

## Steering Shaft Assembly, SN95 Power Steering Rack, 1979-93 Mustang (MMST-13)



*Read all instructions before beginning work. Following instructions in the proper sequence will ensure the best and easiest installation.*

The MM Engineering Team designed a new steering shaft that does not use setscrews. That's right, *no setscrews!* Instead, we secure the U-joints by welding them to the shafts. We attach the steering shaft assembly to the steering rack with a pinch-bolt, just like Ford did with the stock steering shaft assembly. An added bonus with the MM Steering Shaft is the addition of a telescoping center portion to the assembly. This collapsible section eases installation, improves fitment with aftermarket k-members, and improves safety in the event of an accident.

With this MM Hybrid Steering Shaft Assembly, a steering rack from a 1994-2004 Mustang can now be easily installed in a Fox chassis (1979-1993) Mustang. The MM hybrid shaft assembly has the correct lower U-joint to connect to the unique triangular-shaped input shaft of the 1994-2004 steering racks. This MM hybrid assembly also features a splined shaft to allow the steering wheel to be clocked correctly. This feature is required to properly center the steering wheel when a 1994-2004 steering rack is installed in a Fox chassis Mustang. The stock steering wheel and airbag (if so equipped) are not disturbed.

### Required Parts

Fox chassis tie-rods are required for use with Fox length control arms because the SN95 (1994-2004) tie-rods are too long. The correct length tie-rods can be easily swapped into place because the inner threaded connection, where the tie-rod attaches to the steering rack, is the same.

The threads on the tie-rods, where the outer tie-rod ends attach, are different between the SN95 tie-rods and the Fox tie-rods. The choice of tie-rod will dictate which outer tie-rod ends must be used.

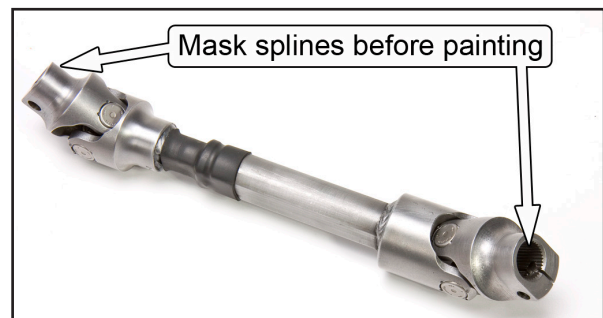
For those using the longer SN95 front control arms on their Fox Mustang, and who will be using an adjustable outer tie-rod end bumpsteer kit, there are two options to choose among for tie-rods and outer tie-rod ends. The longer SN95 tie-rods can be used, which will require an SN95 adjustable outer tie-rod end kit. Or, the shorter Fox tie-rods can be used, along with our **MMTR-6** Tie-Rod End Kit. This kit has a longer aluminum adapter sleeve that allows the shorter Fox tie-rod to work with the longer SN95 front control arms.

**NOTE:** This steering shaft is only intended for installation on 1979-93 Mustangs using a 1994-04 steering rack.

### Preparation

The MM Steering Shaft is manufactured with a bare steel finish. If desired, it can be painted before installation. Please follow these guidelines to avoid damage to the steering shaft:

- Collapse the telescoping section of the shaft approximately half-way, without removing the plastic dust boot.
- Wipe off any grease or oil.
- Mask off the splined sections of the upper and lower u-joints so they do not get painted.
- Paint the steering shaft and allow it to fully dry before installation.

