Test Report issued under the responsibility of:

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

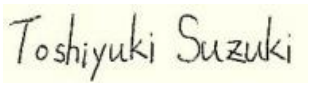
Report Reference No ..... :	E122103-A211-CB-1
Date of issue ..... :	2016-12-19
Total number of pages ..... :	38
CB Testing Laboratory ..... :	UL Japan, Inc.
Address ..... :	4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan
Applicant's name ..... :	TDK-LAMBDA CORP
Address ..... :	NAGAOKA TECHNICAL CENTER 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 ..... :	RWS1500B-12, RWS1500B-15, RWS1500B-24, RWS1500B-36, RWS1500B-48 Maybe followed by suffix "abcde" (a is /, b is R, c is CO2, d is FO, e is RF and "a", "b", "c", "d" and "e" may be blank)
Ratings ..... :	100-240 Vac, 50-60 Hz, 19.0 A

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) .....:	Toshiyuki Suzuki, Project Handler 
	Approved by (name + signature)....:	Tetsuo Iwasaki, Reviewer 
[ ]	**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 (0 pages)

Enclosures (3 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)

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)

Touch Current (Single-Phase; TN/TT System) (5.1, Annex D)

Electric Strength (5.2.2)

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

Power Supply Output Short-Circuit/Overload (5.3.7)

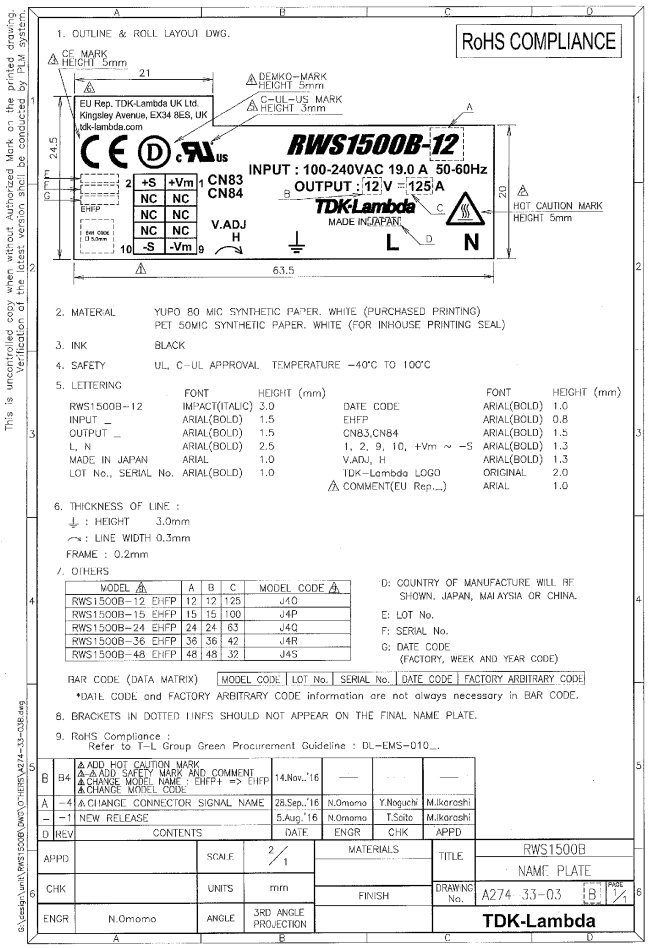
Summary of Compliance with National Differences:

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

List of countries addressed: AR, AT, AU, BE, BG, BY, CA, CH, CN, CS, CZ, DE, DK, ES, EU, FI, FR, GB, GR, HU, IE, IL, IN, IT, JP, KR, MY, NL, NO, NZ, PL, PT, RO, SA, SE, SG, SI, SK, UA, US, ZA

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.



Test item particulars :	
Equipment mobility ..... :	for building-in
Connection to the mains ..... :	permanent connection
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) ..... :	30 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) ..... :	2.7
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 ..... :	2016-07-27 to 2016-09-26, 2017-01-10
Date(s) of Performance of tests ..... :	2016-08-03 to 2016-11-25, 2017-01-17
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):	ALPS LOGISTICS FACILITIES CO LTD 593-1 NISHIOOHASHI TSUKUBA-SHI IBARAKI-KEN 305-0831 JAPAN ZHANGJIAGANG HUA YANG ELECTRONICS CO LTD

TONGXIN RD
ZHAOFENG ECONOMIC DEVELOPMENT ZONE
LEYU TOWN
ZHANGJIAGANG
JIANGSU 215622 CHINA

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

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

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

GENERAL PRODUCT INFORMATION:

Report Summary

The original report was modified on 2017-02-06 to include the following changes/additions:
This test report is only valid in conjunction with CB test Report Nos. E122103-A211-CB-1 and E122103-A211-CB-1 Amendment-1 for following modification.

