

## UL TEST REPORT AND PROCEDURE

<b>Standard:</b>	ANSI/AAMI ES60601-1:2005 (Medical Electrical Equipment – Part 1: General Requirements for Basic Safety and Essential Performance); CSA C22.2 No. 60601-1:08 (Medical Electrical Equipment – Part 1: General Requirements for Basic Safety and Essential Performance)
<b>Certification Type:</b>	Component Recognition
<b>CCN:</b>	QQHM2, QQHM8 (Power Supplies, Medical and Dental)
<b>Product:</b> Switching Power Supply	
<b>Model:</b>	GNT4WXYZ-XXXG, where W be any number from 12 thru 48; X may be the letters A, B or C; Y may be the letter B or T; Z may be blank or the letter E or T which may be followed by 112 or 117; XXX may be any number from 001 thru 999.  MISP1300A1873, MINT1400A2410L03, MINT1400A2410L04, and MINT1400VWXYZ, where V may be the letter A or C; W may be any number from 12 thru 48; X may be any number from 01 thru 99; Y may be the letter E, L or P; Z may be the number 01 thru 99.
<b>Rating:</b>	Input: 100-240 V ~, 5.5-2.5 A, 50/60 Hz  Output: See General Product Information for output electrical ratings.
<b>Applicant Name and Address:</b> SL POWER ELECTRONICS CORP 6050 KING DRVIE, BLDG. A 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 Underwriters Laboratories Inc. ('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 Underwriters Laboratories Inc. (UL) or any authorized licensee of UL.

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**Supporting Documentation – For UL Field Representative’s Use**

The following documents 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 equipment (AC/DC power supplies) covered by this report, are components, which are intended for use in end-product equipment used in a hospital or related health care facility, evaluated to standard Medical Equipment.

Model GNT4WXYZ-XXXG Series, MINT1400VWXYZ Series and MISP1300A1873 are designed for building-into an end product.

**Model Differences**

Model GNT4WXYZ-XXXG series is similar to each other and differ only in secondary circuit for the different outputs.

Model MINT1400VWXYZ series is similar to the GNT4WXYZXXXG series except that the chassis has no slots, the insulator gap pad between the mini cover and the transformer T5 is replaced with an aluminum block bolted to the cover and the insulator gap pad is added between the primary heatsink and chassis.

Model MISP1300A1873 is similar to model GNT415ABG except for added secondary circuitry to allow the output to be adjustable from 11-16 V by external analog signal. Also, the insulator gap pad between the mini cover and the transformer T5 is replaced with an aluminum block bolted to the cover.

Model MINT1400A2410L03 is similar to model MINT1400C2410L01 except the cover is modified and uses a different size fan, which includes a tach to vary fan speed and powered externally with or without a series resistor.

Model MINT1400A2410L04 is similar to model MINT1400A2410L03 except the fan is without a tach.

Model GNT4WXYZ-XXXG Series is available with three different types of input connector and two different type of output connector. Also, there are two different cover/fan options: Option E with fan mounted on the end which includes an appliance inlet for the input; Option T with fan mounted on top; suffix "-112" and "-117" are identical and indicates use of low-speed fan mounted on top of cover.

The following are the various options for the GNT4WXYZ-XXXG:

W = Main Output from 12 thru 48 where,

12 = 12 V dc  
15 = 15 V dc  
24 = 24 V dc  
28 = 28 V dc  
36 = 36 V dc  
48 = 48 V dc

X = Input Connectors A, B, or C where

A = Eby P/N EB5002-03-N-12  
B = Phoenix Contact P/N 1732034 (GMKDSP 3/3)  
C = Amp P/N MTA-156 Series

Y = Output Connectors, B or T where

B = Bussbars  
T = Phoenix Contact P/N 1731721

Z = Cover Options, where

Blank = Standard Mini Cover

E = Cover with Vertically Mounted Fan on End. When used, AC inlet is used (Schurter P/N 6100.3100) and input connector X is C by default.

T = Cover with Horizontally Mounted Fan on Top

-XXX = Configurations that have no impact on safety which may be any number from 001 thru 999.

-112 and -117 = Option used with option T to indicate use of low-speed fan mounted on top of cover.

