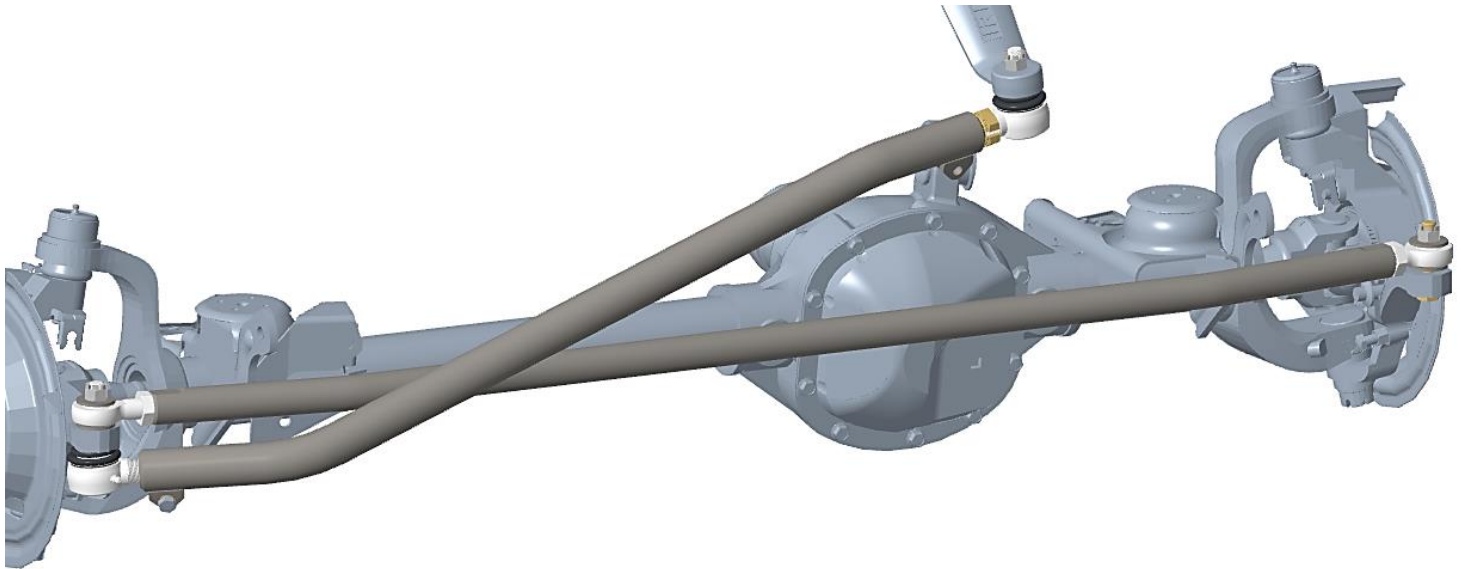


IRON ROCK OFF ROAD

Tie Rod End Over the Knuckle Steering System
Instructions: (1/2" Bolt)

I-877-919-JEEP www.ironrockoffroad.com

Fits: 97-06 Jeep Wrangler TJ with 3-8" of lift height, 84-01 Jeep Cherokee XJ with 3-8" of lift height, and 93-98 Jeep Grand Cherokee ZJ. See below for further fitment requirements.



Parts List:

- Iron Rock Off Road logo decal 10001 (2)
- OTK Tie Rod 95063 (1)
- OTK Drag Link 95174 (1)
- XMR8-12 Spherical rod end (2)
- High Angle Tie Rod End 95164 (1)
- Long-Stud Anti-Flop Tie Rod End 95159 (1)
- IRO TRE double adjuster 95137 (1)
- #186 - Clamping Hardware 13312 (1)**
 - 3/8-16 X 1-1/4 Hex bolt gr8 (2)
 - 3/8-16 Nylock flange nut gr8 (2)
 - 3/8 Mil spec washer (2)
- #285 - OTK Tie Rod Hardware**
 - M12 x 100mm hex bolt (1)
 - M12 flange hex nylock nut (1)
 - 12mm shock sleeve 404739 (1)
 - Steering clamp 95018 (1)
 - 3/4-16 right hand thread jam nut (2)
 - 1/2-20 x 2-1/2" fine thread gr8 hex bolt 95177 (1)
 - 1/2-20 slotted hex nut, gr5 (1)
 - 1/2" I.D. tapered tie rod end insert 95043 (1)
 - 1/2" USS washer (5)

Fitment Requirements:

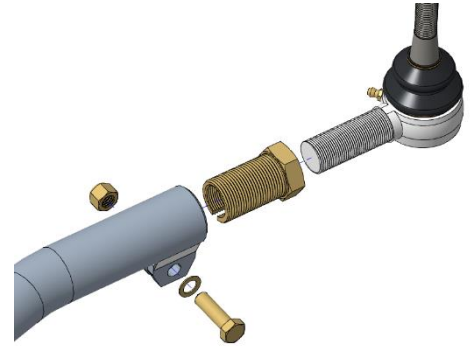
- A. 1 1/4" wheel spacer with OEM wheels, or less than 4 1/2" backspacing for 15" wheels, for wheels over 15", most backspacing amounts will work
- B. 3 to 8" suspension lift height. A drop pitman arm will change this requirement by the amount of drop provided.

