

## Models 2-120 and 2-240

### Omni-Directional Siren



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## ***Description, Specifications, Installation, Operation, and Service Manual***

## 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](http://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](mailto: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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## Safety Messages

**⚠ WARNING**

It is important to follow all instructions shipped with this product. This device is to be installed by trained personnel who are thoroughly familiar with the country electric codes and will follow these guidelines as well as local codes and ordinances, including any state or local noise-control ordinances. Listed below are important safety instructions and precautions you should follow:

**Important Notice**

Federal Signal reserves the right to make changes to devices and specifications detailed in the manual at any time to improve reliability, function, or design. The information in this manual has been carefully checked and is believed to be accurate; however, no responsibility is assumed for any inaccuracies.

**Publications**

Federal Signal recommends the following publications from the Federal Emergency Management Agency for assistance with planning an outdoor warning system:

- The “Outdoor Warning Guide” (CPG 1-17)
- “Civil Preparedness, Principles of Warning” (CPG 1-14)
- FEMA-REP-1, Appendix 3 (Nuclear Plant Guideline)
- FEMA-REP-10 (Nuclear Plant Guideline).

**Planning**

- If suitable warning equipment is not selected, the installation site for the siren is not selected properly, or the siren is not installed properly, it may not produce the intended optimum audible warning. Follow Federal Emergency Management Agency (FEMA) recommendations.
- If sirens are not activated in a timely manner when an emergency condition exists, they cannot provide the intended audible warning. It is imperative that knowledgeable people, who are provided with the necessary information, be available at all times to authorize the activation of the sirens.
- When sirens are used out of doors, people indoors may not be able to hear the warning signals. Separate warning devices or procedures may be needed to effectively warn people indoors.
- The sound output of sirens is capable of causing permanent hearing damage. To prevent excessive exposure, carefully plan siren placement, post warnings, and restrict access to areas near sirens. Review and comply with any local or state noise control ordinances as well as OSHA noise exposure regulations and guidelines.
- Activating the sirens may not result in people taking the desired actions if those to be warned are not properly trained about the meaning of siren sounds. Siren users should follow FEMA recommendations and instruct those to be warned of corrective actions to be taken.
- After installation, service, or maintenance, test the siren system to confirm that it is operating properly. Test the system regularly to confirm that it will be operational in an emergency.

- If future service and operating personnel do not have these instructions to refer to, the siren system may not provide the intended audible warning, and service personnel may be exposed to death, permanent hearing loss, or other bodily injuries. File these instructions in a safe place and refer to them periodically. Give a copy of these instructions to recruits and trainees. Also give a copy to anyone who is going to service or repair the siren.

### Installation and Service

- Electrocutation or severe personal injury can occur when performing various installation and service functions such as making electrical connections, drilling holes, or lifting equipment. Therefore, only experienced electricians should install this product in accordance with national, state, and any other electrical codes having jurisdiction. Perform all work under the direction of the installation or service crew safety foreman.
- The sound output of sirens is capable of causing permanent hearing damage. To prevent excessive exposure, carefully plan siren placement, post warnings, and restrict access to areas near the sirens. Sirens may be operated from remote control points. Whenever possible, disconnect all siren power, including batteries, before working near the siren. Review and comply with any local or state noise control ordinances as well as OSHA noise exposure regulations and guidelines.
- After installation or service, test the siren system to confirm that it is operating properly. Test the system regularly to confirm that it will be operational in an emergency.
- If future service personnel do not have these warnings and all other instructions shipped with the equipment to refer to, the siren system may not provide the intended audible warning, and service personnel may be exposed to death, permanent hearing loss, or other bodily injuries. File these instructions in a safe place and refer to them periodically. Give a copy of these instructions to recruits and trainees. Also give a copy to anyone who is going to service or repair the sirens.

### Operation

Failure to understand the capabilities and limitations of your siren system could result in permanent hearing loss, other serious injuries, or death to persons too close to the sirens when you activate them or to those you need to warn. Carefully read and thoroughly understand all safety notices in this manual and all operations-related items in all instruction manuals shipped with the equipment. Thoroughly discuss all contingency plans with those responsible for warning people in your community, company, or jurisdiction.

***Read and understand the information contained in this manual before attempting to install or service the siren.***

Pay careful attention to the notice located on the equipment.

## **General Description**

This manual describes the characteristics, specifications, installation for the siren, and the additional information required to operate, service, and maintain the control system.

The Federal Signal Model 2 outdoor warning sirens are omni-directional sirens capable of producing high-intensity warning signals over a large area. Federal Signal provides mounting hardware that enables you to install a siren on a utility pole or the roof of a building. As a result, the siren can be installed in almost any situation. The high efficiency of these siren models enables them to produce a high sound level while making moderate demands on the power source.

## **Siren Description**

The Model 2 Siren is a 102 dB single-tone siren.

The Model 2 siren mechanism is enclosed in a sheet metal housing. A conical dome is mounted on the top of the housing, and two truncated conical cowls are attached to the housing, approximately one-third and two-thirds along the height of the housing.

A Model RC2W Motor Starter (purchased separately) is required to operate the siren. The Model 2 uses a 120- or 240-volt universal motor that can operate from either DC or 25-60 Hz single-phase AC.

The mechanism of all siren models covered in this manual consists of a vertically installed motor with a stator attached to the motor housing and a rotor mounted on the drive shaft concentric to the stator. The rotor and stator each contain at least one row of ports. As the motor rotates the rotor, air is drawn through an intake tube and passes through the rotor and stator ports in pulses. These pulses are produced because the rotor alternately opens and closes the stator ports. The pulses of air produce sound at a frequency (pitch) that depends on the instantaneous rotational speed of the motor and the number of ports in the rotor-stator combination.

## **Features**

The Model has the following features.

- Available in 120 V AC/DC and 240 VAC/DC
- High-efficiency design requires only moderate power
- Small compact design
- Powder coating for long life
- Use with RC2W-120/240 motor starter
- Use with FC Controller for ease of operation
- Use with FCU and FCH for remote radio activation
- Produces 102 dBc at 100 feet
- Roof mount standard and pole mount optional
- Pole mount with PMS kit

## **Controls Description**

### **Models RC2W-120 (120 Vac) and RC2W-240 (240 Vac)**

The Model RC2W Motor Starters are heavy-duty relays required for the starting and operating current of a Model 2 siren. The RC2W is enclosed in a NEMA Type 4 enclosure. The unit must be installed on a vertical surface.

### **Models FC (One-way status) or FCTB (Two-way status) Controllers**

The FC or FCTB siren controllers provide RF and/or wire line control of individually programmable timing cycles for contact closure outputs. The versatility of the FC Controller makes it an ideal choice for virtually all siren control applications or any other process that can be controlled through relay contacts.

The microprocessor-based controller contains the following features:

- Synthesized Radio Receiver (Low Band, High Band, or UHF—three separate models)
- Two-Tone and DTMF Decoders
- Up to four Individually Programmable Output Relays
- Siren Tone Generator
- Buttons for Local Control
- Contact Closure Inputs for Land Line Control
- RS232 Programming Port
- Diagnostic LEDs
- Programmability

All functions of the FC Controller are programmable from a current Windows®-compatible computer with an RS232 port using FSPWARE or the Commander® Software System. The software allows easy configuration, uploading, and downloading of control programs.

