FEDERAL SIGNAL
Safety and Security Systems

FireRay®
Warning Lights

Installation and Service Instructions

Limited Warranty

This product is subject to and covered by a limited warranty, a copy of which can be found at www.fedsig.com/SSG-Warranty. A copy of this limited warranty can also be obtained by written request to Federal Signal Corporation, 2645 Federal Signal Drive, University Park, IL 60484, email to info@fedsig.com or call +1 708-534-3400.

This limited warranty is in lieu of all other warranties, express or implied, contractual or statutory, including, but not limited to the warranty of merchantability, warranty of fitness for a particular purpose and any warranty against failure of its essential purpose.

FEDERAL SIGNAL
Safety and Security Systems

2645 Federal Signal Drive
University Park, Illinois 60484

www.fedsig.com

Customer Support
Police/Fire-EMS: 800-264-3578 • +1 708 534-3400
Work Truck: 800-824-0254 • +1 708 534-3400

Technical Support   800-433-9132 • +1 708 534-3400

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Federal Signal *www.fedsig.com*

Safety Message to Installers of Warning Light Equipment

⚠ WARNING

People's lives depend on your proper installation and servicing of Federal Signal products. It is important to read and follow all instructions shipped with this product and the original product. Listed below are some other important safety instructions and precautions you should follow:

- To properly install this light, you must have a good understanding of automotive electrical procedures and systems, along with proficiency in the installation and use of safety warning equipment.

- DO NOT install equipment or route wiring or cord in the deployment path of an airbag.

- If a vehicle seat is temporarily removed, verify with the vehicle manufacturer if the seat needs to be recalibrated for proper airbag deployment.

- When drilling into a vehicle structure, ensure that both sides of the surface are clear of anything that could be damaged.

- Locate the light control so the VEHICLE and CONTROL can be operated safely under all driving conditions.

- Do not attempt to activate or deactivate the light control while driving in a hazardous situation.

- This product contains high-intensity LED devices. To prevent eye damage, DO NOT stare into the light beam at a close range.

- Frequently inspect the light to ensure that it is operating properly and is attached securely to the vehicle.

- File these instructions in a safe place and refer to them when maintaining and/or reinstalling the product.

Failure to follow all safety precautions and instructions may result in property damage, serious injury, or death.

RETAIN AND REFER TO THESE MESSAGES

Overview

The Federal Signal FireRay® Warning Light is a self-contained, high-intensity, LED light designed for mounting to the exterior of a vehicle. All models are available in a variety of colors and have an internal flasher. The internal flasher has 13 selectable flash patterns. All units are designed to work with Federal Signal flashers. However, before they can operate with a Federal Signal flasher, put internal flashers into a steady pattern. Refer to the particular flasher instructions for proper wiring. Additionally, all single- and dual-color units have a Dim Mode (low power) that allows the user to reduce the light brightness for nighttime use. FireRay warning lights are designed for operation on 12 Vdc.

NOTE: All units should NOT be considered for steady burn applications.

Unpacking the Kit

After unpacking the light, inspect it for damage that may have occurred in transit. If it has been damaged, do not attempt to install or operate it. File a claim immediately with the carrier, stating the extent of the damage. Carefully check all envelopes, shipping labels, and tags before removing or destroying them. Ensure that the parts listed in Table 1 are included in the package. If you are missing any parts, contact Customer Support at 1-800-264-3578, 7 a.m. to 5 p.m., Monday through Friday (CT).

Table 1 Kit contents

| Qty.	Description	Part No.
2	#8 x 1 inch Stainless Steel Screw	7011242-16
2	Plastic Screw Grommet	7065073

Installing the Light

⚠ WARNING

AIRBAG DEPLOYMENT: Do not install equipment or route wiring in the deployment path of an airbag. Failure to observe this warning will reduce the effectiveness of the airbag or potentially dislodge the equipment, causing serious injury or death.

