UL TEST REPORT AND PROCEDURE

Standard:	UL 62368-1, 2nd Ed, 2014-12-01 (Audio/video, information and communication technology equipment Part 1: Safety requirements) CAN/CSA C22.2 No. 62368-1-14, 2nd Ed (Audio/video, information and communication technology equipment Part 1: Safety requirements)
Certification Type:	Component Recognition
CCN:	QQJQ2, QQJQ8 (Power Supplies for Use in Audio/Video, Information and Communication Technology Equipment)
Complementary CCN:	QQGQ2, QQGQ8 (Power Supplies for Information Technology Equipment Including Electrical Business Equipment)
Product:	Switching Power Supply
Model:	EPL150PSXX (where XX can be any number between 12 and 48 designating the output voltage), may also be provided with suffix "-SF" or “-T” or “-YYYYYY”
Rating:	Input: 100-240 Vac, 50/60 Hz, 2.5A Max. Output: See Model Differences for details.
Applicant Name and Address:	XP POWER L L C 15641 RED HILL AVE, SUITE 100 TUSTIN CA 92780 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: Robert Leon / Handler Reviewed By: Walid Beytoughan / 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 model covered in this report is a component AC - DC power supply intended for building in Audio/video, information and communication technology equipment.

Model Differences

All models in the Model EPL150PSXX Series are identical with exception to the Mains Transformer TR1, and minor secondary components that allow for different output voltage ratings.

EPL150PS12: 12Vdc (10.1 - 13.5 Vdc), 12.5 A max, 150W max (50C, forced-air with 10 cfm fan)
EPL150PS15: 15Vdc (13.6 - 17 Vdc) , 10 A max, 150W max (50C, forced-air with 10 cfm fan)
EPL150PS18: 18Vdc (17.1 - 21 Vdc) , 8.33 A max, 150W max (50C, forced-air with 10 cfm fan)
EPL150PS24: 24Vdc (21.1 - 26 Vdc) , 6.25 A max, 150W max (50C, forced-air with 10 cfm fan)
EPL150PS28: 28Vdc (26.1 - 31 Vdc) , 5.4 A max, 150W max. (50C, forced-air with 10 cfm fan)
EPL150PS33: 33Vdc ((31.1 - 33 Vdc), 4.5 A max, 150 W max. (50C, forced-air with 10 cfm fan)
EPL150PS36: 36Vdc (33.1 - 42 Vdc) , 4.17 A max, 150W max (50C, forced-air with 10 cfm fan)
EPL150PS48: 48Vdc (42.1 - 52 Vdc) , 3.1 A max, 150W max (50C, forced-air with 10 cfm fan)

EPL150PS12: 12Vdc (10.1 - 13.5 Vdc), 6.25 A max, 75W max (70C, forced-air with 10 cfm fan)
EPL150PS15: 15Vdc (13.6 - 17 Vdc), 5.0 A max, 75W max (70C, forced-air with 10 cfm fan)
EPL150PS18: 18Vdc (17.1 - 21 Vdc), 4.17 A max, 75W max (70C, forced-air with 10 cfm fan)
EPL150PS24: 24Vdc (21.1 - 26 Vdc), 3.13 A max, 75W max (70C, forced-air with 10 cfm fan)
EPL150PS28: 28Vdc (26.1 - 31 Vdc), 2.68A max, 75W max (70C, forced-air with 10 cfm fan)
EPL150PS33: 33Vdc (31.1 - 33 Vdc), 2.27 A max, 75W max (70C, forced-air with 10 cfm fan)
EPL150PS36: 36Vdc (31.1 - 42 Vdc), 2.08 A max, 75W max (70C, forced-air with 10 cfm fan)
EPL150PS48: 48Vdc (42.1 - 52 Vdc), 1.56 A max, 75W max (70C, forced-air with 10 cfm fan)

EPL150PS12: 12Vdc (10.1 - 13.5 Vdc), 8.33 A max, 100W max (50C, convection)
EPL150PS15: 15Vdc (13.6 - 17 Vdc), 6.67 A max, 100W max (50C, convection)
EPL150PS18: 18Vdc (17.1 - 21 Vdc), 5.56 A max, 100W max (50C, convection)
EPL150PS24: 24Vdc (21.1 - 26 Vdc), 4.17 A max, 100W max (50C, convection)
EPL150PS28: 28Vdc (26.1 - 31 Vdc), 3.57 A max, 100W max (50C, convection)
EPL150PS33: 33Vdc (31.1 - 33 Vdc), 3.03 A max, 100W max (50C, convection)
EPL150PS36: 36Vdc (33.1 - 42 Vdc), 2.78 A max, 100W max (50C, convection)
EPL150PS48: 48Vdc (42.1 - 52 Vdc), 2.1 A max, 100W max (50C, convection)

