



Test Report issued under the responsibility of:



**TEST REPORT
IEC 62368-1**

**Audio/video, information and communication technology equipment
Part 1: Safety requirements**

Report Number : 60399412 001
Date of issue : 2020-08-03
Total number of pages : 101 (excluding attachments, refer to page 3)

Applicant's name..... : **TDK-Lambda (China) Electronics Co., Ltd.**
Address : No. 95, Zhujiang Road, Xinwu District, Wuxi 214028 Jiangsu, P.R. China

Test specification:
Standard : IEC 62368-1:2014 (Second Edition)
Test procedure : CB Scheme
Non-standard test method..... : N/A

Test Report Form No..... : IEC62368_1B
Test Report Form(s) Originator .. : UL(US)
Master TRF : 2014-03

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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, A, S**, FET, FGE, LN, 0-9, a-z, A-Z, other alphanumeric character, symbol or blank)
Ratings	See the model list on page 11 for details

Testing procedure and testing location:		
<input checked="" type="checkbox"/>	CB Testing Laboratory:	TÜV Rheinland Shanghai Co., Ltd.
Testing location/ address		No.177, 178, Lane 777 West Guangzhong Road, Jing'an District, Shanghai, China
<input type="checkbox"/>	Associated CB Testing Laboratory:	
Testing location/ address		
Tested by (name + signature)		Tim Song / Technical Expert 
Approved by (name + signature).....		Sunny Sun / Technical Reviewer 
<input type="checkbox"/>	Testing procedure: TMP/CTF Stage 1	
Testing location/ address		
Tested by (name + signature)		
Approved by (name + signature).....		
<input type="checkbox"/>	Testing procedure: WMT/CTF Stage 2	
Testing location/ address		
Tested by (name + signature)		
Witnessed by (name + signature)		
Approved by (name + signature).....		
<input type="checkbox"/>	Testing procedure: SMT/CTF Stage 3 or 4	
Testing location/ address		
Tested by (name + signature)		
Approved by (name + signature).....		
Supervised by (name + signature)		

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

- ATTACHMENT – Measurement Section (4 pages)
- ATTACHMENT – National Differences (35 pages)
- ATTACHMENT – Photo documentation (20 pages)

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

Summary of testing:

Tests performed (name of test and test clause):

This report is based on original CB report 50126329 001 with certificate ref. no. JPTUV-089966 with following changes:

1. Change Applicant and Manufacturer from TDK-Lambda Corp. Nagaoka Technical Center to TDK-Lambda (China) Electronics Co., Ltd.
2. Add additional new factory TDK-Lambda (China) Electronics Co., Ltd.
3. Update test standard from IEC 60950-1 to IEC 62368-1.

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)

Unless otherwise indicated, all applicable tests were performed on models CUS350M-12/A, CUS350M-48/A, CUS350M-12/F and CUS350M-48/F to represent other similar models.

The load conditions used during testing: Maximum normal load according to clause B.2.5 for this equipment is the operation with the maximum specified DC-load with maximum power condition according to the manufacturer specified.

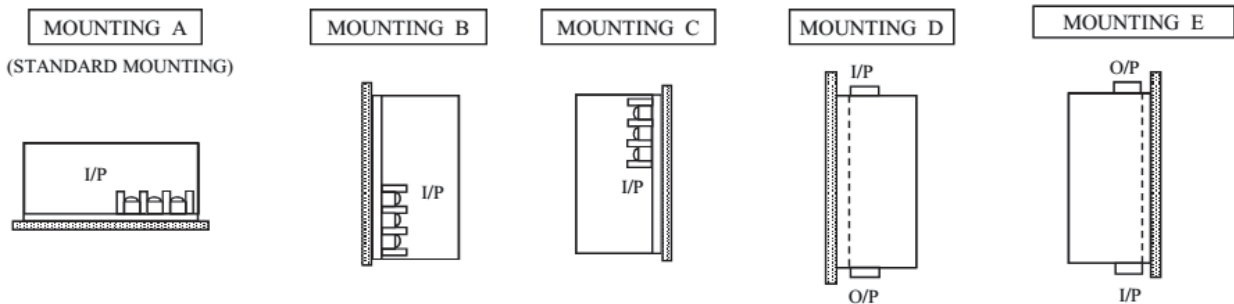
The equipment is operated up to 5000m above sea level as declared by manufacturer. Clearances have been evaluated according to IEC 60664-1 table A.2 with a multiplication factor of 1.48 throughout this report.

