Test Report issued under the responsibility of:

TEST REPORT

IEC 60950-1

Information technology equipment – Safety – Part 1: General requirements

Report Number. .....:	**T223-0035/16**
Date of issue .....:	**2016-02-01**
Total number of pages.....	**191 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

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.
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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.....:	DRF120-24-1-xyz; DRF120-24-1/HL-xyz (Where x, y and z can be any alphanumeric character or blank and is non safety related information.) HL – designates model provided with coating.
Ratings .....:	Input: 100-240 Vac; 1,5 A; 50/60 Hz Output: 24-28 Vdc / 5-4,3 A; Max. output power: 120 W

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).....:		Branko Lamovšek	
☐	**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).....:			

List of Attachments:

1. Test Report (83 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 (34 pages)
6. Additional test performed by manufacturer request – Enclosure No. 4 (5 pages)

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
1.6.2 Input Test **1.7.11 Durability** **2.1.1.5 Energy Hazard Measurements** **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**	**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

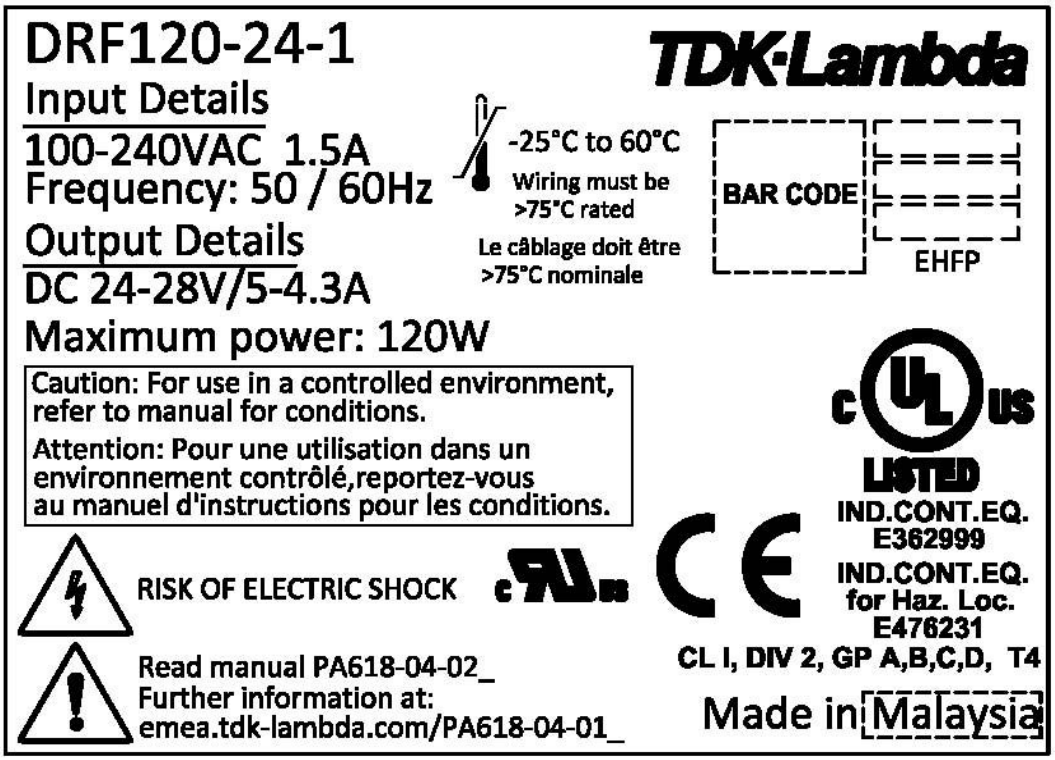
** No national differences to IEC 60950-1:2005 (2nd edition) + A1 + A2 or IEC 60950-1:2001 (1st edition) declared

