FEDERAL SIGNAL
Safety and Security Systems

FireRay® Warning Lights

Installation 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 60484-3167

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

Contents

Tables

Figures

Safety Messages to Installers and Users of Warning Light Equipment

⚠ **WARNING**

People's lives depend on your safe installation of our products. It is important to read, understand and follow all instructions shipped with the products. 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 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.

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

- Do not stare directly into the lights at a close range, or permanent damage to your eyesight may occur.

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

- Refer to the instructions packed with related products for additional precautions and information.

- 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 driving cautiously.

- Also, situations may occur which 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.

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

- 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.

Introduction

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 steady pattern. Refer to the particular flasher instructions for proper wiring. Additionally, all single color units have a Dim Mode (low power) that allows the user to reduce the light brightness for nighttime use. Model FireRay Warning Lights are designed for operation on 12 Vdc. The FireRay split color models can have one side switched off while the opposite side continues to operate.

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

Unpacking the Kit

After unpacking the kit, 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 damage. Carefully check all envelopes, shipping labels, and tags before removing or destroying them. Ensure that the parts in the Kit Contents list 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 Number
2	#8x1-inch Stainless Steel Screw	7011242-16
2	Plastic Screw Grommet	7065073

Installing the FireRay

⚠ 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.
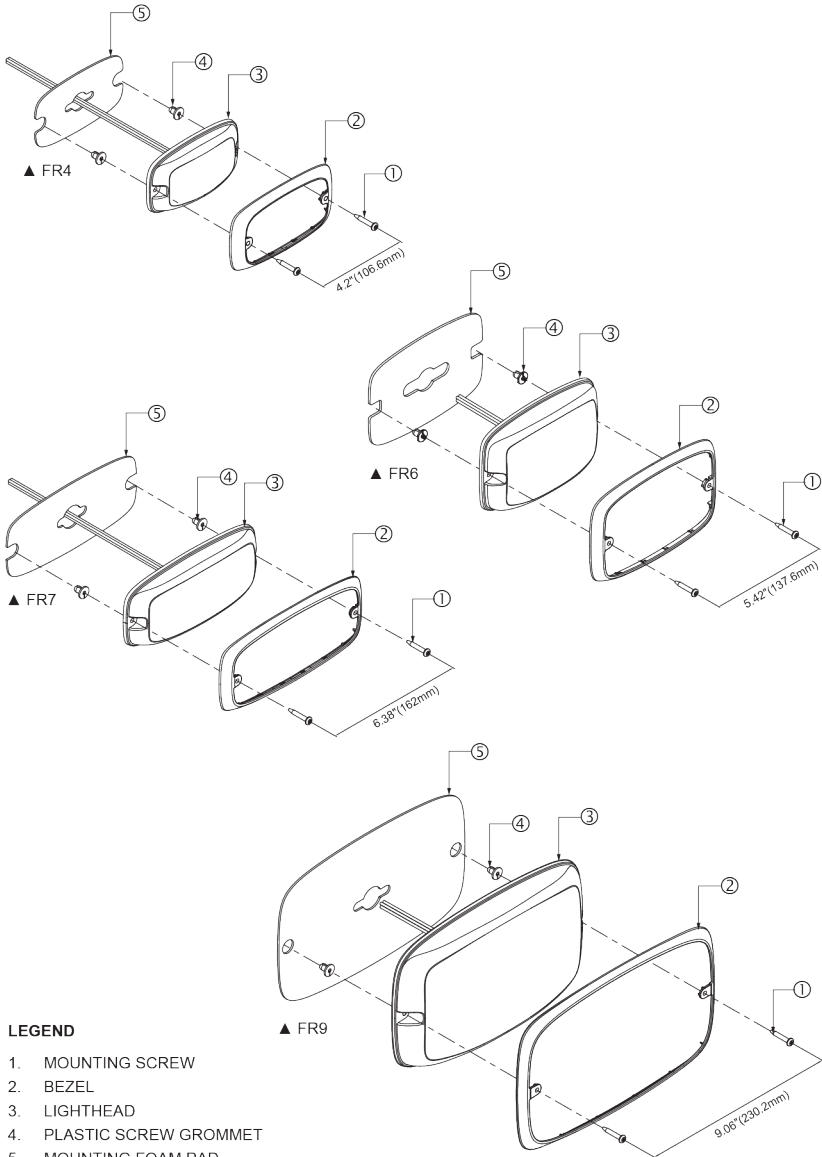
Figure 1 Exploded view without bezel
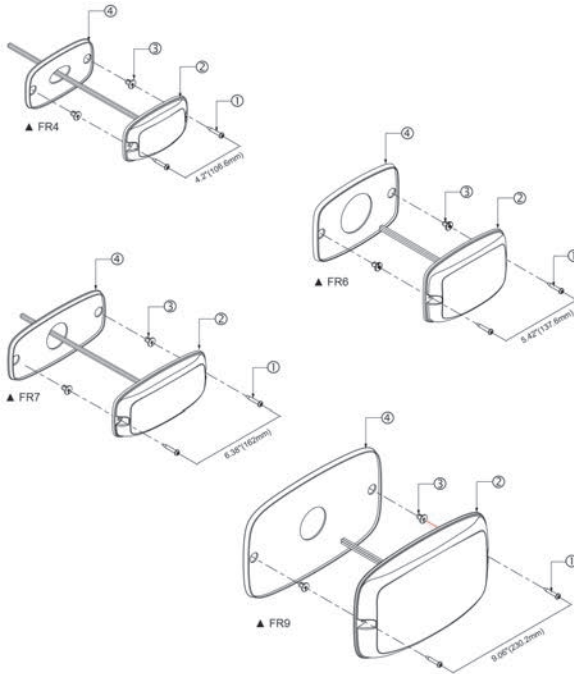
LEGEND

