RCA

2J50

MAGNETRON

FORCED-AIR COOLED

Fixed Frequency: 8825 ± 75 Mc

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage	6.3	ac or dc volts
Current	1.0	amp
Minimum Cathode Heating Time	2	minutes
Frequency	8825 ± 75	Mc
Color Code (3 dots in row following type designation):		
Orange, violet, green	8750 to 8800	Mc
Orange, violet, blue	8800 to 8850	Mc
Orange, violet, violet	8850 to 8900	Mc

NOTE: The color code is given for the convenience of users and is not to be construed as furnishing a basis for ordering 2J50's with a specific color code.

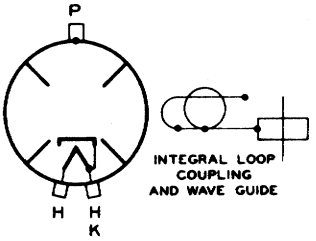
Maximum Frequency Pulling	15	Mc
Maximum Frequency Change with Anode Temperature Change	0.25	Mc/°C

Mechanical:

Terminal Connections:

H – Heater

K – Cathode



P – Anode

Mounting Position . . . . . Any

Dimensions . . . . . See Outline Drawing

Air Flow to Fins:

An air stream should be directed radially along the cooling fins toward the body of the tube. The stream may be obtained from a rectangular nozzle about 3-1/4" by 3/4" located so that the plane through the 3-1/4" side is parallel with the plane of a cooling fin and so that the nozzle is centered on the body of the tube. Adequate flow should be provided so that the temperature of the anode block does not exceed 150°C.

PULSED OSCILLATOR SERVICE

Maximum Ratings, *Absolute Values*:

	For Duty Cycle of 0.0007	*0.0012 max.*	
PEAK ANODE VOLTAGE	16 max.	16 max.	Kv
PEAK ANODE CURRENT	16 max.	16 max.	amp
PEAK POWER INPUT	260 max.	150 max.	Kw
AVERAGE POWER INPUT	180 max.	180 max.	watts
PULSE DURATION	2.5 max.	2.5 max.	μs
OPERATION TIME IN 100-MICROSECOND INTERVAL	5 max.	5 max.	μs
ANODE-BLOCK TEMPERATURE	150 max.	150 max.	°C

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Typical Operation:

With Duty Cycle of 0.001

Heater Voltage	See Operating Notes	
Applied Magnetic Field	5400	gausses
Peak Anode Voltage	12	Kv
Peak Anode Current	12	amp
Pulse Repetition Rate	1000	cps
Pulse Duration	1	μs
Maximum RF Bandwidth	3	Mc
Peak Power Output	45	Kw

OPERATING NOTES

The magnetic field required for operation of the 2J50 should be uniform to within 5 per cent over a cylindrical volume, 0.260" in diameter and 0.310" long, located centrally between the poles and coaxially with them. It is recommended that the pole faces of the magnet have a diameter of 3/4" and be spaced 0.635" + 0.005" - 0.000" from each other. The pole tips should taper back from the face for a distance of 0.430" at an included angle not exceeding 50° in order to clear parts of the tube.

Because of steel inserts in the end plates of the anode, the strength of the magnetic field inside the tube is greater than the strength of the external magnetic field into which the tube is inserted. The field strength shown in the tabulated data is the value at the center of the air gap before the tube is inserted in the field. The 2J50 may be operated without regard to polarity of the magnetic field.

Rated voltage should be applied to the heater for at least 2 minutes to allow the cathode to reach normal operating temperature before high-voltage pulses, negative with respect to the anode (ground), are applied to the cathode terminal. As soon as the 2J50 starts to oscillate, the heater voltage (E_f) must be reduced approximately in accordance with the equation

$$E_f = 6.3 \sqrt{1 - \frac{P_i}{150}}$$

where P_i is the average power input to the tube. For power-input values of 150 watts or greater, the heater voltage should be turned off. When the tube is oscillating, the cathode is subjected to considerable electron bombardment which raises the temperature of the cathode. The magnitude of the heating is a function of the total dissipation and must be compensated by reduction of the heater voltage in order to prevent overheating of the cathode. The heater should be protected against input pulse power by a suitable filter. Failure to start the tube at rated heater voltage and to reduce the heater voltage as soon as oscillation starts may seriously affect tube life.

