

**Disclaimer:**

These parts are intended for race use only. The parts are not certified for use on public roads, and as such may not be legal for highway use. Wilhelm Raceworks LLC is not liable for any damage directly or indirectly related to the use or mis-use of these components.

**A note on rod ends:**

This kit replaces several OEM components with rod end spherical bearings. Please be aware that these are wear items, and depending on the conditions of their use may have a shorter lifespan than the OEM components that they replace. They must be inspected periodically for wear or looseness and replaced if necessary. Part numbers for both standard and premium rod end options are listed below.

	<b>Standard</b>	<b>Premium (FK)</b>
Front Tie Rod	MXTT-10	HJMX10T
Rear Tie Rod, Chassis End	MXM-10	JM10T
Rear Tie Rod, Knuckle End	MXML-10-8	RSML8T

Replacement rod ends can be purchased directly from [MidwestControl.com](http://MidwestControl.com) (standard), or through any FK rod end dealer (Summit Racing, Jegs, Off Road Warehouse, etc) or through Wilhelm Raceworks, LLC. If you wish to substitute alternate rod ends please contact me for suitable alternatives.

**Note:** The FK rod ends require a different combination of bump steer spacers than the standard rod ends. If you wish to switch from one to the other, new spacers are required. These are standard parts available from many sources.

**Parts list:****Front:**

- 2x 1.75" thick front roll center adjusters (RCA)
- 2x Tapered tie rod studs
- 2x Aluminum tie rod spacers
- 2x Tie rod end assemblies
- 2x .100" bump steer spacers (standard rod ends)
- 2x .062" bump steer spacers (FK premium rod ends)
- 2x .300" bump steer spacers (FK premium rod ends)
- 2x 5/8-18 nylock nuts
- 2x 7/16-20 nylock nuts
- 2x 7/16 lock washers
- 4x M10x1.25x70mm bolts

**Rear:**

- 2x 1.25" thick rear RCA
- 2x Welded steel rear tie rod brackets
- 2x Rear tie rod press in steel "slugs"
- 2x Rear tie rod assemblies
- 4x Stepped rod end bushings
- 2x 1/2-20x2" bolts
- 2x 1/2-20x3" bolts
- 4x 1/2-20 nylock nuts
- 4x M12x1.25x65mm bolts
- 4x 1/2" Washers

**NOTE:** The hardware is bagged in groups according to its application. Taking note of what parts are bagged together will help determine what parts are installed together.

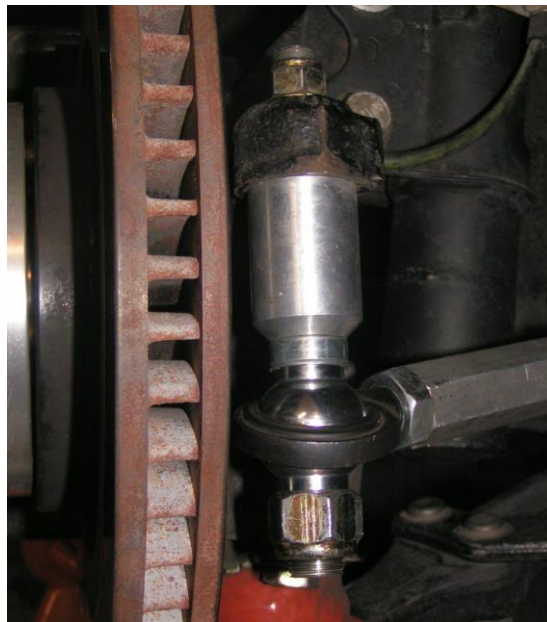
## Installation Instructions:

A Toyota Factory Service Manual may be helpful to have on hand to reference during the installation process.

**NOTE:** Where possible the rod ends have been pre-installed to the tie rods / tie rod adapters with a light coat of anti-seize. If disassembled for rod end replacement I recommend re-applying anti-seize to facilitate future adjustment or replacements.

### Front:

1. Set the parking brake and chock the rear wheels. Jack up the front of the car and support securely with jack stands. Remove the front wheels.
2. Remove the two bolts holding the ball joint to the knuckle. Install the thicker (1.75") front Roll Center Adjuster (RCA) between the ball joint and the knuckle and secure using the 10mm bolts. Torque to the OEM specification of 59 ft-lb.
3. Break loose - but do not move - the jam nut holding the outer tie rod end to the inner tie rod. Remove the cotter pin and nut from the top of the outer tie rod, and remove the outer tie rod end. A 2 jaw puller or pickle fork may be required.
4. Install the new outer tie rod end to the inner tie rod. The outer tie rods have been designed such that if the jam nut is not moved your wheel alignment should not change significantly. An alignment will still be needed after installation, but it should be close enough to get you to the alignment shop. Torque the jam nut.
5. Install front tie rod stud to the knuckle and secure using the 7/16" lock washer and small Nylock nut. Torque the top nut to 30 ft-lb. You may need to temporarily install the large lower nut to provide a means to hold the stud while installing the top nut.
6. Install large spacer, small spacer (.100"), tie rod end, and large Nylock nut to the tie rod stud as shown in Figure 1. Torque the bottom nut to 60ft-lb. The included combination of spacers should minimize bump steer on most vehicles. However, variations in alignment, wheel offset, ride height, etc. may necessitate a slight change in shim thickness. If you feel the need to make adjustments, bump steer spacers are available in a variety of thicknesses from many online retailers. Small changes, 1/16" or less, can make a big difference, so adjust accordingly.

