CERTIFICATE OF COMPLIANCE

Certificate Number	20140902-E146893
Report Reference	E146893-A51-UL
Issue Date	2014-September-02
Issued to:	XP POWER L L C SUITE 150 1241 E DYER RD SANTA ANA CA 92705
This is to certify that representative samples of	COMPONENT - POWER SUPPLIES, MEDICAL AND DENTAL See next page for models
	Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.
Standard(s) for Safety:	Medical Electrical Equipment - Part 1: General Requirements for Basic Safety and Essential Performance, ANSI/AAMI ES60601-1, CAN/CSA-C22.2 No. 60601-1.
Additional Information:	See the UL Online Certifications Directory at www.ul.com/database for additional information

Only those products bearing the UL Recognized Component Marks for the U.S. and Canada should be considered as being covered by UL's Recognition and Follow-Up Service and meeting the appropriate U.S. and Canadian requirements.

The UL Recognized Component Mark for the U.S. generally consists of the manufacturer's identification and catalog number, model number or other product designation as specified under "Marking" for the particular Recognition as published in the appropriate UL Directory. As a supplementary means of identifying products that have been produced under UL's Component Recognition Program, UL's Recognized Component Mark: , may be used in conjunction with the required Recognized Marks. The Recognized Component Mark is required when specified in the UL Directory preceding the recognitions or under "Markings" for the individual recognitions. The UL Recognized Component Mark for Canada consists of the UL Recognized Mark for Canada: and the manufacturer's identification and catalog number, model number or other product designation as specified under "Marking" for the particular Recognition as published in the appropriate UL Directory.

Recognized components are incomplete in certain constructional features or restricted in performance capabilities and are intended for use as components of complete equipment submitted for investigation rather than for direct separate installation in the field. The final acceptance of the component is dependent upon its installation and use in complete equipment submitted to UL LLC.

Look for the UL Recognized Component Mark on the product.

William R. Carney

William R. Carney, Director, North American Certification Programs

UL LLC

CERTIFICATE OF COMPLIANCE

Certificate Number	20140902-E146893
Report Reference	E146893-A51-UL
Issue Date	2014-September-02

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements.

Component switching power supply, GSP500PSXXY (where XX = represents the output voltage between 12- 48 and Y = P or blank, maybe followed with additional suffix “-“ followed by “EF” or/and "SF")

William R. Carney

William R. Carney, Director, North American Certification Programs

UL LLC

UL TEST REPORT AND PROCEDURE

Standard:	ANSI/AAMI ES60601-1 (2005 + C1:09 + A2:10)(Medical Electrical Equipment - Part 1: General Requirements for Basic Safety and Essential Performance) CAN/CSA-C22.2 No. 60601-1 (2008) (Medical Electrical Equipment - Part 1: General Requirements for Basic Safety and Essential Performance)
Certification Type:	Component Recognition
CCN:	QQHM2, QQHM8 (Power Supplies, Medical and Dental)
Product:	Component switching power supply
Model:	GSP500PSXXY (where XX = represents the output voltage between 12- 48 and Y = P or blank, maybe followed with additional suffix "-" followed by "EF" or/and "SF")
Rating:	Input: 100-240 Vac, 50/60 Hz, 6.5A Output: See Model Differences for details
Applicant Name and Address:	XP POWER L L C SUITE 150 1241 E DYER RD SANTA ANA CA 92705 UNITED STATES

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: Wojciech Poleszak Reviewed by: Richard Dolle

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 models covered in this report are component power supplies intended for use in Medical Electrical Equipment. They are open frame power supplies intended for building-in.

Model Differences

The power supplies in the series are differentiated by the output voltage and current ratings, number of turns of primary/secondary windings in the Transformers (T1 (Power)), and minor differences in the secondary circuit components and PWB layout.

The basic model is provided with U-shaped chassis and top cover.

See below for Model Ratings Table Below:

Convection Cooling Method : 180W output max
Model GSP500PS12: Output Rated (V1): 10.1 - 13.5 Vdc, 17 A max (180 W) @ 50 C ambient;
10.1 - 13.5 Vdc, 8.5 A (90 W) @ 70 C ambient
Model GSP500PS15: Output Rated (V1): 13.6 - 17 Vdc, 12 A (180 W) @ 50 C ambient;
13.6 - 17 Vdc, 6 A (90 W) @ 70 C ambient
Model GSP500PS18: Output Rated (V1): 17.1 - 21 Vdc, 10 A max (180 W) @ 50 C ambient;
17.1 - 21 Vdc, 5 A (90 W) @ 70 C ambient
Model GSP500PS24: Output Rated (V1): 21.1 - 26 Vdc, 7.5 A (180 W) @ 50 C ambient;
21.1 - 26 Vdc, 3.75 A (90 W) @ 70 C ambient
Model GSP500PS28: Output Rated (V1): 26.1 - 31 Vdc, 6.43 A (180 W) @ 50 C ambient;
26.1 - 31 Vdc, 3.22 A (90 W) @ 70 C ambient
Model GSP500PS36: Output Rated (V1): 33.1 - 42 Vdc, 5 A (180 W) @ 50 C ambient;
33.1 - 42 Vdc, 2.5 A (90 W) @ 70 C ambient
Model GSP500PS48: Output Rated (V1): (42.1 - 52 Vdc, 3.75 A (180 W) @ 50 C ambient;
42.1 - 52 Vdc, 1.88 A (90 W) @ 70 C ambient

Forced air cooling method : 500W output max
Model GSP500PS12: Output Rated (V1): (V1) 10.1 - 13.5 Vdc, 42 A (500 W) @ 50 C ambient;
10.1 - 13.5 Vdc, 25 A (250 W) @ 70 C ambient
Model GSP500PS15: Output Rated (V1): (V1) 13.6 - 17 Vdc, 33.33 A (500 W) @ 50 C ambient;
13.6 - 17 Vdc, 16.67 A (250 W) @ 70 C ambient
Model GSP500PS18: Output Rated (V1): 17.1 - 21 Vdc, 10 A max (180 W) @ 50 C ambient;
17.1 - 21 Vdc, 5 A (90 W) @ 70 C ambient
Model GSP500PS24: Output Rated (V1): 21.1 - 26 Vdc, 21 A (500 W) @ 50 C ambient;
21.1 - 26 Vdc, 10.5 A (250 W) @ 70 C ambient
Model GSP500PS28: Output Rated (V1): 26.1 - 31 Vdc, 17.86 A (500 W) @ 50 C ambient;
26.1 - 31 Vdc, 8.93 A (250 W) @ 70 C ambient
Model GSP500PS36: Output Rated (V1): 33.1 - 42 Vdc, 13.89 A (500 W) @ 50 C ambient;
33.1 - 42 Vdc, 6.95 A (250 W) @ 70 C ambient
Model GSP500PS48: Output Rated (V1): 42.1 - 52 Vdc, 10.5 A (500 W) @ 50 C ambient;
42.1 - 52 Vdc, 5.25 A (250 W) @ 70 C ambient

Stand-by Output for all models: (V2) 5Vdc, 2A
Fan Output for all models: (V3) 12 Vdc, 0.3 A

Units provided with suffix "-EF" provided with End Fan (15 CFM)
Units provided with suffix "-SF" indicates models provided with only one fuse in the line and no fuse in the

neutral.
Units provided with P (e.g. GSP500PS12P) indicates construction variation to current sensing transformer T100.
See Enclosure for details.

Technical Considerations

- Classification of installation and use : for building-in
- Device type (component/sub-assembly/ equipment/ system) : Component
- Intended use (Including type of patient, application location) : Component switching power supply
- Mode of operation : Continuous
- Supply connection : for building-in
- Accessories and detachable parts included : None
- Other options include : None
- The product was investigated to the following additional standards:: EN 60601-1: 2006 + CORR: 2010 (Medical electrical equipment Part 1: General requirements for basic safety and essential performance), ANSI/AAMI ES60601-1 (2005 + C1:09 + A2:10) (Medical Electrical Equipment - Part 1: General Requirements for Basic Safety and Essential Performance) (includes Deviations for United States), CAN/CSA-C22.2 No. 60601-1 (2008) (Medical Electrical Equipment - Part 1: General Requirements for Basic Safety and Essential Performance) (includes National Differences for Canada),
- The product was not investigated to the following standards or clauses:: Electromagnetic Compatibility (IEC 60601-1-2), Clause 14, Programmable Electronic Systems, Biocompatibility (ISO 10993-1)
- The degree of protection against harmful ingress of water is:: Ordinary
- The mode of operation is:: Continuous
- The product is suitable for use in the presence of a flammable anesthetics mixture with air or oxygen or with nitrous oxide:: No
- The means of connection to the mains supply is: for building-in, to be determined in end-product

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:

- These components have been judged on the basis of the required spacings in the ANSI/AAMI ES60601-1 (2005 + C1:09 + A2:10)(Medical Electrical Equipment - Part 1: General Requirements for Basic Safety and Essential Performance)CAN/CSA-C22.2 No. 60601-1 (2008) (Medical Electrical Equipment - Part 1: General Requirements for Basic Safety and Essential Performance), which covers the end-use product for which the component was designed
- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer’s specification of: 50°C at full rated load and 70°C at 50% of rated load.
- Power supply provides the following MOPP (means of patient protection): two MOPP based upon a working voltage 284 Vrms, 475 Vpk between Primary to Secondary, one MOPP based upon a working voltage 241 Vrms, 343 Vpk between Primary and Earth/Enclosure, two MOPP based upon a working voltage 60Vdc between secondary to floated earth trace on PWB for BF output consideration, one MOPP based upon a working voltage 250 Vrms between secondary and earthing

trace or chassis for BF output consideration.

