

## UL TEST REPORT AND PROCEDURE

<b>Standard:</b>	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)
<b>Certification Type:</b>	Component Recognition
<b>CCN:</b>	QQJQ2, QQJQ8 (Power Supplies for Use in Audio/Video, Information and Communication Technology Equipment)
<b>Complementary CCN:</b>	N/A
<b>Product:</b>	DIN-rail AC-DC Power Supply
<b>Model:</b>	DRF480-24-1-xyz; DRF480-24-1/HL-xyz DRF480-24-1/HLIVS-xyz (Where x, y and z can be any alphanumeric character or blank and is non safety related information.)
<b>Rating:</b>	For DRF480-24-1-xyz and DRF480-24-1/HL-xyz  INPUT: 100-240Vac, 50/60Hz, max 5.4A; OUTPUT: 24-28Vdc, 20-15.4A, max. power 480W  For DRF480-24-1/HLIVS: INPUT: AC 100-240V 50-60Hz, max 5.4A DC 108V-145V, max 5.4A OUTPUT: 24Vdc, 20A, max. power 480W
<b>Applicant Name and Address:</b>	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.

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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

Device is Switch-mode Power supply module to be mounted on DIN-rail.

Input and output have screw terminals.

### Model Differences

Model name "DRF480-24-1" may be appended by alphanumeric suffix, which is not safety-relevant.

Model DRF480-24-1/HL-xyz is identical to model DRF480-24-1-xyz except model with suffix HL is provided with coating.

Model DRF480-24-1/HLIVS-xyz is similar to DRF480-24-1/HL-xyz except it has additional circuitry to limit output voltage and has no output voltage adjustment on front. Also this model can operate on DC input.

### Test Item Particulars

Classification of use by	Skilled person, Instructed person
Supply Connection	AC Mains DC Mains
Supply % Tolerance	+10%/-10%
Supply Connection – Type	Unit for building-in, to be determined in End product
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 (for building-in)
Pollution degree (PD)	PD 2
Manufacturer's specified maximum operating ambient (°C)	70, with derating above 60
IP protection class	IPX0
Power Systems	TN TT IT - 230 V L-L dc mains

Altitude during operation (m)	3000 m
Altitude of test laboratory (m)	below 2000 m
Mass of equipment (kg)	1.34

#### Technical Considerations

- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of : 70 °C with derating of 2.5%/°C between 60 and 70 °C.
- The product is intended for use on the following power systems : TT, TN, IT, DC mains supply
- The equipment disconnect device is considered to be : part of end product evaluation whether device or installation instructions are provided
- 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
- The product was investigated to the following additional standard : EN 62368-1:2014 + A11:2017

#### 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 product-line tests are conducted for this product : Electric Strength, Earthing Continuity
- The end-product Electric Strength Test is to be based upon a maximum working voltage of : Primary-SELV: 403 Vrms, 560 Vpk, Primary-Earthed Dead Metal: 264 Vrms, 480 Vpk.
- The maximum investigated branch circuit rating is : 20 A
- 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 : terminal block CN1, pin marked with "N"
- The following end-product enclosures are required : Mechanical, Electrical, Fire
- 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 155, T401 class 155
- The Clearances and Creepage Distances have additionally been assessed for suitability up to 3000m elevation.

#### Additional Information

Tested maximum normal load including Duty cycle information.

Models DRF480-24-1-xyz and DRF480-24-1/HL-xyz:

@ 60°C: 24 Vdc / 20A; Max. output power: 480 W

@ 60°C: 28 Vdc / 15.4A; Max. output power: 431.2 W

@ 70°C: 24 Vdc / 15A; Max. output power: 360 W

@ 70°C: 28 Vdc / 11.6 A; Max. output power: 324.8 W



Power supply has been additionally tested with duty cycle defined as peak output current 28A for 4 seconds and resting time 8 seconds at 12 A load, which equals total rms power 455 W.

Model DRF480-24-1/HLIVS-xyz:

@ 60°C: 24 Vdc / 20A; Max. output power: 480

@ 70°C: 24 Vdc / 15A; Max. output power: 360 W

this model is not rated for intermittent operation with temporal overload.

<b>Additional Standards</b>	
The product fulfills the requirements of: EN 62368-1:2014 + A11:2017	
<b>Markings and Instructions</b>	
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)"
Fuses – replaceable by skilled person	F1, "Ratings (F12.5AH, 250V for DRF480 and DRF240.../HL; F12.5AH 250Vac 150V dc for DRF480.../HLIVS)", 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)
Equipment for use in location where children are not likely to be presented	"This equipment is not suitable for use in locations where children are likely to be present" (Instruction)/"Cet équipement ne convient pas à une utilisation dans des lieux pouvant accueillir des enfants" (Instruction)
See Installation Instructions	The symbol 
<b>Special Instructions to UL Representative</b>	
N/A	