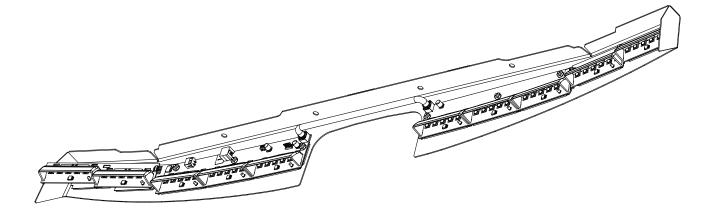


Spectralux Rear ILS Light Bar



Installation, Maintenance, and Service Manual

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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.



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Table of Contents

Safety Message to Installers and Service Personnel of Warning Light Equipment	5
Introduction	7
Unpacking the ILS	7
Wiring the Rear ILS in the Vehicle	7
SignalMaster Option	8
Lightbar Controls	
Typical Installations with Common Control Systems	9
Selecting Configuration Options	9
Safety Message to Operators of Warning Light Equipment	11
Testing the Lightbar	12
Maintaining the Rear ILS	12
Cleaning the Shrouds	
Cleaning the Reflectors	
Servicing the Rear ILS	13
Replacing a PCB	13
Replacing a Reflector	
Ordering Replacement Parts	16

List of Tables

Table 1	Rear ILS lightbar controls and their wires from the Serial Interface Module	9
Table 2	Rear ILS DIP switch settings1	0
Table 3	Common replacement parts1	6
Table 4	Vehicle-specific parts1	6

List of Figures

Figure 1	DIP switches and lights on the control board of the Rear ILS	11
Figure 2	Removing a PCB	14
Figure 3	Removing a reflector	15
Figure 4	Typical connections with a SignalMaster controller (external control)	17
Figure 5	Typical connections with a SmartSiren Model SS2000SM	18
	Typical connections with a serial-controlled lightbar and externally controlled SpectraL	

Safety Message to Installers and Service Personnel of Warning Light Equipment

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. Listed below are some other important safety instructions and precautions you should follow:

Before Installation or Service

Qualifications

 To properly install or service this equipment, you must have a good understanding of automotive mechanical and electrical procedures and systems, along with proficiency in the installation and service of safety warning equipment. Always refer to the vehicle's service manuals when performing equipment installations on a vehicle.

Light Hazards

- To be an effective warning device, this product produces bright light that can be hazardous to your eyesight when viewed at a close range. Do not stare directly into this lighting product at a close range, or permanent damage to your eyesight may occur.
- Do not install the light system in an area that would block, impair, or blind the driver's vision. Ensure that the light system is mounted in a position that is outside of the driver's field of vision so the driver can safely operate the vehicle.
- Federal Signal power supplies and light heads are designed to work together as
 a system. Combining light heads and a power supply from different manufacturers
 may reduce the warning effectiveness of the lighting system and may damage the
 components. Verify or test your combination to ensure that the system works together
 and meets federal, state, and local standards or guidelines.

Electrical Hazards

- Strobe systems present a shock hazard because they use high voltage to operate. Do not handle strobe cables, power supply, or bulbs or remove the lens while the equipment is connected. Strobe systems can hold their charge even after they have been turned off. After disconnecting power to the unit, wait five minutes before handling any parts of the strobe system.
- A light system is a high current system. In order for the system to function properly, a separate negative (–) connection and positive (+) connection must be made. All negative connections should be connected to the negative battery terminal and a suitable fuse should be installed on the positive battery terminal connection as close to the battery as possible. Ensure that all wires and fuses are rated correctly to handle the device and system amperage requirements.
- Never attempt to install aftermarket equipment that connects to the vehicle wiring without reviewing a vehicle wiring diagram available from the vehicle manufacturer. Ensure that your installation will not affect vehicle operation or mandated safety functions or circuits. Always check the vehicle for proper operation after installation.