- The power supply terminals and/or connectors are: Not investigated for field wiring
- 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: Not been conducted
- The following input terminals/connectors must be connected to the end-product supply neutral: Input Connector (CON1) N terminal.
- 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, and (Class F, 155°C) , T2 and T100 (Class B, 130°C or Class F, 155°C)
- The following end-product enclosures are required: Electrical, Mechanical, Fire
- Suitable disconnect device is to be provided in the end system
- Temperature, Leakage and Dielectric Strength testing shall be considered in the end system and consideration of non-frequency weighted leakage current (clause 8.7.3e) to also be considered as part of the end product.
- Clearance spacing evaluated for 5000 m altitude. Additional consideration maybe necessary in the end-use product.
- Printed Wiring Board rated 130°C
- Units provided with additional suffix “SF”, provided with only one fuse. The need for additional fusing shall be determined as part of the end product.
- Heatsinks are floating and considered live. They should not be accessible in the end-product
- The device shall be installed in compliance with the enclosure, mounting, spacing, casualty, markings, and segregation requirements of the end-use application
- ME Equipment is component for building-in. Applicability of the following is to be determined in End Product Evaluation: 5.9 - Accessibility, 7 - Identification marking and Documents, 8.4.2 - Accessible Parts Including Applied Parts, 8.4.4 - Voltage or Chrge Limitation, 8.6 - Protective Earthing, 8.11.1 - Isolation from Supply Mains, 8.11.3 - Power Supply Cords, 9 - Protection against mechanical hazards, 11.3 - Fire Enclosure, 11.8 - Interruption of power supply, 15.3 - Mechanical Strength, 15.4.1 - Construction of Connectors, 15.4.4 - Indicators
- Overcurrent releases of adequate breaking capacity must be employed in the end product.
- The component shall be considered for compliance with the Marking (clause 7) and Separation (clause 8) requirements as part of the end use application evaluation.
- The available voltage for the secondary outputs does not exceed 25 Vac or 60 Vdc, under normal and single fault conditions
- Cleaning test shall be considered as part of end product evaluation.
- The need for Marking Durability and Marking Legibility Testing shall be considered as part of the end product installation
- Models covered under this Report have been evaluated for 50°C and 70°C ambient with either an end fan option or 15 cfm external air-flow for open frame and U-channel options applied at chassis edge (near C20 and D60)
- The Limited Short-Circuit Test (Clause 2.6.3.4 in IEC 609501-1) in addition to the Protective Bonding Test II (Clause 2.6.3.4, 2.6.1 in IEC 60950-1) was not performed.

Additional Information

The required clearance values have been assessed for suitability up to 5000 m elevation (1.29 correction factor as per Table 8 of IEC 60601-1).

IEC 60601-1 Edition 3.1, 2012-08, ES 60601-1, AMD1, CSA C22.2 No. 60601-1:14, EN 60601-1:2006 +A1:2013 (for reference only)

The need for the additional testing and evaluation shall be determined in the end product investigation

The nameplate markings provided are considered representative of the entire series.

The power supply series covered by this report employ 2 MOPP between Primary and Secondary circuits.

Testing to IEC 60601-1-2 was not conducted by UL and no supporting evidence of compliance has been presented. When submitting this Test Report to other Certification Body, the manufacturer is responsible for providing any additional information that the Body may need in order to issue its Mark, including testing for compliance with IEC 60601-1-2.

The models covered under this Report were additionally evaluated to to include IEC 60601-1 Edition 3.1, 2012-08 (for UL report only). Separate CBTR/CBTC issued.

Licenses older than 3 years to be provided by the manufacturer upon request.

The schematics are kept on file at the CBTL and can be provided by the manufacturer upon request by NCB's/CBTL's.

Additional Standards

The product fulfills the requirements of: N/A

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	
Direct current	
Supply Frequency	Rated frequency range in hertz
Power Input	Amps, VA, or Watts
Output	Rated output voltage, power, frequency.

Protective earth ground	
Amendment 1, Cl. 7.2.2	Serial number and date of manufacturer. See Enclosures - Miscellaneous 7-04 for details.

Special Instructions to UL Representative

N/A

Production-Line Testing Requirements

Test Exemptions - The following models are exempt from the indicated test

Model	Grounding Continuity	Dielectric Voltage Withstand	Patient Circuit Dielectric Voltage Withstand
All models	Exempt	Not exempt	Exempt

Solid-State Component Test Exemptions - The following solid-state components may be disconnected from the remainder of the circuitry during either Dielectric Voltage Withstand Test:

Component
N/A

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
N/A	-	-	-

TABLE: List of Critical Components

Object/part or Description	Manufacturer/ trademark	type/model	technical data	CCN	Marks of Conformity
Chassis	Interchangeable	Aluminum	U-shaped. Overall approx. 15.2 by 10 by 4cm, min. 1.9 mm thick.	-	-
Top cover	Interchangeable	Aluminum	Rectangle. Overall approx. 13.8 by 10cm , min. 1.9 mm thick.	-	-
Top cover - Alternate	Interchangeable	Aluminum	Rectangle, 2 pieces Overall approx. 7.8 by 10, and 5.4 by 9.4min. 1.9 mm thick.	-	-
Main board - Printed Wiring Board	Interchangeable	Interchangeable	Overall approx. 15.2 by 9.6 cm, min. 1.5 mm thick. Secured to bottom part of Chassis, see Chassis for details, using integral metal standoffs, min. 4 mm high, and insulating sheet, see PWB Insulating Sheet for details. Rated min. V-1, min. 130°C, rated for direct support of live parts.	ZMPV2	UL
Fan (SELV)	Adda Corp.	AG04012XB series	Rated 12 Vdc, 0.13 A (min. 10 cfm). Approx. dimension 40 by 10 by 10 mm. Fan leads provided with sleeving, see Sleeving and Tubing for details.	GPWV2, GPWV8 (E132139)	UL, cUL
Fan (SELV) -Alternate	Interchangeable	Interchangeable	Rated 12 Vdc, 0.13 A (min. 10 cfm). Approx. dimension 40 by 10 by 10 mm. Fan leads provided with sleeving, see Sleeving and Tubing for details.	GPWV2, GPWV8	UL, cUL
Input Connector (J1)	Dinkle Enterprise	DT-49 or DT-4C Series	Screw type, rated min. 20 A per terminal, min. 300V, min. 105°C.	XCFR2, XCFR8 (E102914)	UL, cUL
Input Connector (J1)	Interchangeable	Interchangeable	Screw type, rated min. 20 A per terminal, min. 300V, min. 105°C.	XCFR2, XCFR8	UL, cUL
Fuse (F1, F2)	Littelfuse	216 Series	Rated 16A, 250V, rated 125°C, vertically mounted to PWB. Fuse lead along with entire fuse provided with Insulating Tubing/ Sleeving, See Insulating Tubing/Sleeving for details.	JDYX2, JDYX8 (E10480)	UL
Fuse (F2) (for models with suffix -SF)	-	-	Not Provided. Jumper wire provided where Fuse (F2) would normally be provided.	-	-

Object/part or Description	Manufacturer/ trademark	type/model	technical data	CCN	Marks of Conformity
Varistor (VDR1)	Panasonic	V14 series (V14471U) (P/N ERZV14D471)	Rated min. 300V, 125 Joules. Soldered to PWB.	VZCA2, VZCA8 (E321499)	UL
Varistor (VDR1) - Alternate	Thinking Electronics	TVR14 Series (TVR14471)	Rated min. 300V, 125 Joules. Soldered to PWB.	VZCA2, VZCA8 (E314979)	UL
Inductor (L1) (Pri)	Interchangeable	Interchangeable (10015031)	Toroidal. min. 130 ºC, Overall approx. 25 outer dia. by 13 mm wide. Windings are soldered through the printed wiring board.	-	-
Inductor (L1) Triple Insulated Wire	Great Leoflon	TRW	Rated 600 V, 155 ºC	OBJT2 (E211989)	UL
Inductor (L1) Triple Insulated Wire - Alternate	Kuo Kuang Electronic Wire	REFU-F	Rated 600 V, 155 ºC	OBJT2 (E222087)	UL
Inductor (L1) Triple Insulated Wire - Alternate	Rubadue Wire Co.	TXXA01TXXX-L or TXXA01TXXX-L	Rated 600 V, 155 ºC	OBJT2 (E206198)	UL
Inductor (L2, L3) (Pri)	Interchangeable	Interchangeable (10015032)	Toroidal. min. 130 Deg C, Overall approx. 28.5 outer dia. by 18 mm wide. Windings are soldered through the printed wiring board and provided with spacer printed wiring board, (ZPMV2), rated min. V-1, 130°C, min. 1.7 mm thick	-	-
Inductor (L4) (Pri)	Interchangeable	Interchangeable (10015033)	Toroidal. min. 130 ºC, Overall approx. 32 outer dia. by 18.5 mm wide. Windings are soldered through the printed wiring board and provided with spacer printed wiring board, (ZPMV2), rated min. V-1, 130°C, min. 1.7 mm thick	-	-
Inductor (L1-L4) - Insulating Tapes	3M	92 or 1350Fx-x series or #44D-A or 1205	Polyester film tape, min. 1.0 mils (0.025 mm) thick, rated min. 130°C (Passed 2500 Vac dielectric).	OANZ2 (E17385)	UL
Heat Sink (HTSK1) (PRI)	Interchangeable	Aluminum	T shape Overall approx. (LxWxH) 2.96 by 3.13 cm by 3.5cm, min. 2.5 mm thick. Secured to through Printed Wiring Board, see Main Board, and soldered.	-	-

