

The Constant Voltage LED Dimmer uses precise, high-resolution PWM technology to control the brightness of Constant Voltage LED fixtures by responding to wireless signals from Self-powered wireless switches, wireless sensors and/or central controllers to activate smooth, flicker-free dimming. The dimmer reduces time, frustration and the mess of installation, allowing controls to be installed in optimal locations without wiring to switch or sensor locations or need for maintenance or batteries. The product operates within Low Voltage Class II circuit limits for safety and compatibility with electrical codes.

<b>Compatible Devices</b>	<b>EnOcean Equipment Profiles</b>
Wireless Light Switch	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 Sensor	EEPs: A5-07-01, A5-07-02, A5-07-03
Door/Window Sensor	EEP: D5-00-01, A5-30-01
Central Command	EEP: A5-38-08 - untimed commands only

- Package Contents**
- (1) PWM LED Dimmer
  - (1) Antenna cover
  - (1) Instruction Sheet

- Equipment needed for Installation**
- Screws for mounting
  - Wire Nuts/connectors
  - Electrical Tape

## INSTALLATION

### CAUTION/NOTES

- Caution: The Constant Voltage LED Dimmer is intended only for use indoors and in dry locations.
- It may be more convenient to link the wireless controls to the Dimmer prior to final installation.
- To be installed and/or used in accordance with electrical codes and regulations.
- If unsure about any part of these instructions, consult an electrician.

### CHOOSING THE OPTIMAL MOUNTING LOCATION

The long term reliability and performance of the Dimmer is strongly influenced by the mounting location. Choose a mounting location carefully. For best radio performance:

- Straighten antenna out & away from metal. An Antenna Cover is provided for this purpose. See Fig. 1.
- Create separation distance away from interfering electronics such as fluorescent tube ends, electronic transformers/power supplies, motors, etc.
- 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. Connect Receiver to circuit following wiring diagram and local electrical codes.
3. Press and release CLR button to toggle output and confirm operation. Hold CLR to test dimming
4. Link Transmitters and Receivers following *Linking Instructions* below.

## LINKING INSTRUCTIONS

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

### BASIC LINKING

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

- Wireless Switch**
  - Quick press top to recall saved level, bottom for OFF
  - Press and Hold top or bottom to adjust saved level up or down respectively
  - Double press top for full brightness, bottom for OFF
- Occupancy Sensor**
  - Auto On/Auto Off to saved level when no switches are linked
  - Manual On/Auto Off to saved level when switches are linked
- Switch Leg Transmitter** – Circuit Interlock - on to saved level
- Window/door Sensor** – Closed-ON to saved level, Open-OFF

1. Press and hold the LNK button for 3 seconds then release. The receiver will toggle a steady pattern indicating Basic Link Mode is active: — — — —
2. To link a switch, **triple** press the top button on switches or single press the LNK button on sensors to create a link. Toggling will pause for 3 seconds when the link is created, then toggling will resume.
3. Link additional transmitters (up to 25) as needed. Link mode will exit automatically after 30 seconds of inactivity and toggling will stop.

### ADVANCED LINKING

Use advanced linking to activate alternate functionality for specific applications:

1. Choose an operating mode for the receiver with the transmitter by reviewing the *Operating Mode Descriptions* outlined in the following section.
2. Activate one of 4 specific Link Modes by pressing the LNK button in the correct sequence following *Link Mode Activation Instructions*.
3. Press the LNK button on the transmitter or **triple** press a switch transmitter, toggling will pause w/ receiver ON to indicate when link is added.
4. Exit Link Mode by waiting 30 seconds with no activity.

## OPERATING MODE DESCRIPTIONS

### SWITCHES

Switches can behave in one of four ways: **Rocker**, **Momentary**, **Toggle**, or **Scene**. **Triple** press switch buttons during linking.

**Link Mode 1: Rocker Dim Mode** – Behavior: Quick press top of rocker to ramp receiver ON to last saved level. Quick press bottom to ramp to OFF. Press and hold top or bottom to adjust saved level up or down. Double press top or bottom for 100% or 0%. Create link by **triple** pressing top button and bottom button will be automatically linked.

**Link Mode 2: Momentary Mode** – Behavior: Pressing a button on a wireless switch causes the receiver to go ON to the saved level momentarily and stay on while the button is pressed. When the button is released, the receiver goes OFF. Each button on the transmitter may control a different receiver. **Triple** press switch to link.

**Link Mode 3: Toggle Dim Mode** – Behavior: Subsequent short button presses cycle between 0%, Saved Level and 100%. When Saved Level is active for 10 seconds or more, a subsequent press skips

100% and dims to 0%. Long button presses adjust the Saved Level by toggling between dim up or dim down. Each button on a transmitter may control a different receiver. Linking multiple receivers to one button is not recommended as it is possible for the receivers get out of sync. **Triple** press to link **Link Mode 4: Scene Mode** — Behavior: Scene mode may be used to recall a specific dim level on one or more receivers when a button is pressed. To link a switch that recalls a specific brightness level, first adjust the brightness to the desired level by pressing and holding the CLR button (subsequent presses reverse dim direction). When the Receiver is in the desired state, activate Link Mode 4 and **triple** press a switch button to complete the link process.

