FEDERAL SIGNAL

Installation Instructions for the Three-Button Control Head for Lightbar Systems

2562497A REV. A 1010

Safety Message to Installers 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. In addition, listed below are some other important safety instructions and precautions you should follow:

- To properly install the equipment described in this instruction sheet, 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.
- Locate the control head so the VEHICLE and CONTROLS can be operated safely under all driving conditions.
- 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, be sure that both sides of the surface are clear of anything that could get damaged.
- 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 or reinstalling the product.

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

Overview

The three-button Control Head is designed to operate with Federal Signal lightbar models Legend®, Arjent® S2, and Raydian® S2 as well as other serial-communication enabled Federal Signal products. It has three backlit pushbuttons, with additional LED indicators above, for activating different functions. The activation commands are sent via an RS485 serial cable. The 12 Vdc power for the control head comes from a two-wire power connector on its right side. To conserve the vehicle battery when the ignition is off, a built-in ignition timer turns off the lightbar after a programmed number of hours have lapsed.

You can select one of nine preprogrammed keypad configurations. Each keypad has between one and three flashing modes, producing distinct flash patterns. You can also change the default flash patterns assigned to the MODE buttons. The remaining buttons activate additional functions, such as front or rear light cutoff, takedown or worklights, alley lights, low power, and SignalMaster™ directional and warn patterns. For more information, see "Selecting a Keypad Configuration" on page 6 and "Selecting a Flash Pattern" on page 7.

Product Specifications

Dimensions:	
Height	1.77 in (4.50 cm)
Width	2.95 in (7.49 cm)
Depth of Housing	1.22 in (3.10 cm)
Depth of Switches	1.36 in (3.45 cm)
Weight:	0.16 lb (73 g)

Unpacking the Product

After unpacking the control head, inspect it for damage that may 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 contained in the packing carton.

Table 1: Parts list

Qty.	Description
2	Mounting Clips
4	Clip Screws
1	Velcro Hook
1	Velcro Loop
1	Sheet of Adhesive Button Legends
1	12-inch Power Lead Wire Assembly

Mounting the Control Head

The control head is supplied with hardware for two mounting methods: swivel mount or a hook-and-loop mount. A hinged bracket mount is also available, but not included. The mounting method depends on the mounting location, available room, and user preference.

⚠ WARNING

MOUNTING PRECAUTION

Unreliable switch activation and loss of "tactile feedback" will result if the method for mounting the control head allows the keypad to move. DO NOT mount the control head on padded surfaces.

Failure to heed this warning could result in driver distraction or error when operating the vehicle, causing serious injury or death to you or others.

⚠ 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 to you or others.

Swivel Mounting:

1. Choose a location for the control head that allows the vehicle and controls to be operated safely at all times.
2. Slide the swivel mount into place on the back of the control head and tighten the two Phillips heads screws, making sure you can remove the swivel mount.
3. Remove the swivel mount assembly and set the control head aside.
4. Using the swivel mount assembly as a guide, scribe the three drill-position marks at the selected mounting location.

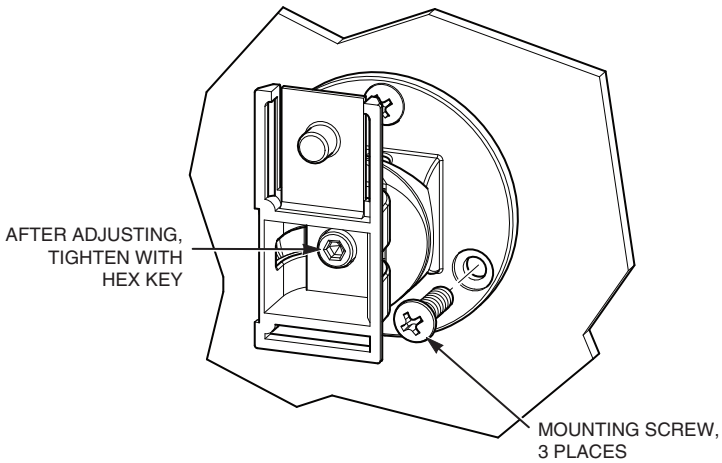
NOTICE

DRILLING PRECAUTIONS

Before drilling holes, check the area into which you plan to drill to ensure you do not damage vehicle components while drilling. All drilled holes should be deburred and all sharp edges should be smoothed. All wires going through drilled holes should be protected by a grommet or convolute/split-loom tubing.

5. Drill three 1/8-inch mounting holes at the scribed drill-positions marks.
6. Secure the swivel mount assembly to the mounting surface with the three Phillips head screws (Figure 1).

