Test Report issued under the responsibility of:

TÜVRheinland®

TEST REPORT
IEC 60950-1
Information technology equipment – Safety –
Part 1: General requirements

Report Number. .....: 50331558 002

Date of issue .....: 2020-12-11

Total number of pages.....: 51 (refer to page 3 for attachment)

Name of Testing Laboratory preparing the Report.....: TÜV Rheinland Shanghai Co., Ltd.

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 60950-1:2005, AMD1:2009, AMD2:2013

Test procedure.....: CB Scheme

Non-standard test method.....: N/A

Test Report Form No.....: IEC60950_1G

Test Report Form(s) Originator.....: SGS Fimko Ltd

Master TRF.....: Dated 2019-07-02

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 .....:	CUS600M1-**zxxxxxxx**, CME600A1-**zxxxxxxx**, CUS500M1-**zxxxxxxx**, CME500A-**zxxxxxxx** (**z** = 12, 19, 24, 28, 32, 36 or 48; **xxxxxxx** = /T, /J, /M, /C, /C2, /SF, /G, /EF, other alphanumeric character, symbol or blank) Refer to page 12 for definition of variables
Ratings .....:	See the model list on pages 9-11 for details

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**CB Testing Laboratory:**	TÜV Rheinland Shanghai Co., Ltd.	
Testing location/ address.....:		No.177, 178, Lane 777 West Guangzhong Road, Jing'an District, Shanghai, China	
Tested by (name, function, signature) .....:		Johnson Ma/ Technical Expert	
Approved by (name, function, signature)...:		Sunny Sun/ Technical Reviewer	
☐	**Testing procedure: CTF Stage 1:**	N/A	
Testing location/ address.....:			
Tested by (name, function, signature) .....:			
Approved by (name, function, signature)...:			
☐	**Testing procedure: CTF Stage 2:**	N/A	
Testing location/ address.....:			
Tested by (name + signature) .....:			
Witnessed by (name, function, signature)..:			
Approved by (name, function, signature)...:			
☐	**Testing procedure: CTF Stage 3:**	N/A	
☐	**Testing procedure: CTF Stage 4:**	N/A	
Testing location/ address.....:			
Tested by (name, function, signature) .....:			
Witnessed by (name, function, signature)..:			
Approved by (name, function, signature)...:			
Supervised by (name, function, signature) :			

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

- ATTACHMENT - Photo documentation (4 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):

All applicable tests as described in Test Case and Measurement Sections were performed on models CUS500M1-12 +, CUS500M1-19 +, CUS500M1-24 +, CUS500M1-28 +, CUS500M1-32 + and CUS500M1-48 + to represent other models.

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 Forced air-cooling on following pages).

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

The test samples are pre-production without serial numbers.

Mounting Direction:

Mounting A and B be used to represent others.

Air speed is same between EUT with EF construction and forced air-cooling condition, and select EF construction for temperature testing covered forced air cooling condition.

Testing location:

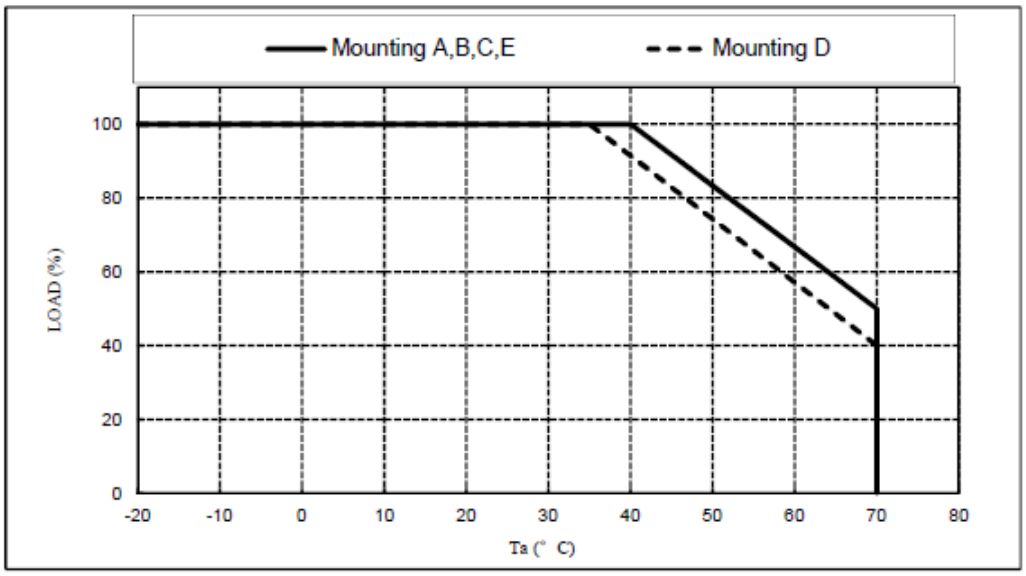
TÜV Rheinland Shanghai Co., Ltd.
No.177, 178, Lane 777 West Guangzhong Road, Jing'an District, Shanghai, China

