# CHECKS, TESTS AND ADJUSTMENTS

## CYLINDER COMPRESSION PRESSURE TEST

**Reason:**

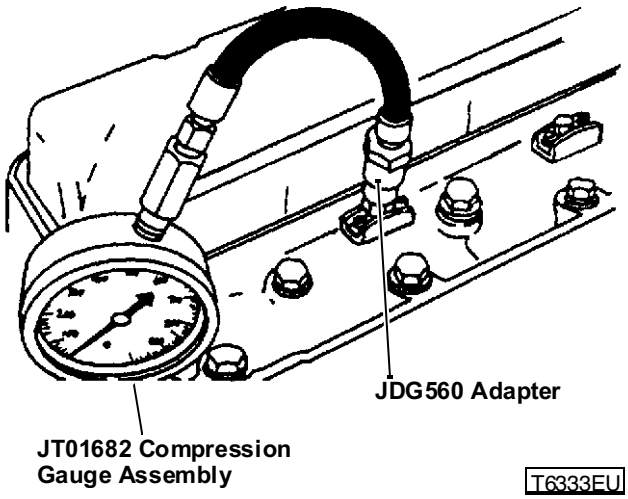
To determine the condition of the pistons, rings, cylinder walls and valves.

**Equipment:**

- JT01682 Compression Gauge Assembly
- JDG560 Adapter

**Procedure:**

1. Remove injection nozzles.




2. Install heat protector from end of injector and install on JDG560 adapter.
3. Install JT01682 Compression Gauge Assembly and JDG560 Adapter.
4. Disconnect fuel control solenoid connector.

**IMPORTANT: DO NOT overheat starter motor during test.**

5. Crank engine for five seconds with starter.
6. Record pressure reading for each cylinder.

**Specifications:**

**Minimum Compression . . . . . 2448 kPa (355 psi)**
**Maximum difference between cylinders . . . . . 490 kPa (71 psi)**
**Minimum cranking speed . . . . . 250 rpm**

**Results:**

- If pressure reading is below specification, squirt clean engine oil into cylinders through injector ports and repeat test.
- If pressure increases significantly, check piston, rings, and cylinder walls for wear or damage.
- If pressure does not increase significantly after retest, check for leaking valves, valve seats or cylinder head gasket.

## THROTTLE CONTROL ADJUSTMENT

**Reason:**

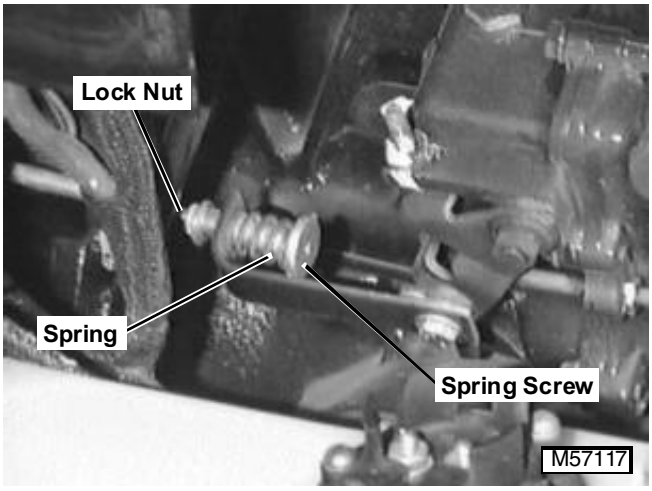
To achieve smooth throttle lever movement with enough tension to maintain throttle setting and to insure that the throttle control moves governor lever fully from idle to fast idle position.

**Procedure:**

1. Connect a spring scale near the end of the throttle lever.


2. Adjust friction by tightening or loosening lock nut until throttle lever movement in forward direction requires **35—53 N (8—12 lb force)**.

