FLASH TECHNOLOGY

AN SPX DIVISION

SERIAL NUMBER

FTC 140-1 System Controller

Reference Manual
Part Number 7911401

Front Matter

Abstract

This manual contains information and instructions for installing, operating and maintaining the FTC 140-1 System Controller.

Copyright

Trademark Acknowledgements

Disclaimer

Warranty

Flash Technology warrants all components, under normal operating conditions, for 2 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 150/5345-43E, 150/5345-51 and 150/4345-53B. 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 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.

Dangerous Voltages Can Persist with Power Disconnected

Under certain conditions, dangerous voltages can be present because capacitors can retain charges even after the power has been disconnected.

Protect yourself — always turn off the input (primary) power and wait for one minute for storage capacitors to drain their charge. Then check between the red and blue wires on the flashhead terminal block with a voltmeter for any residual charge before touching any circuit element or component.

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 — FTC 140-1 Controller Introduction and Operation

Controller

The FTC 140-1 is a System Controller for up to 28 beacons. It synchronizes the beacons and directs flash timing and intensity, and records and reports beacon operating status. It enables either automatic or manual intensity control, and it continuously displays the flashing status of each individual system beacon. You can manually control intensity by using a front panel switch. Otherwise, a photocell sets the intensity. Each beacon transmits a confirmation signal when it flashes. All beacons report to the controller over the same twisted pair of conductors. This composite signal is decoded for an array of two-color LED indicators on the front panel. An assigned indicator represents each beacon in the system. Internal memory retains a transient failure, until you reset it manually; permitting you to identify a beacon that only occasionally misses a flash.

The FTC 140-1R fits in a standard 19-inch equipment rack. System connections are made at a terminal block at the rear of the unit. The FTC 140-1W is in an enclosure that allows the controller to be wall mounted. The front of the enclosure opens to reveal the operating controls. The front panel has a glass window that allows you to observe the indicator lights of the controller. Otherwise, the FTC 140-1R and FTC 140-1W are electrically the same.

Options

Call Customer Service at 1-800-821-5825 for available options.

Photocell

A photocell (PEC 510) directs intensity stepping for the controller. It senses changes in sky illumination and operates switching devices at prescribed levels for twilight and night. Housed in an outdoor enclosure, it may be located at any practical distance from the controller.

Specifications

Physical

FTC 140-1R

(H x W x Depth, Wgt)
7 x 19 x 14.13 in., 10 lbs.
178 x 483 x 359 mm., 4.5 kg.

FTC 140-1W

(H x W x Depth, Wgt)
18.8 x 19 x 6 in., 29 lbs.
478 x 483 x 153 mm., 13 kg.

Note that dimensions are nominal. See mounting and outline drawings in Section 2.

Electrical

AC Voltage

120, 208, 240, 480 VAC ± 10%
60 Hz ±1% single phase
230 VAC 50Hz
25 Watts

Environmental

-50 to +55 degrees Celsius

Alarm Relay

Isolated form C contacts rated at 10 A, 200 VAC or 28 VDC resistive load.

Front Panel Controls

Controls and indicators for normal operation are located on the front panel. Infrequently used programming switches are located internally on the main printed circuit board. The use of these switches, controls, and indicators is described in Table 1-1 through Table 1-3.

Tier and Beacon LED Display

A row and column (tier and beacon) matrix interconnect the two-color LEDs and they are addressed by coordinate signals generated on PCB100. Beacons that are confirming activate the green LED sections, setting the LEDs to green. Non-confirming beacons set the red LED sections (fail), setting the LEDs to red.

Primary/backup systems, such as the FTB 208P, use a slightly different LED signaling: confirming beacons set the LEDs to green; beacons whose primary light is failing but the backup light is functioning alternately flash the corresponding LED green, then red; both lights failing set the LED to red.

You can test these LEDs by using the Display Test Switch described in Table 1-2. The Fail/Confirm switch tests the operation of the LEDs in the indicator array. The FAIL position sets all the LEDs to red. The CONFIRM position sets all the LEDs to green.

Fuses

The F1 fuse is a 1-ampere fuse in the primary power circuit.

PCB100 Control Board Switches

Display and Clear Buttons on PCB100

Green glowing LEDs correspond to beacons that have not missed flashes. An LED flashing green, then red, indicates that the backup lighting unit in a primary/backup system is in operation instead of the primary lighting unit. In such a system, a consistent red LED indicates that both primary and secondary lighting units have failed.

The DISPLAY push-button shows red LEDs for any beacons that have missed flashes since the memory was reset. The CLEAR push-button resets the memory.

On-Board Beacon Switches

FTCA preprograms controllers at the factory for correct installation. Twenty-eight programming switches, one for each potential beacon, reside on the PCB100 printed circuit board. The switches are arranged by tier and light (beacon) number, and these correspond to locations on the structure. Usually the format is obvious and self-explanatory, such as Beacon 2, Tier 3. For every beacon on the structure, the corresponding switch must be closed; all other switches must be left open.

Programming

Programming alters the controller operation to fit a particular arrangement of beacons in tiers on a structure, or allows specific types of system operation. Switches on PCB100 configure the controller to the tower lighting arrangement. Jumpers on PCB100 configure the controller for dual, catenary, or 50HZ operation.

Jumpers

The jumpers are located on PCB100. See Figure 1-1 for the location of the jumpers. The jumpers, when cut, configure the PCB100 Control Board to have the following functions:

- JP2 — RES PEC - Cut to allow the use of the PEC 510 resistive photocell.
- JP5 — FAILCLOSE - Cut to allow sensing of closed contacts as an alarm signal from an external red light controller.
- JP6 — DAYINHIBIT - Cut to turn off day flashing for the unit.
- JP7 — DUAL - Cut to allow dual system operation: it inhibits white light flashing at night. A dual system is one that flashes only white lights during the day and flashes only red lights at night. Dual systems may have white light backup at night in the event of a red light failure. JP7 is applicable only to systems that use an external red light controller.
- JP8 — CAT - Cut to allow catenary operation, flashing the structure lights at sixty flashes per minute in a middle-top-bottom sequence.
- JP9 — 50HZ - Cut to allow operation at 50HZ.

Normal Operation

The following conditions prevail during normal operation when all beacons are flashing:

- All LED indicators in the Tier and Beacon Display that have programming switches closed are GREEN.
- The ALARM LED is off.
- The CONTROL SWITCH is in AUTO.
- The MAN LED is off.
- One of the mode LEDs is glowing according to the amount of skylight: DAY, TWI, or NITE.
- The I 1 SYNC LED on PCB100 is blinking (it should blink in sync with the flashes on the structure; 1 second for standard mode, or 1.5 seconds for catenary mode).

Manual Operation

Select the desired flash intensity by using the Control switch.

Flash Delay

An operator can synchronize the lights with those on a nearby structure by placing the Control switch to DELAY until the lights on both structures are observed to flash simultaneously. This may cause some of the Tier and Beacon Display LEDs to temporarily switch to RED.

Failure Detection

Monitoring provides an alarm if a beacon becomes inoperative. Alarm consists of illuminating the red section of an LED on the front panel accompanied by operation (dropping out) of relay K501. Absence of a signal (zero condition) at an assigned beacon position results in an alarm signal after three successive flash cycles.

Transient fail memory makes it easier to identify a beacon that intermittently fails to flash or one that fails only long enough to cause an alarm and then resumes flashing. When a failure occurs, the circuit freezes the failure in memory. Pressing the Display Switch shows the failed beacon LED as red.

Panel Board — PCB200

All front panel switches and LEDs are mounted on this circuit board.

