

DESCRIPTION AND RATING

IGNITRON GL-6228/506

The GL-6228/506 ignitron is a sealed, stainless-steel-jacketed, water-cooled mercury-pool tube designed primarily for use in electronic frequency changers. In this service, six tubes will rectify or invert up to 7500 kilowatts at 17,000 volts. The tube is also designed for use in intermittent-rectifier service, capacitor-discharge service, and as a d-c short-circuiting switch.

TECHNICAL INFORMATION

GENERAL

Electrical

Type Cathode Excitation - Cyclic	
Type Cathode-Spot Starting - Ignitor	
Number of Electrodes	
Main Anodes	1
Main Cathode	1
Ignitors	3
Auxiliary Anodes	2
Shield Grids	1
Control Grids	1
Gradient Grids	1
Arc Drop	
At 600 Amperes Peak	20 ± 2 Volts
At 2000 Amperes Peak	30 ± 2 Volts
Cathode-Excitation Requirements	
See specific class of service	
Grid-Excitation Requirements	
See specific class of service	

Mechanical

Envelope Material - Metal	
Net Weight	100 ± 10 Pounds
Type of Cooling - Water	
Characteristics for Water Cooling	
Water Temperature Rise	4 C
Pressure Drop at 5 Gallons per Minute, maximum	4 Pounds per Square Inch
Inlet Water Temperature, minimum	35 C
Outlet Water Temperature, maximum	45 C
Water Flow, minimum	5 Gallons per Minute
Recommended Temperature Range	40 to 45 C

MAXIMUM RATINGS

<u>Power-Rectifier Service</u>	Minimum	Maximum
ASA (See ASA Standards 2.103)		
Peak Anode Voltage		
Inverse	---	20,000 Volts
Forward	---	20,000 Volts

Power-Rectifier Service

ASA (See ASA Standards 2.103) (Cont'd)

