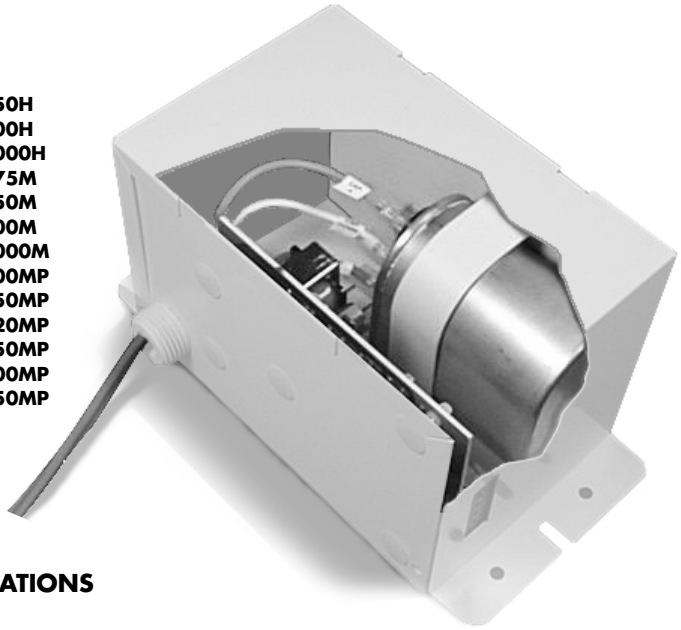
DM-100

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 175-1000W

Model#s:
DM-100-250H
DM-100-400H
DM-100-1000H
DM-100-175M
DM-100-250M
DM-100-400M
DM-100-1000M
DM-100-200MP
DM-100-250MP
DM-100-320MP
DM-100-350MP
DM-100-400MP
DM-100-750MP



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) 200-750W
- 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 warmup 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 . . . . . 3.75"H x 5.75"W x 4.75"D (95.25 x 146 x 121mm)
Leads . . . . . 8 feet

the Watt Stopper®

Installation Instructions

BOX CONTENTS

- DM-100 Bi-Level Control Module (1)
- Installation instructions (1)

Accessory bag:

- Lock-ring (1), wire nuts (2)

NOT SUPPLIED

- 20AWG 3- or 4-conductor jacketed wire* (for connecting DM-100s together)
- Fixture balancing and mounting hardware (if necessary)
- Conduit and hardware

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

DESCRIPTION

The DM-100 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-100 bases its bi-level switching on signals received from a controlling device (see “Controlling Devices” below).

With the DM-100 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-100 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.

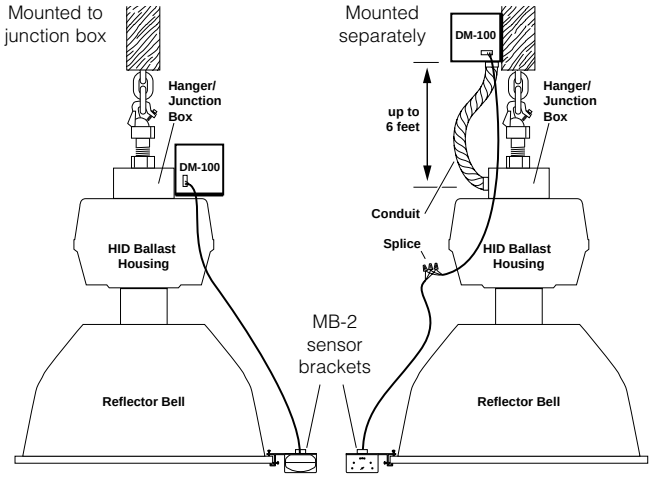
The DM-100's **bi-level switching avoids the warm-up problem** otherwise found when controlling HID fixtures. The switching is immediate and lights are no longer left on at 100% when lighting is not needed. This saves energy and adds convenience.

Controlling Devices:

- One or more controlling devices (such as occupancy sensors, time switches, photocells, etc.) must be used to control a DM-100. The control to this DM-100 can be extended to other DM-100s by connecting them into control groups (see Control Wiring section).
- A controlling device must:
  1. Have its own power supply or be able to be powered by the +24VDC output from a DM-100.
  2. Provide a +24VDC control output to a DM-100 in the controlled group.