Programming options include:

- Radio Receiver Frequency
- Single and Two-Tone Sequential Decode Tones and Tone Lengths
- DTMF Decode Digits
- Output Relay Timing Patterns
- Tone Generation Frequencies and Durations

You can program up to six (6) control timing sequences into the controller. You can choose standard siren control timings or design custom relay output timings. You can activate the control functions from any combination of six (6) Single Tone, Two-Tone Sequential, and/or DTMF tones. You can also initiate timing sequences using the local buttons and contact closure inputs.

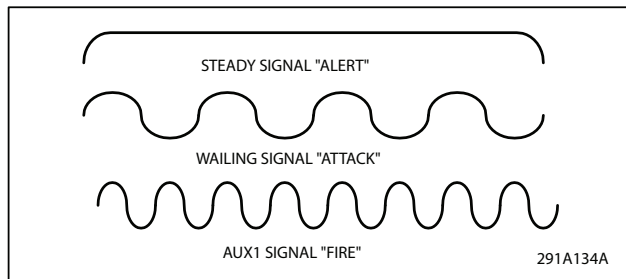
Configuration programs are stored in non-volatile E<sup>2</sup> memory to ensure retention even during a complete power failure.



## Signal Description

The sirens can produce a steady single frequency signal, a wailing rising and falling frequency signal, and a fast wailing signal. The steady signal is frequently used as a civil defense "Alert" or weather emergency signal. The wailing signal is often used as a civil defense "Attack" signal. The fast wail or fire signal is used as a fire signal to summon the local fire department. You can use any of the signals for any desired application. These signals are shown graphically in the following figure.

**Figure 1 Signal Characteristics**



## Ordering Products

Contact our Federal Signal Sales Engineers to design a system that meets your specific requirements.

**Table 1 Ordering Product**

Part Number	Description
2-120	120 Vac/dc, 102 dBc, Roof mount standard
2-240	240 Vac/dc, 102 dBc, Roof mount standard
RC2W-120	120 V Motor Starter
RC2W-240	240 V Motor Starter

**Table 2 Optional Accessories**

Part Number	Description
PMS	Pole Mounting Stand
FSPWARE	Federal Signal programming software (Non-digital applications)
FC	Controller with FC Control Board, no radio
FCH	Controller with VHF radio
FCU	Controller with UHF radio

## Specifications

**Table 3 Specifications**

Power Requirements	120 Vac/dc, single-phase 24 A or 240 Vac/dc, single-phase 12 A
Power	2 HP
Top Frequency - Single Tone	533 Hz (60 Hz) or 444 Hz (50 Hz)
Sound Output	102 dBC at 100 ft (30.5 m - Model 2)
Motor Type	Single phase ball bearing, universal series 120 Vac/dc, or single phase ball bearing universal series 240 Vac/dc
Height	25.5 inches (65 cm)
Diameter	19.6 inches (50 cm)
Net Weight	59 lb (27 kg)
Shipping Weight	85 lb (36 kg)
Operating Temperature	-22°F to 149°F (-30°C to 65°C)

## Installation

**⚠ DANGER**

***ELECTROCUTION HAZARD: Electrocution or severe personal injury can occur when making electrical connections, drilling holes, or lifting equipment. Therefore, installation should be performed by experienced electricians in accordance with national and local electrical codes and ordinances, including any state or local noise-control ordinances.***

**⚠ CAUTION**

***SHOCK HAZARD: The siren and all control devices must be solidly connected to an earth ground. If the siren is installed on a building, ground the system to a metallic object known to be grounded. For pole-mounted installations, drive a metal rod or bar at least two feet (61 cm) into the ground or as close as practical to the base of the pole. Use a separate, continuous 10 AWG or larger wire from the siren frame to ground and the cabinet of each control device to ground.***

**⚠ WARNING**

***MOVING PARTS HAZARD: Moving parts could cause severe cuts or amputation. DO NOT reach into the siren openings.***

## Determining a Suitable Location

**⚠ WARNING**

***SOUND HAZARD: The output level of a siren is capable of causing permanent hearing damage. To prevent excessive exposure, carefully plan siren location and post warnings where excessive levels may be encountered. Refer to OSHA 29 CFR 1910.95 for safe exposure limits.***

***Do not expose personnel to sound levels above 123 dBC.***

Careful consideration of the factors affecting the propagation of sound from the siren and the response of the human ear to the sound will optimize the ability of the siren to warn the community effectively. Follow Federal Emergency Management Agency (FEMA) guidelines when designing the warning system.

The reduction of signal intensity as distance from the siren increases and the minimum desired signal level at the fringe of the area to be covered are important considerations when choosing a siren installation site. As the distance from the siren increases, sound level losses accumulate. These losses result from weather conditions, the terrain, obstructions in the sound path, the pitch of the sound, and the height of the siren.

Optimum sound propagation conditions occur when no obstructions exist in the sound path, the terrain is hard and flat, and the air is blowing away from the source. Under these conditions, you can expect a 6 dB loss per distance doubled. A loss per distance doubled of 10 dB is typically experienced because the atmosphere is rarely calm, terrain may not be flat, and buildings or other obstructions are frequently present in the sound path.

Using a 10 dB per distance doubled loss factor, the following sound levels are predicted for the sirens in the following table.

**Table 4 Sound levels predictions**

<b>Distance</b>	<b>Model 2</b>
100 feet (30.5 m), the sound level is	102 dB
200 feet (61 m), the sound level is	94 dB
400 feet (122 m), the sound level is	86 dB

FEMA studies indicate typical ambient sound levels vary by location as follows:

- Industrial Areas: 70+ dBC
- Urban Areas: 60 dBC
- Rural Areas: 50 dBC

Assuming a typical 10 dB loss per distance doubled and a 70 dB minimum sound level required to warn a typical industrial area, the effective range for a Model 2 Siren is approximately 910 feet (278 meters).

Optimum warning is obtained when the warning signal is at least 10 dB above ambient. Do not expose personnel to sound levels above 123 dBC.

Wind speed and direction often affect the propagation of sound from the siren. Consequently, the direction of the prevailing wind may be a significant factor to consider when selecting the installation site(s) of a small, one- or two-site siren system. For example, if the prevailing wind is from the west, it may be desirable to install the siren toward the western edge of the area to be covered.

Other factors to consider when selecting the installation site(s) include the availability of suitable electrical power, the access to and ease of installation and maintenance, the height of surrounding obstructions, and security against vandalism.

### Installing the Siren

Most siren installations are one of two types: Pole Mount or Flat Surface Mount. These two configurations make it possible to install a siren in almost any situation. If the installations in this manual are not suitable, modification of one of the configurations may be practical.

A siren is typically installed 35 to 40 feet above the ground. If the installation is less than 35 feet above the ground, the sound intensity at close range may increase, but the effective range of the siren may be reduced. Conversely, if the siren is located more than 40 feet above the ground, the effective range of the siren may increase, but the sound may skip over areas closer to the siren. These variables may make it desirable to test the sound coverage of the siren at various heights and locations whenever possible. ALWAYS ensure that the air intakes are clear when the siren is being tested and when it is installed at its final location.

### Pole Installation

A Pole Mounting Stand (Model PMS) is required when mounting the Model 2 on a utility pole. The PMS consists of a mounting plate, three-angle iron legs, six 1/2-inch 13 by 2-inch hex head cap screws, six 1/2-inch 13 nuts, and six 1/2-inch lock washers.

