Description

UL TEST REPORT AND PROCEDURE

Standard:	ANSI/AAMI ES60601-1 (2005/(R)2012 + A1:2012, C1:2009/(R)2012 + A2:2010/(R)2012) - Amendment 1 - Revision Date 2012/08/21 CAN/CSA-C22.2 No. 60601-1:14 - Edition 3 - Revision Date 2014/03
Certification Type:	Component Recognition
CCN:	QQHM2 / QQHM8
Product:	Built-in (open frame) switching power supply
Model:	PM500-xyf series, x=12, 13, 13-1, 14, 15, 17, 18, 19;FSP500M-K47-zyf series, TMC500-Szyf series z=12, 15, 18, 24, 28, 36, 48, or 57(y=B or C; f=Blank or "-SP" for different fuse number used, Blank for double pole fuse construction. "-SP" for single pole fuse construction.)
Rating:	Input rating for all models: 100-240 Vac, 6.0 - 2.6 A, 47-63 Hz See Miscellaneous - (02) for Output ratings for PROTEK / FSP / TRUMPower models. Note: y=B or C for denoting different chassis construction; f=Blank or "-SP" for denoting the use of mains fuse.
Applicant Name and Address:	FSP GROUP INC 2-3 E 3RD ST, PO BOX 35-25, N E P Z KAOHSIUNG 811, TAIWAN

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.

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

Prepared by: Zila Pi, Project Handler Reviewed by: Berman Pang, Project 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 device is switch mode power supply and consists of electrical components mounted on PWB and enclosed by either U-bracket metal chassis with external ventilation fan (min. 30 CFM) or fully enclosed metal enclosure with fan assembly. The device cannot be used as stand-alone and intends for built-in final system. See model difference for details.

The device is designed to provide insulations as below:
- 1MOOP is provided between Line and Neutral before mains fuses;
- 2MOPP are provided between Primary and Secondary;
- 1MOPP is provided between Primary and Protectively Earthed parts;
- 1MOPP is provided between Secondary to Protectively Earthed part when only rated Y1 or Y2 type CY6, CY8 are used.

See Insulation diagram & table and Enclosure “Miscellaneous - (01)” for details.

Output connectors P3 & P4 provided on control board CB1 are for internal circuits use, tests were conducted as per output ratings claimed by manufacturer as below:
- P3 (standby power): 5Vdc, 0.2A
- P4 (fan power): 12Vdc, 0.3A

See "Miscellaneous - (03)" for rating details.

The device can be operated with electrical ratings as follows:
- FULL load of rated output at maximum operating temperature 50 degree C;
- HALF load of rated output at maximum operating temperature 70 degree.

The maximum operating environmental conditions claimed as below:
- Ambient temperature: 5 to 50 degree C (FULL load); 5 to 70 degree C (HALF load);
- Relative Humidity (%): 5 to 95 % R.H.;
- Atmospheric Pressure (hPa): 540 to 1060 hPa (0-5000m).

Refer to the Report Modifications for any modifications made to this report.

Model Differences

All models are identical to each other except for transformer T1 windings, output ratings and secondary circuits.

For common variable "y" and "f" can be construction options as below:
1) y=B or C for denoting different chassis construction
B for U-Bracket metal chassis with external force air (min. 30 CFM) by end system;
C for fully enclosed metal enclosure with fan assembly.
2) f=Blank or “-SP” for denoting the use of mains fuses

Blank for mains fuses F1 and F2 provided in L and N;
"-SP" for mains fuse F1 provided in L only (for end system classified as permanently installed).

