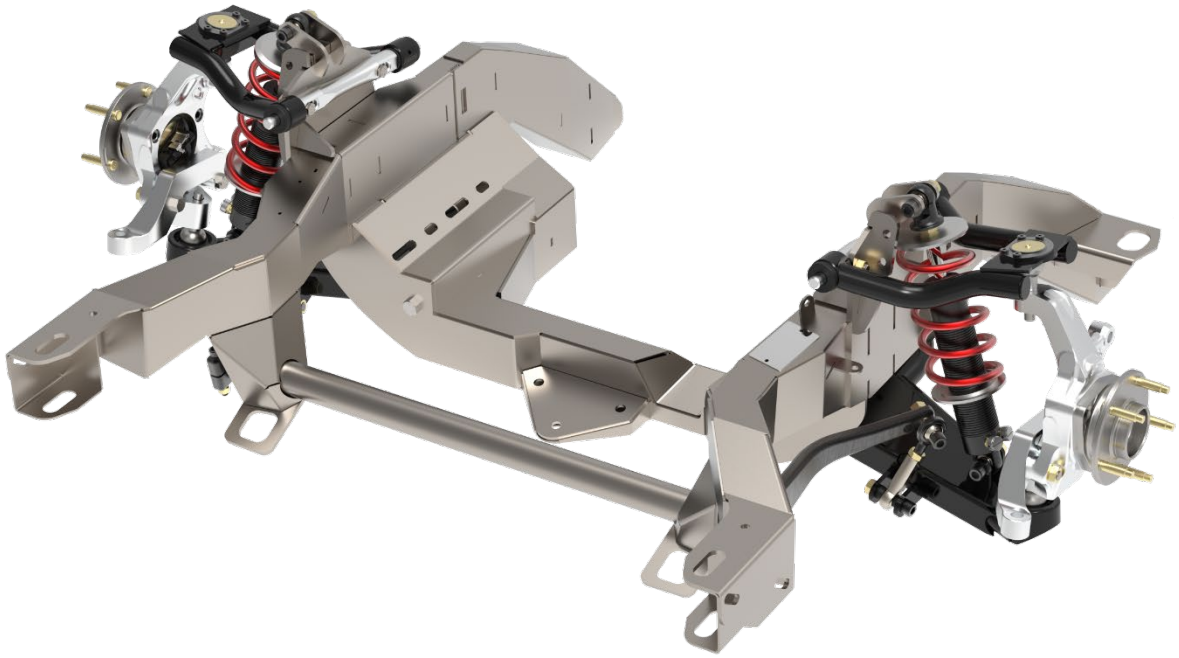
Instruction Guide

ExtReme Front Suspension



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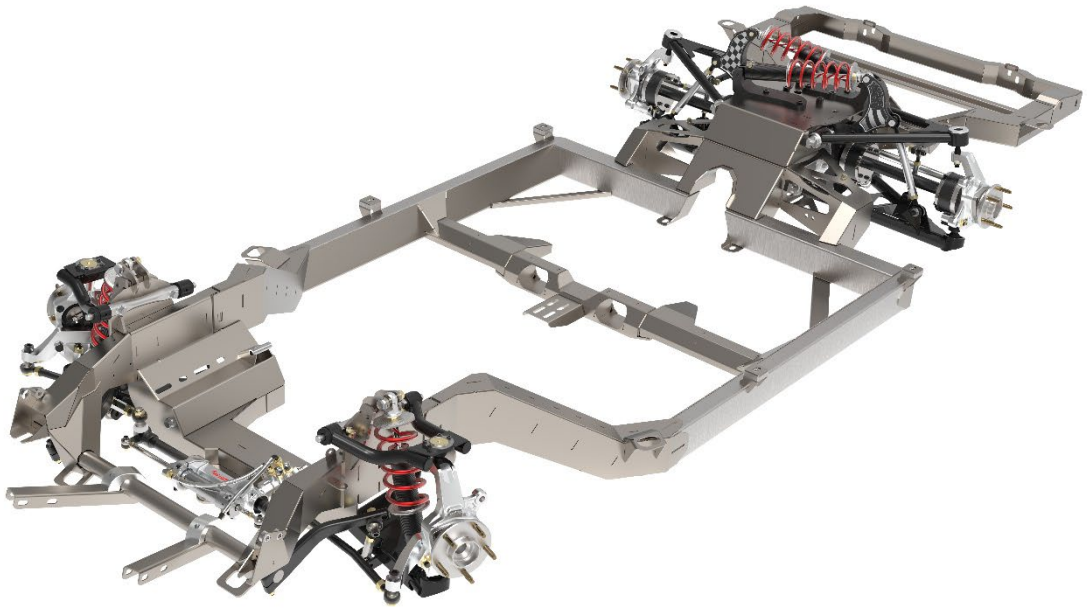

Figure 1: C2 Corvette with Speedtech Performance Extreme chassis

Congratulations on the purchase of your new Speedtech Performance ExtReme front suspension. Use only approved and appropriately rated jack and jack stands, and be sure to take all safety precautions required to complete the job safely and correctly. If you have uncertainties, seek the assistance of a highly qualified workshop to assist you.

Read and understand all instructions thoroughly before you begin. Your main assembly and set up of your ExtReme front suspension can be done in a home garage with hand tools.

Speedtech enjoys seeing the progress our customers are making as they work through their builds. Join the group, Team Speedtech, on Facebook and share your pictures and your story.

Speedtech Performance sends you best wishes for your project!

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1.0 GENERAL INFORMATION

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1.1 THIS GUIDE

Thank you for purchasing your new Speedtech Performance ExtReme suspension kit. Read through all instructions thoroughly before beginning and take all safety precautions required to do the job carefully and correctly. If you have uncertainty, seek the assistance of a highly qualified workshop. Speedtech Performance assumes no responsibility for the installation of any of its products installed by others. All products are intended to be installed by qualified professionals.

WARNING: Once assembled you will need a professional wheel alignment performed. Driving a vehicle without a proper alignment can be dangerous, towing is recommended to transport the car prior to the alignment being performed.

1.2 OVERVIEW

These instructions outline the ExtReme independent front suspension assembly process. A separate instruction will guide you through installing the subframe or chassis in the vehicle. You may want to also see our YouTube channel for video, ExtReme Chassis Build Part 1.

Photos in the instruction process may vary slightly from your exact operation.

