

Installation Instruction Manual

IFH-1710-000
Red (L-864(L)) LED Beacon

IFH-1710-01R
Red/IR (L-864(L)) LED
Beacon

Wind Turbine
Obstruction
Lighting System



Toll Free: +1 (866) 624-8309 • www.itl-llc.com

 **itl** International
Tower Lighting, LLC™

Front Matter

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ITL, LLC guarantees that every IFH-1710 series red/infrared LED beacon is free from physical defects of material and workmanship under normal use for five (5) years 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.

The LED lamps used in this equipment produce brilliant flashes of light and infrared (IR) radiation. Temporary or permanent eye damage may result from looking directly at the LED flash head while it is operating.

Disconnect power at the circuit breaker panel and wait at least 30 seconds before servicing. Do not rely on interlock switches for removing power. Energy storage capacitors can maintain high voltage long after power has been disconnected. Verify that all high voltage warning lights are completely off. Measure all high voltage sources (HV1, HV2) using a DC voltmeter to ensure that power is off and has been completely removed before servicing.

DISCLAIMER: System is not equipped with an interlock switch and is not field serviceable under any circumstances. Only attempt repairs in a lab setting.

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



This equipment emits near infrared radiation. Avoid direct eye exposure.



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Introduction

Congratulations, and thank you for choosing an ITL lighting system component.

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 lighting components 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 the IFH-1710-000 and IFH-1710-0IR. Please take the time to read and familiarize yourself with this manual. It contains the information necessary to install, test and troubleshoot the flash head.

Product Description

The IFH-1710, FAA type L-864(L), is a medium intensity flashing beacon as defined by the FAA's advisory circular, AC150-5345-43H. The IFH-1710 meets or exceeds the specifications as defined in the advisory circular. For more information on those specifications, please refer directly to the FAA website www.faa.gov/airports/airtraffic/airports.

The IFH-1710 is a complete L-864(L) red lighting system containing an integral controller and photodiode. The IFH-1710 can be set for either 20 or 30 flashes per minute (FPM) using DIP switches on the controller board. The IFH-1710 comes with a 50 foot flexible power cable installed.



Figure 1: IFH-1710-000 Red LED Beacon and IFH-1710-0IR Infrared LED Beacon

Specifications

Complies with AC150/5345-43H, Type L-864(L)

Environment

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

Light Output

| | |
|-----------------|---------------------------------|
| Night Intensity | 2,000 +/-25% effective candelas |
| Beam Pattern | 360° horizontal, ≥3° vertical |

Mechanical

| | |
|-----------|------------------------|
| Dimension | Height: 11" (28cm) |
| | Diameter: 16.5" (42cm) |
| Weight | 28lbs (13Kg) max |

Electrical

| | |
|-------------------|------------------------------------------------------------------------------------------------------------|
| Input Power | 120-240VAC, 50/60Hz |
| Power Consumption | 23W ¹ average power, night mode. 13W ¹ average power over 24 hours ² . |

(Note 1: At 25°C, 120Vac)

(Note 2: 12 Hours night mode, 12 Hours day mode)

Installation

The following section describes how to install the lighting system.

Unpacking your Lighting 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 flash head.

- Digital multi-meter
- Nut Drivers and Sockets
- Compact “torpedo” level

Quick Installation Guide

The quick start guide shows how to install the IFH-1710 red/infrared LED beacon.

- Remove power to existing lighting system controller by turning off circuit breaker(s).
- Verify that power has been removed by measuring all input voltages using a multi-meter.
- Remove any packaging material from inside the flash head.
- Install flash head using supplied hardware.
- Connect flash head power cable (see cable/wire identification table below).
- Apply power to lighting system controller.
- Set lighting system controller to night mode operation.
- Verify that IFH-1710 flash head flashes red light at the appropriate rate.
- Verify that the IFH-1710 does not alarm while operating in night mode.
- All fixtures, enclosures and junction boxes must be mounted in the upright position.

| NAME | COLOR | DESCRIPTION |
|------|--------|-----------------------|
| L1 | Black | AC Power in |
| N | White | Neutral |
| GND | Green | Chassis ground |
| N.C. | Orange | Alarm Normally Closed |
| COM | Red | Alarm Common |
| N.O. | Blue | Alarm Normally Open |
| INH+ | Brown | Flash Inhibit Input* |
| INH- | Yellow | Flash Inhibit Input* |

*Flash Inhibit input for connection to Aircraft Detection System.

