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:	ECS65USXX (where XX is any number between 12-48 designating output voltage), may also be provided with suffix "SF" 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

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: Linus Park
Underwriters Laboratories Inc.

Reviewed by: Michael J. Howell
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 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 ECS65USXX 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 ECS65US12: Output Rated: 12 Vdc, 5.4 A
Model ECS65US15: Output Rated: 15 Vdc, 4.3 A
Model ECS65US18: Output Rated: 18 Vdc, 3.4 A
Model ECS65US24: Output Rated: 24 Vdc, 2.7 A
Model ECS65US28: Output Rated: 28 Vdc, 2.3 A
Model ECS65US48: Output Rated: 48 Vdc, 1.4 A

See Enclosures 7-01 (Ill. 15) and Enclosure 7-02 (Ill. 16) for de-rating curve for ambient temperatures up to 70°C.

Suffix "-SF" indicates single fuse provided in the line side of the primary.
Suffix "-B" indicates unit provided with optional EMI Inductor, L2.

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 250 Vac from Primary to Ground, Double/Reinforced for 250Vac 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 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 and consideration of non-frequency weighted leakage current test (Clause 8.7.3e) shall 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 maximum investigated branch circuit rating is: 20 A
- 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: 588 Vpk, 249 Vrms.
- 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-L3 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 provided as part of the end product.

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.

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 ECS65USXX	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:	ECS65USXX (where XX can be any number between 12 and 48 designating the output voltage), may also be provided with suffix "SF" and/or "-B"
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 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 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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Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.

Prepared by: Sal Oseguera Reviewed by: David Heath

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 ECS65USXX 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 ECS65US12: Output Rated: 12 Vdc, 5.4 A
Model ECS65US15: Output Rated: 15 Vdc, 4.3 A
Model ECS65US18: Output Rated: 18 Vdc, 3.6 A
Model ECS65US24: Output Rated: 24 Vdc, 2.7 A
Model ECS65US28: Output Rated: 28 Vdc, 2.3 A
Model ECS65US48: Output Rated: 48 Vdc, 1.35 A

See Enclosure - Miscellaneous for de-rating tables.

Additional Suffix "SF" denotes units provided with only a single line side fuse.

Additional Suffix "-B" denotes units provided with additional EMI filter inductor, L2.

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 : +6%, -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) : 1.2 A
- Pollution degree (PD) : PD 2
- IP protection class : IPX0
- Altitude of operation (m) : 3048
- Altitude of test laboratory (m) : 33
- Mass of equipment (kg) : 0.25 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 + 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 C29
- 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, 359 Vpk, Primary-SELV: 249 Vrms, 588 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, L3 and T1 (Class F, 155°C)
- The following end-product enclosures are required: Mechanical, Fire, Electrical
- Printed Wiring Board rated 130°C.
- 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.

- 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 3048 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.

Additional Information

This report is a reissue of CBTR Ref. No. E139109-A61-CB, CB Test Certificate Ref. No. US/15901/UL. Based on the previously conducted testing and the review of product technical documentation including photos, schematics, wiring diagrams and similar, has been determined that the product continues to comply with the standard.

The clearance distances have additionally 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.

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.

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

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
Entire Series	Transformer (T1)	-	Primary to Secondary	3000	-	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					

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:	ECS100USXX (where XX is any number between 12-48 designating output voltage), may also be provided with suffix "SF", with or without "-".
Rating:	Input: 100-240 Vac, 1.9 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

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.

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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 ECS100USXX 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 ECS100US12: Output Rated: 12 Vdc, 8.3 A
Model ECS100US15: Output Rated: 15 Vdc, 6.7 A
Model ECS100US18: Output Rated: 18 Vdc, 5.5 A
Model ECS100US24: Output Rated: 24 Vdc, 4.2 A
Model ECS100US28: Output Rated: 28 Vdc, 3.6 A
Model ECS100US48: Output Rated: 48 Vdc, 2.1 A

See Enclosure 7-01 (Ill. 10) for de-rating curve for ambient temperatures up to 70°C.

Additional Suffix "-SF" denotes units provided with only a single line side fuse.

