

## Lutron Intelligent Fluorescent Lighting Management System

Virtus Life, □  
Control de Iluminación Natural y Artificial. □  
□  
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...featuring Lutron's

# microWATT® Lighting Controller



Integrates multiple functions-

- Manual Dimming
- Daylight Harvesting
- Occupant Response
- Building Automation/  
Security System Signals

Intelligently co-ordinates functions to automatically adjust fluorescent lighting

- Provides localized automatic control
- Maximizes energy savings
- Creates a comfortable efficient visual environment

## Lutron Intelligent Fluorescent Lighting Management System

Lutron's Intelligent Fluorescent Lighting Management System is centered on Lutron's MW-LC-2 microWATT Lighting Controller. This microprocessor-based device is programmed with logic which intelligently co-ordinates multiple control functions, unobtrusively minimizing the lighting energy used by individual 16 amp fluorescent lighting circuits.

The system integrates with building automation/ security systems, or works independently, to create a comfortable, efficient and energy saving visual environment throughout an entire facility or in selected, localized spaces. It permits greater lighting power density (watts/ft.<sup>2</sup>) in commercial/institutional buildings to meet standards such as ASHRAE/IES 90.1-1989.

Lutron offers single-source responsibility for controls, sensors and ballasts – plus 25 years fluorescent dimming experience – for assured system performance.

### Control, Sensor and Input Signal Functions

*microWATT intelligently coordinates one or all, in any combination*



#### **Manual Dimming Control**

Dim light levels to suit individual requirements. Raise light levels to preset system maximum. Permits multi-location dimming if desired – five wallbox dimmers maximum per microWATT.



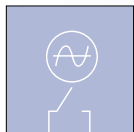
#### **Daylight Harvesting**

Uses daylight contribution to reduce lighting energy use. One photosensor per microWATT.



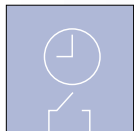
#### **Occupant Response**

Dim lights down or off when the space is unoccupied. Three occupant sensors maximum per microWATT.



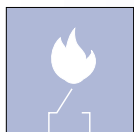
#### **Load Shed Signal\***

Reduces light levels to minimize peak demand charges.



#### **Time Clock OFF Signal\***

Controls lighting energy use outside normal working hours.



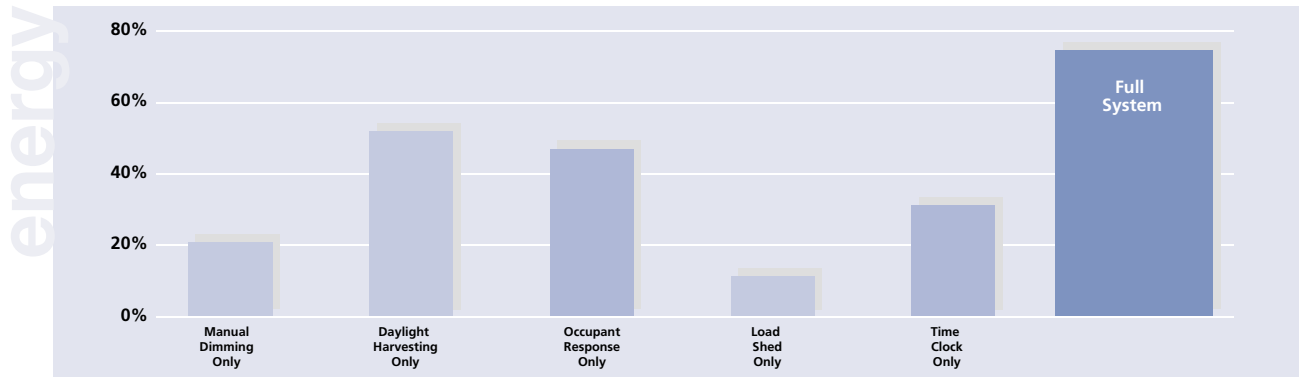
#### **Emergency ON Signal\***

Turns lights on full to high end during emergencies.

\* Contact closures from building automation, demand management or security systems.

## Typical System Savings

Depending on system configuration and application characteristics, a Lutron Intelligent Fluorescent Lighting Management System can save over 70% of lighting energy. Actual savings may vary, depending on the application.



### microWATT Lighting Controller



### microWATT Features

Continually monitors all input functions and intelligently adjusts fluorescent lighting for minimum energy use.

