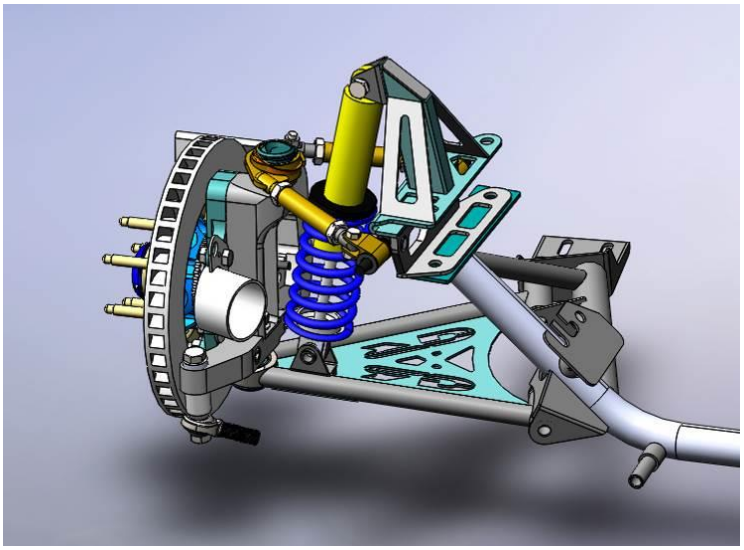
SLA 9000 Installation and Setup Instructions.

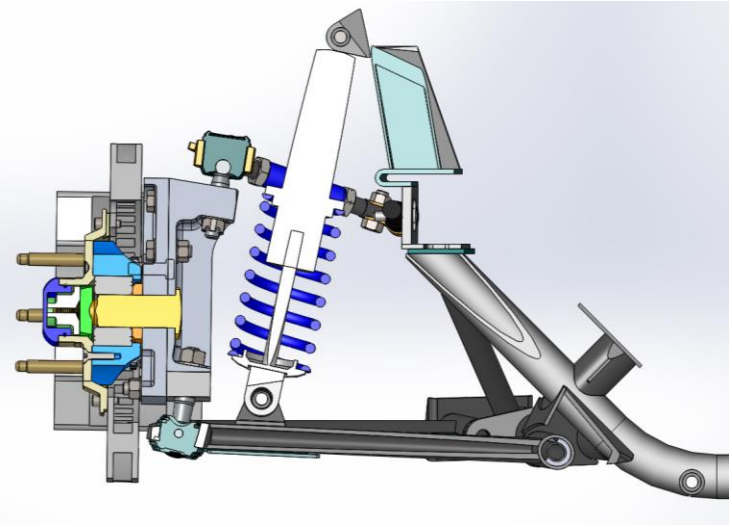
These instructions are written for experienced installer/technicians with a strong idea as to how a chassis is supposed to work and with a real clue as to how a car is supposed to be assembled so that it works properly. If you don't have a solid understanding of such, get some help.

1 MDS series spindles on SLA 9000 Application

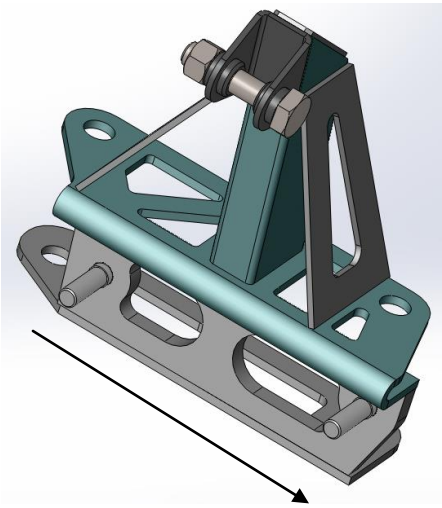


After removing K member, spindles, struts, etc., and thoroughly cleaning subframe areas for installation of SLA kit, brake lines and brackets mounted to the outside of the subframes above the K member will have to be relocated to suit the individual need of the vehicle and brake system employed. It is best to perform this function during final assembly after GR40 SLA is fully installed. **It is recommended that custom tailoring of brake lines be done by a professional.**

The results you get will only be as good as the quality of the installation and setup. Further, following the sequence below will shorten assembly time dramatically. Read and understand before starting.



1) Install corresponding mini-tower (upper control arm mounting bracket) onto frame so that the upper K member mounting bolt holes line up with the holes in the bracket. Note, Ford manufacturing leave things rough some times and therefore sanding, or mallet massage may be required. To identify which tower is left or right, the image left is of the Passenger side (SN95 shown, Fox is similar). Note the position of the control arm mounting studs. The higher one goes forward as indicated by arrow in image.



