

## Setting Preload on VW Rear Torsion Bars By Lee G.

When setting the preload, this is a picture of some of the tools I recommend you use. The winged tool is something I use only as a safety item (I will refer to it as a safety tool). I do not recommend trying to load or unload the torsion bar using this too by itself. It will wear quickly and can slide. It is something to use as a back up only. The angle finder is very inexpensive and it has a magnetic mount. The chain is very important to have. You can't do the change (in my opinion) with out it. Above all, wear safety glasses. Dirt, rust and maybe metal shavings can be launched... just a warning. Mechanix type gloves are not a bad idea either.



You will also need a floor jack and hack stands and a straight level is nice to have but the angle finder will work in a pinch.

Caution: Stay back and keep your hands away as things can come loose and bite... fast. Once you have your vehicle on jack stands and you have tested tha they are set right and

no shaking will drop your vehicle, then you do not get under the car now. Rather than feeling around, get a flash light in there. Use pry bars rather than screwdrivers.

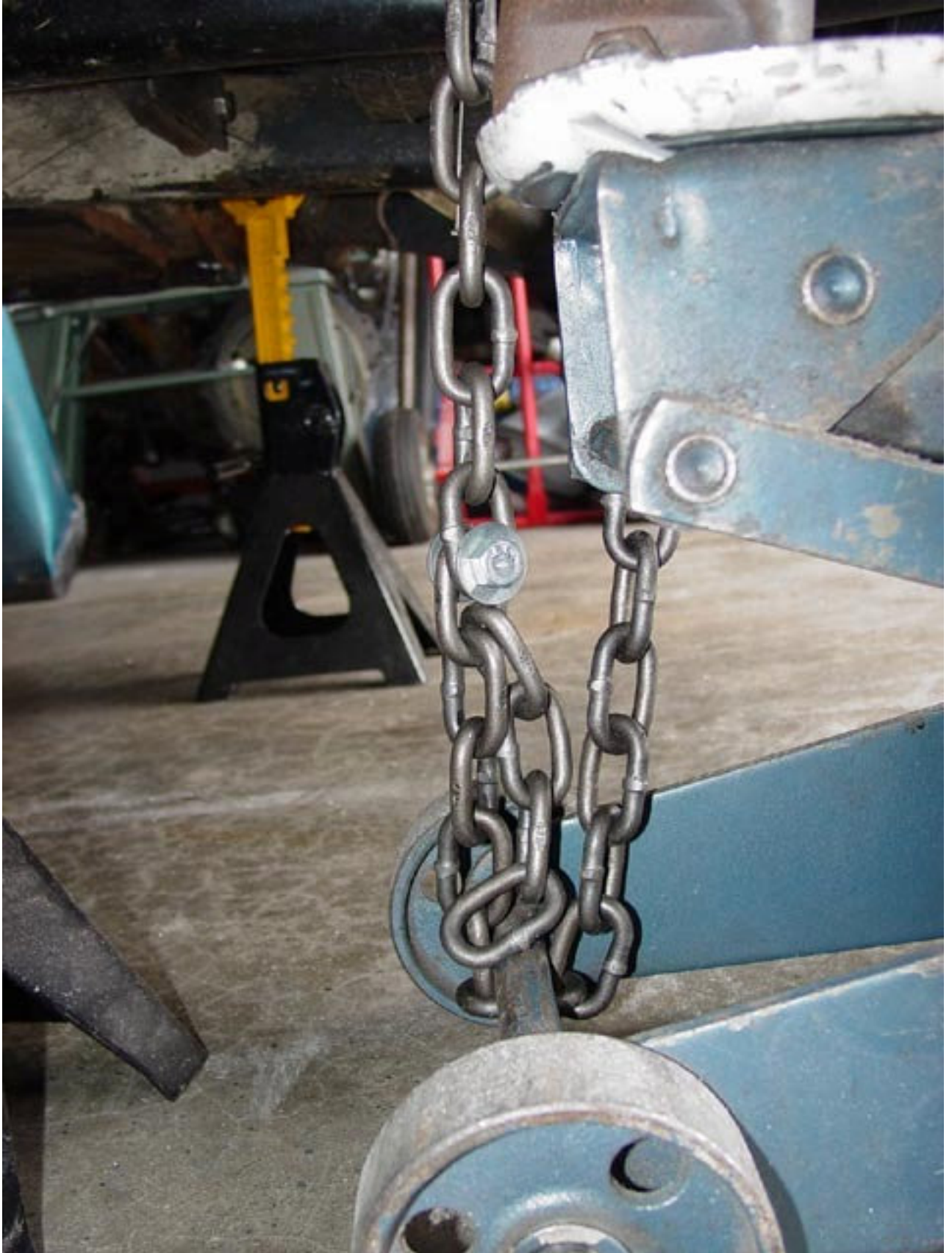
After having built my lift kit, the extra preload that I had put in the rear torsion bars many years ago wasn't needed to keep the body and tires apart any more. I had gone by the instructions in Baja Bugs & Buggies by Jeff Hibbard and installed what he thought was pretty much as much pre-load as you would want to install. I now think that his use was more than one would need for a play buggy. I don't recommend going over 28 degrees of preload with about 26 being the most a light glass buggy would need.



