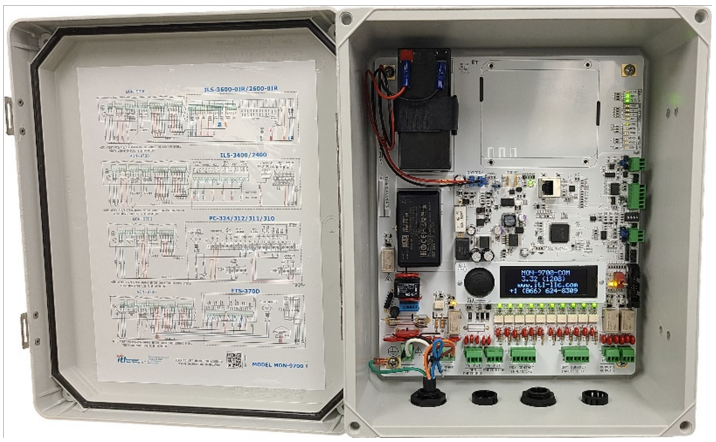
Installation Instruction Manual

MON-9700

Monitoring System



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itl International Tower Lighting, LLC™

Front Matter

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ITL, LLC guarantees that every MON-9700 monitoring system is free from physical defects of material and workmanship under normal use for one (1) year from the date of purchase. If the product proves defective during this warranty period, please contact ITL, LLC in order to obtain a Return Authorization Number, RMA.

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Please send any comments regarding the manual to support_doc@itl-llc.com.

Safety Warning

This equipment uses lethal voltages which can cause serious injury and/or death. Do not attempt to service this equipment with line power applied.

Never rely on just one switch to power down a high voltage supply. Measure for voltages using a voltmeter to ensure that power is off and has been completely removed.

Do not wear any jewelry when servicing this equipment. Gold and silver are excellent conductors of electricity.

Battery Warning and Disposal

There is danger of explosion if the included sealed lead-acid battery is replaced incorrectly. Only replace the battery with the same or equivalent type recommended by the battery manufacturer. Dispose of used batteries according to the battery manufacturer's instructions.

Do not incinerate, disassemble, or puncture the battery.

For questions or details please contact The Battery *Council International at (312) 664-6610*, or your local waste agency.

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Introduction

Congratulations, and thank you for choosing an ITL monitoring system.

We trust that ITL's reputation for technical excellence, experience in product development, commitment to our customers and testing will ensure your complete satisfaction.

You have chosen one of the most technologically innovative monitoring systems for monitoring tower lighting systems available on the market today. This product is the result of many years of engineering with extensive input from field service personnel.

This manual covers both, the MON-9700-000 hardwired Ethernet based system and wireless monitoring system.

Please take the time to read and familiarize yourself with this manual. It contains the information necessary to install, test and troubleshoot the MON-9700 monitoring system.

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Product Description

ITL's MON-9700 systems are designed to provide complete monitoring solutions for all types of tower lighting systems. The monitoring system's rich set of features is directly applicable to monitoring any type of strobe lighting system and red light controller system.

All MON-9700 controllers are SNMP enabled and support SNMP v1 and SNMP v2c capabilities to allow for M2M communication. Additionally, the system has built-in web pages to provide a more intuitive human interface and is supported by most web browsers. The web pages include pre-defined templates for the most common tower lighting configurations for quick and reliable installation.

The MON-9700 systems have ten dry-contact inputs for monitoring tower lighting system's alarm and status relays as well as door switches, generators and other equipment suitable for dry-contact monitoring. The tower lighting system's photocell is monitored and may be over-ridden remotely when needed. Resistive, Photodiode and 120VAC powered photocells are supported. The MON-9700 systems are pre-cabled for up to five dry-contact inputs and battery backup is included as a standard feature.

Both, hardwired Ethernet connection and wireless modem communication are supported.

Typical wireless applications include the use of a secure software tunnel provided by a third party for communication between the MON-9700 (Agent) equipment and network management system (NMS) or SNMP manager.

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Specifications

Environment

Temperature	-40ºC to +55ºC
Humidity	less than 95% relative humidity (non-condensing)

Mechanical

Enclosure

Dimension	Height:	13.56” (344mm)
	Width:	11.43” (291mm)
	Depth:	5.21” (132mm)
Weight		10 lbs (4.08Kg) max

Electrical

Model: MON-9700-000

Input Power	120/240 VAC at 60Hz, 12VA (max.)
Suppression	45 Joule, 275V, Input Power, Photocell
	23 Joule, 275V, Dry Contact Inputs
Relay Outputs	120/230 VAC, 1 Amp, Form-C

Model: MON-9700-24V (Option Available Upon Request)

Input Power	24 VDC, 2A
Suppression	23 Joule, 275V, Dry Contact Inputs

Communication Module

Digi WR21
Digi WR11
Digi IX10

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Installation

The following section describes how to install the MON-9700 series monitoring system. Based on the type of system you are going to install please refer to the appropriate wiring diagram in section *Wiring Diagrams.*

Unpacking your Monitoring System

Please examine the shipping containers and their content thoroughly upon receipt and report any potential shipping damage to the carrier.

Tools for Installation

The following tools are suggested for mounting of the ITL monitoring system and satellite.

- Digital multi-meter capable of reading 600VAC/DC (Fluke 177 or 179)
- Nut Drivers and Sockets
- #2 Phillips Screwdriver
- 5/16 Flat Head screwdriver
- Crimp Tool
- Needle Nose Pliers

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Quick Installation Guide

The quick start guide shows how to install the MON-9700 series monitoring systems. The guide provides only basic instructions to personnel familiar with these types of installations. For more details, refer to this document.

- Remove packaging material
- Determine make of existing tower lighting controller and select appropriate installation diagram from this manual
- Connect MON-9700 to tower lighting controller to be monitored using supplied harness
- Apply power to unit
- All input LEDs should be on solid or blinking
- Determine unit's IP number from either the LCD display
- Use web browser to configure basic network settings

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Mounting Enclosure Panel

The MON-9700 should to be mounted to a properly grounded H-frame or a structure which provides a direct low impedance connection to earth ground.

The mounting cannot obstruct access to the monitoring system's internal components for the purpose of installing and maintaining the equipment. The following diagrams detail the mounting dimensions and clearance for proper access.

