
# OWNER'S MANUAL

## 1999

***For future reference, please fill in the important information below.***

1. ***Key Number*** (Stamped on the upper portion of the key shaft.)

☐☐☐☐

2. ***Vehicle Identification Number (VIN#)***
(Your VIN# can be found on the inward facing surface of the frame seat stay.)

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3. ***Model Code*** (Printed on the end of your shipping carton.)

☐☐☐☐☐☐☐☐☐☐☐☐

4. ***Dealer Name:*** _____
Address: _____
City/State/Zip: _____
Telephone: _____
Contact: _____

***1999***
***Owner's Manual***
***for Electric Powerbikes***

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

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# 1. ABOUT THIS MANUAL

### *A. WHY YOU SHOULD READ THIS MANUAL*

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

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

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

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

### *B. IMPORTANT SAFETY INFORMATION*

Your E-Bike® can provide many years of service, fun and fitness - if you take responsibility for your own safety. Understand the features of your bicycle and become aware of the challenges that you will meet on the road. There is much that you can do to protect yourself while riding. We will offer many recommendations and safety tips throughout this manual. The following are those that we feel are most important.

***1) Always Wear A Helmet!***

Helmets significantly reduce the number and severity of head injuries! Always wear a helmet which complies with your state laws when riding the E-Bike®. Check with your local police department for requirements in your community. Do not wear loose fitting clothing that can become tangled in the moving parts of the E-Bike®. Wear sturdy shoes and eye protection. Also check your state laws concerning other protective gear that may be required when riding the E-Bike®.

***WARNING: Not wearing a helmet significantly increases the chance of serious injury or death in a crash. Be sure that you wear a helmet, eye protection and appropriate apparel when you ride.***

***2) Know your E-Bike®!***
Your new electric bicycle incorporates many features and functions that have never been built into a bicycle before. Read this manual thoroughly to understand how those features enhance your riding pleasure and safety.

***3) Ride Defensively!***
One of the most frequent bicycle accidents occurs when the driver of a parked car opens his door in to bike rider's path. Another common occurrence is when a car or another cyclist moves suddenly in your path. Always be aware of other vehicles around you. Do not assume that the driver or other cyclist sees you. Be prepared to take evasive action or stop suddenly.

***4) Make Yourself Easy To See!***
Make yourself more visible by wearing bright reflective clothing. Keep you reflectors clean and properly aligned. Use your head and tail lights in reduced lighting conditions. Signal your intentions so that drivers and other cyclists can anticipate your actions. Use your horn when needed to make your presence known.

***5) Ride Within Your Limits!***
Take it slow until you are familiar with the riding conditions that you encounter. Be especially careful in wet conditions as traction can be greatly reduced and brakes become less effective. Never ride faster than conditions warrant or beyond your riding abilities. Remember that alcohol, drugs, fatigue and inattention can significantly reduce your ability to make good judgements and ride safely.

***6) Keep Your Bicycle In Safe Condition***
Follow our inspection and maintenance guidelines beginning on page 16. Check critical safety equipment before each and every ride.

***7) Know The Law***
Cyclists are required to follow the Rules of the Road. Additionally, some communities regulate the use of motorized bicycles regarding minimum age requirements and necessary equipment. Check with your local police department for specific details.

***8) Offroad Riding***
Offroad riding is not recommended because the E-Bike®

tires are for street use only. Dust and extreme impacts from offroad riding can cause electrical system problems.

### *C. REPORTING SAFETY DEFECTS*

If you believe that your vehicle has a defect which could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying EV Global Motors Company.

If NHTSA receives similar complaints, it may open an investigation, and if it finds that a safety defect exists in a group of vehicles, it may order a recall and remedy campaign. However, NHTSA cannot become involved in individual problems between you, your dealer or EV Global Motors Company.

To contact NHTSA, you may either call the Auto Safety Hotline toll-free at 1-800-424-9393 (or 202-366-0123 in Washington, DC area) or write to: NHTSA, U.S. Department of Transportation, Washington, DC 20590. You can also obtain other information about motor vehicle safety from the Hotline.

### *D. INSPECTION AND MAINTENANCE*

For your safety and enjoyment, and to insure a long life for your E-Bike®, inspect and maintain your E-Bike® regularly. Use the table below for guidance. It is very important that you check certain key systems before each and every ride. The proper condition and function of these systems is critically important for your safety.

Your E-Bike® should be returned to your servicing dealer at least once a year for a complete and thorough inspection and tune up. If a problem arises that is not described below, discontinue riding the E-Bike® and return it to your servicing dealer immediately. For more information about service and maintenance, please refer to page 42.

| Refer to Page | Component or Condition | Inspect before every ride | Inspect periodically* | Clean and/or lubricate | Adjust/Tighten | Repair/Replace if necessary |
|---|---|---|---|---|---|---|
| 32 | Brake pad adjustment |  | | |  | |
| 26 | Wheel quick release adjustment |  | | |  | |
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| 11-13 | Battery and charger | |  | | |  |
| 42 | Headset adjustment | |  |  |  | |
| 43 | Bottom bracket adjustment | |  |  |  | |
| 42 | All bolts, nuts, and mounting hardware | |  | |  |  |

*Every 5 to 10 rides depending on length and conditions of the ride.