Control Switch

The Control Switch is a six-position rotary switch. The functions of the six positions are discussed in Table 1-1.

Status Indicator Array

The Status Indicator Array is discussed in Tier and Beacon LED Display on Page 1-1.

Fail / Confirm Switch

The Fail/Confirm switch is described in Table 1-2.

Table 1-1 Front Panel Controls - Control Switch

Position	Function
AUTO	Normal operating position. Connects the controller to the PEC to change the intensity of the connected beacons according to lighting conditions.
D	Disconnects the PEC and operates the beacons at highest intensity.
T	Disconnects the PEC and operates the beacons at medium intensity.
N	Disconnects the PEC and operates the beacons at lowest intensity.
(N)	Operates as N position.
DELAY	Alters the flash rate by a small increment allowing you to manually synchronize with another system having its own independent controller.

Table 1-2 Front Panel Controls - Fail / Conf Display Switch

Position	Function
FAIL	Applies uniformly a fail signal to all the LED status indicators. They glow red - for testing the fail function of the LEDs.
CENTER	No test function. Normal operating position.
CONFIRM	Applies uniformly a confirm signal to all the LED status indicators. They glow green - for testing the confirm function of the LEDs. The switch returns to the CENTER position when released.

Table 1-3 Front Panel Indicators - LEDs

LED	Function
DAY	Glows steadily when the controller is operating in DAY mode.
TWI	Glows steadily when the controller is operating in TWI mode.
NITE	Glows steadily when the controller is operating in NITE mode.
MANUAL	Glows steadily when the controller is not in AUTO mode.
PEC ALARM	Glows steadily when any PEC fails to change state during a 19-hour period. A PEC that changes state resets this alarm.
ALARM	Indicates the state of the alarm relay. The alarm relay is on if a beacon fails three times consecutively or the PEC fails to change state during a 19-hour period.

