

Lighting Control Unit Installation Instructions

Regulatory Compliance

Safety

This device has been tested and found to be in compliance with the requirements set forth in UL 916, Energy Management Equipment, and is listed by Underwriters Laboratories, Inc., for installations in the United States.

This device has been tested and found to be in compliance with the requirements set forth in C22.2, No. 205-M1983, Signal Equipment, and is Certified by Underwriters Laboratories, Inc., for installations in Canada.

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Description

Novar Controls Corporation's Lighting Control Unit (LCU; Figure 1) is a unique, cost-effective, and versatile means of controlling lighting. Its design includes fail-safe operation. It can be controlled by the Logic One[®] Input/Output Module (IOM/2). These instructions describe the procedure for connecting the input device as an IOM/2. The LCU uses RR-7 mechanically latching relays (not included) for individual circuit control. The LCU electronics are powered by a 24-VAC power supply.

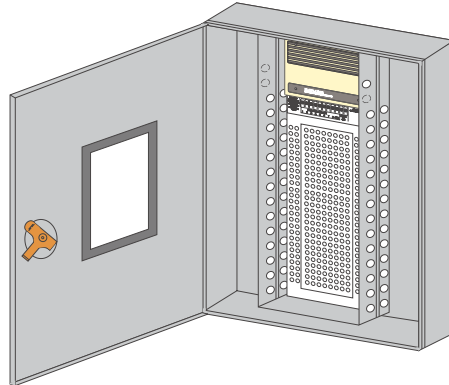


Figure 1. Lighting Control Unit

Novar Controls offers two models of the LCU. (These instructions apply to both.)

- LCU-1010 (277-VAC)
- LCU-1012 (120-VAC)

Specifications

Agency Approvals

Listed device:	CUL/UL E90949
Standards used:	UL 916, Energy Management Equipment CSA C22.2, No. 205-M1983, Signal Equipment

Control Power Requirements

Voltage:	277-VAC (model LCU-1010) 120-VAC (model LCU-1012)
Consumption:	40 VA

Operating Environment

Temperature:	32° to 158°F (0° to 70°C)
Humidity:	0 to 95% Relative, noncondensing

Physical Dimensions

Height:	30 inches
Width:	20 inches
Depth:	6.875 inches
Weight:	56 lb

Precautions

Take the following precautions during installation:

- Observe all national and local electrical codes during installation.
- Observe warning labels marked on the Lighting Control Module terminal strip.
- Do *not* connect Class 1 voltages to any terminal of the LCU electronics or to the matrix board.

The LCU electronics is a Class 2 (low voltage) control device. The LCU's outputs are fed into the matrix board and are low voltage.

- Use Model RR-7 latching relays *only*. The use of any other relays may cause damage to the relays or the LCU.
 - Do not exceed the LCU's limit of 56 RR-7 relays per LCU.
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Mounting the LCU Enclosure

Because LCUs control high voltages, they should be mounted according to local governing electrical codes. The maximum ambient temperature should be 158°F. The LCU's enclosure is not weatherproof.

NOTE! The LCU enclosure must be mounted securely to an approved mounting surface.

Use the following procedure and refer to Figure 2, as necessary, to mount the LCU enclosure.

Step	Procedure
1	Turn off all power to the LCU and the associated equipment prior to installation.
2	Mark the mounting surface to show the location of the four mounting holes (see measurements in Figure 2).
3	Drill holes in the locations marked in Step 2.
4	Turn the top two fasteners (not included) until approximately one-quarter inch remains between the mounting surface and the head of the fasteners.
5	Position the enclosure over the fasteners and slide it down until the fasteners slide into the slots.
6	Insert the bottom two fasteners and tighten all four fasteners to secure the enclosure.

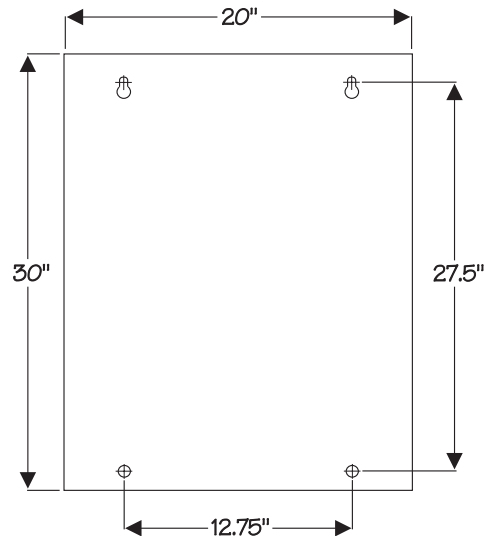


Figure 2. Mounting holes for the LCU

NOTE! The power supply for the electronics transformer should be of the transformer primary rating. Do *not* connect power until all wiring connections are made and verified.

