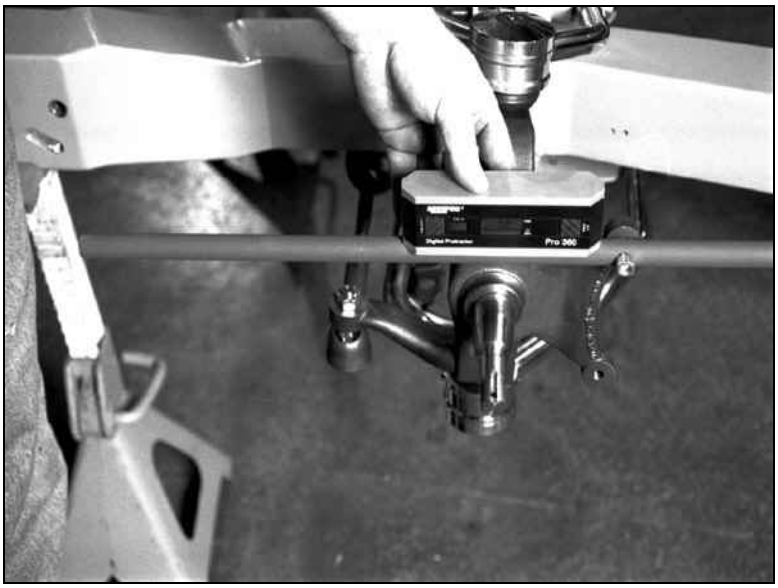
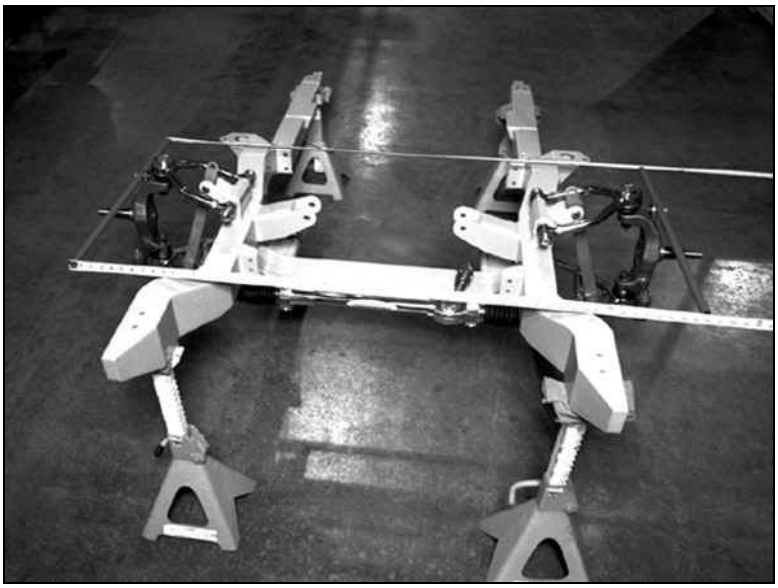
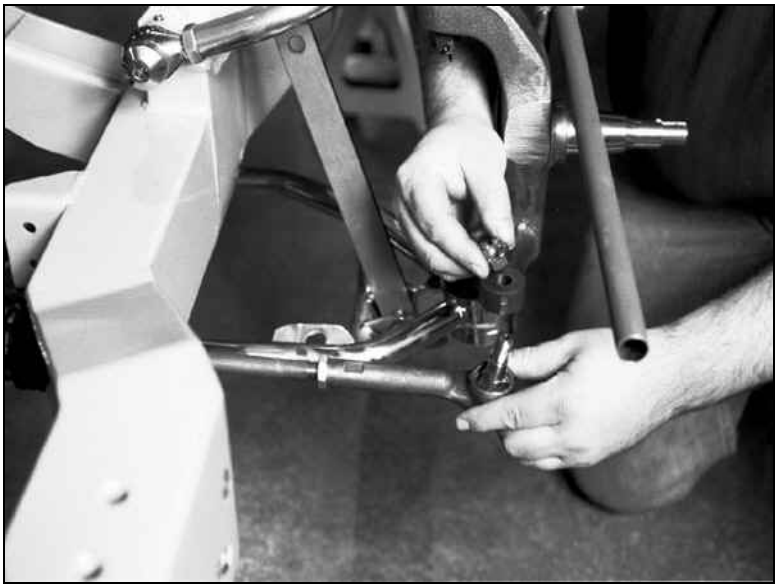


Next, set the bar level and tighten it down. Do this on both the driver and passenger sides.

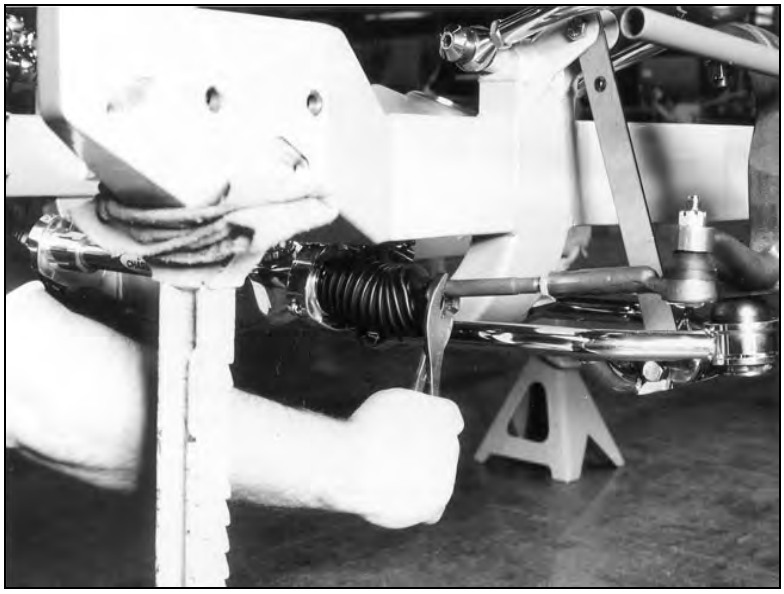


Using two tape measures, measure the outside width at the front and the rear of the tubes. The front dimension should be 1/8 to 3/16 less than the rear; this is the total amount of toe-in. Record the front and rear dimensions and calculate the amount of toe-in by subtracting the front measurement from the rear.



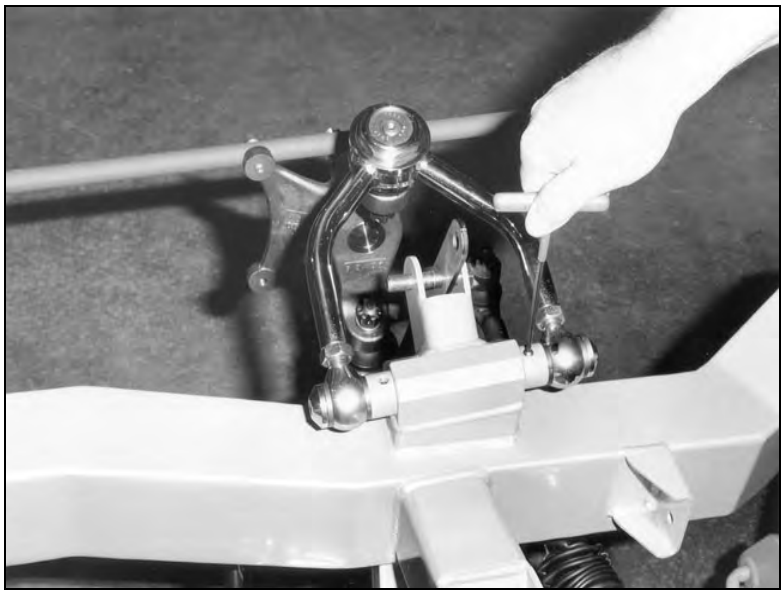
To adjust the toe-in, rotate the tie rod ends to move the spindle in or out as required. Make sure to rotate both the driver and passenger side the same amount. One-half revolution of both tie rod ends will change the toe-in by approximately ¼ inch, front to back.

If rotating the tie rod end 360 degrees changes the toe-in too much, use the rack tie rod to make smaller adjustments. Put the tie rod end in the steering arm and snug the castle nut before adjusting. Use vise-grips to grab onto the tie rod and rotate it to adjust the length. Be careful to turn both tie rods the same amount.



When turning the tie rods, the rubber boot will “wind up" on the tie rod. Once the toe-in is adjusted, use pliers to “unwind” the boot around the tie rod. Gently grab onto the outer boot clamp and twist it back around until the boots are straight. The jam nuts can now be tightened against the tie rod ends.

Verify caster, camber and toe-in are correct before proceeding.

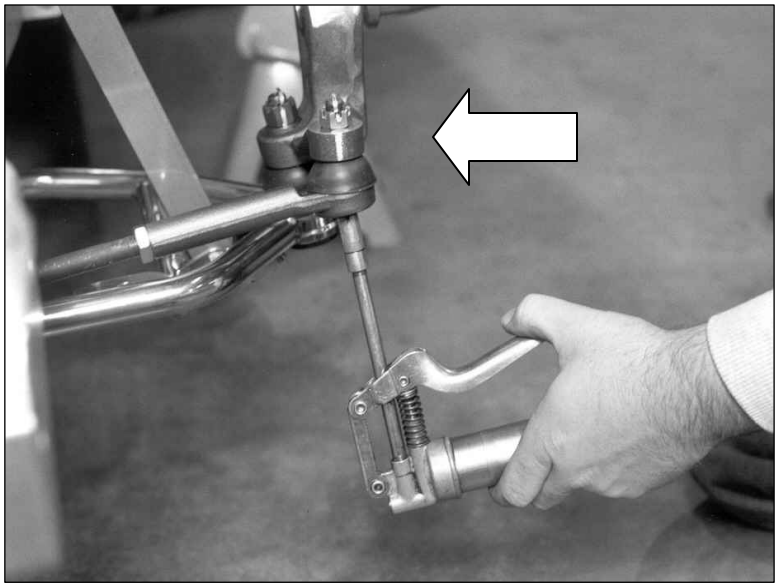


Once the camber, caster, and toe-in are set, tighten down the A-arm bolts and jam nuts, and install the set screws with a drop of Loctite™.

Next, you can final assemble the tie rod ends. Start by installing the grease zerk fitting in the hole at the bottom.

Install the rubber boot.

Put the tie rod ends back into the steering arm. Tighten the castle nut and, install and bend the cotter pin like you did on the balljoints.

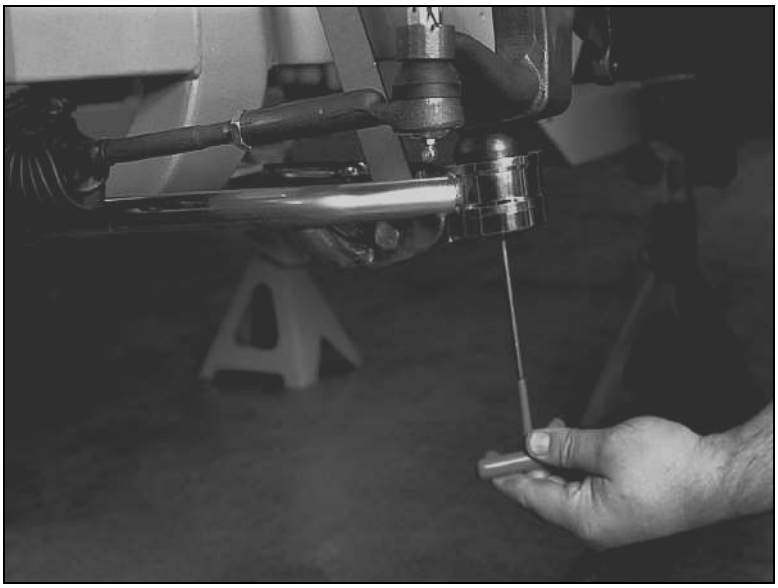


Grease the tie rod end with a small grease gun. Add only enough grease until a small amount starts to come out from under the rubber boot.

