FLASH TECHNOLOGY

FTS 812(L)

LED Approach Lighting System (REIL/RTLS)

Reference Manual

Part Number F7918000

FRONT MATTER

ABSTRACT

This manual contains information and instructions for installing, operating and maintaining the FTS 812(L) LED Approach Lighting Systems.

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TRADEMARK ACKNOWLEDGEMENTS

APPLICABLE SPECIFICATIONS

This equipment meets or exceeds requirements for an FAA Type L-849(L) (styles A and E).

DISCLAIMER

While every effort has been made to ensure that the information in this manual is complete, accurate and up-to-date, Flash Technology assumes no liability for damages resulting from any errors or omissions in this manual, or from the use of the information contained herein. Flash Technology reserves the right to revise this manual without obligation to notify any person or organization of the revision.

In no event will Flash Technology be liable for direct, indirect, special, incidental or consequential damages arising out of the use of or the inability to use this manual.

WARRANTY

Flash Technology warrants all components, under normal operating conditions, under a 5-year parts replacement warranty.

PARTS REPLACEMENT

The use of parts or components, in this equipment, not manufactured or supplied by Flash Technology voids the warranty and invalidates the third party testing laboratory certification which ensures compliance with FAA Advisory Circular 150/5345-51. The certification is valid as long as the system is maintained in accordance with FAA guidelines (FR doc. 04-13718 filed 6-16-04).

PERSONNEL HAZARD WARNING

DANGEROUS VOLTAGES

Dangerous line voltages reside in certain locations in this equipment. Also, this equipment may generate dangerous voltages. Although Flash Technology has incorporated every practical safety precaution, exercise extreme caution at all times when you expose circuits and components, and when you operate, maintain or service this equipment.

AVOID TOUCHING LIVE CIRCUITS

Avoid touching any component or any part of the circuitry while the equipment is operating. Do not change components or make adjustments inside the equipment with power on.

DO NOT DEPEND ON INTERLOCKS

Never depend on interlocks alone to remove unsafe voltages. Always check circuits with a voltmeter after turning the circuit breakers off. Under no circumstances remove or alter the wiring or interlock switches.

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FTS 812(L) SYSTEM

An FTS 812(L) Approach Lighting System consists of two LED-based lighting units. One lighting unit is composed of an FH 800(L) flash head and PC 800(L) power converter co-mounted together and a separate FH 800(L) mounted remotely and attached to the PC 800(L) enclosure.

The FH 800(L) flash head directs the beam 25 degrees horizontally and 15 degrees vertically. The flash head is attached to two-inch EMT pipe by a bracket that has provisions for horizontal and vertical aiming and locking.

APPLICATIONS

In ALS applications, the lights are aligned with the center line of the runway and flash sequentially toward the landing threshold.

An ALS installation may have from 3 to 21 (or more) sequentially flashing lights.

A REIL (Runway End Identifier Lights) system consists of only two lights that are located on each side of the runway at the landing threshold. The REIL lights flash simultaneously.

The lights can be used in a combined ALS and REIL configuration with the REIL lights flashing after the last centerline light has flashed.

1.1 SPECIFICATIONS

1.1.1 PHYSICAL

Heights shown in the table below dimensions of the units from the top of the concrete pad to the top of the assembly for the co-mount and remote mount assemblies. Dimensions given for the PC & FH 800(L) are max envelope dimensions.

Component	Dimensions (H x W x D)	Weight
FTS 812(L) - Co-mounted Assembly	32.5max-19min x 18.6 x 21.5 in. 826max-483min x 473 x 546 mm.	37.9 lbs.* 17.2 kg.
FTS 812(L) - Remote Mount Assembly	32.5max-19min x 7.9 x 16.5 in. 826max-483min x 201 x 419 mm.	18.8 lbs.* 8.5 kg.
PC 800(L) Power Converter (no flash head mounting brackets)	18.6 x 12.8 x 7.7 in. 473 x 325 x 196 mm.	17.1 lbs. 7.8 kg.
FH 800(L) Flash Head (no flash head mounting brackets)	15.1 x 7.9 x 11.6 in. 384 x 201 x 295 mm.	12.9 lbs. 5.9 kg.

Table 1.1 – Weights and Dimensions

* Weight does not include 2” EMT conduit or any fittings below it.

