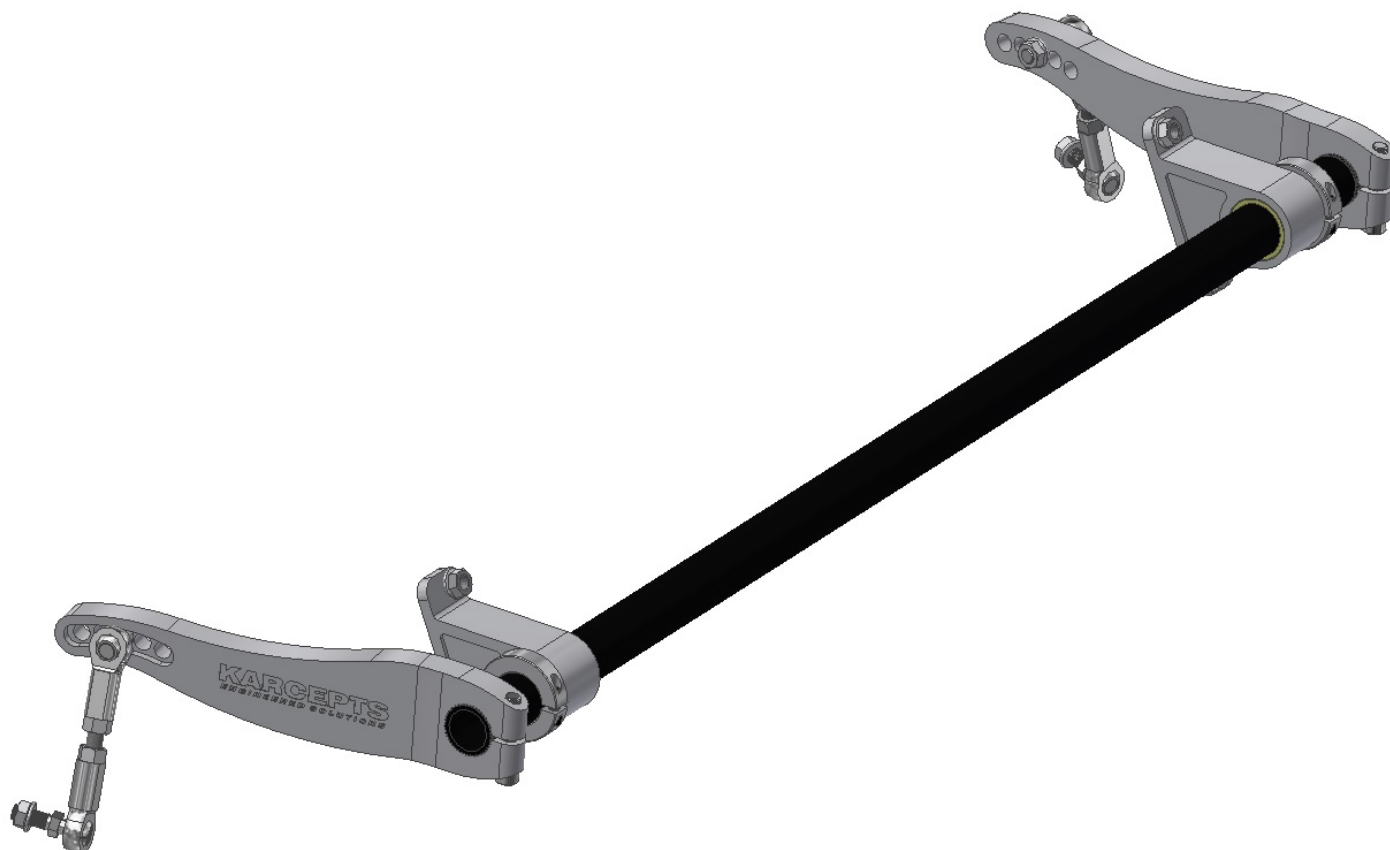


KARCEPTS

ENGINEERED SOLUTIONS



Installation Instructions for Part #: KFSB-ND-XX Karcepts Front Sway Bar Kit for 2016+ Mazda MX-5 Miata

Specifically for track/autocross use, this sway bar kit offers zero compromises:

- Sway bar rate is adjusted with one wrench, in only a few minutes
- Rate adjustments are made with the vehicle on the ground, even at low ride heights
- 9 possible adjustment settings, maximizing tunability and overall range
- Billet aluminum arms optimized for strength and weight utilizing the latest FEA software
- Light weight, zero deflection solid sway bar mounts provided for precise feel
- Low friction, greasable, solid polymer bearings eliminate bushing bind
- Heat treated and plated steel alloy PTFE lined endlinks and all hardware included
- 1.25" diameter high-grade spring steel splined center section for consistent rates
- Center section available in 0.095", 0.120", 0.188" or 0.250" wall thickness

