Description

UL TEST REPORT AND PROCEDURE

Standard:	ANSI/AAMI ES60601-1 (2005/(R)2012 + A1:2012, C1:2009/(R)2012 + A2:2010/(R)2012) - Amendment 1 - Revision Date 2012/08/21; CAN/CSA-C22.2 No. 60601-1:14 - Edition 3 -Revision Date 2014/03
Certification Type:	Component Recognition
CCN:	QQHM2 / QQHM8
Product:	Switching Power Supply housed within a thermoplastic enclosure. The equipment (Switching power supplies) covered by this report, are components, which are intended for use with end-product equipment used in a hospital or related health care facility, evaluated to Medical Equipment standard.
Model:	SE150AXXYYZWW, where S can be M or T, XX represents the output voltage from 12V to 48V, YY represents any number from 00 to 99 or blank, Z represents any letter from A to Z, while F means class I construction and N or Q means Class II construction, WW represents any number from 00 to 99 or blank.
Rating:	Input: 100-240V~, 50-60Hz, 2.0A Output: See Model Differences for the output ratings Model TE150A1251Z01: Input: 100-110Vac, 50-60Hz, 2.0A; Output: 12Vdc, 11.25A Input: 110-240Vac, 50-60Hz, 2.0A; Output: 12Vdc, 12.09A Model TE150A1551Z01: Input: 100-110Vac, 50-60Hz, 2.0A; Output: 15Vdc, 9.00A Input: 110-240Vac, 50-60Hz, 2.0A; Output: 15Vdc, 9.67A Model TE150A1851Z01: Input: 100-110Vac, 50-60Hz, 2.0A; Output: 18Vdc, 7.5A Input: 110-240Vac, 50-60Hz, 2.0A; Output: 18Vdc, 8.06A Model TE150A2451Z01: Input: 100-110Vac, 50-60Hz, 2.0A; Output: 24Vdc, 6.05A Input: 110-240Vac, 50-60Hz, 2.0A; Output: 24Vdc, 6.25A Model TE150A4851Z01: Input: 100-110Vac, 50-60Hz, 2.0A; Output: 48Vdc, 3.13A Input: 110-240Vac, 50-60Hz, 2.0A; Output: 48Vdc, 3.13A
Applicant Name and Address:	SL POWER ELECTRONICS CORP 6050 KING DRIVE, BLDG A VENTURA, CA 93003, 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.

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.

Prepared by: Lindsay Zhao / Paul Zhang (Project Handler) Reviewed by: Karen Shu (Project Reviewer)

Supporting Documentation

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

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

B. Generic Inspection Instructions -

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

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

Switching Power Supply housed within a thermoplastic enclosure.
The equipment (Switching power supplies) covered by this report, are components, which are intended for use with end-product equipment used in a hospital or related health care facility, evaluated to Medical Equipment standard.
Refer to the Report Modifications for any modifications made to this report.

Model Differences

The models differ in output ratings which require different turns and gage in transformer T1 and secondary circuitry component values to accommodate the rated output.
Model number nomenclature explains construction as follows:
SE150AXXYYZWW, where S can be M or T, XX represents the output voltage from 12V to 48V, YY represents any number from 00 to 99 or blank, Z represents any letter from A to Z, while F means class I construction and N or Q means Class II construction, WW represents any number from 00 to 99 or blank.
ME150 and TE150 are the same except for the model designations.
The SE150 family power supply has two types of construction: Class I and Class II.
For each construction, all models are similar except for secondary winding of transformer, secondary components and output rating.
SE150AXXYYFWW is Class I construction, all models are similar except for secondary winding of transformer, secondary components and output rating.
SE150AXXYYNWW is Class II construction, N is for C8 AC inlet, all models are similar except for secondary winding of transformer, secondary components and output rating.
SE150AXXYYQWW is Class II construction, Q is for C18 AC inlet, all models are similar except for secondary winding of transformer, secondary components and output rating.
Models SE150AXXYYFWW are identical to SE150AXXYYNWW and SE150AXXYYQWW except for class of equipment and designation.

Additional Information

The schematics for these models are kept in file at the CB Testing Laboratory mentioned in the first page of this test report, and can be provided by the manufacturer upon request by NCB's/CBTL's.
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.
The Electrical and Nameplate Labels are representative of all models in the series. The Marking Plate, Optional 150 W reference is not shown.

