

This section details the installation of the LightLEEDer lighting controller. The proper installation of the hardware and wiring is important to make a trouble free reliable lighting control system.

2.0 Pre-Installation Check List

- Unpack the lighting control panel.
- Report any damage to the freight carrier.
- Remove the enclosure door and set aside.
- Determine appropriate mounting location for panel.
- Mount the panel to the wall.
- Punch knockout holes for high and low voltage conduit runs.
- Pull a dedicated line and neutral to the control transformer and terminate.
- Pull line wires from circuit breaker box to the relays.
- Pull load wires to lighting loads from the relays.
- Connect line wires to load wires. Test for shorts by powering up the circuits.
- After clearing faults, connect line and load wires to relays.
- Pull CAT5 data line wires to panels and devices and terminate with RJ45 connectors.
- Test all cables with the appropriate cable tester.
- Pull any switch wires, dimming wires, or sensor wires and terminate to the appropriate connectors.
- Clean the cabinet of any construction debris and dust.
- Double check all high voltage connections.
- Apply power to the panel

2.1 Mounting the Controller

2.1.1 Location Determine the proper location for mounting the lighting controller. Typically the panels are mounted near the lighting circuit breaker box and near the lighting loads that will be controlled.

2.1.2 Environment Considerations Standard LightLEEDer panels are installed in a NEMA 1 enclosure designed for indoor applications, where conditions are not usually severe. The panels should be mounted in an area with an ambient temperature between 0 and 50° C (32°-122°F) and humidity from 10 to 90% non-condensing.

2.1.3 Mounting The enclosure is provided with 4 holes located at each corner of the enclosure. Secure the enclosure to the mounting surface with the appropriate hardware for the application.

2.2 Wiring the Controller

2.2.1 Wire Control Transformer Pull a dedicated 120VAC, 277VAC, or 347VAC circuit to the panel for the control transformer. See figure 2.1 for termination details. Cap the unused lead to prevent electrical shock.

2.2.2 Line and Load Wires Pull the line wires from the circuit breaker box and the wires from the lighting loads to the enclosure. Be sure to keep the high voltage wires isolated to the high voltage compartment. Connect each line to the appropriate load wire. Power-up the circuits, test for faults and clear any found. After testing each circuit, connect the line and load to the appropriate relay per the schedule. See figure 2.2 for details. Be sure to torque wire terminations to 20 lb. /in.

