



Test Report issued under the responsibility of:



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

Report Number: T223-0493/15
Date of issue: 2016-02-05
Total number of pages: 240 pages

Applicant's name: TDK-Lambda UK Ltd
Address: Kingsley Avenue, Ilfracombe, Devon, EX34 8ES, UK

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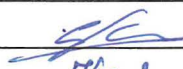
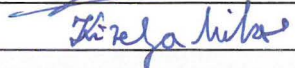
If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

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.
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Test item description	AC DC Power Supply series for building in
Trade Mark	TDK-Lambda
Manufacturer	TDK-Lambda UK Ltd Kingsley Avenue, Ilfracombe, Devon, EX34 8ES, UK
Model/Type reference	ZPSA100-x; where “x” stands for the output voltage 5 Vdc to 48 Vdc
Ratings	Input: 100-240 Vac; 1,5 A; 50-60 Hz Output: ZPSA100-5: 5 Vdc; 20 A ZPSA100-9: 9 Vdc; 11,2 A ZPSA100-12: 12 Vdc; 8,4 A ZPSA100-15: 15 Vdc; 6,7 A ZPSA100-18: 18 Vdc; 5,6 A ZPSA100-24: 24 Vdc; 4,2 A ZPSA100-48: 48 Vdc; 2,1 A

Testing procedure and testing location:		
<input checked="" type="checkbox"/>	CB Testing Laboratory:	SIQ Ljubljana Testing Laboratory is accredited by Slovenian Accreditation, Reg. No.: LP-009
Testing location/ address.....:		Tržaška c. 2, SI-1000 Ljubljana Slovenia
<input type="checkbox"/>	Associated CB Testing Laboratory:	
Testing location/ address.....:		
Tested by (name + signature)		Luka Košir 
Approved by (name + signature)		Mihal Kiselja 
<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:

1. Test Report (92 pages)
2. National Differences – Enclosure No. 1 (41 pages)
3. European Group Differences and National Differences according to EN 60950-1:2006 + A1:2010 + A2:2013 + A11:2009 + A12:2011 – Enclosure No. 1a (21 pages)
4. Pictures – Enclosure No. 2 (6 pages)
5. Schematics, Layouts, Transformer data - Enclosure No. 3 (81 pages)

Summary of testing:

Tests performed (name of test and test clause):

- 1.6.2 Input Test
- 1.7.11 Durability
- 2.1.1.5 Energy Hazard Measurements
- 2.1.1.7 Capacitance Discharge Test
- 2.1.1.8 Energy hazards – d.c. mains supplies
- 2.2.2 SELV: Hazard Voltage (Circuit) Measurement Test
- 2.2.3 SELV Reliability testing
- 2.4 Limited Current Circuit (Bridging components)
- 2.5 Limited Power Source
- 2.9.2 Humidity Test
- 2.10.2 Working Voltage measurement on PCB and Transformer
- 2.10.3/2.10.4 Clearance and Creepage distance measurement
- 2.10.5 Distance Through Insulation measurement
- 2.10.5.6 Thin Sheet Material (barriers)
- 4.2.2-4.2.4 Steady force test, 10N
- 4.5.2 Heating (Temperature) Test
- 4.5.5 Resistance to abnormal heat (Ball pressure test)
- 5.1 Touch Current and protective conductor current
- 5.2 Electric Strength Test
- 5.3 Abnormal Operating Tests foreseeable misuse:
SELV reliability and failure in the voltage regulation,
Functional insulation, Component faults, Overload and short
and no load at the outputs

Testing location:

SIQ Ljubljana, Tržaška c. 2, SI-1000 Ljubljana, Slovenia

Summary of compliance with National Differences**List of countries addressed:**

Argentina**, Australia, Austria***, Bahrain**, Belarus**, Belgium***, Brazil**, Bulgaria***, Canada, China, Cyprus***, Colombia**, Croatia**, Czech Republic***, Denmark***, Finland***, France***, Germany***, Greece***, Hungary***, India**, Indonesia**, Iran**, Ireland***, Israel, Italy***, Japan*, Kazakhstan**, Kenya**, Korea, Lybia**, Malaysia**, Mexico**, Netherlands***, New Zealand*, Norway***, Pakistan**, Poland***, Portugal***, Romania***, Russian Federation**, Saudi Arabia**, Serbia**, Singapore**, Slovakia***, Slovenia***, South Africa**, Spain***, Sweden, Switzerland, Thailand**, Turkey***, Ukraine**, United Arab Emirates**, United Kingdom, Uruguay**, USA, Vietnam**

