

## Injector Sleeve Replacement

### UBS JACKAROO with 4JX1 DIESEL ENGINE

Group 6M

TL323-0210

#### PROBLEM DESCRIPTION

Until recently, the injector sleeve seals in the Jackaroo 4JX1 engine have not been serviceable. They are now serviceable with the use of a special tool which was forwarded to every Holden Retailer attached to Retailer Letter RL72/02.

#### PRODUCTION RECTIFICATION

Injector sleeves with revised o-ring material were introduced in production from:

VIN	Date
JACUBS73GY7102028	03/11/1999

#### SERVICE PROCEDURE

Use following procedure to replace injector sleeves.



Figure 1. – Working Environment

In preparation for this repair:

- Check position C2 on the Vehicle Service History Label to see if the procedure has been previously completed.
- Disconnect the battery negative (-) cable/s.
- Loosen the radiator drain plug and drain approximately 5 litres of coolant from the radiator

1. Follow LCV-SIP instructions and remove the injectors and oil rail assembly. Remove oil rail and injectors as one assembly while avoiding oil entry into the combustion chamber.

**NOTE:** Ensure the injectors are installed in the same positions on the oil rail from which they were removed. Otherwise, recalibration of the ECU with Tech 2 will be necessary.

2. Clean and inspect the injectors. Wipe away soot and deposits from the tip of the nozzle with solvent and a rag.
3. Discard the injector Back Up O Ring and Sleeve rework if fitted.

**CAUTION: THE USE OF A BRUSH WITH METAL BRISTLES MAY DAMAGE THE INJECTOR NOZZLE**

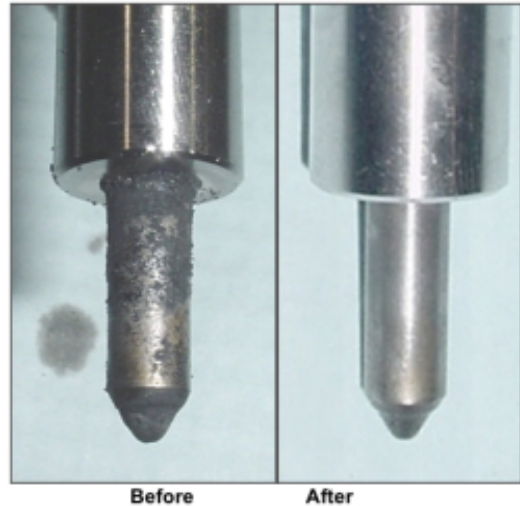


Figure 2 – Inspect and Clean Injectors

4. Remove and replace all injector O-rings. Lubricate with L2 grease. Refer Figure 3.

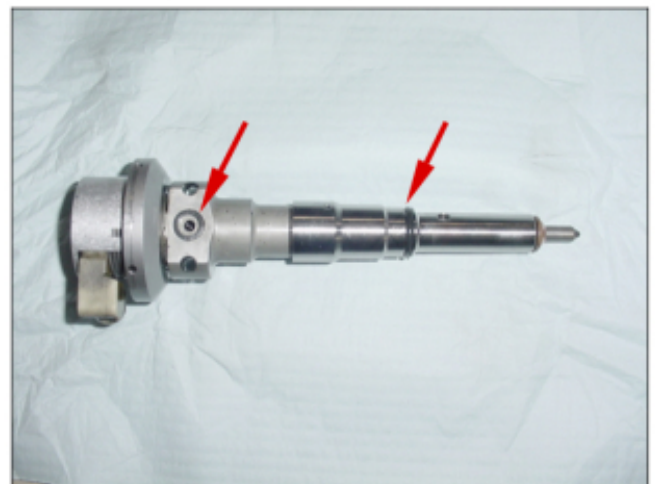
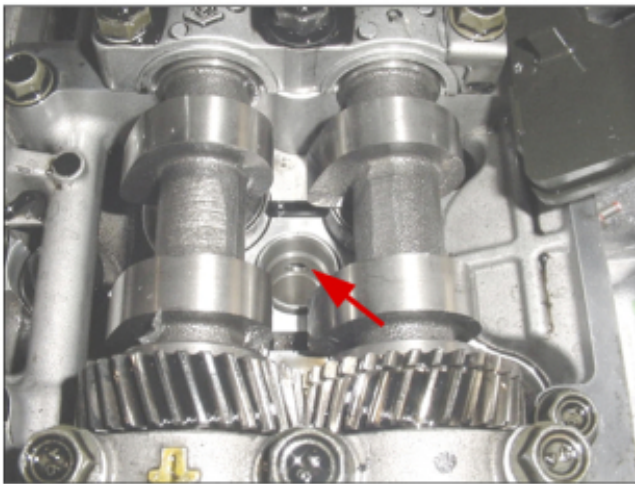
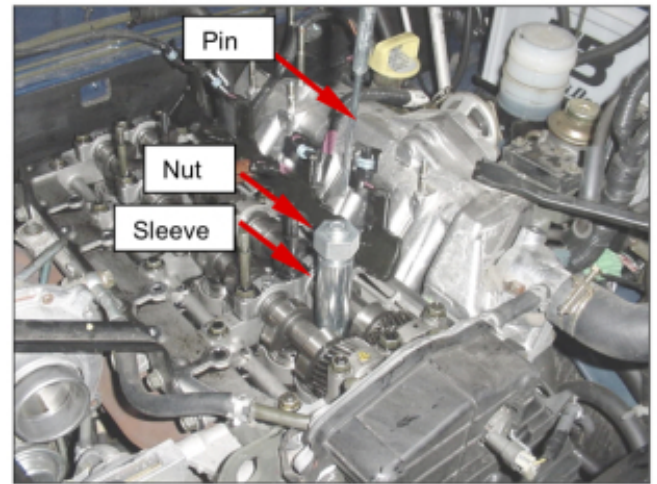