*NOTE: Make sure throttle cable is not binding or stuck.*



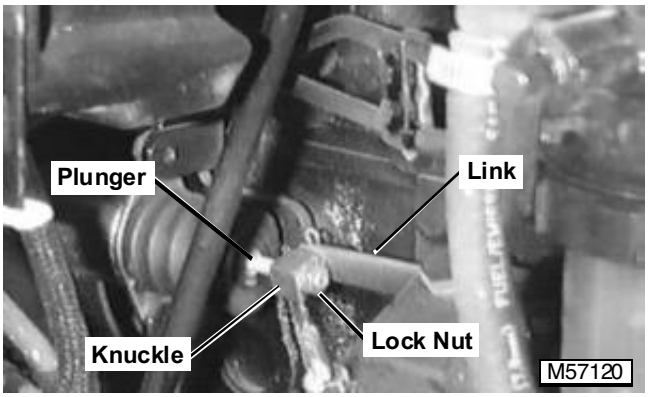

3. Move the throttle lever to the slow idle position. The control rod spring should not be compressed.
4. Move the throttle lever to the fast idle position. The spring should be compressed to 19 mm (0.75 in.).
5. If the spring length is not correct, loosen lock nut and adjust the spring screw. Tighten lock nut.

## FUEL SHUTOFF SOLENOID ADJUSTMENT

**Reason:**

To ensure that fuel shutoff solenoid retracts fully, moving the injection pump shutoff control lever far enough to allow full rack travel.

**Procedure:**




1. Loosen lock nut.
2. Disconnect link from solenoid.
3. Hold solenoid plunger bottomed in solenoid body.
4. Move link toward solenoid until it stops.
5. Turn plunger rod in or out of knuckle until knuckle and link holes line up. Turn out two additional turns.

*NOTE: The additional turns insure that the solenoid bottoms out before the linkage.*

6. Assemble and start engine. Check for free movement of the linkage while engine is running. Also check that linkage returns completely to the STOP position when key switch is turned OFF.

## SLOW IDLE ADJUSTMENT

**Reason:**

To achieve proper slow idle rpm setting. Provides adequate rpm to keep engine running smoothly without stalling.

**Equipment:**

- JT05719 Hand Held Digital Tachometer

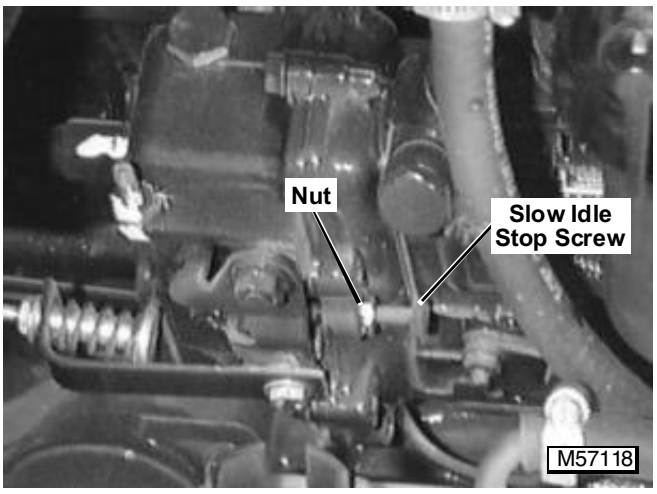
**Procedure:**

1. Start engine and run for 5 minutes to attain operating temperature.
2. Move throttle lever to slow idle position.
3. Place a small piece of reflective tape on crankshaft pulley.
4. Use JT05719 Hand Held Digital Tachometer to check engine speed at crankshaft pulley.
5. Visually check that injection pump throttle lever is against slow idle stop screw. Check slow idle speed.

**Specifications:**

**Slow Idle Speed. . . . . 950 ± 50 rpm**

**Results:**




- If slow idle rpm is not according to specifications, loosen nut and turn slow idle stop screw. After adjustment, tighten nut.

## FAST IDLE ADJUSTMENT

**Reason:**

To achieve proper fast idle speed setting. This insures that engine is running at proper rpm's for peak performance.