EPL150PS12: 12Vdc (10.1 - 13.5 Vdc), 4.17 A max, 50W max (70C, convection)
EPL150PS15: 15Vdc (13.6 - 17 Vdc), 3.33 A max, 50W max (70C, convection)
EPL150PS18: 18Vdc (17.1 - 21 Vdc), 2.78 A max, 50W max (70C, convection)
EPL150PS24: 24Vdc (21.1 - 26 Vdc), 2.08 A max, 50W max (70C, convection)
EPL150PS28: 28Vdc (26.1 - 31 Vdc), 1.79 A max, 50W max (70C, convection)
EPL150PS33: 33Vdc (31.1 - 33 Vdc), 1.52 A max, 50W max (70C, convection)
EPL150PS36: 36Vdc (33.1 - 42 Vdc), 1.39 A max, 50W max (70C, convection)
EPL150PS48: 48Vdc (42.1 - 52 Vdc), 1.04 A max, 50W max (70C, convection)

All models are provided with a Fan output @ CN3 (12 Vdc, 0.5A).
Additional Suffix "-SF" denotes units provided with only a single line side fuse.
Additional Suffix "-T" denotes units provided with screw type terminal.
Additional Suffix "-YYYYYY" can be any digits or letters or blank for marketing purpose.
All “-“ considered optional.

See Miscellaneous Enclosure 7-02 for ratings details.

Test Item Particulars	
Classification of use by	Skilled person
Supply Connection	AC Mains
Supply % Tolerance	+10%/-10%
Supply Connection – Type	For building-in
Considered current rating of protective device as part of building or equipment installation	20 A; building;
Equipment mobility	for building-in
Over voltage category (OVC)	OVC II
Class of equipment	Not Classified
Access location	N/A
Pollution degree (PD)	PD 2
Manufacturer's specified maximum operating ambient	50°C for 100% load. 70°C for 50% load. °C
IP protection class	IPX0
Power Systems	TN
Altitude during operation (m)	5000 m
Altitude of test laboratory (m)	17 m
Mass of equipment (kg)	0.13 kg kg

Technical Considerations

- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of : 50°C for 100% load; 70°C for 50% load.
- The product is intended for use on the following power systems : TN
- Considered current rating of protective device as part of the building installation (A) : 20
- Mains supply tolerance (%) or absolute mains supply values : +10%/-10%
- The power supply series covered by this report employ Double/Reinforced Insulation between Primary and Secondary circuits. Additionally evaluated for Basic Insulation between Line and Neutral up to and across the fuse (F1) per internal requirements of XP Power engineering specifications.
- According to IEC60664-1, Table A2, required Clearances have been adjusted by multiplying the clearance at sea level by a factor of 1.48 for operating at an altitude of 5000 meters. The correction factor is based on barometric pressure of 70kPa and Overvoltage Category II. If the calculated Clearance exceeded the Creepage, the Creepage was adjusted to the value of clearance.

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 product-line tests are conducted for this product : Electric Strength
- The following output circuits are at ES1 energy levels : All
- The following output circuits are at PS3 energy levels : All outputs.
- 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 when installed in a Class I end product.
- The following input terminals/connectors must be connected to the end-product supply neutral : CN1
- The following end-product enclosures are required : Electrical, Fire
- 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) : Transformer TR1 Class B (130)
- The maximum continuous power supply output (Watts) relied on forced air cooling from : 10cfm fan applied 1 inch from input side, blowing inward.
- The power supply was evaluated to be used at altitudes up to : 5000 m
- The power supply is provided with a fuse in both the line and neutral of the primary circuit. The need for a marking warning service person of the hazards associated with neutral fusing shall be considered in the end-product.
- Heating (Thermal Requirements) Test was not conducted on power supply with input/output leads. If power supply is provided with input and/or output leads, then temperature on leads must be measured and cannot exceed 105°C.
- When installed in a Class II end product, the power supply shall be mounted in a manner that provides sufficient clearance and creepage distance between the hazardous parts of the power supply and accessible conductive parts of the end product.
- The end-product Electric Strength Test is to be based upon a Transient Voltage of 2500Vpk.

Additional Information

The switching power supply series covered by this Test Report used Double/Reinforced Insulation between Primary and Secondary circuits.

