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High Voltage Power Supply
XMPF10N5/24

SAFETY AND INSTALLATION INSTRUCTIONS

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Issue	**A**	**1**	
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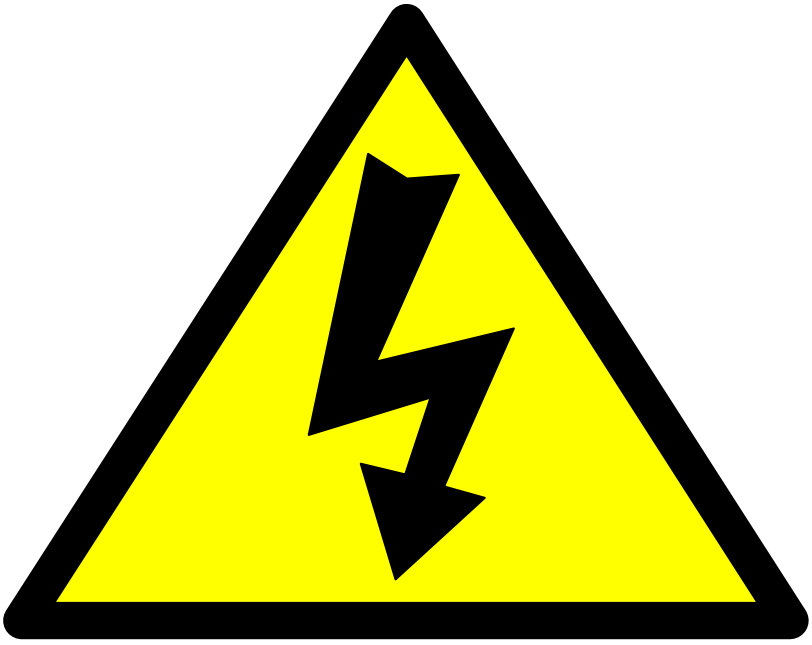
SAFETY



DANGER
HIGH VOLTAGE
RISK OF ELECTROCUTION

Observe extreme caution when working with this equipment

- **High voltage power supplies must always be connected to protective earth**
- **Do not touch connections unless equipment is turned off and the capacitance of both the load and power supply are grounded**
- **Allow adequate time for discharge of internal capacitance of the power supply**
- **Do not ground yourself or work under wet or damp conditions**

Servicing Safety

- **Maintenance may require removing the Instrument cover with the power on**
- **Servicing should only be done by qualified personnel aware of the hazards**
- **If in doubt, return to supplier for servicing**

Change History

Section	Reason for Change	Issue
All	Original	A
4 5 6 7	Added regulatory specifications Added environmental conditions Added mechanical details, and Earth stud indication and info on drawing Added input output connections details	1

Contents

1 Unit Description

The XMPF10N5/24 unit consists of one chassis containing the high voltage power supply.
The dimensions are 170mm x 70mm x 30mm

The unit is designed for operation from 24Vdc ± 10%. The maximum rated input current is 500mA.

The unit provides an HV Cathode output rated at -10kV, 5W. With a floating filament intended to drive an X-ray tube with a grounded anode, rated at 0V to 3.5Vac referenced to the Cathode Output, 0.42A max.

All control and monitoring is accomplished via a 15 way 'D' connector which also provides input power to the unit.

2 Safety

The HV output of the unit is hazardous and the conditions of this manual must be complied with to maintain safety. Operating the unit in a manner not specified in this manual may impair the protection against electric shock provided by the unit.

The unit is contained in an earthed case, the system protective earth shall be provided to the chassis. The case of the unit shall be properly bonded to the main protective earth termination in the end product.

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

Consideration should be given to conducting the following tests with the unit installed in the end product:

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

There is no relevance to a risk assessment carried out as part of the CE testing on the HV unit. It is recommended that a full assessment is carried out in the end application.

 This symbol on the unit means "read the manual before powering the equipment".

 This symbol on the unit means "Caution; risk of electric shock".

3 Installation

3.1 Initial Inspection

Inspect the package exterior for evidence of damage due to handling in transit. Notify the carrier and Spellman immediately if damage is evident. Do not destroy or remove any of the packing material used in a damaged shipment.

After unpacking, inspect the panel and chassis for visible damage.

Note: Failure to comply with the above could compromise the safe operation of the unit and invalidate the warranty.

3.2 Mechanical Installation

The unit should only be used in a Pollution Degree 2 Installation Category II environment.

