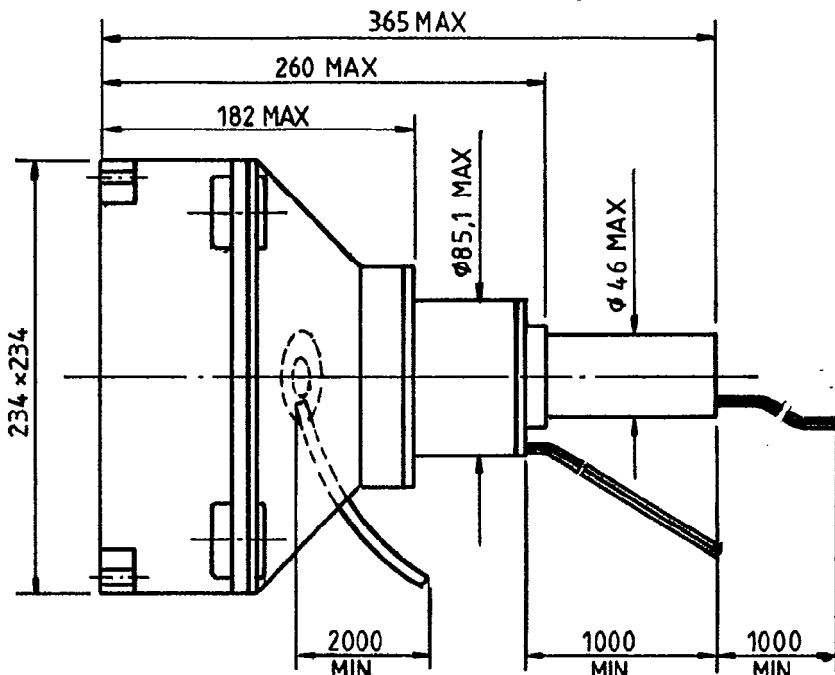


|                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>BRITISH STANDARDS INSTITUTION<br/>2, PARK STREET, LONDON, W1A 2BS</p>                                                                                                                                                                                   | <p>BS CECC 11001-042<br/>ISSUE 1. April 1988</p>                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <p>Specification available from:- AS SHOWN IN PD 9002,<br/>CECC 00 200 AND<br/>RANK BRIMAR LIMITED<br/>GREENSIDE WAY<br/>MIDDLETON, MANCHESTER M24 1SN<br/>Tel: 061-681 7072 Telex: 665326</p>                                                             | <p style="text-align: right;"></p> <p>Page 1 of 31 pages</p>                                                                                                                                                                                                                                                                                                                                            |
| <p>ELECTRONIC COMPONENTS OF ASSESSED QUALITY<br/>DETAIL SPECIFICATION IN ACCORDANCE WITH<br/><br/>BS CECC 11000 : 1980</p>                                                                                                                                 | <p>MANUFACTURER'S TYPE NUMBER<br/><br/>DE 2112</p>                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <p>Outline and dimensions Third angle projection</p>  <p>All dimensions in millimeters<br/>For detail dimensions see Appendix B<br/>Marking information see Clause 5</p> | <p>SEE PD 9002 AND CECC 00 200</p> <p>For ordering information<br/>see Clause 6</p> <p>RADAR DISPLAY CATHODE<br/>RAY TUBE PACKAGE.<br/>Deflection: Magnetic<br/>Focus: Electrostatic<br/>Useful screen: 197mm dia.<br/>Phosphor: I4.(orange/<br/>ultra-violet)<br/>Persistence:Very long.</p> <p>Ruggedised CRT potted in a<br/>mounting frame and magnetic<br/>shield</p> <p>Pre-adjusted deflection coil<br/>mounted on rear of magnetic<br/>shield.</p> <p>Flying lead connections.</p> |
|                                                                                                                                                                                                                                                            | <p>With additional assessment.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

Data (not for inspection purposes)

1. Mechanical.

Mounting position  
Mass

Unrestricted  
7.5 Kg (Nom)

Environmental

Operational temperature range  
Storage temperature range

-40°C to +80°C  
-55°C to +70°C

DATA CONTINUED ON NEXT PAGE

Refer to Qualified Products List PD 9002 and/or CECC 00 200 for details of manufacturers approved to this specification.

