
3-82. INJECTOR AND VALVE ADJUSTMENT (DIAL INDICATOR METHOD)

THIS TASK COVERS:**a. Checking Plunger Free Travel****b. Injector and Valve Adjustment**INITIAL SETUPAPPLICABLE MODELS

All

TOOLS

General mechanic's tool kit
(Appendix B, Item 1)
Injector and valve adjustment kit
(Appendix B, Item 57)
Torque wrench adapter (Appendix B, Item 59)
Dial indicator (Appendix B, Item 11)
Feeler gage (Appendix B, Item 58)
Torque wrench, 1/2-in. dr.
(Appendix B, Item 3)

REFERENCES (TM)

TM 9-2320-260-10
TM 9-2320-260-20
TM 9-2320-260-34P-1

EQUIPMENT CONDITION

- Fuel shutoff valve is in OFF Position (TM 9-2320-260-10).
- Battery ground cable disconnected (TM 9-2320-260-20).
- Rocker lever housing covers removed (para. 3-14).
- Valve crossheads adjusted (para. 3-16).

GENERAL SAFETY INSTRUCTIONS

If task is being performed while engine is in vehicle, ensure fuel shutoff valve is in OFF position and battery ground cable is disconnected to prevent engine from starting.

a. Checking Plunger Free Travel

WARNING

If task is being performed while engine is in vehicle, ensure fuel shutoff valve is in OFF position and battery ground cable is disconnected to prevent engine from starting. Failure to do this may result in injury to personnel.

CAUTION

This procedure is for non-top stop injectors. It is used to prevent excessive loading of the injector actuating systems and possible failure.

NOTE

- Loosening all injector rocker lever adjusting screws and locknuts will help indicate which cylinders have been adjusted and those cylinders that still need to be adjusted.
- All injectors and valves are adjusted the same. This procedure covers the injector and valve adjustment for one cylinder head.

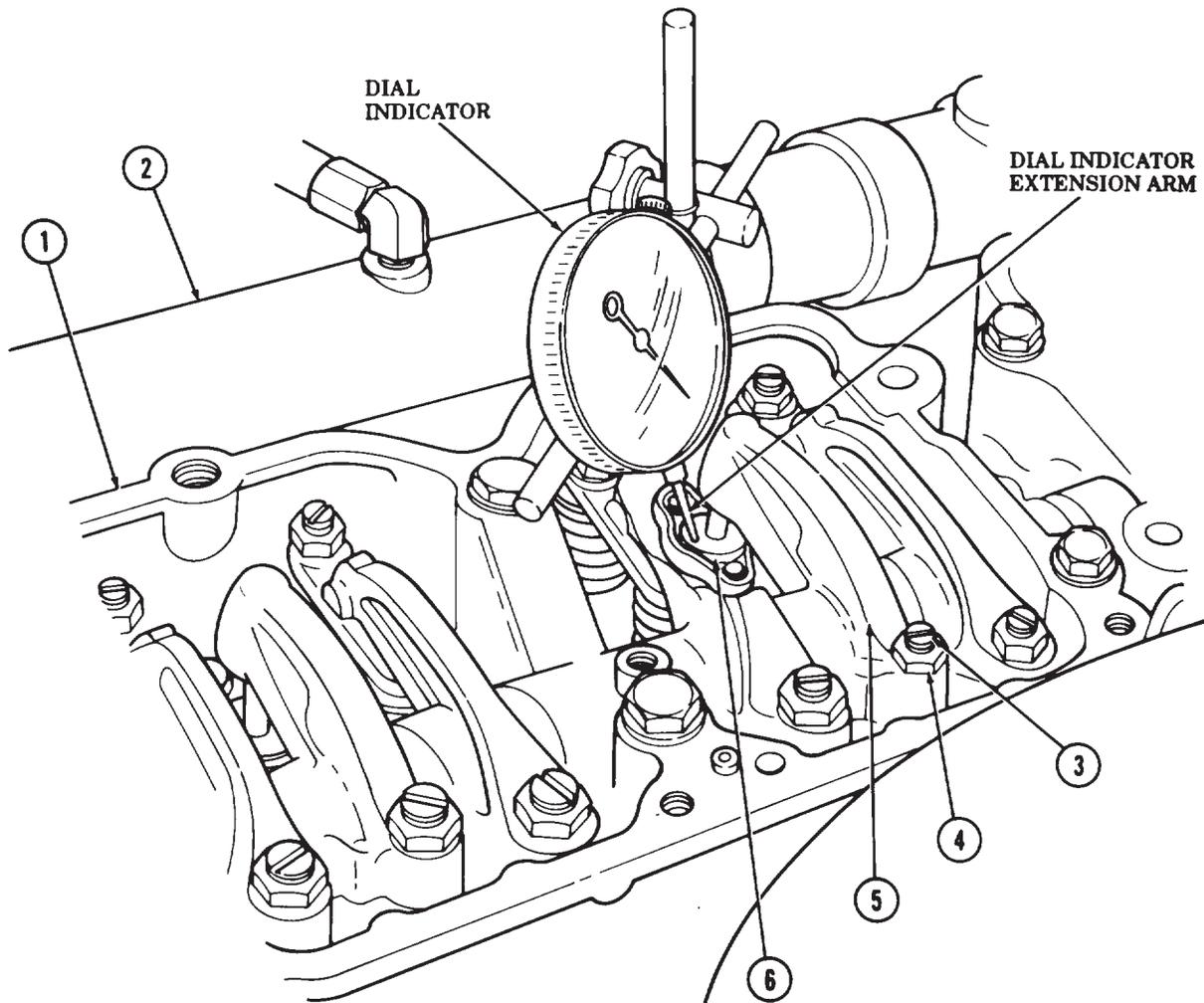
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1. Loosen locknut(4) one full turn on injector rocker lever (5).
2. Loosen adjusting screw (3) one full turn on injector rocker lever (5).
3. Install dial indicator on water manifold (2) side of rocker lever housing (1) and position dial indicator extension arm on top of injector plunger (6).

