

Application Note 37627 (Revision NEW, 3/2016) Original Instructions RESTRICTED—LIMITED DISTRIBUTION

# **Common Rail Injector (CRI)**

Verifying Low Pressure Leakage Circuit Sealing Capability in High Pressure Fuel Adaptor



Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment.

Practice all plant and safety instructions and precautions.

Failure to follow instructions can cause personal injury and/or property damage.



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Any unauthorized modifications to or use of this equipment outside its specified mechanical, electrical, or other operating limits may cause personal injury and/or property damage, including damage to the equipment. Any such unauthorized modifications: (i) constitute "misuse" and/or "negligence" within the meaning of the product warranty thereby excluding warranty coverage for any resulting damage, and (ii) invalidate product certifications or listings.



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# Warnings and Notices

## **Important Definitions**



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

- **DANGER**—Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
- **WARNING**—Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
- **CAUTION**—Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- **NOTICE**—Indicates a hazard that could result in property damage only (including damage to the control).
- **IMPORTANT**—Designates an operating tip or maintenance suggestion.

	The engine, turbine, or other type of prime mover should be equipped with an overspeed shutdown device to protect against runaway or damage to the prime mover with possible personal injury
Overspeed / Overtemperature / Overpressure	loss of life, or property damage.
	The overspeed shutdown device must be totally independent of the prime mover control system. An overtemperature or overpressure shutdown device may also be needed for safety, as appropriate.
	The products described in this publication may present risks that could lead to personal injury, loss of life, or property damage.
	Always wear the appropriate personal protective equipment (PPE) for

- Eye Protection
- Hearing Protection
- Hard Hat
- Gloves
- Safety Boots
- Respirator

Always read the proper Material Safety Data Sheet (MSDS) for any working fluid(s) and comply with recommended safety equipment.

Start-up

Be prepared to make an emergency shutdown when starting the engine, turbine, or other type of prime mover, to protect against runaway or overspeed with possible personal injury, loss of life, or property damage.

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Automotive Applications On- and off-highway Mobile Applications: Unless Woodward's control functions as the supervisory control, customer should install a system totally independent of the prime mover control system that monitors for supervisory control of engine (and takes appropriate action if supervisory control is lost) to protect against loss of engine control with possible personal injury, loss of life, or property damage.

# Chapter 1. General Information

## Description

Common Rail Injector (CRI), Woodward item numbers G50011122 and similar, shipped from Woodward prior to 26-February-2016, may have been assembled without a low pressure fuel sealing O-Ring. See Figure 1-1.





The affected CRI's consist of a high pressure fuel adaptor ("T-Piece") mounted to the top of the accumulator body using 4 hex head bolts. During factory assembly, an O-ring is to be installed at the base of the fuel adaptor. Failure to install the appropriate O-ring can result in low pressure fuel leakage (between accumulator body and high pressure fuel adaptor) to the external environment, creating a potential fire hazard.

## **Preventive Action**

Perform an air pressure leakage test on injectors installed on engine per the instructions below to verify the presence of the required low pressure sealing O-ring.

Tools required

- Air pressure leakage test fixture. See Figure 1-3.
- Standard tools required to install and remove injectors

## Step 1: Test Preparation (Engine Right Bank)



- Remove high pressure fuel line plug from end of daisy chain (cylinder #6). See Figures 1-2 and 1-4.
- Install air pressure leakage test fixture. See Figure 1-3.

- Be sure to lubricate threads when installing fixture into fuel adaptor using high pressure joint grease or a similar lubricant.
- Expose "double wall" leakage paths from bottom of <u>left bank junction</u> <u>block</u> to allow applied air pressure to vent to atmosphere. See Figures 1-4 and 1-5.



Figure 1-2. High Pressure Fuel Line Plug



Figure 1-3. Air Pressure Leakage Test Fixture



Figure 1-4. Engine Fuel System Layout



Figure 1-5. Left Bank Junction Block

### Step 2: Test Execution (Engine Right Bank)

- Use ball valve and/or regulator to apply air pressure until reaching either 6.0bar ±0.5bar (87.0psi ±7.0psi) or until the valve/regulator is fully open and there is a sustained flow of air through the circuit.
- For every injector on Engine Right Bank, manually inspect the entire circumference of the junction of the high pressure fuel adaptor to the injector accumulator for any signs of air leakage. See Figure 1-6.
  - The use of a test fluid may be helpful to identify air leakage, as indicated by the presence of bubbling; however a fluid with rust inhibitive properties must be used to avoid unintended product damage.
- If any air leakage is detected, the injector is to be removed from the engine and returned to Woodward for rework and verification.
  - In the event of leakage, please document the leakage with a video showing either the presence of "bubbles" or a moving piece of paper or cloth. If a video is not possible, please capture a still digital image.
  - Be careful to differentiate any leakage from the high pressure fuel adaptor to accumulator junction from any other high pressure line leakages from different sources.



Figure 1-6. Inspecting Junction Block for Leakages

## Step 3: Test Clean-up (Engine Right Bank)

- Remove the air pressure leak test fixture from the injector.
- Re-install the high pressure fuel line plug.
  - $\circ$   $\;$  Be sure to lubricate the threads upon installation.
  - Be sure to torque to appropriate assembly torque and reapply the appropriate witness mark.

### Step 4: Administer Test for Remainder of Engine (Engine Left Bank)

- Follow the procedures outlined in Steps 1-3 for the left bank of the engine.
- Be sure to remove high pressure fuel line plug on cylinder #12.

#### Step 5: Completion of Procedure

• Reassemble the left bank junction block to allow system to function properly during normal operation.

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