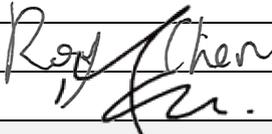


Test Report issued under the responsibility of:



<b>TEST REPORT</b> <b>IEC 60950-1</b> <b>Information technology equipment – Safety –</b> <b>Part 1: General requirements</b>	
<b>Report Number</b> .....	: 15077109 001
<b>Date of issue</b> .....	: 2015-04-23
<b>Total number of pages</b> .....	: 77
<b>Applicant's name</b> .....	: TDK-Lambda Corp. Nagaoka Technical Center
<b>Address</b> .....	: 2704-1 Settaya-machi, Nagaoka-shi, Niigata, 940-1195, JAPAN
<b>Test specification:</b>	
<b>Standard</b> .....	: IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am 2:2013
<b>Test procedure</b> .....	: CB Scheme
<b>Non-standard test method</b> .....	: N/A
<b>Test Report Form No.</b> .....	: IEC60950_1F
<b>Test Report Form(s) Originator</b> ....	: SGS Fimko Ltd
<b>Master TRF</b> .....	: Dated 2014-02
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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.	
<b>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.</b>	
<b>General disclaimer:</b>	
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.	

<b>Test item description</b> ..... : Switching Power Supply	
<b>Trade Mark</b> ..... : <b>TDK-Lambda</b>	
<b>Manufacturer</b> ..... : Same as applicant	
<b>Model/Type reference</b> ..... : CUS250 <b>x-yzz1</b> ( <b>x</b> = blank or LD ; <b>y</b> = 3, 4, 5, 12 or 24 ; <b>z</b> = /CO2, /A or blank ; <b>z1</b> = alphanumeric character, symbol or blank)	
<b>Ratings</b> ..... : AC input: See the model list on page 9 DC output: See the model list on page 9	
<b>Testing procedure and testing location:</b>	
<input checked="" type="checkbox"/>	<b>CB Testing Laboratory:</b> TÜV Rheinland (Shanghai) Co., Ltd.
<b>Testing location/ address</b> ..... : B1-13/F, No.177, Lane 777, West Guangzhong Road, Zhabei District, Shanghai 200072, P. R. China	
<input type="checkbox"/>	<b>Associated CB Testing Laboratory:</b>
<b>Testing location/ address</b> ..... :	
<b>Tested by (name + signature)</b> ..... : Roy Chen 	
<b>Approved by (name + signature)</b> ..... : Mark Chen 	
<input type="checkbox"/>	<b>Testing procedure:</b> <b>TMP/CTF Stage 1:</b>
<b>Testing location/ address</b> ..... :	
<b>Tested by (name + signature)</b> ..... :	
<b>Approved by (name + signature)</b> ..... :	
<input type="checkbox"/>	<b>Testing procedure:</b> <b>WMT/CTF Stage 2:</b>
<b>Testing location/ address</b> ..... :	
<b>Tested by (name + signature)</b> ..... :	
<b>Witnessed by (name + signature)</b> ..... :	
<b>Approved by (name + signature)</b> ..... :	
<input type="checkbox"/>	<b>Testing procedure:</b> <b>SMT/CTF Stage 3 or 4:</b>
<b>Testing location/ address</b> ..... :	
<b>Tested by (name + signature)</b> ..... :	
<b>Witnessed by (name + signature)</b> ..... :	
<b>Approved by (name + signature)</b> ..... :	
<b>Supervised by (name + signature)</b> ..... :	

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

- ATTACHMENT 1 - Technical documentation (37 pages)
- ATTACHMENT 2 - Photo documentation (5 pages)
- ATTACHMENT 3 - National Differences (30 pages)

**Summary of testing:**

All applicable tests as described in Test Case and Measurement Sections were performed.

The maximum specified operation ambient temperature is up to 70°C.

Specified ambient temperature for operation is according to manufacturer's specification.(see next page chart of convection cooling)

The load conditions used during testing: Maximum normal load according to sub-clause 1.2.2.1 for this equipment is the operation with the maximum specified DC-load with maximum power condition according to the manufacturer specified.

