

# **ALL AMERICAN BILLET**

## **Front Drive System - Small Block Ford Installation Instructions**

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**Small Block Ford  
with AC & PS**

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All American Billet Store  
(800) 764-0926  
[www.allamericanbilletstore.com](http://www.allamericanbilletstore.com)

## **Items needed for install**

Jack  
Jack stands  
Wheel chock  
Drain Pan  
Gasket scraper/Scotchbrite  
Brake cleaner  
Flat head and phillips screwdrivers  
Blue Loctite  
Ultra Black Silicone  
Thread Sealant  
Allen Wrenches - Metric and Standard  
Open end wrenches - Metric and Standard  
Sockets - Metric and Standard  
Ratchet - 3/8" drive and 1/2" drive  
Hammer  
Oil Pan Gasket  
Damper Removal Tool  
5/16-18 Thread Chaser

## **Items needed after setup is mocked up onto engine**

(lengths and sizes to be determined upon install in you vehicle)

10 gauge black wire  
4 gauge or larger red wire/cable  
A/C Lines (if equipped)  
Power Steering Lines (if equipped)  
Power Steering Fluid (if equipped)  
Coolant  
Electric Fans (you will not be able to retain the factory engine driven clutch fan with this setup)

## **Notes before installation**

**This Front Drive System is designed to work with a damper with the following dimension. If your engine is not equipped with this damper, you will need to change yours. (not included in this kit)**

**4-hole damper - 3.950 Length**

**Diameter no larger than 6.400"**

**As a note before installation. All surfaces of the components in your new All American Billet Front Drive System are delicate. Please use extra caution while handling, unpacking and installing new components so you do not damage the finish. It is best to have another person help with the installation to ensure the brackets, spacers or other components are well supported and easily installed.**

- 1. Before you disassemble anything on the vehicle, take good pictures of the existing belt drive setup on your vehicle from a few angles. This is for reference purposes and to see the before and after improvements you have made.**
- 2. Disconnect battery and remove it entirely as you will be disconnecting the lead from the back of the alternator later.**
- 3. Drain engine oil, power steering fluid and engine coolant.**
- 4. Remove entire existing belt drive setup from your engine including crank pulley, crankshaft damper, alternator, AC compressor (if equipped), power steering pump (if equipped), water pump, oil pan, timing cover and all brackets.**

**5. Clean entire timing cover and oil pan gasket mating surfaces with gasket scraper/Scotchbrite and brake cleaner to ensure the new gasket will seal properly. Use a thread chaser in all water pump and timing cover holes. This is also a great time to clean up the front of the engine and paint what needs to be painted. More of the engine is going to be visible with our belt drive setup and we want your vehicle looking its best. At this time also use a thread chaser to clean the threads of all the timing cover and water pump retaining bolts.**

**Remove your new timing cover from its box. You will notice that this timing cover has provisions for a timing pointer (reuses existing or one will need to be purchased), mechanical fuel pump and the oil dipstick. Depending on your set-up you may or may not be using these options. At this time determine which of the options you will not be using and cap them with the supplied block offs.**

**Dipstick - Using a small flat punch drive both small caps into the timing cover bosses securely with a small amount of thread sealant**

**Fuel Pump - Install (qty 2) 3/8-16 x 1" bolts through block off plate and gasket. Apply some gasket sealant to the gasket and install onto timing cover.**

**Install crankshaft seal into timing cover using a hammer and seal driver, large socket, oil filter wrench or section of pipe. Be sure to use something large enough to distribute the force evenly around the metal part of the seal. Drive seal in until it sits flush to the timing cover.**