DATA (not for inspection purposes) continued2. Environmental continued

|                    |                   |                         |            |
|--------------------|-------------------|-------------------------|------------|
| Vibration (Random) | 20 Hz to 500 Hz   | 0.02g <sup>2</sup> n/Hz |            |
|                    | 500 Hz to 2000 Hz | 0.02g <sup>2</sup> n/Hz | falling to |
|                    |                   | 0.01g <sup>2</sup> n/Hz | at 2000 Hz |

|                             |                   |                      |
|-----------------------------|-------------------|----------------------|
| Shock ( $\frac{1}{2}$ Sine) | Peak acceleration | 294 m/s <sup>2</sup> |
|                             | Pulse duration    | 11 ms                |

|                            |                   |                      |
|----------------------------|-------------------|----------------------|
| Bump ( $\frac{1}{2}$ Sine) | Peak acceleration | 245 m/s <sup>2</sup> |
|                            | Pulse duration    | 6 ms                 |
|                            | Number of bumps   | 4000                 |

3. Limiting values (absolute maximum rating system - IEC 134)

|                                                          | <u>Min</u> | <u>Max</u>                                          | <u>Unit</u> |
|----------------------------------------------------------|------------|-----------------------------------------------------|-------------|
| Heater Voltage (Vh)                                      | 5.7        | 6.9                                                 | V           |
| Heater to cathode, positive voltage (Vh-k)               |            | 150                                                 | V           |
| negative voltage (Vk-h)                                  |            | 200                                                 | V           |
| Intensity modulator electrode negative voltage (Vg1)     | 1          | 200                                                 | V           |
| Intensity modulator electrode positive voltage (Vg1)     |            | modulator must never become positive w.r.t. cathode |             |
| Final anode voltage (Vg3+5)                              | 10         | 18                                                  | kV          |
| First anode voltage (Vg2)                                | 200        | 600                                                 | V           |
| Focus anode voltage (Vg4)                                | -500       | +750                                                | V           |
| Intensity modulator electrode cathode circuit resistance |            | 1.5                                                 | M           |

4. Operating conditions and typical characteristics (not for inspection purposes)

When the tube is operated under the conditions given below, the characteristic values which follow them are attainable.

Vh = 6.3V  $\pm$  0.1 Vdc; Vg2 = 400V; Vg3 + 5 = 14kV

|                                                               | <u>Min</u> | <u>Max</u> | <u>Unit</u> |
|---------------------------------------------------------------|------------|------------|-------------|
| Heater current (Ih)                                           | 270        | 330        | mA          |
| Intensity modulator cut-off voltage (Vg1) with focused raster | -34        | -78        | V           |
| Focus anode voltage (Vg4)                                     | 0          | +600       | V           |

5. Marking

Each CRT assembly and primary packaging shall bear the following markings:

1. The manufacturer's type number and, if applicable, the NATO stock number.
2. Special marking relating to hazards. Each tube and/or package contains a warning of hazards with respect to handling, implosion and X-rays.
3. Factory identification code.
4. Date code.
5. To BS CECC 11001-042.
6. Manufacturer's serial number.

6. Ordering information

Orders for components to this specification shall include the following minimum information:-

1. Quantity
2. Manufacturer's type number and, where applicable, the NATO stock number.
3. B.S. specification number and issue number.

Any special requirements and packaging instructions shall be included in the order.

7. Related documents

|               |                                                                                                               |
|---------------|---------------------------------------------------------------------------------------------------------------|
| BS2011        | Basic environmental testing procedures.                                                                       |
| BS6001        | Sampling procedures and tables for inspection by attributes.                                                  |
| BS9000        | General requirements for a system for electronic components of assessed quality.                              |
| BS-CECC 11000 | Cathode ray tubes: generic specification.                                                                     |
| CECC 00 200   | Qualified products list.                                                                                      |
| IEC65         | Safety requirements for mains operated electronic and related equipment for domestic and similar general use. |
| IEC67         | Dimensions of electronic tubes and valves.                                                                    |
| IEC68         | Basic environmental testing procedure.                                                                        |
| IEC100        | Methods for the measurement of direct inter-electrode capacitance of electronic tubes and valves.             |
| IEC134        | Rating systems for electronic tubes and valves and analogous semiconductor devices.                           |
| IEC410        | Sampling plans and procedures for inspection by attributes.                                                   |
| PD9002        | BS 9000 component selection guide.                                                                            |

8. Structural similarity

Not applicable.