1.1.2 PERFORMANCE CHARACTERISTICS

FTS 812(L) System Power Requirements

Voltage and Frequency: 120-240VAC, 50 and 60 Hz

Peak Volt-Amperes: 171 VA @ 120VAC, 193 @ 99VAC, 222 VA @ 264VAC

120 fpm: 64.5 W High Intensity, 15.9 W Medium Intensity, 11.9 W Low Intensity and 10.9 W OFF*

60 fpm: 37.8 W High Intensity, 13.4 W Medium Intensity, 11.4 W Low Intensity and 10.9 W OFF*

FH 800(L) Power Requirements (with controller)

120 fpm: 35.5 W High Intensity, 9.6 W Medium Intensity, 7.7 W Low Intensity and 7.1 OFF*

60 fpm: 18.6 W High Intensity, 8.3 W Medium Intensity, 7.4 W Low Intensity and 7.1 OFF*

PC 800(L) Power Requirements (power converter/controller)

3 W Auto

Flash Intensity (Nominal)

High Intensity	15,000 cd
Medium Intensity	1500 cd
Low Intensity	300 cd

Flash Rate

120 or 60 flashes per minute

Flash Coverage

Horizontal: 30 degrees (minimum)

Vertical: 10 degrees (minimum)

Application

L-849(L)

Monitoring & Environmental

Complies with FAA Advisory Circular AC 150/5345-51

* Assumes two FH 800's (LED flash heads) and one PC 800 (controller).

1.2 OPERATION

The FTS 812(L) system uses an internal controller, which is combined with the power converter.

The power converter has internal timing circuitry to fix the instant at which it flashes. This signal also contains encoded flash intensity information. A control line, which enables sequential flashing, interconnects the lights.

1.3 COMPONENT IDENTIFICATION

Figure 1.1 – FH 800 (L) External Views

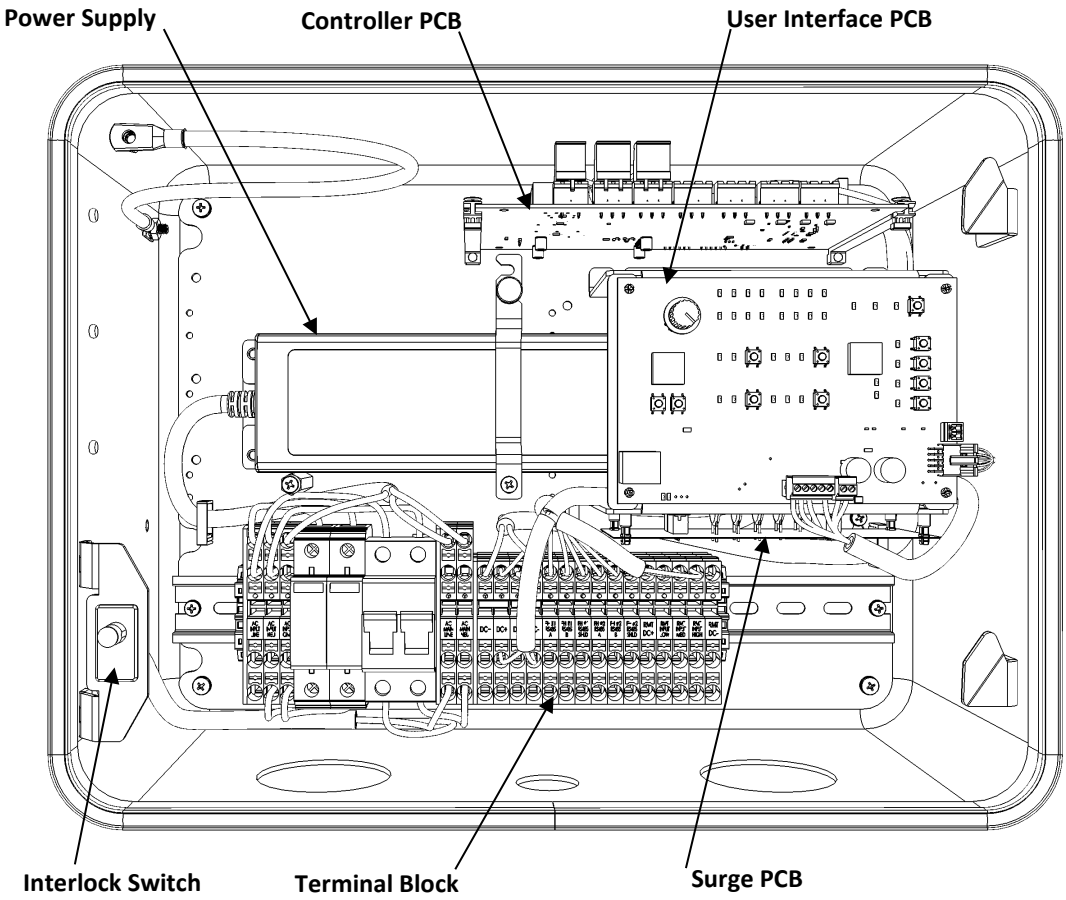


Figure 1.2 – PC 800(L) Internal Components

SECTION 2 – UNPACKING, INSTALLATION, MOUNTING, WIRING AND CHECKOUT

2.1 UNPACK THE FTS 812(L)

The FTS 812(L) is packaged in custom packaging to ensure that it arrives safely and undamaged at the installation location.

