



Test Report issued under the responsibility of:



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

Report Number..... : 15081709 001

Date of issue..... : 2015-10-27

Total number of pages : 145

Applicant's name : TDK-Lambda Corp. Nagaoka Technical Center

Address..... : 2704-1 Settaya-machi, Nagaoka-shi, Niigata, 940-1195, JAPAN

Test specification:

Standard..... : IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am 2:2013

Test procedure : CB Scheme

Non-standard test method : N/A

Test Report Form No. : IEC60950_1F

Test Report Form(s) Originator : SGS Fimko Ltd

Master TRF : Dated 2014-02

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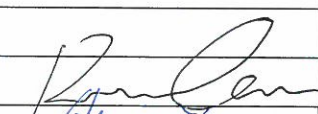
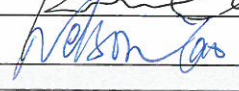
If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

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		Same as applicant	
Model/Type reference		SWS600L-xy, HWS600L-xy, SWS600L-12/DAK, SWS600L-12/DAK2, SWS600L-12/LNF, HWS600L-36/BATz, HWS600L-60/BATz (x = 3, 5, 12, 15, 24, 36, 48 or 60; y = blank, /RF, /CO2 or /RFCO2; z = blank or 3 digit max which consist of 0 to 9 and/or A to Z)	
Ratings		Refer to page 11 for details.	
Testing procedure and testing location:			
<input checked="" type="checkbox"/>	CB Testing Laboratory:	TÜV Rheinland (Shanghai) Co., Ltd.	
Testing location/ address		B1-13/F, No.177, Lane 777, West Guangzhong Road, Zhabei District, Shanghai 200072, P. R. China	
<input type="checkbox"/>	Associated CB Testing Laboratory:		
Testing location/ address			
Tested by (name + signature)		Roy Chen	
Approved by (name + signature)		Nelson Yao	
<input type="checkbox"/>	Testing procedure: TMP/CTF Stage 1:		
Testing location/ address			
Tested by (name + signature)			
Approved by (name + signature)			
<input type="checkbox"/>	Testing procedure: WMT/CTF Stage 2:		
Testing location/ address			
Tested by (name + signature)			
Witnessed by (name + signature)			
Approved by (name + signature)			
<input type="checkbox"/>	Testing procedure: SMT/CTF Stage 3 or 4:		
Testing location/ address			
Tested by (name + signature)			
Witnessed by (name + signature)			
Approved by (name + signature)			
Supervised by (name + signature)			

List of Attachments (including a total number of pages in each attachment):

- ATTACHMENT 1 - Photo documentation (27 pages)
- ATTACHMENT 2- National Differences (28 pages)

Note: Total number of pages in each attachment is indicated in individual attachment.

History of CB Test Report:

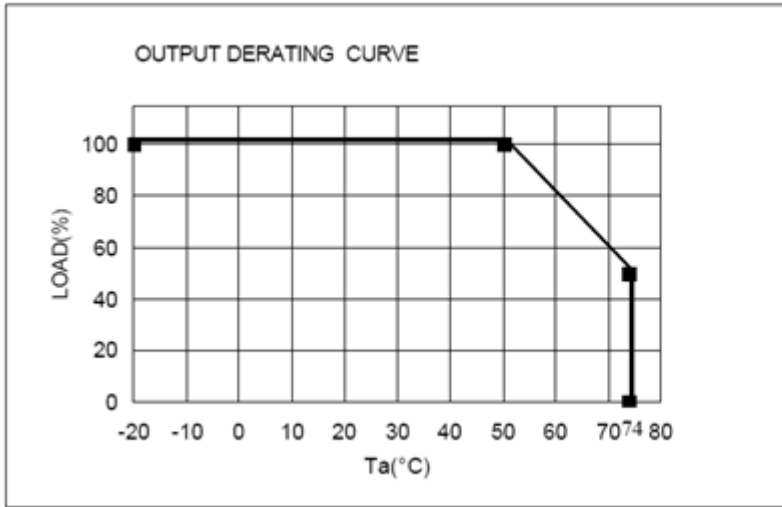
- Test report No. 15038789 001 The test report was issued for TDK-Lambda Corp. and addressed model mentioned page 2 tested to IEC 60950-1:2005+A1:2009 (2nd Edition).
- Test report No. 15038789 002 The test report was issued for TDK-Lambda Corp. to add alternative components and addressed model mentioned page 2 tested to IEC 60950-1:2005+A1:2009 (2nd Edition).
- Test report No. 15054598 001 The test report issued for TDK-Lambda Corp. serves to combine and upgrade the above mentioned test reports. In this test report maximum operation altitude considers up to 3048m, added alternate Fuse (F2) to replace jumper wire(J3) and added alternate components, see relevant sub_clause for details. Additionally this test report updates Group and National Differences, and change name and address of the applicant, manufacturer and factories. This test report consolidates reports 15038789 001 and 15038789 002.
- Test report No. 15054598 002 The test report was issued for TDK-Lambda Corp. to add alternative components and addressed model mentioned page 2 tested to IEC 60950-1:2005+A1:2009 (2nd Edition).
- Test report No. 15054598 003 The test report was issued for TDK-Lambda Corp. to add alternative components and addressed model mentioned page 2 tested to IEC 60950-1:2005+A1:2009 (2nd Edition).
- Test report No. 15081709 001. This test report issued for TDK-Lambda Corp. Nagaoka Technical Center serves to combine and upgrade the above mentioned test reports. In this test report updates Group and National Differences. However it is separate CB test report and it does not have to be used in conjunction with any of the previously issued, above mentioned CB test reports.

