Tokico Illumina rear shocks

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Recently I noticed that the rear end was bottoming out on some bumps and it was becoming annoying. I had replaced the stock rear shocks with some in-expensive Gabriel gas shocks years ago and thought that maybe they were not as good as I had thought they were. After changing the shocks out I realized that one of the Gabriel shocks were blown.

After looking at a lot of shocks on line I decided to go with the Tokico Illumina 5 way adjustable shocks. I figured there would have to be one of the settings that would work for me.

Got the Tokico's and compressed both shocks with one set on #1 and the other set on #5. The #5 setting took almost twice as long to fully extend as the #1 setting. Clearly there should be a good difference between the #1 and the #5 setting in the car.

I first removed the trunk mat, needed to fold the rear seats down to get to the fasteners.

Next removed the side panels in the trunk to get access to the upper mount.
Remove the cargo net hook and there should be one plastic cap on the top.

I removed the old upper hardware and then jacked the car up using the spare tire jack.

Removed the lower shock bolts and removed the old shocks. OEM hardware is 18mm and 15mm.

Before putting the new shocks in take a second to lubricate the top rubber mount with something like Armor All or soap and water.

Then I put shock in place and had someone raise the jack until the lower mount is aligned with the shock. Tokico supplies you with a new bolt and nut in 19mm and 18mm sizes. The manual I have has the lower bolt torqued to 59 foot lbs.

Next I attached the upper rubber mount and retainer and put the nut on and snugged it down. The shock shaft will spin so you will need to hold the shaft while tightening the nut.

The instructions that came with the Tokico's called for tightening the top nut to ONLY 10.5 foot lbs. The ford manual says it should be 30 foot lbs. I went with the 10.5 setting. (The added length of the crows foot throws the torque wrench off a little so I set it at 10 instead of the 10.5 foot lbs)

Seeing as the shaft will spin you can not torque the nut like you normally would using a torque wrench. I used an 18mm crow's foot on the torque wrench while holding the shaft with an 8mm wrench.

Next I installed the index caps and set the shocks to #3.

Quick over view on springs and shocks

Springs

A car's springs are the central part of the suspension. There are different designs of springs, such as torsion bars and leaf springs, but nearly all of today's passenger cars use coil springs at all four corners.

Springs absorb and store road shock caused by bumps, dips, cracks, and so forth. They absorb this shock by compressing and extending. When a car's wheel goes over a bump and gets pushed upward, the spring absorbs that additional load, keeps the road shock from reaching the chassis, and makes sure the tire maintains contact with the pavement.

How much a spring compresses or extends is determined by its "spring rate." Spring rate is measured in pounds per inch of deflection; for example, 100 pounds per inch. So, say a load of 200 pounds is applied; the spring will deflect 2 inches. Spring rate comes from various

factors. For a coil spring, this includes the number of active coils, the diameter of the coils, and the diameter of the spring wire. The fewer coils a spring has, the higher the spring rate it will have.

The design of a spring affects how well the vehicle will ride and handle. A spring that absorbs lots of energy will generally offer a comfortable ride. After all, it can absorb most of the road shock (energy) that is being generated by the road surface. But there are always engineering trade-offs. This kind of spring generally requires a higher vehicle ride height, which will cause the vehicle to feel unstable during cornering. This instability is because the more distance a spring compresses or extends, the more the vehicle "rolls" around on its suspension. This rolling is called weight transfer, and it is caused by centrifugal force acting on the weight of the vehicle as it goes around a corner. Weight transfer can overload a tire's grip, which ultimately hurts traction, and therefore handling.

Shock Absorbers

The other main part of a car's suspension is the shock absorber. Contrary to its name, a shock absorber plays a minimal role in absorbing impacts taken by the suspension. That's the spring's job. A shock absorber dampens road impacts by converting the up and down oscillations of the spring into thermal energy.

Without a shock absorber, a spring that has absorbed energy will release it by oscillating at an uncontrolled rate. The spring's inertia causes it to bounce and over extend itself. Then it re compresses, but then again travels too far. The spring continues to bounce at its natural frequency until all the energy originally put into the spring is used up by friction. This effect can be quite detrimental to the stability of a vehicle.

Shocks and struts help control how fast the suspension is allowed to move, which is important for keeping the tires in contact with the road. Most shock absorber designs have more resistance during the extension (rebound) cycle than the compression cycle. This is because the extension cycle controls the motion of the vehicle's sprung weight (half of the suspension and everything else above the suspension). The compression cycle, on the other hand, controls the motion of unsprung weight (wheels, tires, brakes, and half of the suspension). Obviously, there is a lot more weight in the upper part of the car than unsprung weight in the lower part of the car.