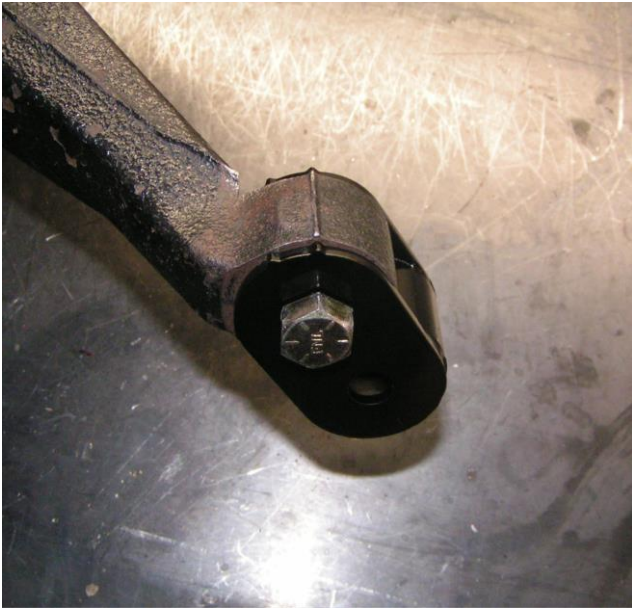


*Figure 1: Front Tie Rod Installation*

7. Reinstall the front wheels and torque to 75 ft-lb.

## Rear:

1. Chock the front wheels. Jack up the rear of the car and support securely with jack stands. Remove the rear wheels.  
**NOTE:** You may be able to accomplish steps 2-4 without removing the knuckle by the use of a 3 jaw puller or ball joint press.
2. Remove the rear knuckle: First, remove the cotter pin and axle nut. Next, remove the two bolts holding the brake caliper and support the caliper with a zip tie or otherwise so as not to put excessive stress on the brake line. Remove the brake rotor. Loosen the two bolts holding the knuckle to the strut, loosen the two bolts holding the ball joint to the knuckle, and remove the two bolts holding the rear tie rod. Remove the knuckle.
3. Using a press, remove the tie rod spherical bearing from the rear knuckle. If you ever plan to put the stock parts back on it is best to devise some way to press on the bearing outer race only to avoid damage to the bearing.
4. Press in the steel slug to replace the bearing. Install the rear tie rod drop brackets over the steel slug. This may be a tight fit. You may need to use a block of wood and a hammer to tap the brackets onto the knuckle. Install the shorter of the two ½” bolt with one of the ½” Nylock nuts, and tighten until snug.
5. Match the alignment tabs on the bracket to the casting line on the top of the knuckle, as shown in Figures 1 & 2. 91/92 rear suspension users should install the brackets angled in toward the center of the car. 93+ users should install the brackets vertically, using the top alignment mark.



*Figure 2: 91 Bracket Install*



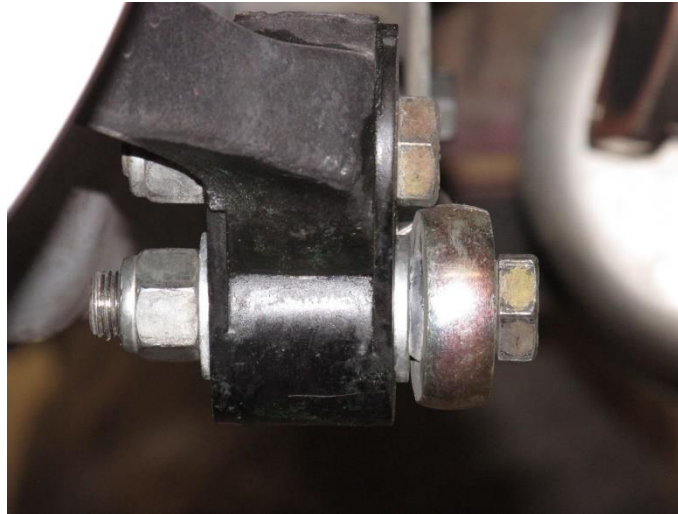
*Figure 3: 93+ Bracket Install*

6. Torque the ½” bolt attaching the bracket to the knuckle to 80 ft-lb. Adding a bead of black RTV to the joint between the knuckle and the bracket will help keep water from collecting in the bottom of the bracket.
7. Reinstall the knuckle (if you removed it earlier). It may be easier to torque all of the bolts at the end of this procedure once everything is attached. Install the rear RCA between the knuckle and the rear ball joint and secure with the four 12mm bolts.
8. Install the rear tie rod as shown in Figure 4 using the stepped bushings and the OEM bolt. Torque to the OEM spec of 76 ft-lb.



*Figure 4: Rear Tie Rod Installation*

9. Insert longer 1/2" bolt through the outer rod end, one of the 1/2" washers, the tie rod bracket, another 1/2" washer, and finally secure with one of the 1/2" Nylock nuts on the forward side. Torque to 40 ft-lb. See Figure 5.



*Figure 5: Rear Tie Rod Installation*

**Note:** The left hand threaded end of the rear tie rods is marked with notches on both the tie rod and the jam nut.

**Note:** The jam nuts on the rear tie rods have NOT been tightened. The tie rods must be adjusted to approximately the right length (to set rear toe) and tightened before driving the car.

10. Torque all remaining bolts to OEM specs:
  - Ball joint to knuckle bolts: 83 ft-lb.
  - Brake caliper bolts: 43 ft-lb.
  - Knuckle to strut bolts: 188 ft-lb.
  - Axle nut: 137 ft-lb non-turbo axles, 217 ft-lb for turbo axles.
11. Reinstall the rear wheels and torque to 75 ft-lb, and lower the car.

**Get a good alignment, and enjoy!**

If you have any questions about the installation process please contact me on [mr2oc.com](http://mr2oc.com), or via email at [wilhelmraceworks@gmail.com](mailto:wilhelmraceworks@gmail.com), or give me a call at (406) 261-0111.