Unpack all hardware and inspect for damage. Please contact Flash Technology Customer Service (page 18) if any parts are damaged or missing. See the RMA Policy (page 19) for additional information.

2.2 WARNING

Read the Personal Hazard Warning (page 3) now. Remove power from all wiring and circuitry before installing or performing work on the system. It is the responsibility of the installer to comply with all applicable electrical codes.

IMPORTANT!! Ensure the correct end of the flash head cable is pulled through the underground conduit/raceway. Failure to pull the correct end will cause installation delays and re-work. Pay attention to all warning and installation stickers.

2.3 BASIC INSTALLATION STEPS

1. Remove the currently installed lighting system (unless new install)
2. Secure the co-mount assembly (FH & PC) and mounting hardware to mounting pipes (2 x 2” OD)
   a. The previous mounts can be re-used, if in appropriate condition
   b. Ensure installed assembly does not exceed 34” in height
   c. Use the included bubble tool to ensure fixture is level
3. Install the incoming power and remote control wires to the terminal block in the PC
4. Secure the remote-mount assembly (FH) to single mounting pipe (1 x 2” OD)
   a. The previous mounts can be re-used, if in appropriate condition
   b. Ensure installed assembly does not exceed 34” in height
   c. Use the included bubble tool to ensure fixture is level
5. Connect the included FH cable to the back of the remote-mount assembly
6. Use the twist connecter to secure
7. Route other end (loose cable) to the PC
   a. Route via underground conduit
   b. Not recommended to leave cable exposed
8. Cut the cable to an appropriate length and terminate inside the PC
9. Follow internal info card and terminal block labels
10. Aim each LED FH using the external vertical and horizontal leveling guides
11. Tighten hardware to lock assembly into place
12. Power the system ON and verify operation (local & remote) and user settings
13. After all steps are completed successfully, the installation is finished

2.4 INSTALL THE CO-MOUNT AND REMOTE-MOUNT UNITS

Install the co-mount and remote mount units on separate concrete pads as illustrated in Figure 2.2. Cut EMT pipe such that the dimensions shown in Figure 2.2 are maintained. A bulls-eye level is supplied to assist in leveling the units and is placed in a hole in the mounting brackets. Using this level as a guide, loosen the supplied 2" EMT fittings at the top of the EMT conduit enough to allow the mounting bracket to be moved until it is level, then tighten the fittings. Ensure that the mounting brackets are level after all fittings have been tightened.