Amendment (Technical):
1. Revised ANNEX Q.1 verdict to N/A.
2. Revised Model Differences.
3. Revise TR1 Insulation to Class B (130)
4. Revise Table 4.1.2 - Bleeder Resistors, Inductor L4, Transformer TR1, Optical Isolator IC4.
5. Revised subclause 5.2.2.3 to Pass verdict.
6. Added statement that all results in Table B.2.5 included a 12Vdc/0.5A load.
7. Revised Table B.3 with repeated Overload Test on 48Vdc output in a 70°C oven.
8. Corrected Manufacturer's specified maximum operating ambient to "50°C for 100% load. 70°C for 50% load."

Correction:
1. Corrected marking plate.
2. Corrected missing model differences for Model EPL150PS33 (50C, forced-air with 10 cfm fan).
3. Corrected ohm rating of Bleeder Resistors (R1, R1A, R2, R2A) to 1 Mohm.
4. Corrected model numbers for L4 Bobbin phenolic.
5. Corrected Enclosures 4-01 to 4-07 and 4-10.

Additional Standards

The product fulfills the requirements of: EN 62368-1:2014 + A11:2017, UL 62368-1 2ND Ed, Issued December 1, 2014, CSA CAN/CSA-C22.2 NO. 62368-1 2nd Ed, Issued December 1, 2014

Markings and Instructions	
Clause Title	Marking or Instruction Details
Equipment identification marking – Manufacturer identification	Listees or Recognized companys name, Trade Name, Trademark or File Number
Equipment identification marking – model identification	Model Number
Equipment rating marking – ratings	"Input Ratings (voltage, frequency/dc, current/power)", "Output Ratings (voltage, frequency/dc, current/power)"
Special Instructions to UL Representative N/A	

CERTIFICATE OF COMPLIANCE

Certificate Number	2018-11-30 (A0/C0) ; 2019-01-07 (A1/C0)-E321744
Report Reference	E321744-D1020-1/A1/C0-ULCB
Issue Date	2018-11-30 (A0/C0) ; 2019-01-07 (A1/C0)
Issued to:	XP Power LLC
Applicant Company:	15641 Red Hill Ave., Suite 100 Tustin, CA 92780 USA
Listed Company:	Same as Applicant
This is to certify that representative samples of	Component Power Supply intended for Building-in EPL150PSXX (where XX can be any number between 12 and 48 designating the output voltage), may also be provided with suffix "-SF" or "-T" or "-YYYYYY" Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.
Standard(s) for Safety:	ANSI/AAMI ES60601-1: A1:2012, C1:2009/(R)2012 and A2:2010/(R)2012, CSA CAN/CSA-C22.2 NO. 60601-1:14, IEC 60601-1 Edition 3.1 (2012)
Additional Standards:	EN 60601-1:2006 + A1:2013 + A12:2014
Additional Information:	See the UL Online Certifications Directory at www.ul.com/database for additional information.

Only those products bearing the UL Certification Mark should be considered as being covered by UL's Certification and Follow-Up Service.

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 Certification Mark on the product.

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

Bruce Mahrenholz, Assistant Chief Engineer, Global Inspection and Field Services, UL LLC
Joseph Hosey, General Manager, Director of Sales – Canada, UNDERWRITERS LABORATORIES OF CANADA INC.

Helena Y. Wolf, Director, Global Market Access Operations, UL LLC

Description

UL TEST REPORT AND PROCEDURE

Standard:	ANSI/AAMI ES60601-1: A1:2012, C1:2009/(R)2012 and A2:2010/(R)2012, CSA CAN/CSA-C22.2 NO. 60601-1:14, IEC 60601-1 Edition 3.1 (2012)
Certification Type:	Component Recognition
CCN:	QQHM2 / QQHM8
Complementary CCNs:	
Product:	Component Power Supply intended for Building-in
Model:	EPL150PSXX (where XX can be any number between 12 and 48 designating the output voltage), may also be provided with suffix "-SF" or "-T" or "-YYYYYY"
Rating:	Input: 100-240 Vac, 50/60Hz, 2.5 A; Output: See Model Differences for details
Applicant Name and Address:	XP Power LLC 15641 Red Hill Ave., Suite 100 Tustin, CA 92780, USA

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.

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Prepared by: Rahul Baria/Project Handler

Reviewed by: James Benscoter / 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.

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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 an open frame AC/DC switching mode power supply and is intended for building-in Class I or Class II from factory installation to be used as part of Medical Electrical Equipment.
Refer to the Report Modifications page for any modifications made to this report.

Model Differences

All models in the Model EPL150PSXX series are identical with exception to the Mains Transformer, TR1, and minor secondary components that allow for different output voltage ratings.

