

# E2V Technologies

## FX1585

### Hydrogen-Filled Thyatron

The data to be read in conjunction with the Hydrogen Thyatron Preamble.

#### ABRIDGED DATA

Hydrogen-filled, flange mounted triode thyatron designed for high voltage modulator applications. It has a rugged internally connected reservoir and an internal X-ray shield to minimise X-ray emission from the region of the anode.

Peak forward anode voltage . . . . .	30	kV max
Peak anode current . . . . .	1000	A max
Average anode current . . . . .	0.6	A max

#### GENERAL DATA

##### Electrical

Cathode (connected internally to one end of heater) . . . . .	oxide coated
Cathode heater voltage (see note 1) . . . . .	6.3 ± 5% V
Cathode heater current . . . . .	13 A
Tube heating time (minimum) . . . . .	5.0 min

##### Mechanical

Seated height . . . . .	230.2 mm (9.062 inches) max
Clearance required below mounting flange . . . . .	31.75 mm (1.250 inches) min
Overall diameter (mounting flange) . . . . .	88.9 mm (3.500 inches) nom
Net weight . . . . .	450 g (1 pound) approx
Mounting position (see note 2) . . . . .	any
Tube connections . . . . .	see outline
Top cap connector (see note 3 and page 4) . . . . .	MA360A

**Cooling (See note 4)** . . . . . natural

#### PULSE MODULATOR SERVICE MAXIMUM AND MINIMUM RATINGS (Absolute values)

	Min	Max
<b>Anode (continuous operation)</b>		
Peak forward anode voltage (see note 5) . . . . .	-	30 kV
Peak inverse anode voltage (see note 6) . . . . .	-	30 kV
Peak anode current . . . . .	-	1.0 kA
Average anode current . . . . .	-	0.6 A
Rate of rise of anode current (see note 7) . . . . .	-	10 kA/μs



	Min	Max
<b>Anode (fault/single shot condition) (see note 8)</b>		
Peak anode current . . . . .	-	3 kA
Capacitor discharge . . . . .	-	0.3 C
Power supply follow-on . . . . .	-	3 C

**PULSE MODULATOR SERVICE  
(Continued)**

	Min	Max	
<b>Grid</b>			
Unloaded grid drive pulse voltage (see note 9)	500	2000	V
Grid pulse duration	1.0	-	μs
Rate of rise of grid 2 pulse (see note 7)	4.0	-	kV/μs
Peak inverse grid 2 voltage (see note 10)	-	450	V
Forward impedance of grid 2 drive circuit	50	200	Ω

**Heaters**

Cathode heater voltage	6.3 ± 5%		V
Tube heating time	5.0	-	min

**Environmental**

Ambient temperature	0	+50	°C
Altitude	-	3	km
	-	10 000	ft

**CHARACTERISTICS**

	Min	Typical	Max	
Critical DC anode voltage for conduction (see note 11)	-	1.5	4.0	kV
Anode delay time (see notes 11 and 12)	-	0.2	0.50	μs
Anode delay time drift (see notes 11 and 13)	-	20	50	ns
Time jitter (see note 11)	-	2.0	5.0	ns
Heater current (at 6.3 V)	11.5	13	14.5	A

**NOTES**

1. An internal reservoir is connected in parallel with the cathode heater, to protect the reservoir from damage by pulse voltage spikes a suitable pulse capacitor should be connected in parallel with the heater leads as close as possible to the tube base.
2. The tube must be fitted by means of its mounting flange.
3. A large area anode connector, E2V Technologies type MA360A, is recommended for high average current operation.
4. Air must be allowed to circulate past the tube and the tube base.
5. This is the maximum peak forward operating voltage for the thyatron.
6. In pulsed operation the peak inverse voltage following conduction, exclusive of a spike of <50 ns duration, must not exceed 5 kV during the first 25 μs after the anode current pulse.

7. This rate of rise refers to that part of the leading edge of the pulse between 10% and 90% of the pulse amplitude.
8. Consideration must be given to the fault current that will flow if the thyatron locks-on to the charging current. The speed of the overload circuits and contactors will determine the total fault energy delivered by the power supply.
9. Measured with respect to cathode potential.
10. This is the maximum peak inverse voltage, arising from the grid drive circuit (usually from the grid trigger transformer back swing), which should be applied to the grid. Standing DC negative bias must not be applied to the grid.
11. Typical figures are obtained on test using conditions of minimum grid drive. Improved performance can be expected by increasing grid drive.
12. The time interval between the instant at which the rising unloaded grid 2 pulse reaches 25% of its pulse amplitude and the instant when anode conduction takes place.
13. The drift in delay time over a period from 10 seconds to 10 minutes after reaching full voltage.

**HEALTH AND SAFETY HAZARDS**

E2V Technologies hydrogen thyratrons are safe to handle and operate, provided that the relevant precautions stated herein are observed. E2V Technologies does not accept responsibility for damage or injury resulting from the use of electronic devices it produces. Equipment manufacturers and users must ensure that adequate precautions are taken. Appropriate warning labels and notices must be provided on equipments incorporating E2V Technologies devices and in operating manuals.



**High Voltage**

Equipment must be designed so that personnel cannot come into contact with high voltage circuits. All high voltage circuits and terminals must be enclosed and fail-safe interlock switches must be fitted to disconnect the primary power supply and discharge all high voltage capacitors and other stored charges before allowing access. Interlock switches must not be bypassed to allow operation with access doors open.