Derating Curve:

Convection cooling condition:

MODEL: CUS500M1-12/19/24/28/32/36/48

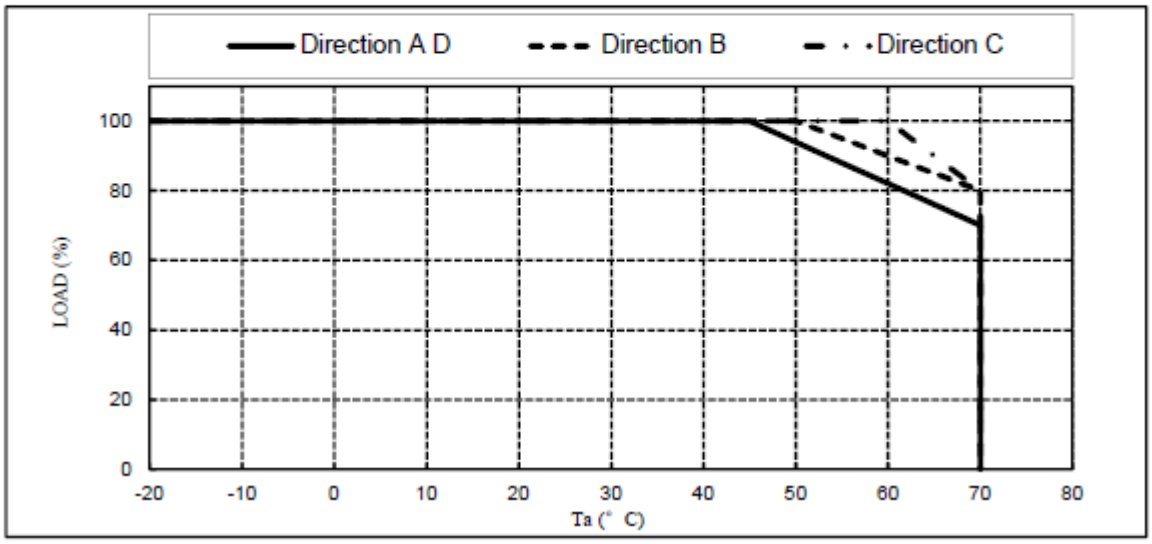
Ta (°C)	Mounting A B C E	Mounting D
	LOAD (%)	LOAD (%)
-20 - +35	100	100
40	100	91.4
50	83.3	74.3
60	66.7	57.1
70	50	40



Forced air cooling condition:

