



***GARY FISHER***<sup>®</sup>

**BICYCLE OWNER'S MANUAL**



Even if you have ridden a bicycle for years, it is important for **every** person to read Chapter 1 before you ride your new bicycle.

## LIMITED WARRANTY

All Gary Fisher bicycles are sold exclusively through our network of Authorized Dealers who we entrust with professional assembly and service of your bicycle.

Gary Fisher Bicycle Company warrants each new Gary Fisher frame, rigid fork, or original component part of the bicycle against defects in workmanship and materials:

### FOR THE LIFETIME OF THE ORIGINAL OWNER

- The bicycle frame, except the fork

### FOR FIVE YEARS

- Rigid forks
- All Bontrager components and accessories, except consumables such as tires and inner tubes

### FOR ONE YEAR

- Paint and decals
- All original parts, excluding Shimano parts, suspension forks and rear shock absorbers
- All Shimano parts, suspension forks, and rear shock absorbers shall be covered by the stated warranty of the original manufacturer.

### THIS WARRANTY DOES NOT COVER

- Normal wear and tear
- Improper assembly
- Improper follow-up maintenance
- Installation of parts or accessories not originally intended for, or compatible with, the bicycle as sold
- Damage or failure due to accident, misuse, abuse, or neglect
- Labor charges for part replacement or changeover

This warranty is void in its entirety by any modification of the frame, fork, or components.

This warranty is expressly limited to the repair or replacement of a defective item and is the sole remedy of the warranty. This warranty extends from the date of purchase, applies only to the original owner, and is not transferable. Gary Fisher Bicycle Company is not responsible for incidental or consequential damages. Some states do not allow the exclusion of incidental or consequential damages, so the above exclusion may not apply to you.

Claims under this warranty must be made through an authorized Gary Fisher dealer. Proof of purchase is required. The subject item must be registered with Gary Fisher Bicycle Company, either through on-line registration or by the receipt of a warranty registration card by Gary Fisher Bicycle Company, before a warranty claim may be processed.

Warranty duration and detail may differ by frame type and/or by country. This warranty gives the consumer specific legal rights, and those rights may vary from place to place. This warranty does not affect the statutory rights of the consumer.

### CARBON CRASH REPLACEMENT POLICY

Assessing any damage done to a carbon fiber part requires more experience than is needed to inspect metal parts. If you crash or impact your bicycle and the force of the impact is absorbed by a carbon part, we strongly encourage you to replace the part, even if there are no indications of damage. If such a crash or impact occurs, Gary Fisher offers a crash replacement program for carbon parts, substantially reducing any replacement cost. To take advantage of this program, contact us and ask for the Warranty department.

## Important: Keep for Future Reference

This manual shows how to ride your new bicycle safely. **Even if you have ridden a bicycle for years, it is important for EACH person to read Chapter 1 before you ride this bicycle!** Parents should speak about Chapter 1 to a child or person who might not understand this manual.

This manual also shows you how to do basic maintenance. Some tasks should only be done by your dealer, and this manual identifies them.

### Keep this Manual with the Bike

This manual is considered a part of the bicycle that you have purchased. If you sell the bike, please make sure this manual is transferred to the new owner as part of the sale.

### About the CD

This manual includes a CD (compact disc) that gives you more comprehensive information while we use less paper for the environment. Please view the CD to see information that is specific to your bicycle.

If you do not have a computer at home, operate the CD on a computer at school, work, or the public library. If your CD does not operate, the same information is on our web site. The address for the web site is on the cover of this manual.

### Complete the Registration

Bicycle registration is the only record we have of who owns this bicycle. If it is necessary to give you new instructions, your registration record is very important. Registration and proof of purchase are necessary to make a warranty claim. Choose one of these easy procedures to complete the registration:

- On the CD, click the link "Register."
- Go to the web address on the cover of this manual and click on the links.

The web site also gives you a link to new instructions. If you make a decision not to complete the registration, make sure you visit the web site frequently.

### Meaning of Safety Signs and Language

In this manual the Safety Alert symbol, a triangle with an exclamation mark, shows a hazardous situation which, if not avoided, could cause injury:

 **'CAUTION' indicates the possibility of mild or moderate injury.**  
**'WARNING' indicates the possibility of serious injury or death.**

This manual complies with these standards:

- ANSI Z535.6
- BS 6102 : Part 1: 1992
- CEN 14764, 14765, 14766, 14781, 14872
- CPSC CFR 1512

My bicycle model	
My serial number:	Lock key #
My dealer:	
The phone number of my dealer:	

## Assembly of Your New Bicycle

Special tools and skills are necessary for the assembly and the first adjustment of your bicycle. Only your dealer should do this.

## If You Have Questions

There are many models of bicycles with a variety of equipment, so this manual might contain some instructions that do not apply to your bicycle. Some illustrations might be different from your bicycle.

If you have questions after you read this manual, speak to your dealer. If you have a question or problem that your dealer can not answer or repair, tell us:

Attn: Customer Service  
801 W. Madison Street  
Waterloo, Wisconsin 53594  
920.478.4678

## A Word About Bicycles, Accidents, and Safety

A bicycle can be fun when used for transportation, recreation, exercise, or competition. But riding a bicycle can also be dangerous, especially if you try to ride beyond the limits of your ability or the limits of your bicycle. The skill of bicycle riders can vary greatly, just like the skill of an automobile driver or a skier. Do not ride in a manner that exceeds *your* ability.

Each bicycle also has limits because of many properties:

- Design and material of the bicycle
- Maintenance and use of the bicycle
- Surface of the road or trail
- And more

## An Impact can Weaken your Bicycle

If you crash or apply force that is higher than the limits of your bicycle, you are very likely to cause damage to the bicycle or its parts. If your bicycle has damage and you crash or load it again later, the previous impact can cause your bicycle to break at a much lower load.

## A Bicycle Cannot Protect You in an Accident

Bicycles are not designed to withstand every situation. In a crash or impact, it is not uncommon for the bicycle to have damage and for you to fall. If you fall, your bicycle can not prevent injury. Cars have bumpers, seat belts, air bags, and crumple zones. Bicycles do not, so even a small crash at slow speed can cause injury or death.

## Think Safety

Always “Think Safety” and avoid dangerous situations, which are usually obvious. But not all dangerous situations are obvious. Many of those are shown in this manual; read at least Chapter 1 before you ride.

Some of the high-risk stunts and jumps seen in magazines or videos are very dangerous; even skilled athletes get severe injuries when they crash (and they do crash).

## Changes to Your Bicycle Can Make it Unsafe

Each and every part of your new bicycles has been carefully chosen and approved. The safety of accessory or replacement parts, and especially how those parts attach and interface with other parts of the bicycle, is not always apparent. For this reason, you should only replace parts with original equipment or parts that are approved. If you are not sure what parts are approved, ask your dealer.

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# Bicycle Type and Use Condition

There are many types of bicycles. Each bicycle type is made for a specified use, or Use Condition. If your use of a bicycle applies more stress than the limit of its use condition, this could cause breakage of the bicycle (or a part of the bicycle).

This section shows the Use Condition for different types of bicycles. If you are not sure of what type of bicycle you have, speak to your dealer.

## Child Bicycle

A bicycle made for a child. A child should not ride without the supervision of a parent. Children should not ride near slopes, curbs, stairs, drop-offs, or pools; or areas that automobiles use:

- Maximum saddle height of 680 mm
- Usually a bicycle with 12", 16", or 20" wheels; or a child's tricycle
- No quick-release wheel attachment systems
- Weight limit of rider: 80 lbs (36 kg)

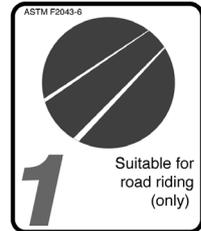


## Condition 1

A bicycle made to ride on a paved surface where the tires are always on the ground:

- Road bicycle with drop-type handlebar
- Triathlon, time trial, or speed bicycle

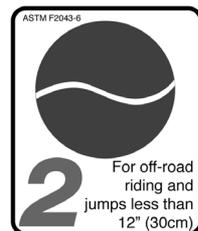
- Tandem
- Cruiser with large, 26" tires and swept-back handlebar
- Pedelec electric-assist bicycle
- Weight limit of rider: 275 lbs (125 kg); Tandem: 550 lbs (250 kg); Pedelec: 300 lbs (136 kg)



## Condition 2

A bicycle made to ride on Condition 1, plus smooth gravel roads and groomed trails with low-angle grades where the tires are always on the ground:

- Hybrid bicycle with 700c wheels, tires wider than 28c, and flat handlebars
- City bicycle: hybrid with special equipment such as fenders or a light
- Cyclocross bicycle: drop-type handlebar, knobby 700c tires, and cantilever or disc brakes
- Mountain bike with 24" wheels
- Weight limit of rider: 300 lbs (136 kg)  
24" wheel mountain bike: 175 lbs (80 kg)



### Condition 3

A bicycle made to ride on Conditions 1 and 2, plus rough trails, small obstacles, and smooth technical areas, and also areas where tires momentarily are not on the ground; NOT for jumps.

Any mountain bike that does not have rear suspension is Condition 3. Any mountain bike with short-travel rear suspension is also Condition 3:

- “Standard,” “race,” or “cross-country” mountain bike with wide, knobby 26” or 29” tires
- Short-travel rear suspension (3”/75 mm or less)
- Weight limit of rider: 300 lbs (136 kg)



### Condition 4

A bicycle made to ride on Conditions 1, 2, and 3; plus rough technical areas, obstacles of moderate height, and small jumps:

- “Heavy-duty,” “trail,” or “all-mountain” mountain bike with wide, knobby 26” or 29” tires
- Medium-travel rear suspension (4”/100 mm or more)
- Weight limit of rider: 300 lbs (136 kg)



### Condition 5

A bicycle made to jump, ride at high speeds, ride aggressively on rougher surfaces, or complete jumps on flat surfaces.

This type of use is very dangerous and puts large forces on a bicycle. Large forces can apply dangerous stress to a frame, fork, or the parts.

If you ride in Condition 5 terrain, you should practice safety precautions such as more frequent bicycle inspections and more frequent replacement of equipment. You should also wear comprehensive safety equipment such as a full-face helmet, pads, and body armor.

- “Freeride” or “jumping” bicycle with heavy-duty frames, forks, and components
- Long-travel rear suspension (7”/178 mm or more)
- Weight limit of rider: 300 lbs (136 kg)



**⚠ WARNING: If your use of a bicycle applies more stress than the Use Condition for which it is intended, the bicycle or its parts can have damage or break. A bicycle that has damage could decrease your control and cause you to fall. Do not ride in Use Conditions that apply more stress than the limits of the bicycle. If you are not sure of the limits of the bicycle, speak to your dealer.**

# Chapter 1: Guide to Safe On-and-Off Road Operation

## Before a First Ride

### Make Sure Your Bicycle is the Correct Size

Your dealer will help you find a bicycle that has the correct dimensions for your body. There should be at least 1" (25 mm) clearance between the top tube and you when you stand over your bicycle (Figure 1). For a mountain bicycle, we recommend 2-3" (50-75 mm) clearance.

