“Kele puts a lot of thought into the products and services they provide. They have everything a controls guy needs to do his job effectively.”

LIGHTING CONTROLS

MADE IN USA

Products manufactured in the United States

NEW

Products that are new to the catalog

CLRI Retrofit Interior
pg. 536

CX Series pg. 544

DLM Series pg. 549

Kele®

www.kele.com

MODEL/SERIES — PAGE

Indicates New Products

LIGHTING CONTROLS

INTEGRATED LIGHTING CONTROL PANEL

AUTOPHOS®

DESCRIPTION

AUTOPHOS® is a BACnet MSTP or N2 relay panel designed for integration with building automation systems. It is powered by the Lx5 technology platform, the first dual processor lighting controller designed from the ground up for integration. No need for protocol option cards, gateways, or separate networks. As an integrated device, **AUTOPHOS®** provides substantial installation and operational savings. Built for expandability, **AUTOPHOS®** can be used for a wide range of projects, from small professional office buildings to large educational campuses. This next-generation product brings increased flexibility in lighting control applications with superior relay and control technology.

FEATURES

- ***BACnet MSTP and Metasys N2 included***
- ***Dip switch selectable protocol***
- ***Network addressing via dip switch selection***
- ***BACnet schedules reside in LX-5™ controller***
- ***Supports BACnet Interoperable Building Blocks (BIBBs) for BAS alarms, trends, and schedules***
- ***Dual coil latching 20A relays with superior quality and reliability***
- ***Relays with direct manual-override switch***
- ***Available in 8, 16, 32, 48, and 60 relay capacities***
- ***Programs switch input and relay output priorities,flash warning, relay energize time, output sequencing, and grouping***
- ***Available with up to 56 digital switch inputs and 6 analog inputs***
- ***Network to 99 panels***
- ***High voltage dead front covers***
- ***Surface mount panels standard wih optional flush mount***
- ***Optional UL 924 Emergency Transfer relays (last 16 relays)***
- ***Removable terminal blocks for easy wire connections***
- ***Full-frame, hinged door with key lock (field reversible)***
- ***High voltage bay (optional) at top of the panel for mounting contactors; includes a dead front cover***
- ***Low voltage bay (optional) at the bottom of the panel for mounting network routers, power supplies, or other controls***

SPECIFICATIONS

Supply Voltage	115/277 VAC ±10%, 60 Hz, 30 VA
Supply VA	30 VA
Secondary Voltage	24 VAC±10%
Relay Type	SPST Latching NO with manual override, pulse driven
Contactor Ballast	20 A, 277 VAC
Contactor Tungsten	20 A, 120 VAC tungsten
Resistive Load	20 amp @ 277 VAC, 20 amp @ 347 VAC
Short Circuit Current Rating	20,000 A @ 277 VAC
Relay Life	2 million+ on/off cycles @ no load 300,000 on/off cycles @ full load
Analog Switch Inputs	6; 0-5 VAC light level sensor
Digital Switch Inputs	(model specific)
16 relay	24 two wire or 12 three wire
32, 48 or 60 relay	56 two wire or 28 three wire
Relay Terminals	screw terminal with box clamp, accepts double 14-10 awg or single awg (solid or stranded Cu only)
Network	Max length 4000 ft
Communication Ports	Network ready, two-wire RS-485
Communication Wire	Belden 8760 or equal
Communication Protocol	BACnet MST (9600, 19200, 38400, 76800), N2 (9600)
Operating Temperature	32° to 125°F (0° to 52°C)
Operating Humidity	20% to 95% RH non-condensing

Dimensions	Standard
08-relay	16.6"H x 13.2"W x 5.8"D (42.2 x 33.5 x 14.7 cm)
16-relay	16.5"H x 18.1"W x 5.8"D (41.9 x 46.0 x 14.7 cm)
32-relay	25.3"H x 18.1"W x 5.8"D (64.3 x 46.0 x 14.7 cm)
48-relay	34.1"H x 18.1"W x 5.8"D (86.6 x 46.0 x 14.7 cm)
60-relay	42.6"H x 18.1"W x 5.8"D (102.8 x 46.0 x 14.7 cm)
	1 Bay Panel
16-relay	25.3"H x 18.1"W x 5.8"D (64.3 x 46.0 x 14.7 cm)
32-relay	34.1"H x 18.1"W x 5.8"D (86.6 x 46.0 x 14.7 cm)
48-relay	42.6"H x 18.1"W x 5.8"D (102.8 x 46.0 x 14.7 cm)
60-relay	52.0"H x 18.1"W x 5.8"D (132.1 x 46.0 x 14.7 cm)
	2 Bay Panel
16-relay	34.1"H x 18.1"W x 5.8"D (86.6 x 46.0 x 14.7 cm)
32-relay	42.6"H x 18.1"W x 5.8"D (102.8 x 46.0 x 14.7 cm)
48-relay	52.0"H x 18.1"W x 5.8"D (132.1 x 46.0 x 14.7 cm)
Enclosure Rating	NEMA 1, Dry/ indoor environment
Approvals	UL 916, UL 924, CE, ULE133813
Warranty	2 years

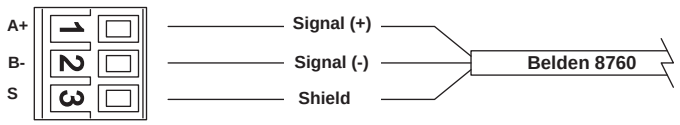
INTEGRATED LIGHTING CONTROL PANEL

AUTOPHOS®

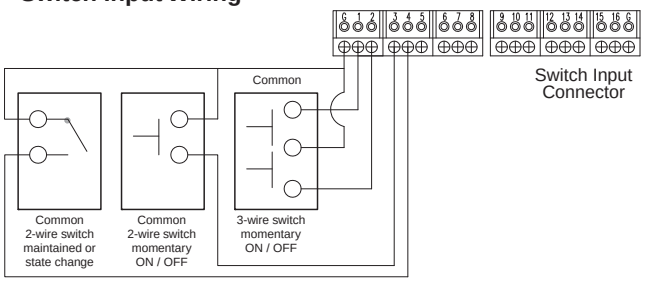
WIRING

Communication

BACnet MSTP / N2 Network (input)



Switch Input Wiring

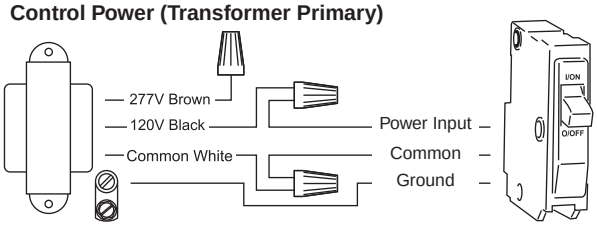


Wiring Recommendations:

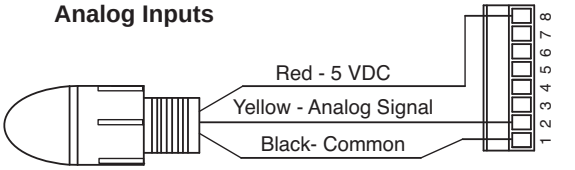
Gauge: 18 AWG (non-twisted, un-shielded wire only)

Maximum Distance: 500 feet of wire between switch input connector and switch terminals

Control Power (Transformer Primary)



Analog Inputs

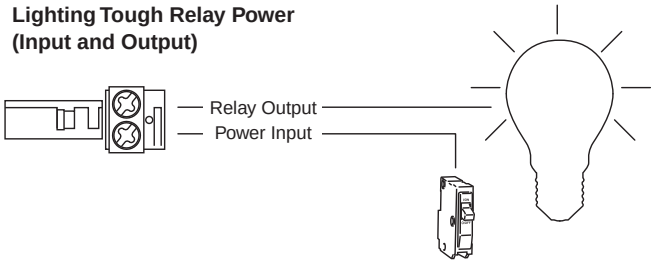


Wiring Recommendations:

Gauge: 18 AWG (non-twisted, un-shielded wire only)

Maximum Distance: 250 feet of wire between analog input connector and MK7 Light Sensor

Lighting Tough Relay Power (Input and Output)



ORDERING INFORMATION

MODEL	DESCRIPTION
AP08P	AUTOPHOS® relay panel with 8-relay capacity, 24 digital and 6 analog inputs
AP16P	AUTOPHOS® relay panel with 16-relay capacity, 24 digital and 6 analog inputs
AP32P	AUTOPHOS® relay panel with 32-relay capacity, 56 digital and 6 analog inputs
AP48P	AUTOPHOS® relay panel with 48-relay capacity, 56 digital and 6 analog inputs
AP64P	AUTOPHOS® relay panel with 60-relay capacity, 56 digital and 6 analog inputs
XX	Number of factory installed relays
	Ordering selections required for 16, 32, 48, 60 relay panels
00	No special control options
IP	Factory installed BACnet IP router with 100 VA aux transformers requires Lo bay (1L)
X0	UL 924 Emergency transfer - last 16 relays
XP	UL 924 Emergency transfer, BACnet IP router with 100 VA aux transformers requires Lo bay (1L)
0L	No Lo bay
1L	Added 9" Lo bay *1
0H	No Hi bay
1H	Added 9" Hi bay *1

AP08P **08** — ***Example:*** **AP08P08** AUTOPHOS® 8-relay capacity panel with 8 factory installed relays.

AP16P – **09** – **00** – **1L** – **0H** — ***Example:*** **AP16P-09-00-1L-0H** AUTOPHOS® 16-relay capacity panel with 9 factory installed relays, with no special control options and added 9" Lo bay.

*1 For size 60 relay panel, limited to either Hi bay OR Lo bay option.

ACCESSORIES		PAGE
APR20	AUTOPHOS® 120/277 VAC 20A relay	554

AUTOPHOS® 20A RELAY
APR20

DESCRIPTION

The AUTOPHOS® **APR20** relay provides the capability to switch line voltage lighting circuits. These improved long-life relays with direct manual override can be switched on or off without power to the control panel. This allows the electricians to manually control the circuits during installation and allows authorized users to override the circuits after installation. This capability is not common in most lighting control products.

APR20

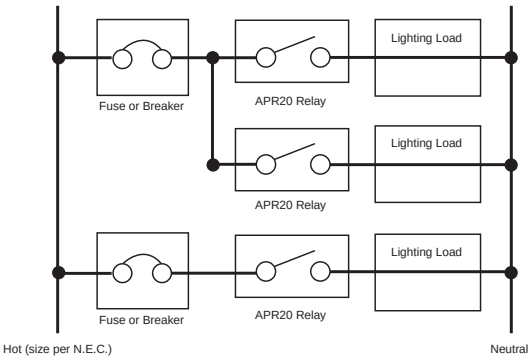
FEATURES

- ***Maximum reliability and performance for direct load control***
- ***300,000 cycles at full load***
- ***20,000 amps at 277 VAC SCCR***
- ***Manual SPST latching override switch***
- ***For use with Autophos® and CL series lighting panels and retrofit interiors***

SPECIFICATIONS

Relay Type	SPST contacts latching with manual override lever
Short Circuit Current Rating	
SCCR	20,000 Amps @277 VAC
Relay Life	300,000 electrical cycle rating at full load, 1,000,000 mechanical cycle rating at any load
Contactor Ballast	20A at 277 or 347 VAC
Contactor Tungsten	20A at 125 VAC
Resistive Load	20A at 277 or 347 VAC
Relay Terminals	Single conductor, 14-8 AWG, solid or stranded, copper only Two conductor, 14-10 AWG, solid or stranded, copper only
Operating Temperature	32° to 125°F (0° to 52°C)
Operating Humidity	20% - 95% RH, non-condensing
Approvals	UL-recognized component UL E133813
Weight	0.15 lbs (0.07 kg)
Warranty	2 years

WIRING



ORDERING INFORMATION

MODEL	DESCRIPTION
APR20	AUTOPHOS® 120/277 VAC 20A relay

RELATED PRODUCTS

CL Series	Integrated Lighting Control Products
Autophos® Series	Integrated Lighting Control Panels and Retrofit products

LIGHTING CONTROLS

KELE AUTOPHOS® RETROFIT KIT

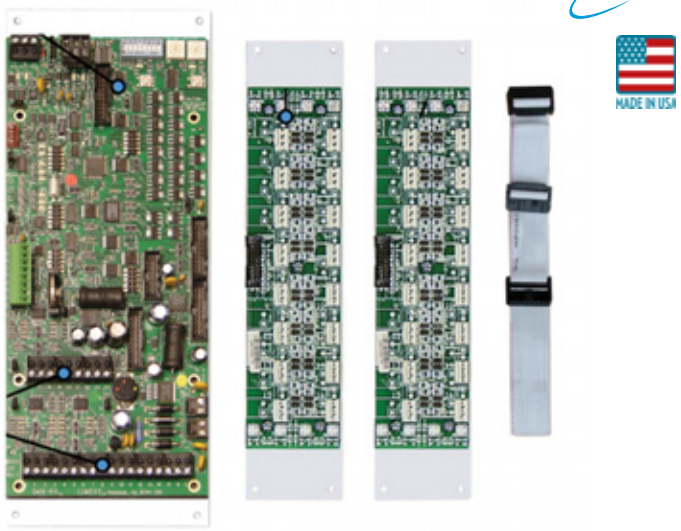
APK

DESCRIPTION

The **APK** AUTOPHOS® Retrofit Kits convert stand alone lighting panels to integrated lighting controls using BACnet MS/TP and JCI-N2 communications. It is the perfect choice for upgrading lighting control panels while reusing the existing switches, panel relays, E and high voltage wiring. The **APK** is an ideal low-cost alternative to the costly replacement of older lighting panels.

FEATURES

- ***Contains all the features of an AUTOPHOS® programmable lighting panel***
- ***Built-in JCI-N2 and BACnet MS/TP Native interface***
- ***Provides a low-cost solution for upgrading existing lighting panels***
- ***Interfaces to existing relays from GE, Douglas, Touch Plate, MicroLite, Reliant, Horton, Lithonia, and others***
- ***Reuses high-voltage wiring, low-voltage switch wiring, enclosure and 24 VAC transformer***



APK3

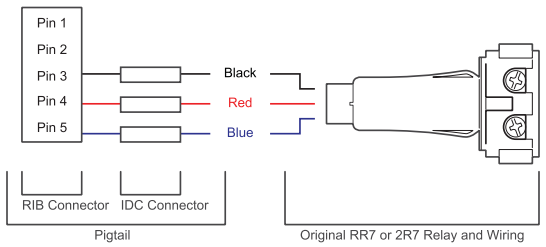
COMPATIBILITY

APK2	Douglas WR-6161/6162/69172/6221, ILC 2PC
APK3	GE RR7, Horton RR7, Wattstopper RR7, Lithonia RR7, ILC 2R7
APK4	MicroLite MLR-020, Touch-Plate 3000/4000-PL, Johnson Controls JCI-ILC
APK5	GE RR9, Horton RR9, WattStopper RR9, Lithonia RR9, ILC 2R9

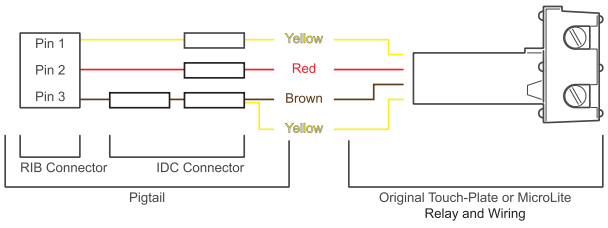
SPECIFICATIONS

Supply Voltage	24 VAC ±10%
Supply Frequency	50/ 60 Hz
Supply VA	30 VA
Analog Input	6; 0-5 VAC light level sensor
Digital Switch Inputs	24 dry contact, 24 2-wire or 12 3-wire momentary or maintained
Relay Outputs	Relay interface boards to existing control relays
Wire Type	
Power	18 AWG min solid or stranded
Input	18 AWG solid or stranded, non twisted, unshielded
Communication Ports	Network ready, two-wire RS-485
Communication Protocol	BACnet/ MSTP,JCI N2
Operating Temperature	32° to 125°F (0° to 50°C)
Operating Humidity	10% to 95% RH non-condensing
Warranty	1 year

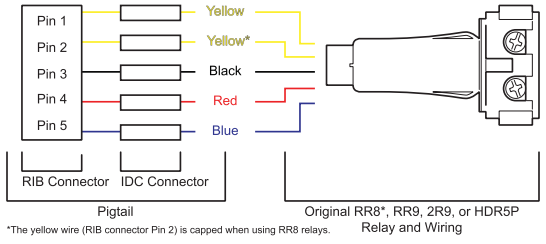
WIRING PIGTAILS FOR APK3, APK4, AND APK5 (optional)



APK3



APK4



APK5

NOTE: APK2 (2 wire) has terminal block connections and pigtails are not required.

KELE AUTOPHOS® RETROFIT KIT

APK

ORDERING INFORMATION

MODEL	DESCRIPTION
APK2	AUTOPHOS KIT BACnet,N2, 32 TWO-WIRE RELAYS
APK3	AUTOPHOS KIT BACnet,N2, 32 THREE-WIRE RELAYS
APK4	AUTOPHOS KIT BACnet,N2, 30 FOUR-WIRE RELAYS
APK5	AUTOPHOS KIT BACnet,N2, 32 FIVE-WIRE RELAYS

ACCESSORIES

APK2X	Expansion kit to 60 relay outputs for APK2
APK3X	Expansion kit to 60 relay outputs for APK3
APK4X	Expansion kit to 60 relay outputs for APK4
APK5X	Expansion kit to 60 relay outputs for APK5
APKPT3	12" 3 -wire pigtail and IDC wire connectors for use with APK3
APKPT4	12" 4 -wire pigtail and IDC wire connectors for use with APK4
APKPT5	12" 5 -wire pigtail and IDC wire connectors for use with APK5
APUSB-TK	Configuration software for Autophos® series and Tech Cable

RELATED PRODUCTS

		PAGE
RR-7	Three-wire low voltage leads	**589**
RR-9	Five-wire low voltage leads with isolated pilot auxiliary contact	**589**

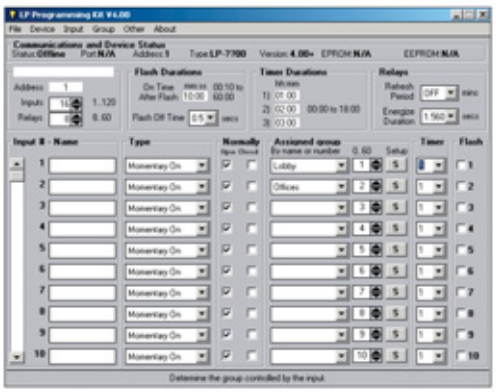
AUTOPHOS® SET-UP SOFTWARE

APUSB-TK

AUTOPHOS®

DESCRIPTION

The **APUSB-TK** (formerly Apsoft or LP-PK) is configuration software required for AUTOPHOS® lighting and retrofit panels. The software is used to assign Inputs to Outputs utilizing a grouping method. Inputs consists of switches, occupancy sensors, light level sensors, etc, and are configured with various settings. Outputs consists of relay loads. Together the Inputs and Outputs are configured and assigned control of a group. Groups are than idenfied by the BMS and treated as control points.



REQUIREMENTS

- ***IBM compatible Pentium or newer***
- ***2 MB or more of RAM***
- ***Mouse and unused serial/USB port***
- ***1M free hard drive space***
- ***CD drive***
- ***Windows NT, 2000, or higher***

FEATURES

- ***Easy-to-use, Windows-based programmers tool***
- ***CD and USB cable provided***
- ***Direct connect PC to lighting panel***
- ***Used to assign panel address and configure inputs/ outputs***
- ***Reads, writes, and stores lighting controller program***

AUTOPHOS® configuration kit includes:

- ***USB cable for computer connection***
- ***CD configuration software***

ORDERING INFORMATION

MODEL	DESCRIPTION
APUSB-TK	Configuration software for Autophos® series and Tech Cable

THE LIGHTS ARE ON, BUT NOBODY'S HOME

You've probably heard the adage, "The lights are on, but nobody's home"—it usually implies a lack of understanding or knowledge, but that's not the case with commercial buildings. It relates to the state of these buildings at night, lit up like Christmas trees, even when no one's there.

Thousands of dollars are wasted every day on excessive energy costs resulting from lighting unoccupied buildings. Even in these tough economic times, businesses and building owners are leaving the lights on. The problem is inferior or nonexistent lighting controls.

Lighting controls integrated with an energy management system can generate BIG savings in energy costs for companies seeking ways to cut overhead expenses. With the addition of rebates from utility companies and various other tax benefits, the incentive to make the investment to install or update lighting control yields attractive ROIs and increased profitability.

AUTOPHOS® from Kele brings your integrated lighting solution to a new level. AUTOPHOS® offers the latest technology in lighting control, and is easily integrated into your energy management system.

By incorporating lighting schedules you can determine which lighting circuits remain on during business off-hours or unoccupied times. During work hours, you have the ability to do day-lighting control or use occupancy sensors to turn lights on in spaces that are normally unoccupied by personnel.

Knowledge is power. Data derived from your energy management system and integrated controls allow for trending to determine ballast lifetime, participating in load shedding events, or scheduling maintenance. Know that the lights may be on, but only because you want them to be!

APK

AUTOPHOS®

OCCUPANCY SENSORS IN BUILDING MANAGEMENT SYSTEMS

While they're often associated with security, occupancy sensors may be used in building automation and energy management to enable and disable loads in order to save energy.

In BAS systems most occupancy sensors, also called motion detectors, employ a passive infrared sensor. Infrared radiation is part of the electromagnetic spectrum and its wavelength is longer than that of visible light. Pretty much anything that generates heat generates infrared radiation. Passive infrared sensors (PIRs) detect the presence of humans by detecting heat. As a rule humans have an average skin temperature of 93°F (33.9°C) and will radiate an infrared wavelength between nine and ten micrometers. Most PIR-type occupancy sensors detect between eight and ten micrometers.

Other types of occupancy sensors include ultrasonic devices that emit an active signal and listen to its echo from the surroundings. A change in the echo indicates a change in surroundings. Dual-technology devices contain both ultrasonic and PIR sensors.

One important thing to consider when selecting an occupancy sensor is the coverage pattern required. A sensor that is ideal for a classroom or conference room may not work well in a warehouse setting with tall shelving units or office space with high cubicle walls. Infrared occupancy sensors can't sense through glass, so be sure a window or a glass door isn't in the way. Adjustable sensitivity and time delay are also things to think about – since these adjustments will help to insure that comfort isn't sacrificed just to achieve savings.

The WattStopper **CX-100, CI-200**, and Kele **LX-24 Series** are PIR sensors. In addition, ultrasonic and dual technology series sensors are available in the lighting controls section of our print and online catalog. These sensors provide a wide variety of coverage patterns and mounting options. All have adjustable sensitivity and time delay to meet different application needs.

CX-100 Sensor

LX-24 Sensor (ceiling mounted)

CI-200 Sensor

INTEGRATED LIGHTING CONTROL PANEL WITH BACNET® AND METASYS N2®

CL SERIES RELAY PANEL

NEW!

MADE IN USA

BLUE RIDGE TECHNOLOGIES

DESCRIPTION

The **CL Series** Relay Panels are open architecture relay control panels designed for integration with Building Automation Systems (BAS). The panels have Blue Ridge innovations including the Lx5 Controller and Lighting Tough Relay (LTR). The Lx5 platform features dip switch selectable BAS protocols eliminating protocol option cards, gateways, and separate networks. In addition, Lx5 is field upgradable so the latest features and protocols are only a download away.

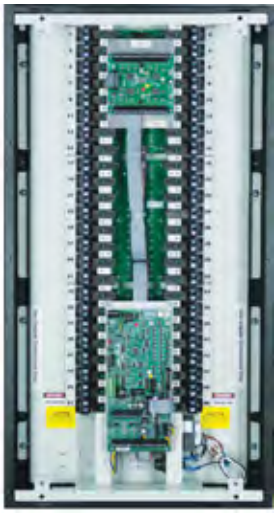
FEATURES

- ***Surface and Flush mount door styles***
- ***08, 16, 32, and 48 relay capacity***
- ***UL 924 Emergency bypass option***
- ***LTR relay rated life of 300,000 cycles at full load***
- ***Hinged locking door is field reversible***

CL08P08

CL16P16-00-0L-0H

CL32P32-00-0L-0H



CI48P48-00-0L-0H

BACnet

UL

SPECIFICATIONS

Supply Voltage	120 or 277 VAC ±10% 50 / 60 Hz
Supply VA	30 VA
Supply Frequency	50 / 60 Hz
Secondary Voltage	24 VAC ±10%
Relay Type	SPST latching with manual override, pulse drive
Short Circuit Current Rating	
SCCR	20,000 A @ 277 VAC
Relay Life Cycles	300,000
Contactor Ballast	20 A @ 277 VAC, 20 amp @ 347 VAC
Contactor Tungsten	20 A @ 120 VAC
Resistive Load	20 A @ 277 VAC, 20 A @ 347 VAC
Analog Inputs	6; 0-5 VAC light level sensor
Digital Switch Inputs	
08 and 16- relay	24 two wire or 12 three wire
32 and 48 -relay	56 two wire or 28 three wire
Relay Terminals	Screw terminal with box clamp
Wire Size	
Power	18 AWG min solid or stranded
Input	18 AWG solid or stranded, non twisted, unshielded
Relay	14-10 AWG or single AWG, solid or stranded Cu only
Network	Max length 4000 ft
Communication	
Wire	Belden 8760 or equal
Communication Protocol	BACnet MSTP 9600, 19200, 38400, 76800 N2 9600
Operating Temperature	32° to 125°F (0° to 50°C)
Operating Humidity	20% to 95% RH, non-condensing
Mounting	Surface, Flush
Enclosure Rating	NEMA 1, Dry / indoor environment
Approvals	IEC Level 3, FCC Part 15 Class A, UL 916, CEC Title 24, UL924
Warranty	2 years

INTEGRATED LIGHTING CONTROL PANEL WITH BACNET® AND METASYS N2®

CL SERIES RELAY PANEL

APPLICATION

The **UL924 Option Relay Interface Board** enables CL Series Relay Panels to provide energy management control of emergency lighting circuits during normal operation while maintaining emergency function during power loss. These panels monitor normal power for drop-out. When drop-out occurs UL924 forces its relays On. Once the emergency transfer switch and generator supply backup power, the emergency lighting comes to life immediately. The UL924 option includes Relay Voltage Dividers (RVD) for separated normal and emergency circuits as well as provisions for user installed indicator lamp.

SEQUENCE OF OPERATION

UL924 Option Relay Interface Board

1. Emergency circuits are controlled from the UL924 Relay Interface Board. The UL924 jumper is set for 'Emergency action Close all relays'.
2. Power loss is detected by the UL924.
3. All relays connected to the UL924 are forced ON. UL924 capacitors power emergency relay function. No external power source or input is required for UL924 operation.
4. Relays not connected to the UL924 remain in their present state (On/Off). Lighting Tough Relays (LTR) are mechanical latching type.
5. Generator transfer switch (not located in the relay panel) reacts and allows generator to feed dedicated emergency circuits previously fed by normal (utility)power. The relays connected to the UL924 are already ON, so the only possible source of delay in emergency lighting is the generator or emergency transfer switch.
6. Dedicated emergency lighting circuits will remain On while emergency power source is applied.
7. Normal power is restored and the emergency transfer switch returns all circuits to normal power.
8. Relays connected to the UL924 will remain On during and after normal power restoration.
9. Relays not connected to the UL924 remain in their present state (On/Off).
10. Normal control of all relays, including relays connected to the UL924, is restored.

