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## **TORSION BAR AND SPRING PLATE INSTALLATION INSTRUCTIONS FOR VW IRS AND SWING AXLE APPLICATIONS**

Sway-A-Way Spring Plates and torsion bars must be installed by a qualified mechanic. Caution: All ways use sturdy jack stands before working on or under a vehicle. Torsion bars can store a lot of energy. Be sure to keep hands and other body parts away from or near spring plates with out proper restraint on the spring plate.

You will need the following tools and equipment for this job:

Metric combination wrenches- 13, 14, 15, 17 and 19mm  
Metric sockets- 13, 14, 15, 17 and 19mm  
½ “or 3/8 “drive ratchet or broken bar  
2 jack stands  
1 floor jack  
1 piece of chain, 4’ to 6’ in length. (Recommended)

1. Place the car on jack stands and remove the rear wheel and tire.
2. Using a cold chisel mark the spring plate and the casting it bolts to so that these marks can be lined up on reassembly to maintain proper wheel alignment. If you are using new spring plates, the wheel alignment should be reset after assembly.
3. Remove the lower shock absorber mounting bolt.
4. Remove the bolts holding the axle or A-arm to the spring plate, and suspend the axle or A-arm from the frame.
5. Remove the four bolts that hold the spring plate bushing cover. Remove the cover.

**CAUTION: READ THIS BEFORE STARTING THE NEXT STEP-** The preload on the torsion bar can cause the spring plate to snap downward with great force when pried off the stop. Keep all parts of the body well clear from the bottom edge of the spring plate when removing the spring plates from the stop.

6. Place a floor jack under the end of the spring plate and jack it up until the plate just comes off the stop. Carefully pry the plate off the stop. Slowly lower the jack until the torsion bar is unloaded.
7. If you are installing spring plates only, scratch a line along the top of the spring plate on the casting behind it. Remove the old plate and install the new one so that the top edge of the plate is parallel to the scratch on the casting.
8. **Note for IRS Spring Plate Applications:** The end of the IRS spring plate should be placed inside of the flange on the “A” arm, not on the out side.
9. If the top edge of the plate is not parallel to the scratch, adjust it as follows. Move the torsion bar one tooth down on the inside spline and one tooth up on the outside. This will move the plate down one degree. If you move it up one on the inside and down one on the outside, it will move the plate up one degree. When installing Sway-A-Way torsion bars this same process can be used to reset the torsion bar preload. Since Sway-A-Way torsion bars have a higher spring rate than stock ones, they generally require less preload.

**CAUTION:** Both stock and Sway-A-Way torsion bars are marked on the big end with an R or L designating the right or left side of the car. Care must be taken to ensure that the bars are installed on the proper side. If you switch the bars from one side to the other they will break when the car is driven.

10. When installing torsion bars wipe a light coat of grease over the whole bar. This will help prevent rust corrosion which can cause breakage. Take care not to scratch the paint on the bar.
- 10-A. Some stock torsion bars won't quite fit Sway-A-Way spring plates. Do not try to hammer the spring plate on. Instead, use emery paper and sand off about .002” of the splines outside diameter.
11. To reassemble, place the spring plate on the torsion bar at the proper angle with the inside grommet installed. Lubricate the grommet with moly grease or a dry moly spray.
12. Lubricate the outer grommet and put it on the spring plate. Set the cap in place over the grommet and start the upper left-hand bolt and the two right hand bolts. (You may want to change to slightly longer bolts for easier starting.) Tighten the three bolts just enough so that the cap is snug but not tightened down.

- 12-A. If you have a lot or pre-load on your torsion bars it may be hard to jack them up. The whole car may start to lift up. In that event you have to take a piece of chain, 4' to 6' in length, and wrap it through one of the holes in the casting and around the floor jack (be sure to put the chain behind the wheels so it can't slip off.) With the chain in place the car will no longer lift and the spring plate will move up into place.
13. Now jack the end of the spring plate up until you can see the lower left hole in the cover, and insert the forth bolt. Continue raising the plate until it's just above the stop, and then clamp the spring plate on the casting with vise grips. Then tighten all four bolts. This will push the spring plate on the torsion bar. Torque the bolts to 25-ft. lbs.
14. Reinstall the A-Arm or axle on the spring plate and replace the bolts, making careful reference to the alignment marks made during removal, Torque the bolts to 80-ft. lbs. and finish assembling.

**CAUTION: INSTALLING SWAY-A-WAY TORSION BARS AND SPRING PLATES CAN SIGNIFICANTLY CHANGE THE HANDLING CHARACTERISTICS OF YOUR CAR.**

**MAXIMUM RECOMMENDED TWIST FOR STANDERED SWAY-A-WAY TORSION BARS (INDEGREES)**

DIAMETER IN M.M.	21 3/4" LONG	24 11/16" LONG	26 9/16"LONG
23	31.0	36.7	39.3
24	29.7	35.2	37.6
25	28.5	33.7	36.1
26	27.5	32.5	34.8
27	26.4	31.3	33.5
28	25.5	30.1	32.2
29	24.6	29.1	31.1
30	23.8	28.1	30.1

**THE TOTAL ANGLE THE BAR CAN BE TWISTED INCLUDES THE PRELOAD**

**Torsion Bar Adjustment:** VW torsion bars are designed with two different splines on each end. The purpose of this is to allow the adjustment of the preload on the torsion bars. This works because the inner end has 40 teeth (9 degrees per tooth) and the outer end has 44 teeth ( 8.2 degrees per tooth). By adjusting the inner and outer splines together, you can adjust the preload by .8 degrees (9 –8.2 degrees). Example: going down four teeth on the inner end and up four teeth on the spring plate end will increase the preload by 3.2 degrees and raise the car by .9 inches. The stock suspension has 3.5 degrees per inch of travel. For other arm lengths divide 57.3 by the arm length to get the number of degrees per inch of travel.

