# 2005 Lefty MAX 140 owner's manual supplement 117105.PDF





READ THIS MANUAL CAREFULLY! It contains important safety information. Keep it for future reference.

# 2005 Lefty MAX 140 OWNER'S MANUAL SUPPLEMENT 117105.PDF

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Please note that the specifications and information in this manual is subject to change for product improvement without notice. For the latest product information, go to <u>http://www.cannondale.</u> <u>com/bikes/tech/</u>.

#### INTRODUCTION - GENERAL SAFETY INFORMATION

#### About This Supplement

Cannondale Owner's Manual Supplements provide important model specific safety, maintenance, and technical information. They are not replacements.

This supplement may be one of several for your bike. Be sure to obtain and read all of them.

If you need a manual or supplement, please contact your Cannondale Dealer immediately, or call us at one of the telephone numbers listed on the back cover of this manual.

You can download Adobe Acrobat PDF versions of any Cannondale Owner's Manuals or Supplements from our website.

Go to: http://www.cannondale.com/bikes/tech

If you at any time have any questions about your bike, please contact your Cannondale Dealer. Or, you can contact us using the information on the back cover of this manual.

• This manual is not a comprehensive safety or service manual for your bike.

• This manual does not include assembly instructions for your bike.

• All Cannondale bikes must be completely assembled and inspected for proper operation by a Cannondale Dealer before delivery to the owner.

#### \* \* Important \* \*

This manual may include procedures beyond the scope of general mechanical aptitude. Special tools, skills, and knowledge may be required.

If you have any doubt about your ability to properly inspect, adjust, or service your fork, do not attempt to perform the work described; please take the fork to a Cannondale Dealer.

### **Special Manual Messages**

In this manual, information which affects your safety is emphasized in the following ways:

The Safety Alert Symbol means :"ATTENTION....BECOME ALERT, YOUR SAFETY IS INVOLVED."

### WARNING

A WARNING indicates a potentially hazardous situation which, if not avoided, can result in serious injury or death.

WARN000

### CAUTION

A CAUTION Indicates a potentially hazardous situation which, if not avoided, can result in serious damage to the product. The matters described under CAUTION may, if not avoided, lead to personal injury, or results depending on the situation and degree of damage. Important matters are described in CAUTION (as well as WARNING), so be sure to observe them.

CAUT000

NOTE:

A NOTE provides helpful information or tips intended to make the information presented clearer.

### Warning Label

Do not remove this warning label. It is located on the spindle. If it is missing or damaged, you can obtain a free replacement from Cannondale.



Figure 1 Lefty Warning Label Location



Figure 2 Lefty Warning Label

#### Intended Fork Use

Lefty forks are designed and intended for use on our All Mountain and Cross-Country Racing and similar bikes. Lefty forks are not intended for use in Freeriding, Downhill, North Shore, Dirt Jumping, Hucking or other extreme forms of riding. Using your Lefty improperly by riding in conditions for which is was not designed or intended to be used is extremely hazardous. Don't misuse or abuse your Lefty fork.

# Bicycle Suspension Systems and Your Abilities/Skill



You could have a bad accident if your skill is not up to handling an advanced suspension system.

Suspension systems (front fork, rear shocks) can increase the handling and stability of most bicycles. If you lack the skills and experience necessary to travel at higher speeds and maneuver over difficult terrain at the greatly increased performance level, you can travel faster than your abilities. You can lose control of the bike in these conditions and crash. Anytime you lose control of the bike, especially at high speed and in advanced terrain, you risk severe injury or death in a crash.

• Ride at reduced speeds.

• Learn the performance characteristics of your bike and suspension components before trying any downhill or very fast biking.

•Ride within your skills and abilities.

•Take a bicycle training course.

WARN001

#### **Front Brake Systems**

Please note the following important points about front brake systems and your Lefty fork:

 Your Lefty fork is designed to only be ridden with a properly mounted, adjusted and functioning front brake system compatible with the International Standard. You must not ride the Lefty without one.

> Why? In addition to providing speed control, the front brake system on your Lefty (disc/ caliper) acts as an integral secondary wheel retention system. If the system is missing or improperly installed, if the wheel hub axle bolt (primary retention) should come loose, the front wheel could slide off the spindle end.

### WARNING

DO NOT RIDE WITHOUT A PROPERLY MOUNTED, ADJUSTED, AND FUNCTIONING FRONT BRAKE SYSTEM.

When mounting IS compatible brake systems: Follow manufacturer's instructions when mounting the brake caliper to the spindle brake bosses. Do not modify the fork in any way.

PLEASE ASK YOUR CANNONDALE DEALER FOR HELP WHEN INSTALLING COMPATIBLE FRONT BRAKE SYSTEMS.

WARN002

- When mounting brake caliper, use the 16 mm bolts for your Lefty, Cannondale kit # LEFTYBOLTS See Figure B.
- Make sure the brake disc does not make contact with the fork boot. A rotating brake disc can wear through the boot allowing contaminants into the fork.



Figure A Lefty Spindle Brake Mounts





This photo shows the area where incorrect bolts will interfere with disc rotation possibly causing severe damage. Correct bolts are shown above.

In addition to checking to make sure the bolt ends do not protrude, you must ensure proper thread engagement.

### FORK BOOT

The fork boot (A) protects the internal parts (inner tube, races, lubricant, needle bearings, and other internal parts) from contamination and damage. It is a barrier to water, dirt, dust, mud, or grit encountered while riding. If the boot is loose or damaged, dirt, water, dust, salt spray or other contaminants will quickly ruin the fork.