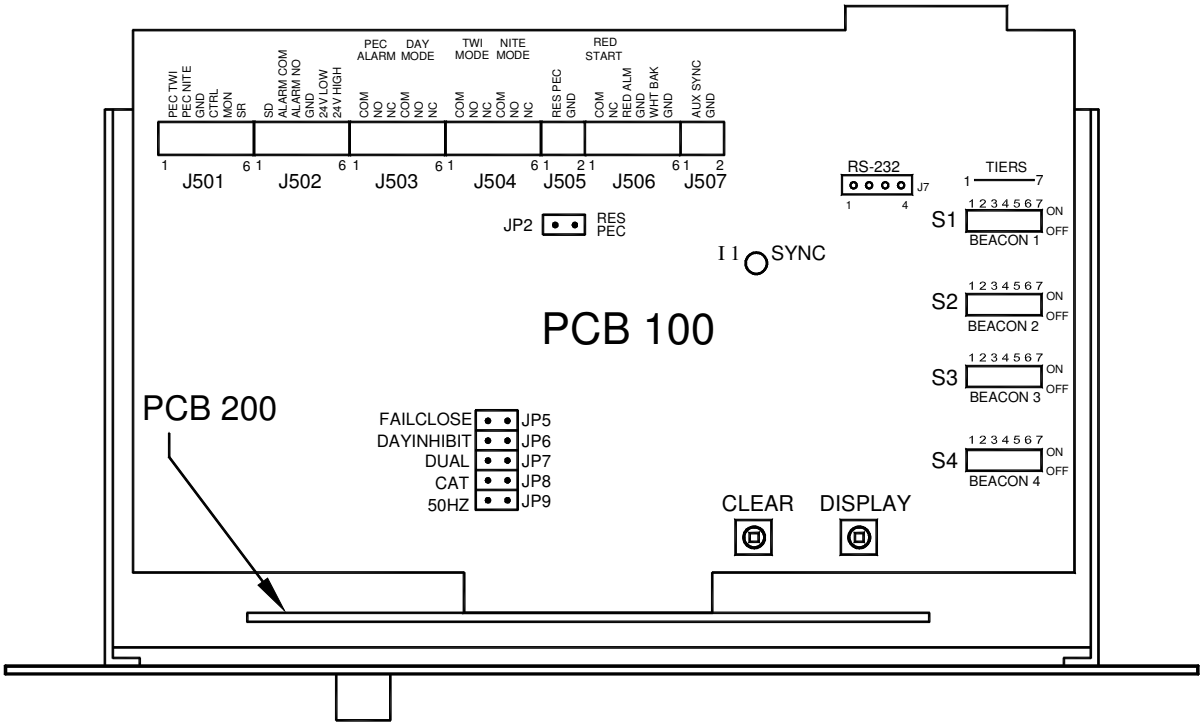


Figure 1-1 – PCB100 Control Board Layout

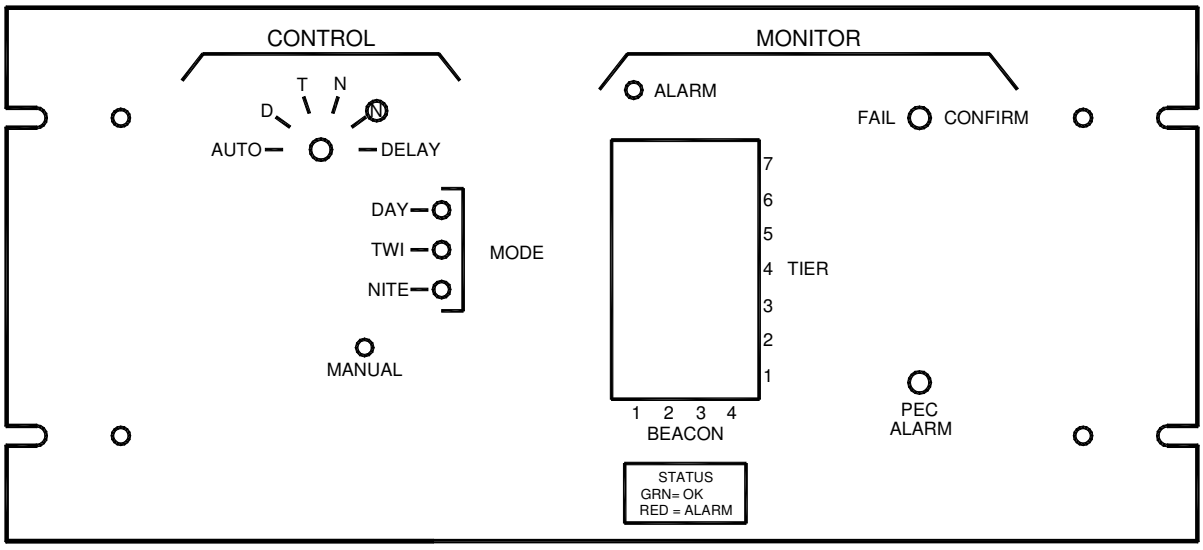


Figure 1-2 – FTC 140-1 Front Panel Controls and Indicators

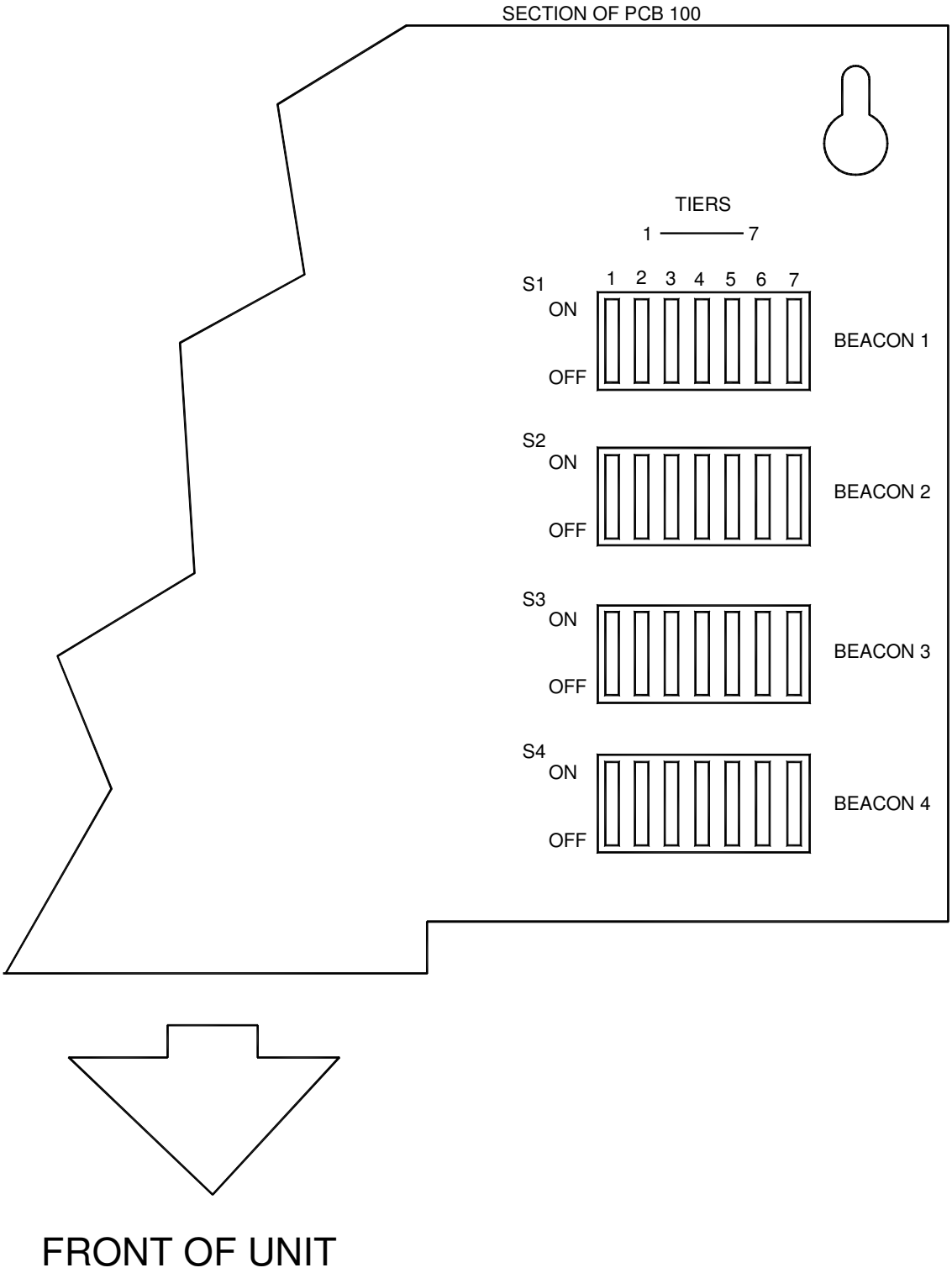


Figure 1-3 – Beacon Programming Switches

Section 2 — Outline, Mounting, and Installation

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

No special tools are necessary.

Controller Mounting

Outline, mounting, and clearance dimensions for the FTC 140-1W are shown in Figure 2-2. Four 10-24 x 1/2-inch screws are required. Outline, mounting, and clearance dimensions for the FTC 140-1R are shown in Figure 2-1.

Location

Locate the controller in an area with restricted access. Locate it where you can conveniently view front panel indicators related to Beacon operation. Access to the rear of the unit is required during installation and servicing of a rack-mounted controller. You can place it anywhere within 2500 feet of the most distant Beacon without further consideration. Consult with the factory if a greater distance is necessary.

Radio Frequency Interference: Direct exposure to strong radio frequency (RF) radiation could damage some of the components or interfere with proper performance. Place the unit at an adequate distance from a powerful RF radiator.

Controller Wiring

Figure 2-5 shows the controller and photocell wiring in a typical installation.

> Only general information for a typical installation is presented here. Consult any installation drawings prepared especially for your site or supplied with the equipment. The installation drawings prepared specifically for your site should take precedence. The System Controller does not control power to the Beacons.

Make electrical connections at the terminal block at the rear of the unit. Be sure to leave enough slack to permit pulling the unit out of the rack from the front without disconnecting the wires when installing an FTC 140-1R.

Ground the case to the site grounding system.

Photocell Mounting

Conduit usually supports the photocell. The socket in the photocell has a threaded male fitting for ½-inch NPT. Mount the photocell vertically at the top end of a vertical length of conduit. The conduit should fasten to the socket from the bottom.

Dimensions and details are shown in Figure 2-3 PEC 510 Photocell Mounting and Outline.

You may locate the photocell any practical distance from the controller. Mount the photocell:

- With an unobstructed view of the polar sky.
- So that direct or reflected sunlight or artificial lighting does not strike them.
- Vertically at the top end of a vertical length of electrical conduit to prevent water from entering the unit.

Photocell Wiring

The recommended minimum wire gauge is #16 AWG. Run the wires in conduit. Connect the wires from the photocell to TB2 in the controller as shown in Figure 2-5.

Internal Wiring for Photocell

J505-1 and J505-2 are used internally for the photocell. Be certain that these connections are correct before applying power, otherwise equipment damage will result. See Figure 2-6.

Installation Checklist

Controller Checklist

Consult the installation drawings for placement, mounting, wiring details, and power phasing.

- Provide a power disconnect switch or a circuit breaker.
- Leave slack in the wires.
- Ensure that the primary power wires are of adequate gauge.
- Ground the case to the site grounding system.

Photocell Checklist

- The photocell should face the polar sky
- It must not view artificial lighting
- Consult the installation wiring diagram for the system