- The lighting system components, especially light bulbs, strobe tubes, LEDs, and the outer housing, get hot during operation. Disconnect power to the system and allow the system to cool down before handling any components.
- Do not mount a radio antenna within 18 inches (45.7 cm) of the lighting system. Placing the antenna too close to the lighting system could cause the lighting system to malfunction or be damaged by strong radio fields. Mounting the antenna too close to the lighting system may also cause the radio noise emitted from the lighting system to interfere with the reception of the radio transmitter and reduce radio reception.
- Do not attempt to wash any unsealed electrical device while it is connected to its power source.

During Installation and Service

- DO NOT get metal shavings inside the product. Metal shavings in the product can cause the system to fail. If drilling must be done near the unit, place an ESD-approved cover over the unit. Inspect the unit after mounting to ensure that there are no shavings in or near the unit.
- DO NOT connect this system to the vehicle battery until ALL other electrical connections are made, mounting of all components is complete, and you have verified that no shorts exist. If the wiring is shorted to the vehicle body or frame, high current conductors can cause hazardous sparks, resulting in electrical fires or flying molten metal.
- DO NOT install equipment or route wiring (or the plug in cord) in the deployment path of an airbag.
- Before mounting any components, check the manual to verify that the component you
 are installing is suitable for use in that area of the vehicle. Many components are not
 suitable for use in the engine compartment or other extreme environmental exposure
 areas.
- When drilling into a vehicle structure, ensure that both sides of the surface are clear of anything that could be damaged. Remove all burrs from drilled holes. To prevent electrical shorts, grommet all drilled holes through which wiring passes. Ensure that the mounting screws do not cause electrical or mechanical damage to the vehicle.
- Refer to the manual packed with the lighting system for proper electrical connections, additional precautions, and information.
- Because vehicle roof construction and driving conditions vary, do not drive a vehicle with a magnetically mounted warning light installed. The light could fly off the vehicle, causing injury or damage. Repair of damage incurred because of ignoring this warning shall be the sole responsibility of the user.
- To avoid denting the vehicle roof, place the light bar mounting feet as close to the outer edge of the roof as possible.
- Locate the light system controls so the VEHICLE and CONTROLS can be operated safely under all driving conditions.

After Installation or Service

- After installation, test the light system to ensure that it is operating properly.
- Test all vehicle functions, including horn operation, vehicle safety functions, and vehicle light systems, to ensure proper operation. Ensure that the installation has not affected the vehicle operation or changed any vehicle safety function or circuit.
- Scratched or dull reflectors, mirrors, or lenses will reduce the effectiveness of the lighting system. Avoid heavy pressure and use of caustic or petroleum based products when cleaning the lighting system. Replace any optical components that may have been scratched or crazed during system installation.
- Do not attempt to activate or deactivate the light system control while driving in a hazardous situation.
- Frequently inspect the light system to ensure that it is operating properly and that it is securely attached to the vehicle.
- After installation and testing are complete, provide a copy of these instructions to instructional staff and all operating personnel.
- 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

Introduction

The Rear SpectraLux ILS is a single-level LED light bar that mounts in the rear window of the vehicle. It uses ROC (Reliable On Board Circuitry[™]) technology, and Solaris[®] S2 reflectors. The light bar operates at a nominal input of 13.6 Vdc (11 Vdc minimum). The functions of the ILS are controlled through the CAT5 serial communication cable. The cable connects to either a compatible Federal Signal Serial control head or a Federal Signal Serial Interface Module (document P/N 8583446). An internal PCB assembly within the light bar decodes the control data and performs the requested function. With the Serial Interface Module, the light bar can be activated by Federal Signal light bar controllers, SignalMaster[®] controllers, and/or individual low-current switches.

The backbone is a powder coated aluminum shroud. The light bar has 15-foot power and ground cables and a 25-foot serial cable. Mounting hardware is a configured option. Refer to mounting instructions supplied with mounting hardware. The light bar has an operating temperature range of -30° C to $+65^{\circ}$ C (-22°F to $+145^{\circ}$ C).