See below for Model Ratings:

EPL150PS12: 12Vdc (10.1 - 13.5 Vdc), 12.5 A max, 150W max (50C, forced-air with 10 cfm fan)
EPL150PS15: 15Vdc (13.6 - 17 Vdc), 10.0 A max, 150W max (50C, forced-air with 10 cfm fan)
EPL150PS18: 18Vdc (17.1 - 21 Vdc), 8.33 A max, 150W max (50C, forced-air with 10 cfm fan)
EPL150PS24: 24Vdc (21.1 - 26 Vdc), 6.25 A max, 150W max (50C, forced-air with 10 cfm fan)
EPL150PS28: 28Vdc (26.1 - 31 Vdc), 5.36 A max, 150W max (50C, forced-air with 10 cfm fan)
EPL150PS33: 33Vdc (31.1 - 33 Vdc), 4.55 A max, 150W max (50C, forced-air with 10 cfm fan)
EPL150PS36: 36Vdc (33.1 - 42 Vdc), 4.17 A max, 150W max (50C, forced-air with 10 cfm fan)
EPL150PS48: 48Vdc (42.1 - 52 Vdc), 3.13 A max, 150W max (50C, forced-air with 10 cfm fan)

EPL150PS12: 12Vdc (10.1 - 13.5 Vdc), 6.25 A max, 75W max (70C, forced-air with 10 cfm fan)
EPL150PS15: 15Vdc (13.6 - 17 Vdc), 5.0 A max, 75W max (70C, forced-air with 10 cfm fan)
EPL150PS18: 18Vdc (17.1 - 21 Vdc), 4.17 A max, 75W max (70C, forced-air with 10 cfm fan)
EPL150PS24: 24Vdc (21.1 - 26 Vdc), 3.13 A max, 75W max (70C, forced-air with 10 cfm fan)
EPL150PS28: 28Vdc (26.1 - 31 Vdc), 2.68A max, 75W max (70C, forced-air with 10 cfm fan)
EPL150PS33: 33Vdc (31.1 - 33 Vdc), 2.27 A max, 75W max (70C, forced-air with 10 cfm fan)
EPL150PS36: 36Vdc (33.1 - 42 Vdc), 2.08 A max, 75W max (70C, forced-air with 10 cfm fan)
EPL150PS48: 48Vdc (42.1 - 52 Vdc), 1.56 A max, 75W max (70C, forced-air with 10 cfm fan)

EPL150PS12: 12Vdc (10.1 - 13.5 Vdc), 8.33 A max, 100W max (50C, convection)
EPL150PS15: 15Vdc (13.6 - 17 Vdc), 6.67 A max, 100W max (50C, convection)
EPL150PS18: 18Vdc (17.1 - 21 Vdc), 5.56 A max, 100W max (50C, convection)
EPL150PS24: 24Vdc (21.1 - 26 Vdc), 4.17 A max, 100W max (50C, convection)
EPL150PS28: 28Vdc (26.1 - 31 Vdc), 3.57 A max, 100W max (50C, convection)
EPL150PS33: 33Vdc (31.1 - 33 Vdc), 3.03 A max, 100W max (50C, convection)
EPL150PS36: 36Vdc (33.1 - 42 Vdc), 2.78 A max, 100W max (50C, convection)
EPL150PS48: 48Vdc (42.1 - 52 Vdc), 2.1 A max, 100W max (50C, convection)

EPL150PS12: 12Vdc (10.1 - 13.5 Vdc), 4.17 A max, 50W max (70C, convection)
EPL150PS15: 15Vdc (13.6 - 17 Vdc), 3.33 A max, 50W max (70C, convection)

EPL150PS18: 18Vdc (17.1 - 21 Vdc), 2.78 A max, 50W max (70C, convection)
EPL150PS24: 24Vdc (21.1 - 26 Vdc), 2.08 A max, 50W max (70C, convection)
EPL150PS28: 28Vdc (26.1 - 31 Vdc), 1.79 A max, 50W max (70C, convection)
EPL150PS33: 33Vdc (31.1 - 33 Vdc), 1.52 A max, 50W max (70C, convection)
EPL150PS36: 36Vdc (33.1 - 42 Vdc), 1.39 A max, 50W max (70C, convection)
EPL150PS48: 48Vdc (42.1 - 52 Vdc), 1.04 A max, 50W max (70C, convection)

All models are provided with a Fan output @ CN3 (12 Vdc, 0.5A).
Additional Suffix "-SF" denotes units provided with only a single line side fuse.
Additional Suffix "-T" denotes units provided with screw type terminal.
Additional Suffix "-YYYYYY" can be any digits or letters or blank for marketing purpose.
All "-" considered optional.