DM-100 MOUNTING OPTIONS

The DM-100 attaches to the ballast hanger/ junction box, with a threaded 3/4" nipple. It can be mounted directly to the box through a knockout hole. The DM-100 can also be mounted up to six feet away and connected with conduit.



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INSTALLATION AND WIRING

⚠ DANGER: HIGH VOLTAGE ⚠

- **EQUIPMENT DAMAGE, PERSONAL INJURY AND DEATH CAN RESULT FROM IMPROPER PROCEDURES AND INSTALLATION.**
- **ONLY PERSONNEL QUALIFIED TO WORK WITH HIGH VOLTAGE AND CAPACITOR DISCHARGE SHOULD INSTALL THIS UNIT.**
- **TURN THE POWER OFF TO THE HID FIXTURE AT THE CIRCUIT BREAKER BEFORE BEGINNING INSTALLATION.**

1. **IMPORTANT:** Verify that the ballast is a CWA (Constant Wattage Autotransformer) and that the DM-100 model# is correct for the lamp ANSI and original capacitor rating (see Ordering Information section).
2. Unplug and move the HID light fixture to a stable, secure work area.
3. **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.
4. Open a 3/4" knockout hole in the ballast hanger box where the DM-100 will attach (either directly or by conduit):

   If connecting directly to the box:
   - Thread the DM-100's wires into the knockout hole and through the 3/4" lock ring (supplied).
   - Secure the DM-100's threaded nipple on the inside with the lock ring.
   - Thread the DM-100's wires down into the ballast housing.

   If connecting with conduit:
   - Thread the DM-100's wires into and out the other end of the conduit.
   - Attach the conduit to the DM-100's threaded nipple.
   - Thread the DM-100's wires into the knockout hole and secure the conduit to the knockout hole.
   - Thread the DM-100's wires down into the ballast housing.
5. Disconnect the wires from the original capacitor. Cut off the end connectors and strip the wires. NO CONNECTIONS WILL BE MADE TO THE ORIGINAL CAPACITOR.
6. With a supplied wire nut, connect one of the black wires from the DM-100 to one of the wires that was disconnected from the original capacitor (it doesn't matter which one). Connect the other DM-100 wire to the remaining disconnected wire (see the wiring diagrams on the next page).
7. Reassemble the ballast housing, being careful not to pinch wires.
8. An occupancy sensor can be attached to the reflector bell at this time or after the fixture is rehung.
9. Replace the fixture with the installed DM-100 and occupancy sensor back to the fixture's mounting location. Balance the fixture, if necessary.
10. If the DM-100 is mounted separately, secure it to its location.
11. Reconnect the power cord to the fixture (power should be off).
12. Once the steps above are completed, continue to the Control Wiring section.

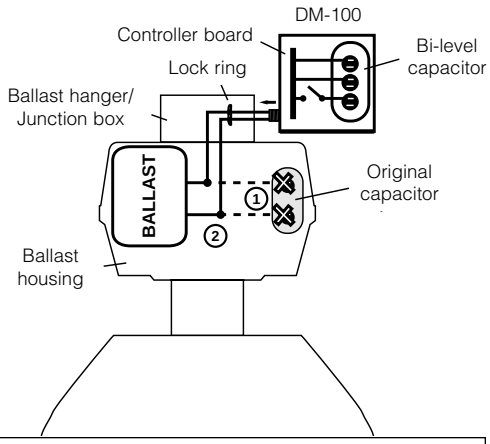
(DM-100 Installation and Wiring continued next page)

DM-100 WIRING

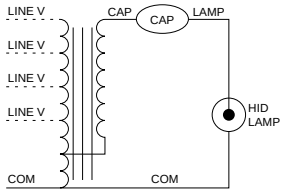
WARNING!: THIS DIAGRAM IS FOR ILLUSTRATION ONLY. READ ALL INSTRUCTIONS BEFORE PERFORMING INSTALLATION OR WIRING.

DANGER!: HIGH VOLTAGE FROM ORIGINAL CAPACITOR MUST BE SAFELY DISCHARGED.

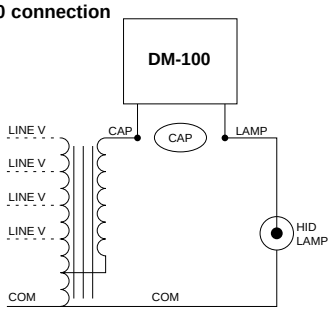
1. WIRES FROM BALLAST ARE CUT AT THE ORIGINAL CAPACITOR TERMINALS.
2. THE DM-100 CONNECTS TO BALLAST WIRES.



