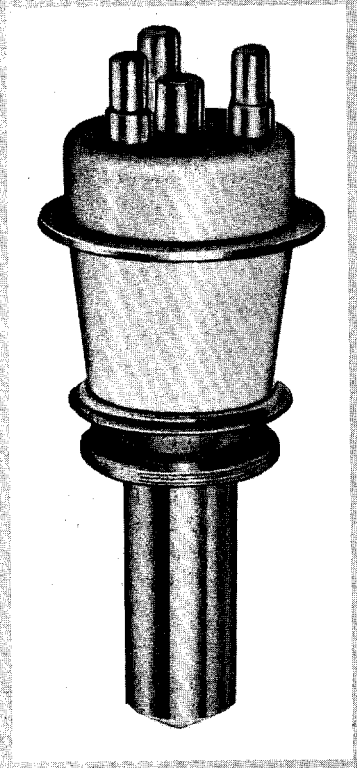
TUBE TYPES

6960A
6961A
8592A

The Amperex 6960A, 6961A, and 8592A are electrically identical triodes for use in industrial RF generators and communication transmitters. The 6960A is water cooled; the 6961A is air-cooled; and the 8592A is water cooled using an integral helical cooler. The metal-ceramic envelope construction allows higher processing temperatures yielding better outgassing, better vacuums, higher reliability and higher maximum seal temperatures.

These tubes feature exclusive, specially processed grids which make possible their high grid current rating and overload characteristics. This is particularly desirable in heavy-duty, industrial applications.



GENERAL CHARACTERISTICS

MECHANICAL

Mounting Position 6960A, 6961A	Vertical, plate up or down
8592A	Vertical with anode down
Dimensions	See outline drawing
Accessories	
Grid Connector (to 30 MHz)	S-17288
Grid Connector (above 30 MHz)	S-3706
Filament Connector	S-3707
Filament Center pin Connector[1]	S-21000
Water Jacket (6960A)	S-3737
Air Flow Chamber (6961A)	S-3705
Net Weight (approx)	
6960A	1 lb.
6961A	10 lbs.
8592A	1.8 lbs.
Cooling Characteristics (see curves)	
6960A[2], 8592A[2]	Water & low velocity air flow
6961A	Forced air
Maximum Inlet Water Temperature (6960A, 8592A)	50°C
Seal Temperatures	
Filament	250°C
Grid and Plate	250°C

ELECTRICAL

Filament Voltage	12.6 volts
Filament Current	33 amps
Amplification Factor	
(I_b = 1 amp; E_b = 6000 volts)	32
Transconductance	
(I_b = 1 amp; E_b = 6000 volts)	15,000 micromhos
Direct Interelectrode Capacitances	
Grid to Plate	11 pF
Grid to Filament	16 pF
Plate to Filament	0.3 pF

1 The filament center tap pin (0.413 dia.) must not be used for filament supply. The filament center pin connector (S-21000) must, however, be used for cooling of this pin.

2 At frequencies above 30 MHz it is necessary to direct a low velocity air flow to plate and grid seals of the 6960A.

Amperex

A.F. POWER AMPLIFIER & MODULATOR
CLASS B

Maximum Ratings, Absolute Values (per tube)

D.C. Plate Voltage	7.2 kV
D.C. Plate Current	2.2 amps
Plate Input	14 kW
Plate Dissipation	6 kW
Grid Resistor	15 kohms

Typical Operation (two tubes)

D.C. Plate Voltage	7000	5000	5000	4000 volts
D.C Grid Voltage	-210	-145	-145	-120 volts
Peak AF Grid to Grid Voltage	1220	840	690	900 volts
Zero Signal D.C. Plate Current	2x0.2	2x0.15	2x0.15	2x0.1 amps
Max. Signal D.C. Plate Current	2x2	2x1.25	2x1.1	2x1.15 amps
Effective Load Resistance, Plate to Plate	4150	4800	5500	3800 ohms
Max. Signal Drive Power (approx.)	2x310	2x130	2x65	2x140 watts
Max. Signal Power Output (approx)	20	9	8	7.1 kW

