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:	Power Supply
Model:	ECP40USXX (where XX can be 05, 12, 15, 18, 24, 30, or 48)
Rating:	Input: 100-240 Vac, 1 A, 50/60 Hz

Output:

Model Number	Output	Max. Power
ECP40US05	5 V/6.0 A	30
ECP40US12	12 V/3.34 A	40
ECP40US15	15V/2.67 A	40
ECP40US18	18 V/2.22 A	40
ECP40US24	24 V/1.67 A	40
ECP40US30	30 V/1.34 A	40
ECP40US48	48 V/0.84 A	40

Applicant Name and Address:	XP POWER INC SUITE 150 1241 E DYER RD SANTA ANA CA 92705 UNITED STATES

This is to certify that representative samples of the products covered by this Test Report have been investigated in accordance with the above referenced Standards. The products have been found to comply with the requirements covering the category and the products are judged to be eligible for Follow-Up Service under the indicated Test Procedure. The manufacturer is authorized to use the UL Mark on such products which comply with this Test Report and any other applicable requirements of 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: Linus Park Reviewed by: Elizabeth Drew

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 in Medical Electrical Equipment.

Model Differences

Models in the ECP40USXX series are all identical with exception to the output voltage and current ratings, transformer (TR1), minor differences in the secondary circuit components, and model designation.

XX = 05, 12, 15, 18, 24, 30, or 48, and Indicates the output voltage

Technical Considerations

- Classification of installation and use : For building-in
- Device type (component/sub-assembly/ equipment/ system) : Component
- Intended use (Including type of patient, application location) : Provide regulated power
- Mode of operation : Continuous
- Supply connection : For building-in
- Accessories and detachable parts included : None
- Other options include : None
- The product was investigated to the following additional standards:: ANSI/AAMI ES60601-1 (2005 + C1:09 + A2:10) (Medical Electrical Equipment - Part 1: General Requirements for Basic Safety and Essential Performance) (includes Deviations for United States), CAN/CSA-C22.2 No. 60601-1 (2008) (Medical Electrical Equipment - Part 1: General Requirements for Basic Safety and Essential Performance) (includes National Differences for Canada), EN 60601-1: 2006 + CORR: 2010 (Medical electrical equipment Part 1: General requirements for basic safety and essential performance)
- The product was not investigated to the following standards or clauses:: Biocompatibility (ISO 10993-1), Clause 14, Programmable Electronic Systems, Electromagnetic Compatibility (IEC 60601-1-2)
- The degree of protection against harmful ingress of water is:: Ordinary
- The mode of operation is:: Continuous
- The product is suitable for use in the presence of a flammable anesthetics mixture with air or oxygen or with nitrous oxide:: No
- The power supply was evaluated for use in 50°C ambient at Full Rated Output and 50% of the Rated

Output in 70°C ambient.

- Scope of Power Supply evaluation defers the following clauses to the be determined as part of the end product: Clause 7.5 (Safety Signs), Clause 7.9 (Accompanying Documents), Clause 9 (ME Hazard), Clause 10 (Radiation), Clause 14 (PEMS), Clause 16 (ME Systems)

- Scope of Power Supply evaluation excludes the following: Patient applied parts clauses: 4.6, 7.2.10, 8.3, 8.5.2, 8.5.5, 8.7.4.7-8.7.4.9, 8.9.1.15; Battery related clauses: 7.3.3, 15.4.3; Hand Control related clauses: 8.10.4; Oxygen related clauses: 11.2.2; Fluids related clauses: 11.6.2 – 11.6.4; Sterilization clause: 11.6.7; Biocompatibility Clause: 11.7 (ISO 10993); Motor related clauses: 13.2.13.3, 13.4; Heating Elements related clause: 13.2; Flammable Anaesthetic Mixtures Protection: Annex G

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 considered for compliance with the Marking (clause 7) and Separation (clause 8) requirements as part of the end use application evaluation.

- Repeat of leakage current testing and consideration of non-frequency weighted leakage to be considered as part of the end product.

