RADIO™

RACELINE

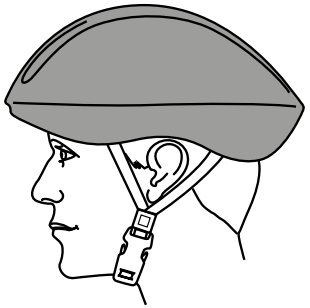
COMPLETE BIKE OWNER'S MANUAL

It is our aim at Radio Bikes to produce high quality BMX bikes that not only serve you well as a daily companion, but become a friend you can rely on. We also take great care during the production of our BMX bikes and through quality control we try to ensure you will get a bike which is every bit as good as you had hoped. This BMX bike is covered by a limited warranty, for full terms of this warranty please visit the warranty section of our website:
radiobikes.com/warranty

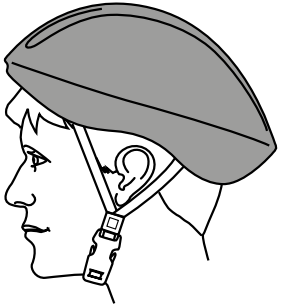
Please also check our website for further component and BMX specific information.

HELMETS SAVE LIVES !!!

ALWAYS WEAR A PROPERLY FITTED HELMET WHEN YOU RIDE YOUR BICYCLE. DO NOT RIDE AT NIGHT. AVOID RIDING IN WET CONDITIONS.



CORRECT FITTING - MAKE SURE YOUR HELMET COVERS YOUR FOREHEAD.



INCORRECT FITTING. FOREHEAD IS EXPOSED AND VULNERABLE TO SERIOUS INJURY.

Please Retain your Sales Receipt as Proof of Purchase.

Notes: _____

All of the original equipment affixed to the bicycle at the time of the original sale were selected as being compatible with your frame and with all other OEM components on the bicycle. Certain after-market products and/or components may not be compatible for use with this bicycle or frame. Consult with your authorized dealer before you attach any non-factory specified product to your bicycle.

Use of any component that is not factory specified could result in damage to the bicycle which would not be covered by the warranty and could further cause you to lose control of the bicycle and fall, all of which could cause serious injury to the rider.

It is recommended that this bike be assembled by an authorized dealer. It may only be sold new by an authorized dealer. If you purchased the bike from any source other than an authorized dealer, the bike may have been obtained under suspect circumstances and may be dangerous for you or your child.

WARNING: Assembly of your bicycle by any party other than an authorized dealer could void your warranty. It is strongly recommended to have all post-sale assembly and service work on your bicycle performed by a properly trained and equipped dealer.

When inspecting your bicycle, be certain to tighten all nuts and bolts properly. Undertightening can result in loosening, parts loss, and component damage. Over-tightened nuts and bolts can break. Certain bicycle parts have metric hardware--always use the correct tools.

Owner's Manual
for BMX Bicycles

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

Unsafe or improper use of the bicycle by failing to read and comply with all safety, performance and maintenance requirements and warnings could result in serious injury or death. It is also impossible to predict every situation and condition which will occur while riding. Radio Bikes has made no representation about the safe use of the bicycle under all conditions.There are risks associated with the use of any bicycle which cannot be predicted or avoided and safe, cautious riding is recommended.

INTRODUCTION

CONGRATULATIONS on the purchase of your new bicycle. This manual is designed to give y information you need for the safe operation and maintenance of your new bicycle. Please read thoroughly before riding your bicycle.

Your bicycle's serial number is stamped on the underside of the bottom bracket shell. Please r the serial number in this manual in the event your bicycle is lost or stolen. You may also want register your serial number with your local police department. Please retain your sales receipt proof of purchase and keep with the information below.

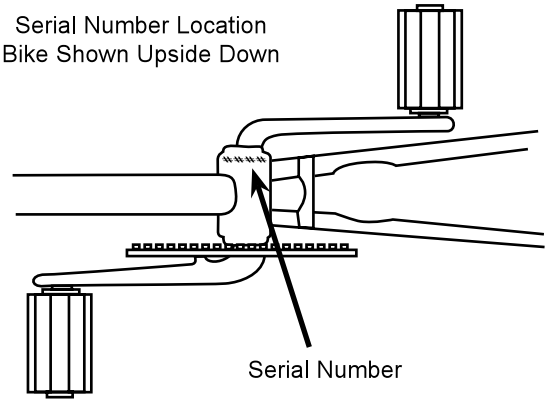
MODEL NAME_____

SERIAL NUMBER_____

COLOR_____

DATE OF PURCHASE_____

PLACE OF PURCHASE_____



ABOUT THIS MANUAL

This manual was written to help you get the most performance, comfort, enjoyment and safety when riding your new bicycle. It is important for you to understand your new bicycle. By reading this manual *before* you go out on your first ride, you'll know how to get better performance, comfort, and enjoyment from your new bicycle. It is also important that your first ride on your new bicycle is taken in a controlled environment, away from cars, obstacles and other cyclists.

GENERAL WARNING

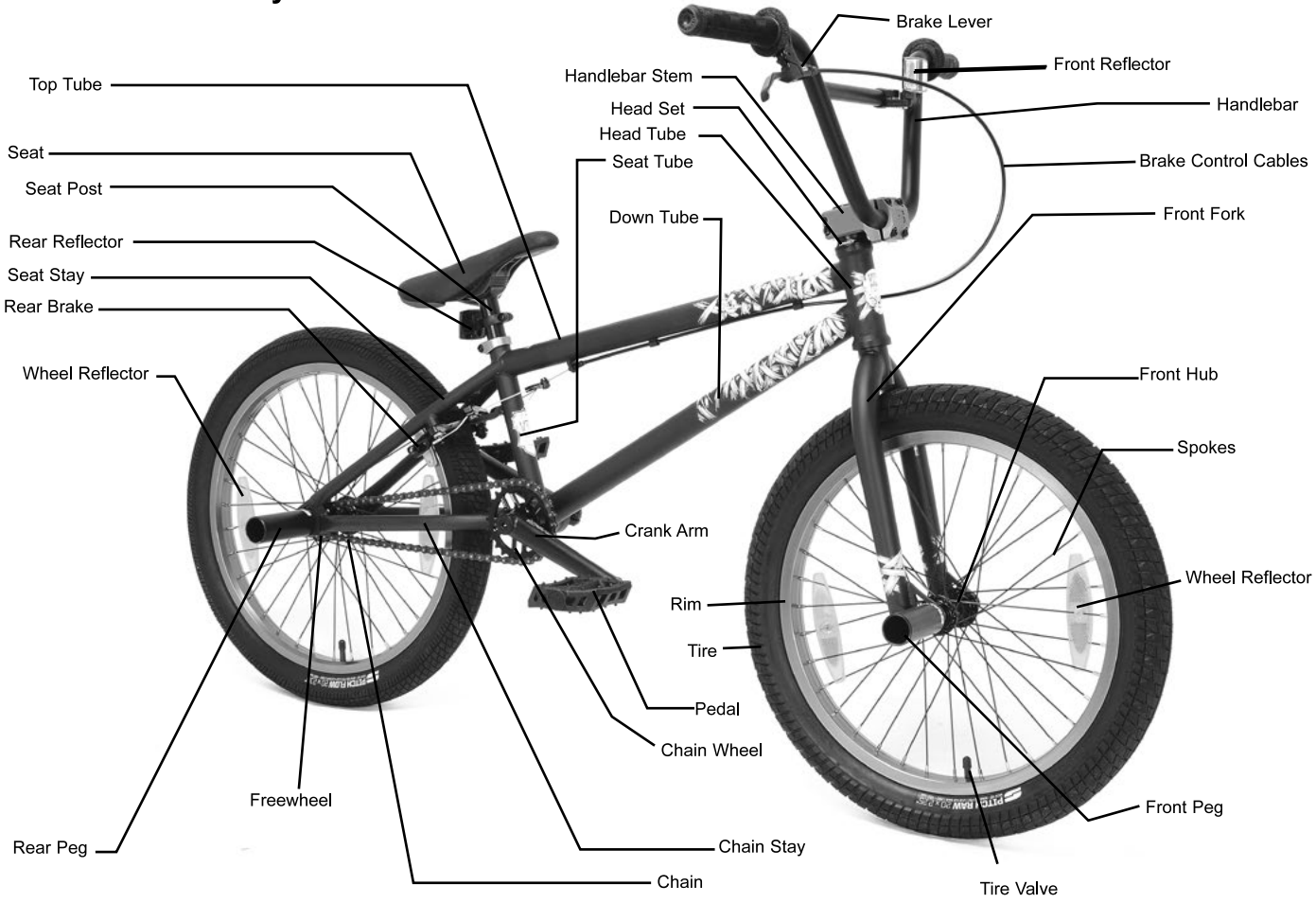
Bicycling can be a hazardous activity even under the best of circumstances. Proper maintenance of your bicycle is your responsibility as it helps reduce the risk of injury. This manual contains many *"Warnings"* and *"Cautions"* concerning the consequences of failure to maintain or inspect your bicycle. 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.

SPECIAL NOTE FOR PARENTS

It is a tragic fact that many bicycle accidents involve children. As a parent or guardian, you bear the responsibility for the activities and safety of your minor child. Among these reponsibilities 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, 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. Please make sure that your child always wears an approved bicycle helmet when riding.

WARNING / IMPORTANT
Take notice of this symbol troughout this manual and pay particular attention to the instructions blocked off and preceded by this symbol

BMX Bicycle


Brake Lever
Front Reflector
Handlebar Stem
Handlebar
Head Set
Head Tube
Brake Control Cables
Seat Tube
Top Tube
Seat
Seat Post
Down Tube
Front Fork
Rear Reflector
Seat Stay
Rear Brake
Front Hub
Wheel Reflector
Spokes
Crank Arm
Rim
Wheel Reflector
Tire
Pedal
Chain Wheel
Freewheel
Front Peg
Rear Peg
Chain Stay
Chain
Tire Valve

The BMX bike got its start around 1970 when a bunch of southern California kids started racing their old banana seat bikes and mimicking their motocross racing heroes. It didn't take long before the demands of this new sport made it clear that a dedicated, BMX specific bike design was needed. While BMX bike designs haven't change that much at first glance, a closer look reveals the high tech improvements that have been driven by the demands of today's riders. Advancements in materials and craftsmanship have spurred a number of innovations that make today's BMX bikes lighter, stronger, and better performing than ever before.

There are two main types of BMX bikes available: racing type BMX bikes and freestyle type BMX bikes. **Racing type BMX bikes** are based on your classic BMX design. Stripped down to the basics, these bikes are built for speed. They generally have a longer wheelbase for greater stability at speed, and more relaxed steering geometry for more predictable handling. Whether you're looking for a new bike to hit the track with or are just looking for a cool bike to cruise the neighborhood on, these bikes are sure to do the job. **Freestyle type BMX bikes** are an adaptation of the standard BMX bike. These bikes will tend to have shorter wheelbases and a steeper steering geometry that better suits the particular demands of freestyle riding. They will often be equipped with axel pegs and some models will be set up for use with a brake rotor that allows the bars to be spun around 360 degrees or more without interfering with the brake cables. In general, freestyle bikes are designed with durability in mind as they are primarily used for skatepark riding and other freestyle endeavors.

NOTE: While the rugged appearance of a BMX bike might suggest that they are indestructible, they most certainly are not. Any bike will suffer damage as a result of misuse or abuse. While BMX bikes are often used for trick riding and jumping, we do not endorse nor encourage the use of any bike in this manner. Please follow all safety guidelines as outlined within this manual

CORRECT FRAME SIZE

When selecting a new bicycle, the correct choice of frame size is a very important safety consideration. Most full sized bicycles come in a range of frame sizes. These sizes usually refer to the distance between the center of the bottom bracket and the top of the frame seat tube.

For BMX bikes, the frame sizing will be primarily based on the length of the frames top tube. However, personal preference and intended use may also play a roll in selecting the appropriate frame size.

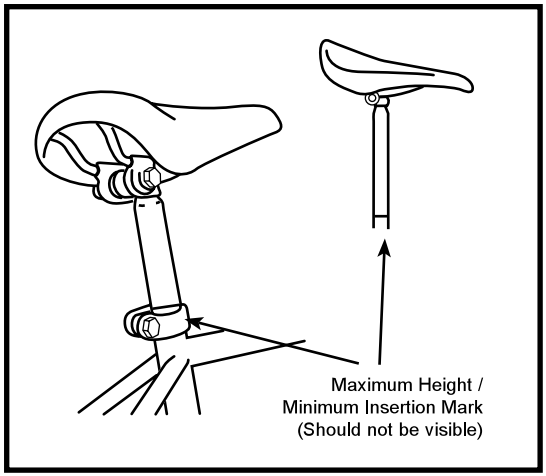
In general, frame sizing on BMX race bikes will utilize a nominal designation such as micro, junior, expert, pro, etc. while freestyle frames will simply reference their numerical top tube measurement. Freestyle frames will not have as wide a range of sizes compared to BMX race frames, so you should consult your authorized dealer for proper sizing considerations.

The following chart will help you determine the correct frame size. However, your dealer will be able to offer detailed expert advice and assistance in determining the best choice for your cycling need.

Please note that these size recommendations are only general guidelines to help you determine the proper fit. It is important that the rider still be able to straddle the bike wile standing flat-footed over the top tube. This should allow for a minimum stand over clearance of 2in. - 4in.

Frame Sizing Guide

Rider Height	Frame Size	Top Tube Length
4'3" and under	Micro-Mini	15" - 16.25"
4'4" - 4'10"	Junior	16.5" - 17.5"
4'8" - 5'4"	Expert	17.5" - 18.5"
5'4" - 5'10"	Pro	18.5" - 19.5"
5'10" - over	Pro XL - XXL	20.5" and over



RIDING POSITION

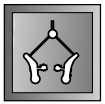
Saddle Height

The correct saddle height for a BMX bike is highly subjective and is dependent on both personal preference and the intended use of the bicycle. In BMX racing, the rider is generally standing up out of the saddle during the entire race, so the saddle is usually set low enough to be more out of the way. This is often the same for freestyle BMX, as these riders tend to prefer a lower saddle height for more maneuverability. In general, it is still important to be sure that the saddle is not positioned in a way that allows the leg to become overextended while pedaling the bike.

Under no circumstances should the seat post project from the frame beyond its "Minimum Insertion" or "Maximum Extension" mark. If your seat post projects from the frame beyond these markings, the seat post or frame may break, which could cause you to lose control and fall. Prior to your first ride, be sure to tighten the saddle adjusting mechanism properly. A loose saddle clamp or seat post binder can cause damage to the bicycle or can cause you to lose control and fall. Periodically check to make sure that the saddle adjusting mechanism is properly tightened.

SAFETY CHECKLIST

Before every ride, it is important to carry out the following safety checks:



1. Brakes

- Ensure front and rear brakes work properly.
- Ensure brake shoe pads are not over worn and are correctly positioned in relation to the rims.
- Ensure brake control cables are lubricated, correctly adjusted and display no obvious wear.
- Ensure brake control levers are lubricated and tightly secured to the handlebar.

2. Wheels and Tires

- Ensure tires are inflated to within the recommended limit as displayed on the tire sidewall.
- Ensure tires have tread and have no bulges or excessive wear.
- Ensure rims run true and have no obvious wobbles or kinks.
- Ensure all wheel spokes are tight and not broken.
- Check to ensure that wheels are proplerly seated in the forks.
- Check that axle nuts are tight. If your bicycle is fitted with quick release axles, make sure locking levers are correctly tensioned and in the closed position.

3. Steering

- Ensure handlebar and stem are correctly adjusted and tightened, and allow proper steering.
- Ensure that the handlebars are set correctly in relation to the forks and the direction of travel.
- Check that the headset locking mechanism is properly adjusted and tightened.
- If the bicycle is fitted with handlebar end extensions, ensure they are properly positioned and tightened.

4. Chain

- Ensure chain is oiled, clean and runs smoothly.
- More frequent service is required in wet or dusty conditions.

5. Bearings

- Ensure all bearings are lubricated, run freely and display no excess movement, grinding or rattling.
- Check headset, wheel bearings, pedal bearings and bottom bracket bearings.

6. Cranks and Pedals

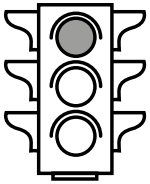
- Ensure pedals are securely tightened to the cranks.
- Ensure cranks are securely tightened to the axle and are not bent.

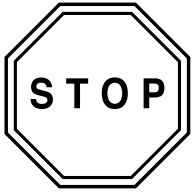
7. Frame and Fork

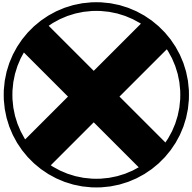
-Clean frame and check for cracks, especially around welds.
- Check that the frame and fork are not bent or broken.
- If either are bent or broken, they should be replaced.

8. Accessories

- Ensure that all reflectors are properly fitted and not obscured.
- Ensure all other fittings on the bike are properly and securely fastened, and functioning.
- Ensure the rider is wearing a helmet.







SAFETY BASICS

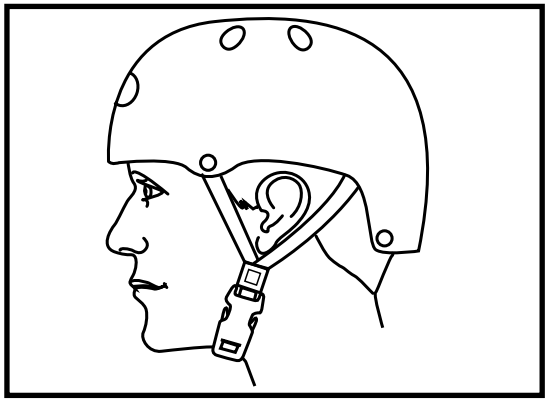
WARNING: The area in which you ride may require specific safety devices. It is your responsibility to familiarize yourself with the laws of the area where you ride and to comply with all applicable laws, including properly equipping yourself and your bike as the law requires.

Observe all local bicycle laws and regulations. Observe regulations about bicycle lighting, licensing of bicycles, riding on sidewalks, laws regulating bike path and trail use, helmet laws, child carrier laws, special bicycle traffic laws. It's your responsibility to know and obey the laws.

