1974-79 FUEL SYSTEMS
Bosch Diesel Injection - Peugeot

504 Diesel

DESCRIPTION

Peugeot diesel injection system consists of a fuel filter which incorporates a priming pump, Bosch rotary type injection pump, Peugeot deferred injection device, four injectors and four glow plugs. The rotary pump incorporates a single piston feed pump, a hydraulically controlled automatic advance and a speed regulator which acts as a governor. The fuel filter incorporates a by-pass circuit with vapor separating cartridge and hand operated priming pump. The injectors incorporate a fuel return line as well as fuel feed line. The glow plug system incorporates an indicator light on the instrument panel to signal when to start the engine.

ADJUSTMENTS

BLEEDING SYSTEM

On top of fuel filter, loosen needle valve and actuate primer lever. *See Fig. 1.* Tighten needle valve when water has drained through drain tube. Loosen air bleed screw and actuate lever. When resistance is felt, tighten air bleed screw.

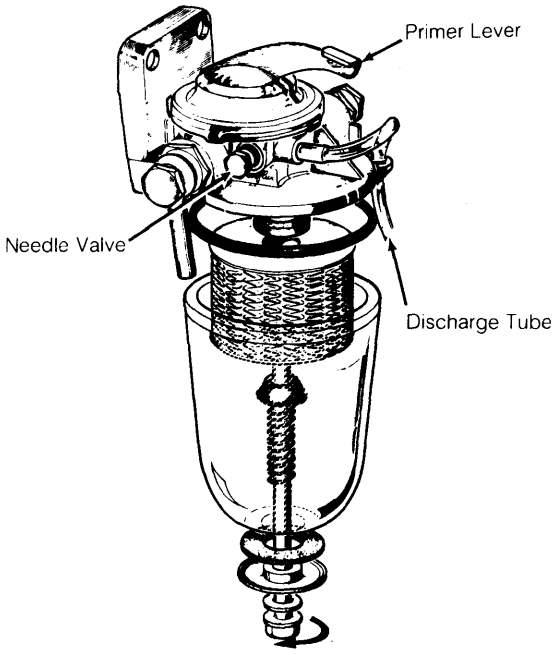

Fig. 1: Fuel Filter Assembly

PRIMING SYSTEM

1) Loosen needle valve on top of fuel filter. Actuate primer lever until fuel flows through discharge tube. Tighten needle valve. Loosen air bleed screw. Again actuate primer lever until resistance is felt, then tighten bleed screw.

2) On EP/VM injection pumps, loosen injection pump bleed screw and actuate pump lever until fuel flows bubble free. Tighten bleed screw on top of injection pump. *See Fig. 2.*

3) On EP/VAC injection pumps, place stop lever (on dash panel) in "STOP" position. Actuate primer lever (on filter) 30-40 times. With stop lever released, turn ignition on.

4) Turn idling control (on dash panel) clockwise to maximum idle. Press starter button for 10-15 seconds, then preheat until signal light comes on. Press starter button again.