DIMENSIONS AND WEIGHTS

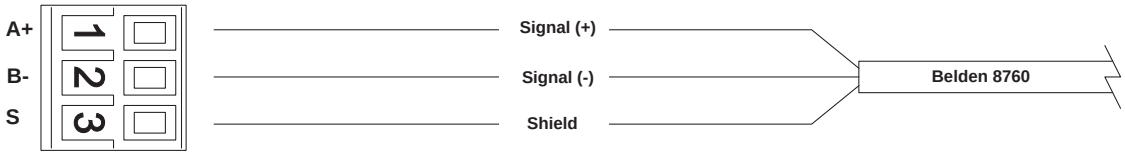
Model	Relay Panel capacity	Enclosure			Surface Door		Flush Door		Weight
		Height	Width	Depth	Height	Width	Height	Width	
CL08	08	14.75 in (37.2 cm)	13.00 in (33.2 cm)	5.75 in (14.6 cm)	14.94 in (37.9 cm)	13.16 in (33.4 cm)	NA	NA	24 lbs (10.2 kg)
CL16	16	16.20 in (41.1 cm)	18.0 in (45.7 cm)	5.75 in (14.6 cm)	16.45 in (41.8 cm)	18.08 in (45.9 cm)	17.70 in (45.0 cm)	19.58 in (49.7 cm)	36 lbs (16.3 kg)
CL32	32	25.00 in (63.5 cm)	18.0 in (45.7 cm)	5.75 in (14.6 cm)	25.25 in (64.1 cm)	18.08 in (45.9 cm)	26.50 in (67.3 cm)	19.58 in (49.7 cm)	54 lbs (24.5 kg)
CL48	48	33.80 in (85.9 cm)	18.0 in (45.7 cm)	5.75 in (14.6 cm)	34.05 in (86.5 cm)	18.08 in (45.9 cm)	35.30 in (89.7 cm)	19.58 in (49.7 cm)	69 lbs (31.3 kg)

INTEGRATED LIGHTING CONTROL PANEL WITH BACNET® AND METASYS N2®

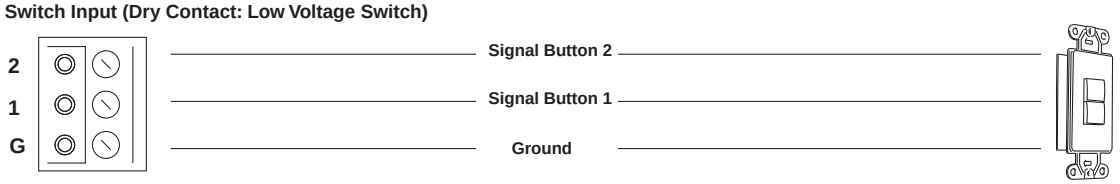
CL SERIES RELAY PANEL

LOW VOLTAGE CONNECTIONS

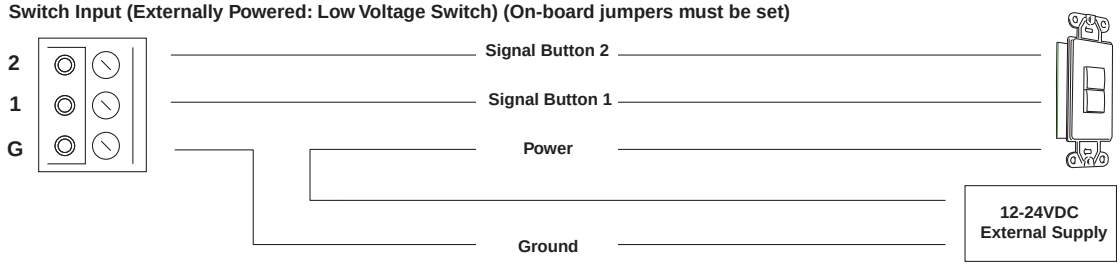
BACnet MSTP / N2 Network (Input)



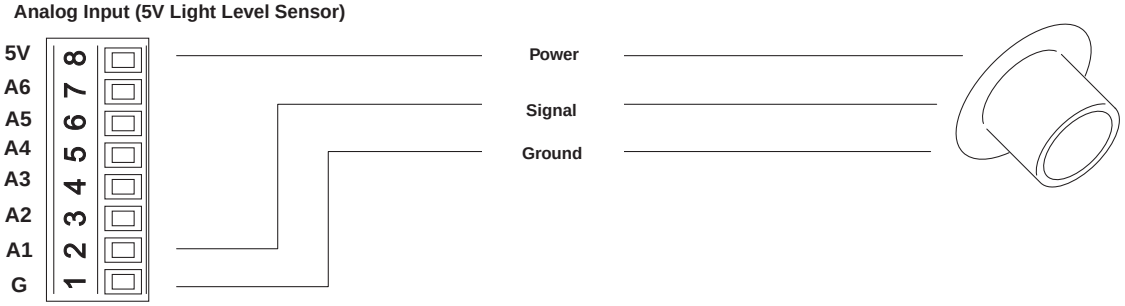
Switch Input (Dry Contact: Low Voltage Switch)



Switch Input (Externally Powered: Low Voltage Switch) (On-board jumpers must be set)

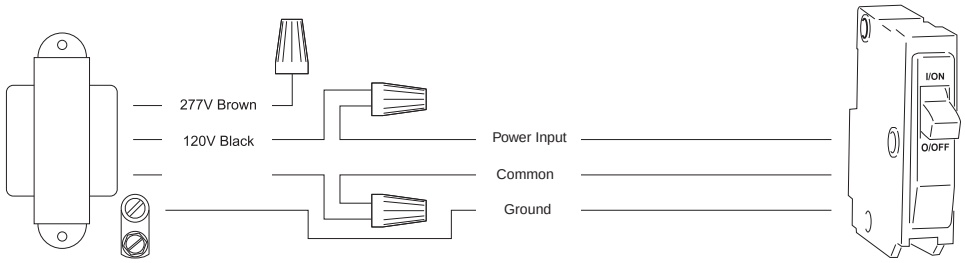


Analog Input (5V Light Level Sensor)



Digital Network (DDN Switches)

WIRING



INTEGRATED LIGHTING CONTROL PANEL WITH BACNET® AND METASYS N2®

CL SERIES RELAY PANEL

ORDERING INFORMATION

Model	Relay Panel Capacity	Relays Factory Installed	Digital Inputs	Analog Inputs	Mounting	UL924 option
CL08P-04	08	04	24	6	Surface	-
CL08P-08	08	08	24	6	Surface	-
CL16P-08-00-S	16	08	24	6	Surface	-
CL16P-16-00-S	16	16	24	6	Surface	-
CL16P-08-X0-S	16	08	24	6	Surface	UL924
CL16P-16-X0-S	16	16	24	6	Surface	UL924
CL16P-08-00-F	16	08	24	6	Flush	-
CL16P-16-00-F	16	16	24	6	Flush	-
CL16P-08-X0-F	16	08	24	6	Flush	UL924
CL16P-16-X0-F	16	16	24	6	Flush	UL924
CL32P-16-00-S	32	16	56	6	Surface	-
CL32P-24-00-S	32	24	56	6	Surface	-
CL32P-32-00-S	32	32	56	6	Surface	-
CL32P-16-X0-S	32	16	56	6	Surface	UL924
CL32P-24-X0-S	32	24	56	6	Surface	UL924
CL32P-32-X0-S	32	32	56	6	Surface	UL924
CL32P-16-00-F	32	16	56	6	Flush	-
CL32P-24-00-F	32	24	56	6	Flush	-
CL32P-32-00-F	32	32	56	6	Flush	-
CL32P-16-X0-F	32	16	56	6	Flush	UL924
CL32P-24-X0-F	32	24	56	6	Flush	UL924
CL32P-32-X0-F	32	32	56	6	Flush	UL924
CL48P-24-00-S	48	24	56	6	Surface	-
CL48P-32-00-S	48	32	56	6	Surface	-
CL48P-40-00-S	48	40	56	6	Surface	-
CL48P-48-00-S	48	48	56	6	Surface	-
CL48P-24-X0-S	48	24	56	6	Surface	UL924
CL48P-32-X0-S	48	32	56	6	Surface	UL924
CL48P-40-X0-S	48	40	56	6	Surface	UL924
CL48P-48-X0-S	48	48	56	6	Surface	UL924
CL48P-24-00-F	48	24	56	6	Flush	-
CL48P-32-00-F	48	32	56	6	Flush	-
CL48P-40-00-F	48	40	56	6	Flush	-
CL48P-48-00-F	48	48	56	6	Flush	-
CL48P-24-X0-F	48	24	56	6	Flush	UL924
CL48P-32-X0-F	48	32	56	6	Flush	UL924
CL48P-40-X0-F	48	40	56	6	Flush	UL924
CL48P-48-X0-F	48	48	56	6	Flush	UL924

ACCESSORIES

CLLTR1	CL Series Lighting Tough Relay (LTR), 1 Replacement LTR for Field Installation
CL	Series Lighting Relay Tough (LTR), 100 for Field Installation, Master Pack
RVD	CL series Relay Voltage Divider
CL-USB-TK	Configuration software for CL Lighting Panel

LIGHTING CONTROLS

RETROFIT LIGHTING CONTROL INTERIOR WITH BACNET® AND METASYS N2®

CL SERIES RETROFIT INTERIOR

DESCRIPTION

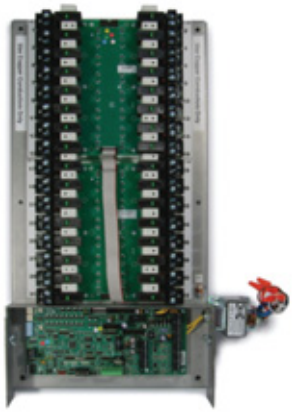
Many stand-alone and proprietary lighting control panels become inoperable with age. When the cost and downtime involved with a complete replacement of the stand-alone system is not an option, an alternative is Retrofit Interiors. A Retrofit Interior is a complete package including brain transplant (Controller) and relays.

FEATURES

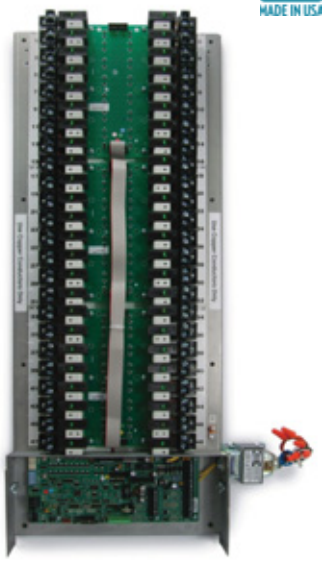
- ***Reduces installation labor up to 60%, install in less than 4 hours (typical)***
- ***Re-use of line voltage wire, conduit, and enclosures***
- ***Schedule, monitor, alarm, and trend from your Building Automation System (BAS)***
- ***UL listed***
- ***Blue Ridge Technologies Lx5 Controller and Lighting Tough Relays (LTR) on a single monolithic Back Plate.***
- ***Selectable (top/ bottom) Low Voltage Compartment***
- ***Relay Interior available in 16, 32, and 48 platform sizes to suit a variety of applications***

NEW!

CLRI16-16-00-B



CLRI32-32-00-B



CLRI48-48-00-B

BLUE RIDGE TECHNOLOGIES

MADE IN USA

BACnet

c UL us

SPECIFICATIONS

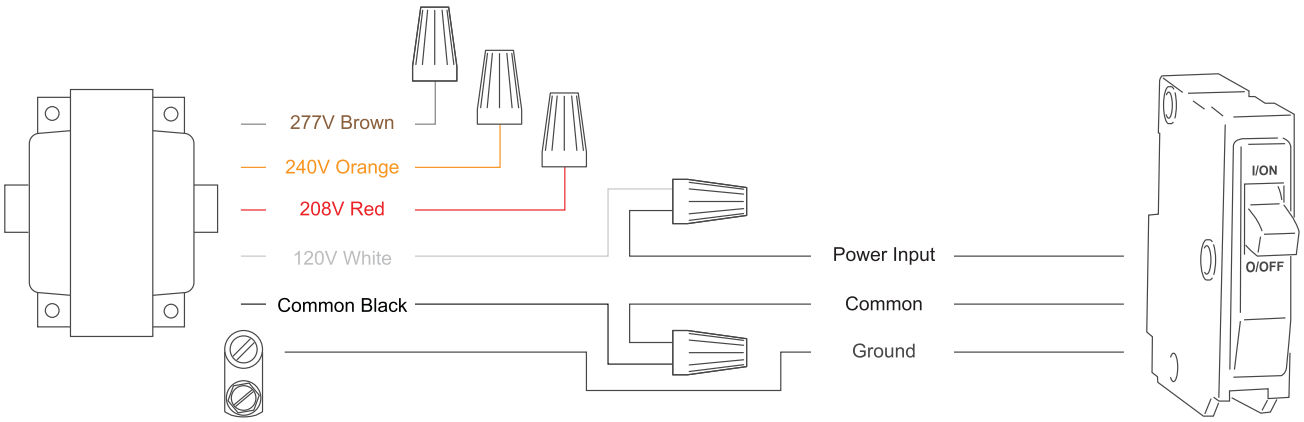
Supply Voltage	120 or 277 VAC ±10%
Supply VA	30 VA
Supply Frequency	50/ 60 hz
Secondary Voltage	24 VAC ±10% inherently limited
Relay Type	SPST latching N.O. with manual override, pulse driven
Short Circuit Current Rating	
SCCR	20,000 A at 277 VAC
Relay Life Cycles	300,000
Contactor Ballast	20 A @ 277 VAC 20 A @ 347 VAC
Contactor Tungsten	20 A @ 120 VAC
Resistive Load	20 A @ 277 VAC 20 A @ 347 VAC
Analog Inputs	6; 0-5 VAC light level sensor
Digital Switch Inputs	24 two wire or 12 three wire
LEXP option	56 two wire or 28 three wire
Relay Terminals	Screw terminal with box clamp
Wire Size	
Power	18 AWG min solid or stranded
Input	18 AWG solid or stranded, non twisted, unshielded
Relay	14-10 AWG or single AWG (solid or stranded Cu only)
Network	Max length 4000 ft
Communication Wire	Belden 8760 or equal
Communication Protocol	
	BACnet MSTP 9600, 19200, 38400, 76800 N2 9600
Operating Temperature	32° to 125°F (0° to 50°C)
Operating Humidity	20% to 95% RH, non-condensing
Dimensions	
16 Relay	14.25"H x 15.56"W x 3.38"D (36.2 x 39.5 x 86 cm)
32 Relay	23.13"H x 15.56"W x 3.38"D (58.8 x 39.5 x 86 cm)
48 Relay	31.88"H x 15.56"W x 3.38"D (81.0 x 39.5 x 86 cm)
Approvals	UL Listed, File E133813
Warranty	2 years

NEW!

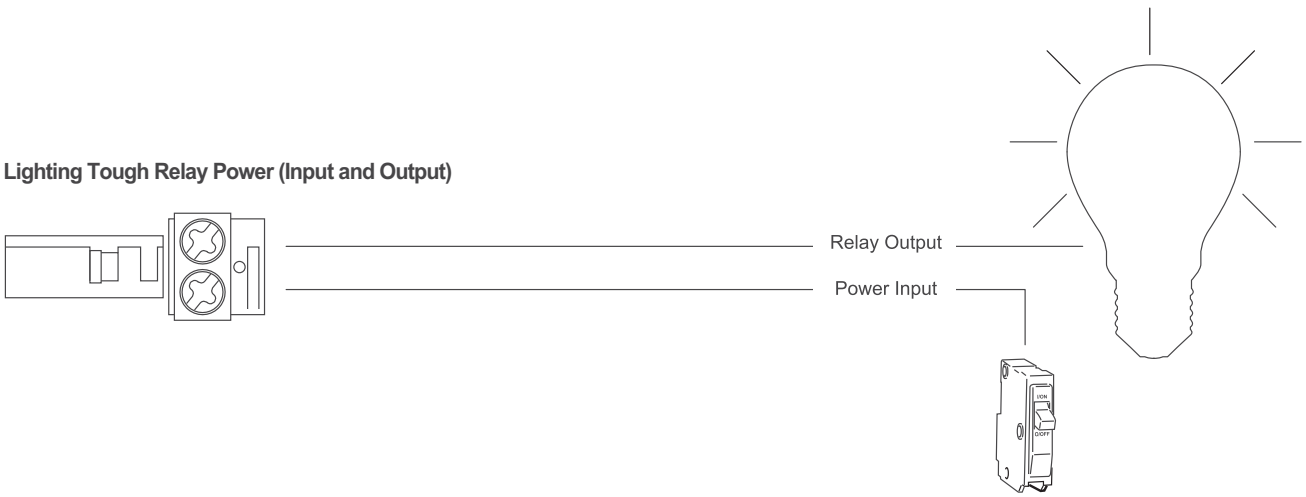
WIRING

Line Voltage Connections

Control Power (Transformer Primary)



Lighting Tough Relay Power (Input and Output)



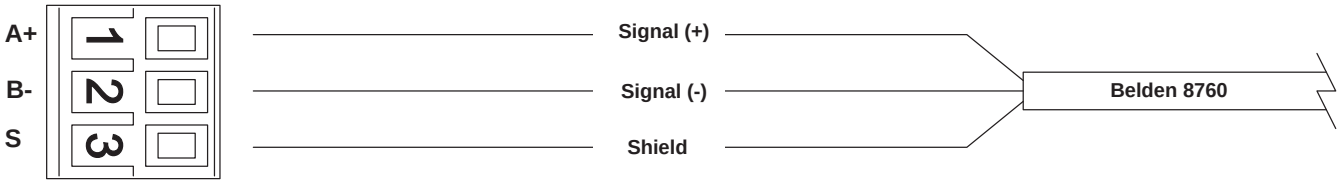
LIGHTING CONTROLS

RETROFIT LIGHTING CONTROL INTERIOR WITH BACNET® AND METASYS N2®

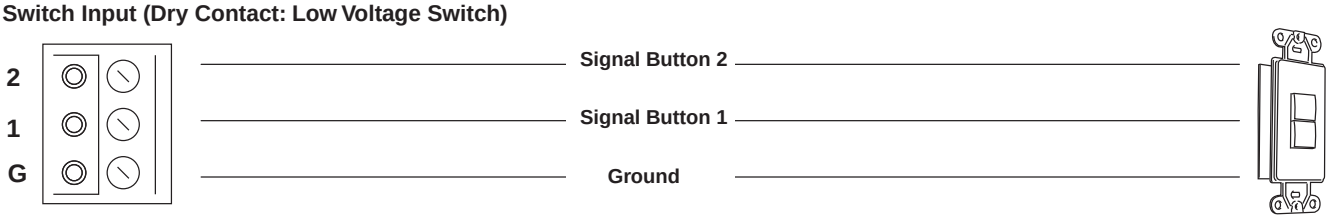
CL SERIES RETROFIT INTERIOR

LOW VOLTAGE CONNECTIONS

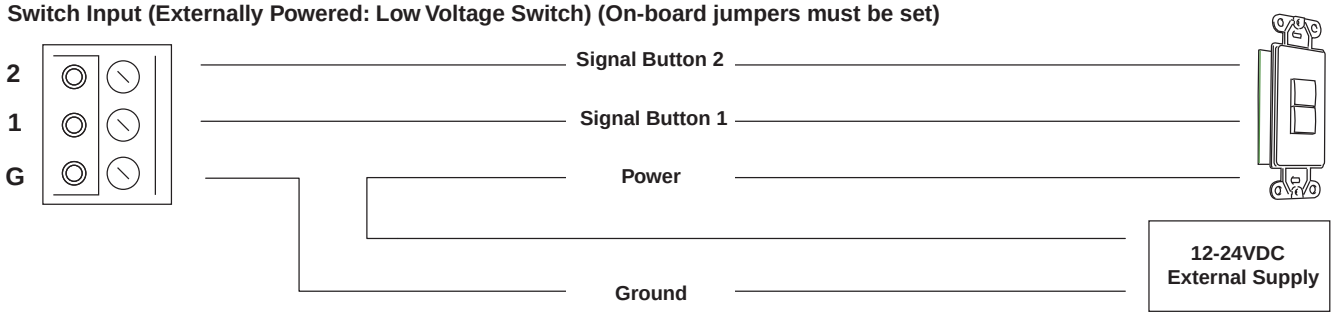
BACnet MSTP / N2 Network (Input)



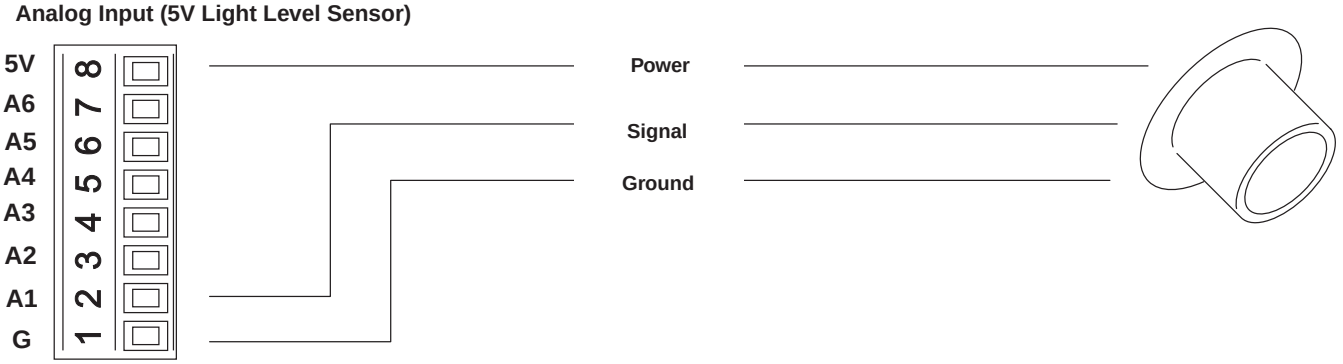
Switch Input (Dry Contact: Low Voltage Switch)



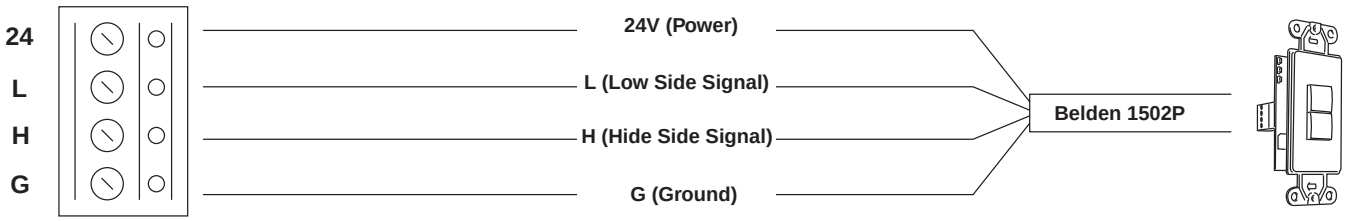
Switch Input (Externally Powered: Low Voltage Switch) (On-board jumpers must be set)



Analog Input (5V Light Level Sensor)



Digital Network (DDN Switches)



NEW!

RETROFIT LIGHTING CONTROL INTERIOR WITH BACNET® AND METASYS N2®

CL SERIES RETROFIT INTERIOR

APPLICATION

The **CL Series** retrofit interior offers an economical alternative to replacing the entire relay panel. By design you retain a substantial portion of the original investment, such as the enclosure, conduit, and wiring. The existing proprietary controls and outdated relay technology are removed. The new UL Listed Retrofit Interior incorporates all the features of a new Relay Panel including an integratable Controller and high performance relays on a single monolithic Back Plate. To accomodate the exisiting panel layout, the low voltage compartment may be factory mounted at the interior's top or bottom. Addtional Input Expansion Cards should be used to expand input capacity.

These interiors are compatible with-

Leviton:	Controlkeeper (16, 32 panel)
Lithonia Lighitng :	Switchkeeper/ WatchKepper/ Control Keeper (16, 32 panel)
Lutron:	XPS (16,32, 48 panel)
PCI Lighting Control:	Switchkeeper/ WatchKepper/ Control Keeper (16, 32 panel)
Siemens:	LCP2000 (16, 32 panel)
Trane:	Tracer LCP (16, 32 panel)

ORDERING INFORMATION

Model	Relay Capacity	Factory Installed Relays	Low Voltage Mounting
CLRI16-08-00-B	16	08	Bottom
CLRI16-08-00-T	16	08	Top
CLRI16-16-00-B	16	16	Bottom
CLRI16-16-00-T	16	16	Top
CLRI32-16-00-B	32	16	Bottom
CLRI32-16-00-T	32	16	Top
CLRI32-24-00-B	32	24	Bottom
CLRI32-24-00-T	32	24	Top
CLRI32-32-00-B	32	32	Bottom
CLRI32-32-00-T	32	32	Top
CLRI48-24-00-B	48	24	Bottom
CLRI48-24-00-T	48	24	Top
CLRI48-32-00-B	48	32	Bottom
CLRI48-32-00-T	48	32	Top
CLRI48-40-00-B	48	40	Bottom
CLRI48-40-00-T	48	40	Top
CLRI48-48-00-B	48	48	Bottom
CLRI48-48-00-T	48	48	Top

PROGRAMMABLE LIGHTING CONTROL PANEL

CX SERIES COMMERCIAL LIGHTING CONTROL PANELS

NEW!

HUBBELL Building Automation, Inc.

DESCRIPTION

The **CX Series** Commercial Lighting Control Panels provide cost-effective lighting control for maximum energy savings. The LCD user interface is located in the door and utilizes simple and intuitive scrolling menus to program, check status or update the panel. The easy to use Pre-Programmed Scenarios Menu makes project commissioning simple and fast.

The CX Panels can save up to 50% in labor and materials when used in place of conventional time clock and contactor combinations.

CX Series

FEATURES

- ***Four relay panel sizes 4, 8, 16, and 24 relay spaces***
- ***Five types of relays 20A/1P and 20A/2P, NO, NC (14K SCCR) and 30A/P latching (18K SCCR)***
- ***Door mounted LCD user interface with keypad***
- ***365 day programming with 64 schedules***
- ***Astronomical and real time clock***
- ***Selectable pre-programmed scenarios***
- ***Programmable inputs accept low voltage switches, photocells, or motion sensors***
- ***Two low voltage dry contact output relays on 8 relay panel***
- ***Program uploads via removable SD memory card***

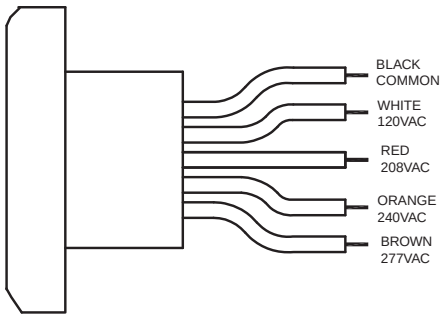
SPECIFICATIONS

Supply Voltage	120/208/240/277VAC
Digital Switch Inputs	6 standard, additional 1 input for each installed relay
Program Port	SD card
User Interface	Door mounted LCD graphical
Time Range	Real time clock and astronomical clock
Time Schedules	64 Schedules with date range, 32 groups
Timing Functions	99 Holiday dates, 4 holiday schedules, recurring dates Open/ Close time, after hour sweeps
Operating Temperature	32°-112°F (0°-50°C)
Operating Humidity	10% - 90% Non-condensing
Lockout	Hinged lockable door
Dimensions	17"H x 14.5"W x 4"D 24"H x 20"W x 4"D
Enclosure Rating	NEMA 1
Mounting	Surface
Approvals	ETL Certified to UL916 and cUL
Weight	
CX04	22 lbs (10 kg)
CX08	24 lbs (11 kg)
CX16	37 lbs (17 kg)
CX24	40 lbs (18 kg)
Warranty	2 years

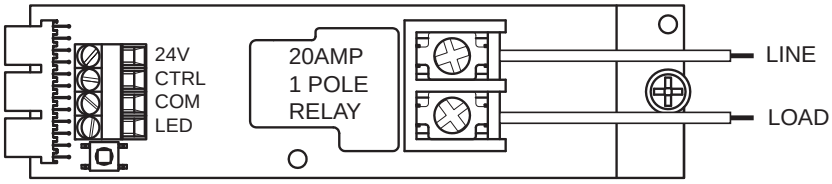
Relay	Type	Poles	Supply Voltage	Contactor Tungsten	Contactor Ballast	Contactor Motor	Short Circuit Current Rating
CXR2N	Electrically Held, NO	1	120	15A	20A	1 Hp	14K
		1	277	n/a	20A	3/4 Hp	14K
CXR2C	Electrically Held, NC	1	120	15A	20A	1 Hp	14K
		1	277	n/a	20A	3/4 Hp	14K
CXR3L	Latching	1	120	20A	30A	1 Hp	18K
		1	277	n/a	30A	n/a	18K
		1	347	n/a	20A	n/a	18K
CXRTN	Electrically Held, NO	2	480	-	20A	2 Hp	14K
CXRTC	Electrically Held, NC	2	480	-	20A	2 Hp	14K

WIRING

Power Wiring



Relay Wiring



ORDERING INFORMATION

Model	Relays Capacity	Relays Installed	Supply Voltage	Relay Type
Relay Panels				
CX042S042NN	4	4	120/208/240/277VAC	4-20A/1P NO
CX042S043LN	4	4	120/208/240/277VAC	4-30A/1P Latching
CX042S04TNN	4	4	120/208/240/277VAC	4-20A/2P NO
CX042S00SPN	4	0	120/208/240/277VAC	CXR Field Installed relay
CX043S043LN	4	4	120/277/347 VAC	4-30A/1P Latching
CX043S00SPN	4	0	120/277/347 VAC	CXR Field Installed relay
CX082S082NM	8	8	120/208/240/277VAC	8-20A/1P NO
CX082S083LM	8	8	120/208/240/277VAC	8-30A/1P Latching
CX082S08TNM	8	8	120/208/240/277VAC	8-20A/2P NO
CX082S00SPM	8	0	120/208/240/277VAC	CXR Field Installed relay
CX083S083LM	8	8	120/277/347 VAC	8-30A/1P Latching
CX083S00SPM	8	0	120/277/347 VAC	CXR Field Installed relay
CX162S162NM	16	16	120/208/240/277VAC	4-20A/1P NO
CX242S242NM	24	24	120/208/240/277VAC	4-20A/1P NO
CXR Relays				
CXR2N	-	-	120/ 277 VAC	20A/1P NO Electrically Held
CXR2C	-	-	120/277 VAC	20A/1P NC Electrically Held
CXR3L	-	-	120/277/347 VAC	30A/1P Latching
CXRTN	-	-	480 VAC	20A/ 2P NO Electrically Held
CXRTC	-	-	480 VAC	20A/2P NC Electrically Held

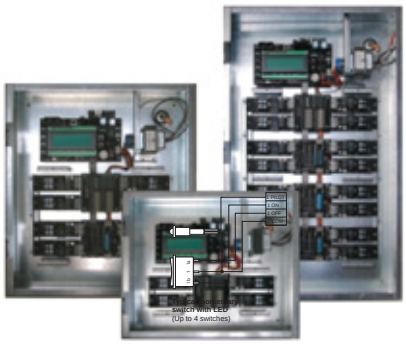
LIGHTING CONTROLS

PROGRAMMABLE LIGHTING CONTROL PANEL

ILC APPRENTICE II

DESCRIPTION

The **ILC Apprentice II (APII)** is a programmable lighting control panel that can network up to 48 control points and up to 32 LightSync™ devices via RJ-45 ports. The onboard USB 2.0 port connected to a PC with the Apprentice II Pro software allows control of the panel via a PC. Add-on cards are easy to install and add capabilities such as Metasys N2, Modbus, LonWorks, BACnet, and DTMF telephone switching. The lighting control panel incorporates a user friendly interface, solid reliability, and the flexibility to easily comply with energy codes.



MADE IN USA

FEATURES

- ***Ships complete, easy to install***
- ***Pre-drilled mounting holes***
- ***Low cost***
- ***365-day programmable lighting control panel***
- ***Removable hinged locking door standard***
- ***ILC LightSync switch and accessory ready***
- ***Network up to 48 control points***
- ***Panel sizes to accomodate 4, 8, and 16 relay outputs***
- ***Available with 4 to 48 hardwired inputs***
- ***48 programmable relay groups, presets, and timers***
- ***Uses ILCs new cost-effective Softcross (zero crossing) relays***
- ***All ON, All OFF push buttons for relay override***
- ***Daylight Saving Time adjustment and astronomical clock standard***
- ***Optional add-on input and communication modules***

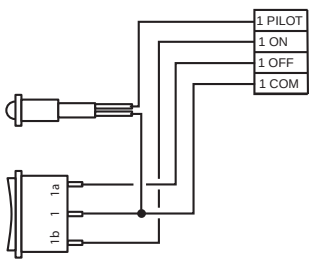
SPECIFICATIONS

Supply Voltage	120 or 277 +/- 10% VAC
Supply Frequency	50 to 60 Hz
Relay Type	4, 8, or 16 SPST Zero Cross, electrically held N.O. or N.C.
Relay Life	10,000,000 cycles
Contactor Ballast	20A at 120/277 VAC
Resistive Load	20A at 120/277 VAC
Switch Input	4 expandable
Relay Terminals	#14–10AWG solid or stranded copper wire
Communication Ports	RJ-45
Communication Protocol	BACnet/ mstp, BACnet/ IP, LonWorks, N2,MODBUS, TCP/IP
Operating Temperature	32° to 112°F (0° to 50°C)
Operating Humidity	10% to 90% non-condensing

Dimensions	
APII 04	12.0" H x 14.0" W x 4.0" D (30.5 x 35.6 x 10.2 cm)
APII 08	16.0" H x 14.0" W x 4.0" D (40.6 x 35.6 x 10.2 cm)
APII 16	24.0" H x 14.0" W x 4.0" D (61.0 x 35.6 x 10.2 cm)
Enclosure Rating	NEMA 1, surface mount
Meets ARRA or BAA	Yes
Additional Specifications	Soft configuration with greater than 50-year EEPROM memory retention in absence of power Minimum 30-day clock retention
Approvals	UL, cUL;File E141518 FCC approval for commercial use California Title 24,
Warranty	1 year

WIRING

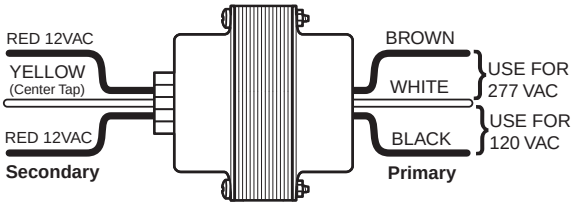
LOW VOLTAGE



Typical momentary switch with LED
(Up to 4 switches)

POWER WIRING

Power transformer termination detail



Dedicated 120/277 VAC circuit
Cap unused lead

APPLICATION ADD-ON INTERFACE MODULES (CARDS)

ADD-ON INTERFACE MODULES

MB: Modbus interface module – The Modbus interface add on module can easily be added to any Apprentice II lighting control panel to provide for integration to your Modbus communication and control system.

