WORKS PERFORMANCE PRODUCTS, INC.
21045 Osborne St., Canoga Park, CA 91304
818.701.1010 fax 818.701.9043
www.worksperformance.com

SHOCK SET-UP AND ADJUSTMENTS FOR BUELL (All except Blast & XB9/12)

#BUELL - 08/05/2004

NOTE: Not all Works single shocks for Buell motorcycles are equipped with external rebound and compression adjustment features. Before making any damping adjustments to the shock, measure the ride height and adjust the preload if necessary. Always set the ride height before doing any damping adjustments. The amount of preload on the shock spring will have a direct effect on the rebound adjustments.

Thank you for choosing Works Performance shock absorbers. These helpful installation tips will enable you to enjoy maximum performance for years to come.

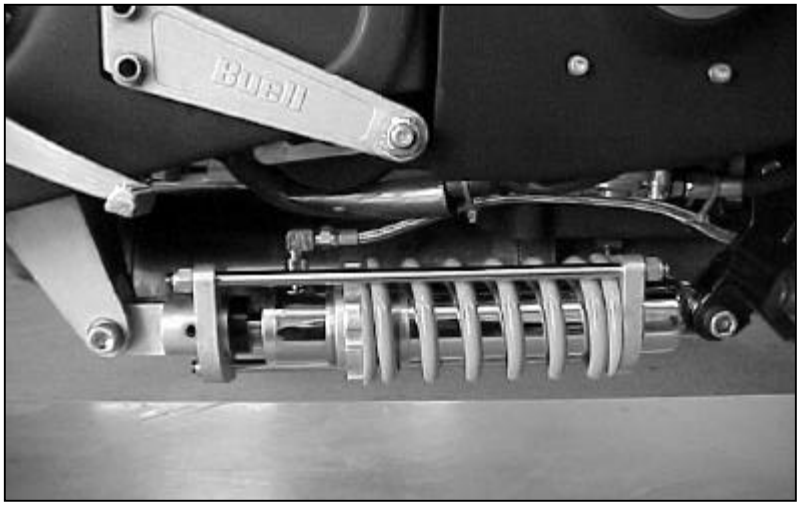

Fig. 1: Mounting position for the shock is body to the front, shaft towards the rear. The hose should exit at the top and run above the shock towards the front of the bike and to the left of the engine mount.

INSTALLATION

Caution: The Works Performance shocks for the Buell are equipped with remote reservoirs. Correct routing of the hose is imperative to ensure that the hose will not be damaged and cause a leak of the shock fluid.

1. The shock is installed with the body towards the front and the shaft pointing to the rear. The shock should be positioned so that the hose fitting exits at the top with the hose running toward the front of the bike.

Note: The steel shock bushings in the eyes ride on a thermoplastic sleeve that is designed for high loading and high rotation. Normally these sleeves are intended to run without lubrication. Some types of grease, spray lubes and chain lubes can have carriers or other elements in them that can cause the sleeve to swell and not perform appropriately. As a result, avoid lubrication on these bushing sets.

2. Install the mounting bolts and nuts with Loctite or other thread locking compound, and torque to the manufacturers specifications.

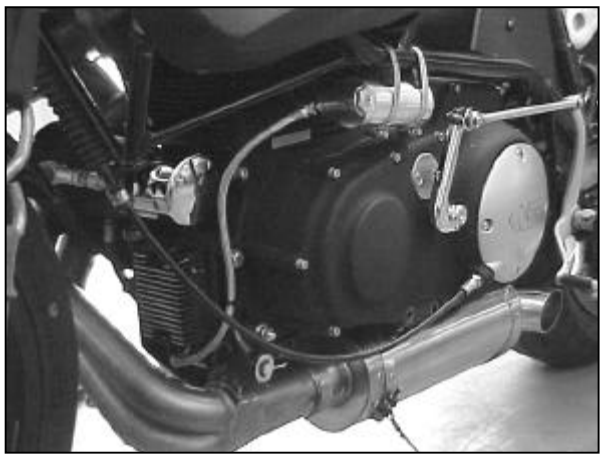

Fig. 2: The hose comes up from the center to position the reservoir on the frame to the left side of the engine. Be sure to allow clearance to the shifter arm.

