

Appendix EM

LightLEEDer Emergency UL 924 Lighting Control

Important Safeguards:

When using electrical equipment, basic safety precautions should always be followed including the following:

- Read and follow all safety instructions.
- 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 be subject to tampering by unauthorized personnel.
- The use of accessory equipment not recommended by the manufacturer may cause an unsafe condition.
- Do not use this equipment for other than its intended use.
- If any Emergency Circuits are fed or controlled from this panel, it must be located electrically where fed from a UPS, generator or other guaranteed source of power during emergency and power outage situations.

Introduction:

The LightLEEDer Emergency UL 924 lighting controller provides emergency bypass operation for the R40 relays. The LightLEEDer panel will be provided with UL 924 Relay Bypass Output Modules that will override the relays ON when normal power is lost to the panel. An optional Phase Monitoring Module can be added to the panel to monitor two or three phase power, when EM load relays are on more than one power phase of the emergency system. This configuration is used with a UL 1008 transfer switch operated by an emergency system providing back-up power. See figure 5

Combined with the standard LightSync 0-10V dimmer output module that will revert to full/non-dim level when the module loses power creating a complete emergency bypass operation of controlled emergency lighting.

This Appendix is intended to add specific detail and instructions related to the emergency operation of the relay panel. All controller programming along with normal power and control wiring in the LightLEEDer Operation Manual shall apply, in addition to the items listed in this appendix EM section.

Programming options for relay power-up (3.6.3) and relay conditionals (3.6.4) can be used for setting a return to normal power operation sequence, otherwise the R40 relays will remain in the current state as determined by the RBOM at the start of the power outage.

LightLEEDer UL 924 Emergency Relay Bypass Output Module (RBOM) details:

The RBOM mounts in the same location as a standard Relay Output Module as shown on lighting controller detail 1.3 and uses the same mounting screws and ribbon connections to the R40 relays.

Normal power must be run to the panel power transformer providing the 24VAC CT connection to the RBOM from the power distribution board.

Note: Do not feed the panel processor or transformer from the emergency power source. Only the load relays controlling emergency lighting are fed from the emergency power source.

The RBOM has a LED status indicator for 24V power to the board, and VIO from the ribbon cable the same standard 24VAC CT 3-wire power connections are used on both an RBOM and the standard Relay Output Module (ROM).

The installer may use relays on only one side of the enclosure for emergency loads, or the entire panel may be emergency loads. See submittal documents for panel configuration. Two rows of four jumpers are provided for selection of the emergency operation of each relay output on the odd or even side of the RBOM. These jumpers allow selection of; Force On, Force Off, and No Control for each relay during a power outage to the panel.

Each RBOM has a "TEST" button for triggering the module into the EM state, and a status LED that flashes when the module is triggered. Auxiliary connectors are provided for an optional external test station momentary closure (J4) and normal power status led (J5)

