REACTOR- IGNITOR OR CONSTANT WATTAGE?

The information on the following pages has been compiled to provide Macro Power customers with a better understanding of HID lamp ballast characteristics, and to assist with the decision of which ballast (reactor-ignitor or constant wattage) should be used in a given application.

REACTOR-IGNITOR CONFIGURATION

![Diagram of reactor-ignitor configuration]

Reactor-Ignitor control gear is an inexpensive, compact and simple method for control of HID lamps. Reactor-ignitor gear consists of:

- a coil (choke) to control current to the lamp,

- a capacitor for Power Factor Correction (p.f.c.) and,

- an ignitor which starts the lamp by ionizing the gas in the arc-tube.

Since the coil is connected directly to the mains, the output power from the lamp is directly affected by mains fluctuations, and over-wattage of the lamp is possible thereby potentially shortening lamp life.
The Constant Wattage (CWA) ballast, although heavier, larger and more costly, provides numerous advantages over reactor-ignitor gear. CWA gear consists of:

- An auto-transformer feeding voltage to a ballast coil,
- A high quality, low tolerance series capacitor,
- An ignitor (HPS gear only. MH CWA gear does not require ignitors)

The lamp output power is maintained at a highly constant state, even over supply fluctuations, due to the regulating action of the auto-transformer. Hence the name Constant Wattage. The capacitor provides the lamp with a higher than line voltage, which ensures reliable starting and a smoother run-up of the lamp to full power.
SOME USEFUL COMPARASONS OF R-I TO CWA

<table>
<thead>
<tr>
<th>REACTOR-IGNITOR</th>
<th>CONSTANT WATTAGE</th>
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<tbody>
<tr>
<td><strong>STARTING CHARACTERISTICS</strong></td>
<td><strong>STARTING CHARACTERISTICS</strong></td>
</tr>
<tr>
<td>- High starting currents (both line and lamp) which require larger feed cables and, in large installations, can necessitate a sequenced power up so as to prevent overload on fuses/breakers etc.</td>
<td>- Significantly lower line starting current overcomes many of the problems of reactor gear in this respect.</td>
</tr>
<tr>
<td>- Inrush current to the power factor correction (pfc) capacitor is a contributor to this.</td>
<td>- Ignitors are required only for HPS gear. MH gear does not require ignitors.</td>
</tr>
<tr>
<td>- Ignitors are required with almost all MH and HPS reactor gear.</td>
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<table>
<thead>
<tr>
<th><strong>REGULATION OF LAMP POWER</strong></th>
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<tr>
<td>- As little as 4% variation in mains supply voltage will push the lamp wattage to the limit of acceptable tolerances. This undesirable variation of the colour temperature and lumen output is not only annoying but can, in the case of unusually high supply voltages, significantly reduce lamp life over time.</td>
<td>- A 10% variation in supply voltage is needed to put the lamp at the same limits of operation. The auto-transformer regulates the voltage to the ballast coil which maintains the lamp power and therefore the lumen output and colour temp. in a relatively constant manner over supply fluctuations.</td>
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<tr>
<th><strong>EXTINCTION AND RESTART</strong></th>
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<tbody>
<tr>
<td>- A sudden dip in supply voltage (even if only for a few cycles) can cause the lamp to be extinguished. This will be followed by the long re-start period typical of HID lamps, (particularly MH lamps). This aspect may be of significant concern in industrial applications where heavy switching of the mains is common.</td>
<td>- Short supply voltage dips of about 40-50% can be tolerated without extinction of the lamp in most cases.</td>
</tr>
<tr>
<td>- Re-start of MH lamps typically takes several times longer than HPS. Since MH CWA ballasts do not require ignitors, there is no repetitive high voltage pulse which could be damaging if the lamp becomes faulty and will not re-start.</td>
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<table>
<thead>
<tr>
<th><strong>GENERAL CHARACTERISTICS</strong></th>
<th><strong>GENERAL CHARACTERISTICS</strong></th>
</tr>
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<tbody>
<tr>
<td>- Noticeable lamp flicker.</td>
<td>- Greatly reduced lamp flicker</td>
</tr>
<tr>
<td>- pfc capacitor is required,</td>
<td>- pfc is inherent to the CWA ballast and no additional pfc cap. is required.</td>
</tr>
<tr>
<td>- pf 0.85-0.9 (typically)</td>
<td>- pf 0.90 or better.</td>
</tr>
<tr>
<td>- Low impedance to high frequency mains signals.</td>
<td>- High impedance to high frequency mains signals.</td>
</tr>
<tr>
<td>- Small physical volume and weight compared with CWA,</td>
<td>- CWA ballasts are large, heavy and expensive by comparison with reactor-ignitor gear.</td>
</tr>
<tr>
<td>- Lower losses and higher efficiency,</td>
<td>- Due to lower efficiency and higher losses, CWA gear can generate a significant level of heat.</td>
</tr>
<tr>
<td>- Significantly lower cost.</td>
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IGNITORS

Ignitors are required with HID lamps because the starting voltage of these lamps is significantly higher than the applied mains voltage. The Macro Power range of ignitors has been developed to provide consistent and reliable starting of Metal Halide and High Pressure Sodium lamps.

IGNITOR TYPES

SUPERIMPOSED-PULSE IGNITORS:

This type of ignitor produces one or more pulses per half cycle and does not rely on the ballast coil for its operation.

The Macro Power IGH 302, 303 are superimposed ignitors.

The inherent advantage of superimposed ignitors is that the pulse is applied only to the lamp and the ballast is effectively isolated from the pulse. This prevents any possible damage to the insulation of the ballast when the ignitor repeatedly tries to re-strike the lamp.

IMPULSER IGNITORS:

These types of ignitor, such as the Macro Power 201 and 202, use the ballast coil inductance in the generation of the high voltage starting pulse. For this reason the ballast and ignitor have been carefully matched for correct operation.

These ignitors may be mounted close to the ballast or close to the lamp since they are typically capable of starting the lamp over significantly long distances.

