

UL TEST REPORT AND PROCEDURE

Standard:	UL 60950-1, 2nd Edition, 2014-10-14 (Information Technology Equipment - Safety - Part 1: General Requirements) CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10 (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:	LCM3000X-T (where X can be L, Q, W or U)
Rating:	For model LCM3000L-T At Input 100-240Vac 20A MAX 50/60Hz Output +9V - +15Vdc 125A MAX (1500W MAX) +5Vsb dc 2A MAX At Input 200-240Vac 20A MAX 50/60Hz Output +9V - +15Vdc 250A MAX (3000W MAX) +5Vsb dc 2A MAX For model LCM3000Q-T At Input 100-240Vac 20A MAX 50/60Hz Output +18V - +30Vdc 62.5A MAX (1500W MAX) +5Vsb dc 2A MAX At Input 200-240Vac 20A MAX 50/60Hz Output +18V - +30Vdc 125A MAX (3000W MAX) +5Vsb dc 2A MAX For model LCM3000W-T At Input 100-240Vac 20A MAX 50/60Hz Output +36V - +60Vdc 31.2A MAX (1500W MAX) +5Vsb dc 2A MAX At Input 200-240Vac 20A MAX 50/60Hz Output +36V - +60Vdc 62.5A MAX (3000W MAX) +5Vsb dc 2A MAX For model LCM3000U-T At Input 100-240Vac 20A MAX 50/60Hz Output +27V - +45Vdc 41.7A MAX (1500W MAX)

+5Vsb dc 2A MAX
At Input
200-240Vac 20A MAX 50/60Hz
Output
+27V - +45Vdc 83.3A MAX (3000W MAX)
+5Vsb dc 2A MAX

Applicant Name and Address: ASTEC INTERNATIONAL LTD
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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: Connie Tse / Handler

Reviewed by: Brian Wong / 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

These equipment are Class I Switching power supply for building-in, intended for information technology equipment provided with terminal block as input connector for AC mains supply connection. Double/Reinforced insulation is provided between primary and secondary circuits. Basic insulation is provided between primary circuits and protective earth.

Model Differences

All three models have the same construction (same PCB, electrical circuit, Auxiliary transformers, Current transformers, Gate drive transformers, enclosures) except for primary configuration boards and output bussbars. The primary configuration boards and output bussbars are used to change the output of the power supply.

Model LCM3000U-T used different power transformer compare to three models LCM3000L-T, LCM3000Q-T and LCM3000W-T

Mains output voltage rating each model.

LCM3000L-T: +9V - +15Vdc

LCM3000Q-T: +18V - +30Vdc

LCM3000W-T: +36V - +60Vdc

LCM3000U-T: +27V - +45Vdc

Technical Considerations

- Equipment mobility : for building-in
- Connection to the mains : to be determined in end system
- Operating condition : continuous
- Access location : operator accessible
- Over voltage category (OVC) : OVC II
- Mains supply tolerance (%) or absolute mains supply values : +10%, -10%
- Tested for IT power systems : Yes
- IT testing, phase-phase voltage (V) : 240
- Class of equipment : Class I (earthed)
- Considered current rating of protective device as part of the building installation (A) : 30
- Pollution degree (PD) : PD 2
- IP protection class : IP X0
- Altitude of operation (m) : 5000
- Altitude of test laboratory (m) : less than 2000 meters
- Mass of equipment (kg) : 3.5 (maximum)
- The product was submitted and evaluated for use at the maximum ambient temperature (T_{ma}) permitted by the manufacturer's specification of: 50 °C (with output power decreases 2.5% per degree C from 50 °C to 70 °C)
- The means of connection to the mains supply is: To be determined in end system
- The product is intended for use on the following power systems: TN, IT
- The equipment disconnect device is considered to be: Input connector (Terminal Block)
- The product was investigated to the following additional standards: EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + A2:2013 (which includes all European national differences, including those specified in this test report).

- The following were investigated as part of the protective earthing/bonding: Printed wiring board trace (refer to Enclosure - Schematics + PWB for layouts)
- The power supply in this equipment was: Investigated to IEC 60950-1. As part of the investigation of this product, the power supply and its test report were reviewed and found to comply with IEC 60950-1.
- LEDs provided in the product are considered low power devices: Yes

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-SELV: 354.7 Vrms, 692 Vpk, Primary-Earthed Dead Metal: 354.7 Vrms, 676 Vpk
- The following secondary output circuits are SELV: LCM3000L-T: +9V - +15Vdc, +5Vsb; LCM3000Q-T: +18V - +30Vdc, +5Vsb; LCM3000W-T: +36V - +51Vdc, +5Vsb; LCM3000U-T: +27V - +45Vdc, +5Vsb, Note: For model LCM3000W-T, beyond +51Vdc output is considered non-SELV
- The following secondary output circuits are at hazardous energy levels: LCM3000L-T: +9V - +15Vdc; LCM3000Q-T: +18V - +30Vdc; LCM3000W-T: +36V - +60Vdc; LCM3000U-T: +27V - +45Vdc, Note: Maximum output power for all models is 3000W at 200-240Vac input and 1500W at 100-240Vac input
- The following secondary output circuits are at non-hazardous energy levels: 5Vsb
- The power supply terminals and/or connectors are: Not investigated for field wiring
- The maximum investigated branch circuit rating is: 30 A
- 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: Been conducted
- The following magnetic devices (e.g. transformers or inductor) are provided with an OBJ2 insulation system with the indicated rating greater than Class A (105°C): T701 (Class F) - 4 provided, T900 (Class F), T601 and T602 (Class F)
- The following end-product enclosures are required: Electrical, Fire, Mechanical
- The equipment is suitable for direct connection to: AC mains supply
- Fans: The fans (2 provided) in this sub-assembly are provided with a fan guard to reduce the risk of operator contact with the stator.
- This equipment was not evaluated for end system mounting. When installed in the end system, proper evaluation must be considered.
- Compliance to the temperature limits of user touchable parts and surfaces of the power supply shall be considered at the end system