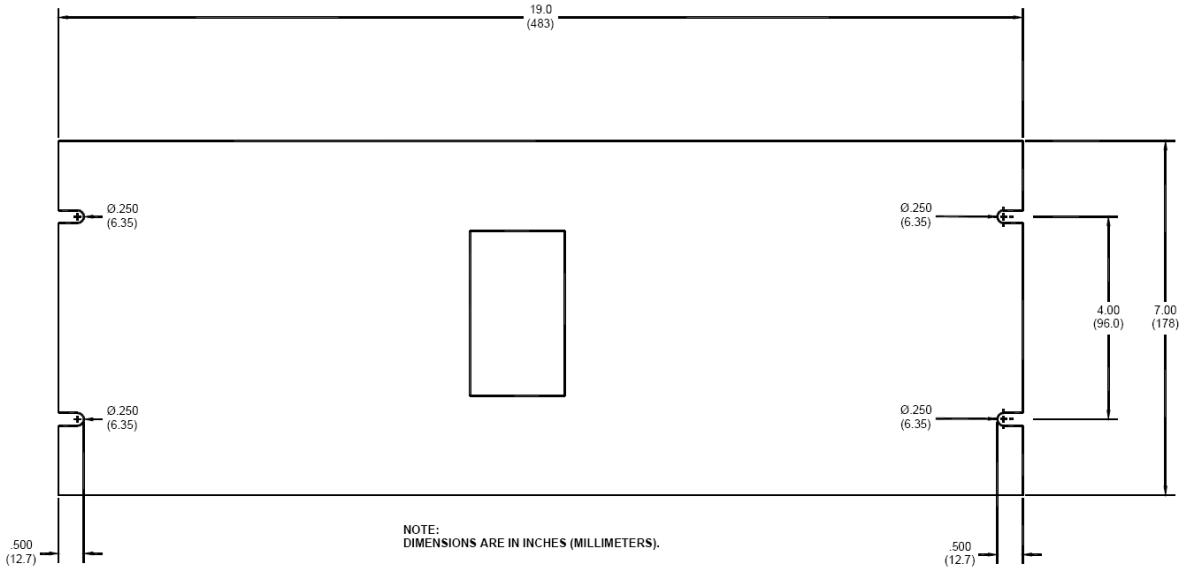


Figure 2-1 – FTC 140-1R Controller Mounting and Outline

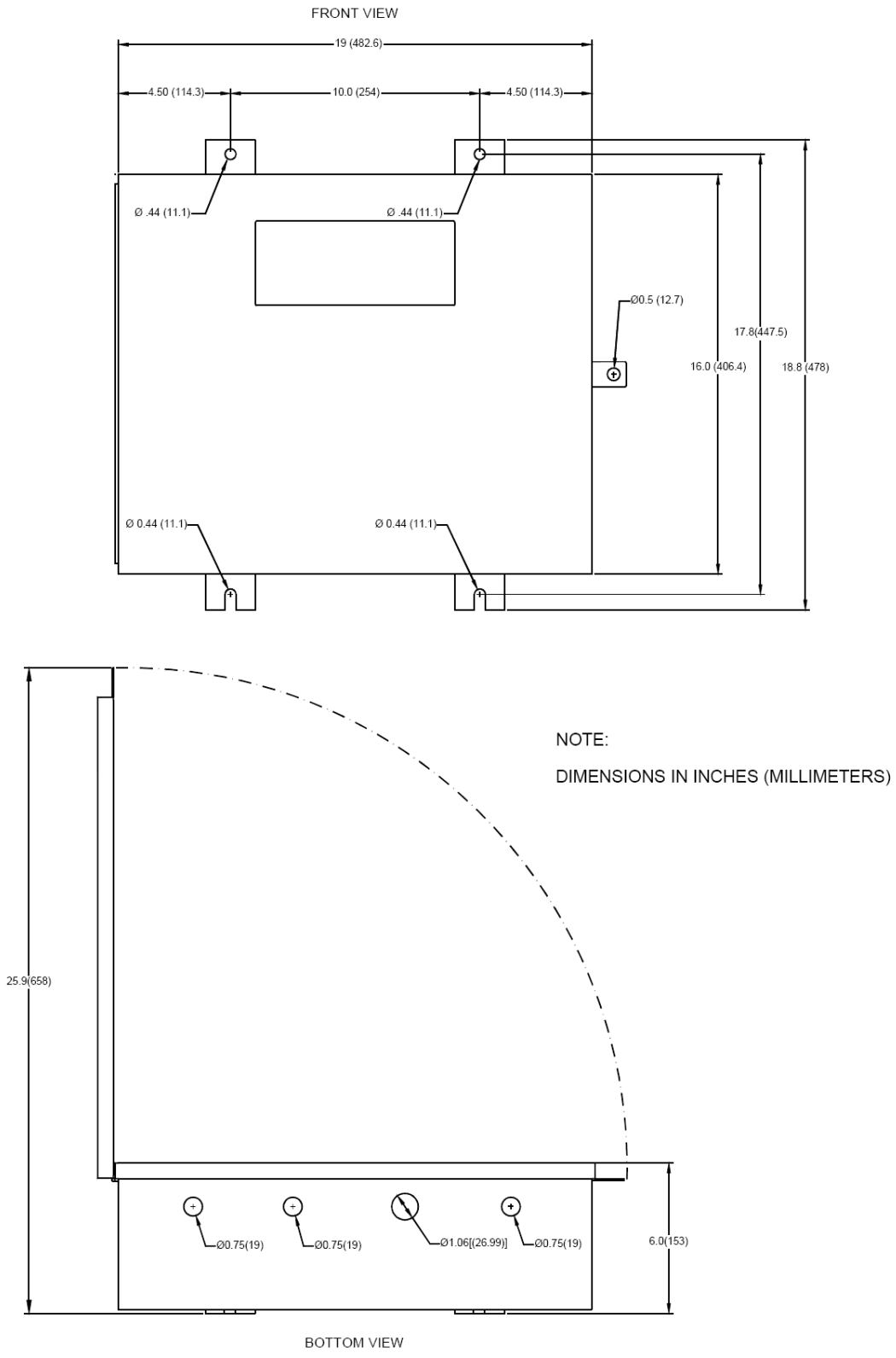


Figure 2-2 – FTC 140-1W Controller Mounting and Outline

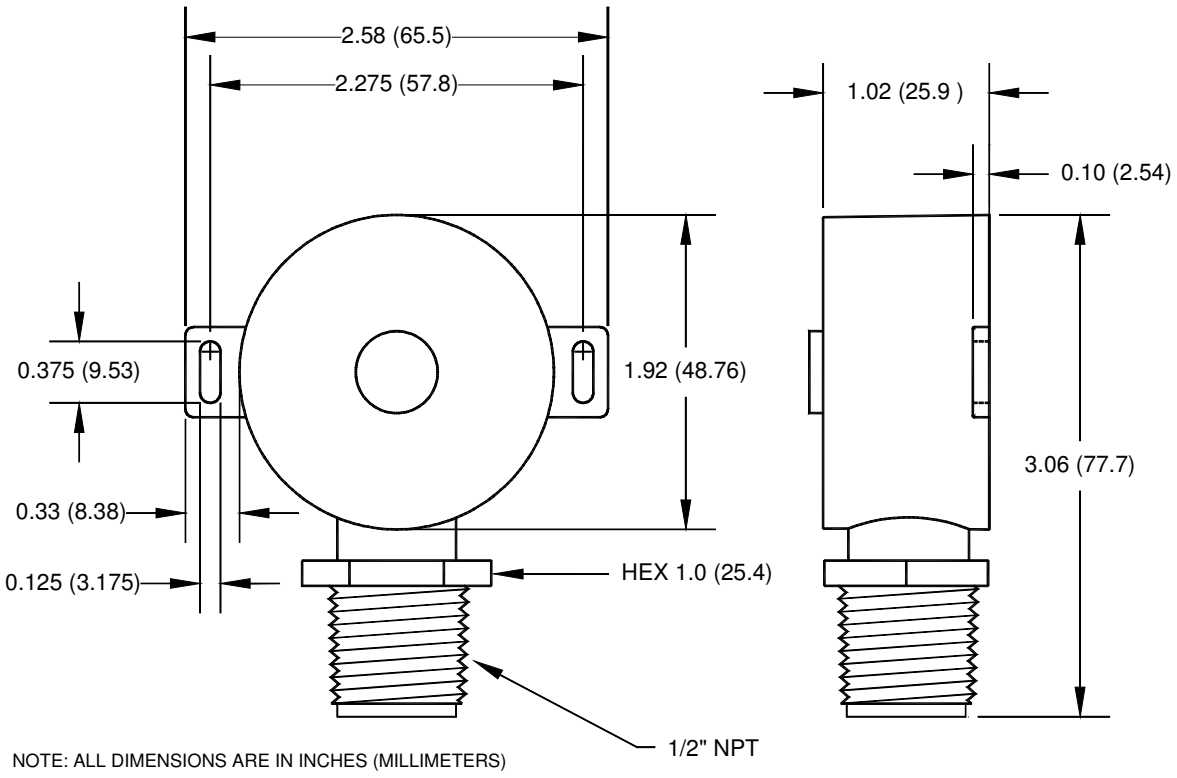
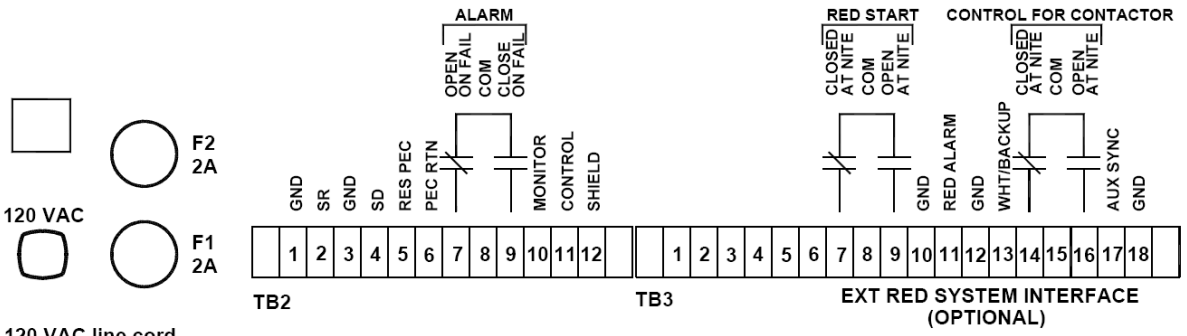


