

QUICK REFERENCE DATA (maximum values)

Inert gas-filled triode for power control applications.

Peak anode voltage	1.5	kV
Cathode current		
Peak	80	A
Average	6.4	A

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

CHARACTERISTICS AND RANGE VALUES FOR EQUIPMENT DESIGN

The values given state the range over which the valve will operate. No allowance has been made in the data for supply voltage and component variation.

Anode

Peak anode operating voltage (forward and inverse)	1.5	kV
Anode voltage drop (approx. instantaneous value)		
$i_k = 6.4A$	12	V
$i_k = 80A$	18	V
Maximum commutation factor (note 1)	130	VA/ μs^2
Anode-to-grid capacitance (note 2)	7	pF
Anode-to-cathode capacitance	0.2	pF
Ignition delay time	See page C1	
Recovery (deionisation) time (approx.)	800	μs

Grid

Control characteristic	See page C1	
Maximum negative grid voltage		
Before conduction	-250	V
During conduction	-10	V
Maximum positive grid current for anode voltage more positive than -10V		
Peak	2.5	A
Average (maximum averaging time = 20ms)	200	mA
Maximum peak positive grid current for anode voltage more negative than -10V	25	mA
Grid resistance		
Maximum	100	k Ω
Minimum	See page C2	
Maximum critical grid current	20	μA
Grid-to-cathode capacitance	5	pF

Cathode (note 3)

Maximum cathode current		
Peak (note 4)	80	A
Average (maximum averaging time = 15s) See page C3	6.4	A
Surge (fault protection only, maximum duration = 0.1s)	1120	A
Minimum cathode heating time	60	s
Filament voltage (note 5)	2.5	V
Filament current range at 2.5V ($I_k = 0mA$)	19 to 23	A

Mechanical

Type of cooling	Convection	
Mounting position	Any position between vertical with base downwards and horizontal	
Net weight (approx.)	{ 13 370 18 510	oz g oz g
Weight of valve in carton (approx.)		
Nominal dimensions of packing	{ 5.5 × 5.5 × 12.25 140 × 140 × 310	in mm

ABSOLUTE MAXIMUM RATINGS

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

Anode

Maximum peak anode voltage (forward and inverse)	1.5	kV
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Grid

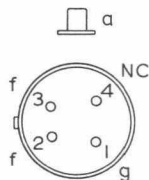
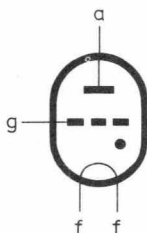
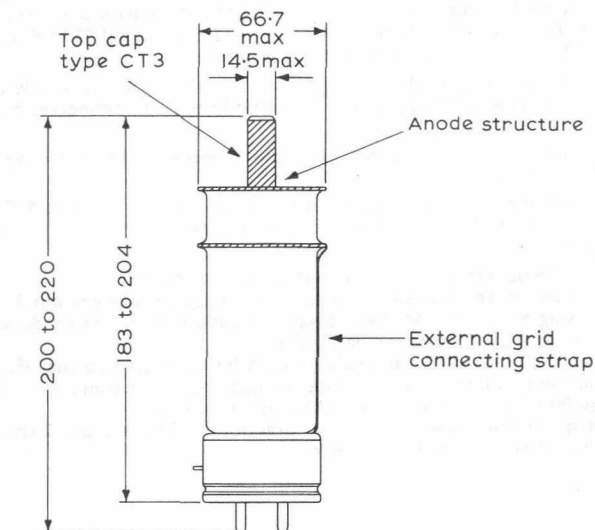
Maximum negative grid voltage		
Before conduction	-250	V
During conduction	-10	V
Maximum positive grid current for anode voltage more positive than -10V		
Peak	2.5	A
Average (maximum averaging time = 20ms)	200	mA
Maximum peak positive grid current for anode voltage more negative than -10V	25	mA

Cathode

Maximum cathode current		
Peak (note 4)	80	A
Average (maximum averaging time = 15s) See page C3	6.4	A
Surge (fault protection only, maximum duration = 0.1s)	1120	A
Minimum cathode heating time	60	s
Filament voltage		
Minimum	2.3	V
Maximum	2.7	V
Ambient temperature		
Minimum	-55	°C
Maximum	+70	°C

OPERATING NOTES

1. In order to minimise gas clean up, the inverse voltage applied across the valve should be kept to a minimum during the immediate post conduction period. Therefore, the inverse voltage should not exceed 250V during the first 500 μ s after the cessation of anode current.
2. In order to prevent spurious ignition due to capacitive anode-to-grid coupling, a capacitor of approximately 1000pF should be connected between grid and cathode.
3. The anode and grid circuit returns should be made to the centre tap of the filament transformer.
4. In welding applications, a single pulse cathode current of up to 120A may be passed provided the average cathode current does not exceed 1A averaged over 1s.
5. Quadrature operation of the filament is recommended.
When quadrature operation is used, the voltage of filament pin 2 should be crossing zero from positive towards negative when the anode voltage is at the peak of the positive half cycle.
In three phase systems, each valve should be connected so that its anode and filament voltages approximate to quadrature phasing, i.e. filament voltage $90 \pm 30^\circ$ out of phase with the anode voltage.
When quadrature operation is not practicable, filament pin 2 should be negative when the anode is positive.



