DIRECT-REPLACEMENT
INSTALLATION AND SET-UP GUIDE

FOR HARLEY-DAVIDSON CVO INVERTED 47MM GRIP ST
ADJUSTABLE CARTRIDGE KITS

GRIP ST CARTRIDGE KITS

APPLICABLE KITS:
890-27-018

605-01-466 REV A

CONTENTS

INTRODUCTION

Thank you for choosing FOX direct-replacement cartridge kit for your motorcycle. FOX products are designed, tested, and manufactured by the finest professionals in the industry.

⚠WARNING

Please read the entire manual before attempting to install the cartridge kit on your motorcycle. When working on this product, always see the vehicle manufacturer's work shop manual for vehicle-specific procedures and important specifications. Be sure to clean the components you intend to modify to avoid contamination or damage during the installation process. If you have any questions call the FOX motorcycle shock service center at 831.740.4619.

To achieve the best performance and product longevity, periodic service and maintenance is required. Please refer to the MAINTENANCE section for more information.

Always use a calibrated torque wrench when tightening components. Failure to properly torque the parts can result in separation of the fork, which could cause loss of control resulting in a crash, bodily injury, or death!

Always use the appropriate lift equipment to ensure the vehicle is securely supported so that it will not tip. Placing body parts beneath an unstable vehicle may lead to serious injury or death.

It is advisable to have a professional motorcycle mechanic install the cartridge kit. In addition to these instructions, professional knowledge of disassembly/reassembly procedures and post installation checks must be known.

FOX recommends that you become thoroughly familiar with the handling characteristics of your modified vehicle before operating it under rigorous conditions. this will help to avoid potential loss of control events that could lead to serious injury or death. FOX further recommends that you use appropriate protective equipment at all times when operating your vehicle.

⚠WARNING

SAFETY INSTRUCTIONS

- FOX direct-replacement cartridge kits are designed to fit and allow proper clearance with the stock components. If aftermarket suspension components are installed it is the customer's responsibility to ensure that interference between the FOX cartridge kit and other motorcycle fork components does not occur at any point in the fork stroke.
- FOX direct-replacement cartridge kits should always be installed as a set for maximum performance.
- Proper installation and service procedures are essential for the safe and reliable operation of the suspension components, requiring the experience and tools specially designed for this purpose. Installation and maintenance procedures for this product must be performed by a qualified service technician, to avoid potentially unsafe motorcycle handling characteristics, which may result in SERIOUS INJURY or DEATH.
- Adjusting your suspension will change the handling characteristics of your motorcycle. Under certain conditions, your adjusted motorcycle may be more susceptible to loss of control, which can result in SERIOUS INJURY or DEATH. Thoroughly familiarize yourself with the adjusted motorcycle handling characteristics before any rigorous vehicle operation. Wear protective body gear and a helmet when appropriate.
- Any attempt to misuse, misapply, modify, or tamper with any FOX product voids any warranty and may result in SERIOUS INJURY or DEATH.

⚠WARNING

INSTALLATION GUIDELINES

- Always use a motorcycle floor jack for the installation of forks, and make certain that the raised motorcycle is securely attached to the lift to prevent the motorcycle from slipping, falling, or moving during the installation process.
- DO NOT install any FOX product without the necessary special tools, expertise and a motorcycle floor jack or you will subject yourself to the risk of SERIOUS INJURY or DEATH. Ensure that the motorcycle is: (1) on level ground, (2) that the wheel not in use during installation is supported to prevent unsafe movement of the motorcycle, (3) and that adequately secured stabilizer straps are used to support the motorcycle while it is elevated. NEVER work on the motorcycle until you have checked to ensure that the motorcycle will be stable during installation.
- If a preload adjustment is necessary for your application, use the supplied FOX Preload Spanner (398-01-289 or 398-01-323) to avoid damaging your preload adjuster. If you cannot reach your optimal ride height within the kit's available preload adjustment, you will need to go up in spring rate to one that fits the application.
- The springs are coated with a corrosion-resistant oil that requires eye protection and gloves for safe handling. Wear safety glasses and rubber gloves when disassembling and reassembling fork legs as they are under spring tension and contain oil. Avoid contact with eyes and skin. Do not ingest and avoid repeated inhalation of vapor.
- The top cap may come out with more force than you expect, which can cause bodily injury. Keep your body and face, along with all other objects, out of the path of the top cap as it is removed.
- Take care when clamping the fork into a fork vise or bench vise, as damage can occur.
- The rebound cartridge assembly will be installed into the right (throttle side) fork leg. The compression cartridge assembly will be installed into the left (clutch side) fork leg.

⚠WARNING

INSTALLATION GUIDELINES

TOOLS REQUIRED

- Gloves
- Safety glasses
- Vehicle manufacturer's workshop manual for torque specifications
- Assorted sockets, ratchets, hex bits, and Torx® bits for fork removal and installation
- Torque wrench
- Bench vise
- 6 mm long hex bit
- 14, 15, and 45 mm wrenches
- Cartridge shaft bleed tool (included in kit: 398-01-293)
- Preload adjust spanner (included in kit: 398-01-289 or 398-01-323)
- Oil height / air gap tool
- 2 quart FOX 5WT PTFE infused suspension fluid (included in kit: 025-03-023)
- Fork spring compressor

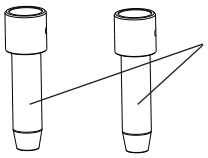
Required tools and supplies may change over time. Visit ridefox.com or contact a representative for the most up-to-date details.

KIT CONTENTS

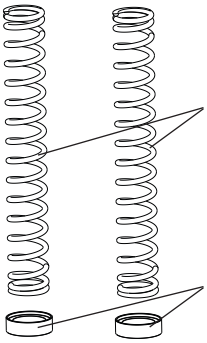
IMPORTANT: Check to make sure all kit items are present prior to starting installation procedure.

