Underwriters Laboratories (UL LLC)
Safety Certification Report

Model:	NV700 or NV7 or NV-700 (see model differences for details of NV700 range model configurations)
Device Description:	Switch Mode Power Supply
Applicant:	TDK-LAMBDA UK LTD KINGSLEY AVE ILFRACOMBE DEVON, EX34 8ES UNITED KINGDOM
Manufacturer:	Same as Applicant
Manufacturing Facility(ies):	Same as Applicant PANYU TRIO MICROTRONIC CO. LTD SHIJI INDUSTRIAL ESTATE DONGYONG NANSHA GUANGZHOU GUANGDONG, 511453 CHINA
Report No.:	E331788-D1008-1/A0/C0-UL
Report (Re)Issue Date:	2021-11-16
Base Standard(s):	UL 61010-1, 3rd Edition, May 11, 2012, Revised July 19, 2019, CAN/CSA-C22.2 No. 61010-1(2012-05), 3rd Edition, with revisions through 2018-11
Additional Standards:	-
Report Types:	This report consists of the following report types: [Yes] US Certification (UL Recognition) [Yes] CAN Certification (cUL Recognition)

This report covers the Safety evaluation of the referenced model(s) according to the standard(s) specified above.

Table of Contents

Report Modifications Summary

The following changes were made to this report. If none listed in the below table, this report is the originally issued report.

The following scheme is used throughout this report to reflect the **Report No.**:

(File No.) – (Report Ref. No.) – (x) / A(y) / C(z) – YYY, where:
(x) = Report (Re)Issue No.
(y) = Amendment No.
(z) = Correction No.
YYY = Report Type (UL/CB/IEC)

Date Modified *(Year-Month-Day)*	Modifications Made (include Report Reference Number)	Modified By
2021-11-16	This report is a reissue of CBTR Ref. No.: E331788-A15-CB-2, CB Test Certificate Ref. No. DK-48638-UL and E331788-A15-CB-2-Amendment-1, CB Test Certificate Ref. No. DK-48638-A1-UL. and CBTR Ref. No. E331788-A15-CB-2-Amendment-1, CB Test Certificate Ref. No.DK-48638-A1-UL. Within this reissue standards has been upgraded to the newest editions and the following changes have been made: - Standards were updated on critical omponent list - Components licenses were attached to the report - Capacitor Murata RA series and SA series with the same electrical ratings has been added as alternate to critical component list. No testing was considered necessary to make these changes. Based on the previously conducted testing and the review of product technical documentation including photos, schematics, wiring diagrams and similar, has been determined that the product continues to comply with the standard.	Marcin Zurek

Test Report issued under the responsibility of:

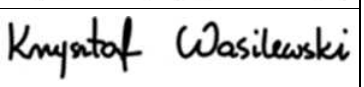
TEST REPORT IEC 61010-1 Safety requirements for electrical equipment for measurement, control, and laboratory use Part 1: General requirements	
Report Reference No. ..... :	E331788-D1008-1/A0/C0-UL
Date of issue ..... :	2021-11-16
Total number of pages ..... :	215
Testing Laboratory ..... :	UL International (UK) Ltd.
Address ..... :	Unit-1 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom
Applicant's name ..... :	TDK-LAMBDA UK LTD
Address ..... :	KINGSLEY AVE ILFRACOMBE DEVON, EX34 8ES UNITED KINGDOM
Test specification:	
Standard ..... :	IEC 61010-1:2010, IEC 61010-1:2010/AMD1:2016
Test procedure ..... :	UL Certification
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC61010_1P

General disclaimer:

The test results presented in this report relate only to the object tested.

This report shall not be reproduced, except in full, without the written approval of the Issuing UL testing laboratory. The authenticity of this Test Report and its contents can be verified by contacting UL.