Karcepts, Inc.
www.karcepts.com
sales@karcepts.com

Parts Included With ND Front Sway Bar Kit

| DESCRIPTION | QTY |
|---|-----|
| LEFT SOLID SWAY BAR MOUNT | 1 |
| RIGHT SOLID SWAY BAR MOUNT | 1 |
| SPLINED SWAY BAR CENTER SECTION | 1 |
| CLAMP COLLAR | 2 |
| ANTI-SEIZE | 1 |
| LEFT SWAY BAR ARM | 1 |
| RIGHT SWAY BAR ARM | 1 |
| 7/16"-14 x 1-3/4" SOCKET HEAD CAP SCREW | 2 |
| FEMALE ENDLINK HALF W/ WRENCH FLAT STUD | 2 |
| 3/8" ENDLINK LOCK NUT | 4 |
| THREADED ROD | 2 |
| FEMALE ENDLINK HALF W/ HEX STUD | 2 |
| 3/8" FLANGE NUT | *6 |

* Only quantity of 4 needed for assembly. Quantity of 2 extra provided as spares.

Tools Required

Tape Measure

14mm Combination Wrench (7" long)

Torque Wrench (11 ft-lb to 60 ft-lb range)

Sockets - 14mm, 9/16", 3/16" hex bit, 3/8" hex bit

1/2" Open End Wrench

9/16" Ratcheting Combination Wrench

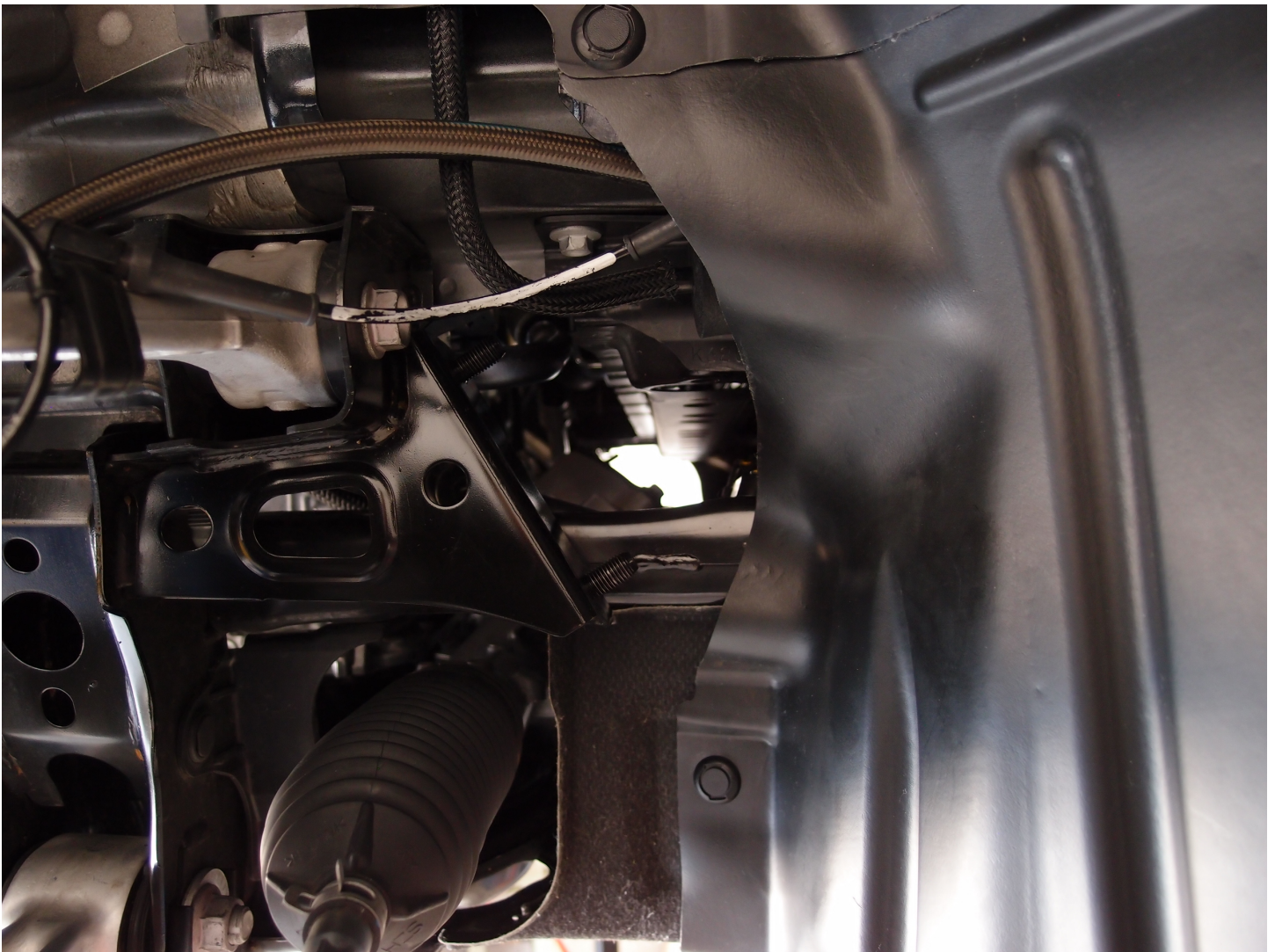
Grease Gun

NLGI #2 Lithium Grease

Note: Read all instructions before attempting installation. If you do not believe you are qualified in performing the necessary installation, please find an experienced professional who can.

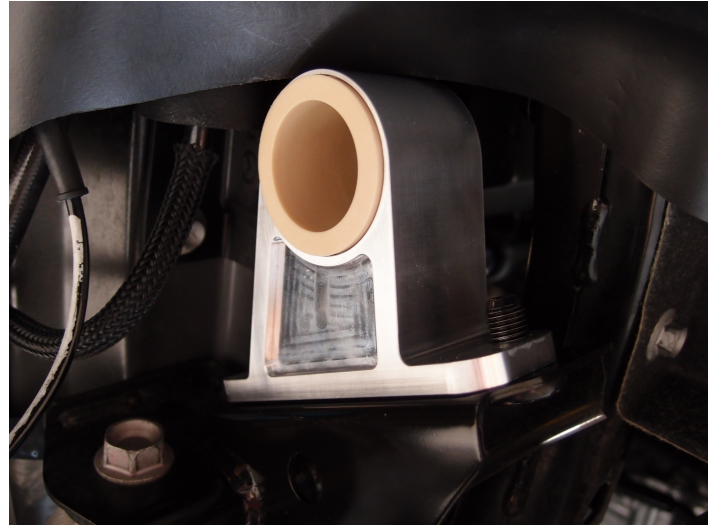
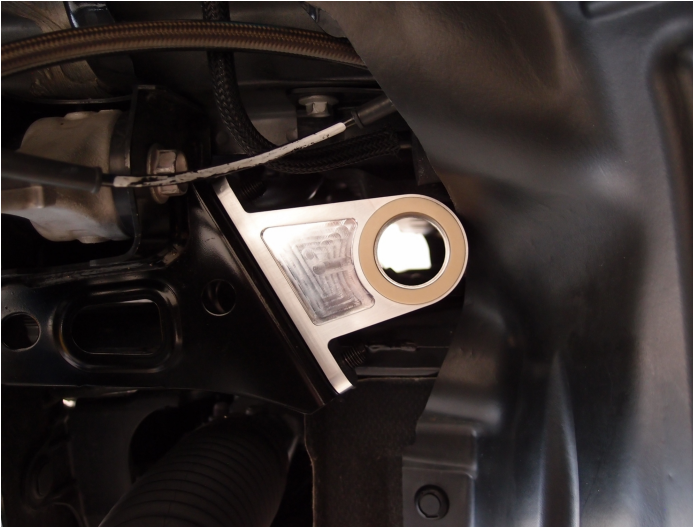
1. Installation Preparations

- A. Before disassembly, use a tape measure to note the vehicle's front left and right ride heights. This information will be needed for Section 4. Ride height is to be measured from the center of the hub to the bottom edge of the fender. For better accuracy, measure from the bottom lip of the rim to the edge of the fender, then subtract half the diameter of the rim to give you ride height (this is easier than trying to eye-ball the center of the hub).
- B. Raise and support the front of the vehicle with either jack stands or a lift, and remove the front wheels.
- C. Reference a 2016+ Mazda MX-5 Workshop Manual for factory front sway bar removal, or save yourself the hassle and break out your favorite metal cutting tool. Remove and discard the factory front sway bar, sway bar brackets, and endlinks. Retain the M10 flange nuts used to hold the factory sway bar brackets; they will be re-used.
- D. If the front under cover, mudguards, or splash shields were removed for factory sway bar removal, re-install those at this time. The Karcepts Front Sway Bar Kit can be installed or removed with all plastic trim in place. The below image displays the chassis ready for installation.



2. Solid Mount/Center Section Installation

- A. For center section installation, it is mandatory to start on the right side of the vehicle. First start by sliding the right sway bar mount over the crossmember studs. The right mount has the flanged portion of its bushing facing outwards. In order to remain SCCA legal, the thick plastic splash shields mounted to the frame rails must remain in place. It will be necessary to push/bend in the right splash shield in order to allow the right mount to drop into position over the crossmember studs. Do not install the mounting nuts at this time.



