



Test Report issued under the responsibility of:



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

Report Number: T223-0042/16

Date of issue: 2016-03-04

Total number of pages: 192 pages

Applicant's name: TDK-Lambda UK Ltd.

Address: Kingsley Avenue, Ilfracombe, Devon, EX34 8ES, United Kingdom

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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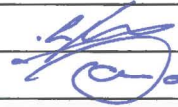

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

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. Kingsley Avenue, Ilfracombe, Devon, EX34 8ES, United Kingdom
Model/Type reference	DRF240-24-1/xyz; DRF240-24-1/HL-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.
Ratings	Input: 100-240 Vac; 2,7 A; 50/60 Hz Output: 24-28 Vdc / 10-8,6 A; Max. output power: 240 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)		Branko Lamovšek 
<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 (82 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 (7 pages)
5. Schematics, Layouts, Transformer data - Enclosure No. 3 (33 pages)
6. Additional test performed by manufacturer request – Enclosure No. 4 (6 pages)

Summary of testing:

Tests performed (name of test and test clause):

- 1.6.2 Input Test
- 1.7.11 Durability
- 2.1.1.7 Capacitance Discharge Test
- 2.2.2 SELV: Hazard Voltage (Circuit) Measurement Test
- 2.2.3 SELV Reliability testing
- 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
- 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 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.

DRF240-24-1

Input Details
 100-240VAC 2.7A
 Frequency: 50 / 60Hz

Output Details
 DC 24-28V/10-8.6A

Maximum power: 240W

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 PA619-04-02_
Further information at:
emea.tdk-lambda.com/PA619-04-01_

UL **US**
LISTED
IND.CONT.EQ.
E362999
IND.CONT.EQ.
for Haz. Loc.
E476231

CE
CL I, DIV 2, GP A,B,C,D, T4

Made in Malaysia

TDK-Lambda

BAR CODE

=====

EHFP

-25°C to 60°C
Wiring must be >75°C rated
Le câblage doit être >75°C nominale

DRF240-24-1/HL

Input Details
 100-240VAC 2.7A
 Frequency: 50 / 60Hz

Output Details
 DC 24-28V/10-8.6A

Maximum power: 240W

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 PA619-04-02_
Further information at:
emea.tdk-lambda.com/PA619-04-01_

UL **US**
LISTED
IND.CONT.EQ.
E362999
IND.CONT.EQ.
for Haz. Loc.
E476231

CE
CL I, DIV 2, GP A,B,C,D, T4

Made in Malaysia

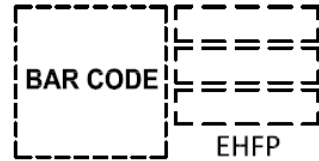
TDK-Lambda

BAR CODE

=====

EHFP

-25°C to 60°C
Wiring must be >75°C rated
Le câblage doit être >75°C nominale

DRF240-24-1/XXXXX**TDK-Lambda**Input Details**100-240VAC 2.7A**
Frequency: 50 / 60Hz**-25°C to 70°C**Wiring must be
>75°C ratedLe câblage doit être
>75°C nominaleOutput Details**DC 24-28V/10-8.6A****Maximum power: 240W**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 PA619-04-02_

Further information at:

emea.tdk-lambda.com/PA619-04-01_Made in **Malaysia**

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 type="checkbox"/> permanent connection <input type="checkbox"/> detachable power supply cord <input type="checkbox"/> non-detachable power supply cord <input checked="" 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 <input checked="" type="checkbox"/> service access area
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)	16 A (for Europe), 20 A (for Canada and US)
Pollution degree (PD)	<input type="checkbox"/> PD 1 <input checked="" type="checkbox"/> PD 2 <input type="checkbox"/> PD 3
IP protection class	IP20
Altitude during operation (m)	Up to 3000
Altitude of test laboratory (m)	300
Mass of equipment (kg)	Approx. 0,86

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	2013-03-18
Date(s) of performance of tests	From 2013-03-20 to 2014-06-18

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 IEC 60950-1:

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.
 Lots 2&3 Kawasan Perindustrian Bandar Baru Jaya Gading, Kuantan MY-26070, 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 24 V to 28 V (total output power max. 240 W).

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 hazardous energy level.

Engineering Considerations:

Maximum operating ambient temperature:
 60°C at 100% load (240 W)
 70°C at 75% load (180 W)

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.

