

RIEJU

E-CITY

MAINTENANCE MANUAL

FOR THE ENGINE



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1. INTRODUCTION TO THE ELECTRIC MOTORCYCLE

1.1 COMPOSITION OF THE ELECTRIC MOTORCYCLE

Basic composition of an electric motorcycle:

The electric motorcycle mainly consists of five systems: power, transmission, driving, braking, and electric instruments. Each one of them has the functions described as follows:

I - Power System

The power part of the electric motorcycle generally consists of a pack of lithium batteries, which is the energy source of the electric motorcycle. Their good or poor performance directly affects the power and economy of the electric motorcycle.

II - Transmission System

The transmission part is used to deliver the output power to the electric motorcycle's drive motor. It consists of the controller and drive motor. It enables the electric motorcycle to obtain the driving force and speed necessary to drive. It also guarantees that the electric motorcycle starts and stops gently.

III - Driving System

The role of the driving part is to make the electric motorcycle one single unit that can withstand the vehicle's total weight. It absorbs and transfers different reactive forces on the wheels to ensure normal and safe driving of the vehicle. It mainly consists of the frame, steering set, front shock absorber, rear shock absorber, front and rear wheels, seat, etc.

IV - Brake System

The brake system is used to directly control the driving direction, speed, and brake performance, and to guarantee driving safety. The brake part mainly consists of the steering handlebar, the brake device, the acceleration grip, etc.

V - Electrical Instruments

The electrical instruments are the main unit to guarantee that the vehicle is driven safely. It helps motorcyclists to correctly and effectively control vehicle driving at the right time. This consists of the data viewer device, charger, headlight, etc.

1.2 TECHNICAL SPECIFICATIONS AND PERFORMANCE PARAMETERS FOR THE ELECTRIC MOTORCYCLE

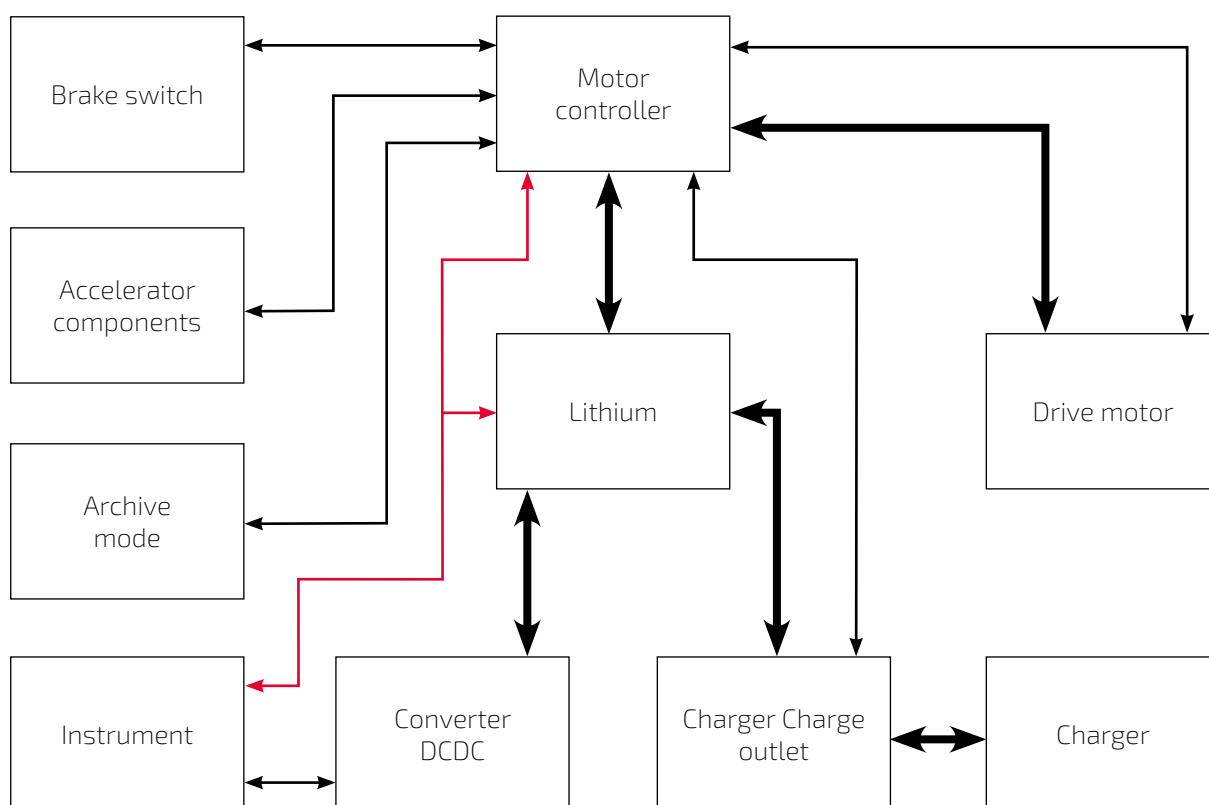
Project		Technical Specifications
Dimensions		1,815mm×732mm×1,185mm
Distance between axles		1,308mm
Min. ground clearance		140mm
Weight		96 Kg
Maximum load		150 Kg
Maximum speed		≥70km/h
Climb capacity		≥ 18°
Brake	Front wheel	CBS Disc
	Rear wheel	CBS Disc
Brake type	Front wheel	Manual handling
	Rear wheel	Manual handling
Shock absorber	Front	Type of spring shock absorber with hydraulic
	Rear	Spring, hydraulic, and gas shock absorber
Tyre shape	Front	Aluminium wheel
	Rear	Comprehensive hub motor
Tyre specifications	Front wheel	110/70-12
	Rear wheel	130/70-12
Tyre pressure	Front wheel	175-200 kPa
	Rear wheel	200-225 kPa
Lithium battery	Type	Lithium battery
	Capacity	35 Ah
	Standard voltage available	60 V
Charger	Input voltage	(200~240) V
	Output current	8 A
Drive motor	Type	Brushless DC
	No-load parameters	<7.5 A
	Rated power	3000 W
	Rated voltage	60 V
	Rated speed	825±3% (r/min)
	Rated output torque	32 N·m
Controller	Type	Electronic type
	Overcurrent protection	≤(70±0.5) A
	Low voltage protection number	(52±0.5) V

