

Ferranti

MICRO SPOT RADAR TUBES

5" diameter optically flat faced Cathode Ray Tubes with a short bulb. The spot size is very small, being less than 0.0005" at the screen centre and the screen can be accurately scanned over an area greater than four inches in diameter.

The high resolution has been made possible in this series of cathode ray tubes by the use of an entirely novel design of electron gun involving two focusing elements, one only of which is electromagnetic and external to the tube in the usual way; the other is electrostatic and of fixed focal length.

| | | | | | |
|---|----------------|---------------|----------------------|-----|----------------------------|
| FOCUS | ... | ... | ... | ... | Magnetic and Electrostatic |
| DEFLECTION | ... | ... | ... | ... | Magnetic, 60° angle. |
| SCREEN | ... | ... | ... | ... | Metal Backed. |
| *Phosphor Fluorescence Persistence to 1/e | Type 'A' Green | Type 'P' Blue | Type 'Q' Blue Violet | | |
| | 1-2 μsecs. | 5-10 μsecs. | <0.1 μsecs. | | |

PHYSICAL DETAILS.

| | | | | |
|-----------------------------|-----|-----|-----|---------|
| Max. Overall Length | ... | ... | ... | 470 mm. |
| Max. Diameter | ... | ... | ... | 128 mm |
| Nom. Neck Diameter | ... | ... | ... | 37 mm |
| Min. Useful Screen Diameter | ... | ... | ... | 110 mm |

For other dimensions see outline drawing on Page 3.

BASE CONNECTIONS.†

| | |
|----------------------|---------------------|
| Pin 1—Heater. | Pin 7—No Connection |
| Pin 2—Grid | Pin 8—No Pin. |
| Pin 3—No Pin. | Pin 9—No Pin. |
| Pin 4—No Pin. | Pin 10—1st Anode. |
| Pin 5—No Pin. | Pin 11—Cathode. |
| Pin 6—No Connection. | Pin 12—Heater |
| | Side Cap—2nd Anode. |

HEATER.

| | | | | |
|----------------|-----|-----|-----|-----------|
| Heater Voltage | ... | ... | ... | 6.3 volts |
| Heater Current | ... | ... | ... | 0.3 amps |

RATINGS.

| | | | |
|---|--------|------|-----------|
| Max. Final Anode Voltage | ... | ... | 30 kV |
| Min. Final Anode Voltage | ... | ... | 12 kV |
| Max. First Anode Voltage | ... | ... | 2.5 kV |
| Min. First Anode Voltage | ... | ... | 1 kV |
| V _g for visual cut-off (at V _{a1} =2kV) | -80 to | -160 | volts |
| Max. V _{h-k} (heater negative) | ... | ... | 200 volts |
| Max. V _{h-k} (heater positive) | ... | ... | 200 volts |

TYPICAL OPERATION.

| | | | |
|-----------------------------------|-----|-----|--------------|
| Final Anode Voltage | ... | ... | 25 kV |
| First Anode Voltage | ... | ... | 2 kV |
| V _g for visual cut-off | ... | ... | -120 volts |
| Resolution | ... | ... | > 8000 lines |

CAPACITANCES.

| | | | |
|---------------------|-----|-----|-------|
| C _k -all | ... | ... | <8 pF |
| C _g -all | ... | ... | <8 pF |

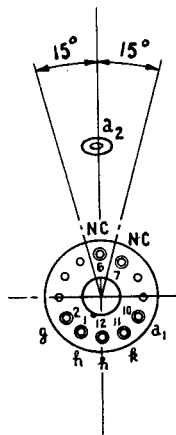
X-RAY WARNING.

When operated at an anode voltage in excess of 16kV, X-ray shielding may be required to give protection against the possible danger of injury from prolonged exposure at close range.

5/7IAM

5/7IPM

5/7IQM



**Base
Connections
Viewed from
spigot end of
tube**

Ferranti

5/7IAM**5/7IPM****5/7IQM****NOTES ON OPERATION****FOCUS COILS.**

The tube is intended for use with an air cored electromagnetic focus coil or a suitable astigmatism-free coil, supplemented by a dynamic focus coil (focus modulation coil).

Ferranti Focus Coil Assembly Type FCS has been designed as a thin magnetic lens to provide the highest resolution of which the tube is capable.

