

TESTS AND ADJUSTMENTS

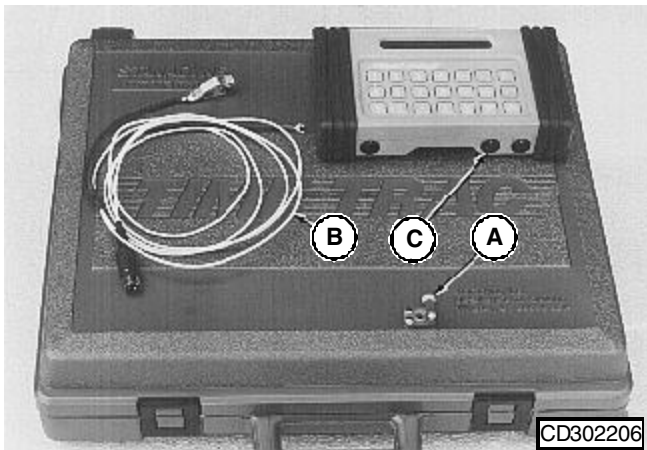
FOR ENGINE REPAIR USE CTM104 AND CTM207

FOR STARTER AND ALTERNATOR REPAIR USE CTM77

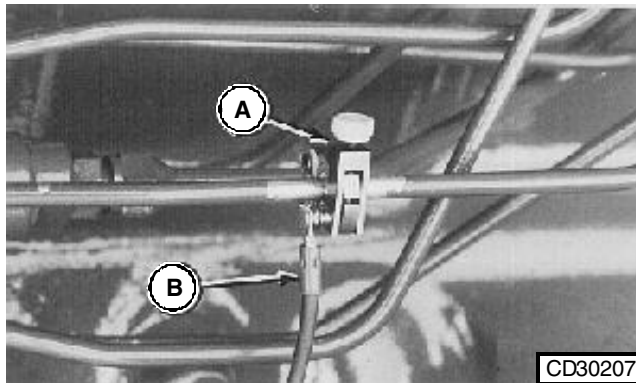
3. Switch on the meter by pressing the "ON/CLEAR" key, then start the engine.



USING THE TIME TRAC METER AS A TACHOMETER



- A. Clamp-On Transducer
- B. Cable
- C. Timing Meter Socket "SR"



The TIME TRAC meter can be used as a tachometer by using clamp-on transducer (A) on any high-pressure line.

Operating Instructions:

1. Remove paint and thoroughly clean the area of the high-pressure line to which the clamp-on transducer is to be attached.
2. Install transducer (A) and connect cable (B) between transducer and socket "SR" (C) on meter. Also connect ground wire.

PRELIMINARY ENGINE TESTING

The following preliminary tests will help determine if the engine can be tuned-up to restore operating efficiency, or if engine overhaul is required.

- After engine has stopped for several hours, loosen crankcase drain plug and watch for any water to drain out. A few drops due to condensation is normal, but more than this would indicate problems which require engine repair.
- With engine stopped, inspect engine coolant for oil film. With engine running, inspect coolant for air bubbles. Either condition would indicate problems which require engine repairs rather than just a tune-up.
- Perform compression test. Pressure below specifications indicates problems which require engine repair.

GENERAL TUNE-UP RECOMMENDATIONS

As a general rule, an engine tune-up is not necessary if all recommended Operator's Manual hourly service procedures are performed on schedule. If your engine performance is not within the rated application guidelines and if engine condition does not require overhaul, the following service procedures are recommended to help restore engine to normal operating efficiency.

1. Change engine oil and filter.
2. Replace fuel filter and water separator.
3. Clean crankcase vent tube.
4. Clean and flush cooling system.
5. Test thermostat and pressure cap.
6. Check condition of coolant hoses and fan belt.
7. Check air intake system. Replace air cleaner elements.
8. Check exhaust system.
9. Inspect turbocharger and check boost pressure.
10. Check fuel injection system:
 - Have injection pump checked by your authorized Stanadyne workshop.
 - Clean injection nozzles and adjust opening pressure.
 - Adjust slow idle speed and perform a dynamic timing.
11. Check engine oil pressure.
12. Check engine valve clearance.
13. Check electrical system.

ENGINE COMPRESSION PRESSURE TEST

Reason:

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

Equipment:

JT01674 Compression Test Set

Procedure:

IMPORTANT: Compression pressures are affected by the cranking speed of the engine. Before beginning test, ensure that battery is fully charged and injection nozzle area is thoroughly cleaned.

