Owner's Manual 2025

RFN WARRIOR YOUTH SX-E5

Dear RFN Customer

Thank you for your trust in the RFN brand. We will accompany you on your journey to explore endless possibilities, find unknown answers, and enjoy an exciting off-road life.

This manual explains the correct and safe use of the vehicle and basic inspection procedures. Please read the operating instructions carefully.

If you have any questions about the operation or maintenance of your vehicle, please contact an authorized dealer.

Even if you sell the vehicle, please always leave this manual to the next owner for maintenance and service records.

Although this manual contains most of the vehicle information, the manufacturer will continuously improve product design and quality, which may lead to differences between the manual and the vehicle. Product specifications are subject to change without notice. If you have any questions, please consult your dealer.

Manufacturing Information

Manufacturer: Zhejiang Apollo Sports Technology Co., Ltd.

Address: 12-14 Jinheng 2nd Road, Jinyanshan Industrial Zone, Quanxi Town, Wuyi County, Jinhua City, Zhejiang Province, China

Vehicle Serial Number: .....

Motor Code: .....

Controller Code: .....

Battery Code: .....

Note: The vehicle serial number (SN code) will be used when ordering spare parts from authorized dealers or in case of vehicle theft.

Table of Contents

1 Safety Information

1.1 Safety Instructions

Many safety instructions must be followed to operate this product safely. Please carefully read these instructions and the following details.

Safety instructions are highlighted in the text and referenced in the relevant paragraphs.

For your own safety, please read this user manual completely before operating the vehicle to ensure you have a comprehensive understanding of how to operate and control the vehicle.

1.2 Risk Levels

⚠ DANGER

Indicates special preventive measures that must be followed. This is an important warning instruction in this manual. Disregarding warnings may result in serious injury or death, and may also cause damage to the vehicle.

⚠ WARNING

Indicates special operational measures that must be followed. This is an instruction that needs to be followed. Disregarding caution tips may put personnel and vehicles at uncontrollable safety risks.

1.3 Safe Operation

Safety largely depends on riding technique. Only riders with a formal license who have received proper training can safely operate this vehicle. Otherwise, do not drive this vehicle to avoid injury.

⚠ WARNING

Driver requirements: Well-trained in driving and necessary technical guidance for off-road riding, wearing off-road protective equipment, prohibition of driving under the influence of alcohol/drugs.

Do not lend the vehicle to personnel who are not suitable for driving.

Maintain the vehicle according to the maintenance instructions in this owner's manual to ensure safety and extend the vehicle's service life. Have the vehicle repaired only by authorized dealers.

1.4 Safe Riding

⚠ WARNING

This vehicle is for use only on professionally constructed off-road grounds. Do not ride in areas such as public roads, streets, or unknown outdoor environments.

Check the vehicle condition and surrounding environment before starting to avoid accidents.

Correct posture is important for maintaining balance. Hold the handlebars with both hands, keep your upper body upright, and place your feet on the footrests. Do not ride when you feel unwell or have abnormal health conditions.

Off-Road Gear Required Before Riding:

Armor: Please wear riding armor with protective functions. Off-road armor is required when driving this type of vehicle to best prevent injuries.

Helmet: Your helmet is the most important part of your protective equipment. A tested helmet can prevent serious head injuries in case of accidents. A professional off-road helmet is required.

Goggles: Regular glasses and sunglasses cannot provide sufficient protection. Professional off-road goggles compatible with off-road helmets are required.

Off-Road Gloves: Professional off-road gloves with joint and knuckle protection are required to reduce hand injuries in case of accidents.

Boots: Professional sturdy high-top off-road boots are required to provide more protection to legs and feet and improve riding safety.

Clothing: Professional long-sleeved and long-pants off-road suits and armor are required to protect arms and legs for better protection.

Modifications

Modifying the vehicle or removing original parts without manufacturer approval may reduce safety and cause serious injury. Consequences are your responsibility.

Load Considerations

Adding accessories or increasing load will cause changes in weight distribution, affecting steering and balance, which can easily lead to accidents.

Standard Load: Max load < 55 kg (121 lb)

When loading within this limit, please remember the following:

- The center of gravity should be kept at a lower level as much as possible.
- Distribute weight as evenly as possible to maintain balance.
- The load must be securely connected.
- Do not hang heavy or bulky items on the handlebars or suspension, which may cause imbalance and slow steering response.

NOTE!

The manufacturer only provides original accessories for your vehicle. Please contact an authorized dealer for this purpose.

The manufacturer disclaims all responsibility for third-party accessories; this responsibility is entirely yours.

When installing accessories, please remember the following:

- Do not install any accessories or transport any load that obstructs or limits ground clearance, suspension travel, steering, lighting, indicators, or reflectors.
- Accessories on the handlebars or front wheel suspension will damage steering performance, ensure that installed accessories are as light as possible.
- Do not install any luggage racks that may affect the vehicle's stability when facing headwinds.
- Have electrical accessories installed only by authorized dealers to correctly match the electrical system; improper installation may lead to loss of lighting, reduced motor power, and damage to the vehicle's electrical components.

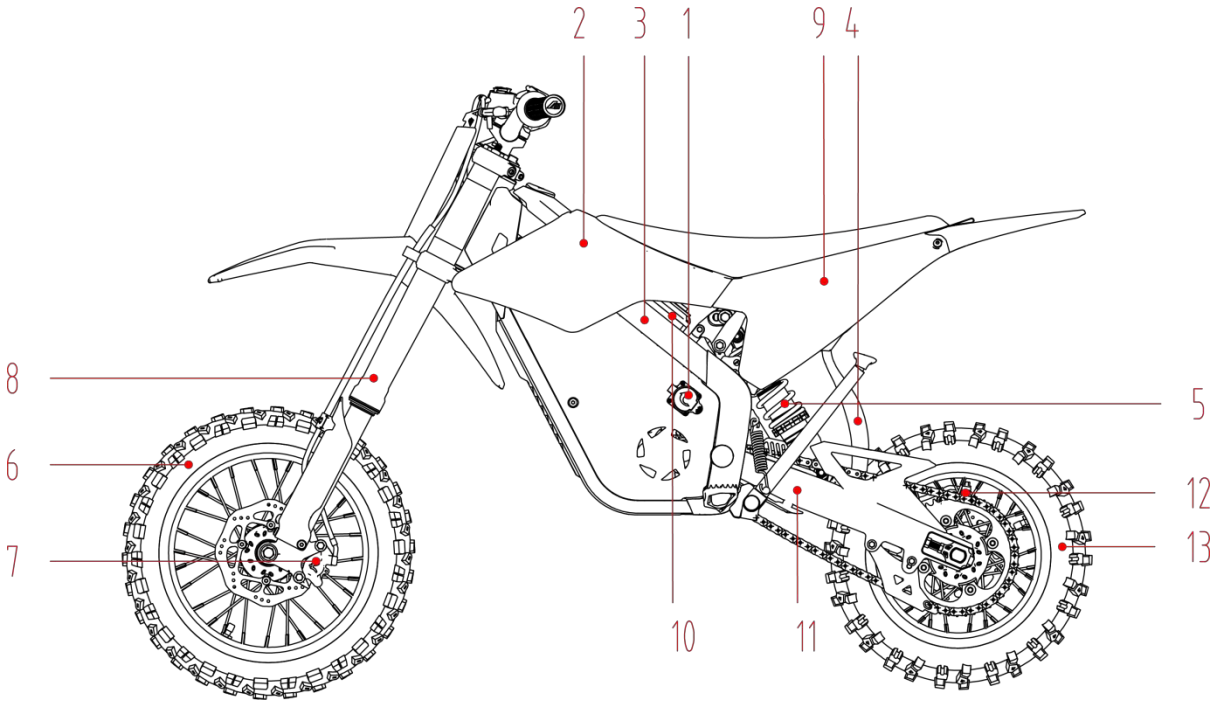
1.5 Other Safety Precautions

Drive slowly and brake carefully on wet roads or slippery surfaces.

Safety Stickers

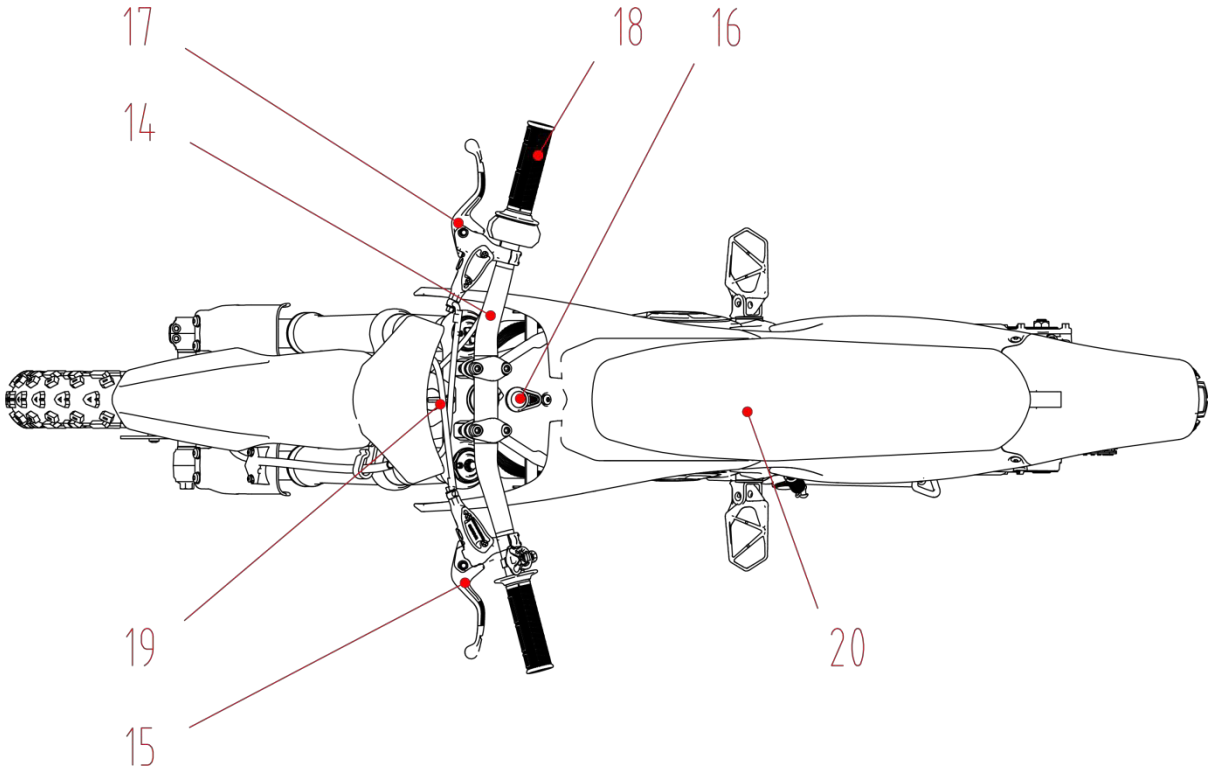
2 Vehicle Overview

2.1 Left View



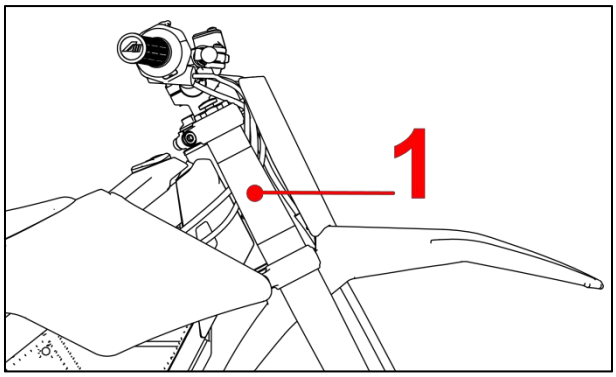
1 Charging port
2 Battery lock
3 Frame
4 Rear fender
5 Rear shock absorber
6 Front wheel
7 Front wheel brake
8 Front shock absorber
9 Motor controller
10 Lithium battery pack
11 Rear fork
12 Rear wheel brake
13 Rear wheel

2.2 Top View

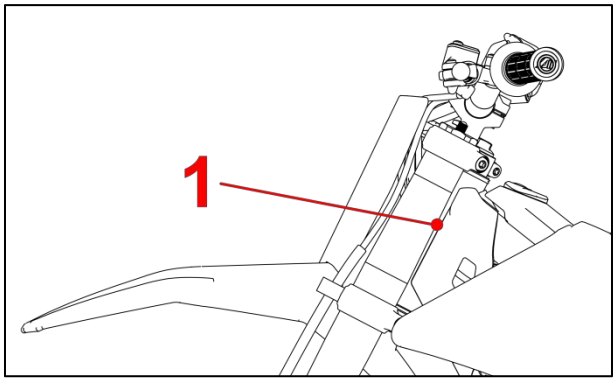


14 Steering handle
15 Rear wheel brake lever
16 Instrument panel
17 Front wheel brake lever
18 Accelerator handle
19 Main key switch
20 Seat

