RACE TECH

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GOLD VALVE CARTRIDGE EMULATOR INSTRUCTIONS
FEGV S3301   STREET / ROAD RACE

TOOLS REQUIRED - Long Allen Socket (typically 6, 8 or 10 mm), Air Impact, ¼" (6 mm) Drill and Drill Motor, Tape Measure (metric/inch), Tubing Cutter, Fork Fluid (see Table 2)

IMPORTANT NOTE: Most models require different fork springs. Consult www.racetech.com or call Race Tech.

NOTE: If you have aftermarket (non-stock) damping rods fitted in your motorcycle you must use an adapter not supplied in this kit. Please call Race Tech Technical Support for details.

NOTE - BEFORE ASSEMBLY CHECK FOR PROPER FIT (SEE STEPS 2 and 6).

Figure 1

1 **Remove the damping rods.** Take the forks off the bike and disassemble them. An air impact and a long Allen socket helps a lot. For stubborn Damping Rod Allen bolts use a drift and beat on the head of the damping rod bolt to jar the threads loose. Unless you are doing a complete overhaul, on most models, you don't have to remove the seals. Simply take the fork spring and the damping rod bolt out, turn the fork upside down and the damping rod will fall out. Some models have washers or circlips on the damping rod, these require complete disassembly.

   Check the fit of the Gold Valve Emulator by placing it on top of the damping rod. The step on the Emulator must sit into the large hole in the top of the damping rod and must completely cover it so there is no blow-by (figure 1). *Do NOT machine down Emulator to fit Yamaha RD250/350/400, use FEGV S3301.*

   NOTES:
   a) **Check the inner diameter of the fork spring.** It must be at least 4 mm (0.160") larger than the Emulator Valve Plate OD for proper flow (figure 1).
   b) **Non-standard style damping rods** include Flat-top and Protruding-top styles. These require special instructions.

3 **Drill the existing compression holes in the damping rod to 1/4 inch (6 mm) and add additional 1/4" holes so you end up with four holes** *(2 sets of 2 holes) (figure 1).* When drilling new holes, space them axially (lengthwise) at 10 mm (7/16") increments. Each set of two holes must be perpendicular to the last set so as not to weaken the rod (figure 1). After drilling, chamfer and deburr the compression holes, inside and out. **Do not add or enlarge the rebound holes and leave their edges sharp if any exist.**

   NOTE: If the bike is equipped with an Anti-Dive Mechanism or an External Compression Adjuster, the new holes should be drilled starting just above the Bottom-out Cones (or washers on models with washers). This will bypass the effect of the Anti-Dive but will result in a vastly improved ride. You do not have to disconnect the external Anti-Dive mechanism; it will be disabled with this modification.

4 **Check the Emulator Valving.** The standard valving may be different than that required by your conditions – see your DVS Setup Sheet. Check the tightness of the jam nut on the Emulator.
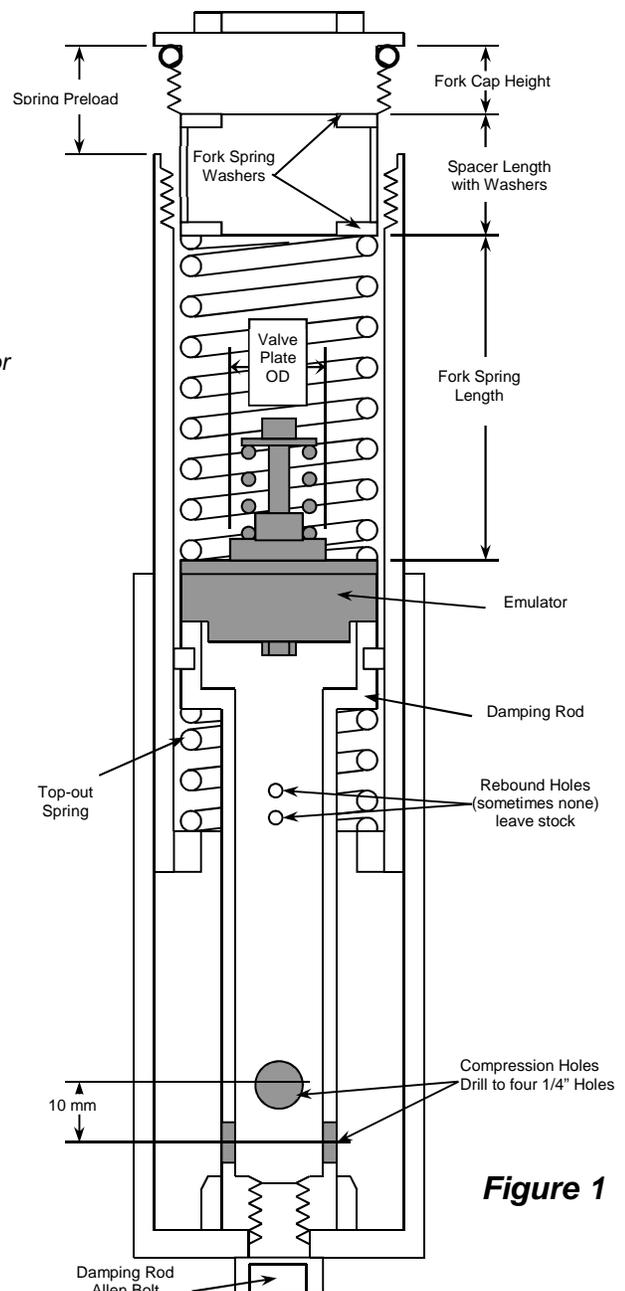
5 **Begin reassembling** the forks according to your manual. Remember to install the top-out spring and bottom-out cone if you have chosen complete disassembly. Consult manufacturers specs for damping rod bolt torque.