Object/part or Description	Manufacturer/ trademark	type/model	technical data	CCN	Marks of Conformity
Heat Sink (HTSK2) (PRI)	Interchangeable	Aluminum	L shape Overall approx. (LxWxH) 2.05 by 5.6 cm by 3.18cm, min. 2.5 mm thick. Secured to through Printed Wiring Board, see Main Board, and soldered.	-	-
Heat Sink (HTSK3) (PRI)	Interchangeable	Aluminum	L shape Overall approx(LxWxH). 0.65 by 5.74 cm by 3.18cm, min. 2.5 mm thick. Secured to through Printed Wiring Board, see Main Board, and soldered.	-	-
Diode Bridge (BR1)	Shindengen America Inc	D25XB60	Rated 600 V, 25A, 150°C, V-0. Secured to Heat Sink (HTSK1) using screw.	QQQX2 (E142422)	UL
Diode Bridge (BR1) - Alternate	Interchangeable	Interchangeable	Rated 600 V, 25A, 150°C, V-0. Secured to Heat Sink (HTSK1) using screw.	-	-
X-Capacitors (C1) -Optional	Epcos Electronic Components S A	B3292x Series	Rated max. 0.33 uF, min 275Vac, marked "X2".	FOWX2, FOWX8 (E97863)	UL, cUL
X-Capacitors (C1) Optional - Alternate	Winday Electri Industrial	MPX series	Rated max. 0.33 uF, min 275Vac, min marked "X2".	FOWX2, FOWX8 (E302125)	UL, cUL
X-Capacitors (C1) Optional - Alternate	Xiamen Faratronic Co. Ltd	MKP61R, Type C40 or MKP62 series (Type C42)	Rated max. 0.33 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E186600)	UL, cUL
X-Capacitors (C1) Optional - Alternate	PanasonicCorp	ECQUA or ECQUL	Rated max. 0.33 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E62674)	UL, CSA
X-Capacitors (C1) Optional - Alternate	Vishay Capacitors Belgium N V	F1772, or F1774 or F1778	Rated max. 0.33 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E354331)	UL
X-Capacitors (C1) Optional - Alternate	OKAYA Electric Industrial Co Ltd	LE series	Rated max. 0.33 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E47474)	UL, cUL
X-Capacitors (C4) -Optional	Epcos Electronic Components S A	B3292x Series	Rated max. 0.68 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E97863)	UL, cUL
X-Capacitors (C4) Optional - Alternate	Winday Electri Industrial	MPX series	Rated max. 0.68 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E302125)	UL, cUL
X-Capacitors (C4) Optional - Alternate	Xiamen Faratronic Co. Ltd	MKP61R, Type C40 or MKP62 series (Type C42)	Rated max. 0.68 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E186600)	UL, cUL

Object/part or Description	Manufacturer/ trademark	type/model	technical data	CCN	Marks of Conformity
X-Capacitors (C4) Optional - Alternate	PanasonicCorp	ECQUA or ECQUL	Rated max. 0.68 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E62674)	UL, CSA
X-Capacitors (C4) Optional - Alternate	Vishay Capacitors Belgium N V	F1772, or F1774 or F1778	Rated max. 0.68 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E354331)	UL
X-Capacitors (C4) Optional - Alternate	OKAYA Electric Industrial Co Ltd	LE series	Rated max. 0.68 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E47474)	UL, cUL
X-Capacitors (C4) -Optional	Epcos Electronic Components S A	B3292x Series	Rated max. 1.0 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E97863)	UL, cUL
X-Capacitors (C4) Optional - Alternate	Winday Electri Industrial	MPX series	Rated max. 1.0 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E302125)	UL, cUL
X-Capacitors (C4) Optional - Alternate	Xiamen Faratronic Co. Ltd	MKP61R, Type C40 or MKP62 series (Type C42)	Rated max. 1.0 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E186600)	UL, cUL
X-Capacitors (C4) Optional - Alternate	PanasonicCorp	ECQUA or ECQUL	Rated max. 1.0 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E62674)	UL, CSA
X-Capacitors (C4) Optional - Alternate	Vishay Capacitors Belgium N V	F1772, or F1774 or F1778	Rated max. 1.0 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E354331)	UL
X-Capacitors (C4) - Optional - Alternate	OKAYA Electric Industrial Co Ltd	LE series	Rated max. 1.0 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E47474)	UL, cUL
Y-Capacitors (C2, C3, C5, C6) - Optional	Murata	KX, KY, or KH series	Rated max. 470pF max, 250Vac, marked "Y1" or "Y2".	FOWX2, FOWX8 (E37921)	UL, cUL
Y-Capacitors (C2, C3, C5, C6) - Optional - Alternate	Panasonic	NS-A, ECK series	Rated max. 470pF, min. 250V, marked "Y1" or "Y2".	FOWX2, FOWX8 (E62674)	UL, cULqw
Y-Capacitors (C2, C3, C5, C6) - Optional - Alternate	Evox Rifa (Kemet Electronics OY)	ERP610 Series	Rated max. 470pF, min. 250V, marked "Y1" or "Y2".	FOWX2, FOWX8 (E73869)	UL, cUL
Y-Capacitors (C2, C3, C5, C6) - Optional - Alternate	TDK-EPC Corp	CS/CD Series	Rated max. 470pF, min. 250V, marked "Y1" or "Y2".	FOWX2, (E37861)	UL
Y-Capacitors (C2, C3, C5, C6)- Optional	Vishay Electronic GMBH	VY2 or VY1 or VKP Series	Rated max. 470pF, min. 250V, marked "Y1" or "Y2".	FOWX2, FOWX8 (E183844)	UL, cUL

Object/part or Description	Manufacturer/ trademark	type/model	technical data	CCN	Marks of Conformity
Y-Capacitors (C19) - Optional	Murata	KX, KY, or KH series	Rated max. 1000pF max, 275V ac, marked "Y1" or "Y2".	FOWX2, FOWX8 (E37921)	UL
Y-Capacitors (C19) - Optional - Alternate	Panasonic	NS-A, ECK series	Rated max. 1000pF, min. 250V, marked "Y1" or "Y2".	FOWX2, FOWX8 (E62674)	UL
Y-Capacitors (C19) - Optional - Alternate	Evox Rifa (Kemet Electronics OY)	ERP610 Series	Rated max. 1000pF, min. 250V, marked "Y1" or "Y2".	FOWX2, FOWX8 (E73869)	UL, cUL
Y-Capacitors (C19) - Optional - Alternate	TDK-EPC Corp	CS/CD Series	Rated max. 1000pF, min. 250V, marked "Y1" or "Y2".	FOWX2, (E37861)	UL
Y-Capacitors (C19) - Optional - Alternate	Vishay Electronic GMBH	VY2 or VY1 or VKP Series	Rated max. 1000pF, min. 250V, marked "Y1" or ¿Y2".	FOWX2, FOWX8 (E183844)	UL, cUL
MOSFET (Q1, Q2)	Infineon Technologies	IPW60R190	N-channel, rated min. 650 V, 20.2 A min., 150°C. Mounted to Chassis using screw and clamping plate	-	-
MOSFET (Q1, Q2) - Alternate	Interchangeable	Interchangeable	N-channel, rated min. 650 V, 20.2 A min., 150°C. Mounted to Chassis using screw and clamping plate	-	-
Diode (D10)	Interchangeable	Interchangeable	Rated min. 600 V, min. 5A, 150°C. Mounted to Chassis using screw and clamping plate, and Insulating Cap.	--	-
Electrolytic Capacitor (C20)	Interchangeable	Interchangeable	Rated max 390 uF, min. 450Vac, min. 105°C. Provided with integral pressure relief.	-	-
Transformer (T1)	Interchangeable	Interchangeable (12 V: 10015035; 24 V: 10015036; 48 V: 10015037)	Open-type. Class F; see Insulation System for details. Core: (per piece) Approx. 21 by 15 by 41 mm, min. 7 mm thick. Bobbin: Approx. 43 by 41 by 28 mm , 1.3 mm thick, provided with min.1 layer of outerwrap, insulating tape around windings and outside of core, see Transformer (T1) - Insulating Tapes for details. See Enclosures 4-05 and 4-06 for construction details.	-	-
Transformer (T1) - Insulation System	XP Power	Class F	Class F. Rated 155°C.	OBJY2 (E324960)	UL
Transformer (T1) -	Sumitomo Bakelite	PM-9820 or	Rated min. 150°C, min. V-0, min. 1.0 mm thick.	QMFZ2	UL

Object/part or Description	Manufacturer/ trademark	type/model	technical data	CCN	Marks of Conformity
Bobbin Material	Co. Ltd.	PM9630		(E41429)	
Transformer (T1) - Bobbin Material - Alternate	Chang Chun	T375J	Rated min. 150°C, min. V-0, min. 0.4 mm thick.	QMFZ2 (E59481)	UL
Transformer (T1) - Triple Insulated Wire	Great Leoflon	TRW	Rated 600 V, 155 ºC	OBJT2 (E211989)	UL
Transformer (T1) - Triple Insulated Wire - Alternate	Kuo Kuang Electronic Wire	REFU-F	Rated 600 V, 155 ºC	OBJT2 (E222087)	UL
Transformer (T1) - Triple Insulated Wire - Alternate	Rubadue Wire Co.	T-AA-X-XX-T-XXX-L	Rated 600 V, 155 ºC	OBJT2 (E206198)	UL
Transformer (T1) - Insulating Tapes	3M	92, 1205, 44D-A or 1350F	Polyester film tape, min. 1.0 mils (0.025 mm) thick, rated min. 130°C (Passed 4000 Vac dielectric).	OANZ2 (E17385)	UL
Transformer (T1) - Tubing, sleeving - Optional	Great Holding	TFT	Teflon. Rated 155°C min., VW-1.	YDPU2 (E156256)	UL
Transformer (T1) - Tubing, sleeving - Alternate -Optional	ChangYuan	CB-TT (may be followed by L, T, or S)	Teflon. Rated 125°C min., VW-1.	YDPU2 (E180908)	UL
Transformer (T2)	Interchangeable	Interchangeable (10015034)	Open-type. Class B or Class F; see Insulation System for details. Core: (per piece) Approx. 22 by 25 by 8 mm, min. 7 mm thick. Bobbin: Approx. 22 by 25 by 17 mm , 1.3 mm thick, provided with min.1 layer of outerwrap, insulating tape around windings and outside of core, see Transformer (T2) - Insulating Tapes for details. See Enclosures 4-05 and 4-06 for construction details.	-	-
Transformer (T2) - Insulation System	XP Power	Class F	Class F. Rated 155°C.	OBJY2 (E324960)	UL
Transformer (T2) - Insulation System - Alternate	XP Power	CIS.04	Class B. Rated 130°C.	OBJY2 (E324960)	UL