1. Start engine and run at rated speed until it warms up to normal operating temperature. (From a cold start, operate engine 10—15 minutes at slow idle.) Turn engine OFF.
2. Shut off fuel supply and remove fuel injection nozzles.



3. Install JT01679 Adapter with O-ring from JT01674 Compression Test Set in injection nozzle bore. Use JT02017 Holding Clamp to hold JT01679 Adapter in position. Install hold-down screw in clamp and tighten screw to **37 N•m (27 lb-ft)**.
4. Push throttle lever to STOP position. Turn crankshaft for 10—15 seconds with starting motor (minimum cranking speed: 150 rpm cold, 200 rpm hot).
5. Compare readings from all cylinders. Compression pressure must be within specification.

Specifications:**Engine Compression**

Pressure (Min) 2379 kPa (345 psi)

Maximum Difference

between Cylinders 350 kPa (50 psi)

NOTE: Pressure given was taken at 183 m (600 ft) above sea level. A 3.6 percent reduction in gauge pressure will result for each additional 300 m (1000 ft) rise in altitude.

All cylinders within an engine should have approximately the same pressure. There should be less than 350 kPa (50 psi) difference between cylinders.



6. If pressure is much lower than shown, remove gauge and apply oil to ring area of piston through injection nozzle bore. Do not use too much oil. Do not get oil on the valves.
7. Test compression pressure again.

Results:

- If pressure is low, worn or stuck rings are indicated. Replace piston rings or install new piston and liner set as needed. (See CTM104 for procedures.)
 - If pressure is low, valves could be worn or sticking. Recondition cylinder head as required. (See CTM104 for procedures.)
8. Measure compression pressure in all remaining cylinders and compare readings. Recondition cylinders and valves as required.

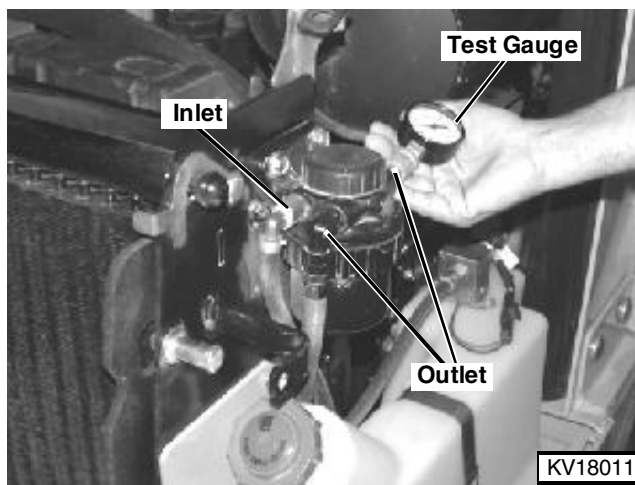
FUEL SUPPLY PUMP PRESSURE MEASUREMENT

Reason:

To determine supply pump operating pressure.

Equipment:

- JT03115 Gauge (0—150 psi) with Male Quick Coupler
- JT01609 Female Quick Coupler Adapter

**Procedure:**

1. Remove plug from auxiliary outlet port on fuel filter base.
2. Install test gauge as shown.
3. Start engine. Fuel pump should maintain positive minimum pressure of **25–30 kPa (3.5–4.5 psi)**. Low pressure can be due to a clogged filter element or a defective supply pump. Replace filter element then recheck pressure. If reading is still below specification, replace supply pump.

NOTE: The fuel supply pump is not repairable and therefore should be replaced when defective.

FAST AND SLOW IDLE ADJUSTMENT

Reason:

To ensure an adequate slow idle rpm that will allow the engine to run smoothly without stalling and to ensure specified fast idle speed setting.

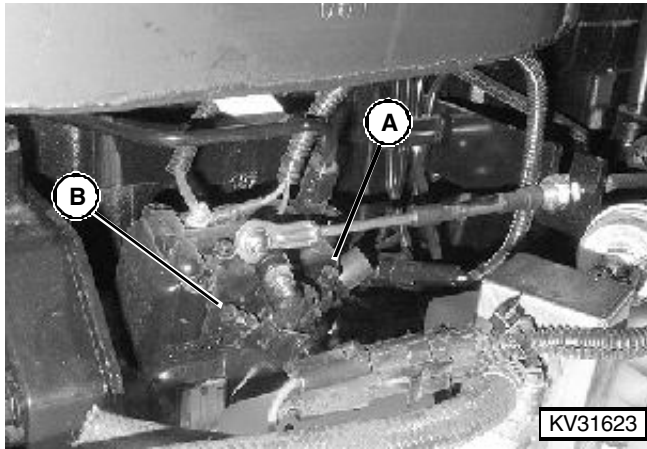
Equipment:

JT05801 Clamp-on Electronic Tachometer

Procedure:

NOTE: Before checking engine speed, make sure engine has reached its normal operating temperature.

