

Unit Injector Removal

M-237-002

(December 2008)

Valid for

Mack CXU, CHU, GU, TD, MRU, LEU, built with MP7/8/10

Case description

This service bulletin provides instructions for unit injector replacement for MACK MP7, MP8 and MP10 engines with three possible hold-down yoke configurations. The original 28 mm yokes were replaced in production by a 38 mm yoke during March of 2008. The 38 mm yoke was later revised to include a stepped-down area to allow improved service removal. Unit injector removal for all three yoke configurations is outlined in the procedures below.

PRELIMINARY STEPS

1. Apply the parking brake and place the shift lever in neutral.
2. Disconnect the batteries by disconnecting the negative battery cable(s) first, and then the positive cable(s). If equipped with dual battery boxes, disconnect the battery cables in both boxes.

The following components need to be removed for access to the engine unit injectors. Refer to the appropriate Mack engine service manual for removal procedures:


- Cylinder Head Cover
- Rocker Arm Shaft

UNIT INJECTOR REMOVAL

1. Thoroughly clean around the unit injectors that are to be removed and check to ensure that the engine is completely drained of fuel.
2. Remove the unit injector hold-down bolt.

Note: Three different styles of the unit injector hold-down yokes were used in production on MACK MP engines. The first style (1) is 28 mm tall with a pronounced stepped-down area on the end of the yoke that engages the unit injector. The second style (2) is 38 mm tall, and the end of the yoke that engages the unit injector is not stepped-down. The third style (3) is also 38 mm tall, but the end that engages the unit injector is stepped-down to allow the forks of the heavy-duty unit injector puller (tool No. J 48922) to engage the unit injector groove. This allows removal of the unit injector without necessitating the removal of any valve springs.

Unit Injector Hold-Down Yoke Styles

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3. Using the chart below to determine the correct method of unit injector removal based on the status of the injector (immovable [stuck], or removable [not stuck]), remove the unit injector as described in the following steps for the style of hold-down yoke being serviced:

Unit Injector Status	28 mm (Short) Yoke	38 mm (Tall) Yoke	38 mm (Tall) Yoke with Stepped-
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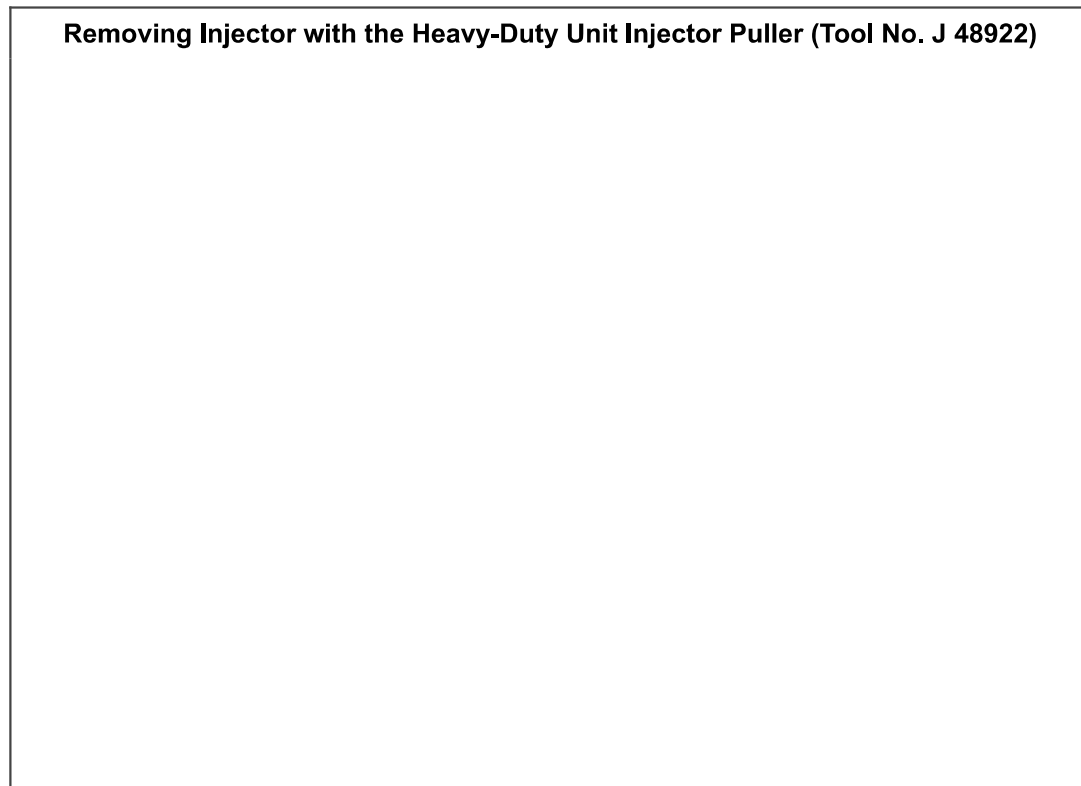
			Down Area
Unit Injector — Immovable (Stuck)	Heavy-Duty Puller J 48922	Heavy-Duty Puller J 48922 <i>Note: Requires removal of the inlet and exhaust valve springs to allow access for heavy-duty puller</i>	Heavy-Duty Puller J 48922
Unit Injector — Removable (Not Stuck)	Standard Puller 9990006	Pry Bar 9998511	Standard Puller 9990006