6 **Set the fork spring preload** *by making the correct length spacers*. This is done before installing the fork fluid. *(See the Custom Valving Setup at www.racetech.com)*

    a. Drop the Emulator down the tube. It sits on top of the damping rod with the <u>Emulator Valve Spring facing up</u> and is held in place with the main fork spring. Refer to figure 1. Visually check to make sure the Emulator is sitting squarely on top of the damping rod or the adapter. If you have flat top style damping rods it requires adapters (figure 2) and they should be installed first, before the Emulator.

    b. Extend the fork tube all the way. Insert the fork springs into the fork tube on top of the Emulator. Install a fork spring spacer washer. Place the fork spring spacer tube in next, then another washer.

    c. Set the fork cap on the washer and determine the preload by measuring from the top of the fork tube to the sealing lip on the fork cap (see figure 1). This is a direct measurement of fork spring preload. Shorten the spring spacer tube to achieve the proper preload as shown in Table 2.

NOTE: If <u>you use the same spring and there is no preload spacer</u> in the forks, it will have more preload and the front end will ride higher. This is not correct.

NOTE: If one end of the spring has a smaller diameter than the other, the large diameter end should go down against the Emulator.

NOTE: You must have washers on both ends of the spacer. <u>The spacer must not rest directly on the spring or the cap</u>**.**

7 **Install the fork fluid.** First remove the fork spring and use the oil viscosity recommended by the DVS Setup Sheet. Bleed the fork by pumping them. Install the Emulator and then **set the oil level** with the forks completely bottomed and the springs out.

8 **Finish reassembly** by installing the spring and spacer. Before you install the cap, 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. **Align the forks on the axle for minimum bind.**

We strongly recommend a quality fork brace for racing applications. Be careful to set the brace width for minimum bind. Torque all the bolts including the brake calipers, pump up the brakes and enjoy!

TUNING NOTES

To adjust the Gold Valve Emulator you must remove it from the fork. When you remove the fork springs use a twisting motion to avoid oil drips. To remove the Emulator, use a parts grabber. Adjust the Emulator Valve Spring Preload a half turn at a time. More Valve Spring Preload will make the forks stiffer. Before installation, be sure the jam nut on the Emulator is tight using a socket.

TUNING VARIABLES

VARIABLE	OPTIONAL	PRIMARY EFFECT
Valve Spring Preload	0 to 7 Turns	Overall firmness, controlling a mushy feel and the speed the front end dives under braking.
Oil Viscosity	10wt to 30wt	Use oil viscosity to set rebound, this affects traction and stability. Heavier oil equals slower rebound, lighter oil equals quicker rebound.
Valve Spring Rate	26, 40 or 64 lbs/in	Overall firmness and the ride on square shaped bumps. Note that most 33-36mm vintage forks work better with the 40lb/in spring at 2-4 turns
Emulator Valve Plate Bleed Holes	Additional bleeds as desire up to 4 total	Initial fork movement low speed damping & plushness before valve plate opens; small bumps, chatter, etc.

* 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.

