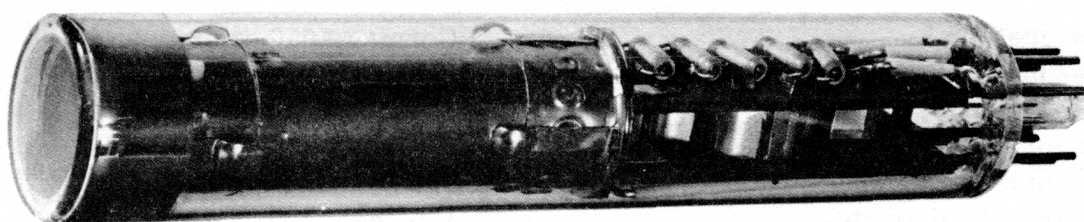


TENTATIVE DATA

VIDISSECTOR - IMAGE DISSECTOR

Type F4012



DESCRIPTION

The F4012 Vidisector is a 1 inch diameter magnetically focused and deflected image dissector camera tube. Photocathodes of the S-1, S-11, and S-20 type can be provided along with various scanning aperture shapes and sizes ranging from 0.0005 inch to 0.150 inch (Notes 1 and 3).

APPLICATION

The image dissector has several properties which make it well suited to such applications as slide-projector readers, hard-copy readers, electronically scanned spectrometers, flaw detectors for industrial process controls, and electronic star trackers. A few of these image dissector properties which should be considered when selecting an appropriate camera tube for a specific application are: (a) high resolution - determined primarily by the size of the defining aperture (b) nonstorage - allowing the scan rate to be varied without changing the signal current amplitude (c) reliable operation over a long period of time - simple rugged construction and lack of thermionic cathode and (d) linear dynamic range of several orders of magnitude.

GENERAL CHARACTERISTICS

Photocathode spectral response (Note 1)	S-1, S-11, or S-20 (see Figure 1)
Focusing Method (Note 2)	Magnetic
Deflection Method (Note 2)	Magnetic
Aperture size limits (Notes 1 and 3)	0.0005 to 1.150 inch
Number of dynodes (Note 4)	12
Internal dynode voltage divider (Note 5)	2.5 megohms per stage Stages 1 through 12

MECHANICAL CHARACTERISTICS

Window material	Corning 7056 or equivalent
Window index of refraction	1.5
Window thickness	0.080 - 0.005 inch
Maximum useful photocathode diameter	3/4 inch
Maximum over-all tube length	6-3/4 inches
Maximum tube diameter	1.0 inch
Weight (approximate)	2.6 ounces
Base	JEDEC No. 8-11 (9 pin Vidicon)
Socket Connections	See Figure 2

RECOMMENDED OPERATING CONDITIONS

Photocathode voltage	-2000 volts
Drift tube voltage	-1700 volts
Dynode No. 1 voltage (Note 6)	-1700 volts
Dynode Nos. 2-11 voltage	(Note 7)
Dynode No. 12 voltage (Note 8)	-140 volts
Guard ring	Ground
Required focus field (Note 7)	40 gauss
Ambient temperature	25° C

ABSOLUTE MAXIMUM RATINGS

Average photocathode current density (Note 9)	10 μ a/cm ²
Peak anode current (Note 10)	8 μ a
Ambient temperature	75° C
Over-all voltage	2800 volts
Photocathode to dynode No. 1 voltage	500 volts
Dynode No. 1 to anode voltage	2300 volts
Dynode No. 12 to anode voltage	200 volts

PERFORMANCE CHARACTERISTICS

	<u>Minimum</u>	<u>Typical</u>
Cathode Luminous Sensitivity (Notes 11 and 12)		
S-1	12	20 μ a/lumen
S-11	35	50 μ a/lumen
S-20	100	120 μ a/lumen
Cathode Peak Radiant Sensitivity (Note 9)		
S-1 (8000 Å)	--	0.0022 amps/watt
S-11 (4400 Å)	--	0.032 amps/watt
S-20 (4200 Å)	--	0.043 amps/watt
Current Amplification	5×10^5	2×10^6
Resolution	See Note 13	

NOTES

1. When ordering an F4012, two specifications in addition to the series designation "F4012" are required, namely: (1) the type of spectral response desired, and (2) the dimension of the defining aperture in mils. These two numerical specifications should follow the series designation in brackets as follows:

EXAMPLE 1: F4012(S1, 2R). This calls for an F4012 image dissector with an S-1 type photocathode and a 0.002 inch diameter round defining aperture.

