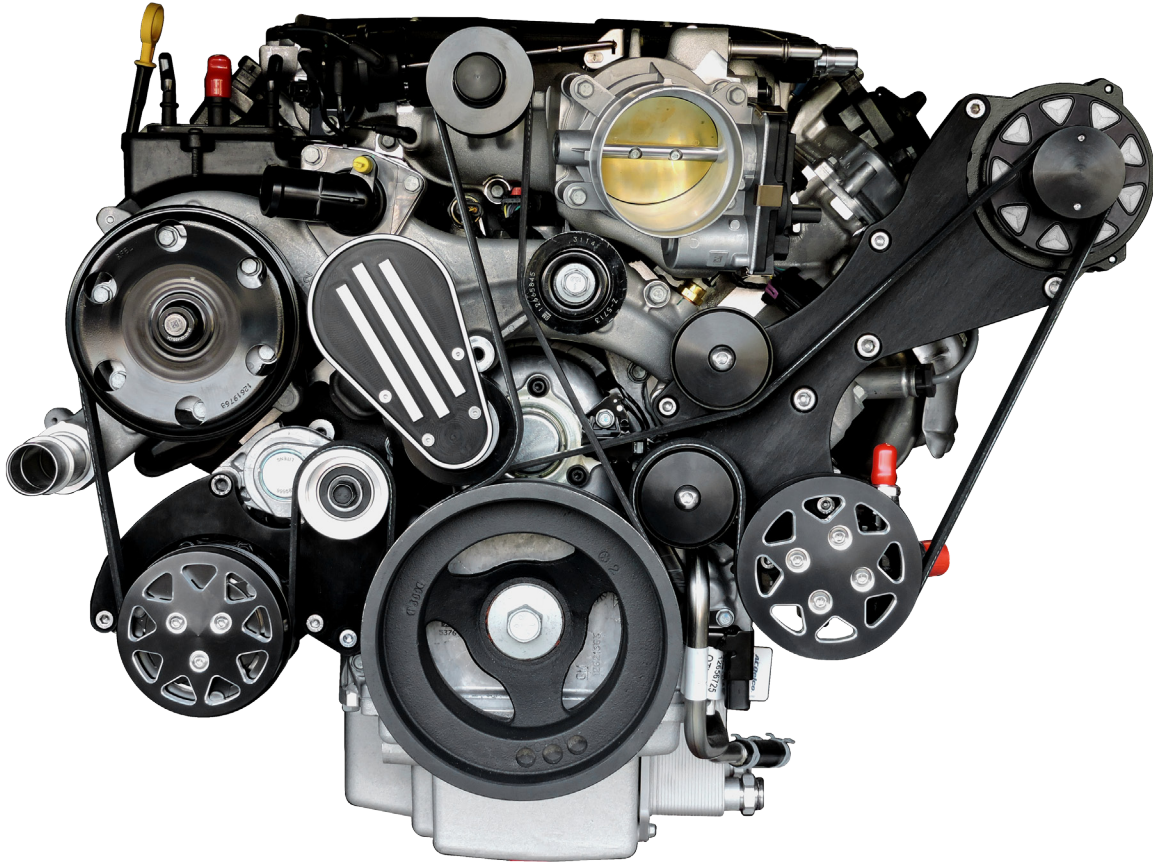


**ALL AMERICAN  
BILLET**



## **LT4 Chevy Instructions**



**LT4 with AC & with PS**

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**All American Billet  
1138 W Watkins St  
Phoenix, AZ 85027  
1-844-BILLET1 (844-245-5381)**

# **Important**

This instruction manual provides information on the installation of the Front Drive kit designed specifically for the engine platform. All information contained within are based on latest product information available at the time of this publication. Changes to this manual may be made at any time without notice. Contact All American Billet for any additional information regarding this kit and any revisions at 1-844-245-5381 8:30-4:00 M-F Arizona time

## **Please consider the following before proceeding:**

1. Proper installation of this Front Drive Kit requires a general automotive knowledge and experience. Please review through these instructions completely before attempting installation to determine if you should refer the job to a professional installer or technician. Feel free to contact All American Billet or your dealer for possible installers in your area.
2. This product was designed for use on an un-modified engine (OEM) engine. Use of any other aftermarket products may prevent proper installation of this Front Drive. Verify proper fitment of parts before installation. Contact All American Billet prior to install with any questions.
3. All American Billet is not responsible for any damages that may occur due to improper installation.