Unpacking the ILS

After unpacking the ILS light assembly, inspect it for damage that may have occurred in transit. If it has been damaged, do not install 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 listed in 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).

Wiring the Rear ILS in the Vehicle

Before proceeding, ensure that the light bar has been installed inside the vehicle in accordance with the instructions included with the mounting kit.

NOTE: The DIP switch on the control PCB in the light bar provides two selectable options. To change DIP switch settings, see "Selecting Configuration Options" on page 9.

The light bar is completely wired at the factory and does not require any additional internal wiring. Two 16 AWG power conductors (red and black) and the CAT5 communication cable exit the light bar. The conductors necessary to control the light bar are contained in the CAT5 cable, which connects to a compatible Federal Signal control head or Serial Interface Module.

NOTICE

INSTALLATION PRECAUTIONS: The warning system and/or two-way radio system may operate improperly if a two-way radio antenna is installed on or within 18 inches of the light bar. Before permanently installing the light bar or a two-way radio antenna, test the warning system and two-way radio system. Some installations may require the relocation of the two-way radio antenna to the trunk or fender. DO NOT drill holes in the light bar or install auxiliary devices on the light bar, or the warning system may fail.

A WARNING

LOCATING OPERATOR CONTROLS: The controls for the light system must be located so that the VEHICLE and CONTROLS can be operated safely under all driving conditions.

NOTICE

REVERSE POLARITY/MISWIRING: Reverse polarity may damage the siren amplifier. To avoid damage to the siren/amplifier, ensure that the battery voltage is the same voltage as the rating of the light and that the correct polarity is observed.

To wire the light bar in the vehicle:

 Ensure that the lines are adequately fused (see Figures 4 through 6 starting on page 17). From the light bar, route the CAT5 control cable into the vehicle's cab or trunk near the planned location of a control head that is compatible with the light bar or Serial Interface Module.

NOTE: An input cable (24-pin harness) is provided with the Serial Interface Module. For connections, see Table 1 on page 8 and Figures 4 through 6 starting on page 16.

- 2. Connect the 16 AWG black lead to the vehicle battery's ground (–NEG) terminal.
- **3.** Connect the 16 AWG red lead through the supplied 15 A fuse at the source to the positive (+BAT) terminal.

SignalMaster_® Option

The SignalMaster function is configured at the factory and does not require any additional wiring inside the light bar. All conductors necessary for control of the SignalMaster are through the compatible serial communication control head or the Serial Interface Module. For wiring and operation, refer to the instructions included with the control head or document P/N 2562248 included with the Serial Interface Module.

Light Bar Controls

Both the Federal Signal Serial Control Head and the Serial Interface Module provide the controls in Table 1 to the light bar. The table shows the corresponding control wires from the Serial Interface Module and their colors. The wire's first color is the predominant color; additional colors are stripes.

For programming options, see the instructions included with the Interface Module or the Federal Signal serial control head.

Light Bar Control*	Wire Color	Function Description
Mode 1	Blue	Lowest priority
Mode 2	Blue/White	Overrides Mode 1
Mode 3	Black/Red	Overrides Modes 1 and 2
Steady Burn	Red/White	N/A
Front Cutoff	Green/White	N/A
Front Enable	Green/writte	N/A
Rear Cutoff	Orango/Plack	Turns OFF power to the Rear ILS
Rear Enable	Orange/Black	Turns ON power to the Rear ILS
Intersection	Blue/Black	N/A
Flash Takedown	Red/Black	N/A
Left Alley	Green/Black	N/A
Right Alley	Orange/Red	N/A
Takedown	White/Black	N/A
Intersection	Blue/Black	N/A
Low Power	White/Black/Red	Dims the lights approximately 50 percent to prevent blinding approaching drivers. Low Power is available only in Modes 1 and 2 and is disabled when switched to another flash pattern, including Mode 3 and Intersection.
Test Pattern (SW-2 Switch 3 in the Serial Interface Module is in the UP position.	Black/White/Red	Cycles through each available color

 Table 1 Rear ILS light bar controls and their wires from the Serial Interface Module

*See document P/N 2562248 for instructions on setting these options in the Serial Interface Module.

