

# ***CB0***

## **Maintenance Manual**

Please read the Manual carefully, especially important safety information.  
Minors under 16 years old are not allowed to drive this motorcycle

## Foreword

Welcome to EMMO Electric Motorcycle World.

Dear EMMO CAOFEN-F80 Electric Motorcycle Users:

We will guide you to understand and become familiar with the functions of the F80 Electric Motorcycle and how to use and maintain it correctly and safely.

To ensure your safety, we recommend that you become familiar with and understand the F80 Electric Motorcycle so that you can drive it safely and reliably under various road conditions. Please read the Manual carefully before driving and always comply with the following requirements: The Manual will provide you with a comprehensive overview of the basic features of the F80 Electric Motorcycle, important information about the motorcycle's equipment, and important recommendations and warnings that you should follow. It also contains information you need to know about motorcycle maintenance, maintenance methods, and preventive measures for operation. If you have any operation and maintenance problems not included in the Manual, please contact your local EMMO authorized distributor. We are always at your service. We wish you a happy riding experience with your EMMO CAOFEN-F80 Electric Motorcycle.

The Manual contains important information, precautions, warnings, and hazard tips about the use of EMMO CAOFEN-F80 Electric Motorcycle. The figures in the Manual may be slightly different from your motorcycle in details, but the principles depicted are the same.

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\*Note: EMMO Electric Motorcycle has maintained continuous and intensive development of structure, equipment, and accessories, ensuring that the motorcycle products constantly comply with new safety and quality standards. Therefore, there may be differences between the contents of the Manual and your motorcycle. EMMO reserves the right to correct errors. Accordingly, none of these data, figures, or descriptions can be used as a basis for any claims.

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## 1. Warning Signs

 Prompts the hazard warnings that shall be noticed - indicating that death or serious injury may be directly caused if appropriate preventive measures are not taken or wrong methods are used. For the safety of you, others and products, please avoid damage when saving.

 Prompts the warning that shall be noticed - indicating that minor injury or serious damage to the motorcycle may be caused if appropriate preventive measures are not taken. For the safety of you, others and products, please do not damage this sign when storing the motorcycle.

 Indicates that there is more detailed information on other page.

- This product is a high-performance electric motorcycle. Please pay attention to the following items when driving:
- Users are not allowed to modify this motorcycle;
- Users should comply with local laws and regulations;
- Any modification to the equipment of this product will affect the performance of the motorcycle.

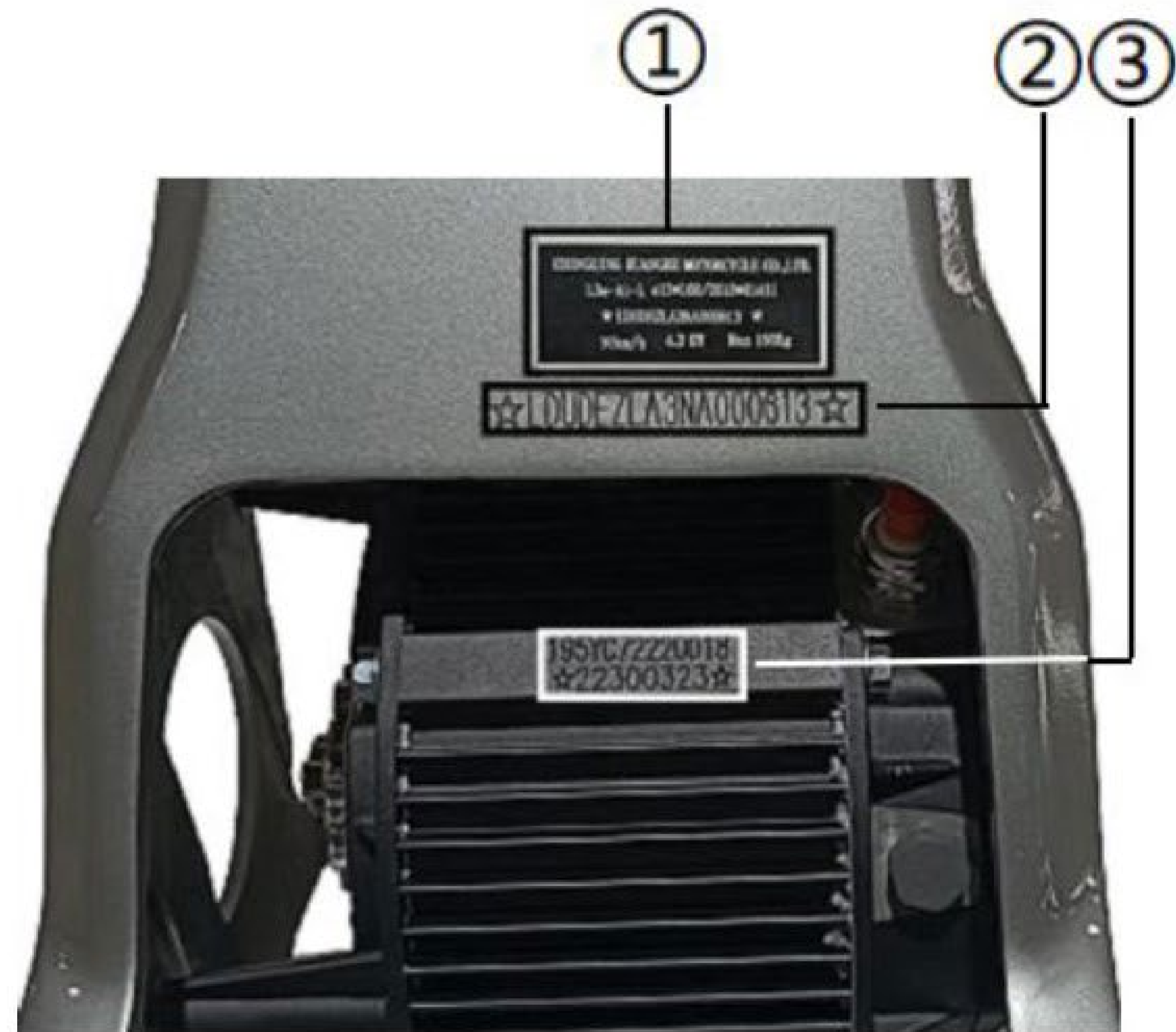
Please read and understand all the labels on this motorcycle because they contain important safety information and operating skills. Please do not remove the labels. If any label is illegible or missing, please contact EMMO distributor.



## 2. Overview of Product Diagrams

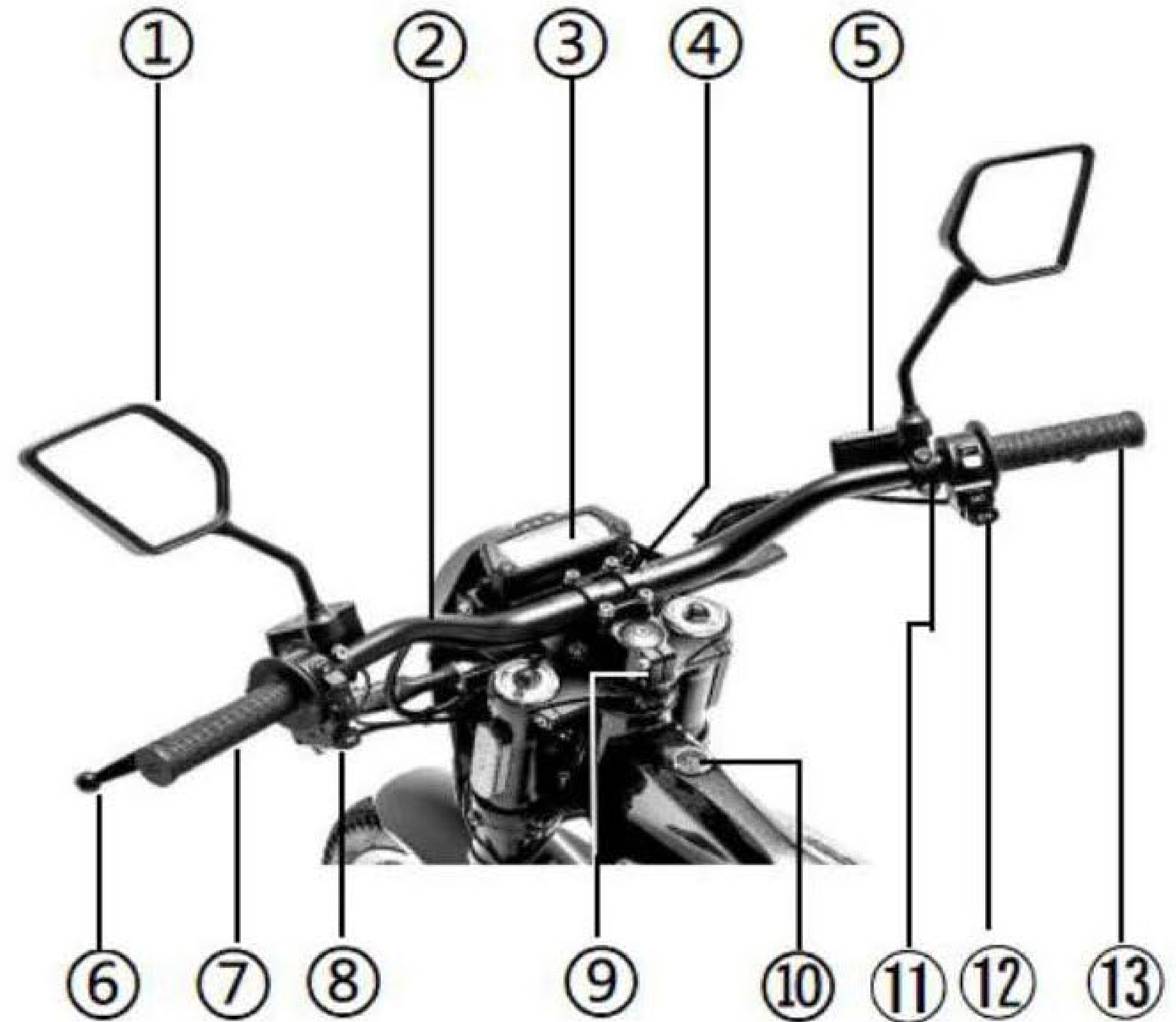
### VIN Code of the Motorcycle

1. Vehicle Nameplate
2. Vehicle Identification Number (VIN)
3. Motor model and factory number



## Motorcycle Head

1. Rear view mirror
2. Handlebar
3. Meter (➡10)
4. Lock cover of handlebar bracket
5. Front brake oil cup
6. Brake lever
7. Left handle grip
8. Left switch (➡12)
9. Handlebar bracket
10. Model logo
11. Cover for rearview mirror mounting
12. Right throttle grip and switch (➡13)
13. Right handle grip





## Left Side

- 14. Front fender
- 15. Headlamp
- 16. Frame
- 17. Seat
- 18. Rear lamp
- 19. Rear section of rear fender
- 20. Front brake disc
- 21. Front brake caliper
- 22. Lower guard plate of battery
- 23. Side stand
- 24. Tensioner
- 25. Chain (▶▶36,48)
- 26. Chain guide
- 27. Rear sprocket
- 28. Left bracket of rear fender



## Right Side

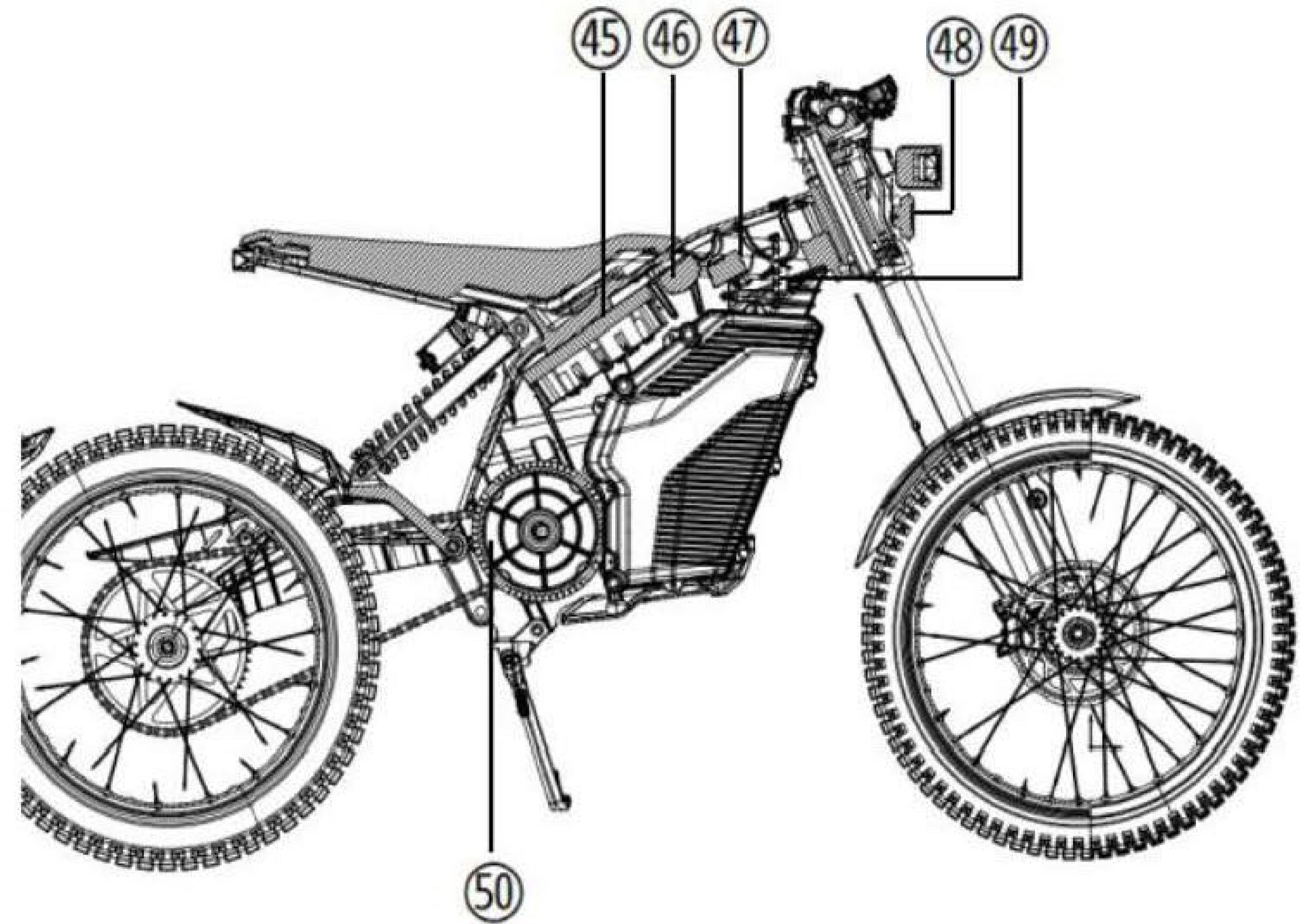
- 29. Rear license plate lamp
- 30. Rear tire
- 31. Front section of rear fender (chain case)
- 32. Front shock absorber (▶▶28)
- 33. Front tire
- 34. Rear fender bracket
- 35. Chain adjusting top block
- 36. Rear rim assembly
- 37. Chain adjusting bolt
- 38. Rear brake caliper
- 39. Rear fork assembly
- 40. Rear shock absorber (▶▶31)
- 41. Pedal
- 42. Decorative cover
- 43. Battery (▶▶16)
- 44. Rear rim





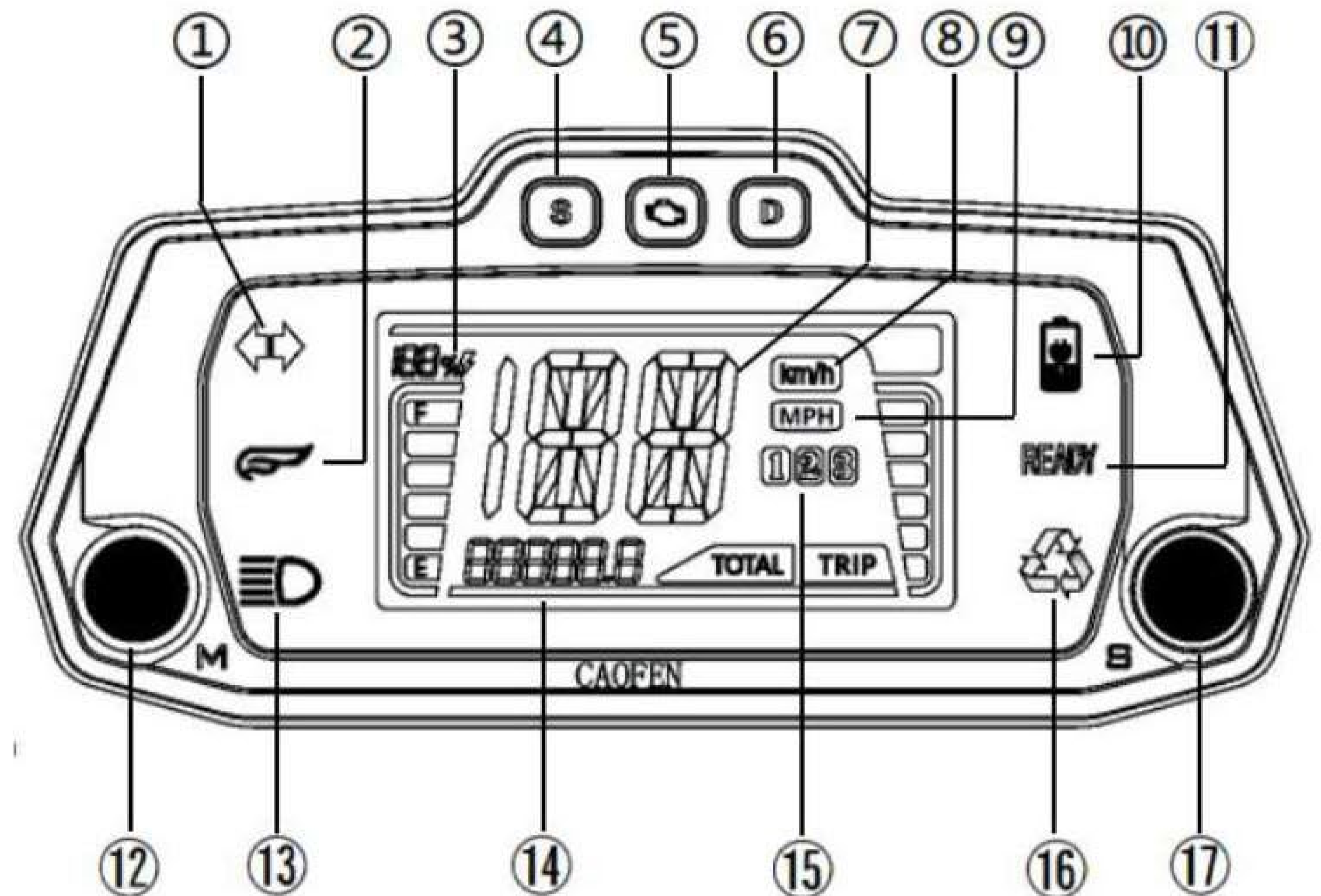
## Frame Interior

- 45. Drive controller
- 46. Steering lock controller
- 47. DCDC converter
- 48. Horn
- 49. Integrated terminal block Assembly (▶23)
- 50. Motor



### 3. Meter Assembly

1. Turn indicator
2. Entertainment mode
3. SOC display
4. Power gear display
5. Fault display (▣▣53)
6. Drive gear display
7. Speed display
8. Speed unit (km)
9. Speed unit (mile)
10. Charging warning light
11. Driving lamp
12. Function switch button (▣▣11)
13. High beam indicator
14. Total ODO display/fault code display
15. 1Current drive gear
16. Energy Recovery (▣▣11)
17. Function switch button (▣▣11)




Tip: The meter of your F80 Electric Motorcycle may be slightly different from the description in the Manual, but the function is the same.




## Meter Display Instruction

\* Press the remote control button of the startup controller, and the LCD screen of the instrument will light up.

 High beam: The meter is initially set into the daily running light, press the Light button on the left switch assembly of the left brake lever, and the high beam will be turned on.

 Left and right turn signals: When the steering switch on the left brake lever switch assembly is pushed to the left, the left front and rear turn signals will flash; when the steering switch is pushed to the right, the right front and rear turn signals will flash.

 Entertainment mode display: When it is on, there is no traction control (that is, no brake is powered off), and when it is off, there is traction control (that is, the brake is powered off).


 Sport gear: When the S indicator flashes, Gear D is applied; when it is steady on, Gear 1 applied; when flashing slowly, Gear 2 applied; when flashing fast, Gear 3 applied.

 Drive gear: Press the N/D button on the right brake lever to control the Gear D indicator to light up or off; 1. Steady on: Gear D is applied and the motorcycle can be driven; 2. OFF: Gear N is applied.

