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**MOUNTING INSTRUCTIONS FOR HARLEY-DAVIDSON,
 ALL MODELS EXCEPT SOFTAIL**

#HDTYP - 01/12/2004

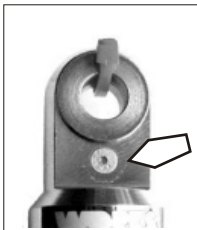
Note: Most Works' shocks are a gas emulsion type. As a result, they are designed to run with the body up and shaft pointing down. This is opposite to most OEM shocks. When the shock is run with the shaft pointing up, the performance is drastically decreased, because the shock is trying to operate in the nitrogen "bubble." In addition there may be some interference on the upper mount. Mounting the shock correctly is very important.

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.

NOTE : Misalignment between the mounts on the frame and the mounts on the swingarm is fairly common with many of the Harley-Davidson models. On the OEM shocks, the soft rubber eyelets and "loose" shaft to seal head tolerance allows the standard shocks to function reasonably well. However, on Works shocks the tolerances are much tighter and the eyelet material is a urethane which is much stiffer than the stock rubber parts. Misalignment of more than 1/4 inch can cause the shocks to bind up and not function properly. If this binding occurs, the shocks will feel overly stiff and harsh. Follow the procedures below to check for misalignment when installing the shocks.

INSTALLATION

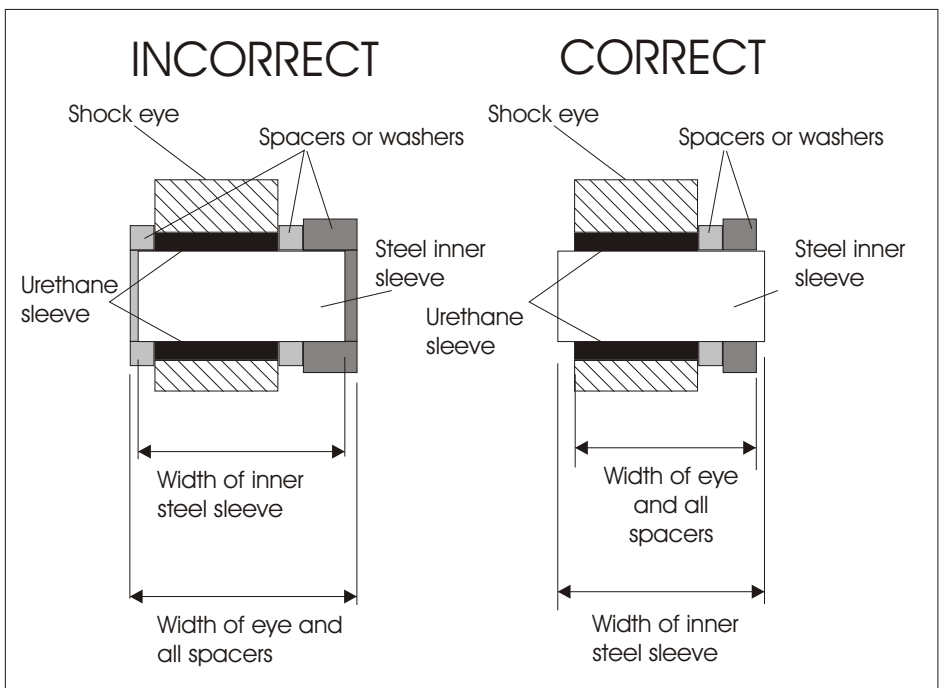
- Shock mounting is fairly straightforward. These shocks mount with the shock body at the top and the shaft pointing downward.
- Support the frame under the engine with blocks that are tall enough to clear the rear tire from the ground.
- Remove the stock shocks, save the hardware.