N2: N2 Metasys interface module – The Metasys N2 interface module can be integrated into a building automation system that includes the N2 communications protocol. The host system can then poll the status of the Apprentice II lighting control panel inputs and outputs and issue commands to the lighting control panels relay outputs.

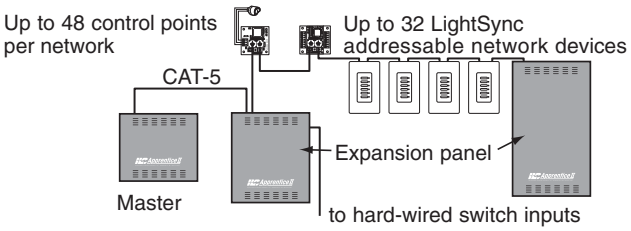
LON: LONWorks interface module – The LONWorks interface add-on module can easily be added to any Apprentice II lighting control panel to provide integration with a LONWorks control system.

TL: DTMF telephone interface module – The DTMF telephone add-on module provides voice prompted DTMF touch-tone telephone control and monitoring. Through the use of DTMF control signals the system user can command relays or groups of relays ON or OFF or activate preset scenes, from any touch-tone telephone, including cellular phones.

BNMSTP/BNIP: BACnet interface module – The Apprentice II BACnet interface add-on module can easily be added to any Apprentice II lighting control panel to provide integration with a BACnet control system.

TCPIP: TCP/IP Interface – The TCP/IP module gives the controller the ability to have an IP address on a 10/100Base-T Ethernet network. Connect to the panels, monitor, and program us the Apprentice II Pro software or connect from anywhere on the local are network or from the wide area network.

DEVICE NETWORK



Network Note: Communication network is 3000 FT max. For networks greater than, 3000 FT add PSR.

ORDERING INFORMATION

MODEL	DESCRIPTION
APII	ILC Apprentice II Lighting Control Panel*
	ENCLOSURE TYPE / SIZE
04	Four relays
08	Eight relays (Accepts one additional IB-4 interface board)
16	Sixteen relays (Accepts three additional IB-4 interface boards)
	PANEL TYPE
A	Stand alone master panel with display and keypad
X	Expansion panel (no display or keypad).
	RELAY TYPE
SR1NO	Normally open (04-4 relays, 08-8 relays, 16-16 relays)**
SR1NC	Normally closed (04-4 relays, 08-8 relays, 16-16 relays)**

APII - 04 - A - SRINO

Example: **APII-04A-SR1NO** ILC Apprentice II standard controller in a 04 enclosure type with4 N.O. relays.

*All panels ship with one IB-4 input board installed. One additional IB-4 can be added to the 08 enclosure type for a total of 8 inputs, and three additional IB-4 can be added to the16 enclosure type for a total of 16 inputs.

**No mixing of NO vs NC

ACCESSORIES

APII-BNMSTP	APII BACnet/MSTP interface card
APII-BNIP	APII BACnet /IP interface card
APII-LON	APII LONWorks interface card
APII-MB	APII MODBUS interface card
APII-N2	APII Metasys N2 protocol interface card
APII-TL	APII Telephone override touch and voice
IB-4	APII 4 Input expansion board
SR1-NC	APII Lighting panel relay (NC)
SR1-NO	APII Lighting panel relay (NO)
93000378	Lightsync Addressable Photocell
PSR	Power Source Repeater for network's greater than 3000 ft
APIITCP/IP	APII TCPIP Interface card

LIGHTING CONTROLS

ILC LIGHT SYNC ADRESSABLE SWITCHES

LS-PB-C SERIES

DESCRIPTION

LightSync™ **LS-PB-C Series** switches provide the flexibility needed for ILC lighting control panel applications that require multiple bypass switches. Each addressable switch button may be individually programmed to control a single relay or group of relays within an individual ILC lighting panel or a network of panels on the LightSync(tm) data line network. LightSync(tm) switches are equipped with common CAT-5 cable RJ-45 connectors. The data line network CAT-5 cable plugs into the RJ-45 plug in the ILC Apprentice II lighting control panel. Switch assembly and cover plate are ordered separately. Warranty is one year.

LS-PB-C-WH-6

MADE IN USA

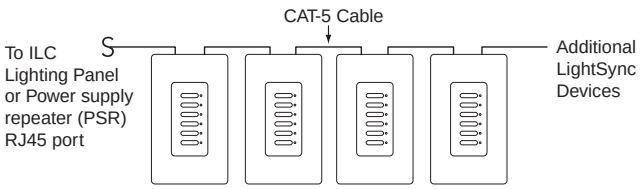
FEATURES

- ***Digitally-addressable device***
- ***1 to 6-button configuration***
- ***Mounts in standard single-gang box spacing***
- ***LED status indicators provide true relay group/preset status***
- ***Fits standard Decoratype plate***
- ***Available in four colors and stainless steel***

SPECIFICATIONS

Supply Voltage	12/24 VDC; 7 mA typical
Data Transmission	LightSync CAT-5data line
Communication Port	RJ45
LED Indication	Relay group / preset status
Operating Temperature	32° to 112°F (0° to 50°C)
Operating Humidity	10% to 95% Non-condensing
Dimensions	2.75" x 4.5" x 1.3" (6.9 x 11.4 x 3.2 cm)
Approvals	FCC
Weight	0.7 lbs (0.32 kg)
Warranty	2 years

WIRING



ORDERING INFORMATION

MODEL	DESCRIPTION	
LS-PB-C	LightSync™ switch assembly*	
	SWITCH COLOR	
	IV	Ivory
	WH	White
	BL	Black
	GY	Gray
	SS	Stainless steel
	X	Number of pushbuttons (up to 6 max.)

LS-PB-C – **WH** – **4**

Example: **LS-PB-WH-4** White, four pushbutton switch assembly

*Switch cover plates included

ACCESSORIES		PAGE
DCP-1.5-W	Power supply, 24 VAC IN to 24 VDC OUT	**837**

DESCRIPTION

Digital Lighting Management, **DLM Series** is an intelligent, distributed control system that automatically maximizes lighting energy efficiency. **DLM** is designed to scale from stand-alone control of individual rooms to centralized control of a floor, a building, or an entire campus. With **DLM**, you layer your choice of control strategies to meet project goals, from energy code compliance to building aesthetics, simplified maintenance and enhanced energy performance. Control options include: room controllers for switched or dimmed lighting loads, or for plug loads; digital occupancy sensors; sleek switches and handheld remotes; versatile daylighting sensors; lighting control panels; tools for remote configuration, scheduling and system management; and interfaces providing connectivity to third party devices.

For building-wide monitoring and management, multiple **DLM** local networks may be connected to an industry standard open protocol network for control by a segment manager or building automation system (BAS).

DLM Series

FEATURES

- ***Sensors and switches include infrared (IR) transceiver for bi-directional communication***
- ***On/off and dimming control options***
- ***Digital sensors feature easy-to-read LCD displays***
- ***Self-calibrating daylighting sensors***
- ***Plugged components on a free-topology Category 5e DLM local network***
- ***Allows scheduling of DLM devices***
- ***BAS integration through use of BACnet objects to represent DLM local network device settings and states Boot loading capabilities for firmware upgrades***
- ***Capable of bi-level control, daylight harvesting, plug load control and dimming.***

SPECIFICATIONS

Supply Voltage	24 VDC from DLM local network Segment Manager 15 VDC from 120 VAC plug-in power supply (included)
Connection Type	Removable terminal block for twisted pair DLM segment network connection
Cable Length	Local DLM network up to 1,000 feet of cable, max of 300 feet between communicating devices
Wire Type	
Local network	Cat5e cables with RJ45 connectors
Segment network	WattStopper LM-MSTP wire, or equivalent rated for BACnet MS/TP (RS485)
Room Controllers	
LMRC-100, LMPL-101	150mA per room controller (maximum 4) Up to 24 communicating devices Up to 8 loads
LMRC-2x, 3x, LMPL-201	Up to 250mA per room controller (output is limited if network is fully powered) Up to 48 communicating devices Up to 64 loads Up to 4 LMRC-100 Series and/or LMPL-101Room Controllers
Communication Interface	Up to 127 DLM local networks, connected via LMBC-300 Network Bridge or LMRC-3xx Series Room Controller, or LILM panels per segment
Communication Protocol	RS485 network, BACnet MS/TP twisted pair, baud rate 9600, 19200, 38400 or 76800 selectable
Connection Style	Free topology permits both star and daisy chain connection patterns Linear topology for MS/TP network daisy chain connection; 4000' maximum per segment
LED Indication	Normal operation
Operating Temperature	32°-158°F (0°-70°C)
Operating Humidity	5-90% RH, non-condensing
Additional Specifications	Reference individual Product Datasheets at www.kele.com
Approvals	UL, cUL, BTL, RoHS, FCC Part 15, ASHRAE 90.1, IECC, EPAct, California Title 24,
Warranty	1 year

DIGITAL LIGHTING CONTROLS

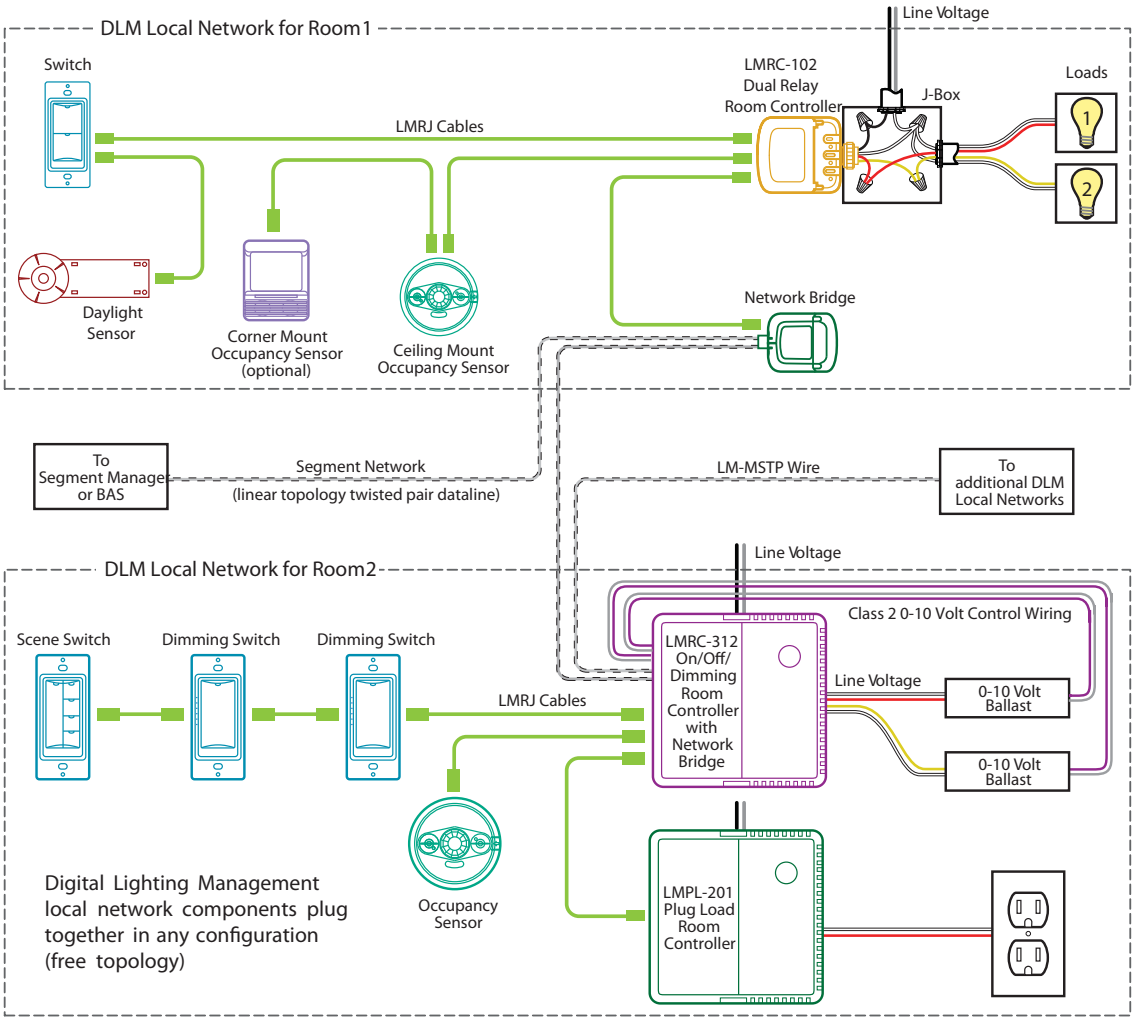
DLM SERIES DIGITAL LIGHTING MANAGEMENT

APPLICATION

Digital Lighting Management (**DLM**) components operate on a free-topology **DLM** local network. Each **DLM** local network is managed by one or more room controllers that, upon startup, automatically configure system components for the most energy-efficient sequence of operation using Plug n' Go technology. Plug n' Go establishes default functionality based on the installed components. The **DLM** architecture is designed from the bottom up, the segment network operation is simple, and builds on the Plug n' Go and Push n' Learn functionality of each local network. New or existing **DLM** systems can easily be incorporated into BACnet MS/TP networks. **DLM** Network Bridge devices are standard MS/TP master devices, and the MS/TP MAC address and communication baud rate are automatically configured through arbitration with other devies on the network. Building operators can create normal and after hours lighting control schedules and conveniently monitor and fine tune **DLM** operation for even greater energy savings.They can also monitor power consumption in real time.

CONNECTION DIAGRAM

Two DLM local networks connected to optional DLM segment network



Each segment network can connect up to 127 local networks for centralized monitoring and control

ORDERING INFORMATION

Model	Description
LMRC-101	Digital On/ Off room controller with one relay
LMRC-102	Digital On/Off Room Controller with 2 relays
LMRC-211	Digital On/Off/0-10 Volt Dimming Room Controller with 1 relay and 1 0-10 volt dimming output
LMRC-212	Digital On/Off/0-10 Volt Dimming Room Controller with 2 relays and 2 0-10 volt dimming outputs
LMRC-213	Digital On/Off/0-10 Volt Dimming Room Controller with 3 relays and 3 0-10 volt dimming outputs
LMPL-101	Digital Plug Load Room Controller
LMPX-100	Digital PIR Corner Mount Occupancy Sensor
LMPC-100	Digital PIR Ceiling Mount Occupancy Sensor
LMUC-100	Digital Ultrasonic Ceiling Mount Occupany Sensor
LMDX-100	Digital Dual Technology Corner Mount Occupancy Sensor
LMDC-100	Digital Dual Technology Ceiling Mount Occupancy Sensor
LMSW-101	Digital 1-Button Wall Switch
LMSW-102	Digital 2-Button Wall Switch
LMSW-103	Digital 3-Button Wall Switch
LMSW-104	Digital 4-Button Wall Switch
LMSW-108	Digital 8-Button Wall Switch
LMDM-101	Digital 1-Button Dimming Wall Switch
LMSW-105	Digital 5-Button Scene Switch
LMRH-102	Digital 2-Button IR Remote Control
LMRH-101	Digital Dimming IR Remote Control
LMRH-105	Digital Scene IR Remote Control
LMLS-105	On/Off Photosensor
LMLS-305	0-10 Volt Dimming Photosensor
LMCT-100	Digital Wireless Confi guration Tool
LMCI-100	Computer Interface Tools and Software
LMCS-100	Pre-Terminated Cables and Accessories (available in 6", 3', 10', 15', 25', 50', and 100' lengths
LMIR-100	Digital IR Ceiling Mount Receiver
LMRL-100	Isolated Relay Interface
LMIO-101	Digital Input/Output Interface
LMBC-300	BACnet network bridge
LMSM-201	Segment Manager, one BACnet MS/TP segment network
LMSM-603	Segment Manager, three BACnet MS/TP segment network

LIGHTING CONTROLS

ELECTRONIC TIME CLOCKS
ET SERIES

DESCRIPTION

Next Generation **Models ET70115C/CR** and **ET70215C/CR** are one- and two-channel electronic time clocks that provide simple, inexpensive control of lighting, HVAC equipment, commercial ovens, fans, blowers and pumps or any electrical load with a time-of-day schedule. These microprocessor-controlled models offer the ultimate in control and application flexibility. Remote override and network connection options move the Next Generation ahead of the competition. A simple keypad combined with a large LED display make models **ET70115C/CR** and **ET70215C/CR** easy to program.

ET70115C

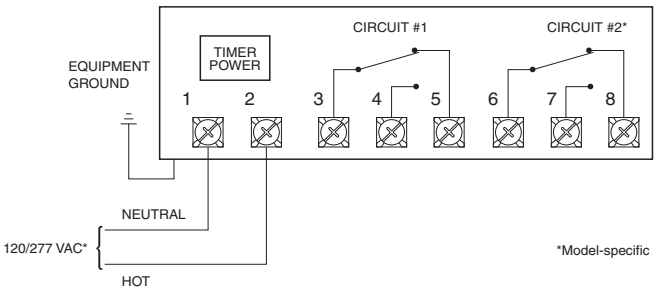
GRÄSSLIN

ET70215C

FEATURES

- ***24 hour, 7 day or 365 day scheduling***
- ***Fixed, astronomical, pulse and interval modes***
- ***Holiday programming (up to 99 schedules)***
- ***Lifetime memory for program data with 1000+ events***
- ***Eight-year battery maintains timekeeping function***
- ***Remote override option***
- ***One- and two-circuit models***
- ***Large LED display and simple keypad***
- ***Auto review for easy program review, with help messages for omissions***
- ***Available in NEMA 1 and NEMA 3 (lockable) enclosures***

WIRING



SPECIFICATIONS

Supply Voltage	120–277 VAC , 24 VAC
Supply Frequency	50/ 60 Hz
Contactor Ballast	20A resistive, general purpose 5A @ 120-277 VAC
Contactor Motor	1 hp @ 120 VAC, 2 hp @ 240 VAC 470 VA pilot duty @ 12-240 VAC
Contactor Tungsten	5A @ 120-240 VAC
Relay Output	SPDT contacts
Channels	One, Two
Dimensions	7.75"H x 5.0"W x 3.0"D (19.7 x 12.7 x 7.6 cm)
Enclosure Rating	NEMA 1, NEMA 3R
Approvals	UL listed, file # E76987 CSA certified
Weight	4.2 lb (1.9 kg)
Warranty	1 year

ORDERING INFORMATION

Model	Supply Voltage	Channels	Enclosure Rating
ET70115C	120–277 VAC	Single	NEMA 1
ET70115CR	120–277 VAC	Single	NEMA 3R
ET70215C	120–277 VAC	Two	NEMA 1
ET70215CR	120–277 VAC	Two	NEMA 3R
ET70215CR24	24 VAC	Single	NEMA 3R

LIGHTING CONTROLS

ELECTRONIC TIME CLOCKS
FM_D SERIES

DESCRIPTION

The **FM1D50 Series** Electronic Time Clocks are compact time controls providing 24-hour or 7-day time-based switching of HVAC control circuits, lighting, or machinery. The **FM1D50** is a single-circuit control and the **FM2D50** is a two-circuit control. They utilize heavy-duty, 16A, SPDT relay contacts suitable for low- or line- voltage loads.

FEATURES

- ***24-hour or 7-day programming with easy 4-button interface***
- ***50 programs, up to 25 on and 25 off events***
- ***24 VAC or 120 VAC models***
- ***Automatic daylight time changeover***
- ***Large LCD display of day, time, and load status***
- ***Manual override of each circuit***
- ***Eighth-day holiday programming***
- ***UL recognized, CE certified***

FM1D50A-120

GRÄSSLIN

c UL us

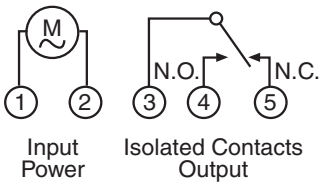
CE

SPECIFICATIONS

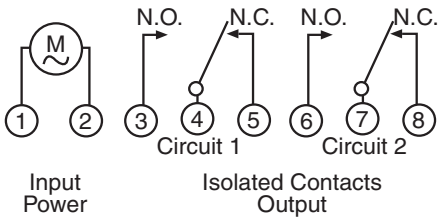
Supply Voltage	24VAC/ VDC, 120V, 240 V
Supply VA	4.4 VA max
Supply Frequency	50/ 60 Hz
Battery	Three year battery life Backups time and date only Programming stored in nonvolatile memory
Connection Type	Screw terminals, 12 AWG maximum
Contactor Ballast	8A @ 240 VAC, 12A @120 VAC 8A @ 240 VAC, 12A @120 VAC
Contactor Motor	1/2 hp, 120 VAC1/2 hp, 120 VAC; 1 hp, 240 VAC 1 hp, 240 VAC
Contactor Tungsten	600W @120 VAC 1000W @ 240 VAC

Resistive Load	16A, 277 VAC resistive
Relay Output	SPDT
Accuracy	±4 minutes per year
Shortest Switch Time	1 minute
Operating Temperature	-20° to 140°F (-28° to 60°C)
Enclosure	Plastic with terminal cover
Dimensions	4"H x 2.8"W x 2.3"D (10.2 x 7.2 x 5.8 cm)
Enclosure Rating	NEMA 3R
Approvals	UL recognized component, file E10694; CE certified
Weight	0.5 lb (0.23 kg)
Warranty	1 year

WIRING



Note: Screw terminals accept up to #12 AWG wire



Note: Screw terminals accept up to #12 AWG wire

ORDERING INFORMATION

Model	Supply Voltage	Channels	Mounting	Additional Specifications
FM1D20A-24	24VAC/ VDC	1	Surface/ DIN rail	20 programs
FM1D20A-120	120V	1	Surface/ DIN rail	20 programs
FM1D20A-240	240 V	1	Surface/ DIN rail	20 programs
FM1D50A-24	24VAC/ VDC	1	Surface/ DIN rail	50 programs
FM1D50A-120	120V	1	Surface/ DIN rail	50 programs
FM1D50E-24	24VAC/ VDC	1	Flush	50 programs
FM2D50-24	24VAC/ VDC	2	Surface/ DIN rail	50 programs
FM2D50-120	120V	2	Surface/ DIN rail	50 programs

LIGHTING CONTROLS

LIGHTING OVERRIDE SWITCHES
KSW SERIES

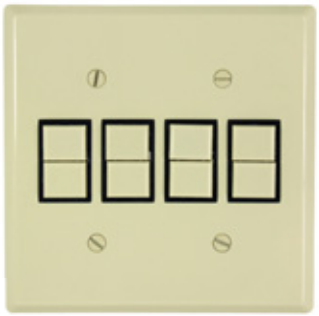
DESCRIPTION

The **KSW Series** (previously LSW) momentary switches are for controlling room and area lighting in commercial applications. The switch actuation on the **KSW-T Series** is toggle and the **KSW-P2 Series** is Push-button.The Push-button models include cover plates.

FEATURES

- ***Push-button models come with cover plates***
- ***Up to 8 momentary Push-button switches***
- ***Available in white, ivory, and stainless steel***
- ***Toggle switches Made in America***

NEW!



KSW-P2-I-24

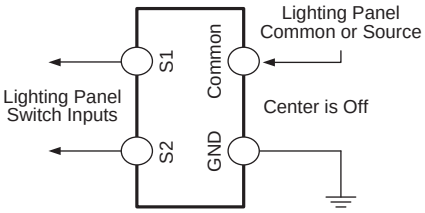
KSW-T-I and KSW-T24-I
Toggle Switches

KSW-P2-I-11
Push-button Switch

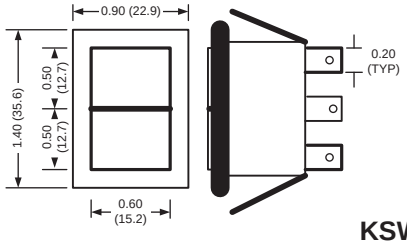
SPECIFICATIONS

Supply Voltage	
Toggle	24 VAC/ VDC, 3A, 120/ 277 VAC, 3A
Push-button	24 VAC/ VDC, 3A
Actuation Type	Push button, Toggle
Number Of Switches	
Push Button	2, 4, 6, 8
Toggle	1
Color	White, Ivory, Stainless steel

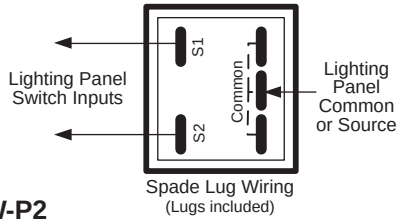
WIRING



KSW-T



KSW-P2



Spade Lug Wiring
(Lugs included)

ORDERING INFORMATION

Model	Supply Voltage	Number of Switches	Actuation Type	Color	Wallplates
KSW-P2-I-11	24 VAC/ VDC	2	Push button	Ivory	Switch plate
KSW-P2-I-12	24 VAC/ VDC	4	Push button	Ivory	Switch plate
KSW-P2-I-23	24 VAC/ VDC	6	Push button	Ivory	Switch plate
KSW-P2-I-24	24 VAC/ VDC	8	Push button	Ivory	Switch plate
KSW-P2-S-11	24 VAC/ VDC	2	Push button	Stainless steel	Switch plate
KSW-P2-S-12	24 VAC/ VDC	4	Push button	Stainless steel	Switch plate
KSW-P2-S-23	24 VAC/ VDC	6	Push button	Stainless steel	Switch plate
KSW-P2-S-24	24 VAC/ VDC	8	Push button	Stainless steel	Switch plate
KSW-P2-W-11	24 VAC/ VDC	2	Push button	White	Switch plate
KSW-P2-W-12	24 VAC/ VDC	4	Push button	White	Switch plate
KSW-P2-W-23	24 VAC/ VDC	6	Push button	White	Switch plate
KSW-P2-W-24	24 VAC/ VDC	8	Push button	White	Switch plate
KSW-T-I	120/ 277 VAC	1	Toggle	Ivory	No switch plate
KSW-T-W	120/ 277 VAC	1	Toggle	White	No switch plate
KSW-T24-I	24 VAC/ VDC	1	Toggle	Ivory	No switch plate
KSW-T24-W	24 VAC/ VDC	1	Toggle	White	No switch plate

NEW!

LIGHTING OVERRIDE SWITCHES
LV SERIES

NEW!

HUBBELL Building Automation, Inc.

MADE IN USA

RoHS

DESCRIPTION

Hubbell Building Automation's Low Voltage Wall Switches are designed for virtually any area. The soft contours of its architecturally pleasing design fit easily into any decor. Switches are available momentary and feature multiple button configurations with and without a pilot LED.

FEATURES

- ***Attractive, architecturally pleasing design***
- ***Momentary and latching versions available***
- ***1-4 buttons with or without LED***
- ***Mounts to standard single-gang box***
- ***2-year warranty***

LVSM2NPWH

LVSMIPLWH

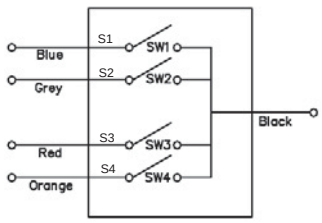
LVSM2PLWH

LVSM1NPWH

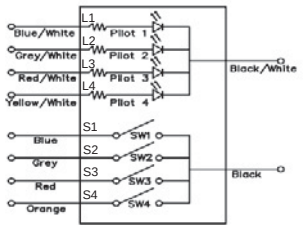
SPECIFICATIONS

Supply Voltage	
Switch	30VDC Max @100mA
Pilot LED	18-30VDC, internal 2.2kohm, ½ Watt resistor
Actuation Type	Momentary
Operating Temperature	32° - 122°F (0° - 50°C)
Operating Humidity	10% - 90% non-condensing
Number Of Switches	1-4
Mounting	Single-gang NEMA 1 style switch box (wall plate sold seperately)
Color	White, Ivory
Dimensions	4.3" x 1.9" x 1.6" (10.9 x 4.8 x 4.1 cm)
Materials of Construction	
Housing	Rugged, high impact, injection molded
Plastic Leads	Color coded
Weight	0.19 lbs (0.09 kg)
Warranty	2 years

WIRING



LVS 4-Button Latching or Momentary Switch, No Pilot



LVS 4-Button Latching or Momentary Switch, with Pilot LEDs*

*Note Pilot Polarity Marks

ORDERING INFORMATION

MODEL	DESCRIPTION
LVSMINPIV	Low Voltage Switch, Momentary, 1 Button, No Pilot, Ivory
LVSMINPWH	Low Voltage Switch, Momentary, 1 Button, No Pilot, White
LVSMIPLIV	Low Voltage Switch, Momentary, 1 Button, w/Pilot LED, Ivory
LVSMIPLWH	Low Voltage Switch, Momentary, 1 Button, w/Pilot LED, White
LVSM2NPIV	Low Voltage Switch, Momentary, 2 Button, No Pilot, Ivory
LVSM2NPWH	Low Voltage Switch, Momentary, 2 Button, No Pilot, White
LVSM2PLIV	Low Voltage Switch, Momentary, 2 Button, w/Pilot LED's, Ivory
LVSM2PLWH	Low Voltage Switch, Momentary, 2 Button, w/Pilot LED's, White
LVSM3NPIV	Low Voltage Switch, Momentary, 3 Button, No Pilot, Ivory
LVSM3NPWH	Low Voltage Switch, Momentary, 3 Button, No Pilot, White
LVSM3PLIV	Low Voltage Switch, Momentary, 3 Button, w/Pilot LED's, Ivory
LVSM3PLWH	Low Voltage Switch, Momentary, 3 Button, w/Pilot LED's, White
LVSM4NPIV	Low Voltage Switch, Momentary, 4 Button, No Pilot, Ivory
LVSM4NPWH	Low Voltage Switch, Momentary, 4 Button, No Pilot, White
LVSM4PLIV	Low Voltage Switch, Momentary, 4 Button, w/Pilot LED's, Ivory
LVSM4PLWH	Low Voltage Switch, Momentary, 4 Button, w/Pilot LED's, White

Standard Decora style wallplates not included.
Add "P" at end of model to include wall plate.

