
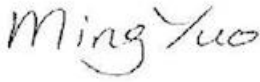




Test Report issued under the responsibility of:



TEST REPORT IEC 62368-1 Audio/video, information and communication technology equipment Part 1: Safety requirements	
Report Number	E252373-A6034-CB-1
Date of issue	2022-09-20
Total number of pages	80
Name of Testing Laboratory preparing the Report	UL International-Singapore Pte Ltd 20 Kian Teck Lane, Singapore 627854, Singapore
Applicant's name	TDK-LAMBDA SINGAPORE PTE LTD
Address	#06-01/08 1008 TOA PAYOH NORTH SINGAPORE 318996 SINGAPORE
Test specification:	
Standard	IEC 62368-1: 2018
Test procedure	CB Scheme
Non-standard test method	N/A
TRF template used	IECEE OD-2020-F1:2020, Ed.1.3
Test Report Form No.	IEC62368_1E
Test Report Form(s) Originator ...	UL(US)
Master TRF	Dated 2021-02-04
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General disclaimer:	
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The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.	

Test Item Description	Switching Power Supply	
Trade Mark(s)	<i>TDK-Lambda</i>	
Manufacturer	TDK-LAMBDA SINGAPORE PTE LTD #06-01/08 1008 TOA PAYOH NORTH SINGAPORE 318996 SINGAPORE	
Model/Type reference	DRB120-24-1wxyz, DRB120-24-1/Rywxyz, DRJ120-24-1wxyz, and DRJ120-24-1/Ewxyz where w,x,y,z are considered as non safety related information: w can be "-" or "/" or blank or any alphanumeric; x can be CO or CO2 or blank or any alphanumeric; y can be blank or any alphanumeric; z can be blank or any alphanumeric;	
Ratings	Input: 100-240 VAC, 1.5 A, 50/60 Hz. Output: 24-28 Vdc, 5-4.3A. Maximum power: 120W	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
<input checked="" type="checkbox"/> CB Testing Laboratory:		
Testing location/ address	UL International-Singapore Pte Ltd, 20 Kian Teck Lane, Singapore 627854, Singapore	
Tested by (name, function, signature)..... :	Zheng Yan Tan / Project Handler	
Approved by (name, function, signature) .. :	Ming Yuo Chai / Reviewer	
<input type="checkbox"/> Testing procedure: CTF Stage 1:		
Testing location/ address		
Tested by (name, function, signature)..... :		
Approved by (name, function, signature) .. :		
<input type="checkbox"/> Testing procedure: CTF Stage 2:		
Testing location/ address		
Tested by (name, function, signature)..... :		

Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) .. :			
<input type="checkbox"/>	Testing procedure: CTF Stage 3:		
<input type="checkbox"/>	Testing procedure: CTF Stage 4:		
Testing location/ address :			
Tested by (name, function, signature)..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) .. :			
Supervised by (name, function, signature) :			

List of Attachments (including a total number of pages in each attachment):

National Differences (28 pages)

Enclosures (33 pages)

Summary of testing:**Tests performed (name of test and test clause):**

4.4.3.2, T.3 – STEADY FORCE TEST, 30 N FOR SAFEGUARD THAT ACTS AS FIRE ENCLOSURE/BARRIER ONLY

4.4.3.8, T.8 – STRESS RELIEF TEST

5.2.2.1-5.2.2.6 – CLASSIFICATION OF ELECTRICAL ENERGY SOURCES

5.4.1.8 – DETERMINATION OF WORKING VOLTAGE

5.4.1.10.3 – BALL PRESSURE TEST

5.4.9.1 – ELECTRIC STRENGTH TEST – TYPE TESTING OF SOLID INSULATION

5.5.2.2 – CAPACITOR DISCHARGE AFTER DISCONNECTION OF A CONNECTOR

5.6.6.2 – RESISTANCE OF THE PROTECTIVE BONDING SYSTEM

5.7.4 – TOUCH VOLTAGE AND TOUCH CURRENT MEASUREMENT – UNEARTHED ACCESSIBLE PARTS

5.7.5 – TOUCH CURRENT MEASUREMENT – EARTHED ACCESSIBLE CONDUCTIVE PARTS – SINGLE-PHASE EQUIPMENT ON TN OR TT SYSTEM

B.2.5 – INPUT TEST: SINGLE PHASE

B.2.6, 5.4.1.4, 6.3, 9.3, B.1.5 – NORMAL OPERATING CONDITIONS TEMPERATURE MEASUREMENT

B.3 – SIMULATED ABNORMAL OPERATING CONDITIONS

B.4 – SIMULATED SINGLE FAULT CONDITIONS

Testing Location:**CBTL: UL International-Singapore Pte Ltd, 20 Kian Teck Lane, Singapore 627854, Singapore**

Conducted during CBTR Ref. No.: E252373-A6004-CB-1, issued date 2018-08-01, with CBTC No. DK-75411-UL, issued date 2018-08-02 investigation.

