

GR40 SLA Installation and Set Up Instructions.

Read these instructions completely before beginning. 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 and does not fall apart from improper bolt torque. If you don't have a solid understanding of such, get some help.

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. In most cases the OEM brake lines may be retained. Should it prove necessary on your particular car to modify or replace them, **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 mini-tower. Note, Ford manufacturing leave things rough some times and therefore sanding, or mallet massage of subframe may be required.
- 2) Position the K member, in place, being sure to position the supplied rear K member mounting flange spacer plates between the rear K member flanges and the respective mounting flanges on the subframe.
- 3) 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 **It is very important that this be done now before going further.** K member squaring instructions can be found on steps 13 thru 17 of the GR40 Full Set Up Instruction Sheet on our website at:
<http://www.griggsracing.com/installation/tubular.html>
- 5) If you are not using SN95 spindles or Griggs 2" dropped SN-95 spindles, but instead are using GR40 Aluminum Spindles, you can skip this step and refer to installation instructions for the Aluminum spindles.

If you are using SN-95 Spindles, inspect them thoroughly as to condition, and replace if required. If steering arm on spindle has not been drilled to 5/8 inch straight hole to accommodate the Bump Steer Kit, do so now. 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.

Note: If the two 5/8" bolts won't start or 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. These are set 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.**

7) Install upper control arms. All upper control arms are universal in fit L-R, as shipped, and come set for maximum negative camber. **Be sure the cross shaft fits flat against the mini-tower and does not interfere with the welds, or stud knurls.** An extra washer is supplied to shim the cross shaft away from the mini-tower should there be interference. It will be a close fit, but **there should be no interference between the cross shaft and any part of the mini-tower** or possible bending of the cross shaft or overstressing of the studs may occur. Should there be interference, remove just enough metal from the cross shaft, not the weld on the mini-tower. Install nylocks and flat washers, **torque to 50-55 lbs.**

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 in the upper ball joint. If you can fit the upper ball joint boot on do so, but we run with out them, as they have melted due to high brake temperatures anyway, and generally are in the way. The ball joints need periodic lubrication anyway which will help keep it clean.

9) SN95 spindles: Install the steering arms onto the bump steer bolts, with enough spacers to make the tie rods parallel to the arms. 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.

Aluminum spindles: Install tie rods onto studs in steering arms. Use supplied spacers to make tie rods arms parallel to lower arms.

10) Install hubs and **torque the nut to 240 ft lbs**, install dust cover.

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 attached "Initial Set Up Alignment" instructions.

13) **Assemble your coil over shock unit and set initial setup distance between spring seat and nut with shock fully extended according to the "Ride Height Requirement Chart." This simple step will save much time and guess work before performing the final ride height setting in step #15. Install coil over shock assembly, be sure to install with shaft down (upside down) 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.

- 15) 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.
- 16) Install brakes and be sure hoses and lines are secured so that they don't rub the wheels, tires, or tangle in the springs.
- 17) Fully assemble car, and then double check ride height, corner weights, and all alignment settings.
- 18) Install anti-roll bar, neutralize end links for no preload, at full operational weight with driver in car.
- 19) 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 you Ford dealer. They come in various thicknesses. We generally use them in 1/4" 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).
- 20) Test drive.

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 275-40/17 RS04 tire, at 30psi on a 9-inch rim. This should work for any 24.7 inch rolling diameter tire. If your tire specifications are different, adjust accordingly. You do the math, don't call us.
- 3) **Recommended 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 got the initial caster right, 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 race maintenance and inspection protocols are recommended.
- 6) The SLA does not seem to be as sensitive to bump steer for good corner entry as was the strut system. So far, experience has shown different tires have affected bump steer requirements with the SLA. Toyos and softer sidewall tires seem to optimize corner entry with some bump-IN, as much as .150" per side according to some drivers. Your optimum will have to be determined by experience. Still we suggest starting with as near zero as you can get.

GR40 SLA Alignment Procedure:

Initial Set Up Alignment:

Our method of initial alignment is to position the car level above the floor or alignment surface and with the spindles held at desired ride height. See Chart "Spindle Ride Height Requirements. Be sure the car is absolutely level left to right and 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.** If you remove your rack boots you can measure accurately to center the rack. 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 5½ 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 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 all 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. **Remember that any subsequent change in caster will adversely affect bump steer.**

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 mark the sleeves with indelible ink or some manner of indexing references to assist you in counting turn increments accurately and therefore caster/bump-steer integrity will be 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 GR40 SLA Alignment Chart.

Recommended initial GR40 SLA Front Alignment Settings:

Caster: 5 to 6 degrees. This 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. 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.

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.

Camber	<u>Street Performance</u>	<u>Road Race</u>
	-0.75 degrees	-2.0 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 height. Included toe (both wheels)

High Speed Track	Low Speed Track
Sweeping Corners	Tight Turns, Auto Cross,
<u>Street Performance</u>	<u>Quicker Turn-In Response</u>
0" to 1/16" Toe In	1/16" to 3/16" Toe Out

For optimizing Camber settings at the track see the page “Camber Adjustments at the Track: The Griggs Racing Method”

Camber Adjustments at the Track:

The Griggs Racing Method; Simple and Quick:

- 1) We set camber by reading the tire scuff pattern and the tire temps, adjusting accordingly. Less change should be required with the SLA than with struts. Adjust in $\frac{1}{4}$ degree, ($\frac{1}{2}$ -turn) increments. If you don't have over 160 degree temps,. They are pretty useless for fine tuning a chassis. Drive it harder and come in hot for the readings. Take them immediately. Be sure to measure the outside temps at least 2 $\frac{1}{2}$ inches in from the edge of the shoulders.
- 2) If a change is needed of say $\frac{1}{4}$ degree, we simply jack the car, place on stands, measure camber with wheel drooped where it is, and adjust from there the required increment, which saves you the time of jacking and lowering or worrying about leveling the car.
- 3) Remember the 2 to 1 relationship. One full turn on the arm sleeves is $\frac{1}{2}$ degree camber change (KEEP THEM THE SAME!). Mark them so you can see what a half-turn is exactly.
- 4) Again, take care not to change the caster. This shouldn't require re checking after setting camber (if you keep both sleeves turned the same amounts!)
- 5) 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.
- 6) 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.

Suggestion: After the event upon returning to your shop; before changing the car in any manner, refill the tank, scale the car, and record all ride heights and alignment settings. This should be your starting point the next time you visit that track.