Figure 1: Swivel mount assembly secured to mounting surface



7. Adjust the swivel mount assembly for maximum access to the three-button control head.
8. Tighten the hex-head screw using a 3 mm hex key or 7/64-inch hex key.
9. Slide the controller onto the swivel mount assembly.

Hook-and-Loop Mounting:

NOTE: The hook-and-loop mounting method is for storing the control head when it is not in use. The hook-and-loop material may not provide sufficient rigidity for proper operation of the control head.

1. Choose a location for the control head that allows the vehicle and controls to be operated safely at all times.

   NOTE: The mounting surfaces of the hook-and-loop pad must be clean and dry for proper adhesion. If necessary, use a mixture of isopropyl alcohol and water to clean the mounting surfaces.

2. Remove the paper backing from the hook pad and affix the pad to the back of the control head.

3. Remove the paper backing from the loop pad and affix the pad to the mounting surface.

4. Place the control head in position by mating the hook and loop surfaces, pressing firmly.

Connecting the Power Leads

The 12 Vdc power for the control head comes from a 2-wire power connector on its right side. Extend the wires, if needed, with 18 AWG minimum wire. Ground is provided through the control cable.

1. Connect the red wire to the positive (+BAT) battery terminal switch.

2. Connect the white wire to a circuit controlled by the vehicle ignition switch.

Connecting the Control Cable

The special lightbar models for serial communication control come with a 20-foot RS-485 (Ethernet-type) control cable.

1. Route the cable from the lightbar to the selected controller location. (See the instructions shipped with the lightbar for further details.) Secure the cable with user-supplied clamps and hold-downs as required

2. Insert the connector into the receptacle on the side of the three-button controller. Secure the connector with user-supplied clamps and/or wire ties to provide strain relief.

Safety Message to Operators

⚠ 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. In addition, listed below are some other important safety instructions and precautions you should follow:

- Be aware that the use of your visual signaling device does not give you the right to force your way though traffic. Your emergency lights and actions are REQUESTING the right-of-way.

- Although your warning system is operating properly, it may not alert everyone. People may not see or heed your warning signal. You must recognize this fact and continue driving cautiously.
- Situations may occur which obstruct your warning 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, you should ensure that the light system is securely attached to the vehicle and operating properly.

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

Operating the Control Head

The control head is shipped fully programmed with default keypad functions, flash patterns, and ignition timer settings. No further programming is necessary, unless you want to change the settings.

The buttons are positioned 1 to 3 from left to right. When you unplug the power connector from the control head and plug it back in, the control head first lights the button that corresponds to the keypad number (Figure 2 on page 8). The button then blinks once for the basic keypad number; the light ABOVE the button blinks twice for the keypad A; and BOTH lights blink three times for the keypad B. After that, all buttons remain off when the ignition is off or light up dimly when the ignition is in the accessories or start position.

When the ignition is off, the buttons do not respond when selected. When the ignition is in the accessories or start position, the press of a button sends a serial command to the lightbar (or other serial enabled product) and a second press turns it off. If the button has more than one function, each press steps through the functions until a final press turns it off; the first press lights up the button to its full brightness, the second press lights up the light above, and the third press lights up both.

Some buttons are dependent, which means that pressing another button turns them off. Dependent buttons include flashing Modes 1 to 3 and SignalMaster™ directional signals.

For more information, see “Selecting a Keypad Configuration” and “Selecting a Flash Pattern” on page 6. See also “Setting the Ignition Timer” on page 7.

Hold-For-Low-Power Function

Some buttons are configured for a Hold-For-Low-Power function (Figure 2 on page 8 and Table 2 on page 9). The function activates low power/reduced light output when the button is pressed and held for one and a half seconds. To indicate low power activation, the button flashes with long on and short off time. Any press (long or short) of the same button will cancel the low power setting and either turn off the button completely, or move to the next function if available for this button. Pressing any other Mode button also cancels the Hold-For-Low-Power function (when more than one MODE buttons are available in the selected keypad configuration).

⚠ WARNING

PRECAUTIONS FOR KEYPAD PROGRAMMING

Property damage, serious injury, or death to you or others may result if the keypad is improperly programmed. Programming is to be performed at the time of the control head's installation. It is NOT intended for operators to "customize" the control heads's operation for their individual preferences. It is the installer's responsibility to determine compatibility, suitability, and ensure proper programming of the system. In addition, the person responsible for programming MUST be familiar with local codes and procedures for the safe operation of emergency-vehicle siren and lights.

