

DM-105

HID Bi-Level Control Module

For fixtures with CWA transformers and non-encased capacitors, using Metal Halide, Metal Halide (Pulse Start) or High Pressure Sodium lamps between 175-1000 watts



SPECIFICATIONS

For indoor use only

For use with CWA (Constant Wattage Autotransformer) ballasts only.

Lamps Metal Halide, Metal Halide (Pulse Start) and High Pressure Sodium

Load Ratings:

Metal Halide (MH) 175–1000W

Metal Halide, Pulse Start (MHPS) 200-1000W

High Pressure Sodium (HPS) 250–1000W

Relay Rating 15A (zero crossing high to low and low to high)

Current Consumption 18mA max.

Total Current Output 15mA max. @ 24VDC

Maintained signal voltage to trigger (low to high) 12µA

Lamp warm up upon power-up 15 minutes

Operating Temperature Range -10–113°F (-23–45°C)

Operating Humidity Range 0%–95% relative, non-condensing

Weight < 2lbs

Dimensions 1.8"H x 3.8"W x 4.6"D

Leads 12 inches



Santa Clara, CA 95050
(800) 879-8585

Installation Instructions

BOX CONTENTS

- DM-105 Bi-Level Control Module (1)
- Installation Instructions (1)
- Lock Ring (1)

NOT SUPPLIED

- 20AWG 3- or 4-conductor jacketed wire*
(for connecting multiple DM-105 units)
- Fixture balancing and mounting hardware
if needed

*Depends on installation requirements. Contact Technical Support for specific recommendations.

UNIT DESCRIPTION

The DM-105 is a control module which is used to switch HID (High Intensity Discharge) lamps from high to low and from low to high. The DM-105 bases its bi-level switching on signals received from a controlling device (see below).

With the DM-105 and an occupancy sensor, HID lighting will switch to a lower, **energy saving light level (high to low)** after a space becomes unoccupied. Then, as soon as the space is occupied, lighting will return to full brightness (low to high).

Upon initial power up of HID lamps, or after a power failure or phase drop, the DM-105 supplies full power for a 15 minute lamp warm-up. Then lighting will either remain at full level if the space is occupied, or go to low level if unoccupied.

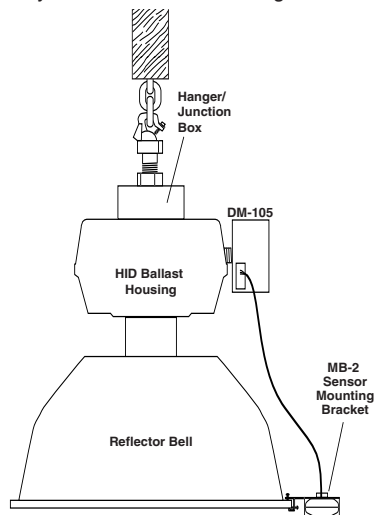
The DM-105's **bi-level switching avoids the warm-up problem** otherwise found when controlling HID fixtures. The switching is immediate and lights are no longer left on at 100% when unneeded. This saves energy and adds convenience.

Controlling Devices

- One or more controlling devices (such as occupancy sensors, time switches, photocells, etc.) must be used to control a DM-105. The control to this DM-105 can be extended to other DM-105s by connecting them into control groups (see Control Wiring).
- A controlling device must:
 1. Have its own power supply, or be able to be powered by the +24VDC output from a DM-105.
 2. Provide a +24VDC control output to a DM-105 in the controlled group.

DM-105 MOUNTING OPTIONS

The DM-105 attaches directly to the HID ballast housing.



