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## **RACE TECH HI-PERFORMANCE FORK SPRINGS - DIRT**

<IP\_FRSP\_D.doc> FRSP Series P Thede © 7.15.13

3 pgs

INCLUDES: (2) Springs, (4) Preload Washers, Spacer material (if required), Instructions - **Cutting Preload Spacers is required on some models.**

Thank you for choosing Race Tech Hi-Performance Fork Springs. These Straight Rate Springs are manufactured from "suspension" quality chrome silicon wire, shot peened, heat-treated and 100% tested. They are the finest available.

**\*WARNING\* for 4146, 4147 and 4448 Series Springs with Elastomer type bottom out – INSTALL THE SPRING SPACING WASHERS AT THE BOTTOM (ON TOP OF THE CARTRIDGE) NOT THE TOP OF THE SPRING. If you put them on top they will not stay aligned and will damage the forks.**

Please read the instructions completely before proceeding. *If you have questions please call Race Tech.* If you are unfamiliar with this process, stop and have a qualified mechanic assist you.

### **GENERAL INSTALLATION INSTRUCTIONS**

**STEP 1 - Remove the fork cap.** Before you remove the cap make a note of the rebound adjustment if available. Use caution as some springs are preloaded heavily and the cap can be released with a lot of force. Remove the spring and spacer.

**STEP 2 - Identify the fork type. (Refer to the next page)**

Type 1 - Upside-down

Type 2 - Conventional (right-side up) damping rod

Type 3 - Conventional Cartridge Forks. **With this type you must also determine if you have EXTERNAL Top-Out or INTERNAL Top-Out Springs. (Refer to the next page for assistance)**

**STEP 3 - Determine the Preload. (Refer to the next page)** Identify the type of fork cap to assist in measuring Preload. **Calculate the required Spacer Length and cut the spacer** (Not required for Type 1 Upside-down Forks). **Remember to include spring washer and Emulator thickness if used.**

**STEP 4 - Install the springs, spacers (if required) and washers.** If you use spacers, you must have washers on both ends of the spacer. **Never let the spring ride directly on the aluminum cap or the spacer. A steel washer should always be between any aluminum cap and the spring.**

**STEP 5 - Install the cap.** If you have cartridge forks, use Loctite on the damping rod threads at the cap and torque it to manufacturers specs. Set the rebound adjusters.

**NOTE for 96 and later XR400R and some 85s:** Some rare models require careful positioning of the rod in the cap so the proper number of rebound clicks are available for adjustment. If the rod is threaded too far into the cap there will not be the full number of clicks. If the cap is not threaded on far enough, it will not touch the adjuster and it could come off the shaft. Consult your owners' manual for the proper procedure.

**STEP 6 - Install the forks** on the bike.

**STEP 7 - Enjoy!**

## DETAILS FOR STEPS 2 and 3

### STEP 2 DETAILS - IDENTIFY THE FORK TYPE

*There are three types of forks each with slightly different instructions:*

- 1 Upside-down cartridge forks** – Most of these springs are specifically designed to fit exactly “as is”. All have INTERNAL Top-Out Springs. Follow the instructions for **INTERNAL**.
- 2 Conventional (right-side up) damping rod forks** - A spacer must be cut for proper preload. These all have EXTERNAL Top-Out Springs. Follow the instructions for **EXTERNAL**.
- 3 Conventional (right-side up) cartridge forks** - A spacer must be cut for proper preload. These forks could have either **EXTERNAL** or **INTERNAL** Top-Out Springs.

Identify the forks as either EXTERNAL or INTERNAL Top-Out. To determine where the Top-Out Spring is located, hold the chrome inner fork tube, with the spring out and the cap off, and extend the fork all the way until it stops. **EXTERNAL TYPE** forks have the Top-Out Spring on the outside of the cartridge tube and will stay the same length as when fully assembled. **INTERNAL TYPE** forks have the Top-Out Spring on the inside of the cartridge tube and therefore will extend longer. Once you have determined which type you have, choose the corresponding instructions.

### RECOMMENDED PRELOAD

STANDARD PRELOAD for FULL SIZE DIRT BIKES - 3 to 5mm (.12 to .20")

STANDARD PRELOAD for 80cc MINI DIRT BIKES - 3 to 5mm (.12 to .20")

**NOTES ON PRELOAD:** Use enough preload to keep the springs from rattling around. More than 5mm of preload will cause the ride to be harsh.

### STEP 3 DETAILS - DETERMINING THE PRELOAD SPACER LENGTH

**EXTERNAL TOP-OUT** - Assemble the forks without the springs and spacers. Install the Emulator (if used). Extend the fork all the way. Drop the spring and spring washer into the fork tube. Use a tape measure to record the distance from the top of the fork tube down to the top of the spring washer. Measure the Fork Cap Height from the bottom of the sealing lip (the point that touches the top of the tube when the cap is tightened) to the point on the bottom of the cap where the spring touches (this point might be on a special spacer or washer). Subtract this distance from the first measurement (down to the top of the spring washer). This would be the required length of the spacer for zero preload. Add the amount of preload required to determine the length of your spacers. Be sure to put spring washers on both ends of the preload spacer during final assembly and include them in your calculations.