Figure 3 – Replace Injector Seals

5. Inspect the injector sleeves in the cylinder head to locate the fuel gallery holes. Refer Figure 4.



**Figure 4 – Injector Sleeve Fuel Gallery Holes**



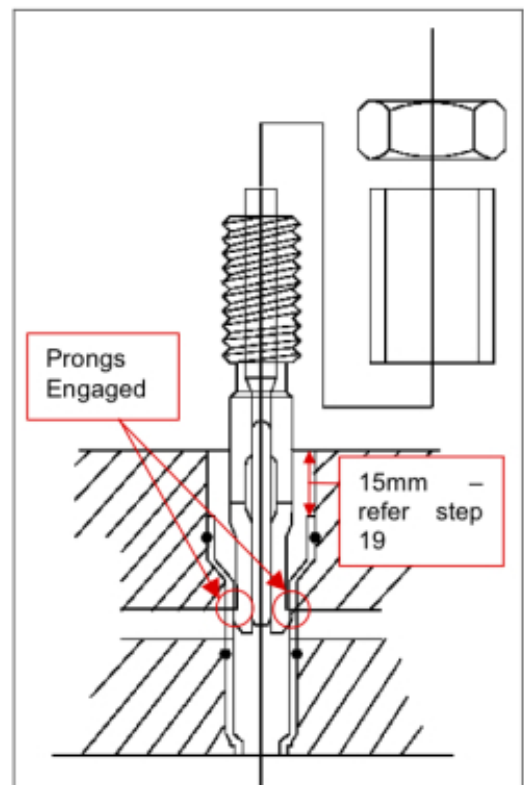
**Figure 6 – Sleeve Removal Tool Assembled**

6. Orient the sleeve removal tool so the prongs will engage the fuel gallery holes when pushed into the sleeve. Refer Figure 5.



**Figure 5 – Orienting Sleeve Removal Tool**

7. Push the sleeve removal tool into the sleeve until the prongs on the tool engage the fuel gallery holes. Twist the tool to check it is fully engaged. Fig 7.
8. Install the tool outer sleeve and finger tighten the nut.
9. Install the pin into the centre of the sleeve removal tool. This keeps the tool prongs engaged in the fuel gallery holes. If the pin does not seat fully or becomes stuck, the sleeve removal tool is not correctly engaged with the injector sleeve. Refer Figures 6 and 7.



**Figure 7 – Tool Assembly in Cylinder Head**

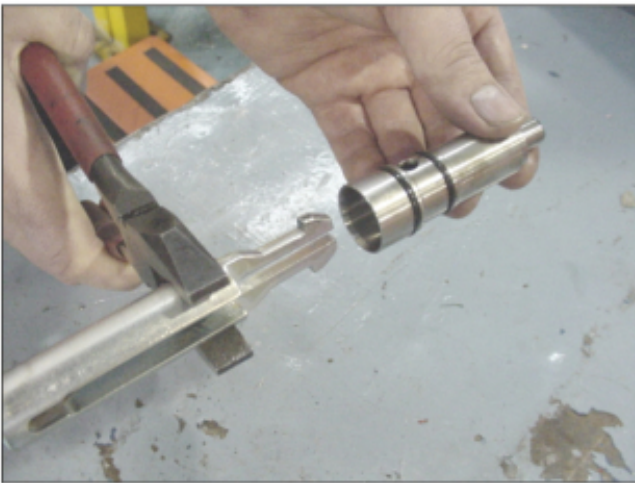
10. Hold the flat on the threaded section of the tool with a wrench and turn the nut clockwise to pull the sleeve from the head. Refer Figure 8.



