



KLYSTRON

A High Power Amplifier Klystron designed for CW operation in the 3 cm. waveband.

SYII

PHYSICAL DETAILS.

Electrode Connections	See Drawing.
Overall Length ...	296 mm. (11 $\frac{1}{4}$ in.).
For other dimensions see	outline drawing on Page 3.
Output Waveguide ...	Rect. lin. \times $\frac{1}{2}$ in. I.D.
Input Waveguide ...	Rect. lin. \times $\frac{1}{2}$ in. I.D.
Water Connections :	
Block ...	To B.S.S. 659 for $\frac{1}{2}$ " bore.
Collector ...	To B.S.S. 659 for $\frac{1}{2}$ " bore.
Mounting Position ...	Vertical with Cathode uppermost.

HEATER.

Heater Voltage ...	4.5 to 6.0 volts.
Heater Current ...	10 to 10.5 Amps.
*Minimum Heating Delay Time	5 minutes.

RATINGS.

Max. Beam Voltage ...	14 kV.
Max. Beam Current ...	850 mA.
†Min. Power Output ...	1800 watts.

FREQUENCY.

‡Operating Frequency ...	8700 - 10,000 Mc/s.
Tuning Range ...	45 Mc/s. \pm 10 Mc/s.

WATER COOLING for operation at :—

	1 kw. 2 kw.
Minimum Water flow through Block at 20°C. ...	1.0 2.0 litres/min.
Pressure drop through Block at above flow ...	0.6 1.2 lbs./sq.in.
Minimum Water flow through Collector at 20°C. ...	2.5 5.0 litres/min.
Pressure Drop through Collector at above flow ...	0.1 0.4 lbs./sq.in.

§AIR COOLING of Output Window

Min. Air Flow at 20°C. ...	0.5 1.0 litres/sec.
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TYPICAL OPERATION AND CHARACTERISTICS.

Beam Voltage	9.4 to 10.6	12.8 to 13.6	kV.
Beam Current	450 to 550	720 to 790	mA.
Focus Voltage	-200 to -450	-300 to -700	volts.
Focus Current	<0.5	<0.5	mA.
Output Power	1000	2000	watts.
Efficiency	19 to 22	19 to 22	%
R.F. Gain :			
High Level	10.5 to 12.5	12 to 14	dB.
Low Level	12 to 14	17 to 18.5	dB.
Phase Variation of Output with Beam Voltage	1.3	1.5	radians/kV.
Loss Current :			
No. R.F.	\geq 10	\geq 10	% of beam current.
Optimum R.F. Drive	<150	<200	mA.

*See Notes on Operation (2) overleaf.