Provides the following ranges of light level

- Sets high end – between full ballast output and approximately 40% light
- Sets low end – between approximately 15% light and ballast low end
- Sets unoccupied level – between approximately 40% light and ballast low end or off

### Fluorescent Fixtures with Lutron Dimming Ballasts



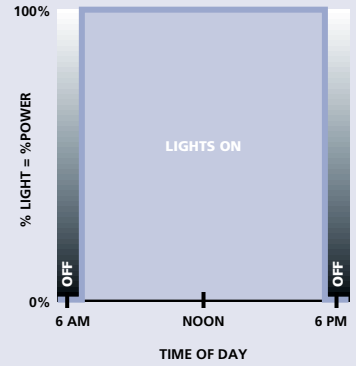
# Lighting Management Strategies

saving energy

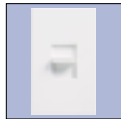
## Saving Energy

Without an automatic energy saving system, lights must be either full on, totally off or manually dimmed. Full on wastes energy if natural light is available, if space is unoccupied, or if a lower light level is temporarily desired. Manual dimming saves energy, but still permits waste if natural light is not fully utilized or space is unoccupied.

A Lutron Intelligent Fluorescent Lighting Management System can combine manual dimming, daylight harvesting and occupant response. It can also respond to building automation/security system signals to save peak demand energy charges, time-schedule lighting, or turn lights full on for emergencies.



*On/Off Control - Saves energy only when off*

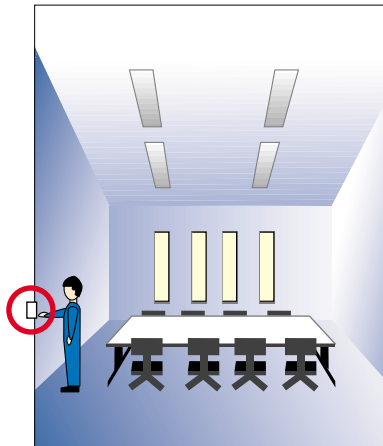


## Manual Dimming

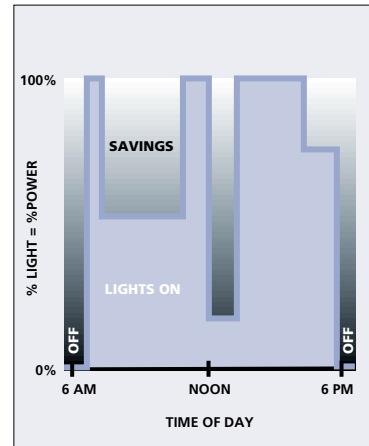
### Lutron Wallbox Dimmers

Provide personal choice and control of light levels to adapt spaces for different tasks and activities. Permit dimming from multiple locations; switch lights on and off.

Best applied in such areas as meeting rooms and offices.



*Adjust lights for tasks and activities.*



*Typical energy consumption pattern.*

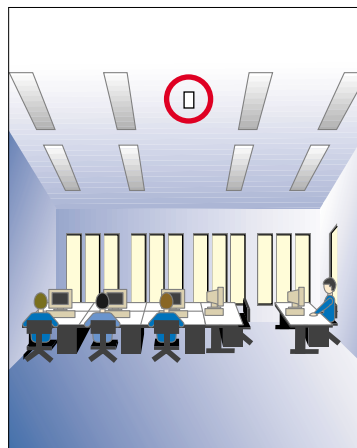


## Daylight Harvesting

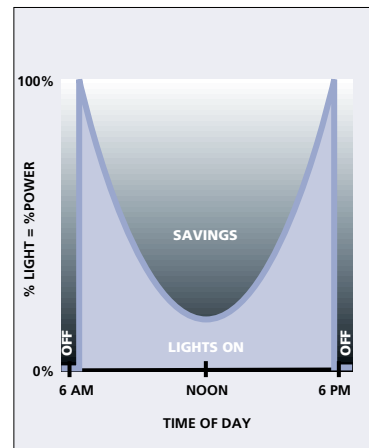
### Lutron microPS™ Photosensor

Takes advantage of available natural light. Adjusts artificial lighting smoothly, unobtrusively and continuously.

Best applied in areas with large windows or skylights, such as perimeter offices, malls, classrooms and atria.



*Maintain constant light level while saving energy.*



*Typical energy consumption pattern.*



## Occupant Response

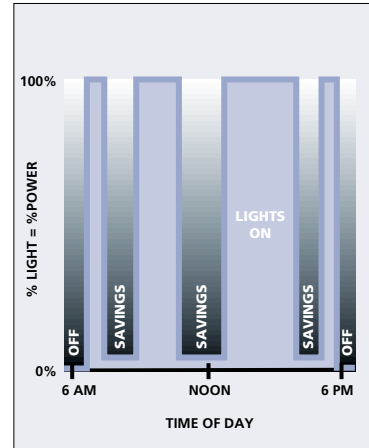
### *Lutron microOS™ Occupant Sensors*

Slowly dim lights to low level or turn lights off when space is unoccupied; turn lights on when someone enters.

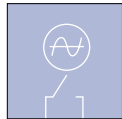
Best applied in enclosed areas such as meeting rooms, corridors and offices.



Lights dimmed or off when space unoccupied.



Typical energy consumption pattern.



