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Revisions			
Rev.	Description	Date	Approved
C	Revised Per ECO 19-020	2/18/19	C. Steimle
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Dodge RAM Heavy Duty Steering Kit

Tie Rod and Drag Link Installation Instructions

Applications:
 1994-2013 2500 and 1994-2012 3500 4x4
 2006-2008 1500 Megacab 4x4



TITLE:
**DODGE RAM HEAVY DUTY STEERING
 KIT INSTALLATION INSTRUCTIONS**

SIZE	DWG NO:	REV
A	8525-XX-INST	E
	SCALE: N/A	PAGE 1 OF 18



Thank you for purchasing the best aftermarket products available for your vehicle. We strongly feel that the parts you are about to install will 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
Phone: (805) 242-0397
Email: support@synergymfg.com

Now for the lawyer part:

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.



Part Lists

Parts for all kits covered by these instructions are below. If you have ordered individual parts, you should be able to find the appropriate components in the tables below. You may then go to the section of the instructions dealing with the individual components.

8525-03 1994-1999 Dodge 2500/3500 4WD Complete Heavy Duty Steering Kit consists of:

8567-03 or 8567-13 Drag link Kit		
QTY	Part Number	Description
1	856703-PC	94-99 Dodge 2500/3500 4x4 Drag link
1	n/a	½-20 UNF 1.75" long Grade 8 Bolt and Lock Nut
1	4160-L	Heavy Duty Tie Rod End (with castle nut, cotter pin, dust boot and zerk fitting)
1	4136-L	Heavy Duty Tie Rod End (with castle nut, cotter pin, dust boot and zerk fitting)
1	n/a	Tie Rod End Jam Nut
1	3622-10-14-PL	Synergy Double Adjuster Sleeve

AND

8568-03 Tie Rod Kit		
QTY	Part Number	Description
1	856803-PC	94-99 Dodge 2500/3500 4x4 Heat Treated Tie Rod
2	n/a	½-20 UNF 1.75" long Grade 8 Bolt and Lock Nut
2	4136-L	Heavy Duty Tie Rod End (with castle nut, cotter pin and zerk fitting)
1	n/a	Tie Rod End Jam Nut
1	3622-10-14-PL	Synergy Double Adjuster Sleeve
2	4134-02	Low Misalignment TRE Dust Cover (Rubber boot and Metal Washer cap)

AND

8568-11 Steering Stabilizer Mount Kit		
QTY	Part Number	Description
1	856811-DB	94-99 Dodge 2500/3500 4x4 Steering Stabilizer Track Bar Mount
1	856810-PC	Dodge Steering Stabilizer Bracket
2	n/a	5/16-18 UNC 1.5" Diameter U-Bolt
4	n/a	5/16-18 Lock Nut and Washer
1	n/a	½-20 UNF 2.5" Long Grade 8 Bolt and Lock Nut
2	n/a	½ Diameter Washer



**8525-02 2000-2002 Dodge 2500/3500 4WD Complete Heavy Duty
Steering Kit consists of:**

8567-02 or 8567-12 Drag link Kit		
QTY	Part Number	Description
1	856703-PC	00-02 Dodge 2500/3500 4x4 Drag link
1	n/a	1/2-20 UNF 1.75" long Grade 8 Bolt and Lock Nut
1	4160-L	Heavy Duty Tie Rod End (with castle nut, cotter pin, dust boot and zerk fitting)
1	4133-L	Heavy Duty Tie Rod End (with castle nut, cotter pin, dust boot and zerk fitting)
1	n/a	Tie Rod End Jam Nut
1	3622-10-14-PL	Synergy Double Adjuster Sleeve

AND

8568-02 Tie Rod Kit		
QTY	Part Number	Description
1	856802-PC	00-02 Dodge 2500/3500 4x4 Heat Treated Tie Rod
2	n/a	1/2-20 UNF 1.75" long Grade 8 Bolt and Lock Nut
2	4134-L	Heavy Duty Tie Rod End (with castle nut, cotter pin and zerk fitting)
1	n/a	Tie Rod End Jam Nut
1	3622-10-14-PL	Synergy Double Adjuster Sleeve
2	4134-02	Low Misalignment TRE Dust Cover (Rubber boot and Metal Washer cap)

AND

8568-10 Steering Stabilizer Mount Kit		
QTY	Part Number	Description
1	856810-PC	Dodge Steering Stabilizer Bracket
2	n/a	5/16-18 UNC 1.5" Diameter U-Bolt
4	n/a	5/16-18 Lock Nut and Washer
1	n/a	1/2-20 UNF 2.5" Long Grade 8 Bolt and Lock Nut
2	n/a	1/2 Diameter Washer



**8525-01 2003-2013 Dodge 2500/3500 AND 4WD Complete Heavy
Duty Steering Kit consists of:**

8567-01 or 8567-11 Drag link Kit		
QTY	Part Number	Description
1	856701-PC	03-13 Dodge 2500/3500 4x4 Drag link
1	n/a	1/2-20 UNF 1.75" long Grade 8 Bolt and Lock Nut
1	4160-L	Heavy Duty Tie Rod End (with castle nut, cotter pin, dust boot and zerk fitting)
1	4133-L	Heavy Duty Tie Rod End (with castle nut, cotter pin, dust boot and zerk fitting)
1	n/a	Tie Rod End Jam Nut
1	3622-10-14-PL	Synergy Double Adjuster Sleeve

