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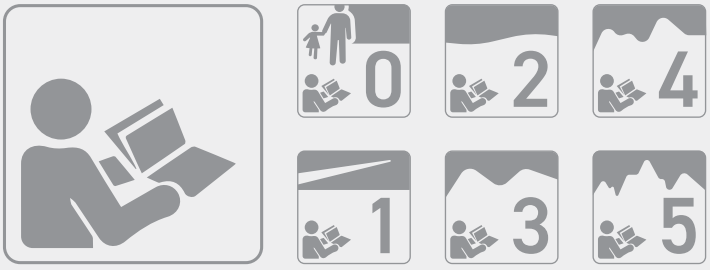
Bicycle Owner's Manual



⚠ WARNING

Read this Manual before riding. Failure to follow the instructions and warnings in this Manual may result in serious injury or death.

Welcome

Bicycling offers many benefits, including recreation, fitness, and transportation. Your new bicycle is designed to help you enjoy these activities safely and responsibly.

Before operating this bicycle, you must read and understand this Manual. At a minimum, review all safety-critical information in this section and consult the referenced chapters for any topic you do not fully understand. Not all bicycles include every feature described in this Manual; ask your dealer to identify the components and functions specific to your model.

This Manual contains essential safety, operation, maintenance, and service information. Keep it for future reference. Additional instructions may be provided by the manufacturers of individual components or accessories (such as helmets, lighting systems, pedals, or suspension parts). If there is any conflict between this Manual and the component manufacturer's instructions, you must follow the component manufacturer's instructions. **If you have questions or are uncertain about any procedure, adjustment, or safety matter, it is your responsibility to consult your dealer or the bicycle manufacturer before riding.**

Notice to Parents and Guardians
Parents and guardians are responsible for ensuring that a child's bicycle is properly fitted, maintained in safe operating condition, and used in accordance with all safety information in this Manual, as well as applicable bicycle, traffic, and motor-vehicle laws. You should read this Manual and review its warnings and instructions with your child before allowing them to operate the bicycle.

Safety Messages

In this manual, particularly important information is presented in the following ways:

⚠ WARNING

Indicates a hazardous situation which, if not avoided, may result in death or serious injury.

⚠ CAUTION

Indicates special precautions that must be taken to avoid damage.

Using the term CAUTION without the safety alert symbol indicates a condition that, if not avoided, may cause serious damage to the bicycle or may void the warranty.

Several warnings and cautions include statements such as "you may lose control and fall." Since any fall can result in serious injury or death, this reminder is not repeated every time.

Because it is not possible to anticipate every situation or condition that may occur while riding, this Manual does not guarantee safe use of the bicycle under all circumstances. Cycling involves inherent risks that cannot be predicted or eliminated, and the rider is solely responsible for operating the bicycle safely.

⚠ WARNING

A properly fitted, approved bicycle helmet must always be worn while riding. A helmet is for cycling use only and must be removed when the child is not riding. Wearing a helmet during play, on playground equipment, or in any non-cycling activity may create a risk of serious injury or death.

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1. Before You Ride

1.1. Safety First

- Always wear an approved helmet, and follow the helmet manufacturer's instructions regarding fit, use, and care.
- Do you have all required and recommended safety equipment? See Part 2. You are responsible for knowing and complying with all applicable local bicycle, traffic, and safety laws.
- Do you know how to correctly secure the front and rear wheels? Review Part 4. Riding with improperly secured wheels can cause wheel wobble or wheel separation, resulting in serious injury or death.
- If your bicycle is equipped with toeclips/straps or clipless ("step-in") pedals, make sure you understand their operation. These systems require specific techniques and skills. Follow the pedal manufacturer's instructions for use, adjustment, and maintenance. See Part 4.
- Check for toe overlap. On smaller frames, your toe or toeclip may contact the front wheel when a pedal is forward and the handlebar is turned. See Part 4 for details.
- If your bicycle has suspension, see Part 4. Suspension changes the handling characteristics of the bicycle. Follow the suspension manufacturer's instructions for use, adjustment, and maintenance.

⚠ WARNING

- Read all safety warnings in this Owner's Manual before riding.
- Riding with a seat post inserted less than 80 mm into the seat tube may result in frame damage or failure and serious injury.
- Do not clamp, crush, or overtighten around composite frame tubes, as this may cause severe structural damage.
- Always apply the rear brake first. Consult your dealer regarding the brake control configuration of your bicycle.
- Before riding, ensure that all release mechanisms (including quick releases, through-axles, and other securing systems) are correctly and securely fastened.

1.2. Mechanical Safety Check

Routinely inspect your bicycle before each ride.

Nuts, bolts, screws, and other fasteners: Because bicycles use fasteners of many different sizes, shapes, and materials—varying by model and component—the correct tightening force (torque) cannot be generalized. Always refer to the specific torque values provided in the instructions supplied by the manufacturer of each component.

Proper fastener tightening requires the use of a calibrated torque wrench. A professional bicycle mechanic equipped with the correct tools should perform torque checks on your bicycle. If you choose to perform maintenance yourself, you must use a torque wrench and follow the torque specifications provided by the bicycle or component manufacturer, or by your dealer.

If you need to make an adjustment at home or while riding, use extreme caution, and have any fasteners you adjusted inspected by your dealer as soon as possible.

⚠ WARNING

Correct tightening force on fasteners—such as nuts, bolts, and screws—is critical for the safe operation of your bicycle. Insufficient torque may prevent the fastener from holding securely, while excessive torque can strip threads, stretch or deform the fastener, or cause it to break. Improperly tightened fasteners can lead to component failure, which may cause you to lose control and fall.

Make sure no parts are loose. Lift the front wheel two to three inches off the ground and allow it to drop. Listen and feel for anything that appears loose. Perform a full visual and tactile inspection of the bicycle. If any part or accessory seems loose, secure it properly. If you are unsure, have someone with experience inspect the bicycle.
Tires & Wheels: Ensure that the tires are properly inflated (see Part 4.). You can check inflation by placing one hand on the saddle and the other on the handlebar–stem junction, then bouncing your weight on the bicycle while observing tire deflection. Compare the tire compression to how it appears when properly inflated, and adjust as needed.
Inspect the tires by slowly spinning each wheel and checking for cuts or damage on the tread and sidewalls. Replace any damaged tires before riding. Check that the wheels are true. Spin each wheel and look for proper brake clearance and any side-to-side wobble. If a wheel shows even slight lateral movement or rubs against the brake pads, take the bicycle to a qualified bicycle mechanic to have the wheel trued.

⚠ CAUTION

Wheels must be true for rim brakes to function effectively. Wheel truing requires specialized tools and skill; do not attempt to true a wheel unless you have the necessary knowledge, experience, and equipment to perform the task correctly.

Wheel rims: Ensure that the wheel rims are clean and free of damage at the tire bead area and—if your bicycle is equipped with rim brakes—along the braking surface. If the rim includes a wear indicator, confirm that the indicator is not visible at any point. A visible wear indicator means the rim has reached the end of its usable life.

⚠ WARNING

Bicycle wheel rims are subject to wear. Ask your dealer about rim wear inspection. Some rims include a wear indicator that becomes visible as the braking surface wears down. When the indicator is visible, the rim must be replaced. Riding a wheel that has reached the end of its service life can result in wheel failure, which may cause you to lose control and fall.

Brakes: Check the brakes for proper operation. See Part 4.
- Squeeze the brake levers—are the brake quick-releases fully closed?
- Are all control cables correctly seated and fully engaged?
- For rim brakes, do the brake pads contact the rim squarely and make full, even contact?
- Do the brakes begin to engage within one inch of lever movement?
- Can you apply full braking force without the lever touching the handlebars?

If any of these conditions are not met, the brakes require adjustment. Do not ride the bicycle until a professional bicycle mechanic has properly adjusted the brakes.

Wheel Retention System: Verify that both the front and rear wheels are securely installed. See Part 4.
Seat Post: If your seat post uses an over-center cam-action mechanism for height adjustment, ensure it is correctly adjusted and fully locked. See Part 4.
Handlebar and Saddle Alignment: Confirm that the saddle and handlebar stem are aligned with the bicycle's centerline and clamped tightly enough that they cannot be twisted out of position. See Part 3.
Handlebar Ends: Ensure that the handlebar grips are secure and in good condition; have your dealer replace them if necessary. Verify that all handlebar ends and extensions are properly plugged. If the handlebars have bar-end extensions, check that they are tightened sufficiently to prevent rotation.

⚠ WARNING

Loose or damaged handlebar grips or extensions can cause you to lose control and fall. Grips and handlebar end-plugs must be replaced if they are worn, damaged, or not in proper condition. Regularly check the handlebar grips on children's bicycles to ensure that adequate end protection is in place. Unplugged handlebar tubes or extensions can cause severe cuts and serious injury in an accident that would otherwise be minor.

Chain Tension: To check chain tension, hold the chain midway between the front and rear sprockets and move it up and down to measure slack. Proper chain tension allows approximately 10–15 mm of vertical movement. If the chain has more or less movement, it must be adjusted. Have a qualified dealer inspect and perform any necessary adjustments.
Belt Drive: Refer to the belt drive manufacturer's operating instructions for technical specifications and maintenance requirements. Bicycles equipped with belt drives use sliding rear dropouts and tension adjustment screws for proper belt tension. Belt tension should be checked regularly, and all adjustments should be performed by a qualified authorized dealer.

VERY IMPORTANT SAFETY NOTE: Be sure to read and fully understand the information regarding the lifespan of your bicycle and its components in Part 6: Lifespan

1.3. Safety Ride

When you fasten your helmet and take your first familiarization ride on your new bicycle, choose a controlled environment free of traffic, other cyclists, obstacles, and hazards. Use this ride to become comfortable with the controls, features, and handling characteristics of your bicycle.

Become familiar with the braking performance of the bicycle (see Part 4). Test the brakes at low speed by shifting your weight toward the rear and applying the brakes gently, using the rear brake first. Sudden or excessive use of the front brake may cause you to be pitched forward over the handlebars. Applying the brakes too hard can lock a wheel, which may cause a loss of control and a fall; skidding is one example of what occurs when a wheel locks.

- If your bicycle is equipped with toeclips or clipless pedals, practice engaging and releasing from the pedals.
- If your bicycle is equipped with suspension, take time to understand how it responds to braking and to shifts in rider weight.
- Practice shifting the gears (see Part 4). Never operate the shifter while pedaling backward, and do not pedal backward immediately after shifting. Doing so may jam the chain and cause serious damage to the bicycle.
- Assess the bicycle's handling, response, and overall comfort during your familiarization ride.

If you have any questions, or if anything on the bicycle does not feel or function as it should, consult your dealer before riding again.

2. Safety

2.1. Basics

⚠ WARNING

The area in which you ride may require specific safety equipment. It is your responsibility to know and comply with all applicable laws, including properly equipping yourself and your bicycle as required by local regulations. Always follow local bicycle laws and rules, including those governing bicycle lighting, bicycle licensing, riding on sidewalks, bike path and trail usage, helmet requirements, child carrier regulations, and any bicycle-specific traffic laws. It is your responsibility to be familiar with these laws and to obey them at all times.

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

When putting on the helmet, ensure that it is at an angle parallel to the ground. Avoid wearing the helmet at an angle tilted backwards.

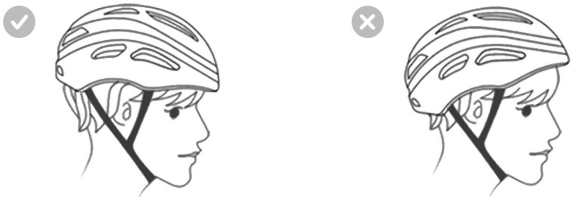

figure1

⚠ WARNING

Failure to wear a helmet while riding may result in serious injury or death.

2- Always perform the Mechanical Safety Check (Part 1) before ride the bicycle.
3- Be fully familiar with the operation of all controls on your bicycle, including: Brakes, Pedals, Shifting mechanisms. See Part 4.
4- Keep all body parts, clothing, and foreign objects away from the sharp teeth of the chainrings, the moving chain, the rotating pedals and crankarms, and the spinning wheels.
5- Always wear:

- Shoes that stay securely on your feet and provide adequate grip on the pedals. Ensure that shoelaces cannot become entangled in moving parts. Never ride barefoot or in sandals.
- Bright, highly visible clothing that is not loose enough to become caught in the bicycle or snag on surrounding objects.
- Protective eyewear to guard against dirt, debris, and insects—use tinted lenses in bright sunlight and clear lenses in low-light conditions.

6- Do not jump your bicycle. Jumping—especially on BMX or mountain bikes—places extreme and unpredictable stress on the bicycle and its components. Riders who choose to jump or perform stunts risk serious damage to the bicycle and serious injury to themselves.

If you choose to engage in jumping, stunt riding, or racing despite these risks, you must read and understand Part 2.6.

7- Ride at a speed appropriate for conditions. Higher speed increases risk and reduces reaction time.

