FEDERAL SIGNAL
Safety and Security Systems

Mobile Camera Systems

Installation and Operation 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. A copy of this limited warranty can also be obtained by written request to Federal Signal Corporation, 2645 Federal Signal Drive, University Park, IL 60484, email to info@fedsig.com or call +1 708-534-3400.

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

FEDERAL SIGNAL
Safety and Security Systems

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Safety Messages to Installers of Federal Signal Mobile Camera Systems

⚠ WARNING

People's lives depend on your proper installation of our 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:

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

- The mobile camera system is only a supplement to the rear-view/side-view mirrors of the vehicle. The system is not a substitute for the proper use of the rear-view/side-view mirrors of the vehicle. Always use caution when backing up.

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

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

- Locate the camera(s) so the VEHICLE and SYSTEM can be operated safely under all driving conditions.

- Frequently inspect the camera system to ensure that it is operating properly and is securely attached to the vehicle. The front face of any installed cameras should be kept clean and free from any accumulated dirt or grime so that the cameras may provide the clearest image. Obstructions to the camera image limit the effectiveness of the system.

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

- Do not open or service the camera element. There are no user-serviceable parts inside. Opening or servicing any component will void the component's warranty.

- 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 to you or others.

An Overview of the Mobile Camera Systems

Federal Signal Mobile Camera Systems provide drivers of vehicles used in towing and recovery, fire/EMS, utilities, highway maintenance/DOT, sanitation, construction, and many other industries an extended field of view when backing up or maneuvering their vehicles in environments where optimum visibility is important for enhanced safety. Designed exclusively for professional applications, all Federal Signal systems and components are built with the distinct needs of the commercial/industrial market in mind and are backed by our two-year warranty.

Turnkey Systems

The following turnkey mobile camera systems are available:

CAMSET56-NTSC-2

CAMSET70-NTSC4B

CAMSETMIR-4RW

Each system includes a monitor, a standard rear-view camera, a camera-to-monitor extension cable, and accessories. Components and systems that are NTSC-compatible include "NTSC" in the part number, and those that are PAL-compatible include "PAL" in the part number. The NTSC video standard is primarily a North American video standard, whereas the PAL video standard is predominantly a European video standard.

CAMSET56-NTSC-2

This system includes:

- a 5.6-inch color AHD LCD monitor (CAMLCD-INT-56)

- a high-resolution rear-view camera with infrared low-light vision capability and a microphone, with a mounting hardware kit (CAMCCD-REARNTSC)

- a 65.5 ft (20 m) camera-to-monitor extension cable (CAMCABLE-20)

- an input/power/trigger wiring harness with inputs and independent triggers for two cameras (CAMADP-INT-2)

- a monitor mounting bracket with mounting hardware (CAMBRK-HD)

  Features:

  - Support for one or two cameras—an optional additional camera can connect to the CAM2 connector on the input/power/trigger wiring harness

  - Automatic triggering of either of two connected cameras via individual camera trigger wires

  - Individual camera settings that are configurable for normal view or mirror-image view

  - Easy setup with a minimum of connections

  - Intuitive controls on the monitor for adjusting the picture quality of the image and the volume of the built-in microphone of the connected camera (as applicable)

  - CAMCCD-REARNTSC is IP68-rated for challenging commercial applications that require a waterproof and dustproof camera

CAMSET70-NTSC4B

This system includes:

- a 7.0-inch color TFT LCD monitor (CAMLCD-INT-70-B)

- a high-resolution rear-view camera with infrared low-light vision capability and a microphone, with a mounting hardware kit (CAMCCD-REARNTSC)

- a 65.5 ft (20 m) camera-to-monitor extension cable (CAMCABLE-20)

- a four individual trigger wires for each of the available camera inputs

- Input/power/trigger wiring harness with inputs and independent triggers for four cameras (CAMADP-INT-4)

- Monitor mounting bracket with mounting hardware (CAMBRK-HD)

Features:

- Support for one to four cameras—optional additional cameras can connect to one of the available inputs

- Automatic triggering of any of up to four connected cameras via individual camera trigger wires

- Individual camera settings that are configurable for normal view or mirror-image view

- Easy setup with a minimum of connections

- Split-screen viewing of multiple connected cameras

- Intuitive controls on the monitor for adjusting the picture quality of the image and volume of the built-in microphone of the connected camera (as applicable)

- CAMCCD-REARNTSC is IP68-rated for challenging commercial applications that require a waterproof and dustproof camera

Monitors
- 5.6-inch monitor (CAMLCD-INT-56): up to two cameras can be connected

- 7.0-inch monitor (CAMLCD-INT-70-B): up to four cameras can be connected (split-screen viewing enabled)

Cameras
- Standard rear-view camera (CAMCCD-REARNTSC)

- Flush-mount camera (CAMCCD-FLSHNTSC)

- Side-view camera (CAMCCD-SIDENTSC)

- Ball camera (CAMCCD-BALLNTSC)

- Dome camera (CAMCCD-DOMENTSC)

Camera-to-monitor extension cables (one per camera)

- 4 inches (0.1 m) (CAMCABLE-SHORT)

- 16.5 feet (5 m) (CAMCABLE-5)

- 33 feet (10 m) (CAMCABLE-10)

- 49 feet (15 m) (CAMCABLE-15)

- 65.5 feet (20 m) (CAMCABLE-20)

- 131 feet (40 m) (CAMCABLE-40)

Installing the Mobile Camera System

After unpacking the system components, examine them for damage that may have occurred in transit. If a component 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 the packing list are contained in the packing carton.

Installing the Rear-View Camera (CAMCCD-REARNTSC)

Before the installation, find an appropriate location for the rear-view camera with these considerations in mind:

- Although the camera is waterproof, repeatedly exposing it to direct, high-pressure streams of water (as from a pressure washer) is not recommended.

- The material properties and thicknesses of vehicle bodies vary widely. The included hardware can accommodate many different vehicle installations. However, exercise judgment when drilling holes into vehicle surfaces.

- 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. (All Federal Signal camera systems include grommets.) Ensure that the mounting screws do not cause electrical or mechanical damage to the vehicle.

- This camera is recommended for rear-view applications in heavy-duty vehicles. In most installations, the trigger wire of this camera would be connected to the reverse lights of the vehicle for automatic viewing when the vehicle is operating in reverse. The camera is also equipped with night vision and audio capability.

- If the camera is to be used in a typical backup camera application, the camera should be positioned so that the driver can obtain a wide, unobstructed field of vision behind the vehicle.

Preparing to install the Rear-View Camera

To prepare to install the camera:

1. Open the camera mounting hardware kit, which has:

- four self-tapping screws
- four machine screws with matching lock washers, flat washers, and nuts
- four plastic screw insulators
- an insulating pad
- an Allen® wrench
- waterproofing tape

2. Use the Allen wrench to remove the sun shield and camera from the mounting bracket so that the bracket can be used as a template for marking drill-hole locations. See Figure 1.

Figure 1 Rear-view camera installation (CAMCCD-REARNTSC)

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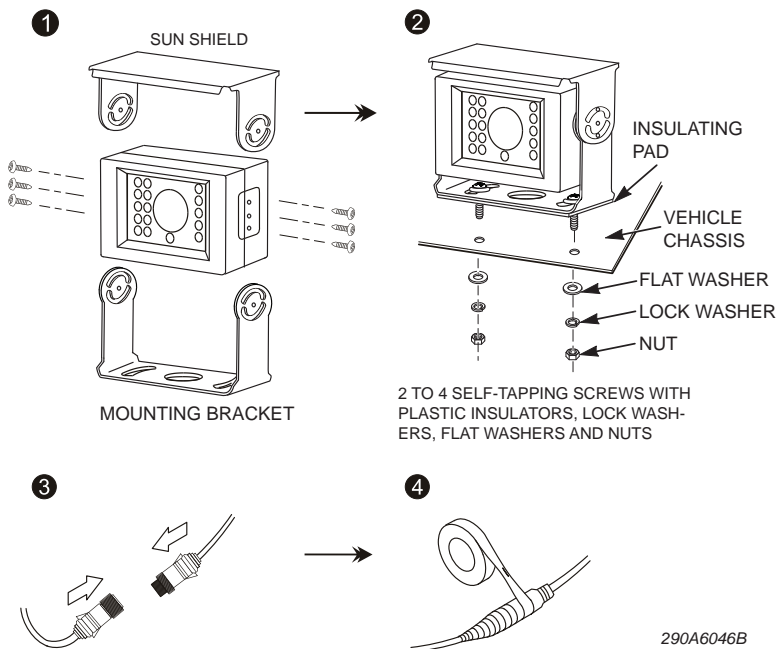
Marking and Drilling the Mounting Holes for the Rear-View Camera

⚠ **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.

