



Installation Instructions

Raytheon 4000B
Protect IR Camera
Installation Kit 801508



Figure 1 Raytheon 4000B ProtectIR Camera

DESCRIPTION

This kit contains all of the components necessary to install the Raytheon 4000B ProtectIR Camera on most vehicles. Included are all components shown above in Figure 1.

The Raytheon 4000B ProtectIR Camera is a pan and tilt night vision camera that is used as an auxiliary camera and not for driving enhancement. A display is not included in this kit and must be purchased separately.

IMPORTANT! PLEASE READ AND FOLLOW THESE INSTRUCTIONS TO AVOID PERSONAL INJURY OR DEATH:

When working on or around a vehicle, the following general precautions should be observed at all times.

1. Park the vehicle on a level surface, apply the parking brakes, and always block the wheels.
2. Stop the engine when working around the vehicle.
3. If the vehicle is equipped with air brakes, make certain to drain the air pressure from all reservoirs before beginning ANY work on the vehicle.
4. Following the vehicle manufacturer's recommended procedures, deactivate the electrical system in manner that removes all electrical power from the vehicle.

Template Included
If Copying this Document Do Not Reduce

5. When working in the engine compartment the engine should be shut off. Where circumstances require that the engine be in operation, **EXTREME CAUTION** should be used to prevent personal injury resulting from contact with moving, rotating, leaking, heated, or electrically charged components.
6. Never connect or disconnect a hose or line containing pressure; it may whip. Never remove a component or plug unless you are certain all system pressure has been depleted.
7. Never exceed recommended pressures and always wear safety glasses.
8. Do not attempt to install, remove, disassemble or assemble a component until you have read and thoroughly understand the recommended procedures. Use only the proper tools and observe all precautions pertaining to use of those tools.
9. Use only genuine Bendix replacement parts, components, and kits. Replacement hardware, tubing, hose, fittings, etc. should be of equivalent size, type, and strength as original equipment and be designed specifically for such applications and systems.
10. Components with stripped threads or damaged parts should be replaced rather than repaired. Repairs requiring machining or welding should not be attempted unless specifically approved and stated by the vehicle or component manufacturer.
11. Prior to returning the vehicle to service, make certain all components and systems are restored to their proper operating condition.

5. Verify that the mounting ring is parallel to the lateral axis of the vehicle. This ensures that the mounting ring, when mounted, will face squarely forward. See Figure 3.

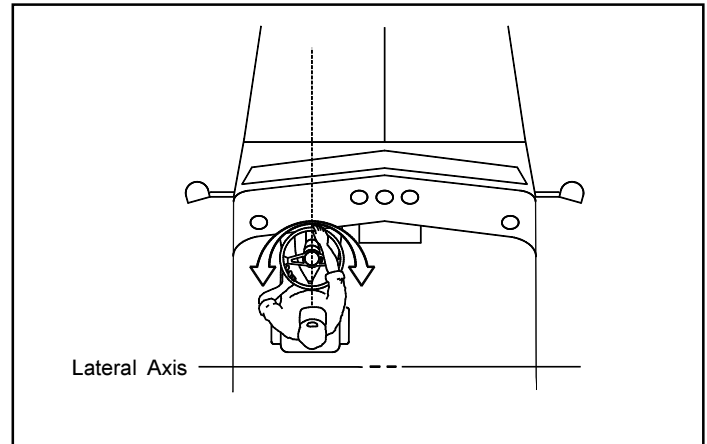


Figure 3 Camera Positioning

6. Use a center punch to mark the three mounting holes and the 2 inch diameter hole to route the system wire harness(5). The wire harness should be located to the right side of the mounting ring nub for ease of mating the connector on the camera base.



Figure 2 ProtectIR Camera and Mounting Ring

CAMERA INSTALLATION

1. Make sure the truck is parked on a level surface.
2. Remove the panel of the headliner above the driver's head to inspect for electrical wires, tubing, or support members.
3. On the roof of the vehicle mark the position of the camera.
4. Position the camera mounting ring template (page 5) on the roof of the vehicle. The nub on the mounting ring points forward toward the front of the vehicle.

