File E227588
Project 03ME16286

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REPORT

on

COMPONENT - POWER SUPPLIES, SPECIALTY - COMPONENT

Spellman High Voltage Electronics Corp.
Hauppauge, NY

DESCRIPTION

PRODUCT COVERED:

USR, CNR: Component - High Voltage Power Supply Series MNX50P50, MNX50P75, **MNX65P50 and MNX60P50X4355;** may be followed by the letter X followed by four digits indicating customer specific non-safety related options.

GENERAL:

The product covered by this report is a 50 Watt **or 75 Watt** high voltage power supply intended for powering protectively earthed cathode X-Ray tubes.

ELECTRICAL RATING:

Model MNX50P50 Series:

Input:	24 V dc ±10% V, 4.0 A max.
High Voltage Output:	50 kV dc, 1.0 mA, 50 W max OR 25 kV dc, 2.0 mA, 50 W max
Filament Output:	5 V dc, 3.2 A

Model MNX50P75 Series:

Input:	24 V dc ±10% V, 6.0 A max.
High Voltage Output:	50 kV dc, 1.5 mA, 75 W max OR 25 kV dc, 3.0 mA, 75 W max
Filament Output:	5 V dc, 3.2 A

Model MNX65P50 Series:

Input:	**24 V dc ±1.0 V, 4.0 A max.**
High Voltage Output:	**60 kVdc, 0.77 mA, 50 W max OR 25 kVdc, 2.0 mA, 50 W max**
Filament Output:	**5 V dc, 3.2 A**

Model MNX60P50X4355:

Input:	**24 V dc ±10% V, 4.0 A max.**
High Voltage Output:	**60 kVdc, 0.833 mA, 50 W max**
Filament Output:	**5 V dc, 3.2 A**

Grid Bias (GB) Option for Model MNX Series:

Input:	24 V dc ±10% V, 5.0 A max (50 W units), 6.0 A max (75 W units)
Grid Bias Output:	0 to -300 V dc, 0.25 mA max
Filament Output:	5 V dc, 0.3 to 3.5 A

TECHNICAL CONSIDERATIONS (NOT FOR UL REPRESENTATIVE'S USE):

Use - For use only in (or with) complete equipment where the acceptability of the combination is determined by Underwriters Laboratories Inc.

Special Considerations - The following items are considerations that were used when evaluating this product.

USR indicates investigation was performed to UL 61010-1, 3rd Edition, 2012-04-17 (ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL, AND LABORATORY USE - Part 1: General Requirements).

CNR indicates investigation was performed CAN/CSA-C22.2 No. 61010-1, 3rd Edition, 2012-04, (ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL, AND LABORATORY USE - Part 1: General Requirements).

The equipment not mains connected, but is intended to be sourced by a double insulated 24 V dc supply with a non-Hazardous Live (Class III) output.

This product’s output voltage range as defined above is determined by one of three methods:

Internally programmed per customer specification with pins 7 and 8 of I/O connector JP4 shorted.

External potentiometer connected between pins 5 and 1 of the I/O connector JP4 and the wiper connected to pin 7 of the I/O connector JP4.

Applying a 0 V to +10 V, or optional 0 V to +5 V, analog differential signal for a 0 V to maximum rated output voltage, to pins 1 (0 V) and 7 (+ V) on the I/O connector JP4.

Model Differences:

Model series MNX65P50 is identical to Model series MNX50P50 except it has two additional multiplier stages and the enclosure is 1 inch longer (9 inches total).

Model MNX60P50X4355 is identical to model MNX65P50 except that it has an additional high voltage divider and is rated to operate up to a 60° C ambient when output is at or below 30 Watts

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Grid Bias (GB) Option for MNX Series is specifically designed for popular commercially available grid bias X-Ray tubes. The grid bias PC board is mated with the MNX Control PCB. The high voltage monitor of the main high voltage output is connected to the Grid Bias (GB) programming input (0-10 V dc = 0 to -300 V dc of Grid Bias (GB). Connected in this manner the Grid Bias (GB) output will track in a linearly proportional fashion the setting of the main kV output. A front panel accessible multi-turn potentiometer limits the maximum magnitude of Grid Bias (GB) output applied to the X-Ray tube.

This product’s output current range is determined by one of three methods:

Internally programmed per customer specification with pins 10 and 11 of I/O connector JP4 shorted.

External potentiometer connected between pins 5 and 1 of the I/O connector JP4 and the wiper connected to pin 10 of the I/O connector JP4.

Applying a 0 V to +10 V, or optional 0V to +5 V, analog differential signal for a 0 V to maximum rated output voltage, to pins 1 (0 V) and 10 (+ V) on the I/O connector JP4.

This product’s Filament current limit is internally programmed for 3.2 A dc unless specified otherwise by the customer.

Conditions of Acceptability - When installed in the end-use equipment, considerations shall be given to the following:

1. This component has been judged on the basis of the required spacings in the Standard for Electrical Equipment for Laboratory Use, UL 61010-1 3rd edition, and CAN/CSA C22.2 No. 61010-1 3rd edition.

2. This component is to be sourced by a double insulated 24 V dc supply with a non-Hazardous Live (Class III) output.

3. The unit shall be properly bonded to the main protective earthing termination in the end product.

6. The equipment has been evaluated for use in a Pollution Degree 2, Installation Category II environment.

7. Consideration should be given to conduct the following tests with the power supply installed in the end product:

   a. Dielectric Voltage Withstand Test, between live parts of the power supply and the end product chassis.
   b. Permissible Limits Tests with the power supply installed in the end product.
   c. Temperatures on power electronic components, transformer windings and accessible surfaces.

8. The units were evaluated for use at a 40°C ambient. **Model MNX60P50X4355 was additionally evaluated for use at a 60°C ambient when operated at an output power of 30 Watts.**

9. The input and output connectors have not been evaluated for field connections and are only intended for connection to mating connectors of the internal wiring inside the end-use equipment. The acceptability of these and the mating connectors relative to the secureness, insulating materials and temperature shall be considered.

10. The unit is intended for building-in. No surface of the unit shall be accessible in the end product.

11. Safety interlocks for the protection of “Service Personnel” are to be provided in the end product.

12. Characteristics related to X-radiation regarding levels of exposure and physiological effects have not been investigated.

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13. The unit has been evaluated to the requirements of Sub-Clause 20.3 “Dielectric Strength”, IEC 60601-2-7 2nd Edition: 1998 “Medical Equipment – Part 2-7: Particular Requirements for The Safety of High-Voltage Generators of Diagnostic X-Ray Generators” only and IEC 60601-2-54 1st Edition: Medical electrical equipment – Part 2-54 (2009-06): Particular requirements for the basic safety and essential performance of X-ray equipment for radiography and radioscopy.

CONSTRUCTION DETAILS:

See Section General for additional details.

Markings – Manufacturer’s name or file number, model number and UL Recognition mark.

Label, UL R/C (PGJI2), type Z-Xtreme 4000 Silver, manufactured by Zebra Technologies, 150°C, Polyester 0.005 thick foil, backed with Acrylic based permanent adhesive label liner and 0.012 thick max. Print with Zebra 5095