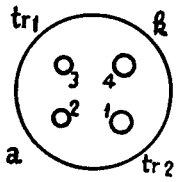
FERRANTI

COLD CATHODE TETRODE

The Ferranti "Neostron" type NSP1 is a cold cathode tetrode gas discharge valve. Developed primarily as a stroboscopic light source emitting a neon-red light, it is equally suitable for other uses where pulses of very high peak current are required.

NSP1



Base Connections
Underside View of Base

PHYSICAL SPECIFICATION.

Base	UX 4 pin.
Max. Seated Height	96 mm. (3⅞in.).
Max. Overall Length	110 mm. (4 11/32in.).
Max. Base Diameter	33 mm. (1 5/16in.).
Length of arc	24 mm (15/16in.).
Mounting Position	Any.

BASE CONNECTIONS.

Pin 1—Trigger Electrode 2. Pin 3—Trigger Electrode 1.
Pin 2—Anode. Pin 4—Cathode.

RATINGS (Absolute).

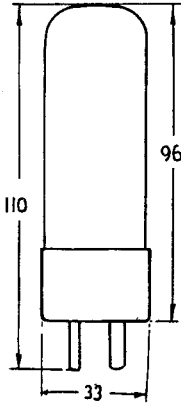
Max. Anode Voltage (static)	440 volts.
Max. Anode Voltage (working)	380 volts.
Min. Anode Voltage (working)	220 volts.
Max. Peak Inverse Anode Voltage	350 volts.
Max. Average Anode Current	100 mA.
→ Max. Discharge Capacitance	16 μF.
Max. Average Trigger Current	10 mA.

CHARACTERISTICS.

*Static striking voltage (tr_2 to tr_1) ...	80–130 volts.
Max. flashing frequency	250 per sec.
Min. trigger current required at V_a 380	50 μA.
→ Min. trigger current required at V_a 220	300 μA.

→ †Peak Anode Current, Peak Luminous Intensity, Flash Duration — The discharge of a 2 μF capacitor charged to 380V. gives a peak anode current of approx. 230 amps. and a Peak Luminous Intensity of approx. 460 candelas with a flash duration of 10 microseconds at half the peak light output.

Delay Time ... ... Less than 40 microseconds, dependent on circuit conditions. With higher energy pulses the delay time can be considerably reduced.



TYPICAL OPERATION as Stroboscopic Light Source :

DC. supply voltage	300–330 volts.
‡Vtr_2 at triggering instant ...	... 70 volts.
§Trigger pulse amplitude (Vtr_1)	... 150 volts min.
Charging resistor	... 3000 ohms.
Discharge Capacitor for Operation at:—	
6–35 c.p.s.	4 μF.
30–50 c.p.s.	3 μF.
45–80 c.p.s.	2 μF.
80–150 c.p.s.	1 μF.
140–250 c.p.s.	0·5 μF.

For typical circuits and further information refer to NSP2 Data Sheet under "Notes on Operation."

All dimensions shown are in millimetres.

*tr_1 negative to tr_2.
→ †A minimum peak current of 5 amps. is recommended. This ensures the formation of an arc discharge with an anode–cathode volt drop of approx. 20 volts. If the peak current is less than 5 amps. a glow discharge is likely to form with a volt drop of 70 volts which may result in permanent damage to the valve.
‡Positive with respect to cathode.
§Negative with respect to cathode.

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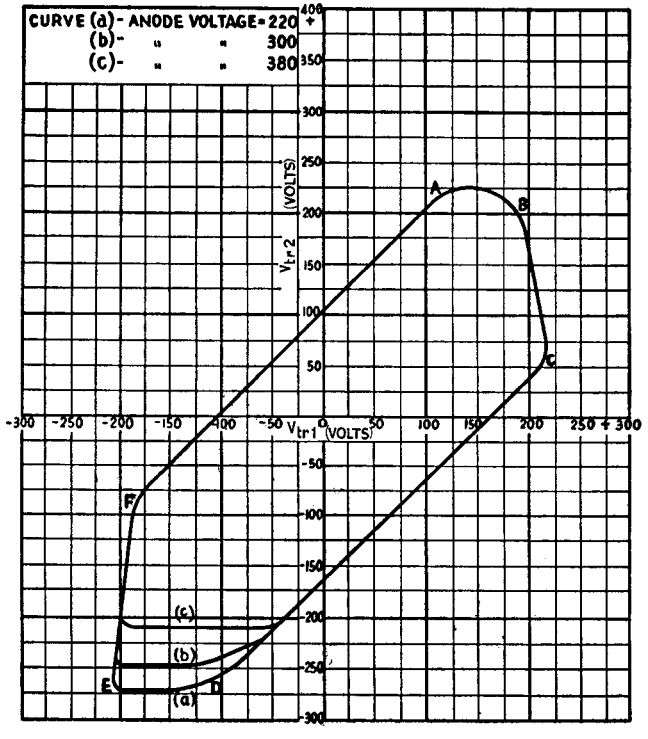

AVERAGE STATIC TRIGGERING CHARACTERISTICS

The area enclosed by the loops is an area of non-conduction. If the vector sum of the voltages on two electrodes lies within the loop the valve will not fire. Any change of either or both of these voltages which causes the vector sum to fall outside the loop will trigger the valve.

For pulse operation it is usually necessary to ensure that the pulse has a sufficient excess voltage (see "Notes on Operation" on NSP2 data sheet).

As the triggering impulse carries the vector sum of the applied voltages outside the loop the point at which it crosses the loop indicates the manner in which the valve is triggered as follows :—

Between AB Trigger Electrode 2 to Cathode Breakdown.
BC Trigger Electrode 1 to Cathode Breakdown.
CD Trigger Electrode 1 to Trigger Electrode 2 Breakdown.
DE Cathode to Trigger Electrode 2 Breakdown.
EF Cathode to Trigger Electrode 1 Breakdown.
FA Trigger Electrode 2 to Trigger Electrode 1 Breakdown.

The most reliable operation is ensured by triggering between Tr_2 and Tr_1, i.e., between F and A on the diagram.