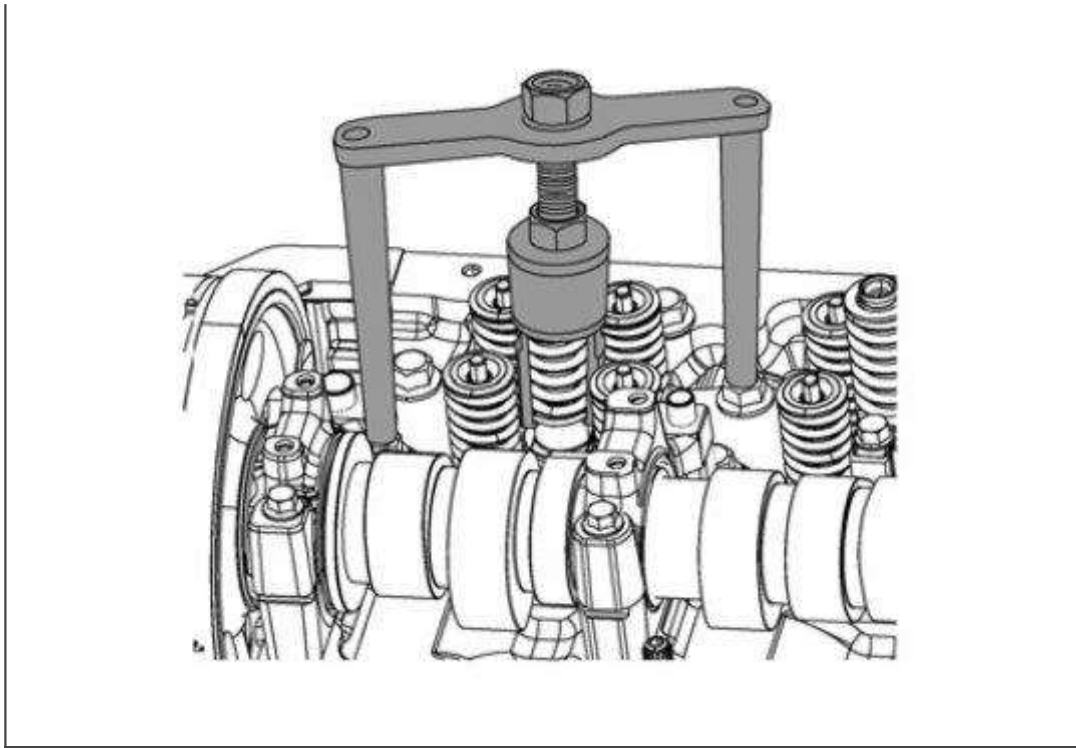
Injector Removal — 28 mm (Short) Yoke

Note: Use care when removing the unit injector because the injector hold-down is not secure and could fall off if not held in place.

