
BICYCLE OWNER'S MANUAL
BIKE
BREAK AWAY

K2 Bike Owner's Manual For Multi-Speed Bicycles - 2003

IMPORTANT: This manual contains important safety, performance and service information. Read it before you take the first ride on your new bicycle, and keep it for reference.

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CONTENTS:

GENERAL WARNING:

Like any sport, bicycling involves risk of injury. By choosing to ride a bicycle, you assume the responsibility for that risk, so you need to know — and to practice — the rules of safe and responsible riding and of proper use and maintenance. Proper use and maintenance of your bicycle reduces risk of injury.
This Manual contains many warnings and cautions concerning the consequences of failure to maintain or inspect your bicycle and of failure to follow safe cycling practices.

- The combination of the ⚠ safety alert symbol and the word **WARNING** indicates a potentially hazardous situation which, if not avoided, could result in serious injury or death.
- The combination of the ⚠ safety alert symbol and the word **CAUTION** indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or is an alert against unsafe practices.
- The word **CAUTION** used without the safety alert symbol indicates a situation which, if not avoided, could result in serious damage to the bicycle or the voiding of your warranty.
- Many of the Warnings and Cautions state, "…you may lose control and fall." Because any fall can result in serious injury or even death, we do not always repeat the warning of possible injury or death.
- Because it is impossible to anticipate every situation or condition which can occur while riding, this Manual makes 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 which are the sole responsibility of the rider.

Note for Parents:

As a parent or guardian, you are responsible for the activities and safety of your minor child, and that includes making sure the bicycle is properly fitted to the child; that it is in good repair and safe operating condition; that you and your child have learned and understand the safe operation of the bicycle; and that you and your child have learned, understand and obey not only the applicable local motor vehicle, bicycle and traffic laws, but also the common sense rules of safe and responsible bicycling. As a parent, you should read this manual, as well as review its warnings and the bicycle's functions and operating procedures with your child, before letting your child ride the bicycle.

⚠ **WARNING. Make sure that your child always wears an approved bicycle helmet when riding; but also make sure that your child understands that a bicycle helmet is for bicycling only, and must be removed when not riding. A helmet must not be worn while playing, in play areas, on playground equipment, while climbing trees, or at any time while not riding a bicycle. Failure to follow this warning could result in serious injury or death.**

1. First

NOTE: We strongly urge you to read this Manual in its entirety before your first ride; but at the very least, read and make sure that you understand each point in this section, and refer to the cited sections on any issue which you don't completely understand.

A. Bike Fit

1. Is your bike the right size? To check, see Section 3.A. If your bicycle is too large or too small for you, you may lose control and fall. If your new bike is not the right size, ask your dealer to exchange it before you ride it.
2. Is the saddle at the right height? To check, see Section 3.B. If you adjust your saddle height, make sure that you follow the Minimum Insertion instructions in Section 3.B.

3. Are saddle and seatpost securely clamped? A correctly tightened saddle will allow no saddle movement in any direction. See Section 3.B for details.
4. Are the stem and handlebars at the right height for you? If not, see Section 3.C on what you can do about it.
5. Can you comfortably operate the brakes? If not, you may be able to adjust their angle and reach. See Section 3.D and 3.E for details.
6. Do you fully understand how to operate your new bicycle? If not, before your first ride, have your dealer explain any functions or features which you do not understand.

B. Safety First

1. Always wear an approved helmet when riding your bike, and follow the helmet manufacturer's instructions for fit, use and care of your helmet.
2. Do you have all the other required and recommended safety equipment? See Section 2. It's your responsibility to familiarize yourself with the laws of the areas where you ride, and to comply with all applicable laws.
3. Do you know how to correctly operate your wheel quick releases? Check Section 4.A.1 to make sure. Riding with an improperly adjusted wheel quick release can cause the wheel to wobble or disengage from the bicycle, and cause serious injury or death.
4. If your bike has toeclips and straps or clipless ("step-in") pedals, make sure you know how they work (see Section 4.E). These pedals require special techniques and skills. Follow the pedal manufacturer's instructions for use, adjustment and care.
5. Does your bike have suspension? If so, check Section 4.F. Suspension can change the way a bicycle performs. Follow the suspension manufacturer's instructions for use, adjustment and care.
6. Do you have "toe overlap?" On smaller framed bicycles your toe or toeclip may be able to contact the front wheel when a pedal is all the way forward and the wheel is turned. See section 4.E.

C. Mechanical Safety Check

Routinely check the condition of your bicycle before every ride.

Nuts, bolts & straps: Make sure nothing is loose. Lift the front wheel off the ground by two or three inches, then let it bounce on the ground. Anything sound, feel or look loose? Do a quick visual and tactile inspection of the whole bike. Any loose parts or accessories? If so, secure them. If you're not sure, ask someone with experience to check.

Tires & Wheels: Make sure tires are correctly inflated (see Section 4.G.1). Check by putting one hand on the saddle, one on the intersection of the handlebars and stem, then bouncing your weight on the bike while looking at tire deflection. Compare what you see with how it looks when you know the tires are correctly inflated; and adjust if necessary. Are the tires in good shape? Spin each wheel slowly and look for cuts in the tread and sidewall. Replace damaged tires before riding the bike. Are the wheels true? Spin each wheel and check for brake clearance and side-to-side wobble. If a wheel wobbles side to side even slightly, or rubs against or hits the brake pads, take the bike to a qualified bike shop to have the wheel trued.

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

Brakes: Check the brakes for proper operation (see Sections 4.C). Squeeze the brake levers. Are the brake quick-releases closed? All control cables seated and securely engaged? Do the brake pads touch the wheel rim within an inch of brake lever movement? Can you apply full braking force at the levers without having them touch the handlebar? If not, your brakes need adjustment. Do not ride the bike until the brakes are properly adjusted.

Quick Releases: Make sure the front wheel, rear wheel and seat post quick releases are properly adjusted and in the locked position. See Section 4.A and 4.B.

Handlebar and Saddle Alignment: Make sure the saddle and handlebar stem are parallel to the bike's center line and clamped tight enough so that you can't twist them out of alignment. See Sections 3.B and 3.C. If not, align and tighten them.

Handlebar Ends: Make sure the handlebar grips are secure and in good condition. If not, replace them. Make sure the handlebar ends and extensions are plugged. If not, plug them before you ride. If the handlebars have bar end extensions, make sure they are clamped tight enough so you can't twist them. If not, tighten them.

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

D. The First Ride

When you buckle on your helmet and go for your first familiarization ride on your new bicycle, be sure to pick a controlled environment, away from cars, other cyclists, obstacles or other hazards. Ride to become familiar with the controls, features and performance of your new bike. Familiarize yourself with the **braking action** of the bike (see Section 4.C). Test the brakes at slow speed, putting your weight toward the rear and gently applying the brakes, rear brake first. Sudden or excessive application of the front brake could pitch you over the handlebars. Applying brakes too hard can lock up a wheel, which could cause you to lose control and fall. If your bicycle has **toeclips** or **clipless pedals**, practice getting in and out of the pedals. See paragraph B.4 above. If your bike has **suspension**, familiarize yourself with how the suspension responds to brake application and rider weight shifts. See paragraph B.5 above and Section 4.F. Practice shifting the gears (see Section 4.D). Remember to never move the shifter while pedaling backward, nor pedal backwards after having moved the shifter. This could jam the chain and cause serious damage to the bicycle. Check out the handling and response of the bike; and check the comfort.

If you have any questions, or if you feel anything about the bike is not as it should be, take the bike back to your dealer for advice.