Typical Installations with Common Control Systems

For typical installations with common control systems, see Figures 4 through 6 starting on page 16.

Selecting Configuration Options

The Rear ILS has three configuration options that are selectable with DIP switches on the light bar control board. Table 2 describes the options.

Table 2 Rear ILS DIP switch settings

DIP Switch Position	Description	
1	Sets the directional arrow pattern for internal SignalMaster® control for the eight- (default) or six- head pattern. For the six-head pattern, move DIP Switch 1 to ON (Figure 1 on page 11).	
2	Not used	
3	Switch 3 has three functions:	
	Activating a lower or upper rear mounted ILS	
	 Performing an LED scan to ensure that an LED board flashes the correct colors after it is installed. 	
	 Changing the Device ID to enable the SpectraLux® ILS to operate independently of the light bar (available with the Convergence Configuration Software). 	
	Choosing to Activate an Upper or Lower Rear ILS To activate an upper rear mounted ILS, set Switch 3 ON.	
	To activate a lower rear mounted ILS, set Switch 3 OFF.	
	Performing an LED Scan When an LED board is changed, an LED scan must be done to enable the LED board to flash the correct colors.	
	To perform the scan:	
	 Disconnect the red power (BAT+) wire to the SpectraLux ILS and maintain power to the control head/interface box. 	
	 Change the position of DIP Switch 3 and turn power ON to the SpectraLux ILS. The SpectraLux ILS emits a short flash to indicate the LED scan is done. 	
	3. To return DIP Switch 3 to its original function, repeat the scan.	
	Changing the Device ID The default setting for the SpectraLux ILS is to respond to light bar commands. For example, if the system includes a light bar and a SpectraLux ILS, both devices perform the same functions. The Convergence Configuration programming software enables you to program the control head to send a set of commands dedicated only to the SpectraLux ILS, making its operation independent of the light bar.	
	To reset the control head to the default setting, perform an LED scan as described above.	
4	Sets the ability to power the network cable for other devices. The default is OFF. Switch 4 should only be set if the main power cables are turned on through an ignition-activated relay. If powering other devices, such as the Six-Button Serial Controller, set DIP Switch 4 to ON. For more information, see the instructions included with the network-powered device.	

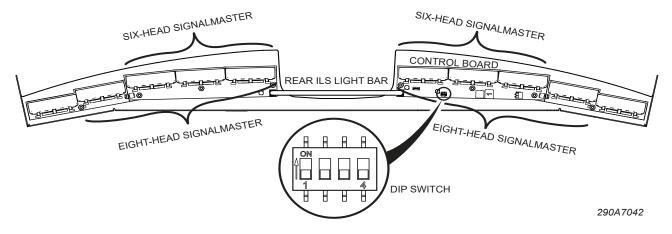


Figure 1 DIP switches and lights on the control board of the Rear ILS

Safety Message to Operators of Warning Light Equipment

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

- Do not attempt to activate or deactivate the light system control while driving in a hazardous situation.
- 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 and man-made objects are between your vehicle and others, such as raising your hood or trunk lid. If these situations occur, be especially careful.
- The effectiveness of an interior mounted warning light depends on the clarity, the tinting, and the angle of the glass it is being placed behind. Tinting, dirt defects, and steeply angled glass reduce the light output of the warning light. This may reduce the effectiveness of the light as a warning signal. If your vehicle has dirty, tinted, or steeply angled glass, use extra caution when driving your vehicle or blocking the right of way with your vehicle.
- All effective sirens and horns produce loud sounds that may cause, in certain situations, permanent hearing loss. You and your passengers should consider taking appropriate safety precautions, such as wearing hearing protection.
- In order to be an effective warning device, this product produces bright light that can be hazardous to your eyesight when viewed at a close range. Do not stare directly into this lighting product at a close range, or permanent damage to your eyesight may occur.
- It is important that you fully understand how to safely operate this warning system before use.
- Operate your vehicle and its light/sound system in accordance with your department's Standard Operating Procedures.