1.3 EXTREME FRONT SUSPENSION FEATURES

Wheel Clearance	10.5”+Wide, Min. 18” Diameter
Coilovers	JRI OAL 15.3, 4” Stroke
Ride Adjustment	2”
Spring Rate	450lb For Most Applications
Roll Center	1.3” Off Ground
Camber Gain	-0.9
Ackermann Error	0.0 Outside, 0.8 Inside
Bump Steer	0.005 Up 2” Down 1”

Figure 2: ExtReme front suspension features

1.4 EXTREME FRONT SUBFRAME FEATURES

- Improved geometry including bump steer.
- Increased shock length providing more suspension travel.
- Improved motion ratio for faster shock response and more precise control and better comfort.
- Fully boxed, welded construction with tabbed through frame crossmembers for added torsion rigidity.
- Purpose built upper and lower tubular control arms engineered with geometry corrections built in.
- Speedtech Performance forged 7075 aluminum spindle.
- Sway bar exclusively designed for the ExtReme subframe with high clearance.
- Lowered ride heights to meet your styling needs can be achieved while maintaining improved geometry

1.5 ADDITIONAL CONSIDERATIONS

The Speedtech Performance ExtReme chassis and subframe designs may cause some of the current components to no longer be valid on the car. These will be covered in your vehicle specific instructions.

1.6 TOOLS

Installation of the Speedtech Performance ExtReme front suspension can be done on the floor with simple hand tools and no special tools are required.

Additional things to have before you start:

- Loctite Red/Blue
- Anti-seize
- Torque Wrench
- Socket Set
- End Wrench Set
- Rubber Mallet
- Drill/Bits or File (to clean out powder coating)

2.0 CHECK IN PARTS AND HARDWARE

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2.1 CHECKING IN THE ORDER

Check in your order as soon as possible. To check in the order, Speedtech has provided tables which can be used as check lists, as displayed in figure 2. All bolts and nuts are NF unless otherwise noted. Hardware comes in several boxes. If you discover anything missing from your order, call your authorized dealer as soon as possible.

2.2 CHECK IN TABLES

Upper Control Arm

	2	Upper Control Arms Assembled: Passenger and Driver	
	4	Upper Control Arm Cross Shaft Slugs Center Hole	
	4	Upper Control Arm Cross Shaft Slugs Off Center Hole	
	4	Upper Control Arm Cross Shaft Bolts	7/16” x 2-1/2”
	4	Upper Control Arm Cross Shaft Nylock Nuts	7/16”
	8	Upper Control Arm Washers	7/16”

Lower Control Arm

	2	Lower Control Arms Assembled: Passenger and Driver	
	4	Lower Control Arm Bolts	9/16” x 4”
	4	Lower Control Arm Nylock Nuts	9/16”
	8	Lower Control Arm Washers	9/16”
	2	Bump Stops	Tall Cone Shape

Steering Rack

	1	Sweet Powered Steering Rack w/ Hardware	
	3	Rack Mount Bolts	1/2” x 1” NC
	3	Rack Mount Washers	1/2”
	2	Rack Rod Spacer Cone	0.60” Tall

Shocks

	2	Shocks	4” Stroke
	4	Shock Mount Shoulder Bolts	1/2” x 1-3/4”
	4	Shock Mount Nylock Nuts	3/8” NC
	4	Shock Mount Washers	3/8”

Engine Stands

	2	Shocks	4” Stroke
	4	Shock Mount Shoulder Bolts	1/2” x 1-3/4”
	4	Shock Mount Nylock Nuts	3/8” NC
	4	Shock Mount Washers	3/8”

Transmission Crossmember

	1	Transmission Crossmember Box	
	2	Transmission Crossmember Arms	
	8	Transmission Crossmember Bolts	3/8” x 1-1/4”
	8	Transmission Crossmember Nylock Nuts	3/8”
	16	Transmission Crossmember Washers	3/8”

Tie Rods

	2	Tie Rods Shafts	
	2	Turn Buckles w/ Nut	
	4	Tie Rod Ends	5/8” RHT
	2	Tie Rod Ends Jam Nut	5/8” RHT
	2	Tie Rod Ends Small (3/4in) Jam Nut	5/8” RHT

Steering Arms

	2	Steering Arms: Passenger and Driver	
	2	Steering Arm Tie Rod Shoulder Bolts	5/8” x 2-1/2”
	2	Steering Arm Tie Rod Nylock Nut	1/2” NC
	2	Steering Arm Tie Rod Spacer Tall	1/2”
	2	Steering Arm Tie Rod Spacer Short	1/4”
	2	Steering Arm Tie Rod Spacer Thin	0.10”

Spindle

	2	Forged Spindles Assembled: Passenger and Driver	
	4	Steering Arm Bolts	1/2” x 2-3/4” SHCS
	4	Steering Arm Washers	1/2”
	4	Steering Arm Nylock Nuts	1/2”

Sway Bar

	1	Sway Bar	
	2	Sway Bar Arms	Bent
	2	Link Rod End Female	1/2”
	2	Link Rid End Male	1/2”
	2	Link Jam Nut	1/2”
	4	Link Arm Rod End Spacer	Cone Shape
	2	Link Lower Arm Bolt	1/2” x 2-1/4”
	2	Link Upper Sway Bar Arm Bolt	1/2” x 2-1/2”
	4	Link Thin Nylock Nuts	1/2”
	2	Delrin Sway Bar Bushing	
	2	Grease Fittings	
	2	Sway Bar Arm Pinch Bolts	3/8” x 2-3/4”
	4	Sway Bar Arm Pinch Washers	3/8”
	2	Sway Bar Arm Pinch Nylocks	3/8”