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 250 Vac from Primary to Ground, Double/Reinforced for 250Vac from Primary to Secondary, and Basic for 250 Vac from Secondary Earth.

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.

§ Repeat of leakage current testing, including applicability of Clause 8.7.3e, shall 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): 353 Vpk, 244 Vrms; Primary-SEC: 547 Vpk, 204 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-L3 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.
- § The power supply was evaluated for use in 50°C ambient at Full Rated Output and 50% of the Rated Output in 70°C ambient (See De-rating Curve, Enclosure 7-01 for details). Additionally, the unit was evaluated for a max. output of 100W provided with force air cooling from a 10 CFM fan and a max. output of 80W with convection cooling.

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.

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
All Models	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:	Power supply for building-in, switch mode type
Model:	ECS100USxx (where xx can be any number between 12 and 48 designating the output voltage), may also be provided with suffix "SF"; ECS100US12-XB0302; ECS100US24-XB0303.
Rating:	Input: ECS100USxx: 100-240 Vac, 1.9 A, 50/60 Hz ECS100US12-XB0302: 100-240 Vac, 1.9 A, 50/60 Hz or 100-350Vdc ECS100US24-XB0303: 100-240 Vac, 1.9 A, 50/60/400 Hz 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: Sal Oseguera Reviewed by: Gregory Ray

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 ECS100USxx 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:

Model ECS100US12: Output Rated: 12 Vdc, 8.3 A
Model ECS100US15: Output Rated: 15 Vdc, 6.7 A
Model ECS100US18: Output Rated: 18 Vdc, 5.5 A
Model ECS100US24: Output Rated: 24 Vdc, 4.2 A
Model ECS100US28: Output Rated: 28 Vdc, 3.6 A
Model ECS100US48: Output Rated: 48 Vdc, 2.1 A
Model ECS100US12-XB0302: Output Rated: 12 Vdc, 6.7 A
Model ECS100US24-XB0303: Output Rated: 24 Vdc, 4.2 A

Additional Suffix "SF" denotes units with only a single line side fuse.

See Enclosure - Miscellaneous for de-rated output values for higher ambient (AC models only).

Model ECS100US12-XB0302 is identical to Model ECS100US12 with the exception DC Mains connection, DC rated fuse and output ratings.

Model ECS100US24-XB0303 is identical to Model ECS100US24 with the exception of input rating addition of 400Hz.

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 : +6%, -10% for AC Models; +20%, -15% for Model ECS100US12-XB0302
- 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) : 20
- Pollution degree (PD) : PD 2
- 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 for 100% load at forced air cooling condition and 80% load at convection cooling condition; 70°C for 50%load at forced air cooling condition and 40% load at convection cooling condition. (See AC Model De-rating Curve, Enclosure 7-01 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; TN or DC mains supply for Model ECS100US12 -XB0302
- 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 C17 (Pri to Sec bridging capacitor). Load side of C29 (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-SELV: 193 Vrms, 547 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" capacitors.,
- The power supply terminals and/or connectors are: Suitable for factory wiring only
- The maximum investigated branch circuit rating is: 20 A for AC models

- 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 (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
- The maximum continuous power supply output (Watts) relied on forced air cooling from: External fan at 10 cfm applied to power supply input side with inward air-flow direction from 2.75 inch distance between fan and the unit.
- The equipment is suitable for direct connection to: AC mains supply; DC mains supply for Model ECS100US12 -XB0302,
- Printed Wiring Board rated 130°C.
- 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.
- Heatsinks 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 3048 m altitude. Additional consideration maybe necessary in the end-use product.

Additional Information

Based upon product similarity, previously conducted testing and the review of product construction, only limited tests were deemed necessary to add Model ECS100US24-XB0303.

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
Polarity marking for d.c. power equipment	"- 48 Vdc" and "+ 48 Vdc" marked adjacent to the dc mains terminals

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:

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					

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:	ECS100USXX (where XX is any number between 12-48 designating output voltage), may also be provided with suffix "SF", with or without "-".
Rating:	Input: 100-240 Vac, 1.9 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

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.