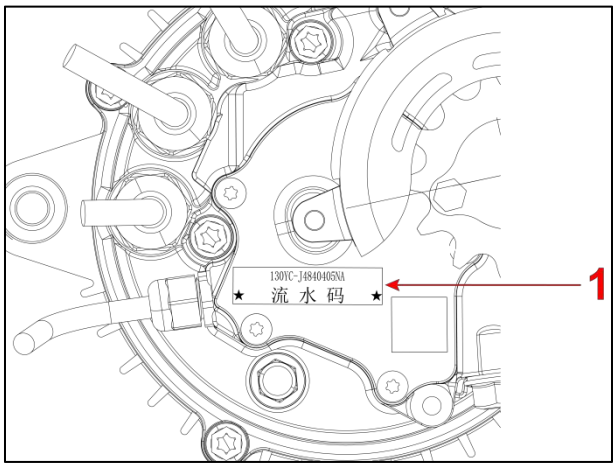
3 Serial Number Locations



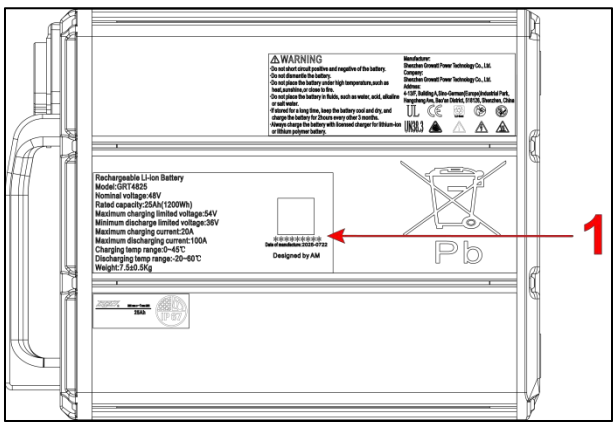
3.1 Frame Number



3.2 Vehicle Nameplate



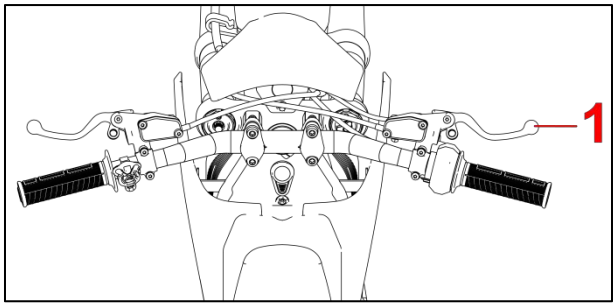
3.3 Motor Number



3.4 Battery Number

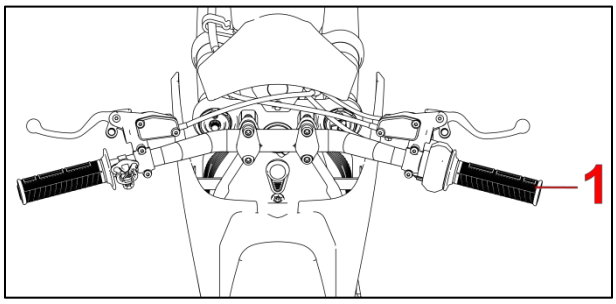
4 Control Components

4.1 Front Brake Lever



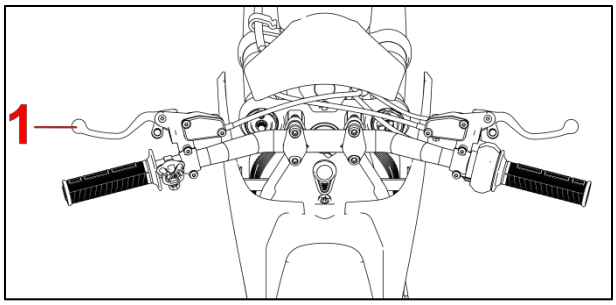
Front brake lever ① is located on the right-hand side of the handlebar.

4.2 Electronic Throttle



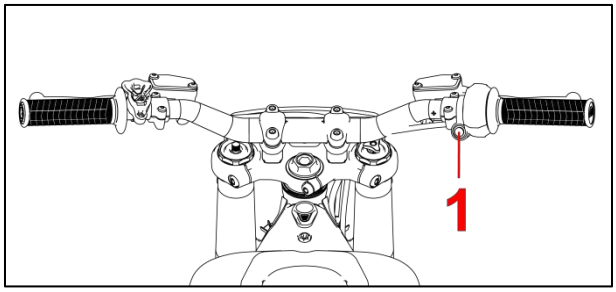
Electronic throttle grip ① is located on the right-hand side of the handlebar.

4.3 Rear Brake Lever



Rear brake lever ① is located on the left-hand side of the handlebar.

4.4 Power On/Off



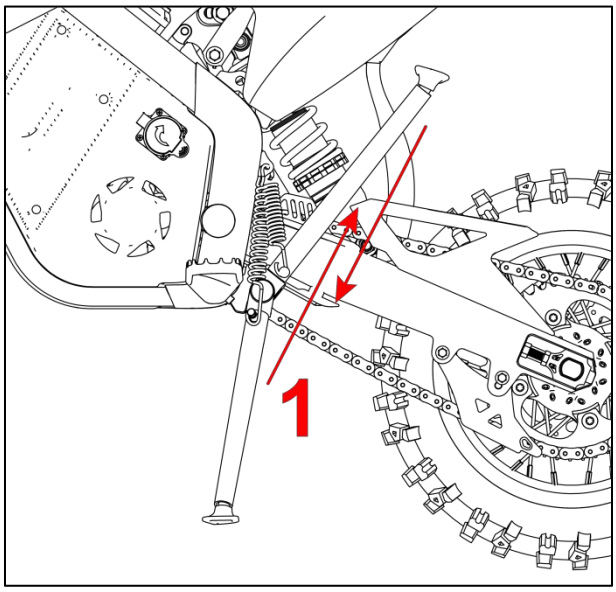
Power switch ① is located in front of the connector on the right side of the battery.

⚠ CAUTION

Switch off the main power immediately after finishing the ride to prevent unintended activation by others.

If the motorcycle remains parked with the display shut down and the main power switch is not turned off for an extended period, the system will automatically cut the power.

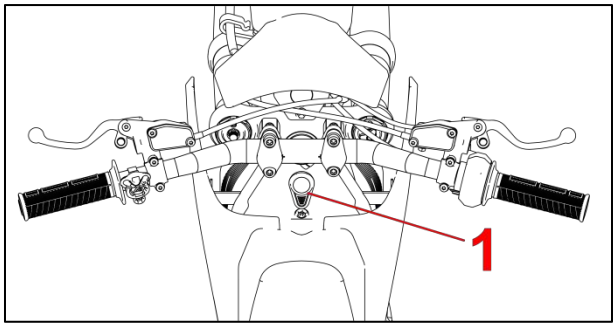
4.5 Side Stand



Side-stand bracket ① is mounted on the lower left side of the motorcycle.

5 Electrical Components

5.1 Instrument Cluster



Note: The instrument cluster is located at the front of the vehicle, in front of the seat.

⚠ CAUTION

Do not damage the instrument cluster as it may prevent the vehicle from starting.

Instrument Display Content Description:

Function	Status	Operating Logic / Actual Display
Vehicle Fault	Gear indicator shows Red	Fault present
Gear Indicator	Off	P-gear locked
Gear Indicator	Green	1st gear
Gear Indicator	Blue	2nd gear
Gear Indicator	Yellow	3rd gear
Battery Display	SOC > 80%: Five bars displayed SOC > 60%: Four bars displayed SOC > 40%: Three bars displayed SOC > 20%: Two bars displayed SOC > 10%: One bar displayed SOC < 10%: One bar flashing red	This indicator allows the rider to monitor the remaining battery capacity and recharge the vehicle in time to avoid unexpected power loss.

Note!

If the vehicle powers on but cannot be ridden normally, detailed fault information must be retrieved using the mobile APP.

5.1.1 Gear Mode Parameters Overview

Gear 1

Peak Bus Power: 2 kW

Motor Max RPM: 1080 rpm

Gear 2

Peak Bus Power: 2.75 kW

Motor Max RPM: 1880 rpm

Gear 3

Peak Bus Power: 5 kW

Motor Max RPM: 2880 rpm

Note!

The actual top speed is significantly affected by load.

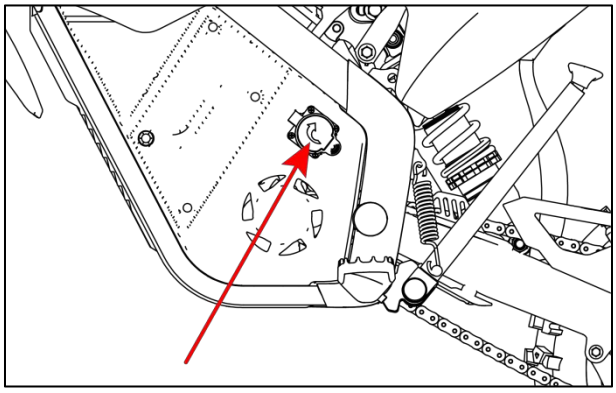
Under heavy load conditions, the top speed may fall below 60 km/h.

⚠ CAUTION

High or low component temperatures and battery charge level may affect the power output across all gears.

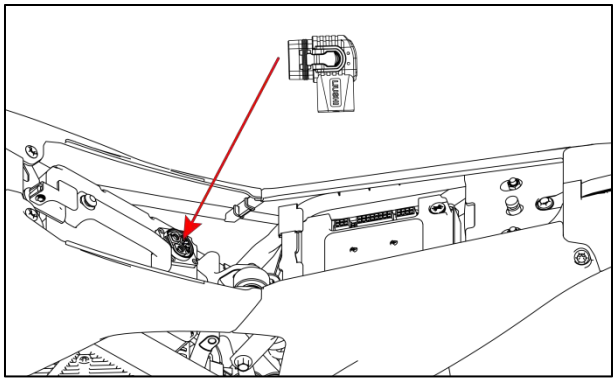
5.2 Power Components

5.2.1 Charging Port



The charging port is located on the left side of the vehicle, mounted on the motor guard plate.

5.2.2 Li-ion Battery Charger



The vehicle is equipped with a dedicated battery charger.

If the battery level drops below 20% , please recharge the battery as soon as possible.

Only the original factory-supplied charger must be used to charge the battery.

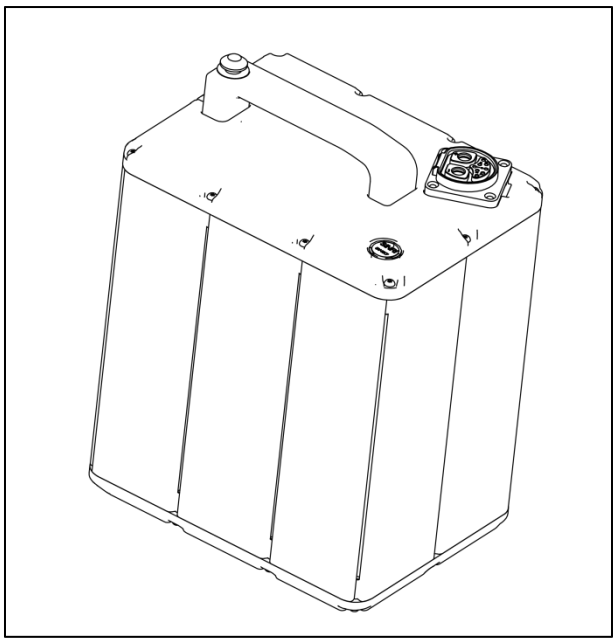
⚠ CAUTION

Charging may not be possible in low-temperature environments. The charger may also report an error and fail to charge if the battery temperature is too high after riding.

⚠ WARNING!

First turn off the battery, then plug in the charger connector, and finally plug in the mains plug.

5.3.3 Li-ion Battery Pack



The vehicle is equipped with a maintenance-free Li-ion battery. The standard battery is 48V 25Ah.

Battery charging operating temperature: 0℃~45℃ (32°F~113°F), battery discharge operating temperature: -15℃~55℃ (5°F~131°F).

Maximum discharge current 150A. High or low temperatures will affect charging/discharging power, and capacity decrease will affect discharge power.

Please follow the warnings on the battery.

Note!

Please fully charge the battery before long-term storage, charge once every 30 days when not in use, avoid completely draining the battery.

The battery may enter sleep mode if not used for more than 90 days due to low power.

After entering sleep mode, the battery can be activated using a charger. First connect the charger to the battery, then connect the charger to power.

⚠ CAUTION

Cover the dust cover when no plug is inserted in the battery port to prevent foreign objects from damaging the female connector or corroding contacts and causing dangerous situations.

⚠ WARNING!

Charge the battery immediately when power drops to 5%! Otherwise, irreversible damage may occur!

Battery long-term storage environment temperature: 5℃~35℃ (41°F~95°F).

Battery long-term storage environment relative humidity: 20%~80%.

Cover the dust cover when no plug is inserted in the battery port to prevent foreign objects from damaging the female connector or corroding contacts and causing dangerous situations.

Do not place the battery in acid, alkali, salt water, or other liquids.

