

BRITISH STANDARDS INSTITUTION
2 PARK STREET, LONDON. W1A 2BS

BS CECC 11001 - 026
ISSUE 2 MAY 1986.

Specification available from:- AS SHOWN IN PD 9002
CECC 00 200

RANK BRIMAR LIMITED.

GREENSIDE WAY,

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MANUFACTURER'S TYPE NUMBER

DE 2111 or DE2117 (See Note)

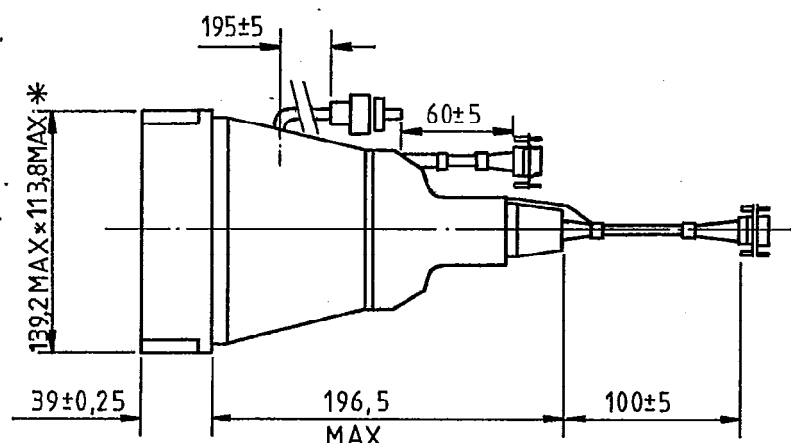
SEE PD 9002 AND CECC 00 200

For ordering information
see Clause 6

ELECTRONIC COMPONENTS OF ASSESSED QUALITY
DETAIL SPECIFICATION IN ACCORDANCE WITH

BS CECC 11000 : 1980

Outline and dimensions Third angle projection



*Face-plate window. 113,5 x 85,5
Dimensions in mm
For detail dimensions see Appendix B

Marking information see Clause 5

RADAR DISPLAY CATHODE RAY TUBE

Deflection: Magnetic
Focus: Electrostatic
Useful Screen: 85 mm x 113 mm
Phosphor: GY or V3 (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 coils pre-
adjusted and potted in a magnetic
shield. External conductive
coating. Bonded mounting frame.
Flying leads with connectors.

FULL ASSESSMENT

+ ADDITIONAL ASSESSMENT

Note:

Alternative contrast enhancement filter system.

DATA (not for inspection purposes)

- | | |
|-------------------------------|----------------|
| 1. <u>Mechanical</u> | |
| Mounting position | Unrestricted |
| Mass | 1.9 kg (Nom) |
| 2. <u>Environmental</u> | |
| Operational temperature range | -26°C to +70°C |

Refer to Qualified Products List PD 9002 and/or CECC 00 200 for details of manufac-
turers approved to this specification

Data (not for inspection purposes) Continued.

2. Environmental (continued)

Damp heat	93% humidity, 40°C for duration of 28 days.
Acceleration	17g along neck axis towards face for 1 minute.
Vibration	Wide band random motion 10 to 60 Hz at 0.02g ² /Hz. 60 to 1000 Hz at 0.01g ² /Hz. all three axes for specified times totalling 50 hours.
Bump	Peak acceleration 10g in four specified directions totalling 4000 bumps.
Shock	Peak acceleration 50g, half sine wave duration 11ms in 4 directions.
Mould growth	Severity 28 days.
Flammability	BS2011, Part 2. Test Pz 1970.
Salt Mist	BS2011, Part 2, Test Kb 1977, two 7 day cycles.
Robustness of terminations	IEC68-2-21, 1975. Test Ual tensile load 2kg, test Ub 10 bends load 1 kg.

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	18	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).

	<u>Min</u>	<u>Max</u>	<u>Unit</u>
Heater voltage (Vh)	6.1	6.5	V
Heater current (Ih) at 6.3V	270	330	mA
Intensity modulator cut-off voltage at final anode=14kV, first anode=450V, and focused raster	-40	-80	V
Useful screen dimensions: height	85		mm
width	113		mm
Focusing voltage at final anode = 14kV and first anode=450V.	0	+450	V

BS CECC 11001-011
Issue 2. MAY 1986.

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. BS number of the detail specification, i.e. BS-CECC11001-026.

The 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. BS detail specification BS CECC11001-026.

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

7. Related documents

BS2011	Basic environmental testing procedures.
BS6001	Sampling procedures and tubes 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 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 interelectrode 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 external conductive coating of this tube should be connected to chassis. The capacitance between this coating and final anode may be used to provide smoothing for the e.h.t. supply.
2. When flashover protection is incorporated the chassis return path of the external conductive coating should be made in a manner appropriate to the protection system employed.
3. 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.
4. 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.
5. 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.
6. 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 or 200 or 300 line non-interlaced 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 BSE 9000 (see 2.6.5. of BSE 9000 part 1).

All tests are non-destructive.