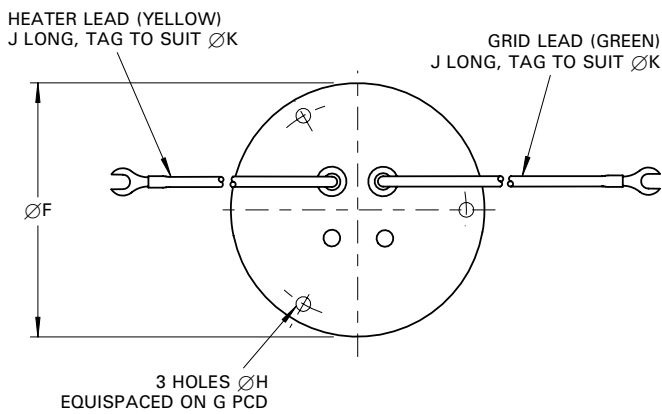
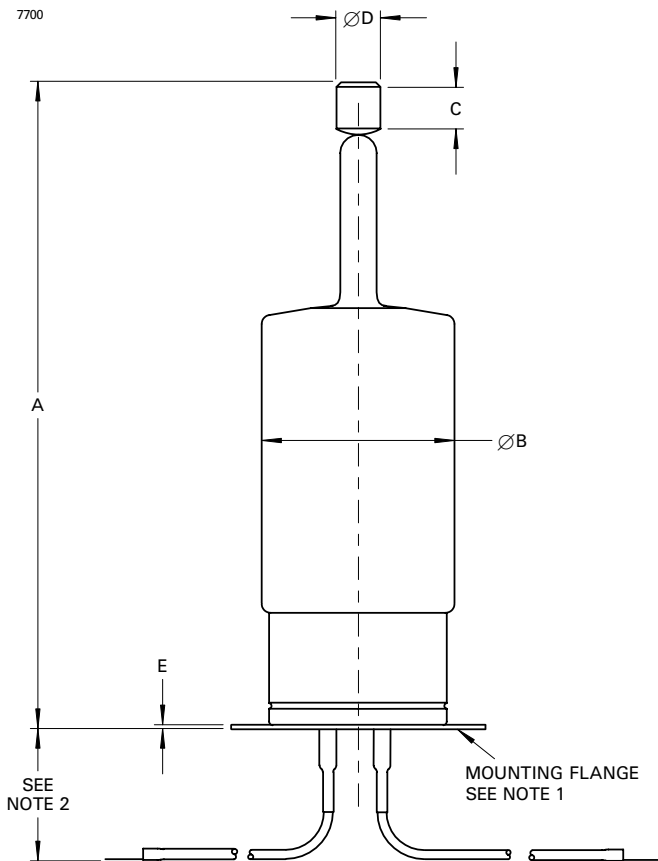
**X-Ray Radiation**

All high voltage devices produce X-rays during operation and may require shielding. The X-ray radiation from hydrogen thyratrons is usually reduced to a safe level by enclosing the equipment or shielding the thyatron with at least 1.6 mm (1/16 inch) thick steel panels.

Users and equipment manufacturers must check the radiation level under their maximum operating conditions.

# OUTLINE

(All dimensions without limits are nominal)



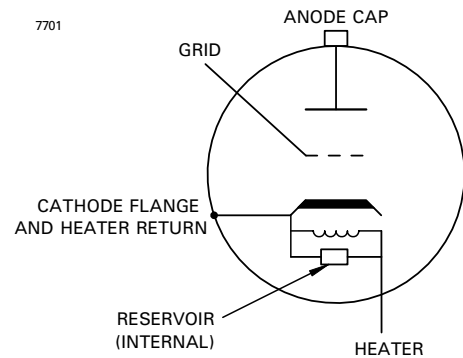
Ref	Millimetres	Inches
A	223.82 ± 6.35	8.812 ± 0.250
B	65.07 max	2.562 max
C	12.70 min	0.500 min
D	14.38 ± 0.18	0.566 ± 0.007
E	1.60	0.063
F	88.90	3.500
G	76.20	3.000
H	5.00	0.197
J	152.4 min	6.000 min
K	6.00	0.236

Inch dimensions have been derived from millimetres .

## Outline Notes

1. The mounting flange is the connection for the cathode and cathode heater return.
2. A minimum clearance of 31.75 mm (1.250 inches) must be allowed below the mounting flange

## SCHEMATIC DIAGRAM

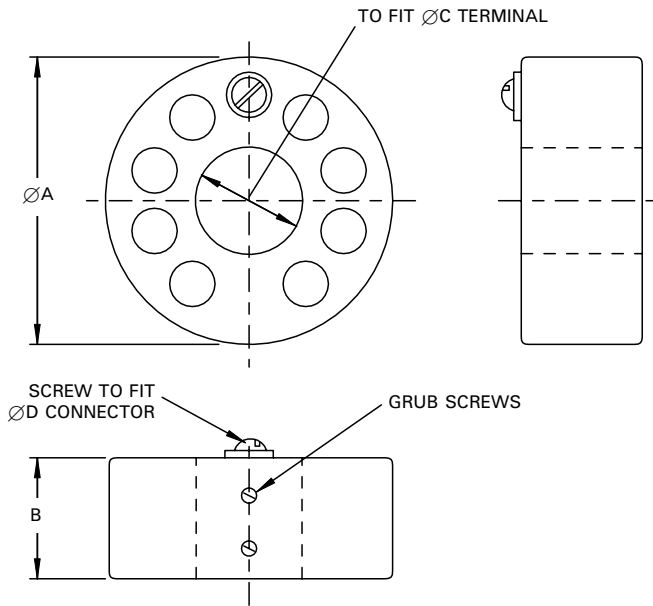


# TOP CAP CONNECTOR MA360A

(All dimensions nominal)

This item is sold separately

4269A



Ref	Millimetres	Inches
A	38.1	1.500
B	15.88	0.625
C	14.38	0.566
D	4.75	0.187

Inch dimensions have been derived from millimetres.

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