Summary of testing:

- All applicable tests as described in Test Case and Measurement Sections were performed.
- Unless otherwise specified, tests were performed on model SWS600L-5, SWS600L-5/RF, SWS600L-15, SWS600L-15/RF, SWS600L-48, SWS600L-48/RF, SWS600L-60, SWS600L-60/RF, SWS600L-12/LNF, SWS600L-5/LNF1, SWS600L-24/LNF1 and SWS600L-60/LNF1 to representative other models.
- The maximum operating temperature was specified as +45°C (100% load) and +74°C (50% load), detail information refer to output derating curve in following pages.
- Heating measurement were performed according to the maximum operating temperature, mounting direction and load conditions specified in instruction manual and output derating curve.
- The Outputs of SWS600L-x (x = 3, 5, 12, 15, 24, 36 and 48) were evaluated as SELV. As for the Output of SWS600L-60, it was considered as SELV when the output voltage equal or less than 60Vdc.
- The equipment is operated up to 3048m above sea level as declared by manufacturer. Clearances have been evaluated according to IEC 60664-1 table A.2 with a multiplication factor of 1.15 throughout this report.
- Posistor (TH1) was shorted during tests because of non-approval.

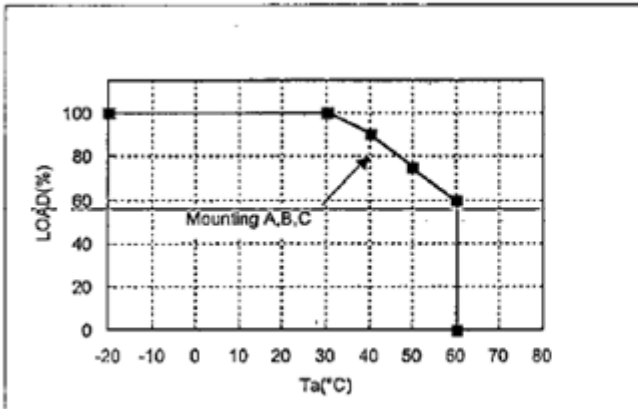
Output derating curve:

For models SWS600L-xy, HWS600L-xy (x = 3, 5, 12, 15, 24, 36, 48, 60; y = blank, /CO2)



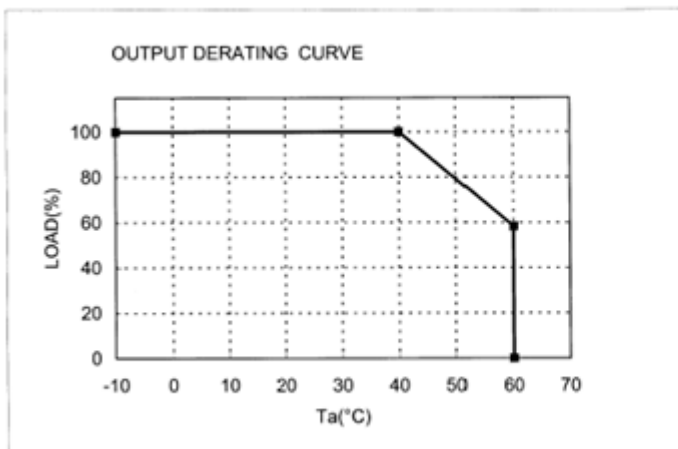
Ta(°C)	LOAD(%)
	Mounting A,B,C
-20~50	100%
74	50%