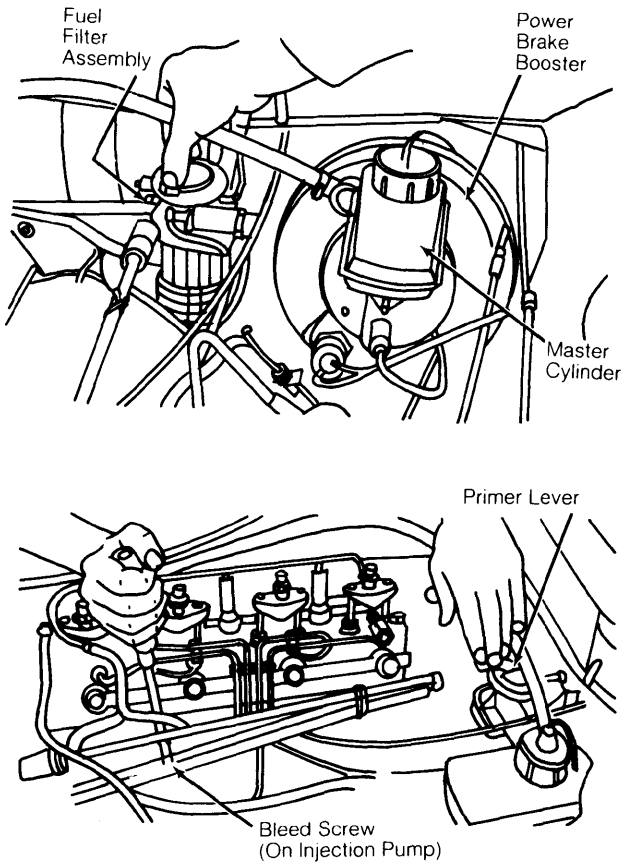

Fig. 2: Priming System on EP/VM Injection Pumps

NOTE: Use Friction Drive Tachometer (Jaegar No. 42.839) and Friction Disc (Jaegar No. 87.645). To read correct idle RPM, it is necessary to divide tachometer reading by 2.

IDLE SPEED

1974-78 Models With EP/VM Injection Pump - **1)** With engine at normal operating temperature, release accelerator cable. Loosen lock nut on fast idle RPM adjustment screw and loosen screw several turns. *See Fig. 3.*

2) Loosen lock nut on idle speed adjustment rod on front of pump. Attach friction tachometer using friction disc to fan drive belt. Adjust idle speed to 730 RPM by turning idle adjustment rod.

3) Unscrew fast idle speed adjusting screw until engine speed increases. Tighten fast idle stop screw one full turn and tighten lock nut. Secure accelerator cable, ensuring pedal travel corresponds to full depression.

4) On instrument panel, turn fast idle control cable to minimum position and connect fast idle control cable by bottoming cable clamp against slide link. DO NOT use fast idle stop screw to adjust idle speed.

1974-78 Models With EP/VAC Injection Pump - Idle speed adjustment is accomplished by adjusting deferred injection device. See DEFERRED INJECTION DEVICE adjustment in this article.

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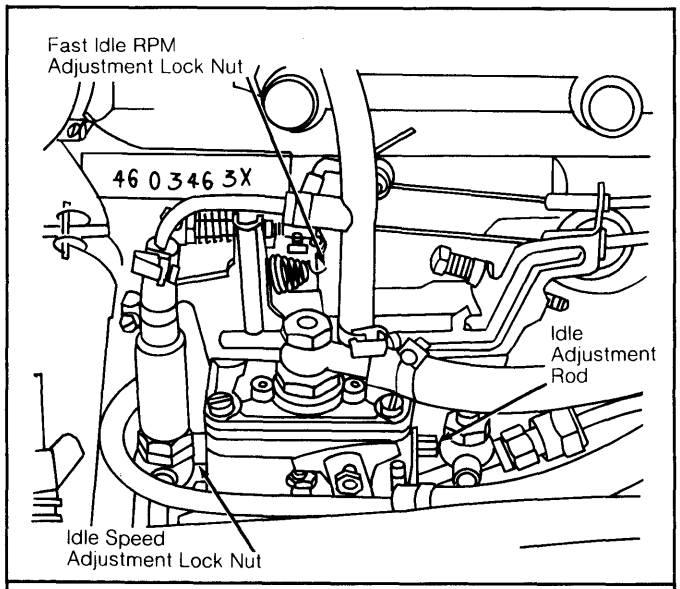

Fig. 3: EP/VM Injection Pump Idle Speed Adjustment

1979 Models – 1) Warm engine to normal operating temperature. With manual idle control set at minimum position, loosen deceleration screw lock nut (located on front of injection pump cover).
2) Turn deceleration screw counterclockwise until it protrudes 33/64-9/16" (13-14 mm) from front of injection pump cover. Loosen stop screw lock nut and adjust stop screw to obtain specified idle speed.
3) Tighten stop screw lock nut. Turn deceleration screw clockwise until engine speed increases 50 RPM. Turn deceleration screw counterclockwise one full turn and tighten lock nut.
4) Accelerate engine to maximum RPM and release accelerator lever. Repeat this several times and recheck idle speed. If engine stalls when accelerator lever is released, turn deceleration screw 1/4 turn clockwise and tighten lock nut.