LIGHTING CONTROLS

LIGHTING OVERRIDE SWITCHES
CLLV-SW

NEW!

DESCRIPTION

The **CLLV-SW** lighting override switch is a low voltage input into a lighting control panel. Each button registers a solid, audible click when pushed.

FEATURES

- ***Switch and frame is made to fit a single gang electrical box***
- ***Made for use with Decora style wall plates (sold seperately)***
- ***One or two button***
- ***Illuminated buttons***

CLLV-SW1

CLLV-SW2

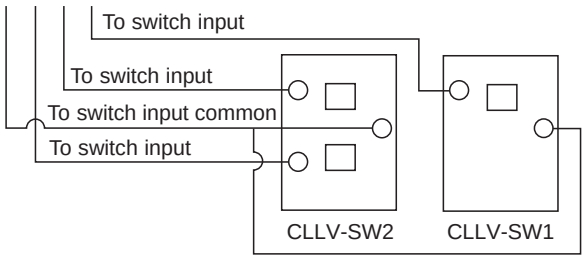
BLUERIDGE TECHNOLOGIES

MADE IN USA

SPECIFICATIONS

Supply Voltage	24 VAC/ VDC maximum
Contact Type	Momentary
Life Rating	1,000,000 mechanical operations
Operating Temperature	14° to 160°F (-10° to 71.1°C)
Operating Humidity	20%-95% RH, non-condensing
Color	White
Dimensions	3.97” (10.08 cm) H x 1.41” (3.58 cm) W x 0.79” (2.0 cm) D
Materials Of Construction	Plastic
Weight	0.1 lbs (0.06 kg)
Warranty	1 year

WIRING



ORDERING INFORMATION

MODEL	DESCRIPTION
CLLV-SW1	One button, low voltage momentary switch
CLLV-SW2	Two button, low voltage momentary switch

KEY OVERRIDE SWITCH
KPSW-K

DESCRIPTION

The **KPSW-K** switch allows key operation of lighting controls.

FEATURES

- ***Tamper-resistant face plate***
- ***Keys included***
- ***Screw chuck***
- ***One year warranty***

KPSW-K

Chuck Key included

MADE IN USA

Two Keys included

SPECIFICATIONS

Supply Voltage	24 VAC/ VDC
Contact Type	SPDT Maintained
Materials Of Construction	Stainless steel
Weight	0.15 lbs (0.07 kg)
Warranty	One year

ORDERING INFORMATION

MODEL	DESCRIPTION
KPSW-K	One Key switch, removable key, stainless steel, maintained contact

ACCESSORIES	
2KL	Replacement keys (two per set)

NEW!

DESCRIPTION

The Marktime **93000 Series** Wall Box Time Switch is a spring wound, manually set time switch for the control of electrical current. Interchangeable with standard toggle switches to turn circuits either off or on at the end of a preset time period, the **93000 Series** is ideally suited for new installations or retrofit projects.

FEATURES

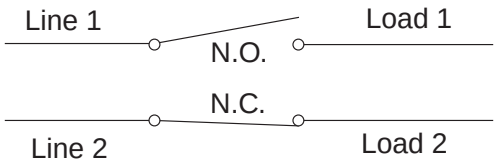
- ***White and ivory plates and knobs included with each time switch***
- ***Time range from minutes to 12 hours, all with ±5% accuracy***
- ***Easy-to-install two-wire design to fit standard single-gang wall box***
- ***Heavy motor loads without the need of contactors***
- ***Hold-Change of state without timer***
- ***No Hold-Changae of state with timer***

93504C

SPECIFICATIONS

Current Rating	7A Tungsten @ 125 VAC 20A non-inuductive, 1 Hp 125 VAC 10A non-inductive @ 277 VAC
Contact Type	N.O./ N.C. SPDT
Operating Temperature	-40° to 120°C (-40° to 48.89°C)
Mounting	Single gang wallbox
Color	Ivory and White included
Approvals	UL Listed, File E13151
Weight	0.4 lbs (0.18kg)
Warranty	1 year

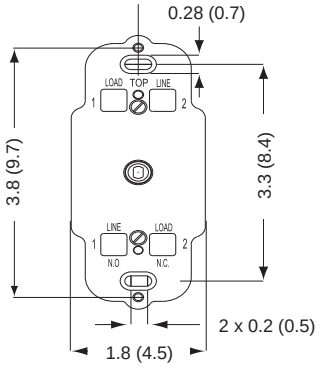
WIRING

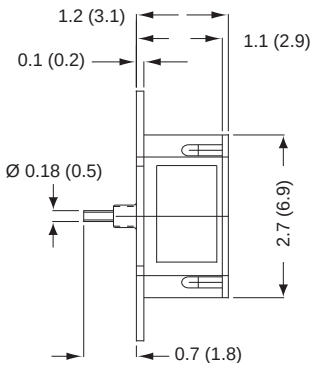


Note: For SPDT operation, install jumper wire from Line 1 terminal to the Line 2 terminal

DIMENSIONS

in
(cm)





ORDERING INFORMATION

MODEL	DESCRIPTION
93501C	0-15 min. timer includes knob and trim plate
93502C	0-30 min. timer includes knob and trim plate
93503C	0-60 min. timer includes knob and trim plate
93504C	0-120 min. timer includes knob and trim plate
93505C	0-6 hr. timer includes knob and trim plate
93506C	0-12 hr. timer includes knob and trim plate
93507C	0-4 hr. timer includes knob and trim plate
93511C	0-15 min. timer with Hold, includes knob and trim plate
93512C	0-30 min. timer with Hold, includes knob and trim plate
93513C	0-60 min. timer with Hold, includes knob and trim plate
93516C	0-12 hr. timer with Hold, includes knob and trim plate

WATTSTOPPER CARD KEY SWITCHES

HS-100, HS-150

DESCRIPTION

The **HS Series** Card Key Switch turns electrical circuits on or off when a card key or **HS-FOB** Key Fob is inserted or removed from its slot. The **HS-100** is a low voltage unit with a normally open and normally closed isolated relay, allowing it to interface with a third party energy management and/or lighting management control system. Additionally, the **HS-100** can connect to one or more Watt Stopper Power Packs. The **HS-150** is a line voltage unit that serves as a master switch for a single guest room circuit.

HS-100/HS-150 Shown with coverplate HS-WD

FEATURES

- ***Attractive, low-profile styling***
- ***Choice of five decorator colors***
- ***Backlit card key slot provides visibility in darkened rooms 30-second egress time delay***
- ***Zero crossing for reliability and increased product longevity (HS-150)***
- ***Can connect with one or more Watt Stopper***
- ***Power packs mounted remotely (HS-100)***
- ***Uses the same card key that unlocks the door***
- ***More effective compliance with code than a simple master wall switch, as only the HS card***
- ***Key switch ensures that guests will turn the lights off when leaving the room***
- ***Compliant with current requirements in both the***
- ***IECC and ASHRAE/IESNA Standard 90.1***
- ***Compatible with building automation systems, energy management systems, and lighting control panels***

APPLICATIONS

HS card key switches are ideal for guest rooms in hotels, motels, boarding houses, or similar applications with guest rooms.

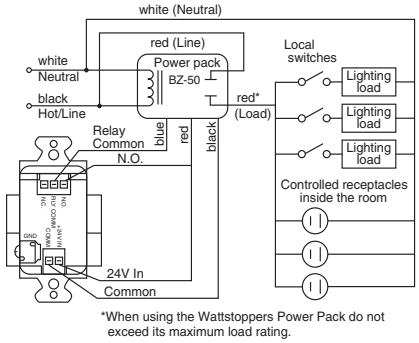
OPERATION

Inserting a door entry card key or **HS-FOB** into the **HS** card key switch energizes the controlled circuits and loads. Removing the card key initiates a 30-second time delay to allow a safe egress from the hotel room. Once this time delay elapses, the power to the circuits is terminated. To restore power to the room's controlled circuits, reinsert the card key into the **HS** card key switch.

SPECIFICATIONS

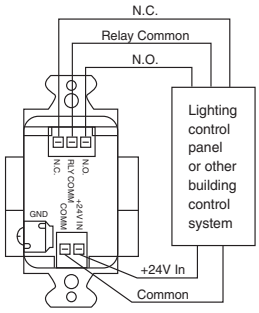
Supply Voltage	
HS100	24 VAC/VDC Half wave rectified
HS150	120/247/277 VAC, 50/60 Hz Zero cross
Contactor Ballast	
HS150	0-800W ballast switches at zero crossing
Contactor Motor	
HS150	1/4 hp @ 240/277 VAC switches at zero crossing
Contactor Tungsten	
HS150	0-800W tungsten switches at zero crossing
Relay Output	
HS100	1A/ 30VDC/VSC SPDT Isolated
Egress Time Delay	30 seconds
Color	Black, Gray, Ivory, Light almond, White
Dimensions	
Casing	2.63" L x 1.69" W x 1.89" D (6.78 x 4.29 x 4.78 cm)
Card key	3.375" H x 2.125" W x 0.034" D (8.6 x 5.4 x 0.09 cm)
Approvals	UL and cUL listed
Weight	
Casing	0.25 lb (0.11 kg)
Card key (FOD)	0.15 lb (0.07 kg)
Warranty	5 years

WIRING

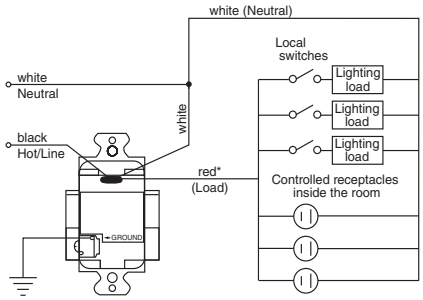


*When using the Wattstoppers Power Pack do not exceed its maximum load rating.

HS-100 with Power Pack



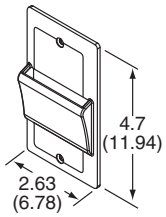
HS-100 with BAS or Lighting Control Panel



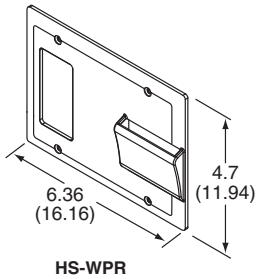
*When using the Wattstoppers Power Pack do not exceed its maximum load rating.

HS-150

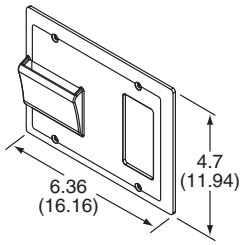
DIMENSIONS



HS-WP



HS-WPR



HS-WPL

ORDERING INFORMATION

Model	Color	Description
HS-100-B	Black	Low voltage card key switch, cover plate ordered separately
HS-100-G	Gray	Low voltage card key switch, cover plate ordered seperately
HS-100-I	Ivory	Low voltage card key switch, cover plate ordered seperately
HS-100-LA	Light almond	Low voltage card key switch, cover plate ordered seperately
HS-100-W	White	Low voltage card key switch, cover plate ordered seperately
HS-150-B	Black	Low voltage card key switch, cover plate ordered seperately
HS-150-G	Gray	Low voltage card key switch, cover plate ordered seperately
HS-150-I	Ivory	Low voltage card key switch, cover plate ordered seperately
HS-150-LA	Light almond	Low voltage card key switch, cover plate ordered seperately
HS-150-W	White	Low voltage card key switch, cover plate ordered seperately
HS-FOB-B	Black	Optional key fob accessory for guest rooms that do not use a card key
HS-FOB-G	Gray	Optional key fob accessory for guest rooms that do not use a card key
HS-FOB-I	Ivory	Optional key fob accessory for guest rooms that do not use a card key
HS-FOB-LA	Light almond	Optional key fob accessory for guest rooms that do not use a card key
HS-FOB-W	White	Optional key fob accessory for guest rooms that do not use a card key
HS-WP-B	Black	Cover plate for single-gang box
HS-WP-G	Gray	Cover plate for single-gang box
HS-WP-I	Ivory	Cover plate for single-gang box
HS-WP-LA	Light almond	Cover plate for single-gang box
HS-WP-W	White	Cover plate for single-gang box
HS-WPL-B	Black	Cover plate for three-gang box with decorator switch option; card slot on the left
HS-WPL-G	Gray	Cover plate for three-gang box with decorator switch option; card slot on the left
HS-WPL-I	Ivory	Cover plate for three-gang box with decorator switch option; card slot on the left
HS-WPL-LA	Light almond	Cover plate for three-gang box with decorator switch option; card slot on the left
HS-WPL-W	White	Cover plate for three-gang box with decorator switch option; card slot on the left
HS-WPR-B	Black	Cover plate for three-gang box with decorator switch option; card slot on the right
HS-WPR-G	Gray	Cover plate for three-gang box with decorator switch option; card slot on the right
HS-WPR-I	Ivory	Cover plate for three-gang box with decorator switch option; card slot on the right
HS-WPR-LA	Light almond	Cover plate for three-gang box with decorator switch option; card slot on the right
HS-WPR-W	White	Cover plate for three-gang box with decorator switch option; card slot on the right

LIGHTING CONTROLS

WIRELESS SWITCH TRANSMITTER AND CONTROL RELAY RECEIVER

WWS SERIES

NEW!

Functional Devices, Inc.

DESCRIPTION

Battery-free **WWS** Wireless Switch Transmitters are used to control lighting, but they can be used to control virtually any on/off device. Each self-powered wireless switch transmitter can be placed anywhere within range of a receiver.

Switch transmitters are powered by EnOcean's energy harvesting technology that converts the press of the switch into a small amount of electricity. This electricity is used to transmit a wireless signal that communicates with a wireless relay receiver. The **WR** Wireless Relay Receivers are prepackaged with relay, LED, socket, mounting rail, transient protection, and housing. The Relay receiver has built-in repeater function. Relay receives signal from wireless switch transmitter and rebroadcasts the signal to the next relay receiver.

FEATURES

- ***Decora style with several color choices***
- ***EnOcean enabled "energy harvesting" technology***
- ***No hardwiring for Wireless Switch Transmitter***
- ***Battery free***
- ***120 or 277 VAC***
- ***Up to 100 ft. (30 m) typical indoor transmission distance***
- ***Made in the USA***

WWS
Wireless Switch

WR
Wireless Receiver

SPECIFICATIONS

Supply Voltage	
WR	120 VAC, 73 mA 277 VAC, 73 mA
WWS	None
Supply Frequency	
WR	60 Hz
Frequency	315 mHz
Relay Life	
WR	10 million cycles min mechanical
Contact Type	
WR	(1) 20 A SPDT Continuous Duty Coil
Contactor Ballast	
WR	20A N.O. @ 277 VAC, 10A N.C. @ 277 VAC
Contactor Motor	
WR	2 Hp @ 277 VAC, 1 Hp @ 120 VAC
Contactor Tungsten	
WR	10A N.O. @ 120 VAC
Contact Resistance	
WR	20A @ 277 VAC, 5A @ 480 VAC
Pilot Duty	
WR	770 VA @ 120 VAC 1,110 VA @ 277 VAC
Transmission Power	
WWS	Max 10 mW equivalent isotropic radiated power
Receiver Sensitivity	
WR	-93 dBm typical
Lead Wires	
WR	16", 600V Rated
Antenna	Integrated 15 cm
LED Indication	
WR	Red Relay Status / Learn Mode Status (Flashing)
Switch Type	Rocker, Momentary, Toggle
Override	None
Range	Up to 100 feet (typical)
Operating Temperature	
WWS	-13° to 149°F (-25° to 65°C)
WR	-30° TO 140°F (-2° TO 61°C)
Dimensions	
WWS	2.75" x 4.50" x 0.62" (7.0 x 11.4 x 1.6 cm)
WR	2.30" x 3.20" x 1.80" with .50" NPT Nipple
Enclosure Rating	
WR	NEMA 1, plenum
Approvals	
WWS	FCC (US), IC (Canada)
WR	UL Listed File E268805, CE
Weight	
WWS	1.0 lbs (0.45 kg)
WR	0.4 lbs (0.2 kg)
Warranty	1 year

NEW!

LIGHTING CONTROLS

WIRELESS SWITCH TRANSMITTER AND CONTROL RELAY RECEIVER

WWS SERIES

APPLICATION

PLANNING GUIDE FOR COMMERCIAL BUILDINGS

The radio coverage in commercial buildings is usually restricted by fire safety walls that must be considered as screening. Inside the fire protected sections lightweight or glass partition walls are used with good radio wave propagation properties (except for metal reinforcements or metalized walls).

The following are two common installation architectures
1. Radio Sensors control the Actuators directly (RF bus). Usually, the radio paths to be covered are not very long (cubicle installation).
2. Radio Sensors control the Actuators via Automation System

Centrally-placed radio Gateways to the Building Automation System (e.g. BACnet, TCP/IP, LON,EIB) are used for system coverage. In the following a reliable radio planning is shown that can be done in quick time and using simple tools only:

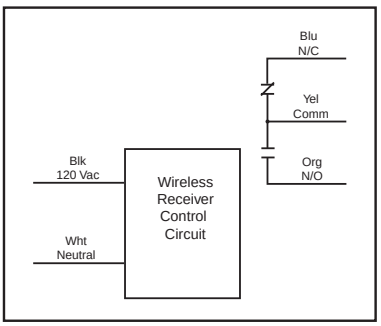
STEP 1: Take a Building Floor Plan and a Drawing Circle

STEP 2: Mark relevant Radio Shadings into the Floor Plan
- Fire Protection Walls
- Lavatories, Staircases, Elevator Shafts, Supply Areas

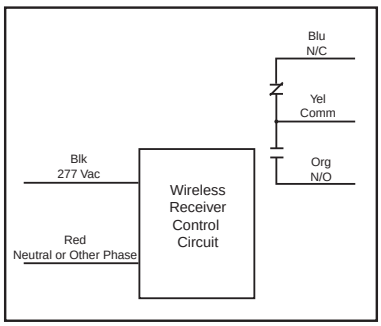
STEP 3: Draw circles area wide
- The circle centre points are the ideal positions of the radio gateways.
- By that the gateways should be positioned in such a way that no screens block the connection to any corner inside the fire safety section (potential sensor positions).

Planning with 32-39 feet range offers extensive reserve to avoid most typical bad conditions. For a highly robust radio transmission system it is advisable to implement a redundant radio receiver path. To do so, program two gateways for parallel reception of radio transmitters.

WIRING



WR120E20



WR277E20

ORDERING INFORMATION

MODEL	DESCRIPTION
WWS-A	Wireless Switch Transmitter (Almond)
WWS-BK	Wireless Switch Transmitter (Black)
WWS-BR	Wireless Switch Transmitter (Brown)
WWS-W	Wireless Switch Transmitter (White)
WWSP-A	Switch Cover Plate (Almond)
WWSP-BK	Switch Cover Plate (Black)
WWSP-BR	Switch Cover Plate (Brown)
WWSP-W	Switch Cover Plate (White)
WR120E20	Wireless Relay Receiver / Repeater Relay 20 Amp SPDT, 120 VAC
WR277E20	Wireless Relay Receiver / Repeater Relay 20 Amp SPDT, 277 VAC

LIGHTING CONTROLS

WATTSTOPPER OCCUPANCY SENSOR
CI-24

DESCRIPTION

The **CI-24** is a ceiling-mount passive infrared occupancy sensor specifically designed to interface with Building Automation Systems through an internal isolated relay. A user-adjustable time delay (30 seconds to 30 minutes) on deactivation may be programmed through DIP switches to prevent unnecessary cycling. The **CI-24** includes a built-in override switch. Two levels of sensitivity are also selectable through DIP switches. The four-level patented Fresnel lens allows the **CI-24** to cover up to 1200 ft2 (111.48 m2).

CI-24

FEATURES

- ***Advanced PIR technology***
- ***Adjustable time delay***
- ***Adjustable sensitivity***
- ***Contains isolated relay for use with BAS and other control systems***
- ***Patented Fresnel lens***
- ***360° coverage up to 1200 ft2 (11.48m2)***
- ***Red LED indicates occupancy detection***
- ***Five-year warranty***
- ***Manual override switch***

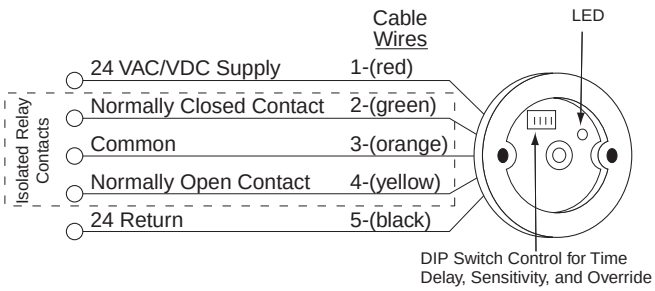
OPERATION

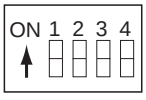
Powered by 24 VAC/VDC, the **Model CI-24** uses advanced PIR technology to detect occupancy. Detection occurs when the unit senses the difference between infrared emissions from a human body and the background space. When occupancy is detected, the **Model CI-24** transfers an SPDT contact set. The contacts return to their normal state after a user-selectable time delay once the space is unoccupied.

SPECIFICATIONS

Supply Voltage	24 VAC/ VDC± 10% 37 mA
Contact Rating	1A @ 24 VAC/ VDC, 1/2A @ 120 VAC
Coverage Pattern	360 degrees up to 1200 ft2 (111.48m2)
Time Delay Adjust	Digital (DIP switch setting) for 30 seconds, 10 minutes, 20 minutes, or 30 minutes
Operating Temperature	32° to 98°F (0° to 36°C)
Mounting	2.75" to 3" hole in ceiling
Color	White
Dimensions	3.3" dia x 2.2" deep (8.5 x 5.6 cm), protrudes approximately 0.4 from ceiling surface
Approvals	cUL listed UL Listed, File E101196
Weight	1.0 lb (0.46 kg)

WIRING





DIP SWITCH #	1	2	3	4
TIME DELAYS				
30 sec	X	X		
10 min.	X	O		
20 min.	O	X		
30 min.	O	O		
SENSITIVITY				
Minimum			O	
Maximum			X	
OVERRIDE				
Normal				O
Override				X

X=on O=off

Note: Exceeding voltage rating may damage sensor.

ORDERING INFORMATION

MODEL	DESCRIPTION
CI-24	Ceiling-mount occupancy sensor with SPDT isolated contact

WATTSTOPPER OCCUPANCY SENSOR

CI-200, CX-100

DESCRIPTION

The **CX-100** wall-/corner-mount and **CI-200** ceiling mount devices are full-featured passive infrared occupancy sensors that control lighting and HVAC equipment. Both units can control equipment directly through a power pack or through a BAS with the SPDT isolated relay built into the sensors. Both models have adjustable sensitivity and time delays.

FEATURES

- ***Advanced PIR technology***
- ***Adjustable time delay***
- ***Adjustable unit sensitivity***
- ***Contains isolated relay for use with BAS and other control systems***
- ***Fresnel lens with choice of 3 coverage patterns (CX-100)***
- ***360° coverage(CI-200)***
- ***LED indicator***
- ***5-year warranty***

CI-200

CX-100

OPERATION

Models CX-100 and **CI-200** use advanced PIR technology to detect occupancy. Detection occurs when the units sense the difference between infrared emissions from a human body and the background space. They are powered by 24 VDC either from a power pack or separate 24 VDC power supply. Both units operate by sending a low-voltage signal to the power pack and energizing the SPDT relay when a person enters the controlled area. Both units have an adjustable time delay for turning the lights off when no occupancy is detected, and both have an adjustable sensitivity setting.

Each unit contains an adjustable light-level sensor for controlling lighting based on ambient light level. This feature is wired differently than the occupancy-only output, and does not work with the SPDT-isolated relay.

SPECIFICATIONS

Supply Voltage	
CI200	24 VDC, 26mA
CX100	24 VDC, 20 mA
Contact Rating	1A @ 24 VDC, 1/2A @ 120 VAC, SPDT
Ambient Light	From 2.5 to 430 fc
Coverage Pattern	See patterns
Time Delay Adjust	Digital (DIP switch setting) from 30 sec to 30 min
Operating Temperature	32° to 98°F (0° to 36°C)

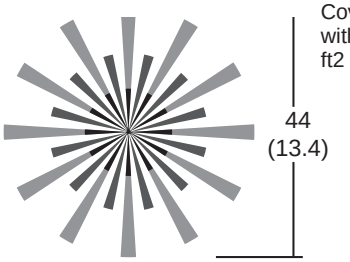
Dimensions	
CX-100	3.38"L x 3.35"W x 2.05"D (8.6 x 8.5 x 5.2 cm)
CI-200	3.30" Dia. x 2.2" D (8.5 x 5.6 cm), extends approximately 0.36" from ceiling
Approvals	UL and cUL listed, File E101196
Weight	1.0 lb (0.46 kg)
Warranty	5 years

LIGHTING CONTROLS

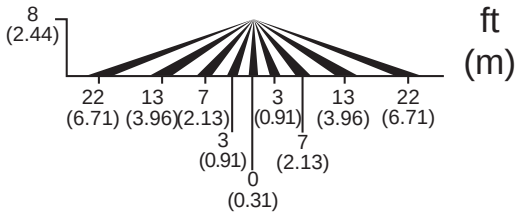
WATTSTOPPER OCCUPANCY SENSOR

CI-200, CX-100

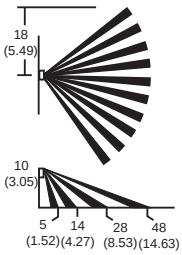
COVERAGE PATTERNS



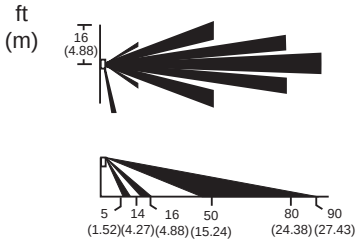
Coverage shown is maxium and represents coverage for half-step walking motion. Under ideal conditions, with no barriers or obstacles, coverage can reach up to 1200 ft2 for half-step walking motion and up to 500 ft2 for hand motion (typical desktop level of activity).



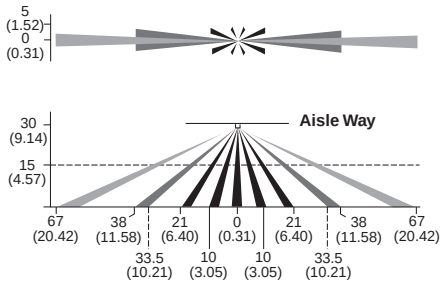
CI-200



Dense Wide Angle (Standard)



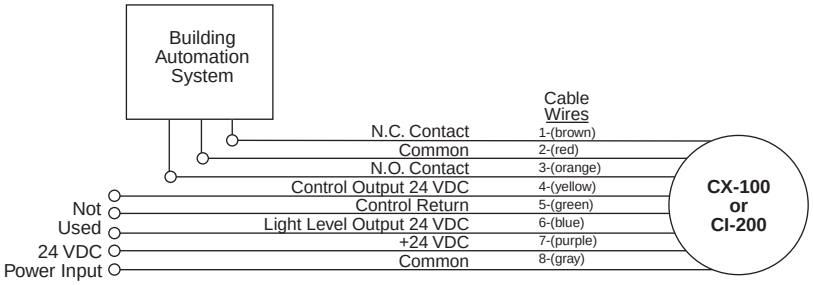
Long Range



Coverages shown are maxium and represent coverage for half-step walking motion. For building spaces with lower levels of activity or with obstacles and barriers, coverage size may vary.

CX-100

WIRING



Note: See power pack in this section for switching lighting loads or other line voltage loads

For Digital Input to BAS

ORDERING INFORMATION

MODEL	DESCRIPTION
CI-200	Ceiling-mount sensor
CI-200-1	Long-range sensor with mounting bracket * Special order
CX-100	Dense wide-angle sensor with mounting bracket
CX-100-1	Long-range sensor with mounting bracket * Special order
CX-100-3	Aisle-way sensor with mounting bracket * Special order

	RELATED PRODUCTS	PAGE
B347-P	347 VAC to 24 VDC power pack	**576**
BZ-50	120-277 VAC to 24 VDC power pack	**576**
DCP-1.5-W	Power supply, 24 VAC IN to 24 VDC OUT	**837**
MB-1	Mounting bracket for CI-200, CX-100 Occupancy sensors	**564**
S-120/277/347-E	Slave pack	**576**

WATTSTOPPER DUAL-TECHNOLOGY OCCUPANCY AND LIGHT SENSOR

DT-300 SERIES

DESCRIPTION

The low-profile **DT-300** dual-technology occupancy sensor with light level sensor combines the benefits of passive infrared (PIR) and ultrasonic technologies. The sensor mounts in the ceiling with a flat, unobtrusive appearance and provides 360 degrees of coverage. Using SmartSet(tm) technology, the **DT-300** requires no adjustment at installation. SmartSet(tm) continuously monitors the controlled space to identify usage patterns.

Using this information, it automatically adjusts the time delay and sensitivity settings for optimal performance and energy efficiency. The sensor assigns short delays (as low as 5 minutes) for times when the space is usually vacant, and longer delays (up to 30 minutes) for busier times.The **DT-305** is a lower cost version of the **DT-300** without isolated relay or light level sensor.

DT-300

FEATURES

- ***SmartSet(tm) adjusts sensitivity and time delay***
- ***Walk-through mode turns lights off***
- ***Ultrasonic diffusion technology***
- ***LED occupancy indication***
- ***Pluggable terminal wiring***

OPERATION

In normal operation, the **DT-300** turns lighting on when both the PIR and ultrasonic technologies detect occupancy.

It can also work with a low voltage switch for manual-on operation. PIR technology senses the difference between infrared energy from a human body in motion and the background space. Ultrasonic technology uses the Doppler principle and high frequency (40 KHz) ultrasound to sense motion.

Once lighting is on, detection by either technology holds lighting on. When no occupancy is detected for the length of the time delay, lighting turns off.

The **DT-300** can also be configured so that one or both technologies are needed to turn lighting on or hold lighting on.