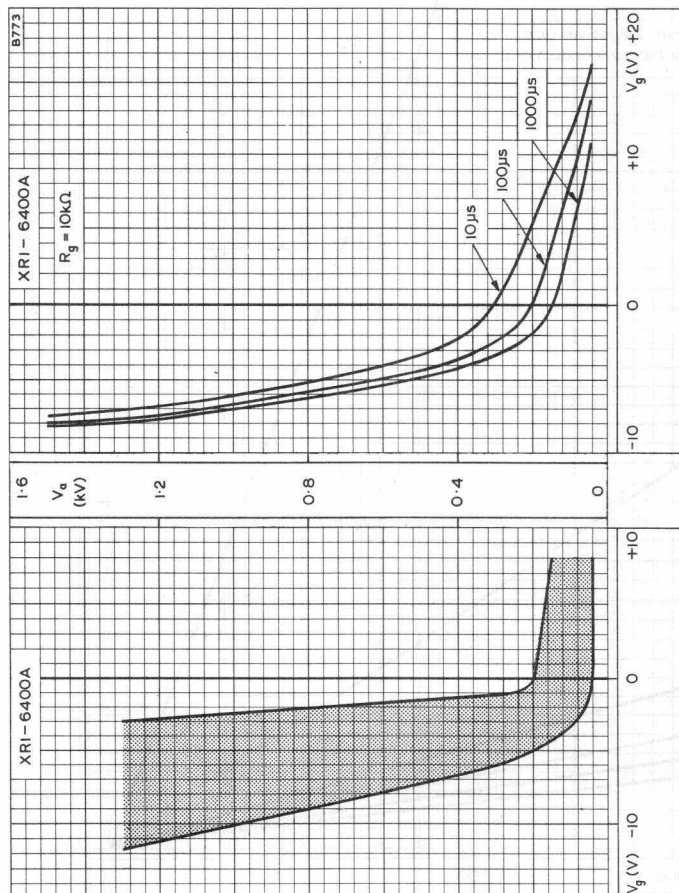
B4D Base

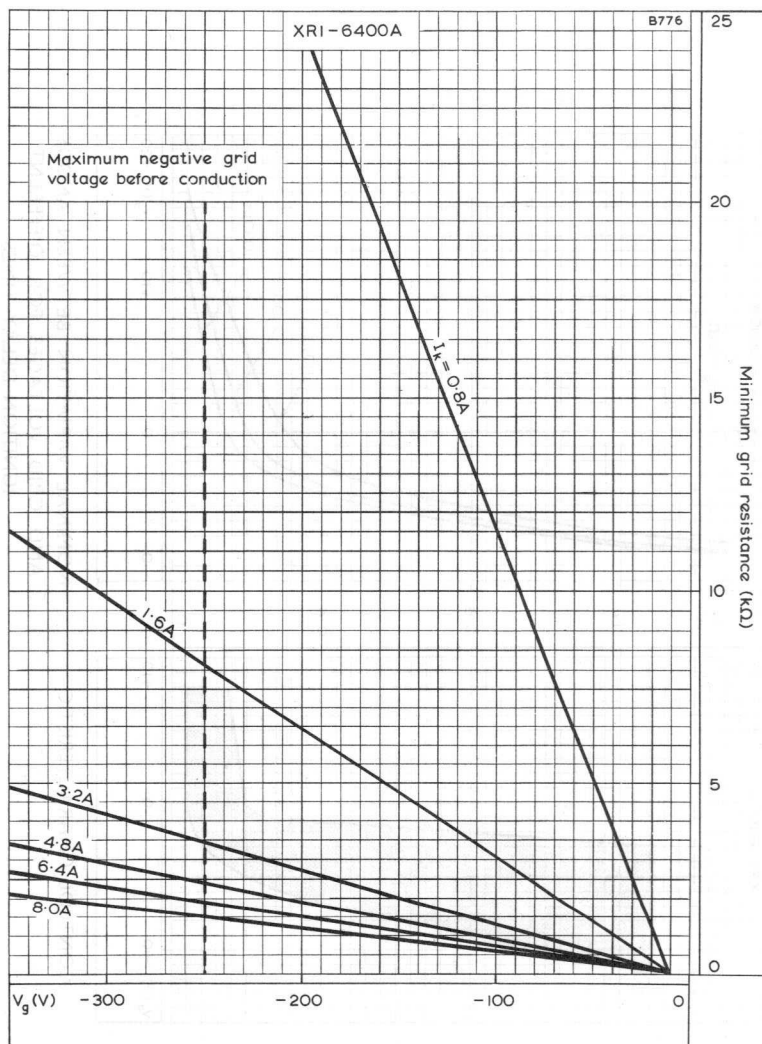
All dimensions in mm

The anode structure must be left free to ensure adequate cooling by free convection

