



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 Number.....: CN224X04 001
 Date of issue: 2022-03-10
 Total number of pages.....: 365 + Attachments

Name of Testing Laboratory
 preparing the Report.....: TÜV Rheinland (China) Ltd.

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

Test specification:

Standard.....: IEC 61010-1:2010/AMD1:2016
 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.....: IEC61010_1P
 Test Report Form(s) Originator.....: VDE Prüf- und Zertifizierungsinstitut GmbH
 Master TRF.....: 2021-04-12

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Test item description :	Programmable AC/DC power supply	
Trade Mark :	TDK-Lambda, TDK-Lambda	
Manufacturer :	Same as applicant	
Model/Type reference :	<p>GENESYS+ 7500W series: 1a) Gxxxx-yyy-z-v/uuuuuu/w or Gxxxx-yyy-z-v-uuuuuu/w (Ordinary unit) 1b) GBxxxx-yyy-z-v/uuuuuu/w or GBxxxx-yyy-z-v-uuuuuu/w (Blank units)</p> <p>GENESYS+ 5000W series: 2a) G1000-5-z-v/uuuuuu/w or G1000-5-z-v-uuuuuu/w (Ordinary unit) 2b) GB1000-5-z-v/uuuuuu/w or GB1000-5-z-v-uuuuuu/w (Blank units)</p> <p>3a) G1500-3.4-z-v/uuuuuu/w or G1500-3.4-z-v-uuuuuu/w (Ordinary unit) 3b) GB1500-3.4-z-v/uuuuuu/w or GB1500-3.4-z-v-uuuuuu/w (Blank units)</p> <p>Note: see "General product information" and "Explaining the variables" for more details.</p>	
Ratings :	<p>Ratings for input: Option 1: AC 190-240 V; 47-63 Hz; 3W+PE. 1a), 1b): Rated input current: 27.8 A max. 2a), 2b): Rated input current: 18.5 A max. 3a), 3b): Rated input current: 18.5 A max.</p> <p>Option 2: AC 380-480 V; 47-63 Hz; 3W+PE. 1a), 1b): Rated input current: 13.8 A max. 2a), 2b): Rated input current: 9.2 A max. 3a), 3b): Rated input current: 9.2 A max.</p> <p>Ratings for output: 1a), 1b): DC 0-20V/375A to DC 0-1500V/5A, 7500 Watt max. 2a), 2b): DC 0-1000V/5A, 5000 Watt. 3a), 3b): DC 0-1500V/3.4A, 5100 Watt.</p>	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
<input type="checkbox"/>	CB Testing Laboratory:	
Testing location/ address :		
Tested by (name, function, signature) :		
Approved by (name, function, signature) . :		

<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 + signature)		
Witnessed by (name, function, signature) :		
Approved by (name, function, signature) . :		
<input checked="" type="checkbox"/>	Testing procedure: CTF Stage 3:	TDK-Lambda Ltd.
<input type="checkbox"/>	Testing procedure: CTF Stage 4:	
Testing location/ address..... :		56 Haharoshet St., P.O.B. 500 Karmiel Industrial Zone Karmiel 2161401, Israel
Tested by (name, function, signature)..... :		Boris Gorinshtein, Safety Group Leader <i>Boris G.</i>
Witnessed by (name, function, signature) :		Liu Xuhua, PE
Approved by (name, function, signature) . :		Feng Xiao, TC
Supervised by (name, function, signature):		Feng Xiao, TC

List of Attachments (including a total number of pages in each attachment)		
Document No.	Documents included / attached to this report (description)	Page No.
Attachment 1	National Differences	30
Attachment 2	Photos	32
Attachment 3	Electrical Schematics	39
Attachment 4	PCB Layouts	123
Attachment 5	Magnetics	38
Attachment 6	Wire Harness	16
Attachment 7	AC input Plug	3

