



- **Custom Designed Specifically for Mammography Applications**
- **Compact Space Saving Modular Format**
- **Fast Rise and Fall Times Help Minimize Unnecessary Patient Radiation Exposure**
- **Dual Speed Starter, Boost/Brake Capability**
- **RS-232 and Optional Ethernet Interfaces**

Spellman's PMX is a high performance X-Ray generator designed specifically for mammography applications including FFDM and DBT. It features 2 and 3 point exposure modes as well as smart AEC with a pre exposure.

The PMX is a 5kW high frequency X-Ray generator integrated with a dual filament power supply, and a dual speed X-Ray tube starter. Due to the PMX's superior power conversion technology and inverter design it can provide stable and accurate X-Ray tube high voltage with fast rise and fall times.

Smooth system integration of the PMX is accomplished through the use of RS-232 and optional Ethernet digital interface, preloaded X-Ray tube parameters, easy access interlocks and I/O connections, and internal generator diagnostics. Optional GUI utility software is also offered to help with initial system integration.

SPECIFICATIONS

Input Voltage:

200-240Vac ($\pm 10\%$), single phase, 50Hz/60Hz

Input Current:

Minimum 35A service recommended for 5kW operation
External EMC Filter (Schaffner FN2070-36-08-36A) required to meet CE/EMC specifications – Not provided
Mains Contactor – Not provided
Customer is responsible for mains safety disconnection.

Output (Tube) Voltage

Output Voltage Range:

20kV to 49kV

Polarity:

Positive, grounded cathode X-Ray tube

Accuracy:

2% (measured per IEC60601-2-45)

Reproductibility:

<0.5%

Rise Time:

<1ms to within 98% of the programmed voltage

Fall Time:

<10ms with a max HV cable length of 8 feet (2.4 meters)

Ripple:

$\leq 4\%$ p-p

Output (Tube) Current/Power:

Output Current Range:

10mA to 200mA

Output Power:

5kW @ 0.1 second loading time,
300 Watts maximum average power

Accuracy:

< $\pm 10\%$ on exposure less than 10ms
(measured per IEC60601-2-45)

Rise Time:

<1ms to within 95% of the programmed mA value

Fall Time:

<10ms with a maximum HV cable length
of 8 feet (2.4 meters)

Exposure Time (Loading Time):

Maximum Single Exposure Time:

10 seconds

Shortest Single Exposure Time:

5ms

Loading time accuracy:

$\pm 3\%$ +1ms (measured per IEC60601-2-45)

Maximum mAs:

600mAs

Exposure Timer:

5mS-10 seconds

Accuracy:

< $\pm 10\%$ (measured per IEC60601-2-45)

Reproductibility:

<0.5%

Filament Configuration:

DC filament drive: self corrected filament preheat settings with closed loop emission control and smart learning algorithm

Filament Output:

0-6 amps at a compliance of 5.5 volts, maximum.

Dual Speed Starter:

High speed (180Hz) and low speed (60Hz) can be configured via the serial interface.
Boost and Brake capability provided.

High Voltage Connector:

60kV, Claymount CA-3 type or equivalent

Communication Interface:

RS-232 standard, optional Ethernet

Grounding Point:

M5 ground stud provided on chassis

Environmental:

Temperature Range:
 Operating: 10°C to 40°C
 Storage: -40°C to 85°C
 Humidity:
 20% to 85% RH, non-condensing.

Cooling:

Internal fan

Dimensions:

9.47" H X 7.19" W X 13.72" D
 (240.5mm x 182.6mm x 348.5mm)

Weight:

<23 pounds (10.5kg)

Regulatory Approvals:

Designed to meet EMC:IEC 60601-1-2. UL/CUL recognized file E242584. RoHS compliant.

Application Features:

- 2 point/3 point exposure modes
- AEC/Smart AEC exposure modes
- Dual Speed Starter
- X-Ray tube anode heat calculator
- Preloaded X-Ray tube parameters and expandable X-Ray tube library

TB2 ROTOR INTERFACE

PIN	SIGNAL	PARAMETERS
TB2-1	PHASE	To tube auxiliary winding
TB2-2	RUN	To tube principle winding
TB2-3	COM	To tube common winding
TB2-4	GROUND	To tube housing ground

PMX STANDARD SYSTEM INTERFACE— JB1 25 PIN MALE D CONNECTOR

PIN	SIGNAL	PARAMETERS
1	GND	Signal Ground
2	+5Vdc Out	+5Vdc, 100mA max.
3	RS-232 Tx Out	RS-232 Transmit
4	RS-232 Rx In	RS-232 Receive
5	PREP	User signal (Contact Closure) to alert the generator that exposure sequence will begin. Once this signal is active, exposure parameters are locked in and cannot be changed. The generator enables the starter to boost the rotor. Contact connection to pin 24. Closed = PREP, the filament is placed in preheat mode
6	READY	Generator signal to user to indicate the rotor runs to speed and the generator is ready for X-Ray exposure Open Collector. Low/Active = Ready
7	ROTOR SHUTDOWN	User signal to brake the rotor drive
8	EXPOSURE	User signal (Contact Closure) to generator to generate X-Rays. Filament is boosted, and high voltage is generated after the boost time. Contact connection to pin 24. Closed = Exposure
9	X-Ray ON 75% Status	Transistor output to indicate X-Ray ON status synchronized with 75% of kVP setting point.
10	X-Ray ON Status	Transistor output to indicate X-Ray ON status synchronized with kV start up.
11	N/C	N/C
12	X-Ray SHUTDOWN/AEC	User signal to generator to rapidly turn HV OFF and ON during serial exposure sequence
13	RS-232 ISO Ground	Isolated ground from RS-232 transceiver IC
14	HVG FAULT Status	Generator signal indicating generator fault. Open collector transistor output. Low/Active = Fault
15	Status Bit 1	3 bit status lines for up to 6 status messages. See separate matrix describing functionality. Open Collector. Low/Active = Message
16	Status Bit 2	
17	Status Bit 3	
18	N/C	N/C
19	N/C	N/C
20	kV Monitor	Signal from generator. 0-10V = 0-50kV. Zout = 1kΩ
21	Emission Monitor	Signal from generator. 0-10V = 0-200mA. Zout = 1kΩ
22	Filament Current Monitor	Signal from generator. 0-10V = 0-6A. Zout = 1kΩ
23	Program/Monitor Return	Ground for reference of program and monitor signals
24	+24Vdc Out	For connection to PREP and EXPOSURE control relay coils
25	SHIELD/GND	For connection of interface cable shield to generator chassis ground

TB3 TUBE AND INTERLOCK INTERFACE

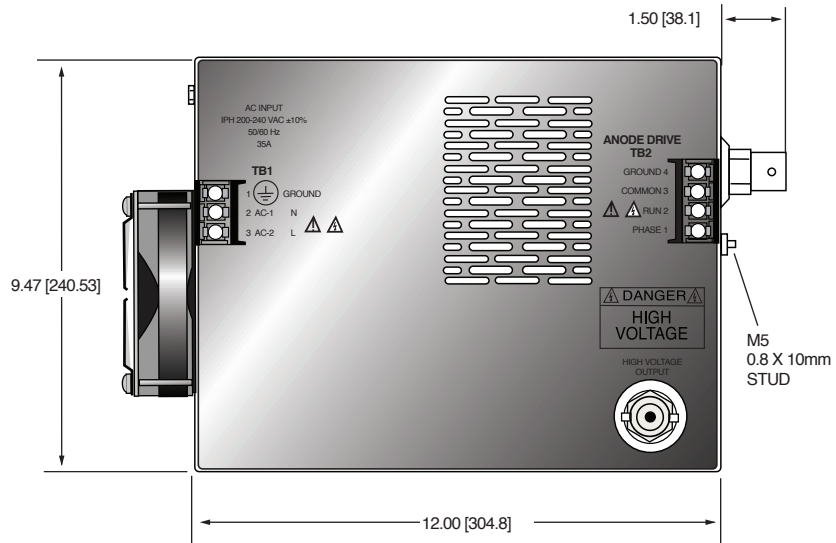
PIN	SIGNAL	PARAMETERS
TB3-1	SMALL FIL	Connection to tube small filament
TB3-2	COMMON	Connection to tube filament common
TB3-3	LARGE FIL	Connection to large filament
TB3-4	GROUND	Generator chassis for cable shield connection
TB3-5	Interlock 2+	Used if tube has separate thermostat switch.
TB3-6	Interlock 2-	Open = OVER TEMP. (short terminals if not used)
TB3-7	Interlock 3+	Used if tube has cooling circulator flow switch.
TB3-8	Interlock 3-	Open = NO FLOW. (short terminals if not used)
TB3-9	Safety Interlock+	User signal (Contact Closure) for safety interlocks such as door interlocks. Open turns HV OFF, or inhibits HV from being generated. Closed = OK 24Vdc @ <1A typical
TB3-10	Safety Interlock-	
TB3-11	Contactors Coil+	Option for contactor coil control
TB3-12	Contactors Coil-	
TB3-13	Spare	N/C
TB3-14	Spare	N/C
TB3-15	Tube Current+	Tube current flows out from this pin
TB3-16	Tube Current-	Tube current flows into this pin

DIMENSIONS: in.[mm]

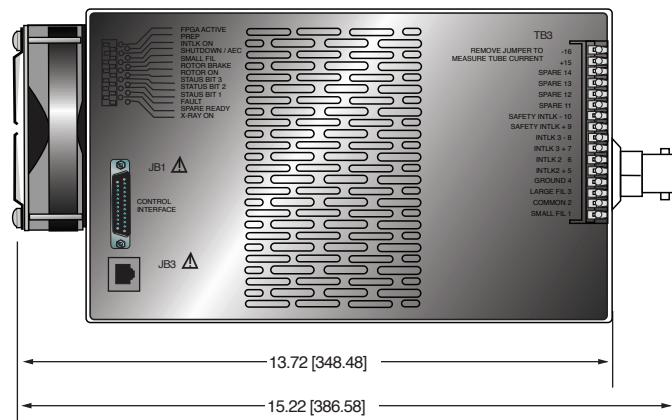
FRONT VIEW



SIDE VIEW



TOP VIEW



BOTTOM VIEW