### OCCUPANCY SENSOR

Occupancy Sensors behave in one of three ways: Manual On/Auto Off, Auto On/ Auto Off, and Walk-through.

**Link Mode 1: Manual On/Auto Off** – A linked wireless switch is used to manually turn the receiver ON to Saved Level. An Occupied Timer is reset to 15 minutes and begins counting down each time an Occupied Signal is received from a linked wireless Occupancy Sensor. The receiver turns OFF when the Occupied Timer counts to 0. This mode is California Title 24 compliant. When no manual controls (i.e. wireless switches) are linked to the receiver, the receiver defaults to Auto On/Auto Off mode with Occupancy Sensor(s) linked in Mode 1.

**Link Mode 2: Auto On/Auto Off** – The receiver turns ON to the Saved Level automatically and resets a 15 minute Occupied Timer each time it receives an Occupied Signal from a linked Occupancy Sensor. When the Occupied Timer counts to 0, the receiver turns OFF. When a wireless switch is used to manually turn the receiver OFF, the Auto ON function is disabled until the Occupied Timer counts to 0.

**Link Mode 3: Walk-through** – This aggressive energy saving mode uses Auto On/Auto Off with an initial 5 minute Occupied Timer that extends up to 15 minutes when subsequent Occupied Signals are received.

### Notes:

- Confirm Occupancy Sensor is sufficiently charged or install battery prior to linking.
- Test wireless link – After linking, confirm the link and test wireless range by pressing the LNK button on the Occupancy Sensor to toggle the receiver output.
- Test Occupancy Sensor coverage – Use the Walk Test mode built into the Occupancy Sensor if available. Perform an interactive walk test more quickly: Press Occupancy Sensor LNK button or press receiver CLR button to toggle receiver output and clear the Occupied Timer. Some wireless Occupancy Sensors can transmit an Occupied Signal with a different button press which can facilitate testing.
- The occupancy timeouts operate only after an Occupancy Sensor signal is received by the receiver. If no linked sensors transmit or if the sensors malfunction, the receiver will not turn OFF after 15 minutes.
- If only occupancy sensors are linked to Receiver, unit will always power up ON.

### KEY CARD SWITCH

**Link Mode 1: Not Supported**

**Link Mode 2: Key Card Switch** – Receiver turns ON to saved level when a key card is inserted. Receiver turns OFF when the key card is removed. Insert and remove key card **3 times** in link mode to create link.

### SWITCH LEG TRANSMITTER (SLT)

**Link Mode 1: SLT** - When the Switch Leg Transmitter is energized, the receiver turns on to saved level. When power is removed from the SLT, receiver turns OFF.

### DOOR/WINDOW SENSOR

**Link Mode 1: Door/Window Sensor Open**, receiver turns OFF. Door/Window Sensor closed, Receiver turns ON to saved level.

## 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 LNK button for 3 seconds then release. The receiver will toggle a steady pattern indicating Link Mode 1 is active:
 

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

\_ \_ \_ \_ \_
  - C - Link Mode 3:** Press and hold the LNK button a third time for 3 seconds, then release. The receiver will toggle a 3 blink stutter pattern indicating Link Mode 3 is active:
 

\_ \_ \_ \_ \_
  - D - Link Mode 4:** Press and hold the LNK button a fourth time for 3 seconds, then release. The receiver will toggle a 4 blink stutter pattern indicating Link Mode 4 is active:
 

\_ \_ \_ \_ \_
- Triple press wireless switch button or single press LNK button on sensor transmitter. Toggling will pause in the ON state for 3 seconds when link is created, then resume toggling.
- Link additional transmitters (up to 25) as needed, wait 30 seconds to exit Link Mode. Toggling stops when Link Mode stops.

## ADDITIONAL FUNCTIONS

### CLR BUTTON FUNCTIONS:

- Toggle Dim** - Press and release the CLR button to select between 0%, Saved Level and 100%. Press and hold CLR button to dim up and down, subsequent presses reverse dim direction.
- Purge All Links** - First activate Link mode by holding the LNK button until the receiver starts toggling, then press and hold the CLR button for 10 seconds to purge all Links from the receiver. The receiver will pause toggling when CLR button is pressed and resume toggling when the CLR process is complete.

### SELECTIVE LINK DELETION

To remove one Link from receiver and leave others unaffected:

- Activate the specific Link Mode used to Link the transmitter (e.g. Link mode 1,2 or 3, etc). Receiver will toggle a pattern indicating the active Link Mode.
- Press the LNK button or **triple** press a wireless switch or key card for the transmitter to be deleted. Toggling will pause in the OFF state for 3 seconds indicating the link is removed, then resume toggling. (Toggling pauses in the ON state when Links are added.)
- Wait 30 seconds for Link Mode to exit. Toggling stops when Link Mode stops.

### REPEATER

Repeater mode is disabled by default. This capability extends the range for other compatible transmitters and receivers in the area by retransmitting any packets received. This receiver supports 2 level repeating meaning that it will repeat both original packets and packets that have been repeated one time. Packets already repeated twice will not be repeated again.

