

**ALL AMERICAN
BILLET**



**Front Drive System - HEMI 6.1
Installation Instructions**



HEMI 6.1 with AC & with PS

All American Billet Store
(800) 764-0926
www.allamericanbilletstore.com

Important Note:

Read the instructions entirely before starting the installation of your All American Billet Front Drive System. The removal and installation of the crank pulley/damper requires special tools.

Items needed for installation

Harmonic Damper Removal and Installation Special Tools #8512-A, #8513A Insert and #1023 Three Jaw Puller.

Torque wrench

Jack

Jack Stands

Wheel Chocks

Drain Pan

Gasket Scraper

Brake Cleaner

Flat Head and Phillips Screwdrivers

Blue Loctite

Anti-Seize

Allen Wrenches - Metric and Standard

Open-End wrenches - Metric and Standard

Sockets - Metric and Standard

Ratchet - 3/8" Drive and 1/2" Drive

3/8" breaker bar

Multi-meter

Impact Wrench

Channel Lock pliers

Items needed after setup is mocked up onto engine

(Lengths and sizes to be determined upon install in your vehicle)

10 gauge Black Wire

4 gauge or larger Red Wire/Cable

A/C Lines

Power Steering Lines

Power Steering Fluid

Coolant

Electric Fans (you will not be able to retain the factory engine driven clutch fan with this setup)

Notes before installation

Our Front Drive System is designed to work with the car style timing cover. It will not work if your engine originally had truck style front accessories.

This kit does not have every possible component to complete installation. Power steering and A/C lines will have to be purchased separately from this kit. This is due to the fact of that we cannot include every possible length, size and fitting for everything our setup is installed on.

This kit is not designed to work with a hydro boost brake system.

The power steering pump included in this kit is 1200psi. Make sure that your steering setup you are running on your vehicle can handle that amount of pressure. The pump's pressure can be reduced to 850psi by simply installing a new valve in the pressure fitting of the pump. (Sold separately)

Custom ECM tuning is required to install this Front Drive System and the engine to run properly. This is the responsibility of the customer.

This Front Drive System is design to work with factory engines. Any modifications to the engine itself (crankshaft, heads, etc.) may affect the fitment of the kit. Give us a call to verify fitment before installation.

All surfaces of the components in the All American Billet Front Drive System are delicate. Please use extra caution while handling, unpacking and installing new components to prevent damage to 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 any disassembly, 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 power steering fluid and engine coolant.

4. Remove entire existing belt drive setup from your engine including crank pulley, alternator, AC compressor (if equipped), power steering pump (if equipped), water pump and all brackets.

5. Remove crank pulley/damper with the recommended tools

6. Clean entire water pump gasket mating surface with gasket scraper and brake cleaner to ensure the new gasket will seal properly. 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.

7. Inspect crank snout for damage caused by removal of the factory damper. Clean any marks with fine grit emery cloth or steel wool.

8. Slide the new damper on crank snout as far as possible. Make sure it is square with the front cover of the engine.

9. Using the proper installation tool, fully seat the balancer onto the crankshaft snout.

10. Install the new balancer bolt and tighten to 129 ft.lbs.

IMPORTANT: Failure to use new crankshaft damper bolt and apply proper torque may result in the balancer not being fully installed onto the crank snout. Damage to the crank and balancer will happen if it comes loose due to improper torque.

11. Remove the trim ring on the front of the damper and discard the trim and hardware. Install crankshaft damper cover using (6) 8-32 x 5/8" BHCS screws and a 3/32" Allen wrench.

12. Install water pump provided with the kit using factory bolts. Do not install the bolts in the far right and bottom most holes in the water pump. These holes will be used later. Lube O-ring on the coolant pipe before installing into water pump body. It's a good idea to replace your thermostat and gasket at this time as well.

13. Install EGR Block off plate with gasket provided using (2) M8 x 1.25 x 25mm BHCS bolts with M8 washers with a 5mm Allen wrench.

14. Loosely install alternator "T" bracket to the passenger side of the timing cover using a M10 x 1.5 x 30mm SHCS and M10 washer.

15. Next, insert an M10 x 1.5 x 80mm SHCS thru the top hole of the alternator plate. Loosely install it with an 8mm Allen wrench into the alternator "T" bracket thru the open boss in the top of the timing cover on the passenger side of the engine.

16. The next step is to install an M8 x 1.25 x 120mm SHCS thru the hole just above the cutout in the alternator plate. This bolt requires a .240" spacer behind the plate. Loosely install the bolt with a 6mm Allen wrench.

17. Locate the .210 spacer, an M10 x 1.5 x 30mm SHCS. Hold the .210 spacer behind the bottom hole on plate. Loosely install the M10 bolt thru both pieces into the threaded boss in the timing cover.

18. Now we will be installing the alternator. Both of the mounting bolts used to mount the alternator to the plate require a .090" spacer between the alternator body and plate. First, install an M10 x 1.5 x 80mm SHCS into the top hole in the plate. Insert it through the plate, .090" spacer, through the larger pass through boss on the alternator and into the alternator "T" bracket.