# 2. OPERATIONAL INSTRUCTIONS

***Please read and understand these instructions completely before operating your E-Bike® to prevent serious injury to yourself and others, and to prevent damage to the bike.***

***IMPORTANT NOTICE:***
***For Warranty purposes, DO NOT break the Warranty Seals from the Controller or Charger Housings and attempt to repair or service these components. ALWAYS contact an authorized EVG dealer for repair or service of these components.***

***Summary Chart for Warning Beeps***
**_ Long Beep  • Short Beep**

| | | |
|---|---|---|
| ***OK*** | _ _ _  _ • _ | Battery connection is okay. |
| ***GO*** | _ _ • _ _ _ | System normal, okay to ride. |
| ***Low Battery*** | • _ • • _ _ _ | Low battery, power will shut off in 3-5 seconds. |
| ***Pedal Assist*** | • _ _ • | System requests pedal assistance from the rider. Beep will sound on steep hills and during over-heat conditions. |
| ***Over-Heat*** | _ _ _ • • • • | Over-heat of motor or controller, power will shut off in 3-5 seconds. |
| ***System Refusal*** | _ • _ _ _ | System refuses to restart during over-heat condition. |

***A. RIGHT HAND CONTROLS***

***1) Ignition On / Off***

• Insert key, press down and turn clockwise to the ON position.

• The LED lights will flash in sequence 2 times and a beep _ _ • _ _ _ (GO), will sound to indicate the system and controls are ready for operation.

***2) Throttle***

Press throttle lever with thumb to apply power to the motor.

***3) Front Brake Lever***

The front brake is activated by squeezing the right hand lever. (It is the opposite of a traditional bicycle.)

***4) Battery Charge Level***

The 3 LED lights on the right hand control switch indicate the battery charge level.

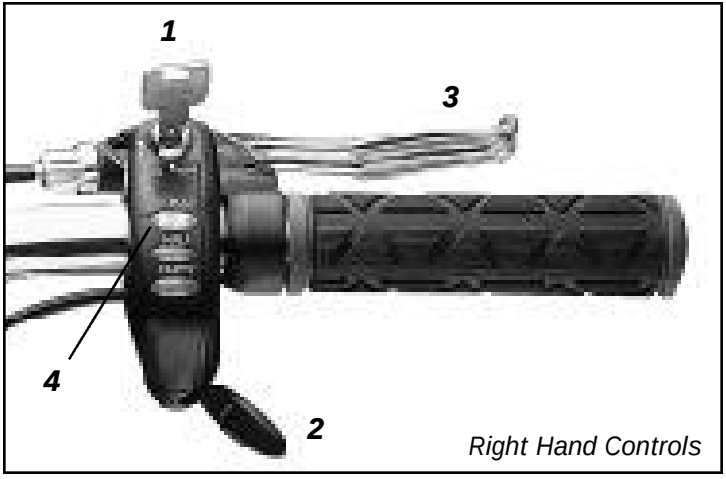
***Green*** • indicates the battery is between full and 60% charged.

***Yellow*** • indicates the battery is between 60% and 15% charged.

***Red*** • indicates the battery is between 15% and empty or low battery shut-off.

The motor will automatically shut-off when the battery is below a preset limit to help extend battery life. A beep • _ • • _ _ _ (Low Battery) will sound 3 to 5 seconds before the motor shuts off. The 3 LED lights will flash in sequence to signify the motor is off and the battery must be recharged. It is recommended that you recharge the battery within 24 hours to help maintain the life of the battery.

***WARNING: The right hand lever activates the front brake on the E-Bike®. IT IS THE OPPOSITE OF A TRADITIONAL BICYCLE.***



*Right Hand Controls*

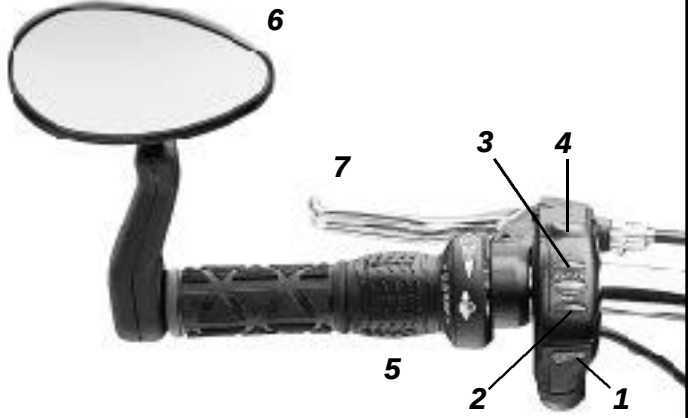
***B. LEFT HAND CONTROLS***

***1) Normal or Economy Switch (N/E)***

The Blue N /E switch provides 2 different power delivery characteristics.

***In the Normal or N mode***, your E-Bike® will have maximum hill climbing capability and acceleration. Total range will be shorter because power usage will be greater.

***In the Economy or E mode***, your E-Bike® will have lower hill climbing capability and may accelerate more slowly. Total range will be longer because power usage will be less.



*Left Hand Controls*

***2) Horn Switch***

Press the Red Horn button to activate the horn.

***3) Cruise Control Button***

The Green Cruise Control button allows you to automatically set a constant throttle setting for thumb free operation.

***To set,*** hold the thumb throttle at a desired speed, press the Green Cruise button and release your thumb from the throttle lever.

***To cancel,*** pull either Brake Lever or press the Green Cruise button or turn the Key Off.

***4) Headlight On/Off***

The Yellow Headlight switch activates the headlight, taillight (running light) and the Yellow LED light.

Press the Yellow Headlight switch to ON for Headlight and Taillight operation.

The Yellow LED will illuminate to help provide Horn and Cruise button visibility at night.

In the ON position, power consumption will increase and total range will decrease.

When the motor is shut-off due to a low battery or over-heat condition, the headlight and taillight will continue to operate until the battery is fully discharged. It is recommended that

you recharge the battery as soon as possible or within 24 hours to help maintain the life of the battery.

***5) Twist Grip Gear Selector***

By twisting this grip, you can select any one of seven gears on the rear wheel. The grip is labeled with the corresponding gear selection.

***6) Rear View Mirror***

Sit on your E-Bike® and adjust the Rear View Mirror so that you can see behind you. It is intended to be used for added safety but always be sure to look over your shoulder to allow maximum viewing.