PRELOAD ADJUST SPANNER

CARTRIDGE SHAFT BLEED TOOL

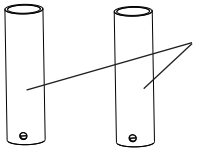


SPRING GUIDES

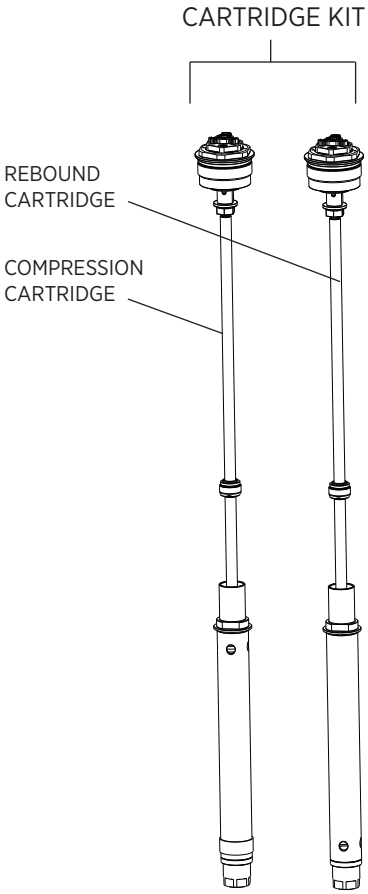


MAIN SPRINGS

RETAINING RINGS



PRELOAD SPACERS



FORK LEG REMOVAL

GRIP ST CARTRIDGE KIT INSTALLATION

⚠WARNING: Refer to pages 1-4 in this manual for Safety and Installation Instructions.

NOTICE: The rebound cartridge assembly will be installed into the right (throttle side) fork leg. The compression cartridge assembly will be installed into the left (clutch side) fork leg.

NOTICE: All fork disassembly instructions are repeated for the second fork leg. However, it is recommended to complete the “Fork Leg Disassembly” and “Fork Leg Reassembly” sections for one fork leg before working on the second fork leg.

1. Use a motorcycle floor jack for the installation of fork components, and make certain that the raised motorcycle is securely attached to the lift to prevent the motorcycle from slipping, falling, or moving during the installation process. This will remove the load on the mounting hardware.
2. Prior to removal of the fork legs, note the fork leg height relative to the triple clamps (Fig. 1). Note the left (clutch side) and right (throttle side) leg separately so the cartridges are installed into the correct side.
3. Remove the front wheel, brake caliper, fender, any fairings, and the fork legs from your motorcycle according to your vehicle manufacturer’s workshop manual and secure them in a fork clamp.

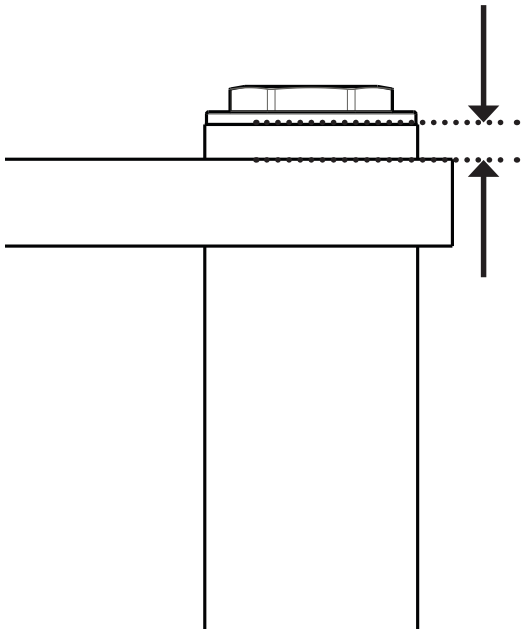


Fig. 1: Note the fork position relative to the triple clamp.

FORK LEG DISASSEMBLY

⚠WARNING: The springs are coated with a corrosion-resistant oil that requires eye protection and gloves for safe handling. Wear safety glasses and rubber gloves when disassembling and reassembling fork legs as they are under spring tension and contain oil. Avoid contact with eyes and skin. Do not ingest and avoid repeated inhalation of vapor.

1. Clamp the upper tube, then fully unthread the top cap (Fig. 2A) with an appropriately-sized tool.

   NOTICE: Use care when clamping not to damage the upper tube.

2. Clamp the lower dropout in a vise and lower the upper tube (Fig. 3 arrow).

   NOTICE: Use care when clamping not to damage the lower dropout.

3. Compress the main spring with a fork spring compressor until the cinch nut (Fig. 3A) is exposed.

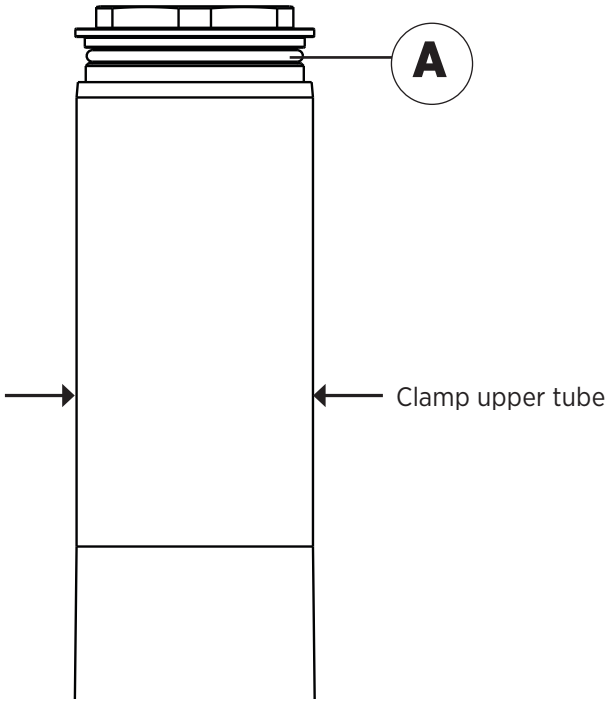


Fig. 2: Carefully unthread the top cap.