Figure 3 Lefty Boot

The boot is an important protection, so before every ride do the following:

- Check the boot for damage cracking, splits, or tears. Be sure to check in the folds of the boot. Check for any cables or lines rubbing the boot. Make sure contact with brake disc is not present.
- Check the attachment of the boot at the top and bottom. The upper and lower boot lips should be fitted over the lower collar and fork lip. NO PART OF THE FORK INNER TUBE (lower leg) SHOULD BE EXPOSED.
- Replace the zip ties and cable guides (clamps) as required. Always tighten securely. Replacement boots, zip ties, and cable clamps are available through a Cannondale Dealer.

If you find boot damage, the area under the fork should be inspected for damage. And the damaged boot must be replaced with a new one. Do not try to fix it.

### 

Never ride your Lefty without a boot or with a boot that is damaged (e.g., cuts, holes, tears, etc.)

WARN003

#### **Inspection and Grease Renewal**

Under the boot, periodic external cleaning and re-greasing helps assure that the inner tube leg surface, bearings races and needle bearings do not suffer damage due to lack of good lubrication. The interval will depend on how the fork is used and in what environments. Average riders should have the service performed every 2 months. Any clean high-quality bicycle bearing grease selected for riding temperatures and environment can be used. The forks are assembled at our factory using Royal Purple Ultra Performance Grease NLGI #2 (ISO 46 BASE).

- Place your bike in a work stand with the front wheel off. Loosen and remove the outer cap assembly and the two split rings. See Spring Change for how to remove the outer cap assembly. Removing the outer cap assembly and split rings will enable you to hand cycle the fork to work in the new grease.
- 2. Carefully cut the upper and lower zip ties securing the fork boot. Some forks may have an screw type band clamp securing the upper portion of the boot. If this is the case, simply loosen the clamp.
- 3. Lift the unsecured boot up to expose the inner tube (aka inner fork leg).
- 4. Wipe away any old grease with a clean lintfree shop towel. Cycle the fork and repeat.

### CAUTION

Do not use solvents or spray chemicals to clean.

Protect the exposed fork from contaminants. Work in a clean area.

CAUT001

5. Thoroughly inspect the inner tube (1) and inner races (2) a for any signs of corrosion or damage. Some very light wear to the inner races is normal, however, they are worn-out if any scratches or grooves are evident. If heavy corrosion is present they must be replaced. If ridges can be felt by the tip of a rolling ball point pen over the race, the races should be replaced. If damage is found, the damaged parts must be replaced new before the fork is ridden.



Figure 4 Lefty Under Boot

6. Use a stiff nylon brush to rub in a highquality bicycle grease onto the inner tube and bearing races. Cycle the fork and re-apply grease. Cycling moves the new grease inside the fork onto the outer tube races and bearing cages. Its OK to leave a good coating under the boot. Avoid applying grease to the area (A) just under the boot/zip tie. Wipe it off the inner tube and inner boot to ensure that boot does not slide up when zip tie is re secured.



Figure 5 Lefty Refreshing Grease Under Boot

 When you are finished, inspect the condition of the boot. Make sure it is undamaged. Replace it if it is. Re secure the boot and reassembly the fork.

# WARNING

Never ride your Lefty if the inner tube, bearing races, or bearings are corroded, rusted, or cracks are present.

WARN004

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### **AIR FILTER**

As the fork moves, outside air is drawn into and forced out through the small hole in the outer tube behind the air filter assembly (A).



#### Figure 6 Lefty Air Filter

The air filter assembly stops the passage of dirt and water which would damage the internal components.

The small holes (a) at the base of the air filter cover should remain open.

The foam filter element (1) should be cleaned and re-oiled frequently.

When the cover (2) is reinstalled the small holes should be positioned to the sides of the and not to the front or back of the bicycle to minimize the chance dirt thrown by the wheels will plug the holes.

> Clean the foam air filter element with warm soapy water, allow to dry completely, and reapply a high-quality foam air filter oil before reinstallation.

Be sure to massage the oil into the foam.

A foam element without the oil is ineffective.



Figure 7 Lefty Air Filter Cover & Element

HANDLEBAR STEMS



#### Figure 8 Handlebar Stem

The handlebar stem is marked near the stem clamp bolts with an eight character size code (a). The format is "AAABBCCC" : stem length (A), the stem rise angle (B), and the handlebar clamp diameter (C). Example: stem length is 100 mm, rise angle is 20°, and the clamp diameter 25.4mm.

The stem code maybe followed by other numbers or letters used to identify manufacture; these numbers do not indicate size or use in any way.

If you decide to change to a different size stem, please the cable and controls mounted on the handlebar may have to be adjusted to compensate for the longer or shorter stem. For this reason and to ensure that the stem is a good fit for you and installed properly, we strongly recommend that you have your Cannondale Dealer perform the stem replacement. Before every ride:

- Check the stem (1), handlebar clamp (2) for damage (e.g., cracks, deep scratched, corrosion).
- Make sure the handlebar is securely attached. Apply Loctite #242 (blue) to the bolt threads and tighten to the specified torque: Handlebar clamp bolts (3), Stem clamp bolts (4)

### WARNING

Never ride with a damaged or loose handlebar stem.

A damaged or loose stem can cause you to lose steering control while riding. A cracked stem can break away from the handlebar unexpectedly. In either case, you can crash and suffer serious injury or even be killed in an accident.

Its a good idea to replace the handlebar stem regularly, without regard to the condition of the old one.

WARN005

#### **Upper Head Tube Bearing Seal**



Figure 9 Lefty Upper Head tube Bearing Seal

Handlebar stem (1), Upper fork clamp (2), Seal (3), Upper bearing cup (4)

- The open side (a) of the seal face should always face toward the bearing.
- A coating of bearing grease can be applied to the open side of the seal for added protection.