MULTI-PULSE IGNITORS:

These ignitors also use the ballast coil to generate the high voltage pulse.

For correct operation the ignitor must be used only with the specified Macro Power ballast as the tapping position on the ballast is carefully matched to each of the different ignitors in the Macro Power range.

The Macro Power 104, 102 and 301 are multi-pulse ignitors.

AS WITH ALL MACRO POWER IGNITORS, ONCE THE LAMP HAS FIRED THE IGNITOR IS AUTOMATICALLY SWITCHED OFF.

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TIMED CUT-OUT IGNITORS:

Potential damage to the lamp and ballast and the annoying flicker of an ageing lamp trying to start can be overcome through the use of an ignitor with a timed cut-out module built in.

This module will switch the ignitor off if the lamp fails to start after a pre-determined period of time.

The inclusion of this relatively inexpensive module is highly recommended by authorities as it will limit the emission of RFI/EMI by the lighting circuits and will prevent the possibility of damage to fittings and ballasts.

The timed cut-out module is available with any ignitor in the Macro Power ignitor range.

The standard timed cut-out period is 120 seconds, however shorter or longer time periods can be accommodated on request.

LONG DISTANCE IGNITORS:

Starting a lamp over significantly long distances can be a problem due to the capacitance of the lamp feed cable to earth. This capacitance acts to absorb the pulse and prevent it from reaching the lamp. For this reason maximum load capacitances for each ignitor are specified.

All Macro Power ignitors have a minimum starting range of 2m, and most can fire a lamp over significantly longer distances. The standard IGH201 ignitor, for example, has a firing range of 60m and this is enough for most applications.

Where the standard firing range is not enough, special Long Distance ignitors have been developed to meet the various ‘real world’ needs of Macro Power customers.

For example, the IGH301/30 was developed for use with HPS1000 CWA ballasts to fire the American LU1000 lamp over a cable run of up to 30m. This is a typical example since lighting poles with control gear mounted at the bottom, lamp at the top and a long run of cable in between are in common use.

For details on specific ignitors and their firing ranges, see the specification sheets for each.
Due to its inherent starting characteristics, HID lighting needs time for the lamp to rise to its full power state. This is especially true if the lamp has been running and is then re-started, as it needs to cool itself down before it can re-ignite. This can take anywhere up to 15 minutes depending on the lamp type.

During these periods when the lamp is doing little or no useful work, it is often necessary that there be some auxiliary source of light available to prevent accident or injury to personnel or damage to equipment and products.

The SCR-8 is an electronic changeover relay developed to control an auxiliary light source (such as an incandescent lamp).

The SCR-8 electronically monitors the state of the HID lamp output power. When this is low, the SCR-8 will switch the incandescent lamp on and keep it on until the HID lamp reaches about 75% of its full output power. At this point the auxiliary lamp is automatically switched off and the HID lamp continues its ramp up to full power. If at any time the HID lamp turns off for any reason, the SCR-8 will sense the loss of output, immediately switch the auxiliary lamp (300W Max.) on and repeat the cycle described above.(provided power is available to the aux. lamp and SCR-8).

The SCR-8 is suitable for use with MH/HPS Reactor-Ignitor ballasts 150-400W, or Constant Wattage ballasts 175-1000W. (Control gear outside these ranges can be accommodated on request).

Superimposed, multi-pulse or impulse ignitors as well as Reactor or Constant Wattage, may be safely used in conjunction with the SCR-8. These features make it a very versatile and useful device.

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POWER REDUCTION SWITCHES

While the maximum performance of a lighting system is only required during busy active hours a significant energy savings are gained if the illumination level can be reduced during less demanding times. Therefore power reduction is possible in HPS and MH’s lighting level by switching the inductance in the luminaries without compromising the uniformity of the lighting design which is easily achieved with Macro Power’s Hi/Low power reduction relays. The power input of mercury vapour and high pressure sodium vapour can be reduced to as low as 50% of the rated wattage without impairing lamp life.

PS-10 – This power switch relay can be simply and easily wired into the control equipment circuit and operated by a separate switch. When this separate control supply is energized the lamp runs at reduced power.

Lamp Power Reduction applications can be as following and much more.

- In factories, warehouses, industrial storage, railway yards etc., a reduction in the lighting level outside working hours to provide amenity security.

- Car parking areas, floodlighting of buildings, security lighting, advertising signs, and public amenity areas can all benefit from reduced yet uniform lighting in the quite hours, late in the evening and in the early hours of the morning.

- Low level but uniform security lighting on railway station platforms.

- Airport gate lounges and check-in counters, baggage areas and customs halls.

- In road lighting applications, reduced lighting levels can be set to periods of very low traffic volumes, e.g.: 12:00am – 4:00am.

This excellent device not just only offers you a reduction in power bill but also extends you lamp life and therefore having less lamp replacement costs.

Note: Due to continual product improvement data and specification are subject to change without notice.
The IGH102 ignitor is a superimposed pulse type ignitor for single or double ended metal halide lamps up to 150W with Macro Power tapped ballast. The maximum firing distance may vary due to the variation of the cable capacitance but is usually possible at distances of 2M. When the lamp starts the ignitor is automatically deactivated.

**IGH102/T** has an inbuilt, timed cut-out module of 120 sec. (standard).

- **Supply voltage at ballast input:** 220-250 V, 50/60 Hz
- **Pulse voltage:** 3000-4500 Vp
- **Pulse repetition rate:** 2 – 4 per cycle (min)
- **Cut off voltage:** 190 V
- **Maximum load capacitance:** 250 pF
- **Losses during lamp operation:** negligible
- **Temperature rise:** negligible
- **Case temperature (maximum allowable):** 90°C
- **Termination:** 3 way terminal block
- **Mass:** 160 g
The IGH104 ignitor is a pulse type ignitor for single or double-ended metal halide/high pressure sodium lamps up to 1000W. The ignitor is to be used with suitable Macro Power tapped ballasts. The maximum firing distance may vary due to a variation in cable capacitance but it is usually possible to fire the lamp at distances up to and greater than 6M. When the lamp starts the ignitor is automatically deactivated.