## Load Shedding

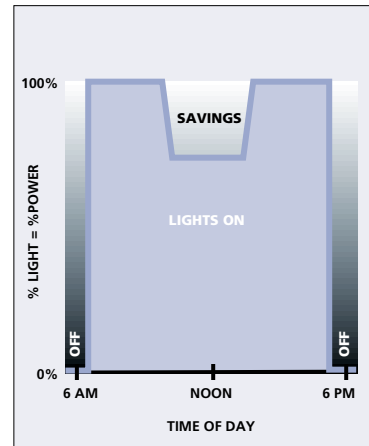
### *Load Shed Device (Signal from Building Automation System)*

Reduces light levels to save peak demand energy charges. Gradually dims lights by 25% from any current level when closure is received.

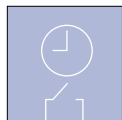
Best applied in office buildings and facilities with large electrical loads or high peak demand charges.



Reduce power usage at peak demand times.



Typical energy consumption pattern.

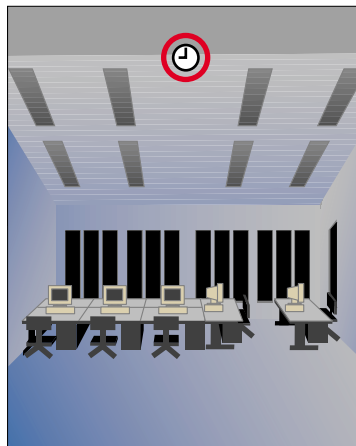


## Time Scheduling

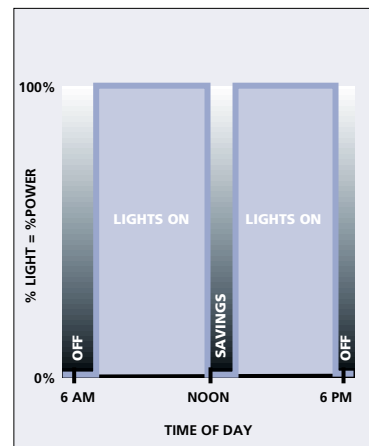
### *Time Clock (Signal from Building Automation System)*

Automatically turns lights on and off based on a scheduled pattern. Flash/warn sequence alerts occupants before off.

Best applied in larger areas like open offices, cafeterias and schools.

