

# Installation and Operation Manual

# ILS-1700-CAT

LED Red Catenary Obstruction Lighting System





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#### **Front Matter**

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#### **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.

Do not rely on interlock switches to remove lethal voltages from the system. Measure for voltages using a voltmeter to ensure that power is off and has been completely removed.

Do not wear any jewelry. Gold and silver are excellent conductors of electricity.





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#### Introduction

Congratulations! You have purchased one of the most advanced control solutions for red LED obstruction lighting systems available today. This product is the result of many years of engineering with extensive input from field service personnel.

Please take the time to read and familiarize yourself with this manual. It contains the information necessary to install, test and troubleshoot the ILS-1700-CAT Catenary Obstruction Lighting System.

#### **Product Description**

The ILS-1700-CAT Catenary Obstruction Lighting System consists of at least one RLC-0236-000 Controller and multiple LED Beacons, typically model IFH-1700, although other models are supported. The RLC-0236-000 controller is capable of controlling from 3 to 6 red LED beacons. Individual alarm relays are provided for indication of beacon alarm, PEC alarm, power failure, GPS alarm and system mode. Virtually all information necessary for installation and operation of the RLC-0236-000 is available on the "quick info" card located in the door of the enclosure.



#### Figure 1: RLC-0236-000 Controller



# **Specifications**

Designed to comply with AC 150/5345-43

#### Environment

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

#### **Obstruction Lights**

Beacons

3, 4, 5 or 6 ITL IFH-1700-000 or Dialight D464 Series LED Beacons

#### **Mechanical**

Dimension	Height:	22.29" (566mm)
	Width:	16.57" (420mm)
	Depth:	9.76" (248mm)
Weight	65 lbs	(20Kg)

#### **Electrical**

Input Power:	120 VAC at 50/60Hz, 12VA
Alarm Relays:	120 VAC, 1 Amp
PEC:	120 Vac, 50/60 Hz, 1 VA
Suppression	303 Joule, 274V, Input Power, Beacon,
	Side Lights & PEC
	23 Joule, 275V, All alarm relays



# **Catenary Applications**

ILS-1700-CAT Catenary Red Obstruction Lighting Systems are used for night time marking of catenary support structures such as transmission line river crossings. The lights flash in a middle-top-bottom sequence at 60FPM. Top-level lights mark the highest point of the catenary support structure. Mid-level lights mark the middle of the catenary and may be omitted if the distance from the top and bottom lights is less than 100ft. Bottom-level lights mark the bottom of the catenary. GPS flash synchronization is available to wirelessly synchronize the flashing of multiple structures. Catenary support structures require paint or white day catenary lighting systems (not included) for day time marking. The catenary may require markers, spherical or cylindrical, of alternating color (not included) for day time marking. Multiple lights may be required at each level. Refer to FAA's Aeronautical Study of the structure for determination of required lighting system type and configuration. See FAA advisory circular 70/7460 Obstruction Lighting and Marking for detailed requirements.



Figure 2: Typical Catenary System



# Installation

The following section describes how to install the RLC-0236-000 controller. The LED Beacons should be installed according to the manufacturer's instructions.

#### Unpacking your RLC-0236-000 Controller

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

#### **Quick Installation Guide**

The quick start guide shows how to install the RLC-0236-000 controller.

- Remove RLC-0236-000 controller from packaging material.
- Mount the RLC-0236-000 enclosure.
- Ground the RLC-0236-000 enclosure to the site grounding system using AWG6 copper conductor.
- Install LED Beacons per manufacturer's instructions and FAA requirements.
- Install electrical cable from RLC-0236-000 to LED Beacons per manufacturer's instructions.
- Install FAA type L-810(L) LED obstruction lights (if used) per manufacturer's instruction and FAA requirements.
- Install Photoelectric Cell and socket (ITL P/N: PEC-NITE-120, PEC-SOCK-000).
- Install 120Vac line power to the RLC-0236-000 Controller.



#### **RLC-0236-000 Controller Mounting**



Figure 3: RLC-0236-000 Controller Dimensions and Mounting Details



#### **Electrical Connections**

All electrical control connections are made on P1 thru P7 located at the bottom of the controller. Connections for alarm relays are made on Alarm Relay Board located on the door of the controller. Typical connections for a 120VAC system are shown below.

