

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

BS CECC 11 001 - 027



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

RANK ELECTRONIC TUBES LIMITED,
SIDCUP BY-PASS,
SIDCUP, KENT.

TELEPHONE 01-302-0271

TELEX 896215

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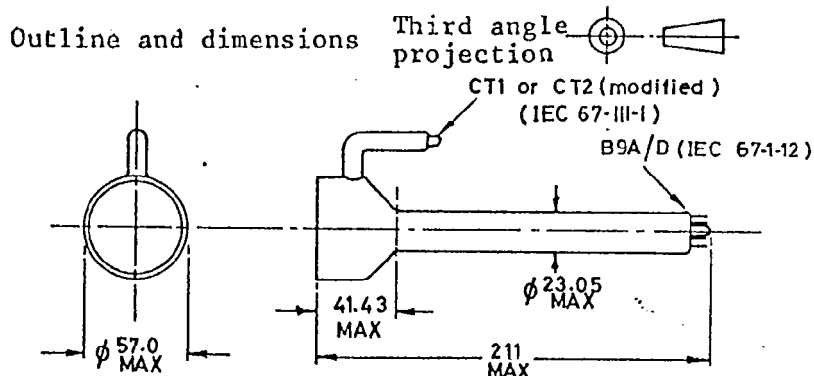
ELECTRONIC COMPONENTS OF ASSESSED QUALITY : DETAIL
SPECIFICATION IN ACCORDANCE WITH BS CECC 11000 : 1980

MANUFACTURER'S TYPE NUMBER
G0602-J2

NATO STOCK No.
5960-99-037-2229

SEE PD 9002 AND CECC 00 200

For ordering information
see Clause 4.



HEAD-UP DISPLAY CATHODE
RAY TUBE

DEFLECTION : MAGNETIC
(40° total angle)

FOCUS : MAGNETIC

SCREEN : 46 mm DIA.

PHOSPHOR : J2 (JEDEC P1)

COLOUR : YELLOWISH GREEN
x = 0.218 y = 0.712

PERSISTENCE: MEDIUM

FULL ASSESSMENT
(ADDITIONAL)

All dimensions in mm

For detail dimensions and base connections
see Appendix B.

Marking information see Clause 3.

1. DATA (not for inspection purposes)

Mechanical

Mounting position Unrestricted (See additional information)

Mass (weight) 0.15 kg nom. 0.25 kg max.

Environmental

Not applicable

Electrical - Limiting values (absolute maximum rating system - IEC 134)

	Min.	Max.	Units
Heater voltage	5.7	6.9	V
Heater to cathode, positive voltage		200	V)
Heater to cathode, negative voltage		200	V) Note 1.
Intensity modulator electrode negative voltage	1	100	-V
Intensity modulator electrode positive voltage	Must never become positive		V
Anode voltage	15	25	kV
Intensity modulator electrode cathode circuit resistance	1.5		MΩ

Note 1. Short term overload condition only.

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

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2. OPERATING CONDITIONS AND TYPICAL CHARACTERISTICS

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

$$V_h = 6.3 \text{ Vac} ; V_{g1} = 18 \text{ V} ; V_{g2} = 20 \text{ kV.}$$

Deflection coil: Celco type B1809-1

Deflector coil: Cintel type A93/25176

	Min.	Max.	Units
Heater current at $V_h = 6.3$ volts	0.55	0.63	A
Focusing requirements	Dependent on coil used		A
Voltage required on the intensity modulator electrode for cut-off (negative)	20	40	-V
Useful screen dimensions	46 dia.		mm
Resolution (line width) at 20 kV anode voltage and a writing speed of 2.95 m/s	--	0.11	mm
Raster luminous intensity (nominal) 2.0 cd			

3. MARKING

Each tube and package shall bear the following markings:

- Manufacturer's type number.
- NATO Stock Number.
- Special marking relating to hazards. Each tube and/or package contains a warning of hazards with respect to handling, implosion and X-rays.
- Factory Identification code.
- Date code.
- To BS CECC 11 001 - 027
- Manufacturer's serial number.

4. ORDERING INFORMATION

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

- Quantity.
- Manufacturer's type number.
- NATO Stock Number.
- BS CECC 11 001 - 027 Issue 1
- Any special requirements and packaging instructions shall be included in the order.

5. RELATED DOCUMENTS

- | | |
|----------------|---|
| BS 6001 | Sampling procedures and tables for inspection by attributes. |
| BS 9000 | General requirements for a system of electronic components of assessed quality. |
| BS CECC 11 000 | Generic Specifications : Cathode ray tubes. |
| CECC 00 200 | CECC Qualified Products List. |
| IEC 67 | Dimensions of electronic tubes and valves. |
| IEC 68 | Basic environmental testing procedures. |
| IEC 100 | Methods for the measurement of direct interelectrode capacitances of electronic tubes and valves. |
| IEC 134 | Rating systems for electronic tubes and valves and analogous semiconductor devices. |
| PD 9002 | BS 9000 Component selection guide. |

6. STRUCTURAL SIMILARITY

Not applicable

7. X-RADIATION

If this tube is operated at voltages in excess of 16 kV., X-ray shielding is advisable to give protection against the possible danger of personal injury arising from prolonged exposure at close range.