2) Position the K member, in place. Install the supplied upper bolts with washers under heads, thread pointing upward and install nuts on top side. Do not tighten nuts. Install rear mounting bolts; do not tighten these as well.

4) Square K member as per K member squaring instructions found on GR4O Full Set Up instruction sheet on our website. It is very important that this be done now before going further.

5) Prep Spindles: If you are using Griggs Aluminum MDS Series Spindles, you can skip this step. If you are using SN-95 Spindles, inspect them thoroughly as to condition, and replace if required.

Note: It needs to be said that although the GR40 SLA system with SN-95 spindles is a huge geometry improvement over the strut system, the OE hub flex and lower ball joint placement, result in less than perfect camber curve, and roll center stability which will maintain a residual inherent understeer than would perfecting the geometry with the Aluminum MDS spindle. Also you cannot run the ride heigh aas low as with the MDS spindle.

a) If the steering arm on your SN95 spindle has not been drilled to 5/8 inch straight hole to accommodate the Bump Steer Kit, do so now. Be sure to chamfer edges of hole.

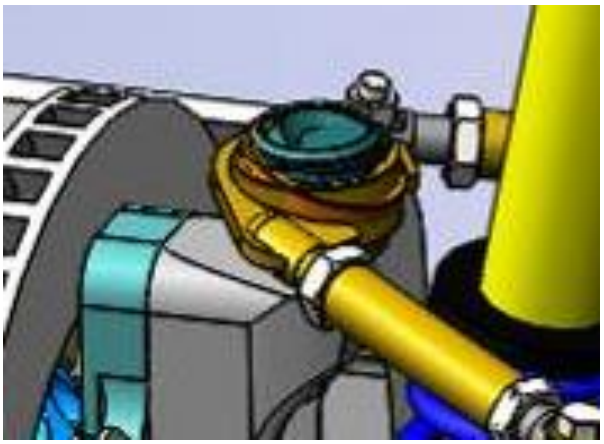
b) Then, install left and right Upper Ball Joint Adaptor Brackets onto respective spindles. Be sure that they fit properly before tightening the bolts. Each bracket is made from precision laser cut parts and then carefully welded together on fixtures that are made frame OEM spindles, and allowed to cool before removal. But, there may be slight variations in OEM spindles, so if fit up is a problem, sand or grind where necessary. Be sure to use Loctite on the two bolts and on the upper brake bracket mounting stud, or bolt, depending on your case. Torque the two 5/8" bolts to 75-85 ft-lbs. Be sure to install split washers if supplied, and back side Nylock nut on lower bolt. (See notes below). The spindle will be held for you while torqueing if you can wait until upi install the spindle on to the control arms on the car to torque these bolts.

Note 1: Bolts may vary in length, be sure upper bolt has full thread engagement. If not eliminate the lock washer and secure with Loctite after checking that the bolt does not interfere with Ball joint bung part of the upper ball joint adaptor

Note 2: If the two 5/8" bolts won't start and turn cleanly you may have to elongate the holes in the spindle slightly. We have seen one case of this.

6) Install lower control arms per individual instruction for the respective arms in use.

Note: MFA 4000 SLA 2 piece arms are fitted with Heim joints. The forward one is extra high strength steel to handle the increased loads form the coil over shock and bump stop. These arms are assembled and set to length in a fixture before shipping to a standard dimension, no adjustment should be necessary, at least for now. If you want to deviate from this dimension, you are on your own, but don't do so without really knowing what you are doing. Further the aluminum rod end spacers suppled to fit the arms to the K member come in two different lengths. There is only 0.100 inch difference. Be sure to install the shorter spacers in the forward rod end. The longer spacer will not fit into the forward arm mount bracket of the K member.



7) Installing upper control arms:

Note 1: All upper control arms are universal in fit L-R, as shipped. However Arms for use with SN95 spindles should have the ball joint bung welded perpendicular to the plane of the arm. Arms to fit MDS spindles will be canted at 10 degrees. Inspect to be sure you have the correct control arms.

Note 2: All upper control arms from 2012 on are no longer steel bushings, but are fitted with Urethane Bushings for rattle free operation. The following 4 steps applies to these arms

a) Remove the two retaining nuts, and slide the pivots from upper control arm cross shafts. Carefully remove the two Urethane Bushings from the Upper Control Arm Pivots. Lubricate all surfaces

of each Bushing with quality synthetic waterproof grease, Reinstall in pivots. Reinstall pivots, loosely install retaining nuts.

b) Install the Upper control arms on to the Mini towers on the chassis.