PLATE MODULATED R.F. POWER AMPLIFIER
CLASS C - TELEPHONY

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

Maximum Ratings, Absolute Values (per tube)

Frequency	30 MHz
D.C. Plate Voltage	5.5 kV
D.C. Grid Voltage	1250 volts
D.C. Plate Current	1.8 amps
D.C. Grid Current	0.6 amps
Plate Input	9 kW
Plate Dissipation	4 kW

Typical Operation

D.C. Plate Voltage	5	5	4 kV
D.C. Grid Voltage[3]	-400	-400	-300 volts
Peak RF Grid Voltage	800	730	680 volts
D.C. Plate Current	1.6	1.4	1.6 amps
D.C. Grid Current	0.6	0.5	0.6 amps
Driving Power	432	328	367 watts
Power Output	6.4	5.6	5.0 kW

R.F. POWER AMPLIFIER & OSCILLATOR
CLASS C - TELEGRAPHY

Maximum Ratings, Absolute Values (per tube)

Frequency	30 MHz
D.C. Plate Voltage	7.2 kV
D.C. Grid Voltage	-1250 volts
D.C. Plate Current	2.2 amps
D.C. Grid Current	0.6 amps
Plate Input	14 kW
Plate Dissipation	6 kW

[3] Grid bias partially obtained by the grid resistor.

R.F. POWER AMPLIFIER & OSCILLATOR
CLASS C - TELEGRAPHY (Continued)

Typical Operation f = 30 MHz

D.C. Plate Voltage	6.5	6.0	5.0 kV
D.C. Grid Voltage	-450	-400	-300 volts
Peak RF Grid Voltage	820	780	660 volts
D.C. Plate Current	2.0	2.0	2.0 amps
D.C. Grid Current	0.5	0.5	0.5 amp
Driving Power	370	350	297 watts
Power Output	9.5	8.5	7.1 kW
Plate Power Input	13	12	10 kW
Plate Dissipation	3.5	3.5	2.9 kW
Efficiency	73	71	71 %

CLASS C OSCILLATOR
RECTIFIED, UNFILTERED, THREE-PHASE, HALF-WAVE PLATE SUPPLY

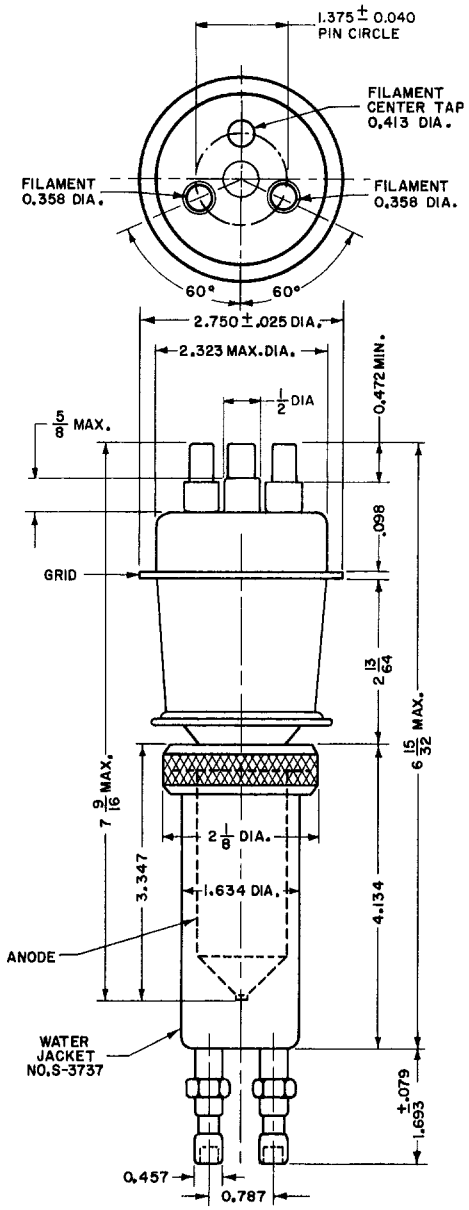
Maximum Ratings, Absolute Values (per tube)

