cannondale

HEAD SHOK

SERVICE MANUAL

GETTING IN TOUCH WITH CANNONDALE

For technical assistance with any Cannondale, HeadShok, or CODA product, please contact our Technical Support department.

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INTRODUCTION

We at Cannondale are committed to providing our dealers and our end customers with the finest cycling products in the world. As part of this commitment, we have compiled this comprehensive service manual to provide the bicycle service technician with the latest technical information.

This manual is intended to be used as a resource for our dealers, helping them to service the ever expanding range of Cannondale, HeadShok, and CODA products. We have included detailed specifications and service information for all HeadShok front suspension systems, Cannondale frames and rear suspension systems, and CODA components that have been produced up through the 1997 model year. Our plan is to produce updates to this book and send them out periodically as new products are introduces, or as existing products are refined.

If you have any questions regarding the procedures or information contained in this book, please contact our Technical Support department. Likewise, if you have any suggestions for changes that may improve later updates, please forward them on, as well.

HEADSHOK FRONT SUSPENSION

The HeadShok section of this manual is split into three distinct chapters: Identification, Service, and Parts List. The Identification chapter will help you to determine exactly what type of fork or cartridge you have before you, and where to look for service information. The Service chapter contains instructions for all pertinent service procedures. The Parts List covers all small parts, kits, and special tools.

If you're not sure of exactly what type of HeadShok fork (or cartridge) you have before you, see the Identification chapter first. Remember that most HeadShok forks and cartridges are interchangeable, and the cartridge may have been upgraded or replaced since the bike was new. Once the exact type is determined, proceed to the Service chapter for further instructions.

CANNONDALE FRAMES & REAR SUSPENSION

The "Cannondale Frames" section of this manual covers all Cannondale frames and rear suspension systems. This section is split into two chapters: Service and Parts List. The Service chapter contains specifications and service instructions for various areas of Cannondale rigid and rear suspension frames. The Parts List contains item numbers for all kits and small parts that are currently available.

CODA COMPONENTS

The CODA section of this manual covers all CODA components. It contains two chapters: Service and Parts List.

HEADSHOK SUSPENSION FORKS: A BRIEF EXPLANATION

HeadShok forks consist of 3 distinct components:

- Fork blades
- Telescoping steerer tube
- Cartridge (guts)

Fork Blades

Since its introduction in 1991, there have been several different types of forks made with the HeadShok design. Most were made for 26" mountain bike wheels, but 700c versions for Hybrids and for Road bikes have also been manufactured.

Telescoping Steerer Tube

The Telescoping Steerer Tube has undergone several changes, the most notable being the switch (in 1993) from adjustable needle bearings to fixed, pre-adjusted needle bearings. There have also been minor changes and differences in steerer tube length and needle bearing race length over the years.

Cartridges

There have been a large variety of different cartridges made over the years. See the Cartridge Identification section for complete information on the various HeadShok cartridges.

The fork blades and the telescoping steerer tube are permanently assembled at the factory, but the cartridges are interchangeable (with a few exceptions).

SUSPENSION BASICS

Any suspension system must consist of two distinct components: a spring and a damper. In the case of a bicycle suspension fork, the spring supports the rider's weight, while the damper controls the action of the spring.

Springs

Several different devices can be used for a spring. Compressed air, MCU (Microcellular Urethane), elastomer, and steel coils have all been used in HeadShok suspension at one time or another.

- Elastomer

Elastomer is a rubbery plastic material that has a slight damping (energy absorbing) property. Some suspension systems utilize elastomers as a spring. However, elastomers are relatively dense, and cannot compress much beyond their original size before "going solid". As such, they tend to produce a very steeply progressive spring rate, to the point where travel is limited. Elastomers also tend to be affected by temperature (they get markedly stiffer in colder temperatures.)

■ MCU

Micro-Cellular Urethane (or MCU) is a porous plastic material with a rubbery consistency. The pores in the material are filled with air, reducing its density. As the material is compressed, the air is pushed out of these pores, allowing the material to be compressed much smaller than its original size. When used as a spring, MCU has a progressive rate, and a slight inherent damping property. However, MCU alone does not give sufficient damping for an effective suspension system. A separate damping mechanism is required.

■ Coil Springs

Coil springs are simple, reliable, and give a predictable, linear spring rate. However, the spring rate does not provide enough force in a short-travel application to prevent bottom-out on large impacts.

■ Compressed Air

The benefits of using compressed air for a spring are light weight, a wide range of adjustability, and the small volume needed. Air springs have a progressive rate, which prevents the fork from bottoming out on large bumps. The curve of spring rate progression can be very steep or more moderate depending on the air volume used. Potential drawbacks to air springs are the possibility for seal leakage (and resulting loss of air pressure) and the need for air spring preload pressure to be adjusted with a special, high-pressure pump (a minor inconvenience).

■ Coil-MCU combinations

Because coil springs have a linear spring rate, they stay very supple and reactive when used in a bicycle suspension fork. However, when a large bump is hit, the rate of a coil spring does not rise quickly enough to prevent a hard bottom-out. Another type of spring with a more steeply progressive rate must be used to supplement the coil spring.

Some suspension forks use a short coil spring in series with a longer MCU or elastomer spring. This produces a suspension fork that feels soft and supple through the first bit of travel. However, when the coil spring bottoms out, the elastomer alone (with its steeply progressive rate) compresses until it "goes solid" and limits the fork's travel.

The HeadShok Advanced Spring System uses a long coil for the suspension's primary spring. To prevent a hard bottom-out, a column of soft MCU is used to supplement the coil spring. This gives the suspension the suppleness of a coil spring, with a steep rise in the spring rate at the very bottom of the fork's travel. The MCU column can be trimmed shorter to retard the progression of the spring, so that it begins to stiffen later in the suspension's travel.

Dampers:

There have been two types of dampers used in HeadShok suspension forks.

■ Hydraulic Damper (a.k.a. Oil Damper, Hydraulic Cartridge)

A hydraulic damper is a sealed, oil-filled cylinder with a piston in it. The piston has one or more ports (holes) in it, and is attached to a shaft. As the suspension is compressed, the piston is forced from one end of the cylinder toward the other, forcing the oil to flow from one side of the piston, through the ports, to the other side. Because oil is a thick liquid that flows slowly, this slows the action of the suspension.

■ Mechanical Damper

A mechanical damper is a simple nylon wear ring that contacts the inner surface of the fork's steerer tube. The small amount of interference between the ring and the steerer tube produces a small amount of friction, slowing the suspension.

GLOSSARY

Travel

The term "Travel" refers to the amount of distance a front (or rear) wheel can move to absorb an impact. Generous amounts of travel alone is not the mark of a good suspension system. Of equal or greater importance is the suspension's ability to absorb the energy of the impact without sacrificing rider control.

Spring

A spring is an energy storage device. In a suspension system, the spring stores energy as it is compressed. The spring then expends the stored energy as it extends.

Preload

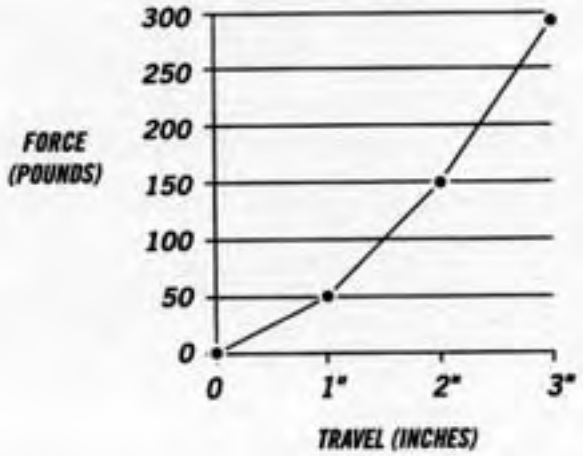
Preload is the force that a spring exerts when the suspension is fully extended. When preload is adjusted properly, the suspension will not compress needlessly under the rider's body weight, but will activate with even the smallest impact.

Spring Rate

Spring rate is a measurement of a spring's stiffness. Spring rate is typically expressed in terms of mow much weight (force) is required to compress the spring one inch.

Progressive Spring Rate

A progressive spring rate is one that gets stiffer at a disproportionately to the amount it is compressed. The degree to which a progressive spring stiffens as it is compressed varies. Some types of springs get stiffer very gradually while others stiffen very abruptly.



Example of progressive spring rate:

Fully extended: 0 lbs.

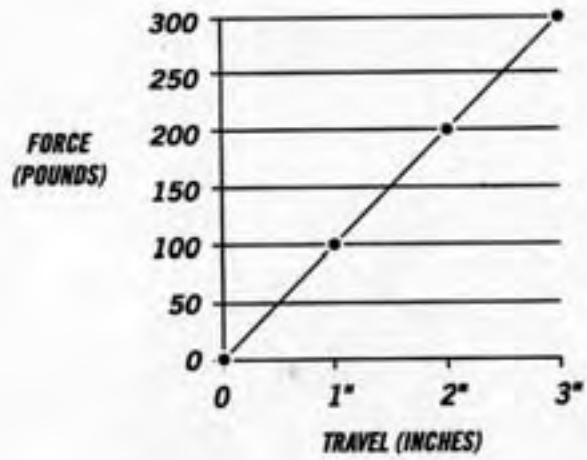
Compressed 1": 50 lbs.

Compressed 2": 150 lbs.

Compressed 3": 300 lbs.

Linear Spring Rate

A linear spring rate is one that gets stiffer in direct proportion to the amount it is compressed. Coil springs in particular have a linear progression rate.



Example of linear spring rate:

Fully extended: 0 lbs.

Compressed 1": 100 lbs.

Compressed 2": 200 lbs.

Compressed 3": 300 lbs.

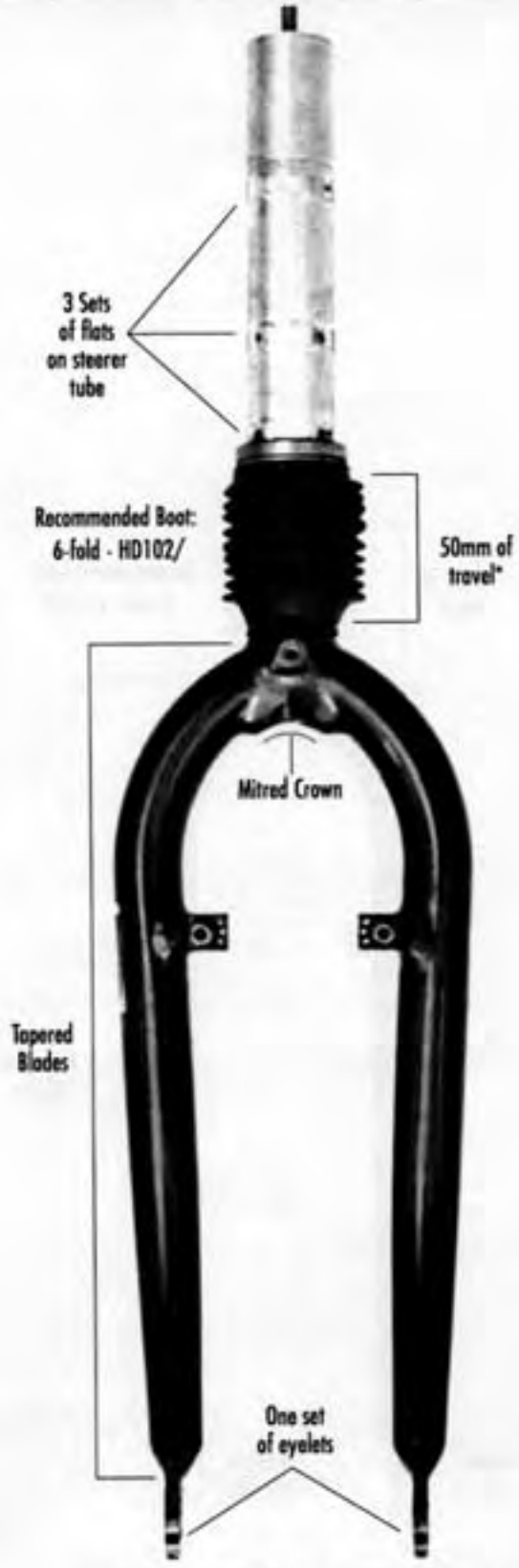
Damping

Damping controls the speed at which the suspension compresses and rebounds. There are several different types of damping devices. Most bicycle suspension systems use simple friction-ring devices or more versatile hydraulic shock absorbers. Some systems have no damping device at all, and rely on elastomer bumpers to provide a very small amount of damping.

Stiction

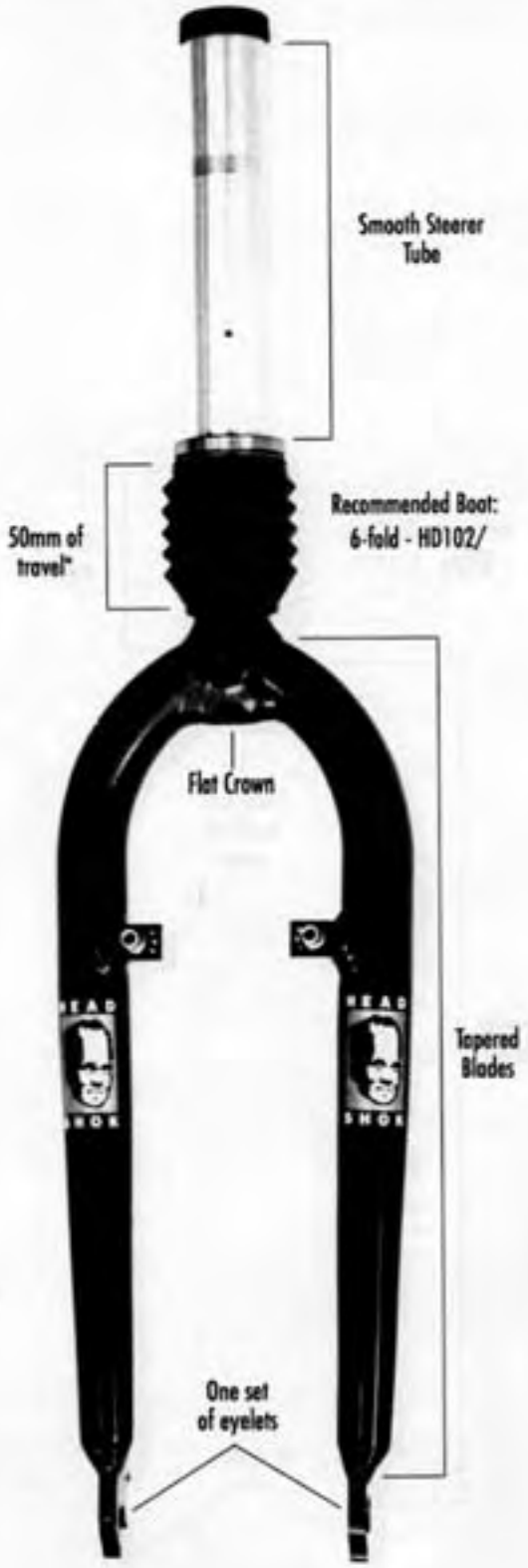
Bad. "Stiction" refers to static friction; the tendency for two surfaces to resist sliding against each other. The problem of stiction is most prevalent in conventional telescoping-blade type suspension forks. The bushings that these forks have in between the stanchion and slider tubes produce a great deal of stiction. In order for the suspension to compress, this resistance must first be overcome, preventing the fork from reacting to many small bumps and reducing the efficiency of the suspension overall. The needle bearings in HeadShok forks produce almost zero stiction.

Pepperoni Blades - early type (curved rake)



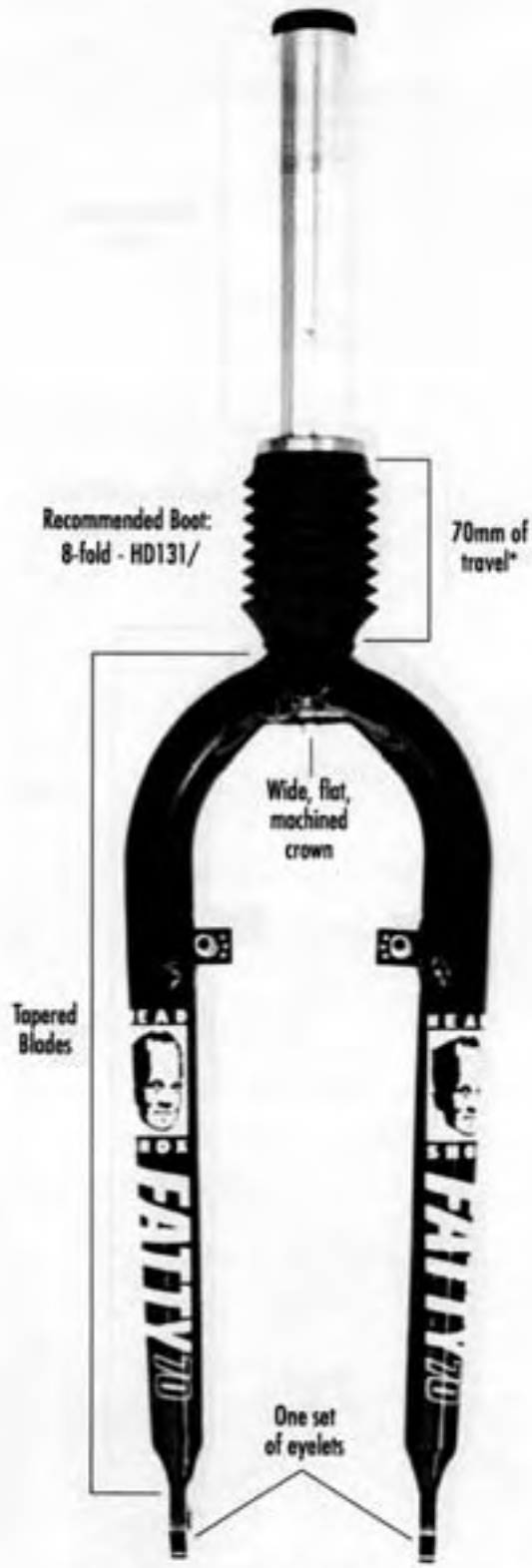
* Travel is measured with cartridge removed from fork

Pepperoni Blades - later type (straight rake)



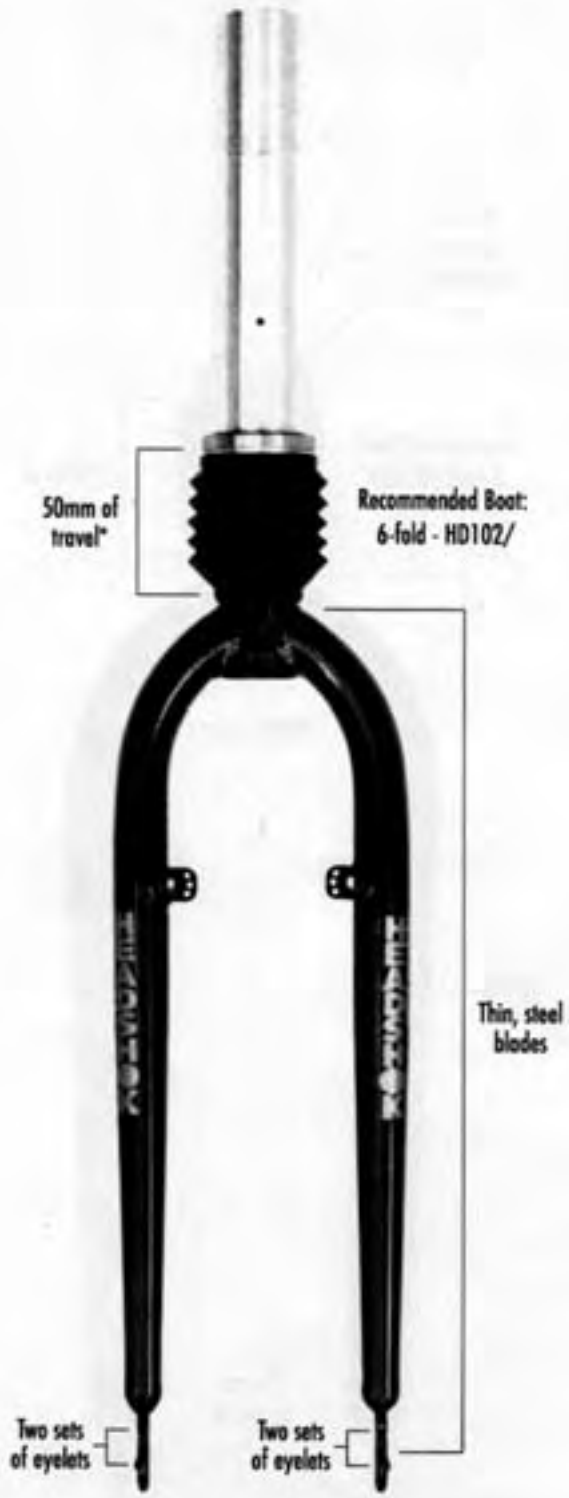
* Travel is measured with cartridge removed from fork

Pepperoni Blades
Fatty 70



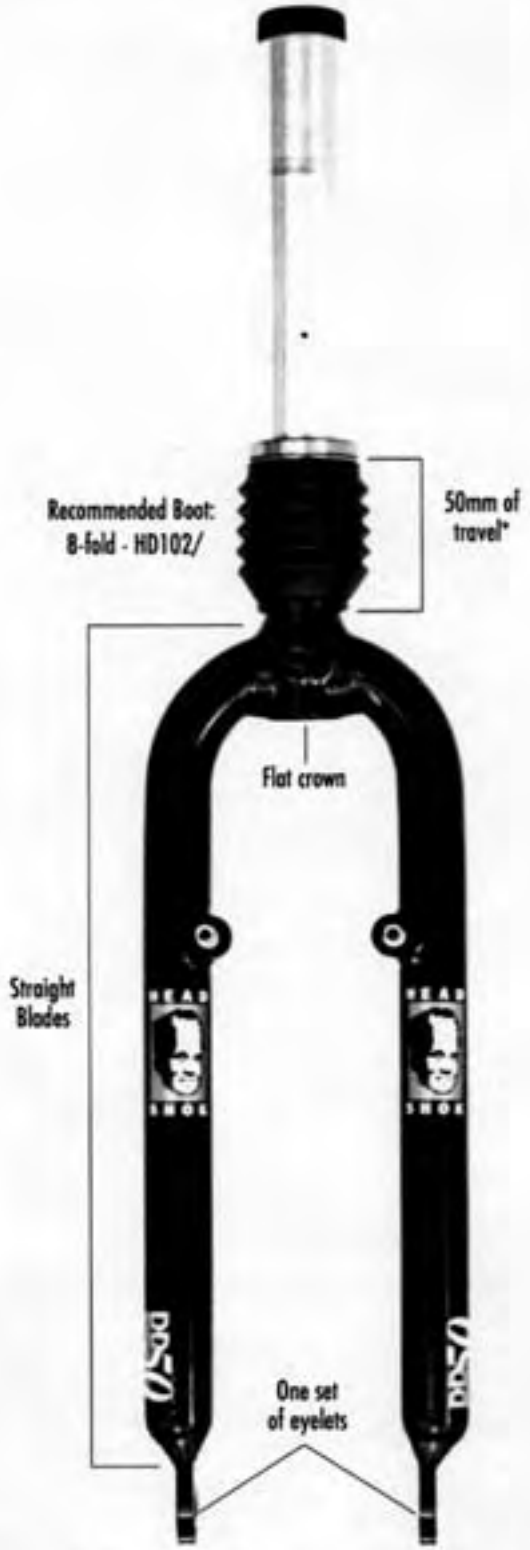
* Travel is measured with cartridge removed from fork

Steel Blades



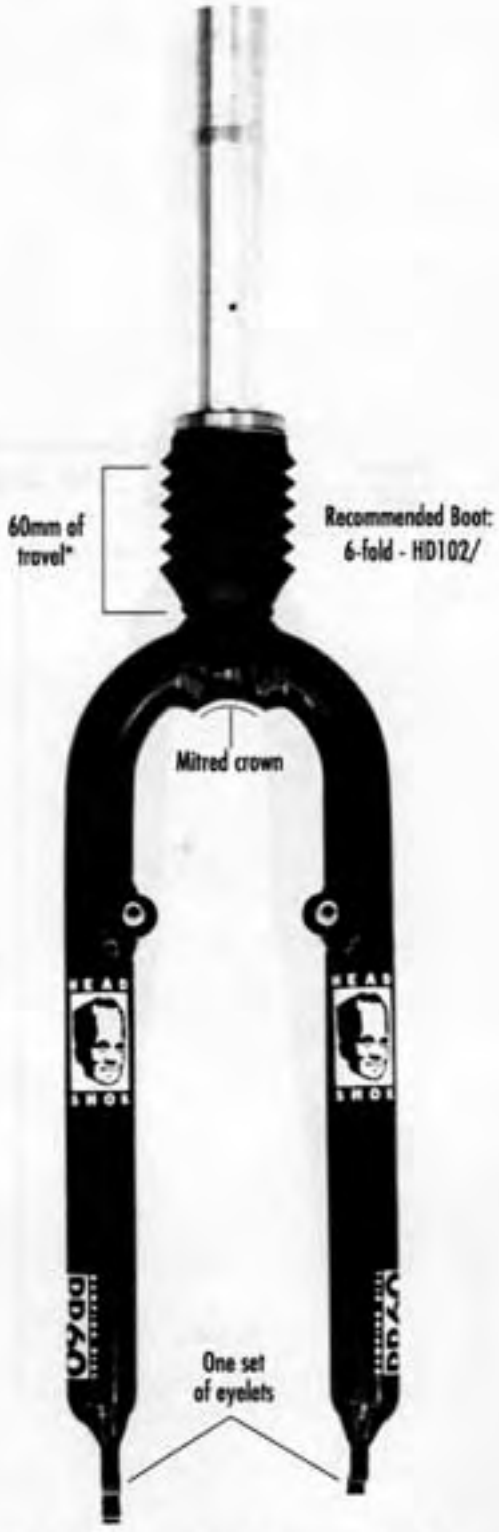
* Travel is measured with cartridge removed from fork

P-Bone Blades - 50mm



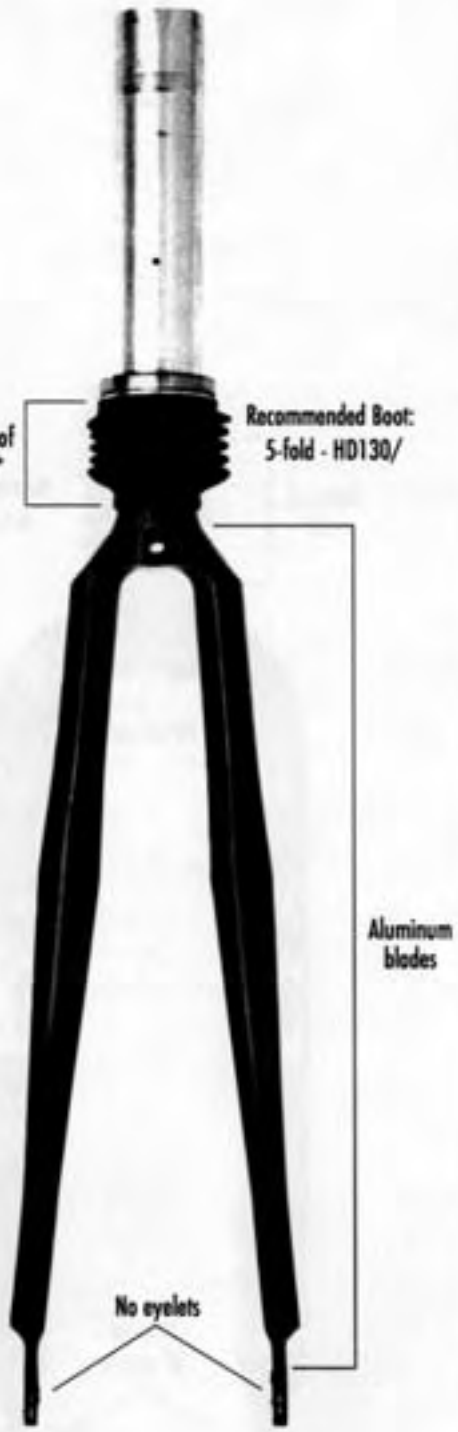
* Travel is measured with cartridge removed from fork

P-Bone Blades - 60mm



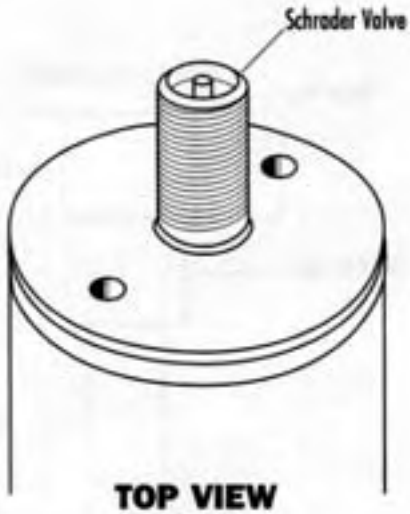
* Travel is measured with cartridge removed from fork

Silk Road



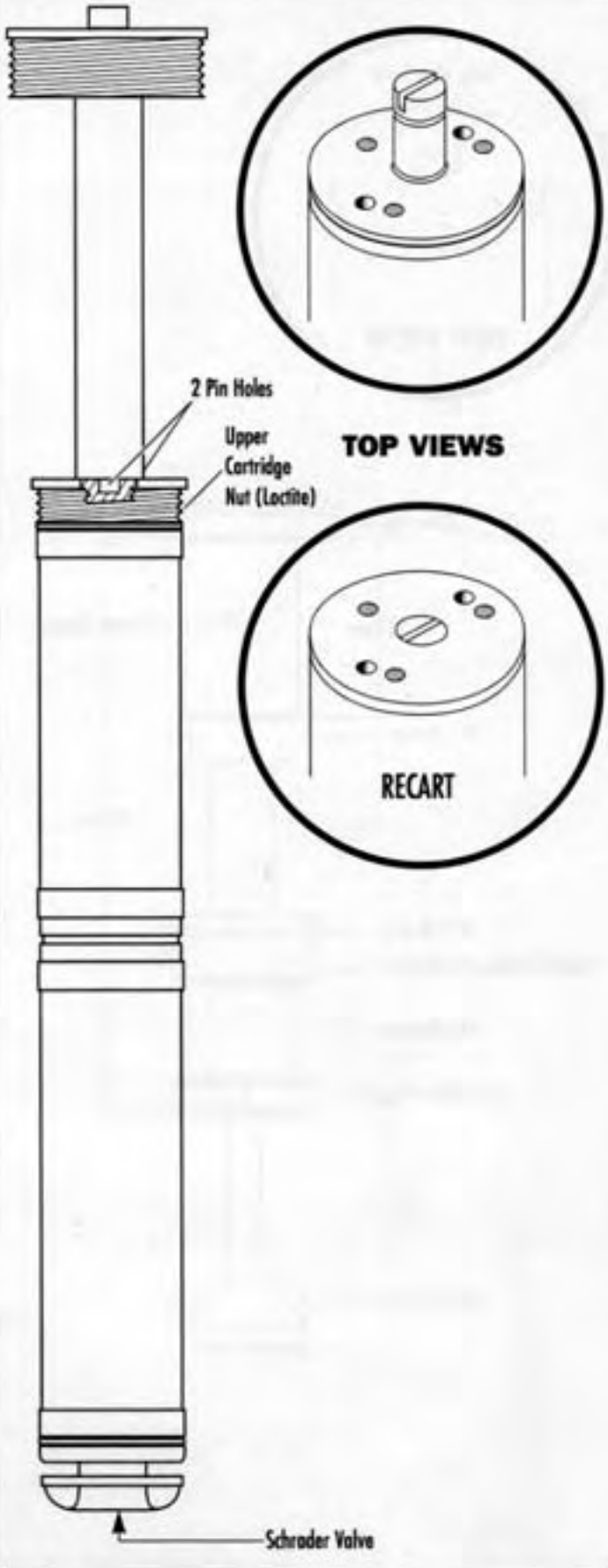
* Travel is measured with cartridge removed from fork

TYPE 1



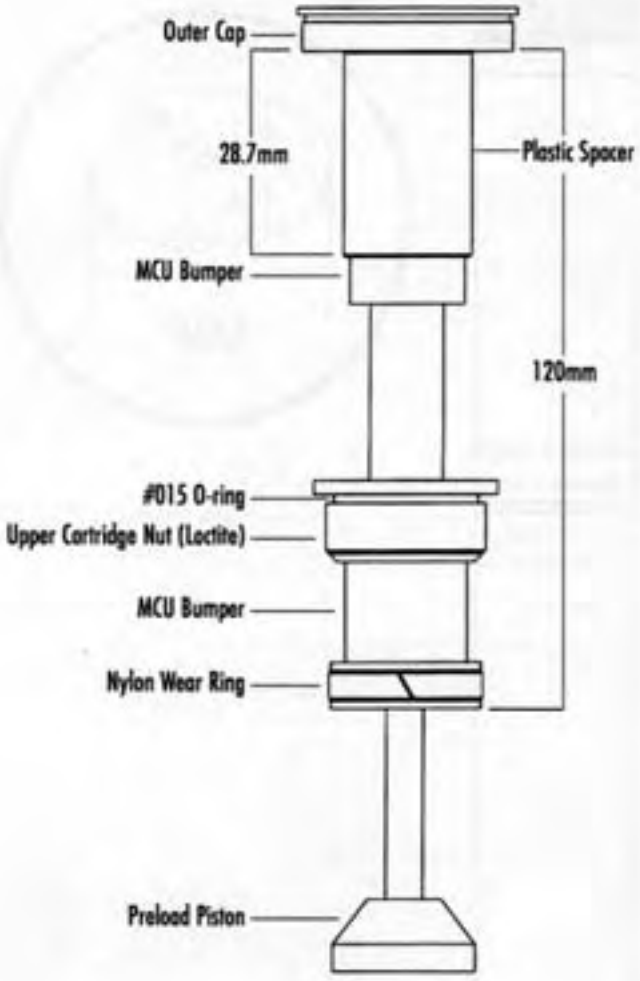
TOP VIEW

MZ (DD/RDC)

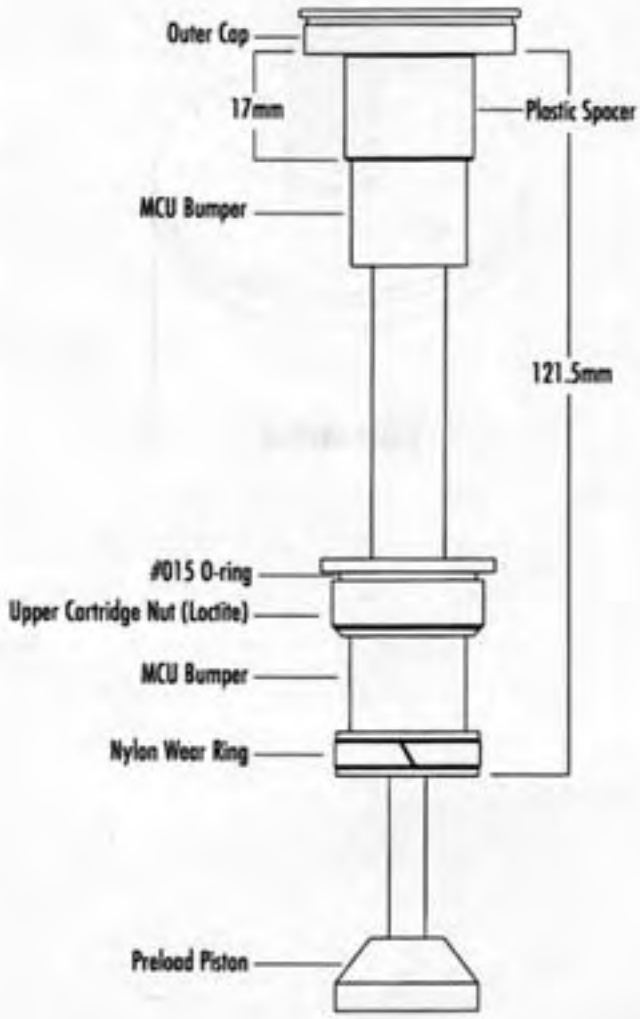


TOP VIEWS

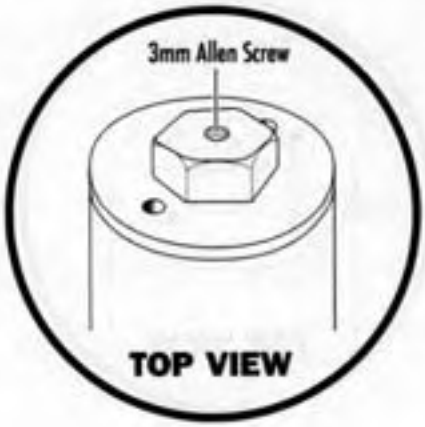
EDM/MC50

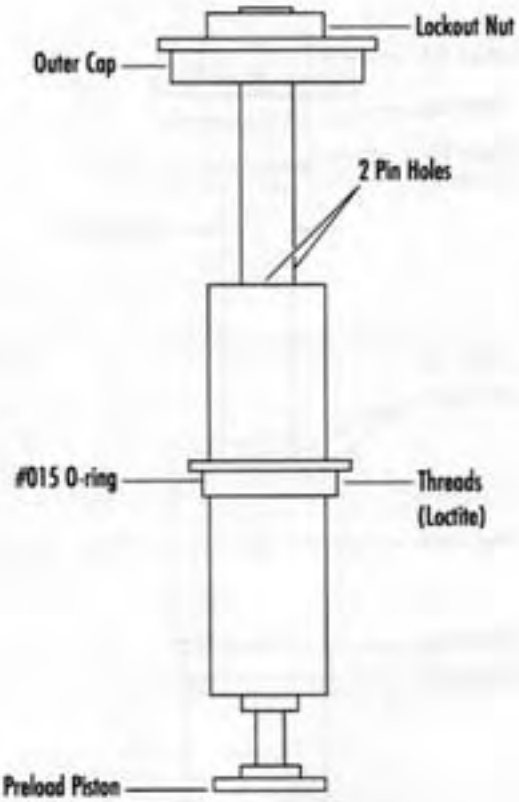


MC60



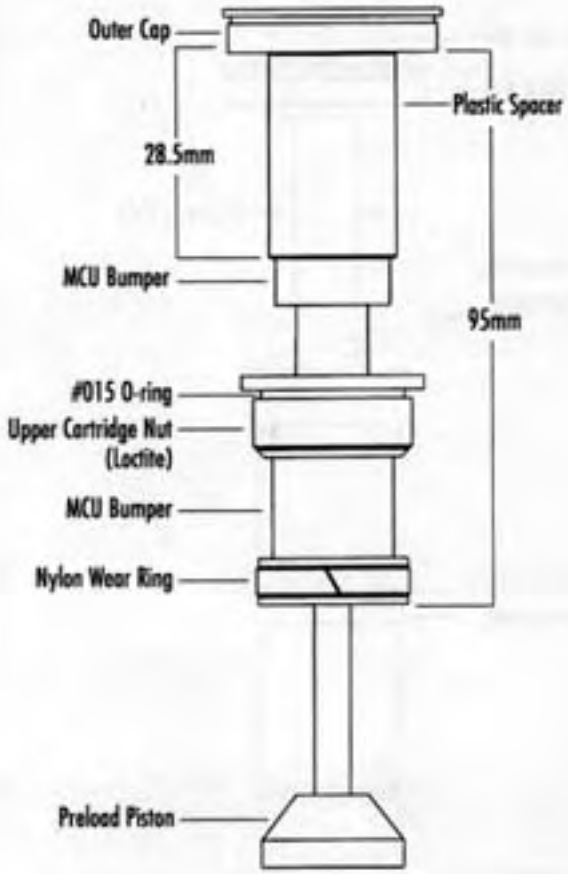
DD2


3mm Allen Screw
TOP VIEW

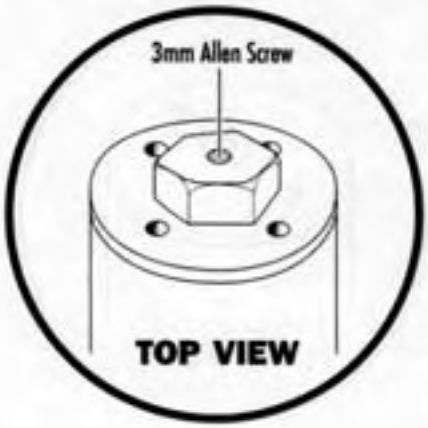

Lockout Nut
Outer Cap
2 Pin Holes
#015 O-ring
Threads
(Loctite)
Preload Piston

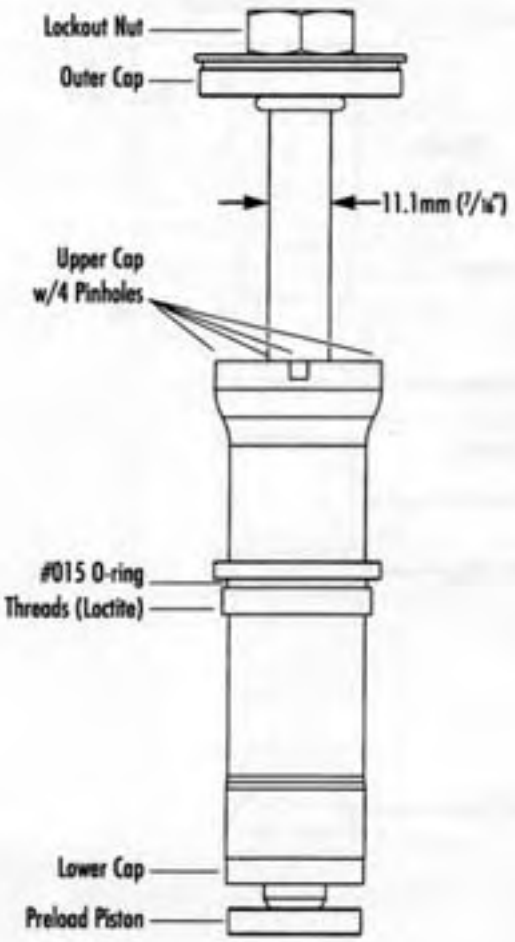
CMT


4mm Allen Screw
TOP VIEW

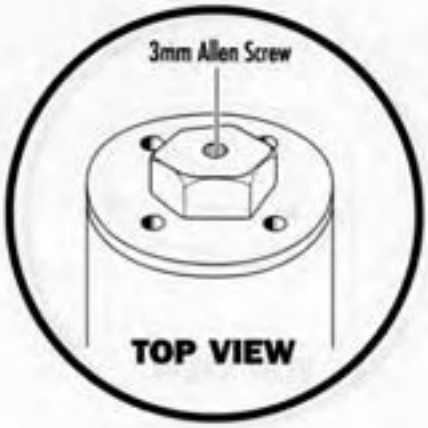

Outer Cap
Plastic Spacer
28.5mm
MCU Bumper
95mm
#015 O-ring
Upper Cartridge Nut
(Loctite)
MCU Bumper
Nylon Wear Ring
Preload Piston

