



TECH INFO AND TROUBLE- SHOOTING GUIDE

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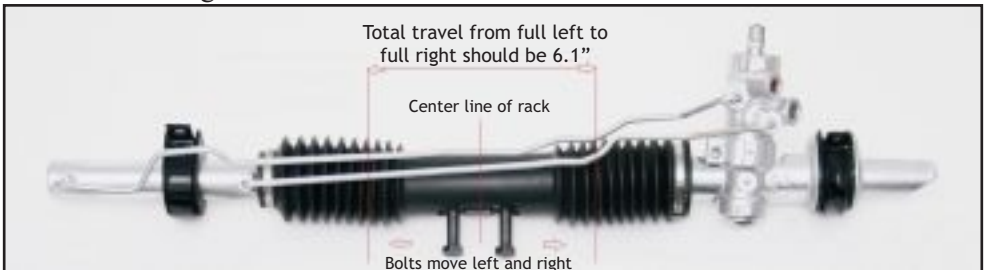
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IMPORTANT: TURNING RADIUS & TIRE CLEARANCE

The turning radius with our kit is slightly increased over stock. Most customers have said it is an insignificant amount, if not unnoticeable. You will still be able to easily whip in and out of parking spots or driveways. Overall turning circle is increased by about five feet. If you are experiencing a large increase in turning radius (the car doesn't turn as sharp) then please check the following:

- 1) If the car turns sharper one direction than the other then the rack has not been properly centered. Recenter the rack as outlined in the Installation Instructions.
- 2) Check "Mounting Location of the Tie Rod End" in this guide.
- 3) Measure the total distance of the rack travel. In the Corvette and Mustang applications the rack should be moving 6.1" from full left to full right (not 5.7"). If the rack is only moving 5.7" then it is a short travel rack and it may be necessary to replace the plastic bolt keeper inside the rack unit. We can supply this item at no additional charge.



Instructions

- 1) Rotate the pinion shaft until the rack bolts are all the way to the left position.
- 2) Make a mark with a piece of tape where the LEFT bolt comes to a stop.
- 3) Rotate the pinion shaft until the rack bolts are all the way to the right position.
- 4) Make a mark with a piece of tape where the LEFT bolt comes to a stop - make sure you measure the same location on the same bolt as you did with the 1st measurement.
- 5) Measure the distance between the two marks. The bolt should travel 6.1" from full left to full right positions. If it only travels 5.7" the bolt keeper may need to be replaced.

NOTE: If you are running your stock tire size, due to the tall side wall, on occasion the driver's side tire can rub on the end of the rack. This is at the very end of the rack's travel and should not affect your turning radius much (usually when this happens there is already evidence of the tire rubbing on the frame rail). These taller tires may rub, but most do not. Changing to a slightly lower profile tire will eliminate this from happening.

ALIGNMENT RECOMMENDATIONS

0 - .25 Negative Camber

2.5 – 4.75 Positive Caster (usually as much as possible)

(C1 Corvettes can't get that much caster so slower ratio racks are provided)

0 – 1/8" Toe In

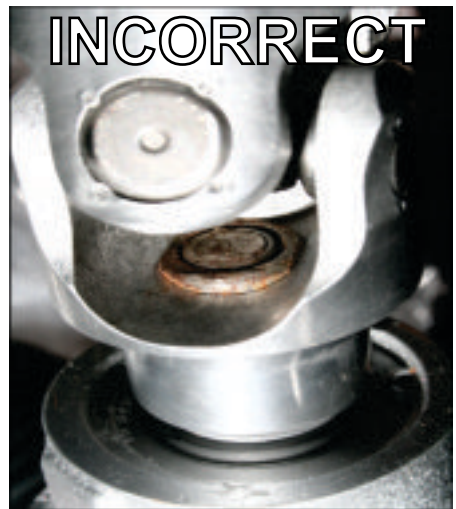
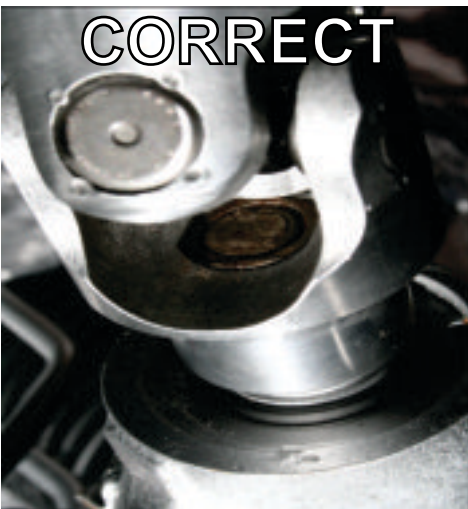
NOTE: The more caster you put into a vehicle's suspension, the more the car will want to return to center after a turn. It also increases the resistance in the steering wheel.

BINDING U-JOINTS

Making sure that your universal joints (u-joints) are operating correctly will insure that products last the life of the vehicle and stay safe on the roads. One thing we cannot stress enough with the Steeroids™ rack and pinion kits is the importance of having your u-joints adjusted correctly.