Figure 3: Check in tables with amounts, descriptions, and sizes

2.3 ASSEMBLY OVERVIEW

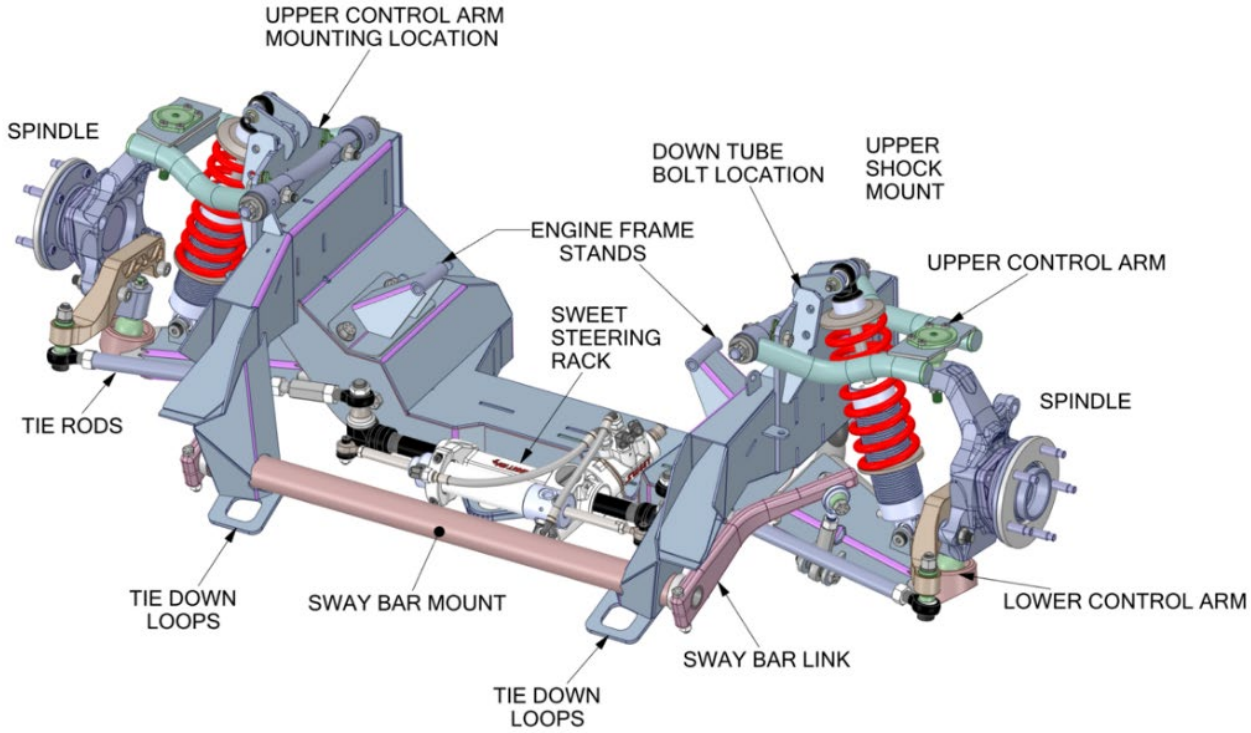

Figure 4: Assembly overview

3.0 GETTING STARTED

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3.1 PREPARE

- Unpack all the components and organize them on a table with their accompanying hardware. Use the check list in figure 2.
- Level the Speedtech Performance ExtReme chassis or ExtReme subframe on a smooth level work surface.
- Check all threaded holes and all holes in the chassis where a bolt will be inserted. Clearance to fit where powder coating has closed the hole too much in interference with the required bolt.
- Install the lower control arm bump stops before the area becomes hard to access.
    - Locate the 3/8 NC hole on the underside of the crossmember above the lower control arm. Check the threads and chase the thread with a 3/8-16 tap if bolt does not screw in.
    - Screw in the bump stop all the way into the frame.
    - Pro Tip: Install the LCA travel limiter before moving on.

4.0 ASSEMBLE THE EXTREME INDEPENDENT FRONT SUBFRAME

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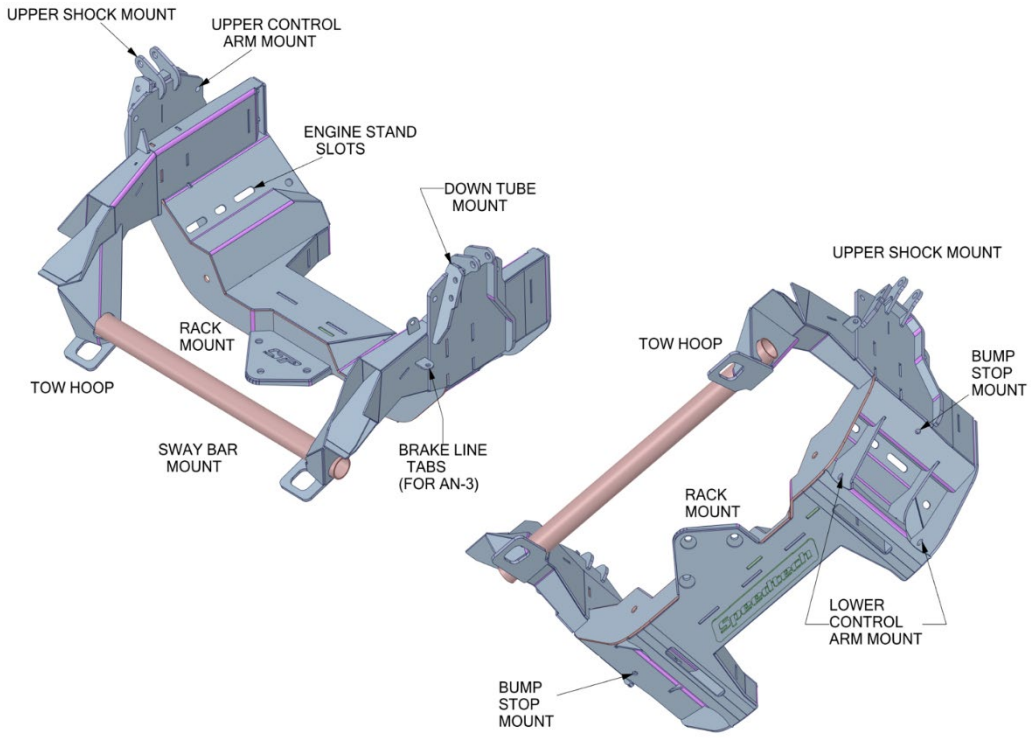
Figure 5: Assembly



4.1 SUPPORT THE SUBFRAME

Support the chassis or subframe with jack stands and confirm that it is sturdy and level.

4.2 INSTALL THE ENGINE STANDS AND TRANSMISSION CROSSMEMBER

Install the supplied engine stands onto the frame with the 7/16 x 3/4 bolts. Do not fully tighten at this time to aide engine fitment later.

NOTE: Small block and big block engine stands are equal in height and can be installed on either side. LS Series engines use two different frame stands; the taller stand must be installed on the driver side. This will move the engine over ¾" to clear the oil pan rail. You must also use an LS motor mount adapter such as the ATS 070001.

Figure 6: Transmission crossmember

Install the transmission crossmember. Offset top holes in center box are for LS applications. Small block and big block engines use centered holes. Use side holes as appropriate for your specific engine and transmission application. Do not fully tighten the bolts at this time to allow adjustment later when installing the engine and transmission.

Figure 7: Two photos of installment

4.3 INSTALL THE LOWER CONTROL ARMS

- Begin by checking the 9/16” holes in the “K” member are cleared for the 9/16” bolts. If they need to clearance, use a flapper or a 9/16” drill bit and cut out the powder coat/paint from the holes.
- Apply anti-seize lubricant to the shank of the 9/16 x 3 1/2" bolts. Set aside for convenient reach during the next step.
- Slide the arm into the pockets in the frame. The sway bar mount will be toward the front of the frame/car.
- Bolt lower arm into place using the prepared 9/16” bolts, washer, (on the nut side) and nylock nut. Torque to 100 ft. lbs.

NOTE: For maximum performance, Speedtech component tolerances are designed to be tight. The thickness of paint or powder coating may require you to open the bolt hole slightly.