For model: SWS600L-xy, HWS600L-xy (x = 3, 5, 12, 15, 24, 36, 48, 60; y = /RF, /RFCO2)



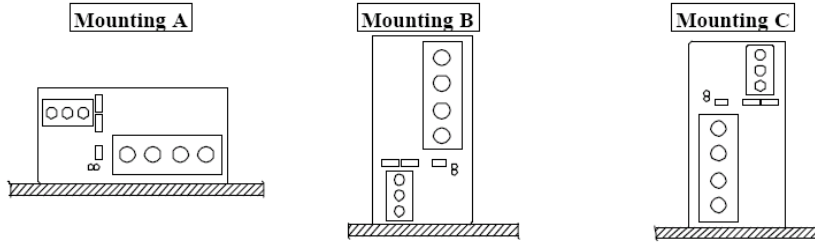
Ta(°C)	Load (%)
	Mounting A, B, C
-20 ~ +30	100
+40	90
+50	75
+60	60

For model SWS600L-12/LNF



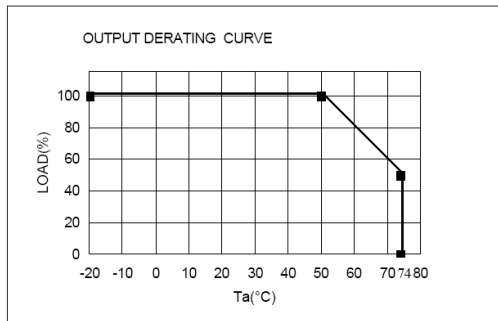
Ta(°C)	LOAD(%)
	Mounting A,B,C
-10~40	100%
60	58.3%

Mounting direction for model SWS600L-xy, HWS600L-xy, SWS600L-12/LNF (x = 3, 5, 12, 15, 24, 36, 48, 60; y = blank, /RF, /CO2, /RFCO2)

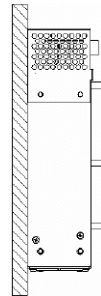


For model SWS600L-12/DAK and SWS600L-12/DAK2

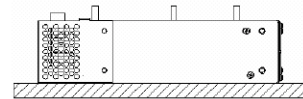
Ta(°C)	LOAD(%)
-20~50	Mounting A,B 100%
74	50%