See Figure 1

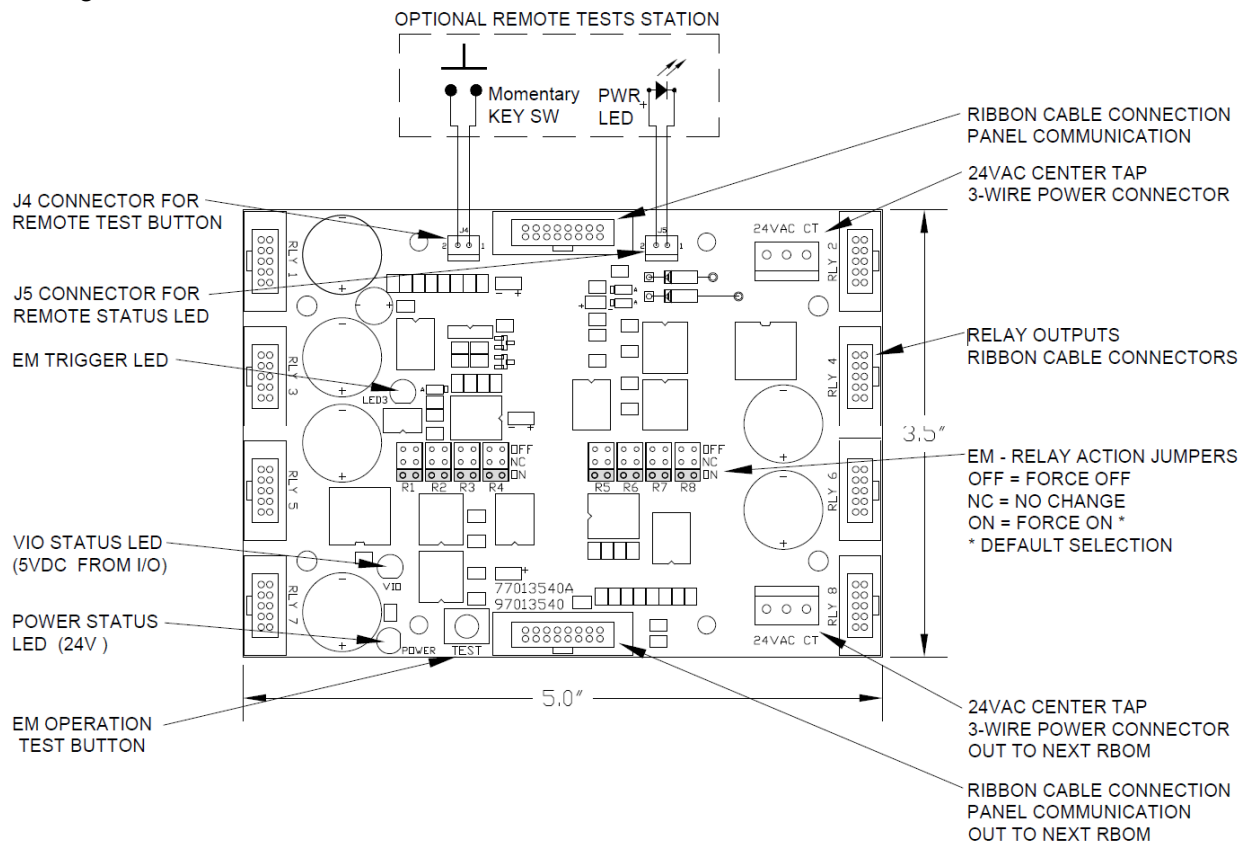


Figure 1 - Relay Bypass Output Module details

The RBOM module replaces the standard R40 relay output module used in a LightLEEDer lighting control panel. Typically, these are installed at the factory, but can be field installed. If the entire panel is operating emergency powered loads, normal power must be used to power the transformer and LightLEEDer CPU. If the panel controls a combination of normal and emergency loads, the standard layout would have the left side or bottom half of the panel with the emergency load relays. Separation between EM and normal power relays is provided using the steel High Voltage Dividers (HVD) placed between relay sections. Emergency sections are marked with provided labels to designate the EM sections. See Figure 2.

