



Test Report issued under
the responsibility of:



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

Report Reference No : E135494-A86-CB-2
Date of issue : 2015-03-26
Total number of pages : 25

CB Testing Laboratory : UL VS Limited
Address : Unit 3 Horizon, Kingsland Business Park, Wade Road, RG24 8AH
Basingstoke UNITED KINGDOM

Applicant's name : TDK-LAMBDA UK LTD
KINGSLEY AVE
Address : ILFRACOMBE
DEVON
EX34 8ES UNITED KINGDOM

Test specification:
Standard : IEC 60950-1:2005 (Second Edition); Am1:2009 + Am2:2013
Test procedure : CB Scheme
Non-standard test method : N/A

Test Report Form No. : IEC60950_1F
Test Report Form originator : SGS Fimko Ltd
Master TRF : Dated 2014-02

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Test item description	Switch Mode Power Supply
Trade Mark	TDK-Lambda 
Manufacturer	TDK-LAMBDA UK LTD KINGSLEY AVE ILFRACOMBE DEVON EX34 8ES UNITED KINGDOM
Model/Type reference	NV300 or NV-300 Series (NVx-abcde-f-g-ijk) (See model differences for details of models and nomenclature).
Ratings	100-240Vac nom, 5Arms max, 45-440Hz. 133-318Vdc nom, 3.8Adc. (See model differences for details of ratings)

Testing procedure and testing location:	
<input type="checkbox"/> CB Testing Laboratory	Testing location / address
<input type="checkbox"/> Associated CB Test Laboratory	Testing location / address
	Tested by (name + signature)
	Approved by (name + signature).....
<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 checked="" type="checkbox"/> Testing Procedure: SMT/CTF Stage 3 or 4	Testing location / address: TDK-LAMBDA UK LTD, KINGSLEY AVE, ILFRACOMBE, DEVON, EX34 8ES UNITED KINGDOM
	Tested by (name + signature): Nick Marsh 
	Approved by (name + signature).....: Kevin Tizzard 
	Supervised by (name + signature) .: David Snook 
<input type="checkbox"/> Testing Procedure: RMT	Testing location / address
	Tested by (name + signature)
	Approved by (name + signature).....
	Supervised by (name + signature) .:

List of Attachments	
National Differences (0 pages)	
Enclosures (60 pages)	
Summary Of Testing	
Unless otherwise indicated, all tests were conducted at TDK-LAMBDA UK LTD, KINGSLEY AVE, ILFRACOMBE, DEVON, EX34 8ES UNITED KINGDOM.	
Tests performed (name of test and test clause)	Testing location / Comments

General Guidelines

Heating (4.5.1, 1.4.12, 1.4.13)

Summary of Compliance with National Differences:





Countries outside the CB Scheme membership may also accept this report.

List of countries addressed: AR, AT, AU, BE, BG, BY, CA, CH, CN, CS, CZ, DE, DK, ES, EU, FI, FR, GB, GR, HU, IE, IL, IN, IT, JP, KR, MY, NL, NO, NZ, PL, PT, RO, SA, SE, SI, SK, UA, US, ZA

The product fulfills the requirements of: EN 60950-1:2006 /A11:2009 /A1:2010 /A12:2011 /A2:2013, CSA C22.2 No. 60950-1-07 + 2nd Edition 2014-10

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.

T T~ N   INPUT: 100-240 Vac nom. 45-440Hz (for IEC/EN/UL/CS A60950-1) 100-240Vac nom. 45-63Hz (for IEC/EN/UL/CS A60601-1) 5A rms max.	22-Jul-14 Made in the UK										
TDK-Lambda NV-300 www.emea.tdk-lambda.com Product Code : NVA30114H Serial Number : 8142020153 Description : NVA3-4G5FHFH-C Customer Data :											
											