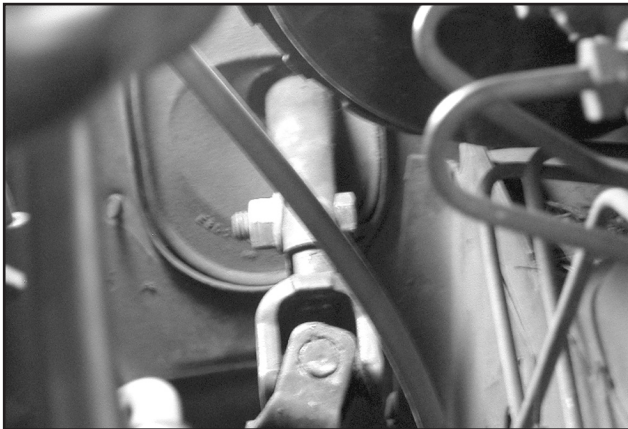


## Instructions

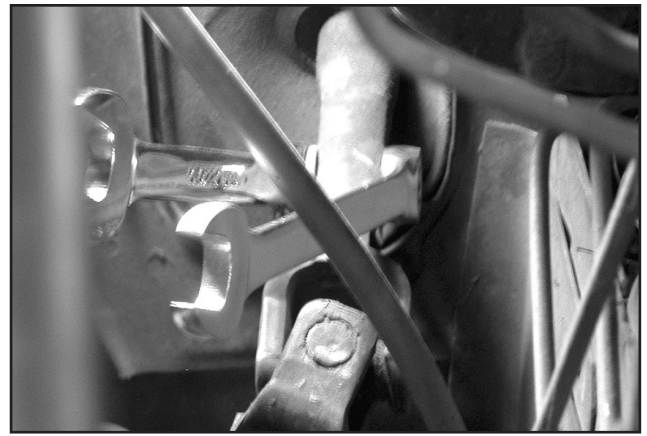
**WARNING:** If the steering wheel is rotated too many revolutions in either direction the electrical wires (known as the clock spring) that connect to the airbag, horn, and other electrical controls will be severed. From the factory, the steering wheel is centered within its rotational range. It is important not to lose this position while the steering wheel is disconnected from the steering rack.

**NOTE:** You must consult a factory manual on the procedure for centering the clock spring should the steering wheel's center position be lost.

1. Raise the front of the car and place it safely on jack stands.
2. Remove the front wheels from the vehicle.
3. Remove the nut and bolt that connects the upper stub of the stock steering shaft to the steering column. Be sure to retain the factory nut and bolt for later use.

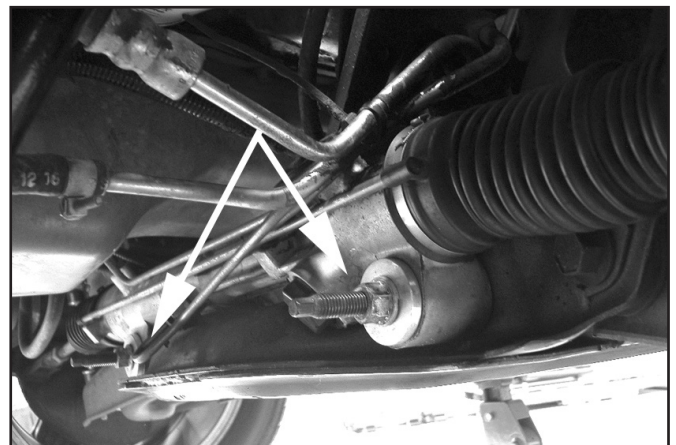


**NOTE:** While it is possible to use two wrenches, it is easier to use a very long extension and a ratchet. If necessary, rotate the steering wheel to orient the bolt for the best access. Completely remove the bolt and nut. Set them aside, as they will be reused to attach the new MM Steering Shaft.



4. Remove the pinch-bolt that connects the stock steering shaft to the rack input shaft.
5. Center the steering wheel: tires steering straight ahead. Secure the steering wheel position by some means; rope, tape, etc., to prevent it from rotating and damaging the clock spring wiring.
6. Remove the stock Fox steering rack. For guidance, refer to a shop manual. Cap the exposed fluid lines.

**NOTE:** Be sure to retain the factory nuts and bolts that retain the steering rack to the k-member.



7. After reading the Pro Tips below, remove the steering shaft from the car by pulling it out of the steering column. The “steering column” is under the dashboard and protrudes forward through the firewall.

### Pro Tips:

- The stock steering column in all 1979- 93 Mustangs is collapsible for crash protection. The tube protruding out from the firewall into the engine compartment, which the upper stub end of the steering shaft slips into, slides inside another tube located under the dashboard. That telescoping section inside the steering column may be inadvertently extended when removing the steering shaft.
  - To prevent problems later in the installation process, take careful note of the position of the hole for the bolt that secures the upper steering shaft stub to the steering column tube. Note the hole’s location relative to the firewall before trying to pull the shaft out of the column. If the steering column pulls forward from the firewall, tap it back into position.
  - In some cases, it may be necessary to tap on the steering shaft with a hammer to pull the upper stub out of the steering column. Do NOT hammer directly on the U-joint cross, or on the shaft below the upper cross, as damage to the cross and bearings may occur.
8. Begin installing your 1994-04 steering rack by connecting the fluid lines. It is easier to attach the lines to the rack before the rack is secured to the k-member.