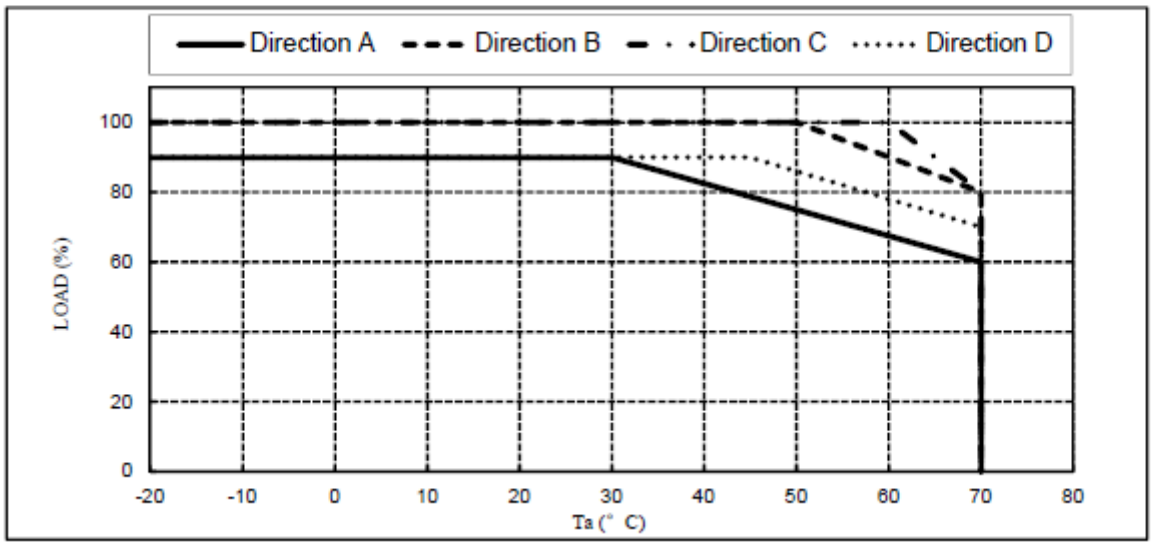
MODEL: CUS500M1-19/24/28/32/36/48

Ta (°C)	Direction A D	Direction B	Direction C
	LOAD (%)	LOAD (%)	LOAD (%)
-20 - +45	100	100	100
50	94	100	100
60	82	90	100
70	70	80	80



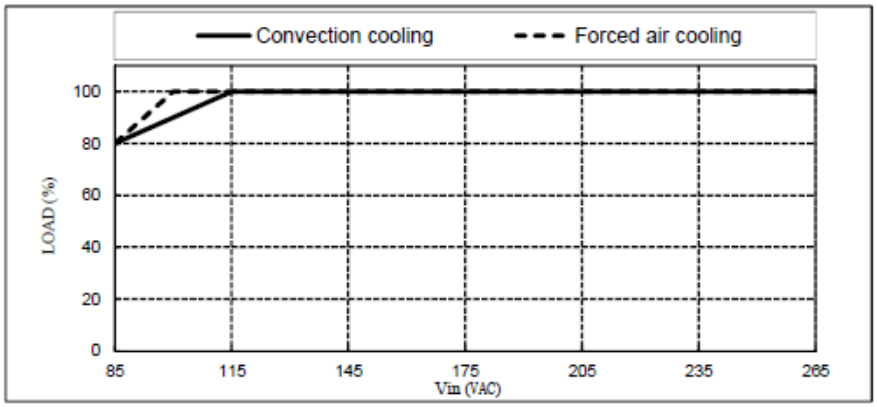
MODEL: CUS500M1-12

Ta (°C)	Direction A	Direction B	Direction C	Direction D
	LOAD (%)	LOAD (%)	LOAD (%)	LOAD (%)
-20 - +30	90	100	100	90
40	82.5	100	100	90
45	78.8	100	100	90
50	75	100	100	86
60	67.5	90	100	78
70	60	80	80	70