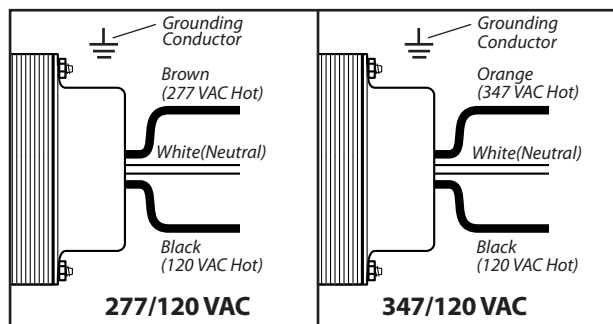


Figure 2.1 – transformer wiring details

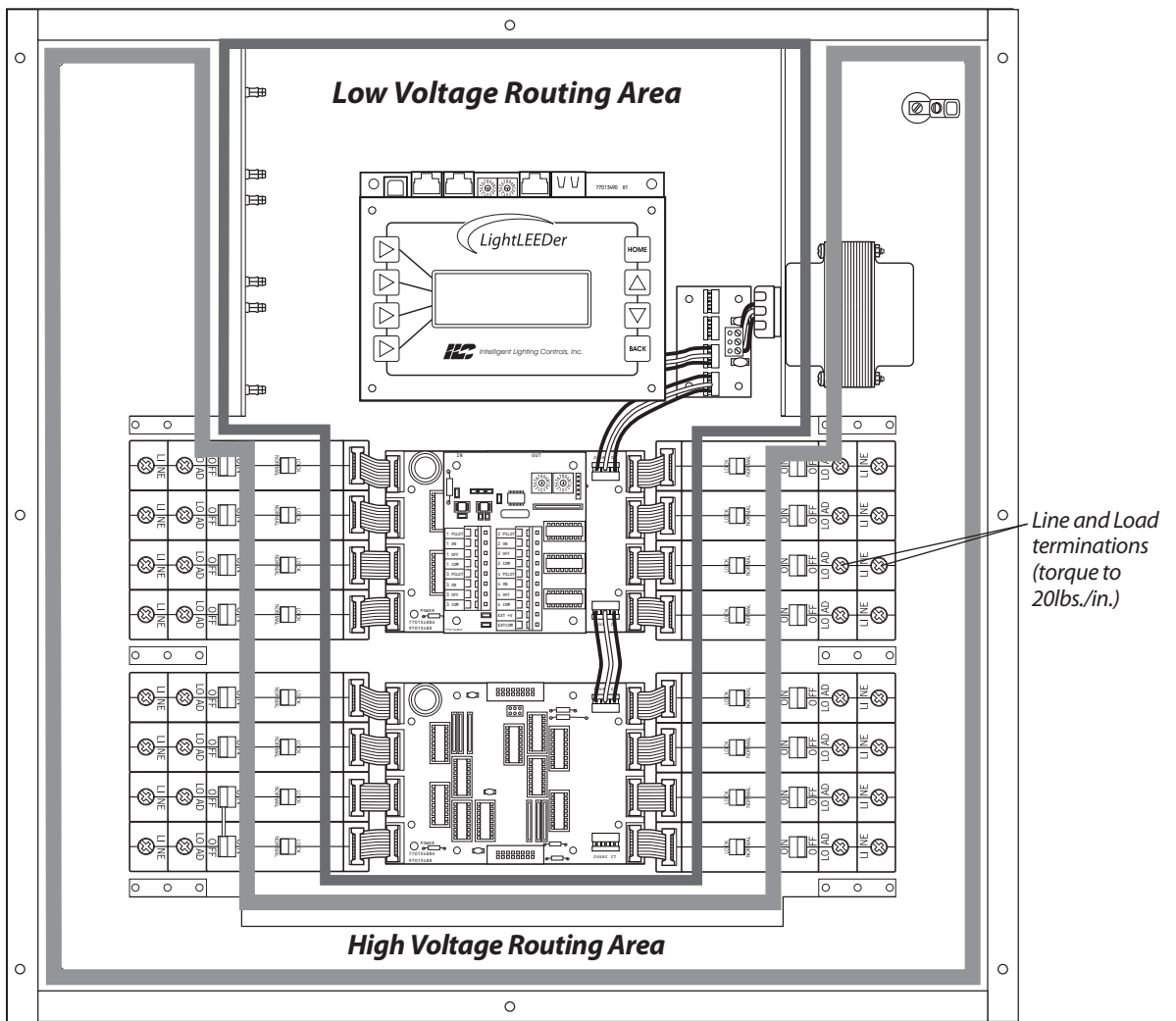


Figure 2.2 – Class2 and HV wiring areas

Note: Branch circuit protection and disconnect switch to be provided by installer

