

REGISTRATION DATA

WESTERN ELECTRIC 5795 MAGNETRON

DESCRIPTION

The 5795 is an integral magnet type tunable magnetron intended for service as a pulsed oscillator capable of operating over a frequency range of 3100 to 3500 megacycles per second. The peak power output is approximately 1000 kilowatts and the tube is forced-air cooled.

GENERAL ELECTRICAL DATA

Pre-heat Heater Voltage	107± 7 volts
Pre-heat Heater Current (at 107 volts)	3.65± 0.35 amperes
Minimum Pre-heat Time	600 secs
Heater Cold Resistance	3.2 ohms

RATINGS, Absolute Values

Heater Voltage (Maximum)	120 volts
Pre-heat Time (Minimum)	240 seconds
Heater Surge Current (Maximum)	17 amperes
Peak Anode Voltage (Maximum)	50 kilovolts
Peak Anode Current (Maximum)	50 amperes
Average Power Input (Maximum)	5 kilowatts
Duty Cycle (Maximum)	.0022
Pulse Duration (Maximum)	1.5 μsec.
Rate of Rise of Anode Voltage (Maximum)	220 kv/μsec.
Anode Temperature (Maximum)	110° C

GENERAL MECHANICAL DATA

Recommended Mounting Position	Output vertical facing up.
Net Weight	65 pounds
Coupling Between Tube and Load	Waveguide Flange
Input Connection	See Footnote A
Output Connection	See Footnote B

The output section is coupled to RG-48/U waveguide by means of the choke coupling shown on Fig. 9.

Note A: The coaxial input connector shall utilize a heater shunt capacitor in close proximity to the cathode input terminal so as to minimize voltage surges which could damage the heater. The input connector must have provision for cooling the cathode with an air flow of $4\text{-}3/4" \pm 1/2$ c.f.m.

Note B: Provision should be made externally and in close proximity to the magnetron output window for an "arc quencher", which should be wired into the appropriate voltage supply and relay circuitry, so that an arc across the output window, caused by R.F. voltage breakdown in the waveguide load, can be extinguished by automatically turning off the applied pulse voltage momentarily. The effect of the quencher is to protect the output window from "suck in" when such an arc is permitted to run.

TYPICAL OPERATING CONDITIONS

	<u>Ef</u> <u>V</u>	<u>If</u> <u>A</u>	<u>Ib</u> <u>mA</u>	<u>epy</u> <u>kv</u>	<u>Pi</u> <u>Kw</u>	<u>Du</u>	<u>tp</u> <u>μsec.</u>	<u>rrv</u> <u>kv/μs</u>
#1	40	2.5	90	45	4.0	.002	1.33	150
#2	65	2.7	60	45	2.6	.00133	1.33	150

The data on lines #1 and #2, shown under "Typical Operation" caption above, each constitute a satisfactory set of simultaneous operating conditions. Fig. 2 shows typical satisfactory pulse shapes for these, observed when using a Line Type Modulator.

COOLING DATA

For any ambient temperature to a maximum of 50° C. and any anode dissipation to a maximum of 2250 watts, the tube shall be cooled with forced air as follows:

<u>Locations</u>	<u>Air-flow</u>
Body	300 c.f.m. min. through fins
Cathode	$4\text{-}3/4" \pm 1/2$ c.f.m.
Tuning Head	$6 \pm 1/2$ c.f.m.
Output Window	$1\text{-}1/2$ c.f.m.

OPERATING DATA

These data are embodied in the following set of figures. A family of curves are shown which represents the spread in range of the tube as manufactured. Data involving VSWR have been carried beyond the 1.5 test value for information purposes only.