**Equipment:**

- JT05719 Hand Held Digital Tachometer

**Procedure:**

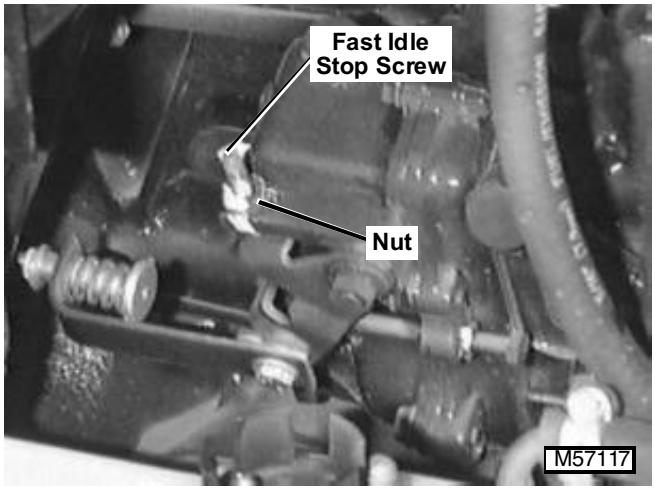
1. Start engine and run for 5 minutes to attain operating temperature.
2. Move throttle lever to fast idle position.
3. Place a small piece of reflective tape on crankshaft pulley.
4. Use JT05719 Hand Held Digital Tachometer to check engine speed at crankshaft pulley.
5. Visually check injection pump throttle lever is up against fast idle stop screw. Check fast idle speed.

**Specifications:**

**Fast Idle Speed. . . . . 3150 ± 25 rpm**

**Results:**

*NOTE: Some adjustment can be made without removing sealed wire. Attempt to make the adjustment before removing wire.*




- If fast idle rpm is not according to specifications, loosen nut. Turn fast idle stop screw until fast idle speed is correct. After adjustment, tighten nut.

*NOTE: Make sure air cleaner is clean and not restricted. Replace air cleaner element as necessary.*

- If engine still does not meet fast idle speed specifications, have pump inspected by an diesel injection service.

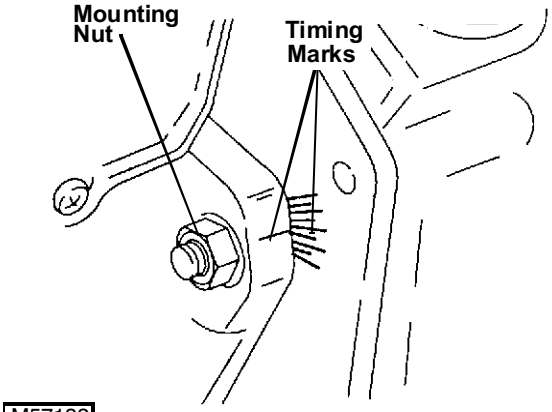
## INJECTION PUMP TIMING ADJUSTMENT

**Reason:**

To make sure that injection pump timing is set to manufactures specifications.

**Procedure:**

**IMPORTANT: Injection pump timing should be correct. Once timing is set, it will not normally change during the life of the engine, unless it was altered.**
**Check and adjust timing only as the last option. Check fuel, fuel supply system, injectors, air intake system and cylinder compression before continuing.**




1. Clean around injection pump area.
2. Injection pump timing is set by aligning the arrow between the **5th and 6th** line from the top.
3. Loosen injection pump mount nuts and rotate to align marks.
4. Tight injection pump mount nuts to 27 N•m (20 lb-ft).

**Results:**

- If engine performance is poor, check air cleaners, fuel filter, fuel supply, injectors and cylinder compression before attempting to adjust timing. Then reset injection pump timing by aligning marks. Retest performance.
- If performance did not change, have pump tested by a diesel injection service.

# VALVE CLEARANCE CHECK AND ADJUSTMENT

**Reason:**

To achieve correct engine operation.