**Exclusions from warranty coverage considerations include, but not limited to:**

1. Neglect, abuse, lack of maintenance, abnormal operation or improper installation.
2. The combined use of this Front Drive System with other modifications that prevent proper installation.
3. Continued operation with an impaired vehicle or sub system.

### ***\*\*\*Note Before Installation***

This kit is designed to work with crate engine GM Part Number 19355404 equipped with a crankshaft damper/pulley with factory LT4 belt spacing and overall diameter (GM part number 12671006) as well as the factory CTS-V supercharger pulley diameter. Although the kit will work with aftermarket balancers/pulleys with the same dimensions, we cannot guarantee that the belt will be proper length and belt tension will be in an acceptable range due to the various diameters on the market.

This kit also requires the engine to have a factory CTS-V water pump housing (GM part number 12653751)

### **Items needed for installation**

Jack  
Jack Stands  
Wheel Chocks  
Drain Pan  
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  
Heat Gun  
Torque Wrench

### **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)

This page is the Driver's Side Main Bracket. Please reference this page to help you with installation.

**Lu, there is two PDF's in the LT4 instructions folder titled Driver and Passenger side Bolt and Spacer Diagram. It is a PDF version of a Solid-works print I created. Please crop out the borders and drawing info block on the lower right hand corner. Place them on these two pages when they are cropped please.**

This page is the Passenger Side Main Bracket. Please reference this page to help you with installation.

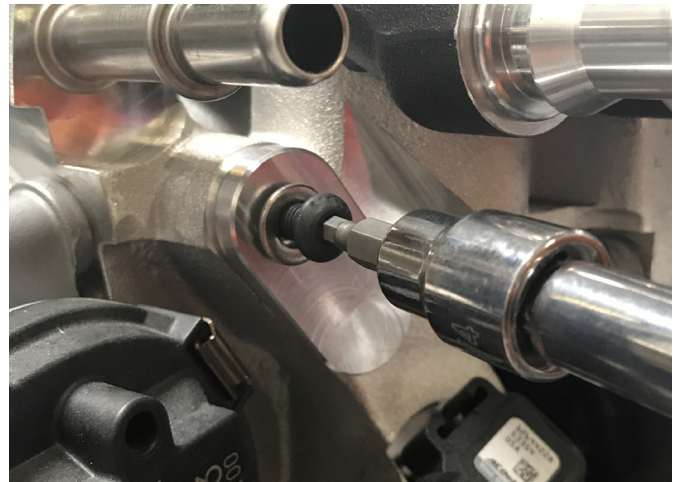
**Lu, there is two PDF's in the LT4 instructions folder titled Driver and Passenger side Bolt and Spacer Diagram. It is a PDF version of a Solid-works print I created. Please crop out the borders and drawing info block on the lower right hand corner. Place them on these two pages when they are cropped please.**

***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 getting started, 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.**

- Disconnect battery and remove positive terminal**
  
- Drain engine coolant.**
  
- Remove entire existing belt drive setup from your engine including alternator, AC compressor (if equipped), and all brackets.**
  
- . Clean all threaded bosses in both cylinder heads with a thread chaser. 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.**

**2. The first step is optional if you choose to remove the Evap Valve on the supercharger front housing. Using a 10mm, Remove the valve mounting bolt. Remove the o-ring from the Evap Valve and carefully place it on the Evap Block off Plate. Discard the valve and bolt. Carefully press the Evap Block off Plate into front housing and secure it with an M6 x 1.0 x 25mm BHCS and washer**



**3. Next step is to install the catch can plate. Secure the plate to the catch can with the supplied M6 x 1.0 x 25mm BHCS and M6 Nylock Nut using a 10mm wrench and 4mm allen wrench.**



**4. Using a 13mm, remove the connector mounting bracket on the driver's side cylinder head. This boss will be used as a mounting point in a later step. Remove the bracket from the connector.**