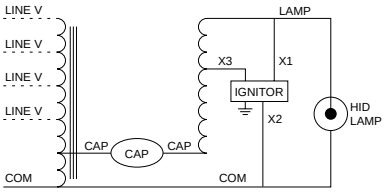
Typical CWA circuit for: Metal Halide lamps



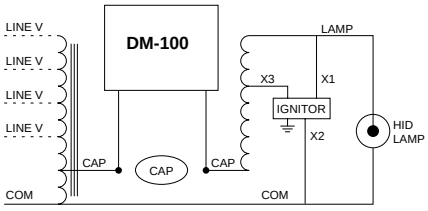
DM-100 connection



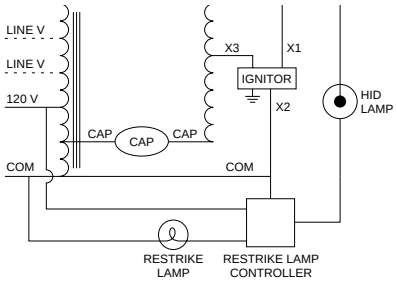
Typical CWA circuit for: Metal Halide (Pulse Start) or High Pressure Sodium



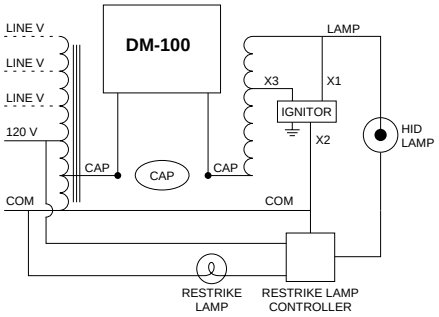
DM-100 connection



Typical CWA circuit with Quartz Restrike



DM-100 connection



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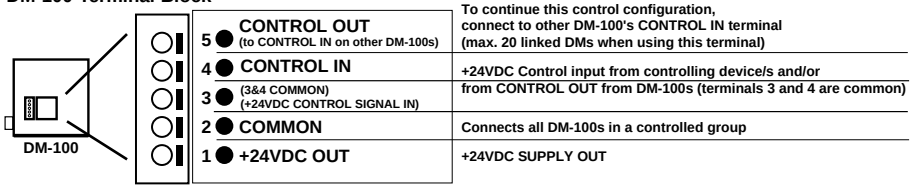
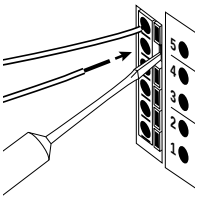
CONTROL WIRING

After the DM-100 is installed and the fixture has been remounted, low voltage control wire connections can be made to the terminal block, located on the side of the DM-100.

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

DM-100 Terminal Block





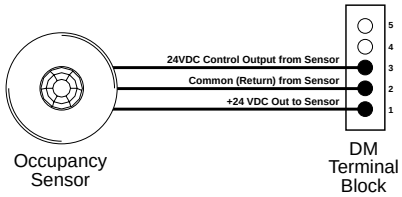
To insert or remove wires: Use a small flat-blade screwdriver to push in the plunger, insert wire, then release plunger (see left).

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.

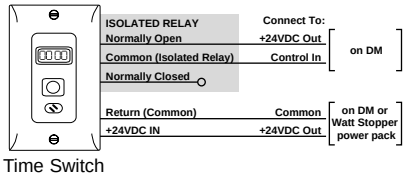
Occupancy sensors: (typical connections)

1. Connect the sensor's +24VDC Input lead to the +24VDC OUT on the DM-100.
2. Connect the Common lead from the sensor to the COMMON on the DM-100.
3. Connect the Control Output lead from the sensor to a CONTROL IN on the DM-100.



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

1. Connect the switch's +24VDC Input and Common leads to the DM-100 as for the occupancy sensor above, or to a power pack from The Watt Stopper.
2. Connect the isolated relay's Normally Open lead to 24VDC OUT and its Common lead to CONTROL IN on the DM-100.