Grease the upper and lower balljoints. Install the zerk fittings and inject grease with a grease gun. Put only enough grease in to make the balljoint rubber boot bulge out on the side. If you are installing the balljoint caps, remove the zerk fitting.

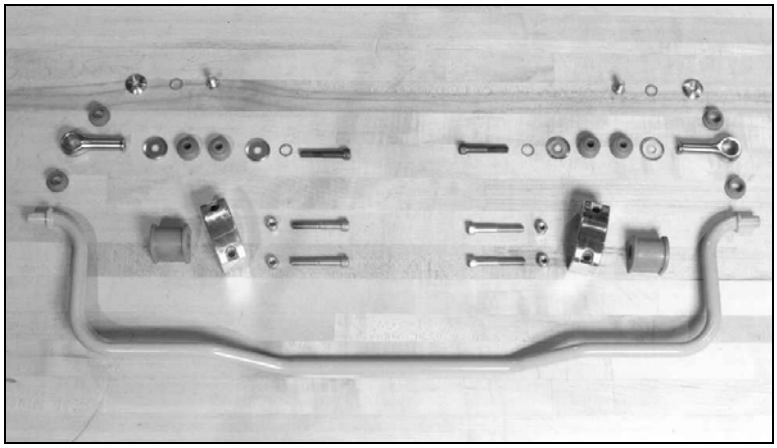
Set the stainless steel cap over the balljoint.

The caps are held in place with the countersunk stainless steel allen screws provided. They screw into the hole where the grease zerk was just removed. Be sure to remove all grease from the threads in the balljoint and Loctite™ the countersunk allen head screw in place.



Use the same procedure to install the lower balljoint caps.

Installing Antiroll Bar



Next, install the antiroll bar.

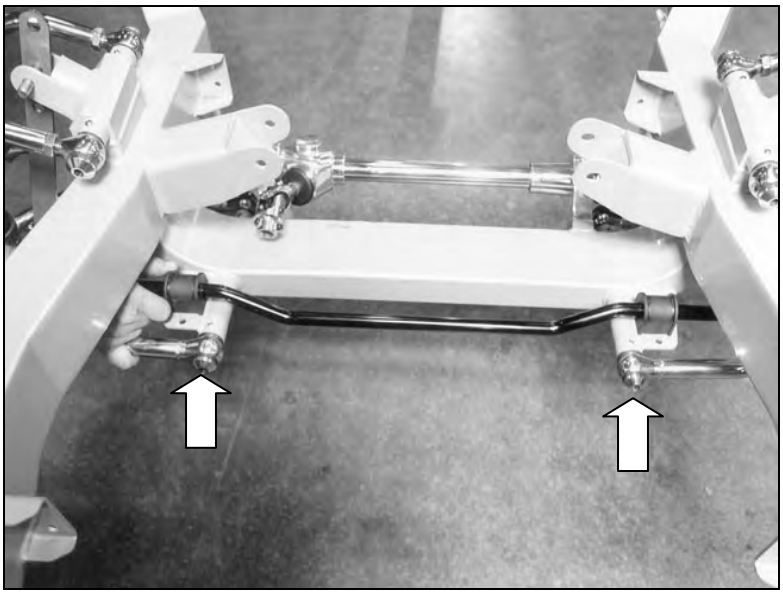
These are the components of the antiroll bar kit.

To prevent the urethane bushings from squeaking in action, use the supplied silicone grease to coat all sides of the urethane bushing that contact a metal surface. A thin screwdriver can be used to smear it around inside the bushing. Take extra care not to get this grease all over, it's very sticky.

To open up the bushings, use the handle end of the balljoint wrench that is included in the suspension kit.

Once the slot in the bushing is opened, slide it over the antiroll bar near the 90-degree bend.

With both bushings on the bar, bring it up from under the car and set it in position.

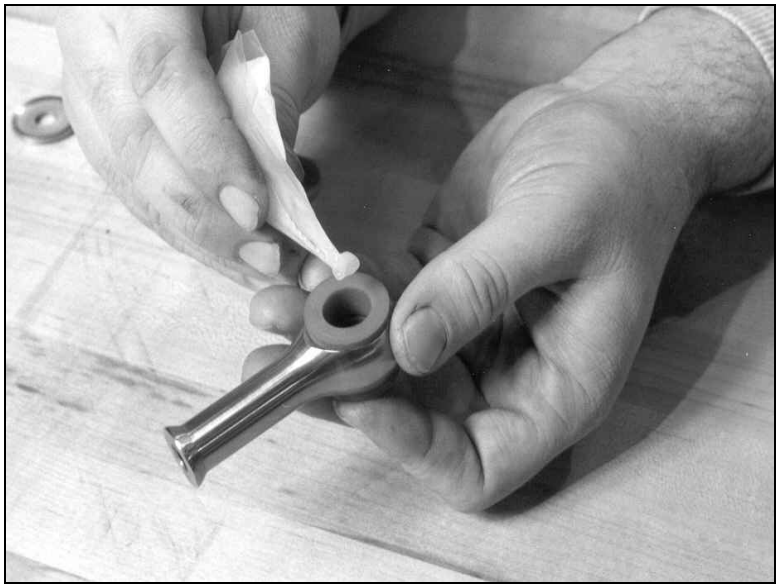


Center the bushings on the mounting pads welded to your frame.

Center the antiroll bar in the frame by measuring from the side of the frame to the end of the bar on the driver and passenger sides.

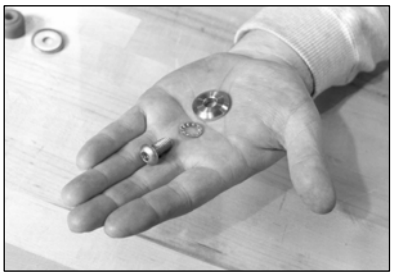
Slide the billet aluminum cap over the bushing and secure with the 3/8-16 x 2 1/2” socket head allen and locknuts provided.

Put the urethane bushings into the upper antiroll-bar-link eyebolt.



Coat the bushings with the silicone grease.

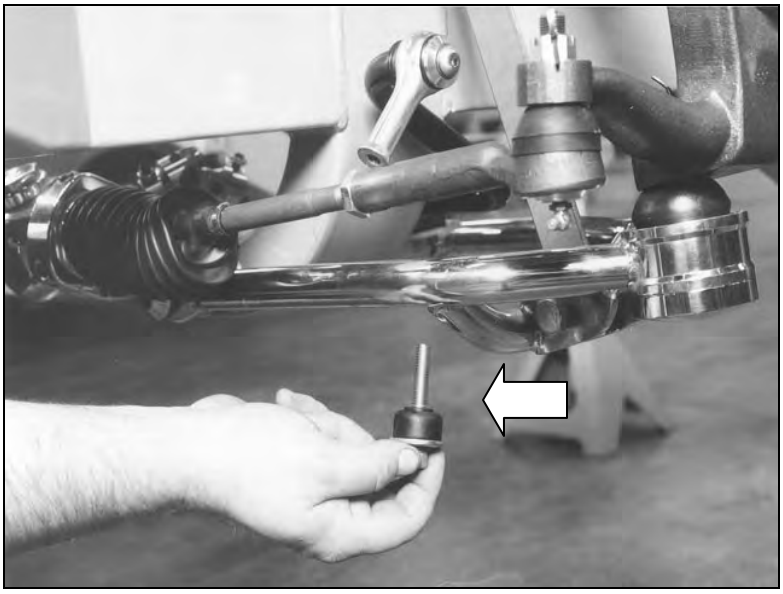
Next, slide the link eyebolt onto the end of the antiroll bar.



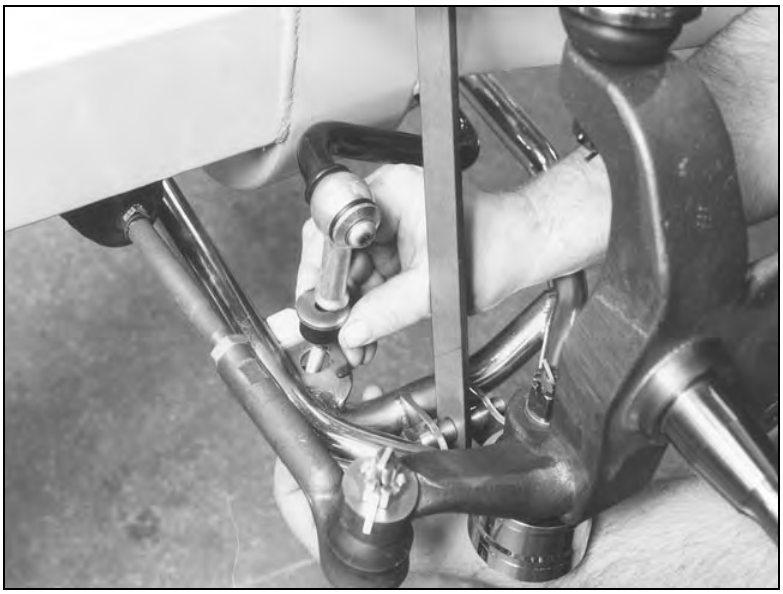
Shown here is the hardware used to attach the link eyebolt to the antiroll bar.

Attach the link eyebolt to the antiroll bar. Place the internal tooth lock washer next to the head of the 3/8-16 x 3/4” button head allen and the beveled stainless steel washer. Apply Loctite™ to the button head allen and tighten.

Put the star lock washer, bushing washer and one urethane bushing on the 3/8-16 x 2 1/4 socket head allen. This attaches the link eyebolt to the lower A-arm. Apply silicone grease to the bushing on all surfaces.

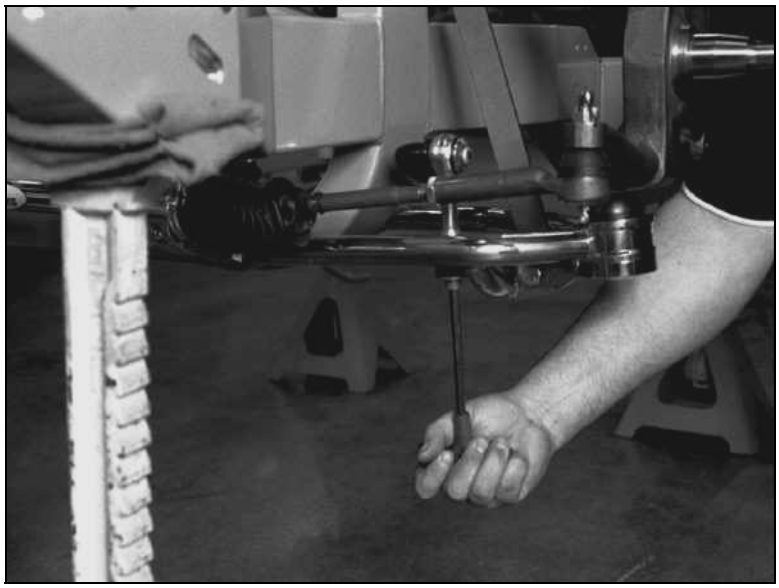


Insert the lower bushing assembly into the lower A-arm mount bracket.

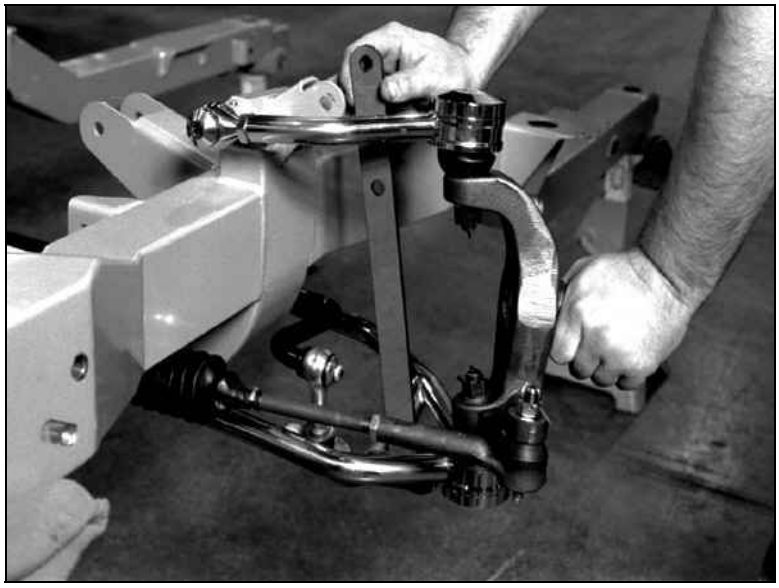


Grease the upper bushing and slide it and the other bushing washer over the bolt.