Installing and Wiring the RR-7 Relays

Before installing and wiring the RR-7 relays, verify the RR-7 ratings for the voltage and amperage being controlled. The RR-7 relays should be mounted with banana plugs installed on all three leads.

The circuits being controlled must dictate the size and voltage rating of the wire used. Copper wire is recommended.

Use the following procedure and refer to Figure 3, as necessary, to wire the relays.

Step	Procedure
1	Strip approximately an inch of wire and insert the lead through the opening in the plug, making sure that the insulated portion shows through the other side.
2	Wrap the lead clockwise around the groove above the opening.
3	Place the plastic cap over the plug and tighten it until it covers the exposed wire. NOTE! Make sure that all wire connections made with banana plugs are tight and that no wire strands are exposed.

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Step	Procedure
4	Plug the common (blue) leads into the outer (left/right) female receptacles on the matrix board.
5	Plug the on (red) leads into the desired schedule on female receptacles.
6	Plug the off (black) leads into the same schedule off female receptacles. <hr/> NOTE! No Class 1 wiring should enter the Class 2 compartment. No Class 2 wiring should enter the Class 1 compartment unless properly insulated. Figure 4 shows a typical wiring diagram and the location of the Class 1 and Class 2 compartments. <hr/>
7	Turn off the breaker(s) or circuit(s) being controlled.
8	Route the wire through the RR-7 relay and back to its source and label each wire individually with the breaker number.

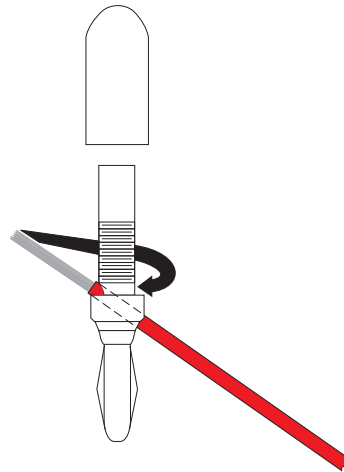


Figure 3. Wiring the banana plug relays

Once 24-VAC power is connected to the LCU electronics, the LCU pulses all properly wired RR-7s to the fail-safe (on or closed) position. For information about connecting power, see “Installing the LCU Electronics Transformer” in this document.

NOTE! If an LCU has fifty-six RR-7 relays (the maximum limit), it may take more than one pulse to change all of the RR-7s to the proper state. Pulses occur every 32 seconds.