SPECIFICATIONS

Supply Voltage	
DT300	24 VDC/VAC +/-10% 43 mA
DT305	24 VDC/VAC +/-10% 35 mA
Switch Input	Low voltage, momentary for manual ON or OFF operation
Relay Output	
DT300	Isolated SPDT contacts rated for 1A @ 30 VAC/VDC
Ambient Light	
DT300	10 to 300 footcandles (108 to 3230 lux)
Coverage Pattern	Up to 1000 ft2 (92.9 m2)
Sensitivity Adjustment	SmartSet™ (automatic) or reduced sensitivity (for PIR sensitivity); ultrasonic sensitivity is variable with trimpot
Time Delay Adjust	SmartSet™ (automatic), fixed (5, 10,15, 20, or 30 minutes), walkthrough, test-mode
Ultrasonic Frequency	40kHz
Mounting	Ceiling tile 4" square junction box with double gang mud ring
Dimensions	4.50" fl x 1.02"D (11.3 x 2.5 cm)
Approvals	UL and CUL listed, File E101196
Weight	1.0 lb (0.46 kg)
Warranty	5 years

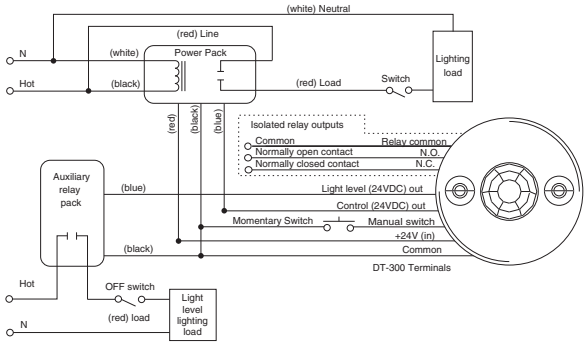
LIGHTING CONTROLS

WATTSTOPPER DUAL-TECHNOLOGY OCCUPANCY AND LIGHT SENSOR

DT-300 SERIES

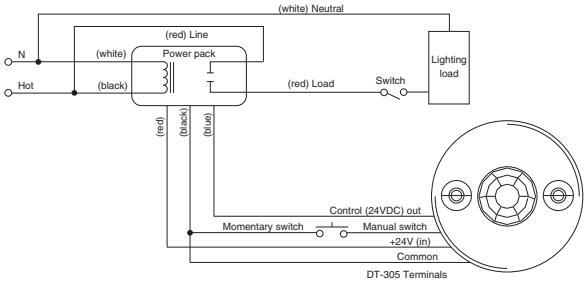
WIRING

Occupancy and Light Level Controlled Lighting



DT300

Occupancy



DT305

Notes: Exceeding voltage rating may damage sensor. Shown with BZ-50 power pack (optional).

DIP SWITCH SETTINGS

Occupancy Logic	Trigger	Initial Occupancy	Maintain Occupancy	Re-trigger (seconds duration)
	Standard	Both	Either	Either(5)
	Option 1	Either	Either	Either(5)
	Option 2	PIR	Either	Either(5)
	Option 3	Both	Both	Both(5)
	Option 4	PIR	PIR	PIR(5)
	Option 5	Ultra	Ultra	Ultra(5)
	Option 6	Man.	Either	Either(30)
	Option 7	Man.	Both	Both(30)

◀ = Factory Setting
● = ON
- = OFF

Occupancy	Logic	Switch# 1	2	3
	Standard	-	-	- ◀
	Option 1	●	-	-
	Option 2	-	●	-
	Option 3	●	●	-
	Option 4	-	-	●
	Option 5	●	-	●
	Option 6	-	●	●
	Option 7	●	●	●

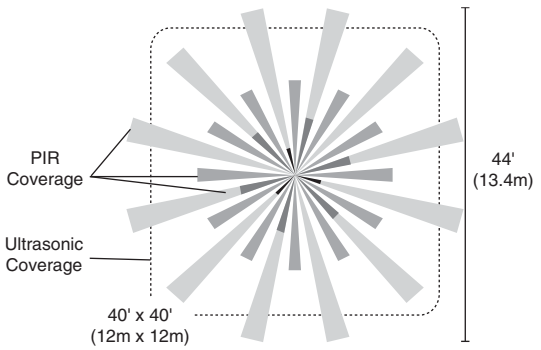
Time Delay	4	5	6
5 sec/SmartSet	-	-	- ◀
5 min	-	-	●
10 min	-	●	-
10 min	-	●	●
15 min	●	-	-
15 min	●	-	●
20 min	●	●	-
30 min	●	●	●

= walk-through mode

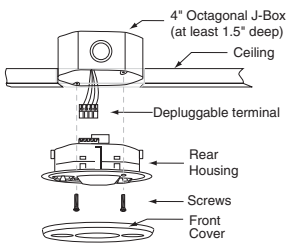
LEDs	7
Disabled	-
Enabled	● ◀

PIR Sensitivity	8
Minimum	-
Maximum/SmartSet	● ◀

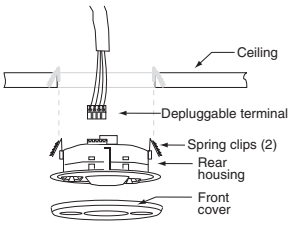
COVERAGE



MOUNTING



J-Box Mount



Ceiling Mount

ORDERING INFORMATION

MODEL	DESCRIPTION
DT-300	Dual technology occupancy sensor with isolated relay and light level actuation
DT-305	Dual technology occupancy sensor with 24 VDC control output only (no light level or relay)

KELE OCCUPANCY SENSOR

LX-24

DESCRIPTION

The **Model LX-24** is a ceiling-mount passive infrared (PIR) occupancy sensor specifically designed to interface with building automation systems through an internal isolated relay. A user-adjustable time delay (30 seconds to 30 minutes) on deactivation may be programmed through DIP switches to prevent unnecessary cycling. The **Model LX-24** includes two levels of sensitivity selectable through DIP switches.

LX-24

FEATURES

- ***Passive infrared technology***
- ***Adjustable time delay***
- ***Adjustable sensitivity***
- ***Isolated relay for use with BAS and other control systems***
- ***360-degree coverage up to 1100 ft2***
- ***Red LED to indicate occupancy detection***
- ***Five-year warranty***

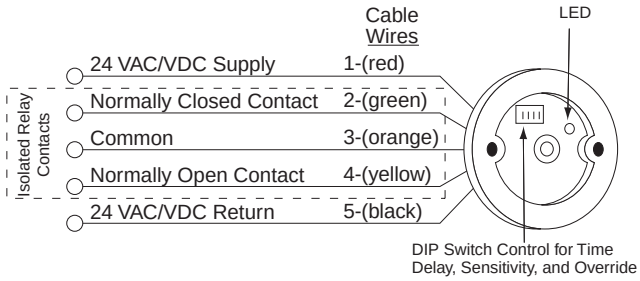
OPERATION

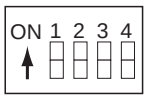
The Model LX-24 is powered by 24 VAC/VDC, and uses PIR technology to detect occupancy. When the unit senses the difference between infrared emissions from a human body and the background space, detection occurs. The Model LX-24 transfers an SPDT contact set, when occupancy is detected. The contacts return to their normal state after a user-selectable time delay once the space is unoccupied.

SPECIFICATIONS

Supply Voltage	24 VAC/VDC 37mA
Contact Rating	1A @ 24 VDC, 24 VAC
Coverage Pattern	360 degrees up to 1200 ft2 (111.48m2)
Time Delay Adjust	Digital (DIP switch setting) for 30 seconds, 10 minutes, 20 minutes, or 30 minutes
Operating Temperature	32° to 98°F (0° to 36°C)
Mounting	2.75" to 3" hole in ceiling
Color	White
Dimensions	3.3" dia x 2.2" deep (8.5 x 5.6 cm), extends approx. 0.36" (0.91 cm) from ceiling
Weight	1.0 lb (0.46 kg)
Warranty	5 years

WIRING





DIP SWITCH #	1	2	3	4
TIME DELAYS				
30 sec	X	X		
10 min.	X	O		
20 min.	O	X		
30 min.	O	O		
SENSITIVITY				
Minimum			O	
Maximum			X	
OVERRIDE				
Normal				O
Override				X

X=on O=off

ORDERING INFORMATION

MODEL	DESCRIPTION
LX-24	24 VAC/VDC ceiling-mount occupancy sensor with SPDT isolated contact

KELE OCCUPANCY SENSORS

LX-100

DESCRIPTION

The **Model LX-100** Wall-/Corner-Mount passive infrared (PIR) occupancy sensor controls lighting and HVAC equipment. This device can control equipment directly through a BAS with the SPDT isolated relay built into the sensors.

LX-100

FEATURES

- ***Passive infrared technology***
- ***Advanced PIR technology***
- ***Adjustable time delay***
- ***Adjustable unit sensitivity***
- ***Contains isolated relay for use with BAS and other control systems***
- ***LED indicator***

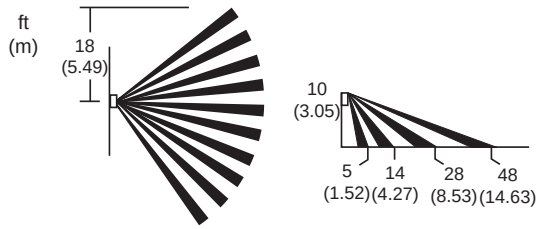
SPECIFICATIONS

Supply Voltage	24 VDC 20 mA
Contact Rating	1A @ 24 VDC, 1/2A @ 120 VAC, SPDT
Ambient Light	From 2.5 to 430 fc
Coverage Pattern	See patterns
Time Delay Adjust	Digital (DIP switch setting) from 30 seconds to 30 minutes
Operating Temperature	32° to 98°F (0° to 36°C)
Dimensions	3.38"L x 3.35"W x 2.05"D (8.6 x 8.5 x 5.2 cm)
Weight	1.0 lb (0.46 kg)
Warranty	5 years

OPERATION

The **LX-100** uses Passive infrared technology to detect occupancy. Detection occurs when the unit senses the difference between infrared emissions from a human body and the background space. Operation occurs by sending a low-voltage signal and energizing the SPDT relay when a person enters the controlled area. **LX-100** has an adjustable time delay for turning the lights off when no occupancy is detected, and adjustable sensitivity setting. **LX-100** contains an adjustable light-level sensor for controlling lighting based on ambient light level. It is wired differently than the occupancy-only output, and does not work with the SPDT-isolated relay.

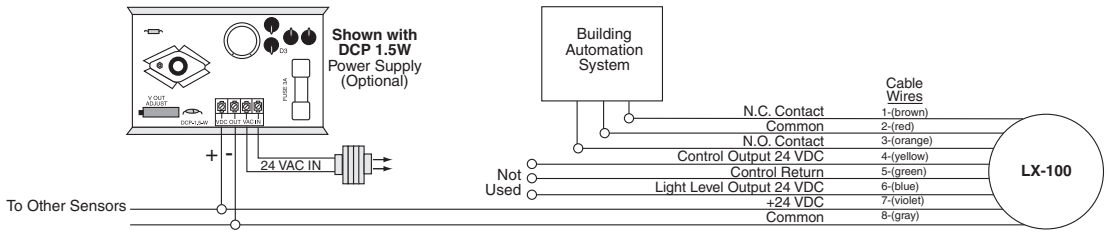
COVERAGE PATTERNS



Dense Wide Angle (Standard)

Coverages shown are maxium and represent coverage for half-step walking motion. For building spaces with lower levels of activity or with obstacles and barriers, coverage size may vary.

WIRING



For Digital Input to BAS

ORDERING INFORMATION

MODEL	DESCRIPTION
LX-100	Dense wide-angle sensor with mounting bracket

RELATED PRODUCTS		PAGE
DCP-1.5-W	Power supply, 24 VAC IN to 24 VDC OUT	**837**

WATTSTOPPER OCCUPANCY SENSOR

WS SERIES

DESCRIPTION

The **WS Series** Occupancy Sensor is a decorator style automatic wall switch with an attractive, low profile design. It replaces a standard wall switch to turn lighting on when a room is occupied and off when the room is vacant. The **WS Series** has advanced passive infrared (PIR) technology and a two-level lens to sense when a room is occupied. It also contains an adjustable light level sensor to keep lights off when ambient light is adequate.

FEATURES

- ***Advanced PIR technology***
- ***Shallow housing and flying leads for quick installation***
- ***Adjustable time delay***
- ***Integrated light level sensor***
- ***Adjustable unit sensitivity***
- ***No minimum load requirement***
- ***No leakage to load in off mode***
- ***Voltage drop protection***
- ***Compatible with all ballasts and incandescent lighting***
- ***Five year warranty***
- ***Includes single gang cover plate***

OPERATION

The **WS Series** uses advanced PIR technology to detect occupancy. Detection occurs when the unit senses the difference between infrared emissions from a human body and the background space. The **WS Series** utilizes a custom-made Fresnel lens to achieve 180-degree detection coverage (up to 900 ft2/83.61m2) and automatically turns lights on each time the controlled area is entered. The **WS Series** features a built-in light-level sensor, adjustable from 2 to 200 footcandles, that holds lights off in the auto mode when natural light levels are above the preset light level. The **WS Series** has an adjustable time delay for turning the lights off when no occupancy is detected, and it also has an adjustable sensitivity setting.

SPECIFICATIONS

Supply Voltage	120/ 277 VAC +/- 10%	**Dimensions**	2.6" x 1.7" x 1.55" (166.0 x 4.31 x 39.4 mm)
Contactor Ballast	0-800W @ 120 VAC 0-1200W @ 277 VAC	**Additional Specifications**	Switch positions Auto/Off (on/off during override)
Contactor Tungsten	Up to 800W @ 120 VAC	**Approvals**	UL and cUL listed, File #E101196
Ambient Light	From 2 to 200 fc	**Weight**	0.35 lb (0.16 kg)
Coverage Pattern	Major motion 35' x 30' Minor motion 20' x 15'	**Warranty**	5 years
Time Delay Adjust	Digital time delay from 30 sec to 30 min.		
Operating Temperature	32° to 98°F (0° to 36°C)		

LIGHTING CONTROLS

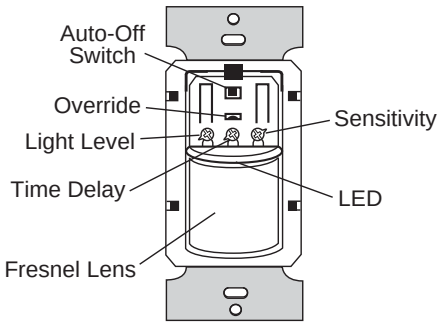
WATTSTOPPER OCCUPANCY SENSOR
WS SERIES

INSTALLATION

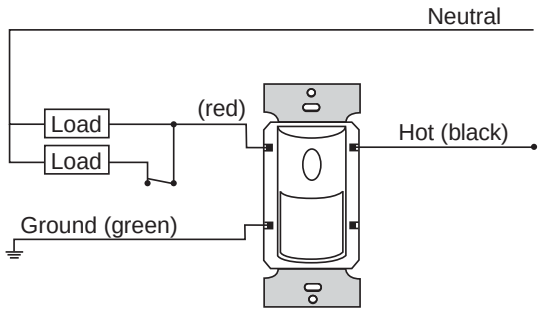
Turn off the power at the circuit breaker before installing the sensor to prevent electrical shock or equipment damage. All wiring must comply with local codes and ordinances.

1. Place the auto/off switch in the off position.
2. Connect the existing wire leads to the appropriate WS Series with UL-listed wire connectors. Red connects to the load, black to the line, and green to the ground. Do not allow bare wire to show below the connector. The ground wire must be tightly secured to ground for the unit to operate properly.
3. Attach the sensor to the wall box with the two mounting screws provided, and install the cover.
4. Set the auto/off switch to auto, and turn the circuit breaker on. After a 10-30 second delay, the lights will turn on. This delay is due to the initial power-up of the sensor and only occurs during installation.
5. Make all time delay, ambient light, and sensitivity adjustments after a two-minute warm-up. Override Function: In the event it is necessary to leave the lights on or there is a unit failure, remove the blue override pin. This will turn the auto/off switch to a standard on/off switch (functions like a standard toggle switch).

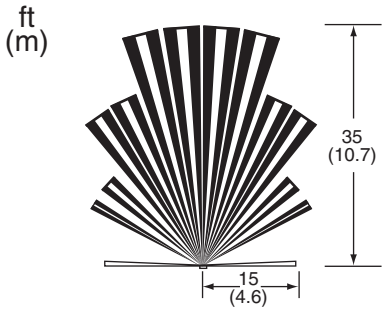
WIRING



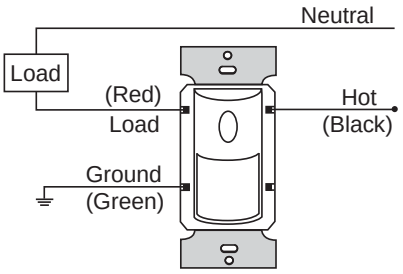
Controls



Multiple Bi-level Lighting



Coverage Pattern



Single-level Lighting

ORDERING INFORMATION

MODEL	DESCRIPTION
WS-250	120/277 VAC 0-800W ballast occupancy sensor - For 240 or 347VAC Contact Kele
	COLOR
I-P	Ivory
LA-P	Light Almond
W-P	White
G-P	Gray -Special Order
B-P	Black- Special Order

WS-250 – **W-P** ***Example:*** **WS-250-W-P** White occupancy sensor
P = Plate Included

LIGHTING CONTROLS

WATTSTOPPER WALL SWITCH SENSORS
DW, PW, AND UW

DESCRIPTION

PW SERIES Passive Infrared
PIR technology senses occupancy by detecting the difference between heat emitted from the human body in motion and the background space.

UW SERIES Passive Ultrasonic
Ultrasonic detection works by transmitting ultrasonic sound waves throughout an area and measuring the speed at which they return. Occupant movement changes the frequency at which these sound waves return, resulting in a Doppler shift and occupancy detection.

DW SERIES Dual Technology (Infrared and Ultrasonic)
The Dual Technology combines the best of both PIR and ultrasonic technologies. While PIR and ultrasonic sensors provide optimal control for many spaces, some applications pose difficulty for single technology products. Dual Technology sensors ensure maximum sensitivity and coverage in tough applications for optimal reliability and energy savings.

PW-100
PW-100-24

UW-100, UW-100-24
DW-100, DW-100-24

UW-200
DW-200

PW-200

FEATURES

- ***Detection Signature Processing eliminates false triggers and provides immunity to RFI and EMI***
- ***Zero-crossing technology relay****
- ***Vandal resistant lens***
- ***Choice of Auto-ON or Manual-ON operation***
- ***SmartSet automatically adjusts time delay and sensitivity setting from occupants patterns***
- ***Selectable walk-through mode***
- ***Selectable test mode***
- ***Selectable audible and/or visual alerts***
- ***LED occupancy indication***
- ***Built-in light level sensing***
- ***Override mode***

SPECIFICATIONS

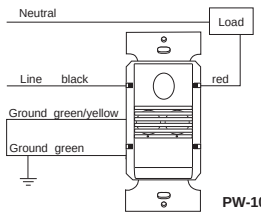
Supply Voltage	18-24 VDC, 35 mA 24 VAC ± 10% 35 mA 120 VAC ±10% 50/60 Hz 240/277± 10% VAC 50/60 Hz
Coverage Pattern	
DW	PIR major motion 35' x 30' PIR minor motion 20' x 15' Ultrasonic major motion 20' x20' Ultrasonic minor motion 15' x15'
PW	PIR Major motion 35' x 30', minor motion 20' X 15'
UW	Ultrasonic Major motion 20' x 20' minor motion 15' x 15'
Sensitivity Adjustment	
DW	PIR (high/low), Ultrasonic (fully variable)
PW	PIR (high/low)
UW	Ultrasonic (fully variable)
Time Delay Adjust	SmartSet (automatic), fixed (5, 15 or 30 minutes), walk-through, testmode
Dimensions	2.73"L x 1.76"W x 1.83"D (6.9 x 4.5 x 4.7 cm)
Approvals	UL Listed, File E101196
Weight	0.36 lb (0.16 kg)
Warranty	5 years

LIGHTING CONTROLS

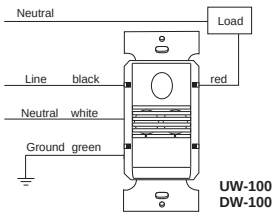
WATTSTOPPER WALL SWITCH SENSORS

DW, PW, AND UW

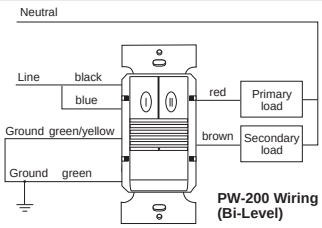
WIRING



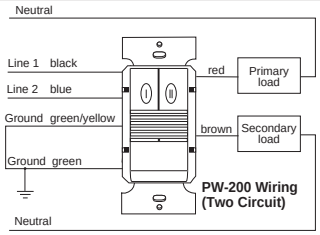
PW-100 Wiring



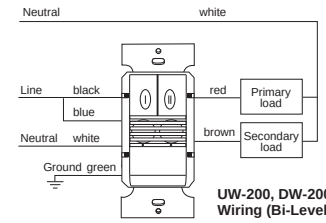
UW-100 and DW-100 Wiring



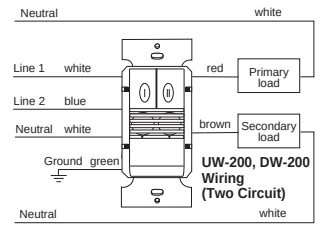
PW-200 Wiring (Bi-Level)



PW-200 Wiring (Two Circuit)

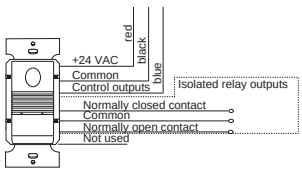


UW-200, DW-200 Wiring (Bi-Level)

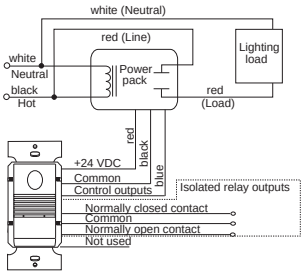


UW-200, DW-200 Wiring (Two Circuit)

24 VAC Wiring Only



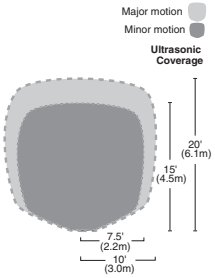
24 VDC Wiring Only



PW-100-24, UW-100-24 and DW-100-24 Wiring

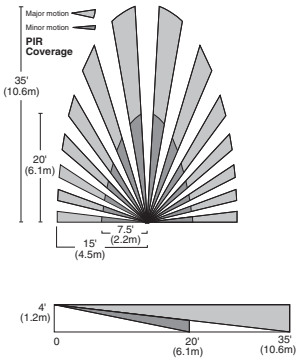
Note: 24 volt units available with one relay only

COVERAGE



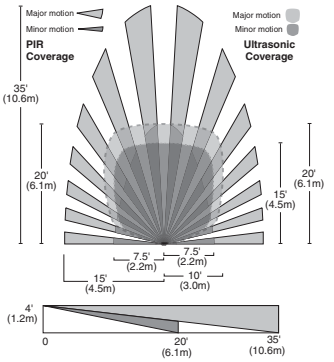
* For best performance, Watt Stopper/Legrand recommends using this sensor in spaces no larger than 15' x 15'

Passive Ultrasonic



* For best performance, Watt Stopper/Legrand recommends using this sensor in spaces no larger than 15' x 12'

Passive Infrared



* For best performance, Watt Stopper/Legrand recommends using this sensor in spaces no larger than 18' x 15'

Dual Technology (Infrared & Ultrasonic)

ORDERING INFORMATION

MODEL	DESCRIPTION
PW	Passive Infrared
UW	Passive Ultrasonic
DW	Dual Technology (Infrared and Ultrasonic)
	POWER AND NUMBER OF RELAYS
100	One relay 120/230/277 VAC power
100-24	One relay 24VAC/VDC power
200	Two relays 120/230/277 VAC power
	COLOR
X-P	W = white, LA = light almond, G = grey, B = black

UW — **200** — **LA-P** ***Example:*** **UW-200-LA-P** = Passive ultrasonic, two relays, light almond with wall plate

LIGHTING CONTROLS

WATTSTOPPER DAYLIGHTING CONTROLLER
LS-102

DESCRIPTION

The **LS-102** daylighting controller is a single-zone on/off switching, closed loop photosensor for interior lighting applications. The **LS-102** will signal a lighting control device to automatically turn off or turn on the designated interior lighting based on the amount of daylight present. It has an advanced digital multiband photosensor, an onboard microcontroller, and an LCD display. The **LS-102** has a 100° optical cone that cuts off unwanted light, eliminating false triggering.

LS-102

FEATURES

- ***Automatic commissioning***
- ***Easy-to-read LCD display***
- ***Four user-adjustable parameters:***
  - ***on setpoint***
  - ***off setpoint***
  - ***time delay***
  - ***"hold on while occupied" mode (requires occupancy sensor)***
- ***Test mode override***
- ***Manual override***
- ***LED status indicator***

APPLICATION

The **LS-102** daylighting controller can be used to control any type of lighting: incandescent, fluorescent, compact fluorescent, or HID. The sensors work in peripheral offices, skylit areas, cafeterias, warehouses, and any other indoor areas with natural light access.

OPERATION

The **LS-102** is a self-contained 24 VDC device with an extended range of 1-1400 footcandles that requires a low voltage power pack to operate. When the user adjusts the setpoints, the device will turn lighting systems off when the ambient light levels exceed the OFF setpoint, and will turn lighting systems back on when natural light levels have fallen below the ON setpoint. Because of its automatic calibration feature, many applications require little or no adjustment of the settings. The **LS-102** can be paired with a low voltage wall switch to enable manual override or with an occupancy sensor to enable its 'hold on while occupied' feature.

ON, OFF, AND DEADBAND SETTINGS

The **LS-102** features automatic setpoint calculations. The device initiates a procedure to select an appropriate value for the on setpoint. As part of the process, the controlled load is first turned on for a brief interval to warm up the lamps, and then switched off. This process is repeated several times. At the completion of the calibration, a new value for the on setpoint will have been selected. Other adjustable settings include deadband and time delay settings. If desired, the deadband can be adjusted to a value of 25, 50, 75, or 100 percent above the setpoint. The time delay can be adjusted to 3, 10, 20, or 30 minutes.

SPECIFICATIONS

Supply Voltage	12/24 VDC; 7 mA typical	**Operating Temperature**	32° to 120°F (0° to 49°C)
Output Signal	24 VDC digital; 120 mA maximum	**Operating Humidity**	less than 90% RH
Deadband Range	25%, 50%, 75% and 100% above the ON setpoint	**Dimensions**	2.4"Ø x 0.7"D (6.1 x 1.8 cm)
		Additional Specifications	Suitable for dry interior locations
ON Setpoint Range	1-850 footcandles	**Approvals**	UL listed, File E101196
Photo Sensor Range	1-1400 footcandles	**Weight**	0.50 lb (0.28 kg)
Status Indicator	Multi-function green LED	**Warranty**	5 years
Time Delay	3, 10, 20, or 30 minutes		

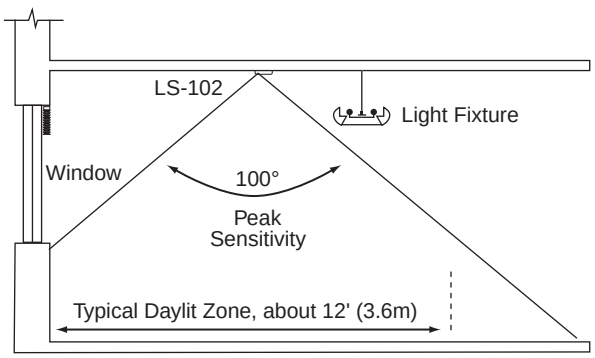
LIGHTING CONTROLS

WATTSTOPPER DAYLIGHTING CONTROLLER

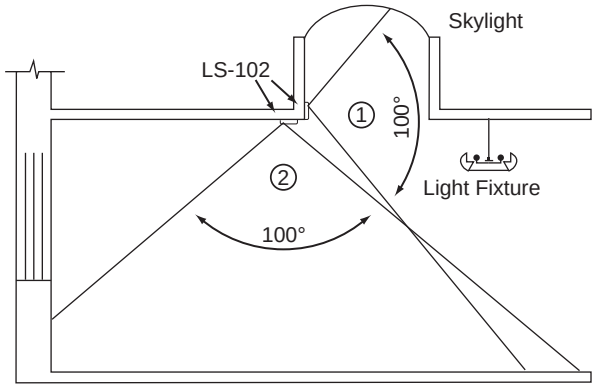
LS-102

APPLICATIONS

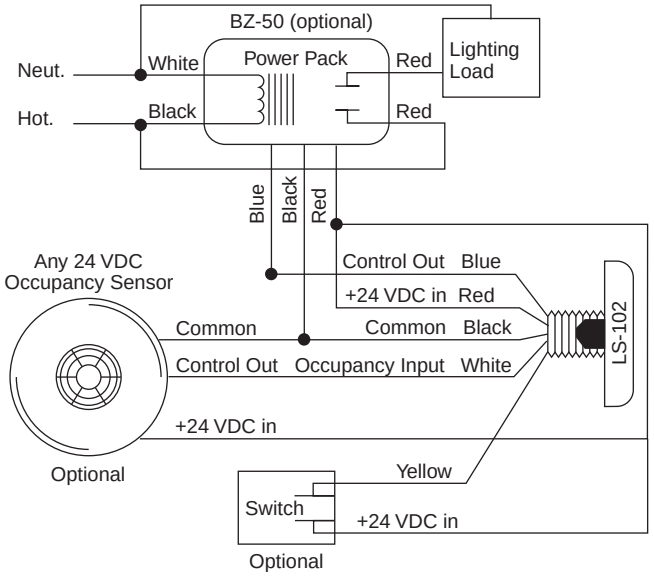
Side Lighting



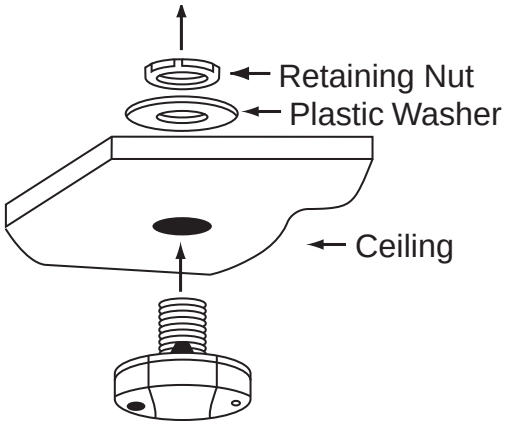
Top Lighting



WIRING



MOUNTING INSTALLATION



ORDERING INFORMATION

MODEL	DESCRIPTION
LS-102	Daylighting Controller

	RELATED PRODUCTS	PAGE
BZ-50	120-277 VAC to 24 VDC power pack	**575**
CL Series	Integrated Lighting Control Products	**536**

WATTSTOPPER UNIVERSAL VOLTAGE POWER PACK

BZ-50

DESCRIPTION

The **Power Pack** provides 24 VDC operating voltage for occupancy sensors and light level sensors. Each is capable of switching up to 20A electrical load. The **Slave Pack** is similar to the **Power Pack** but has no transformer power supply, only an isolated relay. **Power** and **Slave Packs** can be combined to switch almost any lighting or HVAC load controlled by occupancy or light sensor controls. They can also be used for low voltage switching.