This Focus Coil Assembly incorporates:—

Main Focus Coil.

Alignment Coils for electrical alignment—no mechanical adjustment required.

Astigmatism Coils to produce a non astigmatic round spot

Dynamic Focus Coil to ensure highest resolution over whole scan area

This dynamic focus coil is supplied with a signal, the current of which is proportional to the distance of the spot from the screen centre, by this means the focal length of the combined lens decreases as the spot approaches the centre.

Further information regarding this coil will be supplied on request.

SCAN COILS.

The design of deflector coils should be aimed at producing a uniform field consistent with linear angular deflection and with minimum spot size. The best design for scan coils is toroidally wound coils on a ferrite core with the connections for each winding brought out separately to permit push pull or single ended operation. The coils should be wound in segments to keep the self capacity as low as possible. Damping resistors should be provided.

Any pin-cushion distortion which may result from coil design is best corrected by small shaping magnets placed around the tube bulb between the scan coils and face

Suitable scan coils for most applications can be supplied by Ferranti Ltd. Details on request.

BEAM CENTRING MAGNET.

A weak permanent magnet, clamped to the base or neck of the tube a little behind the cathode can be adjusted to provide the correction necessary to allow for reasonable tolerances in the gun design and the presence of a small external field.

EHT AND HT SUPPLIES

The quality of EHT, scanning and focus is very important since multiple effects due to EHT ripple, imperfect focusing and poor scanning fields can cause such enlargement of the spot that no advantage is apparent when using these tubes.

High Frequency ripple on the EHT supply can cause considerable performance loss in this type of tube. This fault can usually be recognised by a "crawl" visible on the line as seen under a microscope, more commonly observed when the EHT supply is driven by a free-running oscillator. Even locked ripple at a harmonic of the sweep speed may upset both focus and linearity. In decoupling to cure this trouble, excessive smoothing capacity should be avoided to prevent "flashover".

SETTING UP.

The centring magnet should be clipped loosely at the gun end of the neck. Bias and H.T. voltages should be applied and a raster obtained. Without applying focus current, the centring magnet should be now adjusted and clamped or exact symmetry of the raster on the face of the tube. The strength of the centring magnet may be adjusted by rotation.

Ferrous metal should not be used in the construction of the mount.

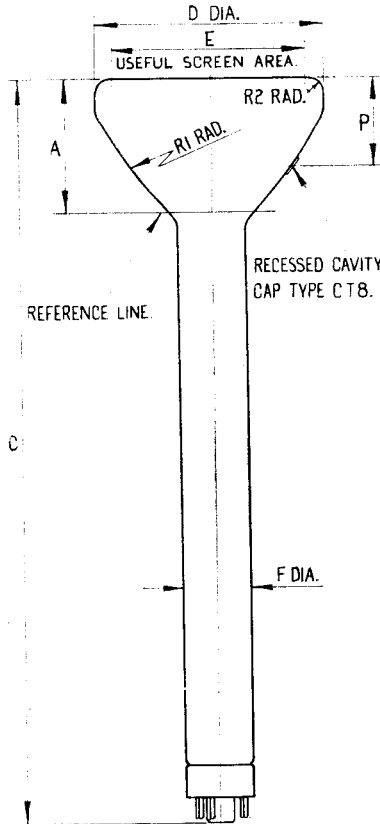
Neither ferrous nor non-ferrous metals should be placed close to the scan coil.

It is essential that the mumetal sleeve provided should be fitted to the neck.

5/7IAM

5/7IPM

5/7IQM



| DIM. | INS. | m m. | DIM. | INS. | m m. |
|------|---------------|----------|------|--------------|----------|
| A | 2.953 ± .118 | 75 ± 3 | F | 1.457 ± .069 | 37 ± 1.5 |
| C | 18.307 ± .197 | 465 ± 5 | P | 1.968 ± .197 | 50 ± 5 |
| D | 4.960 ± .079 | 126 ± 2 | R1 | 17.716 | 450 |
| E | 4.330 | 110 MIN. | R2 | 2.250 | 6.35 |

5/7IAM

5/7IPM

5/7IQM

TYPICAL GRID DRIVE CHARACTERISTICS.