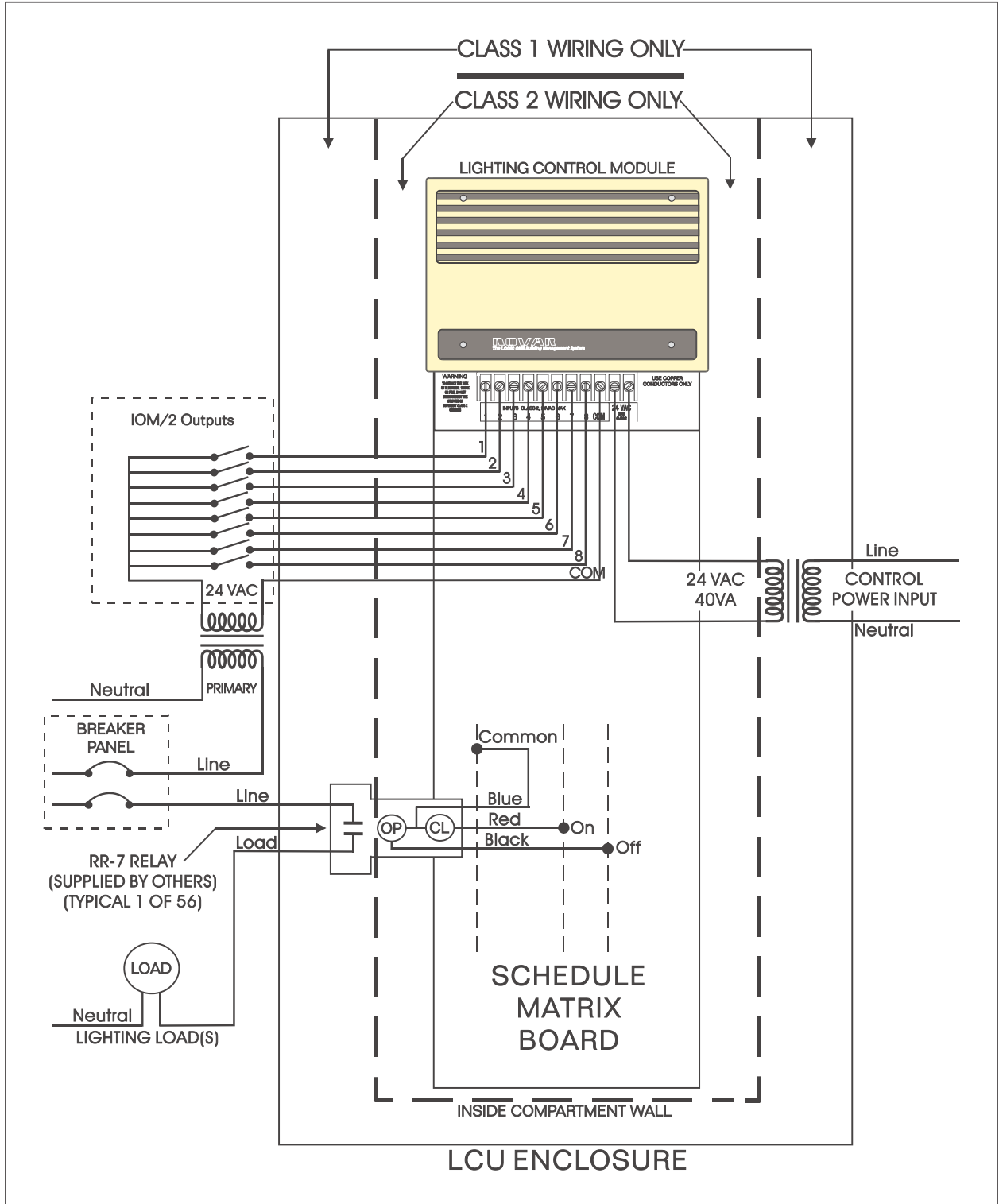


Figure 4. Typical Wiring Diagram for LCU

Wiring the IOM Outputs to the LCU Terminal Strip

All control schedule wiring must meet national/local codes. Refer to Figure 4 for the location of the Class 1 and Class 2 wiring compartments.

The control schedule wiring must be Class 2, low voltage, 18- to 20-gauge solid or stranded cable. If using all eight schedule groups, a 10-conductor wire is recommended.

NOTE! Make sure that the Class 2 wiring does not interfere with removing the LCU electronics. If holes are punched in the top of the LCU for wiring, they should not be directly above the LCU electronics.

Determine the total number of schedules provided/required (8 maximum). Input devices should be Class 2 contacts, 24-VAC. A supply transformer must be provided at the IOM.

- Connect one side of the transformer to one side of the IOM outputs.
- Connect the other (common) side of the transformer to Terminal 9 (COM; see Figure 5) on all LCUs.

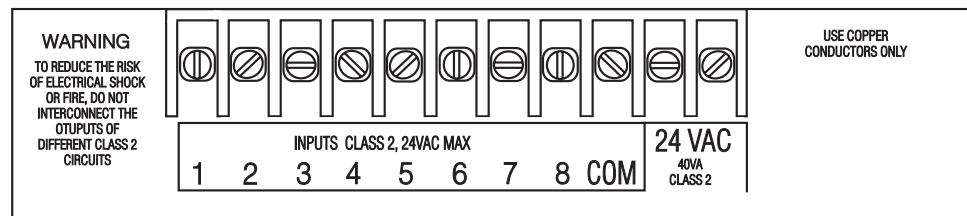


Figure 5. LCU Terminal Strip

Each IOM output should be connected to a respective terminal on all LCUs.

NOTE! IOM output wiring can be wired in parallel to multiple LCUs. If the matrix board is becoming full, the banana plugs can be wired in tandem to make it easier to insert them on a loaded LCU.

Installing the LCU Electronics Transformer

The 24-VAC transformer that powers the LCU electronics comes in a separate package and must be mounted in the LCU during installation. Use the following procedure and refer to Figure 6, as necessary, to install the LCU electronics transformer.

