Test Report issued under the responsibility of:

TÜVRheinland®

TEST REPORT

IEC 60950-1

Information technology equipment – Safety – Part 1: General requirements

Report Number. :	15074110 001
Date of issue :	07 Nov., 2014
Total number of pages :	82
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

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 ..... :	ZWS10B-**abcd**, ZWS15B-**abcd** (**a** = 3, 5, 12, 15 or 24; **b** = / or blank; **c** = L, A or blank; **d** = blank, CO2, FG or FV)
Ratings ..... :	Refer to page 7 and 8

Testing procedure and testing location:			
☒	**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	
☐	**Associated CB Testing Laboratory:**		
Testing location/ address ..... :			
Tested by (name + signature) ..... :		Angela Lee	Angela Lee
Approved by (name + signature) ..... :		Mark Chen	
☐	**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) ..... :			
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 (10 pages)
- ATTACHMENT 2 - National Differences (35 pages)

Summary of testing:

- Unless otherwise indicated, all tests were conducted on Models ZWS10B-5/A, ZWS10B-24/A, ZWS15B-5/A and ZWS15B-24/A. Tests performed on Models ZWS10B-5/A, ZWS10B-24/A, ZWS15B-5/A and ZWS15B-24/A were considered to be representative of other models.
- Specified ambient temperature for operation is according to manufacturer's specification.
- The load conditions used during testing: Maximum normal load according to sub-clause 1.2.2.1 for this equipment is the operation with the maximum specified DC-load with maximum power condition according to the manufacturer specified.
- The equipment is operated up to 3000m above sea level as declared by manufacturer. Clearances have been evaluated according to IEC 60664-1:1992 table A.2 with a multiplication factor of 1.14 throughout this report.
- Pre-production samples without serial numbers.

Tests performed (name of test and test clause):

Clause	Test description
1.6.2	Input Current
2.1.1.5	Energy Hazards
2.1.1.7	Discharge of Capacitors in equipment
2.2.2	Voltages under normal conditions
2.2.3	Voltages under fault conditions
2.5	Limited Power Sources
2.6.4.2	Protective earthing and bonding terminals - Terminals
2.9.2	Humidity Conditioning - Electrical insulation
2.10.2	Determination of working voltage
2.10.5.1	General - Solid insulation
4.2.2	Steady Force Test, 10N
4.5.2	Temperature tests
4.5.5	Resistance to abnormal heat
5.1.6	Test measurements - Touch current and protective conductor current
5.2	Electric strength
5.3	Abnormal operating and fault conditions
Annex C	Transformers

Testing location:

The laboratory described on page 2.

Summary of compliance with National Differences

List of countries addressed:

EU Group Differences, EU Special National Conditions, US, FI, DE, DK, IL, KR, SE, GB, AU,CA, CH, ES, IE, NO.

Explanation of used codes: US = United States of America, FI*=Finland, DE*=Germany, DK**=Denmark, IL*=Israel, KR*=Korea, SE**=Sweden, GB**=United Kingdom, AU**=Australia, CA*=Canada, CH**=Switzerland, ES**=Spain, IE**=Ireland, NO**=Norway.

*** National difference according to IEC 60950-1:2005 (2nd Edition); Am 1:2009.**

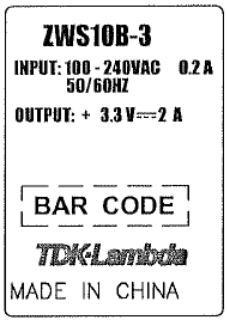
**** National difference according to IEC 60950-1:2005 (2nd Edition)**

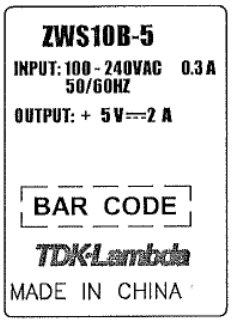
☒ The product fulfils the requirements of EN 60950-1:2006/A11:2009/A1:2010/A12:2011/A2:2013

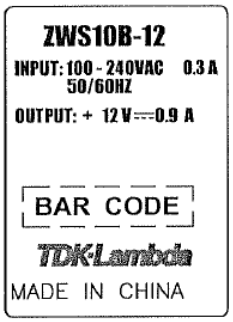
Copy of marking plate

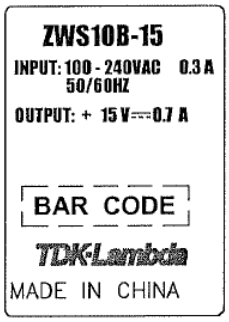
The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