The input and output connectors are not intended for field connections and should only be connected to internal wiring in the end product. The unit is intended for use as a component and no surface of the unit should be accessible in the end product.

3.3 Electrical Installation

The unit must be terminated safely before operation. Hazardous voltages will be exposed if the connector is removed whilst the unit is enabled.
The 24Vdc input shall be provided by a double insulated, or SELV, UL recognised power supply.

Circuits connected to the unit shall be provided with rated insulation to IEC/UL61010-1.

The unit must be switched off for at least one minute before disconnecting any of the connectors.

4 Regulatory Specifications

The unit is designed to meet the requirements of EN 61010-1, UL 61010-1 and CAN/CSA-22.2 No. 61010-1. Please consult the factory for further approval information.

As the unit is designed for incorporation within the user's system it is not tested against any specific EMC standards. The user will need to take sensible EMC precautions when designing the unit in and verify the overall system EMC performance against any relevant standards.

5 Environmental conditions

5.1 Operating

Protection:	The power supply will be designed to meet IP40 and will be reasonably protected against dust.
Temperature:	+5°C to +40°C.
Relative Humidity:	20% to 80% (no condensation)

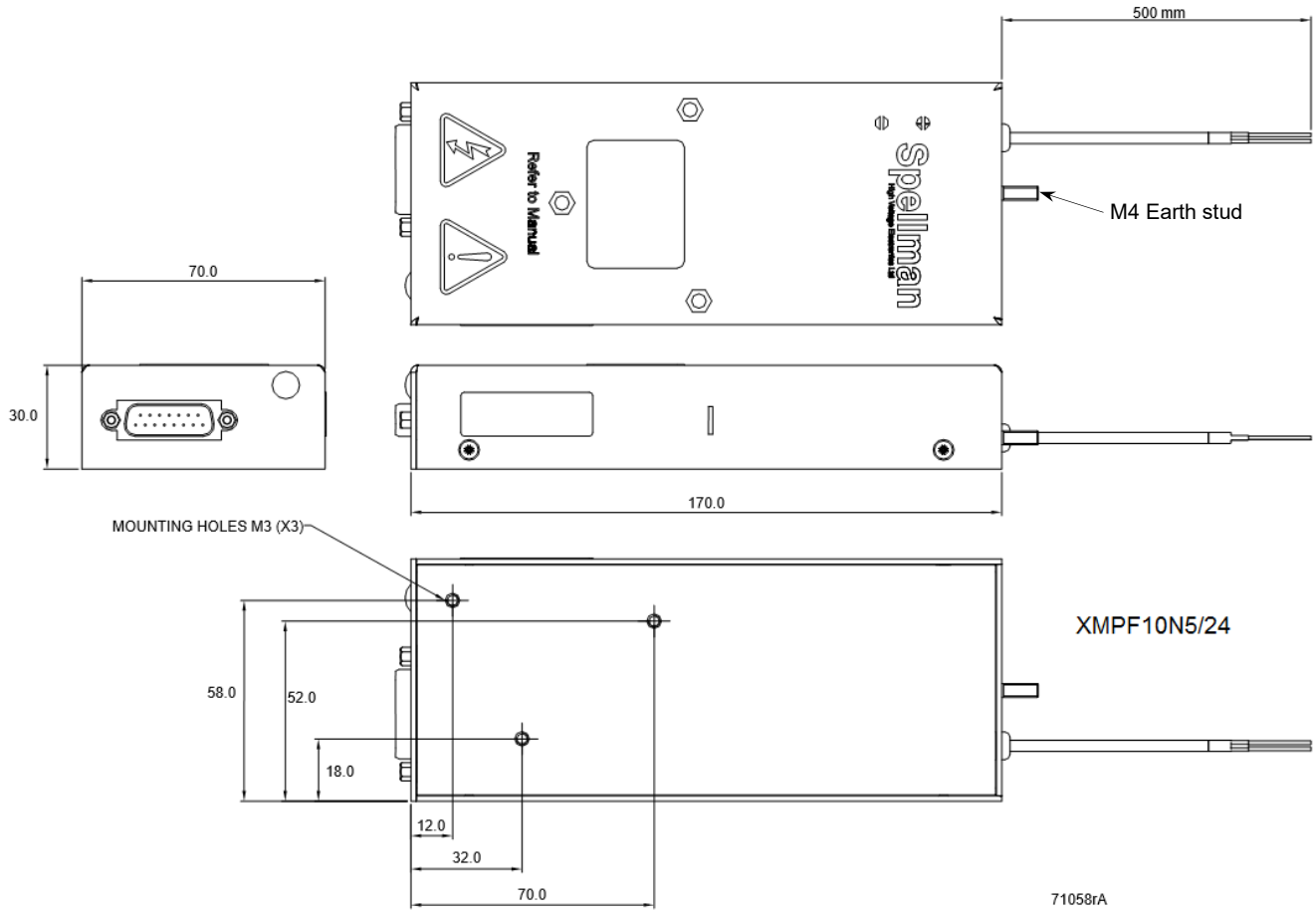
5.2 Storage

Temperature:	-40°C to +70°C.
Relative humidity:	5% to 95%
Absolute humidity:	maximum 25 gm^{-3}
Maximum storage period:	>0.25 year (at above conditions)
Long term storage:	>3 year (special packaging required)

6 Mechanical

6.1 XMP10 Mechanical outline: 170mm x 70mm x 30mm

The mass of the module is nominally 2kg.



7 Input and Output Connections

7.1 Monitoring and Control

7.1.1 Filament (direct program)

If required, the filament can be programmed directly. In this case the emission current is not controlled it will be fixed by the filament setting. This requires removal of an internal link and should be requested when the unit is ordered so that it can be configured at the factory.

7.1.2 HV enable

This is a digital input which controls the output. Driving this input low (< 0.8V) will cause the filament current to increase from its pre heat level to the value set by the pre-set maximum filament current adjustment. The HV converter then starts up and reaches full output approximately 4.5 seconds after the HV enable is driven low. Disconnecting or driving this input high (>2.4V) will cause the filament to return to its pre heat value and the HV output is disabled. The maximum input voltage of this input is 12V.

7.1.3 Cathode voltage program output

