



IGNITRON

RECTIFIER SERVICE—190 AMPERES

TEMPERATURE CONTROLLED

RESISTANCE-WELDING-CONTROL SERVICE—355 AMPERES

The GL-6348 ignitron is a sealed, stainless-steel-jacketed, water-cooled, mercury-pool tube designed primarily for resistance-welding-control service. In this service, two tubes in the inverse-parallel connection will control 2400 kilovolt-amperes at voltages of 250 to 600 volts over the frequency range of 25 to 60 cycles. The ability of this tube to carry very high peak currents for short periods makes it especially suited to such service.

Ease of installation, economical use of space, and reliability of operation are assured by design and construction features inherent in the steel-jacketed construction.

This tube is identical in ratings and characteristics to the GL-5553-A. Mechanically, it has the additional feature of an integral temperature-control device with protective features. The control includes a switch which operates a solenoid valve in the water-supply line to the tube in response to increasing and decreasing tube temperature, thus maintaining the amount of cooling water

to the minimum required by the operating conditions. An over-temperature switch is included to remove power from the ignitron when its temperature exceeds a safe value. In applications where the cooling water flows through two tubes in series, this tube can be used with the GL-5553-A since the GL-6348, in the position nearer the water drain where it receives the warmer water, can control the flow to both under normal conditions.

This new construction prevents excessive condensation over the external parts of the tube under conditions of high humidity. Another advantage is the appreciable saving in maintenance costs over tubes of the old design since this control feature, in addition to greatly reducing the amount of water required, eliminates the necessity for such safety devices as water-flow relays, water over-temperature relays, and water-pressure interlocks required with the older design tubes. The GL-6348 ignitron is equivalent to a 1200-ampere magnetic contactor.

TECHNICAL INFORMATION

GENERAL

Electrical

Cathode Excitation—Cyclic		
Cathode Spot Starting—Ignitor		
Number of Electrodes		
Main Anodes	1	
Main Cathodes	1	
Ignitors	1	
Arc Drop at 13,600 Peak Amperes	36	Volts
Arc Drop at 1115 Peak Amperes	17	Volts
Cathode Excitation Requirements		
Ignitor Voltage Required to Fire	200	Volts
Ignitor Current Required to Fire	30	Amperes
Starting Time at Required Voltage or Current	100	Microseconds

Mechanical

Envelope Material—Stainless Steel		
Net Weight	21	Pounds

Thermal

Type of Cooling—Water		
Inlet Water Temperature, minimum	10	C
ⓈInlet Water Temperature, maximum	40	C
Water Flow, minimum, solenoid water valve open	3.0	Gallons per Minute
Characteristics for Water Cooling at Rated Minimum Flow		
Water Temperature Rise, maximum	9	C
Pressure Drop at 3 Gallons per Minute, maximum	5.1	Pounds per Square Inch

MAXIMUM RATINGS AND TYPICAL OPERATION

Power-Rectifier Service, Intermittent Duty

Ratings are for Zero Phase-Control Angle—See Curve for Details.

Maximum Peak Anode Voltage				
Inverse	600	1200	1500	Volts
Forward	600	1200	1500	Volts
Maximum Anode Current				
Peak	4000	3000	2400	Amperes
Corresponding Average	54	40	32	Amperes
Average	190	140	112	Amperes
Corresponding Peak	1140	840	672	Amperes
Maximum Averaging Time	6.23	6.25	6.25	Seconds
Ratio of Average to Peak Current, maximum				
Averaging Time 0.2 Second	0.166	0.166	0.166	
Ratio of Fault to Maximum Peak Current	12.5	12.5	12.5	
Maximum Duration of Fault Current	0.15	0.15	0.15	Seconds
Frequency Range	50-60	50-60	50-60	Cycles per Second

Resistance-Welding-Control Service*

Two Tubes in Inverse Parallel, Ratings per Tube

Voltage Range	250 to 600	Volts RMS
Maximum Demand	2400	Kilovolt-Amperes
Average Current at Maximum Demand	192	Amperes
Maximum Average Current	355	Amperes
Demand at Maximum Average Current	800	Kilovolt-Amperes
Maximum Averaging Time at 250 Volts RMS	11.0	Seconds
Maximum Averaging Time at 600 Volts RMS	4.6	Seconds
Maximum Peak Fault Current at 250 Volts	27,000	Amperes
Maximum Peak Fault Current at 600 Volts	11,200	Amperes

