AMPEREX TUBE TYPE 502-R

Power Amplifier and Oscillator

GENERAL CHARACTERISTICS

FORCED AIR COOLED TRIODE

ELECTRICAL

Filament	Thoriated Tungsten			
Starting current must never exceed 36 amps.				
Voltage	7.5			volts
Current	24			amperes
Amplification Factor	24			
Transconductance (Grid to Plate) Ip = 1.0 amp.	17,500			micromhos
Direct Interelectrode Capacitances				
Grid to Plate	10			$\mu\mu$f
Grid to Filament	14			$\mu\mu$f
Plate to Filament	1.3			$\mu\mu$f
Frequency for Maximum Ratings	150			megacycles

MECHANICAL

Maximum Overall Dimensions				
Length	6–5/16			inches
Diameter	3⅝			inches
Mounting Position—Vertical	Radiator Down			
Type of Cooling	Forced Air			
Plate Dissipation	1.0	1.5	2.0	(KW)[4]
Air Flow to Radiator	70	100	150	(CFM)
Back Pressure	0.4	1.0	2.0	(in. water)
Maximum Incoming Air Temperature	45°C			
Maximum Glass Temperature	180°C			
Net Weight (approx.)	5½			pounds
Shipping Weight (approx.) (one tube)	6			pounds

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MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

A.F. Power Amplifier and Modulator—Class B

	Maximum Rating per Tube	Typical Operation Two Tubes
D.C. Plate Voltage	3500	3500
D.C. Grid Voltage	.....	—200
Effective Load Resistance (plate to plate) (ohms)	.....	3820
Zero Signal D.C. Plate Current (amps)	.....	0.100
Peak A.F. Grid to Grid Voltage	.....	1200
Max. Signal D.C. Plate Current (amps)[1]	1.0	1.9
Max. Signal Plate Input (kw)[1]	4.0	....
Plate Dissipation (kw)[1]	1.5	....
Max. Signal Driving Power (approx.) (watts)	.....	380
Max. Signal Power Output (kw)	.....	4.7

R.F. Power Amplifier—Class B—Telephony

(Carrier conditions per tube for use with a maximum modulation factor of 1.0)

	Maximum Rating per Tube	Typical Operation One Tube
D.C. Plate Voltage	3500	3500
D.C. Grid Voltage	.....	—200
Peak R.F. Grid Voltage	.....	295
D.C. Plate Current (amps)	0.8	0.5
Plate Input (kw)	2.25	....
Plate Dissipation (kw)	1.5	1.2
D.C. Grid Current	....	0
Driving Power (approx.) (watts)[2]	.....	82
Power Output (kw)	.....	.610

Plate Modulated R.F. Power Amplifier Class C—Telephony

(Carrier conditions per tube for use with a maximum modulation factor of 1.0)

	Maximum Rating per Tube	Typical Operation One Tube
D.C. Plate Voltage	2750	2500
D.C. Grid Voltage	—600	—600
Grid Resistor (ohms)	.....	2900
Cathode Resistor (ohms)	.....	45
Peak R.F. Grid Voltage	.....	950
D.C. Plate Current (amps)	.800	.570
Plate Input (kw)	2.0	.....
Plate Dissipation (kw)	1.0	....
D.C. Grid Current (approx.) (ma)	150	100
Driving Power (approx.) (watts)	.....	90
Power Output (kw)	....	1.0

R.F. Power Amplifier and Oscillator—Class C Telegraphy

(Key-down conditions per tube without amplitude modulation[3])

	Maximum Rating per Tube	Typical Operation One Tube
D.C. Plate Voltage	3500	3500
D.C. Grid Voltage	—600	—450
Peak R.F. Grid Voltage	.....	880
D.C. Plate Current (amps)	1.0	860
Plate Input (kw)	3.0	.....
Plate Dissipation (kw)[4]	1.5	....
D.C. Grid Current (approx.) (ma)	150	150
Driving Power (approx.) (watts)	.....	120
Plate Power Output (kw)	....	2.175

NOTES:

1. Averaged over any audio-frequency cycle of sine-wave form.
2. At crest of audio-frequency cycle with modulation factor of 1.0.
3. Modulation essentially negative may be used if the positive peak of the envelope does not exceed 115% of the carriar conditions.
4. The normal maximum plate dissipation is 1.5 kw. However, for industrial applications where low efficiencies may be expected, an extra margin of safety may be assured by increasing the air flow rate and, therefore, plate dissipation to 2.0 kw.