AND

8568-01 Tie Rod Kit		
QTY	Part Number	Description
1	856801-PC	03-13 Dodge 2500/3500 4x4 Heat Treated Tie Rod
2	n/a	1/2-20 UNF 1.75" long Grade 8 Bolt and Lock Nut
2	4134-L	Heavy Duty Tie Rod End (with castle nut, cotter pin and zerk fitting)
1	n/a	Tie Rod End Jam Nut
1	3622-10-14-PL	Synergy Double Adjuster Sleeve
2	4134-02	Low Misalignment TRE Dust Cover (Rubber boot and Metal Washer cap)

AND

8568-10 Steering Stabilizer Mount Kit		
QTY	Part Number	Description
1	856810-PC	Dodge Steering Stabilizer Bracket
2	n/a	5/16-18 UNC 1.5" Diameter U-Bolt
4	n/a	5/16-18 Lock Nut and Washer
1	n/a	1/2-20 UNF 2.5" Long Grade 8 Bolt and Lock Nut
2	n/a	1/2 Diameter Washer



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 your reference.
- Replacement tie rod ends and boots are available from Synergy MFG, see parts listing for appropriate part numbers.
- The tie rod and drag link are designed to be used in conjunction with each other. They cannot be used with factory components or other aftermarket components in most cases.
- When greasing tie rod ends, use one pump of grease. DO NOT fill dust boot with grease as this will cause the boot to leak or fail upon articulation.
- For 03-08 trucks, switching to the Mopar pitman arm P/N: 68039930AA for 08.5+ trucks is recommended. The updated pitman arm is designed for 'T' style steering as opposed to the older 'Y' style steering.
- 98-99 trucks that originally came with T-Style Steering (Where the tie rod connects to both knuckles) must use the pitman arm from 94-97 trucks, stamped TRW-246.
- The Synergy MFG heat treated tie rod replaces the factory tie rod in the factory location. The included tie rod steering stabilizer clamp will be used to attach the factory or aftermarket steering stabilizer. We recommend using FOX-982-24-941 stabilizer as an aftermarket unit.
- 94-99 trucks with factory "high mount" steering stabilizers will require removal of axle side track bar bolt for 8568-11 stabilizer bracket installation.

Tools Needed

- Wrench / socket sizes:
 - 15mm
 - 18mm
 - 21mm
 - 3/4"
 - 7/8"
- Two large Crescent type wrenches
- Hammer or tie rod end separator tool
- 94-99 vehicles; Drill with metal cutting 3/8" drill bit or welder (optional)
- Needle nose pliers / dykes
- Quality jack and jack stands (never work under a vehicle supported only by a jack!)
- Measuring tape
- 4-1/2" angle grinder with sanding disc or 3" air sander with sanding disc (recommended)
- Torque wrench

Estimated Installation Time 2-4 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 distance between the tie rod ends on the steering knuckles.
 - Record Tie Rod Length: _____



Figure 1. How to Measure Tie Rod Length

TIE ROD INSTALLATION

- 1) Jack the front axle up so the tires are not touching the ground and support with jack stands.
- 2) Measure Tie Rod length and record on Page 7 if not done already.
- 3) Remove steering stabilizer.
 - 00-13 trucks; Remove the steering stabilizer from bracket on tie rod.
 - 94-99 trucks; Remove the steering stabilizer completely.
- 4) Loosen tie rod end nuts at the knuckles and the pitman arm. Remove nuts completely, then reinstall loosely – one or two complete turns of engagement. This will prevent the tie rod and drag link falling when the taper separates.
- 5) Separate the tie rod ends from the steering knuckles by using a tie rod separator tool or by striking the knuckle near the taper with a large hammer. Separate the tie rod end from the pitman arm using a tie rod separator. Completely remove the steering from the steering knuckles and pitman arm.
- 6) On the new Synergy tie rod, adjust the tie rod end on the tapered hole side of the tie rod so that it is all the way in with only a thread or 2 showing past the jam nut. See **Figure 2**.

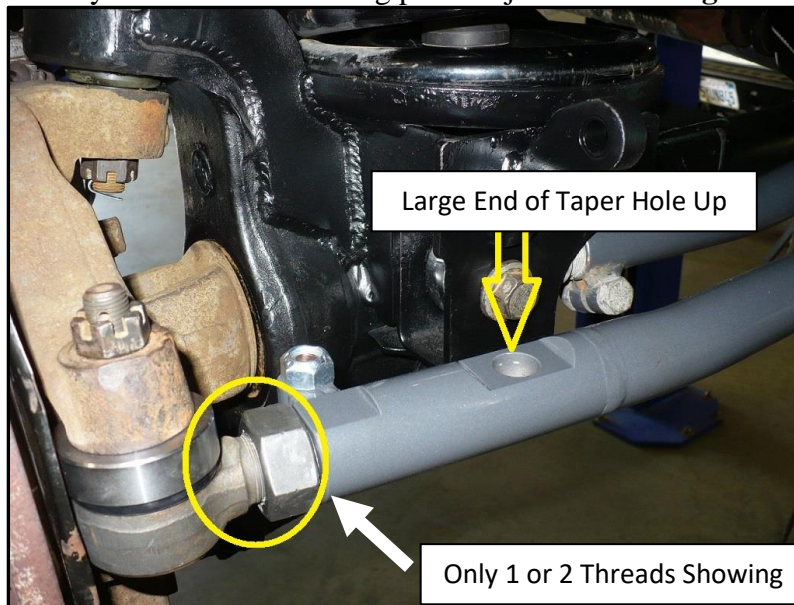


Figure 2. Tie Rod End Shown Threaded in with 1 or 2 Threads Showing

- 7) Install tie rod end dust boots. Install the rubber cap first. Press down until it snaps into place. Coat the top of the boots and inside of the metal caps with grease and install the caps on top of the rubber cap. See **Figures 3, 4, and 5**.