<table border="1"> <tr> <td>CH 1</td> <td>24V_12.5A</td> </tr> <tr> <td>CH 2</td> <td>5V_8A</td> </tr> <tr> <td>CH 3</td> <td>15V_8A</td> </tr> <tr> <td>CH 4</td> <td>-15V_2A</td> </tr> <tr> <td>AUX</td> <td></td> </tr> </table>	CH 1	24V_12.5A	CH 2	5V_8A	CH 3	15V_8A	CH 4	-15V_2A	AUX		Refer to www.emea.tdk-lambda.com for installation manual. For Test Certificate: Refer to http://testcert.emea.tdk-lambda.com pat: uk.tdk-lambda.com/patents
CH 1	24V_12.5A										
CH 2	5V_8A										
CH 3	15V_8A										
CH 4	-15V_2A										
AUX											
 8142020153											

Test item particulars :	
Equipment mobility	for building-in
Connection to the mains	Connection to the mains via host equipment
Operating condition	continuous
Access location	for building-in
Over voltage category (OVC)	OVC II
Mains supply tolerance (%) or absolute mains supply values	+10%, -10% (AC) 120-350Vdc absolute values.
Tested for IT power systems	No
IT testing, phase-phase voltage (V)	no
Class of equipment	Class I (earthed)
Considered current rating of protective device as part of the building installation (A)	20A
Pollution degree (PD)	PD 2
IP protection class	IP X0
Altitude of operation (m)	4000m
Altitude of test laboratory (m)	64m
Mass of equipment (kg)	1kg maximum
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(s) of receipt of test item	2014-11-05
Date(s) of Performance of tests	2015-11-25
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 point is used as the decimal separator.</p>	
Manufacturer's Declaration per Sub Clause 4.2.5 of IEC60950-1:	
Yes	
<p>The application for obtaining a CB Test Certificate includes more than one factory 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</p> <p>When differences exist, they shall be identified in the General Product Information section.</p>	
Name and address of Factory(ies):	TDK-LAMBDA UK LTD KINGSLEY AVE ILFRACOMBE DEVON EX34 8ES UNITED KINGDOM

PANYU TRIO MICROTRONIC CO. LTD
SHIJI INDUSTRIAL ESTATE
DONGYONG
NANSHA
GUANGZHOU GUANGDONG CHINA

GENERAL PRODUCT INFORMATION:

Report Summary

The original report was modified on 2016-01-05 to include the following changes/additions:
Amendment to cover non standard use of reverse air, 8.2Vdc fixed speed fan (Y30006A), updated handbook, updated licenses and addition of alternative components to the CCL.
This report should be read in conjunction with CBTR Ref. No. E135494-CB-2, CB Test Certificate Ref. No. DK-44380-UL. Based on previously conducted testing and the review of product construction, only heating tests were deemed necessary

Product Description

NV300 or NV-300 series. Switch mode power supplies for building into end equipment.

Model Differences

Input Parameters:

NOMINAL INPUT VOLTAGE RANGE	100 - 240V AC. 133 - 318Vdc.
MAXIMUM INPUT VOLTAGE RANGE	90 - 264V AC. 120 - 350Vdc.
INPUT FREQUENCY	45- 440Hz MAXIMUM *. dc.
MAXIMUM INPUT CURRENT	5Aac rms 3.8Adc
INRUSH CURRENT	<15A AT 25°C

All ratings apply for ambient temperatures up to 50°C. From 50°C to 65°C the total output power and the module current ratings are both derated at 2.5% per deg C.

Output Parameters

NV300 or NV-300 models as described below:

Unit Configuration Code:

NVx-abcde-f-g-ijk

(may be prefixed by NS - # / or - where # may be up to any four letters and may be followed by -\$ where \$ may be any number between 000 to 999, indicating non safety related model differences)

where:

-	=	can be blank
x	=	A3 for 300 or -300 or blank
a	=	Number of Outputs : 1, 2, 3 or 4 or blank
b	=	Channel 1 Output Voltage†: 5, T or G or blank
c	=	Channel 2 Output Voltage†: 1, 2, 2H 3, 3H, 5, 5H, T, F or 0 or blank
d	=	Channel 3 Output Voltage†: T, F, TH, FH, G or 0 or blank
e	=	Channel 4 Output Voltage†: 3H, 5H, T, F, TH, FH, 0H (fan only channel 4 output)
		followed by P for positive output or 0 or blank
f	=	Global Option : N3 for 5V version with ATX compatibility, N4 for 12V version with ATX, N5 for 13.5V version ATX compatibility or blank for no Global Option present
g	=	U for U chassis, C for U chassis and cover, F for U chassis and cover with fan, I for U

chassis and cover with fan and IEC inlet or blank for Open Frame

ijk = Three numbers from 0 to 9 which denotes various output voltages and currents within the specified ranges of each output for a particular unit or blank for standard output settings

Output Voltage Cross Reference

Designation	Output Voltage
0	Omit output
A	1.5
1	1.8
B	2
2	2.7
3	3.3
5	5
7	7
T	12
F	15
G	24

All channels are adjustable except for Channel 4 and Global Options in accordance with the following table:

O/P Channel	Designation	Vout (V)	Range (V)	I out (A)	Max Power (W)
CH1	5	5	5 - 5.5	40A	200
	T	12	12 - 13.2	25A	300
	G	24	24 - 28.5	12.5A	300
CH2 (CH1 5V)	1	1.8	0.9 - 2.5	15A	37.5
	2	2.7	2.5 - 3.8	15A	50
	2H	2.7	2.5 - 3.8	24A	80
	3	3.3	2.5 - 3.8	15A	50
	3H	3.3	2.5 - 3.8	24A	80
CH2 (CH1 12V)	5	5	3.3 - 5.5	10A	50
	5H	5	3.3 - 5.5	16A	80
CH2 (CH1 24V)	5	5	5 - 5.5	8A	40
	5H	5	5 - 5.5	12.5A	62.5
	T	12	12 - 15.5	10A	150
CH3	F	15	12 - 15.5	10A	150
	T	12	12 - 15	5A	60
	F	15	12 - 15	5A	60
	TH	12	12 - 15	8A	96
	FH	15	12 - 15	8A	96
CH4	G	24	18 - 24.5	2.5A	60
	3H	+/-3.3	Fixed	2A	6.6
	5H	+/-5	Fixed	2A	10
	T	+/-12	Fixed	1A	12
	F	+/-15	Fixed	1A	15
	TH	+/-12	Fixed	2A	24
	FH	+/-15	Fixed	2A	30
CH4 (fan output)	OH	-	-	-	-
Global Option	N3	5 (ATX)	Fixed	2A	10
	N4	12-13.5* (ATX)	Fixed	1A	12-13.5
	N5	12-13.5* (ATX)	Fixed	1A	12-13.5

*12-13.5 is the range. Nomenclature kept for legacy purposes.

Variations and limitations of use:

Maximum 300W power output. With 180Vac and greater input voltage, output power 300W plus global option (max 313.5W)

Channels 1 and 2 combined output currents must not exceed 40A.

Channel 1 with G output, 25V max with 5V channel 2 fitted.

Additional variations and limitations of use for fan version with 5V channel 1:

Output power de-rated 3W per volt from 100Vac to 90Vac (at 90Vac input, 270W output)

Unit with global option, high current channel 2 de-rated to 21A

Unit without global option, high current channel 2 de-rated to 19A

Unit without global option, low current channel 2 de-rated to 13A

Additional variations and limitations of use for all fan version:

Channel 4 3H, 5H, TH and FH max output current 1.5A.

The products listed in the following table are typical examples:

Model	CH1	CH2	CH3	CH4	Global Option
NVA3-453FFH	5V/40A	3.3V/15A	15V/5A	-15V/2A	-
NVA3-453HFHFH					
-N3	5V/40A	3.3V/24A	15V/8A	-15V/2A	5V/2A
NVA3-4GFGT-N5	24V/12.5A	15V/10A	24V/2.5A	-12V/1A	13.5V/1A

Output Limitations

All outputs are SELV.

