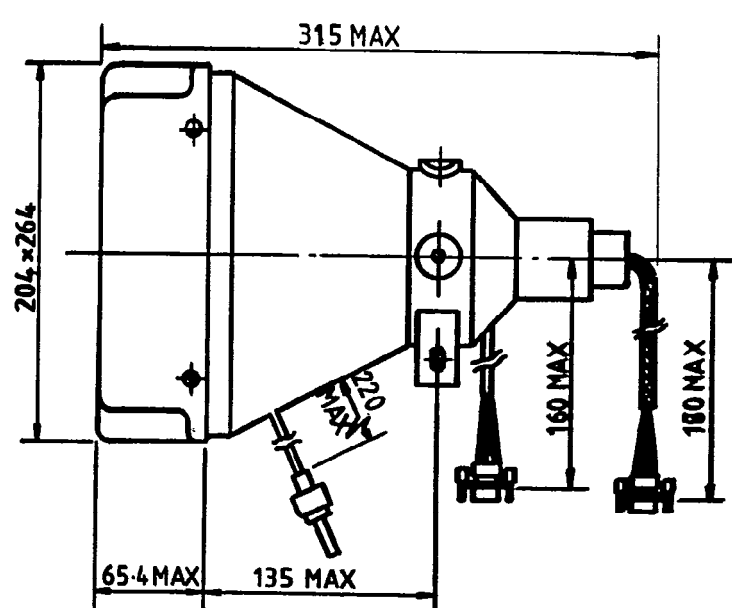


BRITISH STANDARDS INSTITUTION 2 PARK STREET, LONDON. W1A 2BS.	BS CECC 11001 -040 ISSUE 1 October 1987
Specification available from:- AS SHOWN IN PD 9002 CECC 00 200, AND RANK BRIMAR LIMITED, GREENSIDE WAY, MIDDLETON, MANCHESTER, M24 1SN. TELE: 061-681-7072 TELEX: 665326	 PAGE 1 of 30 PAGES
ELECTRONIC COMPONENTS OF ASSESSED QUALITY DETAIL SPECIFICATION IN ACCORDANCE WITH BS CECC 11000 : 1980	MANUFACTURER'S TYPE NUMBER DE 2110
Outline and dimensions Third angle projection  Face-plate window 220 x 165 Dimensions in mm For detail dimensions see Appendix B Marking information see Clause 5	SEE PD 9002 AND CECC 00 200 For ordering information see Clause 6 RADAR DISPLAY CATHODE RAY TUBE Deflection: Magnetic Focus: Electrostatic Useful Screen: 158mm X 210mm Phosphor: S3 (Jedec P43) Colour: Yellowish-green Persistence: Medium short Laminated Faceplate: Laminating sheet with green contrast enhancement filter and an anti-reflection coating Ruggedised CRT with coil pre- adjusted and potted in a magnetic shield. Bonded mounting frame. Flying leads with connectors. WITH ADDITIONAL ASSESSMENT

DATA (not for inspection purpose)

1. Mechanical

Mounting position
Mass

Unrestricted
6 kg (Nom)

2. Environmental

Operational temperature range
Storage temperature range

-26°C to + 70°C
-40°C to + 90°C

Refer to Qualified Products List PD 9002 and/or CECC 00200 for details of
manufacturers approved to this specification



Documents

Document Sharing Hub

Data (not for inspection purposes) Continued

2. Environmental (Continued)

Acceleration	196 m/s ² along neck axis towards face for 10 s min.
Vibration	Sinusoidal 10 - 17 Hz at 2.54 mm displacement, 17 - 400 Hz 29.4 m/s ² (3 g). 2 hrs in each of the three mutually perpendicular axes.
Shock	Peak acceleration 294 m/s ² , half sine wave, pulse duration 11 ms, applied in 4 directions.
Mould Growth	IEC 68-2-10: 1968, Exposure 28 days.
Flammability	BS 2011, Part 2. Test Pz 1970.
Salt Mist	BS 2011, Part 2.1. Test Kb (Two 7 day cycles).
Robustness of terminations	IEC 68-2-21, 1983 Test Ua1 tensile load 2 kg.
Low pressure	0.3 bars absolute.

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)		200	V
Intensity modulator electrode positive voltage (Vg1)	modulator must never become positive w.r.t. cathode		
Final anode voltage (Vg3+5)	12	15	kV
First anode voltage (Vg2)	300	600	V
Focus anode voltage (Vg4)	-700	+700	V

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 = 6.3 V ± 0.1 Vdc; Vg2 = 450 V; Vg3+5 = 14 kV.

	<u>Min.</u>	<u>Max.</u>	<u>Unit</u>
Heater current (Ih)	270	330	mA
Intensity modulator cut-off voltage (Vg1) with focused raster	-40	-80	V
Focus anode voltage (Vg4)	0	+450	V

5. Marking

Each tube and package 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 Xrays.
3. Factory identification code.
4. Date Code.
5. To BS CECC 11001-040
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.
IEC 67	Dimensions of electronic tubes and valves.
IEC 68	Basic environmental testing procedure.
IEC 100	Methods for the measurement of direct inter-electrode capacitance of electronic tubes and valves.
IEC 134	Rating systems for electronic tubes and valves and analogous semiconductor devices.
IEC 410	Sampling plans and procedures for inspection by attributes.
PD 9002	BS 9000 component selection guide.

