Pioneer 1000 Hydraulic Steering Installation Instructions

We have tried to cover every detail of this installation as thoroughly as possible, but in the event that we missed something, please let us know. We really appreciate your business, and we hold customer satisfaction with high regard. Do not hesitate to give me a call if you need clarification or assistance with anything at all throughout your installation process.

-Jared Doster
936-581-2948

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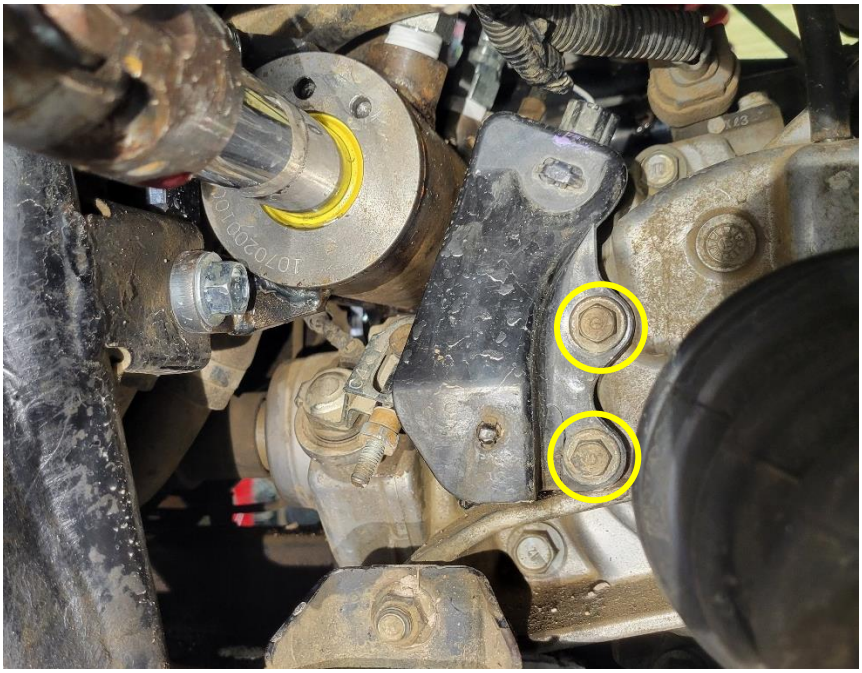
This Hydraulic Steering system is an extreme upgrade to the conventional rack and pinion setup on the Pioneer. The new Electric PS Pump requires a lot of power to supply the system with the pressure and fluid volume it needs and therefore it is **MANDATORY THAT YOU RUN A DUAL BATTERY SETUP WITH THIS SYSTEM that does NOT utilize a "smart isolator."**

Uninstall Stock Steering Rack:

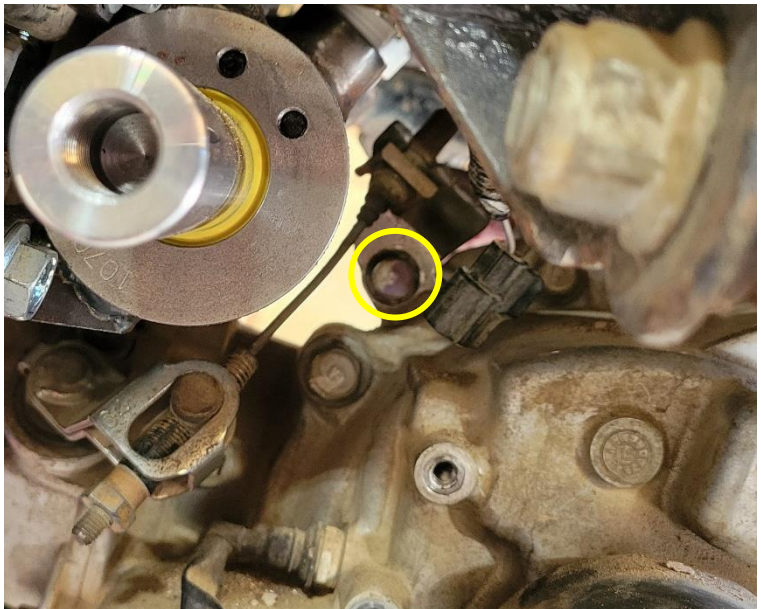
Step 1. Jack up the front of the machine, remove the tires, and uninstall the tie rods from the steering rack.

Step 2. From the driver's side, remove the steering yoke bolt that secures the steering shaft to the steering rack. Also remove the next bolt up from there that allows the yoke and lower steering shaft to slide up and off of the steering rack input shaft. **(6-Seaters do not have the second bolt)**

Step 3. Next, on the passenger's side, remove the two 10mm bolts securing the plastic cover on the passenger side of the differential. After removing the 2 bolts, unplug the 4wd connector.



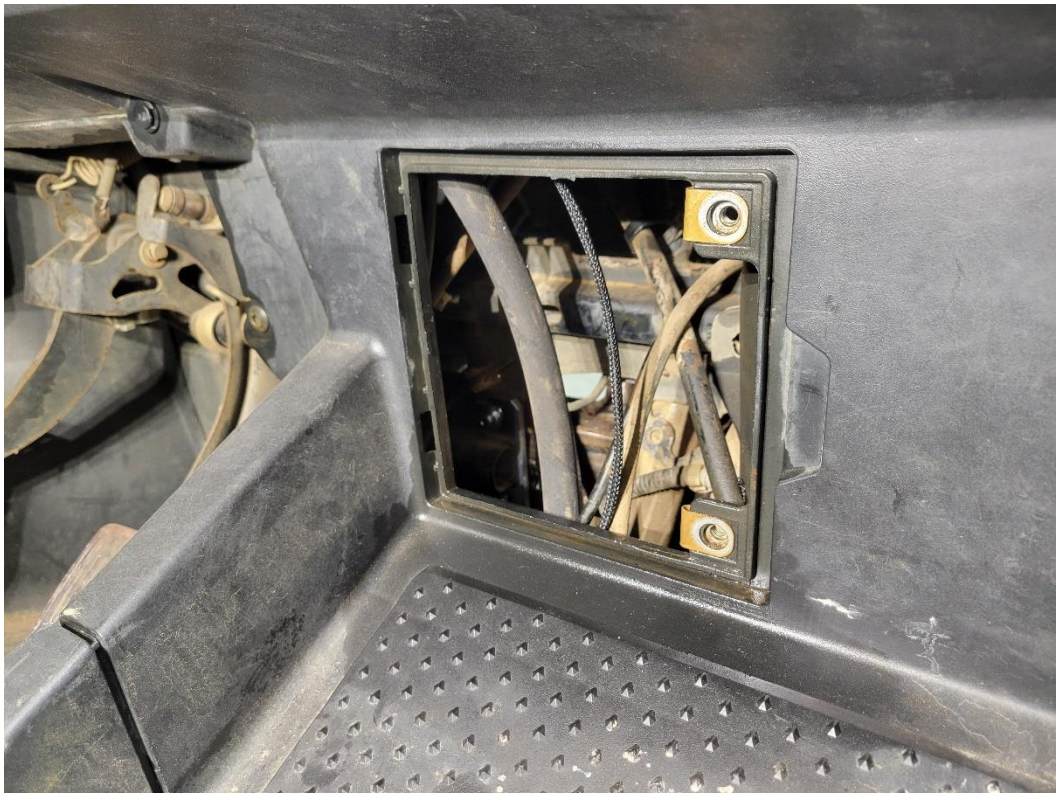
Step 4. Now remove the 12mm bolt holding the 4wd cable bracket to the front differential. Remove the slide clip holding the cable to the bracket and remove the bracket. (This bracket will need to be modified for clearance)



Before

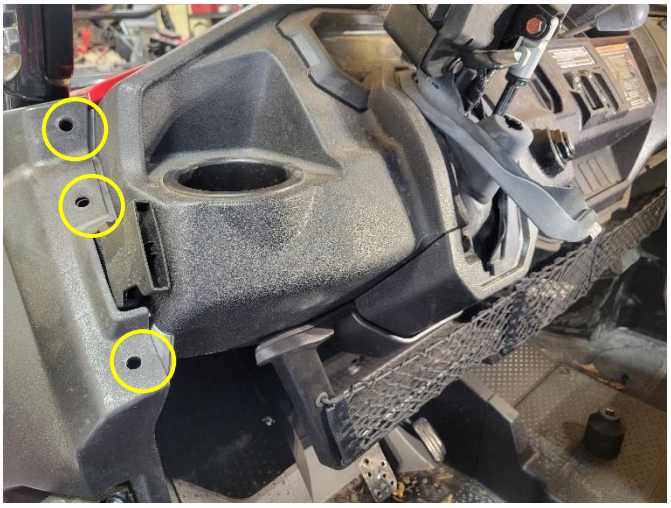
After

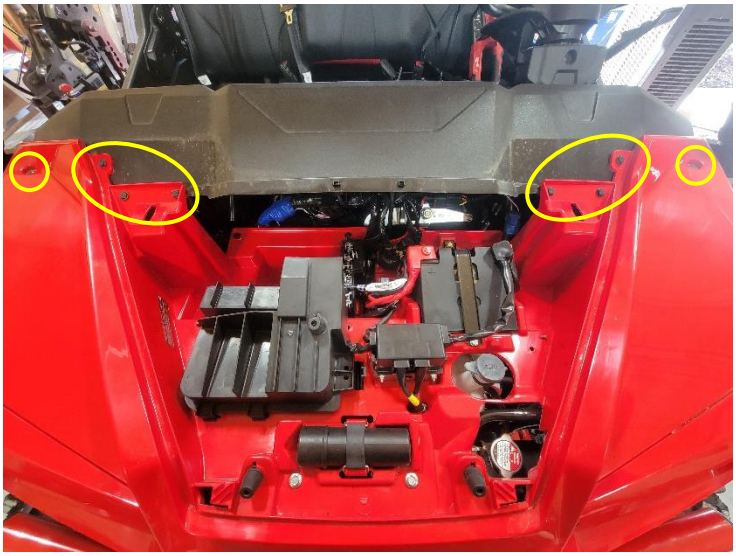
Step 5. Now that the bracket is out of the way, remove the 4 bolts holding the stock steering rack to the frame and completely remove the steering rack. You will access the nuts on the back of the steering rack through the access door in the floor board/firewall. (This step is difficult and will require a second set of hands)