*NOTE: We highly recommend installing new Teflon® seals on the power steering hydraulic line fittings. If new seals did not come with your steering rack, purchase them from your local Ford dealer. Note that there are two sizes, to fit the two different sized rack fittings.*

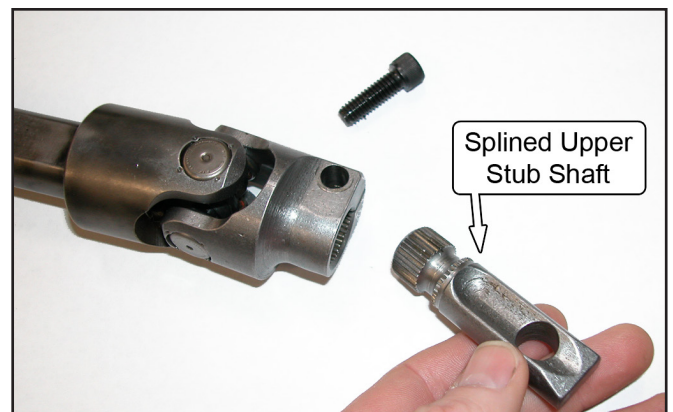
9. Install your 1994-04 rack onto the vehicle using the factory bolts.

When tightening the mounting bolts:

- When using stock rubber bushings or aftermarket urethane replacement bushings and 1985-93 12mm rack bolts torque to 40 lbs-ft.
- When using aftermarket solid rack bushings follow the manufacturer’s installation instructions.
- When using 1979-84 stock 16mm bolts and stock rubber bushings or aftermarket urethane replacement bushings see a 1979-84 Mustang service manual for the proper torque value.

*NOTE: The MM Hybrid Steering Shaft can usually be installed after the rack has been positioned and the bolts torqued because the telescoping feature of the MM steering shaft allows it to collapse enough to be slipped into place.*

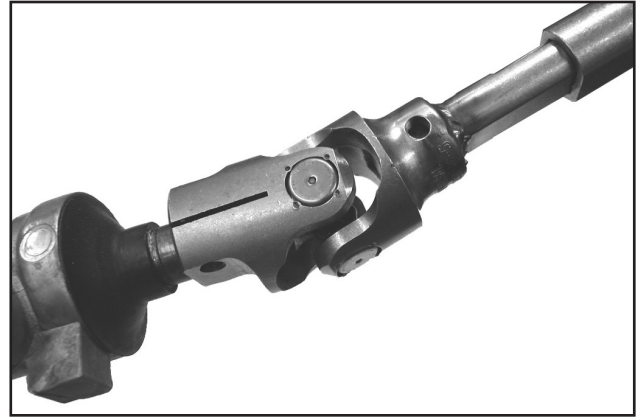
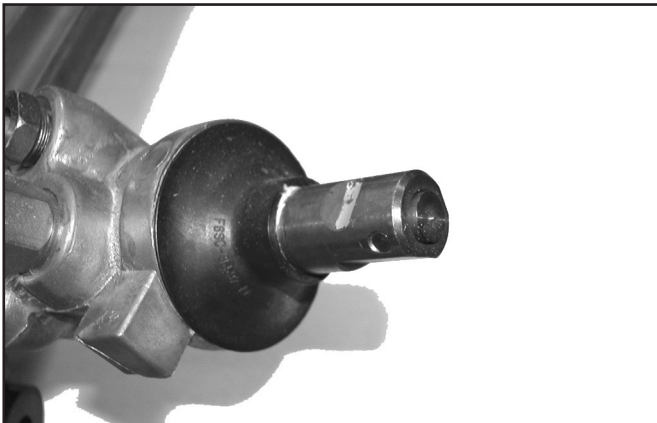
10. Collapse the MM steering shaft by firmly pushing the two U-joints toward each other.
11. Remove the pinch-bolts from both the upper and lower U-joints of the MM steering shaft.
12. Remove the splined upper stub shaft from the upper U-joint. It will be installed next, before the lower portion of the steering shaft assembly.