Figure 10 Seal Orientation

### CAUTION

Incorrect seal orientation or clamping can pinch or deform the seal causing it to become ineffective.

CAUT002

### FRAME BUMPER

The frame bumper (1) located on the outer tube (2) cushions the frame from contact with the fork. Replace it with a new one if it ever becomes

damaged, torn, or missing.



Figure E Lefty Frame Bumper

FORK CLAMPS



Figure C Lefty Alloy Fork Clamp Bolts

Creaking noise can be an indication of loose fork clamp bolts.

Check the clamp bolt tightness periodically. When tightening is required, re-apply Loctite #242 (blue) and tighten with a good torque wrench.

Tightening Torque	
ALLOY (Figure C)	7.0 N∙m (60 In∙Lbs)
CARBON (Figure D)	9.0 N•m (80 In•Lbs)

### CAUTION

Do not over-torque the clamp bolts.

CAUT003



Figure D Lefty Carbon Fork Clamp Bolts

#### **Removing Alloy Forks**

The upper and lower fork clamps are integrated with the head tube steerer. The fork can be removed for service, by sliding it down out of the clamps:

- 1. Remove the brake caliper and detach the brake line.
- 2. Remove the outer cap assembly.
- 3. Loosen the three fork clamp bolts. See Figure C.
- Slide the fork down out of the clamp. As the fork is removed, the bumper will slide off. Be sure to reinstall it when the fork is repositioned in the clamps.



Figure E Lefty Alloy Fork Removal

Reverse the step for installation. Be sure to not key and slot in clamp and outer tube.

#### **Removing Carbon Forks**

For carbon lefty forks, the clamps are integrated with the fork clamps. The upper and lower clamps are permanently bonded to the outer tube and must not be removed. Carbon Lefty forks are removed from the bicycle by sliding the steerer tube out of the fork clamps.

- 1. Remove the brake caliper and detach the brake line.
- 2 Handlebar stem from the head tube steerer.
- 3. Loosen the upper and lower clamp bolts. See Figure D.
- Hold the fork and use a rubber mallet to remove the steerer from the head tube and fork clamps. Remove it from the bottom of the head tube.

# **FRONT WHEEL**

#### Removal

- 1. Place in work stand with front wheel slightly off the ground.
- Use a 5 mm Allen key wrench to loosen the two disc brake caliper mounting bolts (1). It is not necessary to remove the bolts.



Figure 11 Lefty Loosen Brake Caliper

3 When the bolts are loose, remove the caliper from the spindle. Tilt the bottom of the caliper out first, then the top.

Be sure to note the number and locations of any brake alignment shims. Shims are located between the spindle bosses and the caliper body/or mounting adapter.



Figure 12 Lefty Brake Caliper Off

#### CAUTION

Do not allow the brake caliper to hang. Support the caliper and position it up out of the way.

CAUT004

4. When the brake caliper is dismounted, use a 5 mm Allen key and turn hub bolt (1) counter-clockwise. As the bolt is turned counter-clockwise, it will begin to back against the hub cap bolt (2) causing the hub (3) to be drawn out and off the spindle bearing seats. Since the hub bolt is actually retained inside the hub body by the hub cap, the bolt will remain in the hub when the wheel is removed. There is no need to remove that cap from the hub.



Figure 13 Lefty Hub Bolt (5 mm Allen Key)

5. Pull the wheel off of the spindle carefully.



Figure 14 Lefty Wheel Off

### CAUTION

Cover the opening of a removed hub/wheel with a clean towel to prevent contamination. PROTECT SPINDLE WHEN WHEEL REMOVED. A fall or drop to the ground can destroy or damage the spindle.

CAUT005

#### Reinstallation

 Hub - Inspect the hub seal and inside for contamination. Apply a high-quality bike grease to the inside diameter of the large hub cartridge bearing (inner one), axle bolt threads.

Spindle - Wipe clean the spindle completely with a dry towel and apply a film of grease to the smaller spindle bearing seat and inner bolt threads.

### WARNING

Do not contamination of brake caliper, pads, or rotor with grease.

WARN006

 Align and install the hub onto the axle spindle. Slide the wheel straight onto the spindle so, the larger hub bearing starts to position on it spindle seat. At this point, the axle bolt threads can correctly engage the threaded spindle if the wheel is held on straight.

#### NOTE:

It is sometimes easiest to install the front wheel by positioning the bike horizontally with the spindle facing up. Then place the hub straight down onto the spindle, and tighten the axle bolt.

 When the hub bolt threads engage the spindle, turn the bolt clockwise with finger force slowly to allow the hub bearings to slide onto the spindle bearing seats.

Once the hub has been drawn onto the hub completely, and proper threading is evident, use torque wrench to tighten to final 15.0  $N \cdot m$  (133.0  $ln \cdot Lbs$ ).



Figure 15 Lefty Loosen Brake Caliper

#### CAUTION

TO PREVENT THREAD STRIPPING, use only finger force to start the installation of the hub bolt, use the long end of a 5 mm Allen key. Finish with torque wrench.

CAUT006

4. Reinstall the brake caliper.

#### CAUTION

LOCATE DISC BETWEEN THE PADS. Replace shims are in use, be sure the shims are positioned between the caliper body and inner face of the fork mounts not under the head of the caliper bolts.

USE ONLY 16 MM (Cannondale kit # LEFTYBOLTS. Longer bolts can result in contact with the brake rotor causing severe damage. Check clearance between the bolt tips and rotor after remounting the caliper.

CAUT007

- Tighten the caliper mounting bolts to 78.0 In•Lbf (9.0 N•m.
- 6. Spin the wheel to make sure it spins freely.
- 7. Be sure to test the brakes for proper operation before riding.