Object/part or Description	Manufacturer/ trademark	type/model	technical data	CCN	Marks of Conformity
Transformer (T2) - Bobbin Material	Sumitomo Bakelite Co. Ltd.	PM-9820 or PM9630	Rated min. 150°C, min. V-0, min. 1.0 mm thick.	QMFZ2 (E41429)	UL
Transformer (T2) - Bobbin Material - Alternate	Chang Chun	T375J	Rated min. 150°C, min. V-0, min. 0.4 mm thick.	QMFZ2 (E59481)	UL
Transformer (T2) - Triple Insulated Wire - For Class F insulation systems only	Great Leoflon	TRW	Rated 600 V, 155 ºC	OBJT2 (E211989)	UL
Transformer (T2) - Triple Insulated Wire Alternate, For Class F insulation systems only	Kuo Kuang Electronic Wire	REFU-F	Rated 600 V, 155 ºC	OBJT2 (E222087)	UL
Transformer (T2) - Triple Insulated Wire Alternate, For Class F insulation systems only	Rubadue Wire Co.	T-AA-X-XX-T-XXX-L	Rated 600 V, 155 ºC	OBJT2 (E206198)	UL
Transformer (T2) - Triple Insulated Wire Alternate . For Class B insulation systems only	Cosmolink Co. Ltd	TIW-M	Reinforced Insulation, rated 130°C	OBJT2 (E213764)	UL
Transformer (T2) - Insulating Tapes	3M	92, 44D-A , 1205	Polyester film tape, min. 1.0 mils (0.025 mm) thick, rated min. 130°C (Passed 2500 Vac dielectric).	OANZ2 (E17385)	UL
Transformer (T100) - Insulating Tapes Alternate For Class F insulation systems only	3M	1350F	Polyester film tape, min. 1.0 mils (0.025 mm) thick, rated min. 130°C (Passed 2500 Vac dielectric).	OANZ2 (E17385)	UL
Transformer (T100) - Insulating Tapes Alternate . For Class B insulation systems only	3M	1350F-1 or 1350F-2	Polyester film tape, min. 1.0 mils (0.025 mm) thick, rated min. 130°C (Passed 2500 Vac dielectric)	OANZ2 (E17385)	UL
Transformer (T2) - Tubing, sleeving -	Great Holding	TFT	Teflon. Rated 155°C min., VW-1	YDPU2 (E156256)	UL

Object/part or Description	Manufacturer/ trademark	type/model	technical data	CCN	Marks of Conformity
Optional					
Transformer (T2) - Tubing, sleeving - Alternate -Optional	ChangYuan	CB-TT (may be followed by T, or S)	Teflon. Rated 125°C min., VW-1.	YDPU2 (E180908)	UL
Transformer (T100)	Interchangeable	Interchangeable (10015038)	Toroidal. Class B or Class F; see Transformer (T2) - Insulation System for details. Core: Approx. 13.5 by 7.5 mm, support by base bobbin Approx. 16.5 by 7.1 by 3.6 mm, Or spacer printed wiring board, (ZPMV2), rated min. V-1, 130°C, min. 1.5 mm thick.	-	-
Transformer (T100) - Insulation System	XP Power	Class F	Class F. Rated 155°C.	OBJY2 (E324960)	UL
Transformer (T100) - Insulation System - Alternate	XP Power	CIS.04	Class B. Rated 130°C.	OBJY2 (E324960)	UL
Transformer (T100) - Bobbin Material	Sumitomo Bakelite Co. Ltd.	PM9820 or PM9630	Rated min. 150°C, min. V-0, min. 1.0 mm thick.	QMFZ2 (E41429)	UL
Transformer (T100) - Triple Insulated Wire. For Class F insulation systems only	Great Leoflon	TRW	Rated 600 V, 155 ºC	OBJT2 (E211989)	UL
Transformer (T100) - Triple Insulated Wire Alternate . For Class F insulation systems only	Kuo Kuang Electronic Wire	REFU-F	Rated 600 V, 155 ºC	OBJT2 (E222087)	UL
Transformer (T100) - Triple Insulated Wire Alternate For Class F insulation systems only	Rubadue Wire Co.	T-AA-X-XX-T-XXX-L	Rated 600 V, 155 ºC	OBJT2 (E206198)	UL
Transformer (T100) - Triple Insulated Wire Alternate For Class B insulation systems only	Cosmolink Co. Ltd	TIW-M	Reinforced Insulation, rated 130°C	OBJT2 (E213764)	UL

Object/part or Description	Manufacturer/ trademark	type/model	technical data	CCN	Marks of Conformity
Transformer (T100) - Insulating Tapes	3M	92 or 44D-A	Polyester film tape, min. 1.0 mils (0.025 mm) thick, rated min. 130°C (Passed 2500 Vac dielectric).	OANZ2 (E17385)	UL
Transformer (T100) - Insulating Tapes Alternate For Class F insulation systems only	3M	1350F	Polyester film tape, min. 1.0 mils (0.025 mm) thick, rated min. 130°C (Passed 2500 Vac dielectric).	OANZ2 (E17385)	UL
Transformer (T100) - Insulating Tapes Alternate For Class B insulation systems only	3M	1350F-1 or 1350F-2	Polyester film tape, min. 1.0 mils (0.025 mm) thick, rated min. 130°C (Passed 2500 Vac dielectric).	OANZ2 (E17385)	UL
Transformer (T100) - Insulating Tapes - Alternate - For Class F insulation systems only	3M	1205	Polyester film tape, min. 1.0 mils (0.025 mm) thick, rated min. 130°C (Passed 2500 Vac dielectric).	OANZ2 (E17385)	UL
Transformer (T100) - Tubing, sleeving - Optional	Great Holding	TFT	Teflon. Rated 155°C min., VW-1.	YDPU2 (E156256)	UL
Transformer (T100) - Tubing, sleeving - Alternate - optional	ChangYuan	CB-TT	Teflon. Rated 125°C min., VW-1.	YDPU2 (E180908)	UL
Mosfet (Q101, Q102) (SELV)	Interchangeable	Interchangeable	Rated min. 10 A. Mounted to DC Busbar (Busbar 101 and 102)	-	.-
Electrolytic Capacitors (C102-C105, C118,) (SELV)	Interchangeable	Interchangeable	Rated min. 105°C, provided with integral pressure relief.	-	.
LED (D801) (SELV)	Interchangeable	Interchangeable	Non-lasing diode. Visible spectrum.	-	-
DC Busbar (BBAR101) (SELV)	Interchangeable	Nickel plated copper	n-shaped. Overall approx. 3.85 by 3.4 cm, min. 1.5 mm thick.	-	.-
DC Busbar (BBAR102) (SELV)	Interchangeable	Nickel plated copper	L-shaped. Overall approx. 2.85 by 2.78 by 1.49 cm, min. 1.5 mm thick.	-	-
DC Busbar (BBAR103)	Interchangeable	Nickel plated	Rectangular-shaped. Overall approx. 2.35 by 1.7	-	-

Object/part or Description	Manufacturer/ trademark	type/model	technical data	CCN	Marks of Conformity
(SELV)		copper	cm, min. 1.5 mm thick..		
DC Busbar (BBAR104) (SELV)	Interchangeable	Nickel plated copper	L-shaped. Overall approx. 1.09 by 1.2 cm by 1.81, min. 1.5 mm thick.	-	-
DC Busbar (+) (BBAR5) (SELV)	Interchangeable	Nickel plated copper	U-shape Overall approx. 1.2 by 1.27 cm by 1.4, min. 1.5 mm thick.	-	-
DC Busbar (-) (BBAR5) (SELV)	Interchangeable	Nickel plated copper	U-shape Overall approx. 1.2 by 1.27 cm by 1.4, min. 1.5 mm thick..	-	-
Daughter Board	-	-	Consists of Printed Wiring Board and Optocouplers, see Daughter Board - Optocouplers for details. Secured vertically to Main Printed Wiring board using soldered mounting pin connectors.	-	-
Daughter Board - Printed Wiring Board	Interchangeable	Interchangeable	Overall approx. 11.7 by 3 cm. Rated min. V-1, min. 130°C, rated for direct support of live parts.	ZMPV2	UL
Daughter Board - Optical Isolator (U303, U310, U317, U408-U410)	Lite-On	LTV-817	Double protection, isolation voltage 5000 V, DTI min. 0.4mm.	FPQU2 (E113898)	UL
Daughter Board - Optical Isolator (U303, U310, U317, U408-U410)- Alternate	Sharp	PC817	Double protection, isolation voltage 5000 V, DTI min. 0.4mm.	FPQU2 (E64380)	UL
Daughter Board - Optical Isolator (U303, U310, U317, U408-U410) - Alternate	Vishay	SFH 6156 Series	Double protection, isolation voltage 4420 V.	FPQU2 (E52744)	UL
Daughter Board - Optical Isolator (U303, U310, U317, U408-U410) - Alternate	Vishay	TCLT10 series (TCLT1007)	Double protection isolation voltage 5000 V, DTI min. 0.4mm	FPQU2 (E76222)	UL
Bias Board	-	-	Consists of Printed Wiring Board. Primary component. Secured vertically to Main Printed Wiring board using soldered mounting pin connectors.	-	-

Object/part or Description	Manufacturer/ trademark	type/model	technical data	CCN	Marks of Conformity
Bias Board - Printed Wiring Board	Interchangeable	Interchangeable	Overall approx. 3.1 by 2.5 cm, min. 1.2 mm thick. Rated min. V-1, min. 130°C, rated for direct support of live parts.	ZMPV2	UL
PWB Insulating Sheet (Between Chassis and Printed Wiring Board)	ITW	GK-10NC	Overall approx. 24 by 15.2 cm, min. 0.24 mm thick. Rated min. 130°C, min. V-2.	QMFZ2 (E121855)	UL
RTV	Interchangeable	Interchangeable	Rated min. HB, min. 125°C	QMFZ2	UL
Cushioning tape	Interchangeable	Interchangeable	Rated V-0, min. 105°C	QMFZ2	UL
Sleeving and Tubing - Optional	Great Holding	TFT or TFS	Teflon, rated 155°C min., VW-1, min. 0.4 mm thick.	YDPU2 (E156256)	UL
Sleeving and Tubing Alternate - Optional	Interchangeable	Interchangeable	Teflon, rated 155°C min., VW-1, min. 0.4 mm thick.	YDPU2	UL

CERTIFICATE OF COMPLIANCE

Certificate Number	20140709-E139109
Report Reference	E139109-A134-UL
Issue Date	2014-JULY-09
Issued to:	XP POWER L L C SUITE 150 1241 E DYER RD SANTA ANA CA 92705
This is to certify that representative samples of	COMPONENT - POWER SUPPLIES, INFORMATION TECHNOLOGY EQUIPMENT INCLUDING ELECTRICAL BUSINESS EQUIPMENT See Addendum
	Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.
Standard(s) for Safety:	UL 60950-1 and CSA C22.2 No. 60950-1-07, Information Technology Equipment - Safety - Part 1: General Requirements
Additional Information:	See the UL Online Certifications Directory at www.ul.com/database for additional information

Only those products bearing the UL Recognized Component Marks for the U.S. and Canada should be considered as being covered by UL's Recognition and Follow-Up Service and meeting the appropriate U.S. and Canadian requirements.

