

INSTRUCTIONS

910-82700

BUMP STEER GAUGE

★★★★ ★★★★★ WARNING ★★★★★ ★★★★★

It is very easy to kill or permanently injure yourself when using the bump steer gauge!!! The procedures listed below call for blocking up the car and removing the front springs. Both of these operations can be deadly if done improperly!! So pay attention to what you are doing and obtain qualified help if you are uncertain. One of my best mechanics (20+ years of experience) broke his back changing a flat tire, when the car slipped off the jack and dropped 2", striking him on the shoulder! He wasn't even under the car, he just had his arm in the wheel well.

★★★★ ★★★★★ WARNING ★★★★★ ★★★★★

Bump steer is the amount the toe-in or toe-out changes when the front suspension moves up and down relative to the frame. Ideally, the front suspension geometry is such that the toe does not change, but the ideal is very hard to attain.

Everyone has driven a car or truck that almost jerks the steering wheel out of your hand when going through a bad pot hole. This is an example of bump steer. When your race car does this, it makes it not only harder to drive, but it will also cause the car to push or become loose (depending on the setup and how close to the edge of the performance envelope you are driving.) One thing to remember about bump steer is that the faster you go, the more important it is, and the less you can live with.

Bump steer is caused by front geometry. The steering tie rods do not follow the same arcs as the upper and lower A-arms. If you have a car that has a caster curve, it is nearly impossible to make this happen throughout the whole suspension travel.

In general you want to minimize bump steer from your loaded ride height to where the wheel has moved up 1 to 2 inches, You may not be able to completely eliminate bump-steer, but you should try to make the car toe-out, that way you won't spin out when you hit a big hole.



You can adjust bump steer in several ways:

- By changing the length of the tie rods and the drag link
- By moving the tie rod attachment points on the spindles up or down (modifying the steering arms)
- By moving the drag link up or down (requires moving the steering box and idler arm)
- By moving the drag link forward or backward (requires moving the steering box and idler arm)

NOW WE GET INTO WHAT THE BUMP STEER GAUGE DOES FOR YOU!

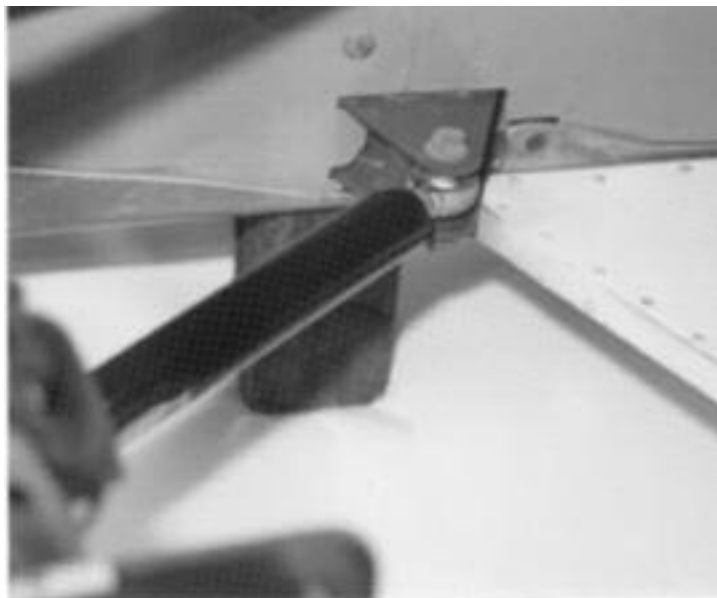
The bump steer gauge will measure how much toe change there is when the front suspension moves up and down. It won't tell you what to change, but it will tell you what you have. You will need to make changes by trial and error, checking after each change.

