UL TEST REPORT AND PROCEDURE

Standard:	ANSI/AAMI ES 60601-1:2005 (Medical electrical equipment – Part 1: General requirements for basic safety and essential performance) CSA C22.2 No. 60601-1:08 (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:	Switching Power Supply
Model:	ECS45US05, ECS45USXX and ECS25USXX (where XX can be any number between 12 and 48 designating the output voltage, may also be follow by suffix SF or -C or both).
Rating:	Input Rating: Model ECS45US05 and Model ECS45USXX Series: 100-240 Vac, 0.9 A, 50/60 Hz Model ECS25USXX Series: 100-240 Vac, 0.6 A, 50/60 Hz Output Rating: All Series: See Model Differences for details.
Applicant Name and Address:	XP POWER LLC 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 Underwriters Laboratories Inc. ('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 Underwriters Laboratories Inc. (UL) or any authorized licensee of UL.

Prepared by: Longjie Zhang
Underwriters Laboratories Inc.

Reviewed by: Paul Hilgeman
Underwriters Laboratories Inc.

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

Products are component power supplies intended to be used as part of Medical Electrical Equipment. It is an open frame power supply intended for building-in Class I or Class II end-products. Double insulated symbol is optionally provided. Earthing symbol may only be provided for Class I power supplies.

Model Differences

All models in the Model ECS45USXX series are identical with exception to the Mains Transformer, T1, and minor secondary components that allow for different output voltage ratings. See below for Model Ratings Table Below for 50°C:

Model ECS45US05: Output Rated: 5 Vdc, 6.0 A
Model ECS45US12: Output Rated: 12 Vdc, 3.75 A
Model ECS45US15: Output Rated: 15 Vdc, 3.00 A
Model ECS45US24: Output Rated: 24 Vdc, 1.90 A
Model ECS45US48: Output Rated: 48 Vdc, 0.95 A

All respective models in the Model ECS25USXX Series are identical Model ECS45USXX Series, except for the lower output power rating and the heatsink is not provided. See below for Model Ratings Table Below for 50°C:

Model ECS25US12: Output Rated: 12 Vdc, 2.08 A
Model ECS25US15: Output Rated: 15 Vdc, 1.67 A
Model ECS25US24: Output Rated: 24 Vdc, 1.04 A
Model ECS25US48: Output Rated: 48 Vdc, 0.52 A

See Enclosure - Miscellaneous for de-rated output values for higher ambients.

Suffix "SF" indicates units provided with a single fuse provided in the line side of the primary.

Technical Considerations

- The product was investigated to the following additional standards: ANSI/AAMI ES60601-1:2005/C1:2009 (includes National Differences for USA); CAN/CSA-C22.2 No. 60601-1:08 (includes National Differences for Canada), EN 60601-1:2006
- 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
  Flammable Anaesthetic Mixtures Protection: Annex G
- The product is Classified only to the following hazards: Casualty, Fire, Shock
- The degree of protection against harmful ingress of water is: Ordinary
- The mode of operation is: Continuous
- Software is relied upon for meeting safety requirements related to mechanical, fire and shock: No
- The product is suitable for use in the presence of a flammable anaesthetics mixture with air or oxygen or with nitrous oxide: No
- Manufacturer's Recommended Ambient: 50°C (See De-rating Curve, Enclosure 7-01 and Enclosure 7-02 for details)
- Classification of installation and use: Building-in
- Supply connection: Building-in
- Accessories and detachable parts included in the evaluation: None
- Options included: None

Risk Controls/Engineering Conditions of Acceptability

For use only in or with complete equipment where the acceptability of the combination is determined by Underwriters Laboratories Inc. When installed in an end-product, consideration must be given to the following:

- Considerations to the applied parts requirements shall be considered as part of the end-product evaluation.
- The end-product evaluation shall ensure that the requirements related to Accompanying Documents, Clause 7.9 are met.
- Consideration should be given to measuring the temperature on power electronic components and transformer windings when the power supply is installed in the end-use equipment. The end-use product shall ensure that the power supply is used within its ratings.
- The output circuits have not been evaluated for direct patient connection (Type B, BF or CF).
- The available voltage for the secondary outputs does not exceed 25 Vac or 60 Vdc, under normal and single fault conditions.
- The input/output connectors are not acceptable for field connections, they are only intended for connection to mating connectors of internal wiring inside the end-use machine.
- Heatsink 1 was considered floating live and should not be connected to earth in the end-product.
- The power supply should be mounted on insulating posts when installed in a Class II end product.
- The "floating" mounting hole shall be mounted on insulating post or properly earthed for Class I end-product.
- Units may be provided with one fuse in the Line side or one fuse in both the Line and Neutral sides. The need for additional fusing shall be determined as part of the end-product evaluation.
- Units provided with either a Cover or Chassis should be used only in a Class I application. The cover and chassis shall be reliably earthed in the end-use application.
- When installed in a Class I end product, the power supply shall be mounted in a manner that provides, at a min. 2.5 mm Clearance between the primary side of the power supply and protectively earthed accessible conductive parts. In addition, when installed in a Class I end product, the protective bonding terminal of the power supply shall be reliably connected to the main protective earthing terminal of the end product.
- When installed in a Class II end product, the power supply shall be mounted, on insulating posts, in a manner that provides, at a min. 5 mm Clearance between the primary side of the power supply and any accessible conductive parts.
- Power supply provides the following MOPP (means of patient protection): two MOPP based upon a working voltage 240 Vrms, 531 Vpk between Primary to Secondary, one MOPP based upon a working voltage 250 Vrms, 354 Vpk between Primary and Earth/Enclosure
- Temperature, Leakage Current, Protective Earthing, Dielectric Voltage Withstand, and Interruption of the Power Supply tests should be considered as part of the end product evaluation.
- The product was submitted and evaluated for use at the maximum ambient temperature (Tmra) permitted by the manufacturer's specification of: 50°C (See De-rating Curve, Enclosure 7-01 and Enclosure 7-02 for details)
- Magnetic devices T1 employs a Class F (155°C) insulation system. Magnetic devices L1, L2, L3 employ a Class F (155°C insulation system
- The PWB is rated 130°C.
- The products were tested on a 20 A branch circuit. If used on a branch circuit greater than this, additional testing may be necessary.
- The need for marking durability testing to be considered as part of the end product application.
- The power supplies have been evaluated as continuous operation and have not been evaluated for use in the presence of flammable anesthetic mixture with air, oxygen or nitrous oxide.
- A single maximum current rating of 0.9A or 0.6A were provided for the entire 100-240Vac voltage range. The end product evaluation shall consider the acceptability of this component power supply rating as it relates to the requirements of Clause 7.2.7.

Additional Information

The clearance distances have additionally been assessed for suitability up to 3000 m elevation. The creepage and clearance measurement in Table: To insulation diagram are derived from 2nd edition evaluation.

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.

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
Alternating current	
Supply Connection	Voltage range, ac/dc, phases if more than single phase
Direct current	
Power Input	Amps, VA, or Watts
Output	Rated output voltage, power, frequency.
Funtional Earth Terminal	

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	Test	Test	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:

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

Model	Samples	Test	Test Details
N/A			

UL TEST REPORT AND PROCEDURE

Standard:	ANSI/AAMI ES 60601-1:2005 (Medical electrical equipment – Part 1: General requirements for basic safety and essential performance) CSA C22.2 No. 60601-1:08 (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:	Switching Power Supply
Model:	ECS60USXX (where XX can be any number between 5 and 48 designating the output voltage), may also be provided with suffixes "SF", C, and/or B with or without “-“.
Rating:	Input: 100-240 Vac, 1.2 A, 50/60 Hz Output: See Model Differences for details
Applicant Name and Address:	XP POWER LLC SUITE 150 1241 E DYER RD SANTA ANA CA 92705 UNITED STATES

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Prepared by: Linus Park
Underwriters Laboratories Inc.

Reviewed by: Michael J. Howell
Underwriters Laboratories Inc.

Supporting Documentation

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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

Products covered are open frame power supplies intended for building-in to be used with Medical Electrical Equipment. Units are intended for used with Class I or Class II end-products.

Model Differences

All models in the Model ECS60USXX series are identical with exception to the Mains Transformer, T1, and minor secondary components that allow for different output voltage ratings. See below for Model Ratings for up to 50°C ambient:

Model ECS60US05: Output Rated: 5Vdc, 8.0 A
Model ECS60US12: Output Rated: 12 Vdc, 5.0 A
Model ECS60US15: Output Rated: 15 Vdc, 4.0 A
Model ECS60US18: Output Rated: 18 Vdc, 3.33 A
Model ECS60US24: Output Rated: 24 Vdc, 2.50 A
Model ECS60US28: Output Rated: 28 Vdc, 2.14 A
Model ECS60US48: Output Rated: 48 Vdc, 1.25 A

See Enclosure 7-01 (Ill. 14) for de-rating curve for ambient temperatures up to 70°C.

