

# CANNONDALE OWNER'S MANUAL FOR MULTI-SPEED BICYCLES

This manual contains important safety, performance and maintenance information. Read the manual before taking your first ride on your new bicycle, and keep the manual handy for future reference.

**In order to validate your warranty and BE ENTERED TO WIN A FREE SUPER V RAVEN 2000, please fill out the Registration Card inside or visit our website at [www.cannondale.com](http://www.cannondale.com).**

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Complete your  
**WARRANTY REGISTRATION CARD**  
and be  
**AUTOMATICALLY  
ENTERED TO WIN A  
CANNONDALE SUPER V RAVEN!**



Sure, returning warranty registration cards is a hassle, but if you need some extra motivation consider this: If you send in your card you just might score a sweet new Super V Raven full-suspension bike! If you prefer e-mail to snail-mail, you can even register your bike on-line and automatically be entered into the same Super V Raven drawing.

And remember, completing your warranty registration card just might help you recover your bike if it's ever stolen.

So grab a pen, or visit us on-line at [cannondale.com](http://cannondale.com) and get registered!

**NO PURCHASE NECESSARY.** See Official Rules on attached page in manual.

**NOTE:** By mailing this card, you'll help us in working with your local police department to match bicycle serial numbers with their owners. Thanks!

Fold here and tape closed before mailing.

Please do not send products  
or other correspondence to  
this address.

FIRST CLASS  
POSTAGE  
REQUIRED

**cannondale**  
HANDMADE IN USA

Product Registration Department  
P.O. Box 2127  
Denver, CO 80201-2127 USA

# CANNONDALE WARRANTY REGISTRATION CARD

Thank you for buying a Cannondale bicycle. Please complete and mail this card immediately or if you would like to register your bike via the internet you can do so at [www.cannondale.com](http://www.cannondale.com) and join our Cannondale CHAIN Gang for important product information. Prompt registration will insure that your serial number is recorded in the event of theft and that you will receive safety notifications.

1. Mr.  2. Mrs.  3. Ms.  4. Miss

First Name						Initial		Last Name					
Address: (Number and Street)												Apt. #	
City						State			Zip				

2. Marital Status: 1.  Married 2.  Single

3. E-mail: \_\_\_\_\_

4. Phone Number: \_\_\_\_\_

5. Date of Purchase: \_\_\_\_\_

Month \_\_\_\_\_ Day \_\_\_\_\_ Year \_\_\_\_\_

7. Bicycle Model: \_\_\_\_\_

example: Super V 1000

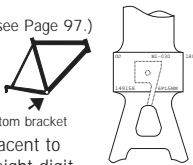
8. Model Color: \_\_\_\_\_

9. Frame Size: \_\_\_\_\_ in. or cm.

10. Store Name: \_\_\_\_\_

11. Serial Number: Located on underside of bottom bracket (Please see Page 97.)

BIO302									



**NOTE:** Late model bikes will have the serial number printed adjacent to a bar code label on the bottom bracket shell. Please write the eight-digit number below left:

SER # [ ] [ ] - [ ] [ ] [ ] [ ] [ ] [ ]

12. What are the top three (3) features influencing your purchase?

1. <input type="checkbox"/> Received as a Gift	6. <input type="checkbox"/> Component Selection	11. <input type="checkbox"/> Frame Design/Materials
2. <input type="checkbox"/> Value for Price	7. <input type="checkbox"/> Comfort/Fit	12. <input type="checkbox"/> Recommendation of Friend/Family
3. <input type="checkbox"/> Color/Appearance	8. <input type="checkbox"/> Weight of Bicycle	13. <input type="checkbox"/> Recommendation of Salesperson
4. <input type="checkbox"/> Prior Experience	9. <input type="checkbox"/> Cannondale Reputation	14. <input type="checkbox"/> Other
5. <input type="checkbox"/> Quality/Durability	10. <input type="checkbox"/> Advertisement	

13. How many times do you ride per month?

1.  1-5 2.  6-10 3.  11-15 4.  15+

14. What type of cycling do you do most often? (check one)

1. <input type="checkbox"/> Mtn. Biking	3. <input type="checkbox"/> Touring	5. <input type="checkbox"/> Commuting	7. <input type="checkbox"/> Triathlons
2. <input type="checkbox"/> Road Riding	4. <input type="checkbox"/> Racing	6. <input type="checkbox"/> Recreational	8. <input type="checkbox"/> Other

15. What other types of bikes do you currently own?

1. <input type="checkbox"/> Full-suspension mountain	4. <input type="checkbox"/> Hybrid/City bike	7. <input type="checkbox"/> Tandem
2. <input type="checkbox"/> Front suspension mountain	5. <input type="checkbox"/> Road racing	8. <input type="checkbox"/> I do not own any other bikes.
3. <input type="checkbox"/> Rigid mountain	6. <input type="checkbox"/> Touring	

16. Do you plan to race your new bicycle?  Yes  No

17. Date of **Your** birth: \_\_\_\_\_

Month \_\_\_\_\_ Day \_\_\_\_\_ Year \_\_\_\_\_

18. Education (Please check which category applies):

1. <input type="checkbox"/> High School	3. <input type="checkbox"/> Completed College
2. <input type="checkbox"/> Some College	4. <input type="checkbox"/> Graduate School

19. What protective gear did you purchase with your bike, or already own and use? (See owners manual and consult your retailer)

1. <input type="checkbox"/> Helmet	<input type="checkbox"/> Already own	<input type="checkbox"/> Bought with bicycle
2. <input type="checkbox"/> Gloves	<input type="checkbox"/> Already own	<input type="checkbox"/> Bought with bicycle
3. <input type="checkbox"/> Protective glasses	<input type="checkbox"/> Already own	<input type="checkbox"/> Bought with bicycle

20. Do you plan to ride at dusk, dawn, or at night? If so, have you purchased or do you already own and plan to use a lighting system as is required for night riding in all 50 states? (See owners manual and consult your retailer)

1. <input type="checkbox"/> Yes	<input type="checkbox"/> Already own	<input type="checkbox"/> Bought with bicycle
2. <input type="checkbox"/> No	<input type="checkbox"/> Do not plan to ride at dusk, dawn, or night	

21. Which best describes your family income?

1. <input type="checkbox"/> Under \$15,000	4. <input type="checkbox"/> \$35,000-\$49,999	7. <input type="checkbox"/> \$100,000-\$149,999
2. <input type="checkbox"/> \$15,000-\$24,999	5. <input type="checkbox"/> \$50,000-\$74,999	8. <input type="checkbox"/> Over \$150,000
3. <input type="checkbox"/> \$25,000-\$34,999	6. <input type="checkbox"/> \$75,000-\$99,999	

22. Including children, what are the ages of the other people that live in your house?

Males (in years) [ ] [ ] [ ] [ ] [ ]	Females (in years) [ ] [ ] [ ] [ ] [ ]
--------------------------------------	----------------------------------------

23. In the last six (6) months have you or others in your household:

1. <input type="checkbox"/> Purchased clothes through the mail?	5. <input type="checkbox"/> Purchased a PC or PC software?
2. <input type="checkbox"/> Purchased gifts through the mail?	6. <input type="checkbox"/> Purchased two or more books?
3. <input type="checkbox"/> Worked in your garden?	7. <input type="checkbox"/> Purchased cassettes/CDS?
4. <input type="checkbox"/> Traveled on vacation?	8. <input type="checkbox"/> Donated to charities?

Thank you for filling out this questionnaire. We value your answers and input. Please check here  if you would prefer not to participate in further market research for Cannondale or obtain information on new and interesting opportunities from other exciting companies.

## CANNONDALE Super V Raven Sweepstakes Official Rules

**NO PURCHASE NECESSARY.** To enter, complete and mail in the attached warranty registration card, or register your new Cannondale bike on-line at *cannondale.com*. You'll be automatically entered when we receive your registration. You may also enter by hand-printing your name, address, phone number, and the words "Cannondale Super V Raven Sweepstakes" on a 3" x 5" card and mailing it to: Cannondale Corporation, 16 Trowbridge Drive, Bethel, CT 06801, Attn: Raven Sweepstakes. Limit one entry per person. No mechanically reproduced entries will be accepted. All entries must be received by July 1, 2000 when the Sweepstakes ends.

**PRIZE AND ODDS.** One (1) prize will be awarded: a 2000 Cannondale Super V Raven bicycle (approx. retail value \$3,000.00). Odds of winning depend on number of entries. No substitution of prize. All taxes on prize are responsibility of winner. If winner is a minor, prize will be awarded to parent or legal guardian.

**ELIGIBILITY.** Sweepstakes begins May 1, 1999 and is open to legal residents of the fifty United States and D.C., 18 years of age or older, except employees of Cannondale Corporation, Cannondale Corporation Bethel, Connecticut, its agents, advertising agencies, promotional suppliers and members of the households or immediate families of any of the foregoing. This Sweepstakes is void everywhere outside the United States and wherever prohibited by law. All applicable federal, state and local laws and regulations apply.

**SELECTION OF WINNER.** Winner will be selected at random on or about July 31, 2000 from among all eligible entries received. Winner will be notified by mail.

**GENERAL.** All Sweepstakes materials are subject to validation. Judges decisions are final. By entering, you agree to be bound by these Official Rules and all decisions of the judges. The potential winner may be required to sign and return an affidavit of eligibility, a prize release and a publicity release. Failure to do so when requested may result in disqualification and selection of an alternate winner. Sweepstakes materials are not valid if illegible, incomplete, forged, duplicated, mutilated or otherwise reproduced or tampered with in any way. All entries become property of sponsor, and none will be returned. No responsibility is assumed for lost, late, stolen, misdirected or postage due mail or unavailability or malfunctioning of on-line connections or communications.

**WINNER'S LIST.** For name of winner, send a self-addressed, stamped envelope by August 31, 2000 to Cannondale Corporation, 16 Trowbridge Drive, Bethel, CT 06801, Attn: Raven Sweepstakes.

# THANK YOU FOR PURCHASING A CANNONDALE.

No assembly instructions are in this manual. Your new bicycle should be delivered to you only in a completely assembled and properly adjusted condition, complete with all CPSC required safety equipment.

## YOUR OWNER'S MANUAL

To help you get the most out of your Cannondale, we've included this owner's manual with your purchase. The manual is organized into two sections. The first section is a generic guide to the proper function and use of bicycles. The second section covers information specific to Cannondale bicycles. Both are important.

## OWNER'S MANUAL SUPPLEMENTS

Many Cannondale bicycles (especially models equipped with front and/or rear suspension) require specific instructions in addition to this Owner's Manual. If your new bicycle is equipped with suspension, your dealer must supply you with an Owner's Manual supplement in addition to this Owner's Manual. This supplement has instructions covering proper use, maintenance, and adjustment of your bike's suspension components, and may include important warnings and warranty information.

If your new Cannondale bicycle is equipped with front and/or rear suspension, and you did not receive an Owner's Manual supplement or additional instructions with the Owner's Manual, please call your Cannondale dealer immediately, or call us at one of the numbers listed on the back cover of this manual. Do not ride your new bicycle until you receive and read these additional instructions.

## YOUR LOCAL AUTHORIZED CANNONDALE RETAILER

Along with this manual, your key source of information and assistance is the shop where you purchased your bicycle. Your local Authorized Cannondale Retailer is your primary contact for service and adjustment of your bicycle, instruction in its use, and any warranty questions. To find the Cannondale retailer closest to you, call 1-800-BIKE-USA.

## REPAIR AND MAINTENANCE

Technological breakthroughs have made bicycles and bicycle components more complex than ever before, and the pace of innovation is increasing. This on-going revolution makes it impossible for this manual to provide all the information required to properly repair and/or maintain your bicycle. In order to help minimize the chances of an accident and possible injury, it is critical that you have all repair and maintenance work performed by an Authorized Cannondale Retailer.

Equally important, establish and adhere to a periodic maintenance schedule. Your individual maintenance requirements will be determined by everything from how often and how far you ride to your riding style to geographic location. Consult your Authorized Cannondale Retailer for help in determining your maintenance requirements.

# 1 ABOUT THIS MANUAL



## WHY YOU SHOULD READ THIS MANUAL

This manual was written to help you get the most performance, comfort, enjoyment and safety when riding your new bike.

It's important for you to understand your new bike, its features and its operation, so that, from your first ride, you get maximum enjoyment with maximum safety. By reading this manual *before* you go out on your first ride, you'll know how to get the most from your new bicycle.

It is also important that your first ride on a new bicycle is taken in a controlled environment, away from cars, obstacles and other cyclists.

### GENERAL WARNING:

Bicycling can be a hazardous activity even under the best of circumstances. Proper maintenance of your bicycle is your responsibility as it helps reduce the risk of injury. This Manual contains many "Warnings" and "Cautions" concerning the consequences of failure to maintain or inspect your bicycle. Many of the Warnings and Cautions say "you may lose control and fall". Because any fall can result in serious injury or even death, we do not repeat the warning of possible injury or death whenever the risk of falling is mentioned.



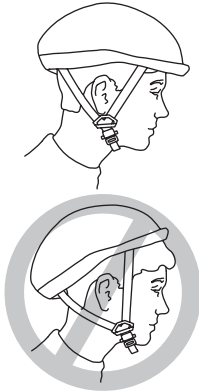
When all else fails . . . it's too late to read the manual

Even if you've been riding a bike all your life, you probably need an updating of your bicycling habits, knowledge and assumptions. Why? Because bicycles are going through some pretty dramatic changes in the technology which affects function, handling, comfort, performance and safety.

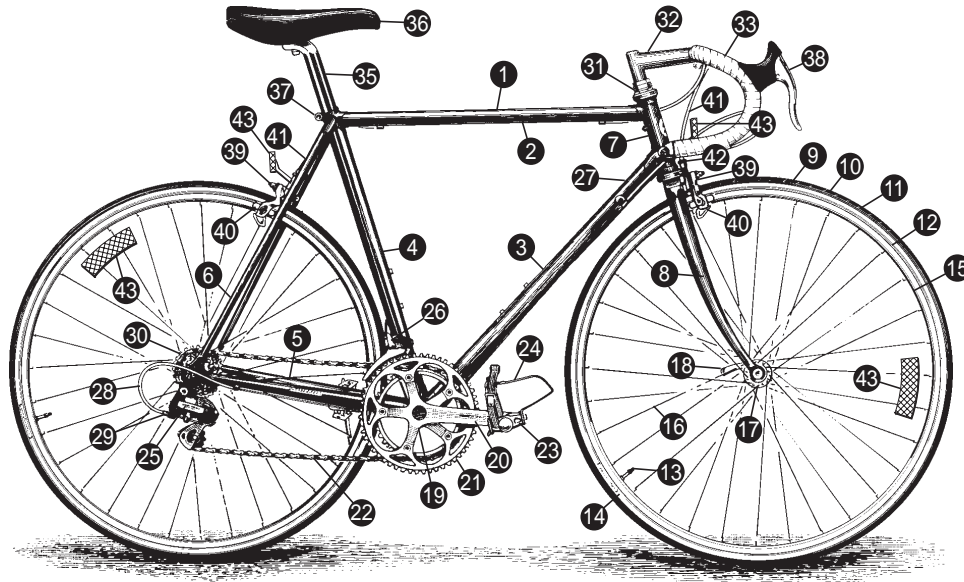
#### A SPECIAL NOTE FOR PARENTS:

It is a tragic fact that most bicycle accidents involve children. As a parent or guardian, you bear the responsibility for the activities and safety of your minor child. Among these responsibilities are to make sure that the bicycle which your child is riding is properly fitted to the child; that it is in good repair and safe operating condition; that you and your child have learned and understand the safe operation of the bicycle; and that you and your child have learned, understand and obey not only the applicable local motor vehicle, bicycle and traffic laws, but also the common sense rules of safe and responsible bicycling. As a parent, you should read this manual before letting your child ride the bicycle. We have tried to make this manual interesting and instructive for both you and your child.