Keeping the alternator carefully supported, loosely install using an 8mm Allen wrench. Next using an M8 x 1.25 x 30mm BHCS w/M8 washer and a 5mm Allen wrench, install it through the bottom hole in the plate and .090" spacer into the alternator body.

19. While holding the alternator up and towards the center of the engine first tighten the M10 bolt at the top of the "T" bracket. Next, tighten the M10 bolt going through the timing cover into the back of the "T" bracket. All of the other bolts in the passenger side main plate can be fully tightened.

20. Install the idler pulley onto the passenger side boss on the water pump with a M10 x 1.5 x 30mm BHCS and the idler cover. Be sure that the idler is oriented with the bearing exposed outward. Hold the idler cover and idler centered while fully tightening the bolt.

21. The next step is prepping the A/C compressor for installation. Using channel lock pliers, remove the insert that is located in the bottom rear mount of the compressor.

22. Locate the A/C clutch cover and (3) 1/4-20 x 3/4" BHCS bolts. Install the bolts through the cover and into the clutch of the compressor with a small amount of blue Loctite on the threads with a 5/32" Allen wrench. These bolts do not need to be very tight. Let the Loctite do the work. Overtightening will damage the compressor and it will not be warrantied. Set the A/C compressor aside and we will return to it later.

23. Installation of the driver's side main plate is next. Locate (2) M8 x 1.25 x 60mm SHCS and (2) .840 spacers. Holding the plate with the power steering pump mounting area upward, insert the bolts through the farthest left and farthest right countersunk holes. Place the .840 spacers onto the bolts on the rear of the plate. Now carefully hold the spacers and bolts into the plate and insert the bolts into the two remaining holes in the water pump. Install finger tight.

24. Locate (2) M8 x 1.25 x 110mm SHCS and the .950" and 1.150" spacers. Install one M8 bolt and the .950" spacer in the very bottom counter sunk hole in the driver's side plate. Install the other M8 bolt and 1.150" spacer in the counter-sunk hole above it. Tighten all bolts installed into the driver's side plate at this time with a 6mm Allen wrench.

25. The next step is to install the A/C compressor that you prepped earlier. Located (2) M8 x 1.25 x 30mm BHCS w/M8 washers. Install them through the lower two remaining holes in the driver's side plate and into the A/C compressor housing with the mounting block for the manifold facing upward. Tighten fully with a 5mm Allen wrench.

26. The lower A/C “L” bracket now needs to be installed. (2) M10 x 1.5 x 30mm SHCS bolts w/M10 washers will be used. First install one into the pass through hole in the “L” bracket and into the bottom of the timing cover finger tight. Next insert one M10 bolts through the bottom mount of the compressor and thread it into the “L” bracket. Both can now be fully tightened with an 8mm Allen wrench.

*****If you are hooking up the A/C system at this time, you can install the A/C manifold on top of the compressor. Remove the two 12mm bolts holding the cap onto the compressor. Verify that the two O-rings are in place in the bosses on the compressor. Locate (2) M8 x 1.25 x 30mm SHCS and the A/C manifold. Fully tighten onto the compressor with a 6mm Allen wrench. The location of the large (#10) and small (#8) fittings in the manifold is critical. The large fitting needs to be in the forward position and small towards the rear. Changing positions of these fittings will result in A/C system damage. The A/C clutch wire will need to be connected to your vehicle’s A/C system positive (+) signal wire.**

27. Next, install the water pump pulley using (4) 5/16-24 x 3/4” BHCS screws. Tighten fully with a 3/16” Allen wrench.

28. The power steering pump is next using (2) M8 x 1.25 x 30mm BHCS w/M8 washers. Holding the pump with the small (-6) fitting facing up, install them through the top of the driver’s side main plate and into the pump housing with a 5mm Allen wrench. Tighten them fully.

29. Install the power steering pump pulley using (4) 5/16-24 x 1/2” BHCS screws and tighten fully.

30. Now the serpentine belt and tensioner will be installed. The tensioner is mounted with a M10 x 1.5 x 50mm BHCS bolt w/M10 washer. Holding the tensioner and bolt with one hand, route the belt around the tensioner pulley with the ribs facing outward. Be careful not to kink or bend the belt. Make sure that the peg on the back of the tensioner engages into the proper boss on the water pump as you finger tighten the tensioner bolt and the tensioner fully mates to the water surface, not catching on the main plate. Tighten the tensioner bolt fully with a 6mm Allen wrench.

31. Now you can fully install the belt. Refer to the belt routing diagram included in these instructions. Route the belt by hand around all points except the power steering pulley. Holding the belt by the power steering pulley, use a breaker bar with a 3/8” drive end to rotate the tensioner clockwise. Slide the belt over the power steering pulley, verify that the belt is seated properly around all pulleys and release the tensioner.

32. Install the tensioner cover with (2) 10-32 x 1/2" FHCS and a 1/8" Allen wrench. Tighten fully.

33. 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 completely upright for proper operation. The mounting bracket for the reservoir uses (2) 10-32 x 1/4inch 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.

