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 .....:	E135494-A6069-CB-1
Date of issue .....:	2023-01-16 ; Amendment 1 : 2024-08-28
Total number of pages.....:	114
Name of Testing Laboratory preparing the Report.....:	UL VS Limited
Applicant's name.....:	**TDK-LAMBDA UK LTD**
Address .....:	**KINGSLEY AVE** **ILFRACOMBE** **EX34 8ES UNITED KINGDOM**
Test specification:	
Standard .....:	IEC 62368-1: 2018
Test procedure.....:	CB Scheme
Non-standard test method.....:	N/A
TRF template used .....:	IECEE OD-2020-F1:2021, Ed.1.4
Test Report Form No.....:	IEC62368_1E
Test Report Form(s) Originator...:	UL(US)
Master TRF .....:	Dated 2022-04-14

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.

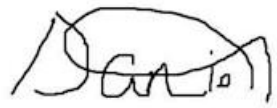
This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory.
The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test Item description :	Power Supply
Trade Mark(s) .....:	TDK-Lambda
Manufacturer.....:	TDK-LAMBDA UK LTD KINGSLEY AVE ILFRACOMBE EX34 8ES UNITED KINGDOM
Model/Type reference .....:	(Standard model) NV350 or NV3 or NV-350 series (May be prefixed by NS - # / or - where # may be any characters indicating non safety related model differences) followed by abcde. See report Model Differences for details). (Non-Standard model) K300yy#, X00004# (where yy can be 45A, 45B, 52X, 68X. Where # can be any letter denoting non-safety related changes, e.g. extra labels on the unit. See report Model Differences for details).
Ratings .....:	100-240 Vac nominal, 47-440 Hz, 5.5 A rms max.

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☐ **CB Testing Laboratory:**		
Testing location/ address .....:		
Tested by (name, function, signature).....:		
Approved by (name, function, signature) ..:		
☐ **Testing procedure: CTF Stage 1:**		
Testing location/ address .....:		
Tested by (name, function, signature).....:		
Approved by (name, function, signature) ..:		
☐ **Testing procedure: CTF Stage 2:**		
Testing location/ address .....:		
Tested by (name, function, signature).....:		
Witnessed by (name, function, signature) .:		

Approved by (name, function, signature) .. :			
☒	**Testing procedure: CTF Stage 3:**		
☐	**Testing procedure: CTF Stage 4:**		
Testing location/ address ..... :		TDK-LAMBDA UK LTD KINGSLEY AVE ILFRACOMBE EX34 8ES UNITED KINGDOM	
Tested by (name, function, signature)..... :		Mark Gisbey / Tester	
Witnessed by (name, function, signature) . :		Mark John De Sagun / Witness Engineer	See GPI for details
Approved by (name, function, signature) .. :		Mark John De Sagun / Reviewer	
Supervised by (name, function, signature) :		Daniel Wong / Handler	

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

National Differences (0 pages)
Enclosures (3 pages)

Summary of testing:

Tests performed (name of test and test clause):	**Testing Location:**
5.4.9.1 – ELECTRIC STRENGTH TEST – TYPE TESTING OF SOLID INSULATION 5.7.5 – TOUCH CURRENT MEASUREMENT – EARTHED ACCESSIBLE CONDUCTIVE PARTS – SINGLE-PHASE EQUIPMENT ON TN OR TT SYSTEM B.2.6, 5.4.1.4, 6.3, 9.3, B.1.5 – NORMAL OPERATING CONDITIONS TEMPERATURE MEASUREMENT B.4 – SIMULATED SINGLE FAULT CONDITIONS G.5.4.6.3 – ALTERNATIVE LOCKED-ROTOR OVERLOAD TEST FOR DC MOTORS	**Unless otherwise noted, test are all conducted in** **CTF Stage 3: TDK-LAMBDA UK LTD** **KINGSLEY AVE** **ILFRACOMBE** **EX34 8ES UNITED KINGDOM**

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

Australia - AU, New Zealand - NZ, EU Group Differences, United States of America - US, Canada - CA

