RACE TECH

RACE TECH SUSPENSION / LOWERING KIT
WITH EMULATORS FLEK S38xx

<flek_s38.doc> **FLEK S38xx**   P Thede © 12-4-13   M Wiley 10-1-14   ©   3 pgs

TOOLS REQUIRED - Long Allen Socket (typically 8 or 10mm), air impact, 5/16" (8mm) drill and drill motor, tape measure (metric/inch), tubing cutter, Fork Fluid.

Thank you for choosing Race Tech products. The Suspension / Lowering Kit you have selected includes Emulators, Fork Springs, Two Inch Top-out Springs and Preload Spacer Material. These instructions cover installation as well as specific set up information.

CAUTION: IF YOU CHOOSE TO LOWER THE MOTORCYCLE THIS WILL AFFECT GROUND CLEARANCE AND THEREFORE IS RECOMMENDED FOR CUSTOM SHOW BIKES ONLY.

Please read the instructions completely before proceeding. *If you have questions please call Race Tech.* If you are unfamiliar with this process, stop and have a qualified mechanic assist you.
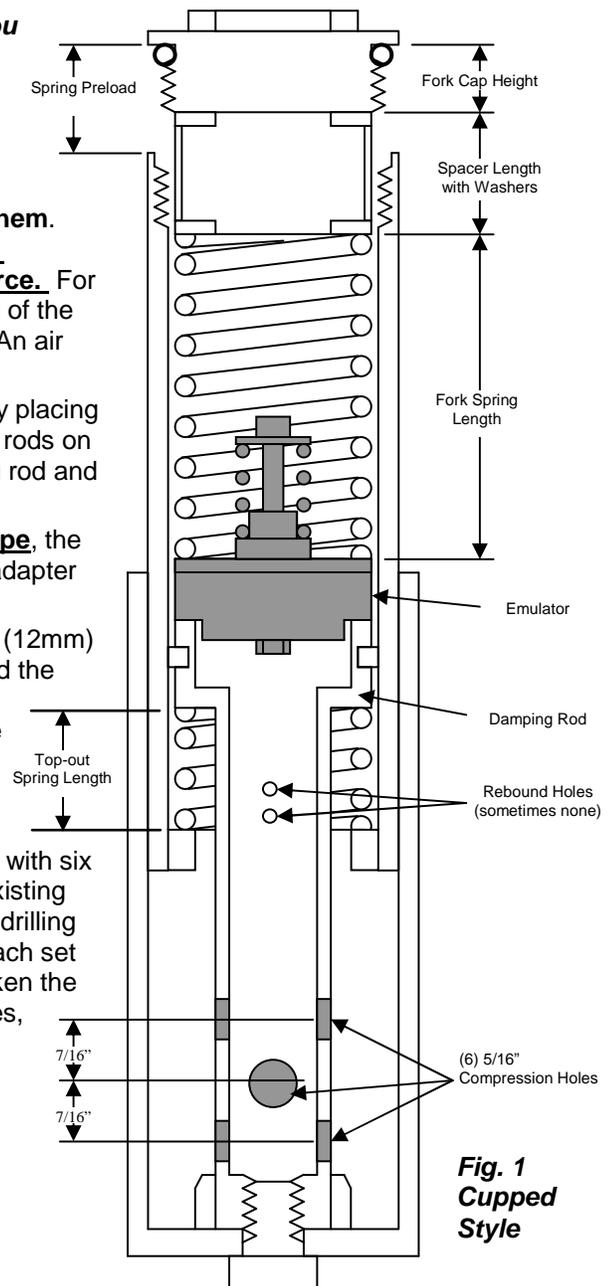
NOTE - BEFORE ASSEMBLY CHECK FOR PROPER FIT (see Step 2).

1   **Remove the forks from the bike and completely disassemble them**. **When removing the fork cap use caution as some springs are preloaded heavily and the cap can be released with a lot of force.** For stubborn damping rod bolts (on the bottom of the fork), hit the head of the damping rod bolt with a drift and hammer to jar the threads loose. An air impact and a long Allen socket also helps.

2   **Before installation, check the fit of the Gold Valve Emulator** by placing it on the top of the damping rod. (There are two types of damping rods on 41mm Harley forks. One that is cupped on the top of the damping rod and another that is flat on the top.)

   The cupped type is standard for most bikes. On **the cupped type**, the step on the Emulator must sit into the top of the damping rod. No adapter is required.

   The flat top style requires an adapter (fig. 2). The adapter is a ½" (12mm) long piece of aluminum tubing. It sits on top of the damping rod and the Emulator sits on top of the adapter. (This type is very rare and is only on some Harleys. We supply the adapter in the kit just in case you need it. If you have an application with this type please call us so we can complete our database.)

