



Test Report issued under the responsibility of:



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

Report Number: T223-0104/16

Date of issue: 2016-03-15

Total number of pages: 227 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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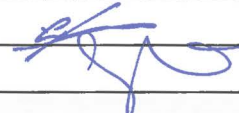
This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.

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Test item description	DIN Rail Power Supply
Trade Mark	TDK-Lambda
Manufacturer	TDK-Lambda UK Ltd.
Model/Type reference	DRB50-5-1-xyz; DRB50-12-1-xyz; DRB50-24-1-xyz; DRB50-48-1-xyz (Where x, y and z can be any alphanumeric character or blank and is non safety relevant information.)
Ratings	Input: 100-240 Vac; 1,2 A max.; 50/60 Hz Output: DRB50-5-1-xyz: 5-5,5 Vdc / 6,0-5,45 A; Max. Output power: 30 W DRB50-12-1-xyz: 12-15 Vdc / 3,4 A; Max. Output power: 51 W DRB50-24-1-xyz: 24-28 Vdc / 2,1-1,8 A; Max. Output power: 50,4 W DRB50-48-1-xyz: 48-52,8 Vdc / 1,05-0,95 A; Max. Output power: 50,4 W

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)		Boštjan Glavič
<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 (99 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 (40 pages)
6. Datasheets of Safety critical components (if required) – Enclosure No. 4 (12 pages)
7. Additional test data – Enclosure No. 5 (8 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
 - 2.2.2 SELV: Hazard Voltage (Circuit) Measurement Test
 - 2.2.3 SELV Reliability testing
 - 2.5 Limited Power Source
 - 2.6 Earthing Test, earth trace test (UL PAG)
 - 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
 - 4.2.2-4.2.4 Steady force test, 10N, 30 N, 250 N
 - 4.2.7 Stress relief test; heat test (°C/7 h)
 - 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, Air holes closed.

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

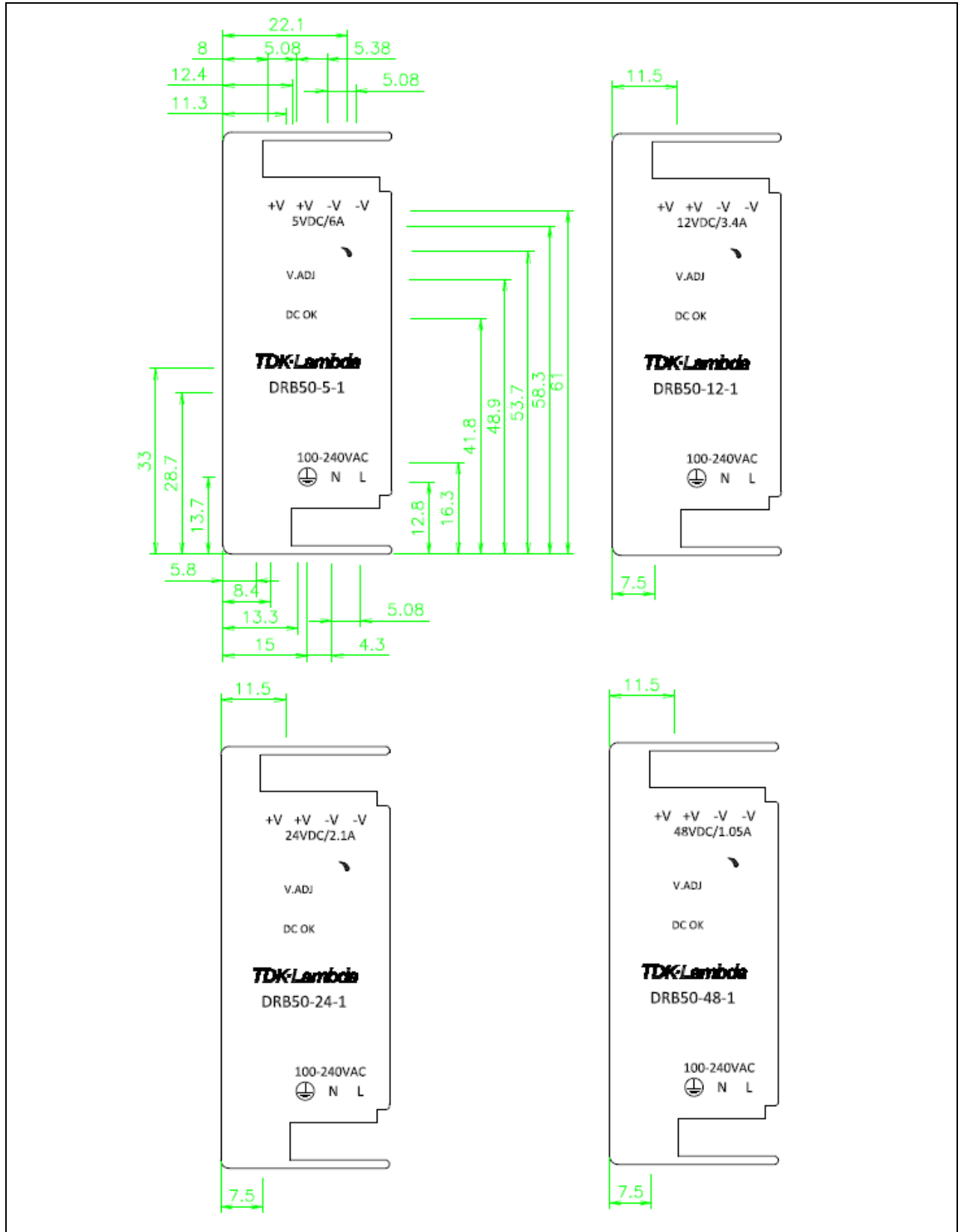
*** EU group differences

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.

