FLASH TECHNOLOGY

Vanguard Red FTS 371

Medium Intensity RED LED Obstruction Lighting System Reference Manual

Part Number F7913801

SERIAL NUMBER

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Front Matter

Abstract

This manual contains information and instructions for installing, operating and maintaining the Vanguard Red FTS 371 system components.

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Trademark Acknowledgements

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Applicable Specifications

The equipment included in this system meets or exceeds FAA AC 150/5345-43H requirements for the FAA Type L-864, L-810 and L-810(F) obstruction lights. This equipment can accommodate system configurations that meet the FAA AC/7460-1L and FAA AC/7460-1K standards for marker configurations.

The equipment included in this system meets or exceeds requirements for Transport Canada CAR621.19 types CL-864, and CL-810.

The equipment included in this system meets or exceeds requirements for ICAO Annex 14 Sixth Edition for Medium-intensity obstacle lights Types B and C, as well as Low-intensity obstacle light Type B.

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 controller and LED Lighting components, under normal operating conditions, for 5 years.

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 Circulars 150/5345-43H, 150/5345-53D, and Engineering Brief No. 67D. 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 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. Under no circumstances remove or alter any safety interlock switch.

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Section 1 – Introduction & Specifications

FTS 371 System

The Vanguard Red FTS 371 system is comprised of an FTS 371 FTC (AC or DC) series controller, zero to four MKR 371 L810/CL810 series low intensity red LED obstruction lights (Marker), and zero to one FTS 371 FH (AC, DC 24V, or DC 48V) L864 medium intensity red LED obstruction lights (Flashhead/Beacon). System and Component model combinations are provided in the table below.

The FTS 371 FTC AC and DC Controllers may be used with incoming power having the negative leg grounded and are available in Polycarbonate enclosure.

The FTS 371 system is designed to meet FAA, ICAO and Transport Canada regulations and to be utilized for their corresponding valid tower lighting configurations.

System and Component Model Combinations

System	Controller	Beacon	Markers
FTS 371 AC	FTS 371 FTC AC	FTS 371 FH AC IR (0 to 1)	MKR 371 (0 to 4) MKR 371 IR (0 to 4)
FTS 371 DC 24V	FTS 371 FTC DC	FTS 371 FH DC 24V IR (0 to 1)	MKR 371 (0 to 4) MKR 371 IR (0 to 4)
FTS 371 DC 48V	FTS 371 FTC DC	FTS 371 FH DC 48V IR (0 to 1)	MKR 371 (0 to 4) MKR 371 IR (0 to 4)

System Specifications

Controller: FTS 371 FTC AC, FTS 371 FTC DC

Parameter	Specification
Physical Dimensions **Polycarbonate Enclosure**	 7.80” x 8.25” x 4.01” (198.12 mm x 209.55 mm x 101.85 mm)
Weight **Polycarbonate Enclosure**	 2.10 lbs. (0.95 kg)
Operating Temperature Range	-40 to +55 degrees Celsius
Input Voltage Range **FTS 371 FTC AC** **FTS 371 FTC DC**	 100 – 240VAC Nominal; 85-265 VAC at 50/60 Hz 12 – 48 VDC +/- 10% (12VDC for markers only)
Power Consumption **FTS 371 FTC AC** **FTS 371 FTC DC**	 0.9 Watts 0.8 Watts
Flash Rate Options (Flashes Per Minute)	Steady Burn / 20 / 30 / 40 / 60
Alarm Relay Contact Rating	5 Amp @ 120V AC / 5 Amp @ 24V DC, Isolated contacts
Protection Rating	IP65, NEMA 4X

Flashhead/Beacon: FTS 371 FH AC, FTS 371 FH DC 24V, FTS 371 FH DC 48V

Parameter	Specification
Physical Dimensions	15.75” diameter x 7.5” (400 mm diameter x 190.5 mm)
Weight	25.6 lbs. (11.7 kg)
Flash Intensity	FAA Mode: 2000 effective candela +/- 25% ICAO Mode: 2200 effective candela +/- 25%
Operating Temperature Range	-40 to +55 degrees Celsius
Input Voltage Range **FTS 371 FH AC** **FTS 371 FH DC 24V** **FTS 371 FH DC 48V**	 85-265 VAC at 50/60 Hz 24V +/- 10% (21.6 – 26.4V) 48V +/- 10% (43.2 – 52.8V)
Power Consumption	***Mode*** **Average Power** *FAA, Efficient, 20 FPM* 4.0 Watts *FAA, Efficient, 30 FPM* 5.3 Watts *ICAO, Efficient, 20 FPM* 4.4 Watts *ICAO, Steady* 30 Watts
Beam Spread	Horizontal: 360 deg. / Vertical: 3 deg.
Aerodynamic Wind Area	99.125 in^2
Protection Rating	IP65, NEMA 4X

Markers: MKR 371 series

Parameter	Specification
Physical Dimensions	9.0” x 2.75” x 2.13” (228.6 x 69.9 x 54.1 mm)
Weight	1.6 lbs. (0.7 kg)
Intensity (Steady)	32.5 ECD +/- 25%
Operating Temperature Range	-40 to +55 degrees Celsius
Power Usage	***Marker Type / Mode*** **Average Power** *MKR 371 L810 / Steady* 2.5 Watts *MKR 371 L810 / Flashing* 0.4 Watts *MKR 371 CL810 / Steady* 3.1 Watts *MKR 371 CL810 / Flashing* 0.6 Watts *MKR 371 L810 IR / Steady* 3.9 Watts *MKR 371 L810 IR / Flashing* 0.7 Watts *MKR 371 CL810 IR / Steady* 4.4 Watts *MKR 371 CL810 IR / Flashing* 0.9 Watts
Beam Spread	Horizontal: 360 deg. / Vertical: 10 deg.
Aerodynamic Wind Area	24.75 in^2
Protection Rating	IP65, NEMA 4X

Markers: MKR 371 OL2 series

Parameter	Specification
Physical Dimensions	11.25” x 5.0” x 8.75” (279.4 mm x 127 mm x 222.25 mm); ¾” NPT Coupling
Weight	5.40 lbs. (2.45 kg)

Section 2 – Outline, Mounting and Installation Instructions

Unpacking

Inspect shipping cartons for signs of damage before opening. Check package contents against the packing list and inspect each item for visible damage.

Promptly report damage claims to the freight handler.

Tools

- 1/8" non-flared flat blade screw driver
- Digital volt-ohm meter
- #2 Phillips® head screwdriver
- Wire strippers
- Level
- Tin Snips
- Mounting hardware for controller (if not provided in the system kit)
- Various drill bits (to create openings in the bottom of the controller for cable runs)

Controller Installation and Grounding

Locate the FTS 371 FTC controller in an area that will allow proper access to the enclosure. Ensure the mounting location does not interfere with the quick-release latch that secures the enclosure's door. Release the latch to open the door for internal access.

Use the following guidelines for mounting the controller:

- Ensure that adequate space exists around the equipment for access during installation, maintenance, and servicing.
- Allow space for air flow around the controller. Recommended 3-4" of space allowed on each side of the controller. Flash Technology does not furnish mounting hardware unless it is ordered as part of an installation kit.
- The use of flexible conduit is recommended for all cable runs with the exception of the beacon cable and jacketed ground wires.
- Ground the controller using a 10 AWG insulated ground conductor crimped into the supplied Yellow ring terminal. The ring terminal must be installed at the lower left PCB mounting screw in the Controller. Route all ground conductors down and away from the energized equipment and ensure there are no bends less than 8 inches radius. If installed outdoors the system controller should be bonded to the site grounding grid (via exothermic welding). If installed inside a shelter or building route the 10 AWG insulated ground wire to the nearest down-link and attach using a compression fitting (c-tap).

Use the following guidelines for installing the photodiode:

- Locate the photodiode where it has an unobstructed view of the polar sky (north).
- It must not view direct or reflected artificial light.
- The photodiode should be supported vertically at the top end of a vertical length of rigid conduit to prevent moisture intrusion.
- If possible, mount the photodiode in a location that will allow easy access for future testing.

L-864 Flashhead/Beacon Installation and Grounding

1. Verify that the mounting surface is free of debris.
2. Align the four mounting holes in the base of the beacon with the holes in the tower or pedestal's mounting plate.
3. Leaving the hardware assemblies loose, secure the beacon with ½ inch stainless steel or galvanized hardware (Part # 5991740).
4. With the light engine secured by the two latches on the base, place a level on the beacon's top plate and verify that it is level in two directions. Note: Flash Technology's "T"- Level (Optional Part # 11000013455) has two vials to simplify installation.
5. If the beacon is not level, add stainless steel shim material or washers (stainless steel or galvanized) as necessary to level the beacon.
6. Tighten the hardware once the beacon is level in both directions. Verify that the beacon is level once the hardware is fully tightened. If necessary, loosen the mounting hardware and repeat Step 5 until the beacon is level with the hardware fully tightened.
7. Connect a minimum 8 AWG insulated grounding wire to the pre-installed grounding lug on the Beacon base exterior. Connect the other end of the wire directly to tower steel, collective buss bar, or customer preferred location. Ensure the use of an anti-corrosive agent is used on all terminal ends.

Marker Installation and Wiring

Installation and wiring instruction concerning MKR 371 DC marker fixtures are supplied with the marker kit.

Lightning Protection

All Flash Technology equipment is designed to withstand severe transient over-voltages. However, a lightning arresting system should be installed to prevent eventual damage by lightning. Transient suppressors from line-to-line and line-to neutral are recommended at the primary power load center.