3   **Drill additional compression holes in the damping rod**. No matter how many compression holes come stock, you must end up with six 5/16 inch (8mm) holes (3 sets of 2 holes) (see figure 1). Drill the existing holes larger and, when necessary, add additional holes. If you are drilling new holes, space them lengthwise at 7/16" (10mm) increments. Each set of two holes must be perpendicular to the last set so as not to weaken the rod (Fig 1). After drilling, chamfer and deburr the compression holes, inside and out. Do not add, enlarge or deburr the rebound holes.

Spring Preload

Fork Cap Height

Spacer Length with Washers

Fork Spring Length

Emulator

Damping Rod

Top-out Spring Length

Rebound Holes (sometimes none)

7/16"

7/16"

(6) 5/16" Compression Holes

Fig. 1 Cupped Style

HOW LOW WILL YOU GO?

NOTE: If you do not want to lower your motorcycle use the Original Top-out Springs only.

If you want to lower the bike (recommended for custom show bikes only) you must lengthen the Top-out Spring. The Top-out Spring is located inside the fork on the damping rod, its main purpose is to provide a bit of cushion when the fork reaches full extension. The length of the Original Top-out Spring is approximately one inch (25mm). **To lower your bike one inch,** replace the Original Top-out Spring with the Race Tech Two Inch Top-out Spring.

To lower your bike two inches use both the Race Tech Top-out Spring and the Original Top-out Spring.

EMULATOR VALVING SETUP

The compression damping is determined by the Emulator Valve Spring setup. Check this setting as well as the tightness of the jam nut on the Emulator. Set up the Emulator Valving Spring according to the Table. This is done by first loosening the lock nut on the bottom of the Emulator and backing off the Allen bolt (counter clockwise) until there is no tension on the spring. From there turn the Allen bolt in (clockwise) the number of revolutions listed on the Table and tighten the lock nut.

4 **Begin reassembling** the forks according to your manual. Remember to install the Top-out Spring and bottom-out cone. Consult the manufacturers specs for damping rod bolt torque.

DETERMINING THE PRELOAD SPACER LENGTH

5 Spring preload is the amount the spring is compressed when it is installed in the fork leg with the forks fully extended. Do this step with no fork fluid.

(see figure 1) Extend the fork all the way. Install the Emulator by dropping it down the fork tube. It will sit on top of the damping rod with the Emulator Valve Spring facing up. If your model requires the adapter (damping rods with flat tops), it should be installed before the Emulator. Visually check to make sure the Emulator is sitting squarely on top of the damping rod or the adapter.

Install the spring. Place both spring washers on top of the spring temporarily. Use a tape measure to record the distance from the top of the fork tube down to the top of the spring washer (Distance "A" Figure 1). Measure the fork cap height. This is the distance from the bottom of the sealing lip (the point that touches the top of the tube when the cap is tightened) to the bottom of the cap (where the spring touches). Subtract this distance from Distance "A". The result is the required length of the spacer for zero preload. Add 1.0 inch (25mm) to this length to determine the length of the spacer. Hint: *PVC Spacer should come to top of fork tube +/- in most applications.*

Cutting the spacers can best be accomplished with a tubing cutter available at hardware stores. Washers must be installed on both ends of the spacer. The spacer must not rest on the spring or the cap directly. Double check the preload by stacking the spring, spacer, washers and cap and measuring the distance from the sealing lip on the cap to the top of the fork tube (see Figure 1).

OIL LEVEL SETUP

6 Remove the fork spring and **install fork fluid.** Use the oil viscosity and level recommended on the chart. Bleed the air bubbles out of the fork by pumping them up and down. The oil level is measured from the top of the fork tube down to the top of the oil when the fork is completely collapsed. Be sure to set the oil level with the Emulator installed, the forks completely bottomed and the fork springs out.

7 **Finish reassembly** by installing the spring, the first spring washer, the spacer and the second spring washer. Re-check the spring preload. This will indicate whether the Emulator is seated properly. Install the fork caps and, with the forks off the bike, push on them, checking for any unusual drag or bind that would indicate an improperly seated Emulator. Install the forks back on the bike. Where applicable, align the forks on the axle for minimum bind. Torque all the bolts including the brake calipers, pump up the brakes and enjoy!