9. X-Radiation

If this tube is operated at voltages in excess of 16kV 'X-ray radiation can be produced which, after prolonged exposure, may constitute a health hazard if not properly shielded.

10. Additional information

1. The precautions taken in manufacture reduce the possibility of spontaneous implosion to a minimum, but any additional stress due to mishandling considerably increases the risk of implosion; such implosion may occur immediately or be delayed. Particular care should be taken not to scratch any part of the tube envelope, especially the faceplate as this will appreciably weaken the glass and may lead to implosion of the tube. The tube should always be transported in the original packing designed for the purpose and kept in that packing until required for installation. When a tube is not in its equipment or original packing, it should be placed face downwards on a soft pad of suitable material free from abrasive substances.
2. The tube should be operated at its minimum useful brightness in order to prevent damage to the screen material. There is a possibility of a rapid burn on the screen if the spot is allowed to remain stationary.

## TEST CONDITIONS AND INSPECTION REQUIREMENTS

## GROUP A - Lot by Lot

## General test conditions (unless stated otherwise for particular tests)

Heater voltage ( $V_h$ ) = 6.3V

First anode voltage ( $V_{g2}$ ) = 400V

Final anode voltage ( $V_{g3+5}$ ) = 14kV

Focus anode voltage ( $V_{g4}$ ) = Adjusted as required

Intensity modulator electrode negative voltage ( $V_{g1}$ ) = adjusted as required.

Fixing flange at earth potential.

Deflection coil incorporated.

Raster details: 625 line TV standard at a field repetition frequency of 50Hz. It must be possible to overscan.

Pulse conditions: Rise and fall times within 10% of pulse duration.  
 Droop within 10% of pulse amplitude.

Pre-heating: Apply  $V_h$  only for 2 minutes, before any non-consecutive test.

All electrode voltages are with respect to cathode unless otherwise stated.

Astigmatism correction is not applied.

Samples submitted to tests which are marked (D) shall not be accepted for release under BS9000. (See 20.2 of BS9000 Part 1. 1981).

All tests are non-destructive

AQL given in %

| INSPECTION<br>OR TEST     | REFERENCE<br>CECC 11000 | CONDITIONS<br>OF TEST                                                                                                                         | INSPECTION REQUIREMENTS |     |             |          |     |
|---------------------------|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-----|-------------|----------|-----|
|                           |                         |                                                                                                                                               | MIN                     | MAX | UNITS       | IL       | AQL |
| SUB-GROUP A1              |                         |                                                                                                                                               |                         |     |             | 100<br>% |     |
| - Visual inspection       | 4.3                     |                                                                                                                                               | See 4.3                 |     |             |          |     |
| - Non operating endurance | 4.9.1                   | Duration 24 hrs min.                                                                                                                          |                         |     |             |          |     |
| - Gas content coefficient | 4.6.1                   | $V_{g2} = 200V$<br>$V_{g3+5} = -40V$<br>Adjust $V_{g1}$ for<br>$I_k = 400\mu A$<br>Measure $I_{g3+5}$<br><br>Calculate $\frac{I_{g3+5}}{I_k}$ |                         |     |             |          |     |
|                           |                         |                                                                                                                                               |                         | 0.2 | nA/ $\mu A$ |          |     |

