IKUISTA

Owner’s Manual

CONGRATULATIONS - *And welcome to the IKUISTA family.*

You have chosen a bicycle engineered and assembled in Finland with a single purpose: to deliver timeless performance and uncompromising reliability. Every detail reflects Nordic precision, careful material selection, and a design philosophy built around longevity and ease of ownership.

Your bicycle has been crafted to feel stable, predictable, and efficient in its intended environment. The frame and components are chosen to work together seamlessly, giving you a ride experience that is both confident and effortless. IKUISTA's modular assembly approach also ensures that your bike can evolve with you, remaining serviceable and upgrade-ready for years.

Before your first ride, take a moment to familiarize yourself with the instructions in this manual. Proper setup and understanding of your bicycle will enhance comfort, extend component life, and ensure you enjoy everything the bike was designed to offer. A few minutes of preparation now will make every ride safer and more enjoyable.

Should you ever need assistance, guidance, or expert support, our service partners and customer team are here to help. Your IKUISTA bicycle is meant to be a long-term companion — something you can trust on every ride, in every season, for many years to come.

Built in Finland

EU Product Manual & Technical Compliance Blueprint

Version 1.0 – November 2025

Original Language: English (EN)

Manufacturer Information

Manufacturer: IKUISTA Bicycles

Address: Hyllilänkuja 7, Tampere, Finland

Website: www.ikuista.com

Support Email: info@ikuista.com

This manual contains essential safety, assembly, operation, maintenance, and compliance information for IKUISTA bicycles. Read fully before riding. Keep this manual available throughout the lifetime of the product.

Legal Compliance
This product is designed, assembled, and tested in accordance with applicable European regulations, directives, and harmonised standards.

Applicable Directives and Regulations:

- EU General Product Safety Regulation (EU) 2023/988
- Machinery Directive 2006/42/EC
- EMC Directive 2014/30/EU (for EPAC models)
- Radio Equipment Directive 2014/53/EU (if equipped with wireless systems)
- RoHS Directive 2011/65/EU
- WEEE Directive 2012/19/EU
- Battery Directive 2006/66/EC (EPAC only)

Harmonised Standards:

- EN ISO 4210: Safety requirements for bicycles
- EN 15194: Electrically Power Assisted Cycles (EPAC)
- EN 14781 / EN 14766 (legacy structural references where applicable)
- ISO 4210-2: Frame and fork test methods
- ISO 4210-4: Braking test methods
- ISO 4210-5: Steering test methods

About This Manual
This document provides all required instructions, safety information, adjustment procedures, maintenance schedules, and EU compliance details for IKUISTA bicycles. It is mandatory reading before use.

⚠ IMPORTANT: Improper use or assembly can cause severe injury or void your warranty. Failure to follow the instructions in this manual may result in serious injury or death.

Document Scope
This manual provides mandatory information for:

- Non-electric road bicycles
- Non-electric gravel bicycles
- EPAC models (Electrically Power Assisted Cycles)
- Approved accessories and components
- Safety instructions and limitations
- Assembly steps completed by the user
- Maintenance intervals and service procedures
- Inspection requirements after impacts
- Legal responsibilities and warranty terms

This document does **not** cover non-approved modifications, aftermarket components not tested by IKUISTA, or third-party electronic systems.

Model Categories Covered
Road — endurance, performance, training
Gravel — mixed terrain, off-road light trails
E-Road / E-Gravel — pedal assist to 25 km/h
Touring / All-Road — long-distance comfort and stability

Basics

Important Safety Notice

⚠ **Read Before Using Your Bicycle**

Your safety—and your liability—depend on understanding this page fully. User assumes full responsibility. Ignoring any instruction here can cause injury, equipment failure, or void your warranty. Improper use may result in death. This manual teaches you how to operate your bicycle safely and detect early signs of mechanical issues. Even though IKUISTA bicycles are designed for high performance, they require correct handling, regular maintenance and responsible use.

This manual is not optional. Reading it is part of using the bicycle safely.

Who This Manual Is For

- First-time riders
- Experienced cyclists
- Riders without mechanical knowledge
- Riders transitioning to performance road or gravel bikes
- EPAC users with or without prior e-bike experience

What This Manual Covers

- How the bicycle works
- How to assemble the user-completed parts correctly
- How to set up the bike for safe riding
- How to maintain essential components
- How to identify unsafe conditions
- How to comply with EU safety legislation
- Warranty, responsibilities, legal limitations

General User Responsibilities

To ensure safe operation and maintain compliance with EU safety regulations, the rider must:

- Read and understand this manual fully before riding
- Keep the bicycle in safe mechanical condition at all times
- Follow all maintenance intervals defined by the manufacturer
- Use components and accessories only as approved
- Inspect the bicycle before every ride
- Stop riding immediately if structural damage is suspected
- Follow local laws and regulations for bicycle and EPAC use
- Maintain a correct fit and riding posture
- Avoid conditions or behaviours outside the intended use category
- Ensure minors use the bicycle only under responsible supervision

Failure to comply with these responsibilities is considered misuse.

You must not

- Modify the frame, fork, battery, motor, or safety systems.
- Install incompatible or uncertified components.
- Exceed the maximum load rating (rider + cargo).
- Attempt any repair you are not technically capable of performing.

⚠ **WARNING:** You alone are responsible for the condition and safe use of your bicycle. Failure to maintain it correctly can lead to serious injury or death.

Intended Riding Environment - IKUISTA bicycles are designed and tested for:

- paved roads (Road models)
- mixed terrain / gravel (Gravel models)
- EPAC electric-assist use up to 25 km/h (E-models)
- Not permitted environments:
- downhill mountain biking
- jumps, drops, stunts
- submersion in water
- commercial or rental use unless certified

Legal Compliance and Standards

This bicycle is designed and manufactured according to applicable European Union safety requirements. All models comply with the essential health and safety provisions of the EU

Machinery Directive, General Product Safety Regulation, and the relevant EN and ISO standards that apply to bicycles within their intended ASTM category.

For non-assisted bicycles, compliance is based on EN ISO 4210, which specifies requirements for frame strength, braking performance, steering stability, fatigue testing, and component durability. These standards ensure the bicycle meets minimum structural and functional safety levels under normal operation. Riders must use the bicycle within its intended category for these safety assurances to remain valid.

For electric models, compliance includes EN 15194, which defines safety, performance, electromagnetic compatibility, charging requirements, and software behavior for electrically assisted cycles with a maximum assist speed of 25 km/h. The motor provides assistance only when the rider is pedaling, and the system must not exceed defined power and speed limits. Any modification to increase performance beyond legal limits voids compliance and warranty coverage.

Each e-bike includes the required CE marking, identifying that the product meets the essential EU directives. The Declaration of Conformity (DoC) lists the applicable standards, directives, manufacturer identity, and responsible contact details.

Components such as brakes, wheels, handlebars, lighting systems, and electronic modules are tested according to their respective EN sub-standards. Replacement parts must meet the same specifications; using components that do not comply with required standards can compromise safety and invalidate legal conformity.

Labeling on the bicycle includes serial numbers, weight limits, motor and battery identifiers, and safety markings. Tampering with these labels or removing them may affect traceability and regulatory compliance.

Riders are responsible for operating the bicycle within the legal framework of their region, including traffic laws, lighting requirements, and helmet regulations. For e-bike models, altering the software, motor firmware, speed limits, or electrical system is illegal and may lead to prosecution, loss of insurance coverage, and immediate voiding of warranty and CE compliance.

Rider Responsibilities

The rider is responsible for ensuring the bicycle is used safely, maintained correctly, and operated within its intended design limits. Before every ride, the rider must inspect the bicycle for loose components, adequate tyre pressure, functioning brakes, and drivetrain condition. Any unusual noise, resistance, or abnormal behavior must be investigated before riding further.

The rider must follow all torque specifications, service intervals, and maintenance procedures outlined in this manual. Failure to tighten bolts correctly, maintain clean components, or replace worn parts increases the risk of mechanical failure. Components showing wear, corrosion, cracks, or deformation must be replaced immediately.

The rider is responsible for selecting the correct ASTM category for the intended terrain. Using the bicycle for riding styles outside its assigned category — such as jumping, downhill use, or carrying excessive load — is considered misuse and voids safety assurances and warranty coverage.

Local traffic laws, lighting requirements, helmet rules, and e-bike regulations must be followed at all times. Riders must operate the bicycle in a predictable, controlled manner and avoid riding in conditions beyond their ability. This includes adverse weather, poor visibility, heavy traffic, and technical terrain that exceeds the rider's skill level.

For e-bike models, the rider must charge, store, and handle the battery according to safety instructions. Using non-approved chargers, modifying the motor firmware, installing performance unlocks, or tampering with electrical components is prohibited and illegal in many regions. These actions invalidate regulatory compliance and warranty coverage.

The rider must ensure all accessories, bags, racks, lights, computers, and third-party components are compatible with the bicycle and correctly installed. Incompatible or improperly mounted equipment can affect structural integrity or interfere with safe operation.

If the bicycle is involved in a crash or impact, the rider is responsible for discontinuing use until a full inspection is completed. Continuing to ride a potentially damaged bicycle puts the rider at significant risk.

Regular maintenance, correct use, and safe riding practices are essential. Ultimately, the rider's behavior has the largest impact on the safety and performance of the bicycle.

Foreseeable Misuse (Legally Required Section)

European safety regulations require manufacturers to identify common rider mistakes that are *predictable*, even if they violate the instructions. These behaviours must be explicitly listed to avoid ambiguity in safety responsibility.

The following actions are considered **foreseeable misuse** and must be avoided:

- Riding with incorrectly tightened handlebars, stem, seatpost, or wheels
- Using the bicycle outside its ASTM category (e.g., road bike on MTB trails)
- Incorrect pedal installation (left pedal on right crank, or forced threads)
- Riding with worn, glazed, or contaminated brake pads
- Using tyres not approved for tubeless or hookless rims
- Riding at pressures far outside recommended range
- Continuing to ride after hearing creaks, cracks, or grinding noises
- Carrying passengers on a bicycle not designed for it
- Exceeding the maximum system weight
- Using pressure washers on hubs, headsets, bottom brackets, or suspension
- Storing batteries in freezing or high-heat conditions (EPAC)
- Using chargers or power supplies not provided or approved by IKUISTA
- Mounting racks, bags, or seats to non-approved attachment points

Any foreseeable misuse can cause sudden loss of control, structural failure, or electrical hazards.

CE & EN COMPLIANCE DECLARATION

This section provides the legally required conformity information for bicycles sold within the European Union. The information below must remain with the product for its entire service life and be available to authorities upon request.

CE Marking

All IKUISTA bicycles and e-bicycles are manufactured in accordance with the essential safety and environmental requirements of applicable European Union directives and regulations. Products bearing the CE mark comply with these standards when used as intended.

Applied EU Directives

The following directives apply depending on bicycle type:

For Non-Assisted Bicycles (Road, Gravel, MTB):
– General Product Safety Regulation (EU) 2023/988
– Machinery Directive 2006/42/EC (where applicable to mechanical risks)
– Outdoor Noise Directive (not applicable to non-motorized bicycles)
– REACH Regulation (EC) 1907/2006 (materials and substances compliance)
– RoHS Directive 2011/65/EU (electronic sub-components in accessories)

For Electrically Assisted Bicycles (EPAC ≤25 km/h):
– EN 15194:2017 (Electrically Power Assisted Cycles)
– EMC Directive 2014/30/EU (Electromagnetic Compatibility)
– Machinery Directive 2006/42/EC
– Radio Equipment Directive (if applicable to wireless systems)
– Battery Directive 2006/66/EC
– RoHS Directive 2011/65/EU
– General Product Safety Regulation (EU) 2023/988

Applied EN / ISO Standards

Non-Assisted Bicycles:
– EN ISO 4210-1 through EN ISO 4210-9: Safety requirements for bicycles
– ISO 5775: Tyre and rim interchangeability
– ISO 4210-10 (if applicable)
– ASTM F2043 (intended use classification reference)

Electrically Assisted Models:
– EN 15194:2017 (Safety, performance, EMC, battery, charger requirements)
– EN 50604-1 (battery safety)
– EN 14764 / ISO 4210 subcomponents where applicable
– ISO 13849 (for safety-related control systems where applicable)
– EN 55014-1 / EN 55014-2 (EMC emissions and immunity)

Technical Documentation

The manufacturer maintains technical documentation demonstrating compliance, including:

– Risk assessment & hazard analysis
– Test reports (mechanical, electrical, EMC, battery)
– Bill of materials and component specifications
– Quality control processes
– Certificates from external test laboratories
– Software and firmware revision history (e-bike models)
– Declaration of Conformity (DoC) master document

Symbols & pictograms

(EU / EN 15194 / EN ISO 4210 Markings)

⚠ General Warning — Follow all safety instructions.
⚡ Electrical Hazard — High voltage components; risk of shock.
🔥 Fire Hazard — Risk of ignition; isolate and discontinue use.
🔒 Do Not Open — No user-serviceable parts; opening voids compliance.
🔌 Approved Charger Only — Use only manufacturer-specified chargers.
♻ Recycle — Dispose through certified recycling centers.
🗑✕ No Household Waste — Batteries and electronics must not go in regular trash.
📘 Read Manual — Mandatory reading before use.
CE CE Mark — Product conforms to EU safety and environmental regulations.
🌡 Temperature Limit — Operate and charge within specified range.
💧✕ No Submersion — Do not immerse or pressure-wash.
🔧 Torque Specification — Use calibrated torque tools only.
❌ Do Not Use If Damaged — Stop use immediately if defects appear.
🏋 Max Load — Do not exceed system weight limits.
➡ Directional Component — Install in specified direction.
↺ Left-Hand Thread — Reverse thread component (left pedal).

ASTM Classification

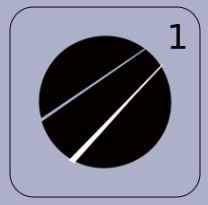
ASTM International (American Society for Testing and Materials) is one of the world's largest and most respected standards organizations. In the bicycle industry, ASTM provides a globally recognized system for classifying bicycles according to their intended usage and the stresses they are designed to withstand.

This system is essential for both manufacturers and riders because it defines:

- How a bicycle is designed and tested
- Which types of terrain it can safely handle
- Which riding behaviors are permitted or prohibited
- What loads, impacts, and forces the frame and components are certified for

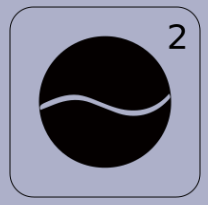
ASTM classification is not a marketing label — it is a safety framework that helps prevent misuse, structural failure, and accidents. Each category corresponds to a specific level of mechanical stress, environmental exposure, and rider demands.

How the Categories Work - ASTM F2043 defines five usage categories:



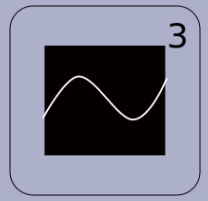
Category 1 – Road Riding / Pavement Only

Intended for fully paved surfaces where the tires remain in continuous contact with the ground.
Use of this category: commuting, road training, leisure rides on asphalt.



Category 2 – Road + Light Gravel

Covers paved and partially unpaved roads, gravel tracks with slight irregularities. The tires may briefly lose ground contact when encountering small obstacles.
Allowed drops/jumps: Less than **15 cm (6 in)**.
Application: light gravel, forest fire roads, non-technical terrain.



