



Test Report issued under the responsibility of:



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

Report Number: 30783346.007
Date of issue: 18th February, 2016
Total number of pages..... 85 + Attachments

Applicant's name.....: TDK-Lambda Ltd.
Address: 56 Haharoshet St., P.O.B. 500 Karmiel Industrial Zone Karmiel
2161401, Israel

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

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General disclaimer:

The test results presented in this report relate only to the object tested.
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Test item description :	Programmable Power Supply	
Trade Mark :	TDK-Lambda, <i>TDK-Lambda</i>	
Manufacturer	Same as applicant	
Model/Type reference	GEN5000W Series: GENwww-xxxy-zuvCO (www = 0-8 to 0-600; xxx = 0-600 to 0-8.5; y = -LAN, -MD, -IEEE, -IEMD, -IS420, -IS510, -USB, blank ; z = 3P208, 3P400; u = -U, blank ; v = -1683, -1690, -1704, -1706, -171X (X=0-9), -1733, -1737, -174X (X=4-9), blank ; CO = -CO, blank) NOTE: CO means Conformal Coating is used	
Ratings :	Input: 1. Option 1 (z = 3P208): 3W+PE AC 190-240V, 50/60Hz, 18A; 2. Option 2 (z = 3P400): 3W+PE AC 380-415V, 50/60Hz, 9.5A Output: 0-8VDC/600A to 0-600VDC/8.5A, 5100 Watt max.	
Testing procedure and testing location:		
<input checked="" type="checkbox"/>	CB Testing Laboratory:	
Testing location/ address :	TÜV Rheinland of North America, Inc. 1279 Quarry Lane, Suite A, Pleasanton, CA 94566	
<input type="checkbox"/>	Associated CB Testing Laboratory:	N/A
Testing location/ address :		
Tested by (name + signature) :	Duy Nguyen	
Approved by (name + signature) :	Ronald Younan	
Testing procedure: TMP/CTF Stage 1:		
<input type="checkbox"/>	Testing procedure: TMP/CTF Stage 1:	N/A
Testing location/ address :		
Tested by (name + signature) :		
Approved by (name + signature) :		
Testing procedure: WMT/CTF Stage 2:		
<input type="checkbox"/>	Testing procedure: WMT/CTF Stage 2:	N/A
Testing location/ address :		
Tested by (name + signature) :		
Witnessed by (name + signature) :		
Approved by (name + signature) :		
Testing procedure: SMT/CTF Stage 3 or 4:		
<input type="checkbox"/>	Testing procedure: SMT/CTF Stage 3 or 4:	N/A

Testing location/ address.....:		
Tested by (name + signature).....:		
Witnessed by (name + signature).....:		
Approved by (name + signature).....:		
Supervised by (name + signature).....:		

<p>List of Attachments (including a total number of pages in each attachment):</p> <p>Attachment 1: National Differences (48 pages)</p> <p>Attachment 2: Photo Documentation (7 pages)</p>	
<p>Summary of testing:</p>	
<p>Tests performed (name of test and test clause):</p> <p>Clause 1.6.2 Power Input Measurements</p> <p>Clause 1.7.11 Durability of Marking Test</p> <p>Clause 2.1.1.1 Accessibility to Energized parts</p> <p>Clause 2.1.1.7 Capacitor discharge test</p> <p>Clause 2.2 SELV circuits – voltage measurements (normal and fault conditions)</p> <p>Clause 2.6.3.4 Protective earthing trace earth fault current; Earthing test</p> <p>Clause 2.10.2 Determination of working voltage</p> <p>Clause 4.2 Mechanical strength test</p> <p>Clause 4.4 Hazardous moving parts</p> <p>Clause 4.5 Temperature rise measurements</p> <p>Clause 5.1 Touch current measurements</p> <p>Clause 5.2 Dielectric strength test</p> <p>Clause 5.3 Abnormal operating and fault Conditions</p> <p><i>testing during original evaluation according to report number 30783346.001, no further testing was deemed necessary for this upgrade of standard</i></p>	<p>Testing location:</p> <p>TÜV Rheinland of North America, Inc. 1279 Quarry Lane, Suite A, Pleasanton, CA 94566</p>

Summary of compliance with National Differences:**List of countries addressed:**

Summary of compliance with National Differences to IEC 60950-1:2005+A1:2009+A2:2013 (for explanation of codes see below):

List of countries addressed: AT, DK, IT, SE, GB, US, TR

Explanation of used codes: AT = Austria, DK = Denmark, IT = Italy, SE = Sweden, GB = United Kingdom, US = United States of America, TR = Turkey

Summary of compliance with National Differences to IEC 60950-1:2005 (2nd Edition) + A1:2009 and EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 for explanation of codes see below):

EU Group Differences, EU Special National Conditions, CA, DE, FI, IL, KR, US.