Make sure that your child always wears an approved bicycle helmet when riding (see Section 4 B).



# 2 WHAT IT'S CALLED



- 1 frame
- 2 top tube
- 3 down tube
- 4 seat tube
- 5 chain stay
- 6 seat stay
- 7 head tube
- 8 fork
- 9 wheel
- 10 tire
- 11 tread
- 12 sidewall
- 13 valve stem
- 14 tube
- 15 rim
- 16 spokes
- 17 hub
- 18 quick release
- 19 bottom bracket
- 20 crank
- 21 chainrings

fig. 1a Dropped Bar Bike

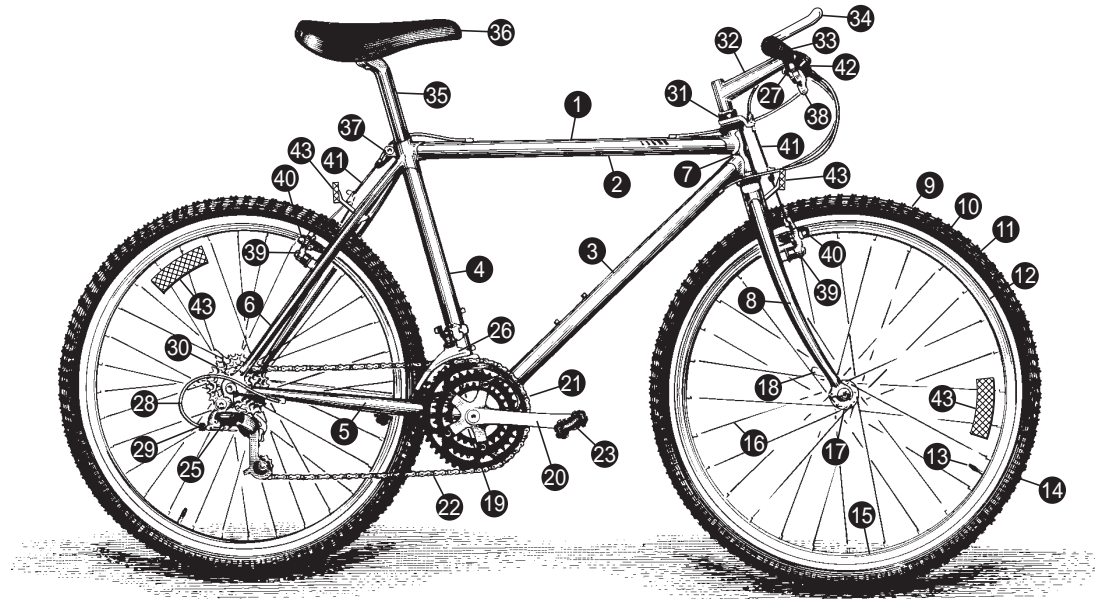


fig. 1b Flat Bar Bike

- 22 chain
- 23 pedal
- 24 toeclip/strap
- 25 rear derailleur
- 26 front derailleur
- 27 shifter
- 28 shifter cable
- 29 adjusting barrel
- 30 freewheel/rear cluster/cassette
- 31 headset
- 32 stem
- 33 handlebar
- 34 bar end extension
- 35 seatpost
- 36 saddle
- 37 seat binder
- 38 brake lever
- 39 brake shoe
- 40 brake shoe
- 41 brake cable
- 42 adjusting barrel
- 43 reflectors

# 3

## WHAT KIND OF A BIKE IS IT?

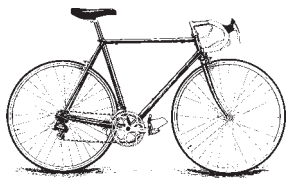


fig. 2 Road Bike

Adult bicycles can be broadly categorized into four types, according to the intended use for which the bike was designed: **Road Bikes, Mountain Bikes, Cross Bikes and City or Cruiser Bikes.** While there is a lot of use overlap in bike design, each type of bike is designed to provide optimum performance, comfort and safety under specific use conditions. Which type is *your* new bike?

**The Road Bike**, sometimes called a *racing bike* because it is derived from the bikes used by bicycle road racers and triathletes, is for fast travel, hard training and competition on paved surfaces. It is the lightest, most aerodynamic and "fastest" type of bike. Because it is generally ridden on relatively smooth paved roads, its frame is made as stiff and light as possible, and its frame geometry is designed to give it quick, very precise response to rider input. Its components, especially wheels, tend to be lighter than those for other categories, again because they are not designed to get banged around as much. Its dropped handlebars, sometimes equipped with aero bar extensions, are designed to give the rider good leverage for climbing and sprinting, and to position the rider in an aerodynamic "tuck" for speed. Its high-pressure, narrow tires reduce rolling resistance to a minimum.

But: The ride tends to be too stiff for comfort on rougher surfaces. The frame and components are too light to take the pounding of off-road excursions. The handlebars position the rider in a way that many find

uncomfortable for more casual riding. The narrow tires are not recommended for use on loose surfaces.

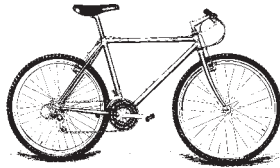


fig. 3 Mountain Bike

**The Mountain Bike** is designed to give the rider maximum control and durability on a wide variety of harsh terrain. Everything about the Mountain Bike is more rugged. Its frame geometry provides maximum ground clearance and allows you to quickly and easily shift your weight to change the balance of the bike as terrain conditions demand. Its wide, high-volume tires absorb shock and provide a bigger, more stable footprint on loose or slippery surfaces. Its wide-range gearing, usually with 18 or more speeds, provides the right choice for almost any condition. Many Mountain Bikes come equipped with suspension systems which help absorb the shocks and vibrations of rough trails.

But: A Mountain Bike is heavier than a road bike. Its wide tires have greater rolling resistance than road bike tires. While more comfortable for many people, the rider's more upright riding position is aerodynamically inefficient. A Mountain Bike is not the best choice for long, fast rides on paved surfaces.

*NOTE: While the rugged appearance of Mountain bikes might suggest that they're indestructible, they are not. They are tough and sturdy; but as with any machine, abuse will soon take a toll on their ability to perform.*

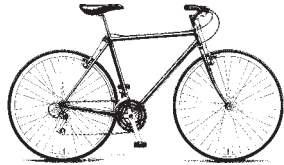


fig. 4 Cross Bike

**The Cross Bike**, also often called a Hybrid, Cross Terrain Bike or Fitness Bike, is like a Swiss Army Knife: it's a versatile tool that does many things well. The Cross Bike is a good choice for the rider who isn't looking for the ultimate in performance either on or off the road, but who wants a bike that will handle paved roads, bike paths, graded fire trails and dirt roads. It's not as fast on pavement as a Road Bike; nor is it designed for hard off-road use on "single track" or rocky, rutted, rugged terrain like a Mountain Bike.

By changing tires, handlebars and shifting and braking controls, your dealer can alter a Cross Bike's performance range to favor either paved road performance or dirt road performance, to suit your intended use.



fig. 4A City Bike

**The City Bike**, also called a **Cruiser**, is designed for comfortable, low-maintenance, casual riding. It is often equipped with three, five, seven or more gears which are housed in the rear wheel hub. Its frame is designed for comfort rather than for high performance, and its fat tires are designed for solid, rather than loose, surfaces. The Cruiser is ideal for around town, for gently rolling or flat rural roads, for a ride around the park, or for a quick trip to the store.

# 4

## FIT AND SAFETY

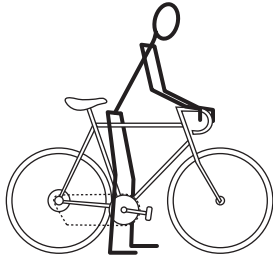


fig. 5 Standover Height

### A. FIT

**Make sure the bike fits.** A bike that's too big or too small for the rider is harder to control and can be uncomfortable.

**WARNING:** If your bicycle does not fit properly, you may lose control and fall. If your new bike doesn't fit, ask your dealer to exchange it before you ride it.

**Frame size:** Your dealer will have recommended the best frame size for you, based on the information provided. If you picked your own bike at the dealership, your dealer took the time to fit you to the correct frame size at the time. If someone else selected the bike for you, as a gift, for example, it's important for you to make sure that it fits before you ride it.

The first check for correct size is **standover height**. Standover height is the basic element of bike fit. It is the distance from the ground to the top of the top tube at that point where your crotch would be if you were straddling the bike by standing half way between the saddle and the handlebar stem. To check for safe standover height, straddle the bike while wearing the kind of shoes in which you'll be riding, and bounce *vigorously* on your heels. If your crotch touches the frame, the bike is too big for you. **Don't even ride the bike around the block.** A bike which

you ride only on paved surfaces and *never, ever* take off-road should give you a minimum standover height clearance of one to two inches. A bike that you'll ride on unpaved surfaces should give you a minimum of three inches of standover height clearance. And a bike that you'll use for real mountain biking on difficult, rough terrain should give you four or more inches of clearance.

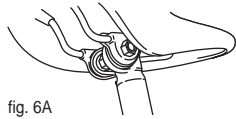


fig. 6A



fig. 6B



fig. 6C

**Saddle position:** Correct saddle adjustment is an important factor in getting the most performance and comfort from your bicycle. Your dealer will have positioned the saddle where experience tells him *most* people find it comfortable. If you find the saddle position is not comfortable, there are adjustments you can make.

Look at Figures 6A, B and C, and determine which one illustrates the type of saddle attachment on your bicycle.

A saddle can be adjusted in three directions:

**1. Up and down adjustment.** Your leg length determines the correct saddle height. The saddle is at the correct height for you when, while seated on the saddle and with the crank arms parallel to the seat tube, you can *just* reach the "down" pedal with one heel. To check for correct saddle height:



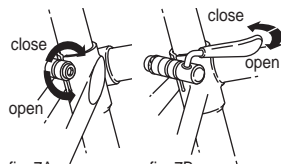


fig. 7A  
Standard Binder

fig. 7B  
QR Binder

- ◆ sit on the saddle;
- ◆ place one heel on a pedal;
- ◆ rotate the crank until the pedal with your heel on it is in the down position and the crank arm is parallel to the seat tube.

If your leg is not completely straight and just touching the center of the pedal, your saddle height needs to be adjusted. If your hips must rock for the heel to reach the pedal, the saddle is too high. If your leg is bent at the knee with your heel on the pedal, the saddle is too low.

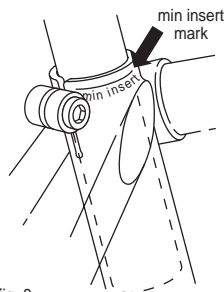


fig. 8

To adjust the saddle height, loosen the seat binder bolt (fig. 7A & B; see also Section 6. B on Seat Post Quick Releases) and move the seat post up or down as required. Then, make sure that the saddle is parallel to the top tube of the bike, and retighten the seat binder bolt tight enough so that you cannot twist the saddle out of alignment. Check the adjustment as described above. **Under no circumstances should the seat post project from the frame beyond its "Minimum Insertion" or "Maximum Extension" mark (fig. 8).**

#### WARNING:

If your seat post projects from the frame beyond the Minimum Insertion or Maximum Extension mark (see fig. 8) the seat post may break, which could cause you to lose control and fall.





**2. Front and back adjustment.** Loosen the saddle clamping mechanism (see fig. 6A, B or C) and slide the saddle back or forward on its rails. Start with the saddle clamped in about the middle, then adjust forward or back until you find the position which is most comfortable for you. Then, retighten the saddle clamping mechanism as tight as you can.

**3. Saddle tilt adjustment.** Most people prefer a horizontal saddle; but some riders prefer to have the saddle nose tilted up just a little, and others prefer it to be tilted down just a little. You can adjust saddle tilt by loosening the saddle clamping mechanism, tilting the saddle to the desired position, and retightening the saddle clamping mechanism tight enough so that you cannot move or jiggle the saddle.

Very small changes in saddle position can have a substantial effect on performance and comfort. Consequently, whenever you make a change to your saddle position, make only one directional change at a time, and make the changes in small increments until you have found the position at which you are most comfortable.

**WARNING:** After any saddle adjustment, be sure to tighten the saddle adjusting mechanism properly before riding. A loose saddle clamp or seat post binder can cause damage to the seat post, or can cause you to lose control and fall. A correctly tightened saddle adjusting mechanism will allow *no saddle movement in any direction*. Periodically check to make sure that the saddle adjusting mechanism is properly tightened.

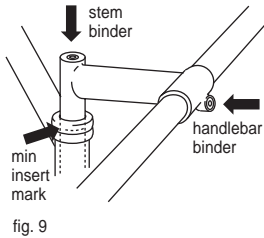
If, in spite of carefully adjusting the saddle height, tilt and fore-and-aft position, your saddle is still uncomfortable, you may need a different saddle design. Saddles, like people, come in many different shapes, sizes and resilience. Your dealer can help you select a saddle which, when correctly adjusted for your body and riding style, *will* be comfortable.



**CAUTION:** It has been alleged that extended riding with a saddle which is incorrectly adjusted or which does not support your pelvic area correctly can cause short-term or long-term injury to nerves and blood vessels. If your saddle causes you pain or numbness, adjust the saddle position and your riding position. If pain or numbness persist, talk to your dealer about fitting a different saddle to your bicycle.

**Handlebar height and angle:** If your bike is equipped with a stem which clamps directly on to the outside of the steerer tube, your dealer may be able to change bar height by moving height adjustment spacers from below the stem to above the stem, or vice versa. Otherwise, you'll have to get a stem of different length or rise. Consult your dealer. **Do not attempt to do this yourself, as it requires special knowledge.**

But on many bikes, you can raise or lower your handlebars a bit by adjusting stem height yourself. Loosen the stem binder bolt by turning it counterclockwise three or four full turns. If the bolt rises but the stem



doesn't, get a piece of wood or a soft mallet and give the bolt a good whack to release the wedge. Adjust the stem position as desired, align stem with tire, and retighten the binder bolt tight enough so that you cannot twist the stem and handlebars out of alignment. **Under no circumstances should the stem be retightened with its "Minimum Insertion" or "Maximum extension" mark visible.**

Now check to make sure that the handlebars rotate freely in both directions without the brake cables catching or binding on anything.

**CAUTION:** On some bicycles, changing the stem or stem height can affect the tension of the front brake cable, locking the front brake or creating sufficient cable slack to make the front brake inoperable. If the front brake shoes move in towards the wheel rim or out away from the wheel rim when you change the stem or stem height, take your bicycle to your dealer for correct brake adjustment before riding it.

**WARNING:** The stem's Minimum Insertion Mark must not be visible above the top of the headset (see fig. 9). If the stem is extended beyond the Minimum Insertion Mark the stem may break or damage the fork's steerer tube, which could cause you to lose control and fall.

You can change the angle of the handlebar or bar end extensions by loosening their binder bolt, rotating the bar or extension to the desired angle, recentering it and retightening the binder bolt tight enough so that the bars or extensions can't move in relation to each other and the stem.