Jack your buggy up and put all four corners on jack stands. You want the floor to be level front to rear and side to side. You will need to have this done when you are measuring the amount of preload you are going to put in.

I then put the jack under the shock tower to lift the tires up enough to remove them (This picture was taken of the right side during the adjustment there. The brown bar you see is a torsion bar.) Remove the rear tires and you are ready to start.





When you start getting serious about removing the spring plates you will want to tie the floor jack into the body. The chain I used is a 5 foot length of 1/4 inch steel chain. I have an older style build where they put a piece of channel under the seat so I wrapped the chain over the channel and down under the front axle of the floor jack. When you get to a certain point in jacking up the spring plate the pan will start to come off the jack stand and the front of the jack will also lift so be prepared or fore warned. You will have to work with this as I know of no way around it. If you don't have the channel, you can wrap the chain around the shock casting but either way, be sure it is secure and won't slip, No matter what method you use to add the chain, I join the two ends of the chain with a good quality, preferable new, bolt wit washers to spread the load and keep the bolt head or nut from slipping into the chain. I forget what the bolt is but it was about an inch and a half long.

I leave the trailing arms installed until the spring plates are off the stops. It is a safety thing and also a better way to jack the spring plates off the stops than using the safety tool to lift the spring plate off the stop.



You can now remove the four bolts that hold the cover on spring plates to the torsion tube. You will get some action on the bolts so be careful. .I have had them come out easy and I have had them loaded so be careful.



Once you are ready to start, put the safety tool on the spring plate. I am not currently using the body mount hole on top of the casting so I put a bolt in place and slipped the cap of the safety tool over the bolt head so the safety tool would not slip. Two changes I make to the safety tool: I add a washer next to the sliding head of the safety tool, and I add a nut to use a wrench on. Don't try to use the wing nut as a working piece as I will make your hands sore and not work well either, I add a second washer above the nut then use the winged nut as a jam nut. Caution: the safety tool can slide down the spring plate (I was prepared for it) so keep your hands out of the way. If it slides, do not grab for it.







Three pictures of where you want to be. The first one shows the safety tool positioned and the second one shows the spring plate off the stop. It also shows a notch in the spring plate. It is about a quarter of an inch deep and goes just past the stop cast into the torsion tube. The third picture shows how much loading will be on the safety tool so be careful.

I still have the floor jack under the trailing arm for safety and as I jacked the suspension up I have also kept the safety tool in firm contact with the spring plate. Now, being very careful, you can slowly lever the spring plate out from the torsion tube by using pry bars of different lengths. You will have to work the pry bars all around so that equal pressure is applied allowing the spring plate to come out a little smoother. You will need to lever the spring plate out so that it is past the stop that is cast into the torsion tube.



Once this is done, you can slowly let the jack down while at the same time you release pressure on the safety tool. You will get to a point where the suspension starts to bind so you will then remove the bolts holding the spring plate to the trailing arm. Notice which bolts go where and which one has a nut on it.

When the trailing arm is loose, support it or you can damage the CV joint. Once that is done, you can continue to lower the spring plate using the safety tool as most of the heavy loading is now off the torsion bar.