#### **⚠ DANGER**

***ELECTROCUTION HAZARD: Electrocution or severe personal injury can occur when making electrical connections, drilling holes, or lifting equipment. Therefore, installation should be performed by experienced electricians in accordance with national and local electrical codes and ordinances, including any state or local noise-control ordinances.***

#### **⚠ CAUTION**

***SHOCK HAZARD: The siren and all control devices must be solidly connected to an earth ground. If the siren is installed on a building, ground the system to a metallic object known to be grounded. For pole-mounted installations, drive a metal rod or bar at least two feet (61 cm) into the ground or as close as practical to the base of the pole. Use a separate, continuous 10 AWG or larger wire from the siren frame to ground and the cabinet of each control device to ground.***

#### **⚠ WARNING**

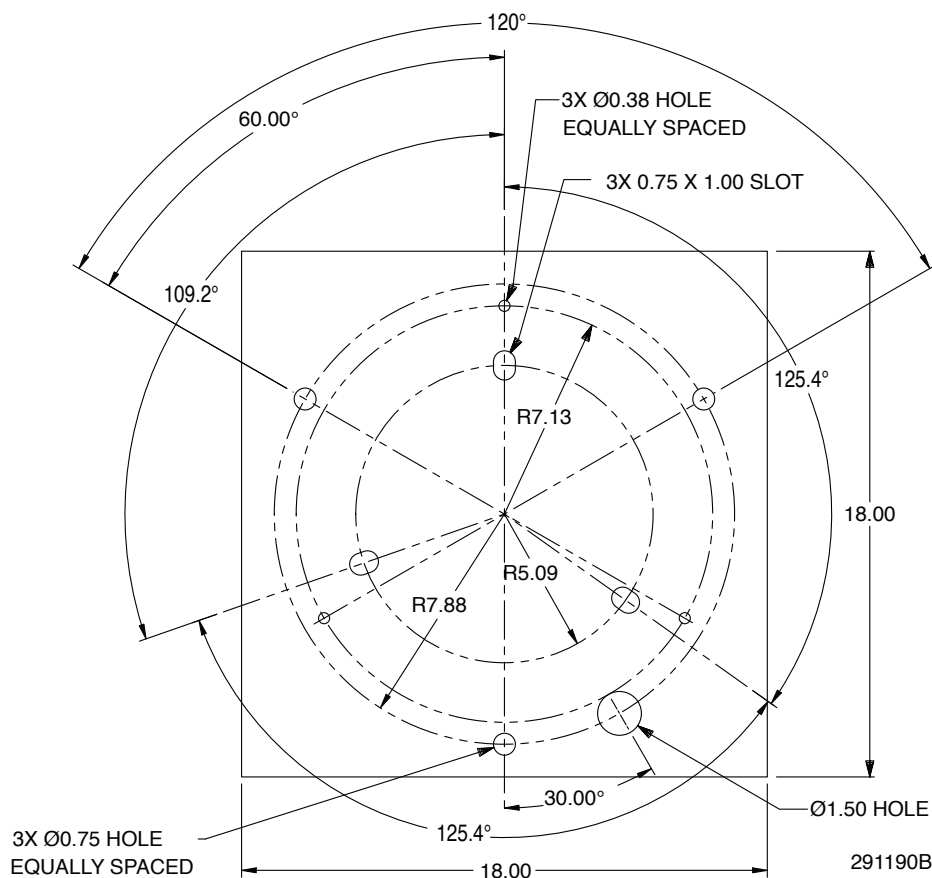
***MOVING PARTS HAZARD: Moving parts could cause severe cuts or amputation. DO NOT reach into the siren openings.***

To install the siren on a pole:

1. Uncrate the siren and remove the siren from the shipping base.
2. Attach the cast iron legs of the siren mechanism to the mounting plate using 3/8-inch lock washers, nuts, and bolts through the three slots in the mounting plate. (See Figure 2.)
3. Set the siren housing over the siren mechanism on the mounting plate. Center the housing over the mechanism. Attach the housing to the plate using aluminum clips, 1/4-inch lock washers, nuts, and bolts through the three 3/8-inch diameter holes. See

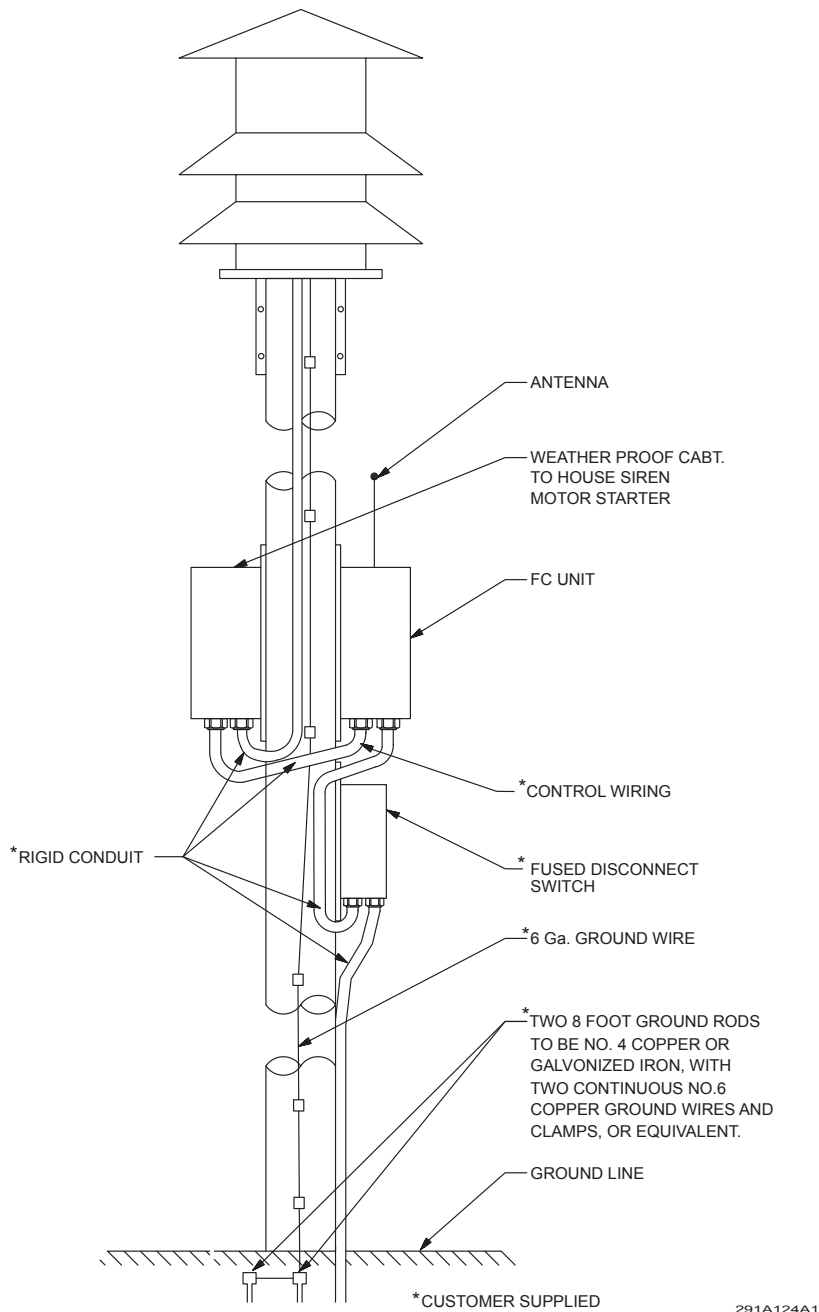
"Figure 2 Mounting Plate Drilling Detail" on page 13 and "Figure 10 Model RC2W Parts Index" on page 26.