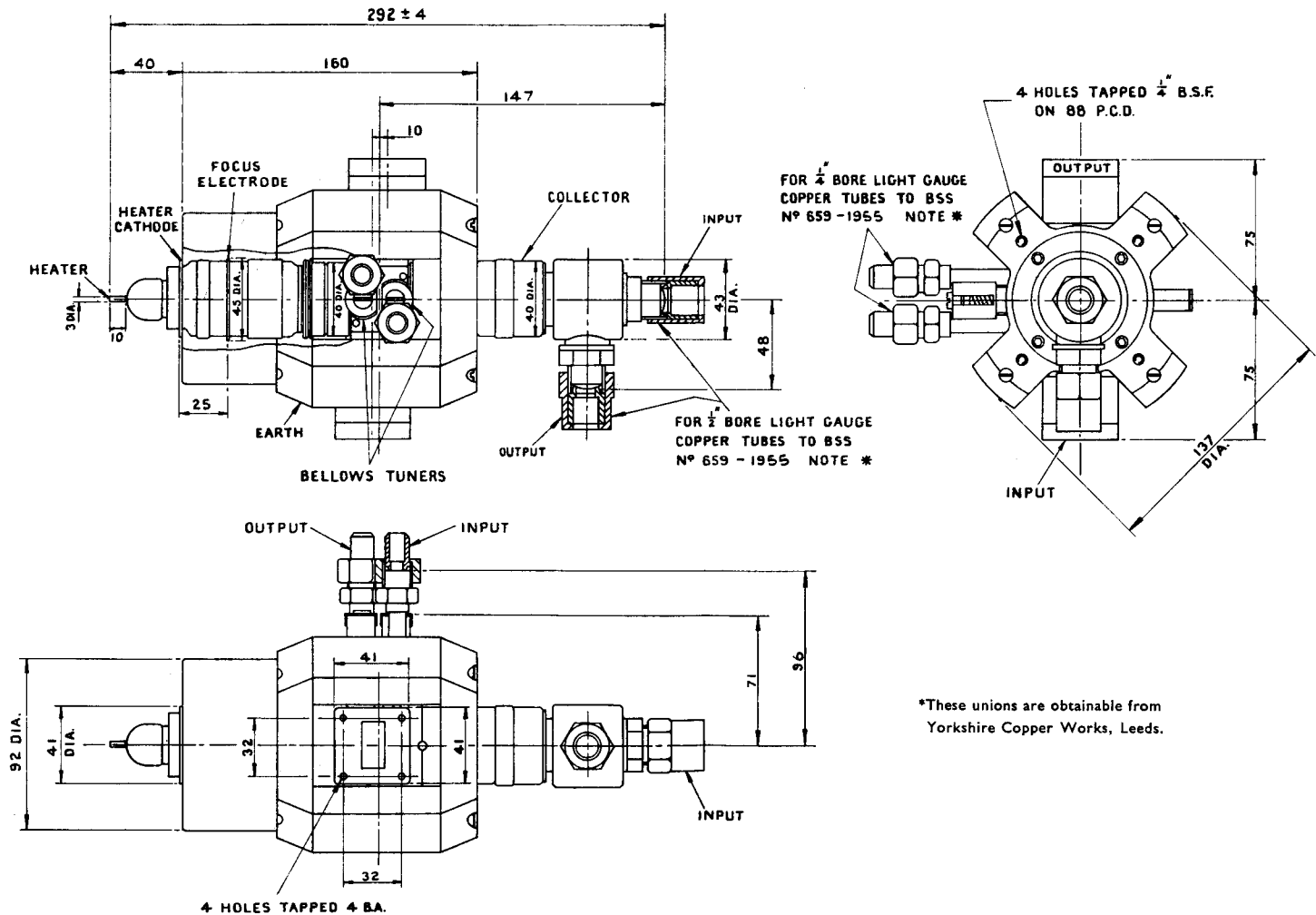
†At Beam Voltage=14 kV.

‡Valves can be supplied tuned to any frequency within this range.

§Drawings of the necessary wave guide cooling section will be supplied on request.

NOTES ON OPERATION.

1. The heater voltage should be gradually increased until a steady current within the specified range is obtained.
2. The valve has no getter and therefore when first installed or after more than two or three weeks shelf life it is advisable to run the heater for about half an hour before applying H.T. which should then be raised slowly (approx. 4 kV/min.) checking that reasonable focus is obtained. On other occasions when this procedure is unnecessary the warm up time from switching on of heaters to full power is about 5 minutes. During this heating period the heater current should not exceed 13 Amps.
3. The cavity block and collector are insulated from each other, therefore current taken by the block can be measured separately. This current should not exceed 200 mA. and an H.T. trip set to operate at 200mA. is a useful safeguard against H.T. flashover.
4. It is recommended that a pressure type water flow relay should be fitted in the collector drain pipe, in order to break the H.T. supply in the event of cooling water supply failure, otherwise the beam will rapidly puncture the collector if such a failure occurs.
5. Care should be taken not to exceed 2 : 1 V.S.W.R. in the output circuit, otherwise the output window may puncture.
6. The following precautions should be taken to avoid internal damage to the cathode or focus electrode in the event of flashover when the valve is first run :—
 - (a) Connect a resistor of not less than 75 ohms in series with the mains H.T. feed to the cathode.
 - (b) Limit the focus electrode to cathode potential in the event of breakdown to less than 1000 volts. This can be readily achieved by series connected neon discharge tubes across the focus electrode supply.
 - (c) It is also advisable to connect a series resistor (approx. 10k Ω) between the focus electrode and its supply potentiometer and to decouple the latter to cathode with a capacitor of 1 μ F.

