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| Revisions | | | |
|-----------|------------------------|---------|----------|
| Rev. | Description | Date | Approved |
| A | Revised Per ECO 16-023 | 5/16/16 | A.Smith |
| B | Revised per ECO 18-023 | 3/26/18 | A.Smith |



Jeep TJ/LJ, XJ, ZJ, MJ Heavy Duty Steering Kit

Tie Rod and Drag Link Installation Instructions

Applications:

- 1997-2006 Jeep Wrangler (TJ)
- 2004-2006 Jeep Wrangler (LJ)
- 1987-2001 Jeep Cherokee (XJ)
- 1993-1998 Jeep Grand Cherokee (ZJ)
- 1987-1992 Jeep Comanche (MJ)



TITLE:
**JEEP TJ HEAVY DUTY STEERING KIT
 INSTALLATION INSTRUCTIONS**

| | | |
|----------------------|------------------------------------|---------------------|
| SIZE A | DWG NO: 8121-00-INST | REV B |
| | SCALE: N/A | PAGE 1 OF 9 |



Thank you for purchasing the best aftermarket products available for your vehicle. We strongly feel that the parts you are about to install should meet or exceed your expectations for performance. Proper assembly is critical to the performance of these components and the vehicle as a whole. Please take the time to carefully read these instructions and familiarize yourself with the installation procedure before working on your vehicle. If you have any questions PLEASE contact Synergy Manufacturing BEFORE beginning installation. Thanks again for supporting Synergy – enjoy the performance benefits of the best aftermarket products available for your vehicle!

Synergy Manufacturing

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Modifying or otherwise altering vehicle components may cause the vehicle to handle differently than originally designed. It is the driver’s responsibility to familiarize themselves with the performance and handling characteristics of the modified vehicle. Vehicles with larger diameter than stock tires must be driven carefully and cannot be expected to perform as stock or meet OEM performance with regard to handling, braking or crash performance. Ensure all replacement components are compatible with vehicle capacities so as not to overload components, especially tires. It is up to the individual to ensure that the vehicle and all components are compatible with the intended vehicle use, including load ratings, road conditions, and driver abilities. Thorough and frequent vehicle inspections are recommended to ensure a safe and reliable state of readiness, especially after off-highway use.

PARTS LIST

| 8121-01 Tie Rod | | |
|------------------------|--------------------|--|
| QTY | Part Number | Description |
| 1 | 812101-PC | TJ Tie Rod Powder Coated |
| 1 | 4135-L | TJ Heavy Duty Tie Rod End, Left Hand Thread |
| 1 | 4135-R | TJ Heavy Duty Tie Rod End, Right Hand Thread |

| 8121-02 Drag Link | | |
|--------------------------|--------------------|---|
| QTY | Part Number | Description |
| 1 | 812102-PC | TJ Drag Link Powder Coated |
| 1 | 4135-L | TJ Heavy Duty Tie Rod End |
| 1 | 4137-L | TJ Heavy Duty Tie Rod End, Single Plane |
| 1 | N/A | 1/2”x1.75” UNF Grade 8 Bolt and Locknut |
| 1 | 3622-07-18-PL | Synergy Double Adjuster Sleeve |

| 8003-20 Steering Stabilizer Mount Kit | | |
|--|--------------------|--|
| QTY | Part Number | Description |
| 1 | 8003 | Steering Stabilizer Clamp |
| 1 | N/A | 1/2” x 2” UNF Grade 8 Bolt and washers |
| 6 | N/A | 5/16” x 1” Socket Head Cap Screw |



GENERAL NOTES

- These instructions are also available on our website; www.synergymfg.com. Check the website before you begin for any updated instructions and additional photos or videos for reference.
- This kit is applicable for vehicles lifted 2"-6". Use the OEM pitman arm with this steering kit on vehicles with 2-4" of lift. Vehicles between 4"-6" of lift will likely need a drop pitman arm for steering compatibility.
- This kit requires a minimum of 2" bump stop spacing and the following wheel requirements:
 - 15" wheel – Maximum of 3.75" back spacing
 - 16" wheel – Maximum of 4" back spacing
 - 17" wheel – Maximum of 4.5" back spacing
- Be sure to check the steering for bind when the suspension is at full droop. Limit straps or shorter shocks might be needed on vehicles lifted to 6" heights to prevent steering bind.
- We recommend using FOX-985-24-145 IFP steering stabilizer in conjunction with this steering kit.
- This kit is bolt in with no modification needed to the steering knuckles or pitman arm. Tie rod ends are a direct match to OEM taper.
- Replacement tie rod ends (Part Number 4135-L, 4135-R, and 4137-L) are available from Synergy MFG.
- When greasing tie rod ends, use one pump of grease. DO NOT fill dust boot with grease as this may cause the boot to leak or fail upon articulation.

