



## Getting Started

- Plan where you will mount each receiver and transmitter.
  - Avoid transmitting along a length of wall, sharp angles and large obstructions.
  - Avoid mounting inside a metal enclosure.
  - Typical range is 100' line of sight.
- **Link devices to each other before installing.** See linking instructions (per application) on following pages.
  - All FDLR products must be powered during Link.
- FDLR20x is both a transmitter and a receiver.
- FDLR05x is only a receiver.
- Linking an FDLR product with another puts the pair in Bi-directional mode.
- PHC Gateway Controller can also link with an FDLR product and be bi-directional.
- Relay state at power-up can be set to ON, OFF, or LAST STATE (default).  
(Exception: FDLR20A will not save last state when powered from 24Vdc).
- Each FDLR product can be Linked to up to 30 transmitters of any combination.

902 MHz Model	Power Input (Vac)	Contact Rating (A)	Transmission Source	EEP
FDLR20A	24 ac/dc	20	Dry-Contact	A5-30-02
FDLR20B	120	20	Dry-Contact	A5-30-02
FDLR20C	208	20	Dry-Contact	A5-30-02
FDLR20D	240	20	Dry-Contact	A5-30-02
FDLR20E	277	20	Dry-Contact	A5-30-02
FDLR05B	120	5	NA	A5-30-02
FDLR05F	208-277	5	NA	A5-30-02
FDLTMAG	None	NA	Contact Closure	D5-00-01
FDLTS2	None	NA	Button Press	F6-02-02
FDLTKEY	None	NA	Insert/Remove Card	F6-04-01
FDLTVC	None	NA	Occupancy Detected	A5-07-01
FDLTVW	None	NA	Occupancy Detected	A5-07-01

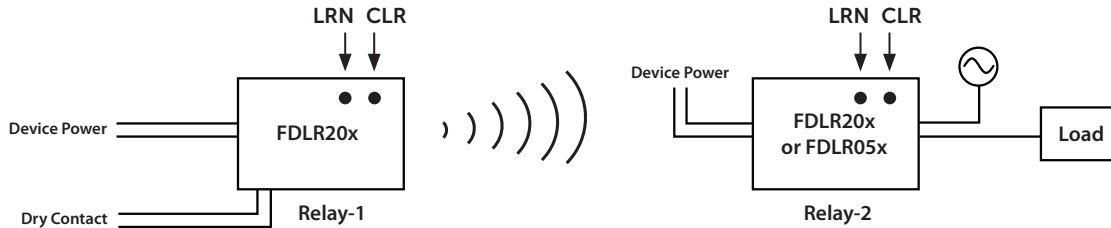
Functional Devices, Inc.'s EnOcean® Manufacturer ID is 0x055.

**Compatible Device from other Manufacturers**

PHC Gateway Controller    EEP A5-38-08

## Building Automation Applications

**Uni-directional Mode: Only one of the FDLR products must transmit. Two FDLR20x or one FDLR20x and one FDLR05x.**



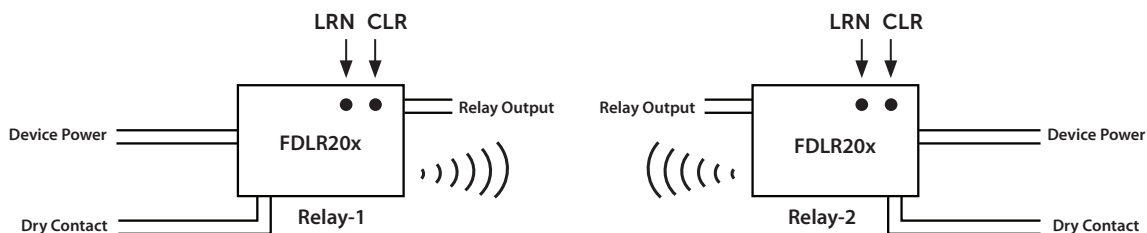
- Only one FDLR product is the transmitter while the other is the receiver.
- Transmitter FDLR product dry contact closure will transmit a relay ON command; dry contact open will transmit a relay OFF command.
- Re-transmits dry contact input state every 70-140 seconds.
- Optional modes: Repeater, Alarm (see page 4)
- When linking an FDLR product with Version 1.5 firmware (on product label next to logo) to an FDLR product with an earlier version, the Ver. 1.5 must be relay-1 in this procedure.