Additional Suffix "-SF" denotes units provided with only a single line side fuse.
Additional Suffix "-C" denotes units provided with cover and chassis.
Additional Suffix "-B" denotes units provided with level B radiated EMI.

Technical Considerations

- Classification of installation and use : For building-in
- Supply connection : For building-in
- Accessories and detachable parts included in the evaluation: None
- Options included: None

- The product was investigated to the following additional standards:: ANSI/AAMI ES60601-1:2005/C1:2009 (includes National Differences for USA); CAN/CSA-C22.2 No. 60601-1:08 (includes National Differences for Canada), EN 60601-1:2006

- Scope of Power Supply evaluation defers the following clauses to the be determined as part of the end product evaluation: 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; Flammable Anaesthetic Mixtures Protection: Annex G

- Supply connection: Overvoltage Category II

- The product is Classified only to the following hazards: Casualty, Fire, Shock

- The degree of protection against harmful ingress of water is: Ordinary

- The mode of operation is: Continuous

- Software is relied upon for meeting safety requirements related to mechanical, fire and shock: No

- The product is suitable for use in the presence of a flammable anesthetics mixture with air or oxygen or with nitrous oxide: No

- Unit also complied with spacing requirements of UL60601-1 (1st), CSA C22.2 No. 60601-1 (2nd), and IEC 60601-1 (2nd) for Basic for 240 Vac from Primary to Ground, Double/Reinforced for 240Vac from Primary to Secondary.

- The product was submitted and evaluated for use at the maximum ambient temperature (Tmra) permitted by the manufacturer's specification of: 50°C with output loaded to 100% rated and 70°C with output loaded to 50% rated (See De-rating Curve, Enclosure 7-01 (Ill. 14) for details).

Risk Controls/Engineering Conditions of Acceptability

For use only in or with complete equipment where the acceptability of the combination is determined by Underwriters Laboratories Inc. When installed in an end-product, consideration must be given to the following:

- The component shall be installed in compliance with the Marking (clause 7) and Separation (clause 8) requirements of the end use application.

- Repeating leakage current testing should be considered in the end product application.

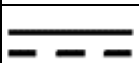
- This power supply was evaluated with Two MOPP between Primary and Secondary; One MOPP primary and Earth/Secondary Reference Conductor; and One MOPP between Secondary and Earth/ Secondary Reference Conductor.
- This power supply has been evaluated as a continuous operation, ordinary equipment and has 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 should ensure that the requirements related to accompanying documents, clause 7.9, are met.
- The available voltage for the secondary outputs does not exceed 25 Vac or 60 Vdc, under normal and single fault conditions
- The following secondary output circuits are at non-hazardous energy levels: All outputs
- The output connectors are not acceptable for field connections; they are only intended for connection to mating connectors of the end-use equipment.
- The Dielectric Withstand Voltage Test conducted on this power supply was based upon a maximum working voltage of: Primary-Earthed Dead Metal (Class I units): 359 Vpk, 244 Vrms; Primary-SEC: 600 Vpk, 237 Vrms.
- The maximum investigated branch circuit rating is: 20 A
- When installed in a Class I end product, the power supply shall be mounted in a manner that provides, at a minimum, 2.5 mm Clearance/4 mm Creepage between the primary side of power supply and protectively earthed accessible conductive parts. In addition, when installed in a Class I end product, the protective bonding terminal of the power supply shall be reliably connected to the main protective earthing terminal of the end product.
- When installed in a Class II end product, the power supply shall be mounted, on insulating posts, in a manner that provides, at a min. 5 mm Clearance/8 mm Creepage between the power supply and any accessible conductive parts.
- An investigation of the protective bonding terminal has: Not been conducted.
- For Class I application: Protective bonding testing shall be considered in the end product application.
- Primary side heat sinks are floating and considered live. They should not be accessible in the end-product.
- 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): L1, L2, and T1 are min. Class F (155°C).

- Printed Wiring Board rated 130°C.
- Cleaning test to 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.
- Fire/ Mechanical/ Electrical Enclosure to be provided as part of the end product.
- Unit provided with additional suffix "-SF" are provided with only one fuse in the line side. Consideration for the need for additional fusing to be determined as part of the end product in accordance with Clause 8.11.5.
- Consideration for suitable protective earthing connection to chassis should be considered for units provided with additional suffix “-C”.

