

RACE TECH

1501 Pomona Rd, Corona, CA 92880 • 951.279.6655 • racetech.com

FORK G2-R COMPRESSION AND REBOUND

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GOLD VALVE INSTALLATION - DIRT 34C/28R (2LS) Single Cartridge/1 Spring

<IP FMGV 3421GC.doc> 2 part LS FMGV 3421C P Thede © 12.3.15

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), 10mm wrench, Fine flat file, Hi-Strength Loctite (included), Metric calipers, Metric micrometer 0-25mm.

NOTE: Many riders require different fork springs. Please consult www.racetech.com or call Race Tech.

COMPRESSION

1 **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.**

NOTE: Twin-Chamber Forks are slightly different than open cartridges. When removing the damping rod from the cartridge carefully inspect the thread on the end of the damping rod for sharp edges. **These edges can tear the shaft seal.** As a precaution pack the thread with heavy grease before you slide the damping rod out.

2 **Remove the nut.** When disassembling the compression valve for the first time, **the thread above the nut must be filed off flat.** Lightly deburr the end of the thread.

3 **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 may need some of the original valving for spacing purposes, do not discard.)

COMPRESSION VALVING

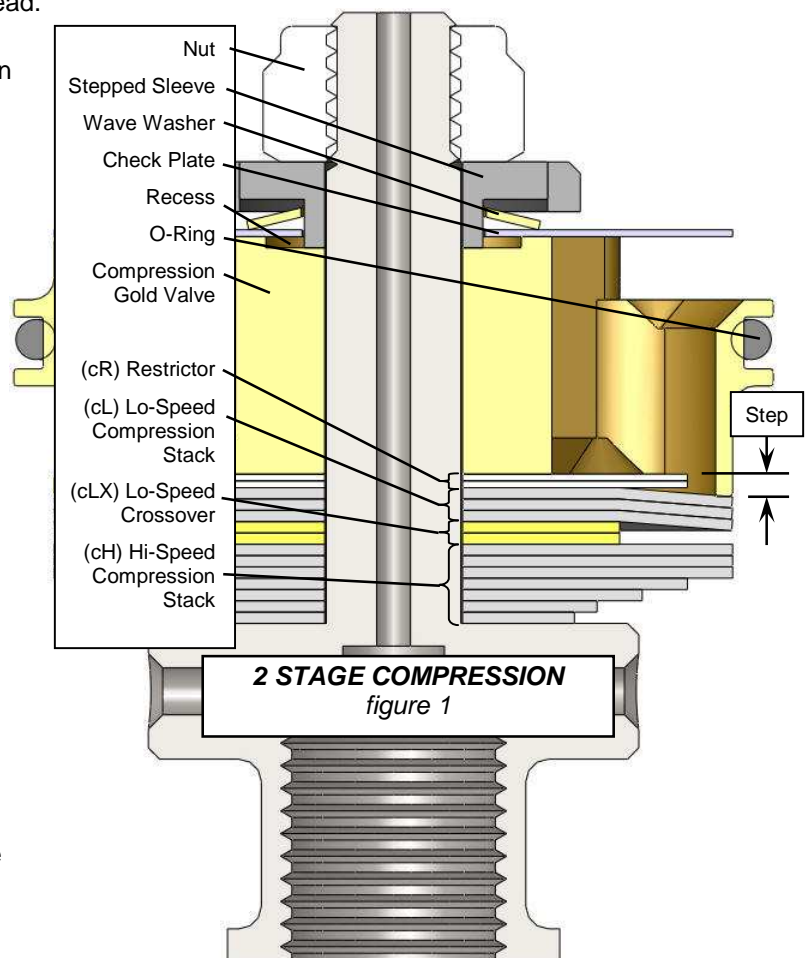
G2-R Theory - There are many ways to setup the valving with G2-Rs. They are made to be preloaded (digressive) or restricted (progressive). This adds a little complexity but makes them extremely versatile.

The Gold Valve piston face has a **1.0mm step** on it. This means if you put on a standard valving stack, without a Restrictor Stack, the shims will be bent 1.0mm without opening. This is called a 1mm preloaded stack. We have found that the best preloads are typically between zero and 0.1mm. The Restrictor Valving Stack thickness adjusts the preload.

