Half-Wave Mercury-Vapor Rectifier

GENERAL DATA

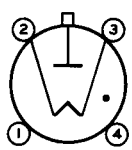
Electrical:

Filament, Coated:		
Voltage (AC)	5.0 ± 5%	volts
Current at filament volts = 5.0	10	amp
Minimum heating time at rated voltage	30	sec
Peak Tube Voltage Drop	See *Characteristics Range Values*	

Mechanical:

Operating Position	Vertical, base down
Maximum Overall Length	10-13/32"
Seated Length	9-7/32" ± 7/16"
Maximum Diameter	2-5/8"
Weight (Approx.)	9 oz
Bulb	T20
Cap	Medium (JEDEC No.C1-5) ←
Cap Connector	Millen No.36011, or equivalent
Socket	Johnson No.123-206, or equivalent
Base	Large-Shell Super-Jumbo 4-Pin with Bayonet (JEDEC No.A4-88), or Large-Metal-Shell Super-Jumbo 4-Pin with Bayonet (JEDEC No.A4-18)
Basing Designation for BOTTOM VIEW	2P

Pin 1 – No Internal Connection
Pin 2 – Filament, Cathode Shield



Pin 3 – Filament
Pin 4 – No Internal Connection
Cap – Anode

Temperature Control:

Heating—When the ambient temperature is so low that the normal rise of condensed-mercury temperature above the ambient temperature will not bring the condensed-mercury temperature up to the minimum value of the operating ranges specified under *Maximum Ratings*, some form of heat-conserving enclosure or auxiliary heater will be required.

Cooling—When the operating conditions are such that the maximum value of the operating condensed-mercury-temperature range is exceeded, provision should be made for forced-air cooling sufficient to prevent exceeding the maximum value.

Temperature Rise of Condensed Mercury to Equilibrium Above Ambient Temperature (Approx.):		
No load[a]	13	°C
Full load[b]	18.5	°C

← Indicates a change.

HALF-WAVE RECTIFIER — In Phase Operation[c]

Maximum Ratings, *Absolute-Maximum Values:*

For supply frequency of 60 cps

	Operating Condensed-Mercury-Temperature Range			
	20 to 60 °C	20 to 55 °C	20 to 50 °C	
PEAK INVERSE ANODE VOLTAGE. .	10000 max.	15000 max.	20000 max.	volts
ANODE CURRENT:				
Peak	8.3 max.	8.3 max.	8.3 max.	amp
Averaged	1.8 max.	1.8 max.	1.8 max.	amp
Fault, for duration of 0.1 second max.	100 max.	100 max.	100 max.	amp

HALF-WAVE RECTIFIER — Quadrature Operation[e]

Maximum Ratings, *Absolute-Maximum Values:*

For supply frequency of 60 cps

	Operating Condensed-Mercury-Temperature Range			
	20 to 60 °C	20 to 55 °C	20 to 50 °C	
PEAK INVERSE ANODE VOLTAGE. .	10000 max.	15000 max.	20000 max.	volts
ANODE CURRENT:				
Peak	11.5 max.	11.5 max.	11.5 max.	amp
Averaged	2.5 max.	2.5 max.	2.5 max.	amp
Fault, for duration of 0.1 second max.	100 max.	100 max.	100 max.	amp

[a] With 4.75 volts rms on filament, and no heat-conserving enclosure.

[b] With 5.25 volts rms on filament, quadrature operation, average anode amperes = 2.5, and no heat-conserving enclosure.

[c] Filament voltage in phase with anode voltage.

[d] Averaged over any period of 20 seconds maximum.

[e] Filament voltage out of phase (60° to 120°) with anode voltage.

CHARACTERISTICS RANGE VALUES[f] FOR EQUIPMENT DESIGN

	Note	Min.	Max.	
Filament Current.	1	9	11	amp
Critical Anode Voltage.	2	10	100	volts
Peak Tube Voltage Drop.	3	–	25	volts

Note 1: With 5 volts rms on filament.

Note 2: With 5 volts rms on filament, and condensed-mercury temperature of 20° C.

Note 3: With 5 volts rms on filament, condensed-mercury temperature of 35 ± 5° C, peak anode current of 11.5 amperes provided by half-cycle pulse from a 60-cps sine wave and recurring aproximately once per second. Tube drop is measured by an oscilloscope connected between anode and center-tap of filament transformer.

