

# GETTING YOUR GMC UNDER CONTROL

## FRONT SUSPENSION BASICS

The steering box has an arm attached to the output shaft called the pitman arm. This connects the steering box to the steering linkage. The pitman arm is connected to one end of the center or drag link. In the other end of the center link is an idler arm. Between the idler and pitman arms, the center link is supported in the proper position to keep the left and right wheels working together.

The inner tie rod ends are attached to either end of the center link and provides pivot points for the steering gear. From there it goes to the outer tie rod ends through an adjustment sleeve. This sleeve joins the inner and outer tie rod ends together and allows for adjustment when the front wheels are aligned. The outer tie rod ends are connected to the steering knuckle that allows the knuckles to pivot on balljoints, turning the front wheels. The knuckles have an upper and lower ball joint that it pivots on and creates the geometry of the steering axis.

Finally we have the control arms. The primary job of the control arms is to mount the suspension to the frame or body of the vehicle and to allow the suspension to move and keep it in it's proper place. They are specifically designed to maintain the geometry of the suspension in a wide range of movement.

## BALL JOINTS

There are three ways to remove OEM riveted ball joints.

1. Chisel the rivet heads off and punch out the rivet body
2. Center punch the rivet head and carefully drill out the body. Start with a drill bit smaller than 5/16. If you end up with bit wander or slightly off-center, you won't end up drilling the mounting holes oversize. Knock out the remaining rivet body with a punch.
3. Same for the top rivet. After carefully center punching the rivet head, drill the head off with a 1/2" drill. Be careful here not to drill into the control arm surface.

Below is a photo of what often happens to the tip of a control arm when the ball joint hole is incorrectly drilled out or the mounting hardware is not torqued correctly. The mounting hardware worked it's way loose and as a result, the ball joint started wallowing around in the tip of the control arm. When this occurs, it almost always results in fracturing the tip of the control arm and over size or out of round mounting holes.



**The control arm pictured above cannot be reused until it is repaired.**

Assuming that your control arm is in good condition and you have successfully removed the old ball joint. Before installing the new ball joint, check out the cavity the ball joint rests in. This area often has welding spatter in it that keeps the new ball joint from mounting flush against the underside of the control arm.

Place the new ball joint in the control arm pocket. Does it fit flush? If it does, continue with the installation. If it doesn't, and you can tell by slightly rocking it in the pocket, find out why. No matter how careful you torque the mounting hardware, a ball joint that doesn't fit flush in the mounting pocket will eventually start wobbling and become loose.

Install the new ball joint, do not tighten down the side mounting bolts. Tighten the upper 3/4" nut to 20 lb ft of torque. Then proceed to tighten the lower bolts to 60 lb ft.

Do not hesitate to use loctite or thread locking compound on the mounting hardware.

If the control arm ball joint mounting holes are oblong, or oversize, you can install the new ball joint using G8 3/8 X 24 X 1-1/4 hardware. Here is the recommended way to do this.

Install the ball joint using the supplied 5/16 hardware. Torque in place. Remove one side at a time and carefully drill the control arm and ball joint to 3/8" dia. Install 3/8" NF, G8 hardware and torque to 60 lb ft. Repeat this procedure on the other lower mounting bolt. Again, don't hesitate to use a thread locking compound.

**SAFETY NOTE: CONTROL ARMS DESIGNATED FOR AUTOMOBILE (CAD/TORO) USE MAY NOT BE USED FOR THE GMC MOTORHOME UNLESS THEY HAVE BEEN CORRECTLY MODIFIED.**



## **CONTROL ARM BUSHINGS**

If your bushings have 100,000 miles on them, they are probably beyond their service life. Ideally, the bushings can be replaced with the control arms removed. The procedure for this is detailed in the manual.

Time and use have a tendency to cause the bushings to take a "set." Pictured below are several pairs of bushings removed from well maintained coaches.



The steel sleeves are off center, the rubber is hard and cracking etc. For sure, they need replacing and most likely, before they got to this condition.

Without special tools, these can be difficult to remove. If you don't have the tools, there are a couple of ways to remove these from the control arms.

1. Drill several  $\frac{1}{4}$ " holes in the rubber around the steel inner sleeves. Drive the inner sleeve out, then push the rubber out. Now you can use a hack saw to very carefully cut the outer sleeve enabling you to remove it.
2. If you have a pneumatic chisel, work the tip carefully around the collar of the outer sleeve. After a few raps while working your way around the bushing collar, the bushing will pop out.
3. The spacing between ears of the bushing has to be maintained while inserting the replacement bushing. Make a shim, (I use a piece of split exhaust tubing) you can insert to keep this area from collapsing. You can use a vice to press the replacement bushing in if you are careful not to let the bushing get cocked, which they seem to have a tendency to do. You'll need a socket that fits around the bushing collar on one end and a spacer to allow the bushing to protrude about  $\frac{3}{16}$ " past the inside ear. Assume any firm resistance is caused by the bushing cocking. Continue past this point and you will crush the outer sleeve. Easy does it.

## URETHANE BUSHINGS

The new kid on the block is urethane. Used for many years for performance suspensions, they have been finding their way to street applications. Urethane has less deflection than rubber. They are considerably more durable and last considerably longer than rubber. I have never seen a worn out urethane bushing. The trade off, if there is one, is a more positive road feel.

Installation is a bit easier than with rubber. The steel outer sleeves remain in the control arms. Just remove the inner sleeve and rubber, clean out the hole, then tap in the new bushing. The new bushings have grooves and the kits come with a generous amount of heavy silicone grease that fills these grooves. When you finish this phase, just tap in the steel inner sleeves with a rubber or wooden mallet. Press in the outer washers and you're finished.





Finished Product