## SUGGESTED PRELOAD ANGLES FOR VW TORSION BARS

Instructions: Before taking apart the suspension, level the car and measure and record the spring plate angle for later reference. The spring plate angle is measured with no pre load on the torsion bar. Find the new bar diameter and pre load angle in the chart. Use the pre load angle from the table for setting the new bars to get stock ride height.

Applications: Stock pre load Angle

Bug, up to 1960, 24 11/16" long bar, 24 mm diameter	13
Bug, 1961-1968, 21 3/4" long bar, 22 mm diameter	16 1/2
Bug, 1969 & up, 26 9/16" long bar, 22 mm diameter	20 1/2
Type 3, all, 26 9/16" long, 23.5 mm diameter.	23 1/2

NOTE: These values are approximate. The angle reference is the top edge of the spring plate from horizontal down with no pre load on the torsion bar. All angles are calculated to maintain stock ride height. The ride height changes by .9" for each 3.2 degrees of pre load.

EXAMPLE: If you want to lower the car by .9", reduce the table pre load by 3.2 degrees.

### Suggested Pre load Angles for VW applications to maintain stock ride height.

<u>Diameter</u>	<u>21 3/4"</u>	<u>24 11/16"</u>	<u>26 9/16"</u>
22 mm	16.52	19.07	20.71
23 mm	13.83	15.96	17.33
24 mm	11.67	13.46	14.62
25 mm	9.91	11.44	12.42
26 mm	8.47	9.78	10.61
27 mm	7.28	8.41	9.13
28 mm	6.30	7.27	7.89
29 mm	5.47	6.32	6.86
30 mm	4.78	5.52	5.99

### Approximate Wheel Rates

<u>Diameter</u>	<u>21.75</u>	<u>24.68</u>	<u>26.56</u>
	LB/IN	LB/IN	LB/IN
22.00	122.85	106.44	98.03
23.00	146.75	127.15	117.11
24.00	173.99	150.74	138.84
25.00	204.85	177.48	163.47
26.00	239.65	207.63	191.24
27.00	278.70	241.46	222.40
28.00	322.34	279.27	257.22
29.00	370.91	321.36	295.98
30.00	424.78	368.03	338.97
31.00	484.31	419.61	386.47

## PORSCHE 911, 912, 924 AND 944 TORSION BAR PRE LOAD ANGLES

Instructions: Before taking apart the suspension, level the car and measure and record the spring plate angle for later reference. The spring plate angle is measured with no pre load on the torsion bar. Find the new bar diameter and pre load angle in the chart. Use the pre load angle from the table for setting the new bars to get stock ride height.

NOTES: These values are approximate. The angle reference is the top edge of the spring plate from horizontal down with no pre load on the torsion bar. All angles are calculated to maintain stock ride height. The ride height changes by .9" for each 3.2 degrees of pre load. EXAMPLE: If you want to lower the car by .9", reduce the table pre load by 3.2 degrees. See the **Torsion Bar Adjustment** section above for the adjustment method.

Application	Stock Pre load Angle
Porsche 911, up to 1968, 23mm diameter	36
911, 1968 & up, 22 mm diameter	39
912, Pre 1968, 23 mm diameter	33
912, 1968 and up, 22 mm diameter	36

<u>Diameter</u>	<u>911, Pre 68</u> <u>24 11/16"</u>	<u>911, 68 &amp; up</u> <u>24 11/16"</u>	<u>912, Pre 68</u> <u>24 11/16"</u>	<u>912, 68 &amp; up</u> <u>24 11/16</u>
22 mm	43.12	38.97	39.47	36.08
23 mm	36.09	32.62	33.04	30.21
24 mm	30.44	27.52	27.87	25.48
25 mm	25.86	23.37	23.67	21.64
26 mm	22.10	19.98	20.23	18.50
27 mm	19.00	17.18	17.40	15.91
28 mm	16.43	14.85	15.04	13.75
29 mm	14.28	12.91	13.07	11.95
30 mm	12.47	11.27	11.41	10.44
31 mm	10.94	9.88	10.01	9.15

### Approximate Wheel Rates

<u>Diameter</u>	<u>911 &amp; 912</u> <u>LB/IN</u>	<u>924 &amp; 944</u> <u>LB/IN</u>
22 mm	106.44	98.03
23 mm	127.15	117.11
24 mm	150.74	138.84
25 mm	177.48	163.47

FOR HIGH STRESS TORSION BARS WHICH WILL ACCOMMODATE GREATER ANGLES OF TWIST, PLEASE SEE OUR WEB SITE FOR MORE DETAILS.