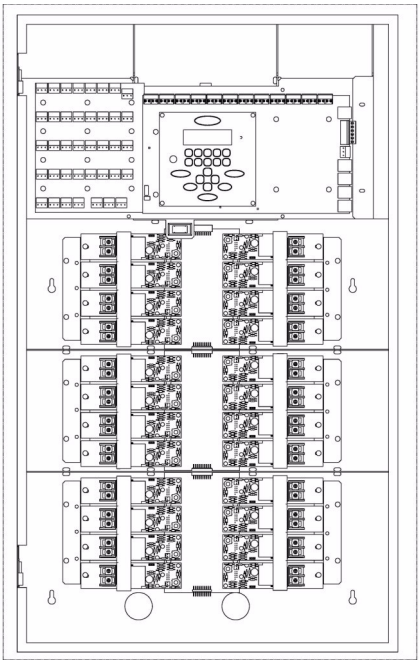
Installation Guide

EZ-MAX PLUS™ RELAY PANELS

Covering EZ-MAX Plus 8, 16 & 24 Relay Panels
Software Revision 1.0 and above.



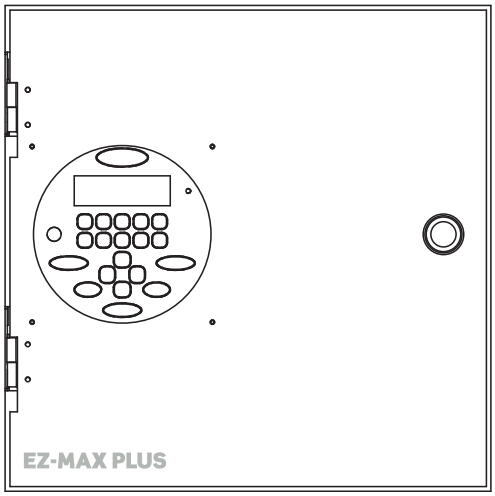


Table of Contents

Read this Before You Begin!

Safety Precautions!

- ❑ Read and follow all safety instructions.
- ❑ Apply the "Emergency Circuits" label (provided) to the front of the door.
- ❑ When using electrical equipment, basic safety precautions should always be followed.
- ❑ Do not use outdoors.
- ❑ Do not mount near gas or electric heaters.
- ❑ Equipment should be mounted in locations and at heights where it will not readily be subjected to tampering by authorized personnel.
- ❑ The use of accessory equipment not recommended by manufacturer may cause an unsafe condition.
- ❑ Do not use this equipment for other than intended use.
- ❑ All servicing shall be performed by qualified service personnel.

SAVE THESE INSTRUCTIONS!

Leviton Service and Support:
www.leviton.com 1-800-959-6004

Warnings!

- ❑ Conduit Entry Locations: The cabinets have been designed with specific locations supporting conduit entry for line and low voltage circuits. There are specific areas of the cabinet that are restricted from some or all types of conduit access. See the Installation sections of this manual for specific details.
- ❑ Line and load circuit wiring: The line wiring should come from an over-current device and the load circuit wiring should go to the specific load to be controlled. On some models that have integrated branch circuit protection, the line side of the relay has been pre-wired to a circuit breaker. Only the load side of the circuits needs to be connected with these products.
- ❑ To be installed and/or used in accordance with appropriate electrical codes and regulations.
- ❑ To be installed by a qualified Electrician.
- ❑ DO NOT CONNECT line voltage wires to low voltage terminals.
- ❑ Mount in a location where audible noise is acceptable.
- ❑ When using with fluorescent ballasts, both lighting fixture and ballast must be grounded.

- Use this relay cabinet only with minimum 75^{O} C copper wire at 75% ampacity.
- Disconnect power when servicing the relay cabinet, fixture or when changing lamps.
- Indoor use only.
- TO AVOID FIRE, SHOCK OR DEATH: TURN OFF POWER AT MAIN CIRCUIT BREAKER, OR FUSE, AND TEST THAT THE POWER IS OFF BEFORE WIRING, OPENING THE PANEL, OR REPLACING ANY COMPONENT!
- During operation, cabinet cover is to be removed by qualified personnel ONLY! Heed all caution markings indicating the presence of High Voltage. High voltage may be up to 600V.
- Test each circuit for short circuits before connecting it to relay so damage to the relay and it's electronics can be avoided.
- Verify that all un-used power supply leads are insulated with wire nuts.

Overview

Introduction

Thank you for choosing Leviton's EZ-MAX Plus line of products for your relay needs. The EZ-MAX Plus product line offers a scalable solution of relay and relay controls that can fit any application with 2 or 3-circuit needs with time clock control.

This manual is designed to assist you in the installation of your product. It includes guidelines, requirements, and instructions that are required only for the installation and low voltage termination of your product. The following resources are also available to you:

- Quick Start Programming Guide (included with every panel)
- Programming Guide (included with every panel)
- Additional resources located at our website at http://www.leviton.com/lms

A hard copy of the Programming Guide is included with your system purchase. Please contact Leviton Technical Support at (800)959-6004 to request additional copies.

NOTE Leviton recommends always checking our website at http://www.leviton.com/lms for late breaking notes, requirements, application information, and firmware updates.

This manual covers all products in the EZ-MAX Plus product line, however, the steps shown are somewhat generic in nature. The particular requirements for your product, especially as related to termination, may differ slightly from the steps in this manual. Please review all markings and labels on your product to ensure that your actions are correct.

Product Specifications and Capabilities

The table below gives a general overview of the specifications of all EZ-Max Plus relay products. The table uses the following abbreviations:

Y = Yes

N = No

O = Optional

* = A single asterisk in any column indicates that there is support for this feature, however, there are conditions that you should be aware of. Consult the specific sections of the manual dealing with this feature for additional information and requirements.

EZ-Max Plus Product Type	**Min-Max Relays**	**Relay Types**	**Weight (lbs (Kg))**	**Size** W", H", D" (Wcm,Hcm,Dcm)	**Flush Mount Option**	**# discrete Inputs**	**Sw. Input Board Avail.**	**Luma-Net Network**	**Emergency Input**	**Emergency Output**	**Touch-Tone Phone**	**Data Modem**	**Front Panel Program**	**Event Scheduler**
Master Panel, 8 relays*	0-8	**	16 (7.26)	13" x 13" x 4-9/32" (33 x 33 x 10.9)	Y	8	N	Y	Y	Y	O*	O*	Y	Y
Master Panel, 16 relays*	0-16	**	44 (19.96)	20-1/4"x34"x4-9/32" (54.4 x 86.4 x 10.9)	Y	12	Y	Y	Y	Y	O*	O*	Y	Y
Master Panel, 24 relays*	0-24	**	44 (19.96)	20-1/4"x34"x4-9/32" (54.4 x 86.4 x 10.9)	Y	12	Y	Y	Y	Y	O*	O*	Y	Y
Note: Voltage:120v/277v/347 @20A, 240v @20/30A ** Relay Types: 30A Latching, 2-Pole, 1-Pole (optional)														

Figure 1: EZ-MAX Plus Product Capabilities Chart

Inspection

Carefully unpack the relay cabinet, and inspect to make sure there is no hidden shipping damage. Report any damage to the freight carrier who delivered the system. Claims for damages are filed with the freight carrier.

In case of damaged components, your relay cabinet may be serviced in the field with factory replacement parts.

Installation Overview

Follow the steps below to install a remote relay cabinet:

Step 1: Mount the relay cabinet to the wall, install conduit, and pull all wire (See "Relay Cabinet Mounting" on page 7.).

Step 2: Terminate line voltage wiring (See "Line Voltage and Control Power Termination" on page 15.).

Step 3: Terminate any low voltage discrete input wiring (See "Low Voltage" on page 23.).

Step 4: Terminate any network wiring (See "Wiring the Phoenix Connector" on page 40.).

Step 5: Inspect your work (REQUIRED FOR ALL CABINETS) (See "Power-Up and Installation Verification Checklist" on page 1.).

Step 6: Power-up and test the system.

Step 7: Install latest software/firmware from Leviton website, www.leviton.com/lms.

Step 8: Perform all necessary configuration. (See the EZ-MAX Plus Programming Guide)

Each of the above steps is covered in detail throughout the rest of this installation guide. Each section contains notes, warnings, requirements, suggestions, and procedures that will help you successfully install and use your system.

Installation

Installation Checklist

Follow these simple steps to install the cabinet:

Step 1: Unpack the system.

Step 2: Report any damage to the freight carrier.

Step 3: If appropriate, remove any covers and/or doors.

Step 4: If appropriate, remove the mounting plate assembly and store where damage will not occur to the electronics.

Step 5: Attach the cabinet to the wall (reference stickers inside the cabinet for proper orientation if it is in question).

Step 6: Drill conduit entry holes if KO's are not provided and attach conduit where appropriate.

Step 7: Pull all wire into the cabinet.

Step 8: Test and verify all wiring by directly connecting line to load. Correct any faults and re-test wiring before you proceed.

Step 9: If applicable, re-install any control electronics removed in Step #4.

Step 10: Terminate discrete input control wiring.

Step 11: Terminate network control wiring.

Step 12: Test each Line/Load circuit for shorts.

Step 13: Terminate the feed and load wiring to each relay.

Step 14: Blow out dust, dirt, or debris which has accumulated in the cabinet.

Step 15: Apply power to the system.

Step 16: Verify proper operation of each relay using the override buttons.

Step 17: Configure cabinet per owner's requirements.

Relay Cabinet Mounting

There are several steps required when mounting your relay cabinet:

Step 1: Install the flush mounting kit if appropriate.

Step 2: Plan your conduit runs and electrical room layout.

Step 3: Determine the appropriate methods for mounting your cabinet to the wall.

Step 4: Mount the cabinet to the wall.

Step 5: Install conduit, pull wire, and other items as required.

Step 6: Proceed to "Line Voltage and Control Power Termination" on page 15.