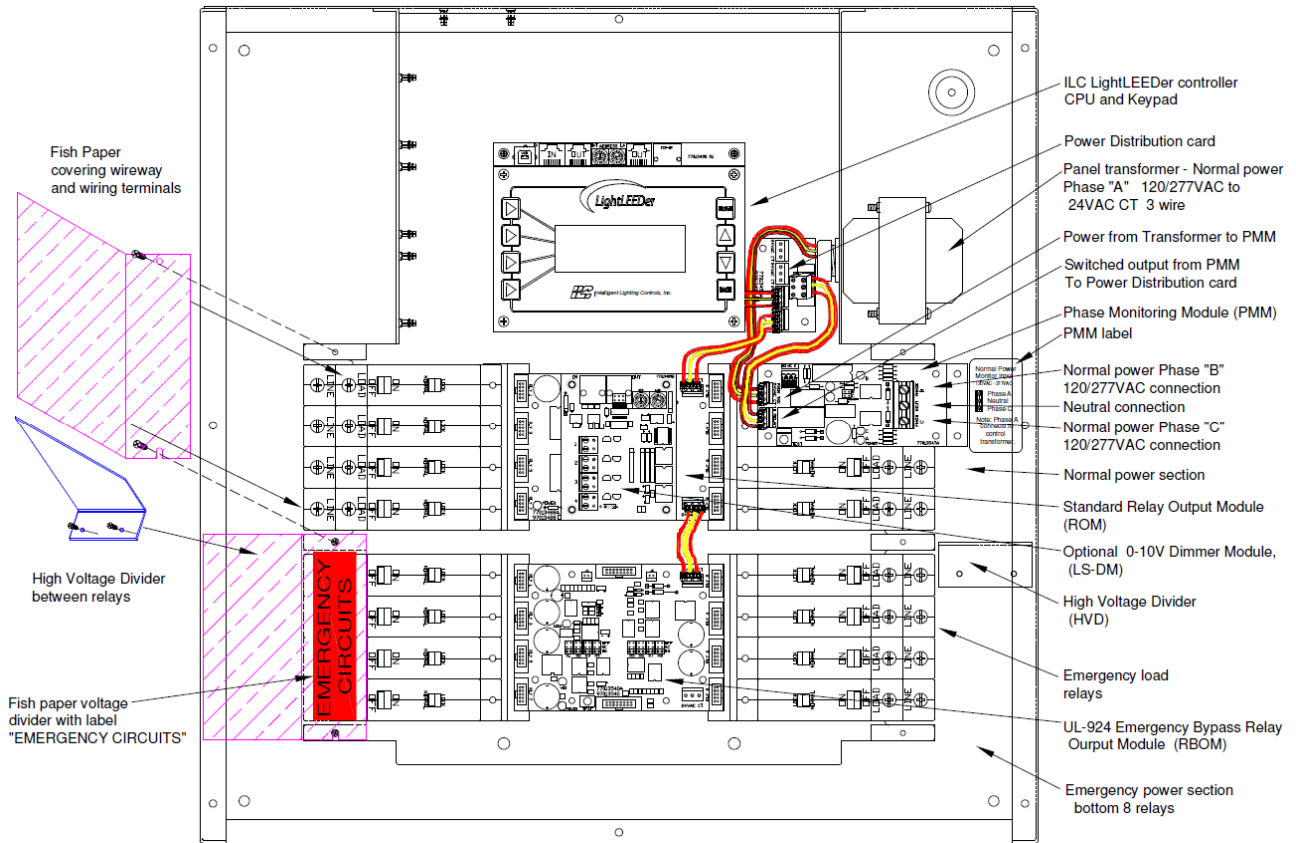


Figure 2 - Emergency UL 924 Lighting controller with RBOM

Panel Installation:

Follow all installation requirements for a LightLEEDer panel in the manual. This LL-EM panel is configured at the factory for emergency and normal loads, field installation requires landing loads to the proper relays, setting control jumpers, and making the required connections to the power transformer and PMM.

1. Review submittal documents and confirm the relays to be used for emergency control.
 2. Land the emergency circuits at the designated relays.
 3. Verify jumper setting on the RBOM for the EM relays are set to "ON"
 4. Verify voltage dividers, if required.
 5. Land the phase "A" un-switched normal power to the panels transformer.
- * See Figure 3 and PMM information for monitoring all 3 phases of normal power.

Optional LightSync 0-10V Dimmer Module:

The Optional LightSync Dimmer Module (LSDM) or (LS-IDM) can be added to an Emergency panel local data line bus CAT-5 connection for remote mounting. This 0-10VDC dimmer control module will revert the dimming output control to a full brightness or 100%-on/non-dim level when local bus power is lost to the dimmer module.

During a normal power outage, the LightLEEDer processor (LL-CPU) is powered by normal power feed and would be off-line, causing any LightSync device on its local bus power to be off. Follow all standard dimmer control module instructions and wiring requirements in Appendix A, testing the emergency operation of the dimmer module can be done by switching off the LL-CPU power switch or unplugging the local bus CAT-5 connection.

Phase Monitoring Module Option Details:

The Phase Monitoring Module (PMM) can be added to the LightLEEDer Emergency panel for monitoring up to three phases of the normal AC power system. This is used to ensure that when any of the three phases drops, the LightLEEDer emergency relay panel will react to this as an emergency event. The PMM will interrupt normal power to the RBOM when it senses a loss of power from any phase.

Phase "A" is wired to the panel's power transformer and is connected to the PMM input marked "From TRX 24VAC CT". The PMM controlled output marked "To Relays" is wired to the power distribution board, which in turn provides power for the panel CPU and the Relay Bypass Output Modules.

Phase "B" and "C" normal power is directly wired to the PMM along with a neutral connection on the terminals provided. The PMM is provided with disable jumpers to allow removal of the 3rd phase for 2-phase monitoring.

LED status indicators for all 3 phases, and a test button are provided.