NOTE

Injector plunger free travel must not exceed 0.206 in. (5.23 mm) on any injector plunger. If injector plunger free travel exceeds 0.206 in. (5.23 mm) on any injector plunger, the torque method of adjustment must be used (para. 3-83).

4. Rotate engine at crankshaft and record the total amount of free travel at injector plunger (6).
5. Check and record the total amount of free travel at all injector plungers (6) (steps 1 through 4).
6. If free travel of all injector plungers (6) is less than 0.206 in. (5.23 mm), reset dial indicator, position on No. 3 cylinder, and proceed to injector and valve adjustment (subtask b.).

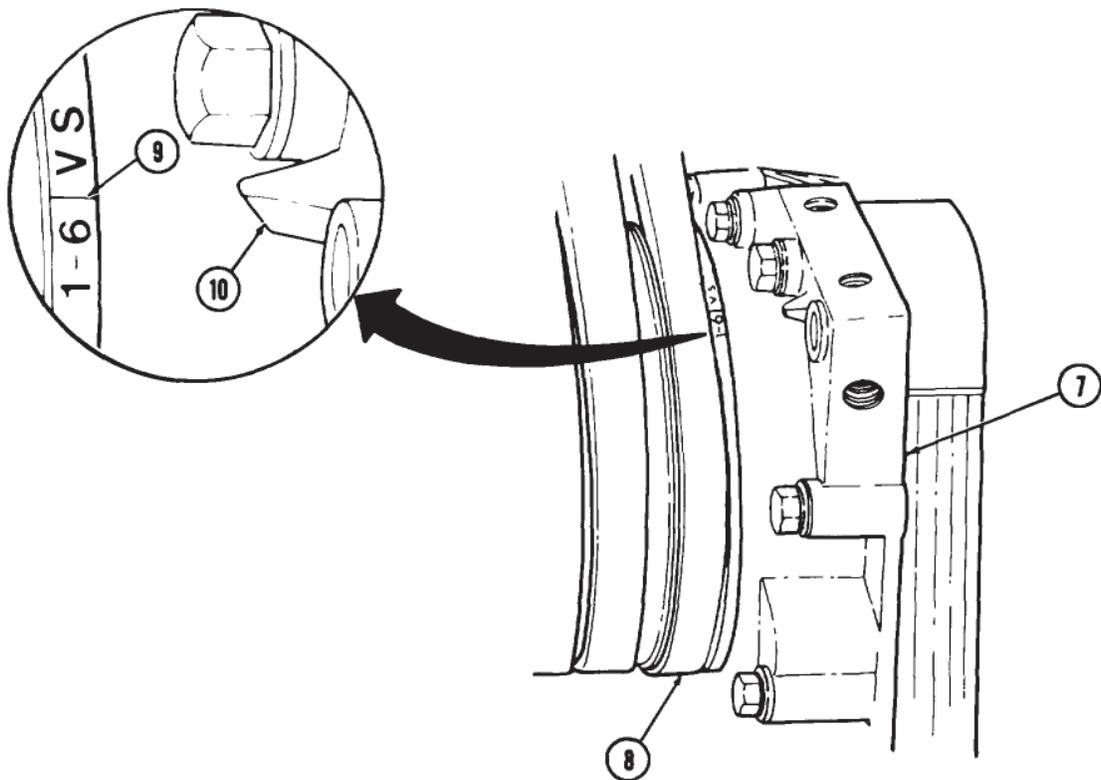


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b. Injector and Valve Adjustment