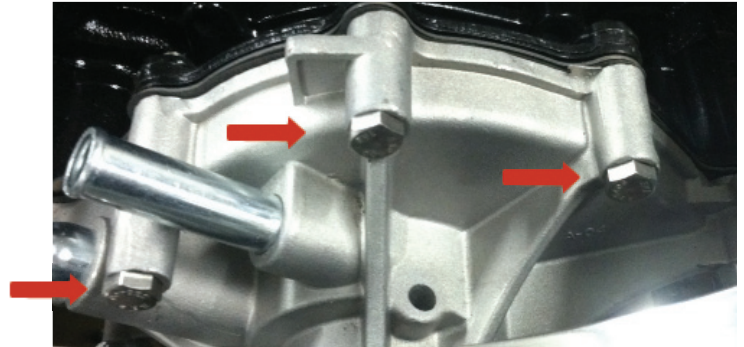
**Next, install the timing cover. You will be reusing the bolts from your factory cover. Apply some gasket sealant to both sides of the timing cover gasket surface. Now install the 2 top bolts in the timing cover that are behind the top of the water pump mating surface first, then the 4 bolts on the lower corners of the cover.**

**Using a new gasket with some gasket sealant, install the oil pan and gasket. Tighten all hardware down fully.**

**Install harmonic damper. Be sure that the one you are using has the same specifications listed in these instructions. Failure to do so will cause belt misalignment.**

**6. Using a 5/16" allen wrench, install the crank pulley using (4) 3/8-16 x 1" SHCS and 3/8" washers.**

**7. Mount the water pump and gasket by using the supplied (2) 5/16-18 x 2" and (1) 5-16-18 x 3" bolts through the two top water pump mounting holes to temporarily hold the water pump in place. Finger tighten only.**



**7a. Using a 1/4" allen wrench, mount the main bracket using the supplied .75" spacer and the 5/16-18 x 6.25" bolt through the bottom drivers side of the bracket and water pump. Tighten just enough to hold in place.**

**7b. Use the 1.95" spacer and 5/16-18 x 6.25" bolt through the bottom passengers side of the bracket and water pump. Tighten just enough to hold in place.**

**8. Install the alternator bracket (stepped bracket), 1.3" spacer and 5/16-18 x 6.25" bolt through the drivers side main bracket and top drivers side water pump mounting location. Make sure the threaded hole on the elongated bracket is facing forward. Tighten just enough to hold in place.**



9. Install the rear AC bracket, the 1.5" spacer and 5/16-18 x 6.25" bolt through the passengers side main bracket and top passengers side water pump mounting location. Tighten just enough to hold in place.

\*if not equipped with AC, install the 1.95" spacer and 5/16-18 x 6.25" bolt through the passengers side main bracket and top passengers side water pump mounting location. Tighten just enough to hold in place.



10. Using a 5mm allen wrench, install the A/C Compressor on the top passenger side of the main bracket into the threaded boss using the M8 x 1.25 x 30 button head bolt with a dab of blue Loctite on the threads with M8 washer in the top mounting location. The ports on the compressor body should face up. Using a 6mm allen wrench and the M8 x 1.25 x 20mm socket head bolt mount the bottom AC and using a 1/4" allen wrench mount the rear AC to the stepped bracket using a 5/16-24 x 1" bolt and M8 washer. "You may need to remove slotted steel spacer in bottom rear ac mount with pliers."

11. Using a 5mm" allen wrench, install the Alternator top mount location using the M8 x 1.25 x 30 button head bolt and M8 washer into the threaded hole in the housing. Using a 7/32" allen wrench on the 3/8-16 x 3" flat head bolt, install the alternator bottom mount thru the pass thru hole in the housing. This bolt will screw into the elongated bracket.

12. **NOW TIGHTEN ALL MAIN BRACKET/WATER PUMP, ALTERNATOR AND A/C BOLTS**

4 - Main Bracket / Water Pump bolts  
3 - A/C bolts  
2 - Alternator bolts

13. Using a 5mm allen wrench, install the type II power steering pump with (2) M8 x 1.25 x 30 button head bolts and M8 washers. The small fitting (-6) should be facing upwards