Figure 2-3 – PEC 510 Photocell Mounting and Outline



120 VAC line cord grommet clamp.

F1 used for 120 VAC.

F1 and F2 used for 240 VAC.

TB2-1 -- Ground for **SR**.
TB2-2 -- **SR** (sync receive); receive for **SD**.
TB2-3 -- Ground for **SD**.
TB2-4 -- **SD** (sync drive); provides a sync pulse to allow synchronization of multiple controllers in a daisy chain configuration (**SD** to **SR**, **SD** to **SR**, and so forth).
TB2-5 -- **RES PEC**; connect **PEC** 510 here.
TB2-6 -- **PEC RTN**; connect **PEC** 510 here.
TB2-7 -- **ALARM**; normally closed, opens upon alarm signalled from ext. red light controller at **TB3-11**.
TB2-8 -- **ALARM**; common.
TB2-9 -- **ALARM**; normally open, closes upon alarm signalled from ext. red light controller at **TB3-11**.
TB2-10 -- **MONITOR**; wired to beacons - monitor connections for beacon monitoring.
TB2-11 -- **CONTROL**; wired to beacons - control connections for beacon control.
TB2-12 -- **SHIELD**; connection for shield of monitor and control cable.

TB3-7 -- **RED START**; close at night - normally connected to external red light controller photoelectric control connections that cause the red system to start with a closed connection.
TB3-8 -- **RED START**; common for **TB3-7** or **TB3-9**.
TB3-9 -- **RED START**; open at night - normally connected to external red light controller photoelectric control connections that cause the red system to start with an open connection.
TB3-10 -- **GND**; ground return connection.
TB3-11 -- **RED ALARM**; signal from the external red light controller indicating that a red failure has occurred. This alarm transfers contacts at **TB2-7**, **TB2-8**, and **TB2-9**.
TB3-12 -- **GND**; ground return connection.
TB3-13 -- **WHITE BACKUP**; signal from the external red light controller indicating that, in a dual system, the top red light has failed and the dual system has switched to white night backup mode.
TB3-14 -- **CLOSE AT NITE**; operates as indicated for controlling coil voltage available at **TB3-15**.
TB3-15 -- **COM**; source voltage from external red light controller. Becomes available at **TB3-14** or **TB3-15** as a coil control voltage for day or night transfer of a contactor at the external red light controller.
TB3-16 -- **OPEN AT NITE**; operates as indicated for controlling coil voltage available at **TB3-15**.
TB3-17 -- **AUX SYNC**; flash sync output to other manufacturer's equipment.
TB3-18 -- **GND**; ground return connection.