Frequency	55 MHz
D.C. Plate Voltage	7 kV
D.C. Grid Voltage	-1250 volts
D.C. Plate Current	1.8 amps
D.C. Grid Current (Full Load)	0.5 amps
D.C. Grid Current (No Load)	0.7 amps
Plate Power Input	11 kW
Plate Dissipation	6 kW
Grid Resistor	10 kohms

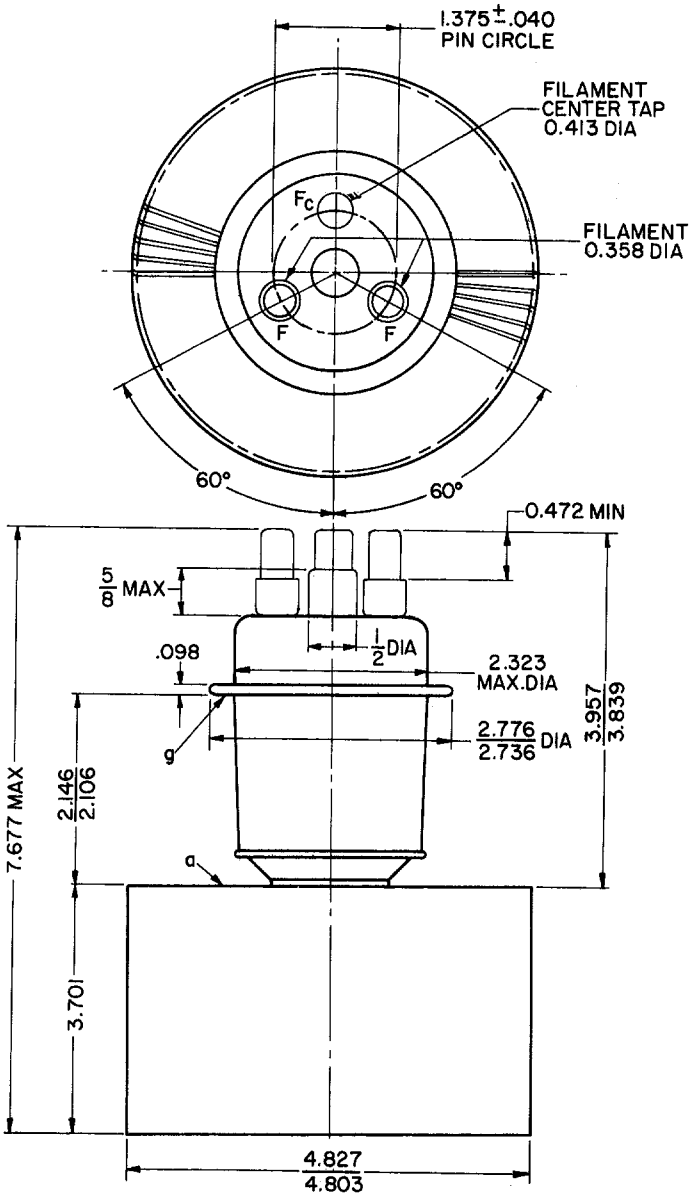
Typical Operation

Frequency	50 MHz
Transformer Secondary Voltage (rms)	5.1 kV
D.C. Plate Voltage	6 kV
D.C. Plate Current	1.5 amps
D.C. Grid Current (Full Load)	0.4 amp
D.C. Grid Current (No Load)	0.7 amp
Grid Resistor	1 kohm
Plate Power Input	9 kW
Plate Dissipation	2.7 kW
Plate Power Output	6 kW