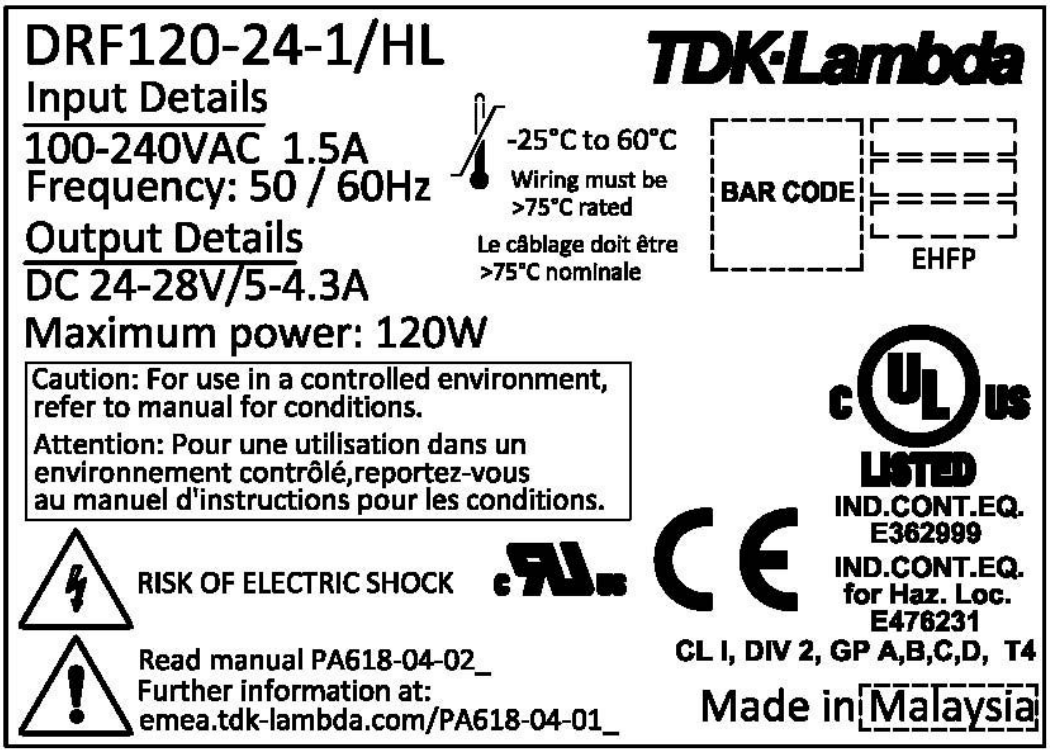
*** EU group differences

☒ **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.





Test item particulars ..... :	
Equipment mobility ..... :	[] movable [] hand-held [] transportable [] stationary [x] for building-in [] direct plug-in
Connection to the mains ..... :	[] pluggable equipment [] type A [] type B [] permanent connection [] detachable power supply cord [] non-detachable power supply cord [x] not directly connected to the mains
Operating condition ..... :	[x] continuous [] rated operating / resting time:
Access location ..... :	[] operator accessible [] restricted access location [x] service access area
Over voltage category (OVC) ..... :	[] OVC I [x] 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) ..... :	16 A (for Europe), 20 A (for Canada and US)
Pollution degree (PD) ..... :	[] PD 1 [x] PD 2 [] PD 3
IP protection class ..... :	IP20
Altitude during operation (m) ..... :	Up to 3000
Altitude of test laboratory (m) ..... :	300
Mass of equipment (kg) ..... :	Approx. 0,61

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 ..... :	2013-06-18
Date(s) of performance of tests ..... :	From 2013-06-21 to 2013-10-09

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.
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. 120 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 does not represents a hazardous energy level (< 240 VA).

Engineering Considerations:
Maximum operating ambient temperature:
60°C at 100% load (120 W)
70°C at 75% load (90 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 non hazardous energy level (< 240 VA).

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.

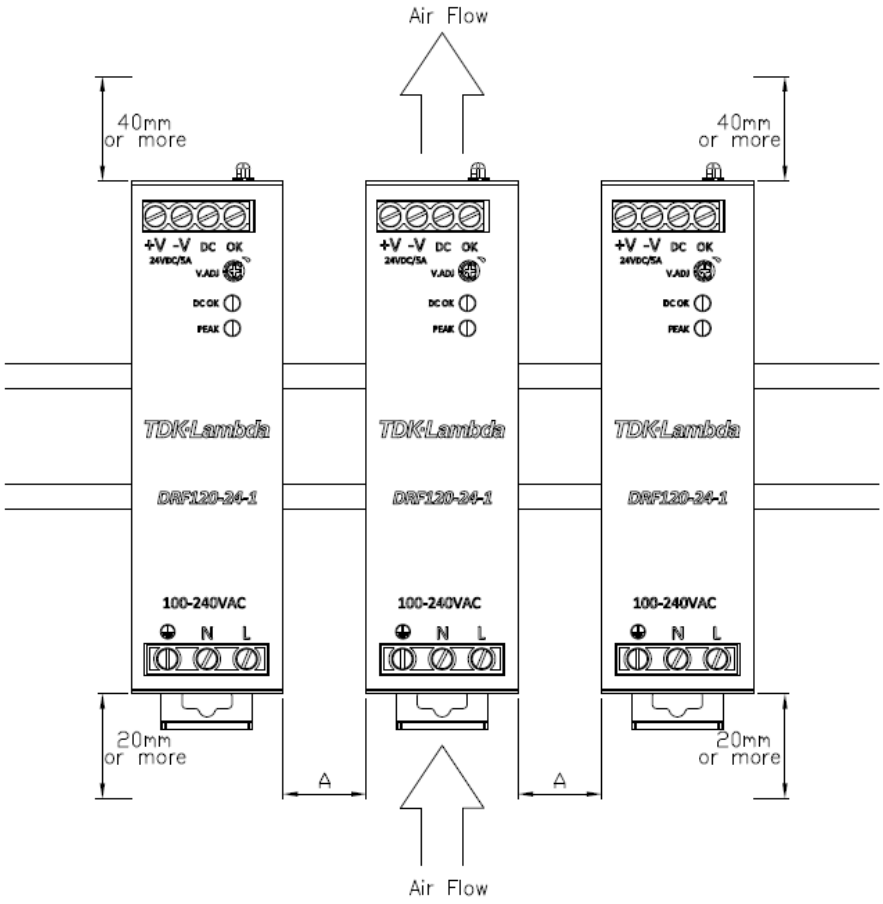
10. The product was evaluated for a maximum ambient of 60°C at full load and 70°C with derating (60°C to 70°C derate linearly to 75% load). Temperature test was performed in vertical orientation, 20 mm above bench without additional forced air.

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	T223-0425/13	Initial report issued.	-
2016-02-01	T223-0035/16	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. No additional tests 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)