- B. Move to the left side of the vehicle and slide the splined sway bar center section through the opening and insert it into the inside of the right sway bar mount. Position your body directly under the vehicle. Hold the right sway bar mount with your left hand, and then feed in the bar with your right hand. With mount nuts not installed, it is important to support the mount in place as you do not want to cause unnecessary stress to the crossmember studs. It may be necessary to perform a twisting motion of the bar to help slide it into the bushing. Allow the bar to protrude from the right mount approximately 2-5/8".



2. Solid Mount/Center Section Installation (continued...)

- C. Now slide the left sway bar mount over the splined center section. A twisting motion of the mount may be helpful to get it into position. Once the bar protrudes around 2-5/8" from the mount, the crossmember studs should line up with the mount holes. Carefully slip the mount over the studs. It may be necessary to gap the right mount from its crossmember mating surface in order to assist with left mount install. If any troubles with left mount install, it may also be beneficial to get directly under the vehicle and place a hand on each end of the splined center section. A rotating motion of the center section may help pop the left mount into place. As mentioned earlier, do not allow unnecessary stress to the crossmember studs. The left mount should drop into position fairly easily, but if anything gets stuck, evaluate the positioning of the mount on the sway bar and adjust if necessary.



- D. Once both mounts are in position, center the splined sway bar with a tape measure by comparing the amount of shaft protruding from each end of the mounts. The distance should be approximately 2-5/8" on each side. If adjustment is needed, it is best to twist the sway bar while pushing in the direction needed. It is important to keep the mount nuts loose when centering, as after the mounts are tightened, it can be quite normal to experience high friction levels between the sway bar and mount bushings upon initial install.

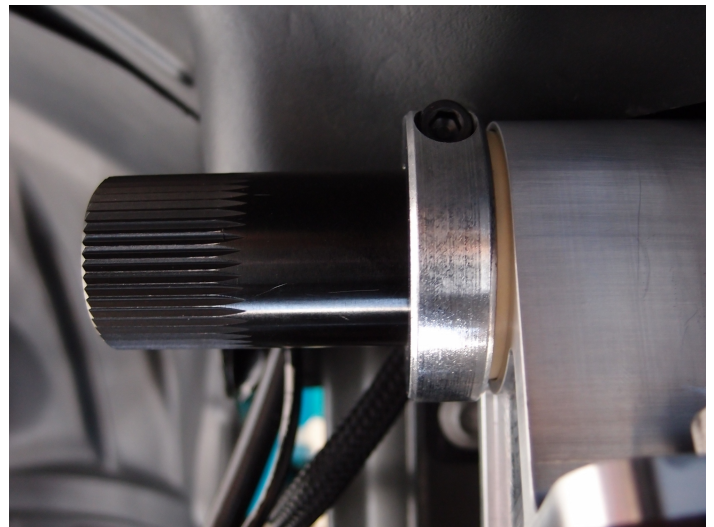
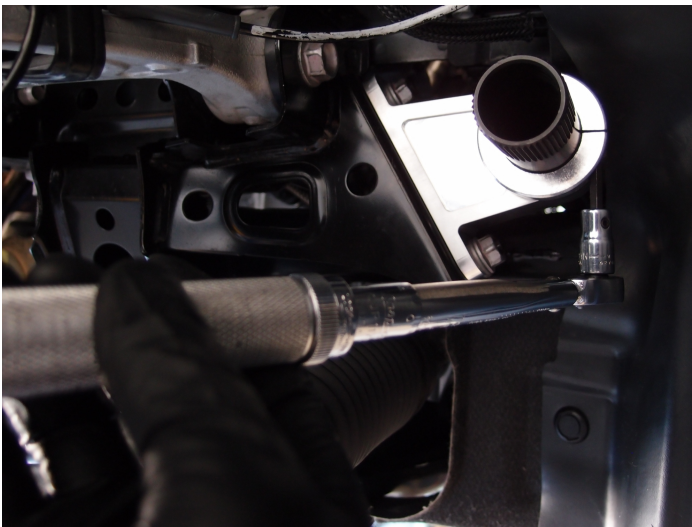


2. Solid Mount/Center Section Installation (continued...)

- E. After the splined sway bar center section is perfectly centered, re-install the factory M10 flange nuts with a standard, 7" long, 14mm combination wrench. Proper torque on these nuts is between 15-20 ft-lbs; however, it will be extremely difficult to get a torque wrench in the tight constraints in this location on the ND chassis. When a standard, 7" long wrench is being used to tighten these nuts, it is short enough that even with a lot of force, it will be difficult to over torque the connection. You do not want to over torque and strip the crossmember mounting studs, but you also want to make sure to apply enough torque where a mount nut can never come loose. A good exercise to guarantee you hit the torque range would be to use one of these nuts on an M10 bolt at a different location where a torque wrench and 14mm socket has adequate clearances. Then compare the tightening of the combination wrench vs. the torque wrench with socket to get an idea of how much force is needed on the combination wrench to hit the proper torque range.