1. Always wear a cycling helmet which meets the latest certification standards and is appropriate for the type of riding you do. Always follow the helmet manufacturer's instructions for fit, use and care of your helmet. Most serious bicycle injuries involve head injuries which might have been avoided if the rider had worn an appropriate helmet.

WARNING: Failure to wear a helmet when riding may result in serious injury or death.

2. Always do the Mechanical Safety Check before you get on a bike.
3. Be thoroughly familiar with the controls of your bicycle: brakes (pp. 71-73); pedals (p. 60); shifting (pp. 73-76)
4. 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.
5. Always wear:
• Shoes that will stay on your feet and will grip the pedals. Make sure that shoe laces cannot get into moving parts, and never ride barefoot or in sandals.
• Bright, visible clothing that is not so loose that it can be tangled in the bicycle or snagged by objects at the side of the road or trail.
• Protective eyewear, to protect against airborne dirt, dust and bugs — tinted when the sun is bright, clear when it's not.
6. Unless your bicycle was specifically designed for jumping (See Appendix A, Intended Use) don't jump with your bike. Jumping a bike, particularly a BMX or mountain bike, can be fun; but it can put huge and



unpredictable stress on the bicycle and its components. Riders who insist on jumping their bikes risk serious damage, to their bicycles as well as to themselves. Before you attempt to jump, do stunt riding or race with your bike, read and understand pp. 21-22.
7. Ride at a speed appropriate for conditions. Higher speed means higher risk.

Always wear a properly fitted helmet which covers the forehead when riding a bicycle. 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. 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. These 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. Check reflectors and their mounting brackets regularly to make sure they are clean, straight, unbroken and securely mounted. Have your dealer replace damaged reflectors and straighten or tighten any that are bent or loose.

RIDING SAFETY

1. Obey all Rules of the Road and all local traffic laws.
2. You are sharing the road or the path with others - motorists, pedestriansand other cyclists. Respect their rights.
3. Ride defensively. Always assume that others do not see you.
4. Look ahead, and be ready to avoid:
• Vehicles slowing or turning, entering the road or your lane ahead of you, orcoming up behind you.
• Parked car doors opening.

• Pedestrians stepping out.
• Children or pets 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 cause you to 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 as close to the edge of the road as possible, in the direction of traffic flow or as directed by local governing laws.
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 approved hand signals for turning and stopping.
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; and, before installing a child carrier or trailer, check with your dealer or the bicycle manufacturer to make sure the bicycle is designed for it. If the bicycle is suitable for a child carrier or trailer, make sure that the carrier or trailer is correctly mounted and the child is secured and wearing an approved helmet.
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. If you intend to do stunts, wheelies, jumps or go racing with your bike despite our advice not to, read pp. 21-22, Downhill, Stunt or Competition Biking, now. Think carefully about your skills before deciding to take the large risks that go with this kind of riding.
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 dawn, dusk or in the dark, or when extremely tired. Each of these conditions increases the risk of accident.

OFF ROAD SAFETY

We recommend that children not ride on rough terrain unless they are accompanied by an adult.
1. The variable conditions and hazards of off-road riding require close attentionand specific skills. Start slowly on easier terrain and build up your skills. If your bike has suspension, the increased speed you may develop also increases your risk of losing control and falling. Get to know how to handle your bike safely before trying increased speed or more difficult terrain.
2. Wear safety gear appropriate to the kind of riding you plan to do.
3. 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.
4. Always take along some kind of identification, so that people know who you are in case of an accident; and take along some cash for food, a cool drink or an emergency phone call.
5. Yield right of way to pedestrians and animals. Ride in a way that does not frighten or endanger them, and give them enough room so that their unexpected moves don't endanger you.
6. Be prepared. If something goes wrong while you're riding off-road, help may not be close.
7. Before you attempt to jump, do stunt riding or race with your bike, read and understand pp. 21-22.

Off Road respect
Obey the local laws regulating where and how you can ride off-road, and respect private property. You may be sharing the trail with others - hikers, equestrians, other cyclists. Respect their rights. Stay on the designated trail. Don't contribute to erosion by riding in mud or with unnecessary sliding. Don't disturb the ecosystem by cutting your own trail or shortcut through vegetation or streams. It is your responsibility to minimize your impact on the environment. Leave things as you found them; and always take out everything you brought in.

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 pp. 23-25.

NIGHT RIDING

Riding a bicycle at night is much more dangerous than riding during the day. A bicyclist is very difficult for motorists and pedestrians to see. Therefore, children should never ride at dawn, at dusk or at night. Adults who chose to accept the greatly increased risk of riding at dawn, at dusk or at night need to take extra care both riding and choosing specialized equipment which helps reduce that risk. Consult your dealer about night riding safety equipment.

WARNING: Reflectors are not a substitute for required lights. Riding at dawn, at dusk, at night or at other times of poor visibility without an adequate bicycle lighting system and without reflectors is dangerous and may result in serious injury or death.

Bicycle reflectors are designed to pick up and reflect car lights and street lights in a way that may help 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 reflectors or reflector brackets from your bicycle. They are an integral part of the bicycle's safety system.
Removing the reflectors reduces your visibility to others using the roadway. Being struck by other vehicles may result in serious injury or death.
The reflector brackets may protect you from a 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 loose control and fall.

If you choose to ride under conditions of poor visibility, check and be sure you comply with all local laws about night riding, and take the following strongly recommended additional precautions:
• Purchase and install battery or generator powered head and tail lights which meet all regulatory requirements for where you live and provide adequate visibility.
• Wear light colored, reflective clothing and accessories, such as a reflective vest, reflective arm and leg bands, reflective stripes on your helmet, flashing lights attached to your body and/or your bicycle ... 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.
• Make sure that your bicycle is equipped with correctly positioned and securely mounted reflectors. While riding at dawn, at dusk or at night:
• Ride slowly.
• Avoid dark areas and areas of heavy or fast-moving traffic.
• Avoid road hazards.
• If possible, ride on familiar routes.
If riding in traffic:
• Be predictable. Ride so that drivers can see you and predict your movements.
• Be alert. Ride defensively and expect the unexpected.
• If you plan to ride in traffic often, ask your dealer about traffic safety classes or a good book on bicycle traffic safety.

EXTREME, STUNT OR COMPETITION RIDING

Whether you call it Aggro, Hucking, Freeride, North Shore, Downhill, Jumping, Stunt Riding, Racing or something else: if you engage in this sort of extreme, aggressive riding you will get hurt, and you voluntarily assume a greatly increased risk of injury or death.
Not all bicycles are designed for these types of riding, and those that are may not be suitable for all types of aggressive riding. Check with your dealer or the bicycle's manufacturer about the suitability of your bicycle before engaging in extreme riding. When riding fast down hill, you can reach speeds achieved by motorcycles, and therefore face similar hazards and risks. Have your bicycle and equipment carefully inspected by a qualified mechanic and be sure it is in perfect condition. Consult with expert riders, area site personnel and race officials on conditions and equipment advisable at the site where you plan to ride. Wear appropriate safety gear, including an approved full face helmet, full finger gloves, and body armor. Ultimately, it is your responsibility to have proper equipment and to be familiar with course conditions.

WARNING: Although many catalogs, advertisements and articles about bicycling depict riders engaged in extreme riding, this activity is extremely dangerous, increases your risk of injury or death, and increases the severity of any injury. Remember that the action depicted is being performed by professionals with many years of training and experience. Know your limits and always wear a helmet and other appropriate safety gear. Even with state-of-the-art protective safety gear, you could be seriously injured or killed when jumping, stunt riding, riding downhill at speed or in competition.

WARNING: Bicycles and bicycle parts have limitations with regard to strength and integrity, and this type of riding can exceed those limitations or dramatically reduce the length of their safe use.

We recommend against this type of riding because of the increased risks; but if you choose to take the risk, at least:
• Take lessons from a competent instructor first
• Start with easy learning exercises and slowly develop your skills before trying more difficult or dangerous riding
• Use only designated areas for stunts, jumping, racing or fast downhill riding
• Wear a full face helmet, safety pads and other safety gear
• Understand and recognize that the stresses imposed on your bike by this kind of activity may break or damage parts of the bicycle and void the warranty
• Take your bicycle to your dealer if anything breaks or bends. Do not ride your bicycle when any part is damaged.
If you ride downhill at speed, do stunt riding or ride in competition, know the limits of your skill and experience. Ultimately, avoiding injury is your responsibility.

CHANGING COMPONENTS OR ADDING ACCESSORIES

There are many components and accessories available to enhance the comfort, performance and appearance of your bicycle. However, if you change components or add accessories, you do so at your own risk. The bicycle's manufacturer may not have tested that component or accessory for compatibility, reliability or safety on your bicycle. Before installing any component or accessory, including a different size tire, make sure that it is compatible with your bicycle by checking with your dealer. Be sure to read, understand and follow the instructions that accompany the products you purchase for your bicycle. See also Appendix A, pp. 78-82 and B, pp. 82-89.

WARNING: Failure to confirm compatibility, properly install, operate and maintain any component or accessory can result in serious injury or death.

WARNING: Changing the components on your bike with other than genuine replacement parts may compromise the safety of your bicycle and may void the warranty. Check with your dealer before changing the components on your bike.

Rules for Children

To avoid accidents, teach children good riding skills with an emphasis on safety from an early age. Make sure your child is properly fitted to their bicycle. Your dealer will be able to offer detailed advice and assistance in determining the proper fit for your child.

1. Always wear a properly fitted helmet.
2. Do not play in driveways or the road.
3. Do not ride on busy streets.
4. Do not ride at night.
5. Obey all the traffic laws, especially stop signs and red lights.
6. Be aware of other road vehicles behind and nearby.
7. Before entering a street: Stop, look left, right, and left again for traffic. If there's no traffic, proceed into the roadway.
8. If riding downhill, be extra careful. Slow down using the brakes and maintain control of the steering.
9. Never take your hands off the handlebars, or your feet off the pedals when riding downhill.
10. Your bicycle is intended for use by only one rider. Do not ride double.

The Consumer Protection Safety Commission advises that the riding of small wheel diameter bicycles at excessive speeds can lead to instability and is not recommended.

Children should be made aware of all possible riding hazards and correct riding behavior before they take to the streets.
- Do not leave it up to trial and error.

BICYCLE CARE

Basic Maintenance

The following procedures will help you maintain your bicycle for years of enjoyable riding.

For regular, periodic cleaning of your frame, wipe with a damp cloth soaked in a mild detergent mixture. Dry with a cloth and polish with car or furniture wax. Your dealer will also have a number of cleaning products available that are specifically intended for use on your bicycle. If your bike is extremely dirty or is caked with mud, you may want to carefully hose the bike off before washing. It is very important however to not use any kind of pressure sprayer on your bicycle and to keep the water directed away from all bearing assemblies. Failure to do so can result in the bearing assembly becoming contaminated causing premature wear and diminished performance.

Always store your bicycle under shelter. Avoid leaving it in the rain or exposed to corrosive materials.
Riding on the beach or in coastal areas exposes your bicycle to salt which is very corrosive. If your ride your bike in these areas, wash your bicycle frequently and wipe or spray all unpainted parts with an anti-rust treatment, making sure to avoid contact with any braking surfaces.

If the hub and bottom bracket bearings of your bicycle have been submerged in water, you should have them serviced by your local dealer. This will prevent accelerated bearing deterioration and maintain overall performance.

If paint has become scratched or chipped to the metal, use touch up paint to prevent rust and corrosion. A good choice would be enamel based model or hobby paint. These paints are widely available and are produced in a wide array of colors. Clear nail polish can also be used as a preventative measure.

Regular cleaning and lubrication will extend the useful life of your bicycle and maintain a high level of performance. While many of these processes can be easily done on your own, we do recommend bringing the bike in to your local authorized dealer for regular service and general inspection.

Correct routine maintenance of your new bike will ensure:

Smooth running - Longer lasting components - Safer riding - Lower running costs

Every time you ride your bicycle, its condition changes. The more you ride, the more frequently maintenance will be required. We recommend you spend a little time on regular maintenance tasks. The following schedules are a useful guide and by referring to Part 4 of this manual, you should be able to accomplish most tasks. As always, please see your dealer for further assistance or if you have any questions.

Schedule 1 - Lubrication

Frequency	Component	Lubricant
Monthly	chain	chain lube
	brake pivots	chain lube
	brake levers	chain lube
	brake rotor	chain lube
Every Six Months	brake cables	chain lube
	freewheel	chain lube
Yearly	seatpost (in frame)	synthetic grease
	pedal threads & bearings	synthetic grease
	bottom bracket threads	synthetic grease
	bottom bracket bearings (non-cartridge)	synthetic grease
	wheel bearings (non-cartridge)	synthetic grease
	headset bearings (non-cartridge)	synthetic grease

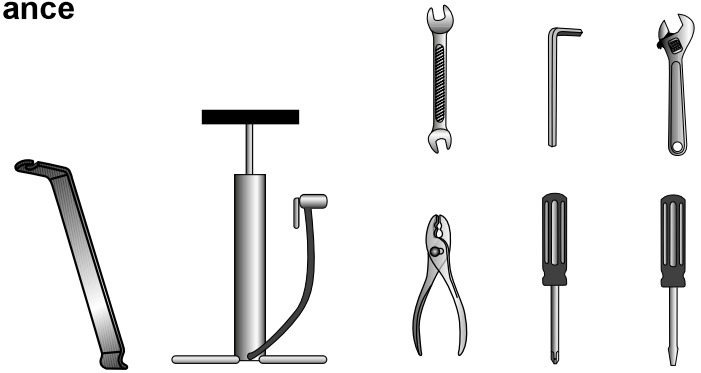
Note: The frequency of maintenance should increase with use in wet or dusty conditions. Do not over lubricate - remove excess lubricant to prevent dirt build up. Never use a degreaser to lubricate your chain.

Schedule 2 - Service Checklist

		Page Reference
Before every ride	Check tire pressure	25
	Check brake operation	35-41
	Check wheels for loose spokes and any wobble	24
	Check wheel bolts	24
	Inspect tires for wear and damage	25
	Check frame and fork for cracks	14
Weekly	Lubrication as per schedule 1	20
	Quick wipe down with a damp cloth	19
	Check handlebar and stem adjustment	28-30
	Check seat and seatpost adjustment	33-34
	Inspect chain and freewheel for wear	14
	Check headset adjustment	31-32
	Check brake adjustment	35-41
	Check brake pads for wear	35-41
	Check that all nuts and bolts are tight	
	Lubrication as per schedule 1	20
Monthly	Check all points as per monthly service	21
	Inspect brake pads for wear and replace as needed	35-41
	Inspect chainrings for wear	49
	Lubrication as per schedule 1	20
Yearly	Schedule service at Authorized Dealer	

Recommended Tools for Basic Maintenance

1. Allen wrenches in 2, 4, 5, 6 and 8mm sizes
2. Open-end wrenches in 9, 10, 15 and 19mm sizes
3. No. 1 Phillips head screwdriver
4. Tire pump with gauge
5. Tube repair kit
6. Tire levers

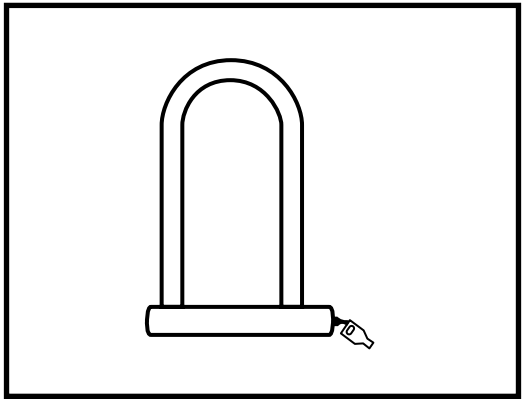


Travel Tools for the Ride:

1. Spare Tube
2. Patch kit
3. Pump
4. Tire levers
5. Multi-tool
6. Change (phone call) or cell phone

Storage

Keep your bicycle in a dry location away from the weather and the sun. Ultraviolet rays may cause paint to fade or rubber and plastic parts to crack. Before storing your bicycle for a long period of time, clean and lubricate all components and wax the frame. Deflate the tires to half pressure and hang the bicycle off the ground. Don't store near electric motors as ozone emission may effect the rubber and paint. Don't cover with plastic as "sweating" will result which may cause rusting. Please notice that your bicycle warranty does not cover paint damage, rust, corrosion, dry rot or theft.



Security

It is advisable that the following steps be taken to prepare for and help prevent possible theft.

1. Maintain a record of the bicycle's serial number, generally located on the frame underneath the bottom bracket.
2. Register the bicycle with the local police.
3. Invest in ahigh quality bicycle lock that will resist hack saws and bolt cutters. Always lock your bicycle to an immovable object if it is left unattended.

If your bicycle sustains an impact

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. After any crash, take your bike to your dealer for a thorough check. Carbon composite components, including frames, wheels, handlebars, stems, cranksets, brakes, etc. which have sustained an impact must not be ridden until they have been disassembled and thoroughly inspected by a qualified mechanic. See also Appendix B, Lifespan of your bike and its components.

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.

WHEELS AND TIRES

Wheel Inspection

It is most important that wheels are kept in top condition. Properly maintaining your bicycle's wheels will help braking performance and stability when riding. Be aware of the following potential problems:

•Dirty or greasy rims:
Caution: These can render your brakes ineffective. Do not clean them with oily or greasy materials. When cleaning, use a clean rag or wash with soapy water, rinse and air dry. Don't ride while they're wet.
When lubricating your bicycle, don't get oil on the rim braking surfaces.

•Wheels not straight:
Lift each wheel off the ground and spin them to see if they are crooked or out of true. If wheels are not straight, they will need to be adjusted. This is quite difficult and is best left to a bicycle specialist.

•Broken or loose spokes:
Check that all spokes are tight and that none are missing or damaged.
Caution: Such damage can result in severe instability and possibly an accident if not corrected.
Again, spoke repairs are best handled by a specialist.

•Loose hub bearings:
Lift each wheel off the ground and try to move the wheel from side to side.
Caution: If there is movement between the axle and the hub, do not ride the bicycle. Adjustment is required.

