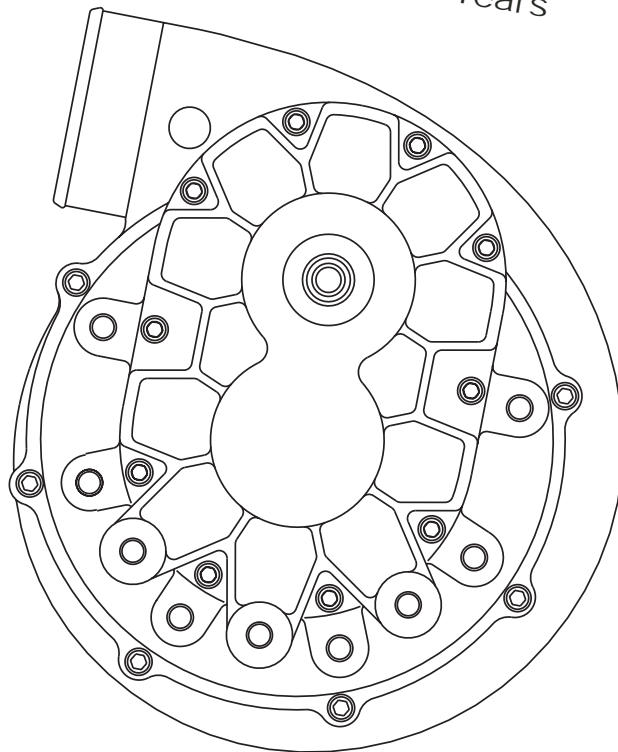


Ford 5.0 Mustang Driver's Side Renegade Supercharger System Installation Instructions

1986-1993 Model Years



ENGINEERING, LLC

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FOREWORD

Proper installation of this supercharger kit requires general automotive mechanic knowledge and experience. Please browse 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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NOTICE

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1986 - 1993
Ford 5.0 Mustang
Driver's Side Renegade Supercharger System
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 only 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 after-market (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:

2A038-285	Renegade Profile, ø2.85
2A038-300	Renegade Profile, ø3.00
2A038-315	Renegade Profile, ø3.15

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/Supercharger Support Strut: 4FA110-020**

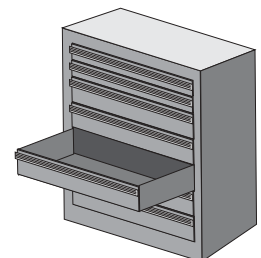
- Reduces crank snout side-loading. (Places the supercharger load onto the crankshaft main bearing centerline and cancels out the load generated by the drive belt between the crank and supercharger pulleys.)
- Reduces supercharger input bearing load and wear.
- Eliminates the possibility of supercharger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