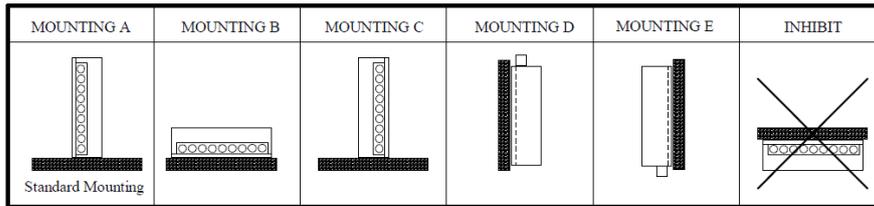
The equipment is operated up to 3000m above sea level as declared by manufacturer. Clearances have been evaluated according to IEC 60664-1 table A.2 with a multiplication factor of 1.14 throughout this report.

**Mounting position:**

**5. Mounting Directions**

**5-1. Output Derating according to the Mounting Directions.**

Recommended standard mounting method is (A). Method (B)-(E) are also possible. Refer to the output derating below. Load(%) of derating curve indicates output power.

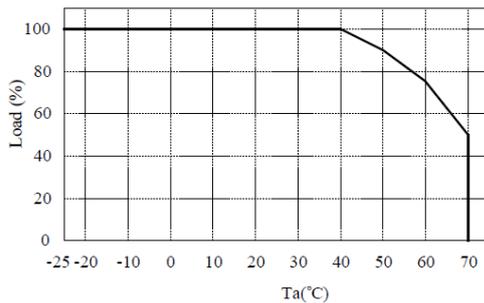


**Derating Curve:**

**5-2. Output Derating vs Ambient temperature**

Make sure that the specified temperature range is maintained.

**CONVECTION COOLING**

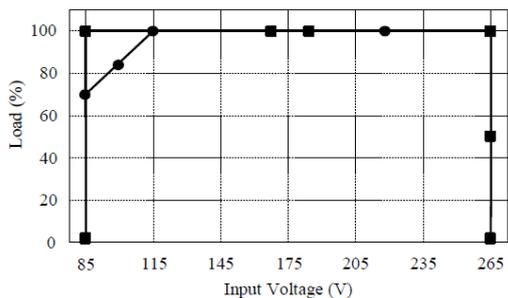


— Mounting (A),(B),(C),(D),(E)

Ta (°C)	Load (%)
	Mounting (A),(B),(C),(D),(E)
-25~40	100
50	90
60	75
70	50

**5.3. Output Derating vs Input Voltage**

Output derating is required when the PSU operate below 115VAC input. Refer to table below for details.



Input Voltage	Load(%)	
	-4, 5, 12, 24	-3
85VAC	80	100
115~265VAC	100	100

**Tests performed (name of test and test clause):**

Clause	Test description
1.6.2	Input Current
1.7.11	Durability
2.1.1.5	Energy Hazards
2.1.1.7	Discharge of Capacitors in equipment
2.2.2	Voltages under normal conditions
2.2.3	Voltages under fault conditions
2.6.3.4	Resistance of earthing conductors and their terminations
2.9.2	Humidity Conditioning - Electrical insulation
2.10.2	Determination of working voltage
4.2.2	Steady Force Test, 10N
4.5.2	Temperature tests
4.5.5	Resistance to abnormal heat
5.1.6	Test measurements - Touch current and protective conductor current
5.2	Electric strength
5.3	Abnormal operating and fault conditions
Annex C	Transformers

**Testing location:**

The laboratory described on page 2.

**Summary of compliance with National Differences**

**List of countries addressed:**

EU Group Differences, EU Special National Conditions, CA, US.

Explanation of used codes:

CA=Canada; US = United States of America.

The product fulfils the requirements of  
 EN 60950-1:2006+A11+A1+A12+A2,  
 UL 60950-1:2007 R10.14 and  
 CAN/CSA C22.2 No. 60950-1-07+A1:2011+A2:2014.