You can adjust the saddle and handlebar to offer the best comfort and performance. Before you make these adjustments, refer to Chapter 3.



**FIGURE 1:**  
Minimum standover height  
A = 1" (25mm) for most bicycles  
2-3" (50-75mm) for mountain bicycles

### Know How Your Bicycle Operates

The properties of your bicycle, if not used correctly, can decrease your control of the bicycle. Before you ride fast or in conditions that are a problem, learn the operation and performance of all the mechanisms of your bicycle, especially brakes and steering components. As an example, "aero-bars" can make steering and braking difficult. Practice the use of your bicycle at slower speeds in a flat, empty parking area. Repeat this step after any change to your bicycle.

If your bicycle does not operate as necessary, or if different parts are necessary for the safe operation of your bicycle, speak to your dealer.

### Learn the Power of Your Brakes

The power of bicycle brakes changes with the Use Condition of the bicycle. If you think it is necessary for your bicycle to have more—or less—power to stop, speak to your dealer about brake adjustments or other brake options for your bicycle.

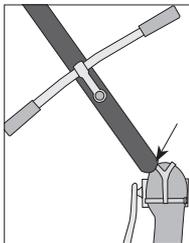
**⚠ WARNING: If you do not use the brake system correctly or you apply too much force with the front-wheel brake, the brakes could decrease your control and cause you to fall. Practice to correctly apply your brakes as shown in this manual.**

### Prevent Toe-clip Overlap

Some modern, high-performance bicycles, especially smaller sizes, use a short-wheelbase design with the front wheel close to the pedals. Increasing the distance between the front wheel and pedals could place the handlebar too far away or make the steering unwieldy. On bicycles where this distance is short, when the handlebar is turned during very slow speeds your foot or toe-clips could overlap or touch the front wheel or fender (Figure 2).

This overlap is affected by the size of your feet, the length of the crankarms, and the pedals you choose. At usual speeds, the handlebar does not turn sufficiently for overlap to occur. When you ride slowly, do not pedal when the handlebar is turned.

**⚠ WARNING: If your foot or toe-clip touches the front wheel or fender, toe-clip overlap could decrease your control and cause you to fall. Do not pedal when you turn at slow speed.**



**FIGURE 2:**  
Toe-clip overlap

### **If Your Frame or Fork has a Problem, Stop Your Bicycle**

Frame problems are not common, but as an example, some riders could get a “shimmy” or “harmonic oscillation” or “frame wobble” at some speeds. If you get a shimmy or any other problem, decrease your speed immediately and do not ride the bicycle. Transport your bicycle directly to a dealer for inspection and repair.

**⚠ WARNING: A frame or fork problem could decrease your control and cause you to fall. If your bicycle gets a shimmy or any other problem, decrease your speed immediately. Transport your bicycle to your dealer for inspection and repair.**

### **Examine Your Bicycle Before Each Ride**

The checklist that follows shows critical areas for you to examine. If a part of your bicycle does not have the correct function, use the instructions in this manual to repair your bicycle or transport your bicycle to your dealer for repair. Do not ride a bicycle with a part that is damaged; replace the part.

**⚠ WARNING: A bicycle that does not operate correctly can decrease your control and cause you to fall. Fully examine all of your bicycle before each ride, and do not ride your bicycle until you correct any problem.**

## **Checklist: Check Before Each Ride**

**This is not a full maintenance program.**

### **✓ Examine the Frame and Fork**

Before and after each ride, examine all of your bicycle for signs of fatigue stress:

- Dents
- Cracks
- Scratches
- Deformation
- Discoloration
- Unusual noises

Bicycles are not indestructible, and their parts will not last forever. If your use of a bicycle increases the forces on it through hard riding, difficult conditions, or increased mileage, you should replace your bicycle or its parts more frequently than riders who ride less or ride smoothly and carefully. The safe life of a part is determined by its construction, materials, use, maintenance, rider weight, speed, terrain, maintenance, and environment (humidity, salinity, temperature, etc.)—so it is not possible to give an accurate timetable for replacement. If you are not sure if you should replace a part, speak to your dealer.

A major impact is anything that causes you to fall from your bike. It is not uncommon in a major impact for the bicycle or its parts to have damage. A minor impact, where you hit an obstacle without falling from your bike, can still place high stresses on your bicycle. After any impact, if your bicycle behaves in an unusual manner or you hear a noise, immediately stop the bicycle and identify the problem. Always inspect the bicycle thoroughly before riding the bicycle again.

In some cases, a lighter frame or part has a longer life than heavier ones. But better maintenance, more frequent inspections, and more frequent replacement are necessary for light-weight, high-performance bicycles and parts.

## Carbon Fiber Composite

Pound for pound, carbon fiber is stronger than steel or aluminum. But it behaves differently when it is overloaded in an accident or impact. An overloaded metal part will bend or deform before it breaks, showing evidence of the load (Figure 3). An overloaded carbon fiber part will not bend or deform, so a damaged carbon part (with reduced strength due to the damage) may look normal—even after the same load that bent the metal part. But when the sum of the forces finally exceeds the strength limit of the carbon fiber, the carbon fiber part breaks, it does not bend (Figure 3).

In an accident or impact that does not break the carbon fiber, the carbon fiber could have internal or hidden damage but appear normal. If that occurs, please carefully read these instructions and examine the carbon fiber. These tests are not conclusive: If you are not sure a part is safe, replace it.

We offer a generous crash replacement program. If you crash your carbon bicycle or part, visit your dealer to learn more about this program.



**FIGURE 3:**

Overloaded forks:

- The metal fork on the left bent when overloaded
- The carbon fiber fork on the right failed at much higher load, but separated

## Carbon Fiber Test

This section tells you how to examine carbon fiber parts. A movie on the owner's manual CD (also on our web site) shows the tap test.

**⚠ WARNING: A carbon fiber part that has damage can break suddenly, causing serious injury or death. Carbon fiber can conceal damage from an impact or crash. If you suspect your bicycle has had an impact or crash, immediately stop the bicycle. Replace the part before riding, or take the bicycle to your dealer for service.**

### To examine for surface problems

1. Clean the part fully with a moist cloth.
2. Look carefully for problems:
  - Scratches or gouges
  - Discoloration
  - Cracks
  - Loose fibers
  - Other surface imperfections

### To examine for a change of rigidity (flex test)

Do not ride, but use the part in the usual manner while someone carefully examines the part for movement or unusual noise. As an example, sit on the saddle while someone looks for unusual flex that would indicate a problem.

### To examine for delamination (tap test)

1. Clean the part fully with a moist cloth.
2. With a coin, tap near the possible damage.
3. Listen carefully for variations in sound. Tap on the part where it is in good condition (or use a part that is almost the same). Compare the sound. Anything unusual, especially a hollow sound, indicates a problem.

## ✔ Examine the Wheels

Make sure the wheels are straight. Turn the wheel and examine the rim when it goes through the brake-pads or the frame. The rim should not wobble up and down or from side to side.

Make sure the wheels are attached correctly. Lift your bicycle and hit the top of the tire (Figure 4) with a solid blow. The wheel should not come off, be loose, or move from side to side. More tests are given in Chapter 3.

Your bicycle may use one or more systems to attach the wheels to the frame: threaded axle nuts, a lever-actuated quick-release mechanism (Figure 5), or a thru-axle. For instructions about adjustment and closure of the wheel attachment devices on your bicycle, see Chapter 3.

**⚠ WARNING: A wheel attachment device that is not correctly adjusted and closed can allow the wheel to be loose or come off, decrease your control, and cause you to fall. Make sure the wheels are correctly attached before you ride your bicycle.**



**FIGURE 4:**  
Test for loose condition



**FIGURE 5:**  
Wheel quick-release  
1. Adjustment nut  
2. Lever

Examine the tire inflation. Inflate the tires to the air pressure recommended on the sidewall of the tire.

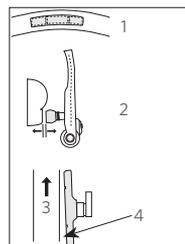
## ✔ Examine the Brakes

Use the inspection instructions for the type of brakes on your bicycle:

**⚠ WARNING: A brake system that has damage or is not adjusted correctly could decrease your control and cause you to fall. Make a full inspection of the brakes before each ride. If your brakes do not operate correctly, do not ride your bicycle. Adjust the brakes or transport your bicycle to your dealer for repair.**

**Hand-Rim Brake:** a cable connects a hand lever to the brake. The lever causes the brake-pads to apply pressure to the rim.

Pull the brake-lever to make sure the brake moves freely and stops your bicycle. If the brake-lever can be pulled to the handlebar, the brake is too loose. When the brakes are not applied, the brake-pads should be 1 to 2 mm from the rim. If the brake-pads are too near the rim, the brake is too tight. The brake-pads should be in alignment with the rim surface (Figure 6).



**FIGURE 6:**  
Brake pad alignment  
1. Brake-pad in alignment with rim surface  
2. Pad and rim should be parallel  
3. Direction that the rim turns  
4. 0.5-1.0 mm toe-in

**Disc Brake:** a cable or hydraulic hose connects a hand lever to the brake. The lever causes the brake to apply pressure to a disc attached to the wheel hub.

**⚠ CAUTION:** A disc brake and disc gets very hot during use and could burn skin. Also, the disc edges can be sharp and could cut skin. Do not touch the disc or disc brake when the disc turns or when it is hot.

Pull the brake-lever to make sure the brake moves freely and stops your bicycle. If the brake-lever can be pulled to the handlebar, the brake is too loose. When the brakes are not applied, the brake-pads should be 0.25-0.75 mm away from the disc. If the pads are too near the disc, the brake is not in alignment or it is too tight.

**Internal Hub Brake:** a cable connects the brake-lever to a mechanism in the hub.

**⚠ WARNING:** An internal hub brake gets very hot during use and could burn skin. Do not touch the hub or cooling fins when hot.

If more than 5/8" (15 mm) of brake-lever movement is necessary to stop your bicycle, the brake is too loose. If less than 7 mm of lever movement stops your bicycle, the brakes are too tight.

**Coaster Brake:** when you move the pedals to the rear, the brake engages.

The brake should engage before the cranks turn 60 degrees (1/6 turn). The chain operates the brake, so make sure the chain can not come off. There should be between 1/4-1/2" (6-12 mm) total vertical movement of the chain (Figure 7).



**FIGURE 7:**  
Test for chain tension

#### ✓ Examine the Handlebar and Stem

Make sure the stem is in alignment with the front wheel and correctly attached to the fork and handlebar. To examine the attachment to the fork, try to turn the handlebar from side to side while you hold the front wheel between your knees (Figure 8). To examine the connection of the handlebar, try to twist it in the stem. The handlebar should not move or be loose. Make sure that no cables are pulled or caught on your bicycle when you turn the handlebar.

Make sure the handlebar plugs are correctly put into the two ends of the handlebar.



**FIGURE 8:**  
Function test for the handlebar and stem

#### ✓ Examine the Saddle and Seatpost

Make sure the saddle is correctly attached. Try to turn the saddle and seatpost in the frame, and try to move the front of the saddle up and down. The saddle should not move or be loose.