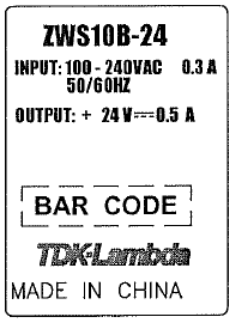
<Representative>

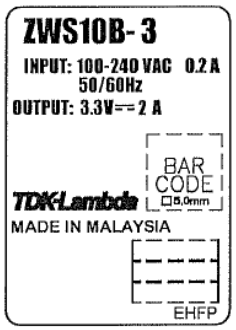


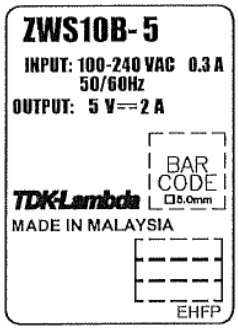


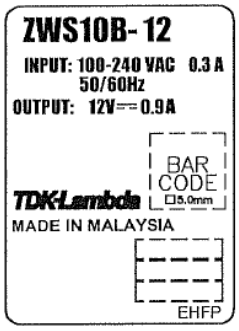


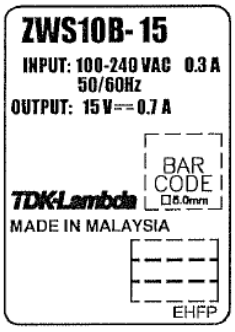


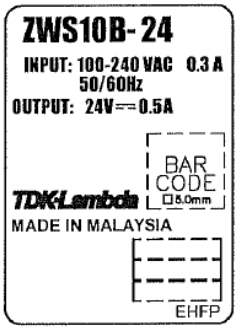


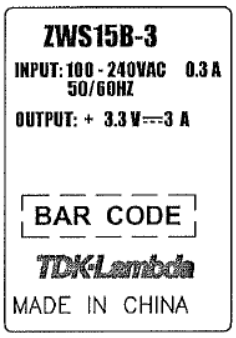


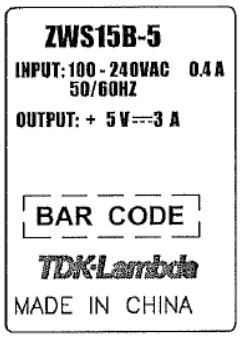


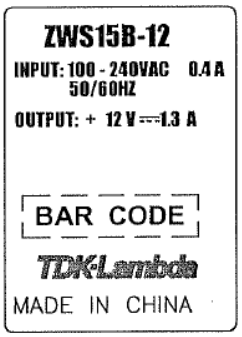


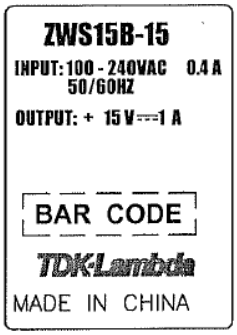


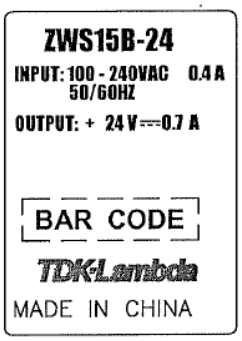


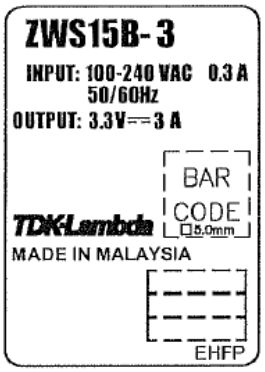

ZWS15B-3
INPUT: 100 - 240VAC 0.3 A
50/60HZ
OUTPUT: + 3.3 V⎓3 A
BAR CODE
TDK·Lambda
MADE IN CHINA

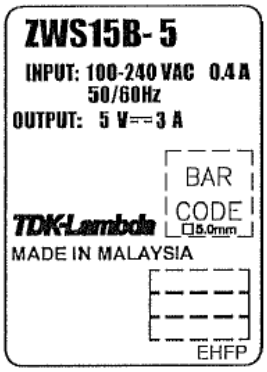

ZWS15B-5
INPUT: 100 - 240VAC 0.4 A
50/60HZ
OUTPUT: + 5 V⎓3 A
BAR CODE
TDK·Lambda
MADE IN CHINA

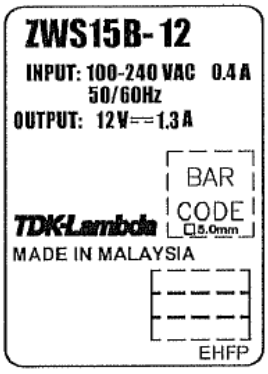

ZWS15B-12
INPUT: 100 - 240VAC 0.4 A
50/60HZ
OUTPUT: + 12 V⎓1.3 A
BAR CODE
TDK·Lambda
MADE IN CHINA

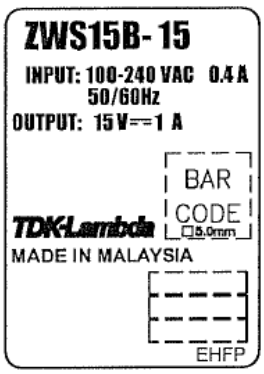

ZWS15B-15
INPUT: 100 - 240VAC 0.4 A
50/60HZ
OUTPUT: + 15 V⎓1 A
BAR CODE
TDK·Lambda
MADE IN CHINA

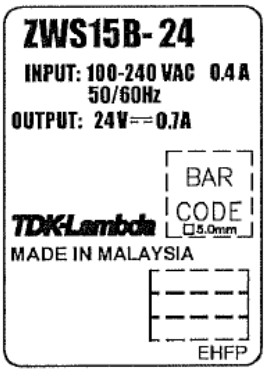

ZWS15B-24
INPUT: 100 - 240VAC 0.4 A
50/60HZ
OUTPUT: + 24 V⎓0.7 A
BAR CODE
TDK·Lambda
MADE IN CHINA


ZWS15B-3
INPUT: 100-240 VAC 0.3 A
50/60Hz
OUTPUT: 3.3V⎓3 A
BAR CODE □5.0mm
TDK·Lambda
MADE IN MALAYSIA
EHFP


ZWS15B-5
INPUT: 100-240 VAC 0.4 A
50/60Hz
OUTPUT: 5 V⎓3 A
BAR CODE □5.0mm
TDK·Lambda
MADE IN MALAYSIA
EHFP


ZWS15B-12
INPUT: 100-240 VAC 0.4 A
50/60Hz
OUTPUT: 12V⎓1.3 A
BAR CODE □5.0mm
TDK·Lambda
MADE IN MALAYSIA
EHFP


ZWS15B-15
INPUT: 100-240 VAC 0.4 A
50/60Hz
OUTPUT: 15V⎓1 A
BAR CODE □5.0mm
TDK·Lambda
MADE IN MALAYSIA
EHFP


ZWS15B-24
INPUT: 100-240 VAC 0.4 A
50/60Hz
OUTPUT: 24V⎓0.7A
BAR CODE □5.0mm
TDK·Lambda
MADE IN MALAYSIA
EHFP

Test item particulars..... :	
Equipment mobility.....:	[] movable [] hand-held [] transportable [] stationary [X] for building-in [] direct plug-in