All indicated speeds apply to an engine not under load. The maximum permissible speed variation is +50/-25 rpm for slow idle speed and for fast idle speed.



1. Disconnect speed control rod at fuel injection pump.
2. Move pump throttle lever against pump fast idle adjusting screw (A). Check engine speed and compare with specification.

Specification:

Fast Idle Speed 2575 +50/-25 rpm

NOTE: Fast idle is set by the factory, then the fast idle adjusting screw (A) is sealed to prevent tampering. Fast idle adjustment can only be performed by an authorized EPA certified service center.

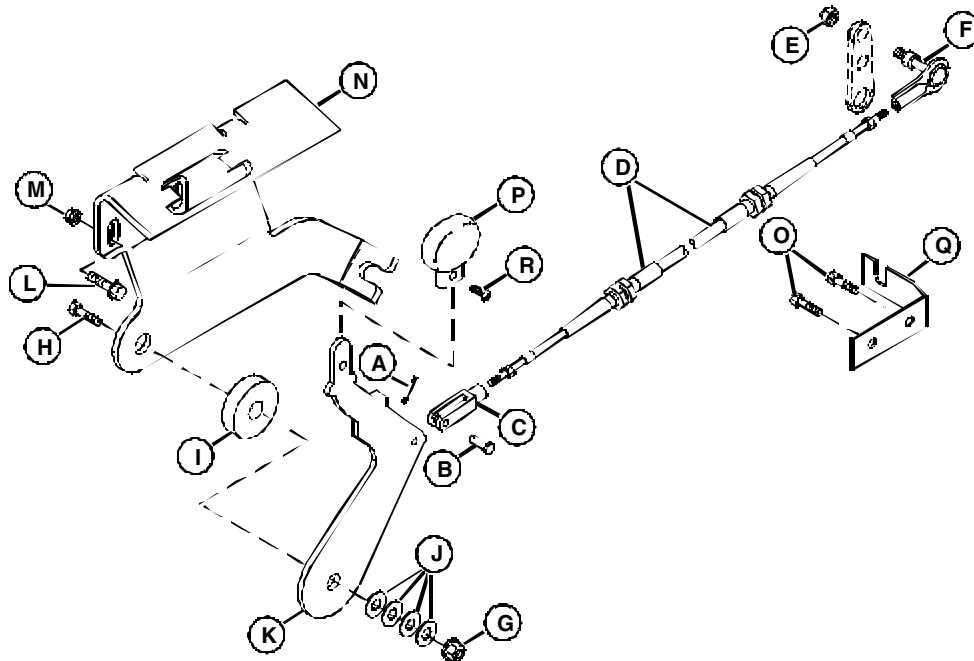
3. Move pump throttle lever in slow idle position against slow idle adjusting screw (B). Check engine speed and adjust to specification.

Specification:

Slow Idle Speed 1000 +50/-25 rpm

4. Turn screw (B) clockwise to increase and counter-clockwise to decrease engine speed.

THROTTLE CONTROL AND CABLE ADJUSTMENT

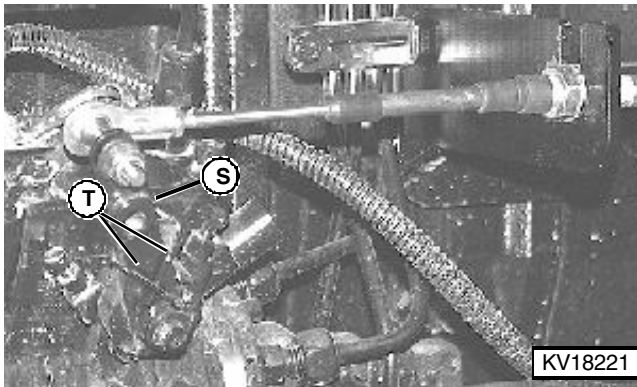


KV18820

- A. Cotter Pin
- B. Pin
- C. Yoke
- D. Cable
- E. Lock Nut
- F. Ball Stud

- G. Lock Nut
- H. Cap Screw
- I. Ring
- J. Washer (4 used)
- K. Control Lever
- L. Cap Screw (2 used)

- M. Nut (2 used)
- N. Bracket
- O. Cap Screw (2 used)
- P. Knob
- Q. Bracket
- R. Screw



KV18221

- S. Throttle Lever
- T. Overtravel Spring

Reason:

To make sure injection pump throttle lever is against the slow idle stop when control lever is in the slow idle position, and against the fast idle stop when control lever is in the fast idle position.