- If a selected function does not perform properly or if any of the lamps remain illuminated when the control is off, disconnect the power connector from the control unit and contact the nearest service center.
- At the start of your shift, ensure that the entire warning light system and the siren system are securely attached and operating properly.
- Suction cup mounting is for temporary applications only. The unit should be removed from the window and stored securely when not in use. Temperature changes and sunlight can cause suction cups to lose holding power. Periodically check the unit to ensure that the suction cups have a firm grip on the mounting surface. An improperly secured light could fall off of the vehicle causing injury and damage.
- The holding power of magnetic mounting systems is dependent upon surface finish, surface flatness, and thickness of the steel mounting surface. Therefore, to promote proper magnetic mounting:
 - Keep mounting surface and magnets clean, dry, and free of foreign particles that prevent good surface contact.
 - Ensure that mounting surface is flat.
 - Do not use a magnet mounting system on vehicles with vinyl tops.
 - To prevent sliding of light assembly on mounting surface, avoid quick acceleration and hard stops.

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

RETAIN AND REFER TO THIS MESSAGE.

Testing the Light Bar

AWARNING

LIGHT HAZARD: To be an effective warning device, an emergency warning system produces bright light that can be hazardous to your eyesight when viewed at a close range. Do not stare directly into this lighting product at a close range, or permanent damage to your eyesight may occur.

See Table 1 on page 8 and the wiring diagrams on pages 17 and 18:

To check the light bar controls:

- **1.** Connect the 16 AWG black lead from the light bar to the ground (–NEG) terminal of the vehicle battery and the 16 AWG red lead to the positive terminal.
- **2.** Connect the black and black/white wires from the Serial Interface Module to the ground (–NEG) terminal of the vehicle battery
- **3.** Apply 12 Vdc to a control wire and to the ignition wire from the Serial Interface Module.

After the installation, check the entire system to make sure the lights are flashing properly and all light system functions are operating properly.

Maintaining the Rear ILS

Establishing a regular maintenance schedule for the ILS light bar extends its life and ensures safety. Periodically check that the light bar operates properly and that all mounting hardware is securely fastened to the vehicle. Inspect the reflectors for cracks, crazing (hairline cracks), discoloration, and other defects.

A WARNING

PERIODICALLY CHECK GLASS: The effectiveness of the Rear ILS depends on the clarity of the glass it is being placed behind. Dirt and defects in the glass reduces the light output. The reliability of light for emergency signaling purposes may be reduced if the glass is dirty, cracked, or not clear. Periodically check the glass for cleanliness to ensure maximum light output of the Rear ILS light bar.

Cleaning the Shrouds

To clean the shrouds:

- **1.** To remove the light bar from the vehicle, refer to the vehicle-specific installation instructions that come with the ILS light bar.
- **2.** Use a soft tissue to clean the shroud. If needed, you can use a solution of mild soap and water, but take care not to get water on the PCBs.
- **3.** When finished, make sure the light bar is completely dry before reinstalling it according the vehicle-specific installation instructions.

Cleaning the Reflectors

A 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.

A 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.

To clean the reflectors:

- **1.** To remove the light bar from the vehicle, refer to the vehicle-specific installation instructions included with the Rear ILS.
- 2. Use a soft tissue to clean the reflectors. If needed, you can use a solution of mild soap and water, but take care to avoid getting the PCBs wet. Avoid heavy pressure and the use of caustic, abrasive, or petroleum-based cleaners, which will scratch or dull the reflectors.