**14. Using a 9/16" wrench, install the tensioner using the 3/8-16 x 2-1/2" hex head bolt.**

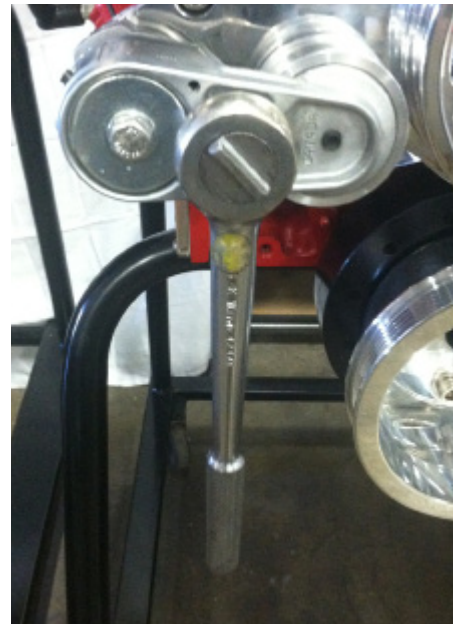
**15. Install pulleys (Note: start all bolts before tightening)**

**Water pump pulley using a 3/16" allen wrench on the (4) 5/16-24 x 3/4" flat head bolts.**

**Power steering pulley (if equipped) using a 3/16" allen wrench on the (4) 5/16-24 x 1/2" flat head bolts.**

**AC Cover (if equipped) using a 5/32" allen wrench on the 1/4-20 x .75" button head bolts.**

**16. Using a 1/2" drive ratchet to turn the tensioner clockwise to relieve the tension, install the serpentine belt.**



**17. Using a 1/8" allen wrench, install the tensioner cover using the (2) 10-32 x .5" FHCS.**



18. Install the A/C Manifold using a 6mm allen wrench on (2) M8 x 1.25 x 30mm SHCS. Be careful and make sure the o-rings are well seated. Inspect the A/C fittings, be sure the smaller diameter fitting is towards the rear of the vehicle.

19. The mock up process is now complete. You will now need to determine a proper place to install your power steering reservoir. Keep in mind that it will need to be located somewhere higher than the power steering pump and upright for proper operation. The mounting bracket for the reservoir uses (2) 10-32x1/4inch set screws to clamp onto the reservoir. The reservoir can be slid up or down in the bracket to best suit your mounting location. It is designed to work best with the set screws clamping into one of the grooves machined into the reservoir cylinder surface. Make sure to put a dab of blue Loctite on the set screws before final installation. **DO NOT OVER TIGHTEN THE SET SCREWS.** Doing so will damage the mounting bracket. The set screws just need to be snug enough to secure the reservoir. The Loctite will do the work of keeping the set screws from backing out. Once you have your location picked out, you can now plan out your power steering hoses and their routing.

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**REFERENCE THE DIAGRAM INCLUDED TO ENSURE PROPER ROUTING.**

**\*\*\*SYSTEM NOT DESIGNED FOR HYDROBOOST\*\*\***

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**20a. The smaller of the two fittings on the power steering pump is -6AN. This is your pressure supply to the rack/steering gear. THIS LINE NEEDS TO BE HIGH PRESSURE RATED (1000+PSI). They generally need to be assembled by a shop that specializes in high pressure lines and hydraulic hoses. Do your research to find one in your area. The easiest way to get proper measurements and angles for this line is to use an old coat hanger or mechanics wire to mimic the angle of the fittings needed off the pump and rack/steering gear for proper routing. After you have done that, take your wire/coat hanger and some pictures of your setup to your local hose shop. Be sure to also include the fitting information for your rack/steering gear setup where this pressure hose will be routed to and have them assemble one for you.**

**20b. The larger fitting on the power steering pump is a -10AN. This is for a low pressure fluid supply line from the reservoir. Using the coat hanger/mechanics wire method again, plan out your routing for the line from the pump to the bottom of the reservoir. MAKE SURE TO ROUTE THIS LINE TO THE PORT ON THE RESERVOIR WITHOUT THE DIVERTER. Not doing so will result in cavitation of the pump and possible power steering component damage.**

**20c. Both ports on the bottom of the power steering reservoir are tapped 3/8" NPT thread. Whatever fittings you determine are best for you system routing and function will need this thread pitch. Make sure to apply some thread sealant to the threads of your fittings before installing them into the reservoir.**