The UL Recognized Component Mark for the U.S. generally consists of the manufacturer's identification and catalog number, model number or other product designation as specified under "Marking" for the particular Recognition as published in the appropriate UL Directory. As a supplementary means of identifying products that have been produced under UL's Component Recognition Program, UL's Recognized Component Mark: , may be used in conjunction with the required Recognized Marks. The Recognized Component Mark is required when specified in the UL Directory preceding the recognitions or under "Markings" for the individual recognitions. The UL Recognized Component Mark for Canada consists of the UL Recognized Mark for Canada: and the manufacturer's identification and catalog number, model number or other product designation as specified under "Marking" for the particular Recognition as published in the appropriate UL Directory.

Recognized components are incomplete in certain constructional features or restricted in performance capabilities and are intended for use as components of complete equipment submitted for investigation rather than for direct separate installation in the field. The final acceptance of the component is dependent upon its installation and use in complete equipment submitted to UL LLC.

Look for the UL Recognized Component Mark on the product.

William R. Carney, Director, North American Certification Programs

UL LLC

CERTIFICATE OF COMPLIANCE

Certificate Number	20140709-E139109
Report Reference	E139109-A134-UL
Issue Date	2014-JULY-09

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements.

Power Supply GSP500PSXX (where XX = represents the output voltage between 12- 48, maybe followed with additional suffix “-“ followed by “EF” or/and "SF" or/and “-R”)

William R. Carney, Director, North American Certification Programs

UL LLC

UL TEST REPORT AND PROCEDURE

Standard:	UL 60950-1, 2nd Edition, 2011-12-19 (Information Technology Equipment - Safety - Part 1: General Requirements) CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2011-12 (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:	Power Supply
Model:	GSP500PSXX (where XX = represents the output voltage between 12- 48, maybe followed with additional suffix “-“ followed by “EF” or/and "SF" or/and “-R”)
Rating:	Input: 100-240 Vac, 50/60 Hz, 6.5A Output: See Model Differences for details
Applicant Name and Address:	XP POWER L L C SUITE 150 1241 E DYER RD SANTA ANA CA 92705 UNITED STATES

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: Bob Leon Reviewed by: Greg Gatt

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 product is a component AC-DC power supply for building-in, open frame type provided with a metal chassis, incorporating primary and SELV components.

The main PWB is secured to the chassis studs by multiple machine screws.

Model Differences

The power supplies in the series are differentiated by the output voltage and current ratings, number of turns of primary/secondary windings in the Transformers (T1 (Power)), and minor differences in the secondary circuit components and PWB layout.

The basic model is provided with U-shaped chassis and top cover.

See below for Model Ratings Table Below:

Convection Cooling Method : 180W output max
Model GSP500PS12: Output Rated: 10.1 - 13.5 Vdc, 15 A max (180 W) @ 50 C ambient;
10.1 - 13.5 Vdc, 7.5 A (90 W) @ 70 C ambient
Model GSP500PS15: Output Rated: 13.5 - 17 Vdc, 12 A (180 W) @ 50 C ambient;
13.5 - 17 Vdc, 6 A (90 W) @ 70 C ambient
Model GSP500PS24: Output Rated: 21.1 - 26 Vdc, 7.5 A (180 W) @ 50 C ambient;
21.1 - 26 Vdc, 3.75 A (90 W) @ 70 C ambient
Model GSP500PS28: Output Rated: 26.1 - 31 Vdc, 6.43 A (180 W) @ 50 C ambient;
26.1 - 31 Vdc, 3.22 A (90 W) @ 70 C ambient
Model GSP500PS36: Output Rated: 33.1 - 42 Vdc, 5 A (180 W) @ 50 C ambient;
33.1 - 42 Vdc, 2.5 A (90 W) @ 70 C ambient
Model GSP500PS48: Output Rated: 42.1 - 52 Vdc, 3.75 A (180 W) @ 50 C ambient;
42.1 - 52 Vdc, 1.88 A (90 W) @ 70 C ambient

Forced air cooling method : 500W output max
Model GSP500PS12: Output Rated: 10.1 - 13.5 Vdc, 42 A (500 W) @ 50 C ambient;
10.1 - 13.5 Vdc, 25 A (250 W) @ 70 C ambient
Model GSP500PS15: Output Rated: 13.5 - 17 Vdc, 33.33 A (500 W) @ 50 C ambient;
13.5 - 17 Vdc, 16.67 A (250 W) @ 70 C ambient
Model GSP500PS24: Output Rated: 21.1 - 26 Vdc, 21 A (500 W) @ 50 C ambient;
21.1 - 26 Vdc, 10.5 A (250 W) @ 70 C ambient
Model GSP500PS28: Output Rated: 26.1 - 31 Vdc, 17.86 A (500 W) @ 50 C ambient;

Model GSP500PS36: Output Rated:	26.1 - 31 Vdc, 8.93 A (250 W) @ 70 C ambient 33.1 - 42 Vdc, 13.89 A (500 W) @ 50 C ambient; 33.1 - 42 Vdc, 6.95 A (250 W) @ 70 C ambient
Model GSP500PS48: Output Rated:	42.1 - 52 Vdc, 10.5 A (500 W) @ 50 C ambient; 42.1 - 52 Vdc, 5.25 A (250 W) @ 70 C ambient

Stand-by Output for all models: 5Vdc, 2A
Fan Output for all models: 12 Vdc, 0.3 A

Units provided with suffix "-EF" provided with End Fan.
Units provided with suffix "-SF" indicates models provided with only one fuse in the line and no fuse in the neutral.
Units provided with suffix "-R" indicates construction variation to current sensing transformer T100. See enclosure 4-04 for details.

Technical Considerations

- Equipment mobility : for building-in
- Connection to the mains : To be determined in end-use product
- Operating condition : continuous
- Access location : To be determined in end-use product
- Over voltage category (OVC) : OVC II
- Mains supply tolerance (%) or absolute mains supply values : +10%, -10%
- Tested for IT power systems : Yes
- IT testing, phase-phase voltage (V) : 230
- Class of equipment : Class I (earthed)
- Considered current rating of protective device as part of the building installation (A) : 20 A
- Pollution degree (PD) : PD 2
- IP protection class : IPX0
- Altitude of operation (m) : 5000
- Altitude of test laboratory (m) : less than 2000 meters
- Mass of equipment (kg) : 0.9
- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: 50°C at full rated load and 70°C at 50% rated load
- The means of connection to the mains supply is: for building-in, to be determined in the end product.
- The product is intended for use on the following power systems: TN, IT
- The product was investigated to the following additional standards: EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 (which includes all European national differences, including those specified in this test report).
- The following accessible locations (with circuit/schematic designation) are within a limited current circuit: Load side of C21 (Pri to Sec bridging capacitor),
- Power supplies covered by this report were evaluated for both Class I and Class II (double insulated). Double insulated symbol is optionally provided. See Conditions of Acceptability for insulation required for Class II. Earthing symbol may only be provided for Class I power supplies.

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 Production-Line tests are conducted for this product: Electric Strength
- The end-product Electric Strength Test is to be based upon a maximum working voltage of: Primary-Earthed Dead Metal: 241 Vrms, 343 Vpk, Primary-SELV: 284 Vrms, 475 Vpk,
- The following secondary output circuits are SELV: All outputs
- The following secondary output circuits are at hazardous energy levels: All outputs (excluding Fan and 5V standby)
- The power supply terminals and/or connectors are: Not investigated for field wiring
- 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: Not been conducted
- The following input terminals/connectors must be connected to the end-product supply neutral: J1
- 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, and (Class F, 155°C) , T2 and T100 (Class B, 130°C or Class F, 155°C)
- The following end-product enclosures are required: Mechanical, Fire, Electrical
- The maximum continuous power supply output (Watts) relied on forced air cooling from: 15 cfm fan applied at chassis edge (near C20 and D60)
- The equipment is suitable for direct connection to: AC mains supply. Means of connection willl need to be evaluated in the end product.,
- Fans: For models with the suffix "EF", the fan provided in this sub-assembly is not intended for operator access.
- Printed Wiring Board rated 130°C.
- Heatsinks are floating and considered live. They should not be accessible in the end-product.
- Touch Current test to be considered in the end-product evaluation.
- Clearance spacing evaluated for 5000 m altitude. Additional consideration maybe necessary in the end-use product.
- End product to determine the need for "Double Pole Fuse" Marking for units provided with double , pole fusing.
- The equipment may be provided with a fuse in both the Line and Neutral of the primary circuit.
- Heating test should be repeated in the end-use product
- Heating test was not conducted on unit with input/output leads. If unit is provided with input and/or output leads, then temperature on leads must be measured and cannot exceed 105°C.