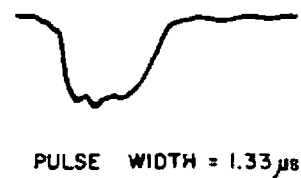
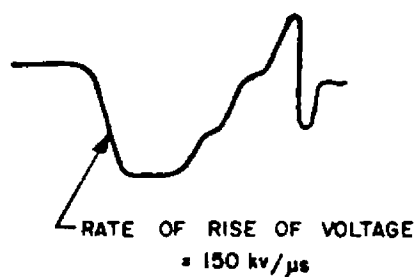
- Figure 3 This is a plot of required filament current and anode cooling air versus applied average anode power input.
- Figure 4 This is a plot of tuning dial readings versus frequency. It is assumed that thermal equilibrium has been obtained at each of the calibrated points.
- Figure 5 This is a plot of both applied peak anode voltage and overall operating efficiency versus peak anode current. The recommended operating range of voltage, current and efficiency are indicated as a guide within which satisfactory operation is expected. These data were taken at 3300 mc. The spread for lower frequencies will decrease and will increase for higher frequencies.
- Figure 6 This is a plot of percent of power output change, from matched load conditions, one can obtain by varying the phase of a 1.5 and a 2.0 VSWR from sink to anti-sink. The nominal match curve is obtained relative to the frequency tuning band by equating the output at each frequency point against the power output at 3100 mc. Therefore, the change due to load mismatch and phase is that difference between the nominal line and the appropriate sink or anti-sink line at any associated frequency point.
- Figure 7 This is a plot of frequency pulling relative to VSWR and represents the greatest variations wherever encountered in the full frequency tuning band.
- Figure 8 This is a plot of long line relationships versus line length for the specific case of 10 mc pulling which is the maximum specification limit.

TYPICAL 5795 PULSES

ANODE VOLTAGE

ANODE CURRENT

TYPICAL OPERATION #1



TYPICAL OPERATION #2

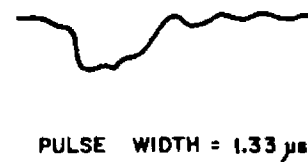
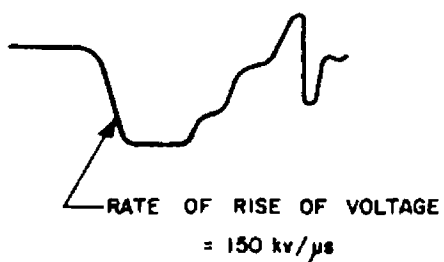


FIG. 2

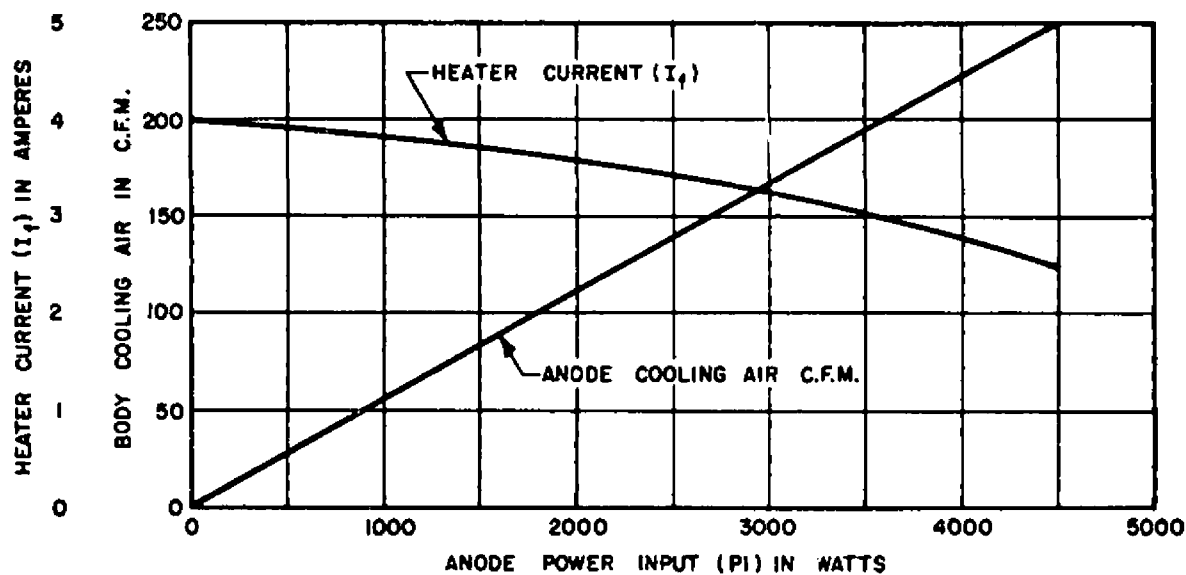


FIG. 3

Note: The air cooling information plotted in Figure 3 above is based on a maximum rise in magnetron body temperature of 60°C above a maximum ambient of 50°C with an anode dissipation of 2250 watts.