CAUTION: Be sure to position the reservoir so that it does not interfere with the shifter arm rotation. Actuate the shifter to ensure clearance here, before tightening the hose clamps.

3. Wrap the reservoir in a plastic bag or with a shop towel to protect it from scratching. Route the reservoir between the pipes and the front of the engine. The reservoir attaches to the

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frame section to the left of the engine(see Figure 2).

4. Using the supplied clamps and rubber stand-offs, clamp the reservoir to the frame tube. Plastic electrical tape wrapped around the frame will protect the paint from the clamps. Do not over-tighten the hose clamps. The reservoir can get quite hot and expand and as a result can break the clamps.

5. At various points along the hose route, zip tie the hose to keep it from touching a hot pipe or sharp edge (see Figure 3).

Fig. 3: The hose should exit at the front of the bike and to the left of the engine mount. Use zip ties to keep the hose away from the pipes.

RIDE HEIGHT MEASUREMENT

Correct ride height is important. If the ride height is too high, the vehicle will "top out" too easily and fail to allow enough travel for appropriate rebound from bumps. If the ride height is too low, the shock can bottom too easily, resulting in a harsh ride. The spring rates are set up for the full amount of travel. If there is not enough pre-load, the total spring rate would not be enough to resist bottoming.

Ride height is to some extent, personal preference, but generally speaking, the vehicle should settle between, and 1/4 to 1/3 of the wheel travel for road racing, flat track and street use. On these vehicles, that would be between 1 inch and 1-1/2 inch.

The proper way tomeasure the ride height:
1. Pull the bike over far enough onto the side stand to “top-out” the suspension.

2. Have an assistant measure and record the vertical distance between the rear axle and a point directly above it. This could be the seat, fender, frame, body panels, etc.

3. Take the motorcycle off the stand and sit on it in a normal riding posture, with one foot on the peg and the motorcycle balanced so as to have minimal weight on your other foot.

4. Have the assistant carefully measure from the same two points. Subtract the second measurement from the first. The difference is the amount of settling or "sag,” in the suspension.

Note:Although the configuration of the pull rods is similar to the open spring shocks built by White Power on many of the Buell models, the method of pre-load adjustment is different. Instead of adjusting the length of the pull rods, the pre-load is adjusted with a threaded spring retainer on one end of the spring. The pull rods do not have sufficient length threads to allow adjustment. All of the adjustment is done with the threaded pre-load ring.

PRE-LOADADJUSTMENT
CAUTION: Before attempting any pre-load changes, make sure that the area around the pre-load nut and the threaded portion of the shock body are clean, free from grit and road grime, and lightly lubricated with a spray lubricant. Failure to heed this advice may result in a pre-load nut that is seized on the shock body.

Once you have determined the amount of change required at the wheel you will want to adjust the pre-load accordingly. Keep in mind that the change at the shock is much less, and varies from vehicle to vehicle based on the frame geometry, spring rates, etc. On Works shocks, two (2) full turns will change the pre-load by 10 percent.

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So adjust it a turn and then check the measurements again.

The very best tool for turning the preload nut is a spanner wrench. In fact, a large pair of channel lock pliers skillfully used will accomplish the job with a minimum of aggravation. If you have access to the spring and can grab it with both hands and turn it, it will often turn the nut along with it. If they turn together, the friction is lessened somewhat and the task is easier.

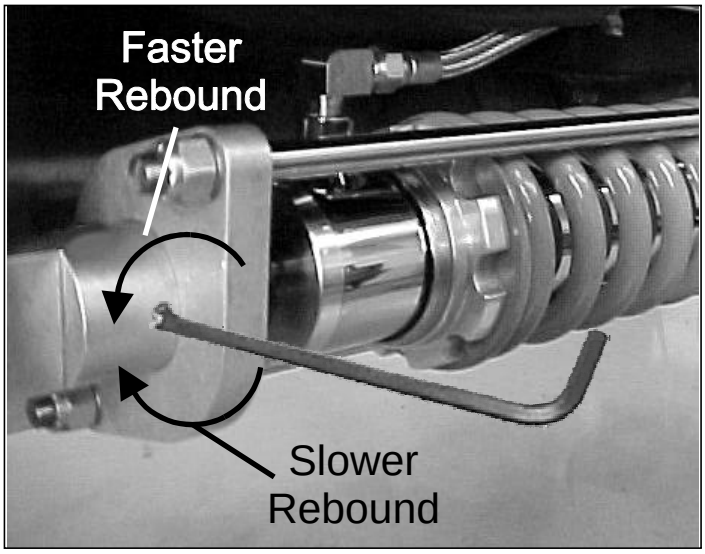

Fig. 4: Rebound adjuster position on shock eye (hex driver positioned for adjustment). Adjustment is clockwise for slower rebound, and counterclockwise for faster rebound.