If your u-joints are not adjusted correctly the most noticeable thing you will experience is a 'binding' in the steering. You will notice a stiff spot in your steering wheel every 90 or 180 degrees of rotation. This is caused by over-angulation or improper alignment of the u-joints. This may not always be noticeable with power steering cars when the vehicle is running because the boost of the power steering pump may overpower the binding and you may not notice it. You need to make sure that the rotation of the steering wheel / u-joints is absolutely smooth throughout the entire travel of the rack unit with the front wheels off the ground and the engine off, rotating the shaft by hand. If you feel any binding at all, it needs to be adjusted out or else there will be premature wear. Follow the steps below to make sure the u-joints are adjusted properly:

1) First make sure that there are no shafts protruding into the center portion of the u-joints. This includes the steering column, the intermediate shaft between the




two u-joints, and the pinion shaft on the rack. If any shafting is protruding into the center portion of the u-joint it can hang up on the yoke of the u-joint while it is rotating and cause stiff spots and binding.

2) Make sure that all of the shafts are completely engaged into the u-joints. The steering column, the intermediate shaft and the pinion shaft on the rack unit all need to be fully inserted into the u-joint (but not protruding into the center portion of the u-joint as mentioned above).


3) Ensure your u-joints are phased correctly. Use the chart that follows to determine correct phasing:

U-Joint Orientation

When two joints are used on a shaft, the forks of the yokes closest to each other should be in line, or “in phase.” Premature wear or binding can result if the u-joints are not phased properly. Sometimes if the u-joints are at a severe angle, even if they are phased correctly, a hard spot in the steering may occur for no apparent reason. If this happens, index the u-joints two or three splines in one direction. The hard spot should disappear or be minimized.



CORRECT PHASING



INCORRECT PHASING

4) Once the first three steps are finished evaluate the u-joint rotation. If you still have binding, loosen the steering column. There are two locations to loosen it – one at the fire wall and the other under the dash near the steering wheel. Once the column is loose, pull the column back toward the driver (it may be necessary to loosen the u-joint on the column to pull the column back). This will relieve the angle on the u-joint. Only a little movement of the steering column can make a big difference in the u-joints. While the column is loose, slide the forward end of the column toward the engine. The steering column has some horizontal adjustment built into it, and again, a little bit goes a long way.

NOTE: If the vehicle is a Corvette, it may be necessary to loosen the support bearing to make these adjustments and let the bearing 'float' until you are finished tightening the column back up.

5) Corvette Owners: If you are experiencing u-joint binding, the problem is most commonly found in the upper double u-joint where it attaches to the column. Usually the binding occurs when the upper u-joint gets into an 'S' shape when viewed from the top. Adjust the column so that the u-joint makes a nice, smooth arch from the column down toward the rack.

ADDITIONAL NOTES:

If the Steeroids™ rack and pinion kit was purchased over 6 months ago,



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download the current set of Installation Instructions for more tech tips. You can download them from our website at www.speeddirect.com.

If the steps above do not solve the binding issue, check to see if you have a collapsible steering column. If so, they can be compressed or extended to better accommodate the u-joint configuration (see "Intermediate Shaft Is Too Short" in this guide). Be sure to check the condition of the bearing at the end of the column as well. A worn out bearing can cause the column shaft to move around, resulting in play in the steering and potentially binding. One final option is to use a different length intermediate shaft between the u-joints. This is extremely rare (usually only encountered when the customer has an aftermarket steering column or other aftermarket components changing the geometry). If you need a different length intermediate shaft, they can be found in our web store and are available in two inch increments. Trim the intermediate shaft in the field to the correct length for your application.

If the u-joints have already worn out due to improper alignment, you might not be able to get the binding out of them because they are twisting and binding up. To determine if the u-joints are worn and need replacement, remove each u-joint and try to twist them (wringing them like you would a towel). If there is any play or motion in the u-joint it needs to be replaced.

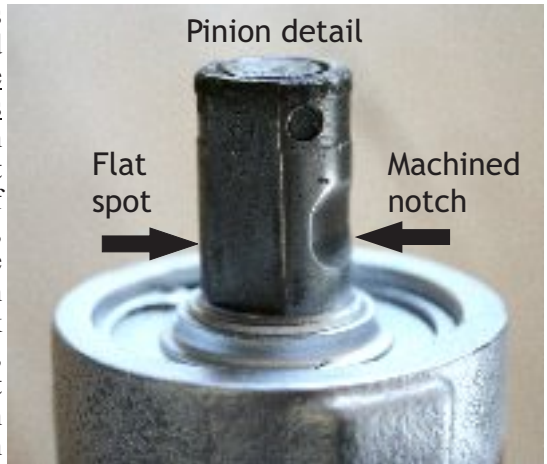
PLAY IN THE STEERING WHEEL

After you have installed the Steeroids™ rack and pinion kit, there should not be any 'Play' in the steering wheel. This is also referred to as a 'Dead Zone' and it takes place when you turn your steering wheel back and forth a slight amount and there is no resistance – the wheels and tires are not responding. This can cause the car to be unresponsive and is a dangerous condition. Usually people automatically think there is something wrong with the rack unit itself, but the rack is actually VERY seldom the problem. If you are encountering 'Play' in the steering wheel with our kit, follow the steps below.