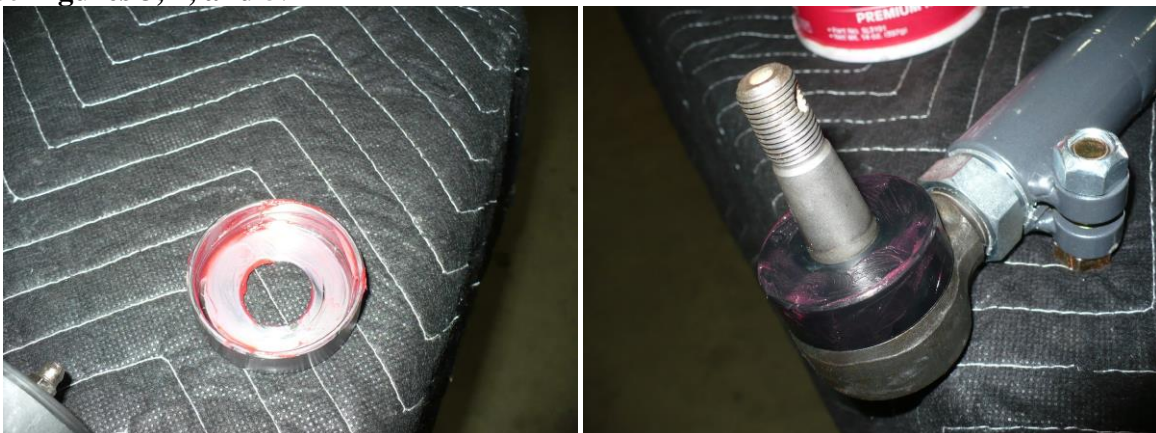


Figure 3 and 4. Grease Bushing and Cap when Installing on Tie Rod End



Figure 5. Bushing and Cap Installed

- 8) Next, ensure that the bottom of the steering knuckle where the tie rod end bolts to is smooth and flat. Any burrs or deformation of the knuckle will cause the tie rod end to not seat properly. Lightly sand smooth if any irregularities are present. See **Figures 6 and 7**.



Figure 6 and 7. Smoothing Bottom of Steering Knuckle

- 9) **Steps 10-14 apply to only 94-99 vehicles which feature the steering stabilizer mounted from the frame to the drag link. 2000 and up vehicles which feature a factory “low mount” steering stabilizer, proceed to step 15.**
- 10) Remove track bar bolt from axle side of track bar and move track bar as out of the way as possible. It may be preferable to completely remove the track bar.
- 11) Install 8568-11 Stabilizer Bracket as shown. Re-install axle side track bar bolt as shown below to align. See **Figure 8**.

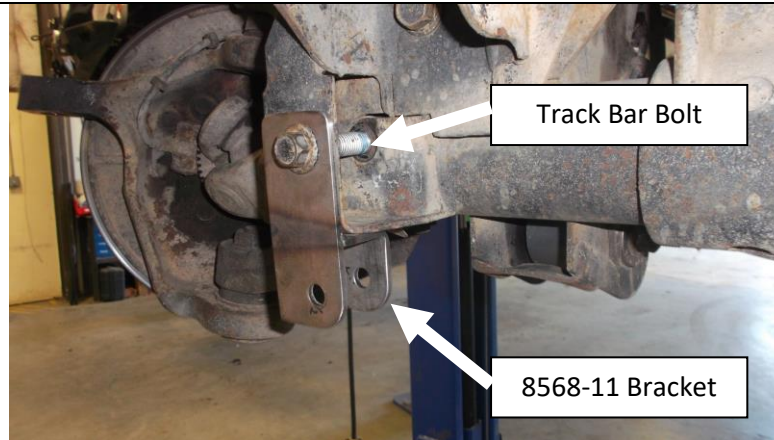


Figure 8. 8568-11 Steering Stabilizer Bracket Installed

- 12) The bracket can be welded or bolted on. If welding the bracket on, take note of the areas that need to be cleaned up for welding. If bolting the bracket on, mark the location of the bottom 3/8" bolt. See **Figure 9**.

