

Steeroids® Installation Instructions

Part Numbers: 83030-1, 83030-2, 83031-1, 83031-2, 83032, 83035, 83037
 1963 - 1982 Corvette

Parts and finishes may vary from those shown.

Power rack pictured.



Verify Kit Contents:

- 1 RACK AND PINION WITH TWO RUBBER RACK BUSHINGS
- 2 RACK MOUNTING CLAMPS
- 2 ROD ENDS WITH TAPERED STUDS
- 3 ROD ENDS (INCLUDING SUPPORT BEARING)
- 2 TIE ROD SLEEVES
- 2 U-JOINTS WITH 1 SHAFT
- 1 DRIVER'S SIDE BRACKET
- 1 PASSENGER'S SIDE BRACKET
- 1 TIE ROD BRACKET
- 1 GUSSET FOR DRIVER'S SIDE BRACKET
- 2 METRIC RACK BOLTS AND NORD-LOCK WASHERS
- 4 3/8- 24 x 4 GRADE 8 BOLTS
- 5 3/8- 24 ELASTIC NUTS
- 9 3/8 FLAT WASHERS
- 1 3/8- 24 x 1 GRADE 8 BOLT
- 6 5/16-24 x 1 GRADE 8 BOLTS
- 6 5/16-24 ELASTIC NUTS
- 6 5/16 FLAT WASHERS
- 2 5/8- 18 X 1.5 GRADE 8 BOLTS
- 2 5/8- 18 RIGHT HAND JAM NUTS
- 2 3/4-16 RIGHT HAND JAM NUTS
- 2 5/8-18 LEFT HAND JAM NUTS
- 2 5/8 SPLIT WASHERS
- 2 EXTRA SET SCREWS (if needed for u-joint clearance)
- Power Kit Only:
- 2 PUMP HOSES (1 PRESSURE, 1 RETURN)
- 1 POWER STEERING FILTER (NOT PICTURED)

PLEASE NOTE: These components are tested and engineered to meet loads equal to what the stock steering system is exposed to during normal operation. If you or the person or firm you hire to install your Steeroids rack and pinion kit believes it is necessary to "modify" any components to make them fit and / or adjust properly PLEASE note that this is extremely dangerous. We offer free technical phone support to assist with installation should you encounter a problem. Modifications may include cutting or welding support brackets, sawing or hammering on u-joints, or any revision, deletion or addition to the product as delivered, and should NEVER be required. Any such modifications void the manufacturer's warranty. Our knowledgeable staff will gladly assist you with any questions you may have during installation. In addition Class M Corporation, DBA SpeedDirect, is not responsible or liable for any damages or injury resulting from any modification to the components as delivered.

See our website for header clearance details: <http://speeddirect.com/index.aspx?nodeID=87>

We are constantly updating our instructions, check for the latest version at <http://speeddirect.com/index.aspx?nodeID=79>

NOTES ON TURNING RADIUS: The turning radius with this kit is slightly increased over stock. Most often it is an insignificant amount, if not unnoticeable. You will still be able to easily whip in and out of parking spots or driveways.

Before beginning: Please note each steering rack is bench tested prior to shipping; fluid from the test occasionally leaks out and may stain the box. This does not indicate damage.

If two small rubber o-rings are attached to the rack with a twist tie, these are extras that can be discarded. The power steering hose adapters or hose ends supplied with the kit should already have o-rings attached, so the extras can be discarded. Any bolts, metal plates and/or washers that are already threaded into the rack unit should be discarded and the included metric rack bolt kit should be used.

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BEFORE INSTALLATION: Have both high strength thread locker and anti seize compound available.