2. Safety

fig. 1

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

A. The Basics

1. Always wear a cycling helmet which meets the latest certification standards and 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 a helmet.
2. Always perform the Mechanical Safety Check (Section 1.C) before you get on a bike.
3. Be thoroughly familiar with the controls of your bicycle: brakes (Section 4.C.); pedals (Section 4.E.); shifting (Section 4.D.)
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. Never ride barefoot or while wearing 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 guard against airborne dirt, dust and bugs — tinted when the sun is bright, clear when it's not.
6. Don't jump with your bike. Jumping a bike, particularly a BMX or mountain bike, can be fun; but it puts incredible stress on everything from your spokes to your pedals. Riders who insist on jumping their bikes risk serious damage, to their bicycles as well as to themselves.
7. Ride at a speed appropriate for conditions. Increased speed means higher risk.

B. Riding Safely

1. Observe all local bicycle laws and regulations. Observe regulations about licensing of bicycles, riding on sidewalks, laws regulating bike path and trail use, and so on. Observe helmet laws, child carrier laws and special bicycle traffic laws. It's your responsibility to know and obey the laws.
2. You are sharing the road or the path with others — motorists, pedestrians and other cyclists. Respect their rights.
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, or coming 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 otherwise cause you to lose control and have an accident.
    - The many other hazards and distractions which can occur on a bicycle ride.
5. Ride in designated bike lanes, on designated bike paths or as close to the edge of the road as possible.
6. Stop at stop signs and traffic lights; slow down and look both ways at street intersections. Remember that a bicycle always loses in a collision with a motor vehicle, so be prepared to yield even if you have the right of way.
7. Use 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, unless it is a small child wearing an approved helmet and secured in a correctly mounted child carrier or a child-carrying trailer.

10. Never carry anything which obstructs your vision or your complete control of the bicycle, or which could become entangled in the moving parts of the bicycle.
11. Never hitch a ride by holding on to another vehicle.
12. Don't do stunts, wheelies or jumps. They can cause you injury and damage your bike.
13. Don't weave through traffic or make any moves that may surprise people with whom you are sharing the road.
14. Observe and yield the right of way.
15. Never ride your bicycle while under the influence of alcohol or drugs.
16. If possible, avoid riding in bad weather, when visibility is obscured, at dusk or in the dark, or when extremely tired. Each of these conditions increases the risk of accident.

C. Off Road Safety

1. The variable conditions and hazards of off-road riding require close attention and 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. Don't do stunts, wheelies or jumps. They can cause you injury and damage your bike.
5. Learn and obey the local laws regulating where and how you can ride off-road, and respect private property.
6. You are sharing the trail with others — hikers, equestrians, other cyclists. Respect their rights.
7. Yield right of way to pedestrians and animals. Ride in a way that does not frighten or endanger them, and stay far enough away so that their unexpected moves don't endanger you.
8. 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.

9. Be prepared. If something goes wrong while you're riding off-road, help may not be close.

D. Wet Weather Riding

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

Under wet conditions, the stopping power of your brakes (as well as the brakes of other vehicles sharing the road) is dramatically reduced and your tires don't grip nearly as well. This makes it harder to control speed and easier to lose control. To make sure that you can slow down and stop safely in wet conditions, ride more slowly and apply your brakes earlier and more gradually than you would under normal, dry conditions. See also Section 4.C.

E. Night Riding

Riding a bicycle at night is many times 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 should not ride at dawn, at dusk or at night unless it is absolutely necessary.

Bicycle reflectors are designed to pick up and reflect streetlights and car lights in a way that may help you to be seen and recognized as a moving bicyclist.

⚠ 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.

⚠ 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 or loose reflectors.

The mounting brackets of front and rear reflectors are often designed as cantilever 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 may reduce 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 the brake straddle cable catching on the tire in the event of brake cable failure. If a brake straddle cable catches on the tire, it can cause the wheel to stop suddenly, causing you to loose control and fall.**

If you must 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:

- Make sure that your bicycle is equipped with correctly positioned and securely mounted reflectors (see Section 3.B.2).
- Purchase and install battery or generator powered head and tail lights which meet all regulatory requirements 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 ... 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.
- While riding at dawn, at dusk or at night:
  a. Ride slowly.
  b. Avoid dark areas and areas of heavy or fast-moving traffic.
  c. Avoid road hazards.
  d. If possible, ride on familiar routes.

F. Downhill or Competition Biking

If you ride downhill at speed or in competition, you voluntarily assume an increased risk of injury or death. When riding downhill, you can reach speeds seen on motorcycles, and therefore face similar hazards and risks. Have your bicycle and equipment carefully inspected by a qualified mechanic and be sure it is in perfect condition. Consult with expert riders and race officials on conditions and equipment advisable at the site where you plan to ride. For mountain biking, 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: High-speed downhill or competition riding can lead to serious accidents. Wear appropriate safety gear and be sure your bike is properly maintained. Even with state-of-the-art protective safety gear, you could be seriously injured or killed when riding downhill at speed or in competition.**

G. 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.

⚠ **WARNING: Failure to confirm compatibility, properly install, operate and maintain any component or accessory can result in serious injury or death. Changing the components on your bike may void the warranty. Refer to your warranty, and check with your dealer before changing the components on your bike.**

3. Fit

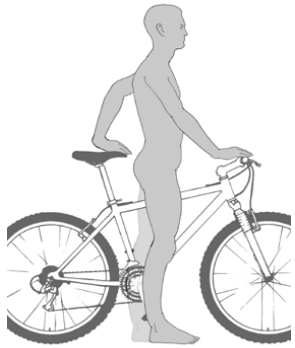


fig. 2

⚠ WARNING: Correct fit is an essential element of bicycling safety, performance and comfort. Making the adjustments to your bicycle which result in correct fit for your body and riding conditions requires experience, skill and special tools. Always have your dealer make the adjustments on your bicycle; or, if you have the experience, skill and tools, have your dealer check your work before riding. If your bicycle does not fit properly, you may lose control and fall. If your new bike doesn't fit, ask your dealer to exchange it before you ride it.

A. Standover Height

fig. 3

Standover height is the basic element of bike fit (see fig. 2). It is the distance from the ground to the top of the bicycle's frame at that point where your crotch would be if you were straddling the bike and standing half way between the saddle and the handlebars. To check for correct standover height, straddle the bike while wearing the kind of shoes in which you'll be riding, and bounce vigorously on your heels. If your crotch touches the frame, the bike is too big for you. Don't even ride the bike around the block. A bike which you ride only on paved surfaces and never take off-road should give you a minimum standover height clearance of five centimeters. A bike that you'll ride on unpaved surfaces should give you a minimum of ¼" of standover height clearance. And a bike that you'll use for real mountain biking on difficult, rough terrain should give you ½" or more of clearance.

B. Saddle Position

Correct saddle adjustment is an important factor in getting the most performance and comfort from your bicycle. If the saddle position is not comfortable for you, see your dealer, who has the tools and skill to change it.The saddle can be adjusted in three directions:

1. **Up and Down Adjustment.** Check for correct saddle height (fig. 3):
   - sit on the saddle;
   - place one heel on a pedal;
   - rotate the crank until the pedal with your heel on it is in the down position and the crank arm is parallel to the seat tube.

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

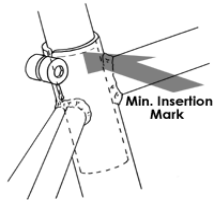


fig. 4

   Once the saddle is at the correct height, make sure that the seatpost does not project from the frame beyond its "Minimum Insertion" or "Maximum Extension" mark (fig. 4).

