FILES ASSOCIATED WITH THIS SPECIFICATION

FILENAME	CONTENTS
SPC – P410.doc	This Document

CHANGE HISTORY

ORIGINATOR	DATE	DESCRIPTION OF CHANGE
/	06/08/17	Initial Release. Modify from P265 - Input Power 230VAC - 80-200KV, 0.2-6mA, 500W max - Fan Beam: 90º - Focal Spot Size: 0.8mm per IEC60336 - Liquid Heat Exchanger - Class B Control Box with 4ft cable - Firmware P198
Jenny He	08/12/21	Rev 1: - Update pump per BOM, layout change from ZS3000-142 R1 to ZS3000-260 R1. - Update FW from P198R2 to P562-R1.00
R. Zhang	5/6/22	Rev 2 - Mechanical drawing update to ZS3000-260 R2

TITLE: IXS200BP500P410	
GENERATED BY: Jenny He	DOC OWNER: X-ray Eng. & Sales
REVIEWED BY: J. Zhou	REVIEW DATE:5/6/22
APPROVED BY: NY Eng. Team	APPROVAL DATE: 5/18/22

Contents

1. OVERVIEW

The IXS200BP500P410 X-ray generator is a 200kV, 500W, High Frequency, Power Factor Corrected 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

- 230 VAC +/-10%, 50/60Hz. Single phase. 3.7Amps RMS max.

3. HIGH VOLTAGE PERFORMANCE

a. Output Power:
Maximum output Power (200kV, 6.0mA) 500W

b. Tube Voltage Operational Range:
The high voltage is programmed within the range of 80 to 200 kV.

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 +/-1%.

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 rise time is ~ 1sec 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 6.0mA @ 500W 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 230Vac +/-10%.
< 0.5% for the output voltage change of 80kV to 200kV.

5. PROTECTION AND SAFETY CIRCUITRY

a. Over-current protection:
The Over-current trip point is set for within 6.3 to 6.6mA. 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 210kV to 220kV. This will disable the high voltage output. A Reset is required to clear this fault.

c. 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.

d. Arc Detection Fault:
When an Arc occurred, the arc fault LED will be ON. If multiple arcs occurred within 10sec, the arc fault signal will be latched. This will disable the high voltage output & a reset is required to clear this fault.

e. Reg. Fault:
When KV or mA output is out of regulation, the unit will disable the high voltage output. A Reset is required to clear this fault.

f. Power Limit Fault:
When the kV/mA feedback values exceed the maximum rated power limit, this will 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:
J2-1 & J2-2 to close through external interlock switches to satisfy the safety. X-Rays will not be produced & interlock open message will be displayed unless J2-1 & J2-2 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. SAFETY REQUIREMENTS

a) Safety Compliance: Designed to meet CE, EN/UL 61010-1 and EN 61326-1.
b) To comply with EN55011, Class B for conducted and radiated emission limits, an external EMI filter (SunHenry, p/n SH710-6 or equivalent) is required to be used at the AC input, mounted directly to the control inverter unit.
c) 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

a. X Ray Beam Filtration: 1.5mm of Ultem
b. X-ray Beam geometry: Fan beam 90^{o} x 10^{o} (Beam port allows for 105^{o} max.)
c. Focal Spot Size: 0.8mm per IEC60336
d. Target Material: Tungsten

e. Tube Inherent Filtration: 0.8mm Be + 1.5mm Glass

9. PHYSICAL SPECIFICATIONS

a. **Environmental**
- Maximum operating ambient temperature: 5°C to 40°C.
- Maximum operating housing temperature: 55ºC
- 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 in Item 15

d. **Weight**
X-ray generator: ~65 lbs
Control box: 7 lbs

e. **Cooling method**
Through an Integrated liquid heat exchanger

10. AC POWER INPUT CONNECTOR – J1
- Voltage: 230VAC +/- 10%, 50/60Hz
- Current: 3.7 Amps RMS max.

11. LED INDICATORS

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

12. CONTROL CABLE AND CONNECTOR

a. **J1 Connector: AC Input**

b. **J2 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
6	N/A
7	N/A
8	N/A
9	N/A

c. **J3 Connector:** (RS232 9 Pin Female)