NOTE: For maximum coverage and effectiveness, mount the light assembly in a horizontal orientation. See Figures 1 and 2.
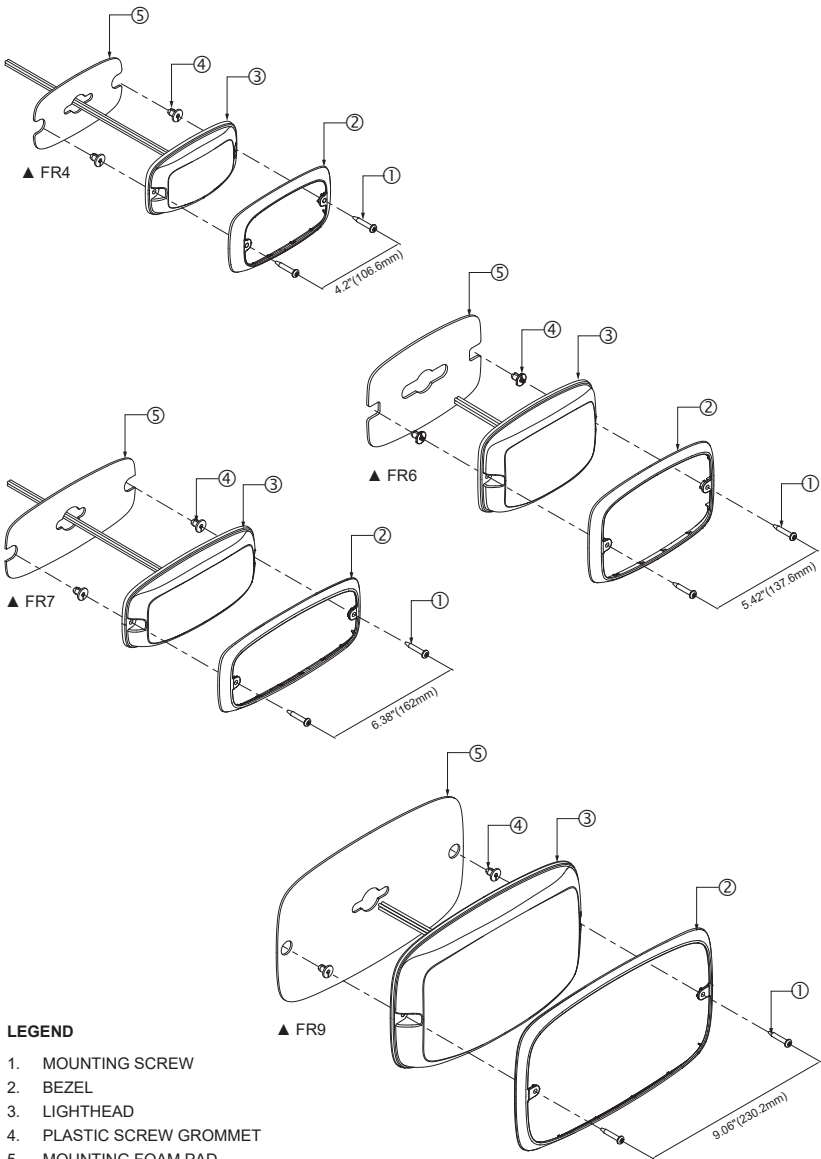
Figure 1 Surface mount without flange bezel
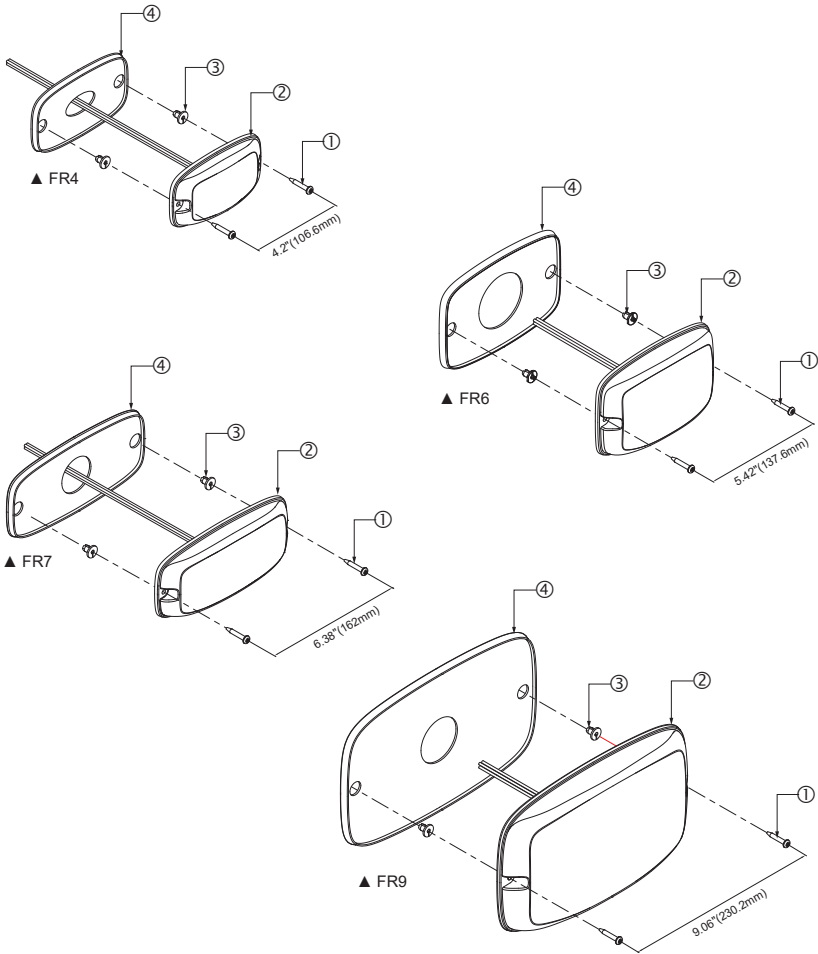
LEGEND