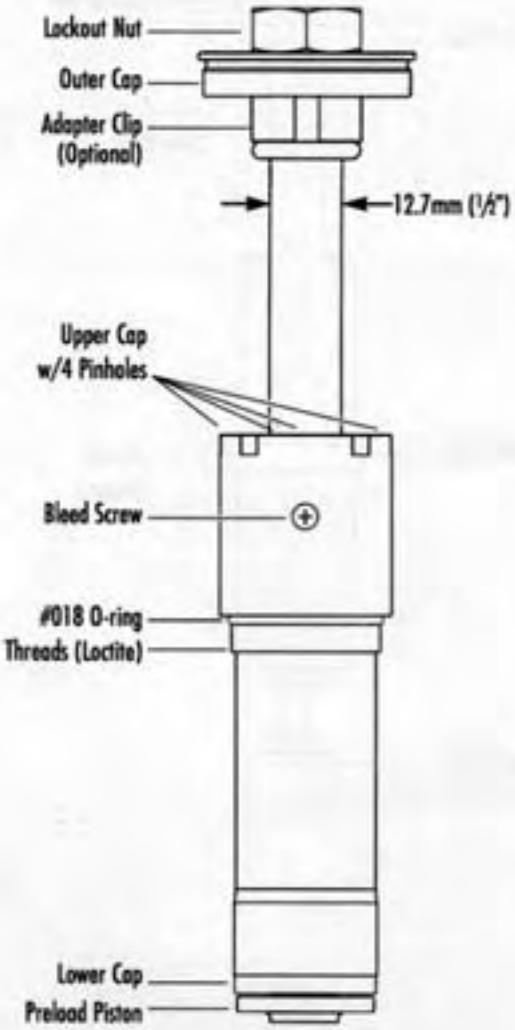
DD50


3mm Allen Screw
TOP VIEW

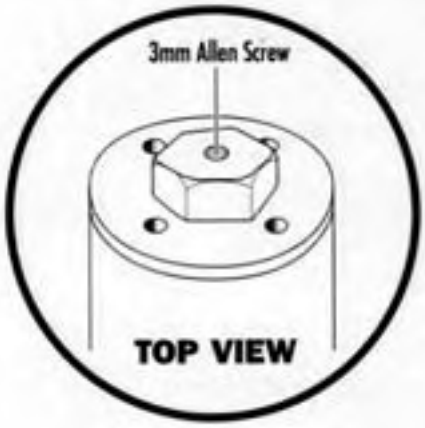

Lockout Nut
Outer Cap
11.1mm (7/16")
Upper Cap
w/4 Pinholes
#015 O-ring
Threads (Loctite)
Lower Cap
Preload Piston

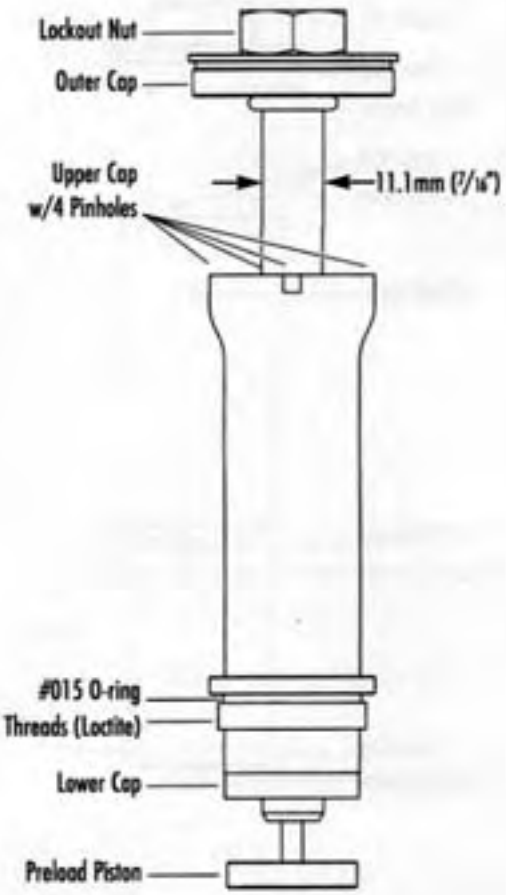
DD60


3mm Allen Screw
TOP VIEW

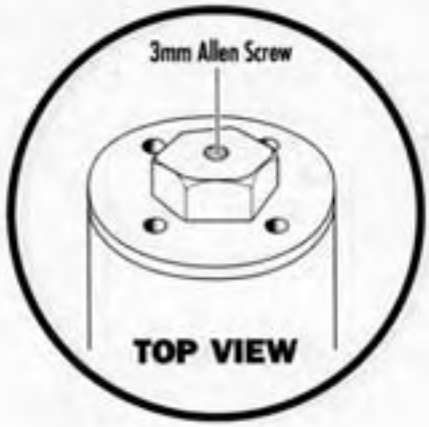

Lockout Nut
Outer Cap
Adapter Clip
(Optional)
12.7mm (1/2")
Upper Cap
w/4 Pinholes
Bleed Screw
#018 O-ring
Threads (Loctite)
Lower Cap
Preload Piston

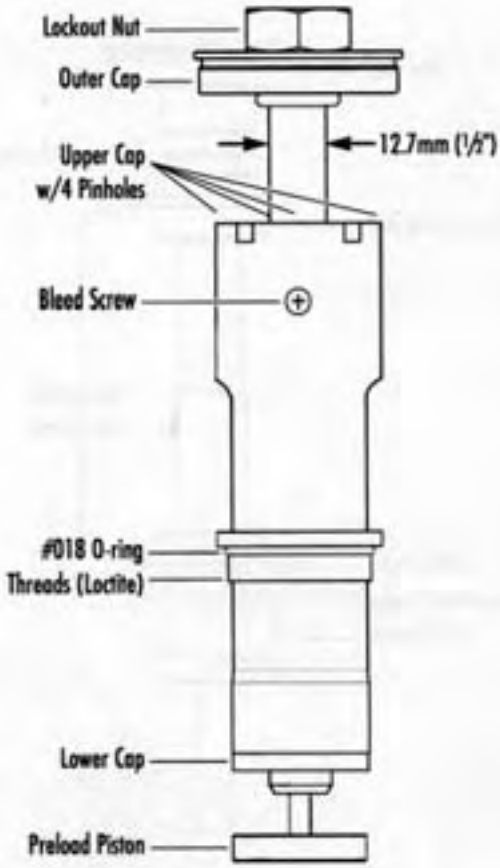
DD25/'96





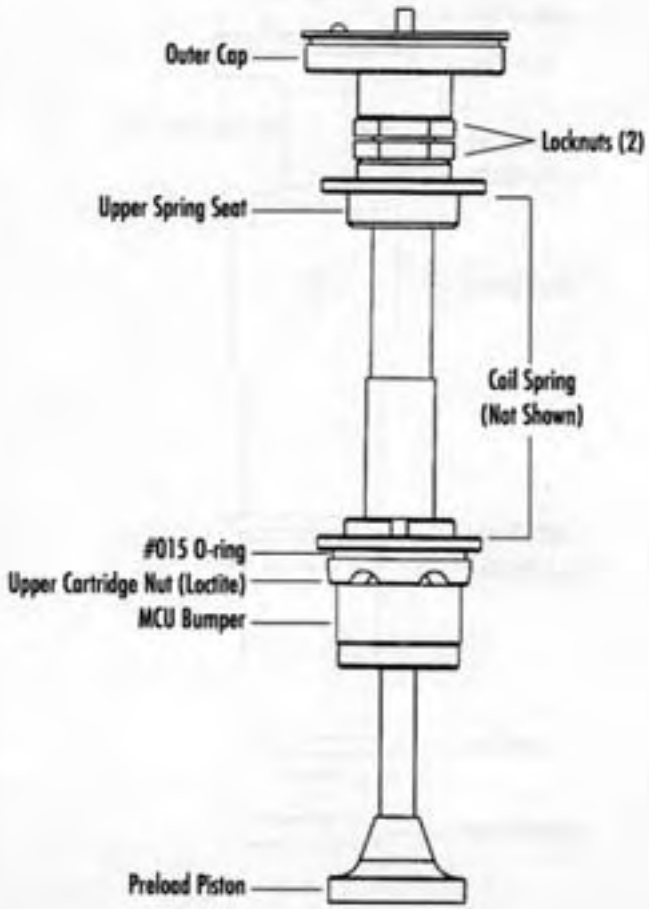
DD25/'97



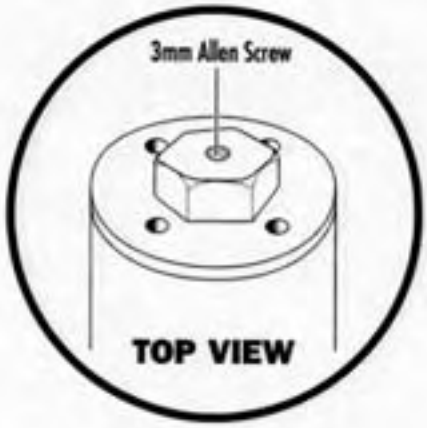


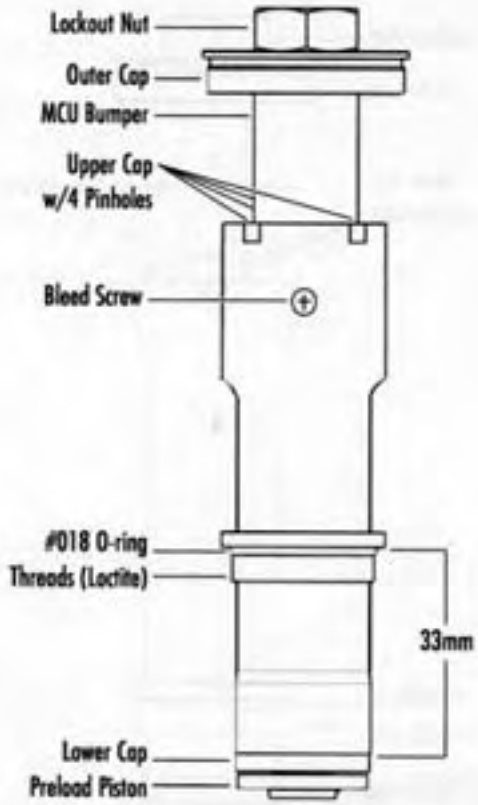
SR


TOP VIEW


Outer Cap
Locknuts (2)
Upper Spring Seat
Coil Spring
(Not Shown)
#015 O-ring
Upper Cartridge Nut (Loctite)
MCU Bumper
Preload Piston

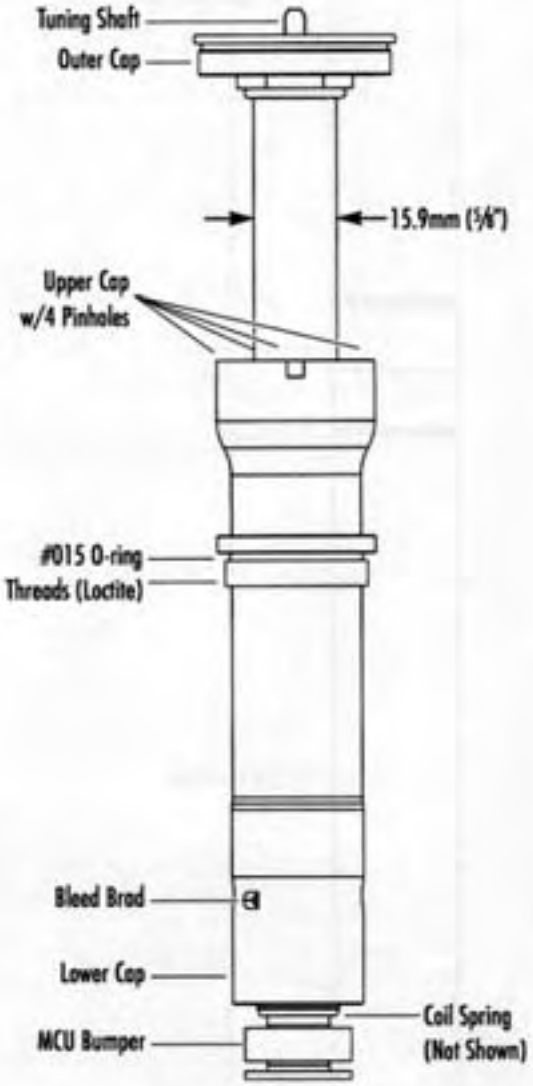
DD15

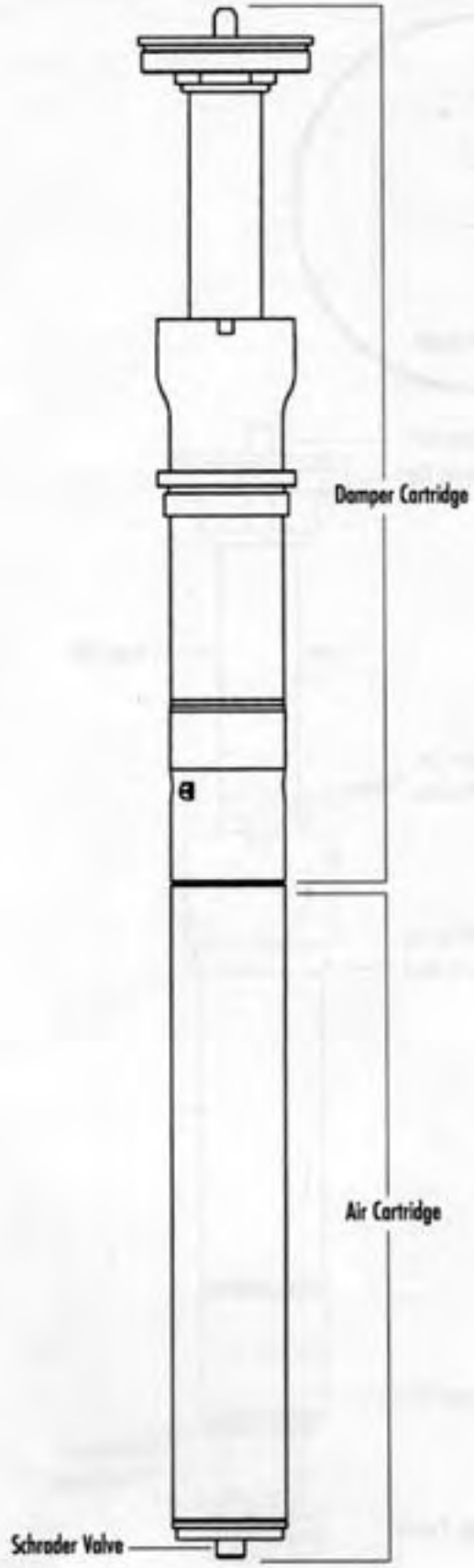

3mm Allen Screw
TOP VIEW


Lockout Nut
Outer Cap
MCU Bumper
Upper Cap
w/4 Pinholes
Bleed Screw
#018 O-ring
Threads (Loctite)
33mm
Lower Cap
Preload Piston

FATTY 50

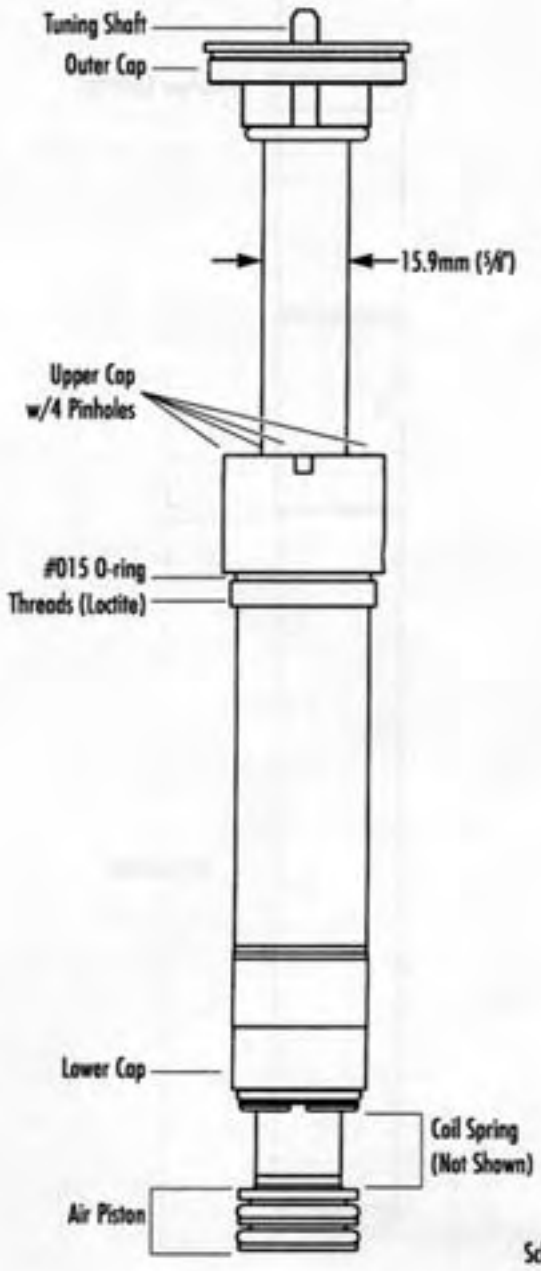

TOP VIEW

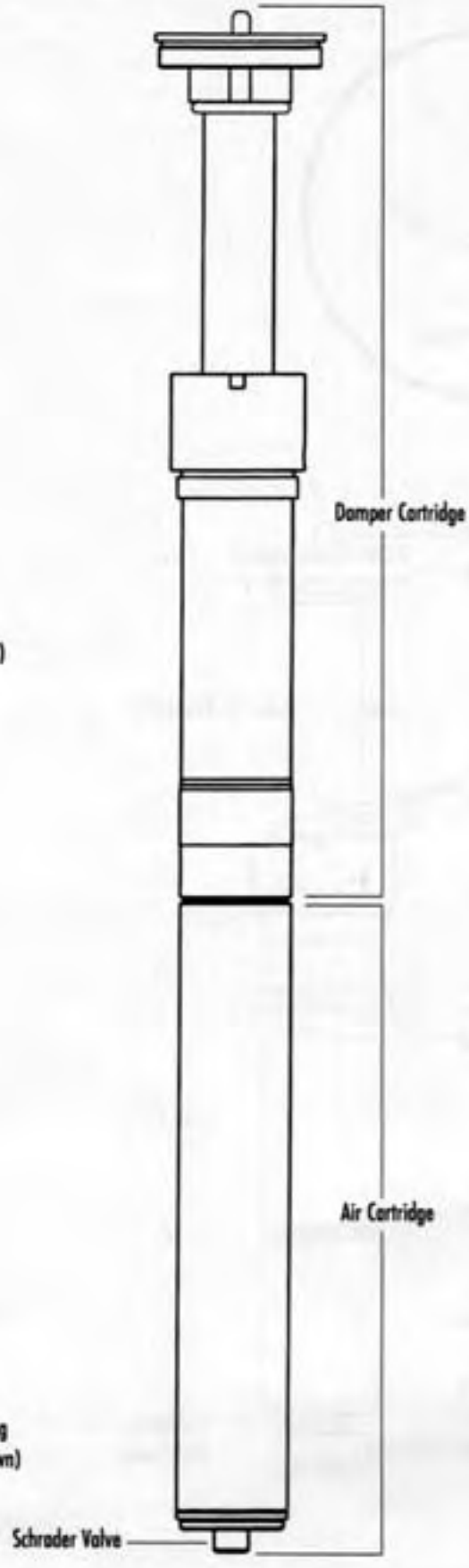

Tuning Shaft
Outer Cap
15.9mm (5/8")
Upper Cap
w/4 Pinholes
#015 O-ring
Threads (Loctite)
Bleed Brad
Lower Cap
MCU Bumper
Coil Spring
(Not Shown)


Damper Cartridge
Air Cartridge
Schrader Valve

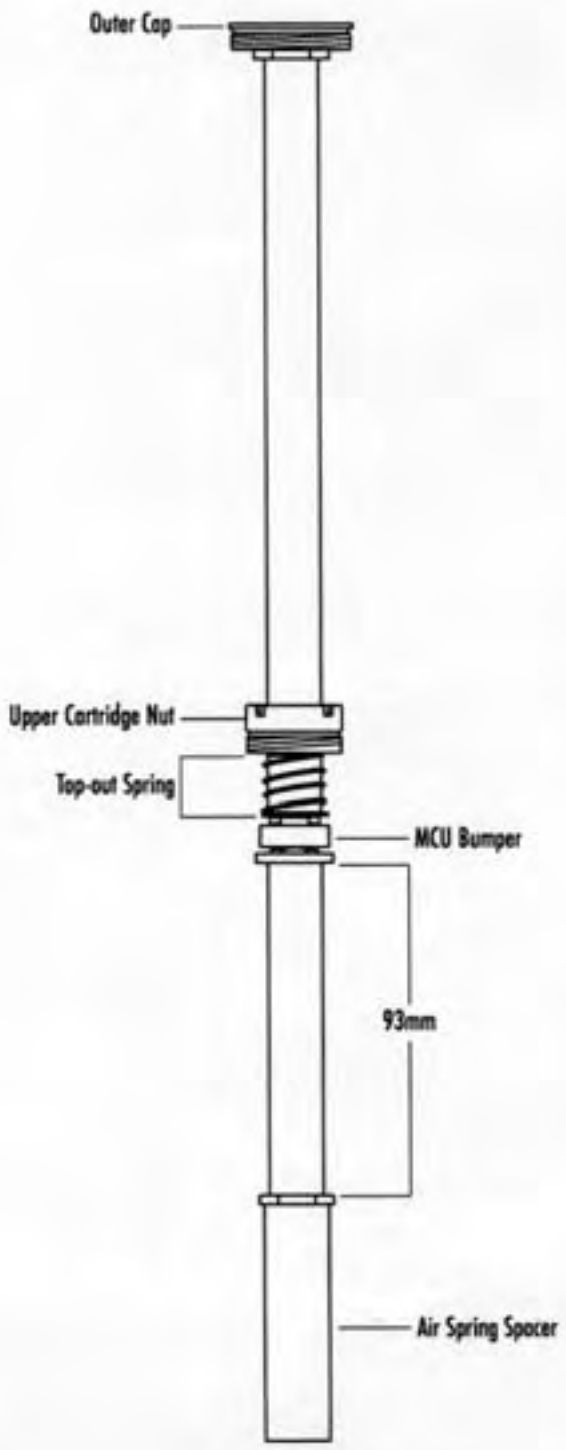
FATTY 70


TOP VIEW

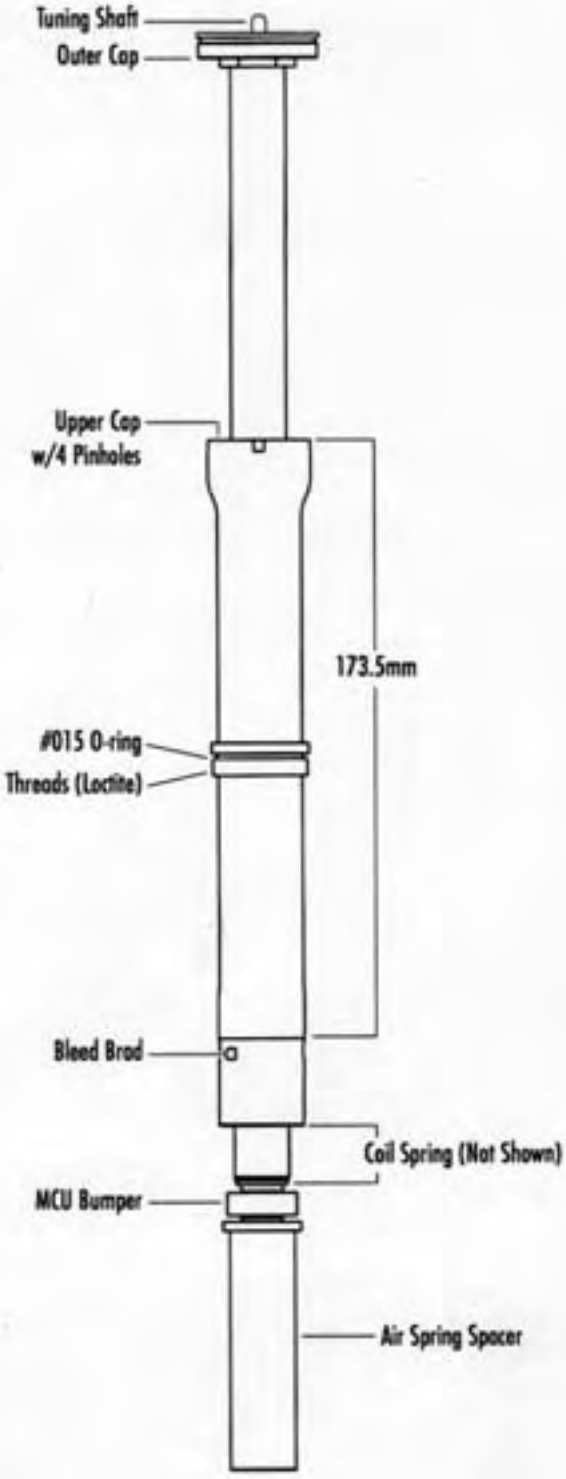

Tuning Shaft
Outer Cap
15.9mm (5/8")
Upper Cap
w/4 Pinholes
#015 O-ring
Threads (Loctite)
Lower Cap
Coil Spring
(Not Shown)
Air Piston


Damper Cartridge
Air Cartridge
Schrader Valve

MOTO 120 DUMMY CARTRIDGE



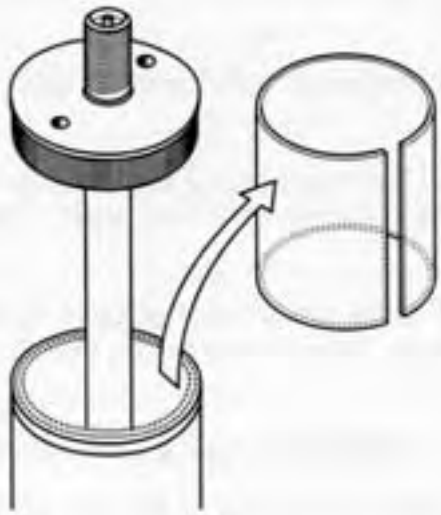
MOTO 120 DAMPER CARTRIDGE



Type 1 "Delta V"

The HeadShok Type 1 suspension fork was introduced in 1991 as the "Delta V" fork. It used an air spring and an adjustable hydraulic damper assembly. This fork was not designed to be internally serviceable. In the event of a mechanical problem with this type of fork, we recommend the cartridge be replaced with a newer model.

Fig.1 ▼



REMOVAL OF INTERNAL HYDRAULIC ASSEMBLY

1. Remove the valve cap, Damping Dial, and large aluminum nut from the schrader valve on top of the fork. Remove all air pressure from the fork by depressing the schrader valve core.

2. Using a pin-spanner wrench (Park SPA-1,green), remove the outer cap from the steerer tube. There may or may not be a 31mm nylon spacer inside the outer steerer tube. If there is a spacer, remove it (Fig.1).

3. Turn the fork upside-down. Clean the recessed area under the fork crown thoroughly, removing all dirt and grime. Using a 3/4" dowel, tap the aluminum bottom plug into the fork crown aprox. 1" to gain access to the circlip located around the inside surface of the fork crown. Use a screwdriver to pry the circlip from the groove. Discard the circlip.

4. Turn the fork upright. Place a bucket under the fork to catch the oil which will drain from the fork. Carefully pump the fork up to approximately 100psi.

CAUTION: This pressure may eject the bottom plug and some oil into the bucket rather violently. If the plug does not eject on its own, carefully push down on the top cap while guiding the plug out through the fork. It is important that the plug does not get jammed sideways during this step. When the plug is removed, oil will drain from the fork.

5. Release all air pressure from the fork. Stroke the hydraulic assembly up and down a few times to purge any remaining oil.

6. Insert a HeadShok cartridge pin wrench (part #101103) into the steerer tube so that the two pins of the wrench engage the two holes in the upper cartridge nut. Turn the handle of the wrench counter-clockwise until the threads of the cartridge nut disengage the inner steerer tube.

7. Turn the fork upside-down. Grasp the top cap and pull down firmly to remove the hydraulic assembly from the fork.

8. Swab the inside bore of the fork to remove any remaining oil.

DAMPING DIAL ADJUSTMENT

1. Install the large nut on the schrader valve, with the set screw tightened against the upper end of the flat section on the side of the valve.

2. Turn the nut counter-clockwise until it stops.

3. Preload the fork with at least 100psi of air pressure.

4. Turn the nut 1/2 turn clockwise, then push down firmly on handlebars to compress the suspension. Repeat (1/2 turn, push, check . . . 1/2 turn, push, check, etc.) until lockout is achieved.

5. Once the lockout position is located, loosen the set screw in the large nut, and slide the nut down the valve so that it bottoms out on the top of the fork. Tighten the set screw.

6. Push the Damping Dial onto the large nut, and install the valve cap.

Test the function of the fork by turning the dial and pushing down on the fork. Check the fork throughout the dial's range of motion. When turned all the way clockwise, the fork should be locked out. As the dial is turned counter-clockwise, the suspension damping should get incrementally lighter.

AIR SPRING PRELOAD

To adjust the air spring preload of the HeadShok "Delta V" suspension fork, you will need a precision air pump with a schrader valve fitting and a pressure gauge.

The original HeadShok fork was designed to operate with a preload pressure equal to 60-70% of rider's weight. Add air pressure based on this guideline, then add or release air until suspension just compresses (aprox 1/16") when rider sits on the bike in a neutral, relaxed riding position.

Marzocchi/HeadShok cartridge (HeadShok-DD/HeadShok-RDC)

REMOVAL OF CARTRIDGE

1. Remove the damping control device from the top of the fork. Leave the top of the fork bare, with only the tuning shaft protruding from the outer cap.

2. Using a pin-spanner wrench (Park SPA-1, green), turn the outer cap counter-clockwise until the threads disengage the outer steerer tube. (Fig.1)

3. Compress the fork from underneath (or pull up on the outer cap.) The piston shaft will become visible. Relieve all air pressure from the fork by depressing the schrader valve located under the fork crown. *DO NOT CONTINUE UNTIL THE AIR PRESSURE IS RELIEVED FROM THE FORK!*

4. Insert a HeadShok cartridge pin wrench (part #101103) into the fork so that the two pins of the wrench engage the two holes in the upper cartridge nut. Turn the handle of the wrench counter-clockwise until the threads of the cartridge nut disengage from the inner steerer tube. (Fig.2)

If the Cartridge will not extend far enough to allow the cartridge pin tool to be inserted, then the outer cap will have to be removed from the center shaft. This is accomplished by grasping the piston shaft with locking-jaw pliers, just below the outer cap, and unscrewing the outer cap (counter-clockwise) from the shaft with a bottom bracket pin-spanner wrench. (The factory fit is usually very tight.) In some extreme cases, the outer cap must be cut off with a hacksaw.

5. Pull the cartridge up and out of the fork. If the bottom plug does not come out with the cartridge, then push it out from the bottom of the fork with a 3/4" dowel. Remove the circlip from the groove around the inside surface of the fork crown. Discard the circlip.

Fig.1 ▼

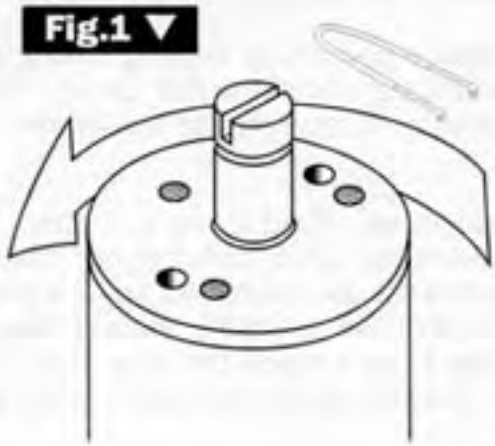
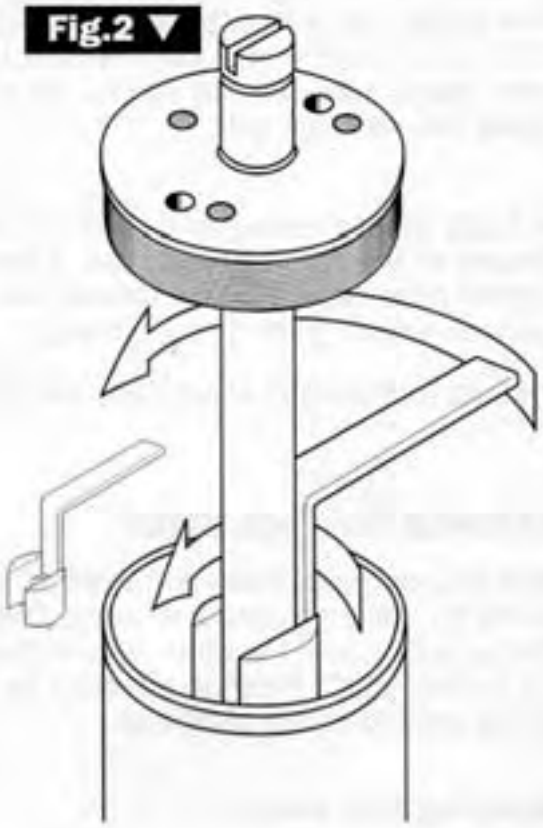


Fig.2 ▼



INSTALLATION OF CARTRIDGE

IMPORTANT: NEVER compress a HeadShok/ Marzocchi cartridge unless it is installed in a suspension fork and has at least 75psi of pre-load air pressure in it. Compressing an unpressurized cartridge will damage the hydraulic mechanisms inside the cartridge.

1. Install a new circlip in the groove around the inside surface of the fork crown. The circlip should fit securely into the groove.

2. Apply a new #018 O-ring just above the threads on the upper cartridge nut. Make sure these threads are clean, and apply a drop of Loctite #242 (blue) to the threads. Also make sure that the threads inside the inner steerer tube are clean and free of dirt, corrosion, or old Loctite.

3. Insert the cartridge into the inner steerer tube from above. Use a HeadShok pin wrench (part #101103) to tighten the cartridge nut into the inner steerer tube. Be very careful not to cross-thread the cartridge nut.

4. Apply some grease or anti-seize compound to threads on the cartridge outer cap. Extend fork. Tighten outer cap into outer steerer tube with pin-spanner wrench (Park SPA-1, green).

Proceed with preload adjustment and DD/RDC setup.

Fig.3 ▼

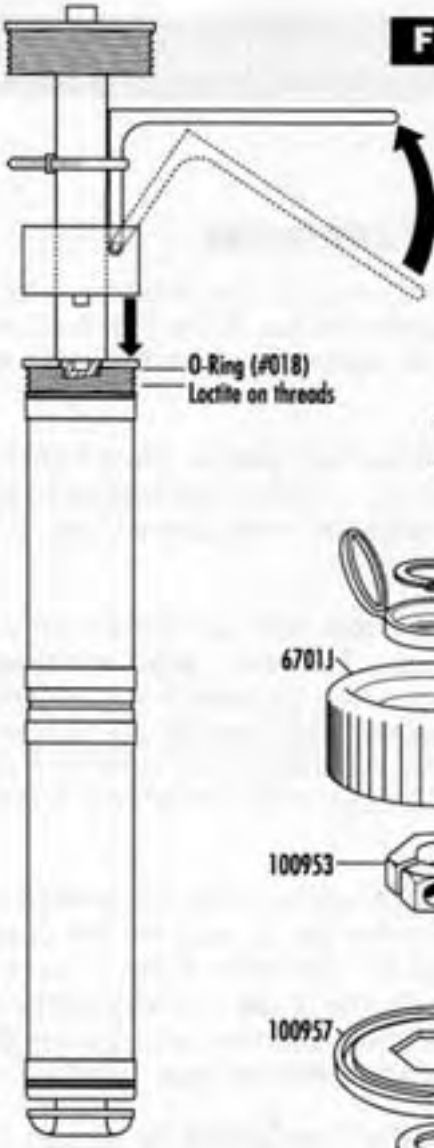
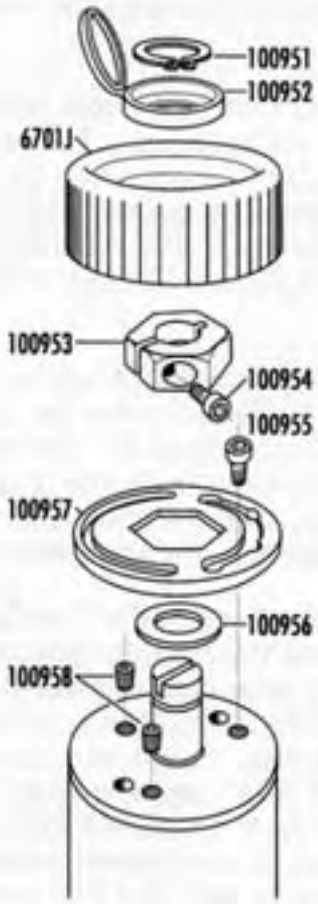


Fig.4 ▼



DAMPING CONTROL SETUP

With this cartridge, there is the option of using one of two possible on-the-fly damping control systems. One is an indexed, 4-position Damping Dial, and the other is an indexed, 4-position Remote Damping Control (RDC) which is activated by an indexed Suntour thumb shifter located on the handlebar.

Damping Dial setup:

1. Using a 1.3mm Allen wrench and Loctite #222 (purple), install two set screws (part #100958) in two of the three threaded holes in the outer cap. Install the 2.5mm cap screw (part #100955) in the remaining threaded hole.

2. Slip the plastic washer (part #100956) and alloy split nut (part #100953) over the tuning shaft. Leave the pinch bolt (part #100954) in the split nut loose.

3. Slip the plastic indexing plate (part #100957) over the split nut, with the hollowed-out groove facing up (Fig.4). The capscrew should fit through the slot in the plate.

4. Turn the split nut and indexing plate assembly clockwise until it stops. The capscrew should end up in the very end of the indexing slot.

5. With the bike on the ground, and at least 75psi of air spring pre-load in the cartridge, locate the fork's "locked-out" setting. This is done by turning the tuning shaft a very small degree clockwise, and then pushing downward on fork. Repeat until the fork will not compress. This is the "locked-out" position.