Procedure:

Adjust throttle cable (D) at cable mounting nuts, yoke (C), and ball stud (F), so throttle lever (S) is against one side of the overtravel spring (T) when control lever (K) is in the slow and fast idle positions.

FUEL INJECTION PUMP TIMING ADJUSTMENT

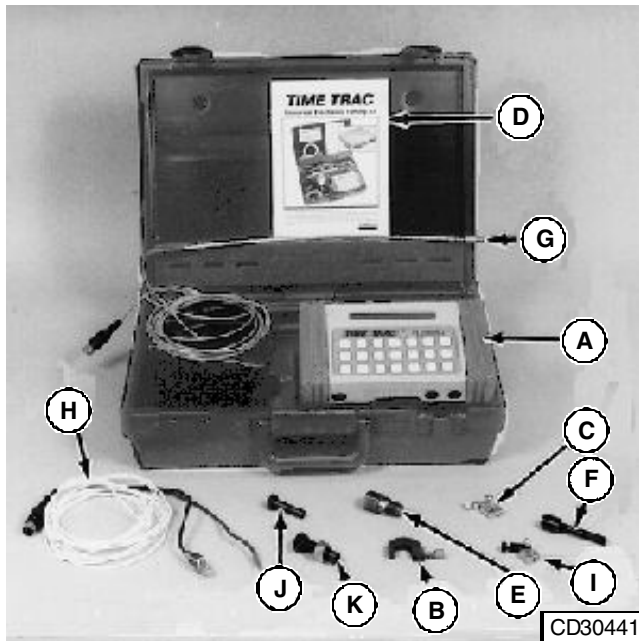
Dynamic Timing

Reason:

To make sure injection pump timing is set to specification.

Equipment:

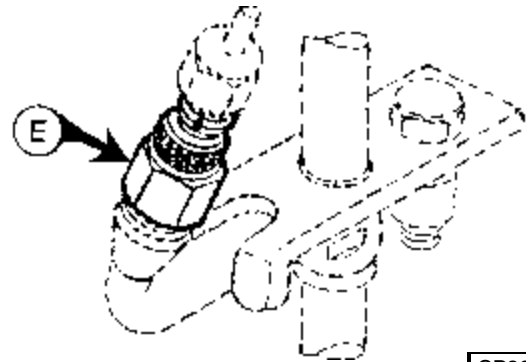
JT07158 TIME TRAC Kit



- A. Meter
- B. Sensor Clamp
- C. 6 mm Clamp-On Transducer
- D. Instruction Manuals
- E. JT07155 9/16 in. SOI Sensor
- F. JDE81-4 Timing Pin
- G. Magnetic Probe
- H. Transducer Cable
- I. 1/4" Clamp-On Transducer
- J. JDG821 Magnetic Probe Adapter
- K. JDG793 Magnetic Probe Adapter

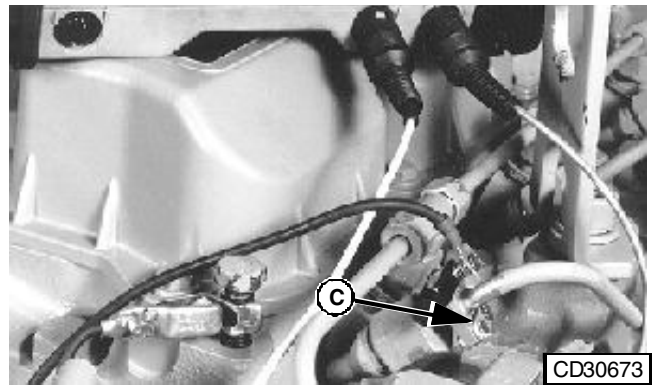
JT07158 TIME TRAC Kit electronically indicates the start of injection with respect to the piston top dead center (TDC), and allows accurate setting of injection pump timing to provide optimum engine performance while complying with exhaust emission regulations.