⚠ **WARNING**

SEAT REMOVAL PRECAUTION: If a vehicle seat is temporarily removed, verify with the vehicle manufacturer if the seat needs to be recalibrated for proper airbag deployment. Failure to heed this warning could result in death or serious injury.

⚠ **CAUTION**

LOCATING OPERATORS CONTROLS: Locate the camera(s) so the VEHICLE and SYSTEM can be operated safely under all driving conditions. Failure to heed this caution could result in driver distraction or driver error while operating the vehicle.

To mark and drill the mounting holes:

1. Use the camera mounting bracket as a guide to mark the locations of two to four mounting holes to be drilled into the vehicle (Figure 1). These locations should lie in the two channels on either side of the circular hole in the center of the bracket.

NOTICE

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

2. Mark a location for a 3/4-inch (19.0 mm) hole, typically centered between the marked locations of the mounting holes, which will accept the rubber grommet on the camera output cable. Once you drill the center hole, you can route the camera output cable through it to:

- a camera-to-monitor extension cable that can be:
  - ◦ one CAMCABLE-SHORT/-5/-10/-15/-20/-40

    that is then connected to

  - ◦ either the CAM1 or CAM2 input on the input/ power/trigger wiring harness (CAMADP-INT-2) of the CAMLCD-INT-56 monitor *or*

  - ◦ one of the four camera inputs on the input/power/ trigger wiring harness (CAMADP-INT-4) of the CAMLCD-INT-70-B

3. Drill holes at the drill position marks that are correctly sized for the screws you are using:

- If you are using the self-tapping screws, drill two to four 9/64-inch (3.5 mm) holes.

- If you are using the machine screws, drill two to four 13/64-inch (5.2 mm) clearance holes.

4. Drill a 3/4-inch (19.0 mm) hole at the mark for the camera output cable. Smooth and deburr the hole.

Mounting the Rear-View Camera

To mount the camera:

1. Install the insulating pad on the bottom of the camera mounting bracket. If you are using the center hole in the bracket for the camera output cable, route the cable through the hole.

2. Align the mounting bracket with the drilled mounting holes, guide the camera output cable into the 3/4-inch (19.0 mm) hole, and secure the rubber grommet in the hole.

3. To fasten the mounting bracket to the vehicle, choose the appropriate screws for the mounting holes you drilled:

- If you are using the self-tapping screws, guide each screw through a plastic insulator and then through one of the two channels in the mounting bracket and into the drilled holes. Fasten the screws tightly to the vehicle body.

- If you are using the machine screws, guide each screw through a plastic insulator and then through one of the two channels in the mounting bracket into the drilled holes. On the opposite side of the vehicle chassis at the mounting location, install the flat washer followed by the lock washer and nut. Fasten the mounting hardware tightly to the vehicle body.

4. Connect one of these camera extension cables to the camera:

  • one CAMCABLE-SHORT/-5/-10/-15/-20

  • one CAMCABLE-40

5. Wrap the cable connection in the supplied black waterproofing tape.

Installing the Side-View Camera (CAMCCD-SIDENTSC)

Before the installation, find an appropriate location for the side-view camera with these considerations in mind:

• Although the camera is waterproof, repeatedly exposing it to direct, high-pressure streams of water (as from a pressure washer) is not recommended.

• The material properties and thicknesses of vehicle bodies vary widely. The included hardware can accommodate many different vehicle installations. However, exercise judgment when drilling holes into vehicle surfaces.

• This camera is recommended for installation on either the left or right side of a vehicle. Typically, the trigger wire for the camera is connected to the turn signal circuit of the vehicle for automatic viewing when the vehicle is turning. The camera is also equipped with night vision and audio capability.

• 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. (All Federal Signal cameras include grommets.) Ensure that the mounting screws do not cause electrical or mechanical damage to the vehicle.

- If the camera is to be used in a typical side-view camera application, the camera should be positioned so that the driver can obtain a wide, unobstructed field of vision of the left or right side of the vehicle.

Preparing to Install the Side-View Camera

1. Open the camera mounting hardware kit, which has:

   - four self-tapping screws

   - four machine screws with matching lock washers, flat washers, and nuts

   - an Allen® wrench for adjusting the orientation of the camera cover (left or right side of vehicle)

   - waterproofing tape

2. To access the mounting holes in the base as a guide for marking drill-position holes, remove the four screws that secure the camera cover. See Figure 2.

Figure 2 Side-view camera installation (CAMCCD-SIDENTSC)
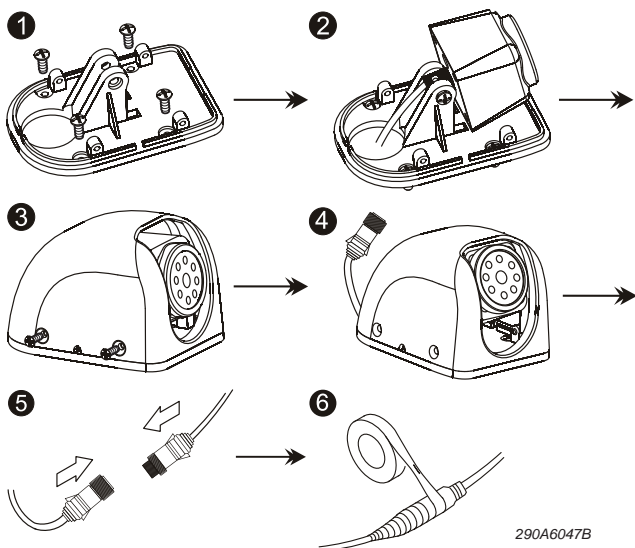
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To verify the orientation of the camera in its housing before the installation, connect the camera to the monitor and turn on the system.

You can adjust the camera assembly inside the housing for either the left or right side of the vehicle. If the image on the monitor appears upside down on the preferred installation side of the vehicle, use the Allen® wrench to remove and flip the camera assembly 180 degrees. Then install it to switch the camera from a left-side-view camera to a right-side-view camera or vice-versa.

Marking and Drilling the Mounting Holes for the Side-View Camera

⚠ 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.

⚠ WARNING

SEAT REMOVAL PRECAUTION: If a vehicle seat is temporarily removed, verify with the vehicle manufacturer if the seat needs to be recalibrated for proper airbag deployment. Failure to heed this warning could result in death or serious injury.

⚠ CAUTION

LOCATING OPERATORS CONTROLS: Locate the camera(s) so the VEHICLE and SYSTEM can be operated safely under all driving conditions. Failure to heed this caution could result in driver distraction or driver error while operating the vehicle.

To mark and drill the mounting holes:

1. Use the mounting base as a guide to mark the locations of four mounting holes on the vehicle chassis and the 3/4-inch (19.0 mm) hole for the camera output cable. Once you drill this hole, you can route the camera output cable through it to:

- a camera extension cable that can be:
  - one CAMCABLE-SHORT/-5/-10/-15/-20/-40

    that is connected to:

  - either the CAM1 or CAM2 input on the input/power/trigger wiring harness (CAMADP-INT-2) of the CAMLCD-INT-56 monitor or

  - one of the four camera inputs on the input/power/trigger wiring harness (CAMADP-INT-4) of the CAMLCD-INT-70-B

NOTICE

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

2. Whether you are using self-tapping or machine screws, drill 0.116-inch (3.0 mm) holes (a #32 drill bit can be used) at the marked positions for the four mounting holes.

3. Drill a 3/4-inch (19.0 mm) hole at the mark for the camera output cable. Smooth and deburr the hole.

Mounting the Side-View Camera

To mount the camera:

1. Align the mounting base with the drilled mounting holes on the vehicle. Guide the camera output cable into the 3/4-inch (19.0 mm) hole and secure the rubber grommet on the cable in this hole.

2. To affix the camera to the vehicle, choose the appropriate screws for the holes you drilled above:

- If you are using the self-tapping screws, guide each screw through the camera base and then into the drilled holes. Fasten the screws tightly to the vehicle body.

- If you are using the machine screws, guide each screw with a lock washer and flat washer through the camera base. Install the matching nut on the opposite side of the vehicle surface. Fasten the mounting hardware tightly to the vehicle body.

