



FEL-PRO INSTALLATION TIPS

GENERAL INSTRUCTIONS

CLEAN MATING SURFACES. Use a degreaser.

CLEAN THREADS of bolts/studs; for nuts/threaded holes use a bottoming tap.

BOLT PREPARATION: Those **entering** coolant passages require pliable non-hardening sealer on threads and underside of bolt heads. Those **not entering** coolant passages require oil on threads and underside of bolt heads.

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

CHECK CASTINGS for flatness. Straighten, resurface or replace if needed.

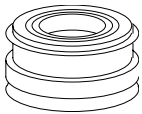
CYLINDER HEAD AND BLOCK: Refer to OEM manual to determine flatness tolerances and resurfacing limitations.

FINAL ASSEMBLY: Torque all fasteners to OEM specifications unless noted. CYLINDER HEAD torquing is critical; we recommend that you confirm with OEM.

HEAD GASKET

Follow any **directional markings shown on gasket(s)**. If no markings exist, install gasket(s). **Fiber Faced Gasket(s):** Install dry. **Metal Faced Gasket(s):** Requires a thin even coat of sealer applied to the metal side(s) of gasket.

VALVE STEM SEALS



Positive Intake



"O" Ring
Intake & Exhaust

For 1981 and later applications use Positive **Intake** and Umbrella **Exhaust** in addition to the "O" Ring. Prior to 1981 use "O" Ring **Intake & Exhaust** only.

POSITIVE GUIDE SEAL: Use the plastic installation sleeve(s), included in this set, to prevent damage to the lip of the seal. Trim the plastic sleeve so it extends 1/16" below the keeper groove. Place the sleeve on the stem. Carefully start valve stem seal over sleeve.

Remove plastic installation sleeve and reuse for installing remaining seals.

FOR RUBBER JACKET SEALS: Push seal down over valve guide until it bottoms.

FOR SOLID OR METAL JACKET SEALS: The use of an OEM service tool is recommended. If tool is unavailable, use a deep socket or rigid tube of appropriate diameter. Center tool (or socket) over the shoulder of the seal and tap the seal down over the guide until it bottoms.

"O" RING TYPE SEAL: Place "O" Ring seal on valve stem and position it into the proper groove. If "O" RING IS USED IN CONJUNCTION WITH A POSITIVE OR UMBRELLA SEAL, install the "O" Ring last.

VALVE COVER GASKET



To effectively seal this sophisticated engine application, FEL-PRO has included PERMA-DRY® molded rubber gasket(s) in this set.

ATTACH AND ALIGN GASKET.

IMPORTANT: This molded rubber silicone gasket must be installed **DRY** without any chemical adhesive.

PLACE GASKET IN VALVE COVER. This gasket is intentionally manufactured undersized and **requires slight stretching** to fit snugly into the cover.

INTAKE MANIFOLD GASKET

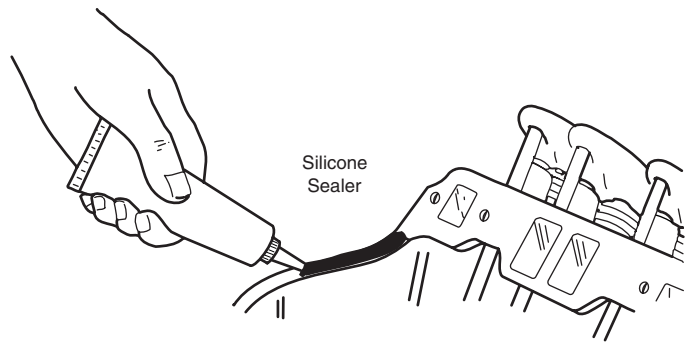


Open
Center
Port

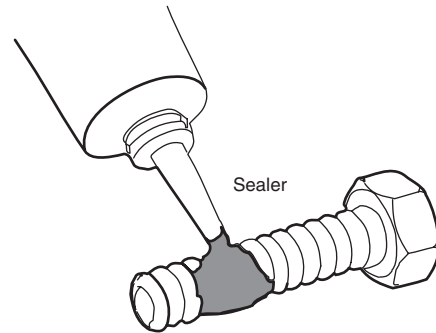
Rear
Restricted
Port

Install the intake manifold side rail gaskets with the restricted port toward the rear of engine.