X



Driver's Side Renegade Supercharger System

Part No. 4FA218-110/118

PARTS LIST

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

Part Number	Description	Quantity	Part Number	Description	Quantity
2A158-040	S/C V-7 YS	1	7C012-020	M12 x 1.75 x 20mm Pltd	3
			7J012-092	12mm Washer, Flat	3
4FP130-011	OIL FEED/DRAIN ASSY	1	4FA111-051	ALT. BRKT ASSY. DSIDE RENEGADE	1
4FP130-026	Oil Feed Line Assy	1	4FP010-011	Bracket, Alternator	1
7P250-121	1/4 NPT Steel Nipple	1	4FP015-020	Alter.Stay, Lower	1
7P250-122	1/4 Pipe Thrd AN 917	1	4FP015-010	Alter.Stay, Upper	1
7P250-120	1/4 NPT Pipe Plug	1	7A375-100	3/8-16 x 1 G5 HXHD Plt	2
7P125-103	-4 x 45° Male Elbow	1	7A312-100	5/16-18 x 1 HXCS GR5P	2
7P250--36	-4 Flare To 1/4 NPT	1	7K375-040	3/8 AN 960 Flat Washr	7
4FP114-023	RADIATOR HOSE ASSY	1	7K312-001	5/16 AN Washer	6
4FP020-011	45° Thermostat	1	7K437-001	7/16" AN Washer	1
4FP040-050	Thermostat Gasket	1	7F375-016	3/8-16 HX Nut	1
4FP014-011	Radiator Pipe	1	7J375-044	3/8 SAE Washer, Pltd	1
7R002-020	#20 Goldseal Hose Clamp	3	7A437-550	7/16 x 5-1/2" Bolt	1
7A312-100	5/16-18 x 1 HXCSGR5P	2	7A375-525	3/8 x 5-1/4 Bolt	2
7K213-001	5/16 AN Washer	2	7A375-325	3/8 x 3-1/4" Bolt	1
7R002-024	#24 Goldseal Hose Clamp	1	4FA017-071	Renegade Brkt Spacer	1
8E018-300	PULLEY PACKAGE, RENEGADE	1			
2A038-300	S/C Pulley 3.00" 8 Groove	1			
7A375-158	3/8-16 x 1/5" SOC HD GR8 Pltd	4			
7K375-040	3/8 AN 960 Flat Washer	4			
7L375-075	3/8 Lock Washer	4			
4FA018-027	4.75" 8.0" 8Gv Crank Pulley	1			
7U100-070	Key, 3/16 x 3/16 x 7/8	1			
4FA111-042	S/C Belt Tensioner Assy, H.O.	1			
2A048-565	Belt, 5080565-DAYCO "94 2.95"	1			
2A040-011	Pulley Retainer S/C	1			
7B375-125	3/8 24 x 1-1/4 HX CLS	1			
7K375-040	3/8 AN 960 Flat Washer Plated	1			
4FA111-071	MTG BRKT. ASSY DSIDE	1			
4FP011-021	Mounting Brkt. Mach	1			
7A375-100	3/8-16 x 1 G5 HXHD Plt	9			
7K375-040	3/8 AN960 Flat Washer, Plated	17			
7K437-001	7/16" AN Washer	2			
7A437-750	7/16-14 x 7.25 HXHD GR8	2			
4GF016-160	Pulley, Idler-Ribbed	1			
2A017-017	Spacer, ACC Idler 5.0 Rngd	1			
2A017-016	Shrt. ACC. Idler, V-3	1			
7A375-250	3/8-16 x 2.5" GR5 HX	1			
4FA017-061	Brkt Spacer, Renegade S/C	1			
7A437-300	7/16-14 x 3.00 SHCS GR8	1			
4FA010-051	Mntg Plt, S/C, Renegade Dual	1			
4FA010-061	Suprt Plt, S/C, Renegade Dual	1			
4FA017-081	Spacer, Idler, Dual Renegade	1			
7B500-240	Arbor, S/C Tens Ply, Renegade	1			
4FA116-021	Idler Assy, 8-Rib x Ø4.0 Alum	1			
2A017-049	Spacer A, SBChev Carb Brkt	5			
7PA375-500	Screw, Idler Adjust, 5.00"	1			
4PF010-031	Brackct, Idler Adjust Screw	1			
7F500-020	1/2-20 Hex Jam Nut GR5 Zinc	1			
4FD017-011	Bearing Pilot, 1/2" Bore	1			
7A250-077	1/4-20 x .75 Flat Allen GR5	2			
7A375-275	3/8-16 x 2-3/4 HXCS G8P Zinc	5			

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 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 the 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.