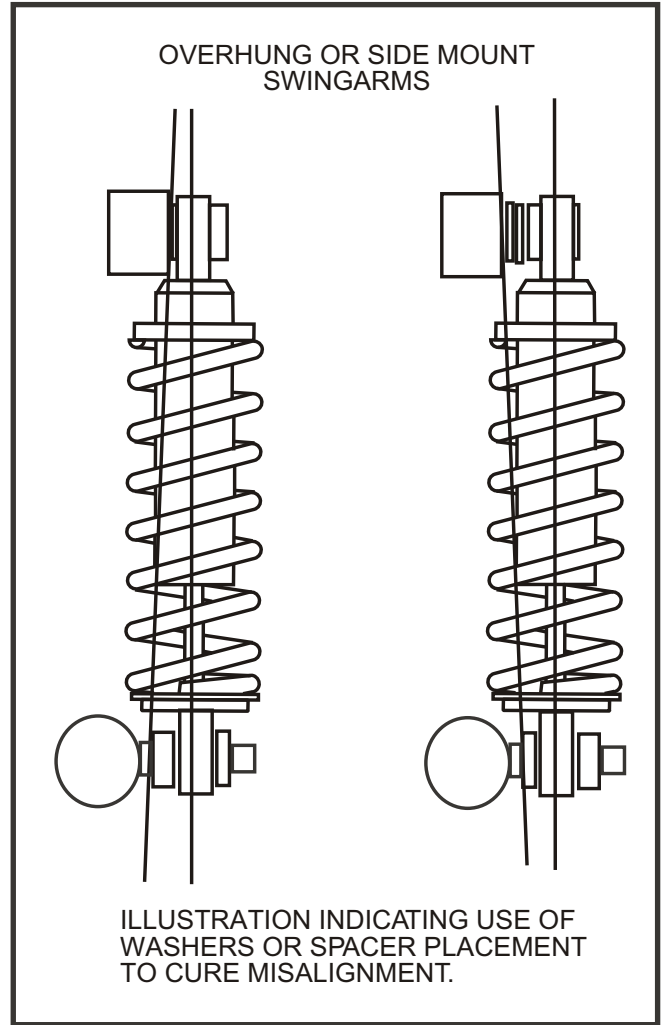
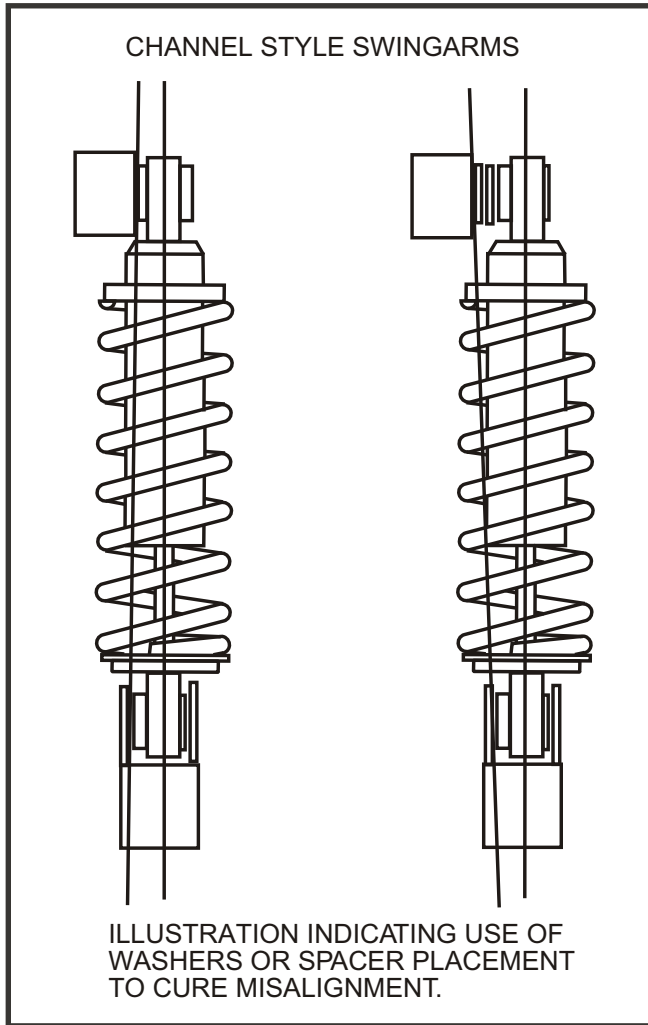
Important Note: Works Shocks have two different external fill valves for charging the shocks with nitrogen. One is a tank valve style with a cap. The one pictured here is referred to as the "hidden port" valve. Do not tamper with this screw as all or part of the nitrogen and oil will escape from the shock.