- This power supply was evaluated with One MOPP/ Two MOOP between Primary and Secondary; One MOPP/ One MOOP between primary and Earth. Additional MOPP between Primary and Secondary shall be considered in the end product

- This power supply has been evaluated as a continuous operation, ordinary equipment and has not been evaluated for use in the presence of a flammable anesthetic mixture with air, oxygen, or nitrous oxide. The output circuits have not been evaluated for direct patient connection (Type B, BF or CF).

- The end product shall ensure that the requirements related to accompanying documents, clause 7.9, are met.

- The available voltage for the secondary outputs does not exceed 25 Vac or 60 Vdc, under normal and single fault conditions.

- The Dielectric Strength Test conducted on this power supply was based upon a maximum working voltage of: Primary-Earthed Dead Metal: 203 Vpk, 240 Vrms; Primary-SEC: 494 Vpk, 240 Vrms.

- Protective bonding testing shall be considered in the end product application.

- 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): TR1 (Class B, 130°C) or (Class F,

155°C)

- Printed Wiring Board rated 130°C.
- 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.
- The products were tested on a 20 A branch circuit. If used on a branch circuit greater than this, additional testing may be necessary.
- Temperature, Leakage Current, Protective Earthing, Dielectric Voltage Withstand, and Interruption of the Power Supply tests should be considered as part of the end product evaluation.
- Unit to be properly earthed as part of the end product.
- Q1 Heatsink considered live and should not be earthed.
- End product shall provide necessary creepage and clearance for 250Vrms from input connector pins to mounting means.
- Power supply fuse was provided with limited breaking capacity and was evaluated for installation where the maximum fault current was limited. End product shall ensure the power supply is used in applications where the limited breaking capacity does not result in unacceptable risk.

Additional Information

This CB Test Report is a reissue and is based on previous CB Test Report E321744-A2-CB and CB Test Certificates No. DK-15706. Only limited testing was required based upon construction review and previous testing.

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

In addition to testing covered under IEC 60601-1, 3rd Edition, some tests were conducted as part of the previous UL60601-1, 1st Edition/ IEC 60601-1, 2nd Edition evaluations and the results and methods, as applicable, were considered representative as part of the testing conducted.

Additional Standards

The product fulfills the requirements of: ANSI/AAMI ES60601-1 (2005 + C1:09 + A2:10), CAN/CSA-C22.2 No. 60601-1 (2008), IEC 60601-1: 2005, EN 60601-1: 2006 + CORR: 2010

Markings and instructions

Clause Title	Marking or Instruction Details
Model	Model number

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:	Open Frame Switching Power Supply
Model:	ECP40USXX (where XX can be any number between 05 and 48 designating the output voltage). See Enclosure - Miscellaneous Table (ID 7-02) for details models list.
Rating:	Input: 100-240 Vac, 50/60 Hz, 1.0A Output: See Enclosure - Miscellaneous Table (ID 7-02) for details.
Applicant Name and Address:	XP POWER LTD 401 COMMONWEALTH DR HAW PAR TECHNOCENTRE LOBBY B, #02-02 SINGAPORE 149598 SINGAPORE

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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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: David E. Drewes Reviewed by: Tim McGeough

Supporting Documentation

The following documents located at the beginning of this Procedure supplement the requirements of this Test Report:

A. Authorization - The Authorization page may include additional Factory Identification Code markings.

B. Generic Inspection Instructions -

i. Part AC details important information which may be applicable to products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of this Test Report.

ii. Part AE details any requirements which may be applicable to all products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of each Test Report.

iii. Part AF details the requirements for the UL Certification Mark which is not controlled by the technical standard used to investigate these products. Products are permitted to bear only the Certification Mark(s) corresponding to the countries for which it is certified, as indicated in each Test Report.

Product Description

The product is an open frame switching mode power supply which is electronic components mounted on print wiring board, and intended for use in Information Technology Equipment (ITE)

Model Differences

See ID 7-02 for models list and output rating, all Models are similar to Model ECP40US05, except for transformer secondary winding, rating of secondary output diode(D31), and Model designation, please see enclosure 4-01 to 4-07, 4-09 to 4-15 for transformer construction details.