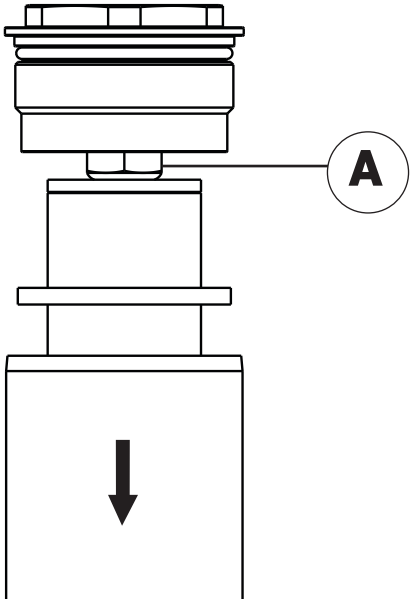


Fig. 3: Lower the upper tube and loosen the cinch nut (A) from the top cap.

4. Loosen the top cap from the cinch nut (Fig. 3A) using appropriately-sized tools.

5. Remove the top cap (Fig. 4B), cinch nut (Fig. 4C), bottom out bumper (Fig. 4D), retaining ring (Fig. 4E), preload spacers (Fig. 4F) and main spring (not shown).

   NOTE: Depending on your model, an adjustment rod will be removed along with the top cap (Fig. 4A).

6. Drain the oil into a clean container by holding the fork leg upside down and cycling the fork several times from full extension to full compression.

7. Clamp the lower dropout in a vise with access the bottom screw (Fig. 5A).

   NOTICE: Use care when clamping not to damage the lower dropout.

8. Remove the bottom screw (Fig. 5A).

   NOTICE: Use care to not drop the cartridge once the screw has been unthreaded.

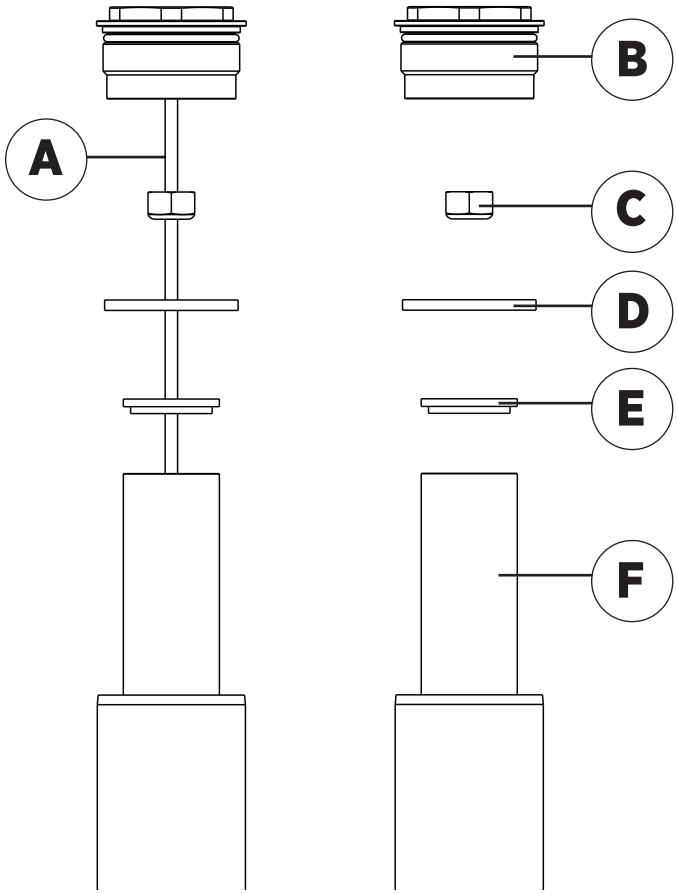


Fig. 4: Adjustable damping models (left), non-adjustable damping models (right). Remove the stock components: adjustment rod (A), top cap (B), cinch nut (C), bottom out bumper (D), retaining ring (E), and preload spacers (F).

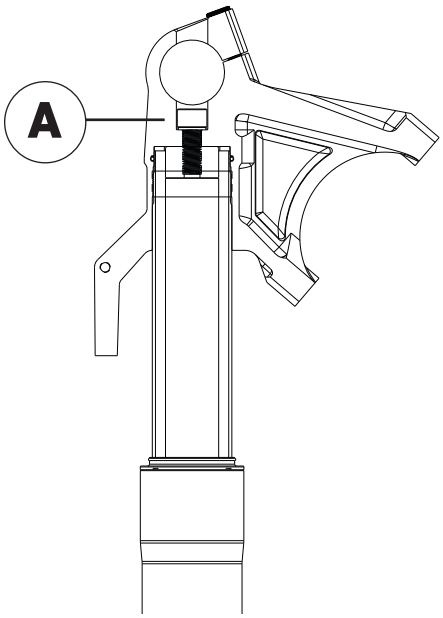


Fig. 5: Remove the bottom screw (A).

9. Remove the cartridge (Fig. 6B) and centering ring (Fig. 6A) from the fork leg.

10. Go to the next section to reassemble this fork leg before moving on to the second fork leg. Then, repeat the disassembly and reassembly for the other fork leg.