Explanation of used codes: CA = Canada, DE = Germany, FI = Finland, IL = Israel, KR = Republic of Korea, US = United States of America.

The product fulfils the requirements of IEC 60950-1:2005 + Am 1:2009 + Am 2:2013 and EN60950-1:2006+A11+A1+A12+A2

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.

Representative

Three phase units (option 1)



Three phase units (option 2)



Additional Information underneath the main label for all models:

EU representative:

TDK-Lambda UK Limited
Kingsley Avenue, Ilfracombe, Devon
EX34 8ES, UK

Test item particulars.....:	
Equipment mobility.....:	<input checked="" type="checkbox"/> movable <input type="checkbox"/> hand-held <input type="checkbox"/> transportable <input type="checkbox"/> stationary <input type="checkbox"/> for building-in <input type="checkbox"/> direct plug-in
Connection to the mains.....:	<input type="checkbox"/> pluggable equipment <input type="checkbox"/> type A <input type="checkbox"/> type B <input type="checkbox"/> permanent connection <input type="checkbox"/> detachable power supply cord <input type="checkbox"/> non-detachable power supply cord <input type="checkbox"/> not directly connected to the mains <i>(NOTE: Means of connection to the mains is depends to the final installation)</i>
Operating condition.....:	<input checked="" type="checkbox"/> continuous <input type="checkbox"/> rated operating / resting time:
Access location	<input type="checkbox"/> operator accessible <input type="checkbox"/> restricted access location <i>NOTE:depends to model-operator accessible (SELV models), restricted access locations (non-SELV models)</i>
Over voltage category (OVC)	<input type="checkbox"/> OVC I <input checked="" type="checkbox"/> OVC II <input type="checkbox"/> OVC III <input type="checkbox"/> OVC IV <input type="checkbox"/> other:
Mains supply tolerance (%) or absolute mains supply values	+10%/-10%
Tested for IT power systems	<input checked="" type="checkbox"/> Yes (Norway only) <input type="checkbox"/> No
IT testing, phase-phase voltage (V)	230VAC
Class of equipment	<input checked="" type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Class III <input type="checkbox"/> Not classified
Considered current rating of protective device as part of the building installation (A)	20A
Pollution degree (PD)	<input type="checkbox"/> PD 1 <input checked="" type="checkbox"/> PD 2 <input type="checkbox"/> PD 3
IP protection class	IP20
Altitude during operation (m)	3000
Altitude of test laboratory (m)	50
Mass of equipment (kg)	15 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	November 12, 2007 <i>[date of receipt of test item during original testing according to report number 30783346.001]</i>
Date (s) of performance of tests	November 13, 2007 <i>[date of performance of testing during original evaluation according to report number 30783346.001, no further testing was deemed necessary for this upgrade of standard]</i>

General remarks:

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 testing laboratory.

"(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 IEC60950:

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

: N/A

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) : TDK-Lambda Ltd. 56 Haharoshet St., P.O.B. 500
 Karmiel Industrial Zone Karmiel 2161401, Israel

General product information:

The GEN5000W series is a family of power supplies having rated output from 0-8VDC/0-600A up to 0-600VDC/0-8.5A with total output power 5100 Watt maximum or less.

The units are evaluated for use in TN, TT and IT (Norway only) power systems.
 The units are Class I, evaluated for use in Installation Category II and Pollution Degree 2 environments.
 The units have Hazardous Energy Level outputs and intended to be installed in RAL.
 All units may be adjusted by operator to 105% of the rated output voltage.
 Units with output rated up to (but not including) 60VDC considered as SELV output units.
 Units with output rated 60VDC and higher considered as Secondary Hazardous voltage output units.
 The units consist of a steel box-type frame enclosure with aluminium cover.
 The following common parts installed (or may be installed-optional parts) inside of enclosure:

common parts:

- Input board with soldered input connector (for 190-240V input-IA653 or for 380-415V input-IA654)
- Power factor control (PFC) board (for 190-240V input-IA651 or for 380-415V input-IA655)
- BIAS board (IA620)
- Two DC/DC converter boards connected in parallel (IA658 for output 8V-100V or IA652 for output 150V-600V)
- Control board (IA673)
- Output filter assembly (IA656 for output 8-100V or IA671 for output 150-600V)
- Display assembly (IA621 and indication voltage and current outputs)
- Fans assembly (board IA622 and three fans)

Optional parts

Isolated analog control board (IA631)
 GPIB board (IA630)
 LAN board (IA672)
 USB board.