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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: Linus Park
Underwriters Laboratories Inc.

Reviewed by: Michael J. Howell
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 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 ECS100USXX 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 ECS100US12: Output Rated: 12 Vdc, 8.3 A
Model ECS100US15: Output Rated: 15 Vdc, 6.7 A
Model ECS100US18: Output Rated: 18 Vdc, 5.5 A
Model ECS100US24: Output Rated: 24 Vdc, 4.2 A
Model ECS100US28: Output Rated: 28 Vdc, 3.6 A
Model ECS100US48: Output Rated: 48 Vdc, 2.1 A

See Enclosure 7-01 (Ill. 10) for de-rating curve for ambient temperatures up to 70°C.

Additional Suffix "-SF" denotes units provided with only a single line side fuse.

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 250 Vac from Primary to Ground, Double/Reinforced for 250Vac from Primary to Secondary, and Basic for 250 Vac from Secondary Earth.

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.

§ Repeat of leakage current testing, including applicability of Clause 8.7.3e, shall 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): 353 Vpk, 244 Vrms; Primary-SEC: 547 Vpk, 204 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-L3 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.
- § The power supply was evaluated for use in 50°C ambient at Full Rated Output and 50% of the Rated Output in 70°C ambient (See De-rating Curve, Enclosure 7-01 for details). Additionally, the unit was evaluated for a max. output of 100W provided with force air cooling from a 10 CFM fan and a max. output of 80W with convection cooling.

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.

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
All Models	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, 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:	Power supply for building-in, switch mode type
Model:	ECS100USxx-By (where xx can be any number between 12 and 48 designating the output voltage, y can be blank or SF or C). Models with SF designate single fuse and models with suffix C is provided with cover for Class I only
Rating:	Input: 100-240 Vac, 1.9 A, 50/60 Hz Output: 100W Max output See Enclosure - Miscellaneous Models output rating and differences for details.
Applicant Name and Address:	XP POWER INC SUITE 150 1241 E DYER RD SANTA ANA CA 92705 UNITED STATES

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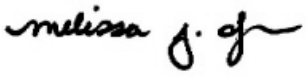
Prepared by: Melissa DeGuia
Underwriters Laboratories Inc.



Reviewed by: Timothy Geiger
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.

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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 with or without metal chassis intended for building-in Class I or Class II end-products.

Model Differences

All models in the Model ECS100USxx-B series are identical with exception to the Mains Transformer, T1, and minor secondary components that allow for different output voltage ratings. Models with suffix C is provided with chassis is considered Class I use only.

Technical Considerations

- Equipment mobility : for building-in
- Connection to the mains : for building-in
- Operating condition : continuous
- Access location : operator accessible
- Over voltage category (OVC) : OVC II
- Mains supply tolerance (%) or absolute mains supply values : +6%, -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
- Pollution degree (PD) : PD 2
- IP protection class : IPX0
- Altitude of operation (m) : Up to 3000
- Altitude of test laboratory (m) : 180
- Mass of equipment (kg) : 341 gram approx.
- 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 at forced air cooling condtion and 80% load at convection cooling condition; 70°C for 50% load at forced air cooling condition and 40% load at convection cooling condtion.
- 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 following accessible locations (with circuit/schematic designation) are within a limited current circuit: Load side of C29 (Pri to Sec bridging capacitor)
- Power supplies covered by this report were evaluated for both Class I and Class II (double insulated). Models with suffix C are provided with enclosure cover and are for Class I use only. See Conditions of Acceptability.
- The unit has two cooling condition: 1) External Forced Aire Cooling: 10CFM air flow, 2.75 inch distand from Fan to input side of the unit with inward air-flow direction; 2) Convection cooling in metal enclosure.

