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## BMW K-SERIES (INCLUDING PARALEVER) SHOCK MOUNTING INSTRUCTIONS

#BMW1 - 4/29/96

**CAUTION:** This shock is pressurized to 250 psi nitrogen. This pressure is not an adjustable feature of the shock. Unless there is a leak, the shock should not normally lose pressure. If the shock damping becomes soft or mushy (after an extended period of time or number of miles) the shock may need to be serviced which includes shock oil and a nitrogen charge. In this situation, re-pressurizing the shock alone may not improve the action of the shock. The shock should be returned to Works Performance Products, Inc., or to a qualified shop that has the appropriate tools, training and nitrogen handling equipment.

In most cases the single shocks for BMW K-series motorcycles include a hose-mounted remote reservoir. This reservoir contains a polyurethane bladder that separates the nitrogen from the shock fluid. The reservoir increases the shock fluid capacity. This additional fluid helps dissipate the heat generated by the damping in the shock.

1. The shock mounts with the hose towards the rear of the machine, with the shock body at the top and the shaft pointing downward.
2. Take the inside half of the bushing set on the shock eye (at the shaft end) and place it on the mounting post on the drive hub.
3. Insert the body eye into the mounting channel on the frame. In some cases the channel may have to be spread slightly to fit the bushing set.

**NOTE;** Do not try to install the shock with only half of the bushings, as this will lead to poor performance and premature seal leakage. For the same reasons, do not grind or file the inner or outer edges of the bushings to make them narrower. The amount of "float" in the bushing set is necessary to ensure smooth operation of the damper assembly.

4. Slide the shaft end of the shock over the mounting post. If it does not easily align with the bushing in place, the eye (and shaft and spring, etc.) can be rotated to fit.

5. Install the outer shock eye bushing and follow with the washer and nut. Install the upper shock mounting bolt and nut finger tight.

6. Position the reservoir under the frame rail below the seat. It will fit neatly between-- and inside-- of the stock luggage rack mounts. Let the reservoir dangle and put the hose clamps loosely in position over the frame tube.

**NOTE:** The reservoir should be mounted so that the hose has a slight curve in it. This will allow a certain amount of movement at the shock body without putting pressure on the hose fittings at the shock.

6. Position the reservoir inside the hose clamps with the rubber stand-off pads between the reservoir and the frame. The hose clamps should be fitted on either side of the Allen bolt that attaches the tail section to the frame. They can be placed at any point along the O.D. of the reservoir, but about 1/2" from each end is typical. The stand-off pads should be at the same location on the reservoir as the clamps. Tighten the clamps snugly. Do not over-tighten the clamps, as this can cause them to break during temperature extremes.

7. Sparingly apply a thread locking compound to the threads on the shock mounting fasteners and tighten them to 28 to 32 lbs/ft. Over-tightening the fasteners can damage the bushings and cause (More on next page)



FIG. 1: TYPICAL SHOCK MOUNTING AND  
RESERVOIR POSITIONING FOR ALL  
K-SERIES BMW

the shock to bind. This results in harsh, choppy performance and premature seal failure.

## MULTI-RATE SPRINGS AND THE ARS SYSTEM

Depending on each application, either dual-rate or triple-rate springs are available. Dual-rate springs are just that-- a spring set with two separate rates. This is done with a short spring stacked on a longer spring. As both springs collapse they produce a soft, or initial, rate. The spring set will maintain this initial rate until the short spring stops compressing. At that point, the spring rate "crosses over" to the stiffer, or final, rate. This multi-rate system allows a soft initial rate for comfort on small bumps, but has the capability of soaking up the big pot-holes and other road hazards.

ARS stands for Adjustable Rate Suspension. ARS is standard equipment on most BMW K-series shocks. The ARS system allows the rider to increase or decrease the load-carrying capacity of the shocks without changing the preload of the springs. Depending on the application and spring set, the rider can increase the load capacity of the shocks up to 50 percent. This allows the shocks to be correct for solo riding, but still be able to handle the increased weight of a passenger and/or baggage. ARS can also be employed during solo riding to stiffen the rates for aggressive riding, or for riding on rough, broken pavement.

The ARS system consists of an indexing lever and a stepped cup that contains the short spring of the dual-rate. The position of the lever in relation to the steps in the cup determines how long the spring set remains on the soft, or initial, spring rate. On most ARS applications, four positions can be selected from full stiff to full soft. Indexing is done in a matter of seconds by rotating the lever or the cup by hand. Indexing the cup to the lever is usually preferable to avoid interference with passenger or bags. Adjustment of the ARS system should only be made while the motorcycle is on the center stand to reduce the load on the springs.

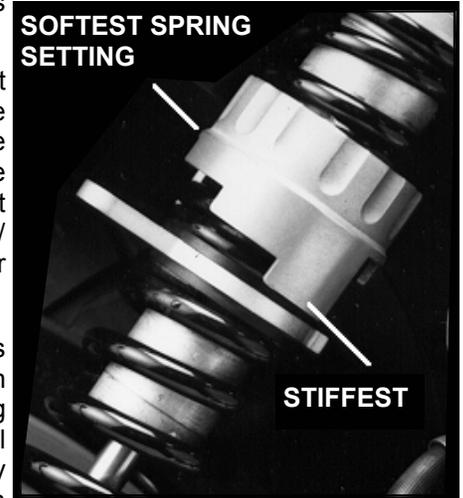


FIG. 2: ARS ADJUSTMENT POSITIONS (FOUR AVAILABLE)

Note: It is important to make sure that a step in the cup is positioned directly over the tang on the lever. This will prevent damage to the cup and/or lever that can be caused by making partial contact between the tang and a step.

**TUNING TIPS**—The “softest” setting on the ARS does not mean that the ride will be the most comfortable at that setting. It means that this is the softest spring setting which would be employed on smooth roads and with a solo rider. Excessive suspension bottoming caused by rough roads or by the addition of a passenger or bags will cause a harsh ride when the shock is adjusted to this setting. To eliminate this bottoming, adjust the ARS to the stiffer positions for a more comfortable ride. Hence, sometimes “stiffer is softer.”

**PRELOAD ADJUSTMENT**—On the Works shocks for Paralever-equipped BMWs, a threaded preload is standard. (See Fig. 3.) This allows the adjustment of the ride height of the motorcycle. The preload is changed by turning a threaded nut up (higher ride height) or down (lower ride height) on a threaded part of the shock. The nut is a right-hand thread. It is used primarily to set the ride height for solo riding, as the ARS should be employed when adding a passenger or extra weight.

### CHECKING RIDE HEIGHT—



FIG. 3. PRELOAD ADJUSTMENT NUT (PARALEVER ONLY)

1. With the bike on the center stand, have an assistant measure from a point on the gear housing at the axle (center point) to a point on the frame, or bodywork directly above it. Record this measurement.
2. With the bike off the stand and the rider in the seat, bounce on the suspension and let the bike settle. Have the assistant measure from the same two points. Subtract the second measurement from the first.
3. For these models (equipped with the stock length shock) the difference should be between 1-1/4 inches (minimum) and 1-5/8 inches (maximum). (Short shocks should range from 3/4 inch to 1 inch.)
4. If the difference is less than the minimum, reduce the spring preload by turning the nut to the left (down) one full turn. Measure the distance again starting with Step 2. Adjust again if necessary.
5. If the difference is more than the maximum, increase the spring preload by turning the nut to the right (up) one full turn. Measure the distance again starting with Step 2. Adjust again if necessary.