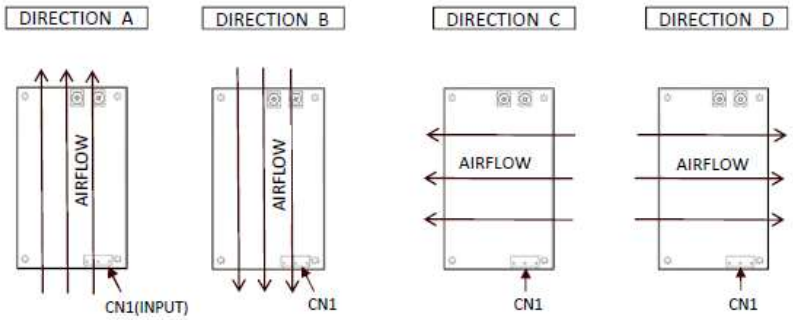


OUTPUT DERATING VERSUS INPUT VOLTAGE

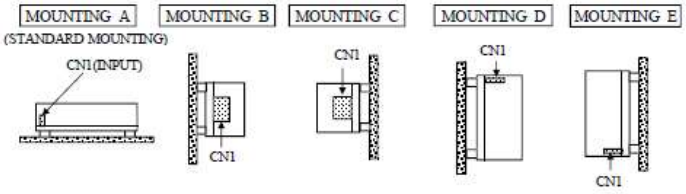
INPUT VOLTAGE (VAC)	LOAD (%)	
	CONVECTION COOLING	FORCED AIR COOLING
85	80	80
100	90	100
115~265	100	100



AIR FLOW DIRECTION



MOUNTING METHOD



Summary of compliance with National Differences (List of countries addressed):

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

Explanation of used codes:

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

Note(s):

Countries outside the CB Scheme membership may also accept this report.