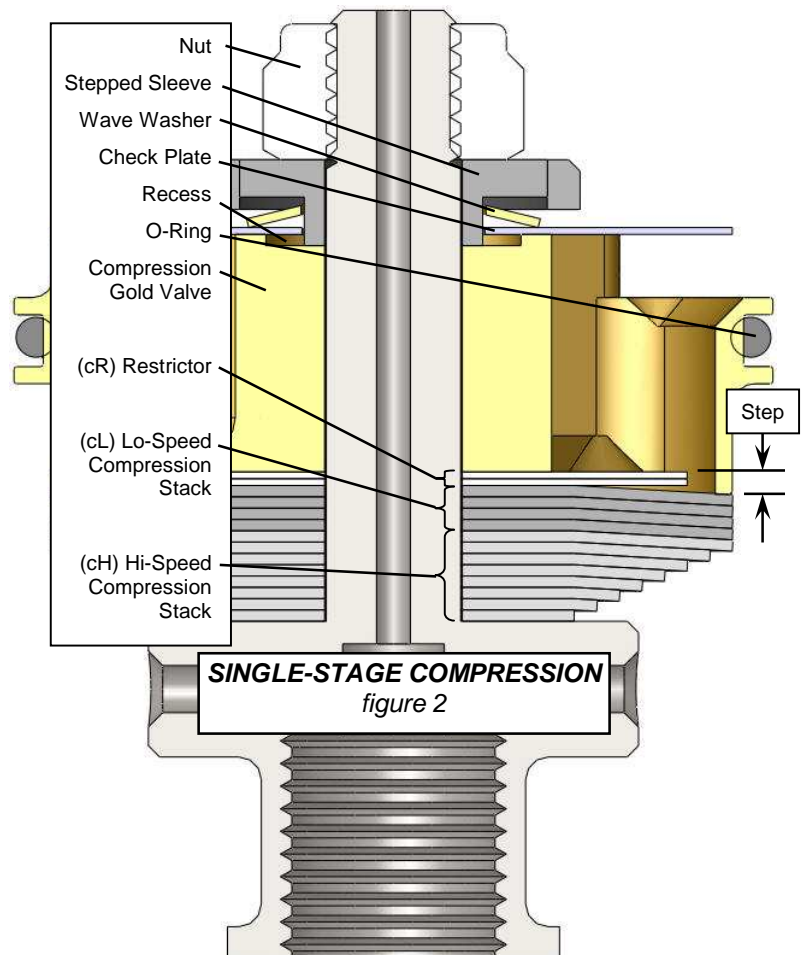
'Step'-'Restrictor Stack Height'='Preload'

example. 1.00 - 0.90 = 0.10 preload

The Restrictor Valving serves a second function. Increasing the diameter restricts the flow area. This increases the damping at high velocities like landing off a jump.



- 4 To obtain custom valving settings visit www.racetech.com, go to Digital Valving Search (DVS), 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.
- 5 Once you have selected your valving begin assembling the valve.
- 5a **Single Stage Stacks** (figure 2) - A Single Stage Stack is a two-part stack made up of a combination of a **Lo-Speed Stack** and a **Hi-Speed Stack with NO Crossover**. Put the valving on the shaft in the order listed, starting with the smallest diameter shim of the Hi-Speed Stack. Then the Lo-Speed Stack gets placed on top of the Hi-Speed Stack. You will not use a Crossover but you will use a **Restrictor Valving Stack** installed next to the Gold Valve itself.
- 5b **Two Stage Stacks** (figure 1) - For Two Stage Stacks the total valving stack is made up of a combination of a **Restrictor Valving Stack, a Lo-Speed Stack, a Crossover and a Hi-Speed Stack**. Put the valving on the shaft in the order listed, starting with the smallest diameter shim of the Hi-Speed Stack. Then the Crossover gets placed on top of the Hi-Speed Stack and ending with Lo-Speed Stack closest to the Gold Valve. Then the **Restrictor Valving Stack** is installed next to the Gold Valve itself.
- 6 Place the **Gold Valve on the shaft** with the recess on the piston facing up. Make sure the o-ring is on the Gold Valve.
- 7 Place the **check valve plate (large ID washer) and the spring on the shaft**. Next install the sleeve washer. Be sure the check valve plate is free to move on the sleeve washer before you tighten the nut.
- 8 Check to see the total valve stack thickness is correct. **WARNING: You must be very sure that the nut does not run out of thread onto the straight part of the shaft.** If it does, the nut will not tighten down on the valving. This will cause incorrect operation or the nut will come off. This is a critical part of the installation. To get the proper total valve stack thickness you may need to place some of the original shims on the shaft just after the base plate. NOTE: Any shims added must be larger in diameter than the last shim in the stack. **Be sure the nut is fully engaging the thread!**
- 9 Make sure the check valve plate (large ID washer) is free and can move up and down against the wave washer spring.
- 10 **CAUTION! The thread can be damaged without extreme care. To install the nut you must use Loctite (provided). The 6mm nut (10mm wrench) 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.**
- 11 **Inspect your work.** For two stage stacks, hold the compression stack up to the light and look for the gap at the cross-over between the lo-speed and hi-speed stack (the small shim near the top of the stack). This gap should be visible, if it isn't, disassemble the stack and look for burrs to surface and/or dirt in the valving. Reassemble and check again.



