

RACE TECH

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GOLD VALVE CARTRIDGE EMULATOR INSTRUCTIONS

Marzocchi 40mm – BMW R 80/100 GS

<IP FEGV S3804.doc> FEGV S3804 P Thede © 4-28-11

3 pgs

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

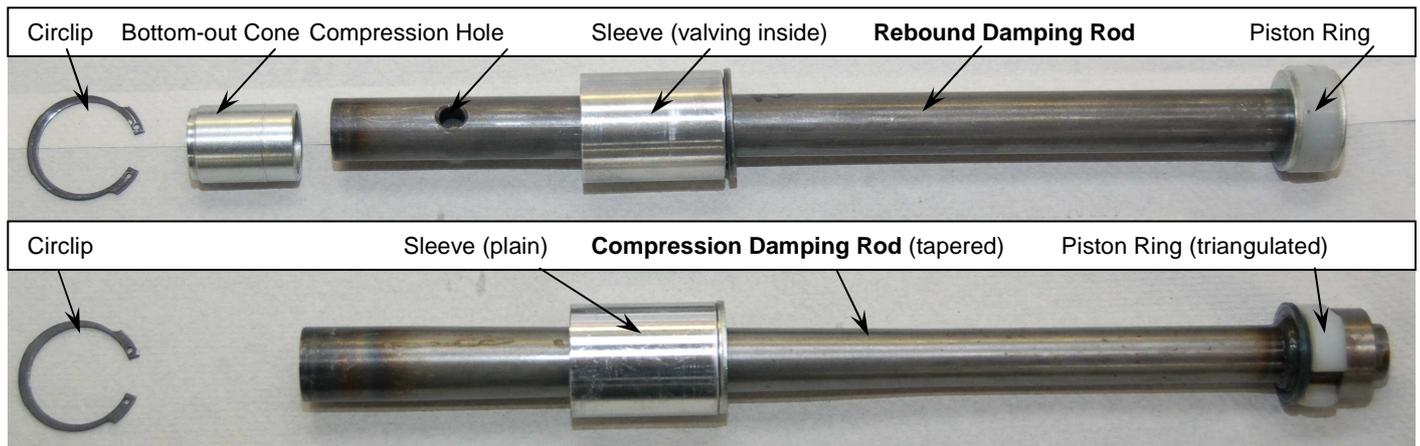
IMPORTANT NOTE: We highly recommend different fork springs. See www.racetech.com or call for recommendations.

Introduction

Thank you for purchasing a Gold Valve Cartridge Emulator Kit. On this particular fork, the left and right fork legs are different. The right leg creates both compression and rebound damping while the left leg creates only compression. **The even though the right leg creates both rebound and compression we will refer to it as the rebound leg.** The left leg creates a marginal amount of compression damping through most of the stroke and really is only effective near bottoming. We will not make any modifications to the compression leg other than spring rate and oil.

We will be creating both compression and rebound damping on the rebound (right) leg. **Note: If your forks have ever been rebuilt before, someone could have reversed the tubes and/or damping rods.**

STOCK DAMPING RODS



- 1 **Remove the damping rod.** Take the right fork leg off the bike and disassemble it. 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 thread loose (I know, it seems a little cave man but it works). Remove the internal circlip in the bottom of the fork tube to remove the aluminum sleeve and damping rod assembly.

You can identify the compression leg because the damping rod is tapered its entire length and has a piston ring with triangular faces. The sleeve in the bottom of the fork that is held in with a circlip is plain (it doesn't have valving in it). **You will not be modifying the compression leg so if these are the components you have you may reassemble it and open the other one.**

When removing the sleeve at the bottom of the fork tube on the rebound leg there will be a check valve, plate and spring. Make note of the order and orientation for reassembly. Note: figure 1 does not show this detail – sorry.