* No national differences to IEC 60950-1:2005 (2nd edition) (+ A1 + A2) declared

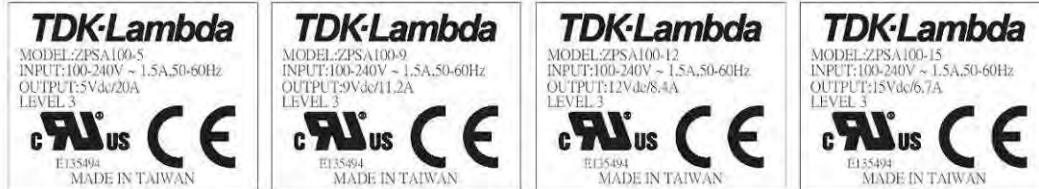
** No national differences to IEC 60950-1:2005 (2nd edition) + A1 + A2 or IEC 60950-1:2001 (1st edition) declared

*** EU group differences

The product fulfils the requirements of EN 60950-1:2006 + A1:2010 + A2:2013 + A11:2009 + A12:2011 (see Enclosure No. 1a).

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.



SCALE(2:1)



Test item particulars:	
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 type="checkbox"/> pluggable equipment <input 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 checked="" 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 type="checkbox"/> restricted access location <input checked="" type="checkbox"/> service access area (for building-in)
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	90 – 264Vac
Tested for IT power systems	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
IT testing, phase-phase voltage (V)	230 Vac line to line (Norway only)
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)	16A (IEC); 20A (North America)
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)	2000m
Altitude of test laboratory (m)	300m
Mass of equipment (kg)	0,258kg

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:	2010-06-21
Date(s) of performance of tests	2010-06-21 to 2010-08-19 2010-09-07 to 2010-10-14 (Rev. No. 1.0) 2010-11-03 to 2010-11-05 (Rev. No. 2.0) 2012-07-09 to 2012-12-04 (Rev. No. 3.0) 2015-12-01 to 2015-12-03 (Rev. No. 4.0)

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 <input checked="" type="checkbox"/> comma / <input type="checkbox"/> point is used as the decimal separator.	

Manufacturer's Declaration per sub-clause 4.2.5 of IEC60950:

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) Cincon Electronics Co., Ltd

No.306, 14F, Hsin Yi Rd. Sec 4, Taipei, Taiwan, R.O.C.

2) Dongguan Cincon Electronics Limited

**No. 1 Jing Xiang Rd.
DongCheng Foreign Trade Industrial Park,
ZhuShan DongCheng District, DongGuan,
GuangDong, CN-523128, P.R. China**

3) Cincon Electronic Factory

**No.8-1 Fu Kung Rd. Fu Hsing Park, Fu Hsing
Hsiang, Chang Hua Hsien, Taiwan, R.O.C.**

General product information:

Information about the Product:

The EUT is component level switch mode power supply with a single power output and with universal input range 100-240Vac. Power supply is open frame construction provided without final enclosure. Input and output connectors are provided on the PCB. Power supplies are of class I, and have protective earth terminal provided on the PCB near input connector.

The power supply series ZPSA100-x (“x” stands for the voltage) may include any version with an output voltage between 5Vdc and 48Vdc. The maximum allowed output current is 20A and the maximum allowed output power is 101W. All versions of ZPSA100-x use identical PCB layout, electrical circuits, primary components and transformer construction. The difference of the versions is the ratio of windings of the transformer and the secondary sub-PCB.

The versions with output voltage up to 24Vdc use the sub-PCB no. AC195-10. The versions with output voltage above 24Vdc up to and including 48Vdc use the sub-PCB no. AC230-10.

List of available versions of ZPSA100-x is in the following table.

Models	Output voltage	Max. load
ZPSA100-5(*)	5 Vdc	20 A
ZPSA100-9	9 Vdc	11,2 A
ZPSA100-12(*)	12 Vdc	8,4 A
ZPSA100-15	15 Vdc	6,7 A
ZPSA100-18	18 Vdc	5,6 A
ZPSA100-24	24 Vdc	4,2 A
ZPSA100-48(*)	48 Vdc	2,1 A

(*) Unless other indicated, all tests were performed on above models to represent entire series

Summary of testing:

The component was tested according to the standard IEC 60950-1:2005 (2nd Edition) + A1:2009 + A2:2013 and/or EN 60950-1:2006 + A1:2010 + A2:2013 + A11:2009 + A12:2011.

Additionally the component was also evaluated according to the standards CSA C22.2 No. 60950-1:2007 + A1:2011 + A2:2014 and UL60950-1:2007 (2nd Edition) + A1:2011 + A2:2014 and fulfils the requirements of these standards.