BS EN IEC 62368-1:2020 + A11:2020 United Kingdom (per customer's request shown separately)

☒ **The product fulfils the requirements of** CSA/UL 62368-1:2019
EN IEC 62368-1:2020+A11:2020,
AS/NZS 62368.1:2018

Use of uncertainty of measurement for decisions on conformity (decision rule) :

☒ No decision rule is specified by the IEC standard, when comparing the measurement result with the applicable limit according to the specification in that standard. The decisions on conformity are made without applying the measurement uncertainty ("simple acceptance" decision rule, previously known as "accuracy method").

☐ Other:… (to be specified, for example when required by the standard or client, or if national accreditation requirements apply)

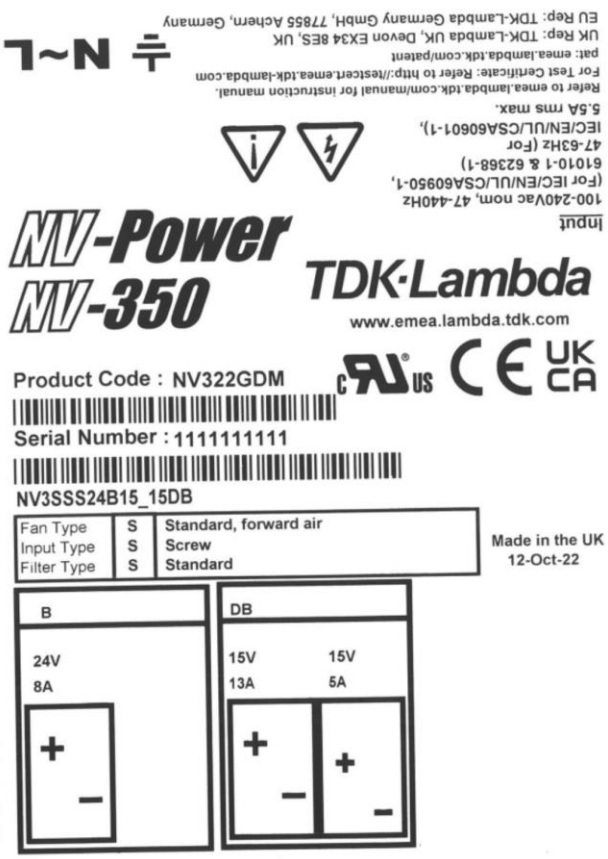
Information on uncertainty of measurement:
The uncertainties of measurement are calculated by the laboratory based on application of criteria given by OD-5014 for test equipment and application of test methods, decision sheets and operational procedures of IECEE.

IEC Guide 115 provides guidance on the application of measurement uncertainty principles and applying the decision rule when reporting test results within IECEE scheme, noting that the reporting of the measurement uncertainty for measurements is not necessary unless required by the test standard or customer.

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

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.



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	Skilled person
Supply Connection	AC Mains
Supply tolerance	+10%/-10%
Supply connection – type	pluggable equipment type A - appliance coupler mating connector
Considered current rating of protective device	20 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)	50°C (Full Load); 65°C (Output power decreased linearly by 2.5%/°C above 50°C)
IP protection class	IPX0
Power systems	TN
Altitude during operation (m)	5000 m
Altitude of test laboratory (m)	64 m
Mass of equipment (kg)	1 kg max
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 .....:	2019-09-04 TO 2024-05-23
Date (s) of performance of tests .....:	2024-04-08 TO 2024-05-23, 2024-07-10
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 UK LTD KINGSLEY AVE ILFRACOMBE DEVON EX34 8ES UNITED KINGDOM Panyu Trio Microtronics Co Ltd SHIJI INDUSTRIAL ESTATE DONGYONG NANSHA GUANGZHOU Guangdong 511453 CHINA TDK-Lambda (China) Electronics Co Ltd No.95, Zhujiang Rd, Xinwu District Wuxi Jiangsu 214028 CHINA

General product information and other remarks:

The original report was modified on 2024-08-28 to include the following changes/additions:

Technical Amendment (UL project 4791352650)

This report should be read in conjunction with CBTR E135494-A6069-CB-1 and CBTC DK-136933-UL, dated 2023-01-16.