AQL given in %

INSPECTION OR TEST	REFERENCE CECC11000	CONDITIONS OF TEST	INSPECTION REQUIREMENTS				
			MIN	MAX	UNITS	IL	AQL
SUB-GROUP A1						100%	
- Visual inspection	4.3		See 4.3				
- Non operating ensurance	4.9.1	Duration=24 hrs min.					
- Gas content coefficient.	4.6.1	Vg2=300V Vg4=0V Vg3+5=-75V Adjust Vg1 for Igl=0.5mA Measure Ig3+5		0.1	nA/μA		
- Intensity modulator elect- rode cut-off voltage.	4.6.2	Focused raster, 85mm x113mm. Measure Vg1.	-40	-80 (record value)	V		

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INSPECTION OR TEST	REFERENCE CECC 11000	CONDITIONS OF TEST	INSPECTION REQUIREMENTS				
			MIN	MAX	UNITS	IL	AQL
SUB-GROUP A1 Cont'd.							
- Resolution	4.6.14.5 Method C1 or Method A	Pulse duration 0.1µs. p.r.f. 25 Hz. Vmod (drive) as determined in T.M. 4.6.4. to give I1 or I2 whichever is greater. Scan rate 30mm/s maximum. Adjust Va3 for best compromise focus over the display area. Measure Vg4 (focus voltage) Measure spot dia. at screen centre to 50% peak luminance. Without change of focus, measure spot size 10mm in from each corner of useable screen area.					
- Stray emission	4.6.6	Switch off deflection coil current. Adjust Vmod to cut-off. Vg3+5=18kV Vg2=+600V Vg4=-700V Screen horizontal and uppermost.	0	450	V		
- Flashover	4.6.7 Method A	Raster over useful screen area. Vg3+5=18kV Adjust Vg1 to cut-off. Vg2=+600V Vg4=-700V Screen horizontal and uppermost. Tap tube neck for 10s.	-	0.32	mm		
- Microphony		Adjust Vg1 for just visible focused raster over useful screen area. Tap tube neck for 10s at 4 taps per second. Use hammer similar to design shown in 4.6.6	-	0.32	mm		
			see 4.6.6				
			see 4.6.7				
			There shall be no dark lines or bars on the screen.				

INSPECTION OR TEST	REFERENCE CECC 11000	CONDITIONS OF TEST	INSPECTION REQUIREMENTS				
			MIN	MAX	UNITS	IL	AQL
SUB-GROUP A1 cont'd							
- Coil parameters.							
X(line)		Inductance (L_L)	480	550	μH		
		Resistance	-	0.90	Ω		
		Insulation	10	-	$M\Omega$		
Y(field)		Inductance	34	38	mH		
		Resistance	30	36	Ω		
		Insulation	10	-	$M\Omega$		
- Mechanical spot displacement.	4.6.5 Method B	Measure relative to housing inner face.	-	2	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 left.					
- Orthogonality error.			-	0.5	%		
- Angular alignment							
X			-	0.3	degrees		
Y			-	0.4	degrees		
- Pattern distortion			-	0.5	%		
- Deflection coil sensitivity.		See Appendix E.					
X		Peak to peak current (I_L) for 113mm deflection.	2.35	2.6	A		
Product $L_L \times I_L$		Product $L_L \times I_L$	-	1350			
Y		Peak to peak current for 85mm deflection.	0.20	0.33	A		
SUB-GROUP A2		Applicable Sub-Group A2 tests performed 100% in Sub-Group A1.				11	1,5

INSPECTION OR TEST	REFERENCE CECC 11000	CONDITIONS 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						
(1) Heater positive w.r.t. cathode		$V_h-k(\text{heater positive})=250V$	-	25	μA		
(2) Heater negative w.r.t. cathode		$V_k-h(\text{heater negative})=250V$	-	25	μA		
- Intensity modulator electrode negative current.	4.6.12 Method A or Method B	$V_{g3+5}=18kV$ $V_{g1}=100V$ $R_{mod}=10M$		5	μA		
- Electrode leakage current.	4.6.11	$V_{g3+5}=18kV$ $V_{g4}=-700V$ $V_{g2}=600V$					
		Measure final anode current (I_{g3+5})	-	5	μA		
		Measure first anode current (I_{g2})	-8	8	μA		
		Measure focus anode current (I_{g4})	-	-2	μA		

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

GROUP B - Lot by lot							
General test conditions - as for Group A							
Only tests marked (D) are destructive				AQL: given in %			
INSPECTION OR TEST	REFERENCE CECC 11000	CONDITIONS OF TEST	INSPECTION REQUIREMENTS				
			MIN	MAX	UNITS	IL	AQL
- Dimensions major	4.4	Inspection drawing Appendix B.				S4	4,0
			As inspection drawing Group B dimensions.				

GROUP C - PERIODIC							
General test conditions - as for Group A							
Only tests marked (D) are destructive							
AQL given in %							
INSPECTION OR TEST	REFERENCE CECC 11000	CONDITIONS OF TEST	INSPECTION REQUIREMENTS				
			MIN	MAX	UNITS	IL	AQL
SUB-GROUP C1	Applicable sub-group C1 tests performed in sub-groups A1 and A3.						
SUB-GROUP C2	Periodicity up to one year					1	1,5
- External conductive coating resistance.	4.6.27	D.C. supply 1.5 to 3.0V. Take three readings 120° apart. To be measured before deflection coils and magnetic shield are fixed in position.		500	Ω		
SUB-GROUP C3	At yearly intervals. The sample size and acceptance criterion shall be as in 3.4 and 4.9.2 of CECC 11000 as appropriate.						
- Mass			-	2.1	kg		
- Heater modulation.	4.6.31	Focused raster just visible non-synchronised with heater supply frequency.	No intensity modulation				