Step	Procedure
1	Thread the two wires located on the primary side of the electronics transformer through the hole provided in the wall on the right side of the LCU electronics and connect them to 120-VAC or 277-VAC, as required.
2	Tighten the locknut on the 277-VAC transformer until the transformer is held firmly in place in the hole. NOTE! The 120-VAC transformer is connected to the hole using a different method. Instructions for making this connection are packaged with the transformer.
3	Connect two wires from the 24-VAC secondary side to the terminals labeled 24-VAC, 40 VA, Class 2 on the electronics.

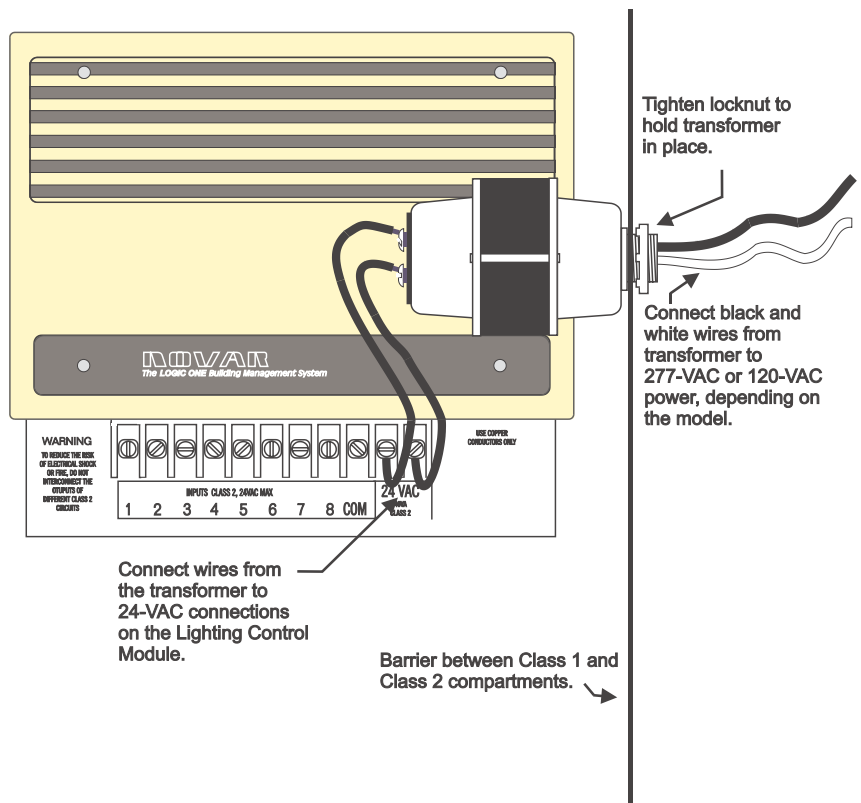


Figure 6. LCU transformer installation

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Checking Operation

When the installation has been completed, the following items should be checked to verify that the LCU is operating properly.

- Turn on power to the LCU. With all IOM output contacts open, the LCU should pulse all RR-7s closed, enabling all lighting to be on. There should *not* be any voltage present when reading across LCU Terminals 18 to COM (Terminal 9). If the lights are not on, verify 24-VAC on Terminals 10–11 (24-VA electronics power).
- Close IOM Output #1. Verify 24-VAC from Terminal 1 (Schedule 1) on the LCU to Terminal 9 (COM). The LCU should pulse the RR-7 relays to the open (off) state within 32 seconds. Repeat this test for all schedules provided.
- Open input device Schedule 1. Verify the absence of voltage on the LCU Terminal 1 and Terminal 9 (COM). The LCU should pulse the RR-7s to the closed (on) state. Repeat this test for all schedules provided.

NOTE! To provide fail-safe operation (lights fail on), the output activated state of the software should be set to off at the IOM Control Settings and Parameters screen in the software.

Model and Part Numbers

Use the part numbers provided in Table 1 to order the necessary Novar Controls parts.

Table 1. Novar Controls Part Numbers		
PRODUCT	MODEL NO.	PART NO.
Lighting Control Unit (277-VAC)	LCU-1010	731000000
Lighting Control Unit (120-VAC)	LCU-1012	731002000
Lighting Control Relays	RR-7	731060000
Banana Plugs for RR-7 Relays	LCU-PLG	731050000
