ALL AMERICAN BILLET

MADE IN THE U.S.A.

Front Drive System – 351 Cleveland
Installation Instructions

351 Cleveland with AC & with PS

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

Items needed for install

Jack
Jack stands
Wheel chock
Drain Pan
Gasket scraper
Brake cleaner
Flat head and Phillip's 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

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 (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)

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 power steering fluid and engine coolant.

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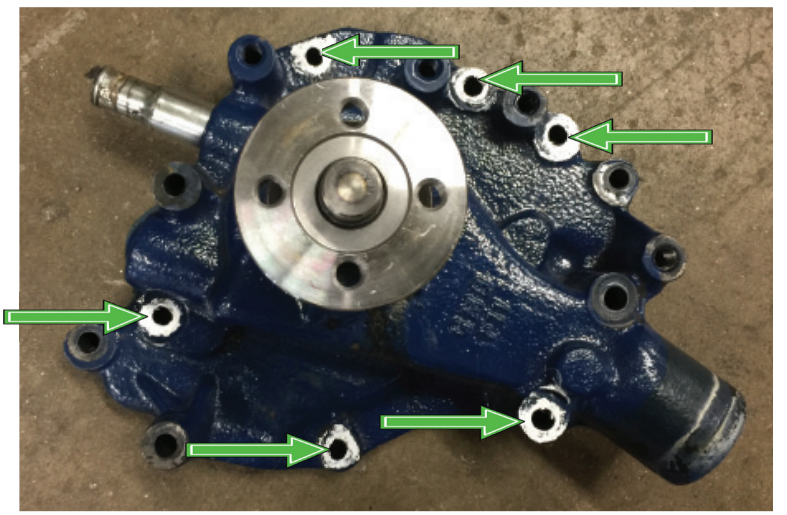
4. Remove entire existing belt drive setup from your engine including crank pulley, alternator, AC compressor (if equipped), power steering pump (if equipped), water pump and all brackets. Pay extra attention to the bolt sizes and locations they came from on the water pump. You will be reusing 6 of the bolts to reinstall the new pump. (See picture below as to which bolts will be reused).

(You do not need to remove the water pump backing plate as this will also be reused.)



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5. Next, remove the oil dipstick and dipstick tube. This will need to be reshaped a little for clearance around the A/C compressor later in the install process.

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. Also, take advantage of this point to address any leaks behind the water pump backing plate or the crankshaft seal.

7. Install the new water pump that came with your new AAB Front Drive kit. Apply Ultra Black Silicone to both sides of the gasket surface before you install it. Tighten down the 6 reused bolts to factory specs with thread sealant on the threads.

8. Next, install the new crank pulley with the supplied (4) - 3/8-16 x 1inch SHCS bolts and 3/8 washers and blue Loctite.

9. Now, you will install the main drive plate with the (4) - 5/16-18 x 4inch SHCS bolts, spacers, and the elongated and offset brackets. It is easiest to place the plate on a table with the 4 bolts installed thru the holes the slide the appropriate spacers onto each bolt before installing it on the engine. Refer to the diagram to position all of your spacers properly. The passenger side upper bolt uses the longest spacer against the plate and the elongated bracket with the threaded hole to the outside and rear of the vehicle.

The driver's side upper bolt uses the second longest spacer against the plate and the offset bracket positioned so the threaded hole is on the outside and oriented more towards the rear of the vehicle. The driver's side lower bolt uses only the shortest spacer.

The passenger side lower bolt uses only the second shortest spacer. Be sure to apply blue Loctite to each bolt before inserting them into the engine. ONLY TIGHTEN THEM FINGER TIGHT at this point. It will ease the rest of the install and you will return to tighten them completely later.

10. Now, you will install the A/C compressor. Grab the M8 x 1.25 x 30mm BHCS bolt and M8 washer with a dab of blue Loctite on the threads and install it through the main bracket and into the "A" position hole in the A/C compressor **ONLY FINGER TIGHT.**

7. Install the new water pump that came with your new AAB Front Drive kit. Apply Ultra Black Silicone to both sides of the gasket surface before you install it. Tighten down the 6 reused bolts to factory specs with thread sealant on the threads.

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The driver's side upper bolt uses the second longest spacer against the plate and the offset bracket positioned so the threaded hole is on the outside and oriented more towards the rear of the vehicle. The driver's side lower bolt uses only the shortest spacer.

The passenger side lower bolt uses only the second shortest spacer. Be sure to apply blue Loctite to each bolt before inserting them into the engine. ONLY TIGHTEN THEM FINGER TIGHT at this point. It will ease the rest of the install and you will return to tighten them completely later.

