ILLUMRA™
SELF-POWERED WIRELESS CONTROLS

E3R-R02-3HOTP (24V)
E3R-R12-3HOTP (120V)
E3R-R24-3HOTP (240V)
E3R-R27-3HOTP (277V)

The 3-Wire Relay Receiver controls lights or other loads by responding to EnOcean signals from self-powered wireless light switches and other compatible transmitters. The Relay Receiver mounts to junction box knockout holes with a threaded nipple or inside wiring cavities; preferably in plastic enclosures for maximum wireless range.

Compatible Devices	EnOcean Equipment Profiles
Wireless Light Switches	(EEPs: F6-02-01, F6-02-02, F6-03-01, F6-03-02)
Key Card Switch	(EEPs: F6-04-01, F6-02-01, F6-02-02)
SLT Wireless Sensor	(EEPs: F6-02-01, F6-02-02, Proprietary)
Wireless Occupancy Sensors	(EEPs: A5-07-01, A5-07-02, A5-07-03)
Door/Window Sensor	(EEP: D5-00-01, A5-30-01)
Light Sensor	(EEP: A5-06-01, A5-06-02)
Central Commands	(EEP: A5-38-08*)
	*untimed commands only

Included Components
  (1) ILLUMRA 3-Wire Relay Receiver
  (1) Instruction Sheet

Tools Needed for Installation
  Pen or object to press recessed buttons
  Electrical tape
  Wire nuts

Installation

Caution/Notes
WARNING: To avoid the risk of fire, shock or death TURN OFF POWER at the circuit breaker or fuse and verify that it is OFF before beginning installation. Make sure it remains off until the installation is complete. Be aware that with some versions of this product it is possible to have multiple circuits feeding current.
- Depending on the circumstances it may be more convenient to pre-link the Relay Receiver prior to final installation.

Wiring Diagram

BREAKER PANEL

HOT
BLACK
NEUTRAL
WHITE
GROUND
GREEN OR BARE

AC POWER
BLACK

AC POWER
WHITE
GROUND
GREEN OR BARE

FIXTURE

N.O.
RED
AC POWER BLACK
AC POWER WHITE

WIRELESS CONTROL SIGNAL UP TO 150 FT.

E3R-R12-3HOTP

E3T-S1AWH   E3T-S2AWH

BATTERY-FREE, WIRELESS SWITCHES OR OTHER TRANSMITTERS

- Always follow local electrical codes when installing this device. Only a qualified electrician should install the product.
- ILLUMRA Relay Receivers are intended only for use dry locations and with permanently installed fixtures.
- ILLUMRA Relay Receivers should not be installed in close proximity to heat sources such as 75W+ ceiling fixtures. (see Operating Temperature)

Choosing the Optimal Mounting Location

The long term reliability and performance of the relay will be determined by the mounting location. Choose a mounting location carefully.
For best radio performance:
- Straighten antenna out & away from metal.
- Create separation distance away from interfering electronics such as fluorescent tube ends, ballasts, electronic transformers, and motors.
- Avoid mounting inside metal enclosures.
- Obstructions of metal, concrete and dense building materials will reduce the range. Mount higher and away from obstructions to maximize the range.
- Site survey tools are available to help fine-tune wireless communications.

Installation Overview:

1. Identify best mounting locations for receiver and transmitter. Perform range test to confirm operation prior to installation.
2. Link Transmitters and Receivers following *Linking Instructions* below.
3. Connect Receiver to circuit following wiring diagram and local electrical codes.
4. Mount transmitters and receivers in final location and verify operation.

Linking Instructions

Note: The Relay Receiver must be powered on while linking. After linking, the Relay Receiver retains the settings in the event of power loss. When in Link Mode, the Relay Receiver's communication range is lowered to prevent accidental interference from other transmitters. For best results, transmitters should be within 15 ft. (5 m) of the Relay Receiver when linking.

Basic Linking

Use basic linking to connect the following devices to the receiver for common applications:

Wireless Switch - Press top for ON, press bottom for OFF
Occupancy Sensor - Auto On/Off, Man. On/Auto off w/ switch linked
Switch Leg Transmitter - Circuit Interlock
Window/door Sensor - Closed-ON, Open-OFF
Light Sensor - ON when below light setpoint, OFF if above setpoint

1. Press and hold the LRN button for 3 seconds then release. The relay will toggle a steady pattern indicating Basic Link Mode is active:

   —   —   —   —

2. Press wireless switch button or TCH button on transmitter, then release. Toggling will pause for 3 seconds, then resume when link is created.
3. Link additional transmitters (up to 30) as needed, wait 30 seconds to exit Link Mode. Toggling stops when Link Mode stops.

Advanced Linking

Use advanced linking to activate alternate functionality for specific applications with transmitters including:

Wireless Switch
Key Card Switch
Occupancy Sensor
Door/Window Sensor

1: Choose an operating mode for the receiver with the transmitter by reviewing the modes outlined in the following sections.