## ✔ Examine the Suspension

Adjust your suspension for your use, and make sure that no suspension component can “bottom-out,” or be fully compressed.

## ✔ Examine the Lights and Reflectors

Make sure the lights operate correctly and that batteries are charged. If the lights use a dynamo, make sure the dynamo is mounted correctly and all attachment hardware is tight. Make sure all reflectors are clean and in their correct position.

Some countries, areas, or governments have specific requirements for lights, such as colors or types. Check before traveling with your bicycle.

**⚠ WARNING: A bicycle without correct lights and reflectors might be difficult for other people to see, and you might not be able to see. If you can not see, or other people can not see you, you could have an accident. Use a front light, a rear light, and reflectors when you ride in low visibility conditions.**

# Rules to Ride Safely

## Know and Obey Local Bicycle Laws

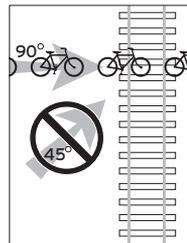
Most state and local areas have special laws for bicycle riders, and you should obey the laws. The necessary items such as lights and reflectors change between areas. To learn what is necessary, speak to the local bicycle clubs or your Department of Transportation (or the equivalent).

These are some of the more important rules for when you ride:

- Use correct hand signals.
- Ride one at a time when you ride with other bicycle riders.
- Ride on the correct side of the road; Do not ride in the opposite direction of traffic.
- Ride defensively; be prepared for all situations. A bicycle rider is hard to see, and many drivers do not know the rights and special considerations of a bicycle rider.

## Look for Cars, Pedestrians, and Other Obstacles

Look for potholes, drain grates, soft or low shoulders, and other deviations which could cause an impact to your wheels or cause the wheels to slide. When you go across railroad tracks or drain grates, ride carefully at a 90° angle (Figure 9). If you are not sure of the surface conditions, walk with your bicycle.



**FIGURE 9:** Ride across tracks safely at a 90° angle

If a car suddenly moves into your lane or someone opens the door of a parked car, you could be in a bad accident. Attach a horn or bell to your bicycle. Use it to tell other people that you are near.

## Wear a Helmet and Bicycle Clothing

Wear a helmet that complies with CPSC or CE safety standards (Figure 10); it can prevent injury. Remove your helmet when you are not on your bicycle; if the helmet is caught, you could choke.

Wear bicycle clothing, eye protection, and gloves. Do not wear clothing that is loose; it could get caught in the chain or the wheels. Also wear light, bright, and reflective clothing to make you more easy to see, especially at night.



**FIGURE 10:**  
Wear a bicycle helmet when you ride

## Ride Safely in Wet Weather or Wind

No brakes stop as effectively in wet weather as they do in dry weather. Even with brakes that are correctly adjusted and serviced, more lever pressure and longer distances are necessary to stop in wet weather.

Wet weather causes decreased traction. The road surface can become slippery and ordinary objects can become treacherous, such as wet leaves, painted crosswalks, or manhole covers. When wet surfaces freeze, traction is decreased further. Strong winds can make a bicycle turn without your control.

When you ride in wet weather, a wet tire can cause a malfunction of a dynamo (generator light). Do not ride in wet weather when visibility is decreased.

**⚠ WARNING: Wet or inclement weather can make a bicycle difficult to control. Decrease your speed and use extra caution, or use other types of transportation.**

## Make Sure Other People Can See You

Your bicycle has a full set of reflectors. Make sure the reflectors are clean and in the correct position. As useful as these reflectors are, they do not help your vision. They do not make you easy to see unless light is pointed at them. You should see and be seen. If you ride at dusk, at night, or in low-visibility conditions, speak to your dealer to find equipment or materials to help your vision and make you more easy to see.

**⚠ WARNING: When you ride in low-visibility conditions such as fog, dusk, or night, you might be difficult to see, which could lead to a collision. Use a front light and rear light when you ride in conditions with low light or low visibility.**

## Think About Safety When You Ride

You can prevent many bicycle accidents if you think about safety. Here are some examples:

- Do not ride 'no hands.'
- Do not ride with loose objects attached to the handlebar or other part of your bicycle.
- Do not ride while intoxicated or while you use medications which can make you drowsy.
- Do not 'ride double.'
- Ride carefully when off-road. Ride only on the trails. Do not ride over rocks, branches, or depressions. When you ride near a

descent, decrease your speed, move your weight low and to the rear, and use the rear brake more than the front.

- Do not ride abusively. Ride in the Use Conditions specified for your bicycle type.
- Do not ride too fast. Higher speeds cause higher risks. At higher speeds, it is more likely that wheels will slide, or that a small bump can cause an impact to your frame or fork. Higher speeds make larger forces if a crash occurs. Control your bicycle at all times.

**⚠ WARNING: You add to your risk of injury when you do not use your bicycle correctly:**

- Jump your bicycle
- Ride over sticks or debris
- Do bicycle stunts
- Ride in severe off-road terrain
- Ride fast, in competition, or “downhill”

- Ride in an unusual manner

Each of these uses adds to the stress on each part of your bicycle. High stress can cause the frame or part to break and increases your risk of injury. To decrease your risk of injury, use your bicycle correctly.

For children, the limit of speed is much lower.

**⚠ WARNING: Training wheels prevent the regular lean of a bicycle when the rider makes a turn. If the child turns too quickly, the bicycle can fall. With training wheels, do not permit children to ride fast or turn suddenly.**

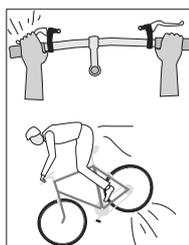
## Riding instructions

### Use Your Brakes Carefully

Always ride with a safe distance between you and other vehicles or objects; use your brakes. Adjust distances and brake forces for the conditions in which you ride.

If your bicycle has a “coaster brake” activated by the pedals, you apply the brake by pedalling backwards. To apply the greatest force, the crankarms should be horizontal when you apply the brake. The pedal will rotate before the brake starts to work, so start to apply the brake with the rear pedal slightly higher than this position.

If your bicycle has two hand brakes, apply the two brakes at the same time. Over-use or incorrect use of a front-wheel brake could cause the rear wheel to lift from the ground which could decrease your control (Figure 11).



**FIGURE 11:**

Do not over-use the front-wheel brake; the rear wheel can lift and cause you to lose control

**⚠ WARNING: Brake force applied to the front-wheel suddenly or too fully could lift the rear wheel off the ground or cause the front wheel to slide out from below you. This could decrease your control and cause you to fall. Apply the two brakes at the same time and move rearward on your bicycle.**

We make bicycles so that the left brake-lever controls the front-wheel brake. To change your bicycle so that the right brake-lever controls the front-wheel brake, see Chapter 3.

Many models of modern brakes are very powerful; they are made to stop a bicycle in wet or muddy conditions. If you think your brakes are too powerful, transport your bicycle to your dealer for adjustment or replacement of the brake system.

## Change Gears Correctly

You can change to the gear combination that is most comfortable for the conditions, a gear that lets you to pedal at a constant rate. Gear change systems are of two types: derailleur (external) and internal.

### To change gears with a derailleur

The left shift-lever controls the front derailleur and the right shift-lever controls the rear derailleur. Use only one shift-lever at a time. Change gears only when the pedals and chain move forward. When you change gears, decrease the force on the pedals to change gears quickly and smoothly, to decrease chain and gear wear, and to prevent bent chains, derailleurs, or chainrings. Do not change gears when you ride over bumps; the chain could miss a gear or fall off.

With modern, indexed gear-change systems, a movement of the shift-lever from one position to the other position (or movement of the shift-lever to the "shift" position) will promptly move the chain to a different gear.

Bicycles that have STI road shift-levers and three chainrings can change front gears better if you "hold" the lever for a moment before you release the left shift-lever. This is most important when you change gears from the smallest chainring to the middle chainring.

### To change gears with internal gears

To change gears, move the pedals to the rear or do not move them. If you must change gears while you pedal, decrease your pressure on the pedals. Too much tension on the chain prevents the correct operation of the gear change mechanism and could damage the mechanism.

## Use Pedal Systems Carefully

If your feet are secured to the pedals, the connection can allow you to pedal more efficiently, apply greater power to the pedals, or increase your control of the bicycle. Some bicycles are equipped with one of these systems:

- Toe-clips and straps attach your feet to the pedals with a strap with a locator that wraps up and in front of your toes.
- Clipless pedals use a spring-loaded mechanism to engage a cleat, a small plate attached to the bottom of a special cycling shoe.

If you choose to ride with one of these systems, practice entry and exit from the pedal before you ride. Keep the pedals and your shoes clean and free of debris that could interfere with the pedal system. Make sure any release mechanism operates correctly, and adjust it for your riding.

If you are not familiar with the pedals or the correct procedures, read the information on the Owner's Manual CD or consult your dealer.

**⚠ WARNING: A pedal system that operates incorrectly could cause your feet to become trapped or allow your feet to release from the pedal unexpectedly, causing you to lose control. Make sure you are familiar with the pedal system before riding, and that the pedal system operates correctly.**

# Safeguard Your Bicycle

## Prevent Theft of Your Bicycle

Purchase and use a lock that resists bolt cutters and saws. Do not park your bicycle unless it is locked. Also, get a licence for your bicycle from your local police department.

## Write down your serial number

Write the serial number of your bicycle in the front of this manual, and put the manual in a safe location. Then, complete our on-line registration; we will keep the serial number on file.

## Safely Park Your Bicycle

When you complete a ride, put your bicycle in a location where it will not be an obstruction. Make sure it can not fall. Do not put down your bicycle on its derailleurs, because you could bend the rear derailleur or get dirt on the drivetrain. Do not let your bicycle fall, because this could cut the handlebar grip or cause damage to the saddle. Incorrect use of a bicycle rack could bend your wheels.

## Park your bicycle carefully

When your bicycle is not in use, park it where it has protection from dangerous conditions. Do not park your bicycle near electric motors; ozone from motors can cause damage to rubber and paint. Rain or snow can cause the metal on your bicycle to corrode. Ultraviolet radiation from the sun can fade the paint or crack the rubber or plastic on your bicycle.

Before you put away your bicycle for an extended time, clean and service it and apply frame polish. Hang your bicycle off the ground with the tires at approximately half the recommended inflation pressure. Before you ride your bicycle again, be sure it operates correctly.

## Include Repair Items when You Ride

When you ride, include a pump, a spare inner tube, patch kit, and tools so you can repair your bicycle if it has a flat tire or other mechanical problem. If you ride at night, include spare bulbs and batteries for your lights.

## Only Install Compatible Accessories

Not all accessories are compatible or safe, so only add accessories that have the approval of the manufacturer. As an example, a child carrier puts weight high on the bicycle. This can make your bicycle less stable. Although some child carriers are compatible with some of our bicycles, always check with your dealer before making any change to your bicycle. As another example, clamping anything on a carbon part can weaken or damage the part.

