

## TRIODE THYRATRON

# XRI-12

12 amp triode, inert gas-filled thyatron with negative control characteristic. Primarily designed for industrial power control applications.

This data should be read in conjunction with DEFINITIONS AND GENERAL OPERATIONAL RECOMMENDATIONS—THYRATRONS, which precede this section of the handbook.

### ABSOLUTE MAXIMUM RATINGS

It is important that these limits are never exceeded and such variations as mains fluctuations, component tolerances and switching surges must be taken into consideration in arriving at actual valve operating conditions.

#### Maximum peak anode voltage

Inverse	1.5	kV
Forward	1.5	kV

#### Maximum cathode current

##### Peak

Occasional (see operating note 1)	160	A
Recurrent	40	A

##### Average

*Maximum averaging time = 7s	12.5	A
*Maximum averaging time = 15min	9.0	A

*\*These ratings apply simultaneously*

#### Maximum negative grid voltage

Before conduction	250	V
During conduction	10	V

#### Maximum average positive grid current during the time that the anode voltage is more positive than -10V

(averaging time 1 cycle) 500 mA

#### Grid circuit resistance

Maximum	20	k $\Omega$
Recommended minimum	1	k $\Omega$

Maximum commutation factor 50 VA/ $\mu$ s<sup>2</sup>

Maximum ambient temperature +70 °C

Minimum valve heating time see page C4

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### CHARACTERISTICS

#### Electrical

Filament voltage	2.5	V
Maximum filament current at 2.5V	43	A
Anode-to-grid capacitance	50	pF
Grid-to-cathode capacitance	25	pF
Recovery (deionisation) time (approx.)	1	ms
Ionisation time (approx.)	10	$\mu$ s
Nominal anode voltage drop	16	V

Measurement of the filament voltage should be made at the shoulder of the lug immediately above the connecting hole.

When two or more valves are used with one filament transformer, the centre tap of the filament transformer must be used for circuit returns.

This may also be connected to the filament centre taps.

When quadrature operation is used, the voltage of filament lug No. 1 should be crossing zero from positive towards negative when the anode voltage is at the peak of the positive half cycle. When quadrature operation is not practicable, filament lug No. 1 should be negative when the anode is positive. In three phase systems, each valve should be connected so that its anode and filament voltages approximate as nearly as possible to quadrature phasing, i.e. filament voltage  $90^\circ \pm 30^\circ$  out of phase with the anode voltage.

#### Mechanical

Type of cooling	Convection
Recommended mounting position	Vertical with the filament lugs downwards

The valve should be mounted and ventilated in such a manner that adequate cooling by free convection is ensured.

It is recommended that the valve should be supported from the anode connector only. If it is necessary to mount the valve on the filament lugs, both the connectors must be flexible.

#### Spacing

A cylindrical volume of radius 130mm about the axis must be kept free of appreciable obstructions or heat producing components. When two or more valves are mounted in close proximity the distance between centres should not be less than 180mm.

Maximum net weight	{ 1 lb 12 oz
	{ 860 g
Nominal weight of valve in carton	{ 5 lb 3 oz
	{ 2.4 kg
Nominal dimensions of carton	{ 8.25 x 8.25 x 23 in
	{ 210 x 210 x 585 mm