Large Zone Control:

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

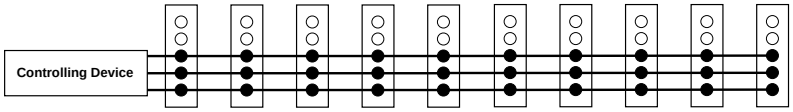
- **To avoid voltage drop issues:**
  - Use the heaviest gauge wire possible. We recommend 18-20AWG.
  - Wire the DM-100s serially and sequentially to avoid long wire runs.
  - If the controlling device is located a long distance away from the controlled zone, test the installation first with only a few DM-100s to ensure there are no problems.

(Large Zone Control continued next page)

Large Zone Control: (cont'd)

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

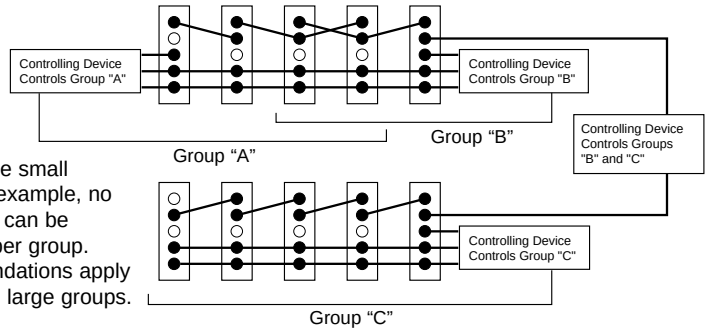
Sample configuration:



Small Control Groups:

- A controlling device can be extended to other DM-100s by linking the DM-100s together into a control group.
- A control group starts from the first DM-100 connected. All other DM-100s connected to this DM-100 (radially or in a series) are part of this group and controlled by the originating device(s).
- Groups can overlap. DM-100s can be part of more than one control group.
- When multiple controlling devices are used, only one signal is needed to turn the DM-100s to high.

Sample configuration:



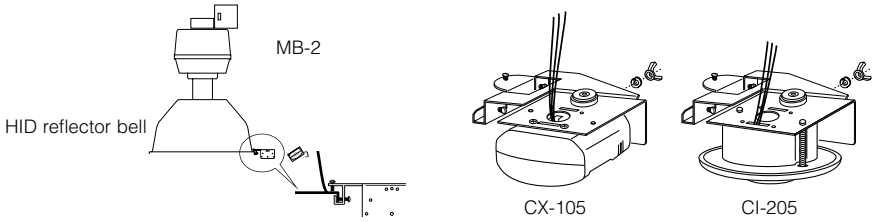
Note: When using the small control group wiring example, no more that 20 fixtures can be connected together per group. The same recommendations apply to small groups as to large groups.

OCCUPANCY SENSOR BRACKET

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

This bracket 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. The bracket comes with an extension wire to connect the sensor to the DM-100, as well as 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).



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TESTING

1. After the installation is complete and checked, turn on the main power to the fixture circuits and turn on any controlling switches.
   Note: The DM-100s 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-100s, 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 on/off input devices turn the lamps to low, as desired.

TROUBLESHOOTING

General checks:
- Terminal block wires make proper contact.
- Terminal block wires are connected to the correct terminals.
- High voltage DM-100 wires are securely connected.
- Wiring of switch, occupancy sensor or other controllers to the DM-100 terminal block are 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.
- Make sure switches and control systems are on.
- Make sure 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-100 group turn on, but others do not:
- Check the DM-100 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 made 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-100 group remain full on:
- Something is giving an ON input to the DM-100s.
- Check switching controllers and systems, as well as connections, to the DM-100s.
- 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-100 group.
- Check switching controllers and systems, as well as connections, to the DM-100s.
- 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 a restrike/warm-up period before the lights will return to full brightness.

Occupancy sensor is not detecting motion:
- Refer to the sensor's installation instructions for proper adjustment and troubleshooting.