Additional Information

The clearance distances have additionally been assessed for suitability up to 5000 m elevation (1.48 correction factor as per IEC 60664-1, Table A2).

The need for the additional testing and evaluation shall be determined in the end product investigation.

The power supply series covered by this report employ Double/Reinforced Insulation between Primary and Secondary circuits.

Licenses older than 3 years to be provided by the manufacturer upon request.

Marking label is representative of all models.

Additional Standards

The product fulfills the requirements of: CSA C22.2 No. 60950-1-07 + A1:2011, EN 60950-1:2006 + A1:2010 + A11:2009 + A12:2011, UL 60950-1 2nd Ed. Revised 2011-12-19, IEC 60950-1:2005 + A1:2009

Markings and instructions

Clause Title	Marking or Instruction Details
Power rating - Ratings	Ratings (voltage, frequency/dc, current)
Power rating - Company identification	Listee's or Recognized company's name, Trade Name, Trademark or File Number
Power rating - Model	Model Number
Fuses - Non-operator access/soldered-in fuses	Unambiguous reference to service documentation for instructions for replacement of fuses replaceable only by service personnel

Special Instructions to UL Representative

N/A

Production-Line Testing Requirements

Electric Strength Test Special Constructions - Refer to Generic Inspection Instructions, Part AC for further information.

Model	Component	Removable Parts	Test probe location	V rms	V dc	Test Time, s
All Models	Transformer T1	-	Primary to Secondary	3000	4242	1

Earthing Continuity Test Exemptions - This test is not required for the following models:

-

Electric Strength Test Exemptions - This test is not required for the following models:

-

Electric Strength Test Component Exemptions - The following solid-state components may be disconnected from the remainder of the circuitry during the performance of this test:

-

Sample and Test Specifics for Follow-Up Tests at UL

Model	Component	Material	Test	Sample(s)	Test Specifics
N/A	-	-	-	-	-

1.5.1	**TABLE: list of critical components**					Pass
Object/part or Description	Manufacturer/ trademark	type/model	technical data	Product Category CCN(s)	Required Marks of Conformity	Supplement ID
Chassis	Interchangeable	Aluminum	U-shaped. Overall approx. 15.2 by 10 by 4cm, min. 1.9 mm thick.	-	-	
Top cover	Interchangeable	Aluminum	Rectangle. Overall approx. 13.8 by 10cm , min. 1.9 mm thick.	-	-	
Top cover - Alternate	Interchangeable	Aluminum	Rectangle, 2 pieces Overall approx. 7.8 by 10, and 5.4 by 9.4min. 1.9 mm thick.	-	-	
Main board - Printed Wiring Board	Interchangeable	Interchangeable	Overall approx. 15.2 by 9.6 cm, min. 1.5 mm thick. Secured to bottom part of Chassis, see Chassis for details, using integral metal standoffs, min. 4 mm high, and insulating sheet, see PWB Insulating Sheet for details. Rated min. V-1, min. 130°C, rated for direct support of live parts.	ZMPV2	UL	
Fan (SELV)	Adda Corp.	AG04012XB series	Rated 12 Vdc, 0.13 A (min. 10 cfm). Approx. dimension 40 by 10 by 10 mm. Fan leads provided with sleeving, see Sleeving and Tubing for details.	GPWV2, GPWV8 (E132139)	UL, cUL	
Fan (SELV) -Alternate	Interchangeable	Interchangeable	Rated 12 Vdc, 0.13 A (min. 10 cfm). Approx. dimension 40 by 10 by 10 mm. Fan leads provided with sleeving, see Sleeving and Tubing for details.	GPWV2, GPWV8	UL, cUL	
Input Connector (J1)	Dinkle Enterprise	DT-49 or DT-4C Series	Screw type, rated min. 20 A per terminal, min. 300V, min. 105°C.	XCFR2, XCFR8 (E102914)	UL, cUL	
Input Connector (J1)	Interchangeable	Interchangeable	Screw type, rated min. 20 A per terminal, min. 300V, min.	XCFR2, XCFR8	UL, cUL	

			105°C.			
Fuse (F1, F2)	Littelfuse	216 Series	Rated 16A, 250V, rated 125°C, vertically mounted to PWB. Fuse lead along with entire fuse provided with Insulating Tubing/ Sleeving, See Insulating Tubing/Sleeving for details.	JDYX2, JDYX8 (E10480)	UL	
Fuse (F2) (for models with suffix ¿-SF¿)	-	-	Not Provided. Jumper wire provided where Fuse (F2) would normally be provided.	-	-	
Varistor (VDR1)	Panasonic	V14 series (V14471U) (P/N ERZV14D471)	Rated min. 300V, 125 Joules. Soldered to PWB.	VZCA2, VZCA8 (E321499)	UL	
Varistor (VDR1) - Alternate	Thinking Electronics	TVR14 Series (TVR14471)	Rated min. 300V, 125 Joules. Soldered to PWB.	VZCA2, VZCA8 (E314979)	UL	
Inductor (L1) (Pri)	Interchangeable	Interchangeable (10015031)	Toroidal. min. 130 DegC, Overall approx. 25 outer dia. by 13 mm wide. Windings are soldered through the printed wiring board.	-	-	
Inductor (L1) - Triple Insulated Wire	Great Leoflon	TRW	Rated 600 V, 155 ºC	OBJT2 (E211989)	UL	
Inductor (L1) - Triple Insulated Wire - Alternate	Kuo Kuang Electronic Wire	REFU-F	Rated 600 V, 155 ºC	OBJT2 (E222087)	UL	
Inductor (L1) - Triple Insulated Wire - Alternate	Rubadue Wire Co.	TXXA01TXXX-L or TXXA01TXXX-L	Rated 600 V, 155 ºC	OBJT2 (E206198)	UL	
Inductor (L2, L3) (Pri)	Interchangeable	Interchangeable (10015032)	Toroidal. min. 130 Deg C, Overall approx. 28.5 outer dia. by 18 mm wide. Windings are soldered through the printed wiring board and provided with	-	-	

			spacer printed wiring board, (ZPMV2), rated min. V-1, 130°C, min. 1.7 mm thick			
Inductor (L4) (Pri)	Interchangeable	Interchangeable (10015033)	Toroidal. min. 130 Deg C, Overall approx. 32 outer dia. by 18.5 mm wide. Windings are soldered through the printed wiring board and provided with spacer printed wiring board, (ZPMV2), rated min. V-1, 130°C, min. 1.7 mm thick	-	-	
Inductor (L1-L4) - Insulating Tapes	3M	92 or 1350Fx-x series or #44D-A or 1205	Polyester film tape, min. 1.0 mils (0.025 mm) thick, rated min. 130°C (Passed 2500 Vac dielectric).	OANZ2 (E17385)	UL	
Heat Sink (HTSK1) (PRI)	Interchangeable	Aluminum	T shape Overall approx(LxWxH). 2.96 by 3.13 cm by 3.5cm, min. 2.5 mm thick. Secured to through Printed Wiring Board, see Main Board, and soldered.	-	-	
Heat Sink (HTSK2) (PRI)	Interchangeable	Aluminum	L shape Overall approx(LxWxH). 2.05 by 5.6 cm by 3.18cm, min. 2.5 mm thick. Secured to through Printed Wiring Board, see Main Board, and soldered.	-	-	
Heat Sink (HTSK3) (PRI)	Interchangeable	Aluminum	L shape Overall approx(LxWxH). 0.65 by 5.74 cm by 3.18cm, min. 2.5 mm thick. Secured to through Printed Wiring Board, see Main Board, and soldered.	-	-	
Diode Bridge (BR1)	Shindengen America Inc	D25XB60	Rated 600 V, 25A, 150°C, V-0. Secured to Heat Sink (HTSK1) using screw.	QQQX2 (E142422)	UL	
Diode Bridge (BR1) -	Interchangeable	Interchangeable	Rated 600 V, 25A, 150°C, V-0.	-	-	

Alternate			Secured to Heat Sink (HTSK1) using screw.			
X-Capacitors (C1) -Optional	Epcos Electronic Components S A	B3292x Series	Rated max. 0.33 uF, min 275Vac, marked "X2".	FOWX2, FOWX8 (E97863)	UL, cUL	
X-Capacitors (C1) - Optional - Alternate	Winday Electri Industrial	MPX series	Rated max. 0.33 uF, min 275Vac, min marked "X2".	FOWX2, FOWX8 (E302125)	UL, cUL	
X-Capacitors (C1) - Optional - Alternate	Xiamen Faratronic Co. Ltd	MKP61R, Type C40 or MKP62 series (Type C42)	Rated max. 0.33 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E186600)	UL, cUL	
X-Capacitors (C1) - Optional - Alternate	PanasonicCorp	ECQUA or ECQUL	Rated max. 0.33 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E62674)	UL, CSA	
X-Capacitors (C1) - Optional - Alternate	Vishay Capacitors Belgium N V	F1772, or F1774 or F1778	Rated max. 0.33 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E354331)	UL	
X-Capacitors (C1) - Optional - Alternate	OKAYA Electric Industrial Co Ltd	LE series	Rated max. 0.33 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E47474)	UL, cUL	
X-Capacitors (C4) -Optional	Epcos Electronic Components S A	B3292x Series	Rated max. 0.68 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E97863)	UL, cUL	
X-Capacitors (C4) - Optional - Alternate	Winday Electri Industrial	MPX series	Rated max. 0.68 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E302125)	UL, cUL	
X-Capacitors (C4) - Optional - Alternate	Xiamen Faratronic Co. Ltd	MKP61R, Type C40 or MKP62 series (Type C42)	Rated max. 0.68 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E186600)	UL, cUL	
X-Capacitors (C4) - Optional - Alternate	PanasonicCorp	ECQUA or ECQUL	Rated max. 0.68 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E62674)	UL, CSA	
X-Capacitors (C4) - Optional - Alternate	Vishay Capacitors Belgium N V	F1772, or F1774 or F1778	Rated max. 0.68 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E354331)	UL	
X-Capacitors (C4) - Optional - Alternate	OKAYA Electric Industrial Co Ltd	LE series	Rated max. 0.68 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E47474)	UL, cUL	
X-Capacitors (C4) -Optional	Epcos Electronic Components S A	B3292x Series	Rated max. 1.0 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E97863)	UL, cUL	
X-Capacitors (C4) - Optional - Alternate	Winday Electri Industrial	MPX series	Rated max. 1.0 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E302125)	UL, cUL	
X-Capacitors (C4) - Optional - Alternate	Xiamen Faratronic Co. Ltd	MKP61R, Type C40 or MKP62 series (Type C42)	Rated max. 1.0 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E186600)	UL, cUL	
X-Capacitors (C4) - Optional - Alternate	PanasonicCorp	ECQUA or ECQUL	Rated max. 1.0 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E62674)	UL, CSA	