Test item description:	Switch Mode Power Supply
Trade Mark:	TDK-Lambda
Manufacturer:	Same as Applicant
Model/Type reference:	NV700 or NV7 or NV-700 (see model differences for details of NV700 range model configurations)
Ratings:	100-240Vac nominal, (90-264Vac including tolerances). 47-440Hz, 11A rms Max. (see model differences for details of model ratings)

Testing procedure and testing location:		
[X] UL/DAP Testing Laboratory:		
Testing location/ address:	UL International (UK) Ltd. Unit-1 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom	
Tested by (name, function, signature):	Marcin Zurek. Project Handler	
Approved by (name, function, signature):	Krzysztof Wasilewski, reviewer	
[ ] Testing procedure: WMT:		
Testing location/ address:		
Tested by (name, function, signature):		
Approved by (name, function, signature):		

List of Attachments (including a total number of pages in each attachment): Refer to Appendix A of this report. All attachments are included within this report.
Summary of testing
Tests performed (name of test and test clause): Testing location: *Refer to the Test List in Appendix D of this report if testing was performed as part of this evaluation.*

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 owners of these marks.

Refer to the enclosure(s) titled Marking Label in the Enclosures section in Appendix A of this report for a copy.

Test item particulars :	
Type of item:	Laboratory
Description of equipment function:	Switch Mode Power Supply for building in.
Connection to mains supply:	None unless via the IEC60320 inlet.
Overvoltage category:	II
Pollution degree:	2
Means of protection:	Class I (PE connected)
Environmental conditions:	50°C ambient
For use in wet locations:	No
Equipment mobility:	Built-in
Operating conditions:	continuous
Overall size of equipment (W x D x H)	280 x 125 x 41mm Max.
Mass of equipment (kg):	2kg Max.
Marked degree of protection to IEC 60529:	N/A
Testing	
Date of receipt of test item(s) .....:	2013-06-24, 2014-05-21 to 2014-10-02, 2017-11-20
Dates tests performed.....:	2013-07-05 to 2013-07-08, 2014-06-03 to 2015-05-05, 2017-11-20
Possible test case verdicts:	
- test case does not apply to the test object .....:	N/A
- test object does meet the requirement .....:	Pass (P)
- test object was not evaluated for the requirement.....:	N/E
- test object does not meet the requirement.....:	Fail (F)
Abbreviations used in the report:	
- normal condition: N.C.	- single fault condition: S.F.C.

General remarks:

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Throughout this report a point is used as the decimal separator.

GENERAL PRODUCT INFORMATION:

Report Summary

All applicable tests according to the referenced standard(s) have been carried out.

Refer to the Report Modifications for any modifications made to this report.

Product Description

NV700 or NV-700 series. Switch mode power supplies for building into end equipment. (See model differences for details of model configurations)
This product range is available as a forced air cooled version (in-built fan) with screw terminal connections or an IEC 60320 inlet. It is also available as a customer air cooled version where the end cap is not fitted and the customer must provide an air flow and measure appropriate temperatures of components within the product.

Model Differences

NV700 models as described below:

Units may be marked with a Product Code: K7x or NV7x where x may be up to any six letters and/or numbers 0 to 9.

Unit Configuration (Description:) Code may be prefixed by NS # followed by / or - (where # may be any characters indicating non-safety related model differences).

Unit Configuration (Description :) Code:

a) NV-700x or NV7x (these models are identical)

where x = H for high hold-up or blank for standard hold-up

b) followed by: S, C or U

where S = Forward airflow, standard fan
C = Customer air, fan not fitted
U = Customer air, fan not fitted, cover not fitted

c) followed by: S or I

where S = Screw input terminals
I = IEC input

d) followed by: S, M, L, R, or T

where S = Standard Leakage (Class B Filter)
M = Medium Leakage
L = Low Leakage
R = Reduced Leakage
T = Tiny Leakage

Unit configuration may be given using the above code and/or by the option description. The input terminal type (screw or IEC) may alternatively be determined by examination of the unit.

e) optionally followed by: EN#V, EN*V, IN#V, IN*V, ES#V, ES*V, IS#V, IS*V.

