UL TEST REPORT AND PROCEDURE

Standard:	UL 60950-1, 2nd Edition, 2019-05-09 (Information Technology Equipment - Safety - Part 1: General Requirements) CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10 (Information Technology Equipment - Safety - Part 1: General Requirements)
Certification Type:	Component Recognition
CCN:	QQGQ2, QQGQ8 (Power Supplies for Information Technology Equipment Including Electrical Business Equipment)
Complementary CCN:	N/A
Product:	Power supply
Model:	CUS400M series Unit product code : CUS400M-xxVx/yyyy (see model differences for detail)
Rating:	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)
Applicant Name and Address:	TDK-LAMBDA UK LTD KINGSLEY AVE ILFRACOMBE EX34 8ES UNITED KINGDOM

This is to certify that representative samples of the products covered by this Test Report have been investigated in accordance with the above referenced Standards. The products have been found to comply with the requirements covering the category and the products are judged to be eligible for Follow-Up Service under the indicated Test Procedure. The manufacturer is authorized to use the UL Mark on such products which comply with this Test Report and any other applicable requirements of UL LLC ('UL') in accordance with the Follow-Up Service Agreement. Only those products which properly bear the UL Mark are considered as being covered by UL's Follow-Up Service under the indicated Test Procedure.

Prepared By:	Mark John De Sagun / Project Handler	Reviewed By:	Dennis Butcher / Reviewer

Supporting Documentation

The following documents located at the beginning of this Procedure supplement the requirements of this Test Report:

A. Authorization - The Authorization page may include additional Factory Identification Code markings.

B. Generic Inspection Instructions -

i. Part AC details important information which may be applicable to products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of this Test Report.

ii. Part AE details any requirements which may be applicable to all products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of each Test Report.

iii. Part AF details the requirements for the UL Certification Mark which is not controlled by the technical standard used to investigate these products. Products are permitted to bear only the Certification Mark(s) corresponding to the countries for which it is certified, as indicated in each Test Report.

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/yyyyy

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.

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

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

For use only in or with complete equipment where the acceptability of the combination is determined by UL LLC. 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

Additional Information

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.

Additional Standards

The product fulfills 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

Markings and Instructions

Clause Title	Marking or Instruction Details
Power rating - Ratings	Ratings (voltage, frequency/dc, current)