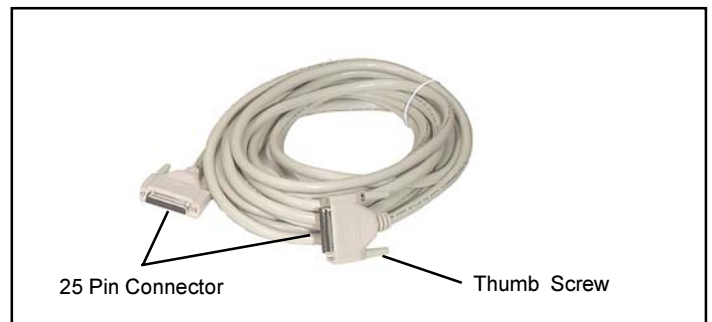


Figure 4 System Wire Harness

7. Drill the 2 inch diameter hole and the three 5/16" mounting holes. Deburr the 2 inch hole.
8. Place the mounting ring(2) over the holes.
9. Using a level, make sure the mounting ring is seated level on the surface of the roof.
10. Remove all parts and clean the surfaces you wish to seal including all bolt holes.
11. Apply sealant between all contact areas between the roof and the mounting ring(2). Secure the mounting ring to the vehicle roof.
12. Feed the system harness(5) through the 2 inch hole. For ease of installation, remove the thumb screws by turning them a full counter-clockwise turn.
13. Install a grommet on the system harness and apply a sealant to all the seams.
14. At the base of the camera, use a T-15 Torx driver to remove one screw and loosen the other that holds the strain relief strap. See Figure 5. Rotate the strap away and connect the system harness(5) to the camera connector. Use a

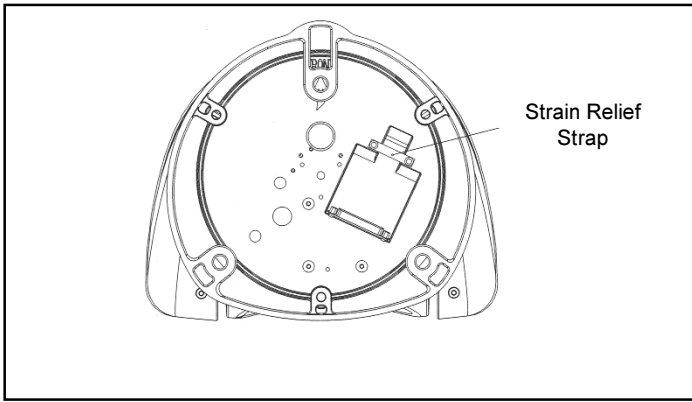


Figure 5 Bottom view of the ProtectIR Camera

flat blade screwdriver to tighten the thumb screws so they clear the connector cavity edge. Rotate the strap back into place and secure using the T-15 screws.

15. Remove the bolt hole cover at the front of the camera(1) by removing the two Phillips head screws and lifting the cover off with a flat head screwdriver. For location see Figure 2. Locate the word, FRONT, on the bottom of the camera. Align the word, FRONT, toward the mounting ring nub.
16. Align the mounting holes to seat the camera(1) flat on the mounting ring(2).
17. Manually rotate the camera(1) slowly, seated in the mounting ring(2), until the bolt hole cover aligns over one of three hole locations in the mounting ring. Rotate 120° between each bolt. Be sure not to side load the head while turning. Secure using the three 1/4-28 x 2" bolts. Reassemble the bolt hole cover with the two Phillips head screws.