Selection of a Mounting Location

Choosing a mounting location for your cabinet is critical to the overall success and ease of installation. Each style of cabinet has its own unique wiring requirements which must be observed. Please review the next few pages, which describe and illustrate these requirements.

Suggested Mounting Heights

Although successful operation is completely independent of mounting height, the suggested mounting heights below were selected to locate the cabinet at a reasonable and accessible working height.

Cabinet	Suggested Mounting height to bottom of cabinet
8-Relay Cabinet	53" (1,359 mm)
16/24-Relay Cabinet	32" (826 mm)

Environmental Considerations

- Cabinets generate heat (see table below). Make sure they are mounted in a climate controlled space where the temperature will be 0-40° C (32-104°F) or 20-30° C (68-86°F) if used as Emergency Lighting Power Equipment.
- Reinforce the wall for strength as required for weight and local code.
- Clearance on left and right side of the panel should be maintained at 1 $^{1}/_{2}$" or greater.
- Relays will click while in operation. Locate the panels where audible noise is acceptable.

Cabinet	MAX BTU/HR
8-Relay Cabinet	583
16/24 Relay Cabinet	583

Preferred Areas for Conduit Entry

Your relay cabinet has been designed for easy installation, with a variety of installation options. Please pay close attention to the "allowed" and disallowed" areas for conduit entry. Disallowed areas are areas where conduit entry is impossible due to physical limitations or code limitations. These areas are clearly marked in the illustrations that follow. Each cabinet style has designated areas for low voltage and line voltage conduit entry. You must adhere to these requirements to ensure a successful installation and continued code compliance.

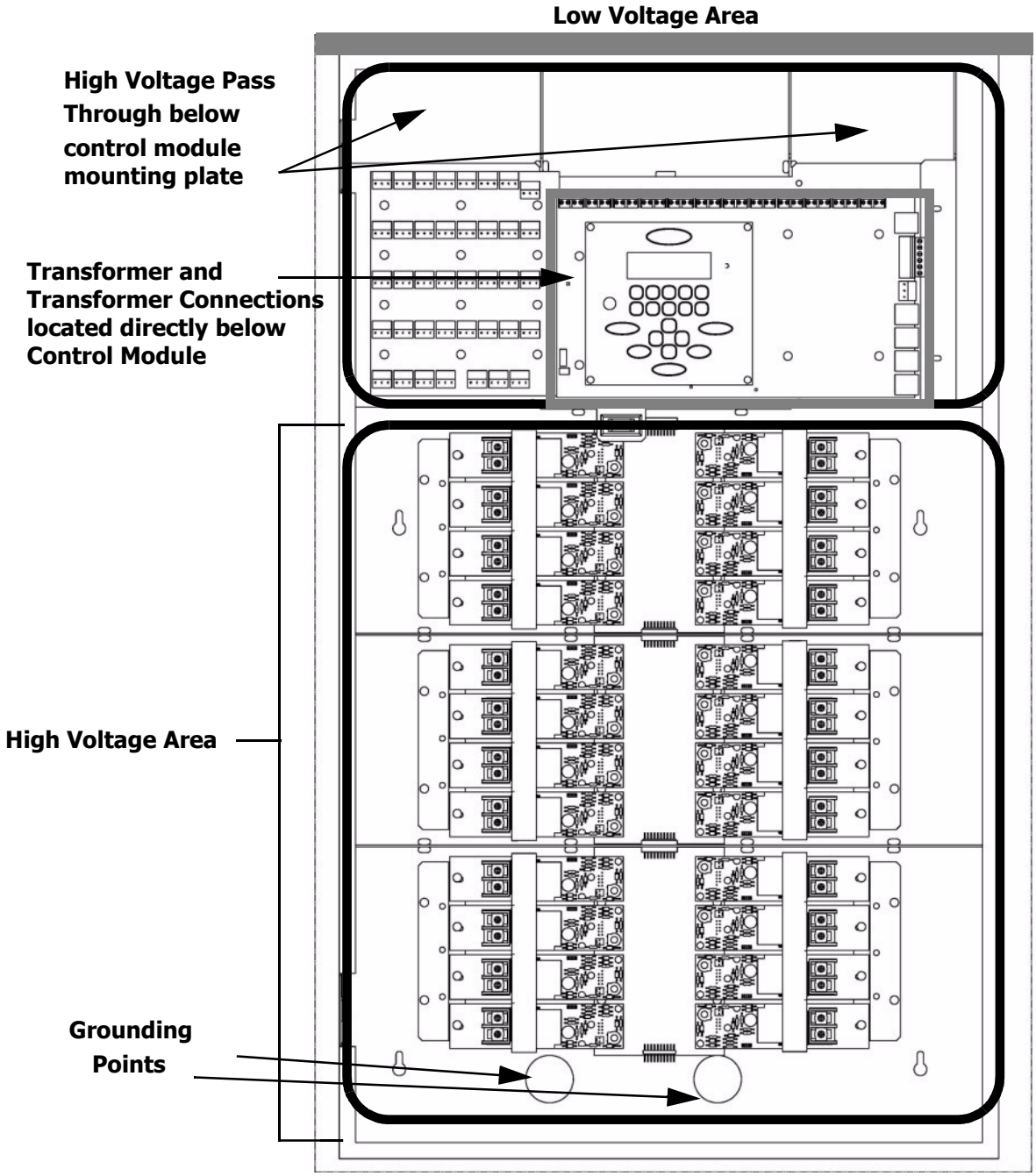


Figure 2: 24-Relay Cabinet Conduit Entry

Sample Electrical Room Layouts

The "right" layout for your application is a decision only you can make. The layouts depicted in the following illustrations show some simple and effective systems which you're welcome to use and adapt to your particular installation.

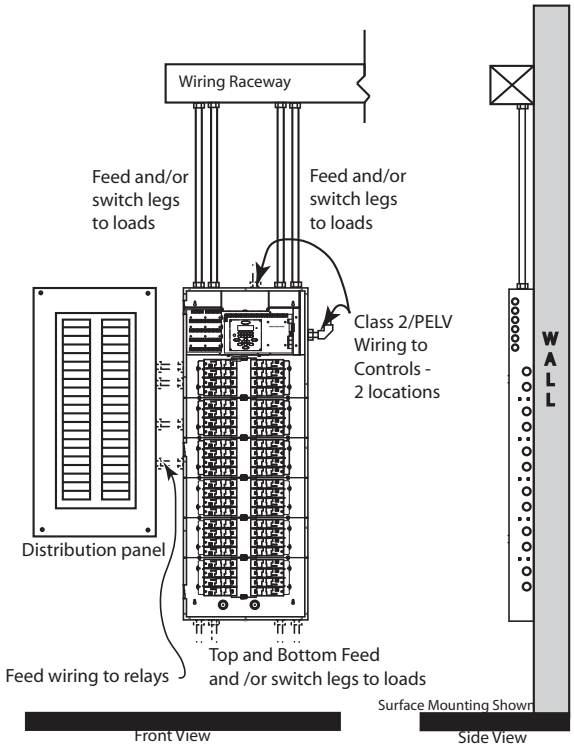


Figure 3: Sample Electrical Room Layouts for all cabinets

Mounting Provisions and Dimensions

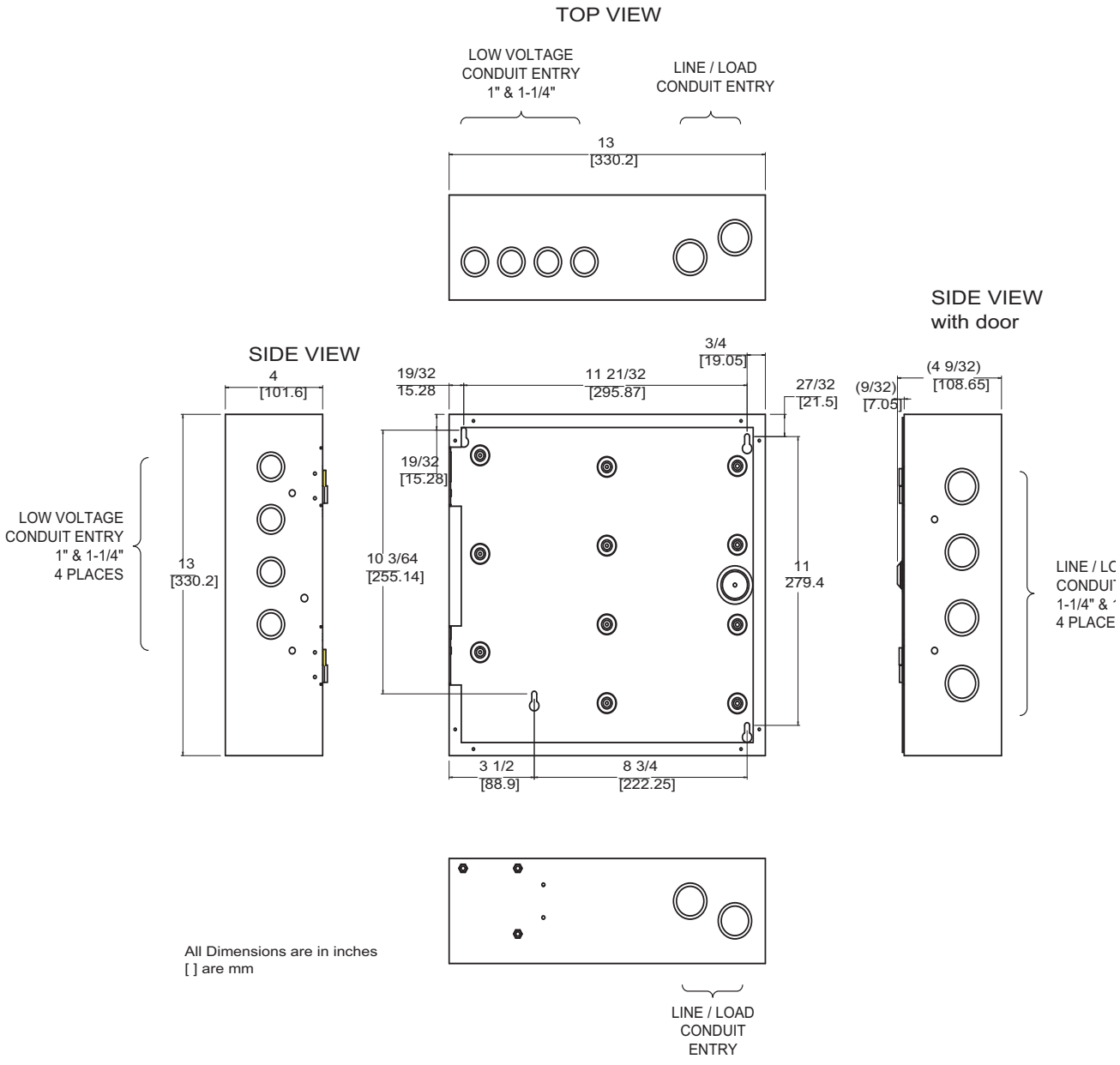


Figure 4: EZ-Max Plus 8 Cabinet mounting provisions and dimensions.