Minimum Maximum

Anode Current *

Peak --- 900 Amperes

Average

Continuous --- 150 Amperes

2 Hours --- 200 Amperes

1 Minute --- 300 Amperes

Fault --- 6,000 Amperes

Duration of Fault Current † 0.15 Second

Peak Control-Grid Voltage

Forward 200 500 Volts

Inverse 100 200 Volts

Peak Shield-Grid Voltage

Forward 200 500 Volts

Inverse 50 200 Volts

Peak Control-Grid Current

Forward --- 5 Amperes

Inverse --- 0.4 Amperes

Peak Shield-Grid Current

Forward --- 5 Amperes

Inverse --- 0.2 Amperes

Peak Gradient-Grid Voltage

Forward 1/2 1/2 Anode-Cathode Voltage

Inverse 1/2 1/2 Anode-Cathode Voltage

Peak Gradient-Grid Current

Forward 0.010 0.020 Amperes

Inverse 0.010 0.020 Amperes

Ignitor Ratings

Peak Ignitor Voltage

Forward, Open-Circuit Voltage 450 750 Volts

Inverse 0 5 Volts

Width of Current Pulse, Sinusoidal Waveshape

At 60 Cycles 500 1500 Microseconds

At 25 Cycles 500 4000 Microseconds

Peak Ignitor Current, Short-Circuit

Current 45 75 Amperes

Auxiliary Anode Ratings

Available Instantaneous Auxiliary Anode

Voltage During Desired Conduction

Period 40 --- Volts

Peak Auxiliary-Anode Voltage

Forward --- 200 Volts

Inverse --- 25 Volts

Peak Auxiliary-Anode Current

Forward --- 20 Amperes

Inverse --- 0.100 Amperes

Average --- 5 Amperes

RMS --- 10 Amperes

Minimum

Forward Current During Desired

Conduction Period 7 --- Amperes

Continuous Duty, No Overloads

Peak Anode Voltage

Inverse --- 20,000 Volts

Forward --- 20,000 Volts

Anode Current *

Peak --- 600 Amperes

Average --- 200 Amperes

<u>Power-Rectifier Service</u>		Minimum	Maximum	
Continuous Duty, No Overloads (Cont'd)				
Anode Current* (Cont'd)				
Fault	---	6,000	Amperes	
Duration of Fault Current ‡	---	0.15	Second	
Product of Inverse or Forward Voltage and Average Current	---	3	Megavolt-Amperes	
Peak Control-Grid Voltage				
Forward	200	500	Volts	
Inverse	100	200	Volts	
Peak Shield-Grid Voltage				
Forward	200	500	Volts	
Inverse	50	200	Volts	
Peak Control-Grid Current				
Forward	---	5	Amperes	
Inverse	---	0.4	Amperes	
Peak Shield-Grid Current				
Forward	---	5	Amperes	
Inverse	---	0.2	Amperes	
Peak Gradient-Grid Voltage				
Forward	1/2	1/2	Anode-Cathode Voltage	
Inverse	1/2	1/2	Anode-Cathode Voltage	
Peak Gradient-Grid Current				
Forward	0.010	0.020	Amperes	
Inverse	0.010	0.020	Amperes	
Ignitor Ratings				
Peak Ignitor Voltage				
Forward	450	750	Volts	
Inverse	0	5	Volts	
Width of Current Pulse, Sinusoidal				
Waveshape	500	---	Microseconds	
At 60 Cycles	---	1500	Microseconds	
At 25 Cycles	---	9000	Microseconds	
Peak Ignitor Current	45	75	Amperes	
Auxiliary Anode Ratings				
Available Instantaneous Auxiliary Anode Voltage During Desired Conduction Period	40	---	Volts	
Peak Auxiliary-Anode Voltage				
Forward	---	200	Volts	
Inverse	---	25	Volts	
Peak Auxiliary-Anode Current				
Forward	---	20	Amperes	
Inverse	---	0.100	Amperes	
Average	---	5	Amperes	
RMS	---	10	Amperes	
Minimum				
Forward Current During Desired Conduction Period	7	---	Amperes	
Intermittent Duty †				
Peak Anode Voltage				
Inverse	---	20,000	Volts	
Forward	---	20,000	Volts	
Anode Current*				
Peak	---	1500	Amperes	
Average	---	150	Amperes	
Averaging Time	---	0.15	Second	
RMS	---	500	Amperes	
Averaging Time	---	0.15	Second	

Power-Rectifier Service

Intermittent Duty † (Cont'd)

	Minimum	Maximum	
Anode Current* (Cont'd)			
Fault	---	6,000	Amperes
Duration of Fault Current ‡	---	0.15	Second
Product of Inverse or Forward Voltage and Peak Anode Current	---	22.5	Megavolt-Amperes
Peak Control-Grid Voltage			
Forward	200	500	Volts
Inverse	100	200	Volts
Peak Shield-Grid Voltage			
Forward	200	500	Volts
Inverse	50	200	Volts
Peak Control-Grid Current			
Forward	---	5	Amperes
Inverse	---	0.4	Amperes
Peak Shield-Grid Current			
Forward	---	5	Amperes
Inverse	---	0.2	Amperes
Peak Gradient-Grid Voltage			
Forward	1/2	1/2	Anode-Cathode Voltage
Inverse	1/2	1/2	Anode-Cathode Voltage
Peak Gradient-Grid Current			
Forward	0.010	0.020	Amperes
Inverse	0.010	0.020	Amperes
Ignitor Ratings			
Peak Ignitor Voltage			
Forward	450	750	Volts
Inverse	0	5	Volts
Width of Current Pulse, Sinusoidal Waveshape	500	---	Microseconds
At 60 Cycles	---	1500	Microseconds
At 25 Cycles	---	9000	Microseconds
Peak Ignitor Current	45	75	Amperes
Auxiliary Anode Ratings			
Available Instantaneous Auxiliary Anode Voltage During Desired Conduction Period	40	---	Volts
Peak Auxiliary-Anode Voltage			
Forward	---	200	Volts
Inverse	---	25	Volts
Peak Auxiliary-Anode Current			
Forward	---	20	Amperes
Inverse	---	0.100	Amperes
Average	---	5	Amperes
RMS	---	10	Amperes
Minimum			
Forward Current During Desired Conduction Period	7	---	Amperes