Fig. 1-- Typical installation. Note that the shock body is at the top with the shaft pointing down. Shock shown has optional billet ARS option.



CAUTION: When installing shocks on custom vehicles, do not allow the total thickness of the spacers and washers to exceed the width of the inner steel sleeve. There must be clearance between the eye/spacer "sandwich" to allow the shock eye to rotate and move freely. Conversely, do not reduce this clearance by grinding the inner sleeve to narrow the mounting set.

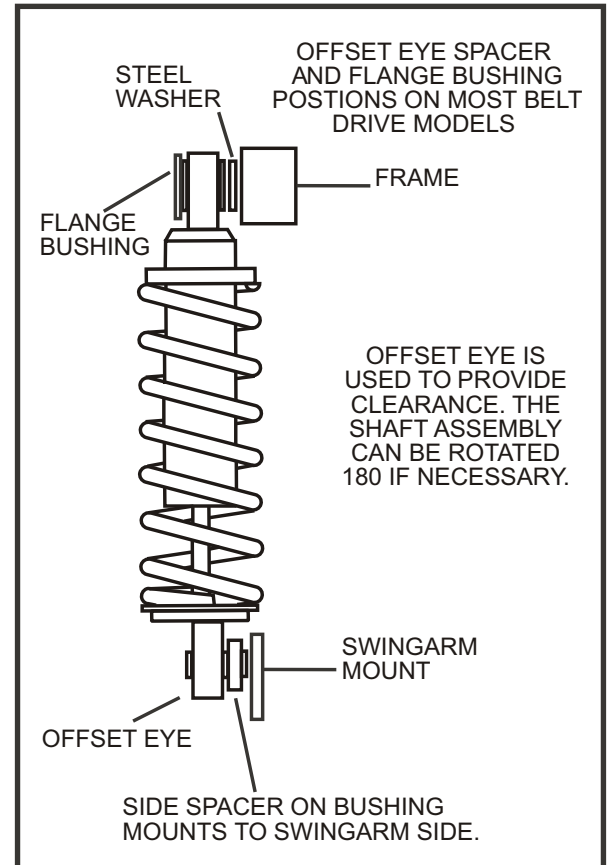
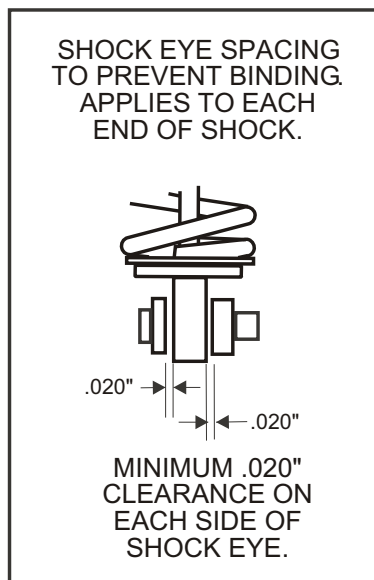


4. Install the Works shocks in the top mount on both sides. Tighten the fasteners.

5. Allow the shock to seek a relaxed position above the shock mounts. Check to see how close or how far away the eye is from the channel or flange. Ideally the shock should naturally drop into the correct position. If you have to pull or push the shock over to make it line up with the mounts, then the shocks will be in a bind and not function correctly.

6. If the shocks are not lined up, add washers if necessary to space them appropriately. On some of the shocks with side spacers (aluminum washers that fit over the bushing) they can be swapped to improve the offset. It is possible that changing the side spacers on the body end (if so equipped) can help with the alignment. Take some time with this because it will pay off in ride comfort.

NOTE: The shock bushings are designed to have a certain side-to-side "float" to keep them from binding. As a result, 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. If the shock eyes are tightened metal-to-metal (the outer faces of the eyes to the flanges or washers), this will lead to a harsh, stiff or choppy ride and premature seal leakage.