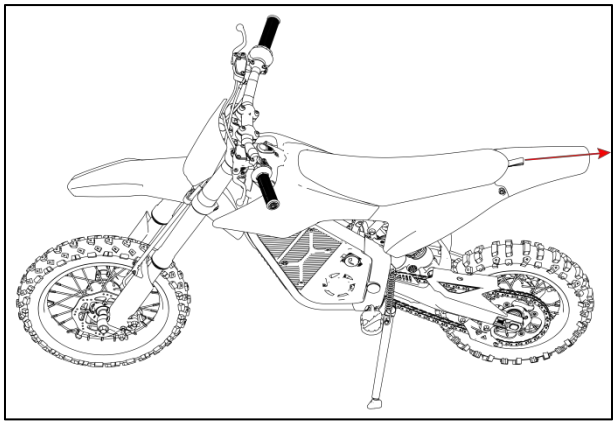
Do not disassemble or impact the battery.

Strictly prohibit using or placing the battery under high temperatures, such as fire, heaters, etc., otherwise it may cause overheating, fire, or functional failure, shortened life.

Strictly prohibit use in strong static electricity and strong magnetic field places, otherwise it may easily damage battery safety protection devices, bringing safety risks.

6 Operation

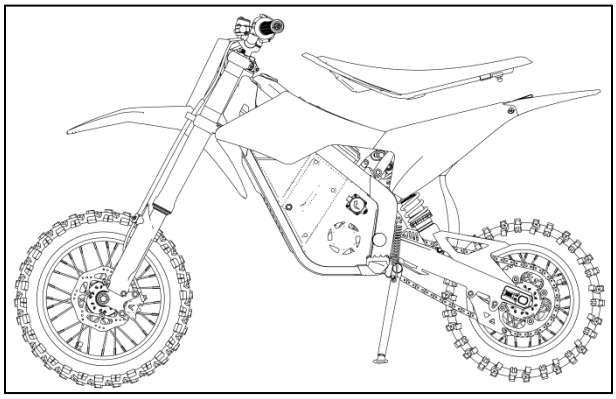
6.1 Seat Removal Procedure



1.Ensure the vehicle is powered off.

2.Pull the seat release strap horizontally toward the rear of the vehicle.

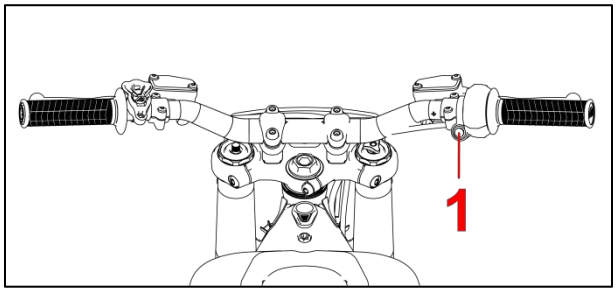
3.Lift the rear end of the seat upward by approximately 3–4 cm.



4.Slide the seat backward to fully remove it.

6.2 Vehicle Charging

1. Turn off the main power

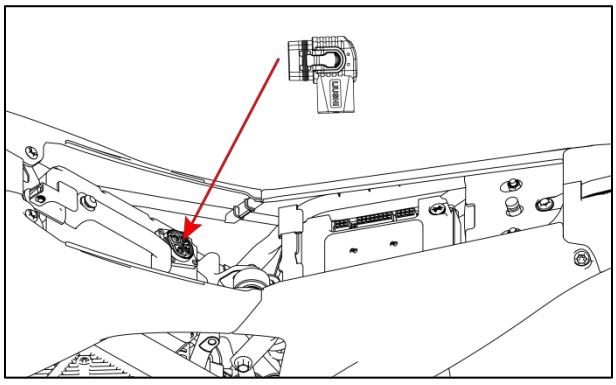


After stopping the ride, press the power button to completely shut down the battery system.

2. Remove the seat

Refer to section 6.1 for detailed seat removal instructions.

3. Connect the charger plug



Insert the charger plug into the vehicle's charging port.

The plug will automatically lock into place with a click.

Plug the charger into a wall outlet

Connect the charger's AC power plug into a standard household power outlet.

Note!

The charger indicator lights display both charge rate and battery level.

When the battery is fully charged, all indicator lights on the charger remain solid, and the charger's noise level decreases.

⚠ CAUTION

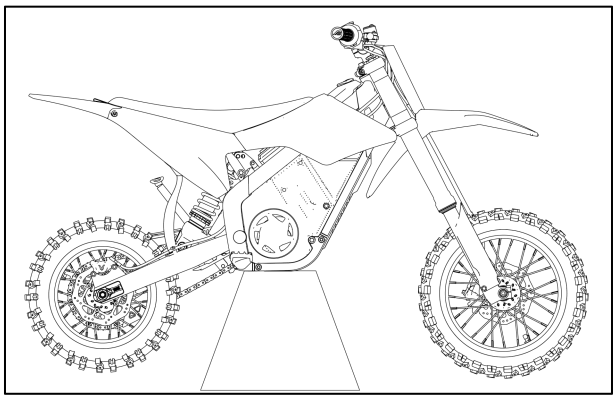
Damage caused by improper operation or over-discharge is not repairable.

Such batteries must be replaced at the owner's expense.

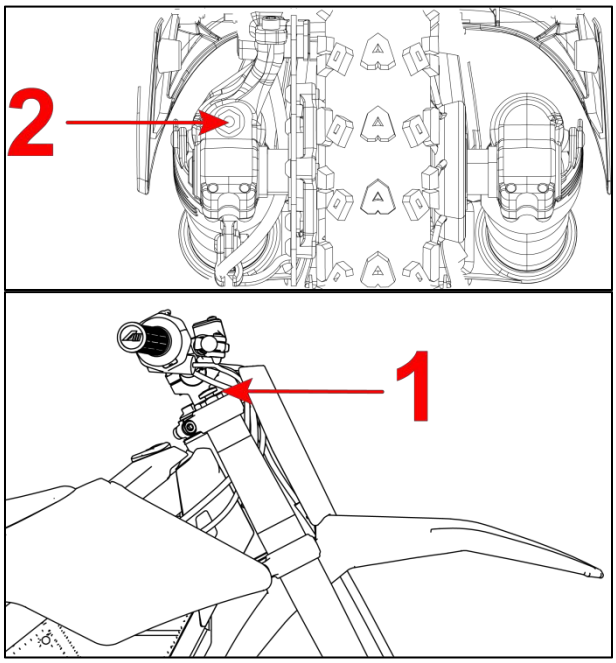
⚠ WARNING!

Do not press the power button to start the vehicle while the battery is charging.

6.3 Front Suspension Damping Adjustment



1. Ensure the motorcycle is powered off.
2. Park the vehicle securely using the parking stand.
3. Use the appropriate tool to adjust the upper and lower damping knobs on the fork.



Note!

The upper adjustment knob (①) on the front fork controls rebound damping.

Turning the knob clockwise (+) slows down the rebound.

Turning the knob counterclockwise (–) speeds up the rebound.

The lower adjustment knob (②) on the front fork controls compression damping.

Turning the knob clockwise (+) increases compression damping, making the suspension stiffer.

⚠ WARNING!

Do not disassemble the suspension components. Doing so may result in serious injury.

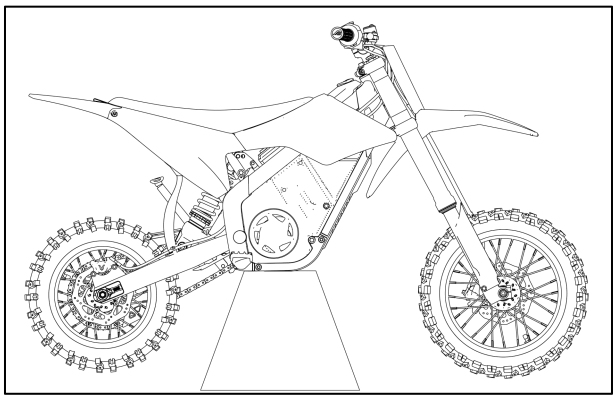
If damping adjustment becomes ineffective, contact your authorised dealer immediately.

⚠ CAUTION

Avoid setting the rebound or compression damping adjusters to their extreme limits.

If maximum or minimum adjustment is required, it is recommended to turn back one click to prevent damage to the suspension

6.4 Rear Suspension Preload/Damping Adjustment

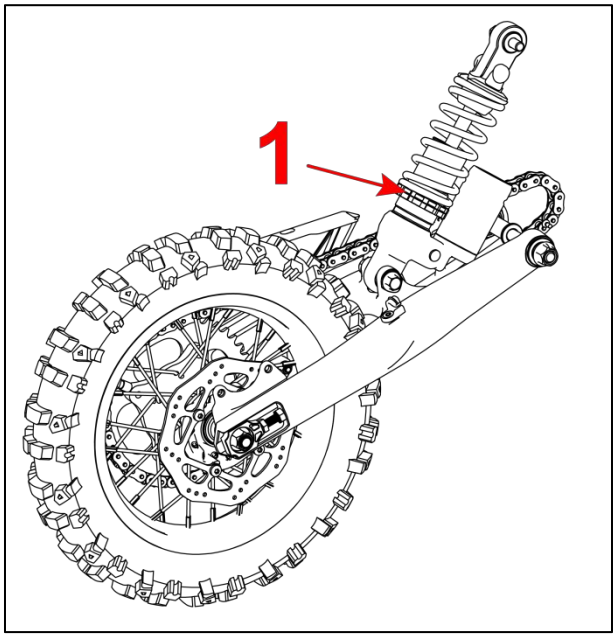


1. Ensure the motorcycle is powered off.
2. Park the vehicle securely using the parking stand.
3. Preload Adjustment:

   Loosen the lock ring (①) at the top of the shock absorber spring.

   • Turn counterclockwise to loosen

   • Turn clockwise to tighten



The upper adjustment knob (①) controls compression damping.

The lower adjustment knob (②) controls rebound damping.

Compression Damping (①):

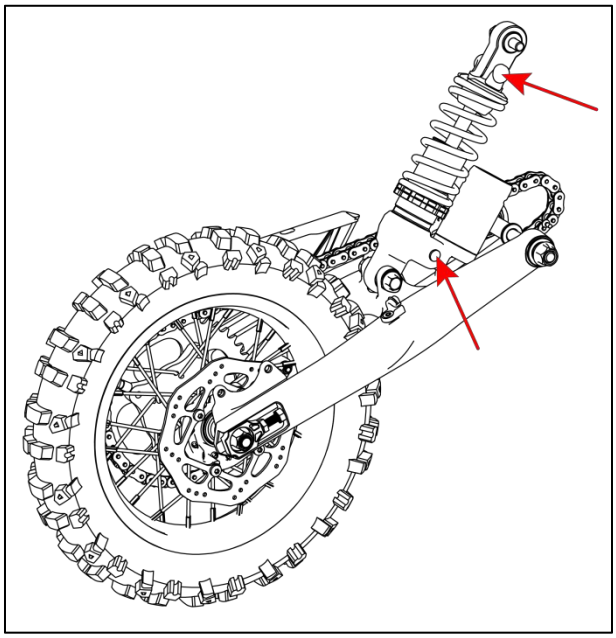
Turn clockwise (+): Suspension becomes stiffer (harder compression).

Turn counterclockwise (–): Suspension becomes softer (easier compression).

Rebound Damping (②):

Turn clockwise (+): Rebound becomes slower.

Turn counterclockwise (–): Rebound becomes faster.



⚠ WARNING!

Do not disassemble the suspension components. Doing so may result in serious injury.

If damping adjustment becomes ineffective, contact your authorised dealer immediately.

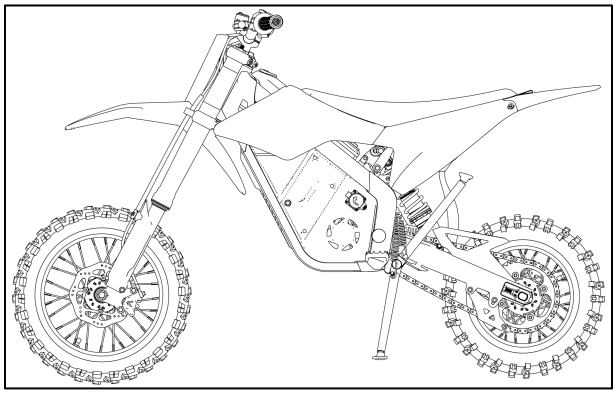
⚠ CAUTION

Avoid setting the rebound or compression damping adjusters to their extreme limits.

If maximum or minimum adjustment is required, it is recommended to turn back one click to prevent damage to the suspension

6.5 Parking

After stabilising the motorcycle, insert the parking triangle stand into the designated frame mounting hole to complete parking.



6.6 Seat Height Adjustment

The seat height can be adjusted using two methods, each offering two position levels:

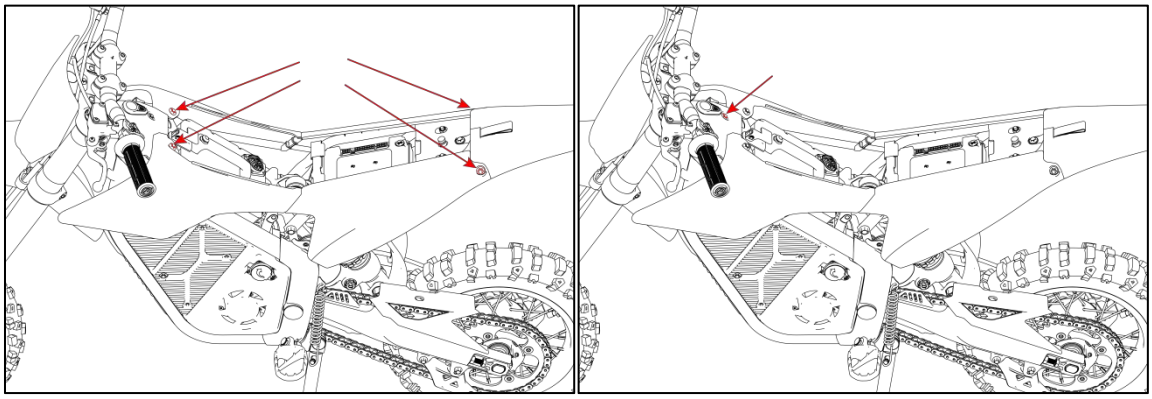
Method A: Adjustment via Subframe and Body Panels

Remove the seat

Refer to section 6.1 for seat removal instructions.