•Axle nuts:
Check that these are tight before each ride.

Tire Inspection

Tires must be maintained properly to ensure road holding and stability. Check the following areas:

Inflation: Ensure tires are inflated to the pressure indicated on the tire sidewalls. It is better to use a tire gauge and a hand pump than a service station pump.
Caution: If inflating tires with a. service station pump, take care that sudden over inflation does not cause tire to blow out.

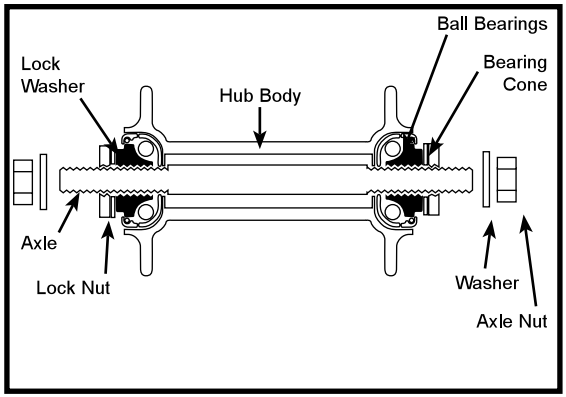
Bead Seating: When inflating or refitting tire, make sure that the bead is properly seated in the rim.

Tread: Check that the tread shows no signs of excessive wear or flat spots, and that there are no cuts or other damage.
Caution: Excessively worn or damaged tires should be replaced.

Valves: Make sure valve caps are fitted and that valves are free from dirt. A slow leak caused by the entry of the dirt can lead to a flat tire, and possibly a dangerous situation.

Recommended Tire pressures:

Please follow the tire manufacturer's guidelines which can be found molded into the sidewall of your tires.

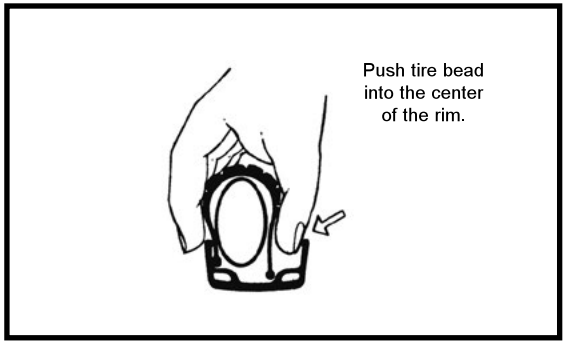


Hub Bearing Adjustment

When checked, the hub bearings of either wheel will require adjustment if there is any more than slight side play.

1. Check to make sure neither locknut is loose.
2. To adjust, remove wheel from bicycle and loosen the locknut on one side of the hub while holding the bearing cone on the same side with a flat open end wrench.
3. Rotate the adjusting cone as needed to eliminate free play.
4. Re-tighten the locknut while holding the adjusting cone in position.
5. Re-check that the wheel can turn freely without excessive side play.

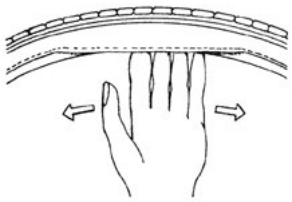
NOTE: If your bike is equipped with cartridge bearing hubs, please see your dealer for assistance.



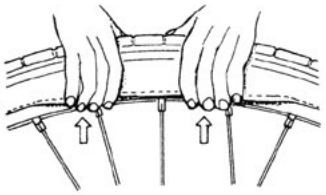
How To Fix a Flat Tire

If you need to repair a tire, follow these steps:

1. Remove the wheel from the bicycle.
2. Deflate the tire completely via the valve.
   Loosen the tire bead by pushing it inward all the way around.
3. Press one side of the tire bead up over the edge of the rim.
   Note: Use tire levers, not a screwdriver, otherwise you may damage the rim.
4. Remove the tube, leaving the tire on the rim.
5. Locate the leaks and patch using a tube repair kit, carefully following the instructions, or replace the tube.
   Note: Ensure that the replacement tube size matches the size stated on the tire sidewall and that the valve is the correct type for your bicycle.



Remove tire bead from the rim.



Pull tire back onto the rim.

6. Match the position of the leak in the tube with the tire to locate the possible cause and mark the location on the tire.

7. Remove the tire completely and inspect for a nail, glass, etc. and remove if located. Also inspect the inside of the rim to ensure there are no protruding spokes, rust or other potential causes. Replace the rim tape which covers the spoke ends, if damaged.

8. Remount one side of the tire onto the rim.

9. Using a hand pump, inflate the tube just enough to give it some shape.

10. Place the valve stem through the hole in the rim and work the tube into the tire. Note: Do not let it twist.

11. Using your hands only, remount the other side of the tire by pushing the edge toward the center of the rim. Start on either side of the valve and work around the rim.

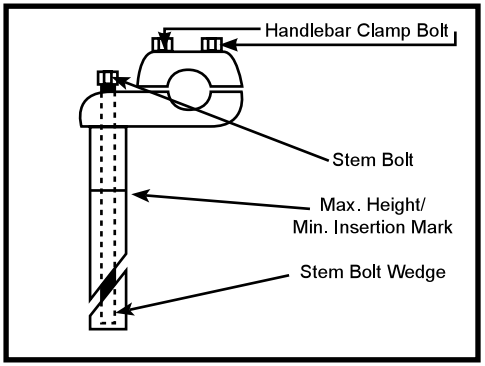
12. Before the tire is completely mounted, push the valve up into the rim to make sure the tire can sit squarely in position.

13. Fit the rest of the tire, rolling the last, most difficult part on using your thumbs. Note: Avoid using tire levers as these can easily puncture the tube or damage the tire.

14. Check that the tube is not caught between the rim and the tire bead at any point.

15. Using a hand pump, inflate the tube until the tire begins to take shape, and check that the tire bead is evenly seated all the way around the rim. When properly seated, fully inflate the tire to the pressure marked on the sidewall. Use a tire air pressure gauge to check.

16. Replace the wheel into the frame checking that all gears, brakes and quick release levers are properly adjusted.



HANDLEBARS AND STEM

Quill Stems

The handlebar stem fits into the steering column and is held firm by the action of a binder bolt and expander wedge which, when tightened, binds with the inside of the fork steerer tube.

When removing the stem, loosen the stem bolt two or three turns, then give it a tap to loosen the wedge inside.

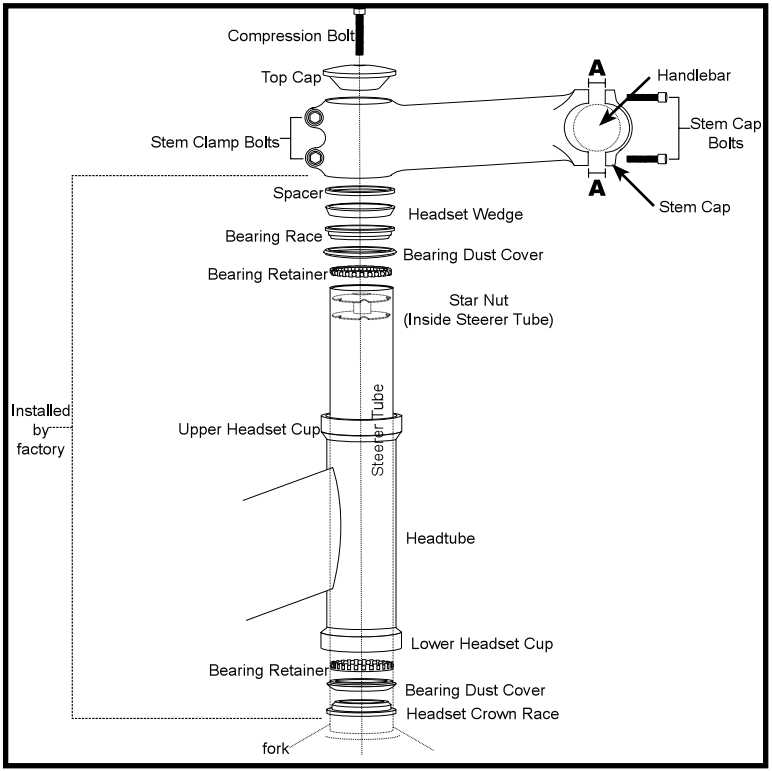
Lubricate by first wiping off any old grease and grime, then applying a thin film of grease to the part, including the wedge, that will be inserted into the frame.

The height of the handlebar can be adjusted to suit your comfort preference.

If the stem is removed from the steering column, you will notice a mark about 65mm up from the bottom with the words “max. height” or “minimum insertion".

Never ride a bicycle if the stem has been raised so that the max. height/ minimum insertion line can be seen.

Warning: Over tightening the stem bolt or headset assembly may cause damage to the bicycle and/or injury to the rider.



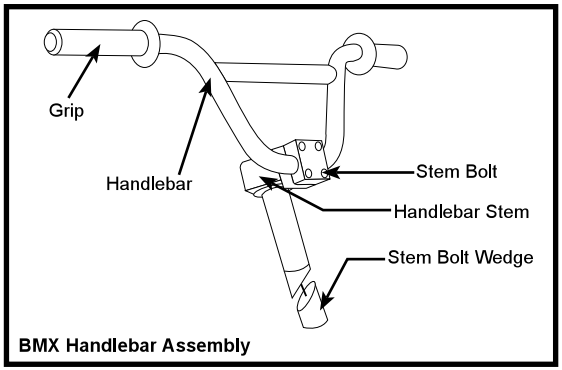
When re-fitting the stem, make sure the handlebars are correctly aligned and tightened using the appropriate hex wrench or allen key.

Do not overtighten.

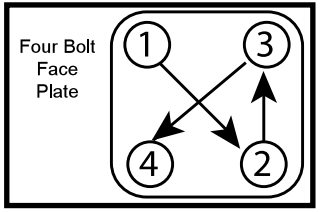
Test the security of the handlebar within the stem, and the stem within the fork steerer tube, by clamping the front wheel between your knees and trying to move the handlebar up and down, and from side to side. The handlebar should not move when applying turning pressure.

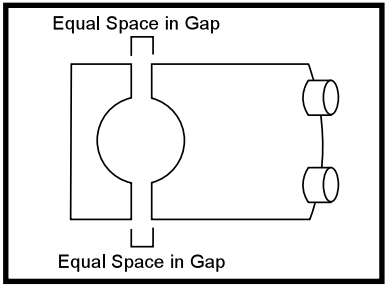
Direct-connect Stems

Direct-connect or threadless type stems can not be raised from their original height. They can however be lowered by switching the spacers from beneath the stem to above the stem. If you find that you need to have the handlebar raised, there are a number of options that are available to you. Your dealer will be able to demonstrate the variou options available and help you choose the best one for your needs. If you have any questions on adjustment of your direct-connect stem, please see your local dealer for service assistance.



BMX Handlebar Assembly





Handlebars

The exact position of the handlebars is a matter of personal preference. You may want to experiment with the handlebar position on a new bike to find what works best for you and your riding style. You may want to start with the handlebars in a near horizontal or vertical position (depending on the style of handlebar) and then adjust the angle as needed. As always, your authorized dealer can further assist you in proper handlebar positioning.

When tightening or loosening the stem faceplate bolts, it is important to follow an alternating diagonal pattern between the four bolts as illustrated in the diagram to the left. This method of alternating between the bolts allows for a more even distribution of clamping forces. When tightening the faceplate bolts, it is important to ensure that there is an equal amount of space in the gap above and below the handlebar between the faceplate and the main body of the stem.

Never ride unless the handlebar clamping mechanism has been securely tightened.

HEADSET

Inspection

The headset bearing adjustment should be checked every month. This is important as it is the headset which locks the fork into the frame, and if loose, can cause damage or result in an accident. While standing over the frame top tube with both feet on the ground, apply the front brake firmly and rock the bicycle back and forth; if the bike is equipped without a front brake, you can brace the nose of the front wheel against a wall and rock the bike back and forth. If you detect any looseness in the headset, it will need adjustment. Check that the headset is not over tight by slowly rotating the fork to the right and left. If the fork tends to stick or bind at any point, the bearings are too tight.

Adjustment

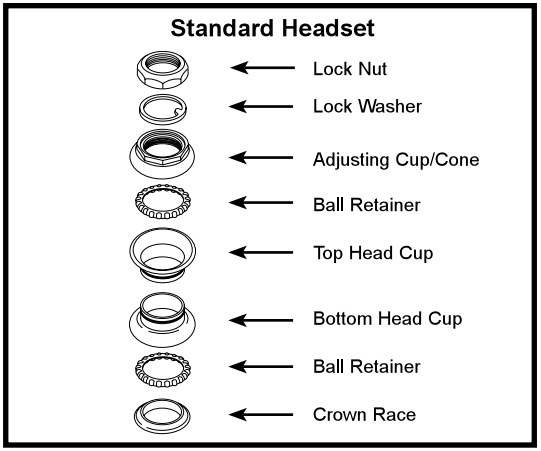
Headset bearing adjustment requires special tools and training. Improper adjustment can result in damage to the bicycle as well as threaten the rider's safety. For these reasons, we recommend that an authorized dealer perform all necessary headset adjustments.

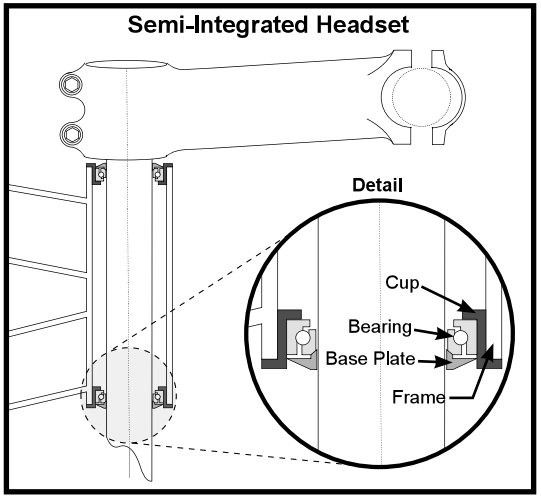
Headset Type

There are 3 main types of headset in common use today. The most basic type is the standard, external headset where the bearings sit outside of the headtube inside cups that are pressed into the frame.

Always make sure that the headset is properly adjusted and that the headset locknut is fully tightened before riding.

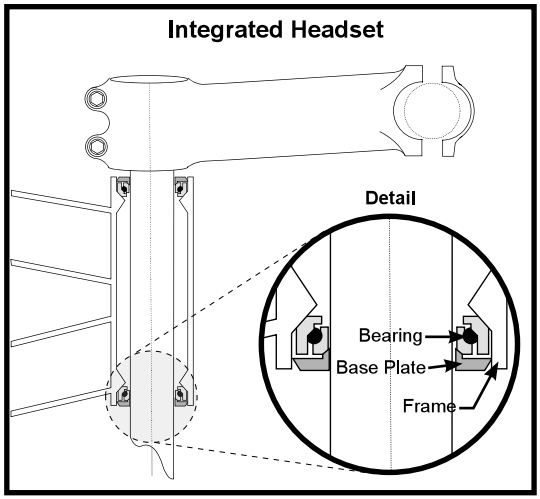
Warning: Over tightening the stem bolt or headset assembly may cause damage to the bicycle and/or injury to the rider.





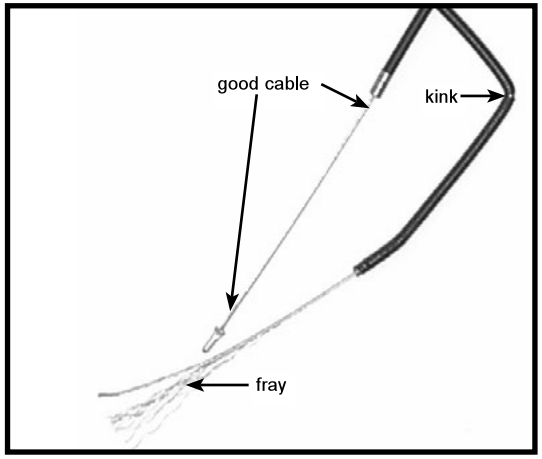
This type of headset can be found in both treaded and threadless versions and is still the most common type of headset used. Another headset in common use today is the semi-integrated type. This headset also utilizes bearing cups that press directly into the headtube of the frame. However, unlike a standard headset, the cup and bearing sit directly inside the headtube. This provides a stronger, lighter weight headset system. The third and final type is referred to as an integrated headset. This headset is matched with a specific headtube design that allows the headset bearings to be placed directly inside the headtube without the need for a pressed in cup, allowing for a very lightweight assembly.

It is important to understand that each of these types of headset are not interchangeable and have very specific requirements for proper fit and adjustment. If you have any questions regarding the headset used on your specific bicycle, or are in need of service, please contact your local dealer for assistance.

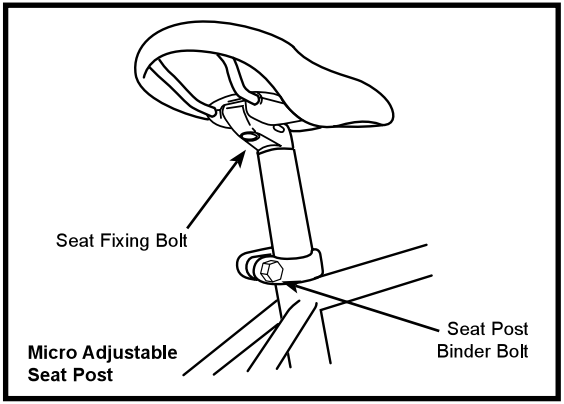


Cables and Cable Housing

Cables and housing are one of the most overlooked parts on the bicycle. The first indication that your cables and housing need to be replaced is an increased amount of pressure needed to operate the brakes or shifters. Before every ride, check that there are no kinks or frays in the cables and housing. Also check that the housing is seated properly into each cable stop of the bicycle. It is recommended that the cables and housing are replaced at least every riding season to prolong the life of your bike. See your authorized dealer for cable and housing replacement.



Do not ride a bicycle that is not operating properly.



SADDLE AND SEAT POST

Inspection

The seat fixing bolt and the seat post binder bolt should be checked for tightness and adjustment every month. On removing the seat pos from the frame, you will notice a mark about 65mm up from the bottom with the words “max. height” or “minimum insertion”.