IGH104/30 is the long distance version of this ignitor. Max. firing distance 30m. IGH104/T has an inbuilt timed cut-out module of 120sec (standard).

Supply voltage at ballast input: 220-250 V, 50/60 Hz
Pulse voltage: 2500 - 4500 Vp
Pulse repetition rate: 3-4 per cycle (min)
Cut off voltage: 190 V
Maximum load capacitance: 400 pF
Losses during lamp operation: negligible
Temperature rise: negligible
Case temperature (maximum allowable): 90°C
Termination: 3 way terminal block
Mass: 75 g
The IGH201 ignitor is a pulse type ignitor for single ended metal halide lamps 250W to 2000W. The ignitor and reactor type control gear combination can be mounted remote from the lamp, the distance may vary due to the variation of the cable capacitance but it is greater than 60M usually. When the lamp starts the ignitor is automatically deactivated.

IGH201/T has an inbuilt timed cut-out module of 11minutes (standard).

Supply voltage at ballast input: 220-250 V, 50/60 Hz
Pulse voltage: 800 - 1300 V
Pulse repetition rate: 1 per cycle
Cut off voltage: 190 V
Maximum load capacitance: 10,000 pF
Losses during lamp operation: negligible
Temperature rise: negligible
Case temperature (maximum allowable): 90°C
Termination: 2 way terminal block
Mass: 52g
IGH202 ignitor is a pulse type ignitor for single ended metal halide lamps 250W to 2000W, operated from a 415V supply. The ignitor and reactor type control gear combination can be mounted remote from the lamp, the distance may vary due to the variation of the cable capacitance but it is greater than 60M usually. When the lamp starts the ignitor is automatically deactivated.

Supply voltage at ballast input: 390-450V, 50/60 Hz
Pulse voltage: 800 - 1300 V
Pulse repetition rate: 1 per cycle
Cut off voltage: 380V
Maximum load capacitance: 10,000 pF
Losses during lamp operation: negligible
Temperature rise: negligible
Case temperature (maximum allowable): 90°C
Termination: 2 way terminal block
Mass: 52 g

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IGH203/2

The IGH203/2 ignitor is a universal superimposed pulse type ignitor for single or double ended Metal Halide and HPS lamps with a 240V supply. The maximum firing distance may vary due to the variation of the cable capacitance but is usually possible at distances of 30M or greater. When the lamp starts the ignitor is automatically deactivated.

Supply voltage at ballast input: 220-250 V, 50/60 Hz
Pulse voltage: 4500 Vp
Pulse repetition rate: 2 per cycle (min)
Cut off voltage: 190 V
Maximum load capacitance: 250 pF
Losses during lamp operation: negligible
Temperature rise: negligible
Case temperature (maximum allowable): 90°C
Termination: 2 way terminal block
Mass: 250 g
The **IGH203/4** ignitor is a universal superimposed pulse type ignitor for single or double ended metal halide lamps up to 3500W with a 415V supply. The maximum firing distance may vary due to the variation of the cable capacitance but is usually possible at distances of 80M or greater. When the lamp starts the ignitor is automatically deactivated.

Supply voltage at ballast input: 380-440 V, 50/60 Hz

Pulse voltage: 4000-5000 Vp

Pulse repetition rate: 2 per cycle (minimum)

Cut off voltage: 350 V

Maximum load capacitance: 20 - 10000 pF

Losses during lamp operation: 1.15 watts

Temperature rise: 12°C

Case temperature (maximum allowable): 90°C

Termination: 2 way terminal block

Mass: 250 g
IGH301

The IGH301 ignitor is a pulse type ignitor for single or double-ended American high pressure sodium lamps 250W-1000W, operated from either a 240V or 415V supply. The ignitor is to be used with Macro Power HPS Constant Wattage ballasts only. The maximum firing distance may vary due to a variation in cable capacitance but it is usually possible to fire the lamp at distances up to and greater than 6m. When the lamp starts the ignitor is automatically deactivated.

IGH301/30 is the long distance version with a firing distance of 30m max.
IGH301/T has an inbuilt timed cut-out module of 120sec. (standard).

Supply voltage at ballast input: 220-250V/400-450V,
Pulse voltage: 4000 - 5000 Vp
Pulse repetition rate: 2 per cycle (min)
Cut off voltage: 190/380V
Maximum load capacitance: 3000 pF
Losses during lamp operation: negligible
Temperature rise: negligible
Case temperature (maximum allowable) 90°C
Termination: 3 way terminal block
Mass: 75 g
The IGH302 ignitor is a superimposed pulse type ignitor for single or double ended metal halide/high pressure sodium lamps up to 400W. The maximum firing distance may vary due to the variation of the cable capacitance but is usually possible at distances of 2M or greater. When the lamp starts the ignitor is automatically deactivated.

IGH302/6 is the long distance version of this type ignitor. Max firing distance is 6m. IGH302/T has an inbuilt timed cut-out module of 120sec for HPS and 11minutes for MH lamps.

Supply voltage at ballast input: 220-250 V, 50/60 Hz
Pulse voltage: 4000-5000 Vp
Pulse repetition rate: 4-6 per cycle (mini)
Cut off voltage: 190 V
Maximum load capacitance: 250 pF
Losses during lamp operation: negligible
Temperature rise: negligible
Case temperature (maximum allowable): 90°C
Termination: 3 way terminal block
Mass: 250 g
The IGH303 ignitor is a superimposed pulse type ignitor for single or double ended metal halide/high pressure sodium lamps up to 150W. The maximum firing distance may vary due to variation in cable capacitance, but it is usually possible to fire the lamp at distances of 2m or greater. When the lamp starts the ignitor is automatically deactivated.

IGH303/T has an inbuilt timed cut-out module of 120 sec for HPS and 11 min for MH lamps.