G = Compliance to RoHS

Output: 12 thru 48 V, 400 W maximum with internal forced air cooling or 220 W maximum with convection cooling or 300 W maximum with convection cooling and unit mounted to aluminium plate (GNT4WXYZ-XXXG);

The following are the options for MINT1400VWXYZ Series:

V = Indicates the design version which may be:

A = standard mini cover

C = optional cover/fan

W = Main Output from 12 thru 48, where

12 = 12 V dc

15 = 15 V dc

24 = 24 V dc

28 = 28 V dc

36 = 36 V dc

48 = 48 V dc

X = Output Connectors 01 thru 99

Y = Input Connectors E, L, or P, where

L = Eby P/N EB5002-03-N-12

P = Phoenix Contact P/N 1732034 (GMKDSP 3/3)

E = Molex P/N 2139 Series or Amp P/N MTA-156 Series

Z = Configuration Options 01 or 02 thru 99, where

01 = Standard Mini Cover

02 thru 99 = Added option not affecting safety

G = Compliance to RoHS.

12 thru 48 V, 400 W maximum with internal forced air cooling or minimum 27 CFM external forced air cooling or 220 W maximum with convection cooling or 300 W maximum with convection cooling and unit mounted to aluminum plate.

Model MISP1300A1873; 11-16 V, 25 A, 150 W maximum with convection cooling, 300 W with 35 CFM forced air cooling.

Model MINT1400A2410L03; 24 V, 350 W with internal fan powered externally or 150/350 W, 150 W for 13 minutes/350 W for 2 minutes with internal fan powered externally through a series resistor.

Model MINT1400A2410L04: 24 V, 400 W maximum with internal fan powered by 12 V Fan Output.

#### **Technical Considerations – For engineering use**

The product was investigated to the following additional standards: ANSI/AAMI ES60601-1, CAN/CSA-C22.2 No. 60601-1:08.

Scope of Power Supply evaluation defers the following clauses to the 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 equipment has been evaluated for use in a maximum ambient of 40°C.

For Models MISP1300A1873 maximum ambient: 50°C

The clearance has been evaluated at maximum 13, 123 feet (4000 m) elevation.

The product is Classified only to the following hazards: Shock, Fire, Casualty

The degree of protection against harmful ingress of water is: Ordinary

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

Power Supply was considered Overvoltage Category II (OVCI)

Classification of installation and use : Building-in

Supply connection : Building-in

Accessories and detachable parts included in the evaluation : None

#### Engineering Conditions of Acceptability

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

1. The component shall be installed in compliance with the Marking (clause 7) and Separation (clause 8) requirements of the end use application.
2. For power supplies Two MOOP is provided between primary and secondary; One MOOP is provided between primary and earth (chassis).
3. 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.
4. The end product should ensure that the requirements related to accompanying documents, clause 7.9, are met.
5. The available voltage for the secondary outputs does not exceed 25 Vac or 60 Vdc, under normal and single fault conditions.
6. 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 machine.
7. End product Risk Management Process to include consideration of requirements specific to the Power Supply.
8. End product Risk Management Process to consider the acceptability of risk for the following components that were identified as High-Integrity Components: Fuse (F1) (F2) (F3), Optocoupler (U11, U12, U13, U14).
9. Single fault testing was conducted without dielectric breakdown, however end product Risk Management Process to consider the need for simultaneous fault condition testing.

10. End product Risk Management Process to consider the need for different orientations of installation during testing.
11. Humidity testing was conducted, however the end product Risk Management Process to determine risk acceptability criteria.
12. End product to determine the acceptability of risk with respect to insulation's resistance to heat, moisture, and dielectric strength per 8.8.4.
13. 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.
14. Leakage current testing should be considered in the end product application.
15. Limitation of voltage, 8.4.3 was not conducted. Compliance to be determined in the end product evaluation.
16. End product to provide fusing that has adequate breaking capacity to interrupt the maximum fault current including the available short-circuit in accordance with clause 8.11.5.
17. Power supply output does not comply with the limits of 8.4.2.c. This shall be considered in the end use product.
  
18. The expected service life of this product is 5 years.
19. Fuses are provided in both supply conductors.
20. Class I models shall be properly bonded to the ground in the end-use equipment.
21. The following secondary output circuits are at hazardous energy levels: All
22. The output circuits have not been evaluated for direct patient connection.
23. Impairment of cooling test has only been conducted on Model GNT412ABTG. Impairment of cooling testing for other models provided with a fan to be determined in the end product evaluation.
24. Abnormal tests were conducted with unit mounted to a 256 in. sq. area aluminum plate. The end use application should consider repeating these tests in the end product based upon the power supply's application in the end product.
  
25. Earthing and Potential Equalization (8.6.4) may need to be conducted in the end use product.

**Additional Information**

**Markings and instructions – For UL Field Representative Use**

Clause Title	Marking or Instruction Details
Company identification	Classified or Recognized company's name, Trade name, Trademark or File
Model	Model number

**Special Instructions to UL Representative**

**Production-Line Testing Requirements – For UL Field Representative Use**

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

Model	Grounding Continuity	Dielectric Voltage Withstand	Patient Circuit Dielectric Voltage Withstand