



## 2002 MOTORCYCLE OWNER'S MANUAL (E440, C440, X440)

- **Safety**
- **Operation**
- **Maintenance**



### ***Before you operate the vehicle. . . .***

- **READ and UNDERSTAND** this manual. It contains information important to your safety.
- Familiarize yourself with all vehicle controls and their proper operation.
- Perform the Pre-Ride Inspection found in this manual.
- Wear appropriate protective gear - approved full faced helmet, eye protection, gloves, boots, long-sleeve shirt, and pants. Consider specially designed protective off-road vehicle riding apparel.

## SAFETY ALERTS

- **FAILURE TO FOLLOW THE WARNINGS CONTAINED IN THIS MANUAL CAN RESULT IN SERIOUS INJURY OR DEATH.**
- **Keep this manual in a safe place.**

WHAT IS THE SAFETY ALERT SYMBOL  ?

- **Pay special attention to all messages preceded by the Safety Alert Symbol.**  
**It means: ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED.**

	Indicates that severe personal injury or death <b>WILL</b> result if instructions are not followed.
	Indicates a potential hazard that <b>COULD</b> result in serious injury or death.

### CAUTION

Indicates a potential hazard that could result in vehicle damage if instructions are not followed.

NOTE :

*Provides helpful information intended to make maintenance easier or the instructions presented clearer.*

## GENERAL PRECAUTIONS

YOU must always exercise good judgement when assessing your abilities to perform the work described in this manual.

### WARNING

- Make sure you are familiar with basic safety practices before performing any work on the vehicle.
- Always work in a well-ventilated area. Carbon monoxide gas (a by-product of combustion engines) is poisonous; you can be seriously injured or even killed if you breathe it.
- Do not service the vehicle with the engine running unless otherwise stated in a procedure.
- You can be seriously injured by moving parts. Always keep your hands, fingers, and clothing away from moving parts.
- Avoid hot components (e.g., engine, exhaust system, coolant system, brake discs, etc.); they can burn you. Allow all components to cool completely before touching or handling them.
- Always place the vehicle on a level surface or proper stand when performing any work to help eliminate the chance of the vehicle rolling away or becoming unstable while you work.
- Make sure you have the skills and tools necessary before performing any procedure.
- Make sure you are wearing the appropriate protective clothing when servicing the vehicle (e.g., safety glasses or a face shield, protective gloves).

### DANGER

#### POTENTIAL HAZARD

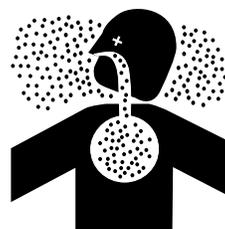
Running the engine indoors.  
Breathing exhaust gases

#### WHAT CAN HAPPEN

Running the engine indoors will expose you to dangerous exhaust gases. Breathing carbon monoxide gas leads to poisoning, asphyxiation, and death. This will happen rapidly and without notice.

#### HOW TO AVOID THE HAZARD

Never operate the vehicle indoors even for brief periods of time.



### WARNING

#### POTENTIAL HAZARD

Hot components (e.g., engine, radiator, hoses, bulbs, exhaust, brakes)

#### WHAT CAN HAPPEN

The engine and other vehicle systems operate at extremely high temperatures. Contact can produce severe burns.

#### HOW TO AVOID THE HAZARD

Wait for the engine and vehicle systems to cool completely before starting any work. If the engine must be running, work carefully and avoid hot surfaces.



**⚠ WARNING**

**POTENTIAL HAZARD**

Improper care when handling fuel.

**WHAT CAN HAPPEN**

Fuel is highly flammable, spilling it can cause a fire or explosion.

**HOW TO AVOID THE HAZARD**

Be sure the fuel cap is closed securely.  
Work in a well-ventilated area which is free of sources that could ignite any spilled fuel accidentally (e.g. cigarettes, welders, torches, grinders, electric shop tools, etc.)



**⚠ WARNING**

**POTENTIAL HAZARD**

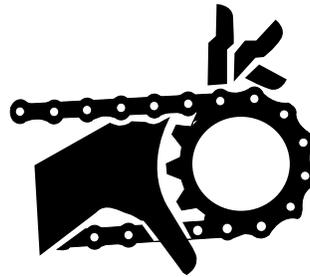
Losing a finger, hand or limb or entanglement

**WHAT CAN HAPPEN**

Moving parts can catch your clothing, fingers or hand resulting in severe injury.

**HOW TO AVOID THE HAZARD**

Never perform maintenance procedures with the engine running unless directed otherwise in a procedure.



**⚠ WARNING**

**POTENTIAL HAZARD**

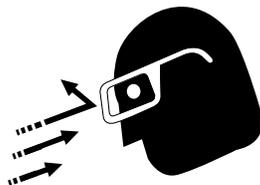
Blindness, eye injury

**WHAT CAN HAPPEN**

Anytime you work on the vehicle there is a potential that an accident involving a foreign object, vehicle component part, fluid, tool, or other maintenance related item can result in severe injury to your eyes. For example, when cleaning the oil filters, objects propelled by compressed air can strike your eyes and cause serious injury or blindness.

**HOW TO AVOID THE HAZARD**

Always wear safety glasses when working on the vehicle.



**⚠ WARNING**

**POTENTIAL HAZARD**

Vehicle fluids (e.g., engine oil, transmission oil, brake fluid, coolant)

**WHAT CAN HAPPEN**

The fluids in your vehicle are hazardous substances. Contact with your skin or eyes you can result in serious injury or irritation. If swallowed, death can result

**HOW TO AVOID THE HAZARD**

Wear hand protection and safety glasses when working with vehicle fluids.  
If you touch a fluid, wash it off immediately with soap and water.  
Clean clothes or rags contaminated with engine oil.  
If swallowed seek immediate medical attention.

**KEEP ALL VEHICLE FLUIDS AWAY FROM CHILDREN AND ANIMALS.**

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## IMPORTANT INFORMATION

### ABOUT THIS MANUAL

The purpose of this manual is to provide the owner with important safety, service, maintenance, and tuning information, and should be thoroughly read before operating or working on the vehicle.

This manual is divided into sections which contain easy-to-follow procedures which are reasonably straight-forward. Anyone with the mechanical ability and the proper tools should be able to perform them. Each procedure is accompanied by illustrations and photos to aid in proper vehicle operation, basic maintenance, tuning, etc.

- **Read and understand the entire procedure before performing any work. If you are unfamiliar with or doubt your own abilities to complete a procedure as described, have an authorized Cannondale Motorsports Dealer service your vehicle.**

Please keep your Owner's Manual in a safe and convenient place, and consider it an integral part of your vehicle.

For detailed servicing information refer to the Service Manual for your vehicle or contact an authorized Cannondale Motorsports Dealer for a list of available publications. If this manual is lost or damaged, contact an authorized Cannondale Motorsports Dealer for a replacement.

## HOW TO USE THIS MANUAL

- **This manual is broken down in headings, numbered steps [which may contain WARNING(S), CAUTION(S), and/or NOTE(S)], and illustrations or line art.**
- **Headings and numbered steps should be followed in the order in which they are presented. The explanations given in the numbered steps are intended to be used as a guide for a technician needing additional information.**
- **Illustrations and line art are used to identify parts of the vehicle included in the procedure to eliminate any possible confusion and to support the numbered steps.**

## LIMITATIONS

All information, illustrations, and specifications in this manual are based on the latest product information available at the time of publication. Cannondale Corporation reserves the right to make changes at any time, without notice.

This vehicle has U.S. and International patents pending.

## **EXPERIENCED RIDERS ONLY**

- **This vehicle is not for beginners.**

All Cannondale motorsports products are designed for use by trained and experienced riders only. All are very high performance, competition sport machines and should only be operated by licensed competition riders in excellent physical condition, who are well-trained and experienced in the operation of high performance competition vehicles.

## **EXERCISE GOOD JUDGEMENT**

There is always a risk involved when riding a vehicle; however, making sure you and the vehicle are in the best condition possible will ensure a great riding experience. Use sound judgement when riding.

Never ride under the influence of alcohol, medication, or drugs. Doing so will greatly reduce your ability to properly operate this vehicle and could lead to an accident, injury, and/or death. If you are taking medications prescribed by your doctor, consult him/her before riding.

## **MODIFICATIONS**

We recommend that you do not substitute parts, change or modify your vehicle. Such changes could seriously impair your vehicle's handling, stability, and braking, making it unsafe to ride and causing serious injury and/or vehicle damage.

## **NO PASSENGERS**

Do not overload this vehicle or carry passengers. Doing so could seriously impair your vehicle's handling, stability, and braking, making it unsafe to ride which could result in damage to the vehicle or serious injury or death to the operator and/or passenger.

## ALUMINUM CHASSIS COMPONENTS

The aluminum chassis components of your vehicle have a finite, limited useful life. The length of that life varies depending on the material used in their manufacture, the amount of use they are subjected to and the care they receive while in service. Regular inspection by a Cannondale Motorsports Dealer is important.

- **Frame - a main support structure for the engine, various components, and rider.**
- **Subframe - adds structural support.**
- **Swingarm - a suspension component**

Use in competitive events, hard and aggressive riding, riding on severe terrain, riding in severe climates and riding fast can dramatically shorten the life of the aluminum (frame) components. Any one and/or a combination of these conditions may result in an unpredictable failure.

We recommend that you carefully inspect your vehicle's chassis components for cracking, bending, deep scratches and/or other damage before every ride.

If you have crashed or rolled your vehicle, there could be damage hidden from your view. **DO NOT** ride a vehicle with any crack, even a small one. It must be carefully inspected by an authorized Cannondale Motorsports Dealer before it is used again.

Riding a cracked frame could lead to complete frame failure. If you have any questions contact your Cannondale dealer or call 1-800-MOTO-USA.

### **⚠ WARNING**

#### **POTENTIAL HAZARD(S)**

- (1) Operating with a bent, corroded/rusted, cracked, dented, or damaged frame, subframe, swingarm or other aluminum component.**
- (2) Attempting to repair the frame, subframe, or swingarm on this vehicle.**

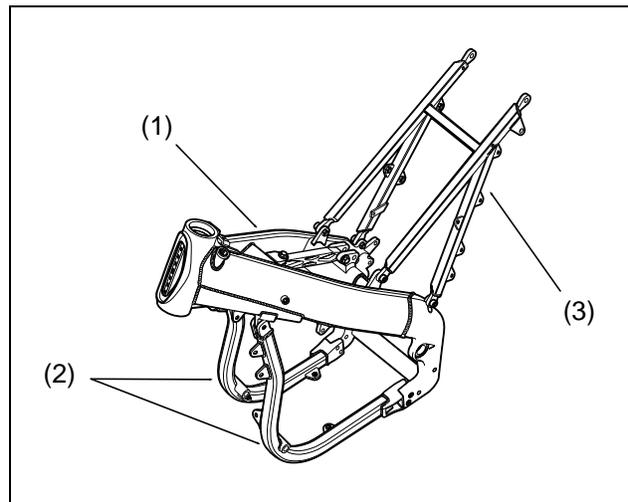
### **WHAT CAN HAPPEN**

- (1) Riding on a damaged frame can lead to a complete frame failure.**
- (2) Aluminum frame (and components) are heat treated. Welding, drilling, or modifying the frame, subframe, or swingarm may weaken the component and result in complete failure leading to a serious accident with subsequent injury or death.**

### **HOW TO AVOID THE HAZARD**

- (1 & 2) Contact an authorized Cannondale motorsports dealer for servicing if either the frame, subframe, or swingarm is damaged; never try to repair the frame, subframe, swingarm, or other components.**

Inspect the frame (1), lower frame rails (2) and subframe (3) for cracks, deep scratches, or other damage. If any damage is found, contact an authorized Cannondale Motorsports Dealer for servicing.



1. Frame
2. Lower frame rails
3. Subframe

### **NOTE :**

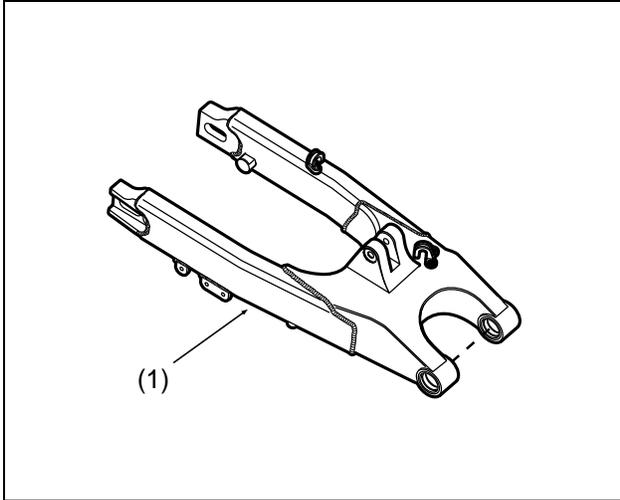
*The frame and subframe are shown removed from the vehicle for clarity.*

Inspect the swingarm for cracks, deep scratches, or other damage.

Inspect the weldments (individual welded components comprising the total swingarm) and fastener fixtures for any sign of cracking or damage.

Place the vehicle on a stand with the rear wheel suspended. The swingarm should move freely up and down with no play side to side.

If any damage to the swinarm is detected, take corrective action before riding. Contact an authorized Cannondale motorsports dealer for servicing.



1. Swingarm

NOTE :

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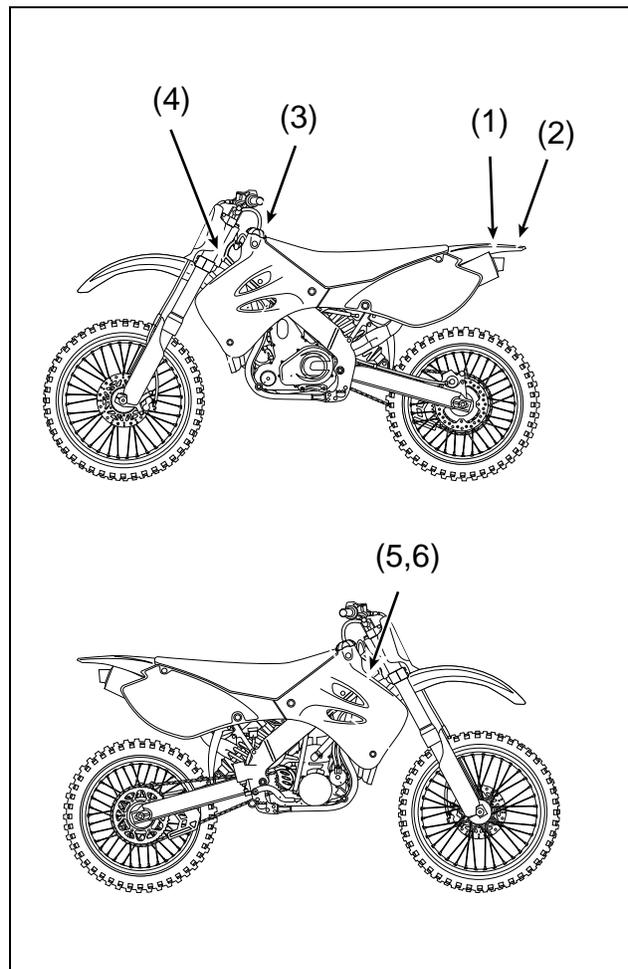
*The swingarm is shown removed from the vehicle for clarity.*

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## VEHICLE LABELING

Read and understand the labels on your vehicle. Examples of the labels can be found in this section. Warning labels contain information which is important to your safety and that of anyone else who operates the vehicle. Other labels provide important information.

- The labels should be considered permanent parts of the vehicle.
- If any label is missing, worn, damaged, or becomes unreadable, replace it. Cannondale offers replacement labels at no charge. A label's part number is printed in the lower right corner of the label and here in the manual. Contact an authorized Cannondale Motorsports Dealer for replacements.
- Label locations are shown in the following illustration. Always replace labels in the correct position.
- Examples of the labels are shown on the following pages. See the illustration for the correct location of the warning labels on your vehicle.



Label 1

P/N 315-5000266-01

**DISCLAIMER:** In accepting delivery of this vehicle, the buyer or transferee acknowledges that he has thoroughly inspected the vehicle and further agrees to accept the vehicle as is with all defects or faults, concealed or obvious. He further agrees that no warranties attach, express or implied, including any warranty of merchantability or fitness for any particular purpose. The buyer or transferee indemnifies and holds harmless Cannondale, its agents and employees for any failure of performance, cost of service, or repair. The buyer further acknowledges that this vehicle is not intended for use on public streets, roads, highways, or trails under public jurisdiction and that use on such may violate state and federal law.

315-5001262-01

Label 2

P/N 315-5001262-01

**WARNING**

- Heat treated aluminum frame.
- Welding, drilling, or modifying in any way may cause failure that could result in loss of control and cause serious injury or death. Inspect frame periodically for cracks.

**DO NOT RIDE OR REPAIR A CRACKED FRAME.**

5001371-01

Label 6

P/N 315-6000477-01



Label 3

**THIS MOTORCYCLE IS DESIGNED FOR CLOSED COURSE COMPETITION USE ONLY. IT DOES NOT CONFORM TO U.S. EPA MOTORCYCLE NOISE STANDARDS.**

5000418

Label 4

Mfd. by **Cannondale Corporation**

This vehicle is designed and manufactured for competition use only. It does not conform to Federal Motor Vehicle Safety Standards and operation on public streets, roads, and highways is illegal. State laws prohibit operation of this vehicle except in an organized racing or competitive event upon a closed course which is conducted under the auspices of a recognized sanctioning body or by permit issued by the local governmental authority having jurisdiction. First determine that operation is legal.

U.S. and International patents pending.  
Type: **Motorcycle**

Label 5

## MACHINE IDENTIFICATION

### NOTE :

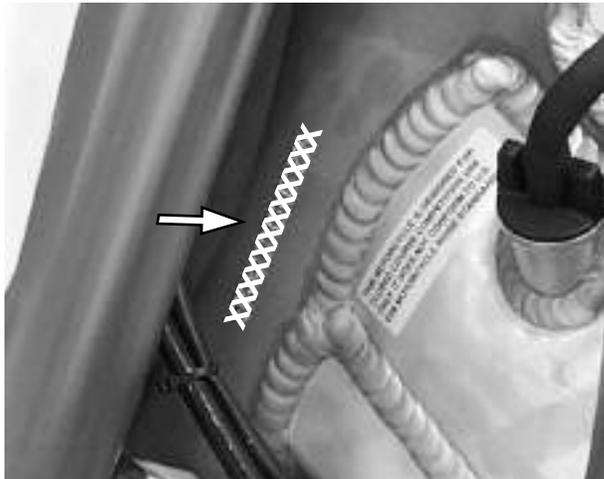
*Your vehicle may differ from those shown in the illustrations in this manual.*

Record your vehicle's identification numbers in the spaces provided. Keep another record of the numbers in a safe place; you may need them for parts, service information, or theft recovery.

Your vehicle's ID numbers identify it from others of the same model type.

## VEHICLE IDENTIFICATION NUMBER (VIN)

The vehicle identification number (VIN) is located on the left side of the steering head.



1. Etched vehicle identification number

Write your number here

## ENGINE SERIAL NUMBER

The engine serial number is etched/stamped into the rear area of the engine crankcase. The number also appears on a metallic plate affixed to the crankcase area above the countershaft sprocket. The number also appears on a temporary factory applied adhesive label in the same area.



1. Engine serial number

Write your number here

## PARTS & CONTROLS

This section describes the parts and control functions found on your vehicle. Not all the items found in this section may be installed on your vehicle.

If you have any questions about the parts, control functions, or components installed on your vehicle, consult your Cannondale Motorsports Dealer.

### ENGINE START BUTTON

The engine start button is located on the right handlebar and is (GREEN) in color.

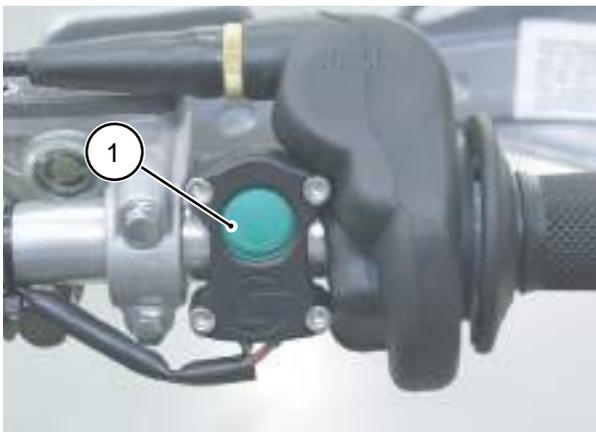
Before attempting to start the engine, press it for 1 second to activate the engine management system circuits. Then, press and hold it to activate the starter motor. But, be sure to read the Operation section of this manual for a detailed explanation of the best starting procedure.

#### NOTE :

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*When pressing the button to operate the starter, motor hold it for no more than 2-3 seconds at a time.*

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1. Engine start button

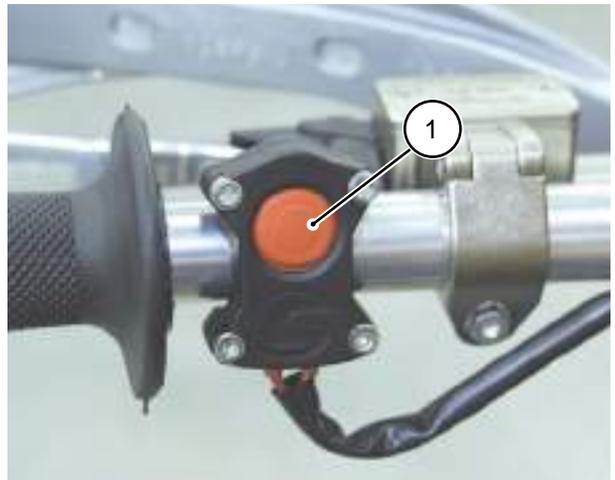
### ENGINE STOP BUTTON

The engine stop button is located on the left handlebar. The button is (RED) in color.

Pressing it will shut off a running engine. Or, press it to deactivate the engine management system circuits.

Make sure this button operates properly before starting out.

To test it, start the engine then press and hold the button. When pressed the engine should stop running.



1. Engine stop button

#### NOTE :

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*The stop button is normally a closed circuit switch. If the stop switch is damaged or the wires are frayed or torn, (circuit open) the engine may not start.*

---

## LIGHTING SWITCH

The lighting switch is used to activate the headlight and taillight together. It is located on the ride computer mounting bracket in front of the handlebar.



1. Headlight/ Taillight switch

The taillight should turn on with the headlight in either the HI or LO switch position. Be sure the lighting operates properly before starting out.

### NOTE :

*The lights on your motorcycle are powered through the engine management system relay. This relay supplies voltage as long as the ECU tells it to. The ECU itself has a 2 minute timer which will shut off itself and the relay. If those two things are off, so is the lighting, even if the switch is in either the HI or LO position.*

*To turn the engine management system on, press the engine START button quickly (1 second) without holding to turn over the engine).*

To test the headlight/taillight, quickly (1 second) press the engine START button to activate the engine management system. Toggle the switch positions and observe that the headlight/taillight are functioning properly. The HI and LOW intensity lamps of the headlight should operate and the taillight should remain lighted in both positions. If the headlight or taillight does not work properly, check the fuse and bulb. If the fuse or bulb is blown, correct the problem before riding.

### **⚠ WARNING**

**Select HI or LO intensity before moving off to ride. Do not remove your hands from the handlebar to toggle the switch while the vehicle is moving. You could lose control and have an accident.**

### NOTE :

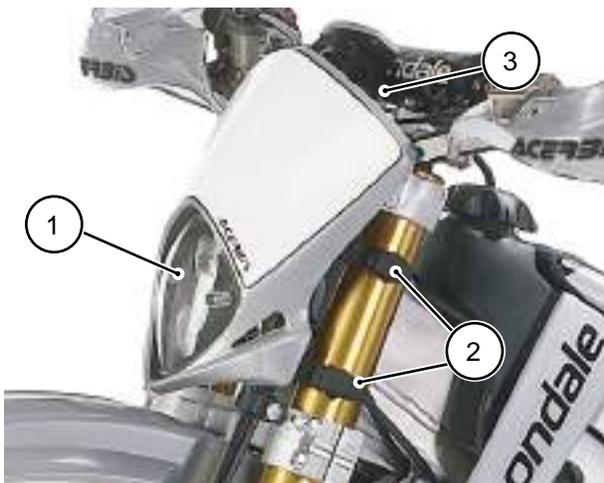
*Switch the lights off before attempting to start the engine.*

Return the switch to the center position when the lighting is not required.

## HEADLIGHT

The headlight is located at the front of the vehicle and is activated with the headlight/ taillight switch. The highlight can be switch to HI or LO intensity with the headlight switch. Be sure the headlight is fastened securely with the mounting straps and operating properly (HI and LO intensity) before starting out.

Details on bulb replacement can be found in the Maintenance and Adjustment section of this manual.



1. Headlight
2. Mounting straps (left fork)
3. Headlight/Taillight switch

## TAILLIGHT

The taillight with the headlight/taillight switch. It should light in both the HI or LO switch position. It is NOT a braking light!

Make sure it is operating properly before starting out.

### NOTE :

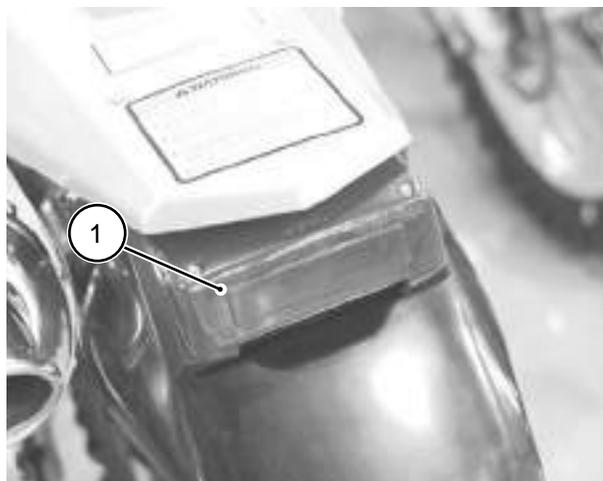
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*Remember that the lighting circuits are energized through the engine management system power relay. This relay is controlled by the ECU. The ECU will shut down the system automatically after 2 minutes if the engine is not started or the START button has not been pressed. In short, the lights can be turned on as long as the engine management system is activated.*

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The taillight should be activated in both switch positions (HI and LO). If it does not light, check to see if a fuse or bulb replacement is needed. Correct the problem before riding.

Details on bulb replacement can be found in the Maintenance and Adjustment section of this manual.



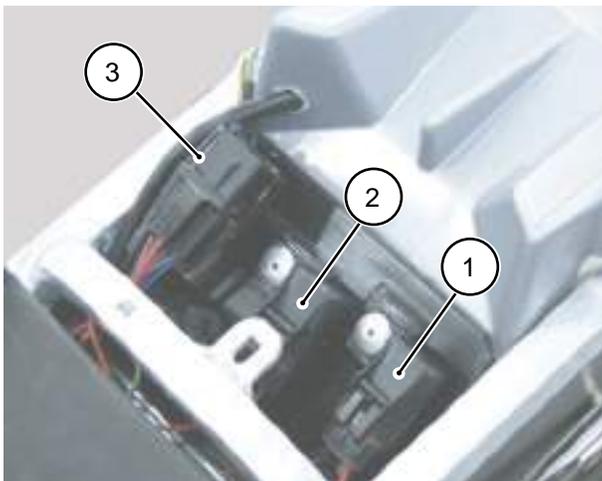
1. Taillight

## FUSES

The fuses for your vehicle are located inside fuse holders under the seat.

Unless directed otherwise in a procedure, you should always remove the fuses before working on the vehicle.

Fuse replacement is described in the Maintenance and Adjustment section of this manual.



1. Main fuse
2. Lighting fuse
3. EMS power relay

**SERVICE:** Main fuse rating  
10 A

**SERVICE:** Lighting fuse rating  
10 A

When a fuse blows repeatedly, it usually indicates a short circuit or current overload in the electrical system. The problem could be intermittent or constant. In either case, don't ride the vehicle because an electrical fire could lead to a serious accident. If you experience frequent fuse "blows," have the vehicle inspected by an authorized Cannondale dealer.

### **⚠ WARNING**

#### **POTENTIAL HAZARD**

Using an unspecified fuse or shorting the fuse holder.

### **WHAT CAN HAPPEN**

Using a fuse with a rating other than specified or using other materials in place of the fuse will cause damage to the system. A malfunctioning electrical system increases the risk that you may be seriously injured or killed while operating the vehicle. For example, an electrical fire can develop from a system overload or you could lose vehicle lighting.

### **HOW TO AVOID THE HAZARD**

Always use a replacement fuse of the specified rating.

Never use other materials in place of the fuse.

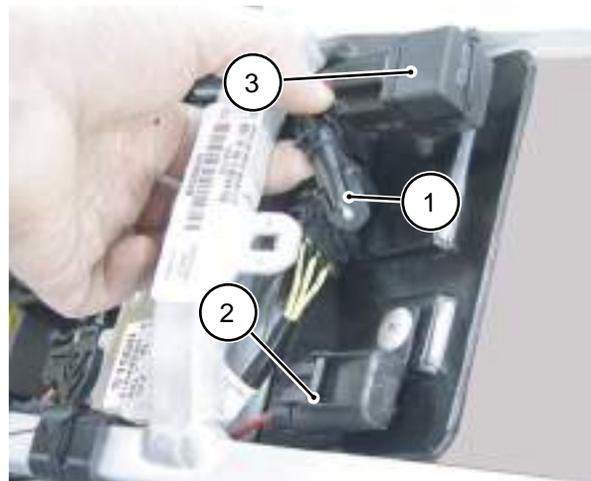
If a fuse blows immediately after replacement have the electrical circuits checked by an authorized Cannondale Motorsports Dealer.

Check the condition of the wiring harness and connectors before replacing a blown fuse.

Make sure the lighting is switched off when replacing a fuse.

## OPTIONAL LIGHTING

If you have an C440 or X440 model, you may choose to install the available lighting systems. The connection for optional lighting is located under the seat near the main fuse and engine management system relay. This connector is NOT protected by a fuse, so do not improvise; contact your Cannondale Motorsports dealer to install the optional lighting system.



1. Optional lighting tap (non-fused)
2. Main fuse
3. Engine Management System power relay

## MULTI-FUNCTION RIDE COMPUTER

The multi-function ride computer is located between the handlebars.

Consult the manufacturer's instruction manual included with this manual for the unit features and operating instructions.

### WARNING

Never remove your hands from the handlebar when riding the vehicle; you can lose control and have a serious accident. Always stop the vehicle on level ground before operating (programming/setting) the computer.



1. Multi-function ride computer



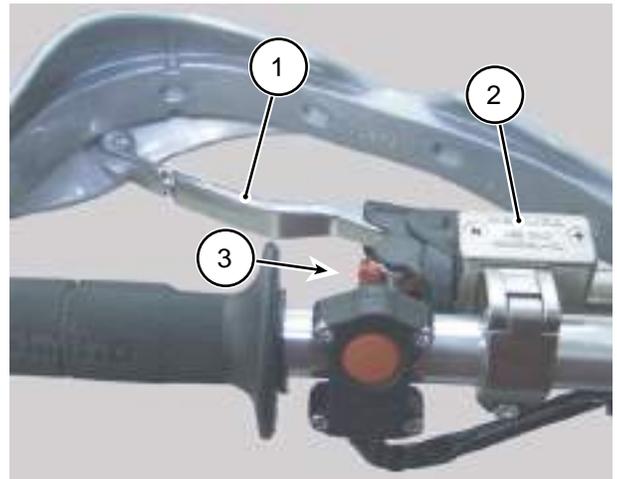
1. Manual

## CLUTCH LEVER

The clutch lever is located on the left side of the handlebar.

Pull in the clutch lever (quickly) to disengage the clutch, and release the lever (slowly) to engage the clutch.

The lever position can be adjusted for individual hand sizes. To adjust it, see the Maintenance and Adjustment section of this manual.

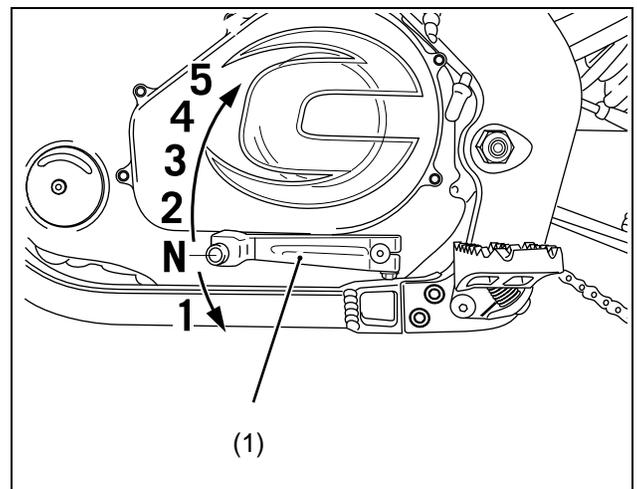


1. Clutch lever
2. Clutch reservoir
3. Lever position adjuster

## SHIFT LEVER

The shift lever is located on the left side of the engine just in front of the left footpeg.

The transmission has five gears, "one down, four up." Neutral is located between first and second gears.



1. Shift lever

## THROTTLE GRIP

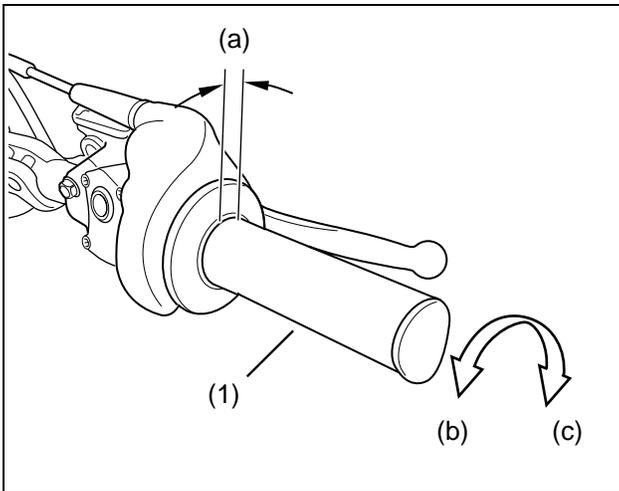
**SERVICE:** Throttle lever freeplay  
1/8 - 5/16 in (3 - 8 mm)

The throttle lever is located on the right handlebar and controls acceleration and deceleration of the engine.

Before every ride make sure the specified freeplay is available at the grip. Freeplay is the distance the grip rotates before all cable slack is taken up. See the illustration below. Adjustment of the freeplay is described in the Maintenance and Adjustment section of this manual.