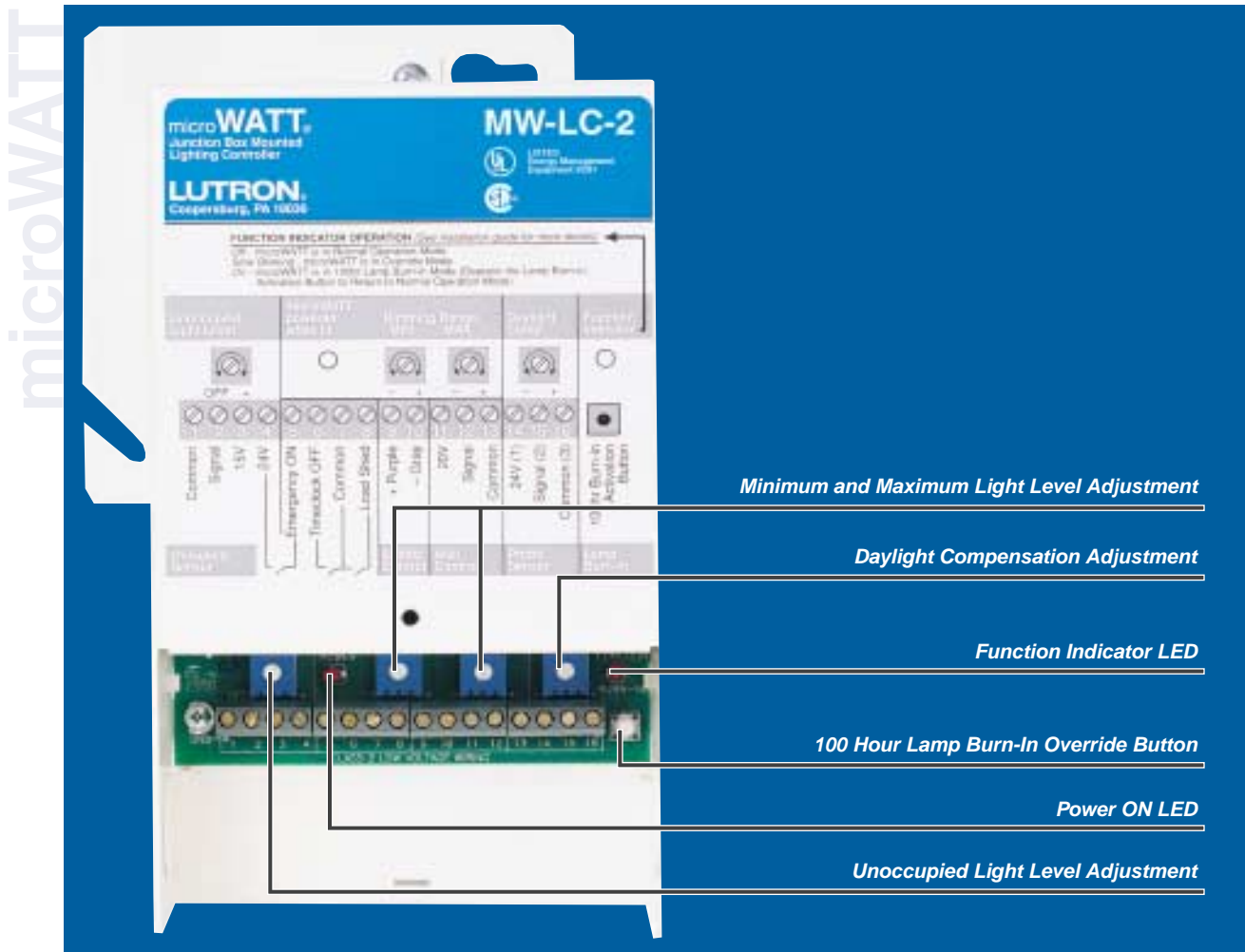


Control room lights on a fixed schedule.



Typical energy consumption pattern.