**20d. The other port on the bottom of the power steering reservoir is for fluid return from the rack/steering gear. This one will have a diverter installed on the inside of the reservoir to ensure proper function. Use the old coat hanger/mechanics wire to find the routing and angles for this line coming from your rack/steering gear.**

**20e. Now that all of your lines are ran, double check to make sure all of your connections are tight on all ends of your lines. At this point you can now add power steering fluid rated for standard applications. The proper level will vary depending on your setup, but a good starting point is fill the fluid up to the second highest groove machined in the reservoir body. DO NOT RUN THE VEHICLE AT THIS POINT. Visually check for leaks at the reservoir and along your lines. Place a shop rag over the top of the closed power steering reservoir at this point. \*AN IMPORTANT NOTE -The vent in the lid can be known to leak some fluid during the first start up and bleeding process. Be aware of this and take proper precautions to prevent power steering fluid getting on any painted surfaces or other components.**

**21. Next, you will need to extend your alternator wire going from the LARGE STUD on the back of the alternator to the factory location. (battery, fuse block, solenoid etc). Be sure to use 4 gauge or larger wire/cable to do this with terminals properly crimped on both ends. The maximum output of this alternator is 140 amps. It will require larger diameter wiring than factory. Take this into consideration while picking your wire size as well as the distance it will be running. Longer distances from the alternator will require larger sized wire/cable to ensure that your battery will be properly charged and not cause a fire.**

**22. Grounding of the alternator is also required. This can be done with 10 gauge black wire and proper terminals on both ends. It can be grounded to the engine, frame or to the negative battery post. Determine a suitable clean location on your vehicle near the alternator. Attach one end to the SMALL STUD on the top of the alternator and the other to your grounding location you have picked out. Make sure that the location you have chosen is clean and free of paints or coatings. Tighten both ends properly.**

**23. Now you will want to fill your cooling system with the proper type and level of coolant. DO NOT RUN THE VEHICLE. Check for leaks and address any issues if any.**

**24. Next you will want to lift the front of the vehicle high enough so that the front wheels are completely off the ground. Make sure it is properly supported on jack stands and the wheels are chocked/parking brake is set.**

## **Note:**

**(If you are connecting the A/C compressor) Make sure it is connected to your system properly and is charged by a qualified technician to the proper level with R134 refrigerant. The new lines will need to be made by a shop that specializes in high pressure lines. You can use the same method to determine length and angles that was explained for the power steering lines or drive the vehicle to a shop after installation is complete. Make sure not to connect the black wire coming from the A/C compressor until you are ready to run the system. The black wire is for positive (+) feed from engagement from your vehicles system. Running the A/C compressor without lines will result in internal damage to the compressor**

**25. You are now ready to start your vehicle. DO NOT TURN THE STEERING WHEEL AT THIS POINT. Visually check system for leaks or issues with the vehicle running. Address any issues or leaks if any before moving forward. The power steering pump will be making a groaning/whining noise at this point. This is normal. Check to make sure your alternator is charging. You can do this with a multimeter at the terminals on the battery. Voltages should be somewhere between 12.5-13.5 at idle. Allow the vehicle to get to operating temperature then shut it off. Allow it to cool, then check your coolant and power steering fluid levels. Top off if necessary.**

**26. Now you will perform the power steering bleeding process. THIS IS JUST AN GENERALIZED PROCESS. Be sure to familiarize yourself with the process designed to your specific steering setup on your vehicle before starting to address any other specifically designed procedures for your rack/steering gear.**

**26a. Start the vehicle and let the idle settle. SLOWLY turn the steering wheel from lock to lock then back to center ONCE. It will be slightly difficult and jumpy at first. This is normal. Once you have completed this, shut off the vehicle and top off your power steering fluid. Check for leaks at all hose connections.**