To accelerate, turn the lever towards you. To decelerate, turn the grip away from you.

Make sure the throttle lever operates properly before you ride. It should operate freely (e.g., without binding, dragging, or sticking) and return to the closed position automatically in all steering positions.



- 1. Throttle grip
- a. Freeplay
- b. Open throttle (accelerate)
- c. Close throttle (decelerate)

### WARNING

#### POTENTIAL HAZARD(S)

- (1) Stuck or damaged throttle
- (2) Incorrect freeplay

#### WHAT CAN HAPPEN

- (1) The throttle must return to the closed position automatically when you release it. If it sticks you can lose the ability to accelerate and decelerate the engine which could result in an accident where you could be seriously injured or killed.
- (2) The throttle freeplay must be maintained as specified, otherwise the engine speed could increase when the handlebars are turned or when the throttle is slightly grasped. Either situation could result in an unexpected acceleration of the engine where you could be seriously injured or killed.

#### HOW TO AVOID THE HAZARD

- (1) Test the operation of the throttle before each ride. Make sure it operates smoothly (with no sticking or binding) in all steering positions. It should return automatically to the closed position when released.
  - (2) Make sure the throttle freeplay is adjusted as specified.
- (1 & 2) If the throttle malfunctions or you can not adjust the throttle to the specified freeplay, do not ride the vehicle. Contact an authorized Cannondale Motorsports Dealer for servicing.

## FRONT BRAKE LEVER

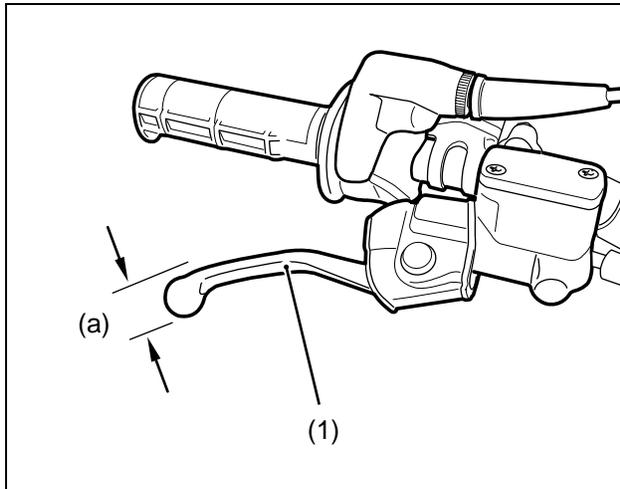
The front brake lever is located on the right handlebar.

Pull the lever against the handle grip to activate the front brake.

Always make sure the brakes (front and rear) on your vehicle operate properly before riding.

Make sure the lever has the specified freeplay. Measure the freeplay at the tip of the lever. See the illustration. Adjustment of the freeplay is described in the Maintenance and Adjustment section of this manual.

The position of the brake lever can be adjusted so that control is comfortable when seated and standing. Adjustment of the lever position is described in the Maintenance and Adjustment section of this manual.



1. Front brake lever
2. Freeplay

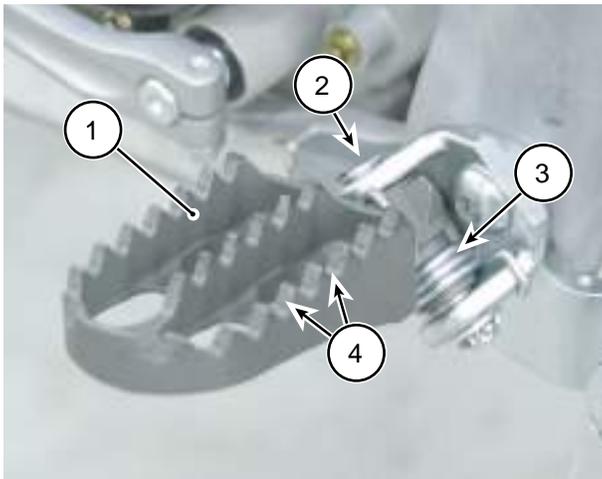
**SERVICE:**     **Brake, lever, front, freeplay,  
maximum  
0.8 inches (20 mm)**

1. To measure the freeplay, gently pull in the brake lever until the play is taken up, then measure distance (a) at the end of the brake lever. Adjust if out of specification.

## FOOTPEGS

The right and left footpegs on your vehicle should be fastened securely and free of any collected mud or dirt. The footpegs should move freely (up and down on the pivot) and not bind - springing back when released.

After cleaning the vehicle, always lubricate the footpeg pivot points with some clean engine oil. Move the pegs up and down to work the lubricate in. Don't use grease; grease will catch and collect dirt and small particles which will damage the pivot point. Make sure the teeth are in good condition.



1. Left footpeg
2. Pivot
3. Spring
4. Teeth



1. Right footpeg

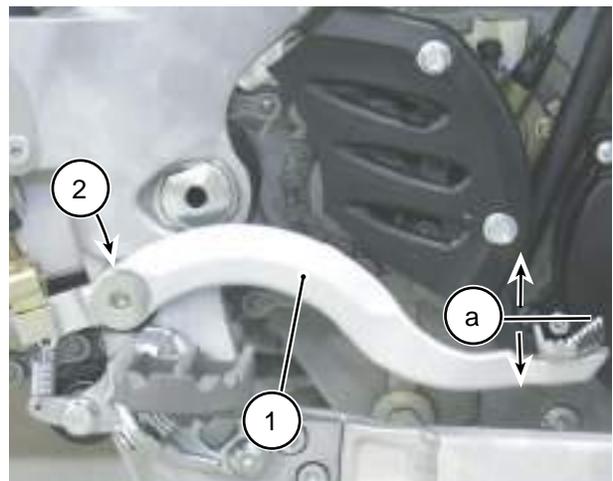
## REAR BRAKE PEDAL

The rear brake pedal is located on the right side of the vehicle.

Press it firmly with your foot to apply the rear brake. Test to make sure it is operating correctly before you ride. When pressed, braking force should be applied to the rear brake disc. Braking force will increase the more you press down on the pedal.

The rear brake pedal height can be adjusted for comfort. To adjust it, see the Maintenance and Adjustment section of this manual.

After cleaning the vehicle, be sure to lubricate the pedal pivot point with clean engine oil. It is not necessary to remove the bolt, simply apply a few drops of oil to the bolt and work the pedal up and down.



1. Rear brake pedal
2. Pivot
- a. Pedal height

## SIDE STAND OR KICKSTAND

The side stand or kickstand (on equipped vehicles) can be used to support the vehicle on firm level ground when not in use (with engine off). It is only designed to support the weight of the vehicle; so do not apply extra weight when using it (e.g., leaning on the bike or sitting on it with the stand or kickstand in place).

The kickstand is mounted on the left side of the motorcycle.

### **WARNING**

#### **POTENTIAL HAZARD(S)**

- (1) Sitting or leaning on the vehicle
- (2) Riding with the side stand attached, the kick stand down, or not fully upright.
- (3) Working on the vehicle with the side stand or kickstand.

#### **WHAT CAN HAPPEN**

- (1) The side stand and kickstand are designed to support only the weight of the vehicle. If you sit or lean on the vehicle, the additional weight could cause the vehicle to fall over.
- (2) The stand can cause you to lose control of the vehicle.
- (3) The motorcycle can fall onto you.

In any of the cases above, you can be serious injured or killed.

#### **HOW TO AVOID THE HAZARD**

- (1) Never sit or lean on a vehicle.
- (2) Remove the side stand; lift the kickstand before riding.
- (3) Always place the vehicle on a work stand when performing maintenance. Ask your Cannondale Motorsports Dealer about motorcycle work stands.

### **CAUTION**

Turn the handlebars to the left side of the vehicle when using the kickstand. Stability of the motorcycle is greater with the wheel pointing to the left; risk of toppling is increase with the handlebars turned to the right.

To use the side stand (triangle shaped and removable from the vehicle), position the vehicle on firm level ground. Hold the vehicle upright and insert the side stand completely into the hole in the rear axle shaft on the right side of the vehicle. Tilt the vehicle toward the stand allowing the weight of the

vehicle to rest on the stand. Make sure there is no danger of the vehicle falling over before leaving the vehicle unattended.



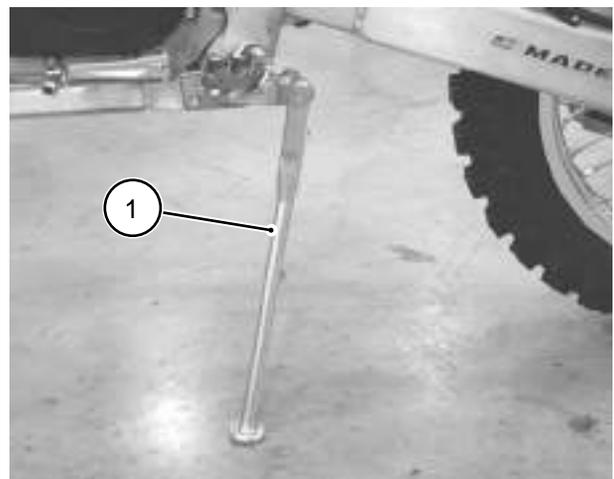
1. Side stand

The kickstand is located on the left side of the vehicle behind the left footpeg. It is designed to support only the weight of the vehicle when it is not in use (with the engine off).

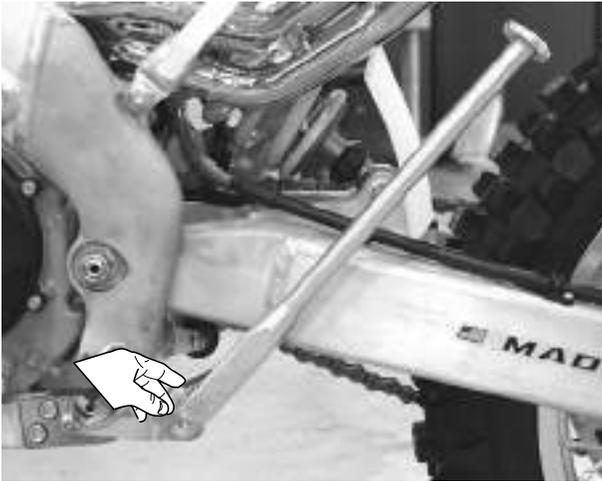
To use the kick stand, position the vehicle on firm level ground. Fold the kickstand down and rest the weight of the motorcycle on it. Turn the handlebars, to the left (toward the kickstand) side of the motorcycle; this shifts more of the weight toward the stand reducing the potential of the vehicle to tip on its right side if bumped. However, the kickstand

Make sure the kickstand is folded up as far as possible and is firmly attached (not wobbling) on the mount before every ride.

After cleaning the vehicle, apply some clean engine oil to the pivot point and work the stand up and down to work in the oil.



1. Kickstand (shown supporting weight of the vehicle)



This photo shows the kickstand in the operating position. See a close-up of the area indicated in the next photo.



The image on the left shows a kickstand that is in the correct operating position. Notice that there is no gap (1) present between the kickstand leg and the plate.

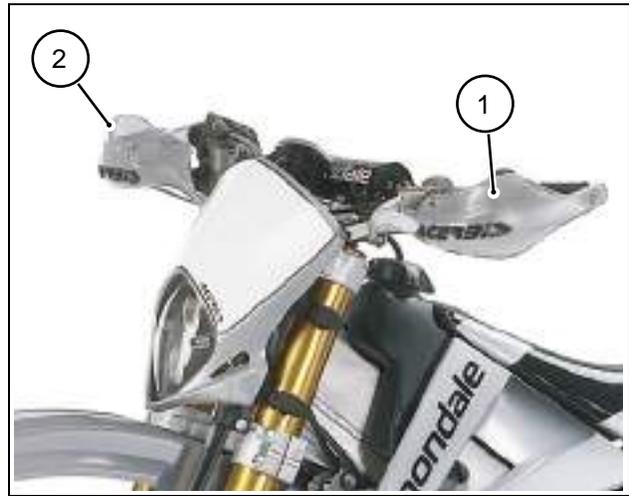
The image on the right shows a kickstand in the up position but "hanging." Notice that gap between the leg and the plate. The kickstand may be damaged (e.g., bad spring, bent leg or plate). This condition must be corrected before riding the vehicle.

## HANDGUARDS

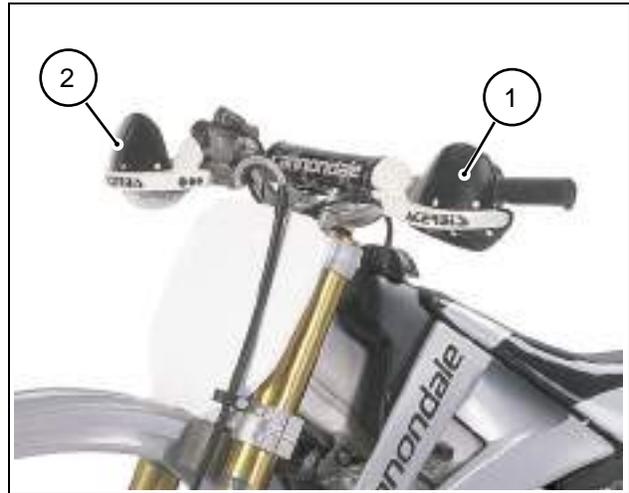
The handguards are located on the right and left sides of the handlebar directly in front of the handle grips.

These guards are designed to only offer limited hand protection. Make sure you read the warning following a description of the guards.

Make sure the handguards are in good condition and fastened securely before riding. The handguards should not interfere with operation of the vehicle controls. Tighten the mounting hardware securely.



1. Type 1 handguard (left side)
2. Type 1 handguard (right side)



1. Type 2 handguard (left side)
2. Type 2 handguard (right side)

**⚠ WARNING**

**POTENTIAL HAZARD(S)**

- (1) Interference with the vehicle controls
- (2) Crushed, mangled, or injured hands

**WHAT CAN HAPPEN**

(1) If a handguard is loose or damaged, it can interfere with the controls possibly preventing your hands from operating the controls as required.

(2) The hand guards (TYPE 1 and TYPE 2) provide limited protection against trail hazards [e.g., wind deflection, small branches, “roost” (the dirt and debris thrown backward from a leading vehicle)]. The guards **WILL NOT** protect you (your hands) from injury in a crash.

In either case above (1,2) you can be severely injured or killed.

**HOW TO AVOID THE HAZARD**

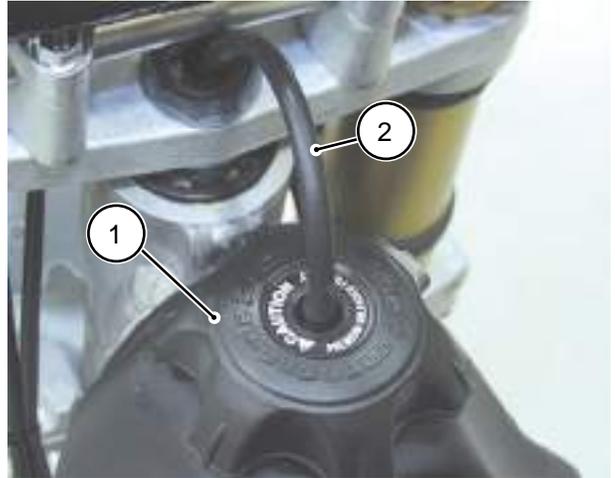
(1 & 2) The handguards should be inspected before every ride to ensure that they are mounted securely and will not interfere with the vehicle controls. If they are damaged or loose, take corrective action. If you have any questions about the conditions or intended use of the handguards, contact your Cannondale Motorsports Dealer for assistance.

## FUEL CAP

Remove the fuel cap to fuel the motorcycle. You should fill the vehicle with the specified gasoline before each ride. See the Fluids section of this manual.

To open: Turn the cap counter-clockwise.

To close: Reinstall the fuel cap and turn it clockwise until it is secured.



- 1. Fuel cap
- 2. Breather (vent) hose

# FLUIDS

## FUEL

Use only clean, fresh unleaded gasoline with a minimum Anti-Knock Index of 92 or higher.

Fill the tank with the specified fuel before every ride.

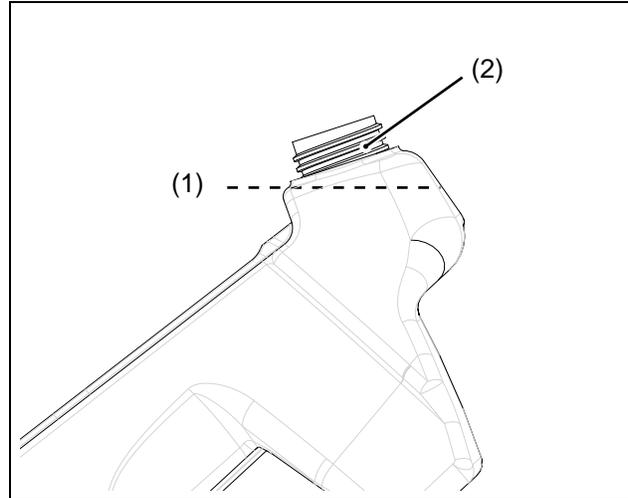
We recommend that the inline fuel filter is replaced every 5 hours of operation for the best performance. See the Maintenance and Adjustment section of this manual.

### CAUTION

If engine “knocking” or pinging occurs, use a different brand of gasoline or a higher octane rating.

Never experiment by using fuels other than the recommended type in this vehicle. Other fuels or additives that are not designed specifically for this vehicle can severely damage the engine and its supporting components (e.g. fuel system, sensors, tank, hoses, etc.)

1. Remove the fuel cap and fill the tank with fuel until it reaches the bottom of the filler neck.



1. Fuel level
2. Filler neck

### WARNING

#### POTENTIAL HAZARD

Overfilling the fuel tank

#### WHAT CAN HAPPEN

Fuel expands due to heat (e.g., engine, sun) and may overflow if the tank is overfilled, resulting in a fire.

#### HOW TO AVOID THE HAZARD

Stop adding fuel when the correct level is reached.

### WARNING

#### POTENTIAL HAZARD

Improper care when handling fuel.

#### WHAT CAN HAPPEN

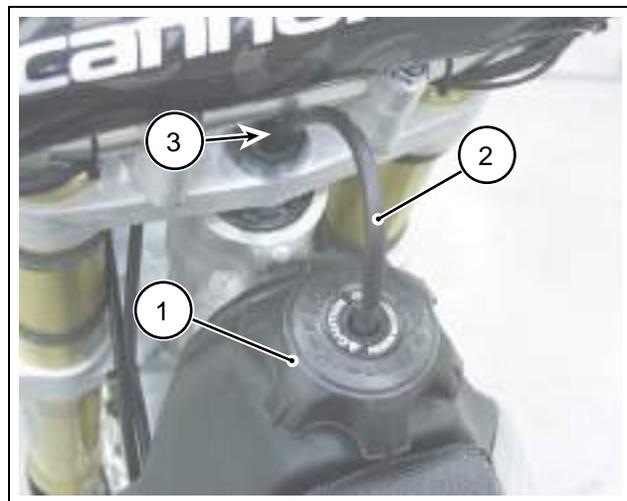
Fuel is highly flammable, spilling it can cause a fire or explosion.

#### HOW TO AVOID THE HAZARD

Work in a well-ventilated area which is free of sources that could ignite any spilled fuel accidentally (e.g. cigarettes, welders, torches, grinders, electric shop tools, etc.)



2. Tighten the fuel cap securely and make sure the breather hose is undamaged and routed correctly.



1. Cap
2. Breather (vent) hose
3. Steering stem hole

## BRAKE FLUID

Check the brake fluid in both the front and rear systems before every ride.

Use only clean DOT #4 brake fluid from a sealed container. Do not mix brake fluid types or brands.

Have the brake fluid in both systems replaced every year.

### **WARNING**

#### **POTENTIAL HAZARD**

- (1) Eye and skin injury, death if swallowed
- (2) Mixing fluid types or brands
- (3) Fluid from unsealed containers
- (4) Low fluid level

#### **WHAT CAN HAPPEN**

- (1) Brake fluid is a hazardous substance. It can cause injury to your eyes or skin if you touch it. If swallowed it can cause death.
- (2) Mixing types and brands can damage the brake system leaving you without brakes.
- (3) A container of brake fluid once unsealed can begin to absorb moisture from the atmosphere - if used in the brake system, the moisture will reduce braking force. You could lose your brakes and have an accident resulting in injury or death.
- (4) Low brake fluid can allow air to enter the system and this will reduce braking power. Again, you could have an accident and be seriously injured or killed.

#### **HOW TO AVOID THE HAZARD**

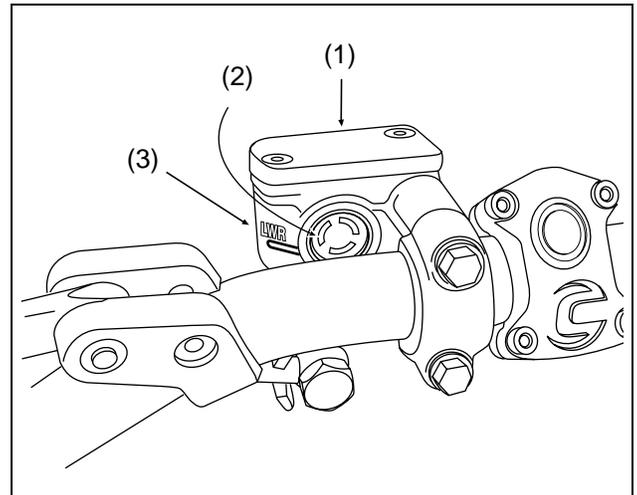
- (1) Always wear eye and hand protection when working with brake fluid. Keep brake fluid out of the reach of children and animals. If ingested contact a doctor immediately.
- (2,3) Always use DOT 4 brake fluid from a sealed container. Don't mix fluids or use opened fluids. Have the system drained and refilled by an authorized Cannonadale Motorsports dealer if you suspect fluids have been mixed accidentally.
- (4) Check the fluid level before riding the vehicle.

### **CAUTION**

Avoid spilling brake fluid on painted, plastic or rubber parts; damage will result. Place a shop towel or rag over these parts when servicing the brake system. Wipe up any spills immediately.

## FRONT BRAKE

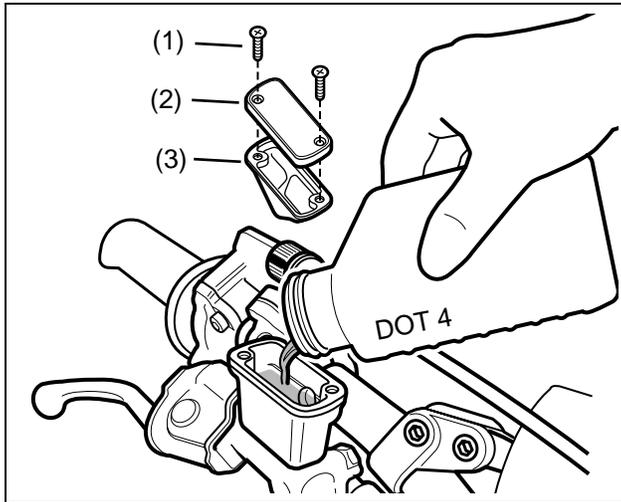
1. To check the front system, start by leveling the top of the master cylinder (mounted on the right handlebar).



- 1. Master cylinder
- 2. Site window
- 3. 'LWR' mark

2. Inspect the fluid level through the site glass. If the fluid level is below the 'LWR' mark, add the specified brake fluid until the fluid is at the top of the window.
3. To add fluid, make sure the area around the master cylinder is clean to prevent contamination which can lead to a loss of braking force. Remove the screws, cover and diaphragm from the master cylinder.

- Pour DOT#4 brake fluid from a sealed container until the fluid level rises to the top of the site window and no higher. If you fill above the window the fluid will overflow when the diaphragm and cover are re-installed.



- Front brake master cylinder cover screws
- Front brake master cylinder cover
- Diaphragm

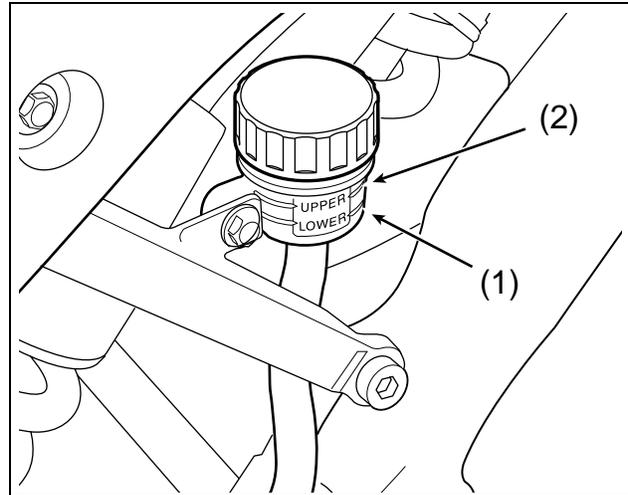
- Reinstall the front brake master cylinder diaphragm and cover. Tighten front master cylinder cover screws to the specified torque.

**TORQUE :** Front brake master cylinder cover screws  
1.4 lbf•ft (1.9 N•m)

## REAR BRAKE

- To check the rear system, level the rear brake master cylinder reservoir. The fluid level should be above the 'LOWER' mark.

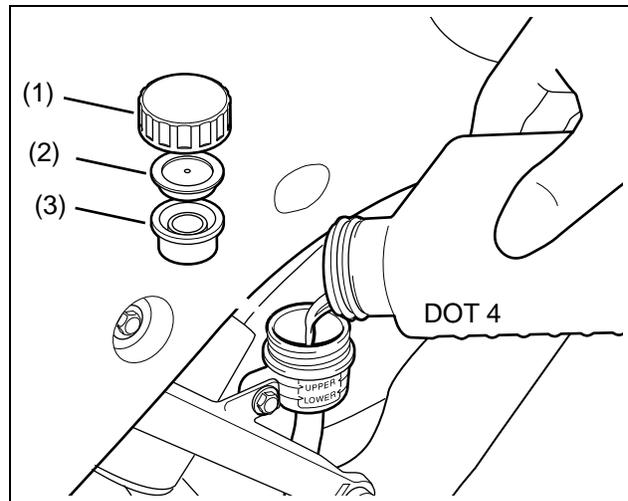
- If the fluid level is below the 'UPPER' mark, remove the cap and add the specified brake fluid until it reaches the 'UPPER' mark.



- 'LOWER' mark
- 'UPPER' mark

### NOTE :

*Do not fill the brake master cylinder above the 'UPPER' mark or the fluid will overflow when the diaphragm is installed.*



- Reservoir cap
- Diaphragm plate
- Diaphragm

- Install reservoir diaphragm, diaphragm plate and cap.

## ENGINE OIL

See the Model Specification section in this manual for the recommended engine oil type and capacity.

Check the engine oil level before every ride.

Clean the engine oil filters (screen type) or replace with new ones (paper element type) in accordance with Maintenance Schedule in this manual.

Service more frequently when operating in/under extreme conditions.

## CHECKING ENGINE OIL

You have to start and run the engine for 1 minute, shut the engine off, wait another minute before checking the oil level.

### DANGER

#### POTENTIAL HAZARD

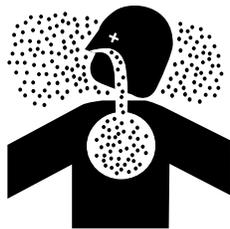
Running the engine indoors.  
Breathing exhaust gases

#### WHAT CAN HAPPEN

Running the engine indoors will expose you to dangerous exhaust gases. Breathing carbon monoxide gas leads to poisoning, asphyxiation, and death. This will happen rapidly and without notice.

#### HOW TO AVOID THE HAZARD

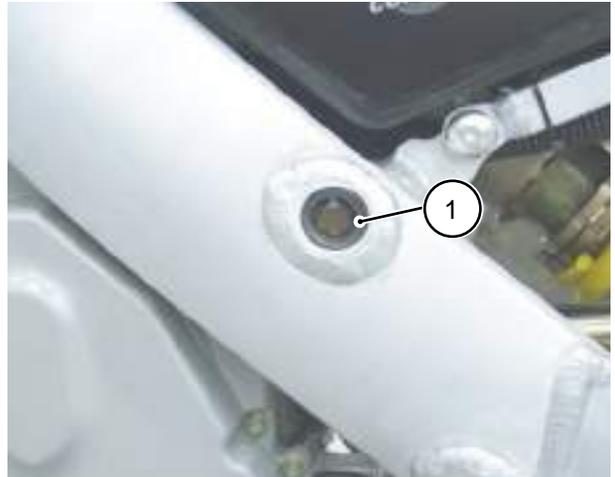
Never operate the vehicle indoors even for brief periods of time.



### WARNING

The engine and exhaust system are extremely hot and take time to cool after you shut the engine off. Work carefully to avoid hot surfaces. You can be burned severely.

1. Position the vehicle upright on a stand.
2. Start the engine and allow to run for 1 minute at idle speed, then turn off the engine.
3. Wait 1 minute for the engine oil to settle inside the spar.
4. Inspect oil level in the inspection window on the left frame spar.



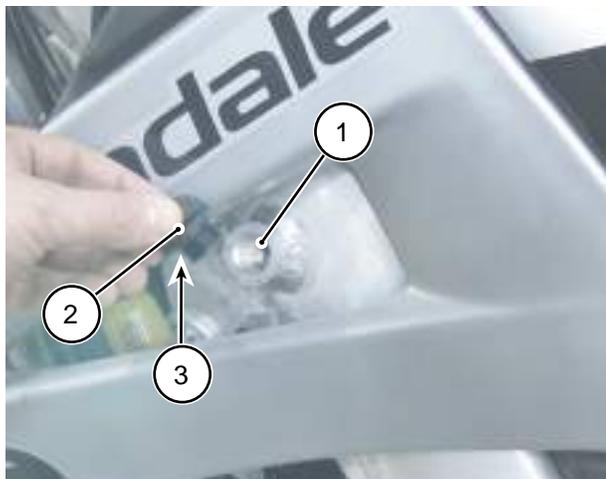
1. Inspection window (left frame spar)



This is a close-up photo of the inspection window showing the oil inside the spar and its 'level' observed with the vehicle held upright. This oil level is OK. The "level" of the oil should be visible in the window.

5. If the level is low (cannot see oil in the window), add a sufficient amount of oil to raise it to the correct level. Add at the filler hole using a clean

funnel. If you see that the level is too high, drain some out using the left spar drain bolt until the oil level is visible through the window.



- 1. Engine oil filler hole
- 2. Cap
- 3. O-ring

## CHANGING ENGINE OIL AND CLEANING THE FILTERS

Your vehicle has two engine oil filters. One filter is located within the engine oil pressure pump housing. The other filter is located inside the crankcase inlet fitting. We highly recommend cleaning (or replacing) both as directed.

Clean (the screen type) or replace (the paper element type) engine oil filters every time you change the oil.

### DANGER

#### POTENTIAL HAZARD

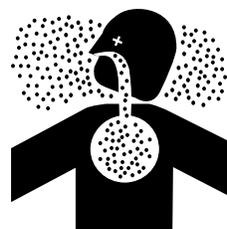
Running the engine indoors.  
Breathing exhaust gases

#### WHAT CAN HAPPEN

Running the engine indoors will expose you to dangerous exhaust gases. Breathing carbon monoxide gas leads to poisoning, asphyxiation, and death. This will happen rapidly and without notice.

#### HOW TO AVOID THE HAZARD

Never operate the vehicle indoors even for brief periods of time.



### WARNING

The engine and exhaust system are extremely hot and take time to cool after you shut the engine off. Work carefully to avoid hot surfaces. You can be burned severely.

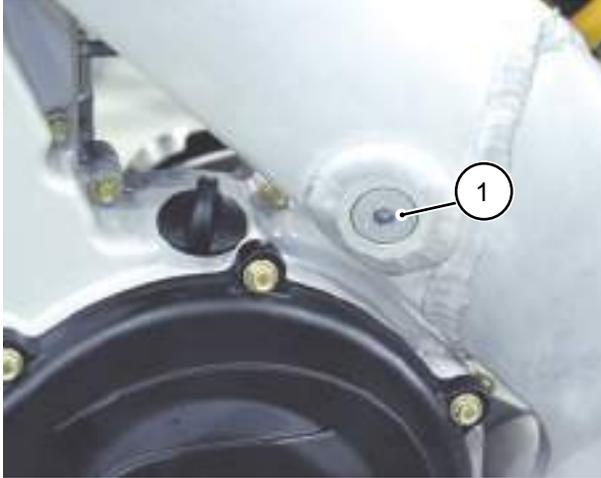
#### NOTE :

*Remove the spar engine oil filler cap (left spar) when draining.*

*When refilling engine oil, add slowly and recheck level frequently so as not to over fill the system.*

1. Position the vehicle upright on a stand.
2. Start engine and allow to run briefly to warm the engine oil. Then, turn the engine off.

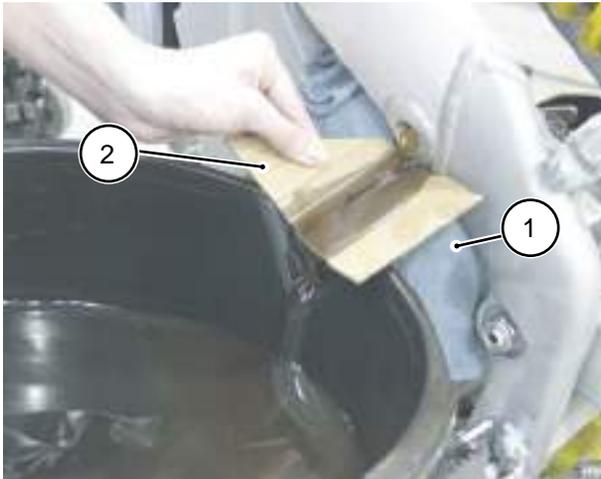
3. Remove the left spar drain bolt and drain the contents into an oil pan.



1. Left spar drain bolt

**NOTE :**

*Position a clean shop towel behind a folded piece of thin cardboard to channel or direct the flow of oil from the spar drain bolts into your oil pan.*



1. Shop towel  
2. Folded cardboard

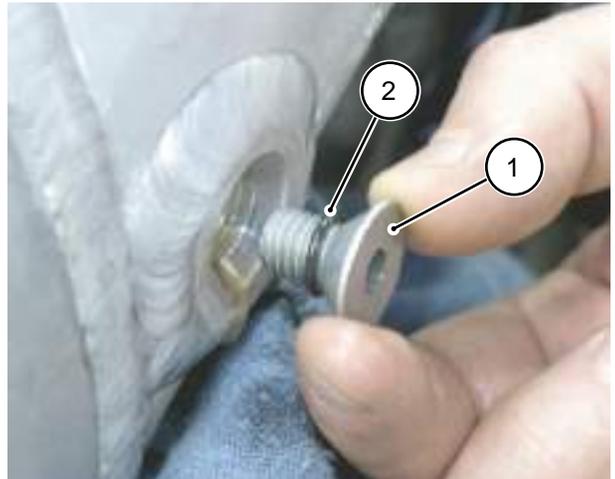
4. When the spar flow is reduced, have an assistant hold the handlebars and slightly tilt the vehicle toward the oil pan to drain any remaining oil.