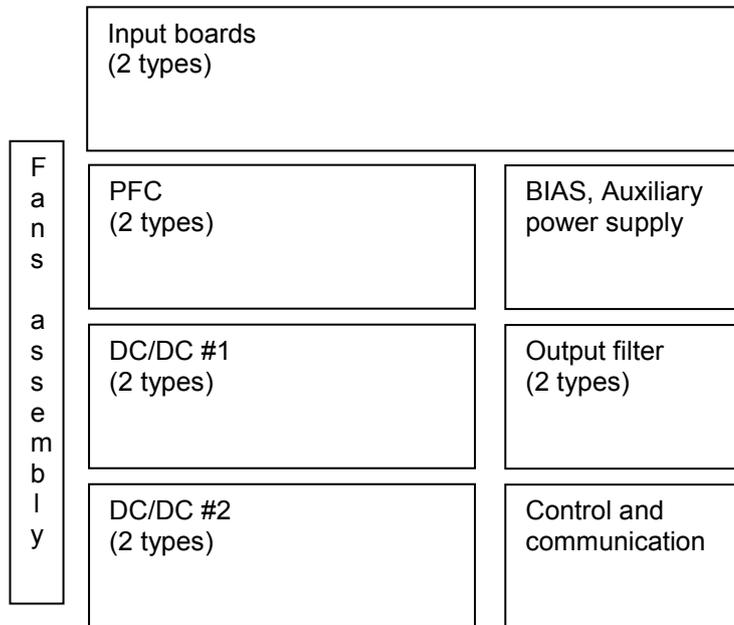
The power I/O connectors are suitable for factory and field wiring.
 The units are suitable for maximum ambient operating temperature 50°C at maximum load.
 The units are suitable for maximum operational altitude up to 3000m.

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)

Block Diagram (as they are laid out with in unit)



Component's description

1. Input boards

The input board is constructed of UL Recognized input connector intended for factory and field wiring connection, EMI filter, inrush current protection and diode rectifier.

There are two types of input boards:

- 3 phase, for units rated 190-240VAC
- 3 phase, for units rated 380-415VAC

The input board provides the DC voltage for the PFC (Power Factor Control) board

2. Power factor control (PFC) board

The PFC board includes a Power Factor Correction circuit

There are two types of PFC board:

- For 3 phase units rated 190-240VAC
- For 3 phase units rated 380-415VAC

The PFC board provides 380VDC voltage for the DC/DC converter boards and BIAS board

<p>3. DC/DC boards The DC/DC board includes a DC/DC converter There are two types of DC/DC boards:</p> <ul style="list-style-type: none"> • For units having output voltage from 8VDC up to (and including) 100VDC • For units having output voltage from 150VDC up to (and including) 600VDC <p>In each unit there are two DC/DC boards which are assembled in parallel to provide full output power 5000W (Each board 2500W) Each type of the DC/DC converter is the same besides the mains transformer construction and winding ratio.</p>
<p>4. BIAS The BIAS board is the same for all models. The BIAS board includes an auxiliary switching power supply providing the DC voltage for the internal circuits. The BIAS power supply provides three output circuits. One output is connected to the SELV control (RS232) circuits. The other two outputs are connected to the control circuits. Control circuits are regarded as SELV for units up to 40V output and Secondary Hazardous for all other power supply models.</p>
<p>5. Control board The control board is the same for all models. The control board includes the control and adjusts circuits for maintenance of functioning of DC/DC boards.</p>
<p>6. Output filter assembly The output filter assembly includes an output filter and output current sense (shunt) There are two types of the output filter assembly:</p> <ul style="list-style-type: none"> • For units having an output voltage from 8VDC up to (and including) 100VDC • For units having an output voltage from 150VDC up to (and including) 600VDC <p>The first type of output filter assembly has bus-bar type of output terminals. The second type of output filter assembly has a UL Recognized connector intended for factory and field wiring.</p>
<p>7. Display assembly The display assembly is same for all models The display assembly includes a digital display and components for management of the power supply</p>
<p>8. Fans assembly The fans assembly is the same for all units The fans assembly consists of fans bracket, three identical fans and a fans distribution board</p>

History of report:	
30783346.001	Original CB-Report
30783346.003	New CB-report / this report for an upgrade of standard to list IEC 60950-1:2005
30783346.005	New CB-report / this report for an upgrade of standard to list IEC 60950-1:2005+A1 and EN 60950-1:2006+A11+A1+A12
30783346.007	<p>New CB-report covers:</p> <ul style="list-style-type: none"> -an upgrade of standard to IEC 60950-1:2005 + Am 1:2009 + Am 2:2013. -revision of Critical Components List. - added “blank” for suffix y -addition of suffix “-CO” for models in which conformal coating is used and “blank” for models without conformal coating. -Ingress protection class rating change from IPX0 to IP20. <p>No testing was performed or deemed necessary for the upgrade of standard.</p>
Note: Gaps in the report numbering were reserved for TÜV internal use, not related to the CB report.	