***7) Rear Brake Lever***

The rear brake is activated by squeezing the left hand lever. (It is the opposite of a traditional bicycle.)

***WARNING: The left hand lever activates the rear brake on the E-Bike®. IT IS THE OPPOSITE OF A TRADITIONAL BICYCLE.***

***C. ON-BOARD BATTERY CHARGING***

• An on-board Charger is located at the top of the Battery Power Pack.

• When charging the battery, the Ignition Key must always be in the OFF position.

• Open the Battery Power Pack door by turning the door closures clockwise.

• Retrieve the charging cord located in the lower compartment at the bottom rear of the body.

• Plug the female end of the cord into the receptacle on the right side of the battery charger and the male end of the cord into a standard U.S.110V/60 Cycle wall socket.

• The RED indicator light and Cooling Fan will automatically turn on when in the charging mode.

• The indicator light will turn GREEN when fully charged.

***WARNING: Keep Charger and Battery Power Pack away from water to prevent electrical shock and shorting. The Charger is intended for indoor use only.***

***CAUTION: If the Cooling Fan does not operate when in the charging mode (Red light on), immediately UNPLUG the charger from the wall socket. Contact an authorized EVG dealer for advice.***

***D. REMOTE BATTERY POWER PACK CHARGING***

The Battery Power Pack can be removed for remote charging.

- Turn key to the OFF position.
- Open the Power Pack door.
- Release the Battery Power Pack retainer gate latch.
- Remove the Power Pack using the built-in handle with one hand, while supporting the bottom of the Battery Power Pack with your other hand.
- Retrieve the charging cord located in the lower compartment at the bottom rear of the body.
- Plug the female end of the cord into the receptacle on the right side of the battery charger and the male end of the cord into a standard U.S.110V/60 Cycle wall socket.
- The RED indicator light and Cooling Fan will automatically turn on when in the charging mode.

***WARNING: Keep Charger and Battery Pack away from water to prevent electrical shock an shorting. Charger is intended for indoor use only.***

***CAUTION: Be sure the COOLING FAN VENT is unrestricted or facing out when charging the battery to prevent the Charger from over-heating. The COOLING FAN should always be ON when the Red light is on to prevent charger over-heat.***

***WARNING: The Battery Power Pack weighs over 20 pounds. Use both hands to remove it from the bike frame.***

• Reinstall the Battery Power Pack by tilting the bottom first.
• If a proper battery pack electrical connection is made, a beep _ _ _ _ • _ (OK) will sound.
• Close the retainer gate.
• Close latch by lifting the latch ring with your left hand and locating it on to the frame hook with your right hand.
• Close the Battery Power Pack door and turn closures counter clockwise to secure.

### *E. BATTERY MAINTENANCE*

Always recharge the Battery Pack within 24 hours after use to maximize battery cycle life and prevent damage to the battery. During long periods of storage, recharge or 'top off' the battery at least once per month to help extend the battery cycle life. If preferred, the battery can be continuously charged with no harm to the battery.

***1) Built-in Protection Systems***

Power to the motor will automatically shut-off if any one of three conditions occurs; 1) Low battery, 2) Electrical controller over-heat, or 3) Motor over-heat.

***2) Over-Heat Conditions***- A warning beep _ _ _• • • • (Over-heat) will sound to warn the motor or controller are in an over-heat condition. The motor will shut-off within 3 to 5 seconds after the warning beep. The charge level LED will remain on and the pedal assist beep (•_ _ •) will repeat every 8 seconds until the temperature falls below a preset limit. If the key is turned off and on, when in the over-heat condition, in an attempt to restart the motor, a warning beep _•_ _ _ (System Refusal) will sound to indicate the system refuses to restart until the temperature falls below the preset limit. Once the system has cooled, the OK beep (_ _ _ _•_) will sound and the throttle can be used to power the motor.

***3) Low Battery Condition -*** A warning beep, • _ • • _ _ _ (Low Battery) will sound 3 to 5 seconds before the motor is shut-off due to a low battery condition. The system will not restart if the motor shut-off was due to a low battery condition. The 3 LED lights will flash in sequence until the key is turned to the OFF position. However, the headlight and taillight will continue to function until the battery is completely discharged. It is recommended that you recharge the battery as soon as

possible or within 24 hours to help maintain the battery's cycle life.

***4) Pedal Assist*** - A warning beep, • _ _ • (Pedal Assist) will sound every 8 seconds when climbing steep hills or during an over-heat condition.

***F. BUILT-IN SAFETY FEATURES***

***1) Automatic Throttle Reset*** - Whenever the key is turned from OFF to the ON position, the throttle will automatically reset to "0", regardless of its positioning, to prevent motor operation and causing an unexpected movement of the E-Bike®.

***2) Automatic Brake Shut-Off*** - When either brake lever is applied, the motor is automatically shut-off.

***3) Safe Start*** - If the throttle is held in an ON position while either brake lever is applied and then released, the power to the motor will shut-off, then gradually increase from "0" to prevent a surge of power from the motor.

***4) Motor Shut-off Warning*** - As described above, warning beeps •_••_ _ _ (Low Battery) or _ _ _ • • • • (Overheat), will sound to warn you 3 to 5 seconds before the motor shuts-off because of over-heat or low battery conditions. You must pedal to maintain your speed or momentum on a hill or flat surface when the motor is off.

***5) Care and Cleaning***

Remove the Battery Power Pack before washing your E-Bike®.