BUILDING the COMPRESSION VALVING STACK - DIRT 3421G

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

1. Log on to www.racetech.com
2. Go to Digital Valving Search (DVS)
3. Input your Access Code when prompted (your Code is printed on top of page 1 of these instructions)
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 for a limited-time.

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

Single Stage - made up of a Restrictor Stack, Lo-Speed Stack and a Hi-Speed Stack –**NO Crossover**.

Two Stage - made up of a Restrictor Stack, Lo-Speed Stack, Crossover and a Hi-Speed Stack.

Single Stage COMPRESSION EXAMPLE:

The Total Compression Valving Stack is:

Restrictor Valving	cR00.24
Lo-Speed	cL1510
Crossover	cLX – none
Hi-Speed	cH17

Starting from the Gold Valve piston face:

Restrictor Valving – cR20.24

- (6) .15x24
- (1) .10x17

Lo-Speed Stack – cL1510

- (10) .15x30

Hi-Speed Stack – cH17

- (1) .15x30
- (1) .15x28
- (1) .15x26
- (1) .15x24
- (1) .15x22
- (1) .15x20
- (1) .15x18

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

2 Stage COMPRESSION EXAMPLE:

The Total Compression Valving Stack is:

Restrictor Valving	cR10.22
Lo-Speed	cL1510
Crossover	cLX2022
Hi-Speed	cH17

Starting from the Gold Valve piston face:

Restrictor Valving – cR10.22

- (6) .15x22

Lo-Speed Stack – cL1510

- (10) .15x30

Crossover – cLX2022

- (2) .10x20

Hi-Speed Stack – cH17

- (1) .15x30
- (1) .15x28
- (1) .15x26
- (1) .15x24
- (1) .15x22
- (1) .15x20
- (1) .15x18

OIL LEVEL, EXTERNAL ADJUSTERS, SPRING RATE, and PRELOAD are listed on the DVS on 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 parenthesis the quantity is one. Example: (2).15x30 means quantity two, 15 hundredths of a millimeter thick by 30 millimeters in diameter.

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RESTRICTOR VALVING **STIFFER** (Diameter) →

0.00 Preload	cR00.17	cR00.22	cR00.24	cR00.26
0.00	(6).15x17	(6).15x22	(6).15x24	(6).15x26
	(1).10x17	(1).10x17	(1).10x17	(1).10x17
0.05 Preload	cR05.17	cR05.22	cR05.24	cR05.26
0.05	(5).15x17	(5).15x22	(5).15x24	(5).15x26
	(2).10x17	(2).10x17	(2).10x17	(2).10x17
0.10 Preload	cR10.17	cR10.22	cR10.24	cR10.26
0.10	(6).15x17	(6).15x22	(6).15x24	(6).15x26

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The Restrictor Valving Stack serves 2 purposes. First, its diameter can restrict the port size. Second, its thickness can create preload.