1.   MOUNTING SCREW
2.   LIGHTHEAD
3.   PLASTIC SCREW GROMMET
4.   RUBBER MOUNTING PAD

Figure 2 Surface mount with flange bezel

▲ FR4

▲ FR6

▲ FR7

▲ FR9

4.2"(106.6mm)

5.42"(137.6mm)

6.38"(162mm)

9.06"(230.2mm)

LEGEND

1. MOUNTING SCREW
2. BEZEL
3. LIGHTHEAD
4. PLASTIC SCREW GROMMET
5. MOUNTING FOAM PAD

Installing the Light

Before proceeding with the installation, determine the approximate location of the light assembly and plan all cable/wire routing.

To install the FireRay®:

1. Position the FireRay warning light assembly on the desired mounting surface. Ensure that the unit is level side to side. Using the dimensions provided in Figures 3 and 4, scribe the two mounting hole locations and a wire routing hole location on the mounting surface.

Figure 3 FR 4 and 6 mounting hole locations (not to scale)

FR4

4.197"

2.098"

Ø0.25" Ø1" Ø0.25"

FR6

5.417"

2.709"

Ø0.25" Ø1" Ø0.25"
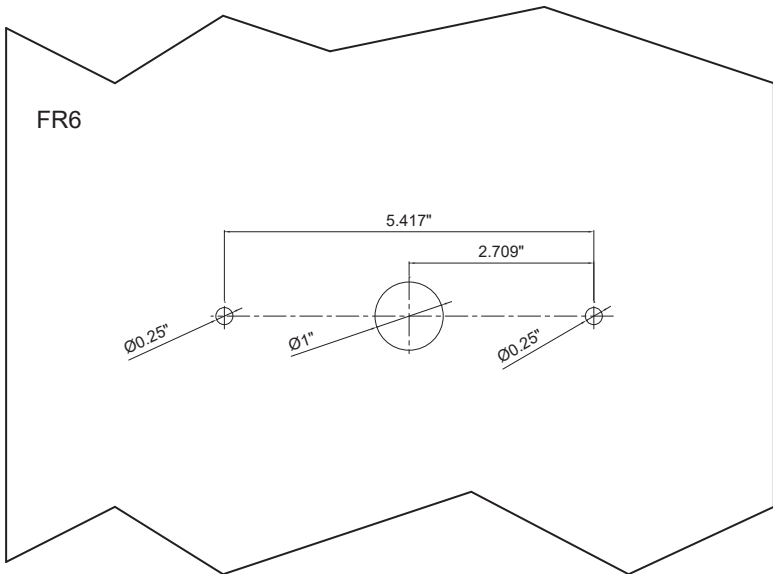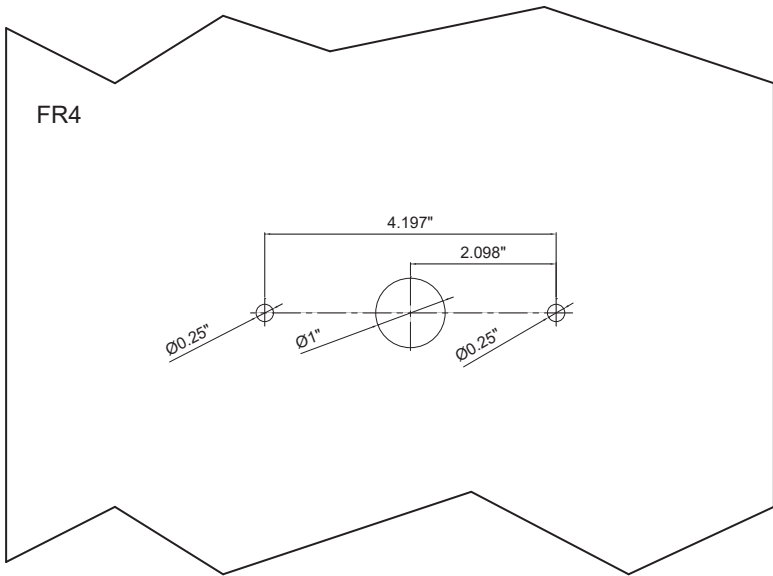
Figure 4 FR 7 and 9 mounting hole locations (not to scale)

FR7

6.375"

3.19"

Ø0.25"

Ø1"

Ø0.25"

FR9

9.06"

4.53"

Ø0.25"

Ø1"

Ø0.25"
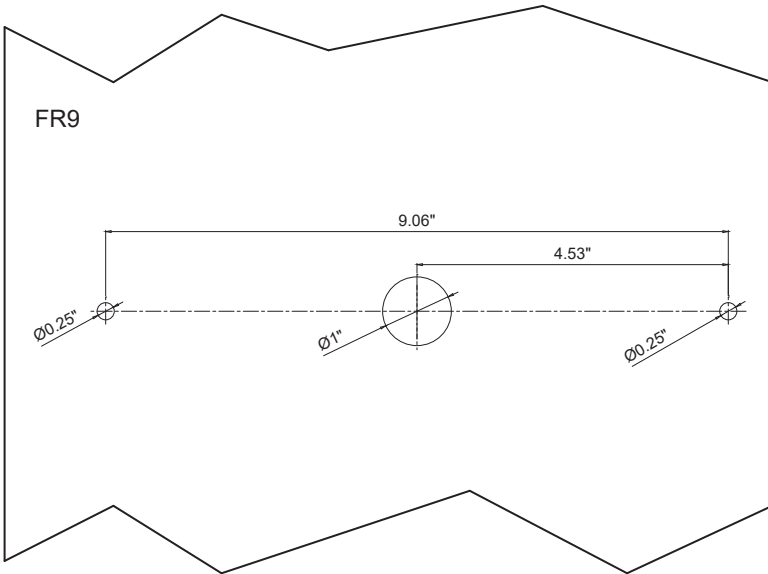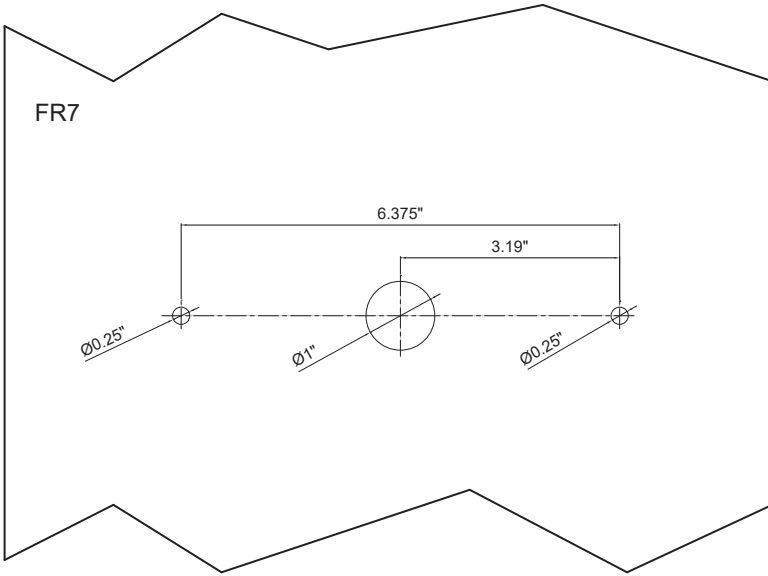
NOTICE