   If your bike has an interrupted seat tube, as is the case on some bikes with rear suspension, you must also make sure that the seat post is far enough into the frame so that you can touch it through the bottom of the interrupted seat tube with the tip of your finger without inserting your finger beyond its first knuckle (see fig. 5).

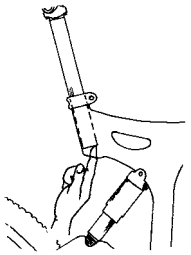


fig. 5

⚠ **WARNING: If your seat post projects from the frame beyond the Minimum Insertion or Maximum Extension mark (see fig. 4) or you cannot touch the bottom of the seat post through the bottom of the interrupted seat tube with the tip of your finger without inserting your finger beyond its first knuckle (see fig. 5), the seat post may break, which could cause you to lose control and fall.**

2. **Front and Back Adjustment.** The saddle can be adjusted forward or back to help you get the optimal position on the bike. Ask your dealer to set the saddle for your optimal riding position and to show you how to make further adjustments.
3. **Saddle Angle Adjustment.** Most people prefer a horizontal saddle; but some riders like the saddle nose angled up or down just a little. Your dealer can adjust saddle angle or teach you how to do it.

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

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

⚠ **WARNING: Some people have claimed that extended riding with a saddle which is incorrectly adjusted or which does not support your pelvic area correctly can cause short-term or long-term injury to nerves and blood vessels, or even impotence. If your saddle causes you pain, numbness or other discomfort, see your dealer.**

C. Handlebar Height and Angle

Your bike is equipped either with a "threadless" stem, which clamps on to the outside of the steerer tube, or with a "quill" stem, which clamps inside the steerer tube by way of an expanding binder bolt. If you aren't absolutely sure which type of stem your bike has, ask your dealer. If your bike has a "threadless" stem, your dealer may be able to change handlebar height by moving height adjustment spacers from below the stem to above the stem, or vice versa. Otherwise, you'll have to get a stem of different length or rise. Consult your dealer. Do not attempt to do this yourself, as it requires special knowledge. If your bike has a "quill" stem, you can ask your dealer to adjust the handlebar height a bit by adjusting stem height. A quill stem has an etched or stamped mark on its shaft which designates the stem's "Minimum Insertion" or "Maximum extension". This mark must not be visible above the headset.

⚠ **WARNING: On some bicycles, changing the stem or stem height can affect the tension of the front brake cable, locking the front brake or creating excess cable slack which can make the front brake inoperable. If the front brake pads move in towards the wheel rim or out away from the wheel rim when the stem or stem height is changed, the brakes must be correctly adjusted before you ride the bicycle.**

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

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

D. Control Position Adjustments

The angle of the controls and their position on the handlebars can be changed. Ask your dealer to make the adjustments for you.

E. Brake Reach

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

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

4. Tech

It's important to your safety, performance and enjoyment to understand how things work on your bicycle. If you have even the slightest doubt as to whether you understand something in this section of the Manual, talk to your dealer.

A. Wheels

1. **Wheel Quick Release Description.** The wheel quick release uses a cam action to clamp the bike's wheel in place (see fig. 6). Because of its adjustable nature, it is critical that you understand how it works, how to use it properly, and how much force you need to apply to secure the wheel.

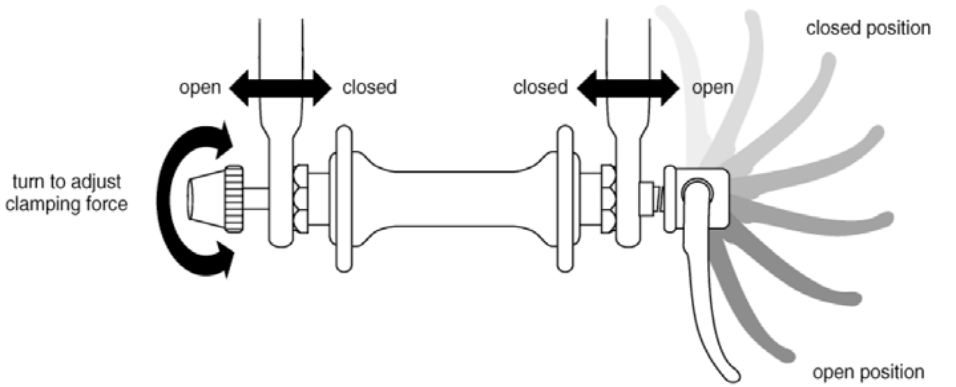


fig. 6

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

3. **Front Wheel Secondary Retention Devices.** Most bicycles have front forks which utilize a secondary wheel retention device to keep the wheel from disengaging if the quick release is incorrectly adjusted. Secondary retention devices are not a substitute for correct quick release adjustment. Ask your dealer to explain the particular secondary retention device on your bike.

Secondary retention devices fall into two basic categories:

a. The clip-on type is a part 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.

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

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

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

4. Removing and Installing Quick Release Wheels

a. Removing a Quick Release Front Wheel. Follow these simple steps:
   (1) If your bike has rim brakes, disengage the brake's quick-release mechanism to open the clearance between the wheel rim and the brake pads (See Section 4.C fig. 11 through 14).
   (2) Move the wheel's quick-release lever from the locked or CLOSED position to the OPEN position (figs. 7a & b). If your front fork does no have a secondary retention device go to step (5).
   (3) If your front fork has a clip-on type secondary retention device, disengage it and go to step (5).
   (4) If your front fork has an integral secondary retention device, loosen the tension-adjusting nut enough to allow removing the wheel; then go to the next step.
   (5) Raise the front wheel a few inches off the ground and tap the top of the wheel with the palm of your hand to knock the wheel out of the front fork.

fig. 7a

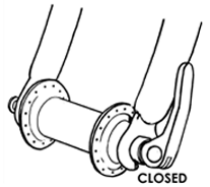
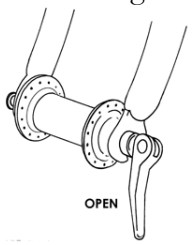


fig. 7b



⚠ **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 the wheel safely in the dropouts.**

⚠ **CAUTION: If your bike is equipped with disk brakes, 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 Section 4.C.**

b. Installing a Quick Release Front Wheel
   (1) Move the quick-release lever so that it curves away from the wheel (fig. 7b). This is the OPEN position.
   (2) With the steering fork facing forward, insert the wheel between the fork blades so that the axle seats firmly at the top of the slots which are at the tips of the fork blades — the fork dropouts. The quick-release lever should be on the left side of the bicycle (fig.7a & b). If your bike has a clip-on type secondary retention device, engage it.
   (3) Holding the quick-release lever in the OPEN position with your right hand, tighten the tension adjusting nut with your left hand until it is finger tight against the fork dropout (fig. 6).

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

   (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, move the quick-release lever upwards and swing it into the CLOSED position (fig. 6 & 7a). 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.

(5) If the lever cannot be pushed all the way to a position parallel to the fork blade, return the lever to the OPEN position. Then turn the tension-adjusting nut counterclockwise one-quarter turn and try tightening the lever again.
(6) Re-engage the brake quick-release mechanism to restore correct brake pad-to-rim clearance; 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.