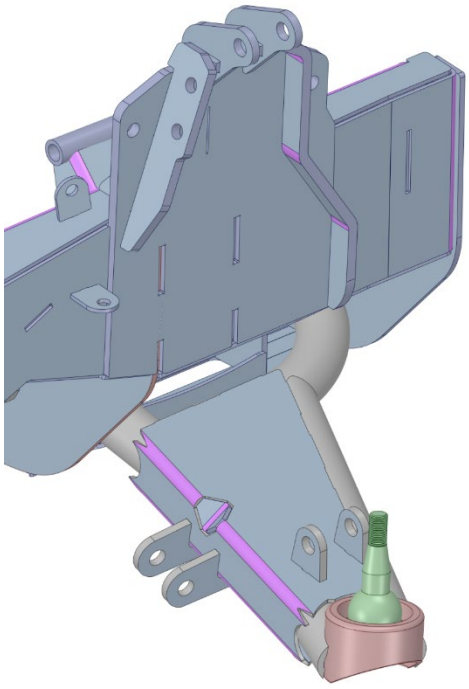


Figure 8: Installing the lower control arms

5.0 COILOVER SHOCKS

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5.1 OVERVIEW

IMPORTANT: Your shocks come from the manufacture with assembly instructions. The manufacture supplied information supersedes the shock information supplied by Speedtech Performance.

5.2 ASSEMBLE

- Start by checking the 1/2” holes in the crossmember and lower control arm are cleared for the 1/2” shoulder bolts. If they need clearing, use a 1/2” drill bit and cut out the powder coat/paint from the holes.
- Apply anti-seize lubricant to the shank of the 1/2” x 1-3/4” shoulder bolts. Set aside for convenient reach for the next step.
- Slip the shock into the tabs on top of the lower control arm, slide in a shoulder bolt.
- Place the shock into the tabs on top of the crossmember, slide in a shoulder bolt from back toward the front of the car.
- Use the 3/8” washers under the 3/8” nylock nuts and torque to 35 ft.lbs.

NOTE: Check the clearance fit of the shock body and spring cap with the crossmember frame. If desired, the JRI shocks can be mounted inverted for additional clearance. Camber settings may also impact this clearance.

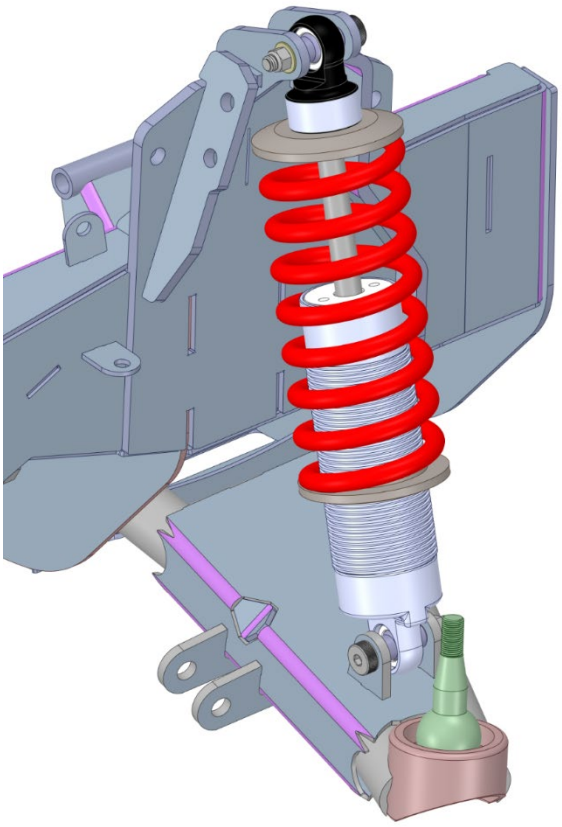

Figure 9: Coilover shocks

6.0 INSTALL SPINDLES AND UPPER CONTROL ARMS

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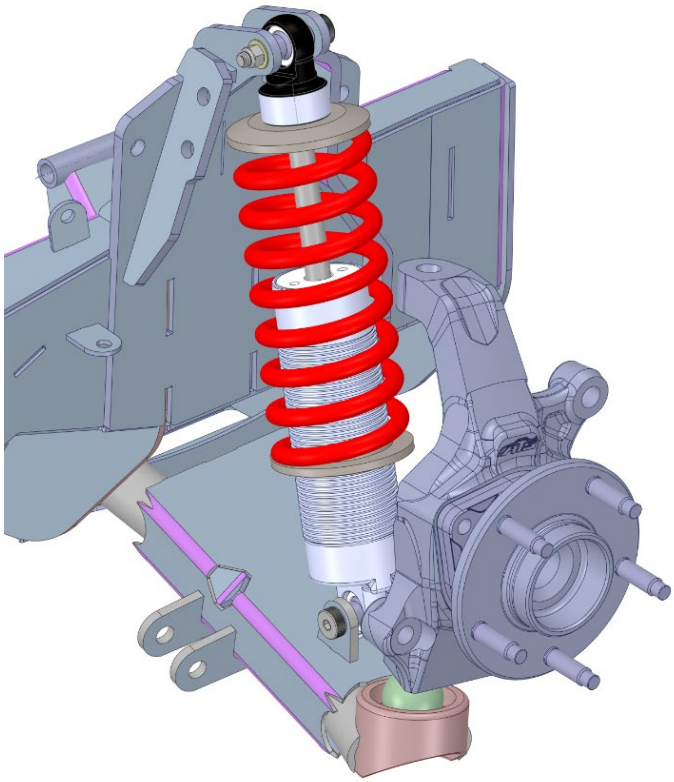
6.1 INSTALL UPPER CONTROL ARMS

- Begin by setting the spindle onto the lower control arm ball joint taper. Double-check that the correct spindles are on the correct side of the car. The brake mounting needs to point towards the rear of the car.
- Screw on the slotted castle nut. Do not torque at this time. It will be easier to get the upper arm on and have both ball joints in the spindle before torquing.
- Check the 7/16” holes in the crossmember are clearance for the 7/16” bolts. If they need to be opened up, use a flapper or 7/16” drill bit and sand, or cut out the powder coat/paint from the holes.