3. Make sure the light bar is completely dry before reinstalling it according to the vehicle-specific instructions.

Servicing the Rear ILS

This section has instructions for replacing the light bar's PCBs and reflectors. For additional service and support, call the Federal Signal Service Department at 800-433-9132, 7 a.m. to 5 p.m., Monday through Friday (Central Time). For a list of common replacement parts, see "Ordering Replacement Parts" on page 19.

Replacing a PCB

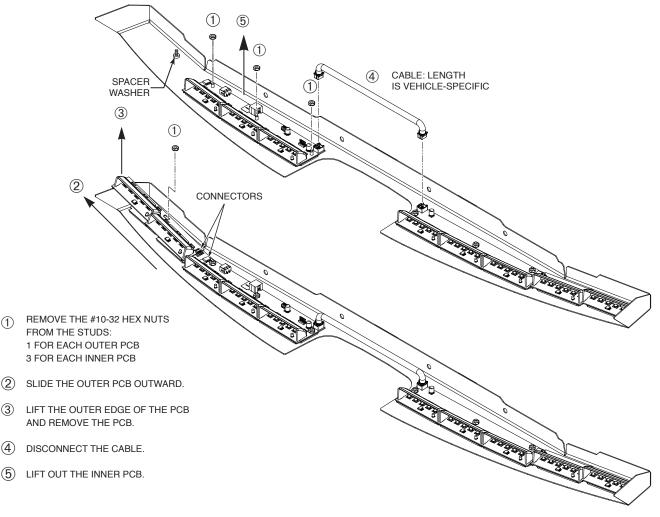
To replace a PCB:

1. To remove the light bar from the vehicle, refer to the vehicle-specific installation instructions that come with the Rear ILS.

NOTE: To remove an inner PCB you must first remove the outer PCB next to it.

2. Remove the #10-32 nuts that hold down the PCB. See Figure 2.

Figure 2 Removing a PCB



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NOTICE

PCB CONNECTOR DAMAGE: To avoid damaging the connectors, slide the outer PCB straight out before lifting it.

3. Remove the outer PCB by sliding it straight outward and then lifting it by its outside edge. To remove an inner PCB, make sure all the nuts have been removed. Disconnect the cable and lift out the PCB.

NOTE: To remove a reflector, see "Replacing a Reflector."

- **4.** To install an inner PCB, align the holes in the PCB with the three inner studs on the shroud and place the PCB on the insulator.
- 5. Mate the pins of the outer PCB to the inner PCB on an angle.
- **6.** Slide the outer PCB in while lowering its outer edge until the stud is centered in the slot on the PCB. Rest the PCB on the insulator.
- **7.** Tighten the #10-32 nuts to 36 in-lb (3 ft-lb).

Replacing a Reflector

A 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.

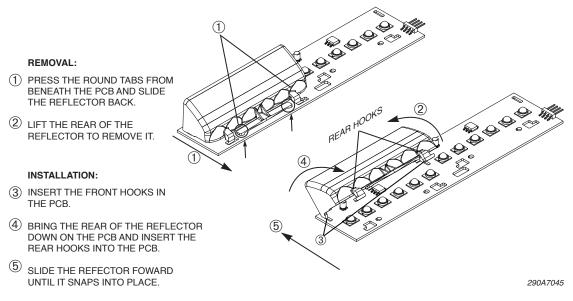
AWARNING

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.