Technical Considerations

- The product was investigated to the following additional standards: None
- The following additional investigations were conducted: None
- 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 following accessories were investigated for use with the product: None
- The degree of protection against harmful ingress of water is: IPX2
- The degree of protection against harmful ingress of particular matter is: IP2X
- 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
- Manufacturer's Recommended Ambient: 40°C
- The product is Classified only to the following hazards: Shock, Fire, Heat, Mechanical, Energy
- Power Supply was considered Overvoltage Category II (OVCII)
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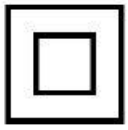
Engineering Conditions of Acceptability

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) and Separation (clause 8) 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.
- Transformers (T1) is provided with a Class F (155) insulation system.
- Temperature of external enclosure was high, Since PSU was considered at maximum output conditions for test. Acceptable duration of operator contact with enclosure shall not exceed 1s. End product shall re-evaluate the temperature of external surface for PSU if longer touch time needed.
- The compliance with cl. 7.9 shall be evaluated in end product.
- Instability hazards according to cl. 9.4 need to be considered in end product.
- End product to determine the acceptability of risk in conjunction to the Cleaning and Disinfection Methods as part of the power supply.
- End product to determine the acceptability of risk in conjunction to the Leakage of Liquids as part of the power supply.
- End product to determine the acceptability of risk in conjunction to the Arrangement of Indicators as part of the power supply.
- End product to determine the acceptability of risk in conjunction to the results of Mechanical Testing conducted as part of the power supply.
- 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 available voltage for the secondary outputs does not exceed 25 Vac or 60 Vdc, under normal and single fault conditions.
- End product Risk Management Process to include consideration of requirements specific to the Power Supply.
- Single fault testing was conducted without dielectric breakdown, however end product Risk Management Process to consider the need for simultaneous fault condition testing.
- End product Risk Management Process to consider the need for different orientations of installation during testing.
- Humidity testing was conducted, however the end product Risk Management Process to determine risk acceptability criteria.
- Temperature Test was conducted without Test Corner. End product to determine the acceptability of risk with respect to insulation’s resistance to heat, moisture, and dielectric strength per 8.8.4.
- End product to determine the acceptability of risk in conjunction to the selection of components as it pertains to the intended use, essential performance, transport, storage conditions as part of the power supply.
- Leakage current testing (with the MD and non-frequency weighed device, cl. 8.7.3.e) should be considered in the end product application.
- The expected service life of this product is 5 years.
- Both Line and Neutral of the power supplies are fused.
- For Class I configuration, Two MOPP is provided between primary and secondary, and between primary and plastic outer enclosure; One MOPP is provided between primary and earth. One MOPP is provided between output and earth. In addition, the power supply was evaluated with either the output (+) or (-) connected to ground
- For Class II configuration, Two MOPP is provided between primary and secondary, and between primary and plastic outer enclosure;
- Both Class I and Class II were evaluated for the leakage current test results for TYPE BP circuitry.

- The end product will need to determine the appropriate air clearance required if rated operating altitude is greater than 5000 m. This air clearance for this component evaluation was based on operating altitude <= 5000 m.
- The products were tested on a 20 A branch circuit. If used on a branch circuit greater than this, additional testing may be necessary.

Markings and instructions	
Clause Title	Marking or Instruction Details
Company identification	Classified or Recognized company's name, Trade name, Trademark or File
Model	Model number
Serial number or lot or batch identifier	Serial number or lot or batch identifier
Date of manufacture or use by date	Date of manufacture or use by date
Supply Connection	Voltage range, ac/dc, phases if more than single phase
Alternating current	
Direct current	
Supply Frequency	Rated frequency range in hertz
Class II equipment	 For SE150AXXYYNWW and SE150AXXYYQWW series only.
Power Input	Amps, VA, or Watts
Output	Rated output voltage, power, frequency.
IP Rating	IP22
Protective earth ground	 Marked on Class I models SE150AXXYYFWWAC inlet.

Special Instructions to UL Representative
None

Production-Line Testing Requirements		
Test Exemptions - The following models are exempt from the indicated test		
Test	Exemption Specifics	Details
Grounding Continuity	The following models are exempt from the indicated test:	Not Exempt
Dielectric Voltage Withstand	The following models are exempt from the indicated test:	Not Exempt
Patient Circuit Dielectric Voltage Withstand	The following models are exempt from the indicated test:	Exempt
Solid-State Components	The following solid-state components may be disconnected from the	Exempt

	remainder of the circuitry during either Dielectric Voltage Withstand Test:	

Sample and Test Specifics for Follow-Up Tests at UL

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

Plastic Enclosure or Part	Test	Sample(s)	Test Specifics
None	NA	NA	NA