It might be easiest to have another person help you at first. While the engine is off, have one person turn the wheel back and forth a little bit - but only turn it within the 'Dead Zone', not all the way back and forth through the whole travel of the rack. Have another person carefully look through the entire system while this is happening. Usually you will see a place where motion is happening on one end of a component but not on the other. This is a good place to start. Even if you find a problem, it is a good idea to check all of the suggestions below:

- 1) Check the condition of the forward most steering column bearing. If this bearing is worn out it can cause excessive play in the steering wheel.
- 2) Download a current set of Installation Instructions from our web site, www.speeddirect.com, and then proceed to Step 3.

3) Re-tighten all of the set screws on the u-joint assembly as outlined in the Installation Instructions - the order they are tightened in is important! You will need to loosen the jam nuts first. If they were not tightened in the correct order, or if a bur of metal got under a set screw, then the u-joint can get loose on the splined shaft (both at the column and at the pinion shaft on the rack and pinion unit). For the rack unit, be sure to tighten the set screw that sits on the flat spot of the pinion first, then tighten the set screw on the round portion (see photo).



4) Verify that the bolts traveling through the center tie rod bracket into the center of the rack are torqued to the correct specification as outlined in the Installation Instructions.

5) Ensure that both inner and outer tie rod ends do not have any play in them.

6) Corvette Kits Only: Look at the support bearing where the intermediate shaft between the u-joints passes through the bearing. If there is excessive play in the support bearing, this will translate into play in the steering wheel. Different sizes of bearings are available and we may be able to provide you one with slightly tighter tolerances. A small amount of play is acceptable, but it should be minimal.

If you have checked all of these items and everything is still tight, then you need to determine where exactly the play is coming from. Check these areas for worn parts:

1) The u-joints can get pre-maturely worn out if they were binding when installed. Remove the entire u-joint assembly and try "twisting" each u-joint to see if there is actually play in the u-joint itself. If there is any play the u-joint needs to be replaced, and you need to make sure the new one is installed with out ANY binding. Refer to the Installation Instructions to learn about installing the u-joints without any binding.

2) While the u-joint assembly is removed, place a wrench on the pinion shaft of the rack and turn the rack slightly back and forth to see if there is play in the rack itself. It is actually VERY rare for there to be play in the rack. Usually the play is found from other loose or worn parts. When turning the pinion shaft, look for the movement where the two center bolts pass through the center tie rod bracket into the rack. This does not apply to Camaro/Nova racks.



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After going through these steps, if it is determined that there are some replacement parts required, we can get you whatever you need. The only time we have seen u-joints wear out is if they were installed incorrectly and were binding. All of the rack units have been bench tested before they were shipped out, so if there appears to be an issue with the rack contact us to discuss a potential warranty replacement.

NOTES:

You may see the rack move inside the rubber mounting bushings where the rack mounts to the frame brackets. The rubber bushings that mount the rack are the hardest ones available; they are stiffer than the OEM bushings. This amount of movement should be minimal.

You will notice that the center tie rod bracket moves up and down a small amount on the rack unit. As outlined in the Installation Instructions, this is normal (see section below discussing this movement).

On Corvette and Chevelle Steeroids™ kits it is acceptable to have a slight amount of play where the intermediate shaft passes through the support bearing. It should not be flopping around in there, though.

MOVEMENT IN THE TIE ROD BRACKET

Some movement of the Tie Rod Bracket is normal. This is because as the steering rack moves through its travel a small amount of motion, mostly rotation, is present. This should not be more than a couple of degrees and does not affect the feel or response. This perceived movement is a combination of the mount inside the rack and the rubber bushings which cradle the rack. If these were completely rigid and without movement then all the vibration created by uneven road or track surfaces would be transmitted up the steering path to the steering wheel resulting in a very noticeable and annoying vibration of the wheel as you drive.

POWER KITS VS. MANUAL KITS

The majority of manual racks we use are power racks that have been converted to manual (physically modified internally). Modified racks (with no hard hydraulic lines) cannot be made power later because they have been internally modified. If you have a rack with a jumper hose (a short hose connecting the high and low pressure ports of the rack near the pinion shaft) then the rack can be converted to a power rack at a later time.

Power racks can be run as manual racks. Turn the wheel back and forth to purge all the fluid then plug the ports. Ensure the rack is dry before plugging the ports.

Most of the kits we sell are power kits. People seem to enjoy the benefits of the rack and pinion steering more with the power kits because they are not fighting

the manual. Both systems will give you a dramatic improvement over the stock steering, including quicker ratio steering, tighter feel, and less bump steer. However, the manual kits still require about the same amount of effort to turn as the stock manual systems, so you have to lean on the steering wheel pretty hard when you are stopped or barely rolling. Considerations with a manual kit should include the weight of the front of the vehicle (small block, big block, aluminum heads, etc.) and the width of the front tires. All of these will have an affect on the amount of effort required to turn the steering wheel. Again, most people choose the power steering kits unless they have race cars.

POWER STEERING PUMP PROBLEMS & RECOMMENDATIONS

Basic Guidance

Before changing any single component of the steering system, inspect the cleanliness of your system. Dirty or black fluid can quickly ruin new steering components. If changing the box or rack, rub your finger on the inside of the reservoir. If it isn't clean, you must flush the pump and hoses with clean fluid before installing new components (see Flushing The System below).

Fluid

Do not run synthetic fluid through your rack unit until the break in period is over, usually around 1000 miles.