### Uni-directional Link Procedure

1. Apply power to both FDLR products.
2. Get relay-1 in Learn mode by pressing the LRN button until LED starts flashing. (approx. 1/2 second)
3. On relay-2 **hold** LRN button until the LED flashes once (approx. 3 seconds) to transmit a Teach telegram.
  - a. LED on relay-1 will stay ON for 4 seconds to acknowledge and then transmit a Teach telegram.
  - b. LED on relay-2 will stay ON for 4 seconds to acknowledge the Teach telegram from relay-1.

Note: To clear memory, hold CLR button for 3 seconds.

### Bi-directional Mode: Two FDLR20x or one FDLR20x and a PHC Gateway Controller



- Both devices must be able to receive and transmit.
- Dry contact closure will transmit a relay ON command; dry contact open will transmit a relay OFF command.
- FDLR20x re-transmits dry contact input state every 70-140 seconds.
- Optional modes: Repeater, Alarm (see page 4)
- When linking an FDLR product with Version 1.5 firmware (on product label next to logo) to an FDLR product with an earlier version, the Ver. 1.5 must be relay-1 in this procedure.

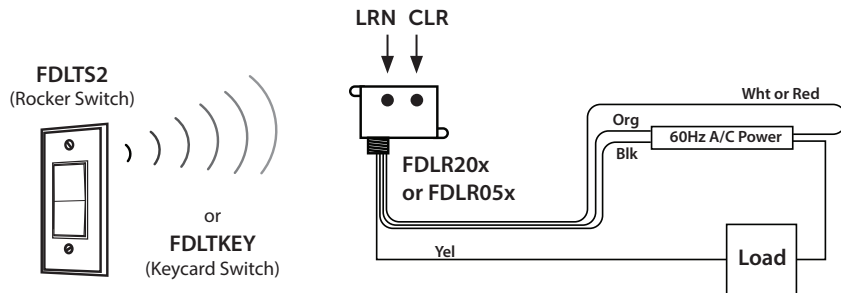
### Bi-directional Link Procedure

1. Apply power to both FDLR products.
2. Get relay-1 in Learn mode by pressing the LRN button until LED starts flashing. (approx. 1/2 second)
3. On relay-2, **hold** LRN button until the LED flashes once (approx. 3 seconds) to transmit a Teach telegram.
  - a. LED on relay-1 will stay ON for 4 seconds to acknowledge and then transmit a Teach telegram.
  - b. LED on relay-2 will stay ON for 4 seconds to acknowledge the Teach telegram from relay-1.

Note: To clear memory, hold CLR button for 3 seconds.

## Lighting Applications

### Simple Lighting Control: *FDLR20x or FDLR05x and FDLTS2 or FDLTKEY*



#### FDLTS2 Modes

##### A. Rocker Mode

- Relay activates when Rocker ON is pressed; relay deactivates when Rocker OFF is pressed.
- Optional mode: Repeater (see page 4)

##### Rocker Mode Link Procedure

1. Apply power to FDLR product.
2. Press and hold LRN button on FDLR product until LED flashes slowly. (approx.  $\frac{1}{2}$  second)
3. Press and release the button on the switch you are learning three times quickly.
4. LED on FDLR product will stay ON for 4 seconds indicating telegram reception.
5. To learn another switch, repeat steps 2-4.

##### B. Momentary Mode

- Relay activates while switch is pressed and deactivates when switch is released.
- Optional mode: Repeater (see page 4)

##### Momentary Mode Link Procedure

1. Apply power to FDLR product.
2. Press and hold LRN button on FDLR product until LED flashes slowly. (approx.  $\frac{1}{2}$  second)
3. Press and hold LRN button on FDLR product for 3 seconds until LED pattern changes to FLASH, FLASH, OFF (2 flashes).
4. Press and release the button on the switch you are learning three times quickly.
5. LED on FDLR product will stay ON for 4 seconds indicating telegram reception.
6. To learn another switch, repeat steps 2-5.