If equipped with a binder clamp: Insure the lip on the binder clamp is fitted completely against the top of the seat tube of the frame. With the seat post inserted, tighten the binder bolt securely. Position the top of the seat parallel with the ground. Push the front of the seat up and down to firmly mesh the serraions together. The serrations must mesh completely together to insure a stabilized riding position. Securely tighten the nut on the seat clamp. If there is a nut on both sides of the clamp, tighten each one by alternating from one to the other. Check for tightness by twisting the seat from side to side, and from front to back. If the seat moves at the seat clamp or quick re-lease, re-position and re-tighten the appropriate clamping mechanism.

The seat post must be inserted so that the minimum insertion mark cannot be seen. Failure to do this may cause loss of bicycle control.

Adjustment

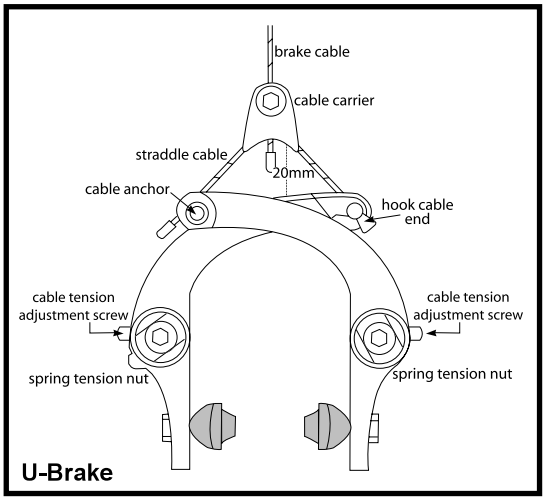
As mentioned in Part 2, the seat can be adjusted in height, angle and distance from the handlebars to suit the individual rider. Saddle angle is a matter of personal preference but the most comfortable position will usually be found when the top of the seat is almost parallel to the ground, or slightly raised at the front.

The saddle can also be adjusted by sliding it forward or back along the mounting rails to obtain the most comfortable reach to the handlebars. When fitting, position the seat post into the clamp under the seat and place it in the frame without tightening. Adjust it to the desired angle and position, and tighten the clamping mechanism.

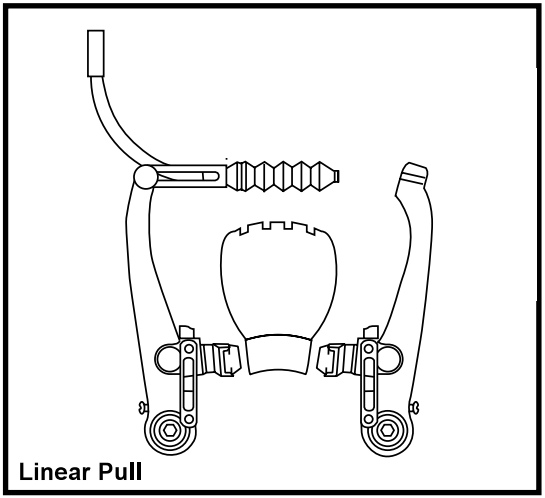
There are two types of seat clamps commonly in use. The most common employs a steel clamp with hexagonal nuts on either side to tighten. The other type, known as a micro-adjustable clamp, uses a single vertically mounted Allen head fixing bolt to tighten. After fixing the seat to the desired position on the post, adjust the height to the required level and tighten the binder bolt.

Note that the type of binder bolt may be either a hexagonal bolt, an Allen head bolt or a quick release mechanism. The operation of a seat post quick release mechanism is the same as for quick release hubs. v Test the security by grasping the seat and trying to turn it sideways. If it moves, you will need to further tighten the binder bolt.

Note: Remember that the minimum insertion mark must remain inside the frame assembly.



U-Brake


Linear Pull

BRAKES

The correct adjustment and operation of your bicycle's brakes is extremely important for safe operation. Brakes should be checked for effective operation before every ride. Frequent checking of adjustment is necessary as the control cables will stretch and the brake pads will become worn with use.

Never ride a bicycle unless the brakes are functioning properly.

There are numerous types of brake systems in common use on today's modern bicycles: side pull calipers, U-brakes and Linear Pull. Each utilizes a handlebar mounted lever which controls a cable to operate the brake. Sidepull brakes are mounted to the frame or fork via a single pivot point. Linear and U-brakes use two brake pivot arms, each mounted on separate pivots on either side of the frame/fork.

Inspection

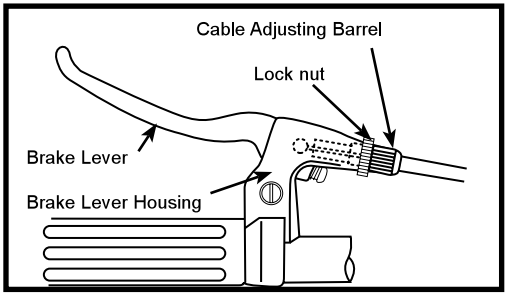
Brake levers should be checked for tightness at least every three months. They should be set in a comfortable position within easy reach of the rider's hands, and must not be able to move on the handlebar. Some brake levers make use of a reach adjustment screw, which can be altered to the distance between the handlebar grip and the lever, as required. The brake pads should be checked for correct positioning and tightness before every ride, and the various bolts and nuts at least every three months. Squeeze each brake lever to make sure they operate freely and that the brake pads press hard enough on the rims to stop the bike. There should be about 1mm - 2mm clearance between each pad and the rim when the brakes are not applied. The brake pads must be properly centered for maximum contact with the rim. Replace the brake pads if they are over worn so that the grooves or pattern cannot be seen. The brake cable wires should be checked for kinks, rust, broken strands or frayed ends. The outer casing should also be checked for kinks, stretched coils and other damage. If the cables are damaged, they should be replaced.

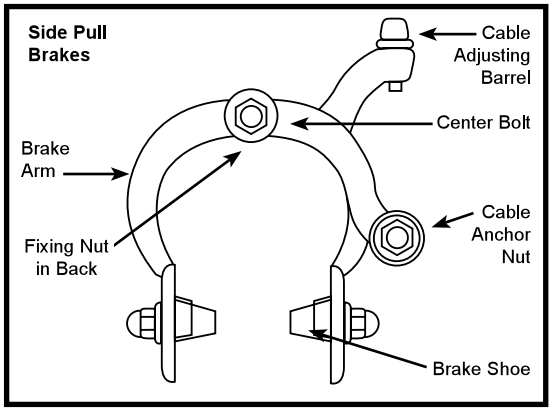
Some brakes have a quick release mechanism to allow easier wheel removal. Whenever you adjust the brakes, make sure the quick release mechanism is in the closed position.

Never ride unless the quick release is firmly locked in the closed position.

Lubrication

The brake lever and brake caliper pivot points should be lubricated with 2-3 drops of chain lube at least every three months to ensure smooth operation and to reduce wear. Cables should be greased along their entire length, after removing them from their casings, at least every six months. Always grease new cables before fitting.



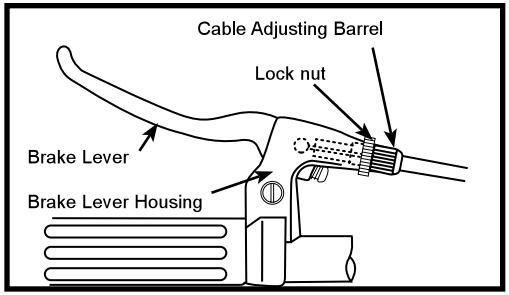


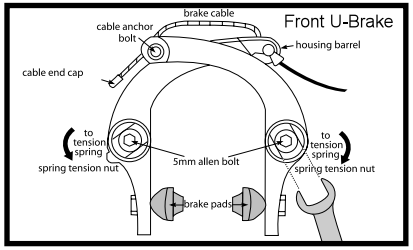
Adjustment - Sidepull Calipers

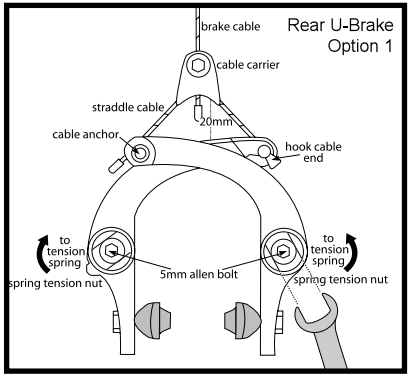
Minor brake adjustment can be made via the cable adjusting barrel, usually located at the upper cable arm. To adjust, squeeze the brake pads against the rim, loosen the lock nut and turn the adjuster Brake pad clearance should be a maximum 2mm from the rim. When correct, re-tighten the lock nut. If the pads cannot be set close enough to the rim in this manner, you may have to adjust the cable length. Screw the barrel adjuster 3/4 of the way in, squeeze the pads against the rim, undo the cable anchor bolt and pull the cable through with pliers. Re-tighten the cable anchor bolt and apply full force to the brake lever to test, then fine tune using the barrel adjuster. If one pad is closer to the rim than the other, loosen the fixing nut at the back of the brake, apply the brake to hold it centered, and re-tighten the fixing nut.

Ensure the Brake fixing nut is secured tightly. Failure to do this may cause the Brake assembly to dislodge from the fork.

Some brakes have a special mechanism which enables you to set the clearance on either side of the rim using a screwdriver. Brake pads should finally be adjusted so that the leading edge of the pad makes first contact with the rim. Some brakes have special curved washers to allow this, but on less complex models it will be necessary to apply a little force to the pad and its mounting.





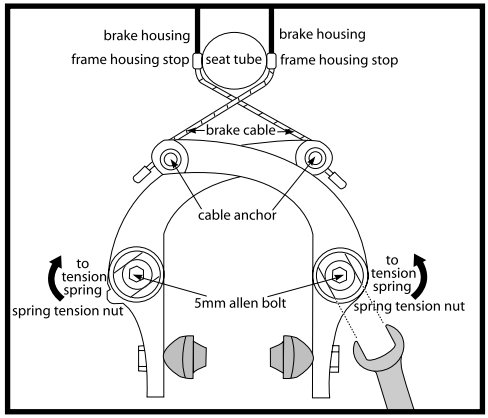


Adjustment: U-Brakes

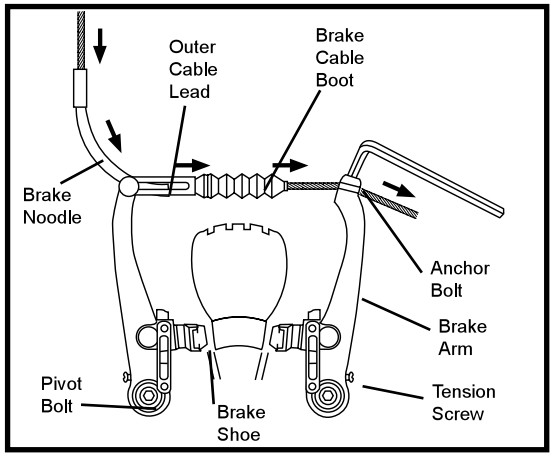
As with most brake systems, minor adjustments can be made with the barrel adjuster on the brake lever. To adjust, loosen the barrel adjuster locknut and turn the barrel adjuster out counter-clockwise to reduce brake pad clearance and lever pull. To increase brake pad clearance and lever pull, turn the barrel adjuster in clockwise. When adjustment is complete, hold the barrel adjuster in place and turn the lock ring so that it is tight against the brake lever body. This will lock the adjustment in place. Note that this process should only be done for very minor brake adjustments. Larger adjustments should be made at either the brake arm pinch bolt or the straddle cable pinch bolt. To adjust, loosen the brake cable pinch bolt and either pull more cable through or let more cable out, depending on what is needed. While holding the cable in position, re-tighten the cable pinch bolt. As with any new brake adjustment, compress and release the brake lever at least 10 times to ensure proper brake operation.

Your bike may have the rear U-brake located either on the underside of the frame seatstays, or on the topside of the frame chainstays depending on your bikes frame design. BMX U-brakes also have a number of different ways that the brake cables can be routed, each requiring different considerations regarding their adjustment and maintenance. If you have any questions regarding your bikes specific brake set-up or operation, please contact you authorized dealer for assistance or service.

To adjust the brakes so that the brake pads are an equal distance from the rim, you will need to adjust the brake arm spring tension. There are two main types of spring tension adjustment. The first type will utilize a small screw located on the side of each brake arm. To increase the spring tension, turn the screw in clockwise. To decrease the spring tension, turn the screw out counter-clockwise. The second type utilizes a spring tension-adjusting nut located at the brake arm-mounting bolt. If the left brake pad is too close to the rim, turn the left side tension-adjusting nut clockwise to increase clearance. If the right brake pad is too close to the rim, turn the right side tension-adjusting nut counterclockwise to increase clearance. You should also ensure that the brake pads contact the rim in a parallel fashion and are centered on the rims brake wall surface.



Rear U-Brake Option 2



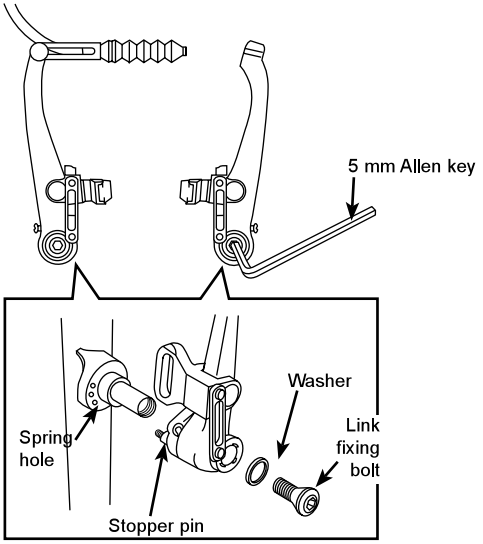
Note: brake adjustments can require specialized tools and knowledge. It is recommended that you bring your bike in to your local authorized dealer for expert service.

Linear Pull Brakes

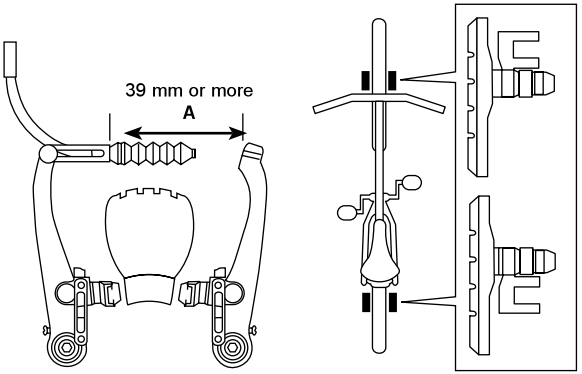
If not already assembled, take the brake noodle from the parts box and slide the cable through the larger opening. The cable housing will then seat into the end of the noodle. Slide the cable through the cable lead on the end of the left brake arm, this will cause the noodle to fit into the lead. Slip the brake cable boot over the cable and position it between both brake arms. Next, loosen the 5mm anchor bolt at the end of the right brake arm and slide the cable under the retaining washer. Pull the slack out of the cable making sure a distance of 39mm or more remains between the end of the lead and the start of the anchor bolt. Once the cable is secured to the brake arms, engage the brake lever several times, checking the position of the brake shoes at the rim. The brake shoes should be 1mm away from the rim when in a relaxed position. When the brake lever is engaged, the brake shoe should hit the rim flush (never the tire) with the front brake pad touching the rim slightly before the rear. This is called “toeing-in” your brake shoe. If this position is not achieved, adjustments to the brake shoe are required. Loosen the brake shoe hardware and reposition the brake shoe. It may take several shoe and cable adjustments before the required position is accomplished.

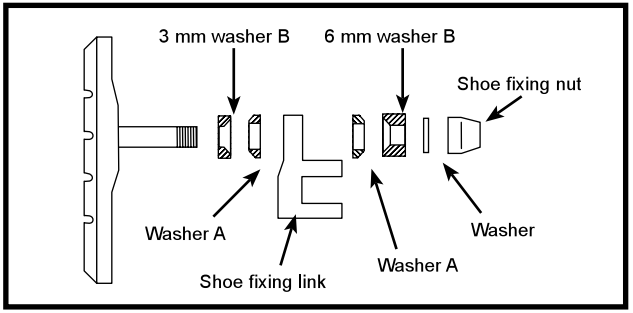
Linear Pull Brake

1. If fitted with linear pull brakes, insert the brake body into the center spring hole in the frame mounting boss, and then secure the brake body to the frame with the link fixing bolt.

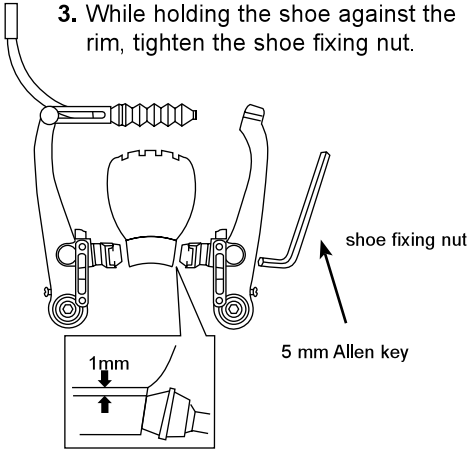


2. While holding the shoe against the rim, adjust the amount of shoe protrusion by interchanging the position of the B washers (i.e. 6 mm and 3 mm) so that dimension A is kept at 39 mm or more.

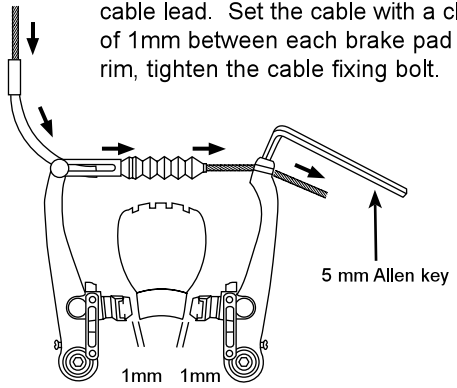




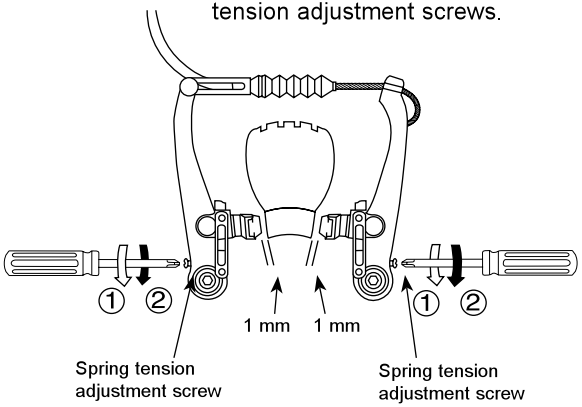
3. While holding the shoe against the rim, tighten the shoe fixing nut.