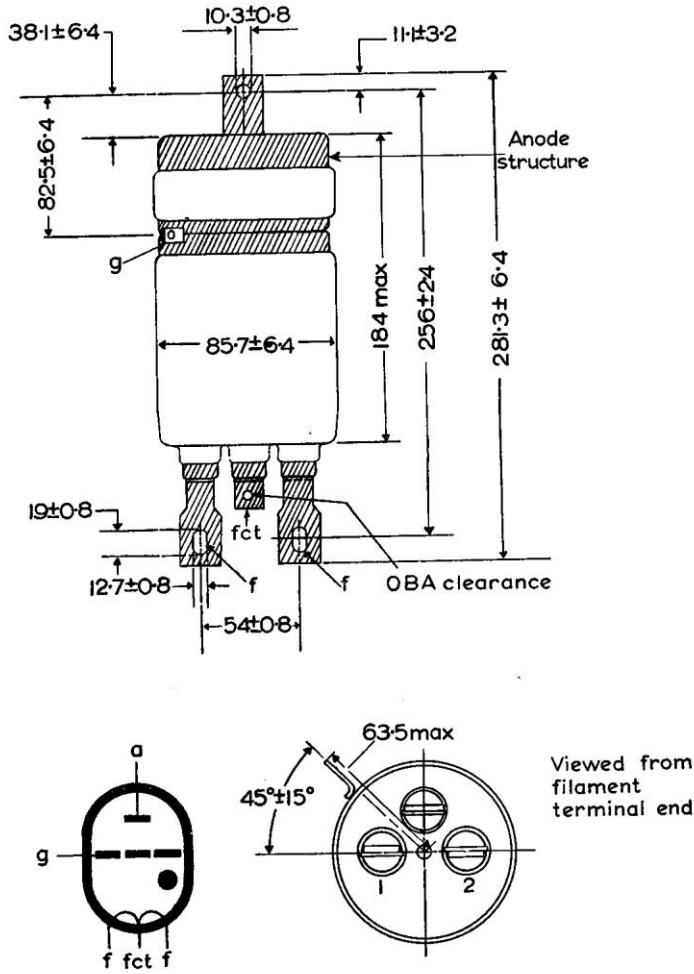
### OPERATING NOTES

1. When the peak cathode current exceeds 40A, the ratio of peak-to-average cathode current must not exceed 30 (minimum averaging time = 1s, see page C2). The total number of cycles (50c/s operation) in any 15 minute period during which peak currents in excess of 40A are drawn is limited (see page C3).
2. In order to prevent spurious ignition due to anode-to-grid coupling, it may be necessary to connect a capacitor of the order of 5000pF between grid and cathode.

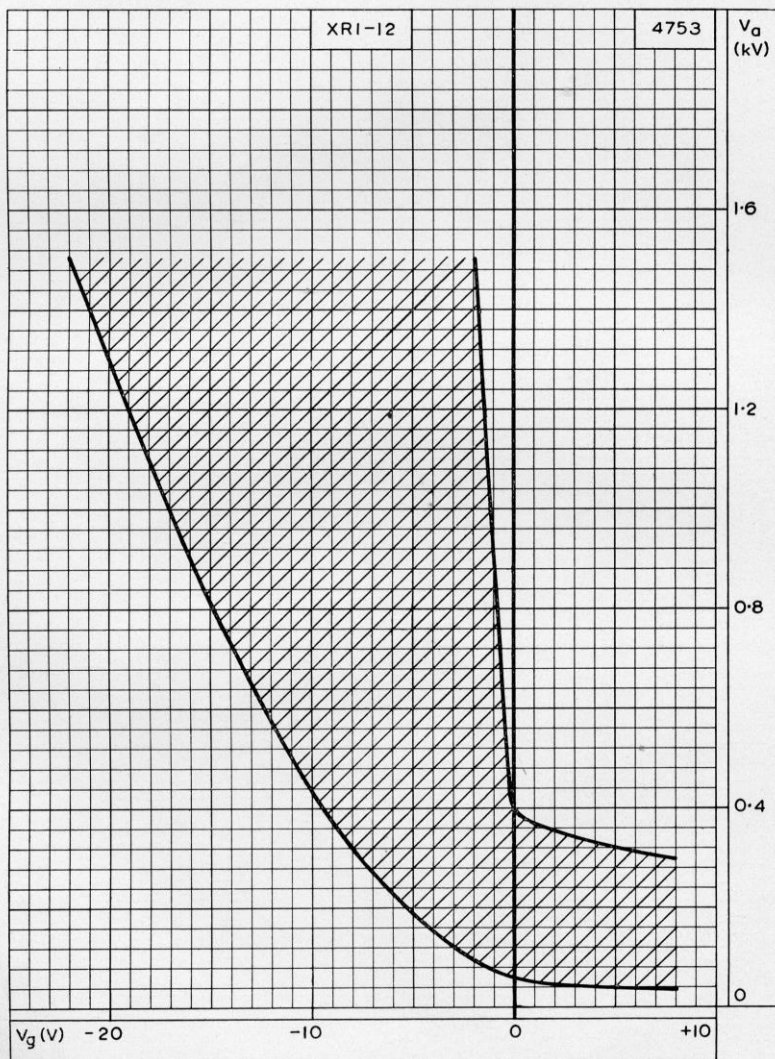
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3826