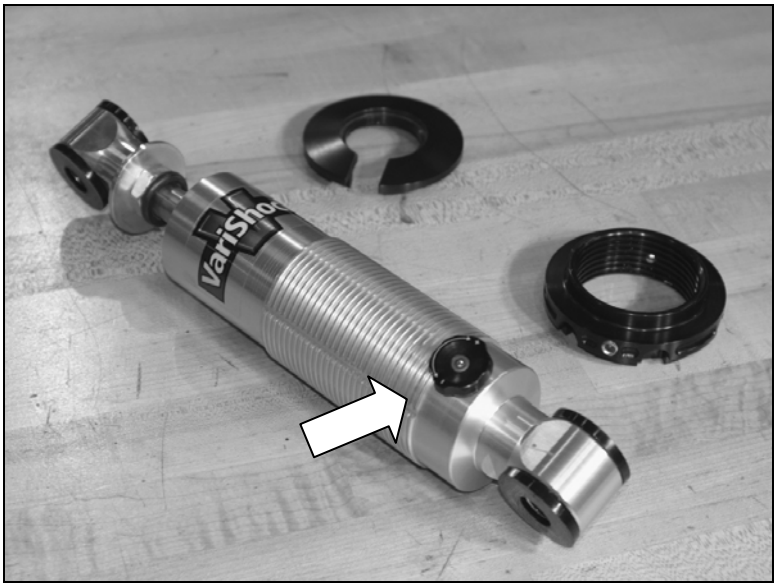
Apply Loctite™ to the bolt. Push down on the antiroll bar and thread the bolt into the end of the link eyebolt.



Use the T-handle Allen wrench to tighten the bolt from under the lower A-arm. Tighten only until the urethane bushing begins to crush.



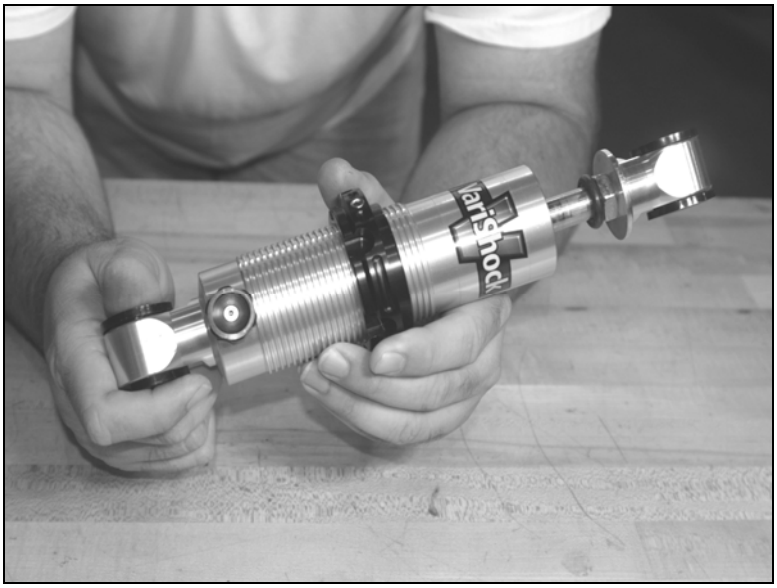
After finishing the antiroll bar installation, run the suspension through its travel full shock extension to full shock compression. Do this with the spindle turned full left, full right, and centered. Everything should move without binding. Because the antiroll bar makes independent installation difficult, you will have to do the driver and passenger sides at the same time.



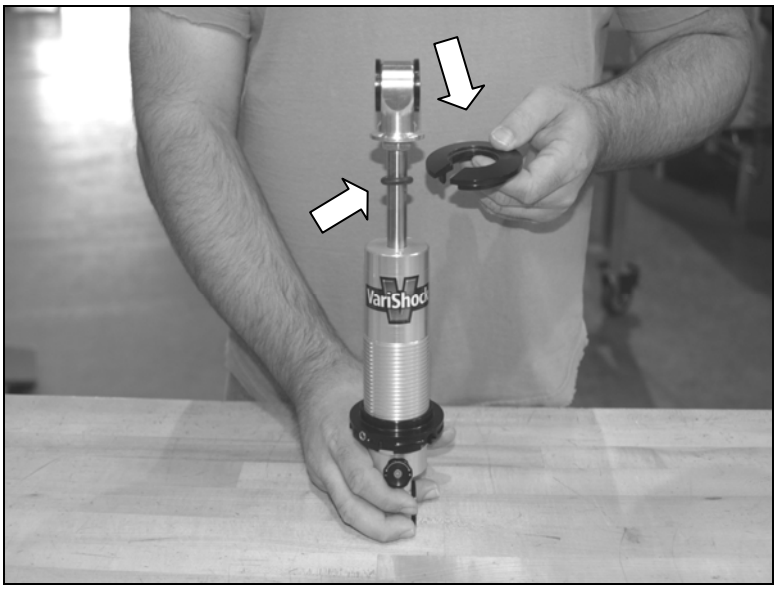
Installing Shocks & Springs

The front suspension kit includes the VariShock Quickset 1 externally adjustable coilover shocks with urethane bushings. The knob on the bottom is used to change the ride quality and handling of the vehicle.

Optionally available is a VariShock Quickset 2 double adjustable coilover.

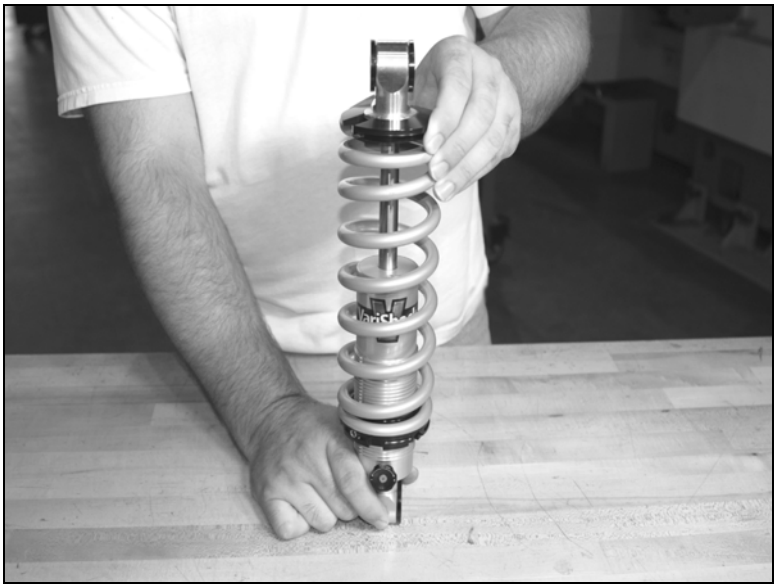


Screw the spring seat adjuster onto the shock. The set screw locking ball allows the spring seat height to be adjusted in ½ turn increments and then locked once the desired spring height is set.



This upper spring seat holds the spring in place at the top of the shock. The slot allows the spring seat to be inserted after the spring is in place.

Slide the rubber bumper down the shock shaft before installing the spring.

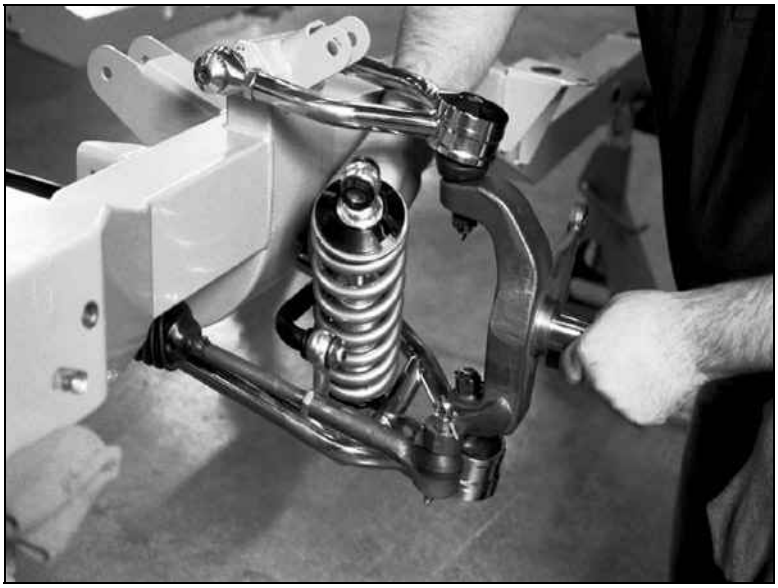


After dropping the spring over the shock, slide the upper spring seat over the shaft.

Next, turn the shock over and tighten the spring seat against the spring. After the spring seat makes contact with the spring, turn it one-half of a revolution. This will add a small amount of preload to the coil spring. Tighten the set screw locking ball with an allen wrench. With the spring seat at this position, adjusting the spring seat up or down 1/2-inch can make small changes in the vehicle ride height.

The designed ride height of the suspension has the compressed coilover at 12” eye to eye. If you install a 195/65-15 tire on a 6” wide 15” diameter 3 1/2” backspace wheel, the tire will have 6 1/2” of thread width be 8” wide at the section, have a mounted diameter of 25” and a rolling radius of 12”. This will hold the bottom of the crossmember 4 1/2” off the ground. The tire will hold the spindle centerline 12” off the ground. If you use a larger or smaller diameter tire, the crossmember clearance will change accordingly

These are the stainless steel shock mounting spuds used at the top and bottom of the shocks. If you did not purchase these, use the 1/2 x 2-1/2 bolts and locknuts provided with your suspension kit.



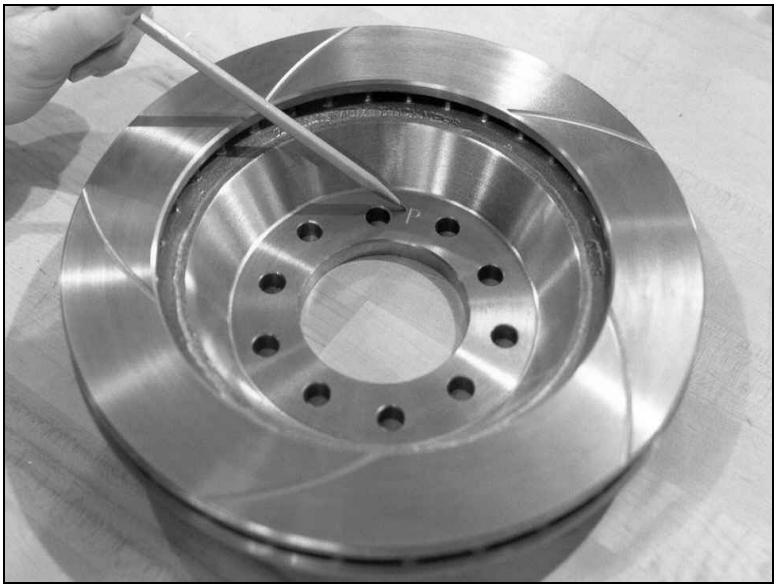
Insert the shock from the bottom. It will fit between the antiroll bar and the lower A-arm shock mount cross tube.

Install the lower shock spud first. Insert the male shock spud from the front of the car into the lower A-arm. Insert the female part of the spud from the back, it acts as the nut. Use Loctite™ to secure threads.