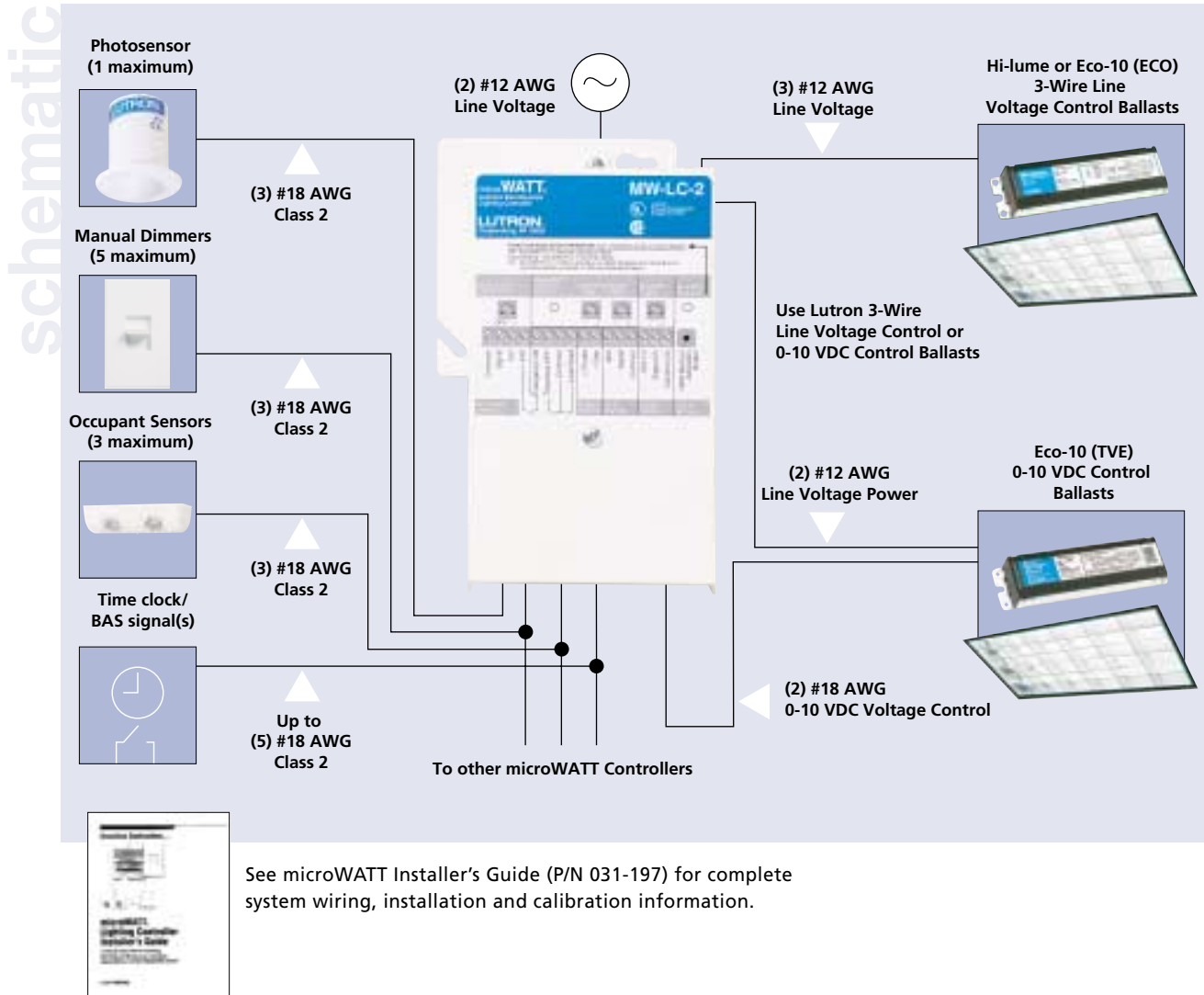
## microWATT Lighting Controller



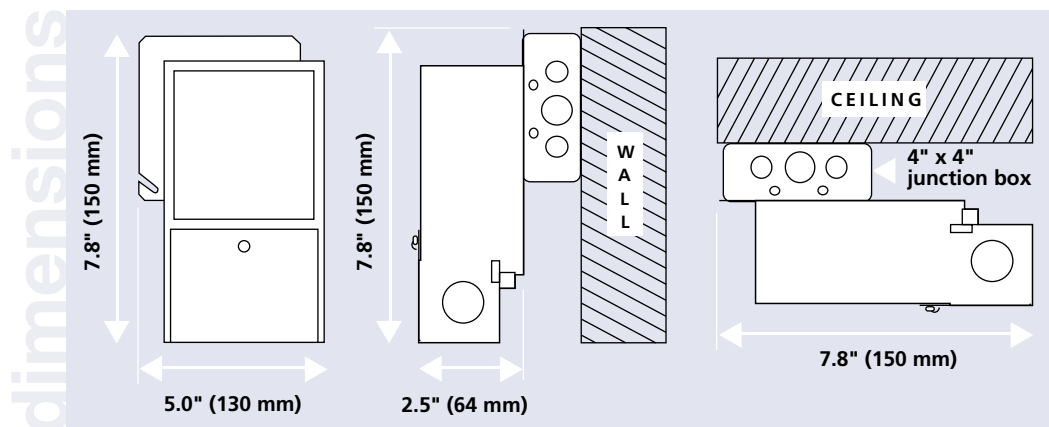
### microWATT Features:

- State-of-the-art microprocessor-based design provides intelligent lighting energy management.
- Photosensor function incorporates built-in fade rate to prevent sudden light level changes.
- Occupant sensor function includes built-in automatic fade rate so lights dim to low light level or off when room is empty; lights turn on immediately when someone enters room.
- Manual dimming function also allows lights to be turned on when entering a room.
- Time clock flash-warn sequence alerts occupants – lights flash low, high, low again five minutes before off.
- High end (maximum) fluorescent light level adjustable from full ballast output to approximately 40% light.
- Low end (minimum) fluorescent light level adjustable from approximately 15% light to low end of ballast range.
- Unoccupied light level adjustable from approximately 40% light to low end of ballast range.
- Lamp burn-in button overrides automatic operation to provide 100 continuous hours of full light output, after which microWATT automatically begins normal operation. (For proper performance, all new fluorescent lamps must be operated at full intensity for 100 hours before dimming.)
- Patented Softswitch™ technology protects power relays when loads are switched on and off.
- 20 amp rated (16 amp continuous load). Accepts 100, 120, 200, 220-240 or 277 VAC, 50/60 Hz.
- To order, specify Model MW-LC-2 (Model MW-LC-2-JA for Japan).

## System Schematic



## Mounting and Dimensions



MicroWATT mounts on 4" square junction box, typically in electrical closet or above suspended ceiling.





## Control, Sensor and Input Signal Functions

### Manual Dimming

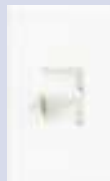
#### Lutron Wallbox Dimmers

- Low voltage wiring (20 and 24 VDC)
- Powered from microWATT Controller
- Use one single-pole dimmer per microWATT per zone. For **multi-zone applications**, connect one single-pole dimmer to as many as five microWATTs. For **multi-location dimming**, use up to five Nova T☆ RX-MIC-MW- Dimmers

#### Single-Pole Dimmers / 3-Way Switching

Control	Description	Model No.	3-Way Switching
	Vareo® Tapswitch™ Preset slide Dimmer	MW-V-	Use VETS-P-Tapswitch (9 maximum per microWATT)
	Nova T☆® Thin profile Slide-to-off Dimmer	MW-NT-	—
	Diva® Paddle switch Preset slide Dimmer	MW-DV-	Use CA3-PSH- or any 3-way switch
	Ariadni® Toggle switch Preset slide Dimmer	MW-AY-	Use with any 3-way switch

#### Multi-Location Dimming

	Nova T☆ Thin profile Slide-to-off Dimmer (5 maximum per microWATT)	RX-MIC-MW- (Do not mix with MW-NT-)	—
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Add color suffix to complete model number.  
See catalog 360-178 for specifications and colors.