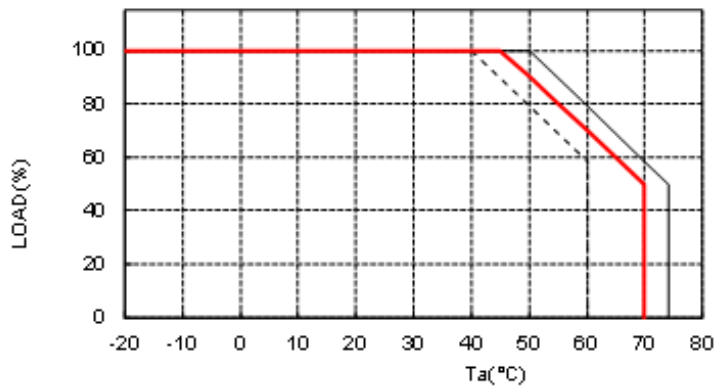
Mounting A



Mounting B



1. Output Derating Comparison



TENTATIVE

Tests performed (name of test and test clause):		Testing location:
Tested in original report No. 15038789 001		TÜV Rheinland (Shanghai) Co., Ltd. B1-13/F, No.177, Lane 777, West Guangzhong Road, Zhabei District, Shanghai 200072, P. R. China
Clause	Test description	
1.6.2	Input Current	
1.7.11	Durability	
2.1.1.7	Discharge of Capacitors in equipment	
2.2.2	Voltages under normal conditions	
2.2.3	Voltages under fault conditions	
2.6.3.4	Resistance of earthing conductors and their terminations	
2.9.2	Humidity Conditioning - Electrical insulation	
2.10.2	Determination of working voltage	
2.10.3 & 2.10.4	Clearances, creepage distances	
4.5.2	Temperature tests	
4.5.5	Resistance to abnormal heat	
5.1.6	Touch current and protective conductor current	
5.2	Electric strength	
5.3	Abnormal operating and fault conditions	
Annex C	Transformers	
For report 15038789 002 No further testing performed		Same as above
For report 15054598 001 No further testing performed for the CB re-issue.		Same as above
For report 15054598 002 No further testing performed		Same as above
For report 15054598 003		Same as above
Clause	Test description	
1.6.2	Input Current	
4.5.2	Temperature tests	
5.2	Electric strength	
5.3	Abnormal operating and fault conditions	
this report No. 15081709 001 No further testing performed for the Amendment 2.		Same as above

Summary of compliance with National Differences

List of countries addressed:

EU Group Differences, EU Special National Conditions, AT, CA, DK, US, IT, SE, GB

Explanation of used codes:

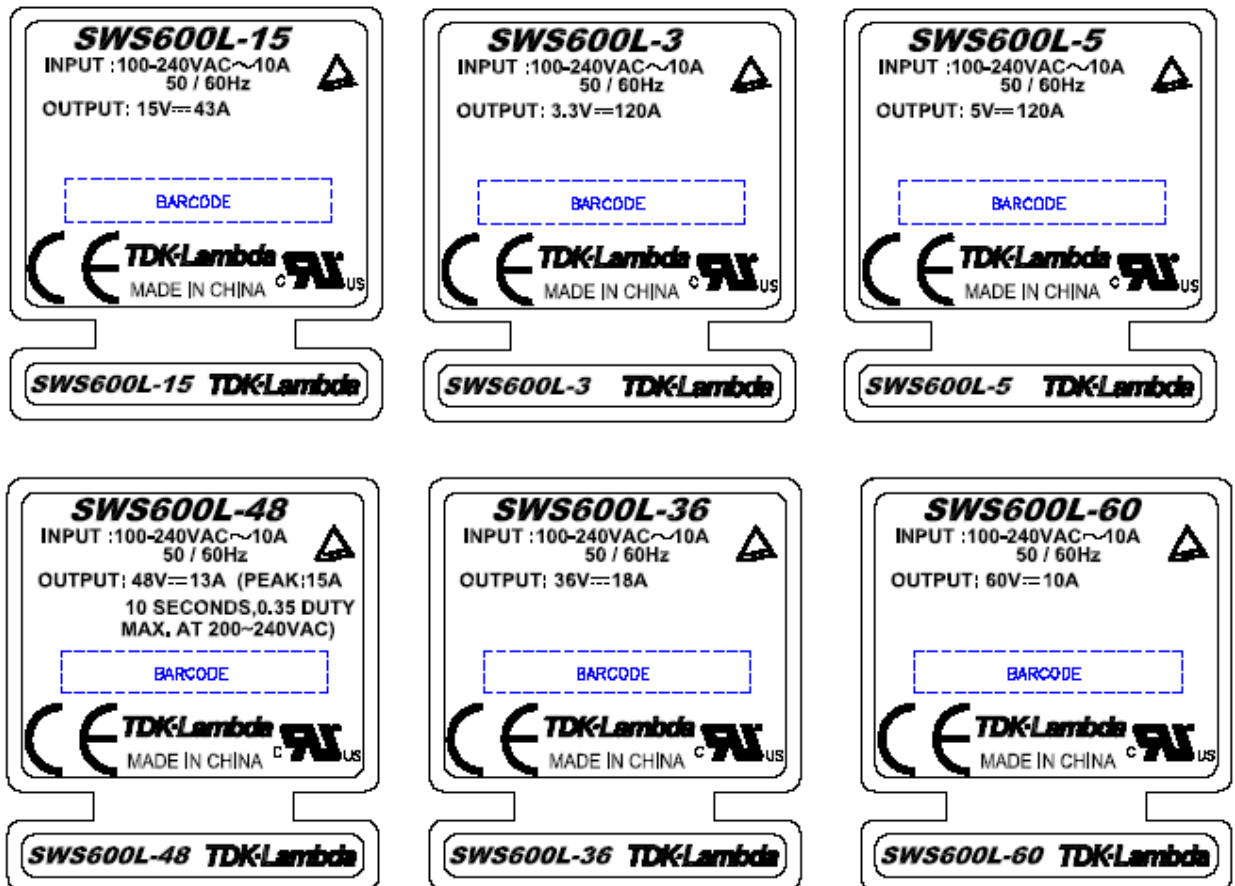
AT=Austria; CA=Canada; DK=Denmark; IT=Italy; SE=Sweden; GB=United Kingdom; US = United States of America.