The presence of a copper lightning rod should be confirmed. Ensure the lightning rod is approx. 18" away from the L-864 Red LED Beacon and 36" above the beacon for proper protection.

System Wiring

This manual may not contain all the information about installation wiring required for your installation.

Important! If installation drawings prepared specifically for your site disagree with information provided in this manual, the site installation drawings should take precedence. Consult any site-specific installation wiring diagrams supplied with your equipment.

Flash Technology wiring diagrams define only minimum requirements recommended for satisfactory equipment operation. It is the responsibility of the installer to comply with all applicable electrical codes.

All installation wiring should have an insulation rating of 600 volts. Wire size for the lights on each wire run is calculated from the number of lighting fixtures and the length of the wire on that run.

After the beacon wiring has been terminated to the beacon base ensure all cord grips are fully tightened and both latches are secured to prevent moisture intrusion.

Securing the Cable (2-3-4 Tape Method)

Flash Technology provides the material for securing the beacon cable to a skeletal structure with the following technique.

NOTE! Always adhere to local electrical codes that could supersede this recommended technique:

Step 1	Step 2	Step 3
Run the cable along one of the tower legs and wrap two full turns of two-inch Scotchrap™ #50 tape, or the equivalent, around the cable and tower leg.	**Wrap three full turns of one-inch Scotchrap™ Filament #890 tape, or the equivalent, over the Scotchrap™ #50 tape.**	**Wrap four full turns of two-inch Scotchrap™ #50 tape, or the equivalent, over the Scotchrap™ Filament #890 tape.**

NOTE!! Ensure there is at least a 4 to 5 foot (1.5 meters) separation between taping sections per NEC.

Flange Stress Relief

Secure the cable above and below each flange approximately 1-6 inches by performing steps 1 through 3. Allow a 1 inch to 3 inch separation from the flange and the cable.

AM "Hot" Tower Wiring

On AM "Hot" Towers, wire the Beacon, Markers, and Controller as described in this section except for the following. On the cable between the Controller and Beacon, do not connect the Ground conductor in the Controller or the Beacon.

Flashhead/Beacon Wiring

For AC powered systems, Beacon wiring is shown in Figure 6 and typical installation diagrams are provided in Figures 7 and 8. In the Beacon, connect the black wire to PCB terminal L1 and white wire to L2/N. Connect the green Ground wire directly to the beacon base using the screw with integrated star washer located near the cable entry point.

For DC powered systems, Beacon wiring is shown in Figure 11 and typical installation diagrams are provided in Figures 12 and 13. In the Beacon, connect the red wire to PCB terminal DC+ and black wire to DC-. Connect the Blue Ground wire directly to the beacon base using the Ground terminal installed in the beacon base located near the cable entry point.

Controller Wiring

For AC powered systems, Controller wiring is shown in Figure 5 and typical installation diagrams are provided in Figures 7 and 8.

For DC powered systems, Controller wiring is shown in Figure 10 and typical installation diagrams are provided in Figures 12 and 13.

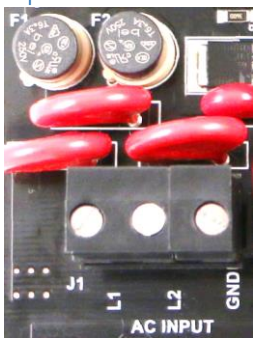
Input power connections

Input power will be applied to J1.

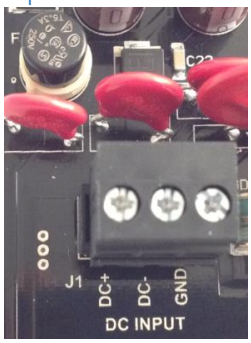
AC powered systems are not sensitive to input power phase and have an operational voltage range of 85-265 VAC, 50/60 Hz with no modification necessary to the input power module. The replaceable input power fuses are located at F1 and F2. To remove a fuse, disconnect power then pull the fuse straight out.

On DC systems, observe polarity of input voltage (connect + to DC+ and – to DC-). There is only one replaceable input power fuse located at F1. To remove the fuse, disconnect power then pull the fuse straight out.

FTS 371 FTC AC
Input Power Connections



FTS 371 FTC DC
Input Power Connections



Beacon & Marker Connections

On the FTS 371 FTC Controller, the Beacon connections are at J2 and Marker connections are at J3.

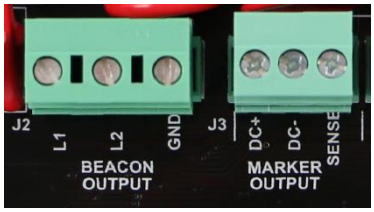
For AC powered systems, one FTS 371 FH AC IR beacons may be connected. Connect the black wire to J2 terminal L1, white wire to L2, and Green wire to GND.

For DC powered systems, one FTS 371 FH DC IR beacon may be connected. Connect the red wire to J2 terminal DC+, black wire to DC-, and Blue wire to GND.

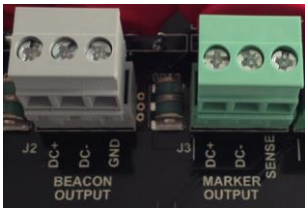
Up to four of the MKR 371 DC series marker lights may be powered from the MARKER OUTPUT at J3. Connect the red wire to DC+, black wire to DC-, and WHT/BLU wire to SENSE. The marker cable shield wire (non-insulated) should be connected to GND at J2, BEACON OUTPUT.

Note: The Beacons or Markers are powered if wired to the connectors. Alarming is configured by the Configuration Switches and Jumpers.

FTS 371 FTC AC
Beacon and Marker Connections



FTS 371 FTC DC
Beacon and Marker Connections

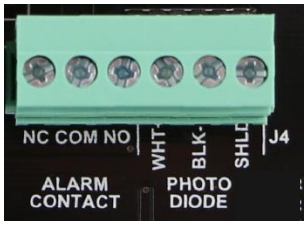


Dry Contact Monitoring and Photodiode connections

The dry contact monitoring connections can be found on J4. The FTS 371 controller provides one alarm point available for external monitoring.

The photodiode (PHD 516) will connect to the far right of J4. If necessary, prepare the photodiode cable by stripping jacket and removing foil shield from black, clear, and drain wires. Connect the wires to matching labels on the PCB for proper operation (Clear to WHT, Black to BLK, and drain wire to SHLD).

Dry Contact Monitoring and
Photodiode Connections



Installation Checklists

Use the following checklists when installing the system:

- [ ] *All equipment has been pre-inspected for damage.*
- [ ] *All received equipment has been verified against the packing list to ensure completeness.*
- [ ] *Site installation drawings have been consulted for placement, mounting, and wiring details.*
- [ ] *A power disconnect switch or a circuit breaker has been provided.*
- [ ] *A lightning protect system is in place.*
- [ ] *Junction boxes have been ensured to drain condensation properly.*
- [ ] *Controller has been mounted and positioned to allow adequate clearance to open the cover.*
- [ ] *Controller has been mounted upright.*
- [ ] *All screws within the internal controller hardware are tight.*
- [ ] *No holes have been punched or drilled on the top of the controller enclosure.*
- [ ] *The photodiode has been located where it has an unobstructed view of the polar sky (north).*
- [ ] *Photodiode is located where it will not view direct or reflected artificial light.*
- [ ] *Photodiode is supported directly by electrical conduit or mounted on the optional Antenna Mounting Bracket (Kit PN 1905355).*
- [ ] *Photodiode is not mounted underneath the controller where it could be shadowed.*
- [ ] *Photodiode installation is water tight.*
- [ ] *AM Towers Only: If the AM tower is "hot", do NOT connect the ground wires to the beacon power connector or the controller beacon power connector.*

Complete the following steps before applying power:

- [ ] *Examine installation drawings.*
- [ ] *Verify incoming service voltage is the value stated on the ID plate.*
- [ ] *Ensure the unit is wired according to the included instructions.*
- [ ] *Check all electrical connections for tightness.*
- [ ] *Check all terminal strip connections for tightness.*
- [ ] *If external alarm detection circuit responds to closed contacts, ensure they are wired to the proper contacts that close on alarm.*
- [ ] *If external alarm detection circuit responds to open contacts, ensure they are wired to the proper contacts that open on alarm.*
- [ ] *Verify alarm wiring has been protected by using shielded wires. Also verify proper grounding of the shield wire, and that the wires are ran through conduit.*
- [ ] *Ensure the white wire of the photodiode is connected to J4 terminal labeled WHT+ and the black wire is connected to J4 terminal labeled BLK-.*

Check-out Procedure

Lighting Inspection

To perform a lighting inspection (LI) you will be required to physically remove the connectors labeled J2 (Beacon Output) and J3 (Marker Output). By removing these connectors the voltage supply to the structure lights will be interrupted and the required alarm will be generated. The following inspection will only test devices that the controller is configured for.

NOTE!! To ensure system damage does not occur it is extremely important to remove power from the lighting controller before removing the connectors and before reinserting the connectors to PCB1.