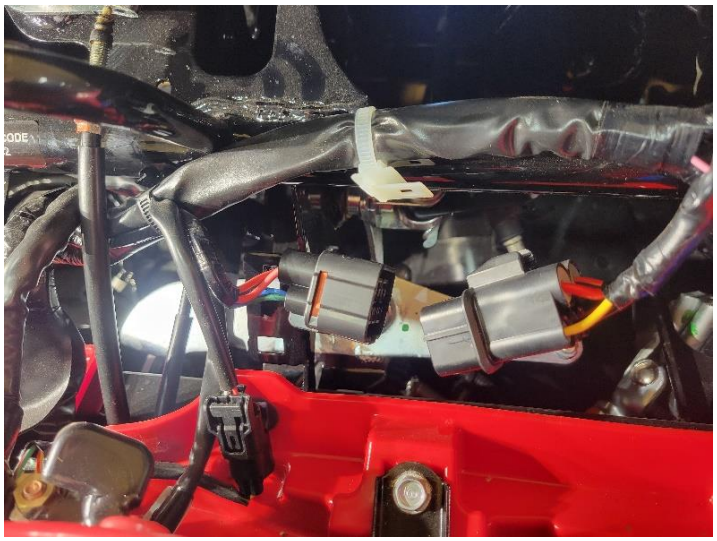
Remove Upper Dash and EPS Unit:

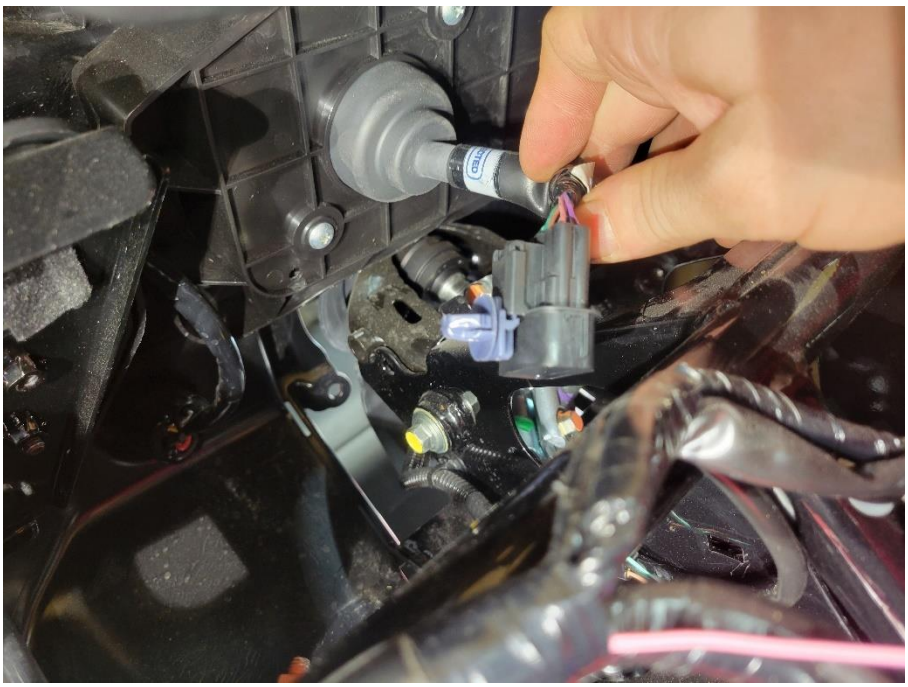
Step 1. Remove all of the pop rivets and allen head bolts that secure the upper dash to the frame and other body panels. Remove the shift knobs by pulling and wiggling.



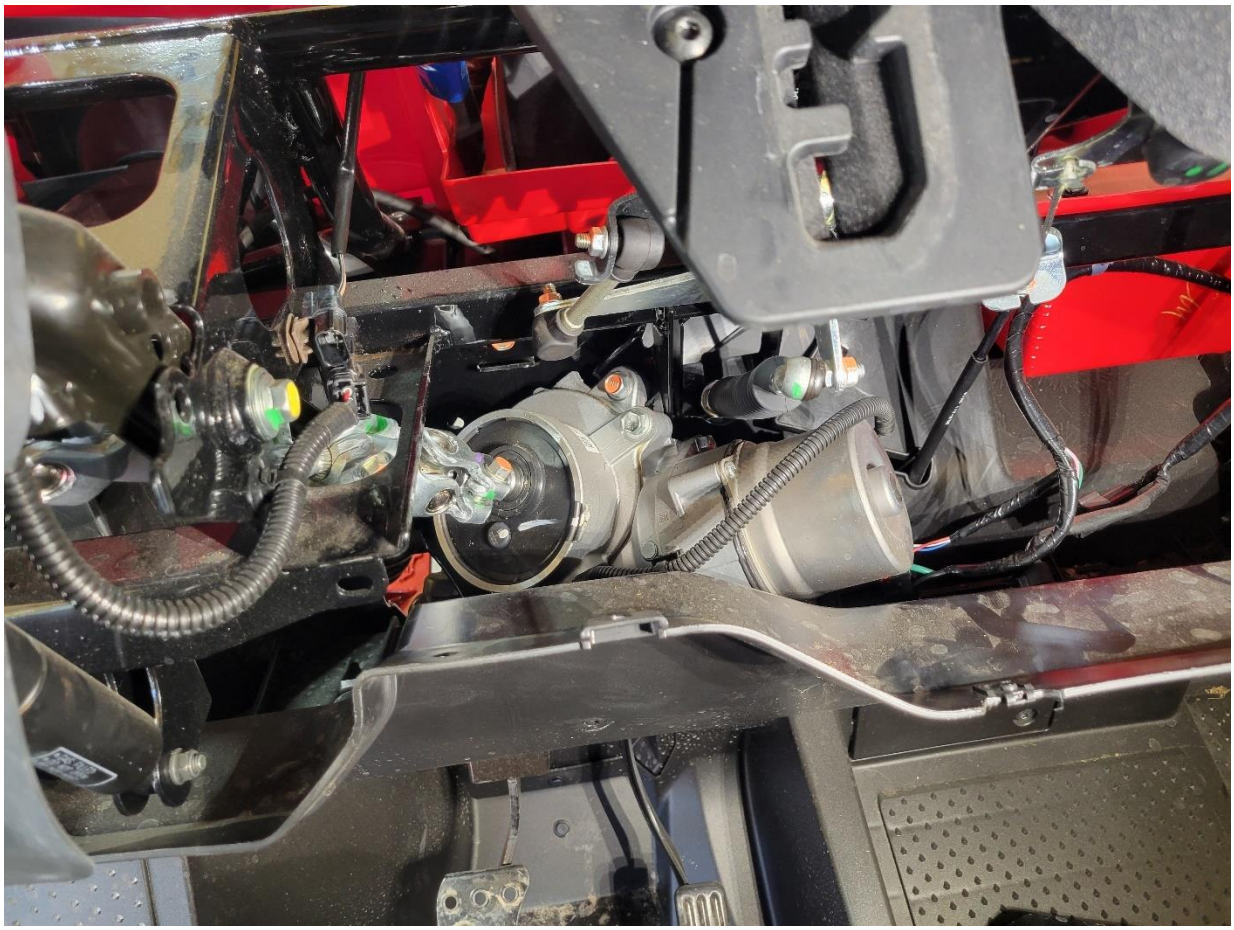


Step 2. Unplug all wire connectors that supply power to the dash components. Year models will differ.