Figure 2-4 – FTC 140-1 Panel Connections

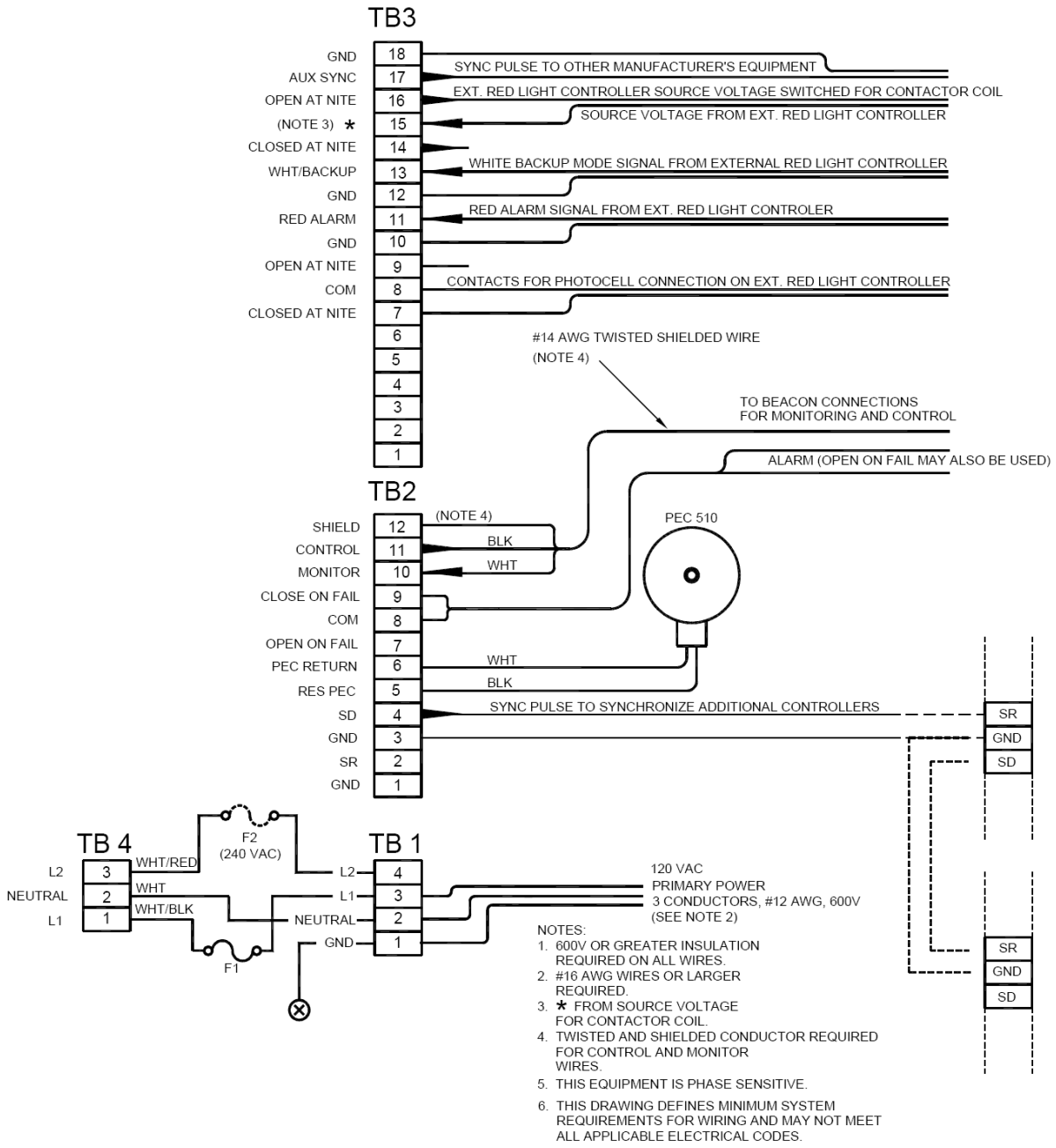


Figure 2-5 – Typical Installation Wiring

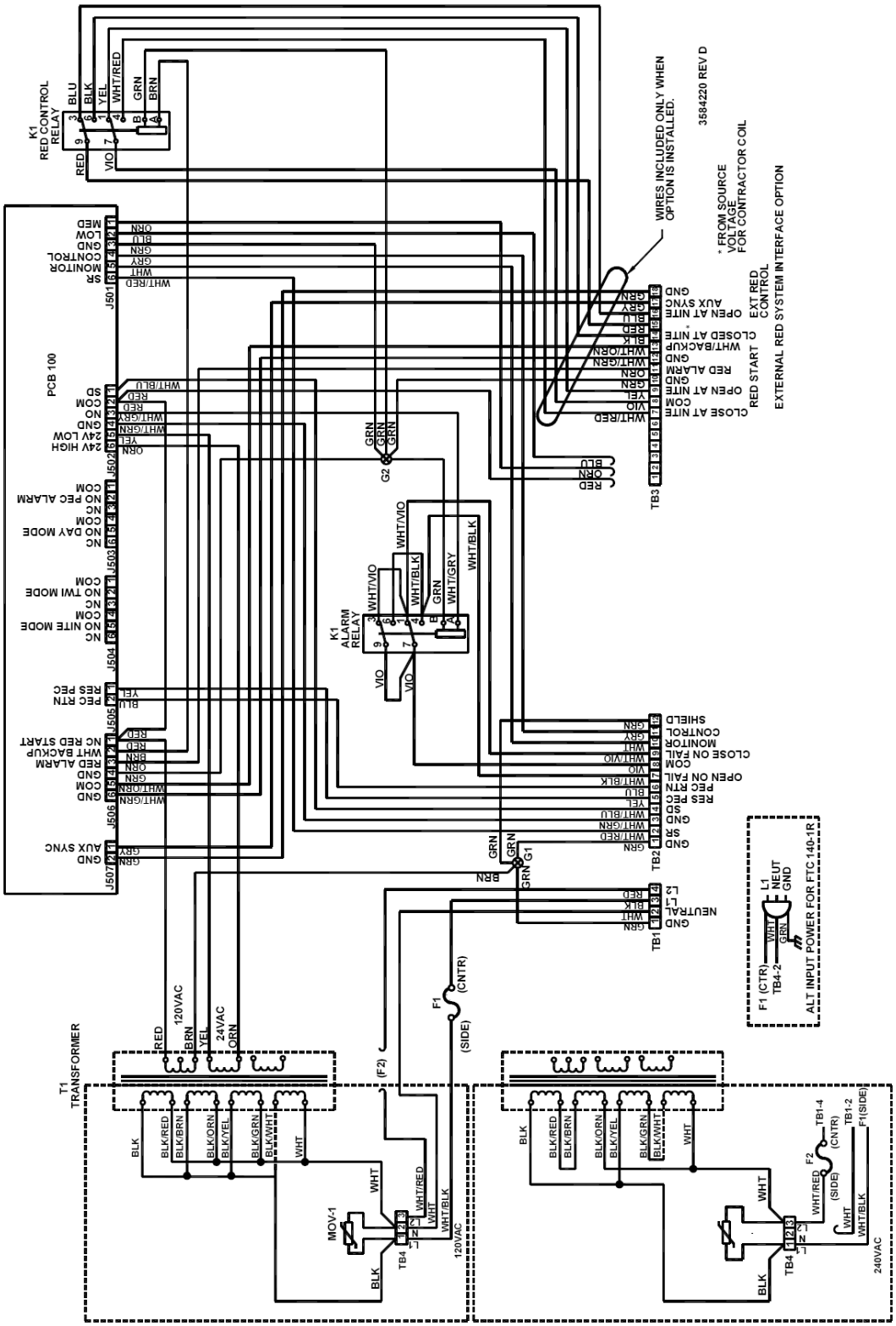


Figure 2-6 – FTC 140 Internal Wiring

Section 3 — Maintenance and Troubleshooting

Maintenance

This equipment requires no scheduled maintenance although the circuit boards should be kept free of accumulated dust. Brush as necessary.

> Do not use compressed air for cleaning this equipment.

Clean the printed circuit board connectors when necessary — use a contact cleaner recommended for electronic circuit components only. Do not polish with any kind of abrasive material.

Circuit boards, when not installed in the equipment, should be kept in antistatic bags or containers.

Troubleshooting

Good observation of the behavior of the system often leads directly to a faulty component or other abnormal condition. Many abnormal symptoms observed at the controller may originate at some other part of the system, such as the photoelectric control units or the beacons.

The following tables may help locate the cause of a problem: Table 3-1 is a list of observable symptoms; Table 3-2 relates symptoms to possible causes.

Troubleshooting Hints

Failing to Switch State in AUTO Mode

The PEC ALARM should be on if the photocell failed to switch state. If possible, swap the photocell with one known to be operative.

Switch the Mode Selector Switch through the manual modes and see if the structure lights follow the intensity indicated by the switch position. It they do, the trouble is likely the photocell. Note that some lights may be difficult to see in bright daylight.

Erratic or Confused Tower or Structure Light Operation

Nearby radio transmitters or radar may cause radio frequency interference on control and monitor lines or within the lights or controller. Also, check power line phasing on 3-phase power systems.

Try swapping the PCB100 Control Board with a PCB100 Control Board known to be in good condition.

Beacons

If any beacon is not flashing in the correct mode or is out of sync with its position or other beacons, check the communication cable to that beacon. Check that the sync LED on the PCB1 board is flashing once every 1.5 seconds (non-catenary), matching the output of the controller sync.

Check that the DIP switches on PCB100 conform to the setup of the structure lights.

LED Displays

Look at and analyze the LED displays on the front panel. LEDs indicate manual operating modes when you use the Mode Selector Switch. LEDs in the Tier/Beacon Display Window indicate failed beacons.

The Display switch on PCB100 shows previously failed beacons in the Tier/Beacon Display Window. The Clear switch on PCB100 resets these stored failures.

Table 3-1 Major Troubleshooting Symptoms

Code	Observed Symptom
A	Controller inoperative; no LEDs are lit
B	Beacons stuck in DAY mode (during AUTO operation)
C	No AUTO operation
D	Incorrect mode response (AUTO and MAN)
E	One LED RED
F	One indicator RED, but cycles GREEN to RED repetitively
G	Beacons OK, but all LEDs are RED
H	All LEDs cycle GREEN to RED repetitively
I	Beacons change modes randomly
J	LEDs do not respond at all

Table 3-1 Major Troubleshooting Symptoms

Component or Condition	Symptoms from Table 3-1									
	A	B	C	D	E	F	G	H	I	J
Line fuse F1, line power, or transformer T1	X									
Open photocell wire		X	X							
Beacon not flashing					X					
Beacon flashing out of sync[1]						X				
Control signal line open[2]								X		
Control signal line shorted[2]								X		
Monitor signal line open							X			
Monitor signal line shorted							X			
PCB100[3]		X	X	X						X
PCB200										X
Incorrect power line phase									X	

1. Consult troubleshooting section in the Beacon manual.
2. Beacons may also be out of SYNC and at wrong intensity.
3. Try swapping PCB100 with one known to be in good condition.