Additional test was deemed necessary.

This report includes the changes/ additions as below:

1. Updated the Model name and nomenclature.
2. Updated the Model Differences section.
3. Added a new factory of TDK-Lambda (China) Electronics Co. Ltd.
4. Updated the CCL table to include the alternate fan YS Tech FD124020UB-H-NCB, fusible resistor in place of F2 fuse and other critical components.
5. Updated test tables B.4, 5.4.1.4, 5.7.5, 5.4.9, 5.4.4.9.
6. Updated frequency information in test table 5.4.2, 5.4.3.
7. Updated Draft CB Test Certificate in enclosure section.

Product Description

NV350 is a range of switching power supplies intended for building-in as component which employ isolating transformers. Reinforced insulation is provided between primary and secondary circuits. Basic insulation is provided between primary circuit and PE (Protective Earth).

Model Differences

Model Differences

Unit Configuration Code:

NV350 or NV3 or NV-350 followed by abcde (these models are identical)

(may be prefixed by NS - # / or - where # may be up to any four letters and may be followed by - $; where $ maybe any number between 000 to 999, indicating non-safety related model differences)
Unit Configuration Code (Description :) may be prefixed by SP followed by / or – (SP represents a sales code). Units may be additionally marked with a product code: K3x or Q3x where x may be any number of characters).

Where a = S, R, Q, P, V, C, T, U, K or L where:

Option Letter	Airflow Option
S	Forward airflow, standard fan
R	Reverse airflow, standard fan
Q	Forward airflow, quiet fan
P	Reverse airflow, quiet fan
V	Forward airflow, temperature controlled fan
C	Customer air, fan not fitted
T	Forward airflow, top fan
U	Customer air, fan not fitted, cover not fitted
K	Custom fan/chassis assembly
L	Fixed speed fan (see non-standards below)

Where b = S or I where:

Option Letter	Input Option
S	Screw input terminals
I	IEC input

Where c = S, M, L, R, or T, where:

Option Letter	Leakage Option
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.

Optionally followed by d = EN#V, EN12V, EN13.5V, IN#V, IN12V, IN13.5V, ES#V, ES12V, ES13.5V, IS#V, IS12V or IS13.5V. Where:

Description Option	Description
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 of 12-13.5V.

The Global Options Inhibit and Enable functions permit the customer to turn off or on the main PSUs outputs and the fan. The standby supply is for use by the customer and provides an ES1 output that continues to operate when all the main PSUs 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 ES1.

Where e = NV350 or NV3 or NV-350 Modules:

Up to 3 of the following modules types may be fitted:

@B
or @BH
or @C
or @CM

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

or @/#DB (/ can be replaced with a _)

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 (/ can be replaced with a _)

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

where 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 @BHDB (/ can be replaced with a _)

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.

Note.
For all outputs connected in series:
Series modules are non-standard units.
Refer to the Instruction Manual for Energy Source Classification of series modules.
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.
Note: Series connection of one NV350 unit to another NV350 unit is not permitted.

Custom Models:

Model: NV350 LSS 24/24DB 15.5/5.5DB (K30045A)
Maximum outputs: 24V, 1A; 24V, 0.7A; 15.5V, 6.4A; 5.5V, 6.4A. (total power 175W max.)
Maximum ambient: 50°C
Orientations: Horizontal with chassis lowest, on either side.
Comments: PSU has fan drive voltage fixed at 5.5V.

Model: NV350 LSS 24/24DB (K30045B)
Maximum outputs: 24V, 7A; 24V, 0.7A. (total power 184.8W max.)
Maximum ambient: 50°C
Orientations: Horizontal with chassis lowest, on either side.
Comments: PSU has fan drive voltage fixed at 5.5V.