 READY Indicator: it is controlled by the steering lock key or the Start button (depending on the power-on switch of the motorcycle); 1. If it is steady on, the motorcycle will be started; 2. If it is turned off, the motorcycle will not be started.





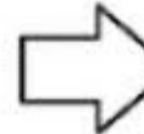

 Energy Recovery indicator: 1. Steady on: the auxiliary brake is applied to recover the energy after a delay of 20 ms when the braking signal is detected (or the speed is reduced by 10%); 2. Flashing: the energy is recovered after the throttle is released; 3. Off: the energy recovery is disabled.

 Charging warning light: 1. Off: sufficient power; 2. Steady on: warning for insufficient power; 3. Flashing: the battery is in low voltage and should be charged as soon as possible.

 Function switch button - M button: 1. Press it once: switch the display of Trip and Total; the trip and maximum speed are displayed at the same time; the speedometer shows the current speed when the motorcycle is running; 2. Press and hold it: switch the mileage unit between km and mile; S button: In Trip mode, press and hold the S button for more than 2 seconds, and the Trip and Max. Speed will be cleared zero synchronously.

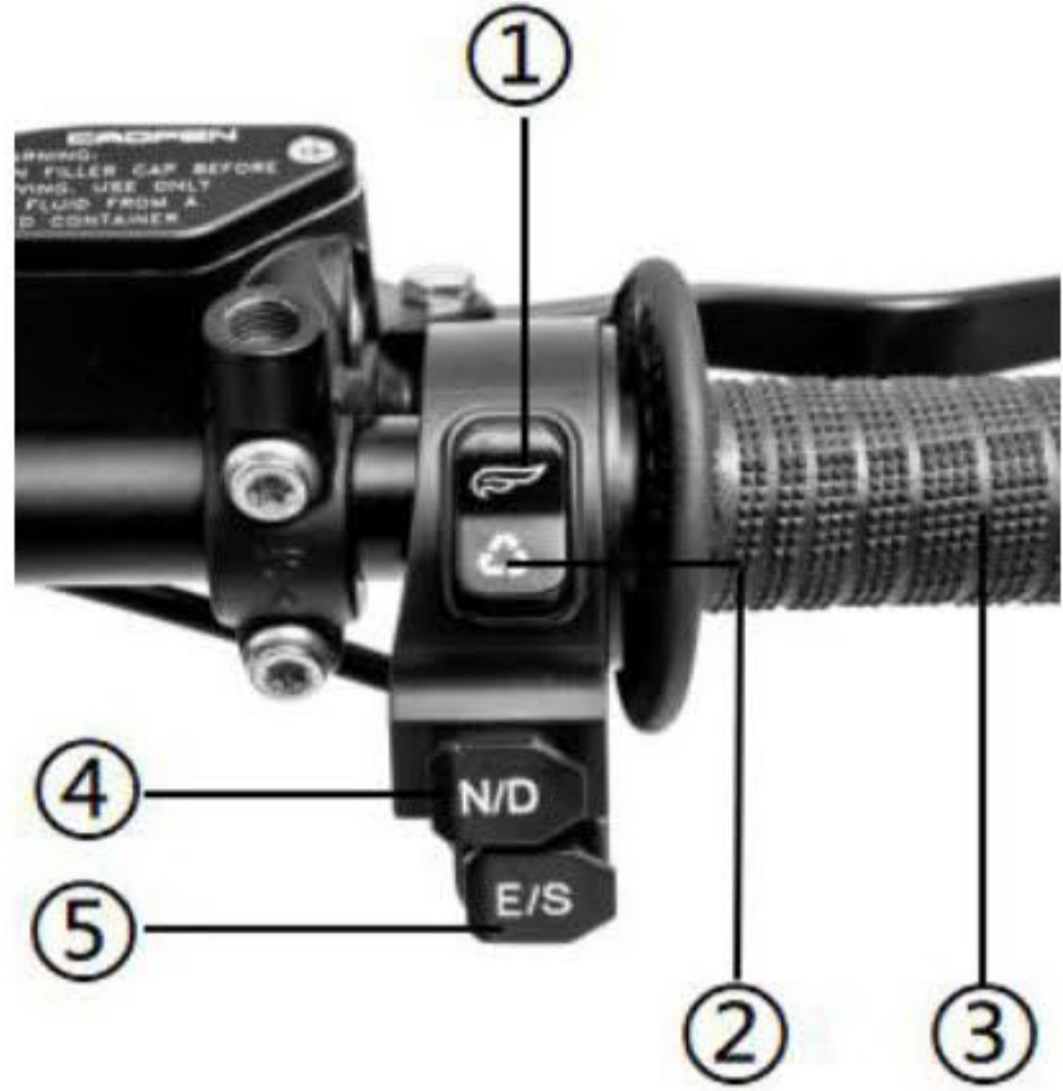


## 4. Left and Right Brake Lever Switches

### Combination switch of left brake lever

	 ① High and low beam switch Press upward to turn on the high beam.  Press downward to turn on the low beam.
	 ② Left turn signal switch Push rightward to turn on the front and rear right turn signals.
	 ③ Right turn signal switch Push leftward to turn on the front and rear left turn signals.
	 ④ Horn switch Press the switch and the horn will sound.



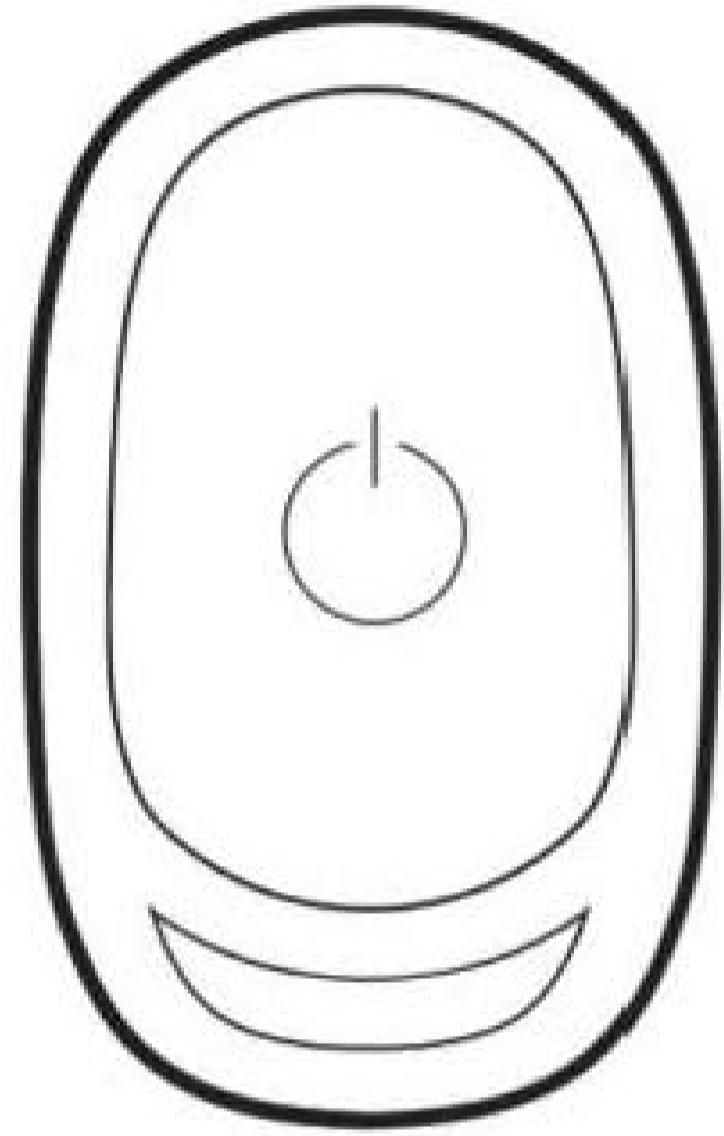
## Combination switch of right brake lever

	 <p>① Entertainment mode switch: Press upward for 3 seconds to turn this mode on and off.</p>
	 <p>② Energy recovery indicator 1. Steady on: the auxiliary brake is applied to recover the energy after a delay of 20 ms when the braking signal is detected (or the speed is reduced by 10%); 2. Flashing: the energy is recovered after the throttle is released. 3. Off: the energy recovery is disabled.</p>
	<p>③ Right throttle grip Turn the grip backward to accelerate.</p>
	<p><b>N/D</b></p> <p>④ Gear and Neutral shift button Instrument movement D gear lights on and off (default N gear every time you start) 1. If steady on, the Gear D is applied and the motorcycle can be driven; 2. If lighting off, the Neutral Gear is applied (not displayed) and the motorcycle cannot be driven;</p>
	<p><b>E/S</b></p> <p>⑤ Gear shift button Power gear display: the button circulates in Gears 1, 2 and 3; when the indicator is steady on, Gear 1 applied; when flashing slowly, Gear 2 applied; when flashing fast, Gear 3 applied. The gear number is also displayed in the current gear area of the meter.</p>



## 5. Startup controller

Electronic key (remote control)



Electronic key: after the battery switch is turned on, the remote control will beep once, indicating that the power gets ready, press the ON button on the remote control and the steering lock will be unlocked; press the OFF button and the lock bolt extends downward to the lock-up direction.

 **NOTE**

When the remote control is applied, ensure that the battery is properly installed in the motorcycle, and the effective remote control distance should not be over 20 meters. When the motorcycle is controlled by the remote control, the distance between the remote control and the motorcycle should not be less than 1.2 meters.

## 6. Battery Pack and Charging Mode

### Battery pack

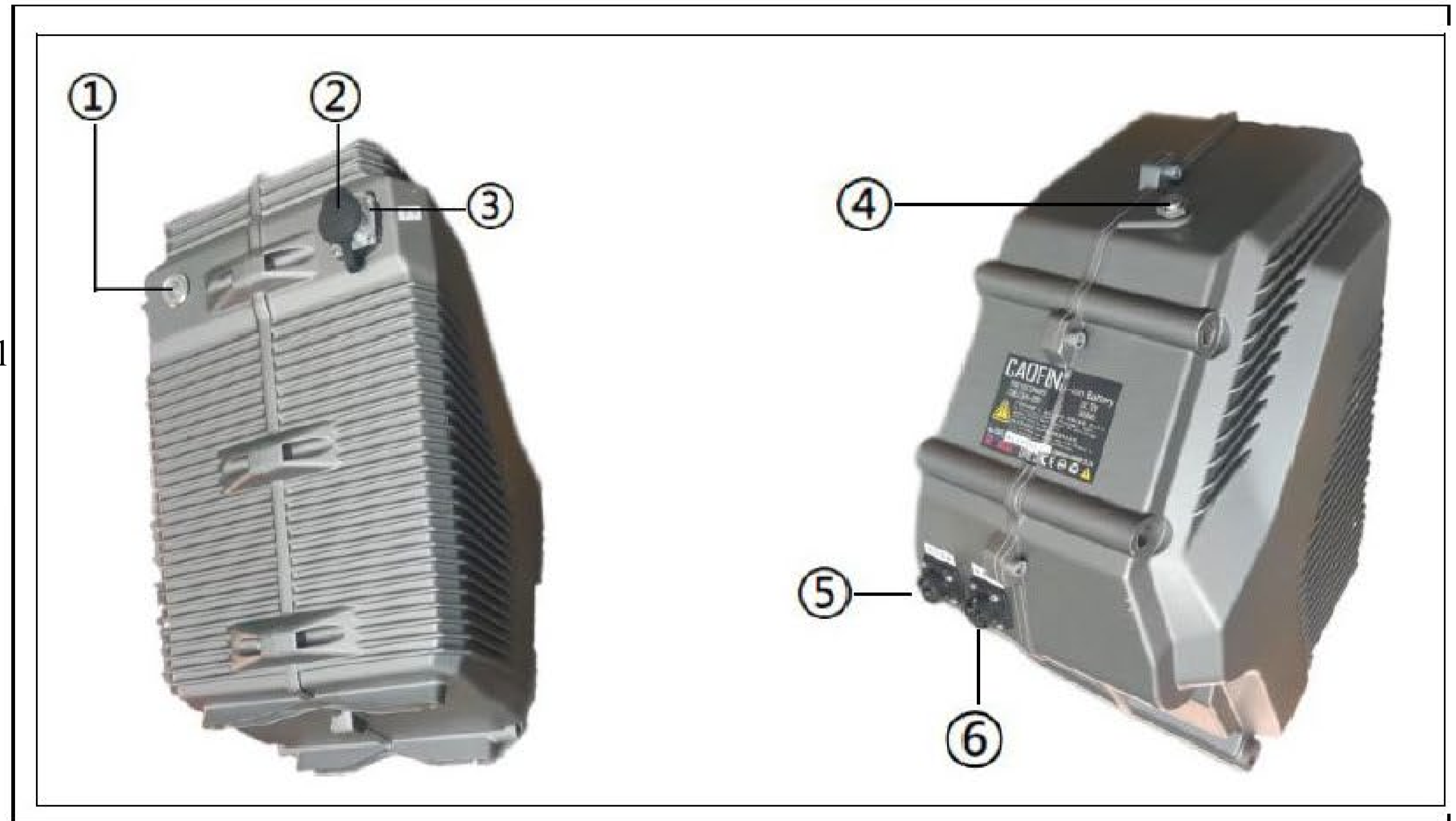
There are three battery specifications (72V48Ah, 32Ah, 30Ah) available for F80 electric motorcycles. Unique fully submerged liquid cooling and heat management solution is adopted for 72V48Ah and 72V32Ah batteries, greatly guaranteeing the safety and service life of the battery.

#### Liquid cooling technology of battery:

- Unique fully submerged liquid cooling and heat management solution in the industry
- IP67 battery module is fully submerged in the compound environment-friendly liquid cooling solvent. The solvent with high specific heat capacity is conducive to rapid heat dissipation and heat balance of the battery. The typical temperature difference is not more than 2 °C so as to maintain the consistency of cell temperature and effectively extends the battery service life.
- Internal power battery system, BMS and other electrical components are all covered with liquid "safety film" and arranged in flame-retardant ABS frame structure, and the battery cells are all kept independently insulated in all directions. A flexible shockproof EVA is placed between the two cells, with coolant flowing in the middle to isolate water and air, providing a different guarantee for battery safety and creating a larger time window of life safety in extreme cases.
- The cell is gold-plated to ensure sufficient current capacity and 5,000 times of plugging and unplugging. The terminal is designed to be locked, namely it can be locked in place to ensure full contact under all working conditions. Special machining technology allows the motorcycle to meet the IP68 waterproof and dustproof requirements.
- The low-temperature charging system (0 to -40°C) is capable to charge the battery anytime and anywhere in case of emergencies, and prevent the cell from dangerous charging at low temperature.
- The magnesium alloy case has superior strength protection and excellent heat dissipation performance. The weight of the case is 1/3 less than that of the aluminum alloy case of the same volume and 1/5 of the weight of the steel case, enabling the motorcycle to have more endurance mileage.

## Schematic Diagram of Battery Shape and Components

1. Battery switch
2. Waterproof and dustproof cap
3. Charging socket
4. Explosion-proof pressure relief valve
5. Discharge cathode holder
6. Discharge anode holder (communication, normal power supply)



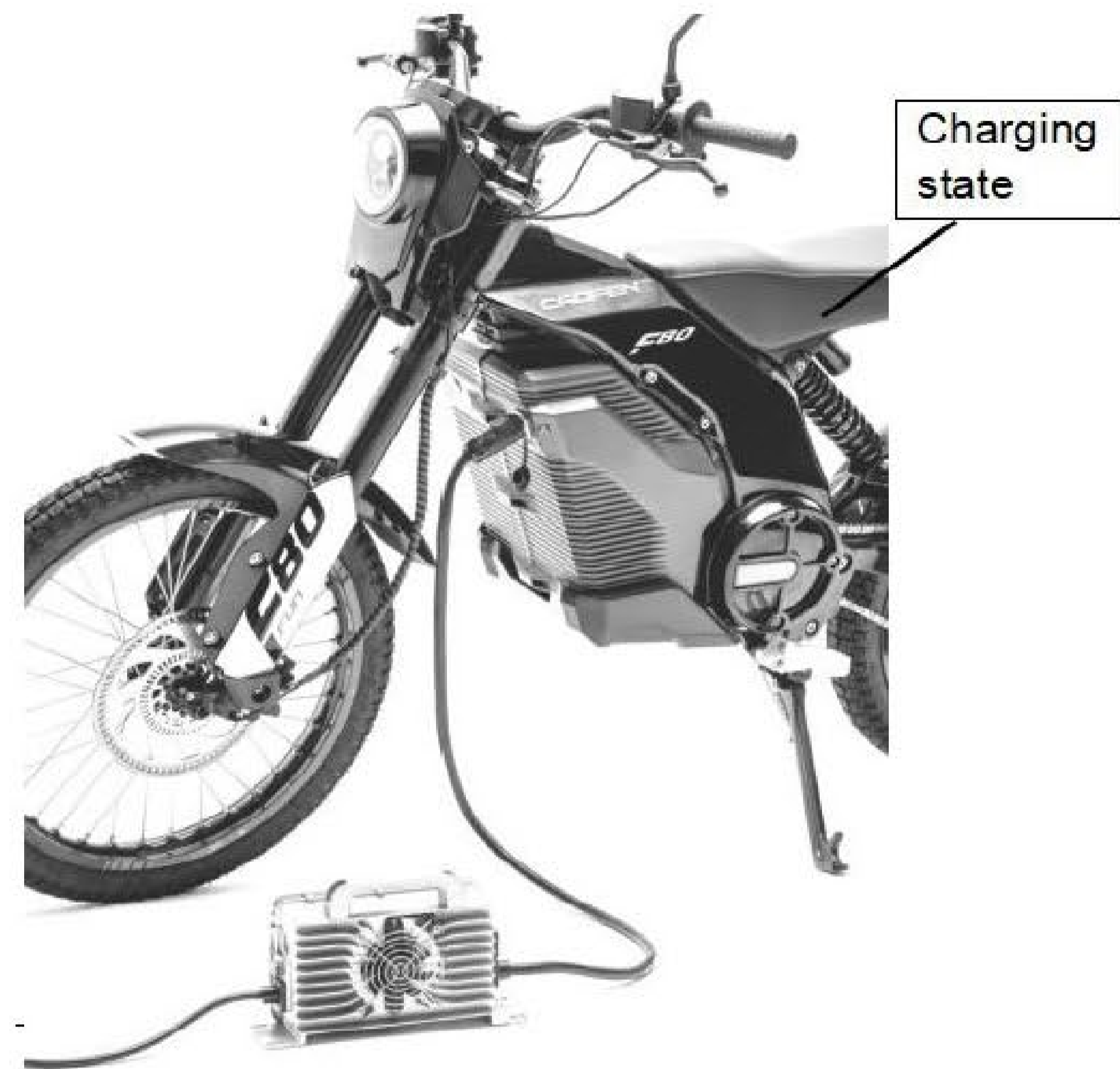
Tip: The Battery of your F80 Electric Motorcycle may be slightly different from the picture in the Manual, but the function and wiring definition are the same.



## Motorcycle Charging Mode

### Charging procedure

1. Check the charger and ensure that it is the original one matched with the battery.
2. Turn on the battery power switch.
3. Connect the charger output plug with the battery charging port (check whether it is plugged in place).
4. Connect the mains power input terminal of the charger to the AC socket (input voltage: AC110V-AC220V).
5. After 3-5 seconds, the charger indicator flashes, the fan rotates and the charger start charging; after the battery is fully charged, the indicator turns green and flashes.
6. After fully charged, cut off the commercial power supply, and then remove the power plug.







### Battery User Manual

- Before putting the battery into service, please ensure that it is original, and do not use other brands or types of batteries.
- Before use, check whether the battery is in good condition, and ensure that there is no obvious damage, liquid leakage, water immersion, smoking, overheating, etc.
- For the safety during transportation, the rated capacitance of the battery is 50%-80% when it is delivered. Due to the influence of self-consumption factors such as transportation and storage cycle, there is low battery power or even no power when the battery is used for the first time. It is normal, and do not worry. Just charge it once according to the instructions.
- Do not connect the charger to AC power supply or charge the battery in a confined space or at high temperature.

## 7. Environment and Precautions

### Operating Environment

			
<ul style="list-style-type: none"> <li>● Use the liquid-cooled battery between -40 °C and 50 °C.</li> <li>● Use lithium iron phosphate battery between -10°C and 45°C.</li> </ul>	<ul style="list-style-type: none"> <li>● Protect the battery from being soaked by water, beverages and corrosive liquids.</li> <li>● Do not wash the interior and meter of the motorcycle with water cannon.</li> </ul>	<ul style="list-style-type: none"> <li>● Keep your motorcycle or battery away from open flame, heat source, and flammable and explosive gas or liquid.</li> </ul>	<ul style="list-style-type: none"> <li>● Keep the metal or other conductive objects from entering the battery case.</li> <li>● Do not short-circuit the anode and cathode of the battery with wire or other metal object.</li> </ul>




■ At low temperatures, the available capacity of the battery will be reduced to varying degrees, which will result in a shorter riding mileage. As long as the decrease is not significantly abnormal, it is considered normal. If you have any questions, please contact your local EMMO distributor or after-sales service center.