##### C. Toggle Mode

- Each press and release of the switch causes the relay to change state.
- Optional mode: Repeater (see page 4)

#### FDLTKEY Mode

##### Momentary Mode

- Relay activates when card is inserted and deactivates when card is removed.
- Optional mode: Repeater (see page 4)

##### Momentary Mode Link Procedure

1. Apply power to FDLR product.
2. Press and hold LRN button on FDLR product until LED flashes slowly. (approx.  $\frac{1}{2}$  second)
3. Press and hold LRN button on FDLR product for 3 seconds until LED pattern changes to FLASH, FLASH, OFF (2 flashes).
4. Insert and remove the card on the switch you are learning three times quickly.
5. LED on FDLR product will stay ON for 4 seconds indicating telegram reception.
6. To learn another switch, repeat steps 2-5.

##### Toggle Mode Link Procedure

1. Apply power to FDLR product.
2. Press and hold LRN button on FDLR product until LED flashes slowly. (approx.  $\frac{1}{2}$  second)
3. Press and hold LRN button on FDLR product for 3 seconds until LED pattern changes to FLASH, FLASH, OFF (2 flashes).
4. Press and hold LRN button on FDLR product for 3 seconds until LED pattern changes again, to FLASH, FLASH, FLASH, OFF (3 flashes).
5. Press and release the button on the switch you are learning three times quickly.
6. LED on FDLR product will stay ON for 4 seconds indicating telegram reception.
7. To learn another switch, repeat steps 2-6.



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## Occupancy Detection

### A. Manual ON – Auto OFF: FDLR product receiving from both an Occupancy / Vacancy Sensor (FDLTVW or FDLTVC) and a Wall Switch (FDLTS2)

- Relay activates when Rocker ON is pressed. Relay deactivates when Rocker OFF is pressed or 30 minutes after last detection of occupancy.
- It may take up to 2 minutes for the FDLR product to respond to the Occupancy / Vacancy Sensor immediately following Link.
- Optional mode: Repeater (see page 4)

### **Manual ON – Auto OFF Learn Procedure**

1. Be sure the Occupancy / Vacancy Sensor is charged
2. Apply power to FDLR product.
3. Press and hold LRN button on FDLR product until LED flashes slowly. (approx.  $\frac{1}{2}$  second)
4. Trigger a Teach telegram from the Occupancy / Vacancy Sensor by pressing the Menu button once.
5. LED on FDLR product will stay ON for 4 seconds acknowledging telegram reception.
6. Press and hold LRN button on FDLR product for  $\frac{1}{2}$  second. LED will flash slowly.
7. Press and release rocker switch three times quickly.
8. LED on FDLR product will stay ON for 4 seconds acknowledging telegram reception.
9. To learn another switch, repeat steps 6-8.

### B. Auto On: FDLR Product and an Occupancy / Vacancy Sensor (FDLTVW or FDLTVC)

- Relay activates when occupancy is detected and deactivates 30 minutes after last detection of occupancy.
- It may take up to 2 minutes for the FDLR product to respond to the Occupancy / Vacancy Sensor immediately following Link.
- Optional mode: Repeater (see page 4)

### **Occupancy / Vacancy Sensor Only Learn Procedure**

1. Charge the Occupancy / Vacancy Sensor per instructions.
2. Apply power to FDLR product.
3. Press and hold LRN button on FDLR product until LED flashes slowly. (approx.  $\frac{1}{2}$  second)
4. Trigger a Teach telegram from the Occupancy / Vacancy Sensor by pressing the Menu button once.
5. LED on FDLR product will stay ON for 4 seconds acknowledging telegram reception.
6. Repeat steps 3-5 for additional Occupancy / Vacancy Sensors.

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## Optional Modes

### Relay State

- Relay state after power-up can be set to ON, OFF or LAST STATE
- Relay state after power-up is LAST STATE by default.

#### Setting Relay State to OFF at Power-up:

1. While device is not powered, press and hold the LRN button.
2. Power-up the device.
3. Wait approximately 3 seconds until the LED blinks 3 times.
4. Release the LRN button.

Relay will always be OFF at power-up.

#### Setting Relay State to ON at Power-up:

1. While device is not powered, press and hold the CLR button.
2. Power-up the device.
3. Wait approximately 3 seconds until the LED blinks 2 times.
4. Release the CLR button.