Connection to the mains.....:	[X] pluggable equipment [] type A [] type B [] permanent connection [] detachable power supply cord [] non-detachable power supply cord [] not directly connected to the mains
Operating condition.....:	[X] continuous [] rated operating / resting time:
Access location .....:	[] operator accessible [X] restricted access location
Over voltage category (OVC) .....:	[] OVC I [X] OVC II [] OVC III [] OVC IV [] other:
Mains supply tolerance (%) or absolute mains supply values .....:	±10%
Tested for IT power systems .....:	[X] Yes [] No
IT testing, phase-phase voltage (V) .....:	230V (for Norway)
Class of equipment .....:	[X] Class I [] Class II [] Class III [] Not classified
Considered current rating of protective device as part of the building installation (A) .....:	16A 20A for North America
Pollution degree (PD) .....:	[] PD 1 [X] PD 2 [] PD 3
IP protection class .....:	IPX0
Altitude during operation (m) .....:	Up to 3000m
Altitude of test laboratory (m) .....:	Not over 2000m
Mass of equipment (kg) .....:	0.042 for ZWS10B-**abcd**; 0.118 for ZWS15B-**abcd**
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.....:	15.10.2014
Date(s) of performance of tests .....:	16.10.2014-05.11.2014
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. Zhangjiagang Hua Yang Electronics Co., Ltd.
   Zhao Feng Industrial Zone, Leyu Town, Zhangjiagang, Jiangsu 215622, P.R. China
4. ALPS Logistics Facilities Co., Ltd.
   593-1 Nishi-Ohashi, Tsukuba-shi, Ibaraki , 305-0831, Japan

History of CB Test Report:

1) Test report No. 15047326 001 The test report was issued for TDK-Lambda Corp. and addressed model mentioned page 1 tested to IEC 60950-1:2005 (2nd Edition).
2) Test report No. 15053458 001 The test report was issued for TDK-Lambda Corp. and addressed model mentioned page 1 tested to IEC 60950-1:2005 (2nd Edition); Am 1:2009.
3) Test report No. 15074110 001 This test report issued for TDK-Lambda Corp. serves to upgrade the above mentioned test reports. Additionally 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.