Supply voltage at ballast input: 220-250 V, 50/60 Hz

Pulse voltage: 4000-5000 Vp

Pulse repetition rate: 4-6 per cycle (mini)

Cut off voltage: 190 V

Maximum load capacitance: 200 pF

Losses during lamp operation: negligible

Temperature rise: negligible

Case temperature (maximum allowable): 90°C

Termination: 3 way terminal block

Mass: 90 g
IGH314

The IGH314 ignitor is a superimposed pulse type ignitor for single or double ended metal halide and high pressure sodium lamps up to 12 amps of maximum permissible lamp current. The maximum firing distance may vary due to the variation of the cable capacitance but is usually possible at distances of 2M or greater. When the lamp starts the ignitor is automatically deactivated.

**IGH314/6** is the long distance version of this type ignitor. Max firing distance is 6m. **IGH314/T** has an inbuilt timed cut-out module of 120sec for HPS and 11minutes for MH lamps.

Supply voltage at ballast input: 220-250 V, 50/60 Hz
Pulse voltage: 4000-5000 Vp
Pulse repetition rate: 4-6 per cycle (min)
Cut off voltage: 190 V
Maximum load capacitance: 20 - 200 pF
Losses during lamp operation: negligible
Temperature rise: negligible
Case temperature (maximum allowable): 90°C
Termination: 3 way terminal block
Mass: 250 g
IGH302M ignitor is a superimposed pulse type ignitor for single or double ended Metal Halide lamps 175 - 400W (max permissible lamp current 4.6A). The maximum firing distance may vary due to the variation of the cable capacitance but is usually possible at distances of 2M or greater. When the lamp starts the ignitor is automatically deactivated.

IGH302M/T11 has an inbuilt digital timed cut-out module of 660sec for MH lamps.

Supply voltage/frequency at ballast input: 198-264 V, 50/60 Hz
Peak voltage: 3000-4000 Vp
Impulse repetition rate: 3 - 4 per half cycle
Impulse width at 2700V: ≥ 1 µsec
Impulse position: 60-90°el and 240-270°el
Switch-off/on voltage: 180-198 V rms
Load capacitance: 20-250 pF
Losses during lamp operation at 4.6A: 2.5 W
Temperature rise at 4.6A: 27°C
Min/max operating amb. temp. at 4.6A(ta): -30/+75°C
Max case temperature(tc): 100°C
Insulation resistance: ≥ 10 MΩ
Termination: 3 way terminal block
Mass: 250 g
Complying with: EN60926-60927 and IEC662
In a circuit containing a purely resistive load (e.g. a heating element), the power developed in the load is simply the product of the voltage across and current through it, (i.e. \( P = VI \)), since the voltage and current are in phase. This last point is important because it means that the Power Factor (p.f.) = 1.

If the load contains inductance or capacitance however, the actual useful power developed in the load is not so obvious. This is due to the phase shift between the current and voltage waveforms.

The electrical principles that govern this are as follows:

- If the load is a pure inductance, the current is forced to lag the voltage by 90°, and the p.f. = 0. (i.e. a lagging p.f.)
- If the load is a pure capacitance, the current is forced to lead the voltage by 90°, and again the p.f. = 0. (i.e. a leading p.f.)

In the real world, we typically encounter some or all of these factors combined in a load and as a result the p.f. may be anywhere from 0 (inductive or capacitive), to 1 (resistive).

<table>
<thead>
<tr>
<th>MACRO CODE</th>
<th>Description</th>
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<tbody>
<tr>
<td>CAP_4uF250VAC</td>
<td>4uF 250VAC CAPACITOR</td>
</tr>
<tr>
<td>CAP_8UF250VAC/100 deg</td>
<td>8uF 250VAC CAPACITOR</td>
</tr>
<tr>
<td>CAP10UF250VAC/100 deg</td>
<td>10uF 250VAC CAPACITOR</td>
</tr>
<tr>
<td>CAP12UF250VAC/100 deg</td>
<td>12uF 250VAC CAPACITOR</td>
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<td>CAP15UF250VAC/100 deg</td>
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<tr>
<td>CAP50UF250VAC/100 deg</td>
<td>50uF 250VAC CAPACITOR</td>
</tr>
</tbody>
</table>
It is generally standardized throughout Australia by power distribution authorities that lighting installations are required to have a p.f. of 0.85-0.9 as a minimum.

A lighting ballast without power factor correction may have a lagging p.f.=0.4 due to the inductance of the ballast. This low p.f. can be raised by the inclusion of a capacitor across the mains which acts to reduce the lagging phase angle of the current and bring the p.f. closer to unity (ie.1).

Macro Power uses two distinctly different types of capacitor:

- Reactor-Ignitor control gear is supplied with a metallized polypropylene capacitor enclosed in aluminium case and manufactured to high quality standards for Power Factor Correction applications. These capacitors have a high temperature rise capacity, are mains rated and are supplied in standard values with each ballast to achieve a high p.f.

- Constant Wattage control gear uses a very high quality, low tolerance capacitor known as a “soggy foil” type capacitor. This capacitor is so called due to its foil plate construction, oil based dielectric and metal casing. These factors give high temperature rise capacity and a voltage rating that is usually in excess of 500V rms in order to withstand the high voltages in CWA circuits. This capacitor helps to achieve the high p.f. inherent to CWA ballasts as well as providing the lamp with a high voltage for reliable starting and smooth power rise.
PRODUCT DESCRIPTION:

- SRM35 (Metal Halide)
- SRM50 (Mercury Vapor)
- SRM70 (Metal Halide)
- SRM80 (Mercury Vapor)
- SRM100 (Mercury Vapor)
- SRMH100 (Metal Halide)
- SRM125 (Mercury Vapor)
- SRM150 (Metal Halide)
- SRM150LL (Metal Halide)

Metal Halide and Mercury Vapor Reactor Ballast is an inexpensive, compact and simple method for control of HID Lamps. They are made of the highest level of insulation Class H and High permeability silicon lamination for endless, years of reliable operation with lower losses and higher efficiency.