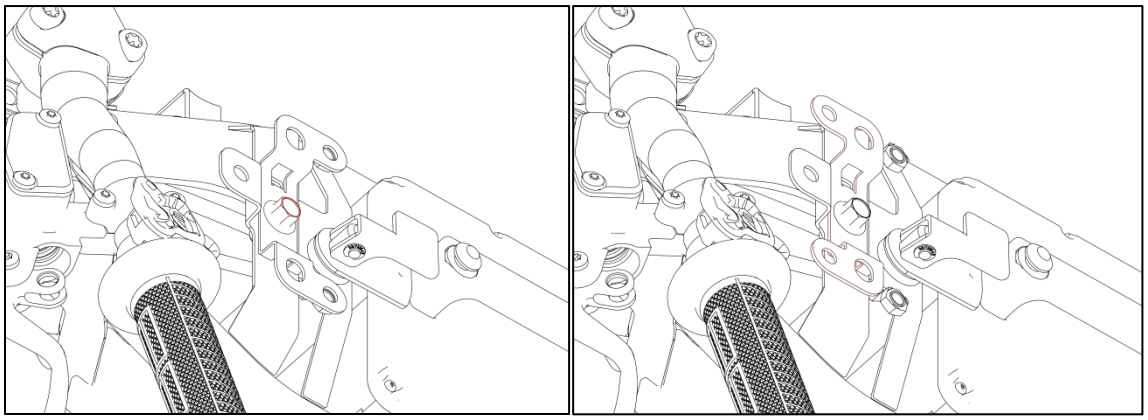
Remove side panels and instrument cover

Detach the front and rear side panels, as well as the instrument cover.



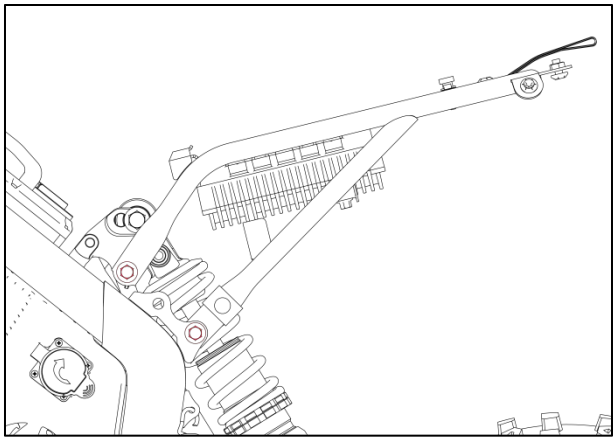
Rotate side panel mounting brackets

Rotate the side panel mounting brackets 180° to the new position.



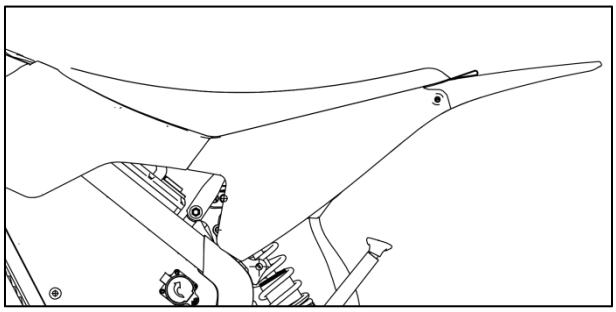
Change subframe mount point

Detach the subframe from the lower mounting point and reattach it to the higher mounting point.



Reinstall side panels

Reattach the front and rear side panels.



Reinstall the seat

Method B: Adjustment via Rear Shock Mount Position

Remove the seat, side panels, and subframe.

Detach the upper mounting bolt of the rear shock absorber.

Reposition the shock absorber to an alternative mounting point to either raise or lower the seat height.

7 Pre-Ride Inspection

⚠ WARNING!

Do not ride the motorcycle if any component is found to be defective.

The manufacturer provides no warranty coverage for damage or safety incidents caused by:

• Negligence on the part of the authorised dealer

• Improper vehicle care and maintenance by the user

• Operation that violates the guidelines of this manual

⚠ CAUTION

For your own safety, always perform a pre- ride inspection before each use.

This helps prevent accidents resulting from unexpected mechanical failures.

Pre-departure Inspection Table:

Checkpoint	Verification
Brake System	Perform inspection while stationary. When you pull the brake, it must not be pulled all the way to the handlebar. The brake system must have stable pressure point when working. If you need to pull the brake lever several times to achieve the desired braking force, contact an authorized dealer to check the brake system. Check brake lines, no fluid leakage. Check brake pads. If brake pads are worn to only 1mm at any point, replace both brake pads.
Wheels	Check if wheels operate normally. Check tires for damage and tread wear. Check tire pressure, correct if necessary.
Throttle	Check if throttle functions normally, rotates smoothly without sticking. Check if it returns to position normally.
Side Stand	Check operating status. If the vehicle is turned on and the throttle lever is rotated, the side stand should not cut power when folded.
Vehicle Body and Suspension	Check that bolts, nuts, and screws are tight.
Chassis	Check the function of shock absorbers by compressing them several times. Also check front and rear shock absorbers for leaks and dirt. Apply front brake, push down on handlebars several times to check if front suspension works properly. Push down on seat several times to check if rear shock absorbers work properly.
Instrument and Lighting	Check if the instrument panel and all lights on the vehicle work properly. This is especially important to be noticed by other traffic participants.

Checkpoint	Verification
Li-ion Battery	Before use, make sure the battery is always fully charged.
Steering	Check for trouble-free operation, lubricate steering pivot if necessary.

⚠ WARNING!

Before riding, make sure you are fully familiar with all control components and their functions.

If you have any questions or uncertainties, contact your authorised dealer immediately.

8 Riding Instructions

8.1 Starting

Locate the power switch

The power switch is located on the right side of the handlebar.

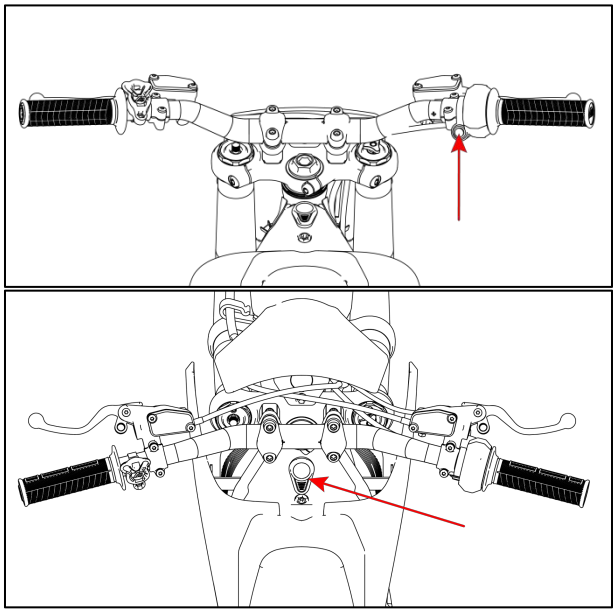
Press the switch briefly

Short press the power switch to turn the vehicle ON or OFF.

Ensure the throttle has returned to the neutral position,

then press and hold the READY button (②) for 3 seconds to unlock P mode.

Once unlocked, the "READY" icon will illuminate on the instrument panel.

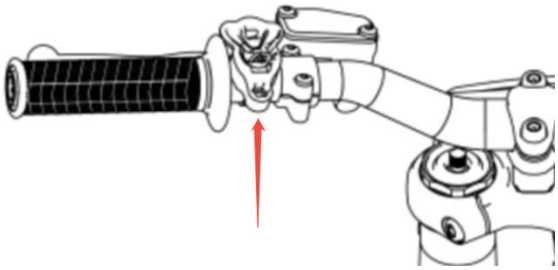


⚠ WARNING!

Children must not operate on their own, please operate under the supervision of a guardian to avoid danger.

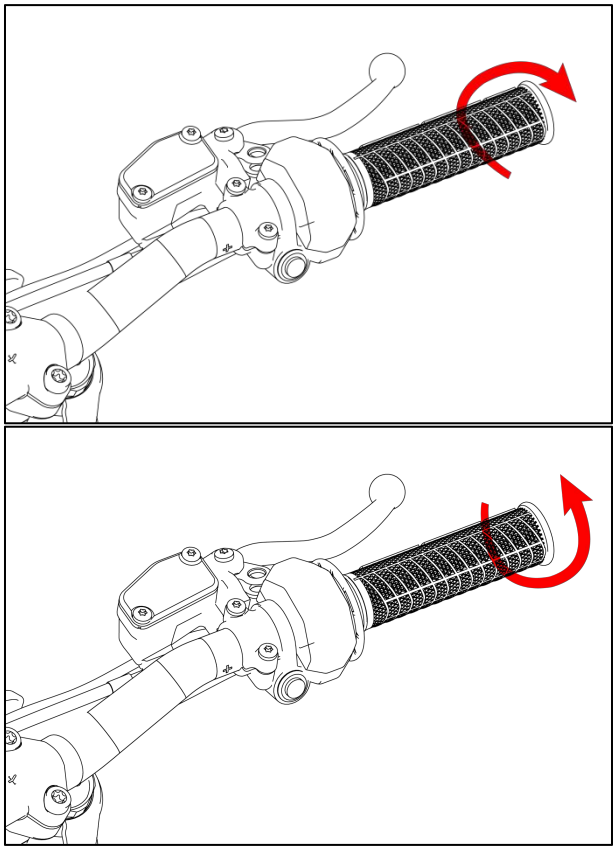
8.2 Emergency Power Cut-off Switch

The emergency power cut-off switch is designed to immediately disconnect the main power supply of the vehicle in case of abnormal conditions or dangerous situations. Activating this switch will instantly stop the motor output, preventing unintended acceleration.



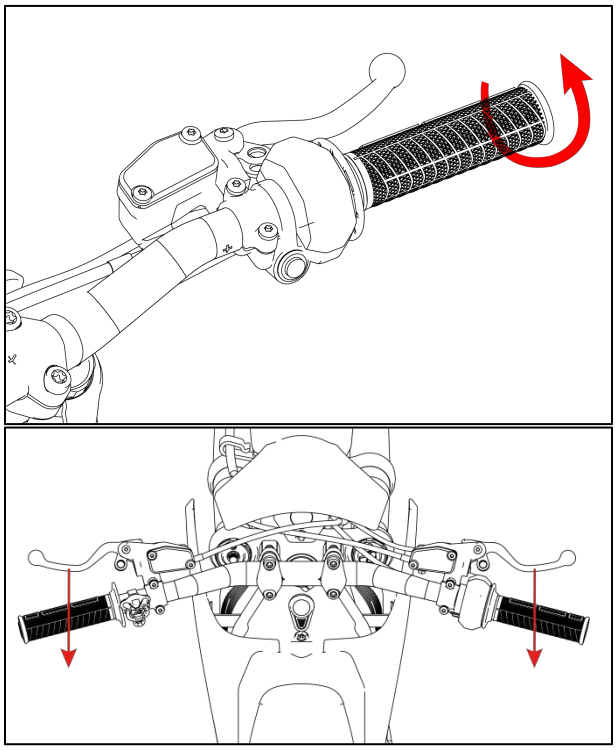
8.3 Acceleration/Deceleration

1. Rotate the throttle grip in direction (a) to accelerate the motorcycle.
2. Rotate the throttle grip in direction (b) to decelerate the motorcycle.



8.4 Braking

1. Fully release the throttle grip (b) to initiate deceleration.
2. Simultaneously apply both the front and rear brakes, gradually increasing braking force (c).



⚠ WARNING!

Avoid sudden or aggressive braking, as this may cause the tyres to lose traction and skid.