An auxiliary status output relay is provided for signaling others systems. The PMM has connection terminals for the normally open/normally closed auxiliary output, this isolated relay is rated at 1 amps 30VDC. See Figure 3

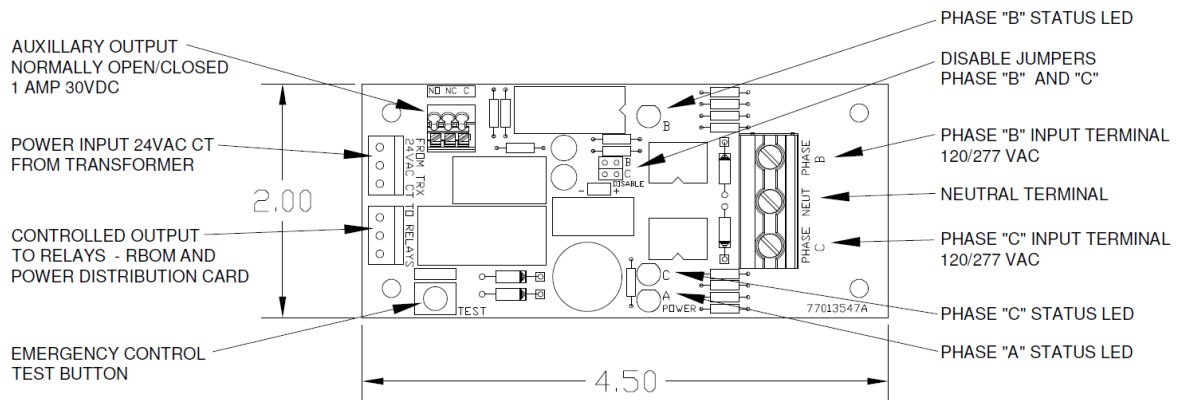
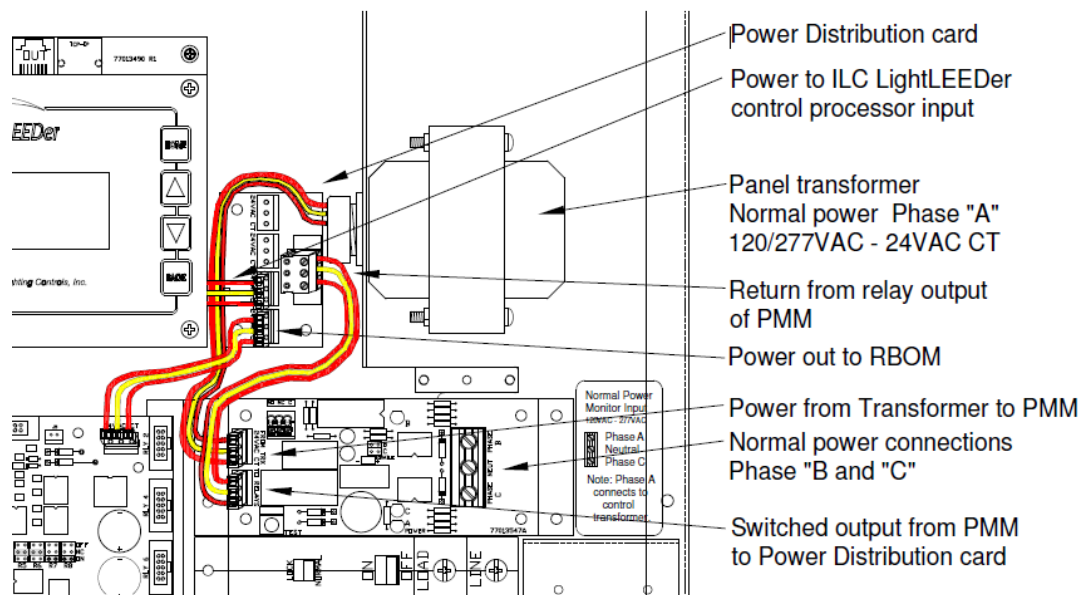


Figure 3 - Phase Monitoring Module detail

Phase Monitoring Module Configuration and Wiring:

The LightLEEDer panel provided with optional Phase Monitoring Module will require field wiring the phase "B" and phase "C" un-switched normal power to the PMM.

1. Verify the PMM is installed and that the power from the transformer is connected to "FROM TRX 24VAC CT" terminal.
2. The "TO RELAYS" terminal will feed the power distribution card.
See Figure 4
3. Normal un-switch phase "A" power will feed the panel transformer.
4. Phase "B" and "C" un-switched normal power will connect to the PMM terminals, along with a normal power neutral.
5. Verify that the disable jumpers are removed for phase "B" and "C" monitoring operation.
6. Switch on the three circuits to be monitored, and verify that the A, B C phase status LED's on the PMM are lit.
7. Test operation using the Test button to trigger the PMM.



The Phase Monitoring Module is provided with mounting back plate and barriers for voltage division, along with a monitoring input terminal label for phase B and C connections. When installing the PMM in the panel it is normally mounted in upper right section taking up relay locations 2 & 4. The PMM can be installed in another area of the panel, but the wiring leads for the 24VAC CT would need to be extended.