Using the spindle shaft as a handle, line up the top eye of the shock in the upper mount and slide the male spud in. Insert the female part of the spud from the back, it acts as the nut. Use Loctite™ to secure threads.

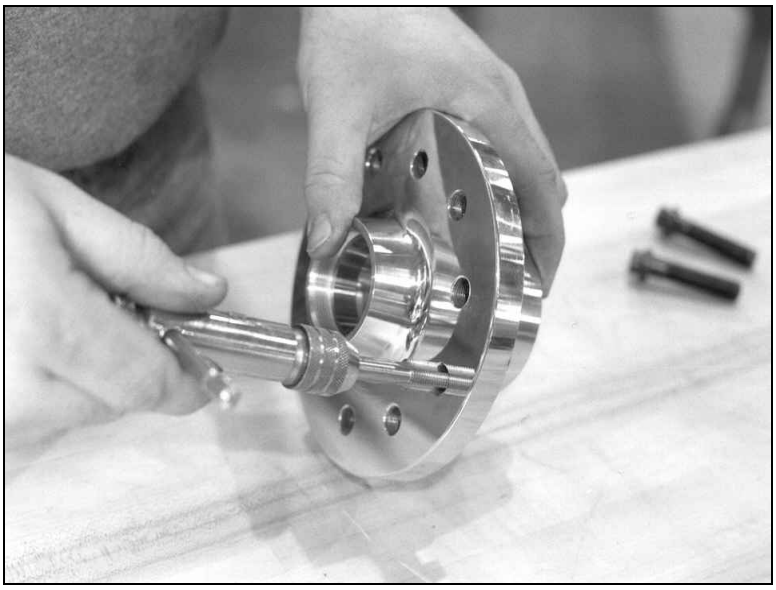
With both halves in place, use two Allen wrenches to tighten the spud together. Tighten them until they stop, the correct amount of crush is calculated into their length.

Installing Brakes



The 11 3/4 inch vented rotors are directional. The “P” machined on the inside identifies the passenger side rotor. There is a "D" on the driver side rotor.

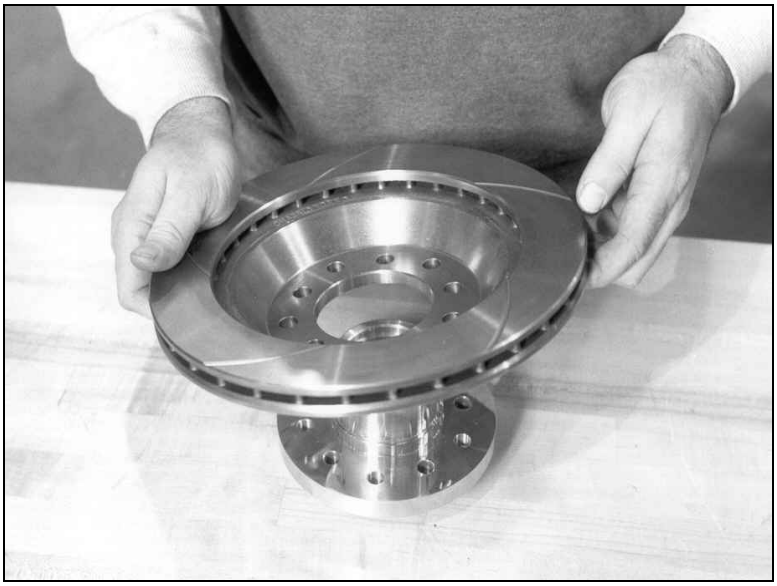
These brakes require at least a 15” diameter wheel; however, even some 15” wheels may not clear. Verify you have at least 1/4” of wheel clearance from all brake components.



The billet aluminum hubs have threaded stud-mounting holes for both 4 1/2 and 4 3/4 inch bolt circles.

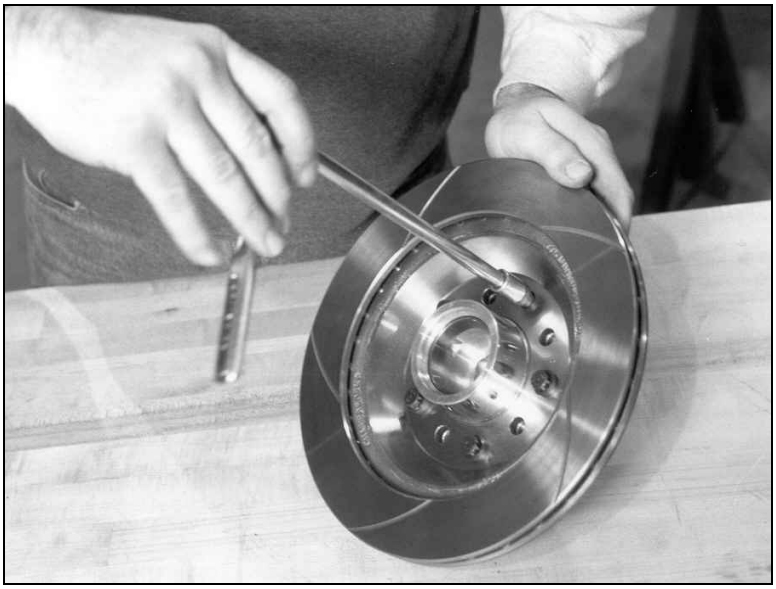
Choose the bolt circle that matches your wheels and chase the threads with a 1/2-20 tap.

After chasing the threads, it is a good idea to blow them out with an air hose making sure no debris remains in the holes.



Set the rotor over the backside of the billet hub. The larger bearing race snout on the hub is the backside. Line up the bolt circles on the hub and the rotor.

Add a drop of Loctite™ to the threads, up near the shoulder and insert the studs through the proper series of holes. The provided 12-point bolts are 2 1/4 inches long. If you need a longer wheel stud for thicker wheels, 3-inch long studs are available from Chassisworks.

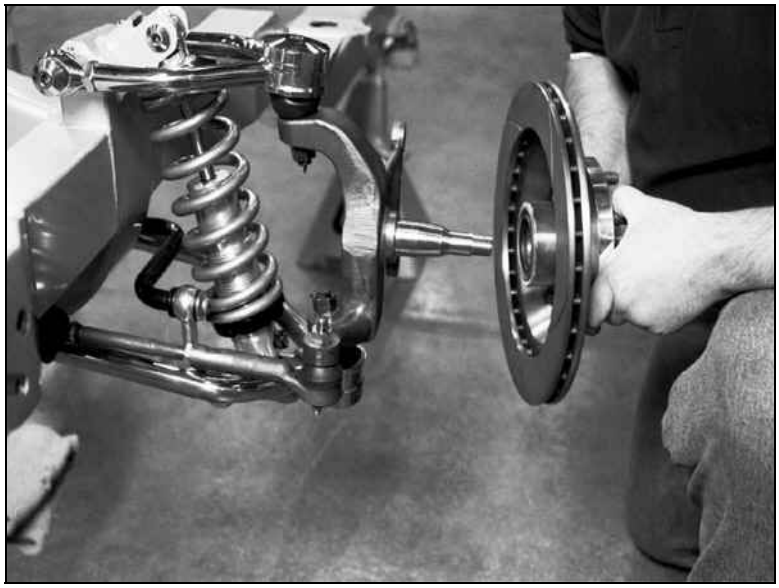


Tighten the studs from the backside of the assembly. You're ready to install the inner wheel bearing and seal.

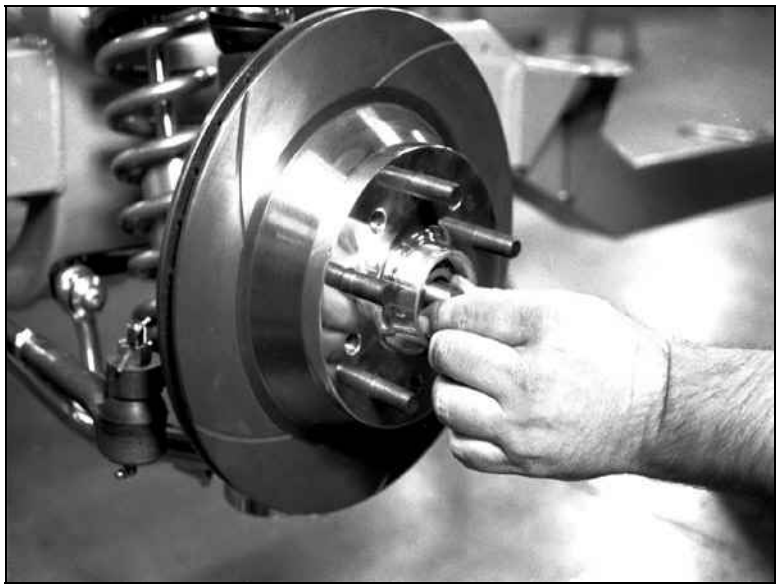
The bearing races are pressed in the billet hub from the factory. You must pack the wheel bearing before installing it. In the photo, a wheel-bearing packer is shown. If you do not have one available, hand packing the bearing is okay. If you are unsure how to pack the bearing, refer to an auto repair manual for assistance.

After the bearing is packed, drop it in the bearing race. The inner wheel bearing seal is then positioned on the hub.

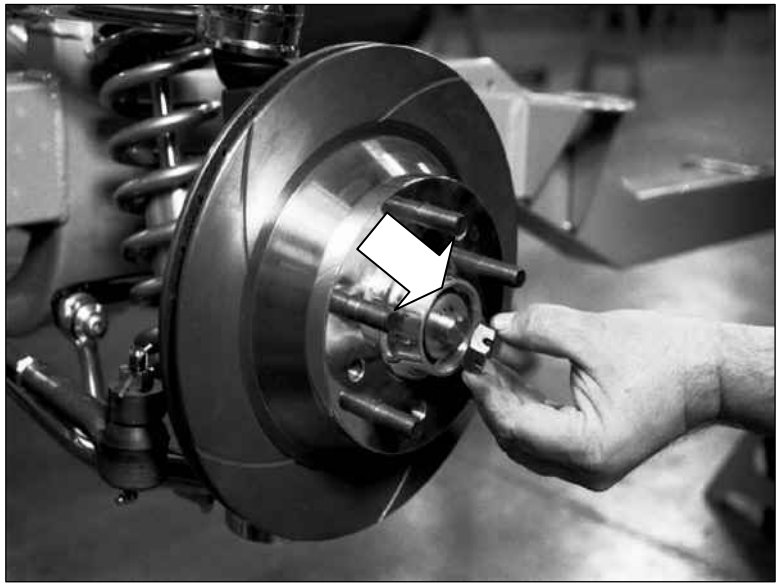
Place the hub on a wood surface before installing the seal. Using a hammer and seal installer, drive the seal into the hub making sure it's fully seated.



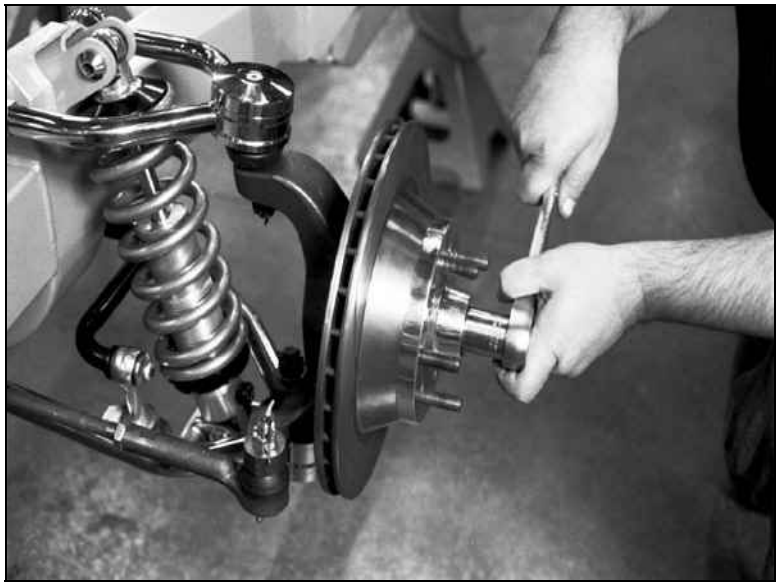
With the inner bearing and seal in place, slide the hub and rotor assembly onto the correct spindle (remember, the rotors are directional).