10. Now, you will install the A/C compressor. Grab the M8 x 1.25 x 30mm BHCS bolt and M8 washer with a dab of blue Loctite on the threads and install it through the main bracket and into the "A" position hole in the A/C compressor **ONLY FINGER TIGHT.**

11. Locate the M8 x 1.25 x 20mm SHCS and apply some blue Loctite to the threads. Install that into the bottom of the front of the compressor thru the hole in the main plate. You can fully tighten this one.

12. Return to the bolt you installed in the "A" position on the top of the A/C compressor and tighten it fully.

13. Locate the 5/16-24 x 1 1/4inch SHCS and an M8 washer. Coat the first few threads with blue Loctite and install through the bottom rear hole of the A/C compressor and into the threaded hole of the elongated bracket. Tighten fully.**"You may need to remove slotted steel spacer in bottom rear ac mount with pliers."**

14. Now you will want to modify the oil dipstick tube. This will take a few "bend a little then test fit" steps. Carefully bend it little by little and test fit it after each adjustment. We found that if you bend the factory bracket on the tube that bolts to the cylinder head, it can still be used. Once again, carefully bend it and test fit after each adjustment to ensure you don't bend it too much. It will fit with minor adjustments.

15. Next, you will install the power steering pump. Locate (2) M8 x 1.25 x 30 bolts with M8 washers. Coat the first few threads with blue Loctite, install into the threaded holes on the pump so that the -6 AN fitting is facing up. Tighten fully.

16. The next step will be installing the alternator. Grab one M8 x 1.25 x 30 and an M8 washer, coat the first few threads with blue Loctite and install it FINGER TIGHT into the top of the alternator. Now locate the 3/8-16 x 6 Flat head SHCS bolt and coat the first few threads with blue Loctite. Push it thru the hole in the main plate and bottom hole in the alternator. You will have to hold the stepped bracket up to the back of the alternator and thread the bolt into it then tighten it fully. You can now tighten the top alternator bolt fully as well.

17. Up next is the tensioner to be installed. Locate the 3/8-16 x 2 1/2inch hex bolt and 3/8 washer. After putting a dab of blue Loctite on the threads, slide it through the round hole in the tensioner. Line up the two locating pins on the back of the tensioner with the holes in the main plate, and then fully tighten the hex bolt.

18. Next, you will go back to the (4) bolts you installed in the main plate in step 9 and tighten them fully. Do this is a crisscross pattern to ensure that the plate will be square with the rest of the engine.

19. Moving to our next step of installing the power steering pulley. Grab (4) 5/16-24 x 1/2inch BHCS bolts. Place a small amount of blue Loctite on the threads and install them through the power steering pulley into the mounting flange. Tighten them fully.

20. Now you will install the water pump pulley. Locate (4) 5/16-24 x 3/4inch BHCS bolts. After a little blue Loctite is placed on the threads, install them through the water pump pulley and into the mounting flange. These can now be tightened fully.

21. The next step is installing the serpentine belt. Refer to the picture to see how the belt is routed. You will need a 1/2" drive ratchet or breaker bar to preload the tensioner in this step. Loosely route the belt around all the pulleys except the alternator. Insert your 1/2" drive ratchet/breaker bar into the square boss in the front of the tensioner and pull upwards; rotating the tensioner downwards in a clockwise motion until it stops. While holding the tensioner there, reach over and place the belt over the alternator pulley. Double check to make sure that the belt is still properly routed on all of the other pulleys. Once you are sure it is on all the pulleys correctly, release the preload on the tensioner. The belt is now installed and at proper tension.

22. You can now install the tensioner pulley cover. Locate (2) 10-32 x 1/2inch flat head SHCS. Place a small amount of blue Loctite on the threads before inserting them through the cover and into the tensioner. Tighten them fully.

23. Next, install the A/C compressor clutch cover. Grab (3) 1/4-20 x 3/4 inch BHCS bolts, place a small amount of blue Loctite onto the threads and thread them into the A/C compressor clutch. These just need to be snug. The Loctite will keep them from backing out. DO NOT OVERTIGHTEN as you will damage the A/C clutch.

24. Install the A/C manifold using the (2) M8 x 1.25 x 25mm SHCS bolts. Make sure the two O-rings are in place on the compressor before installing the manifold. If you are NOT installing hoses and charging system at this time, place compressor manifold and hardware in a safe place and leave cover plate on compressor until A/C system installation and charging is complete. **Do not connect clutch wire or apply power to clutch wire without the hoses connected and system charged – serious damage will occur to compressor.**

25. 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.

SYSTEM NOT DESIGNED FOR HYDROBOOST

26a. 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.