 **WARNING: Any modification can make your frame, fork, or part unsafe. Do not sand, drill, file, remove redundant retention devices, install incompatible forks, or make other modifications. A component that is not approved or assembly that is not correct can put high stress on your bicycle or components. A frame, fork, or component with modifications could decrease your control and cause you to fall. Before you add an accessory to your bicycle or change a part of your bicycle, speak to your dealer.**

## Clean Your Bicycle

If your frame or a component is not clean, clean it with a soft, moist cloth and bicycle cleaner or a solution of dish soap and water. Do not use industrial solvents or harsh chemicals. They can cause damage to the paint or moving parts.

Each three months, clean and polish the frame finish. Some finishes do not require polish. If you are not certain, consult your dealer.

## Avoid Incidental Damage to Your Bicycle

### Do not clamp the frame during transportation or repair

Do not clamp the bicycle frame. This can cause damage to the paint or even dent, crush, or break the light-weight frame-tubes used in high-performance bicycle frames.

When holding the bicycle for repairs, clamp the seatpost. When holding the bicycle for transportation on a motor vehicle, clamp the bicycle by the wheels or fork tips.

### Prevent damage to your bicycle when you ship it

If you need to package your bike for travel, always use a hard case or carton that will protect your bicycle. Attach pads to all the frame and fork tubes, and use a rigid block to protect the fork tips and maintain structural support of the fork blades. If the bicycle is not packaged correctly, it could be easily damaged in transit. If you are not sure, ask your dealer to package your bicycle for you.

## Chapter 2: Maintenance

This maintenance schedule is based on usual use. If you ride your bicycle more than average, or in rain, snow, or off-road conditions, do maintenance on your bicycle more frequently than the schedule recommends. If a part malfunctions, examine and repair it immediately, or speak to your dealer. If a part has wear or damage, replace it before you ride your bicycle again.

After initial use, new bicycles should be examined. As an example, cables stretch through use, and this can affect the operation of the shifting or brakes. Approximately two months after you purchase your new bicycle, have your dealer fully examine your bicycle.

You should have your dealer fully service your bicycle each year, even if you did not ride it much.

## Tools for Bicycle Maintenance

- Torque wrench with lb•in or N•m gradations
- 2, 4, 5, 6, 8 mm allen wrenches
- 9, 10, 15 mm open-end wrenches
- 15 mm box end wrench
- Socket wrench, 14, 15, and 19 mm socket
- T25 Torx wrench
- No. 1 phillips-head screwdriver
- Bicycle inner tube patch-kit, tire-pump with gauge, and tire levers
- Special high-pressure air-pump for a rear shock or a suspension fork

Not all these tools are necessary for all bicycles

## Maintenance Schedule

### Each Ride

Examine the frame and fork.....	4
Examine the wheels.....	6
Examine the tire inflation.....	6
Examine the brakes.....	6
Examine the chain.....	7
Examine the handlebar and stem.....	7
Examine the saddle and seatpost.....	7
Examine the suspension.....	8
Examine the lights and reflectors.....	8

### Each Week

Clean your bicycle with a moist cloth.....	13
Examine for loose spokes.....	26
Examine suspension fork bolts.....	33
Examine rear suspension bolts.....	33

### Each Month

Examine the chainguard (accessories).....	33
Examine cables for wear.....	19
Examine the operation of shift-levers.....	19-22
Examine derailleurs.....	20-21
Apply lubricant to derailleurs.....	36
Examine the internal shift system.....	22
Examine headset bearing adjustment.....	18
Examine brake-pads.....	23
Examine brake bolts.....	23
Examine accessory bolts.....	33
Examine wheel bearing adjustment.....	26
Examine rims for wear.....	26
Apply lubricant to suspension forks.....	36

### Each Three Months

Clean and polish finish.....	13
Examine the crankarms and bottom bracket.....	18
Apply lubricant to brake-levers.....	36

### Each Year

Apply lubricant to handlebar stem.....	35
Apply lubricant to seatpost.....	35
Replace grease in the pedal threads and bearings.....	35
Replace grease in the bottom bracket bearings.....	35
Replace grease in the wheel bearings.....	36
Replace grease in the headset bearings.....	36
Apply lubricant to wheel quick-releases.....	36
Replace grease and oil in the suspension forks.....	36

## Chapter 3: Adjustment

This chapter gives instructions for adjustment of the parts of a bicycle. They are written for a person familiar with the basics of mechanics and with proper tools. Because your safety depends on the correct maintenance of your bicycle, we recommend you have your dealer service your bicycle. After a repair, examine your bicycle as shown in the “Before Each Ride” checklist in Chapter 1.

**⚠ WARNING: A bicycle that malfunctions could decrease your control and cause you to fall. Fully examine all of your bicycle before each ride. If there is a problem, do not ride your bicycle: repair your bicycle or transport it to your dealer for service.**

### A Word about Torque Specifications

Torque is a measure of the tightness of a screw or bolt. Use a torque wrench to make sure you do not apply too much torque, which can cause damage or break the part. However, a fastener that is too loose can also cause damage.

After you use the torque wrench, examine the function of the part with the tests in this chapter. If a part does not have the correct function when it is tightened to the recommended torque, transport your bicycle to your dealer for repair. If your bicycle has parts with fasteners not listed in this manual, see the more extensive information on the Owner’s Manual CD, or consult your dealer.

**⚠ WARNING: Incorrect torque can cause damage or break a part. Use a torque wrench to correctly tighten a part, or transport the bicycle to your dealer for service.**

### Handlebar

You hold the handlebar to steer the bicycle. Its position is important for control and comfort.

#### To adjust the angle of the handlebar

1. Decrease the tightness of the handlebar-clamp bolt(s) on the stem (Figure 12 and Figure 13).
2. Move the handlebar. Make sure it is in the center of stem.
3. Tighten the handlebar-clamp bolt(s) on your type of stem:
  - Welded stems: 100-120 lb•in (11.3-13.6 N•m)
  - Forged stems: 150-180 lb•in (17-20.3 N•m)

### Stem

The stem connects the handlebar to the fork

There are two types of stems:

- Direct-connect (Figure 12)
- Quill-type (Figure 13)

**⚠ WARNING: Overtightening of stem bolts can cause damage to the steerer of the fork, possibly causing it to break. If the steerer breaks, you could fall.**



**FIGURE 12:**

Direct-connect stem

1. Steerer-clamp bolts
2. Handlebar-clamp bolts



**FIGURE 13:**

Adjustable-rise quill stem

1. Quill
2. Handlebar-clamp bolts
3. Expander bolt
4. Angle adjustment bolt

### To align or adjust a quill-type stem

To adjust the height of the adjustable-rise stem in Figure 13, first change the stem angle (see the subsequent section), which gives access to the expander bolt.

1. Decrease the tightness of the expander bolt two to three turns.
2. The stem is held by the stem wedge. To decrease the tightness of the stem wedge, tap the top of the expander bolt with a mallet that has a wood or plastic face.
3. Adjust the handlebar to the necessary height, but the minimum-insertion mark must be in the frame (Figure 13). A minimum of 2<sup>3</sup>/<sub>4</sub>" (70 mm) of the stem quill should always be in the frame.
4. Tighten the expander bolt to 120 lb•in (13.6 N•m).

**⚠ WARNING: A quill stem that is too high can cause damage to your bicycle, decrease your control, and cause you to fall. Make sure the minimum-insertion mark (Figure 14) is in the frame.**



**FIGURE 14:**  
Minimum-insertion mark on quill stem  
1. The bicycle frame should hide this line

### To change the angle of an adjustable-rise stem

1. Decrease the tightness of the angle adjustment bolt (Figure 13) until the stem angle can be changed.
2. Move the stem to the necessary angle.
3. Tighten the angle-adjustment bolt to 150-170 lb•in (17-20.3 N•m).

### To adjust the height of a direct-connect stem

To adjust the height of the handlebar with a direct-connect stem, the headset bearing must be adjusted. Special tools and training are necessary for bearing adjustment, so only your dealer should do this.

### Minimum spacers with a direct-connect stem

On a bicycle with an aluminum steerer, there should be at least one 5mm spacer under the direct-connect stem. On a bicycle with a carbon steerer, there should be at least one 5mm spacer below the stem and also one 5mm spacer above the stem (Figure 15).

**⚠ WARNING: Incorrect or missing spacers can cause damage to the steerer of the fork, possibly causing it to break. If the steerer breaks, you could fall.**



**FIGURE 15:**  
Required spacers above and below a direct-connect stem

### To align a direct-connect stem

1. Decrease the tightness of the steerer-clamp bolts two to three turns.
2. Align the stem with the front wheel.
3. Tighten the steerer-clamp bolts to 100-120 lb•in (11.3-13.6 N•m).

## Saddle

The saddle supports most of your weight on the bicycle. It also controls the extension of your legs and the fore-aft position of your body on the bicycle. With correct adjustment, your bicycle saddle will be comfortable—even for long rides.

**⚠ WARNING: A saddle that is adjusted incorrectly or does not correctly support your pelvic area can cause injury to your nerves or blood vessels. If your saddle causes pain or numbness, adjust the saddle position. If your saddle still causes pain or numbness, speak to your dealer about a change in your position or a saddle that is more comfortable.**

Adjust the saddle angle to your preference. First, try to ride with the top of the saddle parallel to the ground. For bicycles with rear suspension, move the nose of the saddle down slightly; when your body weight compresses the rear shock, the saddle will be level. The saddle can also be moved forward or rearward along the seatpost to add comfort and to adjust the distance from the handlebar, but only with the flat portion of the rails (Figure 17) completely within the seat clamp.

**⚠ WARNING: An incorrectly positioned seatpost can break the saddle rails or the seat-clamp bolt, and cause you to fall. Only clamp the flat portion of the saddle rails in the seat clamp.**

Some saddles have exposed coil springs. If you attach a child carrier to the rear of the bicycle, exposed springs could injure a child's fingers. Cover the springs or use a saddle that does not have springs.

Do not close the seatpost binder with the seatpost out of the frame.

## To adjust the angle of the saddle

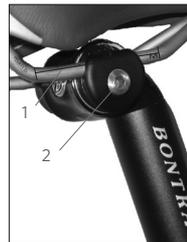
1. Decrease the tightness of the seat-clamp bolt (Figure 15) until the saddle can be moved.
  - Some seatposts use two bolts. To make the adjustment, decrease the tightness of one bolt and then tighten the other bolt.
2. Put a straight edge, bubble level, or ruler across the top of the saddle to better see the angle of the saddle.
3. Adjust the saddle and tighten the saddle-clamp bolt for your type of seatpost:
  - One bolt that uses a 13 or 14 mm open-end wrench: 180-220 lb•in (20.3-24.9 N•m)
  - One bolt across the seatpost head that uses a 5 mm allen wrench (Figure 17): 120-130 lb•in (13.6-14.7 N•m)
  - One bolt that uses a 6 mm allen wrench: 150-250 lb•in (17-28.3 N•m)
  - Two bolts that use a 4 mm allen wrench: 45-60 lb•in (5-6.8 N•m)
  - Two bolts that use a 5 mm allen wrench: 80-125 lb•in (9.6-14.1 N•m)



**FIGURE 15:**

Seatpost parts

1. Seat-clamp bolts
2. Seatpost
3. Seatpost binder bolt



**FIGURE 17:**

Bonttrac seatpost

1. Flat portion of the saddle rails
2. Seat-clamp bolt

### To adjust the height of the saddle

1. While someone holds the bicycle, sit on the saddle without shoes, with the crank arms parallel to the seat tube.
2. Decrease the tightness of the seatpost binder bolt or quick-release.
3. Put your heel on the bottom pedal. Extend the seatpost until your extended leg is straight (Figure 18).
  - When you wear shoes there should be a small bend in your knee in the correct position; with the ball of your foot on the pedal.
4. Make sure the minimum-insertion mark on the seatpost (Figure 19) can not be seen above the bicycle frame.
5. Lock the seatpost quick-release, or tighten the seatpost-clamp bolt to 40-60 lb•in (4.5-6.8 Nm) for a 5mm bolt, or 60-80 lb•in (6.8-9 N•m) for a 6mm bolt.