It is the responsibility of the installer to comply with all applicable local, state, and federal regulations for installation and operation of this device.





Rev. 1



# **Connector Descriptions**

		Connector Descriptions
Connector	Terminals	Function
P1	L1	Input Power Line Voltage
	Ν	Input Power Neutral
LUG	GND	Chassis Ground
P2	BLK	Photoelectric Cell Line Power
	WHT	Photoelectric Cell Neutral
	RED	Photoelectric Cell Signal (120Vac=Night, 0Vac=Day).
P3, P4	N	Neutral terminals (5) for obstruction lights
P5	M3	Marker Level 3 Power
	M2	Marker Level 2 Power (Not used on Catenary systems)
	M1	Marker Level 1 Power
P6	B6	Beacon 6 Power
	B5	Beacon 5 Power
	B4	Beacon 4 Power
P7	B3	Beacon 3 Power
	B2	Beacon 2 Power
	B1	Beacon 1 Power

Figure 5: RLC-0236-000 Connector Descriptions



#### **Enclosure Grounding**

The RLC-0236-000 enclosure must be bonded to the site ground bus via a low impedance electrical connection. Mounting holes are provided on the bottom center of the enclosure for attachment of a two-hole (5/8" centers) compression lug for bonding to earth ground. AWG 6 copper conductor should be used.



Figure 6: RLC-0236-000 Enclosure Grounding Detail



#### **GPS Connections**

An optional GPS (ITL P/N ANT-018X-GPS-KIT) can be added to synchronize the flashing of multiple systems. Each RLC-0236-000 controller requires a GPS. Electrical connections the GPS are made on connector P8 on the main panel shown in the figure. DIP Switch SW2-2 must be in the ON position to enable the GPS. The FIX LED will flash as the GPS waits to receive sync data. When sync data has been received the FIX LED will be steady on. The Pulse-Per-Second LED (PPS) gives visual indication of this GPS signal. The GPS Alarm LED indicates when the GPS has failed to receive sync data.



Figure 7: RLC-0236-000 GPS Connection Detail



#### **Setup and Operation**

Setup and operation of the RLC-0236-000 is performed using the Configuration Jumpers, Configuration DIP Switches, the Marker Alarm Setting dial, and the Manual Mode Select Switch.



Alarm Contacts





#### **Beacon Configuration Jumpers**

The configuration jumpers must be set to match the type of LED beacons used with the RLC-0236-000 controller. Jumper and DIP Switch settings for supported beacons are shown in the figure below. Contact the factory if your model lights are not shown.



= JUMPER NOT INSTALLED



#### **DIP Switches**

SW1 – Installed Beacons		
Number	Description	Function
1	TOP A BEACON*	ON – Disabled
		OFF – Enabled
2	TOP B BEACON*	ON – Disabled
		OFF – Enabled
3	MID A BEACON*	ON – Disabled
		OFF – Enabled
4	MID B BEACON*	ON – Disabled
		OFF – Enabled
5	BOT A BEACON*	ON – Disabled
		OFF – Enabled
6	BOT B BEACON*	ON – Disabled
		OFF – Enabled
*If only one beacon is used on a level it must be the "A" beacon.		
*If only two levels are used it must be the "TOP" and "BOT" levels.		

Figure 10: RLC-0236-000 Configuration DIP Switch SW1 Table





Figure 11: RLC-0236-000 Config LED

SW2 – Configuration		
Number	Description	Function
1	CATENARY	ON – Catenary operation selected (must be ON)
		OFF – Catenary operation disabled
2	GPS ENABLE	ON – GPS Flash synchronization enabled
		OFF – GPS Flash synchronization disabled
3	30FPM	Not used for catenary systems
4	BEACON TYPE	ON – Selects IFH-1700 or D264 model beacons
		OFF – Selects D464 model beacons

Figure 12: RLC-0236-000 Configuration DIP Switch SW2 Table

#### Manual Mode Select Switch

The Manual Mode Select Switch overrides the photoelectric cell (PEC) to allow selection of Day mode or Night Mode for test or troubleshooting purposes. The Day or Night Mode lights flash when in manual mode. This switch should be left in the AUTO position for normal operation. In the AUTO position the operating mode is determined by the photoelectric cell. The Manual Mode Select Switch timed out after 8 hours of manual operation and returns to automatic (PEC) operation regardless of the switch position.