**Figure 8 – Extracting the sleeve using the tool**

11. Remove the pin from the tool and use large pliers to compress the body of the tool to release the prongs from the injector sleeve. Refer Figure 9.

**NOTE: DO NOT COMPRESS THE PRONGS AS DAMAGE TO THE TOOL MAY RESULT!**



**Figure 9 – Removing the tool from the injector sleeve**

12. Repeat this process for the remaining three injector sleeves in the cylinder head.
13. Clean the injector sleeve bores with a lint-free rag wrapped around a soft material such as wood.

14. Prepare the new injector sleeves for installation by applying L2 grease to the O-rings. Refer Figure 10.



**Figure 10 – Greasing new injector sleeve O-rings**

15. Thoroughly clean one of the old injector sleeves to use as an installer. Remove the O-rings in order to identify it.
16. The old sleeve will be used upside down to install the new sleeve. Refer Figure 11.



**Figure 11 – Using old sleeve as installing tool**

17. Sit the new injector sleeve in the cylinder head. Align the fuel gallery holes in the sleeve with the ports in the cylinder head (no photo).
18. Locate the clean, used injector sleeve upside down on the new sleeve. Refer Figure 12.



**Figure 12– Locating injector sleeves**

19. Carefully install the new injector sleeve, using a hammer, until it is fully seated in the cylinder head. Refer Figure 13.



**Figure 13 – Installing new injector sleeve**

**NOTE:** Check the injector sleeve is fully seated in the cylinder head by measuring the depth of the sleeve in the head. The correct depth of the sleeve in the cylinder head is 15mm (refer Figure 7). Once the sleeve is in the home position do not continue to install the sleeve as damage may occur.

20. Repeat this procedure for the remaining three injector sleeves.
21. Remove any oil or coolant that pooled in the combustion chamber with a vacuum bleeder or syringe.

22. Insert the copper packing into the injector sleeves. Use the extraction tool pin to guide the packing into the sleeve. Refer Figures 14 and 15.

**NOTE:** The surfaces of the copper packing create a seal and must be clean (no visible sign of carbon etc).

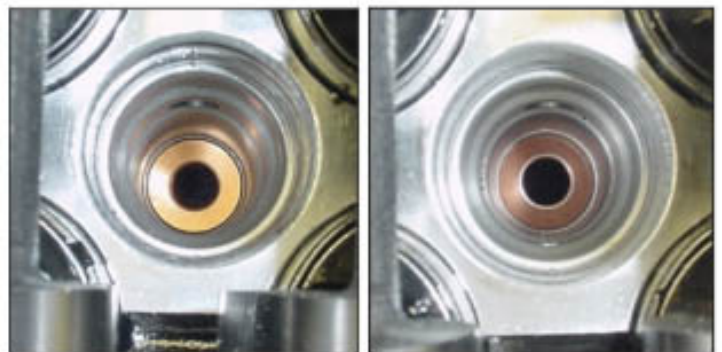


**Figure 14 – Using Extractor Tool pin to guide copper packing**



**Figure 15 – Installing the copper packing**

23. Inspect the copper packing in the sleeve to ensure it is installed correctly. Refer Figure 16.



**Correct                  Incorrect (upside down)**

**Figure 16 – Copper Gasket Inspection**

24. Install the oil rail and injectors.

**Note: Carefully install the injectors into the sleeves.**

25. Install the injector H-clamp and nut and tighten temporarily.

26. Tighten injector to oil rail bolts to the specified torque.

**Torque: 6.5 Nm (0.7 kgm / 5.1 ft lb)**

27. Tighten injector H-clamp nuts to the specified torque to seat the injectors:

**Torque: 30 Nm (3.1 kgm / 22 ft lb)**

28. Loosen the injector H-clamp nuts and retighten to the specified torque:

**Torque: 25 Nm (2.4 kgm / 17.4 ft lb)**

29. Torque the oil rail bolts to the specified torque:

**Torque: 20 Nm (2.0 kgm / 14.5 ft lb)**

30. Reinstall the remaining components in the reverse order. Refer to LCV SIP for information if required.

**Note: Check that the injector electrical connection packing seals are fitted and there is no oil in the connection.**

31. Mark position C2 on the Vehicle Service History Label.

## **PARTS INFORMATION**

<b>Part No.:</b>	<b>Description:</b>	<b>Qty:</b>
8971757830	Gasket – Injector Nozzle Clamp	4
8972407980	Gasket – Nozzle Holder	4
8971611092	Gasket – Injector Nozzle Clamp	4
8971842160	O-Ring	2
8971606721	Gasket – Cover to Cylinder Head	1
8972451850	Sleeve – Injector	4

## **WARRANTY INFORMATION**

<b>Description</b>	Injector Sleeve – Replace
<b>Labour Op.</b>	J000719
<b>Time</b>	2.2hr
<b>Failure Code</b>	95