**FIGURE 18:**  
Leg extension with correct saddle height



**FIGURE 19:**  
Minimum-insertion mark on seatpost  
1. The bicycle frame should hide this line

**⚠ WARNING: A seatpost that is too high can cause damage to your bicycle or decrease your control and cause you to fall. Make sure the minimum-insertion mark (Figure 19) is in the frame.**

### Headset

The headset is the bearing system that allows the handlebar and fork to turn. Each month examine the headset.

#### To examine the headset adjustment

1. Apply the front brake while you rock the bicycle forward and rearward.
2. Lift the front wheel off the ground. Slowly turn the fork and handlebar to the right and left.

If the headset bearings move in the frame or do not turn smoothly, do not ride your bicycle. Transport your bicycle to your dealer for repair. The adjustment of the headset makes special tools and training necessary. Only your dealer should adjust bearings.

### Crankarms

The crankarms connect the pedals to the bottom bracket. They transmit power from the rider to the rear wheel, and on some bicycles they provide braking power.

The length of some crankarms can be adjusted. To change the crankarm length, remove the pedals, then install the pedals into the other position. To remove or install the pedals, see the Pedals section.

### Bottom Bracket

The bottom bracket is the bearing system that allows the crankarms to turn in the frame.

#### To examine the bearing adjustment

1. Lift the chain from the chainrings.
2. Turn the crankarms so that one of the crankarms is parallel to the seat tube.
3. Put one hand on the crankarm and one hand on the seat tube. Try to move the crankarm to and from the seat tube.
4. Turn the crankarms.

If the crank feels or sounds loose, if the movement stops suddenly, or you hear a grinding noise that comes from the bearings, have your dealer service the bottom bracket. The adjustment of the bottom bracket makes special tools and training necessary. Only your dealer should adjust bearings.

## Pedals

The pedals hold your feet so that you can rotate the crankarms. They are threaded into the crankarms. The right pedal is threaded in the usual direction, but the left pedal is threaded in the opposite direction. Tighten pedals into the crankarms to 350-380 lb•in (40.2-42.9 N•m).

### To examine the pedal bearing adjustment

1. Hold the crankarm with one hand and with the other hand, try to move the pedal up and down.
2. Turn the pedal.

If the pedals move on the crankarms or do not turn smoothly, do not ride your bicycle. The adjustment of the pedals makes special tools and training necessary. Only your dealer should adjust bearings.

To adjust the release force on clipless pedals, refer to the manual on the CD that came with your bicycle, or speak to your dealer.

## Chain

The chain connects the crankarms (and chainring) to the rear wheel.

On a bicycle with a rear derailleur, the chain tension is maintained by the derailleur. On a bicycle without a rear derailleur, correct chain tension is required to prevent the chain from falling off. Chain tension is adjusted by moving the rear wheel or adjusting the dropouts. If your bicycle has adjustable dropouts, view the CD for instructions or speak to your dealer.

### To adjust the chain tension

1. Slightly decrease the tightness of the rear wheel axle nut on one side of the wheel, then on the other side of the wheel.
  - If you fully decrease the tightness of the axle nut on one side before you decrease the tightness of the other axle nut, you can cause the bearings to come out of adjustment.
2. Slide the wheel rearward to tighten the chain. Put the wheel in the center of the frame.
3. Complete the wheel installation (see Wheels).

## Cables

On a bicycle with either shifters or hand brakes, a cable connects the control lever to the item it controls.

Each month examine the cables for kinks, rust, broken strands, or frayed ends. Also examine the cable-housing for loose wire strands, bent ends, cuts, and worn areas. If you think there is a problem with a cable or housing, do not ride your bicycle. Follow the instructions to replace the cable, or have your dealer repair your bicycle.

## Shift-levers

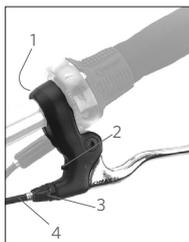
A shift-lever controls a derailleur or internal hub shifting mechanism. The position of a shift-lever can be adjusted on the handlebar. There are many types of shift-levers; if a shift-lever on your bicycle is not covered here, see the Owner's Manual CD or consult your dealer.

### To adjust the position of a lever

1. Find the lever-clamp bolt (Figure 20 and Figure 21).
2. Decrease the tightness of the clamp bolt two to three turns.
3. Move the lever.
4. Tighten the clamp bolt to 53-69 lb•in (6.0-7.8 N•m).



**FIGURE 20:**  
Lever-clamp bolt, road lever  
1. Lever-clamp bolt



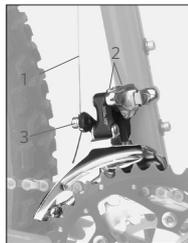
**FIGURE 21:**  
Lever-clamp bolt, mountain lever  
1. Lever-clamp bolt  
2. Reach-adjustment screw  
3. Barrel-adjuster  
4. Cable

## Front Derailleur

With bicycles that have more than one chainring, the front derailleur makes the gear changes.

### To adjust the small-chainring position

1. Move the chain to the smallest front chainring and the largest rear cog.
2. Decrease the tightness of the cable-clamp bolt (Figure 22) until the cable is free.
3. Turn the low-gear limit-screw (identified with an "L") until the inner chain-guide of the derailleur is approximately 0.5 mm from the chain.
4. Pull on the cable end, and move the left shift-lever to the small-chainring position.
5. On the shift-lever or the down tube of the frame, fully turn clockwise the derailleur-cable barrel-adjuster.
6. Put the cable in the groove found near the derailleur-cable-clamp bolt, pull the cable tight, and tighten the clamp bolt to 44-60 lb•in (5.0-6.8 N•m).



**FIGURE 22:**  
Front derailleur  
1. Cable  
2. Limit-screws  
3. Cable-clamp bolt

### To adjust the large-chainring position

1. Move the rear derailleur to the smallest rear cog.
2. Turn the high-gear limit-screw (identified with an "H") counterclockwise until it can not stop the movement of the derailleur.
3. Turn the crankarms with your hand. Use the shift-lever to carefully move the chain to the outside chainring.
4. Move the outer chain-guide approximately 0.5 mm from the chain.
5. Tighten the high-gear limit-screw until it resists.
  - If you have turned the screw too far, the front derailleur will move to the small chainring.
6. Change gears to all the gear combinations. Make sure the chain does not come off when you move the shift-lever. Make sure the derailleur cage does not rub on part of the crankarms.

### To adjust the middle-gear position with three chainrings

1. Move the chain to the largest front chainring and the smallest rear cog.
2. Turn the cable barrel-adjuster (on the down tube, or on the lever) to change the cable tension and align the inner cage of the derailleur until it touches the chain.
3. Change gears to all the gear combinations to make sure the chain smoothly lines up with all the chainrings.

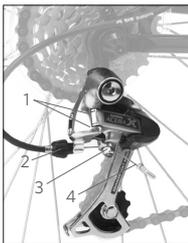
Some front shift-levers have a 'tab.' Slightly move the lever to a lower gear and the derailleur will move in slightly so it does not touch the chain.

## Rear Derailleur

On bicycles with more than one cog on the rear wheel, the rear derailleur makes the gear changes.

### To adjust the small-cog position

1. Move the chain to the smallest rear cog and the largest front chainring.
2. Decrease the tightness of the cable-clamp bolt (Figure 23) until the cable is free.
3. Move behind the bicycle to see that the smallest rear cog, the chain, and the two derailleur pulleys are in alignment.
4. If they are not in alignment, turn the high-gear limit-screw (usually identified with an “H”.) until they are in alignment.
5. While you pull on the cable, move the shift-lever to the small-cog position.
6. On the shift-lever or down tube, fully turn clockwise the barrel-adjuster. Fully turn clockwise the barrel-adjuster on the rear derailleur, then turn it one turn counterclockwise.
7. Put the cable into the clamp-bolt groove on the rear derailleur, pull the derailleur cable tight, and tighten the cable-clamp bolt to 44-60 lb•in (5.0-6.8 N•m).



**FIGURE 23:**

- Rear derailleur
1. Limit-screw
  2. Barrel-adjuster
  3. Cable-clamp bolt
  4. Cable

### To adjust the large-cog position

1. Turn the low-gear limit-screw on the rear derailleur (usually identified with an “L”) counterclockwise until the derailleur can move freely.
2. Carefully move the chain to the smallest front chainring and the largest rear cog.
  - Do not move the rear derailleur too far. The chain can be caught between the large cog and the spokes.
3. Move the rear derailleur pulleys in alignment with the largest cog.
4. Turn the low-gear limit-screw clockwise until it does not turn easily.
  - If you have turned it too far, the derailleur will move to the outside of the bicycle.
5. Change gears to all the gear combinations. Make sure the chain does not come off when you change gears.

### To align the index system

1. Move the chain to the largest front chainring and the smallest rear cog.
2. Move the rear shift-lever for one click.
3. Make sure the chain moves smoothly to the second-smallest gear.
  - If the chain makes too much noise or does not change gears, slightly turn the barrel-adjuster. Change the gear again and make sure the change is smooth.
  - If the chain moves to the third smallest gear, turn clockwise the barrel-adjuster until the derailleur pulleys align with the second-smallest gear.
4. Change gears to all the gear combinations to make sure the chain smoothly lines up with each of the rear cogs.

If the derailleur can not be adjusted correctly, the derailleur hanger could be out of alignment. Transport your bicycle to your dealer for repair.

## Internal Gear Systems

These systems change gears with a mechanism that is in the rear hub.

### To adjust a Nexus 4, 7, or 8-speed systems

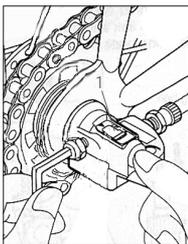
1. Turn the shift-lever to the fourth-gear position.
2. Align the indicator on the rear-hub pulley (Figure 24) with the cog joint bracket.
3. If the red lines are not in alignment, turn the barrel-adjuster until they are in alignment.
4. Move the shift-lever to first gear. Then move the lever to fourth gear. Examine the adjustment.