DEFERRED INJECTION DEVICE

1974-78 Models With EP/VM Injection Pumps – 1) Warm engine to normal operating temperature. Turn idle control on instrument panel to minimum position. Disconnect link rod where it connects to deferred injection device accumulator lever.
2) Push accumulator lever to fully open position (minimum engine speed). Adjust idle speed to 730 RPM with a .080" (2.0 mm) throttle lever free travel. *See Fig. 4.*
3) Push accumulator lever back toward accumulator until engine speed just begins to increase. This point is easily ascertained by an appreciable increase in engine noise.
4) Adjust length of link rod so that it attaches to accumulator lever at point where engine speed begins to increase. Correct adjustment will be evident by existence of .004" (1.0 mm) clearance between throttle stop and throttle lever.
5) Correct position can also be determined by running characteristics of engine. If link is too long, accumulator is out of circuit and advantages of accumulator are lost. If link is too short, engine speed is increased at idle, vehicle will have poor acceleration and exhaust will smoke.

1974-78 Models With EP/VAC Injection Pumps – 1) With engine at normal operating temperature, place idle control on instrument panel in minimum position. Loosen lock nuts on accumulator rod and disconnect accumulator rod at accumulator actuating lever.
2) Push accumulator lever to full open position. This position is evident by minimum engine speed. Adjust idle stop screw to obtain proper idle speed of 730 RPM. *See Fig. 5.*
3) Move accumulator actuating lever toward accumulator until engine speed just begins to increase. This position is evident by an increase in engine noise. Mark one side of center nut on adjusting rod.
4) Adjust length of rod to allow installation of rod end on accumulator lever without changing position of accumulator actuating lever. Rotate adjusting rod one turn to shorten link by approximately 5/64" (2.0 mm). Hold rod and tighten lock nuts.

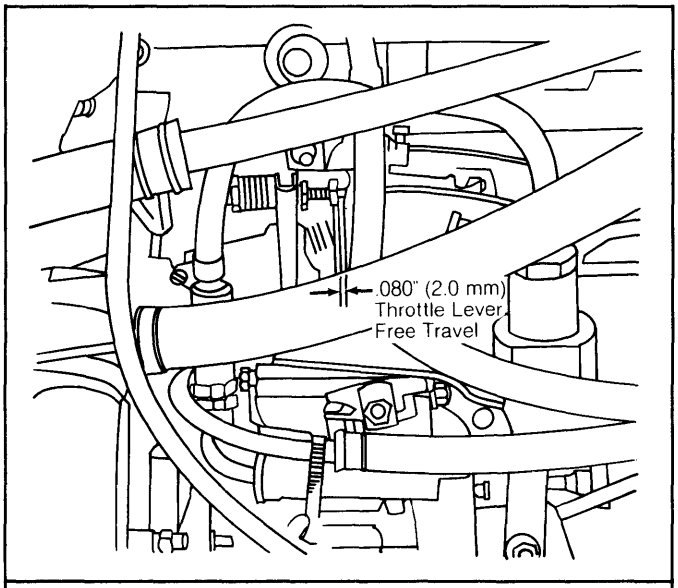

Fig. 4: EP/VM Throttle Stop Adjustment

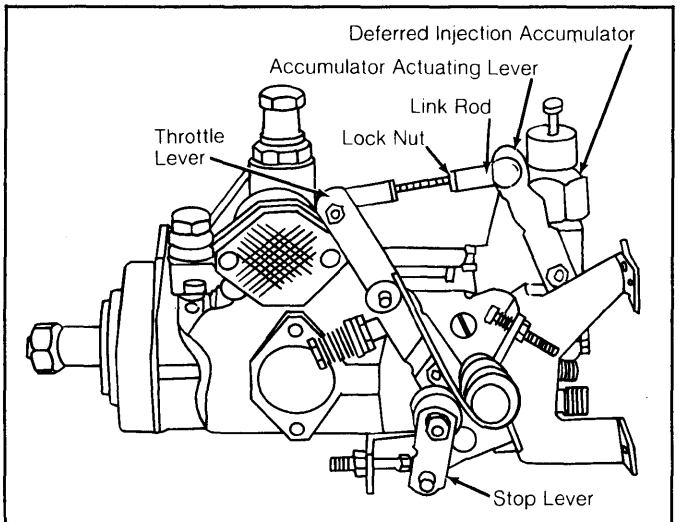

Fig. 5: EP/VAC Injection Pump Deferred Injection Device & Idle Speed Adjustment

TESTING

FUEL CIRCUIT

NOTE: Following test should be performed whenever engine stalls or runs erratically at idle speed, when engine lacks power or whenever fuel circuit is suspected as being cause of improper engine operation.

