



1967-1968 Cougar Torque Arm Rear Suspension Installation Instructions

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Version 2

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Total Cost Involved Engineering's 1967-1968 Cougar Torque Arm rear suspension kit offers a unique approach to vastly improve your cars handling, cornering, braking and ride comfort. Popular on road race sports cars, the kit allows a lower ride height and rear axle control and turns your Cougar into performance touring car.

This kit will require the relocation of the single muffler to a pair of mufflers on both sides of the driveshaft just in front of the rear axle. The suspension kit is bolt-on and will require drilling holes (drilling will required: 1/2 inch, 3/8 inch and a 6½ to 7 inch long 5/16 drill bit) except the coil-over/trailing arm brackets, rear anti-roll bar tabs, panhard bar bracket and torque arm tabs (location tool provided) which will need to be welded to a centered pinion, 9 inch Ford housing. Nine inch housings can be purchased from TCI in various stages with the brackets already welded on. Recommended width: Housing 51.5 inches, with axles 56.5 inches.

I would highly recommend that before painting or powder coating the assembly components that you install the kit first then disassemble and paint or powder coat as desired.



Before



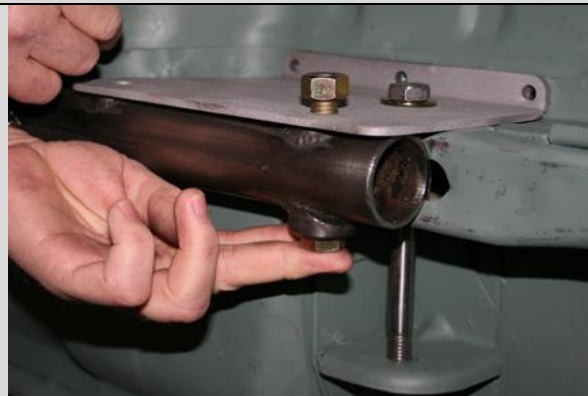
After

Cougar Rear Suspension Installation

The car has to be either on tall jack stands or preferably a hoist to facilitate removal of the exhaust system and old suspension components and the driveshaft. The carpet will have to be temporarily removed in areas that the floor will be drilled through. The front and rear seats need to be removed to facilitate the installation. We used a body rotisserie to aid in the photography.



With all the old suspension removed, start by installing the rear inner sub-frame support plates (L&R) aligned with the front stock leaf spring hole using the 1/2 inch by 6 1/2 inch bolts, washers and nuts that are furnished and lightly tighten.



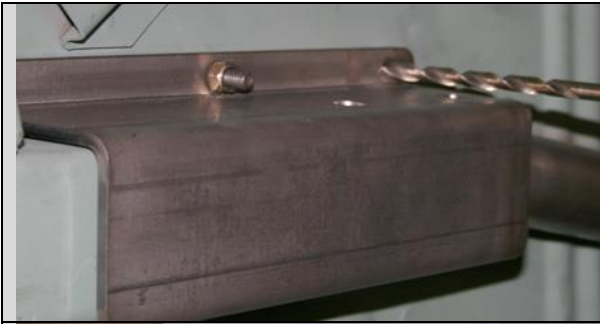
The sub-frame connectors (L&R) are installed by bolting the rear hole of the connector with a 1/2 inch by 3 1/2 inch bolt to the rear hole in the support plates to locate the front channel in the correct location before drilling holes.



Tap the sub-frame connector front channel over the stock frame rail until flush with the floor. Note: You may have to do a little hammer work on the stock frame rails to square them up to install channels. My 67 Cougar's rails had taken quite a beating during the last 40 years.



With the sub-frame channel pushed solidly against the floor and the rear of the connector bolted to the support plates, drill the first hole through the floor with a 5/16 drill bit using the channel's holes as a guide pattern.



After drilling the first hole, install one of the 5/16 button head bolts through the drilled hole and tighten. This helps in drilling the remaining holes.



