



Energy Solutions

Operation of the EZ LED requires a properly functioning metal halide ballast

High Intensity Discharge (HID) lighting systems can be costly to operate from both an energy consumption and a maintenance perspective. Metal halide lamps offer signs that it is time to replace the lamp but these signs often go unnoticed.

A key reason HID lighting can be costly is the lack of preventative maintenance.

Metal Halide lamps offer significant signs that it is time to replace a light bulb. Unfortunately, most people do not take the time to notice the warning signs. The only light bulbs that can be run to their hard fail point is incandescent and halogen light bulbs. These lamps have a filament that breaks, thus breaking the circuit upon failure. Other commercial lamps such as Fluorescent and HID require ballasts. Any light bulb or lighting system requiring ballasts is NOT designed to run until a lamp burns out completely. Failure to replace a commercial light bulb before complete lamp failure will damage the ballast and cause a drastic increase in maintenance costs.

In the case of metal halide, most manufacturers rate these HID light bulbs with a life of approximately 10,000 to 18,000 hours. This rating traditionally means the point in which 50% of the lamps will fail, but in the case of maintenance, this is the DO NOT EXCEED time of all lamps. At this point, all lamps should be replaced.

Metal halide lights offer significant signs that is it time to replace a capacitor or light bulb

The function of a capacitor is to smooth out the current from the ballast. A metal halide lamp will work without a capacitor but it will draw more amps, gain extreme brightness, overheat and then fail prematurely. A test of the capacitor will reveal if it is in spec as a 400w metal halide ballast, as an example, should measure 24 microfarads. Quicker visual checks of the lamp often indicate failure; ***these include a lamp turning greenish or pinkish in color or a loud humming noise from the ballast.*** The EZ LED is a solid state LED unit with electronics that require a functioning ballast in order to operate properly. In many cases a new \$15 capacitor is the easy fix to upgrading old ballasts. A capacitor out of spec could allow a higher amp load to damage the driver and then activate the built in safety feature to shut down the LED.

Details on HID ballasts and troubleshooting

- **The lamp is cycling on an off, or takes a long time to come on**

This is often misdiagnosed by electricians who do not have expert knowledge of HID lighting systems. The most common correction most find for this is to replace the light bulb. Once a new lamp is installed, the metal halide bulb will light and come up to full brightness. However, this is not the correct repair. The ballast in an HID lighting system requires a capacitor, this is a current limiting device that prevents too much amperage to be delivered to the HID bulb. As a metal halide lamp ages, it will require a greater load to maintain illumination. Because of the extreme heat produced by the HID system, the liquid gel that fills the capacitor will crystallize and change the electrical characteristics of the capacitor. At this point the capacitor is providing a low power factor and delivering a higher current than designed. The metal halide lamp will receive an unrestricted current (amp draw) and become brighter until it cuts out again. Then the thermal switch will cool, reset and the cycle repeats. This will prematurely fail the new replacement lamp and result in heavy blackening of the arc tube. The ballast, capacitor and lamp need to be changed.

- **The fixture makes a humming noise**

When a metal halide lamp receives a higher amp load than it was designed for due to the capacitor characteristics changing, the operating temperature of the ballast will rise tremendously. When the ballast overheats, the varnish coating of the coil will begin to melt away from the copper winding of the coil. This coating is what prevents the windings from vibrating against each other. At the point in which the ballast is buzzing, the windings are now beginning to touch, and vibrate resulting in sound. Eventually the varnish will melt enough to allow winding to short across each other, thus resulting in complete failure of the ballasts, and usually will trip a circuit breaker, downing the entire circuit.

- **The light bulbs appears to turn green or blue**

Mostly we find that the lamps turn a greenish color, either light to heavy green. This is caused by a capacitor becoming weak with age. It is delivering a high power factor, enough to maintain illumination of the lamp, but a low current, not enough to illuminate the lamp completely. The gases in the arc tube are not reaching their peak operating temperature, and the lamp glows green. Sometimes the capacitor itself can be replaced and the system will recover. However if the fixture is part of a parking lot lighting system, this is a good sign that the components are very old, and the ballast itself may not last long, as it will be the weak link of the system. It is a good idea to change the ballast and capacitor at this point. A return trip with labor and lift in as short as a month would cost more than the ballast at the time.

We can replicate this by removing a capacitor form the system. The HID system will work without a capacitor as its only job is to limit current. When we completely remove the capacitor, a metal halide lamp will rapidly draw more amps, gain extreme brightness, and become drastically whiter until the ballast overheats and fails.