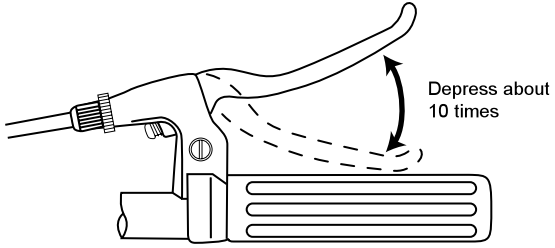
4. Pass the inner cable through the inner cable lead. Set the cable with a clearance of 1mm between each brake pad and the rim, tighten the cable fixing bolt.



5. Adjust the balance with the spring tension adjustment screws.



6. Depress the brake lever about 10 times as far as the grip to check that everything is operating correctly and that the shoe clearance is correct before using the brakes.



Rotors

Some freestyle BMX bicycles come equipped with a detangler system that will allow the handlebar to spin 360-degrees without binding the cables. It is very important that this system is adjusted correctly. Installation should only be done by a qualified bicycle mechanic with the correct tools.

Upper Cable

1. First connect the barrel end of the upper cable to the rear brake lever. Make sure the long cable casing is on top of the short cable casing; otherwise, the upper cable will have a twist in it.
2. Route the upper cable through the handlebars (below the crossbar) with the short cable casing on the same side as the rear brake lever.
3. Connect the upper cable to the upper plate by passing the football ends of the upper cable through the threaded holes in the upper plate and connecting them to the bearing.
4. Screw the adjusting barrels into the upper plate. Don't tighten the locknuts at this time.

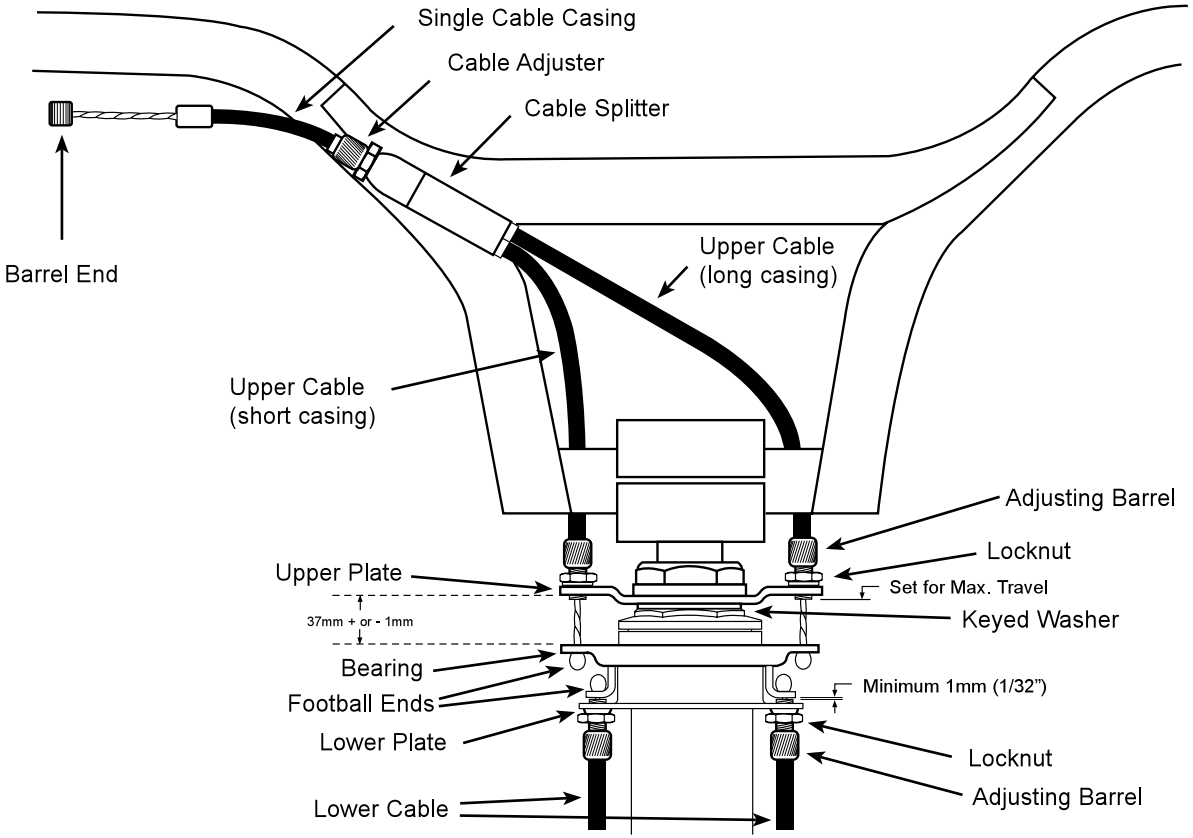
Lower Cable

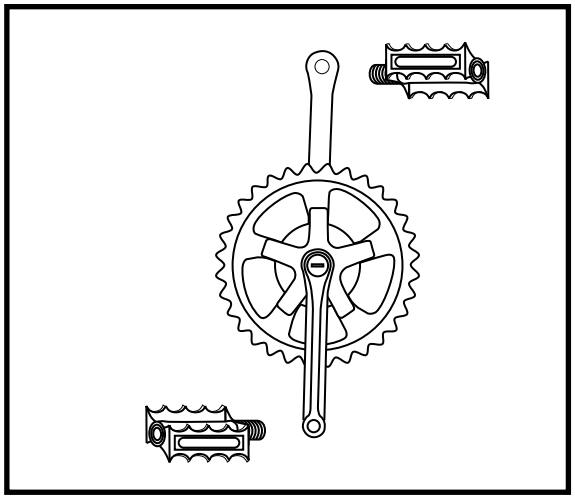
1. Slide the cable casing through the cable guide on the frame.
2. Connect the lower cable to the lower plate by passing the football ends of the lower cable through the threaded holes in the lower plate and connecting them to the bearing.
3. Screw the adjusting barrels into the lower plate. Don't tighten the locknuts at this time.
4. Connect the lower cable to the rear brake. Don't adjust the rear brake at this time.
   NOTE: Check to make sure all 11 cable casing ends on the upper and lower cables are seated correctly, and that the spring tension of the rear brake is pulling the bearing down.

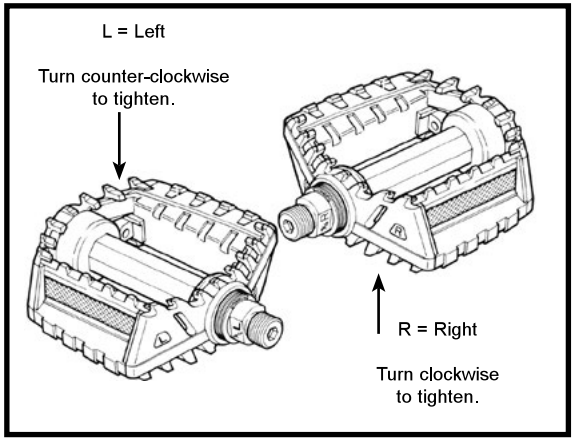
Adjustment

1. Screw the cable adjusters on the rear brake lever and the upper cable splitter all the way in.
2. Screw the adjusting barrels in the upper plate in (or out) to set the bearing for maximum travel. The bearing should be as far down as it can go without resting on the lower plate or the adjusting barrels screwed into the lower plate.
3. Use the adjusting barrels that are screwed into the upper plate to make the bearing parallel to the upper plate. Use a 10mm wrench to tighten the locknut on the left adjusting barrel of the upper cable. Leave the right adjusting barrel loose.
4. Screw the lower cable adjusting barrel into (or out of) the lower plate until they are as close to the bearing as they can get without touching it.
5. Screw the cable adjuster on the upper cable splitter out until all slack is removed from the upper cable. Then screw the cable adjuster out one more turn to raise the bearing an additional 1mm away from the lower cable adjusting barrels.
   CAUTION: Don't screw the cable adjuster on the upper cable splitter out more than 8mm. Use the cable adjuster on the rear brake lever if more adjustment is needed.
6. Check for bearing flop by placing the handlebars in the normal riding position, then quickly rotate the handlebars back and forth. Perform the following steps to eliminate bearing flop.
   NOTE: The bearing should never be allowed to rest on the lower plate or lower cable adjusting barrels.
   a) Screw the lower cable adjusting barrels out of (or into) the lower plate until all bearing flop is eliminated.
   b) Tighten the locknut of the right adjusting barrel on the lower cable.
   c) Rotate the handlebars 180 degrees and recheck for bearing flop. If there is any bearing flop, use the "loose" adjusting barrels on the upper and lower cable to remove it.
   d) Repeat steps (6a) and (6c) until the handlebars can be rotated 360 degrees without any bearing flop.
7. Finish adjusting the rear brakes.

Failure to adjust correctly may result in loss of braking power and personal injury.







DRIVETRAIN

The drivetrain of a bicycle refers to all parts that transmit power to the rear wheel including the pedals, crankset, chain and freewheel/cassette.

PEDALS

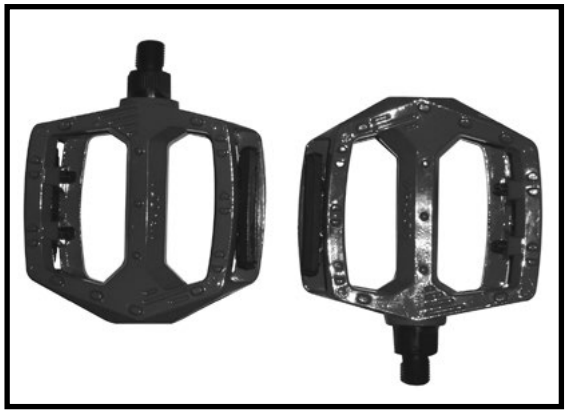
Pedals are available in a variety of shapes, sizes and materials, and each are designed with a particular purpose in mind. Some pedals can be fitted with toe clips and straps. These help to keep the feet correctly positioned and allow the rider to exert pulling force, as well as downward pressure, on the pedals. Use of toe clips with straps requires practice to acquire the necessary skill to operate them safely.

Inspection

Pedals should be inspected every month, taking note of the following areas:

- Check correct tightness into the crank arms. If pedals are allowed to become loose, they will not only be dangerous but will also cause irreparable damage to the cranks.
- Check that pedal bearings are properly adjusted. Move the pedals up and down, and right to left, and also rotate them by hand. If you detect any looseness or roughness in the pedal bearings then adjustment, lubrication or replacement is required.
- Ensure that the front and rear pedal reflectors are clean and securely fitted.
- Check for damage to pedal platform

Never ride with loose or damaged pedals.



Lubrication and Adjustment

Many pedals cannot be disassembled to allow access to the internal bearings and axle. However, it is usually possible to inject a little oil onto the inside bearings, and this should be done every six months. If the pedal is the type that can be fully disassembled, then the bearings should be removed, cleaned and greased every six to twelve months. Because of the wide variety of pedal types and their internal complexity, disassembly procedures are beyond the scope of this manual and further assistance should be sought from your authorized dealer.

Attachment

Note: The right and left pedals of a bicycle each have a different thread and are not interchangeable.
Never force a pedal into the incorrect crank arm.
The right pedal, which attaches to the chainwheel side, is marked 'R' on the end of the axle, and screws in with a clockwise thread. The left pedal, which attaches to the other crank arm, is marked 'L' on the axle, and screws in with a counter-clockwise thread.
Insert the correct pedal into the crank arm and begin to turn the thread with your fingers only. When the axle is screwed all the way in, securely tighten using a 15mm wrench.
If removing a pedal, remember that the right pedal axle must be turned counter clockwise, i.e. the reverse of when fitting.
If replacing the original pedals with a new set, make sure the size and the axle thread is compatible with the cranks on your bicycle. Bicycles use one of two types of cranks and these use different axle threads. Your bike may be equipped with cranks that are a one piece design with no separate axle. These operate with pedals that have a 1/2"(12.7mm) thread. Bikes equipped with three piece crank sets with a separate axle, left crank and right crank, use a slightly larger 9/16"(14mm) thread.
Note: Never try and force a pedal with the wrong thread size into a bicycle crank.

Clipless Pedal

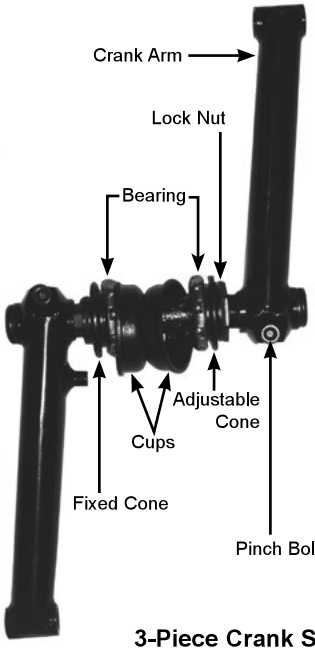
Clipless ("step-in") Pedals

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. Do not practice engaging and disengaging clipless pedals in a place where there are obstacles, hazards or traffic.

Standard Bottom Bracket



3-Piece Crank Set

CRANK SET

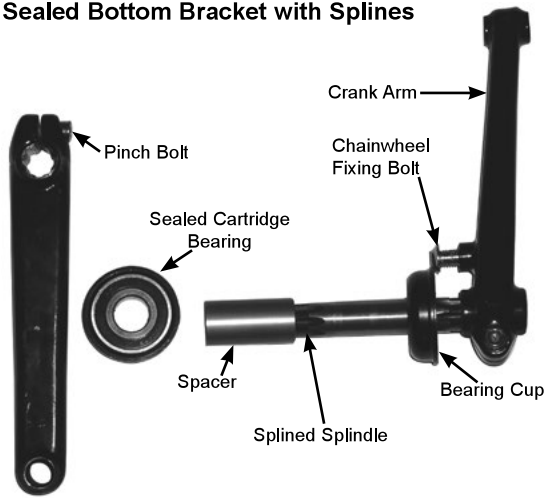
The crank set refers to the crank arms, chain ring, spindle, and bottom bracket bearing assembly. There are two general types of crank sets commonly found on BMX bikes; one- piece cranks, where the crank arms and spindle are combined into one continuous piece, and what are often referred to as three-piece cranks. The three-piece crank set consists of two separate crank arms and a separate bottom bracket spindle. The crank arms bolt directly on to the spindle. One-piece cranks are generally found on more basic, general use BMX bikes while three-piece type cranks will be found on more advanced BMX bikes. Please take the time to familiarize yourself with the type of crank set used on your bicycle.

Never ride your bike if the cotterless cranks are loose. This may be dangerous and will damage the crank arms beyond repair.

Bottom Bracket

There are three main types of bottom bracket styles typically found on BMX bikes. All one-piece cranks and certain three-piece crank sets utilize a standard adjustable bearing bottom bracket. This type of system consists of two bearing cups that are pressed into the frame, a series of loose ball bearings, an adjustable cup that threads directly on to the spindle, and a lock nut, which also threads on to the spindle to lock the adjustment into place.

Sealed Bottom Bracket with Splines



The second type of bottom bracket is utilized on many three-piece cranks, and also consists of two cups that are pressed directly into the frame. However, this system utilizes two sealed cartridge bearings that press into the cups and do not require adjustment or lubrication. The assembly is held in adjustment by the crank arm spindle bolts.
The third type of bottom bracket utilizes a completely sealed cartridge system that threads directly into the bottom bracket shell of the frame as a single unit. This system does not require any bearing adjustment or bearing maintenance. **It is very important that the bottom bracket threads be thoroughly greased whenever reinstalling the bottom bracket unit.**

In addition to the different bottom bracket bearing assemblies, there are also two main types of spindles used. These types differ in the way that the crank arm interfaces with the spindle itself.
The first type uses a multi sided, tapered interface between the crank arm and spindle. This type is usually found on the adjustable type bottom brackets, but can also be found on some non-adjustable cartridge units.
The second type utilizes a series of splines that help lock the crank arm into place and provide a stronger and more secure fitting. This type of system is commonly found on racing style BMX bikes as well as more advanced freestyle BMX bikes. **When working with a splined system, it is important to be sure that the crank arms are properly lined up with one another once installed. It is also important to apply grease to the splines before any reassembly.**

Inspection and Adjustment

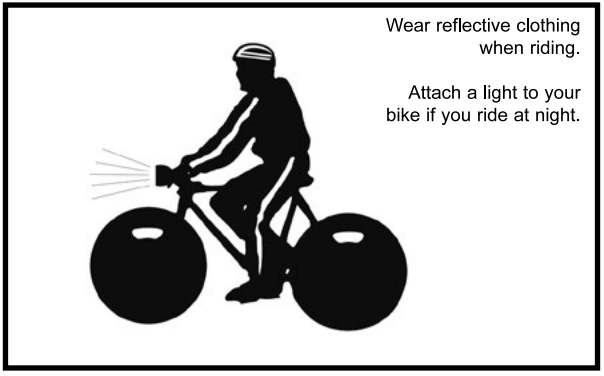
It is important to check your crankset and bottom bracket for proper adjustment on a regular basis. For 3-piece type cranks, you should make sure that both the crank axle bolts as well as any crank arm pinch bolts are properly tightened. To check for proper adjustment for any crank, grab the crank arms and try to move them from side to side. The crank arms should not be able to move on the spindle and there should not be any play in the bottom bracket bearing assembly. You should also check to be sure the bearings run smoothly. With the chain removed from the chainwheel, spin the cranks around. They should be able to spin freely and smoothly. If not, then adjustment or lubrication will be needed.