Additional Information

- Marking label is representative of all models. The nameplate labels included in this report depict the draft artwork for the marking plate pending approval by National Certification Bodies and it will not be affixed to products prior to such approval.
- Bridging Capacitors were considered optional; however test was conducted under the worst case condition with all bridging capacitors provided at their maximum capacitance rating.

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
Alternating current	
Supply Connection	Voltage range, ac/dc, phases if more than single phase
Direct current	
Power Input	Amps, VA, or Watts
Output	Rated output voltage, power, frequency.

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

Model ECS60USXX	Exempt	Test	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:

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

Model	Samples	Test	Test Details
N/A			

UL TEST REPORT AND PROCEDURE

Standard:	UL 60950-1, 2nd Edition, 2011-12-19 (Information Technology Equipment - Safety - Part 1: General Requirements) 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:	Switching Power Supply
Model:	ECS45US05, ECS45USXX and ECS25USXX (where XX can be any number between 12 and 48 designating the output voltage, may also be followed by suffix SF, -C, -S or all).
Rating:	Input Rating: Model ECS45US05 and Model ECS45USXX Series: 100-240 Vac, 0.9 A, 50/60 Hz Model ECS25USXX Series: 100-240 Vac, 0.6 A, 50/60 Hz Output Rating: All Series: 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

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Prepared by: Sal Oseguera Reviewed by: Pawel Ciuba

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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 model covered in this report is a component power supply intended for use in Information Technology Equipment. It is an open frame power supply intended for building-in Class I or Class II end-products. Double insulated symbol is optionally provided. Earthing symbol may only be provided for Class I power supplies.

Model Differences

All models in the Model ECS45USXX Series are identical with exception to the Mains Transformer, T1, and minor secondary components that allow for different output voltage ratings. See below for Model Ratings at 50°C Table Below:

Model ECS45US05: Output Rated: 5 Vdc, 6 A
Model ECS45US12: Output Rated: 12 Vdc, 3.75 A
Model ECS45US15: Output Rated: 15 Vdc, 3.00 A
Model ECS45US24: Output Rated: 24 Vdc, 1.90 A
Model ECS45US48: Output Rated: 48 Vdc, 0.95 A

All respective models in the Model ECS25USXX Series are identical Model ECS45USXX Series, except for the lower output power rating and the heatsinks (HS1, HS2) are not provided. See below for Model Ratings at 50°C Table Below:

Model ECS25US12: Output Rated: 12 Vdc, 2.08 A
Model ECS25US15: Output Rated: 15 Vdc, 1.67 A
Model ECS25US24: Output Rated: 24 Vdc, 1.04 A
Model ECS25US48: Output Rated: 48 Vdc, 0.52 A

See Enclosure - Miscellaneous for details on de-rated outputs based upon higher ambients.

Suffix "SF" indicates single fuse provided in the line side of the primary.

Units provided with suffix "-C" provided with cover.

Units provided with suffix "-S" provided with screw terminal.

Technical Considerations

- Equipment mobility : for building-in

- Connection to the mains : for building-in
- Operating condition : continuous
- Access location : for building-in
- Over voltage category (OVC) : OVC II
- Mains supply tolerance (%) or absolute mains supply values : +10%, -10%
- Tested for IT power systems : No
- IT testing, phase-phase voltage (V) : N/A
- Class of equipment : Class I or Class II (Determined by end product)
- Considered current rating of protective device as part of the building installation (A) : 20A
- Pollution degree (PD) : PD 3
- IP protection class : IPX0
- Altitude of operation (m) : 3048
- Altitude of test laboratory (m) : less than 2000 meters
- Mass of equipment (kg) : 0.17 kg
- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: 50°C (See De-rating Curve, Enclosure 7-01 and Enclosure 7-02 for details)
- 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
- The equipment disconnect device is considered to be: for building-in, to be determined in the end-product.
- 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 circuit locations (with circuit/schematic designation) were investigated as a limited power source (LPS): Models ECS25USXX and ECS45USXX (where XX =12-48): Power Output,
- 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: 244 Vrms, 356 Vpk, Primary-SELV: 240 Vrms, 531 Vpk,
- The following secondary output circuits are SELV: All outputs
- The following secondary output circuits are at non-hazardous energy levels: All outputs
- The following output terminals were referenced to earth during performance testing: Secondary Output (J2) referenced using "Y1" or "Y2" capacitors.,
- The power supply terminals and/or connectors are: Suitable for factory wiring only,
- The maximum investigated branch circuit rating is: 20 A