**WARNING:** Failure to properly tighten the stem binder bolt, the handlebar binder bolt or the bar end extension clamping bolts may compromise steering action, which could cause you to lose control and fall. Place the front wheel of the bicycle between your legs and attempt to twist the handlebar/stem assembly. If you can twist the stem in relation to the front wheel, turn the handlebars in relation to the stem, or turn the bar end extensions in relation to the handlebar, tighten the bolts.

**Control position adjustments:** The brake and shifting controls on your bike are positioned where they work best for most people. The angle of the controls and their position on the handlebars can be changed. **Ask your dealer to show you how, or to make the adjustments for you.**

**Brake reach:** Many bikes have brake levers which can be adjusted for **reach**. If you have small hands and find it difficult to squeeze the brake levers, your dealer can either adjust the reach or fit shorter reach brake levers.



**WARNING:** The shorter the brake lever reach, the more critical it is to have correctly adjusted brakes, so that full braking power can be applied within available brake lever travel. Brake lever travel insufficient to apply full braking power can result in loss of control, which may result in serious injury or death.



## B. SAFETY EQUIPMENT

**WARNING:** Many states require specific safety devices. It is your responsibility to familiarize yourself with the laws of the state where you ride and to comply with all applicable laws, including properly equipping yourself and your bike as the law requires.

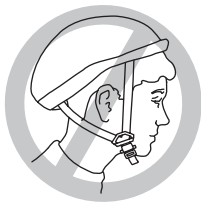
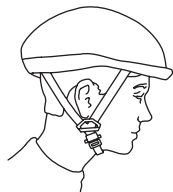


fig. 10 Wearing a Helmet

**Helmet:** While not all States require bicyclists to wear approved protective headgear, common sense dictates that you should wear an ANSI, Snell or other approved helmet whether the law requires it or not. Most serious bicycle injuries involve head injuries which might have been avoided if the rider had worn a helmet. Your dealer has a variety of attractive helmets, and can recommend one to suit your needs. But the "right" helmet is not just a fashion statement. **It must fit correctly, be worn correctly and be properly secured to do its real job. Ask your dealer to help you with the fit and adjustment of your helmet, and refer to the owner's manual provided with the helmet.** (fig. 10)



**WARNING:** Always wear an approved helmet when riding your bike. Always keep the chin strap securely buckled. Failure to wear a bicycle helmet may result in serious injury or death.

**Reflectors:** Reflectors are important safety devices which are designed as an integral part of your bicycle.

Federal regulations require every bicycle to be equipped with front, rear, wheel and pedal reflectors. The size, performance and location of each reflector is specified by the U.S. Consumer Products Safety Commission. The reflectors are designed to pick up and reflect street lights and car lights in a way that helps you to be seen and recognized as a moving bicyclist.



**CAUTION:** Check reflectors and their mounting brackets regularly to make sure that they are clean, straight, unbroken and securely mounted. Have your dealer replace damaged reflectors and straighten or tighten any that are bent or loose.



The mounting brackets of front and rear reflectors are often designed as brake straddle cable safety catches which prevent the straddle cable from catching on the tire tread if the cable jumps out of its yoke or breaks.

**WARNING:** Do not remove the front or rear reflector brackets from your bicycle. They are an integral safety device which protects you from the brake straddle cable catching on the tire in the event of brake cable failure. If a brake straddle cable catches on the tire, it can cause the wheel to stop suddenly, causing you to lose control and fall.



**WARNING:** Do not remove the reflectors from your bicycle. They are an integral part of the bicycle's safety system. Removing the reflectors may reduce your visibility to others using the roadway. Being struck by other vehicles may result in serious injury or death. Remember: reflectors are not a substitute for lights. Always equip your bicycle with all state and locally mandated lights.

**Lights:** If you ride your bike before dawn or after dusk, your bicycle *must* be equipped with lights so that you can see the road and avoid road hazards; and so that others can see you. Vehicle laws treat bicycles like any other vehicle. That means you *must* have a white front and a red rear light operating if you are riding after dusk. Your bike dealer can recommend a battery or generator powered lighting system appropriate to your needs.



**WARNING:** Reflectors are not a substitute for proper lights. It is your responsibility to equip your bicycle with all state and locally mandated lights. Riding at dawn, at dusk, at night or at other times of poor visibility without a bicycle lighting system which meets local and state laws and without reflectors is dangerous and may result in serious injury or death.



**Pedals:** (See also Section 6.E and 6.F.) Some higher performance model bicycles come equipped with pedals that have sharp and potentially dangerous surfaces. These surfaces are designed to add safety by increasing adhesion between the rider's shoe and the bicycle pedal. If your bicycle has this type of high-performance pedal you must take extra care to avoid serious injury from the pedals' sharp surfaces. Based on your riding style or skill level, you may prefer a less aggressive pedal design. Your dealer can show you a number of options and make suitable recommendations.

**Eye protection:** Any kind of riding, but particularly off-road riding, involves airborne dirt, dust and bugs, so it's a good idea always to ride with protective eyewear -- tinted when the sun is bright, clear when it's not. Most bike shops carry protective fashion eyewear, some with interchangeable lens systems.

### C. MECHANICAL SAFETY CHECK

Here is a simple, sixty-second **mechanical safety check** which you should get in the habit of making *every time* you're about to get on a bike.

**Nuts, bolts & straps:** Lift the front wheel off the ground by two or three inches, then let it bounce on the ground. Anything sound, feel or look loose? Do a quick visual and tactile inspection of the whole bike. Any loose parts or accessories? If so, secure them. If you're not sure, ask someone with experience to check.

**Tires & Wheels:** Tires correctly inflated? Check by putting one hand on the saddle, one on the intersection of the handlebars and stem, then bouncing your weight on the bike while looking at tire deflection. Compare what you see with how it looks when you *know* the tires are correctly inflated; and adjust if necessary. See Section 6.G.1 for details and recommended tire pressures.

Tires in good shape? Spin each wheel slowly and look for cuts in the tread and sidewall. Replace damaged tires *before* riding the bike.

Wheels true? Spin each wheel and check for brake clearance and side-to-side wobble. If a wheel wobbles side to side or hits the brake pads, take the bike to a qualified bike shop to have the wheel trued.



**CAUTION:** Wheels must be true for the brakes to work effectively. Wheel truing is a skill which requires special tools and experience. Do not attempt to true a wheel unless you have the knowledge, experience and tools needed to do the job correctly.

**Brakes:** Squeeze the brake levers. Are the brake quick releases closed? The straddle cable securely engaged? Are the brake shoes contacting the wheel rim within an inch of brake lever movement? Can you apply

full braking force at the levers without having them touch the handlebar? If not, your brakes need adjustment. **Do not ride the bike until the brakes are properly adjusted.** See Sections 6.C.1 and 6.C.2 for details.



**WARNING:** Riding with improperly adjusted brakes or worn brake shoes is dangerous and can result in serious injury or death.

**Quick Releases:** Are the front wheel, rear wheel and seat post quick releases properly adjusted and in the locked position? See Section 6.A and 6.B for details.



**WARNING:** Riding with an improperly adjusted wheel quick release can cause the wheel to wobble or disengage from the bicycle, which can cause damage to the bicycle and serious injury or death.

**Handlebar and saddle alignment:** Are the saddle and handlebar stem correctly parallel to the bike's top tube and tight enough so that you can't twist them out of alignment?

**Handlebar ends:** Are the handlebar grips secure and in good condition? If not, replace them. Are the handlebar ends and extensions plugged? If not, plug



them before you ride. On a Mountain bike or Cross bike, are the bar end extensions tight enough so you can't twist them? If not, tighten them.

**WARNING:** Loose or damaged handlebar grips or extensions can cause you to lose control and fall. Unplugged handlebars or extensions can cut your body, and can cause serious injury in an otherwise minor accident.

**OK:** now buckle on your helmet and enjoy your ride.

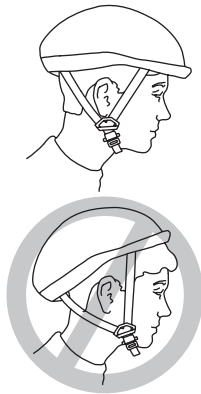


fig. 10 Wearing a Helmet

# 5

## RIDING SAFELY AND RESPONSIBLY

*NOTE: Like any sport, bicycling involves risk of injury and damage. By choosing to ride a bicycle, you assume the responsibility for that risk. Not the people who sold you the bike. Not the people who made it. Not the people who distribute it. Not the people who manage or maintain the roads or trails you ride on. You. So you need to know -- and to practice -- the rules of safe and responsible riding.*

### A. THE BASICS

1. Always do the Mechanical Safety Check (Section 4.C) before you get on a bike.
2. Always wear a cycling helmet which meets the latest Snell or ANSI standard. (see fig. 10)
3. Be careful to keep body parts and other objects away from the sharp teeth of chainrings; the moving chain; the turning pedals and cranks; and the spinning wheels of your bicycle.
4. Always wear shoes that will stay on your feet and will grip the pedals. Never ride barefoot or wearing sandals.
5. Be thoroughly familiar with the controls of your bicycle.
6. Wear bright, visible clothing that is not so loose that it can catch on moving parts of the bicycle or be snagged by objects at the side of the road or trail.

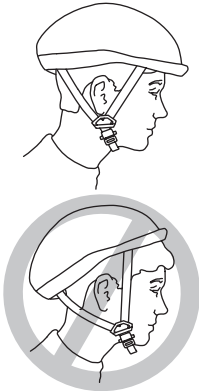


fig. 10 Wearing a Helmet

7. Don't jump with your bike. Jumping a bike, particularly a BMX or mountain bike, can be fun; but it puts incredible stress on everything from your spokes to your pedals. Perhaps most vulnerable to jumping-related damage is your front fork. Riders who insist on jumping their bikes risk serious damage, to their bicycles as well as to themselves.

8. Think about your speed, and keep your speed at a level which is consistent with conditions. Always keep in mind that there is a direct relationship between speed and control, and between speed and component stress.

## B. RULES OF THE ROAD

1. Learn the local bicycle laws and regulations. Many communities have special regulations about licensing of bicycles, riding on sidewalks, laws regulating bike path and trail use, and so on. Many states have helmet laws, child carrier laws and special bicycle traffic laws. In the U.S. and in most foreign countries, a bicyclist is required to obey the same traffic laws as the driver of a car or motorcycle. It's *your* responsibility to know and obey the laws.

2. You are *sharing* the road or the path with others -- motorists, pedestrians and other cyclists. Respect their rights, and be tolerant if they infringe on yours.

3. Ride defensively. *Assume* that the people with whom you are sharing the road are so absorbed with what *they* are doing and where *they* are going that they are oblivious to you.

4. Look ahead of where you're going, and be ready to avoid:

- ◆ Vehicles slowing or turning in front of you, entering the road or your lane ahead of you, or coming up behind you.
- ◆ Parked car doors opening in front of you.
- ◆ Pedestrians stepping out in front of you.
- ◆ Children playing near the road.
- ◆ Pot holes, sewer grating, railroad tracks, expansion joints, road or sidewalk construction, debris and other obstructions that could cause you to swerve into traffic, catch your wheel or otherwise cause you to lose control and have an accident.
- ◆ The many other hazards and distractions which can occur on a bicycle ride.

5. Ride in designated bike lanes, on designated bike paths or on the *right* side of the road, in the *same* direction as car traffic and as close to the edge of the road as possible.

6. Stop at stop signs and traffic lights; slow down and look both ways at street intersections. Remember that a bicycle *always* loses in a collision with a motor vehicle, so be prepared to yield even if you have the right of way.

7. Use hand signals for turning and stopping. Learn the local vehicle code for the correct signals.

8. Never ride with headphones. They mask traffic sounds and emergency vehicle sirens, distract you from concentrating on what's going on around you, and their wires can tangle in the moving parts of the bicycle, causing you to lose control.

9. Never carry a passenger, unless it is a small child wearing an approved helmet and secured in a correctly mounted child carrier or a child-carrying trailer.

10. Never carry anything which obstructs your vision or your complete control of the bicycle, or which could become entangled in the moving parts of the bicycle.

11. Never hitch a ride by holding on to another vehicle.

12. Don't do stunts, wheelies or jumps. They can cause you injury and damage your bike.



13. Don't weave through traffic or make any moves that may surprise people with whom you are sharing the road.

14. Observe and yield the right of way.

15. Never ride your bicycle while under the influence of alcohol or drugs.

16. If possible, avoid riding in bad weather, when visibility is obscured, at dusk or in the dark, or when extremely tired. Each of these conditions increases the risk of accident.

### C. RULES OF THE TRAIL

1. Be prepared. If something goes wrong while you're riding off-road, the closest help may be miles away. See Section 8 for the equipment you should take with you on an off-road ride.

2. Don't ride alone in remote areas. Even when riding with others, make sure that someone knows where you're going and when you expect to be back.

3. Surface hazards make off-road riding much more difficult and therefore more dangerous than riding on paved roads. Start slowly and build up your skills on easier terrain before tackling the more difficult.

4. Learn and obey the local laws regulating where and how you can ride off-road, and respect private property. Don't ride where you are not welcome or where you are not allowed.

5. You are *sharing* the trail with others -- hikers, equestrians, other cyclists. Respect their rights, and be tolerant if they inconvenience you.

6. Yield right of way to pedestrians and animals. Ride in a way that does not frighten or endanger them, and stay far enough away so that their unexpected moves don't endanger you.

7. You may be riding in sensitive habitat, so stay on the designated trail. Don't contribute to erosion by riding in mud or with unnecessary sliding. Don't disturb wildlife or livestock; and don't disturb the ecosystem by cutting your own trail through vegetation or streams.

8. It is your responsibility to minimize your impact on the environment. Ride accordingly. Leave things as you found them; and always take out *everything* you brought in.

#### D. DOWNHILL MOUNTAIN BIKING

To ride downhill at speed or in competition is to voluntarily assume an increased risk of injury or death. When riding downhill, you can reach speeds seen on motorcycles, and therefore face similar hazards and

risks. Wear appropriate safety gear, including an approved full face helmet, full finger gloves, and body armor. Have your bicycle and equipment carefully inspected by a qualified mechanic and be sure it is in perfect condition. Consult with expert riders and race officials on conditions and equipment advisable at the site where you plan to ride. Ultimately, it is your responsibility to have proper equipment and to be familiar with course conditions.



**WARNING:** Downhill mountain biking can lead to serious accidents. Wear appropriate safety gear and be sure your bike is properly maintained. Follow all instructions above. Even with state-of-the-art protective safety gear, you could be seriously injured or killed when doing downhill mountain biking.

If your bike has suspension, the increased speed you may develop also increases your risk. When braking, the front of a suspended bike dips. You could lose control and fall if your skill is not up to handling this system. Get to know how to handle your suspension system safely before trying out downhill or very fast mountain biking.



#### E. WET WEATHER RIDING

WARNING: Wet weather impairs traction, braking and visibility, both for the bicyclist and for other vehicles sharing the road. The risk of an accident is dramatically increased in wet conditions.

Under wet conditions, the stopping power of your brakes (as well as the brakes of other vehicles sharing the road) is dramatically reduced and your tires don't grip nearly as well. This makes it harder to control speed and easier to lose control. To make sure that you can slow down and stop safely in wet conditions, ride more slowly and apply your brakes earlier and more gradually than you would under normal, dry conditions. See also Section 6.C.

#### F. NIGHT RIDING

Riding a bicycle at night is many times more dangerous than riding during the day. Therefore, children should never ride at dawn, at dusk or at night. Adults should not ride at dusk or at night unless it is absolutely necessary.