[f] Throughout tube life.

For Circuit Figures, see Front of this Section

CIRCUIT	MAX. TRANS. SEC. VOLTS (RMS) E	APPROX. DC OUTPUT VOLTS TO FILTER E_{av}	MAX. DC OUTPUT AMPERES I_{av}		MAX. DC OUTPUT KW TO FILTER P_{dc}	
			Resistive Load	*Inductive Load*	*Resistive Load*	*Inductive Load*
Fig. 1 **Half-Wave** **Single-Phase** In-Phase Operation	14000[g]	6300	1.8		11.5	
	10600[h]	4700	1.8		8.5	
	7000[j]	3200	1.8		5.5	
Fig. 2 **Full-Wave** **Single-Phase** In-Phase Operation	7000[g]	6300	3.6		23	
	5300[h]	4700	3.6		17	
	3500[j]	3200	3.6		11	
Fig. 3 **Series** **Single-Phase** In-Phase Operation	14000[g]	12700	3.6		46	
	10600[h]	9500	3.6		34	
	7000[j]	6300	3.6		22	
Fig. 4 **Half-Wave** **Three-Phase** In-Phase Operation	8100[g]	9500	5.4		51	
	6100[h]	7100	5.4		38	
	4000[j]	4700	5.4		25	
Fig. 5 **Parallel** **Three-Phase** Quadrature Operation	8100[g]	9500	15.0		143	
	6100[h]	7100	15.0		106	
	4000[j]	4700	15.0		71	
Fig. 6 **Series** **Three-Phase** Quadrature Operation	8100[g]	19000	7.5		143	
	6100[h]	14200	7.5		106	
	4000[j]	9500	7.5		71	
Fig. 7 **Half-Wave** **Four-Phase** Quadrature Operation	7000[g]	9000	10	10	90	90
	5300[h]	6700	10	10	67	67
	3500[j]	4500	10	10	45	45
Fig. 8 **Half-Wave** **Six-Phase** Quadrature Operation	7000[g]	9500	11	11.5	105	110
	5300[h]	7100	11	11.5	78	81
	3500[j]	4700	11	11.5	52	55

[g] For maximum peak inverse anode voltage of 20000 volts, and condensed-mercury-temperature range of 20 to 50° C.

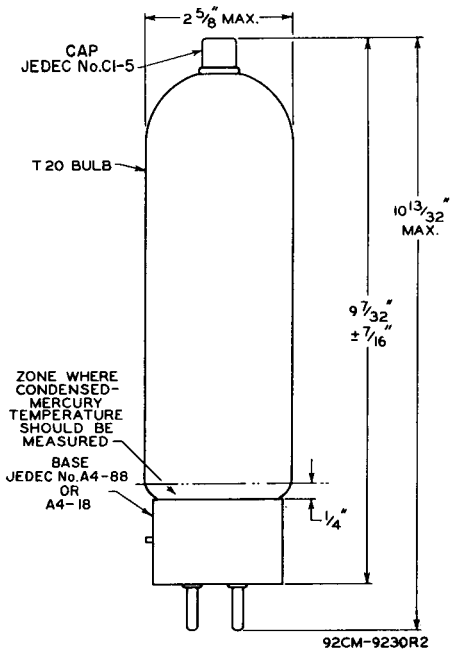
[h] For maximum peak inverse anode voltage of 15000 volts, and condensed-mercury-temperature range of 20 to 55° C.

[j] For maximum peak inverse anode voltage of 10000 volts, and condensed-mercury-temperature range of 20 to 60° C.

OPERATING CONSIDERATIONS

X rays are produced when the 6895 is operated with a peak inverse anode voltage above 16,000 volts (absolute value). These rays can constitute a health hazard unless the tube is adequately shielded for X-ray radiation. Although relatively simple shielding should prove adequate, make sure that it provides the required protection to the operator.

Shields and rf filter circuits should be provided for the 6895 if it is subjected to extraneous high-frequency fields during operation. These fields tend to produce breakdown effects in mercury vapor and are detrimental to tube life and performance. When shields are used, special attention must be given to providing adequate ventilation and to maintaining normal condensed-mercury temperature. Radio-frequency filters are employed to prevent damage caused by rf currents which might otherwise be fed back into the rectifier tubes.