General product information:

The EUTs are a class I open-frame switching mode power supply intended for building-in use in information technology equipment.

Models ZWS10B-**abcd** are identical except for secondary winding (S1) and primary winding (P2) of T1 and secondary capacitor.

Models ZWS15B-**abcd** are identical except for secondary winding (S1) and primary winding (P2) of T1 and secondary capacitor.

There are two alternative PCB layout for discharge resistor, the minor difference does not impact the safety. See ATTACHMENT 1 - Photo documentation for detail.

For rating differences between the models see below tables:

Model	Rated input	Minimal output	Rated output (typical)	Maximum output
ZWS10B-3**bcd**	AC 100-240V, 0.2A, 50/60Hz	2.97Vdc	3.3Vdc	3.63Vdc
		2A	2A	1.82A
ZWS10B-5**bcd**	AC 100-240V, 0.3A, 50/60Hz	4.5Vdc	5Vdc	5.5Vdc
		2A	2A	1.82A
ZWS10B-12**bcd**	AC 100-240V, 0.3A, 50/60Hz	10.8Vdc	12Vdc	13.2Vdc

		0.9A	0.9A	0.82A
ZWS10B-15**bcd**	AC 100-240V, 0.3A, 50/60Hz	13.5Vdc	15Vdc	16.5Vdc
		0.7A	0.7A	0.64A
ZWS10B-24**bcd**	AC 100-240V, 0.3A, 50/60Hz	21.6Vdc	24Vdc	26.4Vdc
		0.5A	0.5A	0.45A
ZWS15B-3**bcd**	AC 100-240V, 0.3A, 50/60Hz	2.97Vdc	3.3Vdc	3.63Vdc
		3A	3A	2.73A
ZWS15B-5**bcd**	AC 100-240V, 0.4A, 50/60Hz	4.5Vdc	5Vdc	5.5Vdc
		3A	3A	2.73A
ZWS15B-12**bcd**	AC 100-240V, 0.4A, 50/60Hz	10.8Vdc	12Vdc	13.2Vdc
		1.3A	1.3A	1.18A
ZWS15B-15**bcd**	AC 100-240V, 0.4A, 50/60Hz	13.5Vdc	15Vdc	16.5Vdc
		1A	1A	0.91A
ZWS15B-24**bcd**	AC 100-240V, 0.4A, 50/60Hz	21.6Vdc	24Vdc	26.4Vdc
		0.7A	0.7A	0.64A
Remark: Operating temp.: up to +70ºC (operating temperature depending on equipment's load, mounting position, for details refer to instruction manual).				

Engineering Considerations

The product was submitted and tested for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: 70°C max.

EUT intended to be used up to altitude 3000 m that specified on installation instruction. Clearance distances have been evaluated according to table A.2 of IEC 60664-1:1992 +A1:2000 +A2:2002, with a multiplication factor of 1.14 throughout this report.

The product is intended for use on the following power systems: TN / IT (for Norway)

Additional Information

Some components are **pre-certified**, which have been evaluated according to the relevant requirements of IEC 60950-1, are employed in this product. Their suitability of use has been checked according to subclauses 1.5.1 and 1.5.2.

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

Tests were repeated with each alternative source of components with identical results unless otherwise specified.

Markings and Instructions:

Fuse Identification (See subclause 1.7.6): F1 T2.0AH 250V

Definition of variable(s):

ZWS10B-**abcd**, ZWS15B-**abcd**

Variable:	Range of variable:	Content:
a	3, 5, 12, 15 or 24	Denotes for different output voltage
b	/ or blank	--
c	L, A or blank	Stands for Blank : Standard type; /L : With chassis; /A : With chassis and cover)
d	blank ,CO2, FG or FV	Stands for Blank : Standard type; CO2: coating of both sides of PCB for functional purpose; FG: low leakage current; FV: fixed output voltage without adjustable volime (VR51)

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)