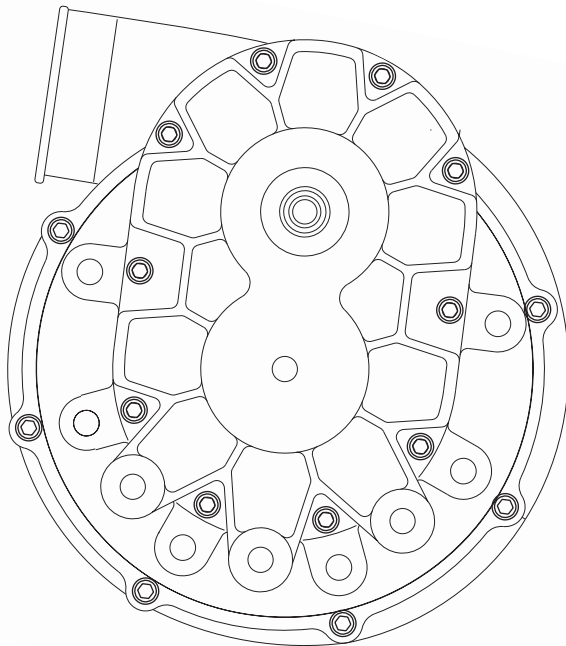


# **Ford 5.0L Mustang Driver's Side S.H.O. Tuner Kit Installation Instructions**

**1986-1993 Model Years**



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# FOREWORD

Proper installation of this supercharger kit requires general automotive mechanic knowledge & experience. Please brows through each step of this instruction manual prior to beginning the installation to determine if you should refer the job to a professional installer/technician. Please call Vortech Engineering for installers in your area.

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# 1986 - 1993 Ford 5.0 Mustang *Driver's Side S.H.O. Tuner Kit* **4FA218-110/118**

**THIS PRODUCT IS NOT FOR A FIRST TIME VORTECH USER.** These products are intended for racing use **ONLY** by professional racers/installers. These packages were designed for "off-road" racing use and are not legal for "public highway" use. Installation of this package requires a trunk mounted battery and removal of all factory front engine accessories with their related bracketry.

This product is intended for use on healthy, well maintained racing engines. It is recommended by Vortech that an aftermarket (SVO) high strength engine block and cylinder heads (TFS, Edelbrock, World Products, etc.) be used. An "O-ringed" cylinder head-to-block seal is also suggested. Installation on a worn-out or damaged engine is not recommended and may result in failure of the engine as well as the supercharger.

**Before beginning this installation, please read through this entire instruction booklet and the Vortech Race Supercharger System Owner's Manual. Other available pieces designed for use with this tuner kit:**

2A031-275	S/C Pulley, 10-Rib, Ø2.75
2A031-295	S/C Pulley, 10-Rib, Ø2.95
2A021-333	S/C Pulley, 10-Rib, Ø3.33

**To determine the proper supercharger pulley(s), use this formula:\***

$$\left( \frac{\text{crank pulley diameter}}{\text{supercharger pulley diameter}} \right) \times 3.45 \times \text{max. engine rpm} = \text{impeller speed}$$

**Vortech Crank/Supecharger Support Strut:\*\* 4FA110-020**

- Reduces crank snout side-loading. (Places the supercharger load onto the crankshaft main bearing centerline and cancels out the load generated by the drive belt between the crank and supercharger pulleys.)
- Reduces supercharger input bearing load and wear.
- Eliminates the possibility of supercharger plate flex.

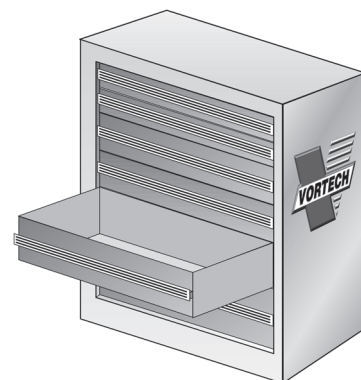
\* Refer to the Vortech racing supercharger system owner's manual for each individual supercharger's specifications.

\*\* Not required for kit function although strongly recommended by Vortech.