■ If the battery exhibits abnormal heating, a scorched smell, smoking, or leaks special sour liquid, stop using it immediately and promptly contact the local after-sales service center or our company!

■ The battery should not be repaired by the user. If it is abnormal, please contact the distributor. Unprofessional disassembly may cause the battery to overheat, smoke, catch fire, or explode. If the user opens the battery case without permission, they will not be eligible for the three-pack policy. Unauthorized opening of the battery case will render the Three Guarantees policy inapplicable.






## Charging Environment

		
<ul style="list-style-type: none"> <li>● Please charge the battery with the original charger rather than other brands of chargers</li> </ul>	<ul style="list-style-type: none"> <li>● Please charge the liquid-cooled battery at -40°C to 50°C.</li> <li>● Please charge the lithium iron phosphate battery at -10°C to 45°C.</li> </ul>	<ul style="list-style-type: none"> <li>● Do not charge the battery for more than 8 hours, because ultra-long charging will affect the service life of the battery.</li> </ul>

- It is unnecessary to fully charge the battery each time, but recharge it fully with a special charger every once in a while (the charger stops automatically, its indicator lights green for a long time, and the SOC shown on the meter is 100%), making the whole battery system in good condition;
- The charging speed is fast in early stage while slowly in later stage, which is set for safe charging;
- In winter, if the temperature is below 0°C, the charging time is longer than that at ideal temperature, which is a normal phenomenon. Please charge the battery at proper ambient temperature to ensure the charging effect.
- During charging, if the indicator is abnormal, the charger has peculiar smell or the charger shell is overheated, please immediately stop charging and repair or replace the charger. Do not disassemble or replace the internal components of the charger. When replacing the charger, the new charger should be made by the original manufacturer.



## Storage Environment

		
<ul style="list-style-type: none"> <li>■ At ordinary times, the motorcycle or battery should be stored in a dry and ventilated place with an indoor temperature of not over 40°C (not over 60°C for liquid-cooled battery).</li> <li>■ For long-term storage, it should be stored at 0°C to 30°C. If stored at an environment higher than 40°C (60°C for liquid-cooled battery), the battery capacity will be irreversibly attenuated.</li> </ul>	<ul style="list-style-type: none"> <li>■ Before long-term storage, it should be confirmed that the battery capacity is between 50% and 80%. If it is insufficient, please recharge the battery. After charged to the recommended capacity, turn off the switch of the battery system, and then put it aside for storage</li> <li>■ When the motorcycle is stored for a long time, due to the self-consumption of the battery, the meter shows a decrease in power after a period of storage, which is normal.</li> </ul>	<ul style="list-style-type: none"> <li>■ The battery of new motorcycle should be charged for 0.5-1 hour within 30 days due to the factors of transport, production cycle and battery self-consumption.</li> <li>■ The battery system should be charged every 3 months. It should be remembered to turn off the switch of the battery system first before it is set aside and not used each time.</li> </ul>

- For long-term storage, do not store the motorcycle or battery in a place where there is a risk of falling. If falling, the motorcycle may be damaged uncontrollably or the battery may leak, heat, smoke, catch fire or explode.
- Do not store the battery with acidic and other corrosive substances and flammable and explosive materials.

## Precautions for Battery Use

● When the battery is used for the first time, please discharge it as much as possible, and then fully it before use, so as to ensure the actual capacity of the battery as accurate as the SOC displayed on the meter or activate the battery management software.

● In the daily use of the motorcycle, when the SOC is insufficient, the battery should be charged in time and frequently to extend the service life of the battery.

● There may be a deviation between the actual capacity of the battery and the SOC displayed on the meter during the long-term use of the motorcycle. Please charge and discharge the battery regularly (no more than 3 months). The built-in battery cell and intelligent system can automatically calibrate the SOC of the battery to improve the experience.

⚡ It is not allowed to reversely connect the anode and cathode, put the battery into water or make it wet, or short-circuit the anode and cathode with wire or other metal object;

⚠ It is forbidden to throw, squeeze, impact or puncture the battery, or expose it to sunlight for a long time, or use it in high-temperature environment (above 60 °C). Otherwise, the battery will not be used due to overheat protection, or will be heated, smoked, caught fire or exploded during use. Frequent use of battery in high temperature environment will affect battery performance, shorten battery service life and reduce battery safety.

⚠ The ambient temperature will affect the discharge capacity. When the ambient temperature exceeds the standard ambient temperature ( $25 \pm 5$  °C), the discharge capacity will be reduced.

⚠ If the liquid in the battery enters the eyes, do not rub it with hands, but wash it with clean water immediately and seek medical help in time. If left untreated, eyes may be damaged.

⚠ Please charge the battery with the supporting special charger. As self-equipped charger will result in product damage and safety problems, customers should fully realize its harmfulness and take full responsibility!

⚠ If the motorcycle wades into water, the water level shall not exceed the tire height (the water is about 60cm deep), otherwise the surge may cause water to enter the controller connector, resulting in a short circuit and causing motorcycle damage. In this case, it is forbidden to recharge the whole motorcycle or battery, otherwise the accessories may be damaged, and the battery may catch fire, burn and explode. The correct treatment is to immediately send the motorcycle to the distributor for inspection and repair.



## 8. Side Stand

1. Stop switch
2. Pedal
3. Side stand
4. Side stand Spring
5. Spring hook bolt

This electric motorcycle is designed with a side stand parking system. The Stop switch on the side stand is designed for safety, which is part of the starting circuit for driving. When the side stand is in the parking state, the READY indicator will light off, or light up only when the side stand is retracted.



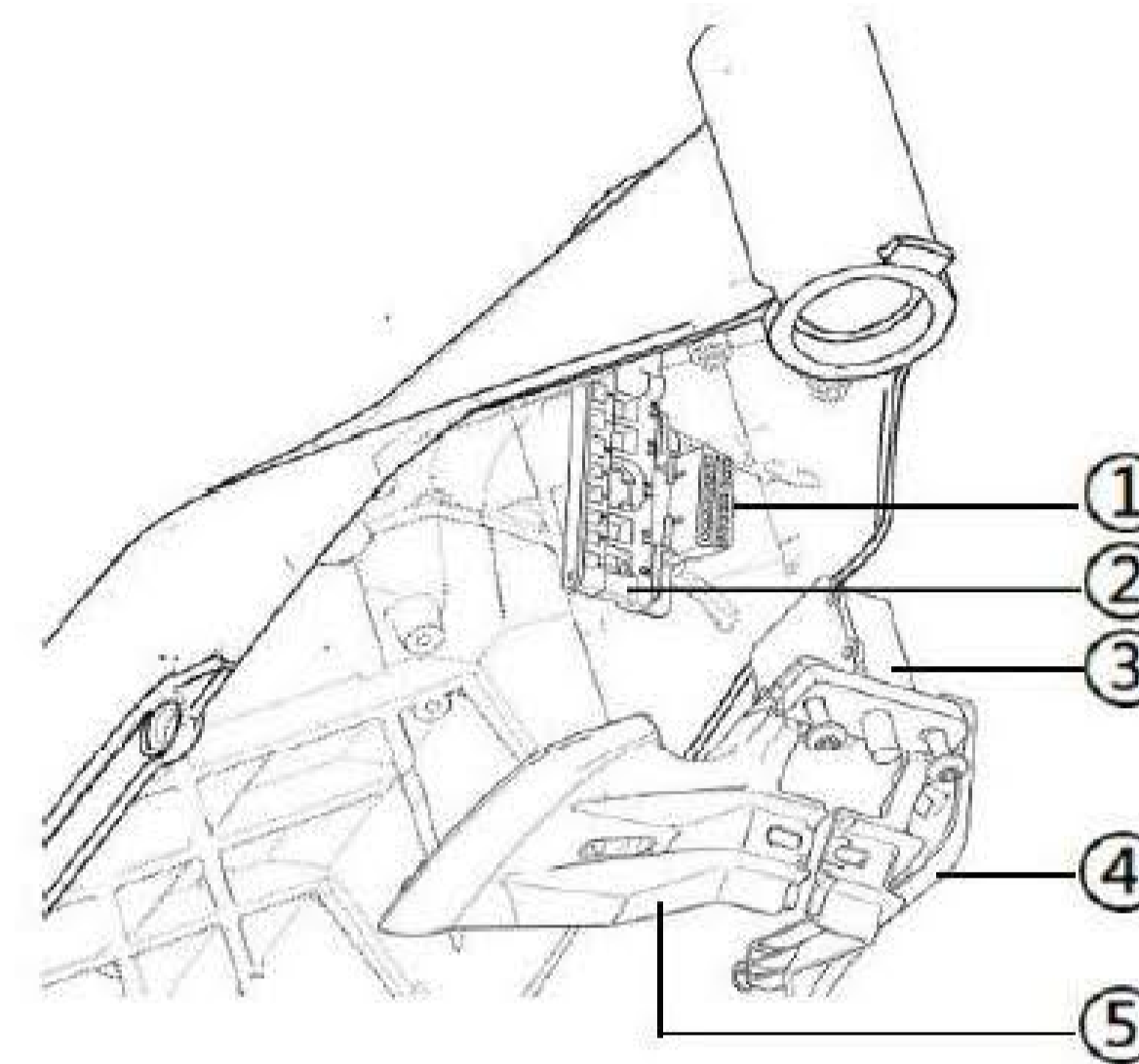
### ⚠ Warning

- If the ground is soft or uneven, the motorcycle will not stop smoothly, so please park it on a solid and flat road.
- If it is required to stop the motorcycle on a slope, please make the head of the motorcycle face uphill to reduce the possibility of reversing caused by side stand rotation.
- The design of the side stand is more concerned with the dead weight of the motorcycle, do not lean or sit on the motorcycle after parking, otherwise the side stand will be deformed or even broken because it bears more loads than the maximum strength it can bear.



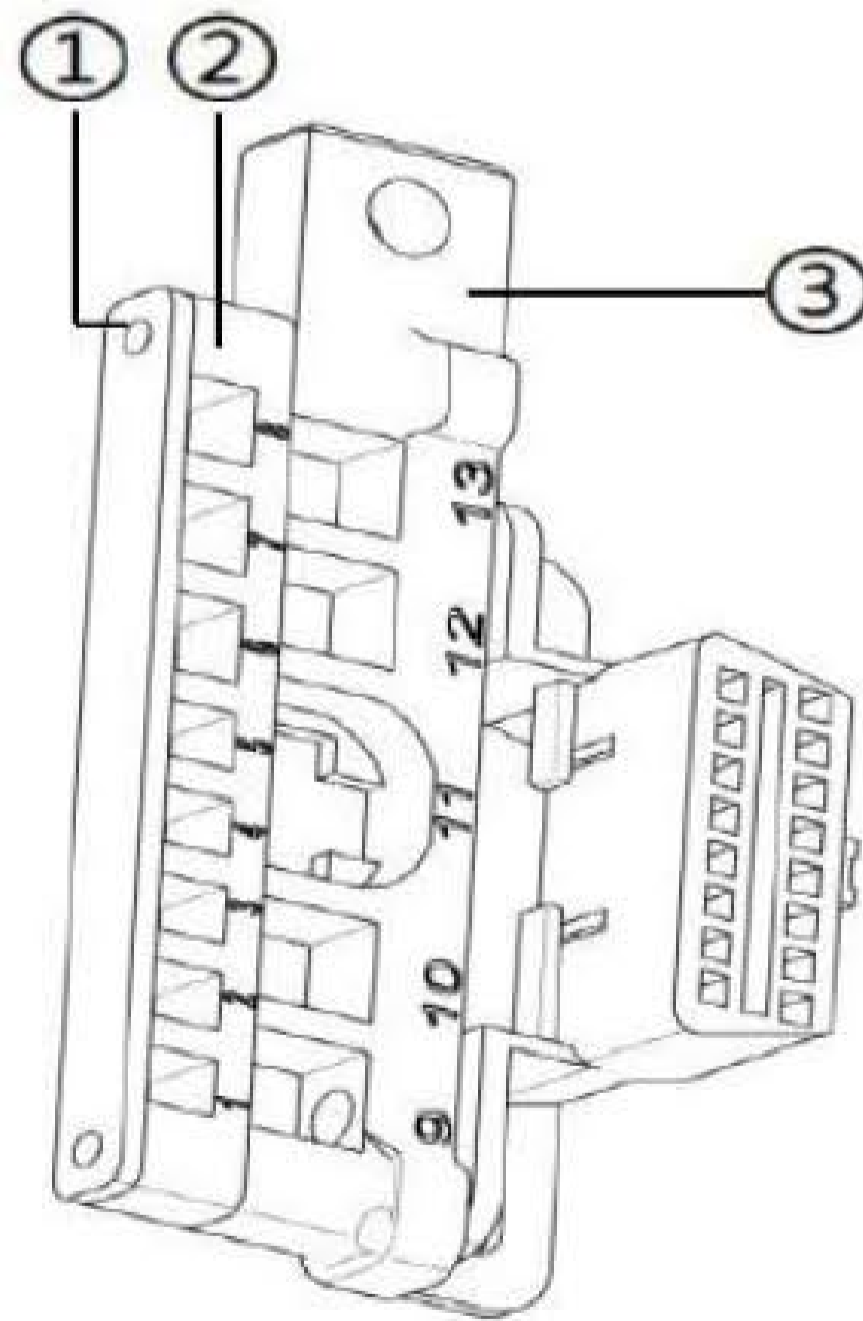
## 9. Service Chamber

1. OBD port
2. Integrated terminal block assembly (➡22)
3. Electronic steering lock
4. Left service chamber cover
5. Right service chamber cover



### Integrated terminal block assembly

1. Locking cover of integrated terminal block
2. Auxiliary support of integrated terminal block
3. Main support of integrated terminal block



Factory wiring definition of integrated terminal block assembly:

1	Front brake	6	Use 6 for wiring in L1e state or off-road state
2	Rear brake	7	-----
3	Right turn indicator	9	Control cable of right brake lever
4	Left turn indicator	10	Control cable of left brake lever
5	External wiring of the meter	11	Front wheel speed sensor
13	Headlamp	13	Meter harness

**⚠ Warning:** The OBD port, different from other products, should be connected by a dedicated CAN cable. Do not improperly connect it, because improper connection may damage the controller.

## 10. Riding Guide

### Precautions before Riding

- This product is a high-performance electric motorcycle and is limited to reasonable recreation and careful driving by experienced persons in compliance with local laws and regulations.
- Driving is prohibited after taking medication or drinking alcohol.
- Before your first drive, please read the Manual, and fully understand all safety information, working principle and operating techniques, then make sure you are in good physical and mental condition, and wear safety helmets, glasses and other safety protective clothing correctly;

### Riding Protection Warning

⚠ For your safety, we recommend that you always wear a suitable and qualified safety helmet, protective glasses, face mask, gloves, boots, long-sleeved clothes or jacket, and pants while driving, regardless of season and riding distance.

**⚠ Warning**

Failure to wear a safety helmet may increase the risk of injury or death in case of collision. For your safety, wear safety helmet, safety glasses and other protective equipment when driving.



## Pre-riding Inspection

For safety reasons, it is very necessary to check the following items before driving:

Item	Procedures	Warning prompt
Right throttle grip	● Make sure that the throttle grip operates stably and rotates flexibly.	<p><b>⚠ Potential hazard</b></p> <p>● Without inspection and maintenance before operation, it is more prone to cause incidents or mechanical damage.</p> <p>● The worn brake shoe will reduce the braking effect.</p> <p>● The brake discs will be worn, thinned, cracked or deformed after frequently used, which may lead to brake failure.</p> <p>● There may be abnormal sound or frequent chain detaching if the tensioner and chain guide are damaged and broken.</p> <p><b>⚠ Notes:</b></p> <p>● Improper spoke tightness will seriously affect driving safety, so it shall be checked regularly.</p> <p><b>⚠ How to avoid</b></p> <p>● Make sure that your motorcycle is in a safe state before each operation. Follow the procedures and operations described in the Manual.</p>
State of charge (SOC)	● Check the SOC and whether it needs to be charged.	
Front and rear brake	<ul style="list-style-type: none"> <li>● No brake fluid is leaking and the brakes are applied normally</li> <li>● Brake discs and brake shoes are free from water and oil stains.</li> </ul>	
Brake lever	● Make sure it can be operated normally	
Tires	<ul style="list-style-type: none"> <li>● Ensure that the tire pressure is correct and adjust it if necessary. The recommended tire pressure is 225Kpa for front and rear wheels</li> <li>● Check whether the surface is worn, cracked, adhered with foreign matters or perforated.</li> </ul>	
Drive chain	● Check the chain for looseness and lubrication, and adjust it if necessary.	
Tensioning Wheel	● After pressed, it can rebound normally, and the rubber wheel is free from damage and fracture.	
Chain guide	● There is no foreign matters stuck in the chain groove, and the accessories are free of fracture, crack, deformation and rubbing with chain.	
Instrument	● After power-on, check whether there is a fault code, whether the READY indicator lights up after the side stand is retracted, and whether the display is normal.	
Left and right brake levers	● After the motorcycle is powered on, confirm that the buttons works normally before riding.	
STEERING SYSTEM	<ul style="list-style-type: none"> <li>● The handlebar is rotated flexibly without sticking.</li> <li>● The steering stem is free of runout or looseness.</li> </ul>	
Shock absorber	● After pressed, it can return smoothly.	
Light	● High beam, daytime running lamp, tail lamp, brake lamp, turn signal and license plate lamp can light up normally.	
Horn	● It works normally.	
Side stand	● It can be retracted normally and the Stop switch works normally.	
Rear-view mirror	● Clean and adjust to proper rear view angle,	
Rim assembly	● Check the tightness of the spokes, and adjust them if they are loosened.	



## Adjustment of Sensitive Parts before Riding

### Adjustment of Handlebar

Check whether the handlebar is assembled in the center of the motorcycle, and adjust it if deviated.

### Adjustment of Rear-view Mirror

Adjust the rearview mirror to the correct position according to your height and driving posture.

The mirror body 1 can be adjusted directly,

Alternatively, adjust the mirror support 2 by loosening the nut 3 with a tool, and then lock the nut 3.

**⚠ NOTE**

After adjusting the handlebar, repeatedly check whether it is fastened. If it is loose, tighten it with bolts with threaded glue, otherwise it will affect your control of the motorcycle.

**⚠ NOTE**

Adjusting the rearview mirror while driving will reduce your control of the motorcycle, and even the motorcycle may be scratched, so please do not adjust the rearview mirror while driving.

## Shock Absorber - Front Absorber Adjustment

The preload of the shock absorber is adjusted to adapt to different drivers, loads, driving modes and road conditions to make the motorcycle to achieve the best driving performance and avoid damage to the front fork, rear shock absorber and body.

External adjustment function of front shock absorber:

- A. Rebound damping adjustment;
- B. Spring preload adjustment;
- C. Air chamber pressure adjustment.