**Figure 2 Mounting Plate Drilling Detail**



4. Lay the siren mechanism on its side and attach the three legs to the mounting plate using three-angle iron clips and six 1/2-inch-13 nuts and bolts. Attach the legs through three 3/4-inch by 1-inch slotted holes indicated in Figure 2.
5. Dig the hole for the Class 2 utility pole and lay the pole on the ground as close as is practical to the installation site.
6. With the siren lying on its side and the pole lying on the work surface, attach the siren to the utility pole using at least two 5/8-inch lag bolts at least four inches long (not supplied) for each leg. If necessary, install shims between the siren legs and the pole.
7. Wrap a cable or chain capable of bearing at least one ton around the pole/siren combination at least three times. Wrap the chain or cable around the legs of the siren. Use the chain or cable in conjunction with a crane or hoist capable of lifting at least one ton to erect the pole in accordance with accepted practice.
8. Install the Model RC2W Motor Starter and a fused disconnect switch in a location on the pole that is readily accessible to service personnel but discourages vandalism. The RC2W must be installed in a vertical position for proper operation. Install the electrical devices following NEC recommendations and local electrical codes. A suggested installation configuration is shown in Figure 3.

Figure 3 Typical Model 2 Pole-Mounted Installation



### Flat Surface Mount

Flat surface mount installation is practical when the installation site is on a flat-roofed building. A weight distribution mat is often required to distribute the siren’s weight safely on the roof. A Structural Engineer is required to specify the appropriate mounting method to mount the siren on a roof safely.

Post high sound level warning signs at all roof entry points and be sure that the siren is not blocked by parapets or other obstructions in the siren’s sound path.

**⚠ DANGER**

**ELECTROCUTION HAZARD:** *Electrocution or severe personal injury can occur when making electrical connections, drilling holes, or lifting equipment. Therefore, installation should be performed by experienced electricians in accordance with national and local electrical codes and ordinances, including any state or local noise-control ordinances.*

**⚠ CAUTION**

**SHOCK HAZARD:** *The siren and all control devices must be solidly connected to an earth ground. If the siren is installed on a building, ground the system to a metallic object known to be grounded. For pole-mounted installations, drive a metal rod or bar at least two feet (61 cm) into the ground or as close as practical to the base of the pole. Use a separate, continuous 10 AWG or larger wire from the siren frame to ground and the cabinet of each control device to ground.*

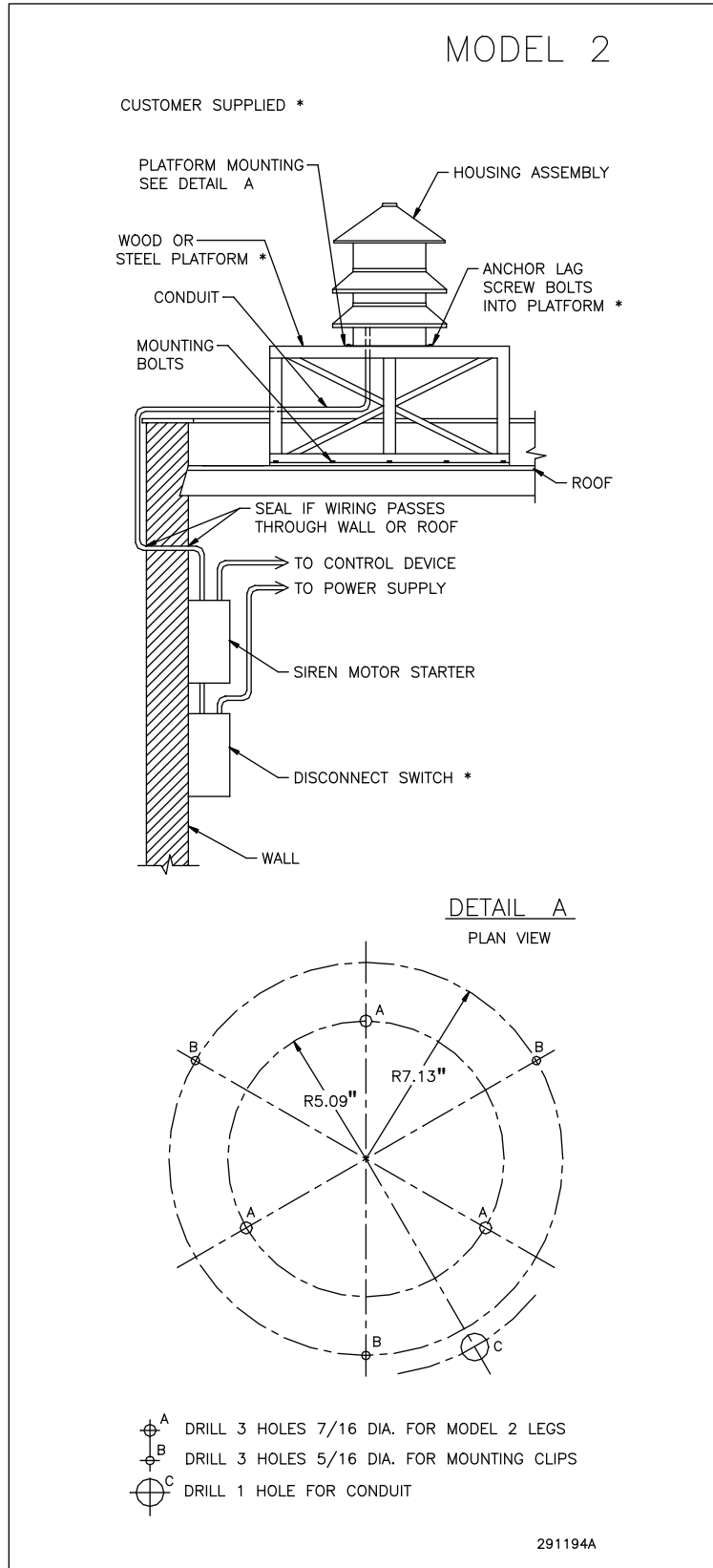
**⚠ WARNING**

**MOVING PARTS HAZARD:** *Moving parts could cause severe cuts or amputation. DO NOT reach into the siren openings.*

To flat surface mount the siren:

1. Center the siren mechanism on the mounting surface, and using the mounting holes in the legs of the mechanism as a template, drill three 7/16-inch holes in the mounting surface. (See Figure 4.)
2. Temporarily set the siren housing over the siren mechanism on the mounting plate. Center the housing over the mechanism.
3. Using the housing and the aluminum clips as a template, drill three 1/4-inch holes approximately equidistant around the circumference of the housing. Lift the housing off the siren. It will be reinstalled later.
4. Mount the siren/base plate assembly on the mounting surface using lag bolts or nuts and bolts as appropriate. Do NOT replace the housing on the siren. It will be replaced later. If the siren is mounted directly on a roof (without a platform or weight distribution mat), be sure to install waterproof joints where the mounting bolts pass through the roof so that water does not enter the building.
5. Install the RC2W Motor Starter, fused disconnect switch, and other control devices as close as is practical to the siren following local electrical codes and NEC recommendations. If the siren is installed on the roof of a building, it may be desirable to install the RC2W and other control devices inside the building. The unit must be installed vertically to operate correctly. (See Figure 4.)

Figure 4 Typical Model 2 Platform Mount





## Electrical Connections

For FC Controller wiring connections, see the FC, FCH, and FCU Models manual (part number 255294). For the FCTB Controller wiring connections, see the FCTBD Models manual (part number 255326).