## TOOL & SUPPLY REQUIREMENTS

- 3/8" socket and drive set: SAE & metric
- 1/2" socket and drive set: SAE & metric
- 1/2" breaker bar and 4" extension
- 3/8" NPT tap, 3/8-16 tap & handle
- Adjustable wrench
- Open end wrenches: 3/8", 7/16", 1/2", 9/16", 18mm, 19mm
- Center punch and a 5/8" tapered punch

- 5 quarts SF rated quality engine oil
- Oil filter and wrench
- Large screwdriver or pry bar
- Flat #2 screwdriver
- Phillips #2 screwdriver
- Heavy grease
- Silicone sealer





# 1986-1993 Mustang

## Part No. 4FA218-110/118

# PARTS LIST

IMPORTANT: Before beginning installation, verify that all parts are included in the kit. Report any shortages or damaged parts immediately.

PART NUMBER	DESCRIPTION	QUANTITY	PART NUMBER	DESCRIPTION	QUANTITY
<b>2A258-050 S/C, V7 YSI, 86-93 5.0L STRT W/PLY 1</b>			<b>4FP114-023 RADIATOR HOSE ASSY 1</b>		
<b>4FA111-051 ALT.BRKT ASSY, DSIDE RENGDE 1</b>			4FP020-011 +45 THERMOSTAT HSG, FORD 5.0 1		
4FA017-071 SPACER, RENGDE ALT BRKT 1			4FP040-050 5.0 FORD THERMOSTAT GASKET 1		
4FP010-011 BRACKET,ALTERNATOR 1			4FP014-011 RADIATOR PIPE 1		
4FP015-010 ALTER.STAY,UPPER 1			7R002-020 #20 SAE TYPE F SS HOSE CLAMP 3		
4FP015-020 ALTER.STAY,LOWER 1			7A312-100 5/16-18 X 1 HHCS, GR5, PLATED 2		
7A312-100 5/16-18 X 1 HHCS, GR5, PLATED 2			7K312-001 5/16 AN WASHER, PLATED 2		
7A375-100 3/8-16 X 1 G5 HHCS, PLT 2			7R002-024 #24 SAE TYPE F SS HOSE CLAMP 1		
7A375-325 3/8-16 X 3-1/4 HX HD GR8 1			<b>4FP130-011 OIL FEED/DRAIN ASSY 1</b>		
7A375-525 3/8-16 X 5-1/4 HXCS G5 P 2			4FP130-026 OIL FEED LINE ,5.0-MONDO 1		
7A437-550 7/16"-14 X 5 1/2" HXHD 1			4FP130-036 OIL DRAIN ASSY 1		
7F375-016 3/8-16 HX NUT 1			7P125-103 1/8NPT X 45 -4SAE FLARE 1		
7J375-044 3/8 SAE WASHER, PLTD 1			7P250-036 -4 SAE FLARE TO 1/4 NPT 1		
7K312-001 5/16 AN WASHER, PLATED 6			7P250-120 1/4 NPT PIPE PLUG 1		
7K375-040 3/8 AN960 FLAT WASHER PLATED 7			7P250-121 1/4NPT STEEL NIPPLE X 3" PLT 1		
7K437-001 7/16" AN WASHER 1			7P250-122 1/4 PIPE THRD AN917 TEE 1		
<b>4FA111-091 MTG BRKT ASY DSIDE DUAL 10RIB 1</b>					
2A017-016 PILOT, 6203/5 BRG, M10 3/8 SCREW 1					
2A017-017 SPACER, ACC IDLER 5.0 RENGDE 1					
2A017-049 SPACER A, SBCHEV CARB BRKT 5					
4FA010-051 MTNG PLT, S/C, RENEGAD DUAL 1					
4FA010-061 SUPRT PLT, S/C, RENEGAD DUAL 1					
4FA017-061 BRKT SPACER, RENGDE S/C 1					
4FA017-091 SPACR, IDLER, DUAL REN PLT 10RIB 1					
4FP116-030 IDLER W/BRNG ASSY, 36MM COG 1					
4FD017-011 PILOT, 6203/5 BRG, 1/2 SCREW 1					
4FP011-021 S/C MOUNTING BRKT. MACH 1					
4GF016-160 PULLEY, 3" IDLER, GROOVED 1					
4PFA010-031 BRACKET, IDLER ADJUST SCREW 1					
7A250-077 1/4-20 X .75 FLAT ALLEN GR5 2					
7A375-100 3/8-16 X 1 G5 HHCS, PLT 9					
7A375-250 3/8-16 X 2.5" GR8 HX 1					
7A375-275 3/8-16 X 2-3/4 HXCSG8P ZINC 5					
7A437-300 7/16-14 X 3.00 SHCS GR8 1					
7A437-750 7/16-14 X 7.50 HXHD GR8 ZINC 2					
7PB500-263 ARBOR, S/C TENS PLY, 5.0 N2K 1					
7C012-020 M12 X 1.75 X 20MM HXHD CL8.8 3					
7F500-020 1/2"-20 HEX JAM NUT GR5 ZINC 1					
7J012-092 WASHER, M12 FLAT, ZN PLT 3					
7K375-040 3/8 AN960 FLAT WASHER PLATED 17					
7K437-001 7/16" AN WASHER 2					
7PA375-500 SCREW, IDLER ADJUST, 5.00" 1					
<b>4FA116-051 CRNK PLY ASSY, 10-RIB V7 SHO 1</b>					
2A041-568 BELT, DAYCO 5100568 10 RIB 1					
4FA017-051 FAN SPACER 1					
4FA018-028 4.6" X 8" 10GV CRNK PLY, STRUT 1					
7A375-178 3/8-16 X 1-3/4 HXHD G8 4					
7F312-021 5/16-24 NUT 4					
7J312-000 5/16 FLAT WASHER-SAE 4					
7J375-044 3/8 SAE WASHER, PLTD 4					
7L375-075 3/8 LOCK WASHER 4					
7U313-115 5/16"-24 X 1.5" STUD 4					