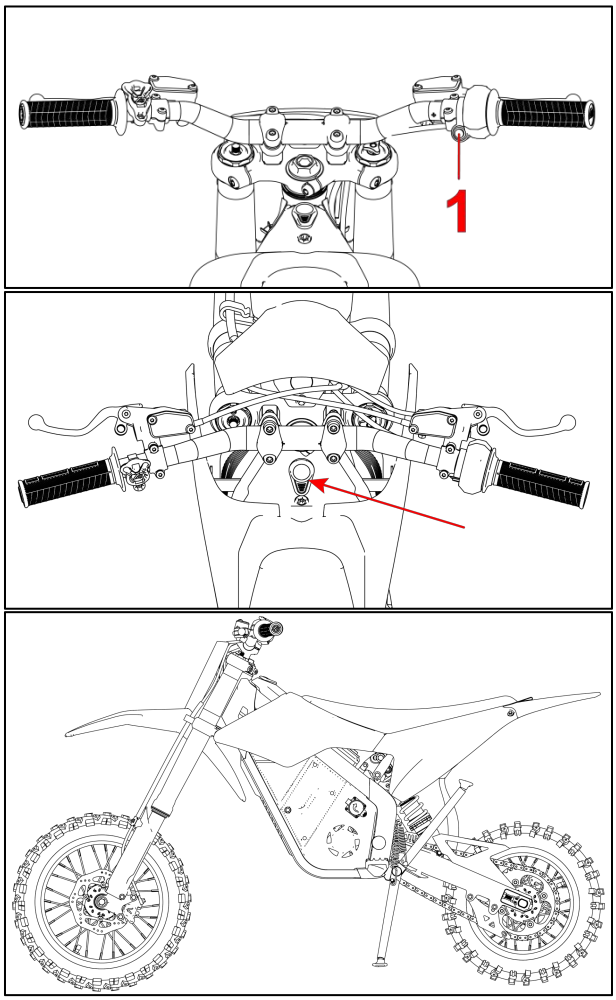
On wet or slippery surfaces, braking distances will be significantly increased.

Avoid riding in extreme weather conditions such as heavy rain whenever possible.

When riding downhill on dry roads, apply the brakes gently and continuously to maintain control and prevent brake overheating.

8.5 Shutdown and Parking

- After coming to a complete stop, press and hold the READY button for 3 seconds to lock into P mode.
- Short press the power switch; the red indicator light on the switch will turn off, and the vehicle will power down.
- Dismount and use the side stand to park the vehicle securely.



⚠ CAUTION

Ensure the vehicle is parked on a stable and level surface.

8.6 APP Control

- For detailed operation instructions, please scan the QR code provided.

9 Settings and Maintenance

The safety and condition of the motorcycle depend on proper maintenance, regular inspections, adjustments, and lubrication.

On the following pages, you will find relevant instructions.

These maintenance guidelines will assist you in performing preventive care and basic servicing.

However, some maintenance tasks require specialised tools.

⚠ WARNING!

Do not attempt any maintenance work that you are unfamiliar with or that may affect warranty coverage.

Unauthorised modifications to the motorcycle may alter its performance and compromise safe operation.

Any such modifications performed without manufacturer approval will void the warranty.

When checking tyre pressure, ensure that the tyres are at ambient temperature.

Always inspect tyre pressure before every ride to ensure it is within the recommended range.

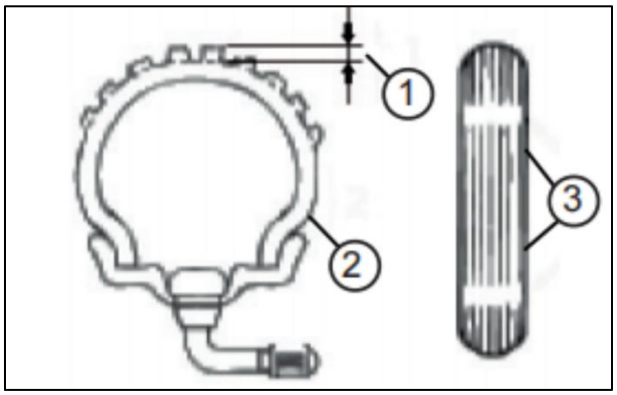
⚠ CAUTION

All maintenance work should be performed by an authorised and qualified dealer.

9.1 Tires

For best tire performance, durability, and safe operation, please refer to the following tire instructions.

Tire Inspection



Front Tyre and Rim Size

Rim: 12 × 1.4

Tyre: 60/100-12

Rear Tyre and Rim Size

Rim: 10 × 1.6

Tyre: 70/100-10

Tyre Tread Depth Inspection ①

The recommended minimum tread depth is 3 mm.

If tread depth is below this value, replace the tyre immediately.

Tyre Sidewall Inspection ②

If cracks or visible damage appear on the tyre sidewall, replace the tyre immediately.

Tyre Wear Indicator Inspection ③

If the tread wears down to the wear indicator, the tyre is no longer safe for use and must be replaced promptly.

Tire	Tire Pressure
Front Tire	1.0 Bar (14.5 psi)
Rear Tire	1.0 Bar (14.5 psi)

⚠ WARNING!

Do not overload the motorcycle.

Excessive load increases pressure on the tyres during rotation and adds strain to the braking and steering systems.

This can lead to component failure or accidents.

Proper weight distribution on the motorcycle is critical for safe operation.

⚠ WARNING!

Inspect tyre wear before every ride.

If the tread has reached the wear indicator, contact a qualified technician immediately to replace the tyre.

This is essential for your safety.

⚠ WARNING!

Tyre wear directly affects riding stability.

Do not continue riding if the tyre is worn beyond the limit or visibly damaged.

Dealers are responsible for checking tyre condition at the time of sale and during maintenance.

⚠ CAUTION

Tyre pressure must be checked before every ride and corrected as needed.

Check tyre pressure regularly.

⚠ CAUTION

To ensure optimal performance, durability, and safe operation of the motorcycle, always follow the guidelines related to rims.

Before each ride, inspect the rims for cracks or deformation.

Damaged rims must be replaced by an authorised dealer.

Do not attempt to repair bent or broken rims yourself — they must be replaced.

⚠ CAUTION

The technical values provided are for reference and may differ from legal requirements in your region. Always comply with local regulations.

9.2 Brake System

(For safe use of brakes, please refer to the following tire instructions.)

9.2 Brake System

For safety guidelines related to braking, refer to the tyre section above.

9.2.1 Brake Lever

Front Brake Lever ① (located on the right side of the handlebar):

Power off the motorcycle and park it on level ground or lift it securely using a stand.

Check that the lever moves smoothly. If there is any stiffness or sticking, apply lubricant to the pivot point ③.

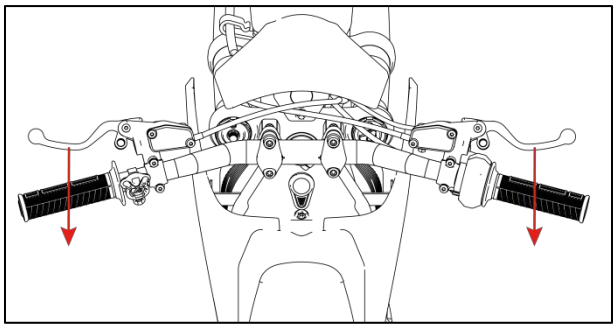
Pull the brake lever and assess the brake feel. If it feels excessively soft, brake fluid or brake pads may need to be replaced.

Rear Brake Lever ② (located on the left side of the handlebar):

Power off the motorcycle and park it on level ground or lift it securely using a stand.

Check that the lever operates smoothly. If movement is stiff, apply lubricant to the pivot point ③.

Pull the brake lever and assess the braking force. If it feels too soft, brake fluid or brake pads should be replaced promptly.



⚠ WARNING!

If the brake lever feels soft or spongy and braking performance is reduced,

this may be due to water or air entering the brake system, or damaged brake components.

This condition can severely reduce braking force and may lead to loss of control.

If such symptoms occur, stop riding immediately and contact an authorised dealer for inspection and repair.

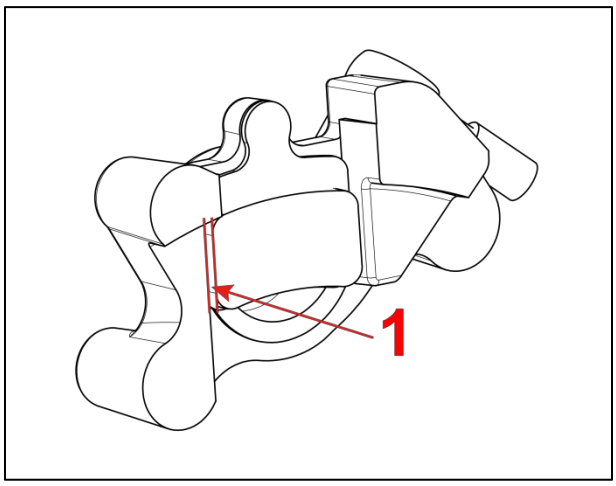
⚠ CAUTION

Check both front and rear brake levers regularly to ensure they function properly.

The pivot points of both brake levers must be lubricated periodically to maintain effective braking force.

If you encounter any braking issues, contact an authorised dealer for a thorough inspection of the brake system.

9.2.2 Brake Pads



Front / Rear Brake Pad Inspection

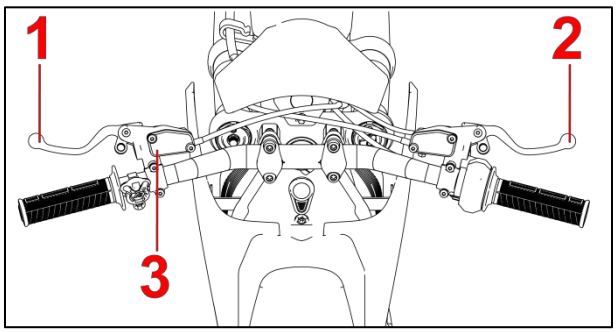
Before every ride, inspect the front and rear brake pads as outlined in the maintenance schedule.

If the brake pad thickness has worn down to the wear limit indicator or is less than 0.5 mm (①), replace the entire set of brake pads immediately.

⚠ CAUTION

If you experience any braking issues, contact an authorised dealer to inspect the brake system.

9.2.3 Brake Fluid



Brake Fluid Inspection

Check that the brake fluid level is within the appropriate range using the inspection window (③).

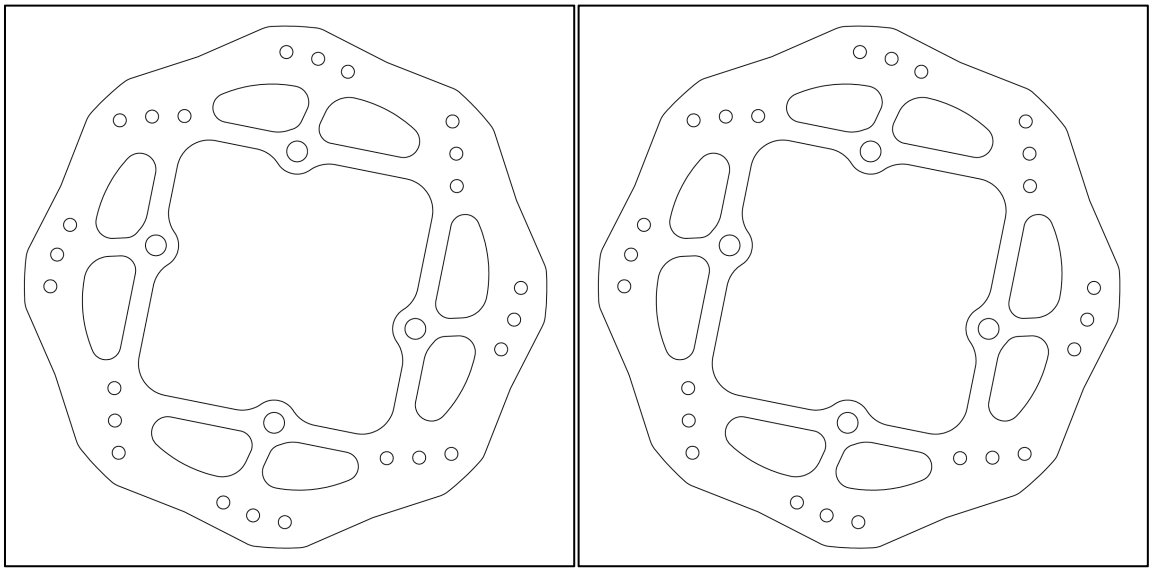
Brake fluid must only be replaced by an authorised dealer.

Only DOT3 or DOT4 brake fluid is permitted.

⚠ CAUTION

If you experience any braking issues, contact an authorised dealer to inspect the brake system.

9.2.4 Brake Disc



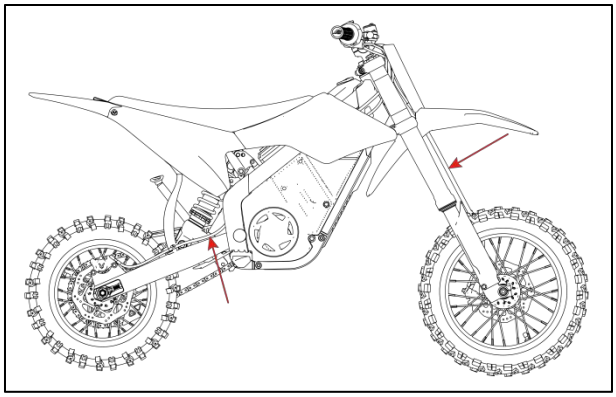
Before every ride, inspect the brake disc for signs of warping or unusual wear marks on the disc surface.

If any deformation or abnormal friction patterns are found, do not ride and have the brake disc inspected by an authorised dealer.

⚠ CAUTION

If you experience any braking issues, contact an authorised dealer to inspect the brake system.

9.2.5 Brake Hoses



Before every ride, inspect the brake hoses (①, ②) for signs of bending, ageing, or abnormal abrasion.

If any damage or wear is found, contact an authorised dealer to replace the hoses.

⚠ WARNING!

Do not attempt to disassemble the brake hoses yourself — brake fluid is corrosive and may cause injury.