- The investigated Pollution Degree is: 3
- Proper bonding to the end-product main protective earthing termination is: required when the power supply is used in a Class I end product. The power supply will be considered Class II only when protection against electric shock does not rely on Basic Insulation and is installated such that it provides a min. 8 mm creepage/4, mm clearance between primary to secondary circuits or to accessible metal circuits in a Pollution Degree 3 environment or provides min. 5 mm creepage/4 mm clearance in a Pollution Degree 2 environment up to 2000m elevation. Class II units have no reliance upon protective earthing.,
- 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: ACN 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): L1, L2, L3 and T1 (Class F, 155°C) ,
- The following end-product enclosures are required: Fire, Mechanical
- The equipment is suitable for direct connection to: AC mains supply
- Printed Wiring Board rated 130°C.
- Units may be provided with one fuse in the Line side or one fuse in both the Line and Neutral sides. The need for additional fusing shall be determined as part of the end-product evaluation.
- Heatsink (HS2) is floating and considered live. They should not be accessible in the end-product.
- Touch Current test to be repeated in the end-product evaluation.
- Clearance spacing evaluated for 3048 m altitude. Additional consideration maybe necessary in the end-use product.
- Units provided with either a Cover or Chassis should be used only in a Class I application. The cover and chassis shall be reliably earthed in the end-use application.
- Mounting hole near connector, J2, is considered part of the SELV circuit. The need for providing supplementary insulation (4 mm creepage/2 mm clearance up to 2000m) to floating metal parts separated from the primary by basic insulation only should be considered in the end-use evaluation.
- When installed in a Class I end product, the power supply shall be mounted in a manner that provides, at a min. 2 mm Clearance between the primary side of power supply and protectively earthed accessible conductive parts up to 2000m elevation. In addition, when installed in a Class I end product, the protective bonding terminal of the power supply shall be reliably connected to the main protective earthing terminal of the end product.
- When installed in a Class II end product, the power supply shall be mounted, on insulating posts, in a manner that provides, at a min. 4 mm Clearance between the power supply and any accessible conductive parts up to 2000m elevation.
- The following warning or its equivalent shall be provided by the end-use product when double pole fused units are installed: "CAUTION. Double pole/neutral fusing"
- For Models provided with suffix "-S". Terminal block type EK381V series suitable for solid/stranded copper wiring only, 16-30 AWG, 1.73 in-lbs. torque.

Additional Information

This CB Report is a reissue of CBTR Ref. No. E139109-A47-CB-1, CB Test Certificate Ref. No. US/14890/UL. Based on previously conducted testing and the review of product technical documentation including photos, schematics, wiring diagrams and similar, has been determined that the product complies with the standard.

The required clearance values have been assessed for suitability up to 3048 m elevation (1.15 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 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.

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
Terminals for external primary power supply conductors	Capital letter "N" located adjacent to a terminal intended exclusively for connection of the primary power neutral conductor

Special Instructions to UL Representative

N/A

UL TEST REPORT AND PROCEDURE

Standard:	UL 60950-1, 2nd Edition, 2007-03-27 (Information Technology Equipment - Safety - Part 1: General Requirements) CSA C22.2 No. 60950-1-07, 2nd Edition, 2007-03 (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:	Switching Power Supply
Model:	ECS60USXX (where XX can be any number between 5 and 48 designating the output voltage), may also be provided with suffix "SF" designating single fusing, C designating cover, B designating level B radiated EMI
Rating:	Input: 100-240 Vac, 1.2 A, 50/60 Hz Output: See Enclosure - Miscellaneous Ratings Table for details.
Applicant Name and Address:	XP POWER INC 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 Underwriters Laboratories Inc. ('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.

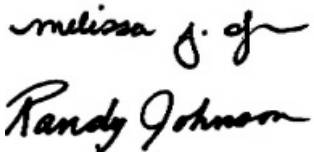
The applicant is authorized to reproduce the referenced Test Report provided it is reproduced in its entirety.

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 Underwriters Laboratories Inc. (UL) or any authorized licensee of UL.

Prepared by: Melissa DeGuia
Underwriters Laboratories Inc.

Reviewed by: Randy Johnson
Underwriters Laboratories Inc.



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 power supply intended for use in Information Technology Equipment. It is an open frame power supply intended for building-in Class I or Class II end-products. Double insulated symbol is optionally provided. Earthing symbol may only be provided for Class I power supplies.