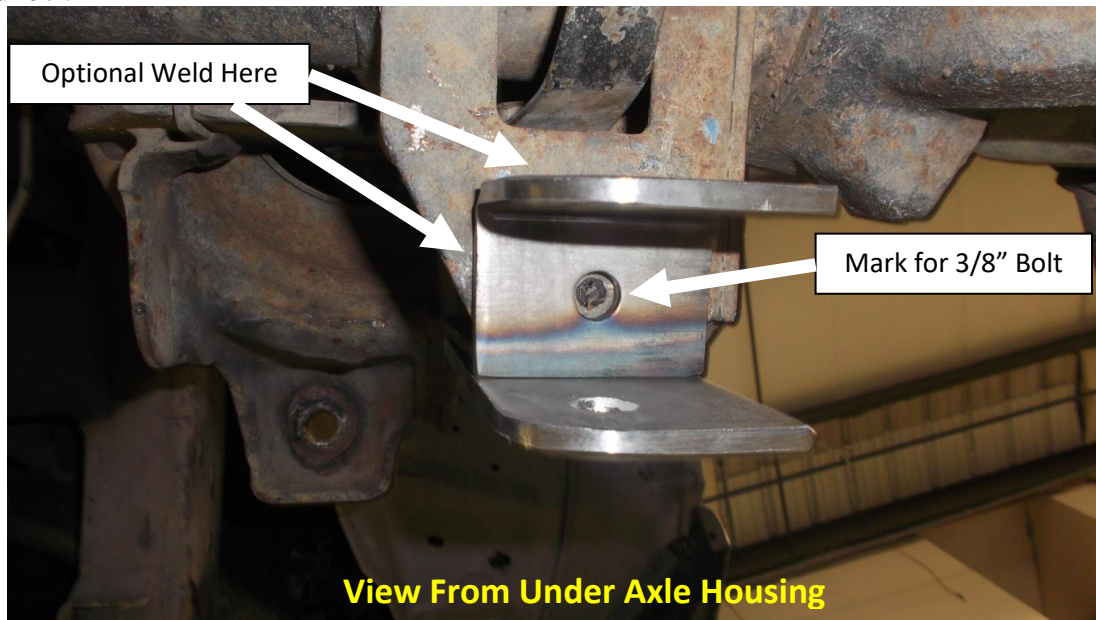


Figure 9. Where to Drill or Weld 8568-11 Bracket

- 13) Remove bracket and drill hole or clean areas for welding. After drilling or cleaning axle, reinstall and attach with bolt or weld. Paint any exposed metal to prevent corrosion.
- 14) Reinstall track bar and fully torque track bar bolts at this time. OEM specs: 130 lb-ft at axle. 70 lb-ft at frame for ball stud. Refer to manufacture's specifications if using a different bracket / track bar / bolt size.
- 15) Install the tie rod.
- 1994-2002 Trucks: Align so that the bent part of the rod points towards down, allowing clearance for the pitman arm. The double adjuster should be on the driver side, the pinch bolts on the back of the tie rod. See **Figures 10 and 11**.

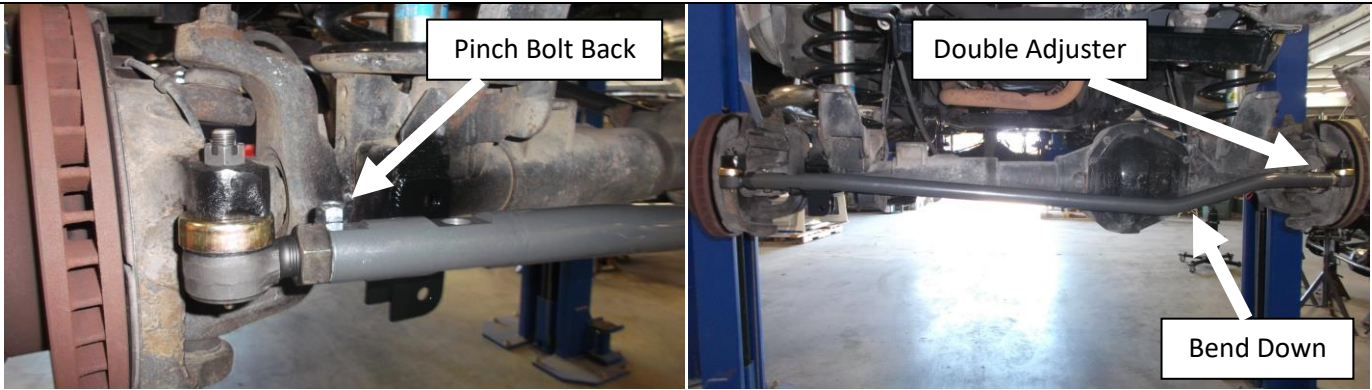


Figure 10 and 11. 1994-2002 Tie Rod Shown with Pinch Bolts Back and Bend Down

- 2003-2013 Trucks: Align so that the bent part of the rod points forward, allowing clearance for the diff cover. The double adjuster should be on the driver side, the pinch bolts on the back of the tie rod. See **Figures 12 and 13**.



Figure 12 and 13. 2003-2013 Tie Rod Shown with Pinch Bolts Back and Bend Forward

- 16) Thread double adjuster assembly (silver nut on drivers side of tie rod) in or out of tie rod bar so that center to center measurement matches original measurement taken on Page 7.
- 17) Torque tie rod end castle nuts to 70 lb-ft and then further tighten in order to align the cotter pin hole. Never loosen castle nuts in order to align cotter pin holes. Install cotter pins.
- 18) Measure Tie Rod length again. In order to adjust length, loosen pinch bolt on driver side and turn the adjuster clockwise to shorten the arm, counter clockwise to lengthen it. Adjust to the measurement recorded on Page 7 for a baseline.
 - We recommend about 1/8" of toe in. Toe-in is when the front of the tires are closer together than the rear of the tires.
- 19) Fully tighten pinch bolts on both sides. Torque both pinch bolts to 90 lb-ft. After tightening the pinch bolt, put a wrench on the adjuster sleeve and try to move the adjuster. Make sure the pinch bolt has adequately clamped onto the threaded tie rod end shank so that the adjuster is not movable. If movable, increase torque on pinch bolt but do not exceed 120 lb-ft.
- 20) Fully tighten the jam nut. Jam nuts have a tendency to come loose, so ensure they are adequately tightened. If the largest tool you own has less than a 2-foot-long handle, you are going to have to use a cheater bar to get the necessary leverage. The jam nut needs to be torqued to 200 lb-ft.