IF THE RIDE HEIGHT IS TOO LOW.....
To raise the vehicle and reduce the amount of ride sag, screw the adjuster nut towards the spring to increase the preload. This makes the installed length of the spring shorter. If this is for competition, record this installed length so that you can set the bike up the same after having the shock disassembled for service.

IF THE RIDE HEIGHT IS TOO HIGH.....
To lower the vehicle and increase the amount of ride sag, screw the adjuster nut away from the spring to decrease the preload. This makes the installed length of the spring longer. For a competition vehicle, record this installed length.

REBOUND
Rebound is the damping of the shock as it recovers, or extends from a bump. Increasing, or stiffening, the rebound damping makes the shock recover slower. Decreasing, or softening, the rebound damping allows the shock to recover faster.

REBOUNDADJUSTER LOCATION
The rebound adjustment screw is located on the shaft end of the shock in the eye . The adjuster is parallel to the ground and should exit to the right side of the bike, away from the muffler. The adjuster is a hex socket screw, that can be turned with a 1/4" socket key wrench.

.CAUTION: The adjuster mechanism inside the shaft includes a tapered needle and seat. Do not over-tighten the adjuster screw. The needle or seat can be damaged and can result in poor performance. Use a light touch on the wrench.

The rebound adjuster screw has three full turns available. Each full revolution has 6 detent positions. Hence there are 18 rebound positions. Position number one is when the adjuster screw is turned clockwise all the way to stop. This is the stiffest (slowest recovery speed) setting. For determining rebound position for recording purposes, this is the starting point.

NOTE: The rebound adjusters on Works shocks are very sensitive. When making adjustments, turn the adjuster only one or two clicks, then check the results by riding the vehicle. In addition, the shocks are setup individually, and a good starting point is where the adjuster is set by the technician. Arbitrarily starting at the mid-position, full stiff or full soft will only slow your setup. When you find the right rebound position, then you will normally only make adjustments of two or three clicks in either direction when tuning for conditions.

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Unscrewing the adjuster screw counter-clockwise will yield 18 positions (three full turns) from that point. This is the softest (fastest recovery speed) position. The detents are very light, so a deft hand should be used. **If you exceed three full turns out, the rebound damping will get full-stiff again.** On these eyes, this will expose the O-ring seal. If you continue to turn the screw out, you will eventually dislodge part of the adjuster mechanism, and the shock will have to be rebuilt.

REBOUNDADJUSTMENTS

If a shock exhibits too much rebound damping, it will have a tendency to "pack." This is seen over multiple bumps, such as stutter bumps or pavement seams. The suspension will react well over the first bump, but seems to get stiffer on each successive bump. On pavement, this can deliver a jolt, or harsh whack on the riders butt.. The fix for this condition is to decrease (soften) the rebound. Turn the screw counter-clockwise to make the rebound faster. If you plan to ride long distances on interstates, you would probably want to set the bike up this way with softer rebound.

When a shock exhibits too little rebound damping, the suspension may feel too mushy, or "pogo." On pavement, this is seen most in fast sweepers. The bike will alternately set, then unload; set, unload. This translates into "sawing" at the handlebars, which is caused by the changes in trail at the front suspension. On the pavement, too little rebound can be much more unsettling than the loss of comfort from too much rebound. To slow the rebound, turn the screw in (clockwise). This would be the setting preferred for twisty road riding.

