

Product Installation Guide



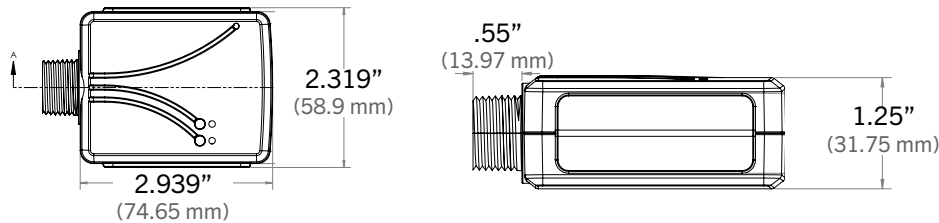
Single Channel Lighting Control Module (0-10V)

Mx-USR-L3

1] Description

The Mx-USR-L3 Lighting Control Module responds to a variety of wireless EnOcean devices to control and dim LED drivers, fluorescent ballasts, or other switchable loads. The Mx-USR-L3 offers bi-directional, ON/OFF and 0-10V dimming control when combined with a wireless light switch or automatic shut-off when combined with a wireless occupancy sensor. Additionally, the Lighting Control Module can perform occupancy-based setback dimming and self-contained daylight harvesting functions. The Mx-USR-L3 can be paired to compatible devices manually, and for more sophisticated configuration the MES software airConfig tool is available for download at <http://download.magnumes.net>.

2] Dimensions



3] Technical Specifications:

Part Numbers (Frequency Dependant)	M9-USR-L3 (902 MHz - North America) M8-USR-L3 (868 MHz - Europe and China) MJ-USR-L3 (928 MHz - Japan)
Range	150 feet (50-150 typical)
EnOcean Profile	D2-29-07 (Proprietary)
Input Voltage	120/277 VAC
Max Switched Power	3300W @ 277VAC
Max Switched Current	20A
Max Switched Voltage	120/277 VAC
Relay Output	1 N.O. and 1 Common contact
Dimmer Output	0-10V, 30 mA (sinking drivers)
Ambient Operating Temperature	0-55°C for 3300 W load @ 277 VAC (Mx-USR-L1 & Mx-USR-L2: 37°C for 3300 W load @ 277 VAC)
Certifications	ETL/Intertek - UL 244A FCC (United States) SZV-TCM3XXX IC (Canada) 5713A-TCMXXX DLC

4] Equipment Needed for Installation

- Electrical tape
- Screwdriver
- Wire nuts

* For advanced configuration, additional equipment is required, including laptop, USB 300U (available for order from MES) and AirConfig, which is available for free download at <http://download.magnumes.net>

5] Planning for Installation

- Take a moment to prepare for installation and ensure optimal communications with other system components in the space
 - To assess signal strength prior to and during installation, you can utilize the following:
 - MES's free range testing tool "AirSpy", available at <http://download.magnumes.net>. Requires USB 300U.
 - If utilizing Mx-eBox (BACnet to IP) gateway, utilize BACnet point available for signal strength (RSSI)
- Always utilize a qualified installer
- Straighten antenna out and away from any surrounding metal
- Create separation distance between interfering electronics such as fluorescent tube ends, ballasts, electronic transformers, and motors. Avoid mounting inside of metal enclosures.
- Obstructions of metal, concrete and dense building materials will reduce the range. Mount higher and away from obstructions to maximize range.

In applications using HVAC units a Relay Contactor is required for the units per AMP rating.

If following the standard, manual pairing process, please refer to the "Learn In Procedure" section at the end of this document. If manual with default settings is the preferred method of commissioning, it is recommended this process be done prior to installation, unless access to buttons and device is possible.

For advanced configuration using AirConfig, install Mx-USR-L3 as discussed and perform commissioning process with device installed. Make sure that device is still within wireless range.