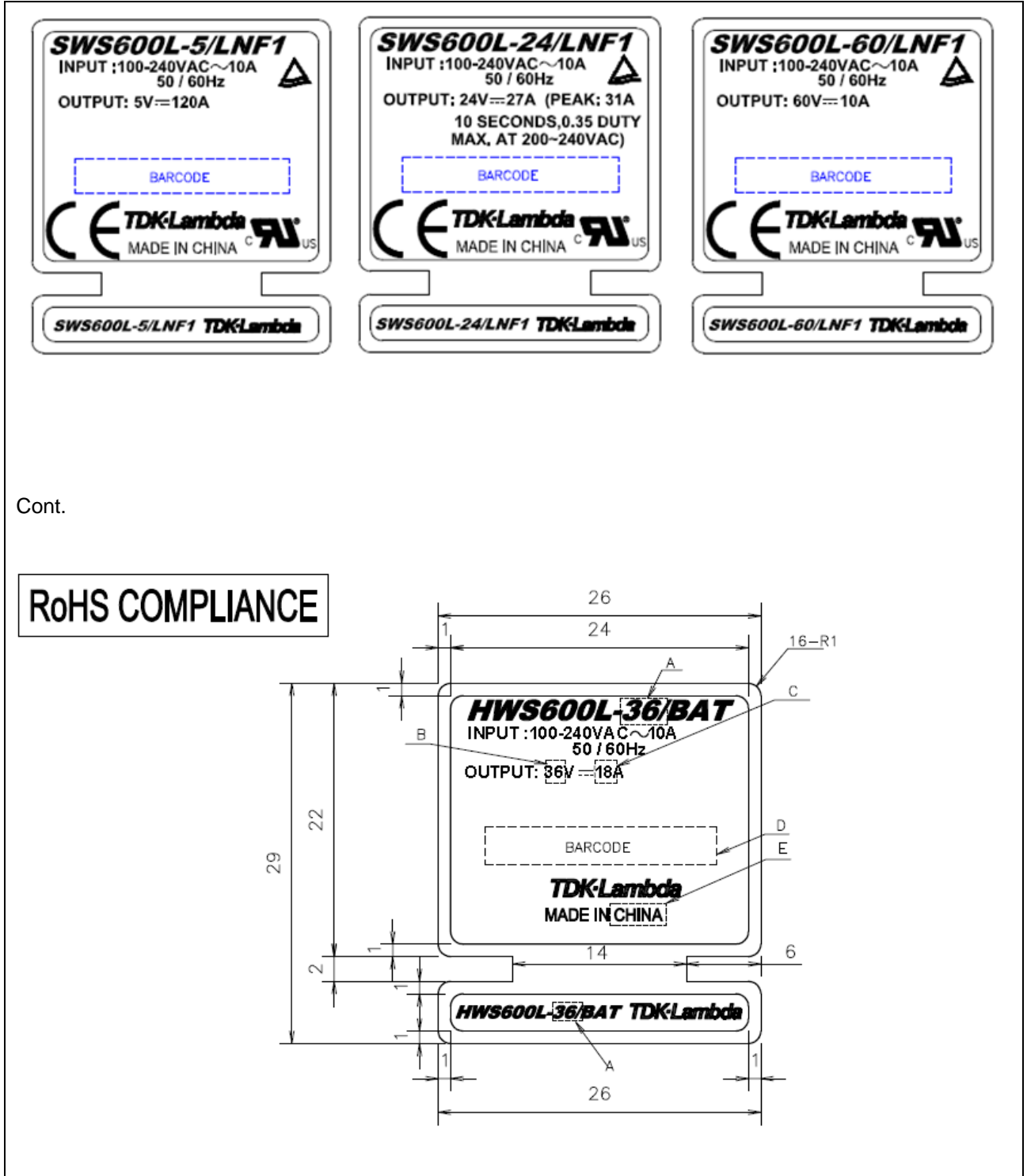
The product fulfils the requirements of EN 60950-1:2006+A11+A1+A12+A2, UL 60950-1:2007 R10.14 and CAN/CSA C22.2 No. 60950-1-07+A1:2011+A2:2014.