See Enclosure - Miscellaneous for Output Ratings Table for additional details

Additional Information

The required clearance values have been assessed for suitability up to 5000 m elevation (1.29 correction factor as per IEC 60606-1, Table 8).
The need for the additional testing and evaluation shall be determined in the end product investigation.
The nameplate markings provided as an Enclosure - Marking Plate are considered representative of the entire series.
The power supply series covered by this report employ Double/Reinforced Insulation between Primary and Secondary circuits.
Equipment mobility : for building-in
Connection to the mains : To be determined in the end-use product.
Over voltage category (OVC) : OVC II
Mains supply tolerance (%) or absolute mains supply values : +10%, -10%
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
The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: 50°C for full load; 70°C for half load.
The maximum continuous power supply output (Watts) relied on forced air cooling from: 10cfm fan applied 1 inch from input side, blowing inward.

Technical Considerations

- The product was investigated to the following additional standards: EN 60601-1:2006 + A1:2013 + A12:2014
- The following additional investigations were conducted: N/A
- The product was not investigated to the following standards or clauses: Biocompatibility, EMC, Annex Z of EN standards for compliance with the MDD
- The following accessories were investigated for use with the product: None
- Scope of Power Supply evaluation defers the following clauses to the be determined as part of the end product: Clause 7.5 (Safety Signs), Clause 7.9 (Accompanying Documents), Clause 9 (ME Hazard), Clause 10 (Radiation), Clause 14 (PEMS), Clause 16 (ME Systems)
- Scope of Power Supply evaluation excludes the following: Patient applied parts clauses: 4.6, 7.2.10, 8.3, 8.5.2, 8.5.5, 8.7.4.7-8.7.4.9, 8.9.1.15; Battery related clauses: 7.3.3, 15.4.3; Hand Control related clauses: 8.10.4; Oxygen related clauses: 11.2.2; Fluids related clauses: 11.6.2 – 11.6.4; Sterilization clause: 11.6.7; Biocompatibility Clause: 11.7 (ISO 10993); Motor related clauses: 13.2.13.3, 13.4; Heating Elements related clause: 13.2
- The product is evaluated only to the following hazards: Casualty, Fire, Shock
- The degree of protection against harmful ingress of water is: Ordinary
- Software is relied upon for meeting safety requirements related to mechanical, fire and shock: No
- 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. See the Output Ratings Table in the Model Differences section for details.

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 end-product Electric Strength Test is to be based upon a maximum working voltage of: Primary-Secondary: 259 Vrms, 504 Vpk, Primary-Earthed Dead Metal: 237 Vrms, 384 Vpk
-
- The following secondary output circuits are at hazardous energy levels: All
-
- The power supply terminals and/or connectors are: Not investigated for field wiring
-
- The maximum investigated branch circuit rating is: 20A
-
- Proper bonding to the end-product main protective earthing termination is: Required
- (Class I configuration only)
-
- 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 (CN1) 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 B (130C): TR1 (Class B)
-
- The following end-product enclosures are required: Fire, Mechanical, Electrical
-
- Suitable disconnect device is to be provided in the end system.
-
- Temperature, Leakage Current with a non-frequency weighted device and Dielectric Strength testing shall be considered in the end system.
-
- Printed Wiring Board rated 130C.
-
- Heatsinks are floating and considered live. They should not be accessible in the end-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 105C.
-
- The equipment is provided with a fuse in both the Line and Neutral of the primary circuit. The need for a marking warning service person of the hazards associated with neutral fusing shall be considered in the end-product.
-
- This power supply has been evaluated as a 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. The
- output circuits have not been evaluated for direct patient connection (Type B, BF or CF).
-
- The end product shall ensure that the requirements related to accompanying documents, clause 7.9, are met.
-

- The need for Marking Durability and Marking Legibility Testing shall be considered as part of the end product installation.
-
- Models provided with suffix SF only provided with one line side fuse. Consideration should be made in the end-use product to determine the need of double pole fusing.
-
- The suitability of the breaking capacity of the fuse per Clause 8.11.5 shall be verified in the end product.
-
- When installed in a Class II end product, the power supply shall be mounted in a manner that provides sufficient clearance and creepage distance between the hazardous parts and accessible conductive parts.
-
- Proper bonding to the Class I end-product main protective earthing termination is required (via mounting holes on the PCB), unless for Class II applications. For Class II applications the primary side mounting
- pads are isolated from accessible conductive chassis by Reinforced Insulation.
-
- This power supply was evaluated with Two MOPP between Primary and Secondary for 504Vpk/259Vrms; One MOPP between primary and Earth for 384Vpk/237Vrms; One MOPP between secondary and Earth for -/48 Vdc.
-
- Energy not exceeding 240 VA or 20 J to be considered in the end-product evaluation.