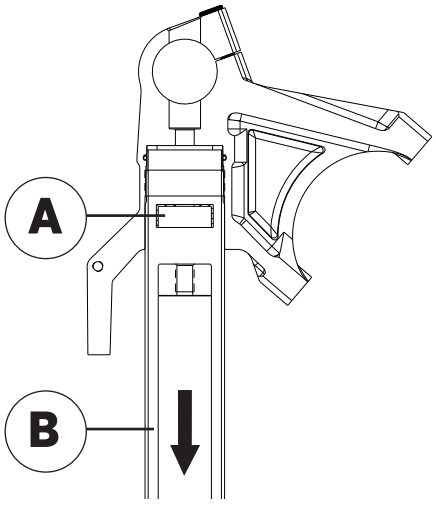


Fig. 6: Remove the cartridge.

FORK LEG REASSEMBLY

REASSEMBLE THE FORK LEG

NOTICE: All fork reassembly instructions are repeated for the second fork leg.

IMPORTANT: Do not mix parts. Make sure to work on one side of the fork leg at a time.

1. Remove the top cap assembly (Fig. 7A), cinch nut (Fig. 7B) and any packaging (not shown) from the shaft. Separate the top cap from the cinch nut using 14 mm and 15 mm wrenches, if necessary.

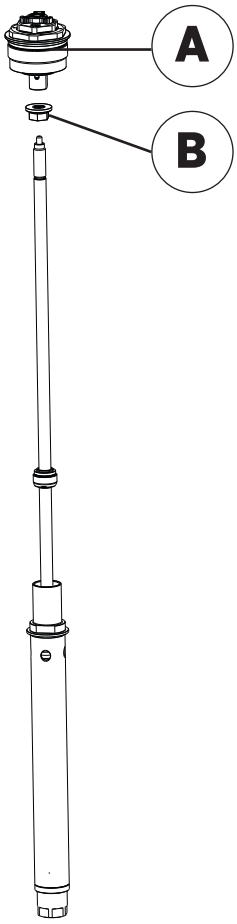


Fig. 7: Remove top cap assembly, cinch nut and packaging.

2. Insert the cartridge assembly: the rebound cartridge installs into the right fork leg (throttle side), and the compression cartridge installs into the left fork leg (clutch side). Confirm that the installation matches the diagram (Fig. 8 and Fig. 9).

3. Install the fork screw (Fig. 8A) and washer (Fig. 8B), according to the manufacturer's workshop manual. If the cartridge body spins and torque cannot be achieved, install the main spring and apply pressure to resist this rotation until the proper torque is achieved.

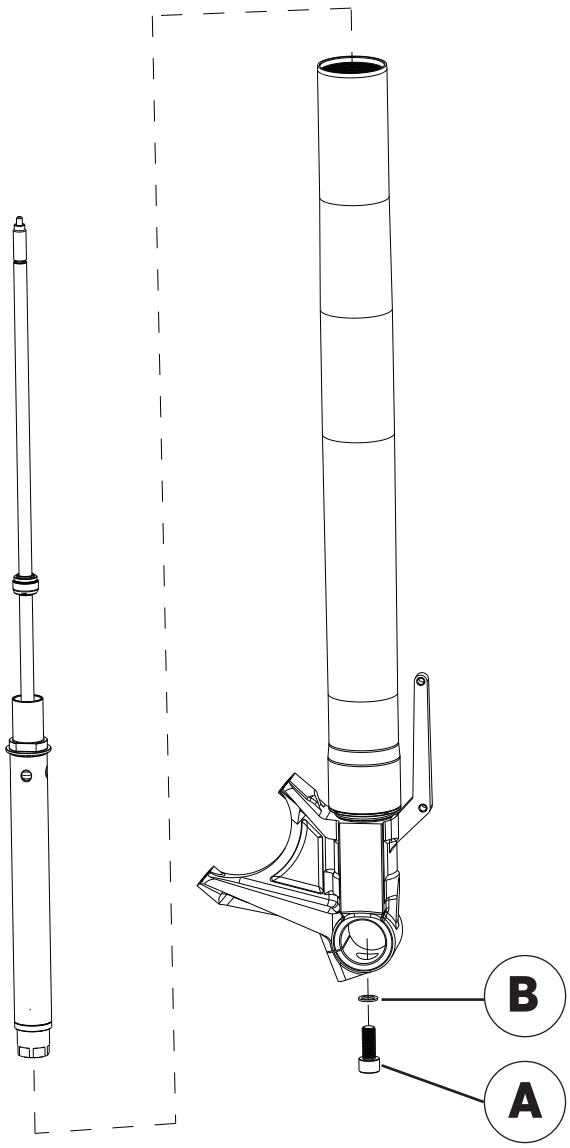


Fig. 8: Install the cartridge (compression leg shown)

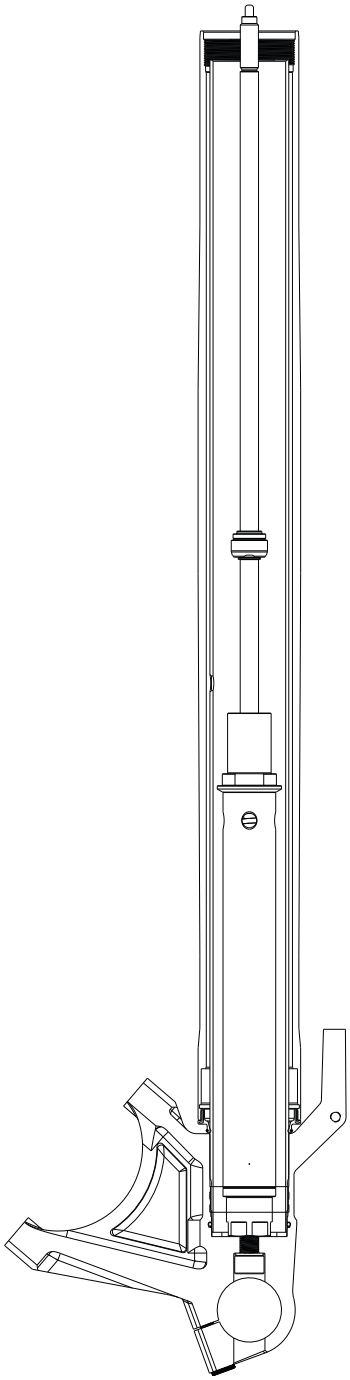


Fig. 9: Install the cartridge (compression leg shown).