DAMAGE TO LIGHT: When installing the FireRay® light on a vehicle, you MUST use the manufacturer's supplied mounting gasket, screws, and screw grommets. Do not use an impact drill or an electric screw gun when installing the light. Torque the mounting screws to the manufacturer's recommended specification of 7.8-11.3 in-lb. Failure to observe these precautions may damage the light and void any warranty claims for the light.

NOTICE

DRILLING PRECAUTION: When drilling holes, check the area you are drilling into to ensure that you do not damage vehicle components. All drilled holes should be deburred, and all sharp edges should be smoothed. All wire routings going through drilled holes should be protected by a grommet or convolute/split loom tubing.

2. Drill two 1/4-inch mounting holes and a 1-inch wire routing hole at the previously scribed locations.

3. Install the two supplied plastic screw grommets into the two 1/4-inch mounting holes.

NOTE: When removing the FireRay warning lights, inspect the mounting grommets for wear and replace them as needed.

4. The FireRay warning light assembly has long lead wires that exit the back of the unit for making electrical connections.

    • Four wires for single-color

    • Five wires for dual-color

5. Complete the electrical connections as described in the Electrical Connections section.

6. Align the FireRay warning light assembly with the previously inserted plastic screw grommets and secure it with the provided screws. See Figures 1 and 2.

NOTE: FireRay models have identifiable color-coded sticker dots located on the back of the light assembly. The color-coded sticker dots correspond to the LED color on the PC board. Note these dots prior to any final assembly mounting to obtain proper light assembly orientation.

Single-Color
Electrical Connections

The FireRay₀ warning light assembly operates on 12 Vdc. Four long lead wires are supplied for making electrical connections to the FireRay warning light assembly. Ensure that all wires are properly connected and insulated appropriately.

To make electrical connections:

1. Using 20-gauge (minimum) wire, connect the red (+) lead to the positive power source terminal and the black (-) lead to the negative power source terminal.

2. Using the white wire (low power, dimming) is connected to a +12 V power source. Removing the power restores the unit to full power.

3. Energize the supply circuit and test the FireRay warning light assembly for proper operation.

Operation
Wiring

To +Vdc.. RED
(Suggested Fuse Rating: FR4 at 2 A / FR6 at 4 A / FR7 at 3 A / FR9 at 5 A)

To -Chassis Ground... BLACK

Low Power (Single color)... WHITE

For Synchronization, Flash Pattern & Setting ....YELLOW
Connect the yellow wires of all light heads together for synchronization. All light heads should be set to the same pattern.

NOTES:

•   If synching only FRxx1-x models: Up to 20 FireRay light heads can be synchronized on one flasher.

•   If combining the FRxx1-x with other models: Up to eight single-color FireRay and dual-color FireRay light heads can be synchronized on one flasher.

Synchronization of Lights with White Light Cutoff

When a complete synchronized circuit requires one or more light heads to be cut off independently, create a separate synchronized circuit for these light heads.

For example, when synchronizing a set of red lights with a set of white lights, have the white set powered by a flasher unit in controller and follower mode on a dedicated circuit. Then have the red set powered by a different flasher unit in controller and follower mode on a different separate circuit. This will ensure the proper operation of the white light cutoff function.