<p>DRB50-48-1</p> <p>Input Details 100-240VAC 1.2A Frequency: 50 / 60Hz</p> <p>Output Details DC 48-52.8V/1.05-0.95A Maximum power: 50.4W</p>		<p>TDK-Lambda</p> <p> -10°C to 55°C Wiring must be >75°C rated Le câblage doit être >75°C nominale</p>	
<p>Caution: For use in a controlled environment, refer to manual for conditions. Attention: Pour une utilisation dans un environnement contrôlé, reportez-vous au manuel d'instructions pour les conditions.</p>		<p> UL US LISTED IND.CONT.EQ. E362999 IND.CONT.EQ. for Haz. Loc. E476231 CL I, DIV 2, GP A,B,C,D, T4</p>	
<p> RISK OF ELECTRIC SHOCK</p> <p> Read manual CA798-04-02_ Further information at: emea.tdk-lambda.com/CA798-04-01_</p>		<p> </p> <p>Made in Malaysia</p>	



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 checked="" 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 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	85-264 Vac
Tested for IT power systems	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
IT testing, phase-phase voltage (V)	230 V phase-phase (Norway)
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)	20 A max.
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)	3000
Altitude of test laboratory (m)	300
Mass of equipment (kg)	Approx. 0,177

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	2013-04-19
Date(s) of performance of tests	From 2013-04-22 to 2013-06-11

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 IEC60950-1:

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) : TDK-Lambda Malaysia Sdn. Bhd.
Kuantan Lot2&3, Kawasan Perindustrian Bandar Baru Jaya Gading, MY-26070 Kuantan, Pahang Darul Makmur, Malaysia

General product information:**Information about the Product:**

The equipment is a switching power supply (DIN rail type) for the use in Information Technology Equipment. The unit is intended for building-in. The temperature testing was performed in vertical application according manufacturer specification.

Output voltage can be adjusted from 5 to 5,5 Vdc (total output power: 30 W) for model DRB50-5-1-xyz
Output voltage can be adjusted from 12V to 15V (total output power 51W) for model DRB50-12-1-xyz
Output voltage can be adjusted from 24V to 28V (total output power 50,4W) for model DRB50-24-1-xyz
Output voltage can be adjusted from 48V to 52,8V (total output power 50,4W) for model DRB50-48-1-xyz

Connection to the supply:

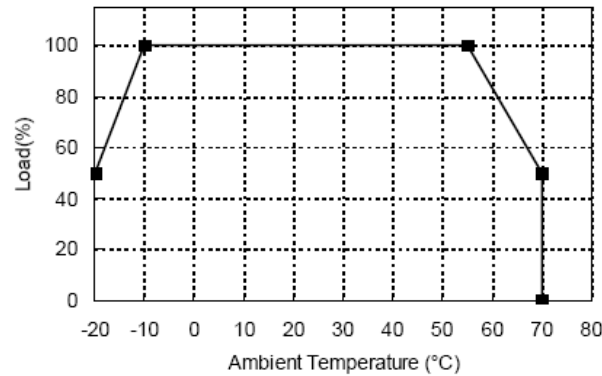
Pillar type terminal block for AC input and DC output
The PSU is for use in equipment with permanent connection to the supply.

Circuit characteristics:

The equipment contains primary circuit and secondary (SELV) circuit and represents non-hazardous energy level.

Engineering Considerations:

Maximum operating ambient temperature:
55°C at 100% load, derating above 55°C to 70°C at 50% load.



Explanation of the test program:

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 max. 20 A 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. Disconnect device is end product consideration.
4. The input and output terminals are suitable for factory and field wiring.
5. 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 has been conducted.
6. The Transformer T1 provides reinforced insulation. These transformers are built up to fulfil the requirement of insulation class B and provide in addition a UR (OBJY2) insulation system (see also list of safety critical components for details).
7. The equipment has been evaluated for use in a Pollution Degree 2 and overvoltage category II environment and a maximum altitude of 3000 m.
8. A suitable Electrical and Fire enclosure shall be provided in the end equipment.
9. The product was evaluated for a maximum ambient of 70 °C. The temperature test was performed 20 mm above bench, 25mm below top surface, zero gap between units and without forced air cooling.

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

History Sheet:

Date	Report No.	Change/Modification	Rev. No.
2013-07-25	T223-0263/13	Initial report issued.	-
2016-03-15	T223-0104/16	Test report updated to IEC 60950-1:2005 (Second Edition) + A1:2009 + A2:2013 and EN 60950-1:2006 + A1:2010 + A2:2013 + A11:2009 + A12:2011 List of critical components was updated. No changes of the unit. No additional tests were considered necessary.	1.0

Additional information for the follow up engineer:

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)