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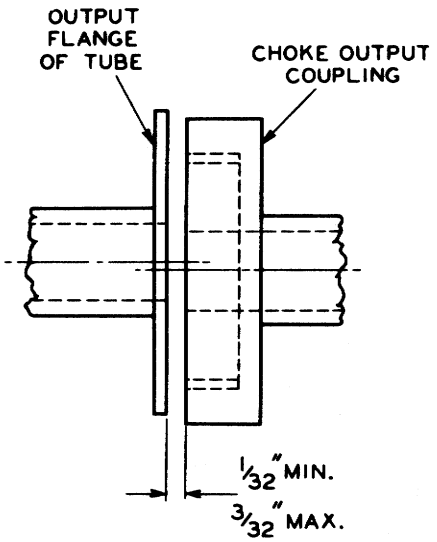
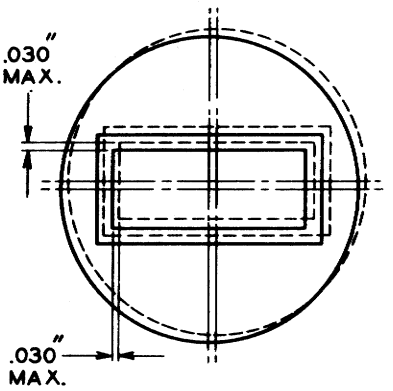
Choke Output Coupling Required for Operation of the 2J50 with a Load Circuit of the Wave-Guide Type





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All points on the face of one component shall be between parallel planes which are 1/32" and 3/32" from and parallel to the face of the other component.

No point of the rectangular opening of one component shall fall outside a rectangle whose dimensions are 0.060" larger than, and whose sides are parallel to, the rectangular opening of the other component.

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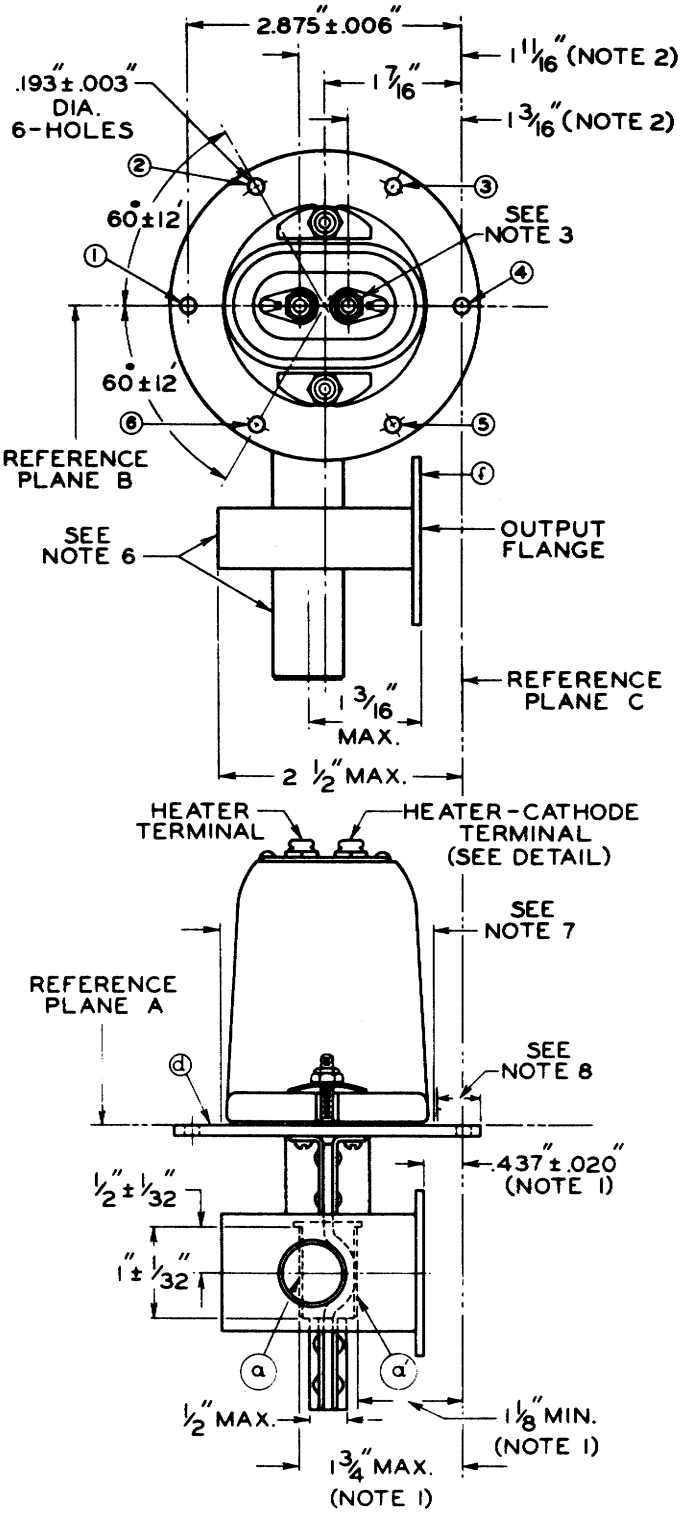