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.

<Representative>





Test item particulars	: See below
Equipment mobility	: <input type="checkbox"/> movable <input type="checkbox"/> hand-held <input type="checkbox"/> transportable <input type="checkbox"/> stationary <input checked="" type="checkbox"/> for building-in <input type="checkbox"/> direct plug-in
Connection to the mains	: <input checked="" type="checkbox"/> pluggable equipment <input checked="" type="checkbox"/> type A <input type="checkbox"/> type B <input type="checkbox"/> permanent connection <input type="checkbox"/> detachable power supply cord <input type="checkbox"/> non-detachable power supply cord <input type="checkbox"/> not directly connected to the mains
Operating condition	: <input checked="" type="checkbox"/> continuous <input type="checkbox"/> rated operating / resting time:
Access location	: <input type="checkbox"/> operator accessible <input checked="" type="checkbox"/> restricted access location
Over voltage category (OVC)	: <input type="checkbox"/> OVC I <input checked="" type="checkbox"/> OVC II <input type="checkbox"/> OVC III <input type="checkbox"/> OVC IV <input type="checkbox"/> other:
Mains supply tolerance (%) or absolute mains supply values	: ±10%
Tested for IT power systems	: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
IT testing, phase-phase voltage (V)	: For Norway, 230V
Class of equipment	: <input checked="" type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Class III <input type="checkbox"/> Not classified
Considered current rating of protective device as part of the building installation (A)	: 16 (20 for US/CSA)
Pollution degree (PD)	: <input type="checkbox"/> PD 1 <input checked="" type="checkbox"/> PD 2 <input type="checkbox"/> PD 3
IP protection class	: IPX0
Altitude during operation (m)	: Up to 3048
Altitude of test laboratory (m)	: < 2000
Mass of equipment (kg)	: 1.8kg max.
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 of receipt of test item	: July, 2010 (for report 15038789 001) N/A (for report 15038789 002) September, 2012 (for report 15054598 001) May, 2013 (for report 15054598 002) September, 2013 (for report 15054598 003) N/A (for this report)
Date(s) of performance of tests	: July, 2010 (for report 15038789 001) N/A (for report 15038789 002) September, 2012 (for report 15054598 001) June, 2013 (for report 15054598 002) September, 2013 (for report 15054598 003) N/A (for this report)
General remarks:	

"(See Enclosure #)" refers to additional information appended to the report.
 "(See ATTACHMENT #)" refers to additional information appended to the report.
 "(See appended table)" refers to a table appended to the report.

Throughout this report a comma / point is used as the decimal separator.

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:

The application for obtaining a CB Test Certificate includes more than one factory location 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..... : **Yes**
 Not applicable

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) : 1. Wuxi TDK-Lambda Electronics Co., Ltd.
 No.6 Xing Chuang Er Lu, Wuxi, Jiangsu 214028, P.R. China

2. TDK-Lambda Malaysia Sdn. Bhd.
 Lot 2 & 3, Batu 9 3/4 Kawasan Perindustrian, Bandar Baru Jaya Gading, 26070 Kuantan Pahang Malaysia

3. TDK-Lambda Corp.
 Nagaoka Technical Center, 2704-1 Settayamachi, Nagaoka-shi, Niigata 940-1195, JAPAN

4. Zhangjiagang Hua Yang Electronics Co., Ltd.
 Zhao Feng Industrial Zone, Leyu Town, Zhangjiagang, Jiangsu 215622, P.R. China

5. ALPS Logistics Facilities Co., Ltd.
 593-1 Nishi-Ohashi, Tsukuba-shi, Ibaraki 305-0831 JAPAN

6. Sendan Electronics Mfg. Co., Ltd.
 1010 Habushin Nanto-shi, Toyama 939-1756 JAPAN

General product information:

The EUTs are switching mode power supply (built-in type) for the use in information technology equipment.

