FILES ASSOCIATED WITH THIS SPECIFICATION

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SPC – P159.doc	This Document

CHANGE HISTORY

ORIGINATOR	DATE	DESCRIPTION OF CHANGE
Nick Wu	3/21/2013	Initial Release: From P017, change x-ray tube to 0.5mm FS - Input power 230VAC - 80kV, 210w - Symmetrical fan beam - 0.5mm FS
Jenny He	01/12/2021	Rev 1: - Update x-ray generator layout drawing to Rev 4, change to new black pump. Control Box layout drawing to Rev 2. - Minimum kV change 30kV to 40kV.

TITLE: P159-IXS080BP210P159	
GENERATED BY: Jenny He	DOC OWNER: X-ray Eng. & Sales
REVIEWED BY: Joseph Zhou	REVIEW DATE: 1/19/21
APPROVED BY: NY Eng. Team	APPROVAL DATE: 1/26/21

1. OVERVIEW

The IXS080BP210P159 X-ray generator is an 80kV, 210W, High Frequency, Power Factor Corrected, self cooled & self contained X-Ray generator. It consists of an integrated X-ray tube, a high voltage and a filament power supply. The Generator is controlled, programmed and monitored via a RS232 interface. The Generator is built in accordance to the following specifications:

2. INPUT POWER:

Input Line Voltage Range

- 180-264VAC, 50/60Hz. Single phase. 1.5Amps RMS max.

3. HIGH VOLTAGE PERFORMANCE:

a. Output Power:
Maximum output Power (80kV, 2.625mA) 210W

b. Tube Voltage Operational Range:
The high voltage is programmed within the range of 40 to 80 kV (+/-10kV to +/-40kV).

c. kV Accuracy:
The High Voltage measured at the X-ray tube is within +/-2% of the selected value.

d. kV Ripple:
The peak to peak value of Total kV is +/-0.5%.

e. Voltage Regulation:
< 0.1% for Line Input changes over specified range
< 0.1% for Load Output changes over specified range

f. kV Rise Time at maximum power:
The kV rises time is < 0.5 Sec from 10% to 90% of the output voltage.

g. kV Overshoot
The kV Overshoot will be <= 5% of full output voltage.

4. TUBE CURRENT (mA) PERFORMANCE:

a. Tube current Operational Range:
0.2mA to 5.0 mA @ 210W Max, continuous

b. mA Accuracy:
The X-ray tube current is within +/-1% of the selected value.

c. mA Regulation:
< 0.5% for Line Input changes of +/-10%.
< 0.5% for the output voltage change over the specified range.

5. PROTECTION AND SAFETY CIRCUITRY:

a. Over-current protection:
The Over-current trip point is set for within 5.2 to 5.5 mA. This will disable the high voltage output. A Reset is required to clear this fault.

b. Over voltage protection:
The Over voltage trip point is set within 82kV to 84kV. This will disable the high voltage output. A Reset is required to clear this fault.

c. Over Power protection:
The power trip point is set with in 215W to 220W. This will disable the HV output. A reset is required to clear all faults.

d. Over temperature protection:
Over temperature trip point is set within 57□C to 63□C. This will disable the high voltage output. A Reset is required to clear this fault.

e. Arc Fault
When an Arc occurred, the arc "fault LED" is lit. This signal will be latched if multiple arc faults occur in a certain time. Once the fault is latched, this will disable the high voltage output & a reset is required to clear this fault.

f. Power Supply Fault:
When the selected power exceeds the maximum rated power of the unit, this fault will be set & disable the high voltage output. A Reset is required to clear this fault.

g. X-ray on Relay:
The X-Ray on relay will operate when HV is enabled & there is no faults occurred.
The X-Ray on relay will de-energize when the X-Ray output is OFF.
The maximum rating of this contact is 30V DC@ 1Amp.

h. Safety Interlock:
J4-1 & J4-2 to close through external interlock switches to satisfy the safety. X-Rays will not be produced & interlock open message will be displayed unless J4-1 & J4-2 are connected together through safety switches.

