

DECADE SELECTOR AND COUNTING TUBE

Z505S

QUICK REFERENCE DATA

Short construction, bi-directional, cold cathode, 10 output selector tube with glow indication.

Maximum counting speed 50 kHz

Supply voltage 500 V

Output

voltage 24 V

current 800 μ A

Indication Self indicating

No individual adjustment is necessary to align the bulb with the escutcheon.

This data should be read in conjunction with OPERATING NOTES - STEPPING TUBES

CHARACTERISTICS AND RANGE VALUES FOR EQUIPMENT DESIGN (at an ambient temperature between 10°C and 50°C unless otherwise stated).

The values given state the range over which the tube will operate both initially and during life. No allowance has been made for supply voltage and component variations.

All voltages are referred to the most positive supply voltage to which any main cathode (not guide cathode) is returned.

IGNITION REQUIREMENTS

Anode supply voltage range $V_{a(b)}$ 400 to 1000 V

Minimum time constant of rise of anode supply voltage (see note 1) 2.0 ms



DISCHARGE AT REST ON A MAIN CATHODE

Maintaining voltage of anode to main cathode

($I_a = 800\mu A$, $V_{GD(b)} = 55V$)

Typical maximum	275	V
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Typical minimum	240	V
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Main cathode current

Maximum (except during reset)	1000	μA
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Minimum	600	μA
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Recommended	800	μA
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Positive guide supply voltage $V_{GD(b)}$

Maximum	65	V
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Minimum	40	V
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Maximum resistance between guides
and guide supply

22	$k\Omega$
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Main cathode potential (except during reset)

Non-conducting cathode

Maximum negative voltage	14	V
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Conducting cathode

Maximum positive voltage (see note 2)	28	V
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Maximum negative voltage	0	V
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STEPPING REQUIREMENTS

This section should be considered in conjunction with the figures given on pages D6 and D7.

Minimum discharge dwell time

Main cathode	8.0	μs
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Guide A cathode	6.0	μs
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Guide B cathode	6.0	μs
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Maximum interval between trailing edge of
guide A pulse and leading edge of guide B
pulse (double rectangular pulse drive)

0.3	μs
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Negative guide voltage to step the discharge from a main cathode to an adjacent guide cathode.

Maximum	80	V
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Minimum	30	V
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Voltage difference required between a guide cathode and the adjacent guide cathode in order to step the discharge.

Maximum	140	V
Minimum (see note 3)	30	V

Positive guide supply voltage to step the discharge from a guide cathode to the next main cathode.

Maximum	65	V
Minimum	40	V

Main cathode potential

Non-conducting cathodes

Maximum negative voltage	14	V
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Conducting cathode

Maximum positive voltage (see note 2)	28	V
Maximum negative voltage	0	V

RESETTING REQUIREMENTS (see note 4)

Maximum permitted negative main cathode voltage	140	V
Minimum negative main cathode voltage (see note 5)	100	V

LIFE

A TYPICAL TUBE CAN BE EXPECTED TO COUNT CORRECTLY WITH THE FOLLOWING CONDITIONS AFTER STANDING ON ONE MAIN CATHODE FOR A PERIOD OF APPROXIMATELY 4500 HOURS.

Anode current	800	μ A
Positive guide supply voltage	60	V
Negative guide voltage for transfer	50	V
Output cathode (K_o) voltage		
Non-conducting	5.0	V
Conducting	-5.0	V
Guide A dwell time	6.0	μ s
Guide B dwell time	6.0	μ s
Main cathode dwell time	8.0	μ s
Temperature	20 $\pm$ 5	$^{\circ}$ C



RATINGS (ABSOLUTE MAXIMUM SYSTEM)

Maximum continuous main cathode current (except during reset)	1000	μA
Maximum voltage between any two main or guide cathodes (except during reset)	140	V
Maximum positive guide supply voltage	65	V
Maximum negative reset voltage	140	V
Maximum ambient temperature for operation and standby (see note 6)	50	$^{\circ}\text{C}$

NOTES

1. If the power supply does not have a suitable time constant as one of its characteristics, it can be conveniently obtained by inserting a resistor in series with the supply voltage and a capacitor to earth ($4.7\text{k}\Omega$ and $0.5\mu\text{F}$ for 2.0ms).
2. The maximum voltage difference between any two main cathodes except during reset must not exceed 28 volts.
3. The adjacent guide cathode (the cathode to which the discharge is being transferred) must also be 30 volts negative with respect to the most positive main cathode supply voltage.
4. The high current which passes during reset should not be allowed to flow for more than a few seconds.
5. If the cathode current falls below $700\mu\text{A}$ and the positive guide supply voltage applied to the tube approaches the minimum value of 40 volts, the negative voltage required for resetting may rise to 110 volts.
6. It is preferable to store the tube as near as possible to room temperature.