**26b. Next, you will start the vehicle again and allow the idle to settle. SLOWLY turn the steering wheel from lock to lock several times. DO NOT HOLD THE STEERING WHEEL AT THE LOCKS. You will notice that the pump will start to run quieter and steering effort will decrease. Once you have done that, shut off the vehicle and check your power steering fluid level. It will have dropped less but still needs to be topped off. Inspect for leaks at all connections.**

**26c. You can now remove the jack stands and place the vehicle back on the ground. Start the vehicle and SLOWLY turn the steering wheel from lock to lock a few times. After that, shut off the vehicle and check your power steering fluid level. Visually inspect the entire Front Drive setup for leaks.**

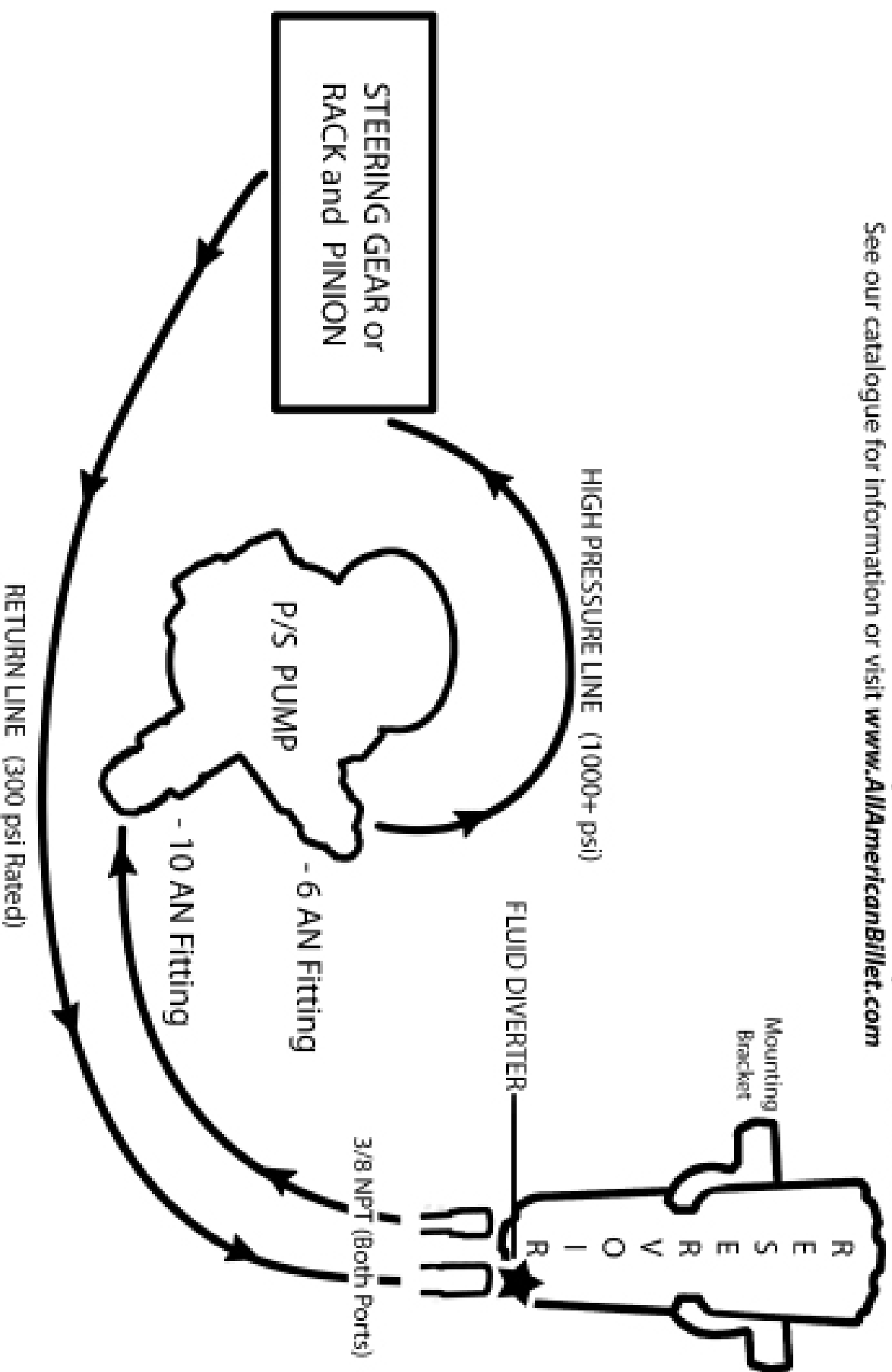
**27. Check ALL fasteners on the Front Drive System. Be sure all bolts and hose connections are tight.**

