

Description**UL TEST REPORT AND PROCEDURE**

Standard:	ANSI/AAMI ES60601-1 AMD 1 Edition 1 - Issue Date 2012/08/20 and CSA C22.2 NO. 60601-1:14 Edition 3 - Issue Date 2014/01/01
Certification Type:	Component Recognition
CCN:	QQHM2, QQHM8
Product:	Switching Power Supply
Model:	MINT1500WXX14YZZ, MINT1500BWW14XYZ, MINT1500C2414E02
Rating:	Input: 100-240V~, 50-60Hz, 6A Output: With Max. 200 LFM (linear feet per minute) forced air flow or integral fan options: Main Output: 12Vdc/40A to 56Vdc/8.9A, Maximum 500W, Fan Output: 12Vdc/1.0A Signal: 5VSB/0.2A Without forced air flow: Main Output: 12Vdc/16.6A to 56Vdc/4.6A, Maximum 350W, Fan Output: 12Vdc/1.0A Signal: 5VSB/0.2A MINT1500C2414E02 Input: 100-240V~, 50-60Hz, 6A Output With Max. 200 LFM (linear feet per minute) forced air flow: Main Output: 24Vdc/20.8A, Maximum 500W
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.

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

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Reviewed by: Michael J. Howell

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 MINT1500WXX14YZZ and MINT1500BWW14XYZ are an open frame AC/DC power supplies designed for building-in to an end-product used in a hospital or related health care facility environment.

Model Differences

The transformers are different among the models and minor secondary components are changed to achieve the various output voltages.

The MINT1500WXX14YZZ designation designates the following:

MINT= Medical Internal New Technology

1 = 1 Output

500 = 500W max.

W = A, C, T or E where A is U-Channel, C is U-Channel with Cover, T is Top Fan/Cover, and E is End Fan/Cover

XX = Output Voltage 12 to 56 Vdc

14 = is Output Connector (Screw Type)

Y = is Input Connector and can be E or L or other, where E is 3 Pin, L is Terminal Block and others are available.

ZZ = 01 is standard; 2-99 are value added options not related to Safety.

Airflow Requirements are Convection, 200LFM or integral fans on T and E covers.

A Model Convection - 350W

C Model Convection (Cover) - 230W

C Model 200LFM (/Cover) 500W

T Model (Cover w/Top Fan) - 500W

E Model (Cover w/End Fan) 500W

Ambient = 50°C

Airflow: C - 17 cfm, E - 7.7 cfm

External - 200 LFM

MINT1500C2414E02 is identical to the base MINT1500C2414E01 except that the Active inrush circuitry comprising of Q105, R138, D114, D115, D117, C115, C116, C117 have been omitted and R103 changed value from 45 ohms to 5 ohms. Additionally, the 12V fan and 5VSB outputs are not used, and the units

output is derated.

The MINT1500BWW14XYZ designation designates the following:

MINT= Medical Internal New Technology

1 = 1 Output

500 = 500W max.

B = 1500 Vac Isolation (One MOPP) between Output to Ground for Type BF applications (Applies to all outputs and signals)

WW = Output Voltage 24 to 56 Vdc

X = is Input Connector and can be E or L or other, where E is 3 Pin, L is Terminal Block and others are available.

Y = 0, C, T or E where 0 is U-Channel, C is U-Channel with Cover, T is Top Fan/Cover, and E is End Fan/Cover

14 = is Output Connector (Screw Type)

Z = 0 is standard; 2-9 are value added options not related to Safety.

Airflow Requirements are Convection, 200LFM or integral fans on T and E covers.

0 Model Convection - 350W

C Model Convection (Cover) - 230W

C Model 200LFM (/Cover) 500W

T Model (Cover w/Top Fan) - 500W

E Model (Cover w/End Fan) 500W

Ambient = 50°C

Airflow: C - 17 cfm, E - 7.7 cfm

External - 200 LFM

Additional Information

The schematics for these models are kept on file at the CB Testing Laboratory mentioned in the first page of this test report, and can be provided by the applicant upon request by CBTLS.

Label in this report is considered representative of all models in the Series.