5. Drain the right spar in the same way.



1. Right spar drain

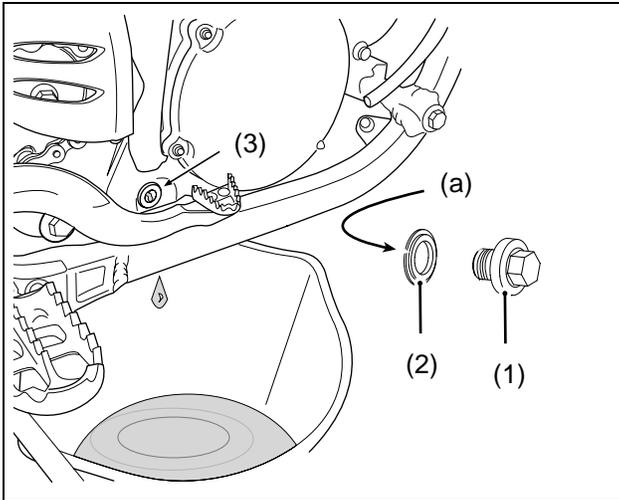
6. For both the left and right spar bolt, inspect the spar bolt O-ring. Replace it with a new one if you find any tears, rips, or if it is distorted in shape. Make sure the bolt threads are clean. Apply some clean engine oil to the threads and O-ring and reinstall. Tighten the bolt(s) to the specified torque.



1. Spar drain bolt  
2. O-ring

**TORQUE :** Spar engine oil drain bolts  
**15.0 lbf•ft (20.3 N•m)**

- Remove the engine oil crankcase drain bolt and sealing washer and allow the oil to drain into your oil pan.

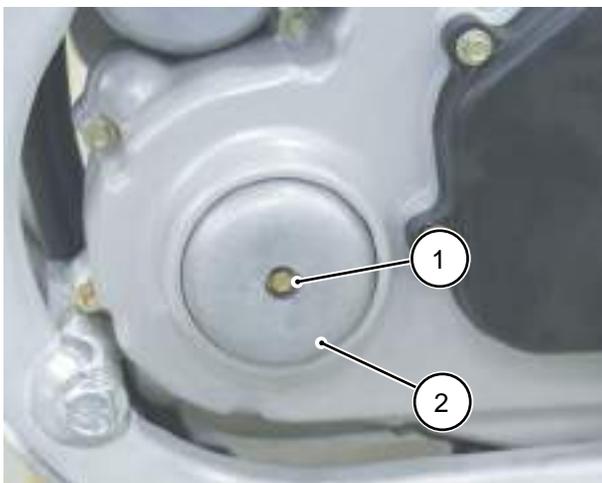


- Bolt
- Sealing washer
- Crankcase drain hole
- Sealing washer (flat side)

- Apply some anti-seize compound to the threads of the drain bolt. Install the sealing washer onto the bolt so that the flat side faces the crankcase and install the bolt and washer into the crankcase. Tighten the bolt to the specified torque.

**TORQUE :** Engine oil crankcase drain bolt  
6.0 lbf•ft (8.1 N•m)

- Position your oil pan under the engine oil filter cover and remove the bolt and the filter cover.



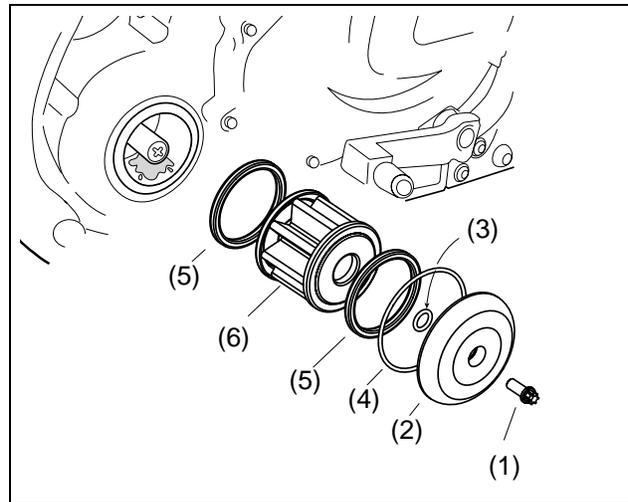
- Bolt
- Cover

NOTE :

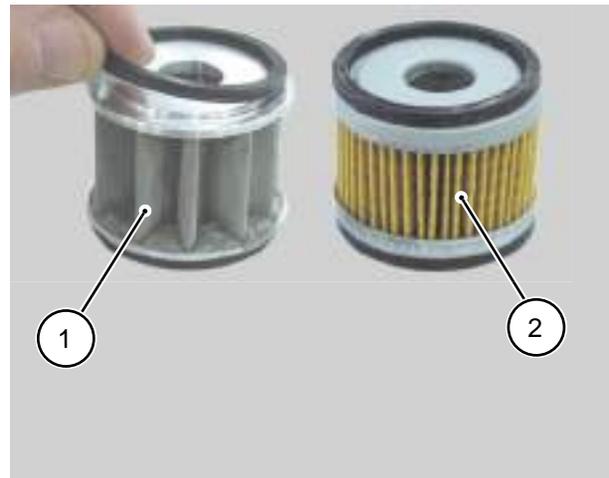
*Be sure to note the two O-rings in the cover when you remove it.*

**WARNING**

If the installed filter is the screen type, remove the seal, oil filter (screen) and oil seal from the filter housing.

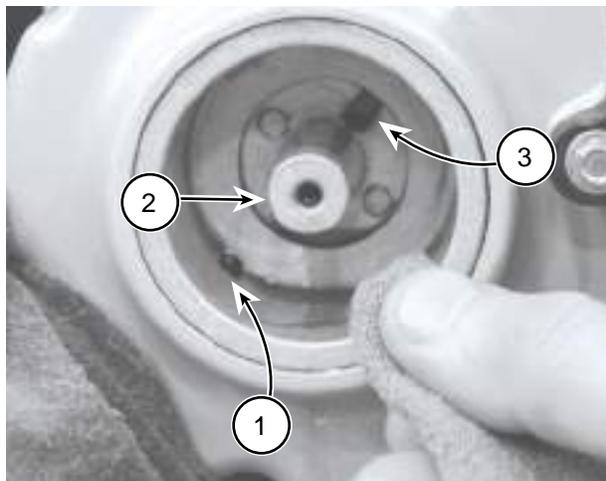


- Bolt
- Cover
- O-ring
- O-ring
- Filter seal
- Filter (screen)



- Screen type filter (with seals)
- Paper type filter (glued seals)

- Clean the filter housing and cover with a clean shop towel to remove any accumulated sediment/debris. When you are cleaning, avoid displacing the contaminants into the areas noted in the photo. Also, be sure to clean the cover (O-ring) mating surfaces. Do not use any type of tool (e.g., screw driver, putty knife) to clean the O-ring mating surfaces; damage will result in oil leakage.



- Oil inlet (from spar inlet filter)
- Oil outlet (to starter clutch assembly)
- Oil (outlet (to crankshaft/cylinder head))

- Clean the filter (screen type only) using compressed air and clean the filter housing cavity with a clean shop towel.

If the filter is the paper type, replace it with a new one.

**WARNING**

**Protect your eyes. Wear safety glasses when working with compressed air.**

- For screen type filters, inspect the filter seals and the filter for tears, cracks, and other damage. Replace new if damaged. Use some O-ring grease to "stick" the filter seals so that they are centered on the filter. This will help assure that the seals remain in place when you insert the filter into the housing. This step is unnecessary with paper type filters as the seals are glued in place.

- Insert the filter into the housing.

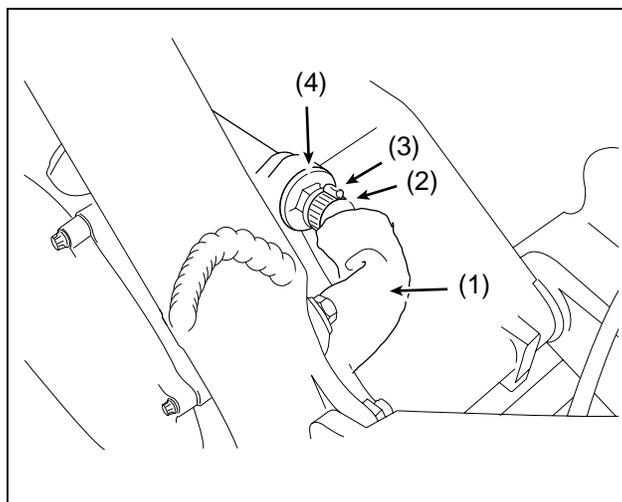
- Apply a light coat of O-ring grease to the large and small cover O-rings and insert them back into the cover. Install the cover and cover bolt. Tighten the bolt to the specified torque.

**TORQUE :** Engine oil filter cover bolt  
3.3 lbf•ft (4.5 N•m)

**CAUTION**

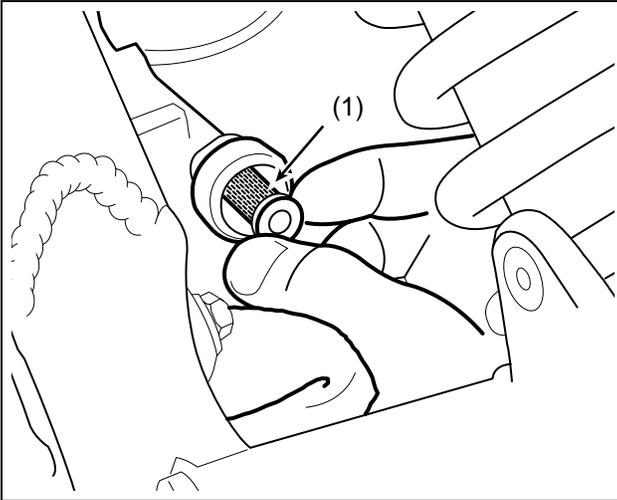
**Do not over-tighten the cover bolt. You will damage the threads of the filter housing. If the cover leaks, you may need to replace the cover O-rings or inspect the cover and housing mating surfaces for damage.**

- At the rear of the crankcase on the left side of the engine, slide the heat shield back to expose the left spar return hose and clamp. Then, remove the clamp and hose from the engine oil inlet fitting. Catch any residual oil within the spar with a clean shop towel.



- Heat shield
- Spar return hose
- Clamp
- Inlet fitting

16. Remove the inlet fitting and inlet filter (screen) from the crankcase hole.



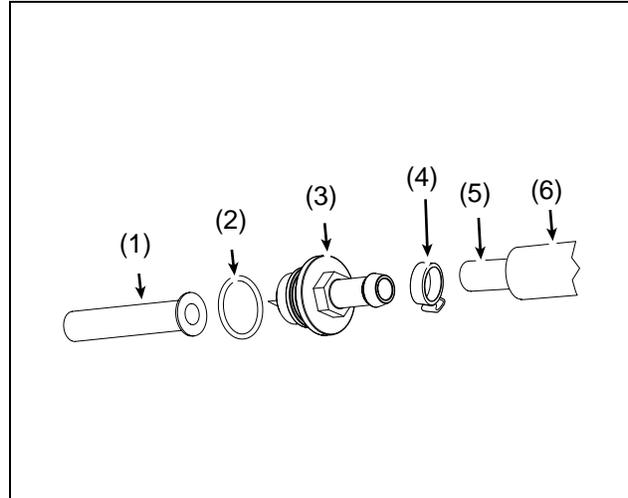
1. Inlet filter (screen)

**WARNING**

Protect your eyes. Wear safety glasses when working with compressed air.

17. Clean the filter using compressed air. Inspect the inlet fitting, O-ring, and inlet screen for tears, cracks, and other damage. Replace any damaged part with a new one.

18. Reinstall the filter and fitting. Be sure to inspect the fitting O-ring and replace it with a new one if necessary. Apply some clean engine oil to the O-ring before installing the fitting.



1. Screen
2. O-ring
3. Inlet fitting
4. Clamp
5. Spar return hose
6. Heat shield

**TORQUE :** Engine, engine oil inlet fitting  
**18.0 lbf•ft (25.0 N•m)**

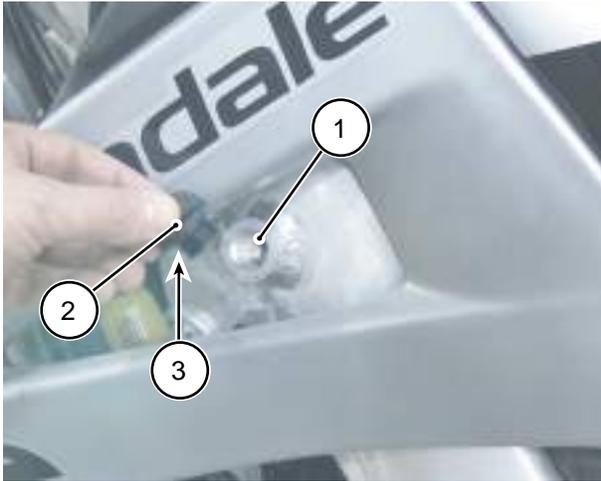
19. Reinstall the engine oil inlet hose and clamp onto the fitting. Be sure to re-position the heat shield up to the clamp.
20. Add the specified engine oil at the filler hole.

NOTE :

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*Make sure you use a clean funnel. Pour slowly allowing the oil to flow throughout the spar.*

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- 1. Engine oil filler hole (left frame spar)
- 2. Filler cap
- 3. O-ring

- 21. Reinstall cap and run engine for 1 minute at idle speed to circulate the new oil.
- 22. Inspect the oil level through the inspection window. Adjust level as required.

## TRANSMISSION OIL

See the Model Specification section in this manual for the recommended transmission oil and capacity.

Check the transmission oil level before every ride.

Change the transmission oil and clean the filter in accordance with Maintenance Schedule in this manual. Service more frequently when operating in/under extreme conditions.

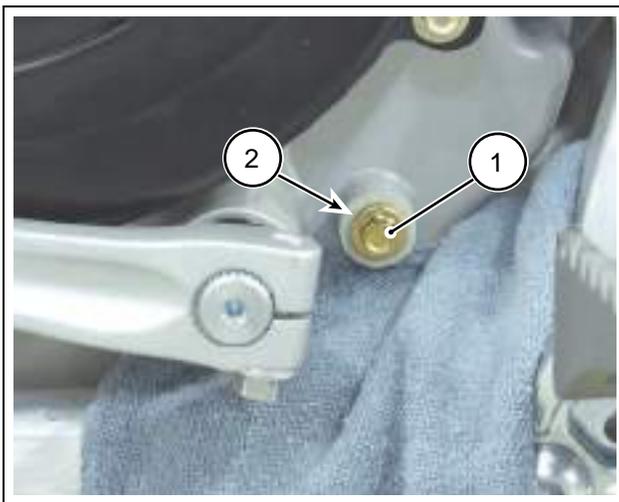
### CAUTION

**Always clean the area surrounding the filler cap before removing it and use a clean funnel when adding transmission oil.**

**Reinstall the drain bolt with filter as directed in this procedure.**

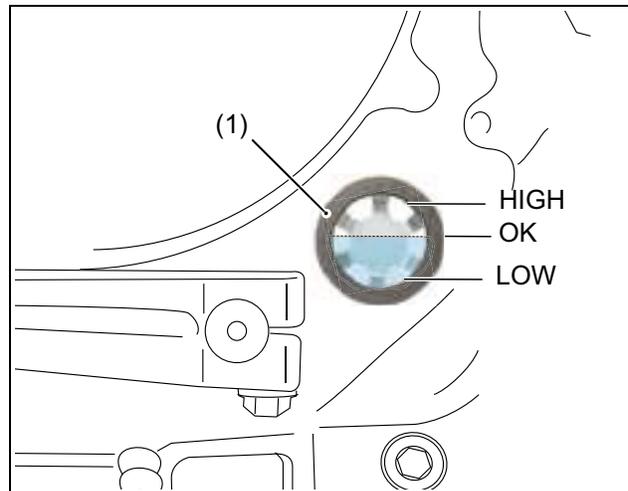
## CHECKING THE TRANSMISSION OIL LEVEL

1. With the engine cold, position the vehicle upright on a stand and wait a few minutes until the transmission oil settles.
2. For vehicles with the check bolt type crankcase covers, hold a clean shop towel under the transmission oil level check bolt and remove it. The transmission oil level should be even with the bottom of the check hole.



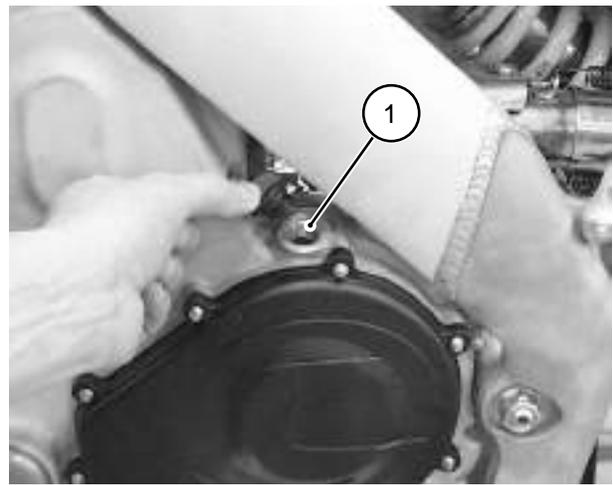
1. Check bolt
2. Sealing washer

For vehicles equipped with an inspection window crankcase cover, the oil level should be visible in the inspection window. See illustration.



1. Transmission oil inspection window

3. If the transmission oil level is low, install the check bolt, and add small amounts slowly at the filler hole and recheck the level.



1. Transmission oil filler hole

4. Install the transmission oil level check bolt.

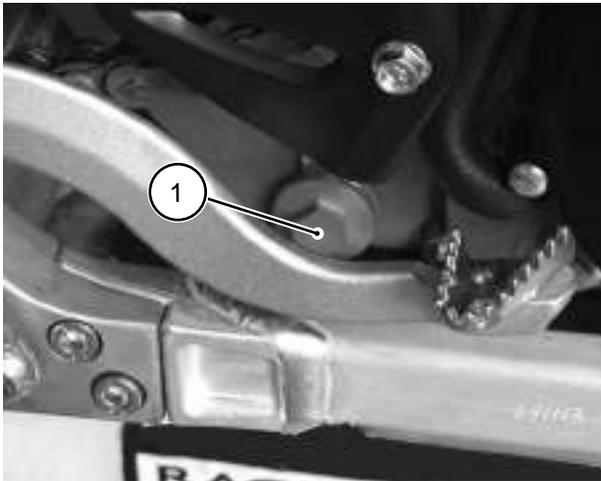
**TORQUE :** Transmission, oil level check bolt, 5.0 lbf•ft (6.8 N•m)

## CHANGING THE TRANSMISSION OIL

### NOTE :

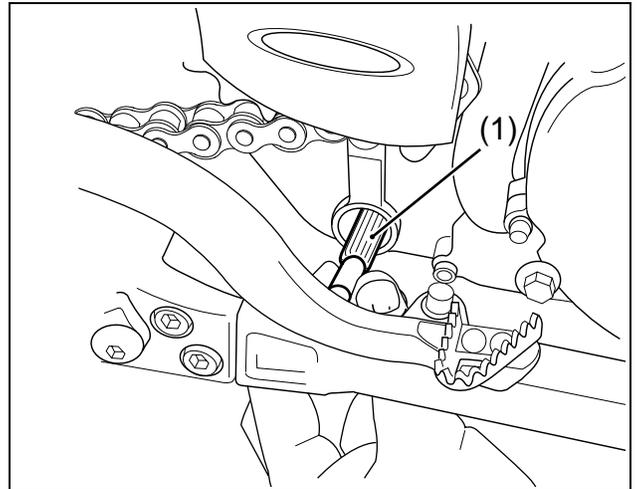
*The transmission drain bolt is located on the right side of the engine.*

1. Position the vehicle on a level surface.
2. Remove the transmission drain bolt and allow the oil to drain into your oil pan. Lean the vehicle slightly to the right to ensure all oil has drained.



1. Transmission drain bolt & filter

3. If the filter did not come out with the bolt, remove it carefully from the hole.



1. Transmission oil filter

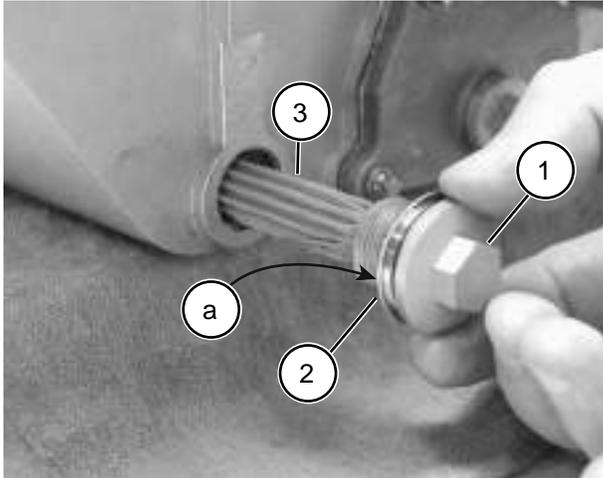
### **⚠ WARNING**

**Protect your eyes. Wear safety glasses when working with compressed air.**

4. Clean the filter using compressed air. Inspect the filter for cracks, holes, tears, and other damage. Replace new if damaged.
5. Make sure the threads of the drain bolt and crankcase are clean. Apply anti-seize compound to the threads of the transmission drain bolt.
6. Install the sealing washer onto the bolt with the flat side facing the crankcase.
7. Insert one end of the filter into the bolt, and install into the case together.

**NOTE :**

*The sealing washer is reusable however a damaged washer may result in a leak.*



- 1. Drain bolt
- 2. Sealing washer
- 3. Filter (screen)
- a. Sealing washer flat side

**CAUTION**

**Insert the filter into the bolt before installing.**

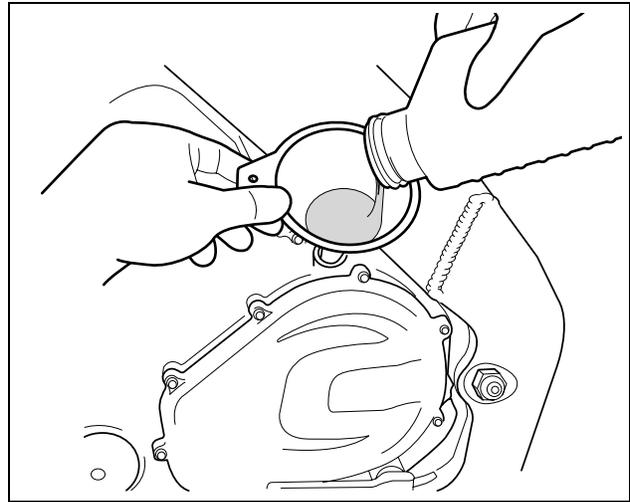
**This method helps assure that the other end of the filter will locate into the back of the transmission oil pump (rear of cartridge plate inside gearbox cavity). If you try to insert the filter into the hole first and the filter does not locate into the cartridge plate hole, unfiltered oil can enter the system damaging the pump.**

- 8. Tighten the bolt to the specified torque.

**TORQUE :**    **Transmission, oil, drain bolt**  
**6.0 lbf•ft (8.1 N•m)**

- 9. Add the specified transmission oil at the filler cap until oil level reaches the bottom of the check bolt hole (or middle of the inspection

window on equipped models). Pour slowly and allow time for the oil to flow throughout the case cavity.



- 10. Run the engine briefly (1-2 minutes) to circulate newly added oil and recheck the level. Add if necessary.

## COOLANT

Use a high quality ethylene glycol based anti-freeze containing corrosion inhibitors specifically formulated for use in aluminum engines.

Use a 1:1 mixture of coolant and distilled water.

Check the coolant level before every ride.

Have the coolant in your vehicle replaced every 2 years.

### **⚠ WARNING**

**Always wait for the engine and radiator to cool completely before removing the radiator cap. You can be burned severely by coolant spraying out at a high temperature.**

**Always wear eye protection and protective clothing when working with any components of the cooling system. Call a doctor immediately if coolant is swallowed and induce vomiting. Flush eyes and skin with water if coolant gets in eyes or comes into contact with skin.**

**KEEP COOLANT AWAY FROM CHILDREN AND PETS. WIPE UP SPILLS IMMEDIATELY.**

### **CAUTION**

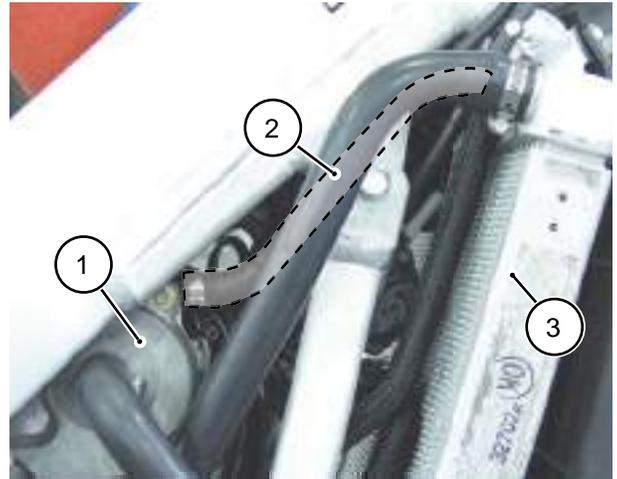
**Insufficient coolant or leaking coolant system can result in severe engine damage.**

**The coolant system on your vehicle is the self bleeding type. Manually bleeding the system is not required after refilling a drained system.**

**If the you ever add more than 150cc of coolant or the top of the radiator core was visible before adding, reinstall the cap and start the engine. Allow it to run for about a minute. Because the bleeding action may not be as good with an engine at idle, raise the engine rpm a few times but don't over-rev. Shut the engine off and allow the system to completely cool. Check the coolant level and add fluid if**

**necessary.**

**If the coolant level in the radiator has dropped, this may be an indication of a serious internal engine problem. Have the system inspected by your Cannondale Dealer before riding.**



The photo above shows the right side of the vehicle with the radiator shroud removed. The dotted line indicates the routing of the coolant bleed hose.

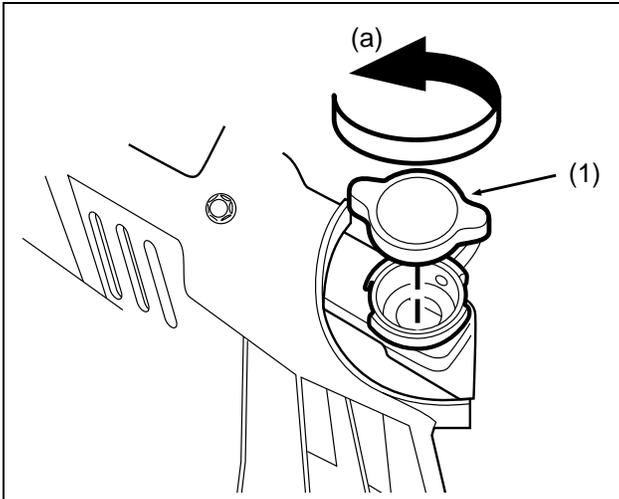
1. Coolant pump cover
2. Bleed hose
3. Radiator

## CHECKING THE COOLANT LEVEL

1. With the engine cold, place a thick towel over the radiator cap. Slowly turn the cap in direction (a) to the first detent and allow any residual pressure to escape.

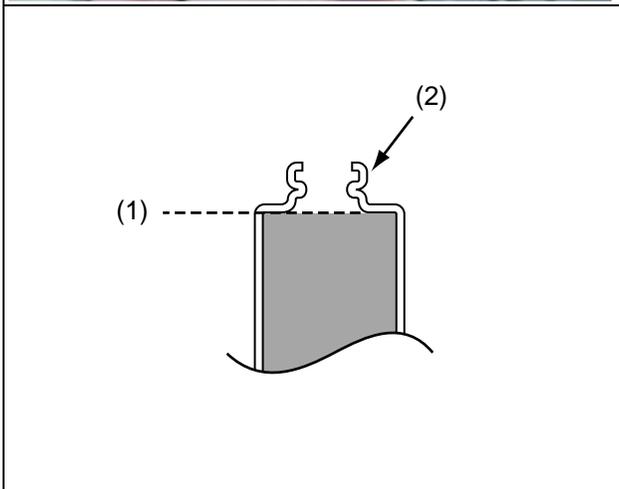
- When all pressure has escaped, press down on the cap and keep turning it until it can be removed.

- Reinstall the radiator cap.
- Check the entire cooling system for leaks.
- If the coolant level drops after adding and no leaks are found, contact an authorized Cannondale Motorsports Dealer for servicing.



- Radiator cap**
  - Loosening direction**

- The coolant level should be at the bottom of the filler neck.



- Coolant level**
- Filler neck**

## HYDRAULIC CLUTCH OIL

See the Model Specification section in this manual for the recommended hydraulic clutch oil.

Check the hydraulic clutch oil level every 10 hours.

Bleed the system if the level feels weak or spongy.

### CAUTION

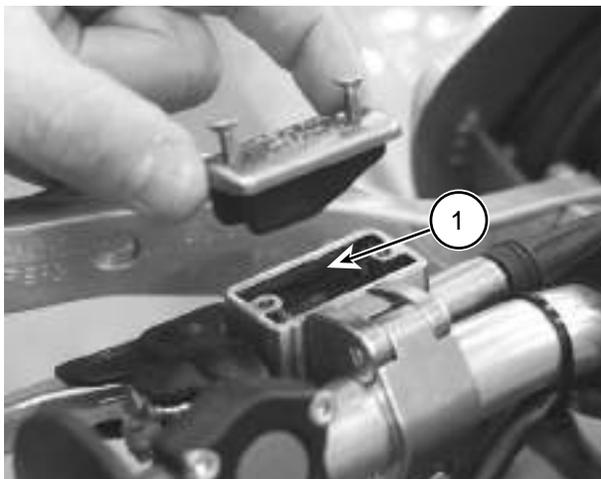
**Never substitute brake fluid for SAE 10 mineral hydraulic oil. Brake fluid will swell the internal seal resulting in severe damage.**

## CHECKING THE OIL LEVEL OF THE HYDRAULIC CLUTCH

### CAUTION

**Make sure the area surrounding the master cylinder is clean before removing the cover.**

1. Position the handlebar so that the top of the master cylinder is level.
2. Remove the cover screws, cover and rubber boot. The oil level should be 4mm below the upper edge.



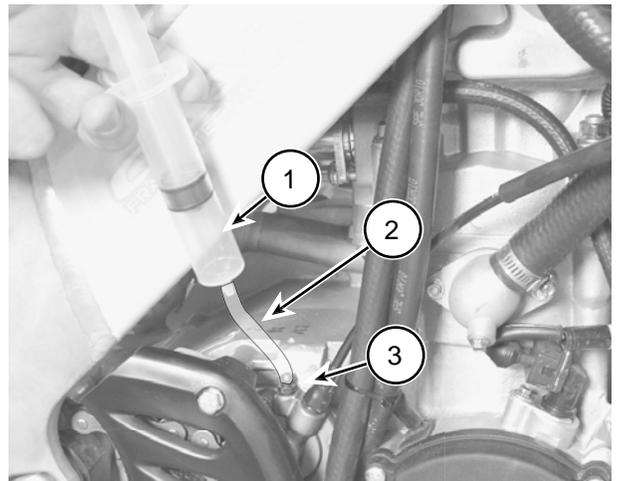
1. Correct oil level

## BLEEDING HYDRAULIC CLUTCH OIL

### CAUTION

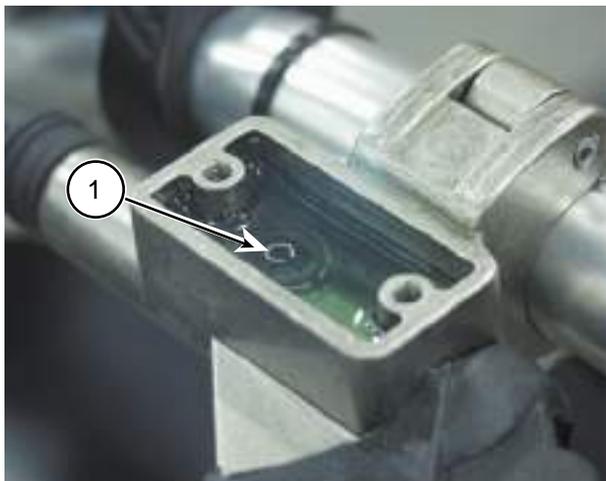
**After bleeding, make sure the fluid level in the master cylinder is correct.**

1. To bleed, remove the master cylinder cover and slave cylinder bleed bolt cap.
2. Fill a clean syringe with SAE 10 (mineral hydraulic oil) and expel any air bubbles.
3. Attach the clean syringe filled with SAE 10 (mineral hydraulic oil) to the bleeder bolt at the slave cylinder.



1. Syringe
2. Tube
3. Bleeder bolt

4. Loosen the bolt and slowly compress the syringe until only oil, (no air bubbles) is discharged at the bore of the master cylinder. Make sure the oil does not overflow out of the master cylinder.



1. Bore

# PRE-RIDE INSPECTION

Perform a pre-ride inspection of your motorcycle before every ride.

 <b>WARNING</b>
<b><u>POTENTIAL HAZARD</u></b> Failure to inspect the vehicle before operating.
<b><u>WHAT CAN HAPPEN</u></b> Increases the possibility of equipment failure resulting in an accident.
<b><u>HOW TO AVOID THE HAZARD</u></b> Always inspect this vehicle before you operate it. Always follow the inspection and maintenance procedures found in this Owner's Manual. Have your vehicle serviced by an authorized Cannondale Motorsports Dealer every 25 hours of operation.