4. Carefully secure the fork upright by clamping the dropout. Confirm that the upper tube is in the lowest position (fully compressed).

   NOTICE: Use care when clamping not to damage the fork leg.

5. Loosely thread the cartridge shaft bleed tool (Fig. 10A) onto the shaft. Make sure to thread a minimum of 3 turns.

6. Start by adding 500mL of the FOX 5WT PTFE infused suspension fluid, included with the kit.

   NOTICE: Springs, spring retainer, and preload spacer **SHOULD NOT** be installed at this time. These will be installed in a later step.

7. Bleed air from the cartridge by cycling the shaft to full compression and full extension 10 times (Fig. 10 arrows).

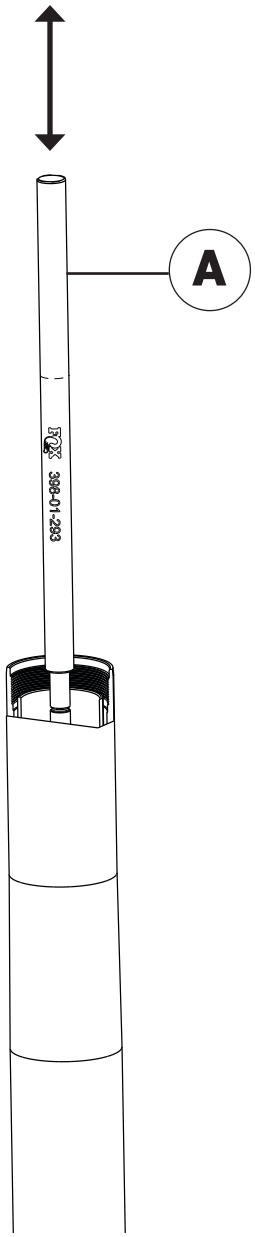


Fig. 10: Cartridge shaft bleed tool installed (A); bleed air out of cartridge by cycling the shaft.

8. Install the preload spacers (Fig. 11A) with the holes oriented downward (Fig. 11 arrow), then install the retaining ring (Fig. 11B). Make sure the groove on the spring retainer faces downward, toward the preload spacer (Fig. 11C).

9. Set the air gap to 108 mm (4.25 in); measurement setup shown in Fig 12.

   NOTICE: Set the upper tube to the lowest position when measuring the air gap. Additionally, set the cartridge shaft to the lowest position when measuring the air gap. If the air gap does not match what is specified, add or remove oil until the proper air gap is achieved.

10. Remove the cartridge shaft bleed tool. Then, install the main spring (Fig. 13A) and the spring guide (Fig. 13B).

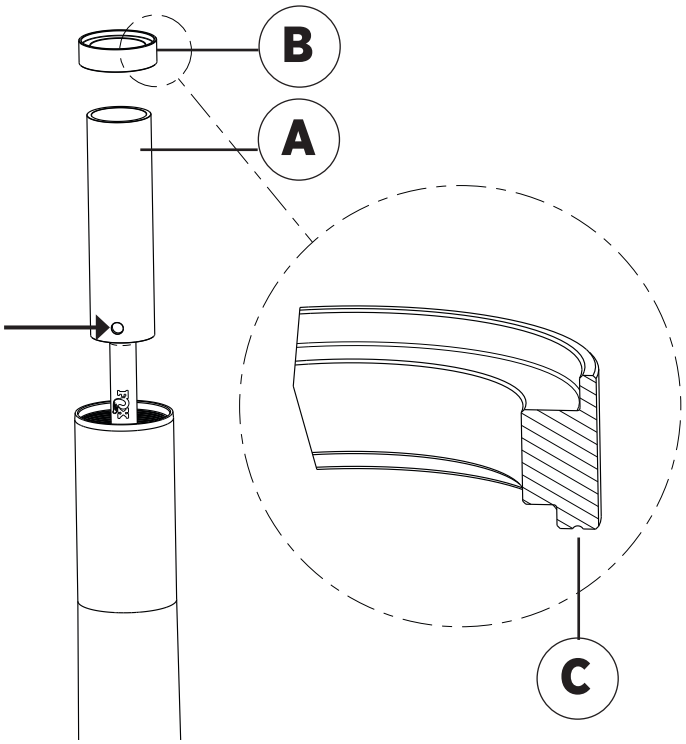


Fig. 11: Install preload spacer and retaining ring.

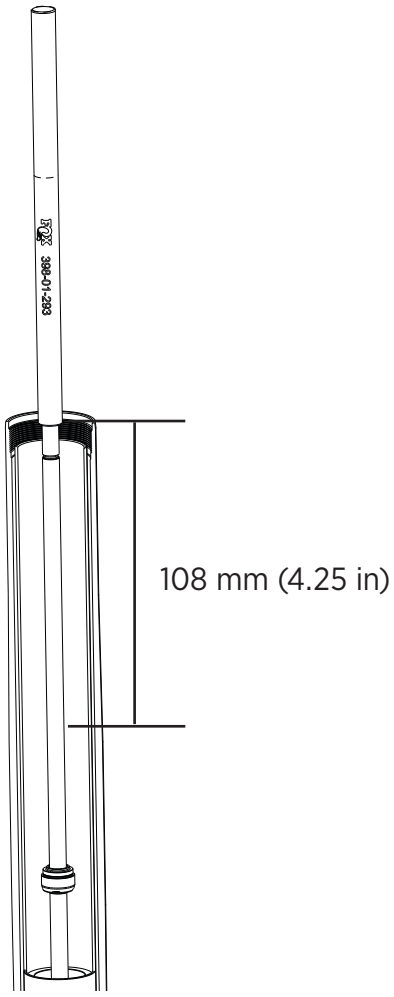


Fig. 12: Set the air gap to the specified height.