## 1. PREPARATION/REMOVAL

- A. Disconnect the battery negative cable. (The battery must be relocated to the trunk in order for the system to fit properly.)
- B. Remove all drive belts (accessory/supercharger).
- C. Remove the radiator shroud, fan, upper radiator hose and thermostat housing.
- D. Remove all components that lead to the throttle body (tubing, air filter, etc.).
- E. Remove all accessories, brackets and related items from the front of the engine block and heads. Remove the crankshaft pulley. Set aside the alternator for reinstallation.

## 2. OIL DRAIN

- A. To provide an oil drain for the supercharger, it is necessary to make a hole in the oil pan. Locate and mark hole per diagram. It is best to punch the hole rather than drill.
- B. Remove the oil filter.
- C. Remove paint around the hole area.
- D. Use a small center punch to perforate the pan and expand the hole. Switch to a larger diameter punch and expand the hole further to approximately 9/16" diameter. Most punches are made from a hexagon material and may be placed in a socket with an extension to make this procedure easier.

**NOTE:** When punching the hole, make sure that no contact is made with the crankshaft or rods. Rotate crank for clearance, if needed.

- E. Tap the hole with a 3/8" NPT tap approximately 1/4" deep. Pack the flutes of the tap with heavy grease to hold chips. Use a small magnet to check for any stray chips.

**NOTE:** This method of rolling over the lip of the hole and tapping it works very well if carefully done and should cause no problems.

- F. Thoroughly clean the threaded area. Apply a small amount of silicone sealer to the new threads. Apply more sealer to the 3/8" NPT hose fitting and secure in hole. Make sure a seal is formed all around the fitting.
- G. Drain the engine oil.

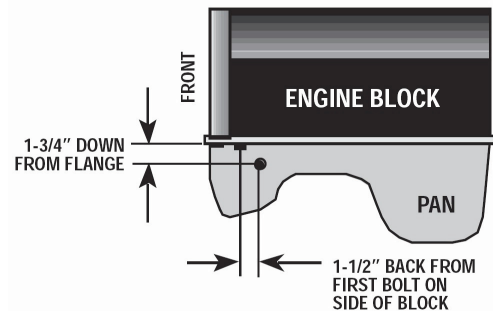


Fig. 2-a

### 3. OIL FEED LINE

- A. Remove the oil pressure sender and mounting boss fitting from the engine.
- B. Assemble the supplied 1/4" NPT fittings as shown. Teflon tape, paste or other sealant is not recommended as it might loosen and cause blockage of the oil feed orifice, resulting in supercharger failure. Thread the assembly into the block.
- C. Connect the red oil feed line to the #4 flare fitting. Cover the end of the hose from dirt and debris until hose can be attached to the supercharger.
- D. Install a new oil filter and refill the engine with oil. **DO NOT OVERFILL.**