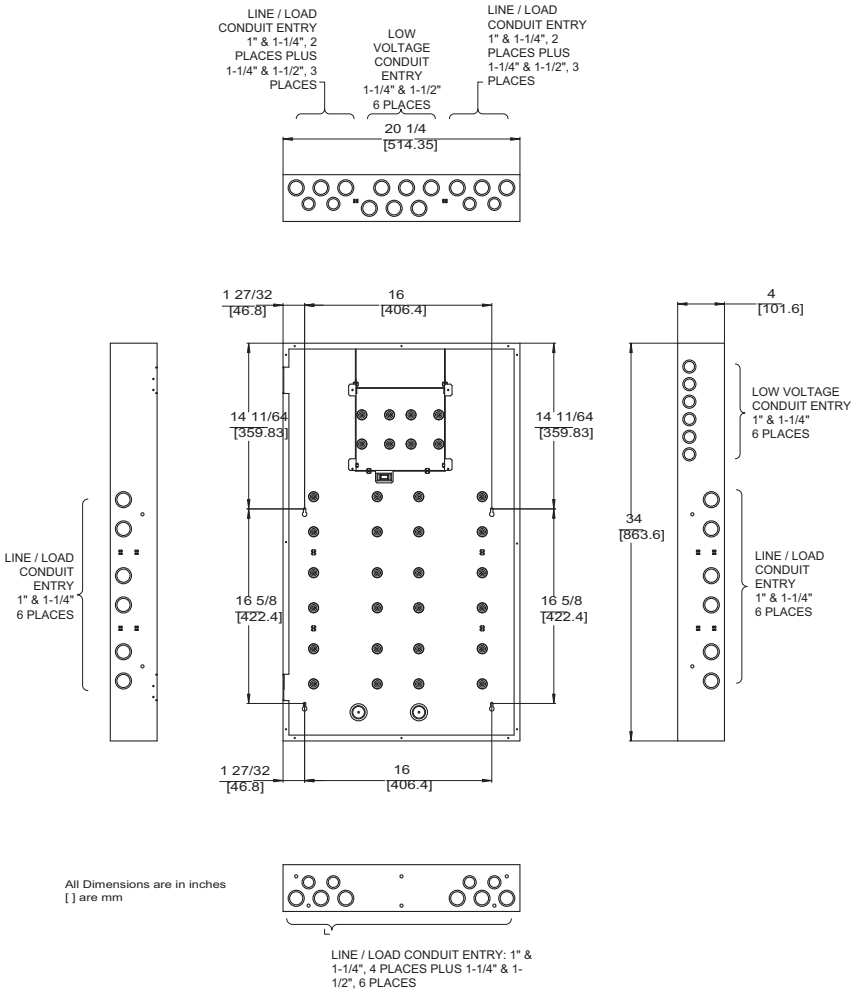


Figure 5: EZ-MAX Plus 16/24 relay cabinet mounting provisions and dimensions.

Step-by-step Mounting Instructions

Step 1: Choose a location to mount the cabinet. Make sure the location in a dry area that is convenient to the branch circuit panel.

Step 2: Leviton requires that cabinet mounting hardware reach through the drywall to wall studs or other suitable solid backing. However, properly sized struts and suitable hardware can also be used. The load must be evenly distributed to the anchors without exceeding the recommended anchor limit. Using drywall screws directly through drywall without a stud is not acceptable. Make sure that adequate support at all points is provided. For fully loaded cabinet weights, see "Product Specifications and Capabilities Chart" on page 3.

Step 3: Remove the cover. Some cabinets may also require the removal of data and/or grounding wires. Make sure that this occurs prior to removal of the door and that they are reconnected when reinstalling the door. On cabinets with hinges, simply lift the door off the hinges. On cabinets with screws, remove the cover screws. Appropriately store the cover for future use.

Step 4: Before you proceed any further, see "Preferred Areas for Conduit Entry" on page 8. This section shows the location of the mounting holes and allowed conduit entry locations for each cabinet type.

Step 5: Verify which end of the cabinet is the top before you attach the cabinet to any surface. Some cabinets have "up" arrows to indicate the top end.

Step 6: Attach the cabinet to its prepared mounting surface as appropriate.

Step 7: Cut, punch, or remove knockouts for the desired conduit openings. Pay special attention to any disallowed areas for conduit entry.

Step 8: Pull all wire, both line and low voltage as appropriate.

Step 9: Carefully and completely remove any dust, debris, metal particles, etc. from inside the cabinet in preparation for wire termination and eventual power up.

Step 10: Proceed to "Line Voltage and Control Power Termination" on page 15.

Line Voltage

Line Voltage and Control Power Termination

Overview of Power Wiring - Feed\Line Wiring

Wiring is simple. All you need is the following:

- Dedicated circuit for control power - Hot, Neutral and Ground
- Individual load wires leaving relays, output circuits.

NOTE Since the panel is fed from multiple circuits, locate each one and lock-out each feed in the OFF position.

All cabinets have ample area for conduit entries for feed, load, and control wiring. Ensure that conduit entry is only in the allowed locations. See "Preferred Areas for Conduit Entry" on page 8 for permitted locations.

Each relay panel has areas dedicated for line voltage wiring and similar orientation. The figures on the next few pages illustrate line voltage wiring.

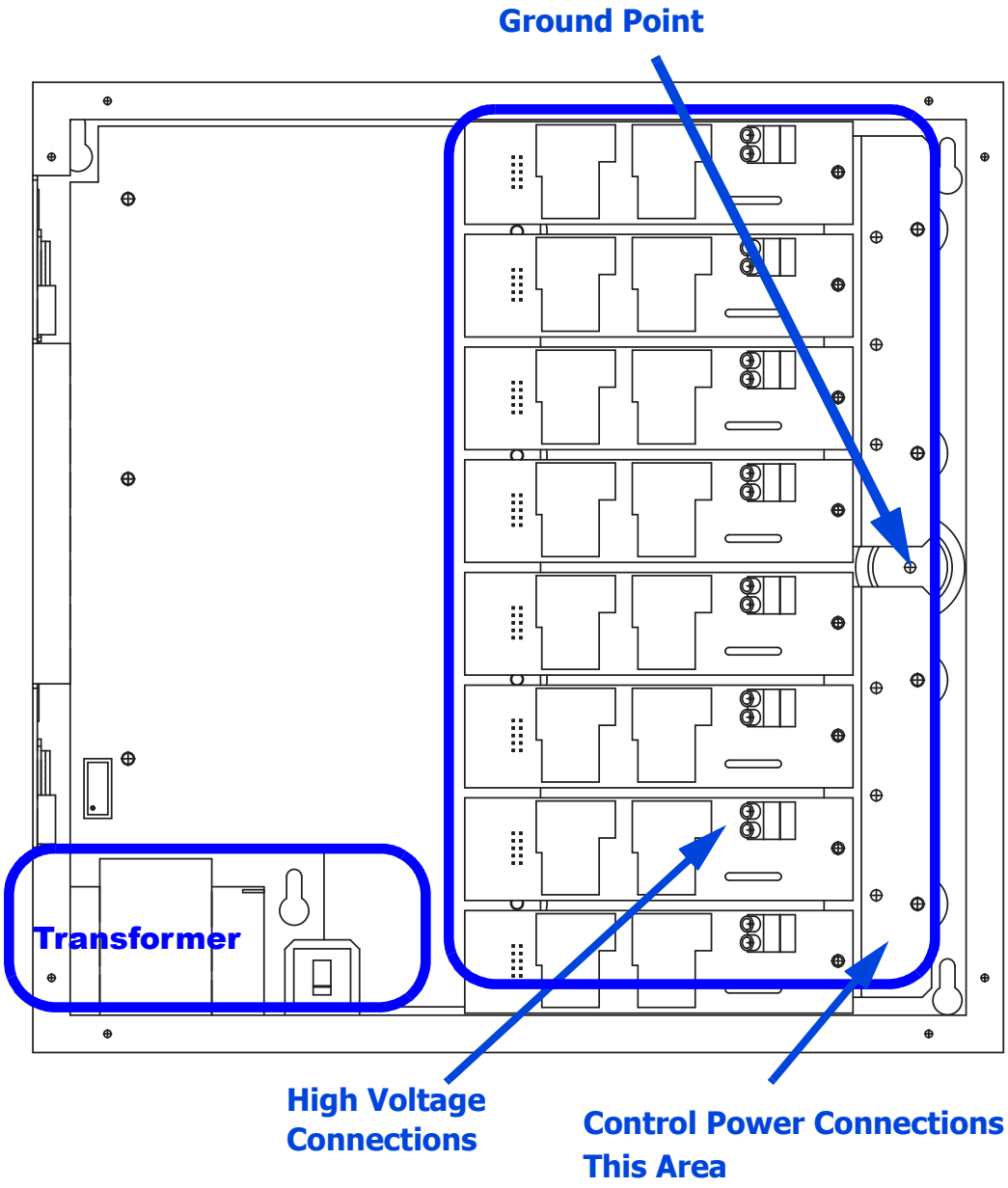


Figure 6: EZ-MAX Plus 8 Line Voltage Wiring Areas.