Conducted during CBTR Ref. No.: E252373-A6004-CB-1, issued date 2018-08-01, with CBTC No. DK-75411-UL, issued date 2018-08-02 investigation.

Conducted during CBTR Ref. No.: E252373-A6004-CB-1, issued date 2018-08-01, with CBTC No. DK-75411-UL, issued date 2018-08-02 investigation.

Conducted during CBTR Ref. No.: E252373-A6004-CB-1, issued date 2018-08-01, with CBTC No. DK-75411-UL, issued date 2018-08-02 investigation.

Conducted during CBTR Ref. No.: E252373-A6004-CB-1, issued date 2018-08-01, with CBTC No. DK-75411-UL, issued date 2018-08-02 investigation.

Conducted during CBTR Ref. No.: E252373-A6004-CB-1, issued date 2018-08-01, with CBTC No. DK-75411-UL, issued date 2018-08-02 investigation.

Conducted during CBTR Ref. No.: E252373-A6004-CB-1, issued date 2018-08-01, with CBTC No. DK-75411-UL, issued date 2018-08-02 investigation.

Conducted during CBTR Ref. No.: E252373-A6004-CB-1, issued date 2018-08-01, with CBTC No. DK-75411-UL, issued date 2018-08-02 investigation.

Conducted during CBTR Ref. No.: E252373-A6004-CB-1, issued date 2018-08-01, with CBTC No. DK-75411-UL, issued date 2018-08-02 investigation.

Conducted during CBTR Ref. No.: E252373-A6004-CB-1, issued date 2018-08-01, with CBTC No. DK-75411-UL, issued date 2018-08-02 investigation.

Conducted during CBTR Ref. No.: E252373-A6004-CB-1, issued date 2018-08-01, with CBTC No. DK-75411-UL, issued date 2018-08-02 investigation.

F.3.10 – TEST FOR THE PERMANENCE OF MARKINGS

Conducted during CBTR Ref. No.: E252373-A6004-CB-1, issued date 2018-08-01, with CBTC No. DK-75411-UL, issued date 2018-08-02 investigation.

G.5.3.3 – TRANSFORMER OVERLOAD

Conducted during CBTR Ref. No.: E252373-A6004-CB-1, issued date 2018-08-01, with CBTC No. DK-75411-UL, issued date 2018-08-02 investigation.

Summary of compliance with National Differences (List of countries addressed):

EU Group and National Differences, USA / Canada

The product fulfils the requirements of EN IEC 62368-1:2020+A11:2020, BS EN IEC 62368-1:2020+A11:2020

Additional Country Information:

Singapore (National Differences as provided on IECEE Website. TRF is included in Enclosure ID 07-04 of this test report),

United Kingdom (per customer's request shown separately)

Statement concerning the uncertainty of the measurement systems used for the tests

Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:

Procedure number, issue date and title:

Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

Statement not required by the standard used for type testing

(Note: When IEC or ISO standard requires a statement concerning the uncertainty of the measurement systems used for tests, this should be reported above. The informative text in parenthesis should be delete in both cases after selecting the applicable option)

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.

DRB120-24-1/xyz
 Input Details
 100-240VAC 1.5A
 Frequency: 50 / 60Hz
 Rated Output Details
 DC 24-28V/5-4.3A
 Peak Output Details*
 DC 24-28V/6-5.14A/Max 10sec.
 Maximum power: 120W

Caution: For use in a controlled environment, refer to manual for conditions. Wiring must be $\geq 105^{\circ}\text{C}$ rated.
 Attention: Pour une utilisation dans un environnement contrôlé, reportez-vous au manuel d'instructions pour les conditions. Le câblage doit être $\geq 105^{\circ}\text{C}$ nominale.

Warning / Avertissement
 Surrounding Air Temperature : 25°C to 70°C

RISK OF ELECTRIC SHOCK

*Read manual PA634-04-01, for details of derating curve, peak output, wire sizes, torque values and others information.
 Further information at: emea.tdk-lambda.com/PA634-04-01_

TDK-Lambda Germany GmbH
 Karl-Bold-Str. 40, 77855 Achern

TDK-Lambda UK Ltd,
 Kingsley Avenue, Ifracombe,
 Devon, EX34 8ES, United Kingdom

Made in China

DRB120-24-1/Ry-xyz
 Input Details
 100-240VAC 1.5A
 Frequency: 50 / 60Hz
 Rated Output Details
 DC 24-28V/5-4.3A
 Peak Output Details*
 DC 24-28V/6-5.14A/Max 10sec.
 Maximum power: 120W

Caution: For use in a controlled environment, refer to manual for conditions. Wiring must be $\geq 105^{\circ}\text{C}$ rated.
 Attention: Pour une utilisation dans un environnement contrôlé, reportez-vous au manuel d'instructions pour les conditions. Le câblage doit être $\geq 105^{\circ}\text{C}$ nominale.