1) Remove fuel inlet hose from injection pump inlet fitting. Attach a 4" (100 mm) long, clear nylon tube with an inside diameter of .32" (8 mm) to injection pump inlet fitting.
2) Insert one end of a 1" (25 mm) long copper tube with an outside diameter of .32" (8 mm) into fuel inlet hose and other end into clear tube. Secure hose connections with 2 hose clamps.
3) Start engine and observe clear tubing. Bubbles in fuel should not appear until engine reaches 3000 RPM. If bubbles appear at idle or speeds below 3000 RPM, it will be necessary to conduct further tests to determine where fuel system is admitting air.

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4) If air is present at idle or speeds below 3000 RPM, shut off engine and move clear tubing to inlet side of fuel filter. Again run engine to determine presence of air bubbles in fuel system. If air is still present, continue testing as outlined until air leak is discovered. Repair air leak and bleed fuel system.

REMOVAL & INSTALLATION

INJECTION PUMP

Removal (Injection Pump) – 1) Disconnect battery and turn ignition on. On top of injection pump, disconnect stop control cable, fast idle control cable, and accelerator control cable. Remove rubber hose connected to top of injection pump.
2) Remove fuel inlet hose and outlet fittings from injection pump. Remove complete injector pipe assembly, leave fittings on pump and injector holder (on head) and plug or cap all fittings.
3) Remove pump rear support from cylinder block. On pump driven by timing chain, use Allen Wrench (8.0117.D) to remove 2 bolts holding pump to timing cover.
4) On pump driven by timing gears, remove bolt and 2 bolts holding pump intermediate flange to timing gear housing. On lower screw, use a 6 mm Allen wrench. To remove pump, move it backward while pivoting it toward engine. *See Fig. 6.*