NOTE: The "locked-out" position is very precise. It may take trial and error to locate. Be patient.

6. With index plate still in its extreme clockwise position, tighten the pinch bolt in the split nut.

7. Install the Damping Dial (part #6701J) over the split nut. Try pushing down on the fork in each of the dial's four positions. With the dial in its far-clockwise position the fork should be locked-out. With the dial in its far counter-clockwise position, the fork should have very light damping.

8. Install the hinged cap (part #100952) over the top end of the tuning shaft. Install snap ring (part #100951) to retain cap. Snap the cap shut.

Fig.5 ▼

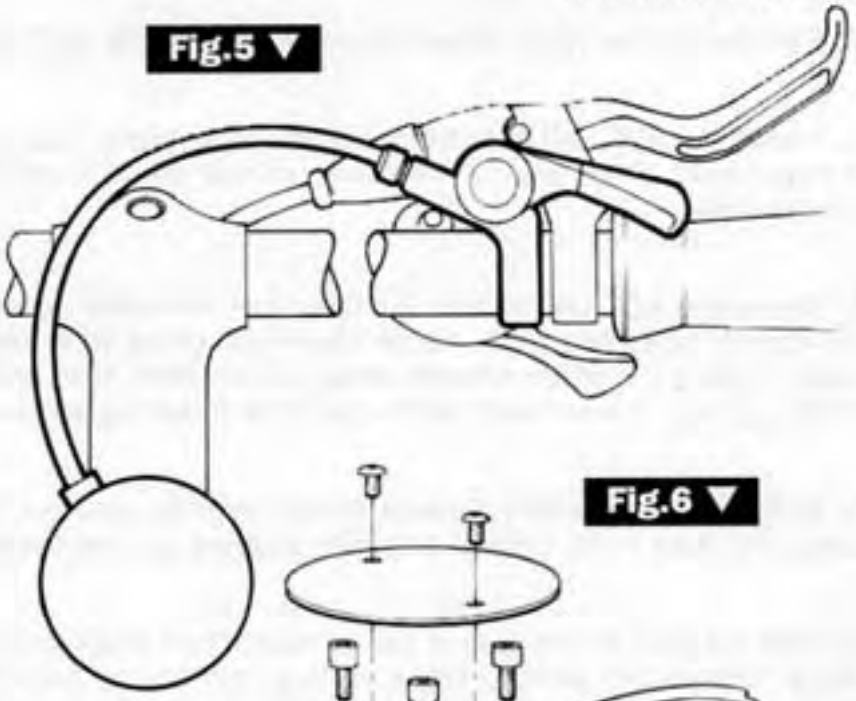
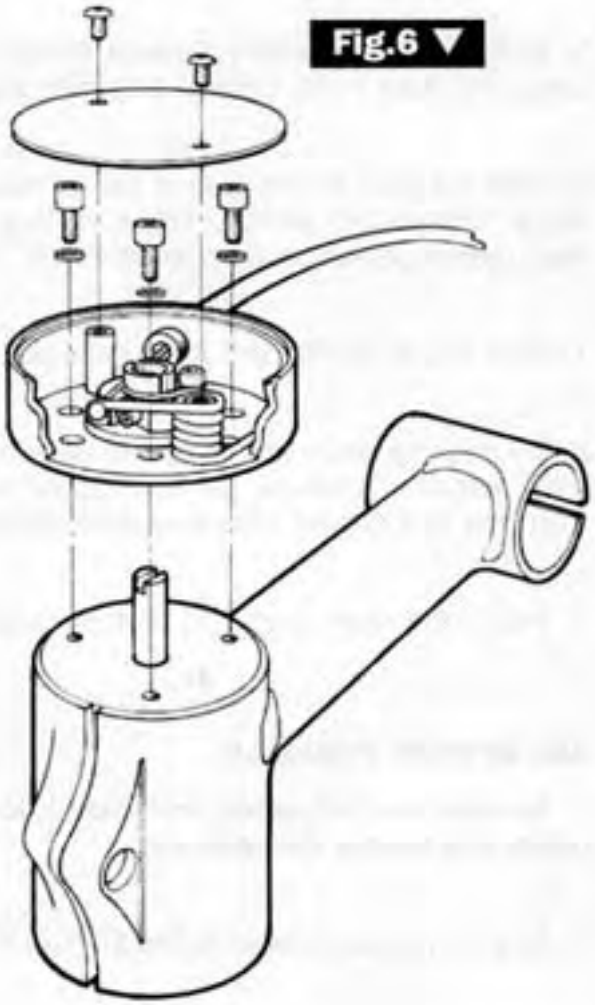


Fig.6 ▼



RDC setup

The RDC (Remote Damping Control) unit is shipped as a complete, as-sembled unit, ready for installation. Do not tamper with or attempt to disassemble the internal components beyond the instructions listed here. The cable comes pre-cut and installed at the factory. The RDC unit is designed for use in conjunction with Shimano Rapidfire shifters. (Fig.5)

1. Install the thumb-shifter on the right-hand side of the handlebar. Make sure the RDC thumb-shifter will operate through all four index-ed positions and will not interfere with proper function of the bicycle's shifter or brake lever.

2. Remove the two Allen screws from the cover of the RDC unit and remove the cover.

3. Install the RDC unit onto the top of the fork steerer tube by slipping the tuning shaft through the splitcollar. Press down on the collar so that the RDC unit seats on the top surface of the steerer tube.

4. Rotate the RDC unit so that the three bolt holes line up with the threaded holes in the top of the steerer tube. Select the proper orientation of the RDC unit to ensure smooth operation of the cable. Secure the RDC unit with three 2.5mm Allen head screws and lock-washers (Fig.6). Loctite #222, purple, is recommended on the three mounting screws.

5. Shift the thumb shifter through its four indexed positions to make sure it operates smoothly. Leave the lever in its farthest extended position (so that the lever is away from the rider.)

6. With the bike on the ground and at least 75psi of air spring preload in cartridge, locate the fork's "locked-out" setting. This is done by turning the tuning shaft a small degree clockwise, then pushing down on fork. Repeat until fork will not compress. This is the "locked-out" position.

7. With thumb shifter still in its extended position, tighten pinch bolt in the collar.

8. Try pushing down on the fork in each of the shifter's four positions. With the shifter in its farthest extended position, the fork should be locked-out. With the shifter pulled back toward the rider, the fork should have very light damping.

9. Install the cover over RDC unit, securing with the two Allen-head screws.

AIR SPRING PRELOAD

1. Remove the front wheel from the bicycle. Clean the area around the underside of the fork crown and remove the valve cap.

2. Add air pressure equal to the 80% of the rider's body weight.

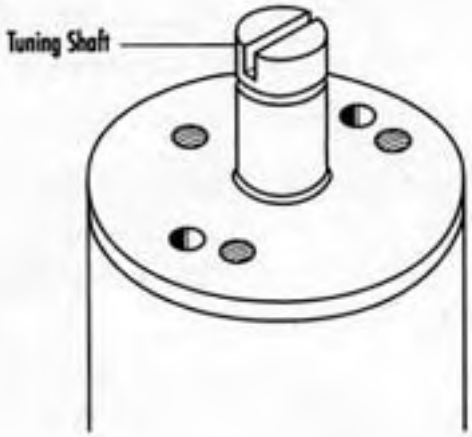
3. Add or release air pressure until the suspension just compresses (aprox. 1/16") when the rider sits on the bike in a neutral, relaxed riding position.

4. Replace the valve cap and front wheel

This procedure is intended as a guideline only. We encourage experimentation with different air pressures, as every rider has a different style.

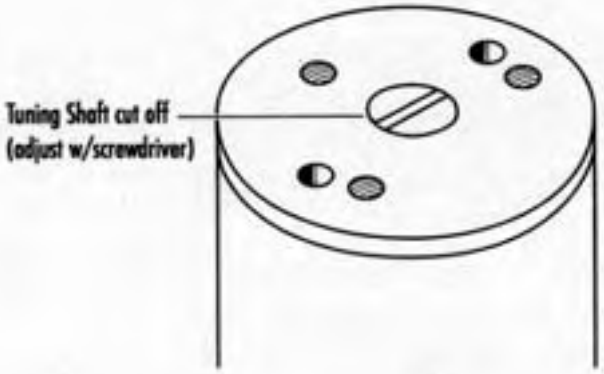
1995 "RECART"

For a short time in 1995, Cannondale supplied a modified Marzocchi-made HeadShok cartridge in the F2000 model bicycle, as well as for some warranty replacements. Known internally as the "RECART", this cartridge was revalved (by Cannondale) to improve performance and reliability. It is identical in appearance to a standard Marzocchi/HeadShok cartridge, except the tuning shaft has been eliminated, and the top of the cartridge is covered by a black metal disc. Under this cover, there is a simple screw-slot used to adjust the damping of the cartridge (see below). This cartridge is not compatible with any HeadShok "on-the-fly" damping control unit or Damping Dial.



TOP VIEW

Standard
Marzocchi/Headshok
Cartridge



TOP VIEW

"RECART"

Fatty 50

NOTE: During the 1996 model year, the Fatty 50 cartridge was referred to simply as "Fatty". After the Fatty 70 was introduced in 1997, the name of the original Fatty was changed to "Fatty 50" so that the two could be distinguished. In this manual, the original Fatty is referred to as Fatty 50.

REMOVAL OF CARTRIDGE

Fig.1 ▼

Fig.2 ▼

1. Release all air pressure from fork by depressing the schrader valve located under the fork crown.

2. Loosen the set screw located in the side of the Damping Dial and remove dial from the top of fork.

Fig.3 ▼

3. Loosen the stem binder bolt and remove the handlebar/stem assembly from the fork.

4. Using a pin-spanner wrench (Park tool SPA-1, green), loosen outer cap of the fork by turning it counter-clock-wise. (Fig.1)

5. Compress fork from beneath. The outer cap and piston shaft will extend above the top of the steerer tube, allowing access to the four notches in the top of the oil damper cartridge. Using a HeadShok "Castle" tool (part #104110), turn oil damper cartridge counter-clock-wise and remove it from the fork (Fig.2).

CAUTION: During this step, be very careful not to scratch or damage the piston shaft with the Castle tool.

Fig.4 ▼

6. If the air chamber did not come out attached to the oil damper cartridge, remove it from the steerer tube by installing a valve cap on the schrader valve (under the fork crown) and pushing up on the valve with a wooden or plastic dowel. The air chamber will come out through top of the steerer tube. (Fig.3)

7. Pry circlip out of groove around inside of fork crown. Discard circlip and use a new one when reinstalling cartridge. (Fig.4)

When loosening or tightening a Fatty 50 cartridge, only use a HeadShok "Castle" tool (part #104110.) Do not attempt to tighten or loosen cartridge by pin holes in inner plastic cap.

Fig.5 ▼

Fig.6 ▼

INSTALLATION OF CARTRIDGE

1. Clean the bore of steerer tube with a cloth. Clean the groove in the inside of fork crown and the threads on the cartridge and on the steerer tube as well.

2. Install a new circlip in the groove around the inside of the fork crown. Make sure the circlip is seated in the groove all the way around the circumference of the circlip.

3. Drop a small amount of oil into the air spring cartridge on top of the air piston. (This will help to lubricate the seals on the air piston, promoting smoother operation and longer seal life.)

4. Apply a drop of Loctite #242 (blue) to threads on the outside of oil damper cartridge, just below the flange (Fig.5). Insert the complete cartridge (air chamber and oil damper) into the steerer tube from the top. Slide the cartridge all the way down into steerer tube so that the bottom of the cartridge contacts and expands the circlip. Tighten the cartridge into the steerer tube with a HeadShok "Castle" tool (part #104110).

CAUTION: During this step, be very careful not to scratch or damage the piston shaft with the Castle tool.

5. Apply some grease or anti-seize compound to the threads on the outer cap. Tighten the outer cap into the steerer tube with a pin-spanner wrench (Park tool SPA-1, green).

6. Install handlebar/stem assembly and tighten stem clamp bolt.

7. Before proceeding, re-check bottom of fork to make sure the circlip is fully covered by the bottom of the cartridge.(Fig.6)

8. Turn the tuning shaft all the way clockwise, then back it out 1/2 turn. Pressurize the fork to approximately 50psi. Press down on the shock once or twice. Check once again to make sure that the bottom of the cartridge has fully engaged the circlip in the fork crown.

9. Install the Damping Dial and adjust the air spring preload.

DAMPING DIAL SETUP

Fig.7 ▼

1. Using a small flathead screwdriver, gently turn the tuning shaft clockwise until it stops. Do not force the tuning shaft! Only turn it until it is lightly seated. Tightening the shaft with excessive force will damage the valves within the cartridge.

2. Loosen the set screw located in the side of the Damping Dial. Install the dial on the tuning shaft, with the ball plunger set into the machined groove in the top of the fork. Turn the dial all the way clockwise.

3. Press down firmly on Damping Dial while tightening set screw in the side of the dial. (Fig. 7)

Pressurize cartridge to at least 50psi. Check the function of the suspension fork in each of the five positions of the Damping Dial. When dial is turned all the way to the right (clockwise), the damping should be very heavy and stiff. Likewise, when dial is turned to the left, the damping should be very soft and compliant.

Please note that the Fatty 50 cartridge is not designed to lockout at any time.

CAUTION: Do not back the tuning shaft out more than one full turn from its clockwise limit. Oil loss will occur if the shaft is loosened too far.

PRELOAD (AIR PRESSURE) ADJUSTMENT

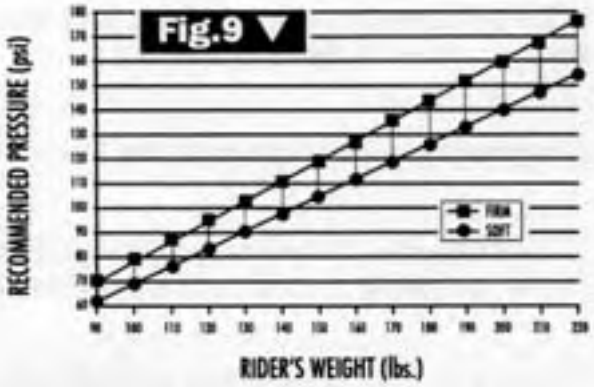
Fig.8 ▼

Since the Fatty 50 employs an air spring, the preload is adjusted by altering the air pressure within the cartridge. Generally, heavier or more aggressive riders require higher preload (more air pressure) than lighter riders or those preferring a softer ride.

The following preload procedure is for initial setup only. We encourage riders to experiment with different preload settings.

1. Remove the front wheel. Thoroughly clean the area underneath the fork crown, then remove the schrader valve cap (Fig.8).

Fig.9 ▼



2. Refer to the chart below (Fig.9) to determine recommended air pressure range based on the rider's weight. A range of pressures is given, as some riders prefer their suspension a bit softer than others. Add air according to the chart.

3. Replace the valve cap and front wheel.

For a more customized set-up, follow the steps detailed below.

4. Position the rider on the bike. With only the rear brake applied, have the rider sit on the saddle in a relaxed, neutral riding position with both hands on the handlebars and one elbow braced against a wall or doorway to stay upright. Be sure Damping Dial is fully open (counter-clockwise).

5. In this position, the fork should compress 1/16" to 1/8". Add or remove air from the fork through the schrader valve until this condition is achieved. Have the rider get off the seat when adjusting air pressure in the shock. Cycle the front suspension before having the rider remount the seat to check the compression of the shock.

When the desired pressure is achieved, note the air pressure for future reference.

Adjustment of the preload of the Fatty 50 suspension fork requires a precise air pump that is capable of delivering at least 150psi through a schrader valve. A check-valve, quick-disconnect, or valve extension may also be helpful in preventing air loss from the valve as the pump is being removed. The maximum recommended preload pressure for the Fatty 50 cartridge is 200psi.

We encourage experimentation with different preload air pressures as each rider has a unique style and preferences.

Preload adjustment for downhill riders

Please note that downhill events require higher air pressure than cross-country riding. For downhill riders, start at the high end of the air pressure range listed on the chart (Fig.9) and increase pressure as desired.

OIL CHANGE/BLEEDING PROCEDURE

Note on suspension oils

The Fatty 50 cartridge is shipped from the factory with 5W oil installed. If desired, a lighter weight oil (as light as 2.5W) may be used to provide quicker, lighter damping. Likewise, a heavier oil may be used to provide heavier damping. In all cases, use a high-quality oil that is specifically intended to be used in suspension systems with natural rubber seals.

NOTE: Protect your eyes from oil spray. Wear safety glasses while performing this procedure! It is also recommended to wear an apron to protect clothing.

Fig.10 ▼

1. Remove the cartridge from the fork.

2. Separate the air chamber from the oil damper cartridge. Using a 12mm cone wrench and a 19mm open-end wrench, unthread the top-out plunger from the lower piston shaft (Fig.10).

3. Using a sharp screwdriver or knife, pry the brass brad (nail) from the lower cap of the cartridge.

CAUTION: Some oil may squirt out when the brad is removed. Wear safety glasses! (Fig.11)

4. Hold the oil damper cartridge over a tub or bucket (to catch oil.) Using a pin-spanner wrench with inward-turned tips (Park tool SPA-3, blue) remove the lower cap from the oil damper cartridge as shown in Fig.12. As the cap is removed, the oil will drain from the cartridge.

Fig.11 ▼

5. Turn the cartridge upright over the tub. With a small screwdriver, turn tuning shaft all the way clockwise, and then back 1/2 turn counter-clockwise. Stroke piston up and down several times to expel any oil that may be trapped above the piston.

6. Extend cartridge (so that outer cap is extended away from the top of cartridge body.) Turn cartridge upside down, and fill to the top with hydraulic oil. See note on oil weights (Fig.13).

Fig.12 ▼

7. With the tuning shaft still turned 1/2 turn counter-clockwise, stroke the piston up and down several times very slowly to expel any air that may trapped above the piston. (You may see air bubbles rise to the top of the oil.) If the oil level drops significantly, add more oil as needed. Do not let the piston come above the level of the oil as it is being stroked.

Fig.13 ▼

8. Holding the cartridge upside down, compress it about 1.5". Gently turn tuning shaft clockwise until it is seated. (don't force the shaft tight.) Hold cartridge upside down under a table or workbench, with the end of the piston shaft up against the underside of the tabletop. With one firm, quick motion, push cartridge body toward underside of the tabletop, forcing the piston to its fully extended position. (This will force the rebound shims to open and release any trapped air.) With cartridge now in its fully extended position, turn the tuning shaft 1/2 turn counter-clockwise. Compress cartridge about 1", and repeat this procedure several times to remove all air from the valves. When finished, leave the tuning shaft backed out 1/2 turn (counter-clockwise.) See fig.14.

NOTE: At this point, if oil appears to have some air suspended in it (tiny, frothy bubbles hanging in the oil), set cartridge aside for a few minutes to let air rise to the top of the oil.

Fig.14 ▼

9. Fill cartridge all the way to the top edge of the cylinder.

10. With the cartridge partially compressed, carefully work the lower cap onto the piston shaft. (It is a tight fit.) Make sure the cap can slide up and down on the piston shaft with-out binding. (If the cap binds up or is difficult to move, it could be that one of the seals is folded over or damaged. Remove the lower cap and inspect the seals within.)

11. Begin to thread the lower cap into the oil damper cartridge. Once the threads have caught, lean the cartridge over so that the small vent hole in the bottom cap (the one that the small brass brad came out of) is positioned at the top. Hold the lower cap in this position and tighten by turning the cartridge body. (See Fig.15) A mixture of air and oil will bleed from the vent hole as the cartridge is being tightened. Finish tightening the cap with an inward-turning pin-spanner wrench (Park tool SPA-3, blue).

Fig.15 ▼

NOTE: During this stage of assembly, it is imperative that the cartridge is not compressed at all. If the piston shaft is moved in (or out) before brass brad is in place, air will be introduced into the system, and the bleed must be repeated.

Fig.16 ▼

12. Insert the brass brad (nail) into the vent hole (Fig.16).

13. Turn the tuning shaft all the way clockwise and then back out 1/4 turn. Cycle the cartridge several times with the tuning shaft in this position, listening for "squishy" sounds (air passing through the valves.) A properly bled shock will make some slight noises or none at all. If the shock makes loud air noises, or if the action of the piston does not feel smooth, repeat steps 7-13 of the bleed procedure.

14. Apply some Loctite #222 (purple) to the threads on top-out plunger. Tighten the plunger into the lower piston shaft.

ADJUSTING THE HIGH-SPEED DAMPING

The term "high-speed damping" refers to the damping circuit that opens up when the suspension fork is compressed very quickly and with great force; like when the rider hits a large bump at high speed. There are two separate high-speed damping circuits in the Fatty 50 cartridge: one for compression, one for rebound. The damping rates of the high-speed circuits are adjustable by changing the amount and/or thickness of the control shims. There is one set of control shims for each of these high-speed damping circuits. These shim stacks are adjustable independently, so the fork may be set up with very heavy compression damping and light rebound damping, vice versa, or any combination in between.

In general, thicker shims give a heavier damping rate than thinner ones, and shims with a larger outside diameter give a heavier damping rate than shims with a smaller outside diameter.

The shims work on a very simple principle. The shims cover ports in the oil piston. When the pressure below the piston is increased dramatically (as in a high-speed compression), the increase in oil pressure forces the compression shims to deform slightly, allowing oil to pass through the compression ports. Likewise, when the pressure above the piston increases dramatically, it forces the rebound shims to deform, allowing oil to pass through the rebound ports in the piston.

SHIM AVAILABILITY

Shims are available in the following sizes:

O.D.	*Thickness*	*Part Number*
12mm	.010"	104167 (bag of ten)
14mm	.004"	104168 (bag of ten)
16mm	.004"	104169 (bag of ten)
18mm	.004"	104170 (bag of ten)
14mm	.006"	104171 (bag of ten)
16mm	.006"	104172 (bag of ten)
18mm	.006"	104173 (bag of ten)

All shims listed above have an inside diameter of 8mm.

A kit is available that includes ten of each of the shims listed above. We recommend that each shop order one of these kits to start with, and replenish their supply of shims as needed. The HeadShok product code for this kit is HD104/.

Preload Shim

In addition, the following "preload" shim is available.

18mm Preload shim HD133/ (bag of 10)

A "preload" shim is a flat shim with a formed crease around its outer edge. The preload shim serves two purposes: to stiffen a thin shim, and to provide a very distinct difference in feel between the fork's slow speed and high-speed damping circuits. The preload shim should only be used in conjunction with an 18mm shim.

SHIM SELECTION

When a Fatty 50 cartridge comes from the factory, it has the following shims installed on both the compression and rebound damping sides of the oil piston:

(1) 18mm x .006"
(1) 16mm x .006"
(1) 14mm x .006"

We encourage our dealers and customers to experiment with different combinations of damping adjustment shims until finding the stack that best suits their riding style. It may take some time, and several shim changes before the right combination is discovered, but once this is accomplished, the fork will be customized beyond the capabilities of any other suspension fork on the market.

Guidelines for shim selection: Fatty 50

■ There must always be an 18mm shim against the piston on both sides of the piston.

■ It is important that the thickness of both shim stacks combined is at least .034". If less, some knocking noises may result.

■ Shims with a larger outside diameter give heavier damping than shims with a smaller outside diameter.

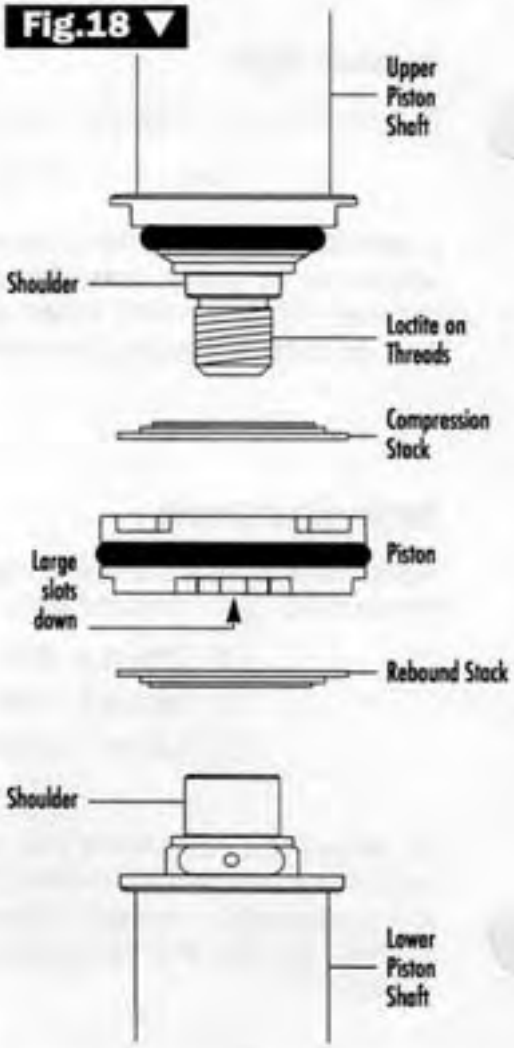
■ Thicker shims (.006") give heavier damping than thinner shims (.004").

■ It is not necessary to have the same sizes, or even the same number of shims on each side of the piston. For example, one could use a stack consisting of one 18mm x.006", two 16mm x.006", and one 14mm x .006" on the compression side of the piston, and a stack of one 18mm x.004", one 16mm x.006" and one 14mm x.004" on the rebound side of the piston. (This arrangement would give moderate compression damping and quick, light rebound damping.)

■ 12mm x.010" shims are used as spacers only. They provide very little damping, but are there to take up space in the shim stack where only two other shims are being used.

Fig.17 ▼

Fig.18 ▼



SHIM CHANGE PROCEDURE: Fatty 50

To change shims in a Fatty 50 cartridge, begin by removing the cartridge from the suspension fork. Complete steps 1-5 of the Fatty 50 Oil change/ Bleeding section of this manual.

1. Use a Park SPA-1 (green) pin-spanner wrench to remove the upper cap from the cartridge body. Slide the cartridge body off of the piston shaft.

2. Hold the locknut just below the outer cap with a 19mm cone wrench while turning the lower section of the piston shaft with a 12mm wrench. The two halves of the piston shaft will unthread and separate at the piston (Fig.17). Note the orientation of the piston as it is originally assembled. There are larger relief slots cut into one side of the piston than the other. When correctly assembled, the side with the larger slots should be facing down; towards the bottom of the cartridge. (Fig.18)

3. Change shims as needed to tune the high speed damping. Use the guidelines above for shim selection.

4. Once the desired compression shims are selected, stack them in order of diameter from large to small. Locate the shoulder on the upper piston shaft, just above the threads on the lower end of the shaft.

5. Place the stack intended for compression damping on the shoulder on the upper piston shaft, with the largest (18mm) shim oriented towards the threaded end of the piston shaft. Make sure that there is no dirt or dust trapped between shims. Even a small particle of dirt caught between two shims can disable the high-speed damping circuit.

6. Place rebound shim stack on shoulder on the end of the lower piston shaft, with the largest (18mm) shim oriented toward the end of the shoulder.

7. Slip the piston onto the upper piston shaft with the smaller slots oriented toward the compression shim stack. Piston should seat on the shoulder just above the threads. (Fig.19).

8. Place a small amount of Loctite #222 (purple) to the threads on upper piston shaft. Thread the two halves of the piston shaft together and tighten securely. Make sure that none of the shims slip off of their shoulders and get caught in the threads of the piston shaft during tightening.

Fig.19 ▼

9. Slip the cartridge body onto the piston shaft, being careful not to damage the O-ring seal on the piston. Thread the upper cap into the cartridge body and tighten snugly.

NOTE: Do not overtighten the upper cap! Overtightening the upper cap will result in binding of the cartridge and unresponsive suspension action.

10. Go to step 6 of Oil change/Bleeding section of this manual to complete cartridge assembly.

Seal change:

As a regular service to a Fatty 50 cartridge, the seals in the lower cap and the O-ring seal on the piston should be replaced once a year. Unless a specific leak is detected, replacement of cup seals in the upper cap is not recommended as a regular service.

It is normal and regular for a small amount of oil to "weep" past the piston seals in the upper and lower caps. This will appear as a thin film of oil on the piston shaft. This does not indicate a faulty seal, or a defective cartridge. If significant oil leakage is noticed, or if the smoothness of the suspension deteriorates and fork begins to feel rough or gritty during compression, then one or more of these seals may be damaged and in need of replacement.

Complete steps 1-5 of the Oil Change/ Bleeding section of this manual.

1. Use a Park SPA-1 (green) pin-spanner wrench to remove upper cap from the cartridge body. Slide the cartridge body off of the piston shaft.

2. Replace the two cup seals located inside lower cap (Fig.21). Be sure to orient the new seals with their larger "flared" ends toward the middle of the cartridge (Fig.22). Also replace O-ring seal on the piston and the O-ring seals on the upper and lower caps. Be very careful not to tear or puncture any of the new seals.

3. Apply a thin coating of oil to all the new o-ring seals. Slip the cartridge body onto the piston shaft, being careful not to damage the O-ring seal on the piston. Thread the upper cap into the cartridge body and tighten snugly.

NOTE: Do not over tighten the upper cap! Over tightening upper cap will result in binding of cartridge and unresponsive suspension action.

Go to step 6 of "Oil Change/Bleeding" procedure and complete the assembly.

Fig.21 ▼

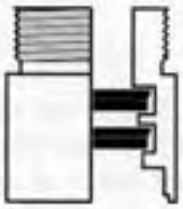
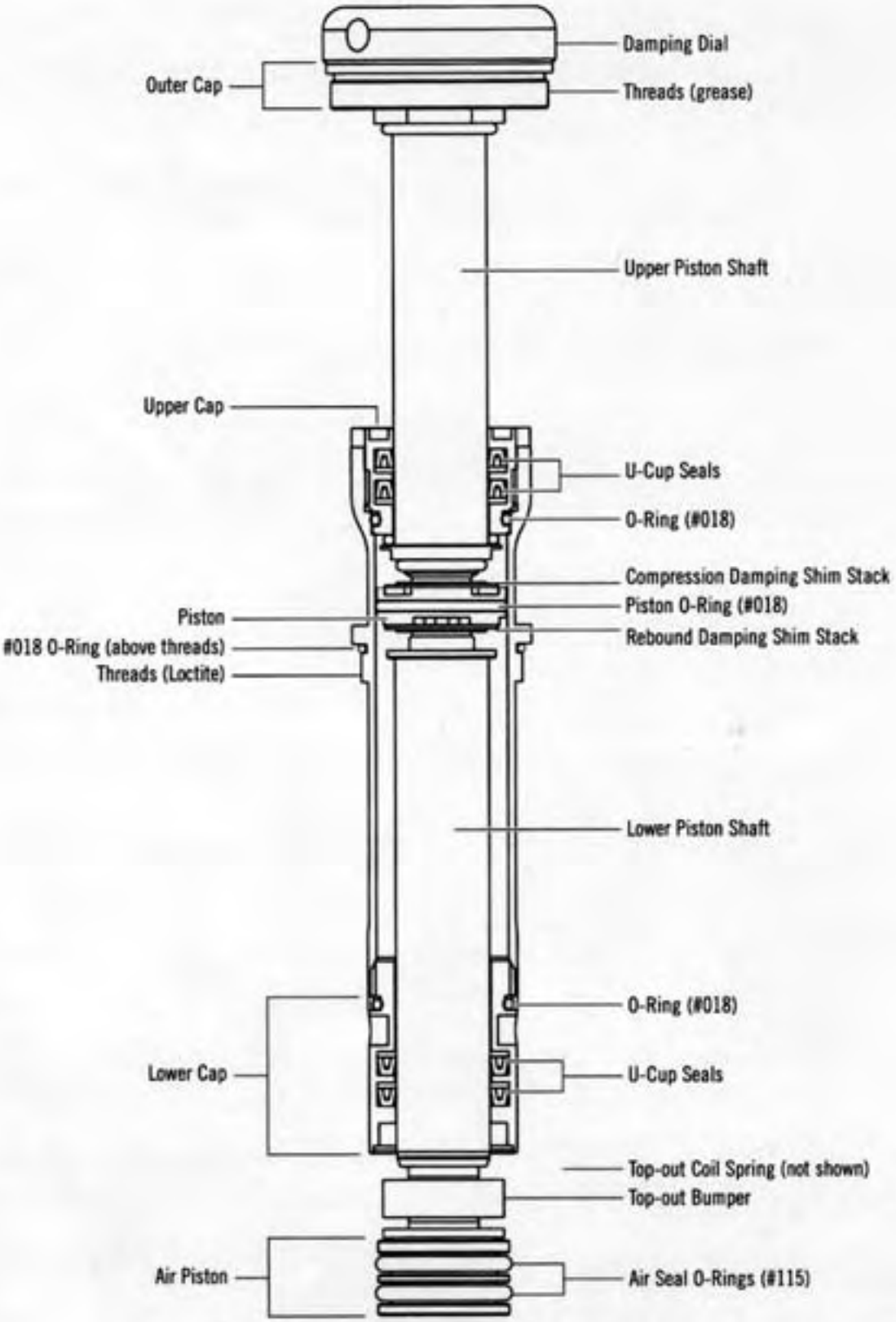


Fig.22 ▼

Fatty 50 Damper Cartridge

Cutaway View



Fatty 70

REMOVAL OF CARTRIDGE

1. Release all air pressure from fork by depressing schrader valve.

2. Loosen set screw in side of Damping Dial and remove dial from top of fork.

3. Loosen stem binder bolt and remove handlebar/stem assembly from fork.

4. Loosen the outer cap of the fork with a pin-spanner wrench (Park SPA-1, green). (Fig.1)

Fig.1 ▼

5. Compress fork from beneath. Loosen damper cartridge with a HeadShok "Castle" tool (part #104110), and remove it from fork. (Fig.2)

CAUTION: During this step, be very careful not to scratch or damage the piston shaft with the Castle tool.

Fig.2 ▼

6. Pry circlip out of groove around inside of fork crown. Discard circlip and use a new one when re-installing cartridge.

When loosening or tightening a Fatty 70 cartridge, only use a HeadShok "Castle" tool (part# 104110) Do not attempt to tighten or loosen cartridge by the pin holes in the inner plastic cap.

Fig.3 ▼

INSTALLATION OF CARTRIDGE

IMPORTANT! See note at end of Fatty 70 section to determine if adapter parts are needed.

1. Clean inside of inner steerer tube. Apply coating of heavy grease to inside of lower end of steerer tube.

2. Install a new circlip in the groove around the inside of the fork crown. (Fig.3)

3. Apply a thin coating of grease to inside surface of air cylinder, and to air piston. (Fig.4)

Fig.4 ▼

4. Insert air piston into air cylinder, then drop some hydraulic oil (10W or heavier) into air cylinder on top of piston. (Fig.5)

Fig.5 ▼

5. Apply a drop of Loctite #242 (blue) to threads on outside of damper cartridge. (Fig.6)

6. Insert cartridge assembly into inner steerer tube. Tighten with a HeadShok "Castle" tool (part #104110).

CAUTION: During this step, be very careful not to scratch or damage the piston shaft with the Castle tool.

Fig.6 ▼

7. Apply some grease to threads on outer cap. Tighten into outer steerer tube with a pin-spanner wrench (Park SPA-1, green).

8. Before proceeding, re-check bottom of the fork to make sure the circlip is fully covered by the bottom of the cartridge. (Fig.7)

DAMPING DIAL SETUP

Fig.7 ▼

1. Turn tuning shaft clockwise until it stops. Do not force the tuning shaft! Tightening the shaft with excessive force will damage the cartridge.

2. Loosen set screw located in side of Damping Dial. Install dial on tuning shaft, with ball plunger set into machined groove in top of fork. Turn dial clockwise to its stop.

3. Press down firmly on Damping Dial while tightening set screw in side of dial. (Fig.8)

Fig.8 ▼

Pressurize the cartridge to at least 50psi. Check the function of the suspension fork in each of the five positions of the Damping Dial. When the dial is turned all the way to the right (clockwise), the damping should be very heavy and stiff. Likewise, when the dial is turned to the left, the damping should be very soft and compliant. Please note that the Fatty 70 cartridge is not designed to lock-out at any time.

CAUTION: Do not back the tuning shaft out more than one full turn from its clockwise limit. Oil loss will occur if the shaft is loosened too far.

PRELOAD (AIR PRESSURE) ADJUSTMENT

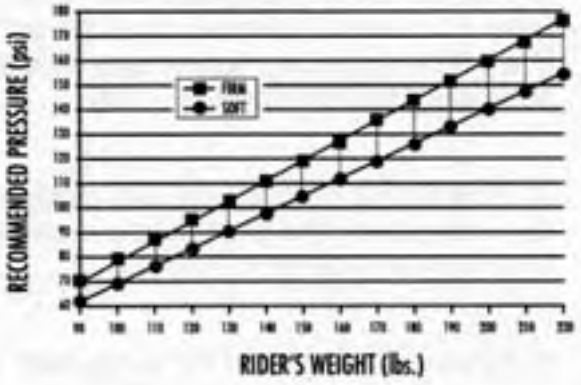
The following preload procedure is for initial setup only. We encourage riders to experiment with different preload settings.

1. Remove front wheel. Thoroughly clean area underneath fork crown, remove schrader valve cap.

2. Refer to the chart below to determine recommended air pressure range based on rider's weight. A range of pressures is given, as some riders prefer their suspension a bit softer than others. Add air according to the chart. (Fig.10)

3. Replace the valve cap and front wheel.

Fig.9 ▼



For a more customized set-up, follow steps detailed below.

1. Position rider on bike. With rear brake applied, have rider sit on saddle in a relaxed, neutral riding position with both hands on handlebars. Be sure Damping Dial is fully open (counter-clockwise).

2. In this position, the fork should compress 1/16" to 1/8". Add or remove air from the fork through schrader valve until this condition is achieved. Have the rider get off the seat when adjusting air pressure in the shock.

3. When desired pressure is achieved, note air pressure for future reference.

Adjustment of the preload of the Fatty 70 suspension fork requires a precise air pump that is capable of delivering at least 150psi through a schrader valve. A check-valve, quick-disconnect, or valve extension may also be helpful in preventing air loss from the valve as the pump is being removed. The maximum recommended preload pressure for the Fatty 70 cartridge is 200psi.

Fig.10 ▼

PRELOAD ADJUSTMENT FOR DOWNHILL RIDERS

Please note that downhill events require higher air pressure than cross-country riding. For downhill riders, start at the high end of the air pressure range listed on the chart and increase pressure as desired.

OIL CHANGE/BLEEDING PROCEDURE

CAUTION: Protect your eyes from oil spray. Wear safety glasses while performing this procedure! It is also recommended to wear an apron to protect clothing.

1. Remove cartridge from fork. Separate oil damper cartridge from air cylinder.

2. Hold outer cap with pin-spanner wrench, and unthread air piston from the lower piston shaft with 8mm Allen wrench. Remove the top-out spring and O-ring. (Fig.11)

Fig.11 ▼

3. Hold oil damper cartridge over a tub (to catch oil.) Remove lower cap from oil damper cartridge with spanner wrench (Park SPA-4, yellow). As the cap is removed, the oil will drain from the cartridge. (Fig.12)

Fig.12 ▼

4. Turn tuning shaft all the way clockwise, and then back 1/2 turn counter-clockwise. Stroke piston up and down several times to expel all remaining oil.

5. Extend cartridge and fill to top with hydraulic oil. See note on recommended oils. (Fig.13)

Fig.13 ▼

6. Stroke piston up and down several times very slowly to expel any air that may be trapped above the piston. You may see air bubbles rise to the top of the oil. If the oil level drops significantly, add more oil as needed. Do not let the piston come above the level of the oil as it is being stroked.

7. Hold cartridge upside down, and compress about 50mm. Turn tuning shaft clockwise until it is seated. Hold the cartridge upside down under a table or workbench, with the end of the piston shaft up against the underside of the tabletop. With one firm, quick motion, push cartridge body toward the underside of the tabletop, forcing the piston to its fully extended position. (This will force the rebound shims to open and release any trapped air.) (Fig.14)

Fig.14 ▼

With the cartridge now in its fully extended position, turn the tuning shaft 1/2 turn counter-clockwise. Compress the cartridge 50mm, and repeat this procedure several times to remove all air from the valves. When finished, leave the tuning shaft backed out 1/2 turn (counter-clockwise.)