Documents referenced by this report (available on request):		
Document Name or No.	Documents description	Page No.
31781623.300	This is the CB Test Report of the GENESYS+ series. Due to similarity in design, construction and components selection between the GENESYS+ 5000W and GENESYS+ 7500W, a number of tests had been waived based on the results achieved during the testing conducted on the GENESYS+ 5000W.	-

Summary of testing:

This test report is based on:

1. Tests conducted as part of IEC 61010-1:2010, AMD1:2016 TUV project 31781623.300 (see "Documents referenced by this report" section) with CB certificate US-TUVR-012197 of GENESYS+ 5000W (hereafter referred to as G+5KW)

The G+5kW mentioned above shares a similar design approach to the GENESYS+ 7.5kW (hereafter referred to as G+7.5kW), and some tests carried out as part of the G + 5kW certification process were deemed to suitably represent the G+7.5kW project, thus, eliminating the need for re-testing.

2. Additional tests conducted as part of this project.

The G+7.5kW project, similar to its counterpart G+5kW project, includes various models which differ by input and output ratings (refer to the "Ratings" section for a list of all applicable ratings) and has a design and constructional similarity, as well as a commonality of materials and components. Thus, the models selected for the tests in this report are deemed to be the worst-case and thus representative of the entire series.

Although the standard describes reference test conditions with 40°C, G+7.5KW series is rated for 50°C, and thus was tested under 50°C ambient temperature instead, where applicable.

The Test Voltage between Secondary Hazardous and Secondary Non - Hazardous circuits applied on Interface module (IA931). The Interface module was tested separately outside the equipment, To avoid damage to components that are not involved in the test.

The Test Voltage between Secondary Hazardous circuits and PE is established in according to Annex K.4. TRANSIENT OVERVOLTAGES between Secondary Hazardous circuits and PE are limited to 1100 V peak by combinations of circuits and components. See Clause 17 and Form A.43 for more details.

Clause	Comment

Test Report History:	
This report may consist of more than one report and is only valid with additional or previous issued reports:	
Report Ref. No.	Item
31781623.300	CB test report of the G+5KW.
Tests performed (name of test and test clause):	Testing location:
4.4 - SINGLE-FAULT CONDITIONS 5.1.3 - MAINS supply (Input Test) 6.2 - List of accessible parts 6.3.1 - Values of NORMAL CONDITION 6.3.2 - Values of SINGLE-FAULT conditions 6.5.2.4 - BONDING impedance of plug-connected equipment 6.5.2.5 - BONDING impedance of PERMANENTLY CONNECTED EQUIPMENT 6.7 - Working Voltages, Clearance, Creepage distances, test voltages 6.8 - Dielectric strength tests 8.2 - ENCLOSURE rigidity test 8.3 - Drop test 9 - Protection against the spread of fire 9.4 - Limited-energy circuit tests 10 - Temperature measurements 10.5.2 - Resistance to heat of non-metallic ENCLOSURES 10.5.3 - Insulating material	TDK-Lambda Ltd. 56 Haharoshet St., P.O.B. 500 Karmiel Industrial Zone Karmiel 2161401, Israel
Summary of compliance with National Differences (List of countries addressed):	
The following national differences were considered to IEC 61010-1:2010 (3rd Edition) + Am 1: 2016:	
List of countries addressed: EUROPEAN GROUP DIFFERENCES, SWITZERLAND, United States of America, Canada, Japan	
<input checked="" type="checkbox"/> The product fulfils the requirements of IEC 61010-1:2010/AMD1:2016, EN 61010-1:2010/AMD1:2019, UL 61010-1:2012 R7.19, CAN/CSA-C22.2 NO. 61010-1-12 + GI1 + GI2 (R2017) + A1.	

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

(may be required by the product standard or client)

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 checked and 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.