SPECIFICATIONS:

<table>
<thead>
<tr>
<th>POWER</th>
<th>VOLT (V)</th>
<th>I-start (A)</th>
<th>I-run (A)</th>
<th>BALLOST LOSSES (W)</th>
<th>BALLAST Part No.</th>
<th>LINE VOLTS (V)</th>
<th>I-start (A)</th>
<th>I-run (A)</th>
<th>Cap. ( \mu F \geq 0.85 ) pf</th>
<th>IGNITOR</th>
<th>MASS (Kg)</th>
<th>Mounting Centre</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>90</td>
<td>0.67</td>
<td>0.50</td>
<td>9.0</td>
<td>SRM35</td>
<td>240</td>
<td>0.28</td>
<td>0.21</td>
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<td>IGH303</td>
<td>1.1</td>
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<tr>
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<td>0.60</td>
<td>9.3</td>
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FEATURES:

- Long Service Life
- Vacuum impregnation
- Non-audible noise level
- Power Factor Corrected to 0.90 or greater with nominated capacitor
- Winding insulation Class H materials
- Fixed air Gap ensuring permanent calibration
- Tw150 winding temperature rating
- C-tick N3499

OPTIONAL EXTRAS INCLUDE:

- Low Losses Ballast
- Thermal Cut out Fuse
- Timer Long Distance Ignitors

FINAL TESTING:

- Winding short Circuit
- Insulation
- Impedance
- Losses
PRODUCT DESCRIPTION:

- RM175
- RM250
- RH250
- RM400
- RH400

Metal Halide Reactor Ballast is an inexpensive, compact and simple method for control of HID Lamps. They are made of the highest level of insulation Class H and High permeability silicon lamination for endless, years of reliable operation with lower losses and higher efficiency.

SPECIFICATIONS:

<table>
<thead>
<tr>
<th>LAMP</th>
<th>BALLAST Part No:</th>
<th>BALLAST LOSSES (W)</th>
<th>LINE Volts (V)</th>
<th>I-start (A)</th>
<th>I-run (A)</th>
<th>GEAR</th>
<th>MASS (Kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>POWER (W)</td>
<td>VOLTS (V)</td>
<td>I-start (A)</td>
<td>I-run (A)</td>
<td>VOLTS (V)</td>
<td>I-start (A)</td>
<td>I-run (A)</td>
<td>Capacitor µF ≥ 0.85 pf</td>
</tr>
<tr>
<td>175</td>
<td>130</td>
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FEATURES:
- Long Service Life
- Vacuum impregnation
- Non-audible noise level
- 300mm Long Flying Leads Provided
- Power Factor Corrected to 0.90 or greater with nominated capacitor
- Winding insulation Class H materials
- Fixed air Gap ensuring permanent calibration
- Tw150 winding temperature rating
- C-tick N3499

OPTIONAL EXTRAS INCLUDE:
- Timer Long Distance Ignitors
- Change Over Relays
- Power Reduction Switches

FINAL TESTING:
- Winding short Circuit
- Insulation
- Impedance
- Continuity
- Losses

Note: Due to continual product improvement data and specification are subject to change without notice.
PRODUCT DESCRIPTION:

- SRH35
- SRH50
- SRH70
- SRH100
- SRH150

Available from 35 – 150, SRH Type High Pressure Sodium Reactor Ballast is an inexpensive, compact and simple method for control of HID Lamps. They are made of the highest level of insulation Class H and high permeability silicon lamination for endless years of reliable operation with lower losses and higher efficiency.

SPECIFICATIONS:

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<th>LAMP</th>
<th>BALLAST</th>
<th>VOLTS</th>
<th>I-start</th>
<th>I-run</th>
<th>Cap.</th>
<th>IGNITOR</th>
<th>MASS</th>
<th>Mounting Centre</th>
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<tr>
<td></td>
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<td>(A)</td>
<td>pF ≥</td>
<td>(Kg)</td>
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<td>VOLT (V)</td>
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<td></td>
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<tr>
<td>I-start (A)</td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>I-start (A)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I-run (A)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>GEAR</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I-start (A)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>I-run (A)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I-run (A)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Cap.</td>
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<td>FEATURES:</td>
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<td></td>
<td></td>
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</tr>
</tbody>
</table>
- Long Service Life
- Vacuum impregnation
- Non-audible noise level
- Power Factor Corrected to 0.90 or greater with nominated capacitor
- Winding insulation Class H materials
- Fixed air Gap ensuring permanent calibration
- Tw150 winding temperature rating
- C-tick N3499

OPTIONAL EXTRAS INCLUDE:

- Low Losses Ballast
- Thermal Cut out Fuse
- Timer Long Distance Ignitors
- Change Over Relays

FINAL TESTING:

- Winding short Circuit
- Insulation
- Impedance
- Continuity
- Losses

Note: Due to continual product improvement data and specification are subject to change without notice.

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Manufacturers of Transformers, H.I.D. Lighting Equipment and Power Supplies
Sheet Metal Fabrication, CNC Turret Punching, Guillotining & Folding
PRODUCT DESCRIPTION:

- RH250T
- RH400T
- RH600T

Available from 250 – 600W, RH Type High Pressure Sodium Reactor Ballast is an inexpensive, compact and simple method for control of HID Lamps. They are made of the highest level of insulation Class H and high permeability silicon lamination for endless years of reliable operation with lower losses and higher efficiency.