The test samples are pre-production without serial numbers.

Testing location:

TÜV Rheinland Shanghai Co. Ltd.
No.177, 178, Lane 777 West
Guangzhong Road, Jing'an District,
Shanghai, China

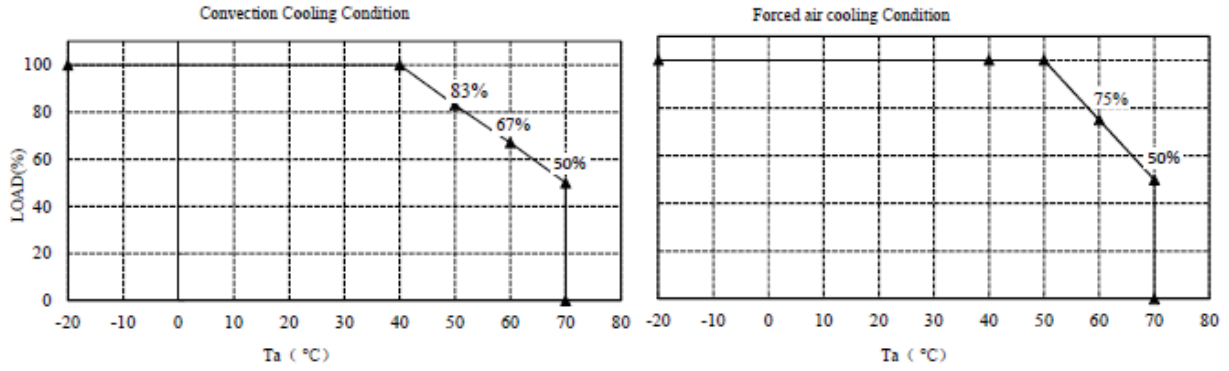
Mounting position:



De-rating Curve for /F models:

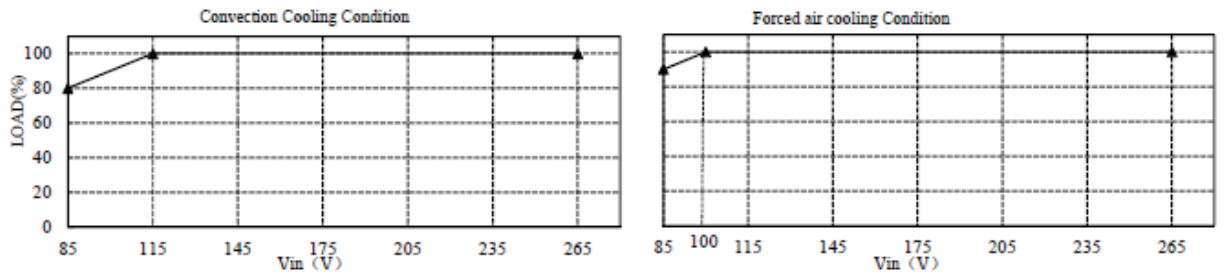
OUTPUT DERATING VERSUS OPERATING AMBIENT TEMPERATURE (Ta)