NOTE

- During rebuild, injectors and valves are “cold set” with temperature of oil and component parts within 10°F (-12°C) of ambient air or room temperature. Final “hot set” adjustments must be made when engine is at operating temperature. When warming engine for hot adjust, ensure rocker cover is installed.
 - The injector and valve adjusting procedures below and in the referenced “table of specifications” requires that the injectors be adjusted before the valves.
 - Perform this procedure for non-top stop injectors.
1. Rotate accessory drive pulley (8) until the timing mark (9), 1-6 “VS”, is aligned with pointer (10) on gearcase cover (7).

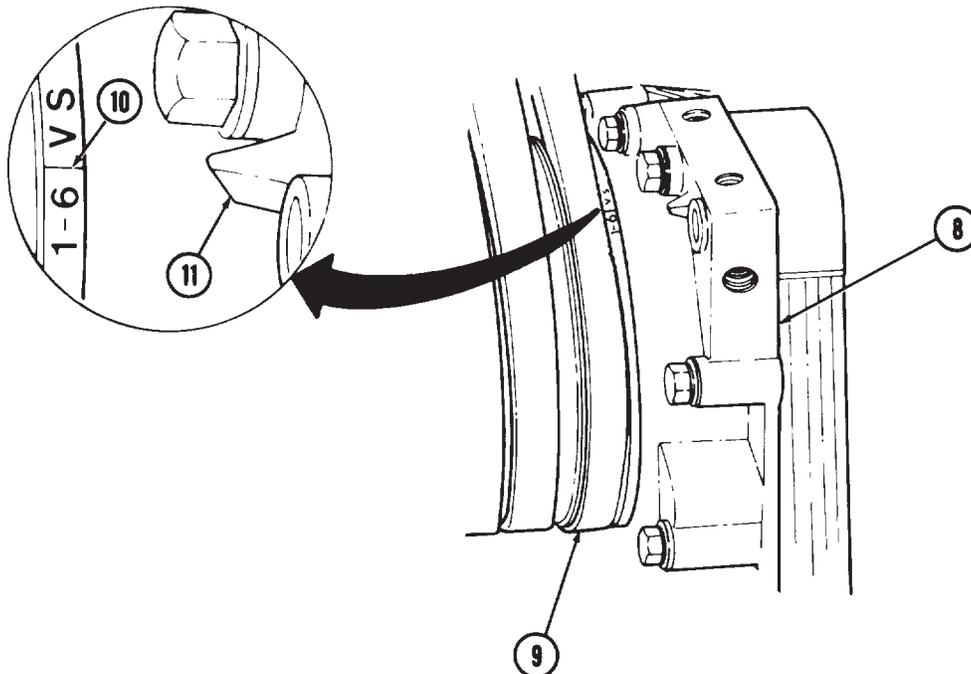
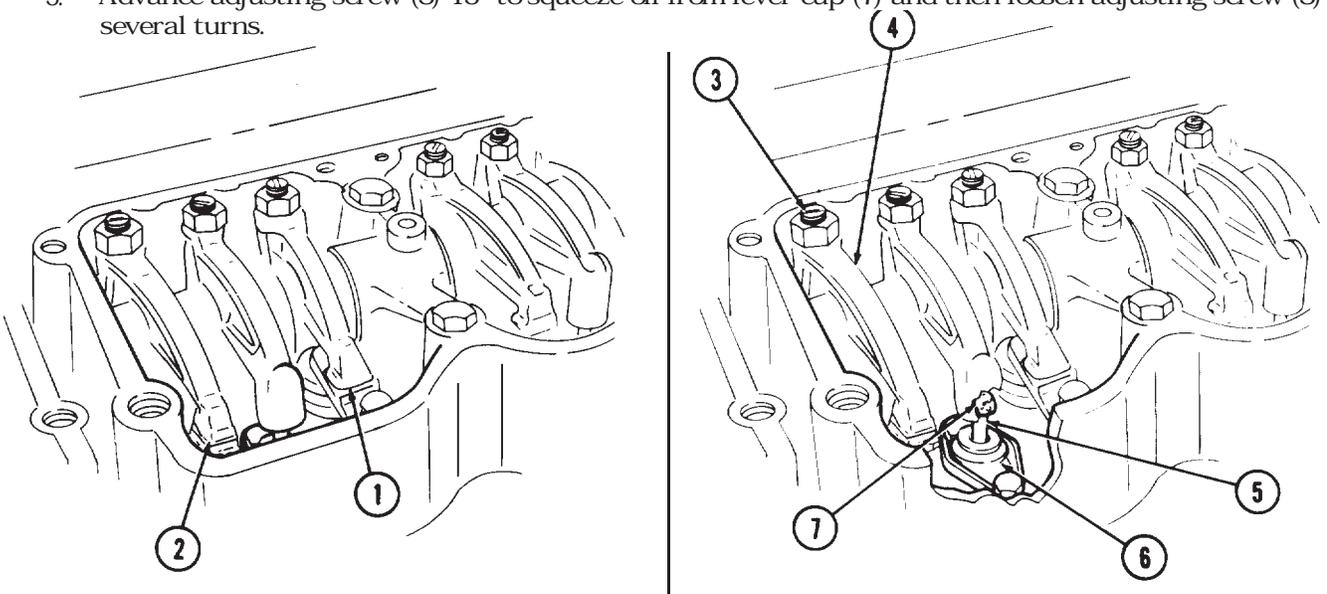