26b. 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.

26c. 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.

26d. 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.

26e. 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.

27. 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.

28. 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.

29. 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.

30. 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 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.

31. 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, and then check your coolant and power steering fluid levels. Top off if necessary. starting to address any other specifically designed procedures for your rack/steering gear.

32. 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

32a. 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.

32b. 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.

32c. 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.

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

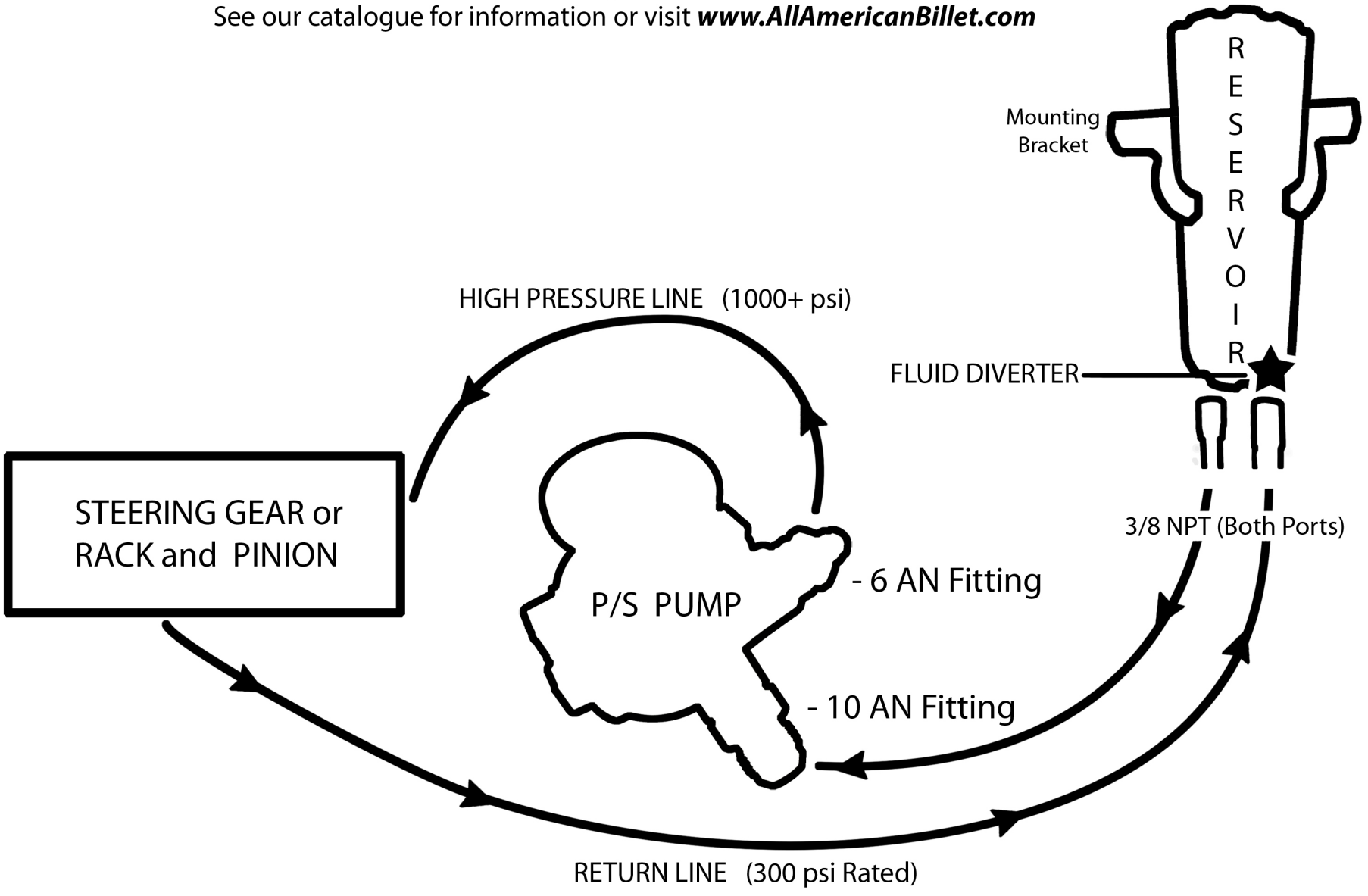
34. Test drive the vehicle. Avoid high RPM and rapid steering movements at this point for the first few drives. You may need to repeat the bleeding processes more times and possibly allow the vehicle to sit overnight between attempts to allow the power steering system to fully bleed itself of any air.

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.

35. 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***



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.

Check out our website for more of our products
www.allamericanbilletstore.com

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