**28. Test drive the vehicle. Avoid high RPM and rapid steering movements at this point for the first few drives. You may need to repeat the bleeding processes more times and possibly allow the vehicle to sit overnight between attempts to allow the power steering system to fully bleed itself of any air. The bleeding process is complete once you have full, smooth steering effort from lock to lock and there is no noise present from the power steering pump**

**29. It is now time to enjoy and show off your new All American Billet Front Drive System. It is recommended to check all connections and fasteners after the first 100 miles. Making sure nothing was missed or has come loose. Any other questions or concerns you may have, feel free to give us a call. We will be more than happy to help you out with your installation. Thank you!**

# POWER STEERING RESERVOIR DIAGRAM

ALL AMERICAN BILLET now offers power steering hose kits, fittings and accessories.  
See our catalogue for information or visit [www.AllAmericanBillet.com](http://www.AllAmericanBillet.com)



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# Common Issues & Solutions

- P/S fluid shooting from reservoir
  - Lines are incorrectly routed (on reservoir/pump/box or rack)
  - Using on a hydroboost setup (system isn't designed for hydroboost)
  - Pressure is too high for steering box/rack (requires flow control valve p/n -131199)
- P/S pump is making noise (whining/grinding/howling)
  - Lines are incorrectly routed (on reservoir/pump/box or rack)
  - Reservoir lower cap is missing plastic "T" fitting (on older style lower cap)
  - Fluid level is not high enough (level should be at top groove in reservoir)
  - Reservoir is not mounted high enough above P/S pump (at least 4" above pump)
  - Lines are collapsing under suction/pressure (incorrect rating of hose used in system)
  - Incorrect fluid being used (Standard G.M. OEM rated P/S fluid is needed)
  - Hole or leak in system
  - System was started or ran without fluid (NO LONGER WARRANTIED)
  - (rarely) Steering box or rack is bad
  - (rarely) P/S pump is defective
  - (rarely) Vent in reservoir lid is plugged/blocked
- Water pump will not fit
  - Customer not using factory style timing cover
    - LS – setup will not fit VVT engines
    - SBF – Must use timing cover and water pump included in kit
    - Hemi – Must have car style front timing cover
- P/S pulley isn't in alignment with other components
  - Flange needs to be pressed on further or pulled out to line up)
- Crank pulley doesn't fit/doesn't sit flush on balancer
  - Customer isn't using factory style balancer/balancer bolt
- Check engine light is on after install
  - Tuning is required for computer controlled engines



- Water pump will not fit
- A/C clutch won't engage/disengage
  - A/C pulley cover bolts too tight
  - Belt isn't on/aligned properly
  - A/C clutch wire isn't connected to vehicle properly (varies depending on vehicle setup)
  - A/C system doesn't have proper amount of refrigerant
  - A/C hose routing incorrect (#8 fitting in rear position, #10 fitting in front on manifold)
  - (rarely) A/C compressor is bad
- Belt tension is loose
  - Tensioner bolt is too tight
  - A/C compressor upside down
  - Belt routing incorrect
  - Incorrect belt (verify part number to setup)

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## IMPORTANT

**After installation, do not start the engine without proper coolant and power steering fluid levels. Bleed the power steering system before driving vehicle.**

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## WARNING

**This front drive system is not designed for racing, to increase horsepower or for any other misuse. All American Billet will not be responsible for damage caused by any of these events or improper installation.**

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[www.allamericanbilletstore.com](http://www.allamericanbilletstore.com)*

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