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
Serial number or lot or batch identifier	Serial number or lot or batch identifier
Date of manufacture or use by date	Date of manufacture or use by date
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.
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:	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

TABLE: List of Critical Components

8.10	**TABLE:** List of critical components				
Component/ Part No.	Manufacturer/ Trademark	Type No./model No./	Technical data	Standard No. [1]	Required Mark(s) & Certificates of Conformity
Primary Connector (CN1)	Long Chu Electronics Co., Ltd.	P101	Rated 7A, 250V, min. 85C (Internal Connection only).	UL1977, CSAC22.2 NO182.3-M1987, IEC/EN 60998-1	UL (ECBT2)
Primary Connector (CN1) - Alternate	Degson Electronics Co., Ltd.	DG350	Rated 7A, 250V, min. 85C (Internal Connection only).	UL1977, CSAC22.2 NO182.3-M1987, IEC/EN 60998-2	UL (ECBT2)
Primary Connector (CN1) - Alternate	Long Chu Electronics Co., Ltd.	P3060G	Rated 7A, 250V, min. 85C (Internal Connection only).	UL1977, CSAC22.2 NO182.3-M1987, IEC/EN 60998-3	UL (ECBT2)
Secondary Connector (CN2)	Long Chu Electronics Co., Ltd	P101	Rated 7A, 250V, min. 85C (Internal Connection only).	UL1977, CSAC22.2 NO182.3-M1987, IEC/EN 60998-4	UL (ECBT2)
Output Fan Connector (CN3)	Long Chu Electronics Co., Ltd	P101	Rated 7A, 250V, min. 85C (Internal Connection only).	UL1977, CSAC22.2 NO182.3-M1987, IEC/EN 60998-5	UL (ECBT2)
Fuses (F1, F2)	Cooper Bussmann	SS-5 Series	Rated T3.15 A, 250 V, soldered onto PWB, 35A interrupt Current rating	UL248, CSA C22.2 No. 248.14, IEC 60127-2	UR
Fuses (F1, F2) (Alternate)	Conquer electronics Co., Ltd	Type MST	Rated T3.15 A, 250 V, soldered onto PWB, 35A interrupt Current rating	UL248, CSA C22.2 No. 248.14, IEC 60127-2	UR
Thermistor (TH1)	Thinking Electronic Co., Ltd.	SCK	NTC. Rated 240 V, 150C, 3 ohm, Iss min. 5 A.	UL 1434	E138827
Bridge Diodes (BD1)	Interchangeable	Interchangeable	Rated min. 600 V, min. 4 A, 150C	-	-
X-Capacitors (CX1)	Carli Electronics Co., Ltd.	MPX Series	Rated max. 0.47uF, min. 275 V, min. 100C, marked "X2"	IEC 60384-14, CSA C22.2 No.1, UL 60384-14	UL, cUL
X-Capacitors (CX1) (Alternate)	HUA JUNG Co., Ltd.	MKP Series	Rated max. 0.47uF, min. 275 V, min. 110C	IEC 60384-14, CSA C22.2 No.1, UL 60384-14	
Y-Capacitors (CY1, CY2,CY3)	TDK Corp	CD	Rated max. 1000 pF, min. 250 Vac, 125C, marked “Y1”	IEC 60384-14, CSA C22.2 No.1, UL 60384-14	UL, cUL,
Y-Capacitors (CY7, CY8,CY9)	TDK Corp	CD	Rated max. 1000 pF, min. 250 Vac, 125C, marked “Y1”	IEC 60384-14, CSA C22.2 No.1, UL 60384-14	UL, cUL
Electrolytic Capacitor (C2) (PRI)	Interchangeable	Interchangeable	Rated min. 82 uF, min. 420 V, 105C.	IEC 60601-1 3rd Ed. + A1	Test as part of power supply
MOSFET (Q1, Q2, Q3) (PRI)	Interchangeable	Interchangeable	500 V min, 5 A min, 150C max	IEC 60601-1 3rd Ed. + A1	Test as part of power supply
Optical Isolators (IC3)	Toshiba	TLP385 Series	Isolation voltage 5000 V, double protection	UL 1577, IEC 60747-5-5	UL, cUL,
Optical Isolators (IC3) (Alternate)	Vishay	VOL618A Series	Isolation voltage 5000 V, double protection	UL 1577, IEC 60747-5-5	UL, cUL, E76222