TOOLS NEEDED

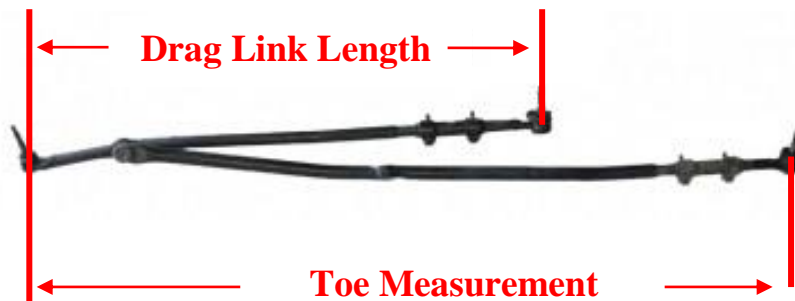
- Wrench / socket sizes: 15mm, 18mm, 5/16", 3/8", 3/4"
- Crescent wrench
- Allen wrench: 1/4"
- Ball peen or small sledge hammer or tie rod end separator tool
- Needle nose pliers / dykes
- Quality jack and jack stands
- Measuring tape
- Torque wrench (recommended)

ESTIMATED INSTALLATION TIME

1-2 Hours

PRE-INSTALLATION CHECKLIST

- Are all the front suspension bushings and joints in good condition?
- Would this be a good time to rotate your tires?
- Measure the drag link and toe lengths as shown below and record.
 - Drag Link Length: _____
 - Toe Measurement: _____



INSTALLATION

- 1) Park the vehicle on a flat, level surface, or safely raise the vehicle on a lift. Chock the rear wheels, make sure the vehicle is in park or in gear, and set the parking brake. This steering kit can be installed with the vehicle on the ground sitting under its own weight, however on vehicles with lower lift heights it is much easier to raise it up and safely support it to gain access to necessary components.
- 2) Record a center to center measurement of the tie rod ends at the knuckle (Toe measurement) and from pitman arm to knuckle (Drag link length) before removing the factory steering. Record numbers above. This will help get a baseline for later with the new steering installed.
- 3) Use the factory steering lock or wrap the seatbelt through the steering wheel in order to prevent the steering wheel from moving too far from center during installation.
- 4) Remove the factory steering. Remove the cotter pins and castle nuts at the pitman arm and steering knuckles. If retaining the same steering stabilizer, remove it at the draglink attachment point, do not retain tapered stud which presses into draglink.
- 5) Remove components by using the appropriate pickle fork, puller or by simply knocking the steering knuckle / pitman arm with a ball peen or small sledge hammer. A couple of sharp blows with a hammer to the steering arm and pitman arm will usually pop the taper loose.
- 6) Upon removal of original steering, inspect the tapered holes in knuckles and pitman arm for deformation and wear. Replace any components that do not appear satisfactory.

- 7) Adjust drag link length to approximately match the length of the removed drag link. Adjust the non-double adjuster side tie rod end (the jam nut side) out to lengthen the bar before installation. The non-double adjuster side tie rod end is left hand thread. Do not adjust the tie rod end out so that more than 1.75" of thread is showing. See **Figure 1**. If more length is needed, adjust the double adjuster side out. Do not adjust the double adjuster out more than 3.25". See **Figure 7**. If the drag link seems too short, then the vehicle requires a dropped pitman arm.