GENESYS+ 7500W series:

Input option 1: Agency marks, identification and rating label (for input 3-phase 190-240V a.c. models):

GENESYS 7500W				
INPUT RATING: 190-240V 3W+  27.8A 50/60Hz	 <small>c u s</small>	 <small>www.tuv.com ID 0217008298</small>	UK CA 	CE 
EU representative: TDK-Lambda Germany GmbH, Karl-Bold-Str. 40, D-77855 Achern UK representative: TDK-Lambda UK Limited, Kingsley Avenue, Ilfracombe, Devon EX34 8ES				
US Patent No. 10,674,626				

Input option 2: Agency marks, identification and rating label (for input 3-phase 380-480V a.c. models):

GENESYS 7500W				
INPUT RATING: 380-480V 3W+  13.8A 50/60Hz	 <small>c u s</small>	 <small>www.tuv.com ID 0217008298</small>	UK CA 	CE 
EU representative: TDK-Lambda Germany GmbH, Karl-Bold-Str. 40, D-77855 Achern UK representative: TDK-Lambda UK Limited, Kingsley Avenue, Ilfracombe, Devon EX34 8ES				
US Patent No. 10,674,626				

GENESYS+ 5000W (G1000-5, GB1000-5, G1500-3.4, GB1500-3.4 models)

Input option 1: Agency marks, identification and rating label (for input 3-phase 190-240V a.c. models):

<h1>GENESYS 5000W</h1>			
INPUT RATING: 190-240V 3W+ 18.5A 50/60Hz	 <small>c u s</small>	 <small>www.tuv.com ID 0217008298</small>	
EU representative: TDK-Lambda Germany GmbH, Karl-Bold-Str. 40, D-77855 Achern UK representative: TDK-Lambda UK Limited, Kingsley Avenue, Ilfracombe, Devon EX34 8ES			
US Patent No. 10,674,626			

Input option 2: Agency marks, identification and rating label (for input 3-phase 380-480V a.c. models):

<h1>GENESYS 5000W</h1>			
INPUT RATING: 380-480V 3W+ 9.2A 50/60Hz	 <small>c u s</small>	 <small>www.tuv.com ID 0217008298</small>	
EU representative: TDK-Lambda Germany GmbH, Karl-Bold-Str. 40, D-77855 Achern UK representative: TDK-Lambda UK Limited, Kingsley Avenue, Ilfracombe, Devon EX34 8ES			
US Patent No. 10,674,626			

Model identification, output rating and trademark label – Ordinary (full panel) and Blank unit:

TDK-Lambda

G600-12.5 0-600V/0-12.5A

DC Power Supply **LXI**

Note "A"

Note "A" (Model)
GB10-500 0-10V/0-500A
GB20-250 0-20V/0-250A
GB30-170 0-30V/0-170A
GB40-125 0-40V/0-125A
GB50-100 0-50V/0-100A
GB60-85 0-60V/0-85A
GB80-65 0-80V/0-65A
GB100-50 0-100V/0-50A
GB150-34 0-150V/0-34A
GB200-25 0-200V/0-25A
GB300-17 0-300V/0-17A
GB400-13 0-400V/0-13A
GB500-10 0-500V/0-10A
GB600-8.5 0-600V/0-8.5A
GB1000-5 0-1000V/0-5A
GB1500-3.4 0-1500V/0-3.4A

Warning label



Test item particulars:	
Type of item	Laboratory
Description of equipment function	Programmable AC/DC power supply
Connection to MAINS supply	Permanent / Non detachable cord set (IEC 60309 type plug) NOTE: means of connection to the MAINS depends on the final installation by the customer, and not provided by the manufacturer.
Overvoltage category	II
POLLUTION DEGREE.....	2
Means of protection	Class I (PE connected)
Environmental conditions.....	Extended: same as normal, except altitude is up to 3000 m, and rated working temperature 0-50°C.
For use in wet locations	No
Equipment mobility.....	Fixed or Portable equipment (both options valid)
Operating conditions.....	Continuous
Overall size of equipment (W x D x H)	Not including accessories and handles (mm): Low voltage output models (with protective bracket): 423 x 598.2 x 43.6 Low voltage output models (without protective bracket): 423 x 551.2 x 43.6 High voltage output models (with protective bracket): 423 x 598.2 x 43.6 High voltage output models (without protective bracket): 423 x 531.7 x 43.6 Including accessories and handles (mm): Covering all models in the series: 482 x 627.7 x 43.6
Mass of equipment (kg).....	8.5 kg maximum for all models.
Marked degree of protection to IEC 60529	IPX0
Possible test case verdicts:	
- Test case does not apply to the test object	N/A (Not Applicable)
- Test object does meet the requirement.....	P (Pass)
- Test object does not meet the requirement	F (Fail)
Testing:	
Date of receipt of test item.....	March 2021
Date (s) of performance of tests.....	March 2021 – January 2022
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 Form A.xx)" refers to a Table appended to the report. Bottom lines for measurement Tables Forms A.xx are optional if used as record.	
Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60068-2-1:	