To replace a reflector:

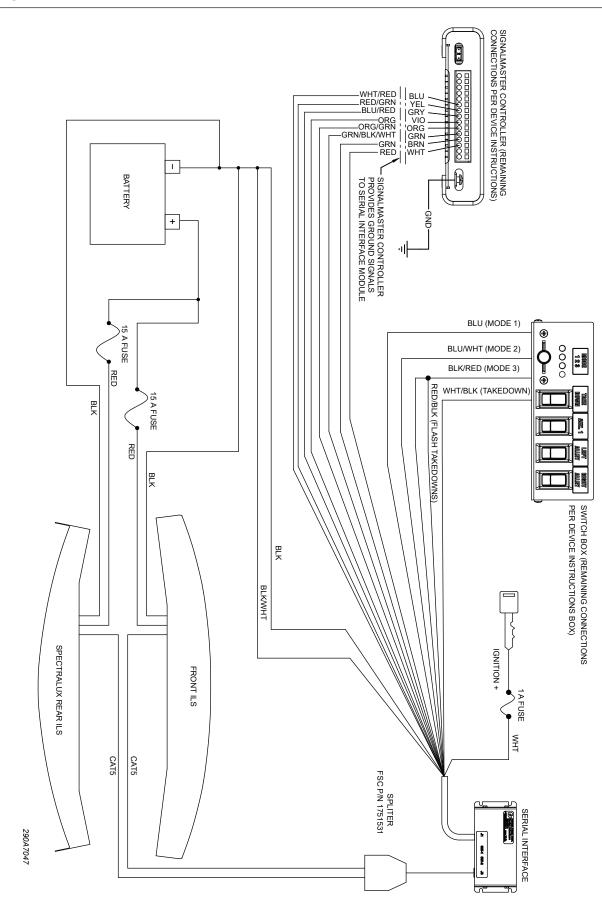
- 1. Refer to the vehicle-specific installation instructions included with the Rear ILS.
- 2. To remove the PCB that holds the reflector, see "Replacing a PCB" on page 13.
- **3.** Use a small Phillips screwdriver to press and release the reflector's two round tabs from beneath the PCB. Slide the reflector toward the rear of the PCB. See Figure 3/