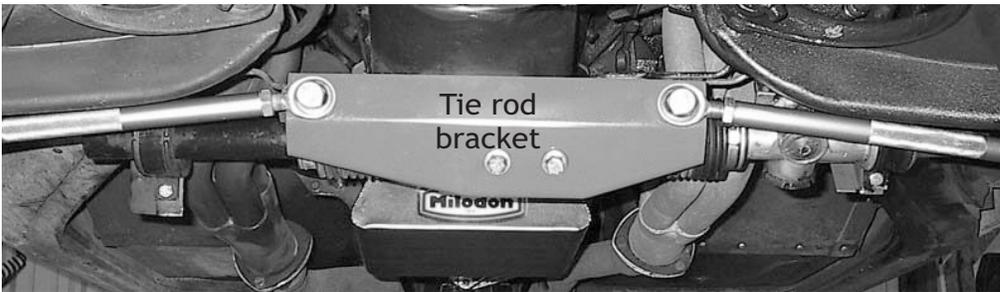
1. Begin by performing an inventory of all the components in the kit. Installing the Steeroids kit requires simple hand tools, high strength thread locker and some anti seize compound. A pickle fork will be useful when disassembling the old system.
2. Start by supporting the car securely on jack stands. Never support the car using only a jack. To relive stress on the fiberglass, pop the hood, open the doors and release the T-top locks (if applicable) when putting a Corvette on jack stands or a lift.
3. Removing the entire steering system as a unit is the most effective way. The outer tie rods require removal of a cotter pin and nut before separating from the steering knuckle (steering arm / spindle) using a pickle fork. Once both tie rods are separated from their respective steering knuckles, remove the two bolts attaching the steering column to the rag joint. Remove the two cross bolts that hold the rag joint to the steering column and the steering box. The steering box is attached with three bolts that extend through the frame from the driver's side wheel well. Remove two of the bolts. Leave the last bolt installed until you are ready to remove the entire system.
4. If tubular headers are present it may be necessary to remove the driver's side header to facilitate removal of the steering box. Unbolt the power assist cylinder and support bracket from the frame rail. Disconnect the power steering hoses from the pump.
5. Remove the two bolts and nuts attaching the idler arm to the passenger side frame rail. The final bolt holding the steering box can be removed now, but **BE PREPARED TO SUPPORT THE STEERING BOX WHEN IT COMES LOOSE**. Lower the steering system out of the car. It may be necessary to work the bolts and rag joint loose from the steering column.

Tech Tip: For Power Steering kits, it may be easier to attach the power steering hoses onto the rack before installing the rack.

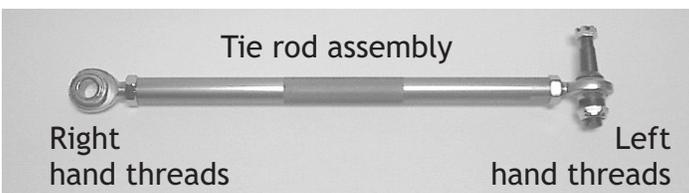
ASSEMBLY AND INSTALLATION

We recommend using red high strength thread lock on all threaded applications except for power steering hose fittings and tie rod sleeves. Be **SURE** to trial fit first, and read the instructions through before going crazy with the thread lock!

6. Bolt the tie rod bracket to the rack and pinion unit using the supplied metric bolts and Nord-Lock washers. Install lock washers between the metric bolt head and tie rod bracket. The bracket installs with the outer holes toward the top of the steering rack. It is possible to install upside down; be sure it is the correct orientation as shown in picture below. Use a high-strength thread locker and torque to 80 ft/lbs. It is OK for the bracket to compress the rubber boot.



IMPORTANT: To center the rack, use an adjustable wrench and turn the pinion until the rack is at its stop (either direction). Count the turns as you proceed to the opposite stop. Divide the number by 2 and turn the pinion back this amount. The steering rack is now centered. If the rack is not properly centered, the car will turn more sharply in one direction than the other.



tighten at this point and do not thread lock it - this is just for trial fitment. The lock washer is located between the head of the bolt and the inner tie rod bearing. To set an approximate alignment, measure the overall length of the old steering system, measuring it from the center of each outer tie rod end. Adjust the tie rods on the steering rack to match your measurement and tighten the jam nuts against the sleeves.