- 1) The products were tested to be suitable for connection to 16A (IEC) and 20 A (North America) branch circuit. The unit is approved for TN mains star connections and IT mains with 230 Vac phase to phase voltage. The unit provides internally one fuse in line.
- 2) All secondary output circuits are separated from mains by reinforced insulation and rated SELV non hazardous energy levels.
- 3) The unit does not provide disconnect device. Disconnecting device is end product consideration.
- 4) Safety Instructions: Built in product, safety instructions are end product considerations
- 5) The input and output connectors were not evaluated for field wiring
- 6) The power supply is rated class I. The power supply shall be properly bonded to the main protective bonding termination in the end product. The earth leakage current is below 3,5 mA. An investigation of the protective bonding terminal shall be performed within end product installation.

7) The transformers T1, L5 provide reinforced insulation. These transformers are built up to fulfil the requirement of insulation class B and provide in addition an UR (OBJY2) insulation system (see also list of safety critical components).

8) The equipment has been evaluated for use in a Pollution Degree 2 and overvoltage category II environment and a maximum altitude of 2000 m.

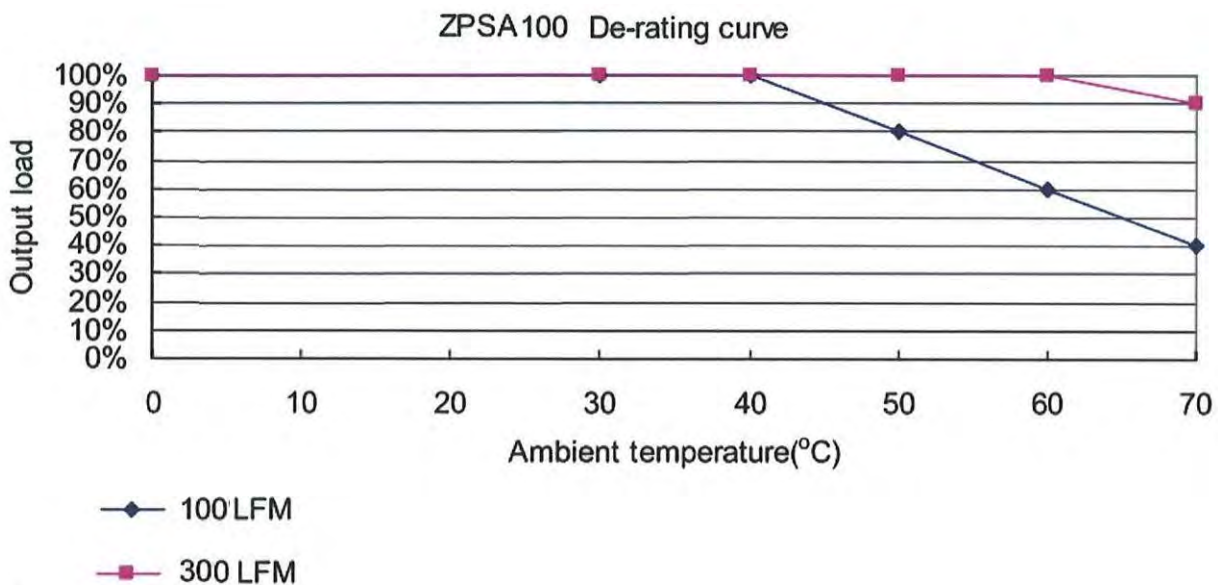
9) A suitable Electrical and Fire enclosure shall be provided in the end equipment.

10) The product was evaluated for a maximum ambient of 40°C with 100% load and was derated 2,5%/°C from 40°C to 70°C. The temperature test was performed 100 mm above bench without forced air cooling.

11) The input and output terminal are suitable for field wiring. The units could also be provided with pins for soldering to a PCB.

12) Approval within the end product: Leakage current measurement should be verified with the unit built into the end product.

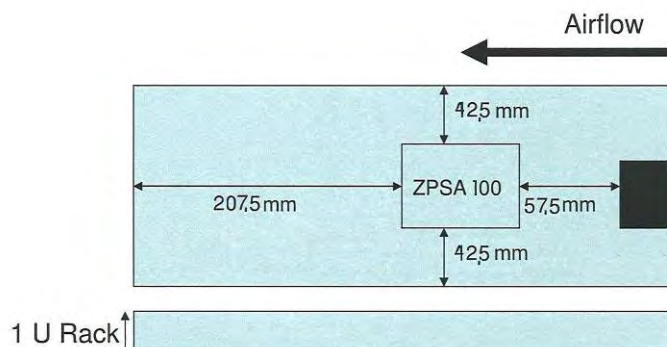
13) The product was additionally evaluated as below:



100 LFM is equivalent to 0,5 m/s

300 LFM is equivalent to 1,5 m/s

Power supply unit was placed within test tunnel as specified below.



External fan is not part of the investigation.