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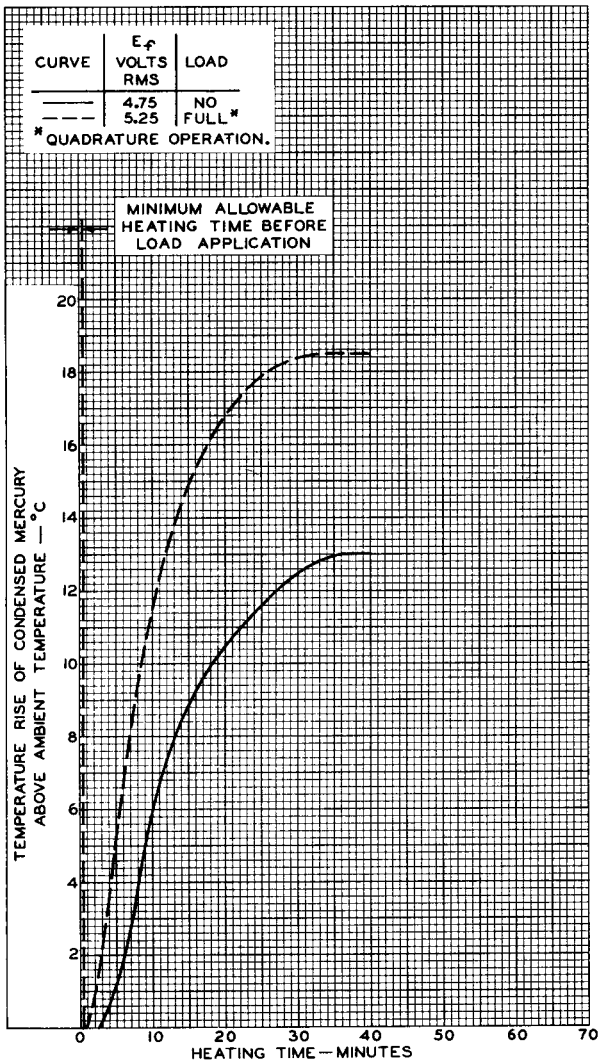
RATE OF RISE OF COND.-MERCURY TEMPERATURE



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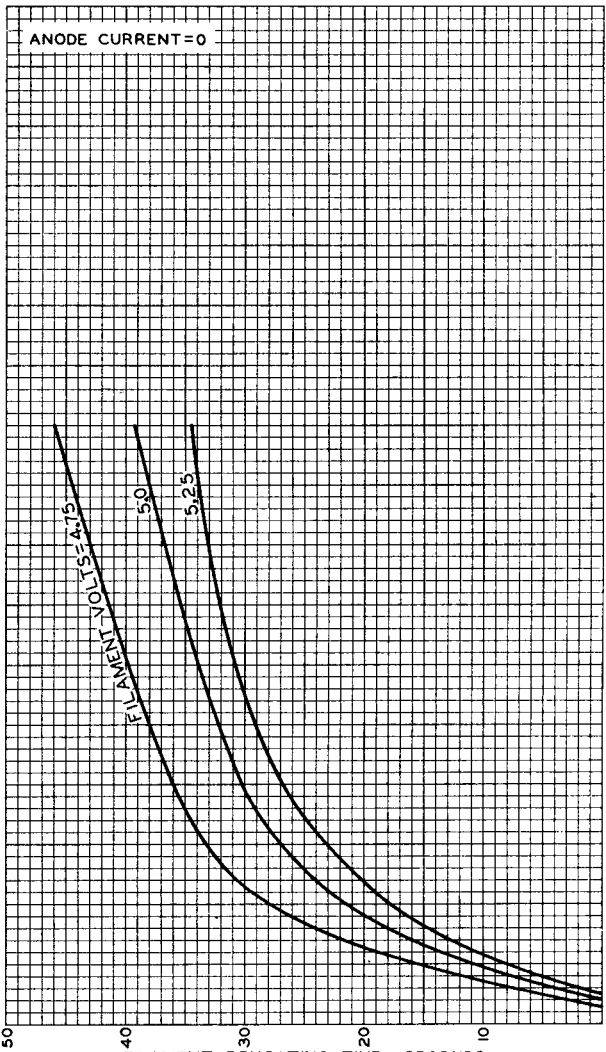
FILAMENT REHEATING TIME REQUIRED
AFTER POWER-SUPPLY INTERRUPTION



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