2.3 Network Cable Installation

2.3.1 Cable Installation Guidelines

- Observe all ILC Data Cable Requirements and LightSync Cable Run Distance Requirements as they pertain to your project in laying out the cable runs.
- Maintain the twists of the pairs all the way to the point of termination, or no more than 1" untwisted.
- Make gradual bends of the cable, where necessary. No sharper than a 1" radius.
- Dress the cables neatly with cable ties. Use low to moderate pressure.
- Use low to moderate force when pulling cable.
- Use cable pulling lubricant for cable runs that may otherwise require great force to install.
- Do not pull ANY data cable or switch wires with or along any high voltage wires.
- Keep all low voltage totally separate from ALL high voltage. Failure to do so will void the ILC warranty.
- Keep cables 2'-3' away from any potential sources of EMI as possible. (Line voltage runs, transformers, light fixtures, etc.)
- Install proper cable supports, spaced no more than 5 feet apart.
- Always label every termination point. Use a unique number for each cable segment. This will make moves, adds, changes and troubleshooting as simple as possible. Document these onto the riser provided.
- Always test every installed segment with a CAT-5 cable tester.
- Always leave extra slack in the cable run, neatly coiled up in the ceiling or nearest concealed place.
- Always use grommets to protect the cable when passing through metal studs or anything that can possibly cause damage.
- Always follow all local and national building and fire codes. Be sure to "fire stop" all cables that penetrate a firewall. Use plenum rated cable where it is mandated.
- Always contact ILC on installations between buildings or cable pulled underground. Special considerations may be needed.

2.3.2 Data Line Cable

The data line cables required for communications between panels and devices use standard Category 5, Category 5e, or Category 6 cable. RJ45 connectors must be rated for the type of cable being terminated to. Be sure that cable run in a plenum is rated for that use. Any cable run underground must have underground rated cable, have a 12AWG solid Cu wire pulled along with it grounded at one end, and have surge suppressors installed. Contact ILC for job specific questions..

2.3.3 Cable Installation

Data line cables need to interconnect all of the lighting control panels and all of the LightSync data line devices. Each controller has a local port that connects LightSync devices only. The controller also includes "in" and "out" ports for connecting panels together, which can also connect LightSync devices, but it is suggested that they are connected to the local port. **Note:** A network controller is required if using Data IN/OUT ports. See Figure 2.3 for network example.

Data cable to either panels or LightSync devices are run in a daisy chain pattern to form a network. "T" connections are permitted with the use of a Power Supply Repeater (PSR) and home-run LightSync devices may be done with a LightSync Hub.

LightSync™ Network Cable Run Distance Detail

Devices that operate on ILC's LightSync CAT-5, 5E, 6 data line include LightSync switches, photocells, and interfaces like the LightSync D-6 and SIB-4. A standard CAT-5, 5E, 6 cable is used for the data line and provides both data and power to these devices. There are limitations to the distance data can travel over CAT-5, 5E, 6 cable without loss, and distance limitations due to voltage drop associated with cable length and number of devices on the LightSync data line. These limitations are addressed by the addition of a Power Supply Repeater, Power Supply or LightSync Hub (see chart), depending on the application. The specific use of these devices depends on the project layout.

There are four main areas of limitation to be addressed:

- 1. Total Data Line Overall Distance:** The total data line end to end distance may not exceed 3000 feet without the addition of a PSR to the data line. Only a PSR will extend the data line.
- 2. Total number devices (ILC panels and LightSync devices):** Total number of devices without a PSR is 32. A PSR will add 31 more devices (PSRs are counted as a device).
- 3. Total number of LightSync devices powered:** No controller panel can power more than its maximum LightSync devices on the data line without a PS, PSR or LightSync Hub (each can power up to 20 additional LightSync devices).
- 4. Total Power Cumulative Distance:** The cumulative distance from each device to its power supply may not exceed 2000 feet if powered by a ILC panel, or 3000 feet if powered by a PS, PSR or LightSync Hub.

ILC Power and Data Repeating Device	Total Data (end to end) Distance	No. of LightSync Devices Powered	Cumulative Power Distance
ILC Panel	3000 feet	8	2000 feet
Power Supply (PS)	N/A	20	3000 feet
Power Supply Repeater (PSR)	3000 feet (combined)	20	3000 feet
LightSync Hub (HUB)	1500 feet per port	20 total	1500 feet per port

ILC Power and Data Repeating Devices

A **Power Supply Repeater (PSR)** is both a power supply and data repeater and its primary purpose is to repeat data and provide a bridge to another data line capable of 3000 feet end to end. This device also has one incoming and two outgoing RJ45 ports to split the line into two different directions. The PSR also adds power to LightSync devices for an additional 3000 cumulative feet.