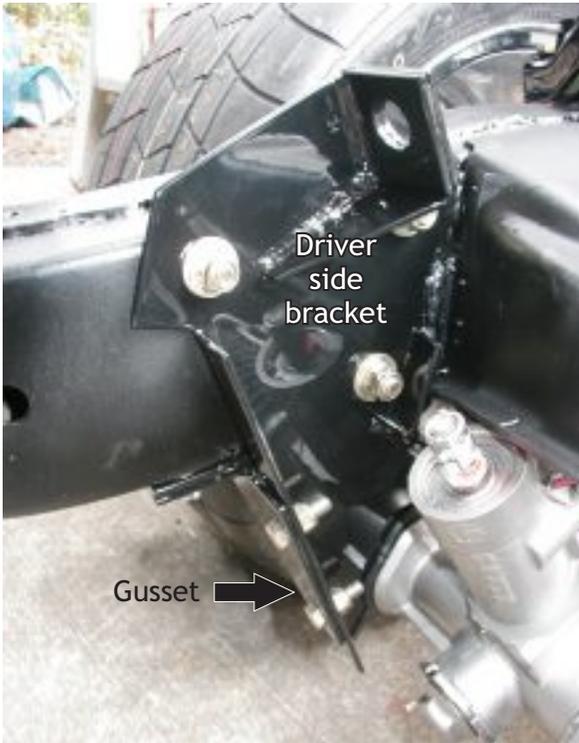
About Nord-Lock Washers



NORD-LOCK is a pair of washers with a wedge-locking action meeting DIN 25201 which is a unique method using tension instead of friction. The rise of the cams between the NORD-LOCK washers is greater than the pitch of the bolt. In addition, there are radial teeth on the opposite side. The washers are installed in pairs, cam face to cam face.

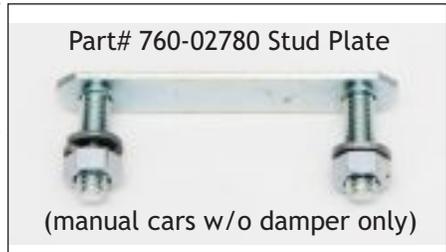
7. Tie Rod Assembly: Please note there are right hand and left hand threads on the aluminum sleeves. Apply anti-seize compound on all the tie rod end threads and aluminum tie rod sleeve threads. Thread each outer tie rod end with jam nut onto the tie rod sleeves an equal amount. On the opposite end of each sleeve, thread the remaining 5/8" inner tie rod ends with jam nuts (see photo). Attach them to the tie rod bracket using the 5/8-18 x 1.5" bolts and lock washers but do not

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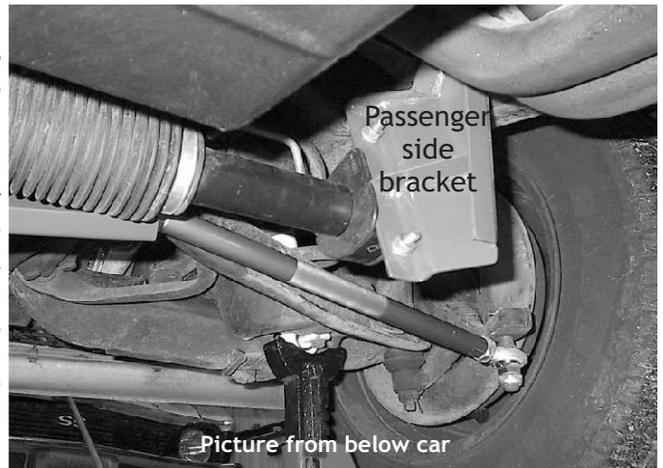
8. Rack Mounting Brackets: NOTE - When installing the rack mounting brackets, the holes in the frame may not line up exactly with the holes in the mounting brackets due to very loose tolerances the car had from the factory. If the holes do not line up enough for all bolts to pass through and start threading, then clearance the hole(s) in the bracket using a drill bit to elongate the hole(s) in the proper direction. (This is rare, but can happen.) Install the Driver's Side Mounting Bracket. The driver's side mounting bracket attaches to the frame at the same location as the steering box. Use either the bolts supplied (be sure to place a washer under the head of the bolt, as well as under the nut) or the existing steering box bolts. The factory original bolts will be a bit longer than needed but won't interfere with the operation of the system. Use a lock washer under standard nuts or use nylon insert lock nuts (whichever provided). When using the original bolts, check to be certain that there are enough exposed threads to properly tighten the nut without it bottoming on the bolt. Add a flat washer if needed. Torque the 3/8" bolts to 35 ft/lbs.

