

*similar Etel 3A2P31*

**G.E.C.**

Mullard DHM9-11  
INSTRUMENT  
CATHODE RAY TUBE

*used in Solartron CT436 & CD1014*

**BRIEF DATA**

A 9cm (3½ inch) diameter flat faced double gun, oscilloscope tube.

|                                   |         |      |
|-----------------------------------|---------|------|
| Final anode voltage . . . . .     | 1.5     | kV   |
| Useful scan (each beam) . . . . . | 5 x 7.7 | cm   |
| D <sub>y</sub> (max) . . . . .    | 18.3    | V/cm |
| D <sub>x</sub> (max) . . . . .    | 27.3    | V/cm |

**HEATER**

|                                              |     |   |
|----------------------------------------------|-----|---|
| V <sub>h</sub> . . . . .                     | 6.3 | V |
| I <sub>h</sub> (approx. both guns) . . . . . | 0.6 | A |

**PREFERRED TYPE**

|                                                               |     |
|---------------------------------------------------------------|-----|
| Tubes normally supplied with 24 phosphor as DHM9-11 (CV8108). | P31 |
| Also available with 08 phosphor as DBM9-11 (CV5966)           | P11 |
| 25 phosphor as DNM9-11 (CV5883)                               | P2  |
| 46 phosphor as DPM9-11 (CV8109)                               | P7  |

**SCREEN (Preferred)**

|                                |              |
|--------------------------------|--------------|
| Fluorescence . . . . .         | Green        |
| Phosphorescence . . . . .      | Green        |
| Persistence . . . . .          | Medium-short |
| E.I.A. phosphor code . . . . . | P31          |
| GEC phosphor code . . . . .    | 24           |

### RATINGS (Absolute)(Each Gun)

|                | Max  | Min  |    |
|----------------|------|------|----|
| $V_{a1+a3}$    | 1.8  | 1.0  | kV |
| $V_{a2}$       | 600  | —    | V  |
| $-V_g$         | 200  | 1.0  | V  |
| $V_{x-a1+a3}$  | 300  | —    | V  |
| $V_{y-a1+a3}$  | 300  | —    | V  |
| $R_{x-a1+a3}$  | 2.0  | —    | MΩ |
| $R_{y-a1+a3}$  | 2.0  | —    | MΩ |
| $R_{g-k}$      | 1.0  | —    | MΩ |
| $v_{h-k}$ (pk) | +150 | -150 | V  |

### CAPACITANCES

|                               | Gun' |     | Gun'' |     |     |
|-------------------------------|------|-----|-------|-----|-----|
|                               | Min  | Max | Min   | Max |     |
| $C_{g-all}$                   | 3.7  | 6.4 | 3.7   | 6.4 | pF  |
| $C_{k-all}$                   | 2.1  | 4.2 | 2.1   | 4.2 | pF  |
| $C_{x1-all}$ (x2 earthed)     | 4.0  | 6.5 | 4.0   | 6.5 | pF  |
| $C_{x2-all}$ (x1 earthed)     | 4.0  | 7.0 | 4.0   | 7.0 | pF  |
| $C_{y1-all}$ (y2 earthed)     | 1.0  | 3.0 | 2.0   | 4.0 | pF  |
| $C_{y2-all}$ (y1 earthed)     | 2.0  | 4.0 | 1.0   | 3.0 | pF  |
| $C_{x1-x2}$                   | —    | 1.7 | —     | 1.7 | pF  |
| $C_{y1-y2}$                   | 1.6  | 2.6 | 1.6   | 2.6 | pF  |
| $C_{x1+x2-y1+y2}$             | —    | 200 | —     | 200 | mpF |
| $C_{x1'+x2'-x1''+x2''}$ (max) |      |     |       | 1.6 | pF  |
| $C_{y1'+y2'-y1''+y2''}$ (max) |      |     |       | 600 | mpF |

### EQUIPMENT DESIGN RANGE

|           | Max  | Min  |                       |
|-----------|------|------|-----------------------|
| $V_{a2}$  | 300  | 160  | V/kV <sub>a3</sub>    |
| $-V_{g1}$ | 63   | 28   | V/kV <sub>a1</sub>    |
| $D_x$     | 18.2 | 13.8 | V/cm/kV <sub>a3</sub> |
| $D_y$     | 12.2 | 9.1  | V/cm/kV <sub>a3</sub> |

## TYPICAL OPERATING CONDITIONS (Each Gun)

|                          |            |         |
|--------------------------|------------|---------|
| $V_{a1+a3}$              | 1.5        | kV      |
| $V_{a2}$                 | 250 to 450 | V       |
| $V_g$ for visual cut-off | -42 to -95 | V       |
| * $I_{a2}$ max           | 150        | $\mu$ A |
| $D_y$                    | 15         | V/cm    |
| $D_x$                    | 23         | V/cm    |

\*With  $V_{a2}$  set for focus, and  $V_g = -1.0V$ .