Technical Support 951-279-6655
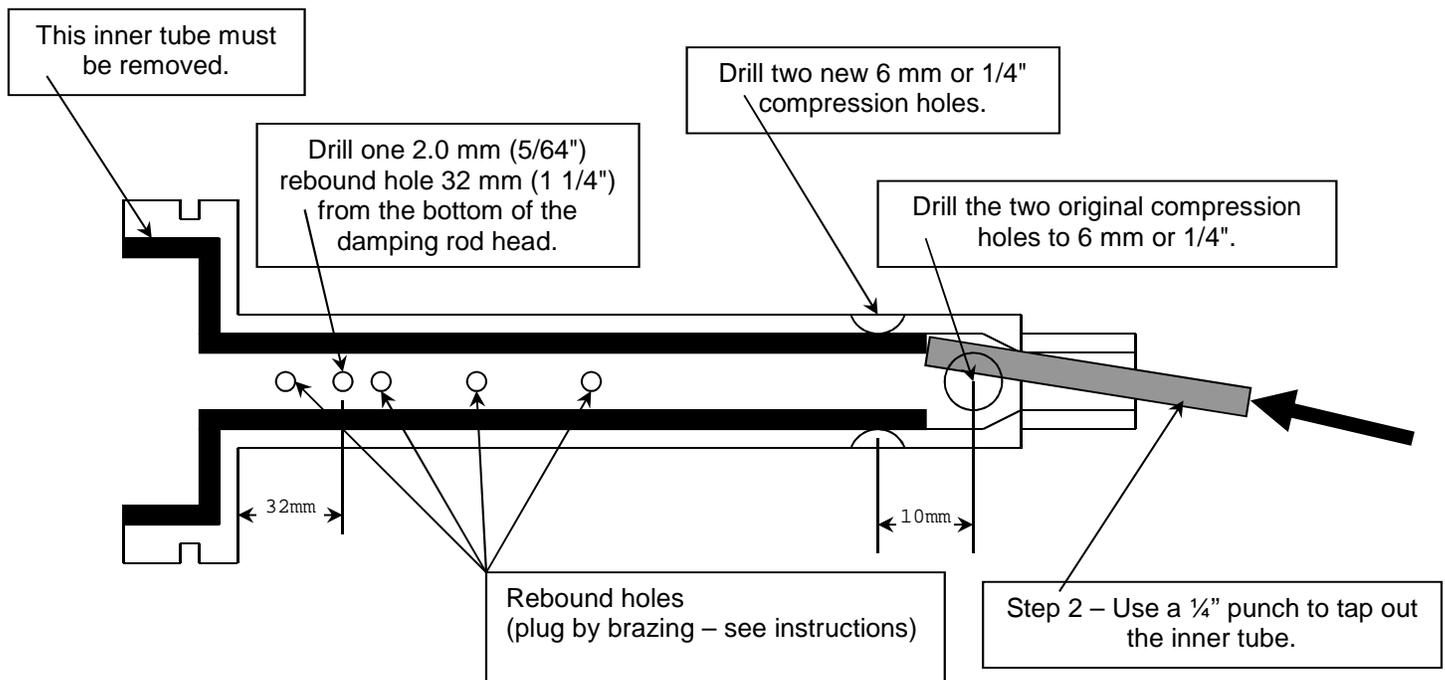
RZ350 DAMPING ROD MODIFICATION
4 HOLE x 1/4"

* __Do NOT Machine down Emulators to fit RD250/350/400!__ *

TOOLS REQUIRED (In addition to those required for standard installation): Brazing Equipment, Fine Flat File, Drill Motor and 5/64" (2.0 mm) Drill Bit, 1/4" Drift (flat end punch) and a Hammer.

CAUTION: THIS MODIFICATION REQUIRES BRAZING AND CAREFUL FILEING. INSTALLATION SHOULD BE PERFORMED BY A QUALIFIED MECHANIC. IF YOU ARE UNFAMILIAR WITH THIS PROCEDURE, STOP! CALL RACE TECH OR A QUALIFIED MECHANIC.

The RZ has a unique "twin tube" damping rod that must be modified for proper damping. The inner tube must be removed and the stock rebound feed holes must be brazed and re-drilled.

1   Remove the damping rods from the forks.

2   Clamp the damping rod lengthwise in a vise with soft jaws to protect the rod. The end of the inner tube is located approximately 38 mm (1 1/2") from the bottom end of the tube. Insert a 6 mm (1/4") drift into the bottom of the damping rod. Angle it to the side and tap out the inner tube (fig 1). Discard the inner tube.

3   There are four rebound feed holes stock. Two large holes located at the top of the rod and two small holes located further down the rod. Braze all four stock rebound feed holes shut. Completely file the excess braze off flush with the damping rod surface. Be careful not to remove steel from the damping rod itself as this will affect the rebound damping.