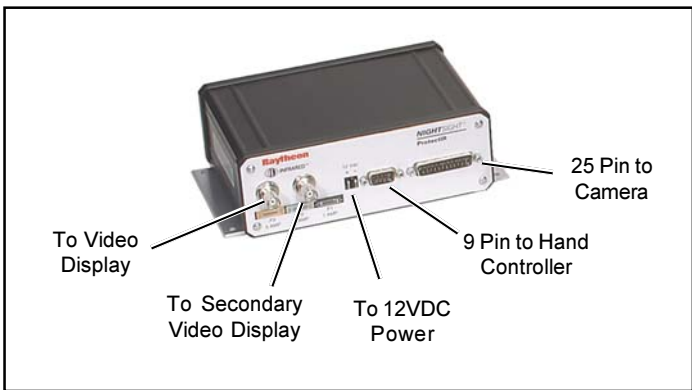


Figure 6 Electronics Module

INSTALLING THE ELECTRONICS MODULE

1. Select a location to mount the electronics module that is not exposed to the outdoor elements. Using the electronics module as a template, mark the four holes for mounting. Drill the marked locations to accommodate the mounting hardware. Using four screws secure the module in the desired location.



Figure 7 Hand Controller

INSTALLING THE HAND CONTROLLER

1. Select a suitable location that is not exposed to the outdoor elements to mount the hand controller(3). The hand controller and its attached wire harness should allow easy access and use by the operator.
2. Secure the hand controller(3) by using a self-adhesive hook and loop fastener, available at most hardware stores.

WIRING HARNESS INSTALLATION

1. Ensure battery is disconnected before connecting the wire harnesses.
2. Connect the power harness to the electronics module(4), attaching the red wire to the + and the black wire to the - input. Connect the other end to truck power and ground. Be sure to leave the fuse/holder intact.
3. Connect the system harness(5) and hand controller harness(8) to the electronics module(4). Secure using the attached thumb screws. If necessary a screwdriver may be required. Route the system harness away from things such as antenna wires.
4. Attach the video harness(7) to one of the two video connectors and display, each provides the same output.
5. Reconnect the battery. Check that the power harness(6) and fuse are secure.
6. Replace the headliner of the vehicle.

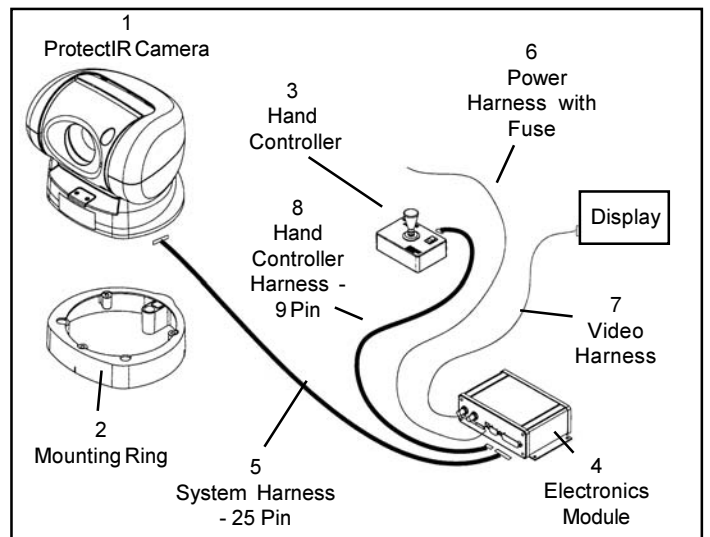


Figure 8 Protect IR System

TESTING

1. Turn the vehicle power on. Turn on the ProtectIR Camera(1) on by depressing the rocker switch on the hand controller(3). See Figure 7. The switch should illuminate red and the camera should automatically rotate to the HOME (forward) position. Turn the video monitor ON.
2. After approximately 45 seconds, an infrared video image should appear on the monitor. Adjust the monitor brightness and contrast for optimum viewing.
3. Move the hand controller(3) joystick to the left. Verify the camera rotates a full circle to the left. Verify that the indicator on the bottom left side of the monitor moves counter-clockwise.
4. Move and hold the joystick to the right. Verify that the camera rotates to the right through a full circle. Verify that the indicator on the monitor moves clockwise.
5. Hold the joystick forward. Verify the camera rotates full down.
6. Hold the joystick to the rear. Verify the camera rotates full up.
7. Turn the ProtectIR camera(1) OFF by depressing the rocker switch on the hand controller(3) back. The switch light should go off, the video monitor goes blank, and the camera should automatically rotate to the "stow" or rear position. To completely store the camera hold the joystick down until it stops and then turn off the switch.