Category 3 – Rough Gravel / Light Trail

Intended for use on rough, unpaved terrain, requiring advance riding skills; some wheel lift and small jumps may occur.
Allowed drops/jumps: Less than **61 cm (24 in)**.
Suitable for adventure bikes, rough gravel, light forest singletrack (non-enduro).

Category 4 – Cross-Country Trail / Moderate Downhill

Designed for terrain including Condition 1, 2 and 3 plus moderate downhill grades and jumps. Speeds may approach 40 km/h (~25 mph).
Allowed drops/jumps: Less than **122 cm (48 in)**.
Intended for all-mountain style bikes, heavier duty frames/components.

Category 5 – Extreme / Downhill / Freeride

This category includes the conditions of Category 1-4 plus very large jumps, steep downhill terrain, high speeds (> 40 km/h).
Allowed drops/jumps: Greater than 122 cm (48 in). Use case: downhill, freeride parks, heavy duty enduro bikes.

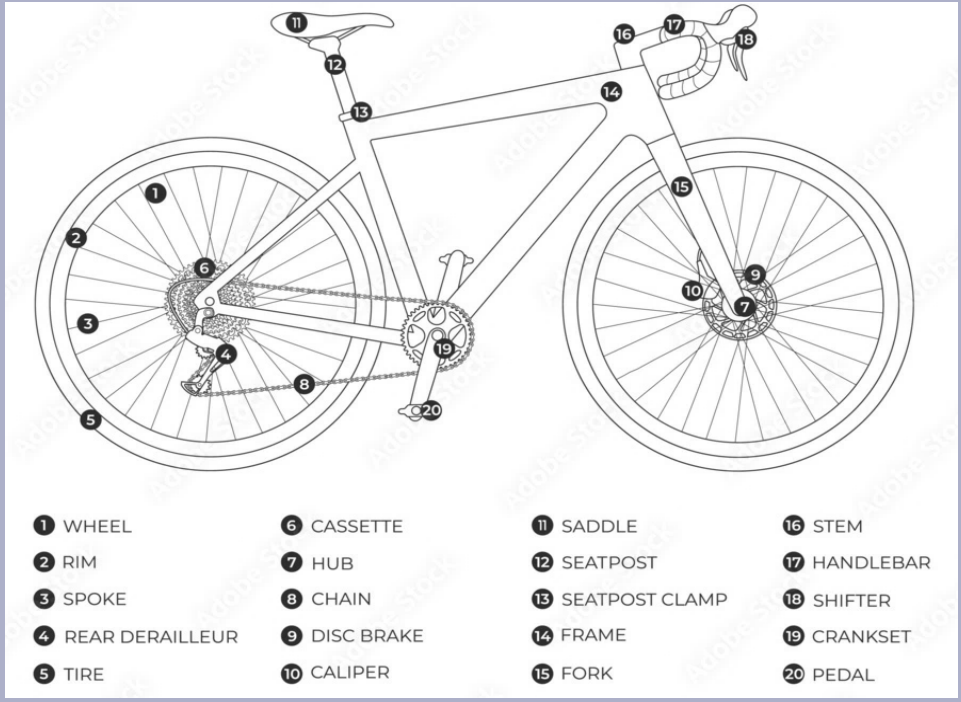
⚠ **WARNING:** Riding a bicycle outside its ASTM category is considered misuse and may result in severe injury, frame damage, or complete loss of warranty coverage.

Pre-ride and misuse of the bicycle

⚠ **Misuse voids all warranties and falls outside EU compliance coverage.**

Rider Requirements - You must meet the following:

- Minimum age: **14** for E-models (follows common EU guidance)
- Physical ability to control and stop the bicycle
- Understanding of local traffic laws
- Ability to perform basic safety checks



1. Wheel
Road/Gravel: Lightweight 700c wheelset designed for speed and efficiency.
MTB: Wider, stronger 29” or 27.5” wheel built for impact resistance.
E-Bike: Reinforced wheelset designed to handle higher torque and system weight.

2. Rim
Road/Gravel: Aero-profile or wide gravel rim for stability.
MTB: Wider, impact-resistant rim for technical terrain.
E-Bike: Strengthened rim capable of supporting motor-assisted loads

3. Spokes
Road/Gravel: Stainless steel or bladed spokes for stiffness.
MTB: Heavier-gauge spokes to withstand impacts.
E-Bike: Reinforced spokes to support motor torque.

4. Rear Derailleur
Road/Gravel: Close-ratio shifting for efficient cadence.
MTB: Clutch-equipped derailleur for chain stability on rough terrain.
E-Bike: Derailleur optimized for higher chain load and torque.

5. Tire
Road: High-pressure slicks for low rolling resistance.
Gravel: All-terrain tread for mixed surfaces.
MTB: Aggressive knobby tread for traction on dirt and roots.
E-Bike: Puncture-resistant, e-rated casing for longevity.

6. Cassette
Road: Tight gear steps for smooth cadence transitions.
MTB: Wide-range cassette for steep climbs.
E-Bike: Durable wide-range cassette designed for motor torque.

7. Hub
Road/Gravel: Lightweight hub with sealed bearings.
MTB: Larger bearings, thru-axle system for stiffness.
E-Bike: Reinforced e-hub capable of handling torsional loads.

8. Chain
Road/Gravel: Lightweight, corrosion-resistant chain.
MTB: Heavy-duty chain for rough impact conditions.
E-Bike: High-strength chain designed specifically for mid-drive torque.

9. Disc Brake Rotor
Road/Gravel: 140–160 mm rotors for balanced control.

MTB: 160–180 mm ventilated rotors for heat dissipation.
E-Bike: E-rated rotors with increased thickness for higher braking forces.

10. Brake Caliper
Road/Gravel: Lightweight hydraulic calipers.
MTB: More powerful multi-piston calipers for technical descents.
E-Bike: Calipers designed for sustained braking under higher system mass.

11. Saddle
Road/Gravel: Performance saddle optimized for long endurance rides.
MTB: Trail saddle with increased side protection and mobility.
E-Bike: Comfort-forward saddle for hybrid and long-distance use.

12. Seatpost
Road/Gravel: Alloy or carbon post for compliance.
MTB: Dropper post for variable rider position.
E-Bike: Reinforced seatpost for added weight capacity.

13. Seatpost Clamp
All Types: Secures the seatpost; torque-critical component.
MTB Option: May include quick-release for rapid height changes.

14. Frame
Road/Gravel: Lightweight alloy/carbon with optimized stiffness-to-weight ratio.
MTB: Robust, high-impact frame with slack geometry.
E-Bike: Reinforced chassis with integrated battery housing.

15. Fork
Road/Gravel: Carbon fork tuned for vibration damping.
MTB: Suspension fork with travel appropriate for terrain type (100–160 mm).
E-Bike: Rigid or suspension fork reinforced for system weight.

16. Stem
Road/Gravel: Performance stem for stable steering.
MTB: Shorter stem for agile control on trails.
E-Bike: Comfort or adjustable stem depending on model.

17. Handlebar
Road: Drop bar for multiple hand positions.
Gravel: Flared drop bar for stability.
MTB: Wide flat bar for maximum steering control.
E-Bike: Ergonomic hybrid bar for comfort and leverage.

18. Shifter
Road/Gravel: Integrated STI levers.
MTB: Trigger-style shifters.
E-Bike: May include integrated assist-mode buttons on display/control unit.

19. Crankset
Road/Gravel: Lightweight crankset for efficient power transfer.
MTB: Narrow-wide ring for chain retention.
E-Bike: Motor-specific crank arms with reinforced interface.

20. Pedal
Road: Clipless road pedals for maximum efficiency.
Gravel: SPD-style pedals or flat pedals depending on preference.
MTB: Wide platform or SPD trail pedals.
E-Bike: High-grip platform pedals for stability.

Before You Ride – Essential Information

Initial Setup: Make sure the bicycle is correctly assembled, handlebars aligned, wheels secured, and torque values followed. Check saddle height, cockpit reach, tire pressure, and brake function.

First Ride Precautions: Ride in an open, low-traffic area. Test shifting, braking, and steering at low speed. Avoid steep gradients, hard braking, and high-speed descents until familiar with the bike.

Break-In Period (0–100 km): Components may settle. Expect slight cable stretch and brake pad bedding. Re-check torque of stem, handlebar, seatpost, wheels, and calipers after the first rides.

Weather Conditions: Wet conditions reduce traction and increase stopping distance. Strong wind affects handling. Avoid riding in snow/ice unless equipped with appropriate tires.

Load Limits: Do not exceed maximum rider + cargo weight specified for your model. Excess load affects frame integrity, braking, and warranty coverage.

Mandatory Pre-Ride Checks

1. Brakes — no rubbing, firm lever feel
2. Tires — correct pressure, no cuts or bulges
3. Wheels — properly secured, no wobbles
4. Chain — lubricated and aligned
5. Battery (E-models) — charged and securely locked
6. Lights & reflectors — functioning and clean
7. Bolts — stem, handlebar, seatpost all tightened to torque spec

Assembly

Final Assembly by Customer

Your bicycle is pre-assembled at the factory. Final assembly by the customer is limited to installing and aligning the handlebar, front wheel and installing the pedals. All other systems are factory-assembled and should not be disassembled.

Only perform the steps below if you are confident using basic tools and a torque wrench. If you are unsure, have the bicycle completed by a qualified mechanic.

Correct torque specs and parts can be found from the bicycle passport on Ikuista website.

Handlebar Installation and Alignment

The handlebar arrives attached to the stem or packed separately, depending on model.

1. Place the bicycle on level ground with the front wheel installed and the bike supported securely.
2. If the handlebar is not yet mounted, remove the stem faceplate bolts, position the handlebar in the clamping area, and reinstall the faceplate.
3. Center the handlebar using the manufacturer's markings. Rotate it to a neutral position where the brake hoods or grips feel comfortable.
4. Align the front wheel and handlebar so they are perfectly straight relative to each other.
5. Tighten the stem faceplate bolts evenly in a cross pattern using a calibrated torque wrench. Use the torque value from the torque specification table in this manual. Do not exceed the maximum torque printed on the stem or handlebar.
6. Check that the handlebar cannot rotate when you apply firm downward and upward force with both hands.

If the handlebar or stem moves under load, stop riding immediately and re-check torque and alignment.

Pedal Installation – Critical Instructions

Pedals are side-specific:

- Right pedal (marked "R") has a standard right-hand thread (tightens clockwise).
- Left pedal (marked "L") has a left-hand thread (tightens counter-clockwise).

Installing pedals on the wrong side or forcing them against the thread direction will destroy the crank arm threads.

1. Identify the right and left pedals by the markings on the axle or pedal body.
2. Lightly grease the pedal threads.
3. Start threading each pedal into the correct crank by hand only for several turns to ensure it spins smoothly and is not cross-threaded.
    a. Right pedal → right crank, turn clockwise to tighten.
    b. Left pedal → left crank, turn counter-clockwise to tighten.
4. Once you are certain the threads are engaged correctly by hand, use a pedal spanner or hex key to tighten the pedals to the torque specified in the torque table. Do not over-tighten.
5. After the first short ride, re-check pedal tightness.

⚠ **WARNING**
Cross-threading, forcing a pedal into the wrong crank, or using excessive force that strips or destroys crank arm threads is considered incorrect assembly and is not covered by warranty. If a pedal does not thread in smoothly by hand, stop immediately and consult a qualified mechanic.

User Prohibited Handling

IKUISTA bicycles are delivered fully assembled, safety-checked, and ready for use except for the limited user-completed steps described in this manual. The bicycle is a precision-engineered product. Incorrect handling, clamping, modification, or servicing can cause structural damage that is not immediately visible.

The following section defines **what the user must not do**. Damage caused by prohibited actions is considered misuse and is not covered by warranty.

The following actions are strictly prohibited and constitute misuse:

- Clamping the bicycle by the frame tubes, top tube, down tube, seat tube, or fork legs in a repair stand
- Supporting the bicycle's weight by carbon frame tubes during service or transport
- Using the seatpost, saddle, or handlebar alone as a lifting or load-bearing point
- Clamping carbon components directly in a work stand
- Applying force to the frame, fork, or seatpost to straighten or align components
- Using pliers, pipe wrenches, or non-calibrated tools on any bicycle component
- Tightening bolts without a torque wrench
- Over-tightening or under-tightening bolts beyond specified torque values
- Installing components not approved by the manufacturer
- Drilling, sanding, filing, cutting, or modifying the frame, fork, or components
- Repainting or heat-treating the frame or fork
- Attempting carbon fiber repairs or bonding
- Pressure washing the bicycle or directing high-pressure water at bearings, seals, suspension, or electrical components
- Opening sealed bearings, bottom brackets, or suspension units
- Servicing hydraulic brakes without proper tools and training
- Servicing EPAC electrical systems, batteries, motors, or firmware
- Using the bicycle after a crash without professional inspection

Specific Prohibited Clamping and Work Stand Use

IKUISTA carbon and aluminum frames must **never** be clamped by the frame tubes.

- Incorrect clamping examples include (but are not limited to):
- Clamping the top tube in a repair stand
- Clamping the down tube or seat tube
- Clamping fork legs or steerer tube
- Hanging the bicycle by the saddle or seatpost while applying side loads

Approved support methods include:

- Supporting the bicycle by the seatpost **only if the seatpost is metal and explicitly rated for clamping**
- Using axle-mounted or bottom-bracket-mounted repair stands
- Supporting the bicycle by the wheels using floor-based stands

Damage caused by improper clamping often results in **internal structural failure that is not visible externally**.

Consequences of Prohibited Actions

Any damage resulting from prohibited actions:

- Is considered misuse
- Is not a manufacturing defect
- Is not covered by warranty
- Voids structural and safety guarantees
- May compromise CE conformity

The manufacturer cannot assess or guarantee the safety of a bicycle that has been handled outside these instructions.

Responsibility Disclaimer

The user is responsible for ensuring that all actions performed on the bicycle comply with this manual. If the user is unsure whether an action is permitted, the bicycle must be taken to an authorized service provider before proceeding.

Failure to follow these instructions transfers full responsibility for resulting damage or failure to the user.

Final Safety Checks After Assembly

After installing the handlebar and pedals, the bicycle must undergo a basic safety check before riding. This ensures all components function as intended.

1. Confirm the handlebar is aligned straight with the front wheel. Apply firm downward and upward pressure to ensure no rotation.
2. Verify all stem bolts are torqued to specification using a certified torque wrench.
3. Check both wheels are securely attached. For thru-axles, tighten until fully seated. For QR systems, ensure they require firm force to close.
4. Inspect the brake rotors to ensure they do not rub excessively against the pads. Minor rub after transport is normal and will settle after a few rides.
5. Spin both wheels to confirm they rotate freely.

6. Squeeze the brake levers firmly several times to ensure consistent pressure.
7. Check tyre pressure and inflate according to the recommended range on the sidewall.
8. Verify the chain sits correctly on the chainring and cassette.
9. Inspect that the derailleurs shift smoothly across all gears.
10. Ensure all accessories (lights, bags, mounts) are securely attached.

If any abnormal noise, rubbing, resistance or looseness is detected, stop and check again.

First Ride Instructions

The first ride is used to settle components, confirm fit, and identify adjustments needed for comfort and stability.