A 10V internal reference voltage and 12 turn 5kΩ potentiometer is provided that can be used to pre-set the cathode voltage. Connecting this output to the cathode voltage program input will allow the voltage of the cathode to be pre-set using the internal potentiometer.

7.1.4 Cathode voltage program input

0 – 10V input corresponding to 0 – 10kV on the cathode output.
Accuracy ±2% of full scale.
Z_{in} =470kΩ

7.1.5 Cathode voltage monitor

0 – 10V output corresponding to 0 – 10kV on the cathode output.
Accuracy ±2% of full scale.
Z_{out} = 2k2Ω

7.1.6 Emission current monitor

0 – 10V output corresponding to 0 – 500uA emission current.
Accuracy ±3% of full scale.
Z_{out} = 2k2Ω

7.1.7 Filament current monitor

0 – 10V output corresponding to 0 – 500mA filament current.
Accuracy ±5% of full scale.
Z_{out} = 2k2Ω

7.1.8 Emission current program input

0 – 10V input corresponding to 0 – 500uA emission current.
Accuracy ±3% of full scale.
Z_{in} = 10MΩ

7.1.9 Emission current program output

A 10V internal reference voltage and 12 turn 10kΩ potentiometer is provided that can be used to pre-set the emission current. Connecting this output to the emission current program input will allow the emission current to be pre-set using the internal potentiometer.

7.1.10 Pre-set maximum filament current set value.

A 10V internal reference voltage and 12 turn 10KΩ potentiometer is provided that can be used to pre-set the maximum filament current. This is brought out to a pin so that it can be measured.

0 – 10V output corresponding to 0 – 500mA filament current.

7.2 The low voltage signal connections are made by a 15 way ‘D’ connector; the pin out is shown below.

Pin #	Signal Name	Range
1	+24V input	
2	Power Ground	
3	Filament (direct program)	
4	Signal ground	
5	HV enable	Digital input
6	Not used	
7	Cathode voltage program output	0 – 10V from internal pre set
8	Cathode voltage program input	0 – 10V input
9	Cathode voltage monitor	0 – 10V output
10	Emission current monitor	0 – 10V output
11	Filament current monitor	0 – 10V output
12	Emission current program input	0 – 10V input
13	Emission current program output	0 – 10V from internal pre set
14	Signal ground	
15	Pre-set maximum filament current set value	0 – 10V from internal pre set

The filament current limit is set via an internal pre-set accessible through the case.
If external cathode voltage control is not required link pins 7 and 8.
If external emission current control is not required link pins 12 and 13.

7.3 Output:

The HV output is a flying lead consisting of 2 Reynolds 18kV rated FEP insulated wire, 1.02mm overall diameter. Conductors 19/40AWG. Overall length 500mm. The two wires are sleeved together.

Pin	Name
N/A	Filament+/Cathode
N/A	Filament-/Cathode