**TO USE THE BUMP STEER GAUGE,
USE THE FOLLOWING STEPS.
MAKE SURE NOT TO SKIP ANY!**

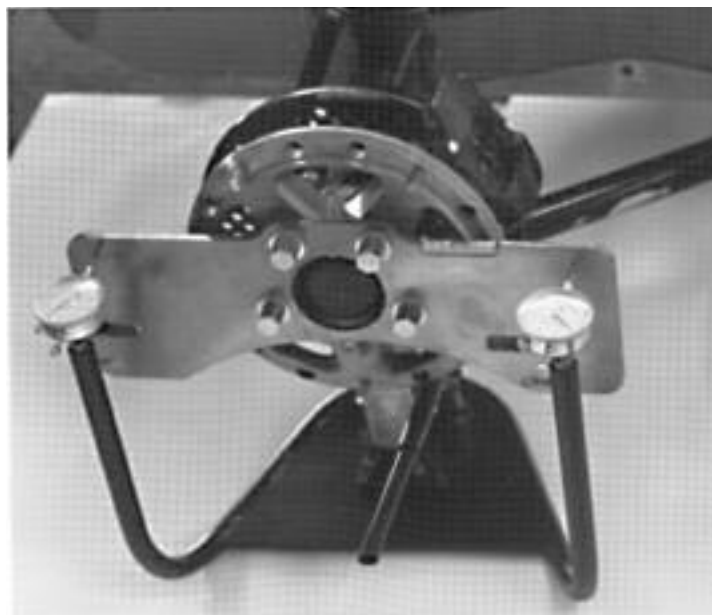
1. Set up the car as you would when you are ready to go racing. With the fuel the fuel load and tire pressures set, and the correct stagger on the car.
2. Measure the chassis height on both sides of the front end.
3. Cut sturdy blocks to slip under the front of the frame to hold the frame at ride height when you remove the tires and springs.
4. Make sure to set the front toe, caster and camber.
5. With the car setting at static ride height, make a clamp to freeze the steering arm or follower arm so that the steering will not move as you move the front suspension up and down, (this is one of the most common mistakes made when checking bump steer, If you don't have the steering tied down, you can't tell if the steering moves or there is bump steer.
6. Jack the car up and put jack stands under the frame.
7. Remove the front tires, shocks and springs.
8. Jack the car up, remove the jack stands.
9. Place the blocks you made under the frame, and slowly lower the car down to the blocks.
10. Double check that the front frame is at the static ride height on both sides.
11. Measure the circumference of both front tires. Use this formula to determine the spindle center-line height:

Left spindle height = _____ (cir)/6.283= _____ in.

Right spindle height= _____ (cir)/6.283=_____ in.
12. Bolt the bump steer plate to the left front hub as shown.
13. Lift the front suspension up and slide the bump steer gauge bottle jack under the lower arm. The center shaft of the jack is threaded so you can extend it if it is too short.



14. Use a ruler or tape and use the bottle jack to lift the front spindle to where it is 1" under the static height you calculated above (this will allow you to check bump steer going 1" down and 2" up). On some tire diameters and spindle combinations, the jack will not go low enough. If this is the case, jack the car up and add a fixed amount to the blocks (i.e., 1.5" or 3") on both sides. You will also need to block up the rear end the same amount, and add this amount to the spindle center line height.
15. Install the gauges and the rods into the stand.
16. Adjust the height of the gauges so that the gauge is toward the top of the plate. (Make sure the plate is level.)



17. Adjust the stand in and out and swivel it so that both gauges are about .50" compressed.
18. Use the jack to slowly raise the front spindle 1" to static ride height.
19. Spin both gauge faces to zero on the indicators.
20. Lower the jack 1", record the readings. Raise the jack back up, stop at static ride height (the dials should be zero.) Continue raising the spindle +1", and +2". Record the readings at each height. (Make sure you watch the direction the needles move = or -.) Re-level the plate before taking each reading.

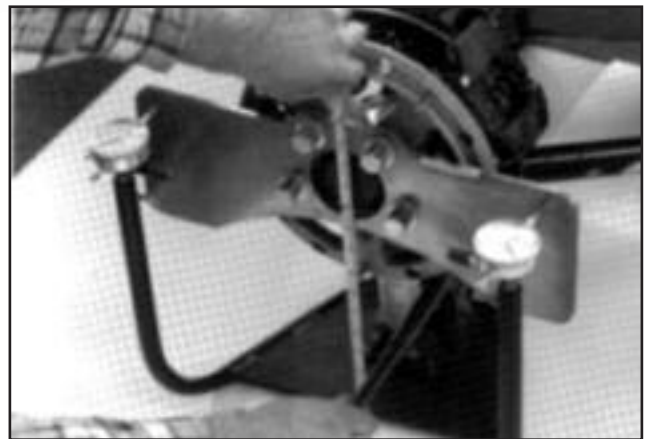


SAMPLE DATA	Front Gauge	Rear Gauge	(Front#) - (Rear#) =change in toe
+2	-.130	-.210	.080 TOE OUT
+1"	+.020	-.040	.060 TOE OUT
Ride Hgt.	0.000	0.000	Starting at 0
-1"	+.105	+.110	.005 TOE IN

Lower the jack and double check the readings.

This is the amount of bump steer. Adjust the steering geometry as required, and check it again. (Make sure you have the steering lashed down so that the drag link or rack won't move!)

Repeat the operation on the other side.



	Front Gauge	Rear Gauge	(Front#) - (Rear#) =change in toe
+2			
+1"			
Ride Hgt.	0.000	0.000	Starting at 0
-1"			

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