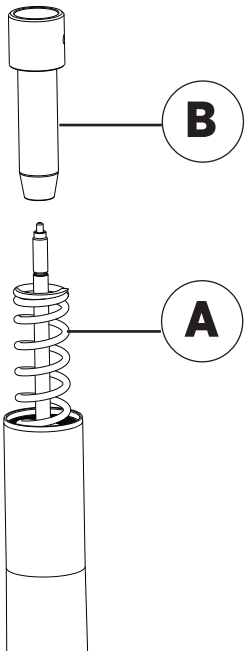


Fig. 13: Main spring and spring guide installation.

11. Compress the main spring using a spring compressor. Compress until the entire threaded end of the shaft is exposed (Fig. 14).

    NOTE: The holes in the spring guide are designed to fit a fork spring compressor with up to 6 mm pins.

12. Thread the cinch nut onto the shaft (Fig. 14A) in the orientation shown until it is finger-tight. Confirm the nut is seated on the shoulder of the shaft (Fig. 15).

13. Thread the top cap assembly onto the shaft (Fig. 16). Make sure the preload adjuster is at the minimum setting. Ensure that the top cap assembly sits flush on the shaft; there should be a gap between the top cap assembly and the cinch nut (Fig. 17).

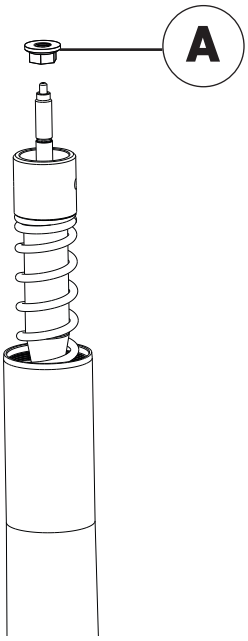


Fig. 14: Install the cinch nut onto the shaft.

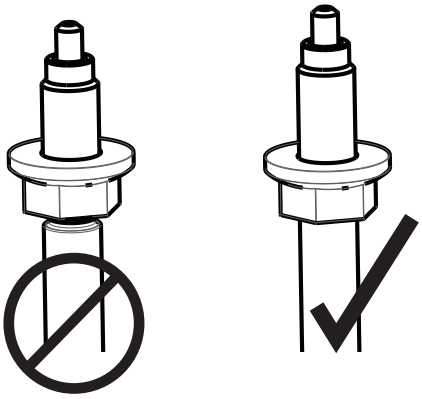


Fig. 15: Cinch nut seated on shaft shoulder.

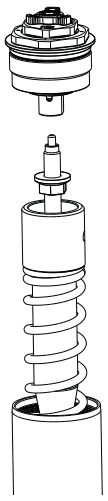


Fig. 16: Thread the top cap assembly onto the shaft.

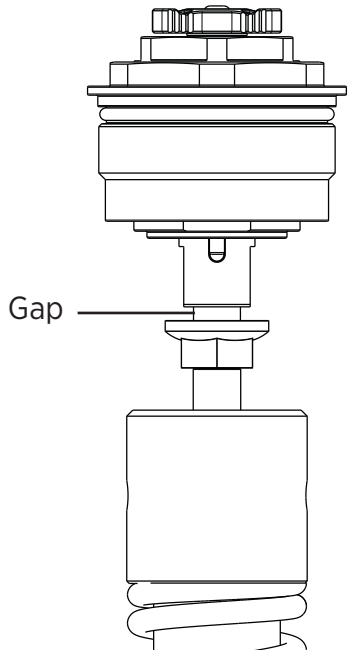


Fig. 17: Confirm there is a gap between the top cap and the cinch nut.

14. Use a 14 mm wrench to hold the top cap, and a 15 mm wrench to tighten the cinch nut against the top cap (Fig. 18). Ensure there is a gap between the cinch nut and shaft shoulder, and no gap between the top cap and cinch nut. Torque the cinch nut to 15 ft-lb.

15. Carefully release the tension on the assembly and remove the spring compressor.

    ⚠WARNING: Pinch Hazard. The assembly will be under spring force, which can cause bodily injury. Keep your hands, fingers, body and face, along with all other objects, out of the path of the top cap when removing the spring compressor.

16. Check that the spring guide is correctly seated on the top cap (Fig. 19; arrow), and that the spring, spring retainer, preload spacer, and top cap assembly are all aligned properly.

17. Raise the upper tube and thread the top cap onto the upper tube (Fig. 20). Use a 45 mm wrench to torque the top cap to the manufacturer's specifications.