In general, bottom bracket bearing adjustment and service usually requires specialized tools and knowledge. It is recommended that you bring your bike in to your local authorized dealer for this service.

MISCELLANEOUS

Reflectors

Your bicycle is supplied with one front (white), one rear (red), two wheel (white), and two pedal (orange) reflectors. These are an important safety and legal requirement, and should remain securely fitted and in good, clean conditions at all times. Periodically, inspect all reflectors, brackets and mounting hardware for signs of wear or damage. Replace immediately if damage is found. Please see pages 12-13 for more information.



Problem	Possible Cause	Remedy
Slipping chain	- Excessively worn/chipped chainring or freewheel sprocket teeth - Chain worn/stretched - Stiff link in chain - Non compatible chain/chainring/ freewheel	- Replace chainring, sprockets and chain - Replace chain - Lubricate or replace link - Seek advice at a bicycle shop
Chain jumping off freewheel sprocket or chainring	- Chainring out of true - Chainring loose - Chainring teeth bent or broken - Chain tension too loose	- Re-true if possible, or replace - Tighten mounting bolts - Repair or replace chainring/set - Adjust chain tension by sliding rear wheel back in dropouts
Constant clicking noises when pedaling	- Stiff chain link - Loose pedal axle/bearings - Loose bottom bracket axle/bearings - Bent bottom bracket or pedal axle - Loose crankset	- Lubricate chain / Adjust chain link - Adjust bearings/axle nut - Adjust bottom bracket - Replace bottom bracket axle or pedals - Tighten crank bolts
Grinding noise when pedaling	- Pedal bearings too tight - Bottom bracket bearings too tight - Chain too tight	- Adjust bearings - Adjust bearings - Loosen chain tension

Problem	Possible Cause	Remedy
Freewheel does not rotate	- Freewheel internal pawl pins are jammed	- Lubricate. If problem persists, replace freewheel
Brakes not working effectively	- Brake pads worn down - Brake pads/rim greasy, wet or dirty - Brake cables are binding/stretched/damaged - Brake levers are binding - Brakes out of adjustment	- Replace brake pads - Clean pads and rim - Clean/adjust/replace cables - Adjust brake levers - Center brakes
When applying the brakes they squeal/squeak	- Brake pads worn down - Brake pad toe-in incorrect - Brake pads/rim dirty or wet - Brake arms loose	- Replace pads - Correct pad toe-in - Clean pads and rim - Tighten mounting bolts
Knocking or shuddering when applying brakes	- Bulge in the rim or rim out of true - Brake mounting bolts loose - Brakes out of adjustment - Fork loose in head tube	- True wheel or take to a bike shop for repair - Tighten bolts - Center brakes and/or adjust brake block toe-in - Tighten headset
Wobbling wheel	- Axle broken - Wheel out of true - Hub comes loose - Headset binding - Hub bearings collapsed	- Replace axle - True wheel - Adjust hub bearings - Adjust headset - Replace bearings

Problem	Possible Cause	Remedy
Steering not accurate	- Wheels not aligned in frame - Headset loose or binding - Front forks or frame bent	- Align wheels correctly - Adjust/tighten headset - Take bike to a bike shop for possible frame realignment
Frequent punctures	- Inner tube old or faulty - Tire tread/casing worn - Tire unsuited to rim - Tire not checked after previous puncture - Tire pressure too low - Spoke protruding into rim	- Replace Inner tube - Replace tire - Replace with correct tire - Remove sharp object embedded in tire - Correct tire pressure - File down spoke

PEDALS

1. Toe Overlap is when your toe can touch the front wheel when you turn the handlebars to steer while a pedal is in the forwardmost position. This is common on small-framed bicycles, and is avoided by keeping the inside pedal up and the outside pedal down when making sharp turns. On any bicycle, this technique will also prevent the inside pedal from striking the ground in a turn.
WARNING: Toe Overlap could cause you to lose control and fall. Ask your dealer to help you determine if the combination of frame size, crank arm length, pedal design and shoes you will use results in pedal overlap. Whether you have overlap or not, you must keep the inside pedal up and the outside pedal down when making sharp turns.

2. Some bicycles come equipped with pedals that have sharp and potentially dangerous surfaces. These surfaces are designed to add safety by increasing grip between the rider's shoe and the pedal. If your bicycle has this type of highperformance 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, or chose to ride with shin pads. Your dealer can show you a number of options and make suitable recommendations.

3. Toeclips and straps are a means to keep 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. Shoes with deep treaded soles or welts which might make it more difficult for you to insert or remove your foot should not be used with toeclips and straps.
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 your attention and cause 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.

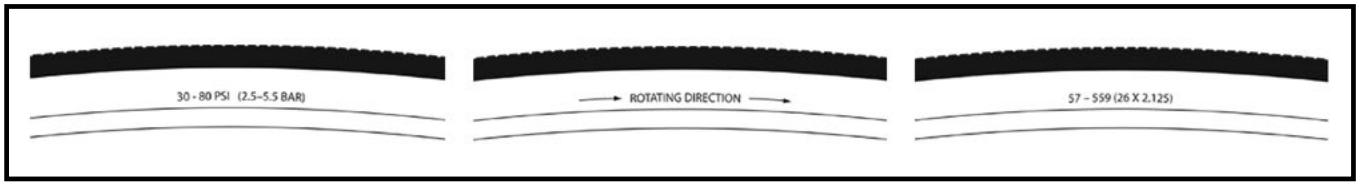
4. Clipless pedals (sometimes called "step-in pedals") are another means to keep feet securely in the correct position for maximum pedaling efficiency. They have a plate, called a "cleat," on the sole of the shoe, which clicks into a mating spring-loaded fixture on the pedal. They only engage or disengage with a very specific motion which must be practiced until it becomes instinctive. Clipless pedals require shoes and cleats which are compatible with 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. Follow the pedal manufacturer's instructions, or ask your dealer to show you how to make this adjustment. Use the easiest setting until engaging and disengaging becomes a reflex action, but always make sure that there is sufficient tension to prevent unintended release of your foot from the pedal.
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. Do not use shoes which do not engage the pedals correctly.

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 your attention and cause you 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 to follow the pedal manufacturer's setup and service instructions. If you do not have the manufacturer's instructions, see your dealer or contact the manufacturer.

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. 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. The part of this information which is most important to you is Tire Pressure. But some wheel rim manufacturers also specify maximum tire pressure with a label on the rim.
WARNING: Never inflate a tire beyond the maximum pressure marked on the tire's sidewall or the wheel rim. If the maximum pressure rating for the wheel rim is lower than the maximup pressure shown on the tire, always use the lower rating. Exceeding the recommended maximum pressure may blow the tire off the rim or dmage the wheel rim, which could cause damage to the bike and injury to the rider and bystanders.



The best and safest way to inflate a bicycle tire to the correct pressure is with a bicycle pump which has a built-in pressure gauge.
WARNING: There is a safety risk in using gas station air hoses or other air compressors. They are not made for bicycle tires. They move a large volume of air very rapidly, and will raise the pressure in your tire very rapidly, which could cause the tube to explode.

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 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 1.C so you'll know how correctly inflated tires should look and feel when you don't have access to a gauge. Some tires may need to be brought up to pressure every week or two, so it is important to check your tire pressures before every ride. 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

There are primarily two kinds of bicycle tire valves: The Schrader Valve and the Presta Valve. The bicycle pump you use must have the fitting appropriate to the valve stems on your bicycle. The Schrader valve is like the valve on a car tire. To inflate a Schrader valve tire, remove the valve cap and clamp the pump fitting onto the end of the valve stem. To let air out of a Schrader valve, depress the pin in the end of the valve stem with the end of a key or other appropriate object.
The Presta valve has a narrower diameter and is only found on bicycle tires. To inflate a Presta valve tire 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

PRESTA

inflate. To inflate a Presta valve with a Schrader pump fitting, 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 into the Schrader pump 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.

WARNING: We highly recommend that you carry a spare inner tube when you ride your bike, unless the bike is fitted with tubeless tires. Patching a tube is an emergency repair. If you do not apply the patch correctly or apply several patches, the tube can fail, resulting in possible tube failure, which could cause you to loose control and fall. Replace a patched tube as soon as possible.

SCHRADER

3. Rim Tape

The majority of all bicycle rims require the use of an adhesive rim tape or rubber rim strip. The purpose of hte rim tape is to protect the tube from being punctured by the spoke nipples on single walled rims or the spoke holes on double walled rims. It is important to have the correct sized rim tape in order to fully cover the rim bed. If you need to replace the rim tape at any time, your dealer will be able to assist you in selecting the correct replacement.

WHEELS

Bicycle wheels are designed to be removable for easier transportation and for repair of a tire puncture. In most cases, the wheel axles are inserted into slots, called "dropouts" in the fork and frame, but some mountain and road bikes use what is called a "through axle" wheel mounting system.

If you have a mountain or road bike equipped with through axle front or rear wheels, make sure that your dealer has given you the manufacturer's instructions, and follow those when installing or removing a through axle wheel. If you don't know what a through axle is, ask your dealer.

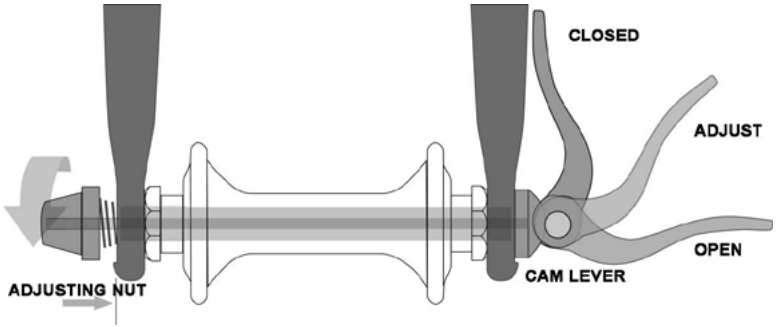


fig.1

If you do not have a bicycle with a through-axle wheel mounting system, it will have wheels secured in one of three ways:

• A hollow axle with a shaft (“skewer”) running through it which has an adjustable tension nut on one end and an over-center cam on the other (cam action system, fig. 1 and fig. 2)

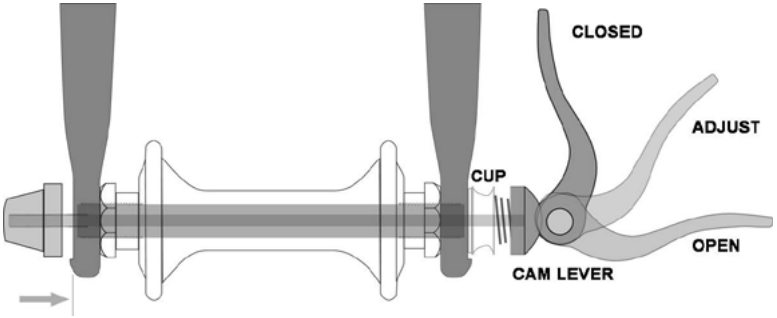


fig.2

• A hollow axle with a shaft (“skewer”) running through it which has a nut on one end and a fitting for a hex key, lock lever or other tightening device on the other (through bolt, fig. 3)

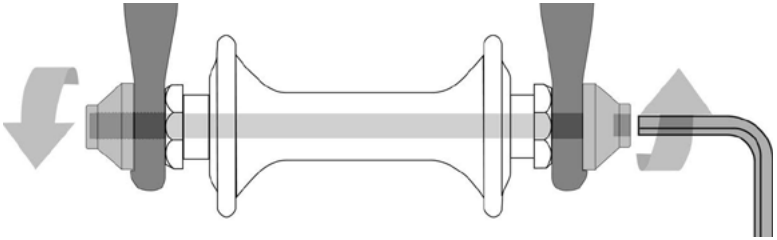


fig.3

• Hex nuts or hex key bolts which are threaded on to or into the hub axle (bolton wheel, fig. 4)

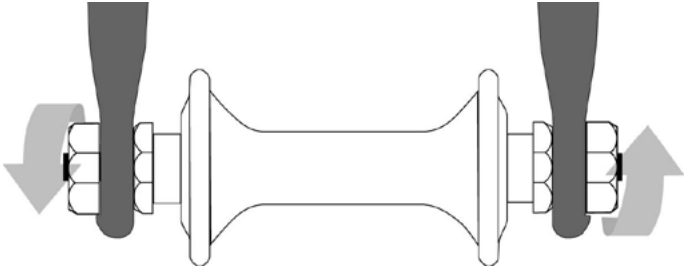


fig.4

Your bicycle may be equipped with a different securing method for the front wheel than for the rear wheel. Discuss the wheel securing method for your bicycle with your dealer.
It is very important that you understand the type of wheel securing method on your bicycle, that you know how to secure the wheels correctly, and that you know how to apply the correct clamping force that safely secures the wheel. Ask your dealer to instruct you in correct wheel removal and installation, and ask him to give you any available manufacturer's instructions.

WARNING: Riding with an improperly secured wheel can allow the wheel to wobble or fall off the bicycle, which can cause serious injury or death. 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.
3. Each time, before you ride the bike, check that the wheel is securely clamped.
The clamping action of a correctly secured wheel must emboss the surfaces of the dropouts.

1. Front Wheel Secondary Retention Devices

Most bicycles have front forks which utilize a secondary wheel retention device to reduce the risk of the wheel disengaging from the fork if the wheel is incorrectly secured. Secondary retention devices are not a substitute for correctly securing your front wheel. Secondary retention devices fall into two basic categories:
a. The clip-on type is a 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: Do not remove or disable the secondary retention device. As its name implies, it serves as a back-up for a critical adjustment. If the wheel is not secured correctly, the secondary retention device can reduce the risk of the wheel disengaging from the fork. Removing or disabling the secondary retention device may also void the warranty. Secondary retention devices are not a substitute for correctly securing your wheel. Failure to properly secure the wheel can cause the wheel to wobble or disengage, which could cause you to loose control and fall, resulting in serious injury or death.

2. Wheels with cam action systems

There are currently two types of over-center cam wheel retention mechanisms: the traditional over-center cam (fig. 1) and the cam-and-cup system (fig. 2). Both use an over-center cam action to clamp the bike's wheel in place. Your bicycle may have a cam-and-cup front wheel retention system and a traditional rear wheel cam action system.

a. Adjusting the traditional cam action mechanism (fig. 1)

The wheel hub is clamped in place by the force of the over-center 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.

WARNING: 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 a cam action wheel safely in the dropouts. See also the first WARNING in this Section, p. 63.

b. Adjusting the cam-and-cup mechanism (fig. 2)

The cam-and-cup system on your front wheel will have been correctly adjusted for your bicycle by your dealer. Ask your dealer to check the adjustment every six months. Do not use a cam-and-cup front wheel on any bicycle other than the one for which your dealer adjusted it.

3. Removing and Installing wheels

WARNING: If your bike is equipped with a hub brake such as a rear coaster brake, front or rear drum, band or roller brake; or if it has an internal gear rear hub, do not attempt to remove the wheel. The removal and re-installation of most hub brakes and internal gear hubs requires special knowledge. Incorrect removal or assembly can result in brake or gear failure, which can cause you to lose control and fall.
CAUTION: If your bike has a disc brake, exercise care in touching the rotor or caliper. Disc rotors have sharp edges, and both rotor and caliper can get very hot during use.

a. Removing a disk brake or rim brake Front Wheel

(1) If your bike has rim brakes, disengage the brake's quick-release mechanism to increase the clearance between the tire and the brake pads.

(2) If your bike has cam action front wheel retention, move the cam lever from the locked or CLOSED position to the OPEN position (fig. 1 and fig. 2). If your bike has through bolt or bolt-on front wheel retention, loosen the fastener(s) a few turns counter-clockwise using an appropriate wrench, lock key or the integral lever.
(3) If your front fork has a clip-on type secondary retention device, disengage it. If your front fork has an integral secondary retention device, and a traditional cam action system (fig. 1) loosen the tension adjusting nut enough to allow removing the wheel from the dropouts. If your front wheel uses a cam-and-cup system, (fig. 2) squeeze the cup and cam lever together while removing the wheel. No rotation of any part is necessary with the cam-and-cup system. You may need to tap the top of the wheel with the palm of your hand to release the wheel from the front fork.

b. Installing a disk brake or rim brake Front Wheel

CAUTION: If your bike is equipped with a front disk brake, be careful not to damage the disk, caliper or brake pads when re-inserting the disk into the caliper. Never activate a disk brake's control lever unless the disk is correctly inserted in the caliper. See also pp. 71-73.

(1) If your bike has cam action front wheel retention, move the cam lever so that it curves away from the wheel (fig. 2). This is the OPEN position. If your bike has through bolt or bolt-on front wheel retention, go to the next step.
(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 fork dropouts. The cam lever, if there is one, should be on rider's left side of the bicycle (fig. 2 & 2). If your bike has a clip-on type secondary retention device, engage it.
(3) If you have a traditional cam action mechanism: holding the cam lever in the ADJUST position with your right hand, tighten the tension adjusting nut with your left hand until it is finger tight against the fork dropout (fig. 1). If you have a cam-and-cup system: the nut and cup (fig. 2) will have snapped into the recessed area of the fork dropouts and no adjustment should be required.
(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:
(a) With a cam action system, move the cam lever upwards and swing it into the CLOSED position (fig. 1 & 2). The lever should now be parallel to the fork blade and curved toward the wheel. To apply enough clamping force, you should have to wrap your fingers around the fork blade for leverage, and the lever should leave a clear imprint in the palm of your hand.
(b) With a through-bolt or bolt-on system, tighten the fasteners to the torque specifications in Appendix D or the hub manufacturer's instructions.

NOTE: If, on a traditional cam action system, 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) With a through-bolt or bolt-on system, tighten the fasteners to the torque specifications in Appendix D or the hub manufacturer's instructions.

WARNING: Securely clamping the wheel with a cam action retention device takes considerable force. If you can fully close the cam lever without wrapping your fingers around the fork blade for leverage, the lever does not leave a clear imprint in the palm of your hand, and the serrations on the wheel fastener do not emboss the surfaces of the dropouts, the tension is insufficient. Open the lever; turn the tension adjusting nut clockwise a quarter turn; then try again. See also the first WARNING in this Section, p. 63.

