Test Report issued under the responsibility of:

TÜVRheinland®

TEST REPORT

IEC 60950-1

Information technology equipment – Safety – Part 1: General requirements

Report Number. ..... :	15077099 002
Date of issue ..... :	2015-12-24
Total number of pages ..... :	62
Applicant's name ..... :	TDK-Lambda Corp. Nagaoka Technical Center
Address ..... :	2704-1 Settaya-machi, Nagaoka-shi, Niigata, 940-1195, JAPAN
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

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 ..... :	Switching Power Supply
Trade Mark ..... :	***TDK·Lambda***
Manufacturer..... :	Same as applicant
Model/Type reference ..... :	CUS350M-**zxxxxxxx**, CME350A-**zxxxxxxx** (**z** = 12, 18, 24, 36 or 48; **xxxxxxx** = F, FN, PG, 2, F2, PG2, S**, 0-9, a-z, A-Z, other alphanumeric character, symbol or blank) Refer to page 9 for definition of variables
Ratings ..... :	AC input: See the model list on page 7 and 8 for details DC output: See the model list on page 7 and 8 for details

Testing procedure and testing location:			
☒	**CB Testing Laboratory:**	TÜV Rheinland (Shanghai) Co., Ltd.	
Testing location/ address..... :		B1-13/F, No.177, Lane 777, West Guangzhong Road, Zhabei District, Shanghai 200072, P. R. China	
☐	**Associated CB Testing Laboratory:**		
Testing location/ address..... :			
Tested by (name + signature) ..... :		Sunny Sun	
Approved by (name + signature) ..... :		Roy Chen	
☐	**Testing procedure: TMP/CTF Stage 1:**		
Testing location/ address..... :			
Tested by (name + signature) ..... :			
Approved by (name + signature) ..... :			
☐	**Testing procedure: WMT/CTF Stage 2:**		
Testing location/ address..... :			
Tested by (name + signature) ..... :			
Witnessed by (name + signature)..... :			
Approved by (name + signature) ..... :			
☐	**Testing procedure: SMT/CTF Stage 3 or 4:**		
Testing location/ address..... :			
Tested by (name + signature) ..... :			
Witnessed by (name + signature)..... :			
Approved by (name + signature) ..... :			
Supervised by (name + signature)..... :			

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

- ATTACHMENT 1 – Technical Documentation (5 pages)
- ATTACHMENT 2 – National Differences (56 pages)

Note: Total number of pages in each attachment is indicated in individual attachment.

Summary of testing:

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

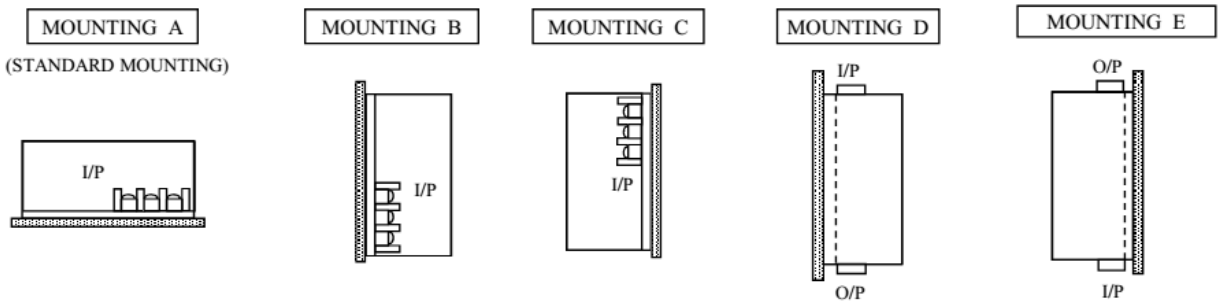
The maximum specified operation ambient temperature is 70°C.

Specified ambient temperature for operation is according to manufacturer's specification.(see chart of convection cooling and force air cooling on following)

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.