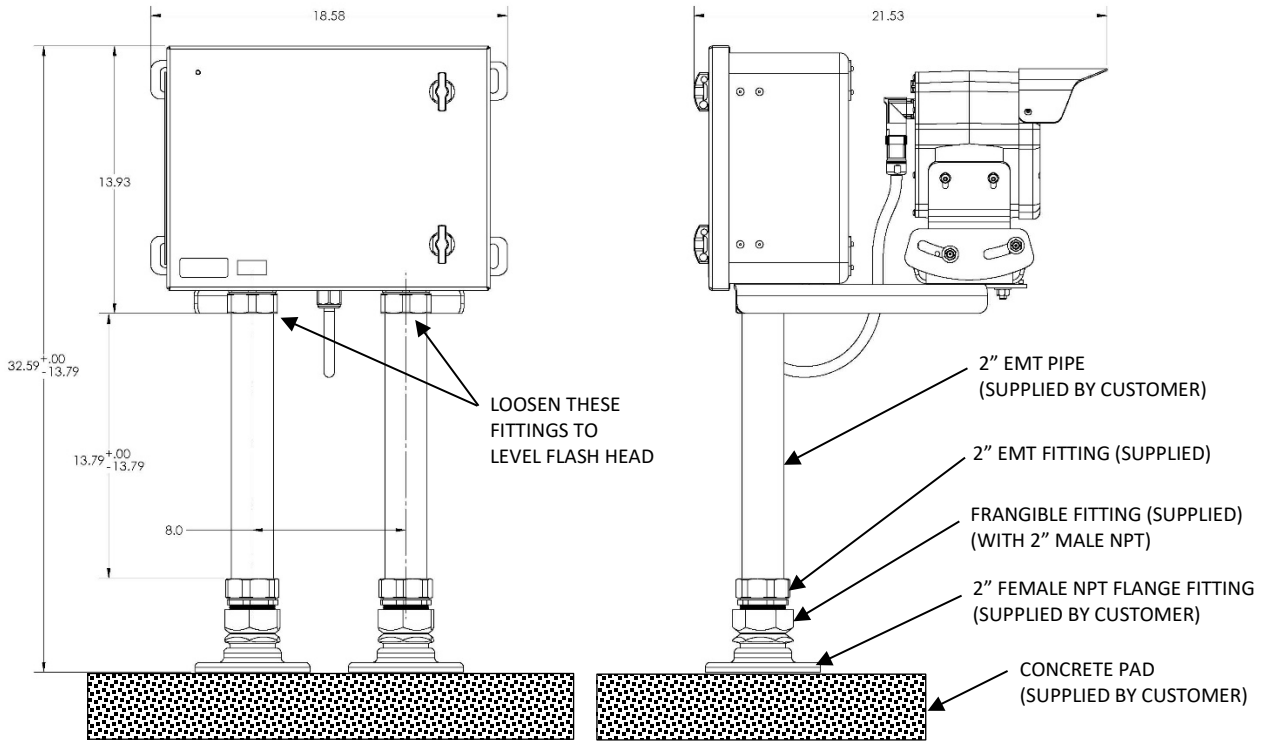
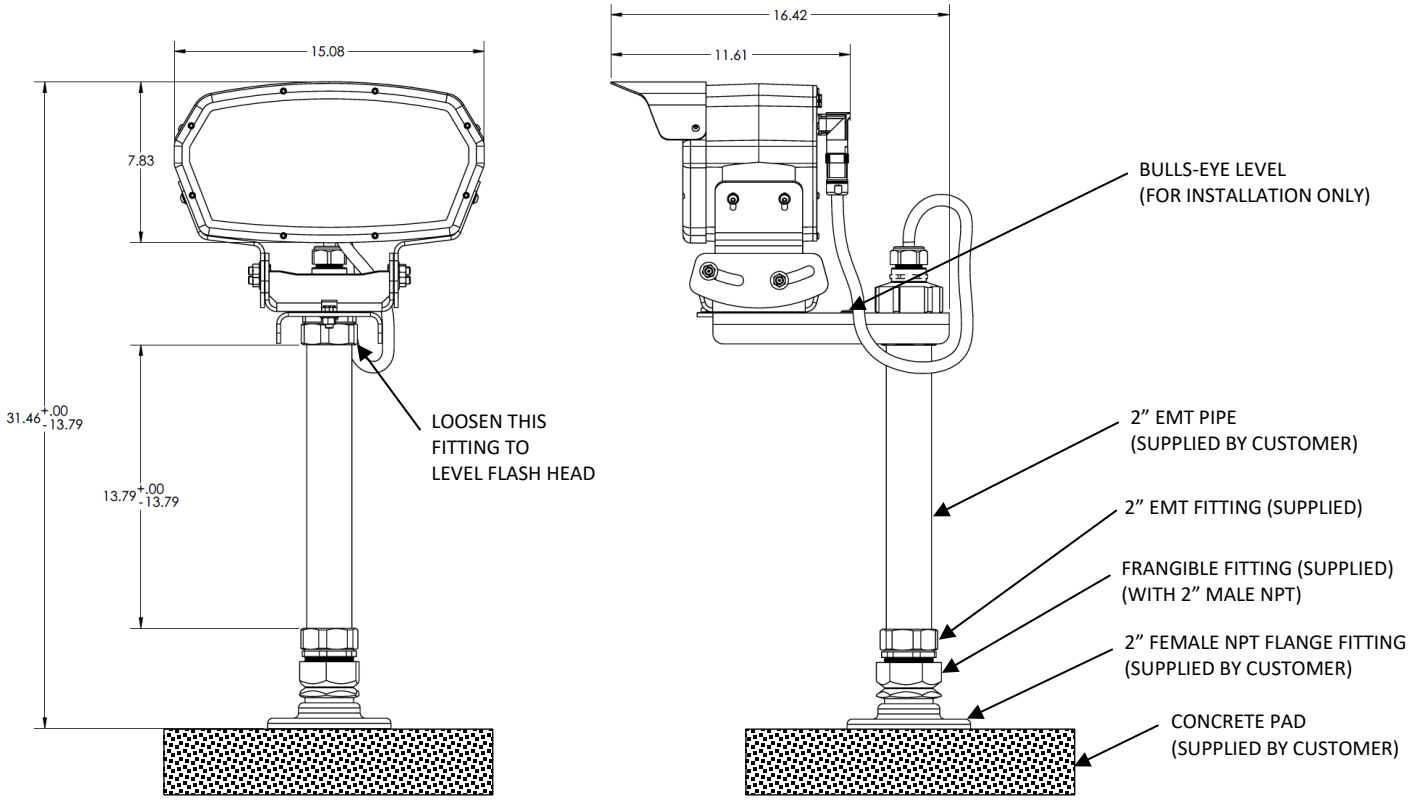


Figure 2.2 – System Dimensions and Mounting Details



Note: All dimensions are in inches.

