

# RACE TECH

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## FORK GOLD VALVE INSTALLATION 96-03 SUZUKI GSX-R750 20mm

FK code

<IP FMGV S2046.doc> FMGV S2046 P Thede © 1.31.14 4 pgs

**TOOLS REQUIRED:** (In addition to those required for fork disassembly.) In-lb Torque Wrench that accurately measures 0 to 50 in-lbs (0.58 kgf-m), 5mm Allen Wrench, Hi-Strength Loctite (included), Metric Calipers, 0-25mm Metric Micrometer, 12" Length of 1/2" Electrical Conduit (to use as a removal tool for the bottom-out piston).

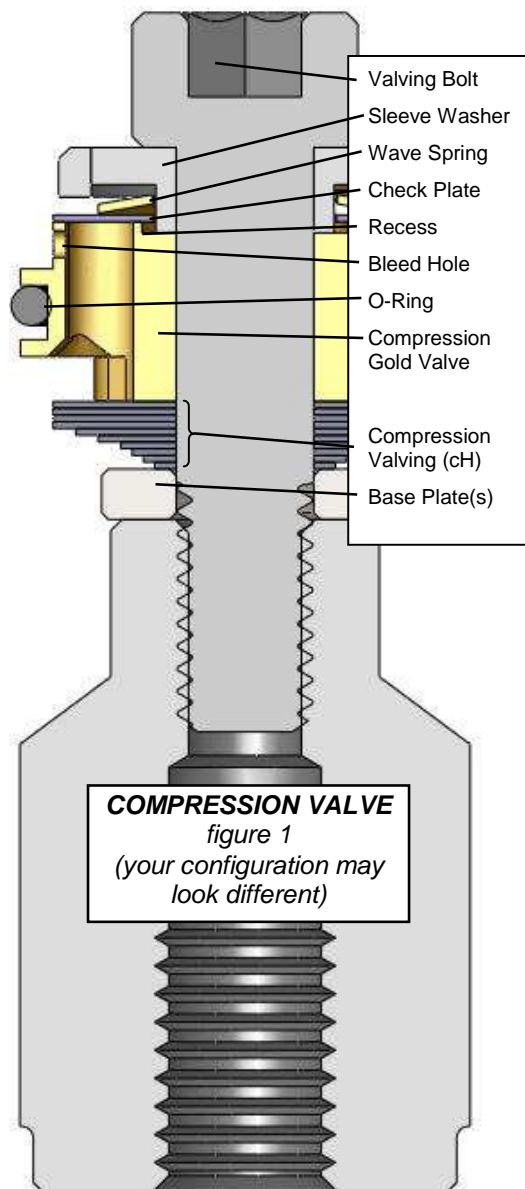
**NOTE:** Many riders require different fork springs. Please consult [www.racetech.com](http://www.racetech.com) or call Race Tech.

### DISASSEMBLY

- 1 **CLEANLINESS IS CRITICALLY IMPORTANT.** Completely disassemble and clean your front forks. **If you are unfamiliar with this process, STOP!!!! Do not proceed. Seek out a qualified suspension technician to complete the installation.**

### COMPRESSION VALVING

- 2 To get to the compression valve you need to **remove the cartridge**. Next **remove the compression valve body from the cartridge**. To do this, push the compression valve holder into the cartridge about 5mm (0.2") to allow access to the wire retaining clip. Remove the clip with a small screwdriver, it comes out easily. Once the clip is out, pull the holder out by screwing the bolt back in and pulling.
- 3 Remove the Allen Bolt and **disassemble the valving stack**. Clean and inspect all the parts.
- 4 **Begin reassembly of the compression valving.** Place the original cupped washer, check valve spring ("warped" washer) and check valve plate (17mm OD by 8 ID) on the stock bolt. Put the Gold Valve on the shaft (the side of the valve with the recess goes on first). Make sure the new o-ring is on the Gold Valve.
- 5 **To obtain custom valving settings, log on to [www.racetech.com](http://www.racetech.com), go to Digital Valving Search, insert your Access Code (printed on the top of the first page), input your personal specifications and print the custom setup information. If you do not have access to the web contact our Technical Support Hotline 951.279.6655 for recommendations. Note: The Access Code is good for one limited-time use.**
- 6 Install the valving with the largest shim closest to the valve. Place the new base plate (thick washer) and the stock base plate on the shaft.
- 7 Inspect to be sure **the check valve (large ID washer) can move up and down freely** against the spring.
- 8 **Install the bolt into the holder. CAUTION!** The threads can be damaged without extreme care. You must use Loctite. The 6mm bolt must be torqued with a torque wrench to 30 in-lbs (2.5 ft-lbs or 0.35 kgf-m), **NO MORE!** Do not take this step lightly.