**WARNING:** Riding at dawn, at dusk, after dark or at times of poor visibility without a bicycle lighting system which meets local and state laws and without reflectors is illegal, dangerous and can result in serious injury or death.

Even if you have excellent night vision, many of the people with whom you're sharing the road don't. A bicyclist is very difficult for motorists and pedestrians to see at dawn, at dusk, at night, or at other times of poor visibility. If you **must** ride under these conditions, check and be sure you comply with all local laws about night riding; follow the Rules of the Road and of the Trail even more carefully, and you must take the following additional precautions:

**Before riding at dawn, at dusk or at night**, take the following steps to make yourself more visible:

- ◆ Make sure that your bicycle is equipped with correctly positioned and securely mounted reflectors (see Section 4 B).
- ◆ Purchase and install an adequate battery or generator powered headlight and tail light.
- ◆ Wear light colored, reflective clothing and accessories, such as a reflective vest, reflective arm and leg bands, reflective stripes on your helmet,

flashing lights ... any reflective device or light source that moves will help you get the attention of approaching motorists, pedestrians and other traffic

- ◆ Make sure your clothing or anything you may be carrying on the bicycle does not obstruct a reflector or light.

When riding at dusk or at night,

- ◆ Ride slowly.
- ◆ Avoid areas of heavy traffic, dark areas, and roads with speed limits over 35 mph.
- ◆ Avoid road hazards.
- ◆ If possible, ride on routes already familiar to you.

# 6 HOW THINGS WORK

It's *important* to your performance, enjoyment and safety to understand how things work on your bicycle. Even if you're an experienced cyclist, don't assume that the way things work on your new bike is the same as how they work on older bikes. Be sure to read -- and to understand -- this section of the Manual. If you have even the slightest doubt as to whether you understand something, talk to your dealer.

## A. WHEEL QUICK RELEASE



**WARNING:** Riding with an improperly adjusted wheel quick release can allow the wheel to wobble or disengage from the bicycle, causing damage to the bicycle, and serious injury or death to the rider. Therefore, it is essential that you:

1. Ask your dealer to help you make sure you know how to install and remove your wheels safely.
2. Understand and apply the correct technique for clamping your wheel in place with a quick release.
3. Each time, before you ride the bike, check that the wheel is securely clamped.

Invented in the 1930s to allow quick, easy wheel removal without the need for tools, the bicycle wheel quick release has become standard equipment on most recreational, sports and competition bicycles. While it looks like a long bolt with a lever on one end and a nut on the other, the wheel quick release uses a cam action to clamp the bike's wheel in place (see fig. 11). Because of its adjustable nature, it is critical that you understand how it works and how to use it properly.



CAUTION: The full force of the cam action is needed to clamp the wheel securely. Holding the nut with one hand and turning the lever like a wing nut with the other hand until everything is as tight as you can get it *will not clamp the wheel safely in the dropouts.*

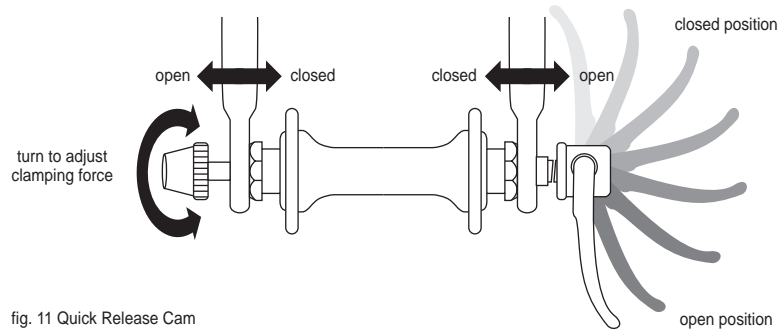


fig. 11 Quick Release Cam



## 1. Adjusting the quick release mechanism (see Fig. 11, opposite)

The wheel hub is clamped in place by the force of the quick release cam pushing against one dropout and pulling the tension adjusting nut, by way of the skewer, against the other dropout. The amount of clamping force is controlled by the tension adjusting nut. Turning the tension adjusting nut clockwise while keeping the cam lever from rotating *increases clamping force*; turning it counterclockwise while keeping the cam lever from rotating *reduces clamping force*. **Less than half a turn of the tension adjusting nut can make the difference between safe clamping force and unsafe clamping force.**

*NOTE: Once the quick release is installed in the hub axle by the manufacturer or the dealer, it never needs to be removed unless the hub itself requires servicing. If the hub requires servicing, consult your dealer.*

## 2. Front Wheel Secondary Retention Devices

Many bicycles have front forks which utilize a secondary wheel retention device to keep the wheel from disengaging if the quick release is incorrectly adjusted. Secondary retention devices are not a substitute for correct quick release adjustment.

Secondary retention devices fall into two basic categories:

- a) The **clip-on** type is an accessory part which the manufacturer adds to the front wheel hub or front fork.
- b) The **integral** type is molded, cast or machined into the outer faces of the front fork dropouts.

Ask your dealer to explain the particular secondary retention device on *your* bike.



**WARNING:** Removing or disabling the secondary retention device is extremely dangerous and may lead to serious injury or death. It also may void the warranty.

### 3. Removing or Installing Quick Release Wheels

#### a. Removing a Quick Release Front Wheel

- (1) Open up the brake shoes (see Section 6.C.1, Figs. 16a, b, c and d).
- (2) Rotate the wheel's quick-release lever from the locked or CLOSED position to the OPEN position (Fig. 11, 12 & 13).

(3) If your front fork *does not* have a secondary retention device go to step 5.

(4) If your front fork has a *clip-on* type secondary retention device, disengage it and go to step (5). If your front fork has an *integral* secondary retention device, loosen the tension adjusting enough to allow removing the wheel; then go to step (5).

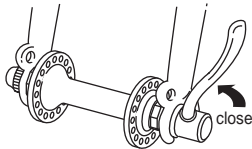


fig. 12 QR Closed Position

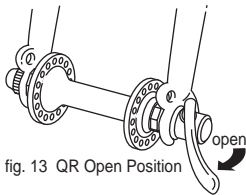


fig. 13 QR Open Position

(5) Raise the front wheel a few inches off the ground and tap the top of the wheel with the palm of your hand to knock the wheel out of the front fork.

## b. Installing a Quick Release Front Wheel

(1) Rotate the quick-release lever so that it curves away from the wheel (fig. 11 & 13). This is the OPEN position.

(2) With the steering fork facing forward, insert the wheel between the fork blades so that the axle seats firmly at the top of the slots which are at the tips of the fork blades -- the fork dropouts. The quick-release lever should be on the *left* side of the bicycle (fig. 12 & 13). If your bike has a clip-on type secondary retention device, engage it.

(3) Holding the quick-release lever in the OPEN position with your right hand, tighten the tension adjusting nut with your left hand until it is finger tight against the fork dropout (fig. 11).

(4) While pushing the wheel firmly to the top of the slots in the fork dropouts, and at the same time centering the wheel rim in the fork, rotate the quick-release lever upwards and push it into the CLOSED position (fig. 11 & 12). The lever should be parallel to the fork blade and curved toward the wheel.



CAUTION: If you can fully close the quick release *without* wrapping your fingers around the fork blade for leverage, and the lever *does not* leave a clear imprint in the palm of your hand, *the tension is insufficient*. Open the lever; turn the tension adjusting nut clockwise a quarter turn; then try again.

(5) If the lever cannot be pushed all the way to a position parallel to the fork blade, return the lever to the OPEN position. Then turn the tension adjusting nut counterclockwise one-quarter turn and try tightening the lever again.

(6) Close the brake shoes; then spin the wheel to make sure that it is centered in the frame and clears the brake shoes.



**WARNING:** Secondary retention devices are not a substitute for correct quick release adjustment. Failure to properly adjust the quick release mechanism can cause the wheel to wobble or disengage, which could cause you to lose control and fall, resulting in serious injury or death.

### **c. Removing a Quick Release Rear Wheel**

- (1) Shift the rear derailleur to high gear (the smallest, outermost rear sprocket).
- (2) Open up the brake shoes (see Section 6.C.1, figs. 16A, B, C and D).
- (3) Pull the derailleur body back with your right hand.
- (4) Rotate the quick-release lever to the OPEN position (fig. 11 & 13).
- (5) Lift the rear wheel off the ground a few inches and, with the derailleur still pulled back, push the wheel forward and down until it comes out of the rear dropouts.

### **d. Installing a Quick Release Rear Wheel**

- (1) Shift the rear derailleur to its outermost position.
- (2) Pull the derailleur body back with your right hand.

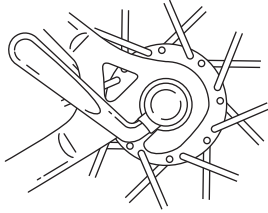


fig. 14 Wheel in Rear Dropouts

(3) Rotate the quick-release lever to the OPEN position (see fig. 11). The lever should be on the side of the wheel opposite the derailleur and freewheel sprockets.

(4) Put the chain on top of the smallest freewheel sprocket. Then, insert the wheel into the frame dropouts and pull it all the way in to the dropouts (fig. 14).

(5) Tighten the adjusting nut until it is finger tight against the frame dropout; then rotate the lever toward the front of the bike until it is parallel to the frame's chainstay or seatstay and is curved toward the wheel (fig. 14).



CAUTION: If you can fully close the quick release *without* wrapping your fingers around the fork blade for leverage, and the lever *does not* leave a clear imprint in the palm of your hand, *the tension is insufficient*. Open the lever; turn the tension adjusting nut clockwise a quarter turn; then try again.

(6) If the lever cannot be pushed all the way to a position parallel to the chainstay or seatstay tube, return the lever to the OPEN position. Then turn the adjusting nut counterclockwise one-quarter turn and try tightening again.

- (7) Push the rear derailleur back into position.
- (8) Close the brake shoes; then spin the wheel to make sure that it is centered in the frame and clears the brake shoes.

#### 4. Removing and Installing Bolt-On Wheels

##### a. Removing a Bolt-On Front Wheel

(1) Open up the brake shoes (see Section 6.C.1, figs. 16A, B, C and D).

(2) With a 15mm box wrench or a six inch adjustable wrench, loosen the two axle nuts.

(3) If your front fork has a *clip-on* type secondary retention device, disengage it and go to step (4). If your front fork has an *integral* secondary retention device, loosen the axle nuts about six full turns; then go to step (4).

(4) Raise the front wheel a few inches off the ground and tap the top of the wheel with the palm of your hand to knock the wheel out of the fork ends.

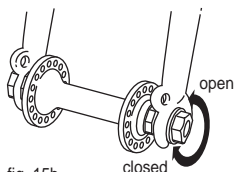


fig. 15b  
Bolt-on Wheel in Front Dropouts

### **b. Installing a Bolt-On Front Wheel**

(1) With the steering fork facing forward, insert the wheel between the fork blades so that the axle seats firmly at the top of the slots which are at the tips of the fork blades. The axle nut washers should be on the outside, between the fork blade and the axle nut. If your bike has a clip-on type secondary retention device, engage it.

(2) While pushing the wheel firmly to the top of the slots in the fork dropouts, and at the same time centering the wheel rim in the fork, use a six-inch adjustable wrench or a 15mm box wrench to tighten the axle nuts as tight as you can.

(3) Close the brake shoes; then spin the wheel to make sure that it is centered in the frame and clears the brake shoes.

### **c. Removing a Bolt-On Rear Wheel**

(1) Open the rear brake shoes (see Section 6.C.1, figs. 16A, B, C and D).

(2) Shift the rear derailleur to high gear (the smallest rear sprocket) and pull the derailleur body back with your right hand.

(3) With a 15mm box wrench or a six-inch adjustable wrench, loosen the two axle nuts.

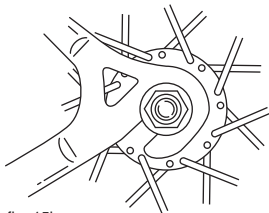


fig. 15b  
Bolt-on Wheel in Rear Dropouts



(4) Lift the rear wheel off the ground a few inches and, with the derailleur still pulled back, push the wheel forward and down until it comes out of the rear dropouts.

#### **d. Installing a Bolt-On Rear Wheel**

(1) Shift the rear derailleur to its outermost position and pull the derailleur body back with your right hand.

(2) Put the chain on to the smallest sprocket. Then, insert the wheel into the frame dropouts and pull it all the way in to the dropouts. The axle nut washers should be on the outside, between the frame and the axle nut.

(3) Tighten the axle nuts as tightly as you can, using a six-inch adjustable wrench or a 15mm box wrench.

(4) Push the rear derailleur back into position.

(5) Close the brake; then spin the wheel to make sure that it is centered in the frame and clears the brake shoes.

## B. SEATPOST QUICK RELEASE

Many mountain bikes are equipped with quick-release seat post binders. The seatpost quick-release binder works exactly like the wheel quick-release (Section 6.A.1) While a quick release looks like a long bolt with a lever on one end and a nut on the other, the quick release uses a cam action to firmly clamp the seat post (see Figs. 7B and 11 ).



**WARNING:** Riding with an improperly tightened seat post can allow the saddle to turn or move and cause you to lose control and fall. Therefore:

1. Ask your dealer to help you make sure you know how to correctly clamp your seat post.
2. Understand and apply the correct technique for clamping your seat post quick release.
3. Before you ride the bike, first check that the seatpost is securely clamped.

### **Adjusting the quick release mechanism**

The action of the quick release cam squeezes the seat collar around the seat post to hold the seat post securely in place. The amount of

clamping force is controlled by the tension adjusting nut. Turning the tension adjusting nut clockwise while keeping the cam lever from rotating *increases clamping force*; turning it counterclockwise while keeping the cam lever from rotating *reduces clamping force*. **Less than half a turn of the tension adjusting nut can make the difference between safe clamping force and unsafe clamping force.**



CAUTION: The full force of the cam action is needed to clamp the seatpost securely. Holding the nut with one hand and turning the lever like a wing nut with the other hand until everything is as tight as you can get it *will not clamp the seatpost safely*.



CAUTION: If you can fully close the quick release *without* wrapping your fingers around a frame tube for leverage, and the lever *does not* leave a clear imprint in the palm of your hand, *the tension is insufficient*. Open the lever; turn the tension adjusting nut clockwise a quarter turn; then try again.

## C. BRAKES

*NOTE: For most effective braking, use both brakes and apply them simultaneously.*



**WARNING:** Sudden or excessive application of the front brake may pitch the rider over the handlebars, causing serious injury or death.

### 1. How brakes work

It's important to your safety that you instinctively know which brake lever controls which brake on your bike. In the U.S., bikes are required to be set up with the *right* brake lever controlling the *rear* brake, and the *left* lever controlling the *front* brake.

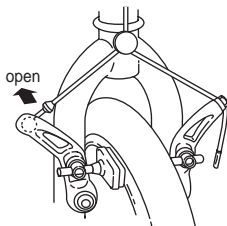


fig. 16A

The braking action of a bicycle is a function of the friction between the brake surfaces -- usually the brake shoes and the wheel rim. To make sure that you have maximum friction available, keep your wheel rims and brake shoes clean and free of lubricants, waxes or polishes.

Make sure that your hands can reach and squeeze the brake levers comfortably. If your hands are too small to operate the levers comfortably,

consult your dealer *before* riding the bike. The lever reach may be adjustable; or you may need a different brake lever design.