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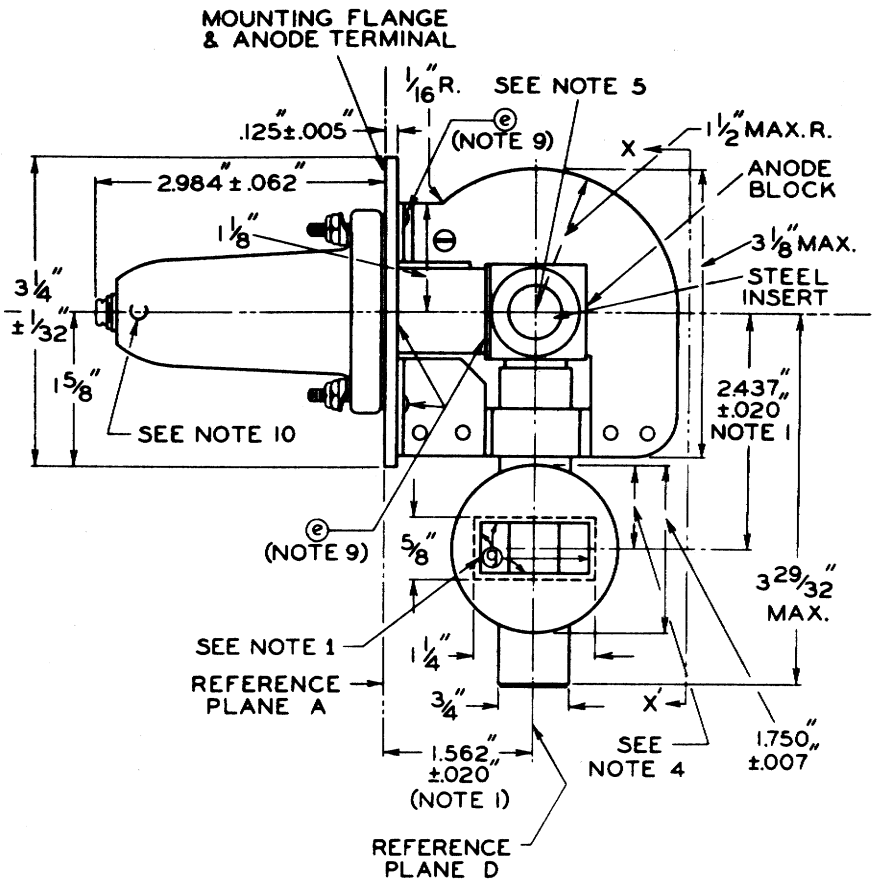
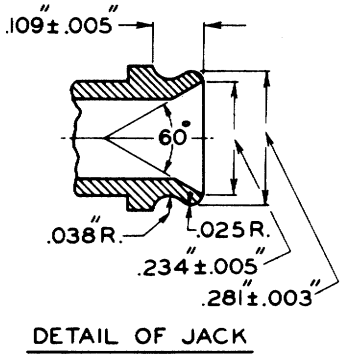
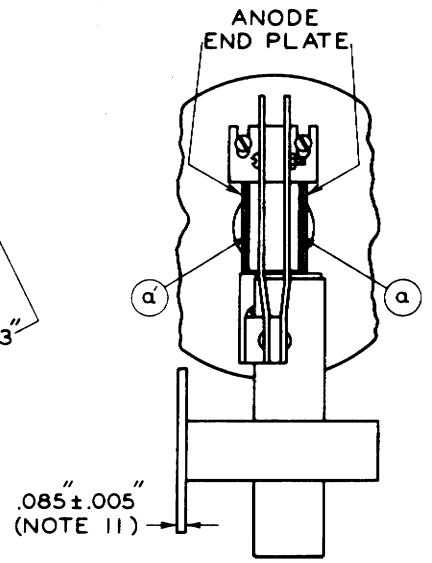




DETAIL OF JACK



VIEW AT X-X'