Transformer differences:
Transformer Primary Winding for all models are identical:
N1: Diameter 0.40 *1*40Ts
N3: Diameter 0.40 *1*20Ts
N4: Diameter 0.30 *1*9Ts
Except Transformer Secondary Winding N2, and list all models details in below:
N2 for model ECP40US05:
Diameter 0.55*4*3Ts
N2 for model ECP40US12
Diameter 0.55*3*7Ts
N2 for model ECP40US15:
Diameter 0.45*3*9Ts
N2 for model ECP40US18:
Diameter 0.50*2*11Ts
N2 for model ECP40US24:
Diameter 0.40*2*14Ts
N2 for model ECP40US30:
Diameter 0.40*2*18Ts
N2 for model ECP40US48:
Diameter 0.40*1*28Ts

Models output rating:
5.0 Vdc, 6.0 A for model ECP40US05;
12.0 Vdc, 3.34 A for model ECP40US12;
15.0 Vdc, 2.67 A for model ECP40US15;
18.0 Vdc, 2.22 A for model ECP40US18;
24.0 Vdc, 1.67 A for model ECP40US24;

30.0 Vdc, 1.34 A for model ECP40US30;
48.0 Vdc, 0.84 A for model ECP40US48

Technical Considerations

- Equipment mobility : for building-in
- Connection to the mains : building-in component, connection type should be consider in end product
- Operating condition : continuous
- Access location : operator accessible
- Over voltage category (OVC) : OVC II
- Mains supply tolerance (%) or absolute mains supply values : +10%, -10% (manufacturer declared)
- Tested for IT power systems : Yes
- IT testing, phase-phase voltage (V) : 230 V ac (for Norway)
- Class of equipment : Class I (earthed)
- Considered current rating of protective device as part of the building installation (A) : 20
- Pollution degree (PD) : PD 2
- IP protection class : IP X0
- Altitude of operation (m) : Up to 3048m
- Altitude of test laboratory (m) : 24m
- Mass of equipment (kg) : 0.12 kg
- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: Condition A: 50 degree C (100% of rated load), Condition B: 70 degree C (50% of rated load)
- The product is intended for use on the following power systems: TN, IT
- The product was investigated to the following additional standards: EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 (which includes all European national differences, including those specified in this test report).
- The following accessible locations (with circuit/schematic designation) are within a limited current circuit: After CY4

Engineering Conditions of Acceptability

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

- The end-product Electric Strength Test is to be based upon a maximum working voltage of: Primary-SELV: 194 Vrms, 457 Vpk.,
- The following secondary output circuits are SELV: Secondary output V+to V-
- The following secondary output circuits are at non-hazardous energy levels: Secondary output V+ to V-
- The following secondary output circuits are Limited Current Circuits: After CY4
- The power supply terminals and/or connectors are: Suitable for factory wiring only
- The maximum investigated branch circuit rating is: 20A
- The investigated Pollution Degree is: 2,
- Proper bonding to the end-product main protective earthing termination is: Required

- An investigation of the protective bonding terminals has: Not been conducted
- The following magnetic devices (e.g. transformers or inductor) are provided with an OBJY2 insulation system with the indicated rating greater than Class A (105°C): Transformer TR1 (Class F)
- The following end-product enclosures are required: Mechanical, Fire, Electrical
- The equipment is suitable for direct connection to: AC mains supply

Additional Information

The label is a draft of an artwork for marking plate pending approval by National Certification Bodies and it shall not be affixed to products prior to such an approval.

The nameplate markings provided as an Enclosure - Marking Plate are considered representative of the entire series

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

The required clearance values have been assessed for suitability up to 3048 m elevation (1.15 correction factor as per IEC 60664-1, Table A2).

This report is a reissue of CBTR Ref. No. E1317867-A7-CB-2, CB Test Certificate Ref. No. US-19433-UL. Based on previously conducted testing and the review of product construction it was determined that the product continues to comply with the standard. No testing was conducted under this investigation for the reissue of CB Test Report Ref. No. E1317867-A7-CB-2. All required tests were carried out under the original investigation.

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 - Rating	Rated current and voltage and type located on or adjacent to fuse or fuseholder.