### ■ Rebound damping adjustment

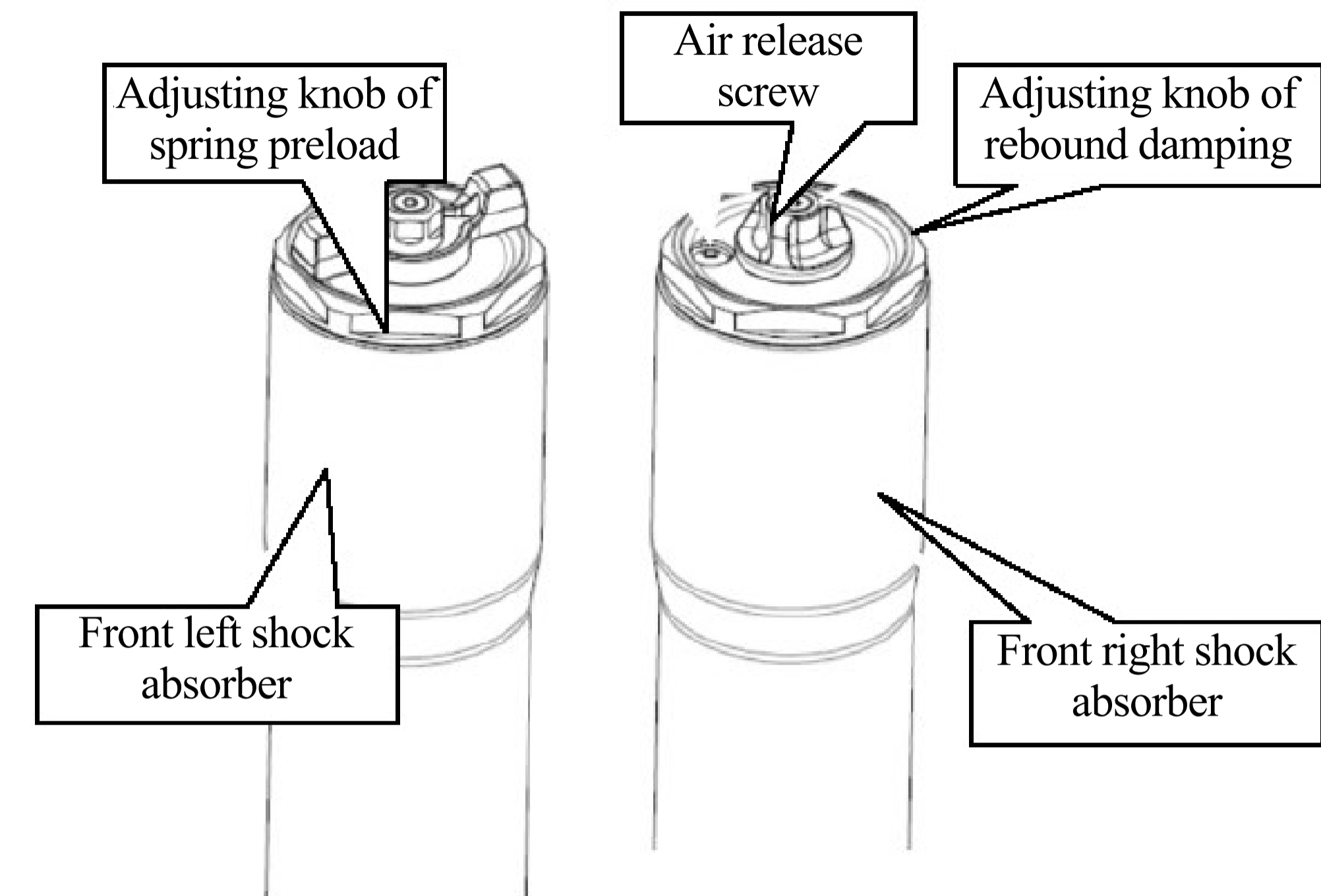
As shown in the figure, the rebound damping can be adjusted by manually rotating the red adjusting knob of rebound damping at the top of the right front shock absorber.

- Rotate the knob clockwise to increase the rebound damping and make the front shock absorber slow down during rebound; rotate it counterclockwise to reduce the rebound damping and make the front shock absorber become faster during rebound.

- The rebound damping can be adjusted by 12 segments and can be set appropriately according to the rider's weight, habits and road conditions. It is generally adjusted clockwise to the maximum and then counterclockwise to the required segment. When adjusting, the force applied should be moderate, and the adjustment stopped immediately in case of slight resistance, so as not to exceed the bearing limit of the adjusting screw.

- When driving on a mountain road or a curved road, rotate the rebound damping adjusting knob clockwise to slow down the rebound and reduce the motorcycle shaking; When driving in urban areas or on bad roads, the adjusting knob of rebound damping can be rotated counterclockwise to make the shock absorber rebound faster and less hard;

- Strenuous driving for a long time will increase the air pressure inside the right tube, making the shock absorber become hard, then unscrew the air release screws on the left and right tubes with a straight screwdriver, and lock them after the air is released.



The performance of the front fork depends on the adjustment in different riding environments, such as the rebound damping adjustment: the standard of clockwise and counterclockwise adjustment (the following segments are for example, and the number of rotations depends on the type of front shock absorber and personal feelings, but you can remember the best segments you adjust in actual use).

Comfort	0-3 segments
Standard	6-8 segments
Sports	10-12 segments

■ Spring preload adjustment

As shown on Page 27, the support force of shock absorber can be adjusted by manually rotating the blue adjusting knob of spring preload at the top of the left front shock absorber.

- Rotate the knob clockwise to increase the support force; rotate it counterclockwise rotation to reduce the support force.
- The adjustable height of spring preload is 12.5mm, and the spring adjusting knob is rotated by one turn to lift up the preload by 1.25mm;
- When adjusting, the force applied should be moderate, and the adjustment stopped immediately in case of slight resistance, so as not to exceed the bearing limit of the adjusting screw.
- The spring weight is 40LBS, and the spring preload of 12.5mm can increase the supporting force by 8.5KG;

The greater the spring preload, the higher the damping characteristics of rebound. In actual application, the preload value of the spring cannot be accurately recorded as a number (the rotation position depends on different environments and personal feelings).

Comfort	+0
Standard	+0
Sports	+3



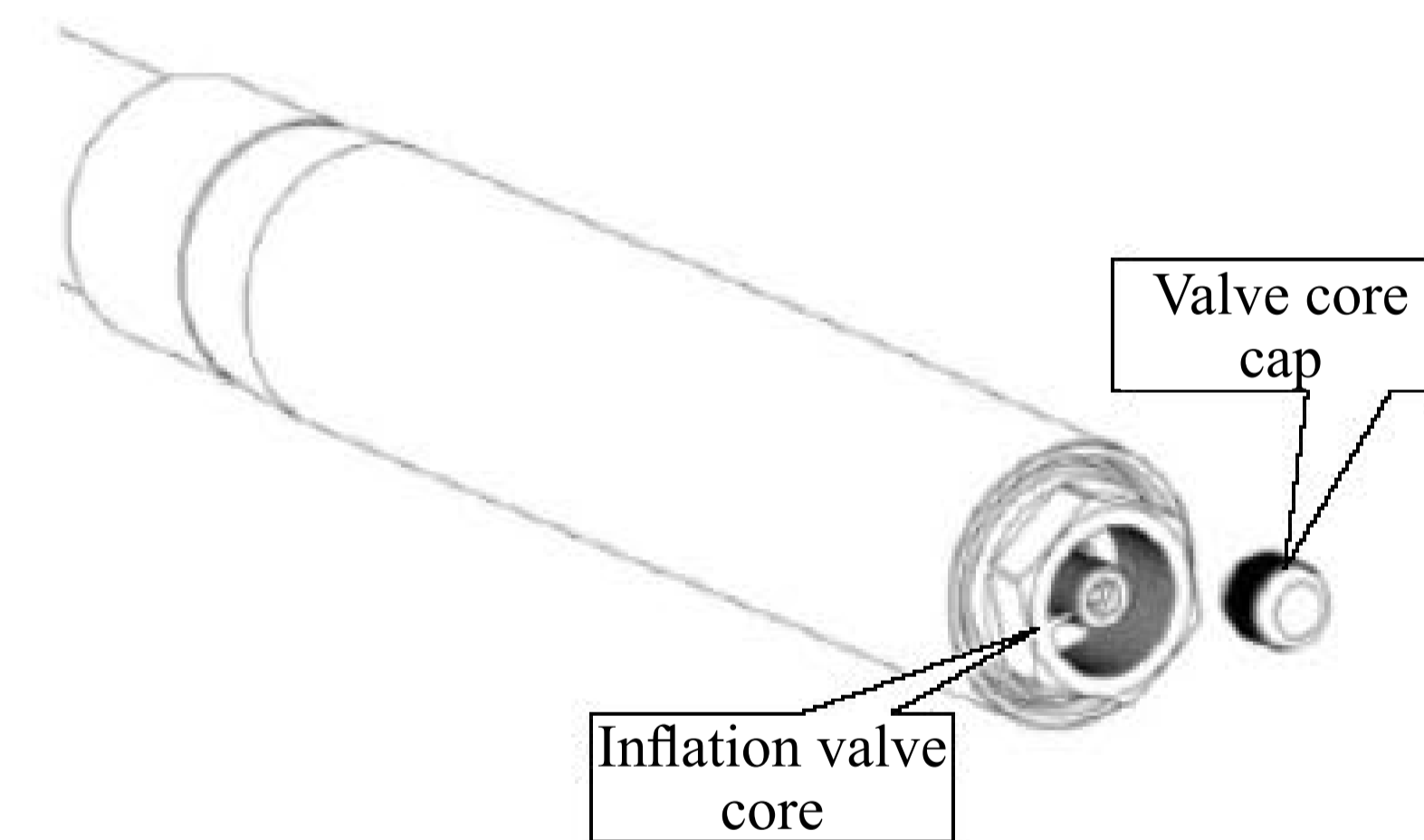
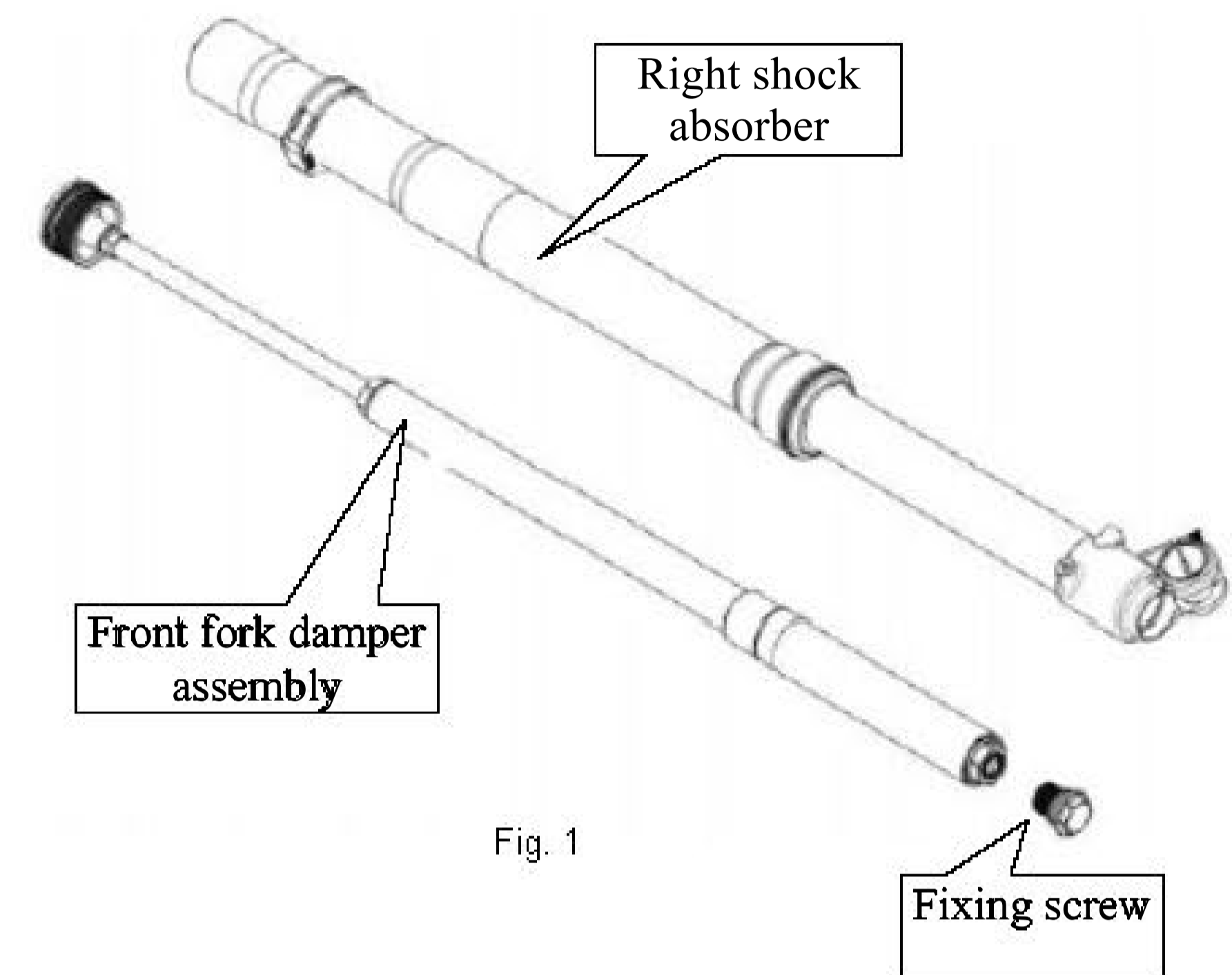
### ■ Air chamber pressure adjustment

As shown in Figure 1, remove the fixing screw at the bottom of the right front shock absorber, loosen the compound joint between the outer tube and the rebound adjusting seat, and remove the damper assembly;

As shown in Figure 2, the damper assembly is equipped with a valve core inflator at the bottom, and a special shock absorber pump can be used to fill the air chamber with high-pressure nitrogen or air through the valve core. The inflation pressure is adjusted and set according to the rider's weight, habits and road conditions.

\* The recommended inflation pressure is 40PSI to 80PSI;

- When driving on a flat road, the inflation pressure can be set to a lower range to make the shock absorber easier to compress and increase the comfort during driving;
- When the load increases, the inflation pressure can be increased appropriately to avoid bottoming out the front shock absorber and eliminate discomfort during riding.
- When the body sinks too fast or shakes excessively when making a turn, the inflation pressure can be increased appropriately;
- When the shock absorber sinks slowly, or the shock absorber become hard and the body jumps when passing through poor roads, the inflation pressure can be reduced properly;



## Shock Absorber - Rear Shock Absorber Adjustment

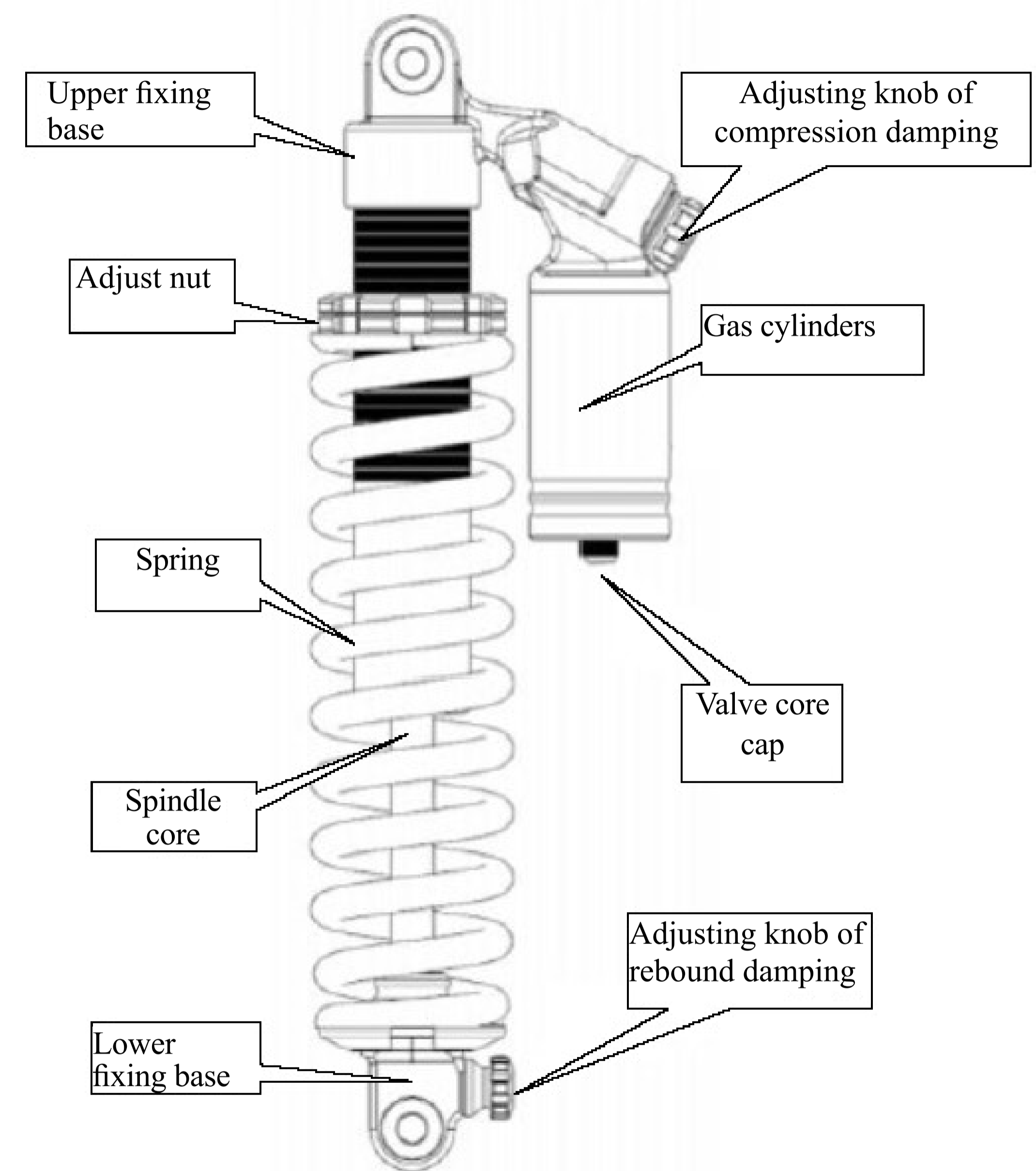
External adjustment of rear shock absorber:

- A. Rebound damping adjustment;
- B. Compression damping adjustment;
- C. Spring preload adjustment;
- D. Airbag inflation setting.

### ■ Rebound damping adjustment

As shown in Figure 1 on Page 30, the rebound damping can be adjusted by rotating the red adjusting knob of rebound damping on the lower fixing base of rear shock absorber.

- Rotate the knob clockwise to increase the rebound damping and make the rear shock absorber slow down during rebound; rotate it counterclockwise to reduce the rebound damping and make the rear shock absorber become faster during rebound.
- The rebound damping can be adjusted by 12 segments and can be set appropriately according to the rider's weight, habits and road conditions. It is generally adjusted clockwise to the maximum and then counterclockwise to the required segment. When adjusting, the force applied should be moderate, and the adjustment stopped immediately in case of slight resistance, so as not to exceed the bearing limit of the adjusting screw.



- When driving on a mountain road or a curved road, rotate the adjusting knob of rebound damping clockwise to slow down the rebound and reduce the motorcycle shaking;
- When driving in urban areas or on bad roads, the adjusting knob of rebound damping can be rotated counterclockwise to make the shock absorber rebound faster and less hard;

#### ■ Compression damping adjustment

- As shown in Figure 2 on Page 31, the compression damping can be adjusted by rotating the blue adjusting knob of compression damping on the upper fixing base of rear shock absorber.
- Rotate the knob clockwise to increase the compression damping and make the front shock absorber hard when pressed down; rotate it counterclockwise to reduce the compression damping and make the front reducer soft when pressed down.
- The compression damping can be adjusted by 18 segments. It is generally adjusted clockwise to the maximum and then counterclockwise to the required segment. When adjusting, the force applied should be moderate, and the adjustment stopped immediately in case of slight resistance, so as not to exceed the bearing limit of the adjusting screw.

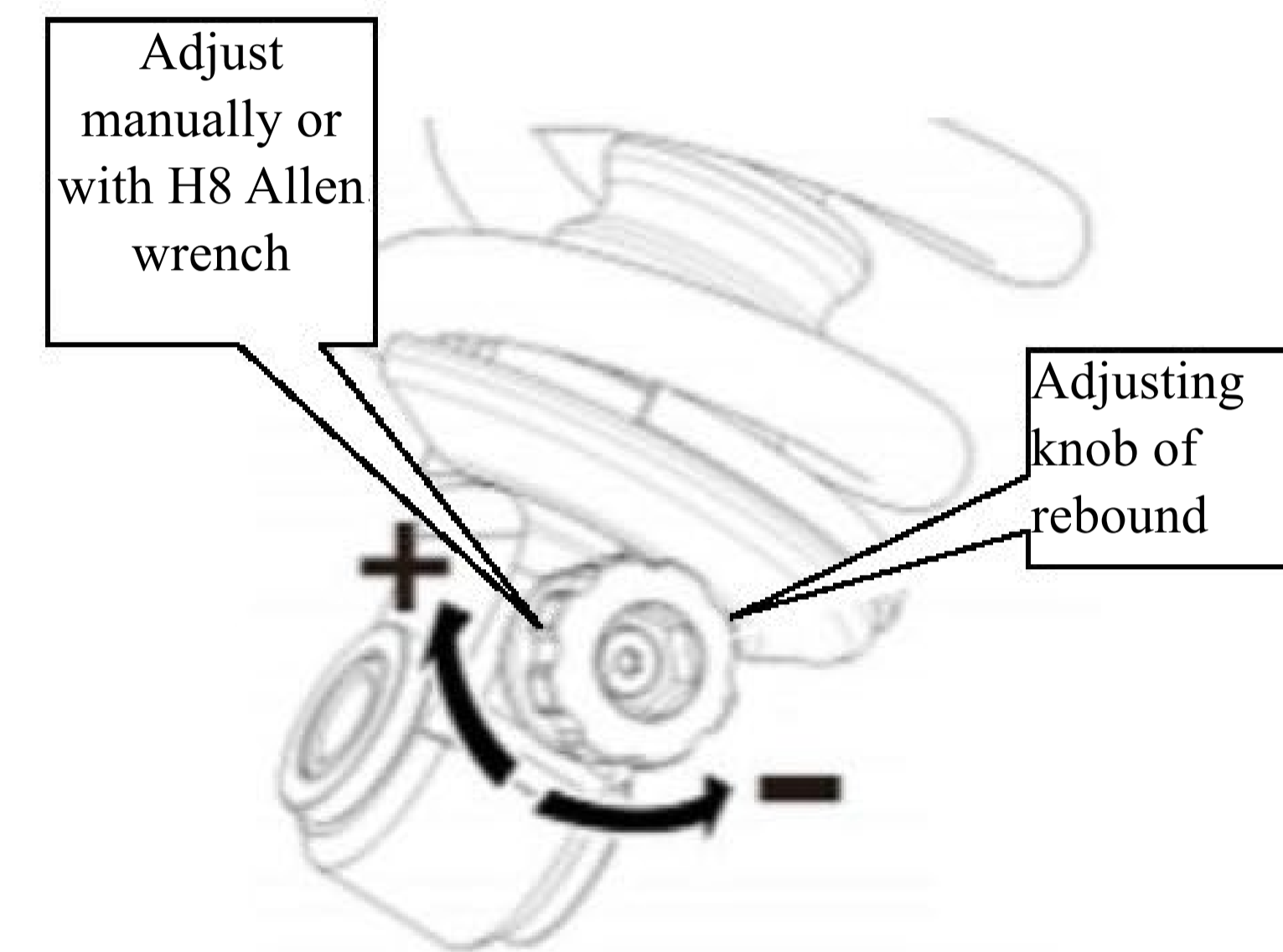


Fig. 1

- Compression damping can be set according to the rider's weight, habits and road conditions:
- When driving on the flat road, adjust the compression adjusting screw clockwise to increase the damping, and increase driving stability;
- When the load is increased, the compression damping can be appropriately increased so as not to bottom out the shock absorber;
- When the body sinks too fast or shakes excessively when making a turn, the compression damping can be appropriately increased;
- When driving on bad roads, the compression adjusting screw should be adjusted counterclockwise to decrease the damping and improve the driving comfort;
- When the shock absorber sinks slowly, or the shock absorber become hard and the body jumps when passing through poor roads, the compression damping can be reduced appropriately.