6] Installation

COMMON APPLICATIONS:

WARNING: TO AVOID RISK OF FIRE, SHOCK, OR DEATH, TURN OFF POWER AT CIRCUIT BREAKER OR FUSE AND VERIFY THAT IT IS OFF BEFORE INSTALLATION BEGINS. MAKE SURE THAT IT REMAINS OFF UNTIL INSTALLATION IS COMPLETE. PLEASE BE AWARE THAT WITH THIS VERSION OF THE PRODUCT, IT IS POSSIBLE TO HAVE MULTIPLE BRANCH CIRCUITS FEEDING THE RELAY RECEIVER.

NOTE: Read the WARNINGS AND CAUTIONS section before beginning these installation options. Read all steps for this option before taking any action to install receiver.

- 1) For in-wall installation, a wiring box must be used. For ceiling installation make wire connections inside a junction box. Ensure that the temperature in the ceiling box will not exceed 50 degrees C. For best wireless signal performance install receiver in plastic box away from floor and away from metal objects.
- 2) Connect wires as shown in Figure A. Twist wire nuts on clockwise making sure no bare wires show. Wrap connections with electrical tape.
- 3) Stow all wires in wiring box.
- 4) Restore power and follow instructions under the "Setting Up Your Device via airConfig" section at the end of this document, or follow manual pairing procedures to use default settings.
- 5) To test that the device is working, press and release SW1. This will toggle ON/OFF. (If receiver is not working, review wiring and programming instructions).
- 6) Finish any installation of fixture or wall switch.

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7] Wiring Diagrams

FIGURE A: Single Power Source

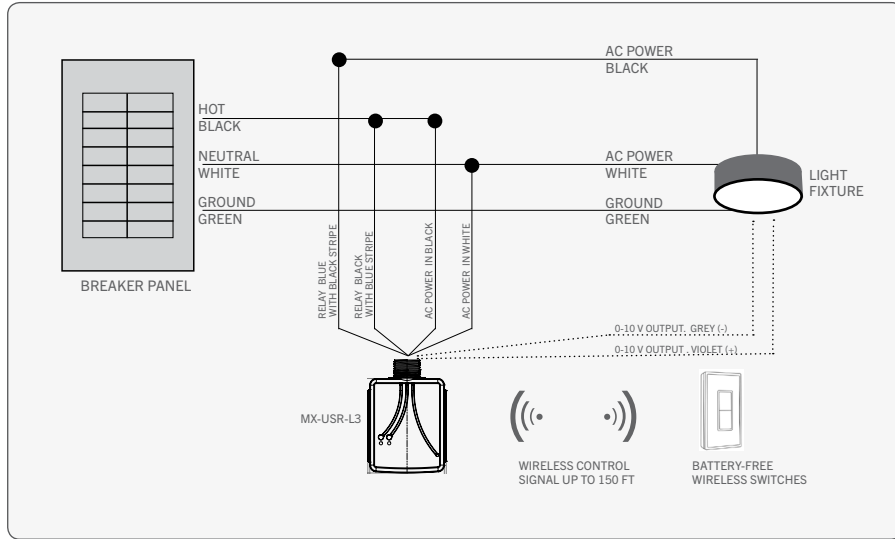
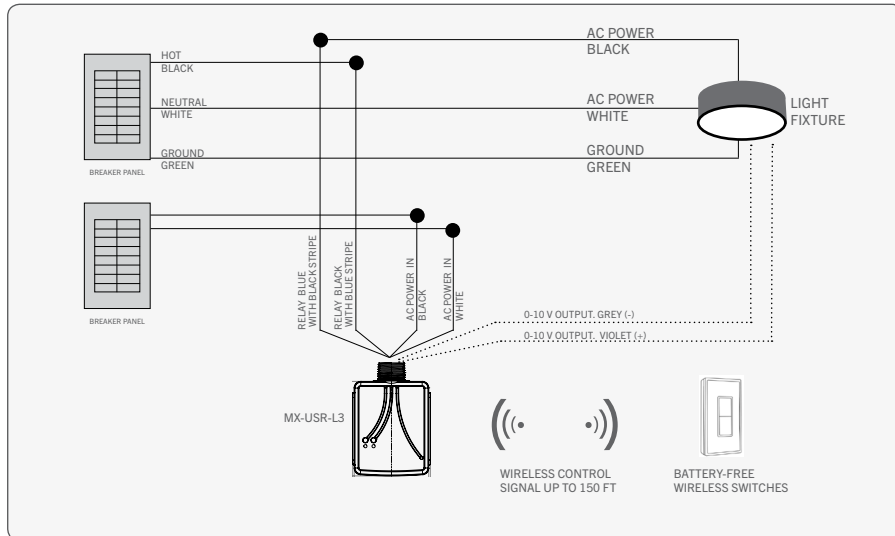
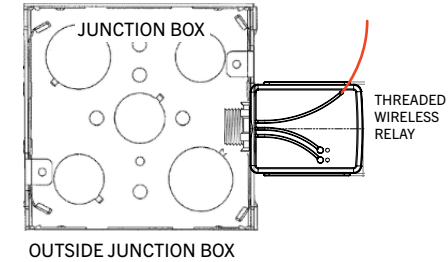