1. Start with a short, low-speed ride in a safe area without traffic.
2. Shift through all gears. Shifting should be smooth and predictable. Minor adjustments may be required as cables settle.
3. Apply brakes gradually to bed in the pads and rotors. Avoid prolonged hard braking during the first 20–30 minutes.
4. Check for any creaks or noises, especially from the cockpit or saddle area.
5. Re-check pedal tightness after the first ride.
6. Stop immediately if any component moves, slips, or feels unstable.

After the first few rides, bolts should be re-checked for correct torque.

Post-Delivery Adjustment Period

New bicycles experience small settling movements as components bed in. The following should be checked after 50–150 km:

– Stem, handlebar, and seatpost torque
– Wheel trueness
– Brake rotor alignment and pad wear
– Chain lubrication and tension
– Shifting precision
– Tyre pressure fluctuations
– Any developing noises or vibrations

Unboxing and Transport Damage Inspection

Before assembly, inspect the bicycle and packaging for signs of shipment-related damage.

1. Examine the box for dents, tears, punctures, or crushed areas.
2. Inspect the frame for marks, cracks, or paint defects.
3. Check the fork tips and dropout areas for impact damage.
4. Confirm all components listed in the packing inventory are present.
5. Inspect rotors for bending caused by transport pressure.
6. Verify the derailleur hanger is straight; transport impacts can bend it slightly.
7. Check carbon parts carefully — even small marks may indicate impact.

If there is any suspicion of structural damage, **do not assemble the bicycle**. Report the issue immediately.

Common Customer Setup Mistakes (And How to Avoid Them)

- **Incorrect Pedal Installation:** Cross-threading or forcing pedals is one of the most common causes of crank damage. Always start threading by hand and verify left/right orientation.
- **Over-Tightening Bolts:** Using too much force without a torque wrench can crush carbon components or strip threads. Always follow torque values exactly.
- **Under-Tightening Cockpit Bolts:** Loose handlebars or stems are extremely dangerous. Even small looseness leads to sudden loss of control.
- **Misaligned Brake Calipers:** During assembly, if the wheel is not fully seated, the brakes can rub heavily. Reseat the wheel and re-center the caliper.
- **Saddle Tilt Errors:** Beginners often tilt the saddle nose too far upward or downward, causing discomfort and instability. Use a neutral tilt.
- **Ignoring Tyre Pressure:** Many riders use tyres far below recommended pressure, causing rim strikes or poor handling. Always check before riding.
- **Installing Accessories on Non-Approved Mounts:** Attaching heavy bags, child seats, or racks to non-rated locations can damage the frame and void warranty.

Riding the Bicycle After Assembly (Safety Rules)

1. Do not perform maximum-effort sprints or hard braking until components are fully bedded in.
2. Avoid steep descents until you confirm brake function.
3. Avoid off-road terrain until the cockpit and wheels have been inspected after initial bedding.
4. Stop riding immediately if:
   – the cockpit rotates

– a crackling noise appears in the frame
– the chain skips under load
– brake lever feel becomes inconsistent
– the wheel wobbles or vibrates unexpectedly

When to Seek Professional Help

Even though final assembly is minimal, **seek a qualified mechanic** if:

– You cannot align the handlebars without play
– Pedals do not screw in smoothly
– Derailleur hanger appears bent
– The headset makes knocking sounds
– Brakes rub continuously
– The wheel is not centered in the frame
– You hear loud creaking from the bottom bracket area
– You are unsure about torque values

Trying to force parts together, or riding a bike that "doesn't feel right," risks mechanical failure.

Mandatory Pre-Ride Checks – What to check before every ride?

1. Brakes — no rubbing, firm lever feel
2. Tires — correct pressure, no cuts or bulges
3. Wheels — properly secured, no wobbles
4. Chain — lubricated and aligned
5. Battery (E-models) — charged and securely locked
6. Lights & reflectors — functioning and clean
7. Bolts — stem, handlebar, seatpost all tightened to torque spec

Legal Notice

This manual **does not override national laws or road regulations**. You are responsible for compliance with traffic rules in your country. IKUISTA Bicycles Oy assumes no liability for:

- accidents caused by misuse
- modifications made by the user
- ignored maintenance
- third-party part installation not approved by IKUISTA

Safety

General Safety

Cycling involves inherent risk. You are responsible for using the bicycle correctly, performing regular checks, and riding within your limits. Do not ride if any component appears damaged, loose, or abnormal.

Mechanical Safety: Always check brakes, wheels, tires, and drivetrain before riding. Do not ride with loose bolts, misaligned wheels, rubbing brakes, or worn components. Never modify the frame, fork, or structural parts. Do not exceed torque specifications.

Riding Conditions: Reduced traction occurs on wet, icy, sandy, or uneven surfaces. Descend slowly and brake earlier in low-grip conditions. Avoid deep puddles or water crossings that may submerge the bottom bracket or motor.

Load & Weight Limits: Do not exceed the maximum rider + cargo limit for your bicycle. Excess weight affects handling, braking, and structural integrity.

Visibility: Use lights in low visibility conditions. Wear reflective clothing where required by law. Make yourself visible to other road users at all times.

Traffic Safety: Follow all road rules. Yield appropriately. Signal clearly. Do not use mobile devices while riding. Keep both hands on the handlebar except when signaling.

Children & Passengers: This bicycle is not designed to carry passengers, child seats, or trailers unless explicitly stated for your model.

Alcohol & Medication: Do not ride under the influence of alcohol, drugs, or medication that affects coordination or reaction time.

Environmental Hazards: Avoid riding during thunderstorms, strong winds, or extreme temperatures. Heat affects tire pressure and battery systems; cold reduces performance.

E-Bike Specific Warnings: Do not touch motor or battery immediately after long, high-assist climbs — components may be hot. Do not attempt to open or service the motor, battery, or wiring. Only use original IKUISTA chargers.

After Crashes: If the bicycle suffers a crash, inspect frame, fork, wheels, and cockpit for cracks or deformation. Carbon parts can fail without obvious external damage; consult a service partner if unsure.

Warranty Impact: Using the bicycle outside its intended ASTM category, riding with incorrect component installation, ignoring maintenance, or modifying safety-critical parts voids warranty.

Load Limits

The bicycle must always be used within the maximum permitted load, which includes the rider, clothing, accessories, bags, and any additional equipment attached to the frame or rack systems. Exceeding the load limit affects handling, braking distance, wheel durability, and overall structural integrity. Maximum weight limit of your frame can be found from the Bike Passport file on the product page on the Ikuista website.

Each model has a specific maximum system weight. This value is determined by frame strength, wheel build, tyre rating, and component selection. Riders must not exceed this rating under any circumstances, as doing so increases the risk of frame fatigue, wheel failure, and deformation of critical parts such as seatposts, handlebars, and stems.

Cargo and accessories must be distributed evenly and securely. Uneven weight distribution can cause steering instability or oscillation at higher speeds. If using frame bags, handlebar bags, saddle bags, or panniers, ensure they are firmly mounted and do not interfere with steering, pedaling, or braking components.

For gravel and mixed-terrain riding, load impacts are higher due to constant vibration and occasional impacts. Heavy loads may cause wheels to go out of true more quickly or accelerate tyre wear. Check wheel trueness and spoke tension more frequently if riding with luggage.

E-bike models have additional considerations due to increased system weight. The battery, motor, and electronics add significant mass, which increases braking force requirements and stress on the frame and wheels. The maximum load for e-bike models includes this built-in mass; riders must calculate remaining capacity accordingly.

Child seats, cargo trailers, or additional attachments must be approved for the bicycle category. Installing non-approved accessories can exceed design loads, especially at mounting points such as the seat tube, chainstays, or dropouts. Using incompatible mounts may void warranty and compromise safety.

Tyres also have individual load ratings printed on the sidewall. Riders should ensure total load does not exceed tyre capacity. Under heavy load, tyre pressure must be adjusted to the higher end of the recommended range to maintain stability and prevent pinch flats.

Using the bicycle within its designated load limits ensures predictable handling, maintains structural integrity, and preserves long-term component reliability.

Charging & battery handling

General Battery Safety

E-bike batteries contain high-energy lithium-ion cells and must be handled carefully. Incorrect charging, physical damage, or exposure to extreme temperatures may cause permanent battery failure, fire risk, or personal injury.

Never open, puncture, crush, immerse, or modify the battery. The battery housing contains multiple protective circuits that cannot be repaired by the user. Any interference voids warranty and regulatory compliance.

Charging Rules

Only charge the battery using the approved charger supplied with the bicycle. Non-approved chargers may cause overheating, short circuit, or uncontrolled high-voltage output.

1. Charge indoors, in a dry, well-ventilated area.
2. Place the battery on a non-flammable surface during charging.
3. Keep away from flammable materials, textiles, solvents, aerosols, and heat sources.
4. Do not charge the battery unattended or overnight.
5. Avoid charging immediately after riding if the battery is hot; allow it to cool to room temperature first.
6. Do not use damaged chargers, cables, or wall outlets.

If unusual noise, smell, or heat is detected during charging, disconnect immediately and move the battery to a safe, ventilated area.

Battery Installation & Removal

Always switch off the bicycle before removing the battery. Handle the battery using both hands and avoid dropping or striking it.

Ensure battery mounts, contacts, and locking mechanisms are clean, dry, and free of debris. Poor contact increases resistance, causes overheating, and may lead to intermittent assist or system errors. If the battery feels loose or rattles while riding, stop immediately and secure the mount.

Temperature Limits

Lithium-ion batteries must be kept within safe operating temperatures:

– Ideal charging temperature: **10°C – 25°C**
– Safe charging range: **0°C – 40°C**
– Safe operating range: **–10°C – 50°C**
– Storage temperature: **10°C – 20°C (recommended)**

Charging below 0°C or above 40°C may cause cell degradation or charging failure. Do not store the battery in direct sunlight, inside vehicles during summer, or in freezing conditions.

Long-Term Storage

If the bicycle will not be used for several weeks or months:

1. Charge the battery to 40–70%.
2. Remove the battery from the frame (if applicable).
3. Store in a cool, dry environment away from sunlight.
4. Recharge every 2–3 months to maintain cell health.
5. Do not store at full charge for extended periods.

A battery stored empty may enter deep discharge and become permanently unusable.

Battery Transport (Ground Transport)

When transporting the bicycle on a vehicle rack, remove the battery first. Secure the battery inside the vehicle using protective padding. External racks expose the battery to vibration, impact, rain, and theft risk. Batteries should never be transported on the exterior of a vehicle.

Battery End-of-Life & Recycling

When the battery reaches end-of-life:

1. Do not open or dismantle the battery.
2. Do not dispose of it in household waste.
3. Take it to an authorized recycling center or dealer.

Caption: Batteries must be recycled according to EU Directive 2006/66/EC. Lithium-ion battery recycling is mandatory for environmental and safety reasons.

Damage, Failure, or Thermal Event

Immediately isolate a battery that shows:

– swelling
– leaking fluid
– smoke
– unusual odor
– overheating
– visible deformation
– impact damage after a crash

Move the battery away from flammable materials and do not touch leaking fluid. Contact an authorized service provider.

Adjustments

Riding Instructions

Starting Off: Begin pedaling smoothly. Maintain a stable, centered body position. Keep hands on the handlebar at all times. Avoid sudden steering movements until you reach a comfortable pace.

Braking: Apply both brakes evenly. Avoid grabbing only the front brake at low grip surfaces. Braking distance increases on wet roads, loose gravel, and steep descents.

Cornering: Reduce speed before entering the turn. Keep your weight balanced, look through the corner, and apply smooth steering input. Avoid braking while leaning unless necessary.

Ascending: Shift to an easier gear before the gradient increases. Maintain a steady cadence. Stay seated on steep climbs for traction, especially on gravel.

Descending: Control speed with light, frequent braking. Keep your body low and balanced. On gravel, avoid locking wheels—let the bike roll and adjust your line gently.

Terrain-Specific Notes

- Road: Stick to paved surfaces; avoid large potholes and curbs.
- Gravel: Expect variable grip; steer smoothly and maintain relaxed arms.
- MTB (if applicable): Use elbows/knees for shock absorption; maintain momentum over obstacles.
- E-Bike: Assist level affects handling; higher modes increase acceleration and wheel slip risk on loose terrain.

Riding in Traffic: Follow local traffic rules. Signal intentions early. Make eye contact with drivers when possible. Keep lights on in low visibility conditions.

Fatigue and Overexertion: Do not ride when extremely tired. Reduced reaction time significantly increases accident risk.

Geometry Basics

The geometry of a bicycle determines how it handles, how stable it feels, and how efficient the rider's position is. Small differences in angle or length change how the bike responds under acceleration, cornering, climbing, and descending. Geometry values are not interchangeable between categories; road, gravel, and MTB frames use different philosophies to achieve their intended riding characteristics.

Stack and reach define a rider's core position. Stack determines vertical height of the cockpit; higher stack offers comfort and stability, lower stack produces a more aerodynamic but demanding posture. Reach controls horizontal cockpit length; longer reach increases stability at speed while shorter reach provides more upright control but less aerodynamic efficiency.

Head tube angle affects steering. A steeper angle results in quicker, more responsive handling suitable for road riding. A slacker angle increases stability on loose or rough surfaces, which is preferred for gravel and MTB riding. Fork rake, combined with head angle, creates trail — a key factor in how stable the bike feels around corners. More trail increases straight-line stability but slows steering response.

Seat tube angle determines how directly the rider's pedaling power is transferred to the crank. A steeper angle positions the rider over the pedals for efficient road and climbing performance. A slightly slacker angle improves comfort and traction on mixed or technical terrain.

Chainstay length influences rear-end stability and traction. Shorter stays create a more agile, responsive ride, while longer stays increase stability and weight balance, especially on gravel and e-bike frames where extra traction and control are needed.

Bottom bracket drop and height affect center of gravity. Lower bottom brackets offer better cornering stability but reduce pedal clearance on uneven surfaces. Higher bottom brackets offer additional clearance for obstacles but raise the center of mass, reducing low-speed stability.

Wheelbase, the distance between axles, defines the overall stability of the bicycle. Longer wheelbases improve straight-line control, especially with added luggage or on rough terrain. Shorter wheelbases create a more lively, responsive feel common on performance road frames.

Correct geometry ensures predictable, safe riding characteristics. Misalignment, incorrect fit, or mismatch between rider and geometry can lead to discomfort, poor handling, or increased fatigue on longer rides.

Rider Fit & Positioning: Correct fit ensures comfort, efficiency, control, and safety. A poorly fitted bicycle increases fatigue, reduces power transfer, and can lead to pain or injury. Fit is determined by three key interfaces: saddle height, saddle fore–aft, and cockpit reach and drop.

The goal is to place the rider in a neutral, balanced position where joints move naturally through the pedaling cycle without excessive strain. Fit varies by discipline: road prioritizes efficiency and aerodynamics; gravel prioritizes stability and comfort; endurance positions use higher stack and shorter reach to reduce stress on the back, neck, and wrists.

Saddle Height: Saddle height affects pedaling efficiency and knee alignment. Too high causes hip rocking and loss of power; too low increases knee load and reduces leverage. When seated, the leg should maintain a slight bend at the bottom of the pedal stroke without locking the knee. A good baseline method is measuring inseam and multiplying by a standard factor (e.g., 0.883 for road). The measurement will be from the middle of the bottom bracket to the middle of top of the saddle. Fine adjustments of a few millimeters significantly affect comfort and performance.