8. Set the cartridge aside for a few minutes to let any trapped air rise to the top of the oil.

9. Stroke piston up and down a few more times to expel any remaining air.

10. Fill the cartridge all the way to the edge of the cylinder.

11. With cartridge partially compressed, insert Head-Shok "bullet" tool (part #105701) into lower end of piston shaft. Slip lower cap over bullet tool and onto piston shaft. Remove bullet tool. (Fig.15)

12. Make sure the cap can slide up and down on the piston shaft without binding. If cap binds up or is difficult to move, it could be that one of the seals is folded over or damaged. If so, remove lower cap and inspect the seals within before continuing.

13. Begin to thread lower cap into oil damper cartridge. When O-ring on lower cap contacts the edge of the cartridge body, loosen bleed screw one turn (Fig.16). Continue tightening lower cap into cartridge body (Oil will bleed through screw hole as the lower cap is tightened.) When lower cap is completely installed, tighten bleed screw (Fig.17). Snug lower cap with a spanner wrench (Park SPA-4, yellow).

NOTE: Do not overtighten lower cap! Overtightening upper cap will result in binding of cartridge and unresponsive suspension action.

14. Turn tuning shaft all the way clockwise and then back out 1/4 turn. Cycle the cartridge several times with tuning shaft in this position, listening for "squishy" sounds (air passing through valves). A properly bled shock will make some slight noises or none at all. If shock makes loud air noises, or if action of the piston does not feel smooth, repeat bleed procedure.

15. Install one O-ring (#204) on lower piston shaft, followed by the top-out spring. Make sure second #204 O-ring is seated on the air piston, just below the threads, and that the small, #013 sealing O-ring is clean and intact. Apply a thin film of grease to all of the O-rings on the air piston. Tighten air piston into lower piston shaft.

16. The cartridge can now be installed in the fork.

Fig.15 ▼

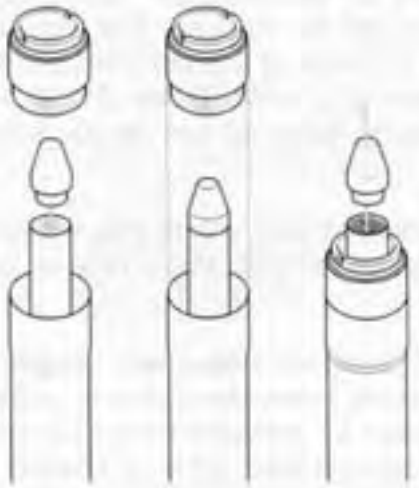


Fig.16 ▼

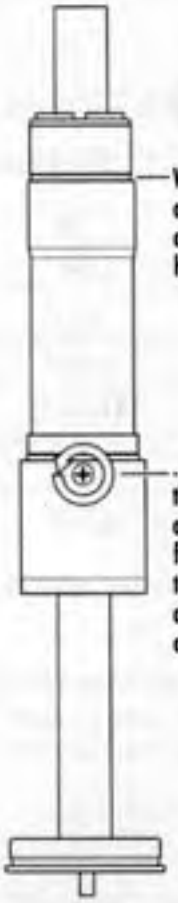
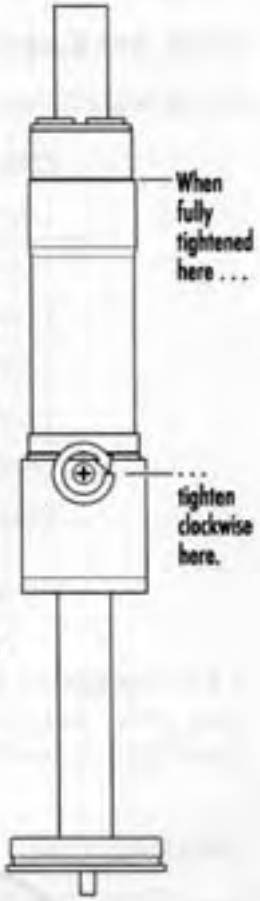


Fig.17 ▼



RECOMMENDED HYDRAULIC OILS:

The Fatty 70 cartridge is shipped from the factory with 5W oil installed. A lighter weight oil (as light as 2.5W) may be used to provide quicker, lighter damping. Likewise, a heavier oil may be used to provide heavier damping. In all cases, use a high-quality oil that is specifically intended to be used in suspension systems with natural rubber seals.

ADJUSTING THE HIGH-SPEED DAMPING

There are two separate high-speed damping circuits in the Fatty 70 cartridge: one for compression, one for rebound. The damping rates of the high-speed circuits are adjustable by changing the stiffness of the control shim stacks. There is one shim stack for each of these high-speed damping circuits. These shim stacks are adjustable independently, so the compression and rebound damping can be adjusted independently.

Thicker (stiffer) shims give a heavier damping rate than thinner ones, and shims with a larger outside diameter give a heavier damping rate than shims with a smaller outside diameter.

The shims work on a very simple principle. The shims cover ports in the oil piston. When the pressure below the piston is increased dramatically (as in a high-speed compression), the increased oil pressure forces the compression shims to bend slightly to allow oil to pass through the compression ports. Likewise, when the pressure above the piston increases dramatically, it forces the rebound shims to deform, allowing oil to pass through the rebound ports in the piston.

SHIM AVAILABILITY

Shims are available in the following sizes:

O.D.	*Thickness*	*Part Number*
12mm	.010"	104167 (bag of ten)
14mm	.004"	104168 (bag of ten)
16mm	.004"	104169 (bag of ten)
18mm	.004"	104170 (bag of ten)
14mm	.006"	104171 (bag of ten)
16mm	.006"	104172 (bag of ten)
18mm	.006"	104173 (bag of ten)

All shims listed above have an inside diameter of 8mm.

A kit is available that includes ten of each of the different shims. We recommend that each shop order one of these kits to start with, and replenish their supply of shims as needed. The HeadShok product code for this kit is HD104/.

PRELOAD SHIM

In addition, the following "preload" shim is available:

18mm Preload shim HD133/ (bag of 10)

A "preload" shim is a flat shim with a formed crease around its outer edge. When used next to a flat 18mm shim, the pre-load shim will provide a very distinct difference in feel between the various settings of the Damping Dial.

SHIM SELECTION

A Fatty 70 cartridge comes with the following shims installed:

Compression (top side of piston): (1) 18mm x .004"
(1) 18mm preload shim

Rebound (bottom side of piston): (1) 18mm x .006"

GUIDELINES FOR SHIM SELECTION: Fatty 70

■ There must always be an 18mm shim against the piston on both sides of the piston.

■ 12mm x.010" shims are used as spacers only. They provide very little damping, but are there to take up space in the shim stack where only two other shims are being used.

SHIM CHANGE PROCEDURE: Fatty 70

Fig.18 ▼

Begin by removing the cartridge from the suspension fork. Complete steps 1-5 of the Fatty 70 Oil change/Bleeding section of this manual.

1. Unthread upper cap from cartridge with pin-spanner wrench (Park SPA-1, green). (Fig.18)

2. Hold outer cap with pin-spanner wrench while turning the lower section of the piston shaft with a spanner wrench with inward-turning ends (Park SPA-3, blue). The two halves of the piston shaft will unthread and separate at the piston. (Fig.19)

Fig.19 ▼

3. Note the orientation of the piston as it is originally assembled. There are larger relief slots cut into one side of the piston than the other. When correctly assembled, the side with the larger slots should be facing down; towards the bottom of the cartridge. Also make note of the original arrangement of shims and steel spacers. See exploded view at end of this chapter for details.

4. See guidelines for shim selection above, and select desired shims to tune high speed damping.

5. Stack rebound shims on the lower piston shaft in order of diameter from small to large. Place the piston on the piston shaft, and check for proper orientation. (Fig.20)

6. Place compression shim stack on the piston shaft, with the largest (18mm) shim up against the piston. Stack the upper piston spacer on the piston connector as shown.

NOTE: When assembling the piston and shims, make sure that no dirt or dust becomes trapped between the shims. Even a small particle of dirt caught between two shims can disable the high-speed damping circuit.

7. Wipe the threads of the piston connector clean, and apply a small amount of Loctite #222 (purple) to the threads. Be sure not to get any Loctite into the oil circuit. (Fig.21)

Fig.20 ▼

8. Turn the tuning shaft counter-clockwise two full turns.

9. Thread upper and lower piston shafts together. Tighten firmly.

10. Turn the tuning shaft clockwise until it stops, then back out 1/2 turn.

Fig.21 ▼

11. Slip the cartridge body onto the piston shaft, being careful not to damage the O-ring seal on the piston. Thread the upper cap into the cartridge body and tighten snugly.

NOTE: Do not overtighten the upper cap! Overtightening the upper cap will result in binding of the cartridge and unresponsive suspension action.

12. Go to step 5 of Oil change/Bleeding section of this manual to complete cartridge assembly.

SEAL CHANGE:

As a regular service to a Fatty 70 cartridge, the seals in the lower cap and the O-ring seal on the piston should be replaced once a year. Unless a specific leak is detected, replacement of the seals on the upper cap is not recommended as a regular service.

It is normal and regular for a small amount of oil to "weep" past the piston seals in the upper and lower caps. This will appear as a thin film of oil on the piston shaft. This does not indicate a faulty seal, or a defective cartridge. If significant oil leakage is noticed, or if the smoothness of the suspension deteriorates and the fork begins to feel rough or gritty during compression, then one or more of these seals may be damaged and in need of replacement.

1. Complete steps 1-4 of the Oil Change/Bleeding section of this manual.

2. Unthread upper cap from cartridge with pin-spanner wrench (Park SPA-1, green).

3. Replace the two cup seals located inside lower cap. Be sure to orient the new seals with their larger "flared" ends toward the middle of the cartridge. Also replace the O-ring seal on the piston and the O-ring seal on the lower cap. Be very careful not to tear of puncture any the new seals. (Fig.22)

Fig.22 ▼

If the seals in the upper cap are to be replaced, unthread the two halves of the piston shaft as described in the Shim Change section. The upper cap can then be removed and the seals replaced. Use Loctite #222 (purple) when reassembling the piston shaft (see Fig.21). Be sure not to get any Loctite into the oil circuit.

4. Apply a thin coating of oil to the o-ring seals on the piston and on the upper and lower caps. Slip the cartridge body onto the piston shaft, being careful not to damage the O-ring seal on the piston. Thread the upper cap into the cartridge body and tighten snugly.

NOTE: Do not overtighten the upper cap! Overtightening the upper cap will result in binding of the cartridge and unresponsive suspension action.

5. Go to step 5 of the Oil Change/Bleeding procedure and complete the assembly.

NOTE: Adapter parts

If the Fatty 70 cartridge is being installed in a HeadShok DD60 or MC60 (P-bone) fork, two adapter parts must be used. If these parts are omitted, the fork will not function properly and damage to the fork will result.

Adapter clip: Slide the O-ring down the piston shaft and snap the clip onto the shaft just below the outer cap. (Fig.23)

Air spring spacer: To install the air spring spacer, unthread the air piston from the lower end of the piston shaft, and slip the spacer into the open end of the shaft. Apply clean grease to the O-rings on the piston and re-install. (Fig.24)

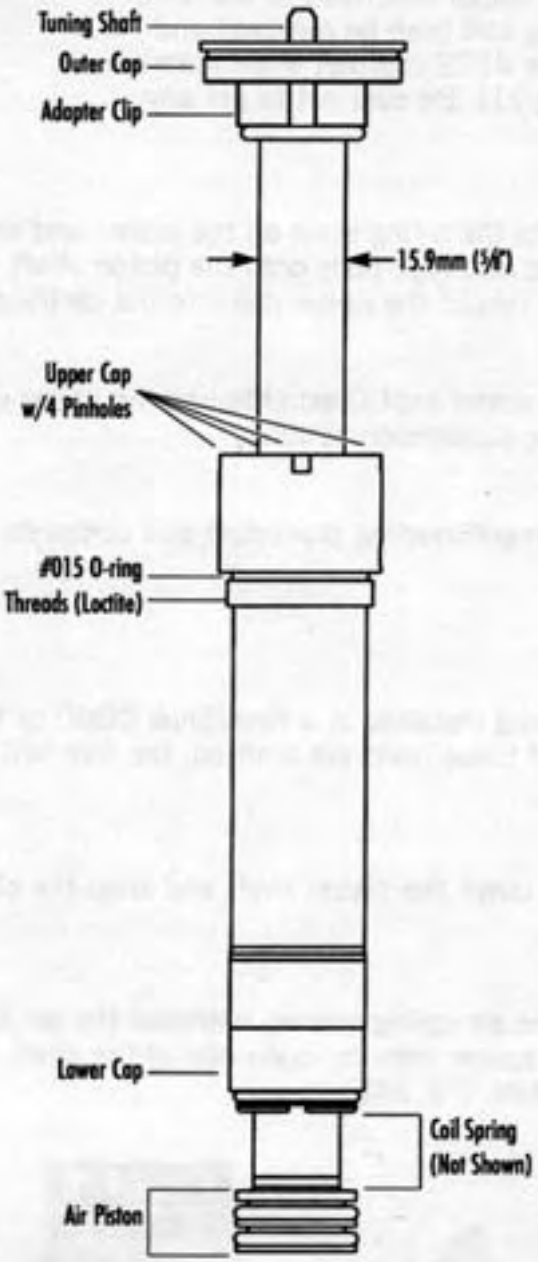
Fig.23 ▼

Installing adapter clip

Fig.24 ▼

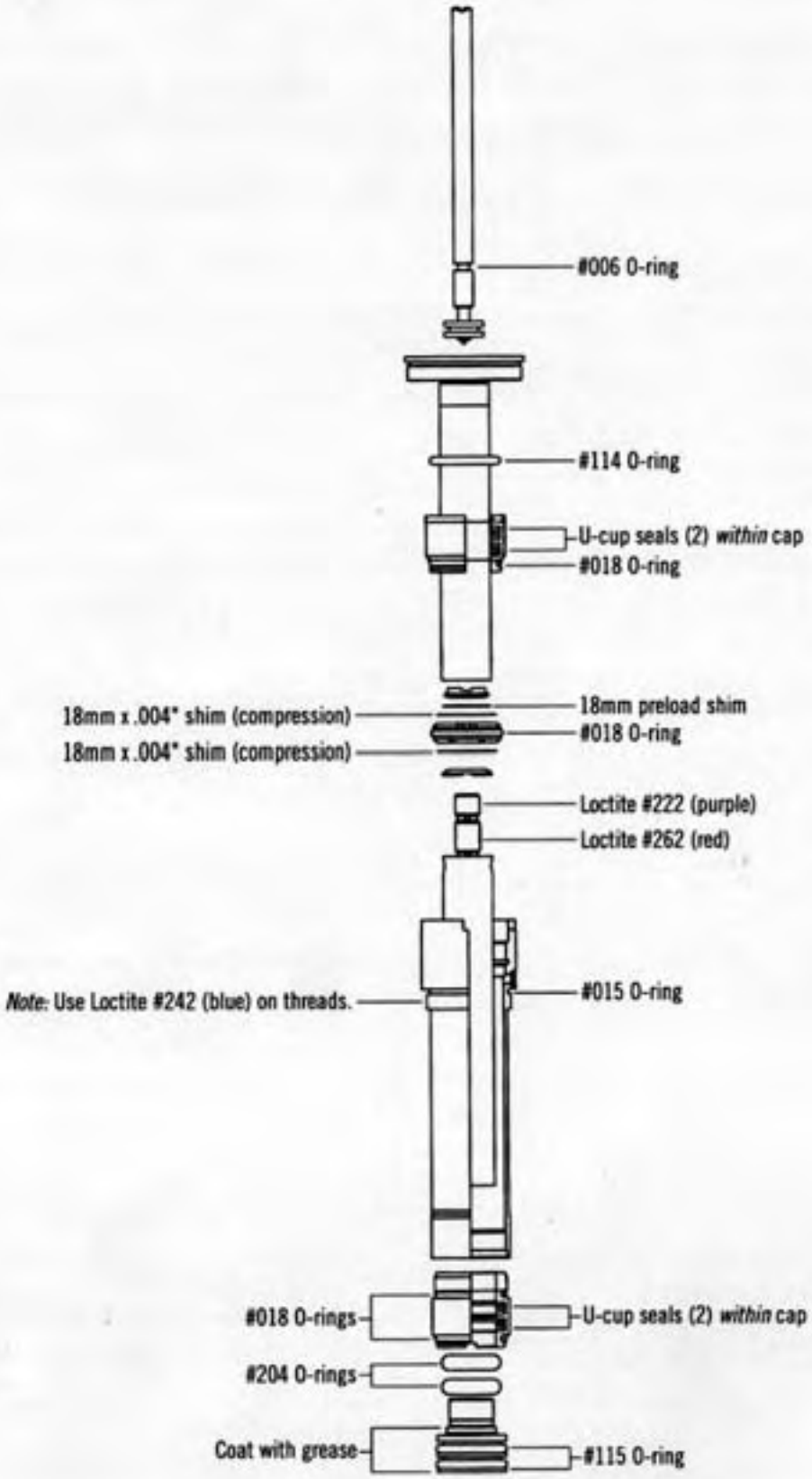
Inserting the air spacer

Fatty 70 Cartridge



Fatty 70 Damper Cartridge

Exploded View

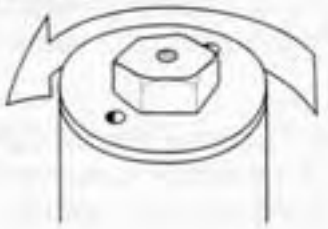


DD2

REMOVAL OF CARTRIDGE

1. Turn the Damping Dial to the left, leaving the fork in it's "on" position. Remove the screw from the center of the Damping Dial and remove the dial from the top of the fork. Back the 3mm preload screw out so that it is flush with the top of the fork.

Fig.1 ▼



2. Loosen the stem binder bolt and remove the stem from the steerer tube. Hang the handlebar/stem assembly out of the way.

3. Using a pin-spanner wrench (Park SPA-1, green), unthread the outer cap of the fork (Fig.1).

Fig.2 ▼

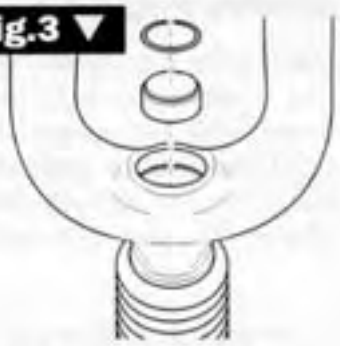
4. With the outer cap completely unthreaded, compress the fork from beneath. This will expose the outer cap and piston shaft of the oil damper cartridge.

5. Using a HeadShok pin wrench (part #101103), unthread the oil damper cartridge from the inner steerer tube, and remove the cartridge from the fork (Fig.2).

6. Turn the fork upside-down. The MCU spring element will drop out of the steerer tube.

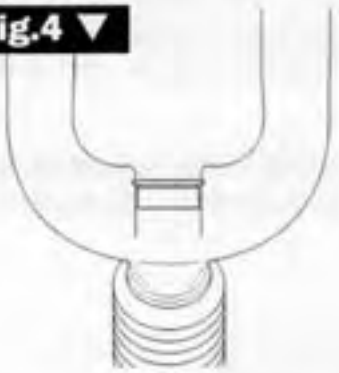
7. With the fork still inverted, push the bottom plug down into the steerer tube about 1" to expose the circlip. Pry the circlip out of its groove with a small screwdriver and remove it from the steerer tube. Discard the circlip and use a new one upon reassembly.

Fig.3 ▼



8. Turn the fork upright again. Insert a long dowel into the steerer tube (from the top) and push the bottom plug out through the bottom of the steerer tube (Fig.3).

Fig.4 ▼

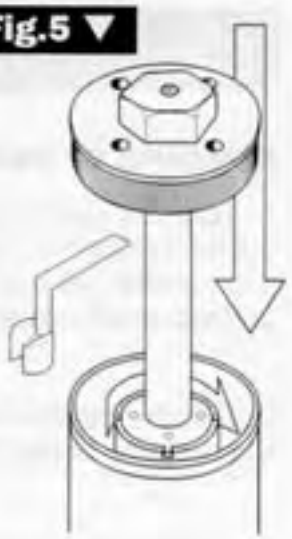


INSTALLATION OF CARTRIDGE

1. With the fork upside down, insert the bottom plug into the fork crown with its reduced end pointed up. push the plug in far enough to allow access to the groove around the inside surface of the fork crown. Install a new circlip in the groove, making sure that it is firmly and completely seated in its groove. Do not reuse the old circlip. When the new circlip is in place, turn fork upright and seat the plug against the circlip by pushing down on it from the top (Fig.4).

2. Coat the MCU spring element (or coil spring) with grease. Drop the spring element into the steerer tube from the top.

Fig.5 ▼

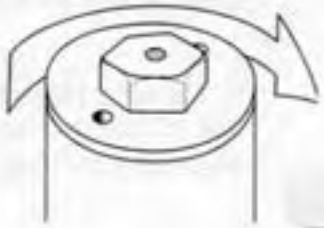


3. Install a new #015 O-ring just above the threads on the outside of the oil damper cartridge. Apply a drop of Loctite #242 (blue) to these threads. Insert the preload piston into the bottom of the oil damper housing. Turn the large hex nut on the top of the housing to the right until you hear a click (this will lock the cartridge out.)

4. To thread the oil damper cartridge into the steerer tube, it will be necessary to compress the spring element slightly. This is easiest to do with the bike out of the work stand and standing on the floor.

Insert damper cartridge into the steerer tube from the top. While pushing down on the outer cap of the damper cartridge, turn the cartridge clockwise with a HeadShok cartridge pin wrench (part #101103) to get the threads started. Continue turning wrench clockwise until cartridge is tight in steerer tube. Be very careful not to damage the threads on the damper cartridge (Fig 5).

Fig.6 ▼

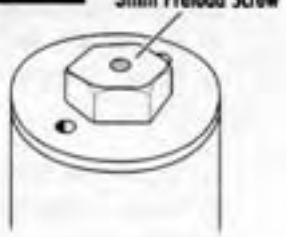


5. Apply grease or anti-seize compound to the threads on the outer cap. Tighten the outer cap into the steerer tube with a pin-spanner wrench (Park SPA-1, green). See Fig.6.

6. Install the stem, then adjust spring preload. Install the Damping Dial.

SPRING PRELOAD

Fig.7 ▼



Make sure the Damping Dial is turned to the left (open position), and remove the retaining bolt in the center of the dial. Turn the 3mm Allen set screw (accessed through the center of the dial) until the desired preload is achieved (Fig.7). With correct preload, the fork should compress 1/16" to 1/8" when the rider sits on the bike in a neutral, relaxed riding position.

Once adjustment is complete, install the supplied 6mm screw into the center of the Damping Dial. This screw serves two very important purposes: to retain the dial on the fork, and to seal fork from water, dirt and other contaminants.

NOTE: This procedure for setting preload is a guideline only. We encourage riders to experiment with preload adjustment. Some prefer a stiffer suspension, some a softer, compliant suspension.

ADVANCED SPRING SYSTEM UPGRADE

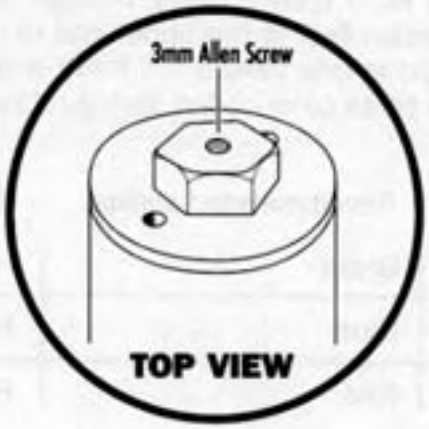
The HeadShok DD2 originally came equipped with an MCU spring element. This spring can be replaced with a HeadShok Advanced Spring System. This spring system upgrade consists of a coil spring with a column of MCU foam running through its center. The coil spring provides a more supple and active suspension feel at the upper end of the fork's travel, while the MCU column provides a progressive spring rate toward the lower end of the travel. The Advanced Spring System kit is available in three color-coded spring rates.

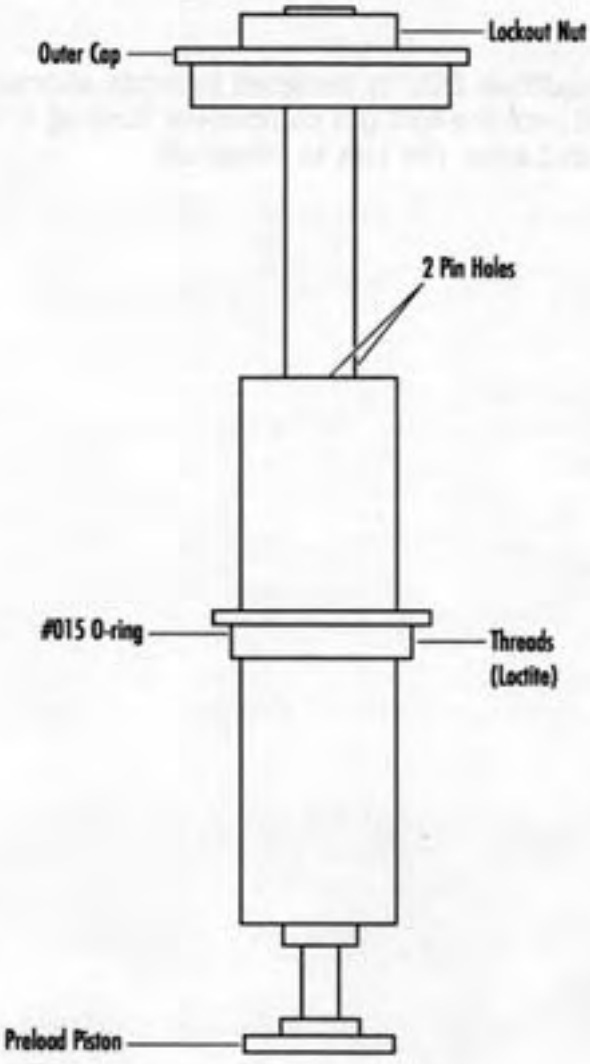
Rider weight range	*Recommended spring*	*Spring Kit code*
150 lbs. or less	Green	HD110/GRE
140 - 200 lbs.	Blue	HD110/BLU
180 lbs. or more	Red	HD110/RED

DAMPING DIAL

The Damping Dial on the HeadShok DD2 is designed to rotate approximately 1/8 turn. Turning the dial clockwise to its stop will lock the fork out completely. Turning it counter-clockwise to its stop will open the damping port and allow the fork to compress.

DD2 Piston

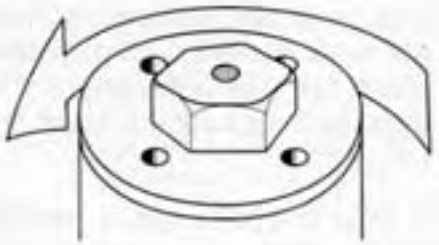

3mm Allen Screw
TOP VIEW


Outer Cap
Lockout Nut
2 Pin Holes
#015 O-ring
Threads
(Loctite)
Preload Piston

DD50 & DD25 (1996)

This section covers 1995 and 1996 HeadShok DD50 and DD25 cartridges. The DD50 is a hydraulic damper cartridge that features 50mm of travel. The DD25 is very similar, but it allows 25mm of travel and was originally installed in "Silk Path" hybrid bikes with 700c wheels. Both cartridges have a Damping Dial, allowing the rider to lock out the suspension fork while riding. See the "HeadShok Identification" section of this manual for more information.

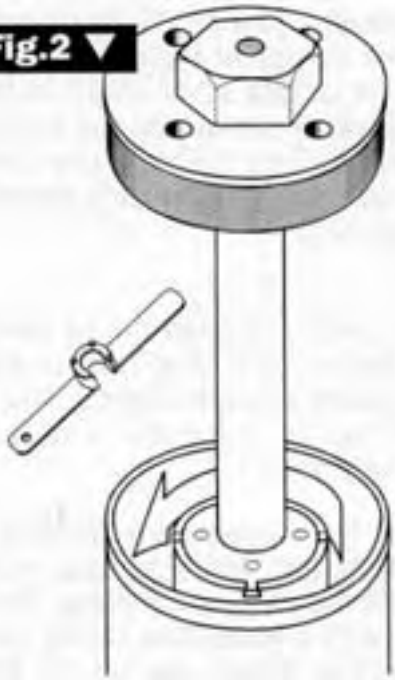
Fig.1 ▼



REMOVAL OF CARTRIDGE

1. Turn the Damping Dial to the left, leaving the fork in it's "on" position. Remove screw from the center of the Damping Dial and remove dial from the top of the fork. Back the 3mm preload screw out so that it is flush with the top of the fork.

Fig.2 ▼



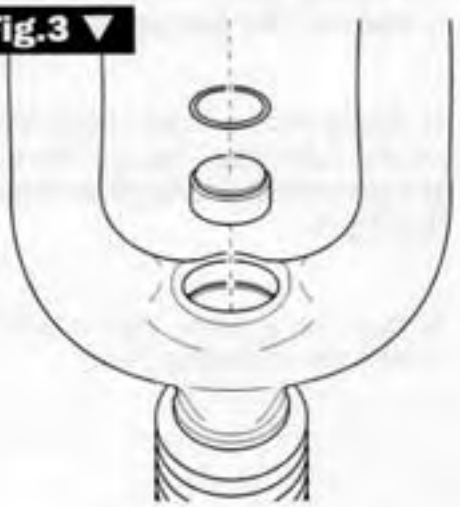
2. Loosen the stem binder bolt and remove the stem from the steerer tube. Hang handlebar/stem assembly out of the way.

3. Using a pin-spanner wrench (Park SPA-1, green), unthread the outer cap of the fork (Fig.1).

4. With outer cap completely unthreaded, compress the fork from beneath. This will expose the outer cap and piston shaft.

5. Using a HeadShok Castle tool (part #104110), unthread the oil damper cartridge from the inner steerer tube, and remove the cartridge from the fork (Fig.2).

Fig.3 ▼



6. Turn the fork upside-down. The MCU spring element will drop out of the steerer tube.

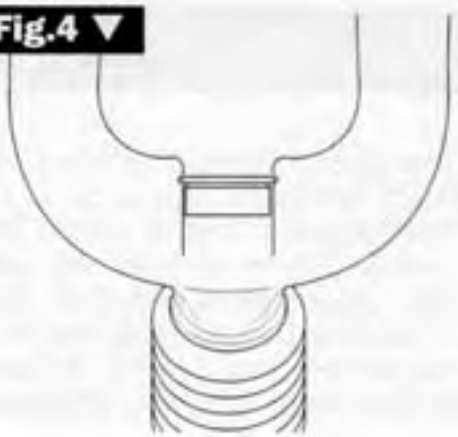
7. With the fork still inverted, push the bottom plug down into the steerer tube about 1" to expose the circlip. Pry the circlip out of its groove with a small screwdriver and remove it from the steerer tube. Discard the circlip.

8. Turn the fork upright again. Insert a long dowel into the steerer tube (from the top) and push the bottom plug out through the bottom of the steerer tube (Fig.3).

INSTALLATION OF CARTRIDGE

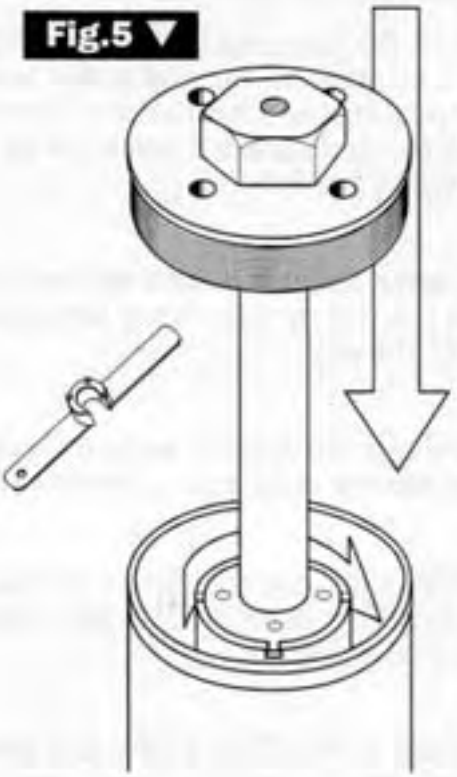
1. With the fork upside down, insert the bottom plug into the fork crown with its reduced end pointed up. push the plug in far enough to allow access to the groove around the inside surface of the fork crown. Install a new circlip in the groove, making sure that it is firmly and completely seated in its groove. Do not reuse the old circlip. When the new circlip is in place, turn the fork upright and seat the plug against the circlip by pushing down on it from the top (Fig.4).

Fig.4 ▼



2. Coat the MCU spring element (or coil spring) with grease. Drop the spring element into the steerer tube from the top.

Fig.5 ▼

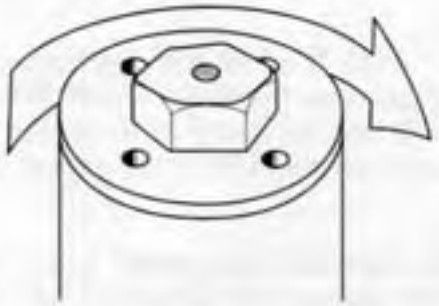


3. Install a new #015 O-ring just above the threads on the outside of the oil damper cartridge. Apply a drop of Loctite #242 (blue) to these threads. Insert the preload piston into the bottom of the oil damper cartridge. Turn the large hex nut on the top of the cartridge to the right (this will lock the damper cartridge out.)

4. In order to thread the oil damper cartridge into the steerer tube, it will be necessary to compress the spring element slightly. This is easiest to do with the bike out of the work stand and standing on the floor.

Insert the damper cartridge into the steerer tube from the top. While pushing downward on the outer cap of the damper cartridge, turn the cartridge clockwise with a HeadShok Castle tool (part #104110) to get the threads started (Fig.5). Continue turning the wrench clockwise until the cartridge is tight in the steerer tube. Be very careful not to damage the threads on the damper cartridge.

Fig.6 ▼



5. Apply grease or anti-seize compound to the threads on the outer cap. Tighten the outer cap into the steerer tube with a pin-spanner wrench (Park SPA-1, green). See Fig.6.

6. Install the stem, then adjust the spring preload. Install the Damping Dial.

SPRING PRELOAD

Make sure the Damping Dial is turned to the left (open position), and remove the retaining bolt in the center of the dial. Turn the 3mm Allen set screw (accessed through the center of the dial) until the desired preload is achieved. With correct preload, the fork should compress 1/16" to 1/8" when the rider sits on the bike in a neutral, relaxed riding position.

Once the adjustment is complete, install the supplied 6mm screw into the center of the Damping Dial. This screw serves two very important purposes: to retain the dial on the fork, and to seal the fork from water, dirt and other contaminants.

NOTE: This procedure is to be used as a guideline only. We encourage riders to experiment with preload adjustment. Some prefer a stiffer suspension, some a softer, more compliant suspension.

ADVANCED SPRING SYSTEM UPGRADE

The HeadShok DD50 (and HeadShok DD25) originally came equipped with an MCU spring element. This spring can be replaced with a HeadShok Advanced Spring System. The Advanced Spring System upgrade consists of a coil spring with a column of MCU foam running through its center. The coil spring provides a more supple and active suspension feel at the upper end of the fork's travel, while the MCU column provides a progressive spring rate toward the lower end of the travel. The Advanced Spring System kit is available in three color-coded spring rates.

Rider weight range	*Recommended spring*	*Spring Kit code*
150 lbs. or less	Green	HD110/GRE
140 - 200 lbs.	Blue	HD110/BLU
180 lbs. or more.	Red	HD110/RED

DAMPING DIAL

The Damping Dial on a HeadShok DD50 or DD25 cartridge is designed to rotate approximately 1/8 turn. Turning the dial clockwise to its stop will lock the fork out completely. Turning it counter-clockwise to its stop will open the damping port and allow the fork to compress.

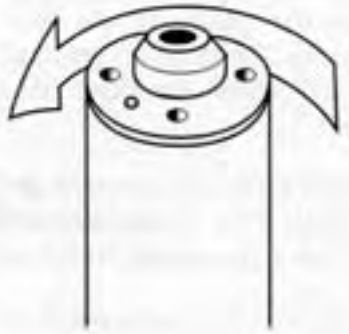
OIL CHANGE / BLEEDING PROCEDURE

The hydraulic oil in a DD50 or DD25 cartridge should be replaced and the cartridge bled at least once a year. The damper cartridge originally came with 5W oil installed, however, the oil may be changed to a different viscosity to change damping performance. A heavier oil (as heavy as 10W) may be used to provide heavier damping, but the fork's ability to absorb large impacts will be reduced. Likewise, a lighter weight oil (as light as 2.5W) may be used to "quicken up" the suspension action.

NOTE: Do not use a "seal swelling" hydraulic oil in a HeadShok cartridge. Only use hydraulic oil that is approved for use in suspension systems with natural rubber seals.

1. Remove the oil damper cartridge from the fork.

Fig.7 ▼



2. Hold the oil damper cartridge upside down over a bucket or similar container. Unthread the lower cap from the cartridge body with a pin-spanner wrench (Park SPA-1, green). See Fig.7.

3. Pour the oil from the cartridge into the container (Fig.8). Stroke the piston up and down in the cartridge to pump out any oil that may be trapped above the piston.

4. Remove the brass brad (nail) from the lower cap and set it aside. The brad is reusable.

5. Holding the cartridge upside down, pour in fresh hydraulic oil. Fill the cartridge all the way to the top.

Fig.8 ▼

6. Stroke the piston up and down very slowly to expel any trapped air. (You will see air bubbles rise to the top of the oil, and the oil level may drop.) Continue stroking until all air is purged from the system.

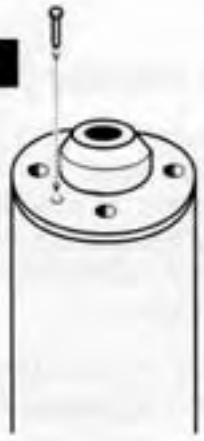
7. Pour more oil into the cartridge until it is again filled to the top. Repeat step 6 if necessary.

8. Screw the lower cap back into the cartridge and tighten with a pin-spanner wrench. Some oil will be forced out through the brad hole in the lower cap.

NOTE: Do not overtighten the upper cap! Overtightening the upper cap will result in binding of the cartridge and unresponsive suspension action.

9. Replace the brass brad in the lower cap (Fig.9). Cycle the cartridge several times and check to make sure the lock-out switch functions correctly. If there is any air in the system, the stroke of the cartridge will feel rough and irregular, and the lock-out may not function. If this is the case, repeat the oil change procedure, paying close attention to step 6. It is not unusual for the cartridge to make some noise just after being rebuilt.

Fig.9 ▼



10. Replace the oil damper cartridge in the suspension fork.

SEAL REPLACEMENT

As a regular service to a DD50 or DD25 cartridge, the seals in the lower cap and the O-ring seal on the piston should be replaced once a year. Replacement of the u-cup seals in the upper cap is not recommended unless significant oil leakage through these seals is noticed.

It is normal and regular for a small amount of oil to "weep" past the piston seals in the upper and lower caps. This will appear as a thin film of oil on the piston shaft. This does not indicate a faulty seal, or a defective cartridge. If significant oil leakage is noticed, if the fork loses its lock-out ability, or if the smoothness of the suspension deteriorates and the fork begins to feel rough or gritty during compression, then one or more of these seals may be damaged and in need of replacement. Seal kits are available through HeadShok.(part #HD115/)

1. Remove the oil damper cartridge from the fork.

2. Hold the oil damper cartridge upside down over a bucket or similar container. Unthread the lower cap from the cartridge body with a pin-spanner wrench (Park SPA-1, green).

3. Pour the oil from the cartridge into the container. Stroke the piston up and down in the cartridge to pump out any oil that may be trapped above the piston.

4. Remove the brass brad (nail) from the lower cap and set it aside. The brad is reusable.

5. Unthread the upper cap from the cartridge body with a pin-spanner wrench. Slide the cartridge body off of the piston assembly.

6. Replace the two cup seals located inside the lower cap. Be sure to orient the new seals with their larger "flared" ends toward the middle of the cartridge (Fig.10). Also replace the O-ring seal on the piston and the O-ring seals on the upper and lower caps. Be very careful not to tear or puncture any the new seals.