LI Procedure

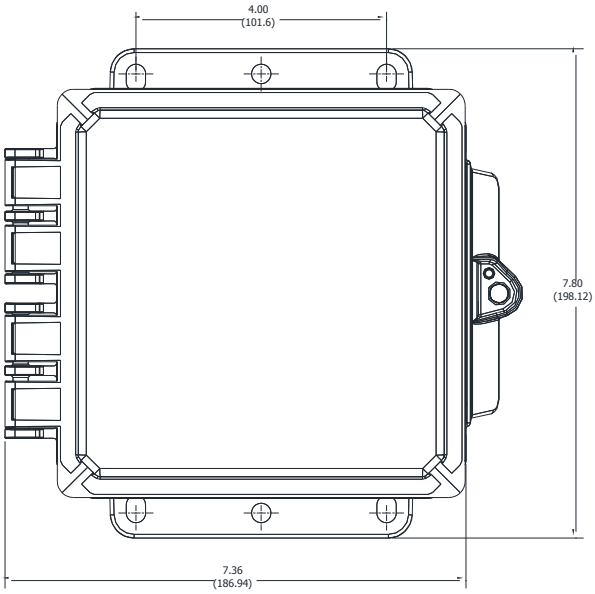
1. Power the 371 controller OFF. Ensure all LEDs are no longer illuminated and that no voltage is present on J1 (Input power).
2. Remove J2 - Beacon Output (If no beacons are installed skip steps 2-7).
3. Power the controller ON and place the system into night mode by covering the photodiode.
4. Once the alarm is active the “BEACON ALARM” LED will be illuminated.

5. To restore (clear) the alarm simply power the controller off (see step 1) and reinsert J2 to PCB1.
6. Power the 371 controller ON and verify the “BEACON ALARM” LED is no longer illuminated.
7. Once the alarm has restored, power the controller OFF.
8. Remove J3 – Marker Output (if no markers are installed skip steps 9,10).
9. Power the controller ON and place the system into night mode by covering the photodiode.
10. Once the alarm is active the “MARKER ALARM” LED will be illuminated.

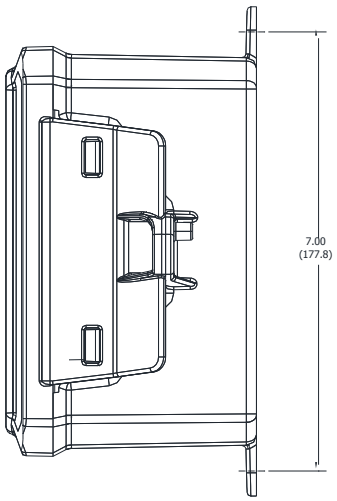
11. To restore (clear) the alarm simply power the controller off (see step 1) and reinsert J3 to PCB1.
12. Power the 371 controller ON and verify the “MARKER ALARM” LED is no longer illuminated.
13. Ensure no alarm LEDS are illuminated and remove the photodiode cover.
14. **TEST COMPLETE!**

Testing the Photodiode

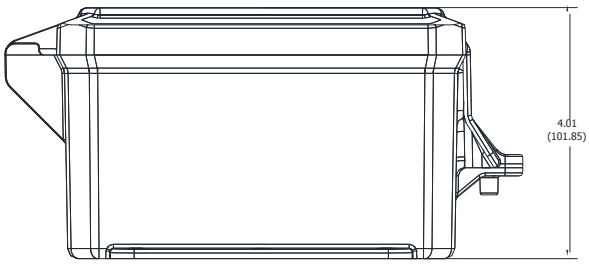
1. Set the MODE switch to AUTO. This ensures that the system is now under photodiode control.
2. Cover the photodiode to block it from all light and wait up to 60 seconds.
   a. Verify that the system is now in NIGHT mode via the “STATUS” LEDs.
   b. The beacon or marker(s) connected to the controller should be on and operating as programmed.
3. Uncover the photodiode to allow light to strike it, or shine a light on it. With no alarms or errors:
   a. Verify that the system is now in DAY mode via the “STATUS” LEDs.
   b. The beacon(s)/marker(s) connected to the controller should turn off.



