



# 2016 Lighting Catalog

Innovative Lighting Solutions  
**UL924 Emergency Shunt Relays**  
Wireless Solutions



## 2016 Lighting Catalog

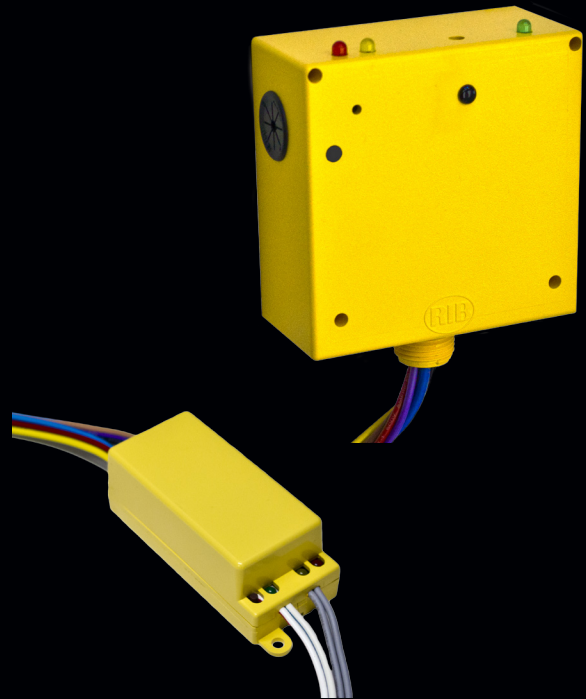
# Table of Contents

<b>UL924 Bypass / Shunt Relays</b>	<b>3</b>
<b>Wireless Devices</b>	<b>19</b>
<b>Light Controllers</b>	<b>24</b>
Closet Light Controllers	25
Ceiling Fan & Light Controllers	28
Ballast Light Fixture Controllers	29
<b>Index</b>	<b>32</b>

# UL924 Emergency Bypass / Shunt Relays

- 1/2" Knockout Nipple Mount
- Ballast Channel Mount

Our UL924 Emergency Bypass / Shunt Relays are designed for applications that require an emergency load to be switched on during a loss of normal power. These economically priced relays are available prepackaged in their own Nema 1 enclosure. Enclosures are available in two form factors: ballast channel mountable or nipple mountable for use with a junction box.

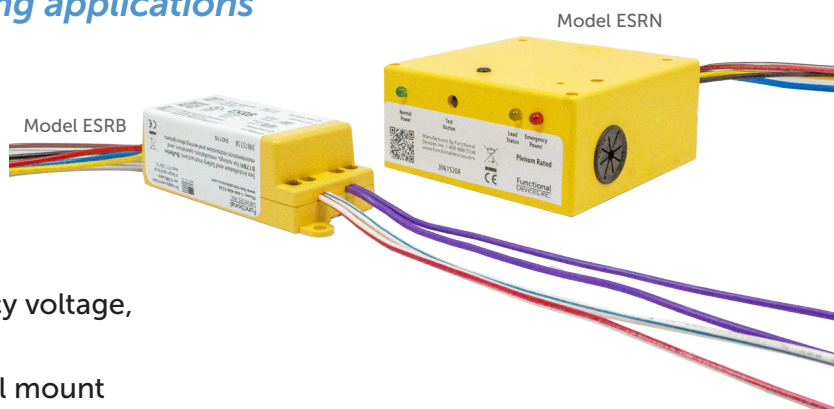


# Emergency Bypass / Shunt Relays (UL924)

## Features

### *Perfect for all emergency shunt lighting applications*

- Up to 16 Amp electronic ballast rating
- 0-10 Vdc dimmer override
- Coil input range: 120 Vac through 277 Vac
- Bypass/shunt override
- Normal control of emergency lighting
- LED indicators for normal voltage, emergency voltage, and load status
- Nipple mount, wall mount, or ballast channel mount
- 10 Amp and 20 Amp SPDT versions including magnetic ballast, electronic ballast, and tungsten ratings
- Made in the U.S.A.



## Applications

### *Our Emergency Shunt Relays are designed to fill every need in your emergency lighting applications.*

- Emergency lighting can be controlled under normal conditions using the wall switch input.
- A two second self-test of the unit is performed every time the wall switch input is turned off.
- The on-board local test button and LEDs allow for installation to be tested immediately.
- Remote test capability allows for a button, switch, controller, etc. to be conveniently mounted anywhere desired. [Class 2 acceptable] See model ESRTB (remote test button).
- Under normal operation, emergency light can be controlled by a controller using the dry contact input.
- The dry contact output can be used to override 0-10 V dimmers to full brightness (or for feedback to controllers, etc.)
- High contact ratings allow for multiple loads on a single relay unit.
- Different housings allow for wall or nipple mount (model ESRN), or ballast channel mount (model ESRB).

# Input and Output Characteristics

## Electrical Specifications (ESRB, ESRN)

Normal Power Supply Voltage	120-277Vac
Normal Power Current Draw	24mA max
Normal Power Operating Frequency	50/60Hz
Emergency Power Supply Voltage	120-277Vac
Emergency Power Current Draw	118mA max
Emergency Power Operating Frequency	50/60Hz
Remote Test Input (Class 2, Dry Contact)	ESRTB or other switching method <sup>1</sup>
Feedback/Dimmer Contact Switching Capability (Dry Contact Output)	130mA @ 250V max
Relay Contact (ESRN) SPST	20A Magnetic Ballast @ 277V 16A Electronic Ballast @ 277V 10A Tungsten @ 120V
Relay Contact (ESRB) SPDT	10A Magnetic Ballast @ 277V 10A Electronic Ballast @ 277V 10A Tungsten @ 120V

**1:** If not using the ESRTB Remote Test Button (sold separately), switching methods should be rated for at least 24Vdc. External voltage should not be supplied to this input. No specific current rating is required.

## Mechanical Specifications

**Housing:** UL accepted for use in Plenum, NEMA 1

**Wire:** 16" 600V Rated

**Weight:** 0.675 lbs. (ESRN)  
0.40 lbs (ESRB)

**Operating Temperature:** -30° to 140° F (-35° to 60° C)

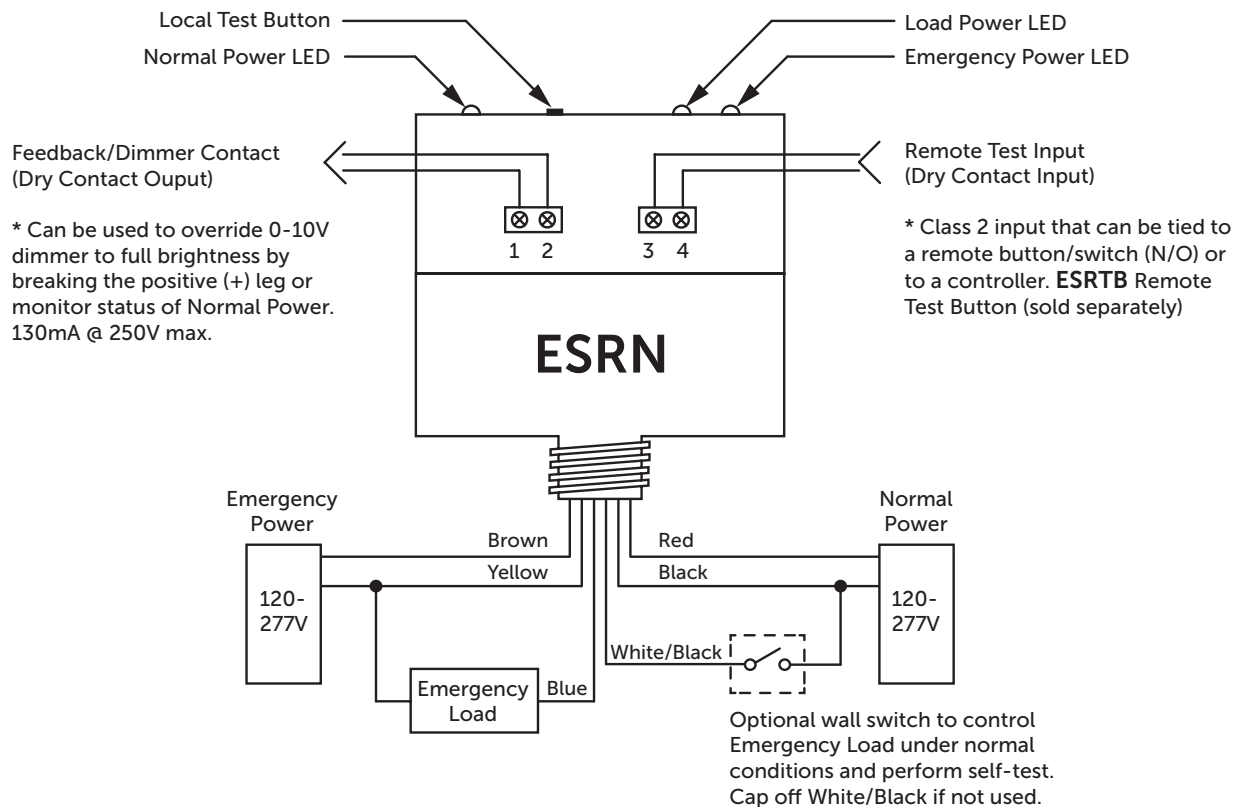
**Humidity Range:** 5 to 95% (noncondensing)  
Rated for dry and damp locations only

**Approvals:** UL listed, UL924, C-UL, CE

# Wiring Information

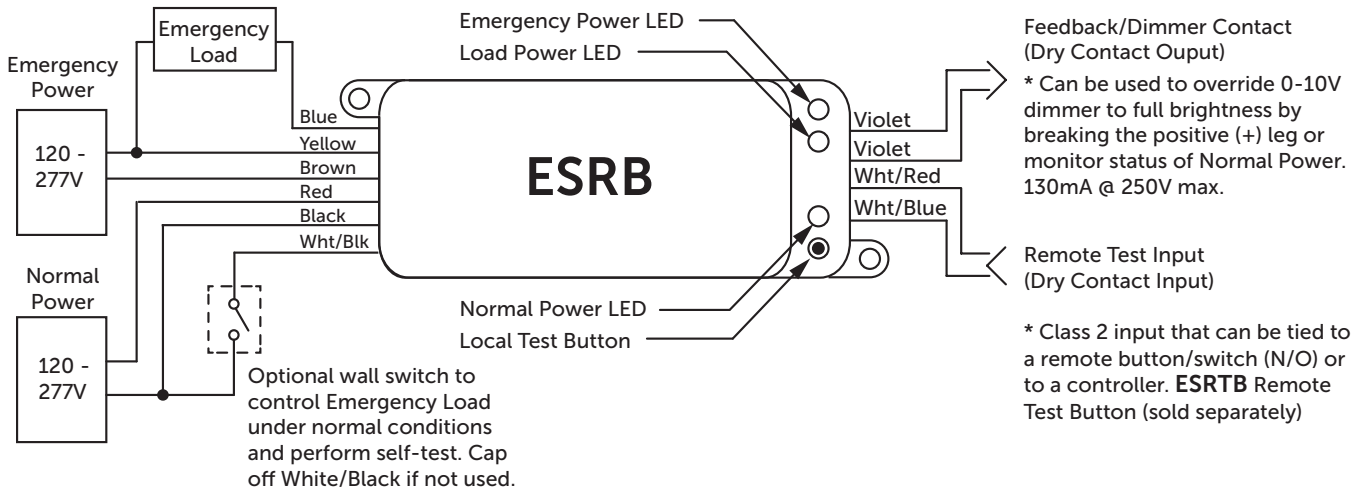
## Wiring Descriptions

Wire Color	Description	Notes
BLACK	Normal Hot	—
WHITE/BLACK	Wall Switch Input (Self-Test Input)	WHITE/BLACK wires must be from same branch circuit as BLACK and RED. When switched off, a two second delay keeps the load on to test emergency power. Does not test feedback/dimmer output.
RED	Normal Neutral or other Phase	—
BROWN	Emergency Hot	—
BLUE	Emergency Hot Switched to Load	Switches out the voltage from BROWN
YELLOW	Emergency Neutral or other Phase	—
WHITE/BLUE (ESRB) Terminal Screw 4 (ESRN)	Remote Test Input (Class 2, Dry Contact Input)	When wiring multiple units together, WHITE/BLUE or Terminal Screw 4 must be a shared common. Test is performed when Input is CLOSED.
WHITE/RED (ESRB) Terminal Screw 3 (ESRN)		
VIOLETS (ESRB) Terminal Screws 1, 2 (ESRN)	Feedback/Dimmer Contact (Dry Contact Output) <b>Wall Switch Input does not test this output.</b>	Relay contacts are OPEN when normal power is absent or Remote Test Input is CLOSED. Relay contacts are CLOSED when normal power is present or Remote Test Input is OPEN.