SPECIFICATIONS:

<table>
<thead>
<tr>
<th>LAMP</th>
<th>BALLAST Part No:</th>
<th>BALLAST LOSSES (W)</th>
<th>LINE VOLTS (V)</th>
<th>LINE I-start (A)</th>
<th>LINE I-run (A)</th>
<th>Gear Mass (Kg)</th>
<th>Mounting Center</th>
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<td>250</td>
<td>100</td>
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<td>3.00</td>
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<td>240</td>
<td>1.80</td>
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<tr>
<td>400</td>
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<td>37</td>
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<td>4.3</td>
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<td>600</td>
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<td>45</td>
<td>240</td>
<td>3.65</td>
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</table>

FEATURES:
- Long Service Life
- Vacuum impregnation
- Non-audible noise level
- 200mm Long Flying Leads Provided
- Power Factor Corrected to 0.90 or greater with nominated capacitor
- Winding insulation Class H materials
- Fixed air Gap ensuring permanent calibration
- Tw150 winding temperature rating
- C-tick N3499

OPTIONAL EXTRAS INCLUDE:
- Low Losses Ballast
- Thermal Cut out Fuse
- Timer Long Distance Ignitors
- Change Over Relays

FINAL TESTING:
- Winding short Circuit
- Insulation
- Impedance
- Continuity
- Losses

Note: Due to continual product improvement data and specification are subject to change without notice.
Product Description:

- RM1000
- RM1000(415)
- RH1000T

Metal Halide Reactor Ballast is an inexpensive, compact and simple method for control of HID Lamps. They are made of the highest level of insulation Class H and High permeability silicon lamination for endless, years of reliable operation with lower losses and higher efficiency.

Specifications:

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<th>Lamp</th>
<th>Ballast Part No:</th>
<th>Ballast Losses (W)</th>
<th>Line Volts (V)</th>
<th>I-start (A)</th>
<th>I-run (A)</th>
<th>Capacitor μF ≥ 0.85 pf</th>
<th>Ignitor</th>
<th>Mass (Kg)</th>
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<tr>
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<td>1000</td>
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Features:

- Long Service Life
- Vacuum impregnation
- Non-audible noise level
- 300mm Long Flying Leads Provided
- Power Factor Corrected to 0.90 or greater with nominated capacitor
- Winding insulation Class H materials
- Fixed air Gap ensuring permanent calibration
- Tw150 winding temperature rating
- C-tick N3499

Optional Extras Include:

- Timer Long Distance Ignitors
- Change Over Relays

Final Testing:

- Winding short Circuit
- Insulation
- Impedance
- Continuity
- Losses

Note: Due to continual product improvement data and specification are subject to change without notice.
PRODUCT DESCRIPTION:

• RH1000T

RH1000T Type High Pressure Sodium Reactor Ballast is an inexpensive, compact and simple method for control of HID Lamps. They are made of the highest level of insulation Class H and high permeability silicon lamination for endless years of reliable operation with lower losses and higher efficiency.

SPECIFICATIONS:

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<tr>
<th>LAMP</th>
<th>BALLAST NO.</th>
<th>BALLAST LOSSES (W)</th>
<th>LINE VOLTS (V)</th>
<th>I-start (A)</th>
<th>I-run (A)</th>
<th>Cap. (µF)</th>
<th>IGNITOR</th>
<th>MASS (Kg)</th>
<th>Mounting Centre</th>
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</thead>
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<td>VOLTS</td>
<td>I-start</td>
<td>I-run</td>
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</tr>
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<td>(V)</td>
<td>(A)</td>
<td>(A)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td>105</td>
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<td>10.6</td>
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<td>240</td>
<td>6.21</td>
<td>4.67</td>
<td>90</td>
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</table>

FEATURES:

• Long Service Life
• Vacuum impregnation
• Non-audible noise level
• 200mm Long Flying Leads Provided
• Power Factor Corrected to 0.90 or greater with nominated capacitor
• Winding insulation Class H materials
• Fixed air Gap ensuring permanent calibration
• Tw150 winding temperature rating
• C-tick N3499

OPTIONAL EXTRAS INCLUDE:

• Low Losses Ballast
• Thermal Cut out Fuse
• Timer Long Distance Ignitors
• Change Over Relays

FINAL TESTING:

• Winding short Circuit
• Insulation
• Impedance
• Continuity
• Losses

Note: Due to continual product improvement data and specification are subject to change without notice.
PRODUCT DESCRIPTION:

- RM250-400

Power Reduction Ballast

Metal Halide Reactor Ballast is an inexpensive, compact and simple method for control of HID Lamps. These Power reduction Ballasts offer even further savings with high efficiency and low losses when used in conjunction with PS-10 (Power Reduction switches). This simple union will also increase your lamp life resulting in less replacement costs.

SPECIFICATIONS:

<table>
<thead>
<tr>
<th>LAMP POWER (W)</th>
<th>VOLTS (V)</th>
<th>I-start (A)</th>
<th>I-run (A)</th>
<th>Ballast Part No:</th>
<th>BALLAST LOSSES (W)</th>
<th>VOLTS (V)</th>
<th>I-start (A)</th>
<th>I-run (A)</th>
<th>Capacitor μF ≥ 0.85 pf</th>
<th>IGNITOR</th>
<th>MASS (Kg)</th>
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</thead>
<tbody>
<tr>
<td>400</td>
<td>135</td>
<td>5.50</td>
<td>3.25</td>
<td>RM250-400</td>
<td>26</td>
<td>240</td>
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<td>20</td>
<td>IGH201</td>
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<td>250</td>
<td>130</td>
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<td>2.50</td>
<td>1.45</td>
<td>20</td>
<td>IGH201</td>
<td>3.1</td>
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FEATURES:
- Long Service Life
- Vacuum impregnation
- Non-audible noise level
- 300mm Long Flying Leads Provided
- Power Factor Corrected to 0.90 or greater with nominated capacitor
- Winding insulation Class H materials
- Fixed air Gap ensuring permanent calibration
- Tw150 winding temperature rating
- C-tick N3499

OPTIONAL EXTRAS INCLUDE:
- Timer Long Distance Ignitors
- Change Over Relays (please refer to page 6)
- Power Reduction Switches (please refer to page 7)

FINAL TESTING:
- Winding short Circuit
- Insulation
- Impedance
- Continuity
- Losses

Note: Due to continual product improvement data and specification are subject to change without notice.