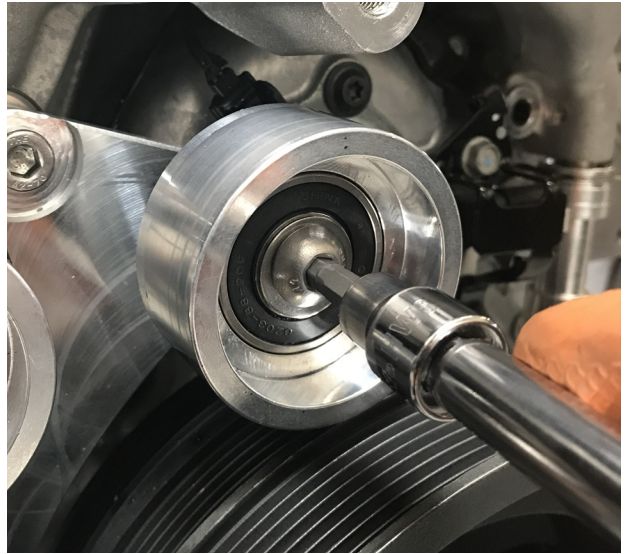


**5. To prepare for further steps, remove all (3) passenger side water pump mounting bolts. These bosses will be used in later steps.**

**6. Next step is installation of the passenger side main bracket. Install an M10 x 1.5 x 100mm in the left side and M10 x 1.5 x 90mm in the right side tensioner holes through the main bracket, through the 2.046" spacers and into the threaded bosses in the block. Next, install a M8 x 1.25 x 90mm through the lowest hole in the main bracket, through the 2.086" spacer, through the A/C Rear bracket with the offset side facing the rear and into threaded boss in the block. Lastly, install an M8 x 1.25 x 95mm through the highest hole in the main bracket, through the 0.250" spacer and into the lowest hole in the passenger side of the water pump. Leave all fasteners slightly loose. You will tighten them in a another step.**



**7. Next, install the small idler pulley using an M10 x 1.5 x 50mm BHCS and M10 washer. Install the bolt through the pulley, idler pulley spacer and into the threaded hole in the upper right hand side of the Passenger Main Bracket.**



**8. Installation of the A/C Compressor is next. Using an M8 x 1.25 x 20mm SHCS, install it through the main bracket and into the manifold side of the A/C Compressor. Leave slightly loose.**



**9. Using the bolt installed in the last step as a pivot, rotate the A/C compressor counter-clockwise to install an M8 x 1.25 x 20mm SHCS into the other front mount of the A/C Compressor. Now tighten both front mounting bolts fully.**



**10. Rotate the A/C rear bracket to align the the threaded hole with the rear mount on the compressor. Insert an M8 x 1.25 x 30mm SHCS w/ M8 washer through the rear mount and into the A/C rear bracket. Tighten fully.**

**11. While lifting upwards on the A/C Compressor, tighten all of the Passenger Side Mounting Bracket mounting bolts.**



**12. Installation of the Supercharger Tensioner mount is next. Install an M8 x 1.25 x 110mm SHCS into the top countersunk hole in the mount. In the other countersunk hole, insert an M8 x 1.25 x 90mm SHCS. Install the assembly into the two remaining open holes in the water pump. Tighten fully.**



**13. To prepare for further steps, remove the lowest water pump mounting bolt on the Driver's side.**



**14. Installation of the Driver's Side Main Bracket is done by installing an M8 x 1.25 x 95mm SHCS through the #1 hole in the plate, through the 1.314" spacer and into the open mounting hole in the water pump. Install the following bolts and spacers into the holes accordingly.**