Warning / Avertissement
 Surrounding Air Temperature : 25°C to 70°C

RISK OF ELECTRIC SHOCK

*Read manual PA634-04-01, for details of derating curve, peak output, wire sizes, torque values and others information.
 Further information at: emea.tdk-lambda.com/PA634-04-01_

TDK-Lambda Germany GmbH
 Karl-Bold-Str. 40, 77855 Achern

TDK-Lambda UK Ltd,
 Kingsley Avenue, Ifracombe,
 Devon, EX34 8ES, United Kingdom

Made in China

DRJ120-24-1/xyz
 Input Details
 100-240VAC 1.5A
 Frequency: 50 / 60Hz
 Rated Output Details
 DC 24-28V/5-4.3A
 Peak Output Details*
 DC 24-28V/6-5.14A/Max 10sec.
 Maximum power: 120W

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.

Warning / Avertissement
 Surrounding Air Temperature : 25°C to 70°C

WAIT FOR 1 MIN TO AVOID RISK OF ELECTRIC SHOCK

Wiring must be $\geq 105^{\circ}\text{C}$ rated
 Le câblage doit être $\geq 105^{\circ}\text{C}$ nominale

*Read manual PA637-04-01, for details of derating curve, peak output, wire sizes, torque values and others information

TUV SUD

Made in Malaysia

DRJ120-24-1/E-xyz
 Input Details
 100-240VAC 1.5A
 Frequency: 50 / 60Hz
 Rated Output Details
 DC 24-28V/5-4.3A
 Peak Output Details*
 DC 24-28V/6-5.14A/Max 10sec.
 Maximum power: 120W

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.

Warning / Avertissement
 Surrounding Air Temperature : 25°C to 70°C

WAIT FOR 1 MIN TO AVOID RISK OF ELECTRIC SHOCK

Wiring must be $\geq 105^{\circ}\text{C}$ rated
 Le câblage doit être $\geq 105^{\circ}\text{C}$ nominale

*Read manual PA637-04-01, for details of derating curve, peak output, wire sizes, torque values and others information

TUV SUD

Made in Malaysia

Note: The above markings are the minimum requirements required by the safety lab. For the final production samples, the additional markings which do not give rise to misunderstanding may be added.

Test item particulars:	
Product group	built-in component
Classification of use by	Ordinary person
Supply Connection	AC Mains
Supply tolerance	+ 10 % / - 15 %
Supply connection – type	Terminal Block for internal connection within end product
Considered current rating of protective device	16 A (for countries other than Canada and USA); 20 A (for Canada and USA); A; Location: building
Equipment mobility	for building-in
Over voltage category (OVC)	OVC II
Class of equipment	Class I
Special installation location	N/A
Pollution degree (PD)	PD 2
Manufacturer's specified Tma (°C)	Up to 70 °C, which depend on mounting direction and load factor. (See Enclosure ID 07-01 for details.)
IP protection class	IPX0
Power systems	TN IT - 230 (For Norway) V L-L
Altitude during operation (m)	3000 m
Altitude of test laboratory (m)	2000 m or less
Mass of equipment (kg)	0.45
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	2022-08-02
Date (s) of performance of tests	2022-09-13 to 2022-09-14
General remarks:	
<p>"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report.</p> <p>Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.</p>	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC60335-1:	

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 :	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> Not applicable
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When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) :	PANYU TRIO MICROTRONICS CO LTD SHIJI INDUSTRIAL ESTATE DONGYONG NANSHA GUANGZHOU GUANGDONG 511453 CHINA TDK-LAMBDA MALAYSIA SDN BHD LOT 2 & 3, BATU 9 3/4 KAWASAN PERINDUSTRIAN BANDAR BARU JAYA GADING 26070 KUANTAN PAHANG MALAYSIA TDK-LAMBDA MALAYSIA SDN BHD PLO33 KAWASAN PERINDUSTRIAN SENAI 81400 SENAI JOHOR MALAYSIA
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General product information and other remarks:

Product Description
 The product covered in this report is a building-in component switch-mode power supply (DIN rail type).

Model Differences
 Model DRB120-24-1/R Y:
 Identical to model DRB120-24-1 except for photo coupler (PC200) which interfacing external control circuit is replaced by photo MOS.

 Model DRJ120-24-1:
 Identical to model DRB120-24-1 except for Input and Output terminal blocks type, and Input Board and Output Board PCB trace design respectively.

 Model DRJ120-24-1/E:
 Identical to model DRB120-24-1 except for Input and Output terminal blocks type, and Input Board and Output Board PCB trace design respectively.

