Image Orthicon

3-Inch Diameter, Bialkali Photocathode Long-Life Type

For Remote and Studio Television Service
Types 8775 is designed to replace types 5820, 5820A, 5820A/L, and 5830B

GENERAL

Direct Interelectrode Capacitance:
Anode to all other electrodes . . . . . 12 pF
Target-to-Mesh:
Spacing . . . . . 0.0022 in (0.056 mm)
Capacitance . . . . . 100 pF
Photocathode, Semitransparent:
Spectral Response . . . . . See *Typical Bialkali Spectral Sensitivity Characteristic*
Window material . . . Corning[a] No.7056, or equivalent
Photocathode material . . Bialkali (Cesium-Potassium-Antimony)

Rectangular image (4 x 3 aspect ratio):
Useful size of . . . . . 1.8 in (46 mm) max. diagonal

Note: The size of the optical image focused on the photocathode should be adjusted so that its maximum diagonal does not exceed the specified value. The corresponding electron image on the target should have a size such that the corners of the rectangle just touch the target ring.

Orientation of . . Proper orientation is obtained when the vertical scan is essentially parallel to the plane passing through center of faceplate and pin 7 of the shoulder base. The horizontal and vertical scan should preferably start at the corner of the raster nearest pin 6 of the shoulder base.

Focusing Method . . . . . Magnetic
Deflection Method . . . . . Magnetic
Overall Length . . . . . 15.20 in (386 mm) ± 0.25 in
Greatest Diameter of Bulb . . . 3.00 in (76.2 mm) ± 0.06 in
Shoulder Base . . . . . Keyed Jumbo Annular 7-Pin
End Base . . . . . Small-Shell Diheptal 14-Pin JEDEC Group 5, No.B14-45

Socket . . . . . Cinch Part No.3M14,[b] or equivalent
Operating Position . . . The tube should never be operated in a vertical position with the diheptal-base end up nor in any other position where the axis of the tube with the base up makes an angle of less than 20° with the vertical.
Weight (Approx.) . . . . . 1 lb 6 oz (600g)

Minimum Deflecting-Coil Inside Diameter	2-3/8 in (61.3 mm)
Deflecting Coil	Cleveland Electronics, OY-Series[C], or equivalent
Deflecting-Coil Length	5 in (127 mm)
Focusing Coil	Cleveland Electronics, OF-Series[C], or equivalent
Focusing-Coil Length	10 in (254 mm)
Alignment Coil	Cleveland Electronics, OA-Series[C], or equivalent
Alignment-Coil Length	15/16 in (23.8 mm)
Alignment-Coil Location	Axially centered 11 inches to rear of tube faceplate
Photocathode Distance Inside End of Focusing Coil	1/2 in (12.7 mm)

ABSOLUTE MAXIMUM AND MINIMUM RATINGS

Voltages are with respect to thermionic cathode unless otherwise specified.

Heater, for Unipotential Cathode:	
Voltage (AC or DC) applied between end base pin No.1 and pin No.14	6.3 ± 10% V
Current	0.6 A
Operating Temperature:	
Of any part of bulb	50 max. °C
Of bulb at large end of tube (Target section)	35 min. °C
Temperature Difference: Between target section and any part of bulb hotter than target section	5 max. °C
Photocathode:	
Voltage	-550 max. V
Illumination	50 max. lm/ft^2 (fc) 538 lux
Grid-No.6 Voltage	-550 max. V
Target Voltage:	
Positive value	10 max. V
Negative value	10 max. V
Grid-No.5 Voltage	150 max. V
Grid-No.4 Voltage	300 max. V
Grid-No.3 Voltage	400 max. V
Grid-No.2 & Dynode No.1 Voltage	350 max. V
Grid-No.1 Voltage:	
Negative bias value	125 max. V
Positive bias value	0 max. V

Peak Heater-Cathode Voltage:		
Heater negative with respect to cathode	125 max.	V
Heater positive with respect to cathode	10 max.	V
Anode-Supply Voltage	1350 max.	V
Voltage Between Consecutive Dynodes	350 max.	V

TYPICAL OPERATING VALUES

Heater Voltage, for Unipotential Cathode	6.3	V
Photocathode Voltage (Image Focus)[e]	-400 to -540	V
Grid-No.6 Voltage (Accelerator)– Approx. 75% of photocathode voltage	-300 to 405	V
Target Voltage Above Cutoff[g]	2	V
Grid-No.5 Voltage (Decelerator)	0 to 125	V
Grid-No.4 Voltage (Beam Focus)[e]	140 to 180	V
Grid-No.3 Voltage[h]	225 to 330	V
Grid-No.2 & Dynode-No.1 Voltage	300	V
Grid-No.1 Voltage for Picture Cutoff	-45 to -115	V
Dynode-No.2 Voltage	600	V
Dynode-No.3 Voltage	800	V
Dynode-No.4 Voltage	1000	V
Dynode-No.5 Voltage	1200	V
Anode Voltage	1250	V
Target Temperature Range	35 to 45	°C
Target Blanking Voltage (Peak to Peak)	5	V
Field Strength at Center of Focusing Coil (Approx.)[i]	75	G
Field Strength of Alignment Coil	0 to 3	G