3. Connect the camera extension cable to the camera.

4. Wrap the cable connection in the supplied black waterproofing tape.

Installing the Flush-Mount Camera (CAMCCD-FLSHNTSC)

Before the installation, find an appropriate location for the flush-mount camera with these considerations in mind:

- Although the camera is waterproof, repeatedly exposing it to direct, high-pressure streams of water (as from a pressure washer) is not recommended.

- Decide whether you will be mounting the camera to the vehicle with the included bracket or flush to a vehicle surface.

- The material properties and thickness of vehicle bodies vary widely. The included hardware can accommodate many different vehicle installations. However, exercise judgment when drilling holes into vehicle surfaces.

- 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. (All Federal Signal cameras include grommets.) Ensure that the mounting screws do not cause electrical or mechanical damage to the vehicle.

- This camera is recommended for flush-mount installation on a vehicle. As an alternative, a mounting bracket is included for mounting above the surface of the vehicle.

- The camera should be positioned so that the driver can obtain a wide, unobstructed field of vision.

Preparing to Install the Flush-Mount Camera

To prepare to install the camera:

1. Open the camera mounting hardware kit, which includes:

   - Four self-tapping screws

   - Four machine screws with matching lock washers, flat washers, and nuts

   - Waterproofing tape

2. Decide whether you will be mounting the camera to the vehicle with the included bracket or flush to a vehicle surface.

Marking and Drilling the Mounting Holes for the Flush-Mount Camera

⚠ 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.

⚠ WARNING

SEAT REMOVAL PRECAUTION: If a vehicle seat is temporarily removed, verify with the vehicle manufacturer if the seat needs to be recalibrated for proper airbag deployment. Failure to heed this warning could result in death or serious injury.
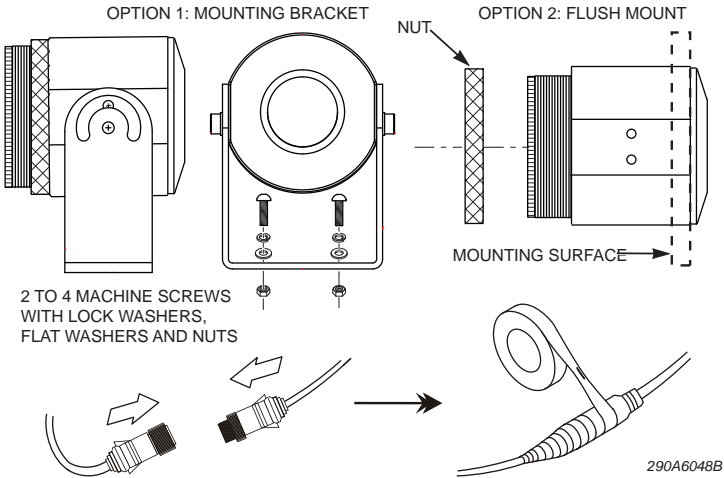
⚠ CAUTION

LOCATING OPERATORS CONTROLS: Locate the camera(s) so the VEHICLE and SYSTEM can be operated safely under all driving conditions. Failure to heed this caution could result in driver distraction or driver error while operating the vehicle.

Option 1: Marking and drilling holes for the flush-mount camera with the included bracket

To mark and drill the holes:

1. Use the mounting bracket as a guide to mark the locations of two to four mounting holes on the vehicle chassis. See Figure 3. These locations should lie in the two channels in the base of the bracket.

Figure 3 Options for mounting flush-mount camera (CAMCCD-FLSHNTSC)

NOTICE

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

2. Mark a location for the 3/4-inch (19.0 mm) hole for the output cable. Once you drill this larger hole, you can route the camera output cable through it to:

   • a camera-to-monitor extension cable that can be either

     ◦ one CAMCABLE-SHORT/-5/-10/-15/-20/-40

       that is then connected to

     ◦ either the CAM1 or CAM2 input on the input/power/trigger wiring harness (CAMADP-INT-2) of the CAMLCD-INT-56 monitor *or*

     ◦ one of the four camera inputs on the input/power/trigger wiring harness (CAMADP-INT-4) of the CAMLCD-INT-70-B

3. Drill the correctly sized holes at the drill-position marks for the type of screws you are using:

   • If you are using the self-tapping screws, drill two to four 0.089-inch (2.2 mm) holes. (A #43 drill bit can be used.)

   • If you are using the machine screws, drill two to four 1/8-inch (3.2 mm) clearance holes.

4. Drill a 3/4-inch (19.0 mm) hole at the mark for the camera output cable. Smooth and deburr the hole.

Option 2: Marking and drilling holes for mounting the flush-mount camera flush to the vehicle surface

To mark and drill the holes:

1. Mark a location for the 1.25-inch (32.0 mm) mounting hole on the vehicle surface that will accommodate the full diameter and depth of the camera body. Once you drill this hole, you can route the camera output cable to:

    • a camera-to-monitor extension cable that can be either

        ◦ one CAMCABLE-SHORT/-5/-10/-15/-20/-40

           that is then connected to

        ◦ either the CAM1 or CAM2 or input on the input/power/trigger wiring harness (CAMADP-INT-2) of the CAMLCD-INT-56 monitor or

        ◦ one of the four camera inputs on the input/power/trigger wiring harness (CAMADP-INT-4) of the CAMLCD-INT-70-B

Mounting the Flush-Mount Camera

Option 1: Mounting the camera with the included bracket

To mount the camera:

1. Align the mounting bracket on the vehicle with the drilled mounting holes, and then guide the camera output cable through the camera barrel and nuts of the mounting bracket assembly (Figure 3 on page 20).

2. Guide the camera output cable into the 3/4-inch (19.0 mm) hole and secure the rubber grommet of the cable in the hole.

3. To affix the mounting bracket to the vehicle, choose the appropriate screws for the holes you drilled:

- If you are using the self-tapping screws, guide each screw through the camera mounting bracket, then into the drilled holes. Fasten the screws tightly to the vehicle body.

- If you are using the machine screws, guide each screw with its lock washer and flat washer through the camera's mounting bracket. Install the matching nut on the opposite side of the vehicle surface. Fasten the mounting hardware tightly to the vehicle body.

4. Install the camera and camera barrel, while adjusting the viewing angle, in the mounting bracket with the included short screws (with matching lock and flat washers).

5. Connect the camera to the monitor via a camera extension cable. To obtain the correct image orientation, it may be necessary to rotate the camera in the barrel of the mounting bracket assembly. Once you obtain the image you want, tighten the nuts of the camera mounting bracket assembly to fix the camera position.

6. Wrap the cable connection in the supplied black waterproofing tape.

Option 2: Mounting the camera flush to the vehicle surface

NOTE: Before routing the camera cable through the hole, you can install an included angled nut so that the camera can be slightly tilted from the horizontal surface of the vehicle.

To mount the camera:

1. Guide the camera output cable through the drilled 1.25-inch (32.0 mm) hole.

2. On the opposite side of the vehicle surface, route the camera output cable through the camera mounting barrel and nut.

3. Install the camera/barrel while adjusting it to the desired viewing angle.

4. Connect the camera to the monitor via a camera extension cable. To obtain the correct image orientation, it may be necessary to rotate the camera in the barrel of the mounting bracket assembly. Once you obtain the image you want, tighten the camera mounting nut to the barrel to fix the camera position.

5. Wrap the camera extension cable connection in the supplied black waterproofing tape.

Installing the Ball Camera (CAMCCD-BALLNTSC)

Before the installation, find an appropriate location for the ball camera with these considerations in mind:

• Although the camera is waterproof, repeatedly exposing it to direct, high-pressure streams of water (as from a pressure washer) is not recommended.

• The material properties and thicknesses of vehicle bodies vary widely. The included hardware can accommodate many different vehicle installations. However, exercise judgment when drilling holes into vehicle surfaces.

• 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. (All Federal Signal cameras include grommets.) Ensure that the mounting screws do not cause electrical or mechanical damage to the vehicle.

• This camera is recommended for installation anywhere that flexibility in positioning the camera is required after it has been permanently installed. The included Allen® wrench is all that is needed to rotate the ball camera within its mount. A typical installation might be mounting

the ball camera on a side-view mirror assembly. The camera should be positioned so that the driver can obtain a wide, unobstructed field of vision.

Preparing to Install the Ball Camera

To prepare to install the camera:

1. Open the included camera mounting hardware kit, which has:

   - two self-tapping screws

   - two machine screws with matching lock washers, flat washers, and nuts

   - an insulating pad

   - an Allen® wrench (for adjusting the orientation of the camera in the housing)

   - waterproofing tape

2. Before the installation, connect the camera to the monitor and turn on the system to verify the camera orientation.

3. For access to the bottom half of the mounting bracket where the mounting screws enter, use the included Allen wrench to remove the two screws and nuts on both sides of the camera mounting bracket. See Figure 4.