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

c. Removing a Quick Release Rear Wheel
(1) Shift the rear derailleur to high gear (the smallest, outermost rear sprocket).
(2) If your bike has rim brakes, disengage the brake's quick-release mechanism to open the clearance between the wheel rim and the brake pads (see Section 4.C, figs. 11 through 14).
(3) Pull the derailleur body back with your right hand.
(4) Move the quick-release lever to the OPEN position (fig. 7b).
(5) Lift the rear wheel off the ground a few inches and, with the derailleur still pulled back, push the wheel forward and down until it comes out of the rear dropouts.

d. Installing a Quick Release Rear Wheel
(1) Shift the rear derailleur to its outermost position
(2) Pull the derailleur body back with your right hand.
(3) Move the quick-release lever to the OPEN position (see fig. 10). The lever should be on the side of the wheel opposite the derailleur and freewheel sprockets.
(4) Put the chain on top of the smallest freewheel sprocket. Then, insert the wheel into the frame dropouts and pull it all the way in to the dropouts.

(5) Tighten the quick-release adjusting nut until it is finger tight against the frame dropout; then swing the lever toward the front of the bike until it is parallel to the frame's chainstay or seatstay and is curved toward the wheel (fig. 7b). To apply enough clamping force, you should have to wrap your fingers around a frame tube for leverage, and the lever should leave a clear imprint in the palm of your hand.

NOTE: If your bike is equipped with disk brakes, 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.

⚠ **WARNING: Securely clamping the wheel takes considerable force. If you can fully close the quick release without wrapping your fingers around the seatstay or chainstay for leverage, and the lever does not leave a clear imprint in the palm of your hand, the tension is insufficient. Open the lever; turn the tension adjusting nut clockwise a quarter turn; then try again.**

(6) If the lever cannot be pushed all the way to a position parallel to the chainstay or seatstay tube, return the lever to the OPEN position. Then turn the adjusting nut counterclockwise one-quarter turn and try tightening again.
(7) Push the rear derailleur back into position.
(8) Re-engage the brake quick-release mechanism to restore correct brake pad-to-rim clearance; 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.

5. Removing and Installing Bolt-On Wheels

a. Removing a Bolt-On Front Wheel

(1) If your bike has rim brakes, disengage the brake's quick-release mechanism to open the clearance between the wheel rim and the brake pads (see Section 4.C, figs. 11 through 14).

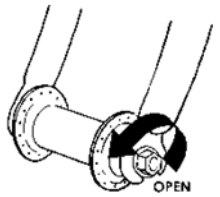


fig. 8

(2) Using a correct size wrench, loosen the two axle nuts.

(3) If your front fork has a clip-on type secondary retention device, disengage it and go to he next step. If your front fork has an integral secondary retention device, loosen the axle nuts enough to allow wheel removal; then go to the next step.
(4) Raise the front wheel a few inches off the ground and tap the top of thewheel with the palm of your hand to knock the wheel out of the fork ends.

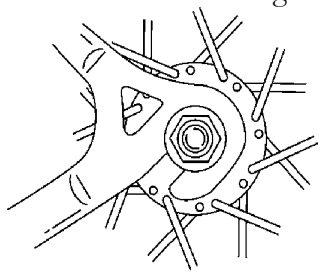
b. Installing a Bolt-On Front Wheel
(1) With the steering fork facing forward, insert the wheel between the fork blades so that the axle seats firmly at the top of the slots which are at the tips of the fork blades. The axle nut washers should be on the outside, between the fork blade and the axle nut. If your bike has a clip-on type secondary retention device, engage it.
(2) While pushing the wheel firmly to the top of the slots in the fork dropouts, and at the same time centering the wheel rim in the fork, use the correct size wrench to tighten the axle nuts as tight as you can.
(3) Re-engage the brake quick-release mechanism to restore correct brake pad-to-rim clearance; 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 Bolt-On Rear Wheel
(1) If your bike has rim brakes, disengage the brake's quick-release mechanism to open the clearance between the wheel rim and the brake pads (see Section 4.C, figs. 11 through 14). Shift the rear derailleur to high gear (the smallest rear sprocket) and pull the derailleur body back with your right hand.
(2) Using a correctly sized wrench, loosen the two axle nuts.
(3) Lift the rear wheel off the ground a few inches and, with the derailleur still pulled back, push the wheel forward and down until it comes out of the rear dropouts.

⚠ **WARNING: If your bike is equipped with an internal gear rear hub, do not attempt to remove the rear wheel. The removal and re-installation of internal gear hubs require special knowledge. Incorrect removal or assembly can result in hub failure, which can cause you to lose control and fall.**

d. Installing a Bolt-On Rear Wheel

fig. 9



Bolt-on Wheel in Rear Dropouts

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

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

(3) Using the correct size wrench, tighten the axle nuts as tightly as you can.

(4) Push the rear derailleur back into position.

(5) Re-engage the brake quick-release mechanism to restore correct brake pad-to-rim clearance; 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.

B. Seatpost Quick Release. Some bikes are equipped with a quick-release seat post binder. The seatpost quick-release binder works exactly like the wheel quick-release (Section 4.A.1). While a quick release looks like a long bolt with a lever on one end and a nut on the other, the quick release uses a cam action to firmly clamp the seat post (see fig. 6).

⚠ **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:**

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

Adjusting the seatpost quick release mechanism. The action of the quick release cam squeezes the seat collar around the seat post to hold the seat post securely in place. 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 seatpost securely. Holding the nut with one hand and turning the lever like a wing nut with the other hand until everything is as tight as you can get it will not clamp the sea tpost safely.**

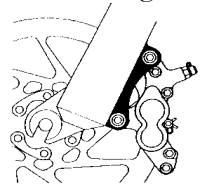
⚠ **WARNING: If you can fully close the quick release without wrapping your fingers around a frame tube for leverage, and the lever does not leave a clear imprint in the palm of your hand, the tension is insufficient. Open the lever; turn the tension adjusting nut clockwise a quarter turn; then try again.**

C. Brakes

1. **How Brakes Work.** It's very important to your safety that you learn and remember which brake lever controls which brake on your bike. The braking action of a bicycle is a function of the friction between the brake surfaces - usually the brake pads and the wheel rim. To make sure that you have maximum friction available, keep your wheel rims and brake pads clean and free of lubricants, waxes or polishes.

   Make sure that your hands can reach and squeeze the brake levers comfortably. If your hands are too small to operate the levers comfortably, consult your dealer before riding the bike. The lever reach may be adjustable; or you may need a different brake lever design.

   fig. 10

   Most 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. 11. 12, 13 & 14) and check each time to make sure both brakes work correctly before you get on the bike.

   fig. 11

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.

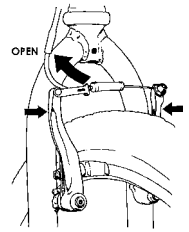


fig. 12

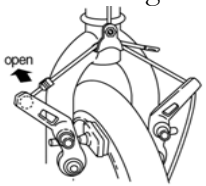


fig. 13

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).

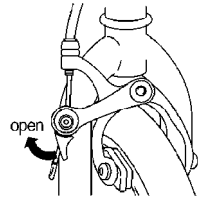
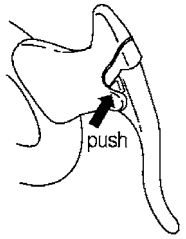


fig. 14

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 Section 4.F). Practice braking and weight transfer techniques where there is no traffic or

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

⚠ WARNING:

- **Riding with improperly adjusted brakes or worn brake pads is dangerous and can result in serious injury or death.**
- **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.**
- **Some bicycle brakes, such as disc brakes (fig. 10) and linear-pull brakes (fig.11), are extremely powerful. Take extra care in becoming familiar with these brakes and exercise particular care when using them.**
- **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.**
- **See the brake manufacturer's instructions for installation, operation and care of your disk brake. If you do not have the manufacturer's instructions, see your dealer or contact the brake manufacturer.**

D. Shifting Gears

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

⚠ 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.