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NOTE

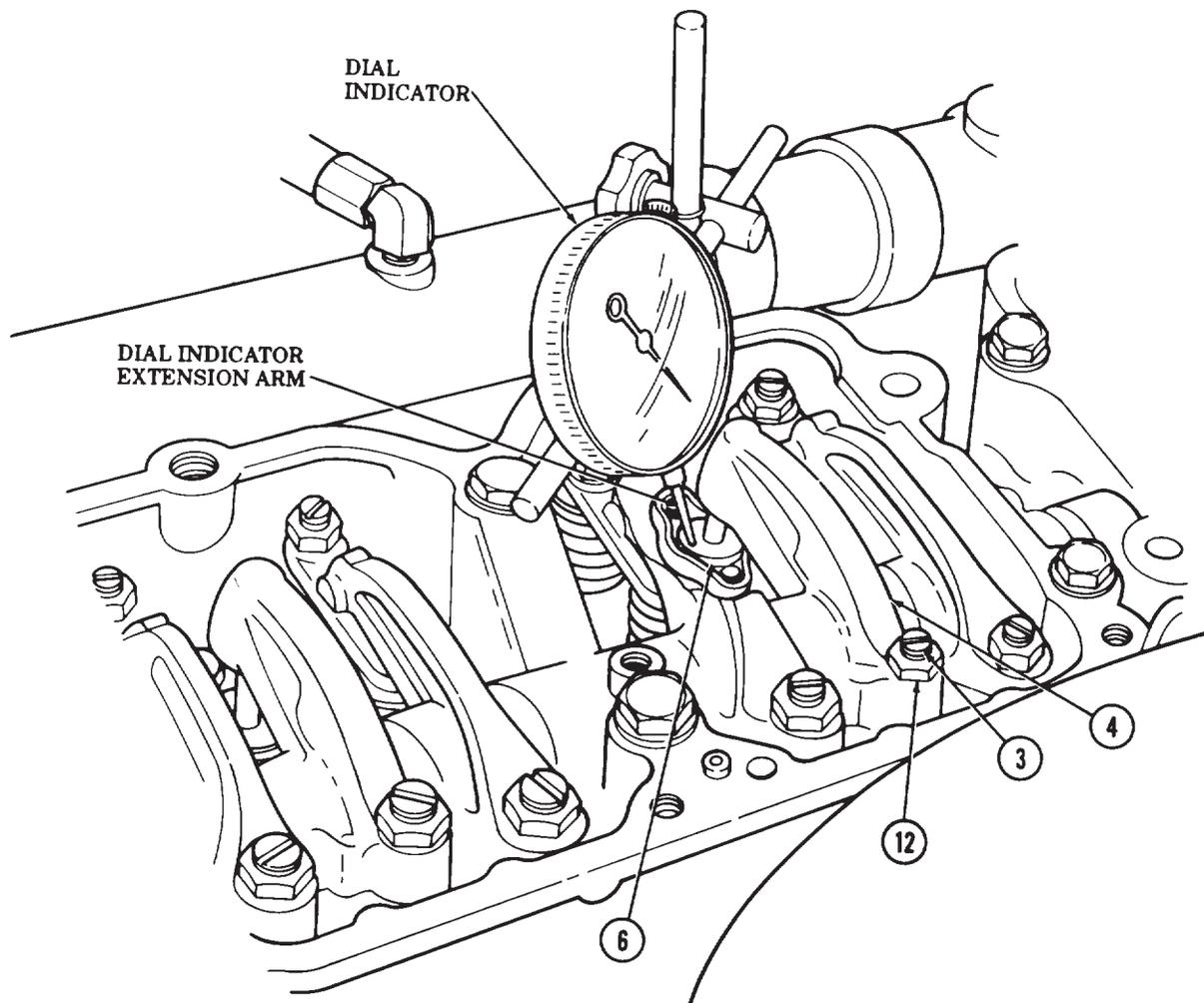
Both valve rocker levers for cylinder No. 5 must be free (valves closed), and injector plunger for cylinder No. 3 must be at top of travel before beginning adjustments.

