

UL TEST REPORT AND PROCEDURE

Standard:	UL 60601-1, 1st Edition, 2006-04-26 (Medical Electrical Equipment, Part 1: General Requirements for Safety) CAN/CSA-C22.2 No. 601.1-M90, 2005 (Medical Electrical Equipment - Part 1: General Requirements for Safety)
Certification Type:	Component Recognition
CCN:	QQHM2, QQHM8 (Power Supplies, Medical and Dental)
Product:	Switching Power Supply
Model:	LCC250-12U-XXXX The first "X" may be "4" or "7", which stands for the top enclosure style; All other "Y" can be blank or any alphanumeric combinations, which are for marketing purposes only and have no impact on safety LCC250-24U-XXXX The first "X" may be "4" or "7", which stands for the top enclosure style; All other "Y" can be blank or any alphanumeric combinations, which are for marketing purposes only and have no impact on safety LCC250-48U-XXXX The first "X" may be "4" or "7", which stands for the top enclosure style; All other "Y" can be blank or any alphanumeric combinations, which are for marketing purposes only and have no impact on safety
Rating:	For model LCC250-12U-XXXX AC INPUT RATING: 100-240V, 50/60Hz, 3.5A DC OUTPUT RATING: Refer to Model Differences section for details. IP Rating: IP64 For model LCC250-24U-XXXX AC INPUT RATING: 100-240V, 50/60Hz, 3.5A DC OUTPUT RATING: Refer to Model Differences section for details. IP Rating: IP64 For model LCC250-48U-XXXX AC INPUT RATING: 100-240V, 50/60Hz, 3.5A DC OUTPUT RATING: Refer to Model Differences section for details. IP Rating: IP64
Applicant Name and Address:	ASTECH INTERNATIONAL LTD - PHILIPPINE BRANCH 16TH FL LU PLAZA 2 WING YIP ST

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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: Emma Xing/ Karen Shu

Reviewed by: Jimmy Deng

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

LCC250-12U-XXXX, LCC250-24U-XXXX and LCC250-48U-XXXX are a series of switching mode power supplies, designed to power medical electrical equipment.

Electronic components are mounted on its PWB, which is fitted in metal enclosure. Potting material fills the completed power supply.

Model Differences

- The differences between LCC250-12U-4PYY and LCC250-12U-7PYY are as follows:

(1) Top enclosure style

LCC250-12U-7PYY has a top enclosure with integral heat sink;

LCC250-12U-4PYY hasn't heatsink, but use external heat sink(refer to enclosure 4-13) fixed to its top enclosure with screws for testing.

(2) Output Derating

LCC250-12U-4PYY can only operate with full load (12V, 20.8A, 250W) on external heat sink's temperature doesn't exceed 85 degree C.

LCC250-12U-7PYY can operate with full load (12V, 20.8A, 250W) at a maximum ambient of 55 degree C or operated with half load(12V, 10.4A, 250W) at a maximum ambient of 85 degree C.

(3) Forced Ventilation

LCC250-12U-7PYY requires forced ventilation (2m/s) in all conditions;

LCC250-12U-4PYY does not require forced ventilation.

- The differences between Models LCC250-24U-4YYY and LCC250-24U-7YYY are as follows:

(1) Top enclosure style

LCC250-24U-7YYY has a top enclosure with integral heat sink;

LCC250-24U-4YYY hasn't heatsink, but use external heat sink(refer to enclosure 4-13) fixed to its top enclosure with screws for testing.

(2) Output Derating

LCC250-24U-7YYY can operate with full load (24V, 10.4A, 250W) at a maximum ambient of 55 degree C or operated with half load (24V, 5.2A, 125W) at a maximum ambient of 85 degree C.

LCC250-24U-4YYY can only operate with full load (24V, 10.4A, 250W) on external heat sink's temperature doesn't exceed 85 degree C

(3) Forced Ventilation

LCC250-24U-7YYY requires forced ventilation (2m/s) in all conditions;

LCC250-24U-4YYY does not require forced ventilation.

- The Model LCC250-12U-XXXX is identical to Model LCC250-24U-XXXX except for output rating, power transformer (T1), current transformer (L4), Y-cap (C54), Opto-coupler Code (IC207 for Model LCC250-24U-XXXX and IC216 for LCC250-12U-XXXX)

- The differences between Models LCC250-48U-4YYY and LCC250-48U-7YYY are as follows:

(1) Top enclosure style

LCC250-48U-7YYY has a top enclosure with integral heat sink;

LCC250-48U-4YYY hasn't heatsink, but use external heat sink(refer to enclosure 4-13) fixed to its top enclosure with screws for testing.

(2) Output Derating

LCC250-48U-7YYY can operate with full load (48V, 5.2A, 250W) at a maximum ambient of 55 degree C or operated with half load (48V, 2.6A, 125W) at a maximum ambient of 85 degree C.