### ■ Spring preload adjustment

As shown in Figure 2, the customized special claw wrench can rotate the spring adjusting nut forward and backward to change the preload height of the spring and thus adjust the support force of rear shock absorber.

- Rotate the spring adjusting nut clockwise to increase the support force of rear shock absorber or counterclockwise to reduce the support force.
- The rear shock absorber spring of EMMO CAOFEN-F80 is 550LBS in weight, the total length of the spring is 180mm, and the height of the preload can be adjusted to 0-10mm.

### ■ Airbag inflation setting

- The EMMO CAOFEN-F80 airbag inflation pressure is set to 100PSI as shown in Figure 2.

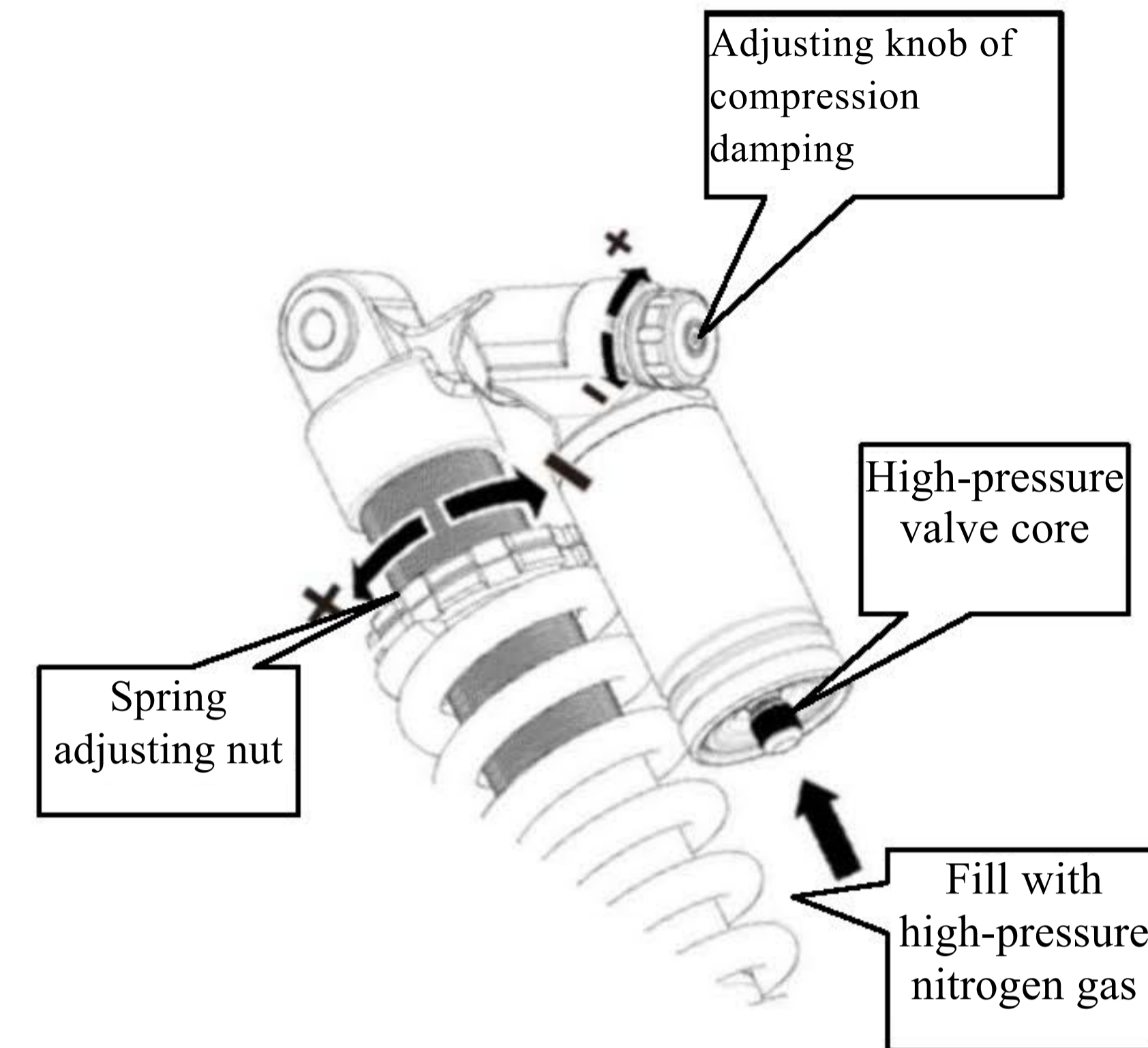


Fig. 2

**! Tip:** Special tool is required for preload adjustment of the rear shock absorber spring. Please turn to your local EMMO distributor if possible.

## Precautions for Shock Absorber

### ■ Precautions for installation:

In order to make the front shock absorber work smoothly, check whether the width of the hub assembly is consistent with the opening width of the shock absorber before installation, and ensure that the two fork tubes of the shock absorber are always in parallel.

### ■ Precautions for use

- The service life of shock absorber depends on a variety of factors, such as road condition, rider weight, driving habits and use intensity, and may be shortened by impact exceeding the bearing limit of shock absorber, irregular falling, and abnormal or rough application.
- Irregular or incorrect maintenance will damage to the oil seal of the shock absorber, self-lubricating bearing, dust seal and main pipe components, which may lead to oil leakage or sluggish movement.
- Different maintenance intervals are set according to different service conditions of users:

Operating Environment	Recommended maintenance interval
Normal road riding	Once every 3 months
Recreational riding through forest road	Once a month
Special users (cross-country)	Inspect and maintain it comprehensively every 10 hours

### ■ Surface cleaning

- The surface of the shock absorber shall be cleaned immediately after each ride, especially when the sediment attached to the main pipe is cleaned with a water cannon, it is forbidden to flush upward against the dust seal to prevent the sediment from entering the oil seal and causing oil leakage;
- It is forbidden to use flammable and corrosive solvents for cleaning, otherwise it will damage the dust seal. The correct method is to use neutral soapy water or detergent and soft cotton cloth;
- After cleaning, it is necessary to apply a layer of lubricating grease on the surface of the fork tube, and press forcibly for several times to fully lubricate the fork tube surface.

#### Warning

Improper use and maintenance will decrease the service life of the motorcycle.

- Abnormal use such as acrobatics, jumping, falling, etc;
- Failure to use, maintain, and operate as required by the user manual;
- Damage caused by unauthorized disassembling, repair and modification or use of non-EMMO original parts;



## Drive Chain Adjustment

It is not correct to make the drive chain too loose or tight.

If the chain is too slack, it will be easy to detach from the sprocket, causing incident.

If the chain is too tight, its service life may be shortened and the transmission resistance will be increased, accelerating the wear of the chain, front sprocket, rear sprocket and chain guider, and some components will be broken or damaged when overloaded.

The correct chain slack is shown in Figure 1:

The motorcycle chain should be adjusted in real time to keep its tightness in at 20-30mm. If the slack of the drive chain fails to meet the above requirements, it should be adjusted.

The adjustment method is as follows:

Keep the motorcycle parked upright, loosen the rear axle nut, adjust the nut and bolt according to the slack of the chain, adjust the left and right sides of the chain adjusting top block to the appropriate slack, and then lock the rear axle nut and the adjusting nuts on the left and right sides.

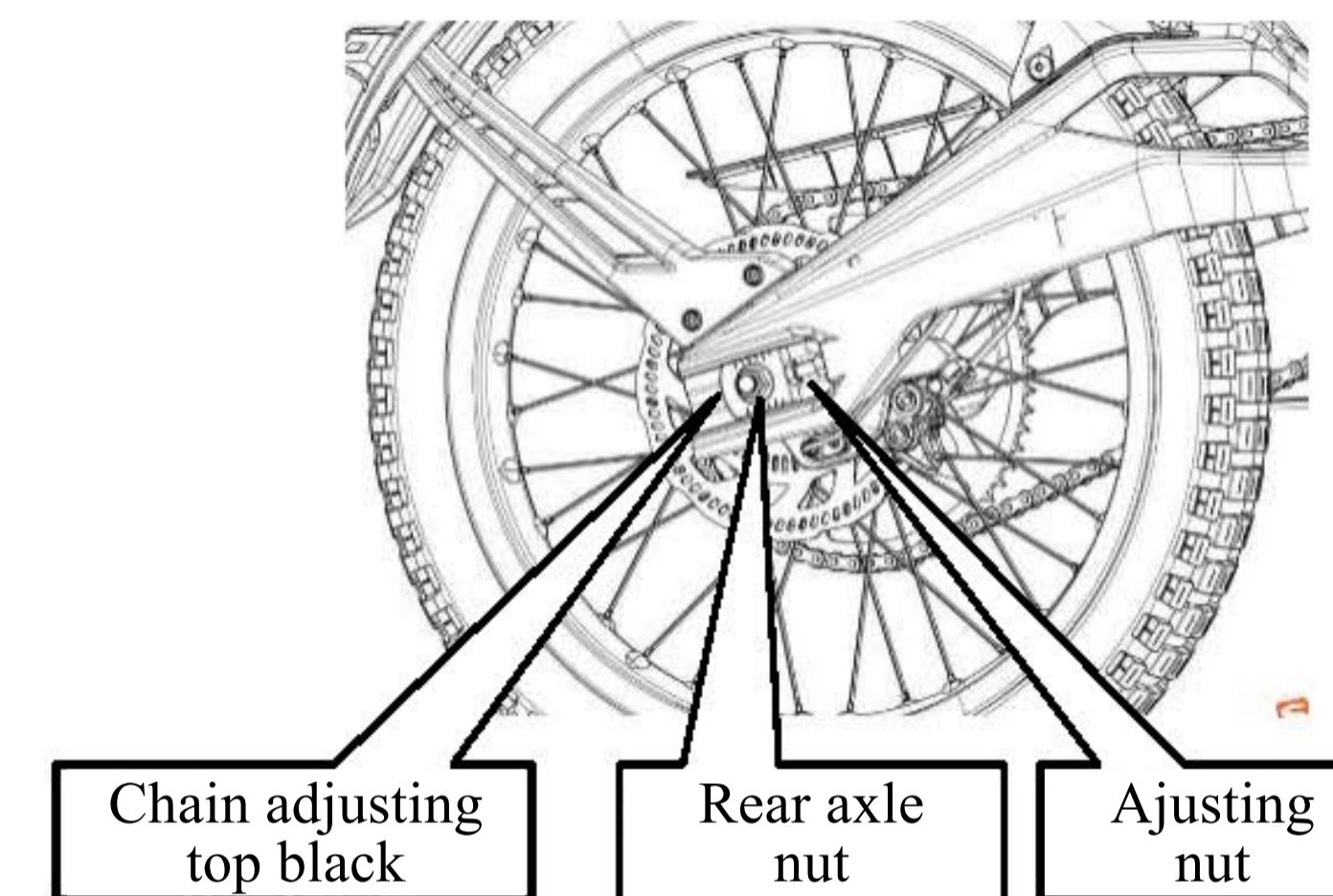
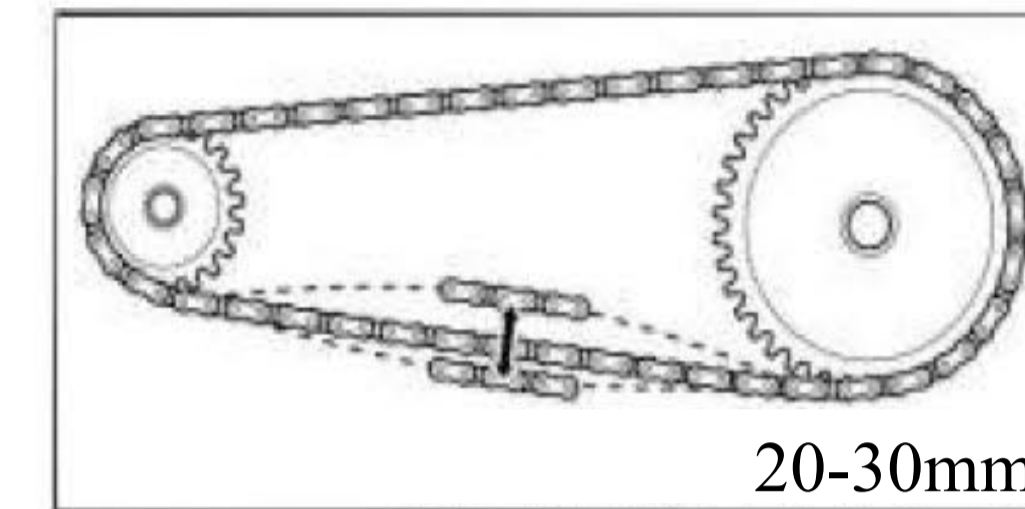
Specification and model of drive chain of EMMO CAOFEN-F80 Electric Motorcycle:

Rear sprocket: 420-128 links, 62 teeth per link

Cradle status: 420-130 knots

Rear sprocket: 420-134 links, 72 teeth per link

The chain guide is applicable to 62T and 72T rear sprocket.



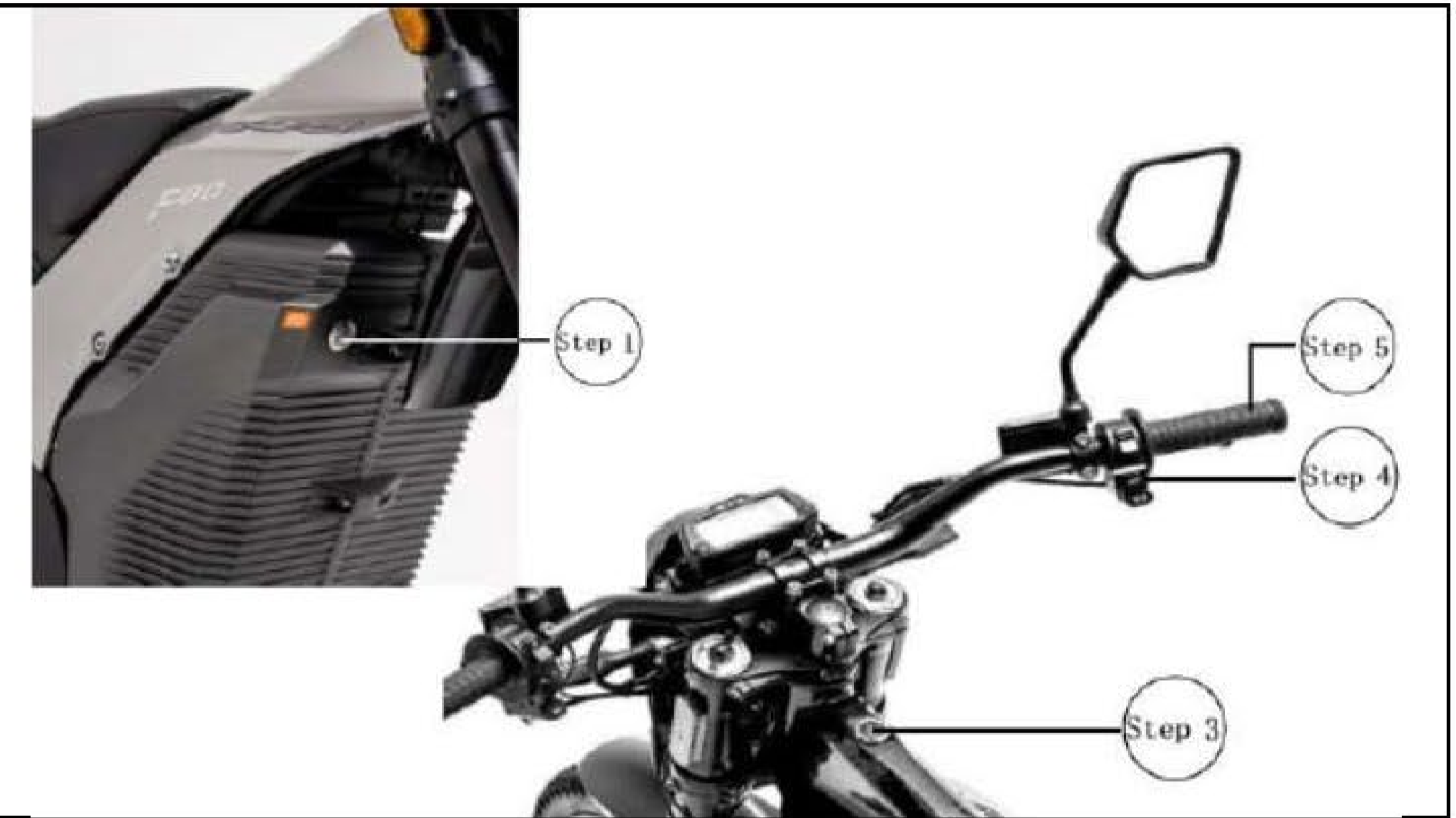
### ⚠ Warning

If the locking clip of the chain is not clamped properly during chain replacement, the chain may be detached, causing incident.



## Motorcycle Start

- Step 1: Turn on the battery power switch of the motorcycle.
- Step 2: Press the button of electronic key remote control, the meter will light up, and the motorcycle will enter the self-test state.
- Step 3: Stow the side bracket, and the instrument shows that the READY lamp is always on, indicating normal start-up (▶▶21)
- Step 4: Press the N/D button on the right brake lever to apply the Gear D, and its indicator on the meter will light up.
- Step 5: Turn the right throttle grip and the motorcycle will be driven normally.



### ⚡ NOTE

When the temperature is lower than 0 °C, the low-temperature protection of the battery system may be triggered. In this case, recharge the battery first; otherwise, the motorcycle may not run normally. When fault code appears on the meter, please refer to the Manual to check the fault code displayed, and contact the local distributor as soon as possible.

### ⚠ Warning

When Gear D is shown on the meter, the motorcycle is in ready state and can be driven after turning the right throttle grip. If you are unfamiliar with the working principle of the motorcycle and rotate the throttle grip fast, the motorcycle will suddenly move forward at a high speed, which may lead to personal injury or motorcycle damage. Therefore, when driving the motorcycle for the first time, please gently rotate the throttle grip, and put the left and right index and middle fingers on the brake lever to make a brake in time when the motorcycle moves forward at a high speed due to fast rotation of the throttle grip.

## Acceleration Slip Regulation (ASR)

This motorcycle is equipped with ASR system, which can ensure that the motorcycle is more stable;

- The ASR system can reduce excessive slippage of rear wheel, which is especially conducive to control and push on wet road.
- When the ASR system is turned off, the rear wheel will slip when accelerating sharply or driving on the surface with low traction.
- The ASR system can also be turned on or off during driving.
- After restarting, the last selected settings will be activated again.

It is forbidden to turn off the ASR system when driving the motorcycle on slippery roads with shallow water and mud, or the motorcycle may slip sideways because:

■ Tire flotation may lead to the loss of traction, smooth ground may cause front and rear wheels slip, making the motorcycle out of control or roll over; therefore, please keep in mind that the braking effect will be reduced in the presence of water, and test the brake system immediately after running through the water.