The piston face has a 1.0mm step on it. This means if you put on a standard valving stack the shims will bend 1.0mm without opening. We call this a 1mm preloaded stack. Testing has shown that the best preloads are between zero and 0.10mm. The Restrictor Valving Stack thickness adjusts the preload.

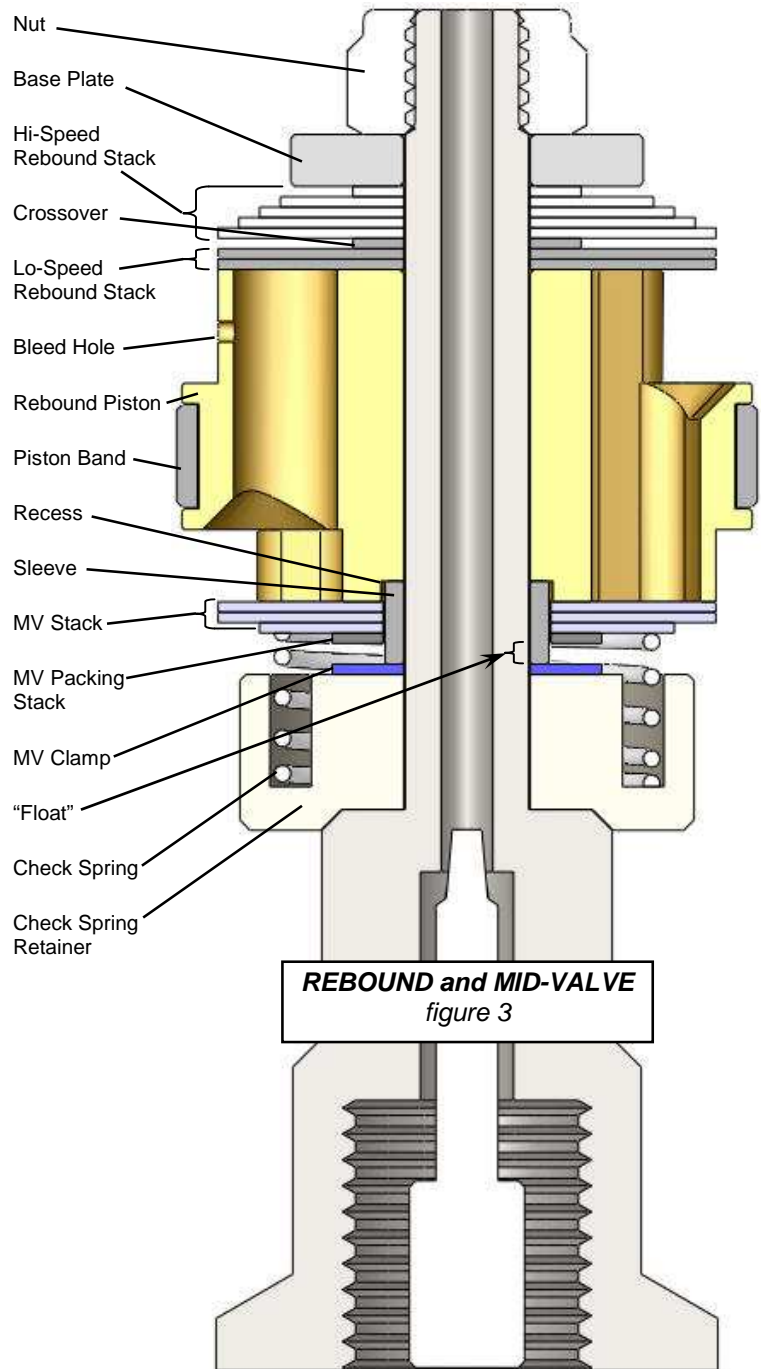
'Step' – 'Restrictor Stack Height' = 'Preload'

REBOUND

- 12 **Remove the rebound rod from the cartridge.**
When the damping rod is removed from the cartridge extreme care must be taken so the thread does not cut the shaft seal. Carefully deburr both ends of the thread and pack the thread with grease. (figure 3)
- 13 **Once the rod is removed, lightly file the peening off the end of the shaft that holds on the nut.**
Remove the nut and **disassemble the valving stack.** Lightly deburr the end of the thread.