9. The gusset installs using the existing fasteners in the frame for the power assist cylinder. If the car was a manual steering car WITHOUT a steering damper, two stud plates that install in the frame will be required. This is rare and they are not included in the kit. If needed, purchase P/N 760-02780. This item installs through the hole in the frame rail in the driver's side wheel well. Make sure the plates rest evenly



on the inside of the frame. Remove any dirt to ensure this. The gusset attaches to the driver's side bracket and to the bottom side of the frame rail. Torque the power assist stud plate bolts to 15 ft/lbs. Two 5/16-24 x 1 bolts are used to attach the Steeroids brackets together. Place a flat washer under the nut; torque these fasteners to approximately 30 ft/lbs.

10. The passenger's side bracket attaches in the same manner as the idler arm. Place flat washers under bolt head AND under nut. Torque to 35 ft/lbs.



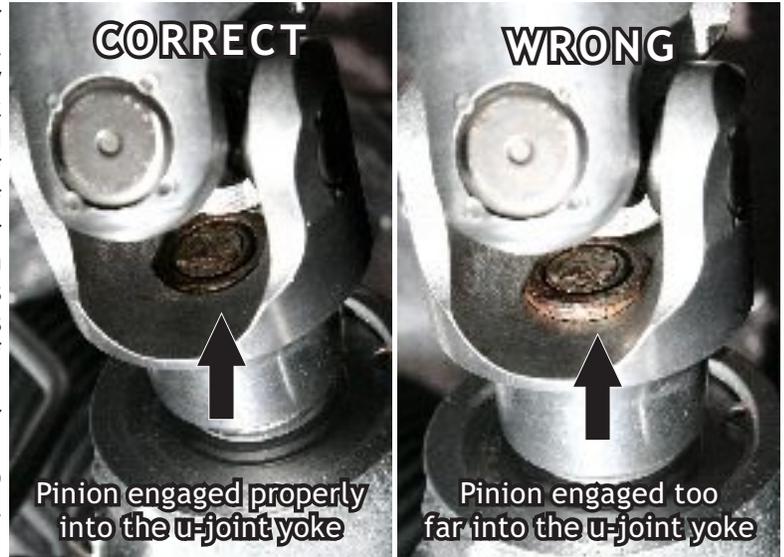
11. Install the rack and pinion unit on to the brackets using the supplied rack clamps and 5/16 x 1" bolts, washers and nuts. Do not torque or thread lock at this time. Please note the two rack clamps provided are shaped differently - they must fit properly on the rack. Install and test fit the rack unit to inspect for clearance problems with the lower A-arm bolts. If you experience clearance issues with the head of the 5/8" bolt at the inner tie rod end, omit the lock washer but be sure to use a high strength thread locker! If there are no clearance issues, remove the inner tie rod end bolts and reassemble with all lock washers and thread locker. Torque to 50 ft/lbs.