Do not modify the routing of the brake hoses, as this may lead to abnormal pressure points and brake failure.

⚠ CAUTION

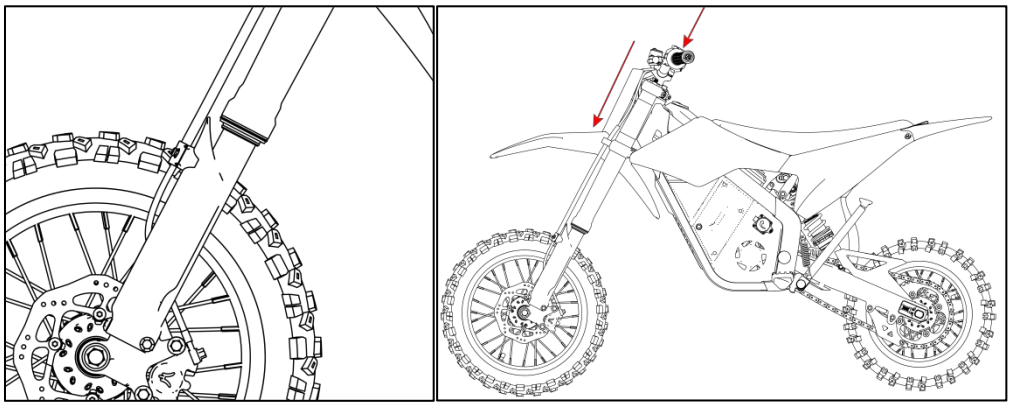
Ensure the brake hoses do not interfere with any part of the vehicle during operation.

If you experience any braking issues, contact an authorised dealer for a complete brake system inspection.

9.3 Suspension System

Before each ride, a brief inspection of suspension components must be carried out, and repairs should be made if necessary.

9.3.1 Suspension System Inspection

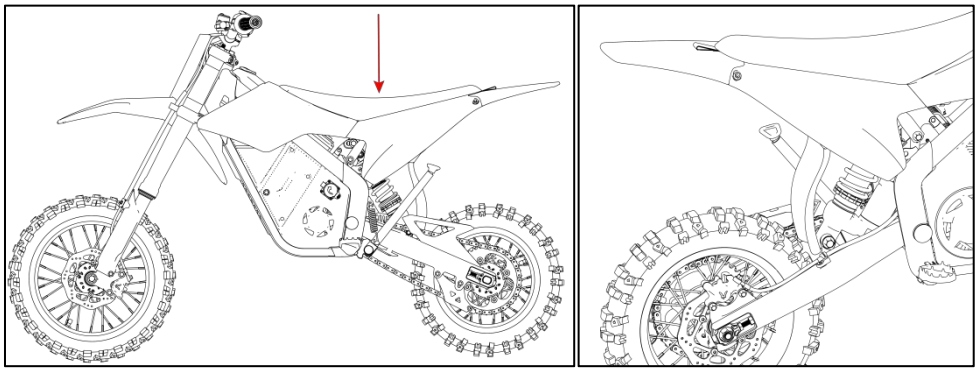


Front Fork Inspection

Park the motorcycle upright on level ground.

Check the fork tube surfaces for scratches, damage, or oil leakage.

Hold the front brake lever and press down on the handlebars several times to verify that the front suspension compresses and rebounds smoothly.



Rear Shock Absorber Inspection:

Inspect the shock shaft and housing for scratches, damage, or oil leakage.

Press down firmly on the seat multiple times to ensure the rear suspension is operating correctly.

⚠ WARNING!

Before riding, check that the front suspension and fork guards do not interfere with the tyres or brake system.

Also inspect for oil leakage.

Any interference or leakage may lead to a serious safety hazard.

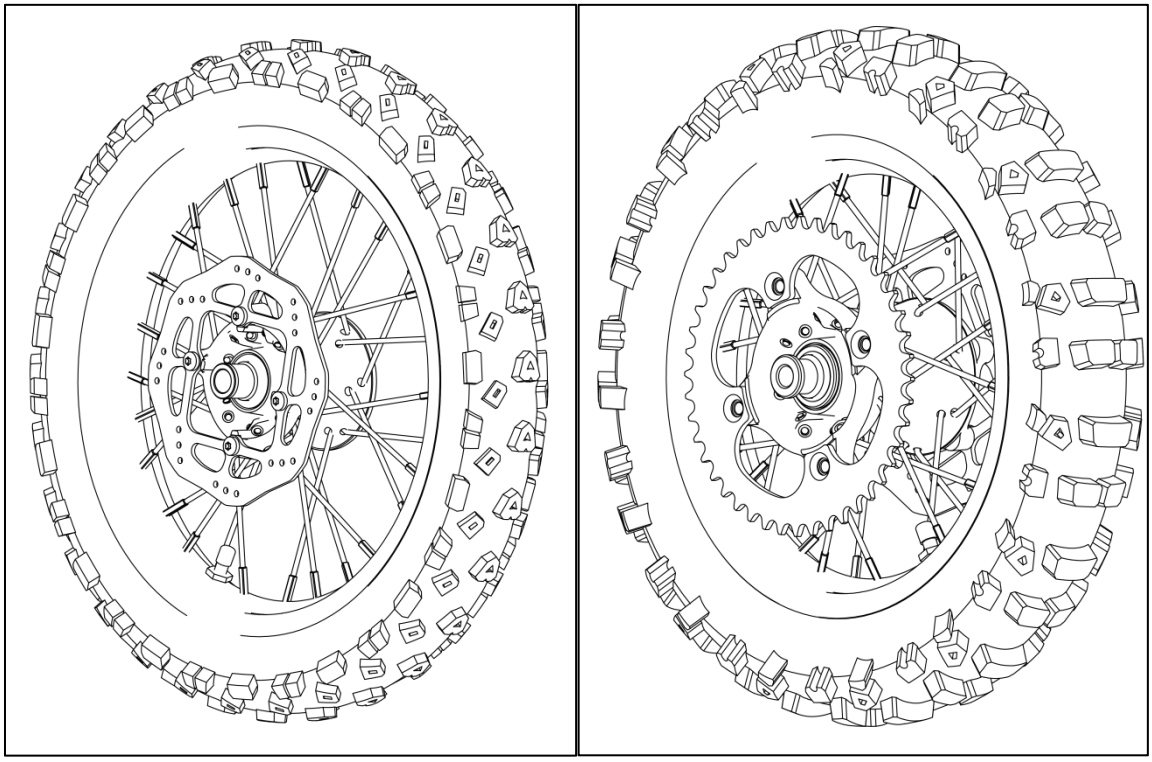
If such issues are found, stop riding and contact an authorised dealer immediately.

⚠ CAUTION

The suspension must operate smoothly without any shaking or vibration.

If abnormal behaviour is observed, have the vehicle inspected by an authorised dealer.Perform regular maintenance and minor repairs as recommended.

9.3.2 Wheel Bearings



Wheel Bearing Inspection

Place the motorcycle on a lift stand and remove the wheel.

Use a suitable tool to move the wheel bearing side-to-side and assess any play or looseness.

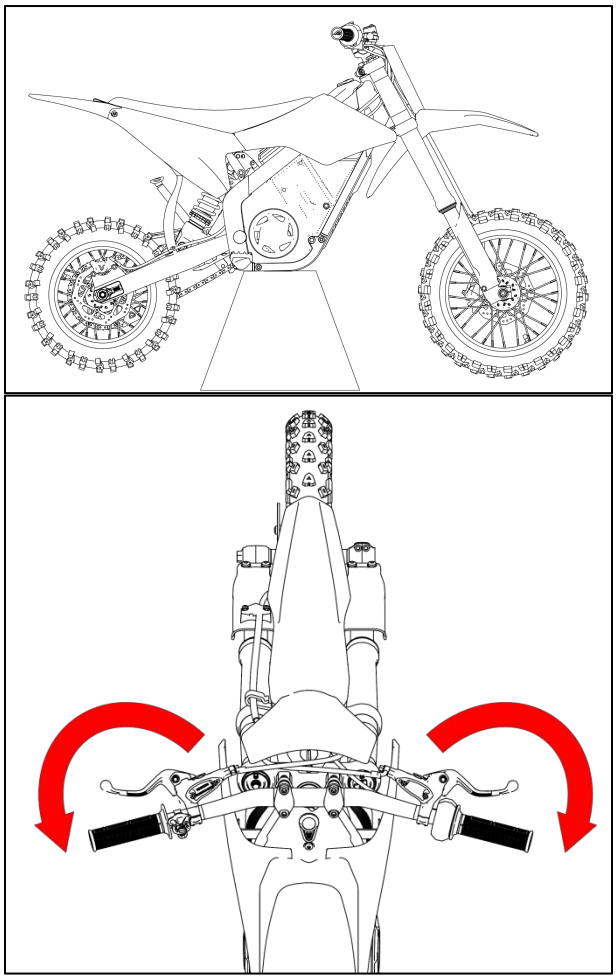
⚠ CAUTION

Before every ride, perform a brief check of the steering components and service them if necessary.

Wheel bearings must be inspected in accordance with the maintenance schedule.

If you notice excessive play in the hub or difficulty in wheel rotation, contact your authorised dealer for further inspection.

9.3.3 Steering Column Bearings



Steering Head Bearing Inspection

Place the motorcycle on a lift stand.

Gently move the front end side to side to check for any noticeable play in the steering head bearings.

⚠ WARNING!

Regularly inspect the condition of the steering head bearings.

Worn or loose bearings can lead to hazardous riding conditions.

Always lubricate and service the steering bearings as part of scheduled maintenance, and replace them if necessary.

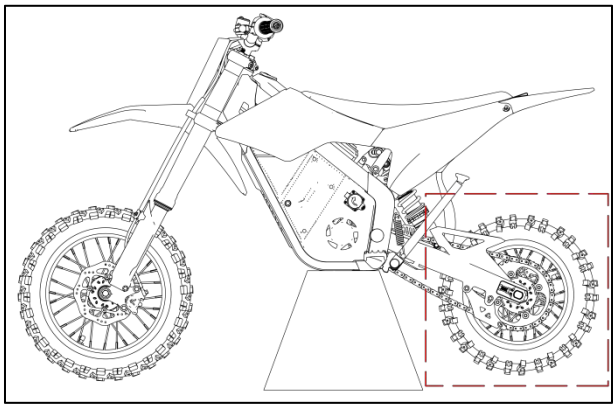
⚠ CAUTION

Before every ride, perform a brief check of the steering components and arrange for servicing if needed.

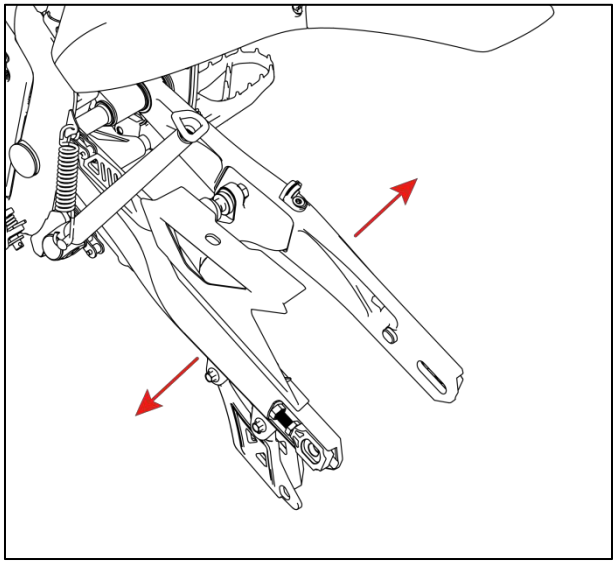
If any looseness or abnormality is detected, have the motorcycle inspected by an authorised dealer.

9.3.4 Rear Fork Bearings

Rear Swingarm Bearing Inspection



Place the motorcycle on a lift stand and remove the rear wheel.



Detach the rear shock absorber, then gently move the swingarm side to side to check for any noticeable play in the bearings.

⚠ WARNING!

Regularly inspect the condition of the rear swingarm bearings.

Excessive wear or looseness may pose a safety risk.

Ensure that the bearings are properly lubricated and serviced as needed, and replace them if any abnormalities are found.

⚠ CAUTION

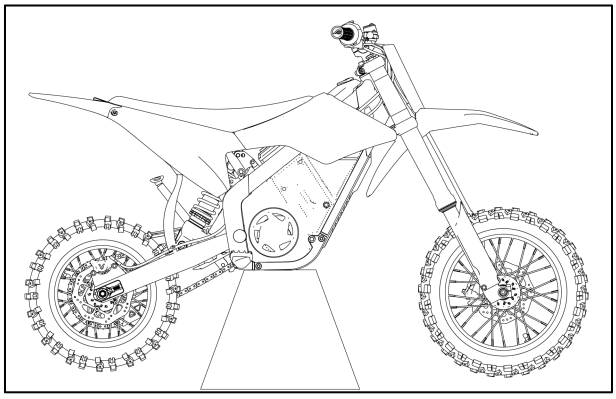
Before every ride, briefly inspect the swingarm assembly.

If any irregularities are detected, have the component serviced or inspected by an authorised dealer.