FIGURE 2.2 – SYSTEM DIMENSIONS AND MOUNTING DETAILS (CONTINUED)

2.5 AIMING THE FH 400(L) FLASH HEADS

Both flash heads are mounted to a bracket which allows the flash head to be rotated in the horizontal and vertical axes. Vertical aiming requires loosening of four nuts, two on each side of the mounting bracket. Once these nuts have been loosened, the flash head can be rotated to the desired vertical angle using the scale provided. After the angle has been set, tighten all four nuts to lock the unit in place at the desired vertical angle. Horizontal aiming requires loosening the two nuts on the bottom of the mounting bracket. Once these nuts have been loosened, the flash head can be rotated to the desired horizontal angle using the scale provided. After the angle has been set, tighten both nuts to lock the unit in place at the desired horizontal angle.

2.6 WIRING THE SYSTEM POWER AND COMMUNICATIONS CONNECTIONS

The system is supplied with a 3-foot pigtail for connecting the co-mounted flash head and a separate 50-200-foot pigtail for connecting the remote mounted flash head. This longer pigtail is intended to be cut-to-length and terminated in the field, while the short pigtail can be used as-is. The long pigtail and remote input wires are to be routed up inside the right side conduit of the PC 800(L) and the incoming power for the system should be routed up the left side conduit. The short pigtail is routed down through the cable gland between the conduits and out to the co-mounted flash head as shown in Figure 2.2. Input power connections required are power (100-240 VAC,

50/60 Hz) and ground. The ground wire must be connected for proper operation and protection of the beacon. The external ground lug of the PC 800(L) must be grounded separately.

A remote switch can be connected via the remote inputs and remote power output to enable remote switching of the 812(L) system. This switch should accommodate switching of the 24 volt remote DC + power provided by the PC 800(L) terminal block.