Remove the one 5/16 locating bolt, place the inside reinforcing plate over the six drilled holes, using the six button head bolts, washers and nuts per side, tighten the plate down against the floor with heads of the bolts and washers on top and the nuts on the bottom against the channel flange. The 5/16 button head bolts on all of the bolt-on brackets can be installed either direction and in some cases may be easier to install from the bottom with the nut inside the car. I didn't want bumps in the carpet in front of the seat so I followed the same theme through out, with the button head on inside and the nut on the outside.

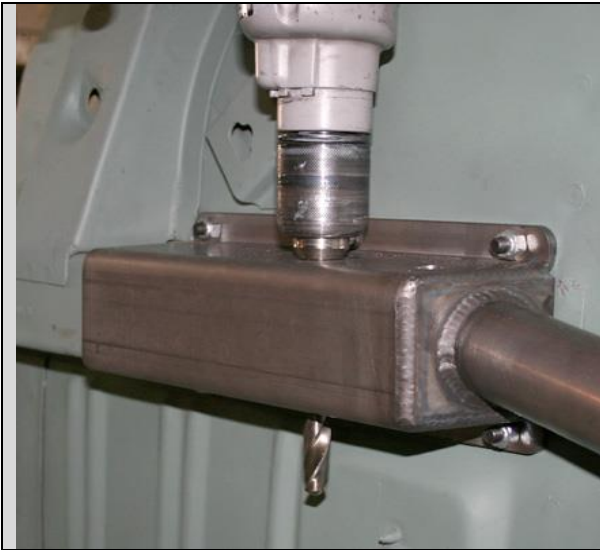


The three holes in the rear inner sub-frame support plate that was bolted on earlier are drilled next with a long 5/16 inch drill bit. I would still use the "install one bolt then drill remaining holes procedure".

Remove the one bolt, place the three hole reinforcing plate over the three drilled holes inside the car, use the three button head bolts, washers and nuts per side, Leave the bolts loose, it makes for easier installation now. When fully assembled the bolts will be tightened and pull the connector tight against the frame. Repeat the process for other side.



Next, the eight 1/2 inch front side holes in the front sub-frame connector channel have to be drilled in the frame. To keep the holes centers straight, drill from the inside and outside of the rail rather than try to drill all the way through from one side. Hold the drill securely as it will want to grab the thin frame sheet metal.



Afterward you can run the drill through both holes to insure the bolts will go through clean. Hang onto the drill; it will want to grab the frame sheet metal.



Installation of the torque arm cross member/frame stiffener is next. Remove the two 1/2 by 3 1/2 inch bolts fastening the rear of the sub-frame connectors to the support plates. Install one of the bolts and washers through the front of the trailing arm brace brackets (L&R) then through the sub-frame connector then partially through the support plate. Let the rear of the plate hang down temporarily. Do both sides.



Lift the torque arm cross member/frame stiffener up between the rails; lightly tap cross member into place between the sub-frame channels.



Install the front four 1/2 by 4 inch bolts, washers and nuts through the cross member and the frame channels.



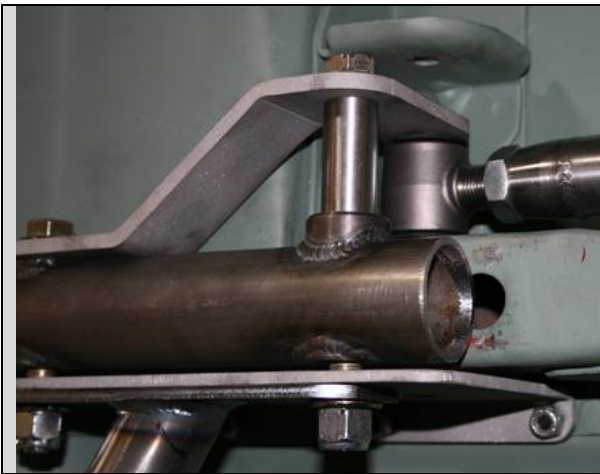
Push the two rear connector $\frac{1}{2}$ by $3\frac{1}{2}$ inch bolts through the front holes of the stiffener flanges, install nuts and washers and leave loose.



The long $6\frac{1}{2}$ inch bolt previously installed in the support plate needs to be unbolted and partially pulled out to allow the brace bracket to be rotated into the proper location.