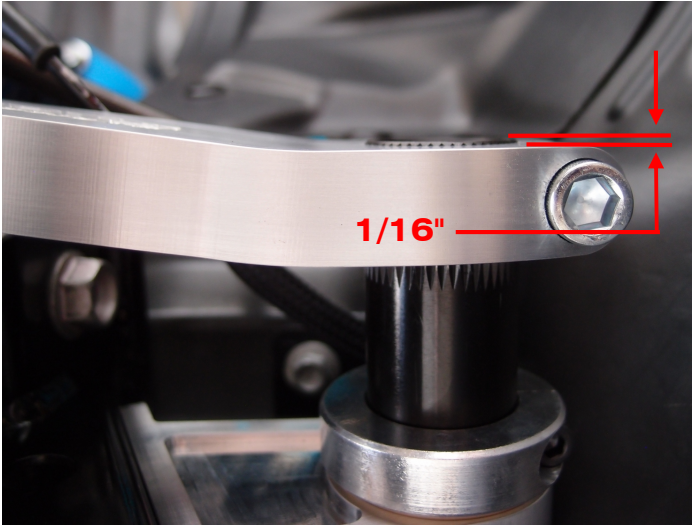


- F. Slide the clamp collars over each end of the splined center section, push them tight against the mount bushings, and torque clamp collar set screws to 11 ft-lbs (132 in-lbs) with a 3/16" hex bit socket. Make certain there is no clearance between the bushings of the solid mounts and the collars once torqued.

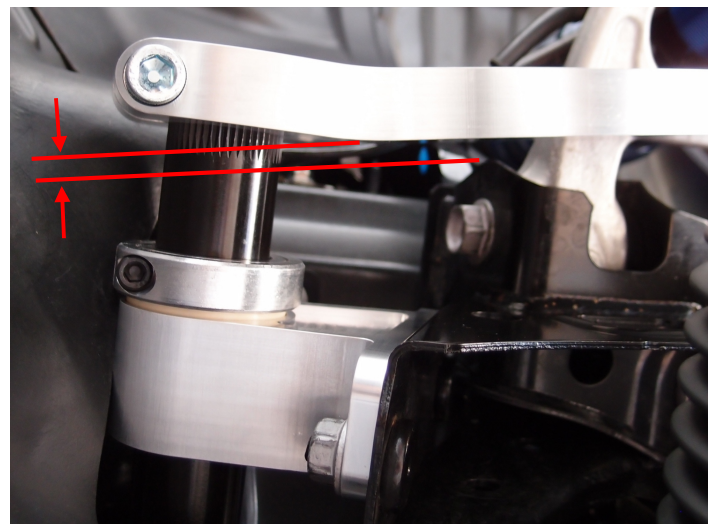
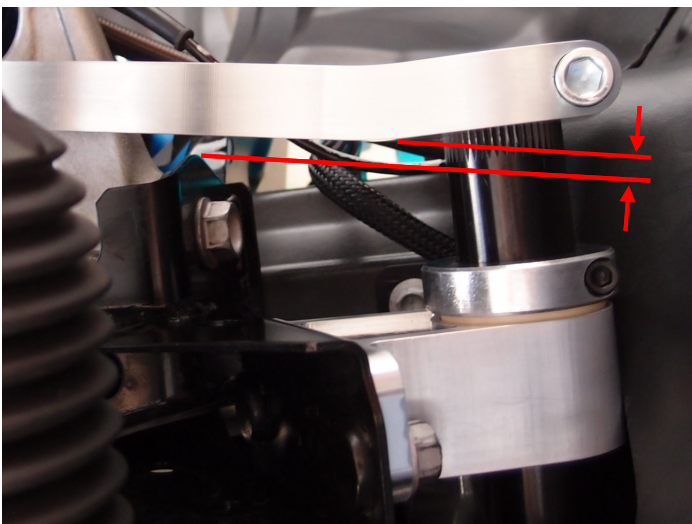


3. Sway Bar Arm Installation

- A. Apply the provided anti-seize onto the splines of the sway bar arms. Coat every tooth of the splines liberally; any excess can be wiped away after install.
- B. Slide the left and right sway bar arms over the splined ends of the center section, making sure to clock the arms to an exact mirror image of each other. Leave 1/16" of shaft protruding past the end of the arms. This is the optimal arm installation position. Snug the 7/16"-14 x 1-3/4" socket head cap screws on the arms with a 3/8" hex bit socket to simply hold the arms in place at this time.



- C. Rotate the sway bar arms upward until they make contact with the upper control arms. Compare the distance between the crossmember and the back of each sway bar arm as shown below. To verify the bar has been centered properly, an equal gap of approximately 1/4" will be observed on each side.