Proceed to attach the outer tie rod ends to the steering arms (spindles). Before torquing, read the following details. **NOTE: the flange below the taper may not seat against the steering arm - this is not a problem.** If the car has two holes in the steering arm, install the tie rod end in the hole closest to the front of the car. Using the hole towards the rear will increase the steering radius. To properly adjust the outer tie rods, use the included bump steer spacers. Start with half above and half below the tie rod end bearing. As needed, move the spacers above or below the bearing so that the entire length of the tie rod matches the angle of the lower control arm with the vehicle on the ground and the suspension settled (the tie rod sleeve should be parallel with the lower control arm pivot points - not necessarily the ground). It may be necessary to come back and adjust this once installation is complete, especially if no engine is installed.

Tie rod end bearings are PTFE-lined and are therefore self-cleaning and self-lubricating. They do not require grease or dust covers. When attaching the tie rod end to the spindle, torque the upper nut (on top of the spindle) to 30 ft/lbs. If castle nuts are provided, continue to tighten the nut to align castellation with the cotter pin hole. Install cotter pin if applicable. Once the bump steer spacers are properly adjusted, torque the lower 15/16" nylock nut to 50 ft/lbs.

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12A. U-Joint Fitment: Before assembling the u-joint assembly, get a small piece of cardboard (about 2" X 2" is big enough). Take the lower, single u-joint and standing it on end on the cardboard, trace around the circumference of the end of the u-joint that will attach to the pinion shaft on the rack unit. Press down on the u-joint hard enough to leave an impression in the cardboard. Cut out around where you traced and also cut out the inner portion of the cardboard that was not compressed (the area that the pinion shaft of the rack slides into). You should now have a disc shaped piece of cardboard with the center cut out. With the rack unit test-mounted, slide the cardboard disc cutout onto the pinion shaft of the rack and determine if any clearancing will be necessary on the motor mount. If there is a clearance issue, mark the motor mount to grind for clearance. Be sure to include room for the setscrew and jam nut plus a little extra in case of slight movement. (This is rare, but can happen.) Two additional shorter setscrews have been supplied in the bag of hardware in the event of any clearance issues when the u-joints rotate. If necessary, remove the rack and grind clearances. Use the single, lower u-joint to double check clearances. Once everything clears, reinstall the rack. Torque the passenger's side rack clamp bolts to 25 ft/lbs but leave the driver's side loose until completing step 14.



12B. Begin assembly of the u-joints. Slide the support bearing onto the intermediate shaft and attach a u-joint on each end (tolerances are tight, shaft may require sanding to fit, DO NOT HAMMER into bearing). The tolerances between the support bearing and the intermediate shaft are supposed to be tight. Unfortunately, sometimes the tolerances are such that sanding the shaft is not possible. If this is the case we can supply a slightly oversized bearing that is .757" instead of the standard .750" bearing included in the kit. Please contact us for one of these bearings. This is very rare and the shaft should NOT be too loose inside the bearing or it can cause play in the wheel and wear on the u-joints. Do not torque or thread lock at this time. Be sure they are phased correctly (see diagram below). **Read this entire section before installation.** Try to have the steering wheel straight when you start. Start with sliding the upper u-joint onto the steering column, but before doing so make sure the lower u-joint is lined up so that one setscrew will align with the flat section on the rack's pinion shaft and the other setscrew will seat in the machined notch (see detail at right). Slide the double u-joint onto the steering column, but do not yet tighten. Be sure that the end of the pinion is flush with the inside of the u-joint yoke - see photos above (do not rotate the pinion shaft on the rack because it will no longer be centered). It may be helpful to unbolt the driver's side rack clamp in order to install the u-joint on the rack unit. Make sure that the shaft ends do not protrude into the inside of the u-joints. Tighten them, but do not use thread lock at this time. Be sure to tighten the setscrew that sits on the flat spot of the pinion first, then tighten the setscrew on the notch. The support bearing is installed by sandwiching the bracket with two jam nuts. During installation it may be easiest to allow the bearing to float between the upper and lower u-joints, do not tighten the jam nuts yet.