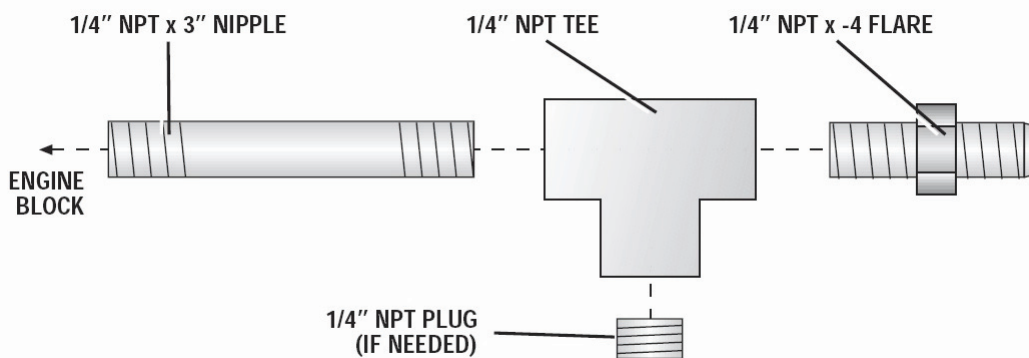


Fig. 3-a

### 4. CRANK/WATER PUMP PULLEY MOUNTING

- A. Make sure the harmonic balancer mounting surface is clean.

**NOTE:** It is **HIGHLY** recommended that an NHRA approved aftermarket balancer be used.

- B. Place the crank pulley onto the balancer (without using bolts) to check balancer-to-pulley fit. If any slop exists (up and down/side to side), use feeler gauges or shim stock to temporarily center the pulley onto the hub. (Due to tolerance variations from different aftermarket balancer manufacturers, Vortech has found that this important exercise may be necessary on some, but not all applications to achieve minimal pulley runout.) If the pulley is not centered on the hub correctly, it may create an out-of-balance condition which will directly affect the engine and supercharger bearing life. Proceed with the next step and remove the feeler gauges/shim stock after the bolts have been torqued.
- C. Using the supplied 3/8-16 bolts and 3/8" AN washers, (a small drop of blue Loctite on the threads of each bolt should be used) attach the Vortech crank pulley to the balancer. Torque to 35 ft/lbs.

**NOTE:** Tighten bolts progressively and evenly in a crisscross pattern so that the pulley will seat properly.



## 5. MAIN BRACKET ASSEMBLY

- A.** Attach the cast aluminum bracket and billet aluminum "3-hole" spacer (the spacer must be between the bracket and cylinder head) to the front of the driver side (left) cylinder head using the supplied 7/16-14 socket-head bolt without washer. Install the bolt finger tight only. (See Fig. 5-a)

**NOTE:** The largest hole (5/8-11) in the end of the cylinder head **MUST** have the factory Ford adapter plug to allow proper hardware fit.

- B.** Match the mounting plate up to the mounting bracket and finish attaching the assembly to the head using the supplied hardware as shown in Fig. 5-a (make sure that all bolts use the proper AN washer, except the socket-head bolt).
- C.** Following Fig. 5-b, attach the idler pulley to the plate and bracket using the 3/8 x 2-1/2" bolt, bearing pilot and spacer. Tighten all fasteners in a progressive manner.