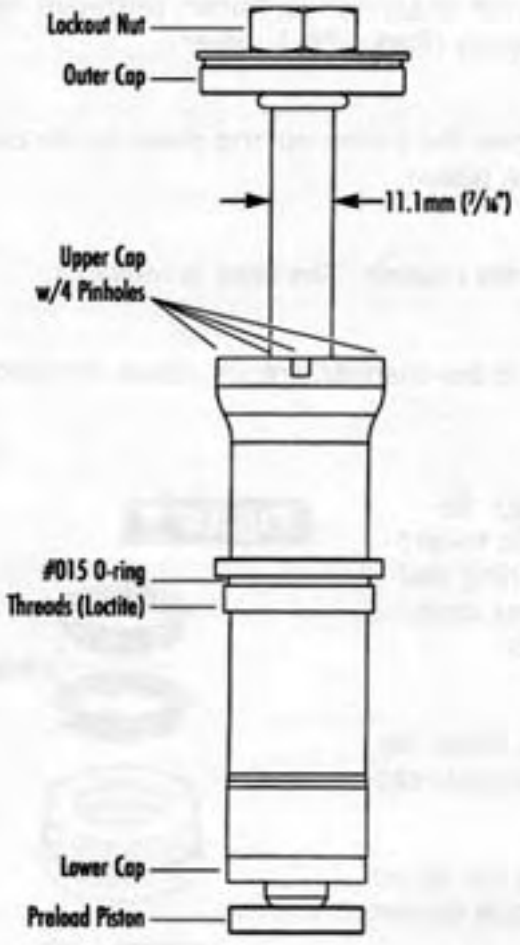
Fig.10 ▼

7. Apply a thin coating of hydraulic oil to the new seals. Slide the cartridge body over the piston assembly and tighten the upper cap with a pin-spanner wrench.

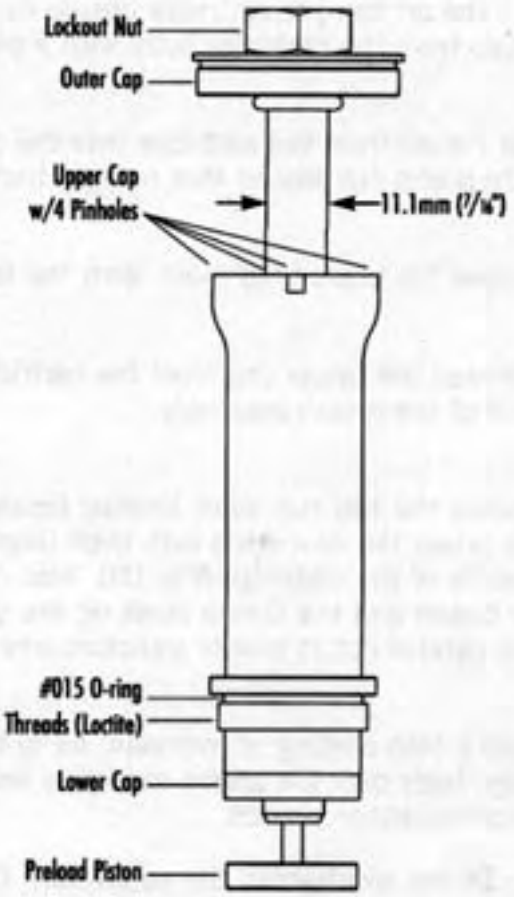
NOTE: Do not overtighten the upper cap! Overtightening the upper cap will result in binding of the cartridge and unresponsive suspension action.

8. Go to step 5 of Oil Change/Bleeding procedure to complete the assembly.

DD50


Lockout Nut
Outer Cap
11.1mm (7/16")
Upper Cap
w/4 Pinholes
#015 O-ring
Threads (Loctite)
Lower Cap
Preload Piston

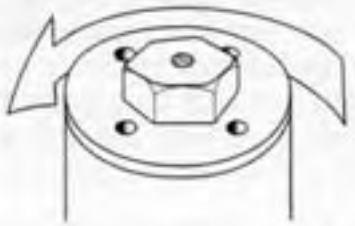
DD25/'96


Lockout Nut
Outer Cap
Upper Cap
w/4 Pinholes
11.1mm (7/16")
#015 O-ring
Threads (Loctite)
Lower Cap
Preload Piston

DD60 & DD25 (1997)

This section covers 1997 HeadShok DD60 and DD25 cartridges. The DD60 is a hydraulic damper cartridge that features 60mm of travel. The DD25 is very similar, but it allows 25mm of travel and was originally installed in "Silk Path" hybrid bikes with 700c wheels. Both cartridges have a Damping Dial, allowing the rider to lock out the suspension fork while riding. See the "HeadShok Identification" section of this manual for more information.

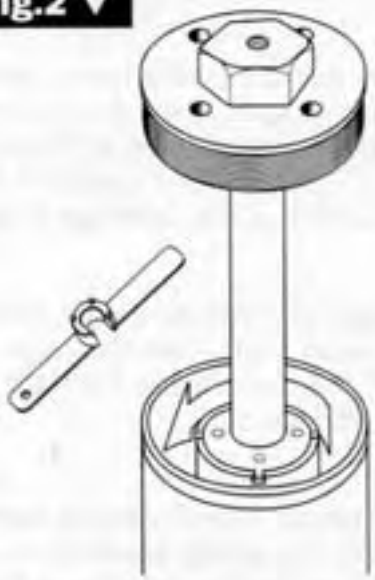
Fig.1 ▼



REMOVAL OF CARTRIDGE

1. Turn the Damping Dial to the left, leaving the fork in it's "on" position. Remove the screw from the center of the Damping Dial and remove the dial from the top of the fork. Back the 3mm preload screw out so that it is flush with the top of the fork.

Fig.2 ▼



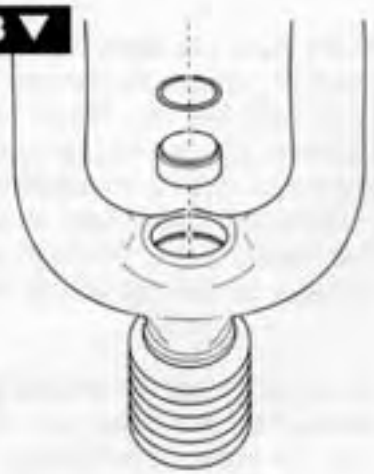
2. Loosen the stem binder bolt and remove stem from the steerer tube. Hang handlebar/stem assembly out of the way.

3. Using a pin-spanner wrench (Park SPA-1, green), unthread outer cap of the fork (Fig.1).

4. With outer cap completely unthreaded, compress the fork from beneath. This will expose the outer cap and piston shaft.

5. Using a HeadShok Castle tool (part #104110), unthread the oil damper cartridge from the inner steerer tube of the fork. When the cartridge is unthreaded from the steerer tube, remove it from the fork (Fig.2).

Fig.3 ▼



6. Turn the fork upside-down. The coil spring and MCU element will drop out of the steerer tube.

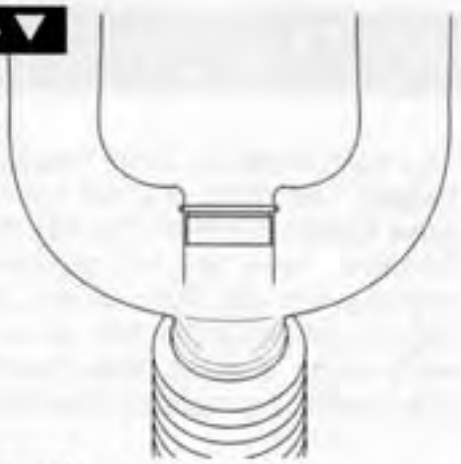
7. With the fork still inverted, push the bottom plug down into the steerer tube about 1 inch to expose the circlip. Pry the circlip out of its groove with a small screwdriver and remove it from the steerer tube. Discard the circlip.

8. Turn the fork upright again. Insert a long dowel into the steerer tube (from the top) and push the bottom plug out through bottom of steerer tube (Fig.3).

INSTALLATION OF CARTRIDGE

1. With the fork upside down, insert the cup-shaped bottom plug into the fork crown with its hollow end pointed into the steerer tube. Push the plug down into the steerer tube about 1 inch. Install a new circlip in the groove around the inside surface of the fork crown. It is very important that this circlip is firmly and completely seated in its groove. When the new circlip is in place, turn the fork upright and seat plug against the circlip by pushing down on it from top with a long dowel (Fig.4.).

Fig.4 ▼



2. Apply a thin coating of grease to the MCU element. Insert the MCU into the coil spring (tapered end first) and apply a coating of grease to the spring. Drop the spring assembly into the steerer tube from the top.

3. Remove old O-ring from cartridge threads and discard. Install a new #018 O-ring just above the threads on the outside of the cartridge. Apply a drop of Loctite #242 (blue) to the threads on the outside of the cartridge (Fig.5.).

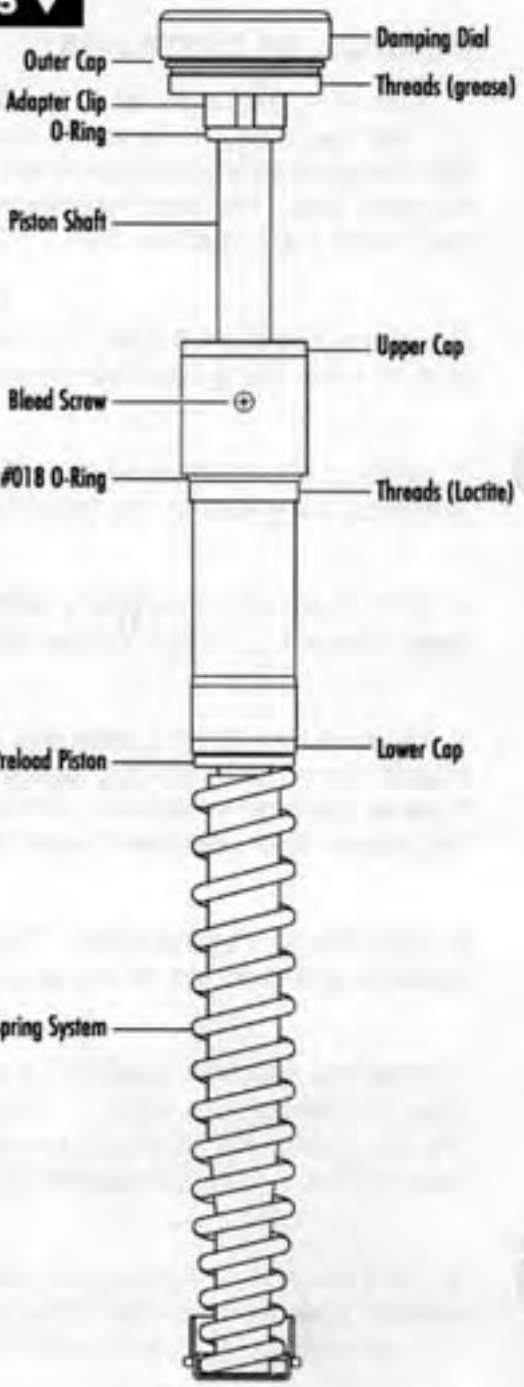
4. Insert the preload piston into the bottom of the piston shaft. Turn the large hex nut on the top of the cartridge to the right (this will lock the cartridge out).

5. To thread the oil damper cartridge into the steerer tube, the spring assembly must be compressed slightly while the cartridge is being turned clockwise with a HeadShok Castle tool (part #104110). This operation is easiest with the bike (or fork) out of the work stand and standing on the floor.

Make sure the large hex nut is turned to lockout position. Insert oil damper cartridge into the steerer tube from the top. While applying downward force to the outer cap of the cartridge, turn the cartridge clockwise with a HeadShok Castle tool. Continue turning the Castle tool until the cartridge is tight in the steerer tube. Be very careful not to damage the threads on the outside of the cartridge (Fig.6.).

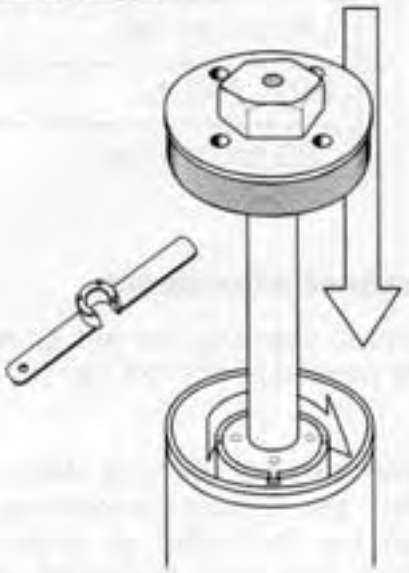
6. Apply grease or anti-seize compound to the threads on the outer cap. Tighten the outer cap into the outer steerer tube with a pin-spanner wrench (Park SPA-1, green).

Fig.5 ▼



7. Install the stem, then adjust the spring preload. Install the Damping Dial.

Fig.6 ▼



Installation of cartridge in pre-1997 HeadShok fork

If this HeadShok DD60 cartridge is being installed in a 1996 or earlier HeadShok or "Delta V" suspension fork, a 50mm adapter clip must be used. If this clip is not installed, the oil damper cartridge and/or needle bearings inside the fork could become damaged during normal use. Damage to the fork resulting from the omission of the 50mm adapter clip will not be covered under warranty. The 50mm adapter clip is not required on 60mm travel DD60 or MC60 forks from 1997 or later.

To install the clip, simply push the bottom-out O-ring (located just below the top cap) down the cartridge shaft, then snap the clip onto the shaft just below the outer cap. Push the bottom-out O-ring up against the clip (Fig.4.).

Omission of the 50mm adapter clip from the cartridge will not increase the fork's travel. HeadShok forks from 1996 and earlier were designed to travel a maximum of 50mm. Any modifications intended to extend this travel may result in damage to the fork.

SPRING PRELOAD

The HeadShok DD60 is designed to be used with the HeadShok Advanced Spring System. This spring element consists of a metal coil spring with a column of MicroCellular Urethane (MCU) running through its middle. There are three different coil springs available to adjust the fork to riders of different sizes. The springs are color coded by stiffness (spring rate). They are also interchangeable, allowing the rider to custom-tune the performance of the fork to his or her liking. Refer to the tables below for information on which would have come with a DD60-equipped bicycle when new, and for explanation of the springs' color coding.

O.E.M. applications:

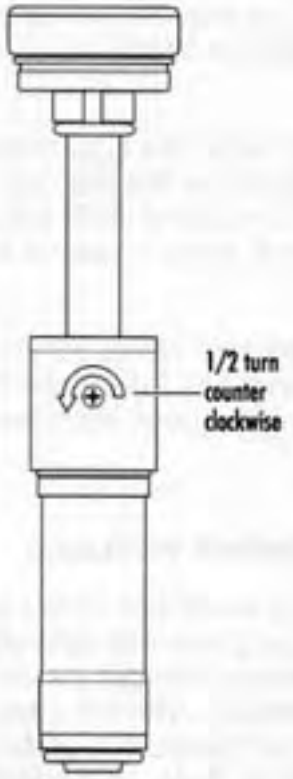
Bike size . . .	*comes with . . .*
Small	Green
Medium	Blue
Large	Blue
Extra Large	Red

Rider weight range	Recommended spring	Spring Kit code
150 lbs. or less	Green	HD110/GRE
140 - 200 lbs.	Blue	HD110/BLU
180 lbs. or more.	Red	HD110/RED

Preload adjustment

Beyond changing the coil springs in the DD60 suspension fork, the preload of the fork can be fine-tuned to suit the rider's style.

Fig.7 ▼



Make sure the Damping Dial is turned to the left (open position), and remove the retaining bolt in the center of the dial. Turn the 3mm Allen set screw (accessed through the center of the dial) until the desired preload is achieved. With correct preload, the fork should compress 1/16" to 1/8" when the rider sits on the bike in a neutral, relaxed riding position.

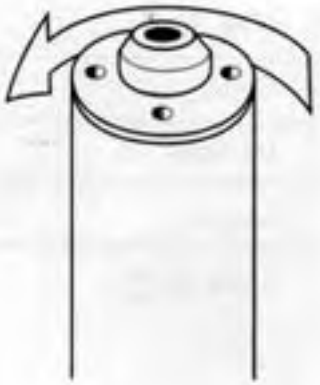
Once the adjustment is complete, install the supplied 6mm screw into the center of the Damping Dial. This screw serves two very important purposes: to retain the dial on the fork, and to seal the fork from water, dirt and other contaminants.

NOTE: This procedure is to be used as a guideline only. We encourage riders to experiment with preload adjustment. Some prefer a stiffer suspension, some a softer, more compliant suspension.

OIL CHANGE / BLEEDING PROCEDURE

A DD60/DD25 cartridge comes from the factory with 5W oil installed. The oil may be changed to a different viscosity to change the damping characteristics of the fork. A heavier oil (as heavy as 10W) may be used, but the fork's ability to absorb large impacts will be reduced. Likewise, a lighter weight oil (as light as 2.5W) may be used to "quicken up" the suspension action. In all cases, only a high-quality suspension fork oil should be used.

Fig.8 ▼



NOTE: Do not use a "seal swelling" hydraulic oil in a HeadShok cartridge. Only use hydraulic oil that is approved for use in suspension systems with natural rubber seals.

1. Remove the oil damper cartridge from the fork.

2. Turn the nut on top of the cartridge to the left, leaving the fork in it's "on" position. Using a Phillips screwdriver, turn the bleed screw (located on the side of the cartridge) 1/2 turn counter-clockwise. (Fig.7)

3. Hold the oil damper cartridge over a bucket or similar container. Unthread the lower cap from the cartridge body with a pin-spanner wrench. (Fig.8.)

4. Pour the oil from the cartridge into the container. Stroke the piston up and down in the cartridge to pump out any oil that may be trapped above the piston.

5. Holding the cartridge upside down, pour in fresh hydraulic oil. Fill the cartridge all the way to the top (Fig.9.).

6. Stroke the piston up and down very slowly to expel any trapped air. (You will see air bubbles rise to the top of the oil, and the oil level may drop.) Continue stroking until no air bubbles are seen.

7. Set the cartridge aside for a few minutes to allow air bubbles to rise to the top of the oil level. Pour more oil into the cartridge until it is again filled to the top. Repeat steps 6&7 if necessary.

8. Begin to thread the lower cap back into the cartridge. When the cap ring seal on the lower cap contacts the lower end of the cartridge body, turn the bleed screw one full turn counter-clockwise (Fig.10). Finish tightening the lower cap into the cartridge body with a pin-spanner wrench. When the lower cap is fully threaded into the cartridge body, tighten the bleed screw fully, being careful not to damage the Phillips screw head (Fig.11.).

9. Cycle the cartridge several times and check to make sure the lock-out switch functions correctly. If there is air in the system, the stroke of the cartridge will feel rough and irregular, and the lock-out may not function. If this is the case, repeat the oil change procedure, paying close attention to steps 6&7. It is not unusual for the cartridge to make a bit of noise just after being rebuilt.

10. Replace oil damper cartridge in the suspension fork.

Fig.9 ▼

Fig.10 ▼

Fig.11 ▼

SEAL REPLACEMENT

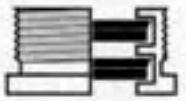
Fig.12 ▼

As a regular service to a DD50 cartridge, the seals in the lower cap and the O-ring seal on the piston should be replaced once a year. Replacement of the seals on the upon cap is not recommended as a regular service.

It is normal for a small amount of oil to "weep" past the piston seals in the upper and lower caps. This will appear as a thin film of oil on the piston shaft. This does not indicate a faulty seal, or a defective cartridge. If significant oil leakage is noticed, if the fork loses its lock-out ability, or if the smoothness of the suspension deteriorates and the fork begins to feel rough or gritty during compression, then one or more of these seals may be damaged and in need of replacement.

1. Remove the oil damper cartridge from the fork.

Fig.13 ▼



2. Turn the nut on top of the cartridge to the left, leaving the fork in it's "on" position. Using a Phillips screwdriver, turn the bleed screw 1/2 turn counter-clockwise.

3. Hold the oil damper cartridge over a bucket or similar container. Unthread the lower cap from the cartridge body with a pin-spanner wrench (Park SPA-1, green).

4. Pour the oil from the cartridge into the container. Stroke the piston up and down in the cartridge to pump out any oil that may be trapped above the piston.

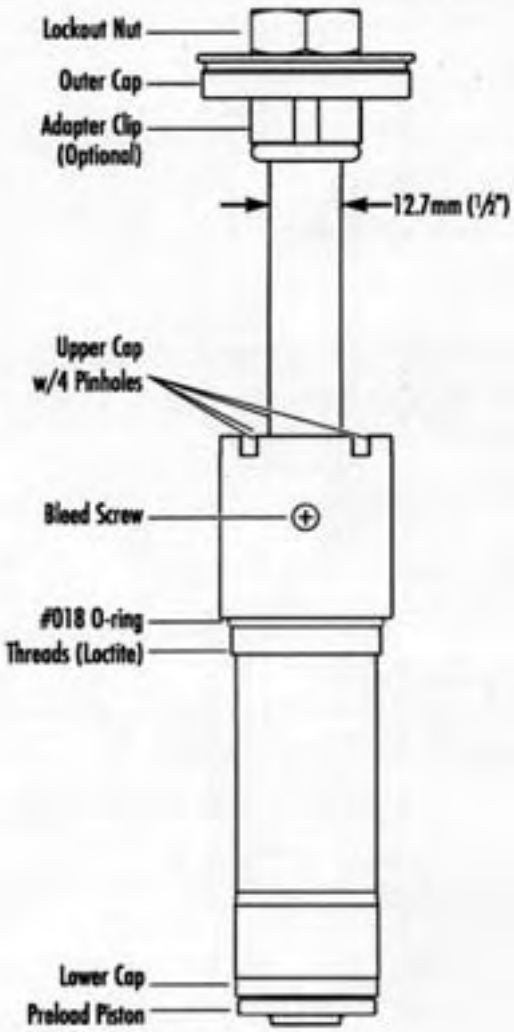
5. Unthread the upper cap from the cartridge body with a pin-spanner wrench. Slide the cartridge body off of the piston assembly.

6. Replace the two cup seals located inside the lower cap. Be sure to orient the new seals with their larger "flared" ends toward the middle of the cartridge. Also replace the O-ring seal on the piston and the O-ring seals on the upper and lower caps. Be very careful not to tear or puncture any the new seals. See Figures 12 and 13.

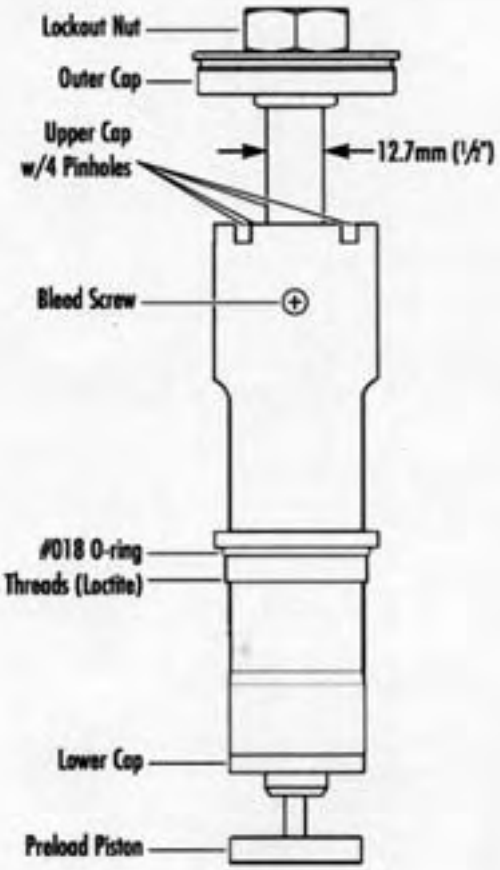
7. Apply a thin coating of hydraulic oil to the new seals. Slide the cartridge body over the piston assembly and tighten the upper cap with a pin-spanner wrench.

8. Go to step 5 of Oil Change / Bleeding Procedure to complete the assembly.

DD60


Lockout Nut
Outer Cap
Adapter Clip
(Optional)
12.7mm (½")
Upper Cap
w/4 Pinholes
Bleed Screw
#018 O-ring
Threads (Loctite)
Lower Cap
Preload Piston

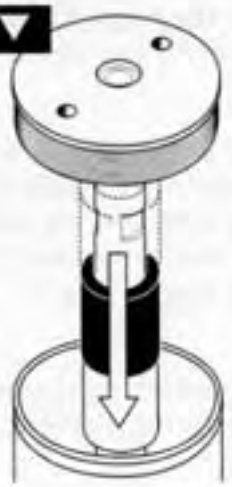
DD25/'97


Lockout Nut
Outer Cap
Upper Cap
w/4 Pinholes
12.7mm (½")
Bleed Screw
#018 O-ring
Threads (Loctite)
Lower Cap
Preload Piston

MC50 / EDM

Introduced in 1993, the HeadShok MC50 (a.k.a. HeadShok EDM) is an MCU-sprung suspension fork with 50mm of travel. The original MCU spring can be replaced with a newer coil/ MCU spring kit, and the mechanical damper/piston assembly can be upgraded to either a DD60 or Fatty 50 system.

Fig.1 ▼



REMOVAL OF PISTON / SPRING ASSEMBLY

1. Remove the plastic mud cap from the top of the fork. Back the 4mm preload screw out so that it is flush with the top of the fork. Loosen the stem binder bolt. (It is not necessary to remove the handlebar/stem assembly from the steerer tube, but doing so may improve access to the cartridge.)

2. Unthread the outer cap from the fork with a pin-spanner wrench (Park SPA-1, green).

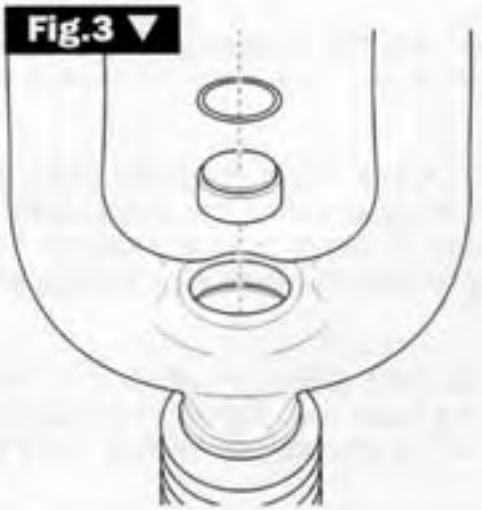
Fig.2 ▼

3. Compress the fork from beneath. The center shaft will become visible, along with the bottom-out bumper and plastic spacer. Slide the bottom-out bumper and nylon spacer down the center shaft to expose the 10mm wrench flats which are cut into the center shaft (Fig.1).

4. Hold the center shaft with a 10mm open-end wrench while turning the outer cap counter-clockwise with a pin-spanner. Remove the outer cap from the center shaft, then remove the plastic spacer and bottom-out bumper.

5. Insert a HeadShok pin wrench (part #101103) into the fork and engage tool in the two holes in the upper cartridge nut. Turn tool counter-clockwise to unthread the cartridge nut (Fig.2). When upper cartridge nut is completely unthreaded from the inner steerer tube, pull up-wards on the center shaft to remove the piston assembly from the fork.

Fig.3 ▼



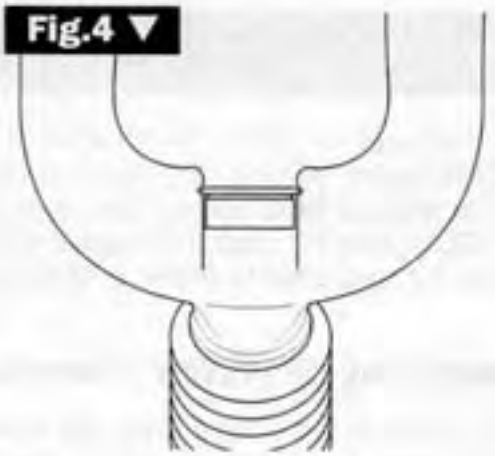
6. Turn the fork upside-down. The spring element will drop out of the steerer tube.

7. With the fork still inverted, push the bottom plug up into the steerer tube to expose the circlip. Pry the circlip out of the groove in the fork crown. Discard the circlip.

8. Turn fork right side up. Insert a 3/4" dowel from top of the fork, and tap bottom plug out through fork crown (Fig.3).

INSTALLATION OF PISTON / SPRING ASSEMBLY

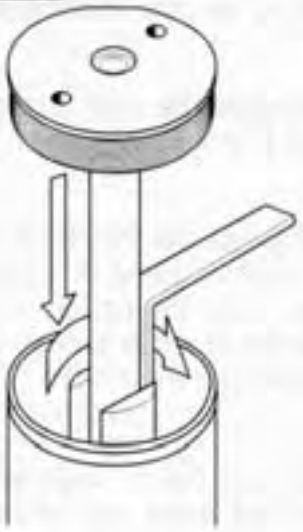
Fig.4 ▼



1. Insert bottom plug into the steerer tube through fork crown, with its reduced end pointed toward the fork blades. Push the plug into the steerer tube aprox. 1 inch to allow access to the groove around the inside of the fork crown.

2. Install a new circlip in the groove in the fork crown. The circlip should fit tightly in the groove. Push down on the bottom plug from the top with the dowel to engage the circlip. When properly installed, the bottom plug should completely cover the circlip (Fig.4).

Fig.5 ▼



3. Turn the fork right side up. Apply a coating of grease to the MCU spring element, and insert into the steerer tube.

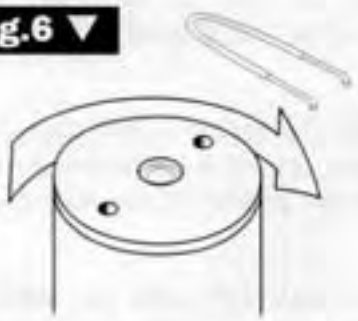
4. Insert the preload piston into the piston shaft. Install one MCU bumper onto the piston shaft and slide all the way down the shaft as far as it will go. Apply a coating of grease to the nylon wear ring, and insert the piston shaft assembly into the inner steerer tube, working the wear ring past the threads around the inside of the steerer tube.

5. Install a new #015 O-ring around upper cartridge nut, just above the threads. Apply a drop of Loctite #242 (blue) to the threads on the nut, and slip the nut onto piston shaft.

To thread the upper cartridge nut cap into the inner steer tube, it will first be necessary to compress the spring slightly. To do so, thread the outer cap onto the piston shaft hand-tight. Insert a HeadShok pin wrench (part #101103) into the steerer tube so that the pins of the tool engage the pin holes in the upper cartridge nut. With the fork's dropouts contacting the floor, lean on the outer cap to compress the spring while turning the pin wrench clockwise (Fig.5). Be very careful not to cross-thread the inner cap in the steerer tube. When the inner cap is tight in the steerer tube, remove the outer cap from the piston shaft.

6. Slip the remaining MCU bumper onto the piston shaft. Slip the plastic spacer onto the piston shaft and slide down far enough to expose the wrench flats on the piston shaft.

Fig.6 ▼



7. Apply a drop of Loctite #242 (blue) to the threads on the upper end of the piston shaft. Hold the piston shaft with a 10mm open-end wrench while tightening the outer cap onto the shaft with a pin-spanner wrench.

8. Apply grease or anti-seize compound to the threads of the outer cap. Tighten the outer cap into the steerer tube with a pin-spanner wrench (Park SPA-1, green) (Fig.6).

9. Give the fork a quick, firm compression to seat the bottom-out bumper, then proceed with spring preload adjustment. Make sure to install the plastic mud cap before the bike is ridden.

SPRING PRELOAD ADJUSTMENT

Fig.7 ▼

1. Remove the plastic mud cap from the top of the fork.

2. Insert a 4mm Allen wrench into hole in the top of the fork. Turn preload adjustment screw clockwise for greater preload (and a stiffer suspension) or counter-clockwise for less preload (and a softer suspension). With correct preload, the suspension should compress 1/16" to 1/8" when the rider sits on saddle in a neutral, relaxed riding position (Fig.7).

3. When the desired preload is set, replace the mud cap by screwing it back into the top of the fork. This cap is very important as it seals the fork from water, dirt and other contaminants.

NOTE: This procedure is to be used as a guideline only. We encourage riders to experiment with preload adjustment. Some prefer a stiffer suspension, some a softer, more compliant suspension.

The MCU foam in the HeadShok MC50 is relatively insensitive to changes in temperature. However, in extremely cold weather it may be necessary to reduce preload setting slightly to maintain optimal performance.

ADVANCED SPRING SYSTEM UPGRADE

The HeadShok MC50 (and HeadShok EDM) originally came equipped with an MCU spring element. This spring can be replaced with a HeadShok Advanced Spring System. The Advanced Spring System upgrade consists of a coil spring with a column of MCU foam running through its center. The coil spring provides a more supple and active suspension feel at the upper end of the fork's travel, while the MCU column provides a progressive spring rate toward the lower end of the travel. The Advanced Spring System kit is available in three color-coded spring rates.

Rider weight range	*Recommended spring*	*Spring Kit code*
150 lbs. or less	Green	HD110/GRE
140 - 200 lbs.	Blue	HD110/BLU
180 lbs. or more.	Red	HD110/RED

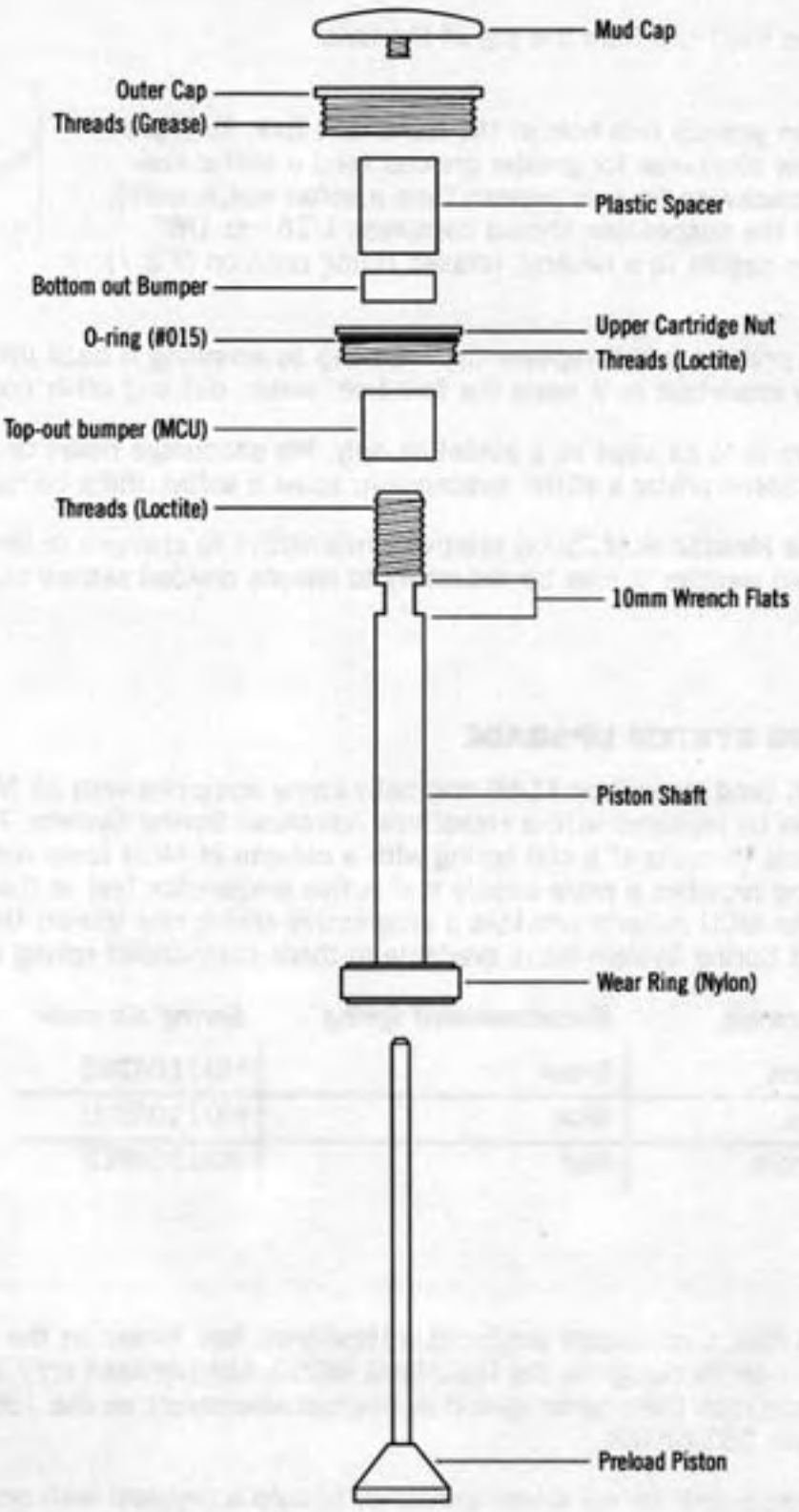
HEADSHOK CMT

For a short time in 1994, Cannondale produced a HeadShok fork known as the "HeadShok CMT". This fork was very similar in design to the HeadShok MC50, but provided only 1 inch of front wheel travel. The HeadShok CMT came spec'd as original equipment on the 1994 C2000 commuter/hybrid bike with 26" wheels.

Parts for this suspension fork are no longer available. Should a problem with one of these forks arise, it is recommended that the suspension piston assembly be replaced with a new DD25 damper cartridge and an Advanced Spring System kit.

MC50 Piston Assembly

Exploded View



MC60

Introduced in 1996 as a revised MC50, the HeadShok MC60 uses an Advanced Spring System to get 60mm of travel. The original MC60 piston assembly can be replaced with a DD60 hydraulic damper upgrade kit.

Fig.1 ▼

REMOVAL OF PISTON / SPRING ASSEMBLY

1. Remove plastic mud cap from the fork. Back the preload adjustment screw out so that it is flush with the top of fork. Loosen stem binder bolt. (It is not necessary to remove the handlebar/stem assembly from the steerer tube, but doing so may improve access to the cartridge.)

2. Using a pin-spanner wrench (Park SPA-1, green), unthread the outer cap from the fork.

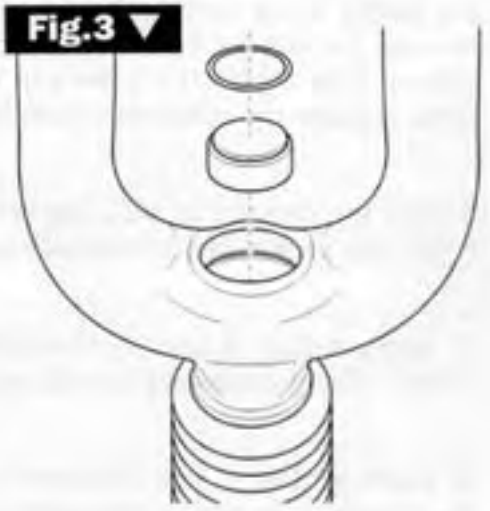
Fig.2 ▼

3. Compress the fork from beneath. The center shaft will become visible, along with the bottom-out bumper and plastic spacer. Slide the bottom-out bumper and nylon spacer down the center shaft to expose the 10mm wrench flats which are cut into the center shaft (Fig.1).

4. Hold the center shaft with a 10mm open-end wrench while turning the outer cap counter-clockwise with a pin-spanner. Remove the outer cap from the center shaft,then remove the plastic spacer and bottom-out bumper.

5. Insert a HeadShok pin wrench (part #101103) into the fork and engage the tool in the two holes in the upper cartridge nut. Turn tool counter-clockwise to unthread the cartridge nut (Fig.2). When the upper cartridge nut is completely unthreaded from the inner steerer tube, pull upwards on the center shaft to remove the piston assembly from the fork.

Fig.3 ▼



6. Turn the fork upside-down. The spring assembly will drop out of the steerer tube.

7. With the fork still inverted, push the bottom plug up into the steerer tube to expose the circlip. Pry the circlip out of the groove in the fork crown. Discard the circlip.

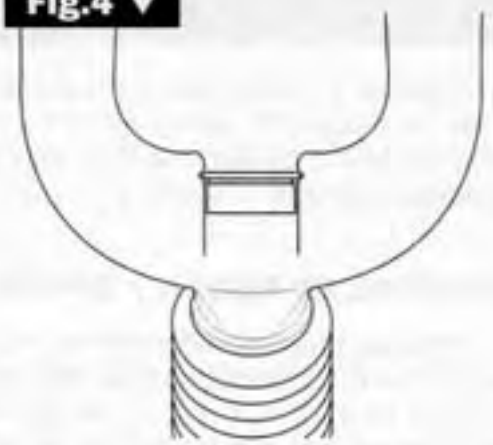
8. Turn fork right side up. Insert a 3/4" dowel from the top of the fork, and tap bottom plug out through fork crown (Fig.3).

INSTALLATION OF PISTON / SPRING ASSEMBLY

1. Insert the bottom plug into the steerer tube through the fork crown, with its reduced end oriented toward the fork blades. Push the plug into the steerer tube 1 inch to allow access to the groove around the inside of the fork crown.