FIGURE B: Dual Power Source



8] Wireless Mounting Options



9] Compatible Devices

- The Mx-USR-L3 can be controlled using a variety of other devices, including:
 - Mx-ML3 (Occ / Lux Sensor)
 - Mx-EOSW (Wall Mounted Occ Sensor)
 - Mx-SW2 (Wireless Double Rocker Switch)
 - Mx-EDRP (Wireless Double Rocker Switch)
 - Mx-EDWS (Wireless Window / Door Sensor)
 - Mx-eBox (BACnet IP Gateway)
 - Mx-EOSC (Ceiling Mounted Occ Sensor)
 - Mx-SW1 (Wireless Single Rocker Switch)
 - Mx-ESRP (Wireless Single Rocker Switch)
 - Mx-MRC1 (Wireless Window / Door Sensor)
 - Mx-ECKU (Wireless Key Card Switch)
 - Mx-AP2 (Access Point)

10] Warnings & Cautions

- **HIGH VOLTAGE:** A qualified installer or electrician must install this device. Follow all applicable electrical codes for installation.
- Relays and receivers are intended for INDOOR use only, in dry locations with permanently installed fixtures
- This device is suitable for a circuit capable of delivering not more than 20 AMP maximum
- Be sure not to install this device in locations where the units are in close proximity to the light bulbs or other sources of heat, particularly with high wattage loads.
- When using relays to switch a motor, overload and over current protection sized for the motor load should be provided at the branch circuit feeder supplying the motor in accordance with the NEC or CEC, as applicable for the installation location
- The maximum over current protection required for the branch circuit supplying this product is 20 AMPS. When one or more motors are installed and not internally protected then an overload protective device sized at not more than 115% of the motor full load AMPS should be installed for each motor.
- When using devices to control motors and HVAC equipment, which don't respond well to the ON/OFF cycling that occurs in the "learn" mode, it is advised to configure the receivers without the motor or HVAC load connected. Instead, program the products in advance by connecting them to a light or to another load that is safe when toggling on and off.

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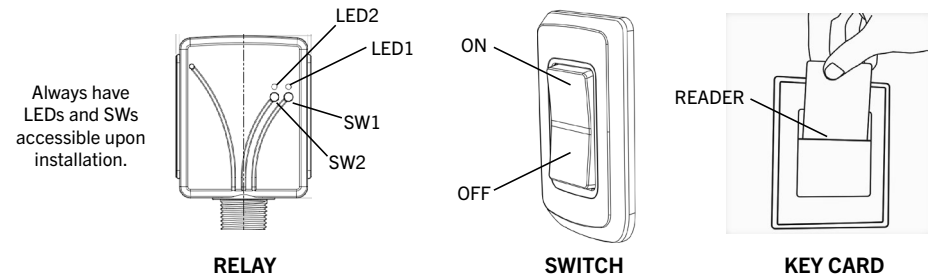
11] Learn In Procedure

It is important to mention that MES devices utilize a point to point wireless topology. The devices are meant to respond only to those devices that they have been paired with, effectively ignoring all other devices. This allows for many devices to be in the same space controlling a variety of different applications without cross-talk. The process outlined below is for manually pairing the Mx-USR-L3 to compatible devices. Once complete, this device will only respond to the compatible devices you physically pair it with. Whether BASIC or ADVANCED is preferred, you can always use airConfig via a USB300U with airConfig downloaded at <http://download.magnumes.net>. See "Setting Up Your Device Via airConfig" at the end of this document.