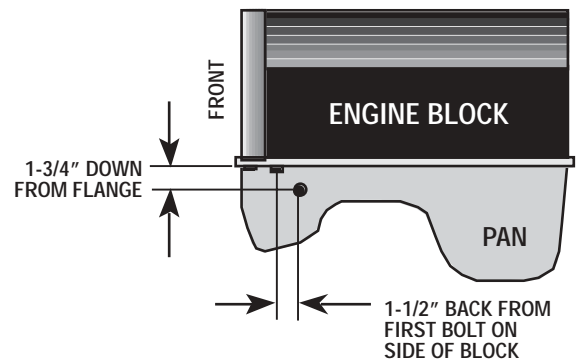


Fig. 2-a

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.**

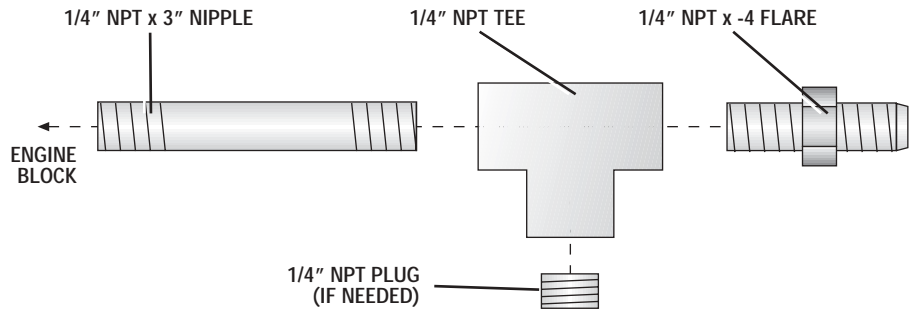


Fig. 3-a

4. CRANK/WATER PUMP PULLEY MOUNTING

IMPORTANT: Check the crank pulley and supercharger alignment after installation. If a Ford Motorsport balancer and spacer are used, the Motorsport spacer **MUST** be machined down to .615" thick (in most cases).

- 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 of 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 gauge/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.

