



Test Report issued under the responsibility of:



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

Report Number: E135494-A116-CB-1
Date of issue: 2019-11-06 ; Amendment 2 : 2020-12-11
Total number of pages..... 18

Name of Testing Laboratory UL VS Limited
preparing the Report: Unit 1-3 Horizon, Wade Road, Kingsland Business Park, Basingstoke
RG24 8AH, United Kingdom

Applicant's name: TDK-LAMBDA UK LTD
Address: KINGSLEY AVE
ILFRACOMBE
EX34 8ES UNITED KINGDOM

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

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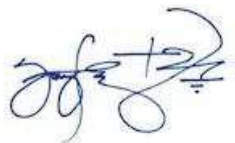

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.
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Test item description	Power supply
Trade Mark	TDK-Lambda TDK-Lambda
Manufacturer	TDK-LAMBDA UK LTD KINGSLEY AVE ILFRACOMBE EX34 8ES UNITED KINGDOM
Model/Type reference	CUS400M series Unit product code : CUS400M-xxVx/yyyy (see model differences for detail)
Ratings	INPUT: 100-240Vac, 47-440Hz, max 5.75A Output: CUS400M-12: 12Vdc 33.33A CUS400M-15: 15Vdc 26.67A CUS400M-19: 19Vdc 21.05A CUS400M-24: 24Vdc 16.67A CUS400M-28: 28Vdc 14.29A CUS400M-36: 36Vdc 11.11A CUS400M-48: 48Vdc 8.33A (max 400W forced air cooling max 250W natural convection) Standby options: board X2, X5: 5Vdc 2A board X3, X6: 12Vdc 0.83A (max 10W)

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):


<input checked="" type="checkbox"/>	CB Testing Laboratory:	
	Testing location/ address	UL VS Limited, Unit 1-3 Horizon, Wade Road, Kingsland Business Park, Basingstoke RG24 8AH, United Kingdom
	Tested by (name, function, signature)	Mark John De Sagun / Project Handler 
	Approved by (name, function, signature) ...:	Dennis Butcher / Reviewer 
<input type="checkbox"/>	Testing procedure: CTF Stage 1:	
	Testing location/ address	

Tested by (name, function, signature) :			
Approved by (name, function, signature)... :			
<input type="checkbox"/>	Testing procedure: CTF Stage 2:		
Testing location/ address..... :			
Tested by (name + signature) :			
Witnessed by (name, function, signature) .:			
Approved by (name, function, signature)... :			
<input type="checkbox"/>	Testing procedure: CTF Stage 3:		
<input type="checkbox"/>	Testing procedure: CTF Stage 4:		
Testing location/ address..... :			
Tested by (name, function, signature) :			
Witnessed by (name, function, signature) .:			
Approved by (name, function, signature)... :			
Supervised by (name, function, signature) :			

<p>List of Attachments (including a total number of pages in each attachment):</p> <p>National Differences (0 pages) Enclosures (4 pages)</p>	
<p>Summary of testing:</p>	
<p>Tests performed (name of test and test clause): None</p>	<p>Testing Location: None</p>
<p>Summary of compliance with National Differences:</p> <p>List of countries addressed: Argentina, Australia / New Zealand, China, EU Group and National Differences, Israel, Japan, Korea, Singapore, USA, Canada</p> <p>EU Group and National Differences applies to CENELEC member countries: Austria , Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom</p> <p><input checked="" type="checkbox"/> The product fulfils the requirements of: EN 60950-1:2006 + A1:2010 + A11:2009 + A12:2011 + A2:2013, CSA CAN/CSA-C22.2 No. 60950-1 2nd Edition, Revised October 14, 2014, UL 60950-1, 2nd Edition, Revised October 14, 2014</p>	

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.

CUS400M-24/F
INPUT: 100-240Vac
47-440 Hz 5.75A MAX
OUTPUT: 24V \Rightarrow 16.7A
 **3KG1502160**
TDK-Lambda
Made in The UK **20-Aug-19**

SAMPLE
ENGINEERING

Note: The above markings are the minimum requirements required by the safety lab. For the final production samples, the additional markings which do not give rise to misunderstanding may be added.

Test item particulars	
Equipment mobility	for building-in
Connection to the mains	to be determined in End Use Application (pluggable A assumed)
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)	230
Class of equipment	Class I (earthed) Class II (double insulated)
Considered current rating of protective device as part of the building installation (A)	20
Pollution degree (PD)	2
IP protection class	IP X0
Altitude of operation (m)	up to 5000
Altitude of test laboratory (m)	less than 2000 meters
Mass of equipment (kg)	max 1.3

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	2019-06-26, 2020-05-05, 2020-05-21
Date (s) of performance of tests	N/A

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 IEC60950-1:	
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.

<p>Name and address of factory (ies)</p>	<p>TDK-LAMBDA UK LTD KINGSLEY AVE ILFRACOMBE EX34 8ES UNITED KINGDOM</p> <p>TDK-LAMBDA MALAYSIA SDN BHD LOT 2 & 3, BATU 9 3/4 KAWASAN PERINDUSTRIAN BANDAR BARU JAYA GADING 26070 KUANTAN PAHANG MALAYSIA</p> <p>PANYU TRIO MICROTRONICS CO LTD SHIJI INDUSTRIAL ESTATE DONGYONG NANSHA GUANGZHOU GUANGDONG 511453 CHINA</p> <p>TRIO-TRONICS (THAILAND) LTD 7/295 MU. 6 MAP YANG PHON SUB-DISTRICT PLUAK DAENG DISTRICT RAYONG PROVINCE THAILAND</p>
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General product information:

Report Summary

The original report was modified on 2020-12-11 to include the following changes/additions:

Technical Amendment: This report has been revised due to the following:

1. Revised LoCC table. Added alternate magnetic supplier "Axis Corporation" and alternate J1 input connector.
2. Added enclosure 7-02 for output voltage ranges option.
3. Added "TRIO-TRONICS (THAILAND) LTD" factory.