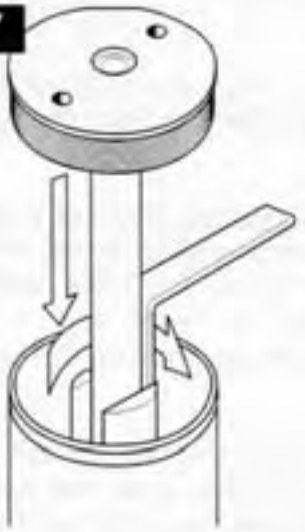
2. Install a new circlip in the groove in the fork crown. The circlip should fit tightly in the groove. Push down on the bottom plug from the top with the dowel to engage the circlip. When properly installed, the bottom plug should completely cover the circlip (Fig.4).

Fig.4 ▼



3. Turn the fork right side up. Apply a coating of grease to the MCU element, and insert into the coil spring. Apply a coating of grease to the outside of the coil spring.

Fig.5 ▼

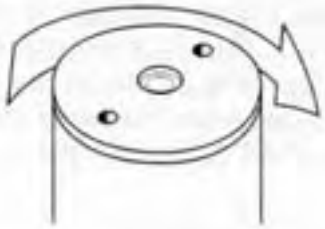


4. Insert the preload piston into the piston shaft. Install one MCU bumper onto the piston shaft and slide all the way down the shaft as far as it will go. Apply a coating of grease to the nylon wear ring, and insert the piston shaft assembly into the inner steerer tube, working the wear ring past the threads around the inside of the steerer tube.

5. Install a new #015 O-ring around the upper cartridge nut, just above the threads. Apply a drop of Loctite #242 (blue) to the threads on the nut, and slip the nut onto the piston shaft.

To thread the upper cartridge nut cap into the inner steer tube, it will first be necessary to compress the spring slightly. To do so, thread the outer cap onto the piston shaft hand-tight. Insert a HeadShok pin wrench (part #101103) into the steerer tube so that the pins of the tool engage the pin holes in the upper cartridge nut. With the fork's dropouts contacting the floor, lean on the outer cap to compress the spring while turning the pin wrench clockwise (Fig.5). Be very careful not to cross-thread the inner cap in the steerer tube. When the inner cap is tight in the steerer tube, remove the outer cap from the piston shaft.

Fig.6 ▼



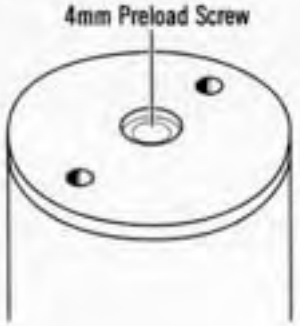
6. Slip the remaining MCU bumper onto the piston shaft. Slip the plastic spacer onto the piston shaft and slide down far enough to expose the wrench flats on the piston shaft.

7. Apply a drop of Loctite #242 (blue) to threads on upper end of piston shaft. Hold piston shaft with a 10mm open-end wrench while tightening outer cap onto shaft with a pin-spanner wrench.

8. Apply grease or anti-seize compound to the threads of the outer cap. Tighten the outer cap into the steerer tube with a pin-spanner wrench (Park SPA-1, green) (Fig.6).

9. Give the fork a quick, firm compression to seat the bottom-out bumper, then proceed with spring preload adjustment. Make sure to install the plastic mud cap before the bike is ridden.

Fig.7 ▼



PRELOAD ADJUSTMENT

Beyond changing the spring kit in the MC60 suspension fork, the preload of the fork can be fine-tuned to suit the rider's style.

1. Remove plastic mud cap from top of the fork. This will allow access to a 4mm Allen screw, recessed into the top of the fork.

2. Insert a 4mm Allen wrench into the hole in the top of the fork (Fig.7). Turn the preload adjustment screw clockwise for greater preload (and a stiffer suspension) or counter-clockwise for less preload (and a softer suspension). Proper preload is achieved when the suspension compresses approximately 1/8" when the rider sits on the saddle in a normal riding position. Note: This procedure is to be used as a guideline only. We encourage riders to experiment with preload adjustment. Some prefer a stiffer suspension, some a softer, more compliant suspension.

3. When the desired preload is set, replace the mud cap. ***Very Important: Never ride without the mud cap in place!***

NOTE: This procedure is to be used as a guideline only. We encourage riders to experiment with preload adjustment. Some prefer a stiffer suspension, some a softer, more compliant suspension.

The spring in the HeadShok MC60 is not sensitive to changes in temperature. There should be no need to change spring settings in cold weather conditions.

SPRING RATE SELECTION

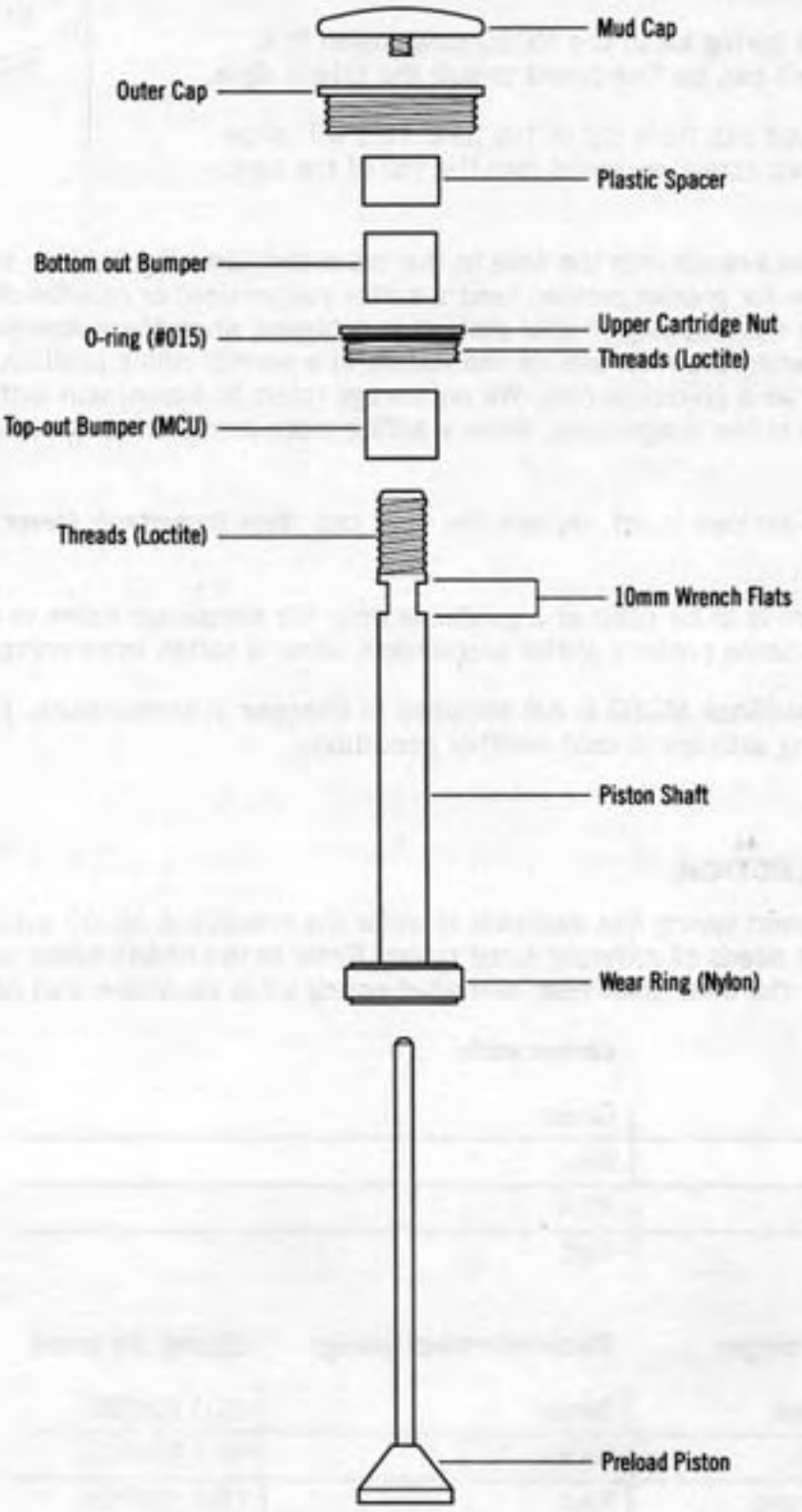
There are three different spring kits available to allow the HeadShok MC60 suspension fork to be customized to fit the needs of different sized riders. Refer to the charts below to determine which spring kit came with the bike when new, and what spring kit is recommended per rider's weight.

Bike size:	*comes with:*
Small	Green
Medium	Blue
Large	Blue
Extra Large	Red

Rider weight range:	*Recommended spring:*	*Spring Kit code:*
150 lbs. or less	Green	HD110/GRE
140 - 200 lbs.	Blue	HD110/BLU
180 lbs. or more.	Red	HD110/RED

MC60 Piston Assembly

Exploded View



1995-96 Silk Road

The HeadShok SR was originally spec'd on the 1995 & 1996 "Silk Road" bicycles. The HeadShok SR suspension fork was designed specifically for use on road bikes, and it allows 15mm of front wheel travel.

WARNINGS

The HeadShok SR suspension fork was designed to be ridden on paved surfaces only. This fork was not designed for off-road or cyclocross use. Use of the HeadShok SR suspension fork off-road or in otherwise abnormal, excessive or improper conditions places the rider in danger of physical injury or death.

The HeadShok SR fork must only be ridden with a front caliper brake installed in the fork crown. Riding the fork without a front brake caliper installed in the fork crown will place the rider in danger of physical injury or death.

REMOVAL OF PISTON / SPRING ASSEMBLY

1. Turn the preload adjustment knob counter-clockwise until it stops.

2. Loosen 6mm stem clamp bolt. Remove preload adjustment knob from top of fork.

3. Use pin-spanner wrench (Park SPA-1, green) to unthread outer cap of fork.

4. Compress fork from underneath, exposing piston shaft and upper spring seat.

5. While holding the outer cap with a pin-spanner wrench, turn the locknut just below the outer cap with a 16mm cone wrench. Once the locknut is loosened, the outer cap may be removed from the piston shaft.

6. While holding the upper spring seat with a pin-spanner wrench, loosen the spring seat locknut (c-cl) with a 16mm cone wrench. Remove the locknut and the upper spring seat from the piston shaft. Pull the coil spring out of the steerer tube.

7. Insert a HeadShok pin wrench (part #101103) into the steerer tube so that the two pins of the wrench engage two of the slots in the upper cartridge nut. Unthread the nut (c-cl) from the inner steerer tube. Pull up on the piston shaft to remove it from the steerer tube.

8. Turn the fork upside down, allowing the MCU spring to drop out of the steerer tube. It is not necessary to remove the bottom plug from the fork.

PRELOAD ADJUSTMENT DIAL

The 1995-96 HeadShok Silk Road fork was equipped with a spring preload adjustment dial, which allows the rider to change the stiffness of the front suspension while riding the bike. This dial is intended to be used as a fine-tuning adjustment only. To be properly set up for the rider, the following preload adjustment procedure must first be performed.

SPRING PRELOAD ADJUSTMENT

1. Turn the preload adjustment knob counter-clockwise until it stops. Remove preload adjustment knob from top of fork.

2. Loosen 6mm stem binder bolt.

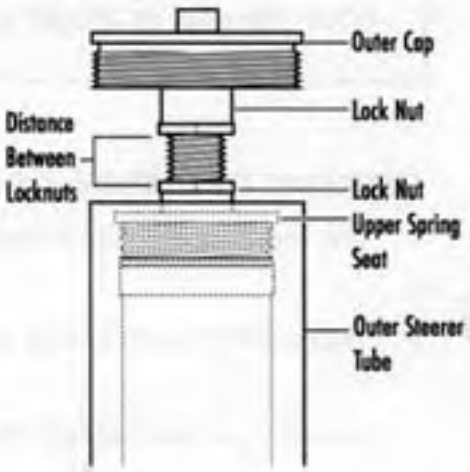
3. Use pin-spanner wrench (Park SPA-1, green) to unthread outer cap of fork.

4. Compress fork from beneath, exposing piston shaft and upper spring seat.

5. Hold the upper spring seat in place with a pin-spanner wrench while turning the locknut counter-clockwise with a 16mm cone wrench.

6. Adjust the upper spring seat up or down according to the rider's weight using the guidelines in the graph below. Also see Figure 1.

Fig.1 ▼



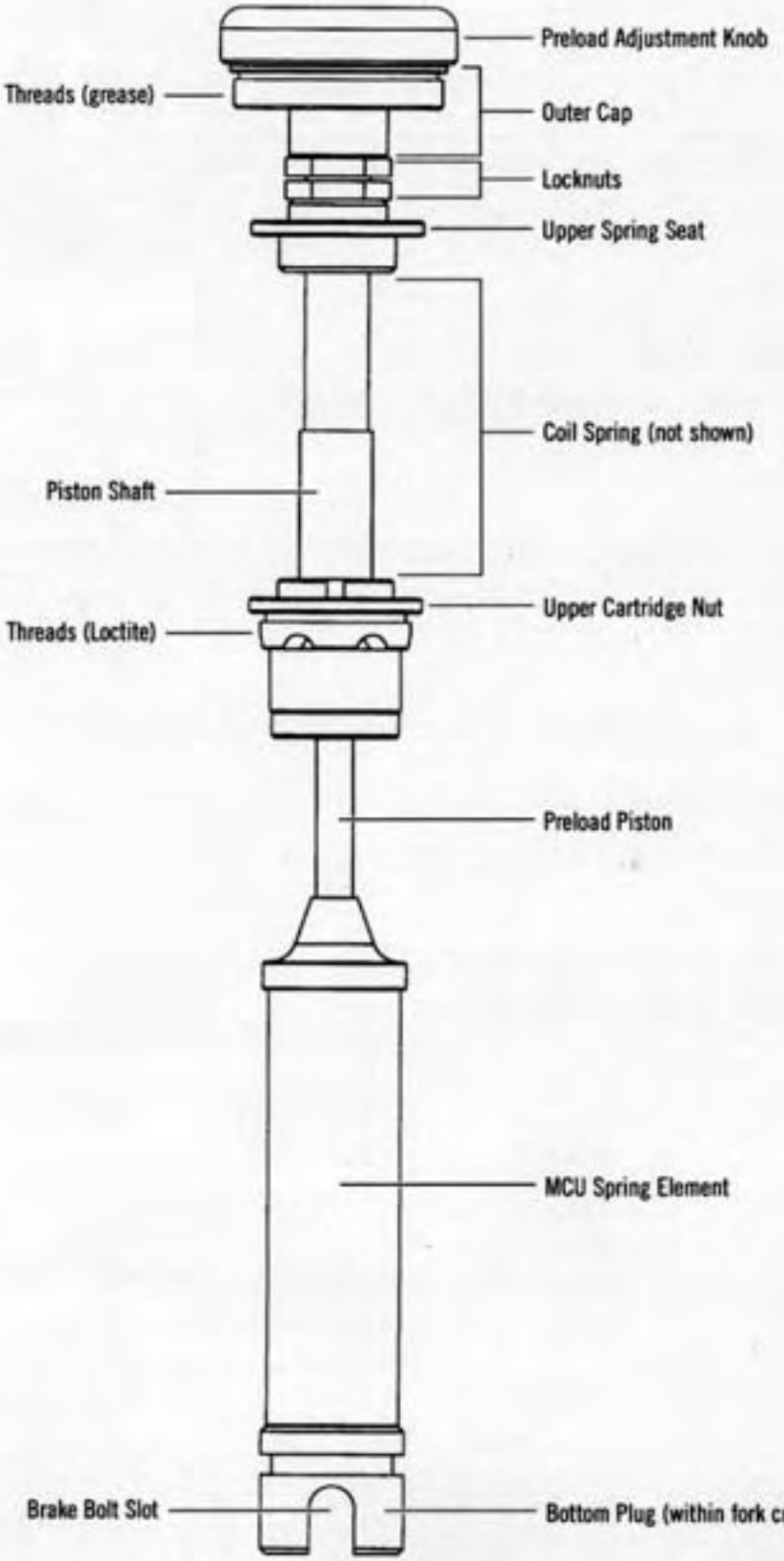
Rider's weight:	*Space between locknuts:*
Less than 150 lbs. (68 Kg)	3mm
150 to 180 lbs. (68-81 Kg)	6mm
Over 180 lbs. (81 Kg)	9mm

7. Tighten the locknut against the spring seat to retain the adjustment.

8. Apply some grease or anti-seize compound to the threads on the outer cap. Tighten the outer cap back into the outer steerer tube with a pin-spanner wrench. Install the preload adjustment knob, and tighten the stem clamp bolt.

NOTE: Internal parts for the original HeadShok SR suspension fork are no longer available. However, the complete DD15 internal assembly (hydraulic cartridge and coil spring) will retro-fit into the SR fork.

Headshok SR Piston/Spring



DD15

The HeadShok DD15 suspension fork was designed specifically for use on road bikes. It allows 15mm of front wheel travel through a combined coil/MCU spring element and a hydraulic damper cartridge with an on-the-fly lockout Damping Dial.

WARNINGS

The HeadShok DD15 suspension fork was designed to be ridden on paved surfaces only. This fork was not designed for off-road or cyclocross use. Use of the HeadShok DD15 suspension fork off-road or in otherwise abnormal, excessive or improper conditions places the rider in danger of physical injury or death.

The HeadShok DD15 fork must only be ridden with a front caliper brake installed in the fork crown. Riding the fork without a front brake caliper installed in the fork crown will place the rider in danger of physical injury or death.

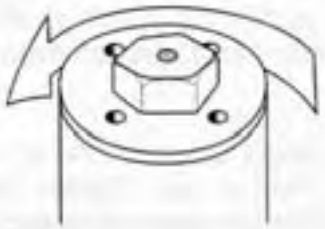
REMOVAL OF THE CARTRIDGE AND SPRING

1. Turn Damping Dial to the left, leaving the fork in it's "on" position. Remove screw from the center of the Damping Dial and remove the dial from the top of the fork. Back the 3mm preload screw out so that it is flush with the top of the fork.

2. Loosen stem binder bolt and remove stem from steerer tube. Hang the handlebar/stem assembly out of the way.

3. Using a pin-spanner wrench (Park SPA-1, green), unthread the outer cap of the fork (Fig.1).

Fig.1 ▼

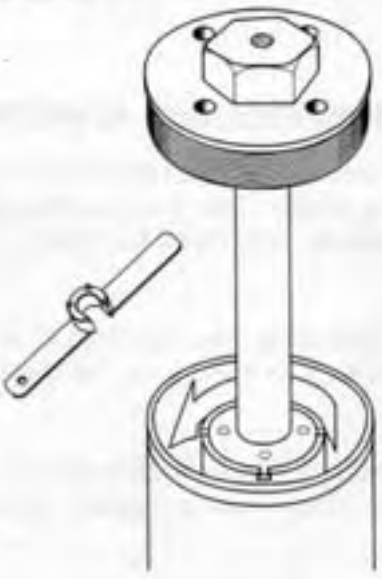


4. With the outer cap completely unthreaded, compress the fork from beneath. This will expose the outer cap and piston shaft of the oil damper cartridge.

5. Using a HeadShok Castle tool (part #104110), un-thread the oil damper cartridge from the inner steerer tube of the fork. When the cartridge is unthreaded from the steerer tube, remove it from the fork (Fig.2).

NOTE: To get the Castle tool to engage the cartridge, it may be necessary to turn the preload screw in (cl) several turns. Doing so will extend the outer cap away from the top of the damper cartridge slightly.

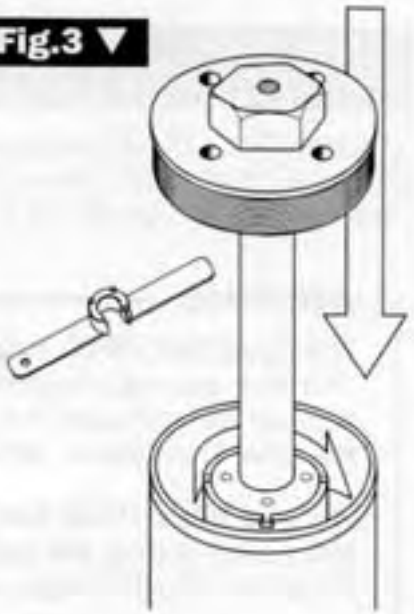
Fig.2 ▼



6. When cartridge is removed, turn fork upside-down. The coil spring and MCU element will drop out of the steerer tube. It is not necessary to remove bottom plug from the DD15 fork.

INSTALLATION OF THE CARTRIDGE AND SPRING

Fig.3 ▼



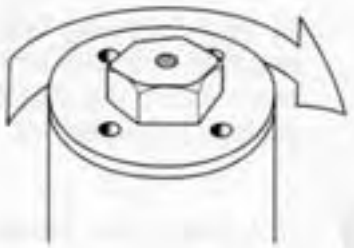
1. Swab out inside of steerer tube with clean cloth.

2. Insert the MCU into the coil spring. Coat spring and MCU with grease and drop into steerer tube.

3. Clean the threads on the outside of the cartridge and install a new #018 O-ring just above the cartridge threads. Apply a drop of Loctite #242 (blue) on cartridge threads. Clean the threads around the inside of the inner steerer tube. Make sure preload screw in cartridge is backed out all the way.

4. Insert cartridge into steerer tube. To tighten the cartridge into the steerer tube, the spring must be compressed slightly. To do so, turn the nut on top of the cartridge clockwise to lock the cartridge out. Push down on the top cap with one hand while tightening the cartridge into steerer tube with HeadShok Castle tool (part #104110) with other hand. When cartridge is tight, turn nut on top to the left (to open damping circuit again) (Fig.3).

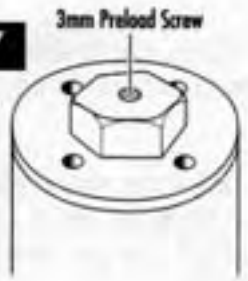
Fig.4 ▼



NOTE: After the cartridge is tightened into the steerer tube, it will be necessary to turn the 3mm spring preload screw (located within the piston shaft) clockwise several turns to allow the Castle tool to be removed.

5. Apply some grease or anti-seize compound to the threads on the top cap. Tighten the top cap into the outer steerer tube with a pin-spanner wrench. (Fig.4).

Fig.5 ▼



6. Install and tighten stem, then adjust spring preload to suit the rider and install Damping Dial.

SPRING PRELOAD ADJUSTMENT

The preload of the HeadShok DD15 may be adjusted to suit different size riders and different riding styles. The preload should be adjusted when the bike is new, and then readjusted for each individual who rides the bike.

1. Make sure the Damping Dial is in the "open" position by turning it to the left. Remove the small bolt in the center of the Damping Dial (Fig.5).

2. Insert a 3mm Allen wrench into the hole in the top of the fork. Turn the preload adjustment screw clockwise for greater preload or counter-clockwise for less preload.

3. When the desired preload is set, re-install the screw in the center of the Damping Dial.

We recommend setting the preload at a point where the fork compresses slightly (2 to 4mm) when the rider is seated on the bike in a normal, relaxed riding position.

NOTE: This procedure is to be used as a guideline only. We encourage riders to experiment with preload adjustment. Some prefer a stiffer suspension, some a softer, more compliant suspension.

OIL CHANGE / BLEEDING PROCEDURE

The DD15 cartridge comes from the factory with 5W oil installed. The oil may be changed to a different viscosity to change the damping characteristics of the fork. A heavier oil (as heavy as 10W) may be used, but the fork's ability to absorb large impacts will be reduced. Likewise, a lighter weight oil (as light as 2.5W) may be used to "quicken up" the suspension action. In all cases, only a high-quality suspension fork oil should be used.

NOTE: Do not use a "seal swelling" hydraulic oil in a HeadShok cartridge. Only use hydraulic oil that is approved for use in suspension systems with natural rubber seals.

1. Remove the oil damper cartridge from the fork.

2. Turn the nut on top of the cartridge to the left, leaving the fork in it's "on" position. Using a Phillips screwdriver, turn the bleed screw (located on the side of the cartridge) 1/2 turn counter-clockwise.

3. Hold the oil damper cartridge over a bucket or similar container. Unthread the lower cap from the cartridge body with a pin-spanner wrench (Park SPA-1, green) (Fig.6).

4. Pour the oil from the cartridge into the container. Stroke the piston up and down in the cartridge to pump out any oil that may be trapped above the piston.

5. Holding the cartridge upside down, pour in fresh hydraulic oil. Fill the cartridge all the way to the top (Fig.7).

6. Stroke the piston up and down very slowly to expel any trapped air. (You will see air bubbles rise to the top of the oil, and the oil level may drop.) Continue stroking until no air bubbles are seen.

7. Set the cartridge aside for a few minutes to allow air bubbles to rise to the top of the oil level. Pour more oil into the cartridge until it is again filled to the top. Repeat steps 6&7 if necessary.

Fig.6 ▼

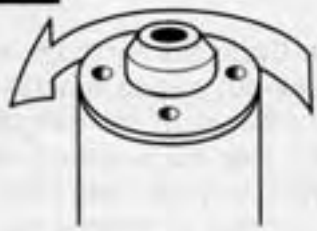


Fig.7 ▼

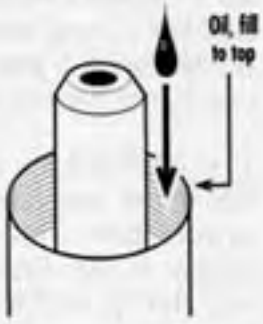


Fig.8 ▼

8. Begin to thread the lower cap back into the cartridge. When the o-ring seal on the lower cap contacts the lower end of the cartridge body, turn the bleed screw one full turn counter-clockwise. Finish tightening the lower cap into the cartridge body with a pin-spanner wrench. When the lower cap is fully threaded into the cartridge body, tighten the bleed screw fully, being careful not to damage the Phillips screw head (Fig.8).

Fig.9 ▼

9. Cycle the cartridge several times and check to make sure the lock-out switch functions correctly. If there is air in the system, the stroke of the cartridge will feel rough and irregular, and lock-out may not function. If this is the case, repeat oil change procedure, paying close attention to steps 6&7. It is not unusual for cartridge to make a bit of noise just after being rebuilt.

10. Replace the oil damper cartridge in the suspension fork.

SEAL REPLACEMENT

As a regular service to a DD15 cartridge, the seals in the lower cap and the O-ring seals on the piston and the upper cap should be replaced once a year. Replacement of the cup seals within the upper cap is not recommended as a regular service.

Fig.10 ▼

It is normal for a small amount of oil to "weep" past piston seals in the upper and lower caps. This will appear as a thin film of oil on the piston shaft. This does not indicate a faulty seal, or a defective cartridge. If significant oil leakage is noticed, if the fork loses its lock-out ability, or if the smoothness of the suspension deteriorates and the fork begins to feel rough or gritty during compression, then one or more of these seals may be damaged and in need of replacement.

1. Remove the oil damper cartridge from the fork.

2. Turn the nut on top of the cartridge to the left, leaving the fork in it's "on" position. Using a Phillips screwdriver, turn the bleed screw 1/2 turn counter-clockwise.

3. Hold the oil damper cartridge over a bucket or similar container. Unthread the lower cap from the cartridge body with a pin-spanner wrench (Park SPA-1, green).

4. Pour the oil from the cartridge into the container. Stroke the piston up and down in the cartridge to pump out any oil that may be trapped above the piston.

5. Unthread the upper cap from the cartridge body with a pin-spanner wrench. Slide the cartridge body off of the piston assembly.

6. Replace the two cup seals located inside the lower cap. Be sure to orient the new seals with their larger "flared" ends toward the middle of the cartridge. Also replace the O-ring seal on the piston and the O-ring seals on the upper and lower caps. Be very careful not to tear or puncture any the new seals. See Fig.10.

7. Apply a thin coating of hydraulic oil to the new seals. Slide the cartridge body over the piston assembly and tighten the upper cap with a pin-spanner wrench.

8. Go to step 5 of Oil Change / Bleeding Procedure to complete the assembly.

MOTO 120

REQUIRED SERVICE CHECKLIST

Before any HeadShok Moto 120 fork is ridden, the following items and adjustments should be checked.

- Lube air pistons
- Lube slider bushings
- Adjust Damping Dial
- Check minimum crown height
- Adjust spring preload pressure
- Adjust head tube angle
- Check all bolts for tightness
- Check entire fork for damage

WARNING: The Moto 120 fork is designed to be precisely adjusted for the intended rider's weight, size, and riding style. Failure to do so places the rider in danger of injury or death.

BASIC ADJUSTMENTS

DAMPING DIAL SETUP

1. Using a small flathead screwdriver, gently turn the tuning shaft clockwise until it stops. Do not force the tuning shaft! Only turn it until it is lightly seated. Tightening the shaft with excessive force will damage the valves within the cartridge.

2. Loosen the 3mm Allen screw located in the side of the Damping Dial. Install the dial on the tuning shaft, with the ball plunger set into the machined groove in the outer cap. Turn the dial all the way clockwise.

3. Press down firmly on the Damping Dial while tightening the 3mm Allen screw set into the side of the dial.

4. Pressurize both legs to 40 psi. Check the function of the suspension fork in each of the five positions of the Damping Dial. When the dial is turned all the way to the right (clockwise), the fork will be very stiff as it is compressed slowly. (The fork will still compress if it's pushed quickly.) When the dial is turned to the left, the damping should be very soft and compliant. Please note that the Moto cartridge is not designed to lock-out at any time.

CAUTION: Do not back the tuning shaft out more than one full turn from its clockwise limit. Oil loss will occur if the shaft is loosened too far.

PRELOAD (AIR PRESSURE) ADJUSTMENT

Since the HeadShok Moto employs dual air springs, the preload is adjusted by altering the air pressure in the fork legs. Generally, heavier riders require higher preload (more air pressure) than lighter riders or those preferring a softer ride.

Most riders use preload pressure of 35-50 psi (2.4-3.5 bar) in each fork leg. We recommend setting a preload pressure that allows the fork to compress (or "sag in") 1/4" to 3/8" when the rider sits on the bike in a normal, relaxed riding position.

Adjustment of the preload of the HeadShok Moto suspension fork requires a precise air pump with a schrader valve connector. A check valve may also be helpful in preventing air loss from the valve as the pump is being removed.

It is important that both fork legs have the same amount of air pressure. To set, fill the first leg to 5-10 psi over your desired setting. Then fill the second leg to the desired setting, and finally go back and re-set the first leg.

We encourage experimentation with different preload air pressures as each rider has a unique style and preferences.

WHEEL INSTALLATION

1. Begin by making sure the dropout pinch bolts are loose and the threads are clean and lubricated with grease. Apply a thin coating of grease to the threads on the end of the hub axle.

2. Place the wheel between the dropouts with the brake disc installed in the brake caliper.

3. Slide hub axle into fork through the non-brake side, through hub and into brake-side dropout.

4. Thread the axle into the brake-side dropout by hand. Tighten hand-tight, then tighten an additional 1/4 turn or so with an inward-turning pin spanner wrench (Park SPA-3, blue) to secure.

5. Tighten the disc brake-side dropout pinch bolt to 8-10 ft-lbs. Then, with 40 psi in the fork legs, compress the fork several times. Finish by tightening the remaining dropout pinch bolt to 8-10 ft-lbs. (This procedure ensures that the fork is in alignment when the dropouts are tightened.)

MOTO 120 FORK BLADE ASSEMBLY

LUBRICATION OF AIR PISTONS

To reduce seal stiction and to extend the lifespan and reliability of the air piston seals, we recommend lubrication of the seals when new and with every 20 hours of riding thereafter.

1. Release all air pressure from both fork legs.

2. Remove both Damper and Dummy cartridges from fork.

3. Drop enough oil down into the slider tubes to cover the air pistons.

4. Re-install the cartridges.

AIR PISTON SEAL REPLACEMENT

1. Release air pressure from both fork legs.

2. Remove cartridge (Damper or Dummy) from affected leg. Remove the front wheel.

3. Remove affected slider tube from stanchion tube.

4. To remove the air piston from the slider tube, attach a hand-operated pump to the schrader valve. Add air pressure slowly until the piston pops out of the slider tube. *CAUTION: The air piston can act as a projectile. Keep face and hands away from the top of the slider tube, and do not point slider at any person while pressurizing.*

5. Remove old O-ring seals from piston.

6. Pack the O-ring slots on the piston with grease. Install the new O-ring seals on the piston.

7. Apply some grease to the new O-ring seals. Also apply grease to the threads around the inside of the upper end of the slider tube.

8. Insert the piston into the slider tube, being careful not to damage the O-ring seals.

9. Insert the slider into the stanchion tube. Lube the slider bushings.

10. Install the cartridge and front wheel, and adjust the preload pressure.

LUBRICATION OF SLIDER BUSHINGS

To eliminate any stiction from the fork slider, and to maximize the lifespan of the bushings inside the stanchion tubes, these bushings should be lubricated when the fork is new, and at least every 20 hours of riding thereafter. A "wet" lube like Pedro's Synlube is recommended.

1. Using a pin-spanner wrench, unthread the outer caps from both fork legs. Compress the fork from beneath, allowing access to the cartridge shafts.

2. Drop approximately 2-3 tablespoons of oil down into each stanchion tube, (just enough to cover upper stanchion bushing).

NOTE: If too much oil is applied to the stanchion bushings, a reduction of travel may be felt, and the excess oil will come out through the stanchion tube seals as the fork is ridden.

3. Re-tighten the outer caps of the cartridges.

Oil will slowly work past the upper bushing and lubricate the lower bushing and stanchion seal.

MOTO 120 DAMPER CARTRIDGE

REMOVAL OF DAMPER CARTRIDGE, SEE FIGURES 2.& 3.

1. Release all air pressure from the fork by depressing the schrader valves located at the dropouts.

2. Loosen 3mm Allen set screw located in the side of the Damping Dial and remove dial from top of the cartridge.

3. Loosen the stanchion clamp bolt on the top crown nearest the damper cartridge. Using a pin-spanner wrench (Park SPA-1, green), loosen the outer cap of the cartridge (c-cl).

4. Compress the fork while depressing the schrader valves. The outer cap and piston shaft will extend above the top of the stanchion tube, allowing access to the four notches in the top of the oil damper cartridge. Using a Cannondale "Castle" tool (part #104110), turn the oil damper cartridge counterclockwise and remove it from the fork.

CAUTION: During this step, be very careful not to scratch or damage the piston shaft or the threads around the inside of the upper end of the stanchion tube with the Castle tool.

When loosening or tightening a HeadShok cartridge, only use a Cannondale "Castle" tool (part #104110). Do not attempt to tighten or loosen cartridge by the pin holes in the inner plastic cap.

Fig.2 ▼

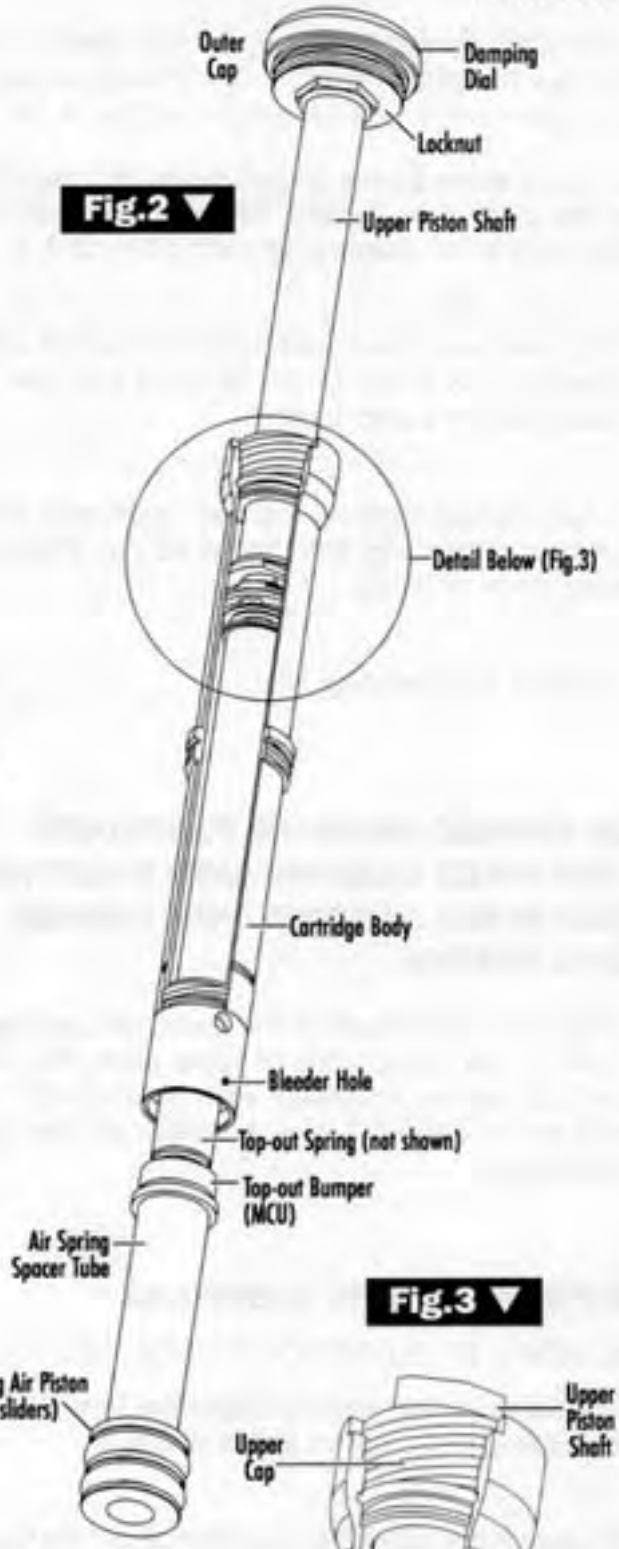
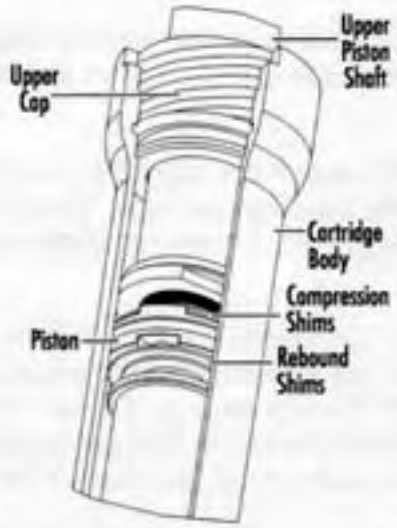


Fig.3 ▼



INSTALLATION OF DAMPER CARTRIDGE

1. Clean the threads on the cartridge and inside the upper end of the slider tube. Loosen the stanchion clamp bolt on the upper triple clamp next to where the cartridge is being installed.

2. Install a new #015 O-ring just above the threads on the outside of the cartridge, then apply some Loctite #242 (blue) to these threads. Insert the cartridge into the slider tube from the top. Tighten the cartridge into the slider tube with a Cannondale "Castle" tool (part #104110).

CAUTION: During this step, be very careful not to scratch or damage the piston shaft or the threads around the inside of the upper end of the stanchion tube with the Castle tool.

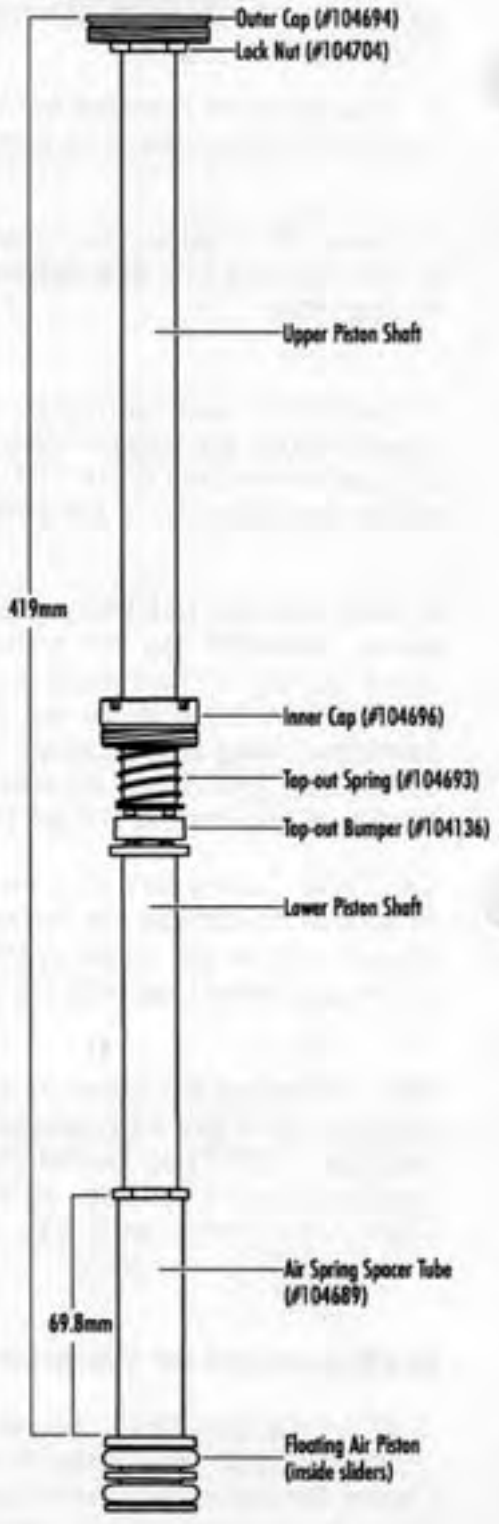
3. Apply some grease or anti-seize compound to the threads on the outer cap. Tighten the outer cap into the stanchion tube with a pin-spanner wrench (Park SPA-1, green).