LCC250-48U-4YYY can only operate with full load (48V, 5.2A, 250W) on external heat sink's temperature doesn't exceed 85 degree C

(3) Forced Ventilation

LCC250-48U-7YYY requires forced ventilation (2m/s) in all conditions;

LCC250-48U-4YYY does not require forced ventilation.

- The Model LCC250-24U-XXXX is identical to Model LCC250-48U-XXXX excepted for output rating, power transformer (T1).

Technical Considerations

- Classification of installation and use : Component to be installed in end-product
- Supply connection : Non-detachable cord
- Accessories and detachable parts included in the evaluation : None
- Options included : None
- The product was investigated to the following additional standards:: UL 60601-1, 1st Edition, 2006-04-26 (includes National Differences for USA), CAN/CSA-C22.2 No. 601.1-M90 (R2005) (includes National Differences for Canada)
- The product was not investigated to the following standards or clauses:: Clause 36, Electromagnetic Compatibility (IEC 601-1-2), Clause 48, Biocompatibility (ISO 10993-1), Clause 52.1, Programmable Electronic Systems (IEC 601-1-4)
- The product is Classified only to the following hazards:: Shock, Fire
- The degree of protection against harmful ingress of water is:: IP64
- 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

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:

- This power supply was tested on a 20 A branch circuit. If used on a branch circuit greater than this, additional testing may be necessary. ,
- The disconnection from the mains must be considered in the end product. ,
- This power supply has been judged on the basis of the required creepage and clearances in the First Edition of the Standard for Medical Electrical Equipment, UL 60601-1, Sub clause 57.10, which covers the end-use product for which the component was designed. ,
- The power supply was evaluated as Double Insulation between Primary and Secondary, and as Basic Insulation between Primary and Earth. See insulation diagram for details ,
- For Model LCC250-12U-XXXX: The end-product Electric Strength Test is to be based upon a maximum working voltage of: Primary D1 to T1 3S: 312.3 Vrms. , For Model LCC250-24U-XXXX: The end-product Electric Strength Test is to be based upon a maximum working voltage of: Primary D1 to T1 3S: 335 Vrms. , For Model LCC250-48U-XXXX: The end-product Electric Strength Test is to be based upon a maximum working voltage of: Primary T1 1S to T1 4F: 315.7 Vrms.

- The secondary output circuit is SELV. ,
- This power supply has not been evaluated for patient connected applications. ,
- 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. ,
- Transformers T1, T3 and L4 all employ a Class 155 (F) insulation system. ,
- Instructions and equipment marking shall be provided in a language, which is acceptable in the country in which the equipment is to be installed. ,
- Earthing test need to be conducted in end-product investigation.
- Leakage current test need to be repeated in end-product investigation. ,
- Forced air cooling is required for LCC250-12U-7PYY, LCC250-24U-7PYY and LCC250-48U-7PYY models, should refer to Accompanying Document for the methods and details of connection, setup, orientation and ventilation. ,
- Cleaning, sterilization or disinfection should be, considered in the end use application. ,
- For Model LCC250-12U-XXXX series, when loaded with full load (12V, 20.8A), all models in this series are designed to operate at an ambient temperature of 55 degree C. In addition, when LCC250-12U-7PYY models are loaded with half load (12V, 10.4A), they can operate at an ambient of 85 degree C. , For Model LCC250-24U-XXXX series, when loaded with full load (24V, 10.4A), all models in this series are designed to operate at an ambient temperature of 55 degree C. In addition, when Model LCC250-24U-7PYY models are loaded with half load (24V, 5.2A), they can operate at an ambient of 85 degree C. , For Model LCC250-48U-XXXX series, when loaded with full load (48V, 5.2A), all models in this series are designed to operate at an ambient temperature of 55 degree C. In addition, when Model LCC250-48U-7PYY models are loaded with half load (48V, 2.6A), they can operate at an ambient of 85 degree C.
- The voltage connected on the signal input/output ports must be SELV. ,
- This series of power supplies can operate at an altitude up to 4000 meters. ,
- There is a hole with a diameter larger than 4.0mm in the enclosure defined as bottom enclosure. Attention must paid to it in end product investigation.(Clause 16b)
- The necessity to conduct cord bending test to the AC input strain relief must be considered in end product investigation. ,
- Rough handling test (Clause 21.6) needs to be considered in end product investigation.
- A suitable fire, electrical and mechanical enclosure is necessary to be provided by the end system.
- For Models LCC250-12U-4PYY, LCC250-24U-4PYY and LCC250-48U-4PYY, a heat sink specified in Enclosure ID 4-13 or other similar means must be considered to ensure no hazard can arise from excessive temperature.
- For the power cord types, further investigation such as strain relief test is necessary in end product