#### Lefty Hub/Spindle Exploded View



#### Figure 16 Lefty Hub & Spindle Assembly

- 1. Cap
- 2. Plastic washer
- 3. O-ring
- 4. Axle bolt
- 5. Outer hub bearing
- 6. Hub body

- 7. Inner hub bearing
- 8. Seal
- 9. Brake rotor
- 10. Bolts
- 11. Spindle

A. Outer bearing seat B. Inner bearing seat C. Axle bolt threads

#### Lefty Wheel Trueing Tool





### **EXTERNAL ADJUSTMENTS**

#### TPC Compression Damping Adjustment

The TPC compression damping adjustment knob (1) is located at the bottom of the spindle.

The knob is blue in appearance. Compression adjustment controls the rate or speed of fork compression.



Figure 18 TPC Compression Damping Adjustment Knob

More Damping - turn in direction "+" (clockwise when viewed from bottom)	Stiffer
Less Damping - turn in direction "-" (counter-clockwise when viewed from bottom)	Softer

### CAUTION

Do not force the knob past the stop points. The adjustment range is 130°.



CAUT008

#### SPV Compression Damping Adjustment

There SPV compression damping adjustment features are located at the bottom of the spindle. There are two possible adjustments: SPV Air Pressure, SPV Air Volume.

#### SPV Air Pressure

Stable Platform Valve (SPV) air pressure is regulated through the Schrader valve. This adjustment control pedaling platform of the fork. Pedaling platform is the fork's tendency to resist compression under the force of pedaling.

More pressure	Stiffer pedaling platform
Less pressure	Softer pedaling platform

- Clean the lower spindle area. Remove the black Schrader valve air cap (1) located on the bottom of the fork spindle. Clean the pump end also.
- Attach a pump to the valve (2) and add or remove air pressure within the limits (low 30 psi, high 100 psi)

### CAUTION

Clean lower fork and pump end before attaching pump.

CAUT009



Figure 19 SPV Air Pressure Valve & Cap

3. Replace the valve cap when finished.

#### **SPV Air Pressure Limits**

MINIMUM - 30 psi (2.0 bar)

MAXIMUM - 100 psi (6.8 bar)

#### SPV Air Volume

Stable Platform Valve (SPV) air volume is changed by turning the red 16 mm hex clockwise or counter-clockwise. This adjustment changes the volume of the internal compression bladder.



#### Figure 20 SPV Air Volume Adjust

Turn clockwise (in)	Increase bottoming
( when viewed	resistance
from bottom)	Progressive
Turn counter- clockwise (out) ( when viewed from bottom)	Decrease bottoming resistance Linear

### CAUTION

Do not force the red hex nut past the stop points.

CAUT010

#### **Optional Tool Available:**

SPV 16 mm volume adjust socket (Answer Products part #85-3007) is needed.

### Lefty SPV Compression Damper Exploded View



#### Figure 21 Lefty Hub & Spindle Assembly

1. Bladder

- 4. Schrader Valve
- 7. Volume Adjust Nut 8. Schrader Cap

- 2. O-Ring 3. Schrader Housing
- 5. Volume Adjust Housing 6. O-Ring
- Suggested SetUp

			SPV			TPC o	r FFD
RID WEI	DER GHT	FORK (Bike) SIZE	FORK SPRING COLOR	SPV PRESSURE (psi/bar) (Schrader valve)	REBOUND (Red knob) Clicks out from closed	FORK SPRING COLOR	REBOUND (Red knob) Clicks out from closed
Lbs	Kg						
120	53	PT	GREEN	40 / 2.8	9	BLUE	9
130	58	SM	GREEN	50 / 3.4	9	BLUE	9
140	63	SM	GREEN	60 / 4.1	9	BLUE	9
150	68	MD	BLUE	50 / 3.4	9	RED	9
160	72	MD	BLUE	60 / 4.1	8	RED	8
170	77	LG	RED	60 / 4.1	8	BLACK	8
180	81	LG	RED	60 / 4.1	8	BLACK	8
190	86	XL	BLACK	60 / 4.1	8	BLACK	8
200	90	XL	BLACK	70 / 4.8	7	BROWN	7
210	95	XL	BLACK	70 / 4.1	7	BROWN	7
220	100	XL	BLACK	80 / 5.5	6	BROWN	6

#### **Rebound Damping Adjustment**

Rebound damping controls how fast the Lefty extends following compression. The rebound adjustment knob is red in color and located at the top of the fork.

Each position in the rotation of the adjustment knob can be considered a click although no audible sound is made. The knob is stopped at each position by the detent balls and spring in the rebound knob assembly. From the fully closed to fully open position the knob can be turned. Be sure to consult "*Lefty Upper Rebound Assembly Exploded View*" in this manual.



Figure 22

Lefty MAX 140 Rebound Damping Adjustment Knob

CLOSE More Damping Turn in direction "+"	Slower Rebound "Sluggish" feel
OPEN Less Damping Turn in direction "-"	Faster Rebound Springier" feel

#### CAUTION

Use only finger force. Do not force adjuster past the stop points. Approximately 13/4 turns total (14 clicks)

CAUT011

# SPRING PRELOAD

#### Recommended Sag 25%

Sag is the distance the fork compresses when you sit on the bike with your static weight. To adjust small amount of sag, change the main spring preload.

. We recommend adjusting the sag so it is 25% of the forks overall travel.

#### **Measuring Sag**

- 1. Without a rider, measure distance (A) from the floor to the bottom of the fork.
- With a rider on the bike in a natural riding position with both feet on the pedals hands on handlebar. Measure distance (B) from the floor to the bottom of the fork.
- 3. Calculate sag. A -B = sag.

#### **Adjusting Spring Preload**

1. Place bike in work stand with front wheel off the ground .

#### CAUTION

Clean area around the top of the fork so dirt does not enter when the fork is opened in the following steps.