4   Drill one new 2 mm (5/64") rebound hole 32 mm (1 1/4") from the bottom of the head of the damping rod. It should be at the same height as the top original rebound hole. Deburr the hole inside and out.

5   Complete the installation following the standard instructions by drilling new compression holes in the bottom of the damping rod, setting the oil level and viscosity according to the DVS. Reassemble and enjoy!

This inner tube must be removed.

Drill two new 6 mm or 1/4" compression holes.

Drill one 2.0 mm (5/64") rebound hole 32 mm (1 1/4") from the bottom of the damping rod head.

Drill the two original compression holes to 6 mm or 1/4".

32mm

10mm

Rebound holes
(plug by brazing – see instructions)

Step 2 – Use a ¼" punch to tap out the inner tube.

NON-STANDARD EMULATOR INSTALLATION
FLAT TOP OR PROTRUDING TOP DAMPING RODS
### *(CUSTOM ADAPTER REQUIRED)*

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Before installation, check the fit of the Gold Valve Emulator by placing it on the top of the damping rod. There are three basic types of damping rods. One that is cupped on the top of the damping rod, second, one that is flat on the top, and third where the damping rod protrudes on top.

Cupped style - the step on the Emulator must sit into the top of the damping rod. This is the most common style. No adapter is required.

Flat-top style requires an adapter. The adapter sits on top of the damping rod and the Emulator sits on top of the adapter. Most adapters are available.

Protruding-top style is just like the flat-top style but the adapter must be slightly taller to insure proper flow.
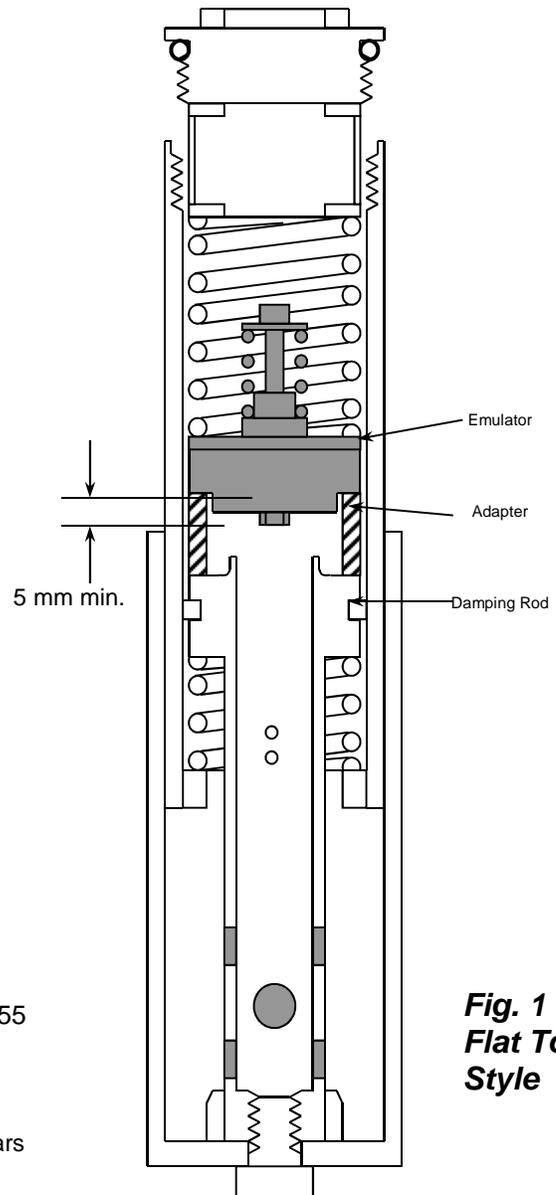
CUSTOM ADAPTER BASIC DESIGN

Since there are many configurations of the top of the damping rod these guidelines will not apply to all applications. Please call Technical Support 951.279.6655 for assistance. Be prepared to supply important dimensions of the fork internals.

- Select the proper Emulator (fits into the tube and clears by .5mm minimum).
- **Material** – Aluminum or PVC
- **Adapter Outer Diameter** – Same as Emulator Outer Diameter
- **Adapter Inner Diameter** - 0.5mm (0.020") larger than the Step Diameter of the Emulator
- **Adapter Height** – The adapter must be tall enough to allow 5 mm (0.200") clearance between the top of the hole in the damping rod and the bottom of the jam nut on the Emulator. (fig 1)
- **Pre-made Adaptors** available from Race Tech, see racetech.com for applications

Emulator

Adapter

5 mm min.

Damping Rod

Fig. 1
Flat Top
Style