## PRE-RIDE CHECKLIST

ITEM	CHECK
Apparel	Condition of (helmet, eye protection, boots, gloves, long-sleeved shirt and long pants).
Brakes	Check proper operation, fluid levels, front lever and rear pedal freeplay, leaks. Fill with DOT4 brake fluid if necessary. Check front and rear pads and discs.
Chassis (frame)	Inspect the frame, subframe, and swingarm for bending, cracks, or other damage. Don't ride if damage is found.
Clutch	Check for proper operation.
Coolant	Check coolant level. Fill with coolant if necessary.
Drive	Clean and lubricate the drive chain. Check drive chain slack and condition, sprockets, swingarm buffer, rollers, and guide block.
Engine	Check oil level. Fill with engine oil if necessary
Fuel	Fill with fuel. Check for leaks or damage to the fuel system.
Throttle	Check the throttle freeplay, makes it operates properly in all handlebar positions. Closes completely when released.
Transmission	Check oil level. Fill with transmission oil if necessary
Wheels/Tires	Wheels (for damage), tire pressures (all four) and condition. Replace if damaged. Add air if required.
Suspension	Check the fork and rear shock compression and rebound damping settings. Check the fasteners for tightness and re-torque if necessary. Inspect for damage and excessive wear.
Steering	Make sure that the handlebars turn freely; no binding of the cables/hoses throughout the full steering range (stop to stop).
Handguards	Make sure the handguards are mounted securely and that they do not interfere with the vehicle controls. Fasten the mounting hardware securely.
Panels, Bolts/Fasteners	Make sure all panels are fastened securely, check fasteners for tightness.
Lights (if applicable)	Check for proper operation of the headlight and taillight

## OPERATION

### **⚠ WARNING**

#### **POTENTIAL HAZARD**

Operating the vehicle without being familiar with all the controls.

#### **WHAT CAN HAPPEN**

Losing control of the vehicle which can cause an accident where you can be severely injured or killed.

#### **HOW TO AVOID THE HAZARD**

Read this manual carefully and fully understand its contents before operating the vehicle.

If you don't understand something, ask a Cannondale Motorsports Dealer.

## COLD STARTING

1. Position the vehicle on level ground and shift the transmission into NEUTRAL.
2. Pull-in the clutch lever.
3. Press and hold the engine START button for 1 second then **WAIT 5 SECONDS**.
4. Press and hold the engine START button until the engine starts but hold it no more than 2 to 3 seconds at a time.
5. When the engine starts, release the button and slowly release the clutch lever.
6. Allow the engine to idle until it reaches operating temperature (70°C) before you begin riding.

## STARTING A WARM ENGINE

When starting an engine after it has reached operating temperature, do NOT open the throttle while operating the starter motor. This will make starting very difficult and possibly foul the spark plug.

## JUMP STARTING

If the battery voltage is low in your vehicle, you can perform a jump start using an auxiliary battery or wall unit. A positive (+) battery terminal is accessible on the back of the battery plate.

### **CAUTION**

You **SHOULD NOT** use this terminal for charging the battery.

**Do not charge the battery while it is installed in the vehicle.**

Jump starting should only be attempted when an undamaged battery suffers a temporary drain and you are no longer able to start the engine with it. Jump starting enables you to start the engine quickly and then use the vehicles' charging circuits to charge the battery to its full capacity. If you do jump start, make sure the charging system has adequate time to re-charge the battery before shutting the vehicle off. If not, remove the battery and place it on a battery charger.

### **⚠ WARNING**

#### **POTENTIAL HAZARD**

Electrical short-circuit or electrical fire.

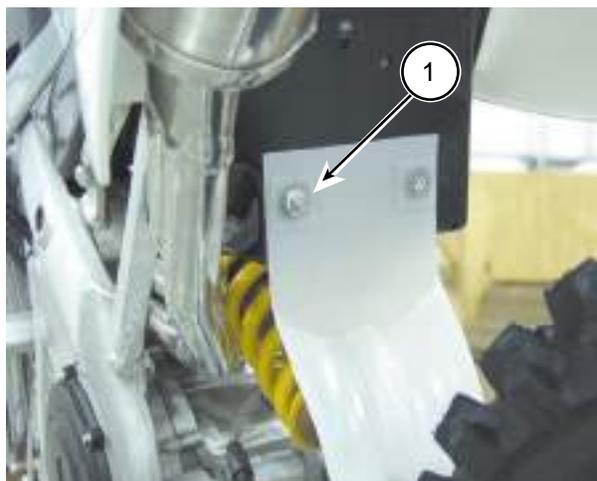
#### **WHAT CAN HAPPEN**

You can short the battery to ground with a tool and the vehicle frame. This can cause an electrical fire. You can be burned severely or be injured by the sparks themselves.

#### **HOW TO AVOID THE HAZARD**

Make sure the jumper cable is attached to the terminal securely. Have an assistant hold the clamp while turning over the engine.

When performing maintenance, cover this terminal with electrical tape to prevent an accidental short to ground. (i.e., touching the terminal with a tool that is grounded to the frame, subframe, swingarm or exhaust system)



1. 12V+ - Battery jump start terminal

## SHIFTING GEARS

### WARNING

#### **POTENTIAL HAZARD**

Down shifting to a lower gear at high speeds.

#### **WHAT CAN HAPPEN**

Tires can lose traction resulting in a loss of vehicle control. You can be severely injured or killed.

#### **HOW TO AVOID THE HAZARD**

Reduce speed gradually when down shifting.

Never down shift into a lower gear when travelling at high speeds.

Use a combination of the front and rear brakes and down shift one gear position at a time when slowing the vehicle from higher speeds.

### CAUTION

When shifting gears, press the shift lever firmly to make sure the gear engagement is complete. Careless shifting can result in incomplete gear engagement and can cause the transmission to jump out of gear. This can severely damage the engine.

1. To engage from NEUTRAL into first gear, pull in the clutch lever and push down on the shift lever.
2. Release the shift lever.
3. Open the throttle a little and slowly let out the clutch lever.
4. To shift into a higher gear, pull in the clutch lever, push the shift lever up to the next gear, release the shift lever, then release the clutch lever.
5. To shift into a lower gear, pull in the clutch lever, push down on the shift lever and release - then release the clutch lever.

## BRAKING

### WARNING

#### **POTENTIAL HAZARD(S)**

- (1) Sudden or uneven brake application
- (2) Wet brake system (e.g. discs, pads)

#### **WHAT CAN HAPPEN**

(1) If you apply the brakes too quickly or suddenly, the wheels may slide or skid causing you to lose control resulting in an accident where you could be seriously injured or killed.

(2) Wet brakes do not provide the stopping power needed and therefore are extremely dangerous.

#### **HOW TO AVOID THE HAZARD**

(1) Apply the front and rear brakes evenly and gradually. Always consider the surface of the terrain you are riding on and how it will affect your braking ability. Concentrate on applying both brakes as hard as possible without skidding. Shift down or fully disengage the clutch as necessary to keep the engine from stalling.

(2) In wet conditions test the brake operation frequently. When riding in wet conditions, ride the vehicle at slow speeds and apply the brakes several times until they are dry and at full power. Before riding the vehicle make sure the brakes and controls (e.g., brake lever, brake pedal, clutch lever, engine stop switch, and throttle) operate properly.

1. To brake, close the throttle completely with the clutch engaged (except when shifting gears) so the engine will help slow down the vehicle.
2. Apply the front and rear brakes evenly.

## POST RIDE CHECKS

1. After riding the vehicle, clean it thoroughly and allow it to dry, and then inspect the entire vehicle for damage or loose fasteners.
2. Repair or tighten any damaged or loose components and lubricate the vehicle.
3. If the vehicle is damaged and you are unable to address the problem right away, put a piece of tape over the START button and attach a note describing the problem to the handlebar. This is a recommended step towards preventing of the vehicle until it is serviced properly.

## BREAK-IN

The break-in period is critical to the long term life and reliability of the engine. The break-in period for the engine is 1 hour. When operating during this period be sure to observe the following cautions:

- **Ride at low to medium engine speeds.**
  - **Do not lug or rev the engine during the break-in period.**
  - **Avoid full-throttle starts and rapid acceleration.**
  - **Do not hold the throttle grip in one position for more than a few seconds. It is better to roll the throttle on and off and ride on flat terrain.**
  - **Avoid riding up steep hills and in sand because this produces greater engine loads, possibly damaging engine components.**
1. Ride the vehicle normally for two 10-minute segments using no more than 1/2 throttle. Wait for the engine to cool completely between segments.
  2. Next, ride three 15-minute segments using no more than 3/4 throttle, again allowing the engine to cool between rides.

### NOTE :

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*During all rides, it is important to shift gears often so that high rpms are avoided and the engine is not lugged.*

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3. After riding the vehicle, clean it thoroughly and allow it to dry. Then inspect the entire vehicle for damage or loose fasteners.
4. Repair or tighten any damaged or loose components and lubricate the vehicle.
5. If the vehicle is damaged, it is recommended that you put tape over the start button to remind you to not start the vehicle. Also, attach a piece of paper to the handlebar with the problem written on it.
6. Complete the break-in period maintenance schedule.

# MAINTENANCE SCHEDULE

Perform the vehicle inspections found in the Pre-Ride Inspection section of this manual before every ride and at each of the scheduled maintenance periods.

C: Clean, R: Replace, L: Lubricate, I: Inspect, verify, clean, adjust, lubricate, replace if necessary

NOTE(s)		Regular Maintenance Interval (in hours)						
ITEMS		NOTE	BREAK-IN (after 1 hr)	5	10	25	100	200
1. Service more if operating in dusty, sandy or snowy areas. 2. Service more frequently if operating in wet or muddy conditions. 3. Replace every 1 years 4. Replace every 2 years								
	WARNING LABELS (condition, readable)		EVERY RIDE					
••	FRAME (mainframe, subframe, swingarm)		I			I	I	
•	FUEL SYSTEM (hoses, tank)		I	I				
	FUEL FILTER			R				
•	THROTTLE OPERATION		I	I				
	AIR FILTER	1		C				
	SPARK PLUG					I		
•	IDLE SPEED				I	I		
•	VALVE CLEARANCE					I	I	
•	EXHAUST (silencer)					C		
	SWITCHES (engine, stop, start,)	1, 2	I			I		
	LIGHTING (headlight, tail light)		I	I		I		
	ENGINE OIL		R		R			
	ENGINE OIL FILTER(s)		C		C/R			
•	TRANSMISSION OIL		R		R			
	TRANSMISSION OIL FILTER		C		C			
	DRIVE CHAIN (sag, stretch, buffer, guide block, sprockets, guards)	1,2	I	I		I		
•	BRAKE FLUID	3	I					R
•	BRAKE SYSTEM (cables, discs, pads, hoses, etc.)	1,2	I			I	I	
	BRAKE LEVER/PEDAL	1,2	I					
•	CLUTCH (lever)	3	I	I		I		R
	CLUTCH HYD OIL		I					R
	COOLANT (radiator, cap, hoses, level, strength)	3	I			I		R
•	SUSPENSION (front/rear shocks, condition, setting)		I	I	I	I	I	
•	STEERING HEAD (grease/ re-pack bearings, adjust slotted nut preload)				I			
•	NUTS, BOLTS AND FASTENERS				I		I	
	SEAT (condition, wear, damage)		I					
<ul style="list-style-type: none"> <li>• Cannondale dealer service suggested. Servicing owners should have the proper tools, service data, and be mechanically qualified.</li> <li>•• Operational safety involved. The service should be performed by a Cannondale dealer.</li> <li>••• Lithium soap base grease</li> </ul>								

C: Clean, R: Replace, L: Lubricate, I: Inspect, verify, clean, adjust, lubricate, replace if necessary

NOTE(s) 1. Service more if operating in dusty, sandy or snowy areas. 2. Service more frequently if operating in wet or muddy conditions. 3. Replace every 1 years 4. Replace every 2 years		Regular Maintenance Interval (in hours)					
••	WHEELS/TIRES (pressure, condition, wear, spoke tightness, wheel bearing play)		I		I	I	I
•	SWINGARM (inspect, re-pack bearings)	1,2			I		
• Cannondale dealer service suggested. Servicing owners should have the proper tools, service data, and be mechanically qualified. •• Operational safety involved, The service should be performed by a Cannondale dealer. ••• Lithium soap base grease							



## MAINTENANCE & ADJUSTMENT

Periodic inspection, adjustment, and lubrication of your vehicle help to keep it safe and reliable to operate.

The maintenance schedule provided in this manual is intended as a general guide only. Where you ride (geographic location), the weather conditions, terrain (e.g. sand, dirt, dusty, wet, etc.), and your riding style all influence how often a maintenance item should be performed. For example, if you ride in sandy conditions, the time (interval) between servicing will be shortened since sand is very abrasive and will act to wear vehicle components more quickly.

### WARNING

If you do not feel comfortable or in any way doubt your own abilities to perform a procedure described in this manual, don't attempt it. Have an authorized Cannondale Motorsports Dealer perform the servicing.

Many maintenance procedures found in this section require the use of a "torque wrench," - a special tool enabling a precise tightness to be applied to a fastener. If you do not have a torque wrench or are not familiar with using one; contact your authorized Cannondale Dealer for assistance.

## SEAT

### SEAT REMOVAL

1. Position the vehicle on a level surface so that there is no danger of it falling over while you work.
2. Press down slightly on the rear of the seat with one hand while pulling up on the quick release lever with a finger of the other hand. The quick release lever is located on the rear left side of

the seat, look for "QR." When the latch is released from the catch on the subframe, the rear of the seat should rise slightly.



3. Slide the seat towards the rear of the vehicle and off the retaining tabs on the gas tank.



4. Examine the receivers (slots) on the bottom of the seat pan. Make sure they are in good condition. If damage is found, replace the seat with a new one.

## SEAT INSTALLATION

1. To install the seat, align the retaining tabs on the fuel tank with the receivers on the underside of the seat.



2. Slide the seat into place.
3. Hold up on the release lever and push the rear of the seat down and release the lever. You should hear the lever “snap” or “click” onto the latch on the subframe.
4. Test to confirm that the seat is latched properly by lifting the rear of the seat up with your fingers.



5. Test similarly at the front of the seat.



### **WARNING**

#### **POTENTIAL HAZARD**

Unlatched, or damaged seat

#### **WHAT CAN HAPPEN**

If you install the seat incorrectly (not latched) or if the seat is damaged, it can shift or come off while you are riding causing you to lose control. You could be seriously injured or killed in an accident.

#### **HOW TO AVOID THE HAZARD**

Make sure the seat is fastened securely and it is in good condition. After installing the seat, pull the front and rear of the seat upwards to make sure it is latched and locked into position.

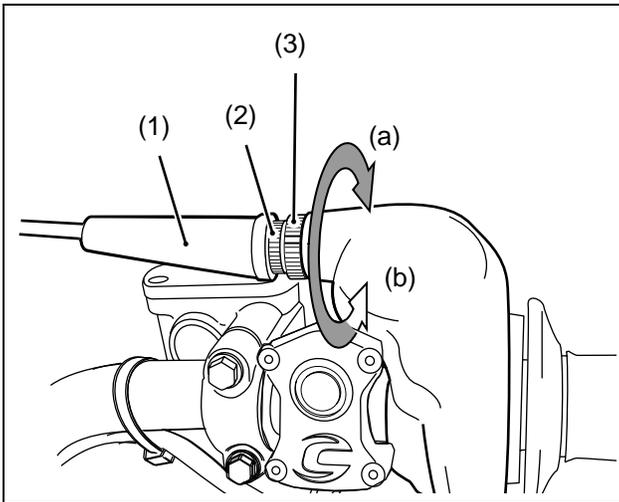
If the seat is loose or unlatched, correct the situation before riding.

Contact your Cannondale Dealer for a replacement seat if damaged.

## FUEL

### THROTTLE FREEPLAY ADJUSTMENT

1. To adjust the freeplay at the grip, slide boot back to expose lock ring and adjuster. Loosen the lock ring and turn the adjuster until the specified freeplay is reached. Tighten the lock ring securely when finished and return the boot.



1. Long rubber boot
2. Cable adjuster
3. Lock ring
- a. Decrease freeplay
- b. Increase freeplay

#### NOTE :

*If the throttle can not be adjusted further and the freeplay is still out of specification, consult an authorized Cannondale Motorsports Dealer.*

## FUEL TANK REMOVAL

### **⚠ WARNING**

#### **POTENTIAL HAZARD**

Fuel fire or explosion

#### **WHAT CAN HAPPEN**

The fuel tank on your vehicle has been designed to be removed without having to drain the fuel from it. However, gasoline is extremely flammable and can explode under certain conditions. A tank with fuel in it can be heavy to handle, if you drop it or fuel spills from the tank, the risk of fire or explosion is increased. You can be seriously injured or killed in a fuel accident.

#### **HOW TO AVOID THE HAZARD**

A filled tank is heavy so be sure you can safely lift and handle the tank before you attempt to remove the tank from the vehicle.

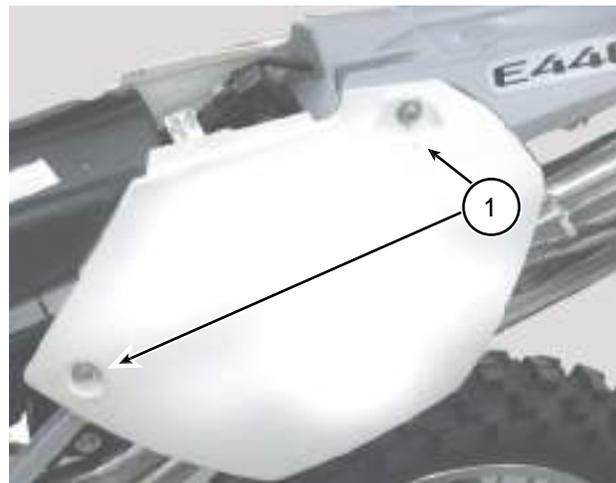
Make sure the work area is free of things that can ignite fuel. (e.g., sparks, flame, welders, cigarettes, torches, etc.).

Make sure the fuel cap is tightened securely.

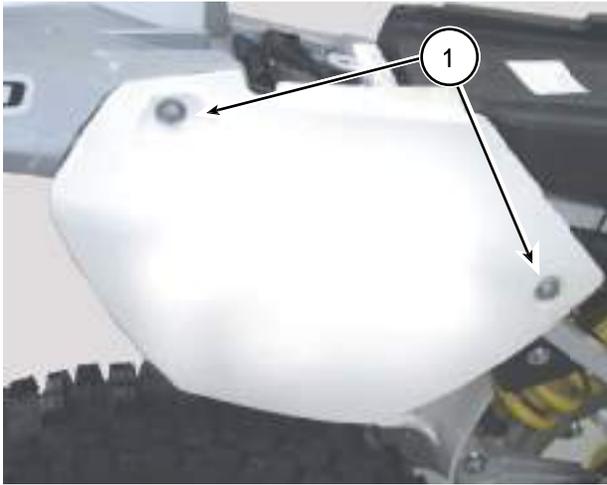
Wipe up any spilled gasoline quickly.

Position the bottom of the fuel tank on a level surface away from the work area.

1. Make sure the engine is cold.
2. Position the vehicle upright on a stand.
3. Make sure the fuel cap is tightened securely.
4. Remove the seat.
5. Remove the left and right side number panels.

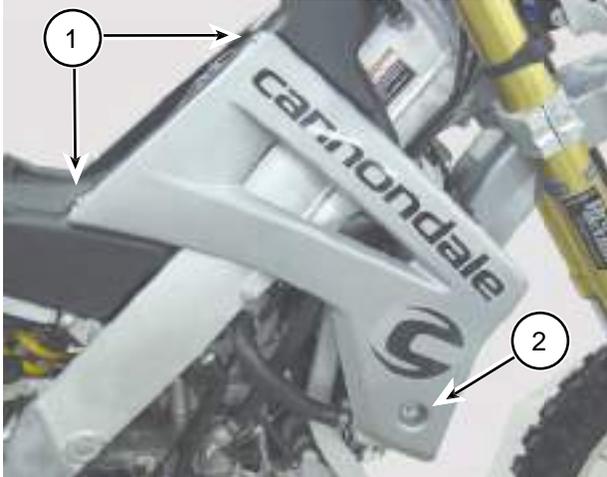
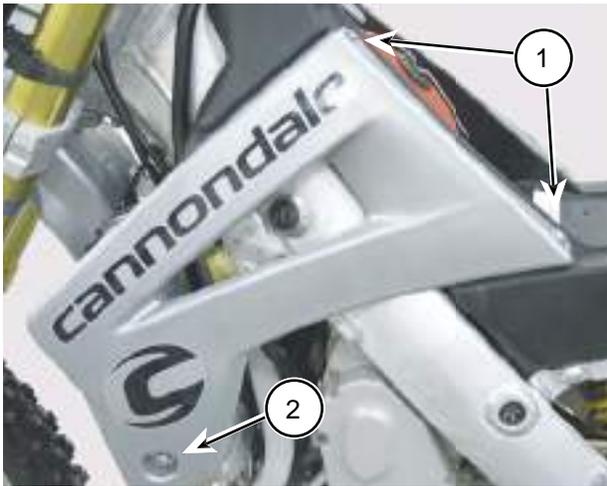


1. Left number panel bolts



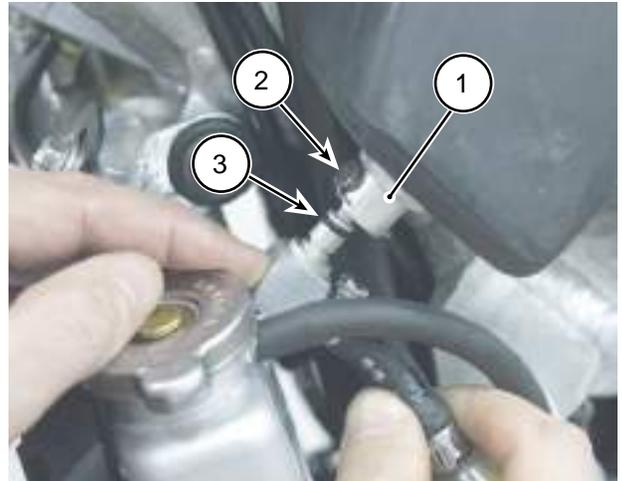
1. Right number panel bolts

6. Remove the left (below top) and right (below bottom) radiator shrouds.



1. Screws  
2. Bolt

7. Press in the tabs on the fuel tank fittings and remove the inlet and outlet hoses from the tank.



1. Outlet tank fitting (left side of tank)  
2. Tab  
3. O-ring

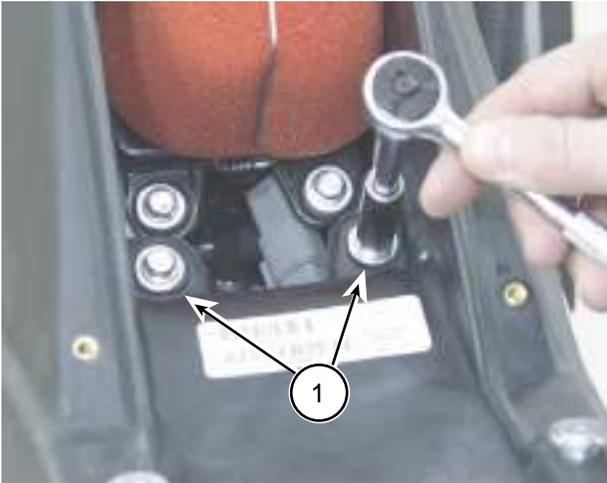


Return tank fitting (right side of tank)

**CAUTION**

Later, when re-installing the tank, remember to inspect and coat the O-rings with clean engine oil. Be sure to press in the tabs before reinserting.

8. Remove the fuel tank mounting bolts.



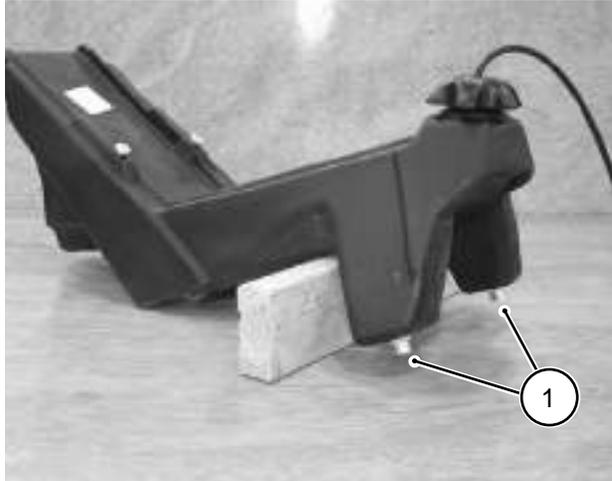
1. Tank mounting bolts

9. Lift the tank out from the frame and position the tank on a level surface away from the work area.



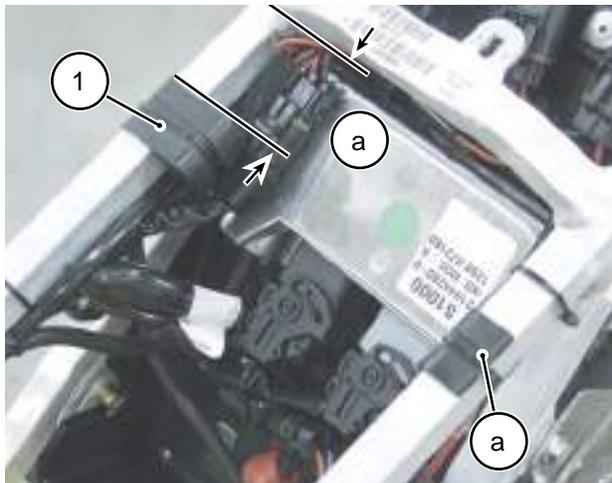
### CAUTION

Don't allow the weight of the tank to rest on the fittings. Damage to the tank will result. Position the tank on a suitable support. We used an ordinary 2x4 for the photo below.



1. Fittings

1. To install the tank, start by making sure that the tank subframe buffers are in place. Then, position the tank into the vehicle.



1. Larger buffer  
2. Smaller buffer  
a. Distance (appx 2")

2. Make sure the tank rests in the frame without interference. The edge of the tank should meet the main frame in the area indicated in the photo with minimal force applied. In the following photo the weight of the technician's hand is enough to obtain the proper fit. What you don't want to do is draw the tank into the

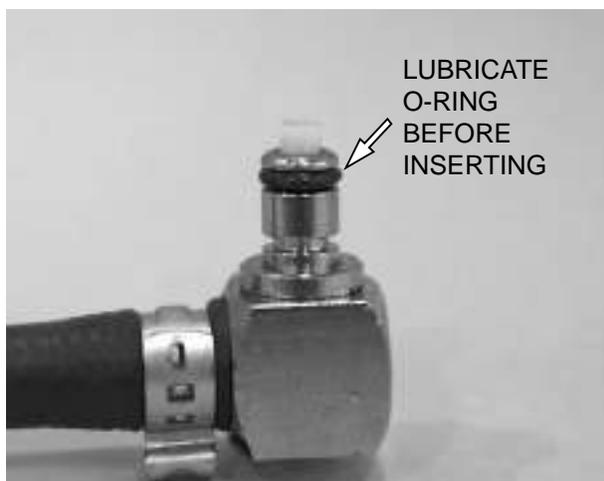
frame using the mounting bolts as this will cause damage to the fuel tank or other vehicle systems.



3. Install the tank mounting bolts and tighten them to the specified torque.

**TORQUE :** Fuel tank mounting bolts  
5.0 lbf•ft (6.8 N•m)

4. Reinstall the outlet (left side) and return (right side) fuel hoses into the tank. When reinstalling the quick connect fittings, be sure to press the fitting tabs in first. Then inspect the O-rings for any damage (e.g., swelling, distortion, tears, rips, etc.) and replace if necessary. Apply a light coat of engine oil to the O-rings and insert the hoses into the tank until the fitting clicks.



5. Reinstall removed components. Consult the Torque Table in this manual for tightening torques.

## FUEL FILTER REPLACEMENT

**SERVICE:** Fuel filter  
Fram, G-4164

Accumulation of dirt in the fuel filter will restrict fuel flow. Proper fuel flow and pressure is critical to the reliability of the fuel injection system and level of vehicle performance. Therefore, the fuel filter should be inspected frequently and replaced in accordance with the Maintenance Schedule in this manual.

Replace the fuel filter every 5 hours of operation.

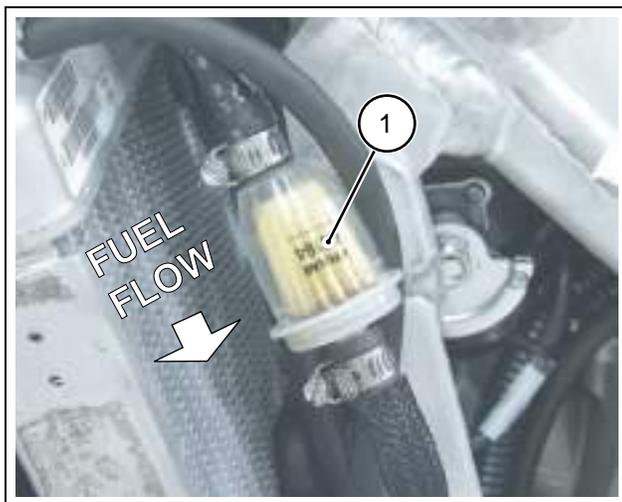
We recommend that you keep a few extra filters handy so that frequent replacement is hassle free.

### **⚠ WARNING**

**Gasoline is extremely flammable and can explode under certain conditions. Handle with care in an area free of sparks, cigarettes, welders, other sources of ignition.**

1. Press in the tab and remove the tank outlet fitting and hose from the tank.
2. Hold the filter in a clean shop towel and loosen the filter hose clamps allowing fuel in the hose to be absorbed by the towel.
3. Remove the filter.
4. Reinstall a new replacement filter making sure to observe the flow indicator on the filter body.

5. Tighten the hose clamps securely.



**1. Fuel filter**

6. Inspect the quick connect fitting O-rings. Replace them with new ones if you find and swelling, tears, rips or other damage.

Coat O-rings with O-ring lubricant or clean engine oil and reinstall into the tank fitting.

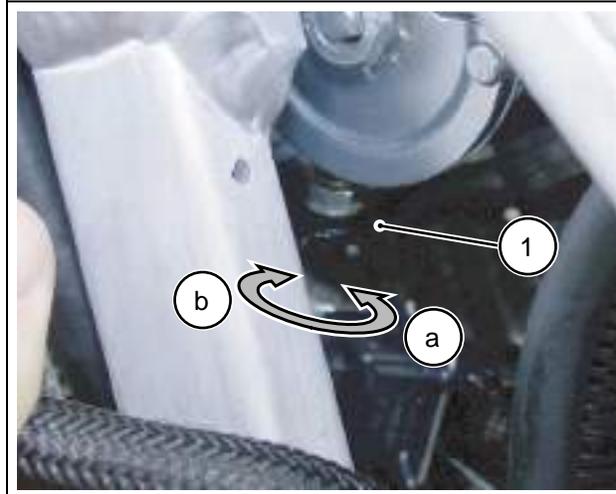
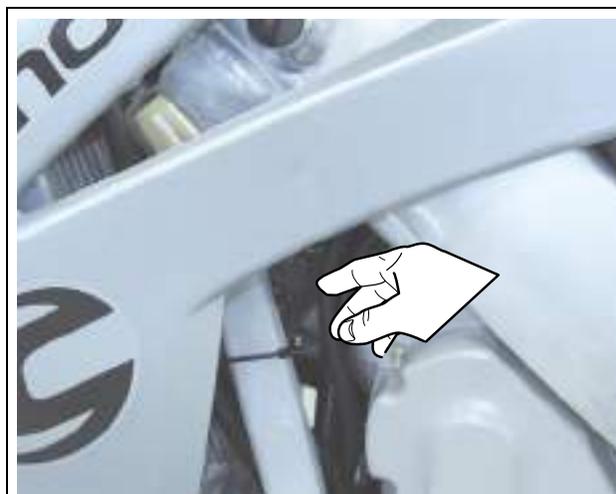
Make sure you press in the tab on the tank fitting before inserting the hose end or you can tear the O-rings.

## IDLE SPEED ADJUSTMENT

**SERVICE:**     **Engine idle speed**  
                          **2100- 2200 r/min**

The idle speed adjustment screw is located on the throttle body and is accessible from the left side of the vehicle.

A special software diagnostic tool and data cable is necessary to communicate with the vehicle ECU and accurately read (display) the engine rpm. For this reason, we strongly recommend that this procedure be left to a Cannondale Service technician. Contact your Cannondale Dealer for a list of special tools available for your vehicle.



- 1. Idle adjuster (thumb wheel)**  
**a. Increase rpm**  
**b. Decrease rpm**

## BRAKES

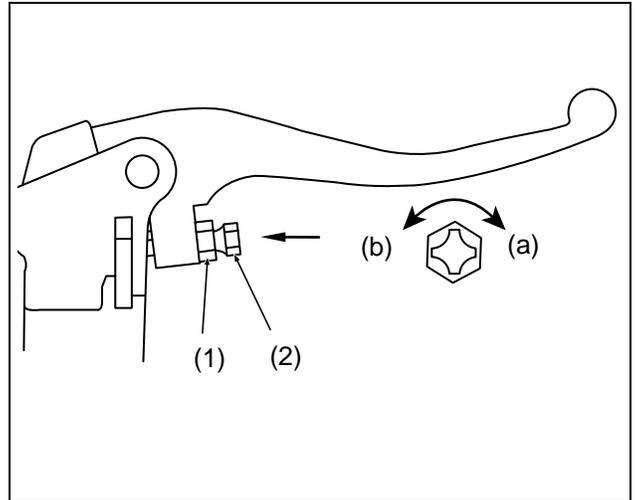
### TESTING THE BRAKES

For safe vehicle operation it is critical to have the brake system performing at its best. Regular inspection of the brake components and brake fluid level should become a habit prior to riding the vehicle.

1. Squeeze the front brake lever and test for proper braking. The lever should feel firm and proportional force should be applied to the discs preventing the vehicle from rolling. If the brake lever feels spongy or weak, and/or the vehicle is not prevented from rolling have the brakes inspected by a Cannondale Motorsports Dealer.
2. Check for fluid leaks. Inspect the entire length of the hoses paying close attention to the banjo bolts, calipers, and master cylinders.
3. Check the rear brake pedal for proper operation by pressing it with your foot. You should feel firm resistance when braking. As with the front brakes, force applied to the pedal should apply force to the rear disc preventing the vehicle from rolling. If the rear brake operates improperly have a Cannondale Motorsports Dealer inspect the system.
4. Inspect the rear brake pads for wear.
5. Test both brake systems at slow speed. Make sure that both systems function properly and that there is proper braking force always available.
6. When riding in wet conditions or after exiting a water crossing, apply the brake lightly a few times so that the heat of friction will dry the pads and discs. If water remains on the system, you will not have adequate braking power when needed.