Selecting a Keypad Configuration

Figure 2 on page 8 and Table 2 on page 9 show and describe the nine selectable keypad configurations with the functions of each button.

1. Press the three buttons together. The buttons flash three times and the controller beeps three times to indicate it is ready to be reconfigured. The short beeps count seconds in the Keypad Configuration Mode. The button and light above that is/are flashing identify the keypad number. For example, if Keypad #1 is active, button #1 flashes; if keypad #1A is active, the light above button 1 flashes; if keypad #1B is active, both button and the light above flash.

2. To select a configuration, press a button one or more times until the correct lights flash: Keypad # only (only the selected button flashes), #A configuration (the light **A**bove the selected button flashes), or #B configuration (**B**oth the selected button and the light above it flashes).

3. When the correct button flashes the right way, exit Keypad Configuration Mode by waiting 15 seconds counted by short beeps or by removing power from the control head.

Selecting a Flash Pattern

Each keypad has up to three buttons assigned to activating a flash pattern. Approximately one dozen flash patterns are available for Mode 3, Mode 2, and Mode 1 except for SignalMaster® Center-Out, which has half as many.

A pattern displayed in Mode 3 is typically more active than the pattern displayed in Mode 2, which in turn is more active than Mode 1.

⚠ WARNING

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.

Selecting a Flash Pattern for a MODE Button

1. Press the two outside buttons together. The buttons flash three times and the controller beeps three times to indicate the keypad is ready to be programmed. There are no beeps counting seconds in this Programming Mode.

2. Buttons that are assigned flash patterns are lit dimly while one button flashes. To change the flash pattern assigned to a button, press the button repeatedly to step through the lightbar flash patterns.

   To change the flash pattern assigned to a second press of a button (Mode 2), which is available in some keypad configurations, e.g. #2), press and hold the button until the light above it lights up. Then press the button repeatedly to step through the lightbar flash patterns.

3. When the flash pattern you want appears on the lightbar, press a different flashing button to program a different button, or exit Programming Mode by either removing power or letting the keypad time-out after approximately 15 seconds.

Setting the Ignition Timer

To conserve the vehicle battery, the control head includes a built-in ignition timer. If you press one or more buttons and then turn the ignition off, the timer keeps the selected functions on for up to eight hours. The default timer setting is zero hours, which turns the ignition off as the ignition key is turned off. To indicate that the timer is on, unselected switches have no backlighting. Without ignition power, the switches do not accept user commands.

To change the timer setting:

1. Turn the ignition key to the accessories position.

2. To enter Keypad Selection Mode, press the three buttons simultaneously. The controller beeps and flashes three times, then emits short beeps every second.

3. To enter Timer Programming Mode, press the two outside buttons simultaneously. The top LEDs and the middle button flash, forming the letter "T." The beeps that count the seconds become louder.

4. To select two hours, press Button 1; to select four hours, press Button 2; to select eight hours, press Button 3. The selected button flashes. To select zero hours, press all three buttons together.

5. After you set the timer or after 6 seconds in Timer Programming Mode, the controller exits the mode.

To turn off the timed functions before the end of their scheduled duration:

1. Turn the ignition to the accessories position.

2. Turn off the buttons.

3. Turn the ignition off.

Keypad Configurations

Figure 2 shows the keypad configurations. Table 2 on page 9 describes the keypad functions.