CORRECT PHASING

INCORRECT PHASING

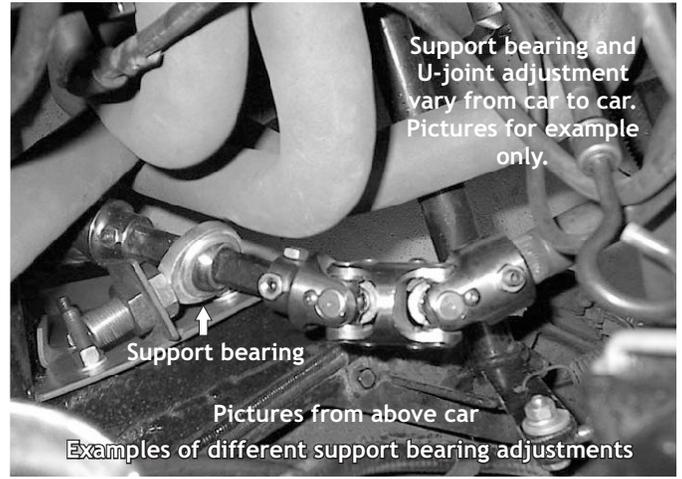
U-Joint Orientation

When two u-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.

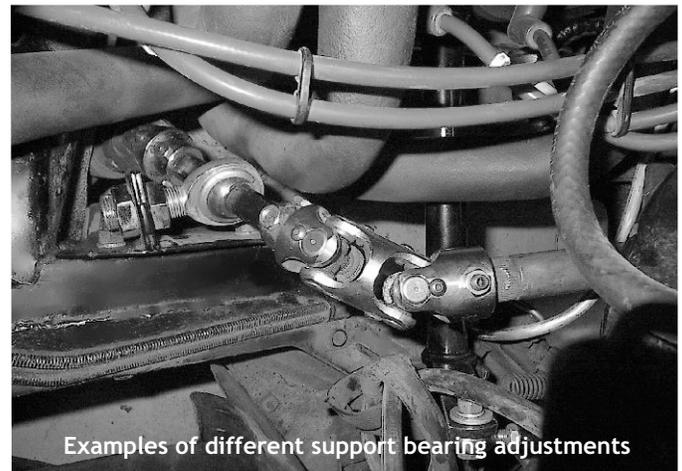
13. Do not tighten jam nuts on the u-joint or thread lock any setscrews at this time. Make sure both u-joints are installed on the intermediate shaft and the rack and pinion unit is in place. Be sure that the shaft is not protruding into the inner part of either of the u-joints. **It is essential that all splines are fully engaged into the u-joints (approx 3/4").**

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14. The steering wheel must be centered at this time. Most likely it has become uncentered in the previous steps. There are two ways to do this: 1) Change the phasing of the u-joint by removing the upper u-joint from the intermediate shaft and rotating it a couple of splines until the steering wheel is straight. It is OK for the u-joints to be slightly out of phase. If straightening the wheel using this method makes the u-joints too far out of phase, remove the upper u-joint from the column, center the wheel and reinstall the u-joint. The steering column splines will then require grinding or drilling an indentation for the setscrew. **DO NOT ROTATE THE RACK UNIT.** The rack has already been centered and the rack unit should not be moved from center. Once installed and there are no clearance issues, tighten all setscrews and their jam nuts using a high strength thread locker **in the order described at the end of 12B.** Torque the driver's side rack clamp bolts to 25 ft/lbs once the u-joint assembly is installed. 2) The other option for centering the steering wheel is to remove the steering wheel and re-center it. This may change the turn signal canceling feature. To modify the plastic canceling cam, the plastic cam and head can be cut off the stem and glued into the correct orientation.