Based on the previously conducted testing and the review of product technical documentation, it has been determined that the product continues to comply with the standard and all required tests were carried out under the original investigation.

This report should be read in conjunction with CBTR Ref. No: E135494-A6116-CB-1-Original, - Amendment-1, and -Correction-1; CBTC Ref. no: DK-89284-A1-UL issued on 2020-08-27.

Product Description

Device is an open-type AC-DC power source for building-in.

Model Differences

Unit Nomenclature for CUS400M range

Unit product code : CUS400M-xxVx/yyyy

Where:

xxVx = Channel 1 output voltage from within the output voltage adjustment range from the "Output Voltage Range"

yyyyy = unit options from list of standard unit options below, or non-safety related model differences

List of Standard Unit Options (yyyyy)

Case Options:

Blank = open frame with potted baseplate

B = with metal baseplate

C = with M3 threaded inserts for underside mounting

U = with U Chassis

A = with U chassis and cover

F = with U chassis and top fan

Connector options:

Blank = JST connector

M = with Molex type connector

Fuse Options:

Blank = Dual fused

E = with single fuse in live line (dual fuse is standard), not available for DC input

Signal, standby options

X2 = option board 2: 5V 2.0A standby supply, remote on/off (enable), dc good, ac fail, remote sense

X3 = option board 3: 12V 1.0A standby supply, remote on/off (enable), dc good, ac fail, remote sense

X5 = option board 5: 5V 2.0A standby supply, remote on/off (inhibit), dc good, ac fail, remote sense

X6 = option board 6: 12V 1.0A standby supply, remote on/off (inhibit), dc good, ac fail, remote sense

Leakage current options:

S = Industrial Leakage <3.5mA for Class I, 60950-1 and 62368-1 only

blank = standard leakage <250µA

R = Reduced Leakage <150µA

T = Reduced Leakage <50µA

Examples:

CUS400M-24 open pcb with baseplate with dual fuses and standard features, 24V

CUS400M-24V5 as above with output set to 24.5V

CUS400M-12/U U chassis, 12V

CUS400M-15V25/FE U chassis, cover and fan, single fuse, 15.25V

Unit Product Code may be prefixed by K, and/or SP followed by / or -

For units with non-safety related changes e.g. Reduced OVP, current limit etc.

Unit product code is followed by "-NNNNL", where N is a string of numbers which identifies the unique requirement. And L is an optional letter, starting with "A", which is incremented for any customer revision.

Example: CUS400M-24/FE-0001A

For non-standard units:

Prefix with "K-". Follow by basic model type e.g. CUS400M. Followed by "-NNNNL", where N is a string of numbers which identifies the non-standard requirement. L is an optional letter, starting with "A", which is incremented for any customer revision.

Example: KCUS400M-24-0001A

Refer also to de-rating curves and voltage adjustment options described in enclosure 7-01
Refer to Enclosure 7-02 for output voltage ranges.

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

Following components may require attention when unit is used in End Product with custom cooling or outside ratings:

L6: 120°C

L7: 120°C

TX1: 130°C

C15: 125°C

C6: 125°C

C7:125°C

The marking label provided is representative of all models.

The test item receipt dates shown are those of the original/ amendment testing.

Technical Considerations

- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of : 70°C with derating above 50°C
- The means of connection to the mains supply is : to be determined in End Product (assessed as Pluggable A, considered worst case)
- The product is intended for use on the following power systems : TT, TN
- The equipment disconnect device is considered to be : determined in end product (considered single-pole disconnection, as worst case)
- The product was investigated to the following additional standards : EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + A2:2013 (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 : main output
- The following circuit locations (with circuit/schematic designation) were investigated as a limited power source (LPS) : Option board output
- The following were investigated as part of the protective earthing/bonding : Printed wiring board trace (refer to Enclosure - Schematics + PWB for layouts)
- The following are available from the Applicant upon request : Installation (Safety) Instructions / Manual, including French language for Canada
- The following scope limitations apply to this test report and are confirmed by Applicant to be covered separately. Additional evaluation and/or tests may be required when submitting this CB Report to a National Certification Body (NCB) to obtain a national mark:
 - 1) no EMC tests nor evaluation to EMC Directive 2004/108/EC and 2014/30/EU,
 - 2) no evaluation to RoHS Directives 2002/95/EC, 2011/65/EU and (EU) 2016/585,
 - 3) no evaluation to Council Recommendation 1999/519/EC nor 2006/25/EC,
 - 4) only English version of markings and instructions provided and reviewed.

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: 299 Vrms/ 571 Vpk; Primary-Secondary: 391 Vrms/ 620 Vpk
- The following secondary output circuits are SELV : all outputs
- The following secondary output circuits are at hazardous energy levels : main output
- The following secondary output circuits are at non-hazardous energy levels : option board output
- The following output terminals were referenced to earth during performance testing : Main output (-), aux output (-)
- The power supply terminals and/or connectors 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
- The following input terminals/connectors must be connected to the end-product supply neutral : marked "N"
- 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) : TX1 class 155 (F), TX3 class 155 (F)
- The following end-product enclosures are required : Mechanical (hot parts), Fire, Electrical
- The following components require special consideration during end-product Thermal (Heating) tests due to the indicated maximum temperature measurements during component-level testing : see Additional Information
- The maximum continuous power supply output (Watts) relied on forced air cooling from : The maximum continuous power supply output (Watts) relied on forced air cooling from : For option F only: 400W with fan as provided with product.
- The equipment is suitable for direct connection to : AC mains supply

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)