■ How to avoid

- Do not rotate the throttle grip or shift the gear suddenly;
- Do not drive at high speed;
- Do not turn off the ASR system

## **Precautions for Riding**

- Gear 1 is the lowest power output, enabling the most stable start, and the power output is increased gradually after Gear 2 and 3 is applied;
- If the SOC is less than 15%, please recharge the battery in time and the battery protection strategy will also limit the output power.
- Please gradually rotate the right throttle grip to accelerate. If rotating it too fast, the motorcycle may tilt up its head, resulting in rollover and other incidents;
- Shifting from middle and high gear to low gear during riding: ensure that the motorcycle decelerates effectively before shifting; the sudden deceleration or loss of traction may make the motorcycle out of control and lead to personal injury damage to the motor drive.
- Please note that the ASR system and the brake power-off strategy will be disabled in infotainment mode, and superb skills is required to drive the motorcycle in infotainment mode. Please try to drive it on closed roads other than public transport roads.

## **Braking Technology**

■ **How to achieve the shortest braking distance:** The dynamic load distribution between the front and rear wheels changes during braking. The greater the braking force, the heavier the front wheel load. The heavier the load on the wheel, the greater the braking force transmitted. In order to achieve the shortest braking distance, the front wheel brake shall be flexible and flexible, and the control performance shall be continuously increased, so as to make the best use of the increased dynamic load on the front wheel, and apply the rear brake simultaneously. If "violent braking" is frequently applied to generate braking pressure quickly during training, the dynamic load distribution may not improve the deceleration effect, and the braking force is not fully transmitted to the road.

■ **Driving downhill:** When driving downhill, if only the rear wheel brake is applied for a long time or intermittently, it may lead to brake failure. In



extreme cases, overheating may cause damage to the brake.

- Frequent sudden braking may lead to wheel deadlock and sliding, making the motorcycle out of control. In this case, release the brake lever, continue to drive forward until the control is restored, and then gently brake until the speed slows down.
- When emergency braking is required to slow down during high-speed driving, if only the front or rear brake is applied, the motorcycle is prone to slip and get out of control, the front and rear brakes should be applied in a balanced manner until the speed slows down.
- Slow down as much as possible before turning. Emergency braking should be avoided when turning so as not to cause the wheels to slide sideways and make the motorcycle out of control.
- The ability to brake in turns and emergencies is an important and experienced riding skill. We recommend training the driver on the basic safety experience to acquire these skills.
- When riding on wet, rainy or soft road, the motorcycle's control and braking capacity are weakened. In this case, all the operations should be slowed down; sudden acceleration, braking or steering may cause the motorcycle out of control. For your safety, please carefully brake, accelerate or make a turn.

## Motorcycle Shutdown Steps:

1. After the motorcycle is stopped, press the N/D button on the right brake lever, and the Gear D indicator lights off and the neutral gear is applied, and the motorcycle will not move.
2. Park the motorcycle, support it with the side stand and the READY indicator lights off.
3. Press the OFF button of the electronic key remote control, and all electrical devices will be shut down.
4. Turn off the battery power switch after 2 seconds.

 NOTE

When the  indicator on the meter lights up, the button of the burglar alarm may not be powered off directly. In this case, directly turn off the battery switch, check the fault code displayed on the meter according to the Manual, and consult the local EMMO distributor as soon as possible.

 NOTE

After the motorcycle is just stopped, the temperature of the motor and brake disc may be very high. Please cool down first to avoid scalding.

 Warning

The failure of right throttle grip will make it difficult to operate and impossible to accelerate or decelerate as you want, which may cause serious injury or death. Therefore, it is required to check whether the right throttle grip can rotate flexibly before starting. If not flexibly or stuck, identify the cause. Only after the fault is solved can you drive the motorcycle. If failing to solve the problem by yourself, please contact your local EMMO distributor.



## 11. Tips on Routine Maintenance

### Maintenance items and intervals

Maintenance items	Mileage/interval (whichever comes first)							
	300mi/ 500km or 1 month	600mi/ 1000km or 2 months	3000mi/ 4800km or 6 months	6000mi/ 9600 km or 12 months	9000mi/ 14500km or 18 months	12000mi/ 19300km or 24 months	15000mi/ 24000km or 30 months	18000mi/ 29000km or 36 months
Right throttle grip								
Make sure that the throttle grip is stable in operation and flexible in rotation, and can spring back to the starting point after rotated to the end and released; The voltage is 0.84 V at startup and maximally up to 3.95V.	✓	✓	✓	✓	✓	✓	✓	✓
Battery pack								
Check the battery for abnormal heating, scorched smell, smoke or special sour liquid leakage, visible damage and collision marks.	✓	✓	✓	✓	✓	✓	✓	✓
Front brake	For safety, it is recommended to replace the brake shoe no matter whether it is worn beyond the limit.							
Check whether the operating fulcrum of brake lever is normal, fluid level in the pump, oil leakage, brake shoe replacement, and brake disc wear and deformation.								
Rear brake	For safety, it is recommended to replace the brake shoe no matter whether it is worn beyond the limit.							
Check whether the operating fulcrum of brake lever is normal, fluid level in the pump, oil leakage, brake shoe replacement, and brake disc wear and deformation.								
Front and rear brake switches	✓	✓	✓	✓	✓	✓	✓	✓
Check the operation and correct if necessary.								
Steering system								
The steering bar is rotated flexibly within the steering range.	✓	✓	✓	✓	✓	✓	✓	✓
The upper and lower steering bearings shall not have obvious clearance.								

Light								
Observe that all lights are turned on normally, and replace them if necessary.	✓	✓	✓	✓	✓	✓	✓	✓
Shock absorber								
It should operate and retract smoothly. Check for oil leakage. It should be adjusted or operated normally; if not, repair or replace it.	✓	✓	✓	✓	✓	✓	✓	✓
Rim assembly								
Check whether the bearing is loose or damaged, and replace it if necessary. Check the spoke for looseness, slipping and cap removal, and adjust or replace it if necessary.	✓	✓	✓	✓	✓	✓	✓	✓
Tires								
Check tire wear and bead toe and replace them if necessary. Check whether the tire pressure is correct, and adjust it if necessary. Check the aging of tires and replace them if necessary.	✓	✓	✓	✓	✓	✓	✓	✓
Motor								
Check whether the casing and cable are cracked or damaged. Check whether it runs normally without abnormal sound and abnormal temperature rise.	✓	✓	✓	✓	✓	✓	✓	✓
Drive chain								
Check the sag of the chain and adjust it if necessary. Check for excessive wear and damage and replace it. Clean and lubricate.	✓	✓	✓	✓	✓	✓	✓	✓
Drive sprocket								
Check the wear and replace it if necessary. Replace if there is abnormal sound. Whether the chain guide or tensioner is replaced	✓	✓	✓	✓	✓	✓	✓	✓

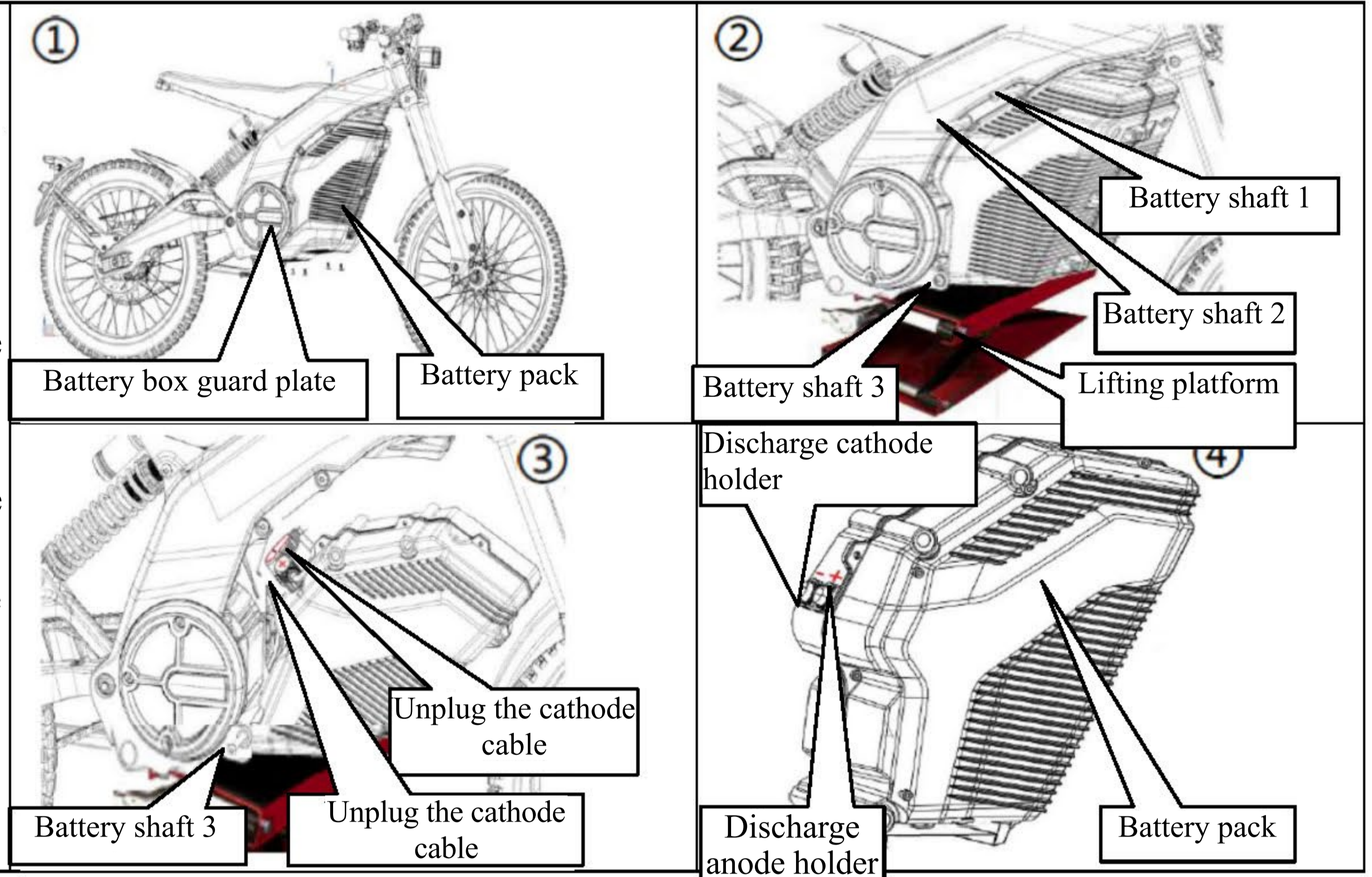
Standard fasteners								
Check whether all standard fasteners and connectors are loose, broken or falling off.	✓	✓	✓	✓	✓	✓	✓	✓
Reinforce or adjust standard fasteners and connectors.								
<p>Routine maintenance and regular maintenance is very important to ensure that your motorcycle is always in the best performance. How to properly maintain the parts is the key to maintain the best performance of the motorcycle. Therefore, if you cannot identify the source and quality of the parts, it is recommended to use the original parts. Inappropriate maintenance may lead to unexpected problems in later use. Unless you have appropriate tools, service data, machinery maintenance qualifications and original parts, we recommend that your motorcycle should be maintained by EMMO authorized distributor.</p>								



## Battery Pack Replacement -- Removal

### Removal steps

- ① ● Remove the battery box guard plate.
- ② ● Raise the lifting table up to the battery and remove the battery shafts 1 and 2.
  - Loosen the battery shaft 3.
- ③ Lower the lifting platform as shown in Figure 3.
  - Make sure the battery switch is turned off and unplug the positive and negative discharge cables.
  - Remove the battery shaft 3.
  - Lower the lifting platform again to proper position and stabilize the motorcycle.
  - Turn the direction of the lifting platform and pull it out of the motorcycle.
- ④ Take down the battery pack and place it gently in the special packaging box;

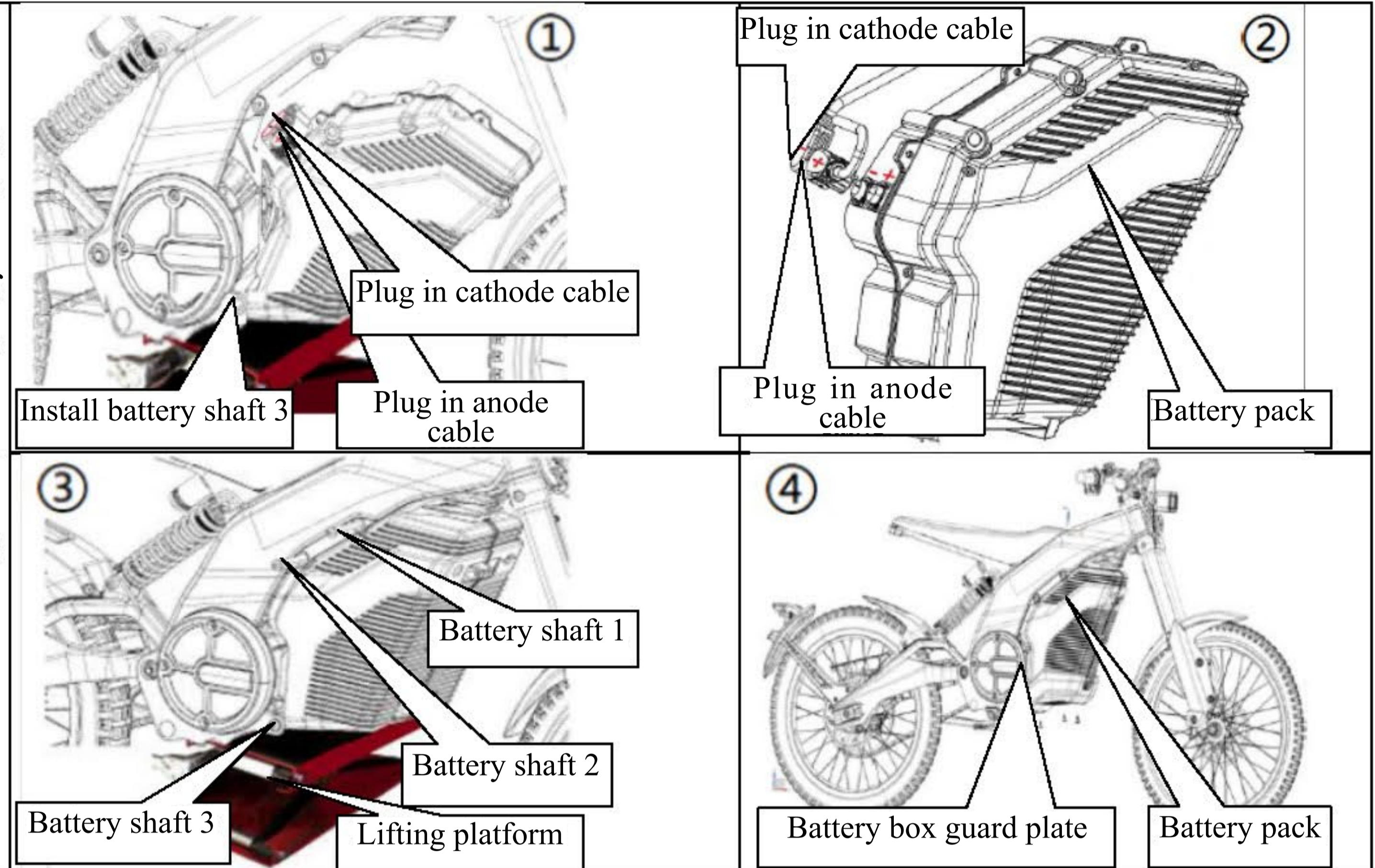




## Battery Pack Replacement -- Assembly

### Installation steps

- ① Lift up the lifting platform to lift the motorcycle stably.
  - Put the battery on the frame and lifting platform, and install the battery shaft 3 in the position aligning with the left and right shaft holes to stabilize the battery.
- ② Plug the anode and cathode cables, straighten out the route of the anode and cathode cables, and prevent the battery from rising to interfere with or squeeze the cables.
- ③ Raise the lifting platform until the battery rises into the frame, install the battery shafts 1 and 2 in alignment with the shaft holes;
  - Power on and make a trial run to check whether the battery is normal.
  - Tighten the fastening bolts of the three batter shafts.
- ④ Assemble the battery box guard plate.





## Drive Chain Maintenance

The service life of the chain greatly depends on the maintenance. Refer to the following contents:

### Chain inspection for defects

- Clean the chain
- Rinse large stains with a gentle water beam.
- Remove lubricant residue with chain detergent.
- Spray chain lubricating spray after drying.
- Replace the chain

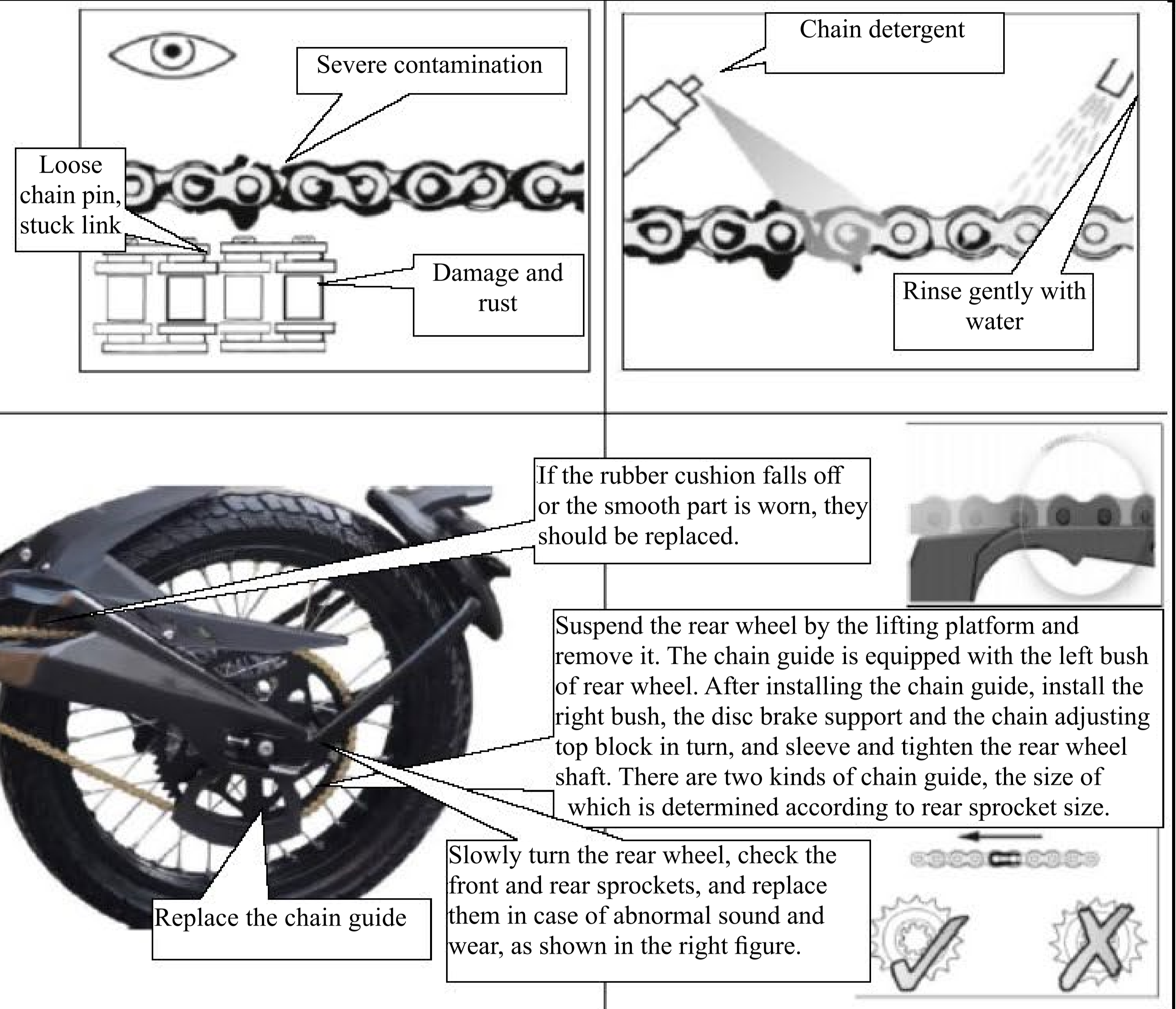
### ■ Check the rubber cushion and chain guide.

If the chain is too tight, it will accelerate the wear of the front sprocket, the rear chain disc, the chain guide, the rubber cushion and the tensioner, and it may be broken or damaged locally.

### ■ Loose chain:

The loose chain may fall off the chain disc; the chain guide can prevent the chain from falling off, provided that the chain guide is intact; the falling chain may damage the chain guide.