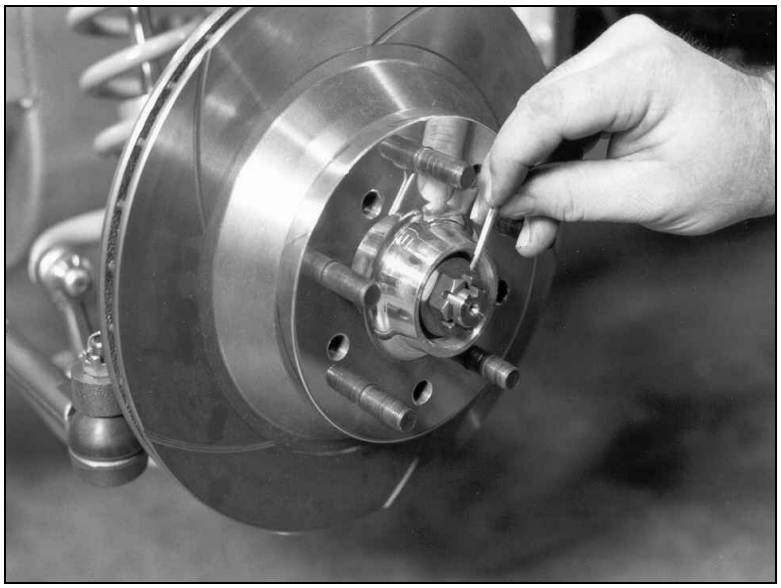
Pack the outer wheel bearing as you did the inner one. Slide the bearing into the race.



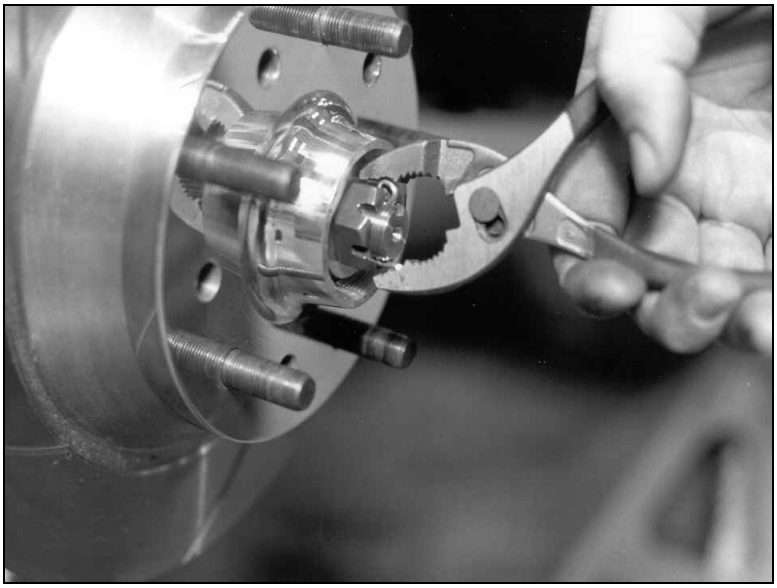
Slide the washer over the spindle shaft and install the castle nut.



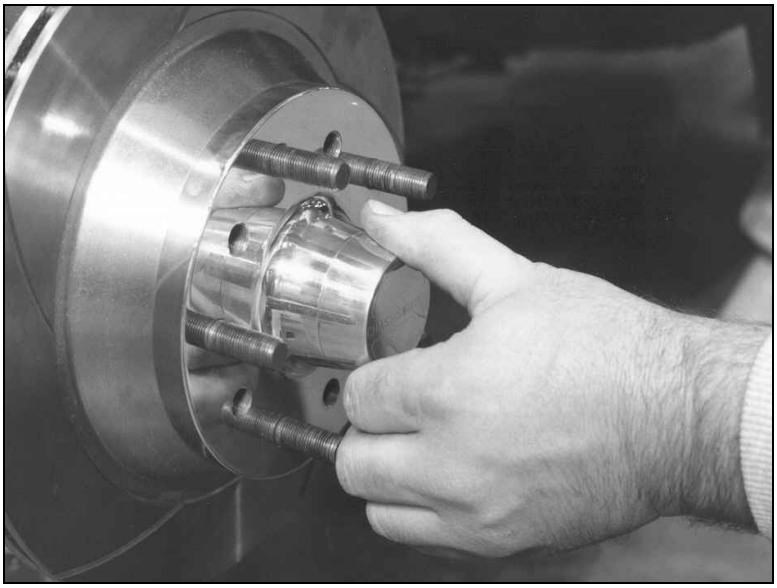
To fully seat the bearings, tighten the castle nut to 12 lb-ft while turning the rotor assembly forward by hand. This will remove any grease that could cause excessive wheel bearing play. Back off the castle nut to the "just loose" position and then hand tighten. There will be .001 to .005 inches of end play when the wheel bearings are properly adjusted.



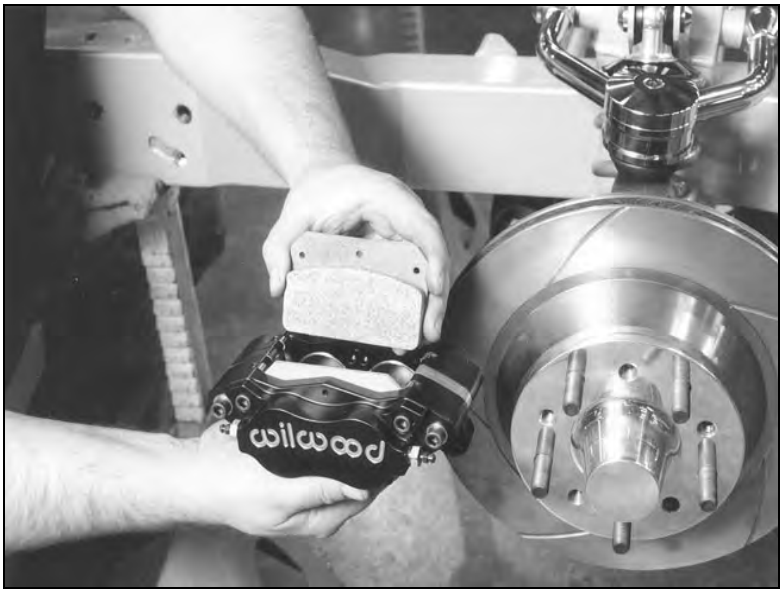
After the wheel bearings are tight, insert the cotter pin through the castle nut and the hole in the end of the spindle shaft. Do not tighten the castle nut when aligning the cotter pin; only loosen it.



Use the same procedure you used on the balljoints to fold the cotter pin legs.

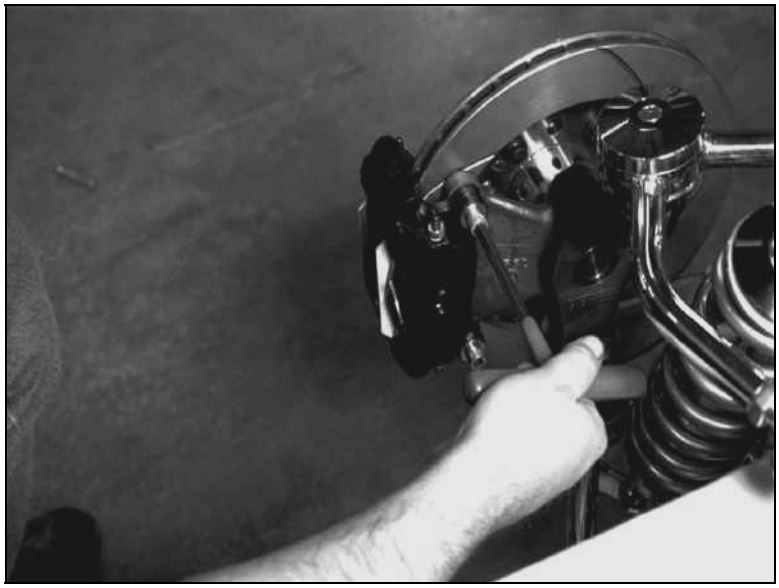


Apply anti-seize to the threads of the screw-on dust cap. Screw the dust cap onto the hub. It only needs to be hand tightened, the o-ring inside will keep it from coming loose.



Next, install the Wilwood brake calipers. Start by inserting the brake pads into the caliper, one on each side of the rotor slot with the metal backing toward the pistons.

Slide the caliper with the pads installed over the rotor and the caliper mounting pads on the spindle. Use the 3/8-16 x 1 3/8 socket head allens, lock washers, and flat washers provided in your brake kit to mount the calipers. The lock washer goes against the head of the fastener.



Use the T-handle Allen wrench to tighten the mounting bolts. Rotate the rotor assembly slowly to check for any clearance problems between the rotor and the caliper.

Finally, bolt your wheel and tire on the hub and check again to be sure there is at least 1/4” clearance between the caliper and the wheel. There are differences in wheel manufacturer’s tolerances. Make sure your wheel turns freely. **Do not** use positive offset wheels with this suspension system.

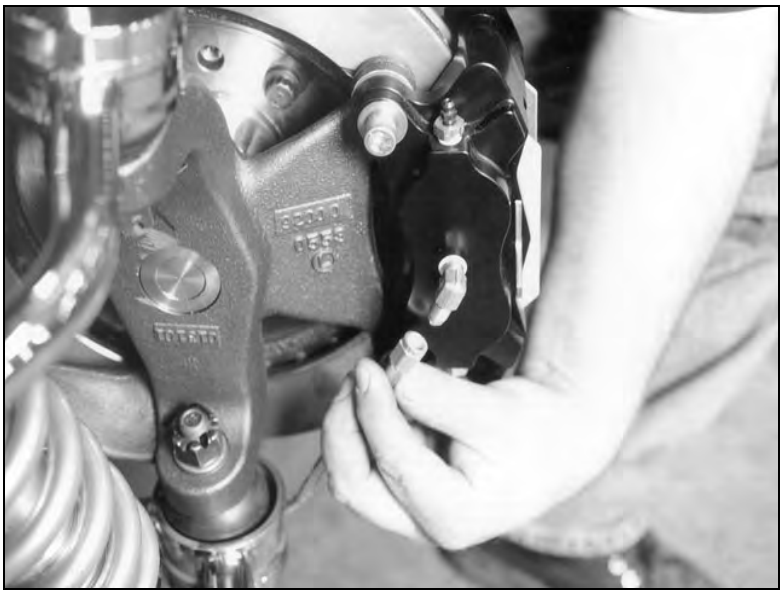
Next, remove the plastic plug protecting the inlet port of the Wilwood caliper to start the installation of the stainless steel brake lines.

Coat the 1/8-pipe threads of the 90-degree brake line adapter fitting with Loctite™ teflon sealing compound.

Thread the fitting into the caliper. Be sure to start it straight so you do not cross thread it. If the threads in the caliper get damaged you will have to replace the caliper.

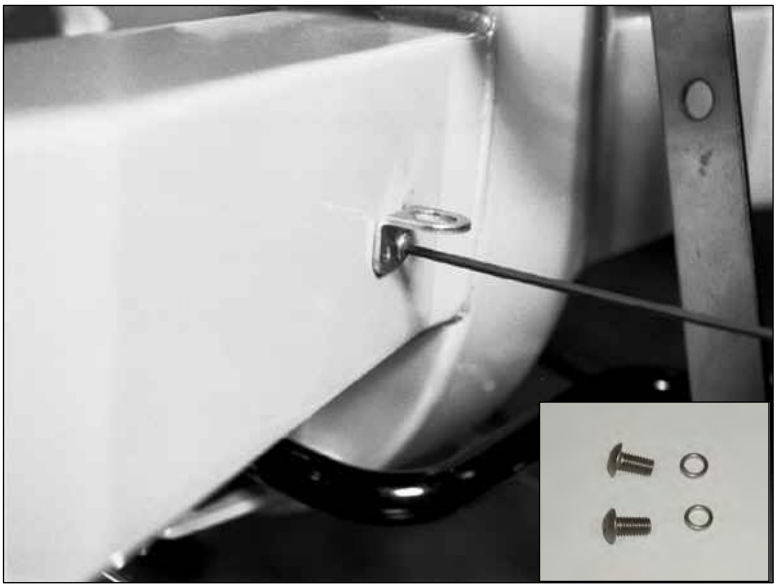
Use a 3/8” wrench to tighten the brake line adapter fitting. The hose end of the fitting should point toward the lower caliper-mounting bolt when tight.