Saddle Fore–Aft Position: Fore–aft determines the rider's center of mass relative to the crank. Moving the saddle too far forward overloads the knees and shortens the effective reach. Too far back increases hip strain and reduces power during climbing. The reference position should allow a centered, balanced posture. Gravel riders often move slightly rearward for stability; road riders may choose a more forward position for torque efficiency.

Saddle Tilt: Tilt must remain neutral unless required for specific anatomical comfort. Nose-down tilt causes sliding and wrist pressure; nose-up tilt causes soft-tissue pressure and impedes movement.

Reach and Handlebar Position: Reach determines upper body extension and influences breathing capacity, control, and long-distance comfort. Excessive reach causes neck and shoulder strain; too short a reach closes chest angle and reduces stability.

Handlebar drop influences aerodynamic position. Road riders typically use deeper drops; gravel riders favor moderate drop and wider bars for stability. Stem length and bar width must be selected according to shoulder width and flexibility.

Handlebar Width: Width should approximate the rider's shoulder width measured at the acromion points. Narrow bars increase aerodynamics but reduce stability; wider bars improve control on gravel and technical terrain.

Crank Length: Crank length affects leverage and joint angles. Shorter cranks reduce hip compression, improve cadence, and enhance clearance; longer cranks increase leverage but demand greater joint range. Road and gravel fitting usually ranges from 165–175 mm depending on leg length and riding style.

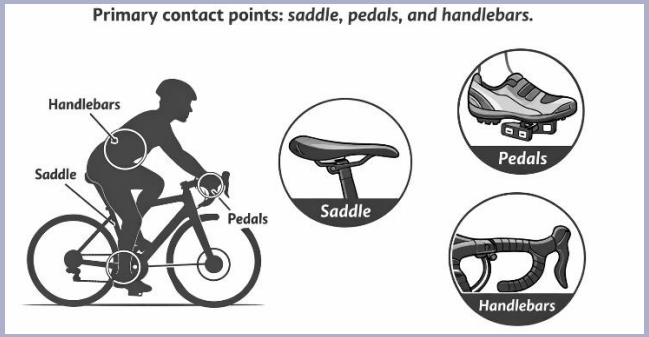
Cleat Position: Cleat placement affects knee tracking, foot alignment, and pedaling stability. Cleats too far forward increase calf strain; too far back reduce leverage. Cleats must allow neutral foot rotation to prevent knee irritation.

Fit Differences by Discipline: Road positions are lower and longer for increased efficiency. Gravel positions prioritize stability, slightly higher stack, and reduced drop for rough terrain. E-bike positions benefit from slightly more upright posture to balance weight distribution and manage motor-assisted acceleration.

Warning on Self-Fitting: Fit adjustments beyond basic increments should be made gradually. Large sudden changes in saddle height, reach, or cleat angle may cause pain or injury. Riders with knee, hip, or lower back issues should use professional fitting services.

Quick Setup Guide

This section provides a fast, reliable method for setting up fit on a new bicycle. It is not a substitute for a professional fitting but gives safe starting positions for most riders. IKUISTA does not guarantee optimal fit or injury prevention based on formula-based adjustments alone.



Caption: Three-step quick setup method for saddle height, reach, and bar position.

Step 1 — Set Saddle Height (Baseline)

Adjust the saddle so that your leg remains slightly bent at the bottom of the pedal stroke. Your hips must not rock, and you should feel stable when pedaling.

If unsure, start with this formula:
Saddle height (mm) = Inseam (mm) × 0.883. Measure from middle of the cranks to top of the saddle. Then adjust 2–4 mm at a time for comfort.

Step 2 — Set Saddle Position Fore–Aft

Place the crank horizontally. Your forward knee should roughly align above the pedal axle. For gravel, move 5–10 mm backward for stability; for road, keep a neutral position.

Step 3 — Set Reach and Handlebar Height

Start with the handlebars level with the saddle or slightly lower. Reach should allow a relaxed arm angle without locking elbows or straining shoulders.

Caption: Neutral beginner-safe reach and bar drop.

Step 4 — Check Cleat Position (If Using Clipless)

Place cleat under the ball of the foot, slightly behind the first metatarsal joint. Maintain natural toe angle.

[IMAGE: Cleat baseline position]
Caption: Beginner-friendly cleat setup for neutral foot alignment.

Step 5 — Make Small Adjustments Only

Ride 2–3 short rides before making additional changes. Adjust in 2–3 mm increments only.

Fit Troubleshooting

This section provides simple cause–effect guidance for common discomforts or performance issues related to fit.

Knee Pain (Front of Knee)

Possible cause: Saddle too low, too far forward, or excessive gear load. Adjustments:
– Raise saddle 2–3 mm
– Move saddle slightly rearward
– Increase cadence, reduce gear load

Knee Pain (Back of Knee)

Possible cause: Saddle too high or too far back. Adjustments:
– Lower saddle slightly
– Move saddle forward 2–4 mm

Hip Rocking or Swaying

Possible cause: Saddle too high. Adjustments:
– Lower saddle until hips remain stable

Numb Hands or Wrist Pain

Possible cause: Too much weight on the handlebars or reach too long. Adjustments:
– Raise handlebar (more spacers or higher stem angle)
– Shorten stem length
– Check saddle tilt (avoid nose-down)

Neck or Shoulder Fatigue

Possible cause: Long reach or low handlebar position. Adjustments:
– Shorten reach (shorter stem)
– Raise handlebar height
– Relax grip and bend elbows slightly

Lower Back Pain

Possible cause: Overreaching, incorrect pelvic angle, or tight hamstrings. Adjustments:
– Shorten reach
– Raise handlebars
– Slightly lower saddle if pelvis is rotating excessively

Saddle Discomfort or Numbness

Possible cause: Incorrect saddle tilt or height. Adjustments:
– Set saddle to neutral tilt (0° ± 2°)
– Lower saddle 2–3 mm
– Check saddle fore–aft balance
– Consider saddle width adjustment depending on sit bone spacing

Poor Handling or Feeling “Crammed”

Possible cause: Reach too short or saddle too far forward. Adjustments:
– Increase stem length
– Move saddle slightly back
– Lower handlebar if too upright

Poor Power Output or “Dead Legs”

Possible cause: Excessive saddle height or incorrect cleat position. Adjustments:
– Lower saddle slightly
– Move cleats rearward a few millimeters

Hot Spots on the Foot or Toe Numbness

Possible cause: Cleat too far forward, shoes too tight, or incorrect arch support. Adjustments:
– Move cleat backward
– Loosen straps
– Add insoles or arch support

Tech

This section describes the mechanical, structural, and functional principles that define how the bicycle operates. It explains how each system contributes to performance and safety, and outlines the engineering constraints that must be respected for reliable long-term use.

The bicycle is a load-bearing structure designed to handle a combination of rider weight, terrain impact, pedaling forces, and braking loads. These forces travel through the frame, fork, wheels, cockpit, drivetrain, and brakes. Each component has a defined tolerance for stress, fatigue cycles, and impact resistance. Exceeding these limits results in accelerated wear or structural failure.

All carbon and alloy frames are engineered to manage directional loads. They are strongest along the primary force paths and weaker when exposed to twisting, crushing, or point loads. Impacts from falls, transport damage, over-clamping, or improper torque application may cause internal damage not visible externally. This type of damage is cumulative and can lead to sudden failure even if the bicycle appears normal.

Components such as handlebars, stems, seatposts, and forks are designed with specific clamping areas. Installing clamps outside these areas or exceeding torque values compromises structural integrity. Carbon components in particular require precise torque control and correct assembly paste to prevent slipping or crushing.

Drivetrain components convert pedaling force into forward motion. Load increases on steeper climbs, with higher rider power, or in lower gears. Chains, cassettes, chainrings, and pulleys are designed to wear gradually and must be replaced before reaching critical wear thresholds. E-bike systems introduce substantially higher torque, which increases mechanical stress on drivetrains and accelerates wear if maintenance intervals are ignored.

Braking systems convert kinetic energy into heat. Prolonged braking on descents generates high temperatures that can glaze pads, warp rotors, or fade braking performance. Correct rotor thickness, pad condition, and system bleeding intervals are essential for safe operation. For e-bikes, higher system mass increases heat load on braking surfaces.

Wheel systems carry dynamic loads from impacts, cornering forces, and rider weight. Spoke tension must remain balanced to maintain wheel integrity. Impacts from potholes, stones, or jumps can deform rim profiles or break spokes. Carbon rims require inspection after any significant strike.

Electronic shifting and e-bike systems rely on stable electrical connections, firmware integrity, and correct sensor alignment. Modifying these systems or ignoring error warnings compromises safety and regulatory compliance.

Correct assembly, torque specification, lubrication, and part compatibility are fundamental technical requirements. Deviations from these principles shorten component lifespan and increase the risk of mechanical failure.

Frame and Fork Engineering

The frame and fork form the primary load-bearing structure of the bicycle, distributing pedaling forces, braking torque, cornering loads, and vertical impacts through the entire chassis. Carbon layup patterns or alloy tube shapes determine stiffness, compliance, and fatigue resistance. All frames are optimized for directional loads and must not be subjected to crushing forces, point impacts, or improper clamp positioning.

Pedaling forces transfer through the bottom bracket, chainstays, and downtube. Braking forces are absorbed by the fork crown, head tube, and front triangle. Side loads concentrate at the head tube junction and rear triangle. Any structural impact, even if cosmetic damage is not visible, may compromise material integrity.

Internal routing requires precise tolerances; missing grommets or misaligned guides can cause cable noise, abrasion, or interference with moving parts. For e-bike frames, wiring paths and sensor mounts must remain unobstructed to maintain system reliability.

Crash Inspection Procedure

If the bicycle impacts the ground or another object, stop riding and inspect:

1. Hairline cracks near joints, bottom bracket, head tube, fork crown.
2. Changes in paint texture (carbon damage often “prints” through).
3. New creaks under load.
4. Steering resistance or play in headset.
5. Fork dropouts for spreading or chipping.

⚠ If *anything* is suspicious: **DO NOT RIDE.** Have the frame inspected professionally.

Carbon vs. Alloy Behavior Under Load

Carbon fiber and aluminum alloy behave fundamentally differently under stress. Carbon is extremely strong when forces follow fiber direction but fragile under crushing or concentrated point loads. When damaged, carbon often fails suddenly without warning. Alloy is more ductile, showing dents or bends before complete failure, but has a finite fatigue limit.

Temperature changes, over-torqueing, and incorrect assembly paste can induce stress concentrations in both materials. Carbon requires exact torque and friction paste at all clamping points. Alloy tolerates slightly more deformation but can crack if overtightened repeatedly.

Both materials must only be clamped in designated reinforced zones. Seatpost slippage, cockpit rotation, and creaking noises often indicate incorrect torque, contamination, or damaged interfaces.

Wheel Dynamics

Wheels carry the most dynamic stress on the bicycle, experiencing vertical impacts, lateral forces, rotational load, and braking torque. Wheel integrity depends on balanced spoke tension, undamaged rim structure, correct tyre pressure, and a properly functioning hub.

Carbon rims provide high stiffness but are sensitive to sharp impacts that strike the rim edge. Alloy rims deform more gradually and may bend instead of cracking. Any wheel showing wobble, vibration, uneven spoke tension, or grinding in the hub must be serviced immediately.

Tyre pressure plays a critical role in absorbing impact. Underinflated tyres transfer excessive force to the rim, increasing the likelihood of rim strike, spoke loosening, or sidewall damage.

Brake System Engineering

Braking systems convert kinetic energy into heat. Road, gravel, and MTB disc brakes rely on hydraulic pressure to clamp pads against the rotor. As temperature rises during braking, pad friction characteristics, rotor stiffness, and hydraulic fluid performance change. Proper maintenance ensures predictable stopping distance.

Rotors are engineered for rotational stiffness and heat dissipation. Thin rotors lose structural integrity when worn below minimum thickness, causing pulsing, noise, or unpredictable braking. Brake pads glaze if overheated, reducing friction. Contaminated pads make loud squealing and must be replaced.

Hydraulic lines cannot contain air or moisture. Any spongy lever feel indicates entrapped air or fluid degradation. Brake fade on long descents signals overheating; stopping to cool the system prevents permanent damage.

Tyres & Tubeless Systems

Tyres are the primary contact between the bicycle and the ground. They determine grip, comfort, rolling resistance, impact absorption, and overall safety. Tubeless systems improve puncture resistance and allow lower pressures, but require correct installation and regular maintenance.

Tyre Construction - Tyres consist of tread rubber, casing (threads per inch), sidewalls, and beads.
Key differences:

- **High TPI casings:** More supple, better grip, less cut-resistant
- **Low TPI casings:** More durable, stiffer feel
- **Tubeless-ready beads:** Stronger bead core designed to lock into rim

Tyre Pressure - Pressure determines comfort, grip, and rim protection.

Too low pressure:

- tyre squirm in corners
- rim strikes (“bottom-outs”)
- burping in tubeless systems
- unpredictable handling

Too high pressure:

- reduced grip
- harsh ride
- increased puncture risk
- difficult bead sealing

Tyre pressure should be checked before every ride.

Tubeless Functioning - Tubeless systems eliminate the inner tube. Instead, airtightness comes from:

- airtight rim tape
- tight bead-to-rim interface
- liquid sealant

Sealant dries over time and must be replaced every 2–6 months depending on climate.

Bead Seating - To seat a tubeless tyre:

1. Ensure rim tape is intact and smooth.
2. Add sealant.
3. Inflate using high airflow (booster pump / compressor).
4. Listen for bead "pops" indicating full engagement.

A bead that will not seat may indicate incompatible tyre, damaged bead, or rim defect.

Do NOT exceed maximum pressure.
Bead blow-off can be violent and dangerous.

When a Tyre Is Unsafe - Do not ride if you see:

- sidewall cuts
- bead separation
- bulges or bubbles
- large punctures sealant cannot close
- exposed casing threads
- rim strikes that dented the rim

Bearings & Rotational Interfaces

What Bearings Do

- Support all major rotations: wheels, bottom bracket, headset, pedals.
- Reduce friction and maintain alignment under axial, radial and torsional load.
- Fail silently at first → early detection prevents major damage.

General Failure Indicators

- Rough or gritty rotation.
- Play or looseness in rotating assembly.
- Knocking, creaking, or clicking under load.
- Resistance when turning by hand.
- Water or dirt contamination visible around seals.

Hub Bearings

- Located inside front and rear hubs.
- Wear accelerated by pressure-washing, gravel, water crossings, and winter salt.
- Symptoms: wheel spin stops quickly, grinding feel, side play, rotor rub.
- Must be **replaced**, not cleaned or greased (sealed bearings).

Bottom Bracket Bearings

- Support highest torque of any bearing on the bike.
- Sensitive to contamination and misaligned shells.
- Symptoms: creaking only under pedaling load, ticking, soft pedaling feel.
- Removal/installation requires professional tools → **mechanic only**.

Headset Bearings

- Maintain smooth, accurate steering.
- Failure signs: knocking under braking, "indexed" steering, grinding at center.
- Incorrect preload can cause damage within hours of riding.
- Replace if corrosion or pitting is present.