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NOTE 1: WHEN THE SURFACE (d) IS MOUNTED ON SURFACE CORRESPONDING TO PLANE "A" BY MEANS OF SIX STUDS 0.176" DIA. LOCATED ON THE SPECIFIED CENTERS AND PROTRUDING THROUGH THE SIX HOLES, THE SURFACES (a – a') CAN BE INSERTED BETWEEN PARALLEL FACES WHICH (1) ARE 13/16" IN DIAMETER AND HAVE THEIR CENTERS ON THE ANODE AXIS (SEE NOTE 5), (2) ARE SPACED 0.625" APART, AND (3) ARE LOCATED EQUIDISTANT BETWEEN PLANES PERPENDICULAR TO PLANE "A" AND PASSING THROUGH THE SPECIFIED CENTERS OF HOLES 2 AND 6, AND HOLES 3 AND 5, RESPECTIVELY. WHEN THE 2J50 IS MOUNTED AS ABOVE SPECIFIED, THE WAVE GUIDE IS LOCATED AS FOLLOWS: SURFACE (f), INCLUDING ITS ANGULAR AND LATERAL DEVIATIONS, FITS BETWEEN PLANES PARALLEL WITH PLANE "C" AND SPACED 0.457" AND 0.457", RESPECTIVELY, FROM IT; CENTER LINE (AXIS) IS (1) BETWEEN PLANES PARALLEL WITH PLANE "A" AND SPACED 1.582" AND 1.542", RESPECTIVELY, FROM IT AND (2) BETWEEN PLANES PARALLEL WITH PLANE "B" AND SPACED 2.457" AND 2.417", RESPECTIVELY, FROM IT; AND SURFACES (g) ARE OUTSIDE OF A RIGHT PARALLELEPIPEDON HAVING A WIDTH OF 1.080", A HEIGHT OF 0.455", AND A DEPTH OF 1/2" AND WHOSE MAJOR AXIS IS IN PLANE "D" AND LOCATED PARALLEL TO AND 2.437" FROM PLANE "B". WITH THE WAVE GUIDE THUS LOCATED, THE SURFACES (a) AND (a') ARE NOT MORE THAN 1–3/4" AND NOT LESS THAN 1–1/8", RESPECTIVELY, FROM PLANE "C".

NOTE 2: THE CENTERS OF THE JACK HOLES ARE WITHIN CIRCULAR AREAS HAVING RADII OF 0.023" FROM THE IDEAL CENTERS, BUT ARE SPACED 0.500" ± 0.010" APART. THE AXES OF THE JACK HOLES ARE PERPENDICULAR TO PLANE "A" WITHIN 3°.

NOTE 3: HEX. HEAD BANANA-PIN SNAP-CATCH JACK HAVING LENGTH OF 19/32" AND HOLE WITH DIAMETER OF 0.169" ± 0.005".

NOTE 4: OUTPUT FLANGE IS CONCENTRIC WITH OPENING IN WAVE GUIDE WITHIN 0.010".

NOTE 5: LOCATION OF ANODE AXIS IS DETERMINED BY THE INTERSECTION OF PLANES "B" AND "D".

NOTE 6: ALL JOINTS IN WAVE-GUIDE ASSEMBLY ARE VACUUM TIGHT SO THAT THE WAVE-GUIDE FLANGE MAY BE USED TO PROVIDE A HERMETIC SEAL AT SURFACE (f).

NOTE 7: NO PART OF THE ASSEMBLY ABOVE THE SURFACE (d) EXTENDS BEYOND THE SURFACE OF A CYLINDER WHOSE AXIS IS PERPENDICULAR TO THE SURFACE (d) AT ITS TRUE CENTER AND WHOSE RADIUS IS 1–7/64".

NOTE 8: WHEN RESTING ON A PLANE SURFACE, THE ANNULAR AREA OF SURFACE (d) TO A DISTANCE 1/2" INWARD FROM ITS OUTER EDGE HAS A FLATNESS SUCH THAT A 0.010" THICKNESS GAUGE 1/8" WIDE WILL NOT ENTER ANY SPACE BETWEEN SURFACE (d) AND THE PLANE SURFACE MORE THAN 1/4".

NOTE 9: ALL JOINTS MARKED (e) ARE VACUUM TIGHT SO THAT MOUNTING FLANGE MAY BE USED TO PROVIDE A HERMETIC SEAL AT SURFACE (d).

NOTE 10: "C" INDICATES ADJACENT JACK IS THE COMMON HEATER-CATHODE TERMINAL.