1. How a Derailleur Drivetrain Works

a. Parts of the Drivetrain. If your bicycle has a derailleur drivetrain, the gear-changing mechanism will have:

(1) a rear cassette or freewheel sprocket cluster
(2) a rear derailleur
(3) usually a front derailleur
(4) one or two shifters
(5) one, two or three front sprockets called chainrings

fig. 15

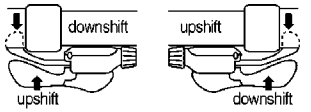
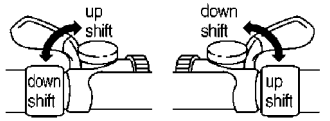


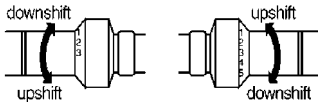
fig. 16



b. Shifting Gears. The different types of shifters and their operation are illustrated in figures 15 through 20. Identify the shifters on your bike before reading on.

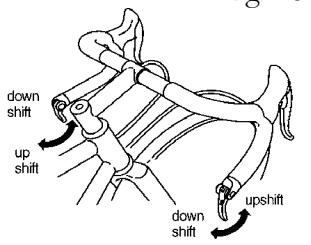
The vocabulary of shifting can be pretty confusing. A downshift is a shift to a "slower" gear, one which is easier to pedal. An upshift is a shift to a "faster", harder to pedal gear. What's confusing is that what's happening at the front derailleur is the opposite of what's happening at the rear derailleur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

fig. 17



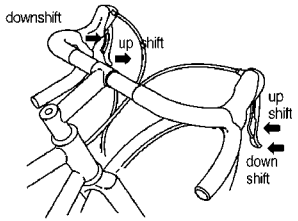
Whether upshifting or downshifting, the bicycle derailleur system design requires that the drive chain be moving forward and be under at least some tension. A derailleur will shift only if you are pedaling forward.

fig. 18



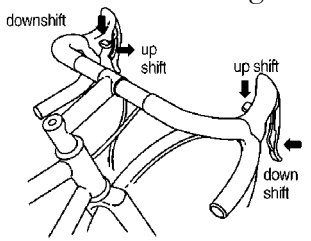
⚠ CAUTION: Never move the shifter while pedaling backward, nor pedal backwards after having moved the shifter. This could jam the chain and cause serious damage to the bicycle.

fig. 19



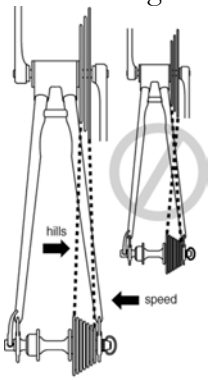
c. Shifting the Rear Derailleur. The rear derailleur is controlled by the right shifter. The function of the rear derailleur is to move the drive chain from one gear sprocket to another. The smaller sprockets on the gear cluster produce higher gear ratios. Pedaling in the higher gears requires greater 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.

fig. 20



d. 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).

fig. 21



e. Which Gear Should I Be In? The combination of largest rear and smallest front gears(fig. 21) 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 other traffic, until you've built up your confidence. If you have difficulties with shifting, the problem could be mechanical adjustment. See your dealer for help.

2. **How an Internal Gear Hub Drivetrain Works.** If your bicycle has an internal gear drivetrain, the gear changing mechanism will consist of:
   - a 3, 5, 7 or possibly 12 speed internal gear hub
   - one, or sometimes two shifters
   - one or two control cables
   - one front sprocket called a chainring
   - the drive chain

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

   b. Which Gear Should I Be In? The numerically lowest gear (1) is for the steepest hills. The numerically largest gear (3, 5, 7 or 12, depending on the number of speeds of your hub) is for the greatest speed. Shifting from an easier, "slower" gear (like 1) to a harder, "faster" gear (like 2 or 3) is called an upshift. Shifting from a harder, "faster" gear to an easier, "slower" gear is called a downshift. It is not necessary to shift gears in sequence. Instead, find the "starting gear" for the conditions — a gear which is hard enough for quick acceleration but easy enough to let you start from a stop without wobbling — and experiment with upshifting and downshifting to get a feel for the different gears. At first, practice shifting where there are no obstacles, hazards or other traffic, until you've built up your confidence. If you have difficulties with shifting, the problem could be mechanical adjustment. See your dealer for help.

E. Pedals

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

Toe Overlap is when your toe can touch the front wheel when you turn the handlebars to steer while a pedal is in the forward most position. This is common on small-framed bicycles, and is avoided by keeping the inside pedal up and the outside pedal down when turning.

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

⚠ WARNING: Toe Overlap could cause you to lose control and fall. If you have toe overlap, exercise extra care when turning.

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.

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

⚠ **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. Using shoes which do not engage the pedals correctly is dangerous. 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. 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.**

Clipless pedals (sometimes called "step-in pedals") are another means to keep 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 and cleats which are compatible with the make and model of the 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.

F. Bicycle Suspension

⚠ 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.

⚠ 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.

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.

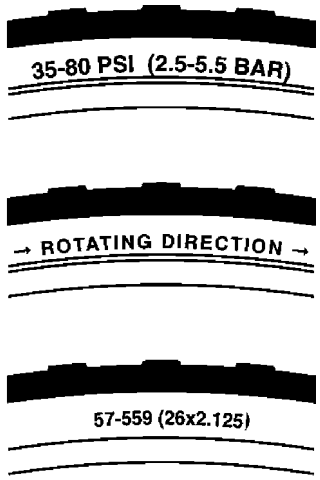
If your bike has suspension, the increased speed you may develop also increases your risk of injury. For example, when braking, the front of a suspended bike dips. You could lose control and fall if you do not have experience with this system. Learn to handle your suspension system safely. See also Section 4.C.

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.

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

G. Tires and Tubes

fig.22



Tire Markings

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 (see fig. 22). The part of this information which is most important to you is tire pressure. 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.

   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.

⚠ **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.**

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

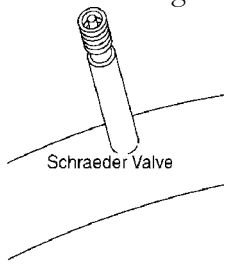
⚠ CAUTION: Pencil type automotive tire gauges can be inaccurate and should not be relied upon for consistent, accurate pressure readings. Instead, use a high quality dial gauge.

⚠ WARNING: 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.

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

2. Tire Valves. There are primarily two kinds of bicycle tube valves: The Schraeder Valve and the Presta Valve. The bicycle pump you use must have the fitting appropriate to the valve stems on your bicycle.

fig 23

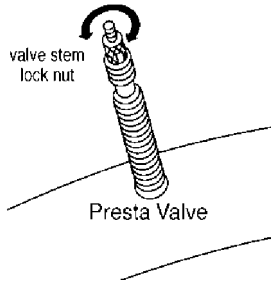


a. The Schraeder valve (fig. 23) is like the valve on a car tire. To inflate a Schraeder valve tube, remove the valve cap and clamp the pump fitting onto the end of the valve stem. To let air out of a Schraeder valve, depress the pin in the end of the valve stem with the end of a key or other appropriate object.

b. The Presta valve (fig. 24) has a narrower diameter and is only found on bicycle tires. To inflate a Presta valve tube using a Presta headed bicycle pump, remove

tires. To inflate a Presta valve tube using a Presta headed bicycle pump, remove the valve cap; unscrew (counterclockwise) the valve stem lock nut; and push down on the valve stem to free it up. Then push the pump head on to the valve head, and inflate. To inflate a Presta valve with a Schraeder 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 Schraeder 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.

fig. 24



H. K2 Razorback Set-Up Instructions

1. **Air Pressure Spring Adjustment.** To receive the best performance from your K2 Razorback, it is necessary to adjust the suspension. The Razorback is equipped with a rear air shock. Air pressure within the shock unit becomes the suspension spring, and should be set to a rider's weight and riding style. A guideline for the airpressure can be found on the left chainstay of the Razorback (fig. 25). Find your weight on the graph, and note the recommended pounds per square inch (p.s.i.) rating. It should be noted that air pressure is a personal preference and can be adjusted accordingly. Riding without enough air pressure can cause excessive shock "bottom out" (or compression) and damage the frame or shock unit. There are two Schrader-type valves on the Razorback shock body. The one closest to the seattube will adjust the air spring (fig 26), while the second located closest to the red rebound adjuster is an air bleed valve. It is recommended that the bleed valve always be set to 0 p.s.i. To adjust the air spring, remove the dust cap and fit the high pressure pump to the valve. Note the current p.s.i. rating and add or reduce the amount of pressure accordingly. For more information, refer to the Fox Shox Owner's Manual.