REFERENCE THE DIAGRAM INCLUDED TO ENSURE PROPER ROUTING.

34a. 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.

34b. 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.

34c. The ports on the bottom of the power steering reservoir are 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.

34d. 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 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.

34e. 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.

***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.**

35. 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.

36. Grounding of the alternator case 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.

37. 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.

38. 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.

(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 black wire coming from the A/C compressor is for positive (+) feed from engagement from your vehicles system. The compressor is pre-oiled, so no additional oil is needed.

39. 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 multi-meter at the terminals on the battery. Voltages should be somewhere between 12.5v-13.5v 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.

40a. Now you will perform the power steering bleeding process. THIS IS JUST A 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.

40b. 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.

40c. 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 you power steering fluid level. It will have dropped less but still needs to be topped off. Inspect for leaks at all connections.

40d. 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 you power steering fluid level. Visually inspect the entire Front Drive setup for leaks.

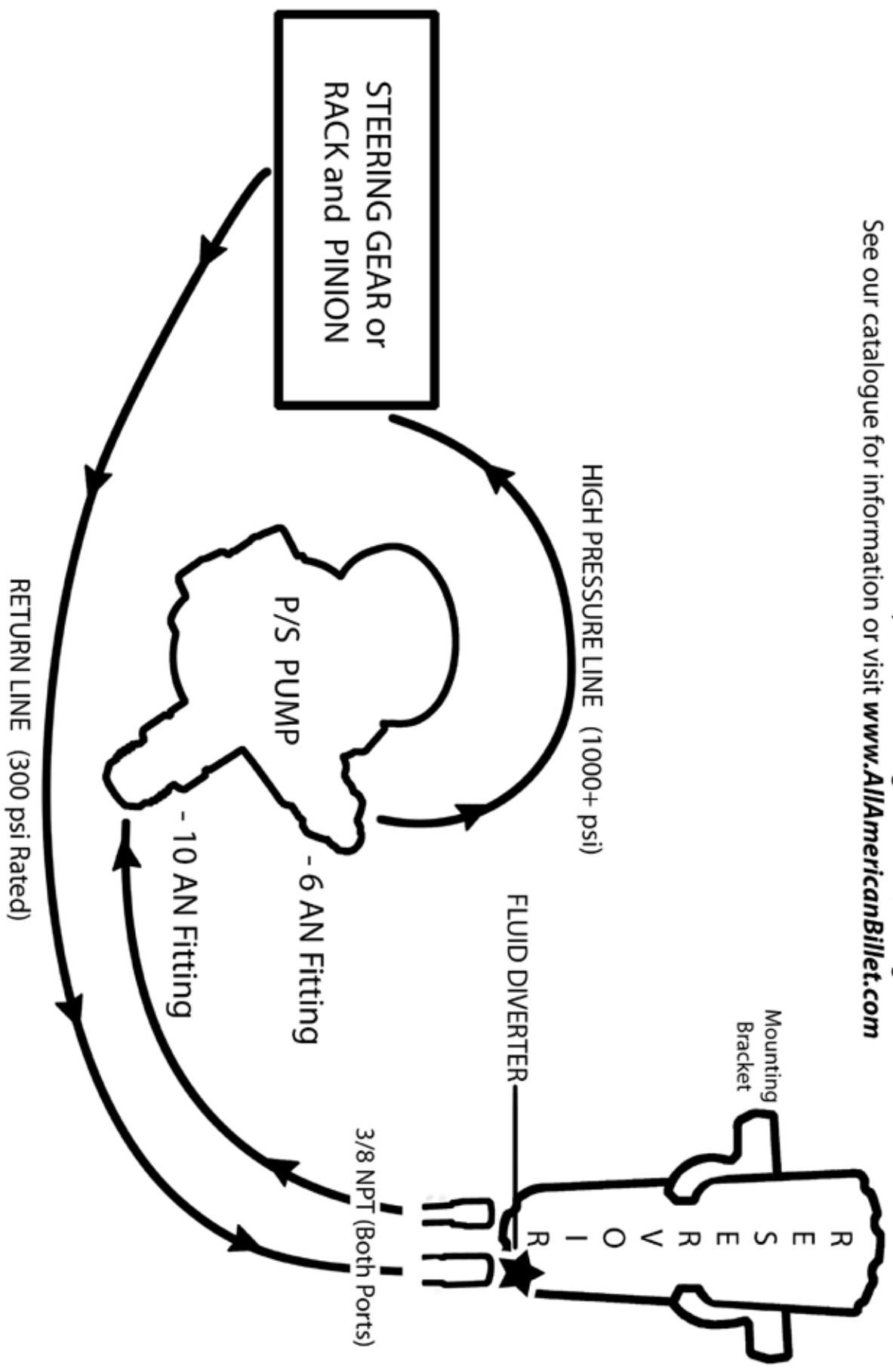
41. Check ALL fasteners on the Front Drive System. Be sure all bolts and hose connections are tight.

42. 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.

43. 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



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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)

IMPORTANT

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

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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