8.10	**TABLE:** List of critical components				
Component/ Part No.	Manufacturer/ Trademark	Type No./model No./	Technical data	Standard No. [1]	Required Mark(s) & Certificates of Conformity
Optical Isolators (IC4)	Lite-On	LTV-817 Series (LTV-817, LTV-817M, LTV-817S)	Double protection, isolation voltage min. 5000 V	UL 1577, IEC 60747-5-5	UL, cUL, E113898
Optical Isolators (IC4) (Alternate)	NEC	PS2561 Series	Double protection, isolation voltage min. 5000 V	UL 1577, IEC 60747-5-5	UL, cUL, E72422
Printed Circuit Board	LI GER ELECTRONICS CO., LTD	FR4	V-0, 130C	UL 746	UL E119801
Label	RONG TAY EMBOSSING PRINTING ART FACTORY	T-05	Rated at min. 85C	UL 969	UR MH16876
Label - Alternate	Interchangeable	Interchangeable	Rated at min. 85C	UL 969	-
Inductor (L2)	AIN HSIN ELECTRONICS CO., LTD	T16*9*5-C	Toroidal Ferrite core overall 17 mm OD, Coil rated min 130C, see Enclosure Diagram 1 for details.	-	-
Inductor (L2) (Alternate)	Interchangeable	T16*9*5-C	Toroidal Ferrite core overall 17 mm OD, Coil rated min 130C.	-	-
Inductor (L3)	AIN HSIN ELECTRONICS CO., LTD	T50-26	Toroidal Ferrite core overall 15mm OD, Coil rated min 130C, see Enclosure Diagram 2 for details.	-	-
Inductor (L3) (Alternate)	Interchangeable	T50-26	Toroidal Ferrite core overall 15 mm OD, Coil rated min 130C.	-	-
Inductor (L4)	AIN HSIN ELECTRONICS CO., LTD	EQ-20	Rated min 110C, see Enclosure Diagram 3 for details.	-	-
Inductor (L4) (Alternate)	HTS	EQ-20	Rated min 110C, see Enclosure Diagram 4 for details.	-	-
Inductor (L4) - Insulation System	Dah Jin Technology Co Ltd	HTS-DJ130	Class 130(B) Rated 110°C.	UL 1446	-
L4 Core	Interchangeable	Interchangeable	Ferrite core, overall 20 by 13 by 16mm high	-	-
L4 Bobbin	Sumitomo Bakelite Co Ltd	PM-9630	Phenolic, min. 0.51mm thick, V-0, 150°C	-	-
L4 Tape	Yahua	CT288	Polyester or Mylar, min. 2.5 mil (0.063 mm) thickness, rated min. 130 °C	UL 510	-
L4 Tape – Alternate	3M	1350F-1 Series	Polyester or Mylar, min. 2.5 mil (0.063 mm) thickness, rated min. 130 °C	UL 510	-
L4 Wire	Interchangeable	Interchangeable	Rated min. 130 °C	UL 1446	-
L4 Tube	GREAT HOLDING	TFL	Black and white. FEP,	UL 224	UL (E156256)

8.10	**TABLE:** List of critical components				
Component/ Part No.	Manufacturer/ Trademark	Type No./model No./	Technical data	Standard No. [1]	Required Mark(s) & Certificates of Conformity
	INDUSTRIAL CO LTD		PTFE, PVC, TFE, neoprene, polyimide or marked VW-1.		
Inductor (L5) (SELV)	AIN HSIN ELECTRONICS CO., LTD	R4*15	Rated min. 130C, see Enclosure Diagram 5 for details.	-	-
Inductor (L5) (SELV) (Alternate)	Interchangeable	R4*15	Rated min. 130C	-	-
Transformer (TR1)	HTSI	X50AATR01F (for EPL150PS12) X50AATR02F (for EPL150PS15) X50AATR03F (for EPL150PS18) X50AATR04F (for EPL150PS24) X50AATR05F (for EPL150PS28) X50AATR06F (for EPL150PS36) X50AATR07F (for EPL150PS48)	Insulation system: SBI4.2, Class B, rated 130C.	-	-
Transformer (TR1) - Insulation System	Dah Jin Technology Co., Ltd.	DJ-130	Class (B), 110C	UL 1446	UR (E318181, OBJS2)
Transformer (TR1) Bobbin	Sumitomo Bakelite Co., Ltd.	PM-9630 or PM-9823 or PM-9750	Rated minimum V-0, 150C, minimum 0.74 mm thick	UL 746C	UR (E41429)
Transformer (TR1) - Case	Chang Chun Plastics Co., Ltd.	4130	Rated minimum V-0, 140C, minimum 1 mm thick	UL 746C	UR (E59481)
Transformer (TR1) - Triple Insulating Wire	Dah Jin Technology Co., Ltd.	TLW-B Series or TLW-BB Series	Reinforced Insulation, rated 130C 1000V	UL 2353	UR (E236542)
Transformer (TR1) - Coil	Interchangeable	MW 79-C or MW 75-C	Rated 130C or 155C	UL 1446	-