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



OUTPUT DERATING VERSUS INPUT VOLTAGE

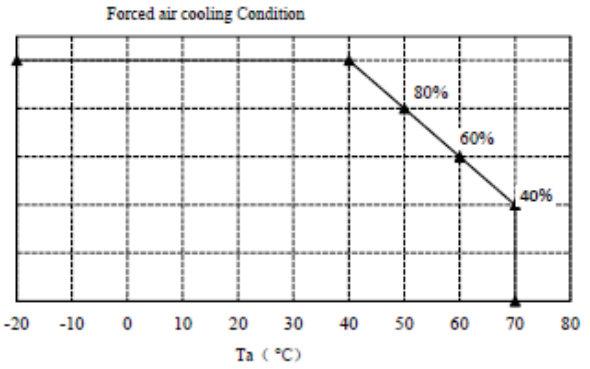
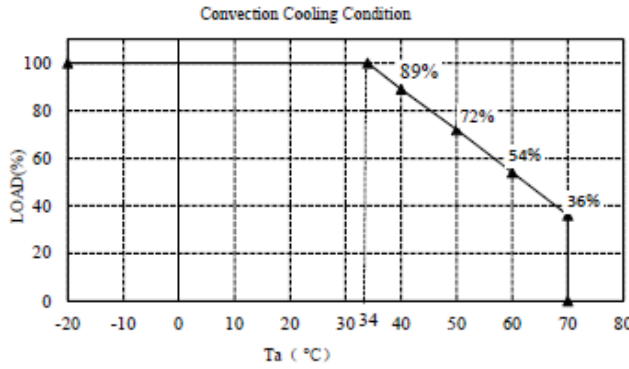
INPUT VOLTAGE (VAC)	LOAD (%)	
	Convection cooling	Forced air cooling
85	80	90
115~265	100	100



De-rating Curve for /A models:

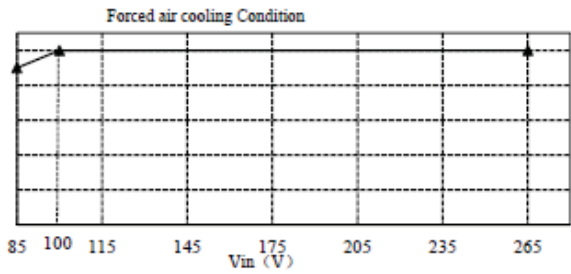
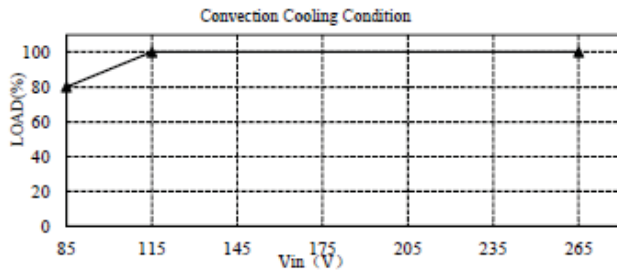
OUTPUT DERATING VERSUS OPERATING AMBIENT TEMPERATURE (Ta)

Ta (°C)	LOAD (%) Convection cooling	LOAD (%) Forced air cooling
-20 - +34	100	100
34	100	100
40	89	100
50	72	80
60	54	60
70	36	40



OUTPUT DERATING VERSUS INPUT VOLTAGE

INPUT VOLTAGE (VAC)	LOAD (%)	
	Convection cooling	Forced air cooling
85	80	90
115~265	100	100



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

EU Group Differences, EU Special National Conditions, AU, CA, DK, JP, NZ, US

Explanation of used codes:

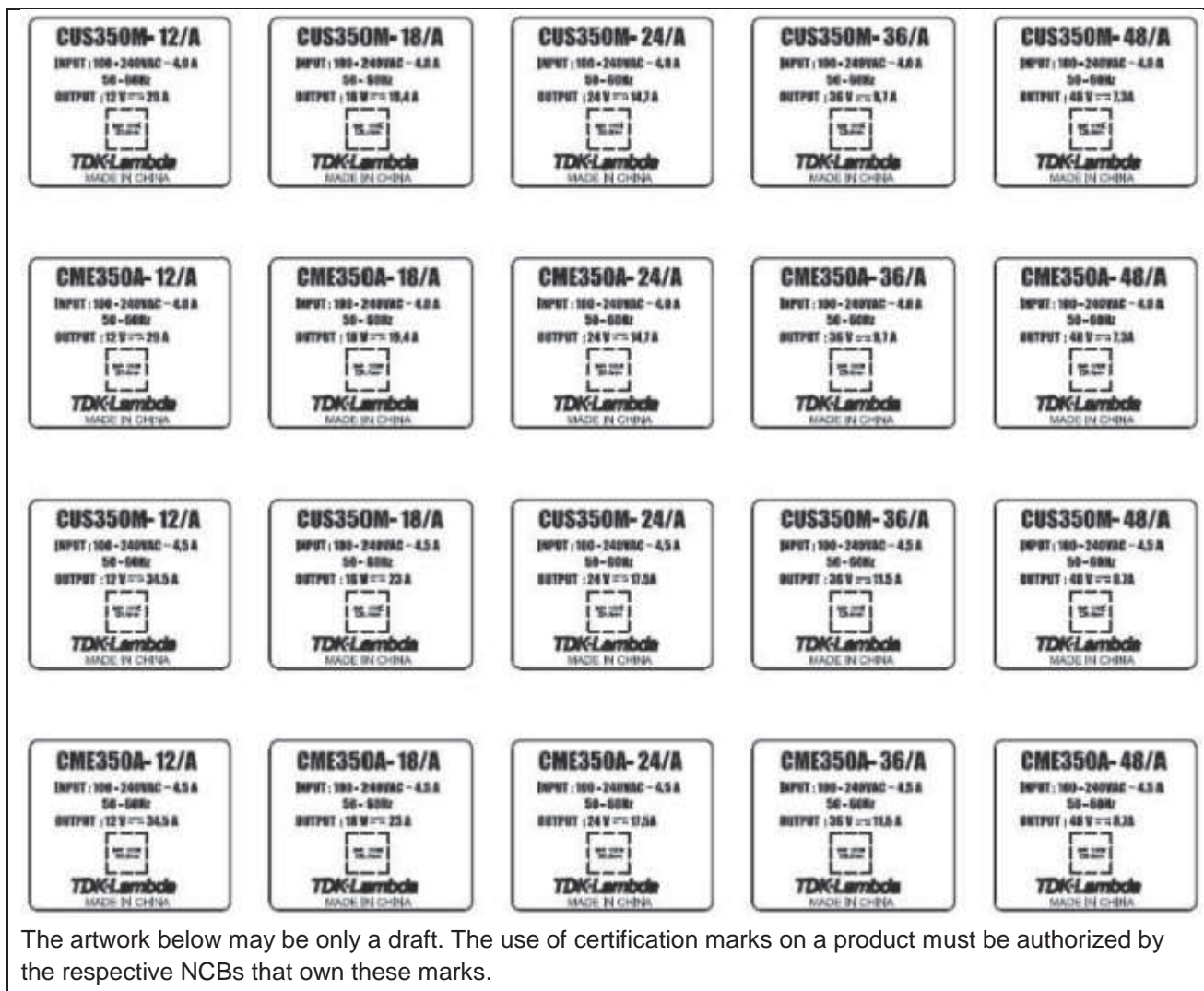
AU = Australia; CA = Canada; DK = Denmark; JP = Japan; NZ = New Zealand; US = United States of America