FRONT VIEW



RIGHT SIDE VIEW



BOTTOM VIEW

Figure 1: Controller FTS 371 Poly Enclosure Mounting and Outline

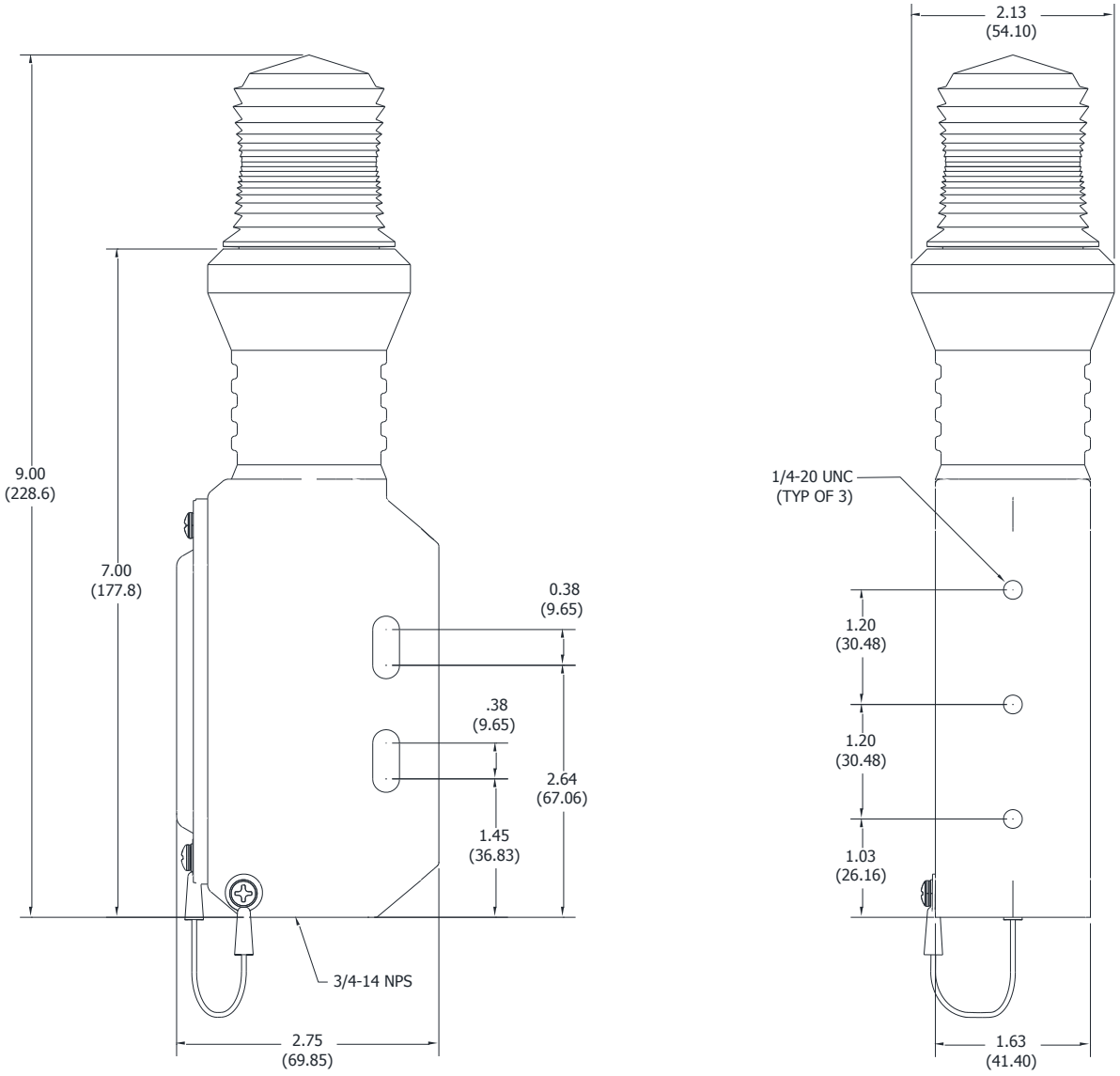


Figure 2: Marker MKR 371 series mounting and outline view

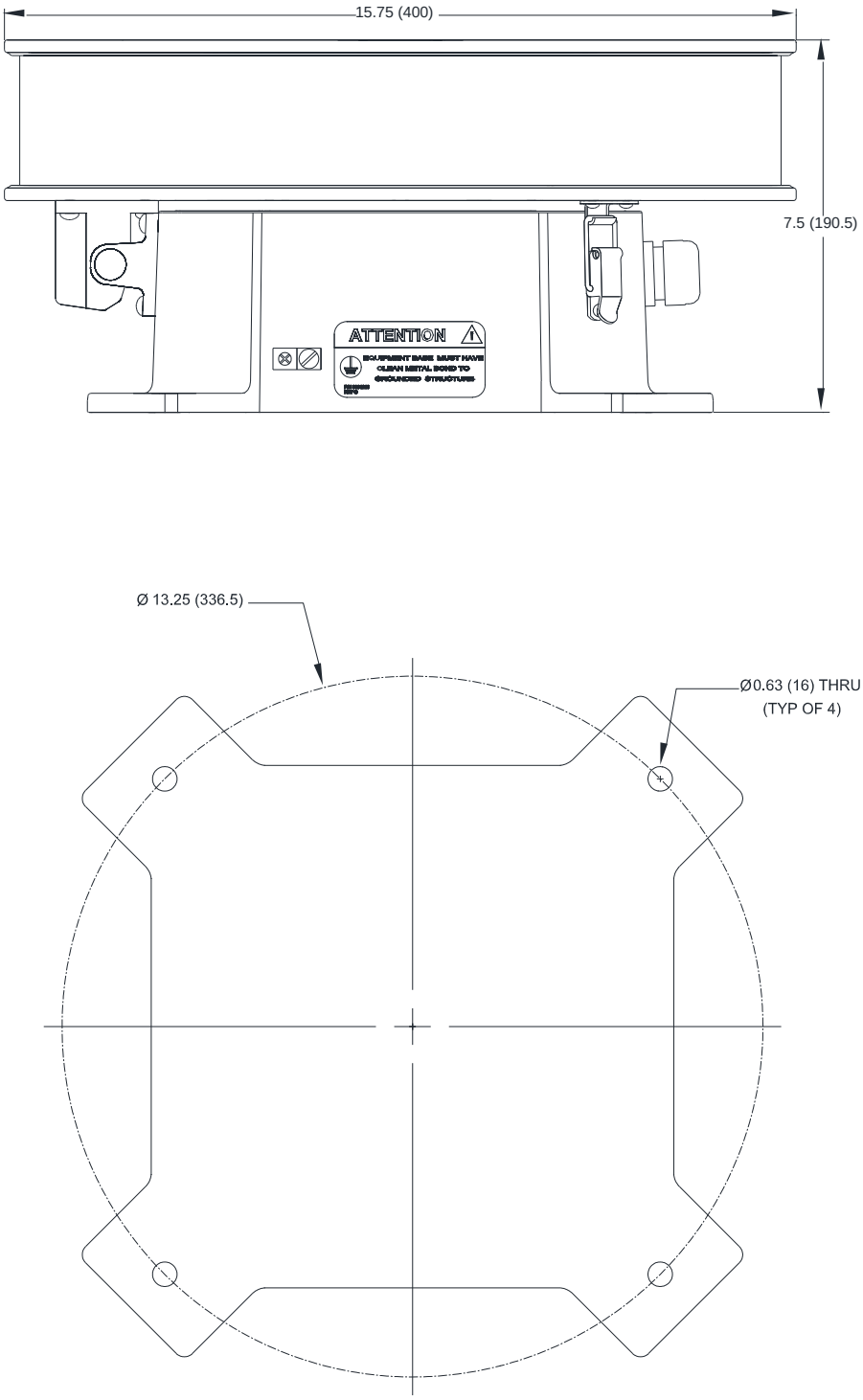


Figure 3: Flashhead/Beacon FTS 371 FH mounting and outline view

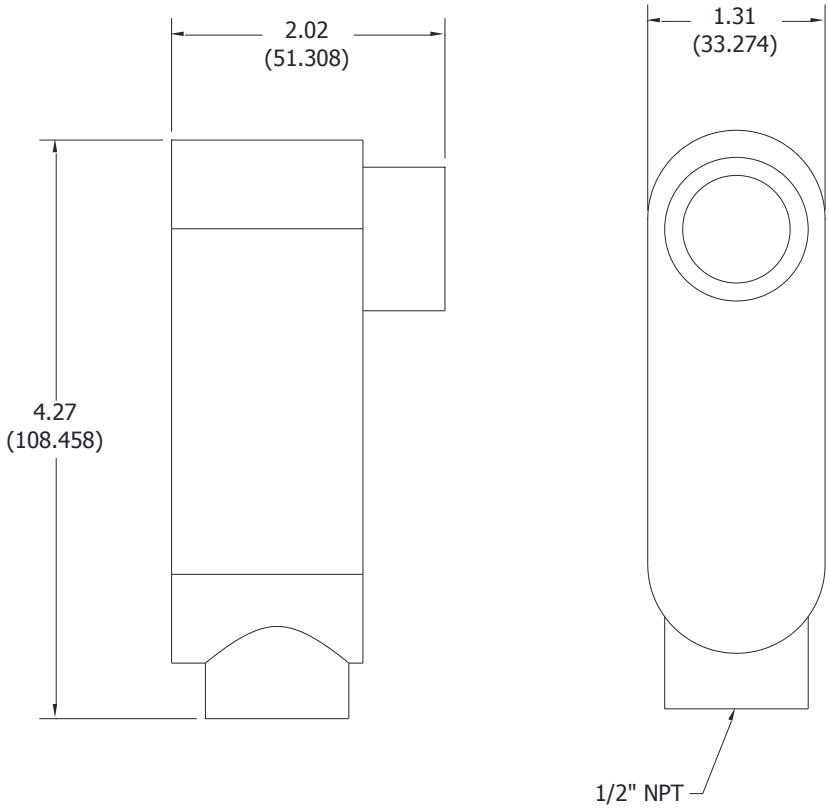


Figure 4: Photodiode PHD 516 mounting and outline view

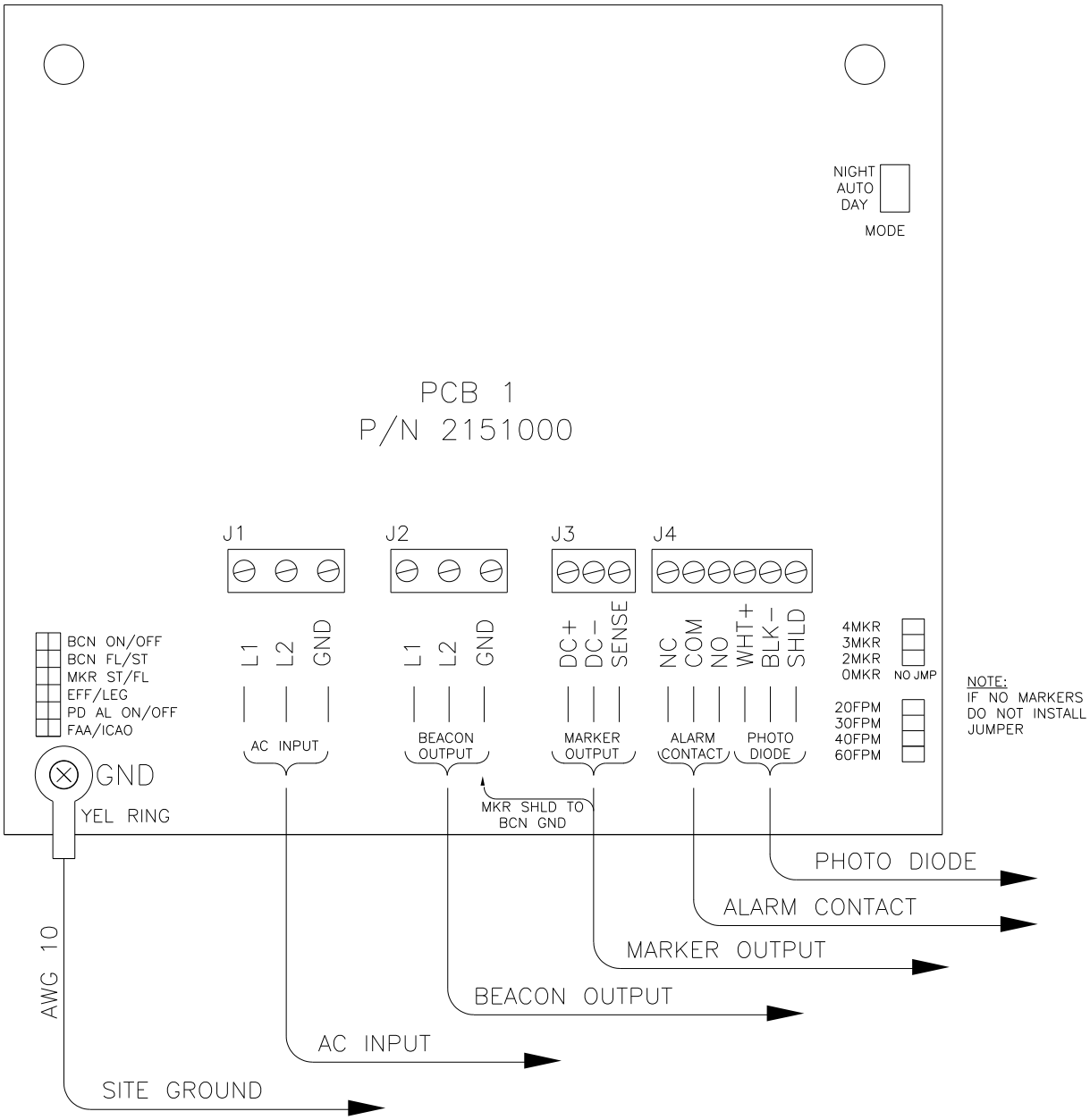


Figure 5: Controller FTS 371 FTC AC Connection Diagram

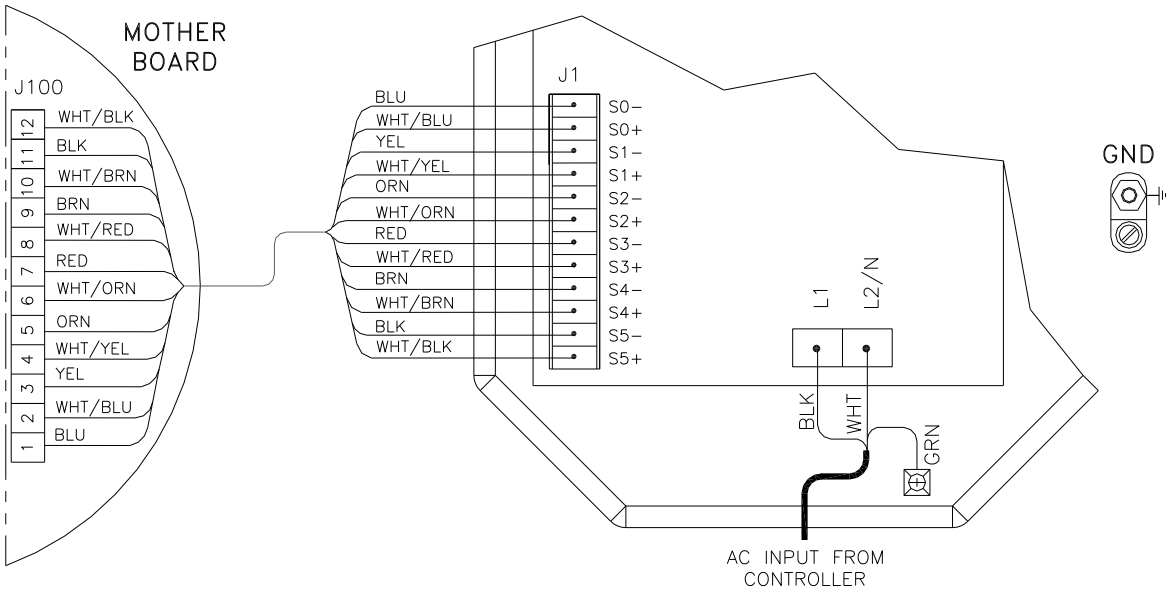


Figure 6: Flashhead/Beacon FTS 371 FH AC Connection Diagram

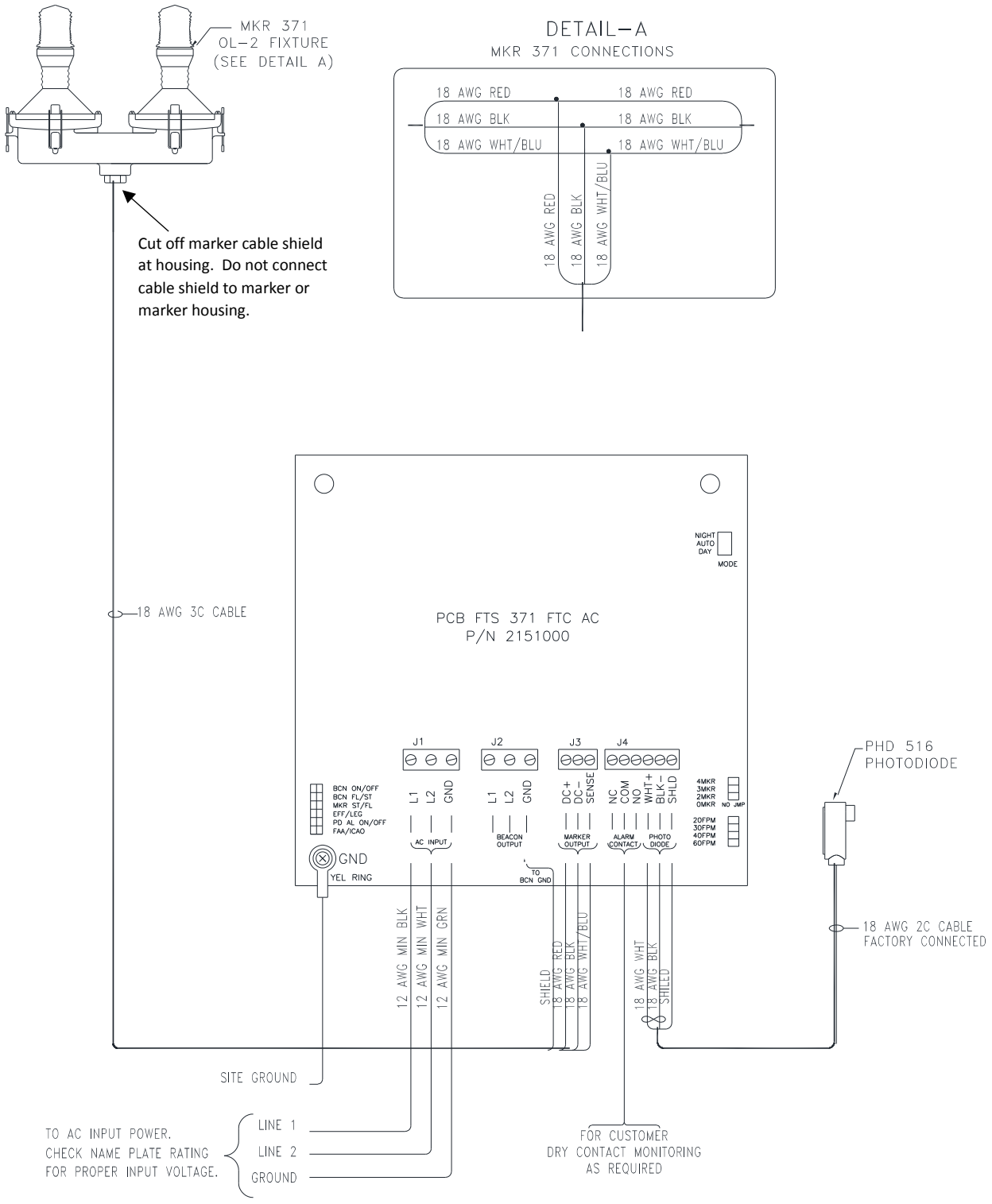