Bleeding Air From the System

All power steering systems are designed to be self-bleeding, but sometimes they need a little help. After installing new components, fill the reservoir and let it sit for a few minutes. Raise the front end of the vehicle and turn the wheels back and forth slowly with the engine off to allow the steering rack to draw fluid. Keep the reservoir full. When the fluid level stops dropping, start the vehicle and continue turning the wheels. When the fluid level remains constant the system is fully bled. If tires are on the ground, put cardboard under the front tires while testing your steering system. The cardboard will slide on the floor and prevent wearing flat spots on the tire from excessive turning of the wheels while not moving.

Flushing the System

Flushing the Pump Only: To flush to power steering pump only, place both the high and low pressure hoses in a bucket and allow all fluid to drain. Add new fluid and allow to drain until it comes out clean. Don't run the engine with both hoses disconnected. However, you can crank the engine with the ignition disconnected so the pump rotates and clears the fluid.

Flushing the Pump and Rack Unit: Assuming the pump is clean and flushed, hook the high pressure hose from the pump to the rack. Attach the low pressure hose to the rack and run the other end into a bucket. Cap the return input on the pump. While keeping the reservoir full, run the steering wheel back and forth with the engine running.

Pump Groaning

It should first be established when the groaning is occurring. Groaning usually happens while turning the steering wheel but it is important to note if the power steering fluid is cold, warm, or hot. Does the groaning happen after the car has been driven a while or as soon as the engine starts?

- Check the reservoir level and top off as necessary

Groaning When Engine and Power Steering Fluid are Cold, With or Without Turning the Steering

Check for aeration (bubbles) in the fluid. If present, be sure the system has been bled as mentioned in the previous section. You may need to let the fluid sit for several hours for the bubbles to dissipate. Once bubbles are no longer present in the fluid check all hose connections for tightness and bleed the steering system by turning the steering side to side about 5 times with the engine running. If bubbles return, check to make sure all lines are tight. Again, you may need to allow bubbles to dissipate before driving.

Groaning When Warmed Up

Check for aeration as mentioned above.

Check for line blockage and loose lines that could allow air to get into the system.

Is the pump new/rebuilt or old?

New/rebuilt pump: Check for excessive bypass causing fluid to overheat. If the pump is putting out too much pressure, see below for pump pressure and volume info. If the pump is putting out too much pressure there may be a pump pressure reduction kit available. We sell them for GM Saginaw pumps – part number 899001. We do not have them for the Ford pumps, but they do exist.

Old Pump: Consider replacing.

Pump Pressure and Volume

All of the Steeroids™ rack and pinion conversion kits are designed to work with the stock power steering pump. More questions arise when people are not using the stock power steering pump, or their stock pump has been rebuilt. Our racks can handle anywhere from 900-1400 psi. Usually the higher the pressure the pump puts out, the easier it is to turn the steering wheel (less resistance). If you have lower pressure there is usually more resistance in the steering wheel. We prefer running in the 1000-1200 range, but that is also up to the driver's personal preference and the alignment settings (more caster = more resistance in the steering wheel). If you have a stock pump that has been rebuilt and is putting out more pressure than desired, we do offer pressure reduction kits for GM Saginaw pumps, see part number 899001.

For the Front Runner system supplied by Vintage Air: The GM Saginaw Type II pump comes with a flow of 3-3.5 gallons per minute and pressure of 1250-1400 psi. Some customers had to reduce the psi to 850 to address light steering at 60 MPH.

The pump cannot have a max volume exceeding 2.5 gallons per minute UNLESS you have a system (such as Hydroboost braking systems) that includes an additional amount of fluid over the stock amount. Why? If you run just from the pump to the rack, then back to the pump, excessive heat is the enemy. Any more than 2 gallons per minute could damage the rack. Systems with additional fluid and routing allow the fluid to cool, allowing some pumps with higher outputs. Unfortunately, higher output pumps may result in slightly less resistance in the steering wheel. This, of course, is a matter of preference for the driver.

How do you test a pump to see if it is bad?

Pull the return line off of the reservoir (plug the reservoir, point the hose into a bucket) then briefly crank or start the engine but don't run the reservoir dry. A little fluid should come out with engine running, but more should come out when you turn the wheel back and forth.

With everything connected, crack the high pressure line at the rack and start engine. There you should see more fluid come out when turning the wheel to determine the pump is making pressure. If you confirm the pump is making pressure at the high pressure side of the rack but it is not coming out of the low pressure line (or even if it is coming out of the low pressure line but you do not have any power assist) then you need to back flush the rack. To do this remove both lines from the rack and then turn the steering wheel back and forth to push the power steering fluid out of the rack. If back flushing the rack does not solve the problem there is a good chance your pump is bad.

Loss of Power Assist

Remove the high pressure hose from the power steering pump. Under the fitting you will find a piston/pressure relief valve. You should be able to push on the piston and a spring behind the piston should push it back, so the piston should move up and down freely. Take a magnet and remove the piston. Check for burrs of metal or debris that could cause the piston to jam. This is more common with the Type II / TC Pumps that we use on the 55-62 Corvettes.