Mounting Details for the Enclosure Panel

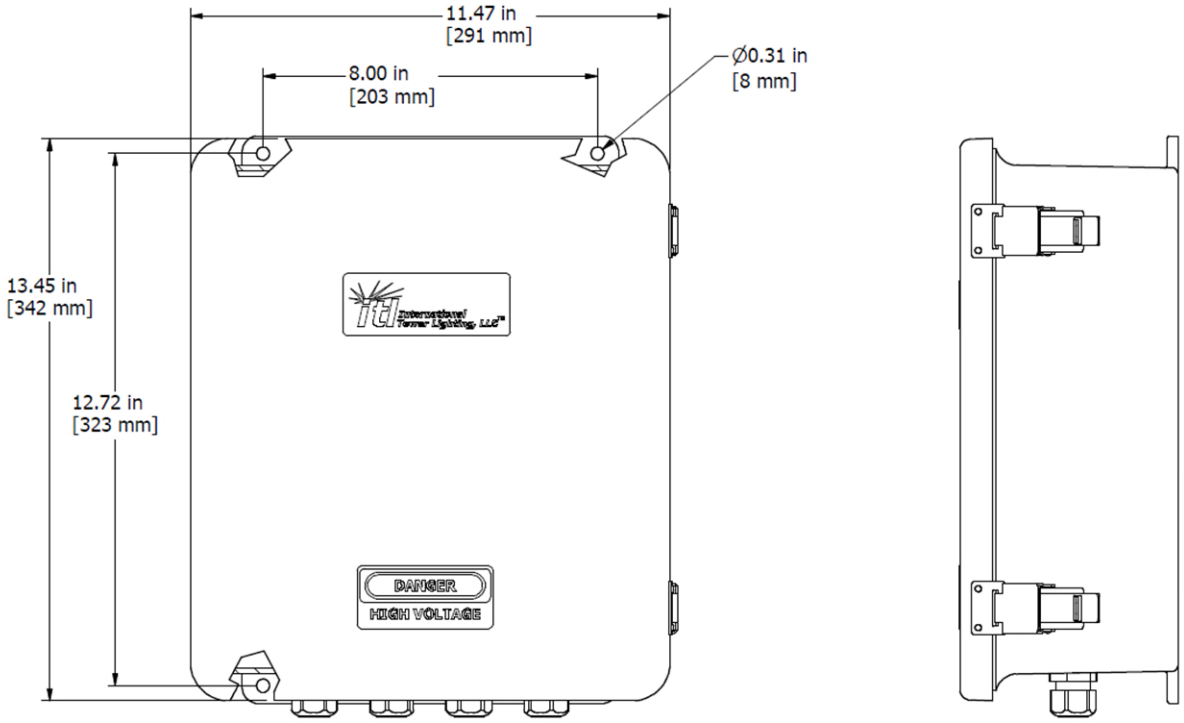

Figure 1: Mounting Details and Dimensions of Enclosure Panel

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Circuit Board

The following sections detail the MON-9700 internal circuit board assembly.

1. ITL-9700 Circuit Board Assembly

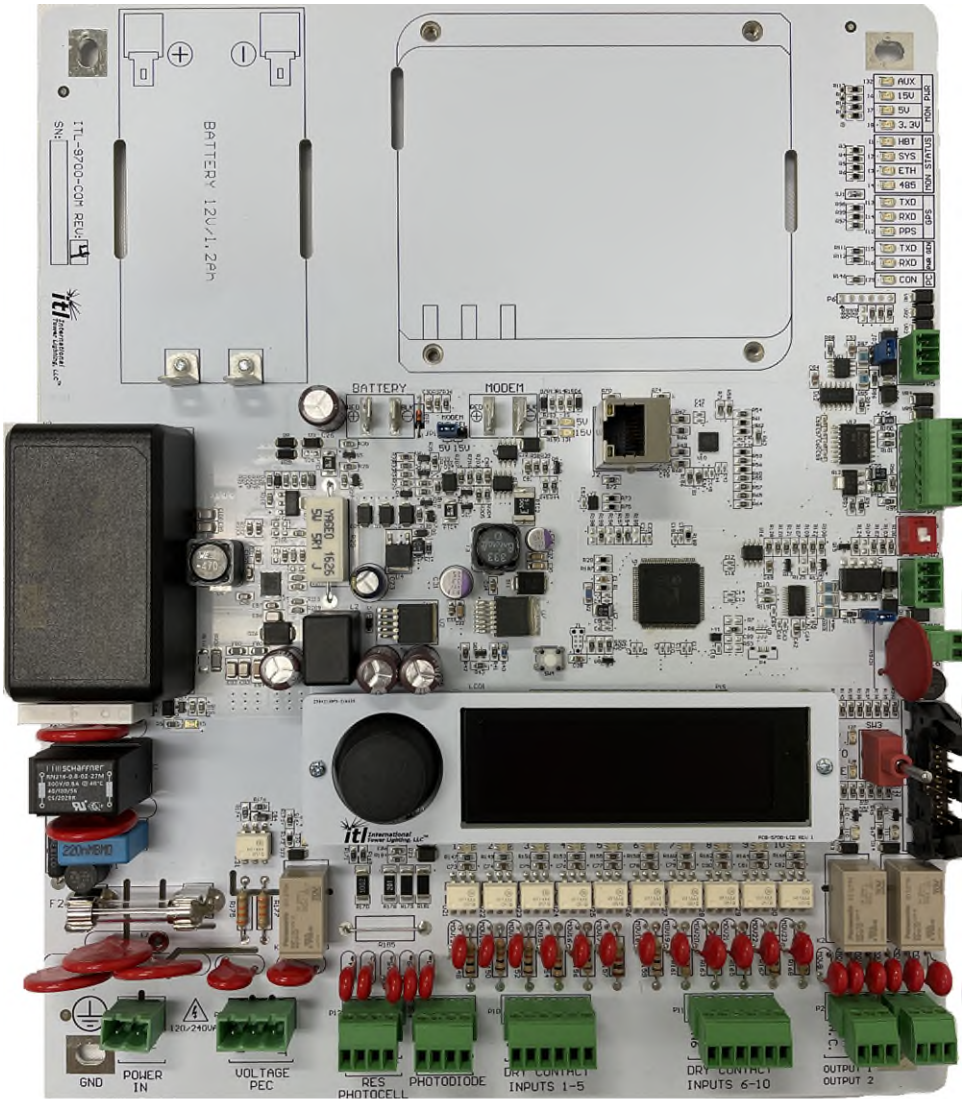

Figure 2: ITL-9700 Circuit Board

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A. Ethernet connection

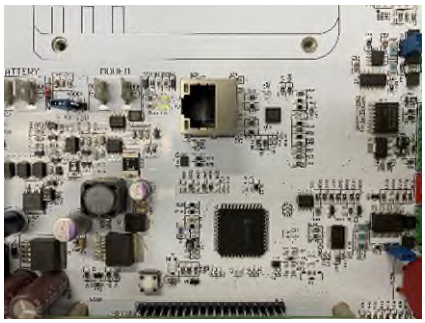

Figure 3: ITL-9700 Ethernet Connection

B. Battery connection and Modem Power

Observe polarity when connecting and disconnecting the battery. Note all battery warnings in the *Safety Warning* section.