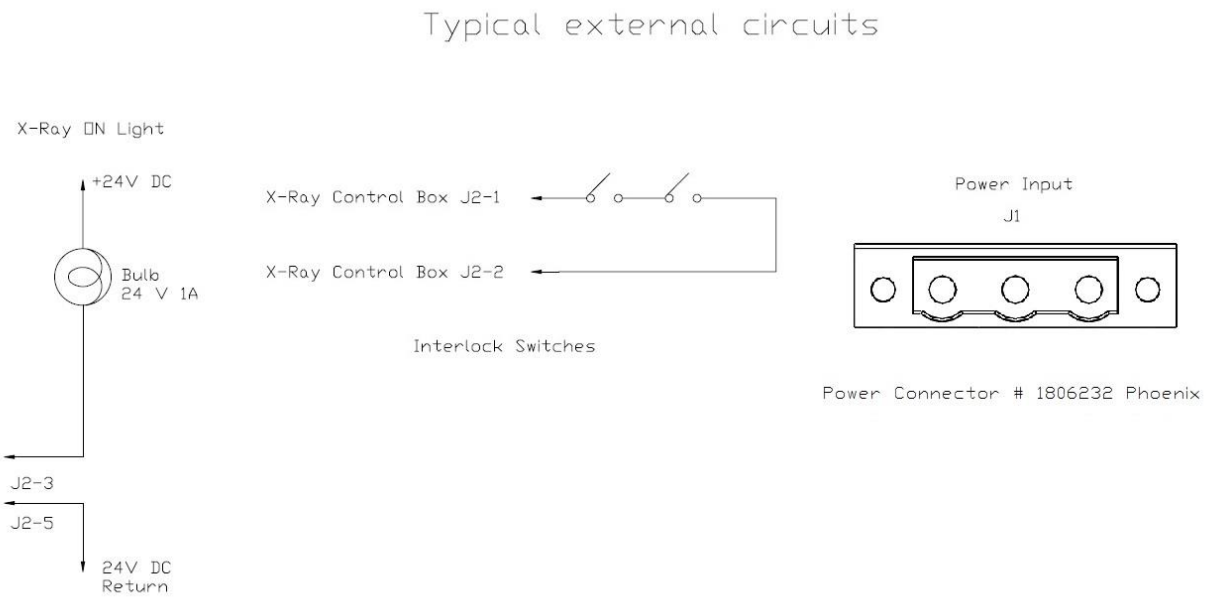
Pin Out	Name
1	N/A
2	TX-
3	RX+
4	N/A
5	SIGNAL GND
6	N/A
7	N/A
8	N/A
9	N/A

d. **Control Cable:** 4ft standard

13. DIGITAL INTERFACE

Refer to document P562-IXS-FIRMWARE-P562.