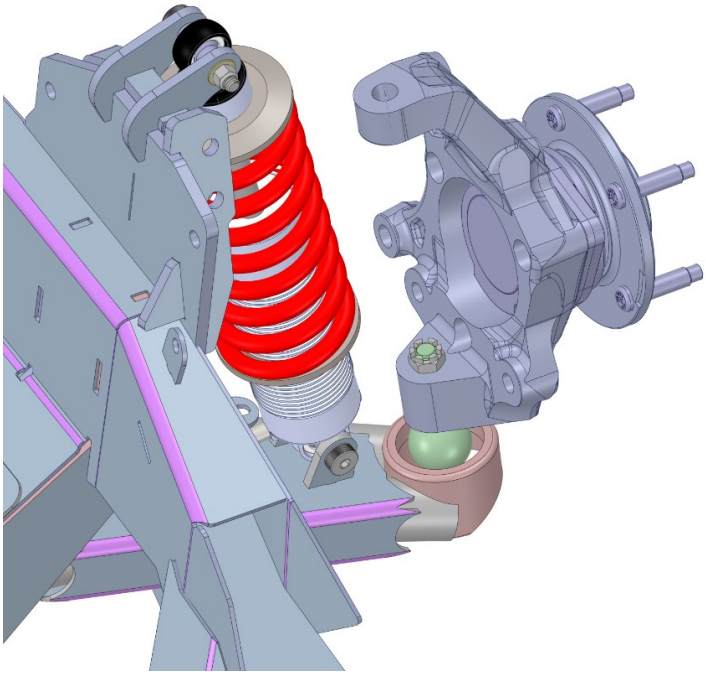


Figure 10: Installing spindles and upper control arms

Assemble the matching caster slugs into the cross shafts. There are two different caster settings on two different sets of slugs. The front of the arm (A) is on the side where the slug pocket is closest to the bushing collar.

- For maximum caster; (≈8°) set the off-center slug holes closest to the front.
- For minimum caster; (≈6°) set the off-center slug holes furthest from the front.

IMPORTANT: Double-check that all four slugs (B) are set the same on both arms. Refer to the alignment specs for initial caster settings for different types of driving.

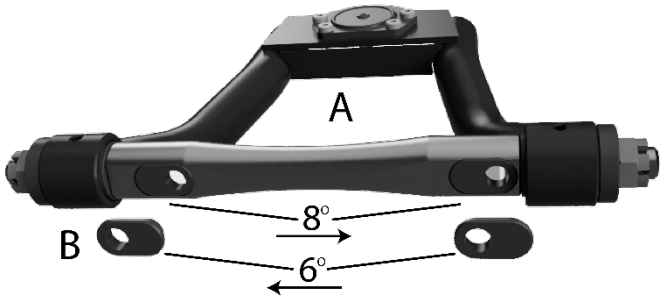


Figure 11: Slug alignment

- Slip on the 7/16” x 2-1/2” bolts with a washer in the cross bar mounting locations on the frame.
- Orient the control arm cross shaft so that the slugs are facing away from the ball joint (A). (The collar closest to a slug is the front arm.)
- Slide on the control arm, through the slug holes, onto the 7/16” bolts.
- Add 1/8” shims (not included) between the cross shaft and the frame as a starting point for alignment.
- Tighten on the 7/16” nylock nuts. Nuts will be torqued during alignment.
- Insert the upper ball joint taper into the top of the spindle. Screw on the slotted castle nut behind the spindle.
- Tighten the lower ball joint to 60 ft/lbs and install the cotter pin.
- Tighten the upper ball joint to 40 ft/lbs. and install the cotter pin.

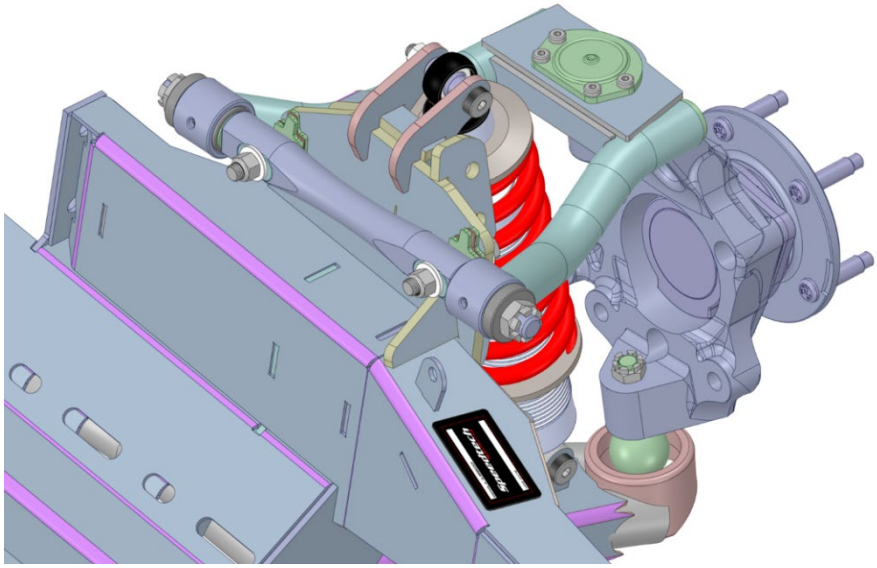


Figure 12: Installment

7.0 STEERING ARM

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7.1 INSTALLING THE STEERING ARM

WARNING: The steering arm must sit flush against the spindle with no interference.

NOTE: The steering arms cannot be installed on the spindle until after the ball joint is torqued and the cotter pin is installed

- On the back side of the spindle, line up the steering arm over the two lower holes, having the arm reach forward and arching out.
- Use the (4) ½" X 2-3/4" SHCS bolt to bolt from the back of the spindle out to the front. Tighten the (4) ½" Stover lock nuts and (4) washers on the front side. Speedtech recommends using red Loctite as a redundant safety on the steering arm bolts.
- Torque to 75 ft.lb.

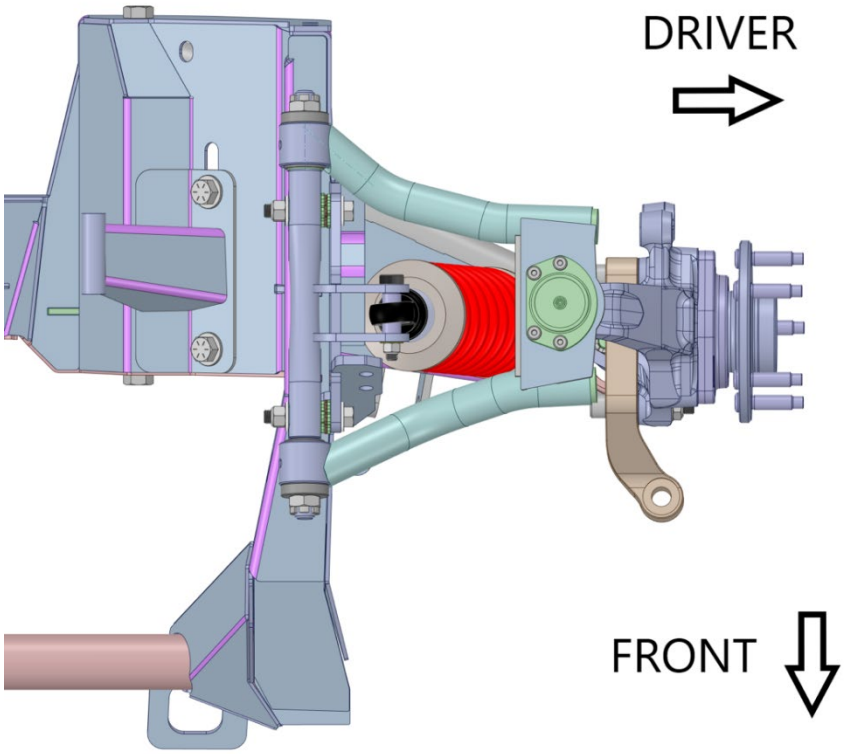

Figure 13: Steering Arm

8.0 SWAY BAR

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8.1 INSTALLATION

- Insert the splined sway bar into the front tube on the crossmember.
- Slide on the plastic Delrin bushings on the sway bar on each side. Make sure to orient the grease fittings to a convenient location.
- Tap the bushings into the crossmember tube, they should be snug, but not tight.