Observe polarity when connecting the modem power. Also observe the jumper labelled MDM PWR SEL. Ensure that the jumper is correctly set for the input power requirements of the connected modem.

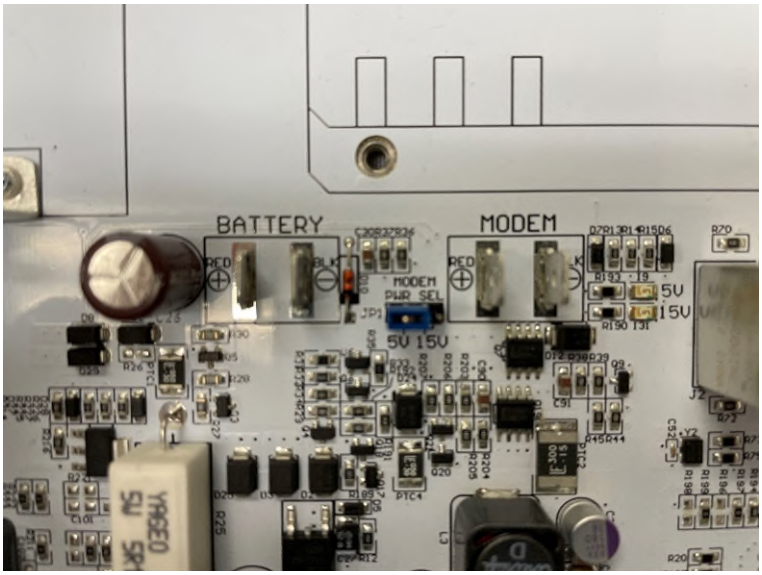

Figure 4: ITL-9700 Battery Connection

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2. LED Indicators

A. Mode

The Day/Nite LEDs will indicate the actual operating mode of the MON-9700. Under normal conditions the board will follow the state of the PEC and/or Photocell inputs.

For diagnostics purposes the normal operating mode can be changed manually with the on-board Manual Mode Switch. The board will follow the Manual Mode Switch if it is not in Auto mode and blink the corresponding LEDs, indicating that it is no longer in auto mode. The Manual Mode Switch will automatically time out after 8 hours, the LEDs will stop blinking, and the board will revert to following the PEC, Photodiode or Photocell inputs. The MON-9700's operating mode can also be overridden remotely in which case the LEDs will also blink. This special mode will not time out since it can be changed remotely.

Both special modes will trigger an exception, i.e. send SNMP traps if enabled, and/or report alarms to ADP if available.

Figure 5: ITL-9700 Mode Status LEDs

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B. Inputs and Output Relays

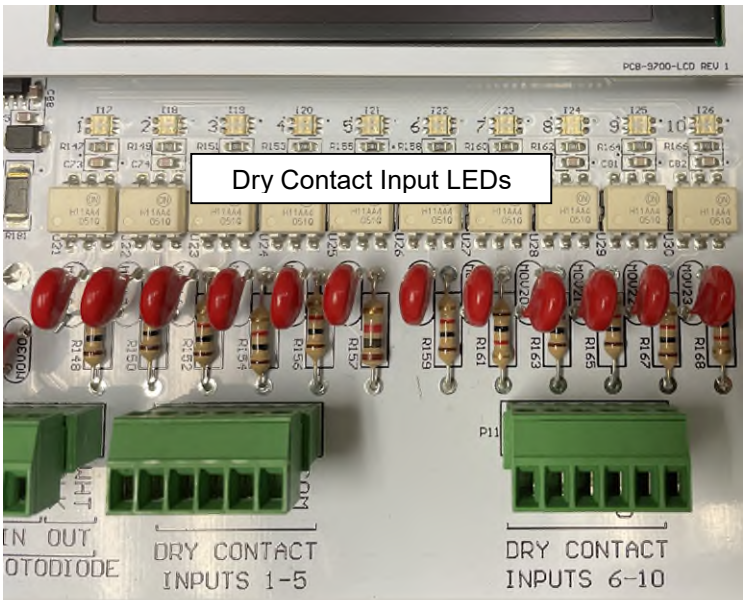

Figure 6: ITL-9700 Dry Contact Input LEDs

C. Indicator Function

Description	Function
INPUTS 1-10, 11-20*	Flashing Red – Alarm Steady Green – No Alarm Off – Disabled
OUTPUTS 1 & 2	On when output relay energized
DAY MODE	Steady – Day mode via connected light sensor Flashing – Day mode via remote/manual mode over-ride
NITE MODE	Steady – Night mode via connected light sensor Flashing – Night mode via remote/manual mode over-ride