CAUT012

- Close the rebound knob; turn clockwise until it stops. Count the clicks to return the setting later.
- 3. Turn the Outer Cap (1) counterclockwise (A) to loosen it.

Use Shimano tool TL-FC32 (2). (Hollowtech bottom bracket wrench).



Figure 23 Loosening Lefty Outer Cap Assembly

#### CAUTION

The outer cap (1) is aluminum; the tool (2) is steel; Be sure to locate all the points of tool on all the cap notches squarely before attempting to turn the cap. Apply force carefully. This will help avoid marring the cap. When loose, unscrew cap by hand.

CAUT013

 Make sure the wheel is off the ground and the lower leg is extended. Unscrew outer cap by hand and lift it off.

#### NOTE:

If needed, hold the Rebound Knob with your fingertips to keep it from rotating with the Outer Cap as it is removed.

NOTE:

Be sure to note location and condition of 2 O-rings. Be sure to recover it. Check both O-ring in the Adapter for damage and replace new if necessary. See "Lefty Outer Cap Assembly Exploded View."



Figure 24 Outer Cap Assembly Removal



#### Figure 25 Outer Cap Assembly Exploded View

- 1. Outer Cap
- 3. O-Ring (large)
- 2. O-Ring (small)
- 4. Adapter
- Compress the fork to cause the rebound assembly to rise up out of the outer fork tube.



Figure 26 Outer Cap Assembly Removal

6. Remove the two Split Rings (1) in the groove (a) of the Shaft (2) .

Note the "TOP" markings on the rings; they install up.



Figure 27 Split Rings Removal

NOTE:

Do not remove the rebound knob assembly from the shaft top. Its not required in this procedure. Just make sure it is screwed in (clockwise) fully.

- 7. Turn the Lock Ring (1) counter-clockwise (A) to loosen it.
- 8. Turn the Adjust Ring (2) counter-clockwise (A) to decrease preload (increase sage)

Turn the Adjust Ring (2) clockwise to increase preload (decrease sag).



Figure 28 Preload Lock and Adjustment Rings

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#### NOTE:

Pull the damper shaft assembly upward to ensure the shaft is fully extended while adjusting the spring preload - if you do not do this you may get an inaccurate setup

#### NOTE:

Make a pencil mark on top of the ring so the turn count is accurate. 1 full turn of the adjustment ring = 1 mm change in installed spring height.



 When adjustment is complete, with fingers, hold the Adjust Ring and tighten the Lock Ring securely against the Adjust Ring.



Figure 29 Tighten Lock Ring Securely

 Apply a high-quality bicycle bearing grease to the Shaft groove. Insert the two Split Rings with the 'TOP' marking up.

Then, apply a ring of grease to the top of the Split Rings.



Figure 30 Tighten Lock Ring Securely

11. Lower the spring assembly back into the outer tube by extending the lower fork leg.

#### NOTE:

Be sure to clean the Outer Cap threads and the threads of the fork outer tube and reapply a light film of grease. Wipe clean with a dry towel. Do not use spray cleaners!

#### NOTE:

If the Rebound Knob is not turned in completely, when the Outer Cap assembly is installed the knob threads can be damaged or the knob will be difficult to turn. Make sure the knob is turned in fully clockwise before the Outer Cap assembly is reinstalled.

- 12. Apply a film of grease to the Outer Cap O-rings and threads.
- 13. Install the Outer cap by hand. Tighten with Shimano #TL-FC32. See following illustration for tightening method.



#### Figure 31

Tighten Outer Cap A = Tighten Snug

B = Continue 1/4 Turn

### CAUTION

Only use the tool only once the cap is screwed on fully. Do not over-tighten.

CAUT014

14. Reset Rebound Knob position. (Recorded earlier).

#### Figure 32 Parts Identification

- 1. Rebound Knob
- 2. Adapter
- 3. O-Ring (small)
- 4. O-Ring (large)
- 5. Outer Cap
- 6. Split Ring(s)
- 7. Detent Ball(s)
- 8. Detent Spring
- 9. Preload Lock Ring
- 10. Preload Adjust Ring
- 11. Shaft
- 12. Outer Tube
- 13. Rebound Tuning Pushrod
- 14. Main Spring
- 15. Bottom Out Spacer (A hard plastic material)
- 16. Bottom Out Bumper (A rubber-like material)



Lefty Upper Rebound Assembly Exploded View



#### **SPRING CHANGE**

#### About the Lefty 140 Main Spring

- Lefty 140 MAX main springs come in several different sizes matched to typical rider weight. The main spring in a Lefty 140 MAX can be changed without changing any other internal parts. For available spring sizes and weight range, see the replacement parts section of this manual.
- You should apply a generous coating of grease to the Lefty spring before you install it.
- The shrink wrap material on the Lefty 140 spring installs with the shrink wrap up. This material is used to reduce noise caused by spring contact with the outer tube.

#### Changing the Lefty 140 Main Spring

Please read "Adjusting Spring Preload" in this manual for steps to remove and install the Outer Cap Assembly.

- 1. Turn the Rebound Knob clockwise in completely until it stops.
- 2. Remove the Outer Cap assembly.
- 3. Remove the two Split Rings.
- 4. Loosen the Lock Ring and Adjust Ring to release the main spring preload.
- Turn the Rebound Knob assembly counterclockwise to remove it. Hold down knob while turning; the knob assembly will pop out since it rests the pushrod which sits atop a spring. BE SURE TO CAPTURE DETENT BALLS AND SPRING.



Figure 33a Rebound Knob Parts

6 Hold the wrench flats on the rebound shaft flats lower wrench with end wrench а q mm open

Loosen the Shaft with a 19 mm open end wrench . Turn counter-clockwise.