### **⚠ DANGER**

**ELECTROCUTION HAZARD:** *Electrocution or severe personal injury can occur when making electrical connections, drilling holes, or lifting equipment. Therefore, installation should be performed by experienced electricians in accordance with national and local electrical codes and ordinances, including any state or local noise-control ordinances.*

### **⚠ CAUTION**

**SHOCK HAZARD:** *The siren and all control devices must be solidly connected to an earth ground. If the siren is installed on a building, ground the system to a metallic object known to be grounded. For pole-mounted installations, drive a metal rod or bar at least two feet (61 cm) into the ground or as close as practical to the base of the pole. Use a separate, continuous 10 AWG or larger wire from the siren frame to ground and the cabinet of each control device to ground.*

The power and control circuitry of a typical Model 2 installation is shown in Figures 5 and 6. The schematic diagram of the Model RC2W Motor Starter is also shown in the figures.

**Figure 5 Contactor Wiring for Model 2 using 120 Vac**

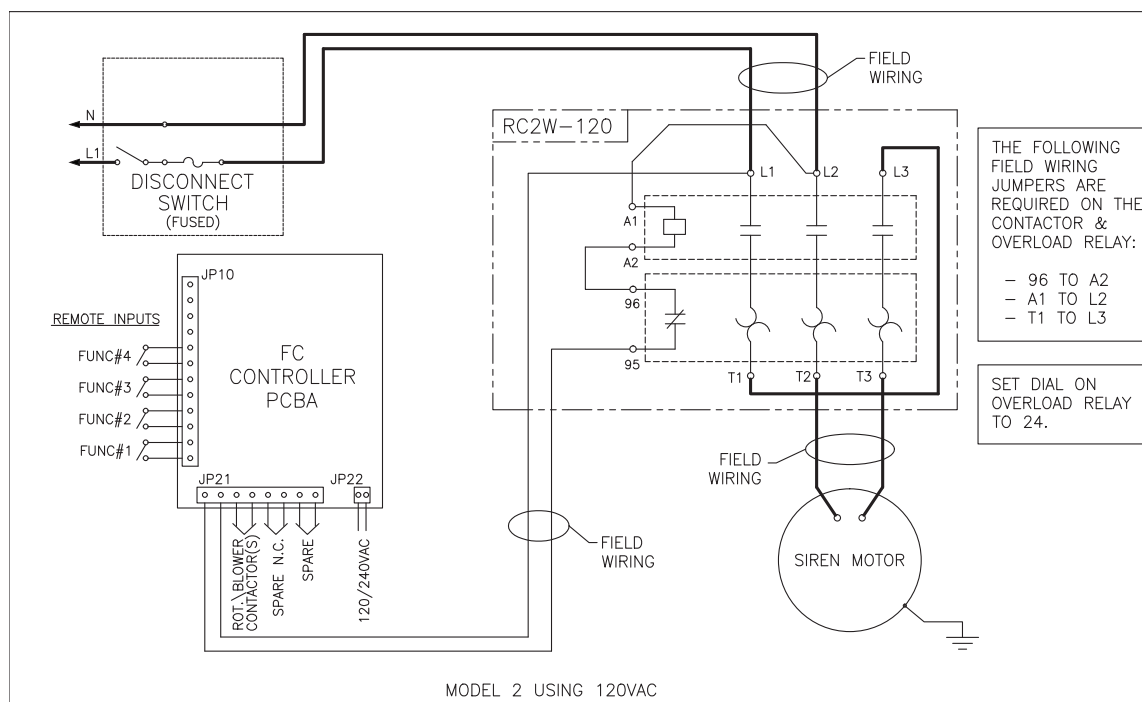
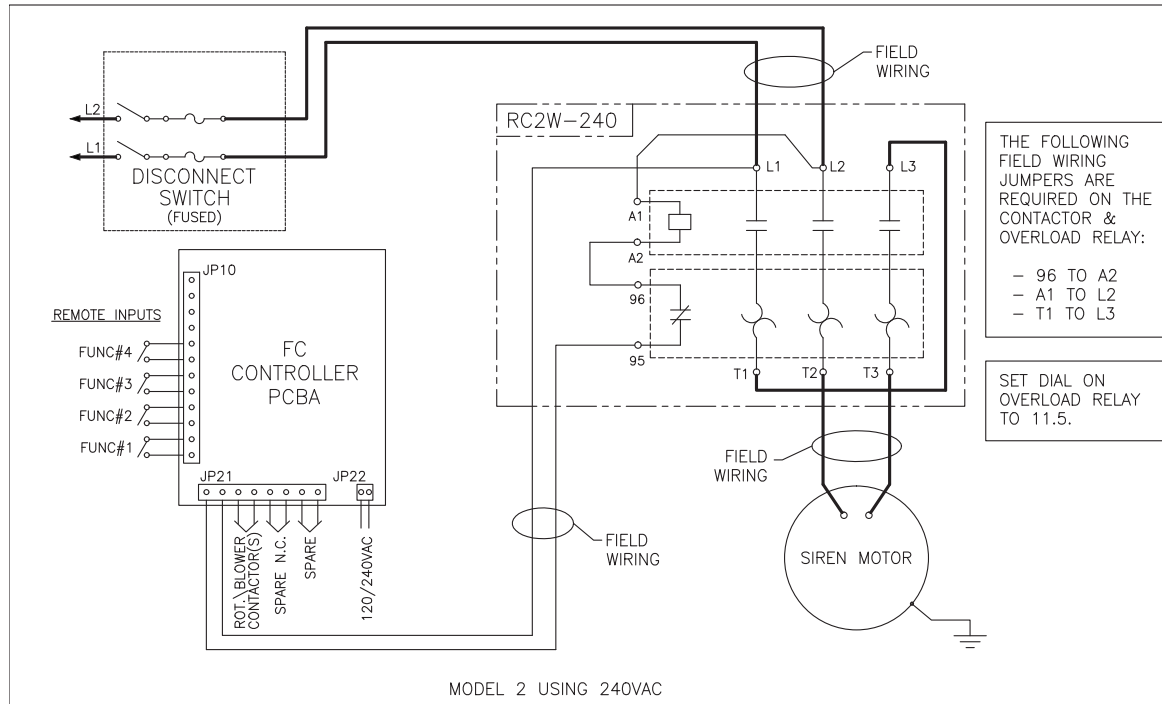


Figure 6 Contactor Wiring for Model 2 using 240 Vac



To connect the motor starter and siren to the power source and control circuitry:

1. Install conduit between the RC2W and the electrical leads on the side of the siren motor.
2. Install conduit between the RC2W and the disconnect switch.
3. Install conduit between the disconnect switch and the electrical power source. If the siren is installed on a utility pole, add an entrance cap to the end of the conduit as shown in Figure 3.
4. Route two wires of the proper size from T2 and T3 in the RC2W through the conduit to the siren motor leads.
5. Route two wires of the proper size from L1 and L2 through the conduit to the power disconnect switch.
6. Route two wires of the proper size from the disconnect switch to the power source.
7. Connect the FC Controller to terminals L1 and 95 in the motor starter. See Figures 5 and 6.
8. Replace the housing on the siren.

## Pre-operation Checkout

After the siren has been completely installed, perform the following checks before putting the siren into service.