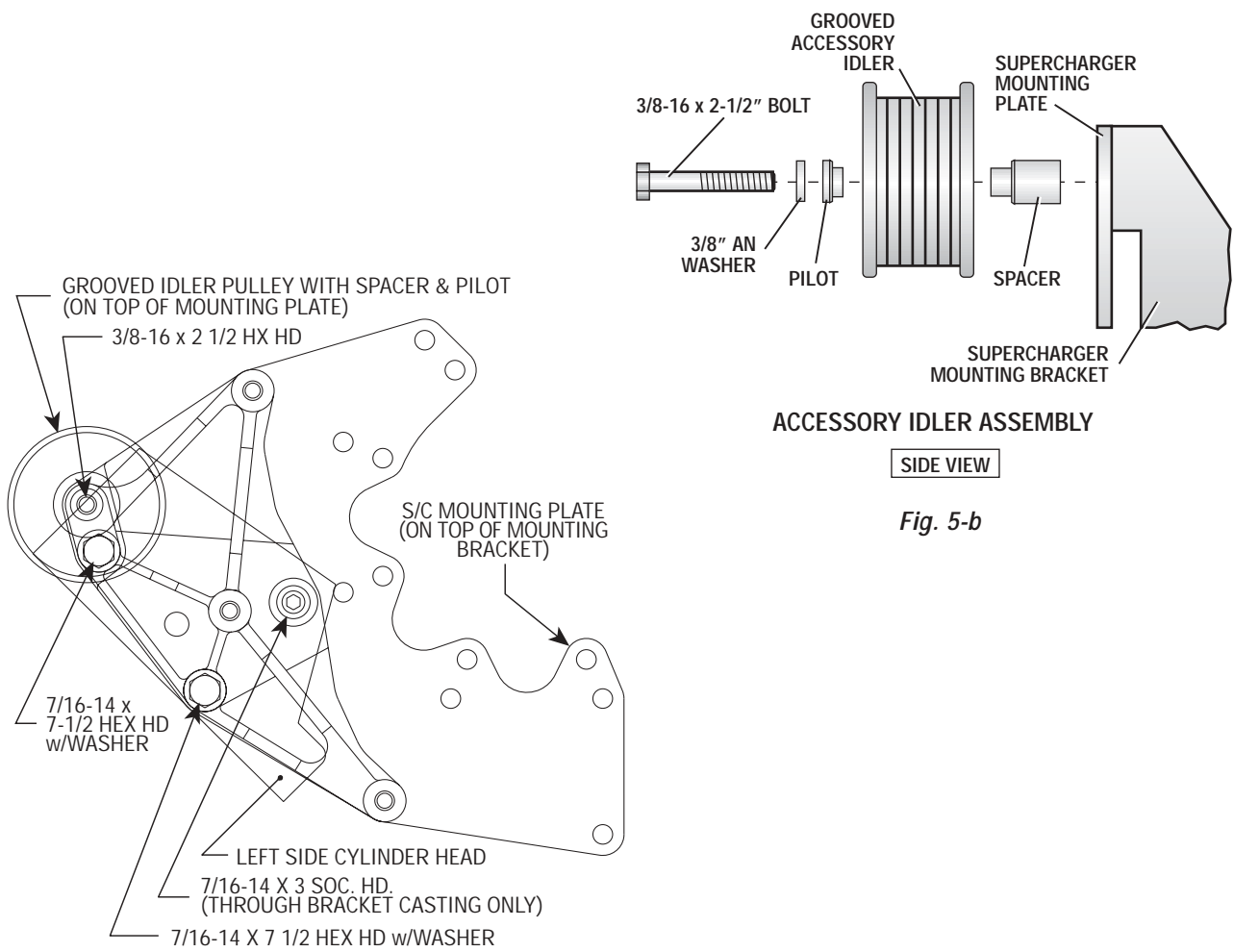


Fig. 5-a

Fig. 5-b

6. SUPERCHARGER MOUNTING

- A. Place the oil drain hose onto the supercharger drain fitting and secure with a hose clamp. Arrange the clamp screw housing so it will not interfere with the mounting plate when installed.
- 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.

WARNING: 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.