Relay will always be ON at power-up.

#### Setting Relay State to LAST STATE at Power-up: (Default Mode) \*\*

1. While device is not powered, press and hold the LRN and CLR buttons.
2. Power-up the device.
3. Wait approximately 3 seconds until the LED blinks 1 time.
4. Release the LRN and CLR buttons.

Relay will return to LAST STATE at power-up.

**\*\*NOTE:** LAST STATE does not work with FDLR20A when powered from 24 Vdc.

## Repeater Mode

- Activating Repeater Mode allows FDLR product to repeat signals from other EnOcean devices within range. The FDLR product “hears” the signal and echoes it but will not respond to it unless it has been linked to the transmitting device.
- FDLR product will allow a signal to be repeated up to two times.

### Enabling Repeater Mode

1. Apply power to FDLR product.
2. Press and hold LRN button on FDLR product until LED flashes slowly. (approx. 1/2 second)
3. Press and hold the CLR button for 3 seconds until LED flashes twice indicating Repeater Mode is enabled.

### Disabling Repeater Mode

1. Apply power to FDLR product.
2. Press and hold LRN button on FDLR product until LED flashes slowly. (approx. 1/2 second)
3. Press and hold the CLR button for 3 seconds until LED flashes three times indicating Repeater Mode is disabled.

## Alarm Mode

- Activating Alarm Mode requires all learned contact switches, such as FDLTMAG or FDLR20x, to transmit a CLOSED telegram before relay will activate. Relay will deactivate if any contact switch transmits an OPEN telegram.

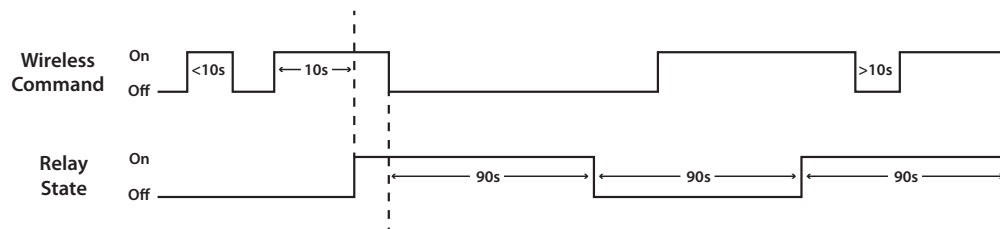
### Enabling Alarm Mode

1. Apply power to FDLR product.
2. Press and hold LRN button on FDLR product until LED flashes slowly. (approx. 1/2 second)
3. Press and hold LRN button on FDLR product for 3 seconds until LED pattern changes to FLASH, FLASH, OFF (2 flashes).
4. Press and hold the CLR button for 3 seconds until LED flashes twice indicating Alarm Mode is enabled.

### Disabling Alarm Mode

1. Apply power to FDLR product.
2. Press and hold LRN button on FDLR product until LED flashes slowly. (approx. 1/2 second)
3. Press and hold LRN button on FDLR product for 3 seconds until LED pattern changes to FLASH, FLASH, OFF (2 flashes).
4. Press and hold the CLR button for 3 seconds until LED flashes three times indicating Alarm Mode is disabled.

## Delay Mode



- Typically used with Hotel Room Energy Control (see page 5).
- Activating Delay Mode allows the FDLR product to ignore temporary changes in switch states.
- The Delay Mode causes a delay of 10 seconds before relay will turn ON and a delay of 90 seconds before it will turn OFF. It also prevents the relay from activating following a deactivation for 90 seconds (see Figure 4, below).
- The OFF delay allows the load to continue to run while the switch or transmitter is temporarily open. This is helpful when monitoring window and door contacts that may be briefly opened and then closed. If the contact remains open for longer than 90 seconds the relay will deactivate.
- The ON delay prevents the relay from immediately responding to a closed contact.
- The 90 second OFF to ON delay is intended specifically for HVAC units so that they will not short cycle.

### Enabling Delay Mode

1. Apply power to FDLR product.
2. Press and hold LRN button on FDLR product until LED flashes slowly. (approx. 1/2 second)
3. Press and hold LRN button on FDLR product for 3 seconds until LED pattern changes to FLASH, FLASH, OFF (2 flashes).
4. Press and hold LRN button on FDLR product for 3 seconds until LED pattern changes again, to FLASH, FLASH, FLASH, OFF (3 flashes).
5. Press and hold the CLR button for 3 seconds until LED flashes twice indicating Delay Mode is enabled.