**#2 - M8x1.25x95mm SHCS/2.711" spacer**

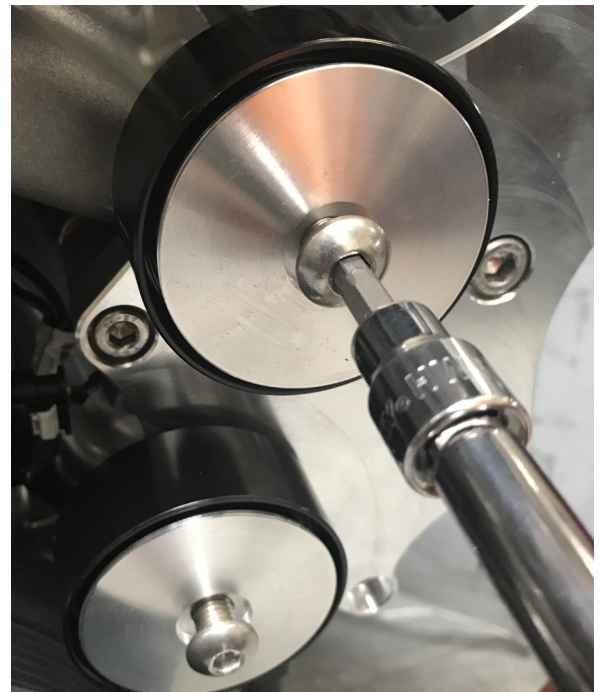
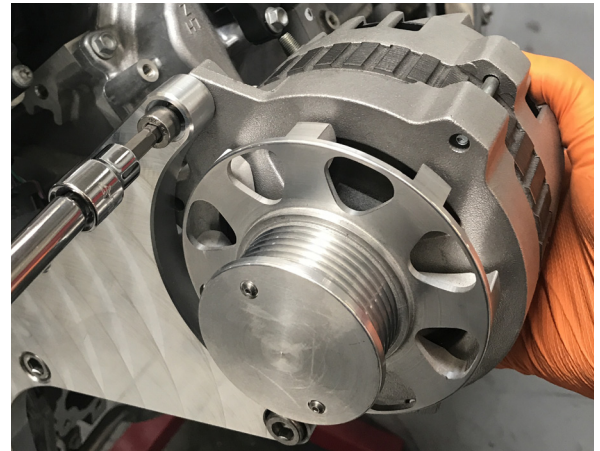
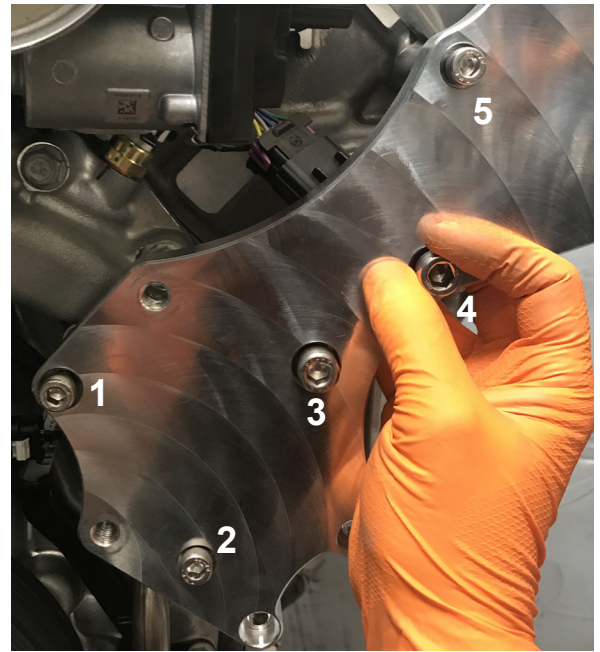
**#3 - M10x1.5x80mm SHCS/2.425" spacer**

**#4 - M10x1.5x80mm SHCS/1.700" spacer and Alternator Rear Bracket**

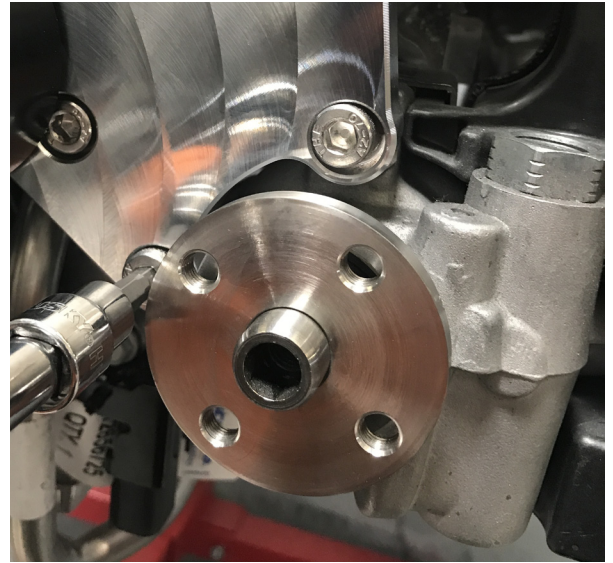
**#5 - M8x1.25x85mm SHCS/2.425" spacer**