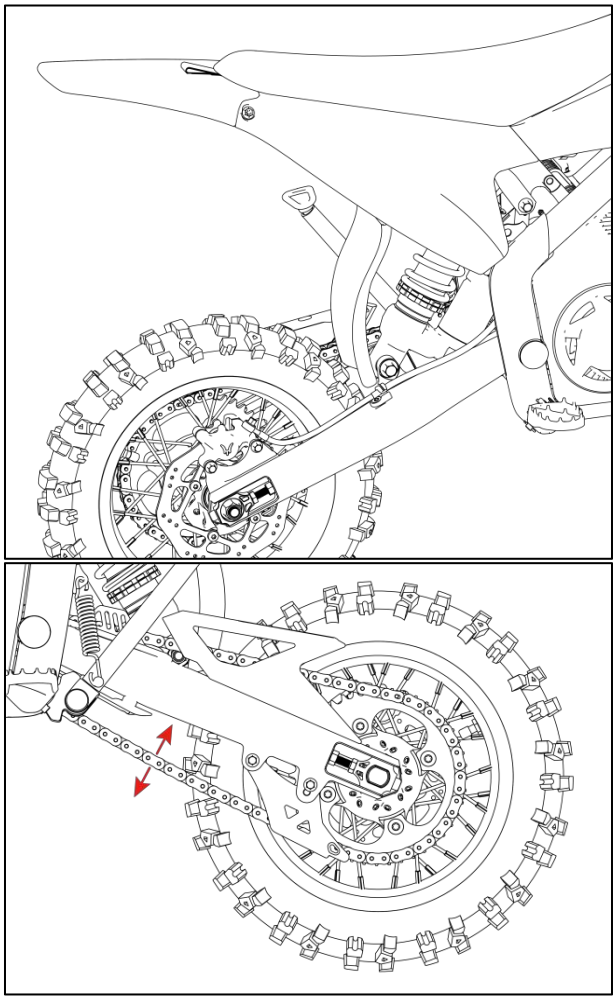
9.4 Drive System

9.4.1 Chain

Drive Chain Adjustment



Place the motorcycle on a lift stand.



Loosen the rear axle nut (①).

Loosen the chain adjuster lock nuts (②).

With the motorcycle unloaded, turn the adjustment bolts (③) until the chain slack is between 15–25 mm.

Tighten the rear axle nut to a torque of 55–60 N·m.

⚠ CAUTION

The rear axle nut must be torqued using a certified torque wrench to avoid damage to the vehicle.

Incorrect chain slack may lead to premature wear or damage to the sprockets, bearings, chainwheel, or the chain itself.

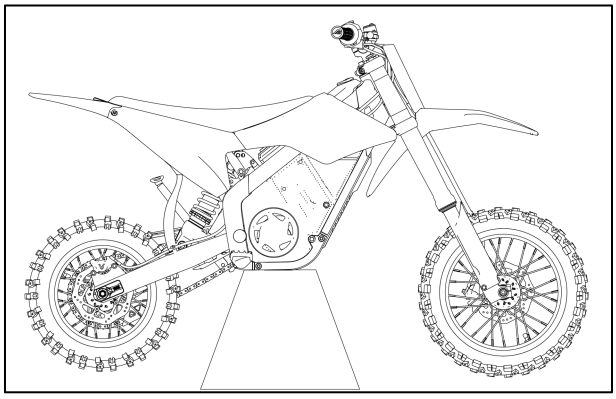
In the worst case, the chain could break or derail, which may result in a traffic accident.

If the chain is rusty, kinked, or has excessive lateral movement, it must be replaced immediately.

9.5 Electrical System

9.5.1 Motor

Motor Inspection

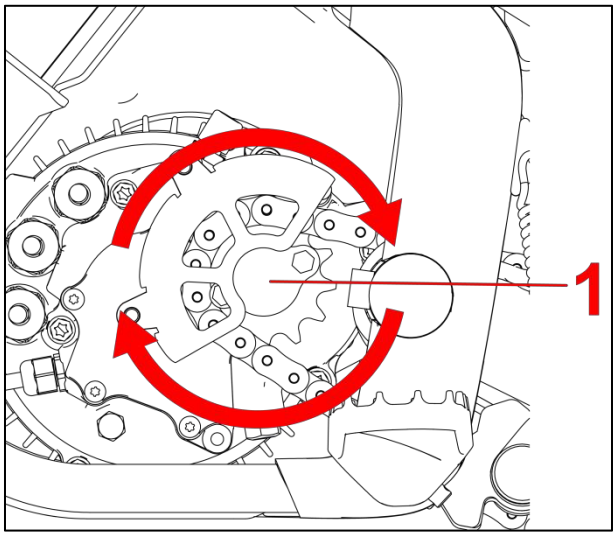


Place the motorcycle on a stand so that the rear wheel is lifted off the ground.

Remove the drive chain and inspect the front sprocket for signs of wear.

Power on the motorcycle and gently rotate the throttle grip to observe the motor (①).

Check for abnormal noise or resistance during rotation.



⚠ CAUTION

If the motor exhibits abnormal noise or any signs of binding, contact your authorised dealer immediately.

Keep hands, tools, and loose items away from rotating components during operation.

Do not touch the sprocket or motor while it is in motion.

9.6 Vehicle Torque Specifications

Component Location	Bolt Specification	Grade	Tightening Torque (Nm)
Front wheel axle	M10 × 1.25	8.8	28–32 Nm
Crankshaft (central axle)	M12 × 1.25	10.9	60–80 Nm
Front fork lower mounting bolts	M6	8.8	7.5–9 Nm
Front & rear brake disc bolts	M6	8.8	7.5–9 Nm
Upper/lower triple clamp bolts	M8	8.8	22–26 Nm
Upper bar clamp bolts	M8	8.8	18–22 Nm
Motor mounting bolts	M8	10.9	38–46 Nm
Subframe hanger bracket bolts	M8	8.8	18–22 Nm
Rear shock absorber mounting bolts	M10 × 1.25	8.8	39–46 Nm
Rear sprocket mounting bolts	M8	8.8	18–22 Nm
Rear wheel axle	M12 × 1.25	10.9	60–80 Nm

10 Cleaning and Storage

10.1 Vehicle Cleaning

Preparation Before Cleaning

Wait until the motor, battery, and controller have fully cooled down.

Ensure all electrical connectors are securely fastened to prevent water intrusion.

Use a pressure washer or water spray to clean the vehicle.

Note!

Do not use gasoline, rust remover, brake cleaner, or similar chemicals on plastic or painted parts — these substances may cause ageing or damage.

After riding in salty or corrosive environments, clean the vehicle as soon as possible to prevent corrosion.

⚠ WARNING!

Ensure no cleaning agents or lubricants remain on the brake discs.

Any contamination may lead to brake failure during operation, posing a serious safety risk.

If such substances come into contact with the braking system, clean thoroughly before use.

⚠ CAUTION

Use only water and mild cleaning agents, or products specifically recommended by authorised dealers.

Do not use acidic cleaners.

If such agents are used accidentally, clean the affected area immediately to prevent damage.

Dry the motorcycle with a clean towel or sponge after washing.

Always follow the manufacturer's care and cleaning guidelines.

Do not use high-pressure washers or steam cleaners on the motorcycle.

High-pressure water may force moisture into bearings or electrical components, such as connectors, switches, or lighting systems.

This may also damage brake pads, seals, paint, or other parts.

⚠ CAUTION

Salt is highly corrosive.

Follow these cleaning instructions after riding in salty or coastal environments:

Wait until the motor has cooled completely.

Use water and a mild detergent to wash all surfaces.

Clean all metal parts thoroughly and apply anti-corrosion spray to components, including nameplates and nickel- plated surfaces.

Use warm water, gentle detergent, and a soft, clean sponge to remove dirt.

Rinse thoroughly with clean water.

Use a small brush to clean hard-to-reach areas.

After cleaning, apply appropriate protective products to prevent rust.

10.2 Vehicle Storage

For long-term storage, place the vehicle in a cool, dry place, store the sensing wristband safely, and protect with a waterproof cloth cover if necessary.

10.3 Li-ion Battery Storage

Dispose of the battery immediately if the battery case is damaged, do not continue to store it.

Keep the battery away from open flames, cigarettes, or other dangerous environments, and ensure it is placed in a dry and safe location.

Ensure the storage place is equipped with safety protective devices (fire-fighting equipment, fire-fighting facilities).

For detailed information about the battery, please refer to the "Power Components" section.

⚠ CAUTION

Always keep the battery with a certain amount of charge. Storing a depleted battery will cause permanent damage to the battery.

⚠ WARNING!

Store the vehicle in a well-ventilated place. High humidity air will cause vehicle rust causing component sealing failure.

If you are not familiar with the battery, please contact a professional dealer.

11. Technical Specifications

The following technical specifications describe the standard configuration of the RFN Warrior Youth SX-E5 electric off-road motorcycle. Specifications are subject to change without notice.

Basic Vehicle Parameters

Model	SX-E5
Name	RFN Warrior Youth
Vehicle Type	Two-wheel Electric Off-road Motorcycle
Compliance	CE
Rated Voltage	48V
Dimensions (L×W×H)	1450*680*900mm (57.1 × 26.8 × 35.4 in)
Wheelbase	1040mm (40.9 in)
Ground Clearance	215mm (8.5 in)
Seat Height	670-645-620mm (26.4 – 25.4 – 24.4 in)
Steering Angle	42°
Trail	65mm(2.6in)

Li-ion Battery Pack and Range

Capacity	25 Ah / 1200 Wh
Discharge Rate	8C
Rated Discharge Current	100A
Peak Discharge Current	150A
Certification	CE 1542, EN50604
Control System	CANBUS
Range	33 km (20.5 mi) at 40 km/h
Battery Detachable	Yes, removable for charging
Battery Lifecycle	300 cycles
Charging Time	6 hours

Motor and Performance

Motor Type	Permanent Magnet Synchronous Motor
Rated Power	2 kW (2.7 hp)
Maximum (Peak) Power	5 kW (6.7 hp)
Maximum Speed	60 km/h (37.3 mph)
Maximum Wheel Torque	145 N·m (106.95 ft·lbf)

Climbing Angle @10 km/h	15°
0–50 m Acceleration	7.33 s
Wading Depth	0.6 m (23.6 in)

Transmission System

Drive System	Chain Drive
Drive Ratio	13:44
Chain Type	415

Suspension System

Front Suspension	Length: 690 mm (27.2 in), Travel: 200 mm (7.9 in)
Rear Suspension	Length: 275 mm (10.8 in), Travel: 60 mm (2.4 in)

Braking System

Front Brake	160 mm (6.3 in) Disc Brake
Rear Brake	160 mm (6.3 in) Disc Brake

Tires and Weight

Front Tire Size	60/100-12
Rear Tire Size	70/100-10
Front Rim	WM1.4-12
Rear Rim	WM1.6-10
Curb Weight	47 kg (103.6 lb)
Maximum Load	55 kg (121.3 lb)

Handlebar and Frame

Handlebar Diameter	Φ 28.5–Φ 22–Φ 19 (Triple Tapered)
Frame	High-Strength Welded Steel Frame
Rear Swing Arm	Integrated Forged & Welded Swingarm
Seat	PU Foam Seat
Color	Customizable

Recommended Tire Pressure

Front Tire	1.0 Bar (14.5 psi)
Rear Tire	1.0 Bar (14.5 psi)

Note！

The specifications listed above are standard for the SX-E5. The actual vehicle may differ slightly due to continuous product improvement. If you have any questions about the specifications, please consult your authorized dealer.

⚠ WARNING!

Maximum rider weight must not exceed 55 kg (121.3 lb). Exceeding this limit may affect vehicle performance and safety.

14. Maintenance Guide

14.1 Purpose & Applicability

• This chapter defines routine inspections and maintenance at specific operating hours/mileage/time; perform within the authorized service network and keep records.

• For harsh duty (dust, humidity, extreme temperatures, water crossings, frequent jumps), shorten intervals accordingly.

• For workshop visits, bring the charger for battery/charging system checks; use an hour meter to track operating hours.

14.2 Service Intervals (hours/km, whichever comes first)

Service triggers use Operating Hours (h) or Odometer (km), whichever comes first. Even if the hour/km threshold is not reached, perform the annual service by calendar time. Suggested equivalence: 1 h ≈ 25 km (typical off-road composite speed; the authorized dealer may adjust).

• Initial service: 10 h or 250 km (whichever comes first)

• Regular service: every 20 h or 500 km

• Extended service: every 40 h or 1,000 km

• Major service: every 80 h or 2,000 km

• Annual service: every 12 months (perform even if hour/km thresholds are not met)

14.3 Task vs. Interval Table

Task	Initial 10h/250km	Every 20h/500km	Every 40h/1000km	Every 80h/2000km	Every 12 months
Read fault memory (diagnostics)	●	●	●	●	○
Check vehicle electrical functions	●	●	●	●	○
Traction battery SOC/health check and top-up	●	●	●	●	○
Front/rear brake pad retention check	●	●	●	●	○
Brake disc wear/damage	○	●	●	●	○
Brake lines for	○	●	●	●	○

leaks/damage					
Front/rear brake fluid level	●	●	●	○	○
Replace front brake fluid					●
Replace rear brake fluid					●
(If applicable) Rear master cylinder seals			●	●	●
Brake lever & pedal free play	●	●	●	●	○
Harness/routing wear & bends	●	●	●	●	○
Frame/linkage visual & fasteners	○		●	●	●
Steering bearings/rod ends play			●	●	●
Tire condition & pressure	●	●	●	●	○
Wheel bearing play		●	●	●	○

14.4 Key Technical Notes & Tips

• Suspension care: bleed the fork and clean dust seals routinely to prevent contamination-related leaks.