**⚠ WARNING**

**SOUND HAZARD: The output level of a siren is capable of causing severe hearing discomfort or permanent hearing damage. Therefore, ALWAYS wear hearing protection when performing tests or maintenance on the siren.**

- Make sure that all air intakes and sound outlets are not obstructed.
- For local test activation see the FC, FCH, and FCU Models manual part number 255294.
- Check the operation of the control circuitry by initiating one or more signals from the FC Controller.

After the installation is complete and it has been established that the siren is operating properly, Federal Signal recommends that all control devices be padlocked to discourage tampering and vandalism.

## Circuit Description

The Model RC2W is used to operate a Model 2 Siren.

The RC2W is a motor starter that switches the power to the Model 2 siren. The RC2W requires a siren controller to provide Steady and Wail type siren signals typically used for warning applications. The siren controller will hold a contact closed to activate the RC2W for a Steady signal and cycle the contact open and closed to create a Wail signal. The RC2W also provides overload protection for the siren motor.

As shown in Figures 5 and 6, the motor starter includes an overload relay. The relay protects the motor starter and the motor if excess current is drawn. The overload relay is activated when there is sufficient current through one or more of its heaters to cause the heater(s) to expand enough to open the relay contacts. The opening of the relay contacts opens the motor starter control circuit. As a result, the motor starter de-energizes, protecting the circuit against damage. The overload relay can also be reset manually after approximately one minute.

## Service and Maintenance

**⚠ DANGER**

***ELECTROCUTION HAZARD: Service or maintenance should be performed by qualified personnel familiar with the siren, associated controls, and power sources being used and in conjunction with the authorities having jurisdiction.***

***The siren has moving parts and high operating currents that could cause severe personal injury, electrocution, or death. Before servicing or maintaining, ensure that remote activation cannot occur and disconnect power to the siren and its controls.***

### Testing and Inspecting the Siren

Test the siren for proper operation at least once a month. A daily test at noon, curfew, or other selected time is preferred. This enhances the usefulness of the siren and instills public confidence in the reliability of the warning system.

To minimize the possibility of siren failure, inspection and maintenance at regular intervals is desirable. Therefore, Federal Signal recommends performing the following procedures at least once a year. However, it may be necessary to increase the frequency of this procedure if the siren is used frequently or if it is used in an extreme climate.

### Inspecting the Motor Brushes

To inspect the motor brushes:

1. Remove the housing and inspect the motor brushes. Replace the brushes if necessary.
2. Inspect all electrical and mechanical connections. Make sure that all fasteners are properly tightened.
3. Inspect the siren installation to be sure that it is vertically oriented. Take corrective action if a pole-mounted installation is more than 5 degrees from vertical or a roof or flat surface mount is more than 10 degrees from vertical to prevent lubrication losses and excessive motor bearing wear.
4. Examine all painted surfaces. Repaint as necessary.

### Corrective Maintenance

#### Troubleshooting

"Table 5 Troubleshooting" on page 21 is provided to assist repair personnel when troubleshooting a siren malfunction. This section also includes diagrams that may be helpful if the siren or control devices need to be repaired.

**⚠ WARNING**

***MOVING PARTS HAZARD: Moving parts could cause severe cuts or amputation. DO NOT rotate the commutator by sticking your fingers in the stator ports and pushing on any part of the rotor.***

**Table 5 Troubleshooting**

Trouble	Possible Cause	Solution
Siren motor inoperative	Motor Starter overload relay tripped.	Reset Relay.
	Open circuit between motor starter and motor.	Check wiring for continuity.
	Rotor Jammed.	Check rotor for free rotation. Remove material causing jamming.
	Siren motor defective.	Check motor and repair or replace if necessary.
	Faulty overload relay.	Replace overload relay.
Motor starter inoperative	Faulty motor starter control winding.	Replace contactor.
	Motor starter overload relay tripped.	Reset relay.
	Faulty overload relay.	Replace overload relay.
	Open circuit between disconnect switch and motor.	Check wiring for continuity. Repair or replace wire as necessary.
	Open circuit between control equipment and motor.	Check wiring for continuity. Repair or replace wire as necessary.
	Faulty control device(s).	Repair or replace as necessary.

### Model 2 Motor Brush Replacement

To replace the Model 2 motor brush:

1. Loosen the clips that hold the siren housing to the mounting surface. Lift off the housing.
2. Remove the insulated cap from the Armature Brush Holder and slide out the worn armature brush. Do not loosen or remove the brush holder.
3. Install the replacement brush and replace the cap. Ensure that the brush is seated correctly before tightening the cap. Make sure that the cap seats properly. However, do not tighten the cap excessively, or it may break.

### Model 2 Armature and Field Replacement

To replace the armature:

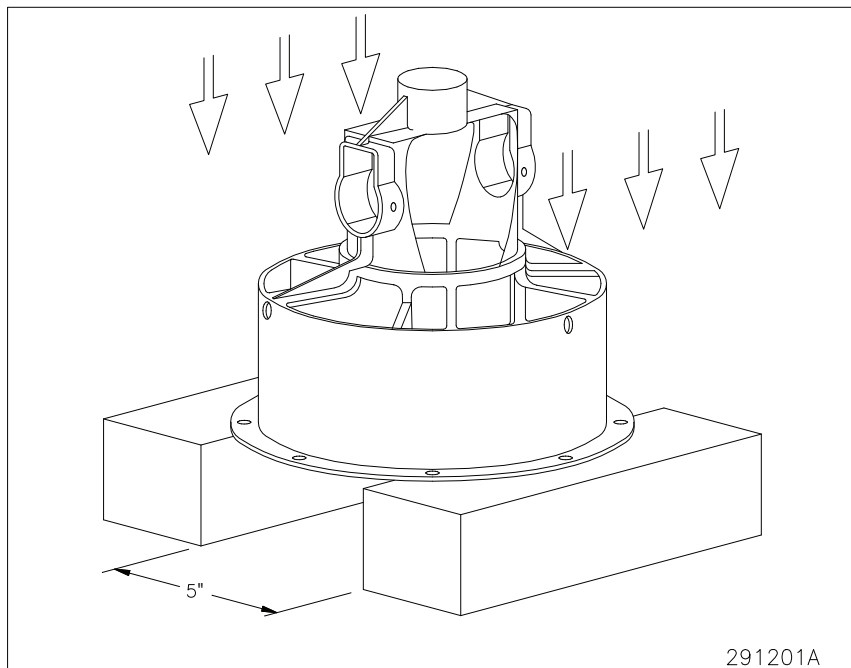
1. Turn off the power to the siren at the disconnect switch.
2. Remove the siren housing from the mechanism.
3. Disconnect the electrical power wiring from the siren motor.
4. Remove the mechanism from the mounting surface. If desired, the legs can also be removed from the mechanism.
5. Remove the four bolts holding the chopper rotor and armature to the stator. Lift out the rotor and armature.

6. Remove the lock nut and lock washer from the armature.
7. Use a bearing puller to pull both roller bearings from the armature shaft.
8. Use a hydraulic press to separate the armature from the chopper rotor.
9. When installing a new armature, it may be necessary to change the electrical connections of the field. Therefore, refer to the instructions included with the replacement armature for the correct field connections.
10. Install the replacement armature and reinstall the siren following steps 1 through 8 in reverse.

To replace the field:

1. Turn off the power to the siren at the disconnect switch.
2. Remove the siren housing from the mechanism.
3. Disconnect the electrical power wiring from the siren motor.
4. Remove the siren mechanism from the mounting surface. If desired, the legs can also be removed from the mechanism.
5. Remove the field-retaining ring from the motor housing.
6. Arrange two spacers consisting of 4 by 4-inch (102 x 102 mm) lumber or similar material, approximately 5 inches (127 mm) apart, on a solid work surface as shown in Figure 7.
7. Sharply rap the motor housing against the spacers several times until the field drops out of the motor housing. The motor housing is aluminum die casting. As a result, it can be broken or damaged. Therefore, use caution to ensure that the motor housing strikes the spacers squarely as indicated in Figure 7.