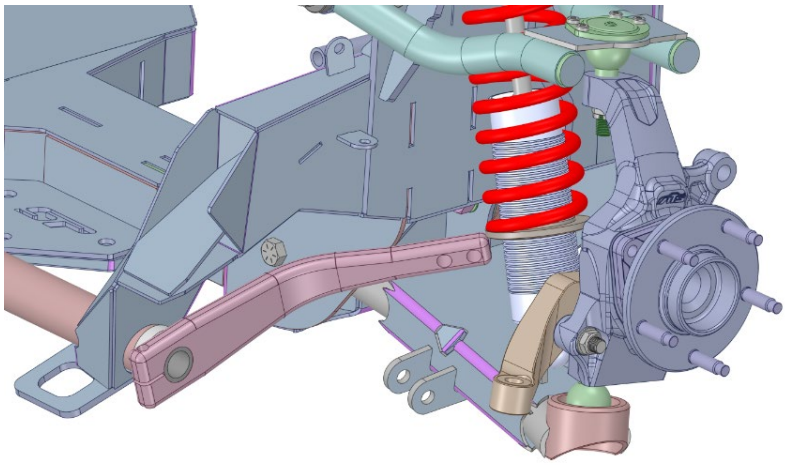


Figure 14: Sway bar

- If they are tight going in you will need to remove the paint or powder coating from the tube for the sway bar where the bushing goes. Roughly center the sway bar by tapping on each end.
- Install the sway bar arms onto the splines. Make sure the arms are reaching in-between the control arms as you line up the splines. Take time to clock the arms to each other so that they match spline locations on each side.
- The arms will slip onto the splines easily, so move them in until they touch the trust surface of the sway bar bushing and remove any gaps in the assembly but do not preload. The sway bar should move smoothly, not be tight or have free play.
- Use the (2) 3/8”-2-3/4” bolts, (4) 3/8” washers, and (2) 3/8” nylock nuts to pinch the sway bar arm onto the spline sway bar.
- Torque to 40 ft.lb.
- Assemble the male and female rod ends with the jam nut. Set the eye-to-eye center to 3-1/2”.
- Refer to figure 15 to bolt the link to the sway bar arm and lower control arm. Do this to one side only to begin with. The other side will be connected during alignment when the weight of the car is on the wheels.
    - Use (2) 1/2” x 2-1/4” bolts, (2) 1/2” thin nylocks, (4) link arm rod end spacer to connect the female link end to the lower control arm.
    - Use (2) ½” x 2-1/2” bolts, and (2) ½” thin nylocks to bolt the male link and to the outside of the sway bar arm.
    - Torque link bolts to 60 ft.lb.

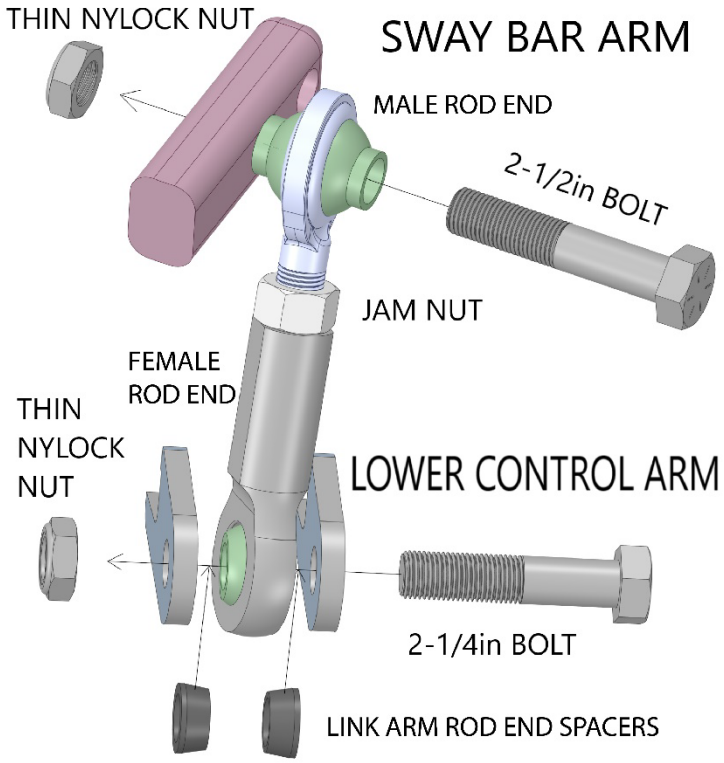
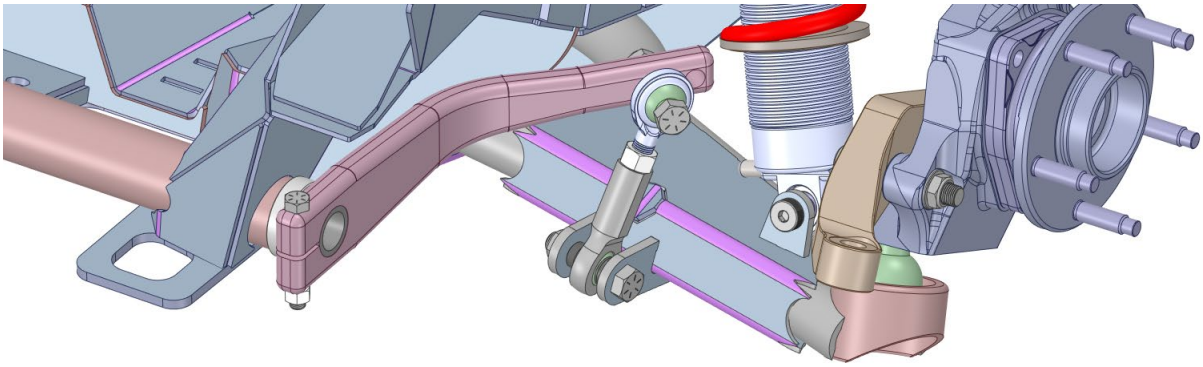


Figure 15: Bolting link to sway bar

- NOTE: The sway bar arm has multiple bolt locations. This is for quick leverage adjustments to change the rate of resistance applied at the lower control arm.