X-Capacitors (C4) - Optional - Alternate	Vishay Capacitors Belgium N V	F1772, or F1774 or F1778	Rated max. 1.0 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E354331)	UL	
X-Capacitors (C4) - Optional - Alternate	OKAYA Electric Industrial Co Ltd	LE series	Rated max. 1.0 uF, min 250Vac, min marked "X2".	FOWX2, FOWX8 (E47474)	UL, cUL	
Y-Capacitors (C2, C3, C5, C6) - Optional	Murata	KX, KY, or KH series	Rated max. 470pF max, 250Vac, marked "Y1" or "Y2".	FOWX2, FOWX8 (E37921)	UL, cUL	
Y-Capacitors (C2, C3, C5, C6) - Optional - Alternate	Panasonic	NS-A, ECK series	Rated max. 470pF, min. 250V, marked "Y1" or "Y2".	FOWX2, FOWX8 (E62674)	UL, cUL	
Y-Capacitors (C2, C3, C5, C6) - Optional - Alternate	Evox Rifa (Kemet Electronics OY)	ERP610 Series	Rated max. 470pF, min. 250V, marked "Y1" or "Y2".	FOWX2, FOWX8 (E73869)	UL, cUL	
Y-Capacitors (C2, C3, C5, C6) - Optional - Alternate	TDK-EPC Corp	CS/CD Series	Rated max. 470pF, min. 250V, marked "Y1" or "Y2".	FOWX2, (E37861)	UL	
Y-Capacitors (C2, C3, C5, C6)- Optional	Vishay Electronic GMBH	VY2 or VY1 or VKP Series	Rated max. 470pF, min. 250V, marked "Y1" or "Y2".	FOWX2, FOWX8 (E183844)	UL, cUL	
Y-Capacitors (C19) - Optional	Murata	KX, KY, or KH series	Rated max. 1000pF max, 275V ac, marked "Y1" or "Y2".	FOWX2, FOWX8 (E37921)	UL	
Y-Capacitors (C19) - Optional - Alternate	Panasonic	NS-A, ECK series	Rated max. 1000pF, min. 250V, marked "Y1" or "Y2".	FOWX2, FOWX8 (E62674)	UL	
Y-Capacitors (C19) - Optional - Alternate	Evox Rifa (Kemet Electronics OY)	ERP610 Series	Rated max. 1000pF, min. 250V, marked "Y1" or "Y2".	FOWX2, FOWX8 (E73869)	UL, cUL	
Y-Capacitors (C19) - Optional - Alternate	TDK-EPC Corp	CS/CD Series	Rated max. 1000pF, min. 250V, marked "Y1" or "Y2".	FOWX2, (E37861)	UL	
Y-Capacitors (C19) - Optional - Alternate	Vishay Electronic GMBH	VY2 or VY1 or VKP Series	Rated max. 1000pF, min. 250V, marked "Y1" or "Y2".	FOWX2, FOWX8 (E183844)	UL, cUL	
MOSFET (Q1, Q2)	Infineon Technologies	IPW60R190	N-channel, rated min. 650 V, 20.2 A min., 150°C. Mounted to Chassis using screw and clamping plate	-	-	
MOSFET (Q1, Q2) - Alternate	Interchangeable	Interchangeable	N-channel, rated min. 650 V, 20.2 A min., 150°C. Mounted to Chassis using screw and clamping plate	-	-	
Diode (D10)	Interchangeable	Interchangeable	Rated min. 600 V, min. 5A, 150°C. Mounted to Chassis	--	-	

			using screw and clamping plate, and Insulating Cap.			
Electrolytic Capacitor (C20)	Interchangeable	Interchangeable	Rated max 390 uF, min. 450Vac, min. 105°C. Provided with integral pressure relief.	-	-	
Transformer (T1)	Interchangeable	Interchangeable (12 V: 10015035; 24 V: 10015036; 48 V: 10015037)	Open-type. Class F; see Insulation System for details. Core: (per piece) Approx. 21 by 15 by 41 mm, min. 7 mm thick. Bobbin: Approx. 43 by 41 by 28 mm , 1.3 mm thick, provided with min.1 layer of outerwrap, insulating tape around windings and outside of core, see Transformer (T1) - Insulating Tapes for details. See Enclosures 4-05 and 4-06 for construction details.	-	-	
Transformer (T1) - Insulation System	XP Power	Class F	Class F. Rated 155°C.	OBJY2 (E324960)	UL	
Transformer (T1) - Bobbin Material	Sumitomo Bakelite Co. Ltd.	PM-9820 or PM9630	Rated min. 150°C, min. V-0, min. 1.0 mm thick.	QMFZ2 (E41429)	UL	
Transformer (T1) - Bobbin Material - Alternate	Chang Chun	T375J	Rated min. 150°C, min. V-0, min. 0.4 mm thick.	QMFZ2 (E59481)	UL	
Transformer (T1) - Triple Insulated Wire	Great Leoflon	TRW	Rated 600 V, 155 ºC	OBJT2 (E211989)	UL	
Transformer (T1) - Triple Insulated Wire - Alternate	Kuo Kuang Electronic Wire	REFU-F	Rated 600 V, 155 ºC	OBJT2 (E222087)	UL	
Transformer (T1) - Triple Insulated Wire - Alternate	Rubadue Wire Co.	T-AA-X-XX-T-XXX-L	Rated 600 V, 155 ºC	OBJT2 (E206198)	UL	
Transformer (T1) - Insulating Tapes	3M	92, 1205, 44D-A or 1350F	Polyester film tape, min. 1.0 mils (0.025 mm) thick, rated min. 130°C (Passed 4000 Vac dielectric).	OANZ2 (E17385)	UL	

Transformer (T1) - Tubing, sleeving - Optional	Great Holding	TFT	Teflon. Rated 155°C min., VW-1.	YDPU2 (E156256)	UL	
Transformer (T1) - Tubing, sleeving - Alternate -Optional	ChangYuan	CB-TT (may be followed by L, T, or S)	Teflon. Rated 125°C min., VW-1.	YDPU2 (E180908)	UL	
Transformer (T2)	Interchangeable	Interchangeable (10015034)	Open-type. Class B or Class F; see Insulation System for details. Core: (per piece) Approx. 22 by 25 by 8 mm, min. 7 mm thick. Bobbin: Approx. 22 by 25 by 17 mm , 1.3 mm thick, provided with min.1 layer of outerwrap, insulating tape around windings and outside of core, see Transformer (T2) - Insulating Tapes for details. See Enclosures 4-05 and 4-06 for construction details.	-	-	
Transformer (T2) - Insulation System	XP Power	Class F	Class F. Rated 155°C.	OBJY2 (E324960)	UL	
Transformer (T2) - Insulation System - Alternate	XP Power	CIS.04	Class B. Rated 130°C.	OBJY2 (E324960)	UL	
Transformer (T2) - Bobbin Material	Sumitomo Bakelite Co. Ltd.	PM-9820 or PM9630	Rated min. 150°C, min. V-0, min. 1.0 mm thick.	QMFZ2 (E41429)	UL	
Transformer (T2) - Bobbin Material - Alternate	Chang Chun	T375J	Rated min. 150°C, min. V-0, min. 0.4 mm thick.	QMFZ2 (E59481)	UL	
Transformer (T2) - Triple Insulated Wire - For Class F insulation systems only	Great Leoflon	TRW	Rated 600 V, 155 ºC	OBJT2 (E211989)	UL	
Transformer (T2) - Triple Insulated Wire Alternate, For Class F insulation	Kuo Kuang Electronic Wire	REFU-F	Rated 600 V, 155 ºC	OBJT2 (E222087)	UL	

systems only						
Transformer (T2) - Triple Insulated Wire - Alternate, For Class F insulation systems only	Rubadue Wire Co.	T-AA-X-XX-T-XXX-L	Rated 600 V, 155 ºC	OBJT2 (E206198)	UL	
Transformer (T2) - Triple Insulated Wire - Alternate . For Class B insulation systems only	Cosmolink Co. Ltd	TIW-M	Reinforced Insulation, rated 130°C	OBJT2 (E213764)	UL	
Transformer (T2) - Insulating Tapes	3M	92, 44D-A , 1205	Polyester film tape, min. 1.0 mils (0.025 mm) thick, rated min. 130°C (Passed 2500 Vac dielectric).	OANZ2 (E17385)	UL	
Transformer (T100) - Insulating Tapes¿ Alternate . For Class F insulation systems only	3M	1350F	Polyester film tape, min. 1.0 mils (0.025 mm) thick, rated min. 130°C (Passed 2500 Vac dielectric).	OANZ2 (E17385)	UL	
Transformer (T100) - Insulating Tapes - Alternate . For Class B insulation systems only	3M	1350F-1 or 1350F-2	Polyester film tape, min. 1.0 mils (0.025 mm) thick, rated min. 130°C (Passed 2500 Vac dielectric).	OANZ2 (E17385)	UL	
Transformer (T2) - Tubing, sleeving - Optional	Great Holding	TFT	Teflon. Rated 155°C min., VW-1.	YDPU2 (E156256)	UL	
Transformer (T2) - Tubing, sleeving - Alternate -Optional	ChangYuan	CB-TT (may be followed by T, or S)	Teflon. Rated 125°C min., VW-1.	YDPU2 (E180908)	UL	
Transformer (T100)	Interchangeable	Interchangeable (10015038)	Toroidal . Class B or Class F; see Transformer (T2) - Insulation System for details. Core: Approx. 13.5 by 7.5 mm, support by base bobbin Approx. 16.5 by 7.1 by 3.6 mm, Or spacer printed wiring board, (ZPMV2), rated min. V-1, 130°C, min. 1.5 mm thick.	-	-	
Transformer (T100) -	XP Power	Class F	Class F. Rated 155°C.	OBJY2 (E324960)	UL	