A-c Control or Capacitor-Discharge Service - Sinusoidal Current, Pulse Duty †

	Minimum	Maximum	
Peak Anode Voltage			
Inverse	---	20,000	Volts
Forward	---	20,000	Volts
Anode Current			
Peak	---	2,000	Amperes
Average	---	200	Amperes
Maximum Averaging Time - One conduction pulse plus one non-conducting period			
RMS	---	500	Amperes
Maximum Averaging Time - One conduction pulse plus one non-conducting period			

A-c Control or Capacitor-Discharge Service - Sinusoidal Current,
Pulse Duty † (Cont'd)

	Minimum	Maximum	
Fault	---	2,000	Amperes
Duration of Fault Current	---	0.15	Second
Product of Inverse or Forward Voltage and Average Current	---	3	Megavolt-Amperes
Equivalent Frequency - 25 to 60 Cycles Above 60 Cycles Use Commutating Reactors			
Current At Start of Commutation Period---		60	Amperes
Current At End of Commutation Period ---		0	Amperes
Length of Commutation Period	200	---	Microseconds

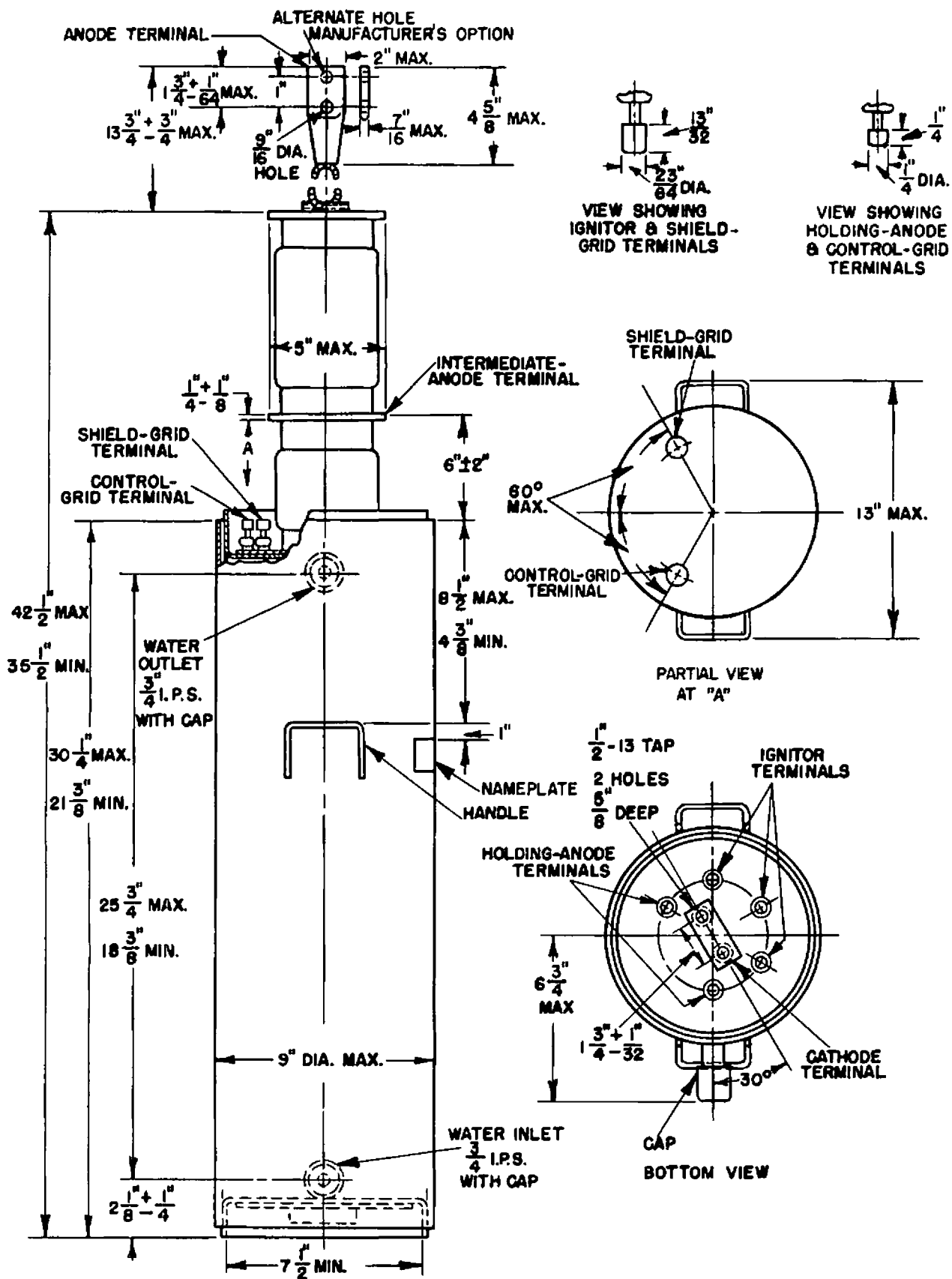
D-c Short-Circuiting Switch †

Anode Voltage			
Peak	---	20,000	Volts
Forward	100	---	Volts
Anode Current			
Peak	---	6,000	Amperes
Average	---	90	Amperes
Averaging Time	---	10	Seconds
Frequency of Current-Conduction Periods	---	100	Per Hour
Ionization Time	---	10	Microseconds
Control-Grid Open-Circuit Voltage	1500	2500	Volts
Control-Grid Short-Circuit Current	5	10	Amperes
Shield-Grid Open-Circuit Voltage	1500	2500	Volts
Shield-Grid Short-Circuit Current	2.5	5.0	Amperes
Time Constant of Shield- and Control- Grid Circuits	50	100	Microseconds
Peak Gradient-Grid Voltage			
Forward	1/2	1/2	Anode-Cathode Voltage
Inverse	1/2	1/2	Anode-Cathode Voltage
Peak Gradient-Grid Current			
Forward	0.010	0.020	Amperes
Inverse	0.010	0.020	Amperes
Ignitor Ratings			
Ignitor Voltage			
Forward Open-Circuit Voltage	1500	2500	Volts
Negative Voltage	---	5	Volts
Ignitor Current			
Short-Circuit Current	200	250	Amperes
Time Constant of Ignitor Circuit	50	100	Microseconds

* Ratings are for zero-phase-control angle - See curve "Phase Control" for ratings at other phase-control angles.

‡ Reduce duration of fault current by suppressing rectifier by removing ignitor and grid excitation