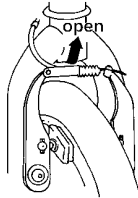


fig. 16B

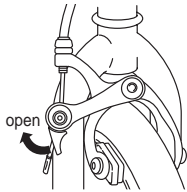


fig. 16C

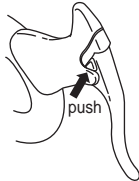


fig. 16D

Most brakes have some form of quick release mechanism to allow the brake shoes to clear the tire when a wheel is removed or reinstalled. When the brake quick release is in the open position, *the brakes are inoperative*. Ask your dealer to make sure that you understand the way the brake quick release works on *your* bike (see Fig. 16A, B, C & D) and check *each time* to make sure both brakes work correctly before you get on the bike.

Brakes are designed to *control your speed*, not just to stop the bike. *Maximum* braking force for each wheel occurs at the point *just before* the wheel "locks up" (stops rotating) and starts to skid. Once the tire skids, you actually *lose most of your stopping force and all directional control*. You need to practice slowing and stopping smoothly without locking up a wheel. The technique is called *progressive brake modulation*. Instead of jerking the brake lever to the position where you think you'll generate appropriate braking force, *squeeze* the lever, progressively increasing the braking force. If you feel the wheel begin to lock up, *release* pressure just a little to keep the wheel rotating just short of lockup. It's important to develop a feel for the amount of brake lever pressure required for each wheel at

different speeds and on different surfaces. To better understand this, experiment a little by walking your bike and applying different amounts of pressure to each brake lever, until the wheel locks.



WARNING: Some bicycle brakes, such as linear-pull (fig 16B) and disc brakes, are extremely powerful. You should take extra care in becoming familiar with these brakes and exercise particular care when using them. Applying these brakes too hard or too suddenly can lock up a wheel, which could cause you to lose control and fall.

When you apply one or both brakes, the bike begins to slow, but your body wants to continue at the speed at which it was going. This causes a transfer of weight to the front wheel (or, under heavy braking, *around the front wheel hub*, which could send you flying over the handlebars). A wheel with more weight on it will accept greater brake pressure before lockup; a wheel with less weight will lock up with less brake pressure. So, as you apply brakes and your weight shifts forward, you need to shift your body toward the rear of the bike, to transfer weight back on to the rear wheel; and at the same time, you need to both *decrease rear* braking and *increase front* braking force. This is even more important on steep descents, because descents shift weight forward.

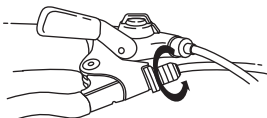


fig. 17A  
Brake Lever Adjusting Barrel

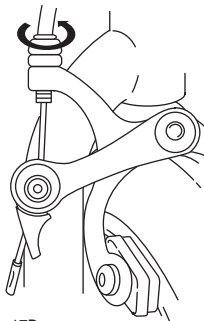


fig. 17B  
Caliper Brake Adjusting Barrel

The keys to effective speed control and safe stopping are controlling wheel lockup and weight transfer. Practice braking and weight transfer techniques where there is no traffic or other hazards and distractions.

Everything changes when you ride on loose surfaces or in wet weather. Tire adhesion is reduced, so the wheels have less cornering and braking traction and can lock up with less brake force. Moisture or dirt on the brake shoes reduces their ability to grip. **The way to maintain control on loose or wet surfaces is to go more slowly to begin with.**

## 2. Adjusting your brakes

**If** either brake lever on your bike fails the Mechanical Safety Check (Section 4.C) you can restore brake lever travel by turning the brake cable adjusting barrel (figs. 17A &B) *counterclockwise*, then lock the adjustment in by turning the barrel's lock nut *clockwise* as far as it will go. If the lever still fails the Mechanical Safety Check, have your dealer check the brakes.

## D. SHIFTING

Your multi-speed bicycle will have a derailleur drivetrain (see 2. below), an internal gear hub drivetrain (see 3. below) or, in some special cases, a combination of the two.

### 1. Why all those gears?

You will get the greatest fitness benefit, produce the greatest sustained power and have the greatest endurance if you learn to spin the pedals at high revolutions per minute (called cadence) against low resistance. You will get the least fitness benefit and have the least endurance by pushing hard on the pedals against heavy resistance. The purpose of having multiple gears on a bicycle is to let you choose the gear that allows you to maintain your optimum cadence under the widest range of riding conditions. Depending on your fitness level and experience (the more fit, the higher the *cadence*), optimum cadence is between 60 and 90 pedal revolutions per minute.



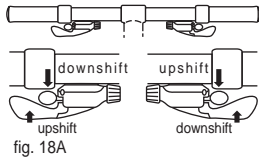


fig. 18A

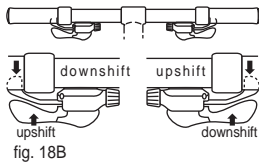


fig. 18B

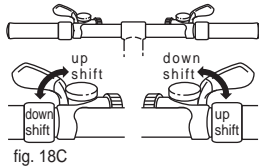


fig. 18C

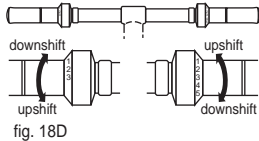


fig. 18D

## 2. Shifting a derailleur drivetrain

If your bicycle has a derailleur drivetrain, the gear-changing mechanism will consist of:

- ◆ a rear sprocket cluster, called a freewheel or freewheel cassette
- ◆ a rear derailleur
- ◆ usually a front derailleur
- ◆ one or two shifters
- ◆ one or two control cables
- ◆ one, two or three front sprockets called chainrings
- ◆ a drive chain

The number of possible gear combinations ("speeds") is the product of multiplying the number of sprockets at the rear of the drivetrain by the number of sprockets at the front ( $6 \times 2 = 12$ ,  $6 \times 3 = 18$ ,  $7 \times 3 = 21$  and so on).

### a. Shifting Gears

There are many different types of shifter mechanisms, each preferred for specific types of application because of its ergonomic, performance and price characteristics. The designers of your bike have selected the

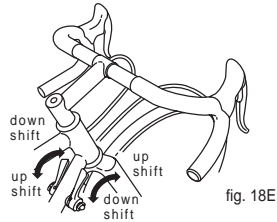


fig. 18E

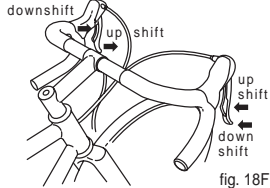


fig. 18F

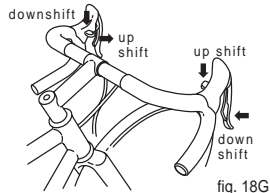


fig. 18G

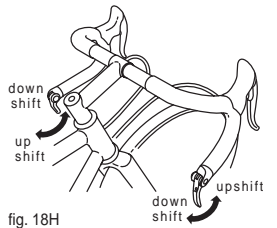


fig. 18H

shifter design which they believe will give the best results on your bike. The different types of shifters and their operation are illustrated in figures 18A through 18H. Identify the shifters on *your* bike before reading on.

The vocabulary of shifting can be pretty confusing. A *downshift* is a shift to a "slower" gear, one which is easier to pedal. An *upshift* is a shift to a "faster", harder to pedal gear. What's confusing is that what's happening at the front derailleur is the opposite of what's happening at the rear derailleur (for details, read the instructions on **Shifting the Rear Derailleur and Shifting the Front Derailleur** below). For example, you can select a gear which will make pedaling easier on a hill (make a *downshift*) in one of two ways: shift the chain *down the gear "steps"* to a smaller gear at the front, or *up the gear "steps"* to a larger gear at the rear. So, at the rear gear cluster, what is *called* a downshift *looks like* an upshift. The way to keep things straight is to remember that shifting the chain *in* towards the centerline of the bike is for accelerating and climbing and is called a *downshift*. Moving the chain out or away from the centerline of the bike is for speed and is called an *upshift*.

Whether upshifting or downshifting, the bicycle derailleur system design requires that the drive chain be moving forward and be under at least some tension. A derailleur will shift *only* if you are pedaling forward.



CAUTION: Never move the shifter while pedaling backward, nor pedal backwards after having moved the shifter. This could jam the chain and cause serious damage to the bicycle.



WARNING: Never shift a misadjusted derailleur onto the largest or the smallest sprocket. The chain could jam, causing you to lose control and fall.

### 1) Shifting the Rear Derailleur

The rear derailleur is controlled by the right shifter.

The function of the rear derailleur is to move the drive chain from one gear to another on the rear gear cluster, thereby changing gear drive ratios. The smaller sprockets on the gear cluster produce higher gear ratios. Pedaling in the higher gears requires greater pedaling effort, but takes you a greater distance with each revolution of the pedal cranks. The larger sprockets produce lower gear ratios. Using them requires less pedaling effort, but takes you a shorter distance with each pedal crank revolution. Moving the chain from a *smaller* sprocket of the gear cluster to a *larger* sprocket results in a *downshift*. Moving the chain from a *larger* sprocket to a *smaller* sprocket results in an *upshift*. In order for the derailleur to disengage the chain from one sprocket and move it on to another, the chain must be moving forward (i.e. the rider must be pedaling forward).

## 2) Shifting the Front Derailleur:

The front derailleur, which is controlled by the left shifter, shifts the chain between the larger and smaller chainrings. Shifting the chain onto a smaller chainring makes pedaling easier (a *downshift*). Shifting to a larger chainring makes pedaling harder (an *upshift*).

### b) Which gear should I be in?

The combination of *largest rear, smallest front gears* (Fig. 19) is for the steepest hills. The *smallest rear, largest front* combination (Fig. 19) is for the greatest speed. It is not necessary to shift gears in sequence. Instead, find the "starting gear" which is right for your level of ability -- a gear which is hard enough for quick acceleration but easy enough to let you start from a stop without wobbling -- and experiment with upshifting and downshifting to get a feel for the different gear combinations. At first, practice shifting where there are no obstacles, hazards or other traffic, until you've built up your confidence. Once you've learned the basics, experience will teach you which gear is appropriate for which condition, and practice will help you shift smoothly and at precisely the optimum moment.

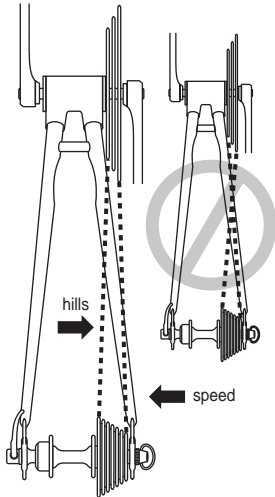


fig. 19 Chain

### 3. Shifting an internal gear hub drivetrain

If your bicycle has an internal gear hub drivetrain, the gear changing mechanism will consist of:

- ◆ a 3, 5, 7 or possibly 12 speed internal gear hub
- ◆ one, or sometimes two shifters
- ◆ one or two control cables
- ◆ one front sprockets called chainrings
- ◆ a drive chain

#### a) Shifting internal gear hub gears

Shifting with an internal gear hub drivetrain is simply a matter of moving the shifter to the indicated position for the desired gear. After you have moved the shifter to the gear position of your choice, ease the pressure on the pedals for an instant to allow the hub to complete the shift.

#### b) Which gear should I be in?

The numerically lowest gear (1) is for the steepest hills. The numerically largest gear (3, 5, 7 or 12, depending on the number of speeds of your hub) is for the greatest speed.

Shifting from an easier, "slower" gear (like 1) to a harder, "faster" gear (like 2 or 3) is called an *upshift*. Shifting from a harder, "faster" gear to an easier, "slower" gear is called a *downshift*. It is not necessary to shift gears in sequence. Instead, find the "starting gear" for the conditions -- a gear which is hard enough for quick acceleration but easy enough to let you start from a stop without wobbling -- and experiment with upshifting and downshifting to get a feel for the different gears. At first, practice shifting where there are no obstacles, hazards or other traffic, until you've built up your confidence. Once you've learned the basics, experience will teach you which gear is appropriate for which condition, and practice will help you shift smoothly and at precisely the optimum moment.

#### E. TOECLIPS & STRAPS

Toeclips and straps are the traditional means which experienced cyclists use to keep their feet correctly positioned and engaged with the pedals. The toeclip positions the ball of the foot over the pedal spindle, which gives maximum pedaling power. The toe strap, when tightened, keeps the foot engaged throughout the rotation cycle of the pedal. While toeclips and straps give some benefit with any kind of shoe, they work most effectively with cycling shoes designed for use with toeclips. Your dealer can explain how toeclips and straps work.



**WARNING:** Getting into and out of pedals with toeclips and straps requires skill which can only be acquired with practice. Until it becomes a reflex action, the technique requires concentration which can distract the rider's attention, causing you to lose control and fall. Practice the use of toeclips and straps where there are no obstacles, hazards or traffic. Keep the straps loose, and don't tighten them until your technique and confidence in getting in and out of the pedals warrants it. Never ride in traffic with your toe straps tight.

#### F. CLIPLESS ("STEP-IN") PEDALS

Clipless pedals (sometimes called "step-in pedals") are the means most racers use to keep their feet securely in the correct position for maximum pedaling efficiency. They work like ski bindings ... a plate on the sole of the shoe clicks into a spring-loaded fixture on the pedal. Clipless pedals require shoes specifically designed for the make and model pedal being used.

Many clipless pedals are designed to allow the rider to adjust the amount of force needed to engage or disengage the foot. Your dealer can show you how to make this adjustment.



**WARNING:** Clipless pedals are intended for use with shoes specifically made to fit them and are designed to firmly keep the foot engaged with the pedal. Practice is required to learn to engage and disengage the foot safely. Until engaging and disengaging the foot becomes a reflex action, the technique requires concentration which can distract the rider's attention, causing the rider to lose control and fall. Practice engaging and disengaging clipless pedals in a place where there are no obstacles, hazards or traffic; and be sure that you follow the setup and service instructions and warnings which came with your pedals.



fig. 20 Tire Markings

## G. TIRES AND TUBES

### 1. Tires

Bicycle tires are available in many designs and specifications, ranging from general-purpose designs to tires designed to perform best under very specific weather or terrain conditions. Your bicycle has been equipped with tires which the bike's manufacturer felt were the best balance of performance and value for the use for which the bike was intended. If, once you've gained experience with your new bike, you feel that a different tire might better suit your riding needs, your dealer can help you select the most appropriate design.



The size, pressure rating, and on some high-performance tires the specific recommended use, are marked on the sidewall of the tire (see Fig. 20). The part of this information which is most important to you is **Tire Pressure**.



**WARNING:** Never inflate a tire beyond the maximum pressure marked on the tire's sidewall. Exceeding the recommended maximum pressure may blow the tire off the rim, which could cause damage to the bike and injury to the rider and bystanders.

The best way to inflate a bicycle tire to the correct pressure is with a bicycle pump. Your dealer can help you select an appropriate pump.



**CAUTION:** Gas station air hoses move a large volume of air very rapidly, and will raise the pressure in your tire very rapidly. To avoid overinflation when using a gas station air hose, put air into your tire in short, spaced bursts.

Tire pressure is given either as *maximum pressure* or as a *pressure range*. How a tire performs under different terrain or weather conditions depends largely on tire pressure.

Inflating the tire to near its maximum recommended pressure gives the lowest rolling resistance; but also produces the harshest ride. High pressures work best on smooth, dry pavement.

Very low pressures, at the bottom of the recommended pressure range, give the best performance on smooth, slick terrain such as hard-packed clay, and on deep, loose surfaces such as deep, dry sand.

Tire pressure that is too low for your weight and the riding conditions can cause a puncture of the tube by allowing the tire to deform sufficiently to pinch the inner tube between the rim and the riding surface.



**CAUTION:** Pencil type automotive tire gauges and gas station air hose pressure settings can be inaccurate and should not be relied upon for consistent, accurate pressure readings. Instead, use a high quality dial gauge.