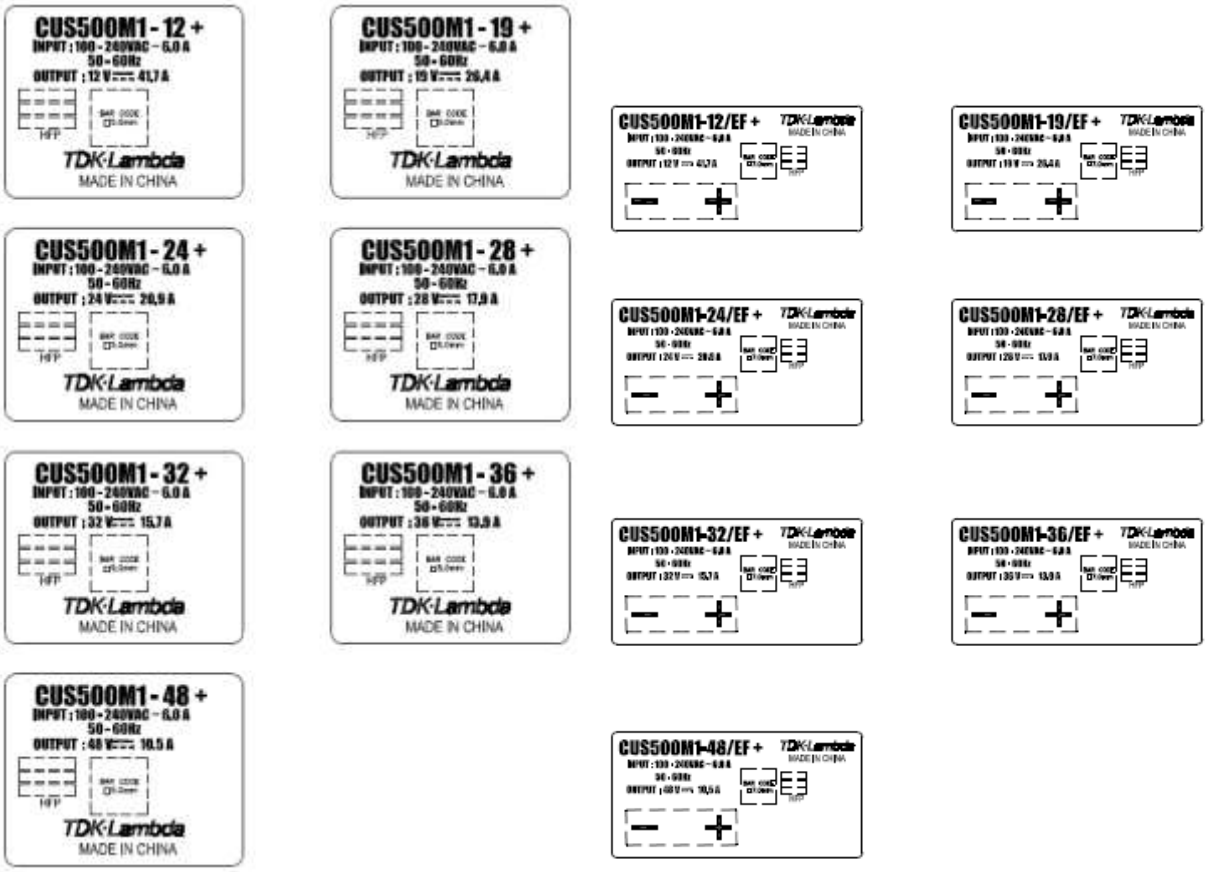
The product fulfils the requirements of

IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am2:2013,
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.

Copy of marking plate:

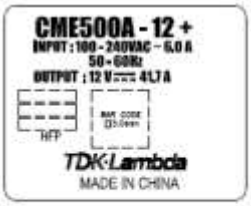
The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

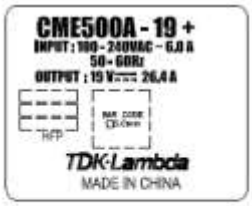
<Representative>

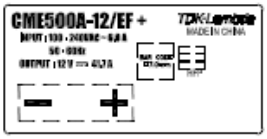


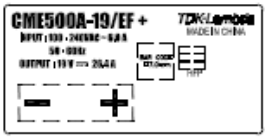
Remark: The rating labels of all models have the same design except for the model designation.

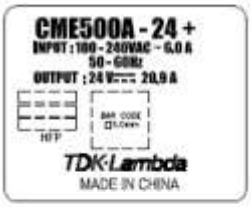
Cont.

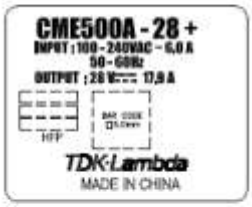


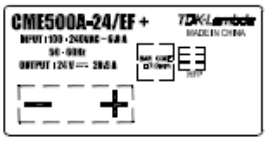


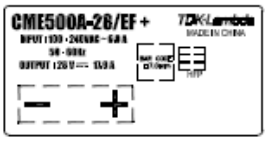


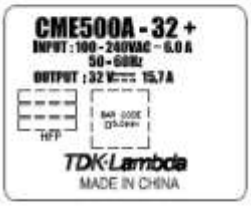


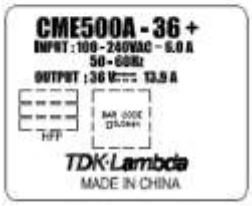


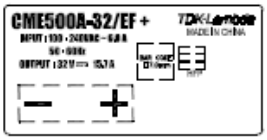


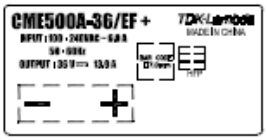


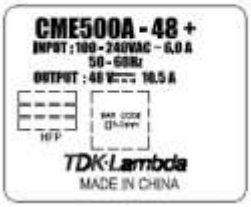


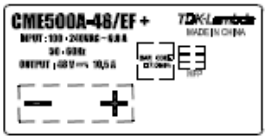












Remark: The rating labels of all models have the same design except for the model designation.

Test item particulars .....:	
Equipment mobility.....:	[] movable [] hand-held [] transportable [] stationary [x] for building-in [] direct plug-in
Connection to the mains.....:	[x] pluggable equipment [] type A [] type B [x] permanent connection [] detachable power supply cord [] non-detachable power supply cord [] not directly connected to the mains Note: shall be evaluated in the final sysytem.
Operating condition.....:	[x] continuous [] rated operating / resting time:
Access location .....:	[] operator accessible [x] restricted access location [x] others: Building-in equipment, shall be evaluated in the final sysytem.
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 .....:	[] Yes [x] No
IT testing, phase-phase voltage (V) .....:	N/A
Class of equipment .....:	[] Class I [] Class II [] Class III [x] 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) .....:	Less than 2000
Mass of equipment (kg) .....:	≈0.43 kg
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 ..... :	2020-08-17
Date (s) of performance of tests..... :	2020-08-17 – 2020-08-28
General remarks:	
"(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 ☐ 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. Zhangjiagang Hua Yang Electronics Co., Ltd.
   Zhao Feng Industrial Zone, Leyu Town
   Zhangjiagang, 215622 Jiangsu, P.R. China
2. TDK-Lambda (China) Electronics Co., Ltd.
   No. 95, Zhujiang Road, Xinwu District, Wuxi 214028
   Jiangsu, P.R. China
3. TDK-Lambda Malaysia Sdn. Bhd
   PLO33, Kawasan Perindustrian Senai, 81400 Senai
   Johor Malaysia