The product fulfils the requirements of

**IEC 62368-1:2014 (Second Edition),
EN 62368-1:2014+A11:2017 and
CSA/UL 62368-1:2014**

Copy of marking plate





TEST ITEM PARTICULARS:	
Classification of use by	<input checked="" type="checkbox"/> Ordinary person <input checked="" type="checkbox"/> Instructed person <input checked="" type="checkbox"/> Skilled person <input type="checkbox"/> Children likely to be present
Supply Connection	<input checked="" type="checkbox"/> AC Mains <input type="checkbox"/> DC Mains <input type="checkbox"/> External Circuit - not Mains connected - <input type="checkbox"/> ES1 <input type="checkbox"/> ES2 <input type="checkbox"/> ES3
Supply % Tolerance	<input checked="" type="checkbox"/> +10%/-10% <input type="checkbox"/> +20%/-15% <input type="checkbox"/> None
Supply Connection – Type	<input checked="" type="checkbox"/> pluggable equipment type A - <input type="checkbox"/> non-detachable supply cord <input type="checkbox"/> appliance coupler <input type="checkbox"/> direct plug-in <input checked="" type="checkbox"/> mating connector <input type="checkbox"/> pluggable equipment type B - <input type="checkbox"/> non-detachable supply cord <input type="checkbox"/> appliance coupler <input checked="" type="checkbox"/> permanent connection <input type="checkbox"/> mating connector <input checked="" type="checkbox"/> other: Terminal block
Considered current rating of protective device as part of building or equipment installation.....	16 A or 20 A (for US/CSA) Installation location: <input checked="" type="checkbox"/> building; <input type="checkbox"/> equipment
Equipment mobility	<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 <input type="checkbox"/> rack-mounting <input type="checkbox"/> wall-mounted
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: _____
Class of equipment	<input checked="" type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Class III <input type="checkbox"/> Not classified
Access location	<input checked="" type="checkbox"/> restricted access location <input type="checkbox"/> N/A
Pollution degree (PD)	<input type="checkbox"/> PD 1 <input checked="" type="checkbox"/> PD 2 <input type="checkbox"/> PD 3
Manufacturer's specified maximum operating ambient	70 °C
IP protection class	<input checked="" type="checkbox"/> IPX0 <input type="checkbox"/> IP____
Power Systems	<input checked="" type="checkbox"/> TN <input type="checkbox"/> TT <input checked="" type="checkbox"/> IT - 230 V _{L-L}
Altitude during operation (m)	<input type="checkbox"/> 2000 m or less <input checked="" type="checkbox"/> up to 5000 m
Altitude of test laboratory (m)	<input checked="" type="checkbox"/> 2000 m or less <input type="checkbox"/> _____ m
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	2018-06-29 (50126329) 2020-06-19
Date (s) of performance of tests	2018-07-20 to 2018-07-23 (50126329) 2020-07-14 to 2020-07-16
GENERAL REMARKS:	
<p>"(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.</p> <p>Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.</p>	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC62 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	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies).....:	<ol style="list-style-type: none"> 1. TDK-Lambda (China) Electronics Co., Ltd. No. 95, Zhujiang Road, Xinwu District, Wuxi 214028 Jiangsu, P.R. China 2. Zhangjiagang Hua Yang Electronics Co., Ltd. Zhao Feng Industrial Zone, Leyu Town Zhangjiagang, 215622 Jiangsu, P.R. China 3. Sendan Electronics Mfg. Co., Ltd. 1010 Habushin Nanto-shi, Toyama 939-1756 Japan 4. ALPS Logistics Facilities Co., Ltd. 593-1 Nishi-Ohashi, Tsukuba-shi, Ibaraki, 305- 0831 Japan 5. TDK-Lambda Corp. Nagaoka Technical Center 2704-1 Settaya-machi, Nagaoka-shi, Niigata 940-1195 Japan

GENERAL PRODUCT INFORMATION:**General product information:**

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

Model CME350A-zzxxxxxxx is identical to model CUS350M-zzxxxxxxx except for model name.