8. Structural similarity

Not applicable.

9. X-radiation

All high voltage devices operating at voltages above 5kV produce progressively more dangerous X-rays as the voltage is increased. The device envelope usually provides only limited protection and further shielding may be required.

10. Additional information

1. 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.
2. The laminated face-plate panel provides implosion protection to IEC 65. A green contrast enhancement filter is incorporated and the external panel surface is coated to reduce specular reflection. When handling the CRT care should be taken not to mark, or otherwise damage the face-plate coating.
3. Grease marks should be cleaned from the face-plate using a soft cloth or brush and a mild detergent solution followed by wiping with methyl alcohol.
4. The tube and facemask should always be transported in the original packing designed for the purpose and kept in that packing until required for installation.

TEST CONDITIONS AND INSPECTION REQUIREMENTS.

GROUP A - Lot by lot

General test conditions (unless stated otherwise for particular tests)

Heater voltage (Vh) = 6.3V.

First anode voltage (Vg2)=450V.

Final anode voltage (Vg3+5)=14kV.

Intensity modulator electrode negative voltage (Vg1)=adjusted as required.

Focus anode (Vg4) = adjusted as required.

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 Vh only for 5 minutes.

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 OR TEST	REFERENCE CECC 11000	CONDITIONS OF TEST	INSPECTION REQUIREMENTS				
			MIN	MAX	UNITS	IL	AQL
SUB-GROUP A1						100%	
Visual inspection	4.3		See 4.3				
- Non operating endurance	4.9.1	Duration=24 hrs.min.					
- Gas content coefficient	4.6.1	Vg2=300V Vg4=0V Vg3+5=-75V Adjust Vg1 for Ig2=0.5mA Measure Ig3+5 Calculate $\frac{Ig3+5}{Ig2}$		0.15	nA/uA		
- Intensity modulator elec- trode cut-off voltage.	4.6.2	Focused spot. Measure Vg1.	-40	-80 (record value)	V		

INSPECTION OR TEST	REFERENCE CECC11000	CONDITIONS OF TEST	INSPECTION REQUIREMENTS				
			MIN	MAX	UNITS	IL	AQL
SUB-GROUP A1 (Cont) - Cathode emission - Quality of fluorescent screen, filter, and face- plate. - Luminance characteristics	4.6.3	Minimum cathode factor $K=2.0$ Overscanned defocused raster.	Calculated		u A		
			$I_k \text{ min} =$				
			$K(V_{\text{mod}})^{3/2}$				
	4.6.10	Visual inspection. Overscan raster defocused. Adjust V_{g1} for lowest convenient screen luminance. Useful screen area. Uniformity of brightness visual inspection.	As blemish specif- ication. Appendix A.				
			158x 210		mm		
			No significant varia- tion in luminance within useful screen area.				
	4.6.4	Determine background luminance L , using method as in Appendix G. Complete both tests A & B below.					
	4.6.4	Test A. Focused raster 158x210mm. Adjust V_{g1} to give lumin- ance equal to $3.2L$. Measure V_{g1} and calculate drive voltage, (V_{d1}). Measure beam current (I_1)		39	V		
			500		u A		
			record		values		
	4.6.4	Test B. Focused raster 158x210mm. Adjust V_{g1} to give a luminance of 200 cd/m^2 Measure V_{g1} and calculate drive voltage (V_{d2}). Measure beam current (I_2)		39	V		
			500		u A		
			record		values		

INSPECTION OR TEST	REFERENCE CECC11000	CONDITIONS OF TEST	INSPECTION REQUIREMENTS				
			MIN	MAX	UNITS	IL	AQL
SUB-GROUP A1 cont'd							
- Coil parameters.							
X(line)		Inductance (L_L)	148.5	181.5	μH		
		Resistance	-	0.35	Ω		
		Insulation	10	-	$\text{M}\Omega$		
Y(field)		Inductance	43.2	52.8	mH		
		Resistance		62	Ω		
		Insulation	10	-	$\text{M}\Omega$		
- Mechanical Spot displacement.	4.6.5 Method B	Measure relative to geometric centre of collar aperture.					
		Vertical displacement		+6	mm		
		Horizontal displacement		+3.5	mm		
<u>Deflection System Tests</u>		Use either method in Appendix C or D to measure Orthogonality, Angular Alignment, and Pattern Distortion. Note: Deflection polarities are upwards and to the right when a positive voltage is applied to pins 6 and 8 on the deflection coil socket, and viewing the screen with the final anode connector to the bottom.					
- Orthogonality error.			-	0.5	degrees		
- Angular alignment							
X			-	0.7	degrees		
Y			-	0.9	degrees		
- Pattern distortion			-	1.0	%		
- Deflection coil sensitivity		See Appendix E					
X		Peak to peak current (I_L) for 210mm deflection	5.5	6.3	A		
Product $L_L \times I_L$		Product $L_L \times I_L$		1040			
Y		Peak to peak current for 158mm deflection	-	0.29	A		
SUB-GROUP A2	Applicable Sub-Group A2 tests performed 100% in Sub-Group A1.					11	1,5

Remaining applicable sub-group A3 tests performed 100% in sub-groups A1.