Pedal Bearings

- Subject to lateral forces and pedal strikes.
- Symptoms: clicking at the same crank position each rotation, lateral play, uneven spin.
- Replace pedals or service per manufacturer instructions.

When Bearings Must Be Replaced Immediately

- Water or mud out of the seal.
- Bearing feel changes suddenly after riding in rain.
- Play increases noticeably.

- Any burning smell, metallic dust, or overheating.

Drivetrain System

Overview

- Transfers rider power to rear wheel efficiently.
- Requires correct alignment, lubrication and wear monitoring.
- Misalignment or wear increases load on frame, hanger, chain and cassette.

Chain

- Most frequently replaced part in drivetrain.
- Wear (“stretch”) increases spacing between pins.
- Replace at 0.5–0.75% depending on system (road vs. gravel).
- Symptoms of worn chain: skipping, noisy pedaling, poor shifting.

Cassette

- Works in system with the chain; wears together.
- Worn teeth: hooked profile (“shark fin”).
- Symptoms: skipping under load, inconsistent shifting.

Chainring

- Carries high torque from crankset.
- Wears slower than chain/cassette but must be replaced when chain no longer engages smoothly.

Derailleur Hanger

- Single most important alignment component.
- Bends easily from minor impacts or the bike falling over.
- Bent hanger → slow shifts, ghost shifts, chain drop, cassette noise.
- Alignment requires a professional hanger gauge → **not user-adjustable**.

Rear Derailleur

- Guides chain across cassette.
- Issues from dirt, worn pulleys, bent cage or weak clutch.
- Symptoms: delayed shifts, chain slap, inconsistent tension.

Front Derailleur (if equipped)

- Highly sensitive to setup: height, angle, limit screws.
- Misalignment causes rubbing, chain drop, poor upshifts.

Electronic Shifting

- Requires clean electrical contacts, correct battery level, updated firmware.
- Symptoms: delayed shift, no shift, self-correction, intermittent behavior.

Lubrication

- Clean and lubricate chain regularly.
- Use only bicycle-specific lubricants.
- Over-lubrication attracts dirt → forms abrasive paste.

When the Drivetrain Is Unsafe to Ride

- Chain skipping under heavy torque.
- Rear derailleur rubbing into spokes.
- Loud grinding that appears suddenly.
- Chain drops repeatedly.
- Hanger visibly bent or derailleur misaligned.

Crankset & Pedals

The crankset and pedals form the primary power-transfer interface between the rider and the drivetrain. They experience continuous high torque, lateral forces, and repetitive loading cycles. Correct installation and maintenance are essential for safety and long-term durability.

Pedal Installation

- Each pedal is threaded differently: the right pedal tightens clockwise, the left pedal tightens counter-clockwise.
- Pedals must always be started by hand for several full turns. If resistance is felt, stop immediately; cross-threading will destroy the crank threads.
- Apply a thin layer of grease to the pedal threads before installation.

- Tighten to the specified torque using the correct tool (pedal wrench or 6–8 mm hex).
- Re-check pedal tightness after the first ride.

Crank Arm Safety

- Crank arms are designed to withstand repeated twisting forces; improper pedal installation is the most common cause of crank failure.
- Over-tightening can deform aluminum threads or crush carbon fiber structures.
- Under-tightening allows micro-movement which damages threads over time.
- Side impacts or crashes may cause hidden carbon damage; discontinue use if any cracks, creaks, or deformation appear.

Bottom Bracket

- The bottom bracket houses high-load bearings and must rotate smoothly under pressure.
- Common symptoms of failure include creaking during pedaling, grinding sensations, ticking noises, or lateral crank play.
- Bottom bracket removal or replacement requires model-specific tools and should only be performed by a qualified mechanic.
- Seized or contaminated bearings must be replaced, not serviced.

Brake System (Hydraulic & Mechanical)

Brakes are the most critical safety system on any bicycle. Modern road, gravel, and MTB models rely primarily on hydraulic disc brakes for maximum power and consistency, while mechanical disc brakes remain in use on selected models.

Hydraulic Disc Brakes

- Hydraulic systems rely on sealed fluid circuits to transmit force from the lever to the caliper.
- Air bubbles in the system cause a spongy feel and dramatically reduce braking power.
- Oil contamination on pads or rotors eliminates friction and must be corrected immediately by replacing pads and cleaning or replacing the rotor.
- Long descents generate significant heat; brake fade or glazed pads indicate overheating.
- Rotors have a minimum thickness; worn rotors can deform under heat and must be replaced.

Brake Pads and Rotors

- Organic pads offer quiet operation but are more sensitive to heat.
- Metallic pads tolerate heat well but may produce more noise.
- Rotors absorb friction heat during braking and can exceed 300°C after long descents; never touch a rotor immediately after riding.
- Bent or contaminated rotors produce pulsing, noise, or vibration and should be inspected by a mechanic.

Mechanical Disc Brakes

- Operate through a steel cable inside a housing rather than hydraulic fluid.
- Cable stretch, friction inside the housing, and water ingress reduce performance.
- Require more frequent adjustment and produce lower braking power on long or steep descents.

Lever Position and Reach

- Levers must be positioned so wrists remain neutral and fingers can pull comfortably without strain.
- Reach adjustment should match the rider’s hand size; poor reach settings reduce control.
- The brake lever must not contact the handlebar under full braking force; if it does, the system contains air or requires service.

When Brakes Are Unsafe to Ride

- Lever pulls to the bar with minimal resistance.
- Sharp loss of braking power during riding.
- Pads are contaminated, glazed, or worn below 1 mm.
- Rotor visibly warped or excessively thin.
- Caliper bolts or adapters are loose.
- Brake hose is kinked, cut, rubbing excessively, or leaking fluid.
- Any sudden noise, vibration, or change in feel during braking.

In any of these situations, the bicycle must not be ridden until inspected and repaired.

Cockpit, Stem, Seatpost & Contact Points

The cockpit assembly (handlebar, stem, spacers, and seatpost) controls steering, load distribution, rider posture, and overall stability. These components are highly sensitive to incorrect torque, misalignment, or improper clamping. Because they directly affect safety, all adjustments must follow strict guidelines.

Handlebar and Stem

- The handlebar must be centered in the stem clamp and positioned within the reinforced clamping zone marked by the manufacturer.
- Carbon handlebars must never be clamped outside the designated area; even small deviations can cause crushing or internal fiber damage.
- Stem faceplate bolts must be tightened evenly in a cross-pattern to avoid uneven clamping pressure.
- Adjust handlebar angle so wrists and shoulders remain neutral in your primary riding position (hoods for road, tops for gravel).
- After any fall or impact, inspect handlebar and stem for rotation, cracks, or creaking noises under load.

Torque Safety

- Over-tightening handlebar or stem bolts can crush carbon bars or deform aluminum.
- Under-tightening allows rotation during riding, which can cause sudden loss of control.
- Always use a calibrated torque wrench and follow the values listed for your components.

Steerer Tube and Headset

- The stem clamps onto the steerer tube, which must be cut to the correct length by the manufacturer or trained mechanic.
- Preload is applied through the top cap; this removes play from the headset bearings.
- If preload is too loose, knocking or rattling will occur when braking or riding over bumps.
- If preload is too tight, steering becomes stiff and may damage bearings.
- Never ride with a loose headset; it can cause steerer tube fatigue and fork failure.

Seatpost

- Seatposts must be inserted past the minimum insertion mark. Riding above this mark can crack the seat tube or damage the post.
- Carbon seatposts require assembly paste to prevent slipping; grease must not be used.
- Aluminum posts can use grease, but only on metal frames; carbon frames still require friction paste.
- A slipping seatpost indicates incorrect torque, wrong paste, or contamination inside the seat tube.

Saddle Rails and Clamp

- Saddle clamps must hold the rails within the manufacturer's marked limits; clamping outside this zone can break the rails.
- Tighten saddle bolts evenly to avoid twisting the clamp.
- Excess saddle tilt (nose up or nose down) indicates improper setup or rider compensating for fit issues.

Common Cockpit Safety Risks

- Bars rotating unexpectedly during a sprint or descent.
- Creaking noises from the stem or faceplate under load.
- Seatpost slipping during a ride.
- Saddle tipping or shifting after bumps.
- Headset knocking when braking.

In any of these cases, stop riding immediately and inspect for correct torque, structural integrity, and proper assembly.

Steering & Headset

The steering system allows the rider to control direction smoothly and predictably. It consists of the fork steerer tube, upper and lower headset bearings, compression hardware, spacers, and the stem. Because the system bears both impact and steering loads, proper adjustment is essential for safety.

Headset Function
The headset enables smooth rotation of the fork relative to the frame. When correctly preloaded, the bearings manage vertical impact loads and steering forces without looseness or binding. Even small deviations in adjustment can cause instability, noise, or accelerated wear.

Correct Preload

- Preload is set using the top cap bolt after the stem bolts are loosened.
- Proper preload eliminates play while still allowing smooth left-to-right rotation.
- If preload is too low, the fork will knock under braking or over bumps.
- If preload is too high, the bearings feel tight, steering becomes heavy, and bearings may be damaged during riding.

Signs of a Loose Headset

- A “knock” or click when applying the front brake and rocking the bike back and forth.
- Rattling or vibration at the front end when riding over uneven surfaces.
- Handlebars or stem feel vague or disconnected from the wheel.
- Visible movement between spacers and the head tube.

A loose headset should be corrected immediately; riding in this condition can cause steerer tube or fork crown fatigue.

Signs of an Over-Tightened Headset

- Steering does not fall freely from side to side when the front wheel is off the ground.
- Handlebar movement feels sticky or indexed.
- Loud creaks coming from the head tube area during turning.
- Bearings become notchy or develop permanent roughness.

Steerer Tube and Stem Interface
The stem clamps directly onto the fork’s steerer tube.

- Carbon steerer tubes must be clamped only within approved zones.
- Excess torque can crush the steerer, leading to sudden failure.
- Stem bolts must be torqued evenly and within the specified limits.
- Spacers above and below the stem must match steerer height for correct compression.

Common Steering System Risks

- Riding with improper preload can damage both headset bearings and the steerer tube.
- Impacts from crashes or curb strikes may crack the crown race, bearing seats, or steerer.
- Dirt or moisture ingress causes headset bearing corrosion and grinding.
- Incorrect stem height or flipped stem angles may shift load distribution and affect handling stability.

When to Stop Riding

- Any knocking or clunking from the front end.
- Sudden changes in steering resistance.
- Grinding through the handlebar when turning.
- Visible damage or separation at the steerer clamp.
- Restricted steering movement after a crash.

If any of these signs appear, discontinue use until a qualified mechanic inspects the system.

Suspension

Some IKUISTA models or future variants may include front suspension, particularly for gravel or mixed-terrain applications. Suspension systems improve comfort, traction, and control by absorbing impacts that would otherwise be transmitted directly to the rider and frame. Their performance depends on correct setup, pressure, sag adjustment, and regular maintenance.

Purpose of Suspension
Suspension allows controlled vertical movement to maintain wheel contact with the ground, improving grip and reducing rider fatigue. The system relies on an air spring or coil spring paired with a damper that moderates rebound and compression. Incorrect setup will reduce performance and may damage internal components.

Sag Setting
Sag is the amount of suspension travel used when the rider is stationary on the bike in normal riding position.

- Typical sag for gravel/light suspension forks is 20–30% of total travel.
- Too little sag makes the bike harsh and decreases traction.
- Too much sag reduces control and can cause bottom-outs on impacts.
- Sag must be checked with correct tire pressure and full riding gear.

Air Pressure Adjustment

- Suspension forks with air springs require correct pressure based on rider weight.
- Pressure that is too low increases bottom-out risk and can damage internal seals.
- Pressure that is too high reduces compliance, increases vibration, and may cause handling instability.
- Air chamber should be adjusted only with a dedicated shock pump.

Rebound and Compression
Rebound controls how quickly the fork returns after compression.

- Too fast rebound causes a “bouncy” feel, loss of traction, and front-end instability.
- Too slow rebound causes the fork to “pack down” on repeated bumps.
  Compression adjustment (if equipped) controls how firm the suspension feels under load.
- Too firm compression reduces small-bump sensitivity.
- Too soft compression increases brake dive and bottom-out potential.

Inspection and Wear
Suspension components include stanchions, seals, bushings, air can, and damper.

- Stanchions must remain perfectly smooth; scratches or wear marks allow dirt and moisture inside.
- Oil weeping around seals indicates contamination or seal failure.
- A knocking sound during suspension movement may indicate worn bushings.
- Any visible oil leakage requires immediate service.

Maintenance Intervals
Suspension forks require periodic service to maintain performance:

- Lower-leg service typically every 50 hours of riding.
- Full damper and air spring service every 100–200 hours depending on conditions.
- Riders in wet, muddy, or dusty conditions require more frequent intervals.

Installation and Compatibility

- Only use suspension forks approved for the frame’s geometry and axle standard.
- Changing travel length alters head angle, bottom bracket height, and handling stability.
- Installing an unapproved fork voids warranty and may cause frame damage.

Common Suspension Risks

- Riding with incorrect pressure or rebound settings.
- Ignoring seal leaks or grinding sensations.
- Pressure loss from temperature changes or slow air leaks.
- Using pressure washers which force water past seals.
- Riding with stanchion scratches which can rapidly destroy internal components.

Discontinue riding immediately if the suspension:

- Loses pressure rapidly
- Makes knocking or clunking noises
- Feels stuck or fails to extend fully
- Shows visible oil leakage
- Develops lateral play at the crown or lowers

Service

Correct torque ensures component safety, prevents slipping or cracking, and maintains long-term structural integrity. All bolts must be tightened evenly, using a calibrated torque wrench. Over-tightening can damage carbon and alloy parts; under-tightening can cause component movement and sudden failure.

The following values are typical for modern road, gravel, MTB and e-bike components unless otherwise specified by the component manufacturer. Always follow component-specific instructions if they differ from these reference values.

For carbon components, never exceed the maximum torque printed on the part. Use carbon assembly paste where required.

Bolts that show corrosion, rounded heads, or incorrect thread engagement must be replaced immediately. If a torque value feels abnormal or components shift under load, do not ride until the issue is resolved.

Material Notes (Carbon vs Alloy Torque Rules)

Carbon components require lower torque values and the use of carbon assembly paste to prevent slipping without over-compression. Over-torquing carbon parts can result in internal cracking that is not visible externally. Alloy components tolerate slightly higher torque but can still deform or strip threads if over-tightened. Always follow the lowest recommended torque when a component includes both carbon and alloy interfaces. Bolts threaded into carbon inserts must never exceed the printed torque on the frame or part.

Never use grease on carbon-to-carbon clamping surfaces. Use carbon paste instead. Alloy posts in carbon frames must be greased lightly to prevent galvanic corrosion and seizing. Any creaking around the cockpit, seatpost, or crank interface often indicates improper torque or lubrication.

If a torque value feels “wrong” during tightening, stop immediately and inspect the threads, washers, and contact surfaces. Do not force any bolt to reach a specified torque if the component appears misaligned or damaged.

⚠ Here are some of the torque specs in the bikes. Note that these are only general values for torque, specific values of your bike can be found from the bike passport.