Timing Sensor Installation:



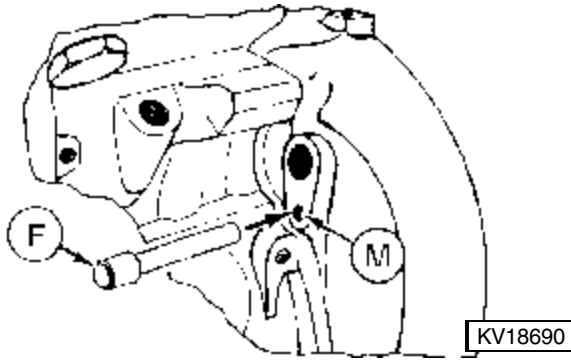
IMPORTANT: SOI sensor must be installed at nozzle end of No. 1 fuel injection line. If access to No. 1 line is restricted, sensor can be installed on No. 4 injection line on 4-cylinder engines.

1. Install JT07155 9/16 in. SOI sensor (E) between No. 1 nozzle and high pressure fuel line.
2. Using two wrenches, tighten sensor and fuel pressure line to 30 N•m (22 lb-ft).

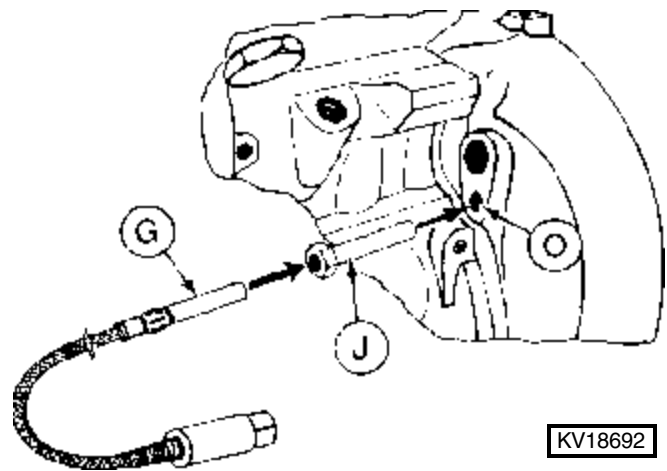


NOTE: If clearance does not allow proper installation of the 9/16 in. SOI sensor (E), JT07178 clamp-on transducer (C) can be installed close to injection nozzle. Remove paint on injection line before installation.

Magnetic Probe Installation:

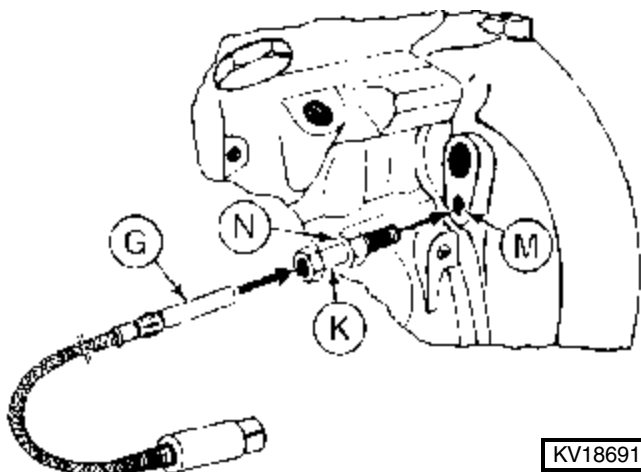


IMPORTANT: Use JDE81-4 timing pin (F) in flywheel housing timing hole (M) to ensure engine is NOT at No. 1 TOP DEAD CENTER. At No. 1 TDC, flywheel timing hole will align with flywheel housing timing hole (M). The magnetic probe (G) would be damaged if installed with flywheel at this location.



Installation of Flywheel Housing with SMOOTH Timing Hole:

1. Install JDG821 Magnetic Probe Adapter (J) into flywheel housing smooth hole (O). Lightly tap adapter to lock into position.
2. Insert magnetic probe (G) into adapter until it contacts flywheel. Pull magnetic probe back out to provide 0.65 mm (0.025 in.) recommended air gap.



Installation of Flywheel Housing with TAPPED Timing Hole:

1. Install JDG793 Magnetic Probe Adapter (K) into flywheel housing tapped hole (M) until it bottoms.
2. Insert magnetic probe (G) into adapter until it contacts flywheel. Back out hex head of adapter two flats and tighten lock nut (N). This will provide the 0.65 mm (0.025 in.) recommended air gap.

Timing Sensor and Magnetic Probe Connection:



1. Connect 9/16 in. SOI sensor (E) or clamp-on transducer (B) to meter socket "SR" (Q) with transducer cable (H). Also connect ground cable wire.

IMPORTANT: Observe correct polarity to avoid possible damage to meter.

2. Connect magnetic probe (G) to meter socket "MP" (P).



Suggest:

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to download the complete manual.

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