Fig. 25

2. **Rebound Adjustment.** All K2 Razorback rear shock units are equipped with a rebound adjustment. Rebound is the movement of the shock unit from a compressed mode to an uncompressed mode. Rebound damping controls the speed at which the shock returns to the uncompressed position. While riding, the shock unit is constantly moving between compressed and non-compressed modes. Rebound damping is adjusted by rotating the red rebound adjuster wheel (fig. 27). There are twelve adjustment increments, ranging in performance from near lockout to no damping. Rotation toward the "+" sign provides greater damping, while "-" applies less damping. More damping means slower rebound. The proper rebound setting is a personal preference and varies upon your weight and riding style. Experts agree that rebound should be as fast as possible, without kicking back, or bucking the rider from the saddle when experiencing larger bumps.

3. **Lockout lever.** All Razorbacks offer rear travel lockout. The lockout lever (fig. 28) is anodized blue and can be found on the head of the pull shock near the rebound adjustment wheel. Lockout provides the rider with the ability to turn their full-suspension bicycle into a hardtail at the flip of the lever. There is a safety blow-off feature that helps prevent blown air seals. If the bump force on the rear wheel is high enough while the lockout is engaged, the blow-off valve will open, allowing the shock unit to compress.

NOTE: When the red rebound wheel is advanced to positions towards full in, or full clock-wise, the blue lock-out lever will feel slack or such that minimal or no force is applied by the adjuster rod. This is not a functional fault.

Fig. 26

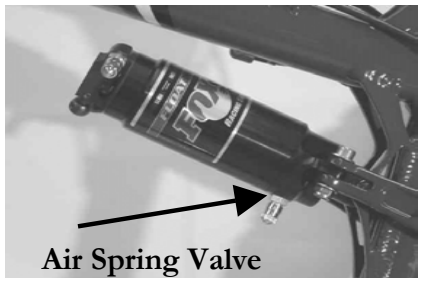


Fig. 27

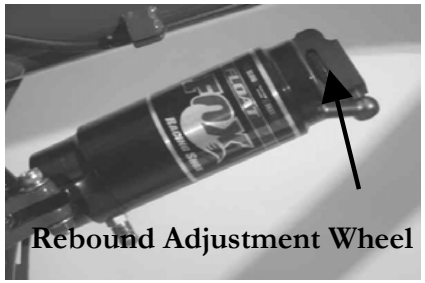
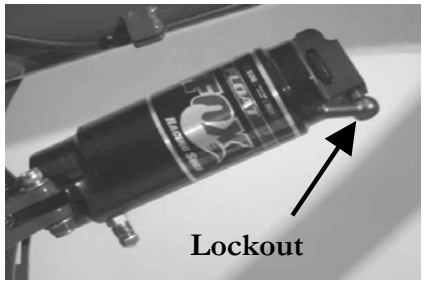


Fig. 28



4. **Adjustable Geometry.** All Razorbacks offer adjustable geometry. The integrated shock mount comes with an A and a B position. The two positions allow you to set up the bicycle with a 71.8 degree head angle with a 3 inch or 4 inch travel fork. It is also possible to adjust the geometry to your personal preference. Please see (Fig. 29) for the correct angles.

Fig. 29

Fork Travel	3"/75mm	4"/100mm
Position **A** Head Angle	71.8°	71.0°
Position **B** Head Angle	72.6°	71.8°

I. K2 Tirade Set-Up Instructions

1. **Spring Preload Adjustment.** To receive the best performance from your K2 Tirade, it is necessary to adjust the suspension.
   a. What is Sag? "Sag" is the amount a shock compresses (or sags) when you sit on the bicycle. Increasing the spring preload will make the shock sag, or compress less. Decreasing the spring preload will make the shock compress, or sag more. Sag should equal 25% of the shock stroke for most usage. You will get the best performance if you achieve the proper amount of SAG with one turn of preload.
   b. Adjusting the Sag. The shock stroke of the K2 Tirade is 2.0"/50mm and the recommended sag would be 25% of the total travel, or 0.5"/13mm. In general, the following procedure would allow you to determine the sag for any shock unit.
      (1) Measure the shock eye-to-eye (the distance from the center of one mounting bolt to the center of the other mounting bolt). Call this dimension "A."
      (2) Sit on the bicycle in a normal riding position, weighting both the handlebars and saddle. Have an assistant measure the shock unit eye-to-eye. This is dimension "B."
      (3) The difference between dimensions "A" and "B" is the sag. If the sag is less than 25% of the stroke, decrease the preload. If the sag is greater than 25% of the stroke), increase the preload. The preload adjustment process varies a bit depending upon the type of shock unit the bicycle is equipped with.

c. Adjusting the Coil Shock Preload.

(1) A coil-sprung shock's preload is adjusted by rotating the knurled preload nut that compresses the coil. By gripping the spring as in (fig. 30) and rotating, you can usually perform the adjustment. To begin, loosen the preload completely until the coil is loose. Then, tighten one turn or until the coil is no longer loose. We will call this the "adjustment starting position."

(2) Measure the sag.

(3) To increase the sag from the adjustment starting position, it is recommended that a lighter spring be purchased and fitted for proper function. To increase the preload, rotate the spring/nut clockwise. K2 recommends no more than five spring/nut rotations beyond the adjustment starting position to achieve the target sag. If more that five rotations are required, it is recommended that a heavier spring be purchased and fitted for proper function.

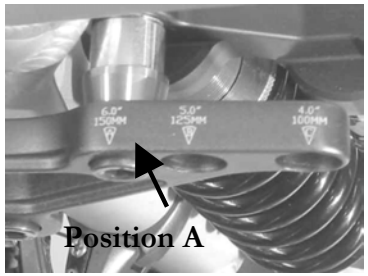
Fig. 30

Fig. 31

d. Adjusting the Air Shock Preload. Adjusting the preload for an air-sprung shock unit requires a high-pressure shock pump fitted with a Schraeder-type valve adaptor (fig 31). Sag will vary by the amount of air pressure in the air spring chamber. Higher Pressure = Higher Preload = Less Sag. Lower Pressure = Lower Preload = More Sag. Again, by trial and error, add or decrease the pressure in the air spring to reach the 25% sag target.