Figure 33 Loosening the Shaft

7. Unscrew the Shaft and lift off.



Figure 34 Lifting Off the Shaft

8. Lift out the Rebound tuning pushrod.



Figure 35 Removing the Rebound Tuning Pushrod

- 9. Lift out the spring.
- Inspect the bottom out spacer (a hard white plastic material) and bottom out bumper (a black rubber-like material) on the rebound shaft.
- Clean the thread of the rebound tuning assembly and reapply a small drop of Loctite #242.



Figure 36 Apply Loctite #242 (blue) to the threads.

CARRONIALLOV	Rider Weight			SPRING		
FORK WITH:	Lbs	Кg	ORDER CANNONDALE KIT #	COIL COLOR	MATERIAL	Wt. (g)
	120 - 140	54 . 67	KF213/GRN	CDEEN	Steel	156
	120 - 149	54- 07	KF214/GRN	UKEEN	Titanium	114
SPV	150 - 169	68 - 76	KF213/BLU	DITIE	Steel	174
Evolve			KF214/BLU	DLUE	Titanium	108
(Stable Diatform Value)	170 100	77.05	KF213/RED		STEEL	197
	170 - 189	77-85	KF214/RED	KED	Titanium	151
	190 - 220	86 - 100	KF213/BLK	BLACK	STEEL	253
TPC	120 - 149	54 - 67	KF213/BLU	BLUE	STEEL	174
(Twin Piston Control)	150 - 169	68 - 76	KF213/RED	RED	STEEL	197
FFD	170 - 199	77 - 90	KF213/BLK	BLACK	STEEL	253
(Fluid Flow Damping)	200 - 220	91 - 100	KF213/BRN	BROWN	STEEL	262

#### Lefty MAX 140 Spring Application

 Generously coat the entire spring with a high-quality spring grease. Then, install a new spring with the shrink wrap on the spring facing up.



Figure 37 Reinstalling the Spring

- 13. Reinstall the Shaft and tighten it securely. DO NOT OVER-TIGHTEN
- 14. Reinsert the Rebound Tuning Pushrod. Make sure it drops into the assembly fully. If it does not drop initially, rotate it until it does. Never force it down.
- 15. Reset the preload Adjust Ring. Once it contacts the SPRING turn it 1 FULL turn. ! turn is the minimum preload. Be sure to adjust sag as needed later. Tighten the Lock Ring against it securely.
- Apply grease to the Shaft groove and install the two split rings with the "TOP" marking up.
- 17. Extend the fork lowering the rebound assembly into the outer tube.
- 18. Apply grease to the top of the splits rings.
- 19. Clean the Outer Tube threads, grease them and reinstall the Outer Cap assembly. Be sure to lubricate the O-rings with a bit of grease.
- 20. Tighten the Outer Cap.

### **NEEDLE BEARING RESET**

The four needle bearing cages (1) are free to move independently up and down between each inner (2) and outer race pair (3). This bearing arrangement provides numerous advantages to fork performance but requires simple periodic maintenance to ensure proper alignment.



Figure 38 Needle Bearing & Races (Outer Tube Shown Removed)

If a cage or cages shifts out of alignment up or down in relation to the others it is said to have "migrated." This migrated condition will limit travel.

Needle bearing migration is normal and expected. However, if the fork is ridden in this state for extend periods, the fork can be damaged. A migrated cage (B) or cages can be brought back into alignment with the other ones by performing a simple procedure. Evidence of migration is:

- An unusual "top out" noise can or may be heard if a bearing cage or cages have migrated. If an unusual noise is suspected the overall extend fork length should be measured to confirm the condition.
- 2. The fork's maximum extended length is reduced.

While the condition can be corrected simply, if migration re-occurs frequently (immediately after resetting), the cause could be damage present in the inner or outer races, ,bearings/cages or other fork parts. Inspection and replacement of damage parts will be required to correct a persistent problem with bearing migration.



Figure 39 Needle Bearing Migration (Cages shown) A - Not Migrated B - Migrated

#### NOTE:

Ideally, reset the bearings after 10 hours of hard riding/racing to maintain optimum fork performance.

#### **Resetting Migrated Needle Bearings**

- 1. Place the bike in a work stand.
- 2. Remove Outer Cap assembly.

#### NOTE:

If the cap is popped off by the spring force when unscrewed, then this indicates that significant migration is present.

- 3. Remove the Split Rings.
- 4. To reset the needle bearings fully extend the telescope until it stops (tip listen

for the knocking at full extension to change from a hollow sound to a solid sound - this indicates full extension has been achieved). Do this several times using only moderate force, extend the lower fork leg using a pumping action.

After, you have performed this action several times, re-measure distance from top edge of outer tube to bottom edge of the spindle. The correct length is 720 -728 mm.

#### CAUTION

After reset if fork is out range, it is possible that the fork is damaged internally. The fork should be disassembled and inspected by a professional mechanic before it is ridden.

CAUT015



Figure 40 Needle Bearing Migration (Cages shown) A - Not Migrated B - Migrated

### **OIL CHANGE**

- 1. Place bike in work stand and remove the fork from the bike.
- If you have an SPV compression damper, remove the Schrader valve cap at the bottom of the fork and release all air pressure by depressing the valve end. Wait for hissing to end.

If you have a TPC compression damper loosen the compression damping knob set screw and remove the knob from the shaft end. Be sure to capture the small O-ring in the knob groove.

If you have a FFD compression damper, continue to the next step.

3. Remove the air bleed screw. There is no air bleed screw on an SPV damper.

#### CAUTION

Make sure the fork, tools, and work area are very clean before performing an oil change. If dirt or grit falls inside the fork, or remove parts are contaminated fork performance will decrease or serious damage can result.