where EN#V = AC good, global module good, PSU enable, 5-5.5V, 2A standby output
EN*V = AC good, global module good, PSU enable, 12-13.5V, 1A standby output
IN#V = AC good, global module good, PSU inhibit, 5-5.5V, 2A standby output
IN*V = AC good, global module good, PSU inhibit, 12-13.5V, 1A standby output
ES#V = AC good, PSU enable, 5-5.5V, 2A standby output
ES*V = AC good, PSU enable, 12-13.5V, 1A standby output
IS#V = AC good, PSU inhibit, 5-5.5V, 2A standby output
IS*V = AC good, PSU inhibit, 12-13.5V, 1A standby output

where # represents the standby output voltage and is in the range 5 to 5.5V
where * represents the standby output voltage and is in the range 12-13.5V

The Global Options Inhibit and Enable functions permit the customer to turn off or on the main psu outputs and the fan. The standby supply is for use by the customer and provides an SELV output that continues to operate when all the main psu outputs have been turned off using the Inhibit or Enable functions. All the functions of the Global Option pass through a single 8 way PWB socket and are all rated SELV.

Modules:
Up to 4 of the following modules types may be fitted:

@B
or @C
or @CM
or @BH

where @ is the output voltage of the module and is within the range given in the single output module table.

or @/#DB or @_#DB

where @ is the output voltage of channel 1 and # is the output voltage of channel 2 of the module. Voltages are within the range given in the DB module tables.

or @/#DA or @_#DA

where @ is the output voltage of channel 1 and # is the output voltage of channel 2 of the module. Voltages are within the range given in the DA module tables. Only 1 DA module may be fitted.

or B/S or B_S

where B/S or B_S indicates that a blanking plate is fitted in place of a module.

The following nomenclature may optionally be used for outputs connected in series:
(Note that outputs may be connected in series even when this nomenclature is not used)

@BB or @ BHB or @BBH or @BHBH or @CC or @CCM

where @ is the total voltage of any two B, BH, C or CM modules connected in series.

or @/#BDB or @_#BDB or @BHDB

where @ is the total series voltage of any B or BH module and DB module channel 1. # is the output voltage of the DB module channel 2. Voltages for # are within the range given in the DB module tables.

or @HDB

where @ is the total series voltage of any DB module channel 1 and channel 2.

For all outputs connected in series:
Permissible min. value for @ is given by summing the min. voltage ratings of the outputs connected in series.
Permissible max. value for @ is given by summing the max. voltage ratings of the outputs connected in series.

Custom Models:

Model: NV-700 RSS IN5V 12BH 12BH
Maximum outputs: 12.5V, 20A; 12.5V, 20A (total power 500W max.)
Maximum ambient: 65°C with 2.5%/°C derating of total power and module current above 50°C
Orientations: Horizontal with chassis lowest, on either side or vertical with the airflow upwards.
Comments: PSU has reverse air.

Model: NV-700 CSS ES5V 12C (NV722DCC and NV7Y019T)
Maximum output: 12V, 37.5A (peak power rating as given in electrical and thermal ratings section on following page)
Maximum ambient: 65°C with 2.5%/°C derating of total power and module current above 50°C
Orientations: Horizontal with chassis lowest, on either side or vertical with the airflow upwards.

Maximum operating altitude: 5000m

Output Interface Assembly:

One of the following output interface assemblies may optionally be fitted:

Wxxx

where xxx is a number between 001 and 999. These assemblies attach to the module output(s) and contain circuitry providing one or more of the following: current sharing, reduced current limit, fusing, sequencing, diode or-ing, module good, filtering, connectors or terminal blocks for outputs or signaling purposes, indicator lamps or LEDs.

Documentation to be made available to the customer detailing ratings of all assembly outputs.

ELECTRICAL AND THERMAL RATINGS

Nominal Input Voltage 100 - 240 Vac
Input Voltage Range 90 - 264 Vac #
Input Frequency Range 47 - 440 Hz
Maximum Input Current 11 A rms

Subject to limitations, see table below.