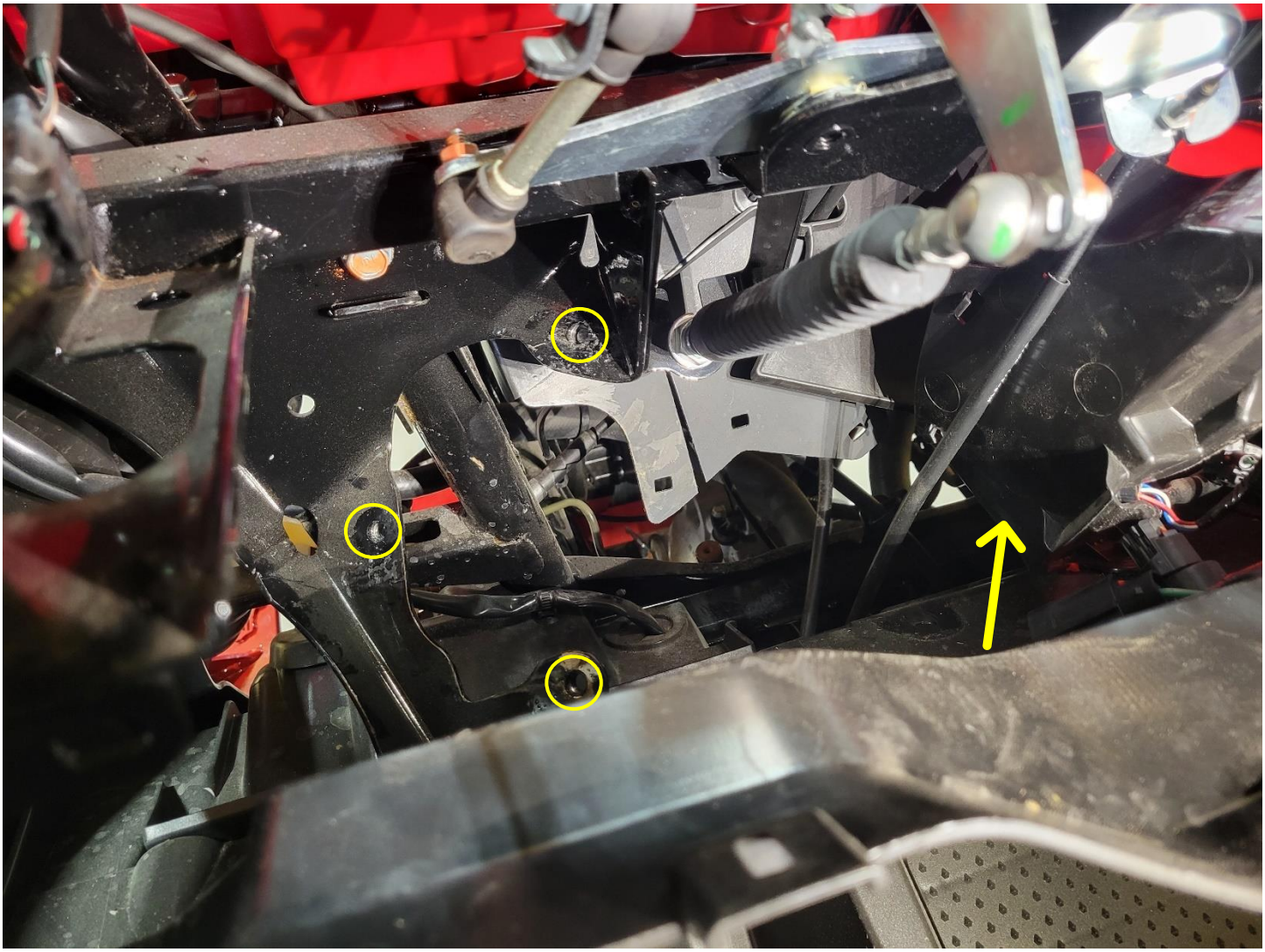


Step 3. Once the upper dash panel is free, pull it away from the machine and move it to the side with enough room to access the EPS Unit.



Step 4. Disconnect the electrical plugs from the EPS unit and remove all of the 10mm bolts on the upper steering shaft between the EPS unit and the steering column.

Step 5. Locate and remove the 3 bolts that secure the EPS unit to the frame, and completely remove the EPS unit.

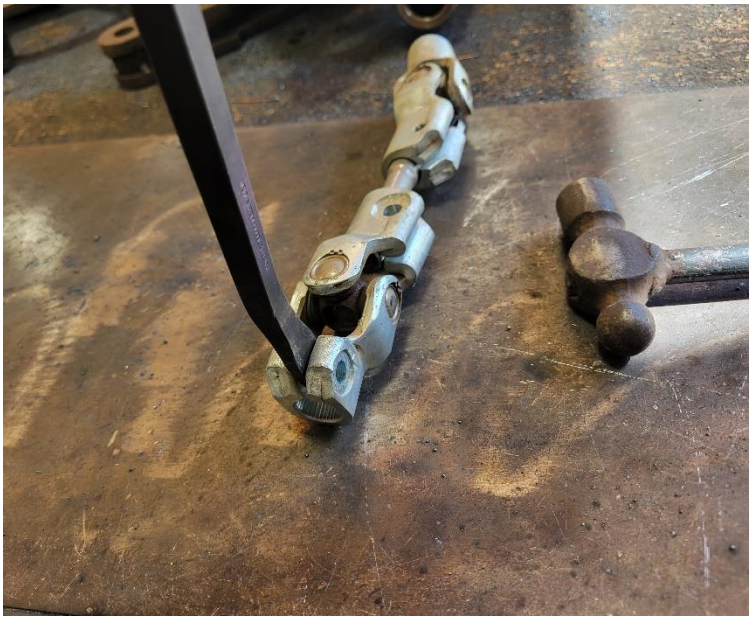


Step 6. Depending on your particular year model, once the EPS unit is removed you may need to trim the inner dash plastic to make room for the new Orbital valve and hose plumbing. (Marked by the yellow arrow in the photo above, there is a piece to the right that has been bent back out of the way. This piece needs to be trimmed off for clearance).

Install Orbital Valve:

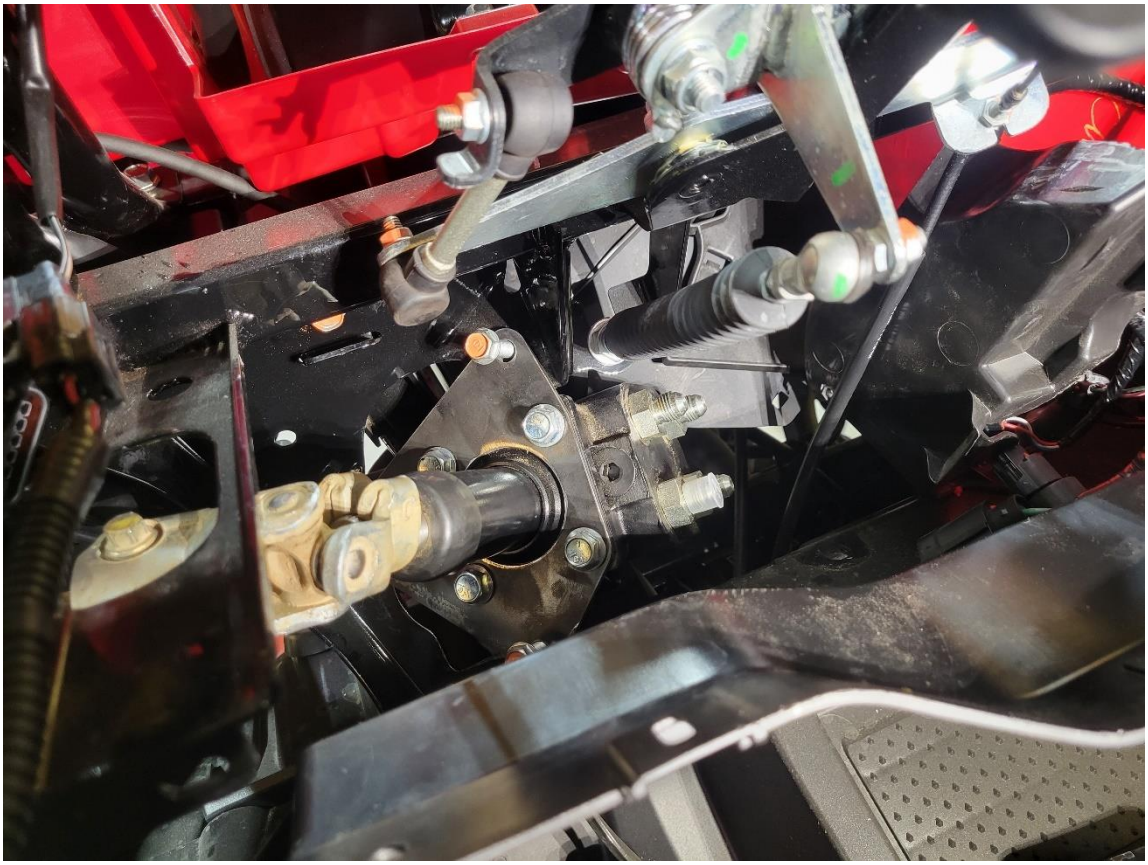
Step 1. Now that you have the EPS unit removed, remove the upper yoke assembly so that we can use it on the new Orbital valve steering column.

Step 2. The yoke that was removed from the EPS unit needs to be slightly modified to work with the new shaft on the Orbital valve. Using a hammer and a pry bar or wedge, spread open the ears on the yoke so that it will slide on to the new Orbital shaft. Then install the yoke onto the orbital valve shaft as shown. It will be a tight fit and you may need to use a rubber mallet to help it onto the shaft. Install the 10mm retaining bolt on to the yolk and tighten.