2. Ensure both No. 5 intake (1) and exhaust (2) rocker levers on cylinder No. 5 are free (in closed position) by shaking levers with hand; valve springs must not be compressed.
3. Ensure injector plunger (6) on cylinder No. 3 is at top of travel. If injector plunger (6) is not at top of travel, rotate accessory drive pulley (9) 360° and realine timing mark (10), 1-6 "VS", with pointer (11) on gearcase cover (8).
4. Turn adjusting screw (3) on rocker lever (4) down until injector plunger (6) link pin (5) contacts lever cup (7).
5. Advance adjusting screw (3) 15° to squeeze oil from lever cup (7) and then loosen adjusting screw (3) several turns.



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6. Position dial indicator extension arm on top of injector plunger (6).
7. Press rocker lever (4) down toward the fuel injector until injector plunger (6) is bottomed.
8. Release rocker lever (4) and allow injector plunger (6) to rise, then press injector plunger (6) to bottom again. Ensure injector plunger (6) is bottomed.
9. Set dial indicator to zero and check injector plunger (6) travel by releasing injector plunger (6) and allowing it to rise. Correct injector plunger (6) travel is 0.169-0.171 in. (4.29-4.34 mm). If injector plunger (6) travel is correct, proceed to step 13.
10. Turn adjusting screw (3) until dial indicator reads 0.170 in. (4.32 mm).
11. Tighten locknut (12) 40-45 lb-ft (54-61 N•m).
12. Recheck injector plunger (6) travel (steps 6 through 8).



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13. Loosen locknut (1) on intake rocker lever (3) of cylinder No. 5 and back out adjusting screw (2).

NOTE

Clearance for cold-set intake valves is 0.011 in. (0.28 mm).
 Clearance for cold-set exhaust valves is 0.027 in. (0.69 mm).

14. Using feeler gage, measure clearance between intake rocker lever (3) nose and crosshead (4).
 15. Slowly turn adjusting screw (2) until intake rocker lever (3) nose touches feeler gage. There will be a slight drag on feeler gage when clearance is correct.

NOTE

Ensure adjusting screw does not move when tightening locknut.

16. When clearance is correct, hold adjusting screw (2) in place with screwdriver and tighten locknut (1) 40-45 lb-ft (54-61 **N•m**).
 17. Perform adjustment procedures (steps 13 through 16) on exhaust rocker lever.