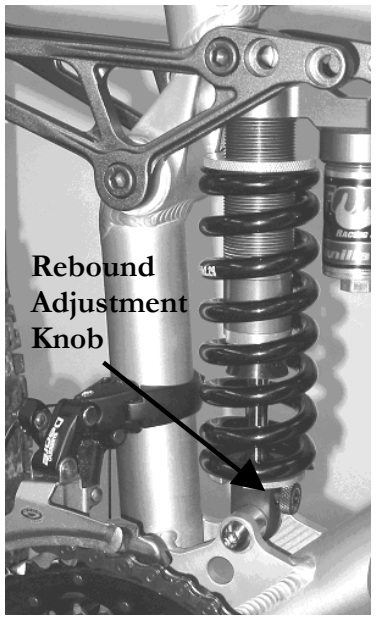
2. **Wheel Travel Adjustment.** The K2 Tirade offers three travel options; with two inches of range we call Broadband Travel. The travel increments will match up to the most popular suspension fork offerings for a truly balanced ride. Position A, as in (fig. 32), will give you 6" of rear wheel travel. The other two positions provide 5" or 4" of rear wheel travel, as indicated by the laser etched markings on the linkage plates. The geometry of the Tirade is virtually unchanged from one travel increment to the other, so no further adjustments need be made to maintain the preferred action and feel of the bike.

Fig. 32



3. **Rebound Adjustment.** All K2 Tirade shock units are equipped with rebound adjustment. Rebound is the movement of the shock unit from a compressed mode to an uncompressed mode. Rebound damping controls the speed at which the shock returns to the uncompressed position. While riding, the shock unit is constantly moving between compressed and non-compressed modes. Rebound damping is adjusted by rotating the rebound adjuster knob (fig. 33). Clockwise rotation toward the "+" sign provides greater damping, while "-" applies less damping. More damping means slower rebound. The proper rebound setting is a personal preference and varies upon your weight and riding style. Experts agree that rebound should be as fast as possible, without kicking back, or bucking the rider from the saddle when experiencing larger bumps.
4. **Compression Adjustment (Tirade 6.0 only).** The Tirade 6.0 shock unit offers compression adjustment. Compression damping adjustment (or "break away") controls the force required to compress the shock. Turning the blue knob counterclockwise decreases the compression damping and allows less force for break away. The shock has 12 clicks of adjustment from fully closed. The proper compression setting is a personal preference and varies upon your weight and riding style.

Fig. 33



NOTE: For more information, visit the Tech areas of www.K2Bike.com and www.FoxRacingShox.com www.answerproducts.com

J. Lithium Set-Up Instructions

1. **Spring Preload Adjustment.** To receive the best performance from your K2 Lithium, it is necessary to adjust the suspension.
   a. What is Sag? "Sag" is the amount a shock compresses (or sags) when you sit on the bicycle. Increasing the spring preload will make the shock sag, or compress less. Decreasing the spring preload will make the shock compress, or sag more. Sag should equal 25% of the shock stroke for most usage. You will get the best performance if you achieve the proper amount of SAG with one turn of preload.
   b. Adjusting the Sag. The shock stroke of the K2 Lithium is 2.0"/50mm and the recommended sag would be 25% of the total travel, or 0.5"/13mm. In general, the following procedure would allow you to determine the sag for any shock unit.
      (1) Measure the shock eye-to-eye (the distance from the center of one mounting bolt to the center of the other mounting bolt). Call this dimension "A."
      (2) Sit on the bicycle in a normal riding position, weighting both the handlebars and saddle. Have an assistant measure the shock unit eye-to-eye. This is dimension "B."
      (3) The difference between dimensions "A" and "B" is the sag. If the sag is less than 25% of the stroke, decrease the preload. If the sag is greater than 25% of the stroke, increase the preload. The preload adjustment process varies a bit depending upon the type of shock unit the bicycle is equipped with.

c. Adjusting the Coil Shock Preload.
   (1) A coil-sprung shock's preload is adjusted by rotating the knurled preload nut that compresses the coil. By gripping the spring as in (fig. 30) and rotating, you can usually perform the adjustment. To begin, loosen the preload completely until the coil is loose. Then, tighten one turn or until the coil is no longer loose. We will call this the "adjustment starting position."
   (2) Measure the sag.
   (3) To increase the sag from the adjustment starting position, it is recommended that a lighter spring be purchased and fitted for proper function. To increase the preload, rotate the spring/nut clockwise. K2 recommends no more than five spring/nut rotations beyond the adjustment starting position to achieve the target sag. If more that five rotations are required, it is recommended that a heavier spring be purchased and fitted for proper function.

d. Adjusting the Air Shock Preload. Adjusting the preload for an air-sprung shock unit requires a high-pressure shock pump fitted with a Schraeder-type valve adaptor (fig 31). Sag will vary by the amount of air pressure in the air spring chamber. Higher Pressure = Higher Preload = Less Sag. Lower Pressure = Lower Preload = More Sag. Again, by trial and error, add or decrease the pressure in the air spring to reach the 25% sag target.

Fig34

2. Wheel Travel Adjustment. The K2 Lithium offers two travel options, with one inch of range. The two travel options will match up to the most popular suspension fork offerings for a truly balanced ride. Position A, as in (fig. 34), will give you 5" of rear wheel travel. The other position provides 4" of rear wheel travel, as indicated by the laser etched markings on the linkage plates. The geometry of the Lithium is virtually unchanged from one travel option to the other, so no further adjustments need be made to maintain the preferred action and feel of the bike.

3. **Rebound Adjustment.** All K2 Lithium shock units are equipped with rebound adjustment. Rebound is the movement of the shock unit from a compressed mode to an uncompressed mode. Rebound damping controls the speed at which the shock returns to the uncompressed position. While riding, the shock unit is constantly moving between compressed and non-compressed modes. Rebound damping is adjusted by rotating the rebound adjuster knob (fig. 33). Clockwise rotation toward the "+" sign provides greater damping, while "-" applies less damping. More damping means slower rebound. The proper rebound setting is a personal preference and varies upon your weight and riding style. Experts agree that rebound should be as fast as possible, without kicking back, or bucking the rider from the saddle when experiencing larger bumps.

K. Attack Set-Up Instructions

1. Spring Preload Adjustment. To receive the best performance from your K2 Attack, it is necessary to adjust the suspension.

b. What is Sag? "Sag" is the amount a shock compresses (or sags) when you sit on the bicycle. Increasing the spring preload will make the shock sag, or compress less. Decreasing the spring preload will make the shock compress, or sag more. Sag should equal 25% of the shock stroke for most usage. You will get the best performance if you achieve the proper amount of SAG with one turn of preload.

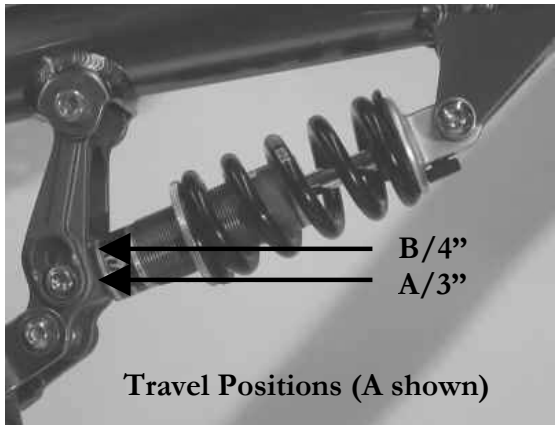
c. Adjusting the Sag. The shock stroke of the K2 Attack varies from size to size.

- The shock stroke of the SM/MD Attack is 1.125"/28mm
- The shock stroke of the LG/WB Attack is 1.5"/38mm
- Recommended SAG for the SM/MD is 0.23"/6mm
- Recommended SAG for the LG/WB is 0.3"/8mm

In general, the following procedure would allow you to determine the sag for any shock unit.