Emulator

Adapter

Damping Rod
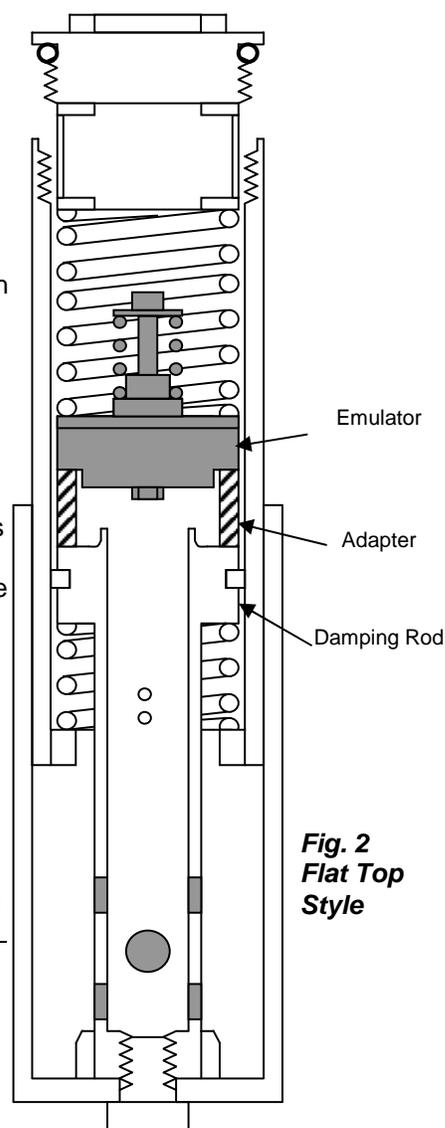
*Fig. 2
Flat Top
Style*

TUNING NOTES

Most riders will use the standard settings, however if you would like to experiment with a different "feel", here are some guidelines. To adjust the Gold Valve Emulator you must remove it from the fork leg (you don't have to remove the forks from the bike in some cases). Remove the springs using a twisting motion to avoid oil drips. To remove the Emulator, use a parts grabber or a 1/16" (1mm) welding rod with 1/4" (6mm) of both ends bent over 90 degrees into an "L" shape. Push the end into the rebound check valve slot and turn it 90 degrees to hook the Emulator. Before installation, be sure the jam nut on the Emulator is tight.

TUNING VARIABLES

VARIABLE	Standard	Options	Primary Effect
Valve Spring Preload*	See Table	1 to 5 Turns	Overall firmness, controlling a mushy feel and the speed the front end dives under braking
Valve Plate Bleeds	See Table	2 or 4	Initial Response, small bumps, plushness
Oil Viscosity	15wt	15wt to 30wt	Use oil viscosity to set rebound, this affects traction and stability
Valve Spring Rate	See Table	Silver #26, Blue # 40 Yellow 64 lbs/in	Overall firmness, response over sharp shaped bumps, high speed damping, fork dive
Fork Spring Preload	1.0" / 25mm	0.75" to 1.75"	Lowers or raises ride height & sag

* Measured from zero preload (no tension) on the Valve Spring. To find zero preload back off on the adjuster bolt until the spring is loose then tighten it until the spring just touches. More Preload gives more compression damping and a firmer ride.

Use oil viscosity to set the amount of rebound damping, then adjust the compression with the Emulator settings. The Emulator does not affect rebound, however oil viscosity does. The primary compression adjustment is the amount of Emulator Valve Spring Preload. Increasing Valve Spring Preload makes the fork stiffer. The effect of all the variables will overlap, this gives extreme tuning flexibility. If you use heavier viscosity oil, back off on the Emulator Valve Spring Preload to compensate for the increased compression damping caused by the heavier fluid.

RECOMMENDED SETTINGS: GOLD VALVE, OIL VISCOSITY and LEVEL

Model Type	SHOWA 41.3mm Forks	Emulator Valve Plate Bleed Holes	Emulator Valve Spring	Emulator Valve Spring Preload	Oil Weight	Oil Level	Fork Spring .80 – 1.0kg
Bike Style	Setup Style	(drill out dimple)	Rate	Turns	Viscosity	Level	Fork Spring
Bagger	Firm/Heavy Load	4 Bleed	64 lb/in	2-3 turns	15wt	150mm / 6"	FRSP S3234xxx
Bagger	Plush/Light Load	4 Bleed	40 lb/in	3-4 turns	15wt	150mm / 6"	FRSP S3234xxx
Dyna/Softail	Firm/Heavy Load	4 Bleed	64 lb/in	2 turns	15wt	150mm / 6"	FRSP S3234xxx
Dyna/Softail	Plush/Light Load	4 Bleed	40 lb/in	2-3 turns	15wt	150mm / 6"	FRSP S3234xxx
Indian Scout	Standard	4 Bleed	40 lb/in	3 turns	20wt	120mm / 4.7"	FRSP S3234xxx

TERMS

Spring Rate - The spring stiffness measured in kg/mm or lbs/in. This is not Preload.
Spring Free Length - The length of the spring when it is not installed.
Spring Set Length - The installed length of the spring with the shock or forks fully extended.
Spring Preload Length - Amount the spring is compressed from it's Free Length to install it. It is <u>not</u> the length of the spacer. Free Length minus Set Length equals Preload.
Spring Spacer Length - Spacer length.