**Equipment:**

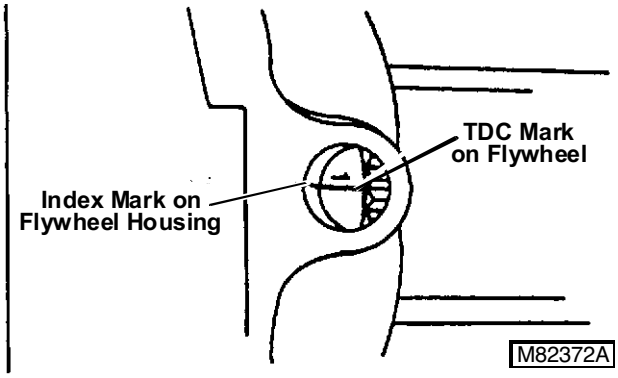
- Feeler Gauge

**Procedure:**

1. Remove rocker arm cover.
2. Remove plug from timing hole in flywheel housing at 9 O'clock position (viewed from rear), if equipped.

*NOTE: "Top Dead Center (TDC)" is the piston at its highest point.*

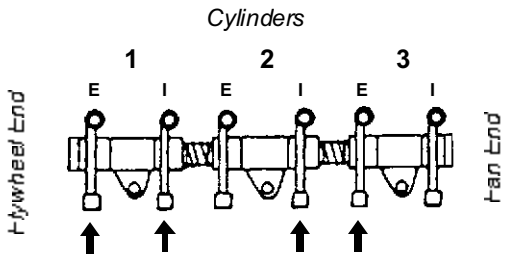
3. Turn crankshaft pulley clockwise until No.1 cylinder TDC mark on flywheel aligns with index mark on flywheel housing or plate.




*NOTE: No. 1 cylinder is the closest to the flywheel.*

4. Try to move both No. 1 cylinder rocker arms or push rods.

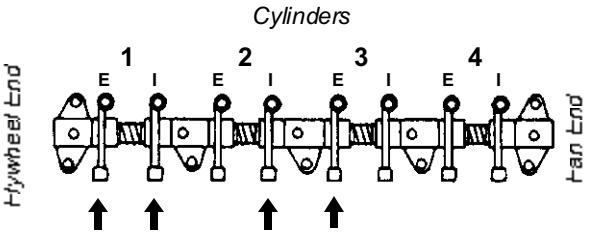
*NOTE: If rocker arm push rods are not loose, rotate flywheel one revolution (360°). If both rocker arm push rods are loose the piston is at TDC on compression stroke.*




**No. 1 Piston at TDC**

**3015D001 (3TNE84)**
**3017D001 (3TNE88)**

M82327A

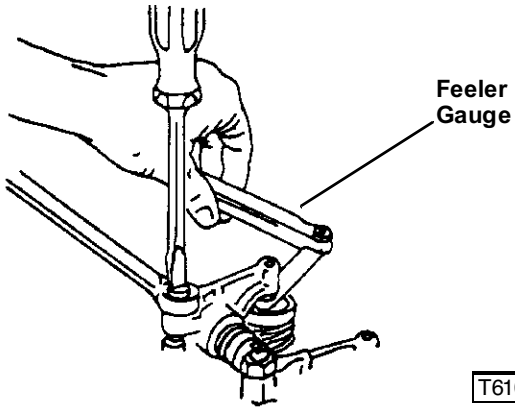



**No. 1 Piston at TDC**

**4020D001 (4TNE84)**
**4022D001 (4TNE88)**

T6479AB

5. Measure and adjust valve clearance on the valves (arrows) with No. 1 piston at TDC.




6. To adjust valves, loosen nut and turn adjusting screw until clearance is **0.20 mm (0.008 in.)**. Hold screw while tightening nut.
7. Turn crankshaft pulley one revolution (360°). This puts the piston in No. 2 cylinder for 3015D001 (3TNE84) and 3017D001 (3TNE88) engines or No. 4 cylinder for 4020D001 (4TNE84) and 4022D001 (4TNE880) engines at TDC compression stroke.

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