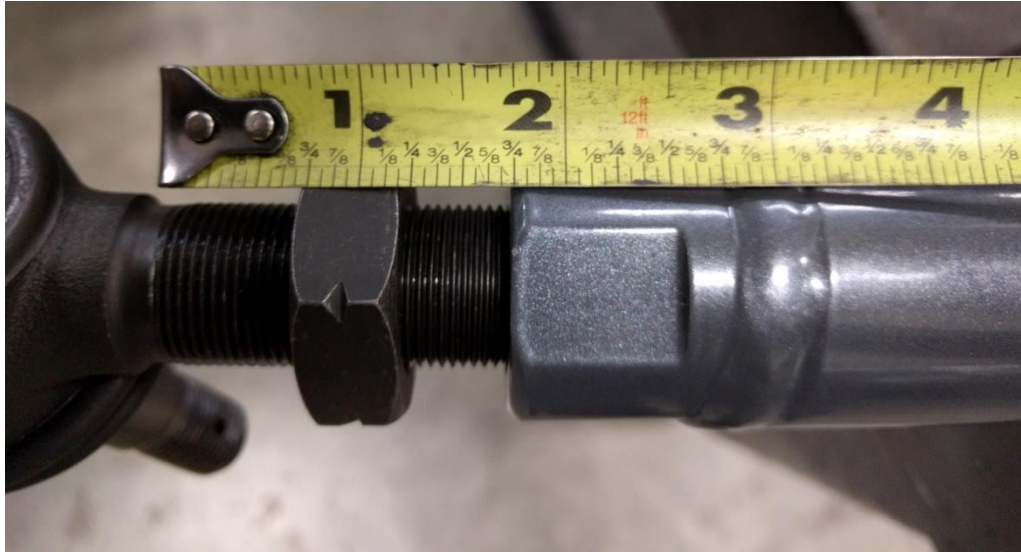


Figure 1. Minimum Thread Engagement on Knuckle Side of Drag Link

- 8) Install drag link onto vehicle. Note, the bent end with the jam nut goes down at the axle side, the double adjuster side with the pinch bolt goes at the pitman arm as shown in **Figure 2**.



Figure 2. Synergy Drag Link Installed

- 9) Install castle nuts and snug down, do not torque at this time.
10) Position draglink so bend is flat and front face of gusset is perpendicular with ground as shown in **Figure 2**. Once approximately in position, snug jam nut at steering knuckle and lightly tighten pinch bolt at pitman arm to hold draglink level.

- 11) Install tie rod onto vehicle. Install tie rod at its shortest assembled length. It does not matter which end goes where; the part is symmetric. Install castle nuts and snug down, do not torque at this time. See **Figure 3**.



Figure 3. Synergy Tie Rod Installed

- 12) Adjust the toe measurement to match the measurement recorded in step 2. Adjust toe by rotating the tie rod. The tie rod features tie rod ends with opposite threads and can be adjusted on the vehicle without removal.
- 13) With toe set, check to make sure the wheels are pointed approximately straight ahead and that the steering wheel is still pointed approximately straight ahead. If the wheels or steering wheel are off significantly, remove the passenger side drag link tie rod end and adjust in or out as necessary, then re-set toe.
- 14) Torque all castle nuts (drag link and tie rod). Torque to 55 lb-ft, then continue to tighten as necessary to align the cotter pin holes. Install cotter pins. Note, cotter pin for gusset side will need to be bent slightly to get started. See **Figure 4**.



Figure 4. Cotter Pin Bent To Engage Tie Rod End Stud

- 15) Install zerk fittings onto all tie rod ends. Note, the 90 deg zerk is to be positioned on the tie rod to draglink joint to allow for ease of service. See **Figure 5**.



Figure 5. Ninety Degree Zerk Fitting

- 16) Install 8003-20 steering stabilizer clamp on drag link. Set stabilizer to halfway through its travel and the steering pointed approximately straight. Install clamp using the supplied 5/16" socket head cap screws. Install one screw on each half of the clamp and snug down. Install the provided 1/2" bolt with a washer sandwiching the steering stabilizer bushing. See **Figure 6**.
- 17) Cycle steering lock to lock to ensure there is no bind and the stabilizer has adequate travel. Once satisfied, install remaining socket head cap screws and torque as follows:
- 5/16" Socket cap screws – 20 lb-ft
 - 1/2" Hex head bolt – 50 lb-ft