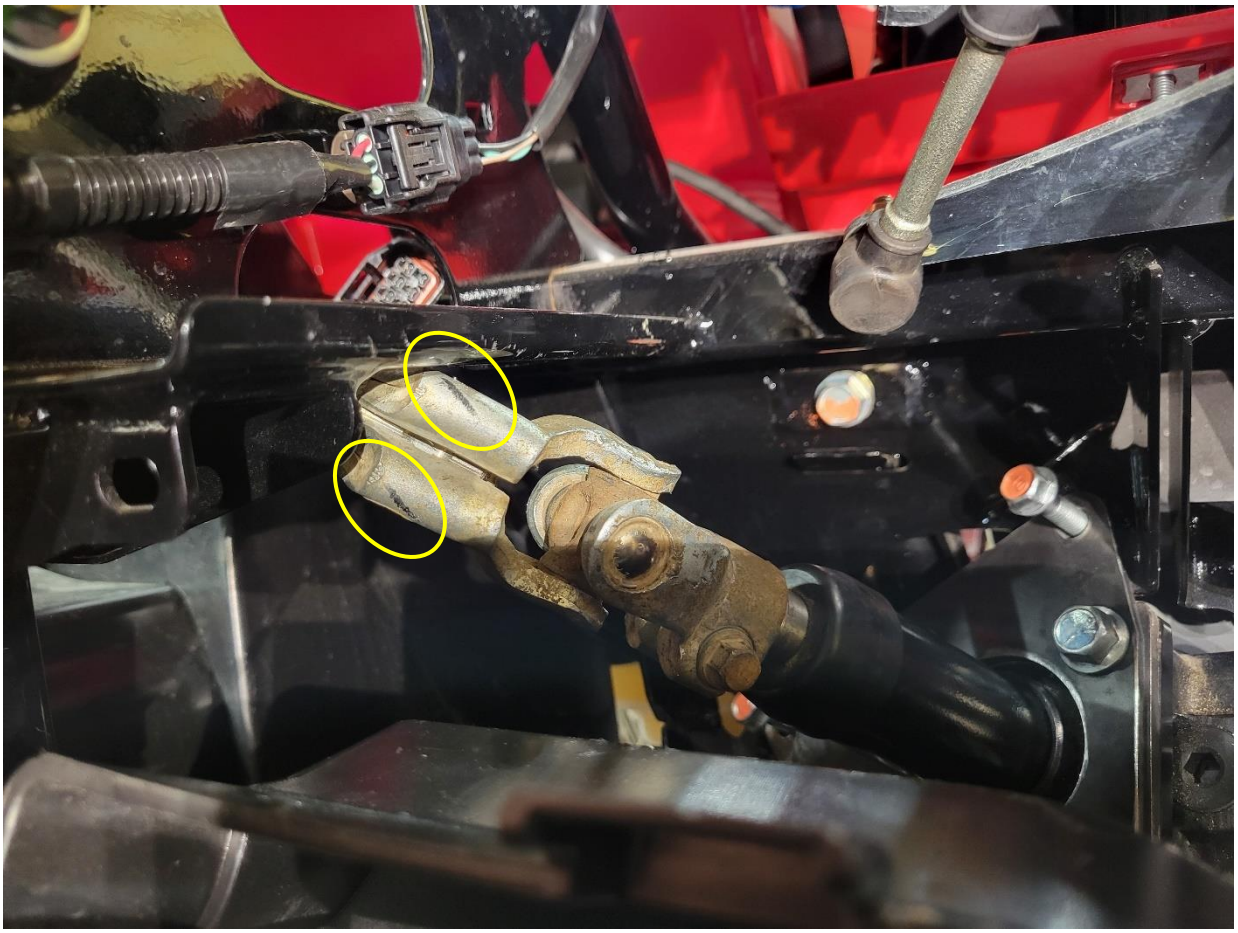


Step 3. Now assemble the Orbital valve in this order, steering column, bracket spacer, frame bracket, and tighten down with the supplied bolts. Also install and tighten the fittings into the Orbital valve at this time.

Step 4. Now install the Orbital valve assembly into the machine. Make sure that all the 10mm bolts on the steering yokes and slide shaft are removed, to make it easier to install the yoke to the steering column on the machine. Once you get the Orbital valve assembly in place, connect the yoke to the steering column before you start any of the frame bolts. There is just barely enough room to make the connection so it will take some wiggling. (You may need to install the yoke section one piece at a time)



Step 5. Now that you have everything in place you may encounter a slight bit of interference between the steering yoke and the column support. If necessary, grind down a bit of the yoke to make clearance.



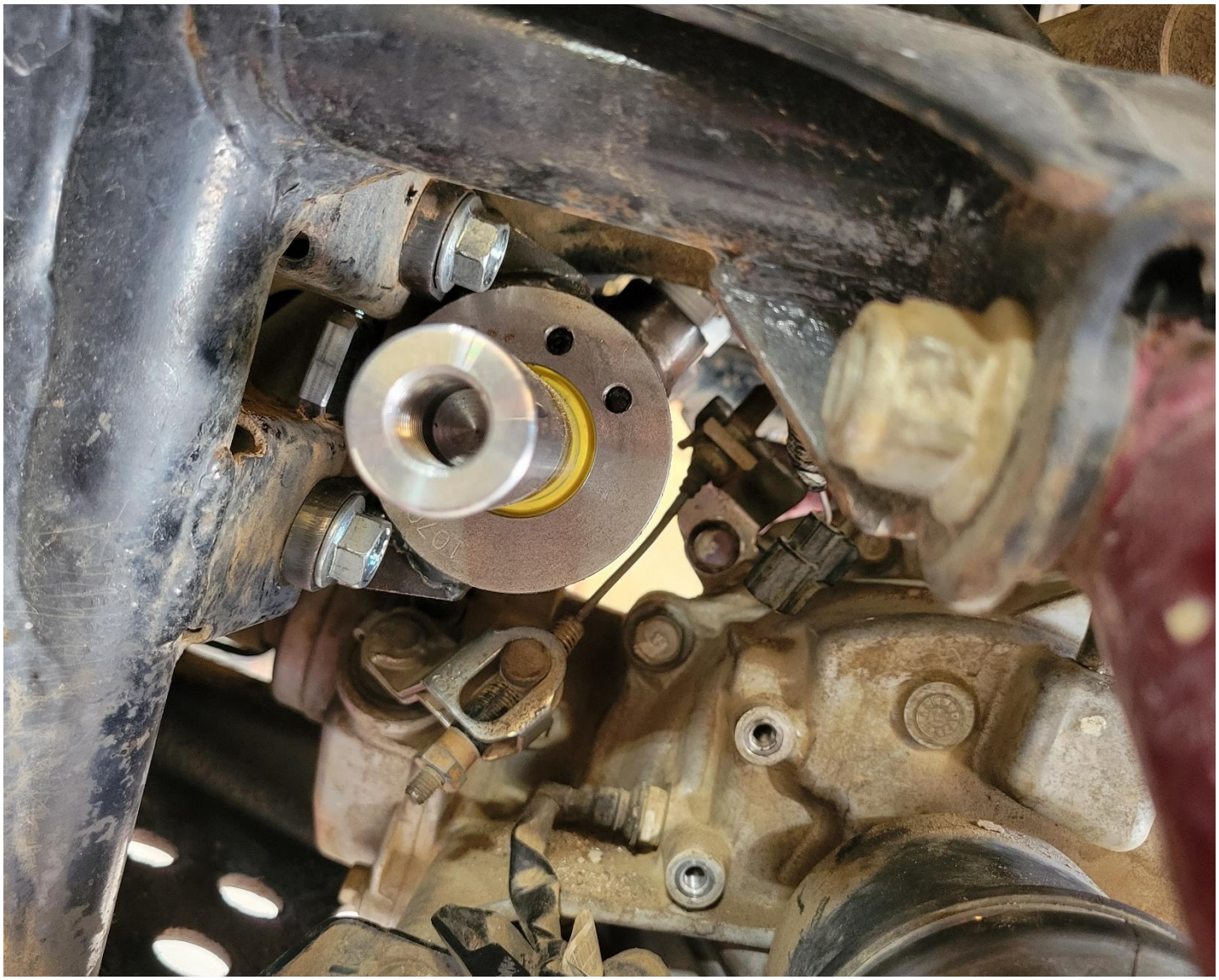
Step 6. Once everything is in place, tighten down the 3 bolts that secure the Orbital valve bracket to the frame. **(Don't worry about whether your steering wheel is straight or not at this time)**

Hydraulic Ram Installation:

Step 1. Locate the Hydraulic ram and RB3 EZ mount tabs. Place the EZ mount tabs in the frame per their installation instructions.

Step 2. Slide the ram into place from the driver's side. Once in place, use the supplied bolts to secure the ram into the EZ mount tabs through the frame. (Installation is now a one-person job!)