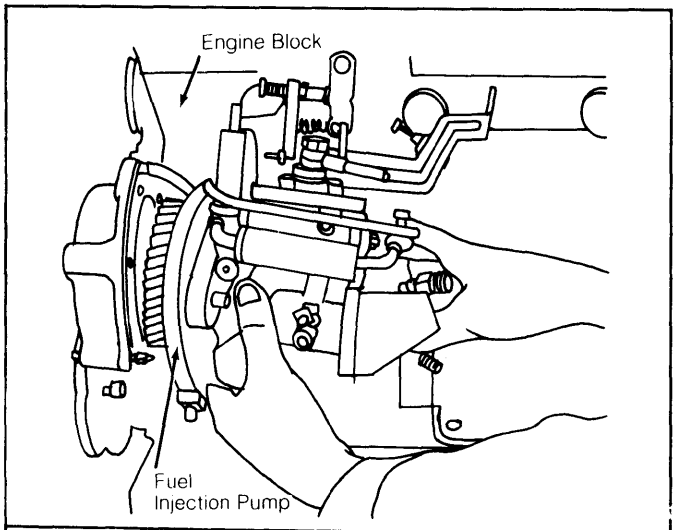

Fig. 6: Removing Fuel Injection Pump

Preparing Engine For Injection Pump Installation – 1) Remove valve cover. Rotate crankshaft to bring cylinder No. 1 (rear) exhaust valve to point where it is just opening (exhaust opening lead).
2) Using Valve Spring Compressor (8.0105 Y), depress cylinder No. 4 (front) exhaust valve. While holding valve spring compressed, remove rocker arm by sliding it rearward with the valve contact face up. Release compressor pressure. DO NOT pull upward on push rod.
3) Now bring piston in cylinder No. 1 (rear) up to point where intake valve is just opening and exhaust valve is just closing (TDC). Using spring compressor, again compress No. 4 cylinder exhaust valve and remove valve keepers. DO NOT allow valve to drop into cylinder.
4) Make sure that valve moves freely and allow it to rest on top of piston. Release compressor pressure. Remove glow plug connector bar and remove cylinder No. 3 and 4 glow plugs.
5) On front rocker-valve cover stud, attach Support (8.0110 G1). Assemble Support (8.0504 A1) onto Support (8.0504 A2). Slide this assembly over top of Support (8.0110 G1) and attach Dial Indicator (8.1504). *See Fig. 7.* Place actuating foot of dial indicator on top of cylinder No. 4 exhaust valve.
6) With engine at TDC, set dial indicator to zero. Rotate crankshaft counterclockwise until DIAL INDICATOR NEEDLE has completed 4 complete turns. Now rotate crankshaft in normal direction of rotation (clockwise) until dial indicator reading corresponds with pump being installed. See VALVE SETTING (BTDC) SPECIFICATIONS table.

VALVE SETTING (BTDC) SPECIFICATIONS

Application	In. (mm)
EP/VM AR5 7 & 8	.055 (1.40)
EP/VM AR10 & 12	.057 (1.46)
EP/VA CR 173	.020 (.51)

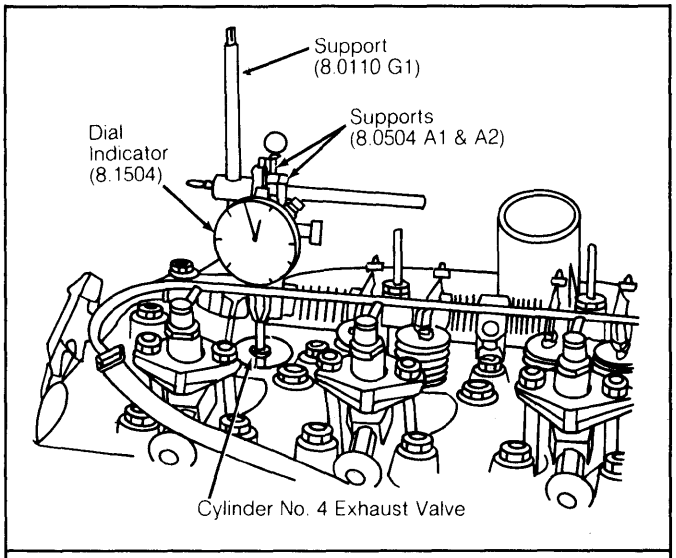

Fig. 7: Preparing Engine For Injection Pump Installation

Preparing EP/VAC Injection Pump For Installation – Remove deferred injection accumulator. Rotate pump drive shaft to bring pump piston timing groove opposite discharge connection marked "B". Attach Dial Indicator (8.0117F) to deferred injection orifice. *See Fig. 8.*
Preparing EP/VM Injection Pump For Installation – 1) Install drive gear on injection pump and tighten attaching bolt to 47 ft. lbs. (64 N.m). On pumps driven by timing gear (as opposed to chain) make sure 2 Allen bolts fastening pump on support flange are centered in slotted holes.
2) Use copper gasket and install support adapter of Setting Arm (6.0168) into injection pump fuel inlet. Insert probe (under tension) of setting arm into pump body through support screw. Use 3 mm Allen wrench to tighten arm on support screw.
3) Install Dial Indicator (8.0117 A) onto top of setting arm. *See Fig. 9.* Check that spring loaded handle (which touches dial indicator) has free movement.