TROUBLESHOOTING

If any of the camera functions are inoperative perform the following checks first:

Caution: Turn the system off at the hand controller(3).

1. Assure all harnesses(5-8) connected to the electronics module(4) are secure. Check that the power harness(6) red wire is connected to the (+) and the black connected to the (-) on the electronics module. Insulated ends should insert into the hole at the faceplate of the module. Assure the power source is in the 9 to 16Vdc range and has a minimum of 3 amp capacity.
2. Assure that the system harness(5) is securely connected to the camera(1) and the strain relief strap is secured over the harness with both screws.
3. Inspect the hand controller harness(8) and assure the connector is properly seated and thumbscrews are tightened.
4. Connect the power source and recheck the system. If the operation is not restored, check each harness for bent or damaged pins. If the problem persists check through the following symptoms for appropriate action.

Symptom: No IR video, pan/tilt works, hand controller light is ON.

1. Allow a 45 second warm-up before the IR video comes up.
2. Check that the camera is not in the closed position.
3. Turn the video monitor brightness to full. If a bright screen doesn't appear, check that the power leads are connected

at the video monitor and at the power source. Verify the video monitor is turned ON. If a bright screens still doesn't appear at the full setting replace the monitor.

4. Check the video harness(7) is secure at the electronics module(4) and monitor. Try connecting the video harness(7) to another video output on the electronics module(4). Test the monitor with a different video signal.
5. Ensure the F3 fuse is not blown.

Symptom: No pan / tilt, video works, hand controller light is ON.

1. Check if the F2 fuse on the electronics module(4) is blown. A fine silver wire can be seen through the clear cover of the fuse. If this wire is broken the fuse is blown and should be replaced.
2. Retest the system.

Symptom: No pan/tilt, no IR video, hand controller light is OFF.