Ask your dealer to recommend the best tire pressure for the kind of riding you will most often do, and have the dealer inflate your tires to that pressure. Then, check inflation as described in Section 4.C so you'll know how correctly inflated tires should look and feel. Some tires may need to be brought up to pressure every week or two.

Some special high-performance tires have **unidirectional treads**: their tread pattern is designed to work better in one direction than in the other. The sidewall marking of a unidirectional tire will have an arrow showing the correct rotation direction. If your bike has unidirectional tires, be sure that they are mounted to rotate in the correct direction.

## 2. Tire Valves

The tire valve allows air to enter the tire's inner tube under pressure, but doesn't let it back out unless *you* want it to.

There are primarily two kinds of bicycle tube valves (actually, there are other designs, but they are seldom seen in the US any more): The **Schraeder** Valve and the **Presta** Valve. The bicycle pump you use must have the fitting appropriate to the valve stems on your bicycle.

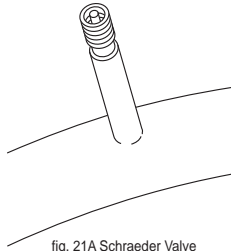
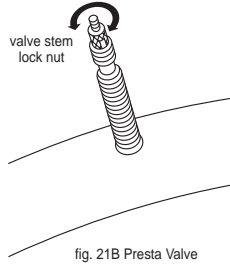


fig. 21A Schraeder Valve

**The Schraeder** (Fig. 21a) is like the valve on a car tire. To inflate a Schraeder valve tube, remove the valve cap and push the air hose or pump fitting onto the end of the valve stem. To let air out of a Schraeder valve, depress the pin in the end of the valve stem with the end of a key or other appropriate object.



**The Presta** valve (Fig. 21b) has a narrower diameter and is only found on bicycle tires. To inflate a Presta valve tube using a Presta headed bicycle pump, remove the valve cap; unscrew (counterclockwise) the valve stem lock nut; and push down on the valve stem to free it up. Then push the pump head on to the valve head, and inflate. To inflate a Presta valve with a gas station air hose, you'll need a Presta adapter (available at your bike shop) which screws on to the valve stem once you've freed up the valve. The adapter fits the end of the air hose fitting. Close the valve after inflation. To let air out of a Presta valve, open up the valve stem lock nut and depress the valve stem.

## H. Bicycle Suspension

Some Mountain Bikes come equipped with suspension systems which are designed to smooth out some of the shocks encountered in off-road riding. There are many different types of suspension systems --- too many to deal with individually in this Manual. If your bicycle has a suspension system of any kind, ask your dealer to provide you with the appropriate adjustment and maintenance instructions.



**WARNING:** Failure to maintain, check and properly adjust the suspension system may result in suspension malfunction, which may cause you to lose control and fall.



**CAUTION:** Changing suspension adjustment can change the handling and braking characteristics of your bicycle. Never change suspension adjustment unless you are thoroughly familiar with the suspension system manufacturer's instructions and recommendations, and always check for changes in the handling and braking characteristics of the bicycle after a suspension adjustment by taking a careful test ride in a hazard-free area.



**CAUTION:** Not all bicycles can be safely retrofitted with some types of suspension systems. Before retrofitting a bicycle with any suspension, check with the bicycle's manufacturer to make sure that what you want to do is compatible with the bicycle's design.



**WARNING:** If your bike has suspension, the increased speed you may develop also increases your risk. When braking, the front of a suspended bike dips. You could lose control and fall if your skill is not up to handling this system. Get to know how to handle your suspension system safely before trying any downhill or very fast mountain biking.

Suspension can increase the handling capabilities and comfort of your bicycle. This enhanced capability may allow you to ride faster; but you must not confuse the enhanced capabilities of the bicycle with your own capabilities as a rider. Increasing your skill will take time and practice. Proceed carefully until you are sure you are competent to handle the full capabilities of your bike.

# 7

## SERVICE AND MAINTENANCE

*NOTE: Technological advances have made bicycles and bicycle components more complex than ever before, and the pace of innovation is increasing. This ongoing evolution makes it impossible for this manual to provide all the information required to properly repair and/or maintain your bicycle. In order to help minimize the chances of an accident and possible injury, it is critical that you have any repair or maintenance which is not specifically described in this manual performed by your dealer.*

Equally important is that your individual maintenance requirements will be determined by everything from your riding style to geographic location. Consult your dealer for help in determining your maintenance requirements.

How much of your bike's service and maintenance you can do yourself depends on your level of skill and experience, and on whether you have the special tools required.



**WARNING:** Many bicycle service and repair tasks require special knowledge and tools. Do not begin any adjustments or service on your bicycle if you have the slightest doubt about your ability to properly complete them. Improper adjustment or service may result in damage to the bicycle or in an accident which can cause serious injury or death.

If you want to learn to do major service and repair work on your bike, you have three options:

1. Ask your dealer whether copies of the manufacturer's installation and service instructions for the components on your bike are available.
2. Ask your dealer to recommend a book on bicycle repair.
3. Ask your dealer about the availability of bicycle repair courses in your area.

Regardless of which option you select, we recommend that you ask your dealer to check the quality of your work the first time you work on something and **before** you ride the bike, just to make sure that you did everything correctly. Since that will require the time of a mechanic, there may be a modest charge for this service.

#### A. SERVICE & MAINTENANCE SCHEDULE

Some service and maintenance can *and should* be performed by the owner, and require no special tools or knowledge beyond what is presented in this manual.



The following are examples of the type of service you should perform yourself. All other service, maintenance and repair should be performed in a properly equipped facility by a qualified bicycle mechanic using the correct tools and procedures specified by the manufacturer.

**1. Break-in Period:** Your bike will last longer and work better if you break it in before riding it hard. Control cables and wheel spokes may stretch or “seat” when a new bike is first used and may require readjustment by your dealer. Your Mechanical Safety Check (Section 4.C) will help you identify some things that need readjustment. But even if everything seems fine to you, it’s best to take your bike back to the dealer for a checkup. Dealers typically suggest you bring the bike in for a 30 day checkup. Another way to judge when it’s time for the first checkup is to bring the bike in after three to five hours of *hard off-road use*, or about 10 to 15 hours of *on-road or more casual off-road use*. But if you think something is wrong with the bike, take it to your dealer before riding it again.

**2. Before every ride:** Mechanical Safety Check (see Section 4.C)

**3. After every long or hard ride; if the bike has been exposed to water or grit; or at least every 100 miles:** Clean the bike and lightly oil the chain, freewheel cogs and rear derailleur pulley bushings. Wipe off excess oil. Lubrication is a function of climate. Talk to your dealer about the best lubricants and the recommended lubrication frequency for your area.

**4. After every long or hard ride or after 10 to 20 hours of riding:**

- ◆ Squeeze the front brake and rock the bike forward and back. Everything feel solid? If you feel a clunk with each forward or backward movement of the bike, you probably have a loose headset. Have your dealer check it.
- ◆ Lift the front wheel off the ground and swing it from side to side. Feel smooth? If you feel any binding or roughness in the steering, you may have a tight headset. Have your dealer check it.
- ◆ Grab one pedal and rock it toward and away from the centerline of the bike; then do the same with the other pedal. Anything feel loose? If so, have your dealer check it.
- ◆ Take a look at the brake shoes. Starting to look worn or not hitting the wheel rim squarely? Time to have the dealer adjust or replace them.
- ◆ Check the control cables and cable housings. Any rust? Kinks? Fraying? If so, have your dealer replace them.

- ◆ Squeeze each adjoining pair of spokes on either side of each wheel between your thumb and index finger. Do they all feel about the same? If any feel loose, have your dealer check the wheel for tension and trueness.
- ◆ Check the frame, particularly in the area around all tube joints, the handlebars, the stem and the seatpost for any deep scratches, cracks or discoloration. These are signs of stress-caused fatigue and indicate that a part is at the end of its useful life and needs to be replaced.
- ◆ Check to make sure that all parts and accessories are still secure, and tighten any which are not.



**WARNING:** Like any mechanical device, a bicycle and its components are subject to wear and stress. Different materials and mechanisms wear or fatigue from stress at different rates and have different life cycles. If a component's life cycle is exceeded, the component can suddenly and catastrophically fail, causing serious injury or death to the rider. Scratches, cracks, fraying and discoloration are signs of stress-caused fatigue and indicate that a part is at the end of its useful life and needs to be replaced.

## 5. As required:

**If either brake lever fails the Mechanical Safety Check** (Section 4.C): restore brake lever travel by turning the brake cable adjusting barrel

*counterclockwise*, then lock the adjustment in by turning the barrel's lock nut *clockwise* as far as it will go. If the lever still fails the Mechanical Safety Check, have your dealer check the brakes.

**If the chain won't shift smoothly and quietly from gear to gear:** the derailleur is out of adjustment. The cause may be as simple as cable stretch, in which case you can compensate by turning the shifter or derailleur cable adjusting barrel *counterclockwise* 1/2 turn. Try shifting again. If 1/2 turn to a full turn of the cable adjusting barrel does not cure the problem, see your dealer.

**6. Every 25 (hard off-road) to 50 (on-road) hours of riding:** Take your bike to your dealer for a complete checkup.

# 8

## GETTING HOME WHEN SOMETHING BREAKS

Unless you're going for a short ride in the neighborhood, or you can walk home or call someone to pick you up if something breaks, you should never go for a bike ride without the following emergency equipment:

- ◆ 4mm, 5mm and 6mm Allen wrenches, used to tighten various clamping bolts that may loosen
- ◆ Patch kit and a spare inner tube
- ◆ Tire levers
- ◆ Tire pump or cartridge inflator with correct head to fit your tire valves (see Section 6.G.2)
- ◆ Some kind of identification (so people know who you are in case of accident)
- ◆ A couple of dollars in cash (for a candy bar, cool drink or emergency phone call)

1. If you get a flat tire: Depress the tire valve to let all the air out of the tube (see Section 6.G.2). Remove the wheel from the bicycle (see Section 6.A.3 or 4). Remove one bead of the tire from the rim by grasping it at a point opposite the valve stem with both hands and, at the same time, lifting and peeling one side of the tire off the rim. If the bead is on too tight for you to unseat it with your hands, use tire levers to lift the bead *carefully* over the tire rim. Remove the valve lock nut (if the valve has one) and push the valve stem through the wheel rim. Remove the inner tube.

Carefully check the outside *and* inside of the tire for the cause of the puncture and remove the cause if it is still there. If the tire is cut, line the inside of the tire in the area of the cut with something handy – tape, a spare patch, a piece of inner tube, a dollar bill – whatever will keep the cut from pinching the inner tube.

Either patch the tube (follow the instructions in your patch kit), or use a new one.



**WARNING:** Patching a tube is an emergency repair. Careless patching or applying several patches can seriously weaken the tube, resulting in possible tube failure, which could cause you to lose control and fall. Replace a patched tube as soon as possible.

Reinstall the tire and tube. Slip one tire bead over the rim. Insert the tube valve through its hole in the rim, but don't secure it with the lock-nut yet. Feed the tube carefully into the cavity of the tire. Inflate the tube just enough to give it some shape. Starting at the valve stem and working around both sides of the rim to the side opposite the valve stem, use your thumbs to push and seat the other bead of the tire inside the rim. Be careful not to pinch the tube between the tire bead and the wheel rim. If you have trouble getting the last few inches of bead over the edge of the rim with thumb pressure, use a tire lever and be careful not to pinch the tube.



**CAUTION:** If you use a screwdriver or any tool other than a tire lever, you are likely to puncture the tube.

Check to make sure the tire is evenly seated around both sides of the rim and that the tube is inside the tire beads. Push the valve stem into the tire to make sure that its base is seated within the tire's beads. Inflate the tube slowly to the recommended pressure (see Section 6.G), all the while checking to make sure that the tire beads stay seated in the rim. Screw down the valve stem locknut finger-tight. Secure the valve locknut (Presta valve). Replace the valve cap. Replace the wheel in the bike (see Section 6.A.3 or 4).



**WARNING:** Riding your bicycle with a flat or underinflated tire can seriously damage the tire, tube, and bicycle, and can cause you to lose control and fall.

## **2. If you break a spoke:**

A wheel with a loose or broken spoke is much weaker than a fully tensioned wheel. If you break a spoke while on a ride, you will have to ride home much more slowly and carefully because the weakened wheel could break additional spokes and become useless.



**WARNING:** A broken spoke seriously weakens the wheel and may cause it to wobble, striking the brakes or the frame. Riding with a broken spoke can cause you to lose control and fall.

Twist the broken spoke around the spoke next to it to keep it from flopping around and getting caught between the wheel and the frame. Spin the wheel to see if the rim clears the brake shoes. If the wheel will not turn because it is rubbing against a brake shoe, try turning the brake cable adjusting barrel(s) clockwise to slacken the cable and open up the brakes (see Section 6.C.2). If the wheel still won't turn, open the brake's quick release (see Figs. 16a through 16d) and secure any loose cable as best you can. Walk the bike, or if you must, ride it with extreme caution, because you now have only one working brake.

### **3. If your bicycle sustains an impact:**



**WARNING:** A crash or other impact can put extraordinary stress on bicycle components, causing them to fatigue prematurely. Components suffering from stress fatigue can fail suddenly and catastrophically, causing loss of control, serious injury or death.





First, check yourself for injuries, and take care of them as best you can. Seek medical help if necessary.

Next, check your bike for damage, and fix what you can.

Then, when you get home, carefully perform the checks described in Section 7.A.4 and check for any other damaged parts. All bent, scored or discolored parts are suspect and should be replaced.

**CAUTION:** If you have any doubt about the condition of the bicycle or any of its parts, take it to your dealer for a thorough check.

## UPGRADING YOUR BIKE AND YOUR EQUIPMENT



The variety of components and accessories available to enhance the comfort, performance and appearance of your bicycle is almost endless. Your dealer can help you select those that will work best for the kind of riding you do.

Even if you are an experienced rider, don't assume you can properly install and operate these components or accessories without first reading any instructions that are enclosed with the product. Be sure to read, and understand, the instructions that accompany the products you purchase for your bicycle. If you have the slightest doubt as to their suitability or about your ability to install them correctly, ask your dealer for help.

**WARNING:** Failure to install and operate any accessory properly can result in serious damage to the bicycle, and serious injury or death to the rider.

### 1. Comfort and Convenience Accessories

Once the bike fit (frame size, saddle position and angle, stem length and rise) is correct, the saddle becomes the single most important comfort accessory.

The comfort of a bicycle saddle depends much more on how the saddle shape relates to the rider's body than on the thickness or material of the padding. Bicycle manufacturers select a saddle shape based on their best guess of what's likely to be comfortable for *most* buyers of that particular bicycle model. But that doesn't mean it's going to be the most comfortable

shape for *you*. That's why your dealer stocks saddles which offer a variety of shapes, padding, covering materials and prices. If the saddle on your new bike is uncomfortable, ask your dealer to suggest an alternative.

If you're planning to spend an hour or more at a time on your bike, get a pair of cycling gloves. Their padded palms help keep your hands from getting numb from the vibration of the handlebars (the numbness, called *carpal tunnel syndrome*, can become quite painful if not taken care of), and they'll provide some abrasion protection for your hands if you fall.