18. Set the fork preload using the Fork Setup charts on page 16.

19. Repeat the "Fork Leg Disassembly" and "Fork Leg Reassembly" sections for the other fork leg.

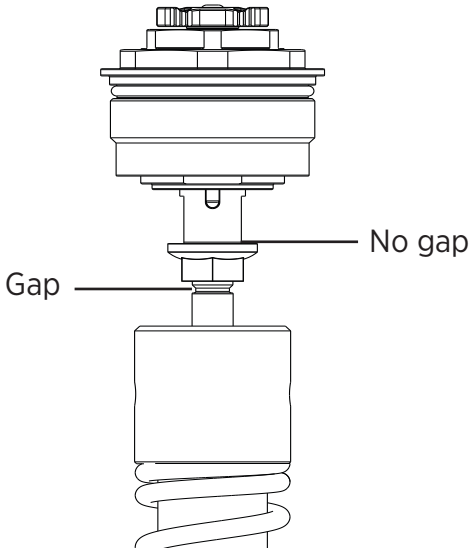


Fig. 18: Confirm there is a gap between the cinch nut and shaft shoulder, and no gap between the top cap and the cinch nut.

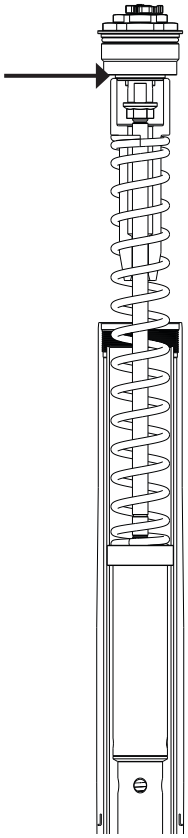


Fig. 19: Check that all components were assembled correctly.

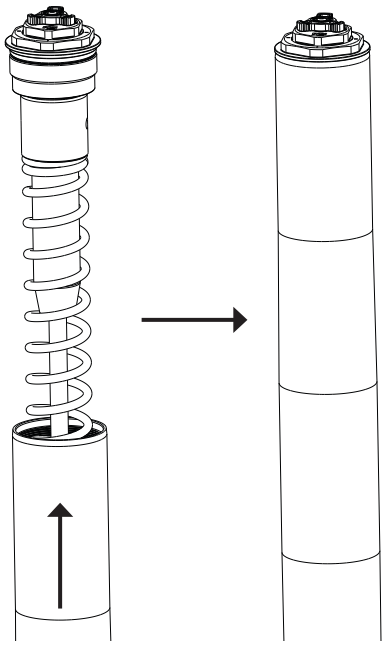


Fig. 20: Raise the upper tube and torque the top cap.

FORK LEG INSTALLATION

FORK LEG INSTALLATION

1. Use the manufacturer's workshop manual to reinstall the fork leg and other removed components on the vehicle. Reference the height you measured when removing the fork in the "Fork Leg Removal" section (Fig. 21) to set the same distance between the fork leg height and the triple clamp. Refer to the manufacturer's workshop manual when setting the fork height in the triple clamps.

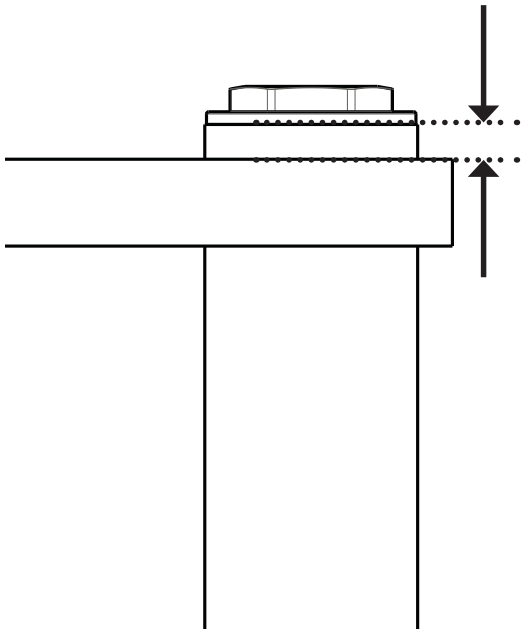


Fig. 21: Set to the height measured when removing the fork in the "Fork Leg Removal" section.

FORK SET UP

GRIP ST CARTRIDGE KITS

ADJUSTING SPRING PRELOAD

FOX GRIP ST Cartridge kits are equipped with spring preload adjusters that have 24 preload positions. Use the preload spanner (Fig. 22A) to adjust spring preload. To adjust the spring preload, rotate the preload adjuster clockwise to increase spring preload and counter clockwise to decrease spring preload. Keep track of the spring preload by counting clicks.

Use the charts on this page to find the preload setting recommended for your rider(s) weight, including gear. If you cannot reach your optimal ride height within the fork's available preload adjustment, you will need to go up in spring rate to one that fits the application. If you have any questions call the FOX motorcycle shock service center at 831.740.4619.

⚠WARNING: Modifying preload spacer length will void the warranty and could result in SERIOUS INJURY and/or DEATH.

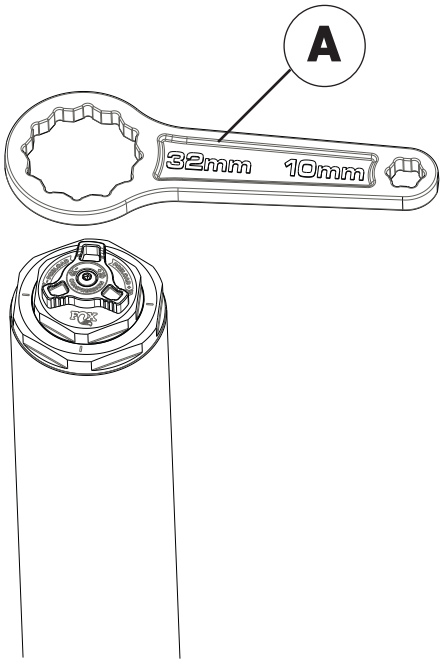


Fig. 22: Spring preload can be adjusted with supplied preload adjust spanner (A); compression leg shown.