Figure 2: IFH-1710 Cable/Wire Identification

Flash Head

Flash heads need to be mounted such that all four mounting feet are in direct contact with an unpainted surface in order to allow for proper grounding of the electrical components. It also needs to be mounted such that it will not obstruct access to the internal components for the purpose of installing and maintaining the equipment. The following diagrams detail the mounting dimensions and clearance for proper access.

Leveling

Flash heads need to be leveled properly for correct vertical beam spread. The following diagrams detail how to use a compact “torpedo” level on two axes to ensure that the flash head is mounted level. If the flash head mounting surface is not level already use shims to correct. Do not compromise grounding of the four flash head mounting feet.

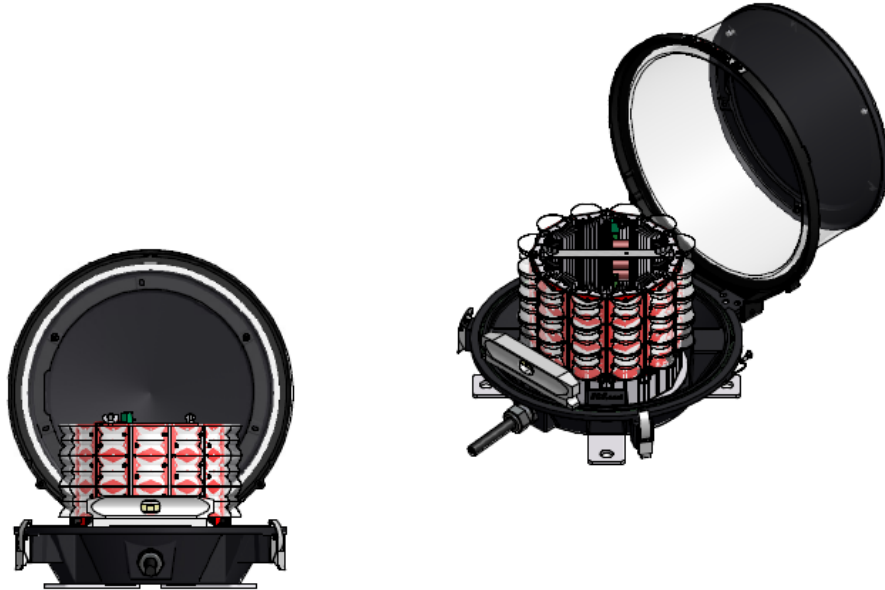


Figure 3: Flash Head Leveling - Axis 1



Figure 4: Flash Head Leveling - Axis 2

IFH-1710 Flash Head Mounting

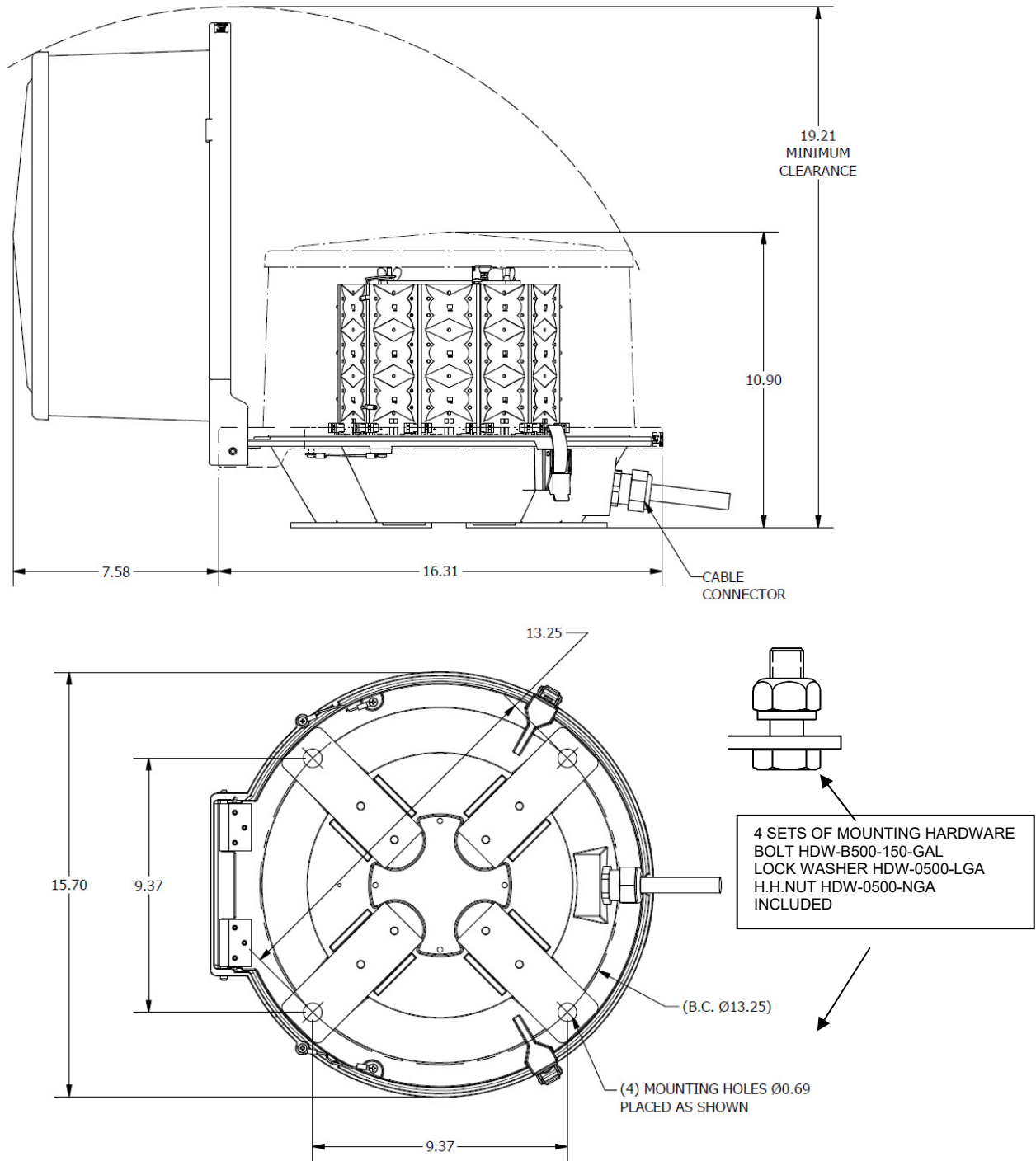


Figure 5: IFH-1710 Flash Head Dimensions and Mounting Detail

System Overview

The major components of the IFH-1710 are shown in the block diagram below. A six-conductor flexible cable comes pre-installed to provide power and access to a Form-C alarm contact. The internal controller monitors an integrated photodiode to determine the appropriate operating mode (day or night). In night mode the internal controller uses solid state electronics to alternate AC power to the IFH-1710 power supply at appropriately timed intervals to create the selected flash rate. IFH-1710 uses an integrated GPS receiver to determine the exact time and synchronizes the flash sequence with other IFH-1710 units or competitor's units. The AC current to the power supply is monitored and an alarm generated if the current falls below the normal operating range or if the integrated flasher circuit fails. The IFH-1710 power supply converts AC power into a controlled DC current. The controlled DC current flows through all 12 LED modules in series causing the LEDs to produce light. Each LED module contains three high power LEDs with a custom optic mounted in front of each LED. The optic focuses the light from the LED into the required beam pattern.