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

- Yes
- Not applicable

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 and other remarks:

Description of unit:

The GENESYS+7500W series is a family of switch-mode AC/DC power supplies, with two types of input stages:

1. **Input 200Vac** – which ranges between 190-240V a.c.;
2. **Input 480Vac** – which ranges between 380-480V a.c.;

The series is divided by models based on the output DC voltage, ranging from non-hazardous output DC voltage of 0-20V, and up to hazardous live 0-1500V.

The GENESYS+7500W series is separated into three types of front panels and operation modes:

1. **Ordinary (full panel) units:** come with display, on/off switch and may be operated independently or in parallel with another Ordinary, Blank or Booster unit by manual or remote control mode;
2. **Blank units:** come without display, with on/off switch, and may be operated independently or in parallel with another Blank or Booster unit by remote control mode only;

The following also apply on the entire series:

- The units are Class I, evaluated for use in Overvoltage Category II, Pollution Degree 2.
- The units are evaluated for use in TN and TT power systems.
- The power supplies are evaluated for the maximum altitude up to 3000 m.
- All units may be adjusted by operator to 105% of the rated output voltage or current.
- Units with output rated up to (but not including) 60V d.c. are considered as non-hazardous live output units.
- Units with output rated 60V d.c. and higher are considered as secondary hazardous live output units and not accessible during normal operation using an output protection compartment.
- The ENCLOSURE of the units consists of an aluminium box-type frame enclosure with an aluminium cover.

Environmental conditions:

All models in the series are rated to work under the following environmental conditions:

- Temperature 0-50°C
- Relative humidity (RH) 20-90% (and no condensation)
- Altitude up to 3000 m (10000 ft);
- Output current derating 2%/100m or Tma derating 1°C /100m above 2000m.
- Non operating: 12000m (40000ft).

The following parts are factory-installed inside of each ENCLOSURE:

Common parts requiring rated input range 190-240Vac:

- IA938 – 3-phase input 200Vac module
- IA934 – BIAS 200Vac module
- IA955 – BIAS 200 SELV module (small, solder-in board, soldered vertically on IA934 module)
- IA916 – PFC 200 module

Common parts requiring rated input range 380-480Vac:

- IA911 – 3-phase input 480Vac module
- IA933 – BIAS 480Vac module
- IA954 – BIAS 480 SELV module (small, solder-in board, soldered vertically on IA933 module)
- IA915 – PFC 480 module

Common parts for ALL models (mechanical):

- Aluminum ENCLOSURE and cover
- Non-metal front panel, comprising part of the ENCLOSURE
- Input protection compartment (mandatory to use with all models)
- Output protection compartment (mandatory to use with all models above 50Vdc output)

Common parts for ALL models (electrical):

- IA918 – Input control module (small, solder-in board, soldered vertically on IA933/IA934 modules)
- IA920 – DCDC slave control module (small, solder-in board, soldered vertically on DCDC modules)
- IA931 – Interface module, includes all the communication and USB ports and defined (as verified by this standard) as a limited-energy circuit.

- IA937 – Control module
- IA772 – Display module – installed on the non-metal front panel and defined (as verified by this standard) as a limited-energy circuit.

Unique parts are as follows:

Each power supply model in the GENESYS+7500W series (except models 1000V and 1500V) comes with three unique DC/DC modules connected in parallel and one unique output filter module corresponding to each model.