Before you begin:

1. Read and understand all installation instructions.
2. If you have any questions before, during, or after installation contact Iron Rock Off Road (see contact information above).
3. *****Ensure that all parts are present and in good condition*****

Prepare the parts for installation:

4. Measure from center of drag link stud to center of tie rod stud (on the top side of each steering knuckle) and record that length here _____.
You will need this measurement later when adjusting the new tie rod.
5. Apply anti-seize compound to the threads of all spherical rod ends (heim joints), tie rod ends, and double adjuster.
6. **Tie Rod Assembly:** Locate **HK #285**. Slide a steering clamp onto the tie rod for the steering stabilizer. Orientation of the clamp is irrelevant.
7. Install jam nuts finger tight onto two rod ends. Install these rod ends into the tie rod. Adjust the tie rod to the measurement from step 4 above, taking care to adjust both rod ends equally and that your measurement is from center of bolt hole to center of bolt hole.
Do not tighten jam nuts yet.
8. **Drag Link Assembly:** Thread the long stud tie rod end into the small threaded end of drag link. Leave 1/2" of thread exposed.
9. Assemble double adjuster all the way into other end of drag link and thread the other tie rod end completely into the double adjuster.
10. Install bolts, washers, and nuts from **HK #186** into the clamping tabs on the drag link. Do not tighten at this time.

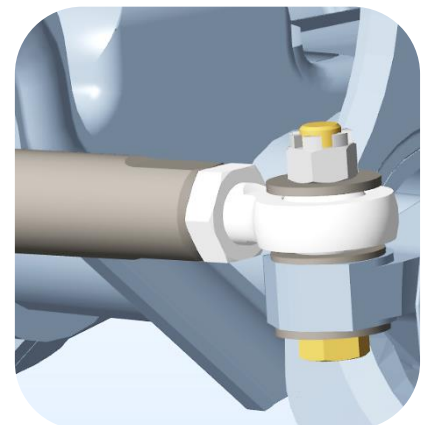
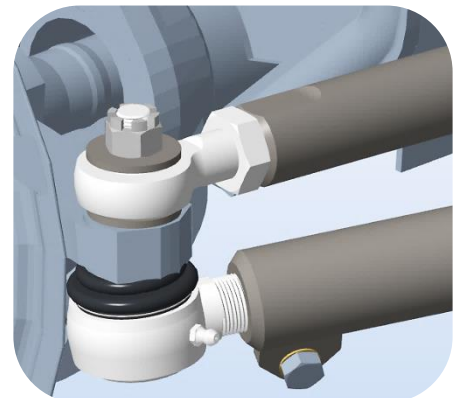


Removal of existing tie rod:

11. Raise the front end slightly off the ground and place the axle on jack stands.
12. Remove tires for easiest installation.
13. Remove the factory tie rod and drag link (including tie rod ends and drag link end of steering stabilizer).
14. Remove the stud from the end of the steering stabilizer (it may be necessary to cut the stud to remove it on OEM steering stabilizers).

Installation:

15. Clean the mounting surfaces for all spherical rod ends using a file. The mounting surfaces must be flat and free of high spots. Be sure to include the bottom of the pitman arm, the top of the driver's side knuckle, and the top and bottom of the passenger side knuckle.
16. Locate the drag link and double check that the tie rod end at axle side (axle side has no double adjuster) has 1/2" of threads exposed.
17. Install the drag link at the pitman arm using the provided nut. Do not install the cotter pin at this time.
18. **Install passenger side of tie rod and drag link using the following procedure:**
 - A. Install the long stud tie rod end through the knuckle from the bottom.
 - B. Place a washer over the tie rod stud on top of the knuckle.
 - C. Place the spherical rod end of the tie rod onto the stud.
 - D. Place another 1/2" washer onto the tie rod stud.
 - E. Install the hex nut provided with the tie rod end and torque to 90 ft-lbs.
Do not install the cotter pin at this time.
19. **Install the driver's side of the tie rod. Use the following procedure:**
 - A. Locate the 1/2" x 2-1/2" drilled bolt, three 1/2" flat washers, 1/2" slotted hex nut, and a tapered adapter.
 - B. Insert tapered adapter sleeve into knuckle from bottom.
 - C. If sleeve sticks out of knuckle, grind flush.
 - D. Place the flat washer on the bolt.
 - E. Place the bolt through the knuckle from the bottom.
 - F. Place a washer over the bolt on top of the knuckle
 - G. Place the spherical rod end of the tie rod onto the bolt.
 - H. Place another 1/2" washer onto the bolt.
 - I. Install the 1/2" slotted hex nut and tighten firmly (will be re-torqued later).