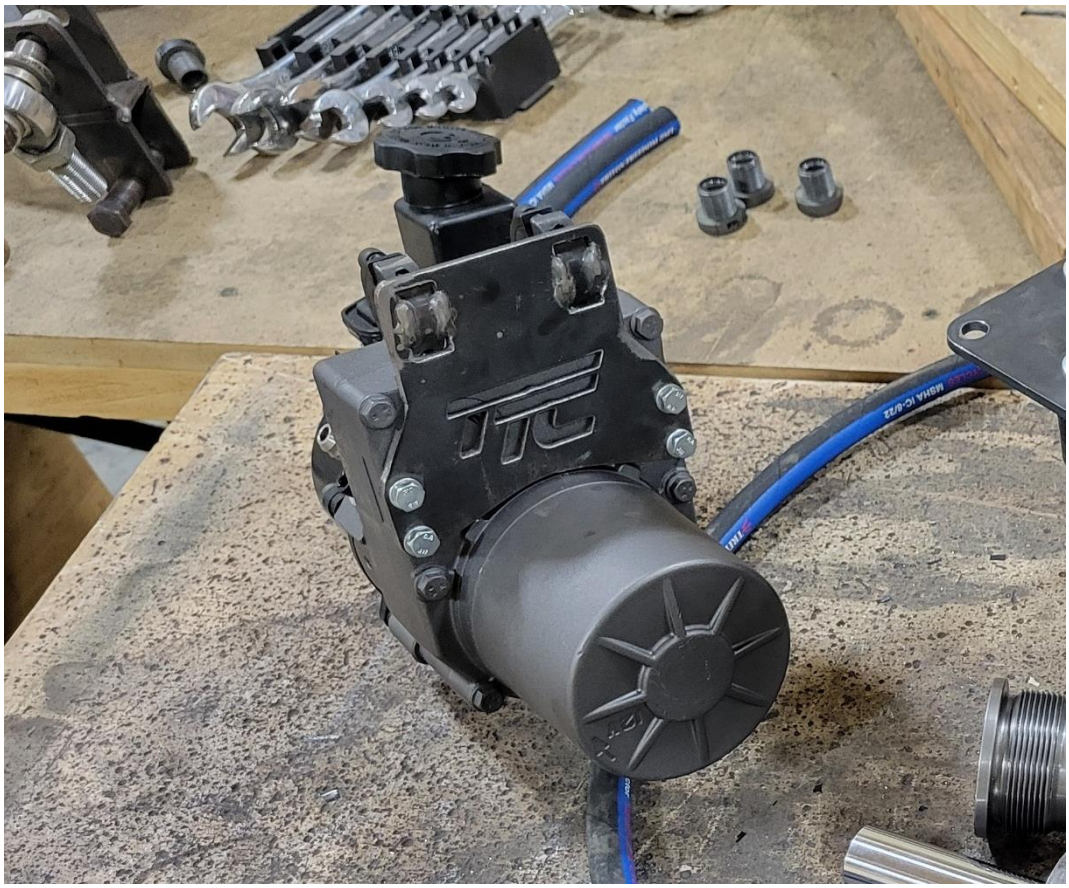
Step 3. Now that the ram is in place and tightened down, re-install the 4wd cable bracket on the passenger's side of the differential that was modified previously. Make sure to secure the cable back in place with the slide clip. (See pic below for reference)



Step 4. Lastly reinstall the plastic cover and reconnect the plug.

Electric Power Steering Pump Installation:

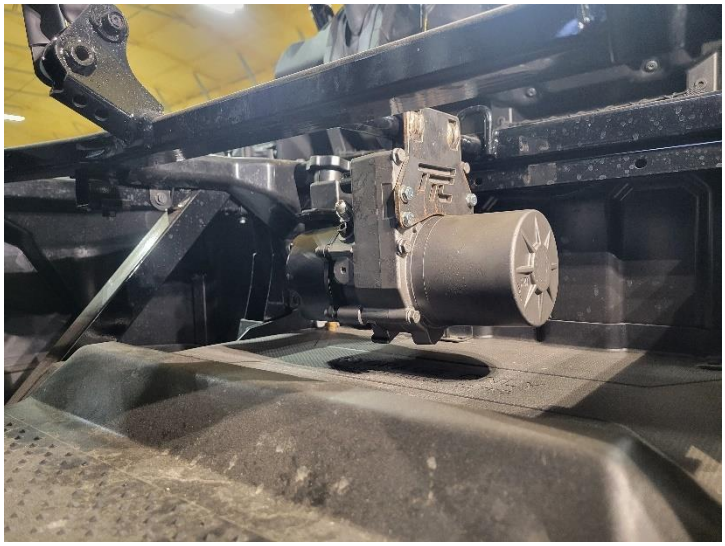
Step 1. Locate the new electric power steering pump, TTC mounting bracket, pump hose fitting, keeper plate, and M6 x 16mm fasteners and assemble as shown.



Step 2. Once assembled, install under the front seat as shown below. The reservoir cap goes on the driver's side. (Leave bar clamps loos until after all lines are plumbed and tightened.

(5-seater)

(6-seater)

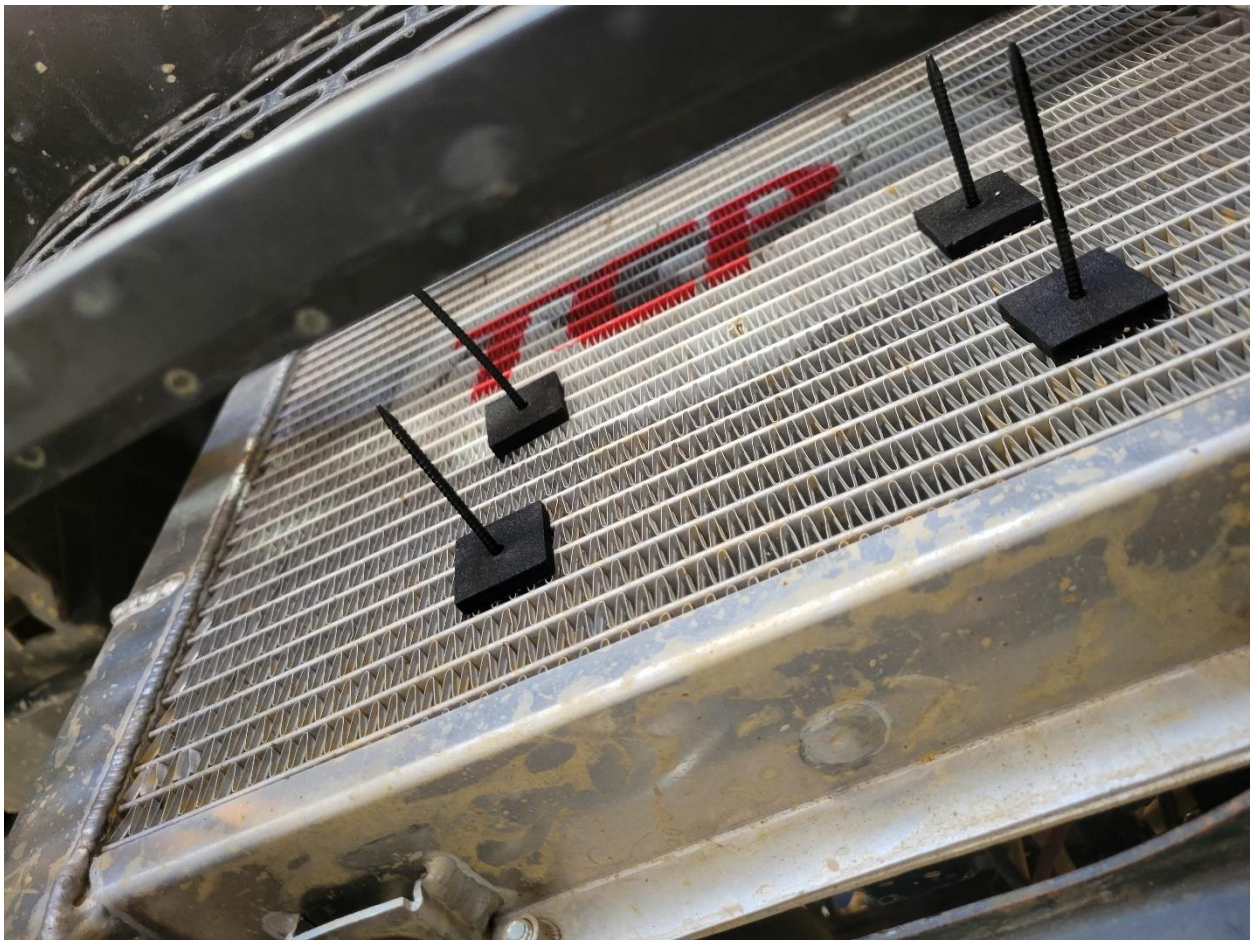


Fluid Cooler Installation:

(Some Models may need to remove the grille for installation of the cooler)

Step 1. Locate the “EZ Tie Mounting Rods” that come with the inline cooler. Begin by pushing these through from the fan side of the radiator.

Step 2. Once the mounting rods are pushed through the radiator, slide the provided foam pads onto the rods.