DRAG LINK INSTALLATION

- Notes:
 - The following images show installation of a drag link on a 2005 Dodge 2500 CTD 4x4. Installation for other years will be very similar.
 - These instructions begin with a Synergy tie rod already installed.
 - There are two different styles of Synergy drag links, the older style uses a jam nut on the tie rod side, the new style uses a pinch bolt on the tie rod side.
- Verify that the tie rod ends are installed on the correct sides of the drag link. Remove the boots and make sure the Single Plane tie rod end is at the end of the drag link that installs in the Tie Rod (non double-adjuster side). The regular tie rod end should be on the pitman arm side with the double adjuster. See **Figures 14 and 15** for the difference between the single plane tie rod end and the normal tie rod end. See **Figure 16** for their location on the drag link.

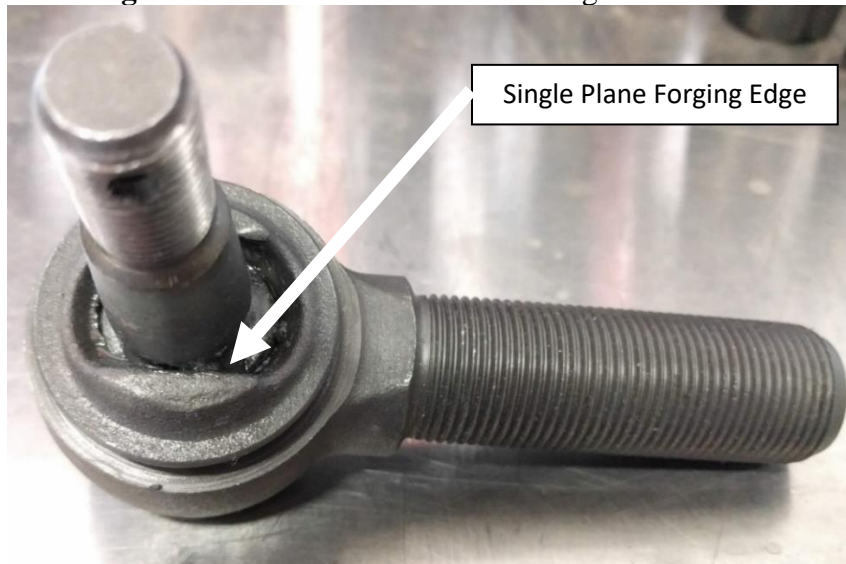


Figure 14. Single Plane Tie Rod End, Boot Removed, to be Installed at Tie Rod

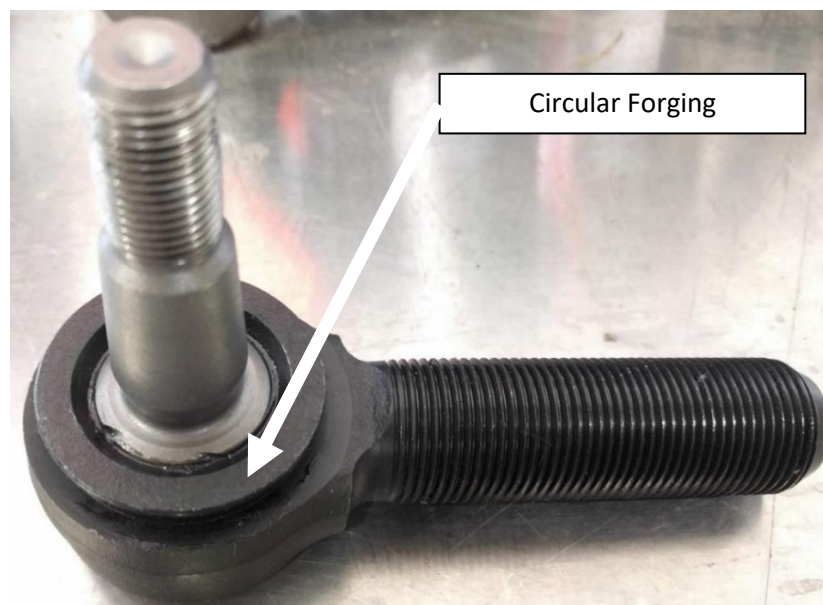


Figure 15. Normal Tie Rod End, Boot Removed, to be Installed at Pitman Arm

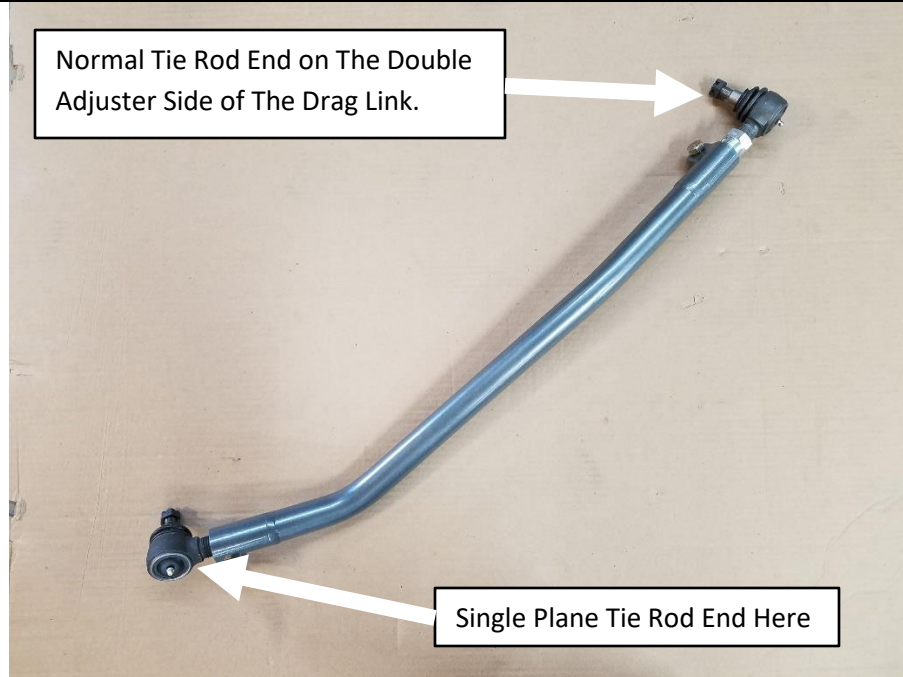


Figure 16. Tie Rod End Locations

3. For vehicles with 0-3.5” of lift, thread the single plane tie rod end fully into the drag link. The tie rod end is **LEFT HAND THREAD**. You are currently adjusting the side of the drag link that bolts to the **tie rod**, the side **WITHOUT** the double adjuster.