STEERING FEEL TOO SENSITIVE

Steering feel can be described in two different ways, so the main thing we need to do is determine what "too sensitive" means, and then work to fix it. Please see the two different instances below:

1) If the steering wheel is too easy to rotate (no resistance in the steering wheel):
If the steering wheel spins easily and it feels like there is no resistance in the wheel, there are different adjustments that can be made to add stiffness, or road-feel, back in to the steering. First of all, make sure the car has been properly aligned TO OUR RECOMMENDATIONS. If the car was aligned to the factory alignment settings the car will feel light and darty with a tendency to wander. Be sure to set to the following alignment recommendations:



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Camber: Between zero and .25 negative

Caster: As much positive caster as possible (usually between 2.5 and 4.75)

Toe: Between zero and 1/8 inch toe in

Alignment is the first thing to check. If the alignment has been set to our recommendations and the wheel still does not have the resistance required, it can be caused by remanufactured power steering pumps putting out more pressure than preferred for the rack unit. Reducing pump pressure to about 1100-1200psi will help increase the resistance in the steering wheel. If you have a GM Saginaw pump we have pressure reduction kits that you can use to lower the pressure on the pump (see part number 899001).

For the Front Runner system supplied by Vintage Air: The GM Saginaw Type II pump comes with a flow of 3-3.5 gallons per minute and pressure of 1250-1400 psi. Some customers reduced the psi to 850 to address light steering at 60 MPH.

2) If the steering wheel is too responsive due to the quick ratio (small amount of steering input results in dramatic turning, for example, you change lanes when barely touching the steering wheel):

The rack units that we provide with our Steeroids™ kits are quick ratio racks that were used in multiple GM performance cars. Honestly, it can take some getting used to! We recommend driving the car for a good hour or so to get used to the feel of the kit. Once you are used to it, we are confident that you will enjoy the fun responsiveness of the quick ratio rack. However, some people would just rather not have the quick ratio. If that is the case, we do have slow ratio racks available that will slow down the steering responsiveness (taking the steering from 2.5 turns lock-to-lock to 3 turns lock-to-lock). You can change the rack unit without having to replace any brackets or any other part of the kit.

STEERING FEEL TOO HARD

Begin by determining when the steering effort is heavy. If you increase the rpm from idle to about 1500 rpm does the power assist work? Is the steering effort too heavy all the time, regardless of engine speed or vehicle speed? Is there any associated power steering pump noises such as groaning or whining?

If the lack of power assist is only at idle then your options are to:

- Increase the engine idle speed
- Increase the speed that the pump rotates at by either increasing the diameter of the crank pulley or decreasing the diameter of the pump pulley
- Check the reservoir while the engine is running to see if fluid circulates. The fluid level should change slightly when the steering is moved.
- Check for kinked or collapsed lines and be sure there are no blockages in any of the lines.

If the power steering pump is older, it often is the case that when a rack & pinion unit is connected then it will start to whine or prove to be inadequate even though



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it was working fine with the old steering. You may need a new or rebuilt pump if this is the case.

RACK HARD LINE CLEARANCE

This series of rack and pinions were offered new on a variety of vehicles and from multiple suppliers when they were new. Accordingly, the routing of the hard lines which move fluid to and from the power assist pistons can vary considerably. Your unit may have hard lines which interfere with the mounting brackets and other items supplied with the kit. If your kit has this problem, normally you can just bend the hard lines out of the way to clear the bracket(s). When doing this use a socket or something round to bend the line around to avoid kinking the hard line.

On occasion the hard line cannot be bent out of the way because the fitting where the hard line attaches to the rack is in the way (on center steer racks only used on Corvette and Mustang applications). This is extremely rare, but if it is the case it sounds like the rack may be phased incorrectly and may need to be re-phased. If it seems this is the case then it can be fixed by the customer. Remove the band clamp holding the passenger side of the rubber boot in place and pull the rubber boot back. There you will see a large nut. Loosen the nut with an adjustable wrench and then rotate the passenger side of the rack a few degrees back so that the fitting clears the bracket. Once it has been rotated back (usually about 5 degrees) then the customer can re-tighten the large nut and then secure the passenger side of the boot back into place using a large hose clamp, or re-using the original band clamp.

TIE ROD ENDS

Bump Steer Adjustment

Bump Steer (or Bump Steering) is a term used to describe when a vehicle hits uneven or rough surfaces and causes the car to wander or become darty. What causes that? Basically, if the tie rods and the lower control arms are not the same length and parallel to each other when the suspension travels up and down they will be traveling at a different radius from each other. This causes the alignment to toe in and toe out as the suspension moves, causing the car to wander and dart while on rough surfaces – which is annoying and dangerous!

Every Steeroids™ Rack & Pinion kit comes with adjustable tie rod ends that include a series of three spacers which allow you to fine tune the angle of your tie rods to match the angle of the lower control arms – helping eliminate bump steer.

Correct Adjustment of Tie Rod Ends to Eliminate Bump Steer

Add and remove spacers provided to move the outer tie rod end up and down. The goal is to get the steering tie rod assembly parallel with the lower control arm pivot points. **NOTE:** you are NOT trying to get the tie rod assembly parallel with

the ground. Be sure to make adjustments when the vehicle is resting on its own weight.

