
TRAFFIC SAFETY CORPORATION

TS-60S-AC Single-Sided / TS-60D-AC Double-Sided
AC-Powered TS60-RRFB LED Systems
Installation, Operation, and Maintenance Manual



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Contents

1. Introduction	3
2. General Information	3
2.1. Warranty Requirements	3
2.2. System Overview	4
2.3. System Configuration and Components	4
2.3.1. System Configuration	4
2.3.2. System Components	5
2.3.3. Pedestrian Activation Methods	5
3. Safety Information	5
3.1. General Safety Precautions	5
3.2. Electrical Safety	6
3.3. Installation Safety	6
4. System Installation	6
4.1. Support Structure and System Placement	6
4.2. RRFB Beacon Installation	7
4.2.1. Single-Sided RRFB Beacon Installation	9
4.2.2. Double-Sided RRFB Beacon Installation	9
4.3. AC Controller Installation	10
5. Electrical Installation	11
5.1. System Wiring Overview	12
5.2. RRFB Beacon Wiring and Connections	13
5.3. Pedestrian Activation System Wiring	14
5.3.1. Push Button Activation System	14
5.3.2. Sensor Bollard Activation System	16
5.3.3. Photocell (For RRFB Dimming Operation)	19
5.4. AC Controller Radio Board	20
5.4.1. Radio Board Switch Settings	21
6. System Start-Up and Functional Verification	23
6.1 Pre-Start-Up Inspection	23
6.2 Functional Verification	24
6.3 Final Verification	24
7. System Operation and Maintenance	24
7.1 Normal Operation	24
7.2 Preventive Maintenance	25
8. Replacement Components	25
8.1 Replacement Components and Repair	25

1. Introduction

The Traffic Safety Corporation **TS-60S-AC** and **TS-60D-AC** LED Rectangular Rapid Flashing Beacon (RRFB) Systems are pedestrian warning systems designed to increase driver awareness at marked crosswalks and pedestrian crossing locations. The systems use high-intensity LED RRFB Beacons to draw attention to pedestrian crossings.

This manual provides instructions for the installation, electrical connections, start-up, operation, maintenance, troubleshooting, and component replacement of the **TS-60S-AC Single-Sided** and **TS-60D-AC Double-Sided AC-Powered RRFB Systems**.

Terminology used throughout this manual:

- **TS-60S-AC Single-Sided AC-Powered RRFB System** – The complete crosswalk system consisting of two Single-Sided RRFB Assemblies, one installed on each side of the crosswalk.
- **TS-60D-AC Double-Sided AC-Powered RRFB System** – The complete crosswalk system consisting of two Double-Sided RRFB Assemblies, one installed on each side of the crosswalk.
- **RRFB Assembly** – The equipment associated with one side of the crosswalk, consisting of the RRFB Beacon(s), one AC Controller, and the applicable pedestrian activation device(s).
- **RRFB Beacon** – The LED warning-light unit. A Single-Sided RRFB Assembly uses one Beacon; a Double-Sided RRFB Assembly uses two Beacons mounted back-to-back.
- **AC Controller** – One Controller is included in each RRFB Assembly. It controls the Beacon(s), receives input from the local pedestrian activation device(s), and communicates wirelessly with the Controller in the opposite Assembly.

Read this manual before beginning installation. Proper installation, operation, and maintenance are required to ensure safe and reliable system performance and to maintain warranty coverage.

2. General Information

2.1. Warranty Requirements

The TS-60S-AC and TS-60D-AC AC-Powered RRFB Systems are covered by a 5-Year Limited Warranty.

To maintain warranty coverage:

1. Install, operate, and maintain the system in accordance with this manual.
2. Use only Traffic Safety Corporation-approved components.
3. Perform all electrical connections in accordance with applicable national, state, and local electrical codes.
4. Do not modify the AC Controller, RRFB Beacons, wiring, or other major system components without prior written approval from Traffic Safety Corporation.
5. Perform periodic inspection and maintenance as specified in this manual.

Unauthorized components or modifications, improper installation, or failure to perform required maintenance may affect system performance and warranty coverage.

2.2. System Overview

Each complete TS60-RRFB AC-Powered System consists of two RRFB Assemblies, one installed on each side of the crosswalk. Each RRFB Assembly includes the RRFB Beacon(s), one AC Controller, and the applicable pedestrian activation device(s).

The Controller within each RRFB Assembly manages its local Beacon(s) and communicates wirelessly through an RF link with the Controller in the opposite Assembly. When the system is activated by a pedestrian, the RRFB Beacons in both Assemblies flash simultaneously.

The system is available as the

- **TS-60S-AC Single-Sided RRFB System** and the
- **TS-60D-AC Double-Sided RRFB System.**

The illustration below shows a typical TS-60S-AC system; the same operating principle applies to the TS-60D-AC system.

Typical TS-60S-AC Single-Sided RRFB System and Operating Principle



2.3. System Configuration and Components

2.3.1. System Configuration

The AC-Powered TS60-RRFB product family is available under the following part numbers:

- **TS-60S-AC – Single-Sided RRFB System:** Consists of two Single-Sided RRFB Assemblies, one on each side of the crosswalk. Each Assembly includes one 12-24VDC RRFB Beacon with Confirmation Light, one AC Controller, and the applicable pedestrian activation device(s).
- **TS-60D-AC – Double-Sided RRFB System:** Consists of two Double-Sided RRFB Assemblies, one on each side of the crosswalk. Each Assembly includes two 12-24VDC RRFB Beacons with Confirmation Light mounted back-to-back, one AC Controller, and the applicable pedestrian activation device(s).

Each AC Controller has a 120-277VAC input and provides 12VDC output for system operation.

2.3.2. System Components

Each complete TS60-RRFB AC-Powered System contains two RRFB Assemblies, one on each side of the crosswalk. Each RRFB Assembly includes:

- RRFB Beacon(s) – one Beacon for TS-60S-AC or two back-to-back Beacons for TS-60D-AC
- One AC Controller
- Applicable Pedestrian Activation Device(s) – Push Button(s) and/or Sensor Bollard(s)
- Mounting Hardware, as applicable

Pedestrian activation devices may be supplied with the system or provided separately by the customer. Any customer-supplied activation device must meet Traffic Safety Corporation compatibility requirements for connection to the AC Controller within the RRFB Assembly.

Some mounting hardware is supplied with the system. Additional site-specific mounting hardware may be required and must be provided by the customer.

2.3.3. Pedestrian Activation Methods

The TS-60S-AC and TS-60D-AC Systems support the following pedestrian activation methods, depending on project requirements:

- Push-Button Activation – Push-button station or standalone stainless steel push button
- Pedestrian Detection – Sensor bollard system for automatic pedestrian detection

IMPORTANT:

Use of pedestrian detection bollards may be subject to local approval, applicable traffic regulations, and requirements of the Authority Having Jurisdiction (AHJ). Confirm that the selected activation method is approved for a specific location before installation.

3. Safety Information

The AC-Powered TS60-RRFB System contains electrical and electronic components.

Installation and maintenance shall be performed only by qualified personnel familiar with traffic control equipment, electrical systems, and applicable safety requirements.

Failure to follow the instructions and safety precautions in this manual may result in equipment damage, system malfunction, serious injury, or death.

3.1. General Safety Precautions

WARNING

Read and understand this manual before installing, operating, or servicing the TS60-RRFB System.

- Installation and maintenance shall be performed by qualified personnel.
- Follow all applicable federal, state, and local regulations and safety requirements.
- Use appropriate personal protective equipment (PPE) during installation and maintenance.
- Inspect all components for visible damage before installation.
- Verify that all components are securely mounted before placing the system into service.
- Do not modify system components without prior written approval from Traffic Safety Corporation.
- Use only approved replacement parts and accessories.

3.2 Electrical Safety

WARNING

Electrical shock hazards may be present during installation and maintenance.

- Disconnect AC power at the source before installing, servicing, or modifying electrical connections.
- Verify that all electrical connections are properly installed and secured before applying power.
- All wiring shall comply with applicable electrical codes and regulations.
- Use appropriate wire sizes and overcurrent protection as required by applicable codes and system specifications.
- Inspect wiring for damage, abrasion, or loose connections before system start-up.
- Do not energize the system until all electrical installation procedures have been completed.

3.3. Installation Safety

WARNING

Installation activities may require work near roadways, moving traffic, elevated structures, and electrical equipment.

- Follow all applicable work-zone safety requirements.
- Use appropriate traffic control measures during installation and maintenance activities.
- Follow approved procedures when working at heights.
- Verify that support structures are capable of supporting all installed equipment and applicable environmental loads.
- Use proper lifting techniques when handling equipment.
- Ensure all mounting hardware is properly tightened before placing the system into service.
- Perform a complete functional verification of the system after installation is complete.

4. System Installation

4.1. Support Structure and System Placement

Proper placement and installation of the TS60-RRFB System are essential for reliable operation, adequate visibility, and compliance with applicable requirements.

The support structures for the RRFB Assemblies are not supplied by Traffic Safety Corporation. Selection, structural design, installation, and foundation requirements for the support structures shall comply with the approved project plans and applicable requirements.

Before installation, verify that the installation locations, support structures, and system configuration conform to the approved project plans and the requirements of the Authority Having Jurisdiction (AHJ).

Install one RRFB Assembly on each side of the crosswalk:

- **TS-60S-AC Single-Sided RRFB System** – Install one Single-Sided RRFB Assembly on each side of the crosswalk. Each Assembly uses one RRFB Beacon.
- **TS-60D-AC Double-Sided RRFB System** – Install one Double-Sided RRFB Assembly on each side of the crosswalk. Each Assembly uses two RRFB Beacons mounted back-to-back and facing opposite directions.

Verify that:

- Support structures are structurally sound and capable of supporting the installed equipment and applicable environmental loads.
- RRFB beacon(s) are properly positioned and oriented for clear visibility to approaching motorists.
- Pedestrian activation devices are located as specified by the approved project plans and are accessible to users.
- The AC Controller for each RRFB Assembly is mounted in a location that allows access for inspection, maintenance, and service.

Before Beginning Installation

- Verify that all required system components have been received and inspect them for visible damage.
- Verify that all required mounting hardware is available.
- Review the applicable installation drawings and wiring diagrams.
- Confirm the system part number and RRFB Assembly configuration before installation.

 IMPORTANT:

Do not install damaged or incomplete components. Contact Traffic Safety Corporation if replacement parts or additional components are required.

4.2. RRFB Beacon Installation

RRFB Beacons are mounted to the support structure using the Shallow Strut Channel attached to the back of the Beacon and customer-supplied Rigid Strut Strap(s).

Before installation, verify the following:

- The RRFB Beacon(s) match the ordered System (TS-60S-AC or TS-60D-AC).
- The required number of RRFB Beacons is available.
- The Shallow Strut Channel size is correct for the applicable RRFB Assembly type.
- The Rigid Strut Strap(s) are compatible with the support structure diameter.
- The Beacon cable(s) can be routed through the support structure before securing the Beacon(s).

 IMPORTANT:

The Rigid Strut Strap(s) are not supplied by Traffic Safety Corporation. Select Rigid Strut Strap(s) compatible with the diameter of the support structure.

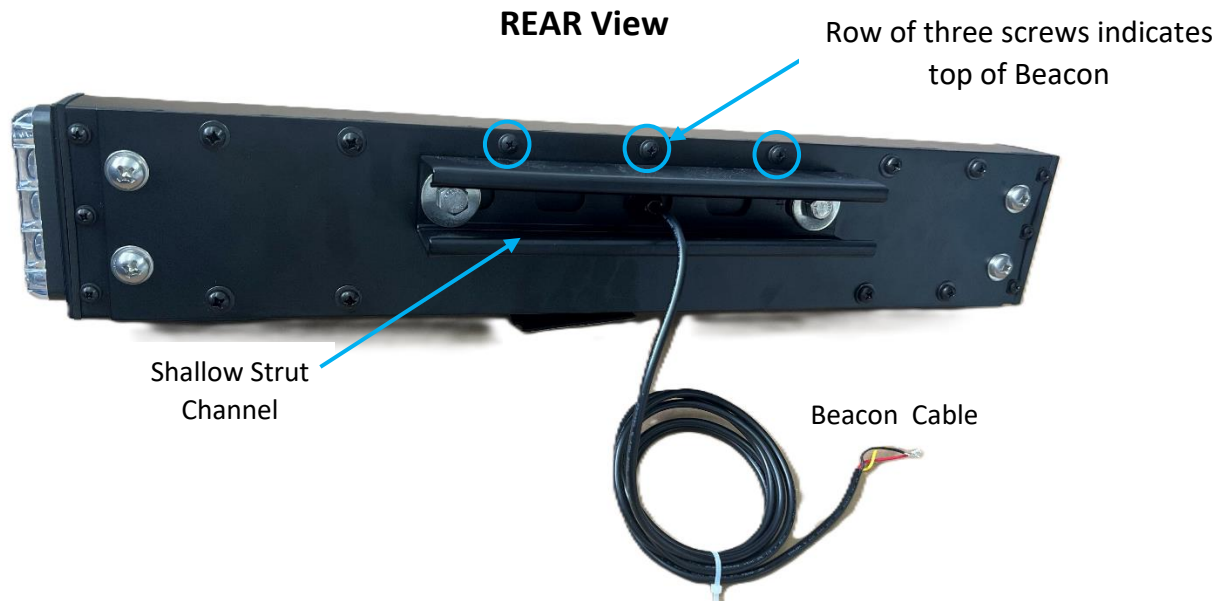
Do not install damaged components. Verify that all mounting hardware is available before beginning installation.

Typical RRFB Beacon Components:

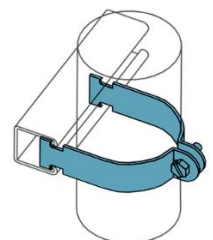


⚠ **IMPORTANT – Beacon Orientation**

- Position each RRFB Beacon for installation with the **TOP arrows** on both front LED modules pointing upward. The LED face shall be vertical and oriented toward approaching traffic.
- If the TOP labels are missing or unreadable, use the rear view of the Beacon as an alternate orientation reference. The horizontal row of three screws located above the Shallow Strut Channel identifies the top of the Beacon.



The Rigid Strut Strap(s) are not supplied by Traffic Safety Corporation.
Select Rigid Strut Strap(s) compatible with the diameter of the support structure.



4.2.1. Single-Sided RRFB Beacon Installation

For the TS-60S-AC Single-Sided RRFB System, each RRFB Assembly uses one RRFB Beacon mounted on its support structure using one 1-5/8" × 13/16" Shallow Strut Channel and one customer-supplied Rigid Strut Strap.



1. Route the Beacon cable through the support structure.
2. Position the Beacon at the required installation height and orientation.
3. Verify that the Beacon is installed with the TOP arrows on both front LED modules pointing upward, with the LED face vertical and directed toward approaching traffic. If the TOP labels are missing or unreadable, use the rear orientation reference shown in Section 4.2.
4. Position the Shallow Strut Channel against the support structure.
5. Install the Rigid Strut Strap around the support structure and through the Shallow Strut Channel.
6. Tighten the strap securely.
7. Verify that the Beacon is properly aligned, firmly mounted, and at the required height.

Verify the following after installation:

- The Beacon is securely mounted.
- The Beacon face is vertical and oriented toward traffic.
- The Beacon is properly aligned.
- The Beacon cable is correctly routed and not pinched or damaged.

4.2.2. Double-Sided RRFB Beacon Installation

For the TS-60D-AC Double-Sided RRFB System, each RRFB Assembly uses two RRFB Beacons mounted back-to-back on its support structure using 1-5/8" × 1-5/8" Shallow Strut Channels and two customer-supplied Rigid Strut Straps.





1. Route both Beacon cables through the support structure.
2. Position both Beacons on the support structure at the required installation height.
3. Verify that both Beacons are installed back-to-back, facing opposite directions, with the TOP arrows on both Front LED modules pointing upward. If the TOP labels are missing or unreadable, use the rear orientation reference shown in Section 4.2.
4. Position both Beacons at the same height so that the Shallow Strut Channels are vertically offset, with one Channel above the other, as shown.
5. Install the two Rigid Strut Straps around the support structure, one above the other, with each Strap engaging its corresponding Shallow Strut Channel.
6. Tighten both straps securely.
7. Verify that the Beacons are directly back-to-back, parallel, at the same height, properly aligned, and firmly mounted.

Verify the following after installation:

- Both Beacons are securely mounted.
- The Beacons are directly back-to-back, parallel, and at the same height.
- The Beacon faces are vertical and oriented in opposite directions.
- The Shallow Strut Channels and Rigid Strut Straps are positioned one above the other
- Both Beacon cables are correctly routed and not pinched or damaged.

4.3. AC Controller Installation

Each RRFB Assembly includes one AC Controller Enclosure; therefore, each complete TS60-RRFB System has two Controller Enclosures, one on each side of the crosswalk. Each Controller operates the Beacon(s), receives input from the pedestrian activation device(s) within its RRFB Assembly, and communicates wirelessly through its RF antenna with the Controller in the opposite Assembly to synchronize system operation.

The AC-Powered Controller Enclosure is supplied fully assembled, is made of polycarbonate, and measures 14" × 12" × 6".

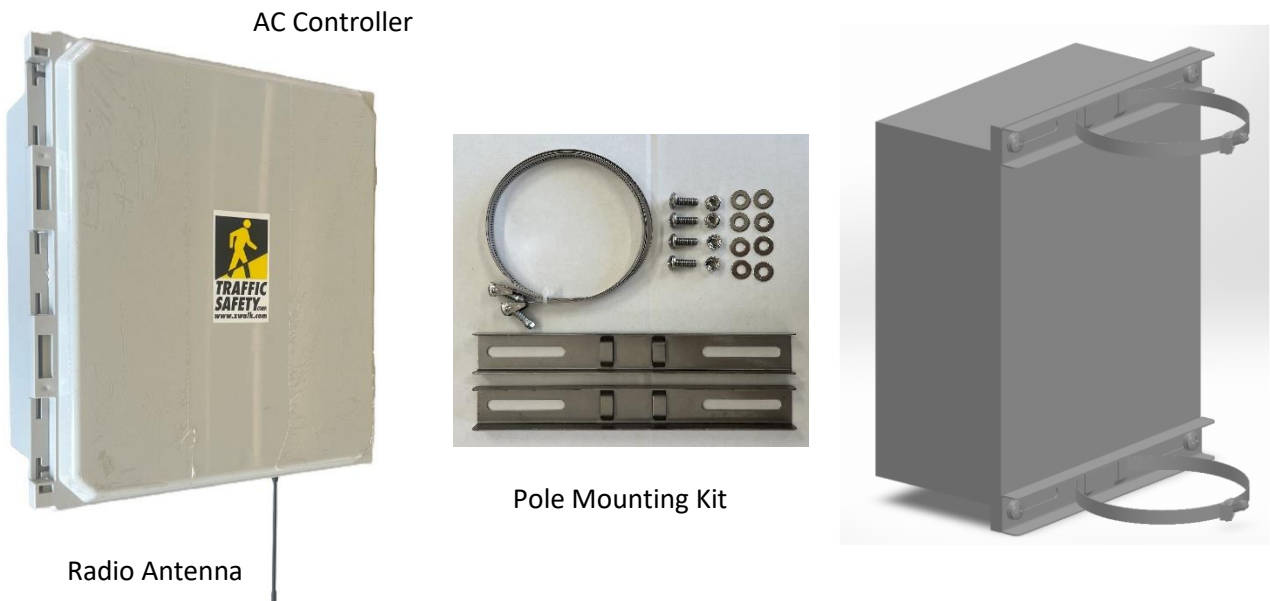
It may be mounted to a support structure or to a flat mounting surface, as specified on the approved project drawings.

For pole-mounted installations, the customer is provided with a universal mounting kit consisting of Mounting Channels, Hose Clamp(s), and associated mounting hardware required for installation on the support structure.

The Controller Enclosure shall be installed at the location specified on the approved project drawings.

Installation

1. Position the Controller Enclosure at the required installation location.
2. Verify that the Controller enclosure is positioned to allow the door to be fully opened for inspection and service.
3. Position the Mounting Channels against the support structure.
4. Secure the enclosure to the support structure using the supplied Hose Clamp(s) and mounting hardware.
5. Tighten all mounting hardware securely.
6. Verify that the enclosure is firmly mounted, properly oriented, and readily accessible for inspection and maintenance.



Final Mechanical Verification

Before proceeding with electrical installation, verify that:

- The Controller Enclosure is securely mounted.
- The enclosure door opens fully without obstruction.
- The enclosure is accessible to service personnel.
- All mounting hardware is properly tightened.

5. Electrical Installation

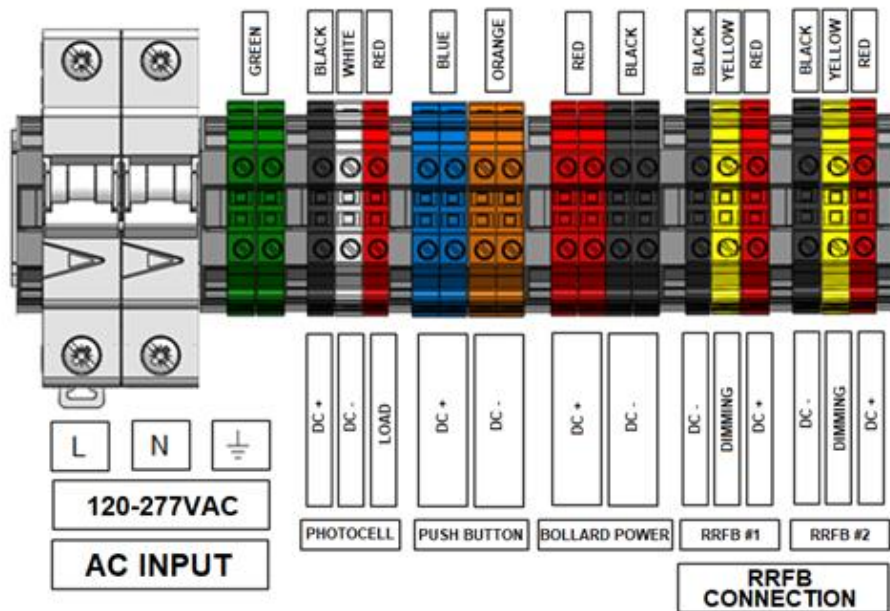
Electrical installation shall be performed by qualified personnel in accordance with applicable electrical codes, approved project drawings, and the wiring diagrams provided in this manual.

5.1. System Wiring Overview

- Each RRFB Assembly is wired to its local AC Controller. The two Controllers communicate wirelessly to synchronize operation across the complete TS60-RRFB System.
- For the TS-60S-AC System, each RRFB Assembly has one Beacon cable connected to its Controller. For the TS-60D-AC System, each RRFB Assembly has two Beacon cables connected to its Controller.

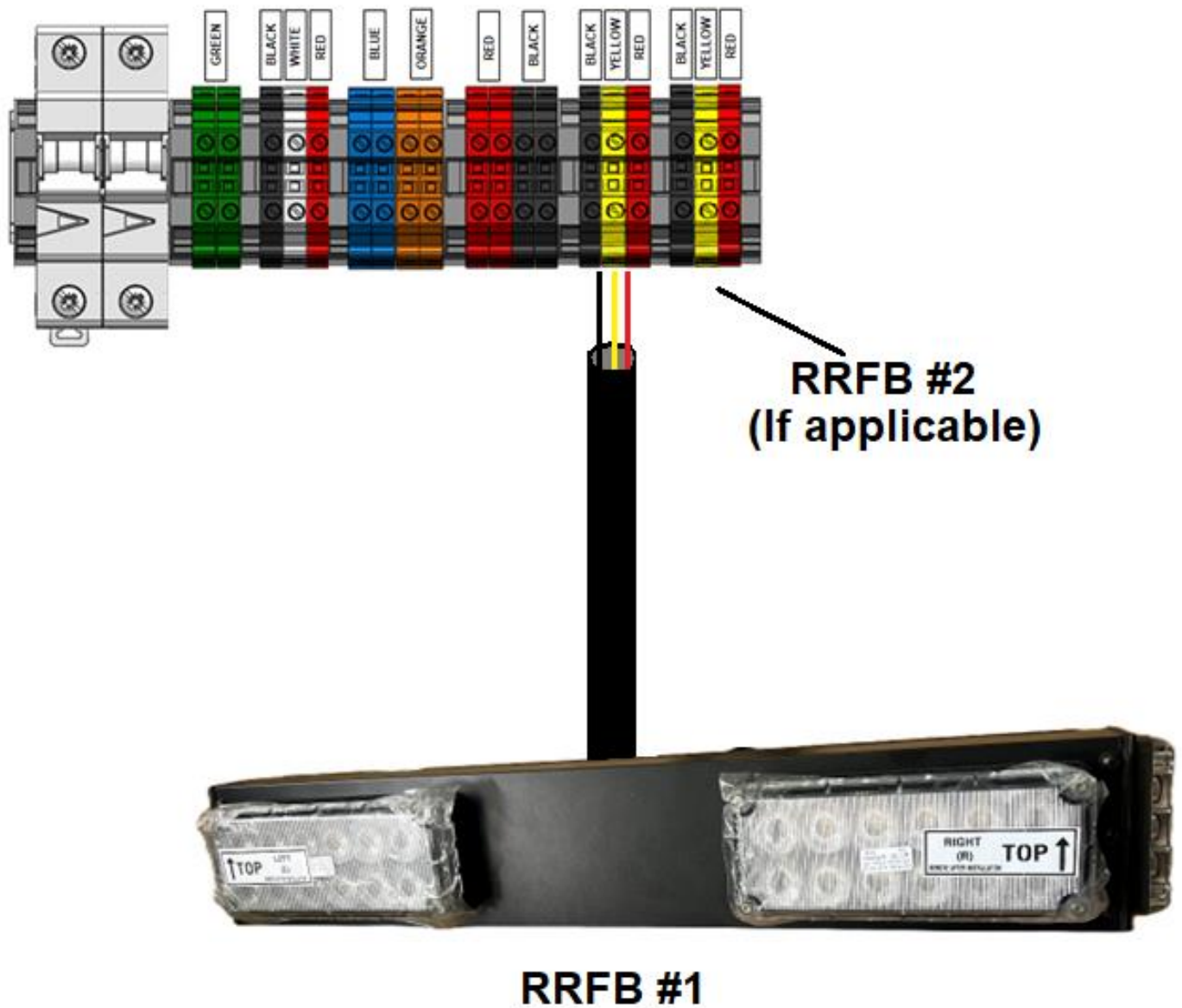
⚠ WARNING

Connect 120-277VAC to the AC Controller input circuit breaker (see diagram below).



5.2. RRFB Beacon Wiring and Connections

- Route each Beacon cable through the support structure before securing the Beacon, as described in Section 4.2 – RRFB Beacon Installation.
- Connect each Beacon cable to the AC Controller within the same RRFB Assembly as shown in the applicable wiring diagram. For the TS-60D-AC System, connect both Beacon cables from that Assembly to its Controller.

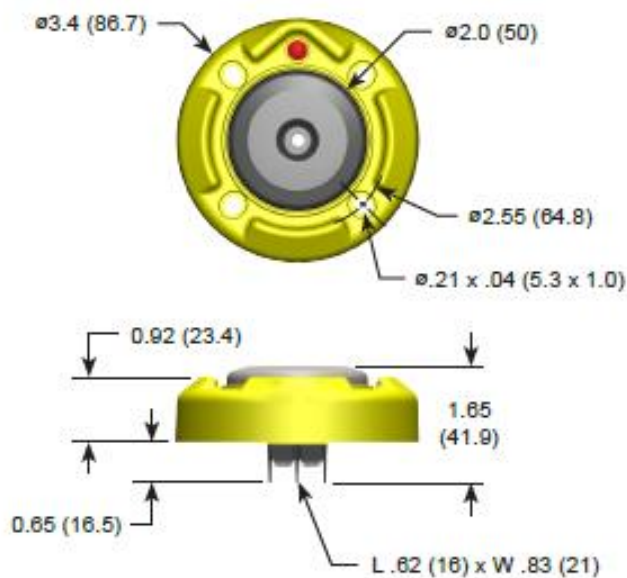


5.3. Pedestrian Activation System Wiring

The TS-60S-AC and TS-60D-AC Systems may use Push Buttons or Sensor Bollards, depending on project requirements. The activation device(s) associated with each RRFB Assembly connect to the AC Controller within that Assembly.

5.3.1. Push Button Activation System

When the switch is activated, a beep will be heard and the button LED will flash.



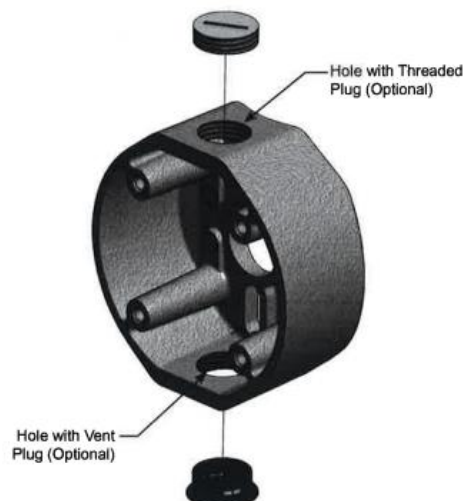
Body Material: Aluminum,
Powder Coated

Button Material: 316 Stainless
Steel

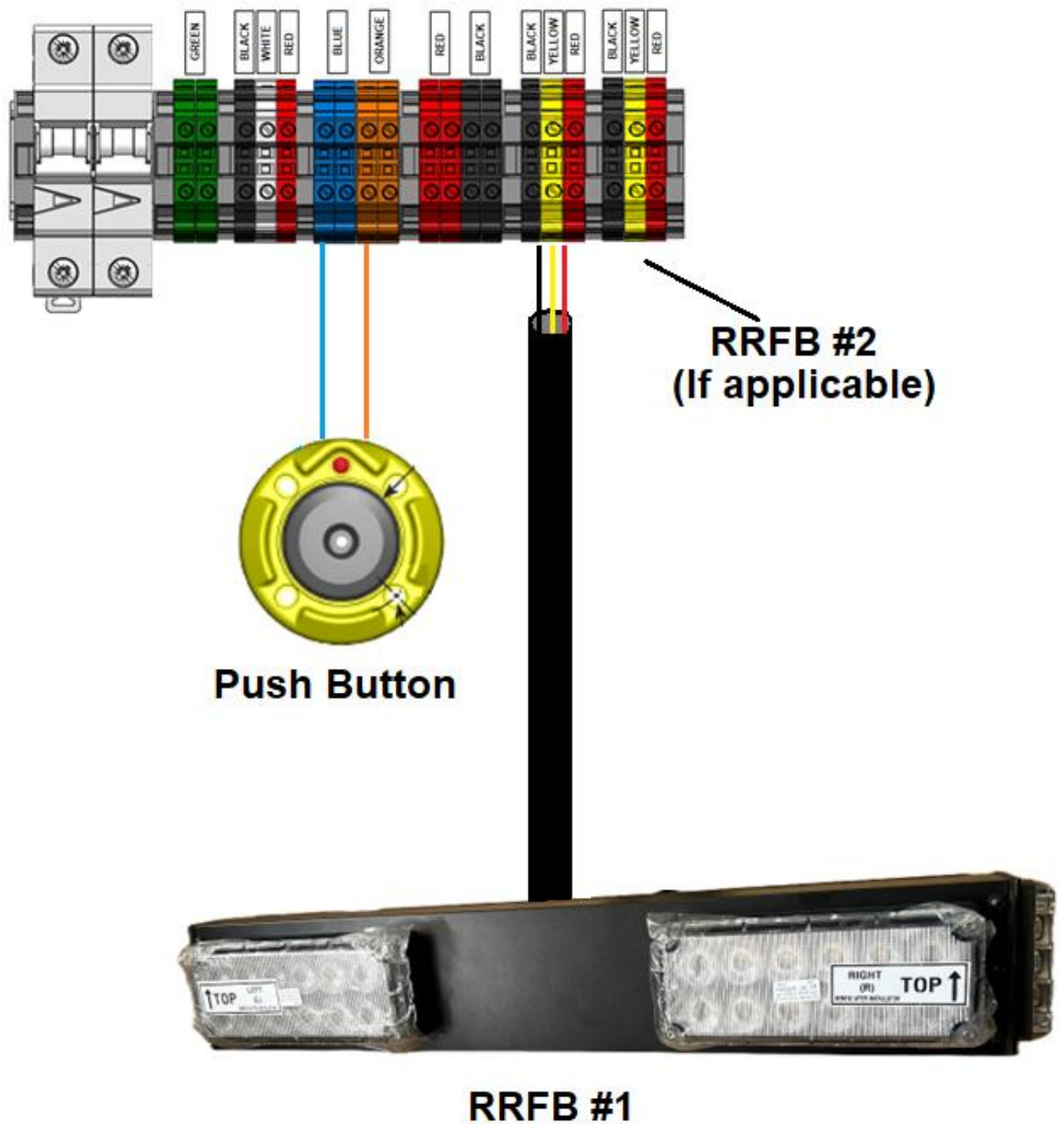
Arrow Button Material:
Anodized 6061 Aluminum, Nickel
Plated Black Powder Coat on area
surrounding arrow

Operation Voltage: 12-36VDC

BDL3 Push Button comes with Aluminum Push Button Cup



Connect the Push Button to the AC Controller within the same RRFB Assembly as shown in the wiring diagram below.



5.3.2. Sensor Bollard Activation System

When Sensor Bollards are used, the complete TS60-RRFB System uses four Sensor Bollards, two associated with each RRFB Assembly.

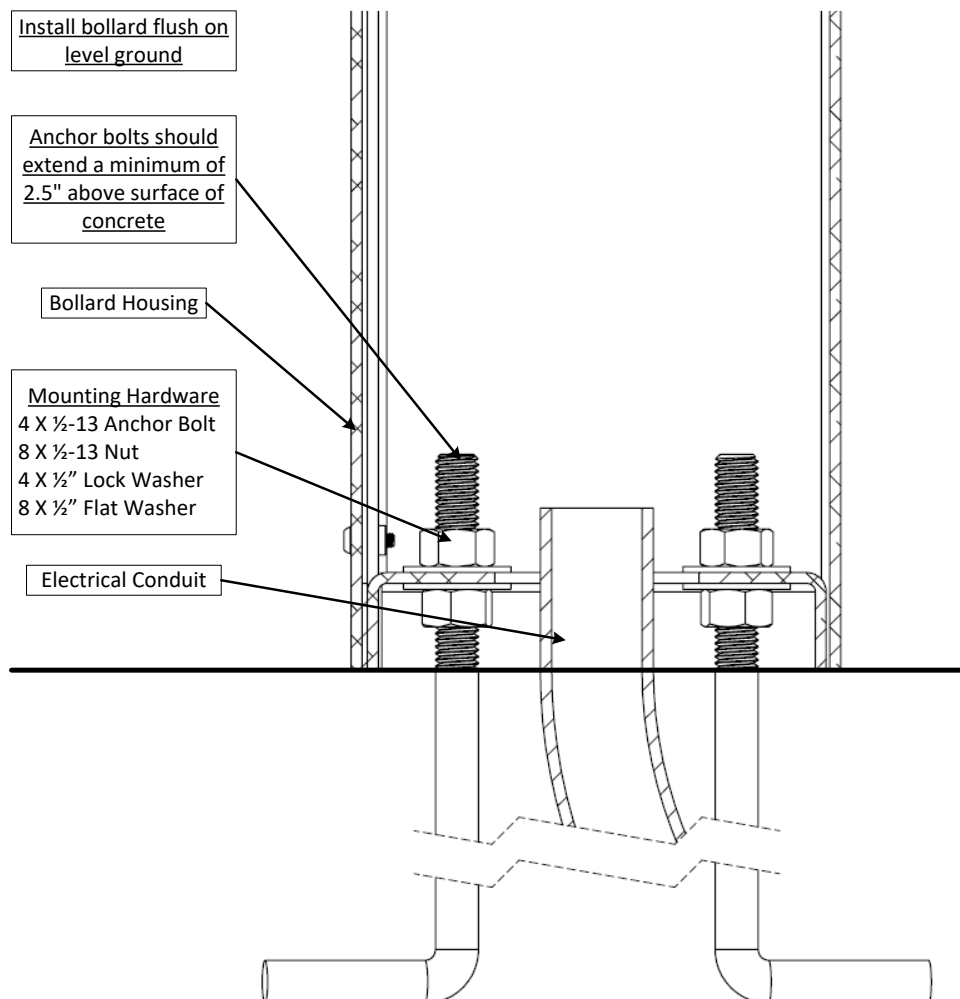
Connect the Sensor Bollard wiring as shown in the applicable wiring diagram.

5.3.2.1. Sensor Bollard Installation and Alignment

Install the Sensor Bollards according to the approved project drawings and applicable site requirements. The installation method shall be verified by the site engineer for compliance with local codes.

It is recommended to install the Bollards using $\frac{1}{2}$ " **L-Hook concrete anchors** in newly poured, level concrete. The site engineer shall evaluate the installation method for compliance with applicable local codes.

The front faces of the two Bollards shall be directly aligned with each other and shall not be skewed or offset. Proper installation and positioning are essential for sensor alignment and calibration.



5.3.2.2. Sensor Alignment and Operation

In order for proper operation, the sensors in each bollard must be properly aligned. When the sensors are optimally aligned the green LED and orange LED on the receiver will be illuminated. When the beam is blocked or the sensor is misaligned, the amber LED will be illuminated.

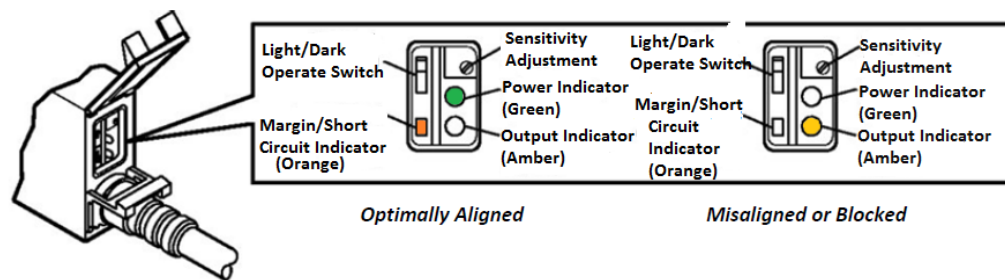
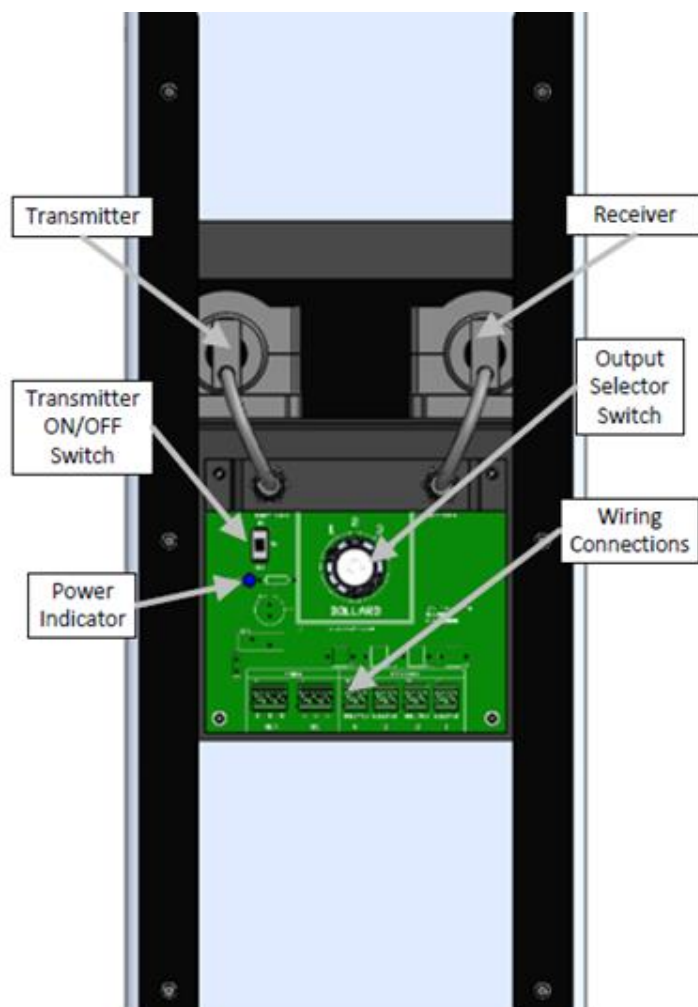


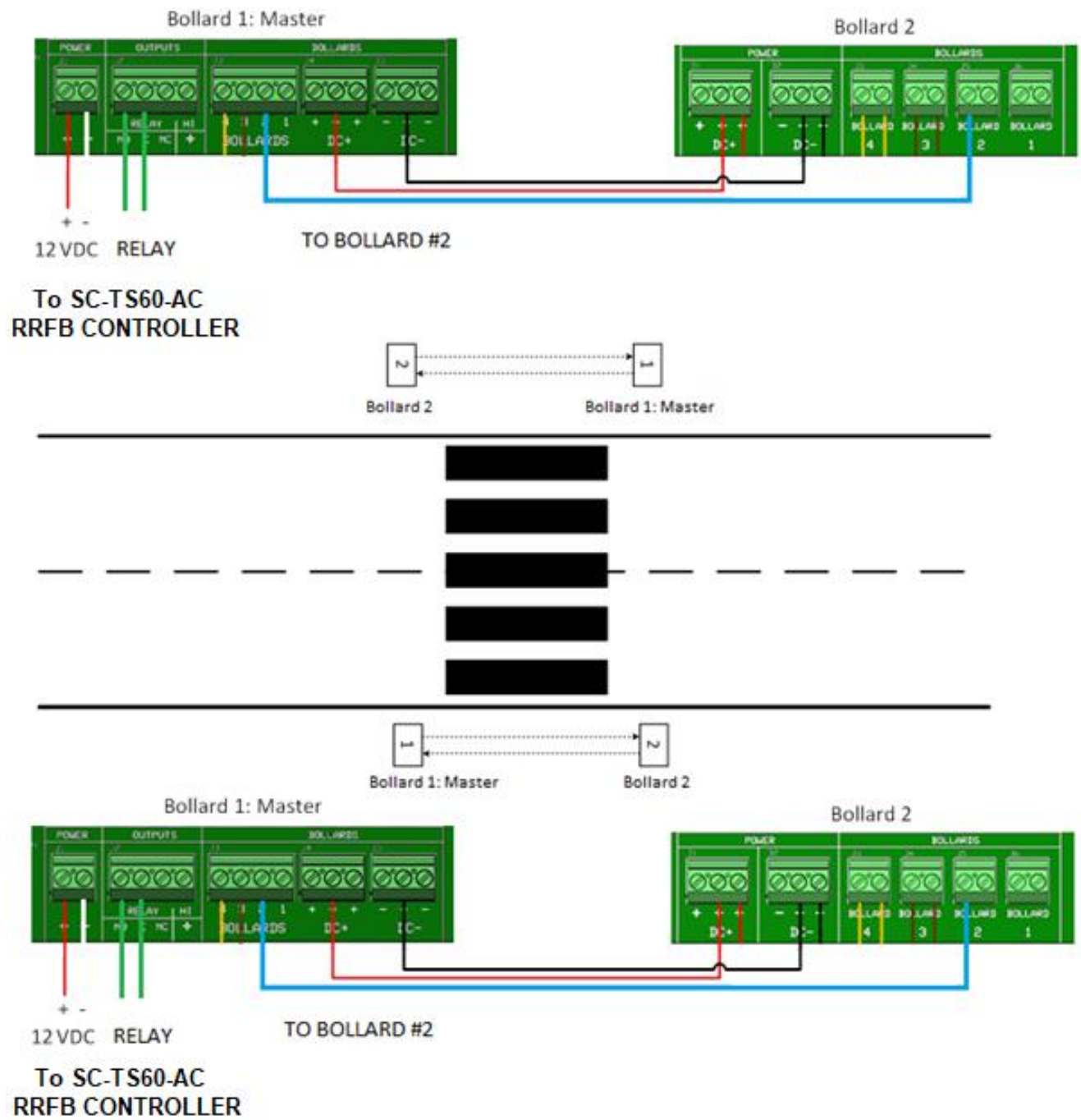
Figure 42: Sensor Status Indicators

When viewing the bollard from the rear, the receiver is on the right-hand side. There is a slide switch located on the circuit board below the transmitter. This switch controls the power to the transmitter. It is best to have the transmitter turned off when aligning the receiver in the same bollard.

Follow the steps below to align each bollard.



- Have one person observe the receiver LEDs at the first Bollard
- Turn off the transmitter at the first Bollard.
- Have a second person at the corresponding Bollard loosen the transmitter swivel-mount screws.
- Make small adjustments to aim the transmitter until the receiver indicates proper alignment.
- Tighten the swivel-mount screws.
- Turn the swivel-mount screws.
- Repeat the procedure as required for the opposite direction.



5.3.3. Photocell (For RRFB Dimming Operation)

The Photocell Control option will change the night/day intensity of the lighting system.

Photocell Specifications:

The 6589C-FAA photocell turns on at 35 FC +/- .25 and turns off at 52 FC.