4. Be sure the double adjuster assembly (pitman arm side) is fully collapsed and at its shortest length. The adjuster sleeve and tie rod end shank should be bottomed out.
5. Synergy 8567-01 drag links are oriented with the pitman arm side pinch bolt up. All other drag links should have the pitman arm side pinch bolt oriented down. See **Figure 17**.

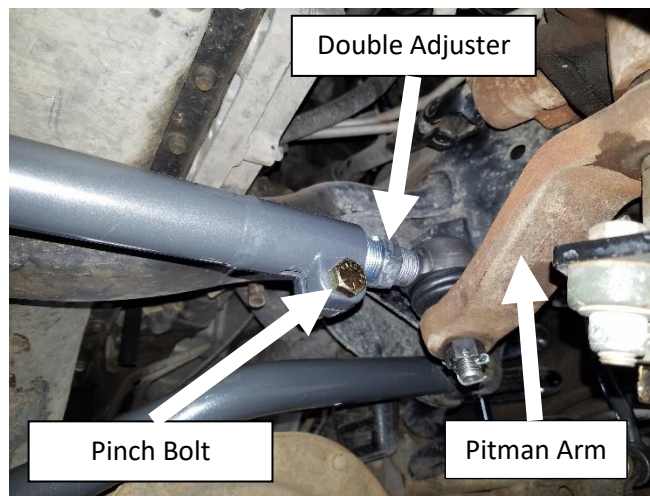


Figure 17. Pitman Arm Side of Synergy Drag Link Shown with Pinch Bolt Down

6. Install the castle nuts at the tie rod side and pitman arm side and torque to 70 lb-ft. Do not install the cotter pins at this time – The tie rod end may have to be removed in order to thread it into or out of the drag link in the next steps.
7. Align the drag link so the bend at the tie rod junction is flat and towards the front. For Drag links with pinch bolts, align the pinch bolt forging so that the pinch bolt is forward. Tighten the pinch bolt on the tie rod side, but you do not need to fully torque at this time. Tightening the pinch bolt will

'lock' the drag link into position. For drag links with a jam nut, hold the drag link wrench flats with a large wrench and tighten the jam nut with a second large wrench. The tie rod end that goes from the drag link into the tie rod is a single plane tie rod end that will prevent the drag link from 'flopping'. See **Figures 18 and 19**.