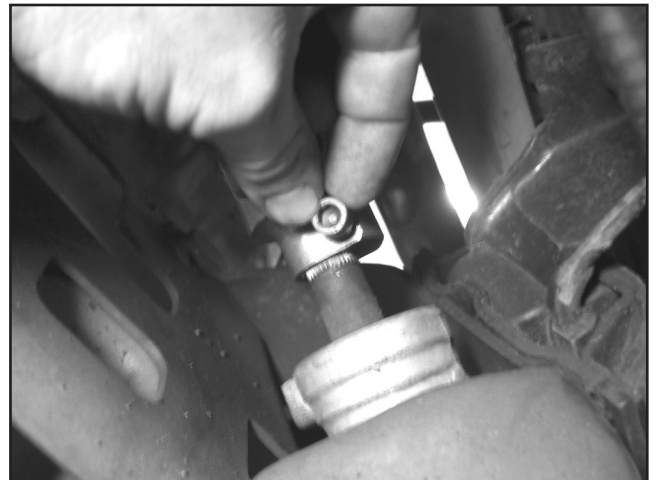
13. After reading the Pro Tips below, install the MM splined upper stub shaft into the steering column tube.

**Pro Tips:**

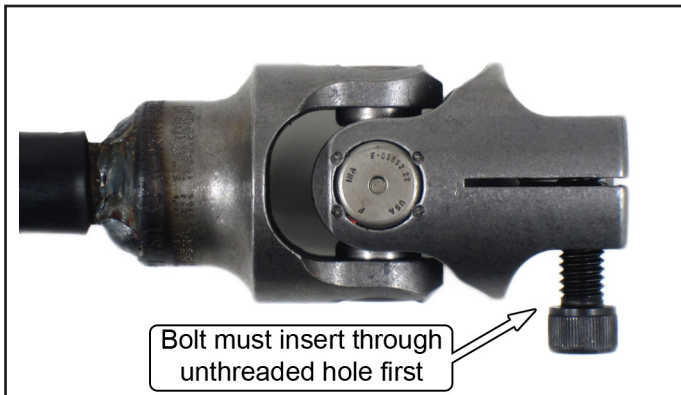
- The upper stub shaft will only fit in one orientation. Take care to identify that orientation before starting to slide it into the steering shaft tube.
  - As previously mentioned, the steering column telescopes. Take note of the position of the hole for the upper steering shaft stub retaining bolt, relative to the firewall, before trying to insert the upper stub shaft into the steering column tube. If the steering column pushes into the firewall, the MM steering shaft will not extend enough to allow the bottom U-joint to reach to the steering rack.
  - If the column does get pushed into the firewall the best solution is to use a slide hammer with a hook, which is placed through the bolt hole in the steering column tube, to pull it out from the firewall and back into place.
14. Secure the MM upper stub shaft by installing the retaining bolt and nut (removed in Step 3) onto the steering column and hand tighten.
15. Install the lower portion of the MM Hybrid Steering Shaft assembly onto the input shaft of the steering rack. It will only fit in one orientation.



16. Install the steering shaft's upper U-joint onto the splines of the MM splined upper stub shaft. As previously stated, in most cases the MM steering shaft will collapse enough to do so. If not, loosen the two steering rack bolts and pull the rack forward from the k-member far enough to allow the upper U-joint to slip onto the splines of the upper stub shaft.
17. Install the pinch bolt removed in Step 11 into the lower U-joint and torque to 24 ft-lbs. The pinch bolt can only be inserted when the lower U-joint is properly positioned on the rack input shaft.



*NOTE: Make sure the Lower U-joint pinch bolt is inserted through the unthreaded side of the U-joint first and then into the threaded side. This will allow the U-joint to clamp onto the triangular-shaped input shaft when the pinch bolt is tightened.*



### Centering the Steering Rack

Steps 18-26 describe how to center the steering rack within its range of travel. This is done before the separate procedure of clocking the steering wheel to match the centered steering rack.

18. Orient the steering wheel so it is pointed in the “straight-ahead” position.



19. Extend the MM hybrid steering shaft’s telescoping section enough to allow the upper U-joint to slip over the splines of the upper stub shaft.