Figure 4 Ball camera installation CAMCCD-BALLNTSC
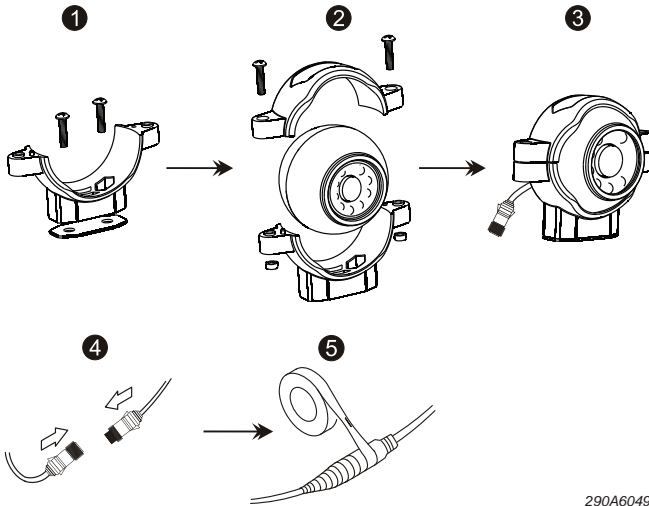
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Marking and Drilling the Mounting Holes for the Ball Camera

⚠ **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.

⚠ **WARNING**

SEAT REMOVAL PRECAUTION: If a vehicle seat is temporarily removed, verify with the vehicle manufacturer if the seat needs to be recalibrated for proper airbag deployment. Failure to heed this warning could result in death or serious injury.

⚠ **CAUTION**

LOCATING OPERATORS CONTROLS: Locate the camera(s) so the VEHICLE and SYSTEM can be operated safely under all driving conditions. Failure to heed this caution could result in driver distraction or driver error while operating the vehicle.

To mark and drill the mounting holes:

1. Use the bottom half of the camera mounting bracket as a guide to mark the locations of the two mounting holes on the vehicle chassis.

2. Mark a location nearby for the 3/4-inch (19.0 mm) hole for the camera output cable. Once this larger hole is drilled, the camera output cable can be routed through it to:

- a camera-to-monitor extension cable that can be

    ◦ one CAMCABLE-SHORT/-5/-10/-15/-20/-40

       that is then connected to

    ◦ either the CAM1 or CAM2 input on the input/power/trigger wiring harness (CAMADP-INT-2) of the CAMLCD-INT-56 monitor or

    ◦ one of the four camera inputs on the input/power/trigger wiring harness (CAMADP-INT-4) of the CAMLCD-INT-70-B

NOTICE

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

3. Drill the correctly sized holes at the drill-position marks for the type of screws you are using:

- If you are using the self-tapping screws, drill two 0.116-inch (3.0 mm) holes. (A #32 drill bit can be used.)

- If you are using the machine screws, drill two 13/64-inch (5.2 mm) clearance holes.

4. Drill a 3/4-inch (19.0 mm) hole at the mark for the camera output cable. Smooth and deburr the hole.

Mounting the Ball Camera

To mount the camera:

1. Align the bottom half of the camera mounting bracket with the drilled mounting holes on the vehicle while inserting the insulating pad between the vehicle surface and the camera mounting bracket.

2. To affix the bottom half of the camera mounting bracket to the vehicle, choose the appropriate screws for the mounting holes you drilled.

- If you are using the self-tapping screws, guide each screw through the bottom half of the camera mounting bracket and then into the drilled holes. Fasten the screws tightly to the vehicle body.

- If you are using the machine screws, guide each screw through the camera mounting bracket and then into the drilled holes. Install the matching lock and flat washers followed by the nuts on the opposite side of the vehicle surface. Fasten the mounting hardware tightly to the vehicle body.

3. Install the camera while adjusting the viewing angle in the mounting bracket using the included Allen® wrench. To verify the image orientation, connect the camera to the monitor with a camera extension cable. It may be necessary to rotate the camera in the mounting bracket to obtain the correct orientation. Once you obtain the image you want, tighten the screws on the mounting bracket to fix the camera position.

4. Wrap the cable connection in the supplied black waterproofing tape.

Installing the Dome Camera (CAMCCD-DOMENTSC)

Before the installation, find an appropriate location for the dome camera with these considerations in mind:
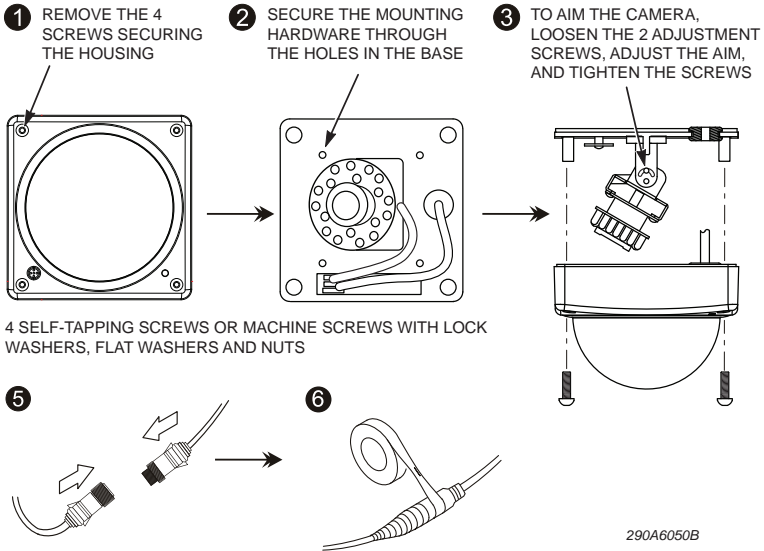
- This camera is intended for only indoor use. Installing it on the exterior of a vehicle is not recommended.

- The material properties and thicknesses of vehicle bodies vary widely. The included hardware can accommodate many different vehicle installations. However, exercise judgment when drilling holes into vehicle surfaces.

- 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. (All Federal Signal cameras include grommets.) Ensure that the mounting screws do not cause electrical or mechanical damage to the vehicle.

- This camera is recommended for installation in vehicle interior spaces like the cargo bay of a delivery vehicle. The camera should be positioned so that the driver can obtain a wide, unobstructed field of vision.

Preparing to Install the Dome Camera

To prepare to install the camera:

1. Open the included camera mounting hardware kit, which has:

   - Four self-tapping screws
   - Four machine screws with matching lock washers, flat washers, and nuts
   - Waterproofing tape

2. Remove the four screws that secure the camera housing cover/dome to its base. See Figure 5.

Figure 5 Dome camera installation CAMCCD-BALLNTSC

① REMOVE THE 4 SCREWS SECURING THE HOUSING

② SECURE THE MOUNTING HARDWARE THROUGH THE HOLES IN THE BASE

③ TO AIM THE CAMERA, LOOSEN THE 2 ADJUSTMENT SCREWS, ADJUST THE AIM, AND TIGHTEN THE SCREWS

4 SELF-TAPPING SCREWS OR MACHINE SCREWS WITH LOCK WASHERS, FLAT WASHERS AND NUTS

❺

❻

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3. The holes in the base can be used as a template for marking drill holes for mounting screws. To access the mounting holes in the base, disconnect the cable that connects the built-in microphone and record indicator LED to the internal PCB assembly.

4. Before the installation, connect the camera to the monitor and turn on the system to verify the orientation of the camera in the housing. The angle of the camera within the dome can be adjusted by loosening the two miniature screws at its base within the housing. Secure the camera at the desired angle.

Marking and Drilling the Mounting Holes for the Dome Camera

⚠ 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.

⚠ WARNING

SEAT REMOVAL PRECAUTION: If a vehicle seat is temporarily removed, verify with the vehicle manufacturer if the seat needs to be recalibrated for proper airbag deployment. Failure to heed this warning could result in death or serious injury.

⚠ CAUTION

LOCATING OPERATORS CONTROLS: Locate the camera(s) so the VEHICLE and SYSTEM can be operated safely under all driving conditions. Failure to heed this caution could result in driver distraction or driver error while operating the vehicle.