4. Tighten stanchion clamp bolt on the top crown nearest the cartridge to 8 ft-lbs. Check to make sure the other stanchion clamp bolts are also tight.

5. Turn tuning shaft all the way clockwise, then back it out 1/4 turn. Pressurize the fork to 40 psi. Press down on the shock once or twice.

6. Install the Damping Dial.

Fig.4 ▼



OIL CHANGE/BLEEDING PROCEDURE
HIGH-SPEED DAMPING SHIM SELECTION
HIGH-SPEED DAMPING SHIM CHANGE
SEAL CHANGE

Aside from the length of the cartridge, and some minor differences in the dimensions of some parts, the Moto 120 damper cartridge shares its design with the Fatty 50 cartridge. Please refer to the Fatty 50 service section of this manual for these procedures.

MOTO 120 DUMMY CARTRIDGE

REMOVAL OF DUMMY CARTRIDGE, SEE FIG.4.

1. Release all air pressure from the fork by depressing the schrader valves located at the dropouts.

2. Loosen the stanchion clamp bolt on the top crown next to the Dummy cartridge. Using a pin-spanner wrench (Park SPA-1, green), loosen the outer cap of the Dummy cartridge (c-cl).

3. Compress the fork. Pull the outer cap upwards so that the piston shaft extends above the top of the stanchion tube. Insert a Cannondale "Dummy" tool (part #104823) so that the four teeth of the tool engage the four slots in the inner cap.Attach a pin-spanner wrench with inward-turning ends (Park SPA-3,blue) to the Dummy tool and unthread the inner cap (c-cl). When the inner cap is unthreaded, pull up on the outer cap to remove the Dummy cartridge from the fork.

CAUTION: During this step, be very careful not to scratch or damage the threads around the inside of the upper end of the stanchion tube with the Dummy tool.

INSTALLATION OF DUMMY CARTRIDGE

1. Clean the threads of Dummy cartridge inner cap and around inside of the top of the slider tube.

2. Slide the Dummy cartridge assembly into the slider tube. Push down on the outer cap of the cartridge while depressing the schrader valve. (This will allow the air piston to go all the way to the bottom of the slider tube.)

3. Apply some Loctite #242 (blue) to the threads of the inner cap. Thread the inner cap into the upper end of the slider tube with a Cannondale "Dummy" tool (part #104823) Be very careful, as it is easy to cross thread the inner cap.

4. Apply some grease or anti-seize compound to the threads of the outer cap. Thread the outer cap into the stanchion tube and tighten with a pin-spanner wrench (Park SPA-1, green).

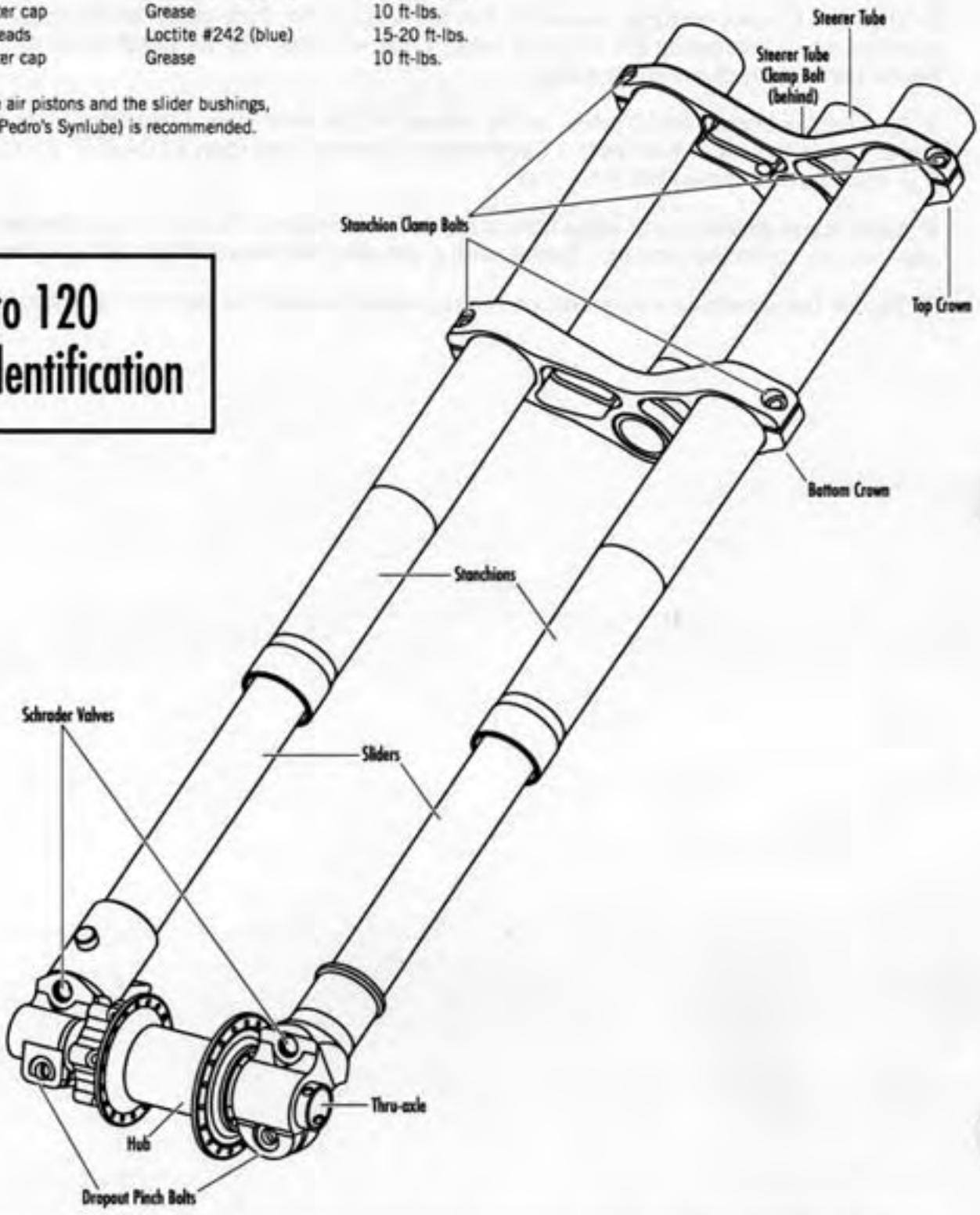
5. Tighten the stanchion clamp bolt on the top crown nearest the Dummy cartridge to 8 ft-lbs.

Torque specifications

Stanchion clamp bolts (4)	Grease	8 ft-lbs.
Steerer tube clamp bolt (1)	Grease	8 ft-lbs.
Dropout pinch bolts (2)	Grease	8-10 ft-lbs.
Hub axle	Grease	Snug + 1/4 turn
Schrader valves(threads)	Loctite #222 (purple)	5 ft-lbs.
	Note: Apply grease to O-rings	
Damper cartridge threads	Loctite #242 (blue)	15-20 ft-lbs.
Damper cartridge outer cap	Grease	10 ft-lbs.
Dummy cartridge threads	Loctite #242 (blue)	15-20 ft-lbs.
Dummy cartridge outer cap	Grease	10 ft-lbs.

For lubrication of the air pistons and the slider bushings, a wet lubricant (like Pedro's Synlube) is recommended.

Moto 120 Parts Identification



GENERAL FORK SERVICE

Removal / Installation of fork in bicycle

REMOVAL

1. Remove Damping Dial or mud cap from top of fork. Disconnect front brake cable from lever.

2. Remove stem from fork. Loosen headset cup pinch bolts (if so equipped.)

3. Place a piece of pipe over tuning shaft or damping nut on top of fork to protect it. A headset crown race installer or a large (13/16") socket works well.

4. While supporting fork from beneath, hit pipe with hammer. Fork will slide free of headtube.

5. Remove upper headset bearing from upper cup by tapping upwards on the bearing with a drift. The lower headset bearing will stay attached to the fork.

INSTALLATION

1. Place fork up into head tube with lower headset bearing aligned with lower headset cup. (Fig.1)

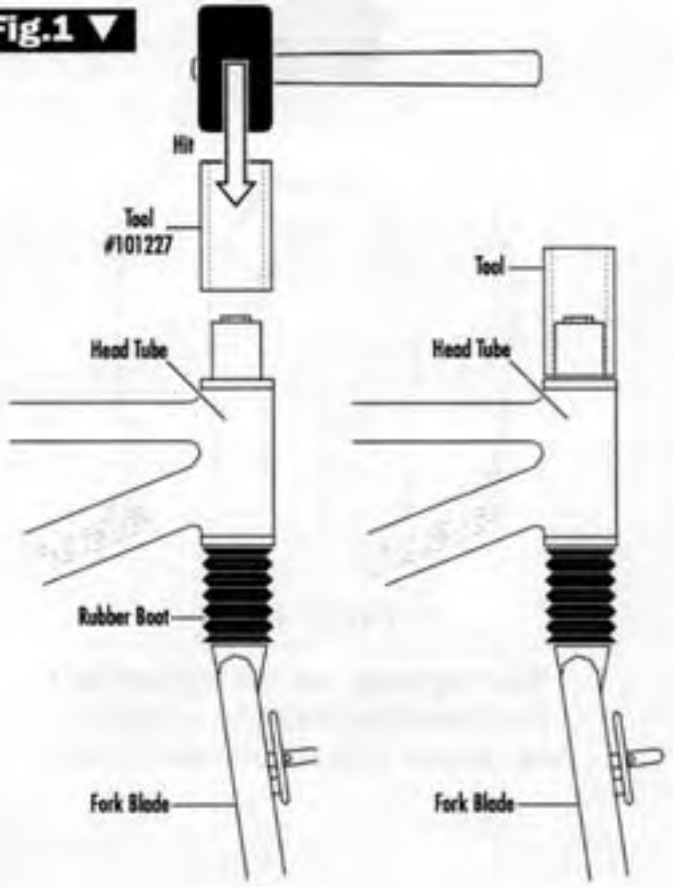
2. Slip upper headset bearing over top of fork steerer tube.

3. Place HeadShok fork installation tool (part #101227) over top of steerer tube so that it contacts upper headset bearing.

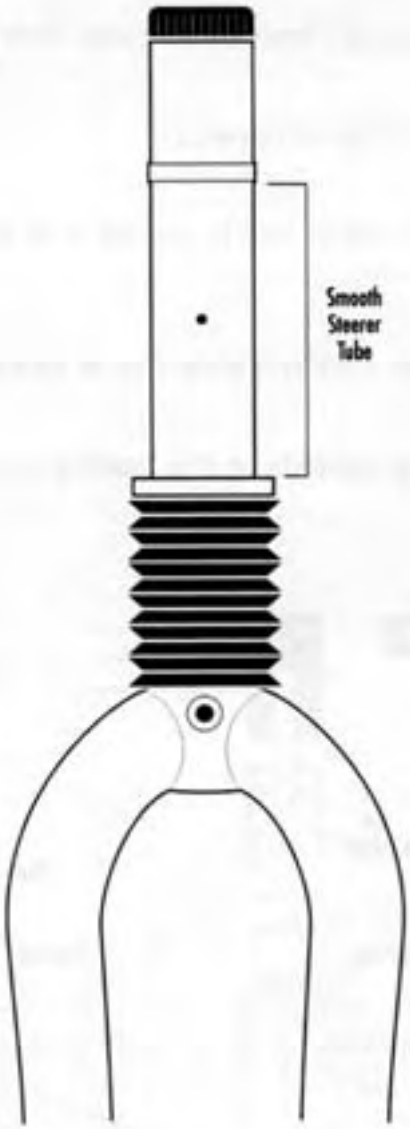
4. While firmly supporting the fork from underneath, hit the installation tool with a hammer. This will press the upper and lower bearings into their cups simultaneously.

5. When both upper and lower bearings are completely seated in their cups, tighten headset cup pinch bolts (if so equipped.) Install stem and Damping Dial or mud cap. Assemble and adjust front brakes.

Fig.1 ▼

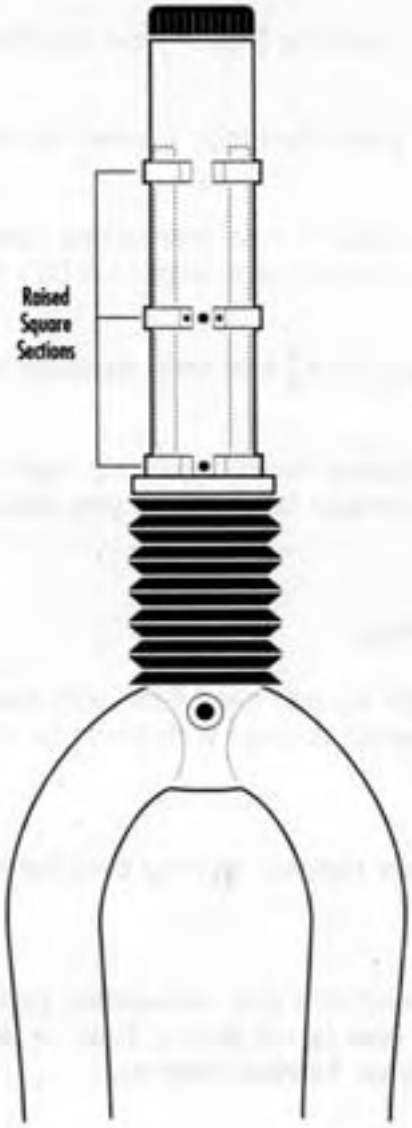


HEADSHOK TELESCOPING STEERER TUBES



LATER TYPE

Bearing races are not adjustable. Replacement parts are available. See Section 1 for rebuild instructions.



EARLY TYPE

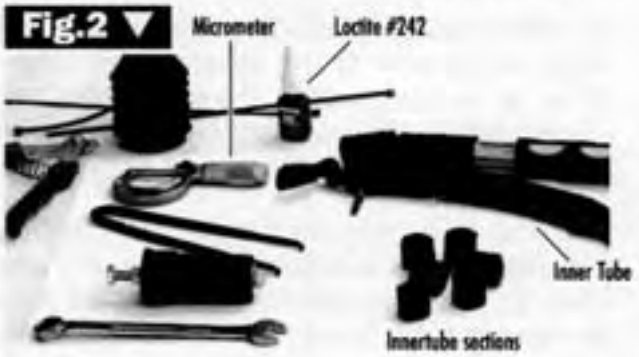
Bearing races are adjustable. Replacement races are no longer available. See section 2 for bearing race adjustment instructions.

PART 1: NEEDLE BEARING SERVICE

Later type, telescoping steerer tube

In addition to standard bicycle tools, one special tool is needed to properly service the HeadShok needle bearing assembly. The HeadShok Outer Race Retainer tool is available from HeadShok. If this tool is not available, a substitute can be fashioned by cutting a section of inner tube, aprox. 14" long, with the valve intact. Tie the ends of the tube section off to make them air-tight. Cut several 1" sections from the remainder of the inner tube. (Fig.2)

Fig.2 ▼



DISASSEMBLY

1. Remove fork from bicycle.

2. Remove cartridge and spring from steerer tube.

3. Mark front of outer steerer tube for future reference.

4. Clip both zip-ties on boot. Remove boot by stretching over top of steerer tube.

5. Insert outer race retainer tool into outer steerer tube. Expand tool. (Fig.3)

Fig.3 ▼

6. Unthread lower collar from outer steerer tube with a pin-spanner wrench (Park SPA-1, green). (Fig.4)

Fig.4 ▼

7. Cut several 1" sections of an inner tube (700 x 35c). (These will be used as retainers for the bearing races and needle bearing strips.) Stretch one of the inner tube strips over the inner steerer tube as shown. (Fig.5)

Fig.5 ▼

8. Slide outer steerer tube up until 6 needle bearings on each bearing strip protrude from outer steerer tube.

9. Stretch another tube section over the four strips of needle bearings to hold them tightly against inner steerer tube. (Fig.6)

Fig.6 ▼

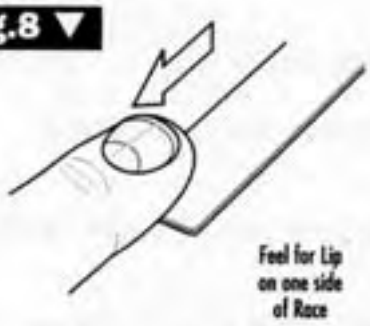
10. Make one final check to ensure that the inner tube races are secured to the inner steerer tube, the outer tube races are secured within the outer tube, and the needle bearing strips are held to the inner tube. Then slide the outer steerer tube off the end of the inner steerer tube.

Now, the races may be removed for cleaning, inspection, and possible replacement. Remove only one race at a time, clean it, and then replace it. It may be helpful to number the steerer tube faces and the corresponding races as shown. This will make sure that the fork is reassembled with the races arranged correctly. (Fig.7)

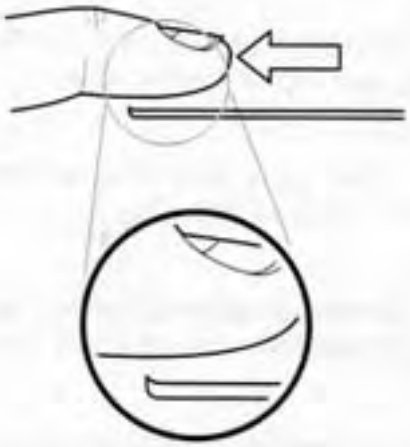
Fig.7 ▼

It is very important that the races be reassembled exactly as they were originally assembled!

Fig.8 ▼



Before placing bearing races onto the inner or outer steerer tube, inspect the end of the races carefully. The ends of the races have a small lip on one side (Fig.8). Make note of the orientation of this lip. On the upper end of the inner tube, the lip should be faced into the steerer tube. On the lower end of the outer tube, the lip should be faced to the outside (toward the inside surface of the tube).



ASSEMBLY

1. Make sure inner races are flush with end of inner steerer tube, and that they are tightly secured against steerer tube.

2. Outer races should be flush with the lower end of the outer steerer tube, and secured with an outer race retainer tool.

3. Coat the needle bearing strips with grease. (See following note on approved grease.) Needle bearing strips should be held to the inner steerer tube so that 11 bearings are hanging off the end of the steerer tube and 11 bearings are on the steerer tube. (Fig.9)

Fig.9 ▼

4. Slide the outer steerer tube onto the inner steerer tube very carefully. Make sure that the needle bearing strips align with the outer races correctly, and that all four needle bearing strips stay in alignment at the same relative position on the steerer tube. Also make sure the marked "front" face of the outer steerer tube aligns with the front of the fork blades. (Fig.10)

5. Slide the outer steerer tube down until all four bearing strips enter the outer steerer tube. All four strips should enter the outer tube at the same point. (Fig.11)

6. Apply a drop of Loctite #242 (blue) to the threads on the outer steerer tube and tighten the lower collar on with a pin-spanner wrench. (Fig.12)

7. Check to make sure the fork is able to travel its full range, and that the needle bearings do not come above the end of the inner steerer tube when the fork is fully extended. (Fig.13)

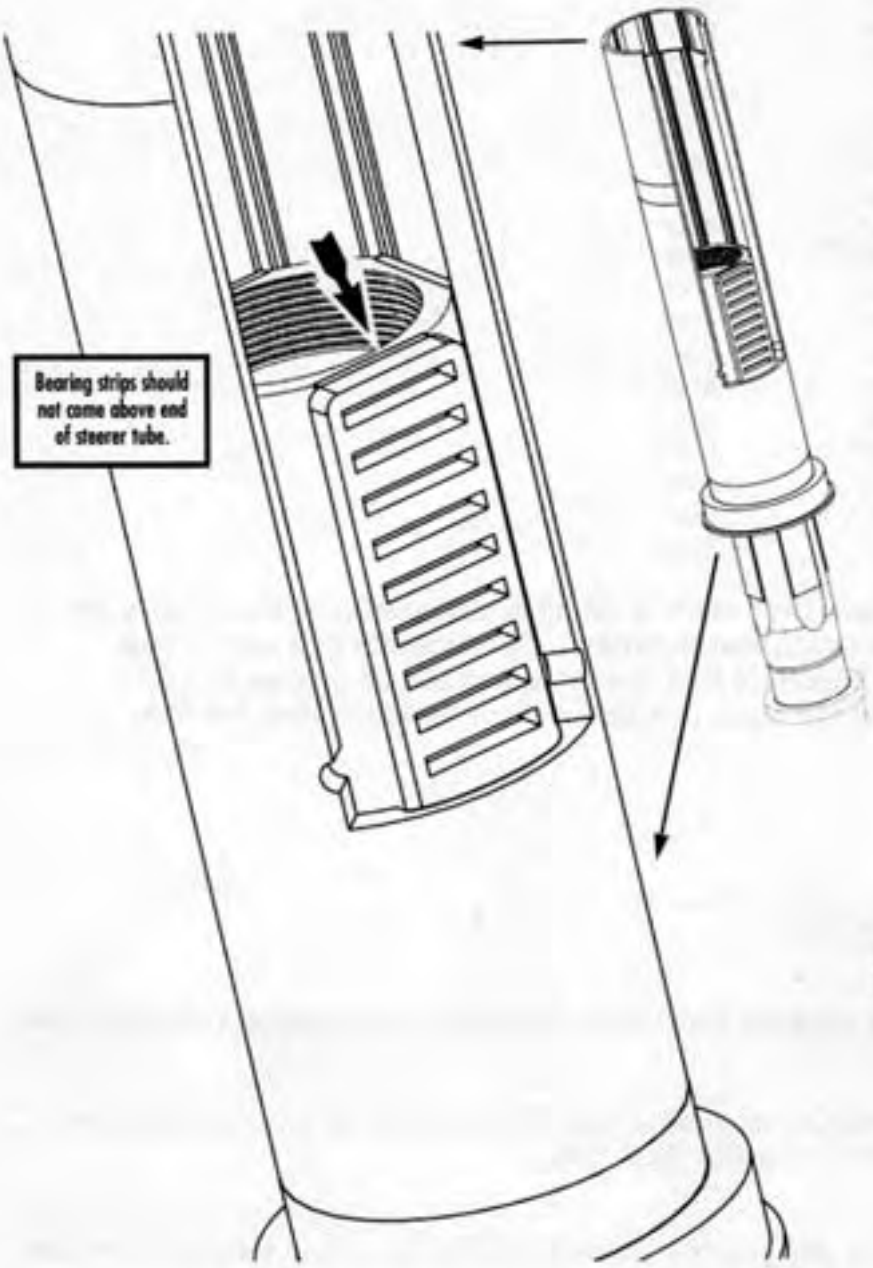
8. Install fork boot. The cartridge may now be installed and the fork installed in the frame.

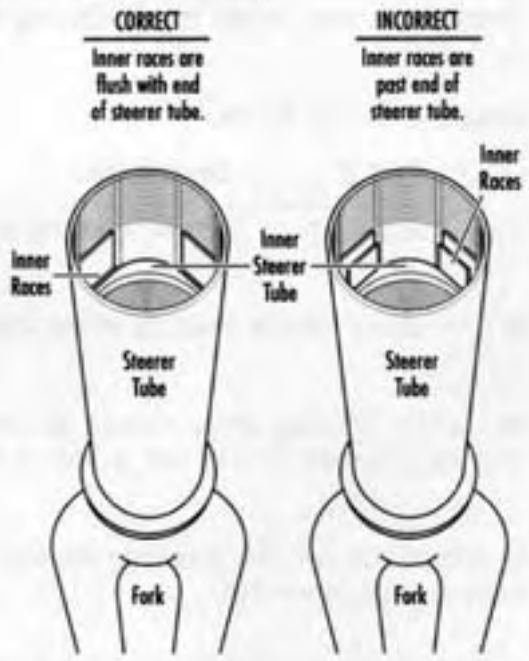
Fig.10 ▼

Fig.11 ▼

Fig.12 ▼

Fig.13 ▼





REPLACING BEARING RACES

Outer races:

Part #	Length	Thickness
105814	7.125"	.040"

Outer tube races are always the same length and thickness.

Inner races:

Part #	Length	Thickness	Width
105815	5.25"	.018"	.500"
105816	5.25"	.019"	.500"
105817	5.25"	.020"	.500"
105818	5.25"	.021"	.500"
105819	5.25"	.022"	.500"
105820	5.25"	.023"	.500"
105821	5.25"	.024"	.500"
105822	5.25"	.025"	.500"
105823	5.25"	.026"	.500"
105824	5.25"	.027"	.500"
105825	5.062"	.018"	.500"
105826	5.062"	.019"	.500"
105827	5.062"	.020"	.500"
105828	5.062"	.021"	.500"
105829	5.062"	.022"	.500"
105830	5.062"	.023"	.500"
105831	5.062"	.024"	.500"
105832	5.062"	.025"	.500"
105833	5.062"	.026"	.500"
105834	5.062"	.027"	.500"

Two different lengths of inner races have been used. A pitted or damaged race should only be replaced with a new race of the same length and thickness. The thickness of a race should be measured with a micrometer. It is important that this measurement be precise to .001". There is no way to tell the thickness of the races in a fork without disassembling the fork.

Needle Bearing Strips:

Part #	Description
105427	needle bearing strip (1)

■ The same needle bearing strips are used for any 50mm, 60mm or 70mm travel HeadShok fork.

■ Needle bearing strips should be replaced as a set of four. They should be coated with grease and then installed with the proper side facing the inner tube.

■ HeadShok needle bearings require a very specific lubricant. CODA Mountain HeadSlide™ lubricant is recommended.

PART 2: ADJUSTMENT OF NEEDLE BEARING ASSEMBLY WITH SET SCREWS

Adjustment of older type telescoping steerer tube

If an original Delta V (Type 1) HeadShok fork develops play in needle bearing assembly, it may be necessary to adjust the tension on the needle bearings. Aside from this adjustment procedure, this type of needle bearing assembly is not serviceable, and no replacement parts are available.

1. Release air pressure from fork.

2. Remove fork from bicycle.

3. Compress fork to bottom. Locate the six 1.5mm Allen set screws located in the fork's outer steerer tube. (Fig.14)

Three set screws adjust one of the two bearing races, and the other three set screws adjust the adjacent bearing race. Each set of three set screws is arranged vertically, with the top and bottom screws directly above and below each other, with the middle screw on the opposing side of the middle flat.

4. Back all six screws out until the heads are flush with the outer edges of the threaded holes.

5. Choose which bearing race is to be adjusted first. Tighten the middle set screw of this set until it bottoms out, then back it out until it is again flush with the outer edge of the threaded hole.

6. Alternate tightening the upper and lower set screws of this set 1/2 turn at a time until both set screws are bottomed out.

7. Tighten the middle set screw until it bottoms out.

8. Repeat steps 5-7 for the other set of bearing races (on the adjacent set of flats.)

9. Re-install fork in bicycle.

Fig.14 ▼

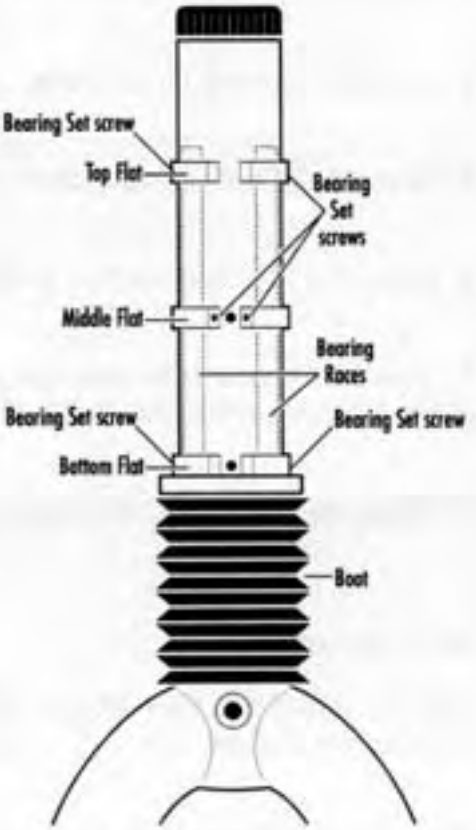
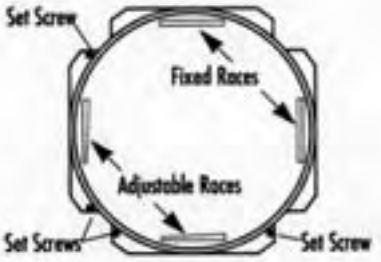
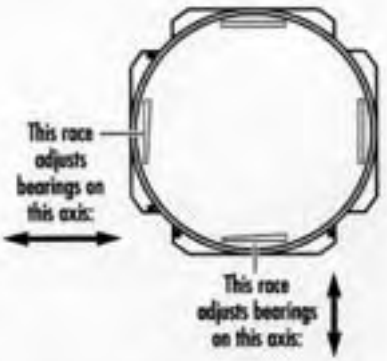


Fig.15 ▼



TOP VIEW



Boot replacement

1. Remove fork from bicycle.

2. Cut both zip-ties on old boot.

3. Remove old boot by stretching over top of steerer tube.

4. Clean the exposed section of steerer tube and apply a thin coating of grease to the flat faces.

5. Stretch the new boot over the top of the steerer tube. Install so that the upper and lower lips of the boot are mounted on the steerer tube collar and the fork crown.

6. Wrap zip-ties around the upper and lower ends of the boot, and pull tight.

Boot Compatibility

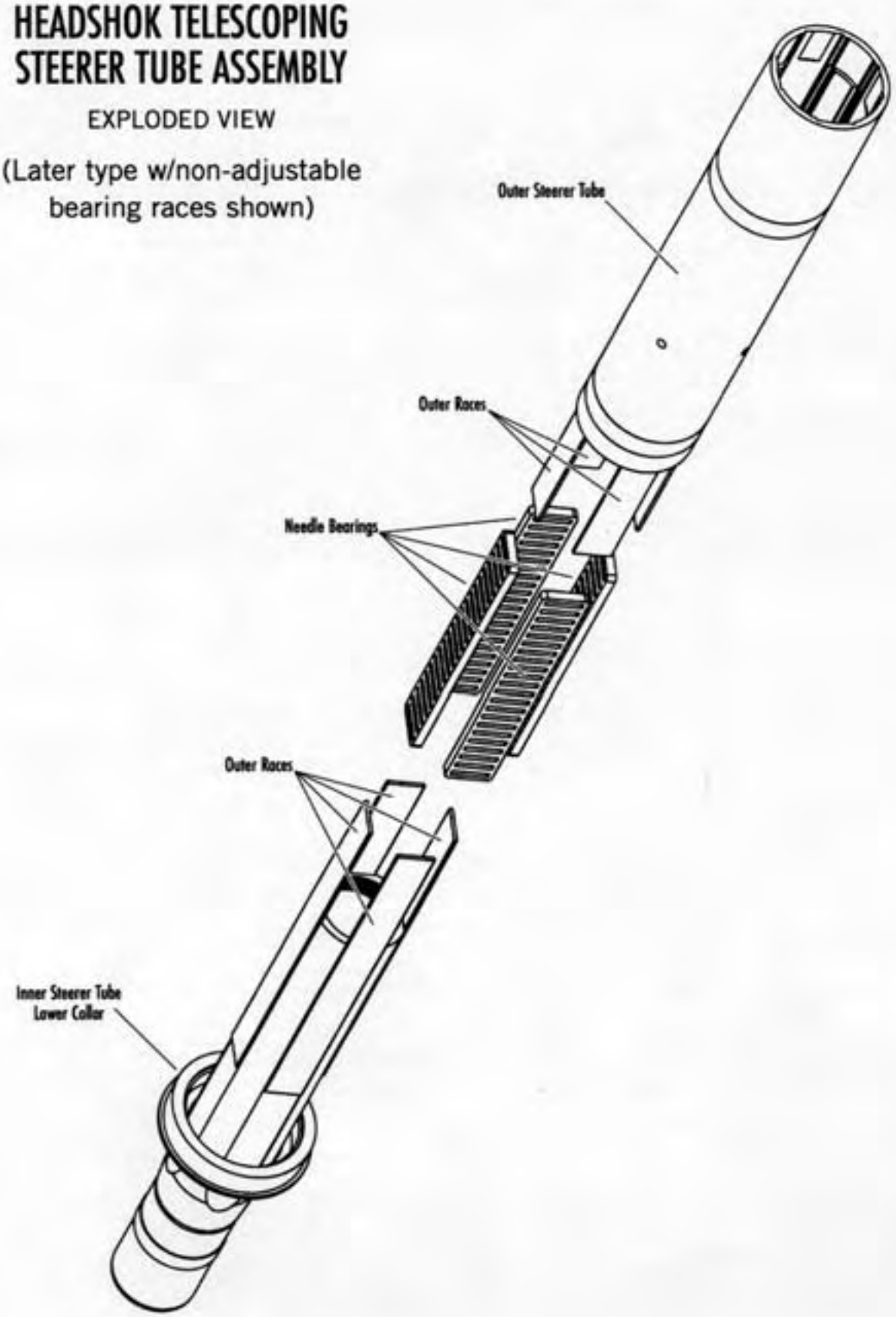
See the HeadShok Fork Identification section to determine which replacement boot is recommended for a given fork.

Note: All HeadShok forks from 1991 to 1995 came equipped with a 9 fold boot. Recommended replacement for this boot is a 6 fold boot.

HEADSHOK TELESCOPING STEERER TUBE ASSEMBLY

EXPLODED VIEW

(Later type w/non-adjustable bearing races shown)



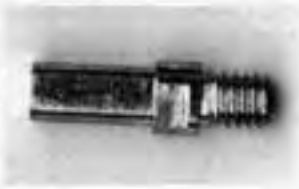
HEADSHOK™ KITS & SMALL PARTS

Code/Color	Part Description

BRAKE PARTS

Cantilever brake studs

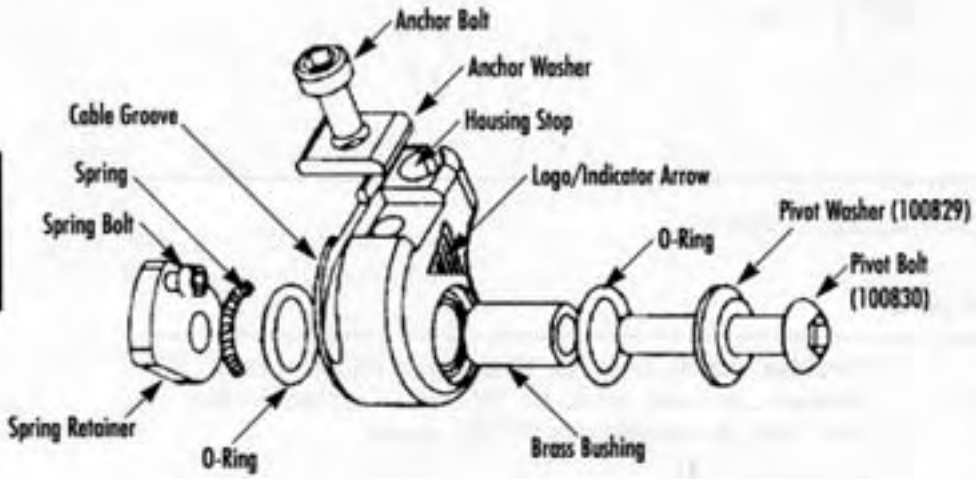
A412/	**Brake studs,** cantilever, bag of ten



Force 40 Plus brake cams

ACOMA/	**Force 40 Plus cams,** pair, w/straddle cables
100830	**Bolt,** Force 40 Plus mounting, M5 x .8 x 25mm
100829	**Washer,** Force 40 Plus mounting bolt

Brake Parts
Force 40 Plus cam (ACOMA/) assembly (exploded view)



"H-Pipe" & "Cobra" cablestops

Note: The "H-Pipe" fits on a round or triangular mounting stud. The "Cobra" fits only on a square mounting stud. These stops should only be installed on the proper type of welded-on mounting stud.

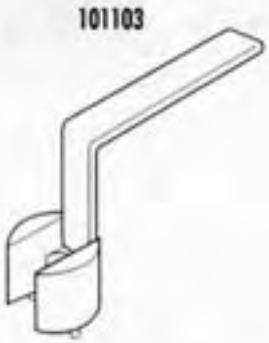
A380/EBO	**H-Pipe cable stops (pair),** w/hardware
105583	**Bolt,** M5 x .8 x 12mm
103983	**Washer,** knurled
A413/	**Cobra cablestop,** w/bolt
104851	**Bolt only,** M5 x .08 x 10mm

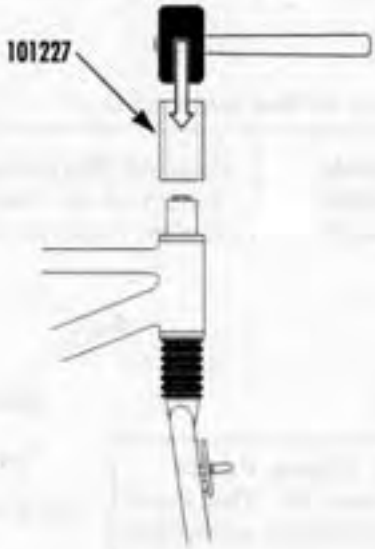
■ HEADSHOK PARTS

Code/Color	Part Description

Tools

101103	**Pin wrench,** HeadShok, for installation/removal of cartridges
104110	**Castle tool,** HeadShok, for installation/removal of cartridges
101227	**Headset upper bearing installation tool,** HeadShok
104823	**Dummy cartridge installation/removal tool,** HeadShok Moto™
101437	**Valve extension,** schrader
HD134/	**Bullet,** Fatty®70 seal installation
HD100/	**High pressure air pump**





Stems

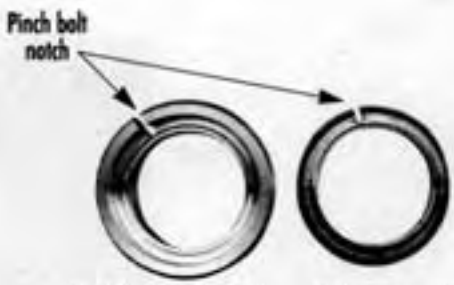
See CODA™ catalog or parts list

Headset parts

6052I	**Cartridge bearing,** large, for headset cup 6700G, below
6700G	**Headset cup,** lower, silver, for '92 Delta V suspension fork
1352P	**Pinch bolt,** for headset cup 6700G, above
6052H	**Cartridge bearing,** small Fits upper on '92 Delta V, upper and lower on all other Delta V and HeadShok™ suspension forks.
105180	**Headset cup,** black, upper or lower, fits bearing 6052H (above)
104999	**Headset cup,** silver, upper or lower, fits bearing 6052H (above)
	Note:These cups do not use pinch bolts.

Headset Cups
6700G (left), 6700F (right)

Note: 1992 Delta V bikes used a larger cartridge bearing and bearing cup on the lower end of the headset than the upper. For a 1992 bike, use one 6052I lower bearing and one 6052H upper bearing. On 1993 Delta V and Super V bikes, the lower headset bearing is not serviceable. The upper bearing for these bikes is a 6052H. All HeadShok bikes since 1994 use 6052H for upper and lower headset bearings, and both are serviceable.



6700G Headset cup for 1992 Delta V. Requires 1 pinch bolt (1352P)

Old upper cup (6700F). Replace with new press-in cup (105180 or 104999).

105180 or 104999
Note:This cup does not use a pinch bolt.

Code/Color	Part Description

"MC" CARTRIDGES

EDM-MC50 (1993 ½—1996)

An MCU-sprung HeadShok fork with 2" of travel. No hydraulic cartridge. Originally used MCU spring, but can be updated with Advanced Spring System kit (HD110/). The spring is preloaded by turning a 4mm set screw located beneath a plastic cap atop the stem.