- **Tip:** position the cotter pin hole at a convenient angle for later.
20. Tighten the clamping bolt on passenger side drag link end with the drag link at a 5-degree upward angle on the drag link where it meets the tie rod end. Meaning the drag link points only up and forward from the tie rod end, not down and back up. The tie rod end should be pivoted so that the drag link can never drop below this 5-degree angle.
 21. Make sure the drag link clamping tabs are positioned so they are pointing down.
 22. Make sure the tie rod end at the pitman arm is in the middle of its travel – the body of the tie rod end is parallel to the pitman arm.
 23. Torque drag link clamping bolts to 50 ft-lbs.
 24. Install wheels and tighten firmly (they will likely need to be removed).
 25. Cycle steering lock to lock and verify that no steering parts contact the wheels or tires.

Alignment Procedure:

*****A professional alignment is recommended and will result in the safest handling and minimized tire wear. As a temporary solution, with careful measurements you can set your toe-in fairly accurately using a tape measure. *****

26. Make sure the vehicle is on a level surface and the front tires are raised slightly off the ground.
27. Make a mark anywhere on the tread area of each front tire. The marks do not have to be in the same spot on each tire. This method insures that your measurements are accurate regardless of rim and tire runout, even bent rims or untrue tires will not affect the measurement.
28. Measure from one mark to the other making sure your measurement is parallel to the axle housing and your marks are facing exactly forward. This is your front measurement.
29. Rotate tires so the marks are facing exactly backward. Measure from one mark to the other making sure your measurement is parallel to the front axle housing. This is your rear measurement.
30. **For 29-32" tire diameter** (measured): adjust your tie rod until the front measurement is 1/16" less than your rear measurement. Adjustment can be done by removing only the driver's side bolt and you can turn the whole tie rod if needed to adjust both sides equally.
For 33-36" tire diameter (measured): adjust your tie rod until the front measurement is 1/8" less than your rear measurement. Adjustment can be done by removing only the driver's side bolt and you can turn the whole tie rod if needed to adjust both sides equally.
31. **Ensure that both spherical rod ends are parallel to each other (both should be rotated down against the hard stop).**
32. Tighten both jam nuts very tightly on the tie rod (do not tighten drag link clamping bolts at this time).
33. Re-check your measurements.
34. Install 1/2" slotted hex nut and torque to 105 ft-lbs.
35. Install cotter pins on tie rod.

Steering wheel alignment:

36. Lower your vehicle from the jack stands.
37. With the weight of the vehicle on the suspension, ensure that the tires are facing exactly forward (not turned left or right).
38. Loosen only the double adjuster clamping bolt on drag link.
39. Turn only the double adjuster until steering wheel is as straight as you can get it.
40. Make sure the tie rod end at the pitman arm is in the middle of its travel – the body of the tie rod end is parallel to the pitman arm.
41. Torque drag link clamping bolts to 50 ft-lbs.
42. Ensure all fasteners are torqued to spec. and cotter pins are installed.
43. Go for a short test drive.
44. Note steering wheel angle when driving straight and steady.
45. Drive straight into your working area making sure steering wheel angle matches angle during test drive.
46. Loosen only the double adjuster clamping bolt on drag link.
47. Turn only the double adjuster until steering wheel is straight.
48. Make sure the tie rod end at the pitman arm is in the middle of its travel – the body of the tie rod end is parallel to the pitman arm.
49. Torque drag link clamping bolts to 50 ft-lbs.
50. Test drive again, recheck steering wheel angle.
51. Repeat steps if necessary.

Install Steering Stabilizer:

52. Lubricate steering stabilizer bushing with multi-purpose grease and insert provided M12 shock bushing sleeve.
53. With the Toe-in adjusted, the steering wheel centered and the Jeep at ride height, turn the steering wheel to the right until full lock is reached. This should be the point where the steering stabilizer would be fully collapsed: its shortest length.
54. Move clamp to meet steering stabilizer. Bolt together using M12 x 100 hex bolt with a washer on each side of the rubber steering stabilizer bushing and a washer between the clamp and the bolt head.
55. Ensure the stabilizer is fully collapsed by compressing it by hand.
56. Note the location of the stabilizer clamp on the tie rod.
57. Extend the stabilizer slightly (approx. 1/8") on the tie rod and tighten the clamp.
58. Torque nut to 60 ft-lbs.
59. The stabilizer should now be centered with the tires pointed straight ahead. Double check by cycling the steering both directions to ensure stabilizer does not limit your steering angle.
60. Torque lug nuts to spec.
61. Double check that all fasteners are torqued, and cotter pins are installed.



*****!!! Important Safety Warning!!!!*****

Always ensure that rod end and double adjuster threads have adequate thread engagement for strength. Thread engagement must be greater than the diameter of the threads. Before driving vehicle check for clearance between steering components and wheels and tires or any other objects at all steering positions including lock to lock steering in both directions.