1. To enter Learn Mode, press and hold SW1 for 5 seconds (Use non-metallic pin):
 - A) Both LEDs flash, then LED1 begins to blink indicating learn mode is active
2. Learning Devices:
 - A) To learn a Light Switch or Key Card, Press ON (Up) Light Switch 3 times quickly (within 3 seconds)
For Key Card, insert card into reader 3 times quickly (withing 3 seconds)
 - i) LED1 goes solid for 2 seconds, indicating the switch is learned
 - ii) LED1 then begins to blink indicating it has returned to learn mode for the next pairing
 - B) If there are more switches to learn in, repeat step "A"
 - C) To learn an Occupancy Sensor, press the learn button on the Occupancy Sensor
 - i) LED1 goes solid for 2 seconds, indicating the switch is learned
 - ii) LED1 then begins to blink indicating it has returned to learn mode for the next pairing
 - D) To learn a Door Sensor, press the learn button on the Door Sensor while the contact is open
 - i) LED1 goes solid for 2 seconds, indicating the switch is learned
 - ii) LED1 then begins to blink indicating it has returned to learn mode for the next pairing
 - E) IF ALL DESIRED DEVICE ARE LEARNED-IN, PRESS SW1 TO END LEARN MODE
 - i) LED1 goes solid for 2 seconds
 - ii) LED1 turns off
 - iii) LED2 begins blinking
 - F) PRESS SW2 TO EXIT LEARN MODE
 - i) LED2 goes solid for 2 seconds
 - ii) LED2 turns off
 - iii) Both LEDs flash indicating it has returned to Operational Mode
3. Clear All: **NOTE: this removes all paired devices from memory and cannot be undone.**
 - A) Press and hold both SW1 and SW2 simultaneously for 10 seconds
 - B) LED1 LED2 both begin to flash
 - C) Press both SW1 and SW2 again within 10 seconds to clear all
 - i) Without a press within those 10 seconds, the relay will return to normal operation and cancel clear all
 - D) Once cleared, LED1 and LED2 will go solid and relay will turn OFF
 - E) Relay will remain in the off state since no IDs learned in to control it
 - F) Verify Clear all by pressing Switch without toggling ON/OFF state of Relay
Verify Clear all by pressing Learn Button on Occupancy Sensor and LEDs do not blink
Please repeat the "Clear All" process if the Switch or Occupancy Sensor is not cleared.

MES offers two different options for pairing devices and customizing settings. For more advanced configuration, airConfig is a free software tool provided by MES. The download is free via <http://download.magnumes.net> and requires a USB stick (ordered from MES) and a laptop. Once the advanced configuration is completed, the laptop and USB are no longer needed for operation. The configuration settings are stored in the products that remain on site.

11] Learn In Procedure (continued)



12] Setting Up Your Device Via airConfig

Airconfig is a free software provided by MES specifically for the advanced configuration of devices. It uses a USB stick and a laptop to communicate with the relays and sensors and deliver their new instructions. Once the advanced configuration is complete the laptop and USB are no longer needed and the configuration will be stored in the products remaining on site.

- Step One**
 - Download airConfig™, based on your operating system, to your computer at download.magnumes.net
- Step Two**
 - Insert Magnum Energy Solutions provided USB stick into your computer
- Step Three**
 - Power up your device
- Step Four**
 - Your laptop / computer (with provided USB stick) must be within radio range to configure device
- Step Five**
 - Start airConfig™ and select "Advanced" tab

13] Advance Features Customizable via airConfig

- Ability to activate built in PI loop controller
- Customizable dimming table for advanced daylighting control settings
- Ability to select Mx-USR-L3 as either Level 1 or Level 2 repeater
- Enable or disable the "occupancy auto on" feature
- Change ON/OFF timers associated with paired devices i.e. occupancy sensor, window/door contact and rocker switch
- Adjustable ramping speed allows for advanced settings with rate of dim
- Adjust the minimum and maximum voltage provided to fixtures
- Changeable voltage settings
- Selectable options for behavior after power loss
- Customize unoccupied light value
- Select the light "on" value to previous value or background daylighting control
- Advanced scene control allows for up to 4 scenes with user selectable percentages

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14] Ideal Product Placement

Utility Boxes / Relay Panels



Worst Case:
Antenna and receiver inside metal box



Better:
Receiver inside and antenna outside.