**FIGURE 24:**  
Nexus rear hub  
1. Pulley  
2. Cog joint bracket  
3. Cable-clamp bolt

### To adjust a 3-speed system

1. Turn the shift-lever to the second-gear position.
2. Align the indicator on the bell crank window with the line on the push rod (Figure 25).
3. If the indicators are not in alignment, turn the barrel-adjuster until they are in alignment.
4. Move the shift-lever to first gear. Then move the lever to second. Examine the adjustment.



**FIGURE 25:**  
Three-speed rear hub  
1. Bell crank window

## Brakes

The brake system allows you to slow or stop your bicycle. This operation is critical to your safety. The brake system is not easy to adjust without the correct tools and training. It is strongly recommended that only your dealer adjust a brake. If more aid is necessary, speak to your dealer.

### Types of brakes

Different types of bicycles have different types of brakes. The brake types can be divided into three types:

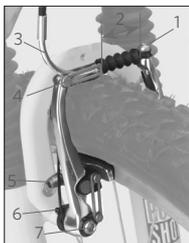
- **Hub brake:** a “coaster” brake or drum brake, where the brake mechanism is inside the hub (Figure 26). A hub brake can be controlled by a hand lever, or by the pedals.



**FIGURE 26:**  
Coaster brake

- **Rim brake:** brake pads apply pressure to the rim. The pressure is controlled with a hand lever that is connected to the brake by a cable. Examples include direct-pull or V-type brakes (Figure 27), cantilever brakes (Figure 28), and road or caliper brakes (Figure 29). The rim brake system includes these parts:
  - Brake
  - Brake pads
  - Rim
  - Brake lever
- Brake cable and housing
- Brake modulator- some front direct-pull brakes are equipped with a brake modulator, or “Power modulator.” This device includes a small spring in the pipe (Figure 27) that changes the way the brake works during the

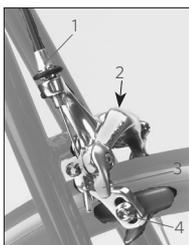
initial contact between the brake pads and the rim. As you squeeze the brake lever, you must move the lever to compress the spring before you can apply full braking power to the rim. This changes the way the brake feels, and also makes the adjustment somewhat more sensitive: if your brake with a modulator does not pass inspection, transport your bicycle to your dealer for adjustment.



**FIGURE 27:**  
Direct-pull brake  
1. Cable-clamp bolt  
2. No touch  
3. Pipe  
4. Link  
5. Pad-clamp bolt  
6. Center-adjust screw  
7. Arm-clamp bolt



**FIGURE 28:**  
Cantilever brake  
1. Linkwire  
2. Arm-clamp bolt  
3. Center-adjust screw  
4. Pad-clamp bolt



**FIGURE 29:**  
Caliper brake  
1. Barrel-adjuster  
2. Center-adjust screw  
3. Brake release lever  
4. Pad-clamp bolt

- **Disc brake:** brake pads apply pressure to a disc mounted to the hub of the wheel (Figure 30). The pressure is controlled with a hand lever that is connected to the brake by a cable or a hydraulic hose.



**FIGURE 31:**  
Disc brake parts  
1. Attachment bolts  
2. Fixed-pad adjuster  
3. Cable-clamp bolt

## Inspection

Before every ride, perform the brake check listed in Chapter 1. Each month examine all the brake bolts, and examine the brake-pads for worn areas:

- Rim brakes: If the grooves in the brake-pad surface are less than 2 mm deep (or 1 mm deep for direct-pull brakes) replace the brake-pads.
- Disc brakes: Replace brake-pads that are thinner than 1.0 mm.

## To adjust the clearance between the brake-pads and the rim

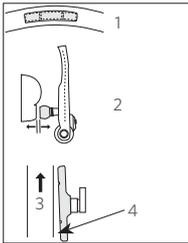
1. Turn the barrel-adjuster.
  - For most direct-pull (Figure 27) or cantilever (Figure 28) systems the barrel-adjuster is on the lever. For most road caliper systems (Figure 29) the barrel-adjuster is on the brake itself.
  - To increase the clearance between the brake-pad and rim, turn the barrel-adjuster clockwise. To decrease the clearance, turn the barrel-adjuster counterclockwise.
2. If the brake-pads can not be adjusted correctly with the barrel-adjuster, further work is required:
  - Direct-pull and caliper: Decrease the tightness of the cable-clamp bolt and attach the cable again.
  - Cantilever: Re-adjust the brake-pad alignment, or transport the bicycle to your dealer.

### To put a direct-pull, cantilever, or road brake in the center

1. Turn the center-adjust screw (Figure 27, Figure 28, or Figure 29) in small increments.
2. If the brake has two center-adjust screws, adjust the overall spring tension while you put the brake in the center.

### To adjust the alignment of the brake-pads on a rim brake

1. Decrease the tightness of the brake-pad-clamp bolt.
2. Align the brake-pads as shown in Figure 30. Tighten the brake-pad-clamp bolts:
  - Caliper: 40-60 lb•in (4.5-6.8 N•m)
  - Direct-pull or cantilever: 70-80 lb•in (7.9-9 N•m)
3. After you adjust the brakes, examine them. Pull the levers. Make sure the cable does not slide through the cable clamp, the brake-pads engage the rim at ninety-degree angles, and the brake-pads do not touch the tire.



**FIGURE 30:**

Brake pad alignment

1. Brake-pad in alignment with rim surface
2. Pad and rim should be parallel
3. Direction in which the rim turns
4. 0.5-1.0 mm toe-in

### To release the brake for wheel removal

- For most road calipers, lift the brake release lever (Figure 29) to the UP position. To close, turn the lever to the DOWN position.
- For Campagnolo levers, push the release button that is at the top of the lever. Slightly pull the lever and push the button until it aligns with the lever body. Release the lever. To close the brake, follow the instructions in the opposite sequence.
- For cantilever brakes, release the linkwire (Figure 28). With one hand, push the brake-pads fully against the rim. With the other hand, pull the leaded end of the linkwire from the fork on the brake-arm. Release the brake-pads. To close the brake, follow the instructions in the opposite sequence.
- For direct-pull brakes, disconnect the pipe from the link (Figure 27). With one hand, push the pads fully against the rim. With the other hand, pull the pipe away from the link, and lift the pipe. Release the brake-pads. To close the brake, follow the instructions in the opposite sequence.
- For internal or drum brakes, to remove the rear wheel, first disconnect the gear and brake cables. To disconnect the brake cable, push the cable-carrier arm forward, and the cable-clamp bolt rearward, so the bolt aligns with the larger diameter hole in the carrier. Pull the cable-clamp bolt out to remove it from the carrier. Slide the brake-cable stop forward to remove it from the brake-arm. Decrease the tightness of the brake-strap bolt. To disconnect the gear cable, put the shift-lever in first gear. Pull the cable-housing out of the gear-cable housing-stop. Turn the gear-cable-clamp bolt until the washer flats align with the slit in the cog joint bracket. Remove the cable.

### To align a hydraulic disc brake

1. Decrease the tightness of the brake-attachment bolts (Figure 31).
2. Fully pull the lever, and tighten the bolts to 100-110 lb•in (11.3-12.4 N•m).

### To align a cable-actuated disc brake

There are three parts to this procedure:

#### A. To adjust the clearance between the right brake-pad and the disc

1. Turn the fixed-pad adjuster (Figure 31).
2. If the pads can not be adjusted correctly in this manner, follow the instructions “To adjust the clearance between the left brake-pad and the disc,” and then adjust the right pad.

#### B. To adjust the clearance between the left brake-pad and the disc

1. Turn the cable barrel-adjuster: clockwise to increase clearance, counterclockwise to decrease clearance.
2. If the pads can not be adjusted correctly, decrease the tightness of the cable-clamp bolt and re-attach the cable. Tighten the cable-clamp bolt to 50-70 lb•in (5.7-7.9 N•m).
3. After adjustment, turn the lock-nut clockwise to make sure the adjustment does not change.

#### C. To align the brake with the disc

1. Decrease the tightness of the brake-attachment bolts.
2. Slide a business card or other thin object between the right brake-pad and the disc.
3. Pull the lever fully, and tighten the bolts to 100-110 lb•in (11.3-12.4 N•m).

### To remove disc brake-pads

1. Remove the wheel.
2. With your fingers or pliers, hold the installation tang of the brake-pad and pull out the pad.

## Brake-levers

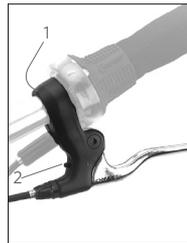
A brake lever allows you to control a brake. The position of the lever on the handlebar should allow you to use the brake with a minimum amount of effort or movement.

There are several types of brake levers:

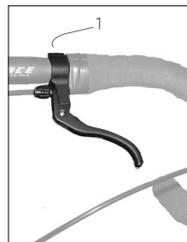
- Road lever: for drop-type handlebar (Figure 32).
- Mountain lever: for flat or mountain-type handlebar (Figure 33).
- Middle-bar brake lever: for drop-type handlebar (Figure 34). This type of lever is used with a road lever to provide additional hand positions.



**FIGURE 32:**  
Road lever  
1. Lever-clamp bolt



**FIGURE 33:**  
Mountain lever  
1. Lever-clamp bolt  
2. Reach-adjustment screw



**FIGURE 34:**  
Middle-bar brake-lever  
1. Lever-clamp bolt

### To adjust the position of a lever

1. Find the lever-clamp bolt (Figure 32, Figure 33, or Figure 34).
2. Decrease the tightness of the clamp bolt two to three turns.
3. Move the lever.
4. Tighten the lever-clamp bolt:
  - Road or mountain brake-lever: 53-69 lb•in (6.0-7.8 N•m).
  - Middle-bar lever (Figure 34): 20-30 lb•in (2.3-3.3 N•m).

### To adjust the reach to the brake-lever

With some brake-levers, you can adjust the reach, the distance from the handlebar to the lever.

1. Find the reach-adjustment screw (Figure 33) and turn. To decrease the reach, turn the screw clockwise. To increase the reach, turn the screw counterclockwise.
2. If it is necessary after you adjust the reach, adjust the brake-pad clearance.

### To change which lever controls the front brake

1. Release the brake.
2. Disconnect the brake cables:
  - For a bicycle with a drop-type handlebar, remove the handlebar tape. Then disconnect each brake cable and fully remove it from the lever.
  - For a mountain bicycle, remove the leaded end of the cable from the lever.
3. Install the cables into the opposite levers.
4. Close the brakes.
  - For a bicycle with a drop-type handlebar, replace the handlebar tape.
5. Examine the brakes as shown in Chapter 1, and adjust the brakes as necessary.

## Wheels

Each month, or whenever you change tires or tubes, examine tires for worn areas and damage. Make sure rims are clean so that the brakes function correctly. Make sure there are no loose spokes or spokes with damage so that the wheel remains straight and strong. Make sure the wheel (hub) bearings are correctly adjusted. Make sure a rim strip is in the correct location and it fully covers all spoke holes or nipples so that it protects the inner tube from puncture.