- D. If necessary, adjust the sway bar center section or arm positioning to maintain similar clearances on each side, then proceed to torque the sway bar arm socket head cap screws to 60 ft-lbs with a 3/8" hex bit socket. (Note: Early version sway bar kits utilized a smaller bolt, which used a smaller 5/16" hex. Cap screws with a 5/16" hex are to be torqued to 45 ft-lbs.)

4. Endlink Length Setup

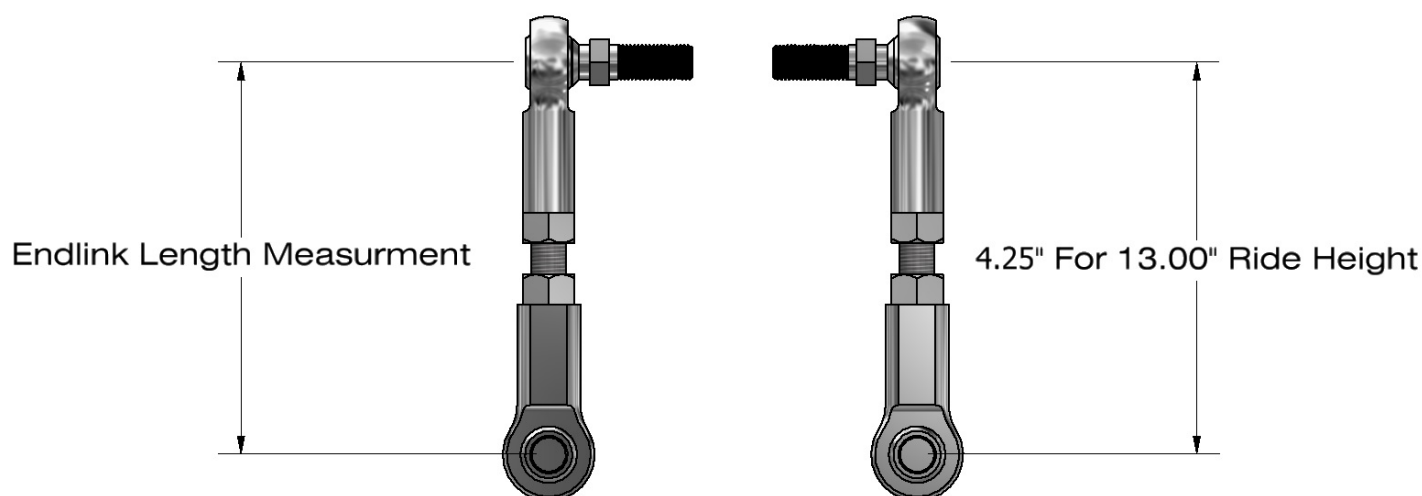
It is critical to set endlink lengths specific to the vehicle's ride height. If ride heights are changed, always re-adjust endlink lengths per the table below. Interpolate endlink lengths if necessary. Potential damage to the sway bar arms or endlinks may occur if endlink length is not set correctly. Additionally, proper endlink length guarantees full functionality of the quick adjustment feature of this sway bar kit.

Use the below table to determine ideal endlink length for your ride height:

| RIDE HEIGHT ^{*1} | ENDLINK LENGTH ^{*2} |
|---------------------------|------------------------------|
| 12.50" | 4.00" |
| 12.75" | 4.13" |
| 13.00" | 4.25" |
| 13.25" | 4.38" |
| 13.50" | 4.51" |
| 13.75" | 4.65" |
| 14.00" | 4.78" |
| 14.25" | 4.91" |
| 14.50" | 5.04" |

^{*1} Ride height is measured from the center of the hub to the bottom edge of the fender.

^{*2} Endlink length is measured from center of ball to center of ball.



Assemble left and right endlink assemblies with the provided female endlink halves, threaded rods, and 3/8" endlink lock nuts. NOTE: The endlink studs that fit into the sway bar arms have two wrench flats on them. The endlink studs that install into the lower control arms use a standard hex. Do not get these confused or damage to the sway bar arms can occur. Build endlink assemblies with one half utilizing a wrench flat stud and the other half with a hex stud.

For proper quick adjustment functionality, the endlinks should have zero preload when the car is at rest without a driver. If the chassis has been corner balanced, you may observe left and right side ride heights may differ without driver weight. If this is the case, set endlink lengths specific to each side of the vehicle's ride height. These endlink lengths will be the initial setup point; however, other factors may dictate adjustments to endlink length for ideal quick adjustment functionality. Secondary adjustments to endlink lengths are covered in Section 7 (Quick Adjustment Troubleshooting).