(6) If you disengaged the brake quick-release mechanism in 3. a. (1) above, re-engage it to restore correct brake pad-to-rim clearance.
(7) Spin the wheel to make sure that it is centered in the frame and clears the brake pads; then squeeze the brake lever and make sure that the brakes are operating correctly.

c. Removing a disk brake or rim brake Rear Wheel

(1) If you have a multi-speed bike with a derailleur gear system: shift the rear derailleur to high gear (the smallest, outermost rear sprocket). If you have an internal gear rear hub, consult your dealer or the hub manufacturer's instructions before attempting to remove the rear wheel. If you have a single-speed bike with rim or disk brake, go to step (4) below.
(2) If your bike has rim brakes, disengage the brake's quick-release mechanism to increase the clearance between the wheel rim and the brake pads (see pp. 71-73).
(3) On a derailleur gear system, pull the derailleur body back with your right hand.
(4) With a cam action mechanism, move the quick-release lever to the OPEN position (fig. 2). With a through bolt or bolt on mechanism, loosen the fastener(s) with an appropriate wrench, lock lever or integral lever; then push the wheel forward far enough to be able to remove the chain from the rear sprocket.
(5) Lift the rear wheel off the ground a few inches and remove it from the rear dropouts.

d. Installing a disk brake or rim brake Rear Wheel

CAUTION: If your bike is equipped with a rear disk brake, be careful not to damage the disk, caliper or brake pads when re-inserting the disk into the caliper. Never activate a disk brake's control lever unless the disk is correctly inserted in the caliper.

(1) With a cam action system, move the cam lever to the OPEN position (see fig. 1 & 2). The lever should be on the side of the wheel opposite the derailleur and freewheel sprockets.
(2) On a derailleur bike, make sure that the rear derailleur is still in its outermost, high gear, position; then pull the derailleur body back with your right hand. Put the chain on top of the smallest freewheel sprocket.
(3) On single-speed, remove the chain from the front sprocket, so that you have plenty of slack in the chain. Put the chain on the rear wheel sprocket.
(4) Then, insert the wheel into the frame dropouts and pull it all the way in to the dropouts.
(5) On a single speed or an internal gear hub, replace the chain on the chainring; pull the wheel back in the dropouts so that it is straight in the frame and the chain has about 1/4 inches of up-and-down play.
(6) With a cam action system, move the cam lever upwards and swing it into the CLOSED position (fig. 1 & 2). The lever should now be parallel to the seat stay or chain stay and curved toward the wheel. To apply enough clamping force, you should have to wrap your fingers around the fork blade for leverage, and the lever should leave a clear imprint in the palm of your hand.
(7) With a through-bolt or bolt-on system, tighten the fasteners to the torque specifications or the hub manufacturer's instructions.

NOTE: If, on a traditional cam action system, the lever cannot be pushed all the way to a position parallel to the seat stay or chain stay, return the lever to the OPEN position. Then turn the tension adjusting nut counterclockwise one-quarter turn and try tightening the lever again.

WARNING: Securely clamping the wheel with a cam action retention device takes considerable force. If you can fully close the cam lever without wrapping your fingers around the seat stay or chain stay for leverage, the lever does not leave a clear imprint in the palm of your hand, and the serrations on the wheel fastener do not emboss the surfaces of the dropouts, the tension is insufficient. Open the lever; turn the tension adjusting nut clockwise a quarter turn; then try again. See also the first WARNING in this Section, p. 63.

(8) If you disengaged the brake quick-release mechanism above, re-engage it to restore correct brake pad-to-rim clearance.
(9) Spin the wheel to make sure that it is centered in the frame and clears the brake pads; then squeeze the brake lever and make sure that the brakes are operating correctly.

SEAT POST CAM ACTION CLAMP

Some bikes are equipped with a cam action seat post binder. The seat postcam action binder works exactly like the traditional wheel cam action fastener (pp. 63 - 70) While a cam action binder looks like a long bolt with a lever on one end and a nut on the other, the binder uses an over-center cam action to firmly clamp the seat post (see fig. 1).

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.
3. Before you ride the bike, first check that the seat post is securely clamped.

Adjusting the seat post cam action mechanism
The action of the 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 and unsafe clamping force.

WARNING: The full force of the cam action is needed to clamp the seat post 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 seat post safely.

WARNING: If you can fully close the cam lever without wrapping your fingers around the seat post or 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.

BRAKES

There are three general types of bicycle brakes: rim brakes, which operate by squeezing the wheel rim between two brake pads; disc brakes, which operate by squeezing a hub-mounted disc between two brake pads; and internal hub brakes. All three can be operated by way of a handlebar mounted lever. On some models of bicycle, the internal hub brake is operated by pedaling backwards. This is called a Coaster Brake and is described in Appendix C.

WARNING:
1. Riding with improperly adjusted brakes, worn brake pads, or wheels on which the rim wear mark is visible is dangerous and can result in serious injury or death.
2. Applying brakes too hard or too suddenly can lock up a wheel, which could cause you to lose control and fall. Sudden or excessive application of the front brake may pitch the rider over the handlebars, which may result in serious injury or death.
3. Some bicycle brakes, such as disc brakes (fig. 5) and linear-pull brakes (fig. 6), are extremely powerful. Take extra care in becoming familiar with these brakes and exercise particular care when using them.
4. Some bicycle brakes are equipped with a brake force modulator, a small, cylindrical device through which the brake control cable runs and which is designed to provide a more progressive application of braking force. A modulator makes the initial brake lever force more gentle, progressively increasing force until full force is achieved. If your bike is equipped with a brake force modulator, take extra care in becoming familiar with its performance characteristics.
5. Disc brakes can get extremely hot with extended use. Be careful not to touch a disc brake until it has had plenty of time to cool.
6. See the brake manufacturer's instructions for operation and care of your brakes, and for when brake pads must be replaced. If you do not have the manufacturer's instructions, see your dealer or contact the brake manufacturer.
7. If replacing worn or damaged parts, use only manufacturer-approved genuine replacement parts.

1. Brake controls and features

It's very important to your safety that you learn and remember which brake lever controls which brake on your bike. Traditionally, in the U.S. the right brake lever controls the rear brake and the left brake lever controls the front brake; but, to check how your bike's brakes are set up, squeeze one brake lever and look to see which brake, front or rear, engages. Now do the same with the other brake lever. 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.
Most rim brakes have some form of quick-release mechanism to allow the brake pads 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 figs. 6, 7. 8 & 9) and check each time to make sure both brakes work correctly before you get on the bike.

2. How brakes work

The braking action of a bicycle is a function of the friction between the braking surfaces. To make sure that you have maximum friction available, keep your wheel rims and brake pads or the disk rotor and caliper clean and free of dirt, lubricants, waxes or polishes.
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.
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).

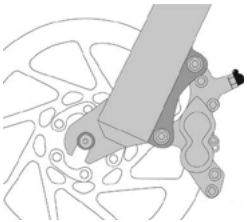


fig.5

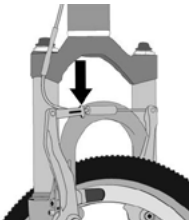


fig.6

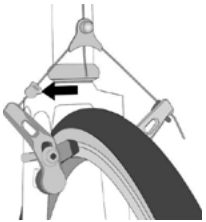


fig.7

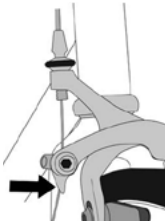


fig.8

fig.9

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 is transferred 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 descents, because descents shift weight forward.
Two keys to effective speed control and safe stopping are controlling wheel lockup and weight transfer. This weight transfer is even more pronounced if your bike has a front suspension fork. Front suspension “dips” under braking, increasing the weight transfer (see also pp. 76 - 77). 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. It will take longer to stop 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 pads reduces their ability to grip. The way to maintain control on loose or wet surfaces is to go more slowly.

SHIFTING GEARS

Your multi-speed bicycle will have a derailleur drivetrain (see 1. below), an internal gear hub drivetrain (see 2. below) or, in some special cases, a combination of the two.

1. How a derailleur drivetrain works

If your bicycle has a derailleur drivetrain, the gear-changing mechanism will have:
• a rear cassette or freewheel sprocket cluster
• a rear derailleur
• usually a front derailleur
• one or two shifters
• one, two or three front sprockets called chainrings
• a drive chain

a. Shifting Gears
There are several different types and styles of shifting controls: levers, twist grips, triggers, combination shift/brake controls and push-buttons. Ask your dealer to explain the type of shifting controls that are on your bike, and to show you how they work.
The vocabulary of shifting can be pretty confusing. A downshift is a shift to a “lower” or “slower” gear, one which is easier to pedal. An upshift is a shift to a “higher” or “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 immediately after having moved the shifter. This could jam the chain and cause serious damage to the bicycle.

b. Shifting the Rear Derailleur

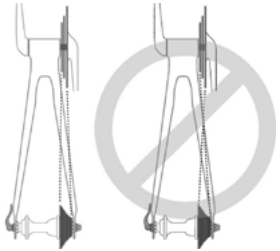
The rear derailleur is controlled by the right shifter. The function of the rear derailleur is to move the drive chain from one gear sprocket to another. The smaller sprockets on the gear cluster produce higher gear ratios. Pedaling in the higher gears requires greater pedaling effort, but takes you 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 move the chain from one sprocket to another, the rider must be pedaling forward.

c. 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).

d. Which gear should I be in?

The combination of largest rear and smallest front gears (see image) is for the steepest hills. The smallest rear and largest front combination 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 othertraffic, until you've built up your confidence. Learn not to use either the "smallest to smallest" or "largest to largest" gear combinations because they may cause unacceptable stress on the drive train. Learn to anticipate the need to shift, and shift to a lower gear before the hill gets too steep. If you have difficulties with shifting, the problem could be mechanical adjustment. See your dealer for help.

WARNING: Never shift a derailleur onto the largest or the smallest sprocket if the derailleur is not shifting smoothly. The derailleur may be out of adjustment and the chain could jam, causing you to lose control and fall.

e. What if it won't shift gears?
If moving the shift control one click repeatedly fails to result in a smooth shift to the next gear chances are that the mechanism is out of adjustment. Take the bike to your dealer to have it adjusted.
2. How an internal gear hub drivetrain works If your bicycle has an internal gear hub drivetrain, the gear changing mechanism will consist of:
• a 3, 5, 7, 8, 12 speed or possibly an infinitely variable internal gear hub
• one, or sometimes two shifters
• one or two control cables
• one front sprocket called a chainring
• 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 ratio. 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 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. Learn to anticipate the need to shift, and shift to a lower gear before the hill gets too steep. If you have difficulties with shifting, the problem could be mechanical adjustment. See your dealer for help.

c. What if it won't shift gears?
If moving the shift control one click repeatedly fails to result in a smooth shift to the next gear chances are that the mechanism is out of adjustment. Take the bike to your dealer to have it adjusted.

BICYCLE SUSPENSION

Many bicycles are equipped with suspension systems. 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, be sure to read and follow the suspension manufacturer's setup and service instructions. If you do not have the manufacturer's instructions, see your dealer or contact the manufacturer.

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. If your bike has suspension, the increased speed you may develop also increases your risk of injury. For example, when braking, the front of a suspended bike dips. You could lose control and fall if you do not have experience with this system. Learn to handle your suspension system safely. See also pp. 71 - 73.

WARNING: 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.

Suspension can increase control and comfort by allowing the wheels to better follow the terrain. 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 have learned to handle the full capabilities of your bike.

WARNING: 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. Failing to do so can result in catastrophic frame failure.

At first, practice shifting where there are no obstacles, hazards or othertraffic, until you've built up your confidence. Learn not to use either the "smallest to smallest" or "largest to largest" gear combinations because they may cause unacceptable stress on the drive train. Learn to anticipate the need to shift, and shift to a lower gear before the hill gets too steep. If you have difficulties with shifting, the problem could be mechanical adjustment. See your dealer for help.

WARNING: Never shift a derailleur onto the largest or the smallest sprocket if the derailleur is not shifting smoothly. The derailleur may be out of adjustment and the chain could jam, causing you to lose control and fall.

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Appendix A
Intended use of your bicycle

WARNING: Understand your bike and its intended use. Choosing the wrong bicycle for your purpose can be hazardous. Using your bike the wrong way is dangerous.

No one type of bicycle is suited for all purposes. Your retailer can help you pick the “right tool for the job” and help you understand its limitations. There are many types of bicycles and many variations within each type. There are many types of mountain, road, racing, hybrid, touring, cyclocross and tandem bicycles. There are also bicycles that mix features. For example, there are road/racing bikes with triple cranks. These bikes have the low gearing of a touring bike, the quick handling of a racing bike, but are not well suited for carrying heavy loads on a tour. For that purpose you want a touring bike. Within each of type of bicycle, one can optimize for certain purposes. Visit your bicycle shop and find someone with expertise in the area that interests you. Do your own homework. Seemingly small changes such as the choice of tires can improve or diminish the performance of a bicycle for a certain purpose. On the following pages, we generally outline the intended uses of various types of bikes.

Industry usage conditions are generalized and evolving. Consult your dealer about how you intend to use your bike.

High-Performance-Road
CONDITION 1

Bikes designed for riding on a paved surface where the tires do not lose ground contact.
INTENDED To be ridden on paved roads only.
NOT INTENDED For off-road, cyclocross, or touring with racks or panniers.
TRADE OFF Material use is optimized to deliver both light weight and specific performance. You must understand that (1) these types of bikes are intended to give an aggressive racer or competitive cyclist a performance advantage over a relatively short product life, (2) a less aggressive rider will enjoy longer frame life, (3) you are choosing light weight (shorter frame life) over more frame weight and a longer frame life, (4) you are choosing light weight over more dent resistant or rugged frames that weigh more. All frames that are very light need frequent inspection. These frames are likely to be damaged or broken in a crash. They are not designed to take abuse or be a rugged workhorse. See also Appendix B.

MAXIMUM WEIGHT LIMIT

RIDER	LUGGAGE*	TOTAL
lbs / kg	lbs / kg	lbs / kg
275/215	10 / 4.5	285 / 129

* Seat Bag /Handlebar Bag Only

General Purpose Riding
CONDITION 2

Bikes designed for riding Condition 1, plus smooth gravel roads and improved trails with moderate grades where the tires do not lose ground contact.

INTENDED For paved roads, gravel or dirt roads that are in good condition, and bike paths.

NOT INTENDED For off-road or mountain bike use, or for any kind of jumping. Some of these bikes have suspension features, but these features are designed to add comfort, not off-road capability. Some come with relatively wide tires that are well suited to gravel or dirt paths. Some come with relatively narrow tires that are best suited to faster riding on pavement. If you ride on gravel or dirt paths, carry heavier loads or want more tire durability talk to your dealer about wider tires.

MAXIMUM WEIGHT LIMIT

RIDER	LUGGAGE*	TOTAL
lbs / kg	lbs / kg	lbs / kg
300 / 136	30 / 14	285 / 129
for Touring or Trekking		
300 / 136	55 / 25	355 / 161

Cross-Country, Marathon, Hardtails
CONDITION 3

Bikes designed for riding Conditions 1 and 2, plus roughtrails, small obstacles, and smooth technical areas, including areas where momentary loss of tire contact with the ground may occur. NOT jumping. All mountain bikes without rear suspension are Condition 3, and so are some lightweight rear suspension models.

INTENDED For cross-country riding and racing which ranges from mild to aggressive over intermediate terrain (e.g., hilly with small obstacles like roots, rocks, loose surfaces and hard pack and depressions). Cross-country and marathon equipment (tires, shocks, frames, drive trains) are light-weight, favoring nimble speed over brute force. Suspension travel is relatively short since the bike is intended to move quickly on the ground.

NOT INTENDED For Hardcore Freeriding, Extreme Downhill, Dirt Jumping, Slopestyle, or very aggressive or extreme riding. No spending time in the air landing hard and hammering through obstacles.

TRADE OFF Cross-Country bikes are lighter, faster to ride uphill, and more nimble than All-Mountain bikes. Cross-Country and Marathon bikes trade off some ruggedness for pedaling efficiency and uphill speed.

MAXIMUM WEIGHT LIMIT

RIDER	LUGGAGE*	TOTAL
lbs / kg	lbs / kg	lbs / kg
300 / 136	5 /2.3	305 / 138
*Seat bag only		
Front suspension frames manufactured with original equipment seat stay and dropout rack mounts only		
300 / 136	55 / 25	355 / 161

All Mountain
CONDITION 4

Bikes designed for riding Conditions 1, 2, and 3, plus rough technical areas, moderately sized obstacles, and small jumps.
INTENDED For trail and uphill riding. All-Mountain bicycles are: (1) more heavy duty than cross country bikes, but less heavy duty than Freeride bikes, (2) lighter and more nimble than Freeride bikes, (3) heavier and have more suspension travel than a cross country bike, allowing them to be ridden in more difficult terrain, over larger obstacles and moderate jumps, (4) intermediate in suspension travel and use components that fit the intermediate intended use, (5) cover a fairly wide range of intended use, and within this range are models that are more or less heavy duty. Talk to your retailer about your needs and these models.
NOT INTENDED For use in extreme forms of jumping/riding such as hardcore mountain, Freeriding, Downhill, North Shore, Dirt Jumping, Hucking etc. No large drop offs, jumps or launches (wooden structures, dirt embankments) requiring long suspension travel or heavy duty components; and no spending time in the air landing hard and hammering through obstacles.
TRADE OFF All-Mountain bikes are more rugged than cross country bikes, for riding more difficult terrain. All-Mountain bikes are heavier and harder to ride uphill than cross country bikes. All-Mountain bikes are lighter, more nimble and easier to ride uphill than Freeride bikes. All-Mountain bikes are not as rugged as Freeride bikes and must not be used for more extreme riding and terrain.

RIDER	LUGGAGE*	TOTAL
lbs / kg	lbs / kg	lbs / kg
300 / 136	5 / 2.3	305 / 138

MAXIMUM WEIGHT LIMIT

* Seat Bag /Handlebar Bag Only

Gravity, Freeride, and Downhill
CONDITION 5

Bikes designed for jumping, hucking, high speeds, or aggressive riding on rougher surfaces, or landing on flat surfaces. However, this type of riding is extremely hazardous and puts unpredictable forces on a bicycle which may overload the frame, fork, or parts. If you choose to ride in Condition 5 terrain, you should take appropriate safety precautions such as more frequent bike inspections and replacement of equipment. You should also wear comprehensive safety equipment such as a full-face helmet, pads, and body armor.