(1) Measure the shock eye-to-eye (the distance from the center of one mounting bolt to the center of the other mounting bolt). Call this dimension "A."
(2) Sit on the bicycle in a normal riding position, weighting both the handlebars and saddle. Have an assistant measure the shock unit eye-to-eye. This is dimension "B."
(3) The difference between dimensions "A" and "B" is the sag. If the sag is less than 25% of the stroke, decrease the preload. If the sag is greater than 25% of the stroke), increase the preload. The preload adjustment process varies a bit depending upon the type of shock unit the bicycle is equipped with.

Fig35



Travel Positions (A shown)

c. Adjusting the Coil Shock Preload.
A coil-sprung shock's preload is adjusted by rotating the knurled nut that compresses the coil. By gripping the spring (fig. 30) and rotating, you can usually perform the adjustment. To begin, loosen the preload completely until the coil is loose. Then, tighten one turn or until the coil is no longer loose. We will call this the "adjustment starting position."
(1) Measure the sag.
(2) To increase the sag from the adjustment starting position, it is recommended that a lighter spring be purchased and fitted for proper function.
(3) To increase the preload, rotate the spring/nut clockwise. K2 recommends not more than 5 rotations beyond the adjustment starting position to achieve the target sag. If more than 5 rotations are required, it is recommended that a heavier spring be purchased and fitted for proper function.

2. Wheel Travel Adjustment. The K2 Attack offers two travel increments. Position A, as in (fig. 35), will give you 3" of rear wheel travel, while position B alters the geometry to allow 4" of travel.

3. **Rebound Adjustment.** The K2 Attack 2.0 shock units are equipped with rebound adjustment. Rebound is the movement of the shock unit from a compressed mode to an uncompressed mode. Rebound damping controls the speed at which the shock returns to the uncompressed position. While riding, the shock unit is constantly moving between compressed and non-compressed modes. Rebound damping is adjusted by rotating the rebound adjuster knob (fig. 33). Clockwise rotation toward the "+" sign provides greater damping, while "-" applies less damping. More damping means slower rebound. The proper rebound setting is a personal preference and varies upon your weight and riding style. Experts agree that rebound should be as fast as possible, without kicking back, or bucking the rider from the saddle when experiencing larger bumps.

5. Service

⚠ **WARNING: Technological advances have made bicycles and bicycle components more complex, and the pace of innovation is increasing. It is impossible for this manual to provide all the information required to properly repair and/or maintain your bicycle. In order to help minimize the chances of an accident and possible injury, it is critical that you have any repair or maintenance which is not specifically described in this manual performed by your dealer. Equally important is that your individual maintenance requirements will be determined by everything from your riding style to geographic location. Consult your dealer for help in determining your maintenance requirements.**

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

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

- Ask your dealer for copies of the manufacturer's installation and service instructions for the components on your bike, or contact the component manufacturer.
- Ask your dealer to recommend a book on bicycle repair.
- Ask your dealer about the availability of bicycle repair courses in your area.
  Regardless of which option you select, we recommend that you ask your dealer to check the quality of your work the first time you work on something and before you ride the bike, just to make sure that you did everything correctly. Since that will require the time of a mechanic, there may be a modest charge for this service.

A. Service Intervals

Some service and maintenance can and should be performed by the owner, and require no special tools or knowledge beyond what is presented in this manual. The following are examples of the type of service you should perform yourself. All other service, maintenance and repair should be performed in a properly equipped facility by a qualified bicycle mechanic using the correct tools and procedures specified by the manufacturer.

1. **Break-in Period.** Your bike will last longer and work better if you break it in before riding it hard. Control cables and wheel spokes may stretch or "seat" when a new bike is first used and may require readjustment by your dealer. Your Mechanical Safety Check (Section 1.C) will help you identify some things that need readjustment. But even if everything seems fine to you, it's best to take your bike back to the dealer for a checkup. Dealers typically suggest you bring the bike in for a 30-day checkup. Another way to judge when it's time for the first checkup is to bring the bike in after 3 to 5 hours of hard off-road use, or about 10 to 15 hours of on-road or more casual off-road use. But if you think something is wrong with the bike, take it to your dealer before riding it again.
2. **Before Every Ride:** Perform the Mechanical Safety Check (Section 1.C).

3. **After Every Long or Hard Ride:** If the bike has been exposed to water or grit; or at least every 100 miles: Clean the bike and lightly oil the chain. Wipe off excess oil. Lubrication is a function of climate. Talk to your dealer about the best lubricants and the recommended lubrication frequency for your area.

4. **After Every Long or Hard Ride or After Every 10 to 20 Hours of Riding:**
   a. Squeeze the front brake and rock the bike forward and back. Everything feel solid? If you feel a clunk with each forward or backward movement of the bike, you probably have a loose headset. Have your dealer check it.
   b. Lift the front wheel off the ground and swing it from side to side. Feel smooth? If you feel any binding or roughness in the steering, you may have a tight headset. Have your dealer check it.
   c. Grab one pedal and rock it toward and away from the centerline of the bike; then do the same with the other pedal. Anything feel loose? If so, have your dealer check it.
   d. Take a look at the brake pads. Starting to look worn or not hitting the wheel rim squarely? Time to have the dealer adjust or replace them.
   e. Carefully check the control cables and cable housings. Any rust? Kinks? Fraying? If so, have your dealer replace them.
   f. Squeeze each adjoining pair of spokes on either side of each wheel between your thumb and index finger. Do they all feel about the same? If any feel loose, have your dealer check the wheel for tension and trueness.
   g. Check the frame, particularly in the area around all tube joints; the handlebars; the stem; and the seatpost for any deep scratches, cracks or discoloration. These are signs of stress-caused fatigue and indicate that a part is at the end of its useful life and needs to be replaced.
   h. Check to make sure that all parts and accessories are still secure, and tighten any which are not.

5. **As Required:** If either brake lever fails the Mechanical Safety Check (Section 1.C), don't ride the bike. Have your dealer check the brakes. If the chain won't shift smoothly and quietly from gear to gear, the derailleur is out of adjustment. See your dealer.

6. **Every 25 Hours of Hard Off-Road Riding or 50 Hours of Road Riding:** Take your bike to your dealer for a complete checkup.

⚠ **WARNING: Like any mechanical device, a bicycle and its components are subject to wear and stress. Different materials and mechanisms wear or fatigue from stress at different rates and have different life cycles. If a component's life cycle is exceeded, the component can suddenly and catastrophically fail, causing serious injury or death to the rider. Scratches, cracks, fraying and discoloration are signs of stress-caused fatigue and indicate that a part is at the end of its useful life and needs to be replaced. While the materials and workmanship of your bicycle or of individual components may be covered by a warranty for a specified period of time by the manufacturer, this is no guarantee that the product will last the term of the warranty. Product life is often related to the kind of riding you do and to the treatment to which you submit the bicycle. The bicycle's warranty is not meant to suggest that the bicycle cannot be broken or will last forever. It only means that the bicycle is covered subject to the terms of the warranty.**

B. 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, and fix what you can so you can get home. Then, take your bicycle to your dealer for a thorough check.

⚠ **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.**

6. K2 Bike Support

If you find that you need support for technical questions, repairs or warranty, please visit the shop from which you purchased the bicycle. If this is not possible, contact our website (www.K2Bike.com) to locate the nearest, authorized K2 Bike Dealer.

7. K2 Bike Limited Warranty

K2 Bike offers a warranty for every bicycle we manufacture. Please visit our web site www.K2Bike.com for the warranty that applies to your particular model. If you do not have internet access, please contact K2 for a written copy of the K2 Bike Limited Warranty that applies to your particular model.