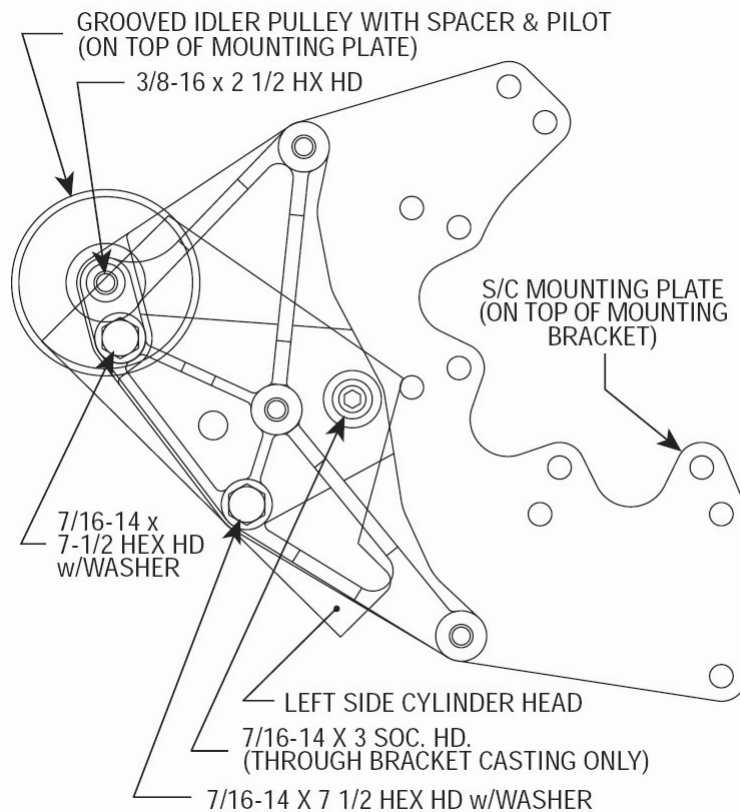


Fig. 5-a

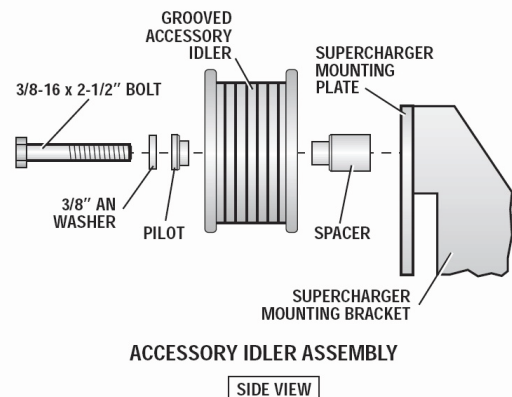


Fig. 5-b

## 6. SUPERCHARGER MOUNTING

- A. Place the oil drain hose onto the supercharger drain fitting and secure with a hose clamp.
- B. Secure the supercharger to the mounting plate with eight 3/8-16 x 1" bolts and AN washers. (See Fig. 6-a)
- C. Attach the supplied belt tensioner hardware to the plate as shown in Figs. 6-b, 6-d.
- D. Attach the supplied front mount plate and 1.309" spacers to the supercharger mounting plate and supercharger as shown in Fig. 6-b.
- E. Attach the supplied 4" idler as shown in Fig. 6-d.
- F. Connect the lower end of the oil drain hose to the fitting on the pan and secure with a hose clamp. Trim hose length if necessary. (It is VERY important that the hose has NO dips or kinks.)
- G. Attach the supplied 1/8" NPT x 45° flare fitting and oil feed hose to the oil feed fitting on the supercharger. When tightening the fitting, use a 1/2" wrench on the oil feed base for support.

**NOTE:** When threading the 1/8" NPT x 45° flare fitting into the supercharger, use engine oil on the pipe threads for lubrication. Teflon tape, paste or other sealant is NOT recommended as it might loosen and cause blockage of the oil feed orifice, resulting in supercharger failure.