All dimensions in mm

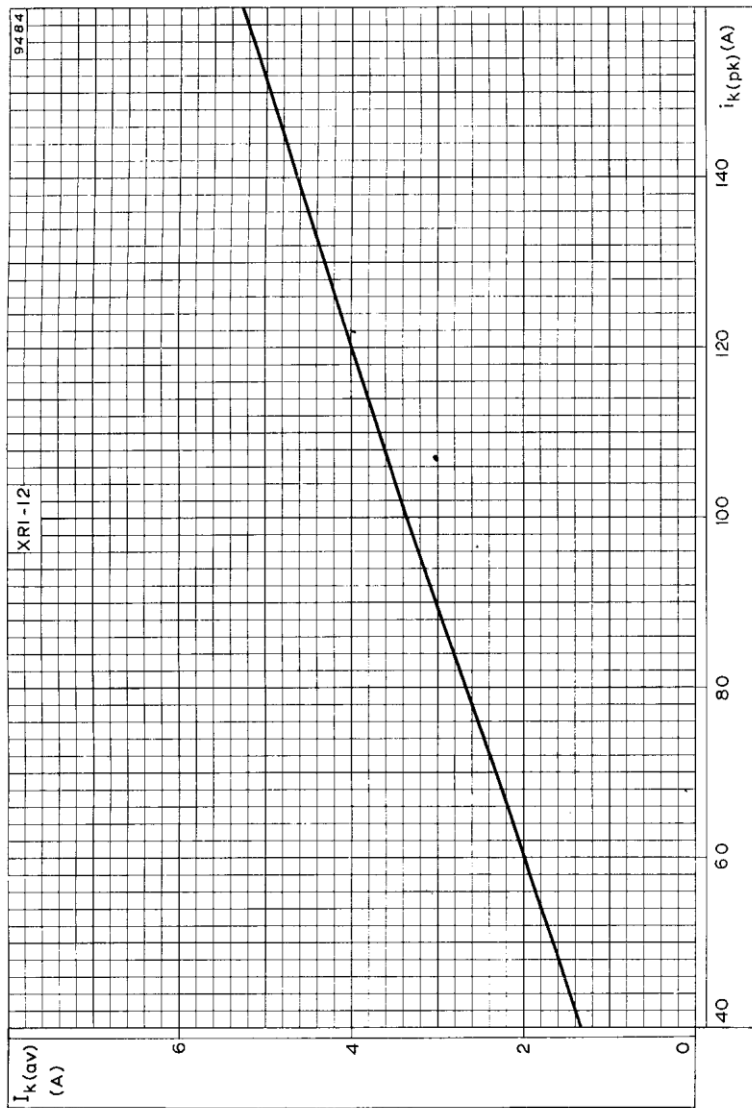


CONTROL CHARACTERISTIC

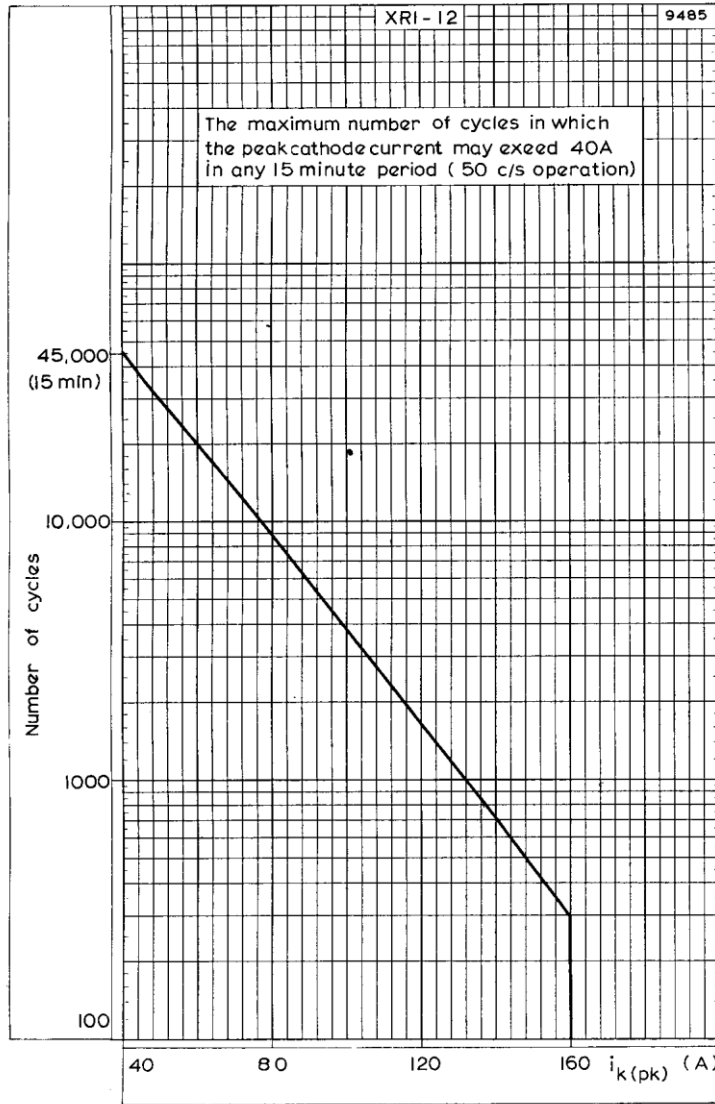


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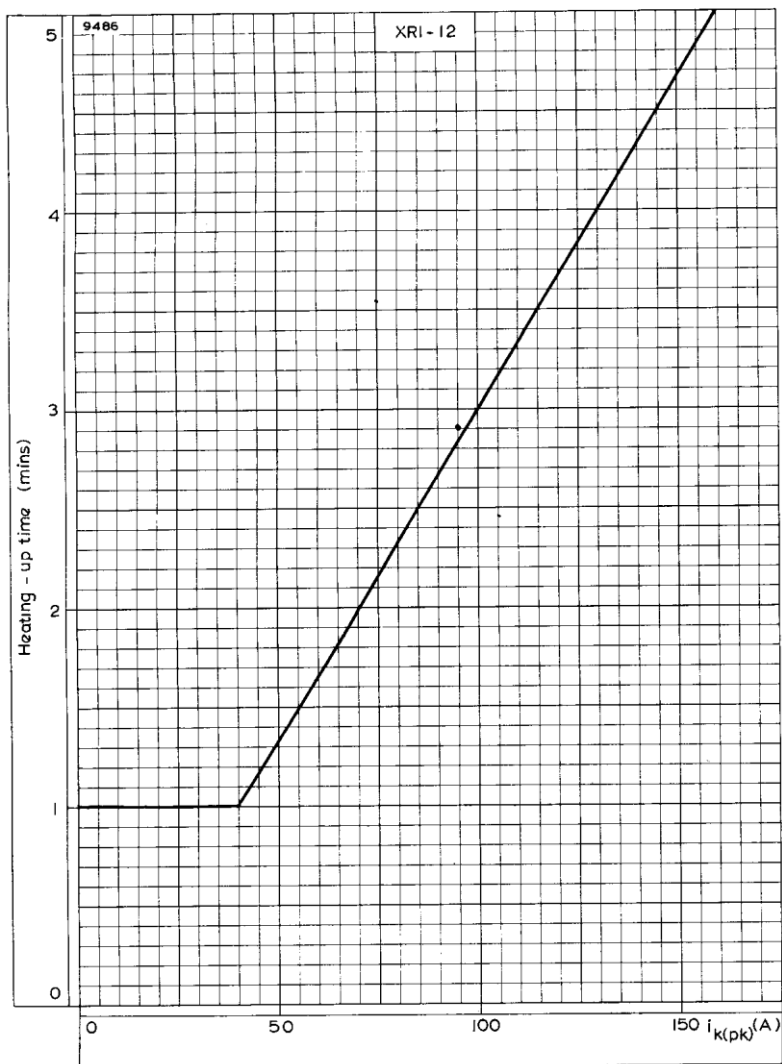
MINIMUM AVERAGE CATHODE CURRENT (MINIMUM AVERAGING TIME = 1s) PLOTTED AGAINST PEAK CATHODE CURRENT EXCEEDING 40A



MAXIMUM NUMBER OF CYCLES IN WHICH THE PEAK CATHODE CURRENT MAY EXCEED 40A IN ANY 15 MINUTE PERIOD (50c/s OPERATION)

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MINIMUM VALVE HEATING TIME