CB Test certificates and proofs of compliance for components are included in Enclosures - Licenses. In accordance with the current rules of the CB scheme, a CB Test certificate is required for critical components, and the certificate is effective for 3 years. Recognizing NCB may challenge the CBTC when a certificate is more than 3 years old, or when it is not provided. The component reports shall be made available from the manufacturer upon request.

The company trademark may be applied to the exterior of the product, product literature or product packaging.

This report is a reissue and upgrade of IT Report Ref. No.: E116994-A96-CB-1 Issued 2012-12-27. Based on the previously conducted testing and the review of product technical documentation including photos, schematics, wiring diagrams and similar, has been determined that the product continues to comply with the standard.

Technical Considerations

The product was investigated to the following additional standards:: ANSI/AAMI ES 60601-1, AMD1 (Medical Electrical Equipment - Part 1: General Requirements for Basic Safety and Essential Performance) (includes Deviations for United States), CSA C22.2 No. 60601-1:14 (Medical Electrical Equipment - Part 1: General Requirements for Basic Safety and Essential Performance) (includes National Differences for Canada), IEC 60601-1 Edition 3.1, 2012-08, EN 60601-1:2006+A1:2013

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

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

Manufacturer's Recommended Ambient: 50°C

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

Engineering Conditions of Acceptability

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.

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 anaesthetic mixture with air, oxygen, or nitrous oxide. The output circuits have not been evaluated for direct patient connection (Type B, BF or CF).

End product Risk Management Process to include consideration of requirements specific to the Power Supply.

Transformers are provided with a Class F (155°) insulation system.

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 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; One MOPP is provided between primary and earth (chassis), operational insulation provided between secondary and earth. Models MINT1500BWW14XYZ - One MOPP is additionally provided between secondary and earth.

The Interruption of the Power Supply Test was not conducted and shall be conducted in the end use application.

End product Dielectric Voltage Withstand Test shall be based on the following working voltages of the power supply: 1 MOPP = 454Vpk, 257Vrms and 2 MOPP = 616Vpk, 415Vrms. Models MINT1500BWW14XYZ – 1 MOPP = 354Vpk, 250Vrms (Secondary to Earth).

Power supply output exceeds the energy limit (240 VA) per 8.4.2.c and considered Hazardous Energy. Accessibility and compliance to be determined in the end-product evaluation.

Units were tested with 200LFM forced air fan. Additional considerations shall be taken into consideration when installed in an end product with different airflow conditions.

Capability of the equipment to withstand cleaning, sterilization or disinfection without deterioration has not been evaluated. Additional evaluation may be required as part of end product investigation.

Tests have been conducted with 20 A Branch Circuit rated devices located in the test circuit, located external to the unit.

The component shall be installed in compliance with the Enclosure (clauses 9 & 11.3), Marking and Installation Instructions (clause 7), Mounting and Separation (clause 8) requirements of the end use application.

End product should evaluate sub-clause 8.6 of this standard.

The input and output connectors are not suitable for field connection.

Proper bonding to the end-product main protective earthing termination is required.

End product Risk Management Process to consider the need for simultaneous fault condition testing.

End product to determine the acceptability of risk in conjunction to insulation to resistance to heat, moisture, and dielectric strength.

The Voltage or Charge Limitation Test per 8.4.3 was not conducted, and shall be conducted in the end product.

The Interruption of the Power Supply Test was not conducted and shall be conducted in the end use application.

The component should be properly bonded to the ground in the end-use application. Acceptability of the Protective Earth (PE) must be determined in the end product.

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	
Supply Frequency	Rated frequency range in hertz
Power Input	Amps, VA, or Watts
Fuses	Ratings (current and voltage) and type. (located adjacent to fuse OR as a diagram inside enclosure)

Special Instructions to UL Representative

None

Production-Line Testing Requirements

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

Model	Grounding Continuity	Dielectric Voltage Withstand	Patient Circuit Dielectric Voltage Withstand
All Models	Exempt for all models except for MINT1500E	Not Exempt	Exempt

Solid-State Component Test Exemptions - The following solid-state components may be disconnected from the remainder of the circuitry during either Dielectric Voltage Withstand Test:

Component
None

Sample and Test Specifics for Follow-Up Tests at UL

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