2: Activate a specific Link Mode by pressing the LRN button in the correct sequence.

3: Press the link button on the transmitter to link the transmitter with the Relay Receiver.

4: Exit Link Mode.

The receiver supports four Link Modes with different functions for each transmitter. Instructions for activating specific Link Modes follow the *Function Descriptions* section.

Function Descriptions

Switches

Switches can behave in one of four ways: **Rocker**, **Momentary**, **Toggle,** or **Scene**.

Link Mode 1: Rocker Mode – Turn relay ON by pressing top button of rocker and OFF pressing bottom button. Create link by pressing top button; bottom button is automatically linked.

Link Mode 2: Momentary Mode – Pressing a button on a wireless switch causes the relay to go ON momentarily and stay on while the button is pressed. When the button is released, the relay goes OFF. Each button on the transmitter may control a different relay.

Link Mode 3: Toggle Mode – Pressing a button on a wireless switch causes the relay to go ON. Pressing it again causes the same relay to go OFF. Each button on the transmitter may control a different relay.

Link Mode 4: Scene Mode — Scene mode is used to link a receiver to recall a specific relay state when a button is pressed. Typically, scene mode is used when a single transmitter action affects multiple receivers in which some receivers turn ON and others turn OFF with a single button press.

To link a receiver to recall a specific relay state, set the Relay Receiver to the desired state by pressing and quickly releasing the CLR button (which will cause the relay to toggle each time the CLR button is pressed). Once the Relay Receiver is in the desired state, activate Link Mode 4 to complete the link process.

Occupancy Sensor

Occupancy Sensors can behave in one of three ways: Manual On/Auto Off, Auto On/ Auto Off, and Walkthrough.

Link Mode 1: Manual On/Auto Off – User turns on the relay manually. The relay remains ON while the sensor detects occupancy. If the sensor detects no occupancy for 15 minutes, the relay will turn OFF. This mode is California Title 24 compliant. When no manual controls (i.e. wireless switches) are linked to the relay, the relay will use Auto On/Auto Off function when linked in Mode 1.

Link Mode 2: Auto On/Auto Off – When the sensor detects occupancy, it turns ON the relay. If the sensor detects no occupancy for 15 minutes, the relay will turn OFF.

Link Mode 3: Walkthrough – An aggressive energy saving mode similar to Auto On/Auto Off with a shorter delay timer. The Relay Receiver turns the relay ON when the Occupancy Sensor detects occupancy. The Receiver Relay turns OFF automatically after 2-15 minutes of no occupancy, depending on sensed motion.

Notes:
When not in Link Mode, pressing the occupancy sensor link button causes the relay output to toggle on linked relays.

When the receiver is turned off with a manual control, Auto On is disabled until the occupancy sensor timeout expires (15 minutes of no activity).

Relay Occupancy timeout operates only after a linked occupancy sensor packet is received by relay. If no linked senors detect occupancy or if they malfunction, the relay will not time out after 15 minutes.

Key Card Switch

Link Mode 1: Not Supported

Link Mode 2: Key Card Switch – Relay turns ON when a key card is inserted. Relay turns OFF when the key card is removed.

Switch Leg Transmitter (SLT)

Link Mode 1: SLT - When the Switch Leg Transmitter is energized, the relay turns on. When power is removed from the SLT, relay turns off.

Door/Window Sensor

Link Mode 1: Instantaneous Mode – Door/Window Sensor Open, Relay turns OFF. Door/Window Sensor closed, Relay turns ON. Instant response.

Link Mode 2: Delay Mode – Door/Window Sensor Open, Relay turns OFF after relay has been on for at least 5 minutes. Door/Window Sensor closed, Relay turns ON after relay has been off for at least 5 minutes. Delays prevent short cycling of equipment. This mode is commonly used in HVAC applications.

Note: When delay mode is active all linked transmitters are subject to minimum on and off delays.

Light Sensor

Link Mode 1: Light Sensor – When sensed light level is below a threshold, relay turns ON. When sensed light level is above a threshold, relay turns OFF.

Link Mode Activation Instructions

The Link Modes build on each other: transition to Link Mode 2 while Link Mode 1 is active, etc as outlined below.

Link Mode Instructions:

1. **Enter Link Mode** (follow steps a - d until desired Link Mode is active, then skip to step 2)
   a. **Link Mode 1:** Press and hold the LRN button for 3 seconds then release. The relay will toggle a steady pattern indicating Link Mode 1 is active:

   — — — —

   b. **Link Mode 2:** Press and hold the LRN button a second time for 3 seconds, then release. The relay will toggle a 2 blink stutter pattern indicating Link Mode 2 is active:

   — — — — — —

   c. **Link Mode 3:** Press and hold the LRN button a third time for 3 seconds, then release. The relay will toggle a 3 blink stutter pattern indicating Link Mode 3 is active:

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   d. **Link Mode 4:** Press and hold the LRN button a fourth time for 3 seconds, then release. The relay will toggle a 4 blink stutter pattern indicating Link Mode 4 is active:

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2. Press wireless switch button or TCH button on transmitter. Toggling will pause in the ON state for 3 seconds, then resume toggling when link is created.
3. Link additional transmitters (up to 30) as needed, wait 30 seconds to exit Link Mode. Toggling stops when Link Mode stops.