# Wiring Information

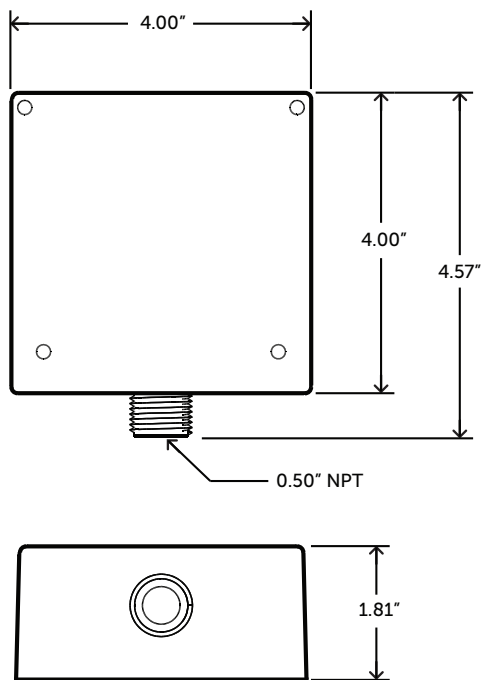
## Wiring Descriptions



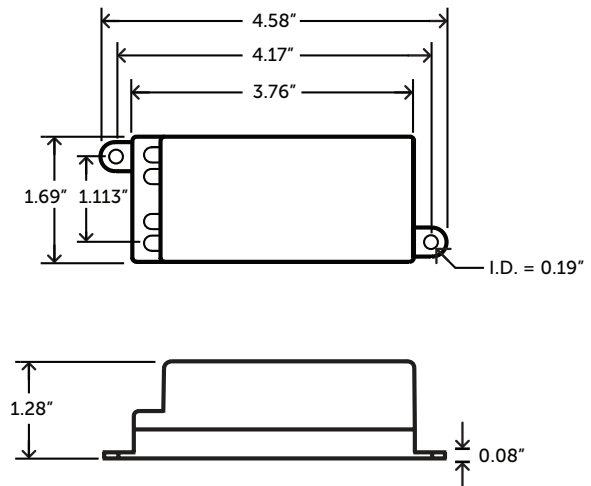
UL924 Emergency  
Bypass / Shunt Relays

## Dimensions

### ESRN

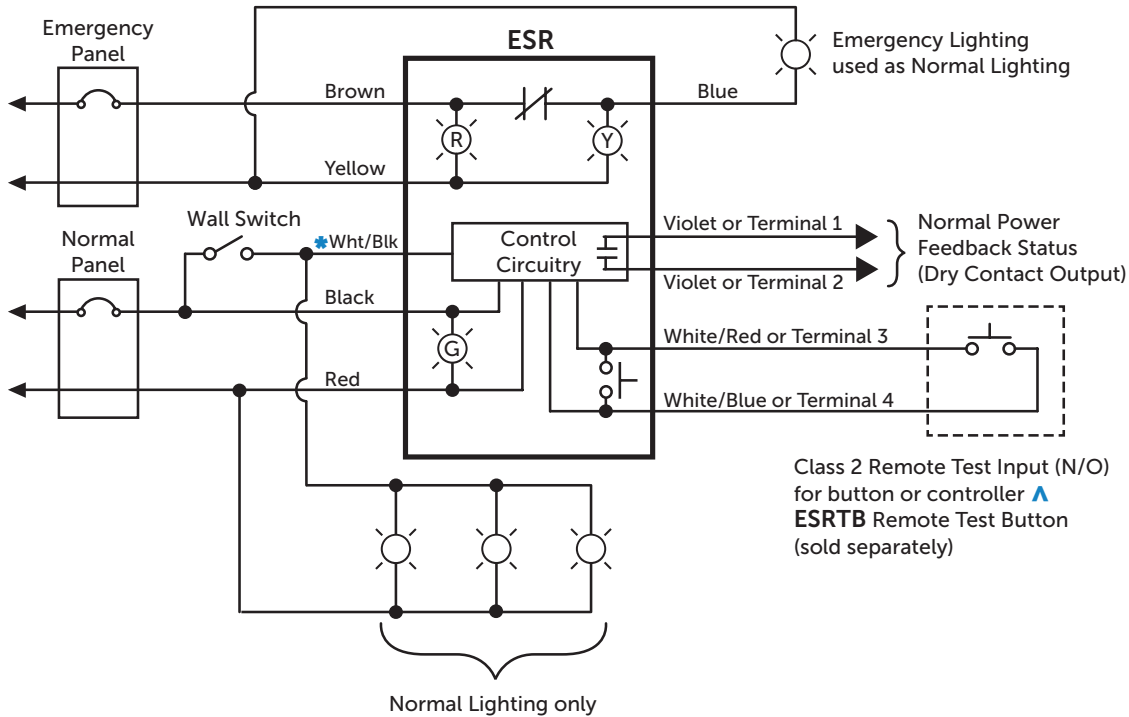


### ESRB



# Typical Applications

## Using Emergency Lighting as Normal Lighting

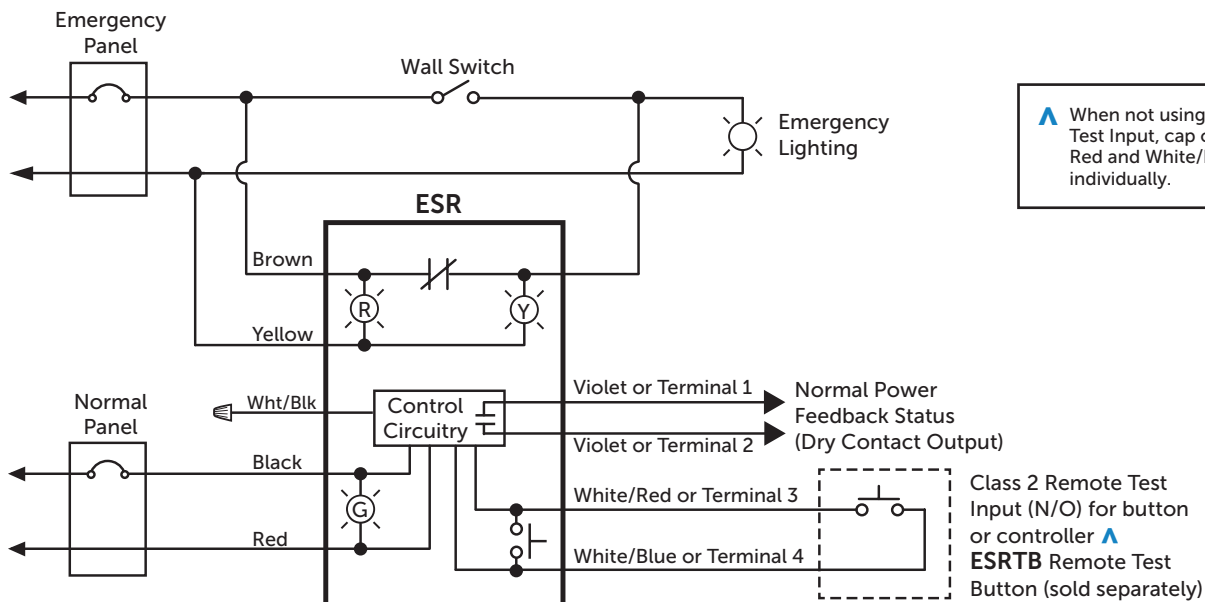


✱ The Wht/Blk wire must be on the same branch circuit as the Normal Power Input.

▲ When not using the Remote Test Input, cap off the White/Red and White/Blue wires individually.

To use Remote Test Input, the wall Input must be open/off. Input can also be sent to a controller.

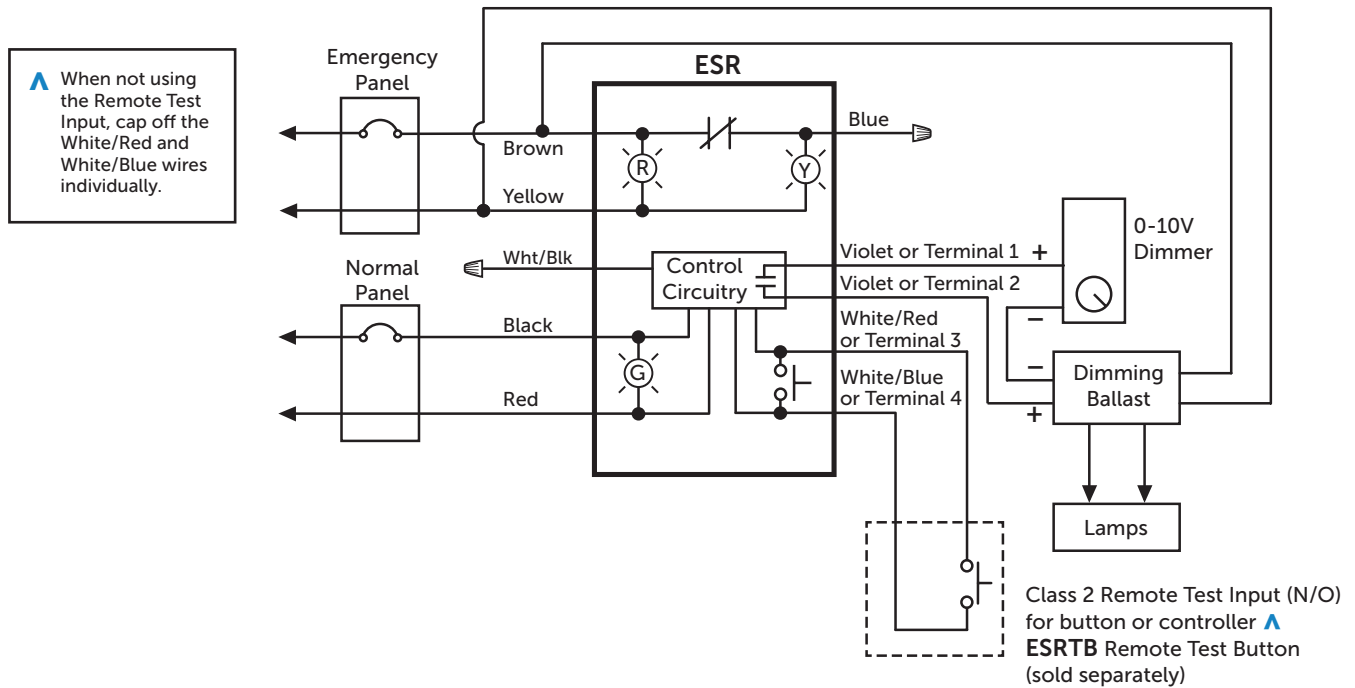
## Basic Switch Bypass/Shunt



▲ When not using the Remote Test Input, cap off the White/Red and White/Blue wires individually.

# Typical Applications

## Overriding a 0-10Vdc Dimmer



# Testing and Troubleshooting

## Test Procedure: Four options to test the ESRB and ESRN after installation:

### Initial Test for Correct Wiring

Apply Emergency Power to the Emergency Power Input and Normal Power to the Normal Power Input. (If using the Wall Switch Input, apply Normal Power to the switch also, but keep the switch OFF/OPEN.)

- The Red LED (Emergency Power available) should be ON.
- The Green LED (Normal Power available) should be ON.
- The Yellow LED (Load Status) should be OFF.
- The Load should be OFF.
- The Feedback/Dimmer Contact should be CLOSED.

### Local Test Button

- Turn switched circuit OFF. Emergency light should be OFF.
- Press and hold "Local Test Button"
- Emergency light should turn ON.
- Release "Local Test Button" and emergency light should turn off.

### Remote Test Button (Model ESRTB - sold separately)

- Turn switched circuit OFF. Emergency light should be OFF.
- Press and hold "Remote Test Button"
- Emergency light should turn ON.
- Release "Remote Test Button" and emergency light should turn off.

### Wall Switch

- Turn ON wall switch if not already on.
- Emergency light should turn ON.
- Turn wall switch OFF.
- Emergency light will remain on for two seconds before turning off.

**To test the ESRB and ESRN periodically, repeat the appropriate Test Procedure above in accordance with national and local codes.**

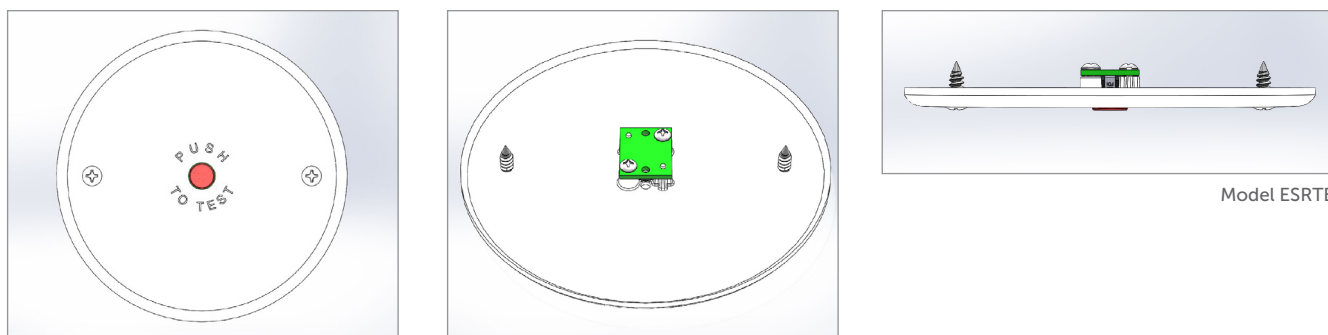
## Troubleshooting

Condition	Action
Red LED is OFF	<ul style="list-style-type: none"><li>Check Emergency Power Input wiring (BROWN and YELLOW wires) and voltage.</li></ul>
Green LED is OFF	<ul style="list-style-type: none"><li>Check Normal Power Input wiring (BLACK and RED wires) and voltage.</li></ul>
Yellow LED is ON but Load is OFF	<ul style="list-style-type: none"><li>Check Load wiring (BLUE wire and Load's neutral).</li><li>Verify Load's operating voltage is the same as the Emergency Power Input Voltage.</li><li>Replace unit.</li><li>Check bulbs and ballast.</li></ul>
Load is ON but Yellow LED is OFF	<ul style="list-style-type: none"><li>Replace unit.</li></ul>
Yellow LED and Load do not turn on when being tested	<ul style="list-style-type: none"><li>Check bulbs and ballast.</li><li>Check wiring connections if using a remote test option.</li><li>Press local test button on the unit.</li><li>Replace unit.</li></ul>
Yellow LED and Load will not turn OFF	<ul style="list-style-type: none"><li>Verify status of Normal Power Input.</li><li>Open Wall Switch Input.</li><li>Verify that no test inputs are stuck closed. (i.e. Remote Test Input is not closed).</li></ul>

# Momentary Test Button

The ESRTB is a momentary pushbutton to be used to remotely test the ESRB and ESRN Emergency Bypass/Shunt Relays. It can either be installed directly to the ceiling or to a standard 4" x 4" round or octagonal Junction Box. The two wire terminations connect directly to the ESRB's and ESRN's Class 2, dry contact "Remote Test Input."