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

Figure 2 Exploded view with bezel

LEGEND

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

▲ FR4 4.2"(106.6mm)

▲ FR6 5.42"(137.6mm)

▲ FR7 6.38"(162mm)

▲ FR9 9.06"(230.2mm)

Before proceeding with 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 wiring routing hole location on the mounting surface.

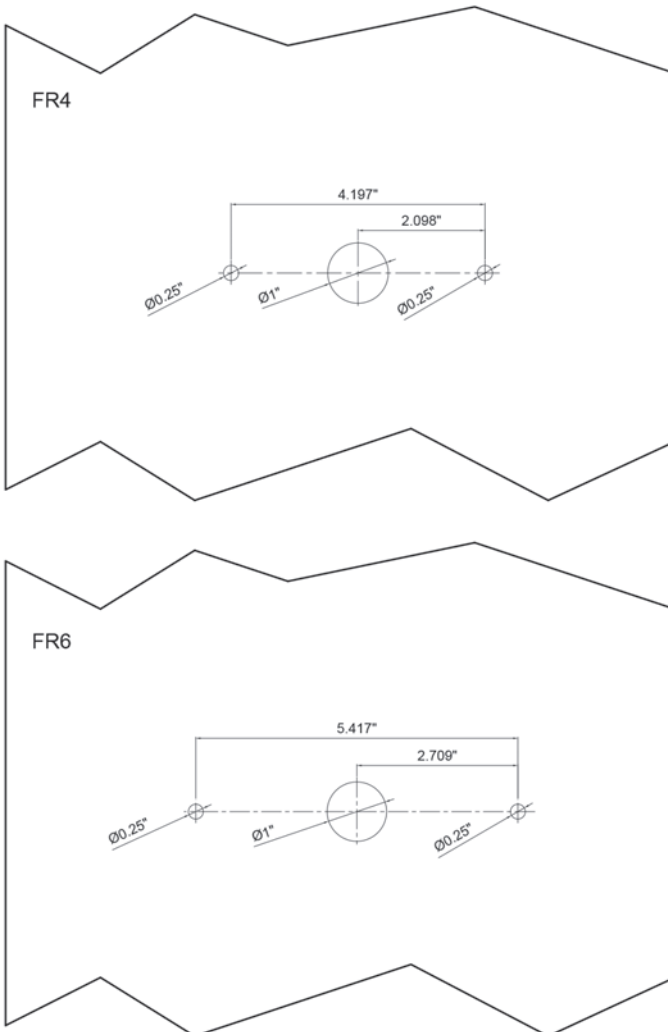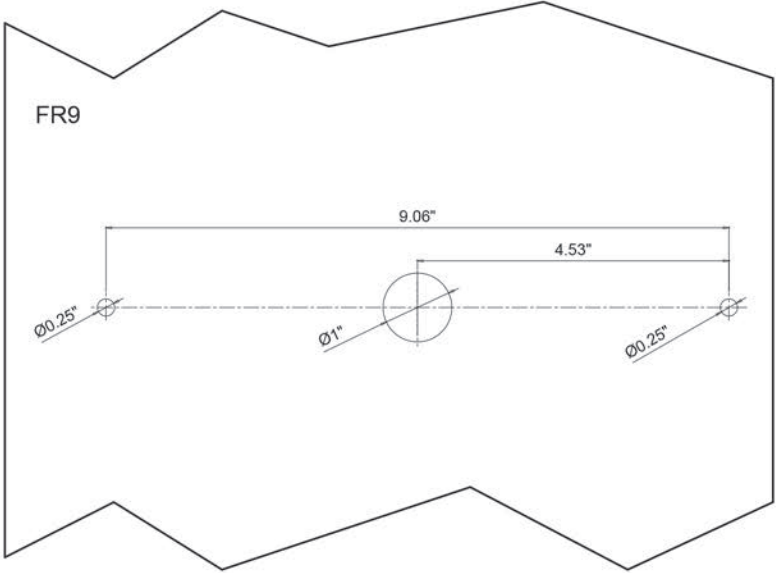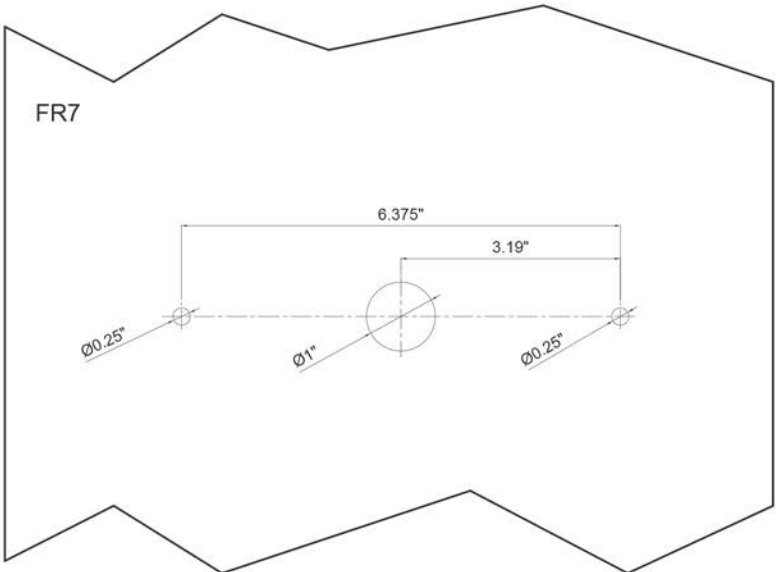**Figure 3 Mounting hole locations - FR4 and FR6**