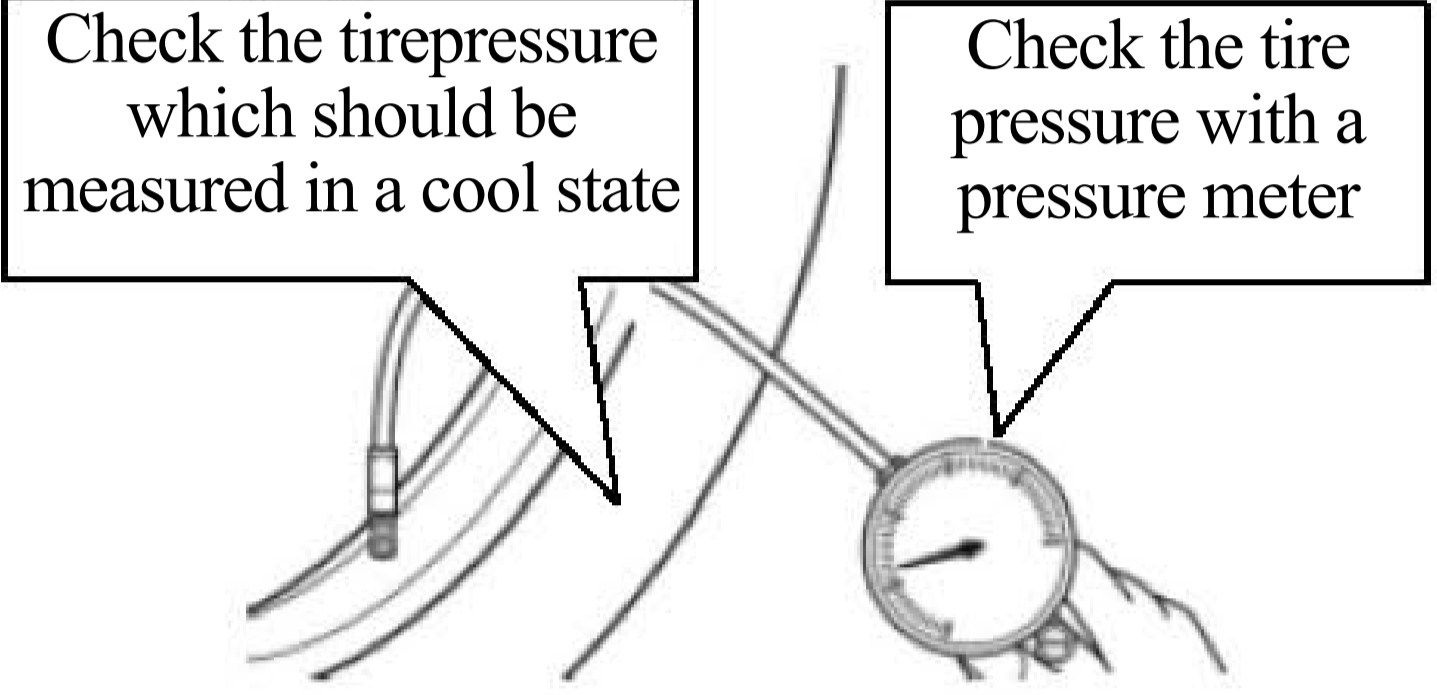
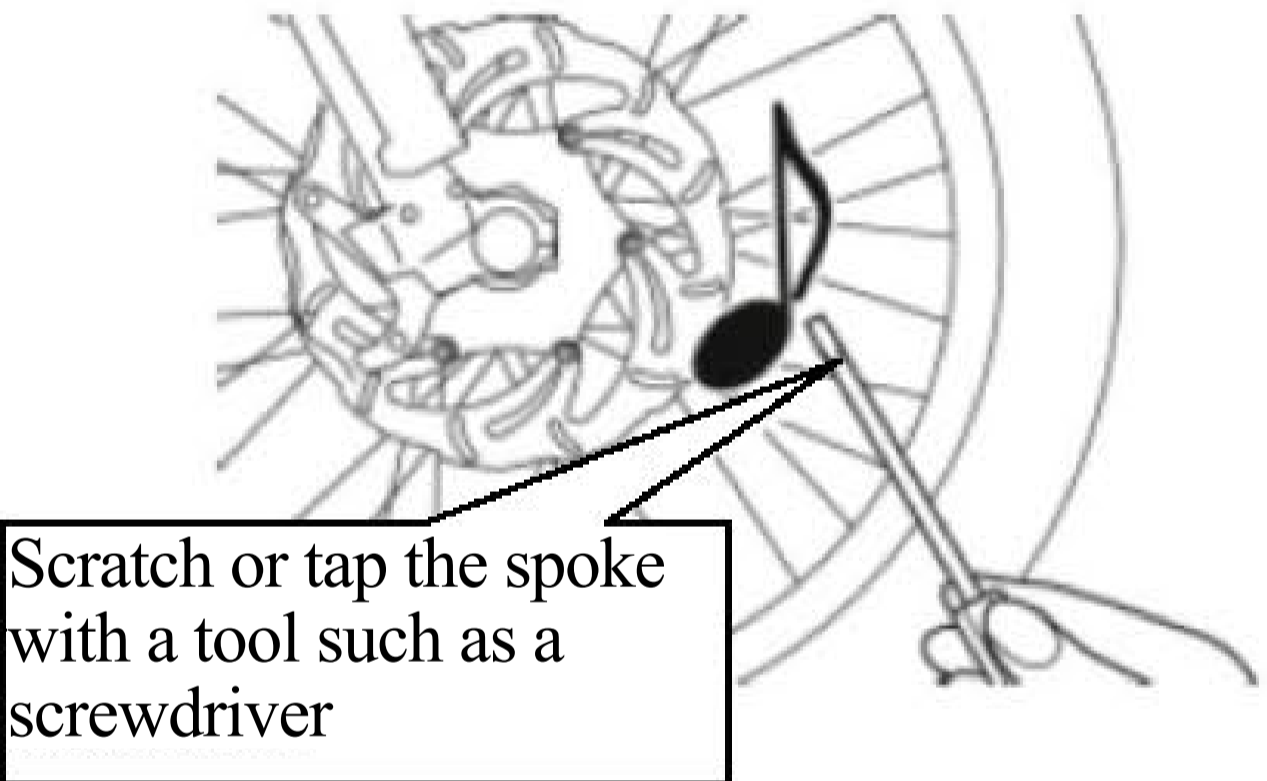
Regular inspection or replacement of tensioner and rubber cushion can prevent chain wear and detaching.





## Tire and Rim Maintenance

Tire is an important part of the wheel to contact the ground. The tires with incorrect condition and size and the rim with wrong spoke tension will affect the driving performance and cause losses.

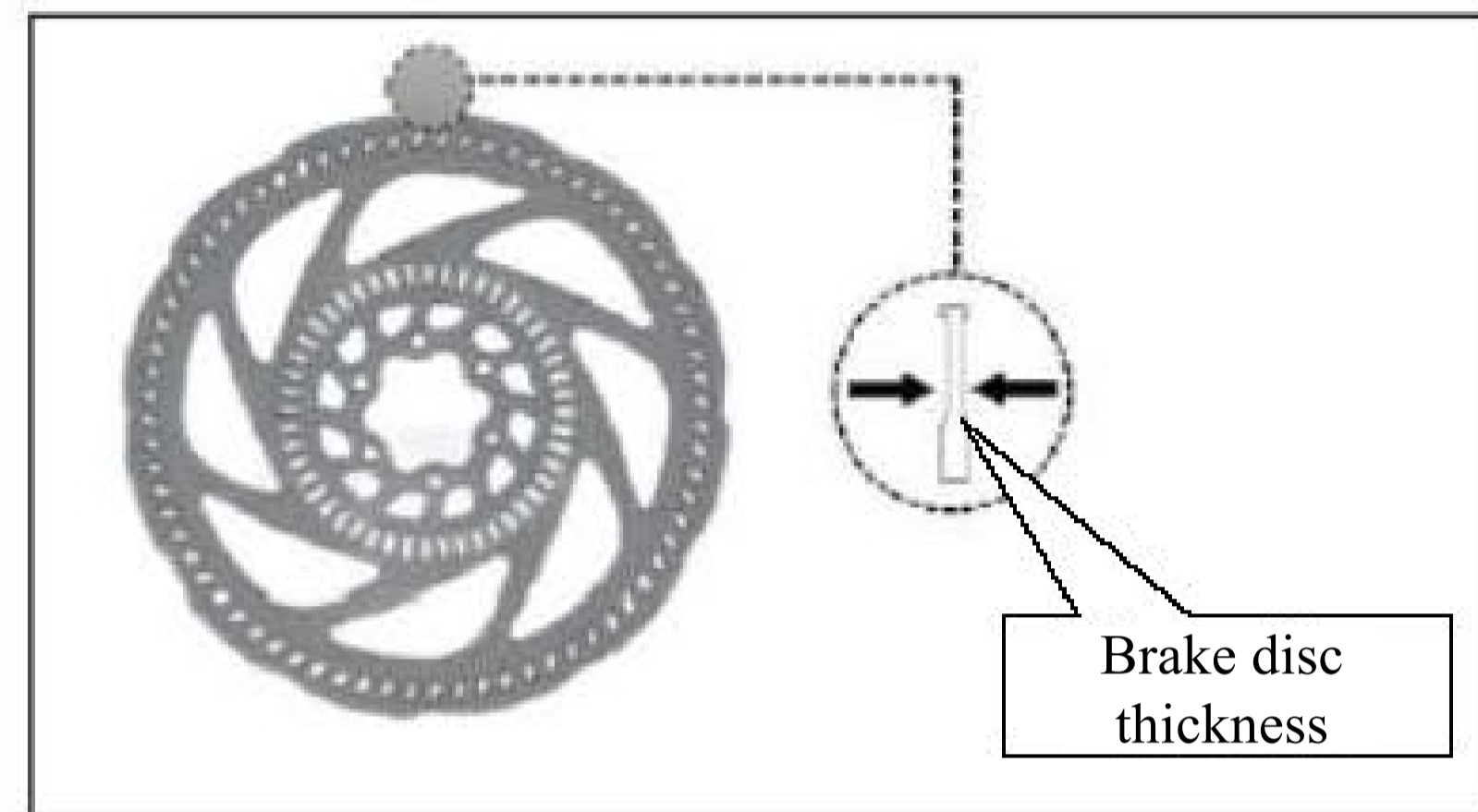
<ul style="list-style-type: none"> <li>● Abnormal tire pressure will reduce the service life of tires, too low pressure will make it difficult to turn, resulting in abnormal tire wear and overheating, and too high pressure will reduce the contact area between the tire and the ground and make it easy to slip or get out of control.</li> <li>● Correct tire pressure can provide the best riding comfort and extend the service life of tires.</li> </ul>		<table border="1"> <tr> <td colspan="2">Correct tire pressure</td> </tr> <tr> <td>Front</td> <td>225Kpa</td> </tr> <tr> <td>Rear tire</td> <td>225Kpa</td> </tr> </table> <p>If the tire pressure is not as specified: Correct the tire inflation pressure when the tire temperature is in line with ambient temperature.</p>	Correct tire pressure		Front	225Kpa	Rear tire	225Kpa				
Correct tire pressure												
Front	225Kpa											
Rear tire	225Kpa											
<p>Check the spoke tightness.</p> <ul style="list-style-type: none"> <li>● If the spokes are too tight, they will break when overloaded.</li> <li>● If the spokes are too loose, the wheel will run sideways or radially jump, further loosening other spokes.</li> <li>● Check the spoke tension regularly with a suitable tool at the site of EMMO distributor.</li> </ul>		<table border="1"> <tr> <td colspan="2">Acceptable spoke sound: crisp and consistent</td> </tr> <tr> <td colspan="2">Unacceptable spoke sound: irregular sound indicates that there is a difference in spoke tightness.</td> </tr> <tr> <td colspan="2">Check the torque of the spoke:</td> </tr> <tr> <td>Inner joint of front wheel spoke</td> <td>6Nm</td> </tr> <tr> <td>Inner joint of rear wheel spoke</td> <td>6Nm</td> </tr> </table>	Acceptable spoke sound: crisp and consistent		Unacceptable spoke sound: irregular sound indicates that there is a difference in spoke tightness.		Check the torque of the spoke:		Inner joint of front wheel spoke	6Nm	Inner joint of rear wheel spoke	6Nm
Acceptable spoke sound: crisp and consistent												
Unacceptable spoke sound: irregular sound indicates that there is a difference in spoke tightness.												
Check the torque of the spoke:												
Inner joint of front wheel spoke	6Nm											
Inner joint of rear wheel spoke	6Nm											

## Brake System Maintenance

### Brake disc inspection

⚠ Warning: Excessive wear of the brake disc will reduce the braking effect, resulting in casualties or motorcycle damage.

The worn brake disc shall be replaced immediately.



#### ● Inspection method:

Measure the disc thickness at multiple points on the front and rear brake discs, as wear will reduce disc thickness within the contact area of the brake shoe. If the thickness is lower than the limit, the disc shall be replaced.

Check whether the brake disc is deformed, damaged or cracked, and replace it if any.

Limit wear of brake disc:

Front brake disc: 1.5mm

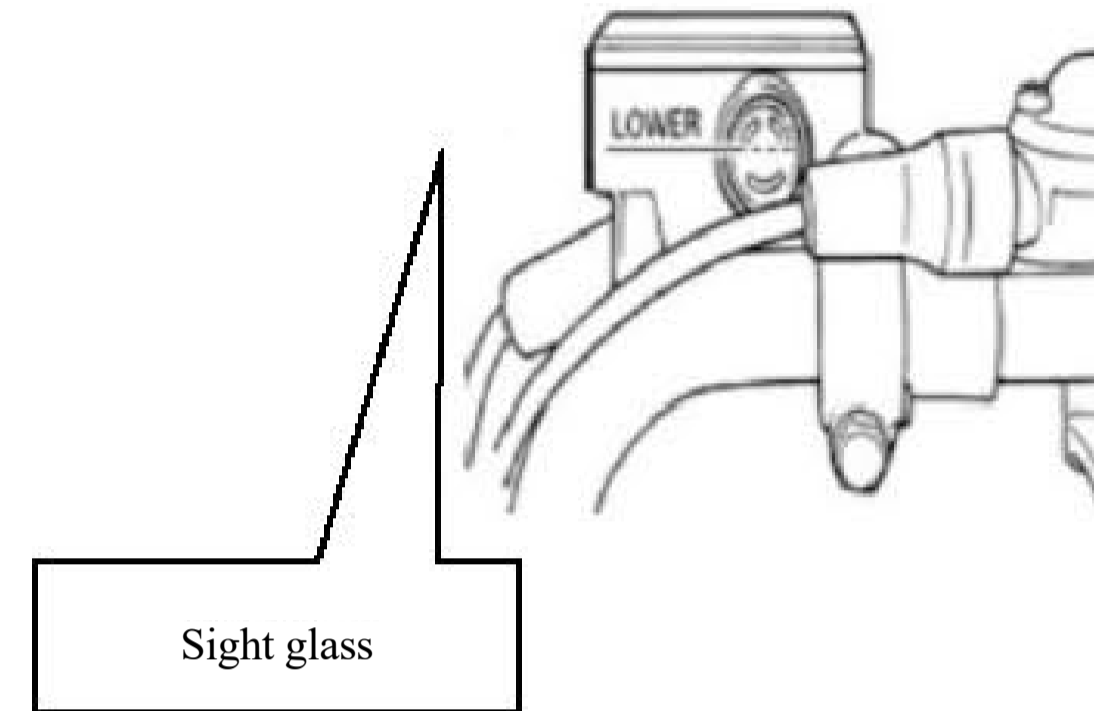
Rear brake disc: 1.7mm

## Brake fluid level inspection

⚠ Warning: The brake system will fail in case of insufficient brake fluid;

● Judgment: When operating the lever to brake, the pressure point is not obvious;

● or check whether the hydraulic oil level is lower than the specified scale or there are a lot of bubbles through the sight glass of oil cup on the brake upper pump;



If there is any aforementioned case, it indicates the brake disc is worn or the hydraulic system is leaking. If necessary to replace the brake shoe or brake fluid, please turn to our authorized distributor for such service.

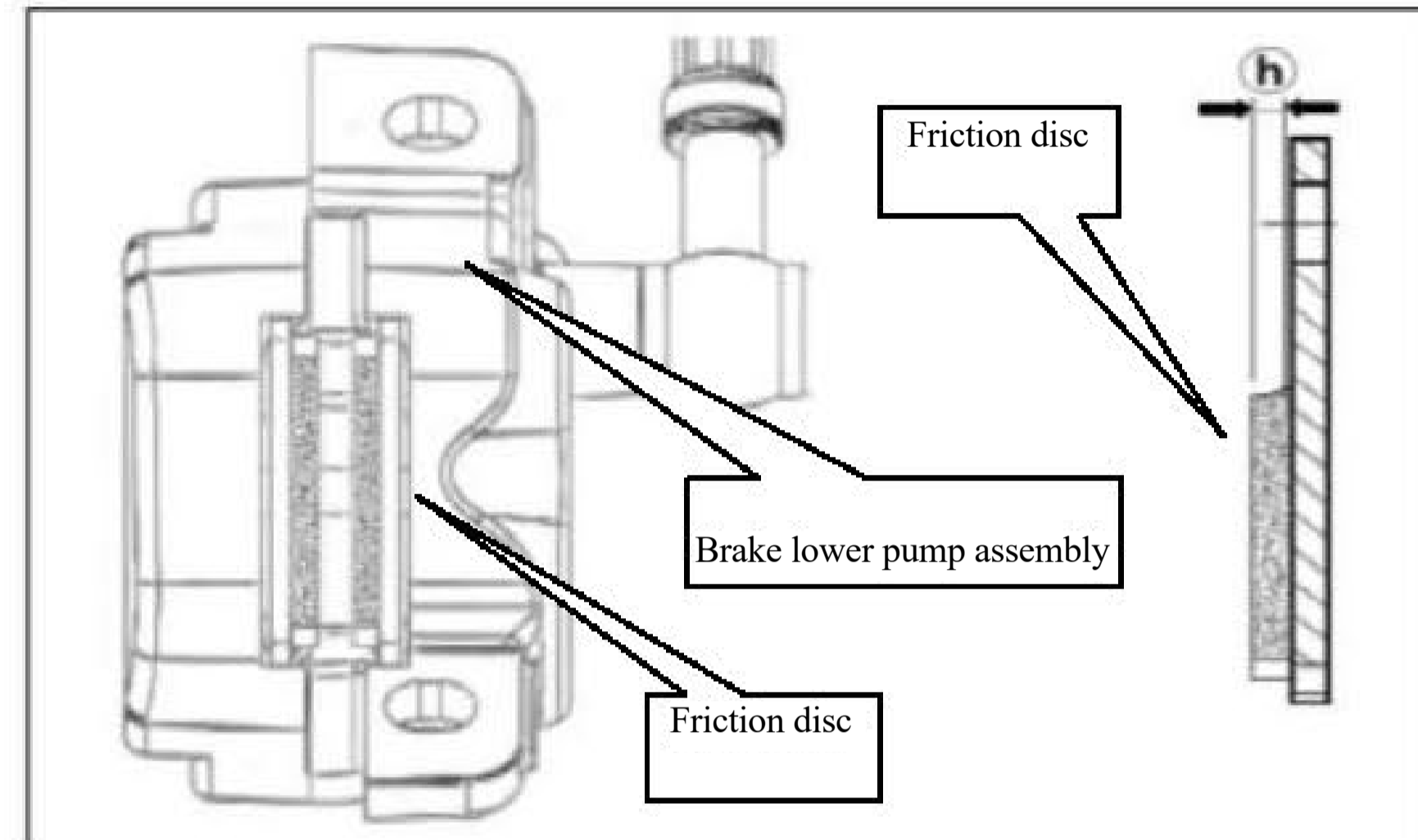
⚠ Warning: The brake fluid used for a long time will reduce the braking effect due to deterioration, and it shall be replaced after 2 years; in addition, as an important medium to transmit braking force in hydraulic brake system, the brake fluid should have reliable resistant to high and low temperature, good low-temperature fluidity, and high corrosion resistance, therefore, it is required to select correct brake fluid.



## Brake System Maintenance

**⚠ Warning:** Worn brake shoe will reduce the braking effect.

The excessively worn and cracked brake shoes shall be replaced immediately.



Check the thickness of the brake shoe and whether it is worn to the minimum thickness.

- Check the minimum thickness of brake shoe of the brake lower pump.

Minimum thickness of brake shoe <b>h</b>	$\geq 0.8\text{mm}$
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- Check the brake shoe for damage and crack.

If damaged and cracked, it shall be replaced.

- Check whether the brake shoe is worn eccentrically.

If worn eccentrically or unilaterally, it shall be replaced.

- In case of oil leakage, further check and replace the brake pump body and oil cylinder.

- Clean the stained brake shoe and replace it if stained severely.