The trailing arm will be installed either in the top hole (stock spring location), street application or the bottom hole, strip application. On this project, we are using the street setup. Install the $\frac{1}{2}$ by $5\frac{1}{2}$ inch bolt through the brace, through the $1\frac{3}{4}$ inch long spacer, through the sub-frame connector, support plate and through the stiffener flange rear hole. Install nut and washer and leave loose.



Adjust the trailing arm to 20 1/8 inch centers for a starting point. Install the adjuster end of the trailing arm between the stock inner spring pocket and the brace.



Push the long 6 1/2 inch bolt through the adjuster and brace until it is flush with the brace. Next install the 1 inch long spacer between the brace and stock spring outer flange and finish pushing in the bolt. Install nut and leave loose.

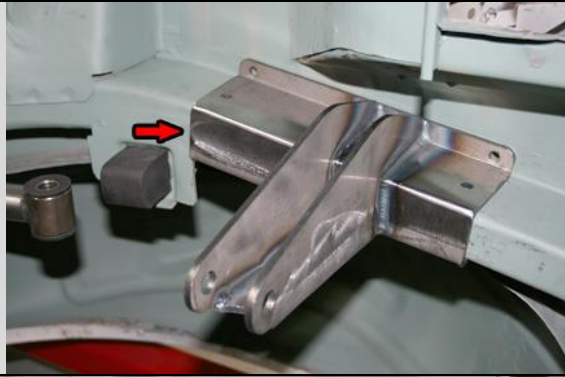


Tighten the 3 button head bolts on the inner frame sub-frame support plates that were left loose. This will pull the connectors up tight against the frame.

Now tighten all remaining front and rear bolts on the sub-frame connectors and the torque arm cross member/frame stiffener. Tie the rear of the bar up out of your way.



The installation of the coil-over/sway bar mount cross member will require the removal of the two thin stock muffler mounting plates that are spot welded on the inside of each frame rail just behind the axle snubbers. I used a small air chisel to break the spot welds. It left a couple of small holes where the spot welds were but they will be covered up with the channel brackets.



Start with the passenger's side cross member channel bracket with the panard bar bracket welded on. Slide channel over the rail and push forward until the bracket touches the axle snubber flange. See arrow.



Clamp channel firmly against the rail and so that it remains in place while you are drilling the four 5/16 inch holes per channel through the floor. Again use the "install one bolt and drill remaining holes procedure". Repeat drilling process for the driver's side channel bracket.



Remove the one alignment bolt and place the slotted reinforcing plate over the inside drilled holes, install the button head bolts and washers through the reinforcing plate, the floor and the outside channel bracket, install nuts and tighten.



Next the 3/8 inch holes in the sides of the channel brackets need to be drill out. The front holes on both sets of brackets can be drilled from the inside and the outside without using the drill guide plate. Drill the outside holes both sides and the front inside holes from the inside.



Using the drill guide plate (furnished), center over the drilled 3/8 inch holes (#2 then #3) on the outside of the frame, securely clamp and drill through existing hole then the frame rail on the other side and then through the existing hole on the inside of the channel bracket. Be patient and hold onto the drill motor as the drill bit will grab when it goes through the inside rail and tries to go out the channel bracket hole.



Next, install the rear 3/8 by 2 1/2 inch bolt through the channel bracket and tighten.

The coil-over/sway bar mount cross member is installed next. If you purchased the rear sway bar option, it can be installed after the cross member is installed but it is much easier to do it on the bench before installing the cross member.



Assemble the sway bar by sliding the tube brackets onto the ends of the bar, then bolt the tube brackets to the cross member using the four 3/8 by 1 inch bolts, washers outside and the nut on the inside of the sway bar bracket on the cross member. This has to be done first before the bushings are installed because the clearance between the bar and the bracket is to close with the bushing installed.



Slide the urethane bushings on and hand press the bushings into the tube brackets.



Center the bar on the cross member and slide the aluminum rings on the sway bar with set screws installed up against the urethane bushing flange, and tighten set screws.



Install the coil-over/sway bar mount cross member between the frame brackets with the coil over mounts and the sway bar brackets towards the rear of the car and the sway bar ends pointing forward.