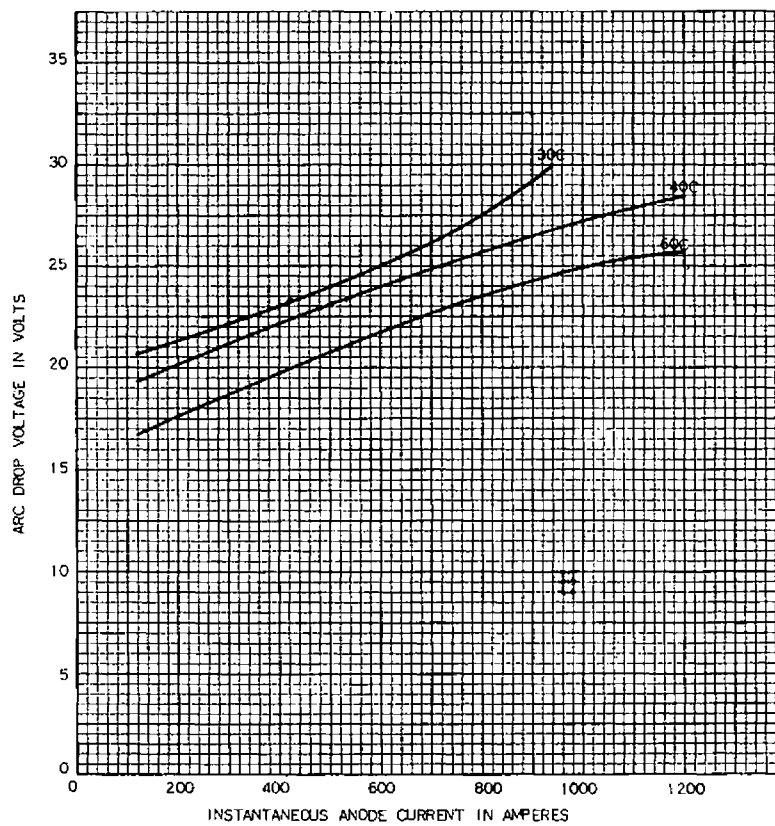
† Precautions should be taken to assure that magnetic fields of adjacent conductors do not deflect the arc in the tube.



