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Technical Specification :

High Voltage Power Supply

(Part Numbers:- 901239, 7933469 and 7934428)

HVPSU overview

The HVPSU has been designed to provide the High Voltage (160kV) and associated control necessary to power the Nordson Dage range of X-ray Tubes.

Care must be taken to ensure the unit is correctly installed (Nordson DAGE approved engineers only) and the host machine correctly configured.

The HVPSU is designed only for connection to a DAGE X-Ray Tube and for use where the X-Ray Tube is installed in an interlocked shielded enclosure to prevent X-ray leakage and inadvertent exposure. As with all Nordson Dage X-ray Tubes it is designed to be integrated into a complete X-ray system by a qualified system integrator. The system integrator is responsible for obtaining any necessary approval or clearance for use and ensuring the complete system meets all safety requirements.

Hardware

Refer to Schematic 802557-D (sheets 1 to 4)

Supply

The unit is powered by a permanent mains supply and a switched mains supply, via a 7W connector, both supplies are protected by integral thermal over-current circuit breakers located on the rear of the unit just below the HV connector. The unit will not function correctly if one or both circuit breakers are tripped. Should the circuit breaker trip, the cause of the problem must be investigated prior to resetting by a Nordson DAGE approved engineer.

The permanent supply is connected to a switched mode power supply (PSU1) which provides low voltage (+5 +/-15V) to the control circuitry.

The switched mains supply powers the second switched mode supply (PSU2), this provides the 24V rail that provides the power for the Filament, Grid and HV generation. The switched mains to the unit must be part of the cabinet safety interlock system to prevent the generation of the HV unless the provided safety system is active.

High Voltage – Low Voltage Isolation

The HV is generated within the HV generator using standard Cockcroft-Walton voltage multiplier stages to derive the KV required, 160kV. To prevent voltage breakdown or discharge the multiplier stack is encapsulated within silicone with the HV terminating at the HV connector. The HV Power Supply is fully enclosed within an earthed metal enclosure which is connected to the machine earth via its main cordage and a separate earth braid direct to the machine chassis. Should the HV breakdown within the silicone, then this would either cause a malfunction of the stack, causing the unit to shut down, or effectively provide a current path to the internal screening or the enclosure.

The X-ray Tube metal casing is connected to the machines protective ground, should a momentary discharge (arc) or more permanent 'short' develop then this would be discharged to the machine earth.

Controls and Indicators

There are no user controls present on the HVPSU. At the rear of the unit six status LED's provide information to aid fault finding and should only be accessed by approved engineers.

The PSU Fault LED will be lit at all times power is applied to the PSU until all interlocks are closed and proven. Only then will PSU OK be displayed .

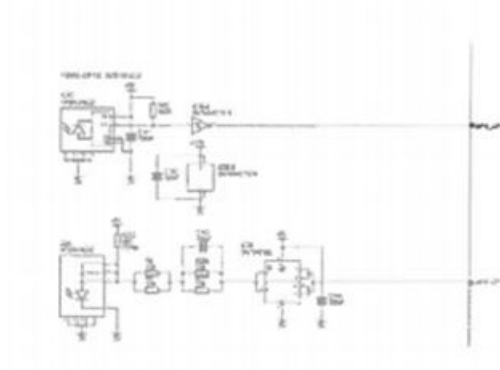
Service and Maintenance

There are no user serviceable components located within the electrical enclosure of the HVPSU.

Variance

The base HVPSU module is part 901239.

7933469- This build of HVPSU contains a different interface to the X-ray Tube, part 901239 has an analogue interface, whereas this part is fitted with an optical interface to provide the same information.



This circuitry replaces the analogue interface and is located on the main control board and is part of the low voltage circuit. The difference is restricted to the communication method to the Tube.

7934428- This build uses the analogue interface as 901239, however, it contains circuitry to provide a DC voltage of a few volts for the Filament, necessary to drive the slightly higher filament resistance. The DC voltage is provided by a bridge rectifier and associated capacitors located within the encapsulation of the high voltage stack. All other components and build are identical.