**15. Install the Alternator using a M8 x 1.25 x 20mm SHCS into the upper mount and an M10 x 1.5 x 70mm SHCS through the lower mount and into the Alternator Rear Bracket. You can now tighten all of the Driver's Side Main Bracket mounting hardware fully.**

**16. Next, install the two steel idler pulleys into the threaded holes on the Main Bracket using M10 x 1.5 x 50mm BHCS. They will install through the idler covers, pulley, idler pulley mounting spacer and into the Main Bracket. Tighten fully.**



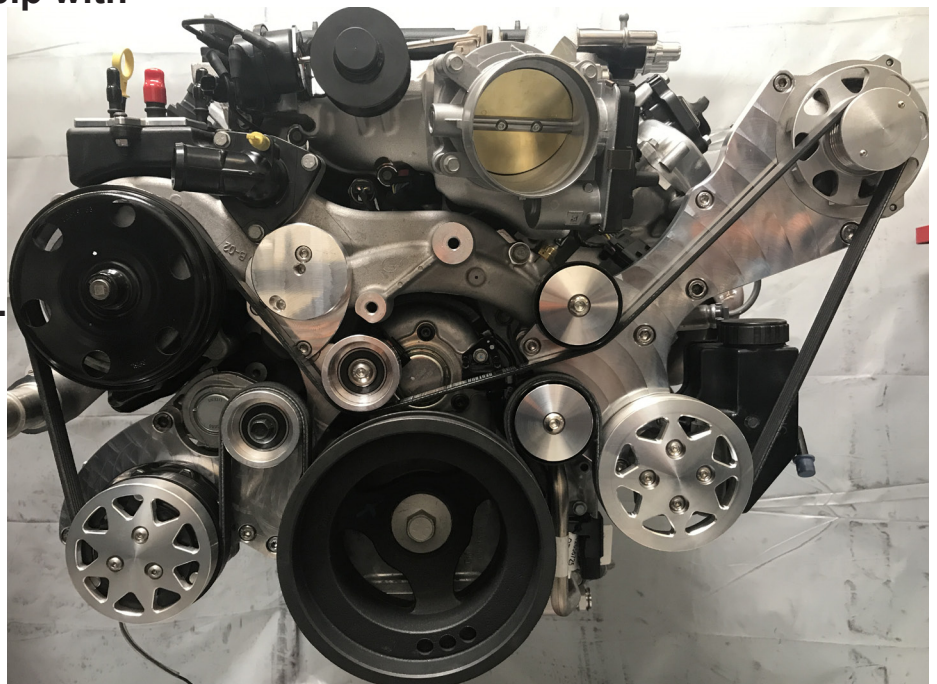
**17. Install the power steering pump using the two countersunk holes on the lower side of the Driver's Side Mounting Bracket and (2) m8 x 1.25 x 20mm SHCS. Make sure it is installed with the small fitting pointed upwards.**