5. Endlink Installation

Install the wrench flat portion of the endlink studs into the middle holes of the front sway bar arms and secure with the 3/8" flange nuts. Proper torque on this nut is 29 ft-lbs, but since this is the adjustment nut, it's impractical to assume you'll be using a torque wrench every time you make a sway bar change. Just tighten these nuts by feel approximately close to 29 ft-lbs. Plan to use a 9/16" ratcheting combination wrench on this nut for quickest adjustments when the vehicle is on the ground. Install the other half of the endlinks into the FRONT side of the lower control arms (NOTE: The factory endlinks were mounted on the rear side of the lower control arms). Use a 1/2" open end wrench (to hold the endlink studs from spinning) along with a 9/16" socket to secure the lower 3/8" flange nuts, and torque to 29 ft-lbs. Two extra 3/8" flange nuts are included as spares in case any get lost during adjustment.



6. Quick Adjustment Procedure

Reinstall the wheels/tires, and get the car back on the ground. Drive the vehicle for 500 miles (or one race event) to allow the bushings and endlinks time to free up. The car is now ready to test the Quick Adjustment Procedure.

The adjustment procedure of this sway bar kit should take no longer than 3 minutes to complete with adequate practice and knowledge of the product. Before attempting to make a sway bar adjustment quickly at the track or between autocross runs, we highly recommend spending a good hour practicing and gaining familiarity with the product/procedure. When first learning the procedure, it's best to crank the wheel full lock to the right when adjusting the left arm position and vice versa (so that you can view what you are doing). With experience and feel, you will want to keep the wheels pointed straight ahead (which decreases the amount of time to adjust). Follow the below steps exactly as provided. If trying to take any short-cuts with the procedure, you may cause yourself excess time or frustration.

1. Loosen and remove the adjustment nut on the back side of the left sway bar arm with a 9/16" ratcheting combination wrench. Set the nut aside and remove the stud of the endlink from the arm. If there is any difficulty removing the stud, skip to Step 2. Articulate the endlink around as required, and insert the stud of the endlink into the new desired hole position. Pay attention to the wrench flats on the endlink stud as well as the machined slot of the sway bar arm. The flats will need to lie within the slot of the sway bar arm. At this initial stage it can be common for the endlink stud to not want to install completely within the slot of a new hole location (pushing up or down on the sway bar arm itself can help seat the stud). If there is any difficulty seating the stud fully within the arm, just leave the stud sitting partially inserted into the new hole position. If able to seat the stud fully into the new hole/slot (3/8" of thread will protrude from the back of the arm), thread back on the adjustment nut, but leave the nut a few turns loose.
2. Loosen and remove the adjustment nut on the back side of the right sway bar arm. Since the left adjustment nut is loose, it should be extremely easy to remove and reposition the right endlink. If any difficulties, simply push up or down on the sway bar arm, and all should be free to reposition. If there are still problems removing the stud, skip to the Quick Adjustment Troubleshooting on the following page. Affix the right endlink stud into the new desired adjustment hole by making certain the wrench flats of the stud are seated fully into the machined slot of the arm. Reinstall the adjustment nut. If you were able to seat the left stud fully into the hole/slot of the left arm from Step 1, you may tighten the right adjustment nut completely; otherwise, leave the right nut a few turns loose.
3. If you were able to seat the left stud fully from Step 1, then your final step is to simply tighten down the left adjustment nut completely and you are done with the quick adjustment. Otherwise, you now need to complete the adjustment and seating of the left endlink stud into the new desired hole position (while the right nut is still loose). Reinstall the left adjustment nut and tighten completely. Now go back to tighten the right adjustment nut and you are done with the quick adjustment.

7. Quick Adjustment Troubleshooting

If following the Quick Adjustment Procedure, there should be no issues completing all 3 steps. If any difficulty with the procedure, this can mean one of a few things:

1. If the vehicle is sitting on extremely un-even pavement, there could be difficulties due to additional preload. It is very possible to perform the procedure on a sloped or inconsistent surface; but when too extreme, issues removing and installing the endlinks can occur. Reposition the vehicle on a more level surface and retry the procedure.
2. Double check to make certain left and right sway bar arms are clocked in sync with each other.
3. Double check to make certain the sway bar is centered properly.
4. Double check to make certain proper endlink lengths are used (Section 4).
5. If none of the above issues are at fault, then an additional endlink adjustment will be necessary. This can be due to differences in the suspension's eccentric alignment bolt positions between sides or can also be caused by an angular deviation tolerance between splined ends of the center section. To begin, first determine which endlink would need to be lengthened and which side would need to be shortened in order to remove the preload. On the link that would need to be shortened, crack loose on one of its middle lock nuts and shorten the link one full turn. Re-test the Procedure. If still difficult, move to the other side of the vehicle and lengthen that side's endlink one full turn. Re-test the Procedure. Keep adjusting and re-testing the Quick Adjustment Procedure until you are able to remove and reposition the links freely into and out of the arm holes. Alternate sides when adjusting the links in order to keep both links as close to the Section 4 table values as possible. To test thoroughly, it's best to make an adjustment, then test drive the vehicle briefly, stop the vehicle on a new area of pavement, and try again. It should not be necessary to deviate from the endlink length table values by more than 1/8" per side. Additionally, do not allow endlink lengths to pass the extremes of the table values (i.e. no endlink should be shorter than 4.00" or longer than 5.04"). It is highly recommended to perform endlink length adjustments with the vehicle on the ground in order to observe the corrections without unsettling the suspension.