2.2. Riding Safety

8- Obey all rules of the road and all applicable local traffic laws.
9- You share the road or path with motorists, pedestrians, and other cyclists. Respect the rights of others.
10- Ride defensively. Always assume other road users may not see you.
11- Scan ahead and anticipate hazards. Be prepared to avoid:

- Vehicles slowing, turning, entering the road or your lane, or approaching from behind;
- Opened car doors;
- Pedestrians stepping into your path;
- Children or pets playing near the road;
- Potholes, sewer grates, railroad tracks, expansion joints, construction zones, debris, and other obstructions that may cause you to swerve, catch a wheel, or crash;
- Any other hazards or distractions encountered while riding.

12- Use designated facilities whenever available. Ride in designated bike lanes or on designated bike paths, or as close to the roadway edge as local law permits, and ride in the direction of traffic.
13- Obey traffic control devices. Stop at stop signs and traffic lights; slow and look both ways at intersections. Remember that a bicycle is vulnerable in collisions with motor vehicles—be prepared to yield even when you have the right of way.
14- Use approved hand signals to indicate turns and stops.
15- Do not ride with headphones. Headphones can mask traffic sounds and emergency vehicle sirens, reduce situational awareness, and their wires may become entangled in moving parts—creating a risk of loss of control.
16- Do not carry passengers, except for a small child who is wearing an approved helmet and is secured in a properly mounted child carrier or a certified child-carrying trailer.
17- Do not carry items that obstruct your vision or control, or that may become entangled in moving parts.
18- Do not hold onto or hitch a ride from another vehicle.
19- Do not perform stunts, wheelies, jumps, or other risky maneuvers. If you nonetheless choose to perform stunts or to race, read and understand Part 2.6 (Downhill, Stunt or Competition Biking) and carefully consider your skill level and protective equipment before attempting such activity.
20- Do not weave through traffic or make unpredictable maneuvers that may surprise or endanger other road users.
21- Observe and yield the right of way as required by local traffic laws.
22- Never ride while under the influence of alcohol or drugs. Impaired riding significantly increases the risk of serious injury or death.
23- Whenever possible, avoid riding in poor weather, reduced visibility conditions (dawn, dusk, or nighttime), or when you are extremely fatigued. Each of these conditions increases the likelihood of an accident.

2.3. Off Road Safety

We recommend that children should not ride on rough or uneven terrain unless accompanied by an adult.
1- Off-road terrain presents variable conditions and hazards that require close attention and specific skills. Begin on easier terrain and gradually build your abilities. If your bicycle is equipped with suspension, be aware that increased speed may also increase your risk of losing control and falling. Become fully familiar with the handling characteristics of your bicycle before increasing speed or attempting more difficult terrain.
2- Wear safety gear appropriate for the type of off-road riding you plan to do.
3- Do not ride alone in remote areas. Even when riding with others, ensure someone knows your route and expected return time.
4- Always carry some form of identification and bring cash or other means to obtain food, water, or make an emergency phone call if needed.
5- Yield the right of way to pedestrians and animals. Ride in a manner that does not frighten or endanger them, and allow sufficient space for unexpected movements.
6- Be prepared. In off-road environments, assistance may not be readily available if something goes wrong.
7- If you choose to engage in jumps, stunt riding, or racing—despite our recommendation not to—read and understand Part 2.6 before attempting these activities.

Off-Road Courtesy and Environmental Responsibility: Obey all local laws and regulations regarding where and how off-road riding is permitted, and respect private property. You may share the trail with hikers, equestrians, and other cyclists. Respect their rights and ride cautiously. Stay on designated trails. Prevent trail erosion by avoiding muddy conditions and avoiding unnecessary skidding or sliding. Protect the natural environment by not creating new trails, cutting through vegetation, or riding through streams. It is your responsibility to minimize your environmental impact. Leave the area as you found it, and carry out all items you brought with you.

2.4. Wet Weather Riding

⚠ WARNING

Wet weather significantly reduces traction, braking performance, and visibility—for you and for other vehicles on the road. Riding in wet conditions greatly increases the risk of an accident.

In wet conditions, brake effectiveness is substantially reduced, and tire grip is noticeably diminished. This makes controlling speed more difficult and increases the likelihood of losing control. To ensure you can slow and stop safely when riding in the wet, reduce your speed and apply your brakes earlier and more gradually than you would in dry conditions. See also Part 4.3 for additional braking information.

2.5. Night Riding

Riding a bicycle at night is significantly more dangerous than riding during the day. Bicyclists are much harder for motorists and pedestrians to see in low-light conditions. For this reason, **children should never ride at dawn, dusk, or at night.**

Adults who choose to accept the substantially increased risk of riding at dawn, dusk, or at night must exercise extreme caution and use appropriate equipment designed to enhance visibility and safety. Consult your dealer regarding proper night-riding safety equipment.

⚠ WARNING

Reflectors are not a substitute for required bicycle lighting. Riding at dawn, dusk, nighttime, or in any other low-visibility conditions without a proper lighting system and without reflectors is extremely dangerous and may result in serious injury or death.

Bicycle reflectors are designed to catch and reflect vehicle headlights and street lighting in a way that helps motorists recognize you as a moving cyclist; however, they do not provide adequate illumination on their own.

⚠ CAUTION

Check all reflectors and their mounting brackets regularly to ensure they are clean, properly aligned, undamaged, and securely attached. Have your dealer replace any damaged reflectors and straighten or tighten any that are bent or loose.

The mounting brackets for many front and rear reflectors are designed to function as brake straddle-cable safety catches. These brackets help prevent the straddle cable from contacting the tire tread if the cable breaks or becomes dislodged from its yoke.

⚠ WARNING

Do not remove the front or rear reflectors or their mounting brackets. They are integral components of the bicycle's safety system. Removing reflectors reduces your visibility to other road users, increasing the risk of being struck by a vehicle, which may result in serious injury or death. In addition, reflector brackets may serve as safety catches for the brake straddle cable. If the straddle cable fails or becomes dislodged, the bracket helps prevent it from catching on the tire. If a straddle cable contacts the tire, the wheel may stop suddenly, causing a loss of control and a fall.

If you choose to ride in low-visibility conditions, ensure you comply with all applicable local laws regarding night riding and take the following strongly recommended precautions:

- Install a compliant lighting system. Use battery-powered or generator-powered front and rear lights that meet regulatory requirements and provide adequate visibility.
- Wear light-colored or reflective clothing and accessories, such as reflective vests, arm/leg bands, helmet stickers, or body-mounted flashing lights. Any reflective or moving light source will help attract attention from motorists and pedestrians.
- Ensure that your clothing, luggage, or accessories do not block reflectors or lights.
- Verify that your bicycle is equipped with properly positioned and securely mounted front (white) & rear (red) reflectors.

When riding at dawn, dusk, or at night:

- Reduce your speed.
- Avoid dark or poorly lit areas and routes with heavy or high-speed traffic.
- Avoid road hazards that may be difficult to see.
- When possible, choose familiar routes.

When riding in traffic:

- Be predictable. Ride in a manner that allows drivers to see you and anticipate your movements.
- Stay alert. Ride defensively and expect unexpected actions from others.
- If you plan to ride in traffic regularly, ask your dealer about bicycle-traffic safety courses or reputable

2.6. Extreme, Stunt or Competition Riding

Whether referred to as Aggro, Hucking, Freeride, North Shore, Downhill, Jumping, Stunt Riding, Racing, or any similar activity, engaging in extreme or aggressive riding exposes you to a significantly elevated risk of injury or death. Riders participating in these activities should expect to fall and to incur injuries.

Not all bicycles are engineered for these forms of extreme riding, and even bicycles designed for such use may not be suitable for every type of aggressive activity. Consult your dealer or the bicycle's manufacturer to confirm whether your bicycle is appropriate for the specific riding you intend to perform.

When descending at high speed, you may reach velocities comparable to those achieved by motorcycles and, as a result, may encounter similar hazards. Before attempting such riding, have your bicycle and all equipment thoroughly inspected by a qualified mechanic to ensure they are in proper operating condition.

Seek guidance from experienced riders, trail or site personnel, and race officials regarding course conditions and recommended equipment for the location where you intend to ride. Wear appropriate protective gear, including an approved full-face helmet, full-finger gloves, and suitable body armor.

Ultimately, it is your responsibility to ensure that you use proper equipment and to familiarize yourself with the conditions of the terrain or course before engaging in any extreme riding activity.

⚠ WARNING

Many catalogs, advertisements, and articles portray riders performing extreme or aggressive maneuvers. Such activities are extremely dangerous, significantly increase the risk of injury or death, and greatly increase the severity of any injury that may occur. The riders depicted are trained professionals with years of experience. Know your limits, and always wear a helmet and appropriate protective gear. Even with advanced protective equipment, you can be seriously injured or killed while jumping, stunt riding, downhill riding at speed, or riding in competition.

⚠ CAUTION

Bicycles and their components have structural limits. Extreme riding can exceed those limits, causing damage or failure. Because of these increased risks, we strongly recommend against this type of riding. However, if you choose to accept the risk, at minimum:

- Take lessons from a qualified instructor.
- Begin with basic skills and progress gradually before attempting difficult or hazardous maneuvers.
- Use only designated areas for stunts, jumps, racing, or high-speed downhill riding.
- Wear a full-face helmet, protective pads, and other appropriate safety gear.
- Understand that the stresses involved in these activities can damage or break bicycle components and may void your warranty.
- If any part of the bicycle bends, cracks, or breaks, stop riding immediately and have your dealer inspect and repair it. Never ride a damaged bicycle.

If you ride downhill at speed, perform stunts, or participate in competition, know your skill limits and experience level. Ultimately, your safety and injury prevention are your responsibility.

2.7. Changing Components or Adding Accessories

A wide range of components and accessories is available to enhance the comfort, performance, or appearance of your bicycle. However, any modification you make—whether replacing components or adding accessories—is done at your own risk.

The bicycle manufacturer may not have tested the specific component or accessory for compatibility, reliability, or safety on your model. Before installing any part or accessory, including different tire sizes, verify compatibility with your bicycle by consulting your dealer. Always read, understand, and follow the instructions supplied with any product you install on your bicycle.

⚠ WARNING

Failure to verify compatibility or to correctly install, operate, and maintain any component or accessory can result in serious injury or death.

Replacing components with anything other than genuine or approved parts may compromise the safety and structural integrity of your bicycle and may void the warranty. Always consult your dealer before making any changes to your bicycle's components.

3. Riding Position

NOTE: Proper fit is a critical factor for bicycling safety, performance, and comfort. Achieving correct fit requires experience, skill, and specialized tools. Always have your dealer perform these adjustments; or, if you have the necessary experience, skill, and tools, have your dealer inspect your adjustments before riding.

⚠ WARNING

Riding a bicycle that does not fit properly may cause a loss of control and result in a fall. If your new bicycle does not fit correctly, ask your dealer to exchange it before you ride.

3.1. Standover Height

1. Diamond Frame Bicycles

Standover height is a fundamental element of proper bicycle fit (see figure 2). It is the distance from the ground to the top of the frame at the point where your crotch contacts the top tube when straddling the bicycle.

To check correct standover height, stand over the bicycle while wearing the shoes you intend to ride in, then bounce firmly on your heels. If your crotch contacts the frame, the bicycle is too large for you. Do not ride it, even briefly.

Recommended minimum standover clearances:

Road / paved-surface riding: at least 2 inches (5 cm)

Gravel / unpaved-surface riding: at least 3 inches (7.5 cm)

Off-road / trail riding: 4 inches (10 cm) or more

These clearances help ensure safe dismounting, proper maneuverability, and reduced risk of injury during sudden stops or uneven-terrain riding.

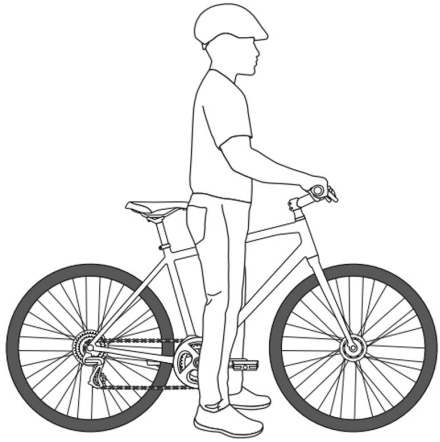

figure 2

2. Step-Through Frame Bicycles

Standover height does not apply to bicycles with step-through frames. For these bicycles, the critical fit dimension is the available saddle height range. You must be able to adjust the saddle position as described in Part 3.2 without exceeding the limits defined by the top of the seat tube or the "Minimum Insertion" / "Maximum Extension" markings on the seat post.

Proper saddle height adjustment is essential for safe operation and to avoid damage to the frame or seat post.

3.2. Saddle Position

figure 3

Correct saddle adjustment is essential for achieving optimal performance and comfort on your bicycle. If the saddle position does not feel comfortable, consult your dealer. The saddle can be adjusted in three directions.

1. Saddle Height (Up–Down Adjustment) To verify correct saddle height (see figure 3):

- Sit on the saddle.
- Place one heel on a pedal.
- Rotate the crank until the pedal with your heel is in the lowest position, with the crank arm parallel to the seat tube.

Your leg should be fully extended in this position. If your leg is not completely straight, the saddle is too low. If your hips must rock from side to side to reach the pedal, the saddle is too high.If your knee remains bent with your heel on the pedal, the saddle is too low. Your dealer can set the saddle to your optimal riding position and show you how to perform this adjustment correctly.

If you choose to adjust saddle height yourself:

- Loosen the seat post clamp.
- Raise or lower the seat post within the safe limits.
- Ensure the saddle is properly aligned fore and aft.
- Re-tighten the seat post clamp to the manufacturer's recommended torque.

Once the saddle is set to the correct height, verify that the seat post does not extend above the frame beyond its "Minimum Insertion" or "Maximum Extension" marking. The seat post must always be inserted into the frame at least 80 mm (see figure 4)

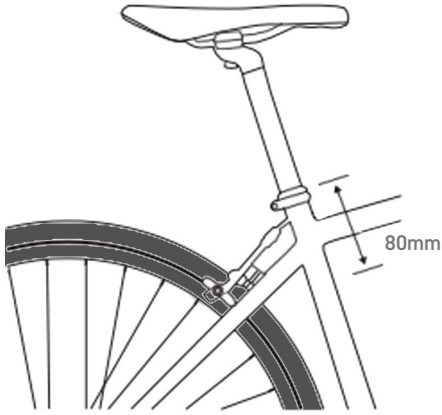

figure 4

⚠ WARNING

A seat post that is extended beyond its safe limit can damage the bicycle and may cause you to lose control and fall. Always ensure that the seat post is inserted into the frame at least 80 mm.

⚠ WARNING

If your seat post is not inserted in the seat tube as described in 3.2.1 above, the seat post may break, which could cause you to lose control and fall.

2. Fore–Aft Adjustment: The saddle can be moved forward or backward to help you achieve an optimal riding position. Ask your dealer to set the saddle correctly and to demonstrate how this adjustment is performed.

If you choose to adjust the saddle's fore–aft position yourself, ensure that the clamp mechanism grips only the straight portion of the saddle rails and does not contact the curved sections (see figure 5). Tighten all clamping fasteners to the manufacturer's recommended torque.

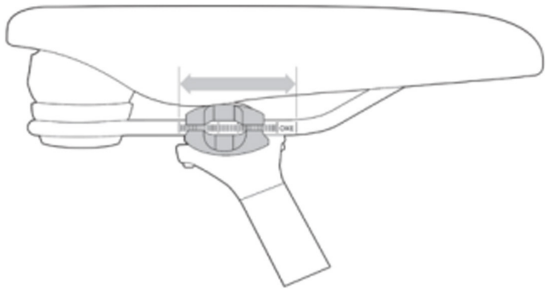

figure 5

3. Saddle Angle Adjustment: Most riders prefer the saddle to be positioned horizontally, although some may choose to tilt the saddle nose slightly upward or downward for comfort. Your dealer can adjust the saddle angle for you or show you how to make this adjustment.

If you choose to adjust the saddle angle yourself and your seat post uses a single-bolt saddle clamp, it is critical to loosen the clamp bolt enough to allow the serrations in the mechanism to fully disengage before changing the saddle angle. After adjusting the angle, ensure that the serrations are fully re-engaged before tightening the clamp bolt to the manufacturer's recommended torque.

⚠ WARNING

When adjusting saddle angle with a single-bolt saddle clamp, always inspect the serrations on the clamp's mating surfaces to ensure they are not worn. Worn serrations may allow the saddle to shift unexpectedly, which can cause a loss of control and a fall. Always tighten fasteners to the correct torque. Fasteners tightened too tightly can stretch or deform; fasteners tightened too loosely can move and fatigue. Either condition can result in sudden fastener failure, leading to a loss of control and a fall.

Note: If your bicycle is equipped with a suspension seat post, the suspension mechanism may require periodic service or maintenance. Consult your dealer regarding the recommended service intervals for your specific suspension seat post.

Even small changes in saddle position can significantly affect comfort and performance. To determine your optimal saddle position, make only one adjustment at a time.

⚠ WARNING

After adjusting the saddle, ensure that the saddle clamp or seat post binder is securely tightened before riding. A loose clamp or binder can damage the seat post and may result in loss of control, leading to a fall. When properly tightened, the saddle should not move in any direction. Regularly inspect the saddle clamp or adjustment mechanism to confirm it remains securely fastened.

⚠ WARNING

Over-tightening the aluminum bolt may cause it to fail while riding, which can result in the saddle coming loose. If you are unsure about the proper torque, have the bolt inspected by your local dealer.

If your saddle remains uncomfortable despite careful adjustment of height, tilt, and fore-aft position, you may require a different saddle design. Saddles, like riders, vary in shape, size, and firmness. Your dealer can assist you in selecting a saddle that, when properly adjusted for your body and riding style, provides optimal comfort.

⚠ WARNING

Riding for extended periods on a saddle that is improperly adjusted or does not provide adequate support to your pelvic area may cause short-term or long-term injury to nerves and blood vessels, and in some cases, may contribute to impotence. If you experience pain, numbness, or any other discomfort while riding, stop immediately and consult your dealer for saddle adjustment or for a suitable alternative saddle.

3.3. Handlebar Height and Angle

Your bike is equipped with either a threadless stem, which clamps around the outside of the steerer tube, or a quill stem, which clamps inside the steerer tube using an expanding binder bolt. If you are unsure which type your bike has, consult your dealer.

Threadless Stem (figure 6): Your dealer may adjust handlebar height by repositioning spacers above or below the stem. If further adjustment is needed, a stem with a different length or rise may be required. Do not attempt this yourself, as it requires specialized knowledge.

Quill Stem (figure 7): Handlebar height can be slightly adjusted by modifying the stem height. Consult your dealer for proper adjustment.

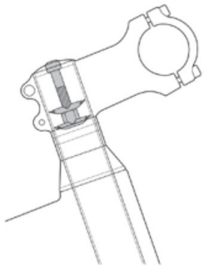

figure 6

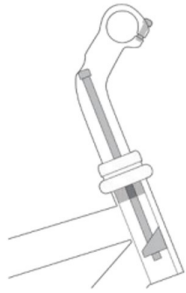

figure 7

A quill stem is marked on its shaft with an etched or stamped “Minimum Insertion” or “Maximum Extension” indicator. This mark must not be visible above the headset.

⚠ WARNING

The quill stem’s Minimum Insertion Mark must not be visible above the top of the headset. Extending the stem beyond this mark may cause the stem to break or damage the fork steerer tube, which can result in loss of control and a fall.

⚠ WARNING

On some bicycles, changing the stem or stem height may alter front brake cable tension. This can cause the front brake to lock or create excessive cable slack, resulting in reduced or lost braking performance. If the front brake pads move closer to or farther from the wheel rim when the stem or stem height is adjusted, the brakes must be properly readjusted before riding.

Some bicycles are equipped with an adjustable-angle stem. If your bicycle has this type of stem, have your dealer demonstrate the correct adjustment procedure. Do not attempt to adjust the stem angle yourself, as changes to stem angle may also require adjustments to the bicycle's control systems.

⚠ WARNING

Always tighten fasteners to the specified torque values. Over-tightened bolts may stretch or deform, while under-tightened bolts may move and fatigue. Either condition can result in sudden bolt failure, which may cause loss of control and a fall.

Your dealer can also adjust the angle of the handlebar or bar-end extensions as needed.

⚠ WARNING

Insufficiently tightened stem clamp bolts, handlebar clamp bolts, or bar-end extension clamp bolts can compromise steering control and may result in a loss of control and a fall. To check clamp security, place the front wheel of the bicycle firmly between your legs and attempt to twist the handlebar and stem assembly. If the stem moves relative to the front wheel, the handlebars rotate within the stem, or the bar-end extensions move relative to the handlebars, the bolts are not properly tightened and must be secured before riding.

3.4. Control Position Adjustments

The angle and position of the brake and shift control levers on the handlebars can be adjusted. Have these adjustments performed by your dealer. If you choose to adjust the control lever angle yourself, always re-tighten the clamp fasteners to the specified torque values.

3.5. Brake Reach

Many bicycles are equipped with brake levers that allow reach adjustment. If you have small hands or find it difficult to comfortably operate the brake levers, your dealer can adjust the lever reach or install brake levers with a shorter reach.

4. Bicycle Components

For your safety, performance, and riding enjoyment, it is important to understand how your bicycle's components function. We strongly recommend that you ask your dealer to demonstrate the procedures described in this section before attempting them yourself, and that you have your dealer inspect your work before riding.

If you have any doubt about your understanding of the information in this section of the Manual, consult your dealer.

4.1. Wheels

Your bicycle wheels are engineered to be removable. This feature facilitates easier transportation of the bicycle and allows for necessary maintenance, such as repairing a flat tire.

There are two primary wheel mounting systems:
Dropouts: On most standard bicycles, the wheel axles slide into slotted openings on the frame and fork known as "dropouts."
Thru-Axles: Certain models, particularly suspension mountain bikes, utilize a "thru-axle" system. In this design, the axle passes directly through the fork or frame holes and the wheel hub, securing the wheel more rigidly.

⚠ WARNING

If your bicycle is equipped with a "thru-axle" system on the front or rear wheels, it is critical that you obtain and follow the specific manufacturer's instructions provided by your dealer. Improper installation of a thru-axle can result in wheel detachment while riding. If you are unfamiliar with the operation of a thru-axle, do not attempt to ride the bicycle; consult your authorized dealer immediately.

Wheels are secured to the frame and fork using one of three primary methods:

- The Quick Release (QR) System / Cam Action System: This mechanism utilizes a hollow axle with a shaft (skewer) running through the hub. It is secured by an adjustable tension nut on one side and an over-center cam lever on the other. The cam lever applies the necessary clamping force to hold the wheel securely in the dropouts. (See figure 8)

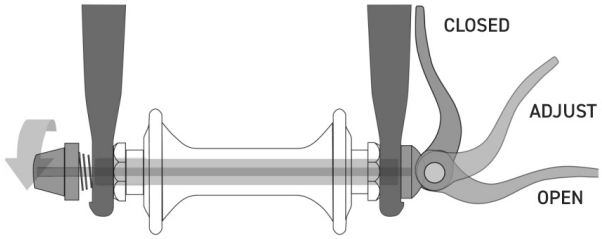

figure 8

- Thru-Bolt System: This system uses a hollow axle and skewer similar to a Quick Release. However, it is tightened using a nut and a tool (e.g., hex key) or a threaded lever, rather than a cam mechanism. (See Figure 9)

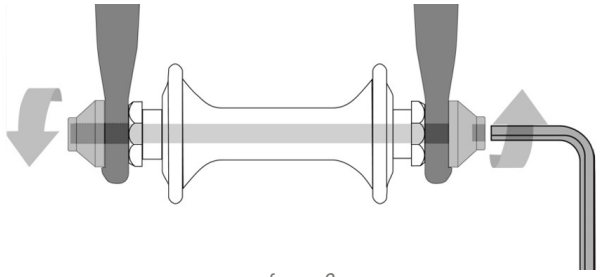

figure 9

- Hex nuts or hex key bolts which are threaded on to or into the hub axle (bolt-on wheel) (figure 10)

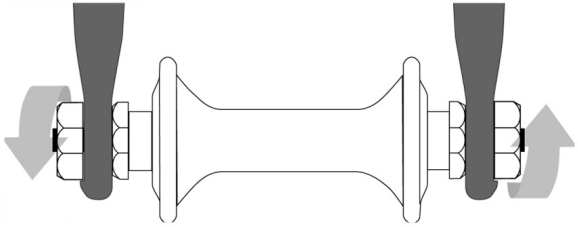

figure 10

Your bicycle may use different wheel retention systems for the front and rear wheels. Consult your dealer to understand the correct wheel securing method for your bicycle.

⚠ WARNING

Riding with an improperly secured wheel can allow the wheel to wobble or detach from the bicycle, which can result in serious injury or death.

Therefore, it is essential that you:
- **Identify your specific wheel mounting system.**
- **Learn how to apply the correct clamping force.**
- **Ask your dealer for a demonstration on proper removal/installation and request any manufacturer instructions.**

⚠ WARNING

Safety Warnings & Secondary Retention Devices: Failure to properly secure the wheels may result in the wheel wobbling or detaching while riding, causing loss of control, serious injury, or death.

To ensure your safety:
- **Verify Competence: Ask your dealer to demonstrate the correct installation and removal technique. Ensure you understand how to apply the proper clamping force.**
- **Pre-Ride Check: Before every ride, physically verify that the wheel is securely clamped.**
- **Visual Inspection: A correctly secured wheel clamp is tight enough to leave a visible impression (embossment) on the fork dropout surfaces.**

1. Front Wheel Secondary Retention Devices

Most modern bicycle forks are equipped with secondary retention devices designed to keep the wheel in the dropouts if the primary Quick Release mechanism is not properly secured. While these devices provide a backup, they are not a substitute for properly tightening your wheel.

These devices generally fall into two categories:
- Clip-on Type: A separate component attached to the front wheel hub or the fork itself.
- Integral Type: Tabs or ridges that are molded, cast, or machined directly into the outer faces of the fork dropouts.

Consult your dealer to identify the specific type of retention device used on your bicycle.

⚠ WARNING

Do not remove, disable, or modify the secondary retention device. It serves as a critical backup safety system. If the wheel is improperly secured, this device reduces the risk of accidental wheel detachment. Removing or tampering with this device compromises your safety and will void the warranty.

Secondary retention devices cannot guarantee safety if the wheel is loose. Always ensure the wheel is properly secured to prevent serious injury or death.

2. Quick Release (Cam Action) Wheel Systems

There are two primary types of cam-operated wheel retention systems used on bicycles:

- The Traditional Quick Release: Uses a standard cam lever and skewer.
- The Cam-and-Cup System: Uses a cam lever housed within a cup mechanism.

Both systems utilize over-center cam leverage to securely clamp the wheel into the frame or fork.
Note: It is common for bicycles to be equipped with a Cam-and-Cup system on the front wheel and a Traditional system on the rear.

a. Adjusting the Traditional Quick Release Mechanism. The wheel is secured by compressing the dropouts between the cam lever and the adjustable nut. Crucial: The amount of clamping force is controlled solely by the tension adjusting nut, not by rotating the lever like a wingnut.

How to Adjust Tension:

- To Increase Clamping Force: Hold the cam lever stationary (do not rotate it) and turn the tension adjusting nut clockwise.
- To Decrease Clamping Force: Hold the cam lever stationary and turn the tension adjusting nut counter-clockwise.

⚠ WARNING

The tension adjusting nut is highly sensitive. Turning the nut less than one-half turn can make the difference between a wheel that is safely secured and one that is dangerously loose. Always make small adjustments and check the tension frequently.

⚠ WARNING

IMPROPER USE Do not attempt to tighten the quick release lever by rotating it like a wing nut. Rotating the lever does not apply the necessary clamping force. You must use the cam action (flipping the lever over) to secure the wheel. Failure to do so may result in wheel detachment.

b. Adjusting the Cam-and-Cup Mechanism. If your bicycle features a Cam-and-Cup mechanism:

- Dealer Adjustment: This system is pre-adjusted by your dealer. Do not attempt to re-adjust it yourself.
- Compatibility: Never use a cam-and-cup front wheel on a bicycle other than the one for which it was originally adjusted.
- Maintenance: Have your authorized dealer inspect the adjustment every six months.

3. Removing and Installing Wheels

Before attempting to remove a wheel, identify your braking and gearing system.
SPECIALIZED HUBS If your bicycle is equipped with:

- Internal Gear Hubs (e.g., Shimano Nexus, Alfine)
- Hub Brakes (Coaster brake, drum brake, or roller brake)

⚠ WARNING

DO NOT attempt to remove the wheel yourself. The removal and re-installation of these systems require specialized knowledge and tools. Incorrect assembly can lead to sudden brake or gear failure, causing loss of control. Consult your dealer for service.

⚠ CAUTION

DISC BRAKES Burn and Cut Hazard:

- **Hot Surfaces: Disc brake rotors and calipers can become extremely hot during use. Allow them to cool completely before touching.**
- **Sharp Edges: Disc rotors often have sharp edges. Exercise extreme care when working near the rotor to avoid cuts.**

a. Removing a disk brake or rim brake Front Wheel
Step 1: Brake Preparation
Rim Brakes: Disengage the brake's quick-release mechanism to open the brake pads and increase clearance for the tire.
Disc Brakes: No adjustment to the brake caliper is typically required for removal.

Step 2: Loosening the Axle Depending on your wheel retention system, follow the appropriate method:
Quick Release (Cam Action): Move the cam lever from the LOCKED (CLOSED) position to the OPEN position (See figure 8).
Thru-Bolt / Bolt-On: Using the appropriate tool (wrench or hex key), loosen the fastener(s) by turning them counter-clockwise a few turns.

Step 3: Disengaging Secondary Retention Devices If your fork is equipped with safety tabs (lawyer lips), you must clear them to remove the wheel:
Clip-on Type: Disengage the clip mechanism manually.
Integral Type (with Traditional QR): Loosen the tension adjusting nut just enough to allow the axle to slide out of the dropouts.
Cam-and-Cup System: Squeeze the cup and cam lever together while removing the wheel. (Note: No rotation is necessary for this system).

Step 4: Removing the Wheel Lift the front of the bicycle slightly off the ground. Firmly tap the top of the tire with the palm of your hand to release the wheel from the fork dropouts.

b. Installing a disk brake or rim brake Front Wheel

⚠ CAUTION

DISC BRAKE CARE Prevent System Failure:

- **Protect the Rotor: When inserting the wheel, exercise extreme care not to impact or damage the disc rotor, caliper, or brake pads.**
- **Do Not Squeeze Lever: NEVER activate the disc brake control lever unless the disc rotor is correctly inserted into the caliper. Squeezing the lever without the rotor can close the pads, making wheel installation impossible and requiring service.**

Step 1: Prepare the Retention System

- Quick Release: Move the cam lever to the OPEN position (curving away from the wheel). Ensure the lever is on the correct side of the bike (typically the left side, opposite the drivetrain).
- Thru-Bolt: Ensure the fasteners are loose enough to accept the fork dropouts.

Step 2: Wheel Insertion With the fork facing forward, insert the wheel into the dropouts.

- Seating: Ensure the axle sits firmly at the very top of the dropout slots.
- Orientation: The cam lever should be on the rider's left side (opposite the chain).
- Secondary Retention: If your fork uses a clip-on type retention device, engage it now.

Step 3: Initial Adjustment (Traditional Quick Release)

- Hold the cam lever in the OPEN position with one hand. With your other hand, tighten the tension adjusting nut until it is finger-tight against the fork dropout.

Note: If using a Cam-and-Cup system, the cup will snap into the recessed area of the dropout automatically.

Step 4: Securing the Wheel While pushing the wheel firmly up into the dropouts to keep it centered:

- For Quick Release Systems: Move the cam lever upwards into the CLOSED position. The lever should end up parallel to the fork blade, curving toward the wheel.
- For Thru-Bolt Systems: Tighten the fasteners using the appropriate tool. Torque Specification: Refer to the manufacturer's instructions for the specific torque value. Ensure the wheel is securely held, then fully tighten to spec.

⚠ WARNING

Securely clamping the wheel requires considerable force. If you can fully close the cam lever without wrapping your fingers around the fork blade for leverage, the tension is INSUFFICIENT.

- **The Test: The lever should leave a clear temporary imprint in the palm of your hand when closed.**
- **The Check: The serrations on the wheel fastener must bite (emboss) into the metal surface of the dropouts.**

Corrective Action: If the lever closes too easily (insufficient tension) or cannot be fully closed (excessive tension):

A. **Return the lever to the OPEN position.**
B. **Turn the tension adjusting nut 1/4 turn (clockwise to tighten, counter-clockwise to loosen).**
C. **Try closing the lever again. Repeat until proper resistance is achieved.**

Step 5: Brake Re-Engagement If you disengaged the brake quick-release mechanism in Step 1, you must re-engage it now.

- Check: Verify that the brake pads are correctly spaced and not rubbing against the rim or rotor.

Step 6: Operational Verification Before riding, perform a final spin test:

- Lift the front of the bike and spin the wheel. It should spin freely and be perfectly centered in the frame/fork.
- Brake Clearance: Ensure the tire does not rub against the brake pads.
- Brake Function: Squeeze the brake lever to verify that the brakes engage correctly and stop the wheel immediately.

c. Removing a disk brake or rim brake Rear Wheel

Step 1: Gear Preparation

- Derailleur Systems: Shift the rear gears onto the smallest, outermost sprocket (High Gear). This creates slack in the chain and makes removal significantly easier.
- Single-Speed Bikes: Skip to Step 4.
- Internal Gear Hubs: STOP. Do not attempt to remove the wheel without consulting the manufacturer's instructions or your dealer. Specialized disconnection procedures are required.

Step 2: Brake Release (Rim Brakes Only) If equipped with rim brakes, disengage the brake's quick-release mechanism to widen the brake pads. This prevents the tire from getting stuck between the pads during removal.

Step 3: Creating Clearance Stand behind the bicycle. With your right hand, pull the rear derailleur body explicitly backward (towards the rear of the bike) to release tension on the chain.

Step 4: Loosening the Axle

- Quick Release (Cam Action): Move the lever to the OPEN position.
- Thru-Bolt / Nutted Axle: Loosen the axle nuts or bolts using the appropriate wrench.
- Action: Push the wheel forward slightly to create enough slack to lift the chain off the rear sprocket.

Step 5: Removal Lift the rear of the bicycle off the ground. The wheel should drop out of the dropouts naturally. Guide the wheel down and forward to clear the chain and frame.

c. Removing a disk brake or rim brake Rear Wheel

⚠ CAUTION

COMPONENT DAMAGE Risk of Disc Brake & Caliper Damage:

- **Precision Required: When inserting the rear wheel, guide the disc rotor carefully between the brake pads. Forcing the wheel can damage the rotor or caliper.**
- **Do Not Squeeze Lever: NEVER actuate the brake lever while the wheel is removed. This will close the pads, preventing wheel installation and requiring professional service.**

Step 1: Preparation

- Cam Action (Quick Release): Move the cam lever to the OPEN position.
- Orientation: Ensure the cam lever is on the non-drive side (the side opposite the chain and sprockets).

Step 2: Chain Engagement Depending on your drivetrain type, follow the specific procedure below:

- Derailleur Bikes (Multi-Speed): Ensure the rear derailleur is still shifted to the outermost, high-gear position. Pull the derailleur body backward with your right hand to create slack. Place the chain onto the smallest sprocket.
- Single-Speed Bikes: First, remove the chain from the front chainring to create maximum slack. Then, place the chain onto the rear wheel sprocket.

Step 3: Wheel Insertion Insert the wheel axle into the frame dropouts.

- Standard Dropouts: Pull the wheel all the way back into the dropouts until it seats firmly.
- Single-Speed Tensioning: Once the wheel is in the dropouts, replace the chain onto the front chainring. Pull the wheel back until the wheel is straight and the chain is tight but has approximately 1/4 inch (6mm) of up-and-down play at its midpoint.

Step 4: Securing the Rear Wheel

- For Quick Release (Cam Action) Systems: Move the cam lever upwards into the CLOSED position.
  - Lever Orientation: The lever should be parallel to the seat stay or chain stay and curved toward the wheel.
  - Leverage: To apply sufficient force, you should need to wrap your fingers around the frame tube (seat stay/chain stay) for leverage.
- For Thru-Bolt / Bolt-On Systems: Using the correct size wrench, tighten the axle nuts.
  - Procedure: Tighten slightly to hold the wheel in place, check alignment, then tighten both nuts simultaneously and fully to the manufacturer's torque specifications.

⚠ WARNING

Insufficient clamping force can cause the wheel to shift or detach, resulting in serious injury.

The "Palm Test":

- **If you can fully close the cam lever without wrapping your fingers around the seat stay or chain stay for leverage, the tension is INSUFFICIENT.**
- **A correctly secured lever must leave a clear imprint in the palm of your hand.**

Corrective Adjustments:

- **If Too Loose (No Imprint): Open the lever, turn the tension adjusting nut clockwise (1/4 turn), and re-close.**
- **If Too Tight (Cannot Close Parallel): Return the lever to OPEN, turn the tension adjusting nut counter-clockwise (1/4 turn), and try again.**

Step 5: Final Safety Checks

- Brake Re-Engagement: If you disengaged the brake quick-release mechanism earlier, re-engage it now to restore correct brake pad-to-rim clearance.
- Spin Test: Lift the rear of the bike and spin the wheel.
  - Verify the wheel is centered in the frame.
  - Verify the wheel clears the brake pads.
  - Function Check: Squeeze the brake lever to ensure the brakes operate correctly before riding.

4.2. Seat Post Cam Action Clamp (Quick Release)

⚠ WARNING

Riding with an improperly tightened seat post can allow the saddle to turn sideways or drop suddenly while riding. This can cause you to lose control of the bicycle and fall, resulting in serious injury or death.

- **Pre-Ride Check: Before every ride, physically check that the saddle is secure and cannot be twisted or moved up/down.**
- **Dealer Instruction: If you are unsure how to operate the seat post clamp, ask your dealer for a demonstration.**

1. Understanding the Mechanism

The seat post cam action binder works exactly like the traditional wheel Quick Release system described in Part 4. It utilizes an over-center cam lever to squeeze the seat collar, securely holding the seat post at the desired height.

2. Adjusting the Tension

The clamping force is controlled solely by the tension adjusting nut, NOT by rotating the lever itself.

- To Tighten: Open the cam lever. Turn the tension adjusting nut clockwise.
- To Loosen: Open the cam lever. Turn the tension adjusting nut counter-clockwise.

⚠ WARNING

Fine Adjustment Required: Less than one-half turn of the tension adjusting nut can make the difference between a safely secured seat post and one that is dangerously loose.

3. Securing the Seat Post

⚠ WARNING

Do not use the lever like a wing nut. The full force of the cam action is needed to clamp the seat post securely. Holding the nut with one hand and spinning the lever with the other will NOT generate enough clamping force, even if it feels tight.

Verification (The "Palm Test"):

- Move the cam lever to the CLOSED position.
- Required Force: You should need to wrap your fingers around the seat post or frame tube for leverage to close the lever completely.
  - Visual Check: The lever must leave a clear imprint in the palm of your hand.
  - If the lever closes too easily: Open it, tighten the nut 1/4 turn, and try again.
  - If the lever cannot be closed: Open it, loosen the nut 1/4 turn, and try again.

4.3. Brakes

There are three general types of bicycle brake systems used today. It is important to identify which type your bicycle is equipped with:

- Rim Brakes: These operate by squeezing the wheel rim between two brake pads. (Includes Linear-pull, Cantilever, and Caliper brakes).
- Disc Brakes: These operate by squeezing a hub-mounted steel disc (rotor) between two brake pads.
- Internal Hub Brakes: These operate via a mechanism located inside the wheel hub.

Note: On some models, the internal hub brake is operated by pedaling backwards. This is known as a Coaster Brake

⚠ WARNING

1. Safety Warnings & Riding Dynamics

Failure to follow these instructions can result in loss of control, serious injury, or death.

- System Maintenance: Riding with improperly adjusted brakes, worn brake pads, or wheels on which the rim wear mark is visible is extremely dangerous. Worn components can lead to sudden brake failure.
- Braking Technique: Applying brakes too hard or too suddenly can lock up a wheel, which could cause the tire to skid and you to lose control and fall.
- "Pitch-Over" Risk: Sudden or excessive application of the front brake may pitch the rider over the handlebars, causing a severe head-over-heels crash.
- System Power: Some bicycle brakes, such as Disc Brakes (figure 11) and Linear-Pull Brakes (figure 12), are extremely powerful. You must take extra care in becoming familiar with these brakes and exercise particular caution when using them to avoid locking the wheels accidentally.

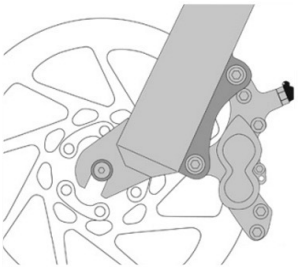

figure 11

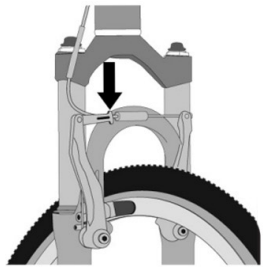

figure 12

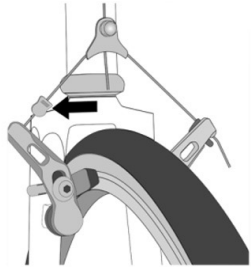

figure 13

2. Brake Force Modulators

Some bicycle brakes are equipped with a Brake Force Modulator. This is a small, cylindrical device through which the brake control cable runs.

Function & Performance: The modulator is designed to provide a more progressive application of braking force. It functions by making the initial brake lever force more gentle, and then progressively increasing the force until full braking power is achieved.

⚠ WARNING

If your bike is equipped with a brake force modulator, take extra care to become familiar with its specific performance characteristics. The feel of the lever will differ from standard direct-pull systems.

⚠ CAUTION

3. Disc Brake Specific Cautions. Risk of Burns and Cuts:

- Hot Surfaces: Disc brakes can get extremely hot with extended use (such as during long descents). Be careful not to touch a disc brake rotor or caliper until it has had plenty of time to cool.
- Sharp Edges: Disc rotors often have sharp outer edges. Exercise care when working near the rotor to avoid cuts.

4. Brake Maintenance and Replacement

To ensure the continued safety and performance of your braking system, you must strictly follow the brake manufacturer's specific instructions regarding operation, care, and the correct intervals for brake pad replacement. If you do not possess these manufacturer instructions, it is your responsibility to obtain them from your dealer or contact the brake manufacturer directly. Furthermore, when replacing any worn or damaged components, use only manufacturer-approved genuine replacement parts. Using non-approved parts can compromise the system's integrity and safety.

Brake Controls and Operation

1. Brake Lever Configuration

It is critically important for your safety that you understand which brake lever controls which wheel. Traditionally in the United States and Europe, the right brake lever controls the rear brake, and the left brake lever controls the front brake. To ensure your bicycle is set up this way, squeeze one brake lever and observe which brake engages, then repeat with the other lever.

Note: The brake setup in some countries (e.g., UK, Japan, Australia) is opposite, with the right lever operating the front brake. If your bicycle has been imported or modified, please verify the setup immediately to avoid confusion.

2. Lever Reach and Comfort

Ensure that your hands can reach and squeeze the brake levers comfortably. If your hands are too small to operate the levers effectively, consult your dealer before riding. The lever reach may be adjustable, or you may require a specialized lever design.

3. Brake Quick-Release Mechanisms

Most rim brakes feature a quick-release mechanism to allow the brake pads to clear the tire for wheel removal. It is essential to understand that when this mechanism is in the OPEN position, the brakes are inoperative. Ask your dealer to demonstrate how this works, and verify that the quick-release is properly closed and the brakes are functional before every ride.

4. How Brakes Work

The braking action of a bicycle relies on the friction between the braking surfaces. To ensure maximum stopping power, you must keep your wheel rims, brake pads, and disc rotors clean and free of dirt, lubricants, waxes, or polishes.

Brakes are designed to control your speed, not merely to stop the bike abruptly. Maximum braking force occurs at the point just before the wheel "locks up" (stops rotating) and begins to skid. It is crucial to understand that once the tire skids, you lose most of your stopping force and all of your directional control. You must practice applying the brakes smoothly and progressively to stop effectively without locking the wheels.

Progressive Brake Modulation: To maintain directional control, you need to practice slowing and stopping smoothly without locking up a wheel. This technique is called progressive brake modulation. Instead of jerking the brake lever instantly to the maximum position, squeeze the lever progressively to increase 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 is 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.

Weight Transfer and Body Position: 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. In extreme braking situations, this weight transfer can be so severe that it lifts the rear wheel, potentially sending you flying over the handlebars.

This Physics Creates a Dilemma: A wheel with more weight on it has better traction and can accept greater brake pressure, while a lighter wheel locks up easily. Therefore, as you apply brakes and your weight transfers forward, you need to actively shift your body weight toward the rear of the bike. This transfers weight back onto the rear wheel, allowing for more effective rear braking and reducing the risk of a pitch-over. This technique is especially critical on steep descents.

Note regarding suspension: If your bike has a front suspension fork, be aware that the fork will compress ("dive") under braking. This compression exaggerates the weight transfer to the front, making correct body positioning even more important.

Wet and Loose Conditions: Riding dynamics change drastically on loose surfaces (like gravel or sand) or in wet weather. Tire adhesion is reduced, meaning wheels have less cornering and braking traction and can lock up with much less brake force. Moisture or dirt on the brake pads further reduces their ability to grip. To maintain control on loose or wet surfaces, you must go more slowly and begin braking earlier than usual.

Brake Pad Alignment (Rim Brakes)

⚠ WARNING

Correct alignment of the brake pads against the rim surface is mandatory for safe braking. Improperly aligned pads can cause severe brake squeal, reduced stopping power, uneven wear, or even damage to the tire sidewall.

1. The "Toe-In" Concept To ensure smooth modulation and prevent noise, brake pads should not contact the rim flatly all at once. Instead, they must be angled slightly so that the front (leading) edge of the pad contacts the rim surface just before the rear (trailing) edge. This setup is known in the industry as "toe-in".

2. Adjustment Specification Unless otherwise specified by the brake manufacturer, use the following spacing as a guideline for creating the correct angle:

- Standard Setup: Align the pads so that the gap between the rim and the front of the pad is approximately 1 mm, while the gap at the rear is approximately 2 mm. This difference creates the necessary toe-in angle.
- Precision Rims: On certain high-precision or machined rims, a more parallel alignment (approximately 1 mm gap at both the front and rear) may be acceptable.

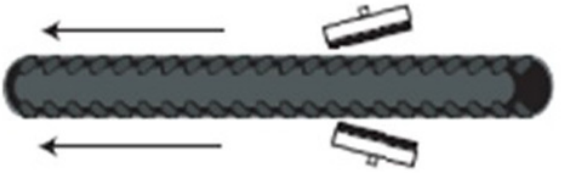

figure 14

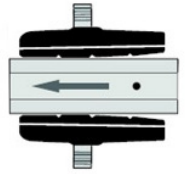

figure 15

3. Final Verification After tightening the brake pads, perform a visual check:

- Surface Contact: Ensure the pads sit fully on the braking surface of the rim and do not touch the tire.
- Clearance: Spin the wheel to ensure the pads do not rub against the rim when the brake lever is released.

4.4. Shifting Gears

Your multi-speed bicycle is likely equipped with a derailleur drivetrain, an internal gear hub drivetrain, or in some special cases, a combination of the two.

1. How a Derailleur Drivetrain Works
If your bicycle has a typical derailleur drivetrain, the gear-changing mechanism consists of a rear cassette (freewheel sprocket cluster), a rear derailleur, a drive chain, and often a front derailleur with one or two front chainrings. Shifting is controlled by levers, twist grips, triggers, or push-buttons located on the handlebars. Consult your dealer to understand the specific operation of the shifting controls on your bike.

Understanding Shifting Terminology The vocabulary of shifting can be confusing, but it follows a simple logic based on the "centerline" of the bike.

- Downshifting: This shifts the bike into a "lower" or "slower" gear, which is easier to pedal. It is used for climbing hills or accelerating. To downshift, the mechanism moves the chain towards the centerline of the bike (to a larger gear at the rear or a smaller gear at the front).
- Upshifting: This shifts the bike into a "higher" or "faster" gear, which is harder to pedal but generates more speed. To upshift, the mechanism moves the chain away from the centerline of the bike (to a smaller gear at the rear or a larger gear at the front).

Operational Requirement 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.

⚠ WARNING

Never move the shifter while pedaling backward, nor pedal backwards immediately after having moved the shifter. This could jam the chain and cause serious damage to the bicycle, potentially causing you to lose control and fall.

⚠ WARNING

a. Shifting the Rear Derailleur

The rear derailleur is controlled by the right shifter and functions by moving the drive chain from one gear sprocket to another. The gear ratios are determined by the size of the sprockets: smaller sprockets produce higher gear ratios, which require greater pedaling effort but propel you a greater distance with each pedal revolution. Conversely, larger sprockets produce lower gear ratios, requiring less effort but covering less distance. Moving the chain from a larger sprocket to a smaller one is called an upshift, while moving from a smaller sprocket to a larger one is called a downshift. For the derailleur to successfully move the chain, the rider must be pedaling forward.

b. Shifting the Front Derailleur

The front derailleur is controlled by the left shifter and shifts the chain between the larger and smaller chainrings. The logic here is straightforward: shifting the chain onto a smaller chainring makes pedaling easier (a downshift), while shifting it onto a larger chainring makes pedaling harder (an upshift).

c. Gear Selection Strategy

Choosing the correct gear is essential for efficient riding. The combination of the largest rear sprocket and the smallest front chainring is designed for climbing the steepest hills, whereas the smallest rear sprocket and largest front chainring provide the greatest speed. It is not necessary to shift gears in numerical sequence. Instead, you should find a comfortable "starting gear"—one that is hard enough for quick acceleration but easy enough to start from a stop without wobbling. Experiment with different upshifting and downshifting combinations to get a feel for the gear ratios. Practice shifting in a safe area free of obstacles, hazards, or other traffic until you build confidence. Furthermore, learn to anticipate the road ahead; shift to a lower gear before a hill becomes too steep to maintain momentum.

figure 16

⚠ WARNING

Loss of Control Risk: Never attempt to shift a derailleur onto the largest or the smallest sprocket if the derailleur is not shifting smoothly. If the mechanism is out of adjustment, the chain could jam between the gears and the frame, causing the wheel to lock up and leading to a loss of control and fall.

Troubleshooting: If moving the shift control one click repeatedly fails to result in a smooth shift to the next gear, the mechanism is likely out of adjustment. Do not force it; take the bicycle to your dealer for professional service.

2. Internal Gear Hub Drivetrains
If your bicycle is equipped with an internal gear hub drivetrain, the gear-changing mechanism consists of a multi-speed internal hub, one or two shifters, control cables, and a single front chainring.

a. Shifting Technique (Crucial Difference)
Shifting with an internal gear hub is fundamentally different from derailleur systems. While shifting is simply a matter of moving the shifter to the indicated position for the desired gear ratio, you must ease the pressure on the pedals for an instant to allow the hub to complete the shift. Do not pedal under full load while shifting.

b. Gear Selection and Troubleshooting
The gear numbering follows a standard logic: the numerically lowest gear (1) is for the steepest hills, and the numerically largest gear is for the greatest speed. Shifting from an easier, "slower" gear (like 1) to a harder, "faster" gear (like 2 or 3) is an upshift, while the reverse is a downshift. Just like with derailleur systems, find a suitable "starting gear" for your conditions and experiment with shifting to get a feel for the distinct gear ratios. Practice in a safe environment and learn to downshift before climbing hills. If you experience difficulty shifting, such as moving the shifter one click without a smooth gear change, the mechanism is likely out of adjustment. Take the bike to your dealer to have it adjusted.

4.5. Pedals

Toe Overlap "Toe Overlap" occurs when your toe touches the back of the front wheel while turning the handlebars to steer. This phenomenon is more common on small-framed bicycles or bikes with specific geometries. To avoid contact between your foot and the wheel, you must adopt a specific cornering technique: keep the inside pedal up (at the 12 o'clock position) and the outside pedal down when making sharp turns. This technique also prevents the inside pedal from striking the ground during the turn.

⚠ WARNING

Risk of Loss of Control: Toe overlap creates a risk of contact between your foot and the wheel, which could interfere with steering, cause you to lose control, and fall. Ask your dealer to help you determine if the combination of frame size, crank arm length, pedal design, and shoes you will use results in toe overlap. Whether you have overlap or not, you must make it a habit to keep the inside pedal up and the outside pedal down when making sharp turns.

Pedal Surface Safety Some high-performance bicycles come equipped with pedals that feature sharp, aggressive surfaces (often called pins or cages) designed to increase grip between the rider's shoe and the pedal. While these provide superior traction, the sharp surfaces pose a risk of laceration if your foot slips. If your bicycle has this type of pedal, take extra care to avoid injury from the pedals' sharp surfaces. Based on your riding style or skill level, you may prefer a less aggressive pedal design or choose to ride with protective shin pads. Your dealer can show you a number of options and make suitable recommendations.

Foot Retention Systems (Toeclips & Clipless Pedals)
Toeclips and Straps Toeclips and straps are designed to keep feet correctly positioned and engaged with the pedals. The toeclip positions the ball of the foot over the pedal spindle for maximum power, while the strap keeps the foot engaged throughout the rotation cycle. While they can be used with various shoes, they work most effectively with cycling shoes designed for use with toeclips. Shoes with deep treads or wide welts may make it difficult to insert or remove your foot quickly.

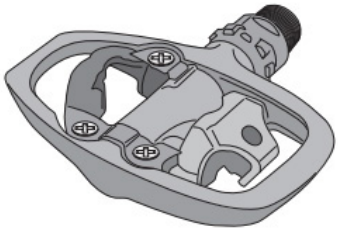

figure 17

⚠ WARNING

SKILL REQUIRED Getting into and out of pedals with toeclips and straps requires skill which can only be acquired with practice. Until it becomes a reflex action, the technique requires concentration which can distract your attention and cause you to lose control and fall. Practice the use of toeclips and straps in a safe area free of obstacles, hazards, or traffic. Keep the straps loose, and do not tighten them until your technique and confidence warrant it. Never ride in traffic with your toe straps tight.

Clipless Pedals (Step-in Pedals) Clipless pedals are another means to keep feet securely in the correct position for maximum pedaling efficiency. They utilize a plastic or metal plate, called a "cleat," attached to the sole of the shoe, which clicks into a mating spring-loaded fixture on the pedal. They only engage or disengage with a very specific motion (typically twisting the heel outward), which must be practiced until it becomes instinctive. Most clipless pedals 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.

⚠ WARNING

CLIPLESS PEDAL HAZARD Requirement for Specific Shoes & Practice:

- **Compatibility: Clipless pedals are intended for use with shoes specifically made to fit them. Do not use shoes which do not engage the pedals correctly.**
- **Practice: Practice is required to learn to engage and disengage the foot safely. Until this becomes a reflex action, the distraction can cause you to lose control and fall. Practice in a safe place where there are no obstacles, hazards, or traffic; and strictly follow the pedal manufacturer's setup and service instructions. If you do not have the manufacturer's instructions, see your dealer.**

4.6. Bicycle Suspension

Many modern bicycles are equipped with suspension systems (forks or rear shocks) to dampen terrain impacts. 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 directly.

⚠ 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.

Maintenance and Handling Dynamics

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. 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.

⚠ WARNING

- **Adjustment Risks: 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.**
- **Retrofitting Warning: Not all bicycles can be safely retrofitted with some types of suspension systems. Before retrofitting a bicycle with any suspension, check with the bicycle's manufacturer to make sure that what you want to do is compatible with the bicycle's design. Failing to do so can result in catastrophic frame failure, causing loss of control, serious injury or death.**

4.7. Tires and Tubes

Tire Specifications and Selection

Bicycle tires are available in many designs and specifications, ranging from general-purpose designs to tires designed to perform best under very specific weather or terrain conditions. If, once you've gained experience with your new bike, you feel that a different tire might better suit your riding needs, your dealer can help you select the most appropriate design. The size, pressure rating, and on some high-performance tires the specific recommended use, are marked on the sidewall of the tire. The part of this information which is most important to you is Tire Pressure.

Inflation Safety and Procedures
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. Ask your dealer to recommend the best tire pressure for the kind of riding you will most often do, and have the dealer inflate your tires to that pressure. Then, check inflation as described in Section 1.C so you'll know how correctly inflated tires should look and feel when you don't have access to a gauge. Some tires may need to be brought up to pressure every week or two, so it is important to check your tire pressures before every ride.

⚠ WARNING

Over-inflation: 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.

figure 18

Compressor Danger
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.

Optimizing Tire Pressure 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. Conversely, 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. However, 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

GAUGE ACCURACY 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.

To convert tire pressure from pounds-force per square inch (P.S.I.) into kilopascals (kPa) use the following conversion chart.

P.S.I	bar	kPa	P.S.I	bar	kPa	P.S.I	bar	kPa
1	0.069	6.9	50	3.447	344.7	110	7.584	758.4
5	0.345	34.5	60	4.137	413.7	120	8.274	827.4
10	0.689	68.9	70	4.826	482.6	130	8.963	896.3
20	1.379	137.9	80	5.516	551.6	140	9.653	965.3
30	2.068	206.8	90	6.205	620.5	150	10.342	1034.2
40	2.758	275.8	100	6.895	689.5	160	11.032	1103.2

Tire Maintenance and Valves

Pressure Conversion
Correct tire pressure is vital for safety and performance. To convert pressure ratings from P.S.I. (Pounds per Square Inch) to Bar or kPa (Kilopascals), refer to the conversion chart provided above. Always verify the maximum pressure rating marked on your tire sidewall before inflating.

Unidirectional Tires
Some high-performance tires feature unidirectional treads, meaning the tread pattern is designed to work effectively in only one direction. The sidewall of such tires will have an arrow indicating the correct direction of rotation. If your bike is equipped with these tires, verify that they are mounted to rotate in the direction of the arrow to ensure proper grip and water displacement.

Valve Types
There are three primary types of bicycle tube valves. You must ensure your pump has the appropriate fitting for your valve type.

- **Schrader Valve (Automotive Style)** The Schrader valve (figure 19a) is identical to the valve found on car tires. To inflate, remove the valve cap and clamp the pump head onto the valve stem. To let air out, depress the small pin in the center of the valve stem using a key or a specialized tool.
- **Presta Valve (High Pressure)** The Presta valve (figure 19b) has a narrower diameter and is typically found on high-performance road and mountain bikes.
  To Inflate: Remove the valve cap, unscrew the small lock nut at the tip of the valve stem (turn counter-clockwise), and push down on the stem to free the seal. Then, push the pump head onto the valve and inflate.
  Using a Schrader Pump: If using a gas station pump or standard car pump, you will need a Presta adapter (available at bike shops). Screw the adapter onto the open valve stem, then attach the pump.
  To Deflate: Open the lock nut and depress the valve stem. Always close the lock nut after inflation.
- **Woods / Dunlop Valve** The Woods valve (figure 19c) is less common in the US but features a bottom similar to a Schrader and a neck similar to a Presta. It can typically be inflated using a Presta-compatible pump.

figure 19a
Schraeder

figure 19b
Presta

figure 19c
Woods/Dunlop

6. Tube Repair and Tubeless Systems

⚠ WARNING

TUBE PATCHING Emergency Repair Only: We highly recommend carrying a spare inner tube when you ride. Patching a punctured tube is considered an emergency repair only. If a patch is not applied correctly, or if multiple patches are used, the tube can fail suddenly. This can cause the tire to lose pressure instantly, leading to loss of control and a fall. Replace a patched tube with a new, intact tube as soon as possible.

Tubeless Tires

Tubeless tires (or "Tubeless Ready" systems) offer benefits such as reduced risk of flats, improved traction, and lower rolling resistance. A complete tubeless system consists of compatible rims, tires, rim tape, valves, and liquid sealant.

⚠ WARNING

TUBELESS INSTALLATION Professional Service Required: Installation or modification of a tubeless system requires special knowledge, dedicated tools, and specific compatibility checks. Improper installation, seating, or adjustment may result in sudden air loss and tire detachment, causing serious injury or death. Consult your authorized dealer for help in determining the requirements and setting up a tubeless system correctly.

5. Service

⚠ WARNING

COMPLEXITY HAZARD Risk of Improper Servicing: Technological advances have made bicycles and their components increasingly complex. It is impossible for this manual to provide all the information required to properly repair or maintain every aspect of your bicycle. To minimize the risk of an accident and possible injury, it is critical that you have any major repair or maintenance work performed by your authorized dealer.

Individual Requirements: Your specific maintenance needs will be determined by everything from your riding style to your geographic location. Consult your dealer to help you determine a maintenance schedule that suits your needs.

⚠ WARNING

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

If you wish to learn to perform major service or repair work on your bike, we recommend asking your dealer for manufacturer installation instructions, recommending a reputable bicycle repair book, or asking about the availability of repair courses in your area. Even if you perform work yourself, we strongly recommend asking your dealer to check the quality of your work before you ride the bike.

5.1. Service Intervals

Some service and maintenance can be performed by the owner and requires no special tools. 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.

1. The 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. The Mechanical Safety Check (Part 1.2) will help you identify some things that need readjustment. However, even if everything seems fine, it is best to take your bike back to the dealer for a checkup. Dealers typically suggest bringing the bike in for a 30-day checkup. Another way to judge the timing 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 use. If you suspect something is wrong with the bike before that time, take it to your dealer immediately.

2. Before Every Ride
Perform the Mechanical Safety Check detailed in Part 1.2 of this manual.

3. Lubrication
After every long or hard ride, or at least every 100 miles (160 km), clean the bike and lightly lubricate the chain's rollers with a good quality bicycle chain lubricant. Wipe off excess lubricant with a lint-free cloth to prevent dirt buildup. Lubrication choice is a function of climate; talk to your dealer about the best lubricants and the recommended lubrication frequency for your specific area.

4. Detailed Inspection (Every 10-20 Hours of Riding)

After every long or hard ride, or after every 10 to 20 hours of riding, perform the following inspections:

- Headset Check: Squeeze the front brake and rock the bike forward and back. If you feel a "clunk" with each movement, you probably have a loose headset. Lift the front wheel off the ground and swing it from side to side. If you feel any binding or roughness in the steering, you may have a tight headset. Have your dealer check it.
- Bottom Bracket Check: Grab one pedal and rock it toward and away from the centerline of the bike; then do the same with the other pedal. If you feel anything loose, have your dealer check it.
- Brake Pad Inspection: Take a look at the brake pads. If they are starting to look worn or are not hitting the wheel rim squarely, it is time to have the dealer adjust or replace them.
- Cable Inspection: Carefully check the control cables and cable housings. Look for any rust, kinks, or fraying. If you find any damage, have your dealer replace them immediately.
- Spoke Tension: Squeeze each adjoining pair of spokes on either side of each wheel between your thumb and index finger. They should all feel about the same. If any feel loose, have your dealer check the wheel for tension and trueness.
- Tires and Rims: Check the tires for excess wear, cuts, or bruises. Check the wheel rims for excess wear, dings, dents, and scratches. Consult your dealer if you see any rim damage.
- General Security: Check to make sure that all parts and accessories are still secure, and tighten any which are not.

5. Service and Maintenance

Component Life Cycle and Fatigue Regular inspection is your primary defense against accidents. You must frequently check the frame—particularly around all tube joints—as well as the handlebars, stem, and seat post for any deep scratches, cracks, or discoloration. These visual cues are signs of stress-caused fatigue and indicate that a part has reached the end of its useful life and needs immediate replacement.