### FRONT BRAKE LEVER FREEPLAY ADJUSTMENT

1. To adjust, loosen the locknut (1).
2. Turn the brake lever adjuster (2) in direction (a) to decrease freeplay, in direction (b) to increase freeplay,

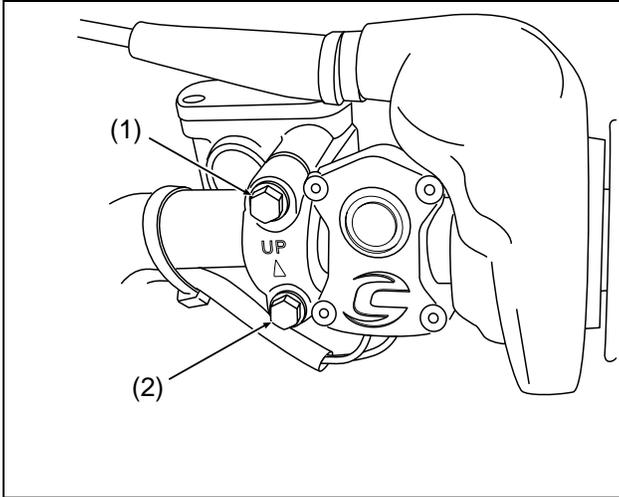


1. Locknut
2. Brake lever adjuster
- a. Decrease freeplay
- b. Increase freeplay

3. When the specified freeplay is reached, tighten the locknut to the specified torque.

**TORQUE :** Front brake lever adjusting locknut  
**4.3 lbf•ft (5.8 N•m)**

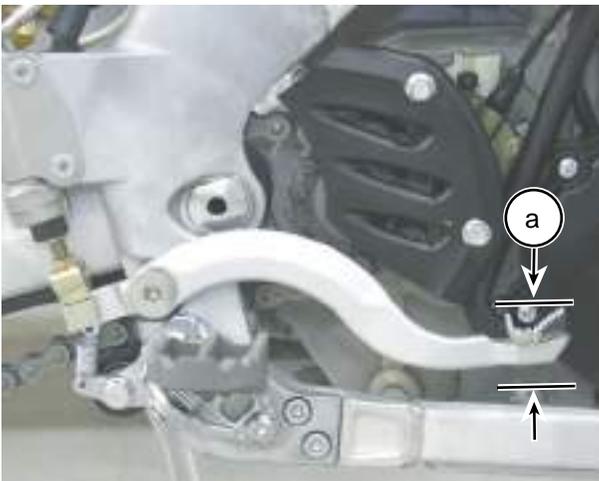
- To adjust the lever position, loosen the clamp bolts and rotate the brake lever to the desired position.



- Upper clamp bolt (tighten first)
- Lower clamp bolt

**TORQUE :** Front brake master cylinder mounting bolts  
5.0 lbf•ft (6.8 N•m)

## REAR BRAKE PEDAL HEIGHT ADJUSTMENT.

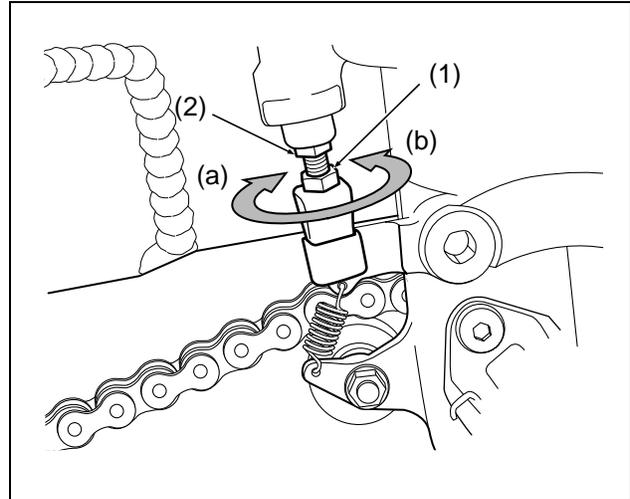


a. Pedal height

- To adjust the pedal height, loosen the locknut on the master cylinder pushrod. Turn the hex on top of the pushrod until the brake pedal is at the correct height.

Turning the hex in direction (a) will lower the

brake pedal and turning the hex in direction (b) will raise the pedal.



- Locknut
- Hex
  - Lowers the brake pedal
  - Raises the brake pedal

- Tighten the locknut to the specified torque.

**TORQUE :** Rear brake pedal locknut  
13.0 lbf•ft (17.6 N•m)

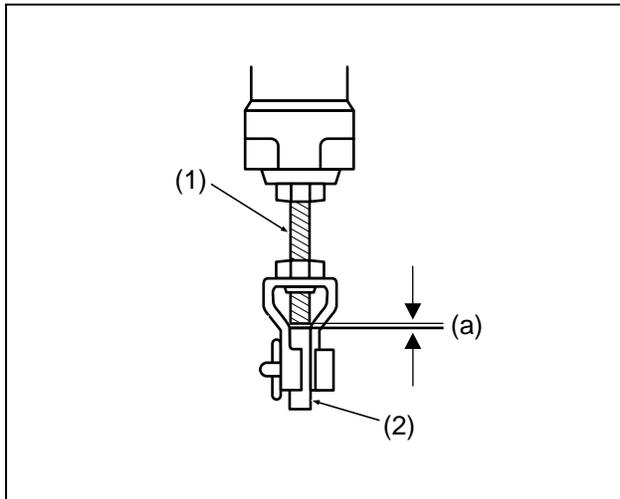
### **⚠ WARNING**

Check brake operation before riding the vehicle. Failure to follow this warning can lead to a serious accident with subsequent injury or death.

## CAUTION

When adjusting the brake pedal, make sure that clearance (a) between the lower end of the pushrod (1) and the brake pedal (2) is within specification.

When raising the brake pedal, do not allow the lower end of the pushrod thread to enter into the brake pedal joint.

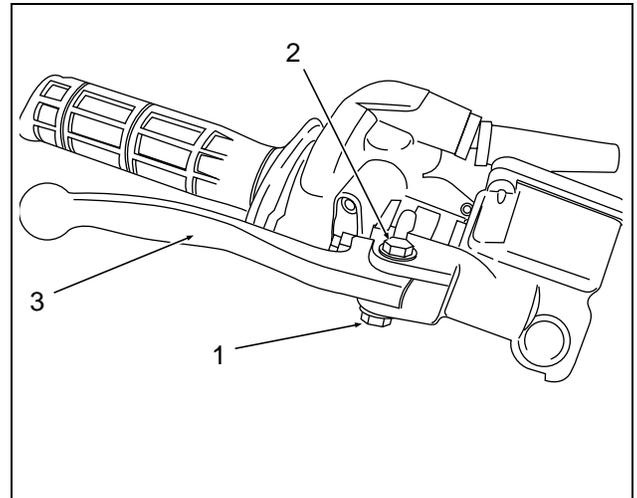


- 1. Pushrod
- 2. Brake pedal
- a. Clearance

**SERVICE:** Brake, rear, master cylinder pushrod, clearance 0.04 in (1mm)

## FRONT BRAKE LEVER LUBRICATION

1. Place the vehicle on a stand.
2. Remove the rubber cover from the brake lever.
3. Remove the nut (1), pivot bolt (2), and brake lever (3).



- 1. Nut
- 2. Pivot bolt
- 3. Brake lever

4. Spray all the parts with a water-displacement chemical, wipe them off, and dry them thoroughly.
5. Install the brake lever and apply a light coat of high quality waterproof grease onto the pivot bolt.

### NOTE :

*Only apply a light coat of grease so it does not attract a lot of dirt and debris.*

6. Install the pivot bolt and tighten the nut securely.
7. Install the rubber boot over the brake lever.

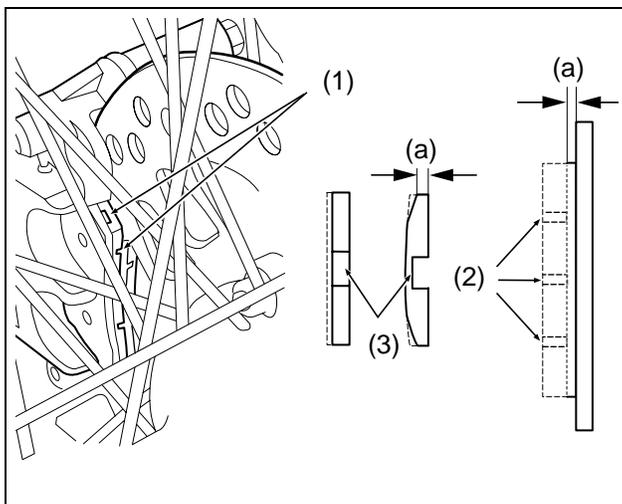
## FRONT BRAKE PADS INSPECTION

### **⚠ WARNING**

**Worn brake pads can damage the brake disc, adversely affecting brake performance and possibly causing an accident. Never ride the vehicle with worn or damaged brake pads.**

Each brake pad has wear indicator marks (1) and grooves (3). If either brake pad is worn to the minimum thickness indicator (2) or beyond the minimum thickness (a), the brake pads need to be replaced with a new set.

Contact an authorized Cannondale Motorsports dealer for replacement.

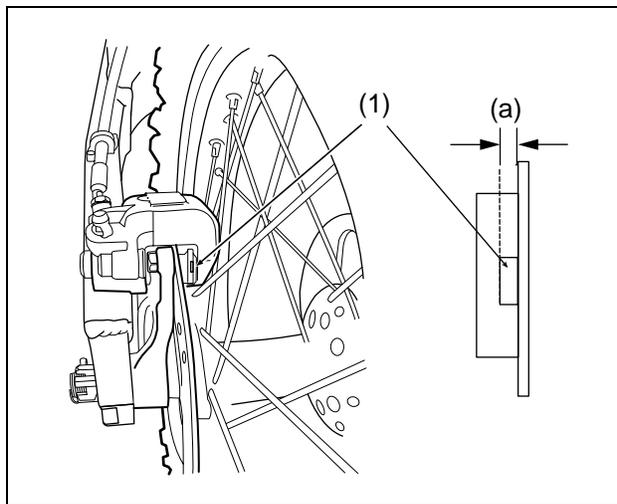


1. Wear indicator marks
2. Minimum thickness indicator
3. Wear indicator grooves
- a. Minimum thickness

**SERVICE: Brake, pad thickness, front, minimum 0.04 inches (1.0 mm)**

## REAR BRAKE PADS INSPECTION

Each brake pad has wear indicator grooves (1). If either brake pad is worn to the minimum thickness indicator (2) (or beyond the minimum thickness (a)), the brake pads need to be replaced with new ones as a set. Contact an authorized Cannondale Motorsports dealer for replacement.



1. Wear indicator
- a. Minimum thickness

**SERVICE: Brake, pad thickness, rear, minimum 0.04 inches (1.0 mm)**

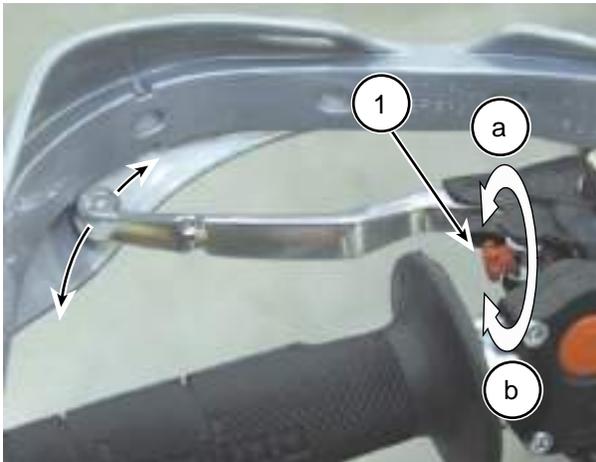
## CLUTCH

### ADJUSTING THE CLUTCH LEVER POSITION

#### CAUTION

The adjusting screw can be turned within certain limits. Do not use excessive force when turning the screw.

1. To adjust the lever position, turn the adjusting screw clockwise to reduce the distance between the lever and the handle grip; turn the adjusting screw counterclockwise to increase the distance between the clutch lever and handle grip.



1. Adjusting screw
- a. Increases distance
- b. Reduces distance

### SETTING THE CLUTCH RELEASE (HYDRAULIC CLUTCH SYSTEM)

Complete the following procedure anytime the clutch plates or springs are replaced.

1. Remove the shift lever and clutch cover.
2. Loosen the clutch release collar lock nut.
3. Turn the adjuster locknut all the way in (clockwise). Then back the adjuster out (counterclockwise) three full turns.
4. Tighten the adjuster locknut to the specified torque.

**TORQUE :** Clutch release collar locknut  
**3.3 lbf•ft (4.5 N•m)**

5. Check the fluid level in the master cylinder.

## DRIVE

### DRIVE CHAIN

See the Model Specifications section of this manual for the chain type and service limits (specifications).

#### **WARNING**

Significant forces act on the chain during operation. If its not clean and lubricated, it can quickly wear-out and possibly fail or contribute to un-safe operating conditions. Clean and lubricate the drive chain before every ride.

#### NOTE :

The chain's condition affects the accuracy of the slack measurement. Be sure to clean and lubricate the chain before measuring the slack. Also, when measuring, rotate the chain and measure different links over the same spot.

### LUBRICATING THE DRIVE CHAIN

#### CAUTION

Never use steam or high pressure washers to clean the chain. You can force dirt into the chain and "wash-out" the sealed lubricants.

Never clean the chain with gasoline or other solvents.

Do not use motor oils or grease to lubricate the drive chain.

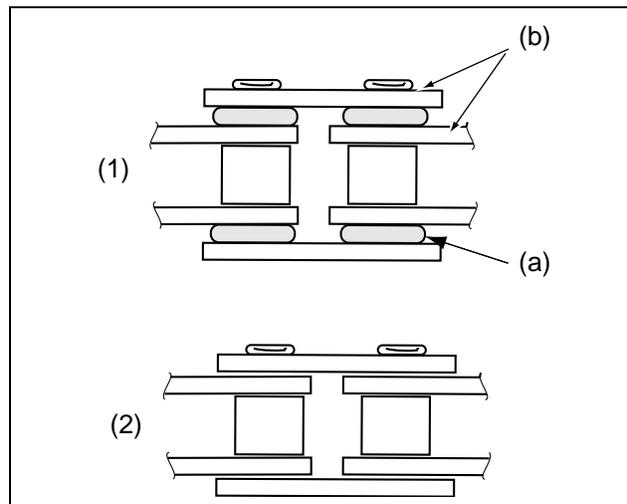
If vehicle is equipped with an O-ring type chain, use an O-ring chain specific lubricant.

#### CAUTION

Lubricate the drive chain after riding in wet or dusty conditions or if the chain appears dry.

Do not use grease to lubricate the drive chain. Grease will attract and accumulate dirt and grime resulting in damage to the chain and sprocket.

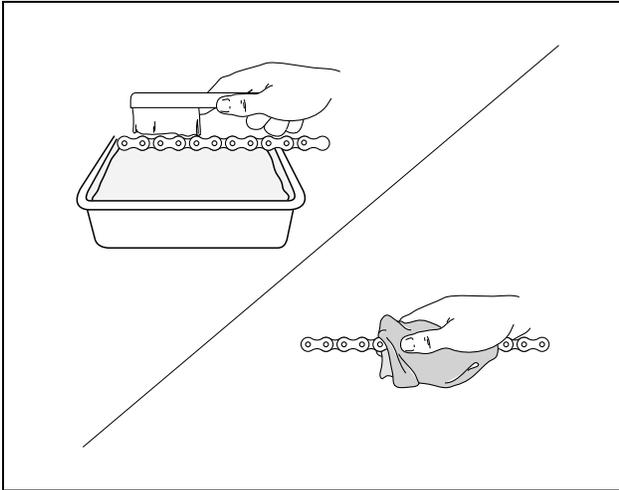
Make sure the chain has dried completely before applying the lubrication.



1. O-ring chain
2. Conventional (non-O-ring) chain
- a. O-rings
- b. Plates

1. Place the vehicle on a stand so that rear wheel is off the ground.

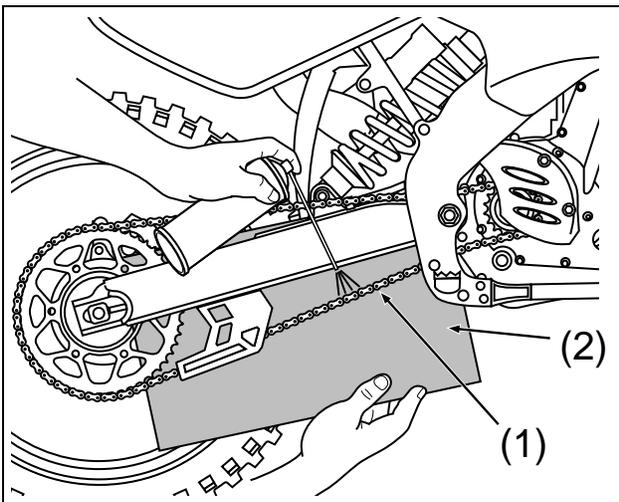
- Carefully clean the chain with a mild detergent and water solution. Rinse with clean water while gently scrubbing the chain with a light nylon brush. Repeat as needed.



- Wipe dry with a clean shop towel.
- Slowly rotate the wheel and apply the specified lubricant on the sag side of the drive chain. Be sure to uniformly lubricate the entire drive chain three to four times.

**NOTE :**

Place a piece of cardboard (2) between the drive chain (1) and vehicle to catch any over-spray.



- Clean drive chain
- Cardboard

## DRIVE CHAIN SLACK ADJUSTMENT

**SERVICE:** Drive, chain, slack  
2.2 - 2.4 inches (55 - 60 mm)

**WARNING**

**POTENTIAL HAZARD**

Drive chain is too tight or loose, sprocket teeth are broken and/or worn, or chain and sprocket is packed with dirt.

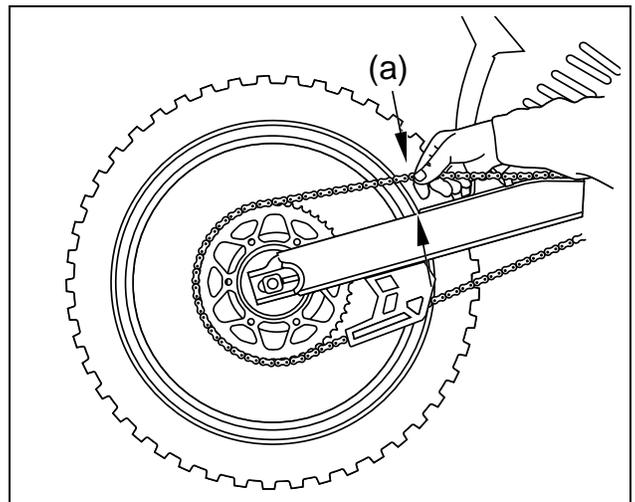
**WHAT CAN HAPPEN**

The vehicle's handling and engine performance will suffer which could cause the rider to lose control and have an accident.

**HOW TO AVOID THE HAZARD**

Inspect and clean the drive chain before each ride.

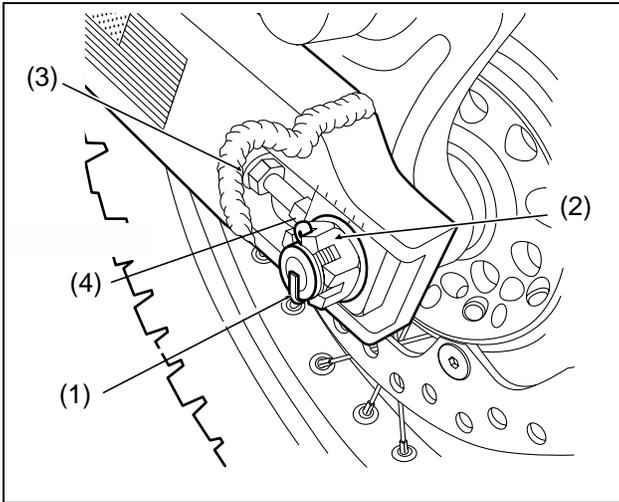
- Place the vehicle on a stand so the rear wheel is off the ground.
- Inspect the drive chain slack at a middle point between the two sprockets. If the slack is out of specification, adjust it.



a. Drive chain slack

- To adjust the chain slack, remove the cotter pin and discard it.

- Loosen the rear wheel axle nut (2) and the adjuster bolt locknuts (3).



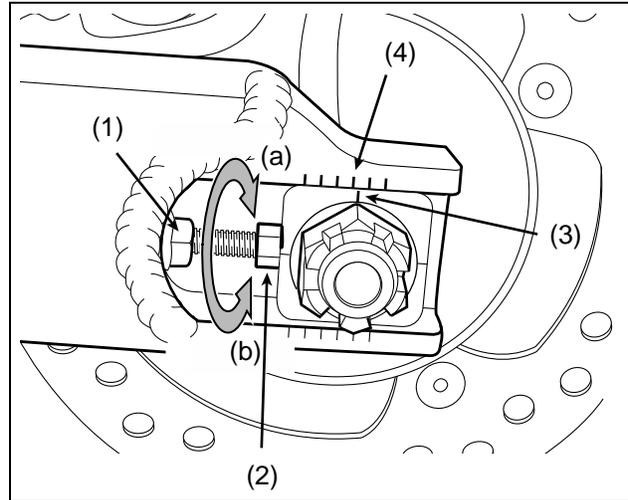
- Cotter pin
- Rear axle nut
- Locknut
- Adjuster bolt

- Increase or decrease slack by using the adjuster bolts.

### CAUTION

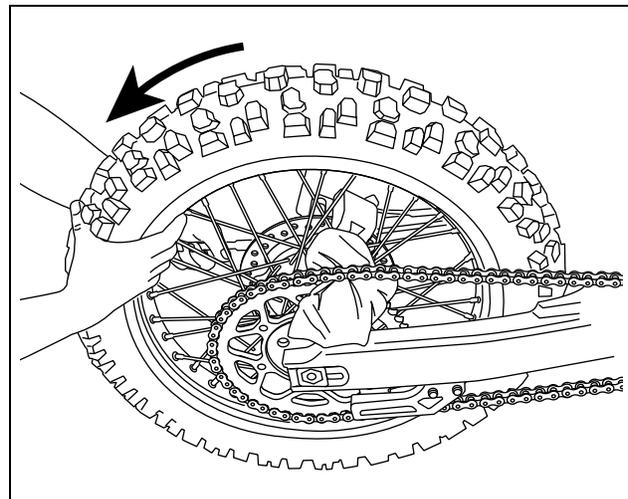
The alignment marks on the adjuster blocks and the marks on the swingarm must be adjusted so they are in the same position on each side of the swingarm.

Make sure the drive chain is straight and in-line with the sprockets.



- Lock nut
- Adjuster bolt
- Adjuster block mark
- Swingarm scale
- Increase slack
- Decrease slack

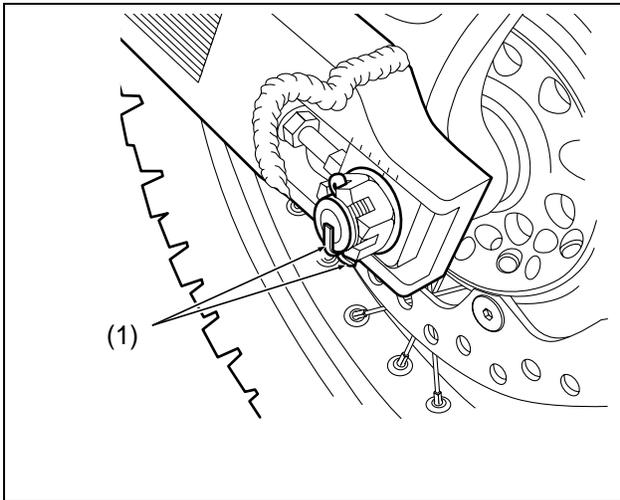
- Place a rag between the drive chain and rear sprocket. Then rotate the wheel backward to tighten the chain.



- Tighten the rear wheel axle nut.

**TORQUE :**    **Wheels, rear axle, nut**  
**72.0 lbf•ft (98.0 N•m)**

8. Install a new cotter pin and properly bend the tabs around the axle nut.



1. Cotter pin tabs

**⚠ WARNING**

**POTENTIAL HAZARD**  
Reusing a cotter pin.

**WHAT CAN HAPPEN**  
The cotter pin can break allowing the rear wheel axle nut to come loose. This could cause a loss of control resulting in serious injury or death.

**HOW TO AVOID THE HAZARD**  
**NEVER** re-use a cotter pin. Always replace cotter pins with new ones.

9. Tighten the drive chain adjuster locknuts securely.
10. Measure the drive chain freeplay again. Correct if necessary.
11. Take the vehicle off the stand, roll it forward and backward a few times and apply the rear brake. Make sure the rear brake operates

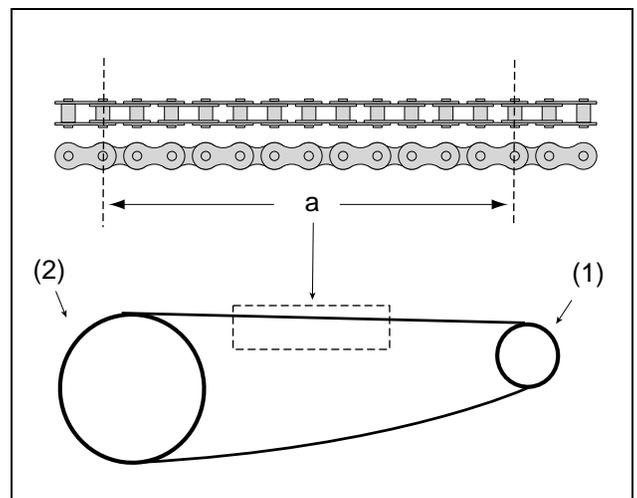
properly. The rear wheel rotates properly and the brake disc is not rubbing against the brake pads.



## DRIVE CHAIN STRETCH INSPECTION

**SERVICE:**    **Drive, chain, length (stretch),**  
**maximum (see specification for**  
**exact pin count)**  
**6.0 inches (151 mm)**

1. With the upper or lower section of the drive chain tight between the sprockets, measure the distance between the span of 13 pins from pin center to pin center. If the distance exceeds the service limit, replace the chain.



1. Countershaft sprocket  
2. Rear sprocket  
a. stretch measurement

## MASTER LINK CLIP

The open end of the masterlink clip must face the opposite direction of the chain rotation.

### **WARNING**

#### **POTENTIAL HAZARD**

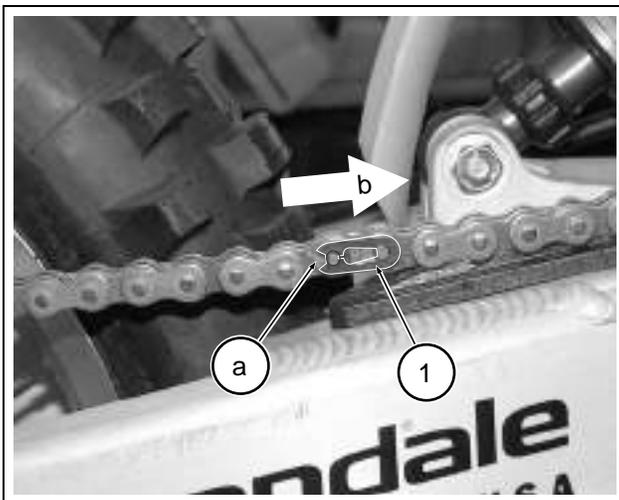
Chain coming off unexpectedly

#### **WHAT CAN HAPPEN**

If the master link clip is installed incorrectly it can be dislodged allowing the chain to break during operation. This will cause you to lose control. You can be seriously injured or killed.

#### **HOW TO AVOID THE HAZARD**

Anytime the drive chain is serviced make sure the drive chain clip is completely installed in its groove and the open end of the clip faces opposite the chain rotation. Make sure the master link clip is completely installed in its groove.

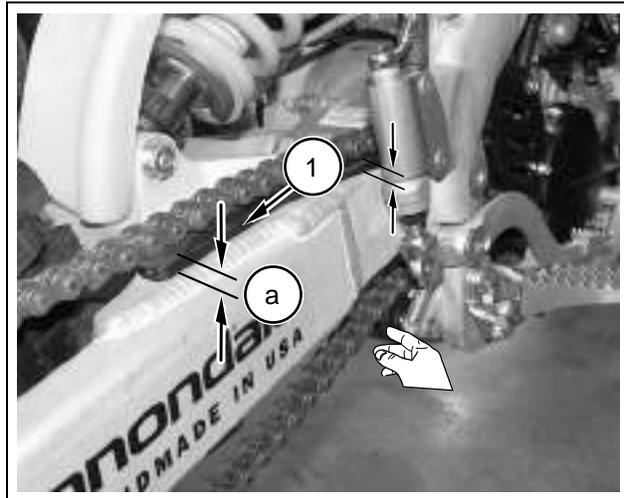


- 1. Clip
- a. Open end
- b. Direction of chain rotation

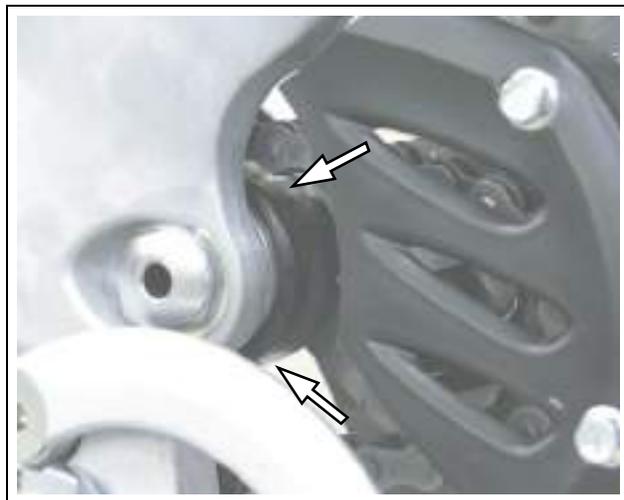
## SWINGARM BUFFER

Inspect the swingarm buffer before every ride. Wear may be distributed unevenly across the buffer, so examine it closely. Pay special attention to the area nearest the pivot shaft.

1. Inspect for cracks, wear, and/or other damage. Replace the swingarm buffer with a new one if damage is found or the wear (a) is out of specification.



- 1. Swingarm buffer
- a. Thickness



This photo shows the area near the pivot shaft to inspect closely.

**SERVICE:** Drive, swingarm buffer, thickness, standard 0.4 inches (10 mm)

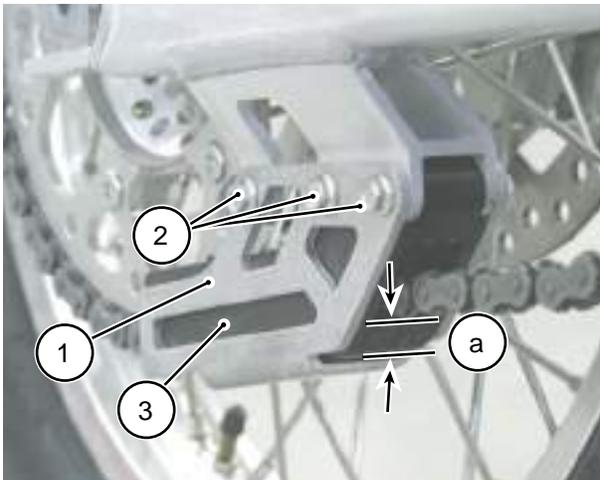
**SERVICE:** Drive, swingarm buffer, thickness, minimum 0.1 inches (3 mm)

1. To replace the buffer, place the vehicle on a suitable stand.
2. Remove the bolts and the old buffer. Make sure you clean the buffer mounting screws with contact cleaner and apply Loctite #242 agent before installing the new buffer.
3. Install the new buffer and tighten screws to specified torque.

**TORQUE :** Drive, swingarm buffer, mounting screws  
**17.0 lbf•in (2.0 N•m)**

## DRIVE CHAIN GUIDE BLOCK

Inspect the drive chain guide and drive chain guide block for cracks, wear, and/or any other damage. Replace the drive chain guide block with a new one if it is damaged or the wear (a) is out of specification.



1. Drive chain guide
2. Bolts
3. Drive chain guide block
- a. Minimum thickness

**SERVICE:** Drive, chain guide block, thickness, standard  
**0.5 inches (12 mm)**

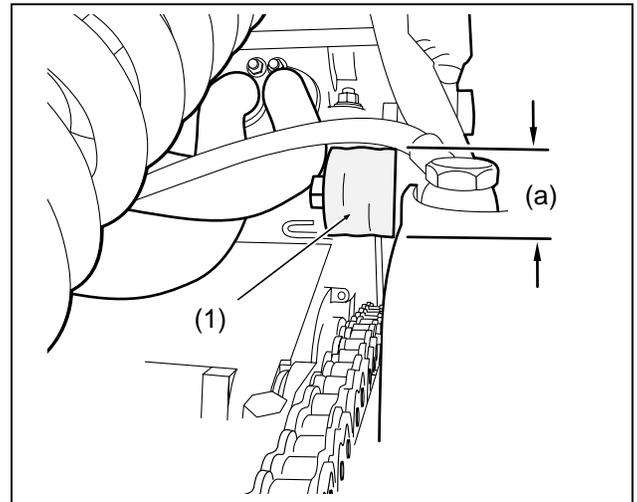
**SERVICE:** Drive, chain guide block, thickness, minimum  
**0.1 inches (3 mm)**

Check the drive chain guide bolts and tighten to the specified torque if necessary.

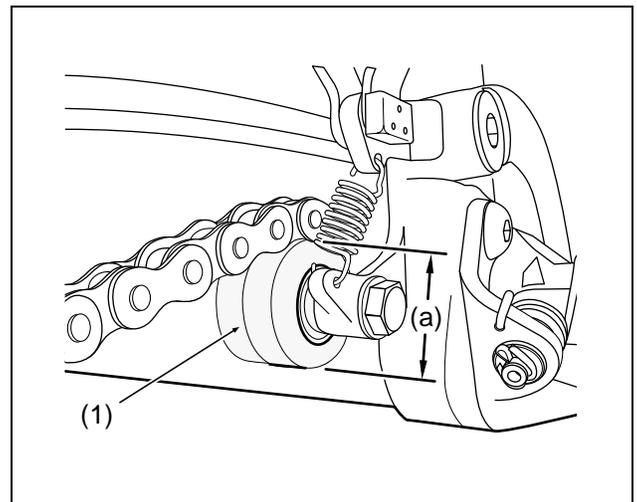
**SERVICE:** Drive, chain guide, mounting bolts  
**9 lbf•ft (12.2 N•m)**

## DRIVE CHAIN ROLLERS

Inspect the upper and lower drive chain rollers for cracks, wear, and/or any other damage. Replace the drive chain roller with a new one if the outside diameter (a) is out of specification.