Cycling shorts and cycling jerseys are both performance *and* comfort accessories. There are two kinds of cycling shorts: the traditional skin-tight Lycra shorts and loose-fit cycling shorts. Both are designed to reduce friction and chafing. The washable pad in the crotch of the shorts both cushions and protects against chafing. Wear them without underwear to avoid the undergarment's bunching up and chafing. Also available are undergarments designed to reduce chafing when worn with regular street clothes. The jerseys have pockets in the back, so that the things you carry don't bang around when you ride. Many are made of special materials with properties that improve riding comfort and performance.

It's important to drink plenty of liquids before and during exercise. A *water bottle* is an essential companion on a longer ride.

Some basic **tools** are also useful. The minimum tool kit you will need to make adjustments, perform maintenance and handle emergency repairs should include:

- ◆ a set of Allen wrenches in 2mm, 4mm, 5mm and 6mm sizes
- ◆ a set of tire levers
- ◆ a 6 inch adjustable wrench
- ◆ a No. 1 Phillips screwdriver *and* a 1/4 inch flat blade screwdriver
- ◆ a tire pump
- ◆ a tire patching kit *and* a spare tire tube



## 2. Performance Upgrades

CAUTION: Changing the components on your bike may void the warranty. To avoid voiding your warranty, check with your dealer before changing the components on your bike.

The most popular way to improve the performance of a bicycle is to substitute **higher priced drivetrain** or **brake components**. Before attempting to upgrade your drivetrain or brakes, make sure that the components you plan to install are fully compatible with the rest of the components on your bike. Your dealer can help you determine component compatibility and resolve compatibility conflicts.

Another popular way to improve the performance of a bicycle is to substitute **lighter weight “racing” components**. Lighter wheels, tires, handlebars and so on can enhance the performance of your bike; but you must always keep in mind that light weight racing components are not intended to have the life expectancy of their heavier counterparts, and you must therefore exercise extra care in checking for signs of stress fatigue (See Section 7.4)

**Suspension forks** are also a popular component upgrade. Before installing a suspension fork on a non-suspension bike or installing a fork with different travel or geometry characteristics than the original fork on the bicycle, you must make sure that the frame is designed to take the change in geometry and the changes in stress characteristics which the change in fork can cause. Ask your dealer to check with the bike’s manufacturer—or check with the manufacturer’s technical support staff yourself—before installing a different fork on your bicycle.



**WARNING:** Suspension forks, particularly the “double clamp” and “triple clamp” designs favored by downhill racers, put extraordinary stresses on the head tube and front part of the bicycle frame which the frame’s design may not be able to handle. Such stresses can result in sudden, catastrophic frame failure, which can cause serious injury or death.

**Disc brakes** are becoming a more common mountain bike performance upgrade. Most front suspension forks are designed to accept a disc brake, and can take the added stresses at the brake mounting points. Be sure that the fork you are using is designed to accept disc brake stresses. Most bicycle frames, however, were not designed for the stresses which a rear disc brake can put on the seatstay or chainstay. Before attempting to install a rear disc brake, ask your dealer to check with the bike's manufacturer—or check with the manufacturer's technical support staff yourself—o make sure that the frame can absorb the localized stresses at the disc brake's mounting points.



**WARNING:** Rear disc brakes put extraordinary stresses on the seatstay or chainstay, which the frame's design may not be able to handle. Such stresses can result in sudden, catastrophic frame failure, which can cause serious injury or death.

Your dealer has many other comfort and performance accessories that can increase your cycling enjoyment.

# 10 ABOUT YOUR DEALER

Your dealer is here to help you get the bike and accessories which are most appropriate for the kind of riding that you intend to do; and to help you maintain your equipment so that you can get the maximum enjoyment from it. Your bike shop's staff has the knowledge, tools and experience to give you reliable advice and competent service. Your dealer carries the products of a variety of manufacturers so that you can have the choices which best meet your needs and your budget.

But your dealer's staff can't make decisions for you; nor can they assume responsibility for *your* lack of knowledge, experience, skill or common sense. They can explain to you how something works, or what part or accessory will meet your special needs, but they can't *know* your questions or your needs unless you tell them.

If you have a problem with your bike or your riding, talk to your dealer. Make sure that the dealer understands your problem or question, and make sure that *you* really understand the answers.

# A.

## IMPORTANT SAFETY INFORMATION



## CANNONDALE-SPECIFIC INFORMATION

Like any sport, cycling is not without risk. Be sure to follow the safety guidelines below each time you ride. Failure to follow these instructions could cause an accident and possible serious injury or death.

Read this manual in its entirety, and familiarize yourself with your bicycle and its controls before riding.

### WARNINGS:

Note that bicycles are lightweight human powered vehicles. Unlike a car, much like a motorcycle, there is no restraint system for your body, no protective structure around your body. Crashworthiness is not a design criteria. A rider sits on a bicycle and can be easily thrown off for many reasons including overly hard use of the front brakes (see section 6.C.) or striking an obstacle.

Always do the pre-ride checklist (See back cover).

Wear a helmet at all times when riding a bicycle.

Ride with traffic, never against it.

Keep your speed under control, maintain a steady course, and avoid swerving. Don't stunt ride.





Never ride double or carry packages that obstruct your view or inhibit your control of the bicycle.

Avoid riding at night, or in inclement weather. If you must ride at night, wear reflective clothing and equip your bicycle with front and rear lights. Make sure your bicycle is equipped with reflectors. If you get caught in a shower, remember that braking distances increase in wet weather, while visibility and tire traction decrease. Check your state laws. Lights are required for riding at dusk, night, or dawn.



Every Cannondale bicycle frame and the components attached to the frame have a finite, limited useful life. The length of that life will vary with the construction and materials used in the frame and components, the maintenance and care the frame and components receive over their life and the type and amount of use the frame and components are subject to. Use in competitive events, trick riding, ramp riding, jumping, aggressive riding, riding on severe terrain, riding in severe climates, riding with heavy loads, commercial activities and other types of non-standard use can dramatically shorten the life of the frame and components. Any one or a combination of these conditions may result in an unpredictable failure. **ALL FRAMES AND COMPONENTS SHOULD BE PERIODICALLY CHECKED BY AN AUTHORIZED CANNONDALE RETAILER** for indicators of stress and/or potential failure, including cracks, deformation, corrosion, paint peeling, dents, and any other indicators of potential problems, inappropriate use or abuse. These are important

safety checks and very important to help prevent accidents, bodily injury to the rider and shortened product life. (see section 7.A.4 and A)



Note that generally speaking, lightweight frames and components have shorter lives. For example, all aspects of use being *identical*, a light-weight CAAD4 frame will have a shorter life than a heavier CAAD1 frame. In selecting lightweight frames and components you are making a trade-off, favoring the higher performance that comes with light weight over longevity. So, if you choose lightweight, high performance equipment, be sure to frequently inspect it as described above.

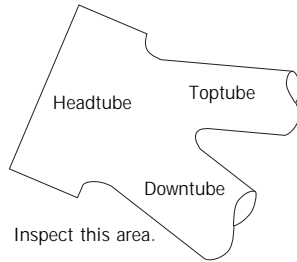


fig. A

Riding a cracked frame could lead to complete bicycle failure. Like other high-performance structures, this frame should be inspected periodically for cracks. Pay particular attention to the underside of the downtube where it intersects the head tube (See fig. A, left). Wipe the tube clean and carefully examine the surface. Inspect mountain bikes with particular care, since they are routinely subjected to demanding conditions. **DO NOT** ride a bike with any crack, even a small one. See your authorized retailer or call 1-800-BIKE-USA. Make inspections for fatigue-related cracks a part of your normal service schedule.

Have all accessories mounted by your Authorized Cannondale Retailer. Poorly or improperly mounted accessories can adversely affect the performance of your bicycle. Be sure that any accessory your or your authorized retailer fits to your bike does not block or interfere with required CPSC reflectors.



Exercise caution with chainrings and pointed, aggressive platform pedals, as they have sharp and potentially dangerous surfaces.

If you have features (such as suspension or brake systems) not covered by this manual, you should have a supplement included with your manual. If you suspect that supplements might be missing, contact your Authorized Cannondale Retailer, or call us at one of the numbers listed on the back cover.



CAUTION: Cannondale urges consumers not to install "Bar Ends" on bicycles. Some handlebars are designed to take the added stress of bar ends, others are not. Very lightweight handlebars may be particularly poorly suited for bar ends. If you want bar ends, consult your Authorized Cannondale Retailer about suitable choices, read and follow instructions and warnings that accompany the handlebars and bar ends, and inspect the handlebars and bar ends regularly.



Be careful when making tight turns. Be aware that many small frame size bicycles with 700c wheels, such as racing, touring and hybrid, may not have clearance between the toe clips and the front tire. Avoid such contact, which could distract you, disrupt your turn or cause a fall. (see section E.)



WARNING: Downhill mountain biking can lead to serious accidents. Wear appropriate safety gear and be sure your bike is in perfect condition. Follow all instructions below. **EVEN WITH STATE-OF-THE-ART PROTECTIVE SAFETY GEAR YOU COULD BE SERIOUSLY INJURED OR KILLED** when doing downhill riding.

## WHEN RIDING WITH CHILDREN



Cannondale urges consumers not to install child carriers on bicycles. Only qualified and experienced mechanics should install frame-mounted accessories on bicycles.

Use caution when riding with a child carrier. Child carriers add weight to the rear, and raise the bicycle's center of gravity, making balance and cornering more difficult.

Cannondale encourages the use of trailers for carrying children.



Be very careful when towing a bicycle trailer. Remember that braking distances increase, and the trailer will track inside the line of the bicycle when making turns.

Children should ALWAYS wear helmets when riding in a child carrier or being towed in a bicycle trailer. Note that the use of bicycle helmets on children is required by law in many areas.



Keep children away from bicycles mounted on stationary trainers, even when the bicycle is not in use. Spinning wheels attract children's attention, and present a serious risk to young fingers. Children have also been known to rotate cranks by hand on bicycles left unattended on stationary trainers, putting themselves at risk of serious injury.

# B. MOUNTAIN BIKE USAGE



If your bike has suspension, the increased speed you may develop also increases your risk. When braking, the front of a suspended bike dips. You could have a bad accident if your skill is not up to handling this system. Get to know how to handle your suspension system well before trying any downhill or very fast biking.

To ride downhill at speed or in competition is to voluntarily assume a very large risk. When riding downhill such as at a ski area, on trails or access roads, or on dirt roads such as fire roads, you can reach speeds seen on motorcycles, with similar hazards and risks. WEAR APPROPRIATE SAFETY GEAR, including an approved full face helmet, full finger gloves, and body armor. Have your bicycle and equipment carefully inspected by a qualified mechanic and be sure it is in perfect condition. Consult with expert riders and race officials on conditions and equipment advisable at the site where you plan to ride downhill.

Likewise, suspension will increase the handling capabilities and comfort of your bicycle. This enhanced capability may allow you to ride faster. But do not confuse the enhanced capabilities of a suspension bike with your own capabilities. Increasing your skill will take time and practice. Proceed carefully until you are sure you are competent to handle the full capabilities of your bike.

While the rugged appearance of mountain bikes might suggest that they're indestructible, they are not. Certainly, they are tough and sturdy. But as with any machine, abuse will soon take a toll on its ability to perform. More specifically, be sure to avoid:

**Jumping.** Jumping a mountain bike is fun, but it puts incredible stress on everything from your spokes to your pedals. Perhaps most vulnerable to jumping-related damage is your front fork. Riders who insist on jumping their bikes risk serious damage, to their bicycles as well as themselves.

**Riding through water.** The so-called "sealed" components (such as headsets, bottom brackets and hubs) are effective at keeping mud and grit out of your bearings. Water, however, is a different story. Any mountain bike that is exposed to large amounts of water will require a complete bearing overhaul to prevent extensive – and expensive – damage.

**Shifting gears under extreme pedaling pressure.** Like jumping, shifting under extreme pedaling pressure puts an incredible amount of stress on components. While most components can withstand an occasional "power shift," continual power shifting will most assuredly damage some part of your drivetrain. Whenever possible, ease up on your pedals when shifting.

**Land access, responsible riding, and the IMBA code.** Don't take land access for granted. Your actions on your next ride will influence which trails will be open for bicycle use in the years to come. Minimizing skidding, avoiding muddy areas, and being courteous to hikers and

equestrians are simple things we can all do on every ride to keep the land open to bicycles. And if you're feeling ambitious, voluntary trail maintenance and packing out others' trash will benefit everyone.

The International Mountain Bicycling Association (IMBA) has established these guidelines for good trail riding:



- Ride on open trails only.
- Leave no trace.
- Control your bicycle.
- Always yield the trail.
- Never spook animals.
- Plan ahead.

# OTHER IMPORTANT NOTES



## PREVENTING CORROSION:

Periodically clean your frame with soap and water. After cleaning and drying it is a good idea to lightly coat the water bottle bosses with a water displacing lubricant such as CODA Dry wax, Tri-Flow or WD40 to minimize corrosion from sweat and salt. This is particularly important on bicycles used in coastal salt air environments and those drenched in sweat on an indoor trainer.

## DO NOT MODIFY YOUR FRAME:

Do not physically alter your frame in any way. Don't sandblast, shotblast or glass bead your frame. Don't use any sandpaper coarser than 150 grit in preparing a frame for refinishing. Don't grind, wire brush or file your frame. Don't weld, braze or let anyone touch your frame with a torch. Don't drill any holes in your frame. Don't acid dip or etch your frame. Don't anodize or chrome plate your frame. Any of these procedures will seriously harm the structural integrity and/or longevity of your frame, which could lead to serious accident and injury. Any of the above procedures will void the warranty on your frame.



## A WORD ON HYBRID BIKES (ALSO KNOWN AS CROSS BIKES):

Some may claim that hybrid bikes are "all-purpose bikes," equally at home on road or trail. This is not true. Hybrids work well on roads or bike paths that are relatively smooth and hard packed, such as cinders, good dirt roads, and "rails-to-trails" paths. Hybrids are not intended or designed for off-road use, such as trails, "single track," with logs, rocks, roots, or loose dirt. Hybrids are not mountain bikes.



## CAR RACKS THAT USE BIKE FORK DROPOUTS FOR MOUNTING

Use care to be sure that both fork dropouts are engaged in the rack before clamping. If only one dropout is engaged and the bike tips over, the leverage can exert great force that may damage the dropout. If your bike tips over, have the dropouts examined by a retailer.





### PROPER USE OF BICYCLE REPAIR STANDS

When using clamp-style bicycle repair stands, be sure to clamp your Cannondale bicycle by the seatpost. **DO NOT CLAMP YOUR BICYCLE BY ANY OF THE FRAME TUBES.** The frame tubes on Cannondale bicycles are crafted from high-performance, thin-walled tubing that can be damaged by clamp-style bicycle repair stands.



### TORQUE FORCE SPECIFICATIONS

Handlebar binder bolt:	150-180lb in or 170-200kgf cm
Stem binder bolt:	175-260lb in or 200-300kgf cm
Stem-to-steerer binder:	100-120lb in or 115-140kgf cm
Seat binder bolt:	150-180lb in or 170-200kgf cm
Saddle clamp bolts:	175-350lb in or 200-400kgf cm
Wheel axle nuts:	130-210lb in or 150-250kgf cm

# D.

## PRE-RIDE CHECKLIST

**Are your seatpost and stem securely fastened?** Twist the handlebars firmly from side to side while holding the front wheel between your knees. The stem must not move in the steering tube. Similarly, the seatpost must be secure in the seat tube.

**Are you visible to motorists?** If you are riding at dusk, dawn or at night, you must make yourself visible to motorists through the use of front and rear lights. Reflectors alone do not provide adequate visibility. Also, give strong consideration to wearing reflective clothing.