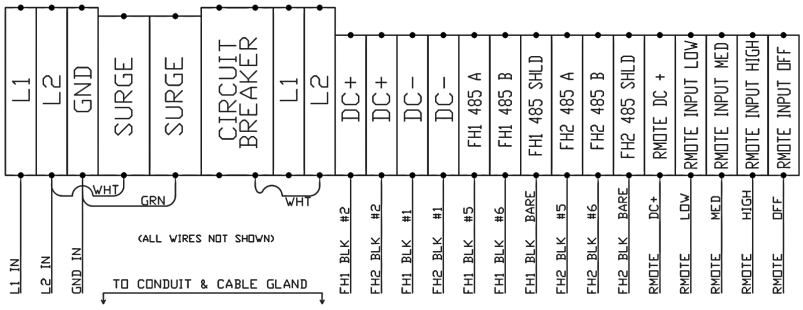


Figure 2.3 – System Input Wiring

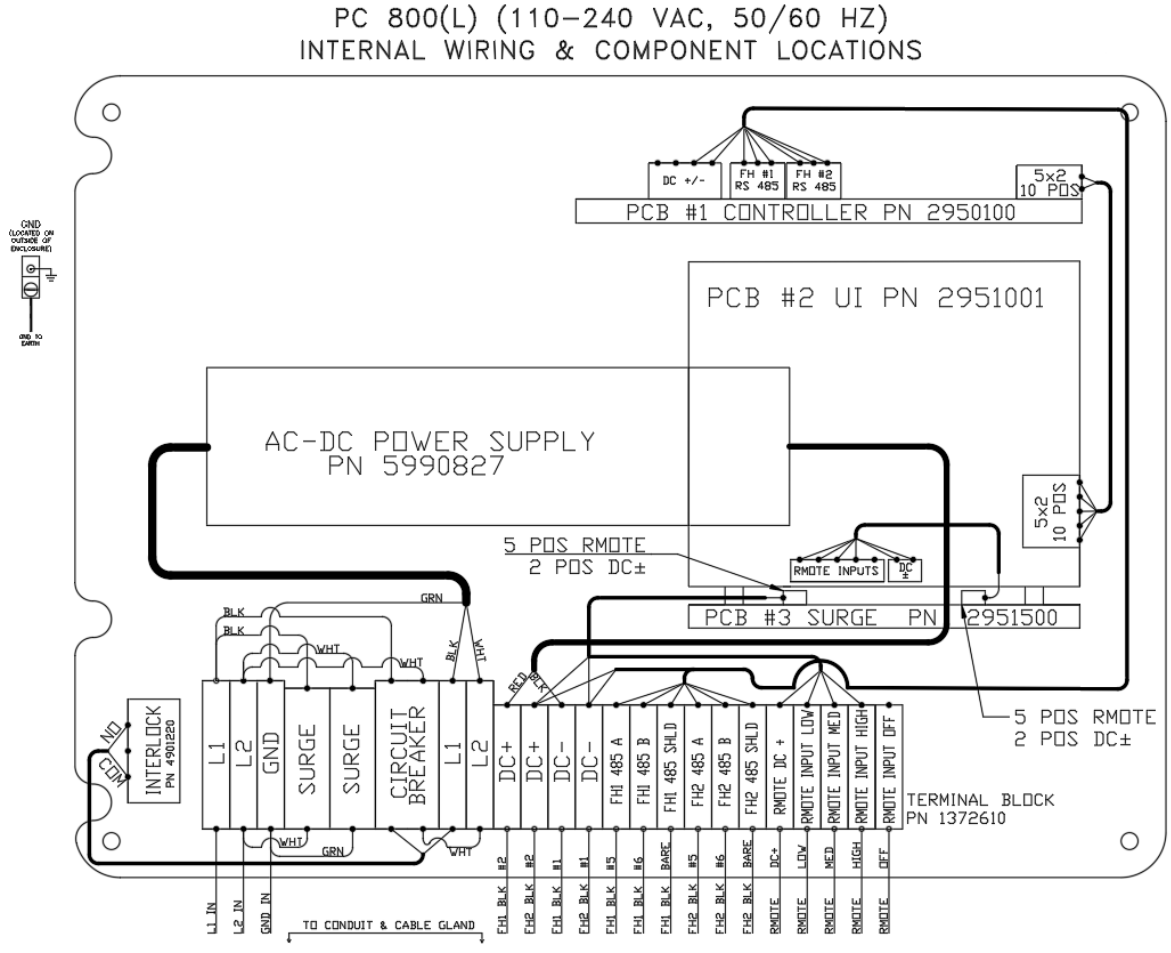


Figure 2.4 – System Wiring Diagram

2.7 VERIFYING OPERATION

Apply power to the system and verify operation and user settings.

2.7.1 POWER UP

When powered up, the system will begin flashing. The flash heads will continue to flash as long as the system is set to a flashing operation mode.

SECTION 3 – BEACON OPERATION

3.1 SYSTEM OVERVIEW

The system has 5 operating modes: Remote, Off, Low, Medium and High. The system operates in a mode chosen by an external switch capable of switching 24 volts DC through the remote input connections available in the PC 800(L) enclosure. It is also possible to locally control the operating mode using the rotary knob available on the User Interface PCB. For general operation, this knob should be set to the “Remote” position. A power supply is located inside the PC 800(L) and powers both flash heads and the enclosure it resides in. The PC 800(L) enclosure has an interlock switch which disconnects incoming power when the door is opened.

3.2 USER INTERFACE BOARD

The user interface board is located inside the PC 800(L) enclosure and controls the operational parameters of the REIL system. Refer to Figure 3.2 for a graphical reference to the sections listed below.