Unless otherwise indicated, all tests were conducted on model CUS350M-12/F, CUS350M-24/F, CUS350M-36/F and CUS350M-48/F considered being representative of all models.

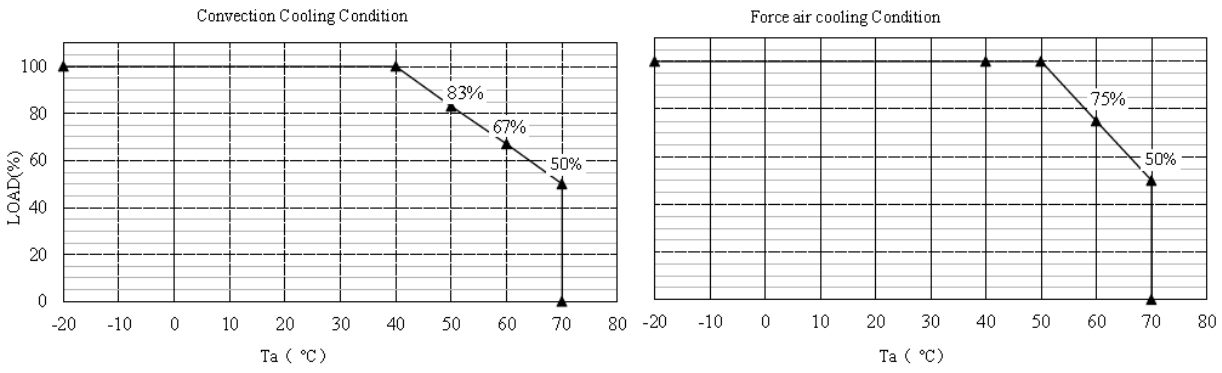
Mounting position:



De-rating Curve:

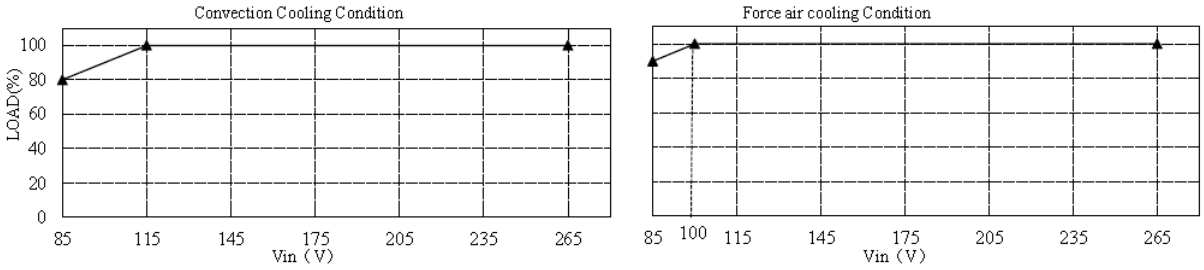
OUTPUT DERATING VERSUS OPERATING AMBIENT TEMPERATURE (Ta)

Ta (°C)	LOAD (%) Covection cooling	LOAD (%) Force air cooling
-20 - +40	100	100
50	83	100
60	67	75
70	50	50



OUTPUT DERATING VERSUS INPUT VOLTAGE

INPUT VOLTAGE (VAC)	LOAD (%)
85	80
115~265	100



The equipment is operated up to 5000m above sea level as declared by manufacturer. Clearances have been evaluated according to IEC 60664-1 table A.2 with a multiplication factor of 1.48 throughout this report.