**18. Install the power steering pulley with the (4) 5/16-24 x 3/4" BHCS. Tighten fully.**



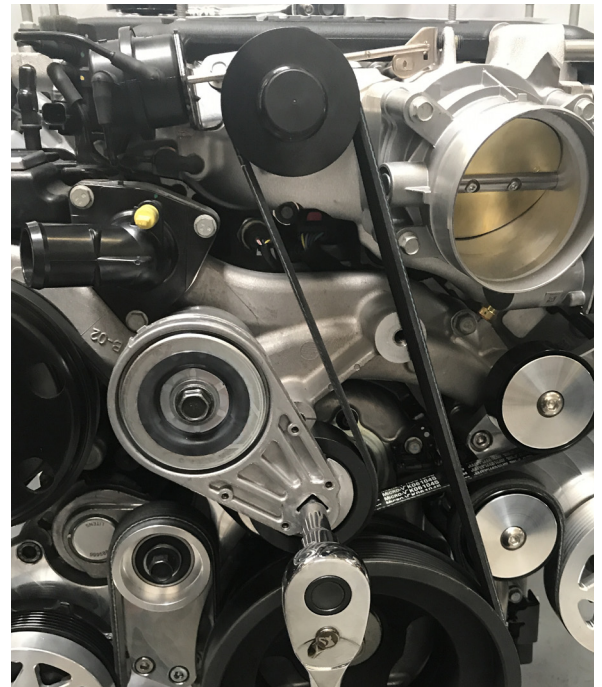
**19. Now you will be installing the main drive serpentine belt. Using this picture as a guide, start by rotating the tensioner clockwise with a 15mm wrench. Route the belt around all the pulleys as shown with the upper steel idler pulley being the last installed. It is best to have someone help with this step. The belt will be tight to install. One tip is to remove the belt from its packaging and place it into the sun for a short time helping it become more pliable and easing the install.**



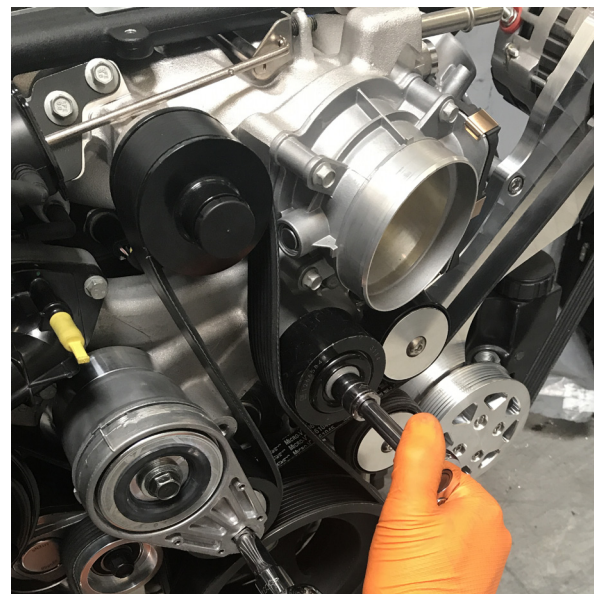
**20. Next, install the supercharger belt tensioner using the supplied bolt and a 15mm wrench. Make sure tensioner is oriented with the indexing pin in the open hole in the face of the supercharger tensioner mount. Tighten the mounting bolt fully at this time.**



**21. The next few steps will require a second person to assist with the install. Using a 1/2" drive ratchet, rotate the tensioner clockwise fully and hold. The other person route the belt first around the supercharger pulley then around the crank pulley. This belt will be tight. Be sure to hold the tensioner fully rotated clockwise to allow the belt to be installed.**



**22. With the tensioner fully rotated clockwise, have the second person pull the other side of the belt out off to the side to allow the supercharger idler pulley into the threaded boss in the water pump just below the throttle body. Be very careful not to cross thread the supercharger idler pulley bolt while installing it into the water pump.**



23. Install the supercharger tensioner cover with (4) 8-32 x 5/8" FHCS. Be careful not to overtighten.

24. Install the AC Cover using a 5/32" allen wrench on the 1/4-20 x .75" button head bolts.

(Note: Coat first few threads with blue Loctite and start all bolts before tightening them fully)

**DO NOT OVER TIGHTEN. YOU WILL DAMAGE THE A/C COMPRESSOR CLUTCH.**

Let the threadlocker do the work.



25. Install the A/C Manifold using a 6mm allen wrench on (2) M8 x 1.25 x 25mm SHCS. Be careful and make sure the o-rings are well seated. The smaller diameter fitting goes in the back.

26. The mock up process is now complete. You will now need to determine a proper place to install your power steering reservoir. It will need to be located somewhere higher than the power steering pump, upright for proper operation. The mounting bracket for the reservoir uses (2) 10-32x1/4" set screws to clamp onto the reservoir. The reservoir can be slid up or down in the bracket to best suit your mounting location. **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\*\*\***

**27a.** 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.

**27b.** 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.

**27c.** Both ports on the bottom of the power steering reservoir are tapped 3/8" NPT thread. Whatever fittings you determine are best for your 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.