### Daylight Harvesting

#### microPS™ Photosensor

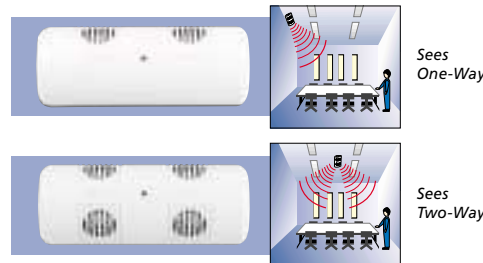


- Provides input to dim/raise fluorescent lights based on available daylight
- Easily calibrated for sensitivity
- Low voltage wiring (24 VDC)
- Powered from microWATT Controller
- Model MW-PS-WH

See data sheet 366-549 for specifications.

### Occupant Response

#### microOS™ Occupant Sensors



- Provide input to automatically turn lights on or off, based on presence/ absence of people in a space
- Ultrasonically detect motion—sensitive to minor movement
- Sensitivity adjustable for room size
- Low voltage wiring (15 VDC)
- Powered from microWATT Controller
- Model MOS-CM-15-WH (sees one-way)
- Model MOS-CM2W-15-WH (sees two-ways)

See data sheet 362-972 for specifications.  
MicroWATT is compatible with other occupant sensors; consult Lutron.

### Building Automation/ Security System Signals

Any maintained, dry contact closure from a time clock, building automation system, demand management system, etc. (by others)

- Time clock OFF will turn lights off on a predetermined schedule
- Load shed function will gradually dim lights by 25% from any current level when closure is received
- Emergency ON function will send lights to full on when closure is received

# Electronic Fluorescent Dimming Ballasts

## Lighting Management

Lutron Eco-10™ electronic fluorescent dimming ballasts manage lighting energy in wide-area applications. They dim from 100% to 10% measured (32% perceived) light and are ideal for commercial and institutional applications, including daylight harvesting.



Eco-10

### *Eco-10™ ECO-Series*

- Dims T8 and T5 twin tube lamps to 10%
- 3-wire line voltage control

### *Eco-10™ TVE-Series*

- Dims T8, T5 twin tube and T4 compact\* lamps to 10%
- 0-10 VDC control
- For retrofits or new construction – ideal where control and power zones are to be separated

## High Performance Architectural Dimming

Lutron Hi-lume® electronic fluorescent dimming ballasts provide true full-range capability – from 100% to as low as 1% measured (10% perceived) light. They are designed to meet the demands of architectural dimming, and are ideal for multi-tasking, computer-intensive applications.



Hi-lume

### *Hi-lume®*

- Dims T8 and T12 lamps to 1%
- 3-wire line voltage control

### *Hi-lume Compact™*

- Dims T4 compact\* and T5 twin tube lamps to 5%
- 3-wire line voltage control

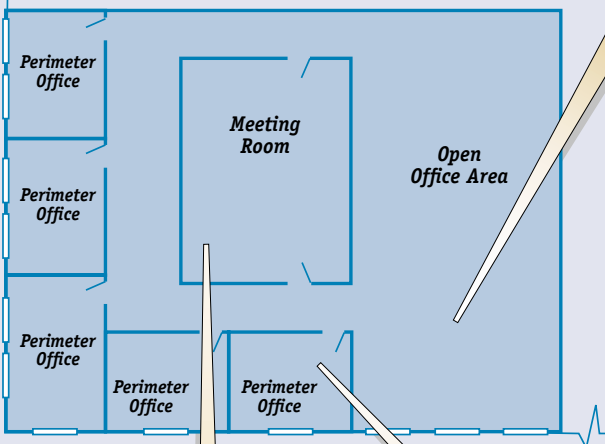
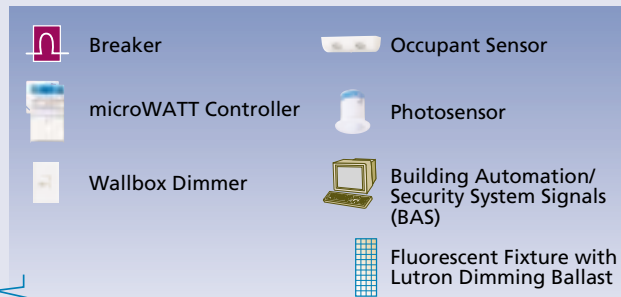
\*Ballasts for T4 compact lamps are intended for factory installation by Lutron OEM fixture partners