If there are any issues installing or removing endlinks into Hole #3 due to shock body interference, this can mean one of two things:

1. Test installing endlinks into Hole #3 on both sides of the vehicle. If only one side has interference, the sway bar is not centered properly. Re-center the sway bar correctly and try again.
2. Shock bodies larger than 2.3" in diameter may encounter this interference. To correct, reset the arm installation position (Section 3.B.) further inward on the center section (to a larger value than the specified 1/16") until clearance is achieved. Endlink length must also be increased from the Section 4 table values by the same additional increment of length that was added to the 1/16" arm installation position.

Sway Bar Disclaimer:

Karcepts Sway Bars are designed for race purposes. Only solid, low friction polymer bearings are utilized in our sway bar kits. No rubber or soft polyurethane is used. Endlink construction is steel on steel (with only a Teflon liner between the ball and race of our endlinks). Additionally, Karcepts Sway Bars are of a 3-piece design, comprised of a NASCAR/Speedway style splined center section, with mating splined aluminum sway bar arms. Karcepts Sway Bars are also capable of stiffness levels far greater than OE, and almost always greater than any other aftermarket bar available. The above factors are why racers choose our products; however, if Karcepts Sway Bars are utilized for daily driving, additional NVH (noise, vibration, harshness) may be observed. Karcepts, Inc. tries to its fullest extent to minimize NVH as much as possible, even with such a rigid design. Few customers have ever claimed our bars add unwanted vibration or harshness. However, in some cases, noises have been reported. In general, most clicks, knocks, clanks, and squeaks can still be eliminated with proper maintenance.

Sway Bar Maintenance:

Below are maintenance procedures that may be helpful in resolving any undesired sway bar noises:

1. Verify everything is tight and installed exactly as specified in the Karcepts Installation Instructions. With such a solid design, any loose part can make all kinds of clatter. If the clamp collars have any gap between them and the mount bushings, the bar can shift side to side and make some sounds. Additionally, all torque specifications must be followed, especially on the sway bar arms and clamp collars. You must obtain the properly sized torque wrench(es) and hex bit socket(s) to install and maintain your Karcepts Sway Bar Kit.
2. The most common noise issue on a 3-piece bar is at the splined connections between the steel center section and the aluminum sway bar arms. The noise can sound like a metallic clicking, often confused with endlink noise. Other times it can make a knocking or clanking noise, so it is always best to address the splined connections first. Some bars and arms never encounter the issue, others may show up one time and need addressed, and yet a few may require a constant maintenance schedule. To eliminate sounds caused from the splined connections, loosen the sway bar clamping bolts, slide the arms off of the center section, rotate the center section within the mounts 60-90 degrees, re-lubricate the splines of the sway bar arms with a liberal amount of anti-seize, then re-install the arms onto the center section and torque bolts to the proper Karcepts supplied torque specifications.
3. For a creak or squeak type noise, apply a NLGI #2 lithium grease on the surfaces between the mount bushings and center section. Some Karcepts Sway Bar Mounts include grease fittings to make this task easier. WD-40 and PTFE sprays are not recommended on the sway bar mount bushings. If a squeak is still prevalent, try spraying the spherical endlink connections with lube to see if the noise goes away. An endlink squeak would be a rare instance on a Karcepts Sway Bar, but it may be possible.

Sway Bar Maintenance (continued...):

4. If driving slowly over a bumpy surface and some clatter is observed, that may likely be attributed to a small amount of endlink play. In most instances you can run the sway bar with endlink play for a long time and there will be no ill effects (other than possible sounds at low speeds). Endlink play is something that can develop over time. Endlinks ordinarily are going to be a wear item, especially when running stiff sway bar settings. Endlink wear can also be magnified if racing in classes that mandate soft factory springs. Karcepts, Inc. has spec'ed out the endlinks in all applications to achieve the greatest life possible, but endlink life will vary based on customer use. In general, you should be able to get at least 2 race seasons out of a set of supplied Karcepts Endlinks. However, extreme applications may require endlink replacement once a year. It is best to physically remove and inspect endlinks to determine if play has built up between the ball and race of an endlink. It may also be possible to spray the spherical connections with lube. If noises subside immediately, then endlink play is most likely the contributing factor.

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