Once a month, inspect the rims. If the wear-indicators on the brake surface show the rim is worn, or if the brake surface is not flat, replace the rim.

 **WARNING: Brake-pads remove rim material when you apply the brake. If the brakes remove too much material over time, the rim can become weak and break, decrease your control, and cause you to fall. Regularly examine your rims. Replace a rim that is worn.**

### To examine the adjustment of the hub bearings

1. Lift the end of the bicycle off the ground with one hand and try to move the rim from the left to the right. Look, feel, and listen for a movement in the bearings.
2. Turn the wheel and listen for a grinding noise or other noises that are not usual.
3. Repeat these procedures for the other wheel.

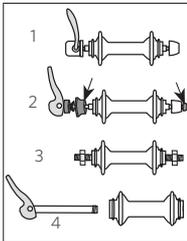
If the hub feels loose or makes a grinding noise, servicing is necessary. The adjustment of the wheel bearings makes special tools and training necessary. Only your dealer should adjust bearings.

## Wheel Installation

Bicycles use different types of wheel attachment devices. Carefully follow the instructions for the device(s) on your bicycle.

### Wheel attachment types (Figure 35):

- Traditional quick-release
- Clix™ quick-release
- Threaded axle and nut
- Thru-axle



**FIGURE 35:**

Types of wheel attachment

- 1- Traditional quick-release
- 2- Clix (arrows indicate the parts not found on a traditional quick-release)
- 3- Threaded axle
- 4- Thru-axle

**⚠ WARNING: A quick-release that is not correctly adjusted and closed can let the wheel be loose or come off, decrease your control, and cause you to fall. Make sure the wheels are correctly attached before you ride your bicycle.**

### To install a wheel with a traditional quick-release

1. Move the lever of the quick-release to the OPEN position (Figure 36) and set the wheel so it fully touches the inner surfaces of the fork ends.
2. With the lever in the adjustment position, tighten the adjustment-nut (Figure 29) until it is slightly tight.
3. Lock the quick-release; with the lever in the palm of your hand, move the lever as shown in Figure 38 to the CLOSE position (Figure 40 and Figure 41). When you move the lever to the adjustment position, you should feel some resistance.

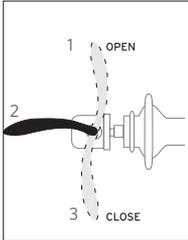
- Do not turn the lever like a wing-nut to tighten it (Figure 39); this will not make sufficient force to hold the wheel.
4. If you can lock the lever with little or no resistance, the clamp-force is not sufficient. Go back to Step 2 and tighten the adjustment-nut. For more information, read the actual measurements (below).
5. Align the levers so they do not touch a part of the bicycle or an accessory part (such as rack or fenders), and so obstacles in the path of the bicycle can not catch the levers.
6. Make sure you have correctly adjusted and locked the quick-release. If the quick-release does not pass a test, adjust the quick-release again or transport your bicycle to your dealer for repair. Do the tests again before you ride.
7. Make sure you have correctly adjusted and locked the quick-release: If the quick-release does not pass a test, adjust the quick-release or transport your bicycle to your dealer for repair. Do the tests again before you ride:
  - Lift your bicycle and hit the top of the tire with a solid blow (Figure 42). The wheel should not come off, be loose, or move from side to side.
  - Make sure the locked quick-release lever can not be turned (Figure 43).
  - When the quick-release is correctly locked, the clamp-force is sufficient to cause metal-into-metal engagement (embossing) of the dropout surfaces.
  - Read the Actual Measurements.

### ACTUAL MEASUREMENTS

If more than 45 pounds (200 Newton) force is necessary to lock the lever, slightly decrease the tightness of the adjustment-nut. If less than 12 pounds (53.4 Newton) force is necessary to release the lever, slightly tighten the adjustment-nut. If necessary, adjust the tightness again.

**To remove a wheel with a traditional quick-release**

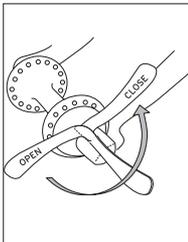
1. Release the quick-release lever; move it to the OPEN position (Figure 36).
2. For the front wheel, decrease the tightness of the adjustment-nut; turn it three turns.
3. Move the wheel out of the fork or the frame.



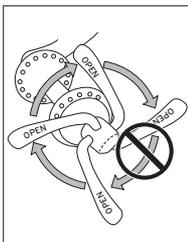
**FIGURE 36:**  
Quick-release lever positions  
1- Released (OPEN)  
2- Adjustment position  
3- Locked (CLOSE)



**FIGURE 37:**  
Tighten nut  
1. Adjustment-nut



**FIGURE 38:**  
Correct lever movement



**FIGURE 39:**  
Do not turn the lever



**FIGURE 40:**  
Front lever position



**FIGURE 41:**  
Rear lever position



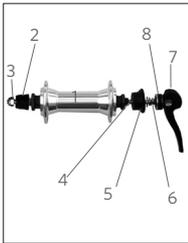
**FIGURE 42:**  
Test for loose condition



**FIGURE 43:**  
Make sure the lever does not turn

## To install a wheel with a Clix

There is a difference between a traditional quick-release and a Clix quick-release (Figure 44). With a traditional quick-release, you should adjust the clamp-force each time you install the wheel. But with the Clix system you should not have to adjust when you install the wheel. Clix is an integrated system that is adjusted to only one fork—to the width of the dropouts (the parts of the fork that hold the wheel).



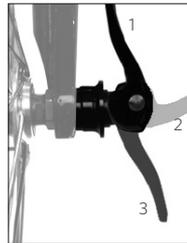
**FIGURE 44:**

- Parts of a Clix
1. Hub
  2. Adjustment-nut
  3. Lock nut
  4. Skewer
  5. Cup
  6. Spring
  7. Lever
  8. Cam follower

**⚠ WARNING: A Clix is adjusted for only one wheel and fork. A change in bicycle, wheel, or fork could cause the Clix to let the wheel be loose or come off, decrease your control, and cause you to fall. Do not move the Clix to a different bicycle, wheel, or fork without correct adjustment.**

1. With the lever of the Clix quick-release in the OPEN position (Figure 45), push together the cup and lever (Figure 46) and lower the fork on the wheel until the inner surfaces of the fork ends touch the wheel.
  - Some forks have special dropouts, so you do not have to push together the cup and lever; the fork will slide automatically on the wheel.
2. Lock the Clix; with the lever in the palm of your hand, move the lever as shown in Figure 47 to the CLOSE position.
  - Do not turn the lever like a wing-nut to tighten it (Figure 48); this will not make sufficient force to hold the wheel.

3. Align the lever so it does not touch a bicycle part or an accessory part (such as rack or fenders), and so obstacles in the path of the bicycle can not catch the lever.
4. Make sure you have correctly locked the Clix. If the quick-release does not pass a test, adjust the quick-release or transport your bicycle to your dealer for repair. Do the tests again before you ride:
  - Lift your bicycle and hit the top of the tire with a solid blow (Figure 49). The wheel should not come off, be loose, or move from side to side.
  - Make sure the locked quick-release lever can not be turned (Figure 50).
  - If you can lock the lever with little or no resistance, the clamp-force is not sufficient.
  - When the Clix is locked, the clamp-force is sufficient to cause metal-into-metal engagement (embossing) of the dropout surfaces.
  - See Actual Measurements on page 28.



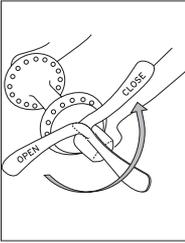
**FIGURE 45:**

- Lever positions
- 1- Locked (CLOSE)
  - 2- Adjustment position
  - 3- Released (OPEN)

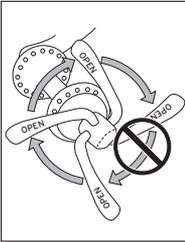


**FIGURE 46:**

Push together the cup and lever



**FIGURE 47:**  
Correct lever movement



**FIGURE 48:**  
Do not turn the lever



**FIGURE 49:**  
Test for loose condition



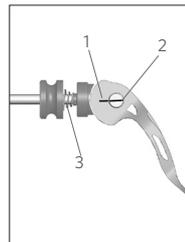
**FIGURE 50:**  
Make sure the lever does not turn

### To remove a wheel with a Clix

1. Release the Clix; move the quick-release lever to the OPEN position (Figure 45).
2. Push together the cup and lever (Figure 46), and push them in slightly to move the adjustment-nut out of the fork.
3. Move the wheel out of the fork.

### To adjust the clamp-force of a Clix

1. Loosen the Clix lock nut.
2. Put the lever in the OPEN position (Figure 45).
3. Align the marks on the lever and on the axle to the adjustment position (Figure 51).
4. Tighten the adjustment-nut until it is slightly tight.
5. Lock the lever and do the tests for correct clamp-force—see Step 4 of “To install a wheel with a Clix.”
6. If the clamp-force is correct, lock the lever.
  - If the clamp force is NOT correct, slightly turn the adjusting nut clockwise to increase the clamp force. Go back to Step 4.
7. To prevent a change of the adjustment, tighten the lock nut until it touches the adjustment-nut. Do not over-tighten.
8. Examine the secondary wheel retention of the Clix system. Move the lever to the OPEN position. Lift the front wheel off the ground and use force to hit the top of the tire. The wheel should not come out of the fork ends. If the Clix system does not pass this test, transport your bicycle to your dealer for repair.



**FIGURE 51:**  
Adjustment position with marks in alignment

1. Lever mark
2. Axle mark
3. Spring (small end of cone points away from hub)

## To install a wheel with a threaded axle and nut

Some wheels are attached with nuts that are threaded on the axle. A toothed washer could be necessary between the nut and fork end.

1. Tighten the axle nuts for a front wheel to 180-240 lb•in (20.3-27.1 N•m), and for a rear wheel to 240-300 lb•in (27.1-33.9 N•m).
2. Make sure you have correctly attached the wheel:
  - Lift your bicycle and hit the top of the tire with a solid blow (Figure 49). The wheel should not come off, be loose, or move from side to side. If the wheel connection does not pass the test, do these procedures again. If you can not correctly attach the wheel, transport your bicycle to your dealer for repair.

## To install a wheel with a thru-axle

There are several types of thru-axes. If these instructions do not cover the hub type on your bicycle, refer to the CD or talk to your dealer.

1. Release the quick-release or decrease the tightness of the clamp-bolts on the fork ends.
2. Put the wheel in its location, and move the wheel into the fork ends.
3. Place the axle or the skewer through the hub and fork ends.
  - For a skewer with threads, start the threads and turn the skewer until it is snug, then close the quick-release lever.
  - For fork tips with clamp bolts, tighten the clamp-bolts to 45-55 lb•in (5.1-6.2 N•m).
4. Make sure you have correctly attached the wheel: Lift your bicycle and hit the top of the tire with a solid blow (Figure 49). The wheel should not come off, be loose, or move from side to side. If the wheel connection does not pass the test, do these procedures again. If you can not correctly attach the wheel, transport your bicycle to your dealer for repair.