Line and Load Circuit Wiring

EZ-MAX Plus relay cabinets have multiple relay circuits of a specific type depending on the cabinet model. For details of the different relay types, their capacities, and permitted wire sizes, please see "Wire Sizes and Capacities for Relays" on page 18.

Testing the Circuits

Verify that all load and feed connections have been made before you attempt to connect any circuit to a relay. Test each circuit in the cabinet by following this procedure:

Step 1: Turn off the breaker feeding the circuit

Step 2: Ensure that all connections and wiring between the relay cabinet and the circuit breaker panel are complete

Step 3: Ensure that all connections and wiring between the relay cabinet and the load are complete.

Step 4: At the relay cabinet, connect the feed(s) for relay #1 to the load for relay #1 with a wire nut or other appropriate means.

Step 5: Turn on the circuit breaker to energize the circuit.

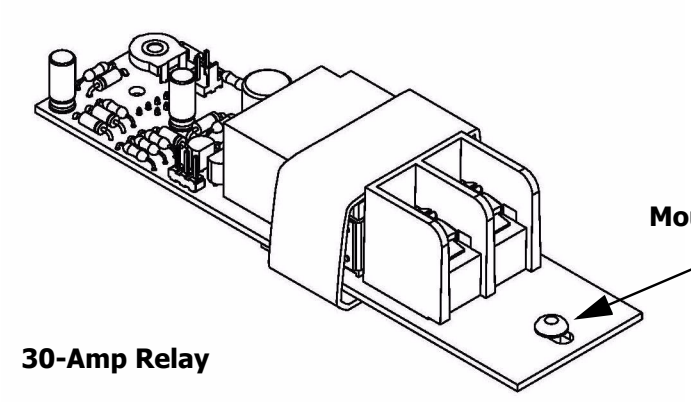
Step 6: Resolve any mis-wiring, shorts, etc. for the connected circuit.

Step 7: Repeat the above steps for all circuits in all relay panels for your system. When all circuits have been tested, disconnect all Lines from Loads and proceed to the next section.

Installing Relay Cards

On several relay cabinet models, the relays are removable. If you have one of these cabinets and need to add or remove relay modules, please follow these instructions:

Step 1: Locate the appropriate location for the relay card



Step 2: Align the connector from the relay card with the relay bus board and gently push the two together.

Step 3: Once firmly seated, use a phillips screwdriver to tighten the mounting screw.

NOTE If you need to remove the installed relay cards that shipped from the factory, remove the shipping screw located near the connector and discard. This screw is only required for shipping and not for installation.

Wiring the Relays

Step 1: Connect the line (feed/circuit breaker) side of the circuit to the "input" terminal(s) on the relay card.

Step 2: Connect the load side of the circuit to the "output" terminal(s) on the relay card.

Step 3: Please note that relay card terminals accept the following wire sizes:

Relay Type (Part #)	Wire Size	Wire Type	Torque	Max Voltage	Tungsten Rating (120V)	Ballast Rating	Motor Rating (120V/277V)	Inductive Ballast, Transformer, HID Rating
30-Amp Relay (RELAY-030)								
1-Pole Relay Module (RELAY-ST2)	20-8 AWG Copper	Solid or Stranded	7 in-lbs	277V	20A	20A	1HP/ 2HP	20A
2-Pole Relay Module (RELAY-2PL)	20-6 AWG Copper	Solid or Stranded	20.5 in-lbs	277V per pole (480V)	-	20A	2HP	20A
347V Relay Module (RELAY-347)	20-6 AWG Copper	Solid or Stranded	20.5 in-lbs	347V	-	20A	-	20A

Figure 7: Wire Sizes and Capacities for Relays

Step 4: Circuit neutrals may follow the path of the line load conductors through the relay panel or the line/load conductors may pass back to the panelboard to be joined with the neutral to the load.

MISWIRING THE RELAY MODULES WILL CAUSE DAMAGE TO THE RELAY MODULE, THE RELAY CABINET, AND POSSIBLY OTHER SYSTEMS!

NOTE When driving secondary contactors, EMF may induce significant noise which may cause some units to reset. Installation of MOV may be required. Please contact Leviton support for additional details.

Wiring Diagrams

The diagrams on the following pages show how to wire the relay circuits.

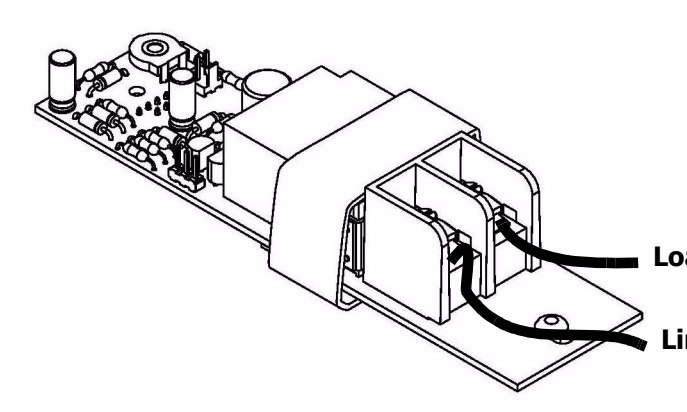


Figure 8: Wiring Diagram for EZ-MAX Plus 30-Amp Relay Card

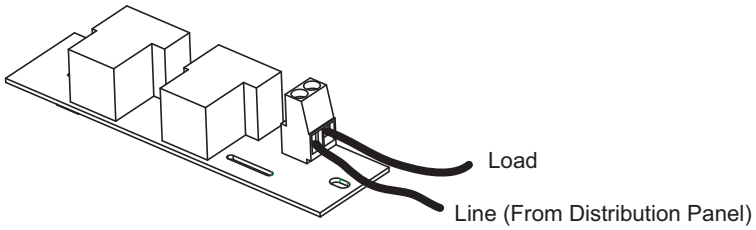


Figure 9: Wiring Diagram for EZ-MAX Plus 1 Pole Relay Card (latching relay card similar)

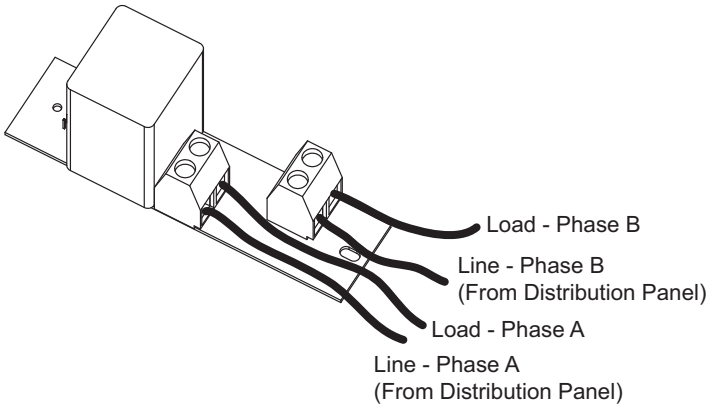


Figure 10: Wiring Diagram for 2-Pole Relay Card

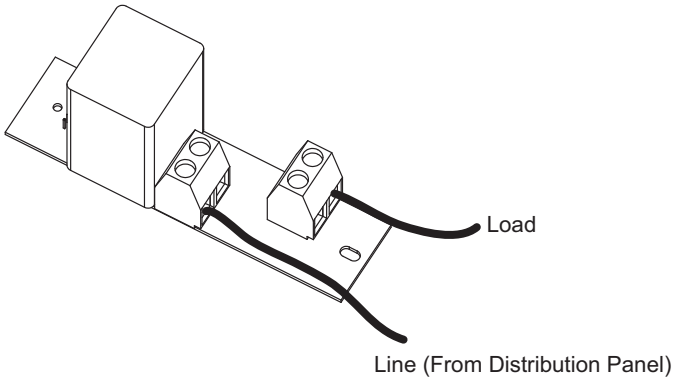


Figure 11: Wiring Diagram for EZ-Max Plus 347 V Relay Card

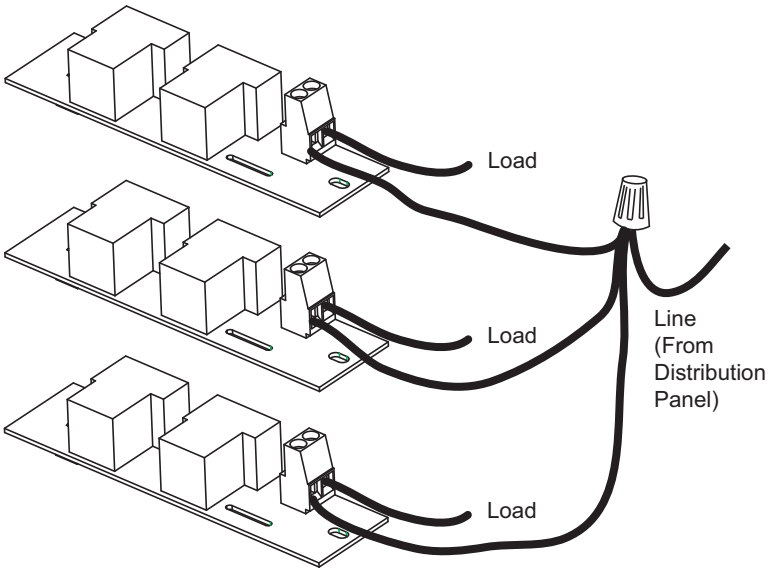


Figure 12: Wiring of Multiple Relays to Common Branch Circuit Breaker

Control Electronics Power Wiring

Your relay cabinet requires a specific power circuit for the control electronics. Leviton recommends that this power circuit be dedicated specifically and used only for power to the control electronics.

NOTE If any Emergency Circuits are fed or controlled from this panel, it must be located electrically where fed from a UPS, a generator, or other guaranteed source of power during emergency and power outage situations.