***WARNING: Keep the Battery Power Pack with Charger away from water to prevent electrical shock and damage to the charger or batteries.***

Clean using a mild soap and sponge. DO NOT use a power hose or washer. Gently rinse with water. Avoid spraying water directly onto the control switches, motor and front hub bearings. Do not spray water inside the Battery Power Pack compartment. Dry the frame mounted electrical connector in the battery pack compartment before reinstalling the Battery Power Pack. Use automotive wax to protect painted surfaces. Lubricate the chain periodically to help prevent corrosion and minimize wear. See the bicycle sections of this manual for more information.

| | |
|---|---|
| ***Top Speed:*** | Up to 15 mph |
| ***Range:*** | Up to 20 miles<br>(10 mph, 200 pound load, level paved ground, no pedaling) |
| ***Max Grade:*** | 8.5% (Continuous operation) |
| ***Battery Life:*** | Approx 350 cycles |
| ***Charge time:*** | 25% - Approx 1 hr<br>50% - Approx 2 hrs<br>75% - Approx 3 hrs<br>95% - Approx 4 hrs<br>100% - Approx 4.5 hrs |

# 3. FIT AND SAFETY

***A. FIT***

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

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

The first check for correct size is ***standover height.*** Standover height is the basic element of E-Bike® fit. It is the distance from the ground to the top of the top tube at that point where your crotch would be if you were straddling the E-Bike® by standing half way between the saddle and the handlebar stem. To check for safe standover height, straddle the E-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 E-Bike® is too big for you. ***Don't even ride the E-Bike® around the block.*** An E-Bike® which you ride only on paved surfaces and never, ever take off-road should give you a minimum standover height clearance of one to two inches. An E-Bike® that you'll ride on unpaved surfaces should give you a minimum of three inches of standover height clearance.

fig. 5 Standover Height

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

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

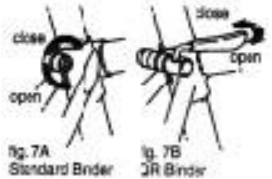
A saddle can be adjusted in three directions:

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

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.




To adjust the saddle height, loosen the seat binder bolt (Fig. 7a &b; see also Section 3. B on Seat Post Quick Releases) and move the seat post up or down as required. Then, make sure that the saddle is parallel to the top tube of the E-Bike®, and retighten the seat binder bolt tight enough so that you cannot twist the saddle out of alignment. Check the adjustment as described above. ***Under no circumstances should the seat post project from the frame beyond its "Minimum Insertion" or "Maximum Extension" mark (Fig. 8).***


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

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

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

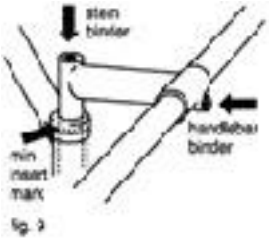
performance and comfort. Consequently, whenever you make a change to your saddle position, make only one directional change at a time, and make the changes in small increments until you have found the position at which you are most comfortable.

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

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

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

***2) Handlebar height and angle:***




If your E-Bike® is equipped with a stem which clamps directly on to the outside of the steering tube, your dealer may be able to change bar height by moving height adjustment spacers from below the stem to above the stem, or vica versa. Otherwise, you'll have to get a longer stem with a higher rise. Consult your dealer. ***Do not attempt to do this yourself, as it requires special knowledge. Your warranty may become invalid if the original parts are change.*** But on most bikes, you can raise or lower your handlebars a bit by adjusting stem height. Loosen the stem binder bolt by turning it counterclockwise three or four full turns. If the bolt rises but the stem doesn't, get a piece of wood or a soft mallet and give the bolt a good whack to release the wedge. Adjust the stem position as desired,

align stem with tire, and retighten the binder bolt tight enough so that you cannot twist the stem and handlebars out of alignment. ***Under no circumstances should the stem be retightened with its "Minimum Insertion" or "Maximum Extension" mark visible.***

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

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

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

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

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

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

***3) Brake reach:*** Many bikes have brake levers which

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

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

***B. SAFETY EQUIPMENT***

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

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

***1) Pedals:*** (See also Section 5.E and 5.F.) Some higher performance model bicycles come equipped with pedals that have sharp and potentially dangerous surfaces. These surfaces are designed to add safety by increasing adhesion between the rider's shoe and the E-Bike® pedal. If your E-Bike® 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.

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

### *C. MECHANICAL SAFETY CHECK*

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

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

***2) Tires & Wheels:*** Tires correctly inflated? Check by putting one hand on the saddle, one on the intersection of the handlebars and stem, then bouncing your weight on the E-Bike® while looking at tire deflection. Compare what you see with how it looks when you know the tires are correctly inflated; and adjust if necessary. See Section 5.H.1 for details and recommended tire pressures.

Tires in good shape? Spin each wheel slowly and look for cuts in the tread and sidewall. Replace damaged tires before riding the E-Bike®.
Wheels true? Spin each wheel and check for brake clearance and side-to-side wobble. If a wheel wobbles side to side or hits the brake pads, take the E-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 and tools needed to do the job correctly.***

***3) Brakes:*** Squeeze the brake levers. Are the brake quick releases closed? The straddle cable securely engaged? Are the brake shoes contacting the wheel rim within an inch of brake lever movement? Can you apply full braking force at the levers without having them touch the handlebar? If not, your brakes need adjustment. Do not ride the E-Bike® until the brakes are properly adjusted. See Sections 5.C.1 and 5.C.2 for details.

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

***4) Quick Releases:*** Are the front wheel, rear wheel and seat post quick releases properly adjusted and in the locked position? See Section 5.A and 5.B for details.

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

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

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

***WARNING : Loose or damaged handlebar grips or extensions can cause you to lose control and fall. Unplugged handlebars or extensions can act like a cookie cutter on your body, and can cause serious injury in anotherwise minor accident.***

# *4.RIDING SAFELY AND RESPONSIBLY*

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

## *A. THE BASICS*

1) Always do the Mechanical Safety Check (Section 3.C) before you get on a E-Bike®.

2) Always wear a helmet which complies with your state laws when riding the E-Bike®. Check with your local police department for requirements in your community.

