



	<p>Test Report issued under the responsibility of:</p> <p><b>UL International Demko A/S</b></p>	
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<p><b>TEST REPORT</b> <b>IEC 60950-1</b> <b>Information technology equipment - Safety -</b> <b>Part 1: General requirements</b></p>	
<p><b>Report Reference No</b> .....</p> <p>Date of issue .....</p> <p>Total number of pages .....</p>	<p>E252373-A31-CB-1</p> <p>2010-12-01</p> <p>56</p>
<p><b>CB Testing Laboratory</b> .....</p> <p>Address .....</p>	<p>UL International Demko A/S</p> <p>Lyskaer 8, 2730, Herlev, Denmark</p>
<p><b>Applicant's name</b> .....</p> <p>Address .....</p>	<p>TDK-LAMBDA SINGAPORE PTE LTD #06-01/08 1008 TOA PAYOH NORTH SINGAPORE 318996 SINGAPORE</p>
<p><b>Test specification:</b></p> <p>Standard .....</p> <p>Test procedure .....</p> <p>Non-standard test method .....</p>	<p>IEC 60950-1:2005 (Second Edition)</p> <p>CB Scheme</p> <p>N/A</p>
<p><b>Test Report Form No.</b> .....</p> <p>Test Report Form originator .....</p> <p>Master TRF .....</p>	<p>IEC60950_1A</p> <p>SGS Fimko Ltd</p> <p>2009-09</p>
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<b>Test item description</b> .....	Switching Power Supply for building-in
Trade Mark .....	<b>TDK-Lambda</b>
Manufacturer .....	TDK-LAMBDA SINGAPORE PTE LTD #06-01/08 1008 TOA PAYOH NORTH SINGAPORE 318996 SINGAPORE
Model/Type reference .....	GWS250-XX/YYYYYYYYYYYYYY, where XX can be 12, 24, 36, 48 and Y options can be any combination of P,F,L,RL,CO,CO2,ME,T,BAT or blank.
Rating .....	For Model GWS250-XX/YYYYYYYYYYYYYY (except : Models GWS250-XX/PYYYYYYYYYYYYYY, GWS250-XX/BATYYYYYYYYYYYYYY, GWS250-XX/PBATYYYYYYYYYYYYYY) Input: 100-240 V ac, 3.3 A, 50/60 Hz Output: GWS250-12: 12 V dc, 21 A GWS250-24: 24 V dc, 10.5 A GWS250-36: 36 V dc, 7 A GWS250-48: 48 V dc, 5.3 A  For Model GWS250-XX/PYYYYYYYYYYYYYY only: Input: 100-240 V ac, 4.8 A, 50/60 Hz Output: GWS250-12/P: 12 V dc, 29.2 A GWS250-24/P: 24 V dc, 14.6 A GWS250-36/P: 36 V dc, 9.7 A GWS250-48/P: 48 V dc, 7.3 A  For Model GWS250-XX/BATYYYYYYYYYYYYYY only: Input: 100-240 V ac, 3.3 A, 50/60 Hz Output: GWS250-24/BAT: 21-29 V dc, 8.8 A GWS250-48/BAT: 42-58 V dc, 4.4 A  For Model GWS250-XX/PBATYYYYYYYYYYYYYY only: Input: 100-240 V ac, 4.8 A, 50/60 Hz Output: GWS250-24/PBAT: 21-29 V dc, 12.2 A GWS250-48/PBAT: 42-58 V dc, 6.1 A

<b>Testing procedure and testing location:</b>	
<input type="checkbox"/>	<b>CB Testing Laboratory</b> Testing location / address..... :
<input type="checkbox"/>	<b>Associated CB Test Laboratory</b> Testing location / address..... : Tested by (name + signature) ..... : _____ Approved by (+ signature) ..... : _____
<input checked="" type="checkbox"/>	<b>Testing Procedure: TMP</b> Tested by (name + signature) ..... : Royston Ng <span style="float: right;"></span>  Approved by (+ signature) ..... : Timothy Geiger <span style="float: right;"></span>  Testing location / address..... : TDK-LAMBDA SINGAPORE PTE LTD, #06-01/08, 1008 TOA PAYOH NORTH, SINGAPORE 318996
<input type="checkbox"/>	<b>Testing Procedure: WMT</b> Tested by (name + signature) ..... : _____ Witnessed by (+ signature)..... : _____ Approved by (+ signature) ..... : _____ Testing location / address..... : _____
<input type="checkbox"/>	<b>Testing Procedure: SMT</b> Tested by (name + signature) ..... : _____ Approved by (+ signature) ..... : _____ Supervised by (+ signature) ..... : _____ Testing location / address..... : _____
<input type="checkbox"/>	<b>Testing Procedure: RMT</b> Tested by (name + signature) ..... : _____ Approved by (+ signature) ..... : _____ Supervised by (+ signature) ..... : _____ Testing location / address..... : _____