* Inputs 11-20 only available with optional MON-9720 expansion board

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Input Connections

A. MON-9700-COM

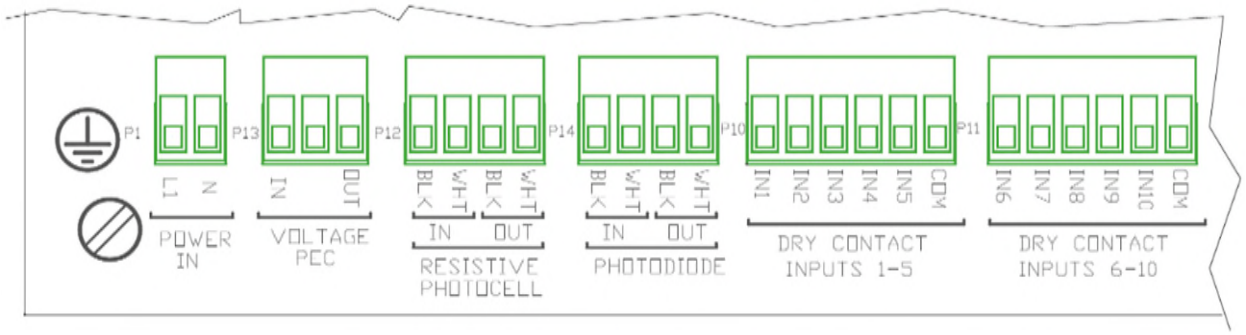

Figure 7: MON-9700-COM Connections

B. MON-9700-24V

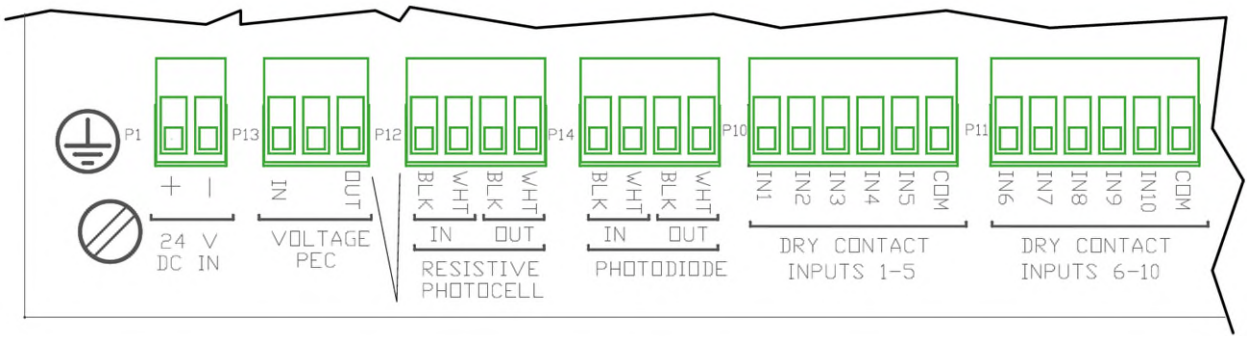

Figure 8: MON-9700-24V Connections

The MON-9700-24V supports 24V DC input. A resistive photocell is required for mode change operation with the MON-9700-24V.

Web Pages

The MON-9700 includes a web graphical user interface (GUI). The GUI can be accessed with most web browsers by directly typing in the device's IP address into the browser's address bar. The IP address is indicated on the MON-9700's on-board the LCD display. An example on how to access the product via a web browser is shown below:

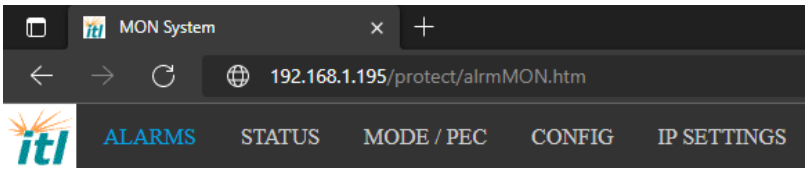

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Figure 9: Web Browser Address Bar

Alarm Page

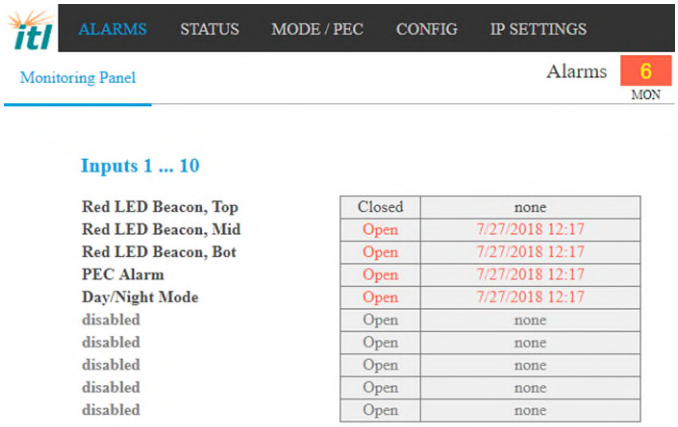

Figure 10: Alarms Page

The alarm page contains status of all input alarms, along with power, battery, remote override and PEC/Photocell/Photodiode status. Each entry will either indicate 'none' if no alarm exists or a timestamp when the alarm occurred. Additionally, an either *Open* or *Closed* state is indicated where applicable.

Alarms can be reset from this page.

The Alarm descriptions match the selections from the Input Configuration page. Table entries which are grayed indicate disabled inputs.

Mode/PEC

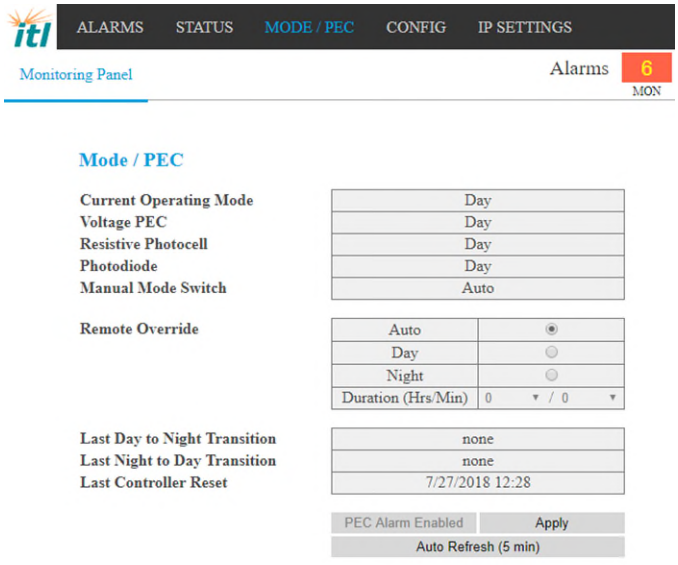

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Figure 11: Mode/PEC Page

The Mode/PEC page displays the system's operating mode along with PEC, Photocell, Photodiode, Manual Mode Switch and Remote Override Status. The system's mode can be changed remotely through this page if needed for test purposes or in case of a PEC/Photocell failure.

The page also indicates the last time the system switched from Day to Night Mode, Night to Day Mode and the last time power has been restored to the controller.

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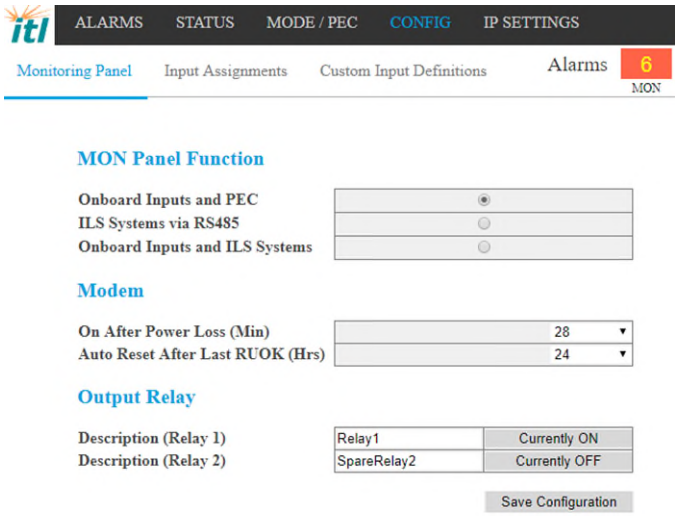
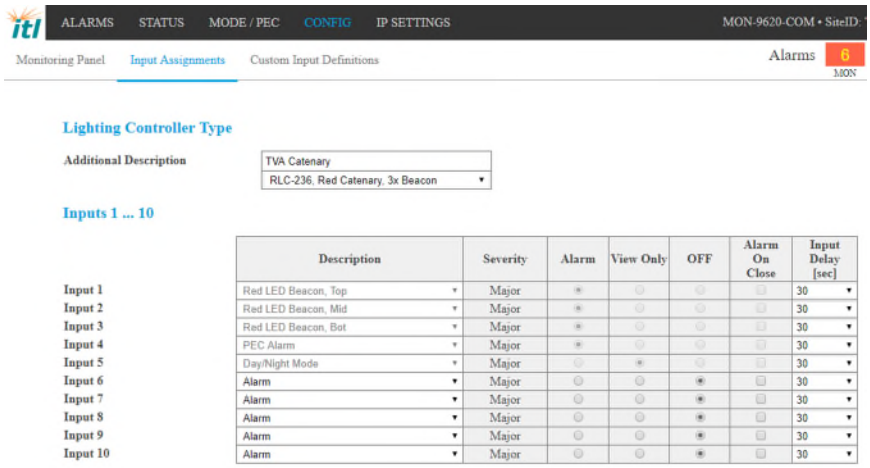
Configuration – Monitoring Panel