3) Be careful to keep body parts and other objects away from the sharp teeth of chainrings; the moving chain; the turning pedals and cranks; and the spinning wheels of your E-Bike®.

4) Always wear shoes that will stay on your feet and will grip the pedals. Never ride barefoot or wearing sandals.

5) Be thoroughly familiar with the controls of your E-Bike®.

6) Wear bright, visible clothing that is not so loose that it can catch on moving parts of the E-Bike® or be snagged by objects at the side of the road or trail.

7) Don't jump with your E-Bike®. Jumping an E-Bike® can be fun; but it puts incredible stress on everything from your spokes to your pedals. Perhaps most vulnerable to jumping-related damage is your front fork. Riders who insist on jumping their E-Bike®s risk serious damage, to their E-Bike®s as well as to themselves.

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

***B. RULES OF THE ROAD***

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

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

3) Look ahead of where you're going, and be ready to avoid:

• Vehicles slowing or turning in front of you, entering the road or your lane ahead of you, or coming up behind you.

• Parked car doors opening in front of you.

• Pedestrians stepping out in front of you.

• Children playing near the road.

• Pot holes, sewer grating, railroad tracks, expansion joints, road or sidewalk construction, debris and other obstructions that could cause you to swerve into traffic, catch your wheel or otherwise cause you to lose control and have an accident.

• The many other hazards and distractions which can occur on a E-Bike® ride.

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

5) 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 E-Bike®, causing you to lose control.

6. Never carry a passenger.

7) Never carry anything which obstructs your vision or your complete control of the E-Bike®, or which could become entangled in the moving parts of the E-Bike®.

8) Never hitch a ride by holding on to another vehicle.

9) Don't do stunts, wheelies or jumps. They can cause you injury and damage your E-Bike®.

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

11) Observe and yield the right of way.

12) Never ride your E-Bike® while under the influence of alcohol or drugs.

13) 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. WET WEATHER RIDING*

***WARNING: Wet weather impairs traction, braking and visibility, both for the rider and for other vehicles sharing the road. The risk of 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 5.C.

***D. NIGHT RIDING***

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

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

Make sure that your E-Bike® is equipped with correctly positioned and securely mounted reflectors (see Section 3 B).

Purchase and install an adequate battery or generator powered head and tail light.

Wear light colored, reflective clothing and accessories, such as a reflective vest, reflective arm and leg bands, reflective stripes on your helmet, flashing lights ... any reflective device or light source that moves will help you get the attention of approaching motorists, pedestrians and other traffic.

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

***While riding at dusk or at night:***

- Ride slowly.

- Avoid areas of heavy traffic, dark areas, and roads with speed limits over 35 mph.

- Avoid road hazards.

- If possible, ride on routes already familiar to you.

# *5. HOW THINGS WORK*

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

### *A. WHEEL QUICK RELEASE*

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

***1. Ask your dealer to help you make sure you know how to install and remove your wheels safely.***

***2. Understand and apply the correct technique for clamping your wheel in place with a quick release.***

***3. Each time, before you ride the E-Bike®, check that the wheel is securely clamped.***

Invented in the 1930s to allow quick, easy wheel removal without the need for tools, the E-Bike® wheel quick release has become standard equipment on most recreational, sports and competition bicycles. Because of its adjustable nature, it is critical that you understand how it works and how to use it properly.

While it looks like a long bolt with a lever on one end and a nut on the other, the wheel quick release uses a cam action to clamp the E-Bike®'s wheel in place (see Fig. 11).

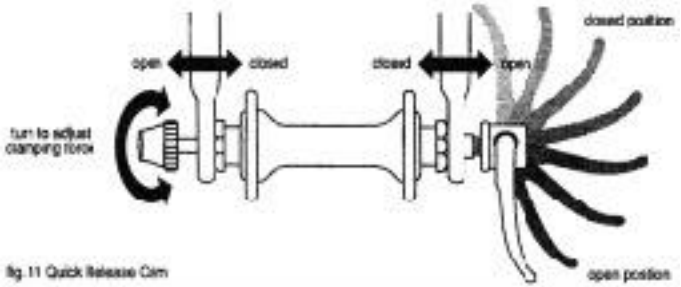


fig.11 Quick Release Cam

***CAUTION: 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. The full force of the cam action is needed to clamp the wheel securely.***

***1) 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.

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

***2) Front Wheel Secondary Retention Devices***

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

Secondary retention devices fall into two basic categories:

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

Ask your dealer to explain the particular secondary retention device on your E-Bike®.

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

***3) Removing or Installing Quick Release Wheels***

***a. Removing a Quick Release Front Wheel***

(1) Open up the brake shoes (see Section 5.C.1, Figs. 16a, b, c and d).

fig. 12 QR Closed Position

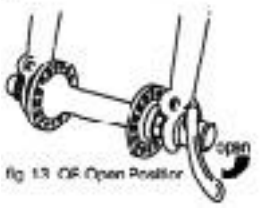


fig. 13 QR Open Position

(2) Rotate the wheel's quick-release lever from the locked or CLOSED position to the OPEN position (Fig.11,12&13).

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

(4) If your front fork has a clip-on type secondary retention device, disengage it and go to step (5). If your front fork has an integral secondary retention device, loosen the tension adjusting nut about six full turns; then go to step (5).

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

***b. Installing a Quick Release Front Wheel***

(1) Rotate the quick-release lever so that it curves away from the wheel (Fig. 11 & 13). This is the OPEN position.
(2) With the steering fork facing forward, insert the wheel between the fork blades so that the axle seats firmly at the top of the slots which are at the tips of the fork blades -- the fork dropouts. The quick-release lever should be on the left side of the E-Bike® (Fig. 12 & 13). If your E-Bike® has a clip-on type secondary retention device, engage it.