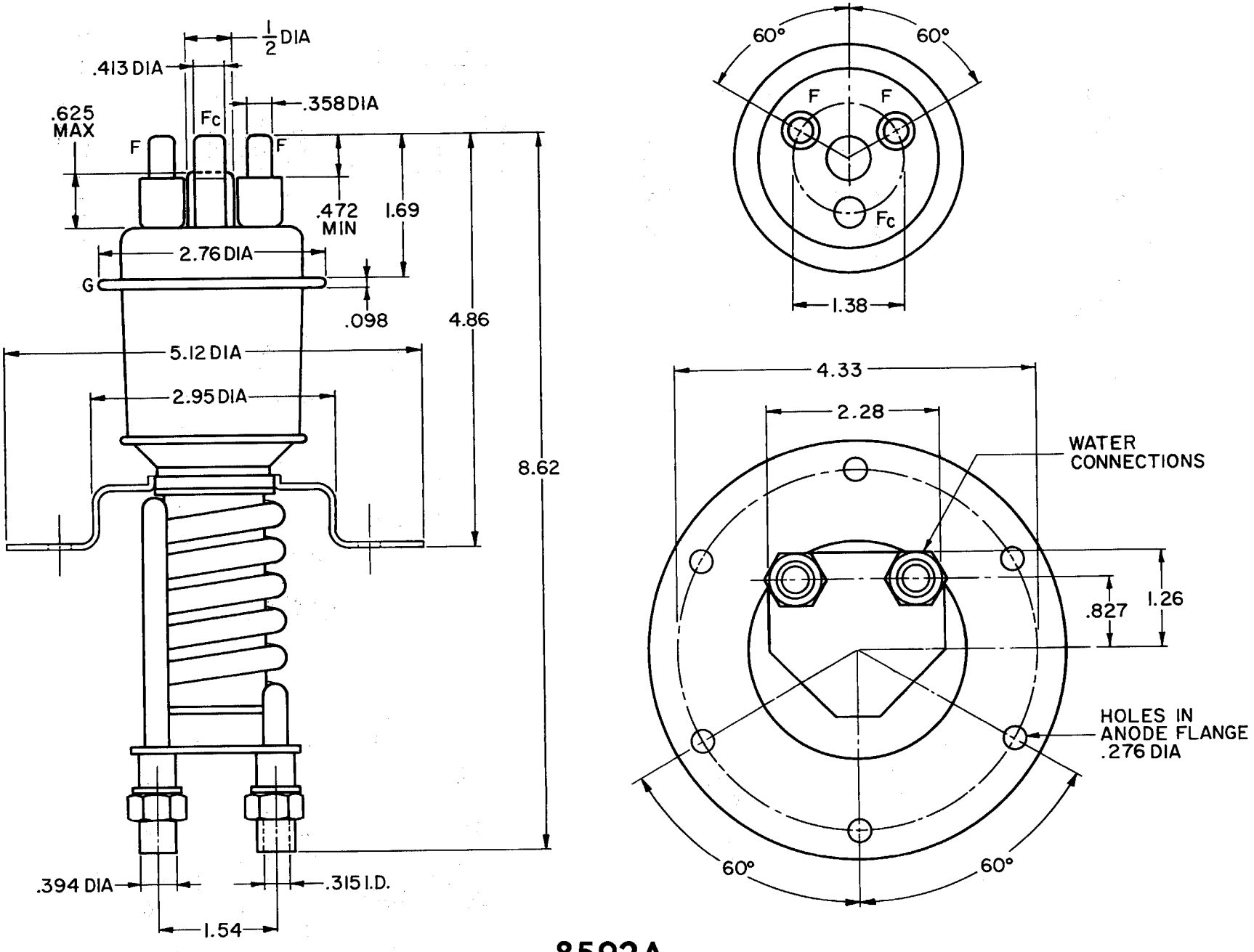
6960A
6961A
8592A



6960A

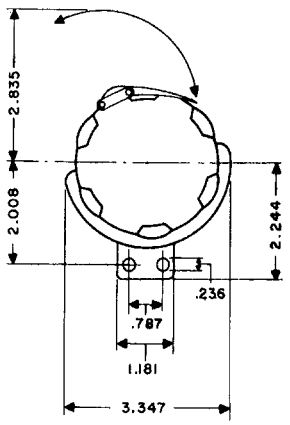


6961A

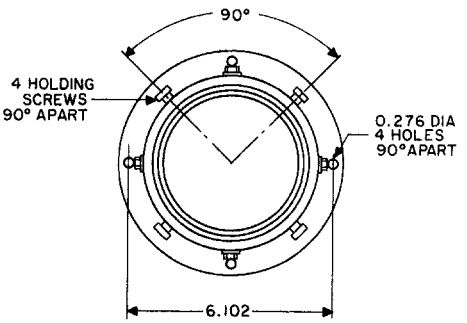

1/2 DIA
.413 DIA
.358 DIA
.625 MAX
Fc
F
F
.472 MIN
1.69
2.76 DIA
G
.098
4.86
5.12 DIA
2.95 DIA
8.62
.394 DIA
.315 I.D.
1.54
60°
60°
F
F
Fc
1.38
4.33
2.28
WATER CONNECTIONS
.827
1.26
HOLES IN ANODE FLANGE .276 DIA
60°
60°