15. Adjust the support bearing to minimize binding of the u-joints during rotation by reducing the angle the upper u-joint makes to connect with the lower u-joint. This usually means moving the support bearing toward the engine and the rear of the car. **There should not be ANY binding.** The steering shaft should be able to be turned by hand (with the wheels off the ground). If the bearing cannot be adjusted to completely remove all binding then the steering column should be moved towards the rear of the car. Adjust the column by loosening the nuts under the dash and at the firewall, and pulling the entire column back. The most common binding is found when the double u-joint starts to form an "S" shape. This is caused by misalignment of the intermediate shaft and steering column. If sliding the steering column all the way back does not remove the binding, it is also possible to slide the forward end of the steering column horizontally toward the engine. This normally relieves any remaining binding. If this adjustment needs to be made, be sure the support bearing is loose during adjustment. After all other items are tightened, re-tighten the jam nuts on the support bearing. Additionally, check the condition of the steering column bearing located at the end of the column tube. If it shows signs of play, it is recommended that it be replaced since a loose bearing can cause u-joint binding and excess play in the steering wheel.



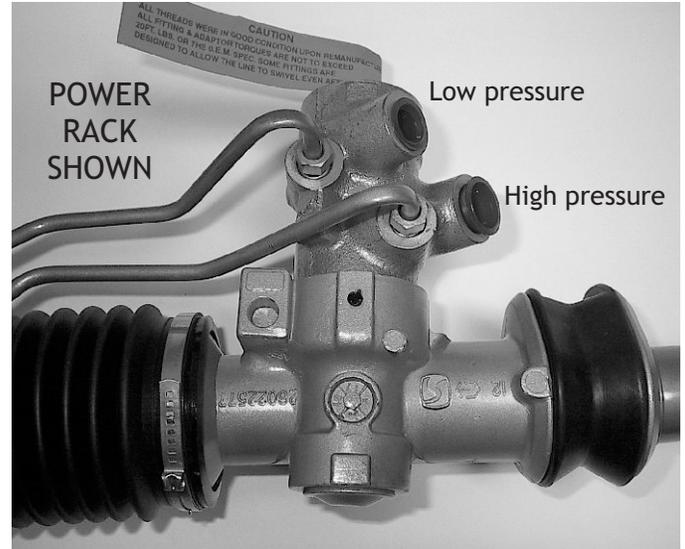
16. Check for any interference between the u-joints and the frame, particularly near the engine mount. On rare occasions, the mount may need to be clearanced with a grinder as mentioned in step 12A. Be sure the setscrews clear when the u-joint rotates. A variety of setscrew lengths have been included, however be sure that when the setscrews are fully tightened down, there is still enough protruding to get full thread bite on the jam nut.

NOTE: For manual kits, skip to step 19.

NOTE: If using the existing power steering pump, drain all remaining fluid and thoroughly clean the pump to remove all dirt and debris from the reservoir. Even the smallest dirt speck can plug a rack valve and cause it to stop working. Failure to clean the system will void the manufacturer warranty.

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17. Attach the power steering hoses. The large hose (the lower outboard) fitting on the rack is the high pressure side. This connects to the threaded fitting on the pump. The high pressure hose has fittings on both ends. Make sure the o-rings are on the fittings going into the rack. Tighten to 21 ft/lbs. The return side (upper, inboard fitting) is torqued to 13 ft/lbs. Please see photo: it is very important to connect these hoses to their proper locations. Reversing the hoses will destroy seals, causing the rack to operate inconsistently and uncontrollably. Depending on the hose kit supplied, there may be hose adapters included to match the hoses to the rack. Other hose kits do not require the adapters. Install the supplied in-line filter on the return hose. Cut the hose in a location that allows for the filter to fit but still have enough hose to connect to the pump. **Failure to install the filter will void the warranty.**



18. Power steering fluid recommendations: Run standard GM Power Steering Fluid. For those who prefer synthetic fluids you may switch to Royal Purple Synthetic after 1000 miles, but it is not required. Bleed the system by turning the wheels all the way to the left. Add fluid to the “cold” mark on the dipstick. Turn the wheel back and forth three or four times. Start the car and allow it to idle. Fill to the “cold” mark as needed. (18A) Turn the wheels side to side from lock to lock until there are no more bubbles. Check the fluid level frequently while proceeding. Allow the engine to run for a few minutes. Add fluid as needed and shut off engine. If the fluid level rises after the engine is shut off, there is still air in the system. Repeat (18A) until all air is out of the system. Replace cap. “Flushing” the system is not necessary, you are only bleeding it of air.