DM-105 INSTALLATION AND WIRING

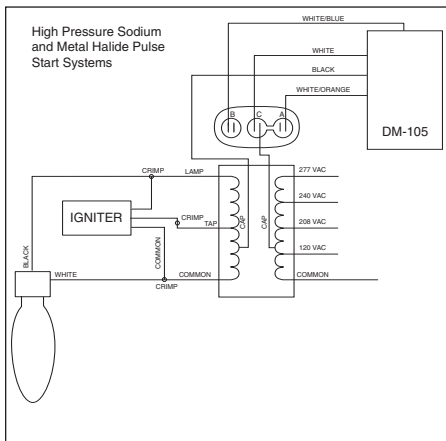
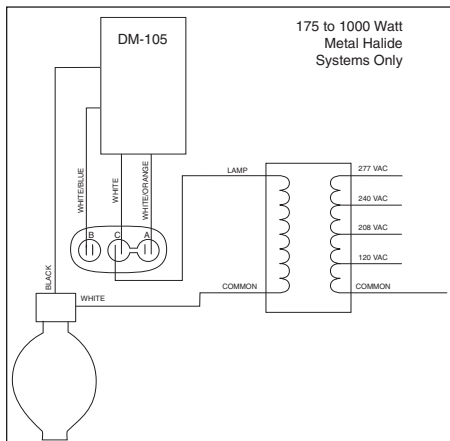
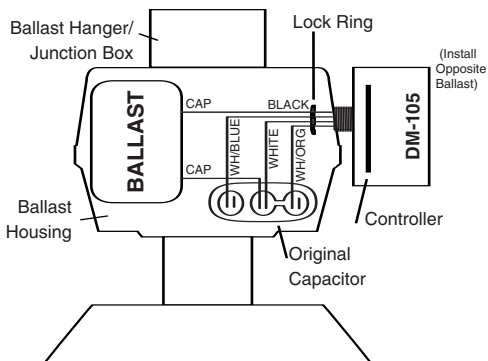
⚠ DANGER—HIGH VOLTAGE ⚠

- **EQUIPMENT DAMAGE, PERSONAL INJURY AND DEATH CAN RESULT FROM IMPROPER PROCEDURES AND INSTALLATION.**

1. **DANGER**—The fixture's capacitor may contain a stored high voltage charge! Carefully open the ballast housing so that the ballast and capacitor are easily accessible. Follow proper safety procedures to discharge the installed capacitor inside the ballast housing.
2. Open a 3/4" knockout hole in the ballast box where the DM-105 will attach.
3. Connect the WHITE/BLUE wire from the DM-105 to the B terminal on the capacitor. Connect the WHITE wire on the DM-105 to the C terminal on the capacitor, from the same terminal complete the connection to the ballast with the WHITE wire. Connect the WHITE/ORANGE wire to the A terminal on the capacitor.
4. Reassemble the ballast housing, being careful not to pinch wires.
5. An occupancy sensor can be attached to the reflector bell at this time or after the fixture is installed.
6. Mount the fixture with the installed DM-105 and occupancy sensor. Balance the fixture if needed.
7. Reconnect the power cord to the fixture (power should be off at the circuit breaker).

WARNING! This diagram is for illustration only. Read all instructions before performing installation or wiring.

DANGER! High voltage from original capacitor must be safely discharged.

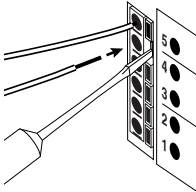
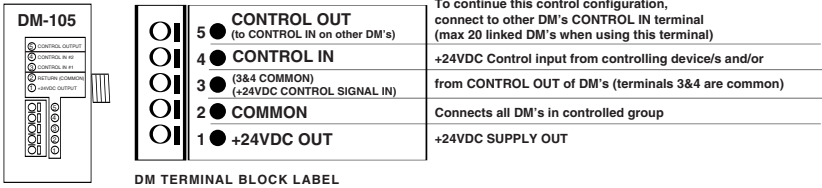


CONTROL WIRING

After the DM-105 is installed and the fixture is remounted, low voltage control wire connections can be made to the terminal block located on the side of the DM-105.

Make connections before the fixture's power is restored. When all connections are made, continue to Testing.

DM-105 Terminal Block



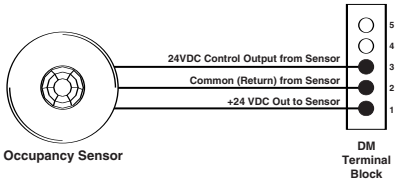
To insert or remove wires, use a small flat-blade screwdriver to push in the plunger, insert wire, then release plunger (see left).

If using stranded wire, make sure all the strands are inserted.

IMPORTANT: Verify that enough insulation is removed (3/8"–1/2") at the end of wires so that when inserted, a proper connection will be made.