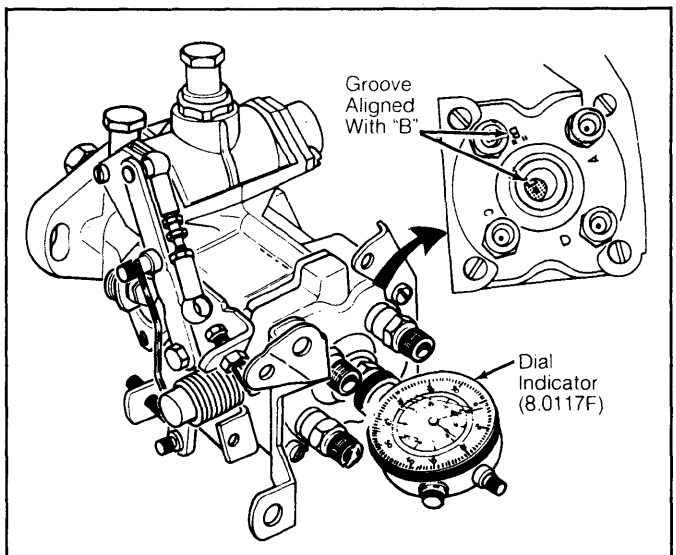

Fig. 8: Installing Dial Indicator On EP/VAC Pump

4) On pumps which are installed on engine with chain timing gears, center double-toothed side of gear with cylinder No. 4 outlet fitting. On pumps which are installed on engines with timing gears, center timing mark (dot on face of gear) with axis of outlet coupling marked "D".
5) On all pumps, set dial indicator to zero at bottom dead center (BDC). This is accomplished by moving drive gear back and forth until lowest reading is obtained and then zeroing dial indicator.
6) Now rotate drive gear in normal direction of rotation until exact instant where dial indicator begins to register start of upstroke (approximately .0008" or .02 mm).

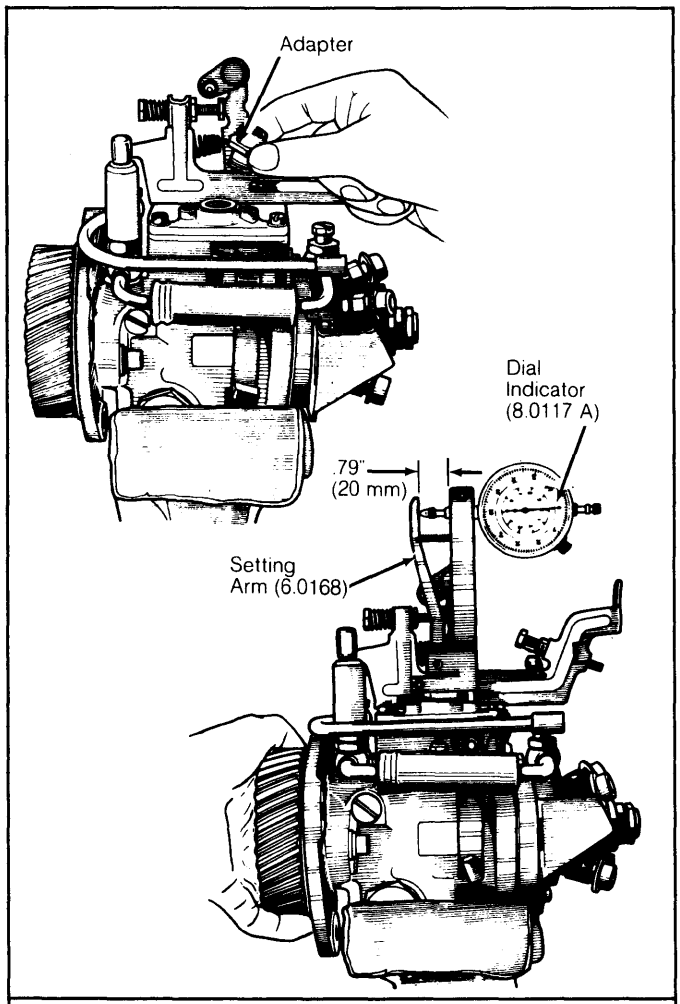

Fig. 9: Installing Adapter on EP/VM Pump

Installation (Injection Pump) – 1) With dial indicators still installed, install new gasket on injection pump. On pumps driven by timing chain, install pump by aligning double tooth of gear with double slot on timing gear. *See Figs. 10 and 11.*
2) On pumps driven by gear (as opposed to chain) install pump by applying slight outward rotation to pump body as pump is inserted into timing case flange. Tighten bolts holding pump assembly to timing case flange.
3) Release tension on Setting Arm (6.0168) by .157" (4.0 mm). Loosen intermediate pump flange (2 Allen screws) by using Allen Wrench (8.0117 D). *See Fig. 12.* Swivel pump around it's axis until dial indicator reading corresponds with pump being installed. See INJECTION PUMP SETTING table.