**Is it raining or wet?** If so, be more cautious. Your braking distances will increase, and your tires' grip on the road will decrease. Also, remember that motorists' visibility decreases with inclement weather.

**Are your tires properly inflated?** Tires must be inflated to the recommended pressure in order to provide maximum performance.

**Are you wearing a helmet and other appropriate equipment and clothing, such as protective glasses and gloves?** Do not wear loose clothing that could become entangled in the bicycle.

**Are your wheels' quick-release skewers properly fastened?** Be sure to read the section on proper operation of quick-release skewers (see section 6).

**Are your front and rear brakes functioning properly?** With cantilever brakes (on mountain bikes, hybrids, tandems, touring), the straddle cable must be attached. With caliper brakes (road bikes), the quick-release must be closed. The brake pads must contact the rim firmly without the brake levers hitting the handlebar.

If you have any reason to suspect that your bicycle is not functioning properly, **DO NOT RIDE IT**. Instead, have it inspected by your Authorized Cannondale Retailer. To locate your nearest Authorized Cannondale Retailer, call 1-800-BIKE-USA.

## TOE CLIP OVERLAP



**WARNING:** Toe clip overlap could cause you to lose control of your bike. Check your bicycle for toe clip overlap. If you have any questions, check with your retailer before you ride.

If you have toe clip overlap, the toe clip may be able to contact the front tire (or front fender) when the pedal and toe clip are all the way forward and the front wheel is turned to a position where the toe clip can contact the tire.

Toe clip overlap is a situation where the toe clip may be able to contact the front tire (or front fender) when the pedal and toe clip are all the way forward and the front wheel is turned to a position where the toe clip can contact the tire.

Toe clip overlap is common on small frame size bicycles. On all bicycles, have the inside pedal up before beginning a turn. As you turn to the left, the inside (left) pedal should be positioned at twelve o'clock. As you turn to the right, the inside (right) pedal should be positioned at twelve o'clock. Having the inside pedal up will preclude any toe clip-to-tire contact and maximize cornering ground clearance.

If you ride with clipless pedals, clip your riding shoes into the pedals and check for front tire clearance.

# F.

## READING YOUR SERIAL NUMBER

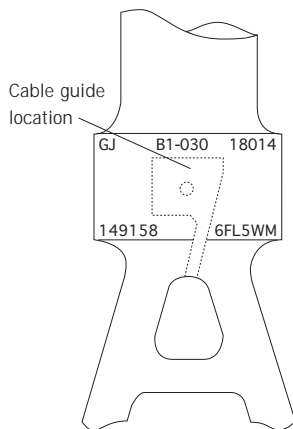


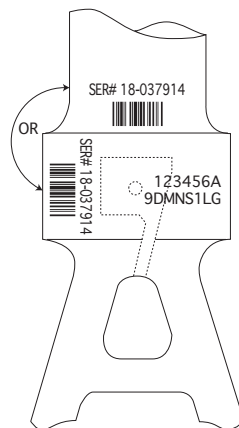
fig. B  
Serial Number Location. When referring to your serial number, use the top number, in this case, GJ-B1-030-18014.

The serial number on your Cannondale bicycle consists of a series of numbers and letters engraved into the underside of the bottom bracket. Contained in the serial number are codes representing the date of manufacture, frame style and size, color, and one sequence of numbers which is unique to your bicycle.

Please take a few minutes to record your bicycle's serial number (fig. B) for your own records, and to fill out *and send in* the warranty registration card located in the front of this book. Late model bikes will have the serial number printed adjacent to a bar code label (fig. C) on the bottom bracket shell. Please record that eight digit number. It is important that we are able to contact you regarding your bicycle.

**However, you should still keep your serial number and original sales receipt on file in a safe place, in case of theft. It's your only proof of purchase to your insurance company and the police, and it makes any claim easier to process.**

fig. C  
Late Model Serial Number Location. When referring to your serial number, use the eight digit number in one of the two locations indicated, in this case, 18-037914.



# G.

## CANNONDALE WARRANTIES & DISTRIBUTORS

The specific warranty covering your Cannondale bicycle is governed by the country in which it was purchased, and applies only to bicycles purchased from Authorized Cannondale Retailers.

### CANNONDALE LIMITED WARRANTY FOR BICYCLES PURCHASED THROUGH AUTHORIZED RETAILERS IN THE U.S.A.

**FRAME:** Cannondale frames (except downhill) are warranted by Cannondale Corporation, 16 Trowbridge Drive, Bethel, CT 06801 against manufacturing defects in materials and/or workmanship for the lifetime of the original owner. Cannondale downhill frames are warranted against manufacturing defects in materials and/or workmanship for a period of one year from the date of original retail purchase.

**COMPONENTS:** All other components, including HeadShok forks, suspension parts, frame fixtures and finishes (paint and decals) are warranted against manufacturing defects in materials and/or workmanship for a period of one year from the date of original retail purchase. Suspension forks (other than those made by Cannondale) are not covered by this warranty, but are separately covered by the stated warranty of their manufacturer.

## TERMS OF WARRANTY:

- This warranty is not meant to suggest or imply that the bicycle cannot be broken or will last forever. It does mean that the bicycle is covered subject to the terms of the warranty.
- This warranty only applies to the original owner of a Cannondale bicycle and is not transferable to subsequent owners.
- For any warranty claim to be considered, the bicycle must be brought in to an Authorized Cannondale Bicycle Retailer in assembled condition and accompanied by the original, dated sales receipt for the bicycle. (Be sure to keep your receipt in a safe place.)
- This warranty only applies to bicycles purchased in fully assembled and adjusted condition from Authorized Cannondale Retailers or other outlets specifically authorized by Cannondale to distribute Cannondale bicycles.
- This warranty is void if the bicycle is subjected to abuse, neglect, improper repair, alterations, modifications, an accident or other abnormal, excessive, or improper conditions.
- Damage resulting from normal wear and tear, including the results of fatigue, is not covered. Fatigue damage is a symptom of the frame being worn out through use. It is one kind of wear and tear. See section A.
- Damage resulting from improper assembly or maintenance, or from installation of parts and accessories not compatible with the Cannondale bicycle is not covered.

- All labor charges for warranty service are the responsibility of the bicycle's owner.
- During the acceptable duration of this warranty, Cannondale will either repair any defective frame, or, at our option, replace any defective frame with the same or most nearly comparable model then available. THIS IS THE EXCLUSIVE REMEDY UNDER THIS WARRANTY. ANY AND ALL OTHER REMEDIES THAT MAY OTHERWISE BE APPLICABLE ARE EXCLUDED, INCLUDING, BUT NOT LIMITED TO, INCIDENTAL OR CONSEQUENTIAL DAMAGES.

THIS IS THE ONLY WARRANTY MADE BY CANNONDALE ON ITS FRAMES AND COMPONENTS. ANY WARRANTIES THAT MAY OTHERWISE BE IMPLIED BY LAW INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED TO THE APPLICABLE DURATION OF THIS LIMITED WARRANTY.

Please refer to the documents included with your bicycle for possible further restrictions.

This Limited Warranty gives the consumer specific legal rights. The consumer may also have other legal rights which vary from state to state. Some states do not allow the exclusion or limitation of incidental or consequential damages or limitations on how long implied warranties last, so the above limitations or exclusions may not apply to you.



## CANNONDALE LIMITED WARRANTY FOR BICYCLES PURCHASED THROUGH AUTHORIZED RETAILERS IN EUROPE

Please see page 97 of this manual for Cannondale's warranty policy. If you have further questions, please contact:

Cannondale Europe B.V., Postbus 5100, Hanzepoort 27  
7570 GC Oldenzaal, Netherlands, 011-31-541-573-580

### AUTHORIZED EUROPEAN DISTRIBUTORS

◆ CROATIA: Spectral D.O.O., Gajdekova 20, 10000-Zagreb, tel: (385) 1 433 309, fax: (385) 1 455 0981 ◆ CZECH REPUBLIC: Vokolek Import, Rezlerova 308, 10900 Prague 10, tel: (42) 2 692 3399 ◆ GREECE: Cannondale Hellas, 304 Thivon Street, Egaleo, Athens, tel: (30) 5392716, (30) 2512779, fax: (30) 2533960 ◆ ESTONIA/LATVIA/LITHUANIA: Hawaii Express Ltd., Regati 1 5KE-102, tel: 372-6398508, fax: 372-6398566 ◆ HUNGARY: Mali Bicycle Technology, JPM k.f.t., Jegenyefasor 1-3, 1184 Budapest, tel/fax: 36 1 420 7563 ◆ MALTA: Seafont Enterprises Ltd., 106 Islets Promenade, Buggiba, tel: 356-573866, fax: 356-573992 ◆ POLAND: S.S.C. Poland, Traugutta Str. 81A, 50418 Wroclaw, tel: (48) 71 725 448, fax: (48) 71 343 1539 ◆ PORTUGAL: Bicigal, Rua S. Gonçalo de Lagos, 6, r/c Esq., 2560 Torres Vedras, tel: (351) 61 311758, fax: 351 61 315637 ◆ SLOVENIA: Sport Trade 2000, Sport Trade 2000, Dunajska 217, 1000 Ljubljana, tel/fax: (386) 611 686 012 ◆ TURKEY: Velespit, Bagdat Cad, Rustiye Sk. No., 81030 Kiziltoprak, Istanbul, tel: (90) 216 337 9660, fax: (90) 216 345 7750

**Note:** Authorized European Distributor list subject to change without notice.

## CANNONDALE LIMITED WARRANTY FOR BICYCLES PURCHASED THROUGH AUTHORIZED INTERNATIONAL RETAILERS/DISTRIBUTORS

Please see page 97 of this manual for Cannondale's warranty policy. If you have further questions, please contact the distributor where you purchased your bicycle:

### AUTHORIZED INTERNATIONAL DISTRIBUTORS

◆ *AUSTRALIA: Cannondale Australia, PO Box 445, Mona Vale, N.S.W. 2103, Australia, 612 9979 5851, cannondaleaustralia@cannondale.com* ◆ *BERMUDA: The New Winners Edge, 34 Church Street, Hamilton HM11, Bermuda, 441 295 6012* ◆ *BOLIVIA: Visal Import & Export, C.Ballivian/Potosi EDIF, Salvatorra 1ER.PISO, CASILLA 561,SANTA CRUZ, 591 334 7145* ◆ *BRAZIL: Anderson Bicicletas, Rua Alonso Calhamares 70, Tatuapé, Sao Paulo, Brasil, 55 11 247 20 99* ◆ *CHILE: Inversiones Lerur Ltda., Avenida las Condes, 12270 #101, Santiago, Chile, South America, 562 215 3470* ◆ *COLOMBIA: Sport and Bike, CRA 46 #16 Sur 36, El Poblado, Medellin, Antioquia, Colombia, 574 262 4211* ◆ *COSTA RICA: Xcesso S.A., PO Box 407-2100 San Jose, Costa Rica, 506 290 3382* ◆ *DOMINICAN REPUBLIC: Ramon H. Vicioso, Av. Bolivar 453, Apartado 97, Santo Domingo, Republica Dominicana, 809 535 2565* ◆ *ECUADOR: B.H. Ecuador CIA Ltda., Caspar De Villaroel 665, Y 6 De Diciembre, 593 2 449729* ◆ *GUAM: Hornet Bicycles, PO Box 8294, Tamuning, Guam 96911, 671 848 9191* ◆ *GUATEMALA: Bike Center, 18 Calle, 7-48, Zona 10, 01010, Guatemala City, Guatemala, 502 366 7708*

◆ SOUTH AFRICA: Cape Cycle Systems Ltd., PO Box 14684, Wetton 7790, Cape Town, tel: 27 21 761 3528, fax: 27 21 761 5914 ◆ TAHITI: Pacific Cycles, Rue Marechal Foch, BP 1535, Pepeeete, Tahiti, tel/fax: 689-450-451 ◆ TAIWAN: Cash Crest, 1st Floor, #2., Lane 66, Huan Nan Road, Ping Chen City, Tao Yuan Hsien, Taiwan, 886 349 15050 ◆ THAILAND: Bikesports, 41 St. Louis 3, Soi Ging PLU, S. Sathorn Road., Sathorn, Bangkok 10120, Thailand, tel: 662-676-2217, fax: 662-676-3846, email: biksport@asiaaccess.net.th ◆ VENEZUELA: Bici Bike, ED. Artelito, 2 DA. Avenida de Los Palos Grandes, Los Palos Grandes, Caracas, 1041, 582 286 0285 ◆ TRINIDAD: Motorcycles Etc., 89 Eastern Main Road, Barataria, Trinidad, W.I., tel: 868-675-2453, fax: 868-675-3816 ◆ VENEZUELA: Bike Sports-Centro Commercial, Planta Baja Local 3A, Calle Garcilazo, Colinas de Bello Monte, Venezuela, 582 751 9730, Bici Bike, Ed. Artelito, Local 5 (WNDCTR), Los Palos Grandes, Caracas, Venezuela 1041, tel: 582-286-0285, fax: 582-283-7466

**Note:** Authorized International Distributor list subject to change without notice.



# YOUR PURCHASE RECORD

It is important to keep a record of your bicycle's serial number, and the date and place of purchase. We've provided space below for you to keep this information. (Be sure to save your sales receipt.)

Serial Number (see page 97 for location):


Late model bikes will have the serial number printed adjacent to a bar code label on the bottom bracket shell. Please write the eight digit number below:

SER #  -

Color: \_\_\_\_\_ Size: \_\_\_\_\_

Date of Purchase: \_\_\_\_\_

Name of Retailer: \_\_\_\_\_

Retailer Address: \_\_\_\_\_

Purchase Price: \_\_\_\_\_

# PRE-RIDE CHECKLIST

**Are you wearing a helmet and other appropriate equipment and clothing, such as protective glasses and gloves?** Do not wear loose clothing that could become entangled in the bicycle.

**Are your wheels' quick-release skewers properly fastened?** Be sure to read the section on proper operation of quick-release skewers (section 6).

**Are your front and rear brakes functioning properly?** With cantilever brakes (on mountain bikes, hybrids, tandems, touring), the straddle cable must be attached. With caliper brakes (road bikes), the quick-release must be closed. The brake pads must contact the rim firmly without the brake levers hitting the handlebar.

**Are your seatpost and stem securely fastened?** Twist the handlebars firmly from side to side while holding the front wheel between your knees. The stem must not move in the steering tube. Similarly, the seatpost must be secure in the seat tube.

**Are you visible to motorists?** If you are riding at dusk, dawn or at night, you must make yourself visible to motorists through the use of front and rear lights. Reflectors alone do not provide adequate visibility. Also, give strong consideration to wearing reflective clothing.

**Is it raining or wet?** If so, be more cautious. Your braking distances will increase, and your tires' grip on the road will decrease. Also, remember that motorists' visibility decreases with inclement weather.

**Are your tires properly inflated?** Tires must be inflated to the recommended pressure in order to provide maximum performance.

**If you have any reason to suspect that your bicycle is not functioning properly, DO NOT RIDE IT. Instead, have it inspected by your Authorized Cannondale Retailer.**

Cannondale Customer Service: <http://www.cannondale.com>

USA: Call 1-800-BIKE USA, Fax: 814-623-6173.

Europe: Call 31-541-573580, Fax: 31-5415-14240.

Japan: Call 0722-99-9399, Fax: 0722-93-6166.

Australia: Call 61-2-9979-5851, Fax: 61-29979-5688.

In other locations, call your Authorized Cannondale Retailer.

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