Figure 2: Selectable keypad configurations

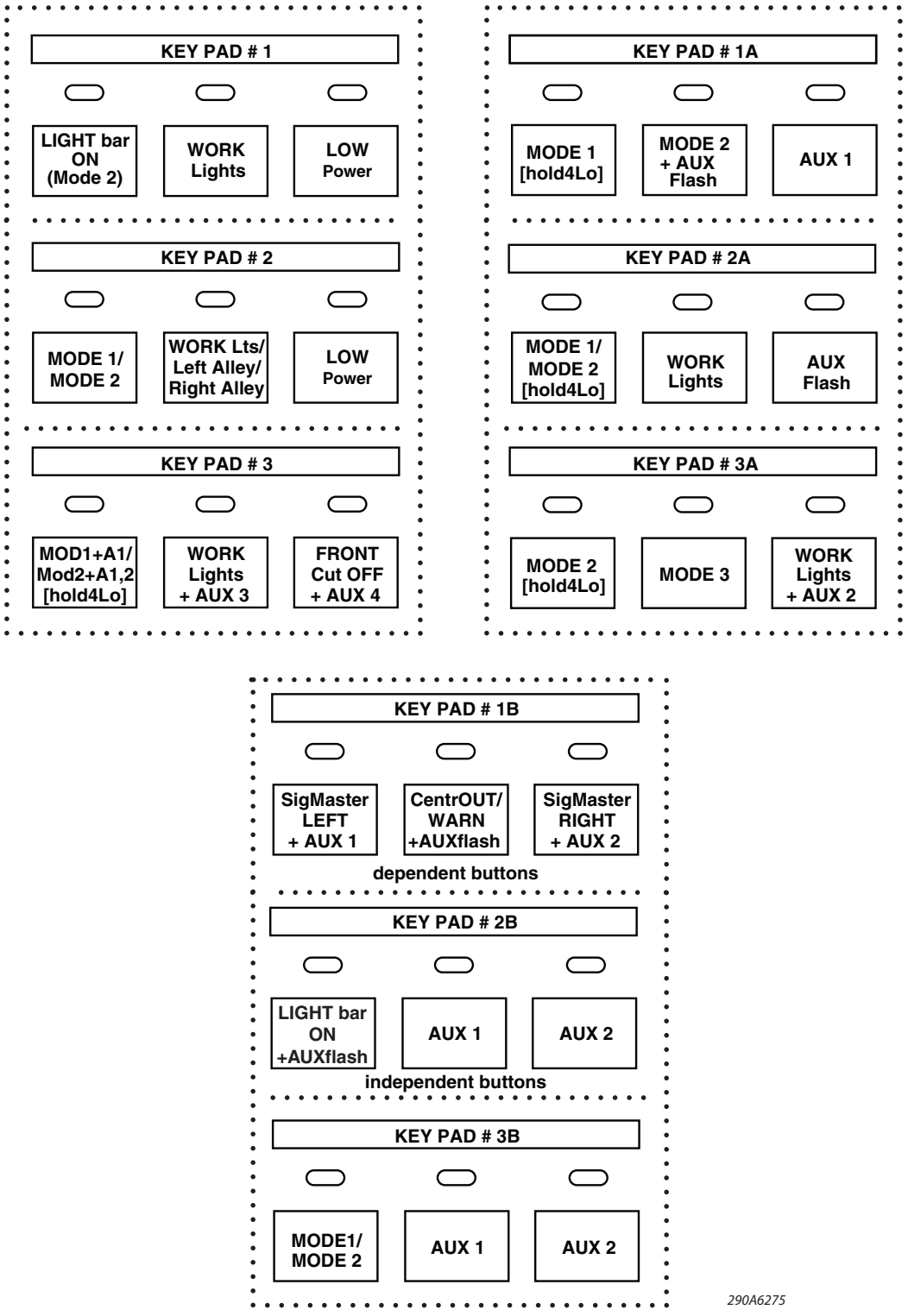


Table 2: Configured keypad functions (continues on page 10)

Legend	Description
AUX 1	Selection of Auxiliary Relay Channel 1
AUX 2	Selection of Auxiliary Relay Channel 2
AUX Flash	Auxiliary Relay Channels 3 and 4 both flashing
LIGHT bar ON + AUX flash	Turns on the lightbar in Mode 1 AND Auxiliary Relay Channels 3 and 4 both flashing (depends on products used in the system)
CentrOUT/WARN + AUX flash	SignalMaster Center-Out directional pattern on first push, SignalMaster Warn pattern on second push AND/OR Auxiliary Relay Channels 3 and 4 both flashing on either push.
FRONT Cut OFF + AUX 4	Cuts off light on the front of the lightbar and turns on devices on Auxiliary Relay Channel 4
LIGHT bar ON (Mode 2)	Turns on the lightbar in Mode 2
LOW Power	Activates low power/reduced light output, dimming lightbar approx. 50 percent
MODE 1/ MODE 2	Step-through selection of lightbar Mode1 and 2 flash patterns
MODE1/ MODE2 [hold4Lo]	Step-through selection of lightbar Mode 1 and 2 flash patterns. Activates low power/reduced light output in selected mode when the button is pressed and held for one and a half seconds.
MODE 1 [hold4Lo]	Turns on lightbar in Mode 1. Activates low power/reduced light output in selected mode when the button is pressed and held for one and a half seconds.
MODE 2 [hold4Lo]	Turns on lightbar in Mode 1. Activates low power/reduced light output in selected mode when the button is pressed and held for one and a half seconds.
MOD1+A1/ Mod2+A1,2 [hold4Lo]	Step-through selection of Lightbar Mode 1 with Auxiliary Relay Channel 1 and Mode 2 with Auxiliary Relay Channels 1 and 2. Activates low power/reduced light output in selected mode when the button is pressed and held for one and a half seconds.
MODE 2 + AUX Flash	Turns on the lightbar in Mode 2 AND/OR Auxiliary Relay Channels 3 and 4 both flashing
MODE 3	Turns on lightbar in Mode 3
SigMaster LEFT + AUX 1	SignalMaster Left directional pattern AND/OR Auxiliary Relay Channel 1 (depends on products used in the system)
SigMaster RIGHT + AUX 2	SignalMaster Right directional pattern AND/OR Auxiliary Relay Channel 2 (depends on products used in the system)
WORK Lights	Turns on worklights (or takedown lights, if equipped).
WORK Lights + AUX 2	Turns on worklights (or takedown lights, if equipped) and Auxiliary Relay Channel 2.