Insulation System						
Transformer (T100) - Insulation System - Alternate	XP Power	CIS.04	Class B. Rated 130°C.	OBJY2 (E324960)	UL	
Transformer (T100) - Bobbin Material	Sumitomo Bakelite Co. Ltd.	PM9820 or PM9630	Rated min. 150°C, min. V-0, min. 1.0 mm thick.	QMFZ2 (E41429)	UL	
Transformer (T100) - Triple Insulated Wire. For Class F insulation systems only	Great Leoflon	TRW	Rated 600 V, 155 ºC	OBJT2 (E211989)	UL	
Transformer (T100) - Triple Insulated Wire - Alternate . For Class F insulation systems only	Kuo Kuang Electronic Wire	REFU-F	Rated 600 V, 155 ºC	OBJT2 (E222087)	UL	
Transformer (T100) - Triple Insulated Wire - Alternate . For Class F insulation systems only	Rubadue Wire Co.	T-AA-X-XX-T-XXX-L	Rated 600 V, 155 ºC	OBJT2 (E206198)	UL	
Transformer (T100) - Triple Insulated Wire - Alternate . For Class B insulation systems only	Cosmolink Co. Ltd	TIW-M	Reinforced Insulation, rated 130°C	OBJT2 (E213764)	UL	
Transformer (T100) - Insulating Tapes	3M	92 or 44D-A	Polyester film tape, min. 1.0 mils (0.025 mm) thick, rated min. 130°C (Passed 2500 Vac dielectric).	OANZ2 (E17385)	UL	
Transformer (T100) - Insulating Tapes - Alternate . For Class F insulation systems only	3M	1350F	Polyester film tape, min. 1.0 mils (0.025 mm) thick, rated min. 130°C (Passed 2500 Vac dielectric).	OANZ2 (E17385)	UL	
Transformer (T100) - Insulating Tapes - Alternate . For Class B insulation systems only	3M	1350F-1 or 1350F-2	Polyester film tape, min. 1.0 mils (0.025 mm) thick, rated min. 130°C (Passed 2500 Vac dielectric).	OANZ2 (E17385)	UL	
Transformer (T100) - Insulating Tapes - Alternate - For Class F	3M	1205	Polyester film tape, min. 1.0 mils (0.025 mm) thick, rated min. 130°C (Passed 2500 Vac	OANZ2 (E17385)	UL	

insulation systems only			dielectric).			
Transformer (T100) - Tubing, sleeving - Optional	Great Holding	TFT	Teflon. Rated 155°C min., VW-1.	YDPU2 (E156256)	UL	
Transformer (T100) - Tubing, sleeving - Alternate - optional	ChangYuan	CB-TT	Teflon. Rated 125°C min., VW-1.	YDPU2 (E180908)	UL	
Mosfet (Q101, Q102) (SELV)	Interchangeable	Interchangeable	Rated min. 10 A. Mounted to DC Busbar (Busbar 101 and 102)	-	.-	
Electrolytic Capacitors (C102-C105, C118,) (SELV)	Interchangeable	Interchangeable	Rated min. 105°C, provided with integral pressure relief.	-	.	
LED (D801) (SELV)	Interchangeable	Interchangeable	Non-lasing diode. Visible spectrum.	-	-	
DC Busbar (BBAR101) (SELV)	Interchangeable	Nickel plated copper	n-shaped. Overall approx. 3.85 by 3.4 cm, min. 1.5 mm thick..	-	.-	
DC Busbar (BBAR102) (SELV)	Interchangeable	Nickel plated copper	L-shaped. Overall approx. 2.85 by 2.78 by 1.49 cm, min. 1.5 mm thick.	-	-	
DC Busbar (BBAR103) (SELV)	Interchangeable	Nickel plated copper	Rectangular-shaped. Overall approx. 2.35 by 1.7 cm, min. 1.5 mm thick..	-	-	
DC Busbar (BBAR104) (SELV)	Interchangeable	Nickel plated copper	L-shaped. Overall approx. 1.09 by 1.2 cm by 1.81, min. 1.5 mm thick.	-	-	
DC Busbar (+) (BBAR5) (SELV)	Interchangeable	Nickel plated copper	U-shape Overall approx. 1.2 by 1.27 cm by 1.4, min. 1.5 mm thick.	-	-	
DC Busbar (-) (BBAR5) (SELV)	Interchangeable	Nickel plated copper	U-shape Overall approx. 1.2 by 1.27 cm by 1.4, min. 1.5 mm thick..	-	-	
Daughter Board	-	-	Consists of Printed Wiring Board and Optocouplers, see Daughter Board - Optocouplers for details. Secured vertically to Main Printed Wiring board	-	-	

			using soldered mounting pin connectors.			
Daughter Board - Printed Wiring Board	Interchangeable	Interchangeable	Overall approx. 11.7 by 3 cm. Rated min. V-1, min. 130°C, rated for direct support of live parts.	ZMPV2	UL	
Daughter Board - Optical Isolator (U303, U310, U317, U408-U410)	Lite-On	LTV-817	Double protection, isolation voltage 5000 V, DTI min. 0.4mm.	FPQU2 (E113898)	UL	
Daughter Board - Optical Isolator (U303, U310, U317, U408-U410)- Alternate	Sharp	PC817	Double protection, isolation voltage 5000 V, DTI min. 0.4mm.	FPQU2 (E64380)	UL	
Daughter Board - Optical Isolator (U303, U310, U317, U408-U410) - Alternate	Vishay	SFH 6156 Series	Double protection, isolation voltage 4420 V.	FPQU2 (E52744)	UL	
Daughter Board - Optical Isolator (U303, U310, U317, U408-U410) - Alternate	Vishay	TCLT10 series (TCLT1007)	Double protection, isolation voltage 5000 V, DTI min. 0.4mm	FPQU2 (E76222)	UL	
Bias Board	-	-	Consists of Printed Wiring Board. Primary component. Secured vertically to Main Printed Wiring board using soldered mounting pin connectors.	-	-	
Bias Board - Printed Wiring Board	Interchangeable	Interchangeable	Overall approx. 3.1 by 2.5 cm, min. 1.2 mm thick. Rated min. V-1, min. 130°C, rated for direct support of live parts.	ZMPV2	UL	
PWB Insulating Sheet (Between Chassis and Printed Wiring Board)	ITW	GK-10NC	Overall approx. 24 by 15.2 cm, min. 0.24 mm thick. Rated min. 130°C, min. V-2.	QMFZ2 (E121855)	UL	
RTV	Interchangeable	Interchangeable	Rated min. HB, min. 125°C	QMFZ2	UL	

Cushioning tape	Interchangeable	Interchangeable	Rated V-0, min. 105°C	QMFZ2	UL	
Sleeving and Tubing - Optional	Great Holding	TFT or TFS	Teflon, rated 155°C min., VW-1, min. 0.4 mm thick.	YDPU2 (E156256)	UL	
Sleeving and Tubing - Alternate - Optional	Interchangeable	Interchangeable	Teflon, rated 155°C min., VW-1, min. 0.4 mm thick.	YDPU2	UL	
Label	Brady Worldwide Inc.	B-423	150 °C, for application to aluminum	PGDQ2	UL	
Label - Alternate	3M	7816 or 7818	150 °C, for application to aluminium. Printed with Brady R6000 ribbon and Subjected to the Durability of Markings Test	PGJI2 (MH16411)	UL	
Label - Alternate	Interchangeable	Interchangeable	150 °C, for application to aluminium.	PGJI2 or PGDQ2	UL	
Label - Alternate	-	-	Pressure sensitive label secured by adhesive, 150°C. Subjected to the Durability of Markings Test, for application to aluminium.	-	-	

Enclosures

Type	Supplement Id	Description
Photographs	3-01	GSP500PSXX-EF - Internal Top View (without cover)
Photographs	3-02	GSP500PSXX-EF - Top View
Photographs	3-03	GSP500PSXX-EF - View of Input and Output
Photographs	3-04	GSP500PSXX-EF - Input and Output Side view
Photographs	3-05	GSP500PSXX-EF - End Fan Side View
Photographs	3-06	GSP500PSXX - External Top View (No End Fan)
Photographs	3-07	GSP500PSXX - Internal Top View without chassis
Photographs	3-08	GSP500PSXX - Internal Bottom View of PCB
Diagrams	4-01	Transformer (T100) - P/N 10015038 (For models without "-R" suffix)
Diagrams	4-02	Inductor (L4) - P/N 10015033
Diagrams	4-03	Transformer (T1, 48V model) - P/N 10015037
Diagrams	4-04	Alternate Transformer (T100) - P/N 10017012 (For models with "-R" suffix)
Diagrams	4-05	Inductor (L2 & L3) - P/N 10015032
Diagrams	4-06	Transformer (T1, 24V model) - P/N 10015036
Diagrams	4-07	Transformer (T2) - P/N 10015034
Diagrams	4-08	Inductor (L1) - P/N 10015031
Diagrams	4-09	Transformer (T1, 12V model) - P/N 10015035
Diagrams	4-10	Cover - For all models
Diagrams	4-11	U Channel - For all models
Diagrams	4-12	Fan Holder - For models with "-EF" suffix
Diagrams	4-13	Chassis Insulation Sheet - Provide between PCB and U channel
Schematics + PWB	5-03	PCB-Bias Board
Schematics + PWB	5-04	PCB-Daughter Board
Schematics + PWB	5-05	PCB-Main Board
Miscellaneous	7-01	Letter of Assurance