Nominal Voltage: 12-48 VDC

Load Rating: 10Amps

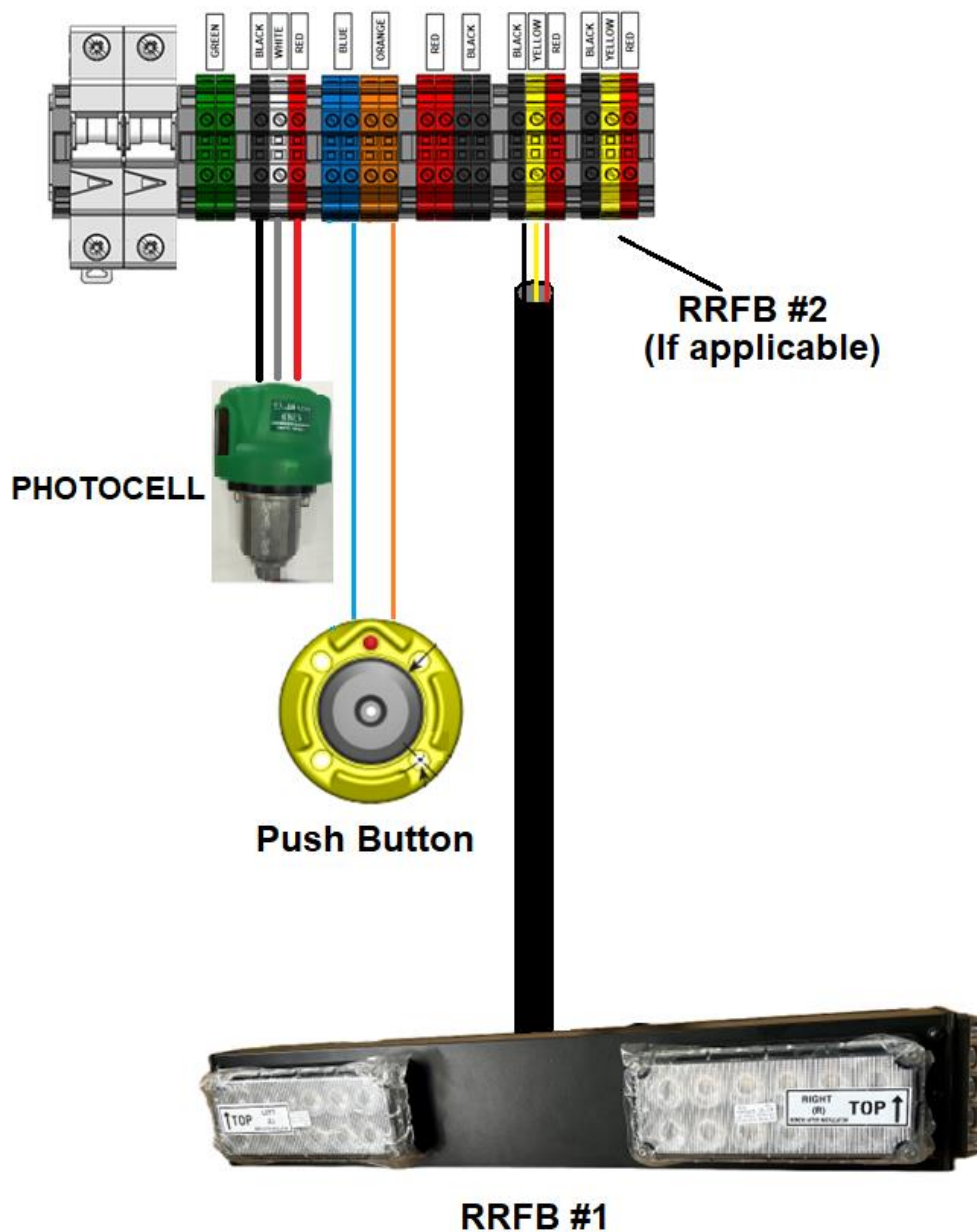
3 to 5 Seconds time delay

⚠ IMPORTANT – Photocell Orientation

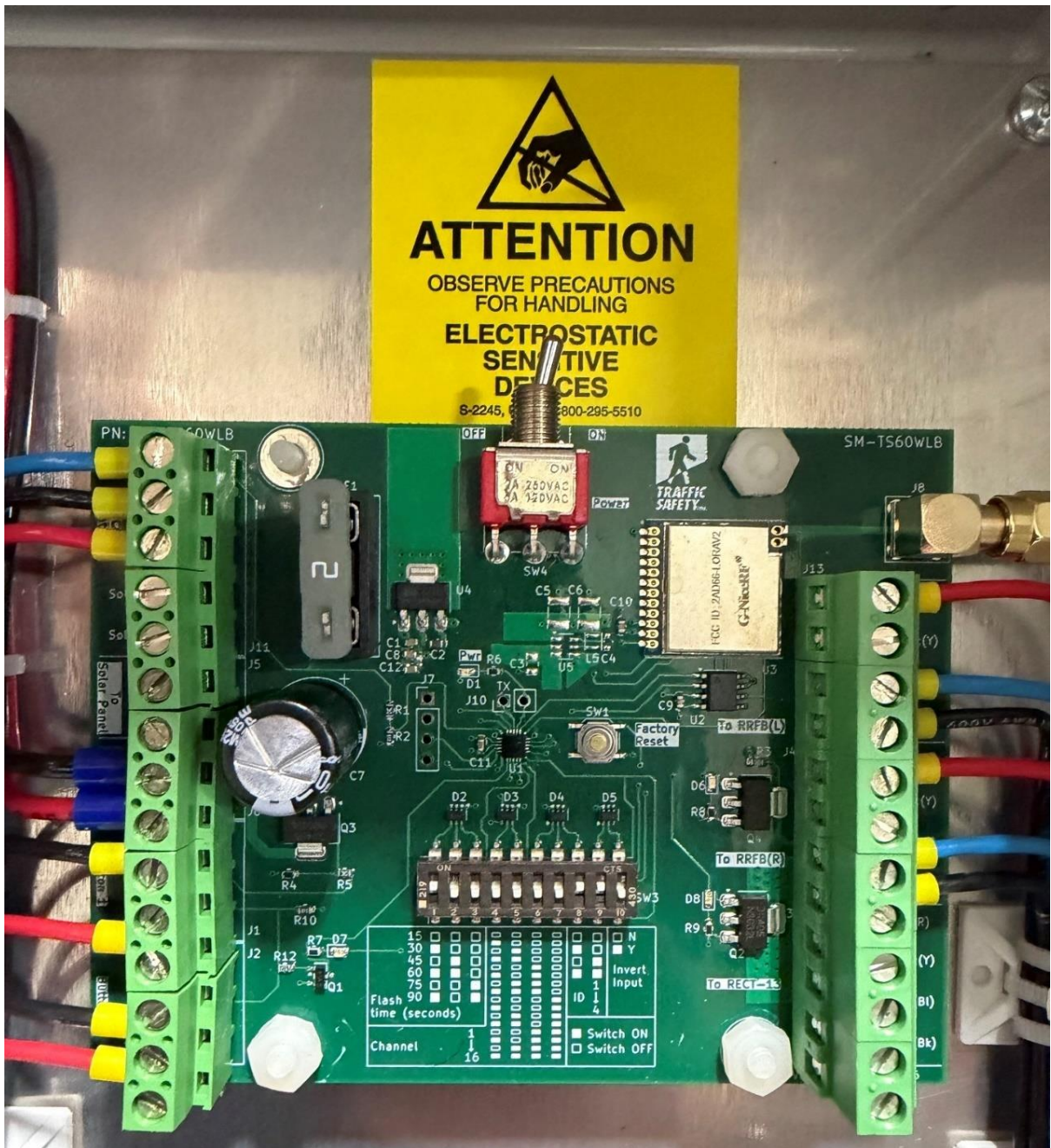
Install the Photocell with the sensor facing **North**.

Proper orientation helps minimize exposure to direct sunlight and ensures reliable day/night light sensing.

The intensity of the RRFB beacons is set to full for day. If the photocell is connected per the diagram below, the RRFB beacons will lower the brightness intensity during the night.