To mark and drill the mounting holes:

1. Use the mounting base as a guide to mark the locations of four mounting holes on the vehicle chassis and a 3/4-inch (19.0 mm) hole for the camera output cable. Once this hole is drilled, you can route the camera output cable through it to:

   - a camera-to-monitor extension cable that can be:
     - one CAMCABLE-SHORT/-5/-10/-15/-20/-40 or
     - two CAMCABLE-SHORT/-5/-10/-15/-20 connected in series with adapter CAMCABLE-EXT

       that is then connected to:

     - either the CAM1 or CAM2 input on the input/ power/trigger wiring harness (CAMADP-INT-2) of the CAMLCD-INT-56 monitor *or*
     - one of the four camera inputs on the input/power/ trigger wiring harness (CAMADP-INT-4) of the CAMLCD-INT-70-B

NOTICE

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

2. Drill the correctly sized holes at the drill-position marks for the type of screws you are using:

    *   If you are using the self-tapping screws, drill four 0.116-inch (3.0 mm) holes.

    *   If you are using the machine screws, drill four 5/32-inch (4.0 mm) clearance holes.

3. Drill a 3/4-inch (19.0 mm) hole at the mark for the camera output cable. Smooth and deburr this hole.

Mounting the Dome Camera

To mount the camera:

1. Align the mounting base on the vehicle with the drilled mounting holes and guide the camera output cable into the 3/4-inch (19.0 mm) hole.

2. To affix the camera to the vehicle, choose the appropriate screws for the mounting holes you drilled:

    *   If you are using the self-tapping screws, guide each screw through the camera base and then into the drilled holes. Fasten the screws tightly to the vehicle body.

    *   If you are using the machine screws, guide each screw with its lock washer and flat washer through the camera base. Install the matching nut on the opposite side of the vehicle surface. Fasten the mounting hardware tightly to the vehicle body.

3. Connect a camera extension cable to the camera.

4. Wrap the cable connection in the supplied black waterproofing tape.

Installing the Monitor (CAMLCD-INT-56, CAMLCD-INT-70-B)

Before the installation, find an appropriate location for the monitor with these considerations in mind:

- The location should be able to support 9 pounds (4 kg) and should not obstruct the view of the driver.

- The monitor should be installed so that the driver can easily view the rear-view mirrors of the vehicle. This system does not replace the need for these mirrors; it is strictly a supplement. Typically, a center console in the cab or dashboard can be a good mounting location; mounting from the ceiling of the vehicle is also possible.

- Avoid placing the monitor where it will be constantly exposed to direct sunlight, moisture, a strong magnetic field (as near a speaker), or a heat source (A/C or heater duct).

- Before choosing a mounting location, decide where to route the monitor cable. The installation requires an appropriately sized hole to accommodate whichever cable your system has:

  - CAMLCD-INT-56: This monitor has an input/power/trigger wiring harness that has two camera inputs, power/ground, and two trigger wires.

  - CAMLCD-INT-70-B: This monitor has an input/power/trigger wiring harness that has four camera inputs, power/ground, and four trigger wires.

Mounting the Monitor in the Vehicle

⚠ **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.

⚠ **WARNING**

SEAT REMOVAL PRECAUTION: If a vehicle seat is temporarily removed, verify with the vehicle manufacturer if the seat needs to be recalibrated for proper airbag deployment. Failure to heed this warning could result in death or serious injury.

⚠ **CAUTION**

LOCATING OPERATORS CONTROLS: Locate the camera(s) so the VEHICLE and SYSTEM can be operated safely under all driving conditions. Failure to heed this caution could result in driver distraction or driver error while operating the vehicle.

To mount the monitor:

1. Use the standard mounting bracket for the monitor as a template to mark the five mounting holes for the self-tapping mounting screws. See Figures 6 and 7. If you are using the optional heavy-duty mount, use the mount as a template for marking mounting holes.

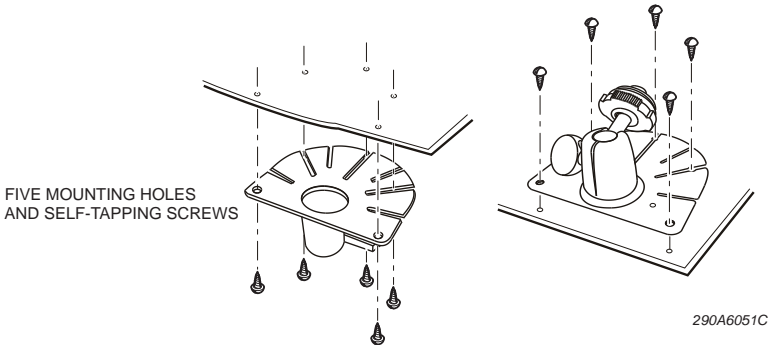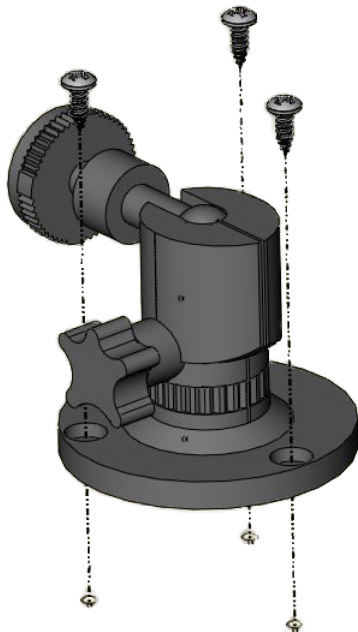**Figure 6 CAMLCD-BRACKET mounting bracket and hardware**

FIVE MOUNTING HOLES
AND SELF-TAPPING SCREWS

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Figure 7 CAMBRK-HD mounting bracket and hardware

NOTICE

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

2. When you are ready to install the monitor mounting bracket, remove the red backing off of the bottom of the bracket to expose the adhesive. No adhesive is included with the heavy-duty mount.

3. Place the monitor in the mounting location and secure it with the five self-tapping screws.

4. Attach the monitor to the mounting bracket and adjust it to the preferred viewing angle.

Connecting the Mobile Camera System

This section describes how to connect two Mobile Camera System configurations:

- **Option 1:** System configured with a CAMLCD-INT-56 monitor (as in the CAMSET56-NTSC-2). System configured with a CAMLCD-INT-56 monitor (as in the CAMSET56-NTSC-2) or CAMLCD-MIR rear-view mirror (as in the CAMSETMIR-4RW).

- **Option 2:** Option 2: System configured with a CAMLCD-INT-70-B monitor (as in the CAMSET70-NTSC4B).
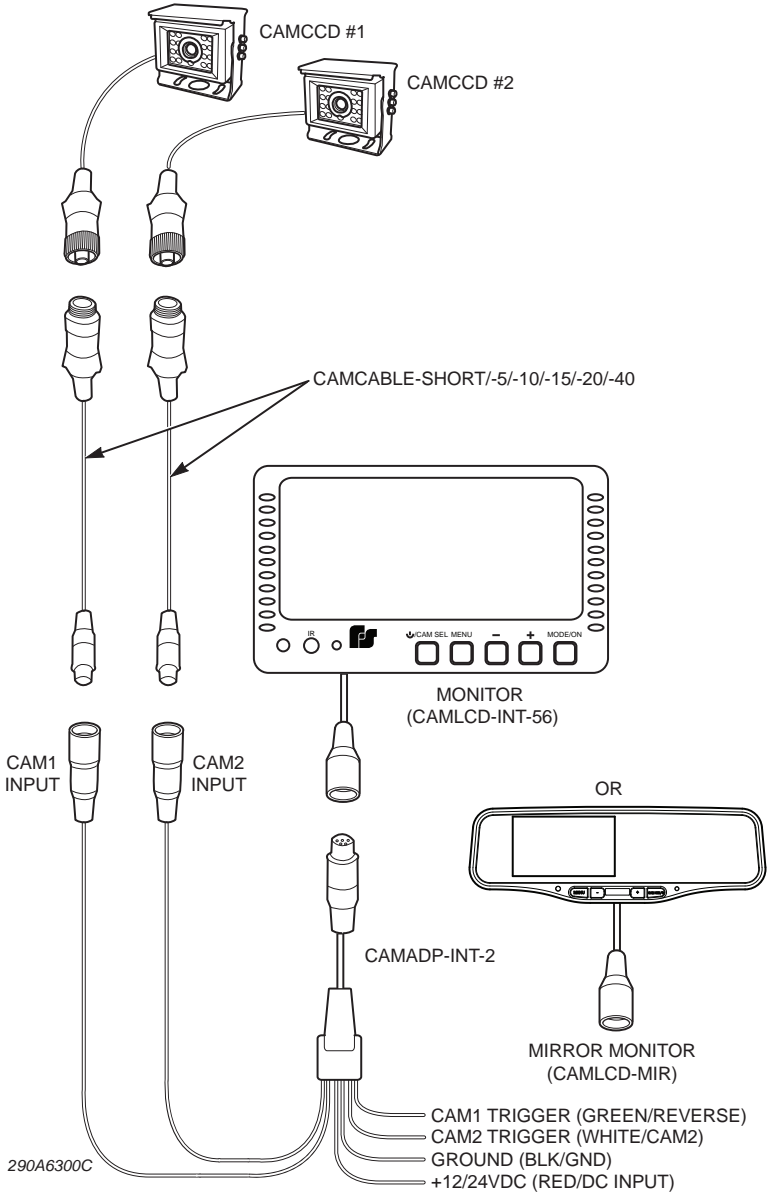
Option 1: Connections for a system configured with CAMLCD-INT-56/CAMLCD-MIR monitor, as in the CAMSET56-NTSC-2/CAMSETMIR-4RW