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-SELV: 240 Vrms, 547 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" 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. Models with suffix C are provided with enclosure cover and are for Class I use only. The power supply will be considered Class II only when protection against electric shock does not rely on Basic Insulation and provided with sufficient spacings between primary part of power supply to secondary or accessible parts on the end product. Class II units have no reliance upon protective earthing., ,
- An investigation of the protective bonding terminals has: Not been conducted. The protective bonding terminal has not been investigated for functional grounding. The acceptability of the protective bonding means shall be determined in the end product.
- 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 (155°C) and T1 (Class F)
- The following end-product enclosures are required: Mechanical, Fire, Electrical
- The maximum continuous power supply output (Watts) relied on forced air cooling from: External fan at 10 cfm applied to power supply input side with inward air-flow direction from 2.75 inch distance between fan and the unit.
- The equipment is suitable for direct connection to: AC mains supply
- Printed Wiring Board rated 130°C.
- The equipment is provided with a fuse in both the Line and Neutral of the primary circuit.
- Heatsinks 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 based upon end product construction.

- § Clearance spacing evaluated for 3000 m altitude. Additional consideration maybe necessary in the end-use product.

- § The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's: 50°C for 100% load at forced air cooling condtion and 80% load at convection cooling condition; 70°C for 50% load at forced air cooling condition and 40% load at convection cooling condtion. Other than above loading condition on Tma shall be done in the end production application.

Additional Information

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

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

Inspect the transformer(s) listed in BD1.1 per AA1.1- (C). When the tests are conducted at other location, inspect test record and specification sheet provided by the component manufacturer. Verify the specification sheet indicates 100% routine test specified in BD1.1 be conducted at the component manufacturer

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:

All model

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					

CERTIFICATE OF COMPLIANCE

Certificate Number	20130530-E146893
Report Reference	E146893-A45-UL
Issue Date	2013-May-30
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	POWER SUPPLIES, MEDICAL AND DENTAL Building-in power supply- ECS130USxx-yy (where xx can be any number between 12 and 48 designating the output voltage, yy can be blank, C, or SF). Models with suffix SF designate single fuse, ECS130US15-XA1013. Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.
Standard(s) for Safety:	ANSI/AAMI ES60601-1 (2005 + C1:09 + A2:10) and CAN/CSA-C22.2 No. 60601-1- Medical Electrical Equipment - Part 1: General Requirements for Basic Safety and Essential Performance.
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

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:	Building-in power supply
Model:	ECS130USxx-yy (where xx can be any number between 12 and 48 designating the output voltage, yy can be blank, C, or SF). Models with suffix SF designate single fuse ECS130US15-XA1013
Rating:	Input Rated: 100-240 V~,50/60 Hz, 3A Output Rated: See Enclosure - Miscellaneous 7-01 for maximum output 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: Alexander Perevezentsev Reviewed by: Melissa DeGuia

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 Medical Equipment. It is an open frame power supply with or without metal cover intended for building-in Class I or Class II end-products.

Model Differences

All models in the Model ECS130USxx-yy series are identical with exception to the Mains Transformer, T1, and minor secondary components that allow for different output voltage ratings. Models with suffix C is provided with metal cover for Class I use only.

ECS130US15-XA1013 is identical to Model ECS130US15, except for the size of the PWB mounting holes.

Technical Considerations

- Classification of installation and use : For Building-in
- Device type (component/sub-assembly/ equipment/ system) : Component, Power Supply
- Intended use (Including type of patient, application location) : To supply regulated power
- Mode of operation : Continuous
- Supply connection : To be determined in the end product
- 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), 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), 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)
- 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
- 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)
- The product is evaluated only to the following hazards: Shock, Fire, Casualty
- The following accessories were investigated for use with the product: None
- Power Supply was considered Overvoltage Category II (OVCII)
- Classification of installation and use : Building-in
- Supply connection : Building-in
- Accessories and detachable parts included in the evaluation : None
- Options included : None

- 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 (130W) with forced air cooling, derated to 50% load (65W) with forced air cooling at 70°C (applicable to all models); 50°C for 77% load (100W) with convection cooling, derated to 39% (50W) with convection cooling at 70°C (applicable to models without cover); 50°C for 58% load (75W) with convection cooling, derated to 29% (38W) with convection cooling at 70°C (applicable to models with cover). See Enclosure "Miscellaneous" for additional details.
- The unit has two cooling conditions: 1) External Forced Air Cooling: 10CFM air flow, 1 inch distance from Fan to input side of the unit with inward air-flow direction; 2) Convection cooling.
- Unit may be used with or without metal cover.

