

UL TEST REPORT AND PROCEDURE

Standard:	UL 62368-1, 2nd Ed, 2014-12-01 (Audio/video, information and communication technology equipment Part 1: Safety requirements) CAN/CSA C22.2 No. 62368-1-14, 2nd Ed-(Audio/video, information and communication technology equipment Part 1: Safety requirements)
Certification Type:	Component Recognition
CCN:	QQJQ2, QQJQ8 (Power Supplies for Use in Audio/Video, Information and Communication Technology Equipment)
Complementary CCN:	N/A
Product:	AC-DC Power Supply
Model:	DRF240-24-1/xyz; DRF240-24-1/HL-xyz DRF240-24-1/HLIVS-xyz DRF240-24-1/HLSLC-xyz (where x, y and z can be ST, BAT or any alphanumeric character or blank and is non safety related information); /HL - designates model provided with coating. /HLIVS - designates models with DC HV input /HLSLC - customized model without front cover
Rating:	Input: 100-240 Vac; 2.7 A max.; 50/60 Hz Output: 24-28 Vdc / 10-8.6A, 240 W max /HLIVS model only: Additional input ratings: 108-145Vdc Output: 22.5-24.5Vdc 10-9.4A 240 W max /HLSLC model only: Output: 25.6 - 30Vdc 8A max 240W
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 handler

Reviewed By: Hubert Koszewski / 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

The product is a switching power supply (DIN rail type) for use in Information Technology Equipment, provided with terminal blocks suitable for field wiring. The unit is intended for building-in. The temperature testing was performed in vertical application according to manufacturer specification.

Output voltage can be adjusted from 24V to 28V (total output power max. 240W).

Circuit characteristics:

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

Model Differences

Models DRF240-24-1/xyz and DRF240-24-1/HL-xyz are identical except model with suffix HL is provided with coating.

Models with suffix ST & BAT are identical and differ from standard model by Overcurrent Protection Circuit (the same PWB, different values of components in secondary circuit). The OCP for DRF240-24-1/ST or DRF240-24-1/BAT is reduced to rated output load condition (8.6A to 10A max.). Additionally OCP shutdown function is removed.

Model /HLIVS is similar to model /HL, except input fuse, extended INPUT rating to include DC range, minor changes in SELV circuit.

Model /HLSLC is identical to HL, except for it does not have front cover

Test Item Particulars

Classification of use by	Skilled person, Instructed person
Supply Connection	AC Mains DC Mains --
Supply % Tolerance	85-264Vac, (108-145Vdc /HLIVS model only)
Supply Connection – Type	n/a (for building-in, terminal block suitable for field wiring)
Considered current rating of protective device as part of building or equipment installation	20 A; building;
Equipment mobility	for building-in
Over voltage category (OVC)	OVC II

Class of equipment	Class I
Access location	N/A
Pollution degree (PD)	PD 2
Manufacturer's specified maximum operating ambient (°C)	70
IP protection class	IP X0, (IP20 declared by manufacturer)
Power Systems	TN TT IT - 230 V L-L
Altitude during operation (m)	up to 3000 m
Altitude of test laboratory (m)	less than 2000 m
Mass of equipment (kg)	approx. 0.86 kg

Technical Considerations

- 1.2 The product was submitted and evaluated for use at the maximum ambient temperature (T_{ma}) permitted by the manufacturer's specification of: 60 °C (full load 240W) and 70°C (with derating 75%, load 180W).
- 1.3 The means of connection to the mains supply is: to be evaluated in end product (only field wiring evaluated).
- 1.4 The product is intended for use on the following power systems: TT, TN, IT
- 1.5 The equipment disconnect device is considered to be: part of end product evaluation whether device or installation instructions are provided.
- 1.11 The following were investigated as part of the protective earthing/bonding: Printed wiring board trace (refer to Enclosure - Schematics + PWB for layouts)
- 1.13 The following are available from the Applicant upon request: Installation (Safety) Instructions / Manual
- 1.21 LEDs provided in the product are considered low power narrowband devices (exempt group).
- The following scope limitations apply to this test report and are confirmed by Applicant to be covered separately. Additional evaluation and/or tests may be required when submitting this CB Report to a National Certification Body (NCB) to obtain a national mark:
 - 1) no EMC tests nor evaluation to EMC Directive 2004/108/EC and 2014/30/EU,
 - 2) no evaluation to RoHS Directives 2002/95/EC, 2011/65/EU and (EU) 2016/585,
 - 3) no evaluation to Council Recommendation 1999/519/EC nor 2006/25/EC,
 - 4) only English version of markings and instructions provided and reviewed,
 - 5) no evaluation to Directive 96/29/Euratom.