MID-VALVE & REBOUND VALVING

- 14 Select the Rebound and Mid-Valve Valving according to the DVS. Begin **assembling the Rebound Gold Valve.** Start with the Stock Check Spring Retainer and Check Spring, MV Clamp, MV Packing Stack and Mid-Valve Stack. There are two critical components of the Mid-Valve; the stiffness of the Mid-Valve Stack itself and the "Float". The Float is controlled by a combination of the thickness of the MV Stack and the MV Packing Stack.
- 15 Install the Rebound Gold Valve with the recess toward the Mid-Valve Stack.
- 16 Select the Rebound Valving. Install the Lo-Speed Rebound Stack, Crossover (if required) and Hi-Speed Rebound Stack, Base Plate and Nut. Use Loctite and torque the nut to 30 in-lbs (.35 kgf-m).



BUILDING the MID-VALVE

- DIRT 2824

MID-VALVE EXAMPLE:

The Total Mid-Valve Stack is MV35, MVP110 and MVC14.

Starting from the recessed Gold Valve piston face:

Mid-Valve Stack (8mm id) – MV35 – .75mm thick

- (2).15x24x8
- (1).15x22
- (1).15x20
- (1).15x18

MV Packing Stack (8mm id) – MVP45 - .45mm thick

- (1).15x15x8
- (3).10x15

Sleeve 6 id x 8 od – 2.55mm long (stock)