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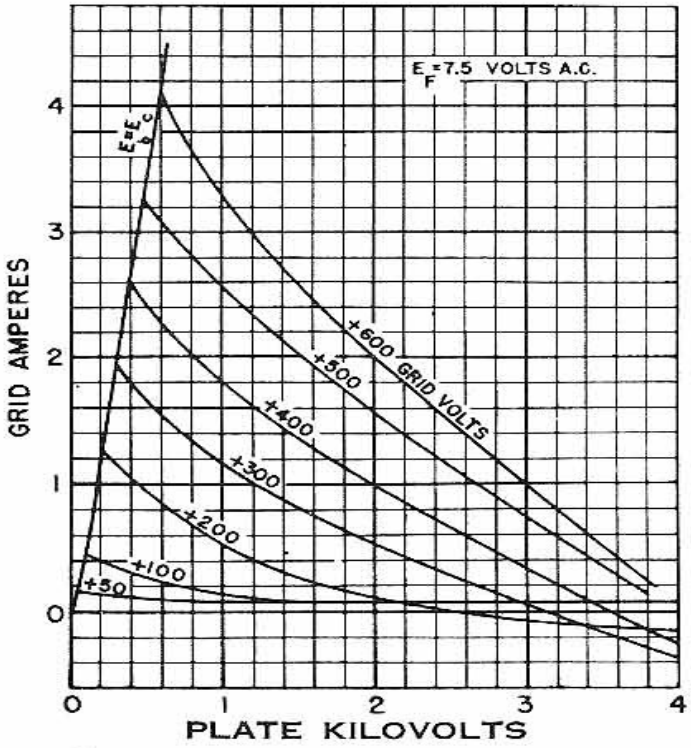