**27d.** 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.

**27e.** 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.

**28. 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 160 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.**

**29. 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.**

**30. 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.**

**31. 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 A/C compressor is shipped with the proper amount of oil, so no additional oil is needed. The black wire coming from the A/C compressor is for positive (+) feed from engagement from your vehicles system.**

**32. 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 12.5v-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.**

**33. 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.**

**34a. 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.**

**34b. 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.**

**34c. 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.**

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

**36. 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.**

**37. 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!**

# TERMS & CONDITIONS

## TERMS

Individual, personal orders or company orders without pre-established terms are required to pay at time of order. We accept Visa, Mastercard, AMEX, Discover and checks. All established dealers with approved credit (at the sole discretion of All American Billet) will have Net 30 terms.

Established companies wishing to become a dealer must submit an All American Billet Dealer Application and meet the requirements to obtain dealer status and Net 30 terms.

## PRICING

Pricing in this catalog is current at time of print and is subject to change without notice.

Current pricing will apply on all orders. All American Billet is not responsible for misprints or printing errors.

## MINIMUM ORDERS

There is a \$5.00 minimum order fee for all orders under \$25.00.

## SHIPPING

Orders will ship via USPS or UPS at the discretion of All American Billet. Orders required to ship via a specific carrier may require an additional handling fee.

Overnight/2nd Day shipping is available for in stock items. Please call 1-844-BILLET1 (1-844-245-5381) during normal business hours to verify availability. Note: there will be a rush fee of \$10.00 plus the actual UPS shipping charges.

## SHIPPING CLAIMS

Any claims for missing or damaged items must be made within 5 days of receipt of goods.

## RETURNS

All American Billet has a 90 day return policy and prior authorization is required on all returns. All American Billet will provide a RAN (Return Authorization Number). The RAN must be clearly labeled on the shipment and all shipping charges must be prepaid. Any returns that have shipping due or do not display the RAN will be refused. Non-returnable items will include any item that was special ordered, customized, damaged, painted, plated, or altered in any way from the original item. All authorized returns not due to defective merchandise or an error on the part of All American Billet will be subject to a 20% restocking fee.

## WARRANTY

All products manufactured by All American Billet will have a one year limited warranty against defects in material and workmanship. Warranty is void if item is altered or misused in any way at the sole discretion of All American Billet.