*Note: The ESRTB is only to be used with the ESRB and ESRN Emergency Bypass/Shunt Relays.*



## Wiring Specifications:

**Acceptable Wiring:** 18-24 AWG, Solid or Stranded with at least 1/4" stripped

**Wiring Terminations:** There are no screws to tighten or tabs to press in order to install the wiring. Wiring is done by inserting the wire through the hole on the circuit board.

**Wiring Contact Degradation:** After 5 cycles

## Mounting Specifications:

**Direct-mount to Ceiling (fig. 1):** Mount directly to surface by cutting appropriate sized wiring hole (1 1/2" square or round hole minimum; 2 1/2" square or round hole maximum.) Screw ESRTB to the surface using the provided screws or other screws of installer's choice.

**Junction Box (fig. 2):** 4" round or 4" x 4" octagonal with #8 cover plate screw holes. Cover plate screw holes must be 3 1/2" apart.

**Included Hardware:** Two (2) #8 self-drilling screws. Screws have white oval Phillips heads and 1/4" grip.

## Faceplate Specifications:

**Actuator:** Red momentary pushbutton (Normally-Open)

**Color:** White

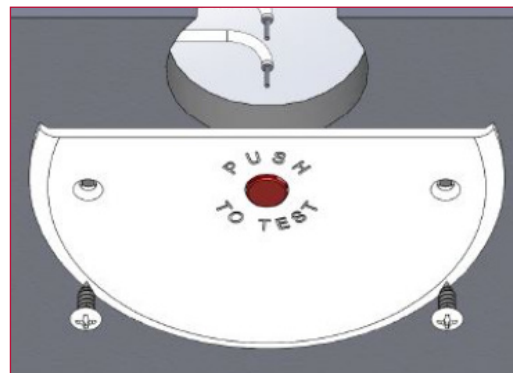
**Overall Diameter:** 4 3/8"

**Operating Actuator Force:** 160 gf (1.57N)

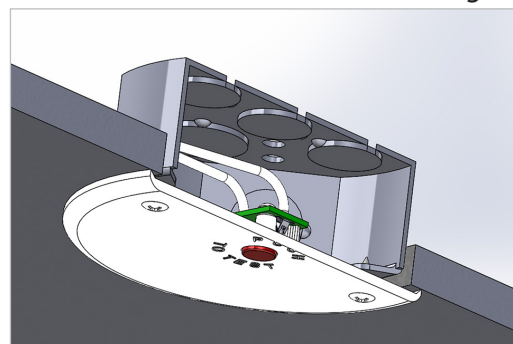
**Expected Life:** 200,000 cycles minimum

**Approvals:** UL94 flame rated plastic

(fig. 1)



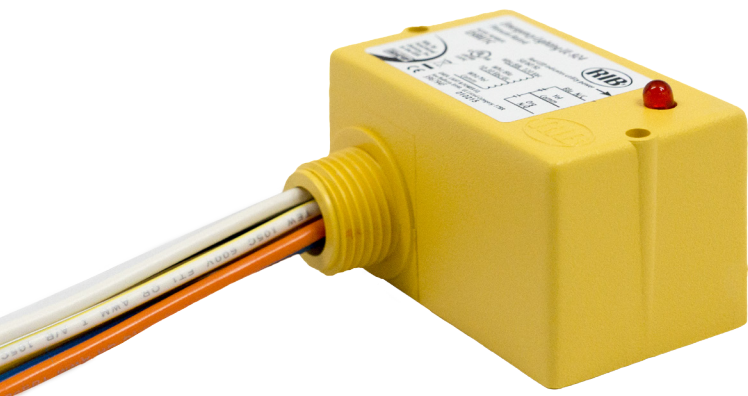
(fig. 2)



# UL924 Emergency Bypass / Shunt Relays

Functional  
Devices, Inc.

- Mounts easily through 1/2" knockout or remotely on flat surfaces
- Multi-coil voltage input
- 10 Amp and 20 Amp contact ratings:  
Up to 16 Amp Electronic Ballast rating
- Prepackaged and prewired for convenience
- LED indicator of utility power
- NEMA 1 enclosure
- Override capabilities for wiring verification and field inspection
- UL924 Listed
- Made in the USA



## UL924 Emergency Bypass / Shunt Relays

Quick Reference Chart

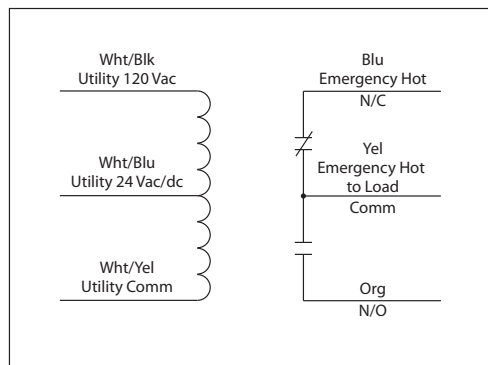
Model #	UL	Coil Voltage		Contacts	Resistive	Test Procedures				Ballast Channel Mount	Nipple Mount	Notes	Spec Page
		AC/DC	AC			Local Test Button	Self Test	Remote Test	Dimmer Override				
ESRN	•		120-277	SPST	20 A	•	•	•	•		•	NEW	4
ESRB	•		120-277	SPST	10 A	•	•	•	•	•		NEW	4
ESRTB				SPST		•						NEW	11
ESR2401B	•	24	120	SPDT	20 A		•				•		13
ESR2402B	•	24	208-277	SPDT	20 A		•				•		14
ESR2401D	•	24	120	DPDT	10 A		•				•		15
ESR2402D	•	24	208-277	DPDT	10 A		•				•		16
ESR01P	•	120		DPDT	20 A		•				•		17
ESR02P	•	208-277		DPDT	20 A		•				•		18

UL = UL924; Emergency Lighting

## ESR2401B

Enclosed Relay 20 Amp SPDT with 24 Vac/dc/120 Vac Coil

UL924 / 20 AMP EMERGENCY BYPASS / SHUNT RELAY



UL924 Emergency  
Bypass / Shunt Relays

## Specifications

**# Relays & Contact Type:** One (1) SPDT Continuous Duty Coil  
**Expected Relay Life:** 10 million cycles minimum mechanical  
**Operating Temperature:** -30 to 140° F  
**Operate Time:** 18mS  
**Relay Status:** LED On = Activated  
**Dimensions:** 2.30" x 3.20" x 1.80" with .50" NPT Nipple  
**Wires:** 16", 600V Rated  
**Approvals:** UL Listed, UL924, C-UL, CE  
**Housing Rating:** UL Accepted for Use in Plenum, NEMA 1  
**Gold Flash:** No  
**Override (Test Switch):** No

**Contact Ratings:**  
 20 Amp Resistive @ 277 Vac  
 20 Amp Ballast @ 277 Vac  
 16 Amp Electronic Ballast @ 277 Vac (N/O)  
 10 Amp Tungsten @ 120 Vac (N/O)  
 770 VA Pilot Duty @ 120 Vac  
 1,110 VA Pilot Duty @ 277 Vac  
 2 HP @ 277 Vac  
 1 HP @ 120 Vac

**Coil Current:**  
 50 mA @ 18 Vac  
 83 mA @ 24 Vac  
 47 mA @ 120 Vac  
 33 mA @ 22 Vdc  
 35 mA @ 24 Vdc  
 47 mA @ 30 Vdc

**Coil Voltage Input:**  
 24 Vac/dc ; 120 Vac ; 50-60 Hz  
 Drop Out = 2.1 Vac / 3.8 Vdc  
 Pull In = 18 Vac / 22 Vdc

## Initial Wiring Verification

1. Turn OFF Normal Power, Transfer Power, and Wall Switch.
2. Wire relay according to wiring diagram.
3. Energize Transfer Power. Emergency Light should illuminate.
4. Energize Normal Power. Emergency Light will turn OFF.
5. Turn ON Wall Switch. Emergency Light should illuminate.

## Field Inspection

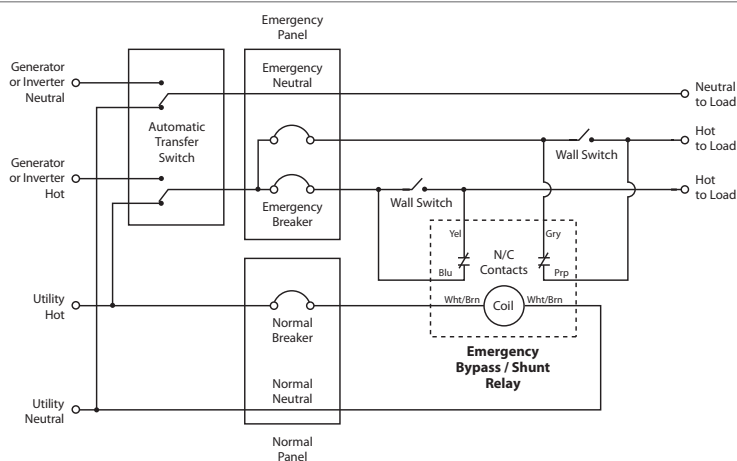
1. Ensure Normal Power and Transfer Power are energized.
2. Turn OFF Wall Switch. Light will turn OFF.
3. Red LED will be illuminated.
4. Turn OFF Normal Power. Red LED will turn OFF. Emergency Light will illuminate.

## Shunt Relay Application

Our Emergency Bypass / Shunt Relays are UL924 listed and suitable for shunting around wall switches in order to turn on emergency lighting in the event of loss of normal utility power.

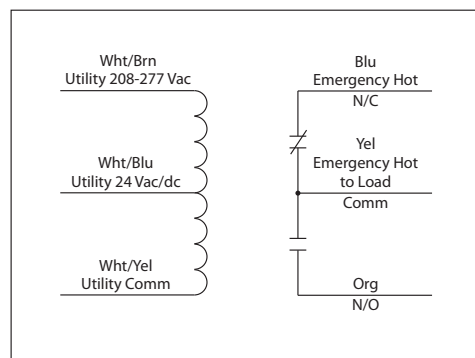
When normal power is present, the ESR relay coil is activated and the emergency panel is fed from normal power. The lighting load can be switched on/off using an individual wall switch.

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 or controller scheme.

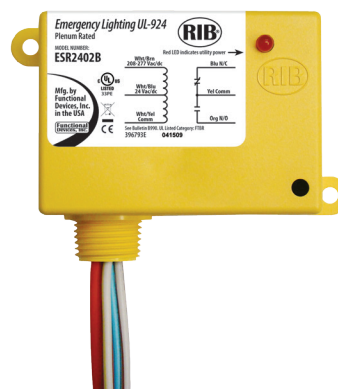


## ESR2402B

Enclosed Relay 20 Amp SPDT with 24 Vac/dc/208-277 Vac Coil



## UL924 / 20 AMP EMERGENCY BYPASS / SHUNT RELAY



## Specifications

**# Relays & Contact Type:** One (1) SPDT Continuous Duty Coil  
**Expected Relay Life:** 10 million cycles minimum mechanical  
**Operating Temperature:** -30 to 140° F  
**Operate Time:** 18mS  
**Relay Status:** LED On = Activated  
**Dimensions:** 2.30" x 3.20" x 1.80" with .50" NPT Nipple  
**Wires:** 16", 600V Rated  
**Approvals:** UL Listed, UL924, C-UL, CE  
**Housing Rating:** UL Accepted for Use in Plenum, NEMA 1  
**Gold Flash:** No  
**Override (Test Switch):** No

**Contact Ratings:**  
 20 Amp Resistive @ 277 Vac  
 20 Amp Ballast @ 277 Vac  
 16 Amp Electronic Ballast @ 277 Vac (N/O)  
 10 Amp Tungsten @ 120 Vac (N/O)  
 770 VA Pilot Duty @ 120 Vac  
 1,110 VA Pilot Duty @ 277 Vac  
 2 HP @ 277 Vac  
 1 HP @ 120 Vac

**Coil Current:**  
 50 mA @ 18 Vac  
 83 mA @ 24 Vac  
 69 mA @ 208-277 Vac  
 33 mA @ 22 Vdc  
 35 mA @ 24 Vdc  
 47 mA @ 30 Vdc

**Coil Voltage Input:**  
 24 Vac/dc ; 208-277 Vac ; 50-60 Hz  
 Drop Out = 2.1 Vac / 3.8 Vdc  
 Pull In = 18 Vac / 22 Vdc

## Initial Wiring Verification

1. Turn OFF Normal Power, Transfer Power, and Wall Switch.
2. Wire relay according to wiring diagram.
3. Energize Transfer Power. Emergency Light should illuminate.
4. Energize Normal Power. Emergency Light will turn OFF.
5. Turn ON Wall Switch. Emergency Light should illuminate.

## Field Inspection

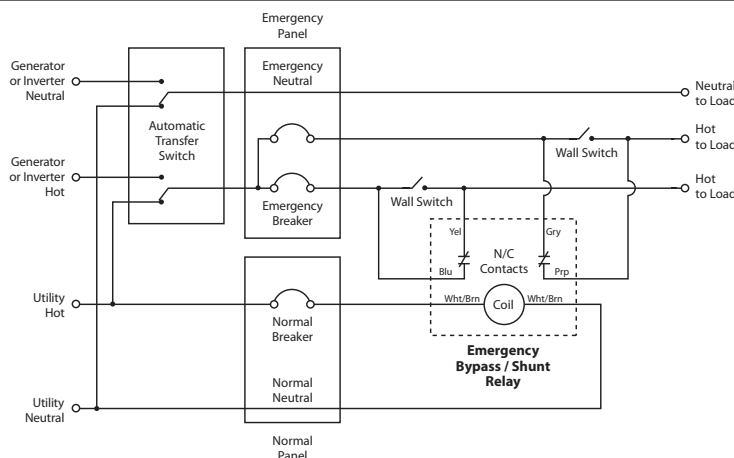
1. Ensure Normal Power and Transfer Power are energized.
2. Turn OFF Wall Switch. Light will turn OFF.
3. Red LED will be illuminated.
4. Turn OFF Normal Power. Red LED will turn OFF. Emergency Light will illuminate.