NOTE: On models driven by gear (as opposed to chain), if unable to obtain correct pump setting within limits of slotted hole adjustment, it will be necessary to remove pump and correct pump installation by moving pump drive gear one tooth.

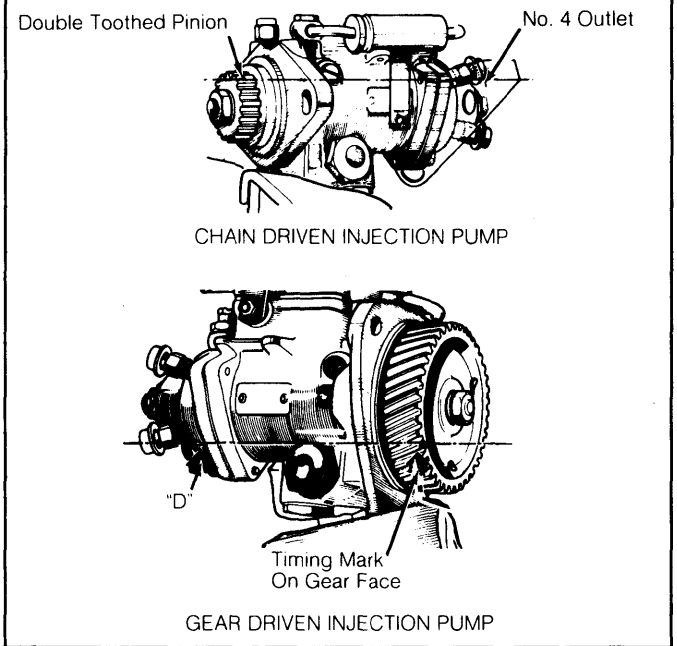

Fig. 10: Chain & Gear Driven Injection Pumps

INJECTION PUMP SETTING

Application	In. (mm)
EP/VM AR 5 & 7	.0148 (.38)
EP/VM AR 8, 10 & 12	.0215 (.55)
EP/VA CR 173	.0253 (.65)

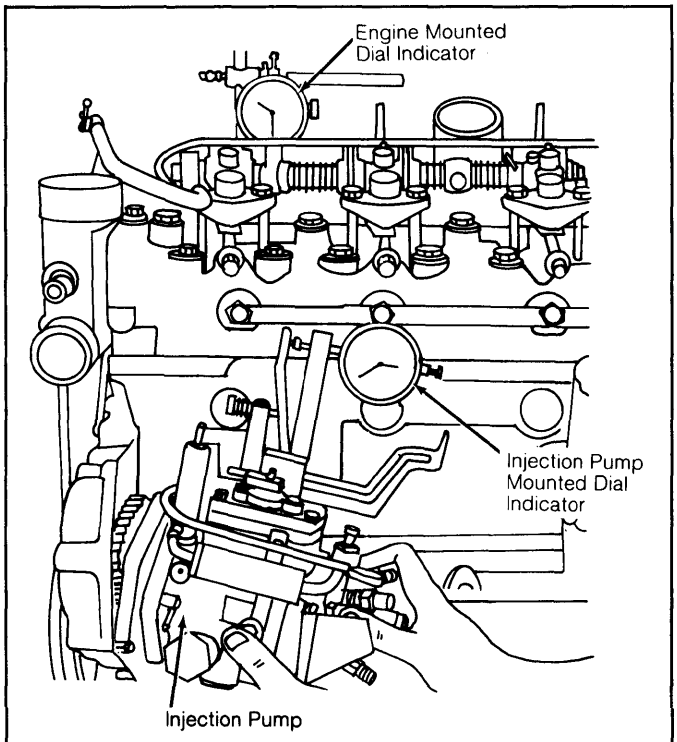

Fig. 11: Injection Pump Installation

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4) To verify pump setting, bring engine up to TDC and check that engine dial indicator reading is zero. Now rotate engine in opposite direction of rotation (counterclockwise) until engine mounted DIAL INDICATOR NEEDLE has completed exactly 7 revolutions. *See Fig. 11.*

5) Now rotate engine in normal direction and check that engine and dial indicator reading corresponds with pump being installed. See INJECTION PUMP TIMING SPECIFICATIONS table. During last revolution, pump dial indicator should be in BDC range and reading zero.