- The Monitoring Panel Configuration allow the change of the panels main function, modem timeouts and control of the output relay states.

Configuration – Input Assignements



- The Input Configuration page provides access to the MON-9700's built-in templates for selecting different manufactures' lighting systems to match this manual's included installation diagrams. Once a template has been selected those inputs cannot be further changed with the exception of the Input Delay. All remaining unused inputs can be disabled or assigned to monitor additional devices' dry contacts.
- Custom Input Strings that have been saved will be listed in the top ten spots of the Menus on each input.
- Copper Theft alarm will take over the contact for Output 2 giving connections for user supplied external sirens and/or lights.

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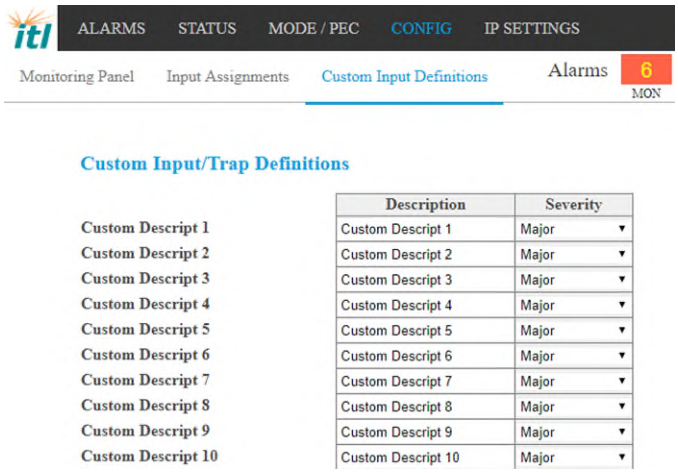
Configuration - Custom Input Definitions



The Custom Input Definitions page provides access to the MON-9700's optional user defined alarm strings. If a Custom input is needed the user can name and set the severity of the input choice. Once a name and severity have been added the user must save and this will allow them to select it on the dropdown menu from the Input Configuration page.

IP Settings - Network

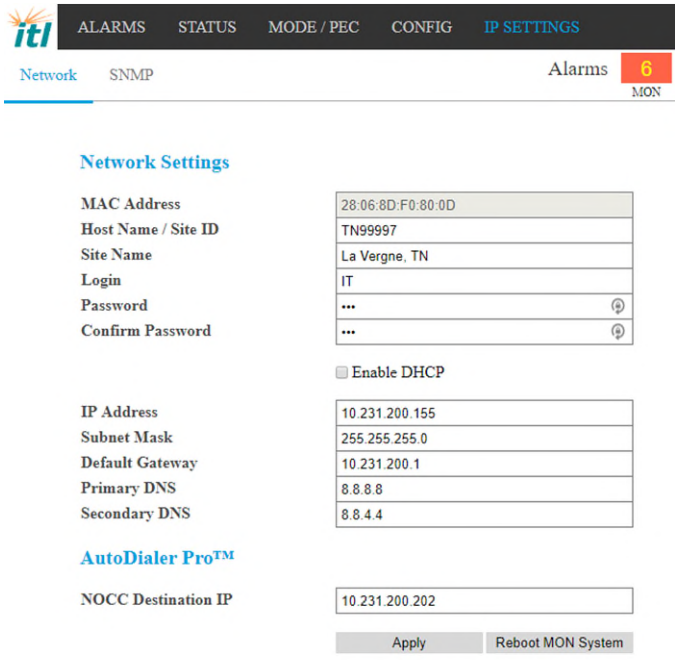


Figure 12: IP Settings – Network Page

This page provides access to the basic network settings. The *Host Name / Site ID* and *Site Name* are both included for reporting verbose SNMP traps. The Default IP Address is 192.168.1.195.

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SNMP Configuration

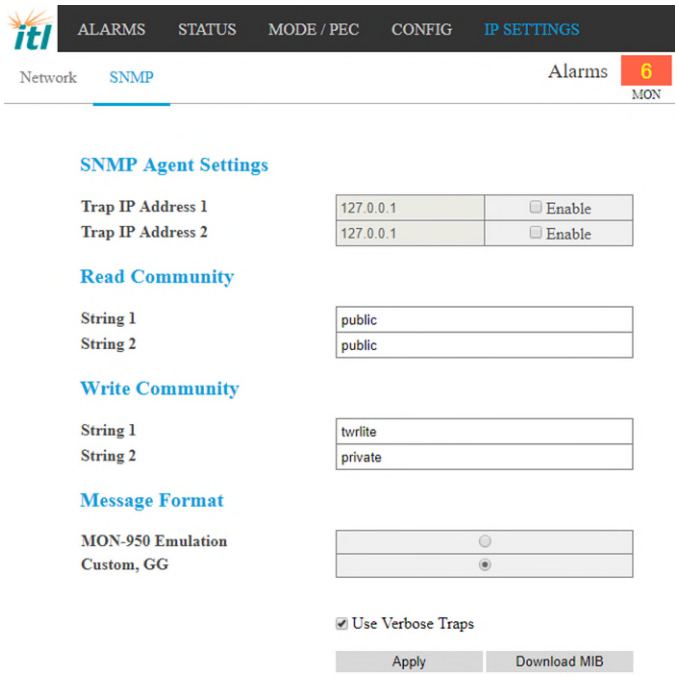

Figure 13: IP Settings - SNMP

This page allows for setting SNMP destination IP addresses for sending SNMP traps. The enable option must be checked for traps to be sent. *Enable Verbose Traps* will send SNMP traps in human readable format rather than numeric. Verbose Traps follow the format