#### **Indicator Lights**

Main Panel Indicator Lights			
Description	Function		
DAY MODE	Steady – Day mode operation via photoelectric cell.		
	Flashing – Day mode operation via manual mode select switch.		
NITE MODE	Steady – Night mode operation via photoelectric cell.		
	Flashing – Night mode operation via manual mode select switch.		
TOP FLASH	On when the RLC-0236-000 commands the top-level beacons to		
	flash.		
MID FLASH	On when the RLC-0236-000 commands the mid-level beacons to		
	flash.		
BOT FLASH	On when the RLC-0236-000 commands the bottom-level beacons to		
	flash.		
MARKERS	Not used		
BEACON 1-6	On when the RLC-0236-000 confirms that the beacon is drawing the		
CONFIRM	correct current.		
GPS FIX	Steady – Sync data received		
	Flashing – Waiting for sync data		
GPS PPS	GPS pulse-per-second indication		
GPS ALARM	Indicates a failure of the GPS to receive sync data		
CONFIG LED	The green CONFIG LED located beside pushbutton PB1 lights when		
	a valid catenary configuration is selected on DIP Switch SW1. When		
	not lit the catenary configuration is not valid and all beacons are		
	enabled.		

Figure 13: RLC-0236-000 Indicator Lights Table





Alarm Board Indicator Lights			
Description	Function		
B6 ALARM	Top-level, Beacon-B Alarm		
(TOP B)			
B5 ALARM	Top-level, Beacon-A Alarm		
(TOP A)			
B4 ALARM (MID B)	Mid-level, Beacon-B Alarm		
B3 ALARM (MID A)	Mid-level, Beacon-A Alarm		
B2 ALARM	Bottom-level Beacon-B Alarm		
(BOT B)			
B1 ALARM	Bottom-level, Beacon-A Alarm		
(BOT A)			
M3 (TOP)	GPS Alarm - Indicates a failure of the GPS to receive sync data		
GPS ALARM			
M1 (BOT)	Not used		
ALARM			
M2 (MID)	Not used		
ALARM			
NIGHT MODE	On – Indicates night mode operation		
	Off – Indicates day mode operation		
PEC ALARM	On – Indicates the photoelectric cell (PEC) has failed to transition		
	Off – Indicates the PEC has transitioned during the last 24 hours		

Figure 14: RLC-0236-000 Alarm Board Indicator Lights Table

# **Spare Parts & Replacement Parts**

ITL Part Number	Description
RLY-2440-B00	Solid State Relay (K1-K6)
ITL-0026-RLY	Alarm Relay Board
ITL-0236-000	Main control panel
IFH-1700-000	LED Beacon
ANT-018X-GPS-KIT	GPS Antenna kit
FUS-008A-3AG	Fuse, 8A, Slo-blow, Input Power Fuse
FUS-001A-3AG	Fuse, 1A, Slo-blow, PEC Fuse
FUS-002A-3AG	Fuse, 2A, Slo-blow, F2-F10
SW0-ASSY-INT	Interlock Switch
LMP-NEON-02K	Neon Lamp, RED, 120V

Figure 15: RLC-0236-000 Spare Parts & Replacement Parts List Table



## **Technical Support and Contact Info**

#### Contact Info

For information on the RLC-206 controller's basic functions, refer to this manual. 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: <u>http://www.itl-llc.com</u>



**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	Initial release	12/12/2013	Prepared By: Elke Hinson
			Approved By: Andy Rudolph
1	Revised IPS-1700-CAT pn to RLC-0236-000.	6/17/2014	Prepared By: Elke Hinson
			Approved By: Andy Rudolph
2	Changed SW1 configuration from installed to	12/2/2014	Prepared By: Elke Hinson
	disabled & not installed to enabled.		Approved By: Andy Rudolph
3	Updated wiring diagram	5/12/2015	Prepared By: Elke Hinson
			Approved By: Andy Rudolph