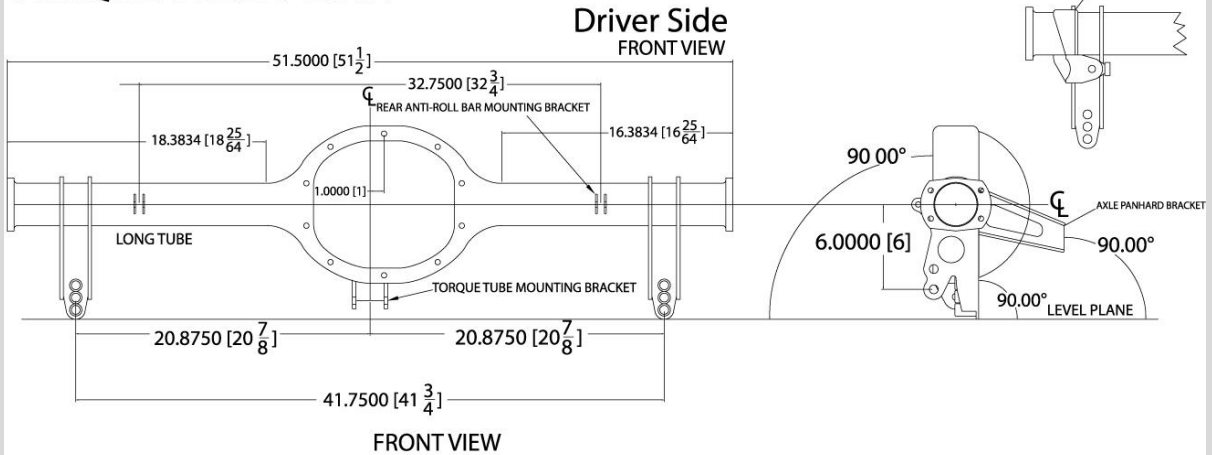
Bolt in with the four 3/8 by 3 inch bolts, washers, nuts and tighten. Note: The flanges on the ends of the cross member are slotted and angled the same as the frame to allow the cross member to be adjusted fore or aft slightly to allow cross member to be parallel to the rear axle assembly.



The rear axle brackets, panhard bracket and the sway bar brackets are installed as per the drawing. I would highly recommend getting this done by somebody with experience narrowing rear axle housings. The kit uses a nine inch centered pinion axle housing. Recommended axle bracket installation is to slide the brackets over the axle tubes without the bearing flanges attached rather than cut the brackets and re-weld together on the housing.

64 1/2-70 TCI MUSTANG REAR-END DIMENSION

TORQUE TUBE 3-LINK



* MEASUREMENT IS FOR CENTER PINION
 * PINION ANGLE IS @ 0 DEGREE.



The panhard bar bracket is installed onto the back of the driver's side axle bracket with the channel facing out and the inner curved radius inside the outer axle bracket rib up against the 3 in axle tube rotated down against the rear face of the axle bracket.



The torque arm tabs are welded on by using the supplied fixture tool. Bolt fixture to the lowest 2 third member bolts flat against the housing flange. Bolt on the two supplied tabs using the 1/2 by 3 1/2 inch bolt and with the longer tab to the passenger side of the housing. Bottom of tabs may need sanding to fit. Weld outside and wrap welds also to the inside.



Finish welding axle brackets and panhard bar bracket the full 360 degrees inside and outside.



The sway bar brackets are located on the front of the axle tubes at axle centerline on 32.75 centers. Finish welding sway bar brackets and straighten rear housing.