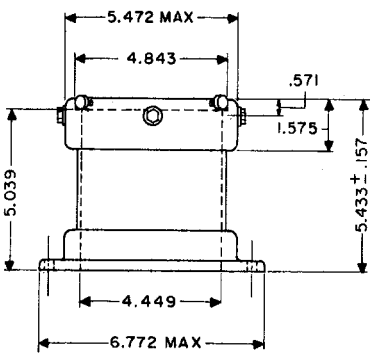
8592A

6960A
6961A
8592A

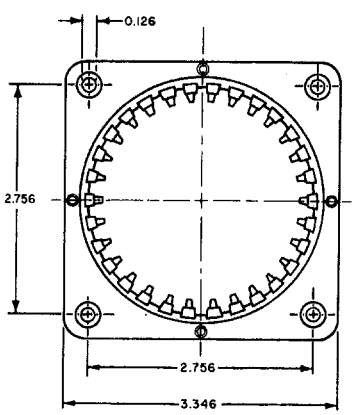


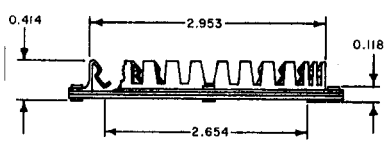
GRID CONNECTOR
S-17288



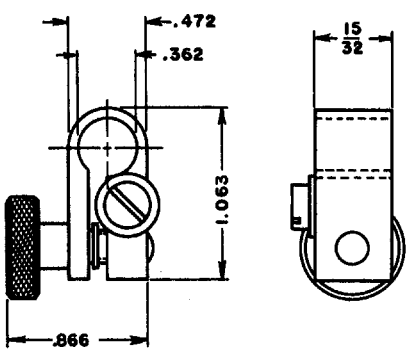


AIR FLOW CHAMBER
S-3705

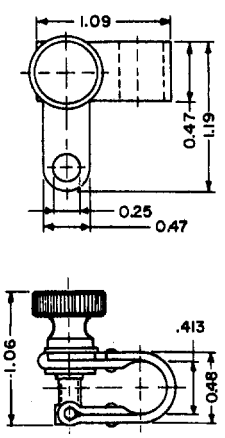




GRID CONNECTOR
S-3706