Code	Cooling Option	Input Voltage) Range (Vac)	Total output power (W)	Maximum ambient (°C)	Derating
S	Forward airflow standard fan	90 - 99.9	700W continuous (850W peak if 700W average #)	65 above 45°C	2.5% per °C
S	Forward airflow standard fan	100 - 149.9	700W continuous (850W peak if 700W average #)	65 above 50°C	2.5% per °C
S	Forward airflow standard fan	150 - 264	1150W continuous (1450W peak if 1150W average #)	65 above 45°C	2.5% per °C
C, U	Customer air fan not fitted	Refer to Customer Air Cooling section for details			

Global Option standby outputs (12-13.5V at 1A or 5-5.5V at 2A) should not be included when calculating total PSU output power.
The total output power, module output currents and Global Option output currents are derated by the given value.
The PSU may output the given peak power for up to 10 seconds providing that the average power from the PSU does not exceed the stated value.

Global Options with output voltages between 5.01 and 5.5V have their max. output current linearly derated from 2A at 50°C ambient to 1.4A at 65°C ambient.

Permitted orientations: Horizontal with chassis lowest, on either side or vertical with the airflow upwards.

Single Output Modules:

Module	Nominal Voltage (V)	Voltage Range (V) #	Max. Current

B	3.3	3.135 - 3.6	40A
	5	4.75 - 5.5	4.75 - 5.0V: 40A
			5.0 - 5.5V: Linearly derate from 40 to 36A
	8	7 - 9	7 - 8V: 22.5A
			8 - 9V: Linearly derate from 22.5 to 20A
	12	12 - 15.5	12 - 12.5V: 19.5A
			12.5 - 15.5V: Linearly derate from 19.5 to 15A
	24	24 - 28	24V: 10A
			24 - 28V: Linearly derate from 10 to 8A
BH	12	12 - 15.5	12 - 12.5V: 20A
			12.5 - 15.5V: Linearly derate from 20 to 15.5A
	24	24 - 28	24V: 10A
			24 - 28V: Linearly derate from 10 to 8.5A
C & CM	12	12 - 13.2	12V: 37.5A. Derated to 450W above 12V
	16	15 - 17.6	15 - 16V: 28.12A. Derated to 450W above 16V
	24	24 - 26.4	24V: 18.75A. Derated to 450W above 24V
	30	27 - 32	27V: 16.67A. Derated to 450W above 27V

C & CM modules may output up to 600W for up to 10 seconds providing that the average power from the module does not exceed 450W.

Dual Output Modules:

Dual Output Modules, Output 1

Module	Nominal Voltage (V)	Voltage Range (V) #	Max. Current
DA	12	12.25	3A
DB	3.3	3.135 - 3.6	25A
	5	4.75 - 5.5	25A
	6	5.5 - 6.5	25A
	12	12 - 15.5	12 - 12.5V: 13A
			12.5 - 15.5V: Linearly derate from 13 to 10A
	24	24 - 28	24 - 25V: 7A
			25 - 28V: Linearly derate from 7 to 6A

Dual Output Modules, Output 2

Module	Nominal Voltage (V)	Voltage Range (V) #	Max. Current(A)	Max. Power(W)
DA	12	(-)11.6 - (-)11.9	1	11.9
DB	5	3.3 - 6	10	60
	12	7 - 15.5	5	60
	24	24 - 32	2	50

Voltage measured at the module power terminals. This voltage must not be exceeded when remote sense is used.
DB modules with 6V nominal channel 1 derated as follows:
Ch.1 : 5.5 - 6V Ch.1 + Ch.2 : 195W total.
Ch.1 : 6.01 - 6.5V Ch.1 + Ch.2 : 170W total.

The DB module may be used with output 1 up to 24V at 8.3A and output 2 up to 16V at 3.13A provided the ambient temperature does not exceed 42°C.

SELV and Outputs Connected In Series:

All individual outputs are SELV. Outputs connected in series are non-SELV if the total output voltage + 30%