For National Differences see corresponding Attachment

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>

**CUS250-3**  

**AC INPUT: 100 - 240VAC ~ 2.0 A**  
**50 - 60Hz**

**OUTPUT: 3.3 V  $\equiv$  50 A**

BAR CODE

**TDK·Lambda**  
 MADE IN CHINA

**INPUT OUTPUT TERMINAL**

-V	-V	-V	+V	+V	+V	FG	L	N
----	----	----	----	----	----	----	---	---

**CUS250-4**  

**AC INPUT: 100 - 240VAC ~ 2.4 A**  
**50 - 60Hz**

**OUTPUT: 4.2 V  $\equiv$  50 A**

BAR CODE

**TDK·Lambda**  
 MADE IN CHINA

**INPUT OUTPUT TERMINAL**

-V	-V	-V	+V	+V	+V	FG	L	N
----	----	----	----	----	----	----	---	---

**CUS250-5**  

**AC INPUT: 100 - 240VAC ~ 2.8 A**  
**50 - 60Hz**

**OUTPUT: 5 V  $\equiv$  50 A**

BAR CODE

**TDK·Lambda**  
 MADE IN CHINA

**INPUT OUTPUT TERMINAL**

-V	-V	-V	+V	+V	+V	FG	L	N
----	----	----	----	----	----	----	---	---

**CUS250-12**  

**AC INPUT: 100 - 240VAC ~ 2.8 A**  
**50 - 60Hz**

**OUTPUT: 12 V  $\equiv$  21 A**

BAR CODE

**TDK·Lambda**  
 MADE IN CHINA

**INPUT OUTPUT TERMINAL**

-V	-V	-V	+V	+V	+V	FG	L	N
----	----	----	----	----	----	----	---	---

**CUS250-24**  

**AC INPUT: 100 - 240VAC ~ 2.8 A**  
**50 - 60Hz**

**OUTPUT: 24 V  $\equiv$  10.5 A**

BAR CODE

**TDK·Lambda**  
 MADE IN CHINA

**INPUT OUTPUT TERMINAL**

-V	-V	-V	+V	+V	+V	FG	L	N
----	----	----	----	----	----	----	---	---

**CUS250LD- 3**

**AC INPUT : 100 - 240VAC ~ 2.0 A**  
**50 - 60Hz**

**OUTPUT : 3.3 V  $\equiv$  50 A**

BAR CODE

***TDK-Lambda***  
 MADE IN CHINA

**INPUT OUTPUT TERMINAL**

-V	-V	-V	+V	+V	+V	FG	L	N
----	----	----	----	----	----	----	---	---

**CUS250LD- 4**

**AC INPUT : 100 - 240VAC ~ 2.4 A**  
**50 - 60Hz**

**OUTPUT : 4.2 V  $\equiv$  50 A**

BAR CODE

***TDK-Lambda***  
 MADE IN CHINA

**INPUT OUTPUT TERMINAL**

-V	-V	-V	+V	+V	+V	FG	L	N
----	----	----	----	----	----	----	---	---

**CUS250LD- 5**

**AC INPUT : 100 - 240VAC ~ 2.8 A**  
**50 - 60Hz**

**OUTPUT : 5 V  $\equiv$  50 A**

BAR CODE

***TDK-Lambda***  
 MADE IN CHINA

**INPUT OUTPUT TERMINAL**

-V	-V	-V	+V	+V	+V	FG	L	N
----	----	----	----	----	----	----	---	---

**CUS250LD- 12**

**AC INPUT : 100 - 240VAC ~ 2.8 A**  
**50 - 60Hz**

**OUTPUT : 12 V  $\equiv$  21 A**

BAR CODE

***TDK-Lambda***  
 MADE IN CHINA

**INPUT OUTPUT TERMINAL**

-V	-V	-V	+V	+V	+V	FG	L	N
----	----	----	----	----	----	----	---	---

**CUS250LD- 24**

**AC INPUT : 100 - 240VAC ~ 2.8 A**  
**50 - 60Hz**

**OUTPUT : 24 V  $\equiv$  10.5 A**

BAR CODE

***TDK-Lambda***  
 MADE IN CHINA

**INPUT OUTPUT TERMINAL**

-V	-V	-V	+V	+V	+V	FG	L	N
----	----	----	----	----	----	----	---	---

**CUS250-3/C02**  

**AC INPUT: 100 - 240VAC ~ 2.0 A**  
**50 - 60Hz**

**OUTPUT: 3.3 V  $\approx$  50 A**

BAR CODE

***TDK-Lambda***  
 MADE IN CHINA

**INPUT OUTPUT TERMINAL**

-V	-V	-V	+V	+V	+V	FG	L	N
----	----	----	----	----	----	----	---	---

**CUS250-4/C02**  

**AC INPUT: 100 - 240VAC ~ 2.4 A**  
**50 - 60Hz**

**OUTPUT: 4.2 V  $\approx$  50 A**

BAR CODE

***TDK-Lambda***  
 MADE IN CHINA

**INPUT OUTPUT TERMINAL**

-V	-V	-V	+V	+V	+V	FG	L	N
----	----	----	----	----	----	----	---	---

**CUS250-5/C02**  

**AC INPUT: 100 - 240VAC ~ 2.8 A**  
**50 - 60Hz**

**OUTPUT: 5 V  $\approx$  50 A**

BAR CODE

***TDK-Lambda***  
 MADE IN CHINA

**INPUT OUTPUT TERMINAL**

-V	-V	-V	+V	+V	+V	FG	L	N
----	----	----	----	----	----	----	---	---