• Environmental compliance: dispose of fluids/cleaners/brake fluid, electrical items (incl. charger) and lithium batteries per local regulations.

14.5 Initial & Advanced Service

• Initial service (10h/250km): re-torque/fastener checks, brake/electrical/wiring/pressure/spoke tension checks, diagnostics readout and software checks.

• Advanced (40h/1000km, 80h/2000km): add structural play/wear assessment (frame/linkage/steering/rod ends, wheel bearings) and periodic replacement of brake fluid and seals.

14.6 Documentation & Traceability

• Record at each visit: date, hour-meter/odometer, tasks performed, parts & materials batch, diagnostic summary, technician signature; note which trigger applied (e.g., “20h first” or “500km first”).

• If RFN releases an updated plan, this chapter follows the latest service bulletin.

⚠ CAUTION

Inspect the motorcycle regularly for signs of rust.

The owner is responsible for performing routine anti-corrosion maintenance.

⚠ WARNING!

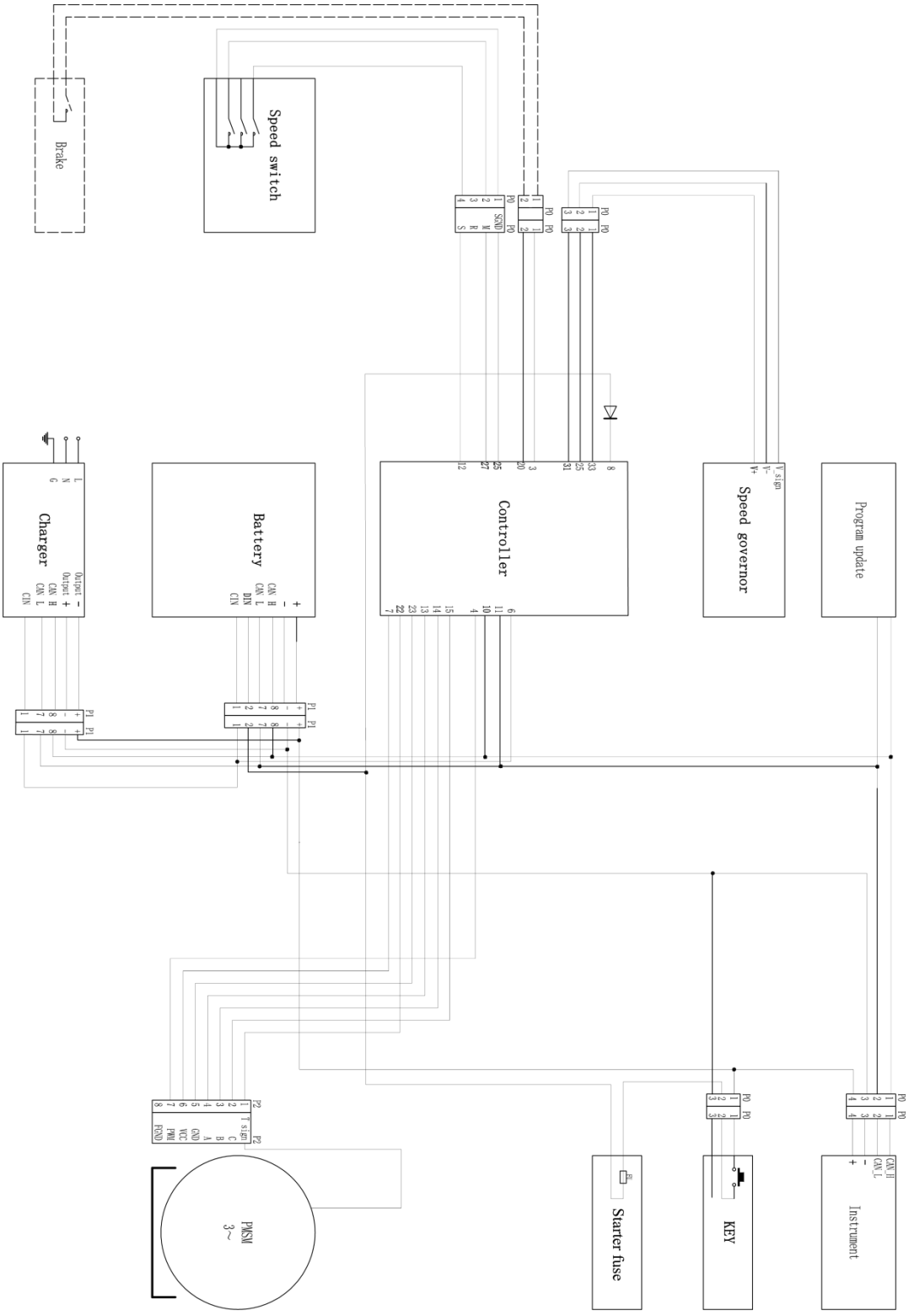
Appropriate maintenance must be carried out in accordance with the prescribed schedule.

Warranty coverage is valid only if the vehicle has been properly maintained according to this plan.

14.7 Electrical System Diagram

Note！

Dashed lines in the schematic represent optional accessories that may be installed additionally.



14.8 Electric Motorcycle Troubleshooting

All RFN electric motorcycles undergo strict quality inspection before delivery.

However, despite thorough checks, technical issues may still occur over time.

The following information provides guidance to help you identify possible problems and carry out minor maintenance where applicable.

If you are unable to resolve the issue, please take the vehicle to an authorised dealer.

If no dealer is available in your region, contact the manufacturer's after-sales service team.

Important Safety Notice – High Voltage Handling

RFN motorcycles contain high-voltage components.

Please observe the following safety precautions at all times:

High-voltage components can cause burns, electric shock, or serious injury.

Always follow the warning labels affixed to components.

Do not touch, remove, or attempt to replace any high-voltage parts, cables, or connectors.

In the event of an accident, do not touch any orange high-voltage cables or connected components.

If the motorcycle catches fire, and only if it is safe to do so, use a Class D fire extinguisher.

After extinguishing the flame, cool the area thoroughly with large volumes of water or a water-based extinguisher.

⚠ WARNING!

Always obey the warning labels attached to the motorcycle.

RFN WARRIOR operates on a 48V high-voltage system.

Beware of high voltage and also high temperatures in the drive system immediately after operation — do not touch.

⚠ EXTREME DANGER!

High-voltage cables are marked in orange for easy identification.

The high-voltage system must never be serviced by users.

Removing or replacing any high-voltage components, cables, or connectors may result in severe burns, electric shock, or even death.

Battery Safety Lockout Behavior

To protect the battery pack, the Battery Management System (BMS) may activate one or both of the following protective lockouts if a critical internal fault is detected:

Operation lockout:

If the battery is fully discharged or if a critical fault is detected, vehicle operation will be disabled until the issue is resolved.

Charging lockout:

If a serious fault is detected, the system will prevent charging even when the battery is connected to a charger and AC power is supplied.

System Fault Alerts

If a system fault is detected, the instrument panel will display a fault warning along with the corresponding error code.

Note！

In fault conditions, the vehicle may be locked in P mode, or limited to restricted riding modes.

Speed, units, and mode indicators may also disappear from the instrument cluster.

A table listing common fault codes, possible causes, and suggested solutions is typically provided on the next page for reference.

14.9 Fault Code Table – Error List and Recommended Actions

Error Code	Fault Description	Troubleshooting Solution
01	Controller Bus Overvoltage	Do not push the vehicle by force; disable regenerative braking.
02	Controller Bus Undervoltage	Charge the battery pack.
03	Controller Phase Current Overcurrent	Check for motor blockage, shut down the vehicle, or use the lowest power mode.
04	Controller Overload	Vehicle enters limited power output mode.
05	Controller U Phase Loss	Shut down the vehicle and check motor phase cable connections.
06	Controller V Phase Loss	Shut down the vehicle and check motor phase cable connections.
07	Controller W Phase Loss	Shut down the vehicle and check motor phase cable connections.
16	Motor Stalled	Check if the motor is blocked and disable power signal.
17	Motor Overtemperature	Stop and wait for the motor to cool down.
18	Motor Overspeed	Stop the vehicle and do not push it manually.
19	Controller Overtemperature	Stop and wait for the controller to cool down.
23	Throttle Fault – Not Reset or Disconnected	Release throttle and check for short/open circuit or physical damage.
25	Gear Switch Fault	Check if the gear switch is stuck or replace the switch.
57	Battery Cell Overvoltage	Shut down and disconnect the battery; contact the manufacturer or dealer.
58	Battery Cell Undervoltage (Low SOC)	Charge the battery.
60	Cell Voltage Imbalance	Shut down and disconnect the battery; contact the manufacturer or dealer.
65	Battery Discharge Overcurrent	Stop and contact the manufacturer or dealer.
69	Battery Hardware Overcurrent Protection	Stop and contact the manufacturer or dealer for BMS inspection.
73	Battery Overtemperature	Stop and wait for the battery to cool down.
74	Battery Undertemperature	Stop and do not charge; wait until temperature rises.
75	BMS Overtemperature	Stop and do not charge; wait for temperature to return to normal.
76	BMS Undertemperature	Stop and wait until temperature rises.
77	Battery MOSFET Overtemperature Protection	Stop and wait until battery temperature normalizes.
83	Battery Overdischarge Protection	Shut down the vehicle and charge the battery.
84	Single Cell Overdischarge Protection	Charge the battery or contact the manufacturer/dealer.
85	Battery High Humidity Protection	Shut down and store in a dry environment or contact the manufacturer/dealer.
87	Battery Immersion Protection	Contact the manufacturer or dealer for battery replacement.
105	Charger Input Undervoltage Protection	Replace the charger or contact the manufacturer/dealer for repair.
106	Charger Output Overvoltage Protection	Replace the charger or contact the manufacturer/dealer for inspection.
109	Charger Overtemperature Protection	Disconnect the charger and stop charging or replace the charger.

14.10 General Troubleshooting Table

Symptom	Possible Cause	Recommended Action
Vehicle has no power after startup	Battery plug not properly connected	Check battery plug
	Battery in sleep mode due to low charge	Recharge battery
	Battery protection due to low/high temperature	Wait until battery returns to normal temperature
	Battery malfunction	Contact authorised service centre
	DC output cable disconnected	Check for pin damage or loose contact
	Main cable diode damaged	Inspect and replace harness
	Display/start switch connector loose	Check and reinsert plug firmly
	Faulty display or switch	Inspect or replace instrument/switch
Power on, but throttle not working	Kickstand switch protection active	Check or retract side stand
	Emergency cut-off switch active	Reset switch or check wiring
	Throttle not returned on startup	Return throttle to rest or replace
	Battery low-voltage protection	Recharge battery
	Motor/controller over-temperature protection	Wait to cool
	Throttle grip malfunction	Replace throttle
	Controller plug loose	Reconnect controller signal plug
	Motor encoder plug loose	Reconnect encoder plug
	Controller or encoder failure	Replace at authorised service centre
Battery info not shown on display	Communication fault or broken wire	Repair or replace battery at service centre
	Display damaged	Replace at authorised service centre
Charger not working	Battery too cold/hot	Wait for temperature normalization
	Loose charger plug	Reconnect charger
	Charger malfunction	Replace charger
	Battery malfunction	Replace or service battery
Power mode invalid / power reduced	Low battery charge	Recharge battery
	Battery temperature too low/high	Wait until temperature is within range
	Motor/controller over-temperature	Wait until cooled
	Motor internal wear/failure	Replace motor
	Power mode switch failure	Replace switch

Reminder:

For other fault codes, connect to the vehicle's mobile app or use diagnostic equipment at an authorised dealer.

Severe faults may require dealer-only tools with elevated permissions.

Always refer to the latest service documents from your dealer or manufacturer.

15. Technical Specifications

At the time of vehicle handover, the following information must be completed and retained as part of the official service record.

Current Mileage: _____

Date: _____

Dealer Stamp & Signature:

(Authorised Dealer/Technician)

Current Mileage: _____

Date: _____

Dealer Stamp & Signature:

(Authorised Dealer/Technician)

Current Mileage: _____

Date: _____

Dealer Stamp & Signature:

(Authorised Dealer/Technician)

Current Mileage: _____

Date: _____

Dealer Stamp & Signature:

(Authorised Dealer/Technician)

Current Mileage: _____

Date: _____

Dealer Stamp & Signature:

(Authorised Dealer/Technician)

Current Mileage: _____

Date: _____

Dealer Stamp & Signature:

(Authorised Dealer/Technician)

Current Mileage: _____

Date: _____

Dealer Stamp & Signature:

(Authorised Dealer/Technician)

Current Mileage: _____

Date: _____

Dealer Stamp & Signature:

(Authorised Dealer/Technician)

This record confirms the official delivery of the vehicle to the end customer and establishes the baseline for future warranty and maintenance tracking.

Complies with:

• EU: EMC Directive 2014/30/EU

• US: CPSC 16 CFR Part 1512

• Battery disposal: Follow local WEEE regulations (♻ symbol)

©2025 RFN. All rights reserved.