Figure 7: FTS 371 AC Typical FAA Type A0 Installation Wiring

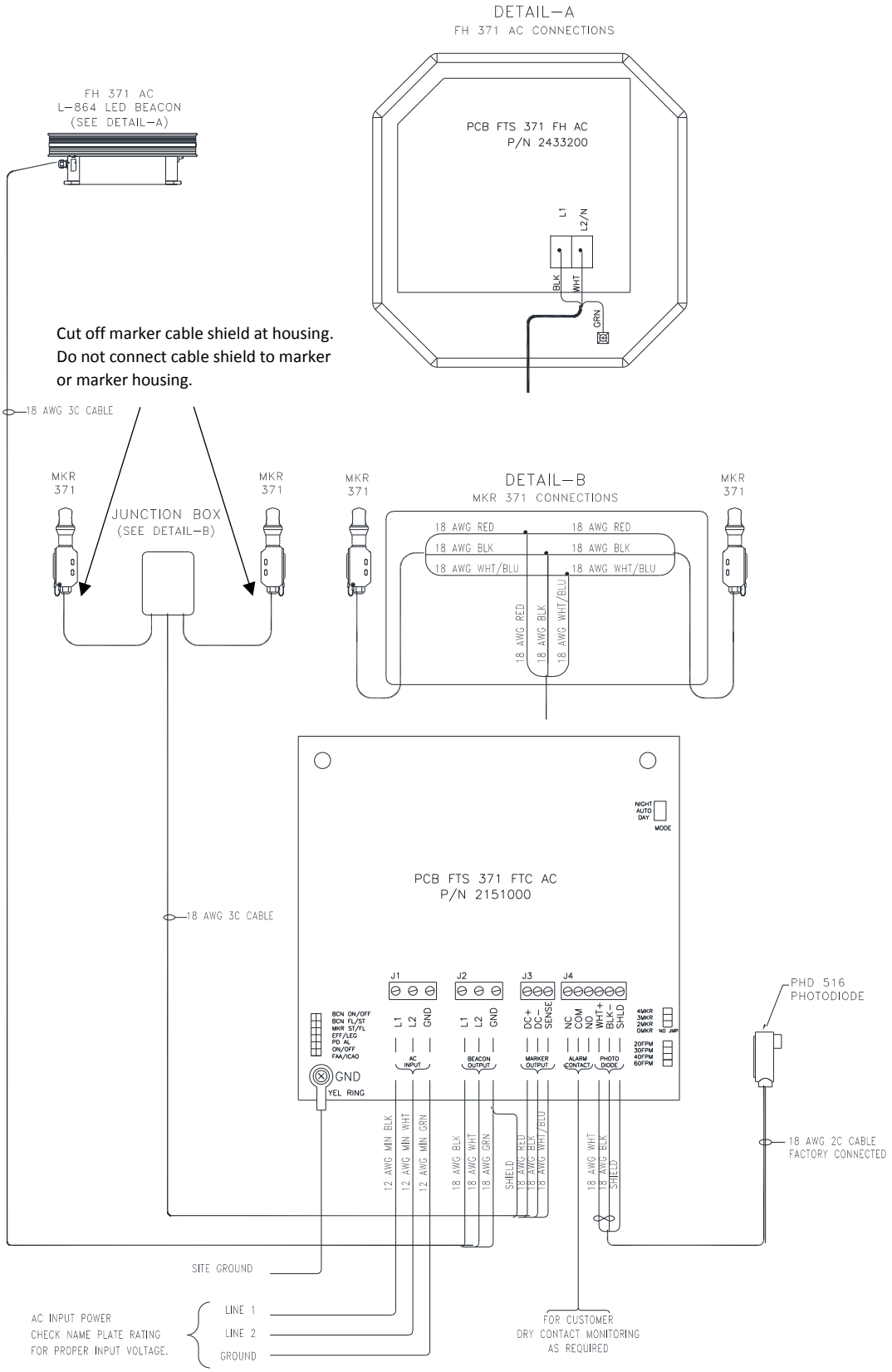


Figure 8: FTS 371 AC Typical FAA Type A1 Installation Wiring

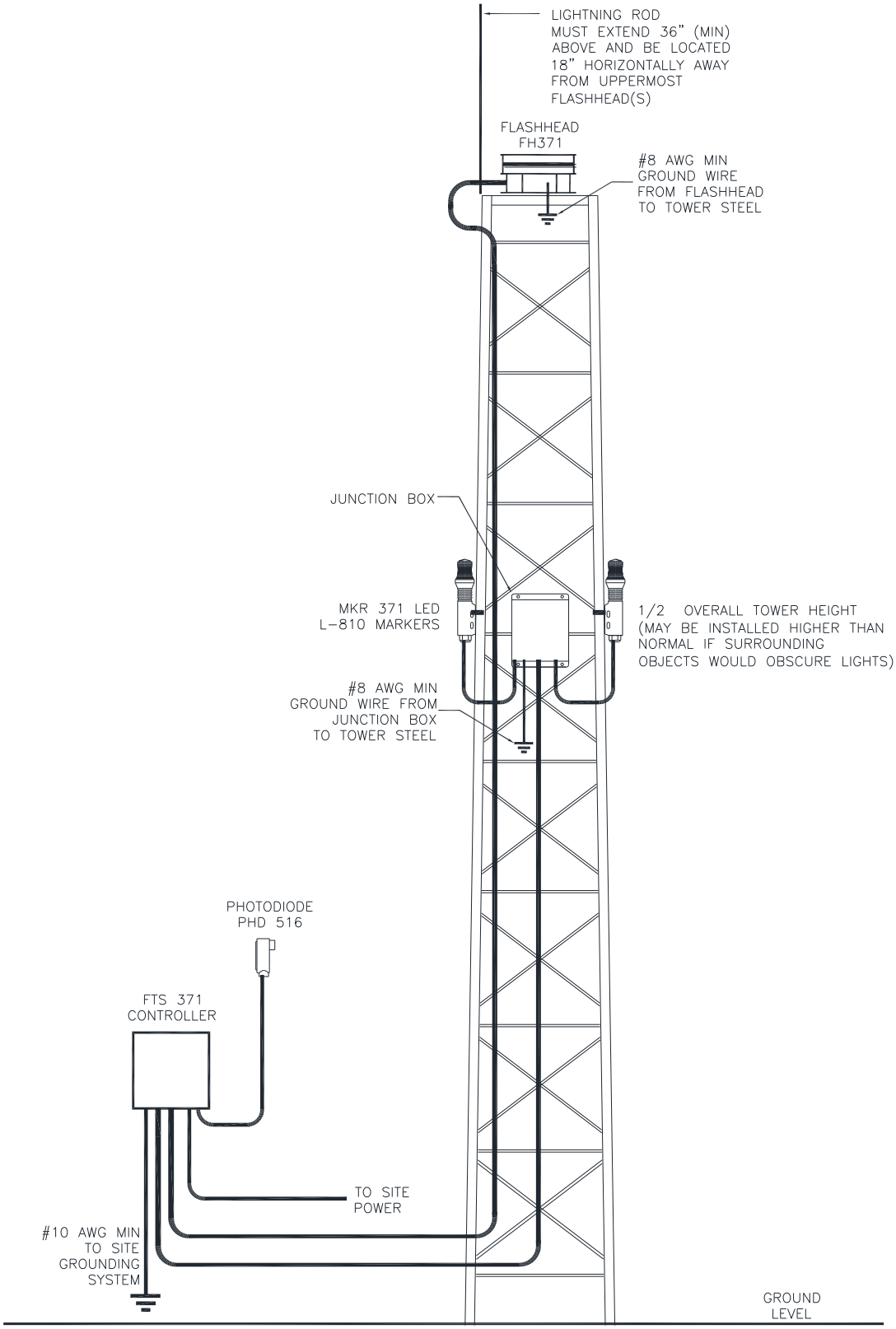


Figure 9: FTS 371 Typical A1 Tower View

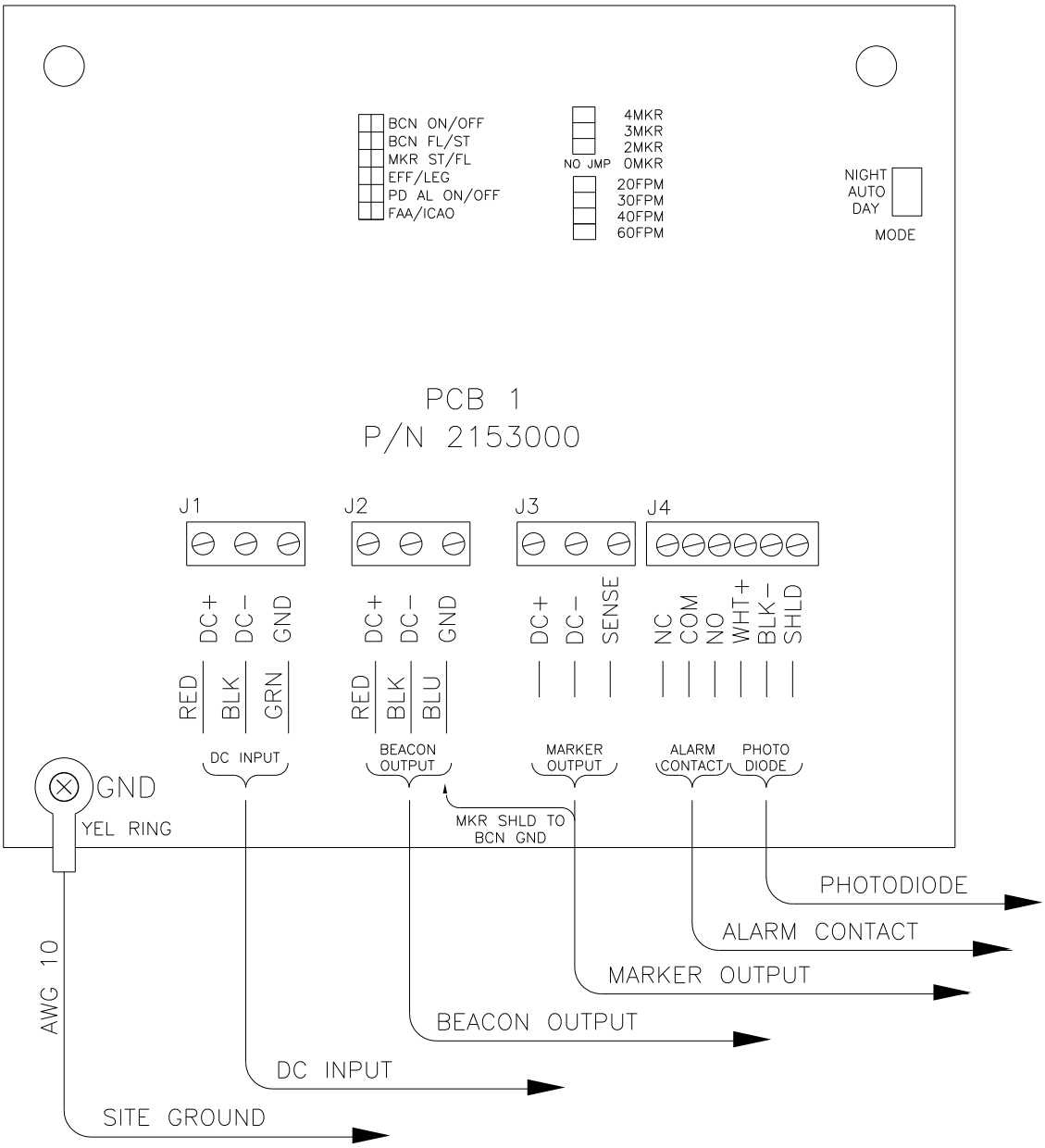


Figure 10: Controller FTS 371 DC Connection Diagram

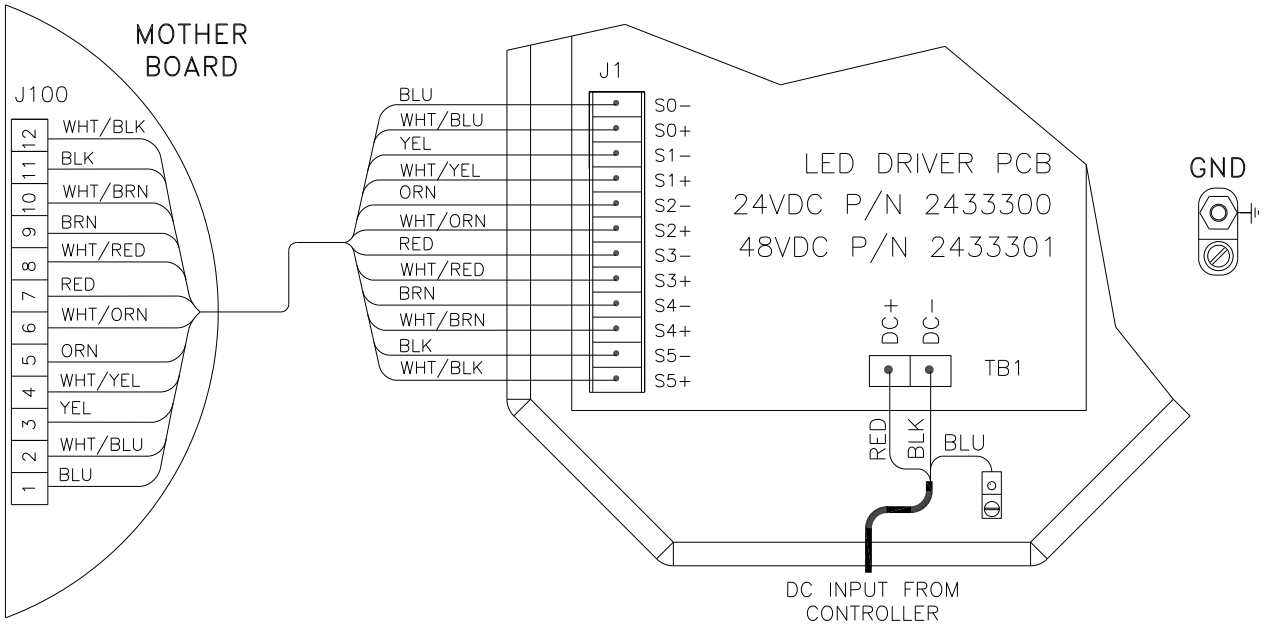


Figure 11: Flashhead/Beacon FTS 371 FH DC Connection Diagram

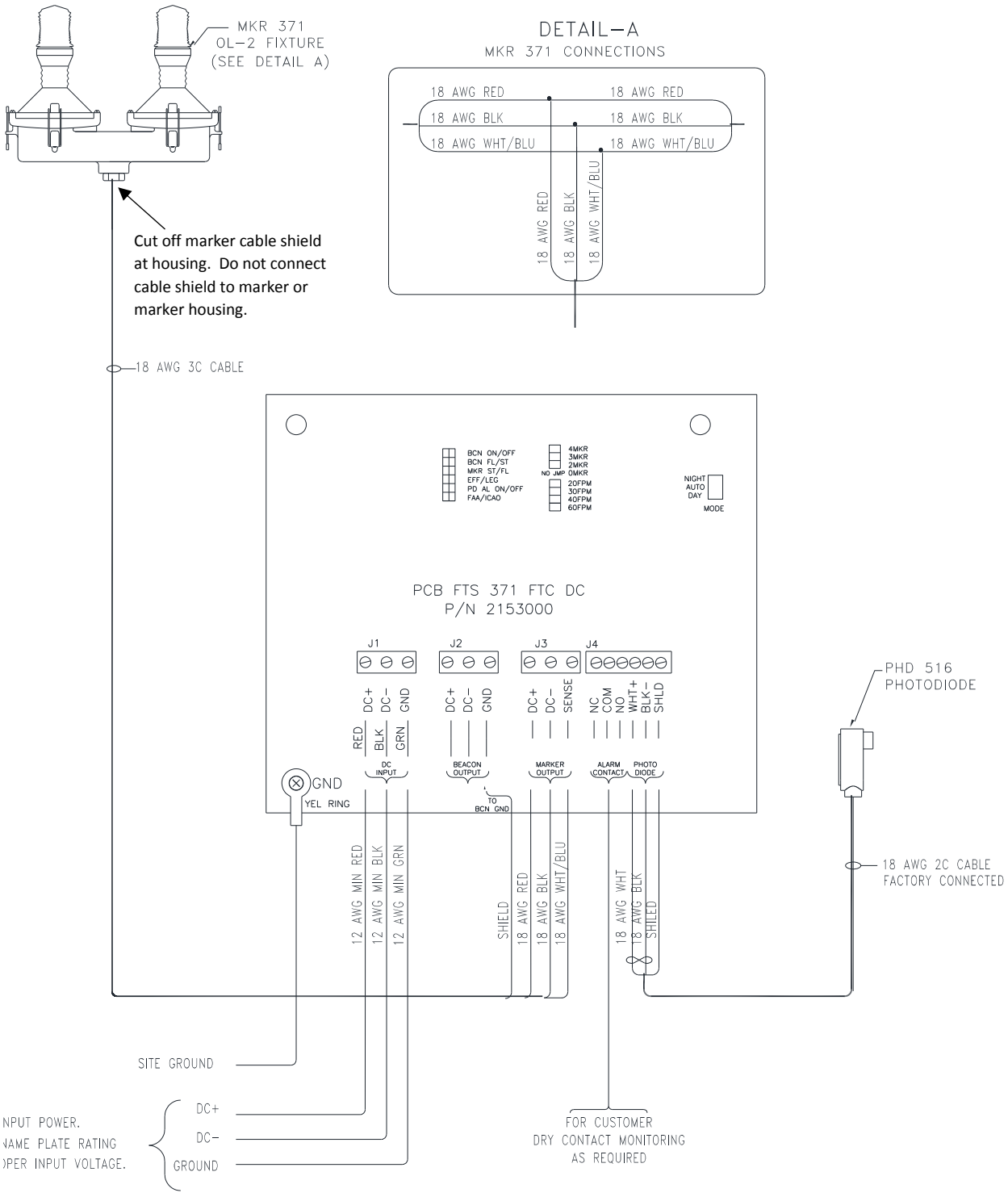


Figure 12: FTS 371 DC Typical FAA Type A0 Installation Wiring

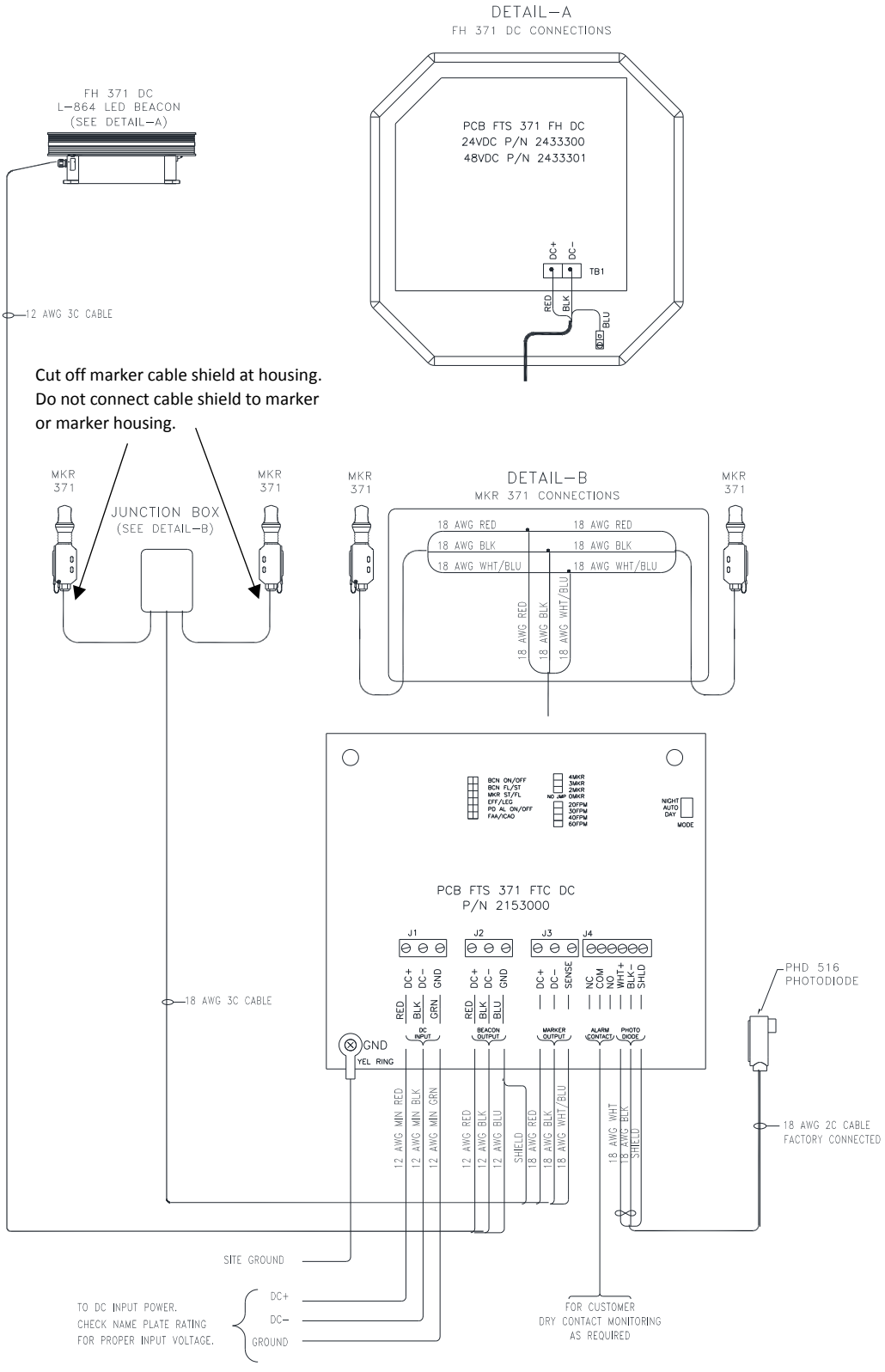


Figure 13: FTS 371 DC Typical FAA Type A1 Installation Wiring

Section 3 - Maintenance Instructions

Safety

Warning!

Read the Personal Hazard Warning now (Page 3). Disconnect primary power before opening enclosures.

Work safely, as follows:

1. Remove rings and watches before opening the equipment.
2. Shut off the equipment and wait one minute before proceeding.
3. Remove the component or connect the test instruments.
4. Replace the component.
5. Turn on the power and test the system.
6. Turn off the power and disconnect the test equipment.

Maintenance

The circuit boards should be kept free of accumulated dust. Brush and vacuum as necessary.

Note: Do not use compressed air to clean this equipment.

Troubleshooting

The most effective troubleshooting procedure begins with observing the behavior of the system. This often leads directly to a faulty component or other abnormal condition.

Table 3-1 contains information to help locate the cause of a problem.

Component Removal and Replacement

Note the wiring connections and wire colors when you remove wires from their connections. These must be replaced exactly as they were.

FTS 371 FTC Controller

PCB1 (2151000 FTS 371 FTC AC) (2153000 FTS 371 FTC DC)

Remove: Unplug wire connectors at positions J1, J2, J3, and J4. Remove four Phillips-head screws located at the corners of PCB1 along with the Grounding conductor ring lug at lower left screw. Lift the board out of the enclosure.