5.4. AC Controller Radio Board

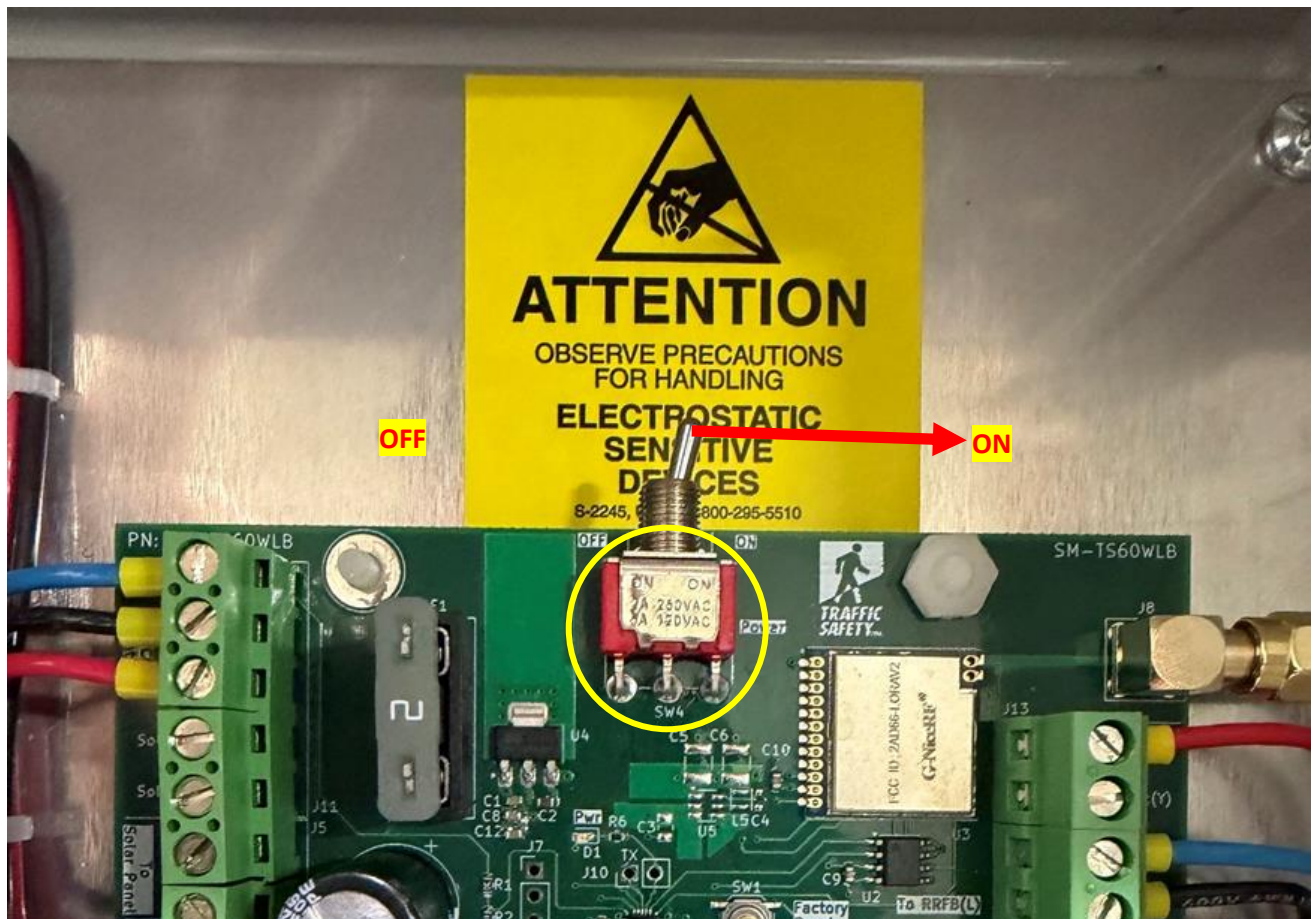


5.4.1. Radio Board Switch Settings

5.4.1.1. Radio Board Power Switch (SW4)

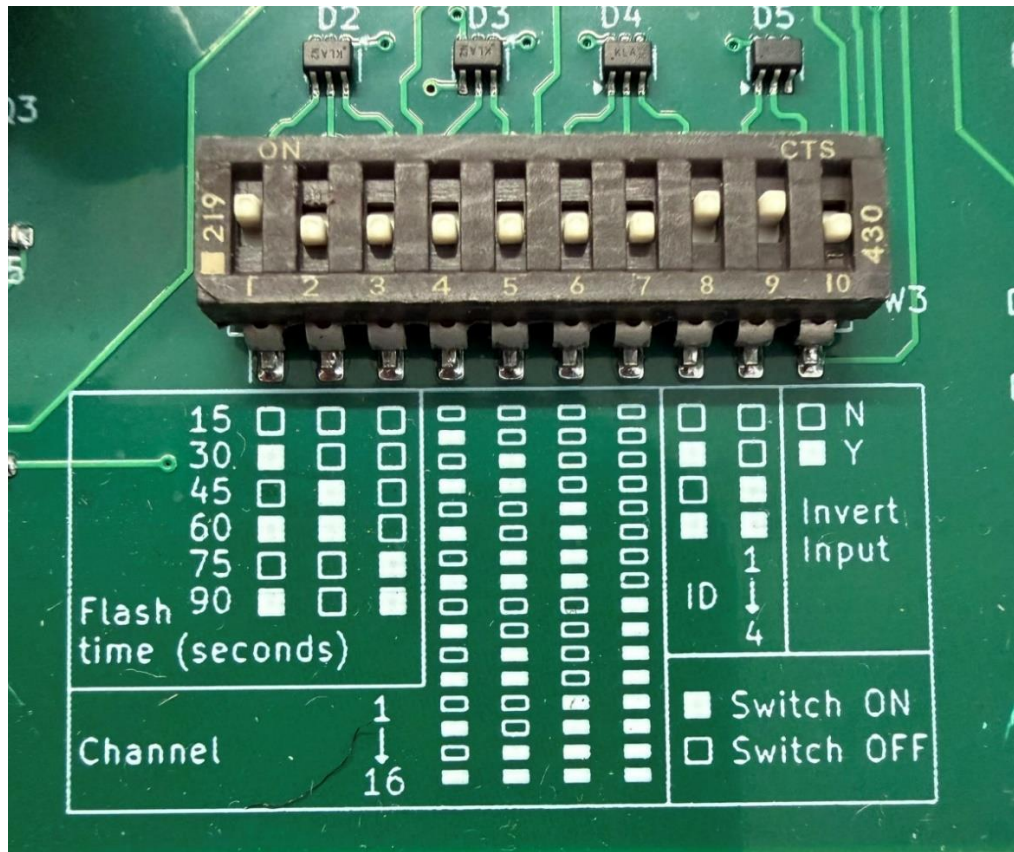
Verify that power switch (SW4) is set to ON.

⚠ Whenever SW3 DIP switch settings are changed or reset, Radio board power switch SW4 must be set to OFF before making the changes and returned to ON after the settings are completed.



5.4.1.2. Radio Board DIP Switch (SW3)

⚠ Whenever SW3 DIP switch settings are changed or reset, Radio board power switch SW4 must be set to OFF before making the changes and returned to ON after the settings are completed.



- **Switches 1–3 (Flash Time – Seconds):** Default from factory, flashing duration is set to **30 seconds**:
 - 1 – **UP**
 - 2 – **DOWN**
 - 3 – **DOWN**
- **Switches 4–7 (Channel Selection):** Set to select the RF communication channel.
 - All Controllers communicating within the same system must be set to the **same** RF channel.
 - Available channels: **16**.
 - Default from factory, Channel is set to 1. All switches set to DOWN.
- **Switches 8–9 (Controller ID):** Switches define the Controller ID within the same system.
 - All Controllers communicating within the same system must be set to **different** Controller IDs.
 - Available Controller IDs: **4**.
 - Default from factory, Controller #1 is set to ID#1. All switches set to DOWN.
 - Default from factory, Controller #2 is set to ID#4. All switches set to UP.
- **Switch 10 (Invert Input):** Do not adjust this switch. Set to **DOWN/OFF (N)**, factory default.

CONTROLLER #1 – SW3 DIP SWITCH (FACTORY DEFAULT SETTINGS)

Switch Position	SW3-1	SW3-2	SW3-3	SW3-4	SW3-5	SW3-6	SW3-7	SW3-8	SW3-9	SW3-10
UP										
DOWN										

CONTROLLER #2 – SW3 DIP SWITCH (FACTORY DEFAULT SETTINGS)

Switch Position	SW3-1	SW3-2	SW3-3	SW3-4	SW3-5	SW3-6	SW3-7	SW3-8	SW3-9	SW3-10
UP										
DOWN										

6. System Start-Up and Functional Verification

Perform system start-up and functional verification only after all mechanical and electrical installation is complete.

6.1 Pre-Start-Up Inspection

Before applying power, verify that:

- All electrical connections are complete and secure.
- Both RRFB Assemblies, including their RRFB Beacon(s), AC Controllers, and pedestrian activation device(s), are securely installed and connected.
- Wiring and connectors are free from visible damage or loose connections.
- Controller Enclosures and electrical covers are properly closed and secured.



WARNING:

Do not energize the system until installation and inspection are complete.

6.2 Functional Verification

1. Apply power to both AC Controllers and allow the system to complete its start-up sequence.
2. Verify that no fault or abnormal indication is present.
3. Activate the system using each installed pedestrian activation method.
4. Verify that the RRFB Beacons in both RRFB Assemblies activate simultaneously.
5. Verify that the LEFT and RIGHT Front LEDs operate correctly.
6. For Beacons equipped with a Confirmation LED, verify that it flashes with the adjacent Front LED.
7. For the TS-60D-AC Double-Sided RRFB System, verify that both Beacons in each RRFB Assembly operate correctly.
8. Verify that the RRFB Beacons in both RRFB Assemblies remain synchronized throughout the activation cycle.
9. Verify that the system completes the required flashing sequence and returns to standby after the activation cycle.

If the system does not operate correctly, correct the condition before placing it into service.

6.3 Final Verification

Before placing the system into service, verify that:

- All pedestrian activation methods operate correctly.
- The RRFB Beacons in both RRFB Assemblies operate correctly and remain synchronized.
- The required flashing sequence operates correctly.
- No fault or abnormal indication is present.
- Controller Enclosures and all associated components are securely mounted and closed.

Correct any abnormal condition identified during functional verification before placing the system into service.

7. System Operation and Maintenance

7.1 Normal Operation

During normal operation, the TS60-RRFB System remains in standby until activated by a pedestrian activation device.

When activated, the RRFB Beacons in both RRFB Assemblies operate simultaneously and remain synchronized through the wireless communication link between the two AC Controllers. The Beacons operate for the programmed activation period and then return to standby.

7.2 Preventive Maintenance

Periodically inspect the system to ensure reliable operation.

- Inspect RRFB Beacons, Controller Enclosures, mounting hardware, and support connections for damage, corrosion, or looseness.
- Inspect accessible wiring, cables, and connectors for damage or loose connections.
- Verify that pedestrian activation devices are securely mounted and operate correctly.
- Inspect Controller Enclosures for damage, proper closure, or signs of water ingress.
- Clean components as necessary to remove dirt or debris that may affect operation.
- Correct any abnormal condition before returning the system to service.

8. Replacement Components

8.1 Replacement Components and Repair

Replacement or repair shall be performed only after the cause of the problem has been identified and, when required, confirmed by Traffic Safety Corporation technical support.

Depending on the diagnosis, approved components may be replaced or repaired in the field. Equipment that cannot be serviced in the field shall be returned to Traffic Safety Corporation for evaluation and repair.

Replacement components may include:

- RRFB Beacon Components
 - Front LED assembly
 - Confirmation LED assembly, where applicable
 - Other approved Beacon components
- AC Controller Components
 - Approved internal electrical or electronic components
 - Complete AC Controller, when required
- Pedestrian Activation Components
 - Push Button
 - Sensor Bollard
- Other Traffic Safety Corporation-approved replacement components, as applicable.

Use only Traffic Safety Corporation-approved replacement components. Do not modify, substitute, or repair components without appropriate technical authorization.

Contact Traffic Safety Corporation for technical support and return instructions when a component or assembly must be returned for evaluation or repair.



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