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

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

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

(5) If the lever cannot be pushed all the way to a

position parallel to the fork blade, return the lever to the OPEN position. Then turn the tension adjusting nut counterclockwise one-quarter turn and try tightening the lever again.

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

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

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

### *B. REMOVING AND INSTALLING BOLT-ON WHEELS*

#### *1) Removing a Bolt-On Front Wheel*

a) Open up the brake shoes (see Section 5.C.1,(Figs. 16 a,b,c and d).

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

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

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

#### *2) Installing a Bolt-On Front Wheel*

a) 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

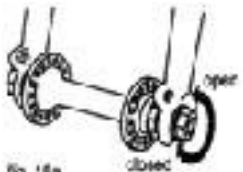


Fig. 16a
Bolt-on Wheel in Front Dropouts

the axle nut. If your E-Bike® has a clip-on type secondary retention device, engage it.

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

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

***3) Removing a Bolt-On Rear Wheel***

a) Open the rear brake shoes (see Section 5.C.1, Figs. 16a, b, c and d).

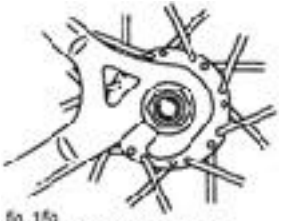


fig. 15a
Bolt-on Wheel in Rear Dropouts

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

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

d) Remove the motor torque arm bolt in the left side seat stay above the drop out.

e) Disconnect the motor wire harness at the quick-release junction box on the inside of the left seat stay above the motor torque arm bolt.

f) 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.

***4) Installing a Bolt-On Rear Wheel***

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

b) 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.
c) Reinstall the motor torque arm and bolt.

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

e) Push the rear derailleur back into position.

f) Reattach the motor harness connectors and close the junction box.

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

### *C. SEATPOST QUICK RELEASE*

Most E-Bike®s are equipped with quick-release seat post binders. The seatpost quick-release binder works exactly like the wheel quick-release (Section 3.A.1) While a quick release looks like a long bolt with a lever on one end and a nut on the other, the quick release uses a cam action to firmly clamp the seat post (see Figs. 7B and 11 ).

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

***1. Ask your dealer to help you make sure you know how to correctly clamp your seat post.***

***2. Understand and apply the correct technique for clamping your seat post quick release.***

***3. Before you ride the E-Bike®, first check that the seatpost is securely clamped.***

***Adjusting the quick release mechanism***

The action of the quick release cam squeezes the seat collar around the seat post to hold the seat post securely in place. The amount of clamping force is controlled by the tension adjusting nut. Turning the tension adjusting nut clockwise while keeping the cam lever from rotating increases clamping force; turning it counterclockwise while keeping the cam lever from rotating reduces clamping force. Less than half a turn of the tension adjusting nut can make the difference between safe clamping force and unsafe clamping force.

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

### *D. BRAKES*

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

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

### *1) How brakes work*

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

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

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

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

Brakes are designed to control your speed, not just to stop the E-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 E-Bike® and applying different amounts of pressure to each brake lever, until the wheel locks.

***CAUTION: Some E-Bike® brakes, such as linear-pull and disc brakes, are extremely powerful. You should take extra care in becoming familiar with these brakes and exercise particular care when using them.***

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

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

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

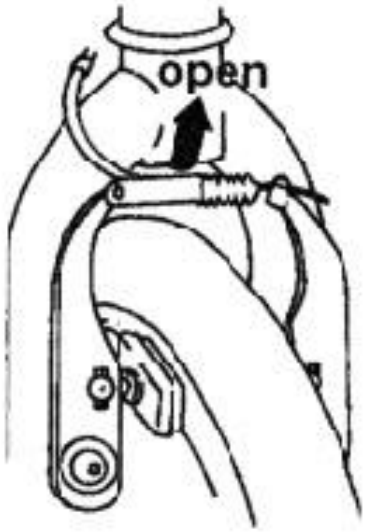


fig. 16

***2. Adjusting your brakes***

If either brake lever on your E-Bike® fails the Mechanical Safety Check (Section 3.C) you can restore brake lever

travel by turning the brake cable adjusting barrel (Fig. 17A) counterclockwise, then lock the adjustment in by turning the barrel's lock nut clockwise as far as it will go. If the lever still fails the Mechanical Safety Check, have your dealer check the brakes.

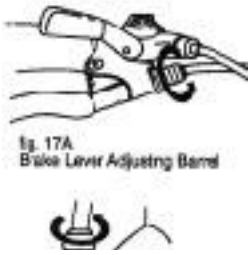


fig. 17A
Brake Lever Adjusting Barrel

***E. SHIFTING***

Your multi-speed E-Bike® has a derailleur drivetrain.

***1. Why all those gears?***

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

***2. Shifting a derailleur drivetrain***

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

- a rear sprocket cluster, called a freewheel or freewheel cassette
- a rear derailleur
- one shifter
- one control cable
- one front sprocket called a chainring
- a drive chain

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

***a. Shifting Gears***

There are many different types of shifter mechanisms, each preferred for specific types of application because of its ergonomic, performance and price characteristics.

The designers of your E-Bike® have selected the shifter design which they believe will give the best results on your E-Bike®. The different types of shifter and its operation is illustrated in Figures 18.

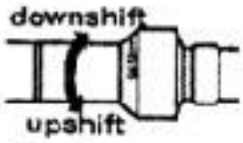


fig. 18

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. For example, you can select a gear which will make pedaling easier on a hill (make a downshift) in one way: shift the chain 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 E-Bike® is for accelerating and climbing and is called a downshift. Moving the chain out or away from the centerline of the E-Bike® is for speed and is called an upshift.

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

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

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

***1) Shifting the Rear Derailleur***

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

moving forward (i.e. the rider must be pedaling forward).