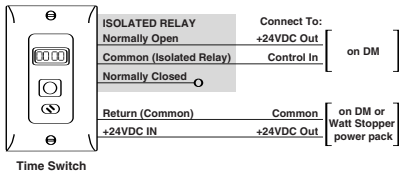
Occupancy sensors: (typical connections)

1. Connect the sensor's +24VDC Input lead to the +24VDC OUT on the DM-105.
2. Connect the Common lead from the sensor to the COMMON on the DM-105.
3. Connect the Control Output lead from the sensor to a CONTROL IN on the DM-105.



Time switch (+24VDC powered) with isolated relay: (typical connections)

1. Connect the switch's +24VDC Input and Common leads to the DM-105 as for the occupancy sensor, above, or to a Watt Stopper power pack.
2. Connect the isolated relay's Normally Open lead to 24VDC OUT and its Common lead to CONTROL IN on the DM-105.



Large Zone Control

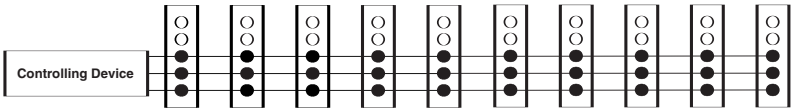
DM-105s can be connected together to control more than 100 fixtures. When one or more controlling devices are used in large zone control applications, the following recommendations and wiring diagram should be followed:

- To avoid voltage drop issues:
 - Use the heaviest gauge wire possible. We recommend 18-20AWG.
 - Wire the DMs serially and sequentially to avoid long wire runs.
 - If the controlling device is located a long distance away from the controlled zone, test the installation first with only a few DMs to ensure there are no problems.

Large Zone Control (cont'd)

NOTE: Contact Technical Support for assistance or clarification with these instructions. For recommendations on how to lay out a specific project, request a custom wiring diagram from Technical Support.

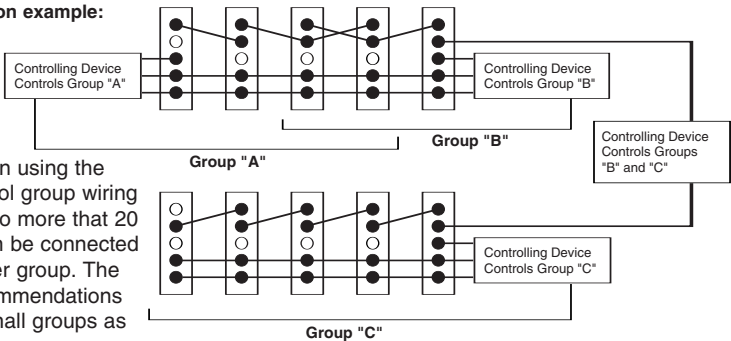
Configuration example:



Small Control Groups

- A controlling device can be extended to other DM-105s by linking the DM-105s together into a control group.
- A control group starts from the first DM-105 connected to this DM-105 (radially or in series) are part of this group and controlled by the originating device(s).
- Groups can overlap. DM-105s can be part of more than one control group.
- When multiple controlling devices are used, only one signal is needed to turn the DM-105s to high.

Configuration example:



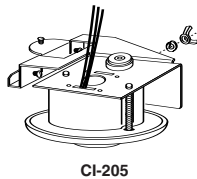
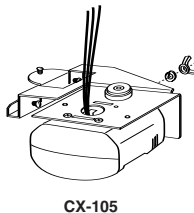
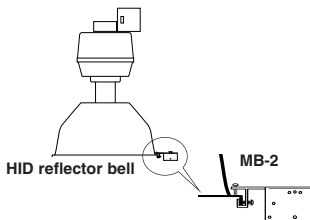
Note: When using the small control group wiring example, no more than 20 fixtures can be connected together per group. The same recommendations apply to small groups as well as to large groups.

OCCUPANCY SENSOR MOUNTING BRACKET

The MB-2 occupancy sensor bracket allows sensors to be mounted to the rim of metal HID reflector bells (with no installed covers).

It secures to the rim with three clamping screws and has an adjustable mounting plate that allows rotation of the sensor to a desired angle for optimal coverage.