To connect your relay cabinet's control electronics to power, please follow these steps:

Step 1: Connect the relay cabinet to the circuit panel using conduit.

Step 2: Remove all cuttings and dirt.

Step 3: Run a dedicated circuit from the circuit panel or distribution panel to the relay panel for the control electronics. Make sure the power is off at the breaker.

Step 4: Wire the circuit as shown in the following figure:

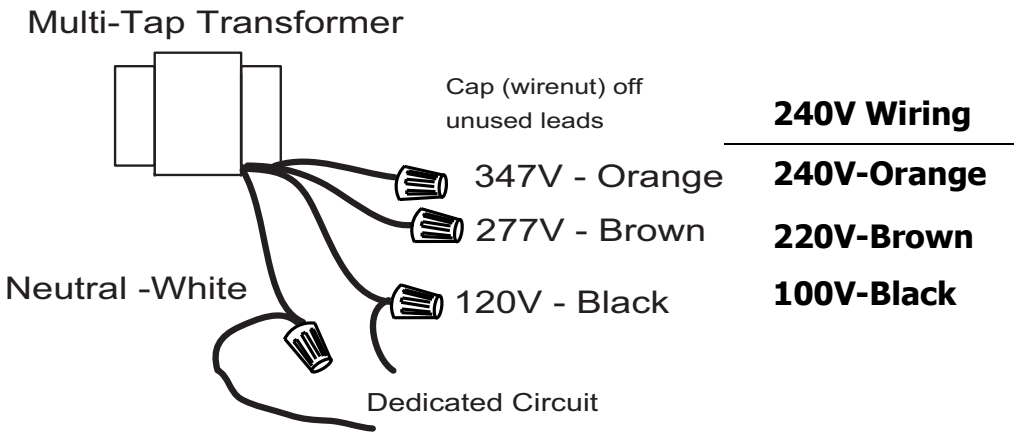


Figure 13: EZ-MAX Plus 16/24 Relay Cabinets Control Electronics Power

NOTE The transformer leads can be found in the lower right corner on the 8 cabinet and underneath the control module on the right hand side of the 16/24 cabinet.

NOTE Branch circuit wiring must be a minimum of 14AWG.

Step 5: Connect the circuit's ground wire to the relay cabinet.

Step 6: Keep the circuit off until all wires are terminated, tested, and double checked.

Low Voltage

Low Voltage Control Wiring

Once the power wiring has been completed, you can begin the control wiring. Control wiring can be divided into two categories: analog and digital. Remote relay panels only support analog control inputs.

Control Overview

The Leviton EZ-MAX Plus relay products are simple yet powerful, and can be operated by multiple control sources. Control input to a relay cabinet can be any combination of the following:

- Low Voltage momentary or maintained through a discrete input.
- Momentary 2-Pole On/Off through a discrete input.
- Photocell 0-10VDC or Switched through a discrete input.
- Occupancy sensor through a discrete input.
- Dry Contacts through a discrete input.
- Digital control inputs (See "Wiring the Phoenix Connector" on page 40).

Please see "Product Specifications and Capabilities Chart" on page 3 for more information on the quantity and types of inputs available for each cabinet. All inputs (except network inputs) support every type as shown above.

The specific wiring requirements for each input type are discussed on the following pages.

NOTE Each product (and in some cases each model of a product) has a slightly different layout at the terminal blocks. The specific function of each terminal is labeled on the circuit board adjacent to the terminal blocks. When wiring the inputs, verify that you are connecting the correct wire to the correct terminal based on function, even if it deviates from what is shown in this documentation. Contact our technical services department with any further questions.

Control Wiring Termination

This section gives instructions for terminating all types of low voltage inputs.

- Leviton recommends minimum 18AWG stranded wire for all low voltage wiring.
- Terminate all control wiring directly to the terminal blocks on the printed circuit board. Use a small 1/8-in. flat screwdriver on these terminals.
- Terminal blocks are 2-part terminals and can be removed for ease of termination. When reinstalling them make sure they are plugged in the correct direction according to the way they were wired.
- All control wiring shall be considered Class 2.
- Use control wire type and size as specified below:

Connector Type	Wire Size and type	Torque
Switch Inputs	14-24 AWG, Stranded	2 in-lb.

Figure 14: Control Wire Type and Size

Input Trigger-What Determines an "ON"

Each of the low voltage inputs can be triggered by either the supply of voltage or a connection to common. When voltage is supplied to an input indicating a change of state, we call this "pulling up the input" or "active high." When a connection to common triggers the input, causing a change of state, we call this "pulling down the input" or "active low."

By default, all inputs are active high (that is receiving voltage to trigger). Active High inputs must not exceed a nominal +24VDC and must be above +9vdc. Active Low inputs must connect to the same common at the same potential as the cabinet.

To change from an active high input to an active low input, the polarity jumper must change position. There are several illustrations which show the location of these jumpers.

Input Power Requirements

The relay cabinet has a finite amount of power which it can supply to connected devices. This topic is discussed in detail in "Power Considerations for Control Systems" in Appendix A. Please make sure that you do not exceed the amount of available peripheral power, or damage to your relay cabinet or connected devices may occur.

General Requirements for Connecting any Device to Low Voltage Inputs

Step 1: Connect leads per wiring diagram as illustrated in the figures on the following pages.

Step 2: Twist strands of each lead tightly (making sure that there are no stray strands) and push firmly into appropriate plug connector location.

Step 3: Tighten the screws on the plug connector—making sure that no bare conductor is showing.

Step 4: Plug the connector back onto the control module with the screws facing the front and the wires coming out of the connector toward the top of the cabinet.

Low Voltage Switches

EZ-MAX Plus relay panels support a variety of low voltage switch types such as:

- **Momentary:** provides momentary contacts, triggering alternating On/Off actions.
- **Maintained:** triggers On action when connection is made, Off action when removed.
- **Momentary On/Off with On & Off terminals provided**: provides momentary connection to the "On" terminal to trigger an On action, momentary connection to the "Off". Used with single pole double throw center off (SPDT-CO) switches.
- **Momentary On/Off with only "IN" or "ON" terminal**: used with 2-pole center off switches and must be used in conjunction with compatible switch input kits to convert from a 1 terminal to a 2 terminal input.

Each Input has a multi-position screw terminal with various positions. The terminal can be pulled off its base for ease of wiring. One possible pinout is shown below.

Please remember to verify the function of each pin as labeled on the product with the device being wired to ensure that it is wired correctly.

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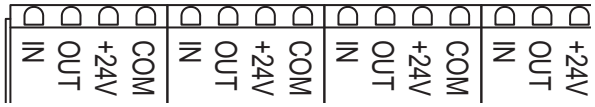


Figure 15: Low voltage terminal layout, 8/16/24 relay cabinets

Typical terminal designations for all products are shown below. Please confirm the function of each pin on your device with the labeling on the circuit board prior to any termination.

Pin Label	Function
+24V	Supplies +24Vdc power to devices, usually unregulated
COM	Connection to DC Common of the cabinet
IN	Switch Input or signal from device. Usually expecting +V to trigger.
OUT	Used for connection to device LED indicating on/off state of that input. Connects to common when on, floats when off. (Max 0.04A)
LED	Used for connection to device LED indicating on/off state of that input. Connects to common when on, "floats" when off. (Max 0.04A)
ON	Usually can be configured identically to the IN terminal but can be configured as Momentary ON input only
OFF	Momentary OFF input only

Figure 16: Discrete input terminal labels and their meanings —applies to all Leviton products

By default, the "IN" or the "ON" terminal is expecting +V to trigger as would be typical with many styles of low voltage switches. If a connection to common is required, it requires some jumper and software reconfiguration. For more information on this topic, please see "Input Trigger-What Determines an "ON"" on page 26.

Connecting to a Low Voltage Input

Step 1: Strip each wire from your device and tightly twist the wires together.

Step 2: Insert the wires from the device into the connector on the relay cabinet in the appropriate location.

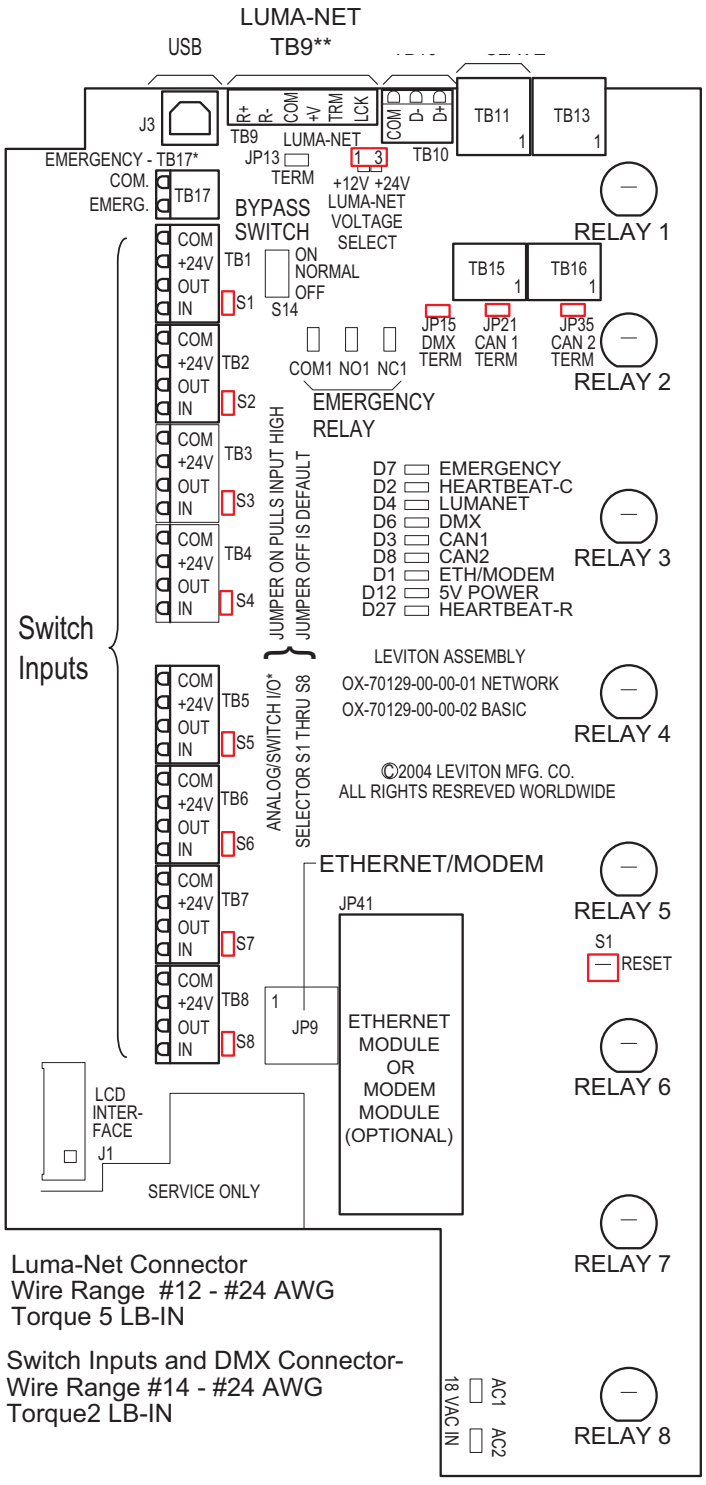


Figure 17: Inside layout of an EZ-MAX 8-Relay Cabinet.

