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Revisions			
Rev.	Description	Date	Approved
F	REVISED PER ECO 23-025	11/7/23	RG



Dodge RAM Heavy Duty Steering Kit

Tie Rod and Drag Link Installation Instructions

Applications:
 2003-2013 2500 and 2003-2012 3500 4x4
 2006-2008 1500 Megacab 4x4



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

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	SCALE: N/A	PAGE 1 OF 13



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
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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

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

8567-11 Drag link Kit		
QTY	Part Number	Description
1	856701-PC	03-13 Dodge 2500/3500 4x4 Drag link
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	3622-10-14-PL	Synergy Double Adjuster Sleeve
2	HF8-8-20	1/2-20 UNF 2" Long Grade 8 Bolt
2	NSF-8	1/2-20 UNF Top Lock Nut
4	WF8-8	1/2" Grade 8 Washer

AND

8568-21 Tie Rod Kit		
QTY	Part Number	Description
1	856821-PC	03-13 Dodge 2500/3500 4x4 Heat Treated Tie Rod
1	4167-L	Heavy Duty Tie Rod End (with boot, castle nut, cotter pin and zerk fitting)
1	4134-L	Heavy Duty Tie Rod End (with boot, castle nut, cotter pin and zerk fitting)
1	3622-10-14-PL	Synergy Double Adjuster Sleeve
2	HF8-8-20	1/2-20 UNF 2" Long Grade 8 Bolt
2	NSF-8	1/2-20 UNF Top Lock Nut
4	WF8-8	1/2" Grade 8 Washer

AND

8568-10 Steering Stabilizer Mount Kit		
QTY	Part Number	Description
1	856810-PC	Dodge Steering Stabilizer Bracket
2	UB-5C-150-200	5/16-18 UNC 1.5" Diameter U-Bolt
4	NSC-5	5/16-18 Lock Nut
4	WF8-5	5/16 Grade 8 Washer
1	HF8-8-20	1/2-20 UNF 2.5" Long Grade 8 Bolt
1	NSF-8	1/2-20 UNF Top Lock Nut
2	WF8-8	1/2" Grade 8 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.
- 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 our 6401-01 Fox stabilizer as an aftermarket unit.

Tools Needed

- Wrench / socket sizes:
 - 15mm
 - 18mm
 - 21mm
 - 3/4"
 - 7/8"
- Hammer or tie rod end separator tool
- Needle nose pliers / dykes
- Quality jack and jack stands (never work under a vehicle supported only by a jack!)
- Measuring tape
- Torque wrench

Estimated Installation Time
2-4 Hours

Pre-Installation Checklist

- 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. Remove steering stabilizer from bracket on tie rod.
3. Measure the factory tie rod length. It is easiest to measure from grease zerk to grease zerk. Make note of this measurement.
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.

- Adjust the passenger side tie rod end (non-double adjuster side) so that the zerck fitting is 2 1/4" from the end of the forging. See **Figure 2**.



Figure 2. Passenger side TRE adjusted to 2 1/4" from end of tie rod.

- Install the tie rod. Position the bar so that the bent part of the tie 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 3 and 4**.

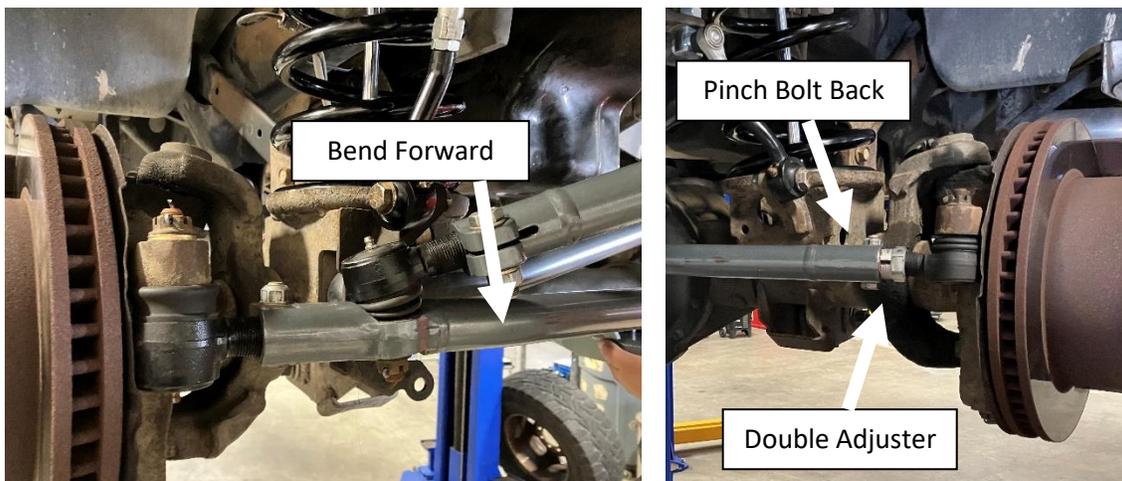


Figure 3 and 4. Tie Rod Shown with Pinch Bolts Back and Bend Forward

- 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.
- Measure tie rod length, and adjust it to the same length of the factory tie rod. 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. 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.