The MB-2 bracket is designed to be used with CX and CI sensors, and it comes with an extension wire to connect the sensor to the DM-105 and mounting screws to attach the sensor to the bracket. A bubble level is attached to the bracket to assist accurate sensor adjustment. See separate MB-2 installation instructions.



TESTING

1. After the installation is complete and checked, turn on the main power to the fixture circuits and turn on any controlling switches.
 - The DM-105s will supply full power to the HID lamps for 15 minutes for the lamp warm up. After the warm up time has elapsed, the lamps can go to low.
2. **To test occupancy control:** Lamps that are controlled by an occupancy sensor will go to low if no occupancy has been detected and the sensor's time delay has elapsed. Turn off all other controlling devices to the sensor controlled lamps. Set the time delay on the sensor to minimum, then move into the coverage area for the sensor, and remain still until the time delay elapses. The lights should go to low.
3. **To test switch control:** turn the switch off. If occupancy sensors are also controlling the DM-105s, remain still and allow the time delay to elapse. Turn the switch back on and the lights should go to high.
4. Verify that other controlling devices turn the lamps to low as desired.

TROUBLESHOOTING

General checks:

- Terminal block wires making proper contact.
- Terminal block wires connected to correct terminals.
- High voltage DM-105 wires securely connected.
- Wiring of switch, occupancy sensor or other controllers to DM-105 terminal block correct.
- Occupancy sensor adjustments needed: sensitivity and light level (if applicable), alignment.
- Light level detector (photocell), if any, adjustment needed.

Lights do not turn on

- Check breakers, fuses.
- Check photocells for proper adjustment and orientation (if installed).
- Check occupancy sensor detection.
- Check that switches and control systems are on.
- Check that HID fixtures are plugged in.
- Follow proper high voltage safety procedures and check wiring and connections in the ballast housings.

Some lights in a DM-105 group turn on but others do not

- Check the DM-105 connections to a fixture that does not turn on in a connected group.
 - Verify that proper wire contact is being made in the terminal block.
 - Verify that connections are to the correct terminals.
- Verify that the bulb has not burned out.
- Make sure you follow the recommendations found in the control wiring section.

All lights in a DM-105 group remain full on

- Something is giving an "on" input to the DM-105s.
- Check switching controllers and systems and connections to the DM-105s.
- Check photocells for proper adjustment and orientation (if installed).
- Check occupancy sensor detection.

Lights remain dimmed

- The "on" input from controllers is not reaching the DM-105 group.
- Check switching controllers and systems and connections to the DM-105s.
- Check photocells for proper adjustment and orientation (if installed).
- Check occupancy sensor detection.

All lights turn off

- The main power is being turned off to the lights. The main power should be turned off only when intending to completely turn off the lights. Remember, there is restrike/warm up period before the lights will return to full brightness.

Occupancy sensor not detecting

- Refer to sensor's installation instructions for proper adjustment and troubleshooting.

WARNING:

THE CAPACITOR IS THE MOST IMPORTANT COMPONENT IN ANY HID BI-LEVEL SYSTEM. SPECIAL CONSIDERATION SHOULD BE GIVEN WHEN SELECTING THE CAPACITOR VALUES AND VOLTAGE. INCORRECT CAPACITOR VALUES AND VOLTAGE WILL CAUSE THE FIXTURE TO OPERATE IMPROPERLY OR CAUSE DAMAGE TO THE LAMP AND BALLAST. CHECK WITH CAPACITOR MANUFACTURER FOR PROPER VOLTAGE AND CAPACITOR VALUES APPROPRIATE FOR YOUR BALLAST/FIXTURE.

ORDERING INFORMATION

If you would like assistance with capacitor selection call 1-800-879-8585

Model	Description
DM-105	Bi-Level Control Unit
MB-1	Occupancy Sensor Bracket for high-bay or industrial setting mounting
MB-2	Occupancy Sensor Bracket for HID metal reflector bell (w/o cover) mounting

WARRANTY INFORMATION

The Watt Stopper®, Inc. warrants its products to be free of defects in materials and workmanship for a period of five years. There are no obligations or liabilities on the part of The Watt Stopper, Inc. for consequential damages arising out of or in connection with the use or performance of this product or other indirect damages with respect to loss of property, revenue, or profit, or cost of removal, installation or reinstallation.

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