Figure 6. Correctly Installed Steering Stabilizer

- 18) Tighten all jam nuts and the pinch bolt at the pitman arm. Jam nuts should be torqued to 175 lb-ft of torque, pinch bolt to 90 lb-ft.
- 19) Next, take a short test drive. When driving in a straight line take note of which way the steering wheel needs to turn to be centered. If the steering wheel is not centered, loosen the pinch bolt and adjust the length of the drag link by turning the double adjuster sleeve. If the steering wheel needs to turn right to be centered, shorten the drag link by turning the silver double adjuster at the pitman arm clockwise. If the steering wheel needs to turn left to be centered, lengthen the drag link by turning the silver double adjuster counterclockwise. When the steering wheel has been determined to be straight, torque the pinch bolt to 90 lb-ft. NOTE, do not adjust the double adjuster out further than 3.25" from center of tie rod end to the end of the draglink. If additional adjustment is needed, adjust out the tie rod end from the knuckle side or the vehicle may need to run a drop pitman arm. See **Figure 7**.

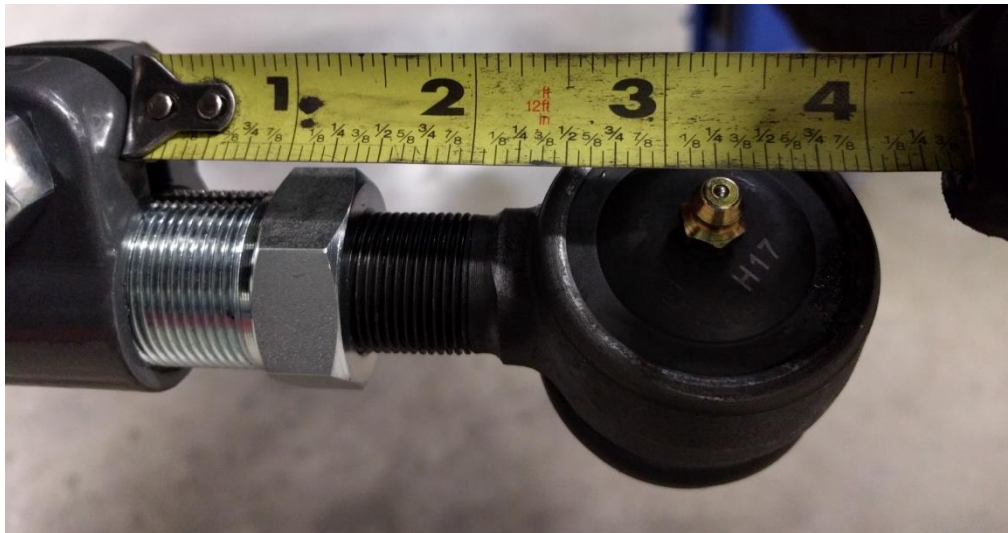


Figure 7. Minimum Thread Engagement on Pitman Arm Side of Drag Link

- 20) Re-check the vehicle toe.
 - Mark a vertical line near the middle of the tire tread on both tires with a paint pen or chalk.
 - Measure between the two lines with a tape measure when the mark is on the front of the tire. Make sure the marks are at the same height so the tape measure is parallel and level with the ground.
 - Take note of this measurement then rotate the tires 180 degrees so the mark is on the back of the tire, measure and note the difference between the two.
 - The difference between the two measurements is toe. We recommend 0" to 1/8" of toe in (The front of the tires are closer together than the rear of the tires).
 - Adjust toe by loosening jam nuts and rotating the tie rod to adjust.
- 21) With toe set, tighten the jam nuts. Torque all jam nuts to at least 175 lb-ft. If the proper tools are not available to torque the jam nuts, it may be necessary to use a large crescent wrench with a cheater bar in order to get the nuts tight enough.
- 22) Double check all bolts / torques before driving and recheck bolt torque after 100 miles of driving.
- 23) Grease tie rod ends at normal chassis lube intervals or after deep water / mud crossings. Be sure to just use one small shot of grease. Do not fill dust boot full of grease, as this can cause boots to leak or fail when articulating.



POST-INSTALLATION CHECKLIST

- Did you remember to torque all the hardware?
- Double check to make sure all cotter pins are installed (there should be 4).
- Make a stop at the alignment shop. Tires are expensive and can get ruined by a bad alignment. Often, if the alignment is good the shop will not charge you.
- Did you find any worn out parts during the install that should be replaced? Get the new parts on order!
- Put a note on your fridge or your phone to check all hardware after approximately 100 miles of driving!