Supplementary information:

The Test Laboratory has verified the component information.

1) Anything specified within brackets "( )" is for reference purposes only and can be used to specify the UL Product Category CCN(s)/File Number if the component includes an UL Certification. This can be useful for the UL Follow-Up Service Inspection associated with the UL Mark; however if in brackets, should not be a required element of the UL Inspection.

---------- END OF APPENDIX C ----------

TEST RESULTS:

APPENDIX D: Test Datasheets Enclosures

The following tests have been performed as part of this report:

Standard	Clause No.	Test Name	Testing Location / Comments
IEC 60601-1:2005 (Third Edition) + CORR. 1:2006 + CORR. 2:2007 + A1:2012 (or IEC 60601-1: 2012 reprint)	4.11	Power Input	XP Power Ltd. Under their CTF status
IEC 60601-1:2005 (Third Edition) + CORR. 1:2006 + CORR. 2:2007 + A1:2012 (or IEC 60601-1: 2012 reprint)	5.7	Humidity Conditioning	XP Power Ltd. Under their CTF status
IEC 60601-1:2005 (Third Edition) + CORR. 1:2006 + CORR. 2:2007 + A1:2012 (or IEC 60601-1: 2012 reprint)	8.4.3	Voltage or Charge Limitation	XP Power Ltd. Under their CTF status
IEC 60601-1:2005 (Third Edition) + CORR. 1:2006 + CORR. 2:2007 + A1:2012 (or IEC 60601-1: 2012 reprint)	8.5.4	Working Voltage Measurements	XP Power Ltd. Under their CTF status
IEC 60601-1:2005 (Third Edition) + CORR. 1:2006 + CORR. 2:2007 + A1:2012 (or IEC 60601-1: 2012 reprint)	8.7	Leakage Current Tests	XP Power Ltd. Under their CTF status
IEC 60601-1:2005 (Third Edition) + CORR. 1:2006 + CORR. 2:2007 + A1:2012 (or IEC 60601-1: 2012 reprint)	8.7.4.5	Earth Leakage Current	XP Power Ltd. Under their CTF status
IEC 60601-1:2005 (Third Edition) + CORR. 1:2006 + CORR. 2:2007 + A1:2012 (or IEC 60601-1: 2012 reprint)	8.8.3	Dielectric Voltage Withstand	XP Power Ltd. Under their CTF status
IEC 60601-1:2005 (Third Edition) + CORR. 1:2006 + CORR. 2:2007 + A1:2012 (or IEC 60601-1: 2012 reprint)	8.8.4.1	Ball Pressure	XP Power Ltd. Under their CTF status
IEC 60601-1:2005 (Third Edition) + CORR. 1:2006 + CORR. 2:2007 + A1:2012 (or IEC 60601-1: 2012 reprint)	11	Temperature	XP Power Ltd. Under their CTF status
IEC 60601-1:2005 (Third Edition) + CORR. 1:2006 + CORR. 2:2007 + A1:2012 (or IEC 60601-1: 2012 reprint)	13	Abnormal Operation Testing	XP Power Ltd. Under their CTF status
IEC 60601-1:2005 (Third Edition) + CORR. 1:2006 + CORR. 2:2007 + A1:2012 (or IEC 60601-1: 2012 reprint)	15.5.1.2	Transformer Short Circuit	XP Power Ltd. Under their CTF status
IEC 60601-1:2005 (Third Edition) + CORR. 1:2006 + CORR. 2:2007 + A1:2012 (or IEC 60601-1: 2012 reprint)	15.5.1.3	Transformer Overload	XP Power Ltd. Under their CTF status

NOTE: If testing location is blank then the test was performed at the CB Testing Laboratory as specified at the beginning of this report.

The following datasheet enclosures are provided in this section of the report. If blank, no separate enclosures are attached.

Enclosures

Supplement ID	Description

-- END OF APPENDIX D --