Special Instructions to UL Representative

N/A

COVER PAGE FOR TEST REPORT

Product Category:	Power Supplies for Information Technology Equipment Including Electrical Business Equipment
Product Category CCN:	QQGQ2, QQGQ8
Test Procedure:	Component Recognition
Product:	Open Frame Switching Power Supply
Model/Type Reference:	ECP40UD01, ECP40UD02, ECP40UD03, ECP40UT01, ECP40UT02, ECP40UT03 and ECP40UT04
Rating(s):	Input: 100-240 V, 1-0.5 A, 50/60 Hz For Model ECP40UD01: Output 1: 5 V dc, 5 A Output 2: 12 V dc, 2 A For Model ECP40UD02: Output 1: 5 V dc, 5 A Output 2: 15 V dc, 1.5 A For Model ECP40UD03: Output 1: 5 V dc, 5 A Output 2: 24 V dc, 1 A For Model ECP40UT01: Output 1: 5 V dc, 5 A Output 2: 12 V dc, 2 A Output 3: -12 V dc, 0.5 A For Model ECP40UT02: Output 1: 5 V dc, 5 A Output 2: 15 V dc, 1.5 A Output 3: -15 V dc, 0.5 A For Model ECP40UT03: Output 1: 5 V dc, 5 A Output 2: 24 V dc, 1 A Output 3: +12 V dc, 0.5 A For Model ECP40UT04: Output 1: 5 V dc, 5 A Output 2: 24 V dc, 1 A Output 3: -12 V dc, 0.5 A
Standards:	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)
Applicant Name and Address:	XP POWER LTD 401 COMMONWEALTH DR HAW PAR TECHNOCENTRE

	LOBBY B, #02-02 SINGAPORE 149598 SINGAPORE
This Report includes the following parts, in addition to this cover page:	
	1. Specific Inspection Criteria 2. Specific Technical Criteria 3. Clause Verdicts 4. Critical Components 5. Test Results 6. National Differences 7. Enclosures

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Test Report By:

Calvin Tang
Project Engineer
UL International Limited

Reviewed By:

Paul Wan
Project Engineer
UL International Limited

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:	Power Supply
Model:	ECP40UD01, ECP40UD02, ECP40UD03, ECP40UT01, ECP40UT02, ECP40UT03 and ECP40UT04
Rating:	Input: 100-240 Vac, 1-0.5 A, 50/60 Hz Output: Model ECP40UD01: Output 1: 5 V dc, 5 A Output 2: 12 V dc, 2 A Model ECP40UD02: Output 1: 5 V dc, 5 A Output 2: 15 V dc, 1.5 A Model ECP40UD03: Output 1: 5 V dc, 5 A Output 2: 24 V dc, 1 A Model ECP40UT01: Output 1: 5 V dc, 5 A Output 2: 12 V dc, 2 A Output 3: -12 V dc, 0.5 A Model ECP40UT02: Output 1: 5 V dc, 5 A Output 2: 15 V dc, 1.5 A Output 3: -15 V dc, 0.5 A Model ECP40UT03: Output 1: 5 V dc, 5 A Output 2: 24 V dc, 1 A Output 3: +12 V dc, 0.5 A Model ECP40UT04: Output 1: 5 V dc, 5 A Output 2: 24 V dc, 1 A Output 3: -12 V dc, 0.5 A
Applicant Name and Address:	XP POWER LTD 401 COMMONWEALTH DR HAW PAR TECHNOCENTRE

LOBBY B, #02-02
SINGAPORE 149598 SINGAPORE

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Prepared by: Linus Park Reviewed by: Paul Hilgeman

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.

Model Differences

Models ECP40UD series are identical to Models ECP40UT series with exception to the number of outputs, output voltage and current ratings, transformer (TR1), minor differences in the secondary circuit components, and model designation.

Models ECP40UD01 and ECP40UT01 using the same Transformer (TR1), Type 40UT01M.
Models ECP40UD02 and ECP40UT02 using the same Transformer (TR1), Type 40UT02M.
Models ECP40UD03, ECP40UT03 and ECP40UT04 using the same Transformer (TR1), Type 40UT03M.

Technical Considerations

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

or with nitrous oxide:: No

- The power supply was evaluated for use in 50°C ambient at Full Rated Output and 50% of the Rated Output in 70°C ambient.

