



Test Report issued under
the responsibility of:



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

Report Reference No: E122103-A126-CB-2

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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	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	HWS1800T-3, HWS1800T-5, HWS1800T-6, HWS1800T-7, HWS1800T-12, HWS1800T-15, HWS1800T-24, HWS1800T-36, HWS1800T-48, and HWS1800T-60 may be followed by /CO, /HD or /SB.
Ratings	3 Phase, 200-240 Vac, 50/60 Hz 4.5 A: HWS1800T-3 6.0 A: HWS1800T-5, HWS1800T-6, HWS1800T-7, HWS1800T-12, and HWS1800T-15 7.0 A: HWS1800T-24, HWS1800T-36, HWS1800T-48, and HWS1800T-60

Testing procedure and testing location:	
<input checked="" type="checkbox"/> CB Testing Laboratory Testing location / address: UL Japan, Inc. 4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan <input type="checkbox"/> Associated CB Test Laboratory Testing location / address: Tested by (name + signature): Tetsuo Iwasaki Approved by (name + signature).....: Masatomo Takiyama	 <hr style="width: 100%;"/> 
<input type="checkbox"/> Testing Procedure: TMP/CTF Stage 1 Testing location / address: Tested by (name + signature): Approved by (name + signature).....:	<hr/> <hr/> <hr/>
<input type="checkbox"/> Testing Procedure: WMT/CTF Stage 2 Testing location / address: Tested by (name + signature): Witnessed by (name + signature) ...: Approved by (name + signature).....:	<hr/> <hr/> <hr/> <hr/>
<input type="checkbox"/> Testing Procedure: SMT/CTF Stage 3 or 4 Testing location / address: Tested by (name + signature): Approved by (name + signature).....: Supervised by (name + signature) ..:	<hr/> <hr/> <hr/> <hr/>
<input type="checkbox"/> Testing Procedure: RMT Testing location / address: Tested by (name + signature): Approved by (name + signature).....: Supervised by (name + signature) ..:	<hr/> <hr/> <hr/> <hr/>

List of Attachments	
National Differences (17 pages)	
Enclosures (122 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: Polyphase (1.6.2)	

Energy Hazard Measurements (2.1.1.5, 2.1.2, 1.2.8.10)
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)
Heating (4.5.1, 1.4.12, 1.4.13)
Ball Pressure (4.5.5, 4.5)
Touch Current (Polyphase; 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:

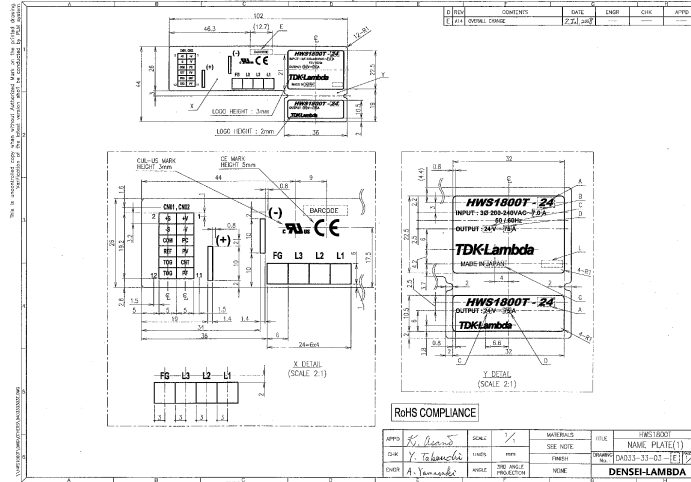
Countries outside the CB Scheme membership may also accept this report.

List of countries addressed: CA, EU, 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.



Test item particulars :	
Equipment mobility	for building-in
Connection to the mains	N/A
Operating condition	continuous
Access location	N/A
Over voltage category (OVC)	OVC II
Mains supply tolerance (%) or absolute mains supply values	+10%, -15%
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)	less than 2000 m
Altitude of test laboratory (m)	approximately 10 m
Mass of equipment (kg)	approximately 3.8 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	2007-02-19, 2007-06-21, 2010-11-12
Date(s) of Performance of tests	2007-03-15 to 2007-05-15, 2007-07-20 to 2007-08-08, 2010-11-25 to 2010-12-15
General remarks:	
<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>	
Manufacturer's Declaration per Sub Clause 4.2.5 of IEC 60950-1:	
<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>	
Name and address of Factory(ies):	WUXI TDK-LAMBDA ELECTRONICS CO LTD LOT 107 WUXI SINGAPORE INDUSTRIAL PARK XING CHUANG ERLU 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 940-1195 JAPAN

SENDAN ELECTRONICS MFG CO LTD
440-GOKA
SHOGAWA-MACHI
TONAMI-SHI
TOYAMA-KEN 932-0313 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

These products are non-temperature dependent type component AC/DC Switching Power Supplies equipped with Fan intended for use in Information Technology Equipment.

