

## Vidicon

Variant of Type 8507A Having a Fiber-Optic Faceplate

## ELECTRICAL

Heater Voltage	6.3 ± 10% V
Heater Current at 6.3 Volts, ac or dc	0.6 nominal A
Focusing Method	Magnetic
Deflection Method	Magnetic
Direct Interelectrode Capacitance: <sup>a</sup>	
Target to all other electrodes	4.6 pF

## OPTICAL

Faceplate (Image Surface) Material	Dark-Clad Fiber-Optics
Flatness	Within 0.5 μm
Pitch (Center-to-center spacing)	5.5 ± 1.0 μm
Maximum tilt	2 minutes of arc
Spectral Response	RCA Type II, See accompanying <i>Typical Spectral Sensitivity Characteristics</i>
Photoconductor	Antimony Trisulfide

## PHOTOCONDUCTIVE LAYER

Maximum useful diagonal of image	0.625 in (16 mm)
Orientation of quality rectangle – Proper orientation is obtained when the horizontal scan is essentially parallel to the plane passing through the tube axis and short index pin.	

## MECHANICAL

Overall Length	6.250 ± 0.125 in (158.75 ± 3.19 mm)
Greatest Diameter	1.210 ± 0.010 in (30.73 ± 0.25 mm)
Bulb Diameter	1.025 ± 0.003 in (26.04 ± 0.08 mm)
Base	Small-Button Ditetra 8-Pin (JEDEC No.E8-11)
Socket	Cinch <sup>b</sup> No.8VT (133-98-11-015), or equivalent
Deflecting Yoke – Focusing Coil –	
Alignment Coil – Assembly	Cleveland Electronics <sup>c,d</sup> No.VYFA-355-2, or equivalent
Operating Position	Any
Weight (Approx.)	2 oz

MAXIMUM AND MINIMUM RATINGS *Absolute-Maximum Values*

For scanned area of 1/2" x 3/8" (12.7 mm x 9.5 mm)

	Min.	Max.	
Grid-No.4 Voltage <sup>f</sup>	–	1000	V

Grid-No.4 and Grid-No.3 Voltage Difference	—	600	V
Grid-No.3 Voltage <sup>f</sup>	—	1000	V
Grid-No.2 Voltage	—	350	V
Grid-No.2 Power Dissipation	—	1	W
Grid-No.1 Voltage	-150	0	V
Heater-Cathode Voltage	-125	10	V
Target Voltage	—	100	V
Dark Current	—	0.25	μA
Peak Target Current <sup>g</sup>	—	0.75	μA
Faceplate:			
Illumination <sup>h</sup>	—	5000 lm/ft <sup>2</sup>	
	—	50000	lux
Temperature:			
Operating and storage	—	71	°C

## TYPICAL OPERATION

With tube operated in a Cleveland Electronics Assembly Type VYFA-355-2, scanned area of 1/2" x 3/8" (12.7 mm x 9.5 mm), faceplate temperature of 30 to 35° C, and standard CCIR "M", or EIA, TV scanning rate (525 lines, interlaced 2:1, frame time 1/30 second)

	Low-Voltage Mode	High-Voltage Mode	
Grid-No.4 (Decelerator) Voltage <sup>f</sup>	500	900	V
Grid-No.3 <sup>f</sup> (Beam-Focus Electrode) Voltage	300	540	V
Grid-No.2 (Accelerator) Voltage	300	300	V
Peak-to-Peak Blanking Voltage:			
When applied to grid-No.1	75	75	V
When applied to cathode	20	20	V
Field Strength <sup>j</sup> at Center of Focusing Coil	40 ± 4	58 ± 4	G
Peak-to-Peak Deflecting- Coil Current:			
Horizontal	350	480	mA
Vertical	20	28	mA
Field Strength of Adjustable Alignment Coil <sup>k</sup>	0 to 4	0 to 4	G

## TYPICAL PERFORMANCE DATA

Under the conditions shown under  
Typical Operation

Grid-No.1 Voltage for Picture  
Cutoff<sup>m</sup> . . . . . -65 to -100      -65 to -100      V

Average "Gamma" of Transfer  
Characteristic for a Signal-  
Output Current Between  
20 nA and 200 nA . . . . . 0.65                  0.65

Lag — Per Cent of Initial Value  
of Signal-Output Current 1/20  
Second After Illumination is  
Removed<sup>n</sup> . . . . . 20                      20                      %

Limiting Resolution:

At center of picture . . . 1000                  1100      TV Lines  
At corner of picture . . . 600                      700      TV Lines

Amplitude Response to a  
400 TV Line Square-Wave  
Test Pattern at Center of  
Picture<sup>p</sup> . . . . . 45                      55                      %

## High-Sensitivity Operation

Conditions

Faceplate Illumination  
(Highlight) . . . . . 0.1                  lm/ft<sup>2</sup> (fc)  
Dark Current<sup>q</sup> . . . . . 0.10                      μA

Performance

Target Voltage<sup>r,s</sup> . . . . . 30 to 60                  V  
Typical Signal-Output Current:<sup>t</sup>  
For collimated light<sup>u</sup> . . . . . 0.08                      μA

## Average-Sensitivity Operation

Conditions

Faceplate Illumination (Highlight) . . . 1.0                  lm/ft<sup>2</sup> (fc)  
Dark Current<sup>q</sup> . . . . . 0.02                      μA

Performance

Target Voltage<sup>r,s</sup> . . . . . 20 to 40                  V  
Typical Signal-Output Current:<sup>t</sup>  
For collimated light<sup>u</sup> . . . . . 0.16                      μA  
For diffused light<sup>u</sup> . . . . . 0.11                      μA

- a This capacitance, which effectively is the output impedance of the 4589, is increased when the tube is mounted in the deflecting-yoke and focusing-coil assembly. The resistive component of the output impedance is in the order of 100 megohms.
- b Made by Cinch Manufacturing Company, 1501 Morse Avenue, Elk Grove Village, IL 60007.
- c Made by Cleveland Electronics Inc., 2000 Highland Road, Twinsburg, Ohio 44087.
- d These components are chosen to provide tube operation with minimum beam-landing error when mounted in the recommended position along the tube axis.
- f Grid-No.4 voltage must always be greater than grid-No.3 voltage. The maximum voltage difference between these electrodes, however, should not exceed 600 volts. When the 4589 is positioned within the magnetic assembly, the recommended ratio of grid-No.3 to grid-No.4 voltage is 6/10 to 5/10; best geometry being provided when the ratio is 6/10, and most uniform signal output when the ratio is 5/10. The operator should select the ratio within this range which provides the desired performance.
- g Video amplifiers must be designed properly to handle target currents of this magnitude to avoid amplifier overload or picture distortion.
- h For conditions where "white light" is uniformly diffused over entire tube face.
- i The polarity of the focusing coil should be such that a north-seeking pole is attracted to the image end of the focusing coil, with the indicator located outside of and at the image end of the focusing coil.
- k The alignment coil should be located on the tube so that its center is at a distance of 3-11/16 inches from the face of the tube, and be positioned so that its axis is coincident with the axis of the tube, the deflecting yoke, and the focusing coil.
- m With no blanking voltage on grid No.1.
- n For an initial signal-output current of 300 nanoamperes and a dark-current of 20 nanoamperes. Lag will increase with a decrease in initial signal current and/or an increase in dark current.
- p Amplitude response is the signal amplitude from a given TV line number (fine picture detail) expressed as a per cent of the signal amplitude from a very-low-frequency (large-area) picture element. In practice, the large-detail reference is usually 15 TV lines with signal amplitude set equal to 100 per cent. The TV line numbers are determined by the number of equal-width black and white lines that will fit into the physical height of the image focused on the camera-tube faceplate.
- q The deflecting circuits must provide extremely linear scanning for good black-level reproduction. Dark-current signal is proportional to the scanning velocity. Any change in scanning velocity produces a black-level error in direct proportion to the change in scanning velocity.

- r The target voltage for each 4589 must be adjusted to that value which gives the desired operating dark current.
- s Indicated range for each type of service serves only to illustrate the operating target-voltage range normally encountered.
- t Defined as the component of the highlight target current after the dark-current component has been subtracted.
- u Fiber-optic faceplates have the following transmission values:

	Min.	Typical
To collimated light	68%	80%
To diffused light*	50%	55%

\*Representative of light output from a phosphor screen fiber-optically coupled.

