

Ballasts & Control Gear



Quality HID ballasts are manufactured in accordance with and compliance to IEC 922 and IEC 923.

High intensity discharge (HID) and low pressure lamps require a current limiting device (called a ballast or choke) to control lamp current.

Ballasts work on the self inductance principle. The impedance of the ballast is set to match the arc voltage of the particular lamp, which ensures that the correct current is supplied.

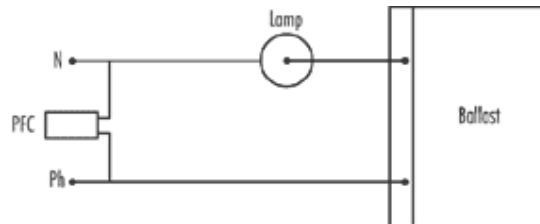
Features of quality HID ballasts

- very short magnetic paths
- transverse laminations with no stray field junctions
- Short heat paths
- winding insulation class H materials
- vacuum impregnated core and coil
- long service life
- low power consumption
- tw130 or tw150 winding temperature rating
- fully automatic production technology with assured manufacturing procedures and quality
- tropicalised

HID Lamps

Mercury Vapour (MV)

MV lamps are the most popular of all HID types and are used in a wide variety of applications. Ambient temperature has little if any effect on the performance of these lamps as the temperature in the discharge tube is usually over 500°C. Most MV lamps will strike and operate from -30°C on standard control equipment. Once struck, the upper ambient temperature limit is determined by the maximum allowable lamp cap and bulb temperatures.



Typical Mercury Vapour (MV) circuit

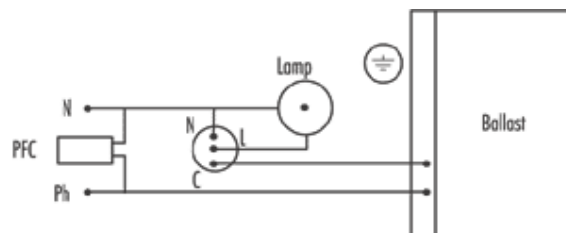
- require a cooling period of approximately 5-10 minutes before re-ignition.
- are not significantly affected by short-term mains voltage variations.
- stroboscopic effects should be minimised by operating adjacent lamps on different phases or using lead/lag control equipment.
- flicker factors for good quality lamps should be around 3% or less.

Metal Halide (MH)

MH lamps are similar in construction to mercury vapour lamps. They are popular for their excellent colour rendering which is achieved by the inclusion of rare earth elements in the discharge tube.

MH lamps are temperature sensitive and operate optimally at 100°C to 180°C ambients requiring luminaries to be designed to provide suitable conditions. Ballasts must operate lamps from the correct supply voltage and their impedance should not vary more than $\pm 3\%$ from the specified value. The supply voltage should not deviate for extended periods of more than 5% of the nominal rated voltage of the ballast and the supply frequency should not deviate by more than $\pm 3\%$.

Metal halide lamps require higher voltages for starting than the usual supply voltages. Various circuits are used to achieve the required starting conditions. They include leakage reactance ballasts, constant wattage auto-transformer control equipment or series (reactor) lag type ballasts with a separate ignitor. Reactor and Ignitor is the most economical solutions with the constant wattage circuit the best for electrical performance.

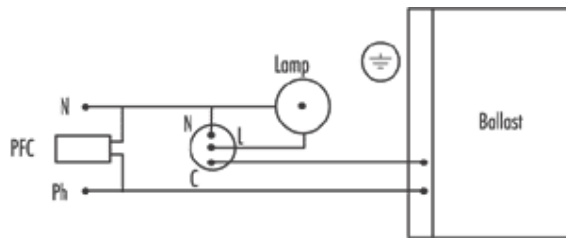


Typical Metal Halide (MH) circuit

High Pressure Sodium (HPS)

HPS lamps operate satisfactorily from -30°C to 100°C on series reactor ballast circuits. Precautions against increase arc tube voltage, due to thermal back radiation when mounted in luminaires, should be considered. Typically only a 10 volt increase in lamp voltage is tolerable. Standard lamps with standard ignitors re-ignite after 30 to 90 seconds requiring 2kV to 5kV to ignite from a cold start, depending on the lamp specifications. HPS lamps can only be re-ignited hot if they are of linear double ended construction as a hot re-strike requires 18kV to 25kV peak starting pulses.

High pressure sodium lamps are most commonly used in a series reactor ballast and ignitor circuit.



Typical H.P. Sodium (HPS) circuit

The lamp power and discharge tube temperature are highly dependent upon the lamp voltage. It is therefore important that the mains voltage does not exceed 105% of the nominal rated voltage of the choke for extended periods. The ballast should exhibit a closely controlled current/voltage characteristic to prevent the lamp from exceeding the maximum power limit as it ages and the lamp voltage rises.

Ignitors

The starting voltage for most HID lamps, (especially MH and HPS types) is higher than the mains voltage. Ignitors provide the necessary high voltage to start such lamps. The high voltage pulses varies from 1 to 5kV depending upon the type of lamp and is inhibited when the lamp starts.

Quality ignitors are manufactured in accordance with IEC 926 and IEC 927, the International Standards, specifying performance, general and safety requirements for starting devices.

Lamp		Nominal Line Current (Amps)	
		Start	Run
Standard T8 26mm	Wattage	HPF	HPF
	18W	0.17	0.15
	2 x 18W (series)	0.39	0.23
	36W	0.37	0.23
	58W	0.56	0.23