Model Differences

All models are identical, except for output rating, Transformer (T201), Inductor (L401) and some components on secondary circuit (output diodes etc.) (see appended table 1.5.1).

The optional suffix /CO is used to identify models provided with conformal coating on Solder Side of PWB

The optional suffix /HD is used to identify models provided with conformal coating on Component Side of PWB.

The optional suffix /SB: This suffix model is identical in construction to models without the /SB suffix except that the /SB model's output terminal (+ and -) is shorter by 11.0 mm.

Maximum Output Power:

Models HWS1800T-15, HWS1800T-24, HWS1800T-36, HWS1800T-48, and HWS1800T-60 are 1800 W.

Models HWS1800T-5, HWS1800T-6, HWS1800T-7, HWS1800T-12 are 1500 W.

Model HWS1800T-3 is 990 W.

Additional Information

This report is a re-issued report of CB Test Report Ref. No. E122103-A126-CB-1 (Original) due to following modification.

- Upgrade Standard.

- Addition of alternate component, Nameplate/Rating Label, Sato Corp., Type S-PETWNN and ZEPHYR Co. (PTE) Ltd., Type ZP-54.

No tests were considered necessary on the above minor modifications because of engineering judgment that the modifications do not have negatively impact to previous test results.

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.

Output Rating:

Model HWS1800T-3: 2.64 to 3.96Vdc, Maximum 300 A , Maximum 990W

Model HWS1800T-5: 4.0 to 6.0Vdc, Maximum 300 A , Maximum 1500W

Model HWS1800T-6: 4.8 to 7.2Vdc, Maximum 250 A , Maximum 1500W

Model HWS1800T-7: 6.0 to 9.0Vdc, Maximum 200 A , Maximum 1500W

Model HWS1800T-12: 9.6 to 14.4Vdc, Maximum 125 A , Maximum 1500W

Model HWS1800T-15: 12.0 to 18.0Vdc, Maximum 100 A , Maximum 1500W

Model HWS1800T-24: 19.2 to 28.8Vdc, Maximum 75 A , Maximum 1800W

Model HWS1800T-36: 28.8 to 43.2Vdc, Maximum 50 A , Maximum 1800W

Model HWS1800T-48: 37.5 to 52.5Vdc, Maximum 37.5 A , Maximum 1800W

Model HWS1800T-60: 48 to 66.0Vdc, Maximum 30 A , Maximum 1800W

Note: Output ratings can be used under Tma 40°C or 50°C. See CE1.2 in Engineering Consideration for details.

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 [with 100% load of output rating] and 71°C [with 50% load of output rating] except for Models HWS1800T-3 and HWS1800T-5. See Enclosure #7-21 for details.
- The product is intended for use on the following power systems: TT, IT (for Norway), 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:

- All tests measuring temperatures of components were conducted with the Power Supply mounted in horizontal position (Position A: Nameplate/Rating Label side up). Heating Test shall be considered in end-product. --
- The following components require special consideration during end-product Heating Tests due to the indicated maximum temperature measurements during component level testing: T201 (Maximum 165°C). Tma was 50°C at 100% Load, 65°C at 75% Load, 71°C at 50% Load for Models HWS1800T-6, HWS1800T-7, HWS1800T-12, HWS1800T-15, HWS1800T-24, HWS1800T-36, HWS1800T-48, and HWS1800T-60. , T201 (Maximum 165°C).Tma was 40°C at 100% Load , 56°C at 75% Load, 71°C at 50% Load for Models HWS1800T-3 and HWS1800T-5. --
- The output of Model HWS1800T-60 is considered HAZ/V (separated by double reinforced from PRI circuitry). --
- Consideration shall be given to the Capacitance Discharge Test in end-product. --
- Conformal Coating applied to PWB is used for performance purposes only. Spacings on PWBs were evaluated in accordance with tables 2H, 2J, 2K, and 2L. --
- The end-product Electric Strength Test is to be based upon a maximum working voltage of: 301 Vrms, 880 Vpk --
- The following secondary output circuits are SELV: Output Circuit of Models HWS1800T-3, HWS1800T-5, HWS1800T-6, HWS1800T-7, HWS1800T-12, HWS1800T-15, HWS1800T-24, HWS1800T-36, and HWS1800T-48. --
- The following secondary output circuits are at hazardous energy levels: Output Circuit of HWS1800T-3, HWS1800T-5, HWS1800T-6, HWS1800T-7, HWS1800T-12, HWS1800T-15, HWS1800T-24, HWS1800T-36, HWS1800T-48, and HWS1800T-60. --
- 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: Been conducted (except for Protective Earth Trace Fault Test) --
- 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): T201 (Class H), T700 (Class B), L3 (RTI:130°C) and T203 (Class B). Class B of T203 is Types DA03304 and DLCT01B only. (see appended table 1.5.1) --
- 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)