All outputs have functional spacings to earth, and due consideration must be given to this in the end product design.

Adjusting output voltage beyond the stated range may cause overvoltage protection (OVP) to operate. To reset for normal operation simply adjust the potentiometer to reduce the output voltage to within its range or cycle the input off then on if the unit has latched off after adjusting the potentiometer.

Seriesing of outputs are not allowed.

Products may additionally be marked with NV3xxxxx or Y3xxxxx where x can be any letter or number between 0 and 9 indicating non-safety related model differences.

Custom models:

Model: NVA3 4G5HFHFH-N3-I (Y30006#, where # can be any character except A)

Maximum outputs: CH1: 24V, 6A. CH2: 5V, 6A. CH3:15V, 3A. CH4: 15V, 0.5A.

Maximum ambient: 50°C

Orientation: Horizontal

Comments: Reverse air

Model: NVA3 4G5HFHFH-N3-I (Y30006A)

Maximum outputs: CH1: 24V, 6A. CH2: 5V, 6A. CH3:15V, 3A. CH4: 15V, 0.5A.

Maximum ambient: 40°C

Orientation: Horizontal

Comments: Reverse air, fixed speed fan: 8.2Vdc

Additional Information

This report is an amendment to CBTR ref No: E135494-A86-CB-2 dated 2015-03-26 including amendments and corrections with CB Test Certificate Ref. No. DK-44380-UL dated 2015-03-26. 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. Only the

tests listed below were deemed necessary, including the following changes/additions:

Non-standard reverse air, fixed speed 8.2Vdc thermal test. (Y30006A)
Updated handbook
Updated licenses
Addition of alternative components to the CCL

Technical Considerations

- The product was submitted and evaluated for use at the maximum ambient temperature (T_{ma}) permitted by the manufacturer's specification of: 50°C (full load); 65° (output power decreasing linearly by 2.5%/°C above 50°C. --
- The product is intended for use on the following power systems: DC mains supply, TN. --
- The product was investigated to the following additional standards: EN 60950-1:2006 /A11:2009 /A1:2010 /A12:2011 /A2:2013, CSA C22.2 No. 60950-1-07 2nd Edition, 2014-10 (which includes all European national differences, including those specified in this test report). --
- 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 equipment disconnect device is considered to be: provided by the end equipment. --
- Multilayer PWB's accepted under CBTR Ref. No. E349607-A23 dated 2014-07-31 and letter report, Enclosure 7-02 of this report. --

Engineering Conditions of Acceptability

When installed in an end-product, consideration must be given to the following:

- The following Production-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: 422Vrms, 676Vpk , Primary-Earthed Dead Metal: 391Vrms, 426Vpk --
- The following secondary output circuits are SELV: All. --
- The following secondary output circuits are at hazardous energy levels: CH1. --
- The following secondary output circuits are at non-hazardous energy levels: CH2, CH3 and CH4 and option. --
- The power supply terminals and/or connectors are: Not investigated for field wiring --
- 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 magnetic devices (e.g. transformers or inductor) are provided with an OBJY2 insulation system with the indicated rating greater than Class A (105°C): TX2, TX4, TX701 (class F) all OBJY3. --
- The following end-product enclosures are required: Mechanical, Fire, Electrical --
- The following components require special consideration during end-product Thermal (Heating) tests due to the indicated maximum temperature measurements during component-level testing: Models without a fan require component temperatures monitored as detailed in the handbook/user manual.

(cooling for units with customer air, open frame , U and C options)., --

- Fans: The fan provided in this sub-assembly is provided with a fan guard to reduce the risk of operator contact with the stator., The fan provided in this sub-assembly is not intended for operator access. --

Abbreviations used in the report:

- normal condition	N.C.	- single fault condition	S.F.C
- operational insulation	OP	- basic insulation	BI
- basic insulation between parts of opposite polarity:	BOP	- supplementary insulation	SI
- double insulation	DI	- reinforced insulation	RI

Indicate used abbreviations (if any)