1. Upper drive chain roller
- a. Outside diameter



1. Lower drive chain roller
- a. Outside diameter

**SERVICE:** Drive, chain rollers, diameter, standard  
**1.4 inches (35.2 mm)**

**SERVICE:** Drive, chain rollers diameter, minimum  
**1.3 inches (32 mm)**

## SPROCKET INSPECTION

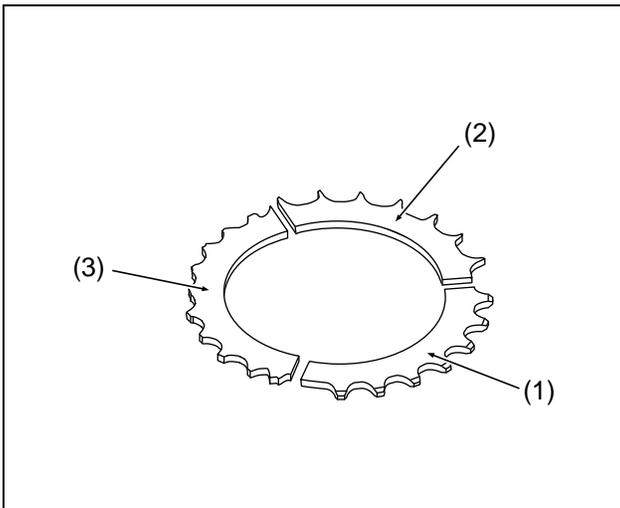
### NOTE :

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*Replace both the sprockets and drive chain as a set*

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Inspect the sprockets for cracks, chipped or broken teeth, excessive wear, and/or any other damage. Check the countershaft sprocket nut and tighten if necessary.



1. Normal teeth
2. Worn teeth
3. Damaged teeth

## ENGINE MANAGEMENT SYSTEM

All Cannondale models use advanced fuel injection systems. Engine operation is supported by an Engine Management System (EMS) which controls both ignition and fuel delivery. The system consists of three types of electrical components: an Engine Control Module (ECM), sensors, and actuators.

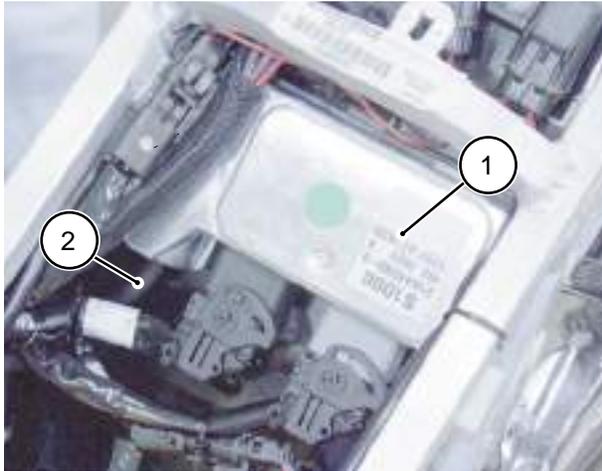
The engine control unit (ECU or ECM) precisely calculates ignition timing and fuel delivery for all engine speeds and loads (based on the currently installed calibration file and its mapping). The ECU is an extremely reliable component and should be the last component checked in the event there is a problem with the fuel injection system.

The sensors of the system collect engine operating information and transmit it to the ECU.

Actuators are devices like the fuel injectors, fuel pump, fuel pressure regulator, spark plug coil, and relays.

## MC1000 ENGINE CONTROL MODULE (UNIT) - (ECM OR ECU)

The ECM is located on the battery box within the subframe. .



Components have been removed for this photo.

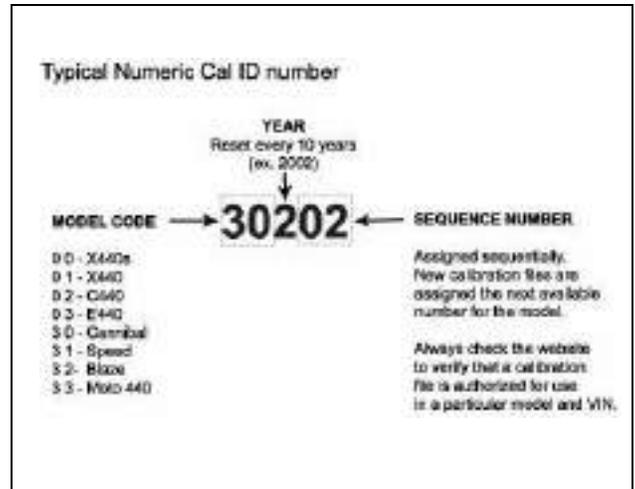
1. Engine Control Module (ECM)
2. Air pressure sensor hose (from airbox and fuel pressure regulator)

The ECM (also known as ECU) is the brain of the fuel injection system. This brain calculates fuel delivery and ignition timing based on information gathered from vehicle sensors and the calibration file loaded at the factory.

### ENGINE CALIBRATION FILE

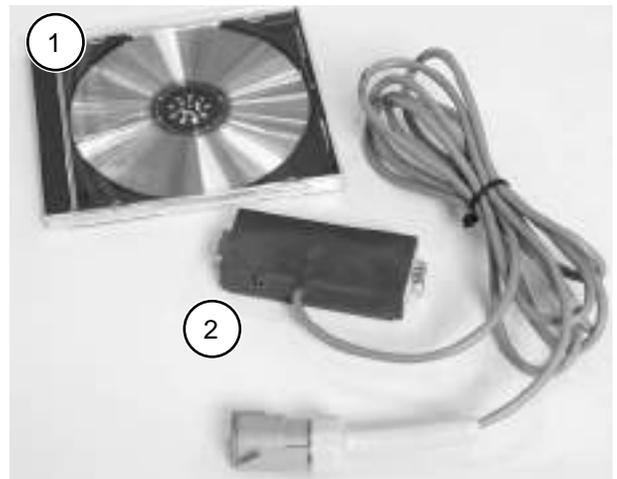
Your vehicle was loaded with a calibration file (Numeric Cal ID) when it left the factory. This file is specific to your vehicle's VIN number. You may be able to benefit from subsequently released calibration files when they are developed, however, always consult with your dealer before attempting to install any calibration file.

All authorized engine calibration files are maintained on our website ([www.cannondale.com/motorsports](http://www.cannondale.com/motorsports)).



### DIAGNOSTICS

Engine Management System diagnostics can be performed using the Cannondale Diagnostic Tool.



1. Software CD
2. Data cable

The tool is a combination of a specially developed Windows- based software program and a data cable used to connect your PC or pocket PC computer to your vehicle.

With the tool, you can read fault codes, install engine calibration files, set vehicle rpm, and monitor engine operating parameters.

## ELECTRICAL

### FUSE REPLACEMENT

#### **⚠ WARNING**

#### **POTENTIAL HAZARD**

Using an unspecified fuse or shorting the fuse holder.

#### **WHAT CAN HAPPEN**

Using a fuse with a rating other than specified or using other materials in place of the fuse will cause damage to system. A malfunctioning electrical system increases the risk that you may be seriously injured or killed while operating the vehicle. For example, an electrical fire can develop from a system overload or you could lose vehicle lighting.

#### **HOW TO AVOID THE HAZARD**

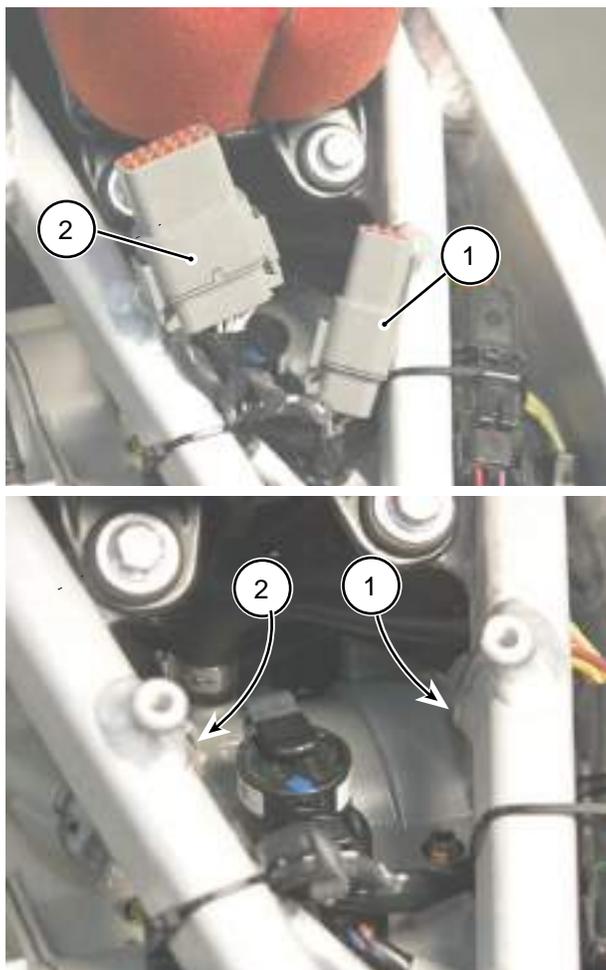
Always use a replacement fuse of the specified rating.

Never use other materials in place of the fuse.

If a fuse blows immediately after replacement have the electrical circuits checked by an authorized Cannondale Motorsports Dealer.

Check the condition of the wiring harness and connectors before replacing a blown fuse.

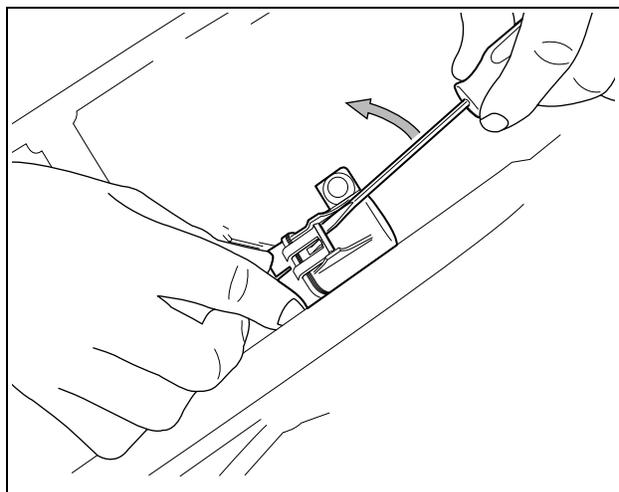
Make sure the lighting is switched off when replacing a fuse.



In the top photo, the connectors have been positioned outside their normal location for clarity. The bottom photo shows the connectors as they are correctly stowed under the framework.

1. Diagnostic connector
2. Interface connector

1. To replace a fuse, remove the seat. See seat removal in this manual.
2. Use a thin blade screwdriver to lift up on the latch.



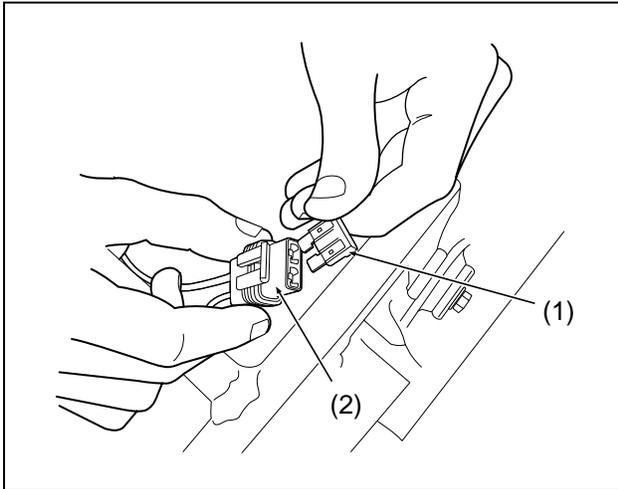
1. Fuse socket
2. Latch
3. Fuse housing

3. Pull the bottom of the fuse socket towards the front of the vehicle.

### CAUTION

Do not pull on the wires.

4. Remove the fuse and install the specified replacement fuse. See the Model Specification section of this manual for the fuse rating.



1. Fuse
2. Holder

## BATTERY

The EFI (electronic fuel injection) system will benefit most from a fully charged battery. Weak batteries will cause hard starting and a general reduction in vehicle performance.

The battery capacity in your vehicle has been sized for maximum performance and minimal weight. Repeated starting without running the engine long enough to replenish the battery will result in a discharged battery with insufficient power to restart the engine.

### WARNING

#### POTENTIAL HAZARD(S)

- (1) Opening the battery
- (2) Disconnecting the battery incorrectly

### WHAT CAN HAPPEN

(1) Your vehicle is equipped with a maintenance-free battery. It requires no servicing other than external cleaning and routine charging (during storage). If you pry off the cap strip you could release poisonous gas and corrosive fluid which could injure you severely. If opened in the presence of an ignition source, the gases could cause an explosion.  
(2) Always disconnect the negative (-) battery lead first. If you don't, the battery may explode causing serious injury or death to anyone in the vicinity of the battery.

### HOW TO AVOID THE HAZARD

(1) Never attempt to open the battery cap strip. Never attempt to add fluid to the battery. Keep sources of ignition away from the battery (e.g. cigarettes, flames, or sparks).  
(2) Always disconnect the negative (-) battery lead first. When reconnecting connect the negative lead last.

### CAUTION

Remove the battery from the vehicle when charging.

Don't charge above the maximum charging rate (2 amps).

Never allow a battery to stand in a discharged condition.

## SPARK PLUG REPLACEMENT

**SERVICE:** Spark plug type  
NGK (CR9EK)

**SERVICE:** Spark plug gap  
0.024 - 0.028in (0.6 - 0.7mm)

**TORQUE :** Spark plug  
20.0 lbf•ft (27.1 N•m)

### CAUTION

Clean the top of the engine and surrounding area with compressed air before removing the coil and spark plug as a step toward preventing dirt and other contaminants from entering the engine.

Only install the spark plug into a cool engine.

Always use the specified spark plug with the proper gap.

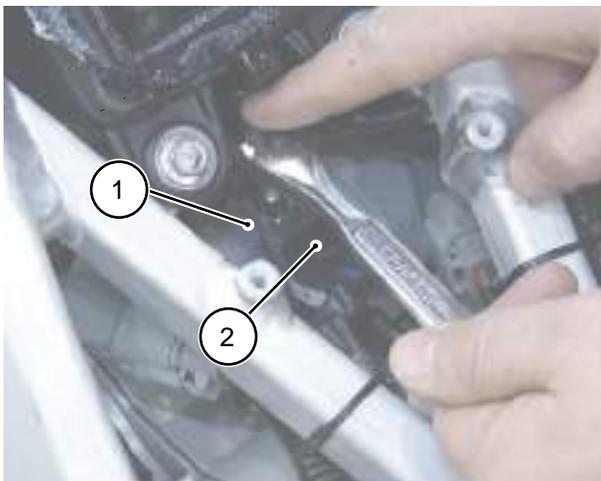
Torque the plug as specified. An overly-tight or cross-threaded spark plug will damage the threads in the spark plug hole.

1. Remove the seat.

**⚠ WARNING**

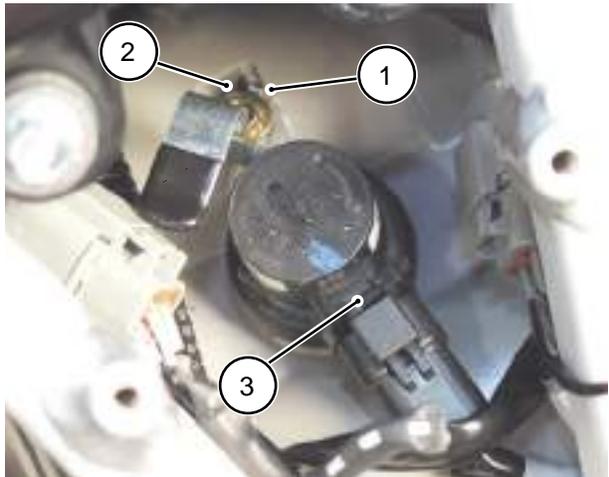
**Protect your eyes! Wear safety glasses.**

2. Carefully clean the area surrounding the coil with compressed air.
3. Remove the air filter and the fuel tank.
4. Use a 3/8" drive socket with a 2" deep 6mm socket to loosen the coil retaining clip bolt just enough so that the clip can be lifted and turned to the side with the bolt still installed in the crankcase cover. Space is tight here so avoid removing the bolt.



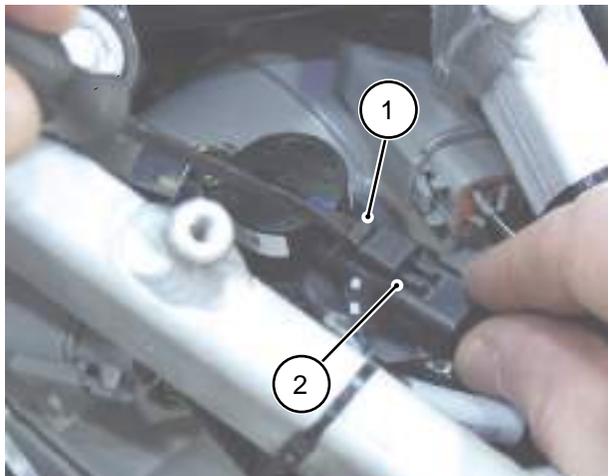
1. Bolt
2. Clip

5. Cut the cable tie securing the connector latch.



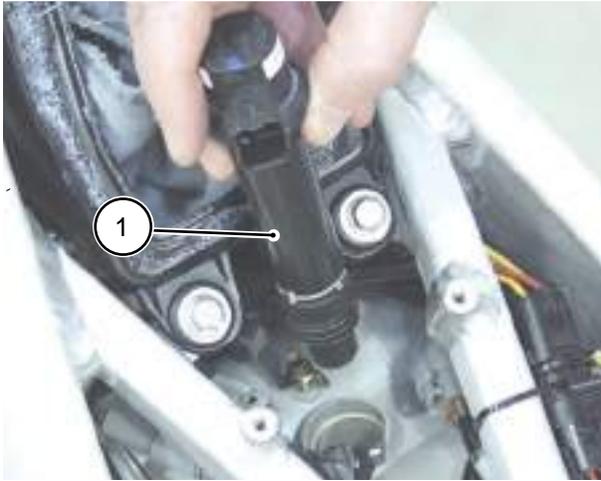
1. Clip tang
2. Crankcase cover hole
3. Zip tie

6. Use a thin flat blade screwdriver to lift the latch up slightly and remove the harness connector from the coil.



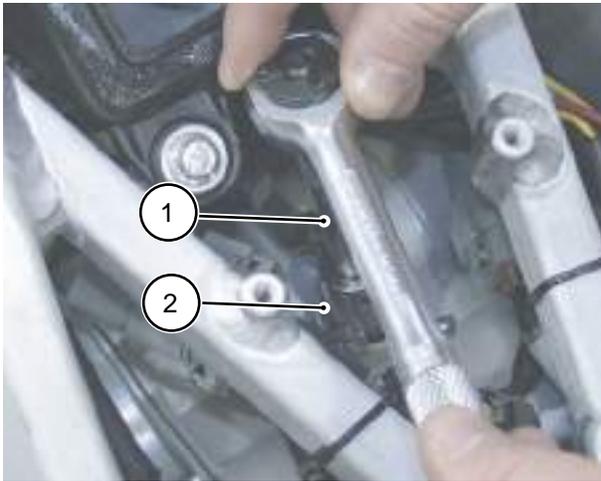
1. Latch
2. Connector

7. Lift out the coil.



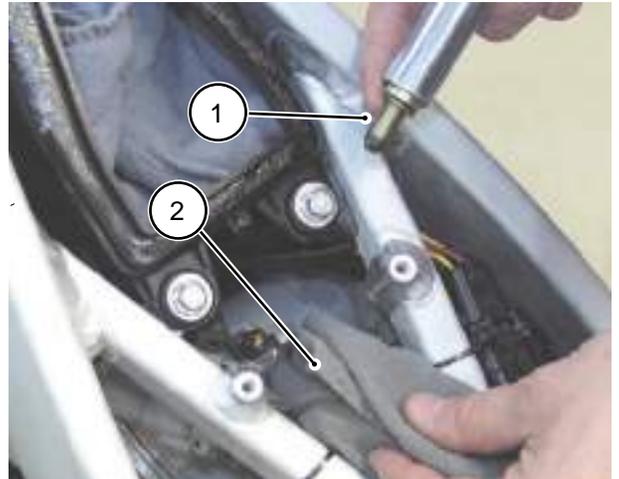
1. Coil

8. Use a 5/8" spark plug socket and an extension to loosen and remove the spark plug. In the photo below, we used a 3/8" drive with a 6" long 5/8" spark plug socket on a 2 1/2" extension.



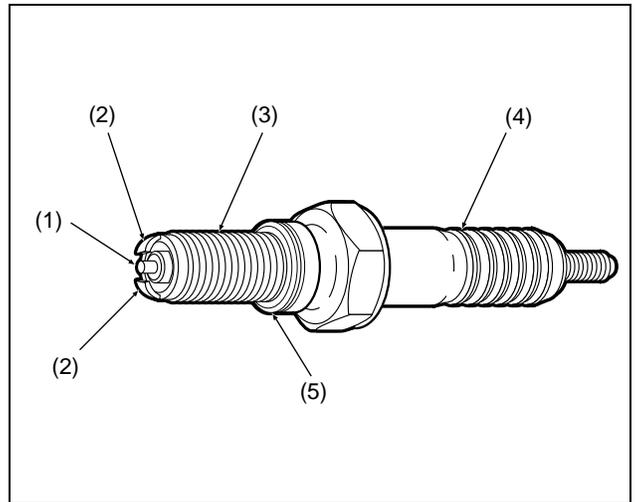
1. 2 1/2" long extension  
2. 6" long 5/8" spark plug socket

9. Lift out the spark plug and cover the cylinder head hole with a clean rag.



1. Spark plug  
2. Hole

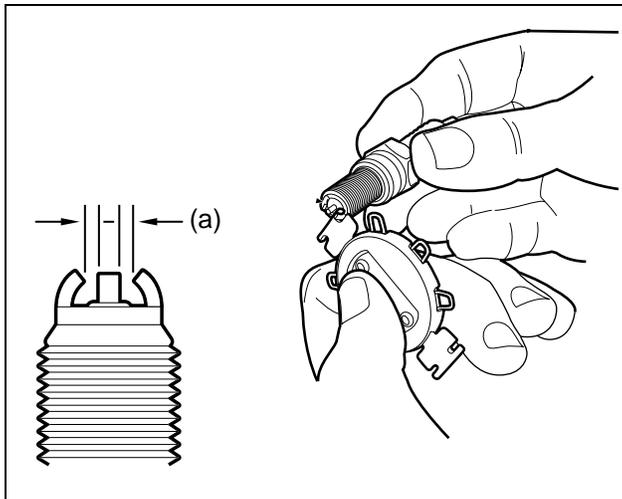
10. Inspect the spark plug. If in doubt concerning the condition of the spark plug, consult an authorized Cannondale Motorsports Dealer. The simple answer is to replace an old spark plug with a new one anytime you remove it, but since the spark plug is a valuable indicator of engine operating characteristics it is extremely important to have it evaluated by a skilled service technician. Consult an authorized Cannondale Motorsports Dealer.



1. Center electrode  
2. Ground electrodes  
3. Threads  
4. Insulator  
5. Sealing washer

The spark plug gap (a) must be measured with a wire gauge or feeler gauge. If the gap is out

of specification, adjust it. If the spark plug utilizes multiple ground electrodes, measure each gap.



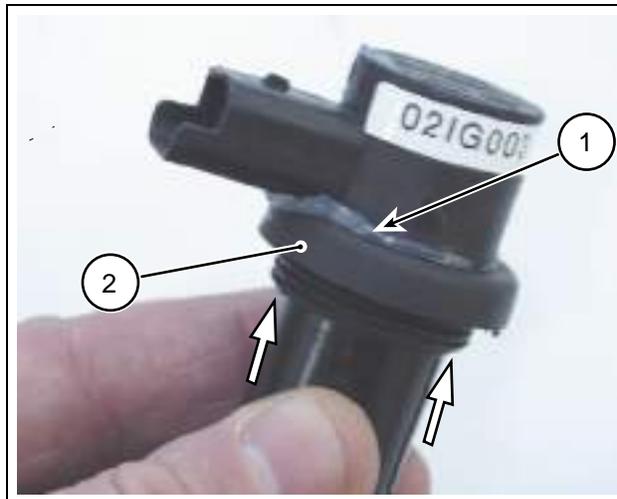
a. Spark plug gap

11. Set the specified gap.
12. Lightly coat the plug threads with a suitable anti-seize compound; this will allow for easier spark plug removal in the future.
13. Install the plug (sealing washer installed) into the cylinder head and tighten to the specified torque.

**TORQUE :** Spark plug  
20.0 lbf•ft (27.1 N•m)

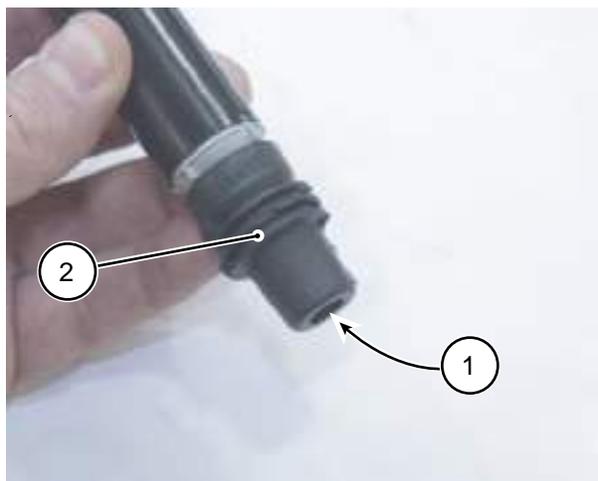
14. Inspect the coil for any signs of damage.
15. Remove any old silicone sealant from the coil seal.

16. Slide the seal onto the coil. Before the seal reaches the top, apply a thin bead of silicone sealant to the inside edges.



1. Coil  
2. Seal

17. Apply a pea-size drop of dielectric grease to the coil tip and apply some clean engine oil to the tip seal.

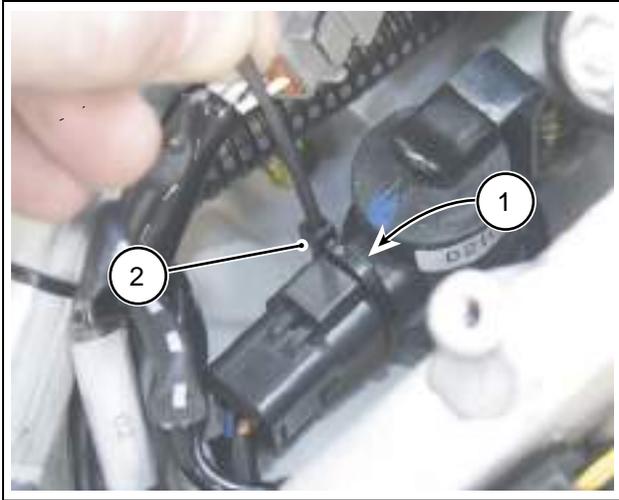


1. Tip  
2. Tip seal

18. Insert the coil into the cylinder head and onto the spark plug.
19. Install the retaining clip over the coil head. Make sure the tang on the clip locates in the crankcase cover hole properly. Tighten the bolt to the specified torque.

**TORQUE :** Ignition coil retaining clip bolt  
3.3 lbf•ft (4.5 N•m)

20. Reconnect the coil harness connector. Slide it onto the coil making sure it latches. Install a zip tie over the latch. See photo below.



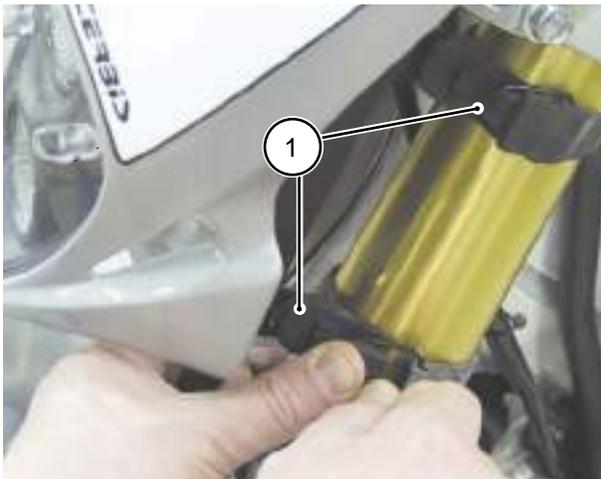
1. Latch
2. Zip tie

21. Reinstall removed components.

## HEADLIGHT BULB REPLACEMENT

Consult the Model Specifications section of this manual for the replacement bulb type.

1. Remove the main fuse.
2. Remove the straps from the left fork leg and notice the brake line and odometer sensor routing. When reassembling make sure the routed lines are on the inside of the headlight bracketing.

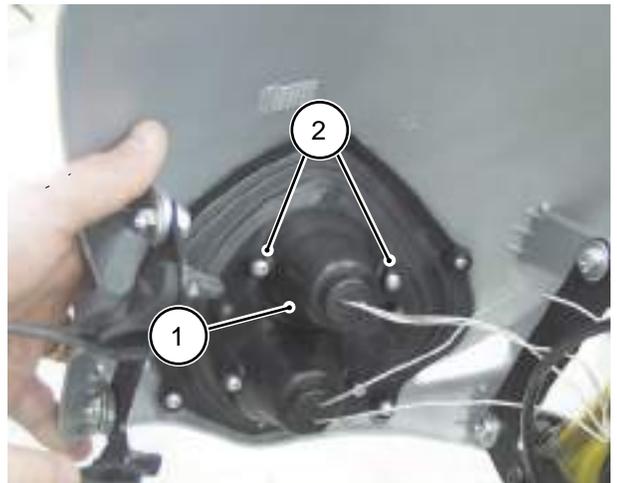


1. Strap

3. Tilt the headlight out slightly and remove the housing screws and remove the bulb housing from the headlight body. The headlight has two lamps, the process is identical for both.

### NOTE :

*Note the fit and form of the housing as you remove it. Later, install the housing as removed or a gap between it and the headlight body may result. A gap will allow water and debris to enter the inside of the headlight causing damage.*



1. Housing
2. Screws (upper bulb)

4. Remove the bulb unit from the socket and install a replacement bulb.



5. Re-strap the headlight to the fork leg making sure the strap catches are connected properly.
6. Test the headlight for proper operation.

**NOTE :**

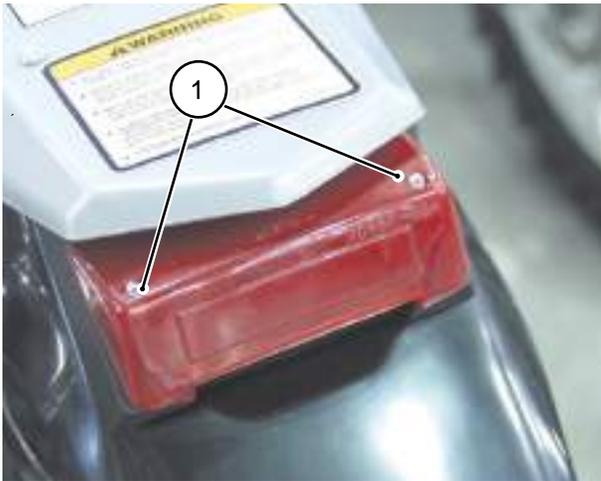
*You may elect to examine the overall headlight mounting at this point. The entire headlight can be positioned slightly higher or slightly lower on the two fork legs. The position of the straps on the fork legs will change the beam height. Positioning the straps evenly on both fork legs will produce good results with regard to tilting of the beam.*

*The bracket is also slotted to allow for up/down movement.*

## **TAILLIGHT BULB REPLACEMENT**

Consult the Model Specifications section of this manual for the replacement bulb type.

1. Remove the main fuse.
2. Remove the lens screws.



**1. Lens screws**

3. Remove the bulb holder from the supports.



4. Inspect the inside of the bulb socket for any sign of damage and take corrective action.



5. Reposition the bulb holder onto the supports and reinstall the lens.
6. Test the taillight for proper operation.

## AIR

### CLEANING THE AIR FILTER

#### **WARNING**

##### **POTENTIAL HAZARD**

Fire or explosion, filter damage

##### **WHAT CAN HAPPEN**

Using gasoline or other low flash point solvents to clean the air filter can result in a fire or explosion.

##### **HOW TO AVOID THE HAZARD**

Use a non-flammable (high-flash point) solvent to clean the air filter elements.

#### **CAUTION**

Be very careful not to allow any dirt or foreign matter into the airbox when you have the filter removed. Severe engine damage will result if foreign matter or dirt enter the combustion chamber via the airbox.

Use only high quality foam air filter specific oils. Consult your authorized Cannondale motorsports dealer for available oil brands.

The air filter must be completely dry before applying the air filter oil.

Make sure the airbox filter fits properly so there are no gaps around the mating surfaces. Use a high quality water-proof grease on the filter where it contacts the airbox to help guard against unfiltered air entering the system.

1. To clean the filter, remove the seat.

2. Release the retaining clip and remove the filter from the airbox. Use your thumb to push down on the clip and use the index finger of your other hand to guide the clip end off the airbox catch.



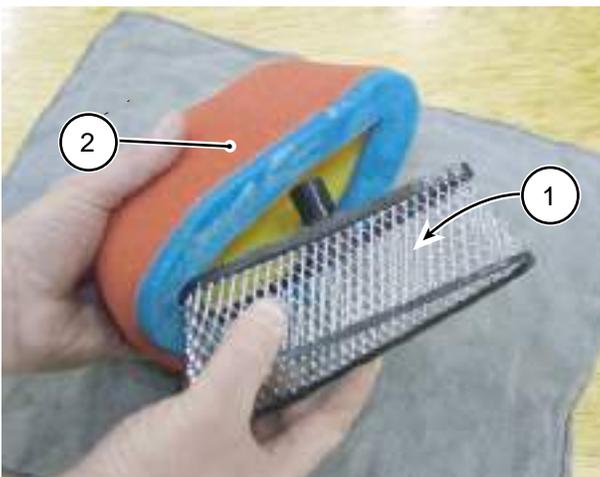
3. Do not attempt to remove the clip entirely; its not necessary. Simply, move the clip to one side and remove the filter from the airbox.



- Place a clean shop towel over the airbox opening.



- Separate the foam element from the screen.