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

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

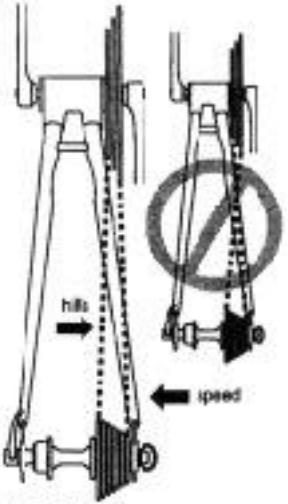


fig. 19 Chain

***F. TOECLIPS & STRAPS***

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

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

### *G. CLIPLESS ("STEP-IN") PEDALS*

Clipless pedals (sometimes called "step-in pedals") are the means most racers use to keep their feet securely in the correct position for maximum pedaling efficiency. They work like ski bindings ... a plate on the sole of the shoe clicks into a spring-loaded fixture on the pedal. Clipless pedals require shoes specifically designed for the make and model pedal being used. Many clipless pedals are designed to allow the rider to adjust the amount of force needed to engage or disengage the foot. Your dealer can show you how to make this adjustment.

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

### *H. TIRES AND TUBES*

#### *1. Tires*

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

Fig. 20 Tire Markings

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

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

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

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

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

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

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

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

***CAUTION: Pencil type automotive tire gauges and gas station air hose pressure settings are generally inaccurate and should not be depended on for consistent, accurate pressure. Instead, use a good quality dial gauge.***

Ask your dealer to recommend the best tire pressure for the kind of riding you will most often do, and have the dealer inflate your tires to that pressure. Then, check inflation as described in Section 3.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 E-Bike® has unidirectional tires, be sure that they are mounted to rotate in the correct direction.

### *2. Tire Valves*

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

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

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

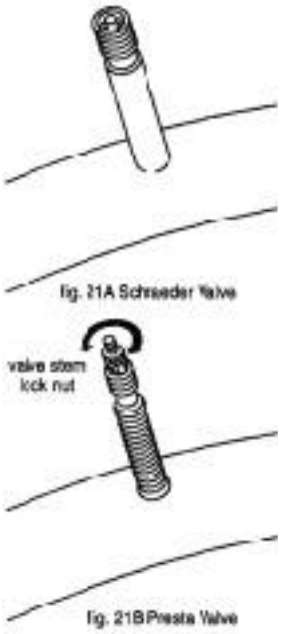


Fig. 21A Schraeder Valve

Fig. 21B Presta Valve

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

### *I. BICYCLE SUSPENSION*

There are many different types of suspension systems -- too many to deal with individually in this Manual. If your E-Bike® has a suspension system of any kind, ask your dealer to provide you with the appropriate adjustment and maintenance instructions.

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

***CAUTION: Changing suspension adjustment can change the handling and braking characteristics of your E-Bike®. 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 E-Bike® after a suspension adjustment by taking a careful test ride in a hazard-free area.***

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

***WARNING: If your E-Bike® has suspension, the increased speed you may develop also increases your risk. When braking, the front of a suspended E-Bike® dips. You could lose control and fall if your skill is not up to handling this system. Get to know how to handle your suspension system safely.***

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

# 6. SERVICE AND MAINTENANCE

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

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

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

***WARNING: Many E-Bike® service and repair tasks require special knowledge and tools. Do not begin any adjustments or service on your E-Bike® if you have the slightest doubt about your ability to properly complete them. Improper adjustment or service may result in damage to the E-Bike® 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 E-Bike®, you have three options:

1. Ask your dealer whether copies of the manufacturer's installation and service instructions for the components on your E-Bike® are available.

2. Ask your dealer to recommend a book on E-Bike® repair.

3. Ask your dealer about the availability of E-Bike® 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 E-Bike®, just to make sure that you did everything correctly. Since that will require the time of a mechanic, there may be a modest charge for this service.

### *A. SERVICE & MAINTENANCE SCHEDULE*

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

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

***1) Break-in Period:*** Your E-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 E-Bike® is first used and may require readjustment by your dealer. Your Mechanical Safety Check (Section 3.C) will help you identify some things that need readjustment. But even if everything seems fine to you, it's best to take your E-Bike® back to the dealer for a checkup. Dealers typically suggest you bring the E-Bike® in for a 30 day checkup. Another way to judge when it's time for the first checkup is to bring the E-Bike® in after three to five hours of hard off-road use, or about 10 to 15 hours of on-road or more casual off-road use. But if you think something is wrong with the E-Bike®, take it to your dealer before riding it again.

***2) Before every ride:*** Mechanical Safety Check (see Section 3.C)

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

***4) After every long or hard ride or after every 10 to 20 hours of riding:*** Squeeze the front brake and rock the E-Bike® forward and back. Everything feel solid? If you feel a clunk with each forward or backward movement of the E-Bike®, you probably have a loose headset. Have your dealer check it.

Lift the front wheel off the ground and swing it from side to side. Feel smooth? If you feel any binding or roughness in the steering, you may have a tight headset. Have your dealer check it.

Make sure all bolts, nuts and mounting hardware are tight.

Grab one pedal and rock it toward and away from the centerline of the E-Bike®; then do the same with the other pedal. Does the bottom bracket feel loose? If so, have your dealer check it.

Take a look at the brake shoes. Starting to look worn or not hitting the wheel rim squarely? Time to have the dealer adjust or replace them.

Carefully check the control cables and cable housings. Any rust? Kinks? Fraying? If so, have your dealer replace them.

Squeeze each adjoining pair of spokes on either side of each wheel between your thumb and index finger. Do they all feel about the same? If any feel loose, have your dealer check the wheel for tension and trueness.

Check the frame, particularly in the area around all tube joints; the handlebars; the stem; and the seatpost for any deep scratches, cracks or discoloration. These are signs of stress-caused fatigue and indicate that a part is at the end of its useful life and needs to be replaced.