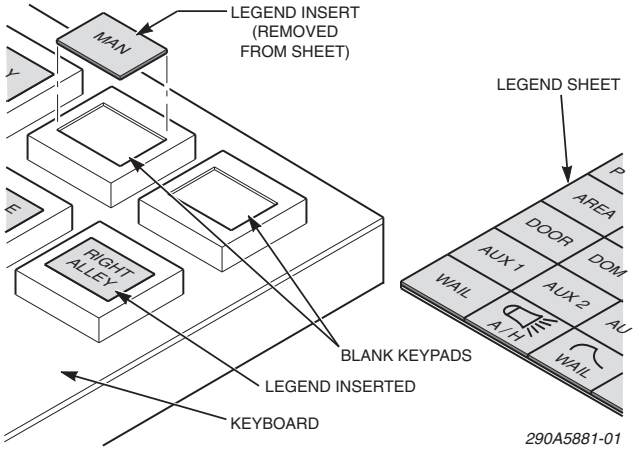
Table 2: Configured keypad functions (continued from page 9)

Legend	Description
WORK Lights + AUX 3	Turns on Worklights (or Takedown lights, if equipped) and Auxiliary Relay Channel 3.
WORK Lts/ Left Alley/ Right Alley	Step-through selection of worklights, left alley light, and right alley light

Applying the Replaceable Keypad Labels

Replaceable keypad labels identify the switches on the control head. A sheet of applicable function legends is supplied. Peel the appropriate labels from the sheet and apply them to the keypad in the areas shown in Figure 3. Verify that the label is properly tucked under the retaining ridge on the pushbutton.

Figure 3: Replaceable keypad labels



Testing the System

⚠ WARNING

SOUND HAZARD

All effective sirens and horns produce loud sounds (120 dB) that may cause permanent hearing loss. Always minimize your exposure to siren sound and wear hearing protection. Do not sound the siren indoors or in enclosed areas where you and others will be exposed to the sound.

After the installation, test the emergency warning system to ensure that it is operating properly. Also test all vehicle functions, including horn operation, vehicle safety functions, and vehicle lighting systems to ensure proper operation. Ensure that the installation has not affected the vehicle operation or changed any vehicle safety functions or circuits. After testing is complete, provide a copy of these instructions to the instructional staff and all operating personnel.

Do not test the sound and light system of the vehicle while driving. Operating the vehicle warning systems may pose a hazard to the operator and other drivers if the systems do not function as expected. Test the vehicle only in a controlled environment.

Getting Technical Support and Service

This control head has no field-serviceable parts. The factory will service the control head for you. If you are experiencing problems, please contact:

Service Department
Federal Signal Corporation
Phone: 1-800-433-9132
Fax: 1-800-343-9706
Email: empserviceinfo@fedsig.com

Ordering Replacement Parts

To order replacement parts, please contact your local dealer/distributor or:

Customer Support
Federal Signal Corporation
Phone: 1-800-264-3578

Returning a Product to Federal Signal

Before returning a product to Federal Signal, call 800-264-3578, 800-433-9132, or 800-824-0254 to obtain a Returned Merchandise Authorization number (RMA number). To expedite the process please be prepared with the following information:

- Your Federal Signal customer or account number.
- The purchase order number under which the items were purchased.
- The shipping method.
- The model or part number of the product being returned.
- The quantity of products being returned.
- Drop ship information as needed.
- Any estimate required.

When you receive your RMA Number:

- Write the RMA number on the outside of the box of returned items.
- Reference the RMA number on your paperwork inside of the box.
- Write the RMA number down, so that you can easily check on status of the returned equipment.

Send all material with the issued RMA Number to:

Federal Signal Corporation
2645 Federal Signal Drive
University Park, IL 60466
Attn: Service Department
RMA: #_____

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Tel.: (800) 264-3578 • Fax: (800) 682-8022
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