To change repeater status hold the LNK button for 20 seconds while powering ON the receiver and observe the status LED blinking 1 or 2 times to indicate the new repeater status: 1 - Disabled, 2 - Enabled. It is recommended that not more than 10 repeaters be deployed in the same area without careful planning to reduce the possibility of interference from too many repeaters.

### POWER UP MODE

The receiver will power up to the ON state unless a wireless switch is linked. When a wireless switch is linked, the receiver will use state memory and power up in the state active before the power was shut off.

## SWITCHING MODE

The LED Dimmer may be set in a mode that deactivates PWM dimming and instead toggles the output between On and OFF. Switching mode is disabled by default. Select this mode by holding the CLR button while powering up the receiver and observe the Status LED toggling 1 or 2 times to indicate the newly selected Output Mode.

- 1 = Disabled: Adjust brightness with smooth full range dimming
- 2 = Enabled: ON/OFF switching mode only, no dimming

## STATE MEMORY

State Memory - Power up to the state active prior to the power cycle. State Memory is active when a wireless switch is linked to the receiver. If a receiver is linked to only occupancy sensors or nothing at all, the receiver will power up ON to the Saved Level. If no switch is linked, power cycling the receiver will turn the unit ON in the event of a light or occupancy sensor malfunction. Also, upon initial installation the receivers will power up ON when they are not linked to any devices.

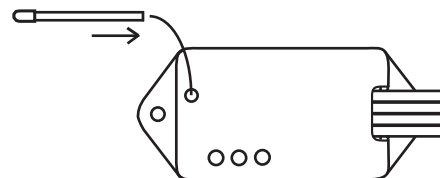
## TROUBLESHOOTING TIPS:

- Briefly press and release CLR button to toggle receiver output and confirm correct connection.
- Confirm link and test range by pressing LNK button on linked sensors to toggle the output.
- Switch linking requires 3 consecutive signals within 3 seconds and with no other signals interleaved. If linking in an environment with many wireless signals, try pressing switch faster and 5 times in a row to link.

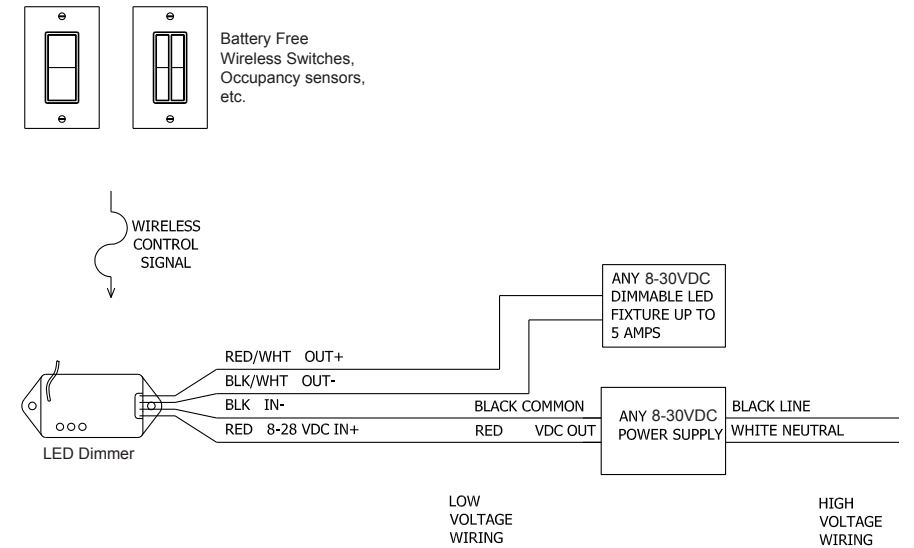
## SPECIFICATIONS

	ExX-D02FL
<b>Range</b>	50-150 feet (16-50m)(typical)
<b>Frequency</b>	315, 868 or 902 MHz
<b>Power Supply Input Rating</b>	8-30 VDC
<b>Output Rating</b>	5 A
<b>Output Channels</b>	1 PWM output
<b>Memory</b>	Stores up to 25 unique transmitter IDs
<b>Operating Temperature</b>	32° to +140°F (0° to +60°C)
<b>Storage Temperature</b>	-40° to +140°F (-40° to +60°C)
<b>Dimensions</b>	2.88 x 1.30 x 0.67 inches (73 x 33 x 17 mm)
<b>Radio Certification</b>	FCC (United States): SZV-TCM300U,C I.C. (Canada): 5713A-TCM300U,C 868Mhz model not FCC approved
<b>Safety Approval</b>	Class II Low Voltage, 12, 24 or 8-28VDC 5A max

FIG. 1 – ANTENNA COVER PLACEMENT



## WIRING DIAGRAM



Contains FCC ID: SZV-TCM300U or SZV-TCM300C  
Contains IC: 5713A-TCM300U or 5713A-TCM300C

The enclosed device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (i.) this device may not cause harmful interference and (ii.) this device must accept any interference received, including interference that may cause undesired operation.

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.