Note, MDS users only: If you are installing on MDS spindles, the canting of the upper ball joint arm should be as shown in the image Left with top surface of ball joint horizontal when arm is elevated to 10 degrees from flat.

c) Offset of pivots does not matter up or down. What does matter is the grease fittings on the pivots not contact anything as the arm articulates. This is usually means they are on the underside of the pivots once the arm is installed down, but check through the range of travel yourself before tightening everything up.

e) Be sure the cross shaft fits flat against the upper mounting bracket and does not interfere with the welds. It will be a close fit, but there should be no interference. Should there be interference, remove metal from the cross shaft, not the weld on the bracket. Install Nylocks and flat washers, torque to 50-55 lbs.

f) Tighten pivot retaining nuts carefully until there is no end play and just a slight amount of drag as you raise and lower the arm, articulating the pivots. You need some preload on the bushings to prevent hammering them out under braking, but "stiction" in the chassis will degrade handling. So just enough pressure to smoothly move the arm up and down, without it falling down when you let go of it.

g) Install the Screw-in upper ball joint into the Ball joint bung. Appling anti-seize to threads is a good is a good idea. You can tighten it after you have instated the arm after you have installed it into the Spindle in step #8. Torque Spec is in table, if you don't have the correct socket you can purchase one to fit a dodge upper ball joint, 60's and 70's vintage.

8) Install the spindles; snug, do not tighten the ball joint nuts in case you should need to disassemble again for any reason before final assembly. Be especially careful when tightening the upper ball joint nut. Use anti-seize on the ball joint tapers to prevent them from corroding to the tapered eyes on the spindle assembly. Disassembly could cost you a ball joint and or an adaptor if you over tighten it. Don't forget to insert the cotter pin and grease fitting into the upper ball joint. If you want to fit the upper ball joint boot on do so, but we run without them, as they have melted due to high brake temperatures, and generally are in the way. The ball joints need periodic lubrication anyway which will help keep it clean. **Don't forget to tighten the upper ball joint into the upper control arm.**

9) Install the steering arms onto the bump steer bolts, with enough spacers to make the tie-rods parallel to the lower arms.

WARNING: Be sure the long 5/8" bolt has its threads pointed down (head at the top of the steering arm). Pointing them up can result in bolt failure. See Bump Steer Instructions, available on our website.

10) Install hubs and torque the nut to 250 ft-lbs., install dust cover. **Warning:** If you are using MDS series Aluminum Spindles, be sure to refer to instructions specific to them. They can be found on our instructions page.

11) Using a good clean grease gun and a high pressure high temp synthetic grease such as Redline, lubricate ball joints as required, If the upper control arms have grease fittings as well, lubricate them now as well too. These are metal to metal bushings, keep them lubricated.

12) Perform initial setup alignment. It is IMPORTANT THAT YOU DO IT NOW if you want to save a lot of time and hassle! See Addendum "Initial Set Up Alignment" instructions.

13) Assemble your coil over shock unit and set initial setup distance between spring seat spring at 1/8" to1/4" free play with shock fully extended. This will be a good starting point for ride height. This

simple step will save much time and guess work later during Setup. Install the coil over shock assembly, be sure to install with shaft down, body up with spring toward bottom.

14) Install, brake rotors/hats, wheels and tires, and set vehicle down on its wheels on scales, or other level alignment surface with full running weight of car on all four tires.

Setup

1) Set ride height with car fully loaded. There should be adequate upper control arm to spring clearance during all phases of motion, although it is close. Contact at full droop is not a problem, contact at full bump is. If there is an issue, recheck the K member for square, and the ride height set up as well as the initial setup alignment before calling us. Also, if preloading the spring is required to maintain the desired ride height with the spring rate desired, (usually a fairly soft rate such as 750 and under) we offer a needle trust bearing set to reduce friction and facilitate preload adjustment. Contact us if this is a problem.
2) Install brakes and be sure hoses and lines are secured so that they don't rub the wheels, tires, or tangle in the springs in any position of suspension ad steering articulation.
3) Install anti-roll bar.
4) If you are using OE style anti-roll bar, we supply billet aluminum anti-roll bar relocation brackets and special end links to position bar correctly for best geometry. Inquire or search web site.