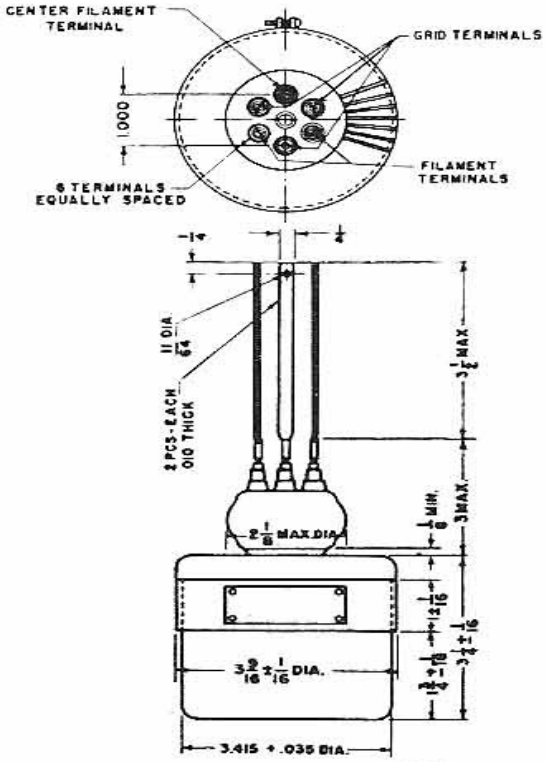
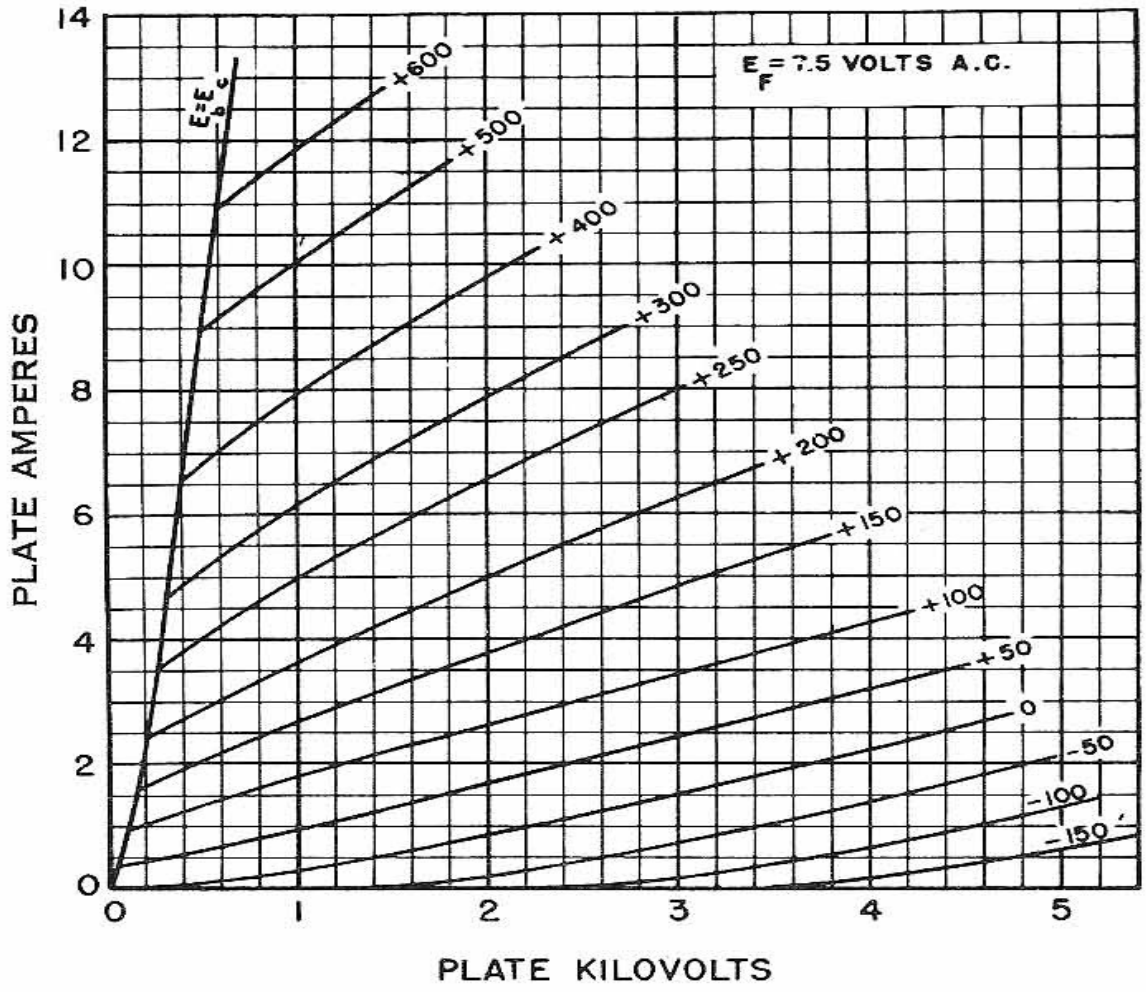
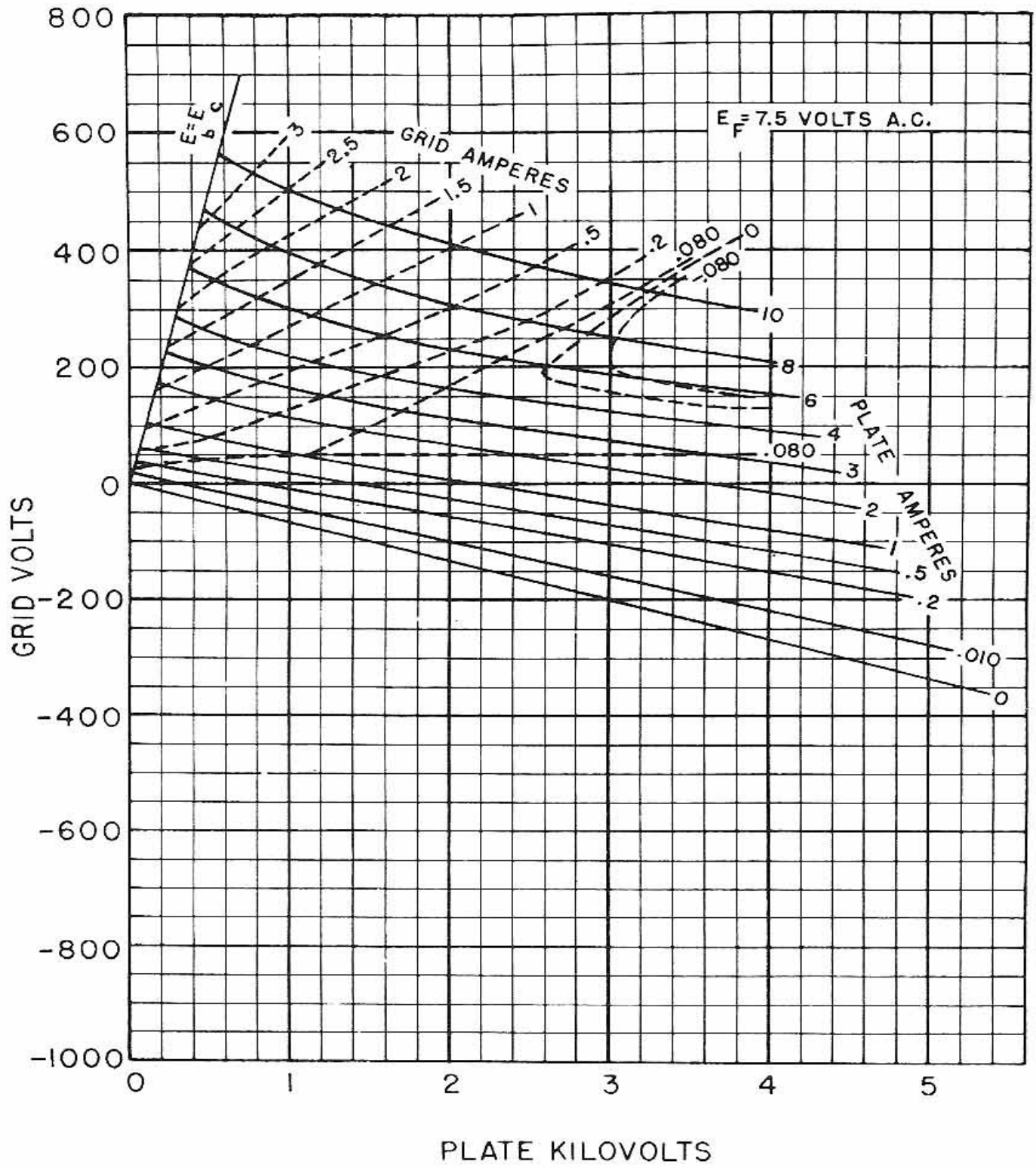