Mounting Location of Tie Rod End

The tie rod ends should always be mounted in the forward most hole in the steering arm / spindle. Not all cars have two holes in the spindle, but if your car does have two holes, make sure the tie rod ends are mounted in the forward most hole. This gives you the tightest turning radius and keeps the quick ratio.

Maintenance of Tie Rod End

The tie rod ends supplied with a Steeroids™ kit are impregnated with self lubricating PTFE and require no lubrication for the lifetime of the rod end.

Dust Cover on Tie Rod End

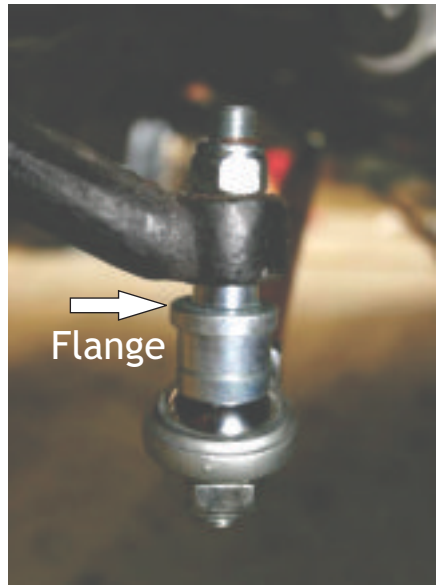
No dust covers are required on Steeroids™ tie rod ends. They have an internal self cleaning PTFE wiper to prevent dirt and road grime from entering the bearing.

Zerk Fitting

No lubrication is necessary since the bearing is no maintenance with a PTFE impregnated liner.

Flange of Tie Rod Bolt Not Seating on Steering Arm

The flange on the bolt which accepts the spherical rod end (tie rod end) is designed to stand off of the steering arm a prescribed distance and therefore will not fit tight against the steering arm (see photo at right). This is to allow proper standoff distance for the rod end. **DO NOT ATTEMPT TO MODIFY THE BOLT IN ANY MANNER.**



STEERING COLUMN

Turn Signal Return / Cancel

If the turn signal does not self cancel or only cancels in one direction you can first position the wheels to point straight ahead, then disconnect the upper u-joint from the column and center the steering wheel so it will cancel in both directions with an equal amount of steering input. Hold that position and reconnect the upper u-joint to the column. If the steering wheel is off center you can remove it and reinstall it so that it is straight.



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NOTE: There are more steering column notes in the “Corvette Specific” and “Mustang Specific” sections in this document.

HEADER CLEARANCE

Header Clearance List

We have an ever growing list of headers that do and do not fit listed on our website for all of our Steeroids™ kits. Please look in our website Tech Info section to see what hits and what fits.

<https://www.speeddirect.com/index.php/tech-info>

Dimpling

On occasion, the headers will be extremely close to part of the Steeroids™ rack and pinion kit and can cause clearance issues. It may be an option to dimple the headers in the place the clearance issue is located to gain more room for fitment. To dimple a header you can heat the header tube with a torch. Once heated, take a large socket and wrap it in a rag and gently tap the socket against the header to make a clean, smooth dimple in the header tube. CAUTION – do not heat the header tube so much that it causes the rag to catch on fire! We have successfully done this with ceramic coated headers without effecting the coating.

CAMARO STEERIODS™ SPECIFIC

Camaro Drop Spindles

There can be a clearance issue with our tie rod ends and the inner part of the wheel if you are running wide 15" wheels . Our tie rod ends hang down a little lower than the stock tie rod ends and can interfere with the inside of the wheel. If you have larger diameter than 15" wheels, or narrow 15" wheels (stock) there should not be any issue.

53-62 C1 CORVETTE STEERIODS™ SPECIFIC

Crank Pulleys

The power steering pump and bracket supplied with the kit is designed to work with a crank pulley that has a second groove that measures between 1.3" and 1.5" from the face of the harmonic balancer. A pulley diameter ranging from 5" to 6.75" will work. Important information to know about the crank pulley:

- Crank Pulley must be for a short style water pump
- Crank Pulley must have two grooves
- Does not need a 2 groove water pump pulley but will work with one
- May require water pump pulley shims
- May require crank pulley shims

Suggestions for crank pulleys include:

- Trans Dapt 9481 aluminum



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- Mr. Gasket 4973 steel (chrome)
- See Installation Instructions for more options

Alternator / Generator Relocation

If the Alternator / Generator is located on the driver's side of the car there will be a clearance issue with the power steering pump. You will need to relocate the Alternator / Generator to the passenger's side using either or both Corvette Central (www.corvettecentral.com) brackets:

301162: Mounting Adaptor Plate - Right Generator / Alternator With Headers

302015: Alternator Support Bracket - Right

You may not need both brackets; you need to double check.

C1 kits with A/C

People have made it work but it depends on the pulley arrangement. It is possible for you to do a two groove power steering pump pulley and run the compressor off of the water pump.

63-82 C2-C3 CORVETTE STEERIDS™ SPECIFIC

Differences Between 63-82 Corvette Kits

We offer 5 different Corvette kits between 1963 and 1982. There are two primary differences between the kits: U-Joints and Hoses

1963-1966 take a 3/4" u-joint at the steering column, where 1967-1982 take a 1" u-joint at the steering column.

1963-1979 small block kits have a pressure power steering hose with a different phase angle than the big block pressure hose.

