# TEST REPORT

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

<table>
<thead>
<tr>
<th>Report Number</th>
<th>T223-0102/16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of issue</td>
<td>2016-03-15</td>
</tr>
<tr>
<td>Total number of pages</td>
<td>182 pages</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Applicant’s name</th>
<th>TDK-Lambda UK Ltd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>Kingsley Avenue, Ilfracombe, Devon, EX34 8ES, UK</td>
</tr>
</tbody>
</table>

## Test specification:

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Test procedure</td>
<td>CB Scheme</td>
</tr>
<tr>
<td>Non-standard test method</td>
<td>N/A</td>
</tr>
</tbody>
</table>

| Test Report Form No.           | IEC60950_1F                                               |
| Test Report Form(s) Originator | SGS Fimko Ltd                                             |
| Master TRF                     | Dated 2014-02                                             |

Copyright © 2014 IEC System of Conformity Assessment Schemes for Electrotechnical Equipment and Components (IECEE System). All rights reserved.

This publication may be reproduced in whole or in part for non-commercial purposes as long as the IECEE is acknowledged as copyright owner and source of the material. IECEE takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

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.
<table>
<thead>
<tr>
<th>Test item description</th>
<th>DIN Rail Power Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trade Mark</td>
<td>TDK-Lambda</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>TDK-Lambda UK Ltd.</td>
</tr>
<tr>
<td>Model/Type reference</td>
<td>DRB15-24-1-xyz</td>
</tr>
<tr>
<td>(Where x, y and z can be any alphanumeric character or blank and is non safety relevant information)</td>
<td></td>
</tr>
<tr>
<td>Ratings</td>
<td>Input: 100-240 Vac; 0,39 A max.; 50/60 Hz</td>
</tr>
<tr>
<td></td>
<td>Output: 24-28 Vdc; 0,63-0,54 A; Max. Output power: 15 W</td>
</tr>
</tbody>
</table>

Testing procedure and testing location:

- **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

- **Associated CB Testing Laboratory:**
  - Testing location/ address: 

- **Tested by (name + signature):** Luka Košir
- **Approved by (name + signature):** Boštjan Glavič

- **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): 

TRF No. IEC60950_1F
**List of Attachments:**

1. Test Report (70 pages)
2. National Differences – Enclosure No. 1 (41 pages)
4. Pictures – Enclosure No. 2 (6 pages)
5. Schematics, Layouts, Transformer data - Enclosure No. 3 (21 pages)
6. Instruction Manual – Enclosure No. 4 (16 pages)
7. Additional test data – Enclosure No. 5 (16 pages)

**Summary of testing:**

<table>
<thead>
<tr>
<th>Tests performed (name of test and test clause):</th>
<th>Testing location:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.6.2 Input Test</td>
<td>SIQ Ljubljana, Tržaška c. 2, SI-1000 Ljubljana, Slovenia</td>
</tr>
<tr>
<td>1.7.11 Durability</td>
<td></td>
</tr>
<tr>
<td>2.1.1.5 Energy Hazard Measurements</td>
<td></td>
</tr>
<tr>
<td>2.1.1.7 Capacitance Discharge Test</td>
<td></td>
</tr>
<tr>
<td>2.2.2 SELV: Hazard Voltage (Circuit) Measurement Test</td>
<td></td>
</tr>
<tr>
<td>2.2.3 SELV Reliability testing</td>
<td></td>
</tr>
<tr>
<td>2.5 Limited Power Source</td>
<td></td>
</tr>
<tr>
<td>2.6 Earthing Test, earth trace test (UL PAG)</td>
<td></td>
</tr>
<tr>
<td>2.9.2 Humidity Test</td>
<td></td>
</tr>
<tr>
<td>2.10.2 Working Voltage measurement on PCB and Transformer</td>
<td></td>
</tr>
<tr>
<td>2.10.3/2.10.4 Clearance and Creepage distance measurement</td>
<td></td>
</tr>
<tr>
<td>2.10.5 Distance Through Insulation measurement</td>
<td></td>
</tr>
<tr>
<td>4.2.2-4.2.4 Steady force test, 10N, 30 N, 250 N</td>
<td></td>
</tr>
<tr>
<td>4.2.7 Stress relief test; heat test (°C/7 h)</td>
<td></td>
</tr>
<tr>
<td>4.5.2 Heating (Temperature) Test</td>
<td></td>
</tr>
<tr>
<td>4.5.5 Resistance to abnormal heat (Ball pressure test)</td>
<td></td>
</tr>
<tr>
<td>5.1 Touch Current and protective conductor</td>
<td></td>
</tr>
<tr>
<td>5.2 Electric Strength Test</td>
<td></td>
</tr>
<tr>
<td>5.3 Abnormal Operating Tests foreseeable misuse:</td>
<td></td>
</tr>
<tr>
<td>SELV reliability and failure in the voltage regulation, Functional insulation, Component faults, Overload and short and no load at the outputs, Air holes closed.</td>
<td></td>
</tr>
</tbody>
</table>
Summary of compliance with National Differences