Additional Information

Technical Considerations

- The product was investigated to the following additional standards: ANSI/AAMI ES60601-1 (2005/(R)2012 + A1:2012, C1:2009/(R)2012 + A2:2010/(R)2012) - Amendment 1 - Revision Date 2012/08/21
- CAN/CSA-C22.2 No. 60601-1:14 - Edition 3 - Revision Date 2014/03
- The following additional investigations were conducted: None
- The product was not investigated to the following standards or clauses: Biocompatibility, PESS, EMC, Annex Z of EN standards for compliance with the MDD, and Usability
- The following accessories were investigated for use with the product: None
- The product is Classified only to the following hazards: Shock, Fire.
- The product is suitable for use in an Oxygen Rich Environment: No

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:

- This power supply has been judged on the basis of the required creepage and clearances in the ANSI/AAMI ES60601-1:2005/(R)2012 and A1:2012, C1:2009/(R)2012 and A2:2010/(R)2012, Sub clause
- 8.9.
- - This power supply has been evaluated as a Class I, continuous operation, ordinary Equipment and has not been evaluated for use in the presence of a flammable anesthetic mixture with air, oxygen, or nitrous oxide. An additional evaluation shall be made if the power supply is intended for use in other than Class I equipment.
- - This power supply was tested on a 20 A branch circuit. If used on a branch circuit greater than this, additional testing may be necessary.
- - Insulations 2MOPP are provided between Primary and Secondary, 1MOPP is provided between Primary and Protectively earthed part, and 1MOPP is provided between Secondary to Protectively Earthed part when only rated Y1 or Y2 type CY6, CY8 are used. See Insulation diagram & table and Enclosure "Miscellaneous - (01)" for detail.
- - Consideration should be given to measuring the temperatures on test corner, power electronic components and transformer windings when the power supply is installed in the end-use equipment. The transformers carried MOPP (T1 and T101) incorporates a Class B, 130°C insulation system.
- - The secondary output circuit of the product is SELV according to cl. 8.4.2 c).
- - The power supply intends for building-in, the hazard evaluation related to accessibility shall be considered and determined in end product.
- - The maximum operating temperature of the product is 50 degree C when full load and 70 degree C when half load.
- - The component shall be installed in compliance with the fire, mechanical and electrical enclosure, mounting, marking (clause 7.1.2 and 7.1.3), spacing, and separation requirements of the end use application.
- - Ceramic sheets adjacent to components DB1, Q13/Q14, and Q1 employed within product are used as 1MOPP, relevant mechanical tests (such as force, impact, and drop test) and following by dielectric test shall be considered as insulation validation in the end application if applicable.
- - Output connectors P3 & P4 provided on control board CB1 for internal circuits use, tests were conducted as per claimed output ratings by manufacturer without identification on label markings.
- - Models with variable "y= -SP" construction(mains fuse F1 provided in L only) is only allowed for use in end system classified as Permanently Installed.
- - Components bridge capacitors CY4 & CY5 are not used as per manufacturer's declaration, and are not included within this evaluation. If any of them was used, relevant insulation construction and

testing shall be re-evaluated.

- - Accessibility shall be determined and evaluated in end application.
- - Impedance of Protective Earth test (cl.8.6.4) shall be re-evaluated when additional conductor or similar means used to installed in end application.

Markings and instructions	
Clause Title	Marking or Instruction Details
Company identification	Classified or Recognized company's name, Trade name, Trademark or File
Model	Model number
Supply Connection	Voltage range, ac/dc, phases if more than single phase
Alternating current	
Supply Frequency	Rated frequency range in hertz
Power Input	Amps, VA, or Watts
Output	Rated output voltage, power, frequency.
Fuses	Ratings (current and voltage) and type. (located adjacent to fuse OR as a diagram inside enclosure)
Protective earth ground	

Special Instructions to UL Representative

None

Production-Line Testing Requirements		
Test Exemptions - The following models are exempt from the indicated test		
Test	Exemption Specifics	Details
Grounding Continuity	The following models are exempt from the indicated test:	Not exempt
Dielectric Voltage Withstand	The following models are exempt from the indicated test:	Not exempt
Patient Circuit Dielectric Voltage Withstand	The following models are exempt from the indicated test:	Exempt
Solid-State Components	The following solid-state components may be disconnected from the remainder of the circuitry during either Dielectric Voltage Withstand Test:	Exempt
Sample and Test Specifics for Follow-Up Tests at UL		

The following tests shall be conducted in accordance with the Generic Inspection Instructions			
Plastic Enclosure or Part	Test	Sample(s)	Test Specifics
None	NA	NA	NA