Remember, the caliper is aluminum and the fitting is steel. Do not over tighten and strip the threads in the caliper.

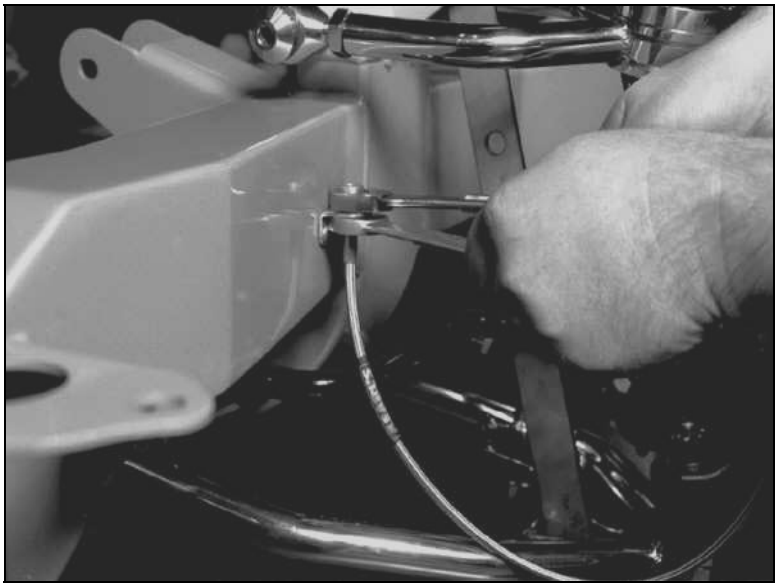


Thread the swivel end of the stainless steel brake line onto the adapter fitting until it is finger tight.

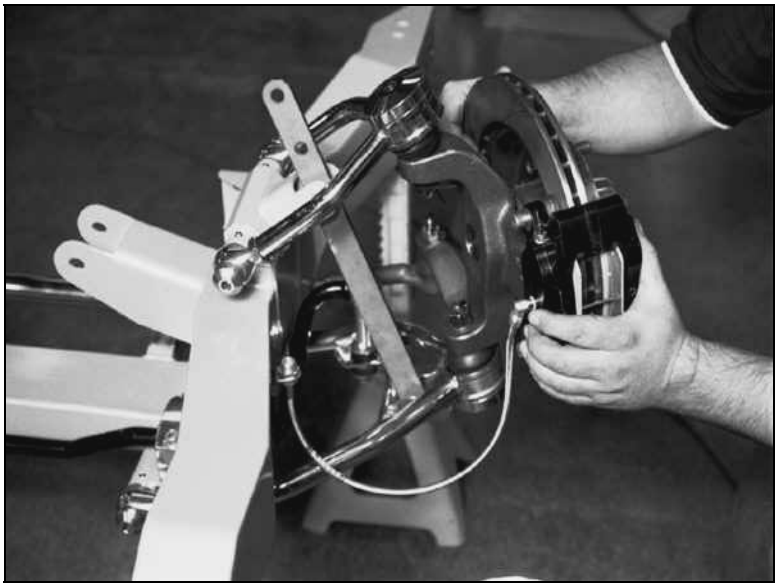
Drill and tap the side of the frame for two 10-32 threaded holes. These holes will position the brake line tab 2” below the top of the frame and 2-1/2” ahead of the weld at the dropped crossmember.



Attach the tab to the frame rail with the stainless steel 10-32 x 3/8” button head and 3/16 high collar lockwasher provided. Use an allen wrench to tighten the button head.

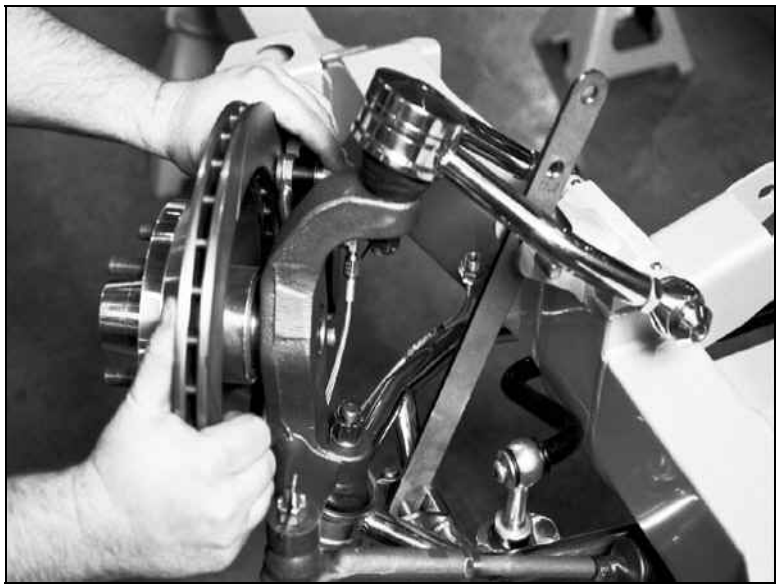


Insert the brake line through the tab and tighten using one wrench to hold the brake line and another to tighten the jam nut.

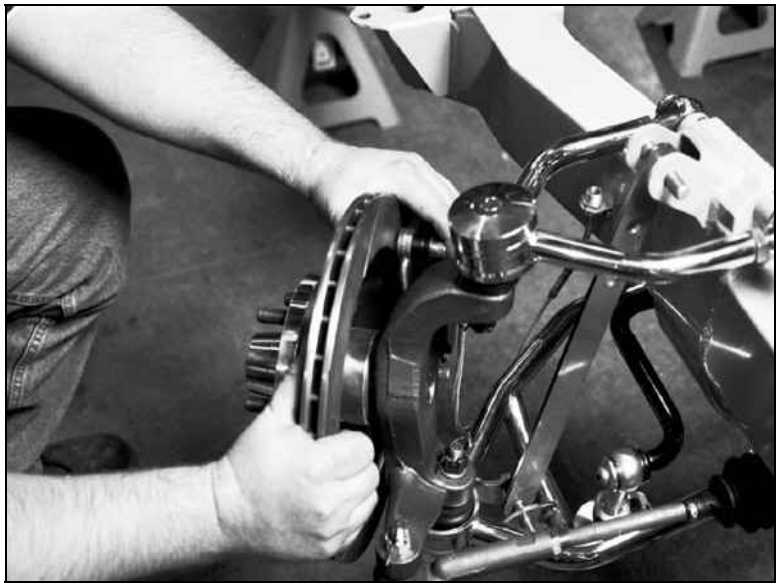


Next, check the brake line for clearance to all suspension parts. Also, be sure the brake line is not stretching or binding while the suspension goes through its full travel and its lock-to-lock turning radius.

Unbolt the driver side end of the anti-roll bar, remove the passenger side coil-over shock and install the shock simulator in the fully compressed position. Turn the spindle to the full left lock position; check the brake line for binding.



Move the spindle to full right lock, check the brake line for any binding.



Move the shock simulator to the full extension setting, turn the spindle to full right lock position. Check the brake to be sure it is not stretched.

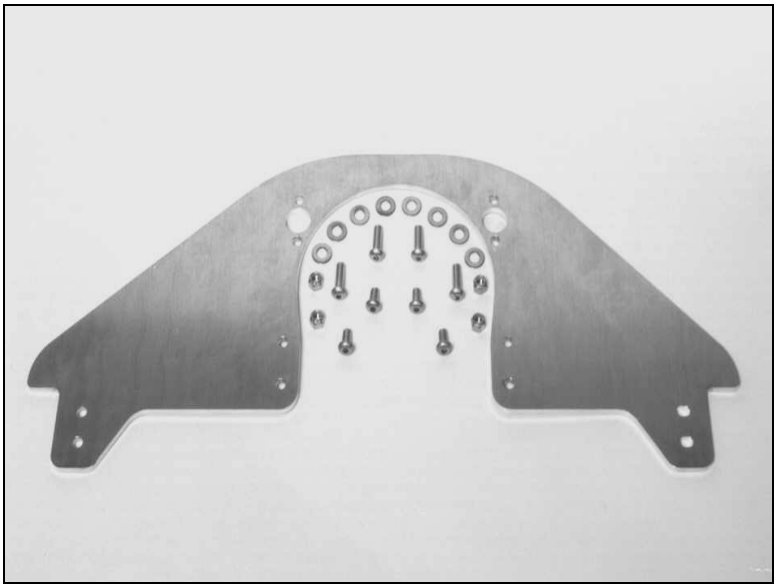
Turn the spindle to the full left lock position; check the brake line for binding. Repeat this procedure at the ride height setting.

You can now final tighten the brake line at the caliper adapter.

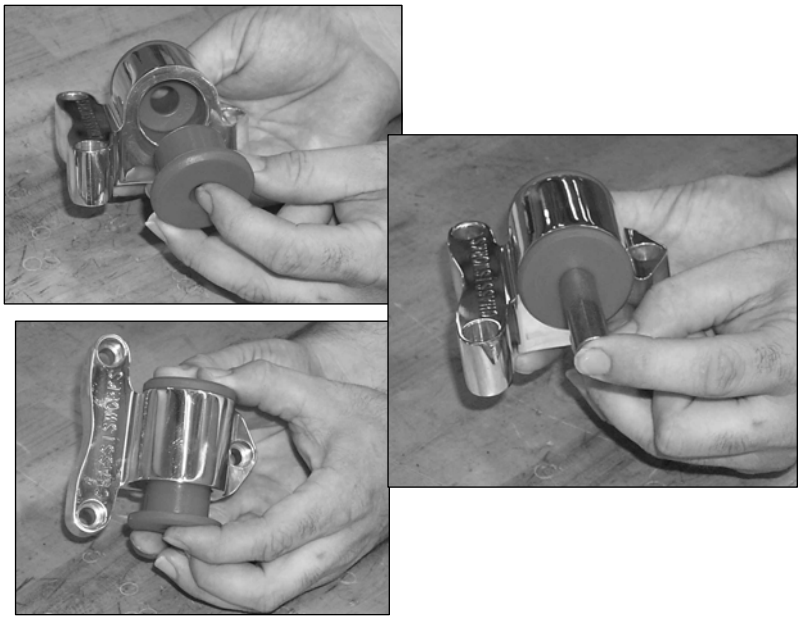
Repeat this procedure for the passenger side brake line assembly.

Installing Billet Engine Mounts & Transmission Mid Plate

For clarity, some of the engine installation photos are shown without the clip installed in the car. If you have the luxury of a lift available, it is actually easier to set the body onto the frame with the engine and transmission installed. This does present its own problems because it is more difficult to align the body mounting locations. You will need a lot of extra hands and three floor jacks to move the frame and engine assembly under the car. A safety note: The car will be very rear end heavy and tend to tip on the lift. We show how to install our clip on jack stands because we feel it is a more popular installation method.



