

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
Complementary CCNs:	N/A
Product:	Power supply
Model:	GU300SXXKZZ Where XX represents the output voltage which may be any number from 12 to 56. ZZ can be any number between 00-99, or any letter from AA to ZZ, or blank, only for market purpose, not affect safety performance
Rating:	<p>Input: 100-240V~, 50-60Hz, 3.5A Output:</p> <p>Model GU300S12K: For convection: max. output power: 180W and total max. 12W for V2 and V3 V1: 12Vdc/14.0A Max. V2: 5Vdc/2.0A Max. V3: 12Vdc/0.5A Max.</p> <p>For conduction: max. output power: 246W and total max. 12W for V2 and V3 V1: 12Vdc/19.5A Max. V2: 5Vdc/2.0A Max. V3: 12Vdc/0.5A Max.</p> <p>For 300LFM: max. output power: 278.4W and total max. 12W for V2 and V3 V1: 12Vdc/22.2A Max. V2: 5Vdc/2.0A Max. V3: 12Vdc/0.5A Max.</p> <p>Model GU300S15K: For convection: max. output power: 180W and total max. 12W for V2 and V3 V1: 15Vdc/11.2A Max. V2: 5Vdc/2.0A Max. V3: 12Vdc/0.5A Max.</p> <p>For conduction: max. output power: 246W and total max. 12W for V2 and V3 V1: 15Vdc/15.6A Max. V2: 5Vdc/2.0A Max. V3: 12Vdc/0.5A Max.</p> <p>For 300LFM: max. output power: 279W and total max. 12W for V2 and V3 V1: 15Vdc/17.8A Max. V2: 5Vdc/2.0A Max. V3: 12Vdc/0.5A Max.</p> <p>Model GU300S24K: For convection: max. output power: 196.8W and total max. 12W for V2 and V3 V1: 24Vdc/7.7A Max. V2: 5Vdc/2.0A Max.</p>

V3: 12Vdc/0.5A Max.

For conduction: max. output power: 266.4W and total max. 12W for V2 and V3

V1: 24Vdc/10.6A Max.

V2: 5Vdc/2.0A Max.

V3: 12Vdc/0.5A Max.

For 300LFM: max. output power: 297.6W and total max. 12W for V2 and V3

V1: 24Vdc/11.9A Max.

V2: 5Vdc/2.0A Max.

V3: 12Vdc/0.5A Max.

Model GU300S48K:

For convection: max. output power: 199.2W and total max. 12W for V2 and V3

V1: 48Vdc/3.9A Max.

V2: 5Vdc/2.0A Max.

V3: 12Vdc/0.5A Max.

For conduction: max. output power: 266.4W and total max. 12W for V2 and V3

V1: 48Vdc/5.3A Max.

V2: 5Vdc/2.0A Max.

V3: 12Vdc/0.5A Max.

For 300LFM: max. output power: 295.2W and total max. 12W for V2 and V3

V1: 48Vdc/5.9A Max.

V2: 5Vdc/2.0A Max.

V3: 12Vdc/0.5A Max.

Model GU300S56K:

For convection: max. output power: 196.8W and total max. 12W for V2 and V3

V1: 56Vdc/3.3A Max.

V2: 5Vdc/2.0A Max.

V3: 12Vdc/0.5A Max.

For conduction: max. output power: 264W and total max. 12W for V2 and V3

V1: 56Vdc/4.5A Max.

V2: 5Vdc/2.0A Max.

V3: 12Vdc/0.5A Max.

For 300LFM: max. output power: 297.6W and total max. 12W for V2 and V3

V1: 56Vdc/5.1A Max.

V2: 5Vdc/2.0A Max.

V3: 12Vdc/0.5A Max.

Applicant Name and Address:

SL POWER ELECTRONICS CORP
BLDG A
6050 KING DR
VENTURA CA 93003, USA

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 as applicable.

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 / Handler Reviewed by: Jay Lu / 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

The GU300SXXKZZ are open frame AC/DC power supplies designed for built-in to an end-product used in a hospital or related health care facility environment.

Refer to the Report Modifications page for any modifications made to this report.

Model Differences

Power supply GU300SXXKZZ series are similar in primary circuit, except for T100. In secondary circuit, some different components are used to serve for different output. Power supply GU300SXXKZZ series contain five kinds of transformers T100 as below: 5-36582-7012 (for GU300S12K), 5-36582-7015 (for GU300S15K), 5-36582-7024 (for GU300S24K), 5-36582-7048 (for GU300S48K) and 5-36582-7056 (for GU300S56K), described in enclosed Transformer specifications. The five transformers have similar construction, refer to Enclosure - Diagrams (04) to (08) for details.