Checkout Procedure

Perform the following steps with the CONTROL and MONITOR wires disconnected at the back of the controller.

1. Apply power to the unit and observe that all the Tier and Beacon LED indicators are RED, and the ALARM LED is illuminated.
2. Turn power off.
3. Reconnect the CONTROL and MONITOR wires
4. Put the Fail/Conf Display switch to FAIL and verify that all the LED indicators are red in the Tier/Beacon Display window.
5. Put the Fail/Conf Display switch to CONFIRM and verify that all the LED indicators are green in the Tier/Beacon Display window.

   For this step and step 4, some indicators may not operate depending on the configuration of beacons on your structure. Check the position of the programming switches on PCB100.

6. Step the CONTROL switch through DAY, TWI, and NITE verifying that the appropriate LED becomes lit (it may take a few seconds). The MANUAL LED should be lit when the switch is in any position but AUTO.

   Perform the remaining steps with the CONTROL and MONITOR wires attached for normal operation and verify that the programming switches (see Programming on Page 1-2) are set correctly.

7. All LED indicators that have program switches closed should be green and the ALARM LED should be out. Refer to Troubleshooting on Page 3-1 if this condition is not achieved.
8. Rotate the CONTROL switch through DAY, TWI, and NITE and visually verify the response of the beacons at each step.

Photocell Maintenance and Repair

Periodic inspections are recommended. Make certain that no water is entering the enclosed unit or socket. Not field repair but only replacement of this unit is recommended.

Component Removal and Replacement

The following procedures explain how to remove and re-install selected components that may require procedures that are not self-evident. Refer to Figure 4-1 and Figure 4-2.

Safety

For all service that requires removal or replacement, turn off the power or remove the fuses.

Rack Mount Access

1. Slide the unit out of the rack.
2. Remove the two top access covers on the chassis for access to the inside components.

Wall Mount Access

1. Swing open the cabinet cover.
2. Remove the large top panel that supports the PCB200 display panel board for access to the inside components.

Control Board Assembly - PCB100

Removal

1. Use either of the previous subsections Rack Mount Access or Wall Mount Access as required.
2. Disconnect the green connectors from PCB100. Use a side-to-side motion to ease their removal.
3. Loosen, but do not remove, the two slotted screws holding down the circuit board.
4. Disengage this circuit board from the display panel board cable connector and lift it away when the screw heads clear the keyhole slots.

Replacement

1. Reverse the removal procedure. Ensure that PCB100 is fully engaged with display panel board cable connector.

Display Panel Board Assembly - PCB200

Removal

1. Use either of the previous subsections Rack Mount Access or Wall Mount Access as required.
2. Unplug the display panel board cable.
3. From the front, remove the hex nuts from the switches. Use a nut driver. Take care to prevent scratching the paint while removing the nuts.
4. Behind the front panel, remove the four screws holding the display panel board to the front panel.

Replacement

Reverse the removal procedure.

Fail Relay - K1

Removal

1. Use either of the previous subsections Rack Mount Access or Wall Mount Access as required.
2. On the main chassis, disconnect the harness at the relay. These harness wires unplug individually.
3. For the rack-mounted unit, remove the Phillips-head screw holding the relay to the main chassis.
4. For the wall-mounted unit, remove the four nuts that hold the chassis to the base of the cabinet. Support the chassis and remove the screw on the side of the chassis that holds the relay.

Replacement

Reverse the removal procedure.

Transformer - T1

Removal

1. Use either of the previous subsections Rack Mount Access or Wall Mount Access as required.
2. Remove the transformer wires from the terminals of green plug J502 on the PCB100 board.
3. Remove the 5/16-inch hex nuts from the two mounting screws.

Replacement

Reverse the removal procedure. Refer to the internal wiring in Figure 2-6. Follow the color code exactly.

Section 4 – Recommended Spare & Replaceable Parts

Customer Service

Customer Service: 1-800-821-5825

Telephone: (615) 261-2000

Facsimile: (615) 261-2600

Shipping Address:

Flash Technology
332 Nichol Mill Lane
Franklin, TN 37067

Ordering Parts

To order spare or replacement parts, contact customer service at 1-800-821-5825.

Table 4-1 Controller Replaceable and Spare Parts

Item	Description	Part Number
F1	Fuse, Power, AGC, 1 amp	4900342‡
K1	Relay, Alarm	4900501
PCB100	Control Board	2471910‡
PCB200	Panel Board	2472001‡
R501†	Resistor, Heating, 25 W, 1.5 KOhm†	6900520‡
T1	Transformer 120VAC Transformer 240 VAC	8590701 8611201
TS501†	Thermostat†	4902794†
TB1	Terminal Strip, 4 Position	4902073
TB2	Terminal Strip, 12 Position	4902074
TB3	Terminal Strip, 18 Position	4901930
TB4	Terminal Strip, 3 Position	4902155
VR1	Varistor, 120 VAC	6901079‡

† Not in all units.
‡ Recommended as a spare part.