   If installing a GR40 Zero-Bind MAR style Anti-roll Bar, or a Griggs/Speedway Endurance Anti-roll Bar, refer to instructions for same on our website.
5) Be sure there is little to no friction in chassis mount pivots that can seriously degrade handling, and or damage lower control arms. Leave one end link disconnected from the arm of the bar until after chassis is fully scaled and set. Fully assemble car, and then double check ride height, corner weights, and all alignment settings. Before the next step
6) Install the link so that the bar is neutralized with no preload on the bar, at full operational weight with driver in car. In other words, the attaching bolt should insert thought the end link and into the arm of the bar straight, and not pull or push on the arm of the bar up or down when the bolt is tightened.
7) Remove steering rack locks and install rack boots. With wheels turned to maximum lock, check for tire rub on fenders, inner wheel wells, control arms, and anti-roll bars. If over size tires are used, steering limiters may be necessary and are available at your Ford dealer. They come in various thicknesses. We generally use them in ¼" units only. 315's on our cars require 11mm of total limiter thickness each side. (Note Most Mustangs come from Ford with some size limiter already installed, usually about 4 mm thick).
8) Test drive.

Further Notes

1) Griggs Racing sets all chassis with 30 psi air pressure in all 4 tires and specifications given here are so predicated.

2) Ride heights given are for use with a Hoosier 315-30-18 Hoosier tire, at 30psi on a 10.5-inch rim. This should work for any 24.7-25" inch **rolling** diameter tire. If your tire specifications are different, adjust accordingly. You do the math, don't call us.

3) Recommended ride height, camber and toe settings are just that; you have to find what works for you, based on the many varying conditions and loads.

4) NEVER reset caster after initial setup, unless you are willing to reset bump steer. Caster is not the critical dimension. If you set the initial caster correctly, and you pay attention to camber setting instructions, it should never need to be set again. But it doesn't hurt to check it periodically to make sure things haven't been screwed up.

5) **This is a race car chassis system, suitable for driving on the street. Regular lubrication, maintenance and inspection protocols are highly recommended.**

Addendums

SLA 9000 **Series Fastener Torque Chart**

Location or Component	Size	Grade	Torque (Ft-Lbs)
Mini-Tower to K Member Bolts, Supplied	14mm	8.8m	105
Rear K Member Bolts OEM	10mm	10.9	48
Lower Control Arm Rearward Pivot, OEM	16mm	10.9	125*
Lower Control Arm Forward Pivot:			
(If supplied, with 1/2-Hi Nylock Nut)	5/8-18 SAE	8	95
MFA 4000 series Control Arm at Ball Joint	1/2-20 SAE	8	85
Upper Control Arm Mount Nuts	7/16-20 SAE	5	55
Upper Control Arm Assembly Bolts	7/16-20 SAE	5	55
Steering Rack Mounting Bolts	1/2-20 SAE	8	75
Ball Joint, Lower, Nut (USE Loctite 242)	M16 x 2.0	7	125
Ball Joint Upper, Housing into Control Arm (Anti-Sieze)	Dodge	5	95-115
Ball Joint, Upper, Nut (Use Cotter pin)	9/16-20 SAE	8	95
ARB Mounting Bolts	5/8-18 SAE	8	125
ARB Linkage Bolts	7/16-20 SAE	8	55
Steering Arm to Tie Rod End Bolt	5/8-18 SAE	8	125
Coil Over Fasteners	1/2-13 NC	3	55
All Jam Nuts	Use good judgment with hand wrenches. Go easy on Aluminum		

*If using Bushed Lower Control Arms, 95

GR40 SLA Alignment Procedure:

Initial Setup & Alignment:

Our method of initial alignment is to Support the car level by its frame above the floor or alignment surface and with the:

1) **Spindles held at desired ride height**. See Chart "Spindle Ride Height Requirements.
2) Be sure the car is **absolutely level left to right**
3) Set rear so body has about **one degree rake measured at various places on the rocker panels or door sills**.

We then **IN THE FOLLOWING ORDER!!** :

1) Center steering rack and lock in place (easiest with GRP Tool number GRP 93 RACK LOCK for 79 to 93 vehicles or GRP 94 Rack lock for94 to 04 vehicles). Set initial tow to zero. Use toe plates, string or experienced eyeball to rear wheel or some other relatively accurate method to be sure spindles are positioned so that if the wheels were installed they would point straight ahead.

2) Then with a bubble gage set caster to 6 degrees (be sure to make each side the same) Turning the steering wheel exactly one turn out, and then one full turn in is slightly less than 20 degrees at the wheel and works accurately enough to use. We never use turn table read outs under a tire for this.

