

# RACE TECH

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## GOLD VALVE CARTRIDGE EMULATOR INSTRUCTIONS

<IP FEGV S2901.doc> FEGV S2901 M Wiley © 7-23-08 - 02-15-2018 MW

3 pages

**TOOLS REQUIRED** – 8 mm Allen Socket, air impact, drill motor and 6 mm (1/4") drill, tape measure (metric), tubing cutter, and 10, 15, 20 or 30wt Fork Fluid; see [racetech.com](http://racetech.com)

**IMPORTANT NOTE:** Many riders require different fork springs. Consult [www.racetech.com](http://www.racetech.com) or call Race Tech.

**NOTE:** The damping rods fitted in your motorcycle you may use an adapter not supplied in this kit, see page 3. Please see **Product Search** or call Race Tech Technical Support for details if necessary.

- 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.
- 2 Drill the existing compression holes in the damping rod to 1/4 inch (6 mm) 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.**
- 3 Check the Emulator Valving.** The standard valving that is pre-installed is Blue 40 lb/in Emulator Valve Spring with 3 turns of Valve Spring Preload. Use Optional Silver 26lb/in Spring for more responsive, plusher Fork.
- 4 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.
- 5 Set the fork spring preload by making the correct length spacers.** This is done before installing the fork fluid.

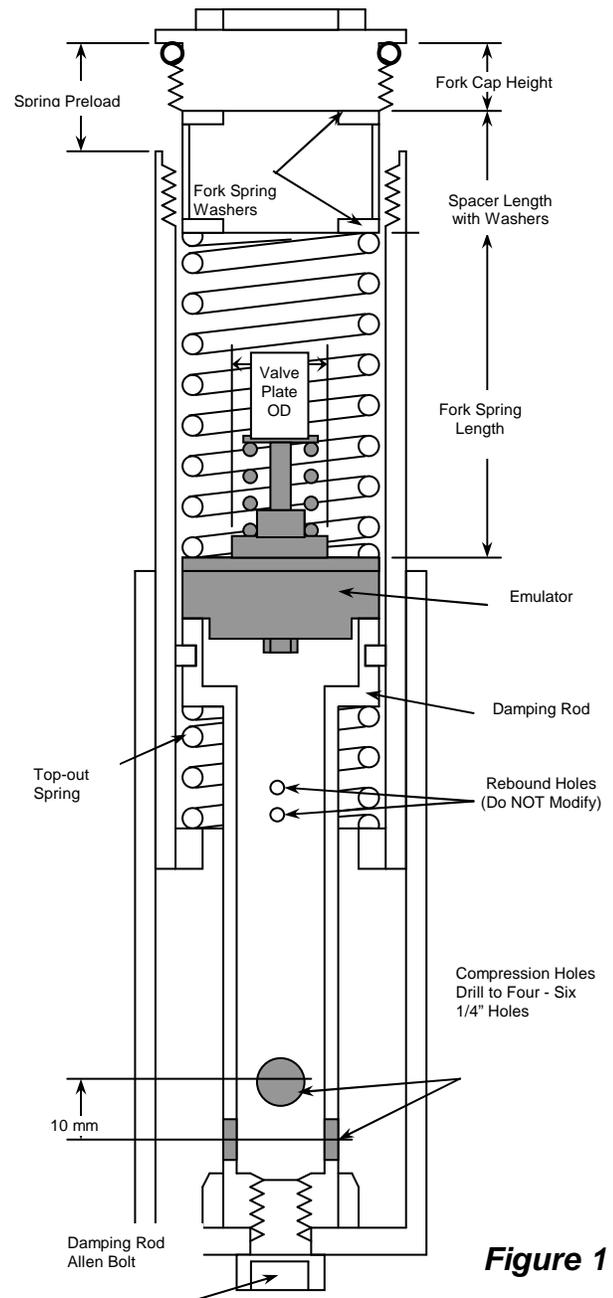


Figure 1

- a. Drop the Emulator down the tube. It sits on top of the damping rod with the Emulator Valve Spring facing up 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.
- 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.

We recommend 15 mm (0.6") of total fork spring preload. (Range 10-20mm)

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

- 6 **Install the fork fluid.** First remove the fork spring. Bleed the fork by pumping them. Install the Emulator and then set the oil level (typically 110-130mm, see service manual) with the forks completely bottomed and the springs out, see racetech.com If you cannot find oil specs call Race Tech Technical Support 951-279-6655
- 7 **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. Tighten all the bolts 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	STANDARD	OPTIONAL	PRIMARY EFFECT
Valve Spring Preload	<b>3 Turns</b>	1 to 5 Turns	Overall firmness, controlling a mushy feel and the speed the front end dives under braking. <u>Add turns of Valve Spring Preload for Racing or for heavy riders.</u>
Oil Viscosity	<b>OSFO 15 (15wt)</b>	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	<b>40 lbs/in (Blue)</b>	26 lb/in (Silver)	Overall firmness and the ride on square shaped bumps. Note that most 33-36mm vintage forks work best with the Emulator spring at 2-5 turns Range
Emulator Valve Plate Bleed Holes	<b>4 Bleeds</b>	Optional 2 Bleed Valve Plates Available	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. 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 or Colored Spring makes the fork stiffer. The effect of all the variables will overlap providing extreme tuning flexibility.

## Technical Support 951-279-6655

**NOTE: If you have aftermarket (non-stock) damping rods you must use an adapter not supplied in this kit. KYB Damping rods require some machining, see racetech.com for details or please call Race Tech Technical Support at 951.279.6655 for information. See instructions below for spacer set up**

## NON-STANDARD EMULATOR INSTALLATION (CUSTOM ADAPTER REQUIRED)

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### **FITMENT: Before installation, check the fit of the Gold Valve**

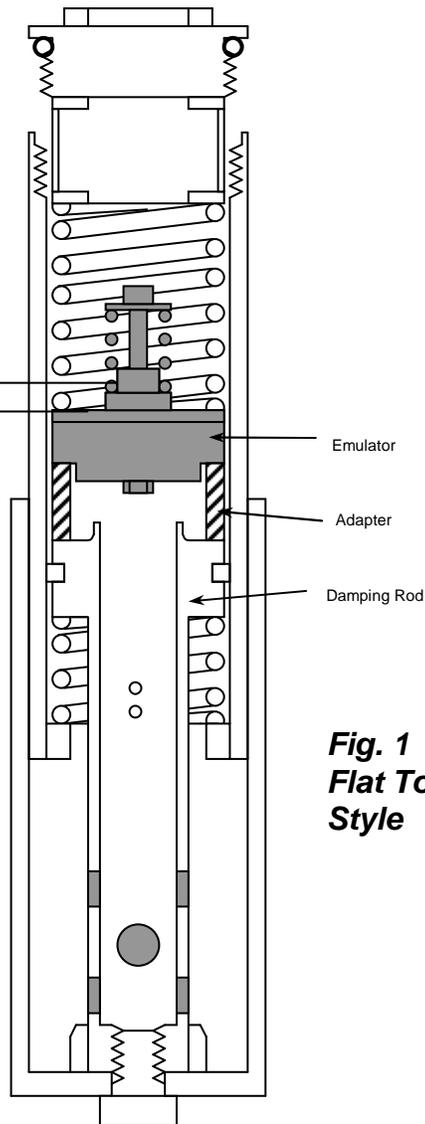
**Emulator** by placing it on the top of the damping rod. There are three basic types of damping rods. One that is cupped on the top of the damping rod, second, one that is flat on the top, and third where the damping rod protrudes on top.

On **the 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.

The **flat top style** requires an adapter. The adapter sits on top of the damping rod and the Emulator sits on top of the adapter. These adapters are mostly custom however some of the more common types are available.

The **protruding top style** is just like the flat top style but the adapter must be slightly taller to insure proper flow to the Emulator; Most KYB & European forks

5 mm min.



**Fig. 1  
Flat Top  
Style**

## 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 the Technical Support Hotline 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 Plastic

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 Race Tech Emulator Adapters are available for most applications:

FPEV AD2901 P Standard no Piston Rings

FPEV AD2902 P with Piston Rings - FPEV AD2903 P Stepped Adapter with Piston Rings for Cerianni Forks.

**NOTE:** Some damping rods require adapters described above in this kit. Some damping rods may require machining, see [www.racetech.com](http://www.racetech.com) for details or call Race Tech Technical Support at 951.279.6655