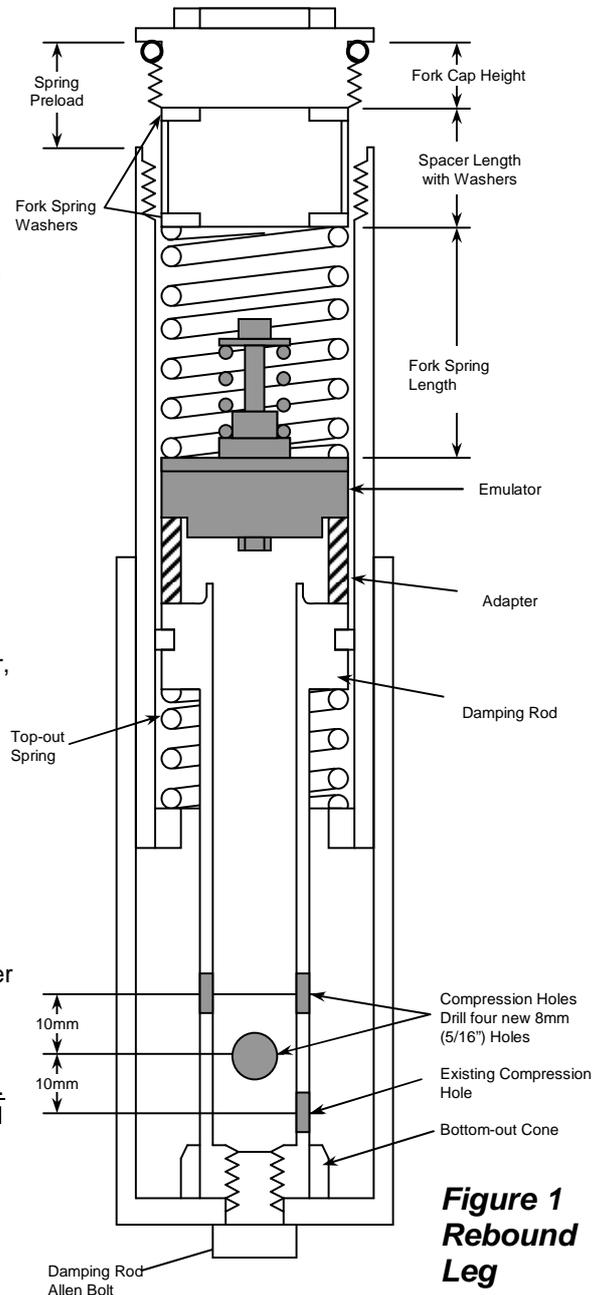
- 2 **Compression Leg (should be the left leg)**—reassemble it and fit the new fork springs.
- 3 **Rebound Leg (should be the right leg)**—**Drill four 8mm (5/16") additional compression holes in the damping rod so you end up with 5 holes (Fig 1).** Note: the existing hole is already larger than 8mm. When drilling new holes, space them lengthwise at 10mm (7/16") increments above the existing holes (exact placement is not critical). 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

- 4 **Check the Emulator Valving.** The standard valving pre-installed is a yellow 64 lb/in Emulator Valve Spring with 4 turns of Valve Spring Preload. The optional Valve Spring included in the kit is a blue 40 lb/in spring for a softer ride. Check the tightness of the jam nut on the Emulator.
- 5 **Begin reassembling** the forks according to your manual. You will not reuse the spring perch that sits on top of the damping rod on the rebound leg. Remember to install the top-out springs as well as the bottom-out cone on the rebound leg. Consult manufacturers specs for damping rod bolt torque.
- 6 **Set the fork spring preload to 15mm (5/8") by making the correct length spacers.** This is done before installing the fork fluid.
 - a. Drop the Adapter and Emulator down the tube. Make sure the Emulator Valve Spring is facing up. It 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 Adapter.
 - 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 fig. 1). This is a direct measurement of fork spring preload. Shorten the spring spacer tube to achieve the proper preload as shown in the Table.

NOTES:

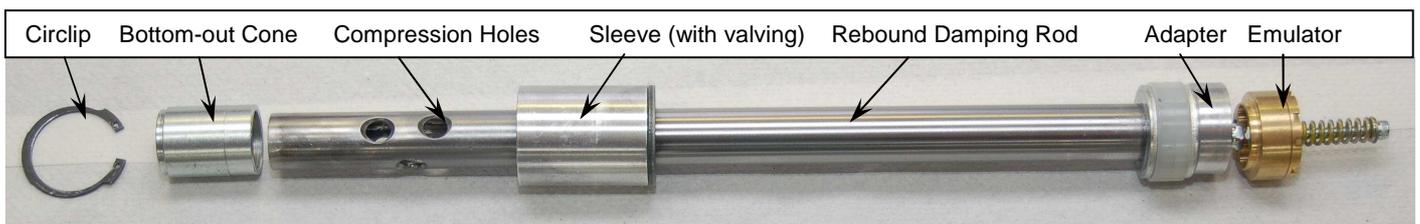
- **If you are not using Race Tech Springs,** make sure the Emulator valve plate has clearance on the ID of the spring (there must be at least 0.160" (4mm) clearance between the OD of the valve plate and the ID of the spring).
- If one end of the spring has a smaller diameter than the other, the large diameter end should go down against the Emulator.
- You must have washers on both ends of the spacer. The spacer must not rest on the spring or the cap directly.

- 7 **Install 10w fork fluid.** First remove the fork spring and use the oil viscosity recommended in the table below. Bleed the fork by pumping them. Install the Emulator **and set the oil level to 150mm (6")** 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. 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!



**Figure 1
Rebound
Leg**

MODIFIED "REBOUND" DAMPING ROD



TUNING

To adjust the Gold Valve Emulator you must remove it from the fork. To remove the Emulator, use a parts grabber. When tuning, 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.

TUNING VARIABLES

VARIABLE	STANDARD	OPTIONAL	PRIMARY EFFECT
Valve Spring Preload	4 Turns	0 to 7 Turns	Overall firmness, controlling a mushy feel and the speed the front end dives under braking. 6 turns of Valve Spring Preload for Racing or for heavy riders.
Oil Viscosity	10wt	10 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	64 lbs/in (yellow)	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	2 bleeds	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.

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 providing excellent tuning flexibility.