ORDERING INFORMATION

Part Number	Fixture/Ballast/ Lamp Type	ANSI CODE	Standard Cap. (uF)	Voltage (Non Bi-level)	Recommended Capacitance Level 1	Level 2	Total
DM-100-250H (M)	250 Watt HPS	S50	35	280	27.5	7	34.5
DM-100-250H (A)			35	300	28	7	35
DM-100-400H (M)	400 Watt HPS	S51	55	280	42	12	54
DM-100-400H (A)			55	300	40	15	55
DM-100-400H (M)	400 Watt HPS	S51	48	280	38	9	47
DM-100-400H (A)			48	300	38	9	47
DM-100-1000H (M)	1000 Watt HPS	S52	26	525	18	8	26
DM-100-1000H (A)			26	525	17.7	8.3	26
DM-100-175M (M)	175 Watt MH	M57	10	400	7.5	2	9.5
DM-100-175M (A)			10	400	8	2	10
DM-100-250M (M)	250 Watt MH	M58	15	400	10	4.2	14.2
DM-100-250M (A)			15	400	9	6	15
DM-100-400M (M)	400 Watt MH	M59	24	400	16.5	7	23.5
DM-100-400M (A)			24	400	15	9	24
DM-100-1000M (M)	1000 Watt MH	M47	24	480	17	6.8	23.8
DM-100-1000M (A)			24	480	15	9	24
DM-100-200MP (A)	200W MH, PS	M136	15	525	10	5	15
DM-100-200MP (VN)			21	330	11	10	21
DM-100-250MP (M)	250W MH, PS	M138	20	400	15	5	20
DM-100-250MP (M)			24	330	18.5	5.5	24
DM-100-250MP (A)			24.5	400	17.5	7	24.5
DM-100-250MP (VN)			20	400	15	5	20
DM-100-320MP (M)	320 Watt MHPS	M132	22.5	330	15.3	6.9	22.2
DM-100-320MP (A)			21	345	13.1	7.9	21
DM-100-320MP (VN)			22	330	14	8	22
DM-100-320MP (VO)			19.5	360	13.5	6	19.5
DM-100-350MP (M)	350 Watt MHPS	M131	24	330	16.5	7	23.5
DM-100-350MP (A)			22.5	345	14.4	8.1	22.5
DM-100-350MP (VN)			24	330	16	8	24
DM-100-350MP (VO)			20.5	370	14.5	6	20.5
DM-100-400MP (M)	400 Watt MHPS	M135	28	330	19.5	8	27.5
DM-100-400MP (A)			26	330	18.5	7.5	26
DM-100-400MP (VN)			26	330	17	9	26
DM-100-400MP (VO)			24	370	16	8	24
DM-100-750MP (M)	750 Watt MHPS		24	440	16.5	7	23.5

( ) denotes ballast manufacturer. (A) = Advanced; (M) = Magnetek; (VN) = Venture (new); (VO) = Venture (old)
Note: Call Technical Support at **800.879.8585** for ordering information on non-standard fixtures or capacitor combinations not listed above.

WARRANTY INFORMATION

The Watt Stopper®, Inc. warranties its products to be free of defects in materials and workmanship for a period of five (5) 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.

The Watt Stopper®

Putting a Stop to Energy Waste®

2800 De La Cruz Boulevard, Santa Clara, CA 95050
Technical Support: 800.879.8585 • 972.578.1699
www.wattstopper.com

00567 r5

Model Number: DM-100	Approval Date:	Referred To: _____

DM-100 Sales Qualification Questionnaire

UPON COMPLETION, PLEASE FAX BACK TO: (972)-422-1311.

Attention: **Phone#:**

Company: **Fax #:**

Project Name: **Quantity:** **PO#**

The DM-100 is specific to the type and wattage of the HID fixture. To ensure that we can match your fixtures with the appropriate DM-100 HID Bi-Level Controller, the following questions must be answered completely. You will find the information requested below on the fixture label or inside the ballast housing. Due to variation between fixtures, this information should be verified on *every* fixture.

*Ballast Information:

This information is necessary to ensure we offer a DM-100 that matches your fixtures.

CWA Type (Circle) Yes No

*The DM-100 will **ONLY** work with a CWA type ballast.*

Manufacturer _____

Model Number _____

Capacitor Information:

Manufacturer _____

Model Number _____

Microfarad (uF) Rating _____

Voltage Rating _____

Potted (Circle) Yes No

In order to bypass the existing capacitor, the capacitor wiring needs to be accessible.

Fixture Information:

Manufacturer _____

Model Number _____

ANSI Code _____

Type (Circle) Metal Halide High Pressure Sodium Metal Halide Pulse Start

Mounting Strategy (circle):

Remote Mounted Fixture Mounted

The balancing hardware will be required if the DM-100 is mounted to the fixture.

Control Strategy (circle):

Occupancy Sensor Daylighting Time Based Manual

*** *INFORMATION REQUIRED.***

From: *The Watt Stopper* **Telephone: *1-800-879-8585***