Testing Emergency operation:

Test the operation of each RBOM by pressing the test button on the lower left side of module. All relay should fire into the ON state, OFF state, or remain in its current state depending on the Selection of the relay action jumpers. See Figure 1

Testing the entire panel can be done by using the test button on the PMM. See Figure 3.

If a relay does not operate, first test the relay operation using the manual on/off switch at the relay. Then using the controller keypad under relay status. If the relay is not switching, you can use a spare relay to test the output or switch the relay control ribbon cable to a confirmed working relay output.

After determining if the relay, relay ribbon cable, or RBOM output point is non-functioning, please contact ILC technical support line (1-800-922-8004) for additional assistance.

Code-Required Testing:

NFPA requires that the testing of emergency lighting equipment be conducted monthly.

ILC recommends following all requirements for monthly testing, and record keeping.

Refer to NFPA section 7.9.3. for details and requirements.

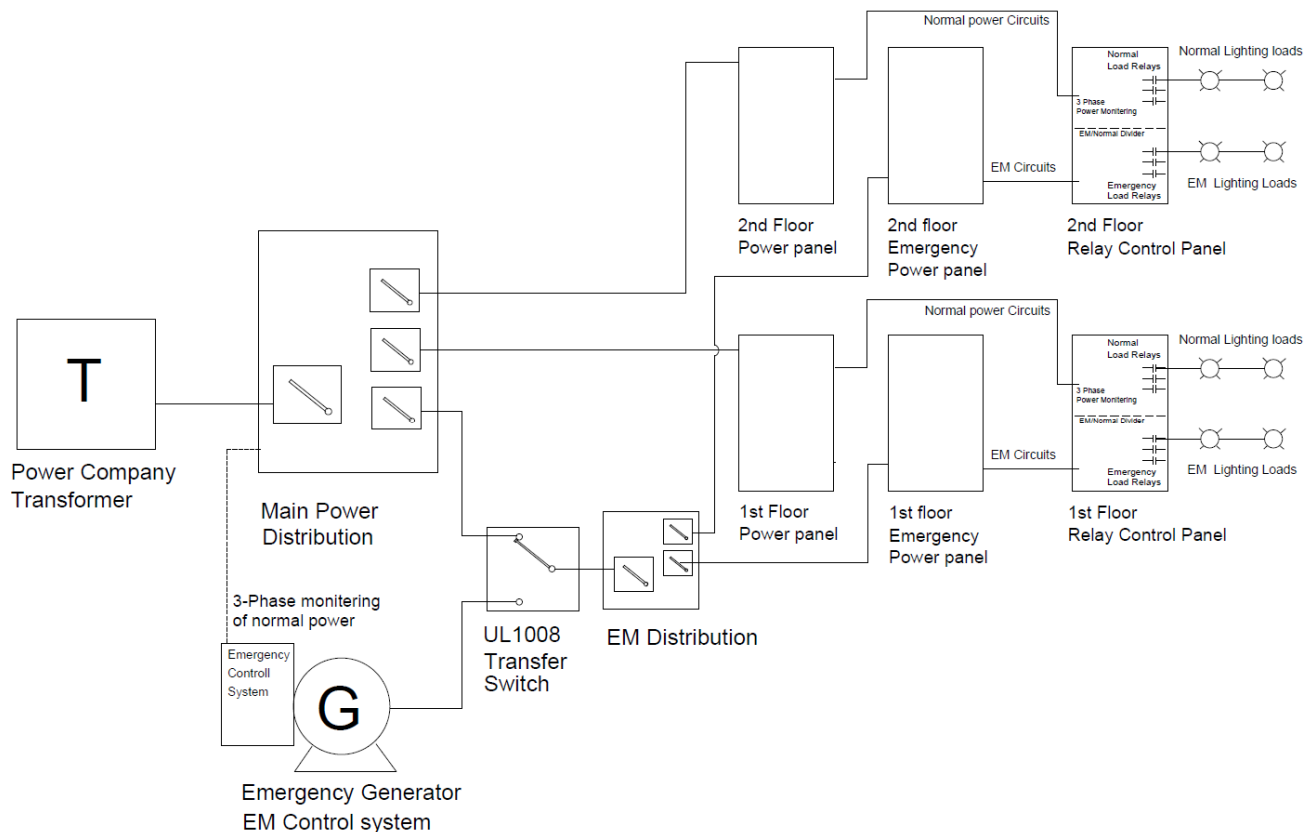


Figure 5 - Power Configuration Example Riser