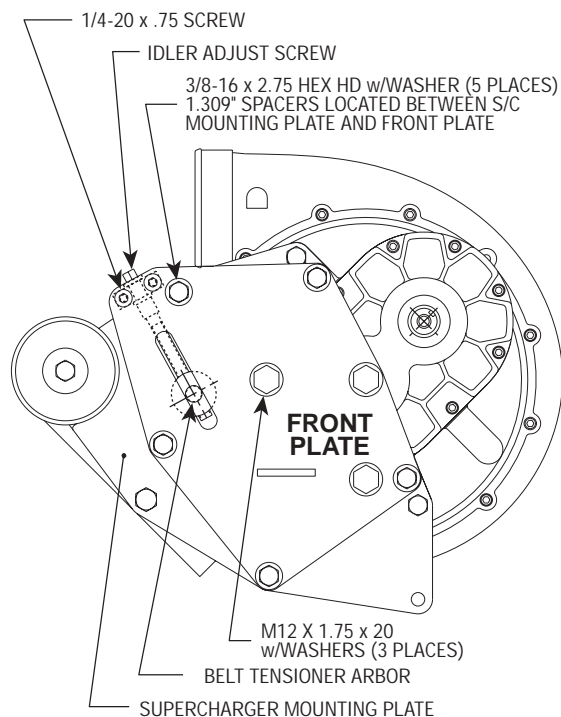


Fig. 6-b

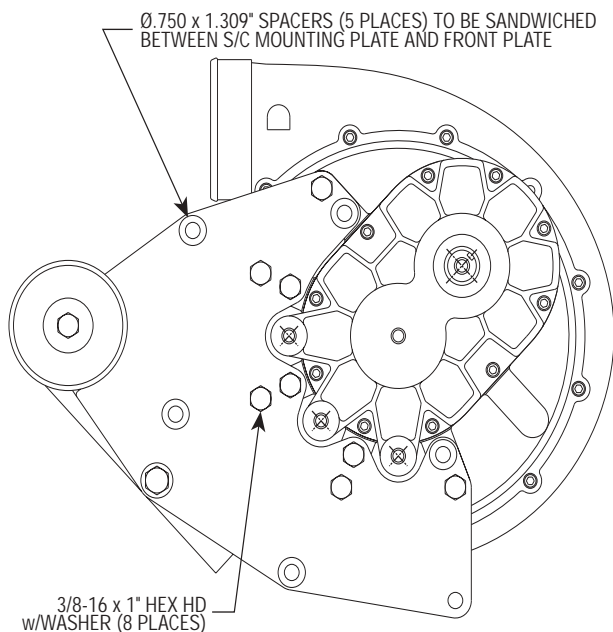


Fig. 6-a

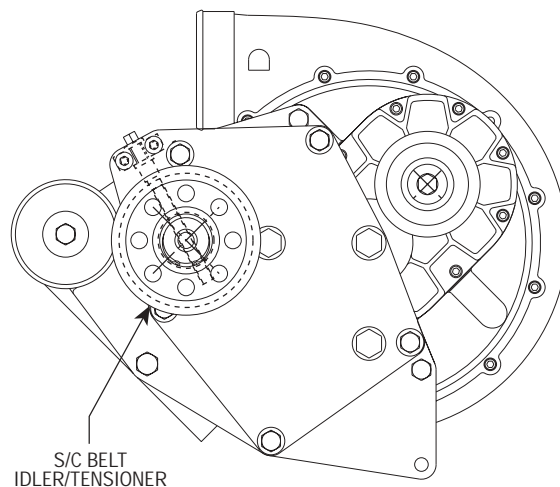


Fig. 6-c

6. SUPERCHARGER MOUNTING, Cont'd.

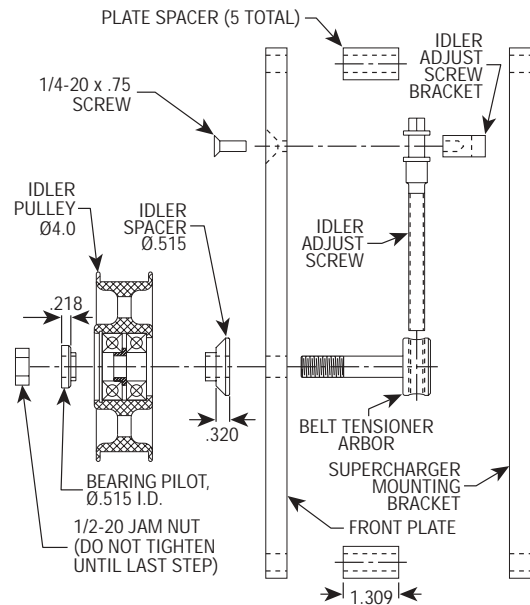


Fig. 6-d

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 the 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 the alternator.

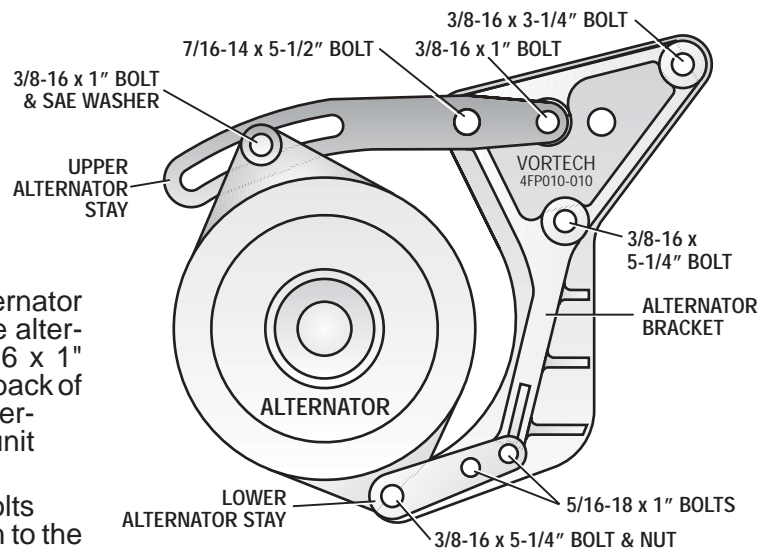


Fig. 7-a

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. Before installing the supercharger pulley onto the supercharger, 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 approximately 1/4 of a turn by hand. Adjust belt tension as needed. Do not over tension the belt.
- E. Tighten the 1/2-20 jam nut on the belt tensioner arbor.