$D_y$ ,  $D_x$  and  $V_g$  for visual cut-off are proportional to  $V_{a1+a3}$ .

## LINE WIDTH (measured with 24 phosphor)

A value for line width under d.c. conditions is given below.

|                          |                    |         |
|--------------------------|--------------------|---------|
| $V_{a1+a3}$              | 1.5                | kV      |
| $V_{a2}$                 | adjusted for focus |         |
| $I_t$                    | 1.0                | $\mu$ A |
| Raster — circle diameter | 50                 | mm      |
| Maximum line width       | 0.7                | mm      |

## EQUALITY OF SENSITIVITIES

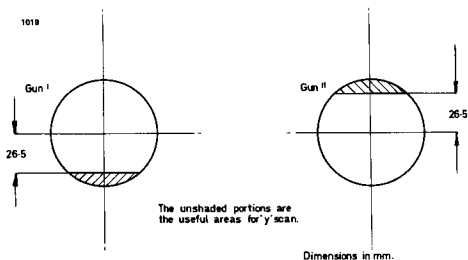
Sensitivity variations between the two guns will not differ by more than 5%, calculated as follows:

$$\text{Difference in sensitivities} = 100 - \frac{\text{lower x sensitivity}}{\text{higher x sensitivity}} \times 100$$

## MINIMUM SCANNED AREA

|                 |            |    |
|-----------------|------------|----|
| x (Full screen) | 7.7        | cm |
| Y               | See Fig. 1 |    |

**FIGURE 1**



**DISPLAY CHARACTERISTICS**

Both x and y plates are intended for symmetrical operation. The tube may be operated asymmetrically, but focus quality will deteriorate and trapezium distortion will be introduced.

The data for raster distortion and line-width will therefore not apply.

In general, the deflection plates should be at the same average potential as  $a1+a3$ . However, it may be necessary to adjust the potential of the deflection plates to obtain optimum focus.

**Pattern Distortion**

Centred at the screen centre, a nominally square raster from either gun may be inserted into the frame bounded by the squares 48.75mm and 51.25mm.

Angle between x and y deflection (each gun) . . . . .  $90^\circ \pm 1.5^\circ$

Maximum angle between the two x deflections . . . . .  $1.5^\circ$

\*Maximum angle between the two y deflections . . . . .  $2.5^\circ$

\*The distance between the two electrical y axes at the geometric screen centre is 3.5mm max.

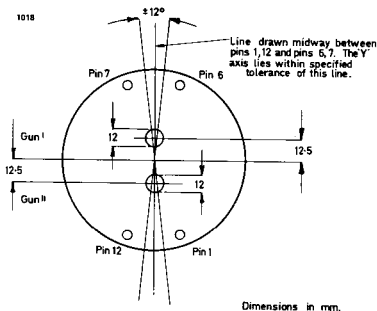
**Pattern Alignment**

When two nominally square rasters, whose edges coincide at their centres are superimposed at the screen centre, and when the rasters are simultaneously adjusted in size, the edges will fall within the frame bounded by the squares 48mm and 52mm, giving a total raster misalignment of  $\pm 4\%$ .

### Spot Position

With the tube magnetically shielded, the undeflected spot of each gun will fall within the appropriate 12mm diameter circle shown in Fig. 2.

**FIGURE 2**



### MOUNTING POSITION

The tube may be mounted in any position but under no circumstances should the socket be used to support the tube.

### WEIGHT

510g.

### BASE CONNECTIONS

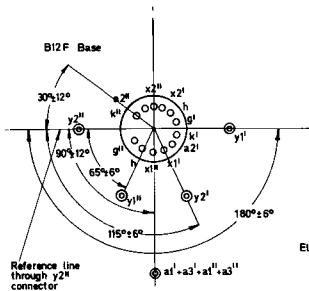
See drawing.

### WARNING

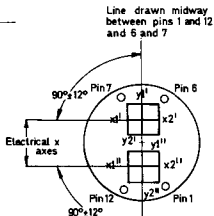
Care should be taken not to expose the tube to strong magnetic fields either in use or during storage.

# OUTLINE

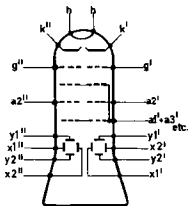
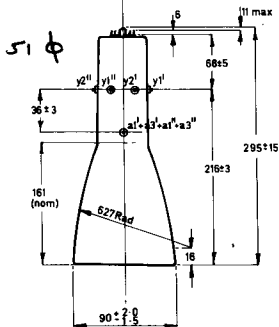
1017



All connectors are CT7



Orientation of axes of deflection as viewed from screen end



Dimensions in mm.