Figure 16: Sway bar arm



9.0 DUAL POWER STEERING RACK

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9.1 INSTALL RACK

- Align the rack's three mounting holes onto the subframe. The holes can be found on a tray in the front of the "K" member.
- Bolt in the rack from the underside using (3) 1/2" x 1" NC and (3) ½" washers. Speedtech recommends using red Loctite on all the bolts.
- Center rack pins to the lower control mounting bolts. They should be in line with each other for optimized alignment.
- Once it is all centered, torque underside bolts to 75 ft.lb.

IMPORTANT: The Sweet steering rack is a high-performance racing rack. As such, it has specific requirements to achieve optimum performance. Refer to section 11.1 of this instruction for additional information, requirements, and final installation of the ExtReme power steering system.

9.2 INSTALL TIE RODS

- Apply anti-seize on the male threads of all (4) of the rod ends and (2) adjuster buckles. Loosely screw on the jam nuts on the joints. (2) Thin 5/8" nuts on (2) rod ends, (4) regular 5/8" nuts on (2) rod ends and (2) adjuster buckles.
- Assemble the tie rods. Use figure 17 as a guide.
    - Thread on the tie rod on the outer steering arm side (short end) with a thin jam nut rod end assembly most of the way in. Lock down with the thin jam nut.
    - Start to thread the other side of the tie rod with an adjuster buckle. (About one turn left hand.) Then thread a rod end with the regular nut into the adjuster the same amount. (About one turn right hand.) While holding the rod end and tie rod steady, turn the adjuster to equally further engage the threads on both sides simultaneously.

WARNING: Not all tie rod setups have a bend in the rod. Even with straight rods, the adjuster will always go towards the steering rack.

NOTE: The initial toe setup is written in greater detail at the end of these instructions under the alignment section.

- Install the assembled tie rods onto the rack pins. Use figure 17 as a guide.
    - Slip on the tapered rod spacer cones (0.60") small size up.
    - Insert the tie rod assembly, adjuster buckle side, onto the rack pin.
    - Add the thin (0.10") shim and tighten the 5/8" nylock nut.
    - Torque to 60 ft.lb.

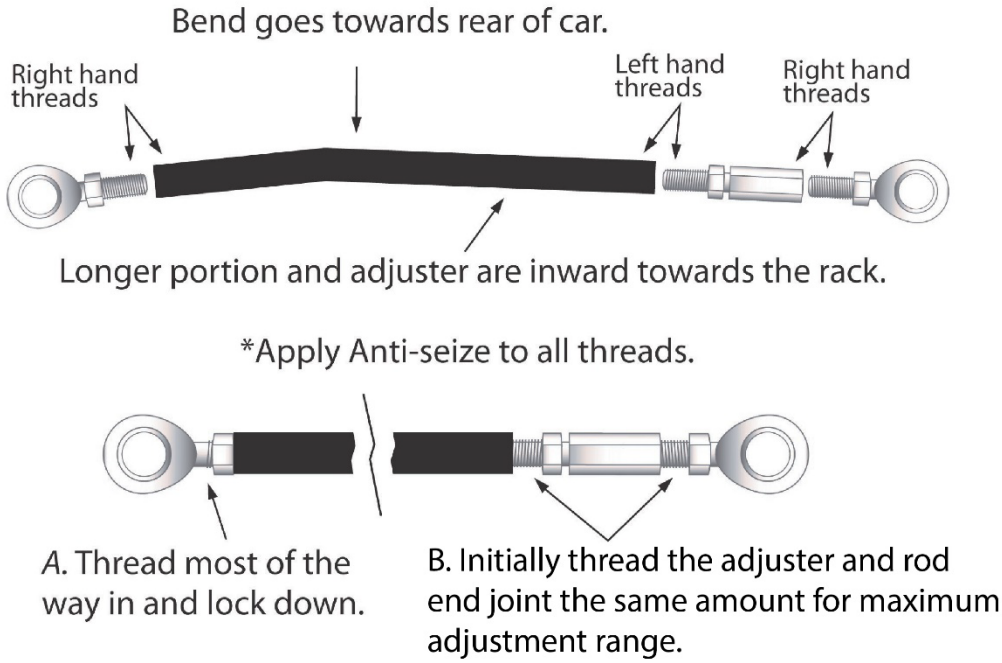

Figure 17: Installing tie rods; diagram one

- Install the tie rod to the steering arm. Use the following diagram as a guide.
    - Starting from the bottom, slide the rod end of the tie rod onto the 5/8” x 2-1/2” shoulder bolt.
    - Add the 1/2” tapered shim onto the bolt stack. The small end must be touching the rod end.
    - Slide the tie rod bolt into the steering arm from the bottom.
    - Add the 1/4” taper and small spacer on top of the arm.
    - Tighten assembly stack down with 1/2” nylock nut.

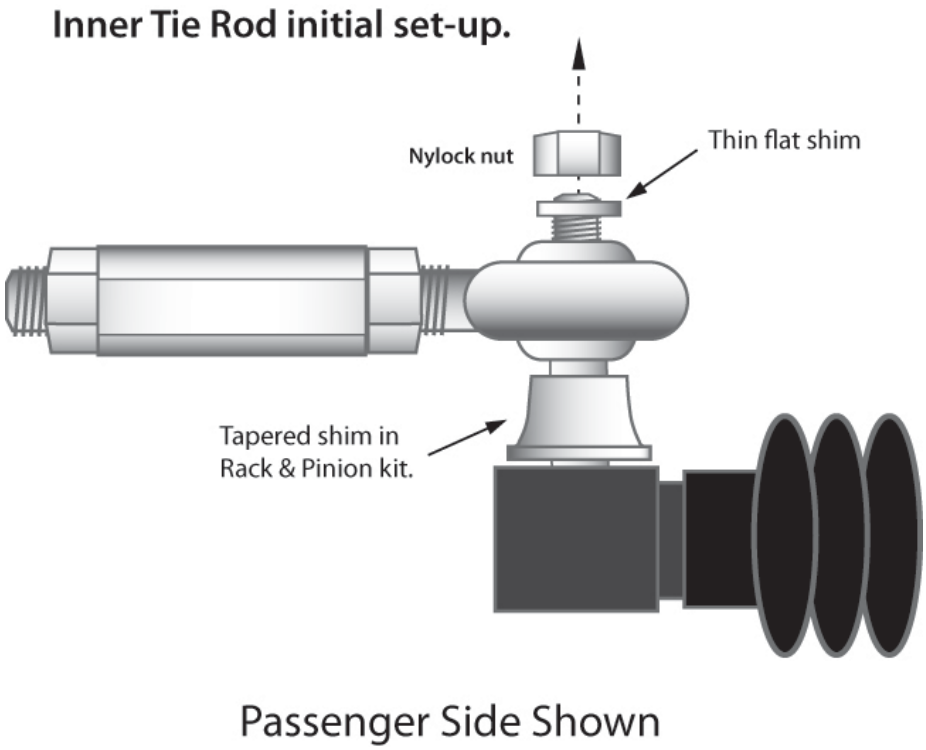

Figure 18: Tie rod set up; diagram two

- **NOTE:** For advanced drivers; the stack order can be rearranged to adjust bump steer. However, all tapers and shims must be used in order to maintain the shoulder bolts grip on the steering arm.