Recess Depth 1.00mm

MV Clamp (6mm id) – MVC14

- (1).10x14x6
- (3).10x15x6

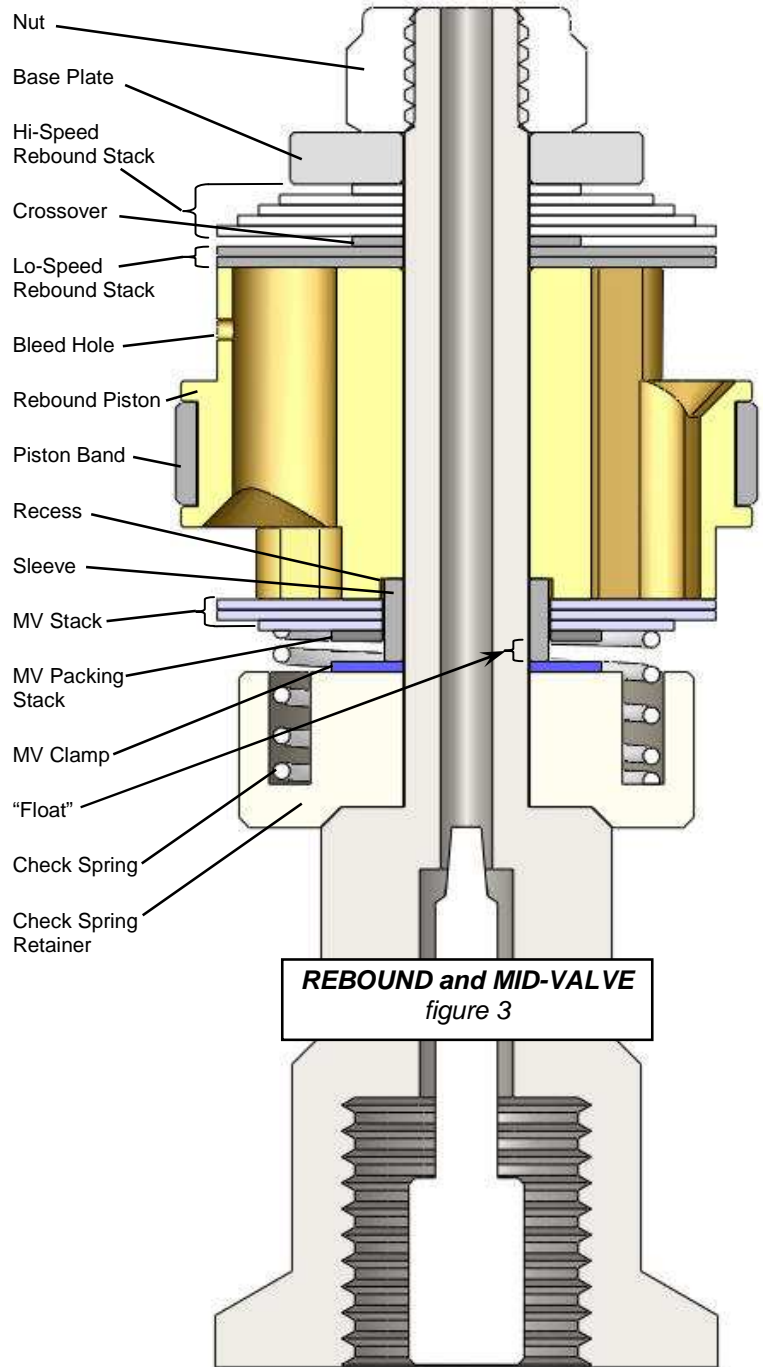
Float = Gap – Total Stack Thickness

For this example:

Sleeve Length (stock)	2.55
Recess (std Gold Valve)	— 1.00
Gap	= 1.55

MV Stack	.75
MVP Packing	+ .45
Total Stack Thickness	= 1.20

Gap	1.55
Total Stack Thickness	— 1.20
Float	= .35



FORK ASSEMBLY

- 17 **Install the damping rod into the cartridge.** Reassemble the forks according to the procedure in your manual. For Twin Chamber Forks the damping rod shaft seal must be protected. Pack the thread with heavy grease before you insert it into the cartridge.
- 18 **Fill and bleed the cartridge.** Before installing the compression assembly which includes the reservoir piston and cap make sure the oil level is high enough (100mm (4") down from the top of the cartridge with the damping rod fully extended). When you install the compression assembly it should require quite a bit of force when you push it in with your hand. Once you have tightened the cap compress the damping rod all the way. This will push out any extra oil from inside the cartridge and should be poured out of the holes in the top of the reservoir. When the damping rod is released it should extend all the way by itself. This indicates that there is enough oil inside the cartridge.
- 19 **Reassemble the forks.** Install the Cartridge Assembly and temporarily screw in the fork cap. Invert the fork. Compress the fork so the Damping Rod extends through the bottom of the fork.
- 20 Use Loctite 271 on the damping rod thread at the Rebound Adjuster. **The Showa "D" Shaped Rod requires special attention.** Slide the "D" shaped Rebound Adjusting Rod on the Adjuster Bolt into the Damping Rod making sure it goes in all the way and registers on the Needle inside. When you screw on the Adjuster Bolt, hold the Adjusting Screw in one place with a screwdriver. This will keep the "D" Shaped Rod from rounding out.
- 21 **Torque the jam nut to manufacturers specs** (typically 16 to 21 ft-lbs [21.7 – 28.5 NM]). Consult shop manual for specs. Tighten the Adjuster Bolt into the Fork Bottom.
- 22 Unscrew the Fork Cap and add the proper oil volume to the outer chamber (consult the DVS). NOTE: The left and right legs have different oil levels. **Tighten the fork cap.**
- 23 **Adjust the compression and rebound adjusters, spring preload, and oil level** according to the DVS Setup Sheet.
- 24 **Install the forks on the bike.** 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.
- 25 **If you have any questions** please call our Technical Support Hotline at 951.279.6655. Feel free to experiment and please call if you need us. Have fun!

TUNING NOTES

- **Damping depends on vertical wheel velocity, not position in the stroke.**
- **If the forks feel too soft all the way through,** increase compression damping with the external adjuster. If that is not enough, change the compression stack internally.
- **The compression damping adjuster** controls the lowest speed damping and affects the entire range. NOTE: The closer to maximum damping (full clockwise) the more effect one click makes. In other words going from 3 to 2 out has a lot more effect than going from 14 to 13. Adjusters are numbered from all the way clockwise (the slowest or firmest setting).
- **If your valving needs to be stiffer, move to the right on the valving chart.** Moving to the right on the Low Speed Valving Chart will stiffen up low speed damping. This will improve bottoming resistance with minimum increase in harshness. Moving to the right on the High Speed Valving Chart will increase damping overall, making it stiffer through the entire speed range. If the forks are too firm, go the opposite direction, to the left.
- **Spring rate affects ride height, dive and bottoming.** Typical spring preload should be 3–10mm (0.1–0.4").
- **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").

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