10. 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.

DRAG LINK INSTALLATION

11. 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 5 and 6** for the difference between the single plane tie rod end and the normal tie rod end. See **Figure 7** for their location on the drag link.

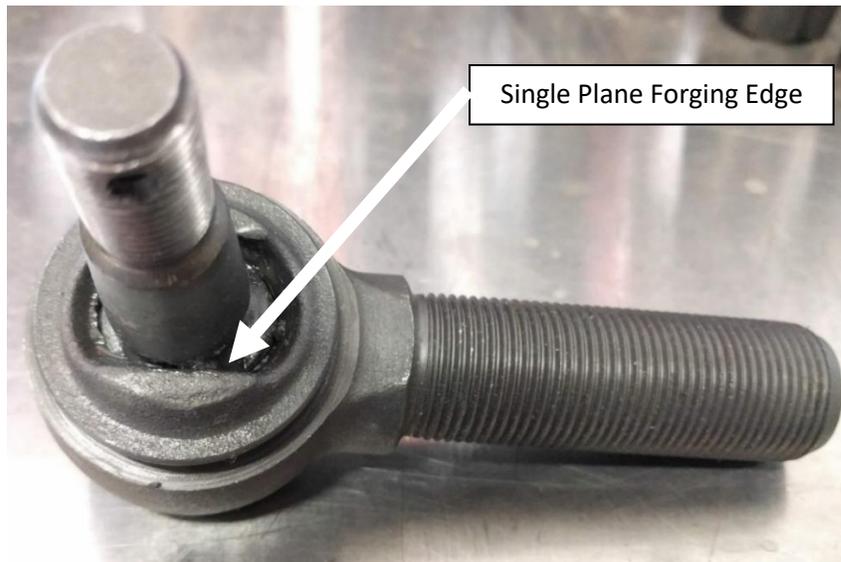


Figure 5. Single Plane Tie Rod End, Boot Removed, to be Installed at Tie Rod

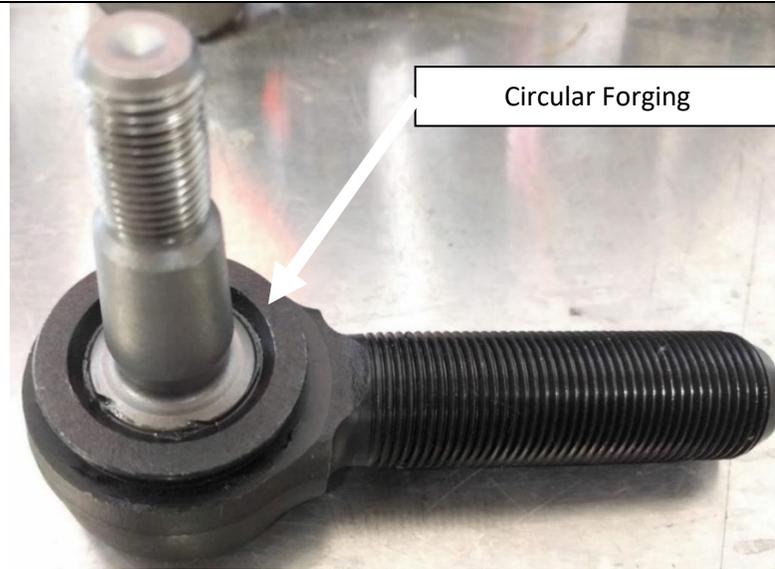


Figure 6. Normal Tie Rod End, Boot Removed, to be Installed at Pitman Arm

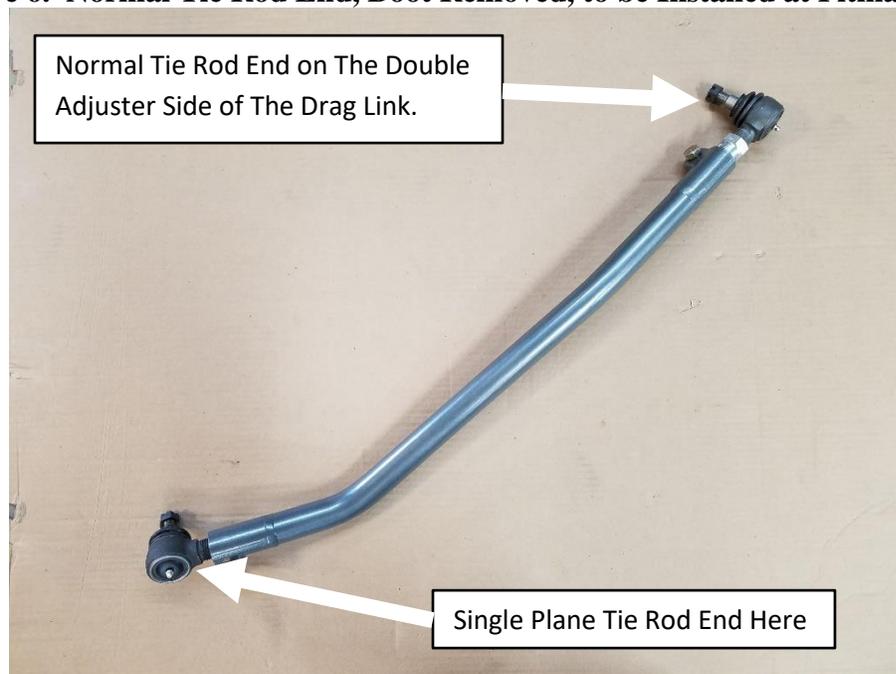


Figure 7. Tie Rod End Locations

12. 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.
13. 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.
14. Synergy 8567-11 drag links are oriented with the pitman arm side pinch bolt down. See **Figure 8**.

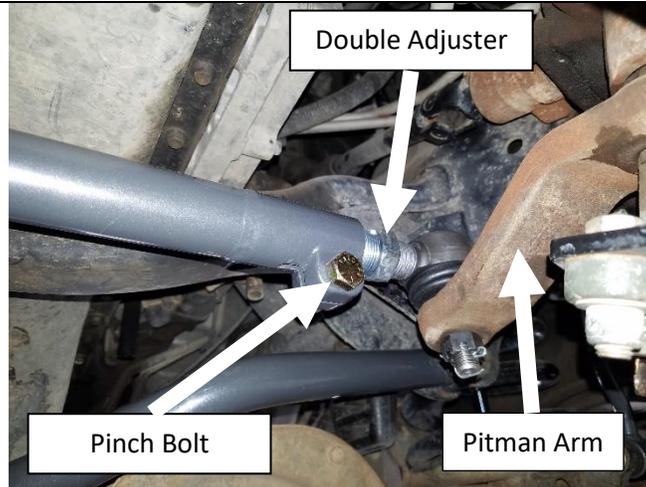


Figure 8. Pitman Arm Side of Synergy Drag Link Shown with Pinch Bolt Down