Component	Torque	Type / Notes
Stem faceplate bolts	5–6 Nm	Alloy & carbon bars; tighten cross-pattern
Stem steerer clamp	5–6 Nm	Do not exceed 6 Nm on carbon steerers
Handlebar clamp (road)	4–5 Nm	Carbon bars typically max 5 Nm
Handlebar clamp (MTB)	5–6 Nm	Wider bars require even bolt tension
Seatpost clamp	5–7 Nm	Carbon posts: max 5 Nm + carbon paste
Saddle rail clamp	8–12 Nm	Alloy rails higher end; carbon rails lower end
Brake caliper bolts	6–8 Nm	Post mount or flat mount depending on model
Brake rotor bolts (6-bolt)	6 Nm	Use threadlocker; never exceed 6 Nm
Thru-axle	10–15 Nm	Model-specific; check printed spec
Derailleur hanger bolt	8–10 Nm	Critical for shifting accuracy
Rear derailleur mount	8–10 Nm	Avoid over-torque on carbon dropout inserts
Front derailleur clamp	5 Nm	Carbon frames may require 4–5 Nm max
Crank arm fixing bolt	35–50 Nm	Range depends on crank design
Pedals	35–40 Nm	Grease threads; left pedal reverse thread
Chainring bolts	8–12 Nm	Check after first 50 km
Bottle cage bolts	2–3 Nm	Avoid stripping rivnuts in alloy frames
Shift lever clamp	4–6 Nm	Carbon bars: max 4–5 Nm
Brake lever clamp	4–6 Nm	Do not over-tighten on carbon bars
Display/control clamp (e-bike)	2–3 Nm	Plastic clamps break if over-torqued
Kickstand (if applicable)	8–12 Nm	Check regularly for loosening
Rack/fender mounts	4–6 Nm	Avoid overtightening on carbon stays

E-Bike Specific Torque Specifications

E-Bike Component	Torque	Notes
Motor mounting plate bolts	25–30 Nm	High-load area; use threadlocker
Battery rail mount bolts	4–6 Nm	Do not overtighten; may crack inserts
Battery lock mechanism	2–3 Nm	Light clamp only; check regularly
Speed sensor mount	2–3 Nm	Avoid bending sensor arm

Magnet bolt (wheel)	2 Nm	Magnet must align with sensor gap
Display/control clamp	2–3 Nm	Plastic components; very low torque
Wiring anchor points	1–2 Nm	Prevents cable damage; do not crush housing
Kickstand (e-bike models)	10–12 Nm	Higher load due to system weight
Rear wheel axle (hub motor, if applicable)	40–50 Nm	Not typical for IKUISTA mid-drive, included for completeness
Chainguide mount (if present)	4–6 Nm	Prevents chain drop under motor torque

Maintenance Overview

Regular maintenance is essential for the safety, performance, and lifespan of your bicycle. Before every ride, check that the brakes operate smoothly, the wheels are secure, and the tires are inflated to the recommended pressure. The drivetrain should run quietly without rubbing or shifting hesitation. Clean dirt, dust, and moisture from exposed components to prevent wear.

After every 100–150 km, inspect the chain for lubrication, check the brake pad thickness, verify torque on the stem, handlebar, and seatpost bolts, and ensure the wheels remain true. Gravel use requires more frequent inspection, especially after wet or dusty rides. If the bicycle makes unusual noises, investigate immediately; rattling, clicking, grinding, or vibration often indicate misalignment or loose hardware.

Every 500–1000 km, depending on use, the drivetrain should be cleaned thoroughly, the chain measured for stretch, cables checked for friction (if mechanical shifting), and brake fluid inspected for consistency in hydraulic systems. Components that show signs of corrosion or wear should be replaced. Tires should be checked for embedded debris and small cuts that may lead to punctures.

Suspension forks on MTB models require seasonal maintenance according to manufacturer recommendations. Electric models require inspection of connectors, wiring, battery mounts, and charging ports to ensure there is no moisture ingress or damage. Never open the motor or battery case; service must be performed by an authorized technician.

After any crash or impact, the bicycle must be inspected carefully. Frames and forks, especially carbon components, can sustain invisible damage. If you are unsure about the condition of any part, do not ride the bicycle until it has been assessed by a qualified service partner.

A properly maintained bicycle performs more predictably, lasts longer, and provides a safer riding experience. Neglecting maintenance increases the risk of component failure and voids warranty coverage.

Drivetrain care

The drivetrain requires regular cleaning and lubrication to operate efficiently. Dirt, dust, and moisture increase wear on the chain, cassette, and chainring, leading to poor shifting performance and reduced component life. Wipe the chain after wet or dusty rides and apply a suitable bicycle-specific lubricant. Excess oil should be removed to prevent dirt accumulation. If the chain begins to squeak, skip gears, or feel rough under load, it is either dry, worn, or misaligned.

Gear shifting should be smooth across the cassette. If shifting becomes slow or inconsistent, check for bent derailleur hangers, stretched cables (for mechanical systems), contaminated housing, or damaged jockey wheels. Electric and electronic shifting systems require periodic battery checks and clean contact points but no lubrication. A misaligned derailleur can cause chain drops, poor gear engagement, and drivetrain noise.

The cassette and chainring wear over time. When the chain stretches beyond recommended tolerance, it must be replaced promptly to prevent accelerated wear of the entire drivetrain. Riding with a worn chain increases the chance of skipping under load, especially in smaller cogs, and can lead to sudden loss of traction or control. Gravel riding accelerates wear due to constant exposure to dust and fine debris.

The bottom bracket should rotate smoothly without resistance, grinding, or lateral movement. Any creaking or play usually indicates worn bearings, loose cups, or contamination. These issues worsen quickly if ignored. The crank arms should be checked periodically for tightness and cracks, especially after impacts or rock strikes in off-road use. Pedals must spin freely and should not show excessive side-to-side movement.

For e-bike models, higher torque loads on the chain and cassette require more frequent inspection. Chain lubrication becomes even more important because the motor amplifies rider power and accelerates wear. Only e-rated chains, cassettes, and chainrings should be used on electric models to ensure mechanical integrity under sustained load.

Routine drivetrain care significantly improves shifting accuracy, pedalling efficiency, and long-term durability. Neglecting these tasks increases wear, noise, and risk of mechanical failure during riding.

Brake System Care

Hydraulic disc brakes require consistent inspection to ensure reliable stopping performance. Before every ride, check that the brake levers feel firm and engage without excessive travel. A soft or spongy lever feel indicates air in the hydraulic line or worn pads. If the lever pulls too close to the handlebar, do not ride until the issue is resolved.

Brake pads wear over time and must be replaced before reaching minimum thickness. Riding with worn pads reduces braking power and may damage the rotor. Inspect pad wear visually by looking through the caliper opening. Gravel riding or frequent descents accelerate wear, and wet conditions can shorten pad life dramatically.

Rotors must remain true and free from contamination. If you feel pulsing, hear scraping, or notice vibration during braking, the rotor may be bent or the caliper misaligned. Clean rotors with isopropyl alcohol only; avoid touching them with bare hands to prevent oil contamination. If braking noise persists after cleaning, the pads may be glazed or contaminated and must be replaced.

Check caliper alignment regularly. The rotor should pass through the caliper without rubbing. If rubbing occurs, adjust the caliper by loosening the mounting bolts, centering the caliper, and retightening to the correct torque. Ensure all bolts on the brake mount, lever clamp, and rotor are torqued to specification.

Hydraulic fluid must remain clean and free of air. If braking feels inconsistent, or if you see fluid leaks around the caliper or lever, the system requires a bleed or component replacement. Only use the brake fluid type specified by the brake manufacturer; mixing fluids can cause seal damage and system failure.

For e-bike models, braking demands are higher due to increased mass and speed. Rotors, pads, and calipers must be inspected more frequently, and only e-rated brake components should be used for replacements.

Properly maintained brakes ensure predictable stopping distance, control during descents, and safe operation in variable conditions.

Wheel and Tire Care

Wheels must rotate smoothly without lateral wobble or vertical hop. If you notice vibration, uneven braking feel, or rim movement, the wheel may require truing. Riding with an untrue wheel increases stress on the spokes, hub, and rim, and should be corrected before the issue worsens. Spokes must maintain proper tension; loose spokes cause instability and may lead to rim failure, especially in gravel conditions.

Check tire pressure before every ride. Underinflated tires increase rolling resistance, reduce cornering stability, and increase pinch-flat risk. Overinflation reduces traction and comfort. Pressure requirements vary by model, tire size, and rider weight, so follow the recommended ranges provided elsewhere in this manual. Inspect tires for cuts, embedded debris, sidewall damage, and punctures. Tires showing deep cuts, visible casing, or distorted shape must be replaced immediately.

Wheels must be securely fixed in the frame and fork. Thru-axles and quick-release systems must be fully tightened to prevent movement. A loose axle can cause sudden wheel misalignment or disengagement, leading to loss of control.

For gravel and mixed-surface riding, tires wear faster due to constant contact with dust, stones, and uneven ground. Check tread depth frequently. A smooth or squared-off tread profile reduces grip significantly.

Tubeless Tire Systems

Tubeless systems improve puncture resistance and allow lower pressures for better traction and comfort. They require regular inspection to ensure airtight performance. The sealant inside the tire dries over time; refresh intervals vary by temperature and riding conditions but typically range from 2 to 6 months. Riding in hot weather or on dusty gravel dries sealant faster.

Always check that the tire bead is properly seated on the rim. A partially seated bead can lead to sudden air loss, especially under cornering load. Visually inspect the bead line around the entire rim before riding. If you notice uneven seating, deflate the tire, lubricate the bead, and re-inflate until the bead snaps fully into place.

If the system loses pressure overnight, check for valve core tightness, rim tape condition, or small punctures that did not seal. Rim tape must be airtight, undamaged, and correctly applied. Damaged tape or poor installation is a common cause of slow leaks. Sealant can temporarily fix small punctures, but larger cuts will require tire replacement.

When inflating tubeless tires, use a pump or inflator with a high-volume burst to seat the bead securely. Avoid exceeding the maximum pressure printed on the tire sidewall. After seating, adjust to the correct riding pressure.

Tubeless systems provide reliable performance when maintained properly, but a poorly sealed setup is unsafe. If you experience repeated pressure loss, sealant spray on the rim, or bead instability, inspect the system thoroughly or have it examined by a qualified technician.

Hub and Bearing Care

Wheel hubs must rotate smoothly without resistance, grinding, or side-to-side play. Any roughness indicates worn bearings, contamination, or insufficient lubrication. Check for play by holding the wheel and pushing it laterally at the rim; movement means the hub requires adjustment or service. Riding with loose bearings accelerates wear and may damage the axle or dropouts.

Sealed cartridge bearings are common on modern wheels and require replacement when worn, as they cannot be serviced internally. Signs of failure include rough rotation, metallic noise, vibration under load, or water contamination after wet rides. If bearing drag is noticeable when spinning the wheel by hand, service is required.

For gravel and mixed-terrain riding, hubs are exposed to dust, mud, and water more frequently. After heavy conditions, inspect seals for dirt intrusion. If water enters the hub, corrosion may occur rapidly, reducing bearing life. Clean the exterior of the hub with a damp cloth and avoid pressure-washing, as high-pressure water can force contaminants past the seals.

Freehub bodies must engage crisply without delay. Slow or inconsistent engagement suggests worn pawls, weakened springs, or debris inside the mechanism. A skipping freehub can cause sudden loss of drive when pedaling under load. For e-bike models, the additional torque from the motor increases stress on the freehub, requiring more frequent inspection.

Front and rear hubs rely on correct axle torque to maintain bearing preload and prevent movement. Under-tightened thru-axles cause instability, brake misalignment, and handling issues. Over-tightening may damage threads or compress hub internals. Follow torque specifications for all axle types.

A well-maintained hub system ensures smooth rolling performance, consistent handling, and long bearing life. Neglecting hub care leads to premature wear, noise, and compromised safety.

Cockpit and Steering Care

The cockpit consists of the handlebar, stem, headset, grips or bar tape, and all control levers. These components directly affect stability and steering precision, so their condition must always be verified before riding. Any looseness or misalignment in the cockpit can cause sudden loss of control.

Check that the handlebar is aligned with the front wheel and that the stem bolts are tightened to the recommended torque. Uneven bolt tension can cause the handlebar to slip during hard braking or impacts. If the bar rotates unexpectedly or creaks under load, stop riding immediately and tighten or inspect the interface.

The headset must rotate smoothly without knocking or resistance. To test for play, apply the front brake and rock the bike back and forth. Any clicking or movement in the head tube area indicates loose bearings or improper preload. A loose headset affects steering precision and accelerates wear on the fork steerer and frame.

Bar tape or grips should be secure and undamaged. Worn or slipping grips reduce control and increase hand fatigue. Replace tape or grips if they become loose, torn, or saturated with moisture.

Brake levers and shift levers must operate freely. Stiffness, sticking, or delayed return indicates contamination or worn internals. In hydraulic systems, lever firmness should remain consistent; a soft lever suggests air in the system or failing seals.

For gravel and off-road use, impacts and vibrations place greater stress on the cockpit. After any fall, even minor, inspect the handlebar and stem carefully. Carbon handlebars and seatposts can sustain damage without visible cracks. If in doubt, have them checked by a qualified technician.

Cockpit integrity is critical for rider safety. Ensuring correct torque, alignment, and smooth operation reduces the risk of steering failure and improves overall handling.

Saddle, Seatpost and Rider Position

The saddle and seatpost directly influence comfort, pedaling efficiency, and long-term joint health. The saddle must be positioned level or with a very slight nose-down angle depending on rider preference, but large tilts cause discomfort and loss of stability. Saddle height should allow efficient leg extension without rocking the hips; an excessively high saddle increases the

risk of knee and hip strain, while a too-low saddle reduces power and places stress on the knees.

The seatpost must always be inserted past the minimum insertion mark. Riding with the post above this limit can damage the frame and lead to sudden structural failure. The seatpost clamp must be tightened to the correct torque — both under-tightening and over-tightening are unsafe. Under-tightening allows the saddle to slip under load, while excessive torque can crush alloy posts or crack carbon ones.

Over time, debris, moisture and fine grit can accumulate inside the seat tube. To prevent seizing, remove the seatpost periodically, clean the surfaces, and apply a suitable assembly compound. Carbon posts require carbon assembly paste; alloy posts typically use light grease unless manufacturer instructions specify otherwise.

Saddle rails should be inspected for cracks, bends, or deformation, particularly after a crash or hard impact. Even minor rail damage can worsen quickly and lead to saddle failure during riding. For gravel and mixed-terrain use, vibration places added stress on the saddle and post, making regular checks more important.

For e-bike models, the higher system weight can increase load on the seatpost and clamp area. Ensure the clamp is correctly torqued and that the saddle remains firmly secured, especially after steep climbs or prolonged seated pedaling.

Correct rider position improves comfort, stability, and power transfer. Adjustments should be made gradually and tested over short rides before committing to longer distances.

Pedals, Cleats and Foot Stability

Pedals must rotate smoothly without lateral play or grinding. Any resistance or uneven rotation indicates worn bearings or contamination. Flat pedals should provide consistent grip; if pins are worn or missing, replace them to maintain traction. Clipless pedals must allow clean entry and release. Mud, sand, or dried debris inside the mechanism can prevent proper engagement and may cause unexpected disengagement under load.

Cleats wear over time and should be inspected regularly. Worn cleats cause unstable foot positioning, reduce pedaling efficiency, and increase the risk of accidental release. Replace cleats when corners become rounded, when movement feels loose even at tighter tension settings, or when stepping in and out becomes inconsistent. For gravel and MTB use, walking on rough surfaces accelerates cleat wear significantly.

Cleat bolts must be tightened evenly to prevent rotation under pedalling forces. Unevenly tightened cleats can twist during riding, altering foot alignment and causing knee discomfort. Use threadlocker where appropriate to prevent bolts from loosening over time. Check cleat alignment periodically; even slight changes in foot angle can cause strain during longer rides.

Pedal tension should be set according to rider preference and experience. Beginners benefit from lower tension for easier release, while experienced riders may prefer a firmer setting for improved stability. For e-bike models, consider slightly firmer tension because higher torque can amplify minor foot movement.

Foot stability is critical for efficient power transfer and safe dismounting. Any change in how your foot feels on the pedal—slipping, unexpected release, or difficulty engaging—should be addressed immediately.

Chain and Lubrication Care

The chain must remain clean, properly lubricated, and free of stiff links to ensure smooth shifting and efficient power transfer. Dirt, moisture, and fine dust accelerate wear on the chain and cassette, especially during gravel riding. After wet rides, wipe the chain immediately to remove water and prevent corrosion. A dry chain causes squeaking, rough pedaling, and increased drivetrain wear.

Use bicycle-specific chain lubricant suited to the conditions. Wet lubes work best in rain or mud but attract more dirt. Dry lubes are cleaner for dry conditions but must be reapplied more often. Apply a small drop of lubricant to each roller, rotate the crank several times, and wipe off all excess oil. Over-lubricating the chain traps abrasive particles and accelerates wear.

Chain wear must be measured regularly using a chain checker tool. When wear reaches the recommended limit, replace the chain promptly. Continuing to ride with an overly stretched chain damages the cassette and chainring, leading to more expensive component replacement. If shifting feels inconsistent, noisy, or rough even after lubrication, chain wear or misalignment may be the cause.

Stiff links should be addressed immediately. Inspect for bent plates, corrosion, or contamination. If a link cannot be restored to smooth movement, the chain must be replaced. Never ride with damaged or cracked chain plates, as failure under load can cause sudden loss of control.

For e-bike models, increased torque from the motor places greater stress on the chain. Lubrication intervals should be more frequent, and chain wear should be checked at shorter mileage intervals. Only use e-rated chains designed for higher load capacity.

A clean and properly lubricated chain ensures quieter operation, smoother shifting, and significantly longer drivetrain life.

Battery and Charging

The battery is a high-energy component and must be handled with care to ensure long service life and safe operation. Always use the original charger supplied with the bicycle. Third-party chargers can cause overheating, reduced battery lifespan, or electrical failure. Connect the charger to the power outlet first, then to the battery. Disconnect in reverse order.

Charge the battery in a dry, well-ventilated environment between 10°C and 25°C. Avoid charging in direct sunlight, inside vehicles, or near flammable materials. Do not charge the battery immediately after a ride if it feels warm; allow it to cool to room temperature before connecting the charger. Charging a hot battery accelerates cell degradation.

The battery should be stored at 40–70% charge if not used for more than two weeks. Storing the battery fully charged or completely empty for extended periods reduces capacity. Every three months, check charge level and adjust as needed. Never store the battery in freezing temperatures; cold conditions can permanently damage cells.

Avoid exposing the battery to impacts, crushing loads, or immersion in water. If the battery casing shows swelling, cracks, dents, or leakage, discontinue use immediately. Do not attempt to open or service the battery yourself. Lithium-ion cells contain high energy and improper handling can lead to fire or injury.

During riding, avoid deep discharges whenever possible. Recharging before reaching very low levels extends battery lifespan. If the battery shuts down due to low voltage, recharge it promptly. Do not continue pressing the power button repeatedly, as this stresses the cells further.

For cleaning, remove the battery if the model allows and wipe it with a damp cloth. Never use high-pressure water around the charging port, power button, or electrical connectors. If water enters the battery housing, stop using the e-bike until inspected by a qualified technician.

If the bike experiences a crash, even if minor, the battery mount, contacts, and rail system must be checked for cracks, misalignment, or looseness. A battery that rattles or moves during riding is unsafe and must be secured immediately.

Proper battery care ensures consistent range, safe operation, and maximizes the total number of charge cycles.

E-Bike System Operation and Assist Modes

The electric assist system provides support only while you are pedaling and up to the legal limit of 25 km/h. Assist levels adjust how much additional power the motor supplies. Higher assist levels increase acceleration and climbing performance but reduce battery range. Lower levels provide smoother handling and improved efficiency, especially on loose or mixed surfaces.

Check that the system powers on normally and that no warnings or error symbols appear on the display. Battery level, assist mode, and system status are shown on the screen. If you encounter unfamiliar alerts, refer directly to the Shimano E-Bike System User Guide for full descriptions of all icons, error codes, and recommended actions.

Assist modes can be changed at any time while riding. The system adjusts power gradually to avoid sudden surges. When walking the bicycle, use walk-assist mode if equipped, but avoid using it on steep or slippery terrain. All operational characteristics, including assist behavior, speed limits, and walking mode rules, follow Shimano’s system specifications; consult Shimano documentation for detailed explanations.

The system includes thermal protection. During long climbs at high assist, the motor may automatically reduce power to prevent overheating. Allow it to cool before continuing at high load. Persistent thermal reduction may indicate incorrect gear usage, excessive load, or insufficient drivetrain maintenance. Shimano’s official manuals provide detailed guidelines on optimal cadence and gear selection for motor longevity.

If the system shuts down unexpectedly, check battery connection points and wiring harnesses for looseness or contamination. Secure, clean electrical contacts are essential for consistent power delivery. For full diagnostic steps, connector diagrams, and wiring checks, follow Shimano’s official troubleshooting procedures.

Do not direct high-pressure water at the motor, display, or wiring ports. After wet rides, dry all electrical contact areas and ensure no moisture remains around the charging port. Although

the system is water-resistant, Shimano's documentation outlines specific cleaning practices that must be followed to avoid damage.

The motor amplifies rider torque, increasing wear on drivetrain components and brakes. Smooth shifting, appropriate assist level selection, and regular maintenance significantly reduce mechanical stress. Shimano service guidance contains the complete list of maintenance intervals, component compatibility, and detailed torque specifications for all e-system hardware.

For all advanced instructions, diagnostic information, and system-specific procedures, refer to the official **Shimano E-Bike System User Manual**, which contains the full operational, safety, and technical requirements beyond the scope of this general manual.

General Troubleshooting

If the bicycle behaves abnormally, makes new noises, or any system feels different from normal operation, stop riding and inspect the cause before continuing. Many issues begin with small symptoms that, if ignored, may lead to sudden component failure.

Unexpected noises such as clicking, grinding, creaking, or metallic scraping usually indicate loose bolts, worn bearings, misaligned components, or contamination. Begin by checking wheel security, brake alignment, drivetrain cleanliness, and cockpit torque. If the noise changes when pedaling versus coasting, the source is likely in the drivetrain. If the noise appears when turning the handlebar, the headset or cable routing may be the cause.

If the bicycle pulls to one side, inspect tire pressure, wheel trueness, and brake rub. Uneven pressure or a dragging brake caliper can cause steering imbalance. Sudden steering resistance often indicates headset over-tightening or contamination inside the bearings.

Shifting issues such as delayed gear changes, chain skipping under load, or dropped chains usually result from cable stretch, derailleur misalignment, worn chain, or contamination. Re-lubricate the chain, check the derailleur hanger alignment, and verify cassette and chainring wear. Persistent shifting issues require professional adjustment.

Brake problems such as soft levers, rubbing pads, or reduced stopping power require immediate attention. Soft levers indicate air in hydraulic lines or worn pads. Rubbing noises indicate rotor misalignment or contamination. Brake failure symptoms should never be ignored.

For e-bike models, error messages, sudden power loss, irregular assist, and display abnormalities require following Shimano's official troubleshooting procedures. Most system alerts relate to sensor alignment, battery connection issues, temperature protection, or wiring problems. If the system displays any error code, refer directly to Shimano documentation for code definitions and corrective steps.

If the bicycle was dropped or crashed, even lightly, inspect the frame, fork, wheels, and cockpit for cracks, deformation, or misalignment. Carbon components may hide internal damage not visible externally. If any doubt remains, have the bicycle inspected by a qualified technician before riding again.

If a mechanical or electrical issue cannot be identified or corrected with basic inspection, discontinue use and consult an IKUISTA service partner.

Shimano and Sram Error Conditions

Shimano and SRAM systems indicate faults differently, but the underlying causes are similar: battery issues, sensor misalignment, communication errors, or drivetrain obstruction. Any abnormal behavior, unexpected noise, or loss of shifting or assist must be addressed immediately.

Shimano systems use on-screen error symbols that correspond to specific electrical, sensor, or temperature conditions. Most faults relate to battery communication, speed sensor alignment, wiring interruptions, or thermal protection. Temperature alerts mean the motor or battery is too hot to operate safely and assistance may reduce or stop until cooled. Speed sensor warnings indicate misalignment between the wheel magnet and the sensor. Communication errors typically result from loose or contaminated contacts. All detailed code definitions and corrective procedures must be referenced from the official Shimano E-Bike System User Guide.

SRAM AXS systems do not use numeric codes; instead, faults appear as LED patterns, shifting refusal, pairing failures, or abnormal derailleur behavior. A red LED on the derailleur almost always indicates a depleted or poorly seated battery. Wireless communication issues cause delayed or inconsistent shifting and require re-pairing according to SRAM AXS manual instructions. Steady or repeating red LEDs may indicate derailleur blockage, chain jam, or incorrect limit screw settings. A bent derailleur hanger is a frequent cause of persistent AXS shifting faults and must be corrected before use. Complete LED pattern explanations and micro-adjustment steps are found in the SRAM AXS User Guide.

For both systems, if shifting stops entirely, the first checks are battery charge, battery seating, clean terminals, and secure electrical or wireless connections. If noise or resistance is present when attempting to shift, stop immediately and inspect for debris, chain jams, or cage obstruction. Do not force shifts.

Moisture intrusion after washing can cause temporary failures in both Shimano and SRAM systems. All contacts and battery interfaces must be dried fully before operation. Firmware updates through Shimano or SRAM official software may resolve communication inconsistencies or shifting irregularities.

Any error or abnormal behavior that persists after basic checks should be considered unsafe. Continued riding may cause further mechanical or electrical damage. Diagnosis beyond basic inspection must follow the official Shimano or SRAM documentation or be handled by a qualified technician.

Crash Inspection

Any crash, drop, or sudden impact—regardless of severity—requires a full inspection before the bicycle is ridden again. Many components, especially carbon frames, forks, bars, and seatposts, can sustain internal or hidden damage that may not be visible on the surface. Riding with compromised structural parts is unsafe and can lead to sudden failure.

Begin by checking the frame and fork for cracks, dents, bulges, or sharp edges. Run your fingers along the tubes; changes in surface texture, soft spots, or clicking sounds when pressing indicate possible internal damage. Inspect all junctions: head tube, bottom bracket, chainstays, and seatstays.

Check the handlebar and stem for rotation, slipping, or creaking. Even minor impacts can damage carbon bars or loosen the clamp interface. If the bar has been struck or twisted, replacement is recommended unless a qualified technician confirms integrity.

Inspect the wheels for trueness, spoke tension, and rim distortion. Spin each wheel and look for side-to-side movement or high spots. Impacts can bend rims, crack carbon rims, or damage hub bearings. A wheel that wobbles, vibrates, or makes new noises should be serviced immediately.

Verify that the derailleur hanger is straight. A bent hanger is common after crashes and causes poor shifting, chain skipping, or derailleur misalignment. Shifting issues after a crash nearly always indicate hanger damage.

For e-bike models, inspect the battery mount, connectors, and wiring for cracks or displacement. Any battery movement during riding is unsafe. Check the motor area for unusual noise, vibration, or resistance. If the system shows errors after an impact, follow Shimano troubleshooting steps and have the bike inspected professionally.

If the crash involved significant force, do not ride until the bicycle has been inspected by a qualified technician. Hidden damage is a serious safety risk. Replace any component that shows signs of structural compromise, even if the bicycle appears rideable.

Washing and Cleaning Guidelines

Regular cleaning preserves the bicycle's performance and prevents premature wear. Avoid high-pressure water at all times; it can force moisture and grit into bearings, seals, and electrical components. Use a bucket of warm water, mild bicycle-specific detergent, and a soft brush or sponge. Rinse gently with low-pressure water.

Begin by cleaning the drivetrain separately with a degreaser formulated for bicycle chains and cassettes. Do not spray degreaser onto brake rotors, pads, or calipers. After applying degreaser, rinse the drivetrain lightly and re-lubricate the chain once dry.

Clean the frame, fork, wheels, and cockpit using gentle circular motions. Pay attention to the underside of the downtube, bottom bracket area, and chainstays, where mud and dust accumulate most. Avoid soaking the headset area, hub seals, or bottom bracket housing.

For e-bike models, avoid directing water at the motor, battery interface, display, charging port, or wiring connectors. Wipe electrical contact points with a damp cloth only. After washing, dry all connections fully and inspect for moisture before powering the bike on. Follow Shimano's cleaning recommendations for e-bike components to prevent damage or safety issues.

Brake rotors must remain free from oil, degreaser, and chain lube. If contamination occurs, clean rotors with isopropyl alcohol and replace brake pads if they continue to make noise or feel inconsistent. Never attempt to sand rotors or pads unless instructed by a qualified technician.

Allow the bicycle to dry completely before storage. Water trapped under bar tape, inside the frame, or around the seatpost can cause corrosion or mold. Removing the seatpost periodically helps ventilate the seat tube and prevent moisture buildup.

A properly cleaned bicycle runs quieter, lasts longer, and is easier to maintain. Poor cleaning habits, especially the use of high-pressure washers, are among the most common causes of premature bearing and drivetrain damage.

Storage and Transportation Guidelines

Store the bicycle in a dry, stable environment away from direct sunlight, extreme temperatures, and moisture. Prolonged exposure to heat can damage tires, battery cells, and lubricants, while cold conditions reduce battery performance and may cause condensation inside components. For long-term storage, keep the bicycle clean, lubricated, and protected from dust.

If the bicycle will not be ridden for several weeks, shift the chain to a middle cassette sprocket to reduce spring tension in the derailleur. Loosen the seatpost clamp slightly and remove or lower the seatpost to promote airflow inside the frame. For e-bike models, store the battery separately in a dry indoor space between 40–70% charge and at moderate temperature. Recharge the battery every three months to maintain cell health.

When transporting the bicycle on a car rack, ensure the rack is compatible with the bicycle's frame material and weight. Frame-clamping racks can damage carbon frames; wheel-hold or thru-axle–mount racks are preferred. Secure all straps and mounting points firmly. Remove accessories, bottles, bags, and lights before transport to prevent loss or damage.

For e-bike transport, remove the battery whenever possible to reduce weight and eliminate vibration stress on the battery mounts. Cover the motor area and electrical contacts to protect against dust and rain during travel. Do not transport the bike upside down or on its side, as this can disrupt the position of hydraulic brake fluid and may cause temporary brake issues.