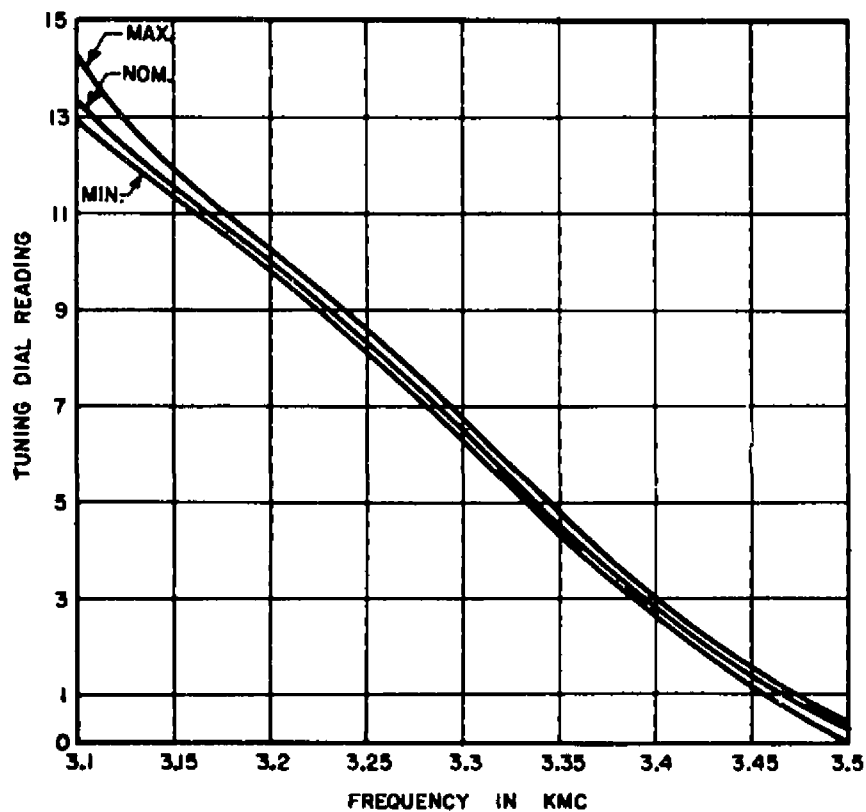


FIG. 4

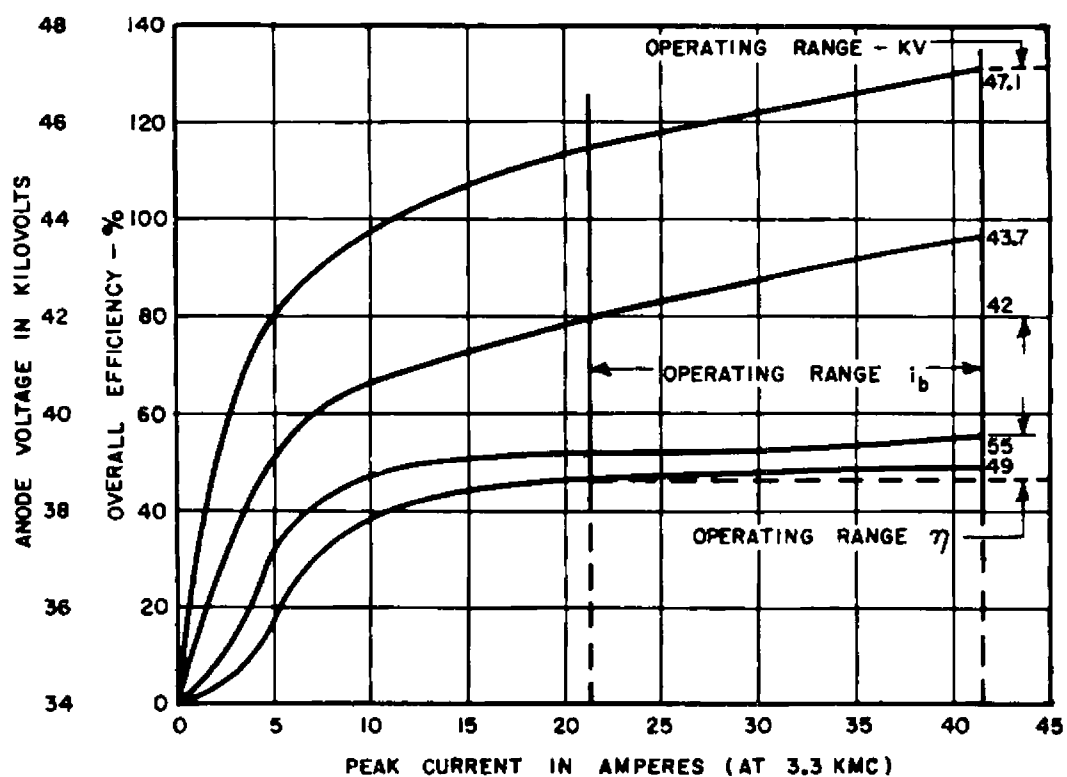