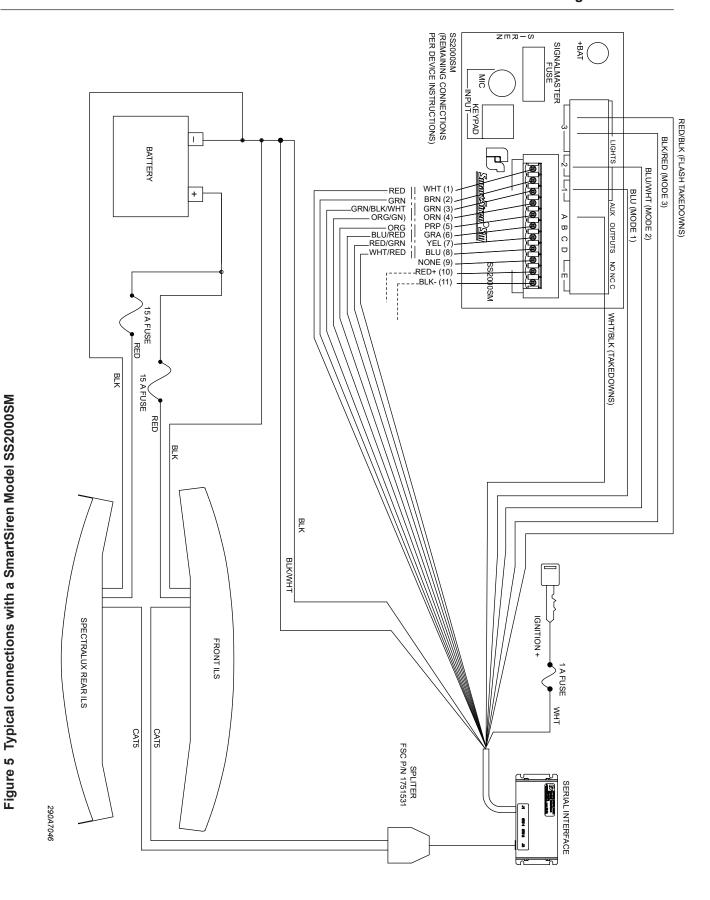
Figure 3 Removing a reflector

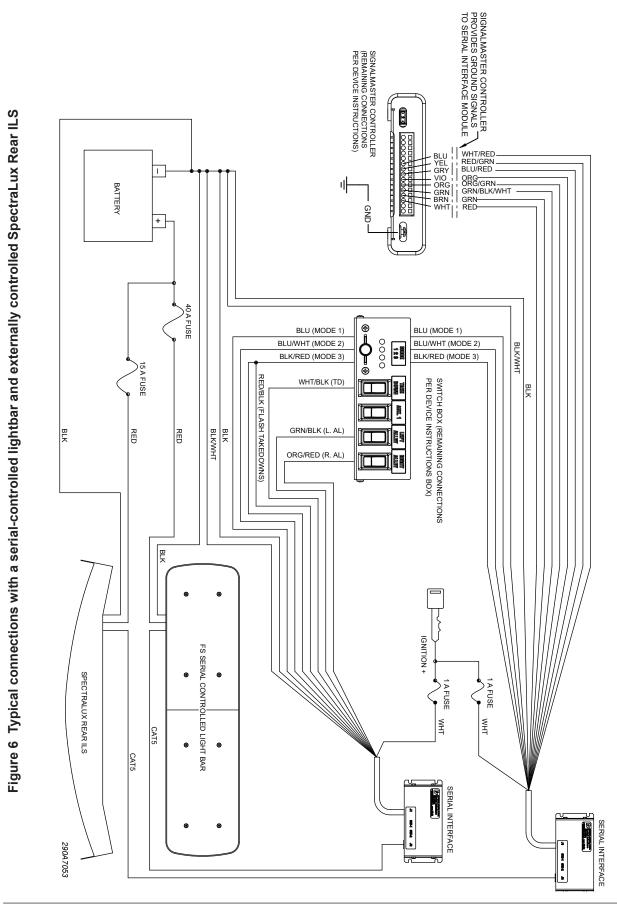


- 4. Lift the rear of the reflector away from the PCB and remove it.
- 5. To install the new reflector, insert its front hooks into their slots on the PCB.
- 6. Bring the rear of the reflector down to insert its rear hooks through the PCB.
- **7.** When the reflector rests on the PCB, make sure the rear hooks are fully inserted and slide the reflector forward until its tabs snap into place.
- **8.** Install the PCBs as described in steps 4 through 7 in "Replacing a PCB" on page 13.









Ordering Replacement Parts

This section contains a list of common and vehicle-specific replacement parts. To order parts, call the Federal Signal Service Department at 800-433-9132, 7 a.m. to 5 p.m., Monday through Friday (CT) or contact your nearest distributor.

 Table 3 Common replacement parts

Description	Part Number
PCB Assembly, Driver Side (Configured)	Contact Federal Signal
PCB Assembly, Driver Rear Inner (Configured)	Contact Federal Signal
PCB Assembly, Passenger Side (Configured)	Contact Federal Signal
PCB Assembly, Passenger Rear Inner (Configured)	Contact Federal Signal
Washer, Spacer	77700365
Nut, Hex #10-32	7058A004
Reflector, Standard	8651110
Sealing Strip	205003
Cable Assembly, Power, 15 ft	1461816
Cable, Network, 25 ft	1751357-02
Fuse, In-Line, 15 A	8620006-01
Fuse Holder	143A120

Table 4 Table 4 Vehicle-specific parts

Description	Part Number
Wire Assembly, PCB to PCB (Vehicle-Specific Length)	17500009-**
Shroud and Mounting Hardware (Vehicle-Specific)	Refer to the vehicle-specific installation instructions for part numbers

Getting Technical Support and Service

For technical support and service, please contact:

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

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 a RMA from a local Distributor or Manufacturer's Representative.

Provide a brief explanation of the service requested, or the nature of the malfunction.

Address all communications and shipments to the following:

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



2645 Federal Signal Drive University Park, Illinois 60484-3167

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