Tests performed (name of test and test clause):

Clause	Test description
1.6.2	Input Current
2.2.2	Voltages under normal conditions
2.2.3	Voltages under fault conditions
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
5.2	Electric strength
5.3	Abnormal operating and fault conditions

Testing location:

TÜV Rheinland (Shanghai) Co., Ltd.
B1-13/F, No.177, Lane 777, West Guangzhong Road, Zhabei District, Shanghai 200072, P. R. China

Summary of compliance with National Differences

List of countries addressed:

EU Group Differences, EU Special National Conditions, AR, AU, AT, BH, BY, BE, BR, BG, CA, CN, CO, HR, CZ, DK, FI, FR, DE, GR, HU, IN, ID, IE, IL, IT, JP, KE, KR, LR, MY, MX, AN, NZ, NG, NO, PK, PL, PT, RU, RO, SA, RS, SG, SK, SI, ZA, ES, SE, CH, TH, TR, UA, AE, GB, US, VN

Explanation of used codes:

AR = Argentina**; AU = Australia**; AT = Austria*; BH = Bahrain**; BY = Belarus**;
BE = Belgium*/**; BR = Brazil**; BG = Bulgaria*/**; CA = Canada; CN = China**;
CO = Colombia**; HR = Croatia**; CZ = Czech Republic*/**; DK = Denmark*; FI = Finland*/**;
FR = France*/**; DE = Germany*/**; GR = Greece*/**; HU = Hungary*/**; IN = India**;
ID = Indonesia**; IE = Ireland*/**; IL = Israel**; IT = Italy*; JP = Japan**; KE = Kenya**;
KR = Korea, Republic Of**; LR = Libya**; MY = Malaysia**; MX = Mexico**; AN = Netherlands Antilles*/**;
NZ = New Zealand**; NG = Nigeria**; NO = Norway*/**; PK = Pakistan**; PL = Poland*/**;
PT = Portugal*/**; RU = Russian Federation**; RO = Romania*/**; SA = Saudi Arabia**; RS = Serbia Republic Of**;
SG = Singapore**; SK = Slovakia*/**; SI = Slovenia*/**; ZA = South Africa**; ES = Spain*/**;
SE = Sweden*; CH = Switzerland*/**; TH = Thailand**; TR = Turkey*/**; UA = Ukraine**;
AE = United Arab Emirates**; GB = United Kingdom*; US = United States of America; VN = Vietnam**

Test item particulars..... :	See below
Equipment mobility.....:	[] movable [] hand-held [] transportable [] stationary [x] for building-in [] direct plug-in
Connection to the mains.....:	[x] pluggable equipment [x] type A [x] type B [x] permanent connection [] detachable power supply cord [] non-detachable power supply cord [] not directly connected to the mains
Operating condition.....:	[x] continuous [] rated operating / resting time:
Access location .....:	[] operator accessible [x] restricted access location
Over voltage category (OVC) .....:	[] OVC I [x] OVC II [] OVC III [] OVC IV [] other:
Mains supply tolerance (%) or absolute mains supply values .....:	±10%
Tested for IT power systems .....:	[x] Yes [] No
IT testing, phase-phase voltage (V) .....:	
Class of equipment .....:	[x] Class I [] Class II [] Class III [] Not classified
Considered current rating of protective device as part of the building installation (A) .....:	16 (20 for US/CSA)
Pollution degree (PD) .....:	[] PD 1 [x] PD 2 [] PD 3
IP protection class .....:	IPX0
Altitude during operation (m) .....:	Up to 5000
Altitude of test laboratory (m) .....:	Approx 50
Mass of equipment (kg) .....:	≅0.8kg
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.....:	2015-12-10
Date(s) of performance of tests .....:	2015-12-10 to 2015-12-17
General remarks:	
"(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 ☐ 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) ..... :

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.

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:

Series Model	I/p voltage (Vac)	Freq (Hz)	I/p current (A)	Minimal output	Rated output (typical)	Maximum output
For convection cooling						
CUS350M-12**xxxxxxx**	100-240	50-60	4.0	11.4 Vd.c.	12.0 Vd.c.	12.6 Vd.c.
CME350A-12**xxxxxxx**				29 A	29 A	27.6 A
CUS350M-18**xxxxxxx**	100-240	50-60	4.0	17.1 Vd.c.	18.0 Vd.c.	18.9 Vd.c.
CME350A-18**xxxxxxx**				19.4 A	19.4 A	18.5 A
CUS350M-24**xxxxxxx**	100-240	50-60	4.0	22.8 Vd.c.	24.0 Vd.c.	25.2 Vd.c.
CME350A-24**xxxxxxx**				14.7 A	14.7 A	14 A
CUS350M-36**xxxxxxx**	100-240	50-60	4.0	34.2 Vd.c.	36.0 Vd.c.	37.8 Vd.c.
CME350A-36**xxxxxxx**				9.7A	9.7A	9.2A
CUS350M-48**xxxxxxx**	100-240	50-60	4.0	45.6 Vd.c..	48.0 Vd.c.	50.4 Vd.c.
CME350A-48**xxxxxxx**				7.3 A	7.3 A	7.0 A
For force air cooling						