8. ADDITIONAL INFORMATION

- 8.1 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 may be delayed. Particular care should be taken not to scratch any part of the tube envelope, especially the faceplate and the area where the faceplate and side-walls meet as this will appreciably weaken the glass and may lead to implosion of the tube .
- 8.2 The tube should be shielded from magnetic fields which can be detrimental to its performance.
- 8.3 Stationary displays at full luminance for long periods should be avoided otherwise phosphor deterioration will result. A stationary d.c. beam impinging on the neck can cause glass failure due to cracking.
- 8.4 This tube has accurately ground glass reference surfaces to facilitate interchangeability in fixed optical systems.
- 8.5 B9A/D valve holders for use with this tube should be modified by drilling a central hole 6.5 mm diameter to allow clearance of exhaust stem.
- 8.6 Faceplate. The faceplate is made of a non-solarizing glass which will not discolour appreciably with time. The thickness is 2.71 ± 0.05 mm with a refractive index (nd) = 1.624.

TEST CONDITIONS AND INSPECTION REQUIREMENTS

GROUP A - Lot by Lot

GENERAL TEST CONDITIONS. (unless stated otherwise for a particular test)

Vh 6.3 Vac Final anode voltage 20 kV.Vg2. All other electrodes as required.

Focus coil details: Celco type B1809-1. The front face of the focus coil shall be positioned 104 mm from the front ground reference surface on the tube envelope. (see Appendix B, Fig.1).

Deflector coil details: Cintel type A93/25176.

Raster details: Non-interlaced 256 line raster. Number of lines per field 256: Field repetition frequency 33.3 Hz. Line repetition frequency 8.533 kHz. Horizontal and vertical dimensions of the display to be beyond the edge of phosphor screen. (overscanned).

Pre-heating: Apply Vh only, 6.3 V for 60 s minimum.

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.

All tests are non destructive AQL: given in %

INSPECTION OR TEST	REFERENCE BS CECC 11 000	CONDITIONS OF TEST	INSPECTION REQUIREMENTS			
			MIN.	MAX.	UNITS	IL AQL
Subgroup A1						
-Visual inspection	4.3	No voltages				100 %
Pre non-operating endurance tests						
-Cathode emission	4.6.3	Minimum cathode factor $K = 2.0$ Modulator voltage (Vg1) equal to half the value found in Proc. 4.6.2. Defocused raster.	+	-	μA $K = \frac{(-V_{g1})^{3/2}}{\sqrt{128}}$	
-Non-operating endurance	4.9.1	Duration = 168 h minimum				

+ To be calculated

GROUP A (continued)

INSPECTION OR TEST	REFERENCE BS CECC 11 001	CONDITIONS OF TEST	INSPECTION REQUIREMENTS			
			MIN.	MAX.	UNITS	IL AQL
Subgroup A1 (cont'd)						
Post non-operating endurance tests						
-Cathode emission	4.6.3	Minimum cathode factor $K = 2.0$ Modulator voltage (V_{gl}) equal to half the value found in Proc. 4.6.2. Defocused raster.				
-Quality of fluorescent screen and faceplate	4.6.10	Adjust modulator electrode voltage for convenient screen luminance				
and						
-Useful screen area			46 dia.	-	mm	
and						
-Uniformity of luminance		Photodetector aperture 8 mm dia. max. Spectral response of the photodetector/ filter combination shall be that of the C.E.E. Standard Observer.	-	1.5:1	ratio	
		Not applicable (Triode Gun)				
-Gas content coefficient	4.6.1		20	40	-V (Record value)	
-Intensity modulator electrode cut-off voltage (negative)	4.6.2		-	18	V (Record value)	
-Luminance characteristics	4.6.4/1	Focused raster 25 mm x 25 mm. Screen luminous intensity = 2.0 cd. Photodetector aperture size 15 mm dia. minimum.	-	25	μ A (Record value)	
		Line length 25 mm. Modulator drive voltage (V_{gl}) equal to the value obtained in Proc. 4.6.4/1 Tube or coil may be rotated through 90° instead of interchanging the line and field scanning voltages.	-	0.11	mm	
-Resolution (line width measured to 20 % peak luminance at screen centre only)	4.6.14/1					

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GROUP A (continued)

INSPECTION OR TEST	REFERENCE BS CECC 11 000	CONDITIONS OF TEST	INSPECTION REQUIREMENTS			
			MIN.	MAX.	UNITS.	IL. AQL.
Subgroup A1 (cont'd) -Stray emission -Flashover -Dimensions	4.6.6 and 4.6.7	Screen horizontal and uppermost. Cathode pre-heating time = 120 s. $V_{g2} = 25$ kV. $-V_{g1}$ at cut-off.				Performance requirements as in 4.6.6 and 4.6.7
	4.4	Inspection drawing (See Appendix B)				As inspection drawing (Group A)
	4.6.5	No raster. The spot position shall be measured relative to the point of intersection of neck axis with screen surface.	-	4	mm	II 1.5 %
Subgroup A3 -Heater current -Heater to cathode leakage -Intensity modulator electrode total negative current	4.6.8	Apply V_h only	550	650	mA	S-4 6.5 %
	4.6.9	V_h-k (heater positive) = 200 V. $V_k=h$ (heater negative) = 200 V. and V_h only.	-	50	μA	
			-	50	μA	
	4.6.12A or 4.6.12B	$V_{g2} = 25$ kV. $-V_{g1} = 100$ V. $R_{mod} = 25 = M\Omega$. Change of V_{g1}	-	4	μA	
			-	100	%	

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 BS CECC 11 000	CONDITIONS OF TEST	INSPECTION REQUIREMENTS			
			MIN.	MAX.	UNITS	IL. AQL
-Dimensions	4.4	Inspection drawing (See Appendix B)				S-4 4 %
						As inspection drawing (Group B)