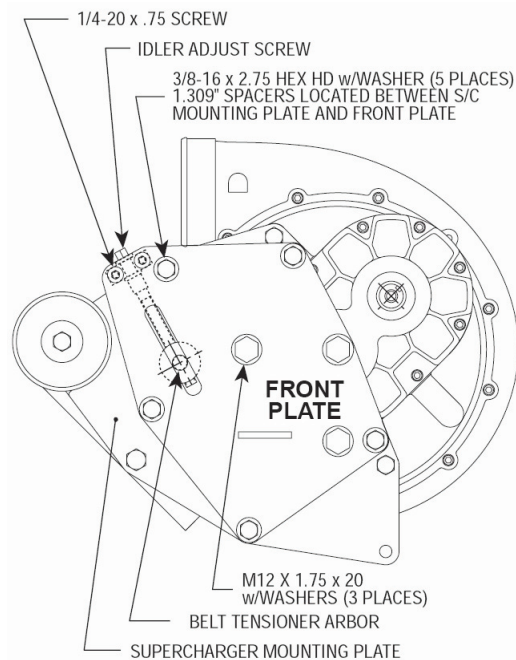


Fig. 6-b

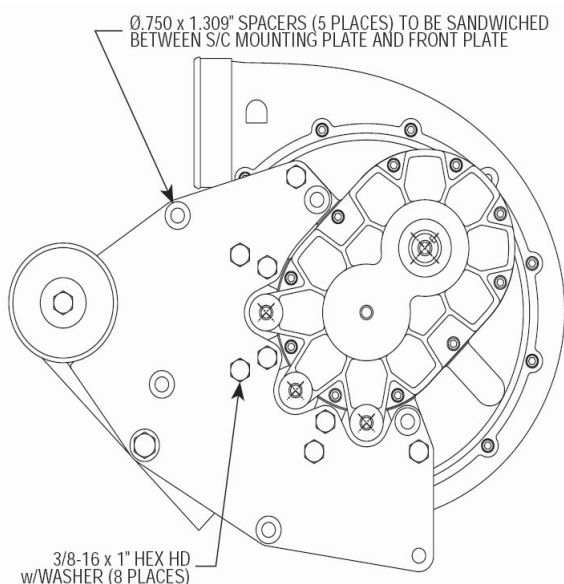


Fig. 6-a

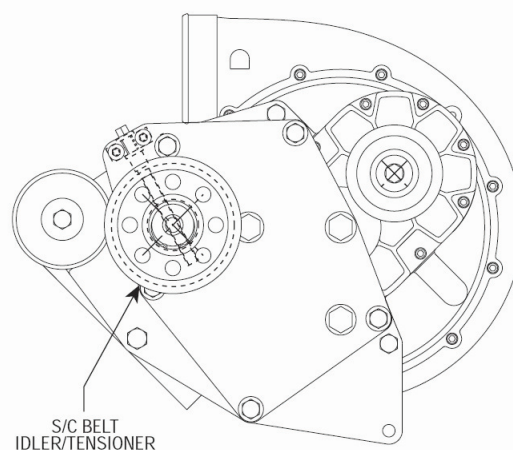


Fig. 6-c

## 6. SUPERCHARGER MOUNTING, cont'd.

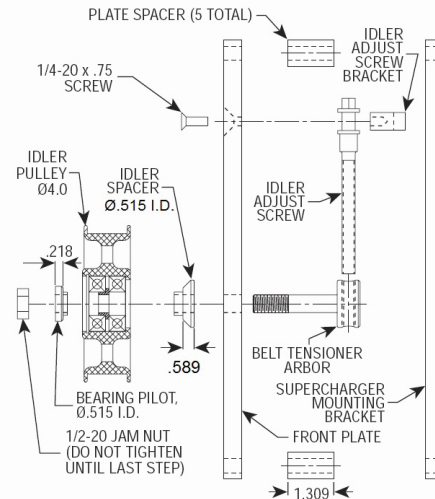


Fig. 6-d  
VIEW FROM DRIVER'S SIDE

## 7. ALTERNATOR MOUNTING

- A. Attach the Vortech aluminum bracket and billet aluminum "3-hole" spacer (the spacer must go between the bracket and cylinder head) to the right side cylinder head using the supplied hardware. Make sure that each fastener uses the proper AN washer, unless noted otherwise (see graphic).
- B. Attach lower and upper alternator tabs to the bracket and mount the alternator. Thread the supplied 3/8-16 x 1" bolt and SAE washer through the back of the upper alternator tab to the alternator. (This is used to secure the unit after tensioning the belt.)
- C. Tighten all brackets to the head bolts and reattach electrical connection to alternator.