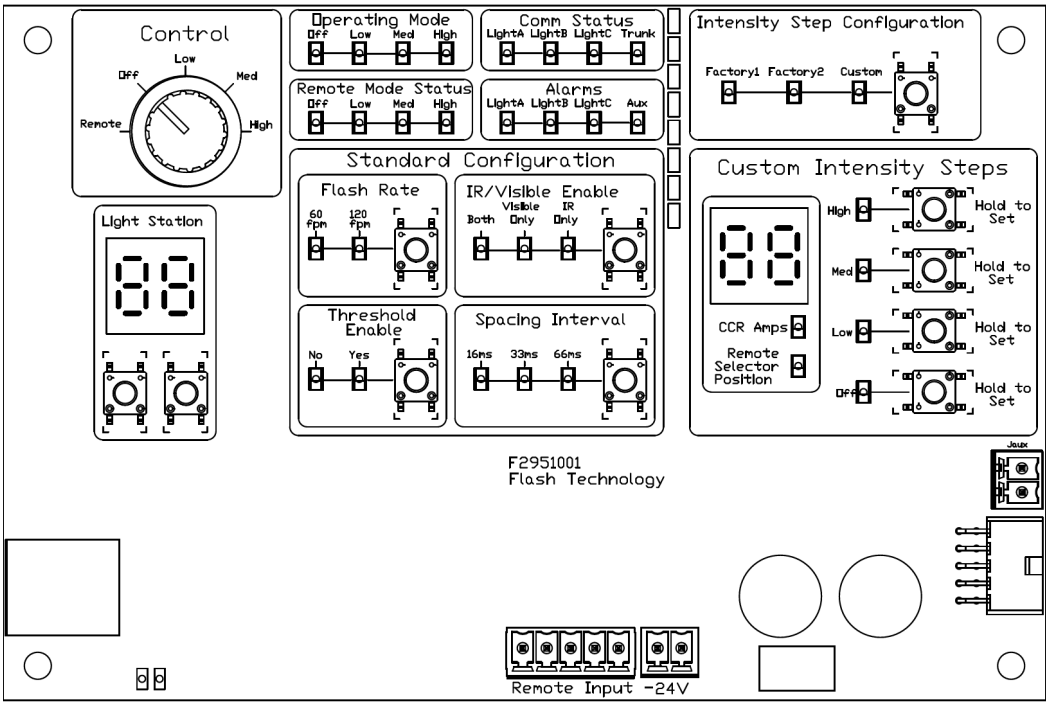


Figure 3.2 – User Interface Board

CONTROL SECTION:

- The 5 position knob controls the mode of the FTS 812(L) system.
- Set the knob to Remote to enable control of the unit to be the remote inputs.
- Set the knob to Off, Low, Med or High as desired for setup and maintenance purposes.

OPERATING MODE SECTION:

- An LED indicator lights up to show what mode the system is currently operating in.

COMM STATUS SECTION:

- An LED status indicator lights up green to show working communications status with a light connected to the PC 800(L). FH1 corresponds to LightA, FH2 corresponds to LightB, and FH3 corresponds to LightC. The Trunk line lights up only when communications are detected for sequenced approach systems and is not used for REIL's

REMOTE MODE STATUS SECTION:

- An LED indicator lights up to show the mode that the system has been remotely commanded to operate in.

ALARMS SECTION:

- An LED indicator will light up red if a fault has been detected. For a given flash head:
    - If the comm status indicator is not lit, and the alarm indicator is lit - then a communication fault has been detected.
    - If both the comm status indicator and the alarm indicator are lit, then the fault is due to a light failure.

LIGHT STATION SECTION:

- This section is used for sequenced approach systems only.

STANDARD CONFIGURATION SECTION:

Flash Rate section:

- Press the button to select between a flash rate of 60 flashes per minute and 120 flashes per minute.

IR/Visible Enable section:

- Press the button to select between: IR only, Visible only and both IR and Visible light output.

Threshold Enable section:

- Press the button to select "Yes" for REIL systems. Select "No" for sequenced approach systems.

Spacing Interval section:

- Press the button to select between 16ms, 33ms and 66ms intervals between flashes in a sequenced approach system. This setting in not used for REIL systems. The default for this setting is 16ms.

INTENSITY STEP CONFIGURATION SECTION:

- This section is not used for voltage driven REILs.

CUSTOM STEP CONFIGURATION SECTION:

- This section is not used for voltage driven REILs.

SECTION 4 – MAINTENANCE AND TROUBLESHOOTING

4.1 MAINTENANCE

No regularly scheduled maintenance is required for the beacon.

- Flash Technology warranties the light output of the beacon to meet or exceed FAA requirements for a 5-year period.
- Periodic cleaning of the lens is recommended with soapy water or any acrylic cleaning solution. No other cleaning solutions are recommended. Abrasive compounds will scratch the lens.
- Mounting bracket hardware should be checked periodically for tightness.

4.2 TROUBLESHOOTING

Follow the troubleshooting steps in the tables below as applicable. Flash head repair procedures are provided in Section 4.3 (page 18).

Table 4.1 – Troubleshooting - Beacon is in Alarm, is Not Flashing Correctly, or is Not Flashing

Step	Check/Test/Action		Action
1a	Do both beacons flash in all modes?	Yes No	Go to Step 1b. Go to Step 2a.
1b	Are the beacons flashing in the commanded mode?	Yes No	Go to Step 1c. Replace Controller PCB.
1c	Are the beacons flashing in sync?	Yes No	Beacon is operational. Replace Controller PCB.