<b>Summary Of Testing</b>	
Unless otherwise indicated, all tests were conducted at TDK-LAMBDA SINGAPORE PTE LTD, #06-01/08, 1008 TOA PAYOH NORTH, SINGAPORE 318996.	
<b>Tests performed (name of test and test clause)</b>	<b>Testing location / Comments</b>
End Product Reference Page	
General Guidelines	
Power Supply Reference Page	
Maximum Output Voltage, Current, and Volt-Ampere Measurement (1.2.2.1)	

Input: Single-Phase (1.6.2)  
Durability of Marking (1.7.11)  
Capacitance Discharge (2.1.1.7)  
SELV Reliability (2.2.2, 2.2.3, 2.2.4, Part 22 6.1)  
Limited Current Circuit Measurement (2.4.1, 2.4.2)  
Protective Bonding II (2.6.3.4, 2.6.1)  
Humidity (2.9.1, 2.9.2, 5.2.2)  
Determination of Working Voltage; Working Voltage Measurement (2.10.2)  
Determination of Working Voltage; Hazardous Voltage (Circuit) Measurement (2.10.2, Part 22 6.1)  
Thin Sheet Material (2.10.5.9, 2.10.5.10, 2.10.5.6)  
Transformer and Wire /Insulation Electric Strength (2.10.5.13)  
Heating (4.5.1, 1.4.12, 1.4.13)  
Ball Pressure (4.5.5, 4.5)  
Touch Current (Single-Phase; TN/TT System) (5.1, Annex D)  
Electric Strength (5.2.2)  
Component Failure (5.3.1, 5.3.4, 5.3.7)  
Abnormal Operation (5.3.1 - 5.3.9)  
Transformer Abnormal Operation (5.3.3, 5.3.7b, Annex C.1)  
Power Supply Output Short-Circuit/Overload (5.3.7)

**Summary of Compliance with National Differences:**

AT, AU, BE, BG, BR, CA, CH, CN, CY, CZ, DE, DK, EE, ES, EU, FI, FR, GB, GR, HU, IE, IL, IS, IT, JP, KR, LT, LU, LV, MT, NL, NO, PL, PT, RO, SE, SG, SI, SK, UA, US

**Copy of Marking Plate** - Refer to Enclosure titled Marking Plate for copy.

**Test item particulars :**

Equipment mobility .....	for building-in
Connection to the mains .....	N/A
Operating condition .....	continuous
Access location .....	operator accessible
Over voltage category (OVC) .....	OVC II
Mains supply tolerance (%) or absolute mains supply values .....	+10%, -10%
Tested for IT power systems .....	Yes
IT testing, phase-phase voltage (V) .....	230V
Class of equipment .....	Class I (earthed)
Considered current rating (A) .....	20
Pollution degree (PD) .....	PD 2
IP protection class .....	IP X0
Altitude of operation (m) .....	Up to 2000
Altitude of test laboratory (m) .....	sea level
Mass of equipment (kg) .....	Open frame: 0.6 kg, With Metal enclosure: 0.82kg

**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 .....	2010-10-25
Date(s) of Performance of tests .....	2010-10-27 to 2010-11-24

**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 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.

**Product Description**

Electronic components mounted on PWB and housed with metal enclosure.

### Model Differences

All Models are similar to each other, except the following:-

- Ratings
- Transformer (T1) Secondary winding
- Model designation

Models GWS250-XX/PYYYYYYYYYYYYY is similar to Models GWS250-XX/YYYYYYYYYYYYYYY except for the following:

- i) ratings and higher power
- ii) external Forced Air Cooling required
- iii) alternate non-perforated Top cover
- iv) alternate control board with minor modifications to R117 from 62 ohms to 24 ohms and VR101/VR201 increased Over-Current Protection

Models GWS250-XX/BATYYYYYYYYYYY is similar to Models GWS250-XX/YYYYYYYYYYYYYYY except for output ratings.

Options:

/F	full cover
/L	no cover
/P	power up (350W)
/RL	reverse logic
/CO	lacquer coating on single side
/CO2	lacquer coating on double side
/ME	low leakage current
/T	OTP auto-restart
/BAT	Battery Charger

### Additional Information

The label is a draft of an artwork for marking plate pending approval by National Certification Bodies and it shall not be affixed to products prior to such an approval.

### Technical Considerations

- The product was submitted and evaluated for use at the maximum ambient temperature (T<sub>ma</sub>) permitted by the manufacturer's specification of: Forced Air - 50 °C, Conventional cooling - 50 °C
- The product is intended for use on the following power systems: TN, TT, IT
- The product was investigated to the following additional standards: EN 60950-1:2006+ A11:2009 (which includes all European national differences, including those specified in this test report).
- The following accessible locations (with circuit/schematic designation) are within a limited current circuit: Bridging capacitor C311

**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-Earthed Dead Metal: 328 Vrms, 542 Vpk,
- The following secondary output circuits are SELV: GWS250-12, GWS250-12/P: 12 V dc; , GWS250-24, GWS250-24/P: 24 V dc; , GWS250-36, GWS250-36/P: 36 V dc; , GWS250-48, GWS250-48/P: 48 V dc; , GWS250-24/BAT, GWS250-24/PBAT: 21-29 V dc; , GWS250-48/BAT, GWS250-48/PBAT: 42-58 V dc,
- The following secondary output circuits are at hazardous energy levels: GWS250-12, GWS250-12/P: 12 V dc; , GWS250-24, GWS250-24/P: 24 V dc; , GWS250-36, GWS250-36/P: 36 V dc; , GWS250-48, GWS250-48/P: 48 V dc; , GWS250-24/BAT, GWS250-24/PBAT: 21-29 V dc; , GWS250-48/BAT, GWS250-48/PBAT: 42-58 V dc
- The following secondary output circuits are Limited Current Circuits: Secondary side of C311
- The following output terminals were referenced to earth during performance testing: T1 pin 17, T301 pin 8
- The power supply terminals and/or connectors are: All models are suitable for factory wiring only
- 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: TB1 Neutral
- 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): T1 (Class F), T301 (Class F)
- The following end-product enclosures are required: Fire, Mechanical, Electrical
- The maximum continuous power supply output (Watts) relied on forced air cooling from: For Models GWS250-XX/PYYYYYYYYYYYY only, Two fans at 10 cfm each placed 7cm from unit applied to Bulk

capacitor C14 side (Opposite terminal block) blowing inwards.

- Power Supply Unit only evaluated on flat (bottom) horizontal position for all tests.

**Factory Location(s):**

TDK-LAMBDA MALAYSIA SDN BHD  
PLO33 KAWASAN PERINDUSTRIAN SENAI  
81400 SENAI MALAYSIA

TDK-LAMBDA MALAYSIA SDN BHD  
LOT 2 & 3, BATU 9 3/4  
KAWASAN PERINDUSTRIAN  
BANDAR BARU JAYA GADING  
26070 KUANTAN MALAYSIA

WUXI TDK-LAMBDA ELECTRONICS CO LTD  
LOT 107  
WUXI SINGAPORE INDUSTRIAL PARK  
XING CHUANG ERLU  
WUXI  
JIANGSU 214028 CHINA

TDK (MALAYSIA) SDN BHD  
KAWASAN PERUSAHAAN NILAI  
71800 NILAI MALAYSIA

MCTRONIC INDUSTRIES SDN BHD  
LOT 1907 JALAN IBRAHIM  
SUNGAI PINGGAN  
82200 BENUT, PONTIAN  
JOHOR MALAYSIA

**Attachments to Test Report**

National Differences (26 pages)

Enclosures (41 pages)