1980-1982 have their own pressure power steering hose

Steering Column Bearing

The general condition of the steering column bearing is very important to the proper functioning of the Steeroids™ u-joints. If the factory column bearing is loose or worn it can introduce enough movement in the column shaft to cause the u-joints to bind. If your bearing is not tight it is recommended that it be replaced.

Steering Column Length

The length of the factory steering column shaft is important to the proper installation of the u-joint assembly. For C3 Corvettes the dimension from the firewall to the end of the column (without the rag joint) should be 7" and measuring just the shaft from the bearing to the end is 4.6"

NOTE: If you have a collapsible steering column there is a chance it will need to be extended / compressed (see Intermediate Shaft section below to adjust).

Intermediate Shaft Is Too Short

Double check the length of the steering column shaft coming out of the firewall. It should measure 4.8" from the face of the bearing to the end of the shaft. Measure

from the face of the bearing as in the photo at right, NOT from the firewall. This shaft often gets partially collapsed when someone gets over exuberant at trying to remove the rag joint or steering box. It may have happened years ago. Also, if the body has been off the frame and new mounts have been installed, the frame may now be in a different relative location to the body.



The column shaft can be knocked out by installing the old rag joint flange and driving it out with a hammer. If the frame/body relation is the issue then a longer shaft will be needed. As long as the steering and u-joints are currently operating smoothly a longer shaft should solve the problem. It can be ordered by contacting us by phone with the needed length, or at our website: www.speeddirect.com

Oil Pan Recommendations

Most oversized oil pans fit as long as the stock steering fits. We are running 7 quart Milodons (part number 31505) on our development vehicles. The factory 327/365 SHP motor which has the larger 6 quart oil pan does not fit with the stock steering, and does not fit with our kit either. Milodon #31188 *stepped drag race pan* will fit BB C2 and C3's even with big stroker engines. The following are some measurements off of our 78 small block (with a 7qt Milodon) that may help:
Back of sump to front of sump: 9"
Back of sump to rack: 12"
Clearance at the top of the rack: 1/2"
From the front of the pan back to the sump, you need about 7" clearance

Mounting Bracket Strength and Flexing

It is a common concern if the brackets made for any steering conversion kit are strong enough to handle the appropriate loads. Steeroids™ rack and pinion kits have steel mounting brackets that are designed to handle loads encountered in normal use with a set of wide tires, while turning when the car is at rest (the highest load case).

The brackets are stress tested both in our development facility with sensitive deflection tools and out on the race track where we try our hardest to punish these parts to the extreme. In fact, we once received some photos of our kit on a customer's race car after he slid the car off the race track into a curb at a high rate of speed. He did significant damage to the front of the car, but NONE of the



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Steeroids™ brackets broke. The rack and all of the brackets were bent severely, but everything was still in tact. We were very pleased... With years of experience and testing, plus thousands of these kits on the road from street cruisers to racers, you can be confident that a Steeroids rack and pinion kit will be durable and rugged enough to handle whatever driving style you throw at it.

Engine Conversion Compatibility

* **LS ENGINES:** Many customers are changing to LS engines. There seems to be only minor modifications necessary. The main clearance issue is with the oil pan, however, if you use a Firebird oil pan it seems to work just fine. We have not heard anything about headers, but stock manifolds should work. You may be able to check our header clearance page for measurements. We offer a hose upgrade to accommodate LS engines.

* **GM SERPENTINE SYSTEMS:** If you are using a GM Serpentine System, we recommend ordering the kit for the Big Block. We have had customers tell us that our hoses for the Big Block kit hook directly up without any modification on some serpentine systems.

* **OIL PAN CLEARANCE:** Most oversized oil pans fit as long as the stock steering fits. We are running 7 quart Milodons (part number 31505) on our development vehicles. The factory 327/365 SHP motor which has the larger 6 quart oil pan does not fit with the stock steering, and does not fit with our kit either. Milodon #31188 *stepped drag race pan* will fit BB C2 and C3's even with big stroker engines. The following are some measurements off of our 78 small block (with a 7 quart Milodon) that may help:

Back of sump to front of sump: 9"

Back of sump to rack: 12"

Clearance at the top of the rack: 1/2"

From the front of the pan back, you need about 7" clearance.

* **MORE:** There are many engine conversions that will work. All the LS engines have been used in conjunction with Steeroids (LS1 to Ls7). We have found that the Street and Performance oil pan will work. Many other pans will work as well.

Manual-To-Power Kit Conversion

If you are changing your Corvette from manual to power, you will need to get some additional bolts to help with the installation of the Steeroids™ kit. Power cars have two bolts that support the hydraulic cylinder bracket and the Steeroids kit requires these two bolts. If you do not have them, you will want to get them. You can order them from us, see part number 760-02780. You will also need your own power steering pump, pump mounting brackets, pump pulley and additional groove on your crank pulley if one is not currently available. We have some kits available to help with this if you need it.



Steeroids™ Compatible With Hydro-Boost?

Steeroids™ is compatible with Hydro-Boost systems. It can be plumbed just like any power steering system. Generally the pump needs to produce 2.5 GPM at the minimum for Hydro-Boost and this flow rate will work with the Steeroids rack. One consideration is that the Hydroboost kits usually require 1200-1400 psi and our Steeroids kits run optimally around 1000-1200 psi, so if you run high boost with the Hydroboost kits it can over boost the Steeroids kit, so try to set your pump in a range that will work with both kits.