NOTE

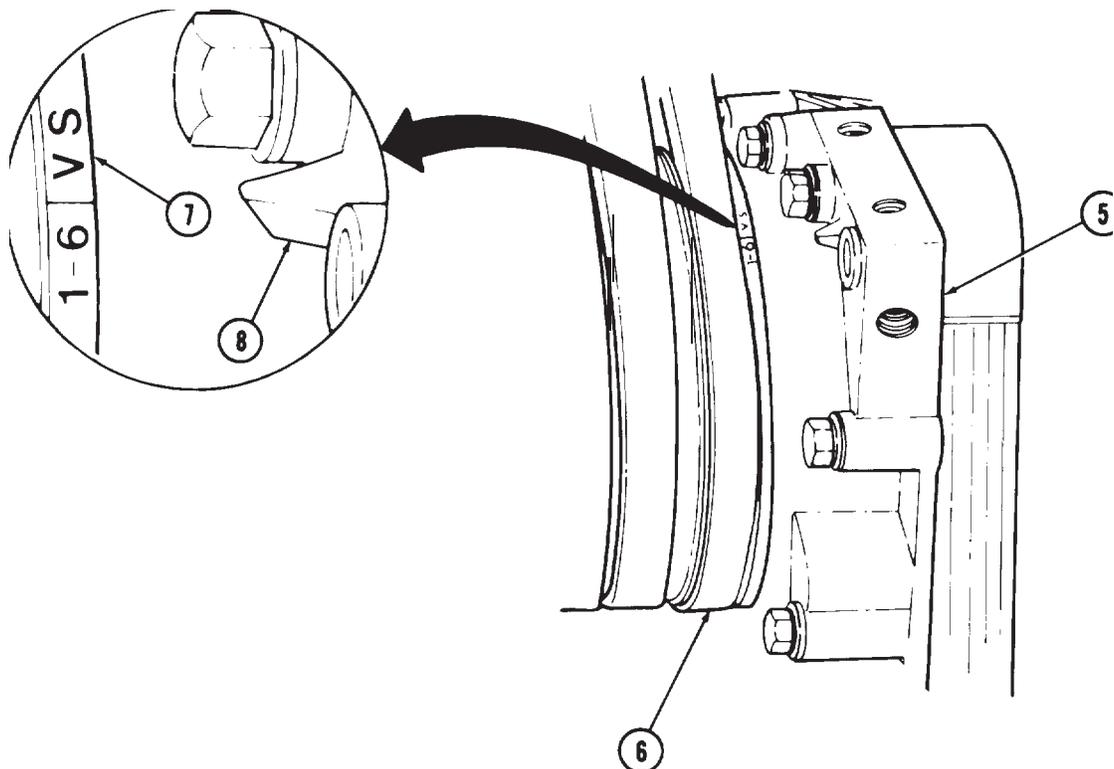
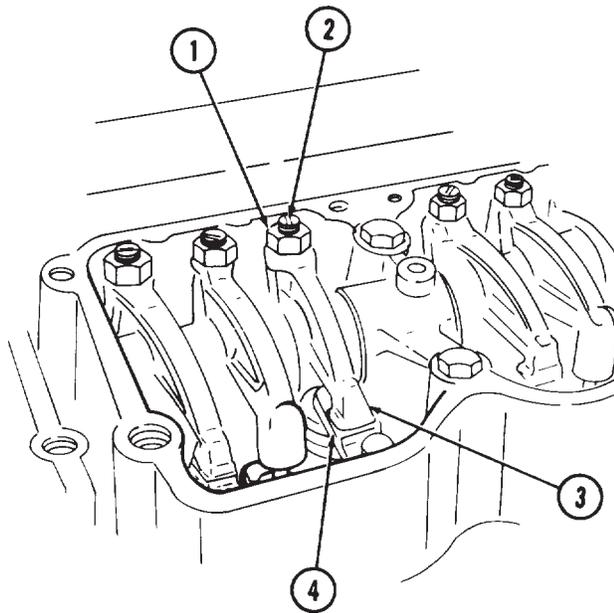
- After each set of injector and valve adjustments, advance pulley to next timing mark and adjust injector and valve until all timing is complete.
- Two complete revolutions of the pulley are required to adjust all injectors and valves.

18. Advance accessory drive pulley (6) until the next timing mark (7) (table 3-6, Injector and Valve Set Position) is aligned with the pointer (8) on gearcase (5) and perform injector and valve adjustments (steps 1 through 17) indicated in table 3-6, Injector and Valve Set Position.

Table 3-6 Injector and Valve Set Position.

ROTATION DIRECTION	PULLEY POSITION	ADJUST CYLINDER	
		INJECTOR	VALVE
Start	1-6 "VS"	3	5
Advance to	2-5 "VS"	6	3
Advance to	3-4 "VS"	2	6
Advance to	1-6 "VS"	4	2
Advance to	2-5 "VS"	1	4
Advance to	3-4 "VS"	5	1

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- FOLLOW-ON TASKS:**
- Install rocker lever housing covers (para. 3-14).
 - Connect battery ground cable (TM 9-2320-260-20).
 - Fuel shutoff valve in ON position (TM 9-2320-260-10).
 - Start engine (TM 9-2320-260-10), run until normal operating temperature is reached, and check for leaks.