



## FEL-PRO INSTALLATION TIPS

### GENERAL INSTRUCTIONS

**CLEAN MATING SURFACES** of all foreign material. Use a degreaser.

**CLEAN THREADS** of bolts/studs using a wire brush; all nuts/threaded holes use a bottoming tap.

**Determine Which Bolts** extend into the coolant passages. Those **entering** the coolant passages require a pliable non-hardening sealer on the bolt threads and the underside of bolt head. Those **not entering** the coolant passages require oil on the bolt threads and underside of the bolt head.

**Exhaust Assembly:** Apply a high temperature anti-seize lubricant to the threadings.

**CHECK ALL CASTINGS** for flatness; straighten, resurface or replace if out of flat conditions exists.

**CYLINDER HEAD AND BLOCK:** refer to OEM manual to determine flatness tolerances and resurfacing limitations.

**Attach and align gasket(s) following any directional markings shown on the gasket.** If no markings exist, simply install the gasket by matching the gasket to engine deck surface.

**Fiber Faced Gasket(s)** are to be installed dry. **Metal Faced Gasket(s)** require a thin even coat of sealer, to be applied to the metal side(s) of the gasket.

**FINAL ASSEMBLY** always requires torquing of fasteners according to OEM specifications. For certain assemblies we have provided specific torquing specifications.

**NOTE:** CYLINDER HEAD torquing procedures are critical and therefore we recommend to double-check with OEM.

**Some procedures may be repeated with additional specific information for your application.**

### VALVE STEM SEALS

Use the valve stem seals included in this set for the applications indicated.

**REMOVE SPRING ASSEMBLIES, KEEPERS** and the old valve stem seals.

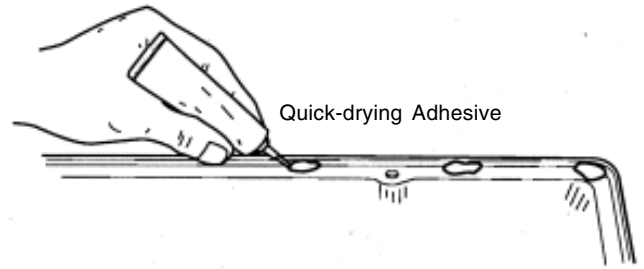
**REMOVE BURRS (IF ANY) FROM VALVE STEMS.** Use a fine stone or crocus cloth. Clean stems thoroughly to remove all abrasives or dust particles. Lubricate lightly.

#### INSTALL NEW SEALS.

**UMBRELLA TYPE SEAL:** Start valve stem seal over valve stem and push seal down on seal body until it touches top of valve stem guide or "boss". The seal will find its proper position on the stem once the engine starts.

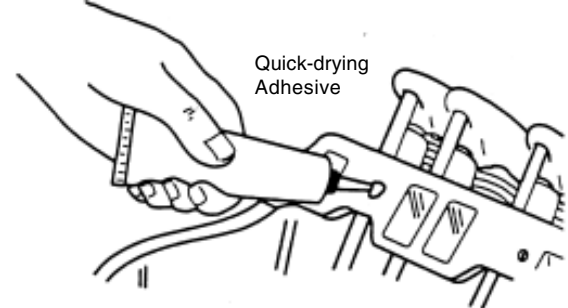
**REPLACE VALVE SPRING ASSEMBLIES.** Compress springs just enough to install keepers. **IMPORTANT:** Excessive compression can result in spring retainer damaging valve stem seal. Release spring carefully.

### VALVE COVER AND PUSH ROD COVER GASKETS



**ATTACH AND ALIGN GASKET.** Apply quick-drying adhesive, sparingly in several places on the mating surface of cover. If gasket has installation tabs, adhesive is **not** required. Mount gasket on cover. **Allow time for adhesive to set.** Test for slippage with light pressure. If gasket moves, allow more time.

### INTAKE MANIFOLD GASKET



**ATTACH AND ALIGN GASKET(S) TO CYLINDER HEAD(S).** Apply quick-drying adhesive, sparingly in several places, on the cylinder heads. Mount gasket(s) on cylinder head(s). **Allow time for adhesive to set.** Test for slippage with light pressure. If gasket moves, allow more time.

### WATER OUTLET, WATER PUMP, FUEL PUMP, OIL PUMP AND TIMING COVER GASKETS

**TO ASSIST IN ALIGNMENT AND SEALING DURING ASSEMBLY,** apply a thin coat of gasket sealer, to both sides of gasket(s).

### ROTATING SHAFT SEALS

The **Seal** included in this set may vary in width from the seal being removed. The sealing lip of the replacement seal will position itself on a different area of the shaft in order to avoid seal leakage problems commonly associated with groove worn shafts.

**PRIOR TO INSTALLING THE ROTATING SHAFT AND/OR SEAL** apply a thin coat of lubricant, such as grease, on the sealing lip and shaft.

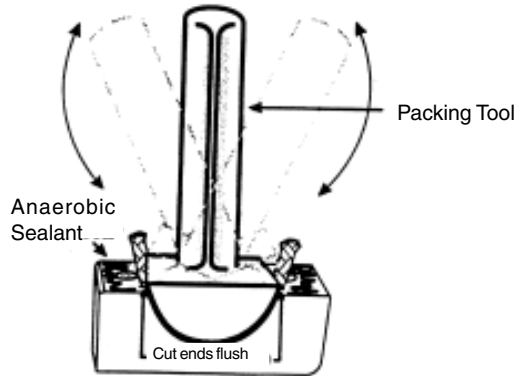
**IMPORTANT:** Do not install any seal without break-in lubricant protection.

#### REAR MAIN BEARING SEAL

To properly install the rear main bearing seal, it is necessary to **remove** the crankshaft and install both seal halves as a pair.

**REMOVE NICKS AND SCRATCHES (IF ANY) FROM THE CRANKSHAFT SEALING SURFACE** using a crocus cloth.

## INSTALL NEW SEALS:



**ROPE SEALS:** Install the seals into the grooves of the cap and block by firmly pressing the packing into the grooves using a “packing tool”.

Make certain that the ends of the seals protrude above the face of the cap and block.

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**IMPORTANT:** The final interference of the rope packing seals against the crankshaft is critical. In order to achieve this proper interference, it is strongly recommended to install the packings using a correct “Packing Tool” for your specific engine.

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With “packing tool” in position, cut the protruded ends of the seals flush with the cap and block using a sharp cutting tool.

**LUBRICATE SURFACE** of seal lip and crankshaft by applying a thin coat of motor oil or grease. If engine will not be started within several days, grease is recommended.

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**IMPORTANT:** Never install any seal with out break-in lubricant protection.

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**PRIOR TO INSTALLING THE REAR MAIN BEARING CAP** apply an anaerobic sealant, to either the rear main bearing cap or cylinder block mating surfaces. **Never** apply sealant on the ends of the seals.

**REINSTALL SEAL RETAINER TO CYLINDER BLOCK.** Torque to OEM specifications.

## OIL PAN GASKET

**ATTACH AND ALIGN GASKET(S).** Apply quick-drying adhesive, sparingly in several places on the engine casting or oil pan (depending upon engine model). Mount gasket (or gaskets and seals, if multipiece) on surface where adhesive was applied. **Allow time for adhesive to set.** Test for slippage with light pressure. If gasket moves, allow more time.

**PRIOR TO INSTALLING OIL PAN** apply a small dab of RTV where all gaskets and seal(s) meet. **IMMEDIATELY PROCEED** to the next step, as RTV normally sets up in 10-15 minutes.

**TEST RUN ENGINE.** Check all mating areas thoroughly to determine that all seals hold during operation.