N22002AZ

September 8, 1952

Outline
Ignitron GL-6228/506

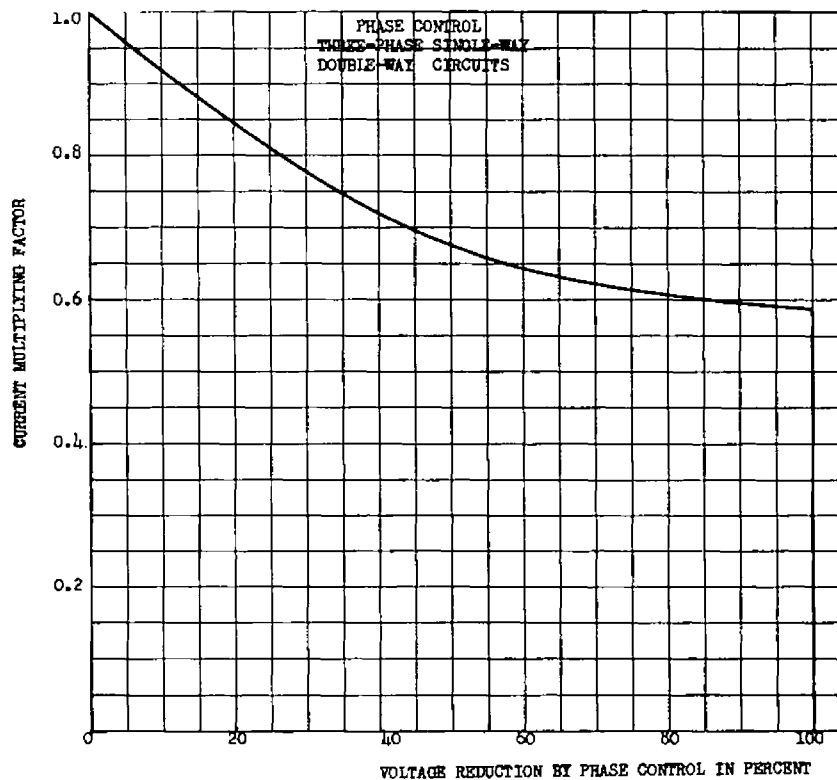


K-69087-72A196

May 2, 1949

GL-6228/506

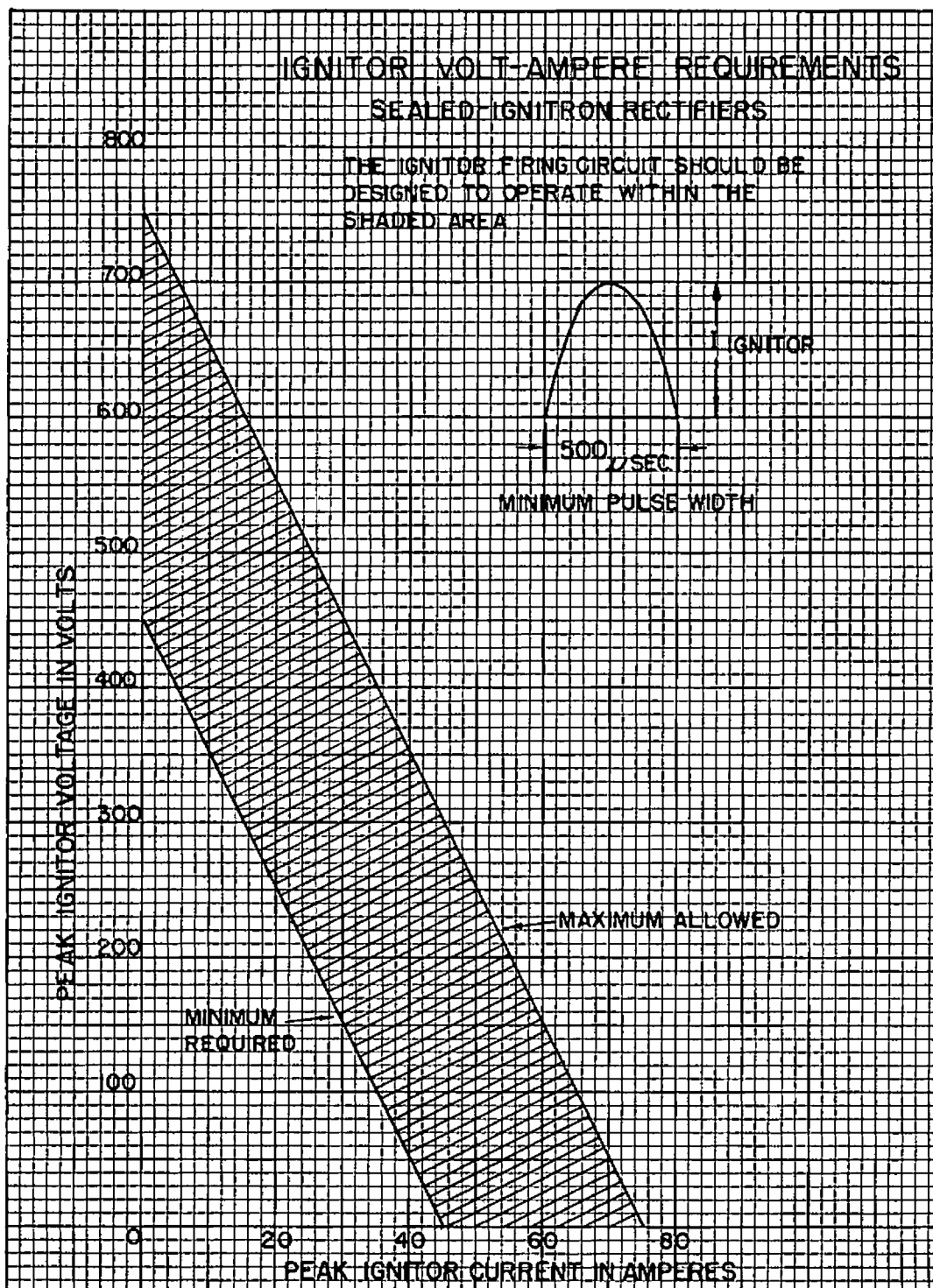
Arc-Drop Characteristic
For Cooling-Water Temperatures of
30-60C



K-69087-72A513

September 10, 1952

GL-6228/506
Phase Control



K-9033883

June 14, 1945

Ignitor Volt-Ampere Requirements
Sealed-Ignitron Rectifiers

TUBE DEPARTMENT

GENERAL  ELECTRIC

Schenectady 5, N. Y.