## Shunt Relay Application

Our Emergency Bypass / Shunt Relays are UL924 listed and suitable for shunting around wall switches in order to turn on emergency lighting in the event of loss of normal utility power.

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.

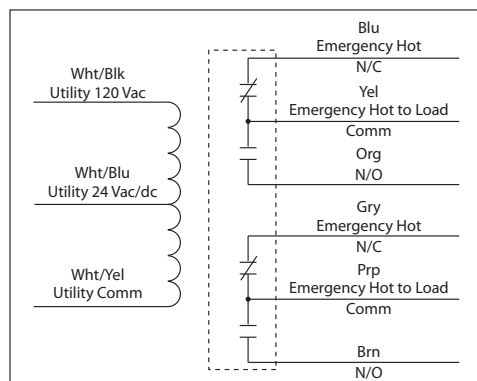
When normal power drops out, the ESR coil is deactivated and N/C contact falls closed. The automatic transfer switch changes over to backup (generator) power, and the lighting load is illuminated regardless of the position of the wall switch or controller scheme.



## ESR2401D

Enclosed Relay 10 Amp DPDT with 24 Vac/dc/120 Vac

UL924 / 10 AMP EMERGENCY BYPASS / SHUNT RELAY



## Specifications

**# Relays & Contact Type:** One (1) DPDT Continuous Duty Coil  
**Expected Relay Life:** 10 million cycles minimum mechanical  
**Operating Temperature:** -30 to 140° F  
**Operate Time:** 8mS  
**Relay Status:** LED On = Activated  
**Dimensions:** 1.70" x 2.80" x 1.50" with .50" NPT nipple  
**Wires:** 16", 600V Rated  
**Approvals:** UL Listed, UL924, C-UL, CE  
**Housing Rating:** UL Accepted for Use in Plenum, NEMA 1  
**Gold Flash:** No  
**Override (Test Switch):** No

**Contact Ratings:**  
 10 Amp Resistive @ 30 Vdc  
 10 Amp General Use @ 277 Vac  
 1/2 HP @ 120/240 Vac (N/O)  
 1/3 HP @ 120/240 Vac (N/C)  
 B300 Pilot Duty  
 120 Vac 30A Make 3A Break (360 VA)  
 240 Vac 15 A Make 1.5A Break (360 VA)  
 208 Vac 17.3A Make 1.73A Break (360 VA)  
 277 Vac 13A Make 1.3A Break (360 VA)  
 24 Vac 30A Make 5A Break (120 VA) 5A Max

**Coil Current:**  
 24 mA @ 18 Vac 20 mA @ 20 Vdc  
 32 mA @ 24 Vac 24 mA @ 24 Vdc  
 40 mA @ 30 Vac 36 mA @ 30 Vdc  
 31 mA @ 120 Vac

**Coil Voltage Input:**  
 24 Vac/dc ; 120 Vac ; 50-60 Hz  
 Drop Out = 3 Vac / 3.8 Vdc  
 Pull In = 18 Vac / 20 Vdc

**Notes:**  
 • Not rated for use as a UL1008 Transfer Device.

## Initial Wiring Verification

1. Turn OFF Normal Power, Transfer Power, and Wall Switch.
2. Wire relay according to wiring diagram.
3. Energize Transfer Power. Emergency Light should illuminate.
4. Energize Normal Power. Emergency Light will turn OFF.
5. Turn ON Wall Switch. Emergency Light should illuminate.

## Field Inspection

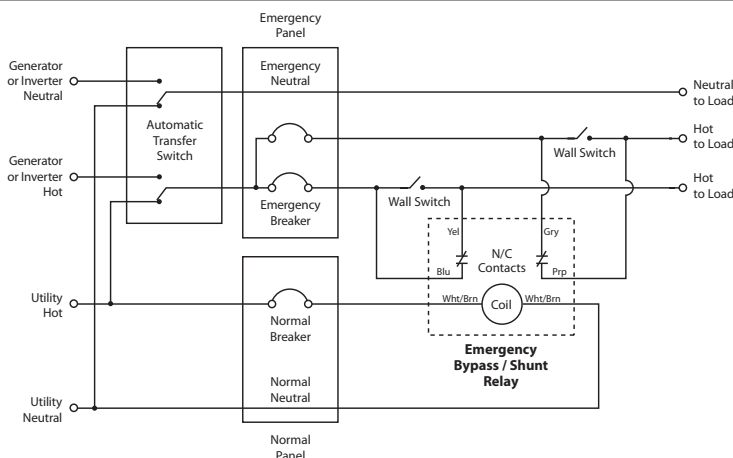
1. Ensure Normal Power and Transfer Power are energized.
2. Turn OFF Wall Switch. Light will turn OFF.
3. Red LED will be illuminated.
4. Turn OFF Normal Power. Red LED will turn OFF. Emergency Light will illuminate.

## Shunt Relay Application

Our Emergency Bypass / Shunt Relays are UL924 listed and suitable for shunting around wall switches in order to turn on emergency lighting in the event of loss of normal utility power.

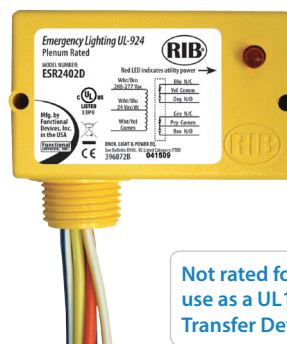
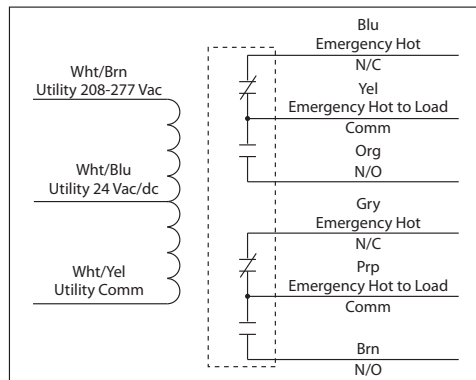
When normal power is present, the ESR relay coil is activated and the emergency panel is fed from normal power. The lighting load can be switched on/off using an individual wall switch.

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 or controller scheme.



Enclosed Relay 10 Amp DPDT with 24 Vac/dc/208-277 Vac

## UL924 / 10 AMP EMERGENCY BYPASS / SHUNT RELAY







Not rated for  
use as a UL1008  
Transfer Device

## Specifications

**# Relays & Contact Type:** One (1) DPDT Continuous Duty Coil  
**Expected Relay Life:** 10 million cycles minimum mechanical  
**Operating Temperature:** -30 to 140° F  
**Operate Time:** 8mS  
**Relay Status:** LED On = Activated  
**Dimensions:** 1.70" x 2.80" x 1.50" with .50" NPT nipple  
**Wires:** 16", 600V Rated  
**Approvals:** UL Listed, UL924, C-UL, CE  
**Housing Rating:** UL Accepted for Use in Plenum, NEMA 1  
**Gold Flash:** No  
**Override (Test Switch):** No

**Contact Ratings:**  
 10 Amp Resistive @ 30 Vdc  
 10 Amp General Use @ 277 Vac  
 1/2 HP @ 120/240 Vac (N/O)  
 1/3 HP @ 120/240 Vac (N/C)  
 B300 Pilot Duty  
 120 Vac 30A Make 3A Break (360 VA)  
 240 Vac 15 A Make 1.5A Break (360 VA)  
 208 Vac 17.3A Make 1.73A Break (360 VA)  
 277 Vac 13A Make 1.3A Break (360 VA)  
 244 Vac 30A Make 5A Break (120 VA) 5A Max

**Coil Current:**

24 mA @ 18 Vac	20 mA @ 20 Vdc
32 mA @ 24 Vac	24 mA @ 24 Vdc
40 mA @ 30 Vac	36 mA @ 30 Vdc
36 mA @ 208-277 Vac	

**Coil Voltage Input:**  
24 Vac/dc ; 208-277 Vac ; 50-60 Hz  
Drop Out = 3 Vac / 3.8 Vdc  
Pull In = 18 Vac / 20 Vdc

**Notes:**

- Not rated for use as a UL1008 Transfer Device.

## Initial Wiring Verification

1. Turn OFF Normal Power, Transfer Power, and Wall Switch.
2. Wire relay according to wiring diagram.
3. Energize Transfer Power. Emergency Light should illuminate.
4. Energize Normal Power. Emergency Light will turn OFF.
5. Turn ON Wall Switch. Emergency Light should illuminate.

## Field Inspection

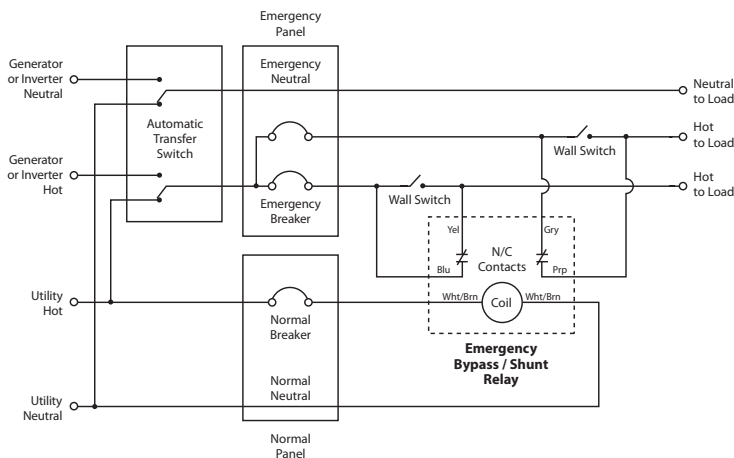
1. Ensure Normal Power and Transfer Power are energized.
2. Turn OFF Wall Switch. Light will turn OFF.
3. Red LED will be illuminated.
4. Turn OFF Normal Power. Red LED will turn OFF. Emergency Light will illuminate.

## Shunt Relay Application

Our Emergency Bypass / Shunt Relays are UL924 listed and suitable for shunting around wall switches in order to turn on emergency lighting in the event of loss of normal utility power.

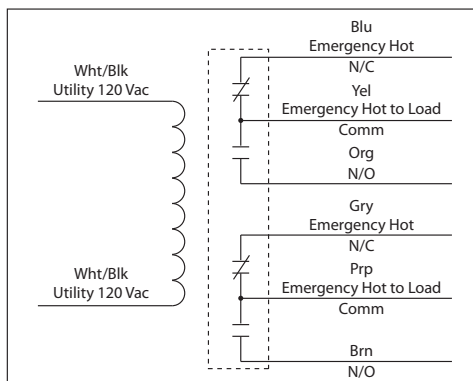
When normal power is present, the ESR relay coil is activated and the emergency panel is fed from normal power. The lighting load can be switched on/off using an individual wall switch.

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 or controller scheme.



## ESR01P

Enclosed Relay 20 Amp DPDT with 120 Vac Coil



## UL924 / 20 AMP EMERGENCY BYPASS / SHUNT RELAY



Not rated for use as a UL1008 Transfer Device

## Specifications

- # Relays & Contact Type: One (1) DPDT Continuous Duty Coil
- Expected Relay Life: 10 million cycles minimum mechanical
- Operating Temperature: -30 to 140° F
- Operate Time: 18mS
- Relay Status: LED On = Activated
- Dimensions: 4.00" x 4.00" x 1.80" with .50" NPT Nipple
- Wires: 16", 600V Rated
- Approvals: UL Listed, UL924, C-UL, CE
- Housing Rating: UL Accepted for Use in Plenum, NEMA 1
- Gold Flash: Yes
- Override (Test Switch): No

- Contact Ratings:
  - 20 Amp Resistive @ 300 Vac
  - 20 Amp Resistive @ 28 Vdc
  - 20 Amp Ballast @ 277-480 Vac
  - Not rated for Electronic Ballast
  - 15 Amp Resistive @ 600 Vac
  - 770 VA Pilot Duty @ 120 Vac
  - 1158 VA Pilot Duty @ 240 Vac
  - 1109 VA Pilot Duty @ 277 Vac
  - 1640 VA Pilot Duty @ 480 Vac
  - 3 HP @ 480-600 Vac
  - 2 HP @ 240-277 Vac
  - 1 HP @ 120 Vac

- Coil Current:
  - 105 mA @ 120 Vac

- Coil Voltage Input:
  - 120 Vac ; 50-60 Hz
  - Drop Out = 35 Vac
  - Pull In = 85 Vac

- Notes:
  - Not rated for use as a UL1008 Transfer Device.

## Initial Wiring Verification

1. Turn OFF Normal Power, Transfer Power, and Wall Switch.
2. Wire relay according to wiring diagram.
3. Energize Transfer Power. Emergency Light should illuminate.
4. Energize Normal Power. Emergency Light will turn OFF.
5. Turn ON Wall Switch. Emergency Light should illuminate.

## Field Inspection

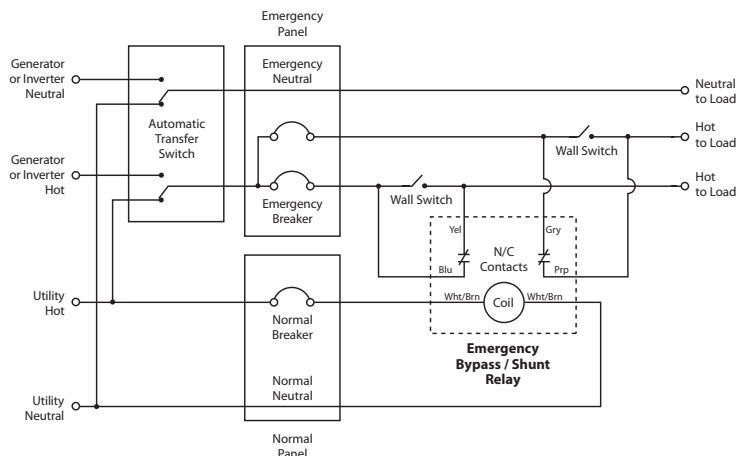
1. Ensure Normal Power and Transfer Power are energized.
2. Turn OFF Wall Switch. Light will turn OFF.
3. Red LED will be illuminated.
4. Turn OFF Normal Power. Red LED will turn OFF. Emergency Light will illuminate.