19. Re-check every bolt and nut to be sure all are tight and torqued with high strength thread locker applied where necessary (especially on the metric, center rack bolts). With the vehicle on a stand, run the steering back and forth to look for clearance issues. Pay close attention to: 1) where the lower u-joint is near the motor mount; 2) where the inner tie rod ends are near the lower control arms; and 3) where the center tie rod bracket passes near the hard hydraulic lines on the rack. Occasionally these hard hydraulic lines will need to be hand-bent out of the way to clear the bracket. Test-drive the car at low speed for a brief period. Check every bolt for tightness again. **For power kits only:** If the engine is at operating temperature, check the power steering fluid level. Fill to the “hot” mark as needed.

CAUTION: The steering ratio of this kit is significantly faster than the stock steering. Exercise caution when first driving with the new system. The vehicle will respond quicker and turn more from the same amount of steering input. This might take some time to get used to.

20. The final step is to have the front end aligned **to the specs below** and re-check all bolts for tightness after the first 100 miles. Ignoring these recommendations and using factory alignment specs will cause the car to handle very poorly. **This is VERY important.**

Alignment Settings: 62-82 Corvette			
	Camber	Caster	Toe*
		2.5 to 5 degree positive	
FRONT			
Street	0 to -0.25 degree negative		0 to 1/8" toe in (0 to 0.28 degrees total)
Track	-1 to -2 degree negative		0 to 1/16" toe out (0 to 0.14 degrees total out)
REAR			
Street	0 to -0.5 degree negative		1/8" toe in (0.28 degrees total)
Track	-0.75 to -1.5 degree negative		1/8" to 1/4" toe in (0 to 0.14 degrees total)

* Toe setting in degrees

*****Please Note:** The rack unit for this kit has some movement built into the rack. When the vehicle goes in for alignment, the center tie rod bracket may move up and down a slight amount, affecting the toe of the vehicle. THIS IS NORMAL. The rack has this movement built in from the factory. Do not try to move the bracket all the way to one side or the other of this movement when aligning the vehicle. Leave the bracket in the same location it was when the vehicle was pulled forward



(888) 425-2776

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WARNING: FAILURE TO ADJUST THE UPPER U-JOINT SO THAT THERE IS NO BINDING WILL RESULT IN PREMATURE WEAR AND FAILURE! IF THERE IS ANY BINDING / LUMPINESS / HARDNESS IN THE STEERING WHEEL WHILE TURNING, ADJUSTMENT IS STILL REQUIRED AS DETAILED IN STEP 15. ADDITIONAL TECH SUPPORT AND INFORMATION IS AVAILABLE ONLINE AT www.speeddirect.com

STEEROIDS FIVE YEAR WARRANTY TERMS

Our warranty can be found at www.speeddirect.com/fiveyearwarranty. It is your responsibility to understand what Class M Corporation DBA: SpeedDirect is warranting on the components you have purchased. Be advised that our warranties change from time to time and it is our exclusive right to change the terms of the warranty at any time and for any reason.

STEEROIDS REPLACEMENT POLICY

Labor charges and/or damage incurred in installation, repair or replacement as well as incidental and consequential damages connected therewith are excluded and will not be paid by seller. Any and all costs for inspection, removal or replacement of the kit or its constituent parts or assemblies under the warranty are the responsibility of the original purchaser.