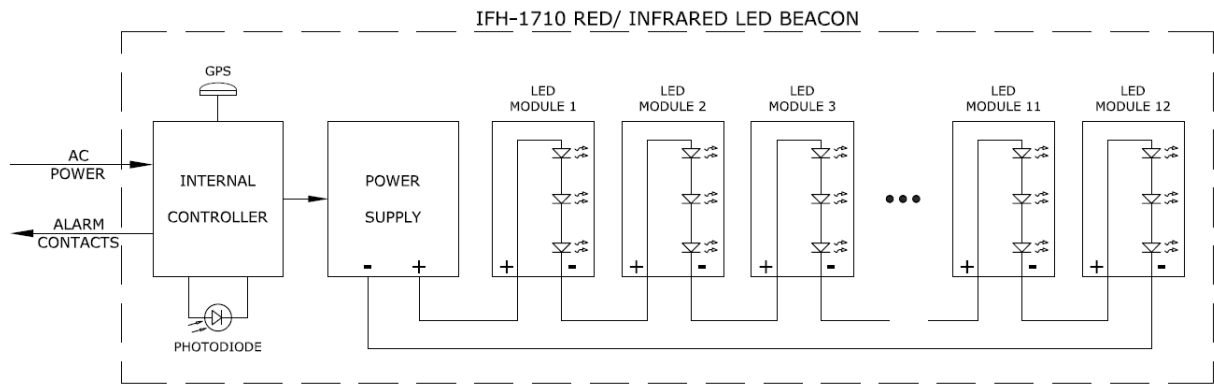


Figure 6: IFH-1710 Block Diagram

Wiring Diagram

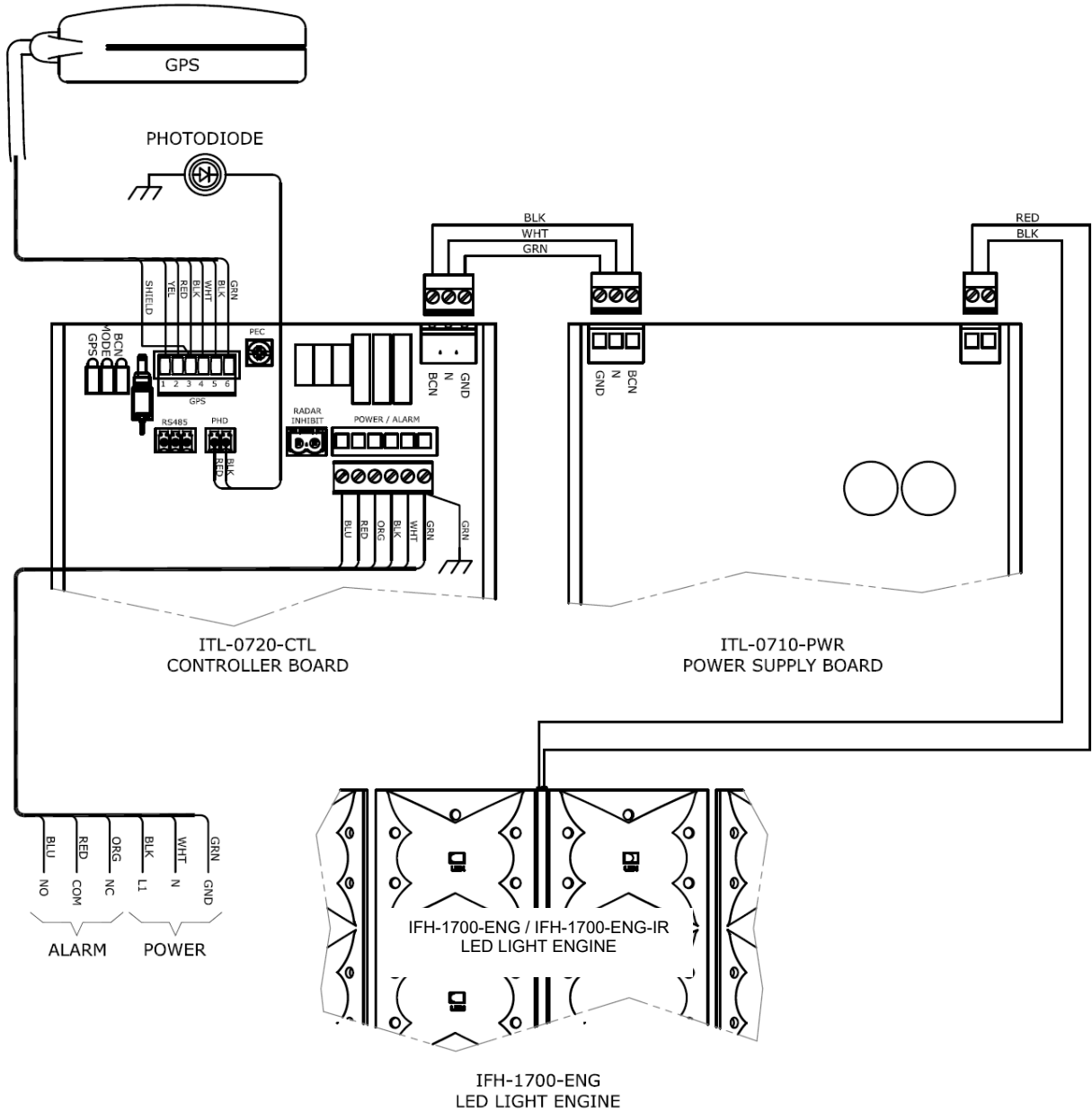


Figure 7: IFH-1710 Wiring Diagram

Grounding

The IFH-1710 should be connected to the wind turbine grounding system using a minimum AWG 6 copper conductor. Fiberglass nacelle covers are non-conductive and do not provide a ground connection.