## Shunt Relay Application

Our Emergency Bypass / Shunt Relays are UL924 listed and suitable for shunting around wall switches in order to turn on emergency lighting in the event of loss of normal utility power.

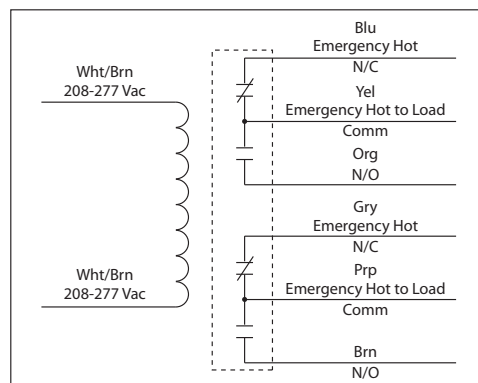
When normal power is present, the ESR relay coil is activated and the emergency panel is fed from normal power. The lighting load can be switched on/off using an individual wall switch.

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 or controller scheme.



## ESR02P

Enclosed Relay 20 Amp DPDT with 208-277 Vac Coil



## UL924 / 20 AMP EMERGENCY BYPASS / SHUNT RELAY



Not rated for use as a  
UL1008 Transfer Device

## Specifications

**# Relays & Contact Type:** One (1) DPDT Continuous Duty Coil  
**Expected Relay Life:** 10 million cycles minimum mechanical  
**Operating Temperature:** -30 to 140° F  
**Operate Time:** 18ms  
**Relay Status:** LED On = Activated  
**Dimensions:** 4.00" x 4.00" x 1.80" with .50" NPT Nipple  
**Wires:** 16", 600V Rated  
**Approvals:** UL Listed, UL924, C-UL, CE  
**Housing Rating:** UL Accepted for Use in Plenum, NEMA 1  
**Gold Flash:** Yes  
**Override (Test Switch):** No

**Contact Ratings:**  
 20 Amp Resistive @ 300 Vac  
 20 Amp Resistive @ 28 Vdc  
 20 Amp Ballast @ 277-480 Vac  
*Not rated for Electronic Ballast*  
 15 Amp Resistive @ 600 Vac  
 770 VA Pilot Duty @ 120 Vac  
 1158 VA Pilot Duty @ 240 Vac  
 1109 VA Pilot Duty @ 277 Vac  
 1640 VA Pilot Duty @ 480 Vac  
 3 HP @ 480-600 Vac  
 2 HP @ 240-277 Vac  
 1 HP @ 120 Vac

**Coil Current:**  
 105 mA @ 208-277 Vac

**Coil Voltage Input:**  
 208-277 Vac ; 50-60 Hz  
 Drop Out = 60 Vac  
 Pull In = 160 Vac

**Notes:**  
 • Not rated for use as a UL1008 Transfer Device.

## Initial Wiring Verification

1. Turn OFF Normal Power, Transfer Power, and Wall Switch.
2. Wire relay according to wiring diagram.
3. Energize Transfer Power. Emergency Light should illuminate.
4. Energize Normal Power. Emergency Light will turn OFF.
5. Turn ON Wall Switch. Emergency Light should illuminate.

## Field Inspection

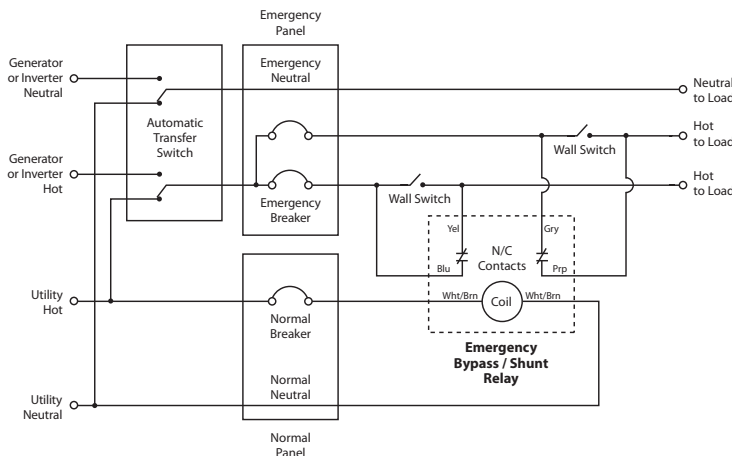
1. Ensure Normal Power and Transfer Power are energized.
2. Turn OFF Wall Switch. Light will turn OFF.
3. Red LED will be illuminated.
4. Turn OFF Normal Power. Red LED will turn OFF. Emergency Light will illuminate.

## Shunt Relay Application

Our Emergency Bypass / Shunt Relays are UL924 listed and suitable for shunting around wall switches in order to turn on emergency lighting in the event of loss of normal utility power.

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 or controller scheme.





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# Wireless Devices

EnOcean<sup>®</sup> enabled wireless relay transceivers in multiple AC voltage models work in conjunction with many switching devices that are EnOcean<sup>®</sup> enabled with 902 MHz transmitters. Wireless wall switches, occupancy sensors, thermostats, key card switches, solar door / window switches, and controller output transceivers are all devices which can activate Functional Devices' wireless control relays by using EnOcean's "energy harvesting" technology. Energy harvesting refers to the process by which energy is captured and stored, then used to transmit a wireless signal, which in turn is received by Functional Devices' wireless relay.

## Advantages at a Glance

- Energy savings
- Flexibility of applications
- Time-savings
- Maintenance-free
- Cost-savings in installation, maintenance, renovation and energy use

## Building Professionals

*Flexibility and simple planning for specifier, system integrators, contractors and architects*

Sustainable buildings are the key to a substantial reduction in energy consumption. Service-free and self-powered wireless switch transmitters, sensors and wireless relay receivers make cabling much simpler. Wireless technology means that the ceiling installation can be considered separately from the wall installation, so there are no limits to flexible room arrangement.

## End-Users

*Flexibility, cost and energy savings for building owners, facility managers and private consumers*

There is now increasing focus on the energy consumed by heating, air-conditioning and lighting in commercial real estate. Simple measures like installed wireless window contacts connected to heating control or a central turn-off function for lighting can substantially reduce operating costs. Whether as insular solutions or linked to modern building automation, both are possible and easily implemented. At the same time, service-free and self-powered wireless switches and wireless sensors can very much simplify the cabling of a building. This wireless technology really shows to benefit if room arrangements later need to be altered, or if a flexible system of dividing walls is used from the very start.



## Interoperable Wireless Standard

Interoperable Technology and Products – HVAC, monitoring and lighting control systems are readily available and wide-ranging. Functional Devices EnOcean<sup>®</sup> enabled wireless devices can prove to be interoperable with many other 902 MHz EnOcean<sup>®</sup> enabled devices. This increases flexibility for building owners, operators and architects.



## Self-Powered

Energy Harvesting – Functional Devices' EnOcean<sup>®</sup> enabled solutions make use of energy created from slight changes in motion, pressure, light, temperature or vibration. The self-powered wireless devices help make buildings smarter, safer, more comfortable and more energy-efficient. No batteries – building professionals and end-users can now realize the promise of battery-less and wire-free control systems. Because they are anchored by self-powered transmitter switches, buildings are more flexible and cost-efficient to design, build and operate.



## Proven Technology for Sustainable Buildings

Tried, Tested and True – EnOcean<sup>®</sup> enabled wireless devices have been installed in over 100,000 buildings; making it the most pervasive and field-tested wireless building automation standard in the world. The wireless standard for sustainable building – from retrofitting older structures to designing new buildings is incorporated in all Functional Devices EnOcean<sup>®</sup> enabled wireless devices.

# Wireless Devices

## Wireless Control Relays

Quick Reference Chart

Model #	UL	Coil Voltage		Contact Ratings								Repeat Function	Dry Contact Output	Ballast Size Enclosure	Spec Page
		AC/DC	AC	Relays	Contacts	Resistive	Motor	Ballast	Tungsten	Pilot Duty	Frequency				
RIBW01C-EN3	•		120	1	SPST-N/O			5 A	5 A		902 MHz	•		•	20
RIBW02C-EN3	•		208-277	1	SPST-N/O			5 A	5 A		902 MHz	•		•	20
RIBW01B-EN3	•		120	1	SPDT	20 A	2 HP	20 A	10 A	1110 VA	902 MHz	•	•		21
RIBW208B-EN3	•		208	1	SPDT	20 A	2 HP	20 A	10 A	1110 VA	902 MHz	•	•		21
RIBW240B-EN3	•		240	1	SPDT	20 A	2 HP	20 A	10 A	1110 VA	902 MHz	•	•		21
RIBW277B-EN3	•		277	1	SPDT	20 A	2 HP	20 A	10 A	1110 VA	902 MHz	•	•		21
RIBW24B-EN3	•	24		1	SPDT	20 A					902 MHz	•	•		21

UL = UL Listed : UL916 Energy Management

## Wireless Transmitters

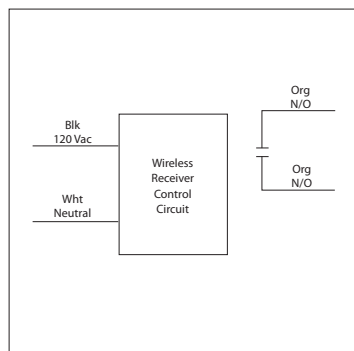
Quick Reference Chart

		Power Input		Quick Reference Chart			
Model #	Description		EnOcean® Energy Harvesting	Frequency	Color	Wireless Switch Cover Plate <sup>1</sup>	Spec Page
WWS-EN3	Wall switch	Self-Powered	•	902 MHz	White	WSTP-W	22
WDWS-EN3	Door and window switch	Self-Powered	•	902 MHz	White		23

<sup>1</sup> = Sold separately

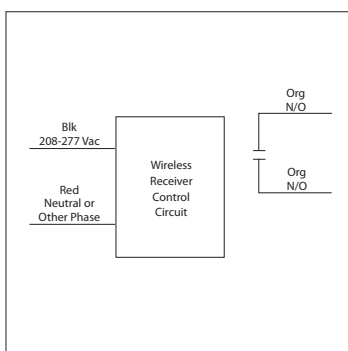
### RIBW01C-EN3

Enclosed EnOcean® Enabled Wireless Relay Receiver / Repeater 5 Amp SPST-N/O, 120 Vac Power Input



### RIBW02C-EN3

Enclosed EnOcean® Enabled Wireless Relay Receiver / Repeater 5 Amp SPST-N/O, 208-277 Vac Power Input



## WIRELESS CONTROL RELAYS



Smaller size design to fit inside ballast housing of fluorescent light fixture.



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## Specifications

**# Relays & Contact Type:** One (1) SPST Continuous Duty Coil  
**Expected Relay Life:** 10 million cycles minimum mechanical  
**Operating Temperature:** -30 to 140° F  
**Humidity Range:** 5 to 95% (noncondensing)  
**Red LED:** Relay Status / Learn Mode Status (Flashing)  
**Dimensions:** 4.60" x 1.20" x 1.70"  
**Wires:** 16", 600V Rated  
**Approvals:** UL Listed, UL916, C-UL  
**Gold Flash:** No  
**Override Switch:** No  
**Frequency:** 902 MHz  
**Receiver Sensitivity:** -93 dBm typical  
**Conducted Power:** 5 mW typical  
**Built-in Switch Modes:** Alarm, Repeater, Delay, Rocker, Momentary, and Toggle

**Contact Ratings:**  
 5 Amp Ballast @ 120/277 Vac  
 5 Amp Tungsten @ 120 Vac  
 5 Amp Electronic Ballast @ 120 Vac

**Power Input Ratings:**  
 75 mA @ 120 Vac ; 60 Hz (RIBW01C-EN3)  
 100 mA @ 208-277 Vac ; 60 Hz (RIBW02C-EN3)

### Notes:

- Compatible with EnOcean® 902 MHz Switches/Transmitters.
- Typical range: 50-150 ft.
- Open area transmission could be farther. Consult factory for more information.
- Repeater function only rebroadcasts original EnOcean® transmission. Up to two repeaters can be used.
- For setup instructions, see website for -EN3 Series:  
[www.functionaldevices.com/pdf/bulletins/B1867\\_393231.pdf](http://www.functionaldevices.com/pdf/bulletins/B1867_393231.pdf)  
 or scan QR code with your smart phone.



## RIBW01B-EN3

Enclosed EnOcean® Enabled Wireless Relay Transceiver / Repeater 20 Amp SPDT, 120 Vac Power, with Dry Contact Input

## RIBW208B-EN3

Enclosed EnOcean® Enabled Wireless Relay Transceiver / Repeater 20 Amp SPDT, 208 Vac Power, with Dry Contact Input

## RIBW240B-EN3

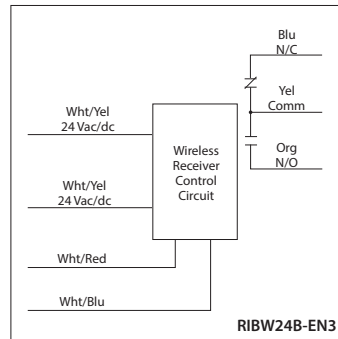
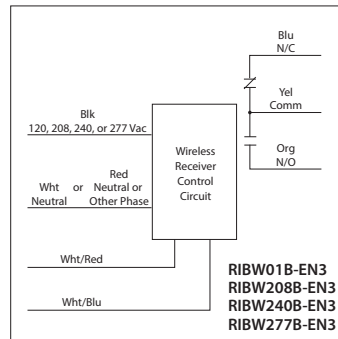
Enclosed EnOcean® Enabled Wireless Relay Transceiver / Repeater 20 Amp SPDT, 240 Vac Power, with Dry Contact Input

## RIBW277B-EN3

Enclosed EnOcean® Enabled Wireless Relay Transceiver / Repeater 20 Amp SPDT, 277 Vac Power, with Dry Contact Input

## RIBW24B-EN3

Enclosed EnOcean® Enabled Wireless Relay Transceiver / Repeater 20 Amp SPDT, 24 Vac/dc Power, with Dry Contact Input



## WIRELESS CONTROL RELAYS



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Relay has built-in repeater function. Relay receives signal from wireless switch transmitter and rebroadcasts the signal to the next relay receiver.