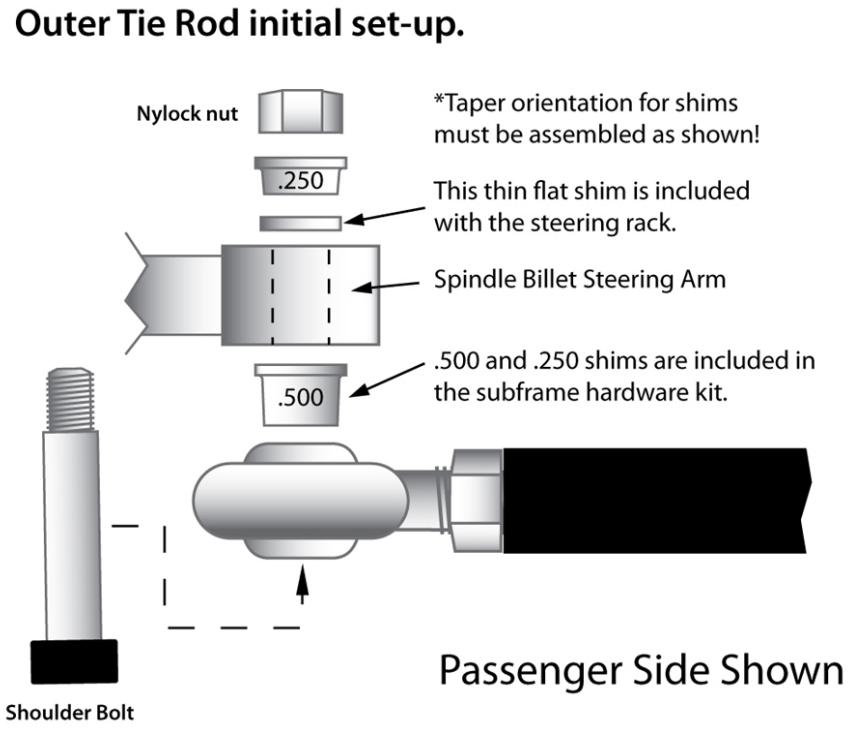

Figure 19: Outer tie rod set up

10.0 CHECK YOUR WORK

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10.1 TORQUE TABLE

Recheck all the steps you have completed to ensure nothing was overlooked.

Below is a table with fastener torque to assist you in this process. Check all fasteners again after your first road test and again after 500 miles.

Bolt Thread	Location	Torque	1st Check	500mi Check
9/16" Nylock	Lower Control Arm	100 ft.lb.		
7/16" Nylock	Upper Control Arm	75 ft.lb.		
3/8" Nylock	Lower Shock Mount	35 ft.lb.		
3/8" Nylock	Upper Shock Mount	35 ft.lb.		
9/16" Castle	Lower Ball Joint	80 ft.lb.		
7/16" Castle	Upper Ball Joint	50 ft.lb.		
1/2" SHCS	Steering Arm	75 ft.lb.		
3/8" Nylock	Sway Bar Pinch	40 ft.lb.		
1/2" Nylock	Sway Bar Link	60 ft.lb.		
1/2"	Rack Bottom	75 ft.lb.		
1/2" Nylock	Tie Rod Ends	60 ft.lb.		
Grease	Lower Arms			
Grease	Upper Arms			
Grease	Ball Joints			

Figure 20: Torque table

11.0 ADDITIONAL INFORMATION

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11.1 SWEET MANUFACTURING RACK AND PINION REQUIREMENTS

The Sweet dual power steering rack is a very high-quality part. Considering the way Speedtech has spec'd its internals for maximum all-around performance and through extensive testing and racing our Sweet equipped test cars, they have come up with the following critical requirements to ensure proper function, reliability, and longevity of your power steering system.

The use of a very high-quality power steering pump is required

- Speedtech recommends Sweet Manufacturing Toyota pump that has 1700 psi and can handle up to 8500 RPM pump speed (# 220806).
- For race applications, we recommend using Sweet's Toyota pump.
- Required minimum power steering pump specifications.
  - 3+ Gallons per minute
  - 1300 PSI
- A power steering fluid cooler is required.
  - Minimum of at least 44 sq inches.
  - We recommend Speedtech Performance Kit #220807
- Use Sweet Full Synthetic Fluid or equivalent.
- For most applications a remote reservoir is recommended.
  - Speedtech Performance offers kit #22084

11.2 ALIGNMENT

WARNING: Do not drive the car before having a professional wheel alignment performed.

NOTE: Use Speedtech's suggested alignment specifications, do not allow the alignment shop to use pre-programmed factory alignment specifications! If your chosen alignment shop cannot match our suggestions, find a different shop familiar with performance alignment set-up.

These are only provided as a suggested starting point and may need refinement to achieve the optimum settings for your driving style or situation. If you are unsure which set-up to use, please call our technical department for help at (435) 628-4300.

Daily Driving and Street Driving

Driver Side	Passenger Side
7 Deg. Positive Caster	7 1/4 (7.25) Deg. Positive Caster
1/2 (.5) Deg. Negative Camber	1/2 (.5) Deg. Negative Camber
3/32 Total Toe In	

Aggressive Street Alignment, Autocross, and Track Use

Driver Side	Passenger Side
8 Deg. Positive Caster	8 1/4 (8.25) Deg. Positive Caster
2 1/2 (2.5) Deg. Negative Camber	2 1/2 (2.5) Deg. Negative Camber
1/8 Total Toe Out	

Figure 21: Alignment specifications

12.0 CONGRATULATIONS

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Congratulations on completing your project! We know you will get many years of enjoyment from your project. Please join the group, Team Speedtech, on Facebook. Team Speedtech is a community of customers, dealers, and factory employers that have a passion for pro touring muscle cars and are using Speedtech Performance products. You can ask questions and get advice from the group members and share your experience. Everyone enjoys seeing the videos and pictures during the progress of your project and Speedtech encourages you to share them!

Thank you for choosing Speedtech Performance and entrusting us with your ExtReme front suspension needs for your custom muscle cars.

Speedtech Performance, LLC
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