Model: NV350 TSS 24B 15BH 5/15DB (K30052X, where X can be any character)
Maximum outputs: 350W max.
Comments: PSU has top fan fitted.
Compliant with EN/IEC/UL/CSA 60950-1 and 62368-1 only
Model: NV350 KISES5V 12/12DB 5B (X00004#, where # can be any number of characters)
Maximum outputs: 350W max.
Comments: PSU has top fan, at an angle fitted. Output cables of 12 to 24 AWG, max 50 cm long are supplied with this model.
Compliant with EN/IEC/UL/CSA 60950-1 and 62368-1 only

Model: NV350 NV3LISIS5V 3.3B 12BH (K30068X, where X can be any character)
Maximum outputs: 201.4W max.
Comments: PSU has fixed, reduced speed fan set to 5.5V.
Compliant with EN/IEC/UL/CSA 60950-1 and 62368-1 only

ELECTRICAL & THERMAL RATINGS:

Input Parameters

Nominal input voltage (V)	100 - 240
Input voltage range (V)	85 - 264
Input frequency range (Hz)	47 - 440*
Maximum input current (A)	5.5
Inrush Current (A)	<15

*For frequencies above 60Hz, refer to Engineering Conditions of Acceptability.

For input voltages between 85 and 89.9V the output power is derated to 94% of the values given in the Cooling Options Table.

Output Modules:

Module	Output Voltage	Slots	Maximum Average Current According to Slot Position (A)				
			Slot 1	Slot 2	Slot 3	Slot 4	Slot 5
B	3.14-3.6V	2	40	-	40	40	40
	4.75-5.5V	2	40*	-	40*	40*	40*
	7-9V	2	2.5**	-	22.5**	22.5**	22.5**
	12-15.5V	2	16***	-	16***	16***	16***
	24-28V	2	8****	-	8****	8****	8****
BH	12-15.5V	2	20#	-	20#	20#	20#
	24-28V	2	10##	-	10##	10##	10##
C	12-13.2V	3	33.34†	-	33.34†	33.34†	-
	15-16.5V	3	26.67†	-	26.67†	26.67†	-
	24-26.4V	3	16.67†	-	16.67†	16.67†	-
	27-32V	3	14.82††	-	14.82††	14.82††	-
CM	12-13.2V	3	-	33.34†††	33.34†††	33.34†††	-
	15-16.5V	3	-	26.67†††	26.67†††	26.67†††	-
	24-26.4V	3	-	16.67†††	16.67†††	16.67†††	-
	27-32V	3	-	14.82†††	14.82†††	14.82†††	-
DA CH1	11.88-12.25V	1	-	-	-	-	3¥
	11.9 to -						
DA CH2	11.6V	1	-	-	-	-	1¥¥
DB	3.14-3.6V	2	25	-	25	25	25
CH1	4.75-5.5V	2	25	-	25	25	25
	5.5-6.5V††††	2	25	-	25	25	25
	12-15.5V	2	13¥¥¥	-	13¥¥¥	13¥¥¥	13¥¥¥
	24-28V	2	7¥¥¥¥	-	7¥¥¥¥	7¥¥¥¥	7¥¥¥¥
DB	3.3-6V‡	2	10	-	10	10	10
CH2	7-15.5V	2	5	-	5	5	5
	24-32V	2	2	-	2	2	2

* - Linearly derate from 40 to 36A over the voltage range 5.2 to 5.5 V.

** - Linearly derate from 22.5 to 20A over the voltage range 8 to 9V.

*** - Linearly derate from 16 to 13A over the voltage range 13.5 to 15.5 V.

**** - Linearly derate from 8 to 7A over the voltage range 26 to 28 V.

- Linearly derate from 20 to 16.5A over the voltage range 13.2 to 15.5 V.

- Linearly derate from 10 to 8.5A over the voltage range 25.7 to 28 V.

† - C & CM modules may output up to 600W for up to 10 seconds providing that the converter ratings are not exceeded and the average power from the module does not exceed the following: 400W for 115 - 264Vac input or 350W for 90Vac input (average power may be linearly interpolated between 90 and 115Vac input).