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

Series Model	I/p voltage (Vac)	Freq. (Hz)	I/p current (A)	Minimal output	Rated output (typical)	Maximum output	
						Vo_max1	Vo_max2
For convection cooling							
CUS350M-12xxxxxxx CME350A-12xxxxxxx	100-240	50-60	4.0	11.1 Vdc	12.0 Vdc	12.6 Vdc	13.2 Vdc
				29 A	29 A	27.6 A	24 A
CUS350M-18xxxxxxx CME350A-18xxxxxxx	100-240	50-60	4.0	16.6 Vdc	18.0 Vdc	18.9 Vdc	19.8 Vdc
				19.4 A	19.4 A	18.5 A	16.1 A
CUS350M-24xxxxxxx CME350A-24xxxxxxx	100-240	50-60	4.0	22.1 Vdc	24.0 Vdc	25.2 Vdc	28.3 Vdc
				14.7 A	14.7 A	14 A	11.3 A
CUS350M-36xxxxxxx CME350A-36xxxxxxx	100-240	50-60	4.0	33.1 Vdc	36.0 Vdc	37.8 Vdc	39.6 Vdc
				9.7A	9.7A	9.2A	8.1 A
CUS350M-48xxxxxxx CME350A-48xxxxxxx	100-240	50-60	4.0	44.2 Vdc	48.0 Vdc	50.4 Vdc	52.8 Vdc
				7.3 A	7.3 A	7.0 A	6.1 A
For force air cooling							
CUS350M-12xxxxxxx CME350A-12xxxxxxx	100-240	50-60	4.5	11.1 Vdc	12.0 Vdc	12.6 Vdc	13.2 Vdc
				34.5A	34.5A	32.8A	24 A
CUS350M-18xxxxxxx CME350A-18xxxxxxx	100-240	50-60	4.5	16.6 Vdc	18.0 Vdc	18.9 Vdc	19.8 Vdc
				23A	23A	21.9A	16.1 A
CUS350M-24xxxxxxx CME350A-24xxxxxxx	100-240	50-60	4.5	22.1 Vdc	24.0 Vdc	25.2 Vdc	28.3 Vdc
				17.5A	17.5A	16.6A	11.3 A
CUS350M-36xxxxxxx CME350A-36xxxxxxx	100-240	50-60	4.5	33.1 Vd.c.	36.0 Vdc	37.8 Vdc	39.6 Vdc
				11.5A	11.5A	10.9A	8.1 A
CUS350M-48xxxxxxx CME350A-48xxxxxxx	100-240	50-60	4.5	44.2 Vdc	48.0 Vdc	50.4 Vdc	52.8 Vdc
				8.7A	8.7A	8.3A	6.1 A

Additional Information:

- The product is a component type switching power supply, the overall compliance shall be investigated in the complete end system/equipment, in particular as:
 - Fire enclosure
 - Mechanical enclosure
 - Electrical enclosure
- Some components are **pre-certified**, which have been evaluated according to the relevant requirements of IEC 62368-1, are employed in this product. Their suitability of use has been checked according to clauses 4.1.1 and 4.1.2.
- The product is to be operated up to 5000 m above sea level, the minimum clearances were multiplied by the factor given in Table A.2 of IEC 60664-1: 1.48.
- 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.

Markings and Instructions

The installation instruction contains instructions for connection to an IT power distribution system.
Fuse Identification (See subclause F.3.5.3): F1A/F1B : T6.3AH 250Vac

Definition of variable(s):

CUS350M-zxxxxxxx, CME350A-zxxxxxxx

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

Note: Suffix options would be used shown below or used together.

Variable:	Range of variable:	Content:
z	12, 18, 24, 36 or 48	Denotes for different output voltage.
Xxxxxx x	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.
	A	Denotes for this model with metal cover.
	S**	Denotes for special modified model, not affect safety.
	FET	Denotes for full function and add M3 mounting holes on chassis.
	FGE	Denotes for full function and Voltage Dip Improvement.
	LN	Denotes for Reduce audio noise.
	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.

Additional application considerations – (Considerations used to test a component or sub-assembly) –

The equipment is a component intended for incorporation in IT equipment, the overall compliance shall be investigated in the complete end system.

The power supply cord set was not evaluated together with the equipment. The suitable certified power supply cord set has to be provided in the country where the equipment is sold.

