

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:	QQGQ2, QQGQ8 (Power Supplies for Information Technology Equipment Including Electrical Business Equipment)
Product:	DC-DC Converter
Model:	EZA11K-320240ab (Suffix a is "CO", "FC" or blank, b is "N" or blank)
Rating:	DC320V [HVDC] INPUT: 240-400 VDC, 42.0A OUTPUT: 320 VDC, 34.4A DC240V [LVDC] INPUT: 150-300 VDC, 52.0A OUTPUT: 240 VDC, 45.8A
Applicant Name and Address:	TDK-LAMBDA CORP NAGAOKA TECHNICAL CENTER R&D DIV 2704-1 SETTAYA-MACHI NAGAOKA-SHI NIIGATA 940-1195 JAPAN JAPAN

Issue Date: 2018-08-09
Revision Date: 2022-06-06

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Report Reference # E122103-A6024-UL

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.

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

Prepared By: Toshiyuki Suzuki / Project
Handler

Reviewed By: Masatomo Takiyama / 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 unit is component type DC-DC Converter for use in dedicated system. (Building-in)

The unit and dedicated system is intended to be located between HVDC side (nominal 320 Vdc) and LVDC side (nominal 240 Vdc)

This DC-DC Converter provides dual directions converter function which converts power from/to HVDC side to/from LVDC side.

Model Differences

EZA11K-320240ab (Suffix a is "CO", "FC" or blank, b is "N" or blank)

CO: Model with thin coating on both component and solder side of PWB

FC: Model with thin coating on both component and solder side of PWB and Splash Proof Fan

N: Model without brackets

Thin coating is not for reducing required spacing.

Test Item Particulars

Classification of use by	Skilled person
Supply Connection	External Circuit - not Mains connected ES3
Supply % Tolerance	None
Supply Connection – Type	Terminal Block
Considered current rating of protective device as part of building or equipment installation	HVDC side: 50A, LVDC side: 60 A; building;
Equipment mobility	for building-in
Over voltage category (OVC)	OVC II
Class of equipment	Class I
Access location	N/A
Pollution degree (PD)	PD 2
Manufacturer's specified maximum operating ambient	50°C
IP protection class	IPX0

Power Systems	--
Altitude during operation (m)	Up to 3000 m
Altitude of test laboratory (m)	Approximately 10 to 20 m
Mass of equipment (kg)	Approximately 20 kg
Technical Considerations	
<ul style="list-style-type: none"> • The product was submitted and evaluated for use at the maximum ambient temperature (T_{ma}) permitted by the manufacturer's specification of : 50°C • The following were investigated as part of the protective earthing/bonding : Protective bonding terminal on Chassis • LEDs provided in the product are considered low power devices: Yes • The product was evaluated to be used in tropical climates. 	
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:	
<ul style="list-style-type: none"> • The following product-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 : HVDC/LVDC - Secondary: 432 Vrms, 626 Vpk, HVDC/LVDC - Earthed Dead Metal: 408 Vrms, 940 Vpk • The following output circuits are at ES1 energy levels : I/F circuit, CN (CN952) and RS485 (CN953, CN954) • The following output circuits are at ES3 energy levels : HVDC at TB1 and LVDC at TB41 • The following output circuits are at PS3 energy levels : HVDC at TB1 and LVDC at TB41 • The maximum investigated branch circuit rating is : 50 A for upstream of HVDC side, 60 A for upstream of LVDC side. • Proper bonding to the end-product main protective earthing termination is : Required • The following end-product enclosures are required : Fire, Electrical, Mechanical • The following secondary output circuits are supplied by a Limited Power Source: I/F circuits, CN (CN952) and RS485 (CN953, CN954) • The following output terminals were referenced to earth during performance testing: -V and -V at LVDC and HVDC. • The power supply terminals and/or connectors are: Not investigated for field wiring • The following magnetic devices (e.g. transformers or inductor) are provided with IEC 60085 (equivalent to UL 1446) insulation system with the indicated rating greater than Class 105 (A): T401, T402, T501, T502 (Class 130(B)) • Front side enclosure has been subjected to Impact test and 250N Steady Force test. • External circuit to which HVDC side and LVDC side connected are considered DC hazardous voltage secondary circuit which is isolated from Primary circuit by reinforced insulation. • Isolation between HVDC circuit and LVDC circuit was evaluated as Basic insulation. • Mains transient voltage from HVDC side (TB1) is assumed to 2500 V peak. • Mains transient voltage from LVDC side (TB41) is assumed to 2500 V peak. • Classification of PIS has not been conducted. Therefore, all electrical components and conductors including printed wirings were assumed to be arcing/resistive PIS. • The following secondary output circuits are SELV: IF circuit, CN (CN952) and RS485 (CN953, CN954) • The following secondary output circuits are at non-hazardous energy levels: IF circuit: CN (CN952) and RS485 (CN953, CN954) 	
Additional Information	

Output voltage at both LVDC and HVDC are adjustable during operation. (See below and Derating curve in Enclosure - Miscellaneous: 7-01.

LVDC output: 150-300Vdc.

HVDC output: 240-400Vdc.

The following Operating Mode and conditions were used during the tests, and were considered representative.

Operating Mode No.1: Charging Operation 2/ From HVDC(Input) to LVDC(Output) loaded by 220Vdc, 50A(11,000W)

Operating Mode No.2: Charging Operation 3/ From HVDC(Input) to LVDC(Output) loaded by 300Vdc, 36.67A(11,000W)

Operating Mode No.3: Discharging Operation 2/ From LVDC(Input) to HVDC(Output) loaded by 275Vdc, 40A(11,000W)

Operating Mode No.4: Discharging Operation 3/ From LVDC(Input) to HVDC(Output) loaded by 400Vdc, 27.5A(11,000W)

Insulation class (EIS) was not applied to main transformer T1 and Coil L101, L102, L151, L152 as compliance criteria because isolation is done by simple construction.

Additional Standards

The product fulfills the requirements of: UL 60950-1, 2nd Ed, Revised October 14, 2014, CSA CAN/CSA-C22.2 NO. 60950-1 2nd Ed, Revised October 14, 2014

Markings and Instructions

Clause Title	Marking or Instruction Details
Equipment identification marking – Manufacturer identification	Listee's or Recognized companys name, Trade Name, Trademark or File Number
Equipment identification marking – model identification	Model Number