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:

- Power supply has been additionally tested for intermittent operation. See Additional Information in the beginning of this test report and Enclosure 7-04 for details. Additional duty cycle marking to be evaluated in end product
- The Clearances and Creepage Distances have additionally been assessed for suitability up to 3 000 m elevation.
- 1.2 The following Production-Line tests are conducted for this product: Electric Strength
Earthing Continuity
- 1.3 The end-product Electric Strength Test is to be based upon a maximum working voltage of:
Primary-Secondary: 318.9 Vrms, 527 Vpk
Primary-Earthed Dead Metal: 310.6 Vrms, 416 Vpk
- 1.5 The following secondary output circuits are ES1: DC output and signal outputs
- 1.6 The following secondary output circuits are PS3 (hazardous energy levels): DC Output
- 1.7 The following secondary output circuits are PS2 (non-hazardous energy levels): signal outputs
- 1.10 The following output terminals were referenced to earth during performance testing: Secondary "-" (minus) during Working Voltage Measurement test
- 1.11 The power supply terminals and/or connectors are: Suitable for field wiring
- 1.12 The maximum investigated branch circuit rating is: 20 A
- 1.13 The investigated Pollution Degree is: 2
- 1.15 Proper bonding to the end-product main protective earthing termination is: Required
- 1.16 An investigation of the protective bonding terminals has: Been conducted
- 1.17 The following input terminals/connectors must be connected to the end-product supply neutral: terminal block CN1, pin marked with "N"
- 1.18 The following magnetic devices (e.g. transformers or inductor) are provided with an OBJY2 insulation system with the indicated rating greater than Class A (105°C): T101 (Class F), T401 (Class F)
- 1.19 The following end-product enclosures are required: Mechanical, Fire, Electrical

Additional Information

Maximum Normal Load:

- @ 60°C: 24 Vdc / 10 A; Max. output power: 240 W
- @ 60°C: 28 Vdc / 8.6 A; Max. output power: 240 W
- @ 70°C: 24 Vdc / 7.5 A; Max. output power: 180 W
- @ 70°C: 28 Vdc / 6.45 A; Max. output power: 180 W

Power supply has been additionally tested with duty cycle defined as peak output current 12.86A for 4 seconds and resting time 7.43 seconds at 4.91A load, which equals total rms power 240 W.

This report is based on previously conducted testing (as listed below) and the review of product construction of original report E135494-A94-UL last revised 2017-02-10.


Refer to Section "Test performed (name of test and test clause)" and enclosure 7-07 covering all applicable performance tests and rationale for waived tests.

Additional Standards

The product fulfills the requirements of: EN 62368-1:2014 + A11:2017

Markings and Instructions

Clause Title	Marking or Instruction Details
Equipment identification marking – Manufacturer identification	Listee's or Recognized companys name, Trade Name, Trademark or File Number

Equipment identification marking – model identification	Model Number
Equipment rating marking – ratings	"Input Ratings (voltage, frequency/dc, current/power)", "Output Ratings (voltage, frequency/dc, current/power)"
Equipment with output terminals other than mains supply	rated voltage, rated frequency/dc, rated maximum current/power, equipment to be connected, Class 1 wiring adjacent to terminals, Class 2 wiring adjacent to terminals, Class 3 wiring adjacent to terminals
Fuses – replaceable by skilled person	(component ID:____), Ratings (____A), "Ratings (____A, ____V)", and (symbol of required characteristics) located on or adjacent to fuse or fuseholder or in service manual.
Class I equipment -Terminal for main protective earthing	Provided adjacent to the main protective earthing terminal  (IEC 60417-5019)
Field wiring terminals for both copper and aluminum conductors only	"Use Copper or Aluminum Conductors"/"Utiliser seulement des conducteurs en aluminium" or "Use Copper, Copper-Clad Aluminum or Aluminum Conductors"/"Utiliser seulement des conducteurs en aluminium cuivré"
Special Instructions to UL Representative N/A	