- Scope of Power Supply evaluation defers the following clauses to the be determined as part of the end product: Clause 7.5 (Safety Signs), Clause 7.9 (Accompanying Documents), Clause 9 (ME Hazard), Clause 10 (Radiation), Clause 14 (PEMS), Clause 16 (ME Systems)

- Scope of Power Supply evaluation excludes the following: Patient applied parts clauses: 4.6, 7.2.10, 8.3, 8.5.2, 8.5.5, 8.7.4.7-8.7.4.9, 8.9.1.15; Battery related clauses: 7.3.3, 15.4.3; Hand Control related clauses: 8.10.4; Oxygen related clauses: 11.2.2; Fluids related clauses: 11.6.2 – 11.6.4; Sterilization clause: 11.6.7; Biocompatibility Clause: 11.7 (ISO 10993); Motor related clauses: 13.2.13.3, 13.4; Heating Elements related clause: 13.2; Flammable Anaesthetic Mixtures Protection: Annex G

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 considered for compliance with the Marking (clause 7) and Separation (clause 8) requirements as part of the end use application evaluation.

- Repeat of leakage current testing and consideration of non-frequency weighted leakage to be considered as part of the end product.

- This power supply was evaluated with One MOPP or Two MOOP between Primary and Secondary; One MOPP or One MOOP between primary and Earth. Additional MOPP between Primary and Secondary shall be considered in the end product

- This power supply has been evaluated as a continuous operation, ordinary equipment and has not been evaluated for use in the presence of a flammable anesthetic mixture with air, oxygen, or nitrous oxide. The output circuits have not been evaluated for direct patient connection (Type B, BF or CF).

- The end product shall ensure that the requirements related to accompanying documents, clause 7.9, are met.

- The available voltage for the secondary outputs does not exceed 25 Vac or 60 Vdc, under normal and single fault conditions.

- The Dielectric Strength Test conducted on this power supply was based upon a maximum working voltage of: Primary-Earthed Dead Metal (Class I units): 374 Vpk, 240 Vrms; Primary-SEC: 560 Vpk, 253 Vrms.

- Protective bonding testing shall be considered in the end product application.
- 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): TR1 (Class B, 130°C)
- Printed Wiring Board rated 130°C.
- 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.
- The products were tested on a 20 A branch circuit. If used on a branch circuit greater than this, additional testing may be necessary.
- Temperature, Leakage Current, Protective Earthing, Dielectric Voltage Withstand, and Interruption of the Power Supply tests should be considered as part of the end product evaluation.
- Unit to be suitably earthed as part of the end product.
- Q1 Heatsink considered live and should not be earthed.
- End product shall provide necessary creepage and clearance for 250Vrms from input connector pins to mounting means.
- Power supply fuse was provided with limited breaking capacity and was evaluated for installation where the maximum fault current was limited. End product shall ensure the power supply is used in applications where the limited breaking capacity does not result in unacceptable risk.

Additional Information

This CB Test Report is a reissue and is based on previous CB Test Report E321744-A7-CB and CB Test Certificates No. DK-17078 and DK-17078-A1.

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

In addition to testing covered under IEC 60601-1, 3rd Edition, some tests were conducted as part of the previous UL60601-1, 1st Edition/ IEC 60601-1, 2nd Edition evaluations and the results and methods, as applicable, were considered representative as part of the testing conducted.

Additional Standards

The product fulfills the requirements of: ANSI/AAMI ES60601-1 (2005 + C1:09 + A2:10), CAN/CSA-C22.2 No. 60601-1 (2008), IEC 60601-1: 2005, EN 60601-1: 2006 + CORR: 2010

Markings and instructions

Clause Title	Marking or Instruction Details

Model	Model number
Company identification	Classified or Recognized company's name, Trade name, Trademark or File
Supply Connection	Voltage range, ac/dc, phases if more than single phase
Alternating current	
Supply Frequency	Rated frequency range in hertz
Power Input	Amps, VA, or Watts
Output	Rated output voltage, power, frequency.
Special Instructions to UL Representative N/A	

Production-Line Testing Requirements

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

Model	Grounding Continuity	Dielectric Voltage Withstand	Patient Circuit Dielectric Voltage Withstand
All Models	Test	Test	Exempt

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

Component
N/A

Sample and Test Specifics for Follow-Up Tests at UL

The following tests shall be conducted in accordance with the Generic Inspection Instructions