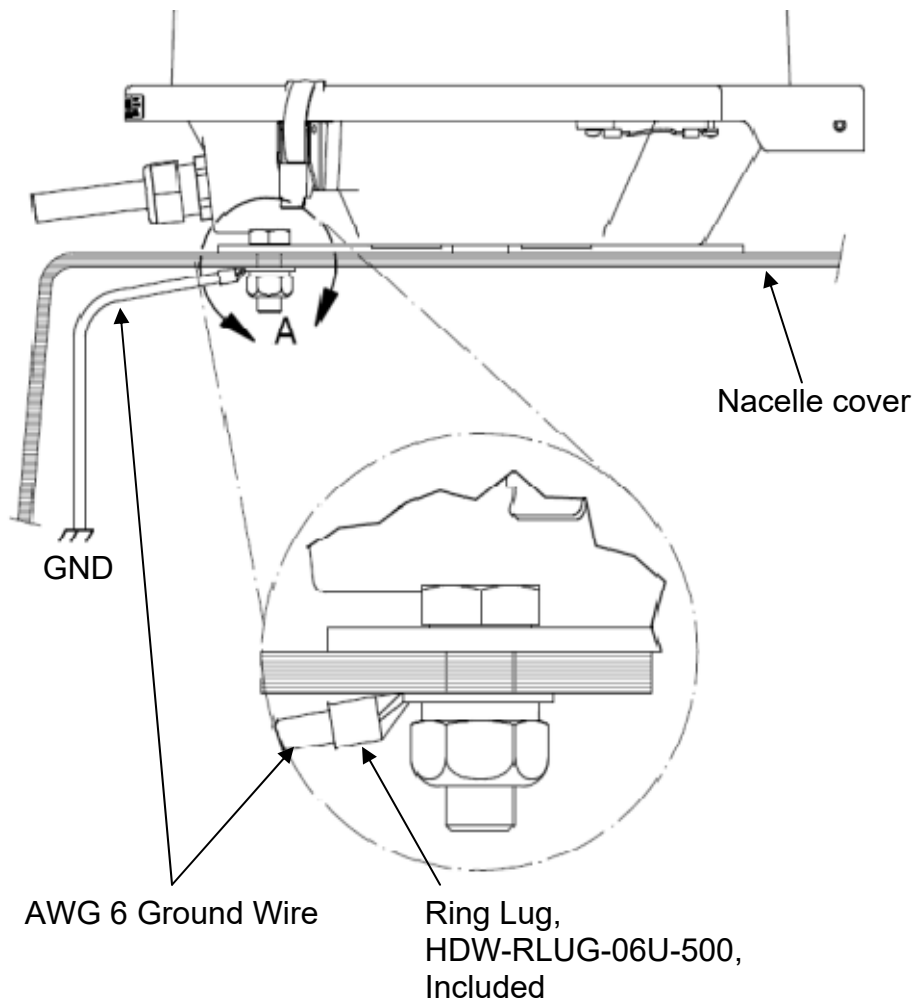


Figure 8: IFH-1710 Grounding

Setup and Operation

All setup functions are performed using the 6-position DIP switch, SW2, on the controller board. SW2 setup functions are described in the table below. Six indicator LEDs show the status of the LED beacon and GPS, as well as the operating mode. LED Indicator functions are shown in the table below.

Pressing the TEST button momentarily will cause the unit to enter night mode operation for 10 flash cycles. Holding the TEST button depressed for 3 or more flash cycles will cause an alarm to be generated for test purposes.

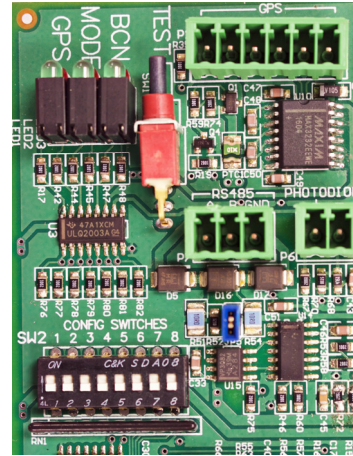


Figure 9: ITL-0720-CTL Controller Board

| SW2 | DESCRIPTION |
|-----|-------------------------------------------------------------------------------------------|
| 1 | FLASH RATE: ON - 30FPM OFF - 20FPM |
| 2 | DUTY CYCLE: ON – 67%(at 20FPM) 58%(at 30FPM) OFF - 50% |
| 3 | INHIBIT ENABLE: ON – Flash Inhibit Input Enabled OFF – Flash Inhibit Input Disabled |
| 4 | GPS ALARM: ON – GPS Alarm Enabled OFF – GPS Alarm Disabled |
| 5 | FTB-360i ON – FTB-360i Compatibility Mode OFF– Standard Operation |
| 6 | L350-864-G ON – L350-864-G Mode OFF – Standard Operation |
| 7 | Unused OFF – Must Remain OFF |
| 8 | Unused OFF – Must Remain OFF |