SiteID : SiteName : AlarmDescription : Severity

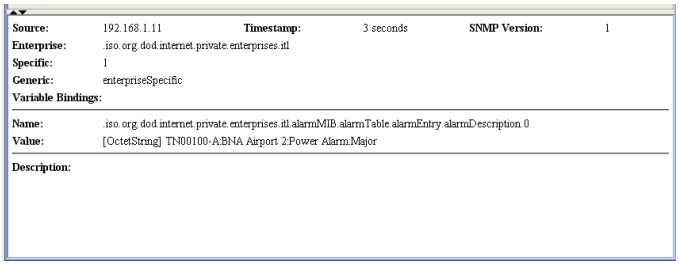

Figure 14: SNMP Verbose Trap

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SNMP

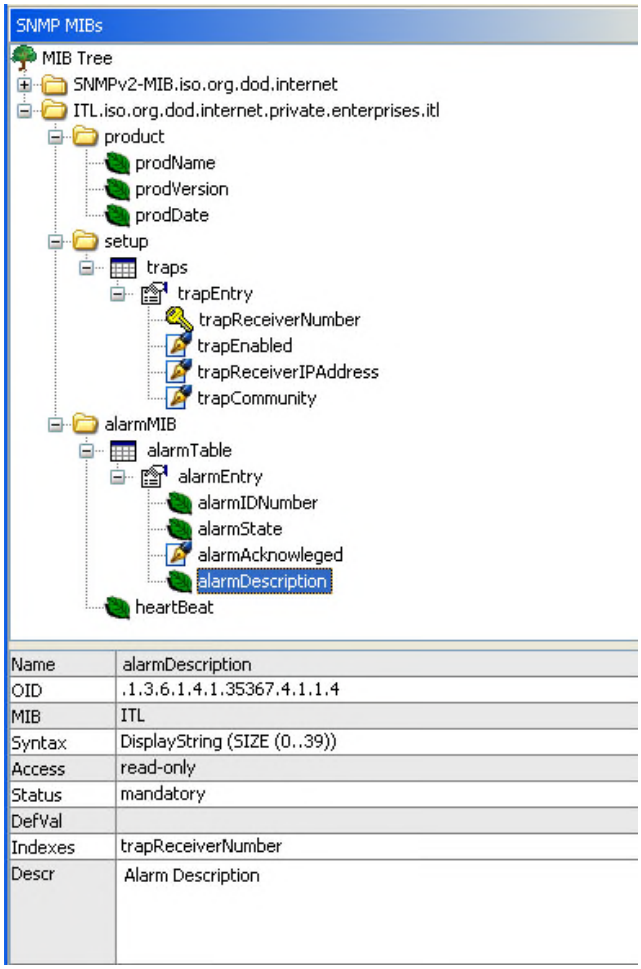
Besides the MON-9700's intuitive web interface the system can also act as a SNMP agent for administrators to query configuration and status of the unit.

The SNMP enabled MON-9700 supports both, SNMP v1 (RFC 1157) and community based SNMP v2c (RFC 3416) application layer protocols over User Datagram Protocol (UDP) transport layer, in order exchange information between the MON-9700 (agent) and a central SNMP manager or Network Management System (NMS).

The agent uses UDP Port 161 to respond (listen) to the SNMP manager and UDP Port 162 to send traps and notifications to the SNMP manager. Get, Get_Bulk, Get_Next, Set and Trap Protocol Data Units (PDUs) are supported.

MIB

The MON-9700 reference MIB can be downloaded from the IP Settings => SNMP web page.



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1. Object Identifiers (OIDs) and Names

With the exception of system Object Identifiers (OIDs), all MON-9700 OIDs will start with the ITL enterprise specific group number, IEEE Organizationally Unique Identifier (OUI), 43.6.1.4.1.35367 and branch from there as indicated below. The following objects are provided.

System OIDs

The following OIDs are read only and follow the

OID Branch: iso(1).org(3).dod(6).internet(1).mgmt(2).system(1)

OID	Name	Description
1.3.6.1.2.1.1.1	sysDescr	Description
1.3.6.1.2.1.1.2	sysObjectID	Object ID
1.3.6.1.2.1.1.3	sysUpTime	Up Time
1.3.6.1.2.1.1.4	sysContact	Contact
1.3.6.1.2.1.1.5	sysName	Name
1.3.6.1.2.1.1.6	sysLocation	Location
1.3.6.1.2.1.1.7	sysServices	Services

Figure 15: System OIDs

Product OIDs

The following OIDs are read only.

OID Branch: iso(1).org(3).dod(6).internet(1).private(4).itl(35367)

OID	Name	Description
1.3.6.1.4.1.35367.1.1	prodName	Site ID
1.3.6.1.4.1.35367.1.2	prodVersion	Firmware Version
1.3.6.1.4.1.35367.1.3	prodDate	Firmware Date

Figure 16: Product OIDs

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Trap Setup OIDs

The MON-9700 supports sending traps to up to two destination IP addresses. Traps can be enabled and configured through a SNMP manager or the MON-9700's build-in web pages. If enabled, traps are sent for any change-of-state of MON-9700 parameters which have been configured through the web pages.

Traps are automatically retransmitted until they have been acknowledged (see Alarm OIDs). The MON-9700 will retransmit traps in the following time interval until acknowledged: 1 minute, 5 minutes, 15 minutes, 30 minutes, 1 hour, 1 hour … for a total of 24 hours. After 24 hours the timer will be reset and the sequence will repeat in the same order as long as the event causing the trap is still present or active.

The following OIDs are read / write with the exception of the trap index which is read only.

OID Branch: iso(1).org(3).dod(6).internet(1).private(4).itl(35367)

OID	Name	Description
1.3.6.1.4.1.35367.11.1.1.1.1	trapReceiverNumber	Trap Index, 0..1
1.3.6.1.4.1.35367. 11.1.1.1.2	trapEnabled	Trap Enable, 0..1
1.3.6.1.4.1.35367. 11.1.1.1.3	trapReceiverIPAddress	Trap Destination IP, 0..1

Figure 17: Trap Setup OIDs

Alarm OIDs

Only the acknowledge OID is read/write, all other OIDs are read only.