⚠ WARNING

COMPONENT LIFE CYCLE Risk of Catastrophic Failure: 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 fail suddenly and catastrophically, causing loss of control, serious injury, or death to the rider.

Signs of Failure: Scratches, cracks, fraying, and discoloration are signs of stress-caused fatigue and indicate that a part is at the end of its useful life. While the materials and workmanship of your bicycle or individual components may be covered by a warranty for a specified period, 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 the treatment to which you subject the bicycle.

Periodic Professional Checkup Beyond your own inspections, professional oversight is required. If either brake lever fails the Mechanical Safety Check (Part 1.2), do not ride the bike; have your dealer check the brakes immediately. Similarly, if the chain won't shift smoothly and quietly from gear to gear, the derailleur is out of adjustment and requires service. As a general rule, take your bike to your dealer for a complete checkup every 25 hours of hard off-road riding or every 50 hours of on-road riding.

5.2. If Your Bicycle Sustains an Impact

In the event of a crash or impact, your priority must be personal safety. First, check yourself for injuries and seek medical help if necessary. Next, check your bike for damage before attempting to move or ride it.

⚠ WARNING

IMPACT STRESS Hidden Damage Hazard: 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.

Carbon Composite Protocol
After any crash, take your bike to your dealer for a thorough, professional inspection. This is non-negotiable for Carbon Composite components (including frames, wheels, handlebars, stems, cranksets, brakes, etc.). Carbon fiber damage is often internal and invisible to the naked eye. These components must not be ridden until they have been disassembled and thoroughly inspected by a qualified mechanic to ensure they are safe.

5.3. Periodic Maintenance Schedule

Cleaning and Maintenance
Regular maintenance is mandatory to ensure your bicycle remains safe to ride and performs correctly. The maintenance values and intervals listed in the table below are general recommendations intended for an average rider logging approximately 625 to 1,250 miles (1,000–2,000 km) or roughly 50 to 100 hours of use per year.

⚠ CAUTION

Usage Variables: Please understand that these intervals are a baseline. If you ride in harsh conditions (rain, mud, salt, or sand), ride aggressively, or carry heavy loads, you must service your bicycle more frequently than recommended here.

⚠ WARNING

SERVICE REQUIREMENT Risk of Component Failure: Failing to inspect, clean, and maintain your bicycle according to this schedule can lead to component fatigue and premature failure. A failing component can cause loss of control, serious injury, or death.

- **Professional Service: While some cleaning tasks can be performed by the owner, major mechanical services (such as truing wheels, bleeding brakes, or adjusting bearings) should be performed by an authorized dealer.**
- **Replacement: If any part appears worn, cracked, or damaged during inspection, replace it immediately. Do not ride a bicycle with worn parts.**

Maintenance & Lubrication Schedule

Component	Frequency / Condition	Recommended Product
Chain	Every 150 miles (250 km), after wet rides, or after washing.	Chain Lubricant
Brake & Shift Cables	Once a year, or if movement is stiff.	Silicone-Free Grease
Wheel Bearings, Pedal Bearings, Bottom Bracket	Once a year.	High-Quality Bearing Grease
Suspension Components (Stanchions/Seals)	After cleaning or riding in rain, in accordance with manufacturer instructions.	Suspension-Specific Spray / Grease
Carbon Component Interfaces	During assembly or re-adjustment.	Carbon Assembly Paste
Quick Release Mechanism	Once a year.	Grease or Spray Lubricant
Seat Post / Frame Seat Tube	During assembly.	Bicycle Grease
Derailleur Linkages & Pivots	Once a year, or if movement is stiff.	Spray Lubricant
Brake Caliper Pivots	Once a year, or if movement is stiff.	Spray Lubricant
Rear Suspension Linkages (Full-Suspension Models)	If operation is stiff or dirty.	Refer to Manufacturer Instructions

Comprehensive Service Schedule

Component	Action / Task	Before Every Ride	Monthly	Yearly	Other Intervals
Lighting System	Check function.	x			
Tires	Check tire pressure.	x			
	Check tread depth and sidewall condition.		x		
Rim Brakes	Check lever reach, pad thickness, and rim alignment; perform static brake test.	x			
Rim Brake Pads	Clean.		x		
Brake Cables / Pads / Lines	Visual inspection for wear or damage.		x		
Disc Brakes	Check lever reach, pad thickness, and leakage; perform static brake test.	x			
	Change brake fluid (if DOT fluid).			x*	
Suspension Fork	Check bolts and tighten if necessary.			x*	
	Change oil, lubricate elastomers/seals.			x*	
Fork (Rigid)	Inspect for fatigue; replace if necessary.				Check at least every 2 years. Replace after 7 years, or 12,500 miles (20,000 km) for standard bikes / 25,000 miles (40,000 km) for e-bikes.
Rims (if using rim brakes)	Check rim wall thickness; replace if necessary.				Replace no later than with the second set of brake pads.
Suspension Seatpost	Perform maintenance/service.			x*	
Bottom Bracket	Check bearing play.		x		
	Disassemble and regrease.			x*	
Chain	Check and lubricate if necessary.	x			
	Check for wear (stretch), replace if necessary; check rear derailleur function.				After 600 miles (1,000 km) or 50 hoursofuse.

* This operation must be performed only by an authorized dealer.

Comprehensive Service Schedule

Component	Action / Task	Before Every Ride	Monthly	Yearly	Other Intervals
Crankset	Check and tighten.		x		
Paint / Anodized Alum. / Carbon	Polish / Protect.				At least twice a year.
Wheels	Check trueness and spoke tension.		x		
	Re-center (True) or tension.				As needed.
Aluminum Handlebars & Stem	Replace.				Check at least every 2 years. Replace after 5 years, or 12,500 miles (20,000 km)for standard bikes / 25,000 miles (40,000 km)for e-bikes.
Carbon Handlebars	Inspect and replace if necessary.				Check at least every 2 years.
Headset	Check bearing play.	x			
	Regrease.			x*	
Metal Surfaces	Protect (Exception: Rim brake sidewalls, brake rotors).				At least twice a year.
Hubs	Check bearing play.		x		
	Regrease.			x*	
Pedals	Check bearing play.		x		
Clipless Pedals	Clean and grease locking mechanism.		x		
Seatpost / Stem	Check bolts.		x		
	Disassemble and regrease (Use Carbon Assembly Paste for carbon parts).			x*	
Front / Rear Derailleurs	Clean / Lubricate.		x		
Quick Release Levers	Check position and security.	x			
Nuts and Bolts	Check and tighten if necessary.		x		
Valves	Check position.	x			
Shift / Brake Cables	Disassemble and grease.			x*	
All Components	Check for product recalls.			x*	

* This operation must be performed only by an authorized dealer.

6. Lifespan

Nothing Lasts Forever All mechanical parts have a finite lifespan, and the bicycle is no exception. While your bicycle and its components are built to high standards, they are subject to wear, stress, and fatigue. The length of your bike's life depends on its design, materials, maintenance, and—most importantly—how you use it.

The Concept of "Useful Life" The "useful life" of a bicycle or component is the period during which it can be used safely. When that period is exceeded, the part may fail.

- Warranty vs. Lifespan: Please do not confuse the "warranty period" with the "useful life." A warranty is a legal protection against manufacturing defects for a set time. It does not guarantee that the product will last that long if subjected to extreme use, nor does it imply the product will fail the day after the warranty expires.
- Usage Impact: A competition rider who rides aggressively every day may exhaust the useful life of a frame in one season, while a casual rider may use the same frame for 20 years without issue.

Understanding Fatigue (Metal Fatigue) Fatigue is the progressive weakening of a material caused by repeated application of load. It is like bending a paper clip back and forth; eventually, it snaps.

- Aluminum: Aluminum frames and components have a finite fatigue life. They do not typically bend or warn you before failing; they can snap suddenly. Regular inspection for cracks is vital.
- Carbon Fiber: Carbon composites are strong but fail differently. They do not bend; they break. Damage to carbon fiber (e.g., from a crash or over-tightening) can be internal and invisible (delamination). A damaged carbon part can fail catastrophically and suddenly without warning.
- Steel: Steel frames are more ductile and often bend or crack visibly before complete failure, giving the rider some warning.

Factors That Shorten Lifespan The following factors significantly reduce the useful life of your bike:

- Riding Style: Jumps, drops, stunts, and aggressive cornering place immense stress on the frame and wheels.
- Rider Weight: Heavier loads accelerate fatigue.
- Environment: Corrosion from sweat, salt, mud, or coastal air weakens metal.
- Lack of Maintenance: Riding with loose bolts or worn bearings allows shock to damage the frame.
- Impacts: Crashes, even minor ones, can initiate fatigue cracks.

What You Should Look For (Inspection) To protect yourself from component failure, you must inspect your bike regularly. If you see any of the following, STOP RIDING IMMEDIATELY and take your bike to your dealer:

- Cracks: Look carefully at weld junctions, openings, and stress points. Any crack, no matter how small (even in the paint), is a sign of failure.
- Deformation: Any bent tubing or dents.
- Corrosion: Rust or bubbling paint.
- Noise: Unusual creaking, clicking, or popping sounds often indicate a structural issue or a crack.
- Discoloration: On carbon parts, look for soft spots, bulges, or changes in the clear coat.

⚠ WARNING

YOUR RESPONSIBILITY A bicycle that has exceeded its useful life is dangerous. Continuing to ride a frame or component with signs of fatigue, stress, or damage can result in catastrophic failure, causing loss of control, serious injury, or death.

- **If you ride aggressively (jumping, downhill, freeride), you must inspect your bike and equipment more frequently and replace components more often.**
- **If you are unsure about the condition of any part, err on the side of caution: Replace it.**

7. Intended Use

Understanding Your Bicycle's Capabilities

Your bicycle is engineered for a specific riding purpose. A road bike is not designed to withstand the stress of jumping, and a city bike is not designed for off-road trails. Using your bicycle outside its intended limits creates a risk of catastrophic frame or component failure, which can result in serious injury or death.

The bicycle industry uses internationally recognized standard systems to categorize bicycles based on their intended use. These classifications are defined by standards such as ASTM F2043 and EN 17406. Please check your specific model's specifications on the Carraro website or ask your dealer to confirm which "Category" applies to your bike. Only bicycles explicitly classified in this category are permitted for the uses described below.

Category Symbol	Weight Limit (lbs/kg)	Category
	66/30	**Category 0** cycles are generally 12" balance bikes and 12" or 16" children's bikes. **Use** For children aged 3 years and up. Only for use under the supervision of a parent or guardian. Not permitted on the road. Not permitted in competitions. Not suitable for jumps or acrobatics
	265/120	**Category 1** vehicles are vehicles designed for purely urban infrastruc ture (road conditions). **Use** Only for asphalt, concrete or paved roads and paths. Permanent contact of the wheels with the ground must be guaranteed. Participation in competitions is not permitted. Not suitable for drops, jumps and acrobatics.
	265/120	**Category 2** vehicles are usually bicycles, pedelecs and S-pedelecs of the city, trekking, cross-trek king, touring or cargo bike type, as well as 24" youth bikes and 20" children's bikes. **Use** Includes category 1, plus surfaced and naturally firm paths with moderate inclines. Can be ridden down steps of up to 15 cm/5.9", e.g. kerbs/curbs. Not permitted in competitions. Suitable for recreational riding and trekking under moderate strain. Not suitable for jumps or acrobatics.
	265/120	**Category 3** cycles are generally bikes, pedelecs and S-pedelecs in the style of mountain bikes designed for cross-coun try, marathon and tour ing use, plus bikes in the gravel, cyclo-cross and all-track segments. **Use** Includes categories 1 and 2, plus rough trails with small obstacles, and unsurfaced routes that re quire good riding technique. Suitable for sport and competition riding with moderate technical demands of the trails. Drops and jumps permitted up to a max. height of 60 cm/23.6" (with appropriate riding technique) Not suitable for acrobatics.

Category Symbol	Weight Limit (lbs/kg)	Category
	265/120	**Category 4** vehicles are usually bicycles, pedelecs and S-pedelecs of the mountain bike type with the all mountain / trail bike purpose. **Use** Includes categories 1, 2 and 3. Larger obstacles and higher speeds require in creased riding skill. Permitted in competitions. Suitable for descents on unpaved roads. Drops and jumps permitted up to a max. height of 120 cm/47.2" (with appropriate riding technique). Not suitable for acrobatics.
	265/120	**Category 5** cycles are generally bikes, pedelecs and S-pedelecs in the style of mountain bikes designed for enduro/fre eride/downhill/dirtjump use. **Use** Includes categories 1, 2, 3 and 4, plus very fast and very demanding terrain with extreme down ward slopes. Very high demands on riding skill. Permitted in competitions. Suitable for jumps and descents on unpaved paths. Drops and jumps permitted up to a height of over 120 cm/47.2" (with appropriate riding technique). Not suitable for acrobatics.

The maximum gross weight limit is calculated as follows:
Bicycle + rider + luggage / back pack / child seat etc. = maximum gross weight limit.