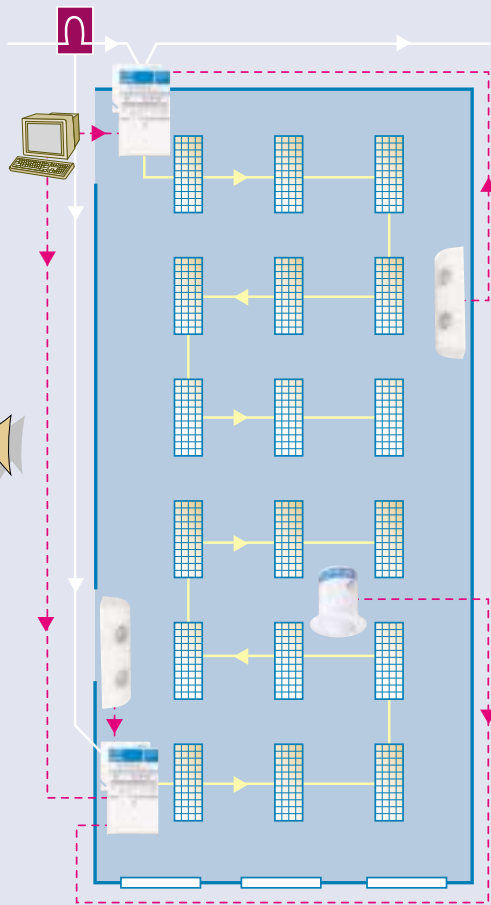
See brochure 366-002 for Lutron ballast specifications.

# System Application

A Lutron Intelligent Fluorescent Lighting Management System can be applied to a complete building or a single space, distributing control and eliminating home-run wiring to dimming panels.

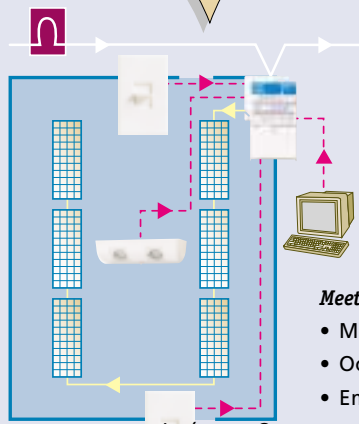


Typical Office Floor Plan (Segment)

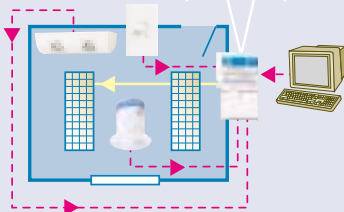


Two Zone Open Office Area (1 microWATT/zone)

- Daylight Harvesting (window zone only)
- Occupant Response (per zone, 1-way sensors)
- Load Shed, Time Scheduling, Emergency On (Signals from BAS)



- Meeting Room**
- Manual Dimming (multi-location)
  - Occupant Response (2-way sensor)
  - Emergency On (Signal from BAS)



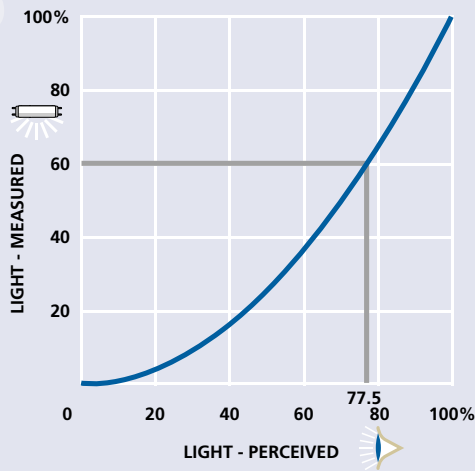
- Perimeter Office**
- Manual Dimming
  - Daylight Harvesting
  - Occupant Response (1-way sensor)

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## Energy Saving

### Actual vs. Perceived Light

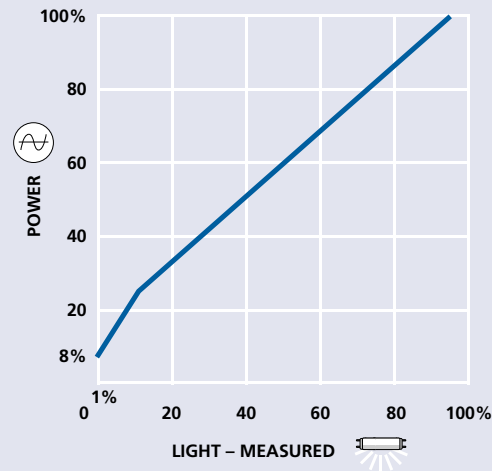
An important aspect of fluorescent lighting control is the difference between measured and perceived light levels. For example if lights are dimmed to 60% of full output, the eye will perceive there is about 77.5% of full light present. This "Square Law" phenomenon takes advantage of how the human eye functions to achieve significant energy savings, while improving the visual environment.



## Energy Saving

### Power vs. Light

There is a nearly linear relationship between fluorescent light level and power consumption. Power is saved proportionately as lights are dimmed.



## Lighting Regulations and Standards

Contact your local power utility for information concerning utility rebates and/or local regulations.