- 9 Hold the compression stack up to the light and visually **check for proper assembly**. If there are any problems, disassemble the stack and look for burrs to surface and/or dirt in the valving.

## REBOUND VALVING and LENGTHEN THE FORK

The stock rebound damping is too quick!

- 10 To get to the rebound stack you must **remove the damping rod from the cartridge**. Being very careful not to damage the damping rod (it is made of aluminum and is fairly easy to crush), hold the rod with the Shaft Holding Tool provided. The stock bottom-out piston is held onto the rod with peening over a circlip on the rod (the circlip is not visible until the piston is removed). You must spread the peening over the circlip. Simply tap down on the piston using a hammer and a 12" (300mm) length of 1/2" (12mm) electrical conduit (or some other piece of pipe) as a driver (or you can use a small chisel). This will spread the peening. Save the circlip, it will be reused. Slide the rod out of the cartridge tube.
- 11 Lightly file the peening off the end of the shaft that holds on the nut. Remove the nut holding on the rebound valving and **disassemble the valving stack**. Lay out the pieces in the order they come off the shaft. Clean and inspect all the original parts. Be careful to maintain the original order and orientation of the parts. (You will need some of the original parts, do not discard.) Lightly deburr the end of the threads.

### LENGTHEN the FORK (optional- figure 2)

The GSX-R750 benefits from a longer front fork. This increases rake and trail slightly and makes the bike more stable.

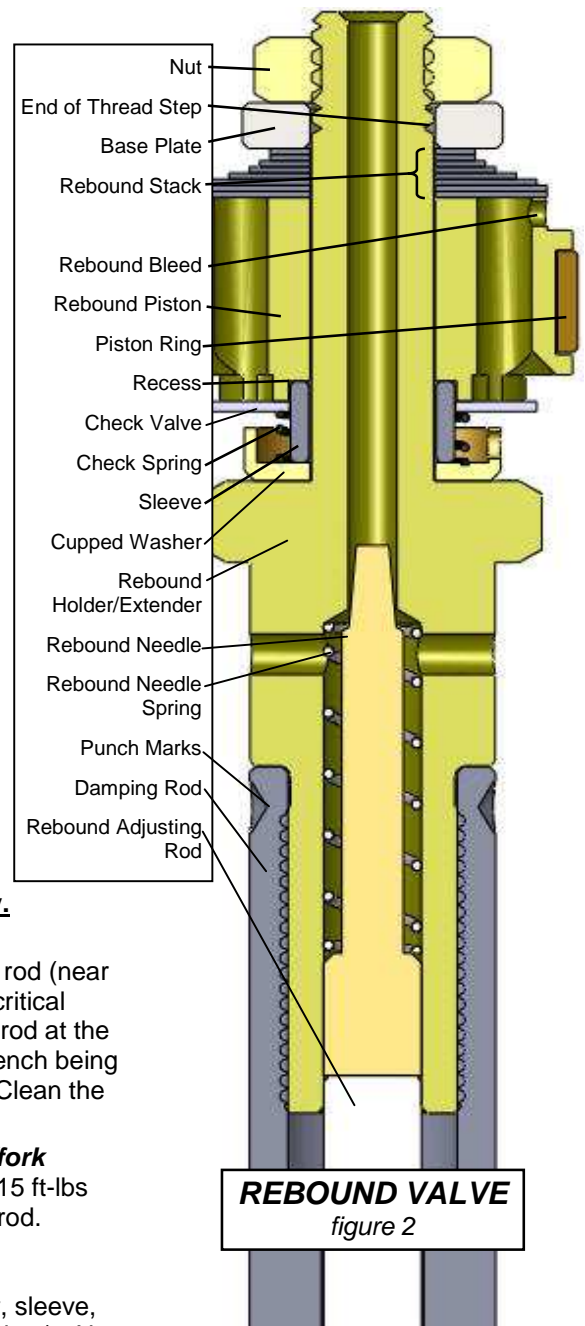
- 12 **Remove the rebound holder** from the end of the shaft. This must be done carefully to avoid damage. There are punch marks on the shaft that must be drilled out to remove the holder. Clamp the rod in the shaft holding tool. Be very careful not to scratch the rod as this will affect performance. Use a 5/64" (2mm) drill and drill through just the punch marks on the aluminum rod. **CAUTION: Drill through the aluminum rod only. Do not drill all the way through the damping rod.**

