



## Rectifier Type AH 205

**General.** The Type AH 205 valve is a hot-cathode mercury-vapour rectifier incorporating a domed carbon anode and a shrouded oxide-coated cathode in a hard glass bulb. It is suitable for the supply of rectified currents up to 30 A at 21 kV depending upon the type of circuit used.

The AH 205 valve should be operated with air blast (see details below). Care should be taken not to cool the anode end of the valve, as the AH 205, in common with other glass mercury-vapour valves, should operate with the top of the bulb hot.

The cathode may be switched on in one operation. The ageing schedule (to be applied after transit or storage) is one hour at normal filament voltage but without anode voltage or air blast.

The valve must always be shielded from draughts, though air circulation around it must not be impeded.

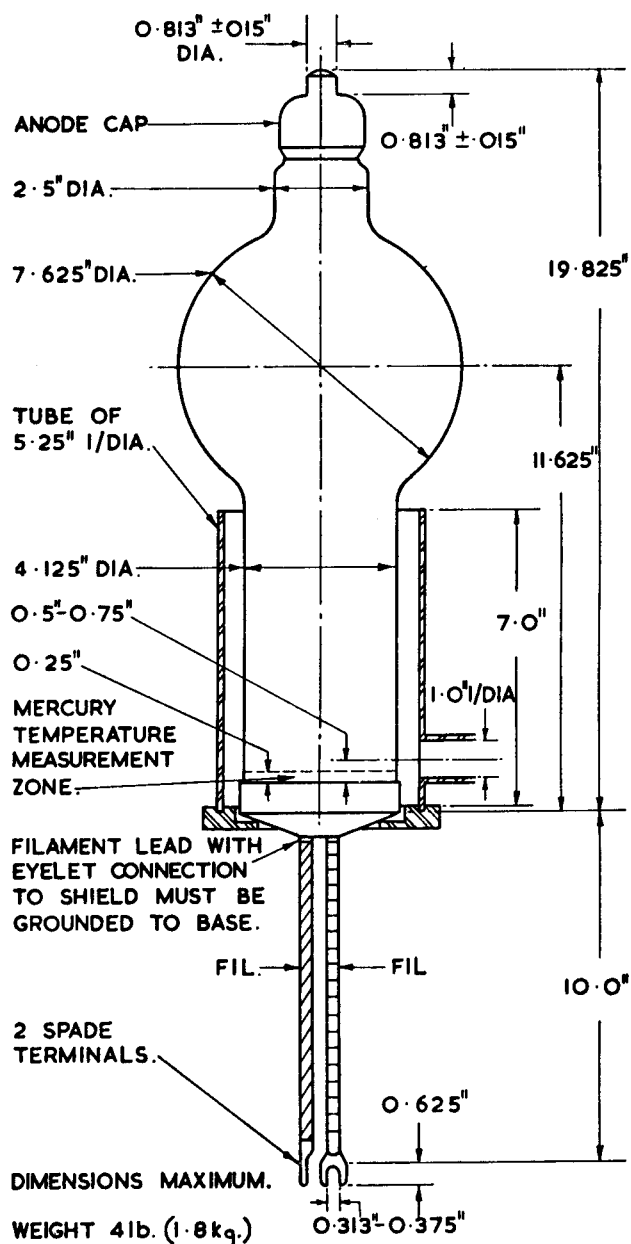
### Conditions of Operation

#### (a) Continuous Air Blast at Constant Temperature.

With this arrangement the blower is operating continuously, and an air heater is switched on and off by a thermostat in the air supply to the valve, thus maintaining a constant temperature. It is imperative that a tube be fitted round the lower neck of the valve as illustrated. The forced air should be applied at a temperature of 35°C for operation at a condensed mercury temperature of 40°C at full load.

#### (b) Thermostatically Switched Forced Air Blast at Ambient Temperature.

As an alternative to the above arrangement the air blast may be switched on and off by a thermostat which measures the ambient air temperature on a level with the top of the base of the valve and 6 in. away from it.



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The blower must be switched off for ambient temperatures between 10°C and 25°C, and on for temperatures between 25°C and 45°C. The valve must never be operated when the ambient temperature is below 10°C. For condensed mercury temperatures below 30°C and above 40°C the peak inverse voltage must not exceed 10,000 volts. The equilibrium condensed mercury temperature rise above ambient temperature at full load is approximately 15°C.

#### Recommended Method of Applying Air Blast

For conditions of operation (a) and (b) above, the air blast is best applied through a pipe of 1-in. bore at a rate of 5 cu. ft./min. and directed at a point  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. above the base of the valve. It should be turned on at least 5 minutes before anode voltage is applied. The air pipe should include at least a 12-in. section of insulating material to avoid risk of flash-over between filament cap and earth.

#### Pre-heating Time for Filament

The mercury condensation temperature is raised approximately 11.5°C above the ambient temperature by the power dissipated in the filament.

The pre-heating time before the condensation temperature rises to its equilibrium working value varies according to the ambient temperature, and under average temperate conditions is of the order of 30 minutes. A table relating the ambient temperature to the pre-heating time, applicable to conditions where the valve is operated as in (b) above, is given below.

Ambient temperature (°C)	Pre-heating Time (Minutes)
15	70
20	45
25	20
30 and above	2

Under conditions as in (a) above, the filament should be switched on at least 2 minutes before HT is applied, provided that the warm air blast has been maintained continuously. If the air blast has been switched off, time, as in the table shown above, should be allowed.

After a short shut-down period, not exceeding one minute in duration, five minutes pre-heating should be allowed before application of anode voltage. For longer shut-down periods from at least 10 to 30 minutes should be allowed according to the duration of the shut-down and the ambient temperature.

#### APPROXIMATE DATA

$V_f$	5 V
$I_f$	30 ( $\pm 3$ ) A
PIV (max)	10 kV, 22 kV
$T_{Hg}$	25 – 60°C, 30 – 40°C
$I_a$ (pk) (max)	40 A
$I_a$ (av) (max)	10 A
$V_{arc}$ (at 10A $I_{a(av)}$ )	15 V

#### Maximum Outputs

(1) 3-phase half-wave (*)	
$V_{dc}$ (max)	10.5 kV
$I_{dc}$ (max)	30 A
(2) 3-phase full-wave (*)	
$V_{dc}$ (max)	21 kV
$I_{dc}$ (max)	30 A
(3) Single-phase full-wave (†)	
$V_{dc}$ (max)	7 kV
$I_{dc}$ (max)	20 A

#### NOTES

1. The valve must be screened against RF fields.
2. If a large smoothing condenser is used, care should be taken not to exceed the maximum peak current on switching on.
3. Care must be taken to see that there is no mercury condensation on the anode or around the anode seal.

(\*) With filament voltage obtained from one phase of three-phase supply.

(†) With filament voltage in phase with anode current.