15. 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.
16. Align the drag link so pinch bolt forging is forward and the bend is flat. Tighten the pinch bolt on the tie rod side, you do not need to fully torque at this time. Tightening the pinch bolt will ‘lock’ the drag link into position. 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 **Figure 9**.

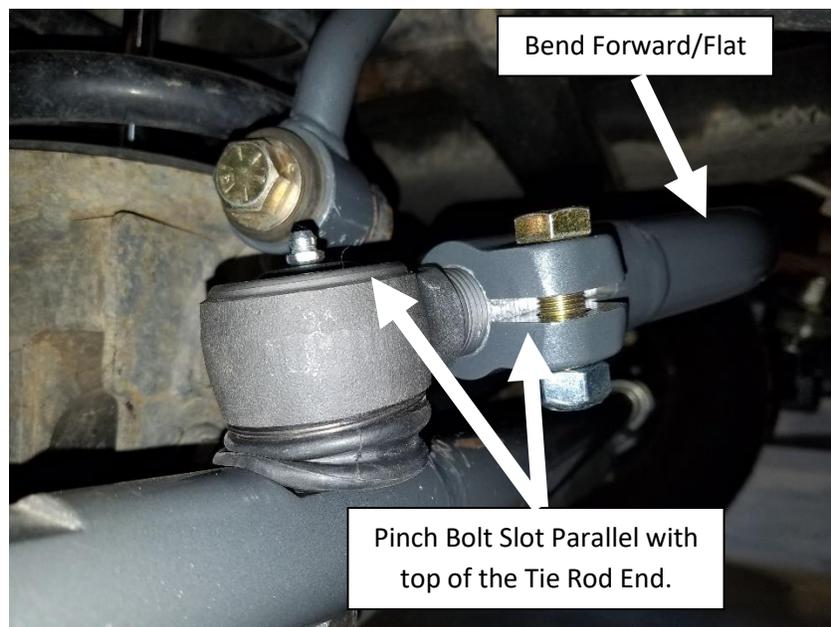


Figure 9. Pinch Bolt Style Drag Link Tie Rod End Correct Alignment

17. 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 tie rod end on the double adjuster out further than 3.25" from the center of the joint (zerk fitting) to the end of the drag link. See **Figure 10**. If the drag link still needs to be adjusted longer, then it will be necessary to remove the passenger side tie rod end from its taper in the tie rod and adjust out (lengthen) the tie rod end. 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 11**.