PRODUCT DESCRIPTION:

Australian Made, Top Quality, Best Service
Manufacturers of Transformers, H.I.D. Lighting Equipment and Power Supplies
Sheet Metal Fabrication, CNC Turret Punching, Guillotining & Folding

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Metal Halide Reactor Ballast is an inexpensive, compact and simple method for control of HID Lamps. They are made of the highest level of insulation Class H and High permeability silicon lamination for endless, years of reliable operation with lower losses and higher efficiency.

**SPECIFICATIONS:**

<table>
<thead>
<tr>
<th>LAMP</th>
<th>BALLAST</th>
<th>LINE</th>
<th>GEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>POWER</td>
<td>VOLTS</td>
<td>I-start</td>
<td>I-run</td>
</tr>
<tr>
<td>VOLS</td>
<td>(V)</td>
<td>(A)</td>
<td>(A)</td>
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<td>2000</td>
<td>230</td>
<td>14.2</td>
<td>10.3</td>
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**FEATURES:**
- Long Service Life
- Vacuum impregnation
- Non-audible noise level
- 300mm Long Flying Leads Provided
- Power Factor Corrected to 0.90 or greater with nominated capacitor
- Winding insulation Class H materials
- Fixed air Gap ensuring permanent calibration
- Tw150 winding temperature rating
- C-tick N3499

**OPTIONAL EXTRAS INCLUDE:**
- Timer Long Distance Ignitors
- Change Over Relays
- Power Reduction Switches

**FINAL TESTING:**
- Winding short Circuit
- Insulation
- Impedance
- Continuity
- Losses

Note: Due to continual product improvement data and specification are subject to change without notice.
PRODUCT DESCRIPTION:

- RM2000H/4(10.3A)

Metal Halide Reactor Ballast is an inexpensive, compact and simple method for control of HID Lamps. They are made of the highest level of insulation Class H and High permeability silicon lamination for endless, years of reliable operation with lower losses and higher efficiency.

SPECIFICATIONS:

<table>
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<tr>
<th>LAMP</th>
<th>BALLAST LOSSES (W)</th>
<th>LINE VOLTS (V)</th>
<th>I-start (A)</th>
<th>I-run (A)</th>
<th>GEAR CAPACITOR µF ≥ 0.85 pf</th>
<th>IGNITOR</th>
<th>MASS (Kg)</th>
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<tr>
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<td>VOLTS (V)</td>
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<td>230</td>
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FEATURES:
- Long Service Life
- Vacuum impregnation
- Non-audible noise level
- 300mm Long Flying Leads Provided
- Power Factor Corrected to 0.90 or greater with nominated capacitor
- Winding insulation Class H materials
- Fixed air Gap ensuring permanent calibration
- Tw150 winding temperature rating
- C-tick N3499

OPTIONAL EXTRAS INCLUDE:
- Timer Long Distance Ignitors
- Change Over Relays
- Power Reduction Switches

FINAL TESTING:
- Winding short Circuit
- Insulation
- Impedance
- Continuity
- Losses

Note: Due to continual product improvement data and specification are subject to change without notice.
PRODUCT DESCRIPTION:

- MH175CW
- MH250CW
- MH400CW
- MH1000CW

Constant wattage ballast although heavier, larger and more costly provides numerous advantages over reactor-ignitor gear. The lamp output power is maintained at a highly constant state, even over supply fluctuations, due to the regulation action of the auto-transformer. Hence the name Constant Wattage (CWA).

SPECIFICATIONS:

<table>
<thead>
<tr>
<th>LAMP POWER (W)</th>
<th>VOLTS (V)</th>
<th>I-start (A)</th>
<th>I-run (A)</th>
<th>BALLAST PART No.</th>
<th>BALLAST LOSSES (W)</th>
<th>I-start (A)</th>
<th>I-run (A)</th>
<th>Capacitor µF ≥ 0.95 pf</th>
<th>IGNITOR</th>
<th>A</th>
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<td>2.66</td>
<td>28</td>
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</table>

CONSTANT WATTAGE BENEFITS:

- Superior performance and lamp control over 10% variations in supply voltage
- Low line starting current
- Greater control of lamp power and colour temperature
- Significant reduction in lamp flicker
- Power Factor Corrected to 0.90 or greater with nominated capacitor
- High input impedance to supply switching frequencies
- Will sustain lamp operation with dips in supply voltage
  In the order of 40-50%

FEATURES:

- Long Service Life
- Vacuum impregnation
- Non-audible noise level
- Winding insulation Class H materials
- Tw150 winding temperature rating

FINAL TESTING:

- Winding short & open Circuit
- Insulation
- Losses

PRODUCT DESCRIPTION:

Australian Made, Top Quality, Best Service
Manufacturers of Transformers, H.I.D. Lighting Equipment and Power Supplies
Sheet Metal Fabrication, CNC Turret Punching, Guillotining & Folding
Constant wattage ballast although heavier, larger and more costly provides numerous advantages over reactor-ignitor gear. The lamp output power is maintained at a highly constant state, even over supply fluctuations, due to the regulation action of the auto-transformer. Hence the name Constant Wattage (CWA).

**SPECIFICATIONS:**

<table>
<thead>
<tr>
<th>POWER (W)</th>
<th>VOLTS (V)</th>
<th>I-start (A)</th>
<th>I-run (A)</th>
<th>Ballast Part No:</th>
<th>Ballast Losses (W)</th>
<th>VOLTS (V)</th>
<th>I-start (A)</th>
<th>I-run (A)</th>
<th>Capacitor &amp; 0.95 pf</th>
<th>IGNITOR</th>
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<td>IGH401</td>
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<td>415</td>
<td>1.70</td>
<td>2.65</td>
<td>28</td>
<td>IGH301</td>
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</tbody>
</table>

**CONSTANT WATTAGE BENEFITS:**
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- Power Factor Corrected to 0.90 or greater with nominated capacitor
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  In the order of 40-50%

**FEATURES:**
- Vacuum impregnation
- Non-audible noise level
- 300mm Long Flying Leads Provided
- Winding insulation Class H materials
- Tw150 winding temperature rating

**OPTIONAL EXTRAS INCLUDE:**
- Timer Long Distance Ignitors
- Change Over Relays (SCR-8)

**FINAL TESTING:**
- Winding short & open Circuit
- Insulation
- Losses
  Note: Due to continual product improvement data and specification are subject to change without notice.