## Tire Installation

There are several types of tires:

- Standard, or clincher, tire: the air inside the tire is contained in an inner tube, and the tire is on a standard rim
- Tubeless or Tubeless Ready tire: there is no inner tube, and the tire is on a special tubeless rim
- Tubular, or “sew-up,” type tire: the inner tube is stitched or glued inside the tire casing, and the casing is glued to the rim.
- Tricycle tire: the air inside the tire is contained in an inner tube, and the tire is on a special, bolted rim

These instructions are written for standard clincher wheel systems. For instructions for another types of tires, view the CD or consult your dealer. When purchasing spares or replacements, use the size written on the side of the tire or consult your dealer.

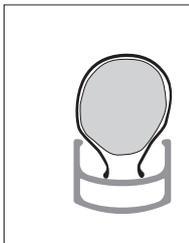
## To remove a wheel from the bike

1. Follow the instructions to open the brake in the Brake System section of this chapter.
2. Follow the instructions to remove a wheel in the Wheels section of this chapter.

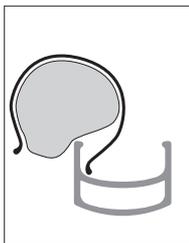
## To remove the tire from the wheel

Remove the tire from the rim with your hands or tire levers. Do not use sharp objects such as a screwdriver to remove the tire.

1. Deflate the inner tube completely.
2. Squeeze the tire beads into the bottom of the rim well (Figure 52). Work your way all around the wheel.
3. Lift one tire bead up and out of the rim with a tire lever. Start opposite the valve.
4. Continue around the wheel to lift the bead out until one bead is completely free (Figure 53).
5. Reach up into the tire and remove the inner tube.
6. Remove the second tire bead from the rim.



**FIGURE 52:**  
Tire beads in bottom of rim well



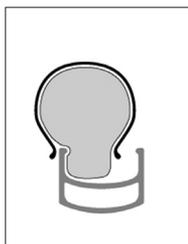
**FIGURE 53:**  
First tire bead and tube out of rim

### To install a tire on the wheel

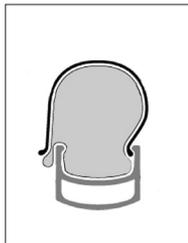
To repair a tube leak, apply a patch to the puncture on the tube, or replace the tube.

1. Follow the Inspection procedures in the Wheels section to check the rim and inside of the tire.
  - If you replace the tube or tire, make sure the new tube or tire is the same size as the old one, or consult your dealer for compatibility of different sizes. The size can be found on the side of the tire.
2. Inflate the tube until it begins to take shape.
3. Place the tube in the tire.
4. Insert the valve stem through the hole in the rim.
5. Install the first bead onto the rim with your hands (Figure 53). Start at the valve stem.
6. Push the tire and tube over so the tube is inside the rim (Figure 54).

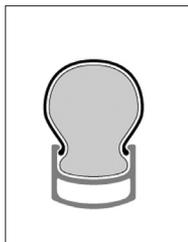
7. Push the second bead into the rim with your hands. Start at the valve stem.
  - Be careful not to pinch the tube between the rim and the tire (Figure 55) when you mount the tire.
8. Push the base of the valve stem up into the tire so that it is not caught between a tire bead and the rim.
9. Inflate the tire to about half pressure and then check that the tire bead is properly seated in the rim (Figure 56).
10. Deflate the tire again. This will help avoid any pinching of the tube.
11. Inflate the tire to the pressure indicated on the side of the tire. Do not over-inflate.



**FIGURE 54:**  
First bead pushed across rim, with inner tube in rim



**FIGURE 55:**  
Tube pinched between tire and rim



**FIGURE 56:**  
Tire beads seated in rim hooks, with inner tube inside rim

## Suspension

If you adjust your suspension, your bicycle will turn and stop differently. After you adjust the suspension, carefully examine your bicycle in a low traffic area until you know its performance.

Sag is the compression of a shock that occurs when the rider sits on the bicycle in a usual position. For the initial adjustment, set the forks at approximately 15% sag, and a rear shock at approximately 25% sag. Try small changes to find your preference.

With the correct adjustment, you should not be able to fully compress the suspension. If the suspension is fully compressed, its movement will stop suddenly and could decrease your control.

Each week, check the bolts on all suspension parts: attachment bolts and pivot bolts.

See the CD or web site for more adjustment and maintenance aid, or speak to your dealer.

## Accessories

Your bicycle might have parts that have not been discussed in this chapter. These parts, such as fenders, lights, racks, chainguard, or kickstand, are accessories. Each month, examine the accessories to make sure they are correctly attached. If the part is loose or not in alignment, tighten the part or transport your bicycle to your dealer for repair.

### To install a light bulb

The bulb has markings that indicate the correct voltage. When purchasing spares or replacements, take the bulb with you to the store to make sure you purchase the correct bulb for your light.

1. Find the lens set-screw on the rear of the light.
2. Turn the screw counterclockwise. Remove it.
3. Turn the lens one quarter-turn clockwise. Pull the lens assembly off of the bulb-attachment.
4. Turn the bulb counterclockwise. Remove it.
  - Be careful not to crush the glass of the bulb. Do not dislodge the wire in the base of the bulb-attachment.
5. Turn a new bulb in until it is slightly tight.
6. Put the lens on the bulb-attachment. Turn the lens one quarter-turn counterclockwise.
7. Put the lens set-screw in the rear of the light. Tighten the screw.

Make sure the new bulb operates. If it does not, examine the wires for correct position, and make sure that the new bulb does not have damage.

## Training Wheels

See other sections of this manual as needed.

1. Put the bicycle on a flat, smooth surface, with the tires correctly inflated.
2. Decrease the tightness of the rear-axle nuts.
3. Hold the bicycle up straight, and adjust the distance between the training wheels and the ground to approximately  $1/4"$  (6 mm). Make the distance the same on the two sides of the bicycle.
4. Adjust the tension of the chain, and tighten the axle-nuts. Use the procedures in the Wheels section.

## Chapter 4: Lubrication

This section shows the parts that should have lubricant applied, the frequency of service, and brief instructions. See your dealer for recommended grease or oil. If more instructions are necessary, see other sections of this manual as necessary, or speak to your dealer.

To service bearings, special tools and training are necessary, so only your dealer should do this. Some bearings are permanently sealed and do not have to have new grease each year.

### Stem

Each year apply lubricant to the stem.

To apply lubricant to a direct-connect stem, adjustment of the headset bearings is necessary. Only your dealer should do this.

#### To apply lubricant to a quill stem:

1. Remove the stem from the frame.
2. Clean the used grease from the stem.
3. Apply a thin layer of grease to the section of the stem-quill that will be put into the frame.  
Also apply grease to the stem wedge.
4. Install the stem.

### Seatpost

Each year, apply lubricant to a metal seatpost. Use the procedure for your frame and seatpost material:

#### Aluminum seatpost in a metal frame

1. Decrease the tightness of the seatpost binder bolt, or release the quick-release, and remove the seatpost from the frame.
2. Clean the used grease off the seatpost.
3. Apply a thin layer of grease to the section of the seatpost that will be in the frame.
4. Put the seatpost into the frame.
5. Adjust the saddle to the correct height and

align it. Tighten the seatpost binder-bolt or lock the quick-release.

#### Carbon fiber seatpost, or carbon fiber frame

1. Decrease the tightness of the seatpost binder-bolt, or release the quick-release, and remove the seatpost from the frame.
2. Clean the seatpost and the inner surface of the seat tube with a soft cloth and clean water.
3. Let the seatpost dry. Then put it into the frame.
4. Adjust the saddle to the correct height and align it. Tighten the seatpost binder bolt.

### Bottom Bracket

Each year, replace the grease in the bottom bracket bearings. To service bearings, special tools and training are necessary, so only your dealer should do this.

### Pedals

Each year, replace the grease in the pedal bearings. To service bearings, special tools and training are necessary, so only your dealer should do this.

Each year replace the grease on the pedal axles where they thread into the crank arms.

1. Remove the pedals; turn the right pedal counterclockwise, but turn the left pedal clockwise.
  - There are right and left pedals, usually identified with a letter on the end of the pedal axle or on the wrench flats.
2. Apply a thin layer of grease on the threads.
3. Install the pedals on the correct side; put the right pedal on the right crankarm and the left pedal on the left crankarm.
4. Tighten the pedals.

## Derailleurs

Each month, apply lubricant to all pivot points on the front and rear derailleurs, together with the derailleur pulleys on the rear derailleur.

## Headset

Each year, replace the grease in the headset bearings. To service bearings, special tools and training are necessary, so only your dealer should do this.

## Brakes and Brake-levers

Each three months apply lubricant to the brake-lever pivots and brake arm fixing pivots.

## Wheels

Each year, replace the grease in the wheel bearings. To service bearings, special tools and training are necessary, so only your dealer should do this.

Each year, apply lubricant to wheel quick-releases. Apply two or three drops of synthetic lubricant or a light oil where the quick-release lever turns in the quick-release body.

## Suspension Forks

Each month, apply a light oil to the fork leg where the lower leg moves on it. Clean the fork if there is too much oil.

Each year, replace the oil in your suspension fork. To replace the oil, special tools and training are necessary, so only your dealer or a suspension fork technician should do this.

## Rear Suspension

Do not apply lubricants to the shock or the pivots of your full-suspension bicycle. If the shock or pivots are making noise or not operating smoothly, take the bicycle to your dealer for service.

## Cables

Apply lubricant to a cable when you install it.

### To install a cable

To install a cable in a cantilever brake, special tools and training are necessary, so only your dealer should do this.

1. Before you remove the used cable, know its path on the frame. Decrease the tightness of the cable-clamp bolt, and remove the worn cable.
2. Apply grease to the new cable. Install the new cable on the same path as the used cable.
3. Make sure the leaded end of the cable is installed correctly in the lever. Make sure the housing is correctly installed in the lever.
  - If necessary when you install a cable in a brake, adjust the brake again.
4. Turn the barrel-adjuster clockwise so that the threads on the barrel-adjuster do not show.
  - For a derailleur cable, put the shift-lever in the position with the least cable tension.
  - For a brake cable, hold the brake closed while you do the subsequent step.
5. Tighten the cable-clamp bolt to 52-69 lb•in. (6-8 N•m).
6. Cut the cable so that no more than 2" (51 mm) extends through the clamp-bolt.
7. Put a metal cap or put a bit of solder on the end of the cable to prevent a frayed cable.
8. Use the instructions for adjustment.

## For more instructions

If more instructions are necessary about your bicycle or the servicing of bicycles, there are many resources in your community.

First, speak to your bicycle dealer. They have extensive experience with bicycles and rides in your community. They can answer your questions and help you in your search for areas in which to enjoy your new bicycle. Most dealers sell books about bicycles and repair manuals that are extensive.

Second, visit your public library. Most libraries have books about how to ride, how to race, bicycle safety, bicycle maintenance, and more.

Third, look on-line. The best on-line resource for your bicycle can be found on the CD that accompanies this manual. With internet access, you can go directly from the CD to our web site. The CD also links to some of the companies that make the parts of your bicycle.



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