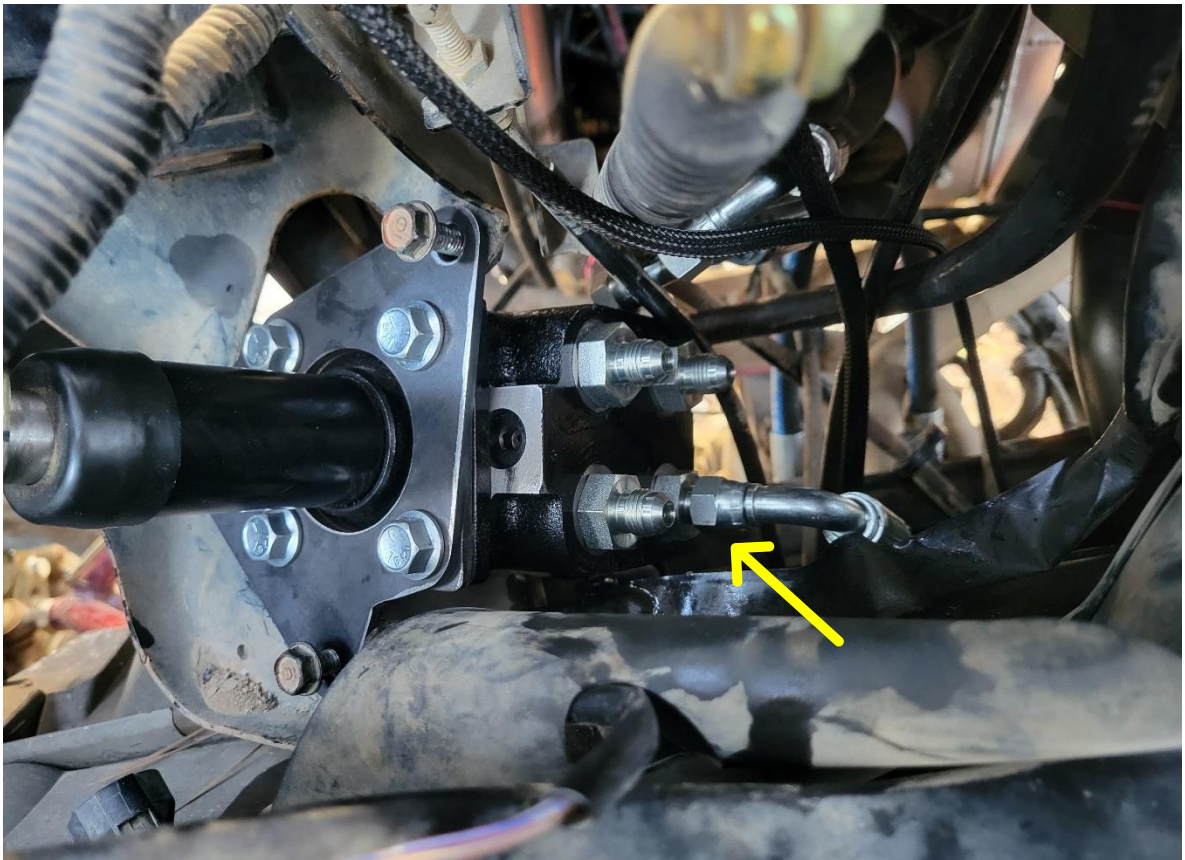


Step 3. Before installing the cooler, install the two 3/8” rubber lines onto each of the barbs on the cooler, and secure them tightly with the provided hose clamps. The line on the upper barb (shorter of the 2) goes to the orbital valve, and the lower line (4ft line) goes back to the pump return barb.

Step 4. Slide the cooler into place and feed the “EZ mount rods” through the cooler. Once in place, slide on the flat plastic holding washers, followed by the tiny locking cones that lock the washers into place and hold everything together. (See pic below) Trim the excess rods.

Plumb Lines and Electrical:

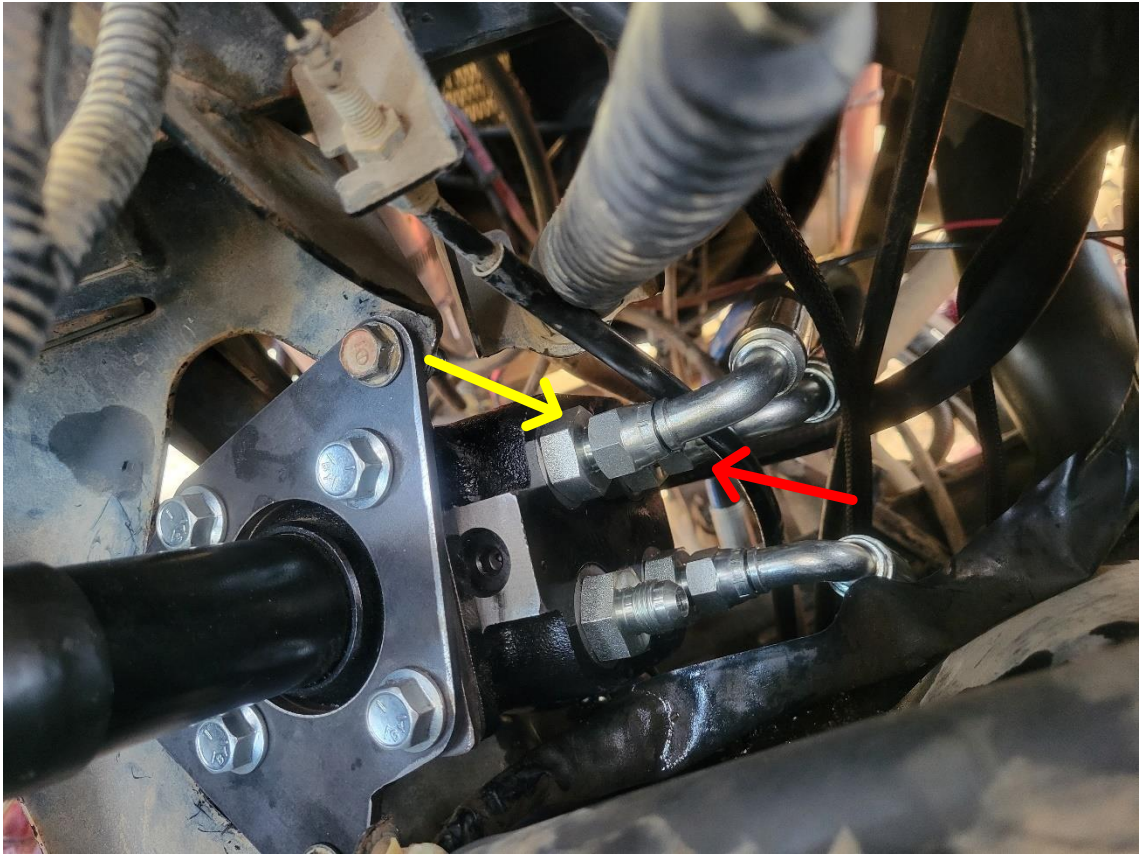
Step 1. Locate the three high pressure hydraulic lines (one long and 2 short). Run the long line down the back side of the fire wall, under the floorboard and back up to the pump under the front seat. **(6-seater models will need to cut out an access hole in the floorboard under the front seat to run plumbing to the pump)** Connect the fitting at the orbital valve first. This fitting connects to the bottom right position on the orbital valve. The other side of the line goes to the electric pump. This is your High-Pressure Supply from the pump. Once both fittings are screwed on, tighten them down with a wrench.



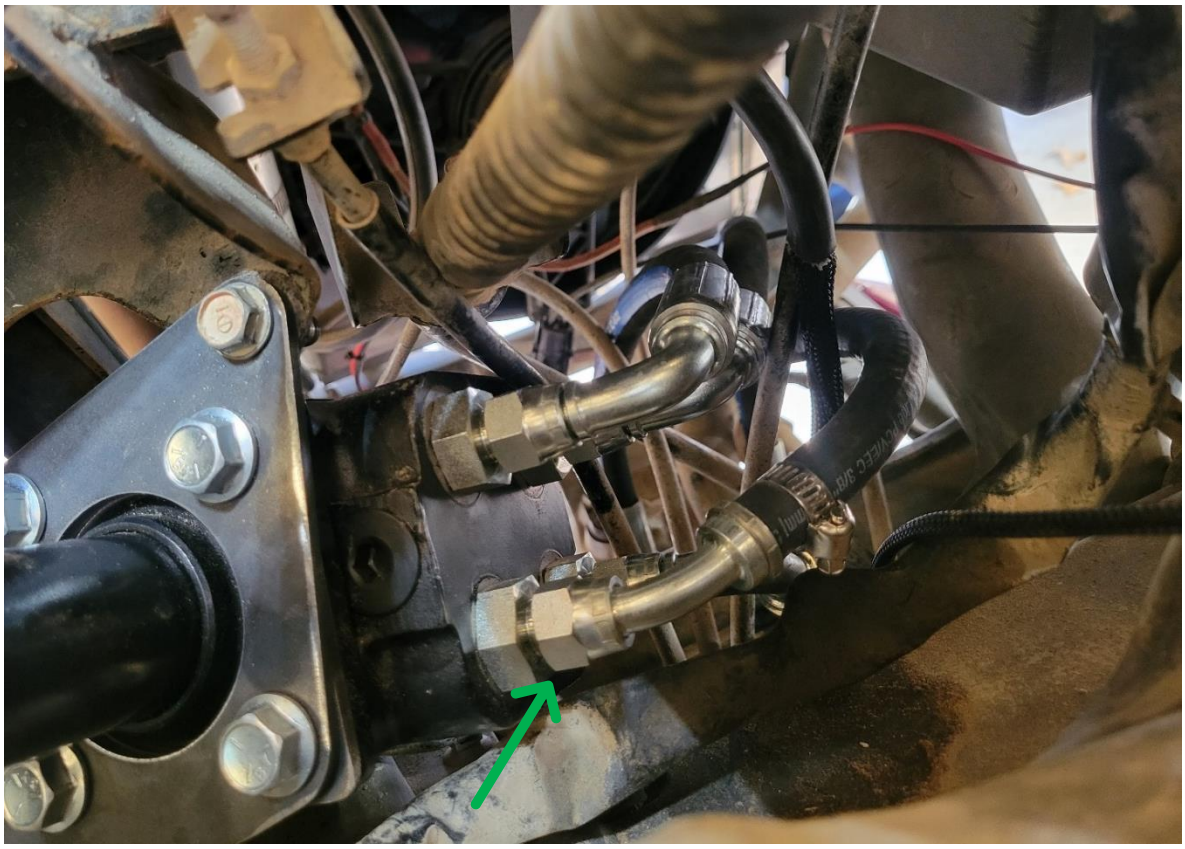
Step 2. Next locate the 4 ft piece of 3/8” hose coming from the lower barb of the cooler. Run this line from the cooler, through the firewall, under the floorboard, and up to the return barb on the pump. Tighten and secure it to the pump with the supplied hose clamps.