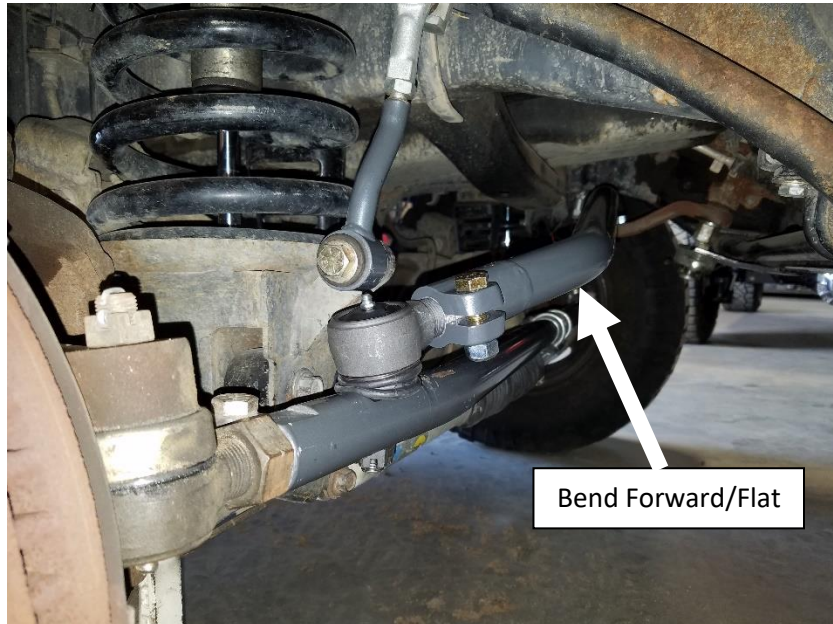


Figure 18. Synergy Drag Link Shown with Bend Forward/Flat

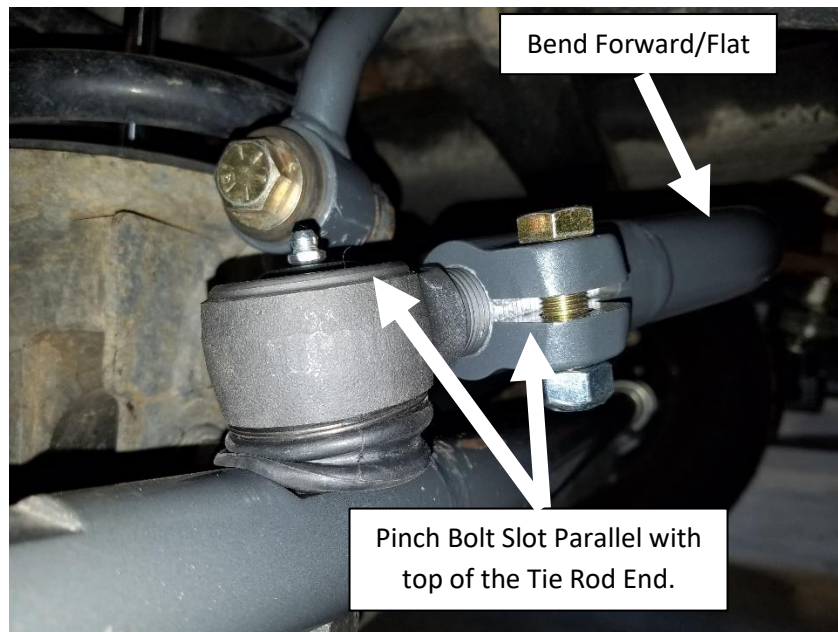


Figure 19. Pinch Bolt Style Drag Link Tie Rod End Correct Alignment

8. Make sure the front wheels are pointed straight ahead. Turn the double adjuster nut (silver nut on pitman arm side of drag link) to center the steering wheel. **If the steering wheel needs to turn right to be centered, shorten the drag link. If the steering wheel needs to turn left to be centered, lengthen the drag link.** Make sure the steering wheel isn't locked and is free to move. NOTE: Do not adjust the double adjuster out further than 3.25" from center of tie rod end (zerk fitting) to the end of the drag link. See **Figure 23**. If the drag link still needs to be adjusted longer then it will be

necessary to remove the tie rod end from its taper in the tie rod and adjust out (lengthen) the drag link. It is left hand thread. Do not adjust the tie rod end out further than 2.75" from center of tie rod end (zerk fitting) to the end of the drag link. See **Figure 20**.



Figure 20. Tie Rod End Adjusted MAX 2.75" Out (Non Double Adjuster Side)

9. When the steering wheel has been centered, tighten the double adjuster pinch bolts to 90 lb-ft. After tightening the pinch bolt, put a wrench on the adjuster sleeve and try to move the adjuster. Make sure the pinch bolt has adequately clamped onto the threaded tie rod end shank so that the adjuster is not movable. If movable, increase torque on pinch bolt but do not exceed 120 lb-ft. If the drag link is the jam-nut style, torque jam nut to 200 lb-ft.
10. At this point, install grease zerks if they haven't been installed already. Grease the joints with 1 pump of grease. DO NOT over grease!
11. Install stabilizer into the factory stabilizer mount at the axle or into the 8568-11 bracket installed in Tie Rod Installation steps 10-14 for 94-99 vehicles. Use the factory steering stabilizer bolt for attachment at the axle side.
12. Set steering stabilizer to approximately halfway through the travel with the wheels pointed straight. Note, on a stock stabilizer, this should equate to about 4-1/4" of shaft showing.
13. Attach the free end of the stabilizer to the 8568-10 bracket as shown. Install the 1/2-20 UNF x 2.5" long bolt and use a washer under both the bolt head and stover nut. Do not fully tighten bolt at this time. See **Figure 21**.