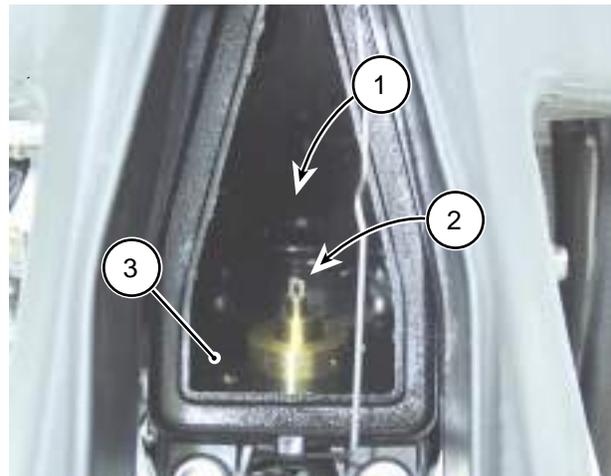
- Screen
- Foam element

- Clean both with non-flammable (high-flash point) and rinse both with warm water. Squeeze the foam to remove water. Allow both to air dry completely. Inspect both for damage (e.g. cracking, tears, holes, etc.)
- Coat the foam evenly with high quality foam air-filter oil. Squeeze the element a few times to ensure complete coverage inside and out.

- Recombine the foam and screen. When recombining, make sure the foam completely covers the screen so that the mating surface of the airbox meets the foam and no part of the screen element.



- Carefully wipe the interior of airbox with a lint free clean shop towel. Avoid the tip of the air temperature sensor. Also, be sure to note the small brass air pressure port fitting. A hose is attached to this fitting on the other side of the airbox. The hose and this fitting should be unobstructed so that the ECU senses the correct air pressure within the airbox. Faulty readings will affect engine operation.



- Air funnel
- Air temperature sensor tip
- Air pressure hose fitting

- Apply a generous layer of high quality waterproof grease to the flange of the air filter and position the filter onto the airbox.

- Install the air filter retaining clip.

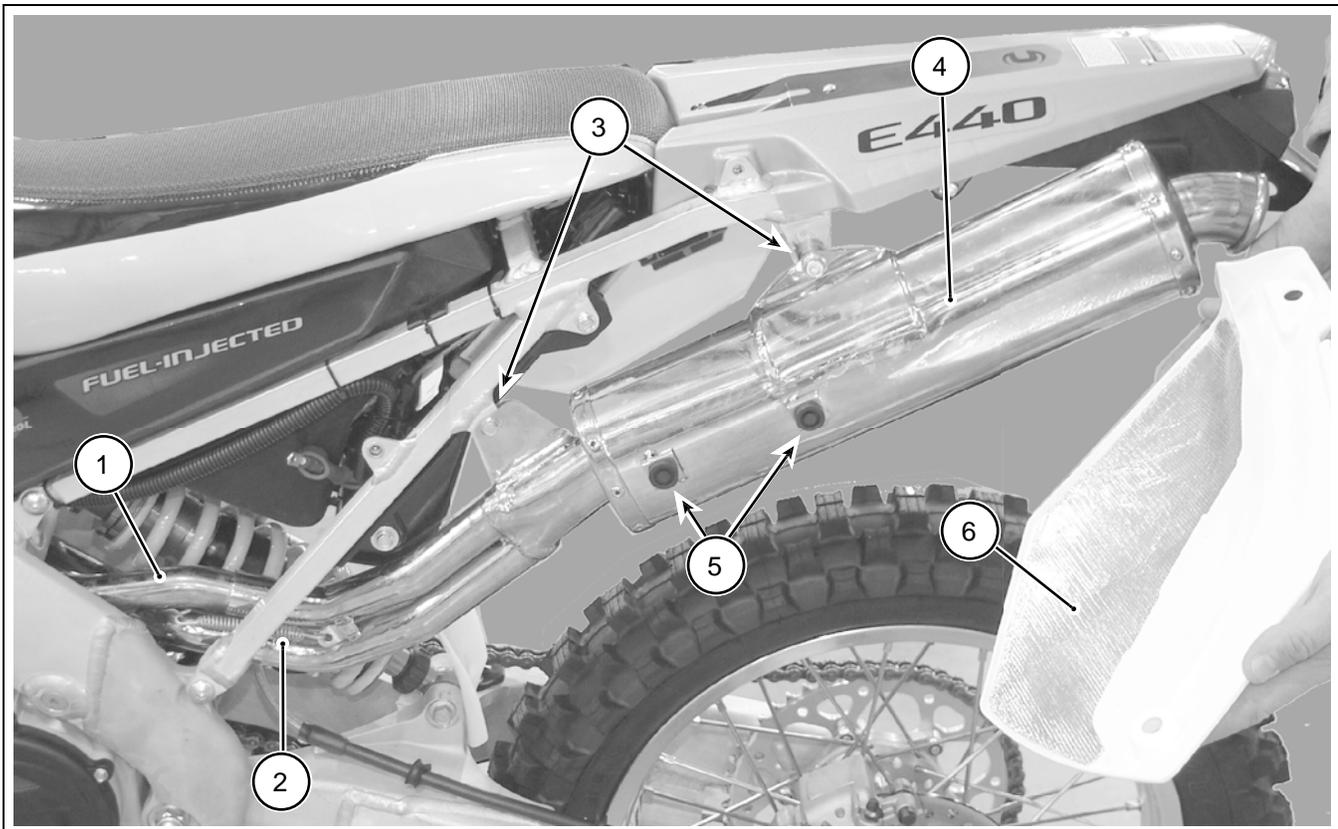
## EXHAUST

The exhaust system on your motorcycle has the two main roles of transferring combustion gases away from the rider and reducing engine noise levels. You should not attempt to remove or modify the exhaust system in any way.

### **⚠ WARNING**

**Visually inspect the exhaust system before every ride to make sure it is in good condition, fastened securely, and operating properly. A damaged, loose, or cracked exhaust system is dangerous to the operator and/or can severely damage the engine if the conditions remain uncorrected.**

Under normal conditions, the silencer should be re-packed every year to ensure that the exhaust system functions as designed. However, individual riding style will change how soon the silencer must be repacked. More abrupt and sustained throttle openings will shorten the amount of time between service. If the exhaust system seems unusually loud, the silencer may need repacking. In any event, consult your Cannondale dealer when this service is required.



In the photo above, the side panel has been removed for clarity.

- |                            |                   |
|----------------------------|-------------------|
| 1. Exhaust header          | 5. Grommets       |
| 2. Spring                  | 6. Heat shielding |
| 3. Silencer mounting bolts |                   |
| 4. Silencer                |                   |

## SUSPENSION

### SUSPENSION: INTERNAL SETTINGS AND EXTERNAL ADJUSTERS

The suspension components (front fork and rear shock) on your Cannondale vehicle are fully adjustable. The adjustment is gained through changes to internal settings and external adjusters. The factory set-up which is a combination of both should be a good match for any rider of average weight, skill, and ability. You may choose to change the factory production settings for ones that better suit your own skills and riding style.

The internal settings (valving, oil volume, spring rates) can be changed. We strongly recommend that if you elect to make any internal changes that the service be performed by experienced suspension professionals. The internal settings for your suspension components have been developed by Pro-Action Suspension. Please contact Pro-Action's authorized service centers for service or re-valving needs. They have 27 authorized service centers across the United States. Contact Pro-Action for the one nearest you.

#### PRO-ACTION WORLD HEADQUARTERS LOCATIONS

East  
Pro-Action Suspension  
3611 8th Avenue  
Beaver Falls, PA 15010  
PH: 724-846-9055  
FX: 724-846-1629  
Email: [GQ@PROACTION.ATTBBS.COM](mailto:GQ@PROACTION.ATTBBS.COM)  
Website: [www.pro-action.com](http://www.pro-action.com)

West  
Pro-Action INC  
12156 Severn Way  
Riverside, CA 92503  
PH: 909-280-9882  
FX: 909-280-9886  
Email: [WESTCOASTHQ@AOL.COM](mailto:WESTCOASTHQ@AOL.COM)  
Website: [www.pro-action.com](http://www.pro-action.com)

## MAKING DAMPING ADJUSTMENTS

Both the front forks and rear shock can be adjusted externally by selecting a range of positions in the compression damping and rebound damping adjusters. But, before you adjust the front or rear shock, be sure to consult the Model Specifications section of this manual for the suspension components installed on your model and the applicable settings and service limits.

Before making any adjustment described on the following pages, be sure to read the basic description of compression and rebound damping and the explanation of how to use the adjusters to prevent damage and assure hassle free adjustment.

- **Click position "0" (zero) is when the adjuster is fully closed (i.e., fully seated). At this setting the adjuster is set at maximum dampening. You should start from 0 every time you adjust.**
- **When counting clicks (making an adjustment), slowly turn the adjuster counter clockwise until the total setting is reached.**
- **Make adjustments in 1 click increments and test ride after each change.**
- **When you think you have made an improvement, go back to what you started with and double check to be sure an improvement was made. Also, pay attention to changes in conditions (e.g., tires, air temperature).**
- **If you become confused or lose track of the current adjustment setting, return to the standard setting and start over.**

## SUSPENSION BREAK-IN

During the first hour, it is recommended to set the ride height (spring pre-load), but do not change the factory-set suspension settings to allow the fork legs and rear shock absorber to break-in, in order to work freely with a minimum of friction.

NOTE :

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*The initial suspension impression (or “feel”) could be harsh or stiff, this will change after about 1 hour of use. Therefore, do not change the initial suspension settings until after the vehicle has been ridden for 1 hour.*

---

## SUSPENSION SERVICING

### **WARNING**

#### **POTENTIAL HAZARD**

Worn or damaged suspension components

#### **WHAT CAN HAPPEN**

Suspension components are directly “safety-related.” You can be severely injured or killed if you operate the vehicle with worn or damaged suspension components.

#### **HOW TO AVOID THE HAZARD**

Inspect and maintain the suspension systems (front/rear) on your vehicle as described in this Owner’s Manual before every ride. If you observe any damage, have it inspected and repaired before riding your vehicle. Contact an authorized Cannondale motorsports dealer.

Have the suspension system serviced in accordance with the maintenance schedule in this Owner’s Manual.

Never attempt to disassemble or perform service to the internal settings of either the front or rear suspension systems. Only a qualified service technician with considerable experience should perform any service.

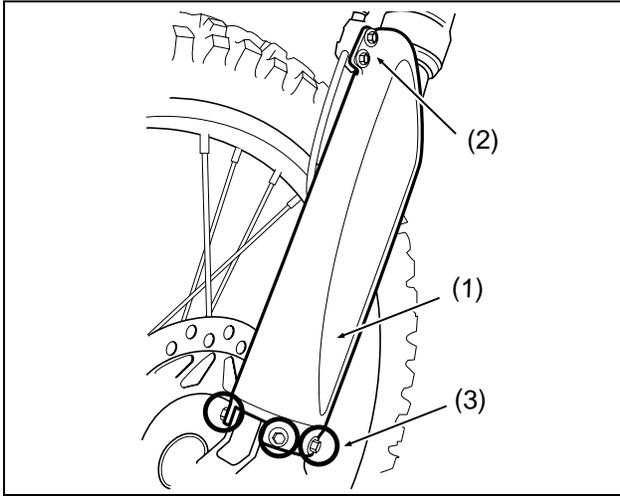
## FRONT SUSPENSION



- |                             |                                 |
|-----------------------------|---------------------------------|
| 1. Fork                     | 5. Wear ring                    |
| 2. Protector                | 6. Seal (wipers)                |
| 3. Rebound damping adjuster | 7. Compression damping adjuster |
| 4. Air bleed screw          |                                 |

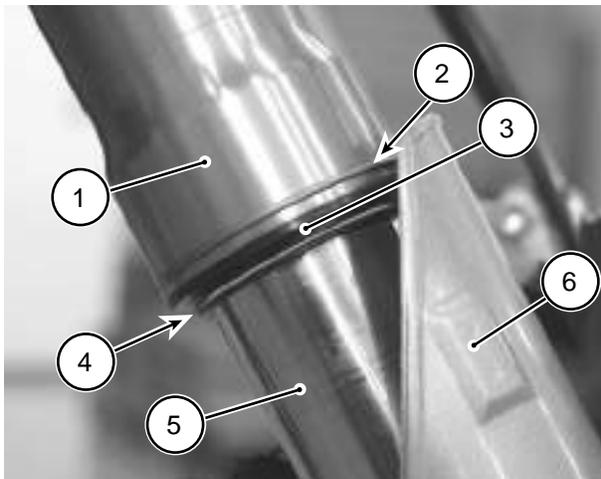
## FRONT SUSPENSION INSPECTION

1. Make sure the fork leg protectors are clean (not packed with mud or dirt) fastened securely and undamaged.



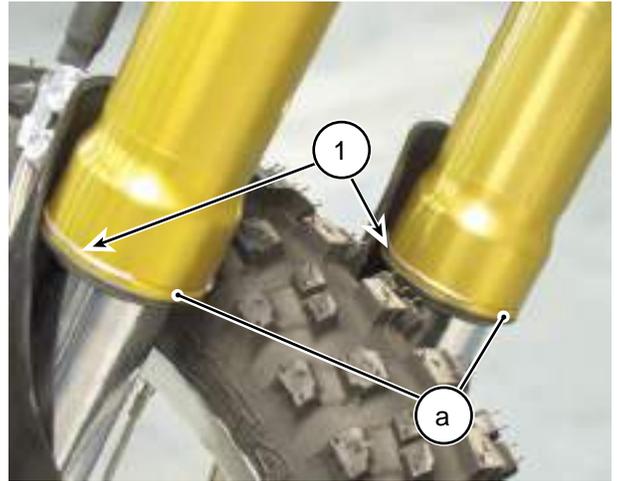
1. Fork protector
2. Brake line clamp bolts
3. Mounting bolts

2. Make sure the fork seals are in good condition and clean. Replace leaking fork seals before you ride the vehicle. Replacement involves fork disassembly and should not be attempted by anyone other than a trained suspension professional; contact your Cannondale motorsports dealer for information on servicing the suspension components on your vehicle.

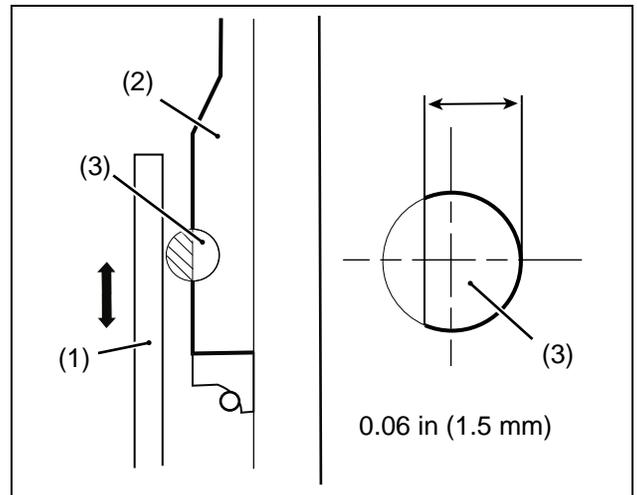


1. Outer tube
2. Wear ring
3. Seal
4. Seal spring
5. Inner tube
6. Protector

3. Inspect the wear rings. Replace the ring if it is damaged or flat with the outer tube surface. Position the gap in the wear ring rearward. If the wear rings are worn beyond specification, incorrectly positioned, or damaged, the outer tube of the fork will be worn.



1. Wear ring
- a. Gap

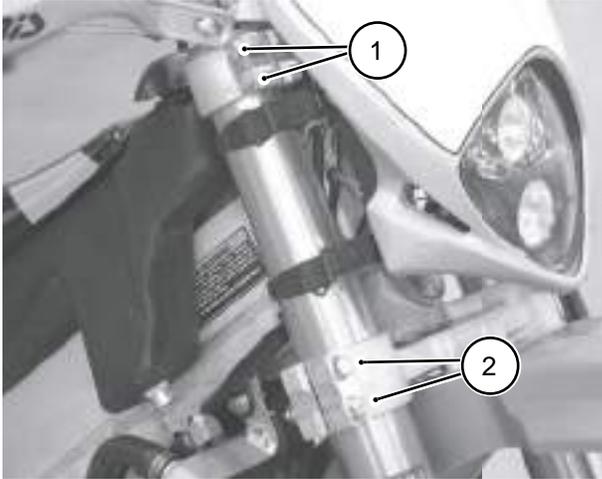


1. Guard
2. Outer tube
3. Wear ring

4. Check for the entire fork for signs of oil leakage especially the area around and below the fork seals for fork fluid. If there is any indication of damage or leaks consult an authorized Cannondale motorsports dealer.
5. Make sure the upper and lower triple clamp pinch bolts are tightened to the specified torque.

## CAUTION

Observe the torque specification found in the Torque Table in this manual. The forks can be severely damaged if you over tighten them in the clamps.

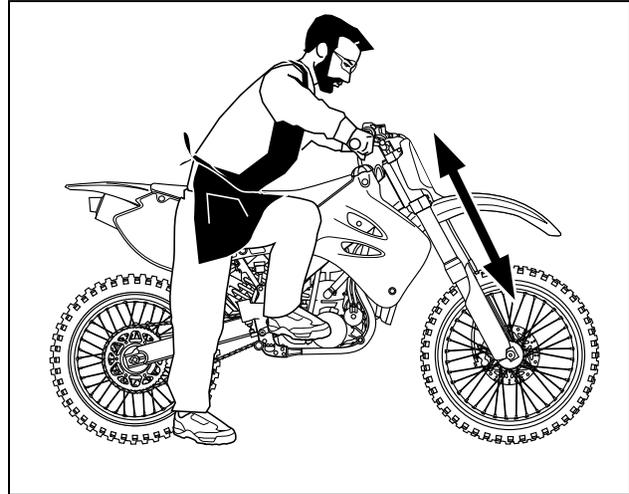


1. Upper triple clamp bolts
2. Lower triple clamp bolts

6. Inspect bolts and nuts for tightness.
7. Apply a thin film of the specified lubricant to the inner tube. Take the vehicle off the stand, apply the front brake, and push down on the handlebar several times. This will allow the grease to spread evenly over the fork tubes and to allow you to check for smooth and proper fork leg operation.

**SERVICE:**     **Suspension, fork leg, grease (daily care)**  
                      **Ohlins green grease - 148-01**

8. Move the front forks up and down several times and inspect for smooth movement.



## FRONT RIDE HEIGHT & STATIC SAG

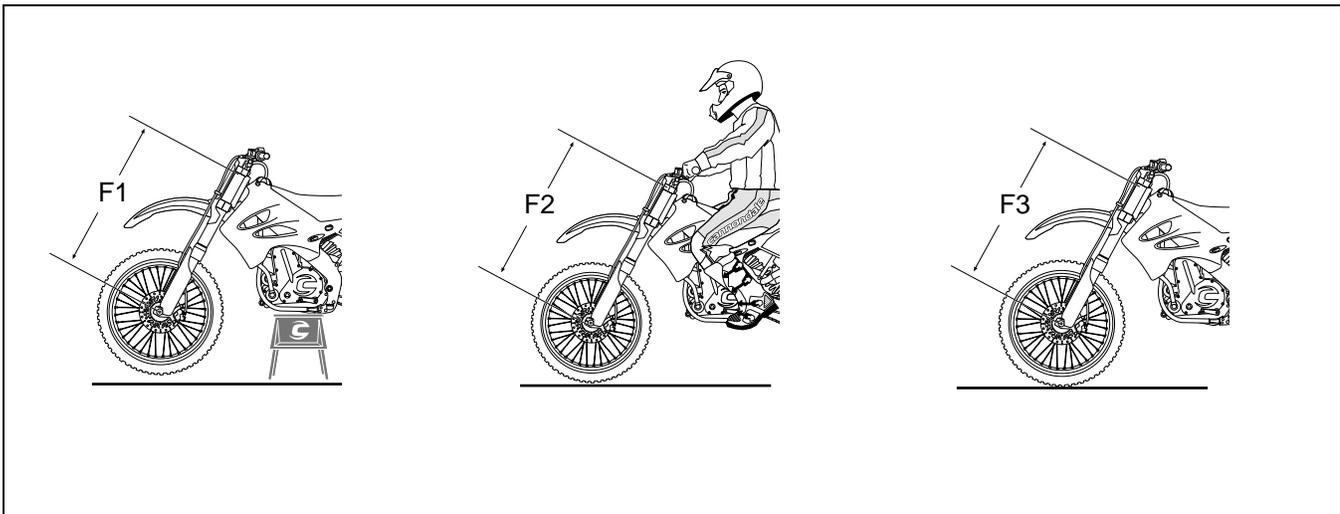
The ride height and static sag specifications for your vehicle can be found in the Model Specification section of this manual.

Make sure the vehicle ride height and static sag dimensions are as specified before performing compression or rebound adjustments.

When measuring the illustrated dimensions, measure from the center of the axle nut to a point on the upper triple clamp. Use the same measurement points each time.

If the ride height or static sag is out of specification, springs with a different spring rate will have to be installed in the forks. Optional springs are available for your vehicle, but you should not attempt to install them yourself. Consult your Cannondale Motorsports dealer for spring and installation service.

1. Place the vehicle on a stand so that the front wheel is off the ground and the forks are fully extended. Measure the unloaded measurement (F1).
2. Take the vehicle off the stand. With rider in full gear seated on the vehicle with feet on the footpegs, repeat the measurement. Have one assistant hold the bike upright and have another do the measuring. Bounce your weight up and down a few times to overcome any "stiction" in the suspension and find the best reference point. Record the value (F2). This is the ride height.
3. With the vehicle on the ground, held in the upright position and fully unloaded, repeat the measurement. Record the value (F3). This is the static sag.



## FORK REBOUND DAMPING ADJUSTMENT

### CAUTION

**Adjust both forks to the same setting.**

Rebound damping affects how quickly the fork “rebounds” or returns to the fully extended position after compression.

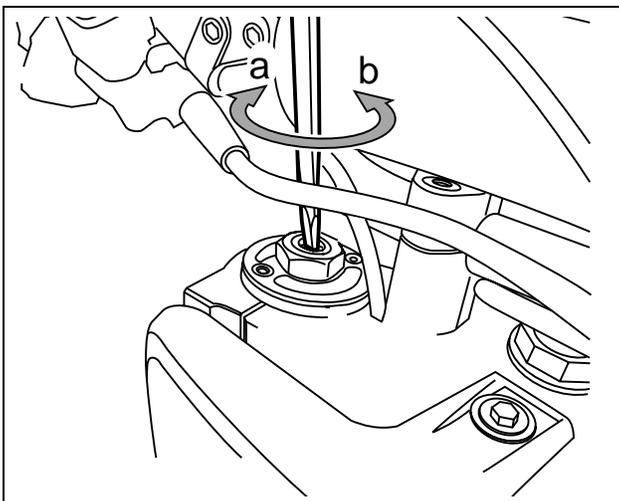
A rebound damping adjuster is located at the top of each fork. The adjuster has 35 positions. Each position can be identified by an audible “click” heard when turning the adjustment screw. There are 8 clicks in each full revolution of the adjusting screw.

1. To set rebound damping to the standard setting, turn the adjustment screw clockwise until it will no longer turn. When the screw stops, this is the harder position “0”.

### CAUTION

**Do not force the adjuster past the stop point.**

2. Turn the adjuster counter clockwise counting each “click” until the specified standard setting for your vehicle is achieved. Consult the Model Specification section in this owner’s manual.



1. Rebound adjuster

## FORK COMPRESSION DAMPING ADJUSTMENT

### CAUTION

**Adjust both forks to the same setting.**

Compression damping affects how quickly the fork compresses.

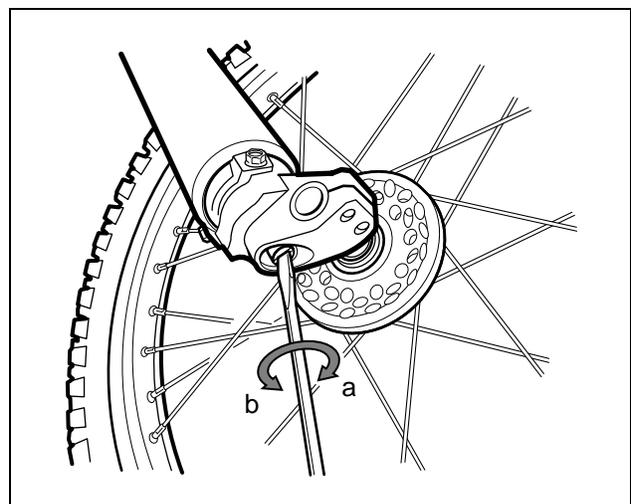
A compression damping adjuster is located at the bottom of each fork. The adjuster has 27 positions. Each position can be identified by an audible “click” heard when turning the adjustment screw. There are 8 clicks in each full revolution of the adjusting screw.

1. To set rebound damping to the standard setting, turn the adjustment screw clockwise until it will no longer turn. When the screw stops, this is the harder position “0”.

### CAUTION

**Do not force the adjuster past the stop point.**

2. Turn the adjuster counter clockwise counting each “click” until the specified standard setting for your vehicle is achieved. Consult the Model Specification section in this owner’s manual.



1. Compression adjuster

## CLEANING THE FORKS

Clean the forks after every ride.

### CAUTION

**Pressure or steam washing will severely damage the fork legs on your vehicle - resist the temptation!**

**The forks, although quite sturdy, have delicate internal components that must stay clean and free of contaminants. You can force water, dirt and other contaminants inside the fork tube where damage will surely result.**

1. Remove and mud or dirt from the guards.
2. Gently clean the fork externally with a light/mild water/detergent solution.
3. Rinse the forks with clean water from an ordinary garden hose.
4. Dry the fork with a clean shop towel and spray with an all-purpose oil (WD-40).
5. Check externally for leaks and damage (e.g., nicks, dent).
6. After inspecting the fork legs, apply a small amount of Ohlins #148-01 grease to the inner tube.

## BLEEDING AIR PRESSURE

### NOTE :

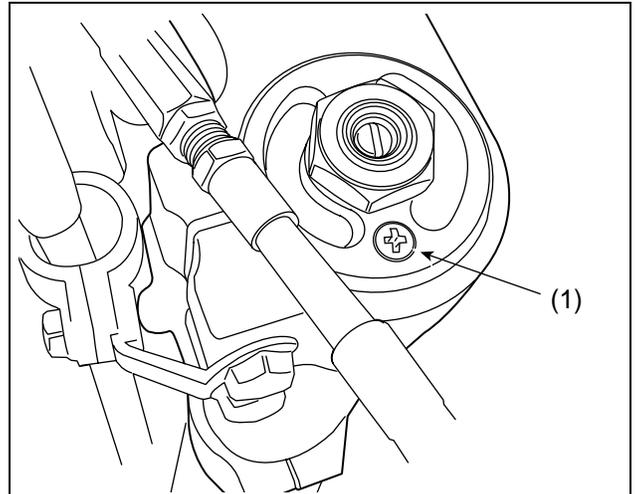
*Air pressure can build inside the forks through the up and down action of the forks during a moto or through changes in elevation (atmospheric pressure) during a ride. Release the air pressure in the fork legs. This pressure will affect the fork action making them stiffer or softer. Make sure the air pressure is bled regularly.*

1. Place the vehicle on a stand with the front wheel off the ground and forks fully extended.

### CAUTION

**Clean the area surrounding the screw to prevent oil contamination. The smallest amount of dirt can severely damage the forks.**

2. Remove the bleed screw located at the top of the fork leg and allow any accumulated air to escape.



1. Bleed screw

3. Inspect the bleed screw O-ring for damage. If damage is found, replace it.
4. Reinstall the bleed screw. Do not over tighten the screw.

### CAUTION

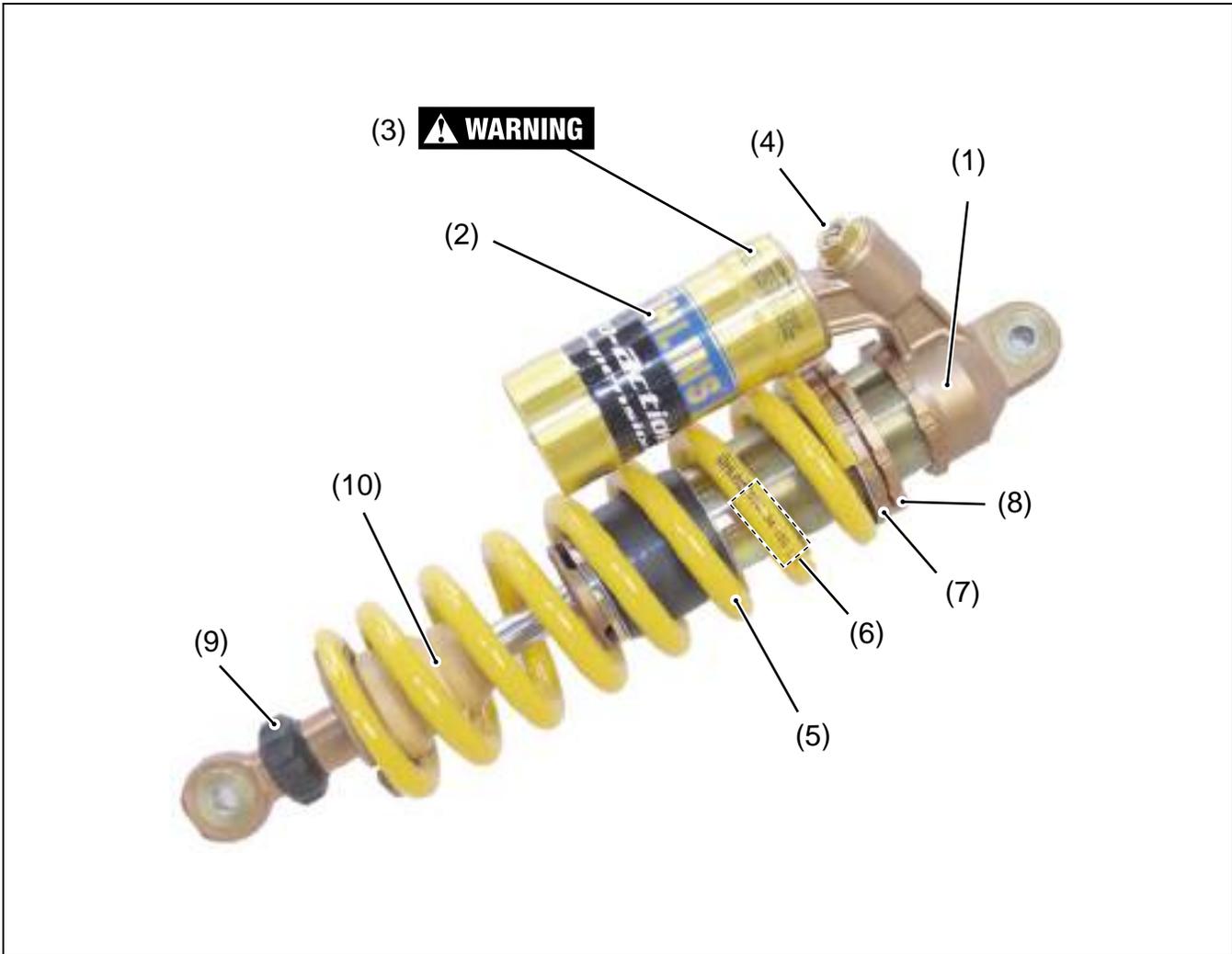
**Do not over-tighten.**

## PROFESSIONAL SERVICE (EVERY 25 HOURS)

We recommend that the fork legs on your vehicle undergo a comprehensive service program every 25 hours. At this interval, the oil should be changed and all internal and external components should be inspected and replaced new if required.

Do not attempt this service yourself. Contact an authorized Cannondale Motorsports dealer.

## REAR SUSPENSION



NOTE :

*Component shown removed for clarity*

- |                                 |                           |                             |
|---------------------------------|---------------------------|-----------------------------|
| 1. Body                         | 5. Spring                 | 9. Rebound damping adjuster |
| 2. Reservoir                    | 6. Spring ID (Type, rate) | 10. Bump stop               |
| 3. Nitrogen gas hazard warning  | 7. Adjuster nut           |                             |
| 4. Compression damping adjuster | 8. Lock ring              |                             |

## REAR RIDE HEIGHT & STATIC SAG

The ride height and static sag specifications for your vehicle can be found in the Model Specification section of this manual.

Make sure the vehicle ride height and static sag dimensions are as specified before performing compression or rebound adjustments.

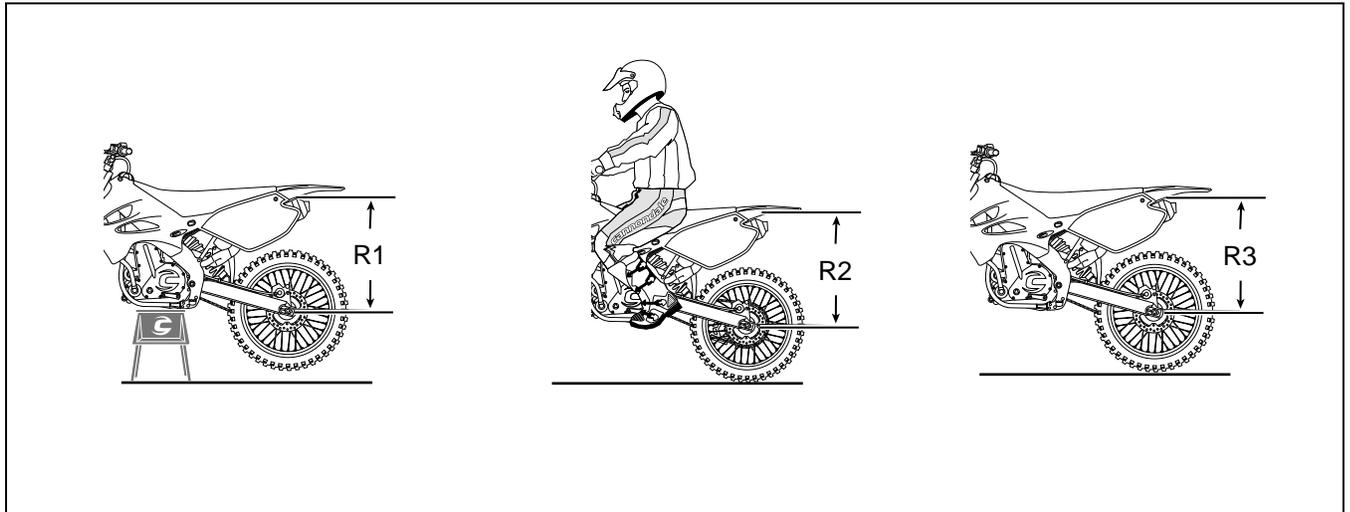
When measuring the illustrated dimensions, measure from the center of the wheel axle to a point on the subframe. Remove the number panel if required to make the measurement easier.