MUSTANG STEERIODS™ SPECIFIC

Manual-To-Power Conversions

Please note that if your car currently has manual steering and you are planning on installing a Steeroids™ rack and pinion kit (power or manual Steeroids™) then you need a crush nut set, part number 760-02774. You will also need your own power steering pump, pump mounting brackets, pump pulley and additional groove on your crank pulley if one is not currently available. We have kits available to help with this.

Manual Transmission Clutch Linkage Interference

TRANSMISSION / CLUTCH INFO: The kit was developed on an automatic. We are still working on fitment applications for the manual transmissions. At this time, the manual transmissions with the manual bell crank (Z-bar) will NOT work without some modification. The kit will work with most manual transmissions with a hydraulic clutch or a clutch cable set-up (The 94 and 95 T5 Tranny may not work with the Steeroids kit if you are using the clutch cable set up. 93 and earlier should work however.) Clutch cable kits are available from Modern Driveline or through Mustang Steve. To make our kit work with a manual clutch linkage set up, you would need to move the Z-bar forward about 3/4", or up about 1.5". We have had customers make the following modification with success and it only took them a couple of hours to make it:

To move the Bell Crank (Z-bar) up about 1.5", you can make a bracket out of flat steel for the engine block side. Support the lower end of the flat steel bracket to the block and then mimic the mounting locations that were in the block on the top side of the bracket. Mount the Z-bar to the top of the new bracket. On the frame rail, just use spacers to lift the Z-bar 1.5" to match the block side. The upper clutch rod that passes through the fire wall can usually slide up without any problem (the hole in the fire wall is pretty large) and the lower pushrod has enough adjustment to accommodate the change. All in all, if you have access to some hand tools, it is not that challenging to make it work.

Steering Column Splines

We offer Mustang steering columns with either GM splines for aftermarket steering wheels or with Ford splines for stock steering wheels. The base kit we



offer is with the GM splines because with the quick ratio rack many people prefer to go to smaller aftermarket steering wheels. If you want to keep your factory steering wheel, the Ford splined columns are available at additional cost (check for current pricing). Mustang kits with GM splined columns require an aftermarket steering wheel that will fit on 68 and later GM passenger cars. If using a Grant steering wheel you can use adapter number 3196.

Big Blocks

See notes about oil pans below. Also check the Header Clearance page at www.speeddirect.com/index.php/tech-info/product-technical-information

Oil Pans

Most oil pans work fine with our kits. However, there are a few pans that will not work: We have heard that the cobra t-type aluminum oil pan for big block has clearance issues. Also the 7 quart Canton oil pan does NOT fit with the 351W. A customer informed us that on his 1970 Mustang our kit did not clear a 7qt Canton oil pan on a 351W. Some stock big block oil pans are a tight fit too. On rare occasion the rack might barely hit the pan. People have remedied this by placing washers on top of the motor mount to lift the engine just a touch and that has been enough to make it fit fine. In general, if your oil pan does not fit with the stock steering it probably will not fit with our kit because our kit occupies the same location as the stock steering. If your stock steering fits, our kit should too.

The following measurements may help you determine if your pan will work with the kit: When measured from the existing Ford cross brace that goes under the oil pan, our bracket sits 2.25" back from the back side of the cross brace and 1.25" higher than the top of the brace where it dips down to clear the oil pan.

Other Ford Applications

We have a lot of people wondering what other applications this kit will fit on. So far, we have not tested this kit in our shop on any Ford applications other than the Mustang years specified. If you wish to try the kit on a different application, you will be responsible to determine if the kit will fit before you install it as we cannot give a refund for a kit after it has been installed. THIS KIT WAS DEVELOPED ON A MUSTANG. To date, many customers have installed our kit on Rancheros and Cougars with success (sometimes there are minimal clearance issues), but we have not tried them for ourselves! Regarding the Falcon, we have a customer who installed our kit on a 1960. The main issue he ran into was adapting the u-joint assembly and lowering the rack. The u-joint assembly we provided with the kit would not work. He purchased a 6" shaft and double u-joint from us for the column and made his work fine. This requires a support bearing to secure the u-joint assembly. He ordered a column from us and it worked fine in his Falcon. Contact us for more info / photos about the modification and fabricating required.



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6 Cylinder Engines

Currently, if you have the straight 6 and are interested in the power kit, we do not have hoses available to run from the rack to the pump. Most hydraulic shops can make you some hoses that will fit for a reasonable price, or we can recommend a company to have them made. We can also discount the price of a kit that does not include hoses.

Grenada Spindles

If you are using Grenada spindles for the disc brake conversion, please make note in the comment box on the online order form or notify your sales person so that we can send you the correct tie rod ends. There is no extra charge.

Mustang Column Horn Wire

The horn wire needs to connect to the horn button, so if there is no hole for it to pass through then one will need to be added. There should be a small contactor on the button or the steering wheel that the wire connects to. The complete circuit should be from the wire/contact in the column to the ground on the wheel/column shaft. Verify that circuit by touching the wire to the column shaft. It should sound the horn.





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