CVO STANDARD SPRING PRELOAD CHART	
RIDER WEIGHT WITH GEAR (LB)	Number of Preload Clicks*
<110	0
140	4
170	8
200	12
230	16
260	20
>290	24

* Preload clicks are counted from full counter-clockwise

FORK SET UP

QS3 COMPRESSION ADJUST

The Quick Switch Compression adjust feature gives you the ability to easily adjust the fork's compression damping with three easy clicks. Adjustments are made by turning the adjuster knob on the top cap (Fig. 23).

The factory setting is Position 2 (Fig. 23). The performance of the fork at this setting is a good balance between comfort and control. For firmer compression, turn the knob clockwise. For softer compression, turn the knob counter-clockwise (Fig. 24).

Adjusting the compression affects how quickly the fork compresses when bumps or corners are encountered. The optimum compression setting usually requires the least amount of damping possible without bottoming out the fork.

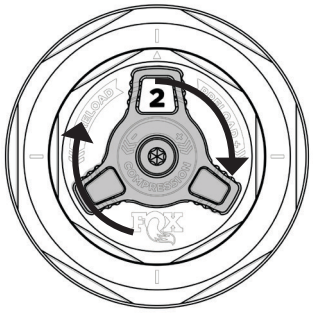
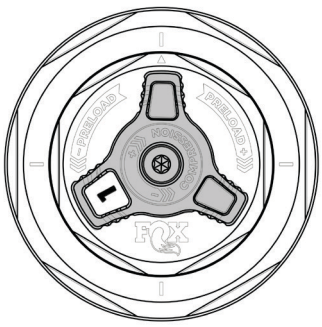
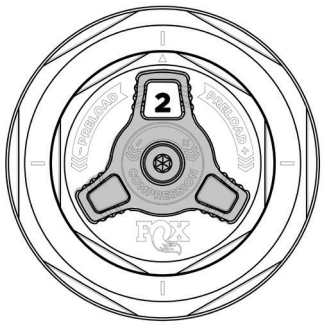


Fig. 23: QS3 compression adjuster shown in factory setting Position 2.

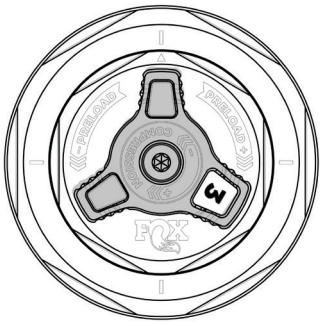
TUNING COMPRESSION DAMPING	
SYMPTOM	**REMEDY**
Rigid, harsh ride	Turn counter-clockwise
Excessive weight transfer	Turn clockwise
Bottoms out often	Turn clockwise
Suspension not using full travel	Turn counter-clockwise



Position 1 (Soft)



Position 2 (Medium)



Position 3 (Firm)

Fig. 24: QS3 compression damping adjustments.

FORK SET UP

QSR REBOUND ADJUST

The Quick Switch Rebound adjust feature gives you the ability to easily adjust the fork's rebound damping with three easy clicks (Fig. 25). The factory setting is Position 2 (Fig. 25). The performance of the fork at this setting is a good all-around setting. For slower rebound, turn the knob clockwise. For faster rebound turn the knob counter-clockwise (Fig. 26).

Adjusting the rebound affects how quickly the wheel rebounds when traveling through a series of bumps and also determines how quickly the front end responds in corners. The optimum rebound setting usually requires the least amount of damping possible without the motorcycle feeling like it is bouncing off of every bump.

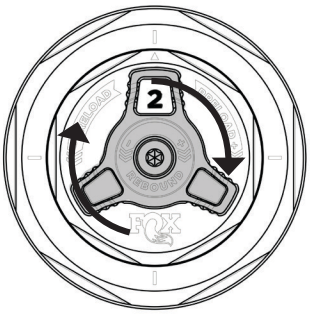
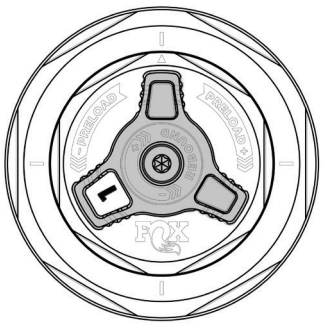
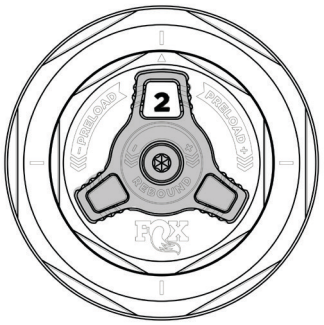


Fig. 25: QSR rebound adjuster, shown in factory setting Position 2.

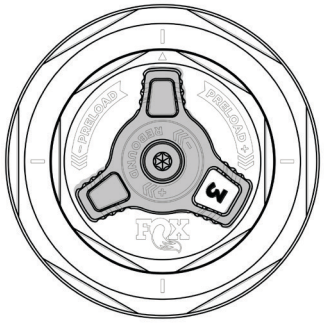
TUNING REBOUND DAMPING	
SYMPTOM	**REMEDY**
Harsh over bumps	Turn counter-clockwise
Excessive weight transfer	Turn clockwise
Wallows in corners	Turn clockwise



Position 1 (Fast)



Position 2 (Medium)



Position 3 (Slow)

Fig. 26: QSR rebound damping adjustments.

MAINTENANCE

SEE OIL CHANGE INTERVAL LISTED IN VEHICLE SERVICE MANUAL.

PROPER INSPECTION AND MAINTENANCE IS ESSENTIAL TO MAINTAIN THE PERFORMANCE AND RELIABILITY OF YOUR FORK KIT.

It is important to keep the forks clean and free of dirt.

The service interval depends on how frequently and aggressively the motorcycle is ridden. Under normal usage, it is recommended to have the forks completely inspected and serviced annually.

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