| INSPECTION<br>OR TEST                                 | REFERENCE<br>CECC11000 | CONDITIONS<br>OF TEST                                                                                                                                            | INSPECTION REQUIREMENTS                                                      |     |       |    |     |
|-------------------------------------------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|-----|-------|----|-----|
|                                                       |                        |                                                                                                                                                                  | MIN                                                                          | MAX | UNITS | IL | AQL |
| SUB GROUP A1 (cont'd)                                 |                        |                                                                                                                                                                  |                                                                              |     |       |    |     |
| - Quality of<br>fluorescent screen<br>and faceplate   | 4.6.10                 | Defocused overscanned<br>raster.<br>Adjust Vg1 for convenient<br>screen luminance.                                                                               | As blemish specification<br>Appendix A                                       |     |       |    |     |
| and                                                   |                        |                                                                                                                                                                  |                                                                              |     |       |    |     |
| Useful screen area                                    |                        |                                                                                                                                                                  | 197<br>dia                                                                   |     | mm    |    |     |
| and                                                   |                        |                                                                                                                                                                  |                                                                              |     |       |    |     |
| Non uniformity<br>of luminance                        |                        | Visual inspection                                                                                                                                                | No significant<br>variation in luminance<br>within the useful screen<br>area |     |       |    |     |
| - Intensity<br>modulator electrode<br>cut-off voltage | 4.6.2                  | Visual extinction of<br>spot<br>Measure Vg1                                                                                                                      | -34                                                                          | -78 | V     |    |     |
| - Cathode emission                                    | 4.6.3                  | Minimum cathode<br>factor K = 2.<br>Modulator voltage equal<br>to half the value found<br>in 4.6.2.<br>Defocused raster.                                         | \$                                                                           |     | μA    |    |     |
|                                                       |                        | Vg2 = 400V<br>Vg4 = -500V<br>Vg3+5 = 5kV                                                                                                                         | $I_k = \frac{K(-V_{mod})}{\sqrt{128}}^{3/2}$                                 |     |       |    |     |
| - Flashover                                           | 4.6.7<br>Method A      | Neck axis horizontal<br>Vg3+5 = 18kV<br>Vg4 = 0V<br>Vg2 = 600V<br>Display raster<br>Adjust Vg1 to twice upper<br>cut-off voltage limit.<br>Tap tube neck for 15s | Performance requirements<br>as in 4.6.7 Method A.                            |     |       |    |     |





| INSPECTION<br>OR TEST                            | REFERENCE<br>CECC11000 | CONDITIONS<br>OF TEST                                                                             | INSPECTION REQUIREMENTS |     |         |    |     |
|--------------------------------------------------|------------------------|---------------------------------------------------------------------------------------------------|-------------------------|-----|---------|----|-----|
|                                                  |                        |                                                                                                   | MIN                     | MAX | UNITS   | IL | AQL |
| SUB-GROUP A3                                     |                        |                                                                                                   |                         |     |         | S4 | 6.5 |
| - Heater current                                 | 4.6.8                  | Apply $V_h = 6.3V$ only                                                                           | 270                     | 330 | mA      |    |     |
| - Heater to cathode leakage                      | 4.6.9                  | $V_h = 6.3V$                                                                                      |                         |     |         |    |     |
| (1) Heater positive w.r.t. cathode               |                        | $V_h - k$ (heater positive) = 150V                                                                |                         | 30  | $\mu A$ |    |     |
| (2) Heater negative w.r.t. cathode               |                        | $V_k - h$ (heater negative) = 200V                                                                |                         | 40  | $\mu A$ |    |     |
| - Intensity modulator electrode negative current | 4.6.12<br>Method B     | $R_{mod} = 10 M$                                                                                  |                         | 5   | $\mu A$ |    |     |
| - Electrode leakage current                      | 4.6.11                 | $V_{g3+5} = 18kV$<br>$V_{g4} = -500$<br>$V_{g2} = 600V$<br>$V_{g1} = -200V$<br>$k = \text{Earth}$ |                         |     |         |    |     |
|                                                  |                        | Measure $I_{g3+5}$                                                                                |                         | 10  | $\mu A$ |    |     |
|                                                  |                        | Measure $I_{g4}$                                                                                  |                         | 3   | $\mu A$ |    |     |
|                                                  |                        | Measure $I_{g2}$                                                                                  | -8                      | 8   | $\mu A$ |    |     |

[illegible]