Figure 10: IFH-1710 Controller Board DIP Switch Settings

| LEDs | DESCRIPTION |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| BCN | GRN – Beacon Confirm RED – Beacon Alarm |
| MODE | GRN, FLASHING – Indicates Night Mode GRN, OFF – Indicates Day Mode RED – Mode Alarm (Photodiode Alarm) GRN & RED FLASHING – Flash Inhibit Active |
| GPS | GRN, SOLID – GPS Fix GRN, FLASHING – GPS Acquiring RED – GPS Alarm |

Figure 11: IFH-1710 Controller Board LED Indicators

Flash Inhibit Input

A Flash Inhibit Input is for connection to an Aircraft Detection System (ADS). The input accepts 12 to 240 VAC or VDC (polarity insensitive) to inhibit flashing when no aircraft are detected by the ADS. The red and green Mode LEDs will flash to indicate flashing is inhibited. When no signal is present on the Flash Inhibit Input the IFH-1710 will operate in the mode determined by the photodiode. This function must be enabled via DIP switch SW2-3.

When flashing is Inhibited, in order to verify continuing operational readiness, the IFH-1710 will perform a Readiness Test beginning around midnight Pacific Time each day. The Readiness Test will cause the IFH-1710 to operate in night mode (flashing) for approximately one minute. Should the IFH-1710 detect a malfunction during the Readiness Test, the alarm relay will activate and remain activated after the test period ends. The alarm will clear upon the next test cycle where no malfunction is detected. The alarm will also clear if the Flash Inhibit Input is de-activated or if power to IFH-1710 is cycled.

The ADS must deactivate the Flash Inhibit Input for at a minimum of one second every 24 hours. Failure of the ADS to deactivate the Flash Inhibit Input will result in the IFH-1710 resuming normal operation with the mode determined by the photodiode.

- DIP Switch SW2-3 must be On to enable the Flash Inhibit Input.
- Flash Inhibit Input electrical connections are made using the Brown & Yellow wires in the flash head cable.
- The Flash Inhibit Input accepts 12 to 240 VAC or VDC to inhibit flashing.
- The Red and Green Mode LEDs flash together when flashing is inhibited.
- A Readiness Test is automatically performed once every 24 hours.
- The ADS must deactivate the Flash Enable Input once every 24 hours.

Maintenance / Trouble-Shooting

Please read section *Safety Warning* in this manual before servicing this equipment. Disconnect power to the tower lighting controller at the circuit breaker(s) before attempting maintenance/trouble-shooting.

Maintenance

The maintenance outlined below should be performed at least once annually. After 5 years of normal operation is recommended that the light engine be replaced. Periodic cleaning of the clear cover with a standard glass or acrylic cleaner is recommended

- Verify that the fixture is functional in all operating modes with no indication of an alarm condition on alarm indicator lights, alarm dry contacts, or digital monitoring interfaces.
- Verify that the photoelectric control operates the system in the correction operating mode (day/night), light color (white/red) and intensity (day/night intensity) when exposed to light and dark ambient lighting conditions.
- Inspect the fixture for any type of obstruction that could block light output at any point along the 360 degree horizontal output of the fixture. Note that multiple fixtures may be used to achieve 360 degree coverage.
- Inspect lenses and transparent covers for damage.
- Clean the fixture lens or transparent cover using a mild detergent and soft nonabrasive cloth.
- Inspect all electrical wiring connections for corrosion, arcing, damage, insulation degradation or loosening of the connection. Correct, replace or secure as needed.
- Inspect all interconnecting cables and power supply cables and conduits for damage.
- Verify the all cables are fastened securely at appropriate intervals to prevent damage.
- Inspect all electrical components for evidence of damage caused by lightning or power line induced electrical surges. Replace any components showing evidence of damage.

- Inspect fixtures and enclosures for water infiltration and insect infiltration. Replace any damaged gaskets or seals. Install plugs to close any unused conduit ports that may allow insect infiltration.
- Verify that all breathers and drain holes are clear of blockages.

Recommended Tools

The following is a list of recommended electrical equipment for troubleshooting the IFH-1710 red/infrared LED beacons.

- Digital multi-meter
ITL-0705-TST LED Module Tester
(Supplied with KIT-1700-LED for IFH-1710-000 or KIT-1700-0IR for IFH-1710-0IR)
- TOL-1700-LED-2 Wire Installation Tool
(Supplied with KIT-1700-LED for IFH-1710-000 or KIT-1700-0IR for IFH-1710-0IR)
- #2 Phillips Screwdriver (8" or longer blade length)
- Small tip (<0.1") slotted screw driver
- Needle Nose Pliers

Trouble-Shooting

Should the IFH-1710 red/infrared LED beacon fail to produce light, perform the following steps:

Verify that AC power is being supplied to IFH-1710.