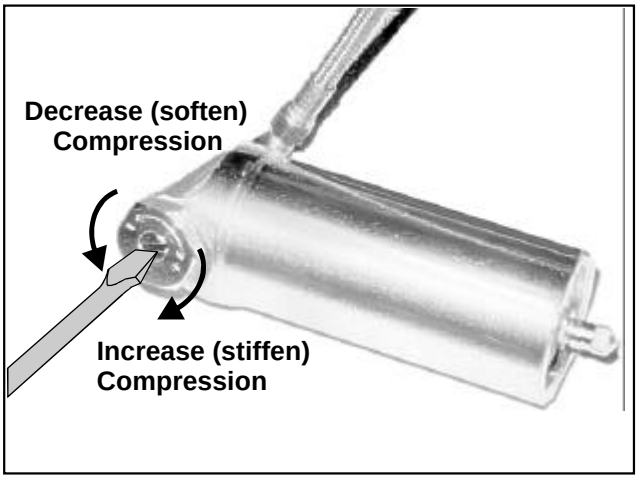

Fig. 5: Compression adjuster screw location on the remote reservoir. Adjustment is clockwise for stiffer, and counterclockwise for softer using a screwdriver. Do not attempt to turn the large hex.

COMPRESSION

Compression damping, is the action of the shock as it compresses or closes when the wheel moves up from hitting a bump. Increasing, or stiffening, the compression slows the shock's movement and makes the suspension less compliant. Decreasing, or softening, the compression allows the shock to collapse more easily and allows the wheel to move further (than a stiffer setting at the same spring pre-load and bump configuration).

COMPRESSIONADJUSTER LOCATION

Compression adjustments are made by turning the screw on the top edge of the reservoir (if so equipped). A flat blade screwdriver is used to make the adjustments. In some cases a coin can be used. **CAUTION: Do not attempt to turn the hex as part of the adjustment procedure.**

The approximate range of adjustment is 18 to 25 "clicks." This varies depending on the spring selected for use in the adjuster mechanism. For determining compression position, turn the screw counterclockwise until it stops. This is the number one position--full soft. Then turn the screw in (clockwise) and count the number of clicks. The maximum number of positions is determined when the screw is turned clockwise to its stop (approximately 3 to 3-1/2 turns in). This is the stiffest setting.

COMPRESSIONADJUSTMENTS

The compression adjuster is used to make fine adjustments to the compression damping. Normally, the starting point for the tuning the shock is compression on full soft (counterclockwise turns to stop). If the suspension bottoms too often, then turn the screw in (clockwise) several clicks, and then ride the bike through the same sections again. If you end up with the adjuster near or at full stiff position, then you may experience a loss of feel on small bumps or washboard surfaces. If this the only way to keep the suspension from bottoming too often, then the spring and/or damping rates may be incorrect for the application. If the spring and main compression damping rates are too light, then the adjuster may not compensate for this, and the shock should be re-sprung

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and the damping rates changed internally.

COMPRESSION AND REBOUND INTERACTION

Compression adjustments are often “tied” to the rebound adjustments and visa-versa. For instance, if you have increased the compression damping to slow the shock thereby using less of the wheel travel (for a given bump), you may end up slowing the rebound to compensate for the shorter recovery distance. Conversely, if you lighten the compression, you will probably end up reducing the rebound damping to enable the wheel to recover faster.

NITROGEN PRESSURES

On Works shocks equipped with reservoirs, the permissible range of pressure is 150 to 300 p.s.i. of dry nitrogen. The pressure setting is not intended as an adjustment, but will affect the compression damping to some small degree. Works has determined that 250 p.s.i. is most suitable for this application. (Measured on the bench without the spring installed).

Note: If you pressurize the shock while it is installed on the vehicle, you will want to pressurize the reservoir to 300 to 350 psi. This will yield approximately 250 psi when the shaft is extended under bump conditions.

Please note that in order to check the pressure, some of the gas must escape and fill the gauge assembly. The volume of the bladder is about the size of your thumb, so a very small volume change results in a large pressure drop. Because the gauges' volumes vary, it is not possible to deduce the actual pressure in the shock prior to attaching the gauge. Therefore it is imperative that any attempt to check pressure be accompanied by the capability of refilling the reservoir. In other words: If you don't have a nitrogen source handy, don't check the pressure!

The best gauges for this purpose screw on to the valve and incorporate a T-handled core depressor to isolate the shock from the gauge. This allows a leak-free separation once the desired pressure is reached. For simplified operation, an extra valve is provided for the filling apparatus, allowing pressure adjustment with the gauge in place. Works offers a suitable gauge for filling the shocks. Most motorcycle shops that sell and service dirt bikes can pressurize the shock.