Figure 4 Mounting hole locations - FR7 and FR9

NOTICE

MOUNTING PRECAUTIONS: To avoid damage to the light, when installing the FireRay 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.

NOTICE

DRILLING PRECAUTIONS: When drilling holes, check the area you are drilling into to ensure that you do not damage vehicle components while drilling. All drilled holes should be de-burred, 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.
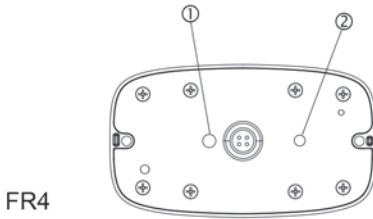
2. Drill two 1/4-inch mounting holes and a 1-inch wire routing hole at the previously scribed locations.

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 four long lead wires, which exit out the back of the unit, for making electrical connections.

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 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.

Figure 5 FR4 and FR6 bases

LEGEND

1. VENT HOLE
2. 0.2" COLOR CODED STICKER DOTS TO BE APPLIED TO IDENTIFY THECORRESPONDING PC BOARD ASSEMBLY LED COLOR ON EACH SIDE.
3. BOTTOM VIEW - MOUNTING Foam REMOVED FOR CLARITY

LÉGENDE

1. TROU D'ÉVENT
2. APPLIQUER DES ÉTIQUETTES EN FORME DE POINTS CODÉSCOUL EURS DE 0.2 PO POUR IDENTI- FIER LES DÉL DE COULEUR DE LACARTE DE CIRCUIT CORRESPON- DANTE SUR CHAQUE CÔTÉ.
3. VUE DU DESSOUS – JOINT D'ÉTAN- CHÉITÉ DE MONTAGE ENLEVÉ POURPLUS DE CLARTÉ