## Specifications

**# Relays & Contact Type:** One (1) SPDT Continuous Duty Coil  
**Expected Relay Life:** 10 million cycles minimum mechanical  
**Operating Temperature:** -30 to 140° F  
**Humidity Range:** 5 to 95% (noncondensing)  
**Red LED:** Relay Status / Learn Mode Status (Flashing)  
**Dimensions:** 2.30" x 3.20" x 1.80" with .50" NPT Nipple  
**Wires:** 16", 600V Rated  
**Approvals:** UL Listed, UL916, C-UL, RoHS  
**Housing Rating:** UL Accepted for Use in Plenum, NEMA 1  
**Gold Flash:** No  
**Override Switch:** No  
**Frequency:** 902 MHz  
**Receiver Sensitivity:** -93 dBm typical  
**Conducted Power:** 5 mW typical  
**Built-in Switch Modes:** Alarm, Repeater, Delay, Rocker, Momentary, and Toggle

### Contact Ratings:

20 Amp Resistive @ 277 Vac  
 20 Amp Ballast @ 277 Vac  
 16 Amp Electronic Ballast @ 277 Vac (N/O)  
 10 Amp Tungsten @ 120 Vac (N/O)  
 770 VA Pilot Duty @ 120 Vac  
 1,110 VA Pilot Duty @ 277 Vac  
 2 HP @ 277 Vac  
 1 HP @ 120 Vac

### Power Input Ratings:

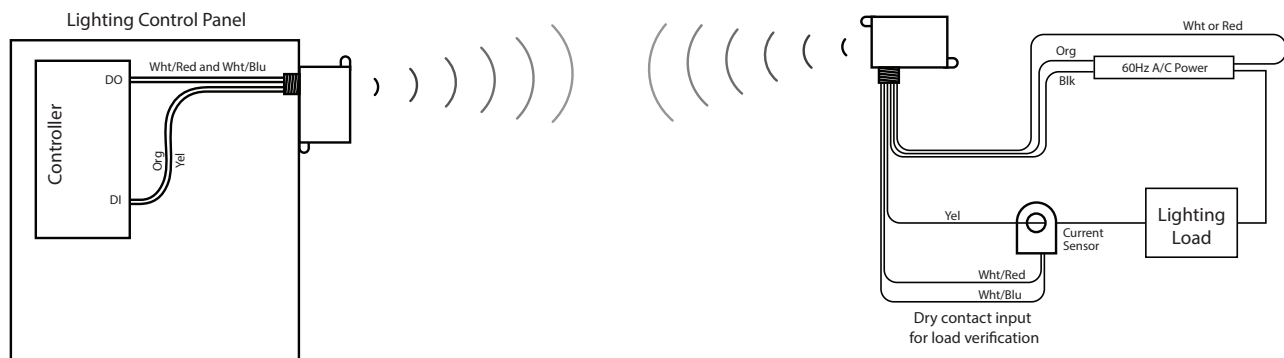
73 mA @ 120 Vac ; 60 Hz (RIBW01B-EN3)  
 80 mA @ 208 Vac ; 60 Hz (RIBW208B-EN3)  
 80 mA @ 240 Vac ; 60 Hz (RIBW240B-EN3)  
 80 mA @ 277 Vac ; 60 Hz (RIBW277B-EN3)  
 139 mA @ 24 Vac ; 69 mA @ 24 Vdc (RIBW24B-EN3)

### Notes:

- Compatible with EnOcean® 902 MHz Switches/Transmitters.
- Typical range: 50-150 ft.
  - Open area transmission could be farther. Consult factory for more information.
- Repeater function only rebroadcasts original EnOcean® transmission. Up to two repeaters can be used.
- For setup instructions, see website for -EN3 Series Application Manual: [www.functionaldevices.com/pdf/bulletins/B1867\\_393231.pdf](http://www.functionaldevices.com/pdf/bulletins/B1867_393231.pdf) or scan QR code with your smart phone.



## Application for Wireless Control & Feedback



**WWS-EN3**

EnOcean® Enabled Wireless Wall Switch  
Transmitter Switch, 902 MHz

Switch Colors Available:



White

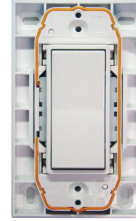
**WSTP-W**

Switch Cover Plate

Cover Plate Colors Available:



White

**WIRELESS ROCKER SWITCH TRANSMITTER & COVER PLATE****Specifications**

**Operating Modes:** On/Off, Toggle, Scene control  
**Power Supply:** Powered by finger press  
(Electrodynamic Energy Harvester)

**Frequency:** 902 MHz

**Antenna:** Integrated antenna, 15cm

**Transmission Power:** Max. 10mw EIRP

**Energy Bowtravel/Operating Force:** 50,000 actuations tested to  
EN60669 / VDE 0632

**Operating Temperature:** -25 to 65° C

**Relative Humidity:** 5%-92%(non-condensing)

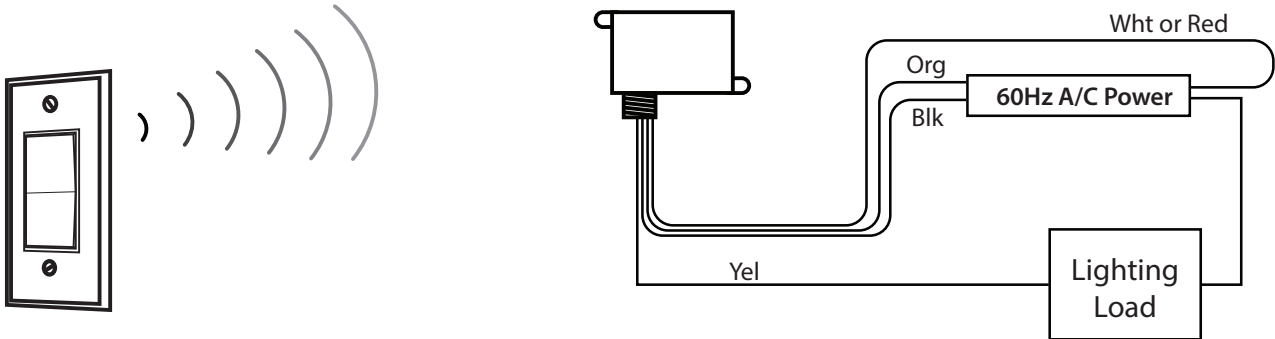
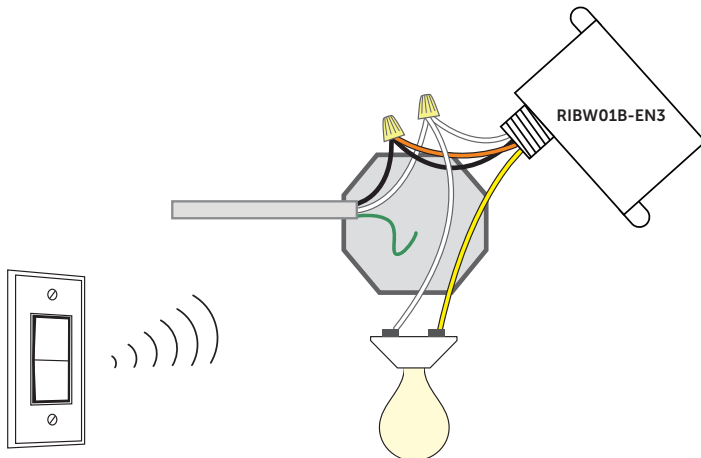
**Dimensions:** 2.75" x 4.50" x 0.62"

**Weight:** 3 oz.

**Radio Certifications:** FCC (US), IC (Canada)

**Notes:**

- Control one load or one group of loads with a single rocker style Wireless Switch Transmitter.
- **Typical range: 50-150 ft.**
  - Open area transmission could be farther. Consult factory for more information.
- Switch cover plate sold separately.
- Do not use metal switch plate covers due to interference with wireless signal.
- Mount with screws or double sided tape.
- For use with EN3 Series Relays.
- EEP F6-02-02

**Application for Wireless Control & Feedback****Two-Way Switch Wiring**

## WDWS-EN3

EnOcean® Enabled Wireless Solar Door / Window Sensor, 902 MHz

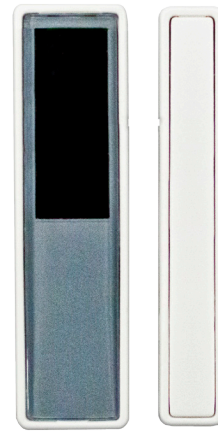
### Specifications

<b>Charge Time before Linking:</b>	2.7 hours @ 10 lux 3.7 hours @ 200 lux
<b>Light Required to Sustain Operation:</b>	15 lux for 6 actuations/hour 50 lux for 30 actuations/hour 100 lux for 60 actuations/hour
<b>Charge Time for Full Charge:</b>	21 hours @ 200 lux (after startup) 42 hours @ 200 lux (cold start)
<b>Operating Life in Darkness (after full charge):</b>	174 hours heartbeat only 67 hours @ 10 actuations/hour 10 hours @ 100 actuations/hour
<b>Maximum Sensor Gap:</b>	0.25" (6.4mm)
<b>Dimensions (Sensor):</b>	3.15" L x 0.83" W x 0.59" D (80mm x 21mm x 15mm)
<b>Dimensions (Magnet):</b>	3.15" L x 0.47" W x 0.50" D (80mm x 12mm x 13mm)
<b>Weight (Total):</b>	0.97 oz. (27.5 g)
<b>Environment:</b>	Indoor use only 32° to 131° F (0° to 55° C) 5% to 95% relative humidity (non-condensing)
<b>Agency Compliance:</b>	FCC, IC

#### Notes:

- Typical range: 50-150 ft.
  - Open area transmission could be farther. Consult factory for more information.
- Only for use with -EN3 Series relays.
- EEP D5-00-01

### WIRELESS SOLAR DOOR / WINDOW TRANSMITTER



[www.functionaldevices.com/pdf/bulletins/B1877\\_393233.pdf](http://www.functionaldevices.com/pdf/bulletins/B1877_393233.pdf)  
or scan QR code with your smart phone.



# Light Controllers

## Closet Light Controllers

Our Closet Light Controllers are designed for a wide variety of applications where the load status (ON/OFF) is determined by the opening or closing of a variety of switches, as in a closet door. These relays are powered by line voltage and can switch loads varying from 120 Vac to 277 Vac. With the CLC212-D15, money and energy can be saved when a closet door is inadvertently left open. In this event, the closet light will switch off after a 15 minute delay. If you wish the light to remain on after the door is open, you simply open, close and reopen the door within three seconds.



## Ceiling Fan & Light Controller

Most ceiling fans are installed at locations where only lights existed before, leaving only one wall switch and one 120 Vac line available to power the fan and light. Our Ceiling Fan Controller allows a ceiling fan and light to be controlled independently from one existing wall switch by using your existing light switch in a simple "OFF" and "ON" 3-stage sequence.

- Enables you to control fan and light independently from one wall switch
- Eliminates the use of pull chains
- Installs easily in the canopy of any ceiling fan
- Never makes the fan hum
- Requires no third wire to be run from the switch to the ceiling fan and light
- Cannot be lost like a remote control unit sometimes can

FANLIGHT  
CONTROLLER™

## Half-Light® Ballast Controllers

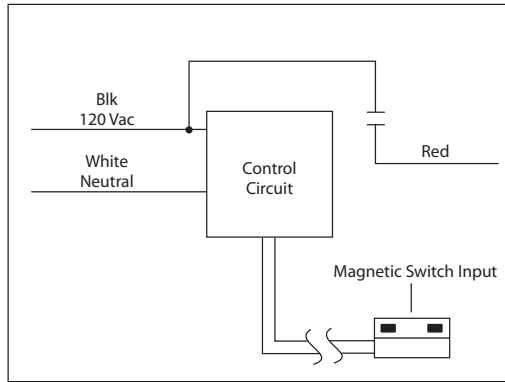
Providing independent control for multiple ballast light fixtures from a single existing wall switch, Half-Light® Controllers can significantly reduce a building's light output, enabling professional lighting users to cost-effectively enjoy the benefits of lighting control with just a simple toggle of their wall-based light switch. Easy to use and install, Half-Light® Controllers from Functional Devices are fully compatible with the market's range of popular fluorescent and HID lamps and represent a simple and affordable alternative to the industry's costlier and more complicated dimming systems and components.