PERFORMANCE CHARACTERISTICS RANGE VALUES

With conditions shown under Typical Operating Values, picture highlights at the "knee" of the light transfer characteristic, 525 line scanning, interlaced 2:1, frame time of 1/30 second, and 1.8" picture diagonal with 4 x 3 aspect ratio. Characteristics are measured in an RCA Model TK-31A camera, or equivalent

	Min.	Typ.	Max.	
Cathode Radiant Sensitivity at 4000 angstroms	–	0.072	–	A/W

Cathode Luminous Sensitivity[k]	–	90	–	μA/lm
Signal-Output Current (Peak-to-Peak)	3	12	30	μA
Signal-to-Noise Ratio[m]	32	34	–	dB
Photocathode Illumination at 2870° K Required to Reach "Knee" of Light Transfer Characteristic	–	0.010	0.020	lm/ft^2
Amplitude Response at 400 TV Lines per Picture Height (per cent of large area black to large-area white)[n]	35	50	–	%
Uniformity:				
Ratio of Shading (Background) Signal to Highlight Signal	–	0.12	0.15	
Variation of Highlight Signal (Per cent of maximum highlight signal)[p]	–	20	25	%

[a] Made by Corning Glass Works, Corning, New York.

[b] Made by Cinch Manufacturing Company, 1026 South Homan Ave., Chicago 24, Ill.

[c] Made by Cleveland Electronics Inc., 2000 Highland Road, Twinsburg, Ohio 44087.

[e] Adjust for best focus.

[f] For minimum highlight flare or "ghost" the grid-No.6 voltage should be 75% of the photocathode voltage.

[g] Test setting of target voltage is +2 volts from target-cutoff. The target supply voltage should be adjustable from -3 to +5 volts to allow user choice of operating target voltage.

[h] Adjust to give the most uniformly shaded picture near maximum signal.

[i] Direction of current should be such that a north-seeking pole is attracted to the image end of the focusing coil, with indicator located outside of and at the image end of the focusing coil.

[k] Under the following conditions: The light source is a tungsten-filament lamp having a lime-glass envelope. It is operated at a color temperature of 2870° K. The value of light flux is 1 x 10^{-4} lumen and -90 to -175 volts are applied between photocathode and grounded grid No.6 and target.

[m] Signal-to-noise ratio is dependent upon tube operating conditions and on the method of measurement. Significant factors affecting this ratio include target voltage, bandwidth, system line number and frame time, and the choice of reference signal black level. The value shown is measured under the following conditions using a Video Noise Meter, Model UPSF (North American Version), or equivalent. This meter is manufactured by Rohde and Schwarz, Munich, West Germany.

Signal: Blanked video, 0.7 V peak-to-peak including 0.07 V set-up.

Noise Meter: Gated with horizontal and vertical blanking signal of camera system. Video pass band is shaped by means of self-contained 100 kHz high-pass and 4.2 MHz low-pass filters.

Weighting filters matching the response of the human eye (CCIR Rec.421, Annex III) are not used and the color subcarrier, 3.58 MHz, is not present during the measurement.

[n] Measured with amplifier having flat frequency response.

[p] Variation of response over scanned area.

DOS and DON'TS On Use of RCA-8775

Here are the "dos"

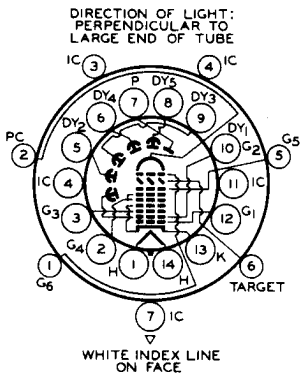
1. Allow the 8775 to warm up prior to operation.
2. Hold temperature of the 8775 within operating range.
3. Make sure alignment coil is properly adjusted.
4. Adjust beam-focus control for best usable resolution.
5. Select target voltage according to operating needs. This freedom of operation results from use of the electronically-conducting glass target.
6. Uncap lens before voltages are applied to the 8775.

7. Turn off the camera or the image-section high voltage supply as the lens turret or the yoke and 8775 must be "swung out" to clean the lens of the tube faceplate.

Here are the "don'ts"

1. Don't force the 8775 into its shoulder socket.
2. Don't operate the 8775 without scanning.
3. Don't operate an 8775 having an ion spot.
4. Don't use more beam current than necessary to discharge the highlights of the scene.
5. Don't turn off beam while voltages are applied to photocathode, grid No.6, target, dynodes, and anode during warmup or standby operation.
6. Don't remove the lens turret or lens when the camera is turned on, or when voltages are applied to the image section of the 8775, unless the light level incident on the tube can be reduced below 50 foot-candles.