### **⚠ NOTE**

After replacing the brake shoe, check whether the brake lever can effectively press the brake disc against the brake shoe. Check whether the free stroke of the brake lever is correct.

### **⚠ Warning**

If the brake shoe with deviation from the original one is used, it will not be guaranteed to be consistent with the original license. In this case, the motorcycle will no longer conform to the delivery condition and the manufacturer's warranty will be invalid.

## Motorcycle Cleaning

- Before cleaning Electric Motorcycle, turn off the power supply.
- Clean the motorcycle with the mixture of tap water and neutral detergent. After scrubbing the motorcycle, wipe its surface with soft cloth.
- Do not clean the chain, chain gear and axle with degreaser.
- Do not directly flush the battery charging port and meter of the motorcycle with a water cannon, and not rinse directly the service chamber because there is a main terminal block set inside it to avoid short circuit; high-pressure water beam may cause the battery box and body paint to fall off, therefore, use gentle water beam for cleaning;

 Warning

The braking capacity of the wet brake will be reduced, it is necessary to test the brake system repeatedly at low speed after washing the motorcycle to make it dry quickly.

## Safe Motorcycle Storage

If your motorcycle will be stored for a long time, please store it by correct method.

- Prior to storage, check the function and wear of the motorcycle and turn off the power switch.
- Park the motorcycle in at a smooth, solid and well-ventilated place with  $65\pm 20\%$  RH, and keep it away from corrosive, flammable and explosive materials.
- Keep the motorcycle from exposure to sunlight and rain to reduce damage or aging of components.
- In case of long-term storage, keep the SOC of the battery between 50% and 70%, check and charge the battery every 3 months (charge for 0.5 to 1 hour), and do not put it in the place where it is too cold or hot [below  $0\text{ }^{\circ}\text{C}$  ( $30\text{ }^{\circ}\text{F}$ ) or above  $30\text{ }^{\circ}\text{C}$  ( $90\text{ }^{\circ}\text{F}$ )] (the room temperature of the liquid-cooled battery shall not exceed  $-10\text{ }^{\circ}\text{C}$  to  $45\text{ }^{\circ}\text{C}$ ).
- The battery should be fully charged if the motorcycle is used against after long-term storage.

## 12. Troubleshooting

Fault Phenomenon	Possible Causes	Solutions
The battery switch cannot be pressed down because it is turned off by bounce-back immediately after it is turned on.	<ol style="list-style-type: none"> <li>1. There may be silt inside the switch;</li> <li>2. The battery management software is unmatched and the battery is turned off for self-protection;</li> </ol>	<ol style="list-style-type: none"> <li>1. Wash the switch gently with clear water until it can be pressed smoothly;</li> <li>2. Refresh the correct battery management software.</li> </ol>
After the battery is turned on, the motorcycle is not powered on.	<ol style="list-style-type: none"> <li>1. The power switch is not turned on;</li> <li>2. The remote control of steering lock is out of its control range;</li> <li>3. The remote control panel is damaged;</li> <li>4. The steering lock controller is damaged;</li> <li>5. 72V fuse is burned out;</li> <li>6. The steering lock is faulty.</li> </ol>	<ol style="list-style-type: none"> <li>1. Turn on the battery power switch again;</li> <li>2. Replace the steering lock controller;</li> <li>3. Replace 5A fuse on 72V output circuit;</li> <li>4. Check whether the steering lock connector is loose or reversed, and replace the steering lock.</li> </ol>
Turn on the battery switch, rotate the throttle grip, but the motor is not started (no fault code is shown on the meter)	<ol style="list-style-type: none"> <li>1. It is not started according to correct startup procedure;</li> <li>2. The motorcycle is in braking state;</li> <li>3. The right throttle grip is faulty or damaged.</li> </ol>	<ol style="list-style-type: none"> <li>1. Restart according to correct startup procedure;</li> <li>2. If the brake indicator is steady on, the brake switch and brake lever may press the brake switch contact, and it is necessary to screw outward the brake switch properly until the brake indicator lights off;</li> <li>3. Rotate the grip in the opposite direction to zero and check whether it is normal to restore the throttle pedal; replace the right throttle grip if there is no response after stepping the throttle pedal.</li> </ol>
The travel distance is insufficient.	<ol style="list-style-type: none"> <li>1. The battery is not fully charged;</li> <li>2. The tire pressure is insufficient;</li> <li>3. The motorcycle is braked and started frequently;</li> <li>4. The motorcycle is overloaded;</li> <li>5. The battery is attenuated normally;</li> <li>6. The ambient temperature is too low and the battery discharge capacity decreases.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check whether the charger is properly used or damaged;</li> <li>2. Check whether the tire pressure is appropriate for the road conditions on the day;</li> <li>3. Develop good riding habits;</li> <li>4. Items 5 and 6 are normal phenomena; battery attenuation is caused by insufficient driving; you can buy a new battery from the EMMO distributor.</li> </ol>



<p>The battery cannot be charged.</p>	<ol style="list-style-type: none"><li>1. The battery switch is not turned on.</li><li>2. The plug is not inserted correctly.</li><li>3. The battery temperature is too low.</li><li>4. The battery temperature is too high.</li></ol>	<ol style="list-style-type: none"><li>1. Check and turn on the battery switch.</li><li>2. Check whether the plug and the external power socket are normal, and re-plug.</li><li>3. Recharge the battery after the battery temperature reaches the normal charging temperature.</li><li>4. Contact EMMO distributor or after-sales personnel to check the battery condition.</li></ol>
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### 13. Fault Code

Fault Code	Causes	
ER-04	Alarm for cell voltage difference: single cell voltage of the battery is greater than or equal to the threshold.	Automatically recover; contact after-sales service center or distributor.
ER-05	Alarm for great cell voltage difference: single cell voltage of the battery is greater than or equal to the threshold.	Contact after-sales service center or distributor.
ER-11	Voltage protection for cell charging: the charging voltage of single cell is greater than or equal to the threshold set by the cell overvoltage protection valve.	Automatically recover; contact after-sales service center or distributor.
ER-14	Voltage protection for cell discharging: the discharging voltage of single cell is less than or equal to the threshold set by the cell undervoltage protection valve.	Recover by recharging and turning on again; contact after sales service center or distributor.
ER-17	High charging temperature protection: the battery charging temperature rise is greater than the set protection value.	Recover by turning on again; contact after-sales service center or distributor.
ER-22	High discharging temperature protection: the battery discharging temperature rise is greater than the set protection value.	Automatically recover; contact after-sales service center or distributor.
ER-25	Low discharging temperature protection: the ambient temperature is lower than the minimum protection value for battery discharge.	Recover by turning on again; contact after-sales service center or distributor.
ER-28	Large temperature difference protection: temperature rise causes the temperature difference between battery cells to be higher than the set average protection value.	Automatically recover; contact after-sales service center or distributor.
ER-29	Charging overcurrent protection: the charging current is greater than or equal to 5A.	Recover by turning on again and discharging; contact after-sales service center or distributor.
ER-32	Three-stage protection for discharge overcurrent: the discharge current is greater than or equal to the set value.	Recover by turning on again and charging; contact after-sales service center or distributor.
ER-33	Pre-charge failure protection	Turn on the switch again; contact after-sales service center or distributor.
ER-35	Charger handshake failure protection: the charger is not matched with the battery in information.	Reconnect and match
ER-36	Temperature sensor failure (short or open circuit)	Power on and re-detect; contact after-sales service center or distributor.
ER-37	Voltage detection failure (open circuit of cell)	Power on and re-detect; contact after-sales service center or distributor.

ER-38	MOS failure:	Power on and re-detect; contact after-sales service center or distributor.
ER-39	AFE detection failure	Power on and re-detect; contact after-sales service center or distributor.
ER-100	IGBT fault: the MOS tube of the controller is short-circuited.	Contact after-sales service center or distributor.
ER-101	Hardware overcurrent: hardware trigger	Contact after-sales service center or distributor.
ER-105	Motor resolver fault: encoder failure	Contact after-sales service center or distributor.
ER-106	Phase loss of motor output: the current different detected among U, V and W phases is large.	Contact after-sales service center or distributor.
ER-107	Current detection fault: Hall current reference deviation	Contact after-sales service center or distributor.
ER-108	Data fault: reading error of power-on parameters	Contact after-sales service center or distributor.
ER-110	Self-check fault of right throttle grip: the throttle does not return to zero, and the throttle voltage is out of the set range.	Turn to zero and keep it for 3S; contact after-sales service center or distributor.
ER-111	LV software undervoltage	Contact after-sales service center or distributor.
ER-112	Software overcurrentt: the phase current calculated by the software is too large.	Contact after-sales service center or distributor.
ER-113	General undervoltage: the battery voltage is less than or equal to 60V.	Restart after charging; contact after-sales service center or distributor.
ER-114	Severe undervoltage: the battery voltage is less than or equal to 50V.	Contact after-sales service center or distributor.
ER-115	General overvoltage: the battery voltage is greater than 90V.	Recover after the battery voltage is less than 80V; contact after-sales service center or distributor.
ER-116	Severe overvoltage: the battery voltage is higher than 95V.	Contact after-sales service center or distributor.
ER-118	Controller overload: the peak torque is kept for a long time.	Automatically recover after the torque is reduced: contact after-sales service center or distributor.
ER-121	Overspeed: the speed is greater than 1.1 times peak speed.	Contact after-sales service center or distributor.
ER-122	Bus timeout: the BMS message is interrupted for 500ms.	Automatically recover; contact after-sales service center or local distributor.
ER-123	General IGBT overtemperature: the controller temperature is higher than 80°C.	Recover after the controller temperature is less than 75°C; contact after-sales service center or local distributor.
ER-124	Severe IGBT overtemperature: the controller temperature is higher than 80°C.	Contact after-sales service center or distributor.
ER-129	General motor overtemperature: the motor temperature is higher than 135°C.	Recover after the motor temperature is less than 130°C; contact after-sales service center or local distributor.



ER-130	Severe motor over-temperature: the controller temperature is higher than 150°C.	Contact after-sales service center or local distributor.
ER-131	Throttle grip out-of-range:throttle grip signal is short-circuited or automatically open-circuited.	recover; contact after-sales service center or local distributor.
ER-145	IGBT temperature sensor fault	Contact after-sales service center or local distributor.
ER-146	Motor temperature sensor fault	Contact after-sales service center or local distributor.

## 14. Technical Parameters of the Motorcycle

MotorcycleParameters	
LxWxH	1970mmx780mmx1080mm (F80L1e)
	2000mmx780mmx1080mm (F80L1e)
Wheel base	1310mm
Seat height	825/840mm (different tire specifications))
Ground clearance	260mm/270mm (different tire specifications)
Curb weight	84kg/78kg
Load capacity	100kg
Max. allowable total weight	184kg/178kg
Max. design speed	85km/h-100km/h
Max. Climbing Capacity	≥ 40°
Braking deceleration	According to GB20073
Motor	Air cooled PM synchronous; maximum power: 8kW
Battery pack available	72V48Ah, 72V32Ah, 72V30Ah
Controller	Type: air-cooled sine wave; maximum current: 125A
Frame	Aluminum alloy integral die-casting frame
Suspension/brake system	
Front damping system	HTWF80; spiral spring/mixed oil-gas adjustable inverted shock absorber, 200mm stroke
Rear suspension system	HTWF80; spiral spring/single mixed oil-gas adjustable rear absorber, 85mm stroke
Available front hub specifications	Aluminum alloy; 1.6-19/1.85-18
Available rear hub specifications	Aluminum alloy; 1.85-18/2.15-18/2.15-16
Available front tire	Front tire 2.25-19, 2.75-18, 3.00-18, 70/100-19 (off-road)
Available rear tire	Rear tire 2.75-18, 80/100-18, 3.00-18 (off-road), 90/100-16(off-road)
Front hydraulic brake system	Disc brake operated by right hand
Front brake disc diameter	203mm/230mm hydraulic single disc
Rear hydraulic brake system	Disc brake operated by left hand
Rear brake disc diameter	203mm hydraulic single disc
Road tire pressure	Off-road tire pressure

Front tire	2.25bar	Front tire	1.5bar
Rear tire	2.25bar	Front tire	1.5bar
Primary sprocket	Model: 420-15		
chain	Model: 420 (rear sprocket: 62 teeth, 128 links; rear sprocket: 72 teeth, 134 links)		
Available rear sprocket	420-62 teeth, 420-72 teeth, aluminum alloy		
Electrics			
Headlight (high/low-beam)	12V10W		
Rear position light	12V0.4W		
Rear stop lamp	12V1.1W		
Front turn lamp	12V2W		
Rear turn lamp	12V2W		
Rear license plate lamp	12V0.5W		
Chip fuse specification	5A		



## 15. Torque of Motorcycle Components

Location	Specification	Torque Value	Management Tools	Remarks
Nut for rear axle	Self-locking nut M12×1.25	50Nm	18mm socket/M8 Allen wrench	
Brake disc	Bolt M6×12	20Nm	T30 hexagonal box wrench	Thread fixing glue
Rear sprocket	Step bolt M6×18	30Nm	T30 hexagonal box wrench	Thread fixing glue
Brake caliper bolt	Bolt M6×25	25Nm	T30 hexagonal box wrench	Thread fixing glue
Chain adjusting bolt	Round head bolt M6×35	15Nm	M10 solid wrench	
Nut for front axle	Bolt M14×15	15Nm	19mm socket/M12 Allen wrench	
Front axle locking bolt	Bolt M6×20	15Nm	T30 hexagonal box wrench	
Locking bolt between steering stem and front shock absorber	Bolt M6×20	15Nm	T30 hexagonal box wrench	
Locking bolt between triple clamp and front shock absorber	Bolt M6×20	20Nm	T30 hexagonal box wrench	
Handlebar seat locking bolt	Bolt M6×20	20Nm	T30 hexagonal box wrench	Thread fixing glue
Handlebar end cap locking bolt	Bolt M6×20	15Nm	T30 hexagonal box wrench	
Triple clamp locking bolt	Bolt M6×30	15Nm	T30 hexagonal box wrench	
Battery installation	Bolt M8×20	25Nm	T40 double offset ring spanner	
Controller bolt	Bolt M6×20	10Nm	T30 hexagonal box wrench	
Motor installation	Bolt M8×20	25Nm	T40 double offset ring spanner	
Minor sprocket mounting bolt	Bolt M6×10	25Nm	T30 hexagonal box wrench	
Burglar alarm holder bolt	Bolt M6×12	15Nm	T30 hexagonal box wrench	
Burglar alarm mounting bolt	Bolt M6×12	10Nm	T30 hexagonal box wrench	
DC/DC converter bolt	Bolt M6×12	15Nm	T30 hexagonal box wrench	
Rear fork shaft nut	Self-locking nut M12×1.25	45Nm	18mm socket/M8 Allen wrench	
Rear shock absorber installation	Self-locking nut M8×1.25	30Nm	T40 double offset ring spanner/13mm socket or wrench	Thread fixing glue
Side stand nut	Self-locking nut M0×1.25	25Nm	15mm, 16mm socket or wrench	
Prdal mounting bolt	Bolt M10×50	30Nm	M8 Allen wrench	
Tensioner nut	Self-locking nut M0×1.25	30Nm	T40 double offset ring spanner/13mm socket or wrench	

Wheel speed sensor bolt	Bolt M6×12	10Nm	T30 hexagonal box wrench	
Rear small fende bolt	Bolt M6×12	10Nm	T30 hexagonal box wrench	
Instrument bracket bolt	Bolt M6×12	15Nm	T30 hexagonal box wrench	
Front fender bracket bolts	Bolt M6×10	15Nm	T30 hexagonal box wrench	
Rear fender bracket bolt	Bolt M6×20	15Nm	T30 double offset ring spanner\MM10 solid wrench	
Left and right brake lever switch bolt	Cheese head bolt M4×20	5Nm	M3 Allen wrench	
Turn signal nut	Hexagon head nut M8	15Nm	14mm wrench	
Headlamp mounting bolt	Round head bolt M6×8	15Nm	M5 Allen wrench	
Seat bracket	Bolt M8×20	25Nm	T40 double offset ring spanner	
Front section bolt of rear fender	Bolt M6×12	10Nm	T30 hexagonal box wrench	
Clamp bolt of rear fender bracket	Bolt M4×6	5Nm	T20 double offset ring spanner	
Headlamp holder bolt	Bolt M6×12	15Nm	T30 hexagonal box wrench	
Rear view mirror holder bolt	Bolt M6×25	15Nm	T30 hexagonal box wrench	
Rearview mirror fastening nut	Hexagon head nut M10	10Nm	14mm wrench	

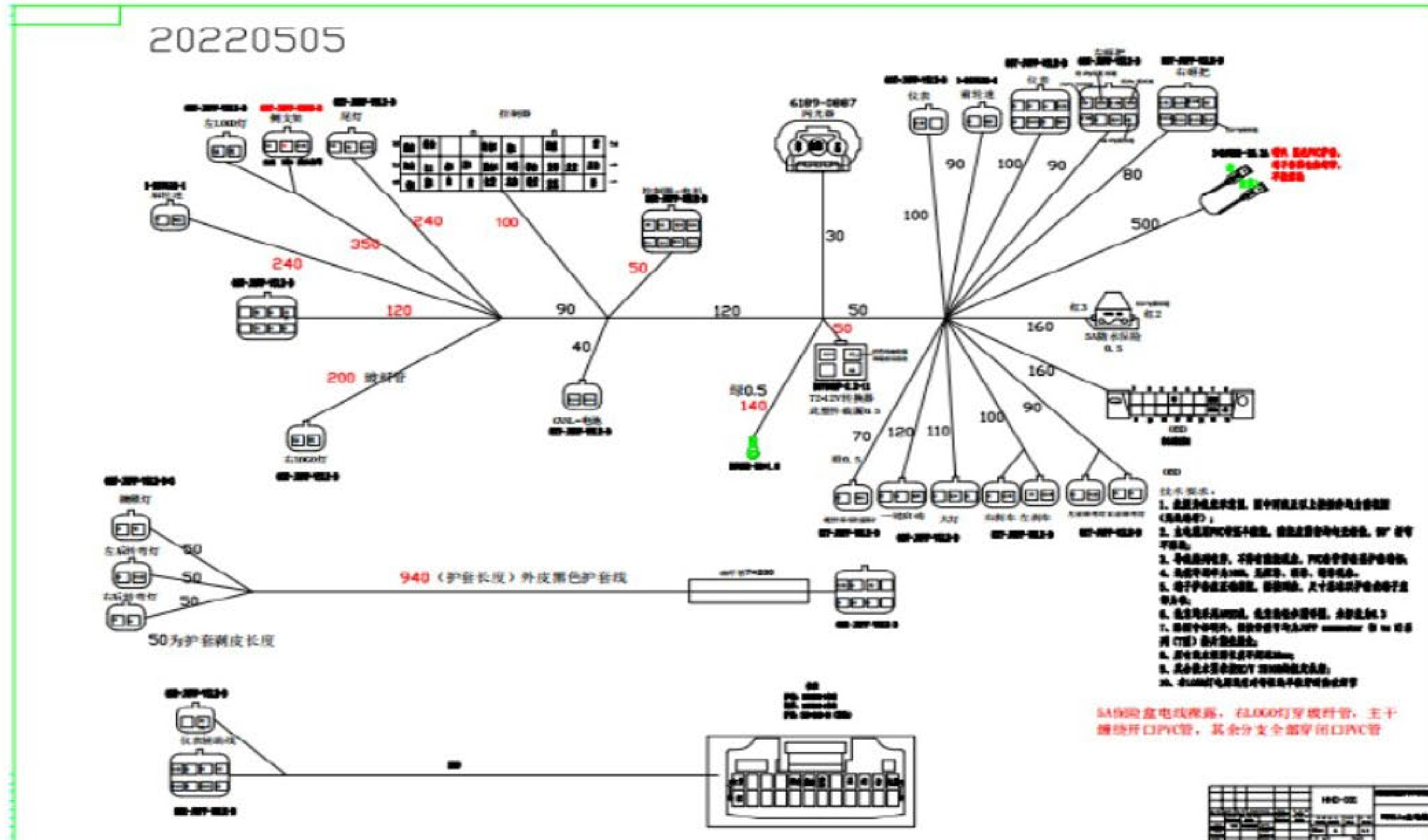
## 16. List of Motorcycle Maintenance Tools

Tool name	Specification	Remarks
Double offset ring spanner	T40	
Double offset ring spanner	T30	
Double offset ring spanner	T25	
Double offset ring spanner	T20	
Internal Hexagon Wrench	M8	
Internal Hexagon Wrench	M3	
Internal Hexagon Wrench	M12	
Sleeve	18mm	
Sleeve	13mm	
Sleeve	15mm	
Sleeve	16mm	
Sleeve	19mm	



# 17. Schematic Diagram of Electrical Circuit

## Main Circuit Diagram



# Electrical Diagram of the Motorcycle

