

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 (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: | DC to DC Converter |
| Model: | DDA***(N or I)-%-%-%-xxxx-(bbb); Where "****" represents rated output power between 0W and 999W, based on the installed dc-dc power unit's rating. N = non-isolated, I = operational insulation / isolated. %-%-% denotes number of outputs, number of modules and polarity (e.g. S1PX = single unit, positive or D2PN = dual output, two modules, one positive and one negative output) xxxx indicates a number indicating magnitude of nominal voltage set point (e.g. 1205 = one 12V and 5V) bbb indicates feature set.. e.g. (on off logic, power good feature present) |
| Rating: | N/A |
| Applicant Name and Address: | TDK-LAMBDA AMERICAS INC SUITE 100 3320 MATRIX DR RICHARDSON TX 75082 UNITED STATES |

Issue Date: 2018-08-03

Page 2 of 8

Report Reference #

E220248-A6001-UL

Revision Date: 2019-08-07

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: Jenny Seward / Project Handler Reviewed By: Warren Fields / 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

The DC to DC converter DDA product family consists of PCB, one or two separately certified DC-DC converter modules and installed in a mounting DIN enclosure. The enclosure is intended to be purchased and mounted on a DIN rail and used as a component in an end-user's power system. The equipment shall be supplied from a DC source that provides double/reinforced insulation from AC mains.

Model Differences

All models within series constructed the same except for the internal DC to DC converter module employed. Rating and model designation are also dependent on converter module employed.

Test Item Particulars

| | |
|--|--|
| Classification of use by | Ordinary person |
| Supply Connection | External Circuit - not Mains connected ES1 |
| Supply % Tolerance | None |
| Supply Connection – Type | Not directly connected to Mains. For building in |
| Considered current rating of protective device as part of building or equipment installation | N/A - Consider in end product installation. A; |
| Equipment mobility | for building-in |
| Over voltage category (OVC) | OVC II OVC II |
| Class of equipment | Not classified |
| Access location | N/A |
| Pollution degree (PD) | PD 2 |
| Manufacturer's specified maximum operating ambient (°C) | 25°C |
| IP protection class | IPX0 |
| Power Systems | N/A |
| Altitude during operation (m) | 2000 m or less |
| Altitude of test laboratory (m) | 2000 m or less |
| Mass of equipment (kg) | 0.25kg |

Technical Considerations

- The product was submitted and evaluated for use at the maximum ambient temperature (T_{ma}) permitted by the manufacturer's specification of : 25°C
- The product is intended for use on the following power systems : No direct connection
- Considered current rating of protective device as part of the building installation (A) : To be considered in end product installation.
- Mains supply tolerance (%) or absolute mains supply values : No direct connection
- The equipment disconnect device is considered to be : No direct connection to Mains
- The following are available from the Applicant upon request : Installation (Safety) Instructions / Manual

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 output circuits are at ES1 energy levels : None
- The following output circuits are at ES2 energy levels : All
- The following output circuits are at PS3 energy levels : All
- The maximum investigated branch circuit rating is : To be considered in end product installation.
- The investigated Pollution Degree is : 2
- The following end-product enclosures are required : Electrical, Fire
- The maximum continuous power supply output (Watts) relied on forced air cooling from : 504 W fan at 30.5 cfm applied to 63 cm away on the side of unit.
- The power supply was evaluated to be used at altitudes up to : "2,000 m"
- The input operating voltage ranges are generally from 4.5V –
- 75Vdc.
- The output voltage range will be between 0.5V and 52Vdc
- depending upon the converter employed.
- All models within this report are considered non- isolating type as it is only provided functional insulation between input and output.

Additional Information

Correction 1:

This is a correction to include the following updates omitted in the original report:

Edited report to add manufacturer and model to clauses F.3.2.1, and F.3.2.2 respectively. Also added clarification to Table 5.2 on why 40 VDC was considered as ES2.

Corrected EN Standard reference in Additional Standards section.

This report is not valid without the original report.

Technical Amendment 1: This report was updated to revise the model number nomenclature (removed "-y" and "may be followed by "R"). The marking plate was updated accordingly. No testing was conducted as part of this Amendment. Per the previously conducted testing and review of product technical documentation including photos, schematics, and wiring diagrams, it has been determined that the product continues to comply with the standard. This Amendment is not valid without the original report.

Labels provided are representative of all models within the report.

Additional Standards

The product fulfills the requirements of: EN 62368-1:2014 + A11:2017

Markings and Instructions

| Clause Title | Marking or Instruction Details |
|--|---|
| Equipment identification marking – Manufacturer identification | Listees or Recognized companys name, Trade Name, Trademark or File Number |
| Equipment identification marking – model identification | Model Number |
| Equipment identification marking – Manufacturer identification | Listees or Recognized companys name, Trade Name, Trademark or File Number |
| Equipment identification marking – model identification | Model Number |
| Special Instructions to UL Representative | |