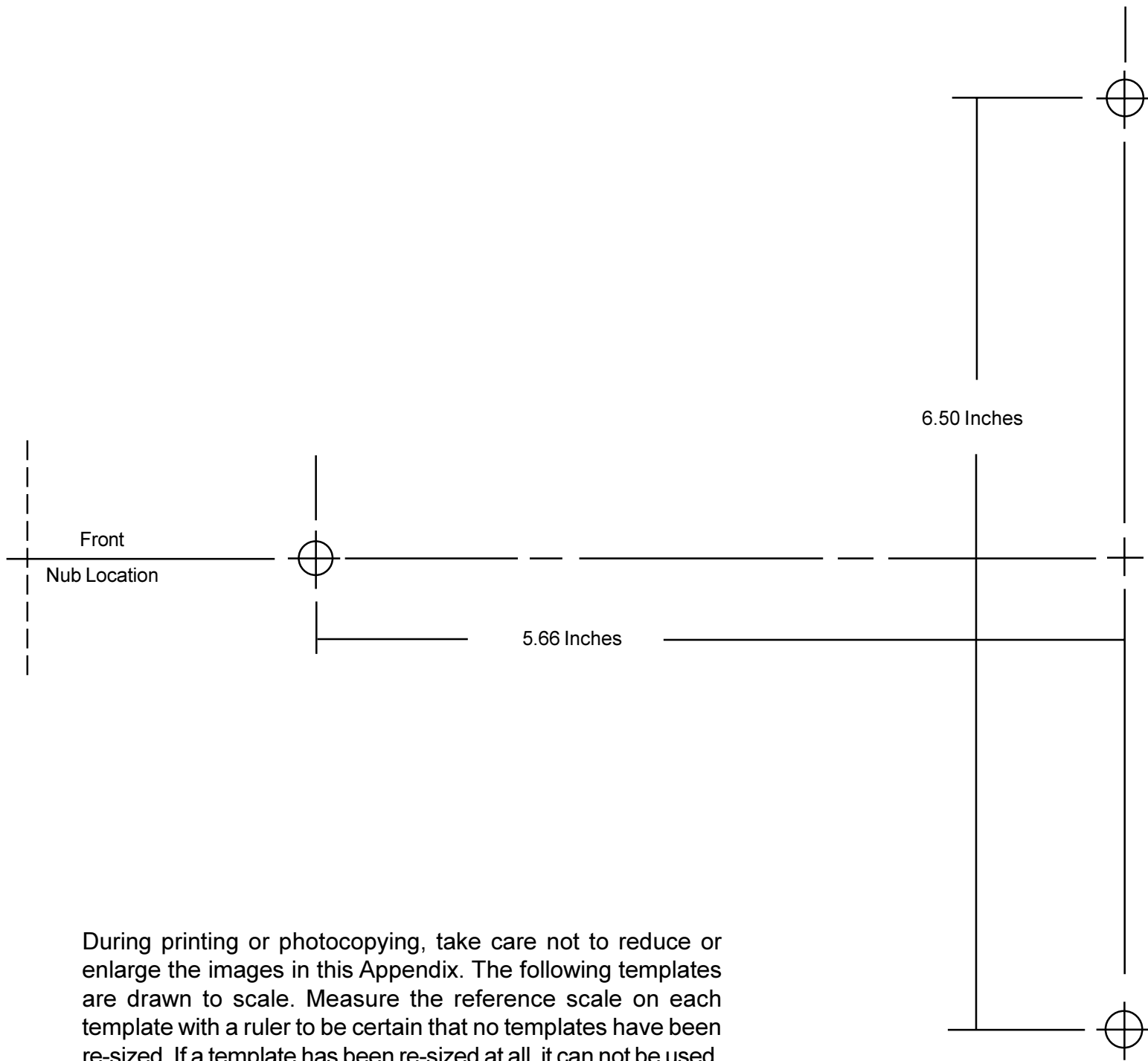
1. Check the in-line fuse at the power source end of the power harness(6) and replace if necessary. If blown, check for any shorts to chassis of the power harness. Verify the power harness connection to the power source is secure and has between 9 to 16 VDC supply with 3 amp minimum current capacity.

Symptom: Camera does not have full range of travel in tilt or up and down direction.

1. It is likely that something is binding between the outer moving surfaces of the tilt housing that holds the camera. This causes the clutched tilt motor to slip which is a built-in protection feature to prevent system damage. While tilting the camera up and down locate the point at which it hangs up. Check for any obvious obstructions such as twigs, small rocks or housing damage that binds.
2. Leave the system ON. If unable to locate or clear, then manually rotate the tilt housing gently back and forth. This will override or slip the clutch motor and allow the debris to be pushed through or out.
3. Try a joystick command and see if the problem persists. Roll and tilt several times, tapping to knock out the debris. If the problem persists use a high pressure water spray while moving the camera up and down to dislodge trapped debris.
4. If binding occurs when panning left and right ensure that the mounting ring was not distorted due to being mounted on surface that is not flat.

Symptom: Camera rotates past HOME (forward) when turned on and no pointer is present in the display symbology.

1. It is likely that a home sensor positioning tooth has been damaged inside the camera. This could result from improper installation of the 2" bolts that mount the camera to the camera(1) mounting ring(2). The bolts must be fully tightened upon assembly.



During printing or photocopying, take care not to reduce or enlarge the images in this Appendix. The following templates are drawn to scale. Measure the reference scale on each template with a ruler to be certain that no templates have been re-sized. If a template has been re-sized at all, it can not be used.

Mounting the Protect IR 4000B Pan and Tilt Camera