†† - Derate to 400W above 27V. C & CM modules may output up to 600W for up to 10 seconds providing that the converter ratings are not exceeded and the average power from the module does not exceed the following: 400W for 115 - 264Vac input or 350W for 90Vac input (average power may be linearly interpolated between 90 and 115Vac input).

††† - CM Module cannot be fitted to slot 1 due to medical spacing requirements.

†††† - See Table below

DB modules with 6V nominal, Output Channel1

Cooling options C, S, T & V O/P 1 : 5.5 - 6V O/P 1 + O/P 2 : 195W total.
O/P 1 : 6 - 6.5V O/P 1 + O/P 2 : Linearly derate from 195 to 170W total.
Cooling option Q O/P 1 : 5.5 - 6V O/P 1 + O/P 2 : 180W total.
O/P 1 : 6 - 6.5V O/P 1 + O/P 2 : Linearly derate from 180 to 140W total.
Cooling options P & R O/P 1 : 5.5 - 6.5V O/P 1 + O/P 2 : 120W total.

DB modules with 6V nominal channel 1 are not allowed when channel 2 exceeds 5.5V.

¥ - 3A forward air, 2A reverse air.

¥¥ - 1A forward air, 0.6A reverse air.

¥¥¥ - Linearly derate from 13 to 10A over the voltage range 12.5 to 15.5 V.

¥¥¥¥ - Linearly derate from 7 to 6A over the voltage range 25 to 28 V.

‡ - Voltage measured at the module power terminals. This voltage at the power terminals must not be exceeded when remote sense is used.

Cooling Options:

Cooling option	Input volts	continuous O/P power	peak power O/P (W)	Ambient(°C)	Derating(°C) †
(S, V ,T) Forward air standard fan	90-264(Vac) ‡	350W	400 peak if 350 average #	65	2.5% per°C above 50
(S, V) Forward air standard fan	115-264(Vac)	450W	510 peak if 450 average #	65	2.5% per°C above 50
(S, V ,T) Forward air standard fan	180-264(Vac)	664W	740 peak if 600 average #	65	2.5% per°C above 50
(R) Reverse air standard fan	90-264(Vac) ‡	250W	N/A	65	2.5% per°C above 50

(Q) Forward air quiet fan	90-264(Vac) ‡	350W	N/A	65	2.5% per°C above 50
(P) Reverse air quiet fan	90-264(Vac) ‡	250W	N/A	60	3.8% per°C above 50

C, U Cooling Option : Customer air, fan not fitted. Refer to Customer Air Cooling section in for details.

† Both the total output power and the module output currents are derated by the given value.

‡ For input voltages between 85 and 89.9V the output power is derated to 94% of the values given for 90V input.

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.

Continuous, peak and average power ratings may be linearly interpolated for input voltages between 90 and 180V.

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, but they are subject to the current deratings for operation above 50°C.

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.

For reverse airflow cooling all B, BH and DB modules are limited to a maximum output power of 150W (total for both channels on dual output modules).

Customer Air Cooling:

The following method must be used for determining the safe operation of PSUs when C or U option (Customer Air) is fitted, i.e. fan not fitted to PSU, and for the NV350PFC assembly. The minimum permitted airflow for customer air cooling is 0.5m/s.

For PSUs and assemblies cooled by customer supplied airflow the components listed in the following table must not exceed the temperatures given. Additionally ratings specified for units with an internal fan must still be complied with, e.g. mains input voltage range, maximum output power, module voltage / current ratings and maximum ambient temperature. To determine the component temperatures the heating tests must be conducted in accordance with the requirements of IEC60950-1:2005 Clause 4.5. Consideration should also be given to the requirements of other safety standards.