General product information:

This report is based on original CBTR 50331558 001. Refer to original report 50331558 001 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
Convection cooling condition						
CUS600M1-12**xxxxxxx** CME600A1-12**xxxxxxx**	100-240	50-60	4.5	10.8Vdc	12Vdc	12.9Vdc
				10.8Vdc – 12.9Vdc Normal Rating: 33.4A, 400.8W Max. Peak Rating: 50A, 600W Max. (Dynamic)		
CUS600M1-19**xxxxxxx** CME600A1-19**xxxxxxx**	100-240	50-60	4.5	17.1Vdc	19Vdc	20.5Vdc
				17.1Vdc – 20.5Vdc Normal Rating: 21.1A, 400.9W Max. Peak Rating: 31.6A, 600.4W Max. (Dynamic)		
CUS600M1-24**xxxxxxx** CME600A1-24**xxxxxxx**	100-240	50-60	4.5	21.6Vdc	24Vdc	25.9Vdc
				21.6Vdc – 25.9Vdc, Normal Rating: 16.7A, 400.8W Max. Peak Rating: 25A, 600W Max. (Dynamic)		
CUS600M1-28**xxxxxxx** CME600A1-28**xxxxxxx**	100-240	50-60	4.5	25.2Vdc	28Vdc	30.2Vdc
				25.2Vdc – 30.2Vdc, Normal Rating: 14.3A, 400.4W Max. Peak Rating: 21.5A, 602W Max. (Dynamic)		
CUS600M1-32**xxxxxxx** CME600A1-32**xxxxxxx**	100-240	50-60	4.5	28.8Vdc	32Vdc	34.5Vdc
				28.8Vdc – 34.5Vdc, Normal Rating: 12.5A, 400W Max. Peak Rating: 18.8A, 601.6W Max. (Dynamic)		
CUS600M1-36**xxxxxxx**	100-240	50-60	4.5	32.4Vdc	36Vdc	38.8Vdc