Clamp the shaft in the shaft holding tool at the top of the damping rod (near the cap). This eliminates the possibility of damaging the rod in a critical location. You may need to use a propane torch to mildly heat the rod at the holder to loosen the Loctite. Unscrew the holder with a 14mm wrench being careful to keep track of the needle and the spring inside the rod. Clean the rod.

- 13 **Reinstall the spring and needle into the new rebound holder/fork lengthener**. Use Loctite on the threads and torque the holder to 15 ft-lbs (20.4 NM). Use a punch and carefully re-punch the holder to the rod.

### REBOUND VALVING (continued)

- 14 **Assemble the Rebound Valve**. Starting with the cupped washer, sleeve, check spring, check plate, rebound valve (recess towards check plate). Next install the rebound valving shims [(8) 0.15x17 and (1) 0.10x10]. Then install the base plate and nut. Use Loctite and torque the nut to 30 in-lbs (0.35 kgf-m).



## **MODIFY the BOTTOM-OUT SYSTEM**

*This helps reduce headshake when braking.*

The hydraulic bottom-out system consists of a piston attached to the damping rod and a cup located at the top of the cartridge. This cup holds fluid. When the fork approaches bottoming, the piston attached to the rod enters this cup, the oil is squeezed out creating resistance. The problem is that the effective length of the bottom-out system is excessive. To reduce this length:

- 15 **Shorten the effective length of the hydraulic bottom-out system** by drilling a 1/8" (3mm) hole in the top of the cartridge. The location is critical. At the top of the cartridge there is a machined line approximately 1/2" (12mm) from the top of the cartridge (where the spring sits). This is the perfect height for a bottom-out bypass hole. Drill and deburr the hole.

## **ASSEMBLY**

- 16 **Reinstall the rod** into the cartridge tube and **install the Race Tech Removable Bottoming Piston**. To do this, first sliding the brass inner sleeve on the rod then reinstall the stock wire clip. Install the brass ring, chamfer first. Install the aluminum nut and tighten. Use 5/8" and 3/4" wrenches.
- 17 Grease the o-ring and **install the compression assembly** into the cartridge. Install the retaining clip and seat the compression valve assembly.
- 18 **Reassemble the forks according to the procedure in your manual. Bleed the cartridge and set the oil level** with the forks and the damping rod completely bottomed. **Set the spring preload and oil level** according to the Digital Valving Search Setup Sheet.
- 19 **Install the fork cap**. This step is important for proper operation of the rebound adjuster. If the cap is threaded too far onto the rod there will not be the full range of adjustment. If the cap is not threaded on far enough, it will not touch the adjuster and could come off the shaft.  
To install the cap, screw the adjuster all the way out (counterclockwise), then screw it in 3 1/2 turns. Use Loctite on the damping rod threads at the cap. Install the cap onto the rod until it starts to feel tight (the adjuster needle is bottomed out). Hold the position of the cap in relation to the rod. Back out the adjuster 1/2 turn (so the rebound adjuster needle isn't damaged when the jam nut is locked down) and tighten the jam nut to manufacturers specs. Check to see you have approximately 3 1/2 turns of total adjustment. Consult owners manual for proper procedure.
- 20 **Adjust the compression and rebound adjusters** according to the Digital Valving Search Setup Sheet.
- 21 **Install the forks in the triple clamps**. Since the forks are longer by 10mm (0.4") you may want the top of the forks to extend up higher than the top of the clamps. Start at 5mm (0.2") above.
- 22 When the forks are put on the bike it is very important to **align the fork tubes**. This is done by first tightening the axle all the way, then the tubes are aligned by pumping the forks up and down with the right-hand axle clamp loose. This will line the tubes up so they won't bind. Finally, tighten the axle clamp. If you have **any questions** please call our Technical Support Hotline at 951.279.6655.