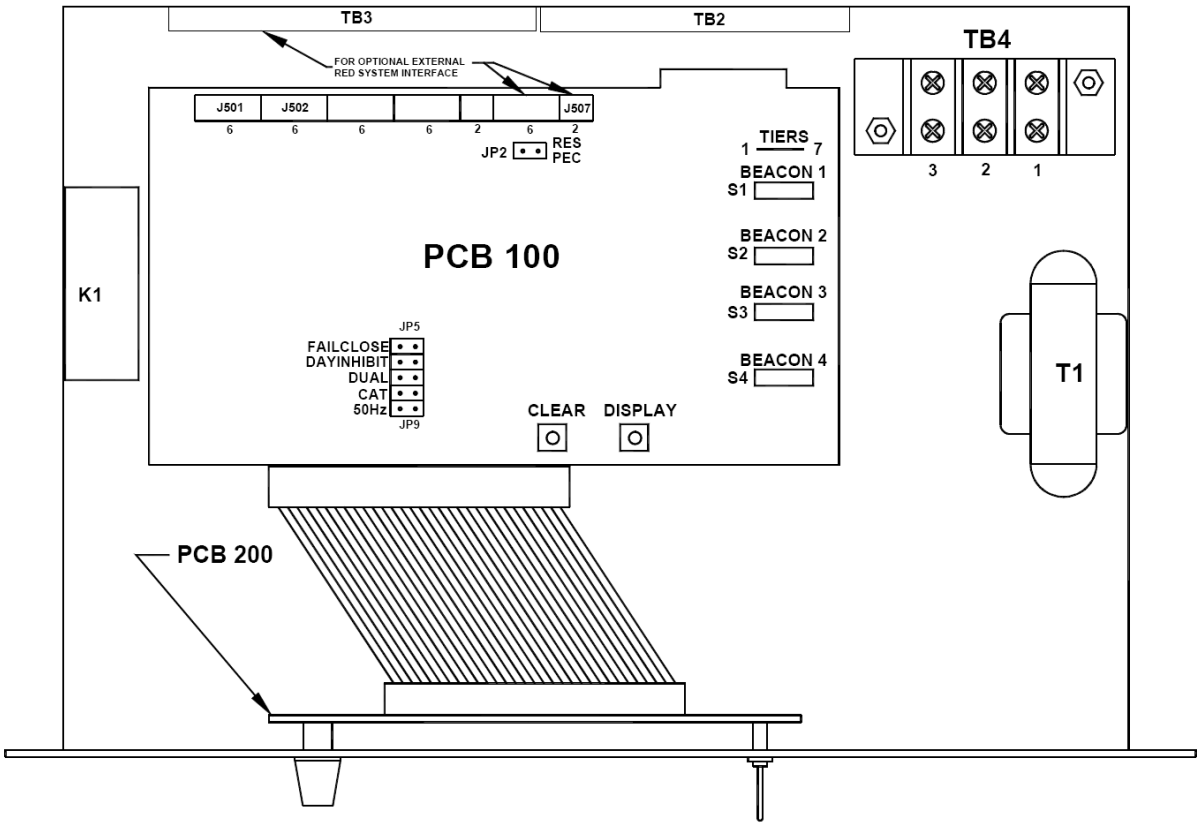


Figure 4-1 – FTC 140R System Controller Component Locations

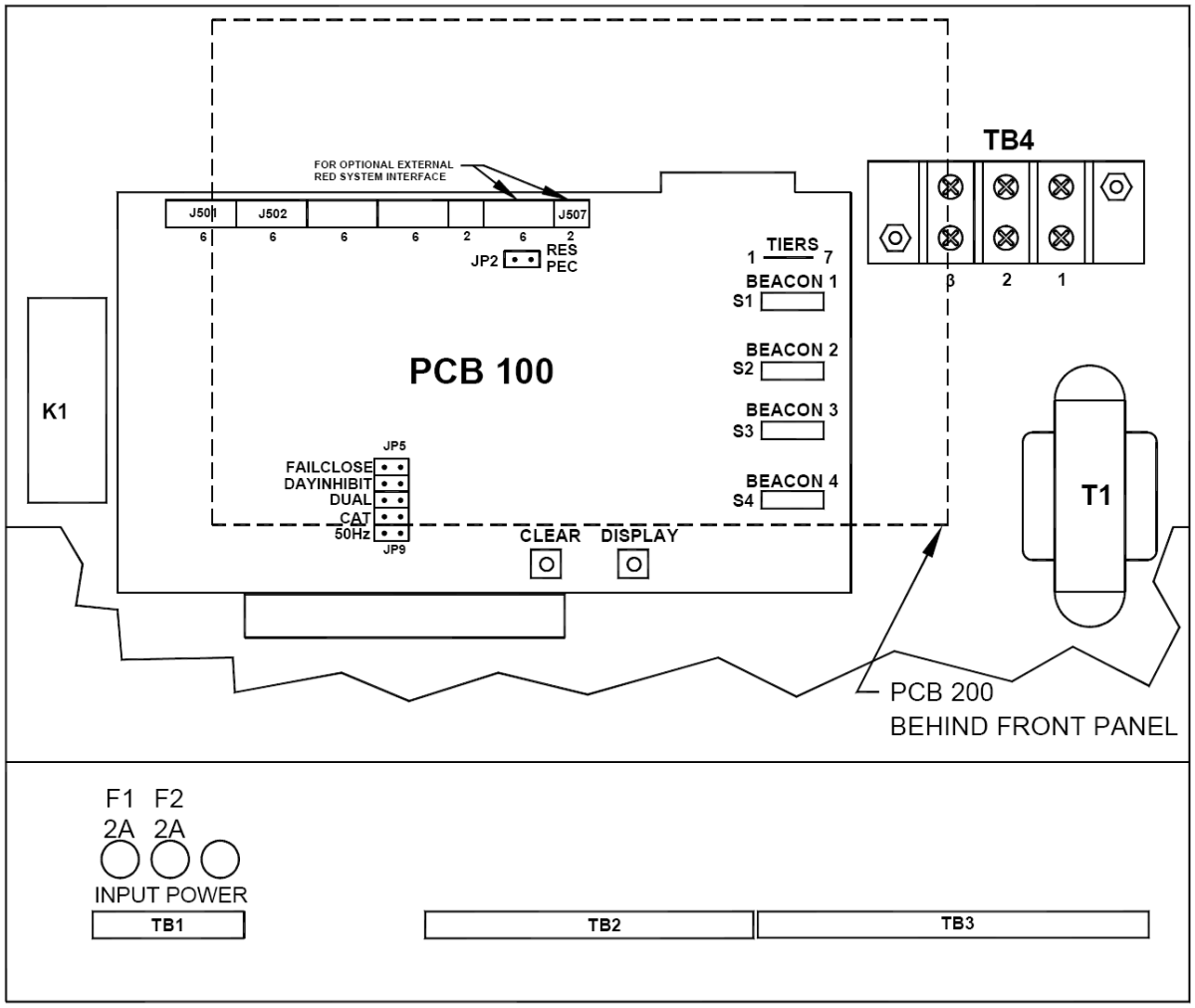


Figure 4-2 – FTC 140W System Controller Component Locations

Returning Equipment – Return Material Authorization (RMA)

If a product purchased from Flash Technology must be returned for any reason, please follow the procedure below:

NOTE: An RMA number must be requested from Flash Technology prior to shipment of any product. No returned product will be processed without an RMA number. This number will be the only reference necessary for returning and getting information on the product's progress.

1. To initiate an RMA, customers should call the Alarm Response & Compliance Center at (800-821-5825) to receive technical assistance and a case number. The following information is required before a case number can be generated:
   - Site Name/Number / FCC Registration number/ Call Letters or Airport Designator
   - Site Owner (provide all that apply – owner, agent or subcontractor)
     - Contractor Name
     - Contractor Company
   - Point of Contact Information: Name, Phone Number, Email Address, Fax Number and Cell Phone (or alternate phone number)
   - Product's Serial Number
   - Product's Model Number or part number
   - Case Number (if previously given)
   - Reason for call, with a full description of the reported issue
2. The case number will then serve as a precursor to receiving an RMA number if it is determined that the product or equipment should be returned. To expedite the RMA process, please provide:
   - Return shipping method
   - Purchase Order (if non-warranty repair)
   - Shipping Address
   - Bill To Address
   - Any additional information to assist in resolving the issue or problem
3. A P.O. is required in advance for the replacement of product that may be under warranty. Flash will then, at its discretion issue a credit once the validity of the warranty has been determined.
4. A purchase order (P.O.) is also required in advance for all non-warranty repairs. NOTE: the purchase order is required prior to the issuance of the RMA number.
   - If the P.O. number is available at the time of the call, an RMA number will be issued and the customer must then fax or email the P.O. with the RMA number as the reference, to ensure prompt processing.

- If the P.O. number is NOT available at the time of the call, a Case Number will be given to the customer and should be referenced on the P.O. when faxed or emailed to RMA Rep.
- Flash will then, at its discretion repair or replace the defective product and return the product to the customer based on the shipping method selected.
- The customer may purchase a new product before sending in the existing product for repair. If Flash Technology determines the existing product is still covered under warranty a credit will be issued to the customer for the new product.

5. After receiving the Flash Technology RMA number, please adhere to the following packaging guidelines:
   - All returned products should be packaged in a way to prevent damage in transit. Adequate packing should be provided taking into account the method of shipment.

     Flash Technology will not be responsible for damaged items if product is not returned in appropriate packaging.
6. All packages should clearly display the RMA number on the outside of all RMA shipping containers. RMA products (exact items and quantity) should be returned to:

   Flash Technology
   Attn: RMA #XXX
   332 Nichol Mill Lane
   Franklin, TN 37067
7. All RMA numbers:
   - Are valid for 15 business days. Products received after may result in extra screening and delays.
   - Must have all required information provided before a RMA number to be assigned.

Return to Stock Policy

- Parts can be returned within 90 days of ship date and will be subject to a 20% restocking fee. Product must:
  - Be in the original packaging
  - Not be damaged
- After 90 days no parts can be returned