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<tr>
<th>POWER (W)</th>
<th>VOLTS (V)</th>
<th>I-start (A)</th>
<th>I-run (A)</th>
<th>BALLAST Part No.</th>
<th>BALLAST VOLTS (V)</th>
<th>I-start (A)</th>
<th>I-run (A)</th>
<th>Capacitor µF</th>
<th>IGNITOR</th>
<th>BALLAST DIMENSIONS</th>
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<td>MH1500CW/4</td>
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<td>415</td>
<td>3.02</td>
<td>5.25</td>
<td>71</td>
<td>N/A</td>
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</table>

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- Losses

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**PRODUCT DESCRIPTION:**

Australian Made, Top Quality, Best Service

Manufacturers of Transformers, H.I.D. Lighting Equipment and Power Supplies
Sheet Metal Fabrication, CNC Turret Punching, Guillotining & Folding
Metal Halide 1500W and 2000W linear control Gear is fastened to a galvanized gear tray designed for suspension within a column or attachment inside a control gear cubicle. The assembly includes ballasts, capacitors, termination facilities and the provision of fuses and blocking inductors as options. Available for 240V and 415V 50Hz supply.

Their applications can be either in switch board cubicles, mounted inside light poles for street or sports lighting where ever remote mounting of HID control gear is required. The most popular application is mobile lighting tower.

**SPECIFICATIONS:**

<table>
<thead>
<tr>
<th>LAMP No.</th>
<th>BALLAST</th>
<th>LINE</th>
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<tbody>
<tr>
<td>MW1500T7/7H</td>
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<td>MW1500T7/7H</td>
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<td>M2000T8/DE</td>
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<td>5.6 8.9</td>
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<tr>
<td>M2000T8/DE</td>
<td>145 415</td>
<td>3.2 5.2</td>
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</table>

**FEATURES:**
- Simple installation,
- Galvanized Steel Gear Tray
- Folded sides for strengthening and provide clearance for component fasteners, such as nuts screws and rivets.
- Power Factor Corrected to 0.90 or greater with nominated capacitor
- All high voltage terminals are Protected
- C-tick N3499

**OPTIONAL EXTRAS INCLUDE:**
- HRC Fuses
- Igniters – Subject to mounting distance from lamp
- Multi-voltage tapped ballasts

Note: Due to continual product improvement data and specification are subject to change without notice.

**PRODUCT DESCRIPTION:**

Australian Made, Top Quality, Best Service

Manufacturers of Transformers, H.I.D. Lighting Equipment and Power Supplies

Sheet Metal Fabrication, CNC Turret Punching, Guillotining & Folding
Metal Halide 1000W constant wattage control Gear is fastened to a galvanized gear tray designed for suspension within a column or attachment inside a control gear cubicle. The assembly includes ballasts, capacitors, termination facilities and the provision of fuses and blocking inductors as options. Available for 240V and 415V 50Hz supply.

Their applications can be either in switch board cubicles, mounted inside light poles for street or sports lighting where ever remote mounting of HID control gear is required. The most popular application is mobile lighting tower.

**SPECIFICATIONS:**

<table>
<thead>
<tr>
<th>LAMP</th>
<th>POWER (W)</th>
<th>VOLTS (V)</th>
<th>I-start (A)</th>
<th>I-run (A)</th>
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<tr>
<td>1000W MH</td>
<td>1000</td>
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<td>1000W MH</td>
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<td>5.83</td>
<td>4.2</td>
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</table>

**FEATURES:**
- Simple installation,
- Galvanized Steel Gear Tray
- Folded sides for strengthening and provide clearance for component fasteners, such as nuts screws and rivets.
- Power Factor Corrected to 0.90 or greater with nominated capacitor
- All high voltage terminals are Protected
- C-tick N3499

**OPTIONAL EXTRAS INCLUDE:**
- HRC Fuses
- Multi-voltage tapped ballasts

**LAMP**

**BALLAST**

**LINE**

Note: Due to continual product improvement data and specification are subject to change without notice.
PRODUCT DESCRIPTION:

- MH 35 w CONTROL BOX
- MH 70 w CONTROL BOX
- MH 150 w CONTROL BOX

The MACRO POWER MH35, MH70 and MH150 control boxes, offer a compact, versatile and quality solution to a multitude of low power lighting needs. The relatively broad color range and high efficacy of Metal Halide lamps is well known. This fact has seen 35W, 70W & 150W MH lamps being increasingly recognised as superior for many down lighting applications. The use of these lamps in a product display or showroom, for example, can greatly enhance the color and appearance of the product and surrounding environment to potential customers.

The MACRO POWER 35W, 70W & 150W units will start and run all popular brands of lamps, (both single and double ended), such as Venture, Phillips, Sylvania, Osram, Wotan, Thorn, and G.E. This can be accomplished due to the development of the Macro Power IGH303 Timed ignitor, which has been designed specifically for starting these lamps at a distance of up to two meters.

SPECIFICATIONS:

<table>
<thead>
<tr>
<th>LAMP</th>
<th>POWER (W)</th>
<th>VOLTS (V)</th>
<th>I-start (A)</th>
<th>I-run (A)</th>
<th>PART No. (Order no.)</th>
<th>BALLAST LOSSES (W)</th>
<th>VOLTS (V)</th>
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FEATURES:

- Simple installation,
- Flex & plug input, round earth lighting socket output,
- Compact enclosure (fits standard 120mm and 160mm ceiling openings).
- Power Factor Corrected to 0.90 or greater with nominated capacitor
- Temperature rise 50deg.C.(max)
- C-tick N3499