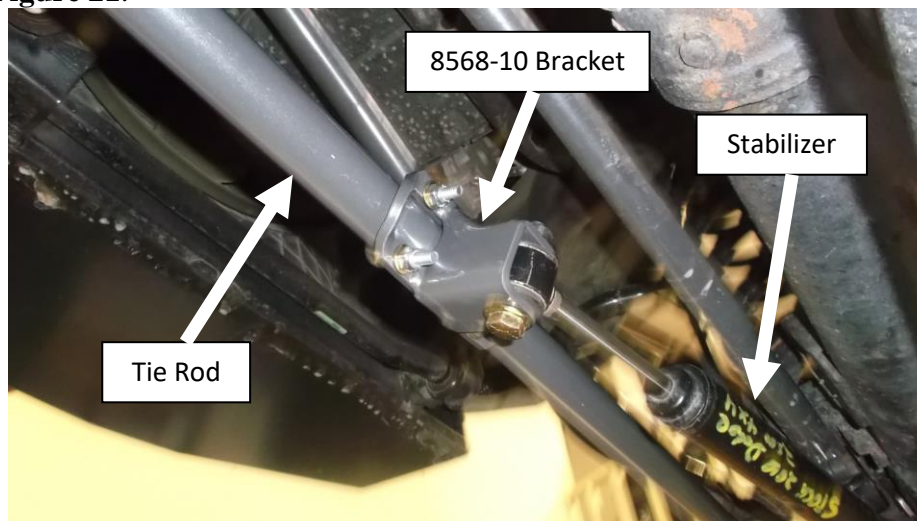


Figure 21. Steering Stabilizer Shown Mounted to 8568-10 Bracket

14. With stabilizer installed into 8568-10 bracket, position bracket onto tie rod so there is no bind in the stabilizer bushings with the steering pointed straight. Make sure bracket sits flat on the tie rod and install u-bolts. Use a washer under the nylock nuts and torque to 15 lb-ft. Do not overtorque! See **Figure 22**.

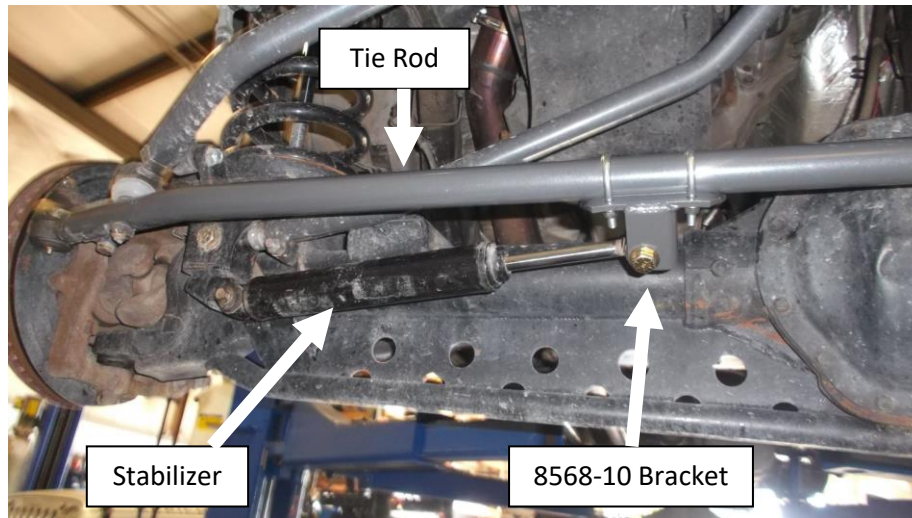


Figure 22. Steering Stabilizer Shown Mounted to 8568-10 Bracket

15. Torque $\frac{1}{2}$ " stabilizer bolt to 80 lb-ft. Turn steering from lock to lock and ensure no binding or interference occurs. If bracket contacts diff cover, rotate it down and forward until it clears at full lock. Ensure the stabilizer does not top out or bottom out (run out of travel in either direction). Bent and broken parts can result from the stabilizer running out of travel.
16. Next, take a short test drive. This can simply consist of rolling the truck forward and back a few feet to verify that the steering wheel is centered. When driving in a straight line take note of which way the steering wheel needs to turn to be centered.
17. Re-adjust drag link as needed. **If the steering wheel needs to turn right to be centered, shorten the drag link. If the steering wheel needs to turn left to be centered, lengthen the drag link.**
NOTE: Do not adjust the double adjuster out further than 3.25" from center of tie rod end (zerk fitting) to the end of the drag link. If additional adjustment is needed, unthread the tie rod end from the tie rod side or vehicle may need to run a drop pitman arm and track bar bracket. See **Figure 23**.



Figure 23. Tie Rod End Adjusted MAX 3.25" Out (Double Adjuster Side)

18. Once the steering wheel is straight, we need to check clearance with the draglink and other components, especially the tie rod. Grab the drag link and rotate it up and down. If it is making contact with the tie rod or anything else through its range of movement, loosen the pinch bolts and or jam nut and readjust. Keep doing this until there is no longer any interference and a sufficient amount of clearance between all components. Now, cycle your steering left and right, lock to lock, and verify there is sufficient clearance between all components at all steering angles. Once satisfied, tighten pinch bolts to 90 lb-ft. After tightening the pinch bolts, put a wrench on the double adjuster sleeve and try to move the adjuster. Make sure the pinch bolt has adequately clamped onto the threaded tie rod end shank so that the adjuster is not movable. If movable, increase torque on pinch bolt but do not exceed 120 lb-ft. Torque jam nuts to 200 lb-ft.
19. Torque tie rod end castle nuts to 70 lb-ft and then further tighten in order to align the cotter pin hole. Never loosen castle nuts in order to align cotter pin holes. Install cotter pins. On the pitman arm side, washers may be necessary under the castle nut in order for the cotter pin to engage the castle nut. This is due to variances in thickness of the pitman arms for the various model year trucks. See **Figures 24 and 25.**



Figure 24 and 25. Washer Used Under Castle Nut

20. Check jam nut & pinch bolt torques after the first 100 miles of driving. Re-grease joints at standard chassis lubrication intervals.

INSTALLATION IS COMPLETE



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! It is important to replace all worn components at the same time. One worn component can cause other brand new components to wear out prematurely.
- Put a note on your fridge or your phone to check all hardware after approximately 100 miles of driving!