UL TEST REPORT AND PROCEDURE

Standard:	UL 60950-1, 2nd Edition, 2014-10-14 (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)
Product:	Switch Mode Power Supply
Model:	CPFE500F-12 CPFE500F-24 CPFE500F-28 CPFE500F-48 May be followed by alpha-numeric characters denoting non safety-related model differences.
Rating:	Input 100-240Vac nom, 8.2A rms max, 50-60Hz. CPFE500F-12 output: (9.6 to 14.4 Vdc), 42A max, 504W max. CPFE500F-24 output: (22.4 to 33.6 Vdc), 18A max, 504W max. CPFE500F-28 output: (22.4 to 33.6 Vdc), 18A max, 504W max. CPFE500F-48 output: (38.4 to 57.6 Vdc), 10.5A max, 504W max.
Applicant Name and Address:	TDK-LAMBDA UK LTD KINGSLEY AVE ILFRACOMBE DEVON 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: Mike Burns Reviewed by: David Snook

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

CPFE500F Range. Switch mode power supply for building into an end equipment.

Model Differences

All models share a common enclosure and PWB but use different component values to provide different output voltages.

CPFE500F model as described below:

Unit Configuration Code:

CPFE500F-a-b-c-d-e
(may be prefixed by NS - # / or - where # may be
up to any four letters and may be followed by - $ where $ may be any number between 000 to 999, indicating non-safety related model differences.

Where:

a	=	Output Voltage (see output voltage table below).
b	=	D for Oring diode. N for no Oring diode.
c	=	L for supplied with cover. N for no cover supplied.
d	=	C for protective coating. N for no protective coating.
e	=	V for Vertical connector or nothing.

Maybe followed by alpha-numeric characters denoting non-safety related model differences.

The PSU may additionally be marked with T8x where x can be any letters and/or numbers between 0 and 9 indicating non-safety related model differences

Output Voltage Cross Reference

Designation	Output Voltage
12	9.6 - 14.4V
24	22.4 - 33.6V
28	22.4 - 33.6V
48	38.4 - 57.6V

Input Parameters

Standard

Nominal input voltage	100 - 240 Vac
Input voltage range	85 - 264Vac*
Input frequency range	45 - 63Hz*
Maximum input current	8.2A rms

* In cases where conformance to various specs (UL, EN) are required, input voltage range will be 100-240Vac (50-60Hz)

Output Parameters

Voltage designation	Adjustment Range (V)	Output Current (A)	Maximum Power (W)
12	9.6 - 14.4V	42	504
24	22.4 - 33.6V	18	504
28	22.4 - 33.6V	18	504
48	38.4 - 57.6V	10.5	504

Technical Considerations

- Equipment mobility : for building-in
- Connection to the mains : for building-in
- Operating condition : continuous
- Access location : for building-in
- Over voltage category (OVC) : OVC II
- Mains supply tolerance (%) or absolute mains supply values : +10%, -10%
- Tested for IT power systems : Yes (Norway only)
- IT testing, phase-phase voltage (V) : 230V
- Class of equipment : Class I (earthed)
- Considered current rating of protective device as part of the building installation (A) : 20A
- Pollution degree (PD) : PD 2
- IP protection class : IP X0
- Altitude of operation (m) : 2000m
- Altitude of test laboratory (m) : 64m
- Mass of equipment (kg) : 1.4kg
- The attached Marking Label is representative of all models.
- The product is intended for use on the following power systems: TN
- The product was investigated to the following additional standards: EN 60950-1:2006 + A1:2010 + A11:2009 + A12:2011 + A2:2013 (which includes all European national differences, including those specified in this test report).
- 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
- The equipment disconnect device is considered to be: provided by the host equipment.

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:

- In the final application the baseplate temperature must remain below the following limits. Horizontal orientation input 90-149V baseplate temperature limited to 75°C.Horizontal orientation input 150V or greater baseplate temperature limited to 85°C.All other orientations baseplate temperature limited to 85°C.With the top cover removed, any orientation is permitted limited to 85°C baseplate temperature.
- The 48Vdc output must not be accessible to an operator as the output can be Non SELV under a single fault condition.
- 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: 417 Vrms, 490Vpk Primary-Earthed Dead Metal: 312Vrms, 435Vpk
- The following secondary output circuits are SELV: 12V, 24V and 28V outputs only.
- The following secondary output circuits are at hazardous energy levels: All
- 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
- An investigation of the protective bonding terminals has: Been conducted
- The following end-product enclosures are required: Fire, Electrical
- The following input terminals/connectors must be connected to the end-product supply neutral: N

Additional Information

The CPFE500F range comprises of previously certified AC to DC converters with additional input filter, boost voltage and secondary circuitry. The PFE500F series of power supplies used within these products have been approved to IEC60950-1:2005+A1+A2.

This report is a re-issue of CBTR Ref. No. E135494-A66-CB-2 including amendments and corrections with CB Test Certificate Ref. No. DK-27889-UL dated 2012-09-04 to upgrade to IEC 60950-1 2nd Edition + Amd 2. Based on the previously conducted testing and the review of product technical documentation including photos, schematics, wiring diagrams and similar, it has been determined that the product continues to comply with the standard.
No tests were deemed necessary as all required tests were carried out under the original investigation under the SMT program. The report was also modified to include the following changes/additions:-
1. Correction/addition to critical component list
2. Revised marking label
3. Enclosures updated
4. Adds alpha-numeric characters nomenclature denoting non safety-related model differences to model numbers.
5. Change of factory name from Trio Engineering Co Ltd to Panyu Trio Microtronic Co. Ltd

Additional Standards

The product fulfills the requirements of: CSA C22.2 No. 60950-1-07 + A2:2014, UL 60950-1 2nd Ed. Revised 2014-10-14, EN 60950-1:2006 + A1:2010 + A11:2009 + A12:2011 + A2:2013