TECHNICAL INFORMATION (CONT'D)

MAXIMUM RATINGS AND TYPICAL OPERATION (Cont'd)

Ignitor

Maximum Voltage

Positive—Anode Voltage

Negative.....5 Volts

Maximum Current

Peak.....100 Amperes

Root Mean Square.....10 Amperes

Average.....1 Amperes

Maximum Averaging Time.....5 Seconds

Temperature-Control-Switch Ratings†

Maximum Voltage.....575 Volts

Maximum Current

□ Over-Temperature Switch.....6 Amperes

□ Water-Control Switch.....1.5 Amperes

Maximum Peak Potential of Tube Water Cylinder

Above Ground.....1500 Volts

Switch-Contact Arrangement

Over-Temperature Switch—Normally Closed

(Contacts Open on Temperature Rise)

Water-Control Switch—Normally Open

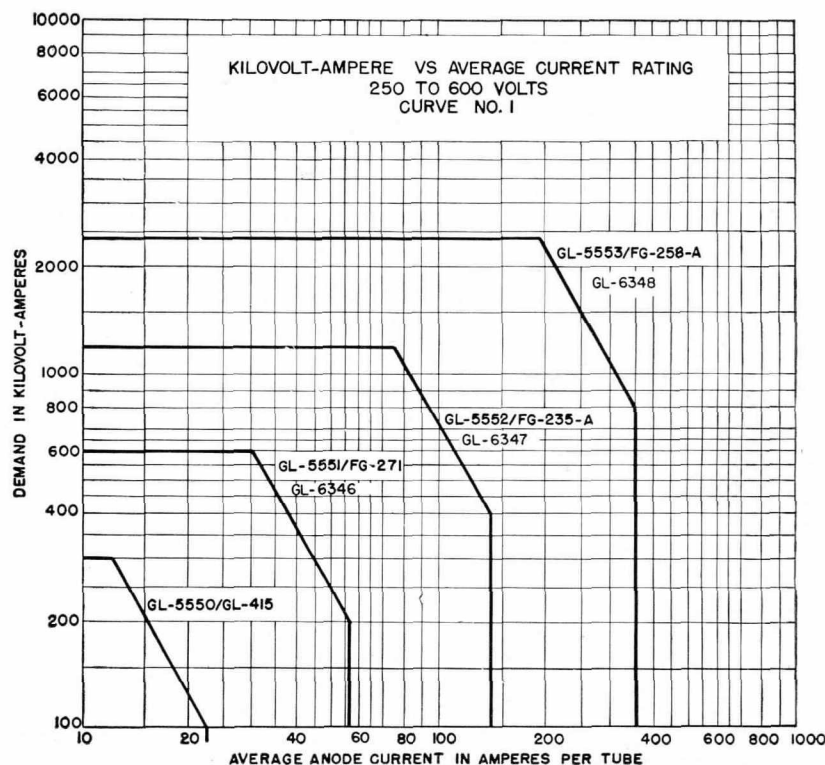
(Contacts Close on Temperature Rise)

⊕ Denotes a change.

* RMS demand voltage, current, and kilovolt-ampere demand are all on the basis of full-cycle conduction (no phase delay) regardless of whether or not phase control is used. For voltages below the minimum, the minimum-voltage current rating applies. With the use of log-log paper straight-line interpolation between tabulated points may be used for other detailed ratings of: Demand kva vs average anode current, and maximum averaging time vs anode voltage.