These are the currently-available DC/DC and filter modules for the GENESYS+7500W series:

- IA917 – DC/DC 20-30V module
- IA924 – DC/DC 40-100V module
- IA919 – DC/DC 150-300V module
- IA912 – DC/DC 400-600V module
- IA932 – DC/DC 335-500V module
- IA917 – Filter 20-100V module
- IA927 – Filter 150-600V module
- IA930 – Filter 1000-1500V module

Note: as seen above, the modules bear a range of voltages in their description. This means that each of these modules carry both common components AND unique components, corresponding to the designated DC output voltage of the model.

Models 1000V and 1500V:

Models 1000V and 1500V come with three DC/DC 335-500V (IA932) respectively. Modules connected in series to each other (not in parallel as with the other models), followed by the output DC filter 1000-1500V module (IA930).

Optional features:

Additionally, all models in the series may come with optional parts:

- GPIB (IEEE) board, number IA834 – models carrying these optional boards must work under a temperature derating rule as follows: 0-40°C (as opposed to 0-50°C for models without)
- Anybus board, number IA790, which gives option for ECAT and MDBS.
- IS420 and IS010 board IA978 – isolated analogue programming and monitoring.

Air filter kit – IA857:

Option air filter kit (IA857) intended to be installed on the front panel

The rated temperature range allowable during normal work, at 100% load, is reduce to 0-40°C (down from 0-50°C). No change to altitude or humidity requirements.

The power input connection:

The input connection is made via the Input connector and is suitable for both factory and field wiring connection, and come with input protection compartment (metal body) and strain-relief/anchorage device, and is screwed to the main enclosure chassis, cannot remove without a tool.

Note: the AC supply side of the supplying cord may both be PERMANENTLY CONNECTED, or utilize a connector meeting the requirements of IEC 60309, an option available to the customer.

The power output connection:

The output connection consists of two Busbars, with mandatory output protection compartment (metal body) preventing shock and HAZARDS.

GENESYS + 5000W series:

G1000-5, GB1000-5, GSS1000-5, G1500-3.4, GB1500-3.4, GSS1500-3.4 models have the maximum output power of 5000 Watt. These models (GENESYS + 5000W series) are exactly the same as all other models in the GENESYS + 7500W series, with no any construction or components differences. The only difference is that the output current is software limited. These models were evaluated to determine the input current, other tests were deemed not necessary.

Grounding outputs:

For all models except models with output voltage of 1500 V, either the positive or negative output terminals can be grounded. For all models with output voltage of 1500 V, only negative output terminal can be

grounded.

Explaining the variables used in the Model/Type reference section (configuration code):

Gxxxx-yyy-z-v/uuuuuu/w or Gxxxx-yyy-z-v-uuuuuu/w

G1000-5-z-v/uuuuuu/w or G1000-5-z-v-uuuuuu/w

G1500-3.4-z-v/uuuuuu/w or G1500-3.4-z-v-uuuuuu/w

Variable:	Applicable value:	Description:
xxxx	020 – 1500	Min./Max. DC output voltage.
yyy	005 - 375	Min./Max. DC output current.
z	1) GPIB (IEEE) 2) MDBS 3) ECAT 4) IS420 5) IS010 6)Blank	1. IEEE card installed. 2. AnyBus module installed with MDBS option. 3. AnyBus module installed with ECAT option. 4. Isolated Analog Programming option 4~20 mA. 5. Isolated Analog Programming option 0~10 mV. 6. Base model.
v	1. 3P200 2. 3P480	1. Model installed with input 3-phase 190-240Vac module. 2. Model installed with input 3-phase 380-480Vac module.
uuuuuu	1. Various letters and/or numbers 2. Blank	1. Indicates other options not related to safety. 2. Base model.
w	1. CO 2. Blank	1. Conformal coating used on all boards or used partially (for environmental protection only). 2. Without conformal coating.

Description of model differences:

See "General product information" section above.

Description of special features:
(HV circuits, high pressure systems etc.)
No special features available.