Figure 10. Tie Rod End Adjusted MAX 3.25" Out (Double Adjuster Side)



Figure 11. Tie Rod End Adjusted MAX 2.75" Out (Non Double Adjuster Side)

- 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.
- 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!
- Ensure drag link and tie rod are installed correctly by referencing **Figure 12**.



Figure 12. Installed Tie Rod and Drag Link

STEERING STABILIZER AND STABILIZER CLAMP INSTALL

23. Install the stabilizer into the factory stabilizer mount at the axle. Use the factory steering stabilizer bolt for attachment at the axle side.
24. Set the steering stabilizer to approximately 1/8" less than the fully extended travel with the wheels pointed full lock to the driver side
25. 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 13**.

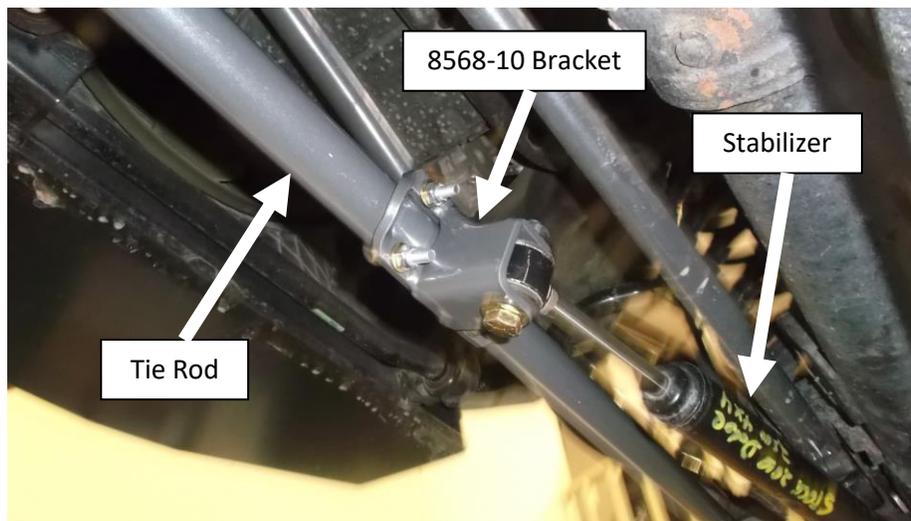


Figure 13. Steering Stabilizer Shown Mounted to 8568-10 Bracket

26. With the stabilizer installed into the 8568-10 bracket, position the bracket onto the tie rod so there is no bind in the stabilizer bushings with the steering pointed straight. Make sure the 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 14**.

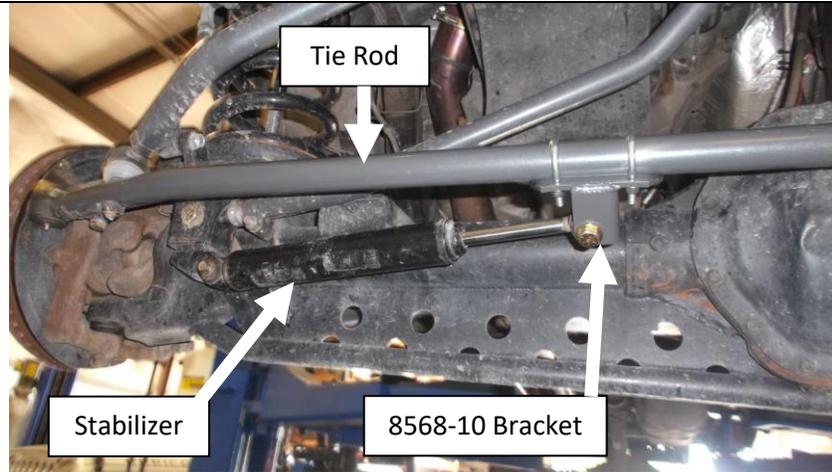


Figure 14. Steering Stabilizer Shown Mounted to 8568-10 Bracket

27. Torque 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.

FINAL ADJUSTMENTS

28. Ensure all hardware is tight
29. 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.
30. 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.
31. 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.
32. 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 15 and 16.**



Figure 15 and 16. Washer Used Under Castle Nut

33. Check jam nut & pinch bolt torques after the first 100 miles of driving. Check all hardware and re-grease joints at standard chassis lubrication intervals.
34. Make an appointment with an alignment shop if you are not comfortable with self-aligning the truck.

INSTALLATION IS COMPLETE