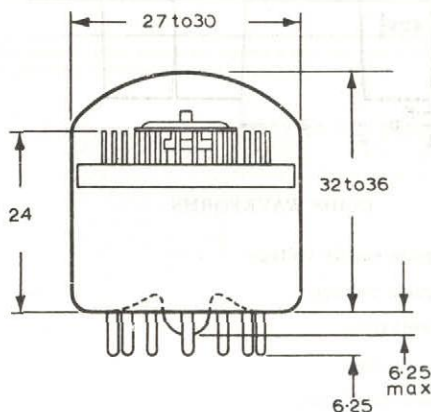
ACCESSORIES

Valve holder	B8 700 67
Escutcheon	101065

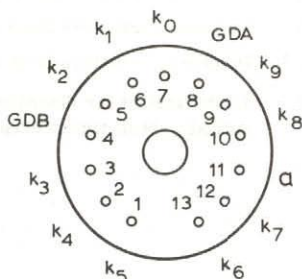
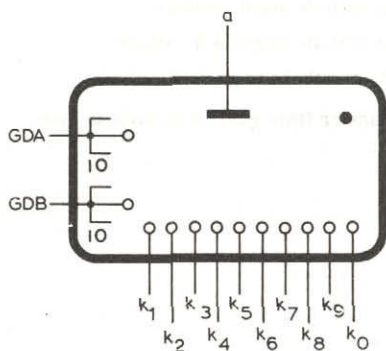


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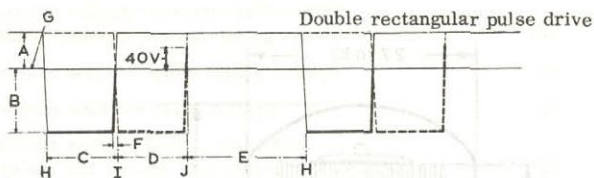
The tubulation
does not project
beyond the pins



B13B Base

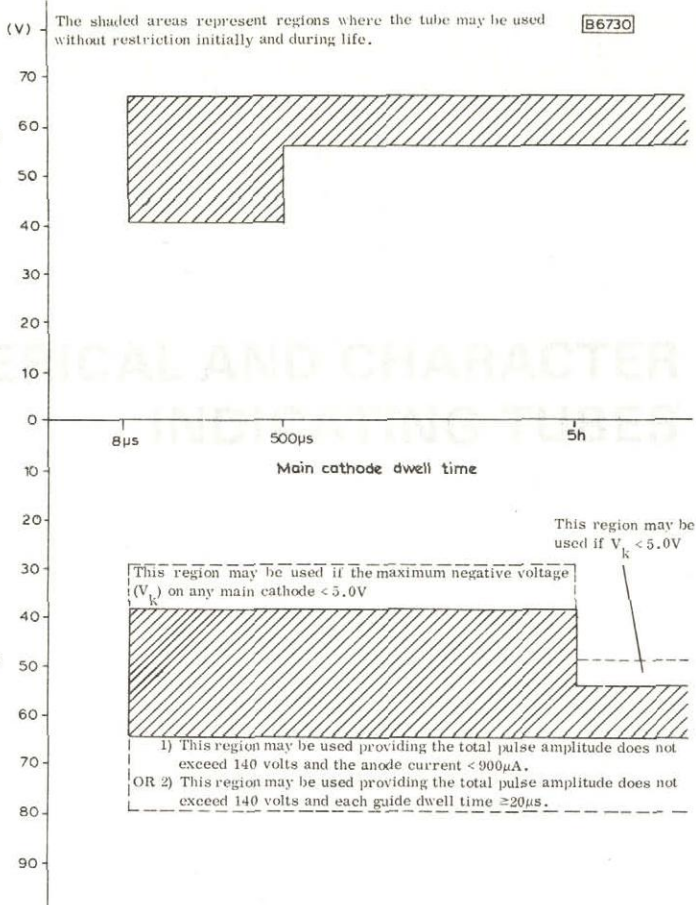
All dimensions in mm
 k_0 is aligned with pin 7 to within $\pm 3^\circ$

B6707



GUIDE WAVEFORMS

- A Positive guide supply voltage
- B Negative guide voltage
- C Guide A dwell time
- D Guide B dwell time
- E Main cathode dwell time
- F Interval between trailing edge of guide A pulse and leading edge of guide B pulse
- G Potential of most positive main cathode supply voltage
- H Discharge transfers from main cathode to guide A cathode
- I Discharge transfers from guide A cathode to guide B cathode
- J Latest instant for discharge transfer from guide B cathode to main cathode, dwell time $\leq 500\mu\text{s}$.



GUIDE OPERATING VOLTAGES