## CLC106 Series

Enclosed Relay 5 Amp SPST, Separated Class 2 Magnetic Door Switch Input, 120 Vac Power

### CLOSET LIGHT CONTROLLERS



## Specifications

**# Relays & Contact Type:** One (1) SPST Continuous Duty Coil  
**Expected Relay Life:** 10 million cycles minimum mechanical  
**Operating Temperature:** -30 to 140° F  
**Dimensions:** 2.90" x 1.50" x 1.05"  
 with Retaining Clip for 1/2" Knockout  
**Wires:** 16", 600V Rated (120 Vac Connections)  
 6' Leads on Magnetic Door Switch  
**Approvals:** UL Listed, UL916, C-UL, CE  
**Housing Rating:** UL Accepted for Use in Plenum,  
 NEMA 1  
**Gold Flash:** No  
**Override Switch:** No

**Contact Ratings:**  
 5 Amp Resistive @ 120 Vac  
 5 Amp Electronic Ballast @ 120 Vac  
 5 Amp Magnetic Ballast @ 120 Vac  
 5 Amp Tungsten @ 120 Vac

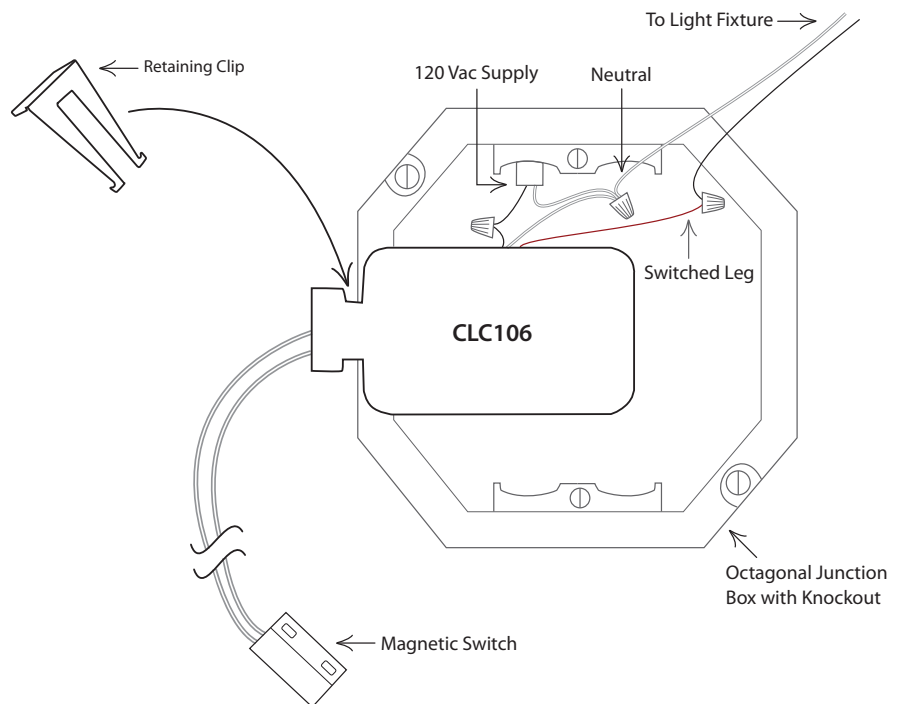
**Power Usage:**  
 21 mA @ 120 Vac Max.

### CLC106 Series Selection Guide

Model #	Magnetic Switch Closed	Magnetic Switch Open
CLC106	Light OFF	Light ON
CLC106-NC	Light ON	Light OFF

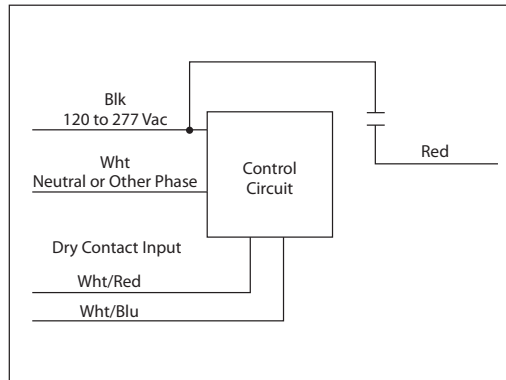
## Retrofit Applications

- Easily fits inside junction box
- Includes magnetic door switch. When the magnet and contact are separated, the closet light turns on.
- 120 Vac operation



## CLC212

Enclosed Relay 10 Amp SPST-N/O, Separated Class 2 Dry Contact Input, 120-277 Vac Power



## CLOSET LIGHT CONTROLLER



## Specifications

**# Relays & Contact Type:** One (1) SPST-N/O Continuous Duty Coil  
**Expected Relay Life:** 10 million cycles minimum mechanical  
**Operating Temperature:** -30 to 140° F  
**Relay Status:** LED On = Activated  
**Dimensions:** 1.70" x 2.80" x 1.50" with .50" NPT Nipple  
**Wires:** 16", 600V Rated  
**Approvals:** UL Listed, UL916, C-UL, CE  
**Housing Rating:** UL Accepted for Use in Plenum, NEMA 1  
**Gold Flash:** No  
**Override Switch:** No

**Contact Ratings:**  
 10 Amp General Use @ 277 Vac  
 1/2 HP @ 125 Vac  
 1 HP @ 250 Vac  
 1/4 HP @ 277 Vac  
 470 VA Pilot Duty @ 125 Vac  
 770 VA Pilot Duty @ 250 Vac

**Power Usage:**  
 50 mA @ 240 Vac Max.

### Notes:

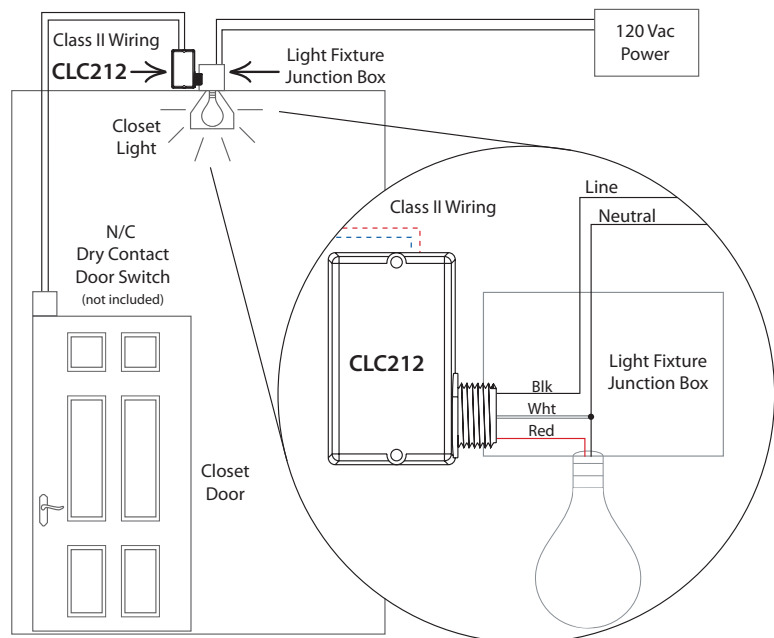
- **Dry Contact Input Operation:** Close Wht/Red wire to Wht/Blu wire to activate relay. Normally open relay will close. If more than one CLC212 shares a single dry contact input, Wht/Blu must be common.
- Order Normally Closed contact by adding "-NC" to end of model number for opposite operation. Normally closed will open when Wht/Red wire is closed to Wht/Blu wire.
- Switch must be Form C or N/C.
- Suggested switches: Detex® model MS-2049 or similar

## New Construction Applications

- No stepdown transformer necessary
- Operates on any device from 120 Vac to 277 Vac
- Light 18 AWG wire used to control relay, instead of armored cable, but any size may be used
- Closet light turns on when door is open
- Customer needs to purchase Form C or N/C door switch.

A Normally Closed (N/C) door switch is closed when no outside forces are acting upon it. When used in this application, the switch is open when the door is closed, and the switch closes when the door is opened, activating the controller to turn the light on.

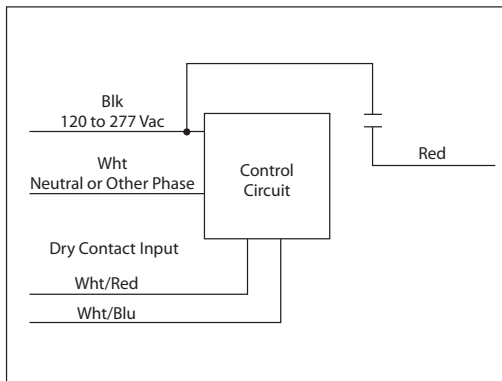
(Door switch not provided, see notes for details.)



## CLC212-D15

Enclosed Relay 10 Amp SPST-N/O, Separated Class 2 Dry Contact Input, 120-277 Vac Power

### CLOSET LIGHT CONTROLLER



## Specifications

**# Relays & Contact Type:** One (1) SPST-N/O Continuous Duty Coil  
**Expected Relay Life:** 10 million cycles minimum mechanical  
**Operating Temperature:** -30 to 140° F  
**Relay Status:** LED On = Activated  
**Dimensions:** 1.70" x 2.80" x 1.50" with .50" NPT Nipple  
**Wires:** 16", 600V Rated  
**Approvals:** UL Listed, UL916, C-UL, CE  
**Housing Rating:** UL Accepted for Use in Plenum, NEMA 1  
**Gold Flash:** No  
**Override Switch:** No

**Contact Ratings:**  
 10 Amp General Use @ 277 Vac  
 1/2 HP @ 125 Vac  
 1 HP @ 250 Vac  
 1/4 HP @ 277 Vac  
 470 VA Pilot Duty @ 125 Vac  
 770 VA Pilot Duty @ 250 Vac

**Power Usage:**  
 52 mA @ 277 Vac Max.

### Notes:

- Dry Contact Input Operation:** Open Wht/Red wire and Wht/Blu wire to activate relay. Relay contact will close. If more than one CLC212-D15 shares a single dry contact input, Wht/Blu must be common.
- For 60 minute delay, order model CLC212-D60.
- Suggested switches: Functional Devices model ACLCMAG Detex® model MS-2049 or similar

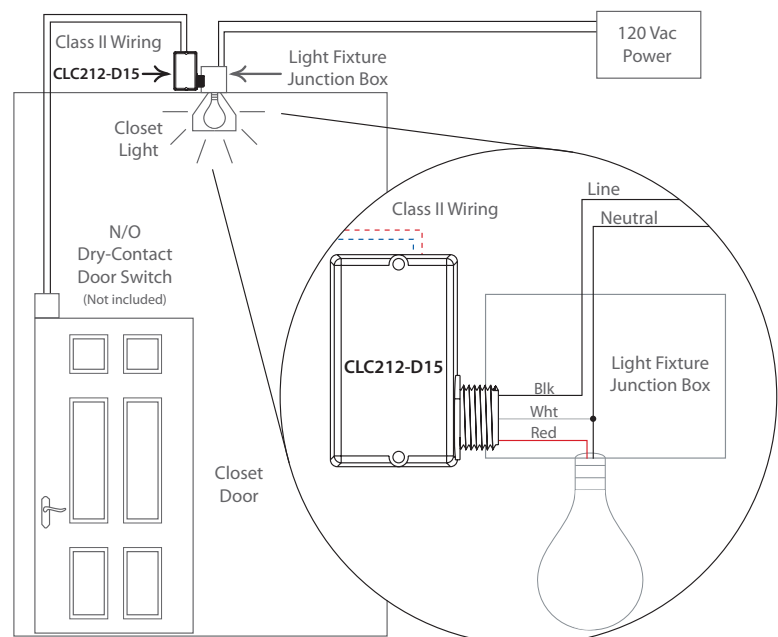
With the CLC212-D15, money and energy can be saved when a closet door is inadvertently left open. In this event, the closet light will switch off after a 15 minute delay. If you wish the light to remain on after the door is open, you simply open, close and reopen the door within three seconds.

## New Construction Applications

- No stepdown transformer necessary
- 15 minute delay when door is left open
- Operates on any device from 120 Vac to 277 Vac
- Light 18 AWG wire used to control relay, instead of armored cable, but any size may be used
- Closet light turns on when door is open
- Customer needs to purchase Form C or N/O door switch

A Normally Open (N/O) door switch is open when no outside forces are acting upon it. When used in this application, the switch is closed when the door is closed, and the switch opens when the door is opened, activating the controller to turn the light on.

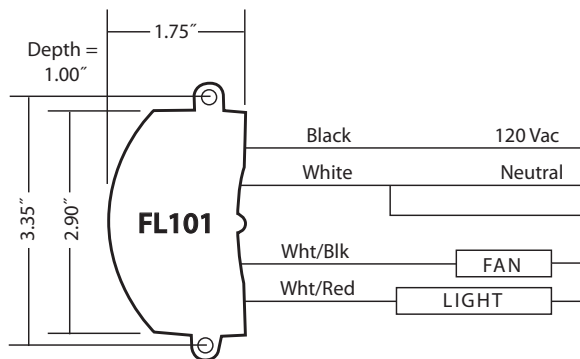
(Door switch not provided, see notes for details.)



## FL101

Independent Control for Ceiling Fan & Light from One Existing Wall Switch

CEILING FAN / LIGHT CONTROLLER



## Specifications

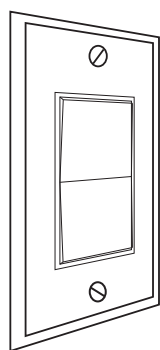
**Input Power:** 120 Vac, 60 Hz, 3 W  
**Contact Ratings:** 360 W Light; 2 FLA, 12 LRA, 120 Vac Fan, 3 Amp Electronic Ballast  
**Operating Temperature:** 32 to 140° F  
**Storage Temperature:** -40 to 185° F  
**Humidity Range:** 5 to 95% (noncondensing)

**Dimensions:** 3.75" x 1.75" x 1.00"  
**Weight:** .20 lbs.  
**Wire Length:** 6.50"  
**Approvals:** UL Listed, C-UL, CSA Approved, CE

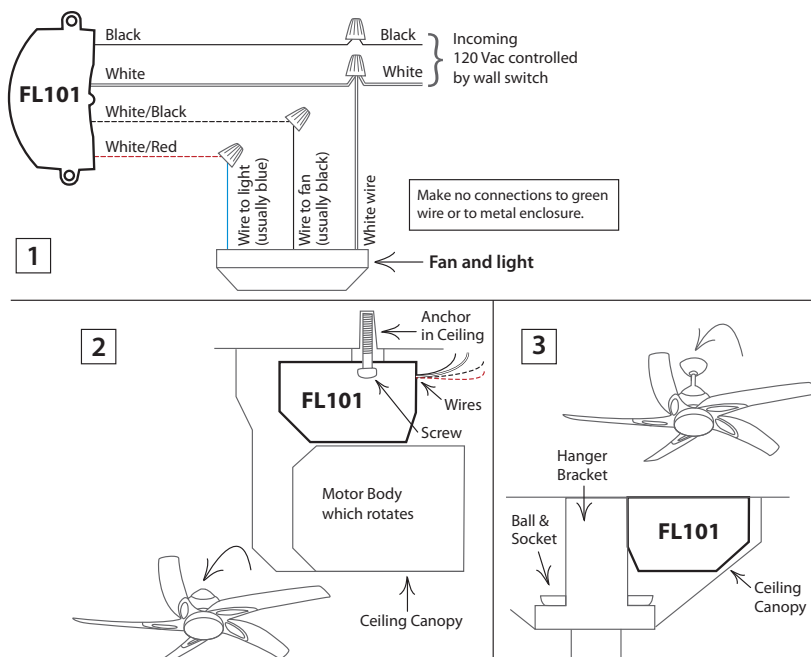
Most ceiling fans are installed at locations where only lights existed before. Consequently, there is only one wall switch and one 120 Vac line available to power your fan and light. (In some cases, there are three-way switches which have the same problem.) To turn your fan and light on independently, you have to use cumbersome pull chains or add another wall switch and run a new wire between the switch and the fan. The Fan Light Controller gives you independent control of the fan switch in a simple "off" and "on" 3-stage sequence. The Fan Light Controller is easily installed in the decorative ceiling canopy of the fan.