 Model / Input and Output PCB Drawing No. / Terminal Block Cat. No.
 DRB120-24-1/ SCB479A / Euro Type by DECA Switchlab.
 DRJ120-24-1/ SCB489A / Screw type by Emuden Corp.
 DRJ120-24-1/E / SCB488 / Screwless type by Tianli Electrical Machinery (NingBo) Co., Ltd.

Models with suffix, CO: Model with optional thin coating (QMJU2) on one side of PWB.

Models with suffix, CO2: Model with optional thin coating (QMJU2) on both sides of PWB.

Rating label designs are identical except for model name.

Additional Information

Rated output condition for testing:

Test load condition A: 24 Vdc, 5A.

Test load condition B: 28 Vdc, 4.3A.

Unless otherwise noted, all tests were conducted on model DRB120-24-1 as representative of all models in this report.

Manufacturer has simulated end-product loading condition to power supply 144 W for 10 seconds and resting time 18.6 seconds at 105.6 W, which equals total r.m.s. power 119.8 W. Refer Enclosure ID 07-03 for details.

This report is issued due to the following:

- standard upgrade IEC 62368-1:2018;
- additional alternate X-Capacitor (C3), Mfr: TDK (Zhuhai FTZ) Co., Ltd., Type: B3292, Mfr: PANASONIC CORPORATION, PANASONIC CORPORATION OF NORTH AMERICA, Type: ECQUA or ECQUL, Mfr: OKAYA ELECTRIC INDUSTRIES CO LTD, Type: LE or LE-xx series and Mfr: Eurotronic (SuZhou) Co. Ltd., Type: MPX2;
- removed alternate X-Capacitor (C3), Mfr: Eurotronic (Taiwan) Industrial Corp., Type: MPX2;
- additional alternate X-Capacitor (C6), Mfr: TDK (Zhuhai FTZ) Co., Ltd., Type: B3292, Mfr: PANASONIC CORPORATION, PANASONIC CORPORATION OF NORTH AMERICA, Type: ECQUA or ECQUL and Mfr: OKAYA ELECTRIC INDUSTRIES CO LTD, Type: LE or LE-xx series;
- additional alternate Y-Capacitor (C1, C2, C4, C5), Mfr: MURATA MFG CO LTD, Type: RA, Mfr: TDK CORPORATION, Type: CD and Mfr: WALSIN TECHNOLOGY CORP, Type: AH;

This test report is based from CBTR Ref. No.: E252373-A6004-CB-1, issued date 2018-08-01, with CBTC No. DK-75411-UL, issued date 2018-08-02.

Based on previously conducted testing and the review of the product construction, only limited test were deemed necessary.

Technical Considerations

- The product was submitted and evaluated for use at the maximum ambient temperature (T_{ma}) permitted by the manufacturer's specification of : Up to 70 °C, which depend on mounting direction and load factor. (See Enclosed Id. 7-01 for details.)
- The product is intended for use on the following power systems : IT, TN
- Considered current rating of protective device as part of the building installation (A) : 20
- Mains supply tolerance (%) or absolute mains supply : +10%/-15%
- The equipment disconnect device is considered to be : Provided in end product

Engineering Conditions of Acceptability

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
- The end-product Electric Strength Test is to be based upon a maximum working voltage of : 418 Vpk, 250 Vrms
- The following output circuits are at ES1 energy levels : Output
- The following output circuits are at PS3 energy levels : Output
- 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 (Chassis)
- The following end-product enclosures are required : 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) : T1, L3 (Class 155(F))
- Line to Line Capacitor (C3, C6) may have variation in capacitance up to 1.0 uF. Therefore, consideration shall be given in controlling the capacitance value in the end-product application with respect to capacitance discharge issue.
- Primary to Ground Capacitor (C1, C2) may have variations in capacitance up to 1000pF. Therefore, consideration shall be given in controlling the capacitance values in end product application with respect to touch Current issue.
- Primary to Ground Capacitor (C4, C7, C8) may have variations in capacitance up to 2200pF. Therefore, consideration shall be given in controlling the capacitance values in end product application with respect to touch Current issue.
- Humidity conditioning has been conducted by tropical condition.
- Classification of PIS has not been conducted. Therefore, all electrical components and conductors including printed wirings were assumed to be arcing/resistive PIS.
- This component has been evaluated in 'control of fire spread' method assuming appropriate fire enclosure is provided in end product. Unless the fire enclosure is made of non-combustible or V-0 material, the separation from the PIS shall be considered.
- Varistor was not tested overload per Annex G.8.2.2, end product shall consider the use of enclosure made by metal or keep a distance of minimum 13mm from Varistor when use of enclosure made of combustible material. Otherwise varistor shall additional perform overload test according to Annex G.8.2.2