Model Differences

All models in the Model ECS60USXX series are identical with exception to the Mains Transformer, T1, and minor secondary components that allow for different output voltage ratings. See below for Model Ratings Table for 50°C ambient below:

Model ECS60US05: Output Rated: 5Vdc, 8.0 A
Model ECS60US12: Output Rated: 12 Vdc, 5.0 A
Model ECS60US15: Output Rated: 15 Vdc, 4.0 A
Model ECS60US18: Output Rated: 18 Vdc, 3.33 A
Model ECS60US24: Output Rated: 24 Vdc, 2.50 A
Model ECS60US28: Output Rated: 28 Vdc, 2.14 A
Model ECS60US48: Output Rated: 48 Vdc, 1.25 A

See Enclosure - Miscellaneous for de-rating tables.

Additional Suffix "SF" denotes units provided with only a single line side fuse.
Additional Suffix "-C" denotes units provided with cover and chassis.
Additional Suffix "-B" denotes units provided with level B radiated EMI.

Technical Considerations

- Equipment mobility : for building-in
- Connection to the mains : for building-in
- Operating condition : continuous
- Access location : for building-in

- Over voltage category (OVC) : OVC II
- Mains supply tolerance (%) or absolute mains supply values : +10%, -10%
- Tested for IT power systems : No
- IT testing, phase-phase voltage (V) : N/A
- Class of equipment : Class I or Class II (Determined by end product)
- Considered current rating (A) : 20 A
- Pollution degree (PD) : PD 2
- IP protection class : IPX0
- Altitude of operation (m) : 3000
- Altitude of test laboratory (m) : <2000
- Mass of equipment (kg) : 0.080 kg
- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: 50°C (See De-rating Curve, Enclosure 7-01 for details)
- The means of connection to the mains supply is: for building-in
- The product is intended for use on the following power systems: TN
- The product was investigated to the following additional standards: EN 60950-1:2006+ A11:2009 (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 C9,
- 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 Underwriters Laboratories Inc. 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: 244 Vrms, 359 Vpk, Primary-SELV: 237 Vrms, 600 Vpk,
- The following secondary output circuits are SELV: All outputs
- The following secondary output circuits are at non-hazardous energy levels: All outputs
- The following output terminals were referenced to earth during performance testing: Secondary Output (J2) referenced using "Y1" or "Y2" capacitors.
- The power supply terminals and/or connectors are: Suitable for factory wiring only
- The maximum investigated branch circuit rating is: 20 A
- The investigated Pollution Degree is: 2
- Proper bonding to the end-product main protective earthing termination is: required when the power supply is used in a Class I end product. The power supply will be considered Class II only when protection against electric shock does not rely on Basic Insulation and provides a minimum of 5 mm creepage and 4 mm clearance distance between Primary and SEC components (mounted above chassis/accessible metal parts on Insulating posts etc). Class II units have no reliance upon protective earthing., ,
- 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: ACN 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): L1, L2, and T1 (Class F, 155°C)
- The following end-product enclosures are required: Mechanical, Fire, Electrical
- Printed Wiring Board rated 130°C.
- Primary side heat sinks are floating and considered live. They should not be accessible in the end-product.
- Touch Current test to be conducted in the end-product evaluation.

- Clearance spacing evaluated for 3000 m altitude. Additional consideration maybe necessary in the end-use product.
- Units provided with fuses in the line and neutral shall be considered for the need for "Double Pole Fusing" warning markings as part of the end-product.
- The equipment is provided with a fuse in both the Line and Neutral of the primary circuit, unless provided with suffix "SF" to indicate only one fuse provided in the Line.

Additional Information

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 and only the output ratings may vary.

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

When installed in a Class I end product, the power supply shall be mounted in a manner that provides, at a minimum, 2.3 mm Clearance between the primary side of power supply and protectively earthed accessible conductive parts. In addition, when installed in a Class I end product, the protective bonding terminal of the power supply shall be reliably connected to the main protective earthing terminal of the end product.

When installed in a Class II end product, the power supply shall be mounted, on insulating posts, in a manner that provides, at a min. 4 mm Clearance between the power supply and any accessible conductive parts.

Markings and instructions

Clause Title	Marking or Instruction Details
Power rating - Company identification	Listee's or Recognized company's name, Trade Name, Trademark or File Number
Power rating - Model	Model Number
Power rating - Ratings	Ratings (voltage, frequency/dc, current)
Fuses - Non-operator access/soldered-in fuses	Unambiguous reference to service documentation for instructions for replacement of fuses replaceable only by service personnel
Terminals for external primary power supply conductors	Capital letter "N" located adjacent to a terminal intended exclusively for connection of the primary power neutral conductor

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
N/A						

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

All 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					