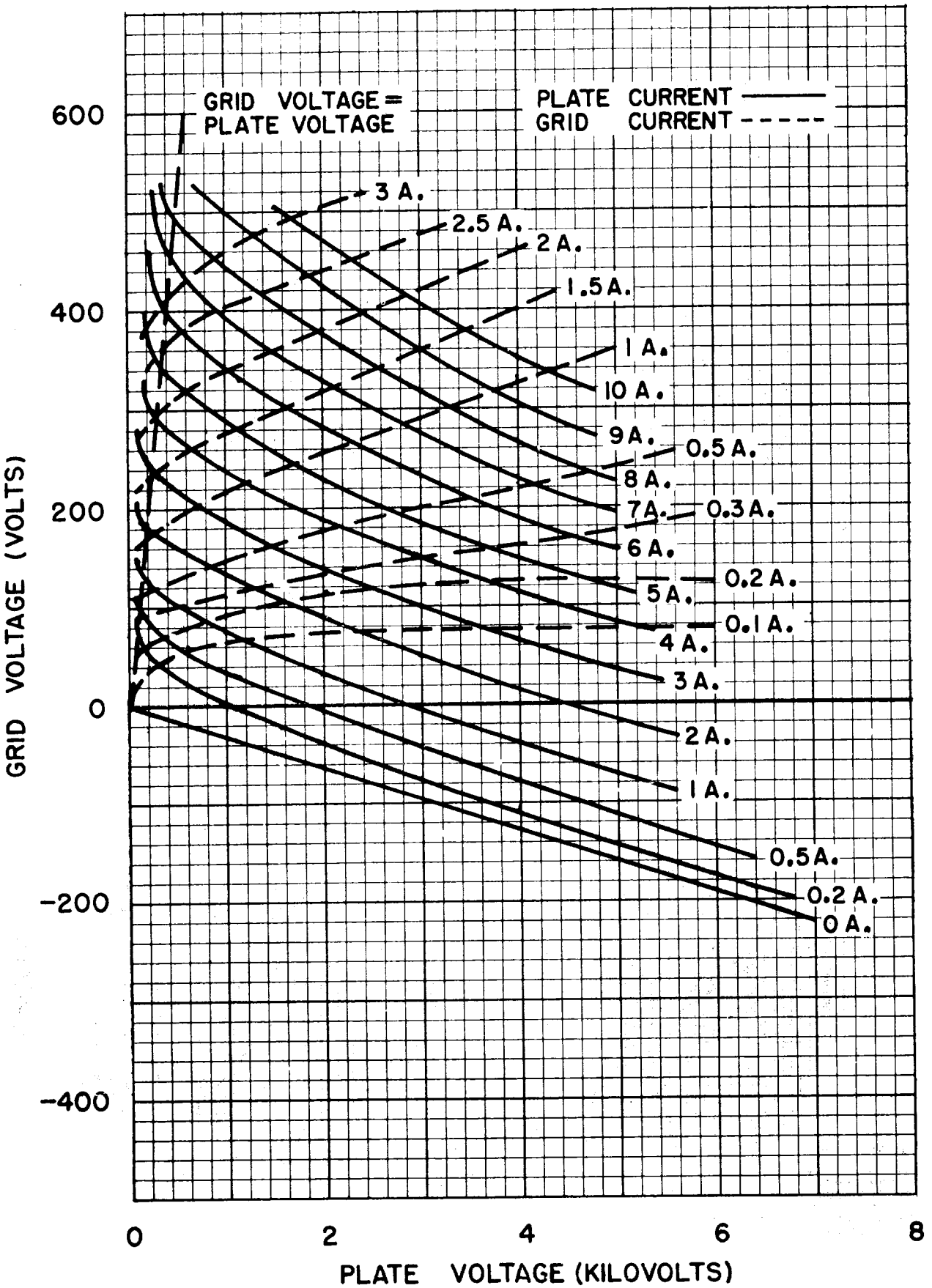


FILAMENT CONNECTOR
S-3707

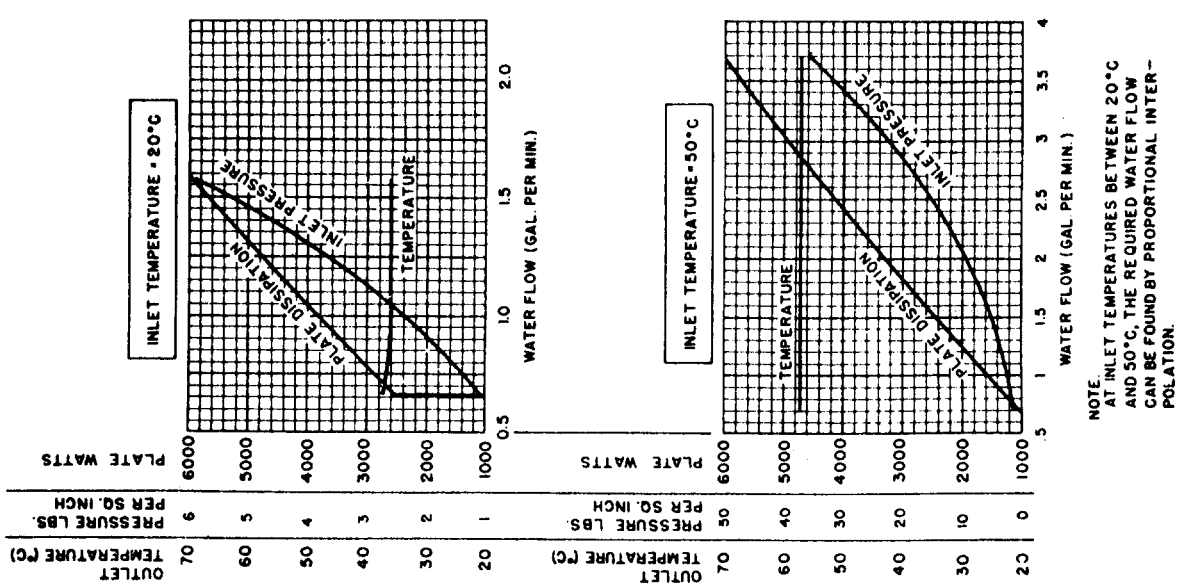


FILAMENT CENTER PIN CONNECTOR
S-21000

6960A
6961A
8592A

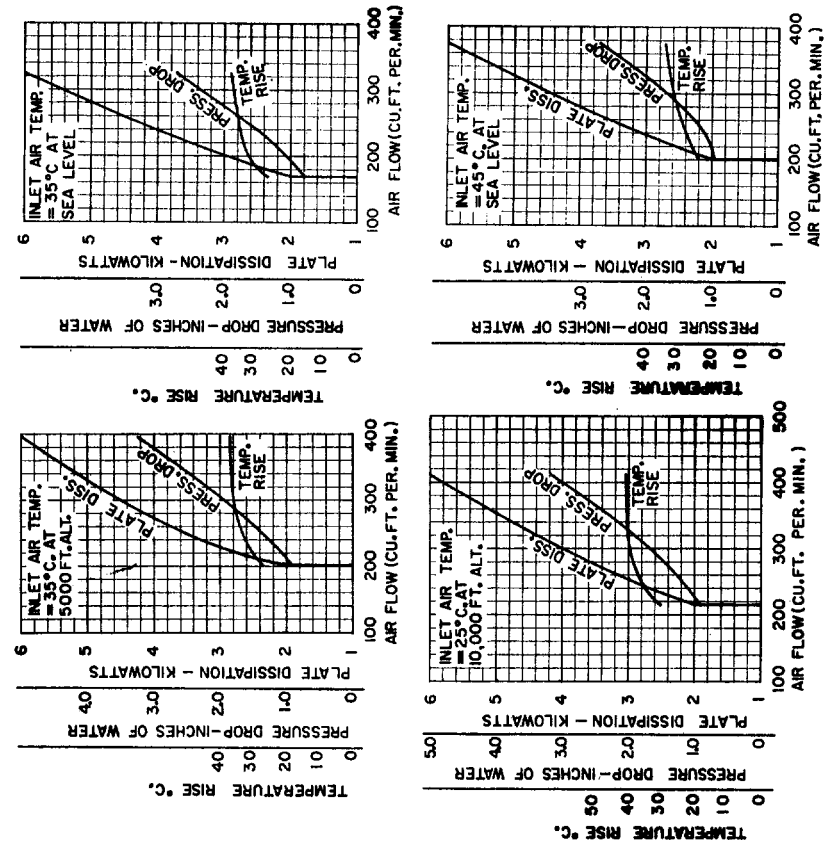


6960A
6961A
8592A

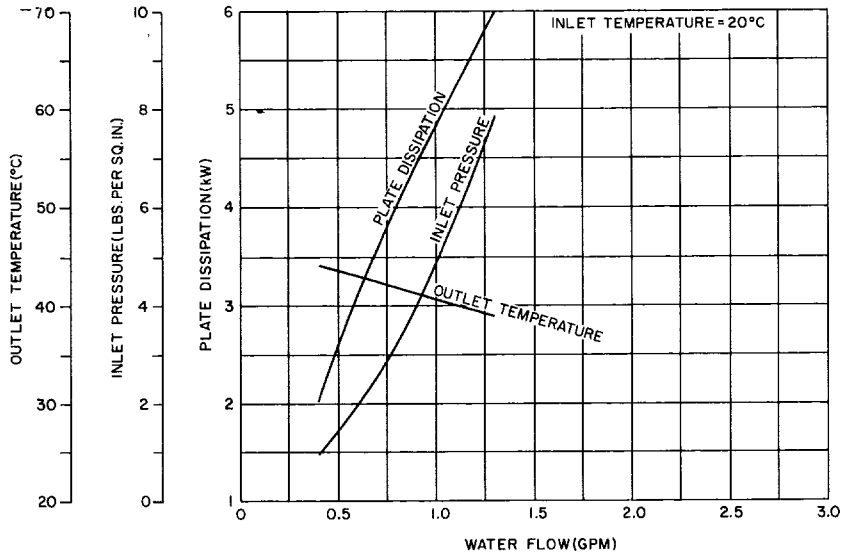


NOTE.