### ASHRAE/IES Standard 90.1-1989

This Standard stipulates lighting power densities (watts/ft.<sup>2</sup>) for new/reconstructed buildings. Automatic energy saving controls permit the following percent increases in these densities:

Photosensor only	30%
Occupant Sensor only	30%
Photosensor and Occupant Sensor	40%
Time Clock only	15%
Time Clock and Photosensor	35%
Time Clock and Occupant Sensor	35%



### California (Title 24)

Allows improved lighting power budget (greater watts/ft<sup>2</sup>):

Photosensor only	40%
Occupant Sensor only	20%
Time Clock only	5%
Photosensor, Occupant Sensor and Time Clock	50%

### New York State

Lighting controls are required in commercial buildings:

All rooms not intended for 24 hour use must have automatic lighting controls. Exterior lighting must be controlled by an automatic timer or photosensor, or both.

## microWATT Specifications

### LUTRON: The Leader in Lighting Control

Since its founding over 35 years ago, Lutron has emerged as the recognized leader in residential and commercial lighting control systems, and is the brand most preferred by lighting designers and specifiers worldwide. Lutron invented the solid state dimmer (1961), the electronic fluorescent dimming ballast (1969) and was among the first U.S. companies to qualify for ISO 9001 registration (1991). With over 100 U.S. patents, Lutron has continuously led the industry with high quality innovative products and solutions for lighting control.

### Technical and Sales Assistance

For help with applications, systems layout, or installation, call the toll-free

**Lutron Hotline:**  
**(800) 523-9466**

(U.S.A. and Canada)

From other areas,

Call: (610) 282-3800

Fax: (610) 282-3090

Visit our website at

**[www.lutron.com](http://www.lutron.com)**

This product may be covered by one or more of the following and other U.S. patents: 4,449,074; 4,663,570; 4,689,547; 4,742,188; 4,833,339; 4,894,587; 5,001,386; 5,041,763; 5,055,742; 5,144,205; 5,173,643; 5,207,317; 5,224,029; 5,262,678; 5,309,068; 5,357,170; 5,359,231; 5,555,150; 5,633,540; 5,637,930 and corresponding foreign patents. U.S. and foreign patents pending. Lutron, Ariadni, Diva, Hi-lume, microWATT, Nova T☆ and Vareo are registered trademarks. Eco-10, microOS, microPS and the Dimming by Lutron logo are trademarks of Lutron Electronics Co., Inc. ©1999 Lutron Electronics Co., Inc. All rights reserved.

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1. The fluorescent lighting management system shall include a microprocessor-based lighting controller capable of logically integrating signals from photosensors, occupant sensors, wall controls, time clocks, building automation systems, fire or safety systems and demand control systems.
2. The controller shall maximize energy savings by integrating control and sensor inputs.
3. The controller shall provide a method for adjusting the maximum light level.
4. The controller shall provide a method for adjusting the unoccupied light level.
5. The controller shall provide a method for calibrating the photosensor level. The photosensor shall be color-corrected.
6. The controller shall provide for an emergency override that can bring the lights to maximum ballast output.
7. The controller shall provide for a gradual 25% lighting reduction in response to a contact closure signal from a load shed device.
8. The controller shall provide a 30 minute time clock off flash-warn sequence to automatically flash lights low, high and low again five minutes before turning off.
9. The controller shall provide an actuation override switch for 100 continuous hours of full light output for lamp burn-in, with automatic return to normal operation.
10. The controller shall provide temporary override conditions so that lights can always be turned on.
11. The controller shall be equipped with burn-in status and power-on LEDs.
12. The controller shall operate over a voltage range from 100 to 277 VAC at 50 or 60 Hz.
13. The connected controls shall use Class 2 wiring that is electrically isolated from line voltage wiring by means of a Class 2 transformer and physically separated.
14. The controller shall supply 15, 20 and 24 VDC for wall control, photosensor and occupant sensor operation.
15. The controller shall provide an air-gap off, and be tested to reliably control a 16A electronic ballast load (fully loaded 20A circuit) for an estimated 10 year life (30,000 cycles).
16. The controller shall pass a 6000V, 200A surge test (ANSI 62.41).
17. Controller operation shall be rated for ambient temperatures from 0 to 40°C.
18. The controller shall be UL listed for Energy Management Equipment and CSA Approved.
19. The controller shall be capable of mounting to a 4" x 4" junction box.
20. Controls, sensors and ballasts shall be provided by a single manufacturer with a minimum of 25 years electronic fluorescent lighting control experience.
21. Manufacturer shall have ISO 9001 quality registration and have factory employed service engineers.
22. Manufacturer shall functionally test each controller's performance prior to shipment.
23. Controller shall be specified Lutron microWATT Model MW-LC-2; no equal without written approval prior to bid due date.
24. Manufacturer shall provide a toll-free phone number, with 24 hour, 7 day access, to specifically service technical and application questions.

**LUTRON** Electronics Co., Inc.

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