ENERGY SOURCE IDENTIFICATION AND CLASSIFICATION TABLE:	
(Note 1: Identify the following six (6) energy source forms based on the origin of the energy.) (Note 2: The identified classification e.g., ES2, TS1, should be with respect to its ability to cause pain or injury on the body or its ability to ignite a combustible material. Any energy source can be declared Class 3 as a worse case classification e.g. PS3, ES3.)	
Electrically-caused injury (Clause 5): (Note: Identify type of source, list sub-assembly or circuit designation and corresponding energy source classification) Example: +5 V dc input ES1	
Source of electrical energy	Corresponding classification (ES)
Primary circuits	ES3
DC output terminal	ES1
Electrically-caused fire (Clause 6): (Note: List sub-assembly or circuit designation and corresponding energy source classification) Example: Battery pack (maximum 85 watts): PS2	
Source of power or PIS	Corresponding classification (PS)
Primary circuits	PS3
DC output	PS3
Injury caused by hazardous substances (Clause 7) (Note: Specify hazardous chemicals, whether produces ozone or other chemical construction not addressed as part of the component evaluation.) Example: Liquid in filled component Glycol	
Source of hazardous substances	Corresponding chemical
N/A	N/A
Mechanically-caused injury (Clause 8) (Note: List moving part(s), fan, special installations, etc. & corresponding MS classification based on Table 35.) Example: Wall mount unit MS2	
Source of kinetic/mechanical energy	Corresponding classification (MS)
Sharp edges and corners	MS1
Equipment mass – mass < 7 kg	MS1
Thermal burn injury (Clause 9) (Note: Identify the surface or support, and corresponding energy source classification based on type of part, location, operating temperature and contact time in Table 38.) Example: Hand-held scanner – thermoplastic enclosure TS1	
Source of thermal energy	Corresponding classification (TS)
Metal chassis	The evaluation shall be made during the final system approval
Radiation (Clause 10) (Note: List the types of radiation present in the product and the corresponding energy source classification.) Example: DVD – Class 1 Laser Product RS1	
Type of radiation	Corresponding classification (RS)
N/A	N/A

ENERGY SOURCE DIAGRAM

Indicate which energy sources are included in the energy source diagram. Insert diagram below

See "ENERGY SOURCE IDENTIFICATION AND CLASSIFICATION TABLE"

ES PS MS TS RS

OVERVIEW OF EMPLOYED SAFEGUARDS				
Clause	Possible Hazard			
5.1	Electrically-caused injury			
Body Part (e.g. Ordinary)	Energy Source (ES3: Primary Filter circuit)	Safeguards		
		Basic	Supplementary	Reinforced
Ordinary (output circuit assumed to be accessible by ordinary person in end product)	ES3: Primary circuits	N/A	N/A	Isolating Transformer, Optocouplers
Ordinary (metal chassis assumed to be direct or indirect accessible by ordinary person in end product)	ES3: Primary circuits	Certified Y- Capacitor	Protectively bonding chassis	N/A
Ordinary	ES1: Output	N/A	N/A	N/A
6.1	Electrically-caused fire			
Material part (e.g. mouse enclosure)	Energy Source (PS2: 100 Watt circuit)	Safeguards		
		Basic	Supplementary	Reinforced
Combustible materials	PS3: > 100 Watt circuit (Primary circuits and Secondary circuits)	Equipment safeguards (no ignition occurs and no such temp. attained specified in 6.3.1 a)	Equipment safeguards (e.g. rated V-0 PCB, combustible material rated V- 2 min., metal fire barrier or enclosure; see 6.4.5 and 6.4.6)	N/A
7.1	Injury caused by hazardous substances			
Body Part (e.g., skilled)	Energy Source (hazardous material)	Safeguards		
		Basic	Supplementary	Reinforced
N/A	N/A	N/A	N/A	N/A
8.1	Mechanically-caused injury			
Body Part (e.g. Ordinary)	Energy Source (MS3:High Pressure Lamp)	Safeguards		
		Basic	Supplementary	Reinforced
Ordinary	MS1: Sharp edge and corners	Rounded edge and corners	N/A	N/A
Ordinary	MS1: Equipment mass – mass < 7 kg	≅0.8kg	N/A	N/A
9.1	Thermal Burn			
Body Part (e.g., Ordinary)	Energy Source (TS2)	Safeguards		
		Basic	Supplementary	Reinforced
N/A	N/A	N/A	N/A	N/A
10.1	Radiation			
Body Part (e.g., Ordinary)	Energy Source (Output from audio port)	Safeguards		
		Basic	Supplementary	Reinforced

N/A	N/A	N/A	N/A	N/A
Supplementary Information: (1) See attached energy source diagram for additional details. (2) "N" – Normal Condition; "A" – Abnormal Condition; "S" Single Fault				