CUS350M-12**xxxxxxx** CME350A-12**xxxxxxx**	100-240	50-60	4.5	11.4 Vd.c.	12.0 Vd.c.	12.6 Vd.c.
				34.5A	34.5A	32.8A
CUS350M-18**xxxxxxx** CME350A-18**xxxxxxx**	100-240	50-60	4.5	17.1 Vd.c.	18.0 Vd.c.	18.9 Vd.c.
				23A	23A	21.9A
CUS350M-24**xxxxxxx** CME350A-24**xxxxxxx**	100-240	50-60	4.5	22.8 Vd.c.	24.0 Vd.c.	25.2 Vd.c.
				17.5A	17.5A	16.6A
CUS350M-36**xxxxxxx** CME350A-36**xxxxxxx**	100-240	50-60	4.5	34.2 Vd.c.	36.0 Vd.c.	37.8 Vd.c.
				11.5A	11.5A	10.9A
CUS350M-48**xxxxxxx** CME350A-48**xxxxxxx**	100-240	50-60	4.5	45.6 Vd.c.	48.0 Vd.c.	50.4 Vd.c.
				8.7A	8.7A	8.3A

Description of change(s):

Previous approved models were modified as following:

1. Add force air cooling condition for all models.
2. Add additional model CUS350M-36**xxxxxxx**
3. Add additional models CME350A-**zxxxxxxx**, which is identical to previous models CUS350M-**zxxxxxxx** except for model name.
4. Update national differences.
5. Correct typing error for appended table 2.10.3 and 2.10.4 and Annex C of original report 15077099 001.

For the above described change(s) the following was considered to be necessary:

Change	Testing	Comments
1.	See page 4	See appended tables for test result.
2.	See page 4	The additional model CUS350M-36**xxxxxxx** is identical to approved model CUS350M-48**xxxxxxx** except for transformer. Related tests have been performed. See appended table 1.5.1 for updated components in bold font.
3.	N/A	The additional models CME350A-**zxxxxxxx** is identical to previous models CUS350M-**zxxxxxxx** except for model name. No further testing performed.
4.	N/A	See ATTACHMENT 1 - National Differences for updated.
5.	N/A	See appended tables 2.10.3 and 2.10.4 and Annex C for details.

History of amendments and modifications:

Ref. No. 15077099 001, dated 2015-05-29 (original test report)
Ref. No. 15077099 002, dated 2015-12-24 (1st Modification)

Definition of variable(s):

CUS350M-**zxxxxxxx**, CME350A-**zxxxxxxx**
(**z** = 12, 18, 24, 36 or 48; **xxxxxxx** = F, FN, PG, 2, F2, PG2, S**, 0-9, a-z, A-Z, other alphanumeric character, symbol or blank)

Variable:	Range of variable:	Content:
z	12, 18, 24, 36 or 48	Denotes for different output voltage
xxxxxxx	F	Denotes for Full function
	FN	Denotes for Fan Power Terminal
	PG	Denotes for power good
	2	Denotes for PWB coating
	F2	Denotes for full function and PWB coating
	PG2	Denotes for power good and PWB coating
	S**	Denotes for special modified model, not affect safety
	0-9, a-z, A-Z, other alphanumeric character, symbol or blank	Denotes for market purposes, no construction differences and no safety impact.
	blank	Denotes for Standard type

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)