Step 3: Tighten the terminal screw, and repeat for all wires from the device.

Step 4: Plug the terminal block back into the cabinet with the screws facing toward you and the wires exiting toward the side or top of the cabinet. Alternatively, the connector can be inserted with the screws parallel to the circuit board and the wires exiting toward you.

Step 5: Verify that the wires land on the correct terminals.

Occupancy Sensors

One of the control input types that your relay cabinet can accept is Occupancy Sensors. When using an occupancy sensor, the cabinet is expecting a DC voltage between +9V & +24V to trigger an occupied state, or a floating input to indicate an unoccupied state. The specific function of what happens in each of these states is set via software configuration. This section only deals with connecting your Occupancy Sensor to your relay cabinet. See the EZ-Max Plus Programmer's Guide for more information on programming your inputs.

Occupancy Sensor Wiring

Step 1: Connect leads per wiring diagram below.

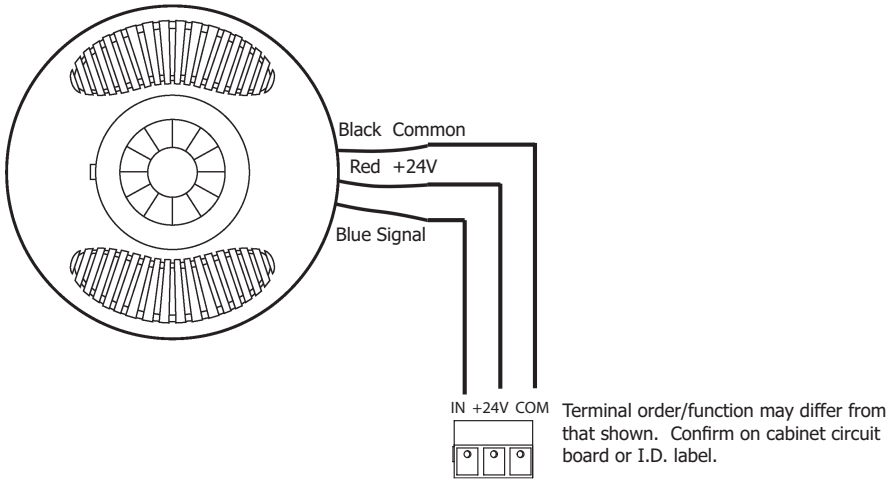


Figure 18: Occupancy Sensor Termination using Dedicated Occ Sensor Terminal

Step 2: Twist strands of each lead tightly (making sure that there are no stray strands) and push firmly into appropriate plug connector location.

Step 3: Tighten the screws on the plug connector making sure that no bare conductor is showing.

Step 4: Plug the connector back onto the control module.

Step 5: Verify that the wires from the Occupancy Sensors are connected to the correct terminals in the cabinet.

Photocells

The relay cabinet is capable of supporting the following types of photocells:

- Switched Photocell (On/Off, trigger point set at photocell).
- 0-10V Photocell.

The configuration and behavior of your photocell is set via software (see the EZ-MAX Plus Programmer's Guide for details). This section only covers installation.

Photocell Wiring

Step 1: Connect leads per wiring diagram as illustrated in one of the following figures:

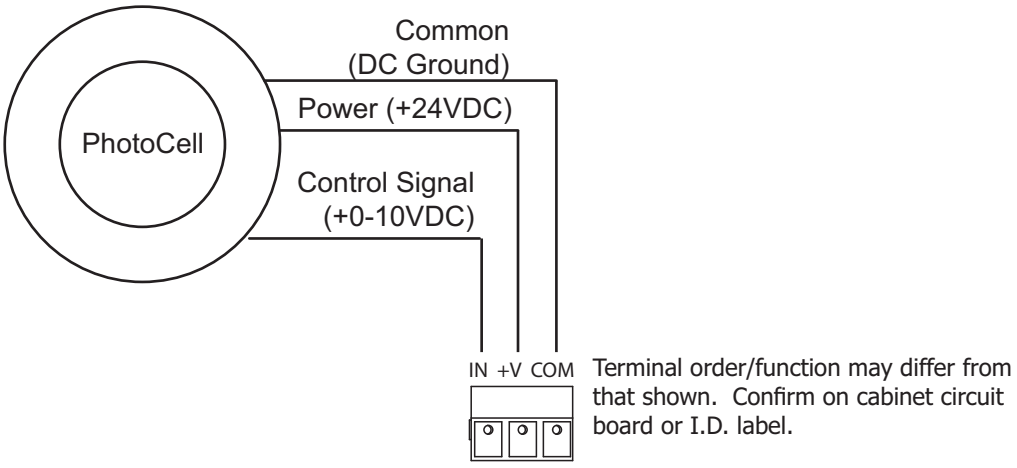


Figure 19: 0-10VDC Photocell Wiring

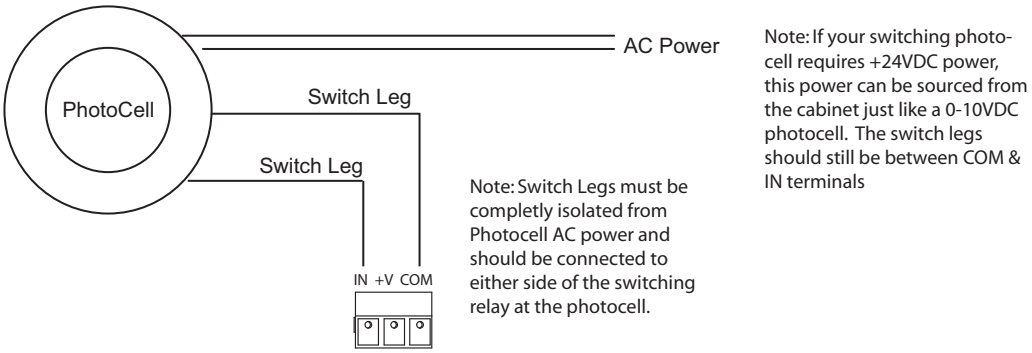


Figure 20: Switching Photocell

Step 2: Twist strands of each lead tightly (making sure that there are no stray strands) and push firmly into appropriate plug connector location.

Step 3: Tighten the screws on the plug connector making sure that no bare conductor is showing.

Step 4: Plug the connector back onto the control module with the screws facing the front and the wires coming out of the connector toward the top of the cabinet.

Step 5: If using a switched photocell, make sure that the jumper below the connector is in the "ON" position.

Digital

Luma-Net III

Luma-Net is Leviton's proprietary digital architectural lighting control protocol. Luma-Net can be used for the following items:

- Optional Communication and control by Dimensions 8000 control stations and accessories.
- Optional Communication and control by Dimensions 4200 control stations and accessories.

Wiring Specifications

Specification	Description
Maximum End to End Run Length	2,000 feet
Maximum number of controlled channels per subnet	2,048 (when used with a D400 or D800 station)
Maximum number of nodes per subnet on the network	255
Network Topology	Daisy-Chain
Interconnection Method	Terminal
Wiring Specifics	(1) Twisted Data Pair plus a common required for digital communication signal Node power requires additional power wiring
Supported Voltage	+12-24Vdc
Minimum voltages for node functionality	varies depending on node type, usually +10Vdc
Recommended Wire (includes data and power pair)	Belden 1502R Belden 1502P (Plenum)
Alternate Approved Wire	Belden 9729,9829,8102,9841, 89729,88102 Alpha 6222C, 6412
Network Protocol	Leviton Luma-Net on RS-485
Conflicting or Multiple Control Message Mitigation Strategy	Last Action Takes Precedence
Termination Requirements	Terminate at both ends of control run Data- to common with 100-120ohm resistor

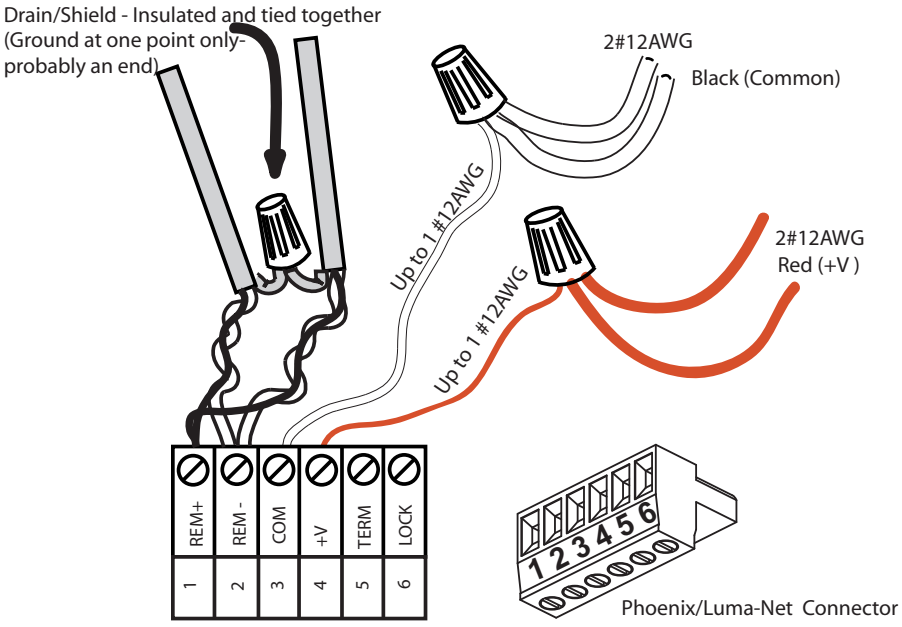
Wiring the Phoenix Connector

Step 1: Connect leads per the wiring diagram below.