Plastic Enclosure or Part	Test	Sample(s)	Test Specifics
N/A			

TABLE: List of Critical Components

Object/part or Description	Manufacturer/ trademark	type/model	technical data	CCN	Marks of Conformity
PWB	Various	Various	Rated min. V-1 or Better, 130°C.	ZPMV2	UL
Primary connector (CN1)	Long Chu Electronics Co., Ltd.	P101	Rated 7 A, 250 Vac, 85 °C minimum.	ECBT2 (E94662)	UL
Fuse (F1, F2)	Cooper Bussmann Inc.	SS-5	Rated T2A, 250 Vac, Non-time delay.	JDYX2, JDYX8 (E19180)	UL, cUL
Fuse (F1, F2) - Alternate	Various	Various	Rated T2A, 250 Vac	JDYX, JDYX7	UL, cUL
Thermistor (TH1)	Various	Various	Min. 5 A, Max. 2.5 ohm at 25°C (Not relied upon for safety)	XGPU2, XGPU8	UL, cUL
X-Capacitor (CX1)	Carli Electronics Co., Ltd.	MPX Series	Rated min. 250 Vac, max. 0.47uF, min. 85°C, marked “X2”.	FOWX2, FOWX8 (E120045)	UL, cUL
X-Capacitor (CX1) - Alternate	Vishay Capacitors Belgium N V	MKP 338 2	Rated min. 250 Vac, max. 0.47uF, min. 85°C, marked “X2”.	FOWX2, FOWX8 (E112471)	UL, cUL
X-Capacitor (CX1) - Alternate	Evox Rifa Group Oyj	PHE840M	Rated min. 250 Vac, max. 0.47uF, min. 85°C, marked “X2”.	FOWX2, FOWX8 (E100117)	UL, cUL
X-Capacitor (CX1) - Alternate	Jenn Fu Electronics Corp	MPX	Rated min. 250 Vac, max. 0.47uF, min. 85°C, marked “X2”.	FOWX2, FOWX8 (E184650)	UL, cUL
X-Capacitor (CX1) - Alternate	Cheng Tung Industrial Co., Ltd.	CTX	Rated min. 250 Vac, max. 0.47uF, min. 85°C, marked “X2”.	FOWX2, FOWX8 (E193049)	UL, cUL
Bleeder Resister (R1, R2)	Various	Various	Rated 680 kohm, 1/4 W	--	--
Inductor (L1)	Various	Various	See Enclosure 4-01 for details.	--	--
Inductor Coil (L1)	Various	Various	Copper magnet wire wound on toroid core. Rated min. 130°C.	OBMW2	UL
Y-Capacitor (CY1, CY2, CY3, CY5)	TDK-EPC Corp.	CD	Rated min. 250 Vac, max. 1000pF, marked “Y1”.	FOWX2 (E37861)	UL, CSA
Y-Capacitor (CY1, CY2, CY3, CY5)	Murata Mfg Co., Ltd.	KX	Rated min. 250 Vac, max. 1000pF, marked “Y1”.	FOWX2 (E37921)	UL, CSA
Y-Capacitor (CY1, CY2, CY3, CY5)	Success Electronics Co., Ltd.	SB	Rated min. 250 Vac, max. 1000pF, marked “Y1”.	FOWX2 (E114280)	UL, CSA
Bridge Rectifier (BR1)	Various	Various	Rated 800 Vac, 2 A Minimum.	--	--