Press and hold the TEST button on the controller board for two seconds. Using a digital voltmeter measure the AC voltage on controller board from P3-3 to P3-2 (black to white). For 10 flash cycles after pressing TEST the controller should enter night mode operation. The MODE indicator LED should flash during this time. The controller board should produce a pulsing AC voltage on P3. If this fails to happen replace the controller board.

Using a digital multi-meter measure the DC voltage from P2-1 to P2-2 (red to black) on the power supply board. Normal operating voltage is 65 to 100VDC.

- A voltage near 180V indicates that one of the twelve LED modules may have failed. Use an ITL-0705-TST Tester to check each LED module and replace as necessary. If an LED module has failed, check for and replace any damaged optics on that module. Be sure that the optics snap into the alignment holes on the LED modules during replacement.
- A voltage under 65V indicates that the power supply may have failed. Replace fuse F1 on the power supply board or replace the power supply board.

Spare Parts & Replacement Parts

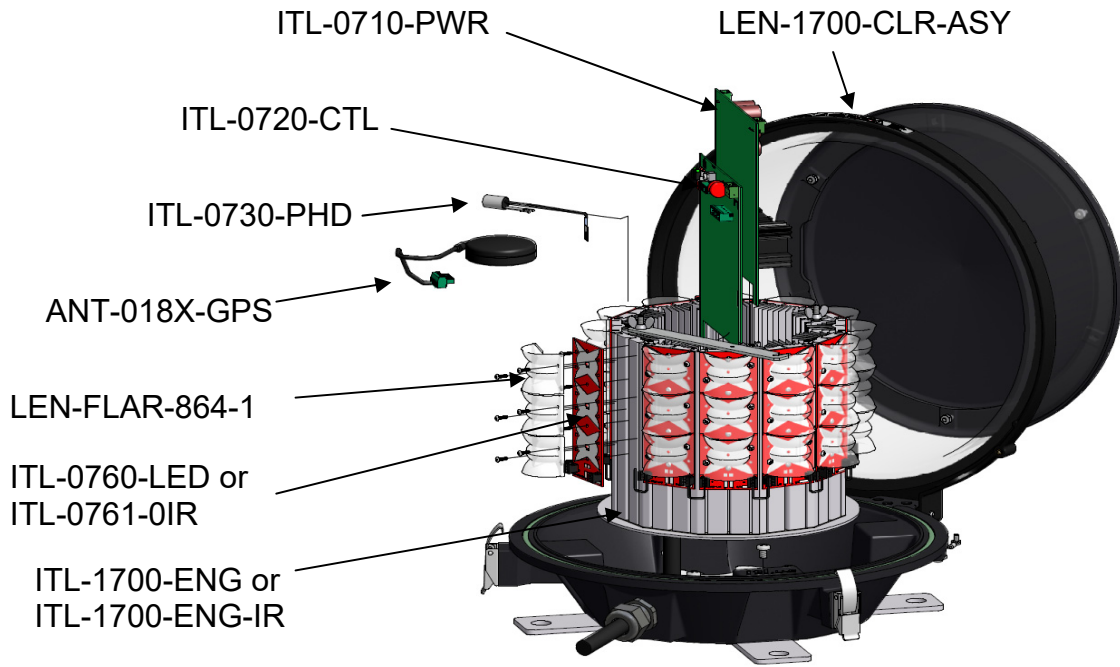


Figure 12: IFH-1710 Replacement Parts Detail

Spare Parts & Replacement Parts continue

| PART NUMBER | DESCRIPTION |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ITL-1700-ENG | LIGHT ENGINE for IFH-1710-000 (Power Supply & Controller Boards not included) |
| ITL-1700-ENG-IR | LIGHT ENGINE for IFH-1710-0IR (Power Supply & Controller Boards not included) |
| ITL-0710-PWR | POWER SUPPLY BOARD |
| ITL-0720-CTL | CONTROLLER BOARD |
| ITL-0760-LED | LED MODULE for IFH-1710-000 |
| ITL-0761-0IR | LED MODULE for IFH-1710-0IR |
| ITL-0705-TST | LED TESTER |
| ITL-0730-PHD | PHOTODIODE |
| ANT-018X-GPS | GPS |
| LEN-FLAR-864-1 | LED OPTIC |
| LEN-1700-CLR-ASY | CLEAR LENS ASSEMBLY WITH MOUNTING RING AND COVER FOR IFH-1710 |
| TOL-1700-LED-2 | WIRE INSERTION TOOL |
| KIT-1700-LED For IFH-1710-000 | REPAIR KIT. Kit includes one ITL-0760-LED LED module, one LEN-1700-864-1 optic, one ITL-0705-TST LED module tester and one TOL-1700-LED-2 wire installation tool. |
| KIT-1700-0IR For IFH-1710-0IR | REPAIR KIT. Kit includes one ITL-0761-0IR LED module, one LEN-1700-864-1 optic, one ITL-0705-TST LED module tester and one TOL-1700-LED-2 wire installation tool. |