E_F = 7.5 VOLTS A.C.
E=E_c
+600 GRID VOLTS
+500
+400
+300
+200
+100
+50
GRID AMPERES
PLATE KILOVOLTS
0
1
2
3
4


CENTER FILAMENT TERMINAL
GRID TERMINALS
FILAMENT TERMINALS
6 TERMINALS EQUALLY SPACED
1.000
11 DIA. 64
2 PCS-EACH .010 THICK
2 1/8 MAX DIA
3 MAX.
3 1/2 MAX.
3 2/16 ± 1/16 DIA.
3.415 ± .035 DIA.


E_F = 7.5 VOLTS A.C.
E=E_c
+600
+500
+400
+300
+250
+200
+150
+100
+50
0
-50
-100
-150
PLATE AMPERES
PLATE KILOVOLTS
0
1
2
3
4
5
0
2
4
6
8
10
12
14

502-R


800
600
400
200
0
-200
-400
-600
-800
-1000
0
1
2
3
4
5
GRID VOLTS
PLATE KILOVOLTS
E_F = 7.5 VOLTS A.C.
$E=E_c$
GRID AMPERES
3
2.5
2
1.5
1
.5
.2
.080
0
.080
10
8
6
4
3
2
1
.5
.2
.010
0
PLATE AMPERES
.080