### Disabling Delay Mode

1. Apply power to FDLR product.
2. Press and hold LRN button on FDLR product until LED flashes slowly. (approx. 1/2 second)
3. Press and hold LRN button on FDLR product for 3 seconds until LED pattern changes to FLASH, FLASH, OFF (2 flashes).
4. Press and hold LRN button on FDLR product for 3 seconds until LED pattern changes again, to FLASH, FLASH, FLASH, OFF (3 flashes).
5. Press and hold the CLR button for 3 seconds until LED flashes three times indicating Delay Mode is disabled.

## Clearing ID's from Memory

### Global Clear (Reset to default settings)

Clears all linked devices, disables optional modes, and turns relay OFF.

#### Performing Global Clear

1. Press and hold CLR button on FDLR product for 3 seconds until LED begins slowly flashing.
  - a. Clear Mode will time out and exit in 30 seconds.

### Single Device Clear

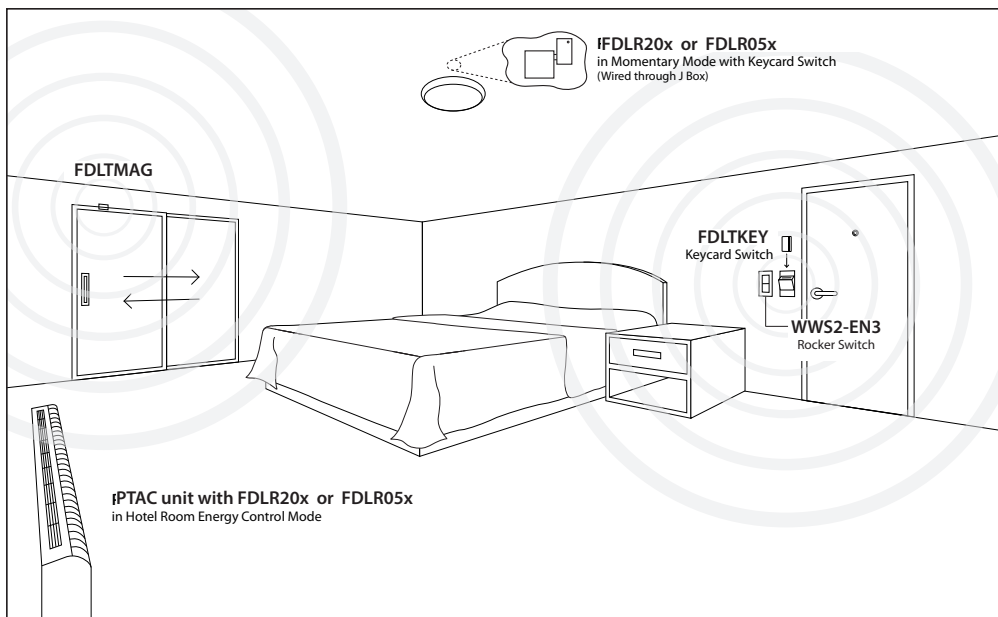
- Allows the user to Un-link a single transmitter from FDLR product.
- Maintains all optional mode settings.

#### Performing Single Device Clear

1. Repeating the Link procedure for a currently Linked device will Un-link that device.

## Energy Saving Applications

### FDLRxxx with Door/Window Sensor(s) FDLTMAG



- Relay activates with closed command from FDLTMAG and deactivates with open command.
- FDLTMAG retransmits contact state every 20-30 minutes.
- Optional modes: **Repeater**, **Alarm**, (see page 4) **Delay** (see page 5)