**INTERNAL TOP-OUT** - This type requires you to measure the Set Length of the fork.

Measuring the Set Length is best accomplished with the cartridge out of the fork, however, it can be done with the fork spring out and cap unscrewed from the outer tube but still attached to the damping rod. Collapse the fork tube. The Set Length is measured from the point the spring touches on the top of the cartridge to the point the spring touches on the cap with the rod fully extended. (Sometimes the point the spring touches on the cap is actually a special washer or spacer.) A tape measure can be put down the fork tube with the spring removed, if you are careful to make sure the tape is resting on the flange when measuring.

Once the Set Length is recorded, measure the Length of the Spring and subtract. This would be the required length of the spacer for zero preload. Add the amount of preload required to determine the length of your spacers. Be sure to include spring washer thickness as they are required on both ends of the preload spacer.

### TERMS

**Spring Rate** - The spring stiffness measured in kg/mm, N/mm or lbs/in.

**Spring Free Length** - The length of the spring when it is not installed.

**Spring Set Length** - The installed length of the spring with the forks fully extended.

**Spring Preload Length** - Amount the spring is compressed from its Free Length to install it. It is not the length of the spacer.

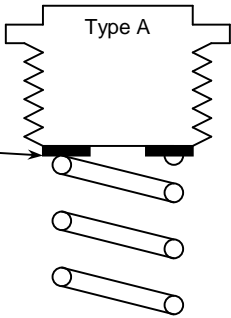
**Spring Spacer Length** - Spacer length.

## FORK CAP TYPES

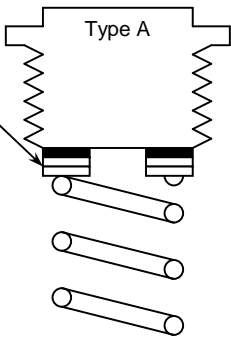
This information is provided to assist you in measuring your Set Length and adding spacing washers. Identify the type of cap you have and note the specific measurement point. There are variations of the types listed below. Be sure to take "special" washer thickness into consideration.

### Type A

The Set Length is measured from this point.

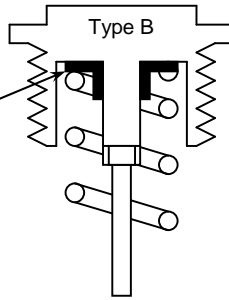


On this type washers or spacers can be added without restriction. Be sure the washers are made of steel and no spacer rides directly on the fork cap or spring.

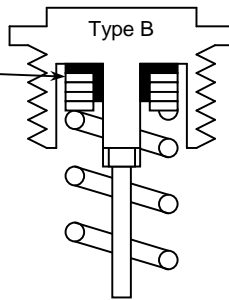


### Type B

The Set Length is measured from this point.

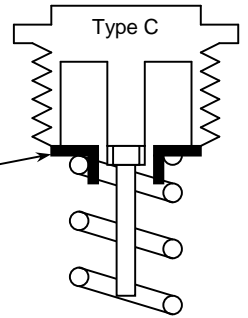


On this type, washers can be added here up to 2mm below the end of the cap, never higher than that or they will not be centered.



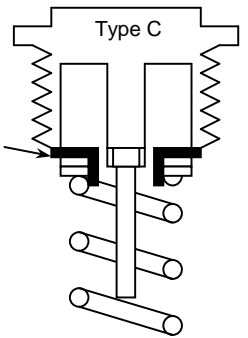
### Type C

Models with flanged washers. The Set Length is measured from this point.



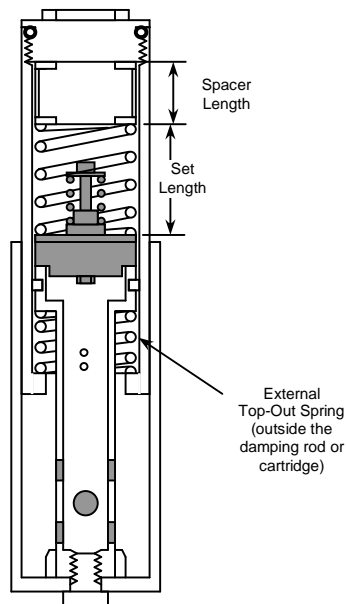
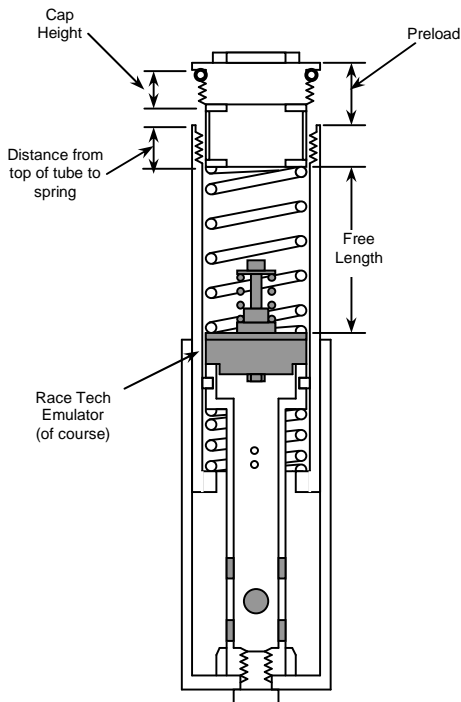
The inner fork tube bottoms on this lip therefore no washers can be added under this flanged washer or travel will be lost.

On this type, washers can be added here up to 2mm below the end of the lip of the flange, never higher than that or they will not be centered.



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## EXTERNAL TOP-OUT



External Top-Out Spring (outside the damping rod or cartridge)

## INTERNAL TOP-OUT