INTENDED For riding that includes the most difficult terrain that only very skilled riders should attempt.
Gravity, Freeride, and Downhill are terms which describe hardcore mountain, north shore, slopestyle. This is “extreme” riding and the terms describing it are constantly evolving.
Gravity, Freeride, and Downhill bikes are: (1) heavier and have more suspension travel than All-Mountain bikes, allowing them to be ridden in more difficult terrain, over larger obstacles and larger jumps, (2) the longest in
suspension travel and use components that fit heavy duty intended use. While all that is true, there is no guarantee that extreme riding will not break a Freeride bike.
The terrain and type of riding that Freeride bikes are designed for is inherently dangerous. Appropriate equipment, such as a Freeride bike, does not change this reality. In this kind of riding, bad judgment, bad luck, or riding beyond your capabilities can easily result in an accident, where you could be seriously injured, paralyzed or killed.
NOT INTENDED To be an excuse to try anything. Read pp. 21 - 22.
TRADE OFF Freeride bikes are more rugged than All-Mountain bikes, for riding more difficult terrain. Freeride bikes are heavier and harder to ride uphill than All-Mountain bikes.

RIDER	LUGGAGE*	TOTAL
lbs / kg	lbs / kg	lbs / kg
300 / 136	5 / 2.3	305 / 138

MAXIMUM WEIGHT LIMIT

* Seat Bag /Handlebar Bag Only

Dirt Jump
CONDITION 5

Bikes designed for jumping, hucking, high speeds, or aggressive riding on rougher surfaces, or landing on flat surfaces. However, this type of riding is extremely hazardous and puts unpredictable forces on a bicycle which may overload the frame, fork, or parts. If you choose to ride in Condition 5 terrain, you should take appropriate safety precautions such as more frequent bike inspections and replacement of equipment. You should also wear comprehensive safety equipment such as a full-face helmet, pads, and body armor.

INTENDED For man-made dirt jumps, ramps, skate parks other predictable obstacles and terrain where riders need and use skill and bike control, rather than suspension. Dirt Jumping bikes are used much like heavy duty BMX bikes. A Dirt Jumping bike does not give you skills to jump. Read pp. 21 - 22.

NOT INTENDED For terrain, drop offs or landings where large amounts of suspension travel are needed to help absorb the shock of landing and help maintain control.

TRADE OFF Dirt Jumping bikes are lighter and more nimble than Freeride bikes, but they have no rear suspension and the suspension travel in the front is much shorter.

	RIDER	LUGGAGE	TOTAL
	lbs / kg	lbs / kg	lbs / kg
MAXIMUM WEIGHT LIMIT	300 / 136	0	300 / 136

Appendix B
The lifespan of your bike and its components

1. Nothing Lasts Forever, Including Your Bike.

When the useful life of your bike or its components is over, continued use is hazardous. Every bicycle and its component parts 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 to which the frame and components are subjected. 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 aspects of use being identical, lightweight bicycles and their components will usually have a shorter life than heavier bicycles and their components. In selecting a lightweight bicycle or components you are making a tradeoff, favoring the higher performance that comes with lighter weight over longevity. So, If you choose lightweight, high performance equipment, be sure to have it inspected frequently.
You should have your bicycle and its components checked periodically by your dealer 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.

2. Perspective
Today's high-performance bicycles require frequent and careful inspection and service. In this Appendix we try to explain some underlying material science basics and how they relate to your bicycle. We discuss some of the trade-offs made in designing your bicycle and what you can expect from your bicycle; and we provide important, basic guidelines on how to maintain and inspect it. We cannot teach you everything you need to know to properly inspect and service our bicycle; and that is why we repeatedly urge you to take your bicycle to your dealer for professional care and attention.

WARNING: Frequent inspection of your bike is important to your safety. Follow the Mechanical Safety Check in Section 1.C of this Manual before every ride. Periodic, more detailed inspection of your bicycle is important. How often this more detailed inspection is needed depends upon you. You, the rider/owner, have control and knowledge of how often you use your bike, how hard you use it and where you use it. Because your dealer cannot track your use, you must take responsibility for periodically bringing your bike to your dealer for inspection and service. Your dealer will help you decide what frequency of inspection and service is appropriate for how and where you use your bike. For your safety, understanding and communication with your dealer, we urge you to read this Appendix in its entirety. The materials used to make your bike determine how and how frequently to inspect. Ignoring this WARNING can lead to frame, fork or other component failure, which can result in serious injury or death.

a. Understanding metals
Steel is the traditional material for building bicycle frames. It has good characteristics, but in high performance bicycles, steel has been largely replaced by aluminum and some titanium. The main factor driving this change is interest by cycling enthusiasts in lighter bicycles.

Properties of Metals

Please understand that there is no simple statement that can be made that characterizes the use of different metals for bicycles. What is true is how the metal chosen is applied is much more important than the material alone. One must look at the way the bike is designed, tested, manufactured, supported along with the characteristics of the metal rather than seeking a simplistic answer. Metals vary widely in their resistance to corrosion. Steel must be protected or rust will attack it. Aluminum and Titanium quickly develop an oxide film that protects the metal from further corrosion. Both are therefore quite resistant to corrosion. Aluminum is not perfectly corrosion resistant, and particular care must be used where it contacts other metals and galvanic corrosion can occur. Metals are comparatively ductile. Ductile means bending, buckling and stretching before breaking. Generally speaking, of the common bicycle frame building materials steel is the most ductile, titanium less ductile, followed by aluminum. Metals vary in density. Density is weight per unit of material. Steel weighs 7.8 grams/cm3 (grams per cubic centimeter), titanium 4.5 grams/cm3, aluminum 2.75 grams/cm3. Contrast these numbers with carbon fiber composite at 1.45 grams/ cm3. Metals are subject to fatigue. With enough cycles of use, at high enough loads, metals will eventually develop cracks that lead to failure. It is very important that you read The basics of metal fatigue below.

Let's say you hit a curb, ditch, rock, car, another cyclist or other object. At any speed above a fast walk, your body will continue to move forward, momentum carrying you over the front of the bike. You cannot and will not stay on the bike, and what happens to the frame, fork and other components is irrelevant to what happens to your body.

What should you expect from your metal frame? It depends on many complex factors, which is why we tell you that crashworthiness cannot be a design criteria. With that important note, we can tell you that if the impact is hard enough the fork or frame may be bent or buckled. On a steel bike, the steel fork may be severely bent and the frame undamaged. Aluminum is less ductile than steel, but you can expect the fork and frame to be bent or buckled. Hit harder and the top tube may be broken in tension and the down tube buckled. Hit harder and the top tube may be broken, the down tube buckled and broken, leaving the head tube and fork separated from the main triangle.

When a metal bike crashes, you will usually see some evidence of this ductility in bent, buckled or folded metal. It is now common for the main frame to be made of metal and the fork of carbon fiber. See Section B, Understanding composites below. The relative ductility of metals and the lack of ductility of carbon fiber means that in a crash scenario you can expect some bending or bucking in the metal but none in the carbon. Below some load the carbon fork may be intact even though the frame is damaged. Above some load the carbon fork will be completely broken.

The basics of metal fatigue

Common sense tells us that nothing that is used lasts forever. The more you use something, and the harder you use it, and the worse the conditions you use it in, the shorter its life. Fatigue is the term used to describe accumulated damage to a part caused by repeated loading. To cause fatigue damage, the load the part receives must be great enough. A crude, often-used

example is bending a paper clip back and forth (repeated loading) until it breaks. This simple definition will help you understand that fatigue has nothing to do with time or age. A bicycle in a garage does not fatigue. Fatigue happens only through use.
So what kind of “damage” are we talking about? On a microscopic level, a crack forms in a highly stressed area. As the load is repeatedly applied, the crack grows. At some point the crack becomes visible to the naked eye. Eventually it becomes so large that the part is too weak to carry the load that it could carry without the crack. At that point there can be a complete and immediate failure of the part.
One can design a part that is so strong that fatigue life is nearly infinite. This requires a lot of material and a lot of weight. Any structure that must be light and strong will have a finite fatigue life. Aircraft, race cars, motorcycles all have parts with finite fatigue lives. If you wanted a bicycle with an infinite fatigue life, it would weigh far more than any bicycle sold today. So we all make a tradeoff: the wonderful, lightweight performance we want requires that we inspect the structure.

What to look for

• ONCE A CRACKS STARTS IT CAN GROW AND GROW FAST. Think about the crack as forming a pathway to failure. This means that any crack is potentially dangerous and will only become more dangerous.	SIMPLE RULE 1 : If you find crack, replace the part.
• CORROSSION SPEEDS DAMAGE. Cracks grow more quickly when they are in a corrosive environment. Think about the corrosive solution as further weakening and extending the crack.	SIMPLE RULE 2 : Clean your bike, lubricate your bike, protect your bike from salt, remove any salt as soon as you can.
• STAINS AND DISCOLORATION CAN OCCUR NEAR A CRACK. Such staining may be a warning sign that a crack exists.	SIMPLE RULE 3 : Inspect and investigate any staining to see if it is associated with a crack.
• SIGNIFICANT SCRATCHES, GOUGES, DENTS OR SCORING CREATE STARTING POINTS FOR CRACKS. Think about the cut surface as a focal point for stress (in fact engineers call such areas “stress risers,” areas where the stress is increased). Perhaps you have seen glass cut? Recall how the glass was scored and then broke on the scored line.	SIMPLE RULE 4 : Do not scratch, gouge or score any surface. If you do, pay frequent attention to this area or replace the part.
• SOME CRACKS (particularly larger ones) MAY MAKE CREAKING NOISE AS YOU RIDE. Think about such a noise as a serious warning signal. Note that a wellmaintained bicycle will be very quiet and free of creaks and squeaks.	SIMPLE RULE 5 : Investigate and find the source of any noise. It may not a be a crack, but whatever is causing the noise should be fixed promptly.

In most cases a fatigue crack is not a defect. It is a sign that the part has been worn out, a sign the part has reached the end of its useful life. When your car tires wear down to the point that the tread bars are contacting the road, those tires are not defective. Those tires are worn out and the tread bar says “time for replacement.” When a metal part shows a fatigue crack, it is worn out. The crack says “time for replacement.”

Fatigue Is Not A Perfectly Predictable Science

Fatigue is not a perfectly predictable science, but here are some general factors to help you and your dealer determine how often your bicycle should be inspected. The more you fit the “shorten product life” profile, the more frequent your need to inspect. The more you fit the “lengthen product life” profile, the less frequent your need to inspect.

Factors that shorten product life:

- Hard, harsh riding style
- “Hits”, crashes, jumps, other “shots” to the bike
- High mileage
- Higher body weight
- Stronger, more fit, more aggressive rider
- Corrosive environment (wet, salt air, winter road salt, accumulated sweat)
- Presence of abrasive mud, dirt, sand, soil in riding environment Factors that lengthen product life:
- Smooth, fluid riding style
- No “hits”, crashes, jumps, other “shots” to the bike
- Low mileage
- Lower body weight
- Less aggressive rider
- Non-corrosive environment (dry, salt-free air)
- Clean riding environment

WARNING: Do not ride a bicycle or component with any crack, bulge or dent, even a small one. Riding a cracked frame, fork or component could lead to complete failure, with risk of serious injury or death.

B. Understanding composites

All riders must understand a fundamental reality of composites. Composite materials constructed of carbon fibers are strong and light, but when crashed or overloaded, carbon fibers do not bend, they break.

What Are Composites?
The term “composites” refers to the fact that a part or parts are made up of different components or materials. You’ve heard the term “carbon fiber bike.” This really means “composite bike.”
Carbon fiber composites are typically a strong, light fiber in a matrix of plastic, molded to form a shape. Carbon composites are light relative to metals. Steel weighs 7.8 grams/cm3 (grams per cubic centimeter), titanium 4.5 grams/cm3, aluminum 2.75 grams/cm3. Contrast these numbers with carbon fiber composite at 1.45 grams/cm3.
The composites with the best strength-to-weight ratios are made of carbon fiber in a matrix of epoxy plastic. The epoxy matrix bonds the carbon fibers together, transfers load to other fibers, and provides a smooth outer surface. The carbon fibers are the “skeleton” that carries the load.

Why Are Composites Used?
Unlike metals, which have uniform properties in all directions (engineers call this isotropic), carbon fibers can be placed in specific orientations to optimize the structure for particular loads. The choice of where to place the carbon fibers gives engineers a powerful tool to create strong, light bicycles. Engineers may also orient fibers to suit other goals such as comfort and vibration damping.
Carbon fiber composites are very corrosion resistant, much more so than most metals.
Think about carbon fiber or fiberglass boats. Carbon fiber materials have a very high strength-to-weight ratio.

What Are The Limits Of Composites?
Well designed “composite” or carbon fiber bicycles and components have long fatigue lives, usually better than their metal equivalents. While fatigue life is an advantage of carbon fiber, you must still regularly inspect your carbon fiber frame, fork, or components. Carbon fiber composites are not ductile. Once a carbon structure is overloaded, it will not bend; it will break. At and near the break, there will be rough, sharp edges and maybe delamination of carbon fiber or carbon fiber fabric layers. There will be no bending, buckling, or stretching.

If You Hit Something Or Have A Crash, What Can You Expect From Your Carbon Fiber Bike?
Let’s say you hit a curb, ditch, rock, car, other cyclist or other object. At any speed above a fast walk, your body will continue to move forward, the momentum carrying you over the front of the bike. You cannot and will not stay on the bike and what happens to the frame, fork and other components is irrelevant to what happens to your body.
What should you expect from your carbon frame? It depends on many complex factors. But we can tell you that if the impact is hard enough, the fork or frame may be completely broken. Note the significant difference in behavior between carbon and metal. See pp. 16 - 17, Understanding metals in this Appendix. Even if the carbon frame was twice as strong as a metal frame,

once the carbon frame is overloaded it will not bend, it will break completely.

Inspection of Composite Frame, Fork, and Components

Cracks: Inspect for cracks, broken, or splintered areas. Any crack is serious. Do not ride any bicycle or component that has a crack of any size.
Delamination: Delamination is serious damage. Composites are made from layers of fabric. Delamination means that the layers of fabric are no longer bonded together. Do not ride any bicycle or component that has any delamination.
These are some delamination clues:
1. • A cloudy or white area. This kind of area looks different from the ordinary undamaged areas. Undamaged areas will look glassy, shiny, or “deep,” as if one was looking into a clear liquid. Delaminated areas will look opaque and cloudy.
2. • Bulging or deformed shape. If delamination occurs, the surface shape may change. The surface may have a bump, a bulge, soft spot, or not be smooth and fair.
3. • A difference in sound when tapping the surface. If you gently tap the surface of an undamaged composite you will hear a consistent sound, usually a hard, sharp sound. If you then tap a delaminated area, you will hear a different sound, usually duller, less sharp.
Unusual Noises: Either a crack or delamination can cause creaking noises while riding. Think about such a noise as a serious warning signal. A well maintained bicycle will be very quiet and free of creaks and squeaks. Investigate and find the source of any noise. It may not be a crack or delamination, but whatever is causing the noise must be fixed or replaced before riding.

WARNING: Do not ride a bicycle or component with any delamination or crack. Riding a delaminated or cracked frame, fork or other component could lead to complete failure, with risk of serious injury or death.

C. Understanding components
It is often necessary to remove and disassemble components in order to properly and carefully inspect them. This is a job for a professional bicycle mechanic with the special tools, skills and experience to inspect and service today’s high-tech high-performance bicycles and their components.

Aftermarket “Super Light” components
Think carefully about your rider profile as outlined above. The more you fit the “shorten product life” profile, the more you must question the use of super light components. The more you fit the “lengthen product life” profile, the more likely it is that lighter components may be suitable for you. Discuss your needs and your profile very honestly with your dealer.

Take these choices seriously and understand that you are responsible for the changes.
A useful slogan to discuss with your dealer if you contemplate changing components is “Strong, Light, Cheap –pick two.”

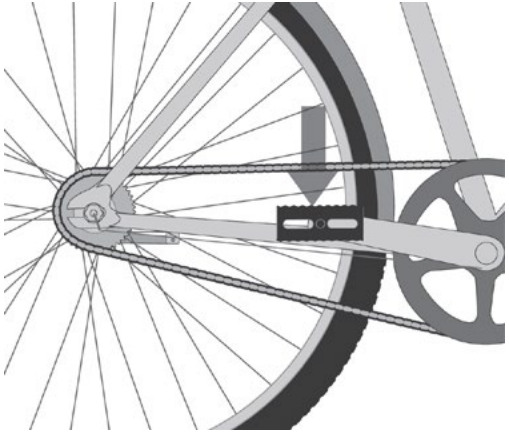
Original Equipment components
Bicycle and component manufacturers tests the fatigue life of the components that are original equipment on your bike. This means that they have met test criteria and have reasonable fatigue life. It does not mean that the original components will last forever. They won’t.

Appendix C
Coaster Brake

1. How the coaster brake works
The coaster brake is a sealed mechanism which is a part of the bicycle’s rear wheel hub. The brake is activated by reversing the rotation of the pedal cranks. Start with the pedal cranks in a nearly horizontal position, with the front pedal in about the 4 o’clock position, and apply downward foot pressure on the pedal that is to the rear. About 1/8 turn rotation will activate the brake. The more downward pressure you apply, the more braking force, up to the point where the rear wheel stops rotating and begins to skid.

WARNING: Before riding, make sure that the brake is working properly. If it is not working properly, have the bicycle checked by your dealer before you ride it.

WARNING: If your bike has only a coaster brake, ride conservatively. A single rear brake does not have the stopping power of front-andrear brake systems.



2. Adjusting your coaster brake
Coaster brake service and adjustment requires special tools and special knowledge. Do not attempt to disassemble or service your coaster brake. Take the bicycle to your dealer for coaster brake service.

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