Additional functions

Master Function

One or more transmitters may be linked with a Master Function which creates a separate logic channel. The Relay turns on only when both the Master channel and the normal channel call for the ON state. A logic AND function with the two channels is used to determine the relay status. A common use for the Master Function is to link a Light sensor as a Master and occupancy sensor as normal device to prevent Auto ON with motion in daylight. To Link a device as a Master, press the Link button twice within 3 seconds when linking, relay will stutter to indicate Master Function was successful. Master Function is not intended for use with Occupancy or SLT sensors.

CLR button functions:

Toggle relay - Press and release the CLR button in less than one second to toggle the relay state.

Purge All Links - Press and hold the CLR button for 3 seconds to purge all Links from the relay and activate Link Mode 1. The relay will toggle a steady pattern indicating Link Mode 1 is now active.

Selective Link Deletion

To remove one Link from the relay and leave others unaffected:
1. Activate the Link Mode used to Link the transmitter. Relay will toggle a pattern indicating the active Link Mode.
2. Press the link button for the transmitter to be deleted. Toggling will pause in the OFF state for 3 seconds then resume when the Link has been deleted. (Toggling pauses in the ON state when Links are added.)
3. Wait 30 seconds for Link Mode to exit. Toggling stops when Link Mode stops.

Repeater

Repeater capability extends the range for other compatible transmitters and receivers in the area by retransmitting any packets received. This receiver supports Level 1 Repeating which means that the relay will repeat all signals that have not already been repeated. The factory setting for repeater mode is Enabled. To change repeater status hold the LRN button during power up and observe the relay toggling 1 or 2 times to indicate the new repeater status: 1 - Disabled, 2 - Enabled. When more than 10 receivers are deployed in the same area it is recommended that some repeaters be disabled to reduce the possibility of interference from too many repeaters. If more than 10-15 Level 1 repeaters are enabled the system performance may degrade. Level 2 repeaters are available separately to repeat signals 1 additional time to further extend the range.

Power Up Mode

Select a Power Up Mode to power up in one of three states: 1 - State Memory, 2 - Default ON or 3 - Default OFF. The factory setting is State Memory. Select different modes by holding the CLR button while powering up the relay and observe the Relay toggling 1, 2 or 3 times to indicate the newly selected Power Up Mode.

State Memory - Power up to the last state saved prior to the power cycle. A new state is saved 10 seconds after the last state change. If a relay is linked to only occupancy or light sensors or nothing at all, the relay will power up to the ON state. In the event of a light or occupancy sensor malfunction, the relay may be forced on by cycling power to the circuit. Also, if relays are installed with no linked transmitter, the relay will power up to the ON state.
Default ON - Turn relay ON when powered up.
Default OFF - Leave relay OFF when powered up.

Troubleshooting Tips:

1. Briefly press and release CLR button to toggle relay output and confirm correct wiring and operation.
2. Press TCH button on Linked Occupancy sensors to toggle relay output to confirm link and test RF range.

Specifications

		E3R-R02-3HOTP	E3R-R12-3HOTP	E3R-R24-3HOTP	E3R-R27-3OHTP
Range		50-150 feet (typical)			
Frequency		315 MHz			
Relay Output		24 VAC	120 VAC	240 VAC	277 VAC
Max Loads/ Contact Ratings	**Tungsten / Incandescent**	100 W	500 W	1000 W	1150 W
	Fluorescent Ballast	3 A			
	General Duty	6 A			
	A300 Pilot Duty	24 VA	120 VA	240 VA	277 VA
Power Supply		24 VAC 50/60 Hz	120 VAC 50/60 Hz	240 VAC 50/60 Hz	277 VAC 50/60 Hz
Output Channels		1 FORM A Relay			
Memory		Stores up to 30 switch IDs			
Dimensions		2.11 x 1.73 x 1.09 inches (54 x 44 x 28 mm)			
Operating Temperature		14° to +122°F (-10° to +50°C)			
Storage Temperature		-4° to +176°F (-20° to +80°C)			
Radio Certification		FCC (United States): SZV-TCM2XXC I.C. (Canada): 5713A-TCM2XXC			
Safety Approval		ETL (U.S.): UL244A ETL (Canada): CSAC22.2#14-05			

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No Wires. No Batteries. No Limits.

This device or certain aspects thereof is protected by at least one U.S. or international patent or has at least one such patent application pending.

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