Step 2: Twist strands of each lead tightly (making sure that there are no stray strands) and push firmly into appropriate plug connector location.

Step 3: Tighten the screws on the plug connector—making sure that no bare conductor is showing.

Step 4: Tie the Drain/Shield wires together and insulate using a small piece of heat shrink tubing.



Step 5: Install termination jumpers as required. Termination jumpers are required at the two ends of the Luma-Net run. The termination can be accomplished on the Luma-Net connector with a jumper wire as shown below. Termination can also be accomplished on the control board by jumpering the 2 pin header to the left of the Luma-Net connector.

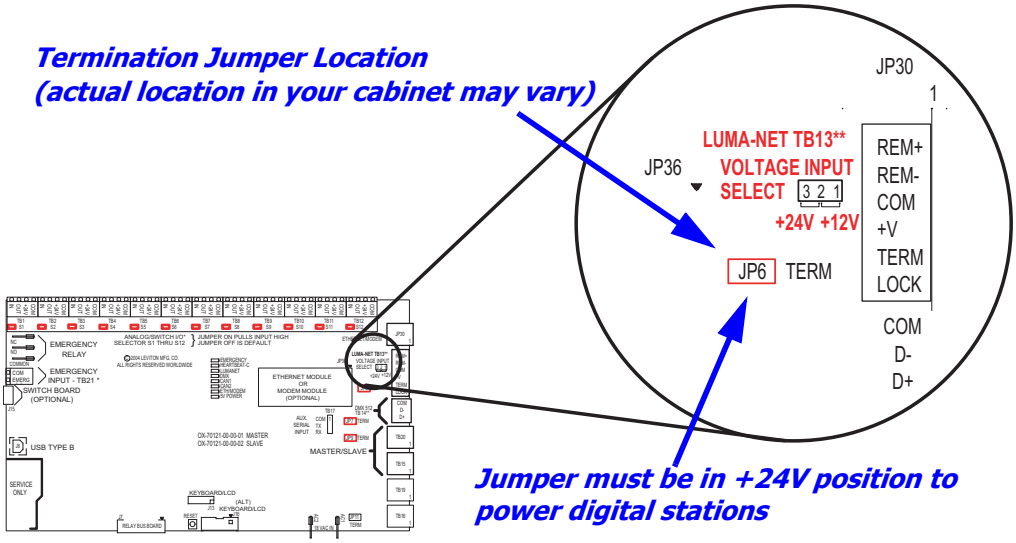


Figure 21: Typical termination jumper location

Emergency

Emergency

Inputs and Outputs

The control card has both an emergency input and output. The input can be driven by a contact closure such as one from a fire alarm or by a low voltage signal capable of sinking 5 mA (3 - 5 volts is emergency off and 0 - 2 volts is emergency on). Emergency output has a common contact and both NO and NC contacts. In the non-emergency state, the NO contact is closed. If the emergency input is activated (closed) or if power is interrupted to the relay cabinet, the NC contact will be closed.

PG Extended information available in the EZ-Max Plus Programmer's Guide.

If it is desirable, the output of one cabinet can be connected to input of another cabinet. In this case, connect the commons of both input and output together and connect the NC output contact to the emergency signal on the input connector as shown in the figures on the following pages.

Each relay can be configured to go *on*, *off* or to *no change* via the setup menu when in an emergency state.

If the emergency input changes from closed to open (low to high), the relays will return to their previous states.

NOTE The emergency input is set from the factory as a level 2 priority, only overridable by the internal bypass switch.

Terminal Locations

Emergency terminal locations for the EZ-Max Plus 8 and 16/24 relay cabinets are shown.

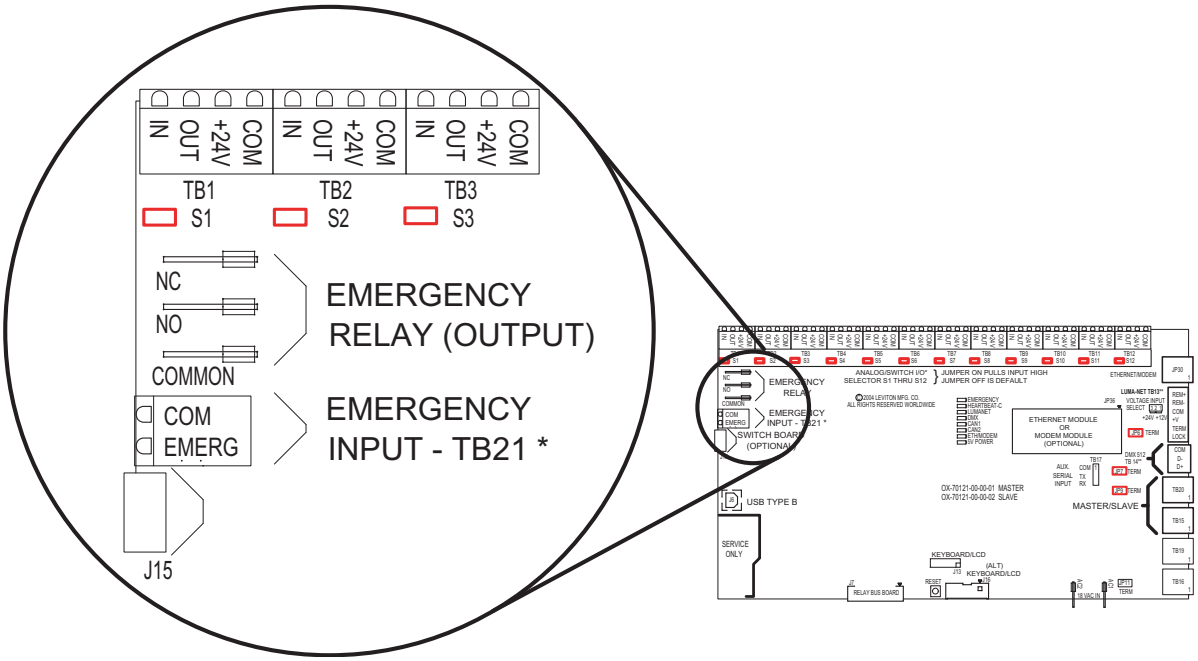


Figure 22: Emergency Input and Output Connectors 16/24 relay cabinets

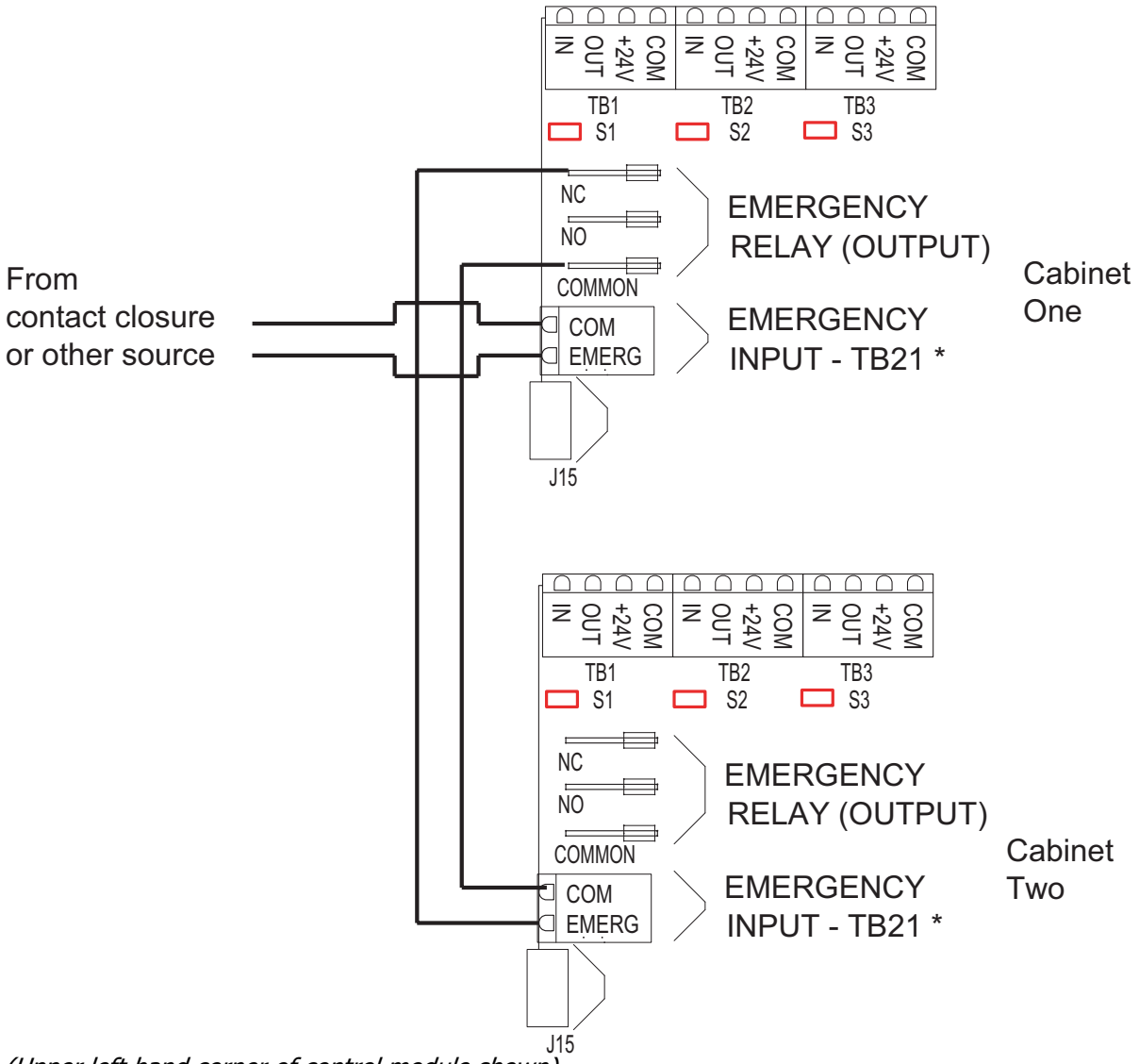


Figure 23: Wiring Diagram for 16/24 relay cabinets showing (2) interconnected Emergency Cabinets.