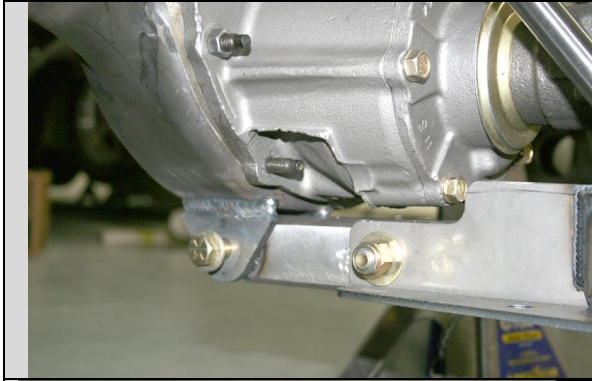


The pinion support brackets are installed next. Using the furnished fixture tool, using the three 3/8 by 24 nuts, bolt the fixture onto the top three studs of the third member housing with the locating tabs facing forward. Bolt the 1/4 inch laser cut brackets to the outside of the fixture tool using the two 1/2 inch bolts with the wider bracket on the passenger side and the shorter bracket on the driver side. Note; Some fitting may be required to get the bracket flush with the top of the third member. The distance between the 2 brackets should be 6.45 inches after welding.

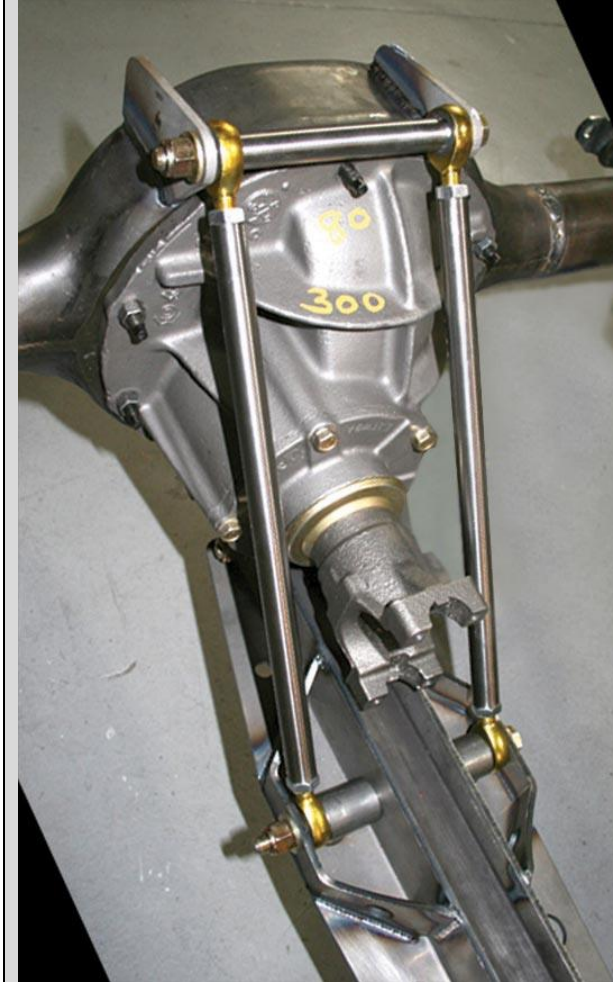


The Torque Arm is shipped with the slider assembly separate to facilitate packaging. The slider has pre-assembled with Teflon bushings and has been installed in the Torque Arm to check for proper fit. We use anti-seize on the threads to prevent galling. When painting or powder coating the assembly, tape the threads on the slider and plug the hole in the Torque Arm tube.

Install the slider into the Torque Arm using anti-seize and be careful not to cross thread and tighten. I used a vise and a 12 inch crescent wrench to make sure it was tight.



Install the rear of the Torque Arm to the tabs on the bottom of the rear end housing using a 1/2 inch by 3 1/2 inch bolt, washers and nut. Lightly tighten.



The pinion support tubes have left and right hand rod ends to facilitate pinion angle adjustment. Adjust the tubes to approximately the same length with an equal amount of threads showing on each rod end. Install the tubes with the right hand rod ends on the inside of the top brackets using the 1/2 by 8 inch bolt, washers, 5.2 inch spacer in between rod ends and Nylock nut.

The left hand end of the tube is installed on the inside of the Torque Arm bracket with the spacer between the rod end and the Torque Arm tube. Install the 1/2 by 8 inch bolt through the bracket, rod ends, tube and spacers. Install Nylock nut and tighten. Now, tighten the nut on the bottom of the housing.