List of countries addressed:


* 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

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.

**DRB15-24-1**

**Input Details**
- 100-240VAC 0.39A
- Frequency: 50 / 60Hz

**Output Details**
- DC 24-28V/0.63-0.54A

**Maximum power:** 15W

**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.

**RISK OF ELECTRIC SHOCK**

Read manual CA798-04-02...

Further information at: ernea.tdk-lambda.com/CA798-04-01

Made in Malaysia
### Test item particulars

**Equipment mobility**
- [ ] movable
- [ ] hand-held
- [ ] transportable
- [ ] stationary
- [ ] for building-in
- [ ] direct plug-in

**Connection to the mains**
- [ ] pluggable equipment
- [ ] type A
- [ ] type B
- [x] 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
- [ ] restricted access location

**Over voltage category (OVC)**
- [x] OVC I
- [ ] OVC II
- [ ] OVC III
- [ ] OVC IV
- [ ] other:

**Mains supply tolerance (%) or absolute mains supply values**
- [ ] 85-264 Vac

**Tested for IT power systems**
- [x] Yes
- [ ] No

**IT testing, phase-phase voltage (V)**
- 230 V phase-phase (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)**
- 20 A max.

**Pollution degree (PD)**
- [ ] PD 1
- [x] PD 2
- [ ] PD 3

**IP protection class**
- IP

**Altitude during operation (m)**
- 3000

**Altitude of test laboratory (m)**
- 300

**Mass of equipment (kg)**
- Approx. 0.085

### 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 2013-06-03

### 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 ® 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) | TDK-Lambda Malaysia Sdn. Bhd.  
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Kuantan Lot2&amp;3, Kawasan Perindustrian Bandar Baru Jaya Gading, MY-26070 Kuantan, Pahang Darul Makmur, Malaysia</td>
</tr>
</tbody>
</table>

### 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 24V to 28V (total output power 15W).

**Connection to the supply:**  
Pillar type terminal block for AC input and DC output provided.  
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: 70°C at 100% load (15W).
Explanation of the test program:


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:

<table>
<thead>
<tr>
<th>Date</th>
<th>Report No.</th>
<th>Change/Modification</th>
<th>Rev. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-07-25</td>
<td>T223-0206/13</td>
<td>Initial report issued.</td>
<td>-</td>
</tr>
</tbody>
</table>
### Abbreviations used in the report:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>N.C.</td>
<td>normal conditions</td>
</tr>
<tr>
<td>OP</td>
<td>functional insulation</td>
</tr>
<tr>
<td>DI</td>
<td>double insulation</td>
</tr>
<tr>
<td>BOP</td>
<td>between parts of opposite polarity</td>
</tr>
<tr>
<td>S.F.C</td>
<td>single fault conditions</td>
</tr>
<tr>
<td>BI</td>
<td>basic insulation</td>
</tr>
<tr>
<td>SI</td>
<td>supplementary insulation</td>
</tr>
<tr>
<td>RI</td>
<td>reinforced insulation</td>
</tr>
</tbody>
</table>

**Indicate used abbreviations (if any)**