UL TEST REPORT AND PROCEDURE

Standard:	UL 62368-1, 2nd Ed, 2014-12-01 (Audio/video, information and communication technology equipment Part 1: Safety requirements) CAN/CSA C22.2 No. 62368-1-14, 2nd Ed, Issued: 2014-12-01 (Audio/video, information and communication technology equipment Part 1: Safety requirements)
Certification Type:	Component Recognition
CCN:	QQJQ2, QQJQ8 (Power Supplies for Use in Audio/Video, Information and Communication Technology Equipment)
Complementary CCN:	N/A
Product:	AC-DC 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.

The applicant is authorized to reproduce the referenced Test Report provided it is reproduced in its entirety.

UL authorizes the applicant to reproduce the latest pages of the referenced Test Report consisting of the first page of the Specific Technical Criteria through to the end of the Conditions of Acceptability.

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.

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

Unit is open-type AC/DC Power supply 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 0.83A 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 0.83A 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 eg. 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 eg. 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 to enclosures 7-01 and 7-02 for output parameters and de-rating information.
Refer to Enclosure 7-04 for output voltage ranges.

Test Item Particulars	
Classification of use by	Skilled person
Supply Connection	AC Mains
Supply % Tolerance	+10%/-10%
Supply Connection – Type	For building-in: To be determined in End Product
Considered current rating of protective device as part of building or equipment installation	20 A; building;
Equipment mobility	for building-in
Over voltage category (OVC)	OVC II
Class of equipment	Class I Class II
Access location	N/A

Pollution degree (PD)	PD 2
Manufacturer's specified maximum operating ambient (°C)	70, with derating above 50
IP protection class	IPX0
Power Systems	TN TT IT - 230 V L-L
Altitude during operation (m)	5000 m
Altitude of test laboratory (m)	2000 m or less
Mass of equipment (kg)	max. 1kg

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 product is intended for use on the following power systems : TN, TT, IT
- Considered current rating of protective device as part of the building installation (A) : 20
- Mains supply tolerance (%) or absolute mains supply values : +10%/-10%
- The equipment disconnect device is considered to be : determined in end Use Application
- The product was investigated to the following additional standard : EN 62368-1:2014, AS/NZS 62368.1:2018
- 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,

- Above 50°C the total output power and current ratings are both de-rated to ensure power curves are met. Refer to Enclosures 7-01 for the De-rating curves.

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 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 output circuits are at ES1 energy levels : Option board output, main outputs for models 12V to 36V
- The following output circuits are at ES2 energy levels : main output for 48V model
- The following output circuits are at PS3 energy levels : All outputs
- 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
- An investigation of the protective bonding terminals has : not been conducted (N.B. an investigation of the PCB traces has been conducted in Annex R}
- The following input terminals/connectors must be connected to the end-product supply neutral : N
- The following end-product enclosures are required : Fire, Electrical, Mechanical
- 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) : XT1 class 155 (F), TX3 class 155 (F)
- 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 : For option F only: 400W with fan as provided with product.
- The power supply was evaluated to be used at altitudes up to : 5000m

Additional Information

Potting is used for thermal performance only -- spacings and insulation comply with clause 5.4
models tested:
CUS400M-12-UX6 (highest output current)
CUS400M-24-UX5 (highest working voltage, most severe thermal effect)

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
TX3: 130°C
C15: 125°C
C6: 125°C
C7: 125°C

Earthing terminal has been evaluated to comply with both: Protective Bonding (with limited short-circuit test, basic insulation to ES3 parts) and Functional Earthing (with leackage current compliant with ES1, reinforced insulation to ES3 parts).

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 62368-1:2014 + A11:2017, CSA CAN/CSA-C22.2 No. 62368-1 2nd Edition, Issued December 1, 2014

Markings and Instructions