NOTE 11: THIS DIMENSION IS GAUGED OVER THE ANNULAR AREA OUTSIDE OF A CONCENTRIC CIRCLE 1–25/64" MAX. DIAMETER.

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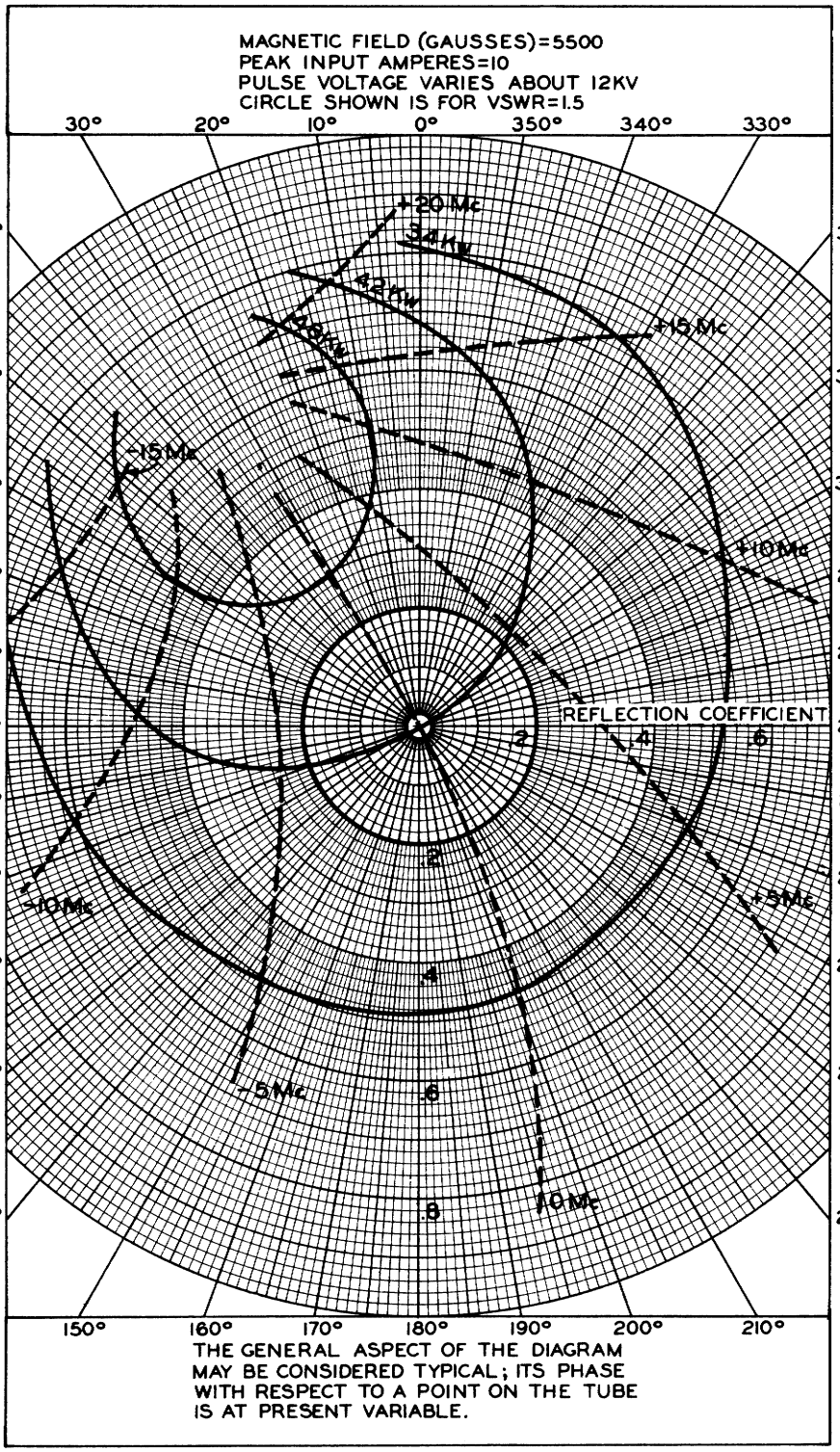
RIEKE DIAGRAM



THE GENERAL ASPECT OF THE DIAGRAM MAY BE CONSIDERED TYPICAL; ITS PHASE WITH RESPECT TO A POINT ON THE TUBE IS AT PRESENT VARIABLE.

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PERFORMANCE CHART