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Figure 41 Releasing SPV Air Pressure

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Figure 42 Removing TPC Compression Damping Knob

4. Hold the fork upside down. Use a socket to loosen the damper. Turn counter-clockwise.

Carefully lift out the damper.



Figure 43 Loosening the Damping Assembly



Figure 44 Removing the SPV Damping Assembly



Figure 45 Removing the SPV Damping Assembly



Figure 46 Removing the FFD Damping Assembly

 With the damper out, invert the fork over a waste oil container and allow to drain. Dispose of waste oil responsibly.

To expel the small amount above the rebound piston, with the spring installed, place the spindle on a rag on the floor and cycle it. About 15cc of oil will come out which a rag can handle. Wipe up any spills.



Figure 47 Draining Oil From The Lefty

6. Refill with the specified oil from a clean container.

Fork Oil	Golden Spectro Motorcycle Cartridge Fork Fluid, 85/150
Volume (cc)	155 (approximate)



Figure 48 Re-Filling Oil

 If you have an SPV compression damper, hold the air valve end in, allowing the bladder to expand fully. Then release the valve. The bladder shape should be cylindrical prior to

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insertion. Make sure the bladder is affixed properly, FULLY EXPANDED, and the cap O-ring in good condition.



Figure 49 Expanding the SPV Bladder

If you have a TPC compression damper, dip the piston end clean fluid and check the cap O-ring.

If you have a FFD compression damper, check the cap O-ring and continue to the next step.

 Slowly insert the damper, moving it up and down in the oil until the cap can be threaded in. Do not insert the damper too quickly; oil might be forced out.



Figure 50 Inserting the TPC Damper

- When the cap threads are engaged, remove the air bleed screw of the TPC and FFD dampers. There is no air bleed screw on an SPV damper.
- Thread the cap in carefully using finger force. If sufficient oil volume is present, oil should start to be expelled through the air bleed hole.
- 11. Tighten the cap to 10.0 N•m (89.0 In•Lbs).
- If you have an SPV compression damper, attach an air pump and pressurize the SPV bladder. (MINIMUM 30 psi, MAXIMUM 100 psi). Be sure to replace the valve cap.

If you have a TPC compression damper, reinstall the air bleed screw and tighten to 2.3 N•m (20.0 In-Lbs). Reinstall the adjustment knob with O-ring and tighten the set screw to 1.0 N•m (9.0 In-Lbs).

If you have a FFD compression damper, reinstall the air bleed screw and tighten to  $2.3 \text{ N} \cdot \text{m}$  (20.0 In·Lbs).

### MAINTENANCE SCHEDULE

Fork maintenance is important to your safety and longtime performance of the fork. In order to maintain the fork you must:

- Periodically inspect your Headshok Lefty fork for sign of damage. Stop riding it immediately if functional problems are present. Perform the Pre-Ride Checklist in this manual before and after every ride.
- Schedule regular professional service of your fork with your Cannondale Dealer. We strongly suggest that this service be perfomed annually at minimum even if no problem are indicated.

Ask your Cannondale dealer for help in establishing a maintenance schedule appropriate to you riding style and conditions, contact your Cannondale dealer.

#### Before each ride (Pre-Ride Checklist):

- Check the fork externally for any sign of damage (e.g., bent fork, cracks, fluid leaks, tears, deep scratches, loose parts).
- 2. Check the fork boot for damage.
- Check the wheel attachment. Spin the wheel to make sure it does not wobble up and down or side-to-side. Make sure the brake disc is located between the pads.
- 4. Check the handlebar and stem clamp bolt tightness.
- Check the fork function. Make sure it operates normally and all adjustments are normal.
- 5. Check the brakes. Ensure that you have good braking.

#### After each ride:

1. Clean the fork and inspect for damage. Have any damage repaired before riding again.

#### Every 10-20 Hours:

- 1. Clean and re-oil the air filter.
- 2. Reset needle bearing migration.

#### Every 25-50 Hours

1. Change the fork oil.

#### **Annual Service**

Annually, or when problems are indicated you should have your Lefty fork serviced through a Cannondale Dealer. Your fork should be disassembled by a suspension professional and evaluated for interal and external part wear and damage parts replaced with new ones.

### WARNING

#### DO NOT RIDE ON A DAMAGED FORK.

Stop riding a damaged fork immediately.

Have your fork service annually through your Cannondale dealer.

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#### Cleaning

When cleaning your Headshok Lefty fork, use only a mild soap and water solution. A clean water and a common dish washing liquid will work best.

Be sure to cover adjustment knobs and air filter (if equipped) with a clean plastic bag secured temporarily with a rubber band or masking tape. Before wiping away dirt, use an ordinary water hose to gently spray off heavy soils and dirt.

#### CAUTION

DO NOT power wash or spray water under high pressure to clean your Headshok fork. Power washing will force contaminants into the fork where they will promote corrosion, immediately damage, or result in accelerated wear.

DO NOT use compressed air to dry your fork. DO NOT use abrasive or harsh chemical cleaner/solvents which can damage the finish or attack and destroy both the outside and internal fork parts.

When rinsing the fork, avoid directing the spray directly at adjusters or air filters.

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# NOTES

You can use a table like this to record maintenance history, service, or set up information about your fork.

