



Hot-Cathode Mercury-Vapour Thyatron

Code: 3V/490A

The 3V/490A is a mercury-vapour thyatron for use mainly in motor speed and other industrial control applications. It is electrically similar to the U.S.A. FG-105A type.

CATHODE.

Indirectly-heated, oxide-coated

Heater voltage	5	V
Nominal current	10.5	A
Minimum cathode heating time	10	min←

DIRECT INTERELECTRODE CAPACITANCES.

Anode to grid	0.1	pF←
Grid to cathode	15	pF←

MECHANICAL DATA.

Maximum overall length	285	mm
Maximum seated height	270	mm
Maximum bulb diameter	66.6	mm
Base	B4D	←
Net weight	350	g

MAXIMUM RATINGS.

Maximum peak anode voltage		
Forward	2500	V
Inverse	2500	V←
Maximum anode current		
Peak (at 25 c/s and above)	40	A
Average	6.4	A
Fault (maximum duration 0.1 second)	400	A
Maximum negative grid voltage	-1.0	kV
Maximum grid current		
Peak	1.0	A
Average	0.25	A

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Recommended grid circuit resistance

Maximum	100	kΩ←
Minimum	1.0	kΩ
Maximum voltage drop	16	V←
Condensed mercury temperature range	35 to 80	°C

The above ratings apply to operation with a choke input filter and a supply frequency of 50 cycles per second.

MAXIMUM PEAK INVERSE VOLTAGE RATINGS AND CONDENSED MERCURY TEMPERATURES

Condensed mercury temperature range	Up to 70 °C	Up to 80 °C
Maximum peak inverse voltage	Up to 2500 V	Up to 1500 V

CATHODE HEATING TIME.

The minimum cathode heating time for this valve is 10 minutes. After shipment or transit the valve must be pre-heated for not less than 30 minutes before any anode voltage is applied so that the mercury may be correctly distributed.

THYRATRON OPERATION.

With a condensed mercury temperature of 35°C the minimum values of negative grid blocking voltages required to prevent ignition are approximately :

Anode Voltage	Grid Voltage
100 V	+1 V
1000 V	-9 V

For positive operation it is recommended that for a given anode voltage the grid should be biased back beyond the value required to prevent ignition, and a positive firing pulse of 20 to 30 volts peak applied.



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The pulse should have a leading edge as near vertical as possible and the grid pulse circuit should be of high impedance in order to limit the grid current.

The control of the output may be affected by varying the phase of the grid pulse relative to the phase of the applied anode voltage.

TYPICAL OPERATING CONDITIONS.

Circuit	No. of Valves	Maximum A.C. Input Volts (R.M.S.)	Maximum D.C. Output Volts (Volts)	Maximum D.C. Output Current (Amps)
Single Phase Full Wave Circuit No. 1	2	883	795	12.8
Single Phase Full Wave Bridge Circuit No. 2	4	1766	1590	12.8
Three Phase Half Wave Circuit No. 3	3	1020	1195	19.2
Three Phase Double Y Parallel Circuit No. 4	6	1020	1195	38.4
Three Phase Full Wave Circuit No. 5	6	1020	2390	19.2

The above tables suitable circuits for this thyatron, and shows their safe maximum input and output conditions. The values are based on sine wave input and the use of a suitable choke input filter.

For details of the circuits referred to see sheet K—8 in the introduction to this handbook.

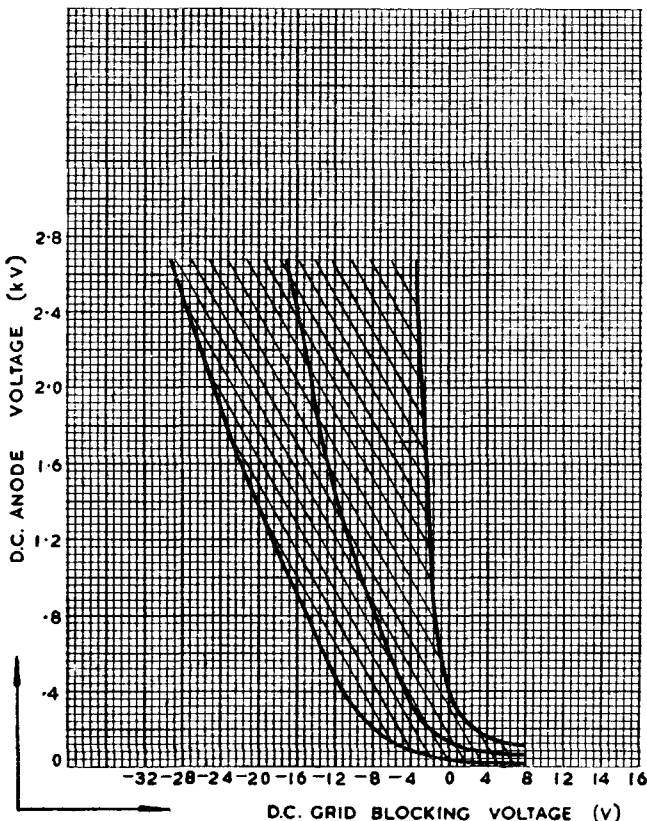
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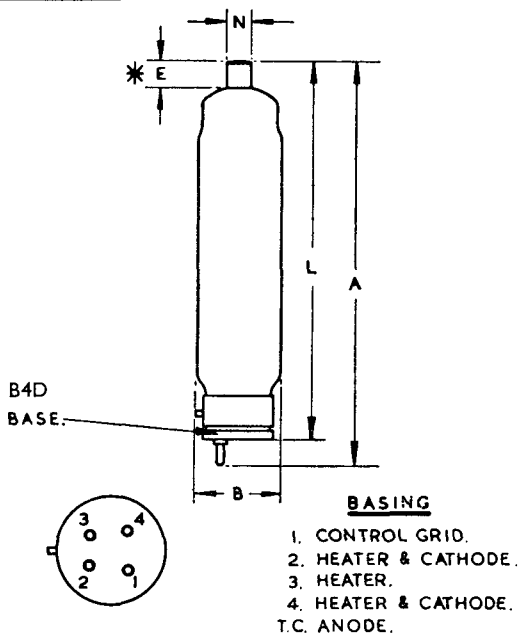
3V/490 A	TYPICAL CONTROL CHARACTERISTICS. SHADED AREA INDICATES THE SPREAD	Hg 35 °C
VL 1897		





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DIM.	MILLIMETRES	INCHES
A	292.1 MAX.	11 $\frac{1}{2}$ MAX.
B	66.7 MAX.	2 $\frac{5}{8}$ MAX.
L	274.6 MAX.	10 $\frac{13}{16}$ MAX.
N	20.32 $\pm$ 0.25	0.800 $\pm$ 0.010
E	17.5 MIN.	1 $\frac{1}{16}$ MIN.

NOTE: BASIC FIGURES ARE INCHES.

* **DENOTES** CONTACT LENGTH
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