Replace: Reverse the removal procedure. Be sure to reconnect the Grounding conductor ring lug at lower left screw. Be sure to make the switch settings and jumper locations on the newly installed PCB match the removed PCB.

FTS 371 FH (L-864 LED) Flashhead/Beacon

Light Engine (1370040)

Remove: The Light Engine “saucer” is designed to be replaced as a single assembly and is identical for the AC and DC Flashheads (FTS 371 FH AC, FTS 371 FH DC 24V, FTS 371 FH DC 48V)). Unfasten the two latches on the front of the beacon’s base. Lift the light engine assembly to expose the wiring harness. Disconnect the light engine from PCB1 by removing the connector at J1. Disconnect the ground wire that is attached to the light engine. Lower the light engine to the closed position. Pull on the ring attached to the hinge pin and remove the hinge pin. Lift the light engine assembly to remove it from the base.

Replace: Reinstall in reverse order.

LED Driver PCB (2433200 FTS 371 FH AC)(2433300 FTS 371 FH DC 24V)(2433301 FTS 371 FH DC 48V)

Remove: Unfasten the two latches on the front of the beacon's base. Lift the light engine assembly to expose the driver PCB. Disconnect the wires at PCB connector TB1. Unplug the connector at 12 position connector J1. Remove the screws that attach the PCB to the base. Remove the PCB from the base.

Replace: Reinstall in reverse order. Be sure to reconnect cable ground conductor to PCB or Flashhead base connection point.

Section 4 - Operating Instructions

Controller

The controller begins programmed operation as soon as power is applied. The controller is shipped preconfigured for your application. It is also field customizable.

Manual Override Option

The unit's operation can be controlled manually by toggling the manual MODE switch. Push the switch up for night mode and down for day mode. The unit will stay in the selected mode for up to 30 minutes if switch is not returned to the AUTO position. The corresponding mode LED (DAY MODE or NIGHT MODE) will blink during a mode override. When the switch is in the center position the controller's mode will be determined by the connected photodiode's reading of ambient lighting.

Tower Configurations

The configuration switch bank and Jumper bank offer the ability to program the controller for a variety of installation situations. The system will come pre-programmed from the factory, but if reprogramming is desired, use the following table to ensure proper operation.

Controller Configuration Switch Definitions

Switch Label	Switch Position	
	Left	Right
BCN ON | OFF (Beacon alarm on/off)	A BEACON ALARM will be generated if a beacon is not connected and working properly. Beacon(s) are powered if wired to J2.	No BEACON ALARM will be generated.
BCN FL | ST	Beacon is set to flash	Beacon is set to steady burn
MKR ST | FL	Markers are set to steady burn	Markers are set to flashing
EFF | LEG	Shorter flash duration that uses less energy	Longer flash duration to resemble an incandescent flash
PD AL ON | OFF	(19) hour mode change alarm "ON" (Photodiode)	(19) hour mode change alarm "OFF" (Photodiode)
FAA | ICAO	Domestic air navigation standards	International air navigation standards

Controller Configuration Jumper Definitions

Switch Label	Jumper Position	
	Open (Not covering both pins)	Closed (Covering both pins)
4 MKR	No selection	Number of markers is (4)
3 MKR	No selection	Number of markers is (3)
2 MKR	No selection	Number of markers is (2)
0 MKR	No selection	Number of markers is (0)
20 FPM *	No selection	Sets system for (20) flashes per minute
30 FPM *	No selection	Sets system for (30) flashes per minute
40 FPM *	No selection	Sets system for (40) flashes per minute
60 FPM *	No selection	Sets system for (60) flashes per minute

* Only one Flashrate selection may be made at a time. If more than one is selected, a "CONFIG ERROR" will be indicated and 30 FPM will be the result.

Alarm Indicators

Alarm Indicator Name	Description	Resolution
BEACON ALARM	The controller has detected that the beacon output circuit is not drawing the proper amount of current for the selected configuration. If the controller's configuration matches the actual setup of the system, then this alarm indicates that the connected FTS 371 FH beacon has failed.	1. Confirm that the controller is properly configured 2. Replace the failed Beacon(s)
MARKER ALARM	The controller detects fewer operating markers than its configuration. If the controller's configuration (MARKER #) matches the actual setup of the system, then this alarm indicates that one or more of the connected MKR 371 lights have failed.	1. Confirm that the MKR Jumper Shunt is installed to configure for the actual number of connected markers. 2. Replace the failed marker lights
PHOTODIODE	The controller has detected the absence of a mode change in the last 19 hours. This could indicate the failure of the photodiode.	1. Visually confirm that the photodiode is properly connected 2. Perform the check-out procedure in Section 2 3. If the alarm persists, replace the photodiode 4. If the alarm persists replace PCB1
CONFIG ERROR	The controller has identified that the current configuration settings are invalid.	1. Confirm that the configurations settings are correct and valid.

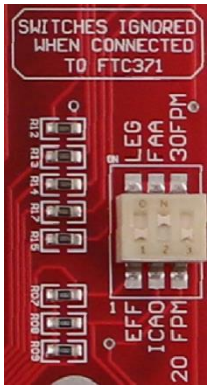
Flashhead/Beacon LED Indicators

The Indicator LED's on the PCB provide status information helpful in troubleshooting.

LED	Indication
Power	Steady on to indicate the board's 5V power supply is on.
AC Sense	On when AC/DC source power is applied to the Beacon. When powered by FTS 371 controller, this LED will flash corresponding to the on/off pulsing power from the Controller which communicates flash type and specification.
Flash	On when the LED strings are On.
Fault	On when a fault is detected on either beacon LED string. Turns on and off each flash cycle. When 4 consecutive flash cycle faults are detected, the beacon LED strings turn off until the next day to night transition or after removal of applied power for more than 30 seconds.
ICAO	On when the board is running in ICAO mode. Off in FAA mode.

Flashhead/Beacon Switch Bank

When the FTS 371 FH is <u>not</u> connected to an FTS 371 FTC controller, the switch bank will be used to program the beacon for a variety of installation situations. *However when an FTS 371 controller is connected, the switch bank settings will be ignored.*



Flashhead/Beacon Switch Definitions

(When an FTS 371 FTC Controller is <u>not</u> connected)

Switch Mode	Switch Position	
	Left	Right
EFF / LEG	EFF - shorter flash duration that uses less energy	LEG - longer flash duration to resemble an incandescent flash
ICAO / FAA	ICAO - international air navigation standards	FAA - domestic air navigation standards
20 FPM / 30 FPM	20FPM - 20 flashes per minute	30FPM - 30 flashes per minute
STEADY	N/A	LEG and 30FPM - When LEG and 30FPM are moved to the right (ON) position, the flash head LEDs will be on steady.

Major Troubleshooting Symptoms

Symptom	Possible Cause in order of Likelihood
All lights fail	1) Main power failure 2) External circuit breaker 3) Blown fuse on the controller's PCB1 4) PCB1 Failure
Single light fails	1) Wiring to Beacon is open or short 2) Individual lighting fixture has failed
Erratic operation	1) Loose connections 2) PCB1 Failure
Beacon / Marker Alarm	1) Normal if a light fixture is out 2) PCB1 is configured incorrectly for the connected lighting equipment
False alarm	1) Check for correct alarm connections: normally open (NO) contacts close on alarm, normally closed (NC) contacts open on alarm 2) PCB1 Failure
Lights do not flash	1) Confirm that the BCN and/or MKR flash configuration settings are set to FL (flashing) and not ST (steady) 2) PCB1 Failure
Lights operate continuously	1) A photodiode is not connected at J4 terminals WHT+ and BLK-. 2) The photodiode has failed 3) PCB1 Failure
Beacon / Marker Alarm will not reset	1) Alarm can only be reset by a mode transition controlled by the photodiode 2) Check the photodiode connections

Section 5 - Major Replaceable Parts, Contact Info, and RMA Policy

Customer Service & Contact Information

Contact Numbers	**Customer Service:** 1-800-821-5825 **Front Desk:** (615) 261-2000 **Facsimile:** (615) 261-2600
Internet Address	flashtechnology.com
Shipping Address	Flash Technology 332 Nichol Mill Lane Franklin, TN 37067

Ordering Parts

To order spare or replacement parts, contact Parts Department at 1-800-821-5825.

Table 1 lists the major replaceable parts for the system.

Table 1: Replacement Parts

System Component	**Item**	**Description**	**Part Number**
FTS 371 FTC AC	Controller (PCB1)	PCB FTS 371 FTC AC	2151000
FTS 371 FTC DC	Controller (PCB1)	PCB FTS 371 FTC DC	2153000
FTS 371 FTC (AC or DC)	PCB1: F1/F2	Fuse, 6.3A	11000016125
FTS 371 FH (AC or DC)	Light Engine	FH 370/371 IR Light Engine Assembly	1370040
FTS 371 FH AC	LED Driver (PCB1)	PCB FTS 371 FH AC	2433200
FTS 371 FH DC 24V	LED Driver (PCB1)	PCB FTS 371 FH DC 24V IR	2433300
FTS 371 FH DC 48V	LED Driver (PCB1)	PCB FTS 371 FH DC 48V IR	2433301
System	Photodiode	PHD 516, SHIELDED	1855516

RMA Policy

If any system or part(s) purchased from Flash Technology need 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 NOC to receive technical assistance (800-821-5825 Option 9, 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. The form can be filled out online at: http://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.