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.



CREATE INTAKE MANIFOLD END SEALS by applying a continuous 3/16" bead of silicone sealer across the front and rear ends of the cylinder block, from one cylinder head to the other.



REINSTALL INTAKE MANIFOLD TO ENGINE while RTV is still wet.

IMPORTANT: The bolts attaching the manifold to the heads should be coated with a thread locking sealer. Torque securely to OEM specifications.

EXHAUST MANIFOLD GASKET

ATTACH AND ALIGN GASKET(S). If gasket has only one steel faced side, install steel side towards manifold.

MISCELLANEOUS FLUID SEALING GASKETS

ATTACH AND ALIGN GASKET(S)/SEAL(S): If supplementary sealer is desired, apply a thin coat of gasket sealer to both sides of gasket(s). However, molded rubber gasket(s) or those with colored PrintoSeal® sealing beads, install **DRY**.

ROTATING SHAFT SEALS

RUBBER SEAL(S): Install seal with its **largest raised sealing lip toward the engine**. Two-piece rubber seals may be installed using a "shoehorn" installation aid placed underneath seals to protect them from sharp edges.

ROPE SEALS: Install seals into grooves of cap and block by firmly pressing packing into grooves with a "packing tool." Ensure that ends of seals protrude above face of cap and block.

IMPORTANT: Final interference of rope packing seals against crankshaft is critical. To achieve proper interference, it is best to install packings using correct **Packing Tool** for your engine. With "packing tool" in position, cut protruded ends of seals flush with cap and block.

LUBRICATE SEALING LIPS AND CRANKSHAFT with motor oil or grease. If engine will not be started within several days, grease is recommended.

IMPORTANT: Never install any seal without break-in lubricant protection.

REAR MAIN BEARING CAP: Prior to installation, apply anaerobic sealant to mating surfaces of cap or block. **AVOID** sealant on ends of seals.

OIL PAN GASKET

ATTACH AND ALIGN GASKET(S). Apply quick-drying adhesive sparingly. Mount gasket and/or seals. **PRIOR TO INSTALLING OIL PAN** apply a dab of silicone sealer where all gaskets and seals meet.



FEL-PRO INSTALLATION TIPS

GENERAL INSTRUCTIONS

CLEAN MATING SURFACES. Use a degreaser.

CLEAN THREADS of bolts/studs; for nuts/threaded holes use a bottoming tap.

BOLT PREPARATION: Those **entering** coolant passages require pliable non-hardening sealer on threads and underside of bolt heads. Those **not entering** coolant passages require oil on threads and underside of bolt heads.

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

CHECK CASTINGS for flatness. Straighten, resurface or replace if needed.

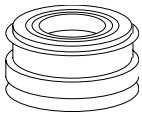
CYLINDER HEAD AND BLOCK: Refer to OEM manual to determine flatness tolerances and resurfacing limitations.

FINAL ASSEMBLY: Torque all fasteners to OEM specifications unless noted. CYLINDER HEAD torquing is critical; we recommend that you confirm with OEM.

HEAD GASKET

Follow any **directional markings shown on gasket(s)**. If no markings exist, install gasket(s). **Fiber Faced Gasket(s):** Install dry. **Metal Faced Gasket(s):** Requires a thin even coat of sealer applied to the metal side(s) of gasket.

VALVE STEM SEALS



Positive Intake



"O" Ring
Intake & Exhaust

For 1981 and later applications use Positive **Intake** and Umbrella **Exhaust** in addition to the "O" Ring. Prior to 1981 use "O" Ring **Intake & Exhaust** only.

POSITIVE GUIDE SEAL: Use the plastic installation sleeve(s), included in this set, to prevent damage to the lip of the seal. Trim the plastic sleeve so it extends 1/16" below the keeper groove. Place the sleeve on the stem. Carefully start valve stem seal over sleeve.

Remove plastic installation sleeve and reuse for installing remaining seals.

FOR RUBBER JACKET SEALS: Push seal down over valve guide until it bottoms.

FOR SOLID OR METAL JACKET SEALS: The use of an OEM service tool is recommended. If tool is unavailable, use a deep socket or rigid tube of appropriate diameter. Center tool (or socket) over the shoulder of the seal and tap the seal down over the guide until it bottoms.