S-120/277/347E-P

BZ-50

FEATURES

- ***Power Pack includes fully self-contained transformer and isolated relay; Slave Pack includes isolated relay only***
- ***Available in several AC voltage inputs***
- ***Zero-crossing switching technology for increased reliability and product life***
- ***Attaches easily to standard 1/2" knockouts***
- ***Housed in ABS, UL listed 94V-0 plastic enclosure***
- ***Can be used to switch low voltage control wiring***
- ***UL and cUL listed***
- ***Five-year warranty***

OPERATION

The **Power Pack** consists of a transformer and high-current relay combined in one small, powerful package. The transformer has a primary high voltage input and a secondary 24 VDC, 100 mA output. The secondary voltage provides operating power for Models CX-100 and CI-200. The **Slave Pack** contains a high current relay only and is controlled by Model CX-100 or CI-200. When occupancy is detected by the sensor (and inadequate ambient light is detected if this feature is used), the sensor electrically closes an internal circuit that sends 24 VDC back to the **Power** and/or **Slave Packs**, which switch the line voltage to control lighting or other equipment.

SPECIFICATIONS

Secondary Voltage	24 VDC, 100 mA
Operating Temperature	32° to 98°F (0° to 36°C)
Dimensions	1.6" H x 2.75" W x 1.6" D (4.1 x 7.0 x 4.1 cm) with 1/2" snap-in nipple
Enclosure Rating	UL 2043-listed 94V-0 plastic enclosure (plenum rated)
Approvals	UL and cUL listed, File #E101196
Weight	0.48 lb (0.22 kg)
Warranty	5 years

Model	Type	Supply Voltage	Contactor Ballast	Contactor Tungsten	Contactor Motor	24 VDC Output Current
BZ-50	Power Pack	120/ 277 VAC	20A	20A	1 hp	225 mA
B347-P	Power Pack	347 VAC	15A	-	-	100 mA
S-120/277/347-E	Slave Pack	120/ 277 VAC	20A	-	-	-
S-120/277/347-E	Slave Pack	347 VAC	15A	-	-	-

LIGHTING CONTROLS

WATTSTOPPER UNIVERSAL VOLTAGE POWER PACK

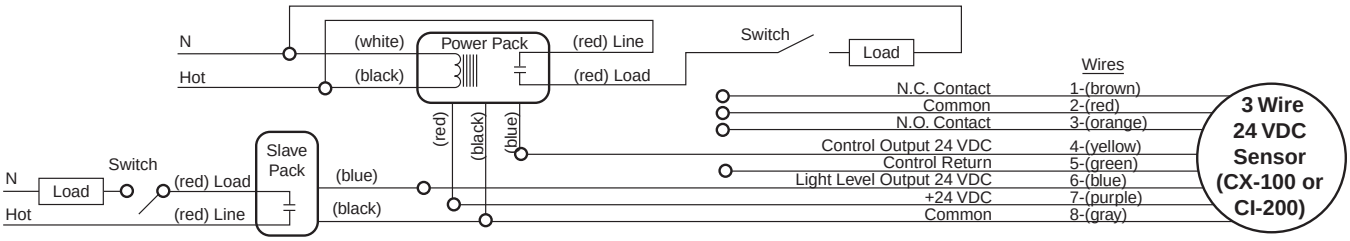
BZ-50

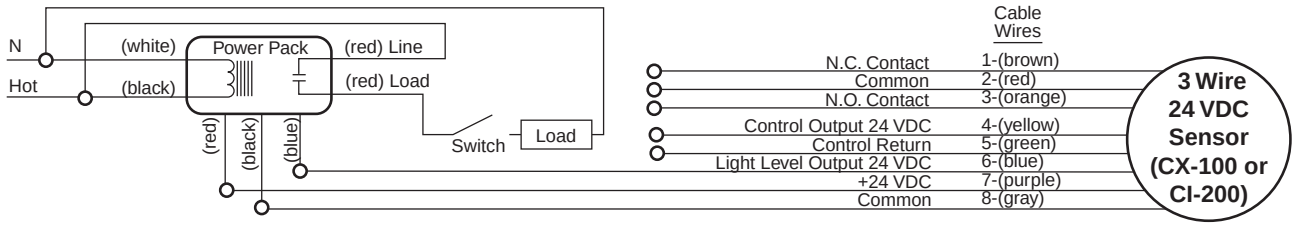
INSTALLATION

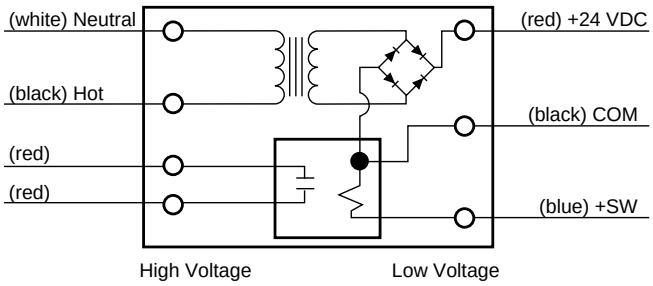
Note: All power packs should be installed in accordance with state, local, and national electrical codes and requirements.
Power Packs are designed to attach to existing or new electrical enclosures with 1/2" knockouts.

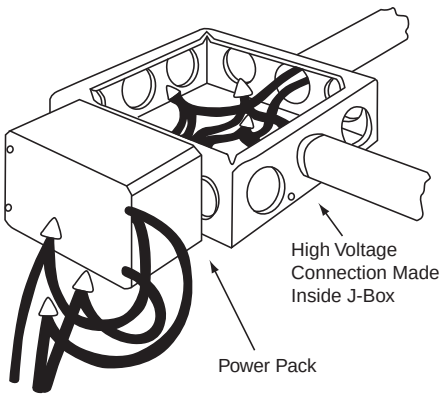
1. Disconnect power at the circuit breaker prior to doing any work.
2. Connect the white wire to neutral and the black wire to the appropriate hot leg.
3. Connect one red wire to the line side of the voltage to be controlled and the other red wire to the load to be controlled.
4. Make all low-voltage connections to the occupancy sensor (see wiring below).
5. Verify all connections are correct, and reset the circuit breaker.

WIRING









ORDERING INFORMATION

MODEL	DESCRIPTION
BZ-50	120-277 VAC to 24 VDC power pack
B347-P	347 VAC to 24 VDC power pack
S-120/277/347-E	Slave pack

LIGHTING CONTROLS

PHOTO SWITCHES
EM SERIES

DESCRIPTION

The **EM** is a low voltage photocell used for controlling exterior lighting and signage. The photocell provides an ON signal when the ambient light level drops below a preset dark setpoint. It then provides a signal OFF as the ambient light level rises above the preset light setpoint. The photocell's relay contact red wires are connected to a panel, to a low voltage controlled loads or directly to a Building Automation System.

FEATURES

- ***On at dusk, off at dawn operation***
- ***Simple installation and wiring***
- ***One set of normally open, isolated relay contacts; contacts are closed when sensed light level is below dark setpoint, open when light level is above light setpoint***
- ***8-second time delay and built-in setpoint deadband prevent cycling***
- ***1/2" threaded male conduit base for easy mounting on conduit fittings or junction boxes.***
- ***Weatherproof enclosure***
- ***Economical input to BAS or lighting control systems***
- ***Ideal for outdoor lighting, billboard lighting, security lighting***

EM Series

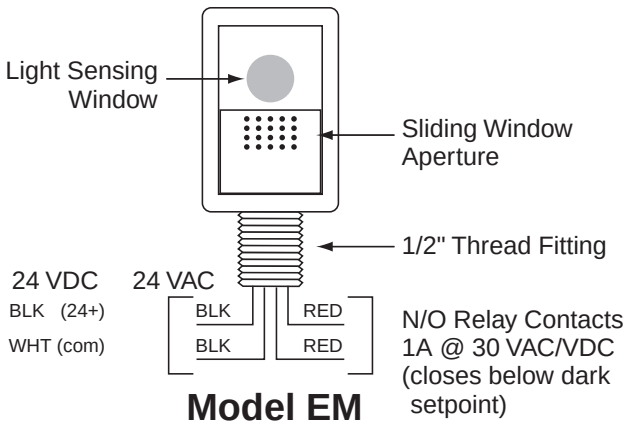
INSTALLATION/ MOUNTING

Mount on exterior or roof of building. Point light sensing window North. The photocell provides an ON signal when the ambient light level drops below a preset dark setpoint. It then provides a signal OFF as the ambient light level rises above the preset light setpoint. The setpoint can be changed for specific applications by opening and closing the photocell's aperture window.

SPECIFICATIONS

Supply Voltage	24 VAC/VDC, 1 VA
Relay Type	N.O. SPST
Relay Output	1 A at 30 VAC/VDC
Lead Length	8" (20.32 cm)
Lead Wire Type	Pigtail leads, 20 AWG
Accuracy	±10% FC
Foot Candles	On 1.0 Off 15.0
Operating Temperature	-25° to 125°F (-31.7° to 51.7°C)
Mounting	Stem with 1/2" thread fitting
Dimensions	2.64"x 1.57"x 1.89" (67.1mm x 39.9mm x 48.0mm)
Enclosure Rating	NEMA 3R weatherproof
Weight	0.4 lbs (0.18 kg)
Warranty	1 year

WIRING



ORDERING INFORMATION

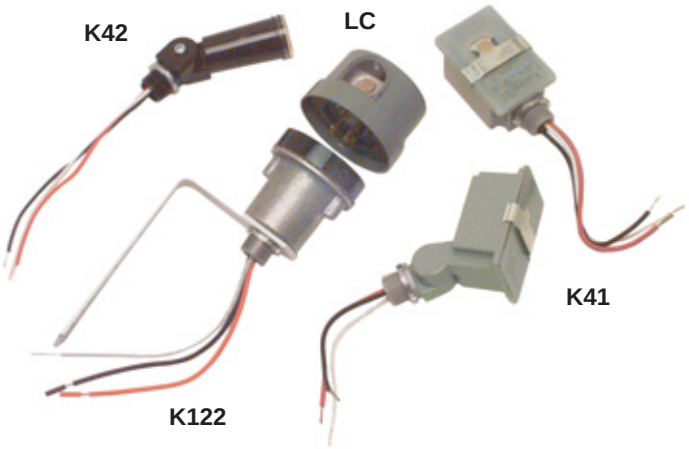
MODEL	DESCRIPTION
EM-24A2	24 VAC Exterior photocell with relay contact
EM-24D2	24 VDC Exterior photocell with relay contact

LIGHTING CONTROLS

PHOTO SWITCHES
K, LC SERIES

DESCRIPTION

Models K and LC Photo Switches are universally employed to control lighting loads in response to available natural light. Each will turn on at dusk and off at dawn, and each may be connected to directly switchloads up to its continuous rating or to switch larger loads through relays or contactors. Stem mount types (see specifications below) are equipped with a 1/2" MNPT nipple and locknut for mounting to a weatherproof box or conduit body.Stem/swivel mount types attach in the same manner, but include a swivel for directional aiming.



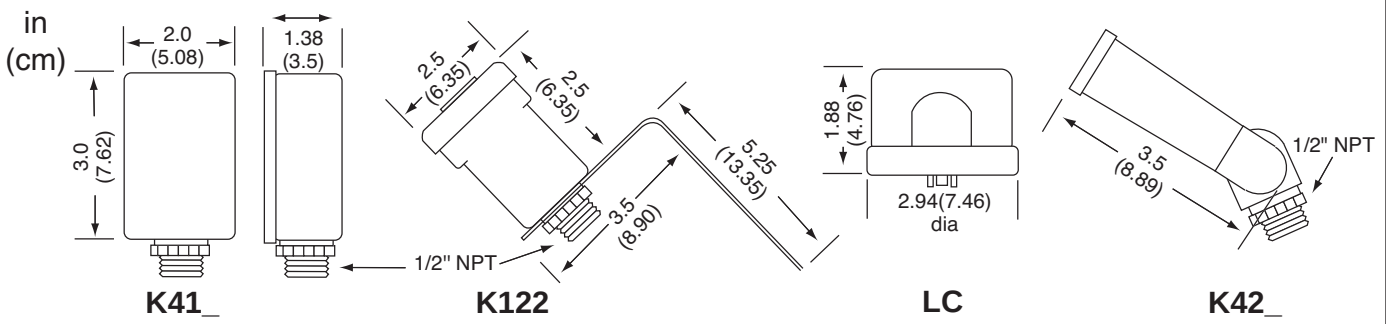
FEATURES

- ***On at dusk, off at dawn operation***
- ***Weatherproof enclosure***
- ***Simple installation and wiring***
- ***Heavy-duty switch to control loads directly***
- ***Contacts remain closed in case of cell failure***
- ***Ideal for outdoor lighting, billboard lighting, security lighting***
- ***UL listed, CSA approved***

SPECIFICATIONS

Supply Voltage	120 VAC 50/60 Hz, 208-277 VAC 50/60 Hz, 105-480 VAC 50/60 Hz	**Enclosure Rating**	NEMA 3R weatherproof
Switch Type	SPST	**Approvals**	UL Listed E42722, CSA, UL Listed E59121, CSA
Lead Length	6" (15.24 cm)	**Weight**	0.25 lbs (0.11 kg)
Lead Wire Type	Pigtail leads, 14 AWG	**Warranty**	
Foot Candles	On 1-5 Off 3-15, On 5 Off 15	**K Series**	5 Years
Operating Temperature	-40° to 150°F (-40° to 65°C)	**LC Series**	3 Years

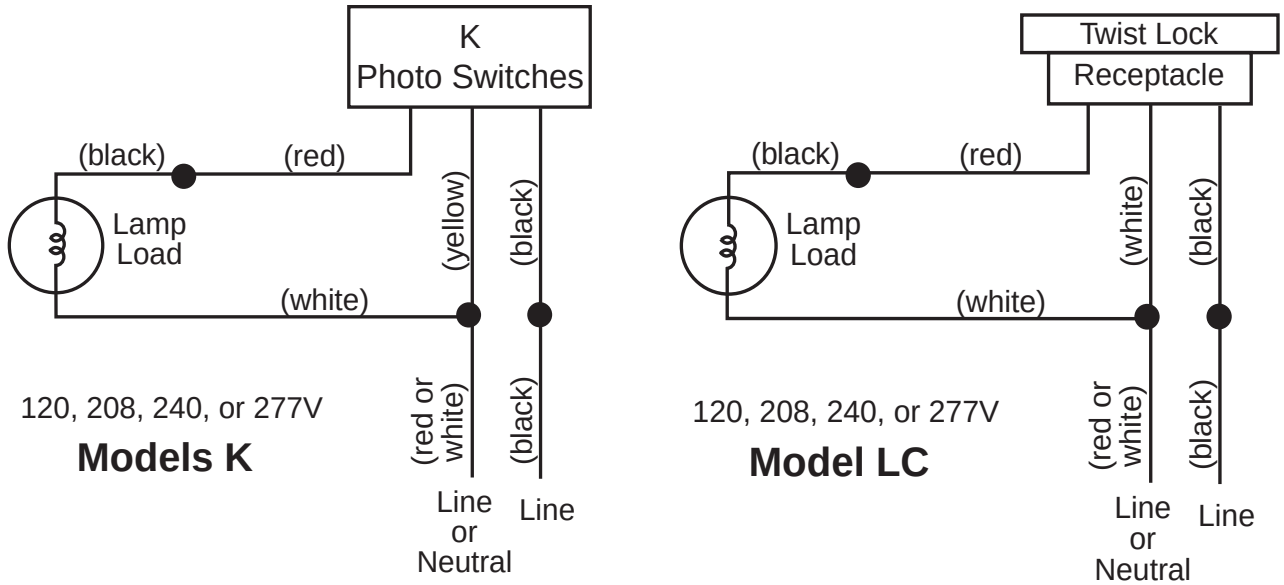
DIMENSIONS



INSTALLATION

When exposed to weather, mount **Models K** and **LC** to a weatherproof hub or conduit body via 1/2" threaded nipple. They may be mounted to a 1/2" knockout in a handy box in locations protected from weather, such as parking garages or beneath substantial overhangs. The LC plugs into a standard mating twist-lock socket supplied by lighting fixture manufacturers or the K122 twist-lock base. K122 base includes the mounting bracket. Mount in a location facing north for normal outdoor light control application, and wire to switch the load directly or through a lighting contactor. Switching level may be adjusted on K41 by moving the slide to block more or less of the photocell window. Covering more of the window will cause lights to come on earlier in the evening (at a higher ambient light level). The K42 model is more directional and may be aimed at darker areas to adjust the level at which lights come on, or it may be aimed toward another light source to provide coordination between multiple light groups. Aiming of the LC series is set by the position of the socket base.

WIRING



ORDERING INFORMATION

Model	Mounting	Supply Voltage	Contactor Ballast	Contactor Tungsten	Foot Candles	Weight
K4121C	Stem	120 VAC 50/60 Hz	8.3A	15A	On 1-5 Off 3-15	4.0 oz (0.10 kg)
K4123C	Stem	208-277 VAC 50/60 Hz	8.3A	15A	On 1-5 Off 3-15	4.0 oz (0.10 kg)
K4221C	Stem/ Swivel	120 VAC 50/60 Hz	8.3A	15A	On 1-5 Off 3-15	4.0 oz (0.10 kg)
K4251	Stem/ Swivel	120 VAC 50/60 Hz	8.3A	15A	On 1-5 Off 3-15	4.0 oz (0.10 kg)
LC4521C	Twist lock	120 VAC 50/60 Hz	8.3A	8.3A	On 5 Off 15	4.0 oz (0.10 kg)
LC4523C	Twist lock	208-277 VAC 50/60 Hz	8.3A	8.3A	On 5 Off 15	3.0 oz (0.09 kg)
K122	Twist lock base	105-480 VAC 50/60 Hz				3.0 oz (0.09 kg)

PLC-MULTIPOINT CELESTIAL SELF-CONTAINED AMBIENT LIGHT SENSORS

MK7-B SERIES

PLC MULTIPOINT, INC.

DESCRIPTION

The **MK7-B Series** Celestial Series Self-contained Sensors develop a variable output voltage that corresponds to the amount of present ambient light. These precise ambient light-level measurement units are designed to detect and transmit, via an analog signal, the amount of light present at their location to the remote analog input point of most Building Automation Controllers. The sensors contain a precision photo-diode type cell that provides an exact, proportional output over a wide range of light levels, allowing for accurate lighting control.

MK7-B-CCF
Indoor

MK7-B-CR
Outdoor

MK7-B-CS
Skylight

FEATURES

- ***Factory calibrated***
- ***Analog voltage models***
- ***Wide range of light-level monitoring***
- ***Compatible with most BAS controllers***
- ***Extremely accurate and reliable***
- ***Three basic models for monitoring: indoor light levels (ceiling mount), outdoor light levels (roof mount), skylight light levels (skylight mount)***
- ***Two-year warranty***

APPLICATION

Sensors allow most building automation controllers to become sophisticated lighting control computers to control any type of lighting at any light level based on the amount of ambient light available. There are three basic types of sensors:

Indoor

Designed to monitor the ambient light levels in offices, schools, etc., the sensor mounts in a 3/8" hole bored in a ceiling tile central to the electrical lighting being controlled. It features an adjustable maximum range from 5-750 fc at the sensor face and a 60° field of view with special flat Fresnel lens configuration.

Outdoor

Designed to mount horizontally in a 1/2" conduit fitting to monitor the outside ambient light levels for parking garages, security lighting, sign lighting, etc., the sensor is generally roof-top mounted facing the northern sky. It features an adjustable maximum range from 5-750 fc at the sensor face. Completely weathertight and temperature stable. At very low ambient temperatures (below 13°F), the sensor will still function but will lose some accuracy and light level sensitivity.

Skylight

Designed to mount vertically in a 1/2" conduit fitting to monitor the ambient light levels from inside a skylight well in warehouses, shopping malls, etc., the sensor features an adjustable maximum range from 1000-7500 fc at the sensor face.

OPERATION

The sensor heads contain patented solid-state circuitry designed to be extremely accurate, adjustable, and flexible over a wide range of input and output voltages. The standard three-wire sensors operate from any input voltage between 12-24 VDC and give a return output signal of 0-5, 1-5, 0-10, 1-10 VDC. The sensors come factory calibrated. The sensor is equipped with a variable range potentiometer, but calibration equipment, such as a foot-candle meter, would be required to change the range of the unit. Note: There is a charge for recalibration of the unit by the manufacturer.

SPECIFICATIONS

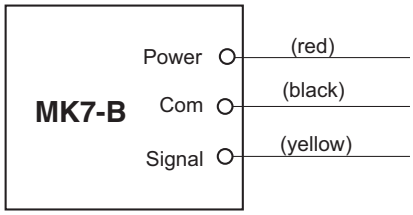
Supply Voltage	12-24 VDC; 20 mA max
Analog Output	0-5 VDC, 1-5 VDC, 0-10 VDC, 1-10 VDC
Wire Type	Three-wire, 18-gauge, stranded
Calibration	
Indoor	
Factory	0-100 fc
Field Adjustable	0 fc minimum - 750 fc maximum
Skylight	
Factory	10-2000 fc
Field Adjustable	10 fc minimum - 7500 fc maximum
Outdoor	
Factory	0-100 fc
Field Adjustable	0 fc minimum - 750 fc maximum
Sensor Type	Blue-enhanced photo-diode
Linearity	2%
Protection	Non-Polarized
Repeatability	±0.5%
Operating Temperature	-40° to 140°F (-40° to 60°C)
Temperature Accuracy	±10%
Approvals	ETL/ UL 916, NEC Class 2, RoHS, Title 24
Warranty	2 years

PLC-MULTIPOINT CELESTIAL SELF-CONTAINED AMBIENT LIGHT SENSORS

MK7-B SERIES

WIRING / CALIBRATION

The sensors come factory calibrated. Each sensor is equipped with a variable range potentiometer, but calibration equipment, such as a foot-candle meter, would be required to change the range of the unit. Note: there is a charge for recalibration of the unit by the manufacturer. Rotating the potentiometer one way or the other causes the upper limit voltage that the sensor produces to correspond to lower or higher foot-candle readings. For example, with a 5V model at the minimum gain setting, the sensor will deliver 5 VDC at 750 fc; at the maximum setting, the sensor will deliver 5 VDC at 50 fc. The zero light level setting is fixed and will not change. The adjustment procedure allows for precise light level monitoring and can compensate for the physical light sensing location of the unit, which may differ from the actual light level present at the task level. Once the calibration procedure is completed, it will remain constant with no further adjustments. Complete installation instructions are provided with the unit. The lower end output (zero light level) and the upper end light level outputs can be custom-ordered for specific voltages. A range of the standard output voltages supplied are listed in Specifications.



CAUTION: To prevent electrical shock and possible equipment damage, disconnect power coming from the controller prior to hookup. Wiring from the sensor to the controller should be with 18- or 22-gauge stranded wire. Do not run the low-voltage wire with or near power wiring. For long wire runs or where there is excessive electrical noise, shielded cable or cable in conduit is required. Cable length should not exceed 500' (152m). Wire the sensor to the appropriate analog port of the controller according to the controller manufacturer's instructions and the specific details of the particular sensor listed on this page.

ORDERING INFORMATION

MODEL	DESCRIPTION
MK7-B	Celestial ambient light sensor
	SENSOR LOCATION
CCF	Indoor
CR	Outdoor
CS	Skylight
	OUTPUT SIGNAL
0/5	0-5 VDC
1/5	1-5 VDC
0/10	0-10 VDC
1/10	1-10 VDC

MK7-B – **CCF** – **1/5**

Example: **MK7-B-CCF-1/5** Light sensor, indoor housing, 1-5 VDC output signal

LIGHTING CONTROLS

PLC-MULTIPOINT SELF-CONTAINED AMBIENT LIGHT SENSORS

MAS SERIES

NEW!

PLC MULTIPOINT, INC.

MADE IN USA

DESCRIPTION

The **MAS** sensors are microprocessor-based light monitors that measure ambient light levels. They provide an analog DC signal to various microprocessors and energy management systems. The sensor is powered by 24VDC and provides a 4-20mA analog signal over 2 wires. The **MAS** can be set to a range of 0 to 10,000 fc. It comes in many styles of housing, including indoor, outdoor, atrium and skylight. The **MAS** sensor's range can be changed with the **MAS-CAL** from up to 4000 feet away.

FEATURES

- ***Compatible with many lighting and building automation controllers***
- ***Measuring range 0-10,000 Fc***
- ***Output 4-20mA***
- ***Adjustable response time***
- ***Indoor sensor adhesive ceiling mount***
- ***All others 1/2" NPT mount***
- ***Class 2 wiring device***
- ***NIST traceable factory calibration available***
- ***Title 24 Listed***
- ***RoHS compliant***
- ***2 year warranty***

MASI
Indoor Sensor Type

MASS
Skylight Sensor Type

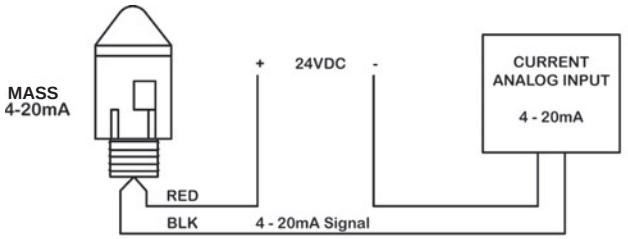
MASO
Outdoor Sensor Type

MASA
Atrium Sensor Type

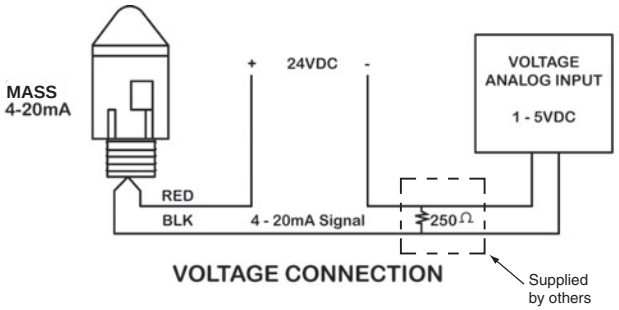
(Correct Orientation Shown)

RoHS

WIRING



CURRENT CONNECTION



VOLTAGE CONNECTION

SPECIFICATIONS

Supply Voltage	18 to 30 VDC
Current Rating	20mA
Analog Output	Low 4mA, High 20mA, 250Ω output impedance
Calibration	MAS-CAL tool
Linearity	2%
Filter Type	Clear, Opaque, Dark
Lens	Fresnel, Flat, Dome
Protection	Non-polarized
Repeatability	±0.5%
Operating Temperature	-40° to 140°F (-40° to 60°C)
Temperature Accuracy	±10%
RoHS Statement	Yes
Dimensions	
Indoor	1.5" X 1.5" X 1.7" (38 X 38 X 43 mm)
Outdoor	1.4" X 1.4" X 2.4" (36 X 36 X 61)
Atrium/Skylight	1.3" X 1.3" X 2.8" (33 X 33 X 71 mm)
Approvals	ETL, NEC Class 2, RoHS, Title 24
Weight	0.13 lbs (0.06 kg)
Warranty	2 years

NEW!