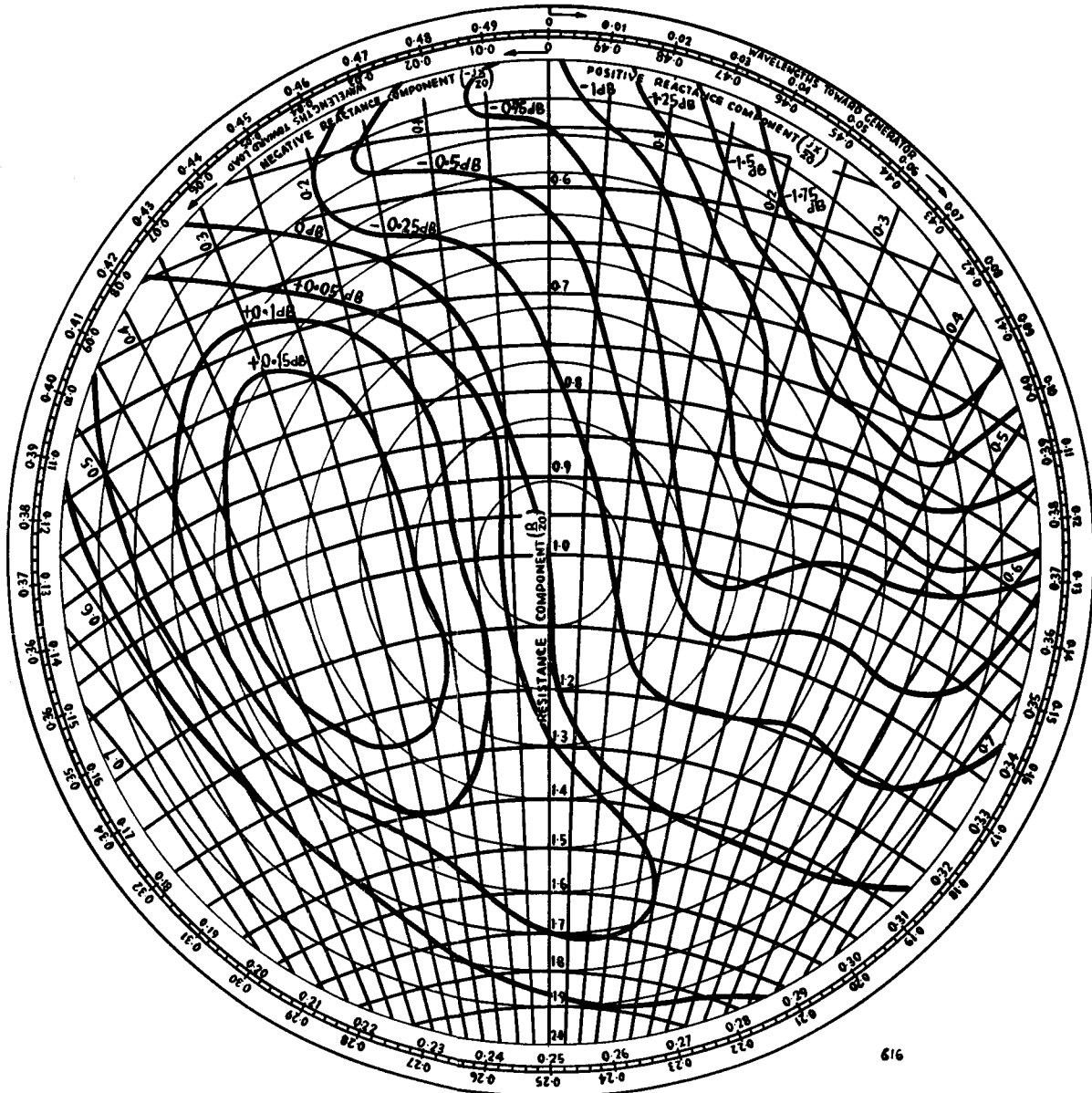


*These unions are obtainable from
Yorkshire Copper Works, Leeds.

Dimensions
shown are in
millimetres

Ferranti

RIEKE DIAGRAM



616



Beam Voltage = 10kV
 Beam Current = 500mA
 OdB = 1kW