Flash Pattern Selection

Momentarily apply +Vdc to the YELLOW wire:

• once to the next pattern

• quickly three times to Flash Pattern # 1

NOTE: This unit may not be factory-set at Flash Pattern #1.

Flash Mode

Each unit may be set to one of the four different Flash Modes.

i. Top-Down Split-Flash (default for FR6/ FR9 split color)	**ii. Criss-Cross Split Flash**	**iii. Left-Right Split Flash (default for FR4/ FR7 split color)**	**iv. Simultaneous (all) Flash (default for all single color)**

*Illustration shows the LED area only, not the actual number of diodes.

Table 2 Flash Patterns

1*	DoubleFlash 150 (default)	8	VariFlash
2*	FedPulse 75	9	SteadyPulse 75
3*	DoubleFlash 75	10	Random
4*	QuadFlash 75	11	3 Flashes Steady
5	SingleFlash 375	12**	Steady Break
6*	SingleFlash 150	13	Top Steady/Bottom 110 FPM
7*	SingleFlash 75		

*Indicates NFPA lower compliance.
**Indicates compatible with Pathfinder® siren, only applicable to Color Mode 1 and Color Mode 2.

1. Enter SETTING MODE by applying +Vdc to the RED wire and then applying +Vdc to the YELLOW wire for over 3 seconds.

2. Once in SETTING MODE, the unit will steady-burn in low power and pulse in high power in its Flash Mode.

3. Momentarily apply +Vdc to the WHITE wire to change to the next Flash Mode:

    i. Top-Down Split Flash

    ii. Criss-Cross Split Flash

    iii. Left-Right Split Flash

    iv. Simultaneous (all) Flash

Multi-Unit Synchronization

Each unit may be set to one of three different groups - ①CONTROLLER (default), ②FOLLOWER-SYNC, and ③FOLLOWER-ALT. If synchronized flashing is not required, select the desired flash pattern.

For synchronized flashing, only one unit should be set to the ①CONTROLLER group, while all other units must be set to ②FOLLOWER-SYNC or ③FOLLOWER-ALT group:

1. Enter SETTING MODE by applying +Vdc to the RED wire and then applying +Vdc to the YELLOW wire for over 3 seconds.

2. Once in SETTING MODE, the unit will steady-burn in low power and pulse in high power in:

   • Single pulse = ①CONTROLLER (default)

   • Double pulse = ②FOLLOWER-SYNC

   • Triple pulse = ③FOLLOWER-ALT

3. Remove the YELLOW wire from +Vdc and then momentarily apply it to +Vdc to change to the next Group:

   • ②FOLLOWER-SYNC units flash simultaneously with the ①CONTROLLER unit.

   • ③FOLLOWER-ALT units flash alternately with the ①CONTROLLER unit and all other ②FOLLOWER-SYNC units.

4. Once in the desired group, exit SETTING MODE by applying +Vdc to the YELLOW wire for over 3 seconds or disconnecting all power.

NOTE: If no CONTROLLER unit is present, all FOLLOWER units flash initially and steady burn for 2 seconds to detect any synchronization signal. The installer/user may also use this to easily pick out FOLLOWER vs. CONTROLLER units.

Dual-Color
Electrical Connections

The FireRay® warning light assembly operates on 12 Vdc. Five long lead wires are supplied for making electrical connections to the FireRay warning light assembly. Ensure that all wires are properly connected and insulated appropriately.

To make electrical connections:

1. Using 20-gauge (minimum) wire, connect the red (+) or green (+) lead to the positive power source terminal and the black (-) lead to the negative power source terminal.

2. Using the white wire (low power, dimming), connect to the +12 V power source. Removing the power restores the unit to full power.

3. Energize the supply circuit and test the FireRay warning light assembly for proper operation.

Operation
Wiring

To +Vdc activates Memory 1 .... RED
Default Color Mode - Color 1 (Suggested Fuse Rating: FR6C2 at 4 A,
FR7C2 at 4 A, FR9C2 at 5 A)
The Memory 2 function takes precedence over the Memory 1 function.