FIG. 5

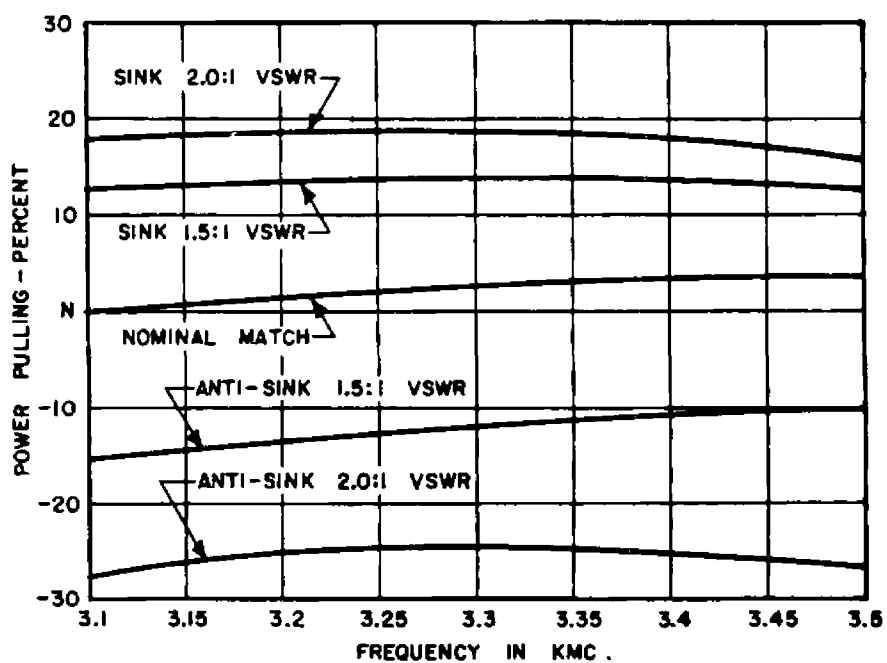


FIG. 6