TERMINAL DIAGRAM (Bottom View)



SMALL-SHELL DIHEPTAL 14-PIN BASE

Pin 1: Heater
Pin 2: Grid No.4
Pin 3: Grid No.3
Pin 4: Internal Connection – Do not use
Pin 5: Dynode No.2
Pin 6: Dynode No.4
Pin 7: Anode
Pin 8: Dynode No.5
Pin 9: Dynode No.3
Pin 10: Dynode No.1, Grid No.2
Pin 11: Internal Connection – Do not use
Pin 12: Grid No.1
Pin 13: Cathode
Pin 14: Heater

KEYED JUMBO ANNULAR 7-PIN BASE

Pin 1: Grid No.6
Pin 2: Photocathode
Pin 3: Internal Connection – Do not use
Pin 4: Internal Connection – Do not use
Pin 5: Grid No.5
Pin 6: Target
Pin 7: Internal Connection – Do not use

ANNULAR BASE GAUGE

Angular variations between pins as well as eccentricity of neck cylinder with respect to photocathode cylinder are held to tolerances such that pins and neck cylinder will fit flat-plate gauge with:

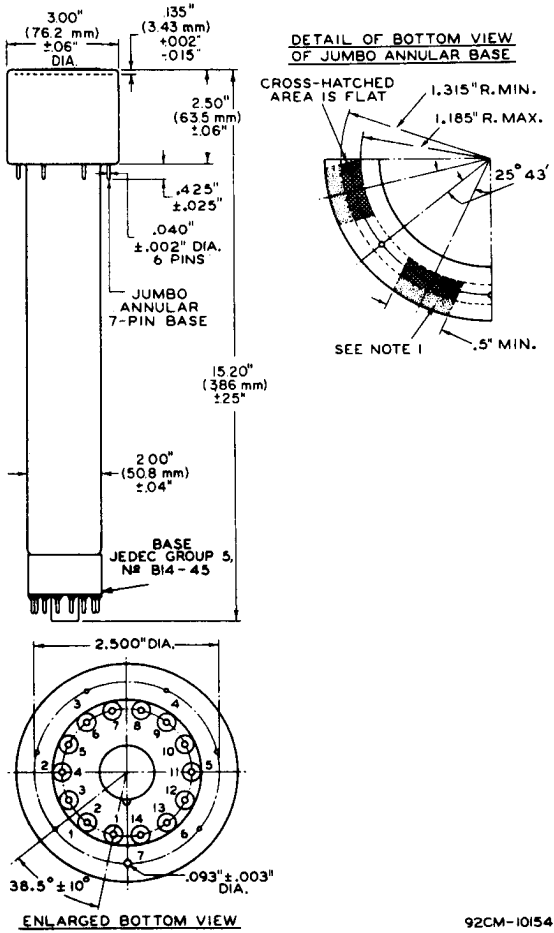
a. Six holes having diameter of 0.065" ± 0.001" and one hole having diameter of 0.150" ± 0.001". All holes have depth of 0.265" ± 0.001". The six 0.065" holes are enlarged by 45° taper to depth of 0.047". All holes are spaced at angles of 51°26' ± 5' on circle diameter of 2.500" ± 0.001).

b. Seven stops having height of 0.187" ± 0.001", centered between pin holes, to bear against flat areas of base.

c. Rim extending out a minimum of 0.125" from 2.812" diameter and having height of 0.126" ± 0.001".

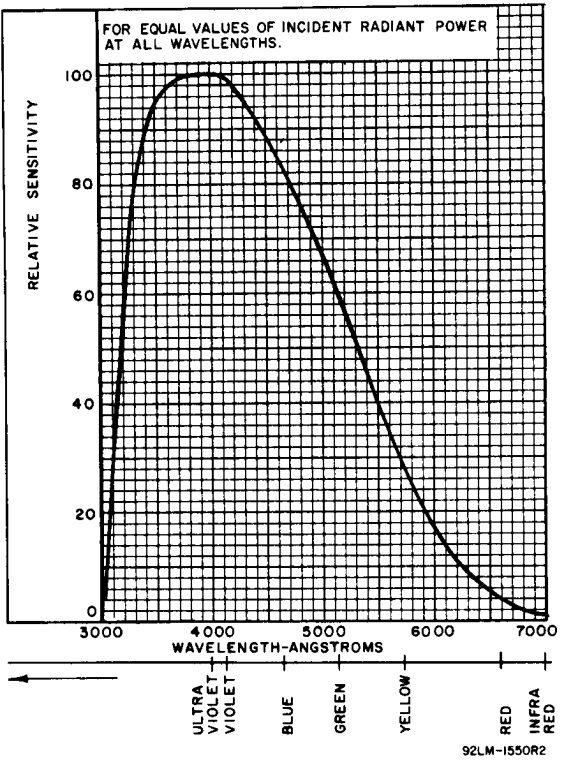
d. Neck-cylinder clearance hole having diameter of 2.200" ± 0.001".

DIMENSIONAL OUTLINE



Note 1: Dotted area is flat or extends toward diheptal-base end of tube by 0.060" max.

TYPICAL BIALKALI SPECTRAL SENSITIVITY CHARACTERISTIC



BASIC LIGHT TRANSFER CHARACTERISTIC