14. TYPICAL EXTERNAL CIRCUITS



15. MECHANICAL DRAWINGS

Figure 1: X-ray Generator

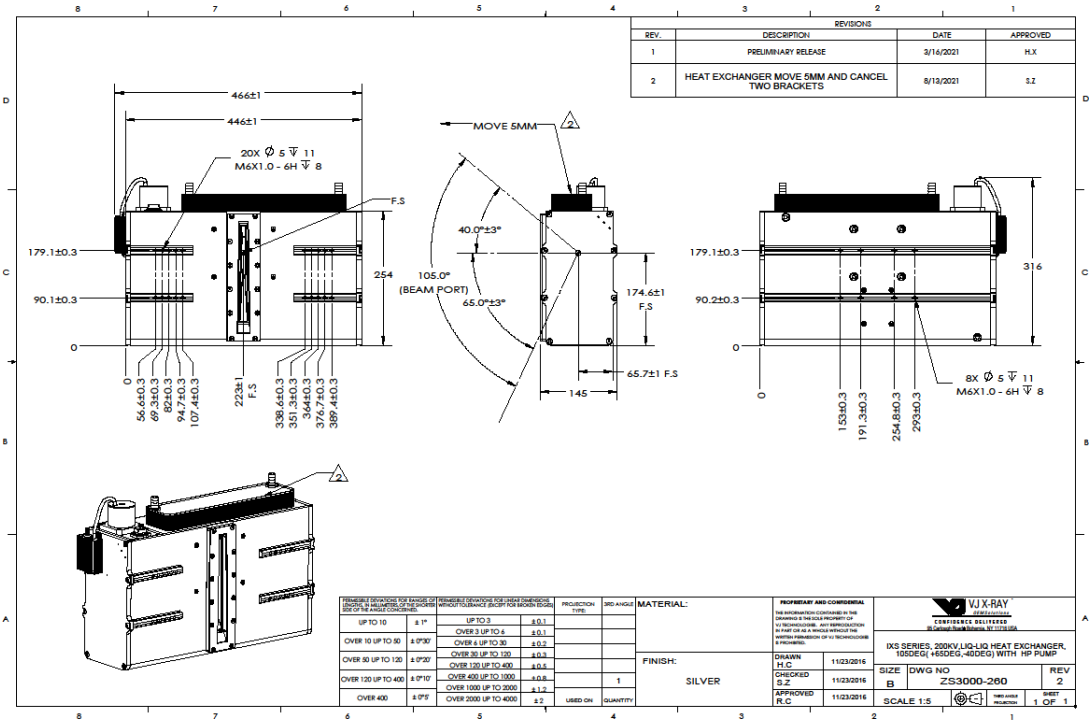
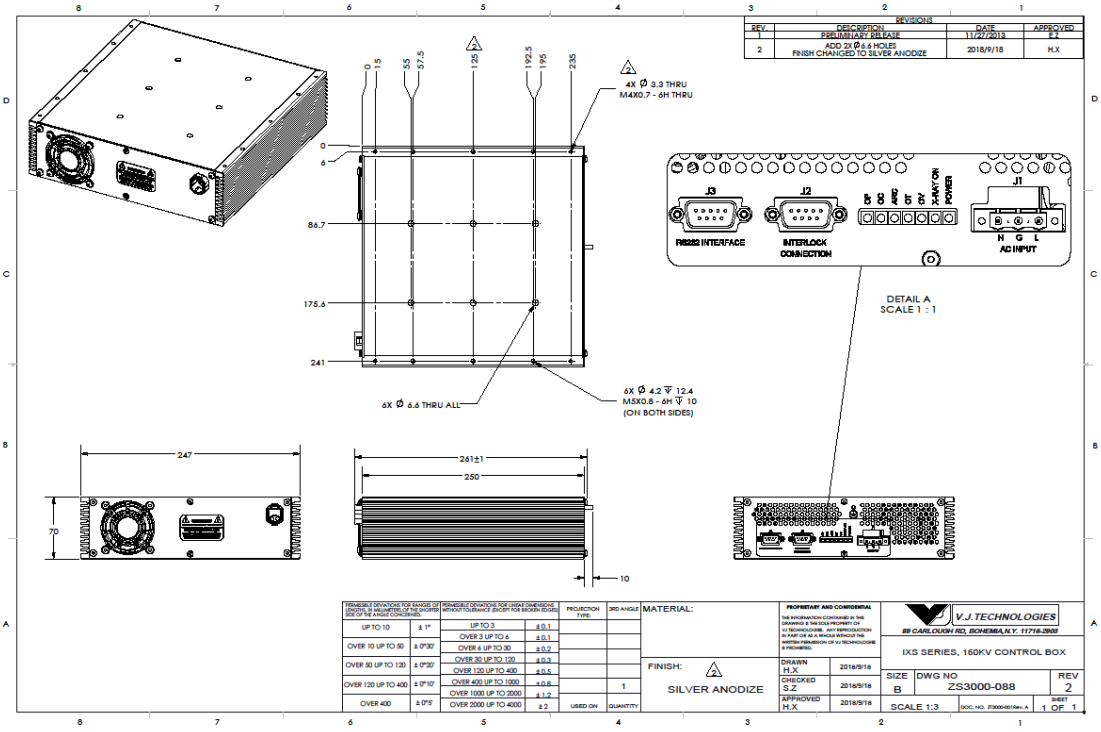


Figure 2: Control Box



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