1. The included input/power/trigger wiring harness (CAMADP-INT-2) has the following connections:

    - Red (Red/DC Input): Connect this to the 12 V or 24 V vehicle battery. To avoid drawing current when the vehicle is not running, connect this wire to the vehicle ignition "accessory" or "on" position.

    - Black (Blk/Gnd): Connect this to the vehicle or chassis ground.

    - Green (Green/Reverse): Applies a 12-24 V signal to the green wire functions as a trigger to display CAM1 on the monitor. If the camera connected to the CAM1 input is used in a standard rear-view application, you can connect the green wire to the reverse light circuit of the vehicle for automatic display of the rear-view camera when the vehicle is in reverse. When this trigger is removed, the monitor will return to standby mode with no image displayed.
      For any other configuration, connect a suitable 12-24 V trigger to this wire to signal when the monitor should view CAM1. This wire has priority over the white wire (CAM2) when both wires are triggered.

- White (White/CAM2): Connect a 12-24 V signal to this wire to trigger when the monitor should display CAM2. The green (CAM1) wire trigger will override a trigger from this wire.

- CAM1 and CAM2: Connect cameras to these inputs. A CAMCABLE-SHORT/-5/-10/-15/-20/-40 connected to one of these inputs can provide camera cable extension up to 131 ft (40 m). With the CAMADP-EXT, two CAMCABLE-SHORT/-5/-10/-15/-20 cables can also be connected in series to achieve lengths up to 131 feet (40 m).

- Monitor: Connect this 13-pin connector to the monitor.

2. Any connections made outside the vehicle interior (camera cable extensions, for example) should be wrapped in the waterproofing tape.

Figure 8 System configured with a CAMLCD-INT-56 monitor

Option 2: System configured with CAMLCD-INT-70-B monitor, as in the CAMSET70-NTSC4B

An example system is shown in Figure 8.

1. Connect the 26-pin male connector on the monitor to the 26-pin female connector on the CAMADP-INT-4 input/power/trigger wiring harness.

2. One to four cameras can be connected to camera inputs 1 to 4 of the input/power/trigger wiring harness, CAMADP-INT-4.

A CAMCABLE-SHORT/-5/-10/-15/-20/-40 connected to one of these inputs can provide camera cable extension up to 131 feet (40 m).

Alternatively, using adapter CAMADP-EXT, two CAMCABLE-SHORT/-5/-10/-15/-20 cables can be connected in series to achieve lengths up to approximately 131 feet (40 m).

3. Connect 12 V — 24 V to the red wire.

4. Connect vehicle or chassis ground to the black wire.

5. Connect camera trigger wires as follows:

- green/red: trigger for Camera 1
- blue/red: trigger for Camera 2
- brown/red: trigger for Camera 3
- black/red: trigger for Camera 4

The priority from highest to lowest for the camera triggers is Camera 1 > Camera 2 > Camera 3 > Camera 4. In other words, the Camera 1 trigger has the highest priority and overrides other triggers.

6. Connect a 12-24 V trigger to the appropriate wire to signal when the monitor should display Camera 1, 2, 3, or 4.

7. Any connections made outside the vehicle interior should be wrapped in waterproofing tape.

Figure 9 System configured with a CAMLCD-INT-70-B monitor
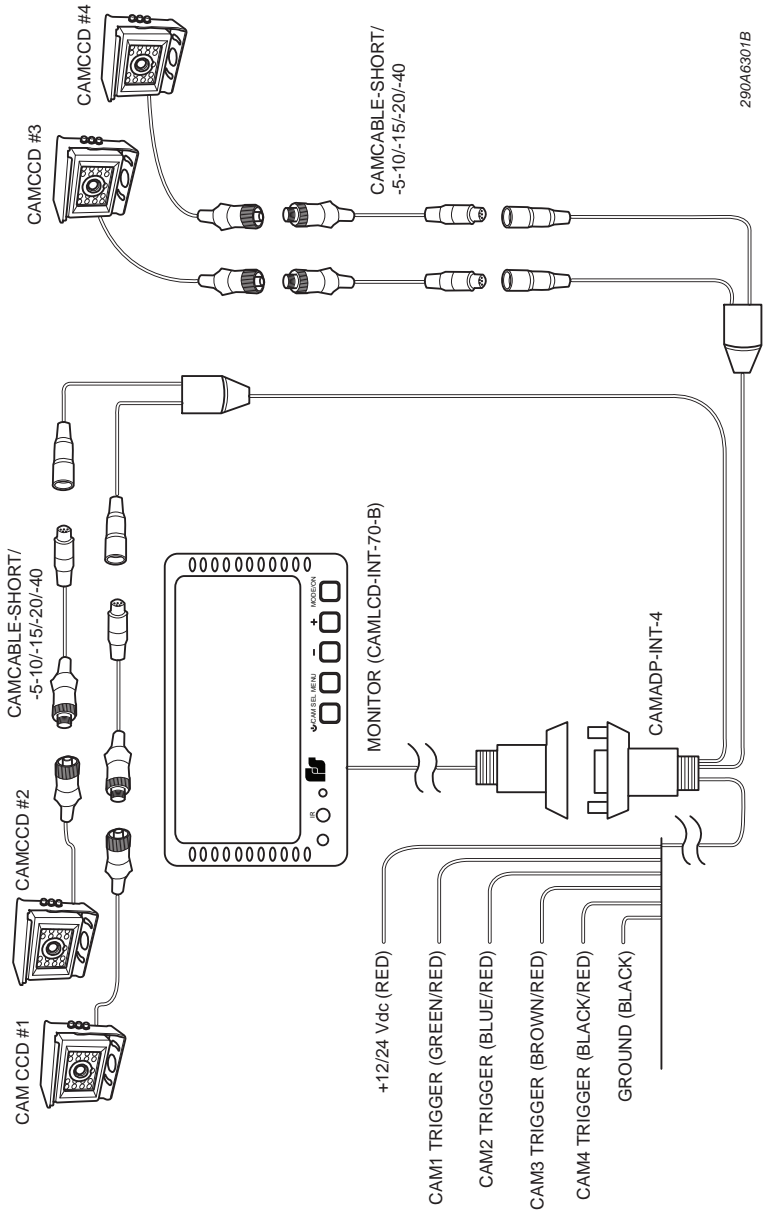
Testing the System

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.

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.

After testing is complete, provide a copy of these instructions to the instructional staff and all operating personnel.

Operating the Mobile Camera System

This section describes how to operate these Mobile Camera System configurations:

- **Option 1:** System configured with a CAMLCD-INT-56 monitor (as in the CAMSET56-NTSC-2) monitor. System configured with a CAMLCD-INT-56 monitor (as in the CAMSET56-NTSC-2) or CAMLCD-MIR rear-view mirror (as in the CAMSETMIR-4RW).

- **Option 2:** System configured with a CAMLCD-INT-70-B monitor (as in the CAMSET70-NTSC4B).

Option 1: System Configured with CAMLCD-INT-56 Monitor, as in the CAMSET56-NTSC-2. System configured with a CAMLCD-INT-56 monitor (as in the CAMSET56-NTSC-2) or CAMLCD-MIR rear-view mirror (as in the CAMSETMIR-4RW).

When you turn on the camera system by turning the vehicle ignition key to either the "accessory" or "on" position, the red LED on the monitor turns on (Figure 10 page 42). The LED indicates Standby Mode, which conserves power by turning off the monitors until you manually turn on the system.