HD123/ AELASTO/ 101136	Mud cap EDM/MC50 internal piston kit Circlip (fits in fork crown)

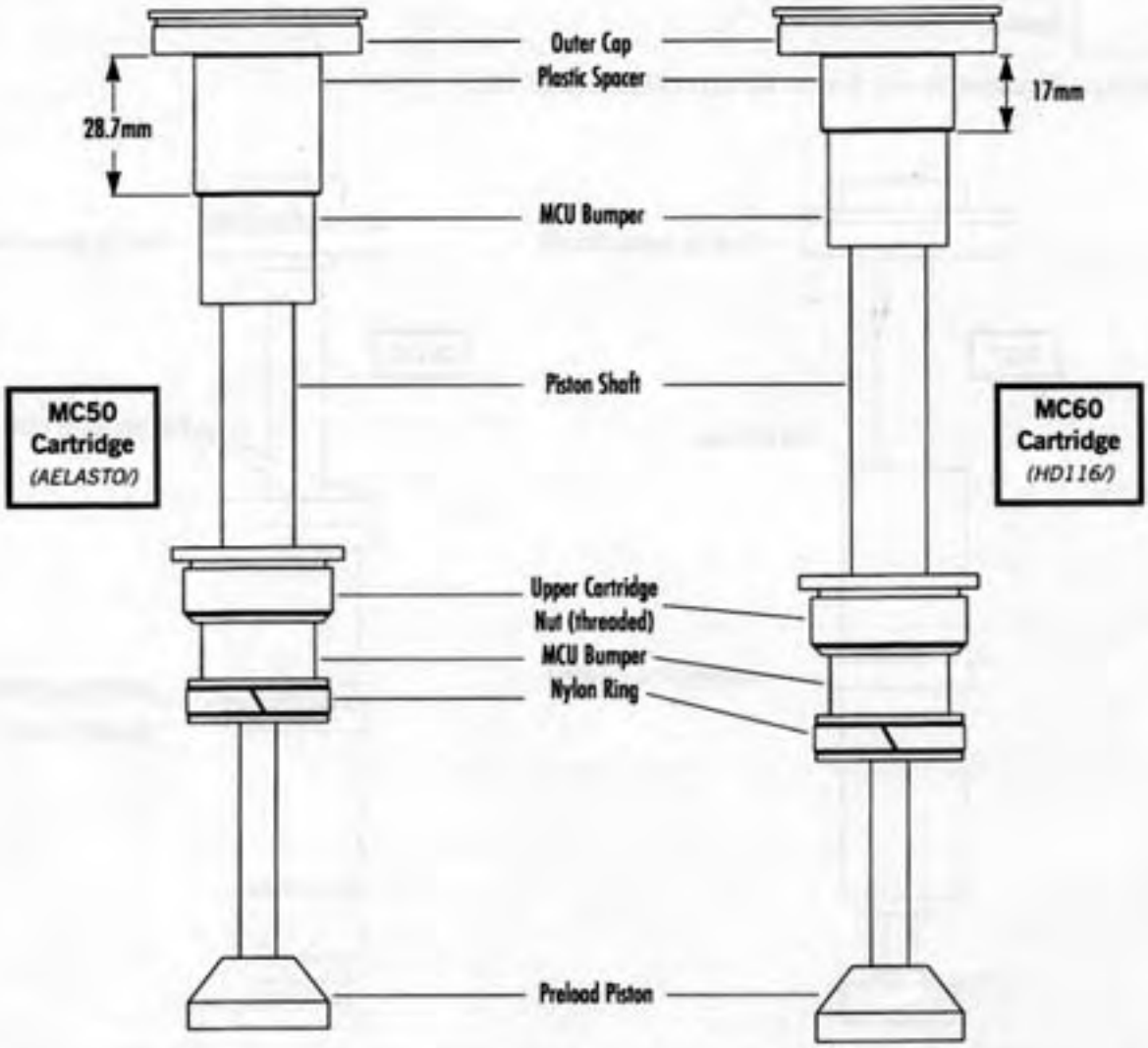
Spring kit: Use Advanced Spring System kit HD110/ (see page 10).

MC60 (1997)

The updated version of the MC50. Uses an Advanced Spring System kit (HD110/) for 60mm of travel.

HD123/ HD116/ 101136	Mud cap MC60 internal piston kit Circlip (fits in fork crown)

Spring kit: Use Advanced Spring System kit HD110/ (see page 10).



Code/Color	Part Description

HYDRAULIC CARTRIDGES

DD2 (1994)

HeadShok hydraulic cartridge with lockout. Originally used MCU spring, but can be updated with Advanced Spring System (HD110/) kit. The internal hydraulics of the DD2 cartridge were not serviceable. The DD2 cartridge can be replaced with a DD60 cartridge.

HD119/	**Damping Dial™** w/screw
103986	**Screw only**
HDUPDD60/	**DD60 cartridge upgrade kit** (Does not include spring kit. See page 10.)
101136	**Circlip** (fits in fork crown)

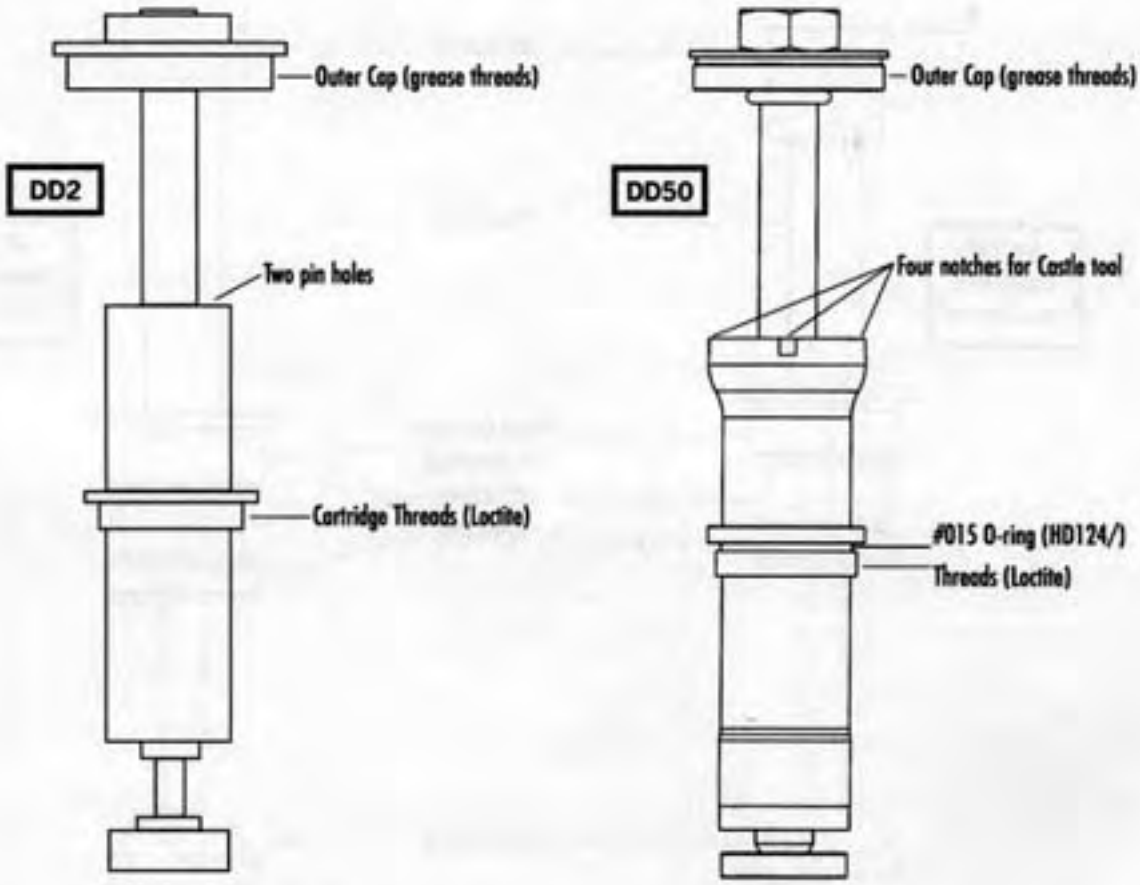
Spring kit: Use Advanced Spring System kit HD110/ (see page 10).

DD50 (1995-96)

An updated version of the DD2 cartridge, the DD50 is internally serviceable. Originally used MCU spring, but can be updated with Advanced Spring System (HD110/) kit. DD50 damper cartridge can be replaced with DD60 cartridge.

HD119/	**Damping Dial** w/screw
103986	**Screw only**
HDUPDD60/	**DD60 cartridge upgrade kit** (Does not include spring kit. See page 10.)
101136	**Circlip** (fits in fork crown)
HD115/	**DD50 seal kit**
104154	**Brad**

Spring kit: Use Advanced Spring System kit HD110/ (see page 10).



Code/Color	Part Description

DD60 (1997)

The latest HeadShok hydraulic cartridge for use with a Coil/MCU spring kit. The DD60 gets 60mm of travel and features a lockout switch (Damping Dial). The DD60 cartridge can be retro-fitted into most pre-1997 HeadShok forks. Uses Advanced Spring System kit (HD110/).

HD119/	**Damping Dial** w/screw
103986	**Screw only**
HD121/	**DD60** damper cartridge only (for replacements)
105314	**50mm adapter clip** Spacer allows DD60 cartridge to work in pre-'97 (50mm travel) HeadShok™ fork
101136	**Circlip** (fits in fork crown)
HD127/	**DD60 seal kit**
HD129/	**Bleed screw**

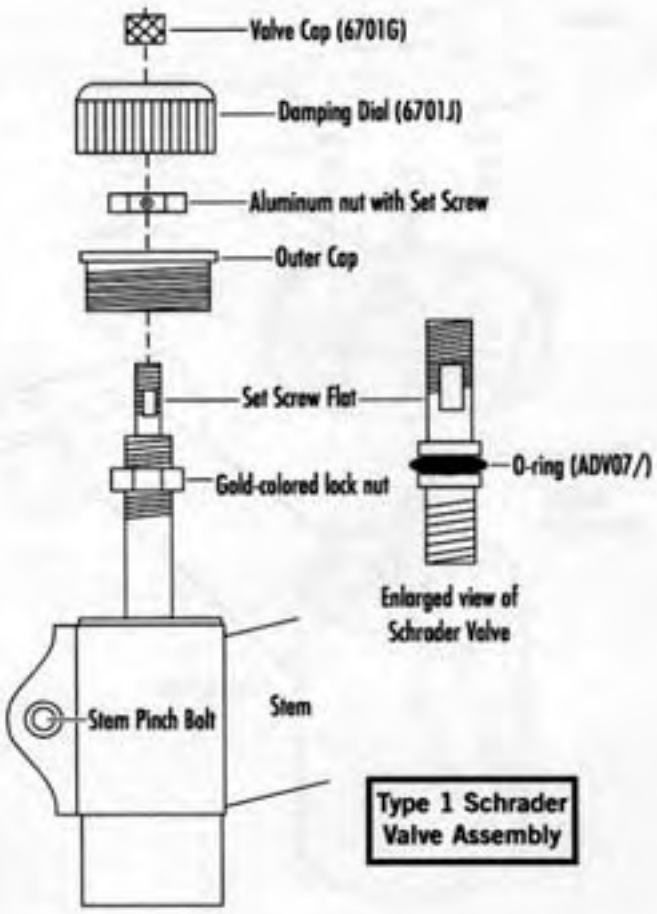
Spring kit: Use Advanced Spring System kit HD110/ (see page 10).

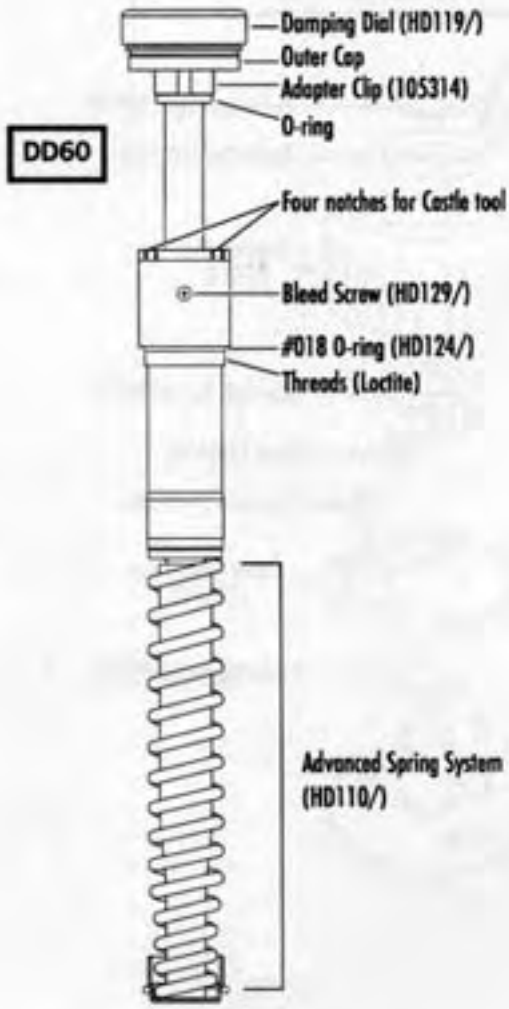
AIR/OIL CARTRIDGES

Type 1 fork (1992-93)

The original air/oil HeadShok (aka "Delta V") suspension fork with 50mm of travel. Air pressure is added through a schrader valve located atop the fork, in the center of the Damping Dial. The dial turns approx. 3 revolutions from open to full lockout.

6701J	**Damping Dial,** old style
6701G	**Aluminum valve cap**
ADV07/	**O-ring kit for schrader valve**





Code/Color	Part Description

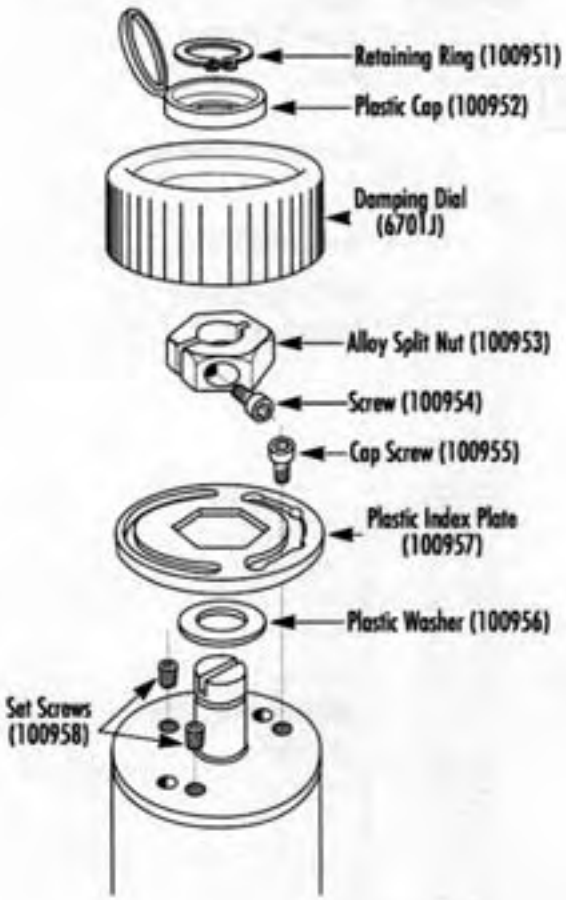
Marzocchi cartridge (1994-95)
A one-piece air/oil cartridge made for Cannondale® by Marzocchi. Air was added through a schrader valve located under the fork crown, and the cartridge had a tuning shaft protruding through the top cap, to which an indexed Damping Dial or RDC lever could be attached.

ARDC/	RDC kit
AIDD/	Damping Dial kit
105509	Valve cap
101136	Circlip (fits in fork crown)

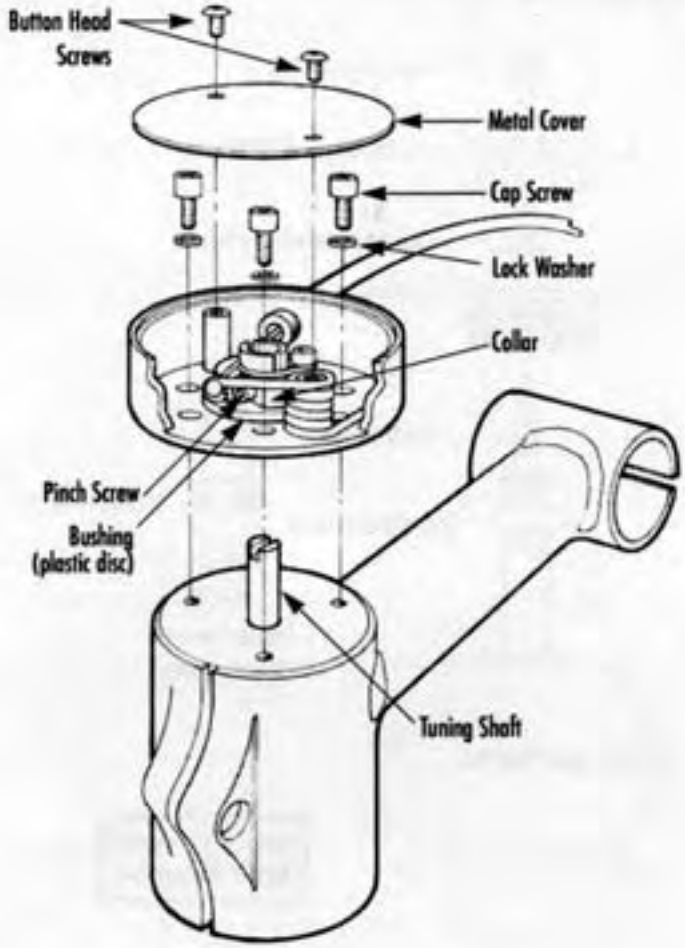
Recart (1995 ½)
A revised version of the Marzocchi cartridge. The Recart had several internal modifications, and the tuning shaft was eliminated. A flat disc was used to cover the top cap.

103797	Top cap cover
100955	Bolts for cover (3 req.)
105509	Valve cap
101136	Circlip (fits in fork crown)

Indexed Damping Dial kit (AIDD/)
(exploded view)



Remote Damping Control unit (ARDC/)
(exploded view)



Code/Color	Part Description

Fatty 50 (1996-97)

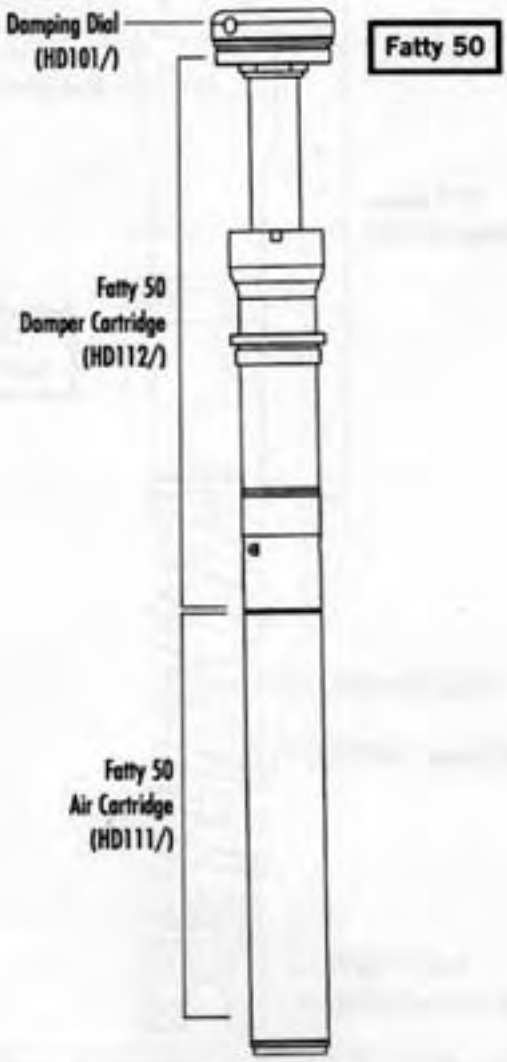
The first in the new generation of HeadShok hydraulics. The Fatty 50 (simply called "Fatty" in 1996), employs an air spring cartridge with a hydraulic damper cartridge. The performance characteristics of the damper cartridge can be altered by changing shims and/or oil weights within the cartridge, or by turning the five-position Damping Dial atop the stem.

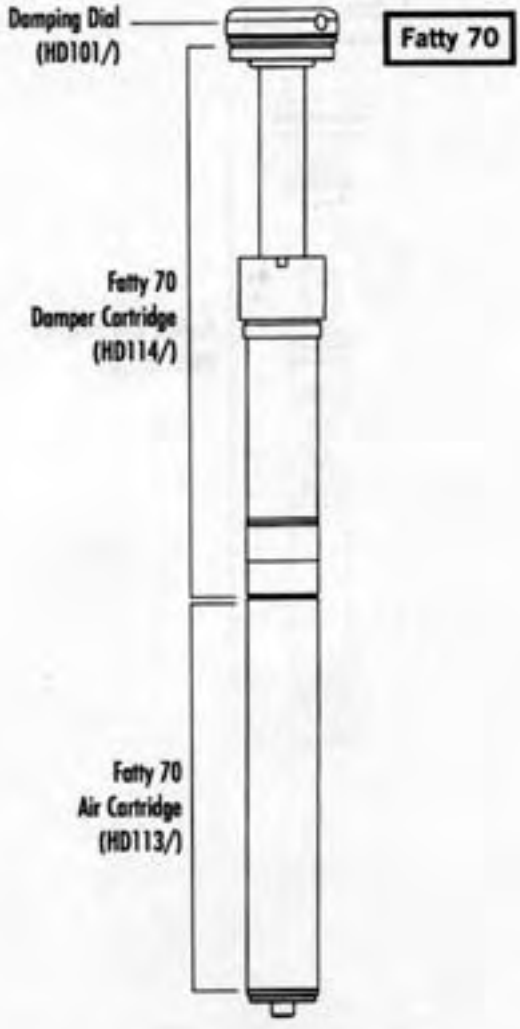
HDUPFAT50/	Fatty 50 cartridge upgrade kit
HD112/	Replacement Fatty 50 damper cartridge only
HD111/	Replacement Fatty 50 air spring cartridge only
HD101/	Fatty Damping Dial
HD103/	Fatty 50 seal kit
HD104/	Fatty/Moto shim kit
104154	Brad

Fatty 70 (1997)

A revised, 70mm travel version of the Fatty 50 cartridge.

HD114/	Replacement Fatty 70 damper cartridge only
HD113/	Replacement Fatty 70 air spring cartridge only
HD101/	Fatty Damping Dial
HD128/	Fatty 70 seal kit
HD104/	Fatty/Moto shim kit
HD129/	Bleed screw





Code/Color	Part Description

ROAD SUSPENSION FORKS (15mm travel)

Silk Road™ (1995 - 1996)

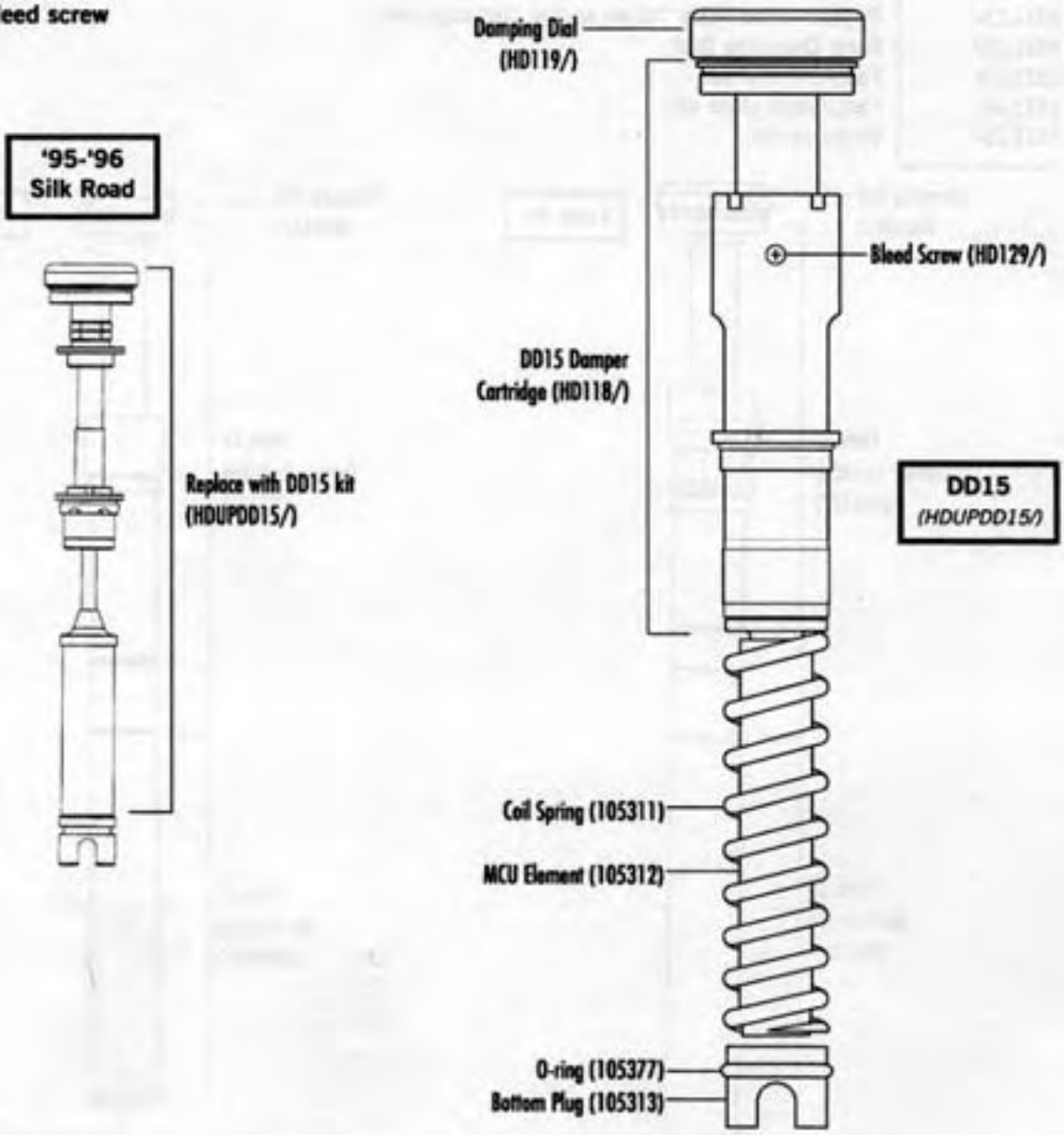
Early versions of the Silk Road fork used an MCU spring and had a dial atop the stem for preload adjustment only. The internal parts for this fork are no longer available, but they can be replaced with a new DD15 cartridge.

HDUPDD15/	Upgrade to DD15

DD15 (1997)

The DD15 is a 15mm travel cartridge for use in Silk Road racing bikes. It uses a coil spring and an MCU for spring, but these are different than the HD110/ spring kit.

HD119/	Damping Dial w/screw
103986	Screw only
HD118/	DD15 damper cartridge only (for replacments)
105311	DD15 coil spring only
105312	DD15 MCU spring only
HD127/	Seal kit
HD129/	Bleed screw



Code/Color	Part Description

HYBRID/COMMUTER FORKS (25mm travel)x

CMT (1994)

Small parts for this fork are no longer available. Replace unit with the following DD25 setup.

HD117/	DD25 cartridge kit w/Damping Dial

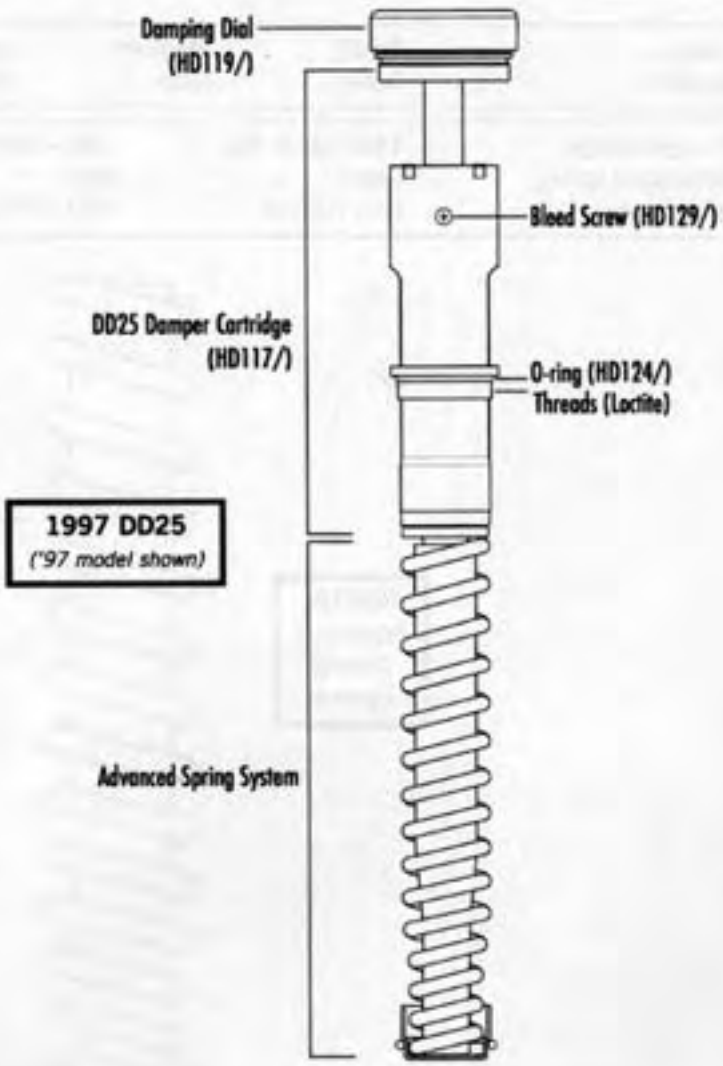
Requires Advanced Spring System kit (HD110/) not included (see page 10).

DD25 "Silk Path™" (1996-97)

A 1" travel HeadShok suspension fork used in several models of hybrid and commuter bicycles. This fork uses a hydraulic cartridge with a lockout Damping Dial. 1996 models used an MCU spring, while '97 models use a coil/MCU spring kit (see HD110/, below).

HD119/	Damping Dial w/screw
103986	Screw only
HD117/	'97 model DD25 Cartridge kit
HD127/	Seal kit (1997 model)
HD129/	Bleed screw (1997 model)
HD115/	Seal kit (1996 model)
104154	Brad (1996 model)

Spring kit: Use Advanced Spring System HD110/ (see page 10).



Code/Color	Part Description

COMMON PARTS

Boot kits

HD130/	**5-notch** (DD15, DD25, DD50, all pre-1997 forks)
HD102/	**6-notch boot** (DD60)
HD131/	**8-notch boot kit** (Fatty 70)

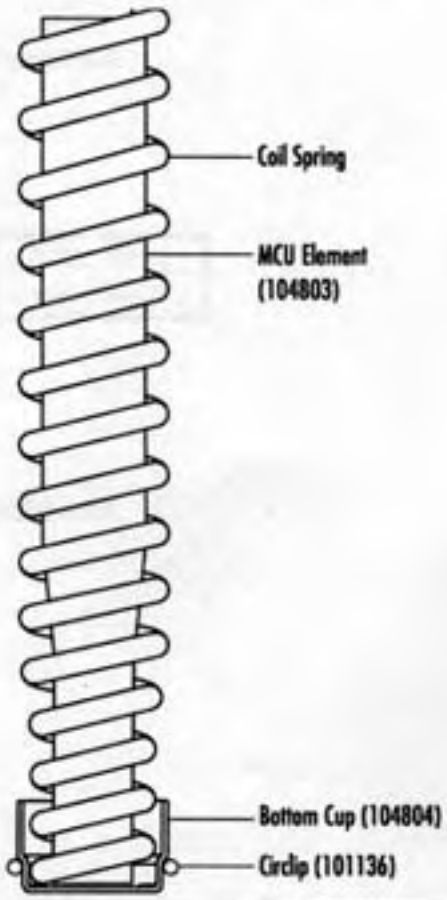
Spring kits

Advanced Spring System coil/MCU spring kit. Coil spring with MCU element for added spring rate progressivity. Comes with special bottom plug and new circlip. Standard equipment in '97 HeadShok MC60 and DD60 forks. Can be retro-fitted to previous years' HeadShok EDM, MC50, DD2, DD50.

HD110/GRE	**Spring kit with green spring** (light spring rate)
HD110/BLU	**Spring kit with blue spring** (medium spring rate)
HD110/RED	**Spring kit with red spring** (heavy spring rate)
104803	**MCU only**
104804	**Bottom cup plug**
101136	**Circlip**

Bike size..... comes with...	**Small** Green	**Medium** Blue	**Large** Blue	**Extra Large** Red
Rider weight range	**150 lbs. or less**	**140 - 200 lbs.**		**180 lbs. or more**
Recommended spring	Green	Blue		Red
Spring Kit code	HD110/GRE	HD110/BLU		HD110/RED

HD110/
Advanced
Spring
System



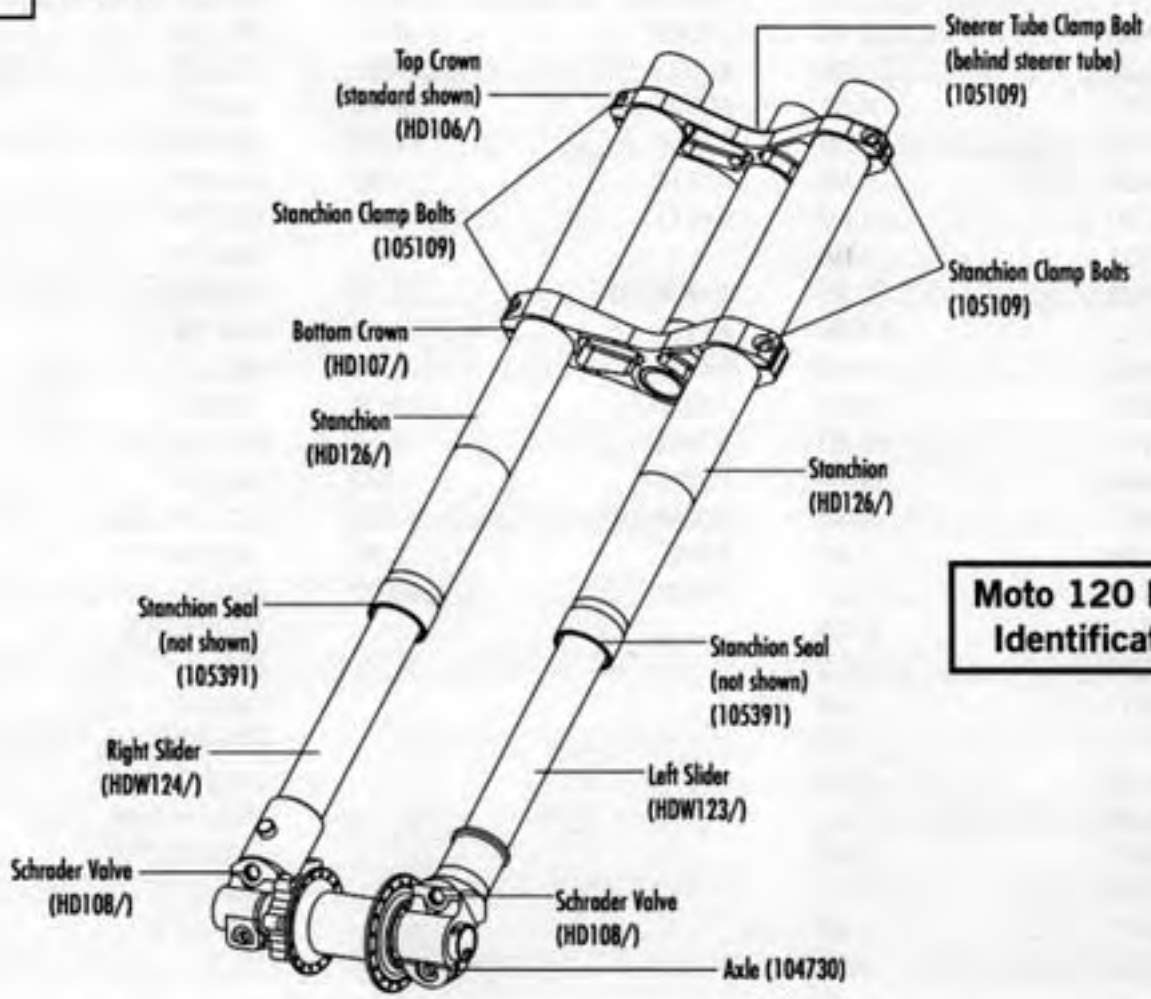
Code/Color	Part Description

MOTO™ FORKS

Moto 120

The Moto 120 is a disc-brake compatible, downhill-specific fork with 120mm of travel.

HD105/	**Moto 120 top crown,** gullwing Replacement top crown allows Moto 120 fork to be fitted to frame with 5 ½" or longer head tube.
HD106/	**Moto 120 top crown,** standard
HD107/	**Moto 120 bottom crown w/steerer** (1 ⅛" x 260mm)
105109	**Stanchion clamp bolts for top & bottom crowns** (M6 x 1 x 20mm)
105109	**Steerer tube clamp bolt**
HD126/	**Moto 120 stanchion assembly,** w/seals
105391	**Stanchion seal** (1)
105112	**Dropout pinch bolts** (M8 x 1.25 x 20mm)
HD120/	**Hydraulic damper cartridge**
HD109/	**Moto Damping Dial kit**
HD104/	**Shim kit, Fatty & Moto damper cartridges**
HD128/	**Seal kit,** Moto 120 damper cartridge
HD108/	**Moto 120 Schrader valve** (1)
101690	**Air piston** (located in sliders)
104692	**Air piston O-rings** (#313)
104730	**Hub Axle**



Moto 120 Parts Identification

Effective 6/1/97

Part #	dealer price
100829	0.04
100830	0.30
100951	0.92
100952	0.05
100953	2.21
100954	0.14
100955	0.21
100956	0.08
100957	2.02
100958	0.12
101103	17.42
101136	0.10
101227	6.12
101437	0.88
101643	2.54
101647	1.12
101660	0.26
101663	0.30
101664	0.04
101666	0.36
103610	0.90
103797	1.66
103986	0.38
104110	12.06
104154	0.02
104690	14.68
104692	0.08
104730	23.68
104731	4.68
104732	6.26
104733	14.34
104803	1.86
104804	0.40
104823	14.90
104834	6.14
104851	0.32
104999	2.92
105109	1.24
105112	0.00
105180	2.52
105311	1.86
105312	1.40
105313	2.56
105314	1.10
105377	0.04
105391	4.72
105427	2.36
105509	0.26

Part #	dealer price
105583	0.24
105814	0.26
105815	0.26
105816	0.26
105817	0.26
105818	0.26
105819	0.26
105820	0.26
105821	0.26
105822	0.26
105823	0.26
105824	0.26
105825	CALL
105826	CALL
105827	CALL
105828	CALL
105829	CALL
105830	0.26
105831	CALL
105832	CALL
105833	CALL
105834	CALL
1352P	0.16
6052H	11.80
6052I	38.94
6700G	44.04
6701G	1.82
6701J	1.52
A380/EBO	12.99
A412/	3.50
A413/	6.25
ACOMA/	12.00
ADV01/	3.75
ADV07/	2.00
AELASTO/	35.00
AIDD/	7.75
ARDC/	69.00

Part #	dealer price
HD100/	25.00
HD101/	4.22
HD102/	3.69
HD103/	2.63
HD104/	15.73
HD105/	50.35
HD106/	47.20
HD107/	69.23
HD108/	2.11
HD109/	4.22
HD110/BLU	18.19
HD110/GRE	18.19
HD110/RED	18.19
HD111/	26.39
HD112/	94.41
HD113/	25.00
HD114/	119.00
HD115/	3.80
HD116/	25.17
HD117/	62.84
HD118/	62.94
HD119/	2.11
HD120/	107.00
HD121/	75.53
HD122/	22.02
HD123/	2.11
HD124/	1.00
HD126/	50.00
HD127/	3.00
HD128/	3.00
HD129/	1.50
HD130/	3.69
HD131/	3.69
HD132/	1.00
HD133/	3.00
HD134/	2.00
HD135/BLU	CALL
HD135/GRE	CALL
HD135/RED	CALL
HD136/	10.00
HD137/	15.00
HDUPDD15/	61.99
HDUPDD60/	74.39
HDUPFAT50/	123.99
HDUPFAT70/	CALL
HDW123/	120.00
HDW124/	120.00

Prices are listed in U.S. dollars.

All prices are subject to change without notice.

Service Manual, First Edition