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 component shall be installed in compliance with the Marking (clause 7) requirements of the end use application.
- 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.
- Leakage Current Testing, including when measured with a non-frequency-weighted device (Clause 8.7.3e), shall be considered in the end product application.
- Proper bonding to the end-product main protective earthing termination is required. Grounding continuity shall be conducted in the end product.
- This power supply was evaluated with Two MOPP between primary and secondary; One MOPP primary and Earth; One MOPP between secondary and Earth for Class I application; Functional Insulation between secondary and floated earth trace for class II application
- Magnetic devices T1, L1, L2 employ a Class F (155°C) insulation system.
- PWB is rated 130°C.
- This power supply has been evaluated as 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 products were tested on a 20 A branch circuit. If used on a branch circuit greater than this, additional testing may be necessary.
- 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 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.
- The need for Marking Durability and Marking Legibility Testing to be considered as part of the end product installation
- A single input current rating is provided over the entire 100-240Vac voltage range. The end product evaluation is to determine the acceptability.
- Power supply provides the following MOPP (means of patient protection): two MOPP between Primary to Secondary, one MOPP between Primary and Earth, one MOPP between secondary and

earthing trace, operational protection between secondary and floated earthing trace.

- When installed in a Class I end product, the power supply shall be mounted in a manner that provides, at a min. 3.2 mm Clearance, min. 4.0 mm Creepage 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 in a manner that provides sufficient clearance and creepage distance between the hazardous parts and any accessible conductive parts.
- Fire/ Mechanical/ Electrical Enclosure to be provided as part of the end product
- Units with SF suffix are provided with only one fuse in the line side. The need for additional fusing shall be determined as part of the end-product evaluation
- The end-product Electric Strength Test is to be based upon a maximum working voltage of Primary-SELV: 225 Vrms, 603Vpk; Primary to Ground: 245Vrms, 356Vpk.
- Units with suffix "C" provided with metal cover.

Additional Information

Marking Plate is considered representative of all models covered under this Report.

The clearance distances have additionally been assessed for suitability up to 5000 m elevation.

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 the applicable collateral standards.

Manufacturer to provide up to date IEC Licenses for component licenses greater than 3 years upon request.

Product was additionally evaluated according to Japan National Deviations. See Enclosure "Miscellaneous" for respective Attachment.

Additional Standards

The product fulfills the requirements of: EN 60601-1: 2006 + CORR: 2010 (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) (includes National Differences for Canada), 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)

Markings and instructions

Clause Title	Marking or Instruction Details
Company identification	Classified or Recognized company's name, Trade name, Trademark or File
Model	Model number
Supply Connection	Voltage range, ac/dc, phases if more than single phase
Alternating current	

Supply Frequency	Rated frequency range in hertz
Direct current	⎓
Power Input	Amps, VA, or Watts
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
N/A			

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			

CERTIFICATE OF COMPLIANCE

Certificate Number	20130517-E139109
Report Reference	E139109-A123-UL
Issue Date	2013-MAY-17
Issued to:	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	Power Supplies for Information Technology Equipment Including Electrical Business Equipment Refer to addendum page for Models 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

William R. Carney, Director, North American Certification Programs

UL LLC

CERTIFICATE OF COMPLIANCE

Certificate Number	20130517-E139109
Report Reference	E139109-A123-UL
Issue Date	2013-MAY-17

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 for building-in, switch mode type
ECS130USxx-yy (where xx can be any number between 12 and 48 designating the output voltage, y can be blank, SF or C). Models with SF designate single fuse option and models with suffix C are provided with a metal cover for Class I use only.

ECS130US15-XA1013

William R. Carney

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) 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 for building-in, switch mode type
Model:	ECS130USxx-yy (where xx can be any number between 12 and 48 designating the output voltage, y can be blank, SF or C). Models with SF designate single fuse option and models with suffix C are provided with a metal cover for Class I use only. ECS130US15-XA1013
Rating:	Input: 100-240 Vac, 50/60 Hz. 3A Output: See Enclosure - Miscellaneous Model output rating 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: Nathan Escalante Reviewed by: David E. Drewes

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 with or without metal cover intended for building-in Class I or Class II end-products.