To manually turn on the system, briefly press the ⏻/CAM/SEL (power/camera select) button. The image of CAM1 (Camera 1) or the last camera selected, the number of which is stored in memory, appears on the monitor. The LED turns off when the system is powered on and an image is displayed.

To automatically turn CAM1 (Camera 1) on, 12 V — 24 V should be applied to the Green/Reverse wire. This can both power the monitor from Standby Mode and select Camera 1.

To automatically turn CAM2 (Camera 2) on, apply 12 V — 24 V to the White CAM2 wire. This can both power the monitor from Standby Mode and select Camera 2.

If two cameras are connected, briefly pressing the ⏻ /CAM/SEL button enables you to manually switch to CAM2 from CAM1 and from CAM1 to CAM2. You can also switch cameras when the system is on by applying 12-24 V to the appropriate trigger wire. When you turn on the system or switch between cameras, CAM1 or CAM2 appears for approximately four seconds to show which camera is being viewed.

To return the system to Standby Mode, press and hold ⏻/CAM/SEL. The red LED lights.

Figure 10 CAMLCD-INT-56

POWER INDICATOR LED
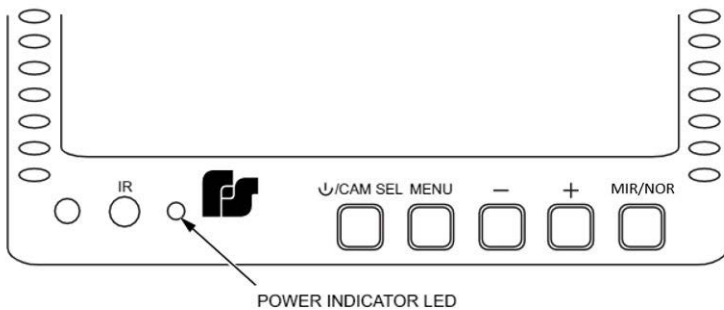
Menu Options

The Menu button enables you to access these options:

- Color: Adjusts the amount of color information in the monitor image on a scale of 0 to 30.

- Brightness: Adjusts the degree of brightness in the monitor image on a scale of 0 to 30.

- Contrast: Adjusts the amount of contrast in the monitor image on a scale of 0 to 30.

- Volume: Adjusts the volume of the sound from the microphone in the selected camera on a scale of 0 to 30, as applicable.

- Return: Returns you to the image of the current camera and exits the menu.

After you press Menu, select one of the options by moving up and down the menu options with the + (up) and **–** (down) buttons and pressing the Menu button. The selected option is red; all other options are yellow. Adjust the scale with the + (increase) and **–** (decrease) buttons. The scale disappears after approximately four seconds of inactivity. Select Return if you are finished setting the menu options; the menu disappears.

The MIR/NOR button enables you to switch the displayed camera image to either a mirror image or a normal image. This setting is retained in memory so that even when the system is turned off, the preferred setting (mirror or normal) is recalled when you turn on the system.

NOTE: The MIR/NOR button is available only on the CAMSET56-NTSC-2 system. This button isn't on the CAMSETMIR-4RW.

Option 2: System Configured with a CAMLCD-INT-70-B monitor (as in CAMSET70-NTSC4B)

When you turn on the camera system by turning the vehicle ignition key to either the "Accessory" or "On" position, the monitor operates in one of two ways, depending on the Power Button setting in the monitor menu.

If Power Button is set to Action when you turn on the camera system by turning the vehicle ignition key to either the "Accessory" or "On" position, the red power indicator LED on the monitor turns on (Figure 11). To manually turn the system on, briefly press the ⏻/CAM SEL (power/camera select) button. The split-screen image of all connected cameras, or the last display configuration selected, which is stored in memory, will appear on the monitor. See below for screen configuration specifics.

If Power Button is set to Off when you turn on the camera system by turning the vehicle ignition key to either the "Accessory" or "On" position, the red power indicator LED on the monitor illuminates and the monitor configures the display based on the number of cameras connected to the system as follows.

Figure 11 CAMLCD-INT-70-B

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POWER INDICATOR LED
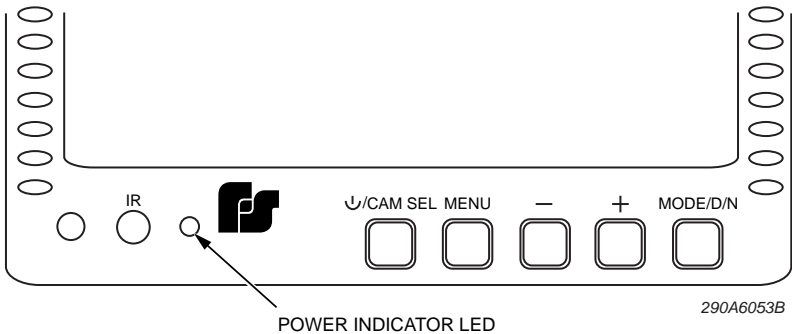
Screen Configurations

• If one camera is connected, its image is displayed full screen.

• If two cameras are connected, one camera is displayed on the top half of the screen and the other on the bottom half in a split-screen.

• If three cameras are connected, one camera is displayed on the right half of the screen, while the other two are displayed on the left side of the screen in a split-screen.

• If four cameras are connected, the screen is split into four sections, with each section filled with an image from one of the cameras.

• Different screen configurations can be accessed by pressing the Mode/D/N button on the monitor (Figure 11) as follows:

  • Press Mode/D/N once for a single camera full-screen image. Successive brief presses of the ⏻ /CAM SEL (power/camera select) button select each of the connected cameras' images.

  • Press Mode/D/N a second time for a dual-camera split-screen view, with one camera on the left and one on the right. Successive brief presses of the ⏻ /CAM SEL (power/camera select) button select a different pair of the images of the connected camera (CAM1/CAM2, CAM2/CAM3, etc.).

  • Press Mode/D/N a third time to return to a split-screen image of all connected cameras.

Automatic Camera Triggering

Automatic triggering of connected cameras is supported as follows:

- To automatically turn on Camera 1, apply 12-24 V to the green/red wire. This can both power the monitor from standby and select Camera 1.

- To automatically turn on Camera 2, apply 12-24 V to the blue/red wire. This can both power the monitor from standby and select Camera 2.

- To automatically turn on Camera 3, apply 12-24 V to the brown/red wire. This can both power the monitor from standby and select Camera 3.

- To automatically turn on Camera 4, apply 12-24 V to the black/red wire. This can both power the monitor from standby and select Camera 4.

Priority for the camera triggers is, from highest to lowest, Camera 1 > Camera 2 > Camera 3 > Camera 4. In other words, the Camera 1 trigger has the highest priority and it overrides other triggers.

Menu Options

Pressing the Menu button enables you to access these options:

- Brightness: Adjusts the degree of brightness in the monitor image on a scale of 0 to 30.

- Contrast: Adjusts the amount of contrast in the monitor image on a scale of 0 to 30.

- Color: Adjusts the amount of color information in the monitor image on a scale of 0 to 30.

- Volume: Adjusts the volume of the sound from the selected camera microphone on a scale of 0 to 30, as applicable.

- Language: Selects the language used in the monitor menu. Available languages are English, French, German, Spanish, Portuguese, Italian, and Polish. Select Return to return to the previous menu.

- Mirror: Selects mirror or normal mode for each of the four monitor inputs. Set the applicable input to On when a mirror image is required and to Off when a normal view is desired. Select Return to return to the previous menu.

- Video: Selects the video standard for the monitor. Select PAL for use with PAL-compatible cameras (European market) and NTSC for use with NTSC-compatible cameras (North American market). Select Return to return to the previous menu.

- Power Button: Selects the operation of the ⏻ /CAM SEL (power/camera select) button.

  Action activates this button, and CAM disables it. See the description at the beginning of this section regarding operation.

- Exit: Exits the menu.

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 an 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

Product Specifications and Part Numbers

This section has specifications for each model of camera.