Check to make sure that all parts and accessories are still secure, and tighten any which are not.

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

***5) As required:***

***If either brake lever fails the Mechanical Safety Check*** (Section 3.C): restore brake lever travel by turning the brake cable adjusting barrel counterclockwise, then lock the adjustment in by turning the barrel's lock nut clockwise as far as it will go. If the lever still fails the Mechanical Safety Check, have your dealer check the brakes.

If the chain won't shift smoothly and quietly from gear to gear: the derailleur is out of adjustment. The cause may be as simple as cable stretch, in which case you can compensate by turning the shifter or derailleur cable

adjusting barrel counterclockwise 1/2 turn. Try shifting again. If 1/2 turn to a full turn of the cable adjusting barrel does not cure the problem, see your dealer.

***6) Every 50 hours of riding. Take your E-Bike® to your dealer for a complete checkup.***

### *B. GETTING HOME WHEN SOMETHING BREAKS*

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

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

***1) If you get a flat tire: Please refer to page 30 to remove rear wheel.*** Depress the tire valve to let all the air out of the tube (see Section 5.G.2). Remove the wheel from the E-Bike® (see Section 5.A.3 or 4). Remove one bead of the tire from the rim by grasping it at a point opposite the valve stem with both hands and, at the same time, lifting and peeling one side of the tire off the rim. If the bead is on too tight for you to unseat it with your hands, use tire levers to lift the bead carefully over the tire rim. Remove the valve lock nut (if the valve has one) and push the valve stem through the wheel rim. Remove the inner tube.

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

Either patch the tube (follow the instructions in your patch kit), or use a new one.
Reinstall the tire and tube. Slip one tire bead over the rim. Insert the tube valve through its hole in the rim, but don't secure it with the locknut yet. Feed the tube carefully into the cavity of the tire. Inflate the tube just

enough to give it some shape. Starting at the valve stem and working around both sides of the rim to the side opposite the valve stem, use your thumbs to push and seat the other bead of the tire inside the rim. Be careful not to pinch the tube between the tire bead and the wheel rim. If you have trouble getting the last few inches of bead over the edge of the rim with thumb pressure, use a tire lever and be careful not to pinch the tube.

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

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

***WARNING: Riding your E-Bike® with a flat or under-inflated tire can seriously damage the tire, tube and E-Bike®, and can cause you to lose control and fall.***

***2) If you break a spoke:***

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

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

Twist the broken spoke around the spoke next to it to keep it from flopping around and getting caught between the wheel and the frame. Spin the wheel to see if the rim clears the brake shoes. If the wheel will not turn because it is rubbing against a brake shoe, try turning the brake cable adjusting barrel(s) clockwise to slacken the cable and open up the brakes (see Section 5.C.2). If the wheel still won't turn, open the brake's quick release (see Figs. 16a through 16d) and secure any loose cable as best you can. Walk the E-Bike®, or if you

must, ride it with extreme caution, because you now have only one working brake.

***3) If you crash:***

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

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

Next, check your E-Bike® for damage, and fix what you can.

Then, when you get home, carefully perform the checks described in Section 3.C and check for any other damaged parts. All bent, scored or discolored parts are suspect and should be replaced.

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

***C. UPGRADING YOUR BIKE AND YOUR EQUIPMENT***

The variety of components and accessories available to enhance the comfort, performance and appearance of your E-Bike® is almost endless. Your dealer can help you select those that will work best for the kind of riding you do.
Even if you are an experienced rider, don't assume you can properly install and operate these components or accessories without first reading any instructions that are enclosed with the product. Be sure to read, and understand, the instructions that accompany the products you purchase for your E-Bike®. If you have the slightest doubt as to their suitability or about your ability to install them correctly, ask your dealer for help.

***WARNING: Failure to install and operate any component or accessory properly can result in serious damage to the E-Bike®, and serious injury or death to the rider.***

***1) Comfort and Convenience Accessories***

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

The comfort of a E-Bike® saddle depends much more on how the saddle shape relates to the rider's body than on the thickness or material of the padding. Bicycle manufacturers select a saddle shape based on their best guess of what's likely to be comfortable for most buyers of that particular E-Bike® model. But that doesn't mean it's going to be the most comfortable shape for you. That's why your dealer stocks saddles which offer a variety of shapes, padding, covering materials and prices. If the saddle on your new E-Bike® is uncomfortable, ask your dealer to suggest an alternative.

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

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

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

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

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

### *2) Performance Upgrades*

***CAUTION: Changing the components on your E-Bike® may void the warranty. To avoid voiding your warranty, check with your dealer before changing the components on your E-Bike®.***

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

Another popular way to improve the performance of a E-Bike® is to substitute lighter weight "racing" components. Lighter wheels, tires, handlebars and so on can enhance the performance of your E-Bike®; but you must always keep in mind that light weight racing components are not intended to have the life expectancy of their heavier counterparts, and you must therefore exercise extra care in checking for signs of stress fatigue (See Section 6.A)

Suspension forks are also a popular component upgrade. Before installing a suspension fork on a non-suspension E-Bike® or installing a fork with different travel or geometry characteristics than the original fork on the E-Bike®, you must make sure that the frame is designed to take the change in geometry and the changes in stress characteristics which the change in fork can cause. Such stresses can result in sudden, catastrophic frame failure, which can cause serious injury or death.

Disc brakes are becoming a more common performance upgrade. Most front suspension forks are designed to accept a disc brake, and can take the added stresses at the brake mounting points. Be sure that the fork you are using is designed to accept disc brakes. Otherwise, such stresses can result in sudden, catastrophic frame failure, which can cause serious injury or death.

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

### *D. ABOUT YOUR DEALER*

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

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

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

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