OID Branch: iso(1).org(3).dod(6).internet(1).private(4).itl(35367)

OID	Name	Description
1.3.6.1.4.1.35367.11.10.1.1.1	alarmIDNumber	Alarm Index, 1..14
1.3.6.1.4.1.35367. 11.10.1.1.2	alarmState	Alarm Active, 1..14 (0=inactive, 1=active)
1.3.6.1.4.1.35367. 11.10.1.1.3	alarmAcknowledged	Alarm Acknowledge, 1..14 (0=not acknowledged, 1=acknowledged)
1.3.6.1.4.1.35367. 11.10.1.1.4	alarmDescription	Alarm Description, ASCII string

Figure 18: Alarm OIDs

Alarms are acknowledged by issuing a SNMP Set to the corresponding OID. This will prevent the alarm from being resent unless the alarm re-occurs.

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Installation Diagrams

The following section details various installation diagrams for connecting the MON-9700 to a wide variety of existing lighting systems. Please refer to the diagram which matches your lighting system at the tower site.

L-885(L) Triple Beacon Wiring Diagram

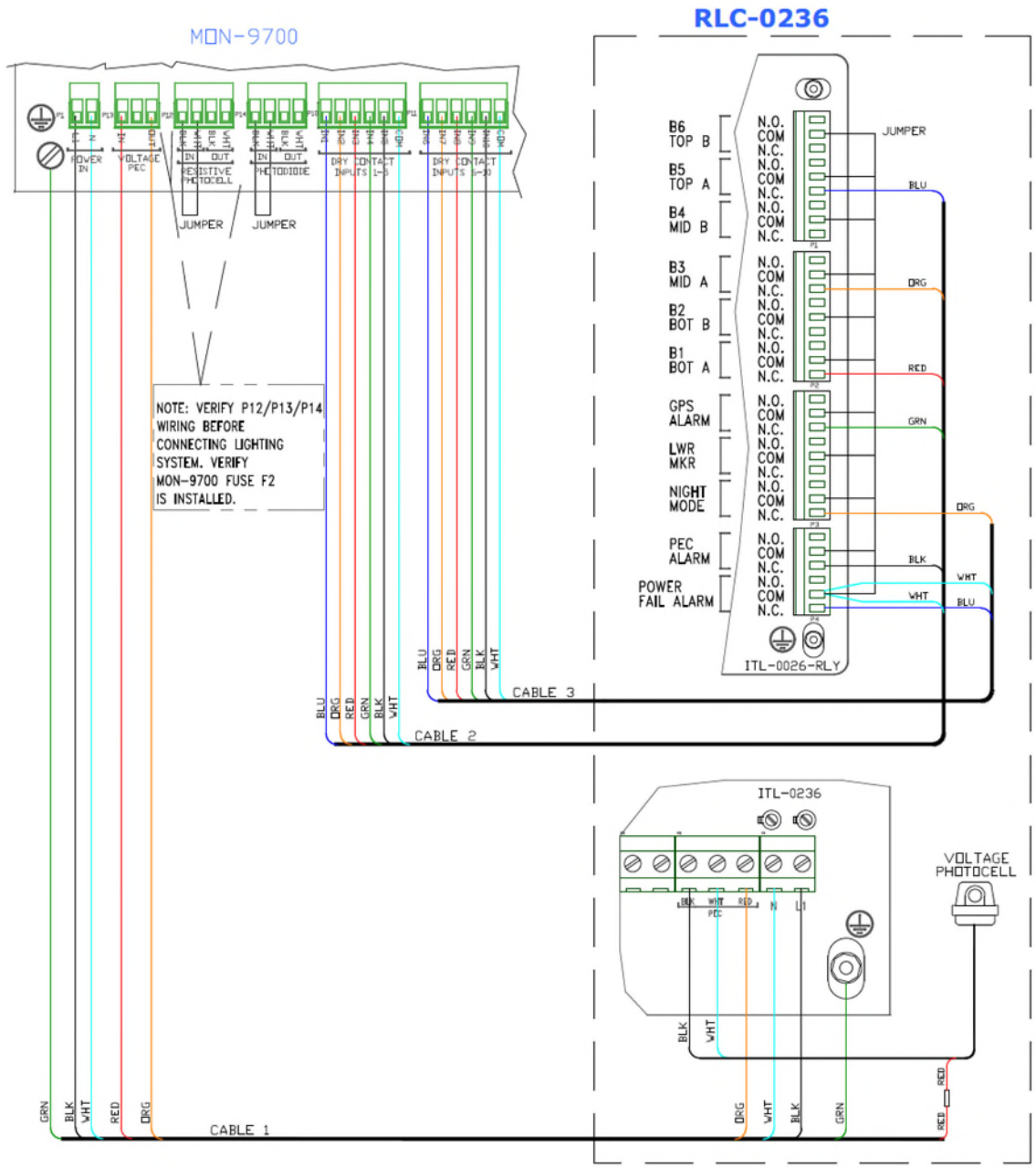

Figure 19: L-885(L) Triple Beacon Wiring Diagram

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L-885(L) Five Beacon Wiring Diagram