- a. Initially attempt to remove the unit injector using the standard injector puller (tool No. 9990006).
- b. If the unit injector cannot be removed using the standard puller, proceed to using the heavy-duty puller (tool No. J 48922) by positioning the forks of the heavy-duty puller (tool No. J 48922) under lip on the unit injector. Secure the puller by sliding the lock collar down over the forks. Remove the injector from the cylinder head using hand tools. **The injector must be lifted out along with the hold-down yoke.**

Removing Injector with the Heavy-Duty Unit Injector Puller (Tool No. J 48922)





Caution

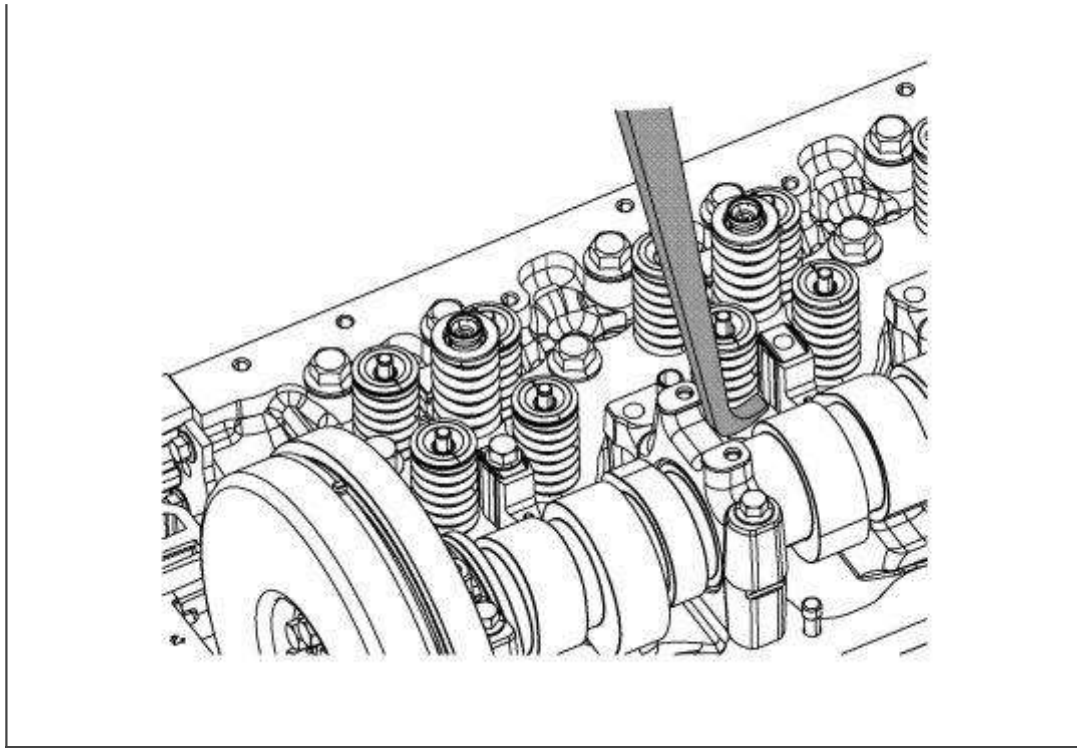
If excessive combustion leakage has resulted in the copper sleeve being stuck-fast to the unit injector by carbon, the unit injector must be replaced. The condition is found when the unit injector is removed and the copper sleeve comes out with the injector.

Injector Removal — 38 mm (Tall) Yoke

Note: Use care when removing the unit injector because the injector hold-down is not secure and could fall off if not held in place.

- a. Use a pry bar (tool No. 9998511) or equivalent, under the hold-down or injector lip and pry up to remove the injector.

Removing Injector with a Pry Bar (Tool No. 9998511)



If the injector cannot be removed using the pry bar, proceed as follows:

i. Depending on which injector is stuck, remove the unit injector from the companion cylinder (i.e., if the injector in cylinder No. 1 is stuck, remove the injector from cylinder No. 6). Use the appropriate flywheel turning tool to rotate the engine crankshaft to position the camshaft at TDC. Next, rotate the engine from TDC to the appropriate camshaft mark to position the piston at the companion cylinder at TDC, see table below. Confirm the piston is at the top of the cylinder by inserting a 40 cm (16 inch) piece of straight stiff wire into the injector hole of the companion cylinder.