Object/part or Description	Manufacturer/ trademark	type/model	technical data	CCN	Marks of Conformity
Bulk Capacitor (C1)	Various	Various	Rated min. 400V, max. 68 uF, 105°C, provided with pressure relief valve.	--	--
Transistor (Q1)	Various	Various	Rated min. 600 Vac, min. 10 A.	--	--
Bridging Capacitor (CY4, CY6)	TDK-EPC Corp.	CD	Rated min. 250 Vac, max. 2200pF, marked “Y1”.	FOWX2 (E37861)	UL, CSA
Bridging Capacitor (CY4, CY6) - Alternate	Murata Mfg Co., Ltd.	KX	Rated min. 250 Vac, max. 2200pF, marked “Y1”.	FOWX2 (E37921)	UL, CSA
Bridging Capacitor (CY4, CY6) - Alternate	Success Electronics Co., Ltd.	SB	Rated min. 250 Vac, max. 2200pF, marked “Y1”.	FOWX2 (E114280)	UL, CSA
Optocoupler (IC3, IC4)	Toshiba Semiconductor (Thailand) Co., Ltd.	TLP721, TLP721F, TLP621F, TLP781F	Rated isolation 5000 Vac double protection.	FPQU2, FPQU8 (E67349)	UL, cUL
Optocoupler (IC3, IC4) - Alternate	NEC Electronics Corp Compound Semiconductor Device DIV (Renesas)	PS2581 or PS2561	Rated isolation 5000 Vac double protection.	FPQU2 (E72422)	UL, CSA
Optocoupler (IC3, IC4) - Alternate	Fairchild Semiconductor Corp	H11AA814, H11A617, H11A817	Rated isolation 5000 Vac double protection.	FPQU2, FPQU8 (E90700)	UL, cUL
Optocoupler (IC3, IC4) - Alternate	Lite-On Technology Corp	LTV816	Rated isolation 5300 Vac double protection.	FPQU2, FPQU8 (E113898)	UL, cUL
Optocoupler (IC3, IC4) - Alternate	Vishay Semiconductor GMBH	TCET1100G, TCET1101G, TCET1102G, TCET1103G, TCET1104G, TCET1105G	Rated isolation 5000 Vac double protection.	FPQU2, FPQU8 (E52744)	UL, cUL
Optocoupler (IC3, IC4) - Alternate	Vishay Infrared Components Inc	SFH615A	Rated isolation 5300 Vac double protection.	FPQU2, FPQU8 (E52744)	UL, cUL
Transformer (TR1) (For	Ain Hsin Electronics	40UT01M	Class B, see enclosure diagram Id4-02 for details.	--	--

Object/part or Description	Manufacturer/ trademark	type/model	technical data	CCN	Marks of Conformity
Models ECP40UD01 and ECP40UT01 only)	Co., Ltd.				
Transformer (TR1) - Insulation System	Ain Hsin Electronics Co., Ltd.	SBI4.2	Class 130 (B)	OBJY2 (E210140)	UL
Core (Primary)	Various	Various	Ferrite Cores: approx. 23.2 by 18.3 by 17.6 mm	--	--
Bobbin	Sumitomo Bakelite Co., Ltd.	PM-9630	Phenolic V-0, 130 °C, minimum 0.71 mm thickness	QMFZ2 (E41429)	UL
Triple Insulation Wire (Primary)	Totoku Electric Co., Ltd.	TIW-2X	Rated min 130°C, 1400 Vpk, (Dielectric passed 10k Vpk for twisted pairand suitable for reinforced insulation).	OBJT2 (E166483)	UL
Copper Wire (Secondary)	Various	Various	Copper magnet wire, ANSI MW28 or MW75. Rated 130 °C	OBMW2	UL
Insulating Tape	Minnesota Mining & Mfg Co., Ltd. (3M)	1350F-1	Rated min 130 °C, Polyester Film Tape, Measured 0.05 mm thickness.	OANZ2 (E17385)	UL
Insulating Tubing/ Sleeving	Great Holding Industrial Co. Ltd.	TFL	Rated min 200 °C, TEFLON.	YDPU2 (E156256)	UL
Varnish	John C Dolph Co	BC-346A	Rated min 130 °C	OBOR2 (E317427)	UL
Transformer (TR1) (For Models ECP40UD02 and ECP40UT02 only)	Ain Hsin Electronics Co., Ltd.	40UT02M	Class B, see Enclosure 4-03 for details.	--	--
Transformer (TR1) - Insulation System	Ain Hsin Electronics Co., Ltd.	SBI4.2	Class 130 (B)	OBJY2 (E210140)	UL
Core (Primary)	Various	Various	Ferrite Cores: approx. 23.2 by 18.3 by 17.6 mm	--	--
Bobbin	Sumitomo Bakelite Co., Ltd.	PM-9630	Phenolic. Min. V-0, min. 130 °C, minimum 0.71 mm thickness	QMFZ2 (E41429)	UL
Triple Insulation Wire (Primary)	Totoku Electric Co., Ltd.	TIW-2X	Rated min. 130°C, 1400 Vpk, (Dielectric passed 10k Vpk for twisted pair and suitable for reinforced insulation).	OBJT2 (E166483)	UL
Copper Wire (Secondary)	Various	Various	Copper magnet wire, ANSI MW28 or MW75. Rated 130 °C	OBMW2	UL
Insulating Tape	Minnesota Mining &	1350F-1	Rated min. 130 °C, Polyester Film Tape, Measured	OANZ2, OANZ8	UL, cUL