Test requirements include: PSU/assembly to be fitted in its end-use equipment and operated under the most adverse conditions permitted in the end-use equipment handbook/specification and which will result in the highest temperatures in the PSU/assembly. To determine the most adverse conditions consideration should be given to the end use equipment maximum operating ambient, the PSU/assembly loading and input voltage, ventilation, end use equipment orientation, the position of doors & covers, etc. Temperatures should be monitored using type K fine wire thermocouples (secured with cyanoacrylate adhesive, or similar) placed on the hottest part of the component (out of any direct airflow) and the equipment should be run until all temperatures have stabilized.

Circuit Ref. Description Max. Temperature (°C)

L2, L3, L4 Filter/PFC assy: Choke winding 155

C3, C4 Filter/PFC assy: X capacitors 100

L1 Filter/PFC assy: Boost choke winding 130

C1 Filter/PFC assy: Electrolytic capacitor 60 (105)

T1 Filter/PFC assy: Fly back transformer 130

winding

RLY1 Filter/PFC assy: Relay 100

TX1, TX2 Modules: Power transformer windings 130

L1, XL1 B, BH & DB module chokes 130
L1 C & CM module chokes 140
Global option T2 Global Options: Transformer winding 90 (130)
Various All other choke & transformer windings 110
Various All <=10mm diameter electrolytic capacitors 80 (105)
Various All 12.5mm diameter electrolytic capacitors 85 (105)
TX1 DA Module: Fly back transformer windings 100 (130)
Higher temperature limit (in brackets) may be used but product life may be reduced.

Additional Information

The following tests were selected as representative of the test program applicable to model covered by this CBTR: ELECTRIC STRENGTH TEST – TYPE TESTING OF SOLID INSULATION (Cl. 5.4.9.1), CAPACITOR DISCHARGE AFTER DISCONNECTION OF A CONNECTOR (Cl. 5.5.2.2), TOUCH CURRENT MEASUREMENT – EARTHED ACCESSIBLE CONDUCTIVE PARTS – SINGLE-PHASE EQUIPMENT ON TN OR TT SYSTEM (Cl. 5.7.5), NORMAL OPERATING CONDITIONS TEMPERATURE MEASUREMENT (B.2.6, 5.4.1.4, 6.3, 9.3, B.1), INPUT TEST: SINGLE PHASE (Cl. B.2.5), SIMULATED SINGLE FAULT CONDITIONS (Cl. B.4) and STEADY FORCE TEST, 250 N (Cl. 4.4.3.2, T.5) These tests have been witnessed for models selected as representative of the standard covered by this report and the applicable test program. (Ref: 4791153162, DA file 331).

The marking label provided is representative of all models.

Customer Air Cooling (options C or U):

The following method must be used for determining the safe operation of PSUs when C or U option (Customer Air) is fitted, i.e. fan not fitted to PSU. The minimum permitted airflow for customer air cooling is 0.5m/s.

For PSUs cooled by customer supplied airflow the components listed in the following table must not exceed the temperatures given. Additionally ratings specified for units with an internal fan must still be complied with, e.g. mains input voltage range, maximum output power, module voltage / current ratings and maximum ambient temperature. To determine the component temperatures the heating tests must be conducted in accordance with the requirements of the appropriate standards.

Test requirements include: PSU to be fitted in its end-use equipment and operated under the most adverse conditions permitted in the end-use equipment handbook/specification and which will result in the highest temperatures in the PSU. To determine the most adverse conditions consideration should be given to the end use equipment maximum operating ambient, the PSU/assembly loading and input voltage, ventilation, end use equipment orientation, the position of doors & covers, etc. Temperatures should be monitored using type K fine wire thermocouples (secured with cyanoacrylate adhesive, or similar) placed on the hottest part of the component (out of any direct airflow) and the equipment should be run until all temperatures have stabilized.

