

UL TEST REPORT AND PROCEDURE

Standard:	UL 60950-1, 2nd Edition, 2014-10-14 (Information Technology Equipment - Safety - Part 1: General Requirements) CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10 (Information Technology Equipment - Safety - Part 1: General Requirements)
Certification Type:	Component Recognition
CCN:	QQGQ2, QQGQ8 (Power Supplies for Information Technology Equipment Including Electrical Business Equipment)
Product:	AC-DC Power Supply
Model:	DRB480-24-1-xyz DRB480-48-1-xyz where x, y, z may be any letter or digit or blank, considered non safety relevant information, see model differences
Rating:	INPUT: 100-240 Vac, 5.4A, 50/60 Hz OUTPUT DRB480-24: 24-26.4Vdc, 20-18.2A (max 480W) DRB480-48: 48-52.8 Vdc, 10-9.09A (max 480W)
Applicant Name and Address:	TDK-LAMBDA UK LTD KINGSLEY AVE ILFRACOMBE EX34 8ES UNITED KINGDOM

This is to certify that representative samples of the products covered by this Test Report have been investigated in accordance with the above referenced Standards. The products have been found to comply with the requirements covering the category and the products are judged to be eligible for Follow-Up Service under the indicated Test Procedure. The manufacturer is authorized to use the UL Mark on such products which comply with this Test Report and any other applicable requirements of UL LLC ('UL') in accordance with the Follow-Up Service Agreement. Only those products which properly bear the UL Mark are considered as being covered by UL's Follow-Up Service under the indicated Test Procedure.

The applicant is authorized to reproduce the referenced Test Report provided it is reproduced in its entirety.

UL authorizes the applicant to reproduce the latest pages of the referenced Test Report consisting of the first page of the Specific Technical Criteria through to the end of the Conditions of Acceptability.

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.

Prepared by: Piotr A. Bizunowicz (Project engineer) Reviewed by: Sebastian Cichocki (Project reviewer)

Supporting Documentation

The following documents located at the beginning of this Procedure supplement the requirements of this Test Report:

- A. Authorization - The Authorization page may include additional Factory Identification Code markings.
- B. Generic Inspection Instructions -
 - i. Part AC details important information which may be applicable to products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of this Test Report.
 - ii. Part AE details any requirements which may be applicable to all products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of each Test Report.
 - iii. Part AF details the requirements for the UL Certification Mark which is not controlled by the technical standard used to investigate these products. Products are permitted to bear only the Certification Mark(s) corresponding to the countries for which it is certified, as indicated in each Test Report.

Product Description

Device is AC/DC switch mode power supply for building-in on DIN rail.

Model Differences

suffix '-xyz' is optional and denotes customer-specific variant (like fixed voltage or no LED), and is deemed not safety relevant.

Model DRB480-48-1 is mechanically and electrically identical to model DRB480-24-1, except for:

- different output ratings
- different transformer TX1, output choke L5
- different FET on ASSY1
- passive elements in SELV circuit to accomodate different output ratings
- changed PWB layouts -- the safety relevant part (spacings, PE path) remain unchanged, Primary side of all models is strictly identical.

Technical Considerations

- Equipment mobility : for building-in
- Connection to the mains : N/A (component for building-in)
- Operating condition : continuous
- Access location : N/A (component for building-in)
- Over voltage category (OVC) : OVC II
- Mains supply tolerance (%) or absolute mains supply values : +10%, -10%
- Tested for IT power systems : Yes
- IT testing, phase-phase voltage (V) : 400
- Class of equipment : Class I (earthed)
- Considered current rating of protective device as part of the building installation (A) : 20A
- Pollution degree (PD) : PD 2
- IP protection class : IP X0
- Altitude of operation (m) : 3000 (See Technical Considerations)
- Altitude of test laboratory (m) : less than 2000 meters
- Mass of equipment (kg) : 1.18
- The product was submitted and evaluated for use at the maximum ambient temperature (T_{ma}) permitted by the manufacturer's specification of: 50°C, 70°C with derating
- The means of connection to the mains supply is: to be determined in End Product
- The product is intended for use on the following power systems: TT, TN, IT
- The equipment disconnect device is considered to be: determined in End Product
- The product was investigated to the following additional standards: EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + A2:2013 (which includes all European national differences, including those specified in this test report).
- The following accessible locations (with circuit/schematic designation) are within a limited current circuit: Output
- The following were investigated as part of the protective earthing/bonding: Printed wiring board trace (refer to Enclosure - Schematics + PWB for layouts)