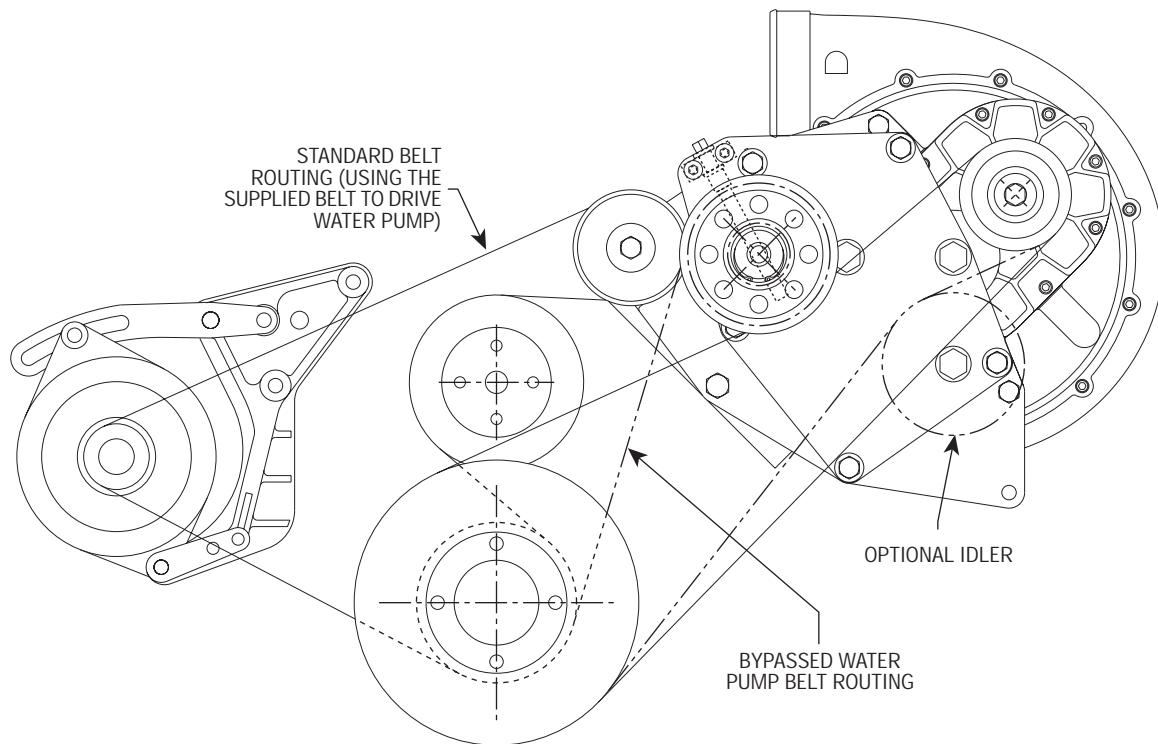


Fig. 8-a

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 nearer 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.

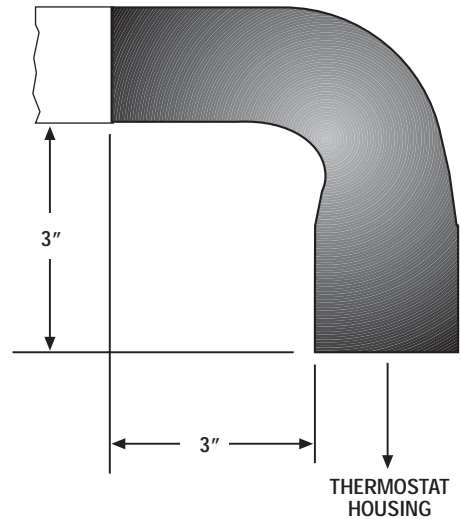


Fig. 9-a

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

10. 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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