Figure 13: IFH-1710 Flash Head Parts List Table

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>



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 | 10/7/2019 | Preparer / Approval |
|----------|-------------------------------------------------------------------------------------------------------|------------|--------------------------------------------------------|
| 20 | Changed from ETL certified to Complies with FAA AC 150/5345-43H | 2/28/2019 | Prepared By: Ryan Gregory Approved By: Andy Rudolph |
| 19 | Added language to address lack of interlock switch | 2/28/2019 | Prepared By: Ryan Gregory Approved By: Andy Rudolph |
| 18 | Removed references to optional for ADS input | 3/2/2018 | Prepared By: Ryan Gregory Approved By: Andy Rudolph |
| 17 | Updated Block Diagram, Wiring Diagram & Part List for Photo Diode ITL-0730-PHD. | 2/19/2018 | Prepared By: Elke Hinson Approved By: Andy Rudolph |
| 16 | Updated to reflect new ITL-0720-CTL Revision. | 12/20/2017 | Prepared By: Ryan Gregory Approved By: Andy Rudolph |
| 15 | Updated warranty from two years to five years. | 12/11/2017 | Prepared By: Elke Hinson Approved By: Andy Rudolph |
| 14 | Added IFH-1710-0IR information. Updated ETL certified reference to 43H. | 10/31/2017 | Prepared By: Elke Hinson Approved By: Andy Rudolph |
| 13 | Updated Replacement Parts List (pg19) Replaced TOL-1700-LED with TOL-1700-LED-2. | 4/4/2017 | Prepared By: Elke Hinson Approved By: Andy Rudolph |
| 12 | Updated Figure 11. | 8/24/2016 | Prepared By: Elke Hinson Approved By: Andy Rudolph |
| 11 | Added description of optional Flash Inhibit Input. | 5/4/2016 | Prepared By: Elke Hinson Approved By: Andy Rudolph |
| 10 | Corrected flash rate switch description for SW2. | 4/13/2016 | Prepared By: Elke Hinson Approved By: Andy Rudolph |
| 9 | Updated power consumption specifications. | 12/8/2015 | Prepared By: Elke Hinson Approved By: Andy Rudolph |
| 8 | Updated Flash Head Dimensions and Mounting Detail | 8/4/2015 | Prepared By: Elke Hinson Approved By: Andy Rudolph |
| 7 | Replaced ITL-1700-KIT with KIT-1700-LED & updated description (Figure 12 Flash Head Parts List Table) | 5/12/2015 | Prepared By: Elke Hinson Approved By: Andy Rudolph |
| 6 | Added installation note "All fixtures, enclosures and junction boxes ...", Added maintenance outline. | 8/29/2014 | Prepared By: Elke Hinson Approved By: Andy Rudolph |
| 5c | Corrected switch number reference SW1 to SW2 in Setup and Operation | 10/23/2013 | Prepared By: Elke Hinson Approved By: Andy Rudolph |
| 5a/b | Change coversheet description from ILS-1710 to IFH-1710, updated voltage in trouble-shooting section, | 9/04/2012 | Prepared By: Elke Hinson Approved By: Andy Rudolph |
| 5 | Updated FAA type from L-864 to L-864(L), Changed length of cable from 75ft to 50ft. | 6/25/2012 | Prepared By: Elke Hinson Approved By: Andy Rudolph |
| 4 | Updated DIP switch descriptions for SW1-5 and SW1-6 | 5/2/2012 | Prepared By: Elke Hinson Approved By: Andy Rudolph |
| 2a | Updated Itl logo, add Toll free number | 9/20/2011 | Prepared By: Elke Hinson Approved By: Andy Rudolph |
| 2 | Add wiring diagram | 9/23/2010 | Prepared By: Elke Hinson Approved By: Andy Rudolph |
| 1 | Issued | 5/17/2010 | Prepared By: Elke Hinson Approved By: Andy Rudolph |