7. Once you are satisfied with the alignment, sparingly apply a thread locking compound to the threads on the shock mounting fasteners and tighten them to the appropriate torque. Over-tightening the fasteners can damage the bushings and cause 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, single or dual-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 on some dual-rate spring shocks. The ARS system allows the rider to increase or decrease the load-carrying capacity of the shocks without changing the pre-load 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 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.



Fig. 2-- Shock compressed with the ARS lever in the softest position. The deepest slot allows the spring set to stay softer longer. The shallowest slot allows the spring set to get stiffer sooner.

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 unloaded to reduce the load on the springs.

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.”

PRE-LOAD ADJUSTMENT—On some Works shocks a threaded pre-load is standard. This allows the adjustment of the ride height of the motorcycle. The pre-load is changed by turning a threaded nut down towards the spring (higher ride height) or up away from the spring (lower ride height). The nut is a right-hand thread. It is used primarily to set the ride height for solo riding, as the ARS would be employed when adding a passenger or extra weight.

CHECKING RIDE HEIGHT—

1. With the bike unloaded on the side stand and the shock fully extended, have an assistant measure from a point at the axle (center point) to a point on the frame, fender 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 models equipped with the stock length shock, the difference should be between 1 inch (minimum) and 1-1/2 inches (maximum). (Short shocks can range from 1/2 inch to 3/4 inch.) the amount of settle, or “sag” is a function of the wheel travel. It should only be between 1/4 and 1/3 of the total travel.

4. If the difference is less than the minimum, reduce the spring pre-load. Measure the distance again starting with Step 2. Adjust again if necessary.

5. If the difference is more than the maximum, increase the spring pre-load. Measure the distance again starting with Step 2. Adjust again if necessary.

Note: If the ride height is too low, the shock will bottom unnecessarily, resulting in a harsh ride. If the ride height is too high, the shock will "top out" too easily when rebounding from a bump or under hard deceleration.

NITROGEN PRESSURES

CAUTION: The pressure in these shocks cannot successfully be checked. Concerns with the gauge volume and the gas volume in the shock body create a situation where you cannot accurately determine what pressure was in the shock. In addition when the pressure is lowered (i.e. checking the pressure) the gas and some of the shock oil escapes into the gauge. It is possible to lose a large percentage of the shock oil by depressing the core of a charged shock to the atmosphere.

Please note that in order to check the pressure, some of the gas must escape and fill the gauge assembly. The volume of the gas pocket is about half 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 shock. In other words: If you don't have a nitrogen source handy, don't check the pressure!

PRESSURIZING THE SHOCK AFTER SERVICE

The pressure setting for emulsion gas shocks is 250 p.s.i. To pressurize a shock with some residual pressure in it, bring the gauge manifold up to 250 p.s.i. and depress the core with the T-handle. This will either equalize the pressure or refill the shock without transferring oil from the shock into the gauge assembly.

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 manifold with attachment, fill valve and gauge. Most motorcycle shops that deal with dirt bikes can pressurize the shock.

SERVICE PARTS

Overhaul seal kit — #SL-S-KIT2

Overhaul seal kit w/ piston ring — #SL-S-KIT2C

Pre-load wrench — #PL-S-SPANNER

Seal holder wrench — #SLH-S-SPANNER

DUAL-RATE FORK SPRINGS

Works Performance adjustable dual-rate fork springs provide a soft initial rate for small bumps and pavement seams, but then "cross over" to a higher rate for potholes and other bad pavement. Unlike progressively wound springs which have the progression preset into the springs, these dual-rate sets allow the rider to choose the point at which the springs go from the soft initial rate to the stiffer final rate. This accommodates various rider weights, riding styles, road or track conditions and personal preference. One set of springs for one fork tube consists of a long spring, a short spring, pre-load spacer material (in most cases), separating washers and three different pairs of metal spacers that determine the "cross-over" point of the spring set. The shortest length causes the spring set to cross over later, so the forks remain softer longer. The longest length causes the spring set to cross over sooner resulting in the stiffer overall rate. The medium-length spacer provides the best average for most suspensions.