**CUS250-12/C02**  

**AC INPUT: 100 - 240VAC ~ 2.8 A**  
**50 - 60Hz**

**OUTPUT: 12 V  $\approx$  21 A**

BAR CODE

***TDK-Lambda***  
 MADE IN CHINA

**INPUT OUTPUT TERMINAL**

-V	-V	-V	+V	+V	+V	FG	L	N
----	----	----	----	----	----	----	---	---

**CUS250-24/C02**  

**AC INPUT: 100 - 240VAC ~ 2.8 A**  
**50 - 60Hz**

**OUTPUT: 24 V  $\approx$  10.5 A**

BAR CODE

***TDK-Lambda***  
 MADE IN CHINA

**INPUT OUTPUT TERMINAL**

-V	-V	-V	+V	+V	+V	FG	L	N
----	----	----	----	----	----	----	---	---

<b>Test item particulars</b> .....	: See below
<b>Equipment mobility</b> .....	: <input type="checkbox"/> movable <input type="checkbox"/> hand-held <input type="checkbox"/> transportable <input type="checkbox"/> stationary <input checked="" type="checkbox"/> for building-in <input type="checkbox"/> direct plug-in
<b>Connection to the mains</b> .....	: <input checked="" type="checkbox"/> pluggable equipment <input checked="" type="checkbox"/> type A <input checked="" type="checkbox"/> type B <input checked="" 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
<b>Operating condition</b> .....	: <input checked="" type="checkbox"/> continuous <input type="checkbox"/> rated operating / resting time:
<b>Access location</b> .....	: <input type="checkbox"/> operator accessible <input checked="" type="checkbox"/> restricted access location
<b>Over voltage category (OVC)</b> .....	: <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:
<b>Mains supply tolerance (%) or absolute mains supply values</b> .....	: ±10%
<b>Tested for IT power systems</b> .....	: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<b>IT testing, phase-phase voltage (V)</b> .....	:
<b>Class of equipment</b> .....	: <input checked="" type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Class III <input type="checkbox"/> Not classified
<b>Considered current rating of protective device as part of the building installation (A)</b> .....	: 16 (20 for US/CSA)
<b>Pollution degree (PD)</b> .....	: <input type="checkbox"/> PD 1 <input checked="" type="checkbox"/> PD 2 <input type="checkbox"/> PD 3
<b>IP protection class</b> .....	: IPX0
<b>Altitude during operation (m)</b> .....	: Up to 3000
<b>Altitude of test laboratory (m)</b> .....	: Approx 50
<b>Mass of equipment (kg)</b> .....	: ≈0.68kg (with chassis and cover)
<b>Possible test case verdicts:</b>	
- 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)
<b>Testing</b> .....	
<b>Date of receipt of test item</b> .....	: 2015-03-06
<b>Date(s) of performance of tests</b> .....	: 2015-03-21 to 2015-04-02
<b>General remarks:</b>	
"(See Enclosure #)" refers to additional information appended to the report. "(See ATTACHMENT #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report.	
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 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) .....** : 1. Wuxi TDK-Lambda Electronics Co., Ltd.  
 No. 6 Xing Chuang Er Lu, Wuxi, Jiangsu 214028,  
 P. R. China  
 2. Zhangjiagang Hua Yang Electronics Co., Ltd.  
 Zhao Feng Industrial Zone, Leyu Town,  
 Zhangjiagang, Jiangsu 215622, P. R. China

**General product information:**

The EUT is a component type switching mode power supplies intended for the class I construction of information technology equipment.

The equipment employs PCB: CCB156 (primary, PB and secondary circuits)

All models are identical, except of the turns of Transformer and the rating of some components which results in different output ratings. See Model List below for details.

For rating differences between the models see below tables:

Model	I/p voltage (Vac)	Fre. (Hz)	I/p current (A)	Minimal output	Rated output (typical)	Maximum output
CUS250x-3zz1	100-240	50-60	2.0	2.97Vd.c.	3.3Vd.c.	3.63Vd.c.
				50A	50A	45.45A
CUS250x-4zz1	100-240	50-60	2.4	3.78Vd.c.	4.2Vd.c.	4.62Vd.c.
				50A	50A	45.45A
CUS250x-5zz1	100-240	50-60	2.8	4.5Vd.c.	5Vd.c.	5.5Vd.c.
				50A	50A	45.45A
CUS250x-12zz1	100-240	50-60	2.8	10.8Vd.c.	12Vd.c.	13.2Vd.c.
				21A	21A	19.1A
CUS250x-24zz1	100-240	50-60	2.8	21.6Vd.c.	24Vd.c.	26.4Vd.c.
				10.5A	10.5A	9.55A

Remark:

Operating temp.: up to +70°C (operating temperature depending on equipment's load, mounting position, for details refer to instruction manual).

**Additional Information**

- The product is component type power supply., the overall compliance shall be investigated in the complete information technology equipment, in particular as Fire enclosure, Mechanical enclosure and Electrical enclosure.
- Some components are **pre-certified**, which have been evaluated according to the relevant requirements of IEC 60950-1, are employed in this product. Their suitability of use has been checked according to subclauses 1.5.1 and 1.5.2.
- The product is a **component** intended for incorporation in information technology equipment, the overall

compliance shall be investigated in the complete information technology equipment

- The label is draft of artwork for marking plates pending approval by National Certification Bodies and it shall not be affixed to products prior to such an approval.
- Tests were repeated with each alternative source of components with identical results unless otherwise specified.

#### Markings and Instructions

- The installation instruction contains instructions for connection to an IT power distribution system. (See subclause 1.7.2.4):
- Fuse Identification (See subclause 1.7.6):  
F1: AC 250V T6.3AH

The product also marked with: CAUTION: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ONLY WITH SAME TYPE AND RATING OF FUSE.

#### History of CB Test Report:

- 1) Test report No. 15050650 001. The test report was issued for TDK-Lambda Corp. Nagaoka Technical Center and addressed model mentioned page 2 tested to IEC 60950-1:2005 (2nd Edition); Am 1:2009.
- 2) Test report No. 15077109 001 This test report issued for TDK-Lambda Corp. Nagaoka Technical Center serves to combine and upgrade the above mentioned test report with following updates:
  - Upgrade test requirement to IEC 60950-1:2005+A1:2012+A2:2013
  - Add plastic cover. Refer to photo documentation for the cover.
  - Add alternate sources of Optocoupler (PC101, PC102), Mfg.: TOSHIBA, type: TLP291 and Mfg.: VISHAY, type VOS617A. Refer to appended table 1.5.1 for details.
  - Update variable definition as below:

#### Definition of variable(s):

Variable:	Range of variable:	Content:
<b>x</b>	LD or blank	blank: Standard type of model name; LD: Special type of model name base on the customer requirement.
<b>y</b>	3, 4, 5, 12 or 24	Denotes for different output voltage.
<b>z</b>	/CO2, /A or blank	/CO2 = with coating; /A = with plastic cover blank = not coating
<b>z1</b>	alphanumeric character, symbol or blank	For market purposes, no construction differences and no safety impact.

#### 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
-Short-circuited	s-c	-No component damage	NCD
-Open-circuited	o-c	-Component damage	CD
-Overloaded	o-l	-Test repeated, similar result	RT
-Internal protection operated	IP	-No indication of dielectric breakdown	NB
-Input	i/p	-Cheesecloth remained intact	NC
-Output	o/p	-Tissue paper remained intact	NT
-Constant temperatures were obtained	CT	-The unit can recover auto when removing the abnormal condition	RA

Indicate used abbreviations (if any)