CME600A1-36**xxxxxxx**				32.4Vdc – 38.8Vdc, Normal Rating: 11.1A, 399.6W Max. Peak Rating: 16.7A, 601.2W Max. (Dynamic)		
CUS600M1-48**xxxxxxx** CME600A1-48**xxxxxxx**	100-240	50-60	4.5	43.2 Vdc	48 Vdc	51.8 Vdc
				43.2Vdc – 51.8Vdc, Normal Rating: 8.4A, 403.2W Max. Peak Rating: 12.6A, 604.8W Max. (Dynamic)		
CUS500M1-12**xxxxxxx** CME500A-12**xxxxxxx**	**100-240**	**50-60**	**4.0**	**10.8 Vdc**	**12 Vdc**	**12.9 Vdc**
				10.8Vdc – 12.9Vdc, Normal rating: 25A, 300W Max. Peak rating: 41.7A, 500.4W Max. (Dynamic)		
CUS500M1-19**xxxxxxx** CME500A-19**xxxxxxx**	**100-240**	**50-60**	**4.0**	**17.1 Vdc**	**19 Vdc**	**20.5 Vdc**
				17.1Vdc – 20.5Vdc, Normal rating: 15.8A, 300.2W Max. Peak rating: 26.4A, 501.6W Max. (Dynamic)		
CUS500M1-24**xxxxxxx** CME500A-24**xxxxxxx**	**100-240**	**50-60**	**4.0**	**21.6 Vdc**	**24 Vdc**	**25.9 Vdc**
				21.6Vdc – 25.9Vdc, Normal Rating: 12.5A, 300W Max. Peak Rating: 20.9A, 501.6W Max. (Dynamic)		
CUS500M1-28**xxxxxxx** CME500A-28**xxxxxxx**	**100-240**	**50-60**	**4.0**	**25.2 Vdc**	**28 Vdc**	**30.2 Vdc**
				25.2Vdc – 30.2Vdc, Normal Rating: 10.7A, 299.6W Max. Peak Rating: 17.9A, 501.2W Max. (Dynamic)		
CUS500M1-32**xxxxxxx** CME500A-32**xxxxxxx**	**100-240**	**50-60**	**4.0**	**28.8Vdc**	**32Vdc**	**34.5Vdc**
				28.8Vdc – 34.5Vdc, Normal Rating: 9.4A, 300.8W Max. Peak Rating: 15.7A, 502.4W Max. (Dynamic)		
CUS500M1-36**xxxxxxx** CME500A-36**xxxxxxx**	**100-240**	**50-60**	**4.0**	**32.4Vdc**	**36Vdc**	**38.8Vdc**
				32.4Vdc – 38.8Vdc, Normal Rating: 8.3A, 298.8W Max. Peak Rating: 13.9A, 500.4W Max. (Dynamic)		
CUS500M1-48**xxxxxxx** CME500A-48**xxxxxxx**	**100-240**	**50-60**	**4.0**	**43.2Vdc**	**48Vdc**	**51.8Vdc**
				43.2Vdc – 51.8Vdc, Normal Rating: 6.3A, 302.4W Max. Peak Rating: 10.5A, 504W Max. (Dynamic)		
Forced air cooling condition (airflow: air velocity 2.7m/s & air volume 28.6CFM)						
CUS600M1-12**xxxxxxx** CME600A1-12**xxxxxxx**	100-240	50-60	7.0	10.8Vdc	12Vdc	12.9Vdc
				50A	50A	46.6A
CUS600M1-19**xxxxxxx** CME600A1-19**xxxxxxx**	100-240	50-60	7.0	17.1Vdc	19Vdc	20.5Vdc
				31.6A	31.6A	29.3A
CUS600M1-24**xxxxxxx** CME600A1-24**xxxxxxx**	100-240	50-60	7.0	21.6Vdc	24Vdc	25.9Vdc
				25A	25A	23.2A
CUS600M1-28**xxxxxxx**	100-240	50-60	7.0	25.2Vdc	28Vdc	30.2Vdc

CME600A1-28**xxxxxxx**				21.5A	21.5A	20.0A
CUS600M1-32**xxxxxxx** CME600A1-32**xxxxxxx**	100-240	50-60	7.0	28.8Vdc	32Vdc	34.5Vdc
				18.8A	18.8A	17.5A
CUS600M1-36**xxxxxxx** CME600A1-36**xxxxxxx**	100-240	50-60	7.0	32.4Vdc	36Vdc	38.8Vdc
				16.7A	16.7A	15.5A
CUS600M1-48**xxxxxxx** CME600A1-48**xxxxxxx**	100-240	50-60	7.0	43.2Vdc	48Vdc	51.8Vdc
				12.6A	12.6A	11.7A
CUS500M1-12**xxxxxxx** CME500A-12**xxxxxxx**	**100-240**	**50-60**	**6.0**	**10.8Vdc**	**12Vdc**	**12.9Vdc**
				41.7A	**41.7A**	**38.8A**
CUS500M1-19**xxxxxxx** CME500A-19**xxxxxxx**	**100-240**	**50-60**	**6.0**	**17.1Vdc**	**19Vdc**	**20.5Vdc**
				26.4A	**26.4A**	**24.5A**
CUS500M1-24**xxxxxxx** CME500A-24**xxxxxxx**	**100-240**	**50-60**	**6.0**	**21.6Vdc**	**24Vdc**	**25.9Vdc**
				20.9A	**20.9A**	**19.4A**
CUS500M1-28**xxxxxxx** CME500A-28**xxxxxxx**	**100-240**	**50-60**	**6.0**	**25.2Vdc**	**28Vdc**	**30.2Vdc**
				17.9A	**17.9A**	**16.6A**
CUS500M1-32**xxxxxxx** CME500A-32**xxxxxxx**	**100-240**	**50-60**	**6.0**	**28.8Vdc**	**32Vdc**	**34.5Vdc**
				15.7A	**15.7A**	**14.6A**
CUS500M1-36**xxxxxxx** CME500A-36**xxxxxxx**	**100-240**	**50-60**	**6.0**	**32.4Vdc**	**36Vdc**	**38.8Vdc**
				13.9A	**13.9A**	**12.9A**
CUS500M1-48**xxxxxxx** CME500A-48**xxxxxxx**	**100-240**	**50-60**	**6.0**	**43.2Vdc**	**48Vdc**	**51.8Vdc**
				10.5A	**10.5A**	**9.8A**
Remark: Operating temp.: up to +70ºC (operating temperature depending on equipment's load, mounting position, for details refer to instruction manual).						