**Figure 7 Model 2 Field Removal**



**NOTE:** It is unnecessary to follow the procedure described in steps 8 through 11 if a hydraulic press is available to press the replacement field into the motor housing.

8. Fabricate two 8-inch (203 mm) guide pins from 3/16-inch (5 mm) metal rod. Taper these pins as indicated in Figure 8.
9. Insert the tapered end of the pins into the threaded holes in the field holder ring, as indicated in Figure 8.
10. Set the new field on the motor housing with the guide pins passing through the two mounting holes in the body of the field, as shown in Figure 8. Be sure that the four wires are in the position shown in Figure 8.
11. Set a length of 3/8-inch (9.5 mm) steel bar stock approximately 5 inches (127 mm) long, or a similar object, on the field as illustrated in Figure 8. Drive the field into the motor housing by firmly and squarely tapping the bar with a hammer. Use caution to avoid cutting or otherwise damaging the wires that are connected to the field.
12. Connect the two wires having rings to the motor brush holders, one wire to each brush holder.
13. Reinstall the field-retaining ring.

**Figure 8 Model 2 Field Replacement**

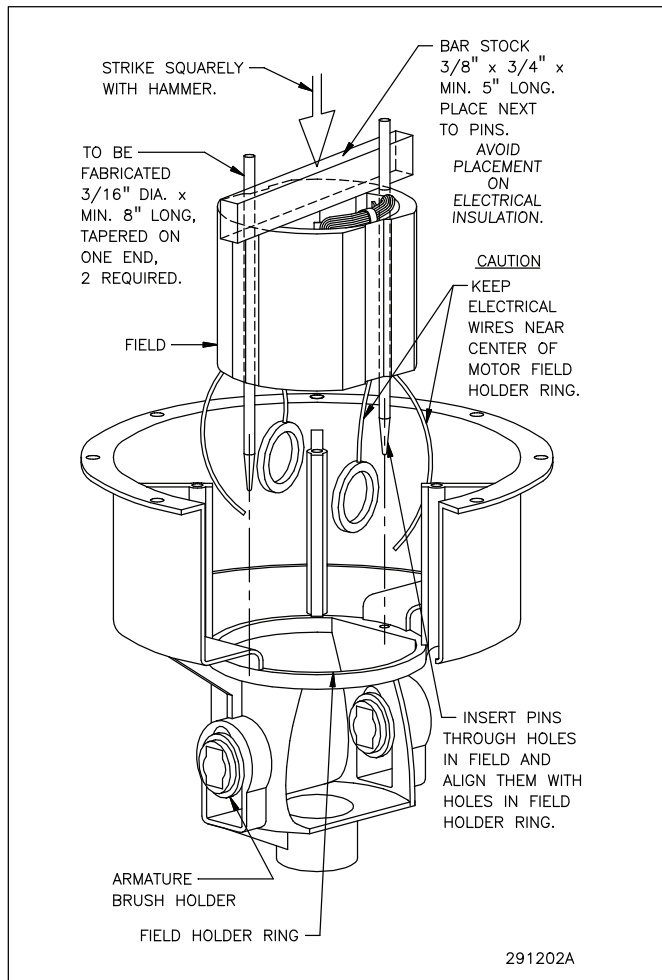


Figure 9 Model 2 Parts Index

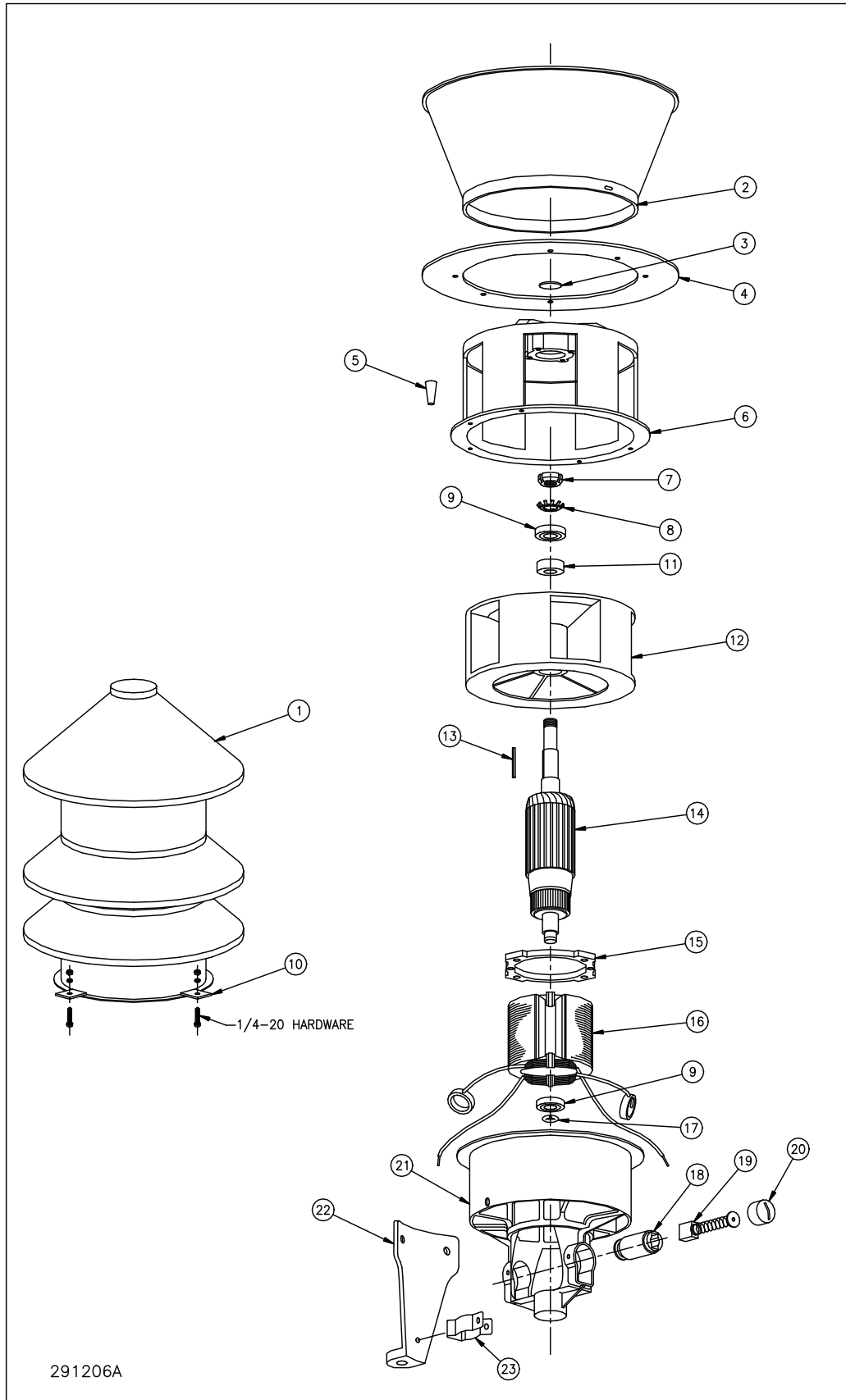




Table 6 Model 2 Siren Parts List

Index No.	Description	Part No.	Qty.
1	Housing Assembly, Galvanized Steel	8155B086	1 AR
2	Projector	8247C006	1
3	Plug	8283A120	1
4	Baffle Plate	8247C007	1
5	#5 x 1 inch Taper Pin	8400A229	2
6	End Bell, Stator	L01-02	1
7	Locknut	L01-15	1
8	Lock Washer	L01-16	1
9	Bearing	8239A045	2
10	Mounting Clip	8155109A	3
11	Rotor Spacer and Bearing Stop	L01-08	1
12	Rotor	L01-21	1
13	Key	8247A057	1
14	Armature (120 V)	847B041G	1 AR
	Armature (240 V)	8247B039G	
15	Field Locking Ring	L01-20	1
16	Field (120 V)	8247B042G	1 AR
	Field (240 V)	8247B040G	
17	Spring Lock Washer, Lower Bearing	L01-11	1
18	Brush Holder	8247A021	2
19	Brush and Spring	8247A020	2
20	Brush Holder Cap	8247A022	2
21	Motor Housing	L01-03	1
22	Legs	L01-4A	3
23	Cable Hanger	8400A211	1

Figure 10 Model RC2W Parts Index

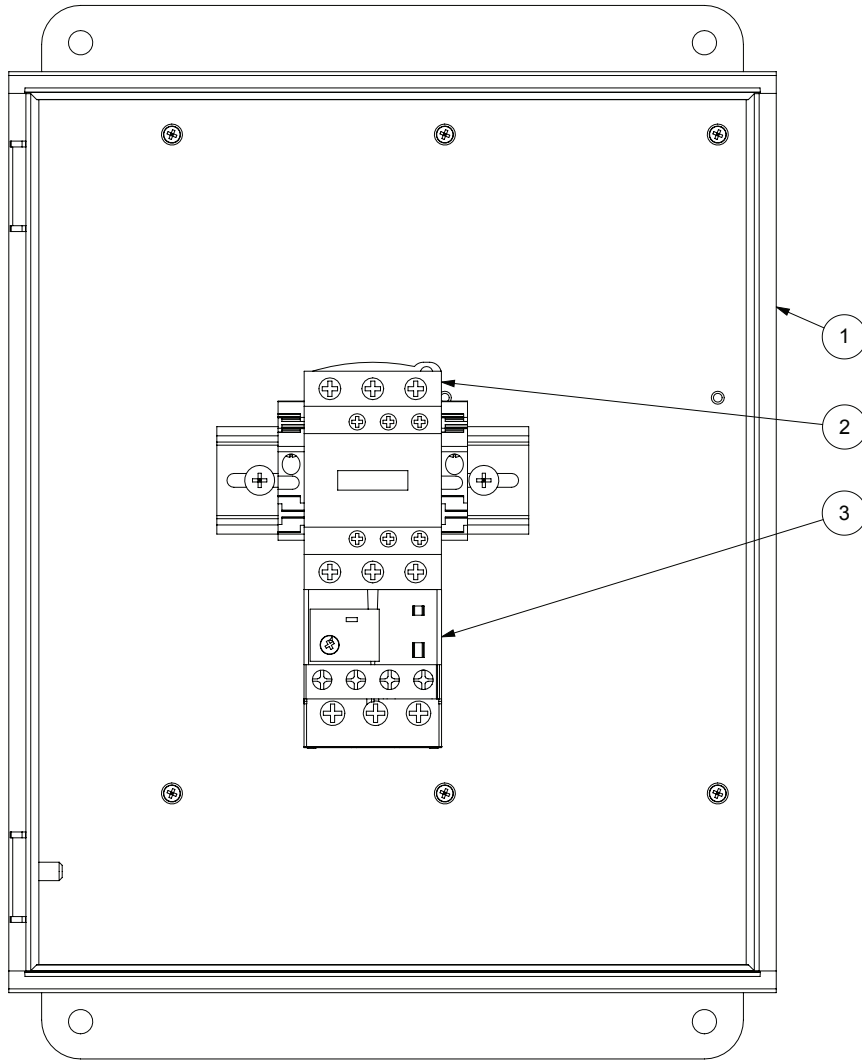


Table 7 Models RC2W-120 and RC2W-240 Siren Remote Control Parts List

Item No.	Description	Part No.	Qty.
1	NEMA Type 4 Cabinet	170314A	1
2	120 Vac Contactor (RC2W-120)	Q13102446A	1
	240 Vac Contactor (RC2W-240)	Q13102448A	1
3	Overload Relay, 24 A (RC2W-120)	Q13102447A	1
	Overload Relay, 13 A (RC2W-240)	Q13102449A	1

# Replacement Parts

To order replacement parts, call Customer Care. See Getting Service.

**Table 8 Replacement Parts**

Description	Part Number
Bearing (Two Required)	Q8239A045
Brush and Spring (Two Required)	Q8247A020
Brush Holder (Two Required)	Q8247A021