*NOTE: When connecting the upper U-joint to the upper stub shaft, it is not necessary for the splines to be fully engaged at this time. They must only be engaged enough to allow the steering wheel turn the steering rack from full-lock to full-lock, as part of the procedure for centering the rack. The upper U-joint pinch-bolt does not need to be installed at this time.*

20. Rotate the steering wheel clockwise until full lock is reached.

21. Place a piece of tape on the current twelve o’clock position of the steering wheel and mark the letter “A” on the tape.



22. Rotate the steering wheel counter-clockwise until full lock is reached. For future reference (in Step 24), count the number of turns required to turn the steering wheel from full lock to full lock.

23. While holding the wheel at full-lock in the counter-clockwise direction, place a piece of tape on the steering wheel in its current twelve o’clock position. Mark the letter “B” on the tape.



24. Divide the number of turns required to go from full lock to full lock in Step 22 by 2.

25. From the counter-clockwise full lock position, turn the steering wheel clockwise the amount calculated in Step 24.

26. If the steering rack is correctly centered the “A” and “B” tape marks on the steering wheel will now be an equal distance away from the twelve o’clock position. If the tape marks are NOT at equal distances from twelve o’clock, the rack is not centered. Repeat “Centering the Steering Rack” procedure until the tape marks are centered. The goal here is to center the steering rack within it’s range of travel, not clock the steering wheel to its straight-ahead orientation; that comes next.



### Clocking the Steering Wheel

Once the steering rack is centered the steering wheel can be clocked to match the rack.

27. Remove the tape from the steering wheel.
28. After Step 26 is completed the steering rack is centered. If the steering wheel is not centered it must be clocked to match the steering rack. To do so, while taking care to NOT rotate the input shaft of the steering rack, collapse the MM steering shaft’s telescoping section to disconnect the upper U-joint from the splined upper stub shaft.
29. Rotate the steering wheel so that it is centered in the “straight-ahead” position.
- WARNING: Do not allow the steering wheel to rotate more than one revolution in either direction, or the clock spring will be damaged.**
30. Reconnect the upper U-joint to the upper stub shaft by extending the telescoping steering shaft enough to slip the splines together. Make sure that the splined upper stub shaft is completely inserted into the splined upper U-joint. If not fully inserted, the pinch-bolt cannot be inserted into the U-joint.

*NOTE: The hollow shaft of the steering column is designed to be collapsible and sometimes gets extended or compressed from its stock location during removal of the stock steering shaft. If you find that it is impossible to fully insert the splined upper stub into the splined upper U-joint, you will have to extend the hollow shaft of the steering column by pulling it forward, out of the firewall. It is easiest to accomplish this by using a slide hammer.*

31. Insert the pinch-bolt into the upper U-joint to secure it to the upper stub shaft. The pinch-bolt can only be inserted when the upper U-joint is properly positioned on the upper stub shaft. Torque the pinch-bolt to 24 ft-lbs.

*NOTE: Make sure the U-joint pinch bolt is inserted through the unthreaded side of the U-joint first and then into the threaded side. If not inserted correctly the upper U-joint will NOT clamp onto the splines of the upper stub shaft when the pinch bolt is tightened.*

32. Torque the bolt clamping the steering column to the splined upper stub shaft to 54 ft-lbs.

*NOTE: Be sure the bolt is properly tightened: Tightening this bolt can be difficult because it squeezes the steering column onto the steering shaft inside. That squeezing action can mislead the torque wrench into “clicking” early, before the bolt is actually tightened enough. If the bolt is not properly tightened it will cause some looseness in the steering feel. It can also cause some noise, as the steering shaft will essentially be rattling around inside the steering column. If there is still play between the two shafts, increase the torque to 60 ft-lbs.*

33. Complete the installation of the steering rack by filling the system with power steering fluid, and bleeding it of air, as per the shop manual.
34. If not already done, install the chosen inner and outer tie-rod ends as per the manufacturer’s installation instructions.
35. Reinstall the front wheels, and torque the lug nuts.
36. Safely lower the car to the ground.
37. Reset the front toe of the vehicle and test drive on a flat, uncrowned road to ensure that the steering wheel is centered.