A **Power Supply (PS)** provides additional power as needed to the LightSync data line. This is the most efficient option to compensate for voltage drop from multiple LightSync devices on the data line. Note that a PS provides power only and does not repeat data.

A **LightSync Hub (HUB)** is a device that allows a home run configuration by providing RJ45 ports for up to 20 LightSync devices, supplying power and data up to 1500 feet per each port.

Figure 2.4 – LightSync Network Cable Run Distance Detail

2.3.5 Cable Termination and Testing

Data cables will be required to be terminated with the proper RJ45 crimp-on connectors for the cable being used. Follow the pin-out shown in figure 2.5. Be sure the color coded wires are terminated exactly as shown. Always visually inspect for a completely seated crimp, as damage could occur to the mating connector on the processor or device.

Test every cable prior to installation for shorts, opens, and inducted voltage. We suggest the use of a LandRover Pro tester manufactured by Test-Um, Inc. Be sure not to connect your tester to a cable connected to any hardware as damage may occur.

2.3.6 Connect Cable

After cables are tested, they can be plugged into the panels and devices. Cables start at the "out port", go to the next panel or device and enters the "in port". This is continued until all devices are connected. See figure 2.6 for details of ports.

2.4 Pre-Power-Up Checks

- Verify power to controller and output boards from the secondary of the transformer. The voltage should be 24-28VAC from red wire to red wire, 12 – 16VAC yellow wire to each red wire. See figure 2.1 for details.
- Verify power connectors to output boards are seated and have voltage from the secondary of the transformer.
- Verify all ribbon cables between controller/output boards and connecting relays are well seated.
- Verify all high voltage wires are terminated and all high voltage fish paper barriers are installed.
- Verify all data cables, sensor wires, dimming wires, input wires are terminated properly.

2.5 Power-Up and Check Out

2.5.1 Power-Up

The power switch is located under the right side of the keypad. Turn the power switch to the right to activate the controller. The power LED located in the lower left should light and the LCD should display the default time and date.

2.5.2 Verify Relay Operation

With the controller powered up press the "all on" push button switch located on the lower left side of the controller, all of the relays should turn ON. Press the "all off" button and verify that all relays turned OFF. The relays have built in indicator on their on/off override switch that indicates their state.

2.5.3 Clearing Memory

It is very critical to clear the memory in the controller prior to programming eliminating any possible unwanted mapping. From the keypad/display push "Edit", then scroll down to "Special Functions", then scroll down to "Firmware Revision", press both up and down scroll buttons simultaneously to enter a hidden menu, and then scroll down to "Clear All Memory".

2.5.4 Set the Internal Clock

Clock settings must be set in the controller if the panel runs time schedules or turns on/off lights in reference to sunrise/sunset. From the keypad/display push "Edit" and scroll down to the "Clock" menu. From this part of the menu you can set the time and date, set up the daylight saving time settings, set the astronomical parameters, and view the current sunrise/sunset settings. See Section 3.3 for more details.

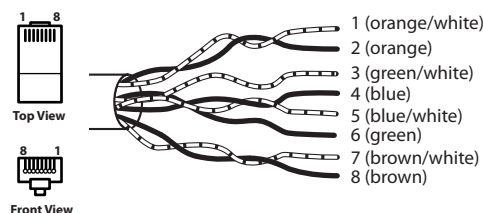


Figure 2.5 – RJ45 Cable Termination Detail

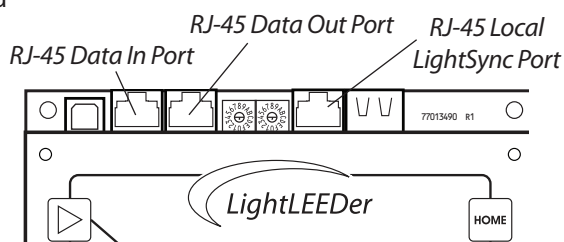


Figure 2.6 – RJ45 Cable Termination Ports