Companion Cylinder	Camshaft Mark
1 and 6	V3 TDC
2 and 5	V6
3 and 4	V2

ii. After verifying that the piston in the companion cylinder is at TDC, remove the inlet and exhaust valve springs at the sides of the hold-down yoke on the cylinder where the unit injector is stuck. To do this require using an alternate valve spring compressor (tool No. J 41989) mounted in the injector hold-down yoke fastener hole of an adjacent cylinder. Compress the valve springs, remove the valve keepers and then slowly release the tool and remove the valve spring.

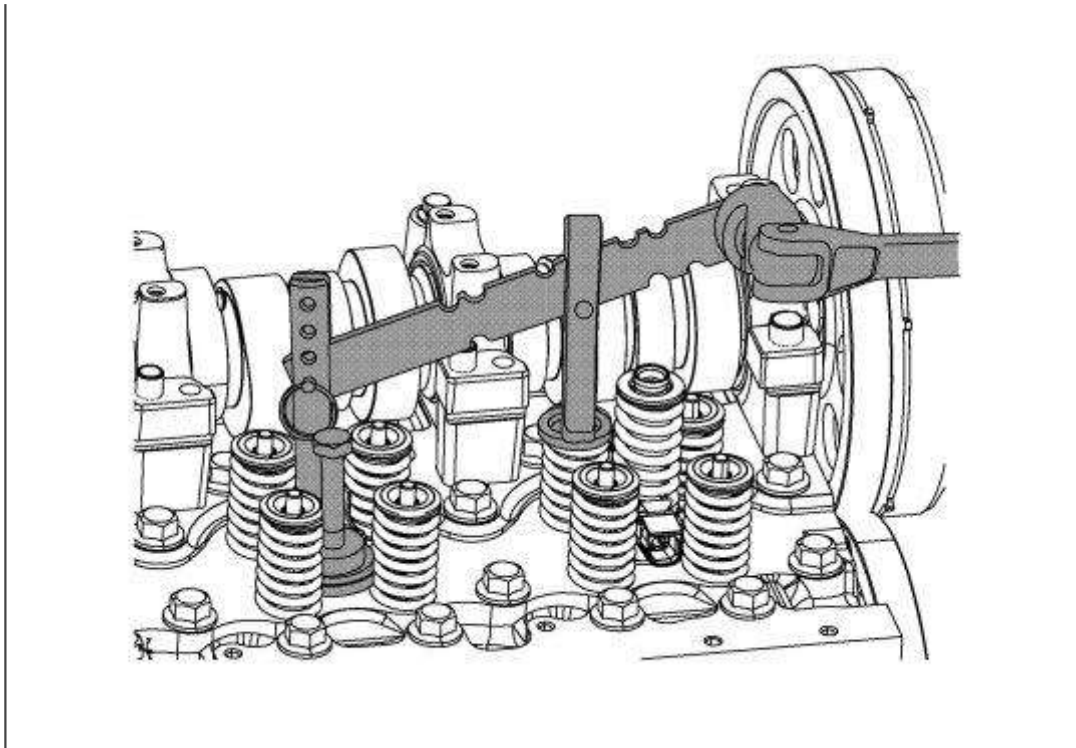


Warning

Use protective goggles or injury to the eyes can occur.