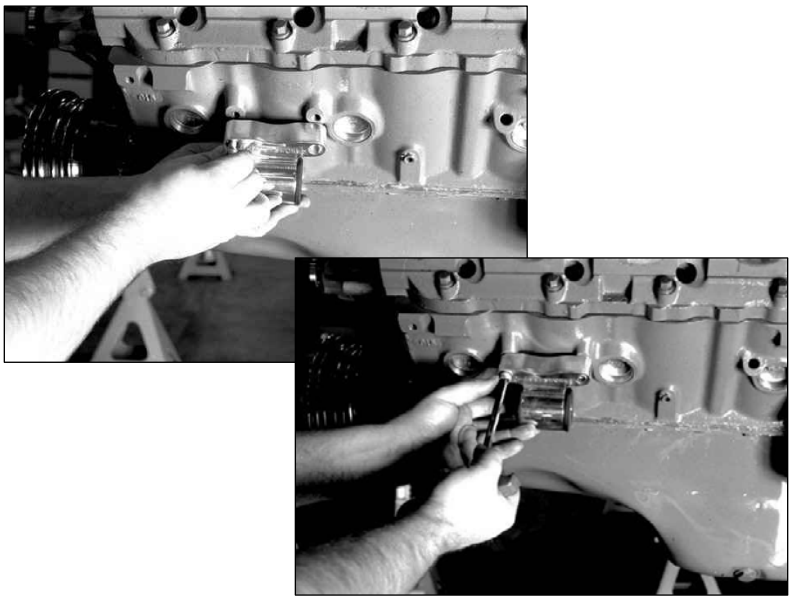
There are two types of motor mounts available; motor plates, and side mounts. The Chassisworks motor plates are available for small and big block Chevy engines. They are shipped completely machined and ready to bolt in. They sandwich between the water pump and block and bolt to tabs that are pre-welded to the frame.



Insert one urethane bushing into each side of the billet mount. Install the steel sleeve into the bushings.

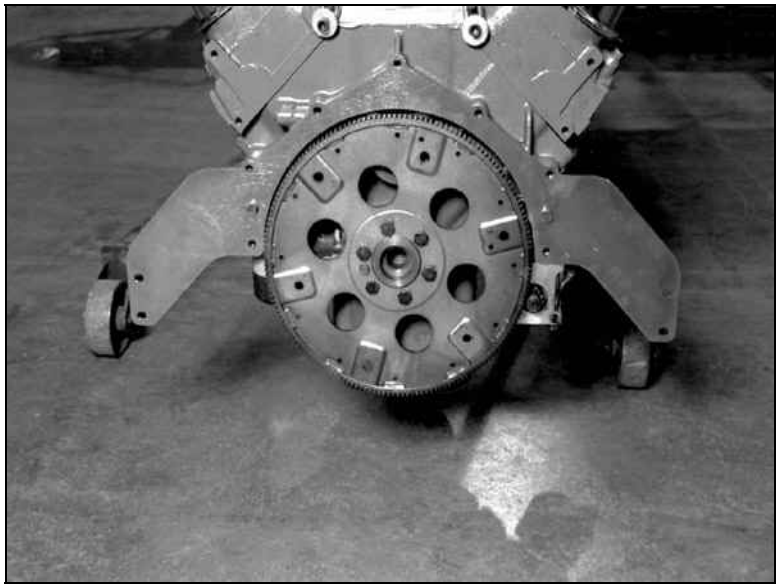
There is no need to lubricate the urethane bushing assembly, it does not rotate.

Repeat the bushing and sleeve installation for the other billet side mount.

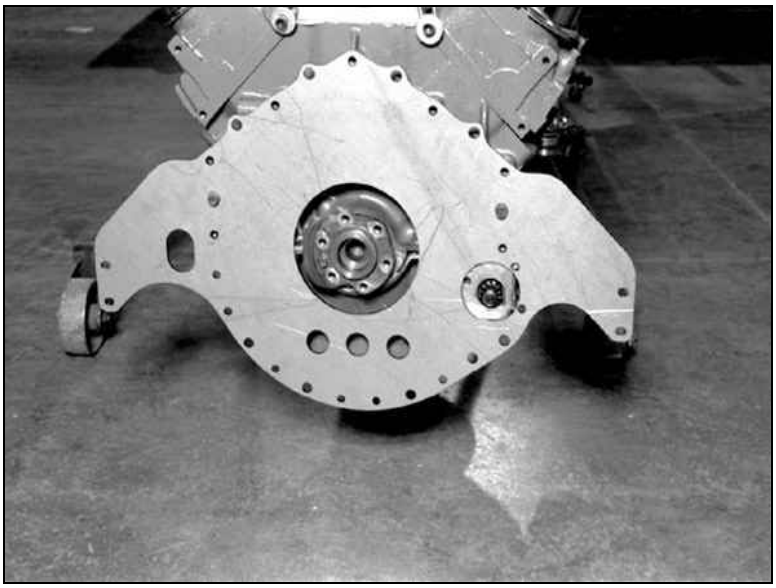


Install the assembled billet mount to the engine block with the stainless steel 3/8-16 x 1 1/2 inch socket head allens and 3/8-inch high collar lockwashers provided. It is best to start all three fasteners before final tightening the billet mount to the block.

Once both billet mounts are installed, you can install the mid plate.

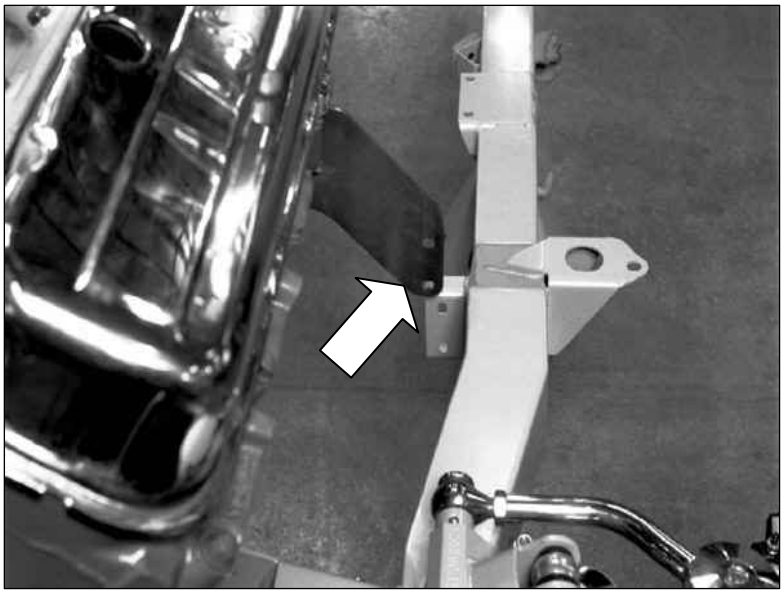


Bolt the automatic transmission mid plate to the back of the engine block. Chassisworks manufactures different automatic mid plates for use with Chevrolet and Pontiac V8.

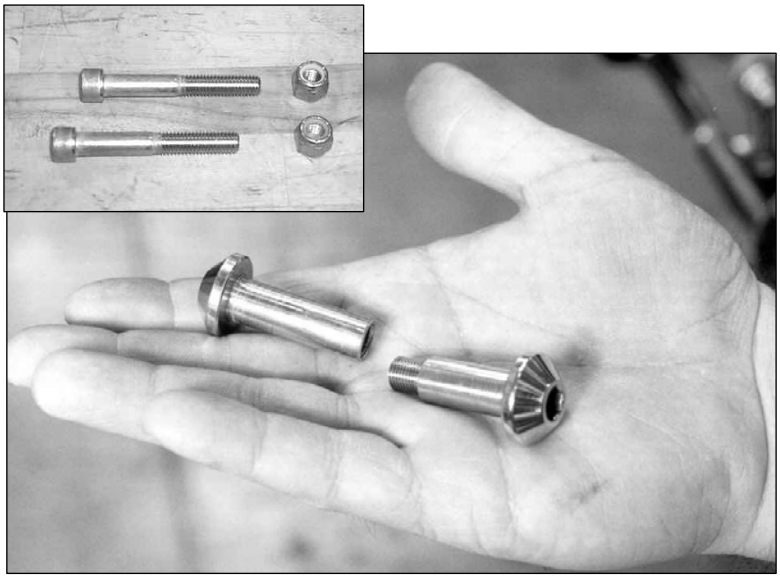


Installation of a manual transmission and Lakewood bell housing will require the mid plate shown here. Chassisworks manufactures different mid plates for Chevrolet and Pontiac V8.

Set the engine in place lining up the billet motor mounts with the frame motor mount brackets. Maneuver the engine into place carefully checking that all parts have sufficient clearance.

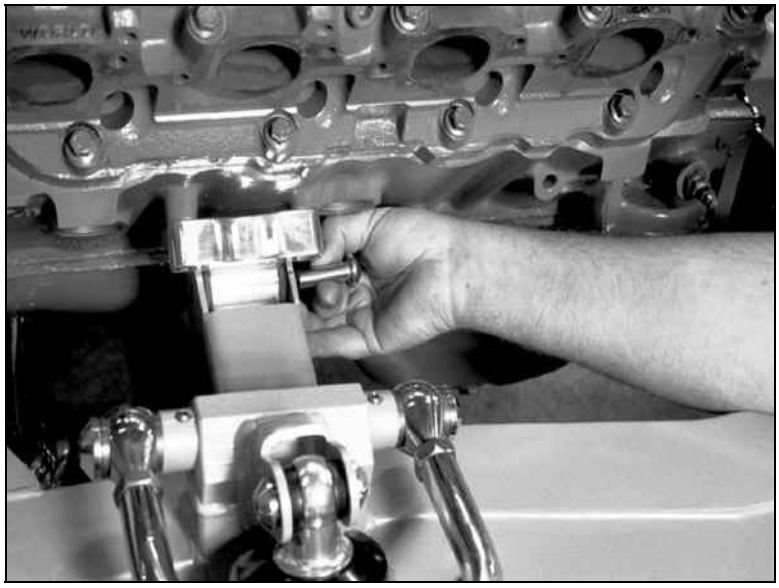


Make sure the mid plate is on the front side on the mounting bracket when setting the engine in place.



These optional stainless steel "spuds" will be used to fasten the billet motor mount to the frame.

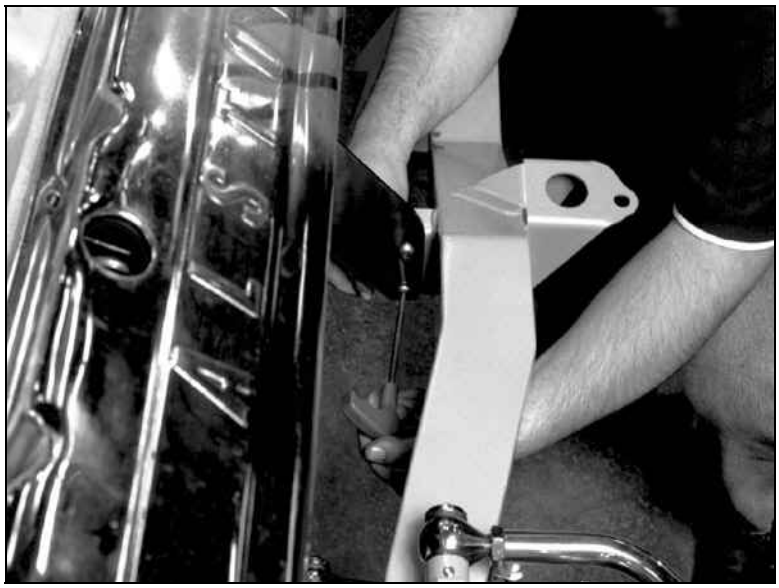
If you did not purchase the spuds, use the stainless steel 1/2-13 x 3 1/2 inch socket head allens and locknuts provided in the billet motor mount kit (shown in upper left).



Insert the female spud through the frame mount into the billet motor mount assembly from the rear. Do the driver side first. The passenger side frame adapter has a slot to allow for misalignment.

Apply a small amount of Loctite™ and insert the male portion of the spud through the motor mount bracket and into the billet motor mount assembly. Thread the male and female spuds together and just finger tighten for now.