Appendix A

Power-Up and Installation Verification Checklist

Prior to the application of power to your relay cabinet, all of the following steps must have been successfully executed.

- ❑ Inspect each relay load wiring for incomplete termination
- ❑ Inspect each relay's load wiring for terminals not completely tightened
- ❑ With each relay in the "off" position, check for voltage between the Line & Load terminals; there should be none.
- ❑ Inspect all low voltage wiring and ensure that it is complete.
- ❑ Inspect control power wiring, ensure that it is complete.
- ❑ Confirm that any unused supply wires on the control power transformer have been suitably capped.
- ❑ Confirm that all connected load wiring between the relay panel and it's load has been completed.
- ❑ Confirm that wiring between the cabinet and all low voltage devices has been completed.
- ❑ Apply power to the cabinet.
- ❑ Confirm that the cabinet boots properly and returns to the status "normal" screen.
- ❑ Set the Time & Date from the menu.
- ❑ Update system software with the latest available software from the website, if appropriate.
- ❑ Proceed to panel programming.

Appendix B

Power Considerations for Control Systems

The control system should be carefully planned to take these important issues into consideration:

- Power Supply for connected devices.
- Wire Size for Power Runs.

On systems where full factory drawings have been provided, our Applications Engineering department has already managed these calculations for you so you only need to follow the instructions on the system drawings. However, on any installation where factory drawings were not provided, the information contained within this guide must be followed to ensure that all of your devices operate properly and without failures or complete in-operability.

NOTE This section of the document contains information that applies to many Leviton products and is not necessarily limited to the product that is primarily included in this manual. There may be information in this chapter which is not relevant to your particular installation. If you have questions about ANY information contained in this manual, please immediately contact our Technical Services Department prior to proceeding with installation.

Terminology

Please review these definitions that are used throughout this section:

- **Power Supply or Supply:** references a device that supplies power to other devices.
- **Power Control Device (PCD):** refers to a device that controls power. The EZ-MAX Plus relay panel is an example of a devices in the Leviton product line that controls power. PCD's supply a certain amount of power to connected low voltage control devices.
- **Control Devices or Low Voltage Control Devices or Device:** these terms all refer to control devices that connect to a Power Control Device (PCD). These devices could be simple low voltage switches, Occupancy Sensors, or D8000 control stations.
- **Luma-Net:** is one of our network lighting control protocols. Luma-Net is an RS-485- based control protocol used by EZ-MAX PLus Digital Control Stations, D8000 and D4200 control devices. Many of our PCD (Power Control Device) products have a direct data connection for a Luma-Net device. All Luma-Net Control Devices require power in one form or another. This power generally accompanies the data wires.
- **Unit Load:** one (1) Unit load is defined as 25mA, or 0.025A. It is an arbitrary definition by Leviton and was created to simplify power calculations.

Power Requirements and Maximum Run Length

Each Control Device used in your system has a different load (draw) and each PCD can support a different total load (supply.) There are logical steps for determining the total load of your network and verifying that the supply is sufficient:

Step 1: Determine the maximum available current of your supply, be it a PCD or other Power Supply. Convert this to the maximum number of Unit Loads if necessary.

Step 2: Calculate the sum required load of each Control Device, expressed in unit loads

Step 3: Verify that the Sum from Step 2 <= the maximum available power from your supply in Step 1.

If this verification fails (the Sum of required loads is > than the available supply) you can either use an external power supply or reduce the number of control devices. Or, contact our Technical Services department for help.

NOTE One Unit Load = 25mA = .025A

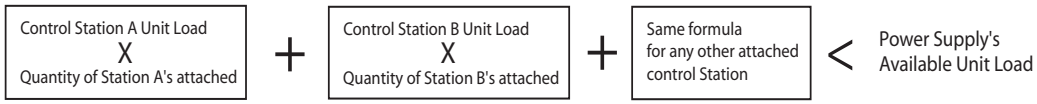


Figure B-1: Load Rating Verification Formula

Power Control Devices - Available Supply Current

The EZ-MAX Plus cabinets are designed to be able to power external control loads from the internal power supply.

NOTE The sum of all devices connected to all power output terminals can not exceed the Maximum number of Unit Loads available in the PCD or supply.

Control Device Loads

Control Devices	Unit Load @12VDC	Unit Load @24VDC	Station Type	Unit Load @ 12VDC	Unit Load @ 24VDC
D4200 LCD	5	2	EZ-MAX Plus Digital Switch, 1 Button	N/A	0.6
D4200 Entry (Button),	2	1	EZ-MAX Plus Digital Switch, 2 Buttons	N/A	0.8
D4200 Room Combine Station	3	1	Z-AX Digital Switch, 3 Buttons	N/A	1.0
D4200 Remote I/R	2	1	EZ-MAX Plus Digital Sw., 4 Buttons	N/A	1.1
Luma-Net Hub	6	3	EZ-MAX Plus Digital Switch, 5 Button	N/A	1.3
D8000 LCD	3	2	EZ-MAX Plus Digital Switch, 6 Button	N/A	1.0
D8000 Entry (Button)	2	1	EZ-MAX Plus Digital Switch, 8 Button	N/A	1.1
D8000 Slider	2	1	EZ-MAX Plus Digital Sw., 10 Button	N/A	1.3
D8000 Key switch	1	1	1 Button Low Voltage Switch	N/A	0.6
D8000 I.O Port	2	1	2 Button Low Voltage Switch	N/A	0.9
D8000 Combine/ Closure (Advanced)	11	10	3 Button Low Voltage Switch	N/A	1.2
Infrared Only Occ Sensor	N/A	1.2	4 Button Low Voltage Switch	N/A	1.5
Ultrasonic Only Occ. Sensor	N/A	1.2	5 Button Low Voltage Switch	N/A	1.8
Multi-tech Occ Sensor	N/A	1.2	6 Button Low Voltage Switch	N/A	2.1
Ultrasonic 2-Way Occ. Sensor	N/A	1.4	8 Button Low Voltage Switch	N/A	2.7
Multi-tech 2-Way Occ, Sensor	N/A	1.4	10 Button Low Voltage Switch	N/A	3.3
Photocell, odc0p-00w			Photocell, pcatr-000		
Photocell, pcind-000			-		
Photocell, pcout-000			-		
Photocell, pcsky-000			-		

Power Wire - Run Length

The maximum total run length of each segment is a function of the total number of unit loads. A run becomes too long when the voltage drop, due to wire size and run length, increases to a point where the station does not have sufficient voltage to operate. The maximum run length, in feet, based on the total number of unit loads is shown below:

NOTE (2) Tables are provided, (1) @ 12VDC and (1) at 24VDC. Make sure that you use the correct table!

Wire Size vs. Length of Runs - Power Wiring @12 VDC

	14 AWG (Feet)	12 AWG (Feet)	10 AWG (Feet)
10 Unit Loads	1905	3000	4800
20 Unit Loads	950	1500	2400
30 Unit Loads	630	1000	1600
40 Unit Loads	475	750	1200
50 Unit Loads	380	600	960
60 Unit Loads	315	500	800
70 Unit Loads	270	425	685
80 Unit Loads	235	375	600
90 Unit Loads	210	330	530
100 Unit Loads	190	300	480
110 Unit Loads	170	270	435
120 Unit Loads	155	250	400

Warranty Information

Limited Warranty

Leviton Manufacturing Co Inc. warrants the products represented in this manual to be free of material and workmanship defects for a period of two years after system acceptance or 26 months after shipment from Leviton, whichever comes first. The EZ-MAX Plus relay cards are covered for a period of ten (10) years. Lighting fixtures manufactured by Leviton are covered for a period of one year.

This Warranty is limited to repair or replacement of defective equipment returned Freight Pre-Paid to Leviton Manufacturing at 20497 SW Teton Ave., Tualatin, Oregon 97062, USA. User shall call 1-800-959-6004 and request a return authorization number to mark on the outside of the returning carton, to assure that the returned material will be properly received at Leviton.

All equipment shipped back to Leviton must be carefully and properly packed to avoid shipping damage. Replacements or repaired equipment will be returned to sender freight prepaid, F.O.B. factory. Leviton is not responsible for removing or replacing equipment on the job site, and will not honor charges for such work. Leviton will not be responsible for any loss of use time or subsequent damages should any of the equipment fail during the warranty period, but agrees only to repair or replace defective equipment returned to its plant in Tualatin, Oregon.

This Warranty is void on any product that has been improperly installed, overloaded, short circuited, abused, or altered in any manner. Neither the seller nor Leviton shall be liable for any injury, loss or damage, direct or consequential arising out of the use of or inability to use the equipment. This Warranty does not cover lamps, ballasts, and other equipment which is supplied or warranted directly to the user by their manufacturer. Leviton makes no warranty as to the Fitness for Purpose or other implied Warranties.

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