Note: On our 67 Cougar with 2 1/2 inch exhaust and Flowmaster mufflers, I had to unbolt the lower end of one of the pinion support tubes to allow enough clearance to get the 3 1/2 inch drive shaft installed then reconnect the pinion tube. To adjust the pinion angle after installation is complete; the tubes can be rotated simultaneous clockwise to raise the pinion or counter-clockwise to lower the pinion. I adjusted the pinion one degree down from the drive shaft. Tighten lock nuts top and bottom.



Install the coil-over shocks (250 lb. rate) on the cross member with the 1/2 by 2 3/8 inch button head bolt, washers and half nyloc nuts.



Install the 5/8 by 6 inch bolt with washer on the shock and 1 3/4 inch spacer on the bolt.

Note: This kit comes standard with steel All American coil-over. Shown are the optional adjustable billet aluminum coil-over. The knob adjusts the rebound setting. Start by turning knob all the way CCW which is maximum soft then 3 clicks CC for a starting point.



Slide the axle assembly under the car and rest the Torque Arm slider assembly in the driveshaft loop.

Torque Arm Slider Schematic on page 17



Time to install the axle housing assembly. You can use a hydraulic floor jack under the third member or have a couple of your strong friends, like I did, lift the ends of the housing while I pushed the long 5/8 inch bolts through the lower mounting hole in the axle brackets. I left off the axles and brake kit because of the extra weight. Tighten the 5/8 nyloc nuts.



With the heavy lifting done, bolt the front of the Torque Arm slider shaft to the cross member center brackets with the slots using the 1/2 by 3 inch bolt, washers and nut.



The slider shaft travels in and out very little but still needs to be positioned in the slots 6/4 inches from the back of the wrench flats on the housing to the center of the sleeve with the bushing in it. This adjustment allows the slider shaft to be in the middle of its travel. Tighten the Nylock nut.



Install the trailing arm bars using the 5/8 by 2 3/4 inch button head bolts and the half nylocs in the top holes in the axle brackets (street), lower hole for strip application.



Install the panhard bar next using the 9/16 by 2 1/4 inch button head bolts and the half nyloc nut with the adjustor end on the axle bracket side.



Using a straight edge on the both the housing flanges, measure to the edge of the snubber housings to center housing and adjust panhard bar as needed.



Install the rod end links on the sway bar using the 3/8 by 1 1/4 inch button head bolt and lock washer. Bolt the bottom of the link to the sway bar bracket on the housing.

Note: I leave one link unhooked from the housing until the car is on the ground, bounce the back of the car and the driver is behind the wheel and then hook up the link in the neutral position so there is no preload on the bar.



Install the plastic end cap on the end of the sub-frame connector tube by tapping with a hammer after paint or powder coating. Tapering the front ribs on a sander makes installation easier.

After installing the axles and rear brake kit, with the wheels and tires on and the car on the ground, check the location of rear tire in the wheel well. The tire can be moved forward or rearward by adjusting the length of the 2 trailing arms although the measurement of 20 1/8 inch should be very close.