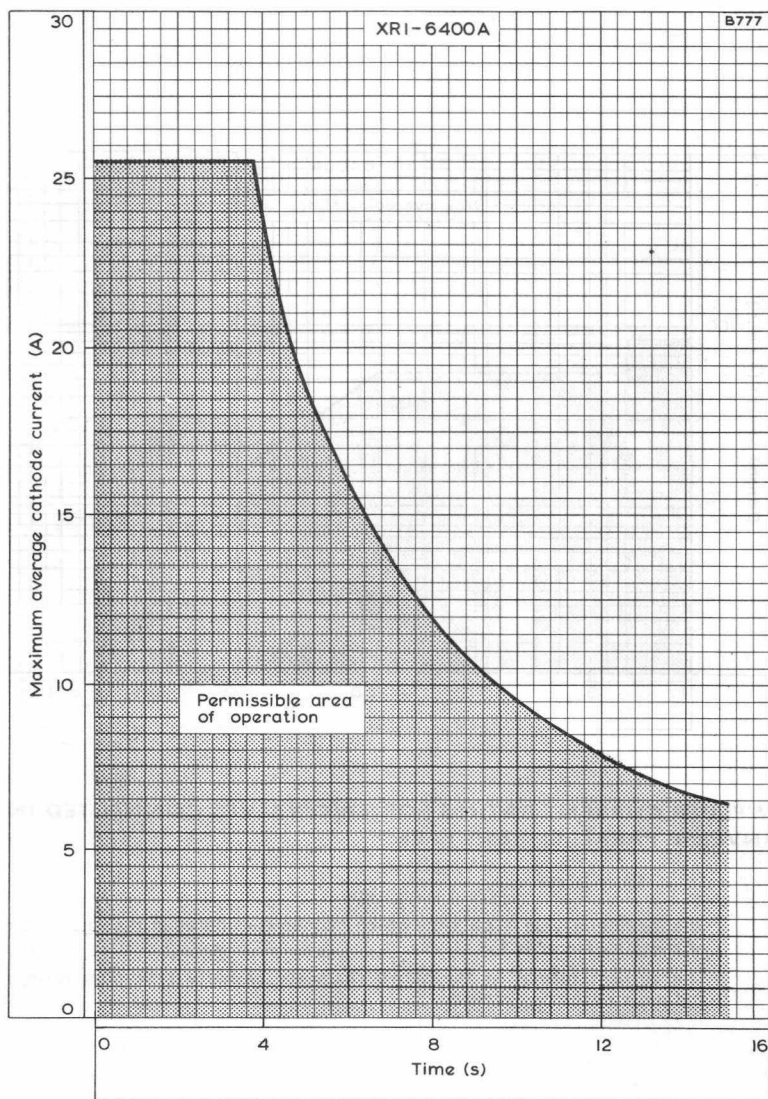
Care should be taken to avoid damage to or contact with the external grid connecting strap

B1013

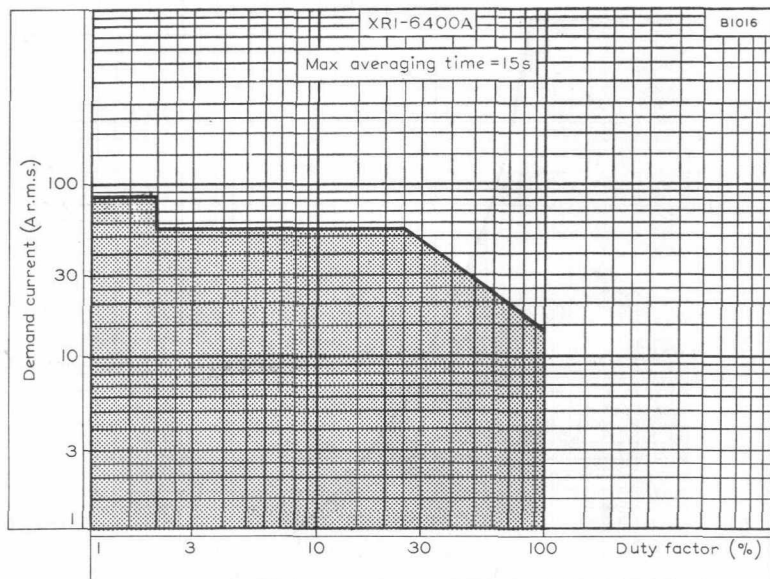




MINIMUM GRID RESISTANCE PLOTTED AGAINST NEGATIVE SUPPLY VOLTAGE WITH CATHODE CURRENT AS PARAMETER



This curve shows the maximum number of seconds in any fifteen second period for which a given average current may be drawn from a sinusoidal supply.



WELDER CURRENT RATING FOR TWO VALVES CONNECTED IN INVERSE PARALLEL ('Back to Back')

$$\text{Duty factor} = \frac{\text{Weld time}}{\text{Weld} + \text{'off' time}}$$

The maximum weld + 'off' time which may be considered in the calculation of the duty factor is 15s.

The current ratings in the above chart are absolute maximum ratings and must never be exceeded.