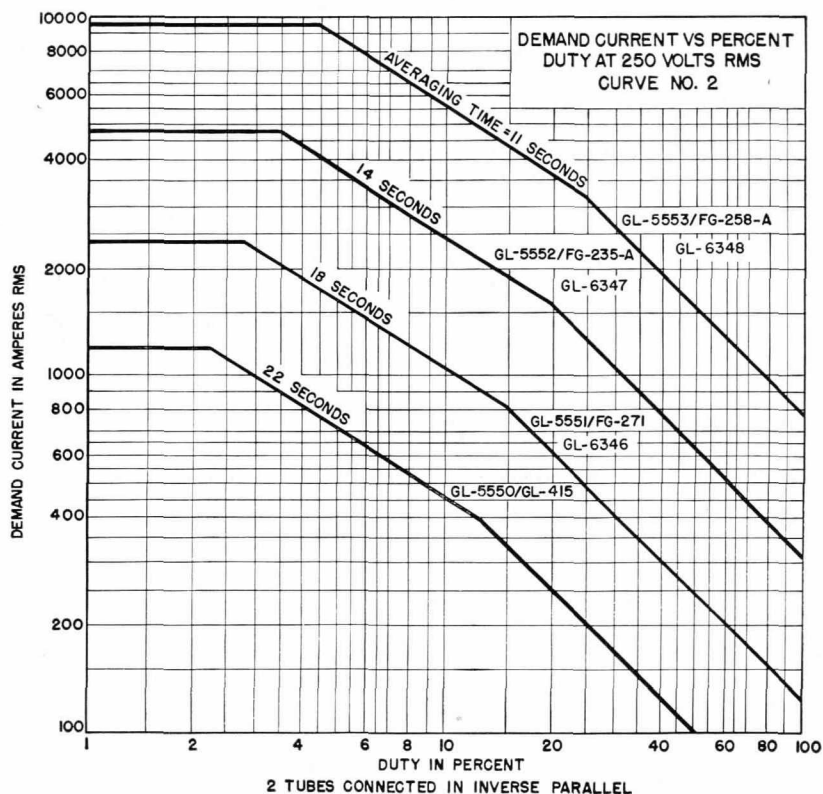
† Suitable fuses should be provided in the switch circuits to prevent a power arc should a ground occur in the switch or wiring.

□ Denotes an addition.