6) Bring engine to TDC and remove all tools. On EP/VAC pumps, install deferred injection accumulator using new sealing washers. Tighten accumulator to 36 ft. lbs. (49 N.m). Using Valve Spring Compressor (8.0105 Y), install valve spring and keepers on cylinder No. 4 exhaust valve.

7) Rotate crankshaft counterclockwise until cylinder No. 1 (rear) exhaust valve just begins to open. Move rocker arm forward tilting valve contact face downward (normal position).

8) With rocker arm correctly positioned above exhaust valve, release compressor pressure and remove spring compressor. Check valve clearances of engine and readjust if necessary. Install and connect all equipment removed. With installation completed, bleed fuel system.

INJECTION PUMP TIMING SPECIFICATIONS

Application	[1] Piston Setting BTDC In. (mm)	[2] Pump Lift In. (mm)
EP/VM AR 5 & 7	.055 (1.40)	.0148 (.38)
EP/VM AR 8	.055 (1.40)	.0215 (.55)
EP/VM 10 & 12	.057 (1.46)	.0215 (.55)
EP/VA CR 173	.020 (.51)	.0253 (.65)

[1] – Reading on engine dial indicator.
[2] – Reading on pump dial indicator.

INJECTORS

Removal – 1) Disconnect negative battery cable. Before removing injector holder from engine, clean area around injector holder. Remove injector pressure pipe.

2) Disconnect fuel return line. Remove flange, injector holder and gasket. If replacing injector, ensure that correct injector for that engine-injection pump combination is used.

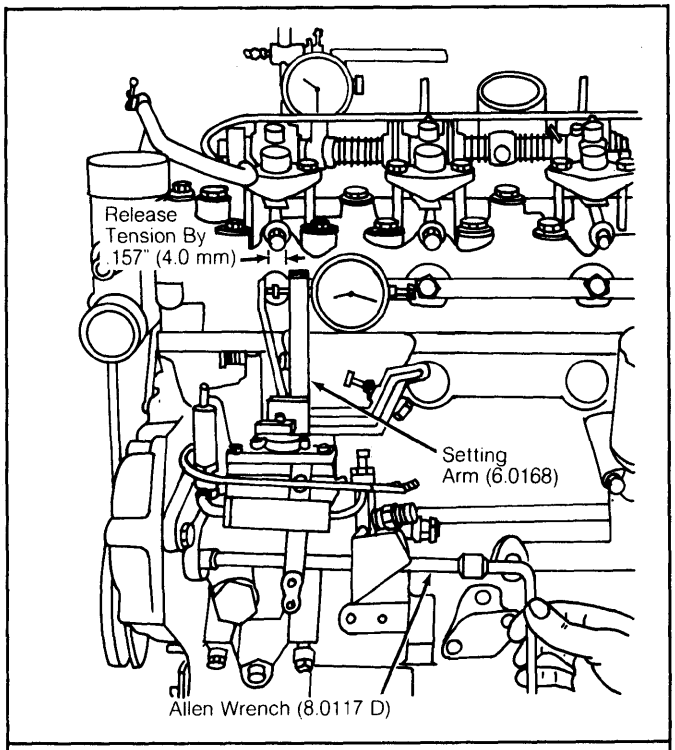

Fig. 12: Adjusting Injection Pump Timing

Installation – 1) Use new copper gasket and position flange on injector holder, but DO NOT tighten at this time. Screw injector pipe fittings on by hand, first on pump then on injector holder.

2) Lightly tighten fittings on pump and injector to 18 ft. lbs. (24 N.m). Tighten flange nuts to 14 ft. lbs. (19 N.m). Connect return pipe. If fitting leaks, do not further tighten fitting. Unscrew fitting and retighten to specification.