

GL-6514

IGNITRON

DESCRIPTION AND RATING

The GL-6514 is a permanently sealed water-cooled rectifier ignitron similar in construction and rating to the GL-5788. Special features are the addition of an integral temperature-control device with protective features, low water-pressure drop, and distinctive (larger diameter) ignitor terminals. The tube is designed for operation in 300, 600, and 900 volt d-c industrial rectifier circuits. The continuous average anode current rating is 200 amperes per tube in rectifiers rated up to 400 volts d-c. 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. It also includes an over-temperature switch which may be used to remove power from the ignitron when its temperature exceeds a safe value.

This new design of tube eliminates the need for the heat exchangers and recirculating water systems required to ensure safe operation of the non-temperature-controlled tube when the available cooling water temperature is too low to provide the minimum reliable mercury-vapor pressure in the tubes. Another advantage is that the temperature-controlled tubes can be used to replace the usual safety devices such as water-flow relays, water over-temperature relays, and water-pressure inter-locks which have required considerable maintenance in the past. Another advantage is that these tubes may be used to prevent excessive moisture condensation over the external parts of the tubes under conditions of high humidity.

TECHNICAL INFORMATION

GENERAL

Electrical

Cathode Excitation - Cyclic	
Cathode-Spot Starting - Ignitor	
Number of Electrodes	
Main Anodes	1
Main Cathodes	1
Auxiliary Anodes	1
Ignitors	2
Arc Drop	
At 600 Amperes Peak	16.2 ± 0.5 Volts
Cathode Excitation Requirements	
Ignitor Voltage Required to Fire	450 Volts
Ignitor Current Required to Fire	45 Amperes
Excitation Arc Current Required, minimum	
	8 Amperes

G E N E R A L E L E C T R I C C O M P A N Y

Excitation Arc-Drop Voltage	9 $\pm$ 0.5 Volts
Excitation Arc Open-Circuit Voltage, minimum	55 Volts AC

Mechanical

Envelope Material - Metal	
Net Weight, Approximate	25 Pounds
Type of Cooling - Water	
Characteristics for Water Cooling	
Water Temperature Rise, maximum	4.5 C
Pressure Drop at 3 Gallons per Minute, maximum	3 Pounds per Square Inch

Thermal

Water Cooling	
Inlet Water Temperature, maximum	
Peak Inverse Anode Voltage = 900	55 Centigrade
Peak Inverse Anode Voltage = 2100	50 Centigrade
Inlet Water Temperature, minimum	6 C
Water Flow	
At Continuous Rated Average Current, minimum	3 Gallons per Minute

MAXIMUM RATINGS**As Power Rectifier Tube ***

Maximum Peak Anode Voltage		
Inverse	900	2100 Volts
Forward	900	2100 Volts
Maximum Anode Current		
Peak	1800	1200 Amperes
Average		
Continuous	200	150 Amperes
2 Hours	300	225 Amperes
1 Minute	400	300 Amperes
Surge	12000	9000 Amperes
Maximum Duration of Surge		
Current	0.15	0.15 Second
Frequency Range	25 to 60	25 to 60 Cycles per Second

* Ratings are for zero phase-control angle.

As AC Control Tube

Two Tubes in Inverse Parallel	
Voltage	2400 RMS Volts
Maximum Demand	2400 Kilovolt-Amperes
Average Current at Maximum Demand	135 Amperes

Maximum Average Current	207 Amperes
Demand at Maximum Average Current	1105 Kilovolt-Amperes
Maximum Averaging Time at 2400 Volts RMS	1.66 Seconds
Maximum Surge Current	6000 Peak Amperes

Ignitor

Maximum Voltage	
Positive	Anode Volts
Negative	5 Volts
Maximum Current	
Peak	100 Amperes
Root Mean Square	15 Amperes
Average	2.0 Amperes
Maximum Averaging Time	10 Seconds
Starting Time at Required Voltage or Current	100 Microseconds

Auxiliary Anode

Maximum Current	
Peak	30 Amperes
Average	9 Amperes
Maximum Averaging Time	10 Seconds
Root Mean Square	15 Amperes
Maximum Peak Forward Voltage	160 Volts
Maximum Peak Inverse Voltage	
Main Anode Conducting	25 Volts
Main Anode Not Conducting	160 Volts

Temperature-Control-Switch Ratings I

Maximum Voltage	575 Volts
Maximum Current	
Over-Temperature Switch	6 Amperes
Water-Control Switch	1.5 Amperes
Maximum Peak Potential Difference	
Between Tube Water Cylinder and Switch Circuit	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)	

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

January 31, 1955

TUBE DEPARTMENT

GENERAL ELECTRIC COMPANY

SCHENECTADY 5, N. Y.