Inside vehicles, ensure the bicycle is restrained securely to prevent movement. Avoid placing heavy objects on top of the bicycle or components. Protect delicate parts such as derailleurs, rotors, and cockpit components with padding or wheel bags.

After transport, inspect the bicycle for any signs of movement, impact, or rubbing. Check wheel attachment, brake alignment, and shifting before riding. Transportation vibration can loosen bolts and cause minor misalignments that affect performance.

Tyre Selection and Pressure Guidelines

Tyre choice affects grip, comfort, rolling efficiency, and overall safety. Road bikes use smoother, narrower tyres designed for lower rolling resistance, while gravel models use wider patterns for stability on mixed surfaces. MTB tyres prioritize traction and impact absorption, with deeper tread and reinforced casings. Always select tyres appropriate for your bicycle's intended ASTM category and ensure clearance within the frame and fork.

Pressure must match rider weight, tyre volume, terrain, and riding style. Higher pressure improves efficiency on smooth surfaces but reduces comfort and traction. Lower pressure increases grip and stability on loose or rough ground but raises the risk of rim strikes and sidewall damage. Never exceed the maximum pressure printed on the tyre sidewall.

For tubeless systems, pressures are generally lower than with inner tubes. Lower pressure improves grip and comfort while maintaining puncture protection through sealant. However, excessively low pressure may cause the tyre to burp air or lose bead stability under cornering load. After seating a tubeless tyre, confirm an even bead line around the rim.

Tyre wear must be checked regularly. Worn tread, exposed casing, deep cuts, embedded debris, or sidewall bulges indicate replacement is necessary. Worn tyres greatly reduce braking efficiency and cornering stability, especially on wet or loose surfaces. For gravel riding, inspect tyres after every ride for sharp stones that may not puncture immediately but weaken the casing over time.

Temperature changes also affect pressure. Tyres gain pressure in heat and lose pressure in cold conditions. Always measure and adjust pressure before riding, not immediately after riding, as heat from use temporarily increases internal pressure.

For e-bike models, tyres must be e-rated to handle higher system weight and torque loads. E-rated tyres feature stronger casings, reinforced bead areas, and compounds designed for additional stress.

Correct tyre choice and pressure improve control, reduce fatigue, and significantly enhance safety on all terrains.

Consumable Wear Limits

Several components on the bicycle are classified as consumable parts and must be replaced regularly to maintain performance and safety. These parts wear out through normal riding and are not covered under warranty unless a manufacturing defect is identified

Chain wear must be checked frequently. When the chain exceeds the recommended elongation limit, it must be replaced immediately to prevent accelerated wear of the cassette and chainring. Riding with a worn chain leads to skipping under load and poor shifting performance.

Brake pads wear over time and must be replaced before reaching minimum thickness. Hydraulic pads that appear thin, contaminated, glazed, or uneven should be changed. Brake rotors must be replaced when they reach the minimum thickness stamped on the rotor surface or if they become heavily grooved or warped.

Tyres wear through mileage, cornering, and impact. Replace tyres that show exposed casing, deep cuts, bulges, or tread worn flat. Tubeless tyres require monitoring for sidewall fatigue and sealant buildup. Tubes should be replaced if they show patches, cracks, or repeated punctures.

Grips and bar tape degrade with use, sweat, and UV exposure. Replace when worn smooth, torn, or loose, as these conditions reduce control. Saddles with damaged rails, collapsed padding, or cracks must also be replaced.

Cables and housing (for mechanical shifting or braking) wear through friction and contamination. Replace if shifting becomes stiff, braking feels inconsistent, or visible corrosion appears. Electronic shifting batteries must be replaced according to manufacturer recommendations.

Bottom bracket, hub, and headset bearings wear and may develop roughness, noise, or play. Any bearing with detectable resistance or movement must be replaced to maintain predictable handling and drivetrain efficiency.

Pedals and cleats wear from repeated engagement and ground contact. Cleats must be replaced when edges become rounded or when release feels inconsistent. Pedals with excessive side play or grinding require bearing service or replacement.

For e-bike models, increased torque accelerates wear on chains, cassettes, brake pads, and tyres. Wear inspections should follow shorter intervals, and only e-rated components should be used as replacements.

Replacing consumable parts at the correct time ensures safe and efficient operation of the bicycle and prevents more costly damage to non-consumable components.

User-Prohibited Tasks

Certain tasks must not be performed by the user under any circumstances. These procedures require specialized tools, certification, or safety controls. Attempting them may cause serious injury, compromise structural safety, void warranty, and invalidate regulatory compliance.

Users must not open, modify, or disassemble the motor, battery, display unit, wiring harness, or any part of the electrical system. Lithium-ion battery packs contain high energy and internal protection electronics that cannot be safely serviced outside an authorized workshop. Opening or puncturing the battery housing creates a risk of short-circuit, fire, or chemical exposure.

Frame repairs, including carbon fiber patching, tube bonding, welding, or structural adhesive work, are strictly prohibited. Any structural damage must be assessed and repaired only by qualified professionals. Attempting repairs on frames, forks, or cockpits can lead to catastrophic failure during riding.

Suspension service, including damper disassembly, air spring overhaul, and oil changes, must not be performed by users without proper training and equipment. Errors can lead to sudden loss of control or component failure.

Internally routed cable replacement inside carbon frames should not be attempted without proper tools, as incorrect routing may damage internal surfaces, block drainage paths, or cut into wiring for e-bike systems.

Users must not perform hydraulic brake bleeding unless properly trained. Incorrect bleeding introduces air or contaminants into the system, causing brake failure. Lever reservoir opening, caliper servicing, and line trimming must be handled by professionals.

Wheel building, spoke replacement, and tension balancing require expertise to avoid wheel collapse or rim failure. Only trained mechanics should adjust spoke tension or rebuild wheels, especially carbon rims.

Motor firmware modifications, speed unlocking devices, or unauthorized software tools must never be used. These actions violate legal regulations, void CE conformity, and may render the bicycle unsafe.

Press-fit bottom bracket installation or removal must not be attempted without correct tools, as misalignment or frame damage can occur. Similarly, headset bearing removal from carbon frames must only be done with the correct extraction tools.

Any task requiring force, heat, chemicals, or electrical testing equipment is prohibited for the user. If the correct procedure is unclear, the task must be referred to a qualified technician.

The following actions are strictly prohibited due to high risk of component failure, loss of control, or fire hazard.

You must never:

- Ride with loose handlebars, stem, seatpost, or wheels
- Ride with damaged, cracked, dented, or out-of-true wheels
- Use brake cleaner or oils on rotors or brake pads
- Install pedals by force or with incorrect thread direction
- Ride with under-inflated tubeless tyres (risk of bead unseating)
- Install suspension forks not approved for your frame
- Use tyres not rated for hookless rims
- Modify EPAC firmware, motor output, or battery software
- Charge the battery in temperatures below 0°C or above 40°C
- Leave the battery connected to non-approved chargers
- Mount racks or seats on non-rated points (risk of frame damage)
- Attempt carbon repairs, drilling, sanding, or repainting
- Use pressure washers near bearings, seals, or suspension
- Use non-certified replacement parts for critical components

If any prohibited action has occurred, the bicycle must be inspected professionally before further riding.

Warranty

The warranty covers defects in materials and workmanship under normal use within the intended ASTM category of the bicycle. The warranty applies only to the original owner and is non-transferable unless stated otherwise. Proof of purchase is required for all claims.

The frame and rigid fork are covered against structural defects for the duration specified by the manufacturer. Damage caused by crashes, misuse, over-torqueing, improper assembly, unauthorized modifications, or riding outside the intended category is not covered. Surface wear, paint chips, and cosmetic marks caused by normal use or transportation are excluded.

Components supplied with the bicycle are covered by their respective manufacturers. These include drivetrain parts, brakes, wheels, cockpit components, suspension units, and tires. Wear items such as chains, cassettes, brake pads, bearings, grips, tires, and bar tape are not covered under warranty unless a manufacturing defect is evident.

For e-bike models, the battery and motor system are covered against manufacturing defects. Reduced battery capacity over time, caused by normal charging cycles and age, is not considered a defect. Improper charging, use of non-approved chargers, exposure to extreme temperatures, water immersion, or opening the battery housing voids coverage. Firmware tampering or third-party motor modifications also void the warranty.

Any structural component that has been subjected to a crash or impact is not covered under warranty. Hidden damage in carbon frames, forks, or handlebars from impacts is considered crash-related even if not visible on the surface. These components must be replaced or professionally inspected before further use.

Warranty claims must be processed through an authorized service partner. The bicycle or affected component must be returned for inspection before a decision is made. If the claim is approved, the manufacturer will repair or replace the defective part at their discretion. Labor, shipping costs, or associated service fees are not always included and may vary by region.

Improper maintenance, failure to follow torque specifications, incorrect installation of aftermarket components, or ignoring required service intervals voids warranty coverage. The bicycle must always be used within its intended design parameters, and any incompatible component or accessory may invalidate the warranty.

Warranty Coverage

The warranty covers defects in materials and workmanship under normal use and within the bicycle's intended ASTM category. Coverage applies from the date of purchase to the original owner and requires valid proof of purchase. Frames and rigid forks are covered for structural integrity against manufacturing defects during the defined warranty period. Component coverage follows the policies of each component manufacturer.

The warranty ensures that the product performs as intended when used correctly, maintained properly, and kept within recommended load limits. If a manufacturing defect is confirmed, the manufacturer may repair or replace the part at its discretion.

Warranty Exclusions

The warranty does not cover damage caused by crashes, improper use, overloading, misuse, incorrect maintenance, corrosion, neglect, or riding outside the intended application category. Wear items such as chains, cassettes, brake pads, tires, bearings, cables, grips, and bar tape are not covered unless a clear manufacturing defect is documented.

Modifications or alterations to the frame, fork, motor, firmware, electrical system, or structural components void the warranty. Damage caused by non-approved accessories, incompatible parts, or incorrect installation procedures is excluded. Cosmetic issues such as scratches, paint wear, and normal aging are not covered.

For e-bike models, the warranty does not cover reduced battery capacity due to normal aging, damage caused by incorrect chargers, over-discharge, water immersion, physical impacts, or opening the battery housing. Motor or battery faults caused by firmware manipulation or speed unlocking devices are excluded entirely.

Warranty Validation Requirements

To maintain warranty status, the bicycle must be assembled, adjusted, and maintained according to this manual. Torque specifications must be followed, consumable parts replaced at appropriate intervals, and safety checks performed regularly. Service records should be kept, especially for e-bike electronics and drivetrain components.

Only compatible, approved replacement parts may be installed. Frames, forks, and cockpits must not be repaired or modified by third parties outside approved service partners. Any structural impact or abnormal noise must be addressed before continued use.

Warranty Claim Procedure

If a suspected defect arises, discontinue use immediately. The bicycle or component must be inspected by an authorized service partner who will determine whether the issue results from manufacturing defect or external cause. Proof of purchase, serial number, and detailed description of the issue are required.

If the claim is approved, the manufacturer will repair or replace the defective part. In some cases, replacement parts may differ slightly in appearance or specification due to model updates. Labor, transport, and related service fees may not be covered and vary by region.

Claims cannot be processed without physical inspection of the affected part. Photos or descriptions alone are insufficient for warranty approval.

Crash Replacement Policy (optional)

For frames or forks damaged in a crash, a discounted replacement may be offered at the manufacturer's discretion. Crash replacement applies only when structural integrity is compromised due to accidental impacts. It does not apply to cosmetic damage or wear. Proof of purchase and damaged components must be presented for evaluation.

Model-Specific Notes

Road and gravel frames are designed for lower impact forces and must not be used in off-road categories beyond their ASTM rating. MTB frames withstand higher impact loads but still require adherence to weight limits and correct maintenance.

E-bike models require additional inspections of the battery mount, motor housing, and wiring harness. Damage in these areas must be reviewed according to Shimano e-bike system guidelines.

Owner Obligations

The owner must maintain the bicycle in safe working condition, follow all maintenance intervals, use approved parts, and avoid prohibited tasks. The owner must operate the bicycle within legal regulations and intended use. Failure to meet these obligations voids warranty coverage.

Warranty Periods

Warranty periods vary by component type and usage category. The frame and rigid fork carry the longest coverage and are protected against manufacturing defects for the duration defined by the manufacturer. This period applies only when the bicycle is used within its intended ASTM category and maintained according to this manual.

Carbon and alloy frames have different warranty durations depending on the model and intended use. Higher-impact categories may have shorter coverage periods due to increased mechanical stress. Paint and decals are typically covered only against clear manufacturing defects that appear at delivery.

Components supplied by third-party manufacturers follow their respective warranty schedules. Drivetrain parts, brakes, wheels, suspension components, and electronic systems each carry their own terms. These component warranties must be processed according to the original manufacturer's requirements.

Wear items are excluded from multi-year coverage and are considered consumables. Chains, cassettes, brake pads, tyres, bearings, and bar tape must be inspected and replaced regularly. Their lifespan depends on riding conditions, rider weight, maintenance frequency, and weather exposure.

For e-bike systems, the motor and control electronics are covered for defects within the stated period, provided the system has not been opened, modified, or used outside legal operational limits. Battery warranty covers defects in materials and assembly but does not cover natural capacity loss over time. Battery capacity gradually decreases with charging cycles, temperature exposure, and storage habits. Capacity reduction is normal aging and not a defect.

Firmware updates, when installed according to manufacturer instructions, do not affect warranty validity. Unauthorized firmware changes or speed-unlock modifications void coverage immediately.

Warranty periods begin on the date of original retail purchase. Replacement components supplied under warranty do not reset the original warranty term unless specifically stated.

What Is and Isn't Considered a Defect

A manufacturing defect is a flaw in materials or workmanship that prevents a component from performing as intended under normal, correct use. Defects are present from the beginning and become visible despite proper maintenance and appropriate riding conditions. Examples include cracks forming without impact, premature bearing failure caused by improper assembly, electronic components that malfunction despite correct installation, or frames that deform under normal loads.

A condition is not considered a defect when it results from wear, crash impact, misuse, improper maintenance, overloading, incorrect torque application, or riding outside the bicycle's intended ASTM category. Damage from accidents, drops, transportation, or improper storage is excluded. Wear items such as chains, cassettes, chainrings, brake pads, rotors, tyres, bearings, and cables naturally degrade over time and are not covered unless a clear manufacturing fault is identified.

Surface marks, scratches, chipped paint, cable rub, discolouration, and normal cosmetic aging are not defects. Carbon components that fail after an impact are not considered defective, even if the damage is not immediately visible. Electrical issues caused by water ingress, non-approved chargers, short circuits from incorrect handling, or firmware modifications do not qualify as defects.

Tyre cuts from road debris, wheel damage from potholes or rocky terrain, rotor warping from overheating during hard braking, and drivetrain wear resulting from dirt or inadequate lubrication are all normal consequences of use and not manufacturing defects. Battery capacity loss over time is also not a defect, as it is a normal characteristic of lithium-ion cells.

A component is only considered defective when it fails under proper use, within specified limits, and without external influence. Any failure caused by incorrect assembly, non-approved parts, over-torquing, under-torquing, or neglected maintenance falls outside defect classification.