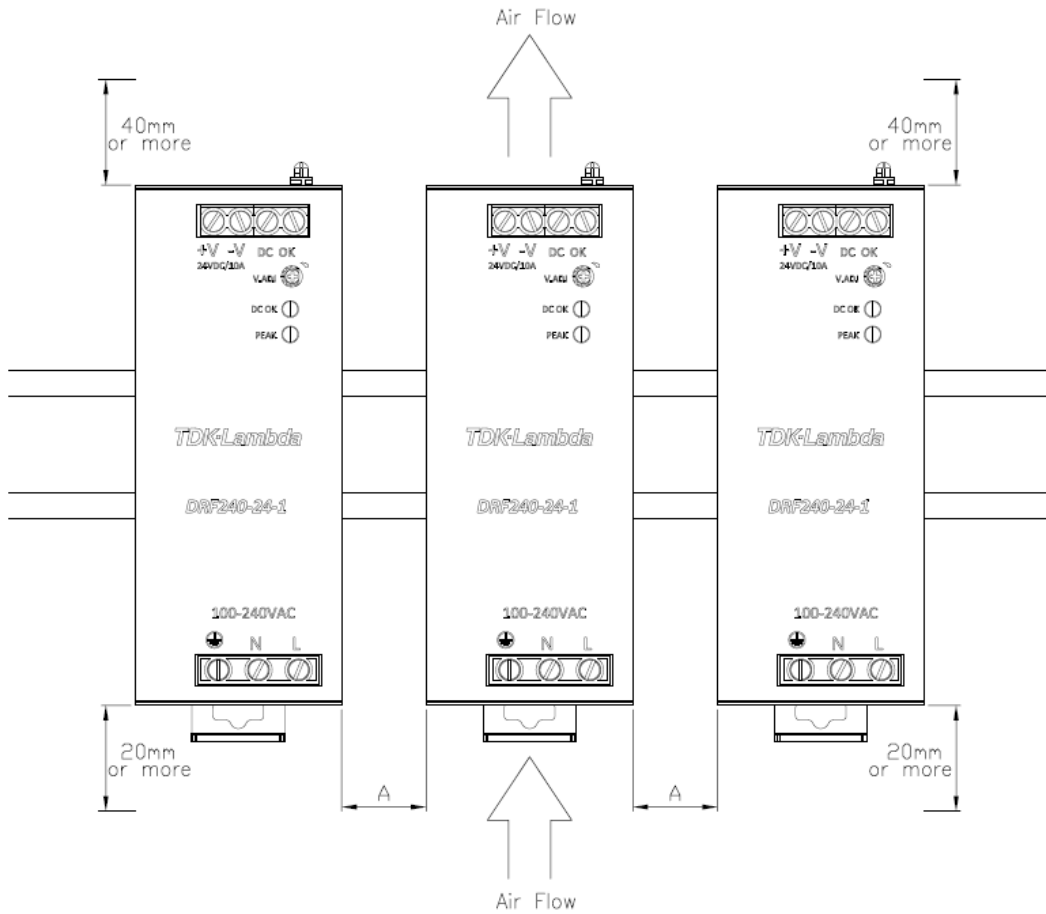
Additionally the component was also evaluated according to the standards CSA C22.2 No. 60950-1:2007 + A1:2011 + A2:2014 and UL60950-1:2007 (2nd Edition) + A1:2011 + A2:2014 and fulfils the requirements of these standards.

1. The products were tested to be suitable for connection to 20 A branch circuit. The unit is approved for TN mains star connections and IT mains with 230 Vac phase to phase voltage
2. Output of the unit is separated from mains by reinforced insulation and rated SELV, hazardous energy level.
3. Disconnect device is end product consideration.
4. Safety Instructions: Built in product, safety instructions are end product considerations
5. The input and output terminals are suitable for factory and field wiring.
6. 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.
7. The transformers T101 & T401 provide reinforced insulation. These transformers are built up to fulfil the requirement of insulation class F and provide in addition a UR (OBJY2) insulation system (see also list of safety critical components).
8. The equipment has been evaluated for use in a Pollution Degree 2 and overvoltage category II environment and a maximum altitude of 3000 m.
9. A suitable Electrical and Fire enclosure shall be provided in the end equipment.
10. The product was evaluated for a maximum ambient of 60°C at full load and 70°C with derating (60°C to 70°C derate linearly to 75% load). Temperature test was performed in vertical orientation, 20 mm above bench without additional forced air.
11. 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.
2014-08-19	T223-0184/13	Initial report issued.	-
2016-03-04	T223-0042/16	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 and documentation (minor changes on the secondary side) was updated. Model name DRF240-24-1/xyz description was extended. No additional test were considered necessary.	1.0

Following mounting position was used during testing



Installation clearances:

40mm on top, 20mm on the bottom, A=5mm on the left and right side are recommended when loaded permanently with full power. In case the adjacent device is a heat source, A=15mm clearance is recommended.

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)