- The following are available from the Applicant upon request: Installation (Safety) Instructions / Manual
- LEDs provided in the product are considered low power devices: Yes
- The following scope limitations apply to this test report and additional evaluation and/or tests may be required when submitting this CB Report to a National Certification Body (NCB) to obtain a national mark: - no EMC tests nor evaluation to EMC Directive 2004/108/EC and 2014/30/EU - no evaluation to RoHS Directive 2002/95/EC - no evaluation to Council Recommendation 1999/519/EC nor 2006/25/EC - only English version of markings and instructions provided and reviewed
- The Clearances and Creepage Distances have additionally been assessed for suitability up to 3 000 m elevation.

Engineering Conditions of Acceptability

For use only in or with complete equipment where the acceptability of the combination is determined by UL LLC. When installed in an end-product, consideration must be given to the following:

- The following Production-Line tests are conducted for this product: Earthing Continuity, Electric Strength
- The end-product Electric Strength Test is to be based upon a maximum working voltage of: Primary-Earthed Dead Metal: 316 Vrms, 584 Vpk, Primary-SELV: 233 Vrms, 423 Vpk
- The following secondary output circuits are SELV: output
- The following output terminals were referenced to earth during performance testing: Output negative.
- The power supply terminals and/or connectors are: Suitable for field wiring
- The maximum investigated branch circuit rating is: 20A
- The investigated Pollution Degree is: 2
- Proper bonding to the end-product main protective earthing termination is: Required
- An investigation of the protective bonding terminals has: Been conducted
- The following input terminals/connectors must be connected to the end-product supply neutral: J7-2
- The following magnetic devices (e.g. transformers or inductor) are provided with an OBJ2 insulation system with the indicated rating greater than Class A (105°C): Transformer T1 (class 155°C), Coil L4 (class 155°C), Coil L1 (class 155°C)
- The following end-product enclosures are required: Mechanical, Fire, Electrical
- The following components require special consideration during end-product Thermal (Heating) tests due to the indicated maximum temperature measurements during component-level testing: metal housing (85.8°C) - additional requirements for accessibility to be evaluated in end product.

Additional Information

DERATING INFORMATION:

Max. Output power: 480W up to 50°C, derate linearly down to 300W at 70°C. See manual.

Project 4787710370 - Revision (UL: E135494-A109)/Amendment 1 (CB: E135494-A109-CB-1):
- production site corrected from TDK-LAMBDA MALAYSIA SDN BHD to PANYU TRIO MICROTRONICS CO LTD as described below:

TDK-LAMBDA MALAYSIA SDN BHD
LOT 2 & 3, BATU 9 3/4
KAWASAN PERINDUSTRIAN

BANDAR BARU JAYA GADING
26070 KUANTAN
PAHANG MALAYSIA

PANYU TRIO MICROTRONICS CO LTD
SHIJI INDUSTRIAL ESTATE
DONGYONG
NANSHA
GUANGZHOU
GUANGDONG 511453 CHINA


- for main PWB changes (PFC stage, parallelly connected R1, R2, R3 and R4 replaced by R1 only) and new type of LED (D9) the following items have been addressed:
a) updated PWB layouts and components placement - Schematics + PWB ID 5-01,
b) revised Photographs ID 3-06 and 3-07.

Testing of DRB480-24-1-xyz was not considered necessary based on the results of previous investigation and no spacigs influence by PWB changes.

Additional Standards

The product fulfills the requirements of: EN 60950-1:2006 + A1:2010 + A11:2009 + A12:2011 + A2:2013

Markings and instructions

Clause Title	Marking or Instruction Details
Power rating - Ratings	Ratings (voltage, frequency/dc, current)
Power rating - Company identification	Listee's or Recognized company's name, Trade Name, Trademark or File Number
Power rating - Model	Model Number
Fuses - Non-operator access/soldered-in fuses	Unambiguous reference to service documentation for instructions for replacement of fuses replaceable only by service personnel
Terminal for main protective earthing	Provided adjacent to the main protective earthing terminal (60417-5019) 
Terminals for external primary power supply conductors	Capital letter "N" located adjacent to a terminal intended exclusively for connection of the primary power neutral conductor

Special Instructions to UL Representative

N/A