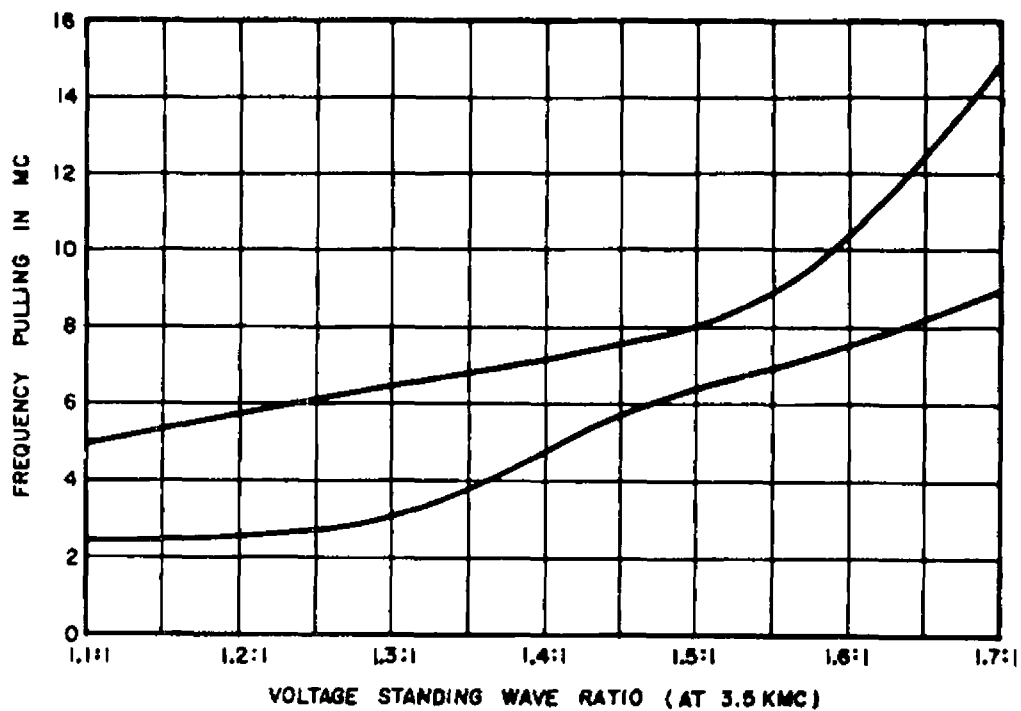


FIG. 7

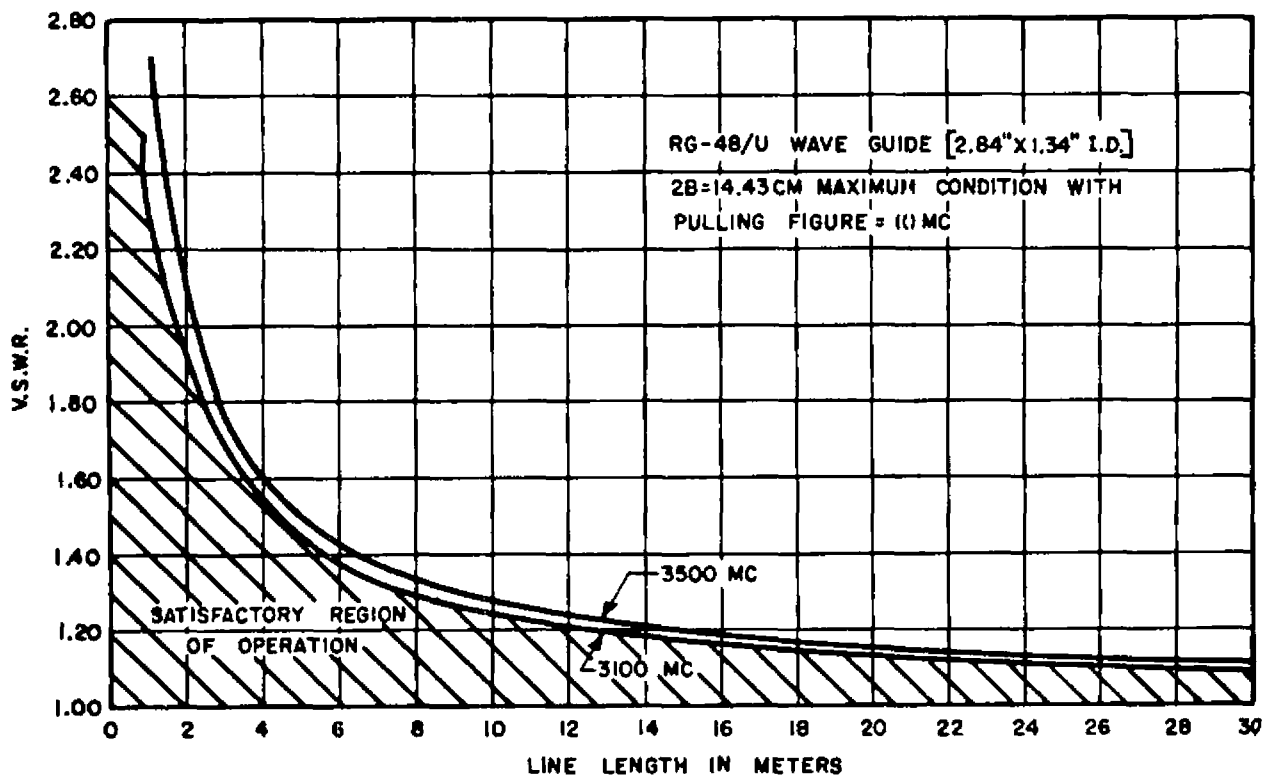