⚠ WARNING

If you are carrying heavy panniers, a child seat, or a battery (E-Bike), weight counts towards the total limit. Always consult your dealer for the specific weight limit of your model.

General Safety & Equipment Reflectors & Lighting
The reflectors supplied with your bike provide only the bare minimum safety. It is recommended, and may also be regulated in your state or country, to equip your bicycle with active lights (headlight and taillight) for safe riding at night or in low-visibility conditions.

Important Information (Components & Service)
Component Manuals Additional safety, performance, and service information for specific components on your bicycle, or for accessories that you purchase, may also be available.

- Action Required: Make sure that your dealer has given you all the manufacturers' literature that was included with your bicycle or accessories.
- Conflict Resolution: In case of a conflict between the instructions in this manual and information provided by a component manufacturer, always follow the component manufacturer's instructions.

Service Responsibility
If you have any questions or do not understand something, take responsibility for your safety and consult with your dealer or the bicycle's manufacturer.

Learning to Service Your Bike
If you want to learn to do major service and repair work on your bike: A. Ask your dealer for copies of the manufacturer's installation and service instructions for the components on your bike, or contact the component manufacturer directly. B. Ask your dealer to recommend a reputable book or website on bicycle repair. C. Ask your dealer about the availability of bicycle repair courses in your area.

8. Notes On Torques

To ensure the safety and durability of your bicycle, all fasteners (nuts, bolts, and screws) must be tightened to the correct torque specification. Achieving this requires the use of a calibrated torque wrench with an appropriate adjustment range.

⚠ WARNING

If you do not own a suitable torque wrench or do not have experience using one, do not attempt to tighten these fasteners yourself. Have your authorized dealer check and adjust them for you. Improper tightening can cause component failure, leading to loss of control and serious injury.

Material & Component Sensitivity

The correct torque depends on the material of the bolt, the diameter of the thread, and the material of the component itself.

- Carbon & Aluminum: Special care is required if your bicycle is equipped with carbon fiber or lightweight aluminum components. These materials can be easily crushed or damaged by over-tightening. Always check the specifications data sheet provided by your dealer or the markings on the components.

Rules of Thumb

- Read the Labels: Many individual components (such as stems, handlebars, and seat posts) are labeled with specific torque limits (e.g., "MAX 5 Nm") or minimum insertion markings. It is essential that you follow these on-part specifications.
- The "Lowest Value" Rule: If two connecting components have different torque markings (e.g., the handlebar says "Max 5 Nm" but the stem says "Max 6 Nm"), you must always observe the lower of the two values.
- Manufacturer Instructions: Always read the operating instructions delivered with specific components (brakes, shifters, suspension) for precise values.

Disclaimer Regarding the Table Below

The values listed in the following table are general guidelines and basic reference values.

- They DO NOT apply to Carbon Fiber components unless explicitly stated.
- Priority: Specific torque specifications marked on the component itself or listed in the component manufacturer's manual always take precedence over the values in this table.
- Missing Info: If a component does not have a marked torque value, ask your dealer for the correct specification before tightening.

Screw Joint	Type	Torque
Handlebars / Stem	-	5-6 Nm
Shift lever / Handlebars	(Gripper clamp)	4-5 Nm
Brake arm / Handlebars	(Gripper clamp)	4-6 Nm
Stem, angle adjustments	-	15-18 Nm
Stem, fork stem	Quill-type (internal clamping mechanism)	8-15 Nm
	A-head (external clamping mechanism)	6-10 Nm
Stem, stem clamp	A-head	4 Nm
Saddle / Seat post	(Clamping connection with cylinder head screws)	13-15 Nm
Seat post / Screw-clamp ring	-	8-10 Nm
Pedal / Crank	(Flat spanner wrench)	35-55 Nm
Front wheel axle / Front fork & rear wheel / Frame	Hub dynamo (Hub) Cotter pin nut	20-25 Nm
	Front wheel/rear wheel hub axle with cap nut	20-30 Nm

9. Appendix A

Whether you are a beginner or a seasoned cyclist, Carraro's dedicated network of Authorized Retailers ensures that you have access to professional maintenance and technical expertise to keep your bicycle in peak condition. When you need to upgrade or equip your ride, you can trust your local Authorized Carraro Dealer to provide components and accessories that are perfectly matched to your specific model and riding style.

Your Carraro bicycle is engineered to meet the rigorous quality standards of today's industry; however, consistent care and maintenance are essential for safety and performance. We strongly recommend relying on your dealer's expertise. If you have any questions or concerns regarding your bicycle's operation, please consult your dealer immediately. You will also find detailed maintenance guidelines and recommended service intervals within this manual.

For your safety, all significant mechanical adjustments and repairs should be performed by a qualified bicycle mechanic. To locate your nearest Authorized Carraro Dealer, please visit our official website.

Enjoy the ride!

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e-mail: info@carrarobisiklet.com.tr

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address: 1262 Washington St, Boston, MA, 02118
phone: +1 857 772 4382
e-mail: info@carrarobike.com

9.1. Warranty

Please complete the Warranty Card in full by recording the model and serial number of your Carraro bicycle for your personal records. If you are unsure where to locate the serial number or frame number, your Authorized Carraro Dealer will be able to assist you. It is recommended that you staple a copy of your sales invoice or proof of purchase to the warranty card. Maintaining these records is essential for the verification of warranty claims and will be required for police reports or insurance claims in the event of theft.

Note: Carraro Bicycles does not guarantee the retention of individual serial number records. In the event of loss or theft, your personal records must be presented. Retention of the sales invoice is mandatory for any warranty-related service.

LIMITED WARRANTY
Carraro warrants to the original owner (original purchaser) that the frame, rigid fork, and original component parts of each new Carraro brand bicycle shall be free from defects in materials and workmanship for the periods specified below.

Components Covered by a 2-Year Warranty:

- Bicycle frame, rigid forks.

Components Covered by a 1-Year Warranty:

- Paint finish and decals
- All other Carraro-branded original parts, including rear suspension linkage components
  Excluded Components: All non-Carraro brand parts, suspension forks, and rear shock absorbers are excluded from this warranty. These components are covered solely by the warranty terms provided by their respective manufacturers.

Required Professional Assembly

This warranty applies exclusively to bicycles and framesets purchased new from an Authorized Carraro Dealer and assembled by that dealer at the time of purchase. Bicycles purchased online or delivered in a box and assembled by the consumer or any unauthorized party are not covered under this warranty.

Limited Remedy

Unless otherwise required by applicable law, Carraro's sole obligation under this warranty, or any implied warranty, shall be limited to the replacement of defective parts, at Carraro's discretion, with parts of equal or greater value. This warranty begins on the original date of purchase, applies only to the original owner, and is non-transferable.

Exclusion of Damages

Under no circumstances shall Carraro be liable for any direct, indirect, incidental, or consequential damages, including but not limited to personal injury, property damage, or economic loss, whether arising from contract, warranty, negligence, product liability, or any other legal theory.

Some countries or states do not allow the exclusion or limitation of incidental or consequential damages; therefore, the above limitation may not apply to you.

Warranty Exclusions and Voidance

To maintain the validity of this Limited Warranty, all of the following conditions must be fully satisfied. Failure to comply with these requirements will render the warranty null and void.

1. Conditions for Warranty Coverage

- Proof of Purchase: A warranty claim cannot be processed without a valid sales invoice (proof of purchase) and a fully completed Warranty Registration Card. Incomplete documentation shall be deemed invalid.
- Professional Assembly: This warranty applies only to bicycles assembled by an Authorized Carraro Dealer. Bicycles purchased in a box and assembled by the consumer or a third party are strictly excluded from Warranty coverage.
- Authorized Service: All periodic maintenance and repairs must be carried out by an Authorized Carraro Service provider. Repairs performed or attempted by unauthorized persons will void the warranty.
- Maintenance Intervals: Regular maintenance is mandatory. The required Periodic Maintenance interval is every 6 months. Failure to perform these services on time and to record them in the service log will result in the warranty being void.

2. Warranty Exclusions (Conditions Not Covered)

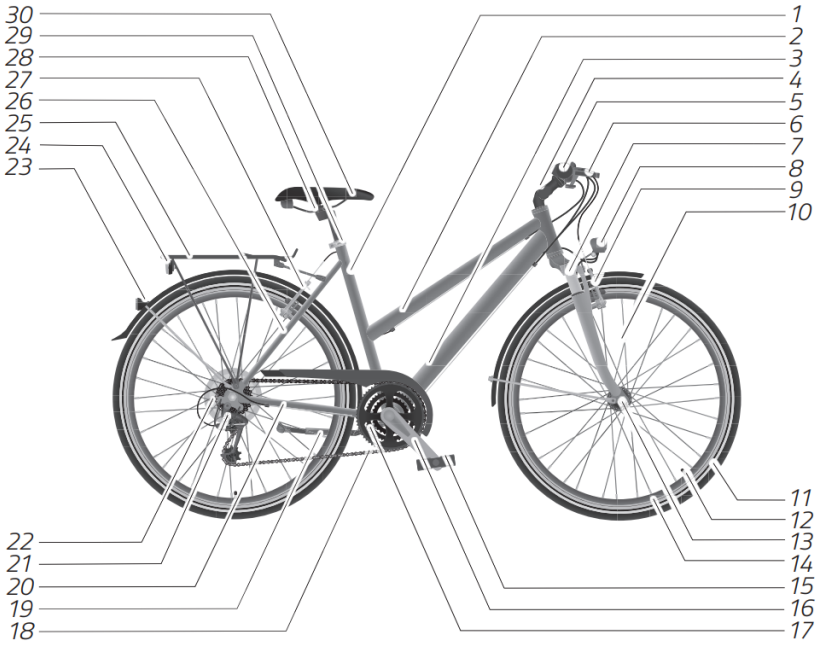
In order for the warranty provided for the bicycle to remain valid, the conditions listed below must be strictly observed. Failure to comply with these requirements will result in the bicycle being considered outside the scope of warranty coverage.

- **Warranty Documentation and Assembly**
  - An incomplete or incorrectly completed Warranty Certificate shall be deemed invalid.
  - Bicycles that have not been assembled free of charge by an Authorized Service Center are excluded from warranty coverage.
- **Authorized Service and Periodic Maintenance**
  - All periodic maintenance and repair operations must be carried out exclusively by Authorized Service Centers.
  - The required periodic maintenance interval is 6 months. Failure to perform these services on time or to record them in the warranty/service log will void the warranty.
- **Normal Wear, Use, and Adjustment Operations:** The following conditions are considered normal wear and tear and are therefore not covered under warranty:
  - Inner tube punctures
  - Tire wear caused by hard braking or wheel locking
  - Brake pad wear
  - Hydraulic disc brake oil/fluid replacement
  - Wheel truing (spoke tension) adjustments
  - Wear of rear sprockets (cassette/freewheel) and chain, or chain breakage
- **Impact Damage, Misuse, and Neglect**
  - Damage to the rear derailleur, derailleur hanger, or rims resulting from impacts, falls, or collisions
  - Rust or corrosion caused by improper storage conditions (e.g. leaving the bicycle outdoors)
  - Gear shifting performed contrary to the instructions specified in the owner's manual
  - Use of the bicycle for purposes or under conditions other than those for which it was designed
- **Part Replacement and Modifications**
  - Use of non-original spare parts
  - Installation of incompatible accessories
  - Any modification that alters or compromises the bicycle's original structure
  - Frame damage resulting from use of the seatpost above the minimum insertion mark
- **Paint Finish and Color Changes**
  - Color fading or changes caused by prolonged exposure to direct sunlight or high temperatures
  - Fading or color changes occurring over time on fluorescent or neon-colored bicycles (Due to the inherent nature of fluorescent and neon paints, color permanence is excluded from warranty coverage.)
- **Electric Bicycle–Specific Exclusions**
  - System failures caused by washing electric bicycles with high-pressure water jets
  - Charger failures resulting from voltage fluctuations in the electrical grid or issues with the electrical installation
  - Battery swelling caused by overcharging or voltage fluctuations

3. How to Make a Warranty Claim

- To submit a warranty claim for a defect occurring within the warranty period, the owner must present the bicycle to an Authorized Carraro Dealer, together with the following documents:
  - The original Warranty Certificate
  - A copy of the Sales Invoice / Proof of Purchase

9.2. Bicycle Components



1	Seat post	**16**	Crankset
2	Top tube	**17**	Chainrings
3	Down tube	**18**	Chain
4	Stem	**19**	Kickstand
5	Handlebar	**20**	Chain stay
6	Brake lever	**21**	Rear derailleur
7	Fork/suspension fork	**22**	Cassette
8	Front light	**23**	Reflector
9	Front brake	**24**	Rear light
10	Spoke	**25**	Carrier
11	Tire	**26**	Seat stay
12	Valve	**27**	Rear brake
13	Hub	**28**	Saddle clamp
14	Rim	**29**	Seat post clamp
15	Pedal	**30**	Saddle

Carraro Bicycle Owner's Manual
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