LIGHTING CONTROLS

PLC-MULTIPOINT SELF-CONTAINED AMBIENT LIGHT SENSORS

MAS SERIES

ORDERING INFORMATION

Model	Ordering description	Filter Type	Foot Candles	Lens	Location	Mounting	Mounting Orientation
MASI-12X0T	Indoor light sensor 50 Fc instant time response	Clear	Min 0 Fc Max 200 Fc	Fresnel	Indoor	Ceiling	Down
MASI-12X1T	Indoor light sensor 50 Fc 10 min time response	Clear	Min 0 Fc Max 200 Fc	Fresnel	Indoor	Ceiling	Down
MASI-12X2T	Indoor light sensor 50 Fc 20 min time response	Clear	Min 0 Fc Max 200 Fc	Fresnel	Indoor	Ceiling	Down
MASI-1X0T	Indoor light sensor 100 Fc instant time response	Clear	Min 0 Fc Max 200 Fc	Fresnel	Indoor	Ceiling	Down
MASI-1X1T	Indoor light sensor 100 Fc 10 min time response	Clear	Min 0 Fc Max 200 Fc	Fresnel	Indoor	Ceiling	Down
MASI-1X2T	Indoor light sensor 100 Fc 20 min time response	Clear	Min 0 Fc Max 200 Fc	Fresnel	Indoor	Ceiling	Down
MASI-2X0T	Indoor light sensor 200 Fc instant time response	Clear	Min 0 Fc Max 200 Fc	Fresnel	Indoor	Ceiling	Down
MASI-2X1T	Indoor light sensor 200 Fc 10 min time response	Clear	Min 0 Fc Max 200 Fc	Fresnel	Indoor	Ceiling	Down
MASI-2X2T	Indoor light sensor 200 Fc 20 min time response	Clear	Min 0 Fc Max 200 Fc	Fresnel	Indoor	Ceiling	Down
MASO-12X0T	Outdoor light sensor 125 Fc instant time response	Clear	Min 0 Fc Max 500 Fc	Flat	Outdoor	1/2" NPT	Horizontal
MASO-12X1T	Outdoor light sensor 125 Fc 10 min time response	Clear	Min 0 Fc Max 500 Fc	Flat	Outdoor	1/2" NPT	Horizontal
MASO-12X2T	Outdoor light sensor 125 Fc 20 min time response	Clear	Min 0 Fc Max 500 Fc	Flat	Outdoor	1/2" NPT	Horizontal
MASO-1X0T	Outdoor light sensor 250 Fc instant time response	Clear	Min 0 Fc Max 500 Fc	Flat	Outdoor	1/2" NPT	Horizontal
MASO-1X1T	Outdoor light sensor 250 Fc 10 min time response	Clear	Min 0 Fc Max 500 Fc	Flat	Outdoor	1/2" NPT	Horizontal
MASO-1X2T	Outdoor light sensor 250 Fc 20 min time response	Clear	Min 0 Fc Max 500 Fc	Flat	Outdoor	1/2" NPT	Horizontal
MASO-2X0T	Outdoor light sensor 500 Fc instant time response	Clear	Min 0 Fc Max 500 Fc	Flat	Outdoor	1/2" NPT	Horizontal
MASO-2X1T	Outdoor light sensor 500 Fc 10 min time response	Clear	Min 0 Fc Max 500 Fc	Flat	Outdoor	1/2" NPT	Horizontal
MASO-2X2T	Outdoor light sensor 500 Fc 20 min time response	Clear	Min 0 Fc Max 500 Fc	Flat	Outdoor	1/2" NPT	Horizontal
MASA-12X0T	Atrium light sensor 500 Fc instant time response	Opaque	Min 50 Fc Max 2,000 Fc	Dome	Atrium	1/2" NPT	Horizontal
MASA-12X1T	Atrium light sensor 500 Fc 10 min time response	Opaque	Min 50 Fc Max 2,000 Fc	Dome	Atrium	1/2" NPT	Horizontal
MASA-12X2T	Atrium light sensor 500 Fc 20 min time response	Opaque	Min 50 Fc Max 2,000 Fc	Dome	Atrium	1/2" NPT	Horizontal
MASA-1X0T	Atrium light sensor 1000 Fc instant time response	Opaque	Min 50 Fc Max 2,000 Fc	Dome	Atrium	1/2" NPT	Horizontal
MASA-1X1T	Atrium light sensor 1000 Fc 10 min time response	Opaque	Min 50 Fc Max 2,000 Fc	Dome	Atrium	1/2" NPT	Horizontal
MASA-1X2T	Atrium light sensor 1000 Fc 20 min time response	Opaque	Min 50 Fc Max 2,000 Fc	Dome	Atrium	1/2" NPT	Horizontal
MASA-2X0T	Atrium light sensor 2000 Fc instant time response	Opaque	Min 50 Fc Max 2,000 Fc	Dome	Atrium	1/2" NPT	Horizontal
MASA-2X1T	Atrium light sensor 2000 Fc 10 min time response	Opaque	Min 50 Fc Max 2,000 Fc	Dome	Atrium	1/2" NPT	Horizontal
MASA-2X2T	Atrium light sensor 2000 Fc 20 min time response	Opaque	Min 50 Fc Max 2,000 Fc	Dome	Atrium	1/2" NPT	Horizontal
MASS-12X0T	Skylight light sensor 2500 Fc instant time response	Dark	Min 100 Fc Max 10,000 Fc	Dome	Skylight	1/2" NPT	Up
MASS-12X1T	Skylight light sensor 2500 Fc 10 min time response	Dark	Min 100 Fc Max 10,000 Fc	Dome	Skylight	1/2" NPT	Up
MASS-12X2T	Skylight light sensor 2500 Fc 20 min time response	Dark	Min 100 Fc Max 10,000 Fc	Dome	Skylight	1/2" NPT	Up
MASS-1X0T	Skylight light sensor 5000 Fc instant time response	Dark	Min 100 Fc Max 10,000 Fc	Dome	Skylight	1/2" NPT	Up
MASS-1X1T	Skylight light sensor 5000 Fc 10 min time response	Dark	Min 100 Fc Max 10,000 Fc	Dome	Skylight	1/2" NPT	Up
MASS-1X2T	Skylight light sensor 5000 Fc 20 min time response	Dark	Min 100 Fc Max 10,000 Fc	Dome	Skylight	1/2" NPT	Up
MASS-2X0T	Skylight light sensor 10000 Fc instant time response	Dark	Min 100 Fc Max 10,000 Fc	Dome	Skylight	1/2" NPT	Up
MASS-2X1T	Skylight light sensor 10000 Fc 10 min time response	Dark	Min 100 Fc Max 10,000 Fc	Dome	Skylight	1/2" NPT	Up
MASS-2X2T	Skylight light sensor 10000 Fc 20 min time response	Dark	Min 100 Fc Max 10,000 Fc	Dome	Skylight	1/2" NPT	Up

ACCESSORIES

MAS-CAL Calibration unit for MAS series light level sensors

KELE PHOTO-SENSITIVE RESISTOR

PSR-1, PSR-1-T

DESCRIPTION

The **Model PSR-1** Photo-Sensitive Resistor may be used as an input to indicate the presence or absense of light at the sensor location. The **Model PSR1-T** is a **PSR-1** coupled with a 4-20 mA transmitter. The sensor is designed to be mounted in the end of a weatherproof conduit box.

FEATURES

- ***Economical dark/light sensing***
- ***4-20 mA output models***
- ***1/2" NPT design***
- ***Track-mounted PSR-1-T transmitter***

APPLICATION

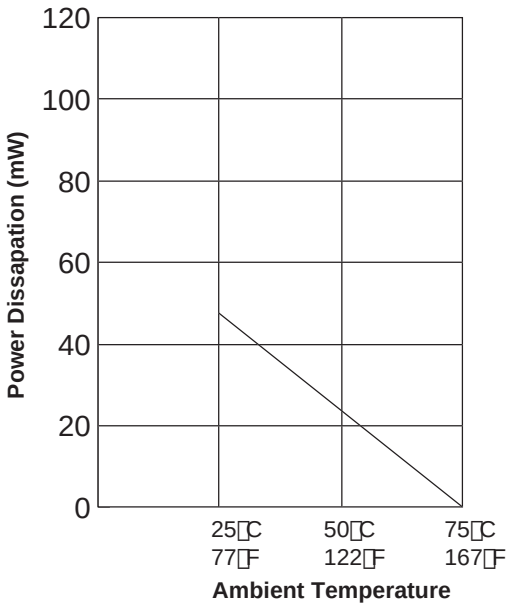
The **Model PSR-1** has a resistance in darkness in excess of 1 MW and a resistance in bright light of less than 1.5 kW. **Models PSR-1** and **PSR1-T** indicate the presence or absence of light. They should not be used for footcandle control of occupied spaces. The **PSR-1-T** is calibrated for 4 mA in bright light (>100 footcandles) and 20 mA in darkness (0.1 footcandles).

PSR-1-T

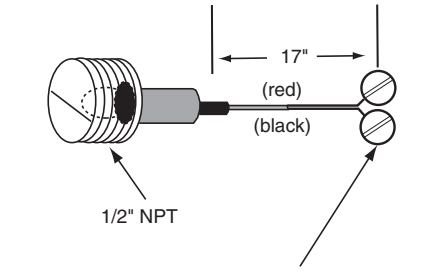
SPECIFICATIONS

Supply Voltage	
PSR-1-T	12-35 VDC
Max Current Draw	
PSR-1-T	22 mA
Outputs	
PSR-1	>1 MΩ in dark <1.5 kΩ in bright light Non-linear within span
PSR-1-T	4 mA = bright light 20 mA = dark Non-linear within span
Operating Temperature	-13° to 167°F (-25° to 75°C)
Weight	0.05 lbs (.02kg)
Warranty	1 year

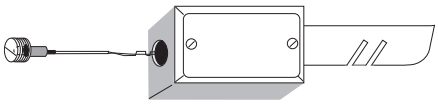
POWER DERATING CURVE



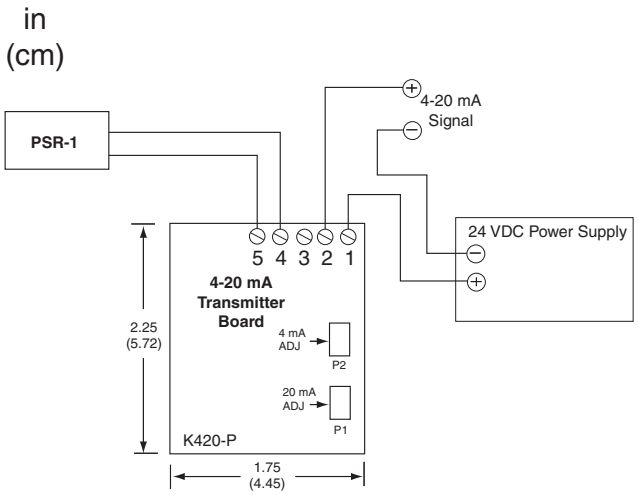
WIRING



PSR-1



PSR-1-E



PSR-1-T

APPLICATION NOTES

Due to the wide tolerance and non-linear nature of the low-cost **PSR-1** and **PSR-1-T**, the values for resistance versus light level (or mA versus light level) cannot be predicated accurately. As stated in the data sheet, it is not intended for control of lighting levels in occupied spaces.

However, an installed device will give very repeatable performance through its span. Note the following procedure is required for each individual **PSR-1** and **PSR-1-T** installed, as interchangeability is not guaranteed.

1. Install the **PSR-1** or **PSR-1-T** in its intended location and connect to controller.

2. Arrange for the sensed lighting to be darkened to the control point that is desired, use of a reliable light level meter is recommended. For outdoor lighting, the most common on/off control points are turn lights on at a point between 1 and 3 foot candles. Without a light meter, the lowest level (on point) can be estimated by observation on a cloudless day at about 5 minutes prior to sunset, or about 5 minutes after sunrise. The high (off point) level can be estimated by observation on a cloudless day at about 15 minutes prior to sunset, or about 15 minutes after sunrise. Sunrise and sunset time for your locality on a given day may be obtained at www.srrb.noaa.gov.

3. Record the value (Ohms or mA) at which each lighting control point is reached.

4. While the method is NOT recommended for analog control of lighting level in occupied spaces, the same procedure may be employed to control artificial lighting in areas that otherwise illuminated by skylights or other overwhelming sources of natural light.

ORDERING INFORMATION

MODEL	DESCRIPTION
PSR-1	Photo-sensitive resistor
PSR-1-T	Photo-sensitive resistor with 4-20 mA output
PSR-1-E	Photo-sensitive resistor with waterproof enclosure
PSR-1-T-E	Photo-sensitive resistor with waterproof enclosure and 4-20 mA output

ACCESSORIES	
AD-2	KNOCK-OUT ADAPTER-3/4in TO 1/2in

LIGHTING CONTROLS

ABB LIGHTING CONTACTORS
A16 SERIES

DESCRIPTION

The **A16 Series** Lighting Contactors are electrically-held four-pole contactors available with normally closed or normally open contacts. The contacts are rated for 30A general purpose and ballast, or 20A tungsten. Compact size and surface or DIN rail mounting make installation easy. The normally closed style keeps the lights on should the control circuit fail.

FEATURES

- ***DIN rail or surface mounting***
- ***Easy parts replacement***
- ***Normally closed (N.C.) or normally open (N.O.) four-pole styles***

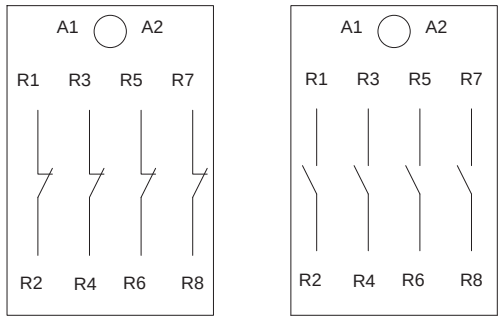
A16-04

SPECIFICATIONS

Frequency	50/60 Hz
Coil Burden	80 VA inrush, 8 VA Holding
Coil Voltage	24, 120 or 277 VAC
Contact Rating	30A General purpose
Contact Type	Four (N.O. or N.C) Electrically held
Contactor Ballast	30A or general purpose
Contactor Tungsten	20A at 600VAC
Wiring	18-10 AWG copper stranded 75°C, max two wires per terminal
Mounting	Surface or DIN rail
Approvals	UL listed, File E312527, CSA File LR56745, CE, RoHS
Weight	0.7 lb (0.318 kg)
Warranty	1 year

NOTE: Electrically-held contactors and starters can emit a humming noise when the coil is energized.

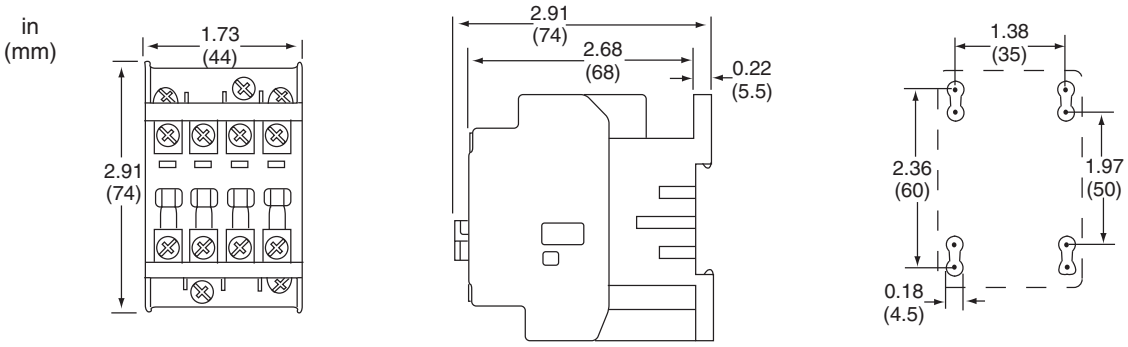
WIRING



Four-pole N.C. Contactor

Four-pole N.O. Contactor

DIMENSIONS



ORDERING INFORMATION

MODEL	DESCRIPTION
A16-04-00-42	Four-pole, N.C., 30A contactor, 277 VAC coil
A16-04-00-81	Four-pole, N.C., 30A contactor, 24 VAC coil
A16-04-00-84	Four-pole, N.C., 30A contactor, 120 VAC coil
A16-40-00-42	Four-pole, N.O., 30A contactor, 277 VAC coil
A16-40-00-81	Four-pole, N.O., 30A contactor, 24 VAC coil
A16-40-00-84	Four-pole, N.O., 30A contactor, 120 VAC coil

DESCRIPTION

The **LS7K Series Lighting Contactors** are electrically held and are available in four-pole normally closed or normally open configurations. The 30 amp contacts are fully rated for general purpose and ballast lighting loads. Compact size and two mounting methods make installation easy, and use of the normally-closed style may eliminate the need for a more expensive latching contactor to keep lights on should the control circuit fail.

FEATURES

- ***DIN or surface mounting***
- ***Easy parts replacement***
- ***Normally closed (N.C.) or normally-open (N.O.) four-pole style***

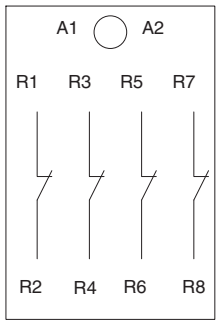
LS7K-04

SPECIFICATIONS

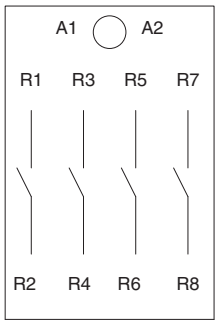
Frequency	50/60 Hz
Coil Burden	45 VA inrush, 6 VA Holding
Coil Voltage	24 VAC or 120 VAC
Contact Rating	32A general-purpose
Contact Type	Four (N.O. or N.C.) Electronically Held
Contactor Ballast	30A
Contactor Tungsten	20A at 600 VAC
Wiring	14-10 AWG 75°C copper only
Mounting	Surface or DIN!rail
Approvals	UL listed File #E76233, CE
Weight	0.60 lb (0.27 kg)
Warranty	1 year

NOTE: Electrically held contactors and starters can emit a humming noise when the coil is energized.

DIMENSIONS

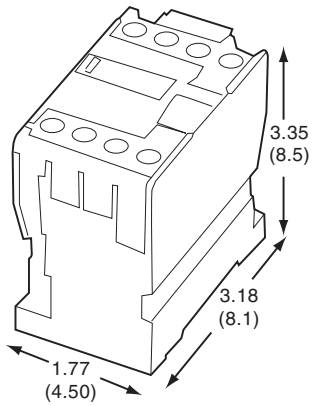


Four-pole N.C. Contactor



Four-pole N.O. Contactor

DIMENSIONS



LS7K-04-A/G
LS7K-40-A/G

ORDERING INFORMATION

MODEL	DESCRIPTION
LS7K-04A	Four-pole, N.C., 30A contactor, 120 VAC coil
LS7K-04-G	Four-pole, N.C., 30A contactor, 24 VAC coil
LS7K-40-A	Four-pole, N.O., 30A contactor, 120 VAC coil
LS7K-40-G	Four-pole, N.O., 30A contactor, 24 VAC coil

LIGHTING CONTROLS

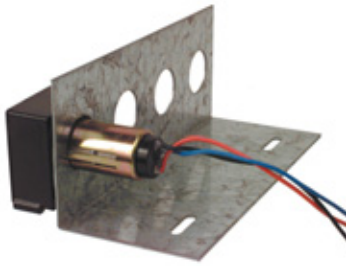
GE LIGHTING RELAYS

RR-7, RR-9

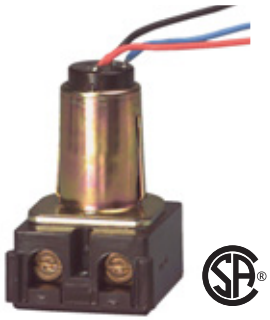
DESCRIPTION

GE **Model RR-7** and **RR-9 Lighting Relays** are mechanical latching-type units requiring only momentary 24 VAC switch circuit pulses to open or close line voltage circuits. All GE low voltage relays may be used to full-rated capacity for tungsten filament, ballast, or resistive loads. The **Model RR-9** includes an auxiliary contact on the low voltage side for status indication.

CAUTION: The coil is designed to resist burnout if continuous voltage is applied with prolonged, continuous voltage.



Optional Bracket for RR-7/RR-9 and HDR Relay

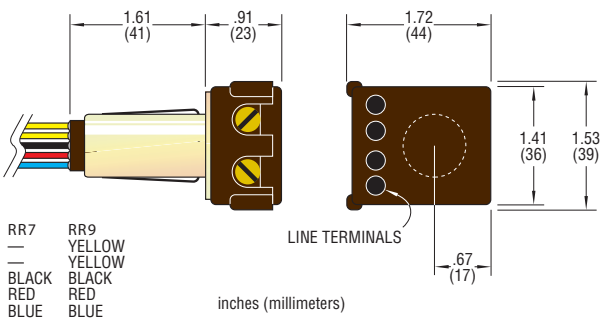


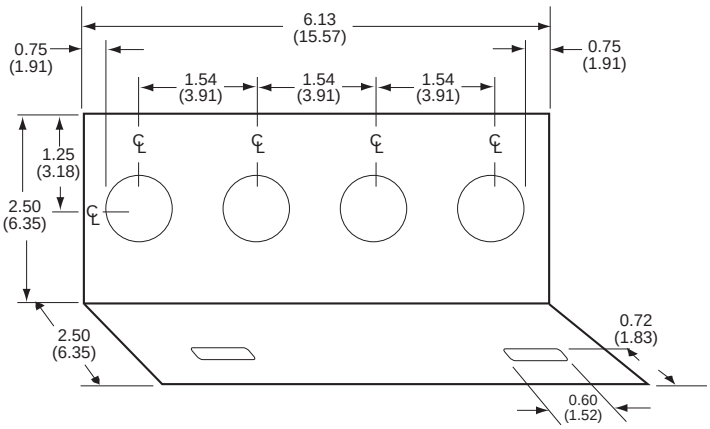
RR-7

SPECIFICATIONS

Supply Voltage	21-30 VAC (class 2) momentary 30-38 VDC momentary
Relay Type	SPST Maintained mechanically latching
Coil Impedance	75-85Ω @60 Hz unrectified 55-60Ω DC resistance
Coil Inrush Current	325 mA @ 24 VAC 450 mA @ 35 VDC
Contactor Ballast	20A at 277 VAC
Contactor Motor	1/2 hp @ 110-125 VAC 1/2 hp @ 220-277 VAC
Contactor Tungsten	20A filament 125 VAC
Resistive Load	30A at 277 VAC
Pilot Contact	1A, 24 VAC isolated (RR-9 only)
Pulse Rate	Minimum activating 50 ms
Lead Length	6" (15cm)
Wiring	Two terminals, two back wiring holes per terminal for use with 14-10 AWG solid or stranded wire (copper wire only)
Endurance	50,000 cycles, full load 50,000 cycles, full load 100,000 cycles, no load 100,000 cycles, no load
Operating Temperature	32° to 140°F (0° to 60°C)
Operating Humidity	10% to 95% RH noncondensing
Mounting	Mounts in standard 1/2" KO in 14 or 16 gauge material
Approvals	UL listed File # E18830, CSA certified
Weight	0.3 lb (0.12 kg)
Warranty	1 year

DIMENSIONS





INSTALLATION

The relay employs a split low-voltage coil to move the line voltage contact armature to the on or off latched position. The on coil moves the armature to the on position when a 24 VAC control signal is impressed across its leads. This is analogous to a magnet attracting the handle of a standard single-pole switch to the on position when energized. The armature (handle) latches in the on position and will remain there until the off coil is energized, drawing the armature into the off position.
This control operation provides several key control features:

Positive action
The relay always goes to the state commanded. For example, multiple off commands will simply keep the contacts in the off position.

Stable operation
Since the relay latches in the on or off position, power outages do not result in a change of state.

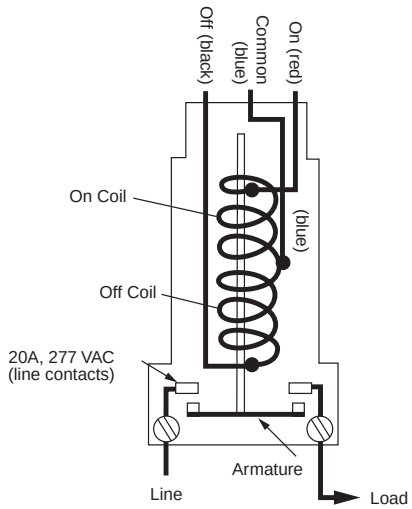
Minimal power consumption
Control power is only required when the relay changes state.

Additive control functions
Pulse control signals coupled with latching allow any number of switches or electronic control devices to operate the same relay. The relay position is always dictated by the last signal.

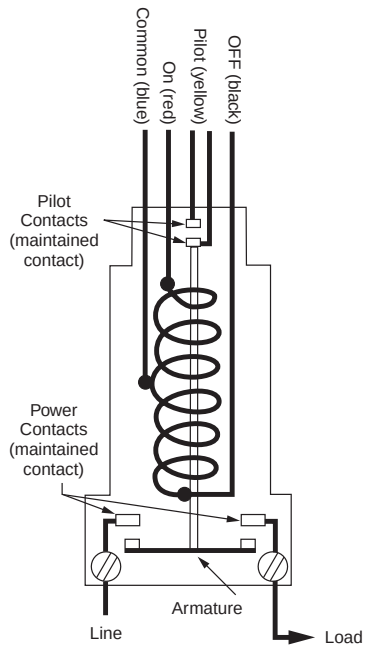
WIRING

Important Restriction

1. Do not use these relays to switch DC loads. Doing so will damage the power contacts.



RR-7



RR-9

ORDERING INFORMATION

MODEL	DESCRIPTION
RR-7	Three-wire low voltage leads
RR-7-B	RR-7 with banana plug connectors
RR-7-T	RR-7 with connector
RR-9	Five-wire low voltage leads with isolated pilot auxiliary contact
RR-9-B	RR-9 with banana plug connectors
RR-BRACKET-4	Optional mounting bracket with 4 1/2" KO's

FUNCTIONAL DEVICES EMERGENCY BYPASS / SHUNT RELAYS

ESR SERIES

DESCRIPTION

These **ESR Series** Emergency Lighting Shunt Relays, or Bypass Relays, are designed for applications that require an emergency load, such as exit lighting or any other emergency lighting, to be switched on during a loss of normal power. The economically priced relays are available prepackaged in their own Nema 1 enclosure or in panel versions to be installed inside an existing enclosure. Emergency Lighting relays can be ordered with a standard two-position on/auto override switch or with a custom two-position momentary on/auto override switch. These switches can be used for testing purposes to verify your emergency load is being switched properly.

ESRU1C

APPLICATION

When normal power is present, the **ESR** relay coil is activated and the emergency panel is fed from normal power. The lighting load can be switched on/off using an individual wall switch.

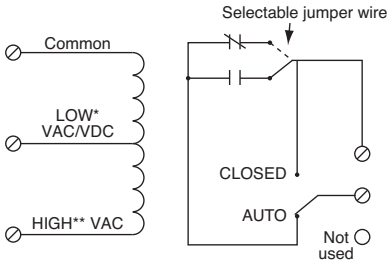
When normal power drops out, the **ESR** coil is deactivated and N/C contact falls closed. The automatic transfer switch changes over to backup (generator) power, and the lighting load is illuminated regardless of the position of the wall switch.

Models that have override test switches are set in the auto position from the factory. This allows emergency power to be switched to the load. To test field wiring connections at the time of installation, the override test switch should be changed to the "closed" position (illuminating emergency lighting), and then placed back to the "auto" position. The red LED shows the normal utility power is connected correctly.

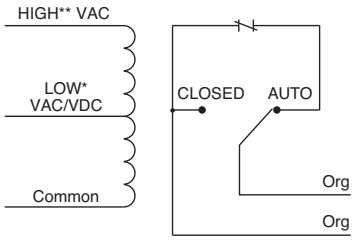
SPECIFICATIONS

Relay Life	10 million cycles minimum mechanical
Coil	Continuous duty
Coil Current	45 mA @ 18 VAC 75 mA @ 24 VAC 62 mA @ 208-277 VAC 30 mA @ 22 VDC 32 mA @ 24 VDC 42 mA @ 30 VDC
Operate Time	18-20 ms
Operating Temperature	-30° to 140°F (-34° to 60°C)
LED Indicator	Relay status, On= activated
Dimensions	
ESR- 24_, U1S, H1S	2.30" x 3.20" x 1.80" with 0.50" NPT nipple (5.8 x 8.1 x 4.6 cm)
ESR- U1C, H1C	1.70" x 2.80" x 1.50" with 0.50" NPT nipple (4.3 x 7.1 x 3.8 cm)
Enclosure Rating	Plenum, NEMA 1
Approvals	UL Listed, UL924, UL916, UL864, CUL, California State Fire Marshal, CE
Weight	0.52 lbs (0.24 kg)
Warranty	5 year

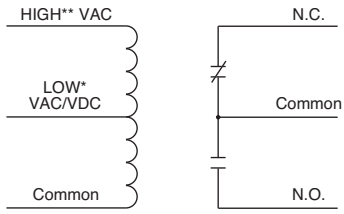
WIRING



Typical of M2402SB



Typical of 2401SB, U1S, H1S, 2301SB, 2402SB



Typical of 2402B, U1C, H1C, 2401B, 2402B, MU1C, MNU1C, 2402B

ORDERING INFORMATION

Model	Coil Voltage	Relay Type	Resistive Load	Contactor Motor	Contactor Ballast	Contactor Tungsten	Pilot Contact	Override Switch	Gold Flash
ENCLOSED EMERGENCY LIGHTING BYPASS/ SHUNT RELAYS									
ESRU1C	10-30 VAC/ VDC; 120 VAC 50-60 Hz	SPDT	10A	1/3 hp	480 VA	600 W	480 VA		Gold
ESRU1S-NC	10-30 VAC/ VDC; 120 VAC 50-60 Hz	SPST-NC	10A	1/6 hp	480 VA	240 W	480 VA	1	Gold
ESRH1C	10-30 VAC/ VDC; 208-277 VAC 50-60 Hz	SPDT	10A	1/3 hp	480 VA	600 W	480 VA		Gold
ESRH1S-NC	10-30 VAC/ VDC; 208-277 VAC 50-60 Hz	SPST-NC	10A	1/6 hp	480 VA	240 W	480 VA	1	Gold
ESR2401B	24 VAC/ VDC; 120 VAC 50-60 Hz	SPDT	20 A	2 hp	20A	1200 W	1110 VA		
ESR2401SB-NC	24 VAC/ VDC; 120 VAC 50-60 Hz	SPST-NC	20 A	2 hp	10A		1110 VA	1	
ESR2402B	24 VAC/ VDC; 208-277 VAC 50-60 Hz	SPDT	20 A	2 hp	20A	1200 W	1110 VA		
ESR2402SB-NC	24 VAC/ VDC; 208-277 VAC 50-60 Hz	SPST-NC	20 A	2 hp	10A		1110 VA	1	
ESR24P	24 VAC/ VDC	DPDT	20 A	3 hp	20A		1640 VA		Gold
ESR01P	120 VAC 50-60 Hz	DPDT	20 A	3 hp	20A		1640 VA		
ESR02P	208-277 VAC 50-60 Hz	DPDT	20 A	3 hp	20A		1640 VA		Gold
PANEL MOUNT EMERGENCY LIGHTING BYPASS/ SHUNT RELAYS									
ESRMU1C	10-30 VAC/ VDC; 120 VAC 50-60 Hz	DPDT	15 A	1/3 hp	15A	600 W	480 VA		Gold
ESRMNU1C	10-30 VAC/ VDC; 120 VAC 50-60 Hz	SPDT	15 A	1/3 hp	15A	600 W	480 VA		Gold
ESRM2402B	24 VAC/ VDC; 208-277 VAC 50-60 Hz	SPDT	20 A	2 hp	20A	1200 W	1110 VA		
ESRM2402SB	24 VAC/ VDC; 208-277 VAC 50-60 Hz	SPST	20 A	2 hp	20A	1200 W	1110 VA	1	

LIGHTING CONTROLS

WATTSTOPPER EMERGENCY LIGHTING CONTROL
ELCU-100

DESCRIPTION

Watt Stopper/Legrands Emergency Lighting Control Unit **ELCU-100** is a self-contained, reliable, easy-to-install device. The **ELCU** provides all required functionality to allow any standard lighting control device to control emergency lighting in conjunction with normal lighting in any area within a building.

FEATURES

- ***Eliminates energy waste caused by "always ON" emergency lighting***
- ***Integral push-to-test button activates emergency mode for a true test condition***
- ***Connects to remote test switch or other input to activate emergency ON from a remote location***
- ***Operates as a control device or as a shunt***
- ***Senses local single circuit power failure***
- ***Zero-crossing switching relay technology****
- ***LED indication for emergency and normal power***
- ***Half-second delayed ON positively identifies emergency***
- ***Provides absolute fail-to-on emergency lighting***

APPLICATION

The **ELCU** is designed to control lighting in areas where emergency lighting fixtures are connected to dedicated circuits that are typically on 24 hours per day. The **ELCU** allows normal control of emergency lighting for energy savings and/or task related reasons while strictly adhering to National Electric Code requirements. It is suitable for any application where enhanced energy saving is desired.

MOUNTING

The **ELCU** is equipped with an integral DIN rail mounting groove and retaining clip mechanism. It can be installed on the DIN rail track provided within a WattStopper enclosure (e.g., LS-E8, LSE12), or in a WattStopper lighting control panel.