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the latest innovations  
at [www.racetech.com](http://www.racetech.com).**

# BUILDING the VALVING STACK - STREET / ROAD RACE 20mm

Welcome to the wonderful world of Gold Valving. To obtain your personal Custom Suspension Settings:

1. Log on to [www.racetech.com](http://www.racetech.com)
2. Go to Digital Valving Search (DVS)
3. Input your Access Code (on top of page 1) when prompted
4. Input your personal specifications
5. Print your DVS Custom Suspension Setup Sheet

If you do not have access to the Internet contact our Technical Support Hotline 951.279.6655 for recommendations. Note: The Access Code is good for one bike, limited-time use.

Once you have your valving settings, build your valving stacks.

## EXAMPLE:

The Total Valving Stack is cH33:

Starting from the Gold Valve piston face

### Compression Stack – cH33

- (3) 0.15x17
- (1) 0.10x15
- (1) 0.10x13
- (1) 0.10x12
- (1) 0.10x11
- (1) 0.10x10
- (1) 0.10x9

Visit [www.racetech.com](http://www.racetech.com), go to Digital Valving Search with your Access Code (from the top of page 1) for your personal computer calculated valving setup!

**OIL LEVEL, EXTERNAL ADJUSTERS, SPRING RATE, and PRELOAD are all listed on the go to Digital Valving Search on [www.racetech.com](http://www.racetech.com).**

NOTE: All measurements are metric (for inches divide by 25.4). The valving list starts at the piston face and goes towards the base plate. Valve specs are listed by (QUANTITY) THICKNESS x DIAMETER. A number in parentheses means quantity. If there is no number in parentheses the quantity is one. Example: (2).15x17 means quantity two, 15 hundredths of a millimeter thick by 17 millimeters in diameter.

# FORK GOLD VALVE CHART - STREET / ROAD RACE 20mm

Chart #20S-054 © P Thede

STIFFER →

cH30	cH31	cH32	cH33	cH34	cH35	cH36	cH37	cH38	cH39
.10x17	(1).15x17	(2).15x17	(3).15x17	(4).15x17	(5).15x17	(6).15x17	(7).15x17	(8).15x17	(9).15x17
.10x15	.10x15	.10x15	.10x15	.10x15	.10x15	.10x15	.10x15	.10x15	.10x15
.10x13	.10x13	.10x13	.10x13	.10x13	.10x13	.10x13	.10x13	.10x13	.10x13
.10x12	.10x12	.10x12	.10x12	.10x12	.10x12	.10x12	.10x12	.10x12	.10x12
.10x11	.10x11	.10x11	.10x11	.10x11	.10x11	.10x11	.10x11	.10x11	.10x11
.10x10	.10x10	.10x10	.10x10	.10x10	.10x10	.10x10	.10x10	.10x10	.10x10
.10x9	.10x9	.10x9	.10x9	.10x9	.10x9	.10x9	.10x9	.10x9	.10x9

Shim Dimensions - (QUANTITY) THICKNESS x DIAMETER in mm (for inches divide by 25.4)

## TUNING NOTES

- Damping is sensitive to vertical wheel velocity, not position in the stroke. If your valving needs to be stiffer, move to the right. This will improve bottoming resistance by increasing damping overall, making it stiffer through the entire speed range. If the forks are too firm, go the opposite direction, to the left.
- Please feel free to use the compression damping adjuster. It controls the lowest speed damping and affects the entire range. The closer to maximum damping (full clockwise) the more effect one click makes. In other words going from 3 to 2 has a lot more effect than going from 14 to 13.
- Spring rate is dependent mostly on rider and bike weight. Spring rate, pre-load and low-speed compression damping; affect dive, wallow and bottoming.
- Oil level can drastically alter bottoming resistance and only affects the last part of the travel (near bottoming). If you like the action, but the forks bottom too easily, raise your oil level by 10mm (0.4").
- If the forks feel too soft all the way through, increase compression damping with the external adjuster (if available). If that's not enough, change the compression stack internally.
- If you would like assistance, please contact the Race Tech Technical Support Hotline 951.279.6655.