AT INLET TEMPERATURES BETWEEN 20°C AND 50°C, THE REQUIRED WATER FLOW CAN BE FOUND BY PROPORTIONAL INTERPOLATION.

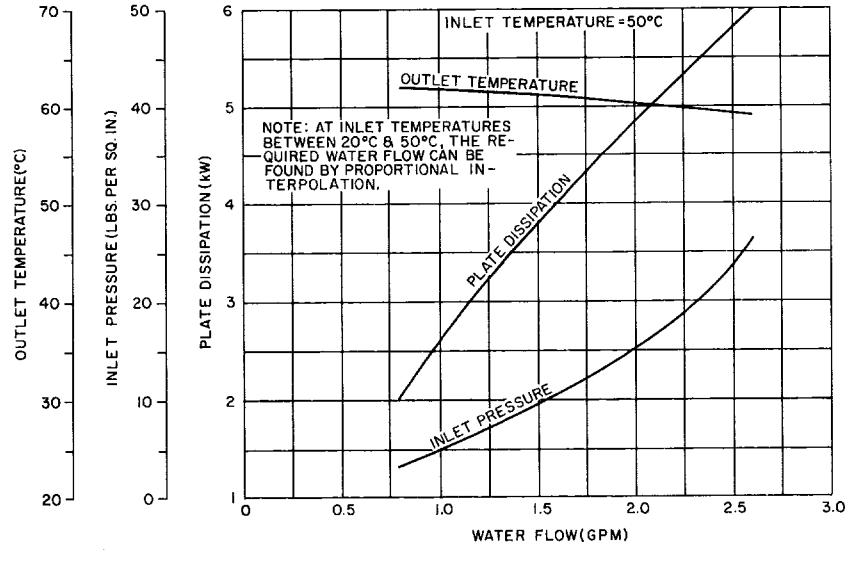
6960A



6961A


INLET TEMPERATURE = 20°C
PLATE DISSIPATION
INLET PRESSURE
OUTLET TEMPERATURE
OUTLET TEMPERATURE(°C)
INLET PRESSURE(LBS. PER SQ. IN.)
PLATE DISSIPATION(kW)
WATER FLOW(GPM)

8592A


INLET TEMPERATURE = 50°C
OUTLET TEMPERATURE
NOTE: AT INLET TEMPERATURES BETWEEN 20°C & 50°C, THE REQUIRED WATER FLOW CAN BE FOUND BY PROPORTIONAL INTERPOLATION.
PLATE DISSIPATION
INLET PRESSURE
OUTLET TEMPERATURE(°C)
INLET PRESSURE(LBS. PER SQ. IN.)
PLATE DISSIPATION(kW)
WATER FLOW(GPM)

8592A