Table 4.2 – Troubleshooting – 1 or 2 Beacons Do Not Flash

Step	Check/Test/Action		Action
2a	Is the required power and ground connected to the PC 800(L) enclosure terminal block? ----------AND---------- Is voltage within the range 120-240VAC present at the line voltage input terminals?	Yes No	Go to Step 2b. Restore AC connections.
2b	Is 24VDC present at the output of the power supply in the PC 800(L) enclosure?	Yes No	Go to Step 2c. Replace the power supply.
2c	Are any of the LED indicators lit on the Controller PCB?	Yes No	Go to Step 2d. Replace the Controller PCB
2d	Does a beacon operate when locally commanded to Low, Med or High but fail to flash in Remote mode?	Yes No	Go to Step 2e. Go to Step 2f.
2e	Is 24 VDC present between the RMOTE DC+ and DC- terminals?	Yes No	Replace Controller PCB Replace Surge PCB
2f	Does the controller show an alarm for the beacon that is not flashing?	Yes No	Replace the beacon. Go to Step 2g.
2g	Is 24VDC available at the beacon end of the pigtail for the beacon that is not flashing?	Yes No	Replace the beacon. Check pigtail, replace as needed

4.3 FLASH HEAD REPAIR PROCEDURES

Warning: Read the Personnel Hazard Warning (page 3) now. Remove power from all wiring and circuitry before installing or performing work on the flash head. It is the responsibility of the installer to comply with all applicable electrical codes.

Note: While performing the following steps, check for any loose connections and other damaged components.

4.3.1 REPLACE THE FLASH HEAD

FH 800(L) Part Number: F1380880

FLASH HEAD REMOVAL

Turn of power to the PC 800(L) and FH 800(L) using the main circuit breaker provided inside the PC 800(L) enclosure. Once power has been turned off to the flash head, disconnect the flash head's power and data cable using the quarter turn cable connector located on the back of the unit (see Figure 1.1). Unfasten the hardware that holds the FH 800(L) to the mounting bracket (two screws on each side of the flash head). Remove the flash head.

FLASH HEAD REPLACEMENT

Replacement is the reverse of the removal process.

SECTION 5 – CUSTOMER SUPPORT

5.1 CONTACT INFORMATION

Customer Service: 1-800-821-5825

Telephone: (615) 503-2000

Fax: (615) 261-2600

Website: flashtechnology.com

Shipping Address:

Flash Technology
332 Nichol Mill Lane
Franklin, TN 37067

5.2 ORDERING PARTS

To order spare or replacement parts, contact Inside Sales at 1-800-821-5825.

Refer to Figure 2.4 for component locations

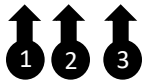
Table 5.1 – Spare/Replacement Parts

Reference	Item	Description	Part Number
PC 800	Power Converter/ Controller	PC 800(L) VOLTAGE DRIVEN	F1380800
PC 800	Fuse	220V, 40kA Fuse	11000010290
PC 800	Bracket	MOUNTING ASSEMBLY	F3380826
FH 800	LED FH	FH 800(L) FLASHING UNI LED	F1380880
FH 800	Cable	CABLE PIGTAIL FOR FH 800(L) - (3 FT)	F4380000003
		CABLE PIGTAIL FOR FH 800(L) - (50 FT)	F4380000050
		CABLE PIGTAIL FOR FH 800(L) - (100 FT)	F4380000100
		CABLE PIGTAIL FOR FH 800(L) - (150 FT)	F4380000150
		CABLE PIGTAIL FOR FH 800(L) - (200 FT)	F4380000200
FH 800	Bracket	REMOTE MOUNTING ASSEMBLY	F3380827

5.4 SYSTEM ORDERING CODE

The following table provides a breakdown of the series scheme for the Flash Technology Airfield LED product. The first digit corresponds to an Omni or Uni-directional beam spread, the second indicates either a voltage or CCR driven power supply and the remaining digits describe how many lights are in the complete system (2-21).

FTS [X] [X] [XX]



# Designation	Description
FTS	Flash Technology System
1	4 = OMNI-Directional
	8 = UNI-Directional
2	3 = CCR Power
	1 = Voltage Power with internal controller
	0 = Voltage Power with external controller
3	Quantity of Lights #2-21
Example: FTS 812 (UNI, voltage power, two lights)	

5.3 RMA POLICY

If any system or part(s) purchased from Flash Technology needs to be returned for any reason (subject to the warranty policy), please see the current RMA policy available online at flashtechnology.com/rma

To initiate an RMA, call the Flash Technology Technical Support at 1-800-821-5825, option 9. Tech Support is available M-F, 7 a.m. to 7 p.m. CT.

Emailing a completed RMA request form to FlashSupport@spx.com can also start the process on sites not requiring detailed troubleshooting. Complete the online form at flashtechnology.com/rma-request-form

NOTE: An RMA number must be requested from Flash Technology prior to return of any product. No returned product will be processed without an RMA number. Failure to follow the below procedure may result in additional charges and delays. Any product received without an RMA number is subject to return back to the sender. All RMA numbers are valid for 30 days.