Date	Work Performed

# TROUBLESHOOTING

Problem	Solution
Rebound knob hard to turn	Knob installed incorrectly. Remove outer cap, thread in knob clockwise completely, reinstall outer cap.
Fork makes whistling noise from Outer Cap.	Slight air exchange around upper fork parts. Coat Split Rings with bearing grease to minimize.
SPV - No damping	SPV air pressure to low., regulate MINIMUM 30 psi, MAXIMUM 100 psi
Not getting full travel, or too little sag	Reduce spring preload or install a lighter main spring Measure/reset needle bearing migration
Fork bottoms out	Main spring too light for rider. Install heavier main spring. SPV Air Pressure too low. Regulate. SPV Air Volume too high, turn SPV Volume adjust (16mm hex) clockwise the decrease volume
Fork "tops out" harshly or "clunks" (migration of needle bearing strips).	Reset needle bearing migration
Fork "rattles" or "clunks".	Check fork clamp tightness to both fork and steerer. Alloy Fork Clamp Bolts - 60 In•Lbs Carbon Fork Clamp Bolts - 80 In•Lbs
Fork feels "rough" or "gritty".	Check for tear in boot and contamination. Service telescope (clean and re-grease). Rebuild telescope.
Fork boot "rides up".	Zip tie loose, or there is grease between boot and inner tube. Clean boot and inner tube, replace zip tie

# **REPLACEMENT PARTS (KITS)**

The following cannondale replacement parts kits are available for the 2005 Lefty Max 140.

Cannondale Kit No.	Description
LEFTYBOLTS	Kit, Lefty, 16mm Brake Bolts (qty 2)
KF205/	Kit, Split Ring,2
KF206/	Kit, Collar, Upper,Alloy,Speed110/MAX140
KF207/	Kit, Collar, Upper,Carbon,Speed110/MAX140
KF208/	Kit, Collar, Lower,Alloy
KF209/	Kit, Collar, Lower, Carbon, clip+bushing
KF213/BLK	Kit, Spring,MAX140 FE,XFIRM
KF213/BLU	Kit, Spring,MAX140 FE,STD
KF213/BRN	Kit, Spring,MAX140 FE,XXFIRM
KF213/GRN	Kit, Spring,MAX140 FE,SOFT
KF213/RED	Kit, Spring,MAX140 FE,FIRM
KF214/BLU	Kit, Spring,MAX140 TI,STD
KF214/GRN	Kit, Spring,MAX140 TI,SOFT
KF214/RED	Kit, Spring,MAX140 TI,FIRM
KF215/	Kit, Damper, Compression, MAX140, FFD
KF216/	Kit, Damper, Compression, MAX140, TPC
KF223/	Kit,Damper,Compression,MAX140,SPV
KF217/	Kit,Damper,Rebound,MAX140,FFD/TPC
KF218/	Kit,Damper,Rebound,MAX140,SPV
KF219/	Kit,Damper,Control ASSY,MAX140
KF220/	Kit,Damper,Bladder SPV,MAX140
KF221/	Kit, Knob, Compression,MAX140,TPC
KF224/	Kit, Damper, Piston Ring, MAX140-5
KF225/	Kit,Seal,Max140
KF222/	Kit, Boot, Lefty MAX 140
KF233/	KIT,KNOB,REBOUND,MAX140
KF234/	KIT,PUSHROD,MAX140
QC671/	Kit,Bleed Screw,MAX/Jake
HD208/	Kit, Outer Race Clip-Lefty / 5
HD209/BLK	Kit, Air Filter/Hood, Lefty
HD175/ BLK	Kit, Zip Ties, Black / 50
HD185/BLK	Kit, Zip Ties, Double Head /10
HD011/	Kit, Band Clamps (2), Boot - Lefty

HD215/	Kit, Frame Bumper, Lefty/Moto
QC679/	Kit, Clamp, Upper, MAX-Silver
QC680/	Kit, Clamp, Lower, MAX-Silver
HD016/	Kit, Steertube, Carbon Lefty
HD210/	Kit, Steerer Tube Plug, Lefty
QSMSEAL/	Kit, Seal, HShok Upper Bearing
QHDST/EBO	Kit, Headset, 2 cups + 1 bearing
HD169/	Kit, Bearings, Headset - 2; HeadShok
HDR2M/020	Kit, Race-Inner: 11.378"-289.0mmx.020"51mm (4)
HDR2M/021	Kit, Race-Inner: 11.378"-289.0mmx.021"53mm (4)
HDR2M/022	Kit, Race-Inner: 11.378"-289.0mmx.022"56mm (4)
HDR2M/023	Kit, Race-Inner: 11.378"-289.0mmx.023"58mm (4)
HDR2M/024	Kit, Race-Inner: 11.378"-289.0mmx.024"61mm (4)
HDR2M/025	Kit, Race-Inner: 11.378"-289.ommx.025"635mm (4)
HDR2N/024	Kit,Race-Outer:8.110"-206mmx.024"61mm (4)

### PRE-RIDE CHECKLIST

- 1. Check the fork externally for any sign of damage (e.g., bent fork, cracks, fluid leaks, tears, deep scratches, loose parts).
- 2. Check the fork boot for damage.
- Check the wheel attachment. Spin the wheel to make sure it does not wobble up and down or side-to-side. Make sure the brake disc is located between the pads.
- 4. Check the handlebar and stem clamp bolt tightness.
- Check the fork function. Make sure it operates normally and all adjustments are normal.
- 5. Check the brakes. Ensure that you have good braking.



A PRE- RIDE INSPECTION IS IMPORTANT TO YOUR SAFETY.

DON'T RIDE ON A DAMAGED FORK.

CORRECT ANY PROBLEMS BEFORE RIDING.

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#### **Our Mission Statement Is:**

"To create innovative, quality products that inspire cyclists around the world."

#### **Our Values Statements Are:**

- 1. We strive to exceed the expectations of our consumers, retailers, and business partners.
- 2. We believe our people drive our success.
- 3. We work together as one global team.
- 4. We act with respect, responsibility and integrity.
- 5. We continue to improve.

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