- Easy installation
- Control fan and light independently from one wall switch
- Eliminates use of pull chains
- Installs easily in canopy of ceiling fan
- Requires no extra wiring between switch and ceiling fan and light
- Cannot be lost like a remote control unit
- 120 Vac
- Made in USA

## OFF / ON Sequence

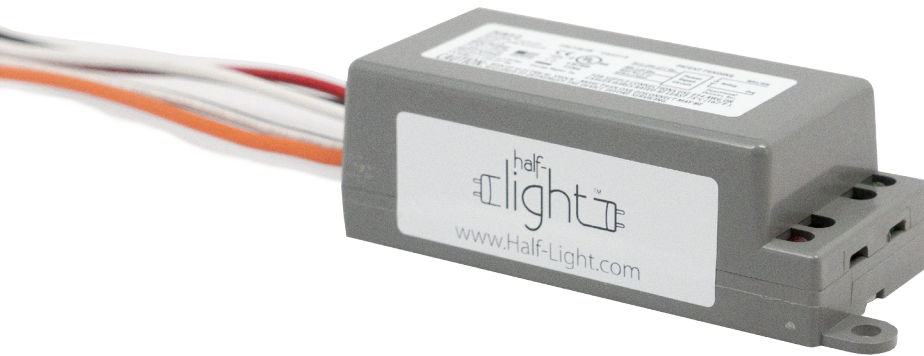


- ↑ • Switch ON gives Lights Only
- ↓ ↑ • Switch OFF, then ON again gives Fan and Lights
- ↓ ↑ • Switch OFF, then ON again gives Fan Only



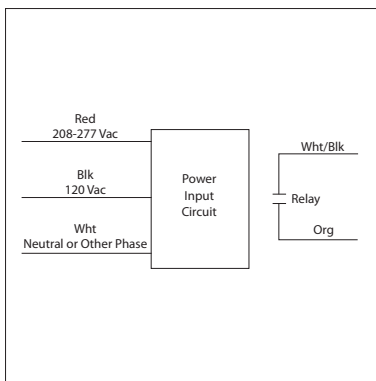
## Plug & Play Energy Saving Device for Lighting

## Up to 50% Energy Savings & Works with All Lighting



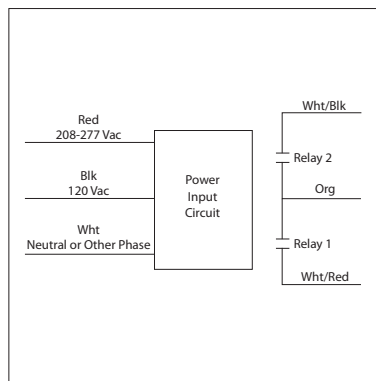
## HAF2

*Enclosed Independent Control for Multiple Ballast Light Fixtures from One Existing Wall Switch, Two Stage; 120 / 208-277 Vac Power Input*



### HAF3

*Enclosed Independent Control for Multiple  
Ballast Light Fixtures from One Existing  
Wall Switch, Three Stage; 120 / 208-277 Vac  
Power Input*



## TWO STAGE & THREE STAGE HALF-LIGHT® BALLAST CONTROLLERS



## Specifications

**Input Power:** 120 / 208-277 Vac

**Contact Ratings:** 5 Amp Ballast @ 120-277 Vac

*Not rated for Electronic Ballast*

5 Amp Incandescent @ 120 Vac

**Operating Temperature:** -30 to 140° F

**Humidity Range:** 5 to 95% (non-condensing)

**Dimensions:** 3.75" x 1.66" x 1.18"

**Weight:** 0.20 lbs. (HAF2); 0.24 lbs. (HAF3)

Wire Length: 6.00"

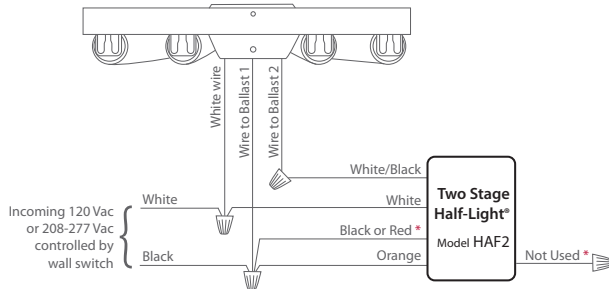
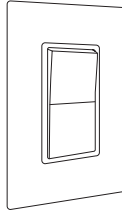
**Approvals:** UL Listed, UL916, C-UL, CE Approved, RoHS

**Power Consumption:** Refer to [www.Half-Light.com](http://www.Half-Light.com) for details

# Three Applications

## Multiple Ballast Light Fixtures

- Classrooms, offices & high bay fluorescent fixtures



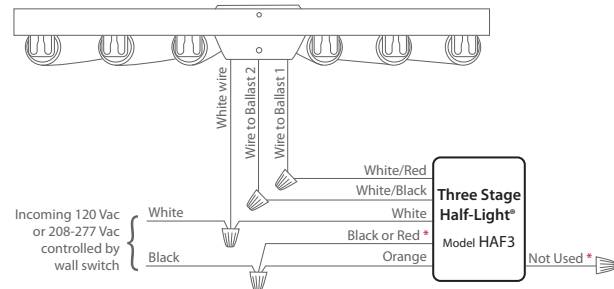
## Two Stage Half-Light\*

- Switch ON  
activates Ballast 1 Only (50% light)
- Switch OFF, then ON again  
activates Both Ballasts (Full light)

Wall switch can be replaced by switching devices such as contactors, relays, or controllers.

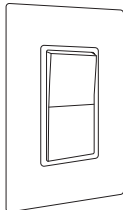
## Three Stage Half-Light\*

- Switch ON  
activates Ballast 1 Only
- Switch OFF, then ON again  
activates Ballast 2 Only
- Switch OFF, then ON again  
activates Both Ballasts (Full light)



## Step Dimming Ballast Control

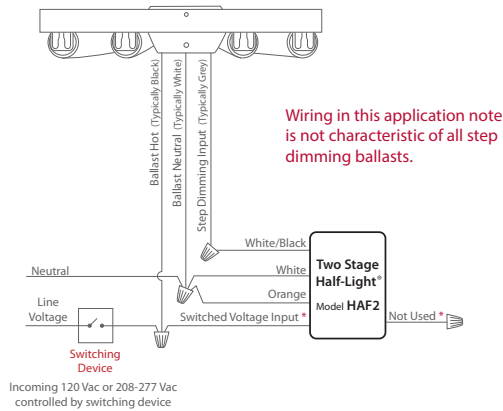
- Eliminates dual wall switch control



## Two Stage Half-Light\*

- Switch ON  
50% Light
- Switch OFF, then ON again  
Full Light

Wall switch can be replaced by switching devices such as contactors, relays, or controllers.



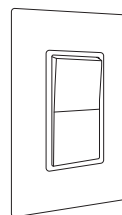
Wiring in this application note is not characteristic of all step dimming ballasts.

## Alternate Fixture Control

- High bay fixtures in box stores, gymnasiums, exhibition halls & warehouses

Start up and restart times may vary depending on fixture.

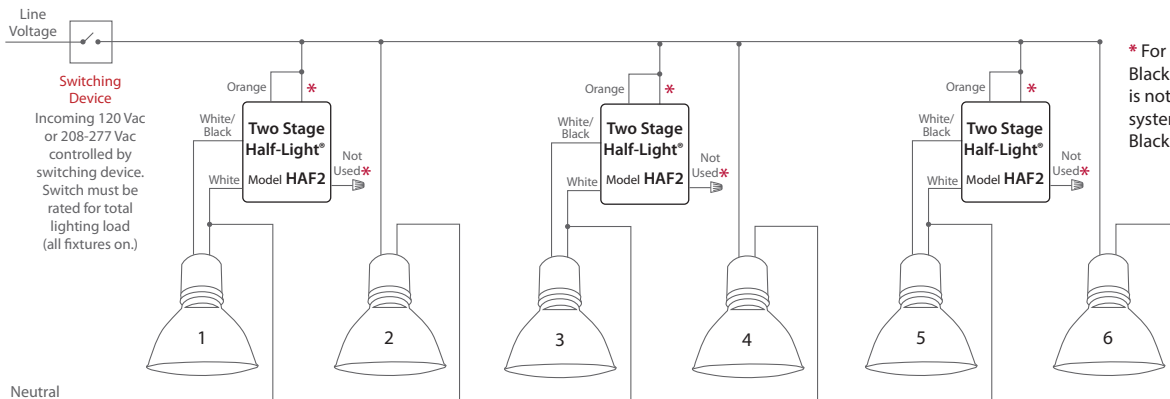
Lights 2, 4, and 6 controlled by switch only.  
Half-Light\* controls lights 1, 3, and 5.



## Two Stage Half-Light\*

- Switch ON  
Every Other Light On
- Switch OFF, then ON again  
All Lights On

Wall switch can be replaced by switching devices such as contactors, relays, or controllers.



\* 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.



## Half-Light® Ballast Controller with Analog Input for Use with Controller Output

### HAF-AI

Enclosed Independent Control for Multiple Ballast Light Fixtures with Analog Input for Stage Selection (0-10 Vdc / 0-5 Vdc); Three Stage; 24 Vac/dc Power Input



0-10 Vdc Control Voltage	0-5 Vdc* Control Voltage	Relay 1 Status	Relay 2 Status
0 - 2.117Vdc	0 - 1.058Vdc	OFF	OFF
2.745 - 4.627Vdc	1.373 - 2.313Vdc	ON	OFF
5.255 - 7.137Vdc	2.628 - 3.568Vdc	OFF	ON
7.765 - 10.000Vdc	3.883 - 5.000Vdc	ON	ON

### THREE STAGE HALF-LIGHT® BALLAST CONTROLLER WITH ANALOG INPUT



## Specifications

**# Relays & Contact Type:** Two (2) SPST-NO Continuous Duty Coil  
**Expected Relay Life:** 10 million cycles minimum mechanical  
**Operating Temperature:** -30 to 140° F  
**Humidity Range:** 5 to 95% (noncondensing)  
**Relay Status:** Green LED On = Power On  
 Red LEDs On = Relays Activated  
**Dimensions:** 3.750" x 1.660" x 1.800"  
**Wire Length:** 6.00"  
**Approvals:** UL Listed, UL916, C-UL, CE, RoHS  
**Gold Flash:** No  
**Override Switch:** No

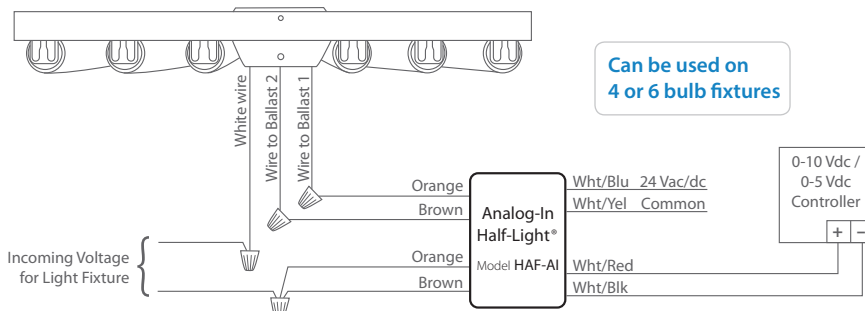
**Contact Ratings:**  
 10 Amp General Use @ 277 Vac  
 10 Amp Resistive @ 30 Vdc N/O  
 7 Amp Resistive @ 30 Vdc N/C  
 1/2 HP @ 125 Vac  
 1 HP @ 250 Vac  
 1/4 HP @ 277 Vac  
 470 VA Pilot Duty @ 125 Vac  
 770 VA Pilot Duty @ 250 Vac

**Power Input:**  
 24 Vac/dc; 50-60 Hz  
 100mA max.

**Notes:**  
 • Custom programming available for large orders.  
 • For lights to power "on" when control signal is lost, add -NC to end of model number for Normally Closed

### Multiple Ballast Light Fixtures

• Classrooms, offices & high bay fluorescent fixtures



Can be used on  
4 or 6 bulb fixtures

# Index

CLC106	25	ESR2402B	14	RIBW01B-EN3	21
CLC106-NC	25	ESR2402D	16	RIBW01C-EN3	20
CLC212	26	ESRB	4	RIBW02C-EN3	20
CLC212-D15	27	ESRN	4	RIBW208B-EN3	21
CLC212-D60	27	ESRTB	11	RIBW240B-EN3	21
ESR01P	17	FL101	28	RIBW24B-EN3	21
ESR02P	18	HAF-AI	31	RIBW277B-EN3	21
ESR2401B	13	HAF2	29	WDWS-EN3	23
ESR2401D	15	HAF3	29	WWS-EN3	22