"O" RING TYPE SEAL: Place "O" Ring seal on valve stem and position it into the proper groove. If "O" RING IS USED IN CONJUNCTION WITH A POSITIVE OR UMBRELLA SEAL, install the "O" Ring last.

VALVE COVER GASKET



To effectively seal this sophisticated engine application, FEL-PRO has included PERMA-DRY® molded rubber gasket(s) in this set.

ATTACH AND ALIGN GASKET.

IMPORTANT: This molded rubber silicone gasket must be installed **DRY** without any chemical adhesive.

PLACE GASKET IN VALVE COVER. This gasket is intentionally manufactured undersized and **requires slight stretching** to fit snugly into the cover.

INTAKE MANIFOLD GASKET

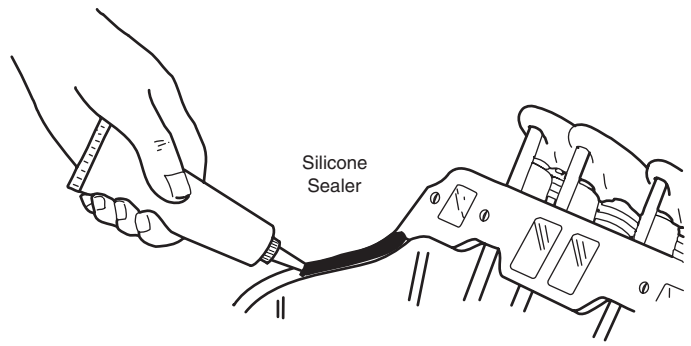


Open
Center
Port

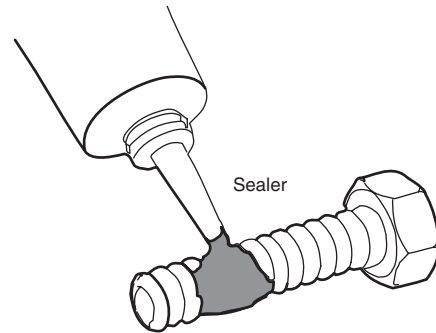
Rear
Restricted
Port

Install the intake manifold side rail gaskets with the restricted port toward the rear of engine.

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.



CREATE INTAKE MANIFOLD END SEALS by applying a continuous 3/16" bead of silicone sealer across the front and rear ends of the cylinder block, from one cylinder head to the other.



REINSTALL INTAKE MANIFOLD TO ENGINE while RTV is still wet.

IMPORTANT: The bolts attaching the manifold to the heads should be coated with a thread locking sealer. Torque securely to OEM specifications.

EXHAUST MANIFOLD GASKET

ATTACH AND ALIGN GASKET(S). If gasket has only one steel faced side, install steel side towards manifold.

MISCELLANEOUS FLUID SEALING GASKETS

ATTACH AND ALIGN GASKET(S)/SEAL(S): If supplementary sealer is desired, apply a thin coat of gasket sealer to both sides of gasket(s). However, molded rubber gasket(s) or those with colored PrintoSeal® sealing beads, install **DRY**.

ROTATING SHAFT SEALS

RUBBER SEAL(S): Install seal with its **largest raised sealing lip toward the engine**. Two-piece rubber seals may be installed using a "shoehorn" installation aid placed underneath seals to protect them from sharp edges.

ROPE SEALS: Install seals into grooves of cap and block by firmly pressing packing into grooves with a "packing tool." Ensure that ends of seals protrude above face of cap and block.

IMPORTANT: Final interference of rope packing seals against crankshaft is critical. To achieve proper interference, it is best to install packings using correct **Packing Tool** for your engine. With "packing tool" in position, cut protruded ends of seals flush with cap and block.

LUBRICATE SEALING LIPS AND CRANKSHAFT with motor oil or grease. If engine will not be started within several days, grease is recommended.

IMPORTANT: Never install any seal without break-in lubricant protection.

REAR MAIN BEARING CAP: Prior to installation, apply anaerobic sealant to mating surfaces of cap or block. **AVOID** sealant on ends of seals.

OIL PAN GASKET

ATTACH AND ALIGN GASKET(S). Apply quick-drying adhesive sparingly. Mount gasket and/or seals. **PRIOR TO INSTALLING OIL PAN** apply a dab of silicone sealer where all gaskets and seals meet.