS300B-36, and RWS300B-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 OBJY2 insulation system with the indicated rating greater than Class A (105°C): Transformer (T1) (Class F)
- The following end-product enclosures are required: Fire, Electrical
- Line to Line Capacitor C1 have maximum 0.68uF for capacitance. C1: 0.68uF was used in test. 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 Capacitors C2, C3 has maximum 2200 pF for capacitance. Primary to ground Capacitor C8 have maximum 2200 pF for capacitance. C2, C3 and C8: 2200pF 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 C8. --
- 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 RWS300B-5 was tested with Output Voltage Range of 4.5 - 5.75 Vdc (maximum 250 W)  
 Model RWS300B-12 was tested with Output Voltage Range of 10.8 - 13.8 Vdc (maximum 300 W)  
 Model RWS300B-15 was tested with Output Voltage Range of 13.5 - 17.2 Vdc (maximum 300 W)  
 Model RWS300B-24 was tested with Output Voltage Range of 21.6 - 27.6 Vdc (maximum 300 W)  
 Model RWS300B-24/H was tested with Output Voltage Range of 21.6 - 25.0 Vdc (maximum 300 W)  
 Model RWS300B-28 was tested with Output Voltage Range of 25.2 - 32.2 Vdc (maximum 308 W)  
 Model RWS300B-36 was tested with Output Voltage Range of 32.4 - 41.4 Vdc (maximum 302.4 W)  
 Model RWS300B-48 was tested with Output Voltage Range of 43.2 - 52.8 Vdc (maximum 302.4 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)