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 following test were selected as representing of the test program applicable to model covered by this CBTR: 8.4.3 – Voltage or Charge Limitation and 8.8.3 – Dielectric Withstand. These tests have been witnessed for models selected as representative of the standard covered by this report and of the applicable test program.

Technical Considerations

- The product was investigated to the following additional standards: 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;
IEC 60601 1: 2005 + CORR. 1:2006 + CORR. 2:2007 + AM1:2012;
EN 60601 1:2006/ A1:2013/ A12:2014;
 - The following additional investigations were conducted: None
 - The product was not investigated to the following standards or clauses: Biocompatibility, PESS, EMC, Annex Z of EN standards for compliance with the MDD
 - The following accessories were investigated for use with the product: None
 - Scope of Power Supply evaluation defers the following clauses to be determined as part of the end product: Clause 4.2 (Risk Management), 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 degree of protection against harmful ingress of water is: IPX0



The product is suitable for use in the presence of a flammable anesthetics mixture with air or oxygen or with nitrous oxide:: No Software is relied upon for meeting safety requirements related to mechanical, fire and shock: No The product is evaluated only to the following hazards: Casualty, Fire, Shock Manufacturer's Recommended Ambient: 50°C

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.
- The relevant testing for label (Clause 7.1.2 Clause 7.1.3) shall be considered in the end application.
- Transformers and choke are provided with a Class F (155°C) insulation system: T100, T200, L100 and L104.
- The end product should ensure that the requirements related to accompanying documents, clause 7.9, are met.
- 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 were evaluated for Type BF leakage current per client's request, the test results were for reference only. The need for earth and enclosure leakage current tests shall be considered in the end product application.
- The available voltage for the main outputs (V1) does not exceed 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.
- The testing for PE impedance and current carrying capability (Clause 8.6.4) shall be tested in the end application. Proper bonding to the end-product main protective earthing termination is required.
- 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.
- 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.
- Two MOPPs are provided between primary and secondary; For T100, two MOPPs are provided between primary and core / primary and secondary, operational insulation provided between secondary and core; For T200, two MOPPs are provided between secondary and core / primary and secondary, operational insulation provided between primary and core; One MOPP is provided between primary and earth, one MOPP is provided between secondary and earth.
- 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 product.
- End product Dielectric Voltage Withstand Test shall be based on the following working voltages of the power supply: 1 MOPP = 354Vpk, 240Vrms and 2 MOPP = 644Vpk, 364Vrms.
- The products were tested on a 20 A branch circuit. If used on a branch circuit greater than this, additional testing may be necessary.
- Under conduction mode, the metal plate (dimension 215mm x 165mm x 2mm thick) was fixed on chassis through four screws.
- Units were tested with 300LFM forced air fan. Additional considerations shall be taken into consideration when installed in an end product with different airflow conditions.
- End product Risk Management Process to consider the need for different orientations of installation during testing.
- Power Supply tested in a max. ambient of 50°C. End product Risk Management Process to determine risk acceptability criteria.
- End product to determine the acceptability of risk in conjunction to insulation to resistance to heat, moisture, and dielectric strength.

- End product to determine the acceptability of risk in conjunction to the movement of components as part of the power supply.
- End product to determine the acceptability of risk in conjunction to the movement of conductors as part of the power supply.
- End product to determine the acceptability of risk in conjunction to the routing of wires away from moving parts and sharp edges as part of the power supply.
- 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.
- This product was evaluated based on operating altitude up to 5000 m.

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
Power Input	Amps, VA, or Watts
Output	Rated output voltage, power, frequency.

Special Instructions to UL Representative
None

Production-Line Testing Requirements		
<u>Test Exemptions</u> - The following models are exempt from the indicated test		
Test	Exemption Specifics	Details
Grounding Continuity	The following models are exempt from the indicated test:	None
Dielectric Voltage Withstand	The following models are exempt from the indicated test:	None
Patient Circuit Dielectric Voltage Withstand	The following models are exempt from the indicated test:	All models
Solid-State Components	The following solid-state components may be disconnected from the remainder of the circuitry during either Dielectric Voltage Withstand Test:	All models

<u>Sample and Test Specifics for Follow-Up Tests at UL</u>			
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