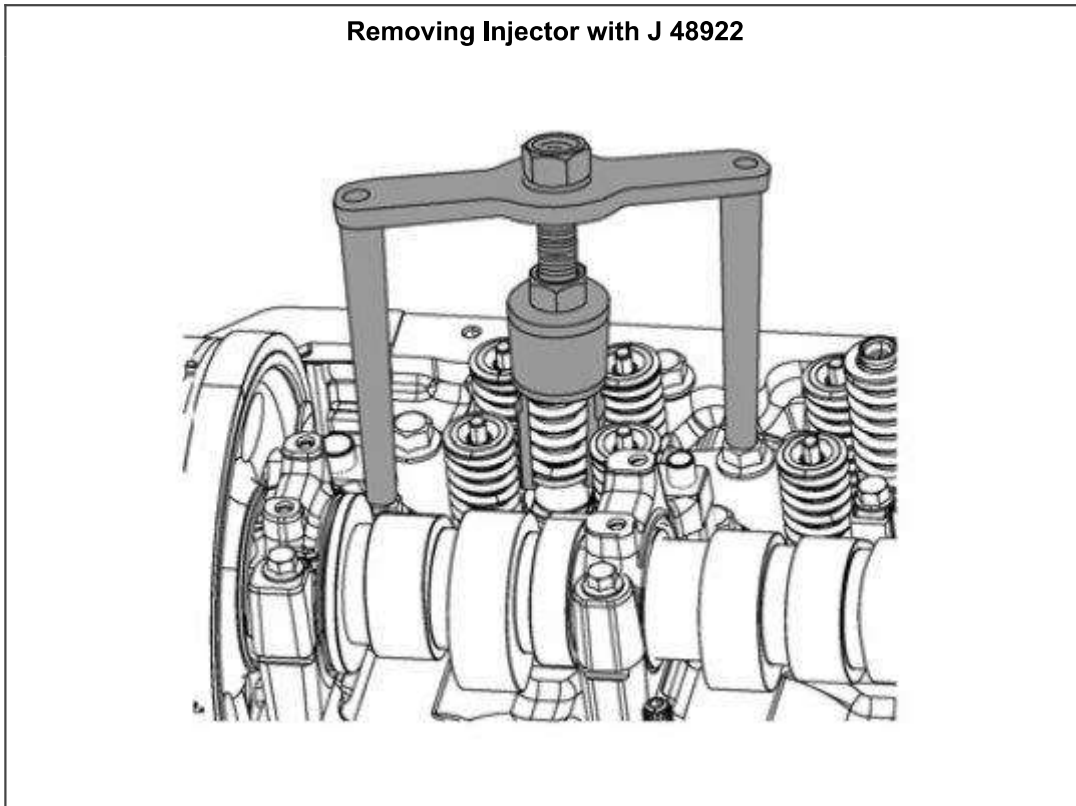
Note: Cover all passageway holes in the cylinder head and gear train opening with shop towels.

Removing Valve Springs with Alternate Valve Spring Compressor (Tool No. J 41989)



iii. Position the forks of the heavy-duty puller (tool No. J 48922) under the lip of the unit injector. Secure the puller by sliding the lock collar down over the forks. Remove the injector from the cylinder head using hand tools. **The injector must be lifted out along with the hold-down yoke.**

Removing Injector with J 48922



Caution

If excessive combustion leakage has resulted in the copper sleeve being stuck-fast to the unit injector by carbon, the unit injector must be replaced. The condition is found when the unit injector is removed and the copper sleeve comes out with the injector.

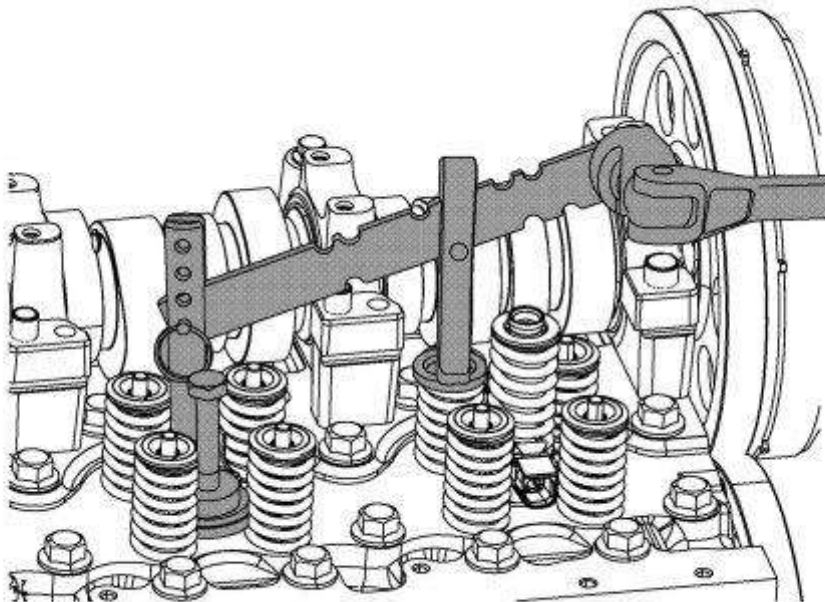
iv. Reinstall valve spring compressor (tool No. J 41989), then position the inlet and exhaust springs over the valves. Compress the springs and install the valve keepers. Tap the valve stem with a soft-faced mallet to make sure the keepers are seated properly. Remove the compressor tool from the cylinder head.