Step 3. Next locate the Electric PS pump power wire and control wire and run them from the pump, under the floorboard, up the back of the firewall, and through the dash to the battery. Make sure that everything you run under the floorboard is clear of the front drive shaft. (It may be necessary to remove the skid plate for ease of access)

Step 4. Now, locate the 2 shorter high-pressure lines and install them onto the orbital valve. Route them so that they can easily be connected to the ram. **(Remember to use Teflon tape on the 3/8 NPT fittings going into the ram).** The one on the right side (red arrow) will go to the right side of the ram, and the one on the left (yellow arrow) will go to the left side of the ram. (See pic below) Once they are both hand tight, thread in the other side (3/8 NPT) into the steering ram and tighten both sides with a wrench.

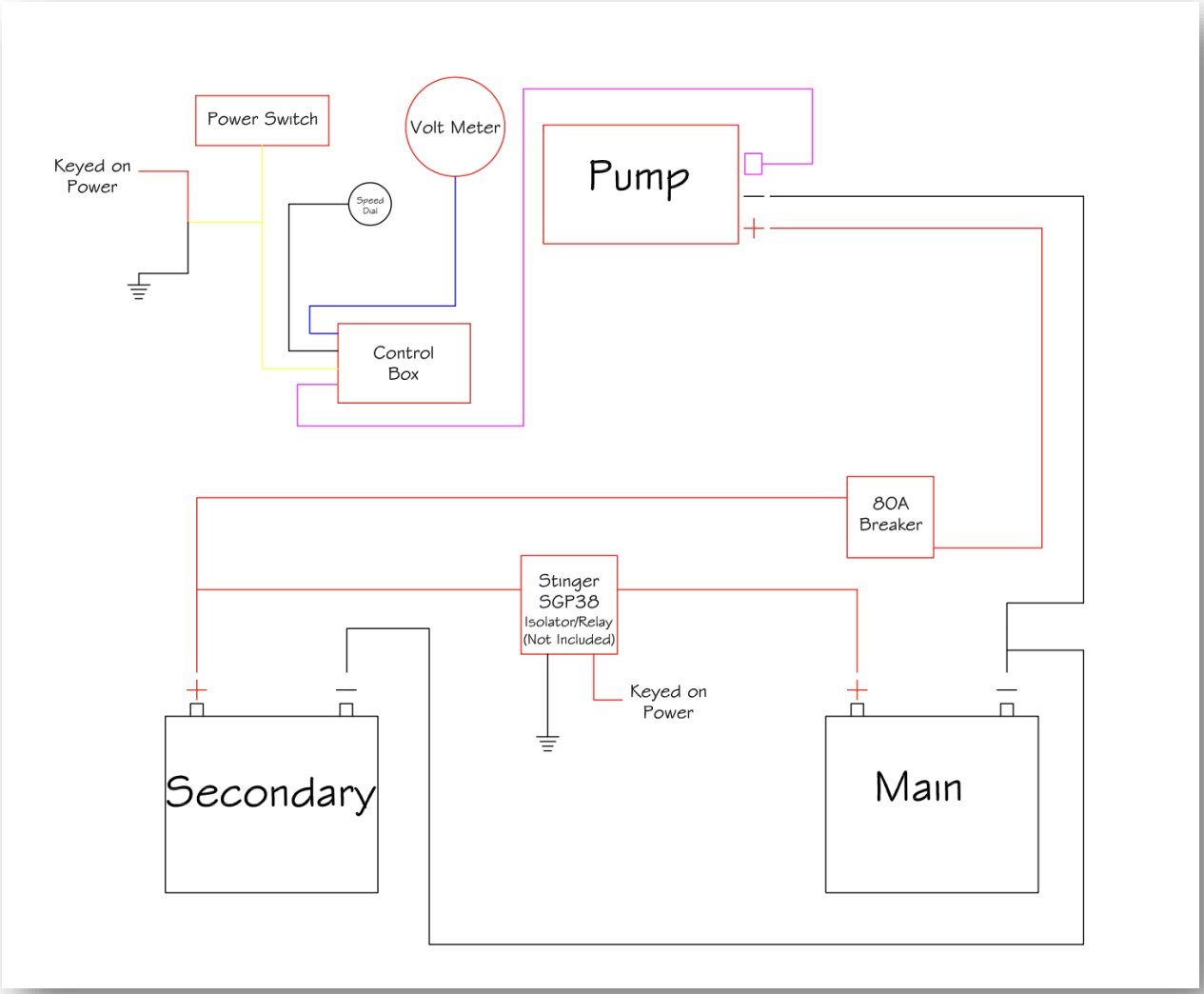


Step 5. Locate the hose barb fitting and the shorter piece of 3/8” rubber line coming from the upper barb on the cooler. Install the barb and secure it tightly with one of the supplied hose clamps. Install that barb fitting onto the last spot on the orbital valve (green arrow in pic below). This is the low pressure return line that goes to the in-line cooler.



Step 6. Connect all the power wires for the control unit, Electric PS Pump, and volt meter, and install the power switch and potentiometer (rotating dial) where desired. The potentiometer controls the rpm of the pump. The higher the rpm the more voltage it consumes and the more psi it puts out. **We recommend that you keep the dial turned down all the way, until you get in a situation that requires more power.**

Dual Battery Wiring Diagram:



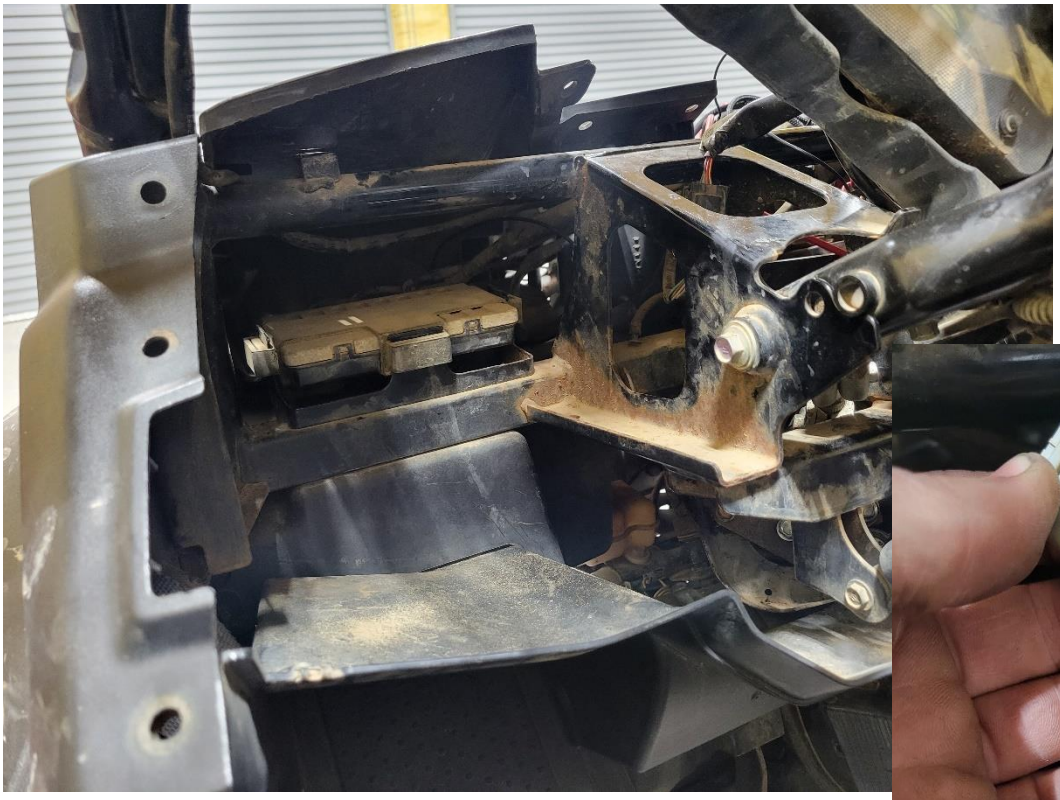
If you are not already running a dual battery setup, we recommend running the Odyssey PC925 as a secondary battery.

It is important that your two batteries are hooked in parallel with an uninterrupted connection while the key is on. Running a "smart" isolator like the "True Isolator" is not recommended with this hydro steer system. Smart isolators disconnect the two batteries when it senses the primary battery drop below a certain voltage. This results in the "Smart Isolator" connecting and disconnecting the 2 batteries constantly while under load, creating a situation where only one battery at a time is supporting the power steering pump and only one battery at a time is charging. This is problematic for the power steering pump because it requires more power than one battery can support alone and will result in frequent voltage drops. If you want to run an isolator so that your batteries are not connected when the system is not charging, we recommend running the Stinger SGP38 isolator or similar, (although it is not necessary to run an isolator). This isolator connects the two batteries and provides and uninterrupted connection whenever the key is on. This will ensure that both batteries charge at the same time and allows you to take advantage of the extra amp hours that a dual battery system provides.

Side Note: Pioneers are known to have a weak charging system. If you want to upgrade your stator we have upgraded charging system options available. Call for details.

Disabling the Power Steering Warning Light:

(Some newer models do not require this step) Once everything is wired up you will need to locate the factory power steering control box (PCM that has 2 plugs both with 2 thick awg wires). Splice into the **Yellow Wire with the Green Stripe** and run it directly to a ground. This will disable the power steering warning light that pops up on the instrument panel since the factory power steering unit is no longer connected.