The product is a component intended for incorporation in information technology equipment, the overall compliance shall be investigated in the complete information technology equipment.

HWS600L-xy is identical to SWS600L-xy except for type designation.

Models SWS600L-x (x = 3, 5, 12, 15, 24, 36, 48, 60) are identical except for output rating, the turns of secondary winding in transformer (T32) and the rating of some components in secondary circuits.

SWS600L-12/LNF is identical to SWS600L-12 except for fan type.

For difference between SWS600L-12/DAK, SWS600L-DAK2 and SWS600L-12, see table below:

Model list:

Character Model	Input Rated Voltage (V a.c.)	Input Rated current (A)	Input frequency (Hz)	Min. Output	Rated output	Max. Output	Max. Output Power (W)
SWS600L-3y HWS600L-3y	100-240	10	50/60	2.64V d.c. 120A	3.3V d.c. 120A	3.96V d.c. 100A	396
SWS600L-5y HWS600L-5y	100-240	10	50/60	4.0V d.c. 120A	5V d.c. 120A	6.0V d.c. 100A	600
SWS600L-12y HWS600L-12y	100-240	10	50/60	9.6V d.c. 53A	12V d.c. 53A	14.4V d.c. 44.2A	636
SWS600L-15y HWS600L-15y	100-240	10	50/60	12.0V d.c. 43A	15V d.c. 43A	19.5V d.c. 33.1A	645
SWS600L-24y HWS600L-24y	100-240	10	50/60	19.2V d.c. 27A (31A)	24V d.c. 27A (31A)	28.8V d.c. 22.5A (25.83)A	648 (744)
SWS600L-36y HWS600L-36y	100-240	10	50/60	28.8V d.c. 18A	36V d.c. 18A	43.2V d.c. 15A	648
HWS600L-36/BATz	100-240	10	50/60	28.0V d.c. 18A	36V d.c. 18A	43.2V d.c. 15A	648
SWS600L-48y HWS600L-48y	100-240	10	50/60	38.4V d.c. 13A (15A)	48V d.c. 13A (15A)	56.0V d.c. 11.14A (12.86A)	624 (720)
SWS600L-60y HWS600L-60y	100-240	10	50/60	48.0V d.c. 10A	60V d.c. 10A	66.0V d.c. 9.09A	600
HWS600L-60/BATz	100-240	10	50/60	48.0V d.c. 10A	60V d.c. 10A	66.0V d.c. 9.09A	600
SWS600L-12/DAK, SWS600L-12/DAK2, SWS600L-12/LNF	100-240	10	50/60	-- --	12V d.c. 53A	-- --	636

Note: The values in parentheses are peak current or peak power, operating period at peak output current is less than 10s, duty less than 35% (it defines the dynamic load, peak load for 10sec and normal load for 18.6s). Average output power and current is less than max. output power and max. output current.

Model	Type of terminal block	Coating material on PCB
SWS600L-12	Manufacture: EMUDEN Type: T7273/ T6968	No
SWS600L-12/DAK	Manufacture: TYCO Type: 1(6)450130-3	Yes
SWS600L-12/DAK2	No	Yes

Definition of variable(s):			
Model: SWS600L-xy, HWS600L-xy, HWS600L-36/BATz and HWS600L-60/BATz			
Variable:	Range of variable:	Content:	
x	3, 5, 12, 15, 24, 36, 48 or 60	Stands for output voltage.	
y	Blank, /RF, /CO2, /RFCO2 or /LNF1	Blank stands for basic models. /RF stands for the cooling fan reversed installation. /CO2 stands for additional coating material on the PWB on weld side. /RFCO2 stands for the cooling fan reversed installation and additional coating material on the PWB on weld side. /LNF1 stands for Low Noise Fan 1.	
z	blank or 3 digit max which consist of 0 to 9 and/or A to Z	Stands for identification of customer's request, no technical change.	
Abbreviations used in the report:			
- normal conditions	N.C.	- single fault conditions	S.F.C
- functional insulation	OP	- basic insulation	BI
- double insulation	DI	- supplementary insulation	SI
- between parts of opposite polarity	BOP	- reinforced insulation	RI
Indicate used abbreviations (if any)			