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Installing Valve Springs with Alternate Valve Spring Compressor (Tool No. J 41989)

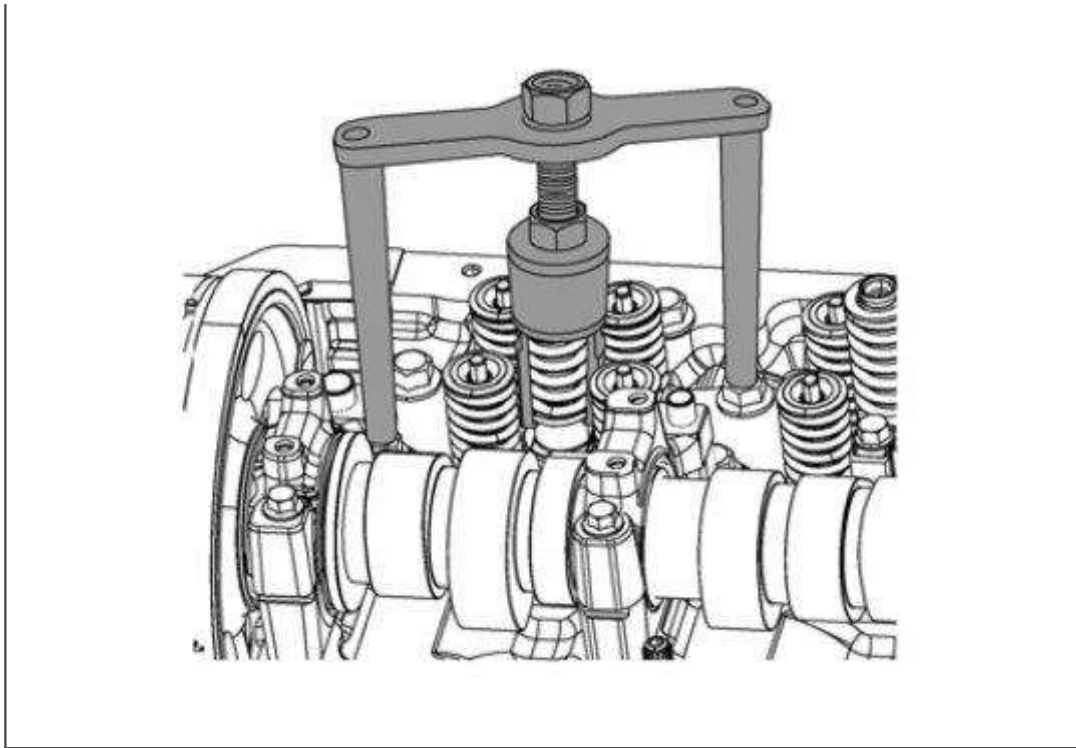


Injector Removal — 38 mm (Tall) Yoke with Stepped-Down Area

Note: Use care when removing the unit injector because the injector hold-down is not secure and could fall off if not held in place.

- a. Initially attempt to remove the unit injector using the standard injector puller (tool No. 9990006).
- b. If the unit injector cannot be removed using the standard puller, proceed with using the heavy duty puller (tool No. J 48922) by positioning the forks of the heavy-duty puller (tool No. J 48922) under the lip of the unit injector, and then secure the puller by sliding the lock collar down over the forks. Remove the injector from the cylinder head using hand tools. The **injector must be lifted out along with the hold-down yoke.**

Removing Injector with Heavy-Duty Puller (Tool No. J 48922)



4. Reinstall the unit injector(s) with new sealing washers per instructions found in the appropriate MACK engine service manual.

FINAL STEPS

Install the following components which were removed for access to the engine unit injectors. Refer to the appropriate Mack engine service manual for installation procedures:

- Rocker Arm Shaft
- Valve Cover

1. Reconnect the batteries by connecting the positive battery cable(s) first, and then the negative cable(s).
2. Start the engine, check for leaks and proper operation. After shutdown, replenish fluids as necessary.

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