

Marconi

RECTIFYING VALVE

TYPE G.U.21



APPROXIMATE DIMENSIONS:

| | |
|-------------------|---|
| Weight | 0.23 kg. (8 oz.). |
| Base | Screw type. |
| Anode cap | Push on type. |
| Height | 248 ± 12 mm. (9 $\frac{3}{4}$ in. ± $\frac{1}{2}$ in.). |
| Diameter | 57 mm. (2 $\frac{1}{4}$ in. max.). |

The Type G.U.21 valve is a hot cathode mercury vapour half wave rectifier incorporating a domed anode and shrouded cathode in a hard glass bulb. It is suitable for the supply of rectified currents up to 3.5 amperes at 10,000 volts, depending upon the circuit used (See table).

Under normal conditions of operation, the space between the anode and cathode is filled with ionised mercury vapour showing the characteristic blue glow. Ionisation reduces the impedance of the valve to a very low value, the voltage drop being about 12 and almost independent of the current.

The condensation temperature of a mercury rectifier is measured by the temperature of that part of the bulb on which mercury collects. During operation this temperature must be between 20 deg. C. and 60 deg. C. The condensation temperature rises to approximately 25 deg. C. above the ambient temperature, provided the valve is shielded from draughts, about 30 minutes being required for the valve to reach this steady condition.

The ambient temperature is measured by a thermometer suspended 6 in. (15.3 cm.) from the valve, with its bulb level with the top of the cathode end cap.

Assuming still air conditions, the maximum permitted ambient temperature is 35 deg. C. When it is necessary to work above this temperature, the valve must be cooled by a stream of air of a temperature not less than 20 deg. C. directed towards the bottom end of the bulb. By these means it is possible to operate the valve up to a maximum ambient temperature of 60 deg. C.

APPROXIMATE DATA :

| | |
|------------------------------|----------------|
| Filament voltage | 4.0 ± 0.1 |
| Filament amperes | 11.0 approx. |
| Peak anode current | 4.7 amps. max. |
| Peak reverse voltage | 11,600 max. |

Adequate time delay must be allowed between the application of the cathode and anode voltages. Failure to observe this delay will result in poor performance and reduced life.

The time delay varies with the ambient temperature and the minimum time delay for various ambient temperatures is given in the following table :—

| Ambient temperature (Degrees Centigrade) | Minimum delay when valve has been unused for more than 20 minutes. | When the valve has been switched off after running for over 30 minutes the delay may be one minute provided the off period has not exceeded those shown below. |
|--|--|---|
| Not less than | | |
| 20 deg. | 1 minute | *See note |
| 18 deg. | 2 " | 20 minutes |
| 16 deg. | 4 " | 20 " |
| 14 deg. | 6 " | 20 " |
| 12 deg. | 7 " | 15 " |
| 10 deg. | 8 " | 15 " |
| 8 deg. | 9 " | 10 " |
| 6 deg. | 10 " | 10 " |

* Note : Provided the ambient temperature is over 20 deg. C. the delay is one minute and is independent of the time the valve cathodes have been switched off.

The above table is required only where starting time is of importance or where ambient temperatures are under 10 deg. C. ; otherwise the following simplified procedure applies :

When the valves have been off for over 15 minutes the delay must exceed 8 minutes.

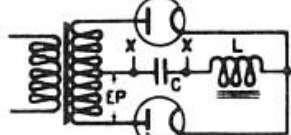
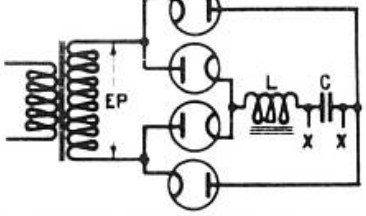
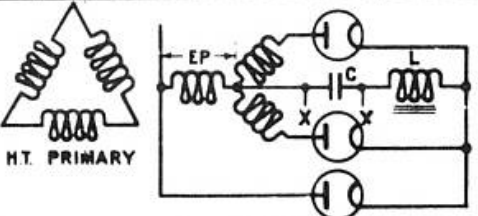
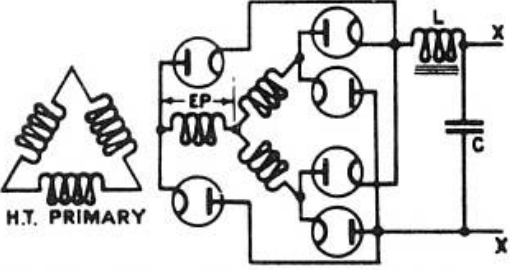
When the valves have been off for less than 15 minutes the delay must exceed one minute.

After transit or storage the delay must exceed 30 minutes.

The valve must be stored, transported and mounted vertically with the anode at the top.

TABLE OF CIRCUITS.

The ratings given in the table of circuits apply only when the supply frequency is of the order of 50 cycles per second ; at higher frequencies the applied voltage must be reduced.

| CIRCUIT | DIAGRAM (OUTPUT AT XX) | MAX. DC. OUTPUT | | MINIMUM VALUE OF L HENRIES | MINIMUM VALUE OF C MICROFARADS | EP RMS VOLTS | APPROX. RIPPLE VOLTS. AT XX. (PEAK VALUE.) | |
|---------------------------|---|-----------------------|---------|----------------------------------|--------------------------------------|--------------------|---|--------------------------|
| | | E _{DC} VOLTS | AMPERES | | | | % E. DC. AMPLITUDE | FREQUENCY CYCLES/SEC. |
| | | | | | | | | |
| BI-PHASE HALF WAVE |  | 3300 | 2.3 | 6 | 4 | 3630 | 8 | 100 |
| SINGLE PHASE FULL WAVE |  | 6600 | 2.3 | 12 | 2 | 7260 | 8 | 100 |
| THREE PHASE HALF WAVE |  | 5000 | 3.5 | 6 | 4 | 4270 | 1 | 150 |
| THREE PHASE FULL WAVE |  | 10,000 | 3.5 | 9 | 1 | 4270 | 0.2 | 300 |

The minimum inductance values for the choke in the table are arranged to limit the peak current through the valve, and to prevent the smoothing circuit resonating to the supply frequency.

The choke used must have the required inductance when a direct current equal to the load current is flowing through it.