Model Differences

All models in the Model ECS130USxx-yy series are identical with exception to the Mains Transformer, T1, and minor secondary components that allow for different output voltage ratings. Models with suffix C is provided with metal cover for Class I use only.

ECS130US15-XA1013 is identical to Model ECS130US15, except for the size of the PWB mounting holes.

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) : 20
- Pollution degree (PD) : PD 2
- IP protection class : IPX0
- Altitude of operation (m) : Up to 5000
- Altitude of test laboratory (m) : less than 2000 meters
- Mass of equipment (kg) : 0.36 with cover, 0.18 without cover
- 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 (130W) with forced air cooling,

derated to 50% load (65W) with forced air cooling at 70°C (applicable to all models); , 50°C for 77% load (100W) with convection cooling, derated to 39% (50W) with convection cooling at 70°C (applicable to models without cover);, 50°C for 58% load(75W) with convection cooling, derated to 29% (38W) with convection cooling at 70°C (applicable to models with cover). See Enclosure "Miscellaneous" for additional details.

- § The means of connection to the mains supply is: for building-in, to be determined in 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 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 accessible locations (with circuit/schematic designation) are within a limited current circuit: Load side of C9 (Pri to Sec bridging capacitor),
- § Power supplies covered by this report were evaluated for both Class I and Class II (double insulated). Models with suffix C are provided with metal cover and are for Class I use only. See Conditions of Acceptability.
- § The unit has two cooling condition: 1) External Forced Air Cooling: 10CFM air flow, 1 inch distance from Fan to input side of the unit with inward air-flow direction; 2) Convection cooling with and without metal cover.

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: Earthing Continuity, Electric Strength
- § The end-product Electric Strength Test is to be based upon a maximum working voltage of: Primary-Earthed Dead Metal: 245 Vrms, 356 Vpk, Primary-SELV: 286 Vrms, 603 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 secondary output circuits are Limited Current Circuits: Load side of C9 (Pri to Sec bridging capacitor)
- § The following output terminals were referenced to earth during performance testing: Output (-).,
- § 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. Models with suffix C are provided with metal cover and are for Class I use only. The power supply will be considered Class II only when protection against electric shock does not rely on Basic Insulation and provided with sufficient spacings between primary part of power supply to secondary or accessible parts on the end product. Class II units have no reliance upon protective earthing.,
- § An investigation of the protective bonding terminals has: Not been conducted. The acceptability of the protective bonding means shall be determined in the end product.,
- § 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): T1 (Class F, 155°C) ,
- § The following end-product enclosures are required: Electrical, Mechanical, Fire,
- § The maximum continuous power supply output (Watts) relied on forced air cooling from: External fan at 10 cfm applied to power supply input side with inward air-flow direction from 1 inch distance between fan and the unit.,
- § The equipment is suitable for direct connection to: AC mains supply
- § Printed Wiring Board rated 130°C.
- § The equipment is provided with a fuse in both the Line and Neutral of the primary circuit. Cautionary markings for service persons to be considered in the end-product.
- § Heatsinks are floating and considered live. They should not be accessible in the end-product.
- § Consideration to repeating the Touch Current test should be given in the end-product evaluation.
- § Clearance spacing evaluated for 5000 m altitude. Additional consideration maybe necessary in the end-use product.

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.

Required values for clearance are adjusted for 5000 m (1.48 correction factor as per IEC 60664-1, Table A2).

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, IEC 60950-1:2005 + A1:2009, UL 60950-1 2nd Ed. Revised 2011-12-19

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

Inspect the transformer(s) listed in BD1.1 per AA1.1- (C). When the tests are conducted at other location, inspect test record and specification sheet provided by the component manufacturer. Verify the specification sheet indicates 100% routine test specified in BD1.1 be conducted at the component manufacturer

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:

All model

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					