To +Vdc activates Memory 2 ....GREEN
Default Color Mode - Color 2 (Suggested Fuse Rating: FR6C2 at 4 A,
FR7C2 at 4 A, FR9C2 at 5 A)

To Chassis Ground.. BLACK

Low Power & Flash Mode .... WHITE

For Synchronization, Flash Pattern & Color Mode ....YELLOW
Connect the YELLOW wires of all light heads together for synchronization.
All light heads must be set at the same pattern.

Flash Pattern Selection

Each unit has two Memory Modes (Memory 1 & Memory 2). To configure:

1. Activate Memory 1 or Memory 2 by applying +Vdc to the RED or
    GREEN wire, respectively.

2. Momentarily apply +Vdc to the YELLOW wire:

    •   once to the next pattern

    •   quickly three times to Flash Pattern #1

Color Mode Setting

To configure:

1. Activate Memory 1 or Memory 2 by applying +Vdc to the RED or
    GREEN wire, respectively.

2. Apply +Vdc to the YELLOW wire for over 3 seconds to enter COLOR
    MODE SELECTION.

3. Once in COLOR MODE SELECTION, the light will cut off and pulse in
    high power in its current Color Mode.

4. Momentarily apply +Vdc to the YELLOW wire once to the next Color Mode:

   • Color Mode 1 = Color 1

   • Color Mode 2 = Color 2

   • Color Mode 3 = Color 1 alternate Color 2

5. Once in desired Color Mode, save and exit SETTING MODE by applying +Vdc to the YELLOW wire for over 3 seconds or disconnecting all power.

| **i. Simultaneous (all) Flash (default for all dual-color)** | **ii. Top-Down Split Flash** | **iii. Criss-Cross Split Flash** | **iv. Left-Right Split Flash** |

*Illustration shows the LED area only, not the actual number of diodes.

Table 3 Flash Patterns

1*	DoubleFlash 150 (default)	8	VariFlash
2*	FedPulse 75	9	SteadyPulse 75
3*	DoubleFlash 75	10	Random
4*	QuadFlash 75	11	3 Flashes Steady
5	SingleFlash 375	12**	Steady Break
6*	SingleFlash 150	13	Top Steady/Bottom 110 FPM
7*	SingleFlash 75		

*Indicates NFPA lower compliance.
**Indicates compatible with Pathfinder₍ₑ₎ siren, only applicable to Color Mode 1 and Color Mode 2

1. Activate Memory 1 or Memory 2 by applying +Vdc to the RED or GREEN wire, respectively.

2. Apply +Vdc to the YELLOW wire for over 3 seconds to enter FLASH MODE SELECTION.

3. Once in FLASH MODE SELECTION, the light will cut off and pulse in high power in its current Flash Mode.

4. Momentarily apply +Vdc to the WHITE wire once to the next Flash Mode:

   i. Simultaneous (all) Flash

   ii. Top-Down Split Flash

   iii. Criss-Cross Split Flash

   iv. Left-Right Split Flash

5. Once in the desired Flash Mode, save and exit SETTING MODE by applying +Vdc to the YELLOW wire for over 3 seconds or disconnecting all power.

Multi-Unit Synchronization

Each unit may be set to one of the different groups - ①CONTROLLER (default), ②FOLLOWER-SYNC, and @FOLLOWER-ALT. If synchronized flashing is not required, select the desired flash pattern.

For synchronized flashing, only one unit should be set to the ① CONTROLLER group, while all other units must be set to ②FOLLOWER-SYNC or ③FOLLOWER-ALT group:

1. Enter GROUPING MODE SELECTION by applying +Vdc to RED and GREEN simultaneously and then applying +Vdc to the YELLOW wire for 3 seconds.

2. Once in GROUPING MODE SELECTION, the unit will steady-burn in low-power and pulse in high-power in:

   • Single pulse = ①CONTROLLER (default)

   • Double pulse = ②FOLLOWER-SYNC

   • Triple pulse = ③FOLLOWER-ALT

3. Remove the YELLOW wire from +Vdc and then momentarily apply it to +Vdc to change to the next Group:

   • ②FOLLOWER-SYNC units flash simultaneously with the ①CONTROLLER unit.