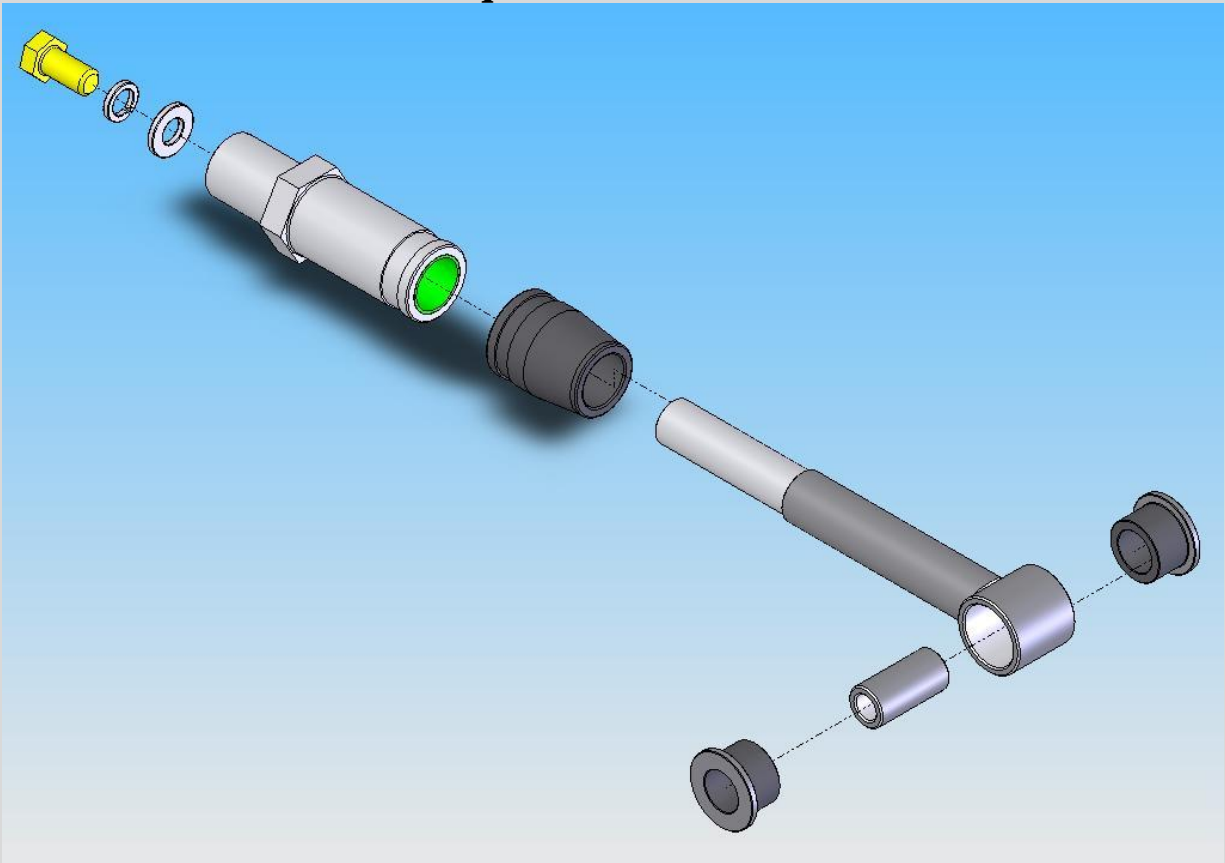


Note: The Cougar wheel well curves outward about 2 inches in the front. This limits the size of the rear tire you can install.



I am not a body man so I took the car to somebody that knows what he is doing and he started by cutting a pie shape piece out in the seat belt bracket area then slit the wheel well in the center and body worked that section inward toward the frame until it was flat like the rear section of the wheel well, pop riveted. He then filled the pie cuts, welded everything up and did a little hammer work. It was a little extra body work but it allowed us to put a 285-40-18 inch tire on a 9.5 inch wide rim. Looks awesome and the cars sits low with a lot of rubber on the ground.