LEYENDA

1. ORIFICIO DE VENTILACION
2. LOS AUTOADHESIVOS EN FORMA DE PUNTOS CODIFICADOS POR COLRESDE 0.2 PULG. SE APLICARAN PARAIDENTIFICAR EL COLOR DEL LEDCORRESPONDIENTE EN EL TABLERODE CIRCUITO IMPRESO EN CADALADO.
3. VISTA INFERIOR – EMPAQUETAD- RA DE MONTAJE RETIRADA PARAMAYOR CLARIDAD

Figure 6 FR7 and FR9 bases

LEGEND

1. VENT HOLE
2. 0.2" COLOR CODED STICKER DOTS TO BE APPLIED TO IDENTIFY THECORRESPONDING PC BOARD ASSEMBLY LED COLOR ON EACH SIDE.
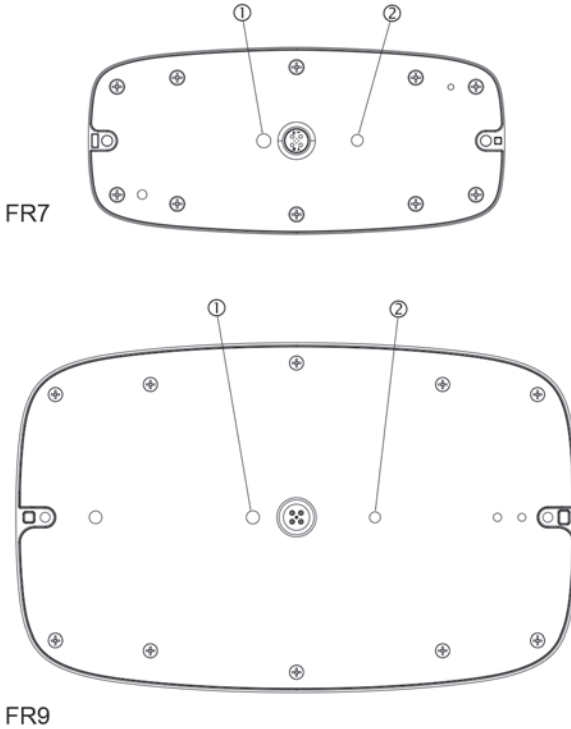3. BOTTOM VIEW - MOUNTING Foam REMOVED FOR CLARITY

LÉGENDE

1. TROU D'ÉVENT
2. APPLIQUER DES ÉTIQUETTES EN FORME DE POINTS CODÉSCOUL EURS DE 0.2 PO POUR IDENTI-FIER LES DÉL DE COULEUR DE LACARTE DE CIRCUIT CORRESPON-DANTE SUR CHAQUE CÔTÉ.
3. VUE DU DESSOUS – JOINT D'ÉTAN-CHÉITÉ DE MONTAGE ENLEVÉ POURPLUS DE CLARTÉ

LEYENDA

1. ORIFICIO DE VENTILACION
2. LOS AUTOADHESIVOS EN FORMA DE PUNTOS CODIFICADOS POR COLRESDE 0.2 PULG. SE APLICARAN PARAIDENTIFICAR EL COLOR DEL LEDCORRESPONDIENTE EN EL TABLERODE CIRCUITO IMPRESO EN CADALADO.
3. VISTA INFERIOR – EMPAQUETAD-RA DE MONTAJE RETIRADA PARAMAYOR CLARIDAD

The FireRay warning light assembly has four long lead wires, For split color version, looking are the back of the unit with the vent

hole on your left, all LEDs are controlled with the red wire. See Figures 5 and 6. The LEDs in the second color position (FR6/FR9: Lower Row; FR7/FR4: Left Row) are turned off by the white wire. If the light has one side the red LEDs and the other a different color (e.g., amber, blue, white, green, or red), the red wire controls both sides and the white wire cuts off the second color side.

Electrical Connections

The FireRay 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.

Operation

WIRING:

* Red: To +VDC
  Suggested Fuse Rating: FR4@2A / FR6@4A / FR7@3A / FR9@5A

* Black: To -Chassis Ground

* White: Low Power (Single color) /2nd Color Cut-off (Split color)

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

Up to eight FireRay lights can be synchronized together 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 master and slave mode on a dedicated circuit, and then have the red set powered by a different flasher unit in master and slave mode on a different separate circuit. This will ensure proper operation of white light cutoff function.