Object/part or Description	Manufacturer/ trademark	type/model	technical data	CCN	Marks of Conformity
	Mfg Co., Ltd. (3M)		0.05 mm thickness.	(E17385)	
Insulating Tubing/ Sleeving	Great Holding Industrial Co. Ltd.	TFL	Rated min. 200 °C, TEFLON.	YDPU2 (E156256)	UL
Varnish	John C Dolph Co	BC-346A	Rated min. 130 °C	OBOR2 (E317427)	UL
Transformer (TR1) (For Models ECP40UD03, ECP40UT03 and ECP40UT04 only)	Ain Hsin Electronics Co., Ltd.	40UT03M	Class B, see Enclosure 4-04 for details.	--	--
Transformer (TR1) - Insulation System	Ain Hsin Electronics Co., Ltd.	SBI4.2	Class 130 (B). Rated 130°C	OBJY2 (E210140)	UL
Core (Primary)	Various	Various	Ferrite Cores: approx. 23.2 by 18.3 by 17.6 mm	--	--
Bobbin	Sumitomo Bakelite Co., Ltd.	PM-9630	Phenolic. Rated V-0, min. 130° C, min. 0.71 mm thickness	QMFZ2 (E41429)	UL
Triple Insulation Wire (Primary)	Totoku Electric Co., Ltd.	TIW-2X	Rated min 130°C, 1400 Vpk, (Dielectric passed 10k Vpk for twisted pair and suitable for reinforced insulation).	OBJT2 (E166483)	UL
Copper Wire (Secondary)	Various	Various	Copper magnet wire, ANSI MW28 or MW75, rated 130°C	OBMW2	UL
Insulating Tape	Minnesota Mining & Mfg Co., Ltd. (3M)	1350F-1	Rated min. 130 °C, Polyester Film Tape, Measured 0.05 mm thickness.	OANZ2, OANZ8 (E17385)	UL, cUL
Insulating Tubing/ Sleeving	Great Holding Industrial Co. Ltd.	TFL	Rated min. 200 °C, TEFLON.	YDPU2 (E156256)	UL
Varnish	John C Dolph Co	BC-346A	Rated min. 130 °C	OBOR2 (E317427)	UL
Heatsink (HS1for Q1)	Various	Various	Fin type: Approx. 30 by 20 by 2 mm.	--	--
Heatsink (HS2 for IC5)	Various	Various	Fin type: Approx. 46 by 20 by 2 mm.	--	--
Connectors and Receptacle (Secondary ELV/SELV circuits)	Various	Various	Rated min. 24V, 5A min.	ECBT2, RTRT2	UL
Connectors and Receptacles (Secondary	Various	Various	Rated min. 24V, 5A min. Copper alloy pins housed in body of plastic rated min. V-2.	QMFZ2	UL

Object/part or Description	Manufacturer/ trademark	type/model	technical data	CCN	Marks of Conformity
ELV/SELV circuits) - Alternate					

Enclosures

Type	Supplement Id	Description
Collateral		
Particular		
Photographs	3-01	Model ECP40XXYY Series - Overall Front View
Photographs	3-02	Model ECP40XXYY Series - Top View
Photographs	3-03	Model ECP40XXYY Series - Rear Overall View
Photographs	3-04	Model ECP40XXYY Series - Bottom View
Diagrams	4-01	Model ECP40XXYY Series - Inductor L1
Diagrams	4-02	Model ECP40XXYY Series - Transformer TR1 (40UT01M)
Diagrams	4-03	Model ECP40XXYY Series - Transformer TR1 (40UT02M)
Diagrams	4-04	Model ECP40XXYY Series - Transformer TR1 (40UT03M)
Schematics + PWB	5-01	Model ECP40XXYY Series - PWB and Component Layout
Manuals		
Miscellaneous	7-01	US National Differences