Camera Specifications

Table 1 CAMCCD-REARNTSC: Rear-View Camera

Imaging sensor	Sony 1/3 CMOS
Resolution in pixels (H x V)	1280 x 960
Horizontal resolution	720 P
Lens	Focal length 2.6 mm, F2.0, 118° viewing angle (measured diagonally)
Low-light/night vision	16 infrared LEDs with photosensor
Microphone	Integrated
Camera housing	Anticorrosion aluminum alloy
Environmental rating	IP68 waterproof and dust-resistant
Voltage	12 Vdc
Power consumption	≤ 2.5 W
Operating temperature range	–4°F to 158°F (–20°C to 70°C)
Dimensions (W x H x D)	3.40 x 2.87 x 2.32 inches (86.4 x 72.9 x 58.9 mm)
Weight (including mounting bracket)	1.76 lb (0.8 kg)
Certifications	FCC, CE, E-mark, RoHS

Table 2 CAMCCD-SIDENTSC: Side-View Camera

Imaging sensor	Sony 1/3 CMOS
Resolution in pixels (H x V)	1280 x 960
Horizontal resolution	960 H
Lens	Focal length 2.6 mm, 2.8 mm, 124° viewing angle (measured diagonally)
Low-light/night vision	Nine infrared LEDs with photosensor
Microphone	Integrated
Camera housing	Anticorrosion aluminum alloy
Environmental rating	IP68 waterproof and dust-resistant
Voltage	12 Vdc
Power consumption	≤ 1.5 W
Operating temperature range	−22°F to 158°F (−30°C to 70°C)
Dimensions (W x L x H)	2.56 x 3.70 x 2.48 inches (65.0 x 94.0 x 63.0 mm)
Weight (including mounting bracket)	0.39 lb (0.18 kg)
Certifications	FCC, CE, E-mark, RoHS

Table 3 CAMCCD-FLSHNTSC: Flush-Mount Camera

Imaging sensor	Sony 1/4-inch color CCD
Resolution in pixels (H x V)	NTSC 510 x 492; PAL 500 x 582
Horizontal resolution	420 TV lines
Lens	Focal length 2.1 mm, F2.5, 150° viewing angle (measured diagonally)
Low-light/night vision	N/A
Microphone	N/A
Camera housing	Anticorrosion aluminum alloy
Environmental rating	IP68 waterproof and dust-resistant
Voltage	12 Vdc
Power consumption	≤ 1.2 W
Operating temperature range	–22°F to 149°F (–30°C to 65°C)
Dimensions, camera only (L x W)	1.87 x 1.42 inches (47.5 x 36.1 mm)
Dimensions, suspended with U-bracket (L x W x H)	1.87 x 1.57 x 2.13 in (47.5 x 39.9 x 54.1 mm)
Weight (including mounting bracket)	0.44 lb (0.20 kg)
Certifications	FCC, CE, E-mark, RoHS

Table 4 CAMCCD-BALLNTSC: Ball Camera

Imaging sensor	Sony 1/4-inch color CCD
Resolution in pixels (H x V)	NTSC 510 x 492; PAL 500 x 582
Horizontal resolution	420 TV lines
Lens	Focal length—2.6 mm, F2.0, 110° viewing angle (measured diagonally)
Low-light/night vision	Nine infrared LEDs with photosensor
Microphone	Integrated
Camera housing	Anticorrosion aluminum alloy
Environmental rating	IP68 waterproof and dust-resistant
Voltage	12 Vdc
Power consumption	≤ 1.5 W
Operating Temperature Range	–22°F to 149°F (–30°C to 65°C)
Dimensions (W x H x D)	3.05 x 2.50 x 2.01 inches (77.5 x 63.5 x 51.1 mm)
Weight (including mounting bracket)	0.34 lb (0.15 kg)
Certifications	FCC, CE, E-mark, RoHS

Table 5 CAMCCD-DOMENTSC: Dome Camera

Imaging sensor	Sony 1/4-inch color CCD
Resolution in pixels (H x V)	NTSC 510 x 492; PAL 500 x 582
Horizontal resolution	420 TV lines
Lens	Focal length—2.6 mm, F2.0, 110° viewing angle (measured diagonally)
Low-light/night vision	18 infrared LEDs with photosensor
Microphone	Integrated
Camera housing	Anticorrosion aluminum alloy
Environmental rating	IP65 water- and dust-resistant; not intended for outdoor applications
Voltage	12 Vdc
Power consumption	≤ 2.5 W
Operating temperature range	–22°F to 149°F (–30°C to 65°C)
Dimensions (L x W x H)	4.09 x 4.09 x 2.82 inches (103.9 x 103.9 x 71.6 mm)
Dimensions (W x H)	4.10 x 2.82 inches (103.9 x 71.6 mm)
Weight (including mounting bracket)	0.85 lb (0.39 kg)
Certifications	FCC, CE, E-mark, RoHS

Monitor Specifications

Table 6 CAMLCD-INT-56: 5.6-inch monitor w/ dual integrated camera inputs

Screen type, size	Color AHD LCD, 5.6 in (diagonal)
Viewing angle (up/ down, left/right)	40°/50°, 60°/70°
Brightness	200 cd/m2
Resolution in pixels (H x V)	307200
Camera inputs & trigger wires	2
Built-in speaker	
Photo sensor for automatic monitor brightness adjustment in low-light/ no-light conditions	
Voltage	12/24 Vdc
Power consumption	≤ 10 W
Operating temperature range	–4°F to 158°F (–20°C to 70°C)
Dimensions (L x W x D)	5.91 x 4.72 x 1.10 inches (150.1 x 119.9 x 27.9 mm)
Weight (including mounting stand)	0.32 lb (0.145 kg)
Certifications	FCC, CE, E-mark, RoHS

Table 7 CAMLCD-INT-70-B: 7.0-inch monitor w/ four integrated camera inputs

Screen type, size	Color AHD LCD, 7.0 in (diagonal)
Viewing angle (up/down, left/right)	60°/70°, 80°/80°
Brightness	350 cd/m2
Resolution (pixels)	614400
Camera inputs & trigger wires	4
Split-screen capable	
Built-in speaker	
Voltage	12/24 VDC
Power consumption	≤ 6 W
Operating temperature range	–4°F to 158°F (–20°C to 70°C)
Dimensions (L x W x D)	7.17 x 4.88 x 1.54 inches (182 x 124 x 39 mm)
Weight (including mounting stand)	1.16 lb (0.53 kg)
Certifications	FCC, CE, E-mark, RoHS

Table 8 CAMLCD-MIR: 4.3-inch mirror monitor with two integrated camera inputs

Screen type, size	Color TFT LCD, 4.3 in (diagonal)
Viewing angle (up/down, left/right)	50°/70°, 70°/70°
Brightness	400 cd/m2
Resolution in pixels	480 x 3 (RGB) x 272
Camera inputs and trigger wires	2
Voltage	12/24 Vdc
Power consumption	≤ 5 W
Operating Temperature Range	−4°F to 158°F (–20°C to 70°C)
Dimensions (L x W x D)	11.02 x 3.58 x 1.18 inches (280 x 91 x 30 mm)
Weight (including bracket)	1.28 lb (0.58 kg)
Certifications	FCC, CE, E-mark, RoHS

Cables

- CAMCABLE-40: 131 ft (40 m) camera extension cable with waterproof connector

- CAMCABLE-20: 65.5 ft (20 m) camera extension cable with waterproof connector

- CAMCABLE-15: 49 ft (15 m) camera extension cable with waterproof connector

- CAMCABLE-10: 33 ft (10 m) camera extension cable with waterproof connector

- CAMCABLE-5: 16.5 ft (5 m) camera extension cable with waterproof connector

- CAMCABLE-SHORT: 4 in (0.1 m) camera extension cable with waterproof connector

- CAMADP-EXT: 4 in (0.1 m) cable for connecting two CAMCABLE-XX in series for extended lengths

Monitor Mounting Brackets

• CAMLCD-BRACKET: Mounting bracket for monitor

• CAMBRK-HD: Heavy-duty mounting bracket for monitor

Adapters

• CAMADP-RCA-IN: Adapter for connecting video/audio input from an external RCA-connector-equipped source to monitor

  • 4-pin DIN screw-type (male) to three male RCA connectors (yellow, white, and red)

• CAMADP-RCA-OUT: adapter for connecting Federal Signal camera to external RCA-connector-equipped input

  • 4-pin DIN screw-type (female) to two male RCA connectors (yellow and white) and red (+12 Vdc) and black (ground) wires

Replacement Wiring Harnesses

• CAMADP-INT-2: Replacement input/power/trigger-wiring harness for CAMLCD-INT-56

• CAMADP-INT-4: Replacement input/power/trigger-wiring harness for CAMLCD-INT-70-B

FCC Compliance Statement

For part numbers:

For the following part numbers—CAMCCD-REARNTSC, CAMCCD-SIDENTSC, CAMCCD-DOMENTSC, CAMCCD-FLSHNTSC, CAMCCD-BALLNTSC, CAMLCD-INT-56, and CAMLCD-INT-70-B:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

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