Adjustments to the spring preload change rear ride height. When adjusting the preload to achieve a certain ride height make both the ride height and static sag specifications are adjusted within specified limits. The static sag measurement (R3) is directly influenced by changes in the ride height.

If either the ride height or static sag is out of specification, a spring with a different spring rate will have to be installed onto the rear shock. Optional

springs are available for your vehicle, but you should not attempt to install them yourself. Consult your Cannondale Motorsports dealer for spring and installation service.

1. Place the vehicle on a stand so that the rear wheel is off the ground and the swingarm is fully extended. Measure the unloaded measurement (R1).
2. Take the vehicle off the stand. With rider in full gear seated on the vehicle with feet on the footpegs, repeat the measurement. Have one assistant hold the bike upright and have another do the measuring. Bounce your weight up and down a few times to overcome any "stiction" in the suspension and find the best reference point. Record the value (R2). This is the ride height.
3. With the vehicle on the ground, held in the upright position, repeat the measurement. Record the value (R3). This is the static sag.



## ADJUSTING THE REAR SPRING

### PRELOAD

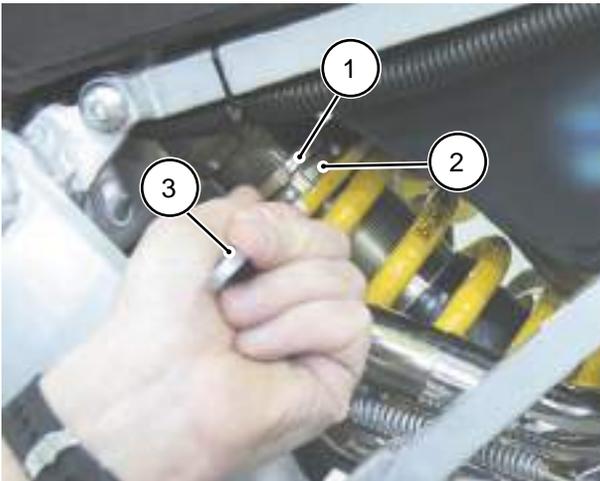
The following rear shock spring service specifications can be found in the Model Specifications section in this manual: (Free length, Installed length (minimum preload), minimum installed length (maximum preload)). Be sure to observe these service limits when adjusting the spring.

#### CAUTION

**Check ride height and static sag after adjustment.**

**Make sure you re-tighten the lock ring securely when finished.**

4. Loosen the lock ring.
5. Make a reference mark on the adjuster nut and spring.



1. Lock ring
2. Adjuster nut
3. Spanner wrench

#### NOTE :

*Turning the adjuster nut one full revolution will produce  $\pm 1$ mm change in spring length.*

6. Using a spanner wrench, turn the adjuster nut to increase (clockwise) or decrease (counter clockwise) the preload to maintain the specified ride height.

#### NOTE :

*Increasing the preload increases the ride height.  
Decreasing the preload decreases the ride height.*

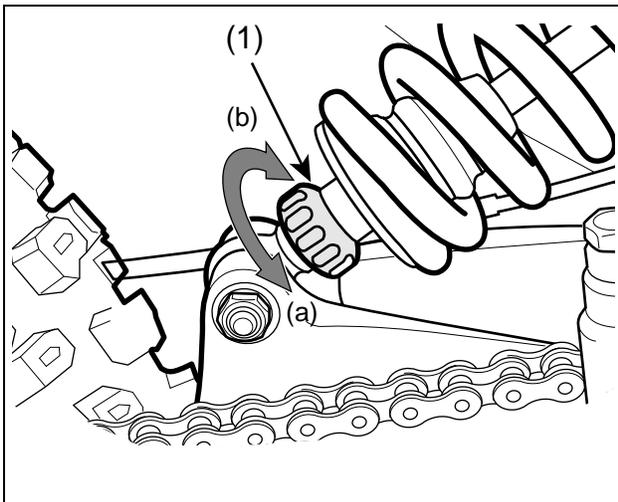
7. Tighten the lock ring when completed.

## REAR SHOCK REBOUND DAMPING ADJUSTMENT

Rebound damping affects how quickly the shock “rebounds” or returns to the fully extended position after compression.

A rebound damping adjuster is located at the bottom of the shock. The adjuster has 42 positions. Each position can be identified by an audible “click” heard when turning the adjuster. There are 20 clicks in each full revolution of the adjuster.

1. To set rebound damping to the standard setting, Turn the adjuster fully clockwise (b) until no clicks are heard or felt.



1. Rebound adjuster
  - a. More damping “stiffer” (counter clockwise)
  - b. Less Damping “softer” (clockwise)

2. Turn the adjuster counter clockwise (a) until the first “hard” click is heard. This is setting one and the first in the count. Continue turning the adjuster counter clockwise and count the clicks until you reach the total specified standard setting. Consult the Model Specification section in this owner’s manual.

## REAR SHOCK COMPRESSION DAMPING ADJUSTMENT

Compression damping affects how quickly the shock compresses.

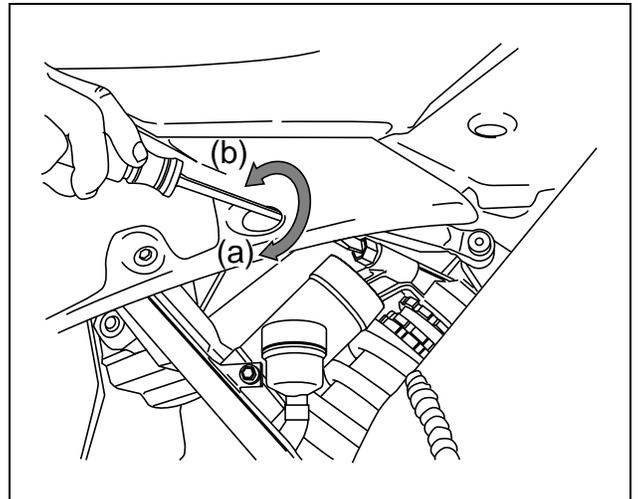
The compression adjuster is located at the top of the shock reservoir. The adjuster has 23 positions. Each position can be identified by an audible “click” heard when turning the adjustment screw. There are 8 clicks in each full revolution of the adjusting screw.

1. To set compression damping to the standard setting, turn the adjustment screw clockwise until it will no longer turn. When the screw stops, this is the harder position “0”.

### CAUTION

Do not force the adjuster past the stop point.

2. Turn the adjuster counter clockwise counting each “click” until the specified standard setting for your vehicle is achieved. Consult the Model Specification section in this owner’s manual.



1. Compression adjuster
  - a. More damping (stiffer)
  - b. Less damping (softer)

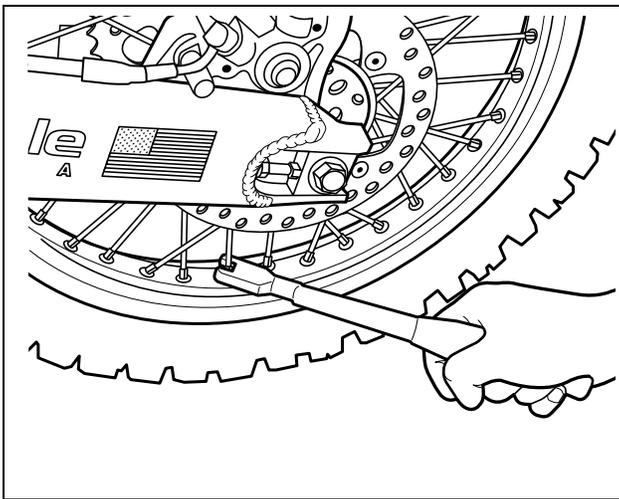
## WHEELS

### CHECKING THE SPOKE TENSION

Check the spoke tension on your vehicle often. Correct spoke tension is very important to wheel stability and safe operation.

1. Check each spoke with a spoke nipple wrench.
2. Tighten so that all spokes have the same tension

**TORQUE :** Wheel, spoke nipple  
3.3 lbf-ft (4.5 N•m)



1.

### WHEEL BEARING INSPECTIONS

1. place the vehicle on a work stand so that the wheel is off the ground.
2. Grasp the top and bottom of the wheel with your hand and try to detect any play in the wheel bearings by trying to move the top and bottom on the wheel .

### REAR WHEEL

### CHECKING THE REAR END FOR EXCESSIVE PLAY

Before every ride, check the rear end for worn or loose swingarm bearings.

#### **⚠ WARNING**

##### **POTENTIAL HAZARD**

Riding this vehicle with worn or loose swingarm bearings

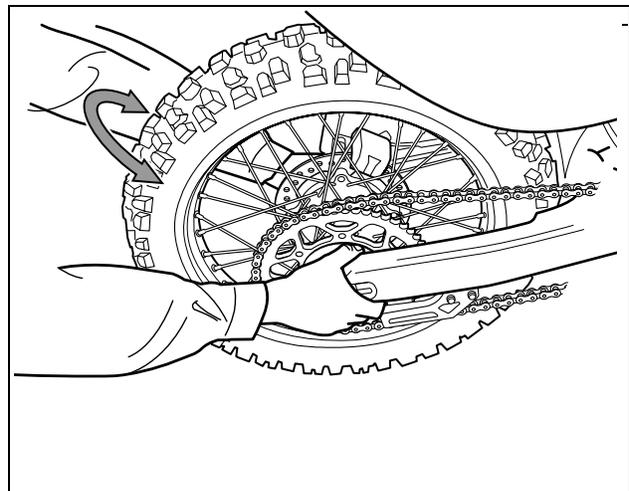
##### **WHAT CAN HAPPEN**

You can lose control of the vehicle resulting in serious injury or death.

##### **HOW TO AVOID THE HAZARD**

Always check the condition of the swingarm bearings before each ride.

1. Place the vehicle on a stand so the rear wheel is off the ground.
2. Hold each side of the swingarm and try to move it from side-to-side. If any freeplay is felt, contact an authorized Cannondale motorsports dealer for servicing.



## TIRES

The following tire service specifications for your vehicle can be found in the Model Specifications section in this manual: (front tire size, rear tire size, front/rear cold tire pressure). Be sure to observe the specifications and service limits for your vehicle.

### CHECKING THE TIRE PRESSURE

The air pressure within the tires affects the vehicle handling and stability. Check the air pressure and maintain the recommended tire pressure in each tire before every ride.

#### **⚠ WARNING**

##### **POTENTIAL HAZARD**

- (1) Uneven or improper tire pressure
- (2) Improper tires

##### **WHAT CAN HAPPEN**

(1 & 2) Tire characteristics influence the handling and stability of this vehicle. Use of tire types/sizes other than specified (front/rear) in this Owner's Manual or improper tire pressures can adversely affect the handling and stability (operation) of this vehicle increasing your risk of an accident.

##### **HOW TO AVOID THE HAZARD**

- (1) Maintain proper pressures in each of the tire. Set pressures when tires are cold. Maintain equal pressure in both tires.
- (2) Always use the type and size tires specified in this manual.

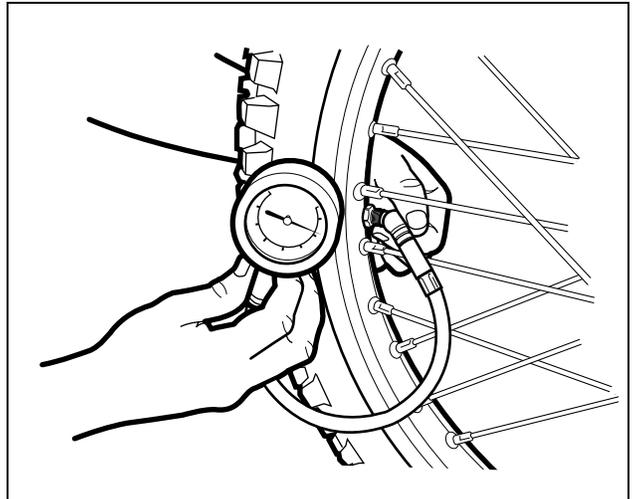
#### NOTE :

*Tire pressure below the minimum specification could cause the tire to dislodge from the rim under severe riding conditions.*

Insufficient tire pressure will result in:

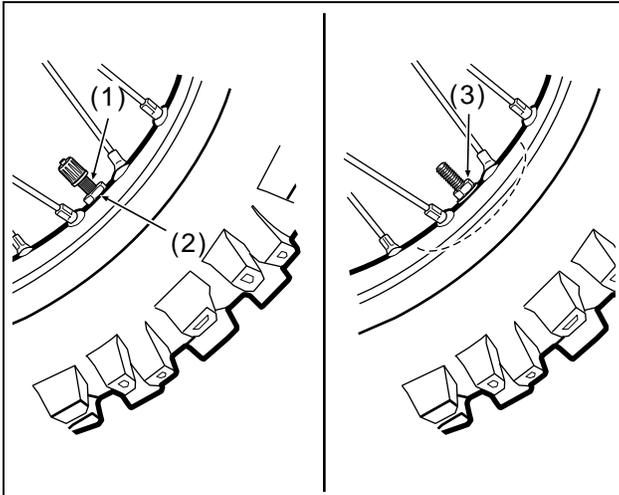
- **Poor handling and may cause the vehicle to "wander."**
- **Rapid tire wear.**
- **Increases fuel consumption,**
- **Decrease performance**
- **Less control.**

1. Take two tire pressure measurements of each tire using a good quality tire pressure gauge while the tires are cool. Use the second reading.



2. Adjust pressure in each tire to meet tire pressure specifications for your vehicle.
3. Add air in small amounts and re-check often to help avoid overinflating. Unusual air loss might be attributed to damaged tires or rims.
4. Check the physical condition of each tire. Make sure there is adequate tread. If the tire is ripped, torn, punctured, or damaged have it replaced with a new one.
5. Check the valve stem for cracks or other damage. If damage is found, replace with a new inner tube. A tilted tire valve stem indicates that the tire has slipped out of position and must be remounted properly.
6. Make sure the tire valve locknut is secure and the rimlock nut is tightened to its specified torque.

**TORQUE :** Rimlock nut  
9.0 lbf-ft (12.2 N•m)



1. Valve stem
2. Locknut
3. Rimlock nut

**NOTE :**

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*If the tire or inner tube needs to be replaced or remounted, contact an authorized Cannondale dealer for servicing.*

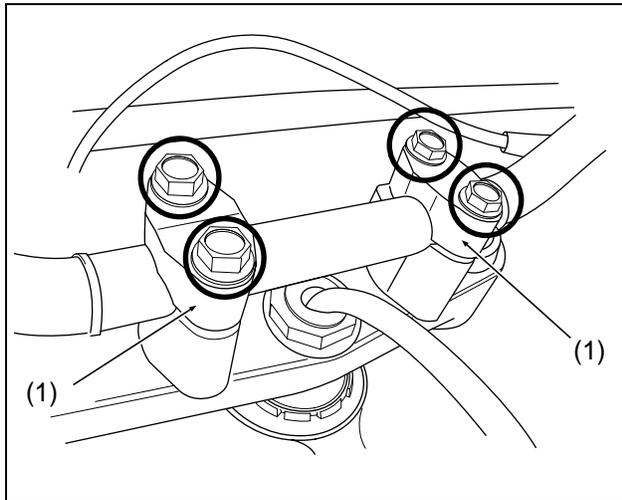
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## STEERING

### ADJUSTING THE HANDLEBAR POSITION

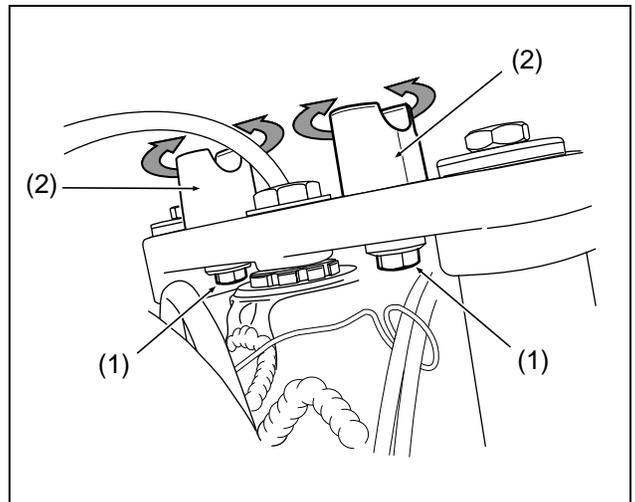
The handlebar position can be adjusted rearward from the factory-set position by removing the lower handlebar clamps and rotating them 180°.

1. Place the vehicle on a stand and cover the gas tank with a clean rag.
2. Remove the handlebar pad.
3. Remove the bolts from each upper handlebar clamp (1). Then, remove the upper handlebar clamps and lay the handlebar on top of the front number plate.



1. Upper handlebar clamp

4. Loosen the bolt (1) from each lower handlebar clamp (2). Rotate the lower handlebar clamp 180° and tighten the bolts to the specified torque



1. Bolts
2. Lower handlebar clamps

5. Place the handlebar onto the lower handlebar clamps, install the upper handlebar clamps, and tighten the bolts to the specified torque.

#### **⚠ WARNING**

##### **POTENTIAL HAZARD**

Handlebar clamp bolts not tightened to their specified torque.

##### **WHAT CAN HAPPEN**

Handlebar may move or come off during operation. Failure to follow these warnings can lead to an accident resulting in severe injury or death.

##### **HOW TO AVOID THE HAZARD**

The lower handlebar clamps must be positioned evenly so there is the same amount of space between both the front and rear. And, they must be tightened to the specified torque.

#### NOTE :

*Tighten the front bolts to the specified torque first, then tighten the rear bolts to the final torque. This creates a pinching action instead of a squeezing action that is produced if the front and rear bolts are tightened uniformly.*

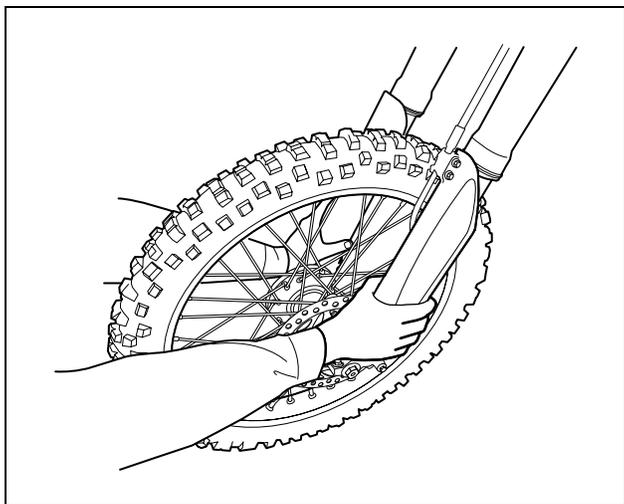
**TORQUE :** Handlebar clamp upper bolts  
17.0 lbf•ft (23.0 N•m)

**TORQUE :** Steering, handlebar clamp,  
lower bolts  
60.0 lbf•ft (81.0 N•m)

6. After installing the handlebar, sit on the vehicle, apply the front brake, and push down on the front end a few times to check if the handlebar moves.
7. Also, turn the handlebar from lock-to-lock to check for looseness or binding.

## STEERING HEAD INSPECTION

1. Place the vehicle on a stand so that the front wheel is off the ground.
2. Hold the bottom of the forks with your hand and inspect for any front to back or side to side play. If play is detected, don't ride the vehicle. Have the steering stem slotted nut checked for tightness or inspect the headset bearings for wear by an authorized Cannondale Motorsports Dealer.



## CLEANING

Regular cleaning helps to maintain appearance and contributes to overall performance of the vehicle by keeping it free of damaging dirt, soils, and grime.

- **When cleaning, avoid harsh detergents and chemical solvents. Use mild solutions of ordinary dish soaps and clean water.**
- **The advertising claims of “power” cleaning products are no substitute for careful and deliberate attention when cleaning the vehicle.**
- **Rinse with plenty of clean water to remove any detergent residue.**

### CAUTION

Don't use high-pressure (e.g., coin-operated car washes) or portable steam power washers to clean the vehicle. The excessive water pressure will force dirt, water, and other contaminants into important electrical connectors and devices, bearings, engine seals, wheel bearings, seals promoting rust and corrosion. Severe damage can result. Use an ordinary garden hose and only enough water pressure to do the job.

Be sure to thoroughly dry your vehicle after washing it. This will prevent corrosion and premature wear of components (e.g., switches, airbox, wheel bearings).

Do not use compressed air to dry the vehicle. Compressed air can force water or other contaminants into bearings and the electrical system leading to severe damage and component failure.

Do not get detergent onto the brake discs or pads. The detergent may cause the brake discs to glaze and ruin the brake pads.

Do not wax or lubricate the brake discs. Braking power will be reduced and may result in an accident.

### WARNING

#### POTENTIAL HAZARD(S)

- (1) Slick or slippery seat
- (2) Wet brake system

#### WHAT CAN HAPPEN

- (1) Some types of cleaners can leave the seat extremely slippery. A rider can slide unexpectedly and lose the ability to control the vehicle.
- (2) Braking performance is reduced when the brake system is wet.

#### HOW TO AVOID THE HAZARD

- (1) Use ordinary mild solutions of soap and rinse clean. Wipe the cleaned seat down with the clean rag. Consult a Authorized Cannondale Dealer for products available to clean your vehicle.
- (2) Before riding normally, ride and very slow speed and repeatedly apply the brakes; friction generated heat will dry the brake system and normal braking force should return. If it doesn't don't ride the vehicle; contact an authorized Cannondale motorsports dealer.

Before you start cleaning the vehicle take the following precautions:

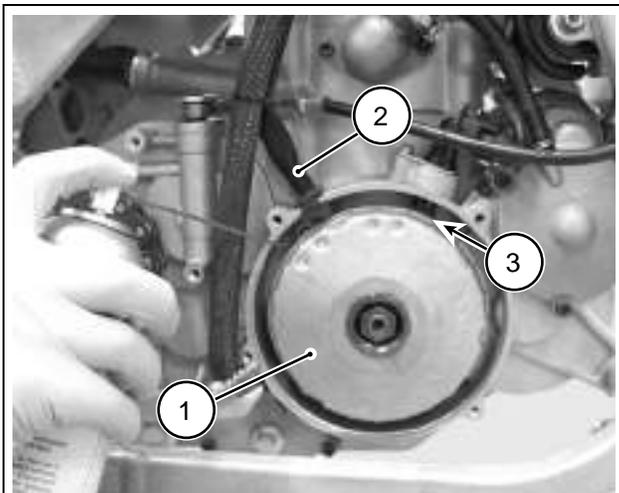
- **Make sure the vehicle is completely cool before cleaning it.**
- **Thoroughly dry the vehicle after washing it.**
- **Cover the rear muffler opening, brake lever and pedals, start and stop switch, clutch lever, throttle with plastic bags secure with strong rubber bands.**
- **Make sure all filler and check caps are tightened securely.**

After washing

- **Remove all plastics bags.**
- **Lubricate the front brake lever and rear brake pedal with clean engine oil.**
- **Test the brakes before operation. Wet brake discs and pads reduce braking efficiency.**
- **Start the engine and allow to run for 5 minutes.**

1. Remove the generator cover.

2. Remove any debris with a clean rag. Use contact cleaner to displace any hidden water residue.



**1. Flywheel**

**2. Generator lead (to wiring harness)**

**3. Crankshaft position sensor (tip)**

3. Reinstall the generator cover making sure that the cover gasket is properly installed onto the cover and tighten the cover bolts securely.

## STORAGE

When the vehicle will not be operated for an extended period of time (e.g., winter months, 45 days or more), it is necessary to perform certain procedures to guard against deterioration and to make sure it is in perfect running condition when the riding season begins.

### NOTE :

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*Make any necessary repairs before storing the vehicle. If you don't have the opportunity to service before storage, write down all needed repairs on a tag and attach the tag the handlebars to act as a reminder later.*

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1. Thoroughly clean and dry the vehicle.
2. Lubricate the drive chain.
3. Change the engine and transmission oils and clean the filters to prevent moisture and acids in the old oil from contaminating the bearing surfaces during the storage period.
4. Carefully inspect the vehicle and perform all necessary repairs.
5. Either drain the fuel tank completely or fill it with fresh fuel. If you drain the fuel tank, drain it into an approved gasoline container. If you fill the tank, add a good quality fuel stabilizer directly to the tank. Fuel stabilizer can be purchased at most automotive parts or large department stores. Make sure you follow the directions on the product label.
6. Remove the air filter and thoroughly clean the area surrounding the airbox.
7. Start the engine. With the engine idling, spray (for 10 - 20 seconds) a high-quality engine fogging oil into the airbox funnel inside the airbox.
8. Shut off the engine and allow to cool.
9. Clean, re-oil and install the air filter.
10. Drain the cooling system and refill it with new coolant.

11. Stuff a clean shop towel into the silencer outlet and then cover the outlet with a clean plastic bag and hold the plastic bag in place with a rubber band to prevent moisture from entering.
12. Remove the battery and store it where it will not be exposed to direct sunlight a clean, dry area.
13. Select a cool dry place away from heat, humidity and dust and dirt to store the vehicle.
14. Cover the vehicle.

## REMOVING FROM STORAGE

1. Uncover the vehicle, and then clean and dry it.
2. Install the fully-charged battery.
3. Remove the rag and plastic bag from the silencer.
4. Drain the gasoline into an approved fuel container and recycle or dispose of the fuel at an EPA approved center.
5. Lubricate the vehicle.
6. Perform all maintenance and pre-ride checks.
7. Start the engine and enjoy.

## TORQUE TABLE

Item	lbf•ft	N•m	kgf•m
Side panel mounting bolts	5.0	6.8	0.69
Rear fender mounting bolt	5.0	6.8	0.69
Engine oil spar drain bolts (left/right)	15.0	20.3	2.07
Engine oil drain bolt (crankcase)	6.0	8.1	0.83
Engine oil filter cover bolt	3.3	4.5	0.47
Engine frame rail mounting bolts (upper/lower)	20.0	27.1	2.77
Engine mounting bolt (center)	35.0	47.5	4.84
Spark plug	20.0	27.1	2.77
Battery terminal nuts			
Transmission oil check bolt	5.0	6.8	0.69
Transmission oil drain bolt	6.0	8.1	0.83
Transmission shift lever pinch bolt	5.0	6.8	0.7
Exhaust header nuts	4.2	5.7	0.6
Silencer mounting bolts	15.0	20.3	2.1
Coolant bleed bolt	3.3	4.5	0.47
Banjo bolt (brake)	14.0	19.0	1.9
Brake caliper mounting bolts (front/rear)	14.0	19.0	1.9
Front brake disc mounting bolts	7.0	9.5	0.97
Front brake master cylinder mounting bolt	5.0	6.8	0.7
Front brake master cylinder cover screws	1.4	1.9	0.2
Front brake lever pivot (bolt/nut)	5.0	6.8	0.7
Front brake lever adjuster locknut	4.3	5.8	0.6
Rear brake disc mounting bolt	12.0	16.3	1.66
Rear brake pedal mounting bolt	15.0	20.3	2.1
Rear brake pedal adjusting locknut	13.0	17.6	1.8
Radiator shroud mounting bolt (to radiator)	5.0	6.8	0.7
Radiator shroud mounting screws (to tank)			
Fuel tank mounting bolts	5.0	6.8	0.7
Side number panels mounting bolts	5.0	6.8	0.7
Clutch release collar adjuster locknut	3.3	4.5	0.47
Clutch pressure plate bolts	3.3	4.5	0.47
Clutch cover bolts	3.3	4.5	0.47

Item	lbf•ft	N•m	kgf•m
Clutch lever mounting bolts	5.0	6.8	0.7
Rear sprocket mounting nuts	35.0	47.5	4.84
Countershaft sprocket nut	29.5	40.0	4.1
Countershaft sprocket guard mounting bolts	5.0	6.8	0.69
Chain roller mounting bolts	15.0	20.3	2.07
Rear sprocket mounting bolts	26.0	35.3	3.59
Chain guide bolts	5.0	6.8	0.69
Swingarm buffer mounting bolts	1.4	0.2	0.2
Upper/lower rear shock strut bolts	25.0	34.0	3.47
Swingarm pivot nut	55.0	74.6	7.6
Steering head filter bolt	5.0	6.8	0.7
Triple clamp bolts (lower)	14.0	19.0	1.94
Triple clamp bolts (upper)	17.0	23.0	2.35
Steering stem slotted nut (stage 1)	9.0	12.2	1.24
Steering stem slotted nut (stage 2)	4.0	5.4	0.55
Steering stem nut	72.0	98.0	10.0
Handlebar clamp bolts	20.0	27.1	2.77
Handlebar mounting bolts	25.0	34.0	3.47
Rear shock mounting bolts (upper/lower)	40.0	54.2	5.53
Wheel, front axle nut	14.0	19.0	1.9
Rear wheel axle nut	72.0	97.6	9.95
Wheel, front axle pinch bolts	14.0	19.0	1.9
Wheel, spoke nipple, front/rear	3.3	4.5	0.46
Wheel rimlock nut	9.0	12.2	1.24
Fuel tank mounting bolt	5.0	6.8	0.7
Subframe mounting bolt	20.0	27.1	2.77

# 2002 MODEL SPECIFICATIONS

NOTE :

*The specifications are subject to change for product improvement without notice.*

## ENGINE

	X440	C440	E440
Engine	4 - stroke single		
Bore and stroke	95 mm x 61 mm		
Compression ratio	12.5: 1		
Displacement	432 cc		
Engine Management System	MC 1000, EFI, 11,600 rpm soft rev limiter		
<p>Engine oil</p> <p>Recommended viscosity: 10W40</p> <p>Classification: Use only high-detergent, premium quality synthetic motor oils with the American Petroleum Institute (API) service classification SF or SG type displayed on the container.</p> <p>NOTE :</p> <p><i>Other viscosities can be used when the average temperature range is within the indicated range.</i></p>	<p>TEMP (C°) -20 -15 -10 -5 0 5 10 15 20 25 30 35 40</p> <p>TEMP (F°) -4 5 14 23 32 41 50 59 68 78 86 95 104</p> <p><b>CAUTION</b></p> <p><b>Be sure to change the engine oil and clean/replace the filters in accordance with the vehicle maintenance schedule. Service more frequently when operating under severe conditions.</b></p>		
Engine oil quantity (dry fill)	1500cc (1.7 US qt.)		
Transmission oil	80W or 85W (Do not use hypoid gear oils)		
Transmission oil quantity (dry fill)	600 cc (0.85 US qt.)		
Cooling system	Liquid cooled		
Coolant	1:1 water/anti-freeze [ethylene glycol (containing corrosion inhibitors for aluminum engines and radiators)]		
Ignition system	Constant - energy inductive coil		
Starting system	Electric start		
Lubrication system	Dry sump		
Compression release	Automatic		
Transmission	5-speed cassette		

## ENGINE

	X440	C440	E440
Final drive	520 non o-ring chain	520 O-ring chain	
Primary reduction ratio	3.071 (86/28)		
Gear ratio 1	2,000 (30/15)		
Gear ratio 2	1.588 (27/17)		
Gear ratio 3	1.316 (25/19)		
Gear ratio 4	1.095 (23/21)		
Gear ratio 5	0.833 (20/24)		
Clutch type	Wet, multi-disc		
Clutch plates	10 metal, 9- friction		
Engine idle speed	2100 - 2200 r/min		
Spark plug, standard	(NGK) CR9EK		
Spark plug gap	0.024 - 0.028 in (0.6 - 0.7 mm)		
Crankshaft position sensor gap	0.02 - 0.04 inches (0.5 - 1.0 mm)		
Valve clearance	IN .006 - .008 in (0.15 -0.20 mm) EX .013 - .015 in (0.33 - 0.38)		
Fuel	Premium unleaded (Anti-Knock Index 93 or higher)		
Fuel filter	35 micron rating		
Fuel system	Electronic fuel injection		
Valve train	DOHC, four-valve		

## CHASSIS

	X440	C440	E440
Frame	Aluminum twin spar perimeter		
Wheelbase	58.5 in (148.6 cm)		
Seat height	38.0 in (96.5 cm)		
Ground clearance, unloaded	14.2 in (36.1 cm)		
Dry weight (approx)	242 lbs (110 kg)	245 lbs (111 kg)	249 lbs (113 kg)
Steering head angle	27.5 degrees		
Front tire	80/100-21		
Rear tire	110/100-19	120/100-18	
Recommended cold tire pressure (front/rear)	14 psi		
Main fuse	10 A		
Lighting fuse			10A
Headlight			35 watt
Taillight			5 watt
Battery	YUASA, YTX5L-BS maintenance-free		
Fuel tank capacity	2.0 US gal (7.6 L)	2.6 US gal (9.8 L)	
Throttle freeplay	1/8 - 5/16 in (3 - 8 mm)		

## CHASSIS

	X440	C440	E440
Air filter	wet foam type		
Front brake	240mm disc, Nissin dual piston caliper		
Rear brake	220mm disc, Nissin dual piston caliper		
Brake fluid	DOT 4 (sealed container)		
Brake pad thickness (MIN)	0.04 in (1.0 mm)		
Brake disc thickness (MIN)	0.14 in (3.5 mm)		
Clutch oil (hydraulic)	SAE 10 mineral hydraulic oil		
Drive chain slack	2.2 - 2.4 inches (55 - 60 mm)		
Swingarm buffer thickness (STD / MIN)	0.275 in (7 mm) / 0.118 in (3 mm)		
Drive chain roller O.D. (STD / MIN)	1.4 in (35.2 mm) / 1.3 in (32.0 mm)		

## SUSPENSION

	X440	C440	E440
<b>Front Fork</b>			
Type	Ohlins 46mm USD, external compression and rebound damping adjustment, 12.0 inch travel		
Spring free length	467 mm (service limit 460 mm).		
Spring rate standard	4.7 N•m		
(optional)	4.3 N•m		
	4.5 N•m		
	4.9 N•m		
Recommended oil	SAE 5W, Öhlins High Performance Front Fork Fluid No. 5		
Oil level	Adjustment range (90 - 130 mm) Standard 95 mm		
Compression adjuster (STD)	12	16	18
Rebound adjuster (STD)	12	14	11
Ride height	50 ± 10 mm		
Static sag	30 ± 10 mm		
<b>REAR SHOCK</b>			
Type	Ohlins linkless position sensitive damping single-shock, external compression and rebound damping adjustment, 12.6 inch travel		
Spring rate	100 N•m		
Free length	230mm		
Installed length	225mm		
Spring preload [installed length (MIN/ MAX)]	228/220 mm		

## SUSPENSION

	X440	C440	E440
Compression damping (STD)	18	18	23
Rebound damping (STD)	14	15	15
Ride height	3.7 - 4.0 in (95 - 100 mm)		
Static sag	1.0 - 1.2 in (25 - 30 mm)		