Description of changes:

The previous approved models were modified as following:

-Add additional models CUS500M1-**zxxxxxxx**, CME500A-**zxxxxxxx**
(**z** = 12, 19, 24, 28, 32, 36 or 48; **xxxxxxx** = /T, /J, /M, /C, /C2, /SF, /G, /EF, other alphanumeric character, symbol or blank), which are similar to original models CUS600M1-**zxxxxxxx**, CME600A1-**zxxxxxxx** with following differences:

- Rated input current, output ratings.
- Add alternate heatsink combination 2. See below table for details:

Parts	Combination 1 (CUS600M1 heatsink)	Combination 2 (tested in this report)
KFA1 (Pri. side)	CA878-32-01x	CA922-32-01x
KFA2 (Pri. side)	CA878-32-03x	without
KFA3 (Sec. side)	CA878-32-05x (12V) (optional) CA878-32-04x (others) (optional)	without
HS201 & HS204 (Sec. side)	TZDD3271 (optional)	without
KKE1 (Sec. side)	CA878-33-01x (optional)	without

- Component parameter adjustment for MOSFET (Q1), Diode (D1), Primary Electrolytic Capacitor (C6) and Resistor (R108).

-Add additional factory TDK-Lambda Malaysia Sdn. Bhd, see factory list on page 9 for details.

-Correct typo error of external creepage from 5.0 mm to 8.0 mm for optocoupler.

The models CUS500M1-**zxxxxxxx** and CME500A-**zxxxxxxx** are identical except for the model designation.

All applicable tests were performed. Refer to above model list, test case and measurement section for details.

History of amendments and modifications:

Ref. No. 50331558 001, dated 2020-06-02 (original test report)
Ref. No. 50331558 002, dated “see cover page” (1st modification)

Definition of variable(s):

CUS600M1-**zxxxxxxx**, CME600A1-**zxxxxxxx**, CUS500M1-**zxxxxxxx**, CME500A-**zxxxxxxx**
(**z** = 12, 19, 24, 28, 32, 36 or 48; **xxxxxxx** = /T, /J, /M, /C, /C2, /SF, /G, /EF, other alphanumeric character, symbol or blank)

Variable:	Range of variable:	Content:
z	12, 19, 24, 28, 32, 36 or 48	Denoting output voltage from 12 Vdc to 48 Vdc.
xxxxxxx	blank	Denoting for Standard model.
	/T	Denoting terminal block connector.
	/J	Denoting JST connector.
	/M	Denoting molex connector.
	/C or /CO	Denoting single side PWB coating.
	/C2 or /CO2	Denoting double side PWB coating.
	/SF	Denoting single fuse.
	/G	Denoting low earth leakage current.
	/EF	Denoting end fan. It is for class I construction only.
	other alphanumeric character, symbol	Used 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**

Indicate used abbreviations (if any)