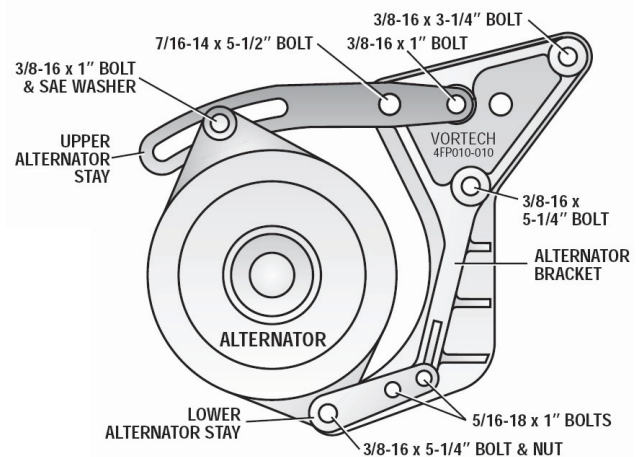


Fig. 7-a

## 8. SUPERCHARGER/ACCESSORY DRIVE BELTS

- A. Route the accessory belt as shown. Tension the belt by rotating the alternator and tightening the upper bolt and pivot.
- B. If the supercharger pulley has not already been installed, make sure that the input shaft is lightly lubricated with a very small amount of grease or oil. Insert the supplied key into the keyway and slide onto the supercharger shaft. Secure the pulley onto the supercharger using the supplied retainer, 3/8-24 bolt and AN washer.

(A small drop of blue Loctite is recommended on the bolt threads.)

**NOTE:** The supercharger pulley should be a slip fit at 70° F. If pulley-to-shaft fit is tight, slightly heat the pulley until it slips easily onto the shaft. At NO point should the pulley be hammered or pried off or onto the shaft.

## 8. SUPERCHARGER/ACCESSORY DRIVE BELTS, cont'd.

- C. Fit the supercharger drive belt over the new crank pulley and supercharger pulley.
- D. Make sure the 1/2-20 jam nut previously threaded onto the tensioner arbor is threaded down almost all of the way, but not tight. The belt is tightened/loosened by rotating the belt tensioner adjustment screw. Tighten the belt until light resistance is felt in the belt tensioner adjustment screw. Proper belt tension is achieved when the belt can be twisted 1/4 of a turn by hand. Adjust belt tension as needed. Do not over tension the belt.
- E. Tighten the 1/2 jam nut on the belt tensioner arbor.