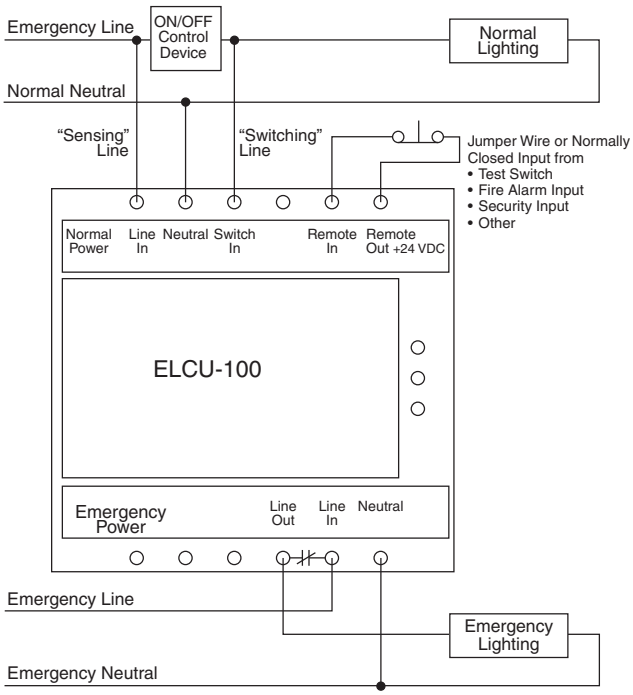
OPERATION

The **ELCU** monitors a single circuit that provides normal lighting to an area. As long as normal power is present, the **ELCU** permits lighting control devices (i.e., occupancy sensors, panels, dimmers, or wall switches) to control the emergency lighting fixtures as well as the general lighting. If power is lost for any reason, including the tripping of a single branch circuit breaker, the **ELCU** will force the emergency fixtures for that area on. The **ELCU** can be wired either as a control device, so that emergency lighting follows the control of normal lighting, or as a bypass device to shunt emergency power around a control device when normal power fails.

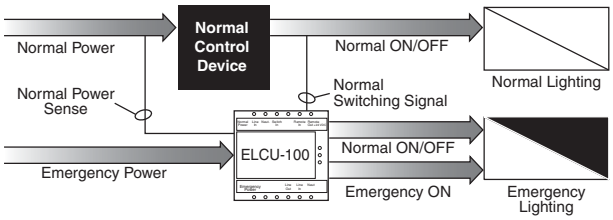
SPECIFICATIONS

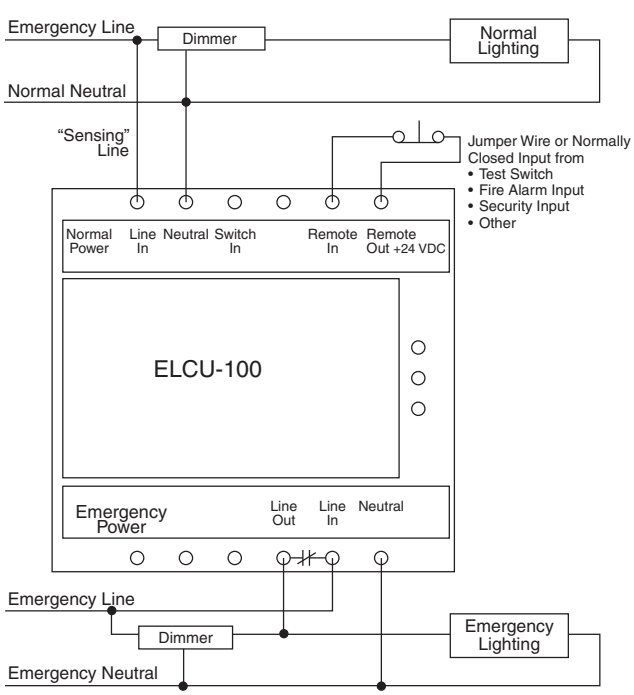
Supply Voltage	120/277 VAC; 60Hz	**Dimensions**	2.78"H x 3.44"W x 2.63"D (7.1 x 8.7 x 6.7 cm)
Contactor Ballast	10 A @ 120 VAC; 10A @ 277 VAC	**Housing Type**	Fire rated V-0, 80°C
Contactor Motor	1HP @ 120 VAC maximum load	**Approvals**	UL 924 listed, file #E302768
Contactor Tungsten	2A @ 120 VAC maximum load		Meets NFPA, OSHA, and NEC safety codes
Activation	Supplies 24 VDC source for dry contact closure	**Weight**	1.0 lb. (0.45 kg)
Test Control	Push-to-test button on unit	**Warranty**	5 years

WIRING



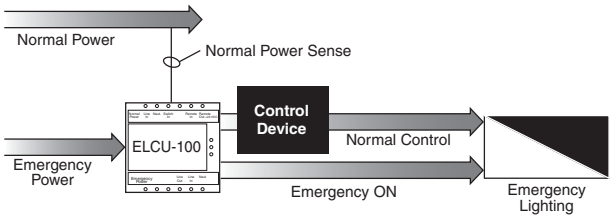
When wired as a control device, the ECLU receives a switching signal from the output of the control device (relay, switch, power pack, etc.)





When wired as a shunt, the switching line is not used.

Note: Use with WattStopper universal dimmers or contact dimmer manufacturer to determine the suitability of the specified dimmer for shunt operation.



ORDERING INFORMATION

MODEL	DESCRIPTION
ELCU-100	Emergency lighting control unit, 120/277 VAC 60Hz

ACCESSORIES

LS-E12	Surface mount enclosure for up to 6 ECLU units, includes screw cover and DIN rail
LS-E8	Surface mount enclosure for 1 or 2 ECLU units, includes screw cover and DIN rail
EMTS-100	Remote test switch on single gang plate, 24 VDC, normally closed contact

LIGHTING CONTROLS

EMERGENCY UL924 BYPASS/ SHUNT RELAYS

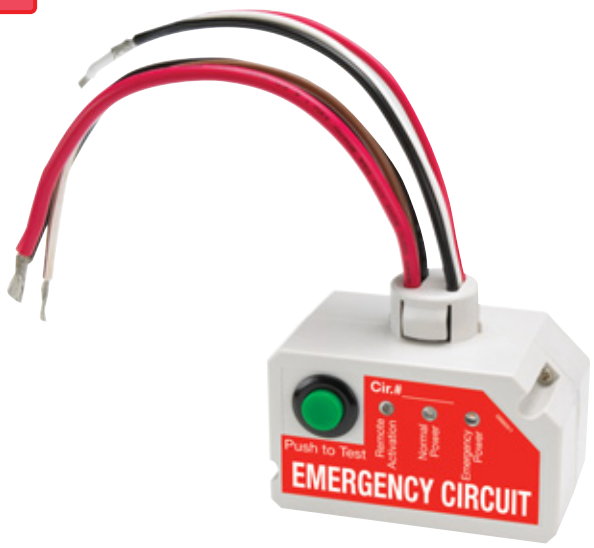
ELCU-200

NEW!

WattStopper | legrand

DESCRIPTION

The **ELCU-200** Emergency Lighting Control Unit is a self-contained device that allows any standard lighting control device to control emergency lighting in conjunction with normal lighting in any area within a building. If power is lost for any reason, including the tripping of a single branch circuit breaker, the **ELCU-200** will force on the emergency fixtures for that area. The ELCU-200 can be wired either as a control device, so that emergency lighting follows the control of normal lighting, or as a bypass device to shunt emergency power around a control device (e.g., a dimmer) when normal power fails.



ELCU-200

FEATURES

- ***Eliminates energy waste caused by emergency lighting that is always on***
- ***Integral push-to-test button activates emergency mode for a true test condition***
- ***Connects to EMTS-100 Remote Test Switch or other input to activate emergency on from a remote location***
- ***Operates as a control device or as a shunt***
- ***Senses local single circuit power failure***
- ***Zero cross switching technology for reliability and increased product life***
- ***Compatible with WattStopper occupancy sensors, daylighting controls, lighting control panels, and dimmers***
- ***LED indication for emergency and normal power***
- ***Half-second delayed on positively identifies emergency fixtures for required maintenance***
- ***Provides absolute fail-to-on emergency lighting***
- ***Qualifies for use on ARRA-funded projects***

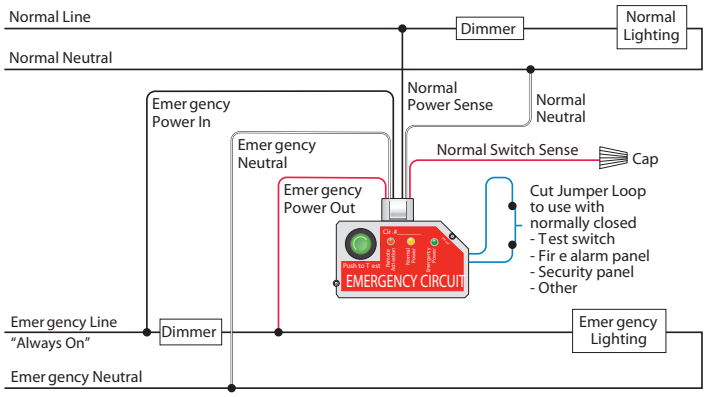
c UL us

SPECIFICATIONS

Supply Voltage	120/277 VAC
Supply Frequency	60 Hz
Maximum Load	
Ballast	20 A @ 120/277 VAC
Incandescent	10 A @ 120 VAC
Motor	1HP @ 120 VAC
Activation	Supplies 24 VDC source for dry contact closure. Push-to-test button on unit.
Operating Temperature	32° to 131°F (0° to 55 °C)
Operating Humidity	5 to 95%, noncondensing
Dimensions	1.7"H x 2.97"W x 1.64"D (43.2mm x 75.4mm x 41.7mm) with a 1/2" (12.7mm) threaded nipple
Housing Type	Fire rated V-0, 176°F (80°C)
Approvals	UL Listed, cUL listed for Emergency Lighting and Power, E302768 Meets NEC, OSHA, and NFPA safety codes; UL 2043 plenum rated
Weight	0.44 lb. (0.2 kg)
Warranty	5 years

WIRING

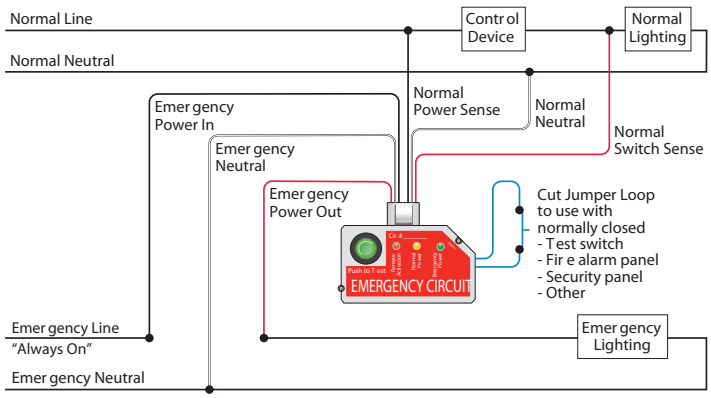
Wiring for a Shunt or Bypass Device



When wired as a shunt, the switching line is not used.

Note: Use with WattStopper universal dimmers or contact dimmer manufacturer to determine the suitablity of the specified dimmer for shunt operation.

Wiring for a Control Device



When wired as a control device, the ELCU-200 receives a switching signal from the output of the control device (relay, switch, power pack, etc.)

ORDERING INFORMATION

MODEL	DESCRIPTION
ELCU-200	Emergency Lighting Control Unit
ELCU-200-U	Emergency Lighting Control unit, ARRA- compliant

	ACCESSORIES	PAGE
EMTS-100	Remote test switch on single gang plate, 24 VDC, normally closed contact	593

LIGHTING CONTROLS

TWO STAGE AND THREE STAGE HALF-LIGHT™ CONTROLLERS

HALF-LIGHT SERIES

NEW!

Functional Devices, Inc.

MADE IN USA

c UL us

CE

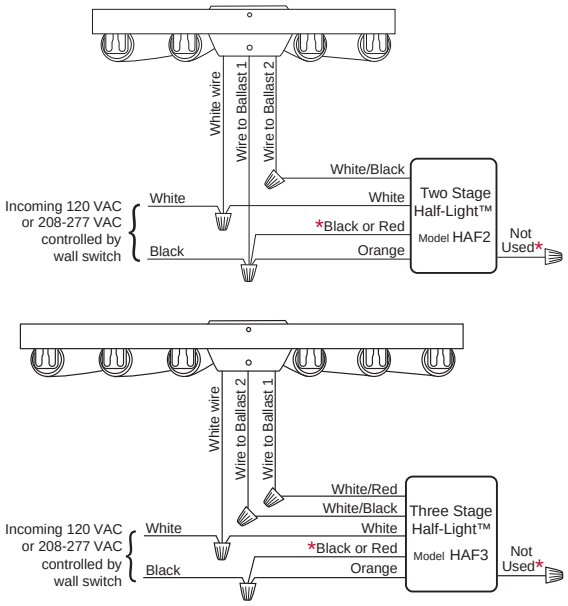
DESCRIPTION

The **Half-Light Series** installs in any light fixtures and uses exisiting switches to start lighting levels at 50% and then can be sequenced to full light. The Two-Stage Half Light Controller(**HAF2**) is designed for a two-ballast, four-lamp fixture in which each ballast controls two lamps. Within this configuration, an initial toggle ON of the wall switch activates one ballast only, producing 50% light; by toggling the switch OFF and then ON again, both ballasts will be activated, delivering full light output. The Three-Stage Half Light Controller (**HAF3**) is designed for a six-lamp fixture in which one ballast controls two lamps and the other ballast controls the remaining four lamps. Within this configuration, an initial toggle ON of the wall switch activates ballast one only, delivering 33% light; toggling the switch OFF and then ON again will activate ballast two only, producing 67% light; and, by toggling the switch OFF and then ON again a final time, both ballasts will be activated, delivering full light output.

FEATURES

- ***Does not change voltage waveform***
- ***Installs in wiring compartment of light fixture***
- ***Uses existing wall switch***
- ***Bi-level lighting control***
- ***Can be used with most motion sensing switches***

WIRING



* For 120 VAC systems, Black wire is used, Red wire is not used. For 208-277 VAC systems, Red wire is used, Black wire is not used.

SPECIFICATIONS

Supply Voltage	120/208-277 VAC
Contactor Ballast	5 A @ 120-277 VAC
Contactor Tungsten	5 A @ 120 VAC
Operating Temperature	-30° to 140°F (-34.4° to 60°C)
Operating Humidity	5 to 95% RH (Non-condensing)
Dimensions	3.75"H x 1.66"W x 1.18"D (9.5 x 4.2 x 3 cm)
Approvals	UL File E68805, C-UL, CE
Weight	0.2 lb (0.09 kg), 0.24 lb (0.11 kg)
Warranty	1 year

ORDERING INFORMATION

MODEL	DESCRIPTION
HAF2	Independent lighting controller, two stage, 120/208-277 VAC
HAF3	Independent lighting controller, three stage, 120/208-277 VAC

NEW!

KELE PULSE INITIATOR

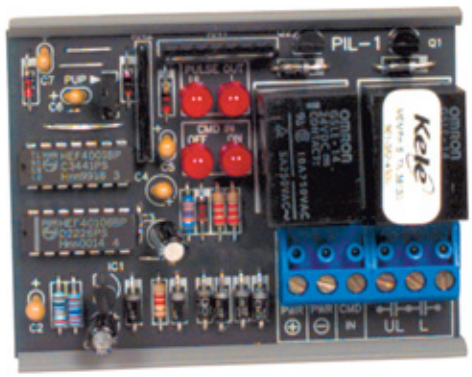
PIL-1

DESCRIPTION

The **PIL-1 Pulse Initiator** is designed to provide pulses to latch and unlatch mechanically held or magnetically held lighting contactors (such as the RR-7, RR-9, or TR Series) from maintained contact outputs.

FEATURES

- ***LED indicators:***
- ***Pulse out (unlatch/latch)***
- ***Command in (off/on)***
- ***AC or DC operation***
- ***Selectable power-up (PUP) state***
- ***Snap-track mounted***

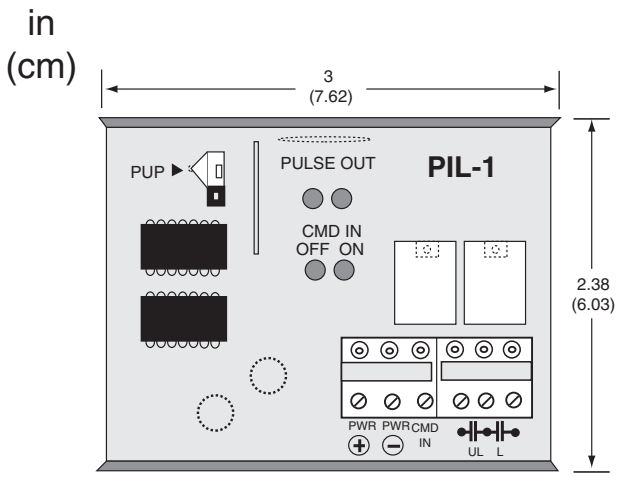


MADE IN USA

OPERATION

The **Model PIL-1** is controlled by a single SPST N.C. or N.O. switch or relay. Closing the input contact causes the latch output to close momentarily for 100 ms. Opening the input contact causes the unlatch output to close momentarily for 100 ms. A power-up feature allows the operator to select either an immediate pulse out (PUP position), depending on the present command of the controller, or a pulse out only when the controller input changes state. LEDs indicate input state and output latch or unlatch pulses. Typical control signals would be a digital output from a BAS panel, a light or toggle switch, or a contact on a timer.

DIMENSIONS



SPECIFICATIONS

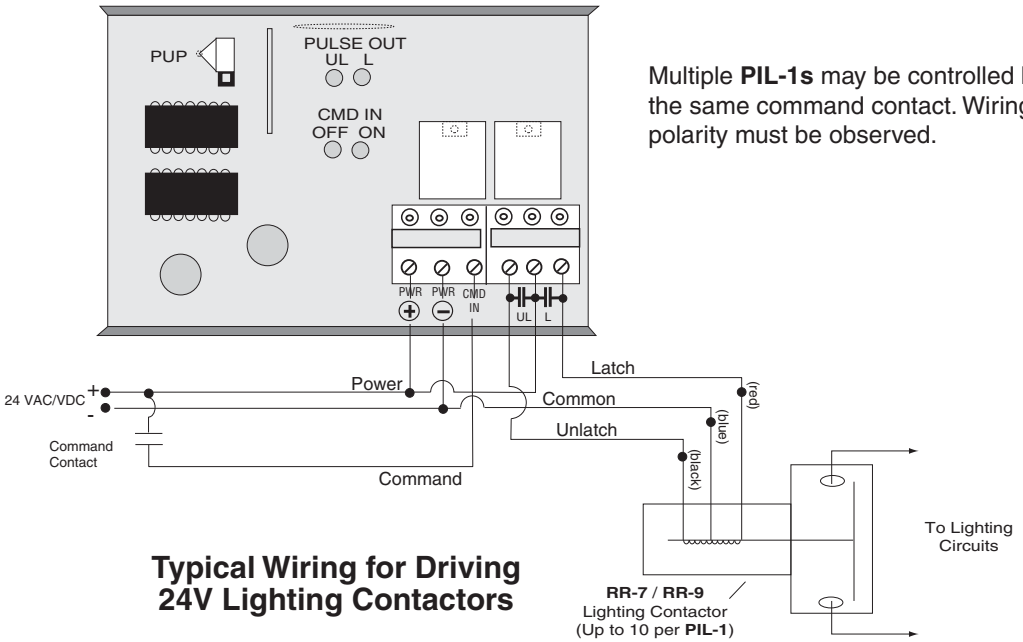
Supply Voltage	24 VAC/VDC @ 50 mA	**Operating Temperature**	14° to 122°F (-10° to 50°C)
Input	SPST switch or relay	**Operating Humidity**	5 to 95% RH non-condensing
Output	Two N.O. pulsed contacts rated for 120 VAC @ 5A	**Dimensions**	2.375" H x 3" W x 1.375" D (6.03 x 7.62 x 3.5 cm)
Output Pulse Time	100 ms standard, others availiable upon request (5 sec max)	**Weight**	0.25 lb (0.12 kg)
		Warranty	18 months

LIGHTING CONTROLS

KELE PULSE INITIATOR

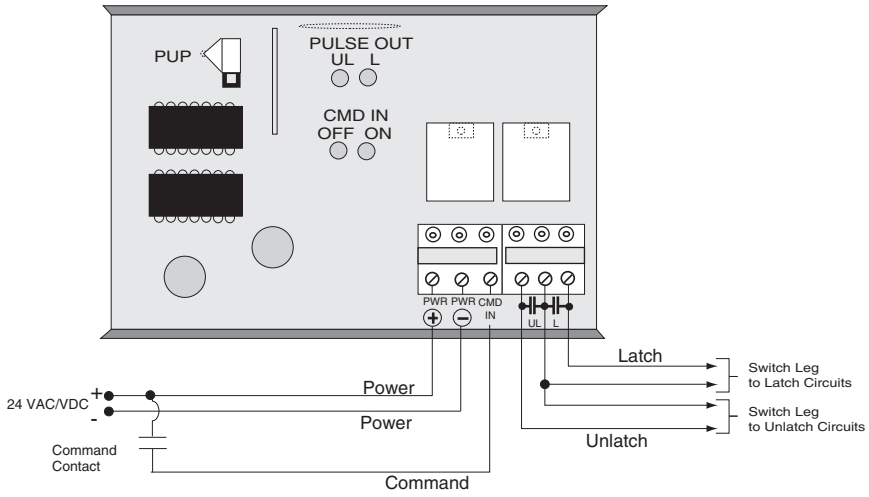
PIL-1

WIRING



Multiple **PIL-1s** may be controlled by the same command contact. Wiring polarity must be observed.

Typical Wiring for Driving 24V Lighting Contactors



Typical Wiring for Driving Loads other than 24V

ORDERING INFORMATION

MODEL	DESCRIPTION
PIL-1	Pulse initiator
PIL-1-C	Pulse initiator with factory-calibrated pulse duration (specify when ordering)

KELE FLUORESCENT DIMMING CONTROL MODULE

LDIM2

DESCRIPTION

The **Model LDIM2** is a fluorescent dimming control for dimmable electronic ballasts. It is designed for single 0-10V output with a 0-10V input or a PWM input. Feedback is provided for light level setpointand light level output. It is an energy saving, low cost device that is easily installed. The **LDIM2** requires dimmable ballasts designed for an analog 0-10V input.

FEATURES

- ***For controlling 0-10 VDC electronically dimmable ballasts***
- ***0.5 amp output capacity***
- ***Fused output***
- ***0-10 VDC light level setpoint***
- ***24 VAC/VDC PWM light level setpoint***
- ***4-20mA light level setpoint feedback***
- ***4-20mA light level output feedback***
- ***24 VAC power***
- ***Status LED***
- ***Light output electrically isolated from automation system signals***
- ***Fail-safe feature sets output to full-bright if input signal is lost***
- ***Manual override of setpoint input***
- ***3.25" x 6.00" snap-track mount***

SPECIFICATIONS

Supply Voltage	24 VAC @ 250 mA± 10%
Input Impedance	50 kΩ
Input Signal	0-10 VDC, 2-10 VDC, or PWM (Adjustable 0.1 to 25.6 seconds)
Output	0-10 VDC, sinking, 0.50 amp max load
Wiring Terminations	Removable terminal block
Manual Override	40% to 100% (adjustable)
Dip Switches	8 postition
Feedback	Two 4-20 mA (setpoint and output)
Operating Temperature	14° to 122°F (-10° to 50°C)
Operating Humidity	5 to 95% RH non-condensing
Warranty	2 years

DIP SWITCH SETTINGS (0 = OFF, 1 = ON)

"LDIM" Light Dimmer	DIP Switch Assignments							
	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
PWM Input	0							
Analog Input	1							
Go 100% Bright On Signal Loss		0						
Maintain Current Brightness On Signal Loss		1						
No Manual Override			0	0	0			
Manual Override 40%			0	0	1			
Manual Override 50%			0	1	0			
Manual Override 60%			0	1	1			
Manual Override 70%			1	0	0			
Manual Override 80%			1	0	1			
Manual Override 90%			1	1	0			
Manual Override 100%			1	1	1			
PWM Timebase, 0.59-2.93 sec (SW1 = Off)						0	0	0
0.1-2.65 sec Timebase						0	0	1
0.1-5.2 sec Timebase						0	1	0
0.1-12.85 sec Timebase						0	1	1
0.1-25.6 sec Timebase						1	0	0
Analog Input Range (SW1 = On)								
0-10V						0	0	0
2-10V						0	0	1

GREEN STATUS LED OPERATION

Solid Off ("No Power")

Indicates that 24VAC power is missing. Any time power is applied, the LED should not be solid off.

Solid On ("Normal")

The LED is solid on for:
• Analog input, no override, no PWM pulse present, not in "Lost Analog Input" state.
• PWM input, no override, no PWM pulse present, not in "Lost PWM" state.

Blink-Blink-Pause ("Override")

This occurs when the board is in Override state and no PWM pulse is present.

Blink-Blink-Blink-Pause ("Lost PWM" or "Lost Analog Input")

This occurs in the PWM state, no override, when a pulse has not been received for 10 seconds (i.e., "Lost PWM" state). This occurs in the analog input state, no override, no PWM pulse present, when the input value drops below 0.3 volts (i.e., "Lost Analog Input" state). The input value must rise above 0.5V to return to normal operation.

Rapid Blink ("PWM Pulse Active")

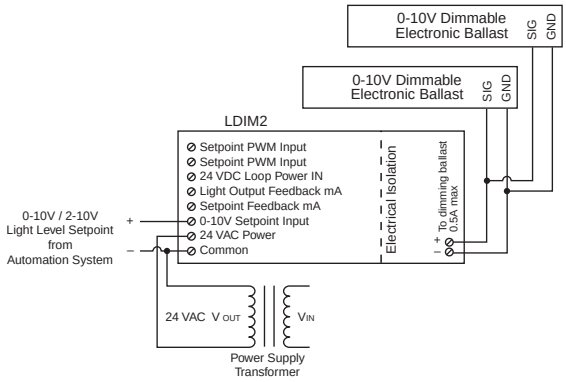
Any time a PWM pulse is active, the Status LED will blink rapidly. This is true even in the analog input and override modes. The rationale for this is that you may have the board in the analog input or override mode because there is a problem with the pulses coming from the controller, and this way you can visually tell when the pulses have been restored. The PWM pulse does not affect the output in the analog input and override modes, just the Status LED.

LIGHTING CONTROLS

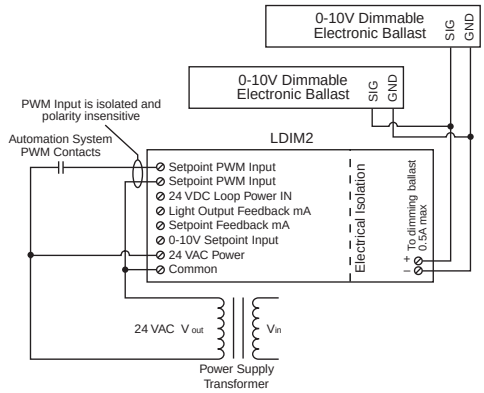
KELE FLUORESCENT DIMMING CONTROL MODULE

LDIM2

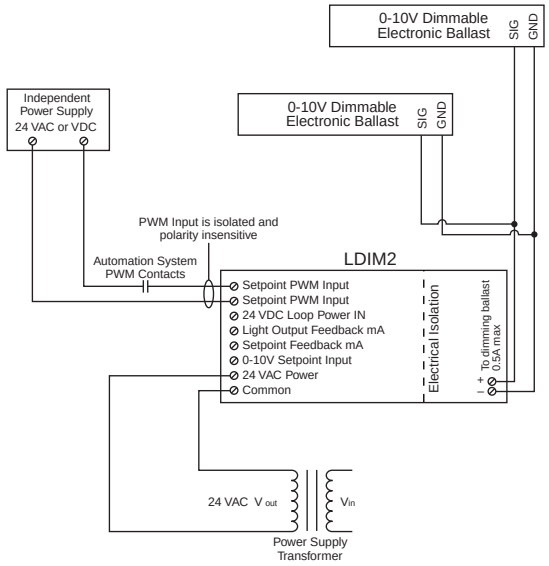
WIRING



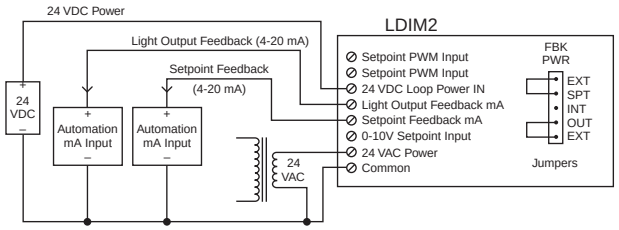
0-10V / 2-10V Analog Setpoint Signal from Automation System
(Feedback circuits not shown)



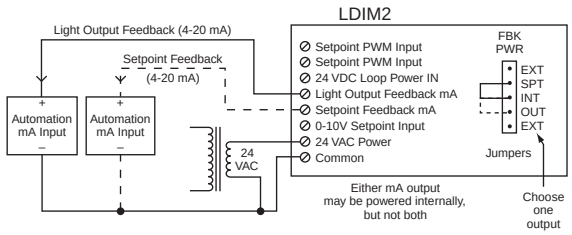
Pulse-Width Setpoint Input Using Board's Power Supply
(Feedback circuits not shown)



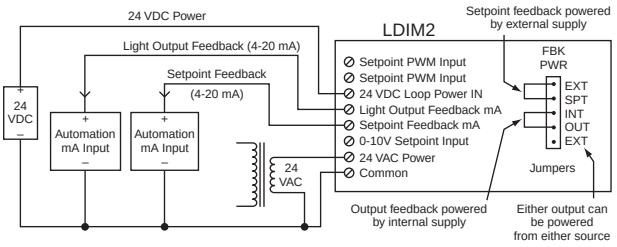
Pulse-Width Setpoint Input Using Independent Power Supply
(Feedback circuits not shown)



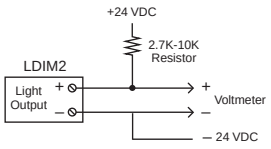
Powering Both mA Feedback Signals with External 24 VDC Loop Supply



Powering Single mA Feedback Signal Internally from LDIM2



Powering One mA Feedback Signal with External 24 VDC Loop Supply and One mA Feedback Signal Internally from LDIM2



Testing LDIM2 Output Without Lighting Ballast(s) Attached

ORDERING INFORMATION

MODEL	DESCRIPTION
LDIM2	Fluorescent dimming control