EXAMPLE 2: F4012(S11, 1S). This calls for an F4012 image dissector with an S-11 type photocathode and a 0.001 inch by 0.001 inch square aperture.

EXAMPLE 3: F4012(S20, 4x 100). This calls for an F4012 image dissector with an S-20 type photocathode and a 0.004 inch by 0.100 inch slit shaped rectangular aperture.

2. The F4012 is designed to utilize the standard deflection and focus coil assembly commercially available for vidicons. Custom built coils for

improved resolution and reduced distortion are also available from ITTIL.

3. The F4012 is available with aperture sizes and shapes varying within the dimensional limits of 0.0005 inch and 0.150 inch. Added tooling costs may be involved if specialized sizes or shapes are required.
4. Additional dynodes can be supplied on special orders.
5. Dynodes No. 1 through No. 12 are connected internally by 2.5 megohms, 1/8 watt resistors. These values are adequate for normal signal currents. Modified multipliers are available for applications requiring more than 8 μ a anode output current.
6. Dynode No. 1 may be operated either positive or negative with respect to the drift tube potential. At more positive potentials it provides higher first stage gain and decreased multiplier noise ratio, without loss in deflection sensitivity, but at the cost of an increased spurious "background" signal. If slightly more negative than the drift tube potential, dynode No. 1 rejects the spurious background signal, hence gives a better black rendition. Ten to twenty volts are sufficient to accomplish this.
7. ITTIL focus coil F4510 operates at approximately 40 ma. To allow for manufacturing variations in the tube and focus coil, some adjustment should be allowed in either cathode for drift tube potential or focus coil current.
8. In general, lower dynode No. 12 voltages favor increased multiplier gain. The limit in dynode No. 12 voltage reduction is set by linearity requirements at high signal currents.
9. Averaged over any interval not greater than 1 second. S-20 photocathodes should not exceed 1 μ a/cm².
10. For a 10 percent maximum departure from linearity of output current versus input flux.
11. With 10⁻² lumen source of 2870 degrees K color temperature, normal to the plane of the window.
12. At 270 volts dc applied between photocathode and all other elements connected together

13. Practical resolution is a complex function involving the defining aperture, focus coil and deflection coils used in the particular application.

Theoretical resolution at 100 percent modulation is a function of aperture size only and is expressed:

$$(1) \quad \text{TV lines/inch} \quad \frac{1}{\text{aperture width in inches}}$$

Amplitude response falls off linearly for a rectangular aperture to 0 percent modulation at the condition:

$$(2) \quad \text{TV lines/inch} \quad \frac{2}{\text{aperture width in inches}}$$

The theoretical resolution of a round aperture decreases nearly linearly from the same resolution at 100 percent modulation, to 22 percent modulation at condition 2, above.

Through careful design and construction it has been possible to reduce the aberrations in the image section to 0.0005 inch. When this factor is added to the physical aperture size in the above calculations, it is possible to estimate the actual performance of the tube.

14. Registered JEDEC response curve. All spectral responses are normalized to 100 percent following registered JEDEC recommendations.

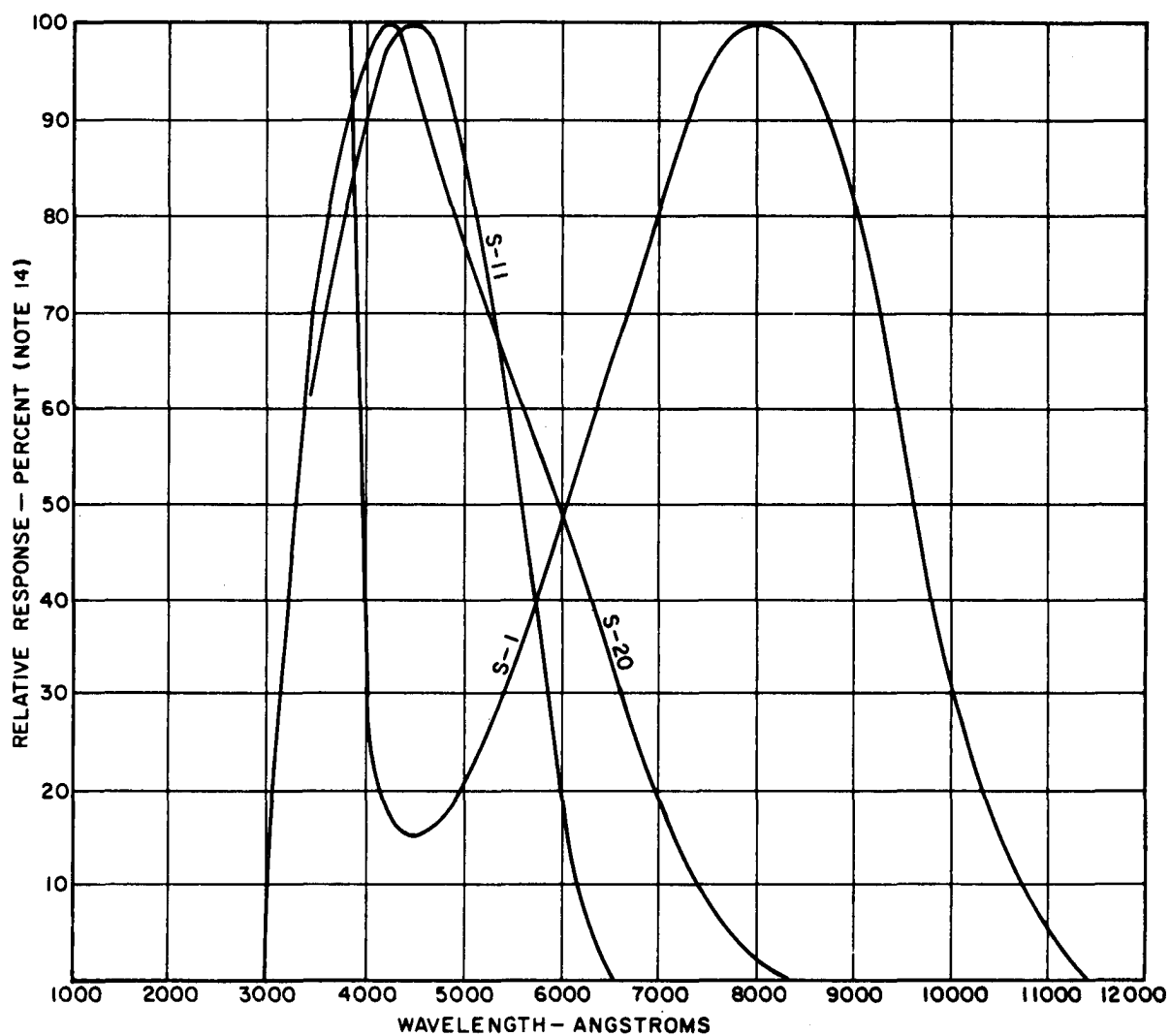
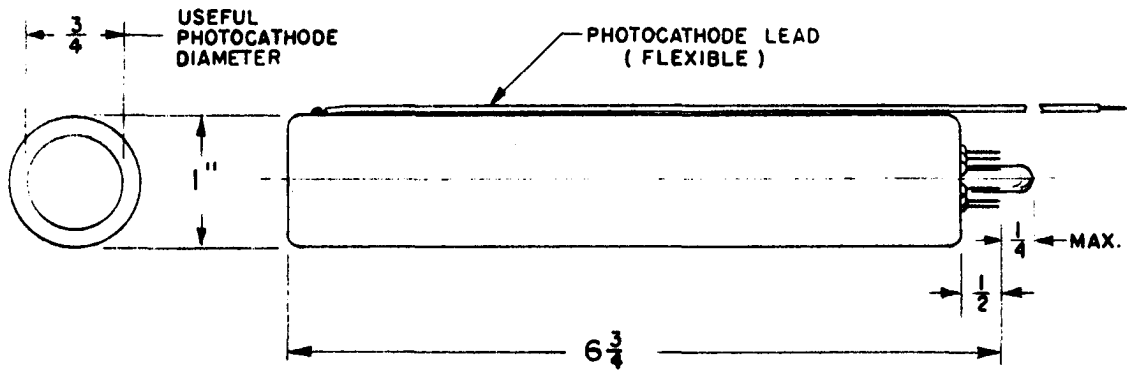
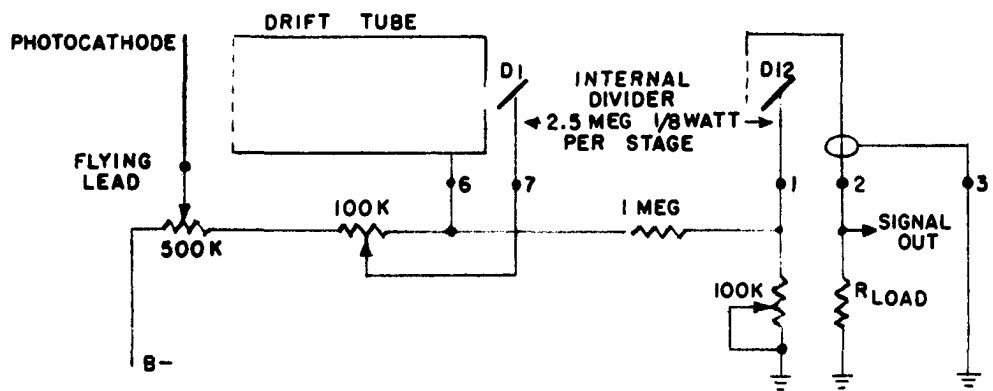


Figure 1 Spectral-Sensitivity Curves

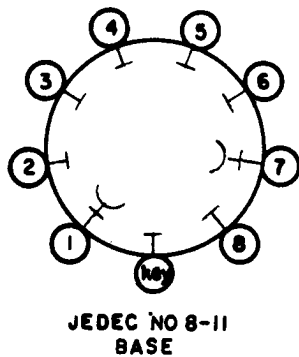
Outline Drawings



Electrical Schematic



Pin Connections

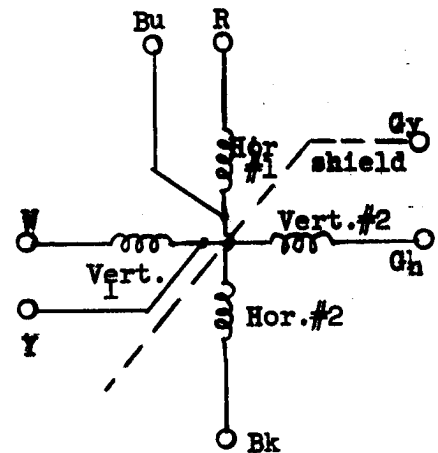
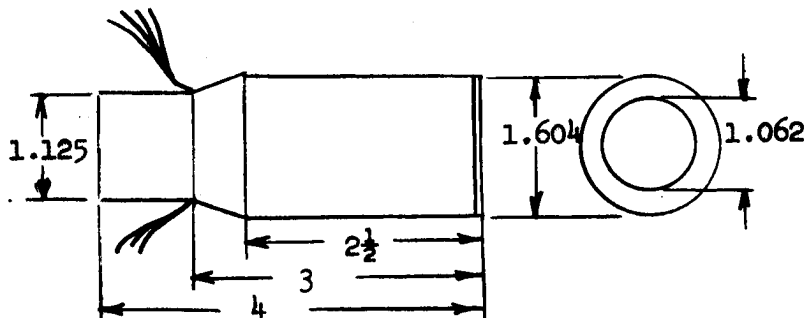


Pin	Connection
1	Dynode 12
2	Anode
3	Guard Ring
4	Internal Connection
5	Internal Connection
6	Drift Tube
7	Dynode 1
8	Internal Connection
Key Pin	Internal Connection (Short Pin)
Flying Lead	Photocathode

1 INCH
DEFLECTION AND FOCUS COIL ASSEMBLIES
FOR F4012 VIDISSECTOR

DEFLECTION YOKE

ITTIL PART NO.	HORIZONTAL COIL			VERTICAL COIL		
	Inductance	Resistance	Typ. Defl. Sens.	Inductance	Resistance	Typ. Defl. Sens.
	mh	ohms	ma/in.	mh	ohms	ma/in.
F4509	42	180	55	50	200	55



FOCUS COIL

ITTIL PART NO.	RESISTANCE ohms	TYPICAL CURRENT ma
F4510	670	30

