Test Report issued under the responsibility of:

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

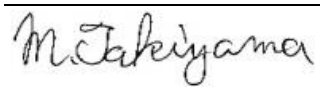
Report Reference No ..... :	E122103-A161-CB-1
Date of issue ..... :	2015-02-26
Total number of pages ..... :	9
CB Testing Laboratory ..... :	UL Japan, Inc.
Address ..... :	4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan
Applicant's name ..... :	TDK-LAMBDA CORP
Address ..... :	NAGAOKA TECHNICAL CENTER R&D DIV 2704-1 SETTAYA-MACHI NAGAOKA-SHI NIIGATA 940-1195 JAPAN
Test specification:	
Standard ..... :	IEC 60950-1:2005 (Second Edition); Am1:2009 + Am2:2013
Test procedure ..... :	CB Scheme
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC60950_1F
Test Report Form originator ..... :	SGS Fimko Ltd
Master TRF ..... :	Dated 2014-02

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. This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description	:	DC-DC Converter
Trade Mark	:	TDK-Lambda
Manufacturer	:	TDK-LAMBDA CORP NAGAOKA TECHNICAL CENTER R&D DIV 2704-1 SETTAYA-MACHI NAGAOKA-SHI NIIGATA 940-1195 JAPAN
Model/Type reference	:	EZA2500-32048ab (a is "CO", "FC" or blank, b is "N" or blank)
Ratings	:	HVDC INPUT: DC300-380V, 8.5A OUTPUT: DC320V, 7.8A LVDC INPUT: DC36-60V, 56.0A OUTPUT: DC48V, 52.0A

Testing procedure and testing location:		
[x]	**CB Testing Laboratory**	
	Testing location / address .....:	UL Japan, Inc. 4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan
[ ]	**Associated CB Test Laboratory**	
	Testing location / address .....:	
	Tested by (name + signature) .....:	Tetsuo Iwasaki, Project Handler 
	Approved by (name + signature)....:	Masatomo Takiyama, Reviewer 
[ ]	**Testing Procedure: TMP/CTF Stage 1**	
	Testing location / address .....:	
	Tested by (name + signature) .....:	
	Approved by (name + signature)....:	
[ ]	**Testing Procedure: WMT/CTF Stage 2**	
	Testing location / address .....:	
	Tested by (name + signature) .....:	
	Witnessed by (name + signature) ..:	
	Approved by (name + signature)....:	
[ ]	**Testing Procedure: SMT/CTF Stage 3 or 4**	
	Testing location / address .....:	
	Tested by (name + signature) .....:	
	Approved by (name + signature)....:	
	Supervised by (name + signature) .:	
[ ]	**Testing Procedure: RMT**	
	Testing location / address .....:	
	Tested by (name + signature) .....:	
	Approved by (name + signature)....:	
	Supervised by (name + signature) .:	

List of Attachments

National Differences (0 pages)

Enclosures (5 pages)

Summary of Testing:

No tests were conducted

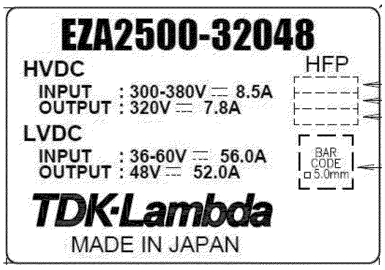
Summary of Compliance with National Differences:

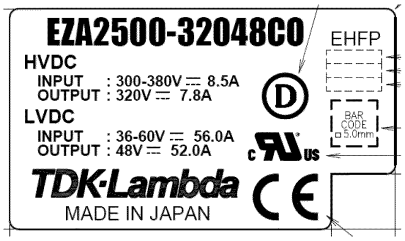
Countries outside the CB Scheme membership may also accept this report.

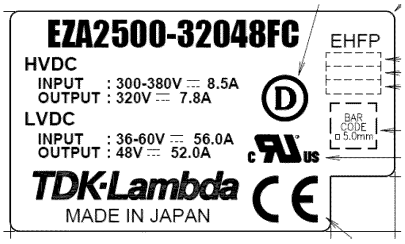
List of countries addressed: CA, DE, DK, EU, FI, GB, KR, SE, SI, US
The product fulfills the requirements of: EN 60950-1:2006 + A1:2010 + A11:2009 + A12:2011 + A2:2013

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.







Test item particulars :	
Equipment mobility .....:	for building-in
Connection to the mains .....:	not directly connected to the mains
Operating condition .....:	continuous
Access location .....:	N/A
Over voltage category (OVC) .....:	OVC II
Mains supply tolerance (%) or absolute mains supply values .....:	No direct connection
Tested for IT power systems .....:	N/A
IT testing, phase-phase voltage (V) .....:	N/A
Class of equipment .....:	Class I (earthed)
Considered current rating of protective device as part of the building installation (A) .....:	20
Pollution degree (PD) .....:	PD 2
IP protection class .....:	IP X0
Altitude of operation (m) .....:	Up to 2000 m
Altitude of test laboratory (m) .....:	Approximately 10 to 20 m
Mass of equipment (kg) .....:	Approximately 8 kg
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(s) of receipt of test item .....:	N/A
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 point is used as the decimal separator.	
Manufacturer's Declaration per Sub Clause 4.2.5 of IECEE 02:	Yes
The application for obtaining a CB Test Certificate includes more than one factory 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 ..... When differences exist, they shall be identified in the General Product Information section.	
Name and address of Factory(ies):	TDK (MALAYSIA) SDN BHD KAWASAN PERUSAHAAN NILAI 71800 NILAI MALAYSIA ALPS LOGISTICS FACILITIES CO LTD 593-1 NISHIOOHASHI