Adjustment is made by turning the upper control arm sleeves exactly the same amount. (Shortening the rear leg while lengthening the front will increase caster and vice versa). This will adjust caster independent of camber. Remember though that any subsequent change in caster will adversely affect bump steer.

3) Once Caster is set, set bump steer to zero, in the first inch of bump. It is impossible to make it perfect in al ranges of motion, but this is the critical stage. If absolute zero cannot be attained, (and it usually can't) shim to the next increment out, do not let it bump in.

4) Set initial camber according to chart below. Adjustment is made by turning the upper control arm adjustment sleeves EXACTLY THE SAME AMOUNTS so that the caster is not affected. It is a good idea to put indelible marks in some manner on the sleeves for an indexing reference so that this can be attained and therefore caster/bump-steer integrity maintained while setting camber in the future. ONE FULL TURN OF THE SLEEVES EQUALS ½ DEGREE CAMBER CHANGE. Keep this in mind and subsequent camber adjustments should be really easy.

5) Set toe according to "Recommended Alignment Settings" chart below.

Recommended Front Alignment Settings:

Caster:

1. 6 degrees is most common. This spec is for all power steering applications as well as small tired drag race manual steering applications, this is dependent on a body angle of 1 degree.
2. Road racing, depending on ambient and tire requirements we do some times set it higher, up to 8 degrees or so. But beware, more caster puts greater load on the steering. Manual steering 2 degrees. (Manual steering not recommended).
3. Auto crossing with power steering, 8-9 degrees.

Note: Higher front ride height relative to rear will increase caster, and lower will decrease it. Take this into account when checking caster in the future.

Note: Any non-power steering cars on large tires may need reduced caster to around 2 degrees. This may be difficult to achieve without spring to control arm contact. Altering a coil over shock mounting point may be required. Anything less than 8 degrees results in a loss of applied camber with steering wheel turned.

Camber	Street Performance	Road Race
	0.75 degrees	-2.0-2.5 degrees

Final Camber setting is dependent on roll angles, which are dependent on ride height, anti-roll bar rate, spring rates, and adhesion.

Toe: Measured at the rim diameter at spindle center height.

High Speed Track Street Performance	Tight Low Speed Turns Auto Cross, Quicker Turn-In Response
0” to 1/16” Toe In	1/8” to ¼” Toe Out

Adjustments at the Road Course: The Griggs Racing Method; Simple and Quick:

1) We set camber by reading the tires and the tire temps, and adjusting accordingly. Less change should be required with the SLA than with struts. Adjust in ¼ degree, (½ -turn) increments. If you don't have over 160 degree temps across the entire tire,. They are pretty useless for fine tuning a chassis. Drive it harder and come in hot for the readings. Take them immediately.

   180 to 200F is when you know you are truly loading the tires and getting accurate data to adjust camber for serious running. Of course, that is on the loaded side of the car it the course is mostly turns in one direction. Be sure to measure the outside and inside temps at least 2 ½ inches in from the edge of the tires shoulders. And only a probe stuck all the way is accurate. Infra-red surface measurements are useless.

2) Remember the 2 to 1 relationship. One full turn on the arm sleeves is ½ degree camber change (**KEEP THEM THE SAME SO AS NOT TO AFFECT CASTER !).** Mark them so you can see what a half-turn is exactly.

3) **Again, take care not to change the caster**. This shouldn't require rechecking after setting camber (if you keep both sleeves turned the same amounts!)

4) If you record your changes, soon a tire temp/camber change relationship will appear in your data and it will become easy to determine from the temp spread how much to adjust it.

5) Sometimes tilting the car laterally will be all that is necessary to achieve the desired camber setting or temperatures for both left and right turns on a particular track. This usually results in the car running more level on the more important highly loaded turns. This is especially helpful on Oval track road courses (rovals) such as Charlotte Motor Speedway, Auto Club, Nashville, Phoenix, Daytona, etc. and a trick we use at tracks like Willow springs and Thunderhill.

   Example: You initial tire temps are 30F hotter on outside than inside on RF and 20-30 deg hotter on inside of LF. Measured at center of rear K member mount plates, raising one side of car 1/4 inch and lowering other side 1/4 inch will affect a camber change a little less than one full degree. Without affecting over all ride height or geometry. Raising just one side ½ inch will do the same. So on banked and/or biased tracks like rovals were there is more chassis compression due to G loads on the bank, we would raise one side double rather than lower the unloaded side. Plus the Splitter will remain more level and effective while on the banking where it will count the most.