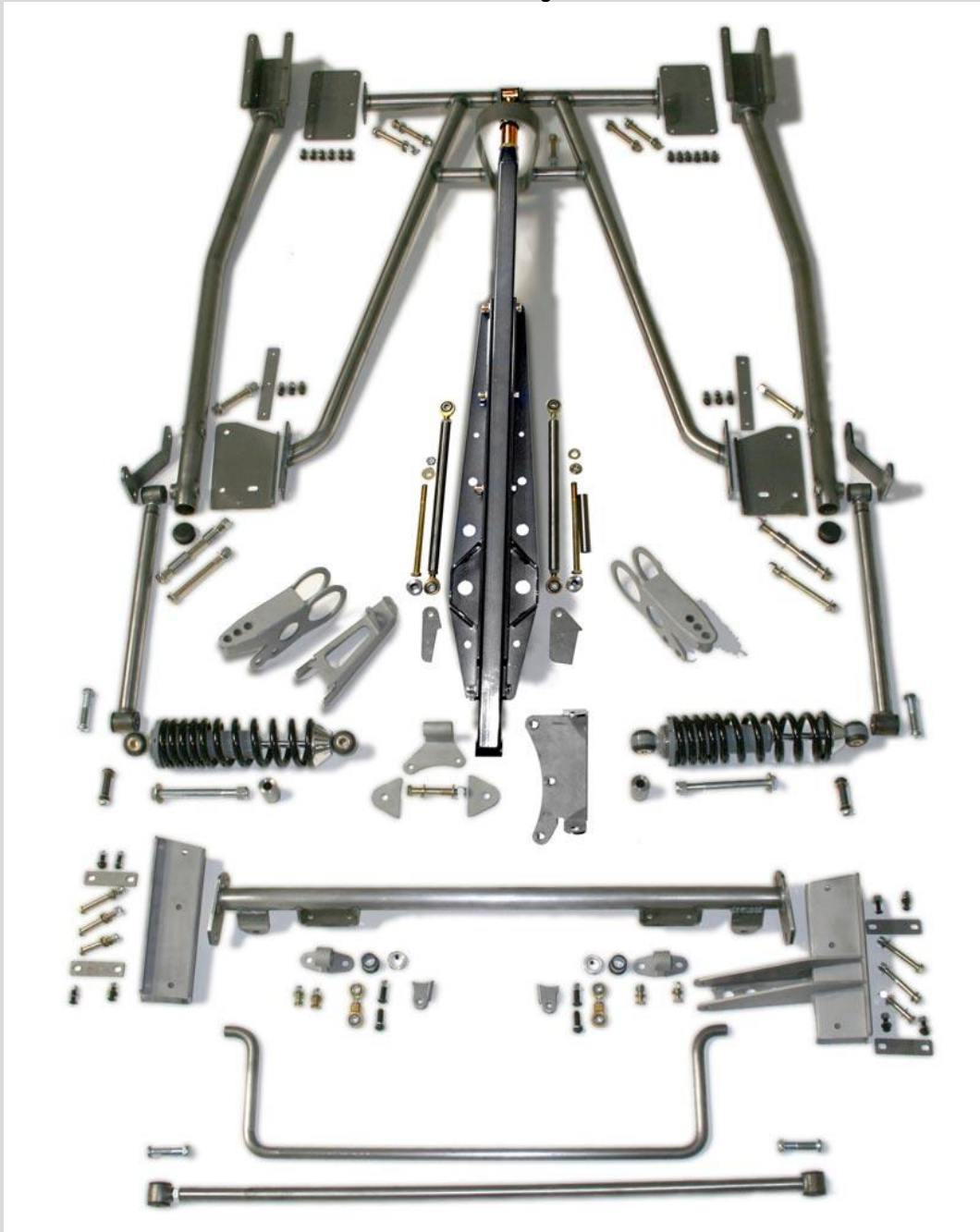
Rear Torque Arm Slider Schematic



Thank you for purchasing a TCI Product. If you have any questions please call 1-800-984-6259 or visit www.totalcostinvolved.com.

We will be adding additional information to this instruction manual as we progress on our 1967 Cougar project. To bring the project up to date, we have installed one of our independent front suspension packages with Wilwood's 12 inch disc brakes front and rear. We also will be doing testing with Wilwood's 13 inch brakes front and rear. The engine is a 351 Windsor with 427 cubic inches from Smeding Performance putting out 578 HP with a single 4 barrel Holley. I have prototyped a set of 1.75 inch headers for the 351 Windsor engine using our front suspension that we are setting up to produce, also 302 style headers for our suspension. The exhaust will be going through Flowmaster Super 44 Series mufflers and a modified 2.5 inch Flowmaster exhaust system. The power goes through a McLeod clutch and bell housing assembly actuated by a McLeod hydraulic throw-out bearing. The power train consists of a Tremec TKO-600 five speed transmission, through an aluminum 3.5 inch driveshaft from Inland Driveshaft and finally a Curries Nodular Iron third member carrying a Posi-traction 3.89 with 31 splined Fast Axles.

1967-1968 Cougar Torque Arm Rear Suspension Parts Layout



No returns or exchanges without a RMA#.

Packages must be inspected upon receipt & be reported within 10 days.

If you are missing parts from your kit, TCI Engineering will send the missing parts via FedEx or U.S. mail ground.

Returned packages are subject to inspection before replacement/refund is given. (Some items will be subject to a 15% restocking fee)

Thank you for your business!

Version 2

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