CURVES K-69087-72A217, K-69087-72A218, AND K-69087-72A219
DO NOT APPLY FOR INTERMITTENT-RECTIFIER SERVICE

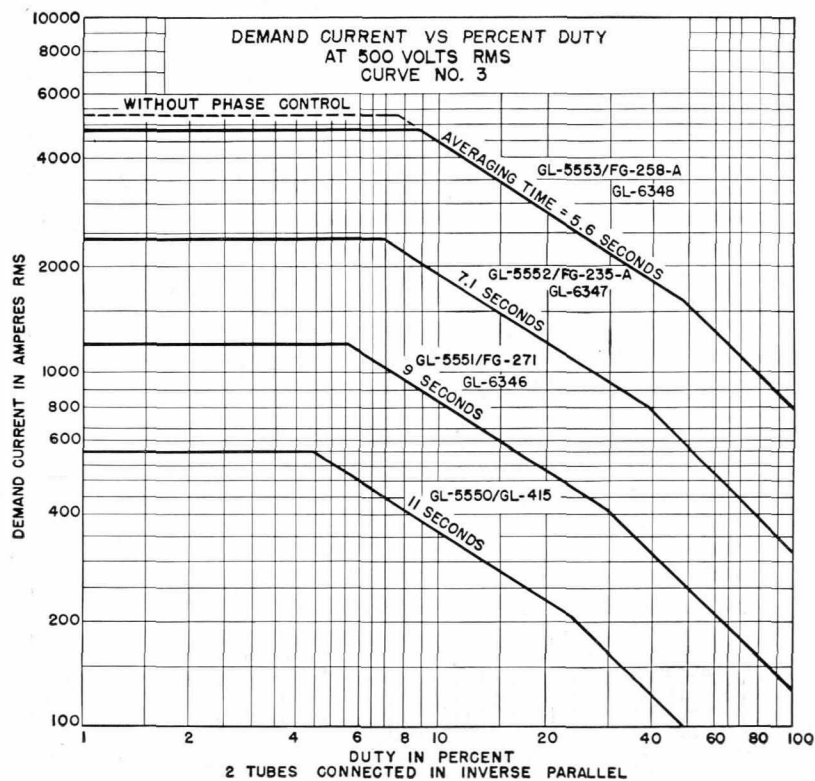
K-69087-72A217

8-21-53



K-69087-72A218

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K-69087-72A219

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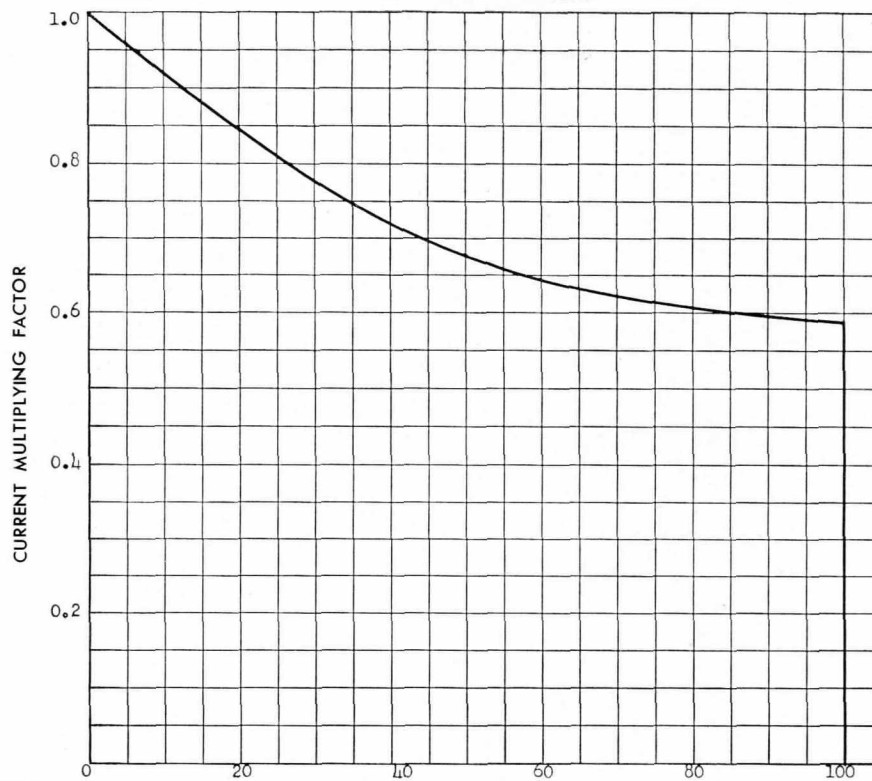
PHASE CONTROL
THREE-PHASE SINGLE-WAY
DOUBLE-WAY CIRCUITS

GL-6348

ET-T1036

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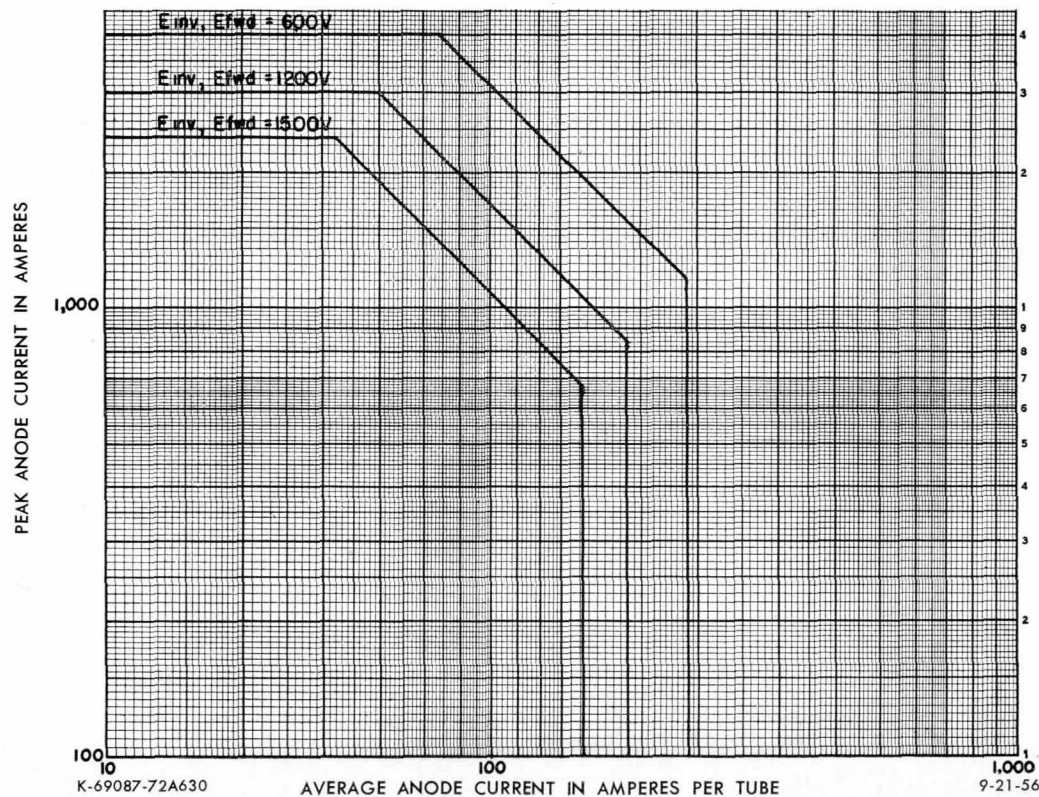
K-69087-72A513—Curve Revised 8-21-53