You can now pry the torsion bar out of the torsion tube. Be sure not to damage either of

the two donuts that the torsion bar uses. You should inspect them and if they are too out of round or damaged you can replace them. In most cases a pair of stock grommets are more than you will need but there are urethane grommets available also.

The spring plate can unload very quickly so keep your arms and hands away from there as much as possible. Using a couple of pry bars, pry the spring plate out past the stop (as shown in picture 2). It is not going to be that easy so do little bits of moving from the top and bottom of the spring plates. What is causing the spring plates to move slowly is the preload against the splines that are at each end of the torsion bar. The last little bit of movement of the spring plates past the stop, you can use a pry bar as a ramp to get the spring plate the last of the way over the stop. Once it is where you can maneuver the spring plate over the stop start letting off on the preload using the nut you added to the safety tool.



Remove the torsion bar from the spring plate. Be careful not to nick or scratch the torsion bar anywhere, especially in the painted area. It does not take much to severally weaken the torsion bar.

The torsion bars are marked R or L indicating which side of the torsion tube they go. The marks face out. . Do not move the bar from side to side as it will fail very quickly if you do. The inner splines are of a different spline count that they outer one so you can get them in wrong. There is a clocking of them which is: 40 splines on the inner side of the torsion bar and 44 splines on the outer end of the torsion bar. You will also notice that there is either an "R" for the right side torsion bar or an "L" for the left side torsion bar.

Rotating the torsion bar using the inner splines, one spline movement is equal to 9-degree, 0-minutes. The outer bar splines will change things 8-degree, 10, minutes. By moving the inner bar one direction and the spring plate the other direction a 50-minute change can be accomplished.

| HOW LOW ? HOW MANY SPLINES ? |                       |                    |                        |
|------------------------------|-----------------------|--------------------|------------------------|
| INNER SPLINE ROTATION        | OUTER SPLINE ROTATION | SPRING-PLATE ANGLE | APPROXIMATE DROP IN CM |
| +1                           | -1                    | 50'                | 0.55                   |
| +2                           | -2                    | 1°40'              | 1.10                   |
| +3                           | -3                    | 2°30'              | 1.65                   |
| +4                           | -4                    | 3°20'              | 2.20                   |
| +5                           | -5                    | 4°10'              | 2.75                   |
| +6                           | -6                    | 5°                 | 3.30                   |
| +7                           | -7                    | 5°50'              | 3.85                   |
| +8                           | -8                    | 6°40'              | 4.40                   |
| +9                           | -9                    | 7°30'              | 4.95                   |
| +10                          | -10                   | 8°20'              | 5.50                   |
| 0                            | +1                    | 8°10'              | 5.50                   |
| +1                           | 0                     | 9°                 | 6.00                   |
| +2                           | -1                    | 9°50'              | 6.55                   |
| +3                           | -2                    | 10°40'             | 7.10                   |
| +4                           | -3                    | 11°30'             | 7.65                   |
| +5                           | -4                    | 12°20'             | 8.20                   |
| +6                           | -5                    | 13°10'             | 8.75                   |
| +7                           | -6                    | 14°                | 9.30                   |
| +8                           | -7                    | 14°50'             | 9.85                   |
| +9                           | -8                    | 15°40'             | 10.40                  |
| +10                          | -9                    | 16°30'             | 11.00                  |
| 11                           | -10                   | 17°20'             | 11.55                  |
| 0                            | +2                    | 16°20'             | 11.00                  |
| +2                           | 0                     | 18°                | 12.00                  |

This is Dale M.'s chart and it is accurate, It shows lowering but the same chart works in the opposite direction (lifting the rear of the car). Setting the preload for off-road is usually done by using a tool.



When you have taken care of all the things you want to do such as painting and especially chasing the threads on the torsion tube and trailing arms and installing the inner donut. Lightly lube the splines and install the spring plate on the torsion bar. Next slide the torsion bar/spring plate assembly in the torsion tube and just barely slide the torsion bar in the splines in the torsion tube. Using the protractor shown above, read the angle it shows. Move the torsion bar in the torsion tube or move the spring plate or a combination of both until you get the desired angle you want.

Now you can reassemble the whole kit and caboodle in reverse order as you took it apart. Done forget the donuts and you might need a drift for the torsion cover when installing the bolts.

Check you angle of the drive axle at full hang then move on to the other side.

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