6. FILAMENT POWER SUPPLY:

Filament Current Output:
Filament Current = 3.0 to 4.0 Amps RMS

Filament Voltage Output:
Filament Output Voltage 2 to 5Vac

7. SAFTY REQUIREMENTS

- Safety Compliance: Designed to meet CE, EN/UL 61010-1 and EN 61326-1.
- X-ray Leakage: Less than 0.5mR/hr at 5cm from the surface of the chassis as per FDA 21 CFR 1020.40.

8. X-RAY BEAM REQUIRMENTS

a. X Ray Beam Filtration: <2mm of Ultem
b. X-ray Beam geometry: Fan beam of 80º x 10º Symmetrical.
c. Beam path through oil: 2.5mm +/- 1.0mm thick
d. Focal Spot: 0.5mm Nominal as per IEC336

9. PHYSICAL SPECIFICATIONS

a. Environmental

- Maximum operating ambient temperature: 0°C to 40°C.
- Storage ambient temperature: -20°C to +60°C
- Thermal cut off: 60ºC ± 3ºC of oil temperature.

b. Humidity
98% non-condensing

c. Dimensions
See figures at the end of this document.

d. Weight
X-ray generator: 50 lbs
Control box: 7 lbs

e. Cooling method
Through an Integrated cooler.

10. AC POWER INPUT CONNECTOR – J1

- Voltage: 230VAC +/- 10%, 50/60Hz
- Current: 1.5Amps RMS max.

11. LED INDICATORS

Power (Green)	DS1	Illuminated when Power is present
X-ray On (Red)	DS2	Illuminated when Interlock is closed & HV is enabled
Arc (Yellow)	DS6	ARC-ing fault
OC (Yellow)	DS5	Over Current Fault
OT (Yellow)	DS7	Illuminated when oil temperature exceeds 60±3ºC
OP (Yellow)	DS4	Over Power, Illuminates when selected power exceeds the rated power
OV (Yellow)	DS3	Over Voltage fault

12. CABLES AND CONNECTORS

a. **J1 Connector: AC Input**

b. **J2 Connector:** (RS232 9 Pin Female)

Pin Out	Name
1	N/A
2	TX-
3	RX+
4	N/A
5	SIGNAL GRD
6	N/A
7	N/A
8	N/A
9	N/A

c. **J3 Control Cable:** 4ft standard

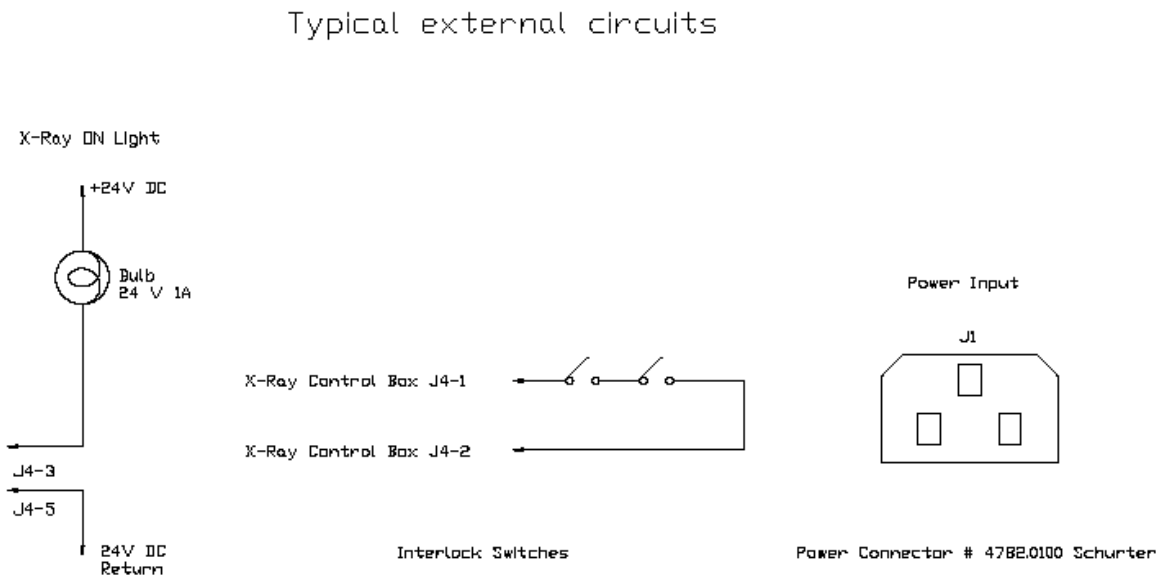
d. **J4 Connector:** (Interlock 9 Pin Male)

Pin Out	Name
1	Interlock out
2	Interlock In
3	X-Ray On Relay contact Common
4	X-Ray On Relay contact N/C
5	X-Ray On Relay contact N/O

13. DIGITAL INTERFACE

Refer to Document P032-IXS-FIRMWARE-P032.

14. TYPICAL EXTERNAL CIRCUITS



15. MECHANICAL DRAWINGS

Figure 1: X-ray Generator

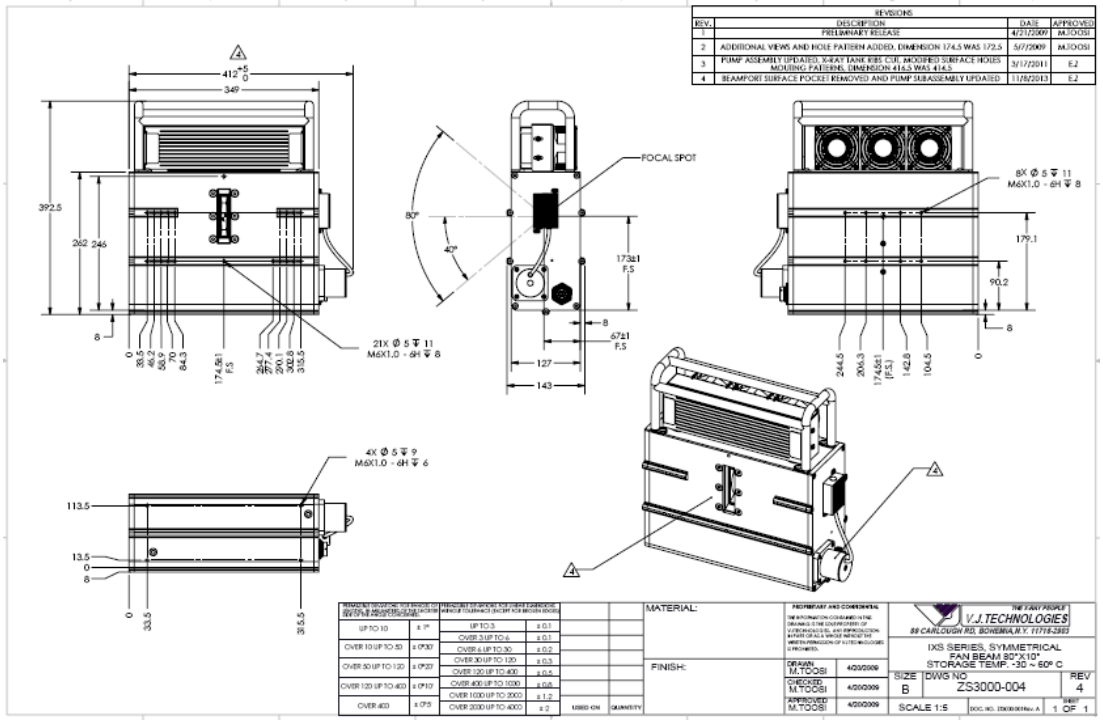


Figure 2: Control Box