### SPURIOUS SIGNAL TEST

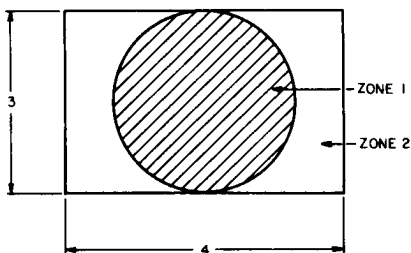


Figure 1

92LS-1064

This test is performed using a uniformly diffused white test pattern that is separated into two zones as shown in Figure 1. To be counted as a spot, the spurious signal amplitude must be greater than 10% of a peak white signal of 300 nanoamperes under either highlight or capped conditions, and lines or streaks must be greater than 5%. Lines or streaks having an area not exceeding that of a 6-TV line round spot are counted as spots and are subject to the spot criteria shown below. Grainy or mottled background having a spurious signal amplitude greater than 3% of the peak white signal (300 nA) and block lines and multifiber shading signal amplitudes greater than 5% constitute reject items.

TABLE 1

For scanned area of 1/2" x 3/8" (12.7 mm x 9.5 mm)

Equivalent Number of Raster Lines	Zone 1 Allowed Spots	Zone 2 Allowed Spots
over 6	0	0
6 but not including 4	0	2
4 but not including 2	6	6
2 but not including 1	25	25
1 or less	*	*

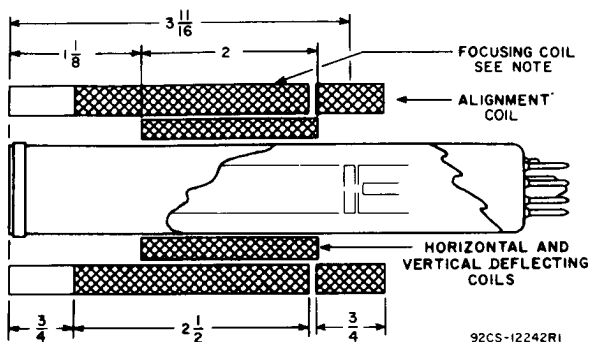
Minimum separation between any 2 spots greater than 1 raster line is limited to 16 raster lines.

\*Spots of this size are allowed unless concentration causes a smudged appearance.

Fiber-Optic Distortion Errors are normally negligible. In exceptional cases, a typical distortion of 2 TV lines may occur.

### RECOMMENDED LOCATION AND LENGTH OF DEFLECTING, FOCUSING, AND ALIGNMENT COMPONENTS

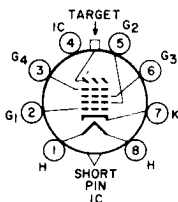
To obtain minimum beam-landing error.



Note: Cross-hatching indicates wound portion of focusing coil.

## TERMINAL DIAGRAM (Bottom View)

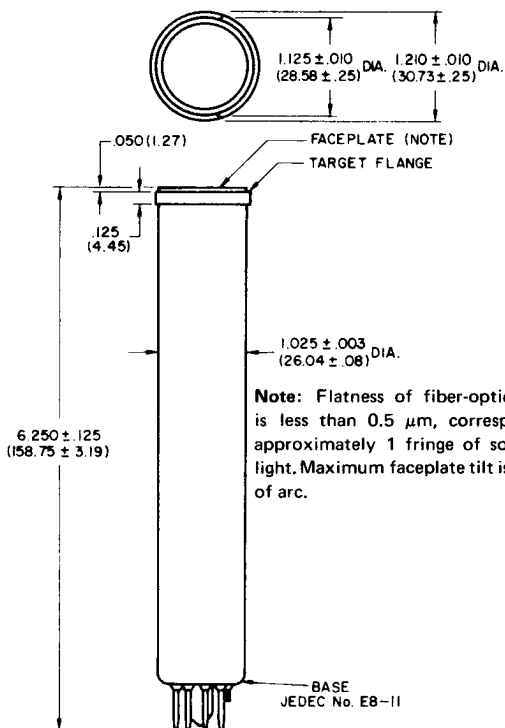
Pin 1: Heater  
 Pin 2: Grid No.1  
 Pin 3: Grid No.4  
 Pin 4: Internal  
 Connection —  
 Do Not Use  
 Pin 5: Grid No.2  
 Pin 6: Grid No.3  
 Pin 7: Cathode



Pin 8: Heater  
 Flange : Target  
 Short Index  
 Pin — Internal  
 Connection —  
 Make No Connection

DIRECTION OF LIGHT:  
 INTO FACE END OF TUBE

## DIMENSIONAL OUTLINE - Dimensions in Inches (mm)



**Note:** Flatness of fiber-optic faceplate is less than  $0.5 \mu\text{m}$ , corresponding to approximately 1 fringe of sodium "D" light. Maximum faceplate tilt is 2 minutes of arc.

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## TYPICAL SPECTRAL SENSITIVITY CHARACTERISTIC