Circuit Ref.	Description	Max. Temperature (°C)
L2, L3, L4	Filter/PFC assy: Choke winding	155
C3, C4	Filter/PFC assy: X capacitors	100
L1	Filter/PFC assy: Boost choke winding	130
C1	Filter/PFC assy: Electrolytic capacitor	60 (105)

T1	Filter/PFC assy: Flyback transformer winding	130
RLY1	Filter/PFC assy: Relay	100
TX1, TX2	Modules: Power transformer windings	130
L1, XL1	B, BH & DB module chokes	130
L1	C & CM module chokes	140
Global option T2	Global Options: Transformer winding	90 (130)
Various	All other choke & transformer windings	110
Various	All <=10mm diameter electrolytic capacitors	80 (105)
Various	All 12.5mm diameter electrolytic capacitors	85 (105)
TX1	DA Module: Flyback transformer windings	100 (130)
XTH101	Primary IMS measured adjacent to XTH101	100 (105)

Higher temperature limit (in brackets) may be used but product life may be reduced.

The manufacturer submitted representative production sample(s) of NV350. The following sample ID 2764822 was used for construction review.

NV3SSS24/24DB24BH28BH, NV350-SSS12BH13.2B12.5/6DB and etc, were used for test purposes and are considered representative of the entire series.

Report based on testing conducted in E135494-A57 for details see list of tests.

Technical Considerations

- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of : 50°C (full load) to 65°C maximum (see cooling options for models and conditions to which the extended ambient applies) with de-ratings.
- The product is intended for use on the following power systems : TN
- Mains supply tolerance (%) or absolute mains supply : +10%/-10%
- The equipment disconnect device is considered to be : appliance coupler (if fitted), or provided by the end equipment.
- The following were investigated as part of the protective earthing/bonding : Printed wiring board trace (refer to Test Reference - Schematics + PWB for layouts)
- The following are available from the Applicant upon request : Installation (Safety) Instructions / Manual
- The product was investigated to the following additional standard : AS/NZS 62368.1:2018, CAN/CSA C22.2 No. 62368-1:19, 3rd Edition, EN IEC 62368-1:2020+A11:2020
- Capacitors are rated for 230V due to the IT power system used in Norway. Further evaluation may be required in the end use product.
- The NV350 range is suitable for use at an altitude of 5000 metres.
- The following scope limitations apply to this test report and additional evaluation and/or tests may be required when submitting this CB Report to a National Certification Body (NCB) to obtain a national mark:
  - no EMC tests nor evaluation to EMC Directive 2004/108/EC and 2014/30/EU,
  - no evaluation to RoHS Directives 2002/95/EC, 2011/65/EU and (EU) 2016/585,
  - no evaluation to Council Recommendation 1999/519/EC nor 2006/25/EC,
  - only English version of markings and instructions provided and reviewed

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 : Earthing Continuity, Electric Strength
- The end-product Electric Strength Test is to be based upon a maximum working voltage of : Primary-Secondary: 363 Vrms, 650 Vpk;, Primary – Earthed Dead Metal: 343 Vrms, 622 Vpk
- The following output circuits are at ES1 energy levels : All except for 24VDB CH2 which is ES2
- The following output circuits are at ES2 energy levels : 24VDB CH2
- The following output circuits are at PS3 energy levels : All circuits
- 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 input terminals/connectors must be connected to the end-product supply neutral : N
- The following end-product enclosures are required : Mechanical, Fire, Electrical with the exception of the IEC inlet face of units fitted with an IEC60320 inlet.
- The following components require special consideration during end-product Thermal (Heating) tests due to the indicated maximum temperature measurements during component-level testing : Refer to additional application considerations.
- The equipment is suitable for direct connection to : AC mains supply
- The power supply terminals and/or connectors are: Screw terminals (where used) are suitable for factory wiring only.
- The following output terminals were referenced to earth during performance testing: All outputs and their return lines individually referenced to obtain maximum working voltage.
- Fans: The end fan provided in this sub-assembly is provided with a fan guard to reduce the risk of accidental contact with the stator. The top fan provided in this sub-assembly is not intended for access by ordinary person.
- The following magnetic devices (e.g. transformers or inductor) are provided with an OBJY3 insulation system with the indicated rating greater than Class A (105°C) : T1, T2, TX1 & TX2 (all Class F). See table 1.5.1 for details of insulation systems used.