TSUKUBA-SHI
IBARAKI-KEN 305-0831 JAPAN

ZHANGJIAGANG HUA YANG ELECTRONICS CO LTD
TONGXIN RD
ZHAOFENG ECONOMIC DEVELOPMENT ZONE
LEYU TOWN
ZHANGJIAGANG
JIANGSU 215622 CHINA

TDK-LAMBDA CORP
2704-1 SETTAYA-MACHI
NAGAOKA-SHI
NIIGATA-KEN 940-1195 JAPAN

SENDAN ELECTRONICS MFG CO LTD
1010 HABUSHIN
NANTO-SHI
TOYAMA-KEN 939-1756 JAPAN

TDK-LAMBDA MALAYSIA SDN BHD
LOT 2 & 3, BATU 9 3/4
KAWASAN PERINDUSTRIAN
BANDAR BARU JAYA GADING
26070 KUANTAN MALAYSIA

TDK-LAMBDA MALAYSIA SDN BHD
PLO33 KAWASAN PERINDUSTRIAN SENAI
81400 SENAI MALAYSIA

Wuxi TDK-Lambda Electronics Co Ltd
NO 6
XING CHUANG ER LU
WUXI
JIANGSU 214028 CHINA

TDK-LAMBDA LTD
56 HAHAROSHET STREET
P.O.B. 500 KARMIEL INDUSTRIAL ZONE
2161401 KARMIEL ISRAEL

GENERAL PRODUCT INFORMATION:

Report Summary

The original report was modified on 2018-03-09 to include the following changes/additions:
This report is only valid in conjunction with CB Test Report Ref. No. E122103-A161-CB-1, including revision CB Test Report Ref. No. E122103-A161-CB-1 (Amendment 1).

Amendment 2 is Technical Amendment to cover the following:

- Addition of Rack mount bracket (it is not relied on any safety aspects)

- Addition of suffix "N" for Model name. Suffix "N" denotes "without brackets".
- Addition photos 3-14, 3-15, 3-16

No tests were conducted on this model because of no construction change.

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 Grid side (nominal 320 Vdc) and Battery side (nominal 48 Vdc)
This DC-DC Converter provides dual directions converter function which from/to high voltage to/from low voltage.

Model Differences

EZA2500-32048ab (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 reduce required spacing.

Additional Information

Output voltage at both LVDC and HVDC are adjustable during installation. (See below, and Derating curve in Enclosure - Miscellaneous: 7-01.
LVDC output: 36-60 Vdc.
HVDC output: 300 - 380 Vdc.

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

Operating Mode No.1 (Charging Operation) - Input; HVDC 300 Vdc, Output; LVDC 48 Vdc, 52.0A.
Operating Mode No.2 (Charging Operation) - Input; HVDC 380 Vdc, Output; LVDC 60 Vdc, 41.6A.
Operating Mode No.3 (Discharging Operation) - Input; LVDC 48.45 Vdc, Output; HVDC 300 Vdc, 8.3A.
Operating Mode No.4 (Discharging Operation) - Input; LVDC 60 Vdc, Output; HVDC 380 Vdc, 6.57A.

Insulation class (EIS) was not applied to main transformer T1 as compliance criteria because isolation between primary and secondary is done by simple construction.

Critical components which have been evaluated and certified to former revision of standard IEC60950-1 were reviewed and found to comply with IEC 60950-1:2005 (Second Edition); Am1:2009 + Am2:2013.

Technical Considerations

- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer’s specification of: 50°C
- The following were investigated as part of the protective earthing/bonding: Protective bonding terminal on TB1
- LEDs provided in the product are considered low power devices: Yes

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-SELV/ Earthed Dead Metal: 476 Vrms, 744 Vpk
- The following secondary output circuits are SELV: I/F circuit
- The following secondary output circuits are at non-hazardous energy levels: I/F circuit
- The following secondary output circuits are supplied by a Limited Power Source: I/F circuits - CN383, CN384 (RS485), CN382 (CN).
- 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: Suitable for factory wiring only
- The maximum investigated branch circuit rating is: 20 A for upstream of HVDC.
- 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: Been conducted
- 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): T1: 155°C (RTI of EIM), T101 (Class B)
- The following end-product enclosures are required: Fire, Electrical
- Front side has been subjected to Impact test and 250N Steady Force test. --
- External circuit connected to LVDC side (Battery side) is considered SELV. --
- External circuit connected to HVDC side (Grid side) is considered DC hazardous voltage circuit which is rectified AC Mains circuit. (Primary circuit) --
- Output circuit voltage at LVDC (TB201) is evaluated to Secondary Hazardous Voltage isolated from primary circuit by reinforced insulation. --
- Primary to ground and secondary capacitors (C10, C11, C12, C16, C17, C51, C52) may have the capacitance variation. Therefore, consideration shall be given in conducting Touch current test in end product application with respect to the variation in those capacitors. --

Abbreviations used in the report:

- normal condition	N.C.	- single fault condition	S.F.C
- operational insulation	OP	- basic insulation	BI
- basic insulation between parts of opposite polarity:	BOP	- supplementary insulation	SI
- double insulation	DI	- reinforced insulation	RI

Indicate used abbreviations (if any)