POWER-RECTIFIER RATING—INTERMITTENT DUTY

MAXIMUM AVERAGING TIME=6.25 SECONDS

$\frac{1 \text{ AVERAGE}}{1 \text{ PEAK}}$ MAXIMUM AVERAGING TIME 0.2 SECOND = 0.166 MAXIMUM

$\frac{1 \text{ FAULT}}{1 \text{ PEAK MAX}}$ MAXIMUM DURATION OF FAULT CURRENT 0.15 SECOND = 12.5 MAXIMUM



K-69087-72A630

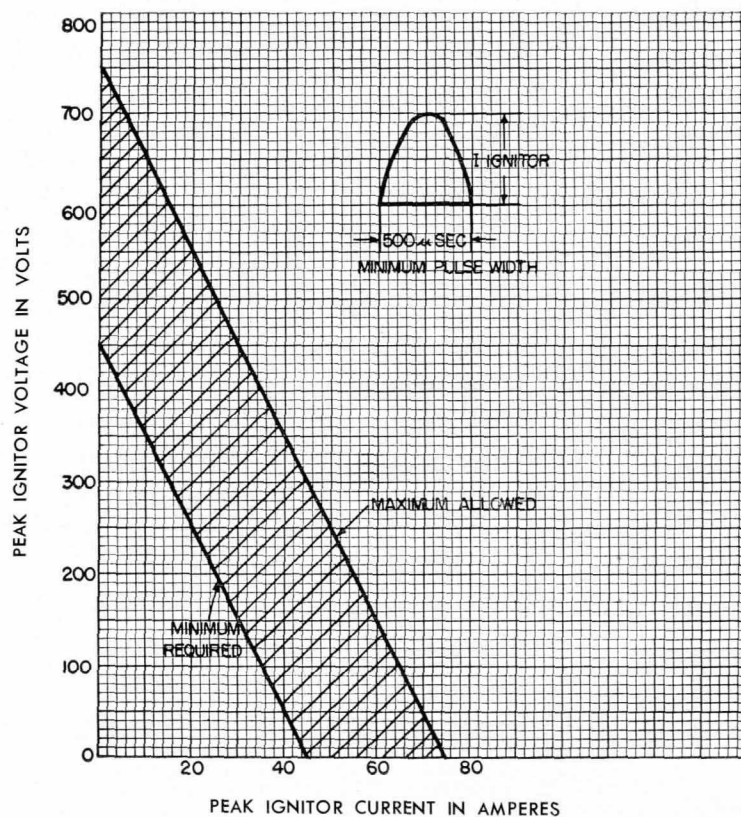
AVERAGE ANODE CURRENT IN AMPERES PER TUBE

9-21-56

† Supersedes pages 5 and 6 dated 9-53.

IGNITOR VOLT-AMPERE REQUIREMENTS—SEALED-IGNITRON RECTIFIER

THE IGNITOR FIRING CIRCUIT SHOULD BE DESIGNED TO OPERATE WITHIN THE SHADED AREA



K-69087-72A741—New Curve

12-9-55