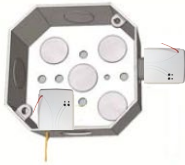


Best:
Receiver and antenna outside.

Junction Boxes



Worst Case:
Antenna and receiver inside J-Box

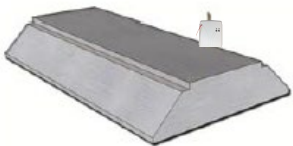


Better:
Receiver inside and antenna outside.



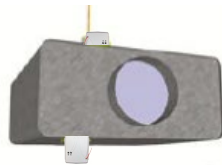
Best:
Receiver and antenna outside.

Fluorescent Light Fixtures



Best:
Outside of fixture and away from "Keep Out" zones and ballasts

HVAC Ducts



Best:
Antenna and receiver on top or bottom (if ceiling is non-metal)

14] Ideal Product Placement: (continued)

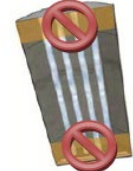
Create separation distance away from interfering electronics Fluorescent Lighting Ballasts



Worst Case:
Wireless receiver and antenna next to ballast or in "Keep Out" zones.

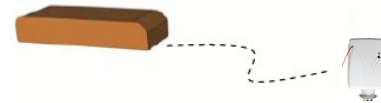


Better:
Maximize separation distance (between wireless receiver and ballast) and pull antenna outside of fixture.



Best:
Avoid placing wireless receiver and antenna within 6" of tube sockets

Lighting



Best:
Outside of fixture and away from "Keep Out" zones and ballasts

HVAC - PTAC Units



Best:
Antenna and receiver on top or bottom (if ceiling is non-metal)

15] Wireless Range Reducers

Wood, drywall, glass (uncoated, without metal)	0-10%
Brick, particle board	5-35%
Metal, ferro concrete, mirrors	10-90%

16] Wireless Range Testing

Site survey tools are available that can help fine-tune wireless communications. For example:

- Indicates wireless signal strength
- Evaluate longer range scenarios that might require enabling repeaters.

Please email info@magnumes.com or call 330.656.9365 to order a USB300U and to request a free download of AirSpy, Magnum's wireless signal testing tool.

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17] Troubleshooting

PROBLEM	WHAT TO CHECK
Lamps/luminaires do not dim	Make sure the ballast is compatible with 0-10V dimming. If the ballast is dimmable, yet the light does not dim, check to ensure the Mx-USR-L3 was wired properly and that the 0-10V output is also wired correctly.
Lighting load doesn't switch ON/OFF	Check to be sure connections to Lighting Control Module comply with the technical specifications listed on this document.
The wrong lights are being controlled	Be sure to review the "Learn in Procedure" and the "Setting Up Your Device via airConfig" to be sure that you paired the device correctly to the selected, compatible device(s). To test the device, please press and release SW1. The connected load will toggle ON/OFF.

18] Warranty

U.S. Two-year Limited Warranty: Products purchased in the U.S.A. are warranted for two years from date of purchase by Magnum Energy Solutions, LLC (M.E.S.) to be free of defects in materials and workmanship. In the event of such defect, product will be repaired promptly without charge or, at our option, replaced with a new product of equal or superior value if delivered to M.E.S. or an Authorized Service Center, prepaid, together with the sales slip or other proof of purchase date. This warranty excludes defects due to normal wear, abuse, shipping damage, or failure to use product in accordance with instructions. This warranty is void in the event of unauthorized repair or modification, or removal or defacing of the product labeling. The MES warranty specified herein covers material only and does not include labor or incidental costs associated with product replacement or repair.