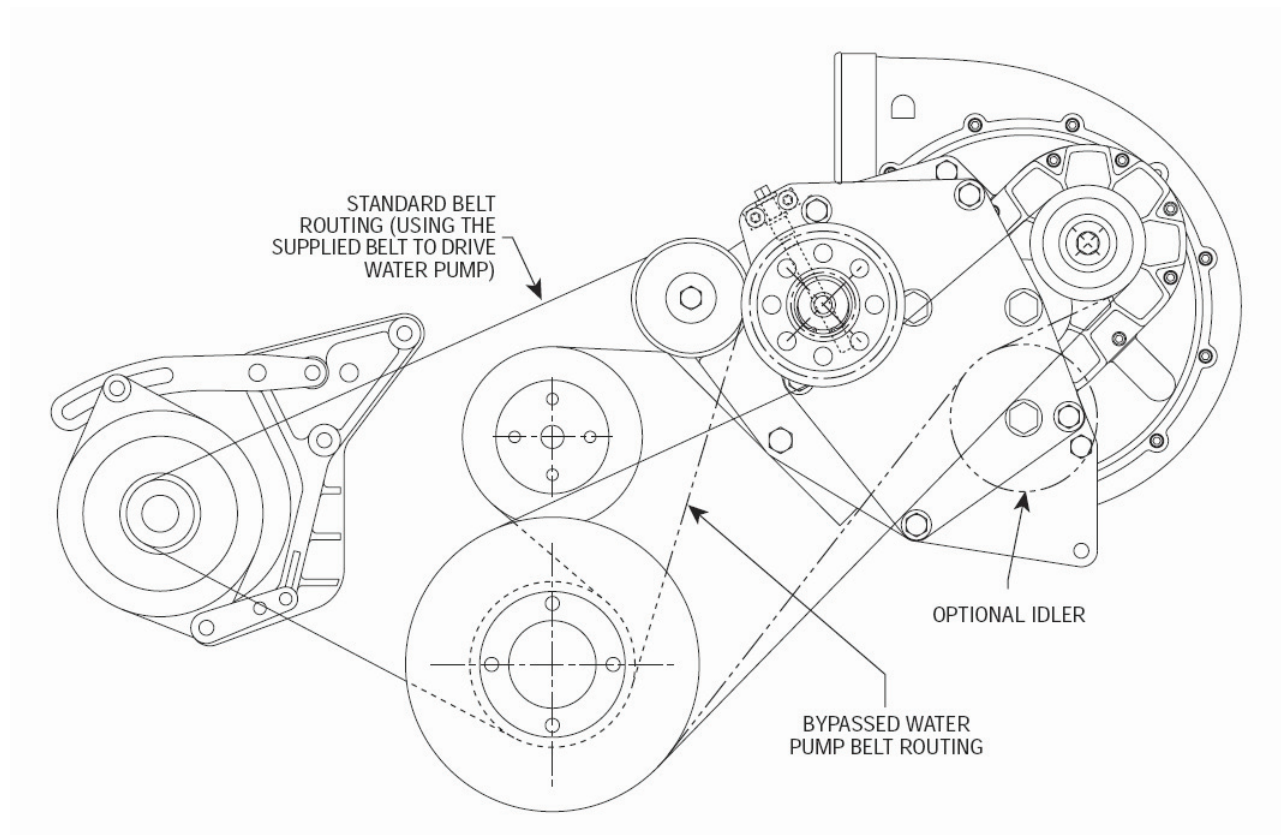


Fig. 8-a

## 9. RADIATOR HOSE & THERMOSTAT HOUSING

- A. From the stock radiator hose, make a 90° elbow by trimming as shown. Also, cut a 2-1/2" long straight piece from the stock hose and attach to the upper radiator tank.
- B. Remove the factory thermostat housing and replace with the supplied 45° unit, gasket and hardware.
- C. Place the stainless steel water pipe between the two hoses placing the shorter leg nearest the radiator.
- D. Position the hoses and tube so there is ample overlap for sealing, and secure with provided clamps.
- E. Refill radiator and coolant bottle.

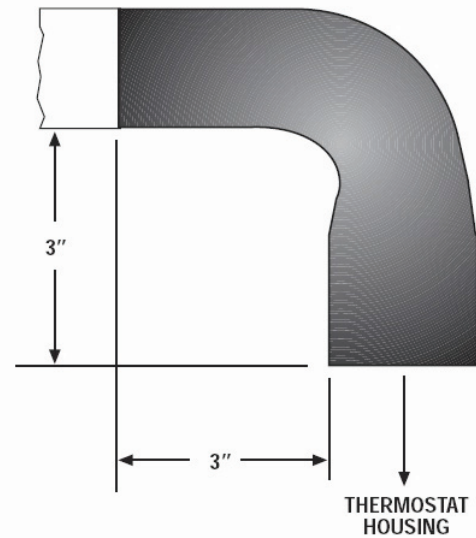


Fig. 9-a

## 10. FINAL CHECK

**NOTE:** Do not attempt to operate the vehicle until ALL components are installed and ALL operations are completed including the final check.

- A. Reconnect the battery.
- B. Check all fittings, nuts, bolts and clamps for tightness. Pay particular attention to oil and fuel lines around moving parts, sharp edges and exhaust system parts. Make sure all wires and lines are properly secured with clamps or tie wraps.
- C. Check all fluid levels.
- D. Start engine and allow to idle a few minutes, then shut off.
- E. Recheck to be sure that no hoses, wires, etc. are near exhaust headers or moving parts and for signs of any fluid leakage.
- F. **PLEASE TAKE SPECIAL NOTE:** Operating the vehicle without ALL the subassemblies completely and properly installed may cause **FAILURE OF MAJOR COMPONENTS.**
- G. Test drive the vehicle.



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