- ③FOLLOWER-ALT units flash alternately with the ①CONTROLLER unit and all other ②FOLLOWER-SYNC units.

4. Once in the desired group, exit SETTING MODE by applying +Vdc to the YELLOW wire for over 3 seconds or disconnecting all power.

NOTE: If no CONTROLLER unit is present, all FOLLOWER units flash initially and steady burn for 2 seconds to detect any synchronization signal. The installer/user may also use this to easily pick out FOLLOWER vs. CONTROLLER units.

Safety Message to Operators

⚠ WARNING

Peoples' lives depend on your safe use of our products. Listed below are some important safety instructions and precautions you should follow:

• Although your warning system is operating properly, it may not be completely effective. People may not see or heed your warning signal. You must recognize this fact and continue to drive cautiously.

• Situations may occur that obstruct your warning signal when natural or man-made objects are between your vehicle and others, such as raising your hood or trunk lid. If these situations occur, be especially careful.

• This product contains high-intensity LED devices. To prevent eye damage, DO NOT stare into the light beam at a close range.

• At the start of your shift, ensure that the light is securely attached and operating properly.

Failure to follow these safety precautions may result in property damage, serious injury, or death to you, passengers, or others.

Cleaning the Beacon

⚠ WARNING

CRAZING/CRACKING Crazing (fine cracks) of lenses causes reduced effectiveness of the light. Do not use cleaning agents such as strong detergents, solvents, or petroleum products. If crazing of the lenses does occur, the reliability of light for emergency signaling purposes may be reduced until the lenses are replaced.

NOTICE

CLEANING the POLYCARBONATE LENSES: To extend the life of this device, periodic cleaning is necessary. Clean the lens with a mild, non-abrasive, neutral-pH cleaning agent and a soft, clean cloth. Rinse the device thoroughly to ensure that no cleaning agent residue remains. To avoid water spots, dry the device with a soft clean cloth. Failure to follow this precaution can cause crazing or cracking of the lens/dome and voids the warranty claims for the light.

Scratched or dull reflectors, mirrors, or lenses reduce the effectiveness of the lighting system. Use a mild, non-abrasive, neutral-pH cleaning agent and a soft, clean cloth when cleaning the lighting system. Replace any optical components that may have been scratched or crazed during system installation. The use of strong, non-neutral-pH cleaners voids the warranty.

Getting Technical Support

For technical support, please contact:

Federal Signal Corporation
Phone: 1-800-433-9132
Email: empserviceinfo@fedsig.com

Ordering Replacement Parts

To order replacement parts, call Customer Support at
1-800-264-3578, 7 a.m. to 5 p.m., Monday through Friday (CT), or contact
your nearest distributor.

Table 4 Replacement Parts

Description	Part No.
Stainless Steel, 18-8 Thread Forming Pan Head Screw	7011242-16
Screw Grommet	7065073
FR4 Series Flat Gasket	861502037
FR6 Series Flat Gasket	861502038
FR7 Series Flat Gasket	861502039
FR9 Series Flat Gasket	861502040
FR4 Series Molded Gasket	861502033
FR6 Series Molded Gasket	861502034
FR7 Series Molded Gasket	861502035
FR9 Series Molded Gasket	861502036
FR4 Series Chrome Trim Ring	861502029
FR6 Series Chrome Trim Ring	861502030
FR7 Series Chrome Trim Ring	861502031
FR9 Series Chrome Trim Ring	861502032

Getting Repair Service

The Federal Signal factory provides technical assistance with any problems that cannot be handled locally.

Any units returned to Federal Signal for service, inspection, or repair must be accompanied by a Return Material Authorization (RMA). Obtain an RMA from a Local Distributor or Manufacturer's Representative. Provided a brief explanation of the service requested or the nature of the malfunction.

Address all communications to the following address.

Federal Signal Corporation
Service Department
2645 Federal Signal Drive
University Park IL 60484-3167