Amendment 2 covers modification as follows.
- Addition of model RWS1500B-15.

Only limited test was considered necessary to perform because of similarity in construction to previously evaluated models

Product Description

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

Output:
12 Vdc (10.2 Vdc - 13.8 Vdc), maximum 125 A (maximum 1500 W) (for RWS1500B-12)
15 Vdc (12.75 Vdc - 17.25 Vdc), maximum 100 A (maximum 1500 W) (for RWS1500B-15)
24 Vdc (20.4 Vdc - 27.6 Vdc), maximum 63 A (maximum 1512 W) (for RWS1500B-24)
36 Vdc (30.6 Vdc - 41.4 Vdc), maximum 42 A (maximum 1512 W) (for RWS1500B-36)
48 Vdc (40.8 Vdc - 55.2 Vdc), maximum 32 A (maximum 1536 W) (for RWS1500B-48)

Model Differences

Each model is identical, except for model designation, output rating, secondary winding and internal construction of Transformer (T3), and secondary components.

RWS1500B Series maybe followed by suffix "abcde" (a is /, b is R, c is CO2, d is FO, e is RF; and "a", "b", "c", "d" and "e" may be blank)
1. R: Model with optional ON/OFF control function.
2. CO2: Model with optional thin coating (QMJU2) on both sides of PWB.
3. FO: Model with Remote Sensing, Parallel operation, Low output voltage alarm.
4. RF: Model with opposite direction and air flow of Fan and different Output Derating Curve.

Additional Information

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

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 #7-01 and 7-04.
- The product is intended for use on the following power systems: IT, 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 RWS1500B-12: Primary-SELV: 240 Vrms, 462 Vpk, Primary-Earthed Dead Metal: 240 Vrms, 422 Vpk, , Model RWS1500B-15: Primary-SELV: 240 Vrms, 472 Vpk, Primary-Earthed Dead Metal: 240 Vrms, 446 Vpk, , Model RWS1500B-24: Primary-SELV: 240 Vrms, 488 Vpk, Primary-Earthed Dead Metal: 240 Vrms, 414 Vpk, , Model RWS1500B-36: Primary-SELV: 264 Vrms, 636 Vpk, Primary-Earthed Dead Metal: 240 Vrms, 406 Vpk, , Model RWS1500B-48: Primary-SELV: 262 Vrms, 700 Vpk, Primary-Earthed Dead Metal: 240 Vrms, 408 Vpk
- The following secondary output circuits are SELV: RWS1500B-12, RWS1500B-15, RWS1500B-24, RWS1500B-36, RWS1500B-48
- The following secondary output circuits are at hazardous energy levels: RWS1500B-12, RWS1500B-15, RWS1500B-24, RWS1500B-36, RWS1500B-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

- 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 B), T2 (Class B), T3 (Class F)
- The following end-product enclosures are required: Electrical, Fire
- Line to Line Capacitor C1 has maximum 3.3 uF for capacitance and C2 has maximum 1.0 uF for capacitance. C1: 3.3 uF and C2: 1.0 uF 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 C2. --
- Line to ground Capacitors C3, C4, C5 and C6 has maximum 3300pF for Total capacitance of (C3+C5, C4+C6). Primary to ground Capacitors C15, C20 has maximum 2200pF for capacitance. Secondary to ground capacitors C51, C52 has maximum 1000pF for capacitance, C60 have maximum 0.022uF for capacitance and C61 have maximum 0.01uF for capacitance. (C3+C5), (C4+C6): 3300pF, C15, C20: 2200pF, C51, C52:1000pF, C60: 0.022uF and C61 0.01uF were used in test. Therefore, consideration shall be given in conducting Touch Current Test in the end product application with respect to the variation in C3, C4, C5, C6, C15, C20, C51, C52, C60 and C61. --

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)