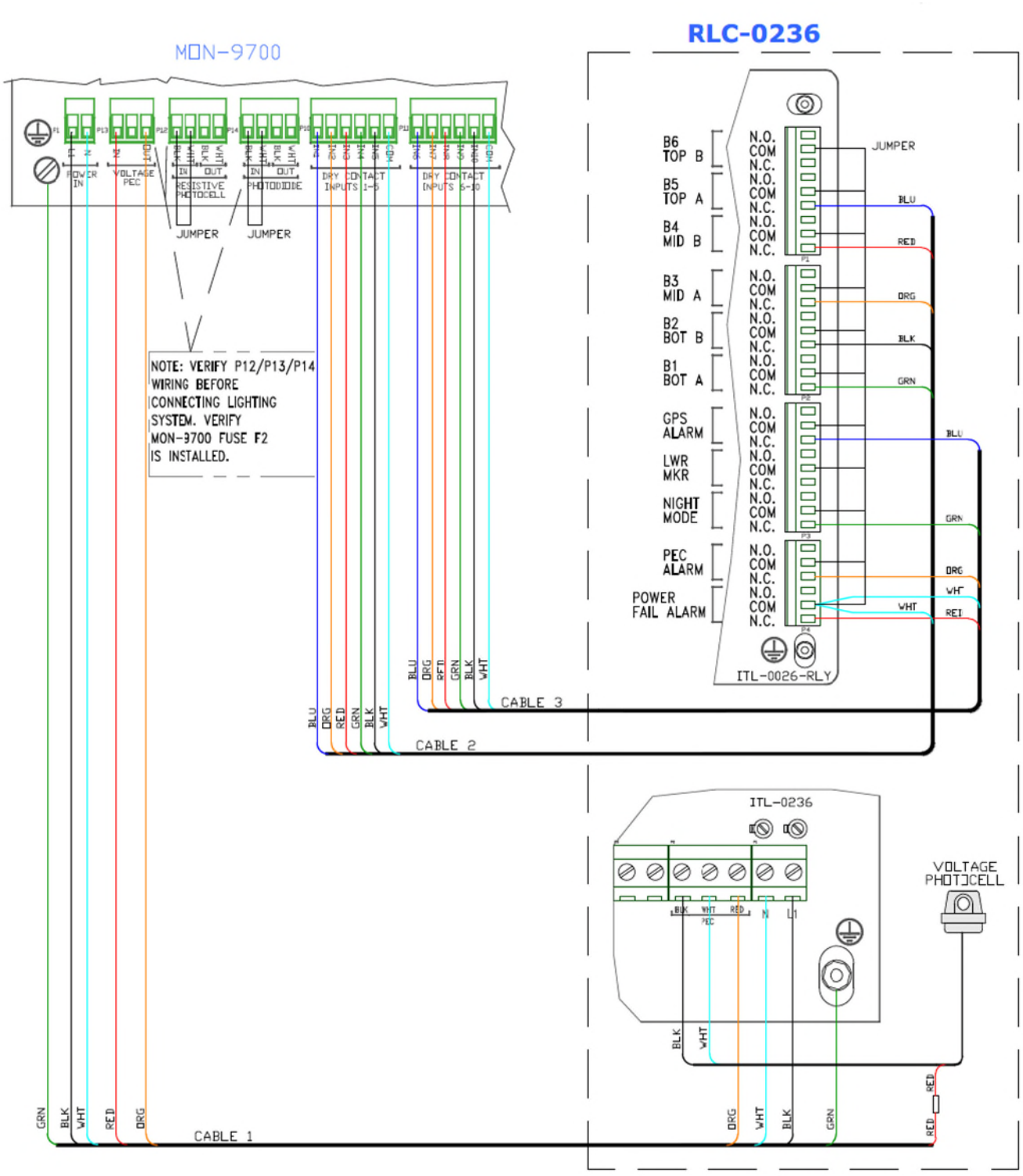

Figure 20: L-885(L) Five Beacon Wiring Diagram

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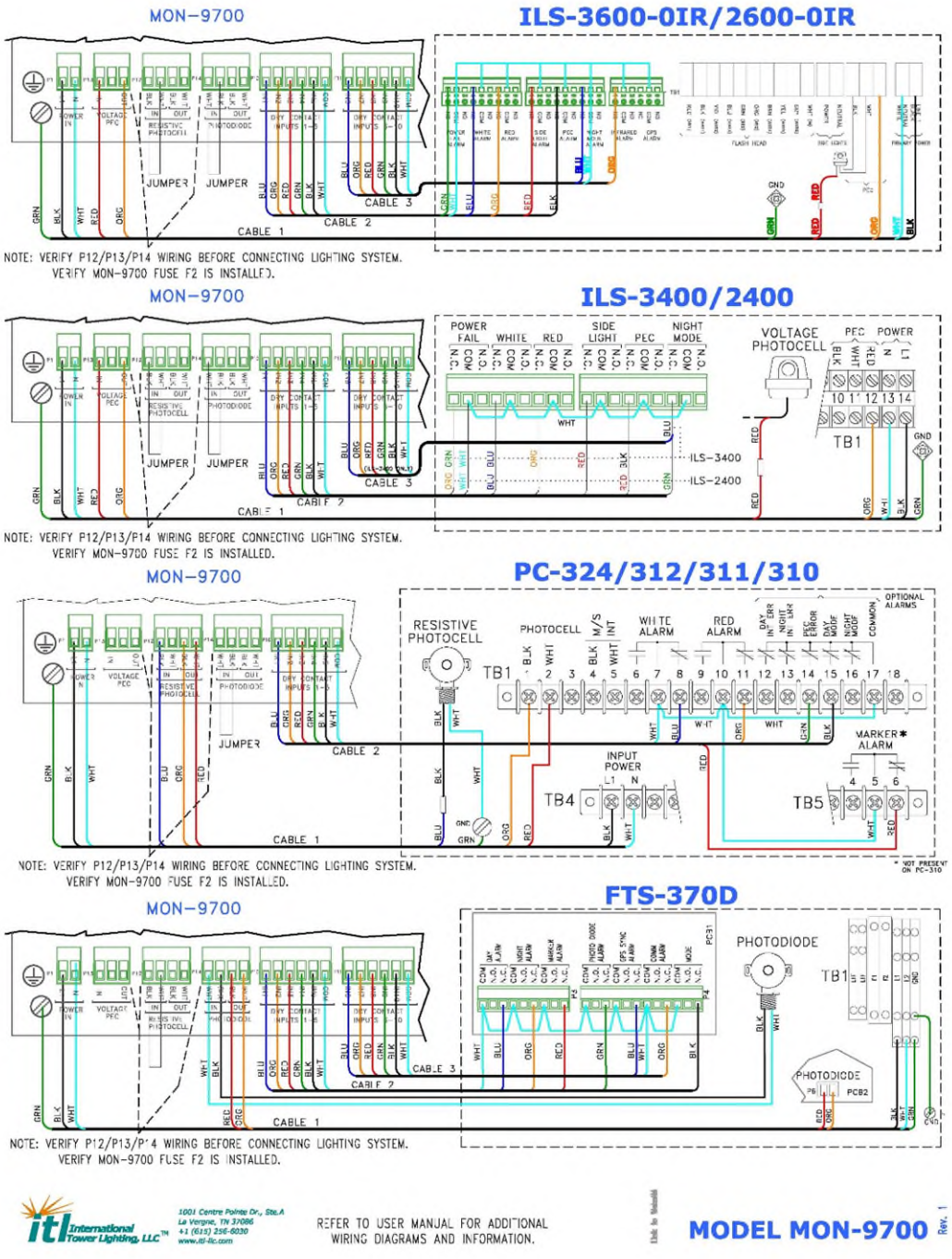
Quick Info Card Wiring Diagram



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Technical Support and Contact Info

Contact Info

For information on the ITL lighting systems' basic functions, refer to this manual and the accompanying drawings. For additional help with the installation or operation of any ITL products, please contact ITL, LLC at one of the following below.

Web and Internet Sites

Corporate home page: http://www.itl-llc.com

Monitoring System Info: http://www.itl-llc.com/monitoring-systems.html

Customer Support Technicians

8:00 AM - 5:00 PM Central Time

US and Canada call: +1-615-256-6030

Toll Free: +1-866-624-8309

Email: support@itl-llc.com

RMA

Please contact ITL, LLC before returning equipment for repair and obtain a Return Material Authorization (RMA) number.

Revision	Description of Change	Date	Preparer / Approval
0	Created	11/7/2022	Prepared By: MT Approved By: RG

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