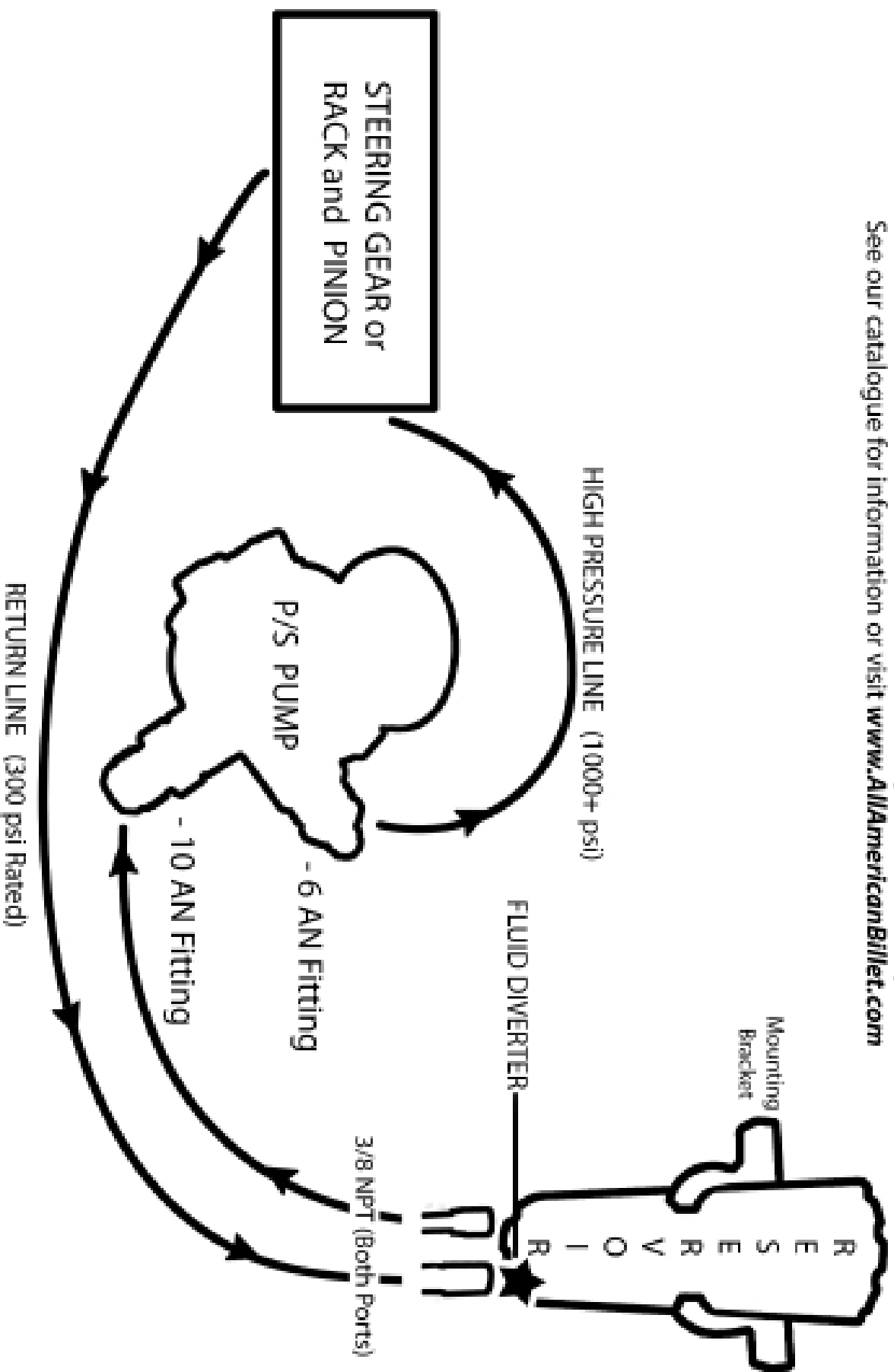
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# POWER STEERING RESERVOIR DIAGRAM

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)



**ALL AMERICAN BILLET**

# 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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*Check out our website for more of our products  
[www.AllAmericanBillet.com](http://www.AllAmericanBillet.com)*

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BILLET**

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[www.allamericanbillet.com](http://www.allamericanbillet.com)

# **Warranty Information**

Here at All American Billet, we do our best to ensure your Front Drive System is of the highest quality. On rare occasions, issues do occur. Please contact All American Billet Tech Dept. by phone (1-844-245-5381) or via email (tech@allamericanbillet.com) to ensure that your issues are handled in the quickest way possible to get you back on the road again.

Items covered under warranty are at the sole discretion of All American Billet. Warranty coverage may require detailed information about your vehicle and testing procedures. Detailed photos of the installation may also be required to verify proper installation. Warranty items may need to be sent back to All American Billet for inspection and approval. Certain circumstances may void all warranties. Warranty voiding scenarios include but are not limited to:

## **Alternator**

Improper size charging wire - **MUST BE** 4 gauge for short runs (3-5ft) or larger for longer runs. All popular aftermarket harnesses and factory harnesses DO NOT support the output of our alternators  
Alternator case not grounded - Case must have exclusive 10 gauge ground

## **Power Steering Pump**

Improperly sized lines and/or fittings -  
Correct sizes  
High pressure side - -6 (3/8") or larger  
Low pressure side - -10 (5/8") or larger  
Ran without fluid for **any** amount of time  
Incorrect fluid - Must use GM Power Steering Fluid

## **A/C Compressor**

Over-torque of A/C Manifold bolts - cracks compressor housing  
Torque Spec – 18ft lbs.  
Over-torque of A/C Clutch Cover bolts - causes clutch noise or dragging  
Torque Spec – 32in lbs. w/ Blue Loctite