# Getting Service

If you are experiencing any difficulties, contact Federal Signal Customer Care at 800-548-7229 or 708-534-3400 extension 7511 or Technical Support at 800-524-3021 or 708-534-3400 extension 7329 or through e-mail at [techsupport@fedsig.com](mailto:techsupport@fedsig.com). For instruction manuals and information on related products, visit <http://www.fedsig.com/>

## Appendix A ICM-AC Mechanical Siren Head Checklist

Type of service performed:  Install  Commissioning  Maintenance

**⚠ CAUTION**

Ensure ear protection safety measures are followed and disable capability of chopper motor activation while servicing the siren head.

Project Information		
1. Customer name:	2. FS order #:	
3. Installation company:	4. Installation complete date(s):	
5. Installation contact(s):	6. Contact #:	
7. Service provider company:	8. Service date(s):	
9. Service provider contact(s):	10. Contact #:	

Siren Head Inspection and Maintenance		
11. Site #:	12. Siren head type:	13. Siren head serial number:
14. GPS Lat:	15. GPS Long:	16. Address:
17. Siren head appears level: <input type="checkbox"/> Yes <input type="checkbox"/> No	18. Verify the chopper rotates freely: <input type="checkbox"/> Yes <input type="checkbox"/> No	
19. Examined chopper motor brushes: <input type="checkbox"/> Yes <input type="checkbox"/> No	20. Do the chopper brushes need replacement: <input type="checkbox"/> Yes <input type="checkbox"/> No If brushes need replacement, complete procedure in manual.	
21. Examined and cleaned chopper motor commutator <input type="checkbox"/> Yes <input type="checkbox"/> No	22. Does the commutator need replacement: <input type="checkbox"/> Yes <input type="checkbox"/> No If pitting or wear on the commutator is found, the unit will need to be rebuilt/replaced.	
23. Inspected painted surface: <input type="checkbox"/> Yes <input type="checkbox"/> No	24. Inspect or replace the housing if applicable: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
25. Audibly sounded siren tones: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A If No, have customer sign "Waiver of Complete Testing" form.		
25. Verified siren operation complete: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A If siren head repair is required, please complete those steps first before answering Yes.		

27. Notes: (List of individuals trained if applicable)

28. Service provider:	29. Completion Date:
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<sup>30</sup> When complete, email to [finvoices@fedsig.com](mailto:finvoices@fedsig.com) For telephone support, please call Technical Support (800) 524-3021.

2645 Federal Signal Drive, University Park, Illinois, 60484 | Technical Support (800) 524-3021 | Customer Support (800) 548-7229