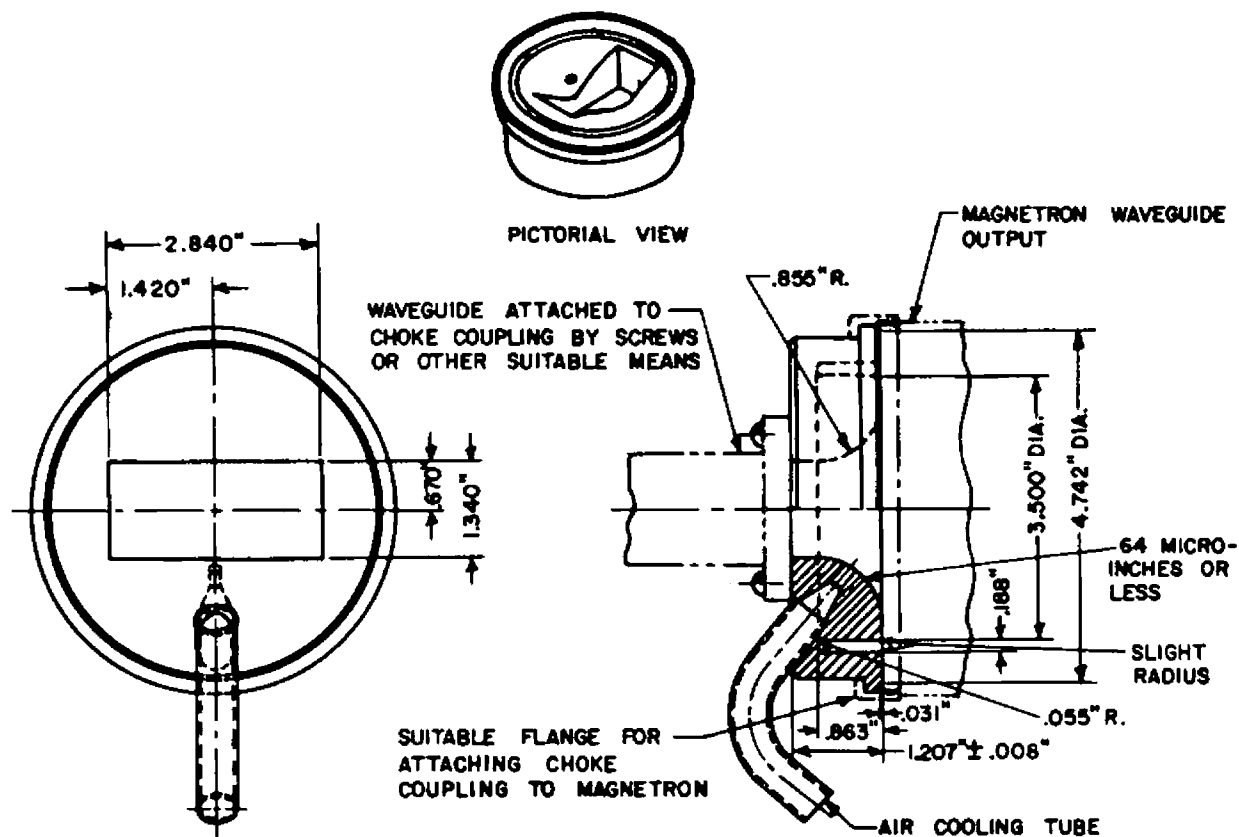


FIG. 8



CHOKE COUPLING

FIG. 9