6) Since most tracks are biased left or right and rarely can you find a level spot to adjust camber, when a change is needed we simply jack the car, place on stands, measure camber with wheel drooped, and adjust from there the required change, which saves you the time of jacking and lowering or worrying about leveling the car.

   Example. You have 20 degrees spread across the tire. Outside hotter, you want to add a half degree camber. Jack it up until the while is fully drooped, measure camber, if it says -5 degrees, change it to 4 ½ degrees, and then set the car back down.

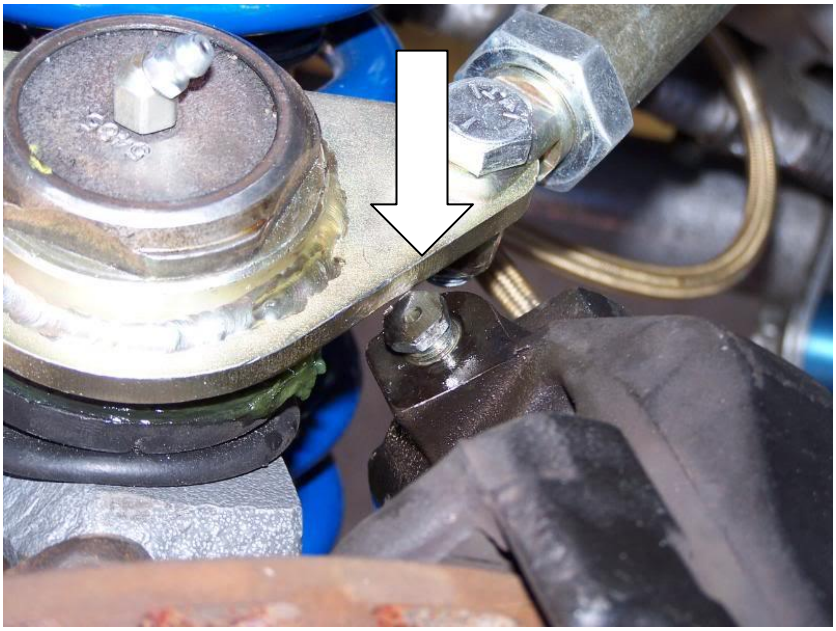
7) When you are finished tuning, be sure to measure the car when you get back to the shop, and record the settings for the next time you go there.

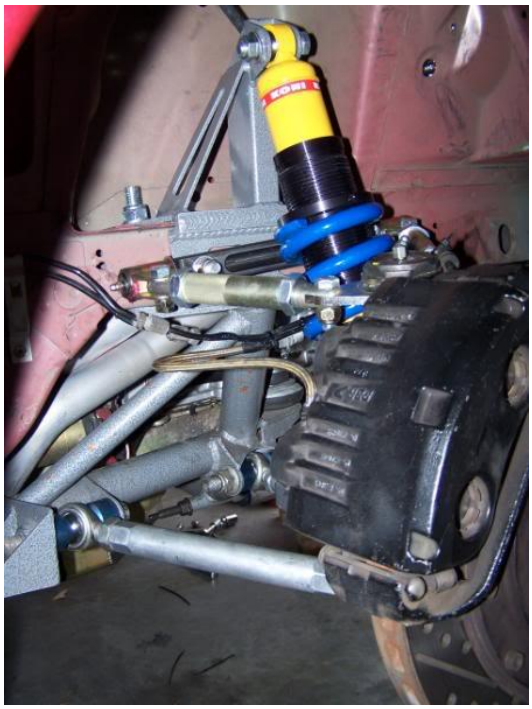
8) Toe should always be checked or set last. Toe settings are measured at the wheel rim with a trammel bar. Follow the recommendation on the initial toe settings for the most important type of turns at the track you are running. We rarely set toe according to tire temps. And if bump steer was set properly Toe will not change with camber adjustments, however it will with ride height changes.

Cobra/PBR/Baer 2 piston caliper mounting and modification on SN95 spindles used on SLA System:

1) **A 12mm stud must be installed into the caliper cage upper mounting bolt hole and secured with lock tight. This is available in a kit form Griggs Racing, Part# SLA PBR. First, test fit that the stud does not bottom against ball joint bung in upper ball joint adaptor on spindle (MBJ 2000)**

2) **Due to interference with the upper control arm, the nipple on the brake bleeder fitting must be removed**





MDS 5000 Spindle Exploded: