S-Band High Power Klystron

- Pulse Amplifier Service
- Factory Fixed Tuned
- Water Cooled
- 28 Megawatts Peak Pulse Output at 2856 MHz
- Power Gain — 53 dB

General Data

Electrical:

Heater		
Type	Matrix Type, Oxide Coated, Unipotential Cathode	
Voltage (AC or DC)	17	V
Current (at 17 V)	15.5	A
Warm up time (at 15.5 A)	20	min.
Direct Interelectrode Capacitance		
Anode to cathode	42	pF
Anode to cathode with corona shield and in electromagnet	50	pF
Operating Frequency	2856	MHz

Mechanical:

Operating Attitude	Vertical, Heater-Cathode end down	
Coolant Connection Pair		
Inlet water connection	1/2-14 NPT External*	
Outlet water connection	1/2-14 NPT External*	
Electrical Connections		
Beam voltage, heater and heater-cathode connections	See Dimensional Outline	
RF input	Mates with Male Connector UG-573/U	
RF output	Mates with Male Waveguide Flange AJ2121, to WR 284 Waveguide	
Uncrated Weight (Approx.)		
Klystron	(68 kg)	150 lb
Electromagnet	(305 kg)	670 lb
X-radiation shielding	(127 kg)	280 lb
Total Weight, Installed with Electro-Magnet and X-Radiation Shielding	(500 kg)	1100 lb

Thermal:

(See Dimensional Outline for temperature measurement points)

Metal Surface Temperature

At O-ring on cathode cylinder	100	max.	°C
At all other metal surfaces	150	max.	°C

Ambient Oil Temperature

(Electron-gun-assembly bath)	100	max.	°C

Window Band Temp. through 10-32 NF Tapped Hole in Window Cover to Accommodate Thermocouple	90	max.	°C

Cooling

Immersion of the electron-gun assembly in the oil-bath is required, to the level indicated on the Dimensional Outline. Transformer oil with high insulating properties such as GE 10 C (Mfg. by GE Company) or equivalent, must be used. The oil-bath must be of sufficient volume to limit the surface of the electron gun assembly to a maximum temperature of 100° C.

Water Cooling of the Internal Structure is Required

Water flow	13	typ.	gal/min.
Maximum water pressure at inlet	100	max.	psi
Maximum pressure differential	30	max.	psi
Outlet water temperature	70	max.	°C
Resistivity of coolant water	1.0	min.	meghom-cm

Pulsed RF Amplifier Ratings

Maximum Ratings, Absolute-Maximum Values:

For a maximum dc rectangular pulse "ON" time of 3.2 microseconds in any 2700-microsecond interval, and a rf load vacuum of 10^{-7} Torr.

Peak Pulsed DC Beam Voltage[a]	270	max.	kV
Peak Inverse Beam Voltage	55	max.	kV
Peak Pulsed DC Beam Current	298	max.	A
Peak Pulsed Input Beam Power	80	max.	MW
Average Input Beam Power	94	max.	kW
Load VSWR (Maximum)	1.5:1		

Typical Operation:

With rectangular waveshape rf-pulse having a duty factor of 0.0009 and a duration of 2.5 microseconds centered within a dc pulse duration of 3.2 microseconds, and at a frequency of 2856 MHz.

Peak Pulsed DC Beam Voltage	270	250	225	kV
Peak Pulsed DC Beam Current	280	250	213	A

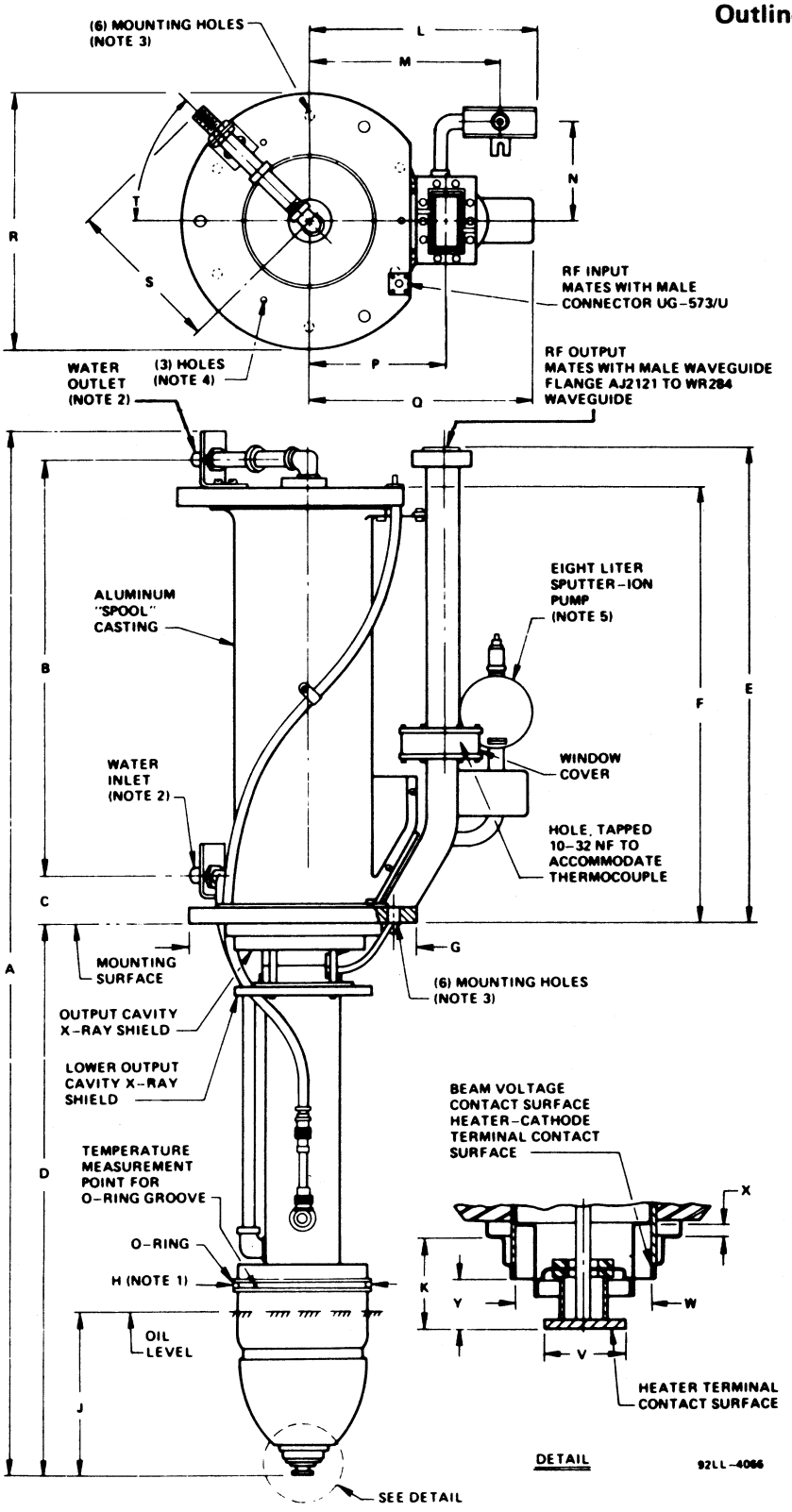
Driving Power Input at Peak of Pulse (Input VSWR <1.5:1)	120	145	170	W
Useful Power Output at Peak of Pulse (Load VSWR <1.2:1)	28	23	16	MW
Power Gain	53	52	48	dB
Phase Modulation, by Heater Magnetic Field	0.14	0.12	0.10	deg
Phase Modulation, by Change in Beam Voltage	6.0	6.0	6.0	deg/percent
Amplitude Modulation, by Noise and Heater Magnetic Field	0.12	0.10	0.08	percent

Accessories necessary for rated operation of the 8840 are available from RCA and include X-radiation shields, electromagnets for beam focusing, a sputter-ion-pump magnet assembly, a corona shield, an "O" ring and a mating waveguide flange with its associated gasket and hardware.

Description	RCA Type No.
Set of X-Radiation Shields	AJ2171
Upper Collector Shield	AJ2107
Lower Collector Shield	AJ2173
Outlet Water Pipe Shield	AJ2109
Window Shield	AJ2110
Waveguide Shield	AJ2111
Inlet Water Pipe Shield	AJ2112
Aluminum Spool Shield	AJ2113
Focusing Magnet (One required)	
Electromagnet, Multi Coil	AJ2117V2
Electromagnet Single Coil	AJ2117V3
Corona Shield	AJ2115
Sputter Ion Pump Magnet & Bracket	AJ2170
Oil Tank Sealant O-Ring	AJ2122
Male Waveguide Flange	AJ2121
Waveguide Flange Hardware (Ten sets, bolts, nuts, washers)	AJ2123
Waveguide Flange Gasket (One required)	
Aluminum Gasket	AJ2119
Copper Gasket	AJ2120

*Amer. Std. Pipe Thd. (Tapered)

Dimensional Outline



Tabulated Dimensions

Dimensions	Inches	Millimeters
A	57.6 max.	1463 max.
B	22.9 ± 0.3	582 ± 8
C	2.66 ± 0.12	67.6 ± 3.0
D	30.2 ± 0.2	767 ± 5
E	26.03 ± 0.09	661.2 ± 2.3
F	24.00 ± 0.03	609.6 ± 0.8
G Dia.	$13.00^{+0.15}_{-0.05}$	$330.2^{+3.8}_{-1.3}$
H Dia.	7.84 ref.	199.1 ref.
J	9.3 ± 1.0	236 ± 25
K	1.26 ± 0.05	32.0 ± 1.3
L	13.0 max.	330 max.
M	10.50 ref.	266.7 ref.
N	5.44 ref.	138.2 ref.
P	7.50 ± 0.03	190.5 ± 0.8
Q	12.5 max.	317 max.
R Dia.	14.2 max.	361 max.
S	8.53 ± 0.35	216.7 ± 8.9
T	45° ref.	45° ref.
V Dia.	1.12 ref.	28.5 ref.
W Dia.	1.92 ± 0.03	48.8 ± 0.8
X	0.05 min.	1.3 min.
Y	$0.67^{+0.16}_{-0.05}$	$17.0^{+4.1}_{-1.3}$

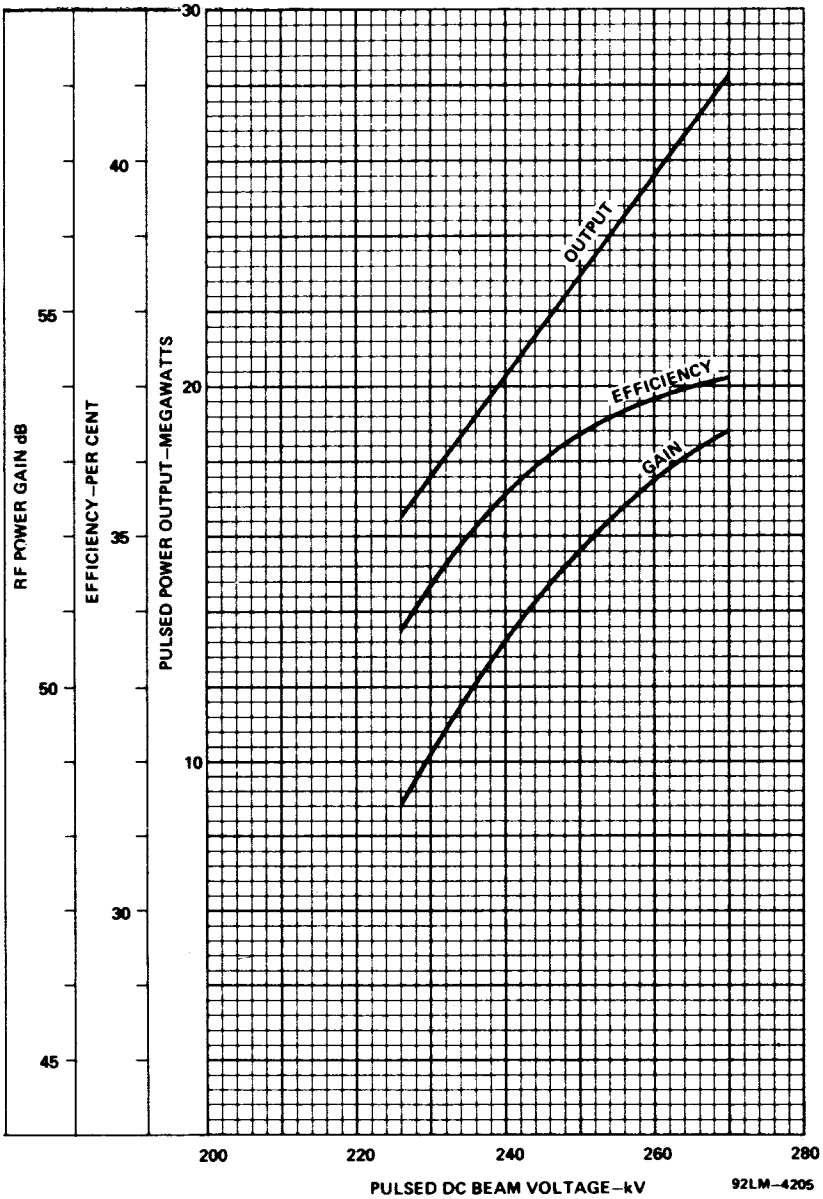
Notes

1. Recommended diameter of O-ring sealing surface.
2. American Standard Taper Pipe Thread (Male) 1/2-14.
3. Mounting holes, six, 9/16 inch diameter equally spaced on a 11.56 in diameter circle.
4. Holes for lifting eye bolts tapped 1/2-13 NC equally spaced on a 10.0 inch diameter circle.
5. A vacuum pump control unit 921-0062 (Varian Vacuum Div., Palo Alto, Calif.) or equivalent is required to operate the sputter ion pump.

X-Radiation Warning

This device in operation may produce X-Radiation which can constitute a health hazard. Shielding or other precautions may be required.

Typical 8840 Performance with Flux Plot "D" Electromagnet Focusing



More detailed information in the form of an application packet PWR-555, is available upon request from your RCA Field Representative or RCA Large Power Tube Application Engineering, Lancaster, PA 17604.