#### FDLTMAG Link Procedure

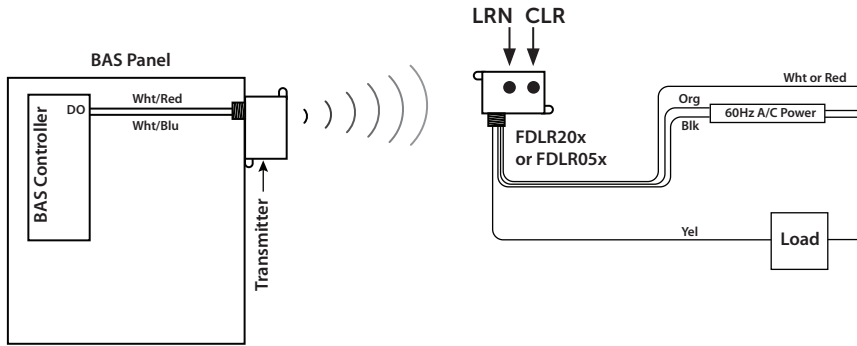
1. Charge the FDLTMAG per Instructions provided with unit.
2. Apply power to FDLR product.
3. Press and hold LRN button on FDLR product until LED flashes slowly. (approx. 1/2 second)
4. Press and release Link button on FDLTMAG to transmit Teach telegram.
5. LED on FDLR product will stay ON for 4 seconds acknowledging telegram reception.
6. To learn more FDLTMAG, repeat steps 3-5.

### Hotel Room Energy Control FDLR Product with FDLTMAG and FDLTKEY

**Consult factory.**

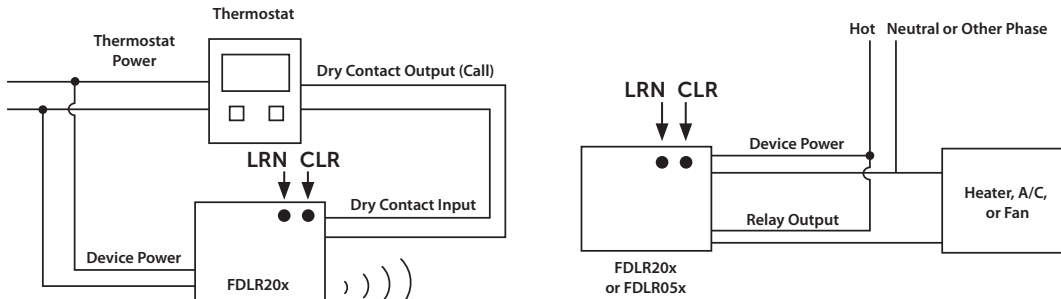
## Other Common Applications

### Unidirectional Control with a BAS System



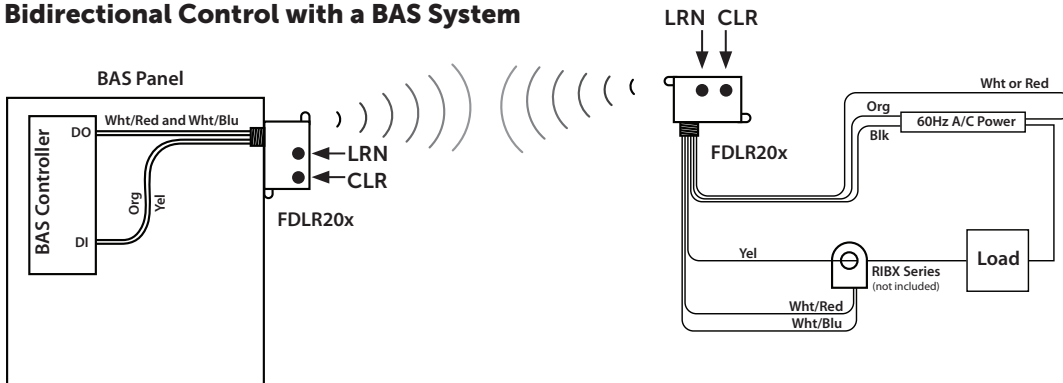
In this application the BAS system dry-contact output controls the transmitter and a FDLR20x or FDLR05x is the receiver.

### Unidirectional Control with a Thermostat



In this application the thermostat dry-contact output controls the transmitter and a FDLR20x or FDLR05x is the receiver.

### Bidirectional Control with a BAS System



In this application the BAS system dry-contact output controls the transmitter on a FDLR20x. A second FDLR20x receives the signal and activates its relay. A current switch detects current flow through the load and closes the dry-contact input on the second FDLR20x. The first FDLR20x receives the transmission and closes its relay. This contact closure to the BAS system lets the controller know the load status.