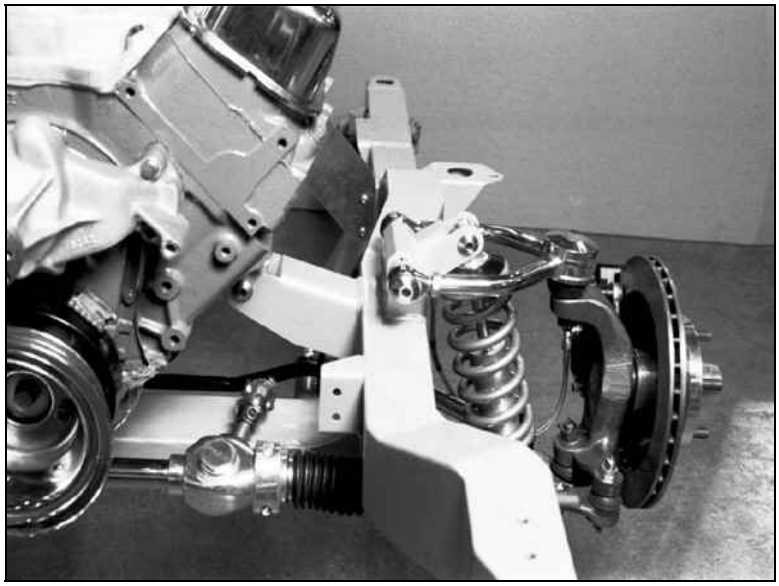
Repeat this on the passenger side before going to the next step.



Use the stainless steel 3/8-16 x 1 1/4 inch button head allens, flat washers and locknuts to attach the mid plate to the mid plate mount brackets. Put a flat washer against the button head and another one on before the locknut.

Do not final tighten these until you have the driver and passenger side button head allens installed. Use an allen wrench and a 9/16 inch wrench to final tighten the mid plate button heads allens.

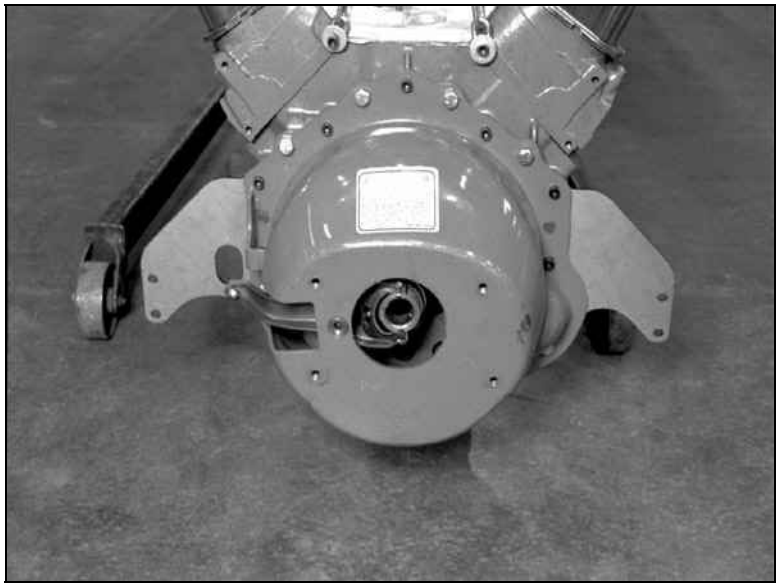
Final tighten the motor mount spuds using two allen wrenches. Torque them to 20 lb-ft.



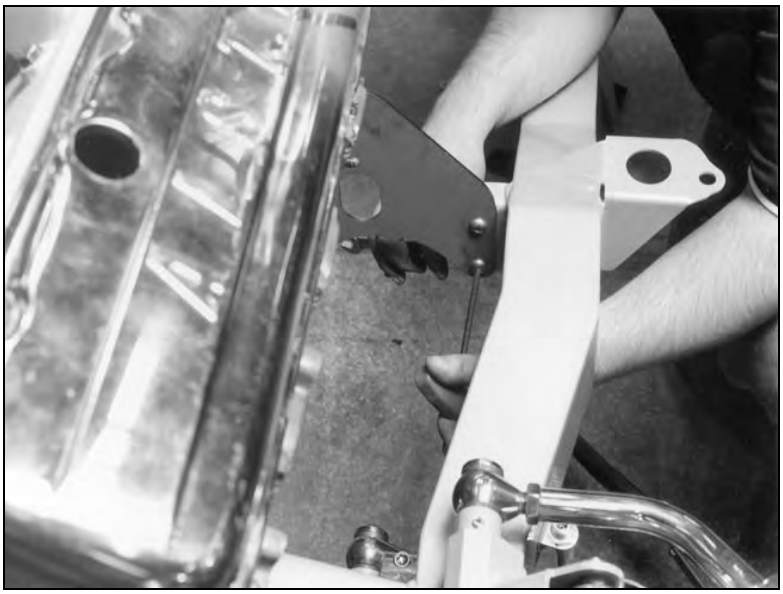
The engine is now mounted and ready for the transmission.

Installing Manual Transmission, Clutch Linkage and Lakewood Can

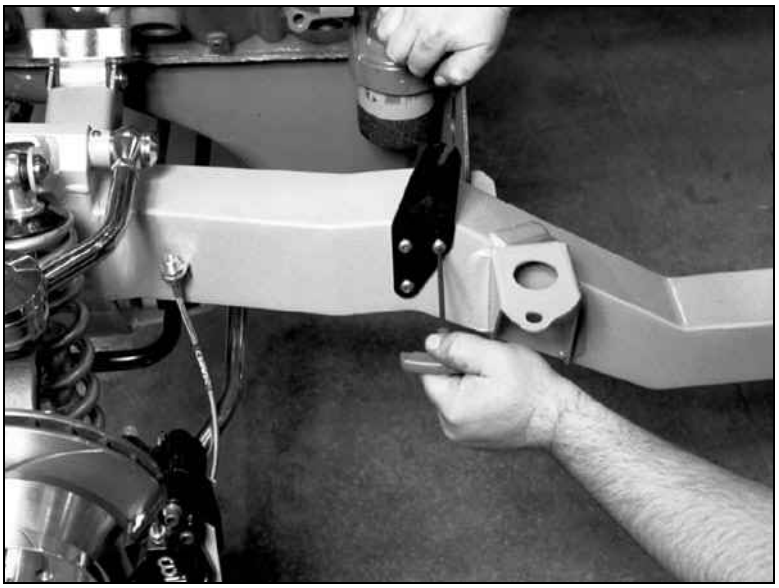
Chassisworks manufacturers a different replacement block saver midplate for use with the Lakewood clutch can for Chevrolet and Pontiac engines.



The block saver mid plate uses all the standard Lakewood hardware to attach to the engine.



The block saver mid plate attaches to the Chassisworks frame the same as the automatic transmission mid plate.



To install clutch linkage, bolt the optional torsion shaft outer support to the frame as shown.

Install the clutch linkage torsion shaft and linkage as in the stock car. Some blocks do not have a pivot ball hole for the other end of the torsion shaft. Chassisworks has an optional bracket to solve this problem.

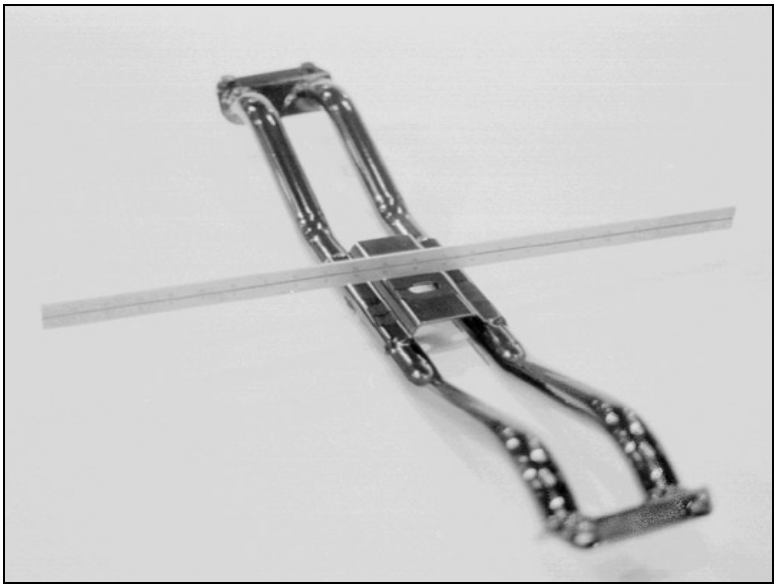
5916-F20-01 - 4-Speed, Powerglide, Turbo 350

5916-F20-02 - 700R4, Tremec, Richmond 5-speed, 4L60

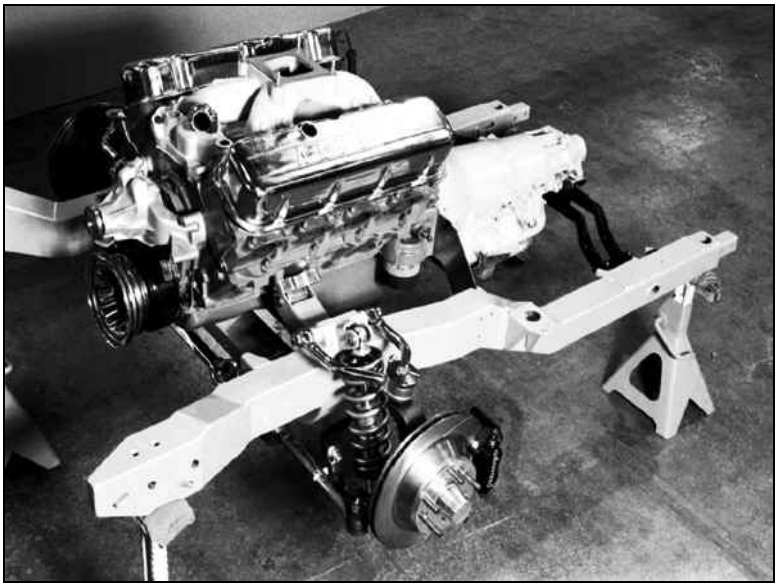
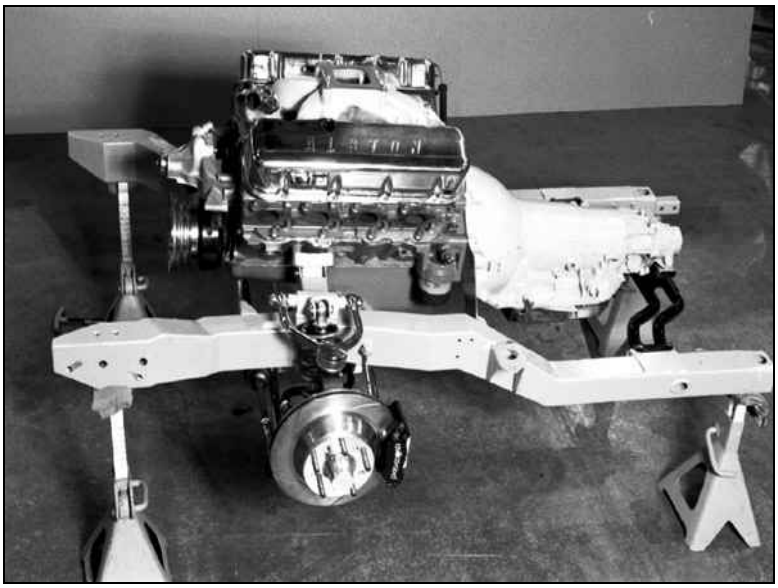
5916-F20-03 - Turbo 400, 200-4R, 4L65E

5916-F20-04 - Richmond 6-speed ROD

Chassisworks currently manufactures transmission crossmembers for most applications. Not all automatic transmission deep pans will clear the Chassisworks crossmembers. The Turbo 350 is the most varied.



Item 5916-F20-03 Turbo 400, 200-4R, 4L65E crossmembers must be installed so the transmission mount surface slopes down hill to the rear of the car. To determine which way the crossmember installs, place a straight edge on the transmission-mounting pad to determine its slope.



These two photos show an engine and Turbo 400 installed.