Fill, Bleed, and Test:

We suggest testing the system **before** you put the dash back together just in case you need to re-tighten or address any fittings associated with the orbital valve.

Double check that everything is installed properly and tightened all fittings before proceeding.

Step 1. Fill the Pump reservoir with power steering fluid, CHF11S, or hydraulic fluid.

Step 2. With the system off, turn the wheel side to side to help the fluid enter the system. Keep an eye on the reservoir and add fluid as needed. Once the system stops taking fluid, turn the power switch on. (Feel fee to start the engine to maintain battery power) **After a few second delay,** the pump will turn on and start to pressurize the system. Turn the steering wheel side to side to allow the system to fill up the lines and bleed any air bubbles. Add fluid as necessary and check for any leaks.

Here is an informational video from the manufacturer on how to bleed the system.

https://www.youtube.com/watch?v=ts6vX8csaTA

Step 3. Since the pump and reservoir are mounted below the orbital valve, it is recommended to bleed the system under a vacuum as the above video suggests. To make a custom bleeder cap we used a 1-1/8”in x 15/16”in rubber stopper and a 1/4"in hose barb from Home Depot. This works perfectly to bleed the system of any extra air bubbles.

Apply 15-18 inches of vacuum to the system. With the pump on, turn the wheel lock to lock, holding at full lock for no more than 2 seconds before turning back the other way. Do this until no more bubbles are occurring.

Step 4. If everything seems to be operating normally, turn the system off and reinstall the dash and all body panels.

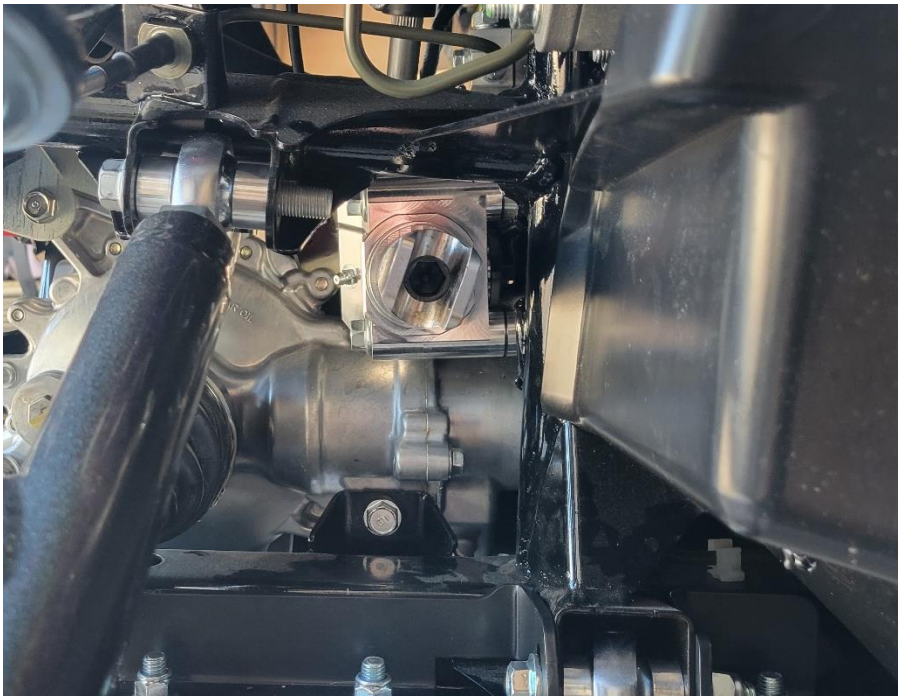
Reassemble:

Step 1. Reinstall the dash and all body panels and make sure to reconnect any electrical connections that were disconnected previously. **(Don't Forget the instrument panel plug)**

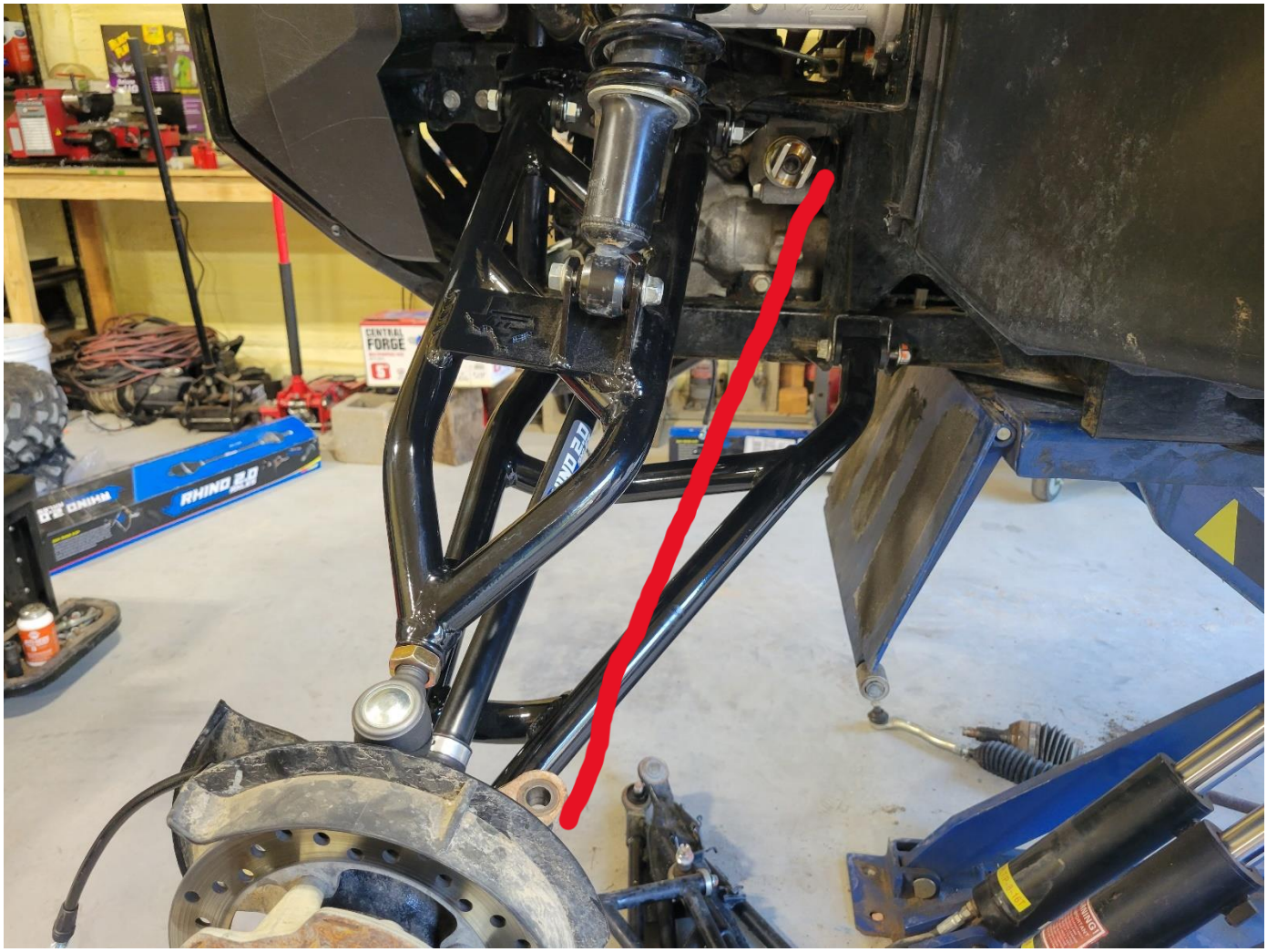
Step 2. Reinstall the inner tie rod clevises into the new steering rack. **(MAKE SURE TO PROPERLY CLOCK THE CLEVISES AND USE RED LOCKTITE) No boots are needed with this Hydraulic setup.**

If you are installing our "Stage 2" heim style tie rods, make sure to "clock" the inner heim clevis slightly towards the back of the machine (@ 1 o'clock on the driver's side, and @ 11 o'clock on the passenger's side). We do this so that the heim maintains full range of movement throughout the full stroke of the ram and doesn't bind up in the clevis. See the picture below or watch the video link below.
(Use red Loctite and torque steering rack bolt to 60ftlb)

https://youtu.be/_fl-srRFd_M



Ideally you want to line the clevis “ears” up with the hole in the hub assembly where the outer tie rod will attach. See pic below.



Step 3. Once everything is put back together, re-check your toe and adjust if needed.

Step 4. Take if for a spin and center steering wheel if necessary.

Step 5. To center the steering wheel, remove the center cap with a flathead screwdriver, then remove the nut securing the wheel to the column. Drive the machine until it is tracking straight, then remove the steering wheel and adjust as necessary. Reinstall the retaining nut and cover, and enjoy.

Troubleshooting:

“Steering Wheel Drift” is normal with any hydraulic steering system. If you notice that your steering wheel does not stay centered while on the trails, don’t be alarmed, this is normal, although you may still have air bubbles in the system that make it worse. Try to vacuum bleed again.

Voltage Drops: If your voltage drops below 12v regularly and does not recover back above 12v under normal riding conditions, you need to double check that your dual battery setup is wired as suggested previously. It is also possible that one of your batteries is getting weak or not charging properly. It could be that your new battery was not fully charged before installation or one of your batteries could be bad or have a bad cell. Try charging both batteries overnight and ensure that both batteries are fully charged and working properly.

Don’t hesitate to give us a call if you have any questions during your installation. 936-581-2948