Flash Pattern Selection

For Flash Pattern, momentarily apply +VDC to the yellow wire:

- Once to next pattern

- Three times quickly to Flash Pattern #1

NOTE: This unit may not be factory set at Flash Pattern #1.
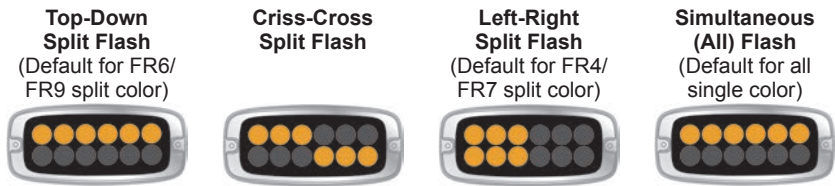
Figure 7 Flash mode

Top-Down Split Flash (Default for FR6/ FR9 split color)	Criss-Cross Split Flash	Left-Right Split Flash (Default for FR4/ FR7 split color)	Simultaneous (All) Flash (Default for all single color)

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

Table 1 Flash Patterns

#	Pattern	#	Pattern
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

NOTES: When using an external flasher:

- Only use FS 16-Channel Flasher (Model 650302).

- When synchronizing over (8) FireRay lights use the FS 16-Channel Flasher set to flash pattern #3 (75 FPM-Alternating C1 and C2) with the recommended patterns:

    - #2 FedPulse 75

    - #3 DoubleFlash 75

- #4 QuadFlash 75

- #7 SingleFlash 75

- #9 SteadyPulse 75

- #11 (3) Flashes Steady

To set the flash mode:

1. To enter Setting Mode, apply +VDC to the red wires and then apply +VDC to the yellow wire for four seconds or longer.

2. Once in Setting Mode, the unit steady burns in low power and pulses in high power in its Flash Mode.

3. Momentarily apply +VDC to the white wire to change to the next Flash Mode:

    - Top-Down Split Flash

    - Criss-Cross Split Flash

    - Left-Right Split Flash

    - Simultaneous (all) Flash

4. Once in desired Flash Mode, save and exit Setting Mode by applying +VDC to the yellow wire for four seconds or longer or by disconnecting all power.

Multi-Unit Synchronization

Set each unit to one of the three different groups: Master (default), Slave-Sync, and Slave-Alt.

If synchronized flashing is not required, select the desired flash pattern.

For synchronized flashing, set only one unit to the Master group, and set all other units to Slave-Sync or Slave-Alt.

1. To enter Setting Mode, apply +VDC to the red wires and then apply +VDC to the yellow wire for four seconds or longer.

2. Once in Setting Mode, the unit steady burns in low power and pulses in high power in:

   - Single pulse = Master (default)

   - Double pulse = Slave-Sync

   - Triple pulse = Slave-Alt

3. Remove the yellow wire from +VDC and then momentarily apply it to +VDC to change to the next group.

   - Slave-Sync units flash simultaneously with the Master unit.

   - Slave-Alt units flash alternately with the Master unit and all other Slave-Sync units.

4. Once in the desired group, exit Setting Mode by applying +VDC to the yellow wire for four seconds or longer or by disconnecting all power.

NOTE: If no Master units are present, all Slave units flash initially and steady burn for two seconds to detect any synchronization signal. You may also use this to pick out Slave vs. Master units.

Up to eight FireRay lights can be synchronized together on one flasher.

Synchronization of Lights With White Light Cut-off

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 master and slave mode on a dedicated circuit. Then have the red set powered by a different flasher unit in master and slave mode on a different separate circuit. This will ensure proper operation of white light cut-off function.

Maintaining the FireRay

⚠ WARNING

CRAZING HAZARD: Crazed, cracked, or faded domes or reflectors reduce the light output and the effectiveness of the lighting system. Tops or reflectors showing this type of aging must be replaced. Failure to follow this warning may result in bodily injury or death to you or others.

⚠ WARNING

CLEANING SOLUTION WARNING: The use of cleaning solutions, such as strong detergents, solvents, and petroleum products, can cause crazing (cracking) of the domes and reflectors. Failure to follow this warning can damage the domes and reflectors and may result in bodily injury or death to you or others.

Scratched or dull reflector, mirrors or lenses reduces 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.

Replacement Parts

Table 2 Replacement Parts

Description	Part Number
Mounting Screws	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 Technical Support

For technical support, please contact:
Federal Signal Corporation
Phone: 1-800-443-9132
Email: empserviceinfo@fedsig.com

Getting Repair Service

The Federal Signal factory provides technical assistance with

Any units returned to 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

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

All product names or trademarks are properties of their respective owners.