Electric part	Instrument type	Liquid crystal display / TFT
	Rear view mirror type	Circular
	Headlamps	12V 8W / 20W
	Blinkers	12V 2W*2
	Brake lights/rear lights	12V 2W / 1.3W

1.3 STRUCTURE OF THE ELECTRIC MOTORCYCLE

The electric motorcycle is a type of motorcycle that uses lithium batteries as a power source, the external signal input driving the motor. Drive system and electric control with motor, controller, lithium battery, charger. The relationship between these devices is:

It stores electric energy with lithium batteries, controls motor rotation with the controller, then drives the vehicle forward. Charge lithium battery to replace energy, so that the lithium battery's charge meets working conditions. There are "four electric components" to guarantee electric function of the electric motorcycles. Electric motorcycles are different from fuel motorcycles and are the human and mechanical integration of the most important and critical components of green transport.



→ Controls network sampling information

→ Can

→ High-voltage line

FIRST, THE CHASSIS

Main parts of the chassis: the front fork, the wheels, steering, shock absorbers, seat, and other components.

SECOND, THE MOTOR

The motor is the electric energy of the vehicle's lithium battery transformed as mechanical energy, which drives the electric motorcycle's components.

THIRD, CONTROL COMPONENTS

The electric motorcycle's control components include the controller, steering, brake levers, instruments, combination switches, lighting, and signals (like headlamps), etc.

1. Controller

The electric motorcycle's controller is used to control the motor's operational state and is the central component of the motorcycle's electric set. It plays a role as low voltage, current limitation, and overcurrent protection. The smart controller used on the motorcycle is a control method that uses magnetic FOC positioning technology, electric vehicle components for self-checking and speed, energy recovery, etc.

2. Accelerating Rotation

The accelerator rotates to control speed and to decelerate the motorcycle.

3. Control System

On the other hand, if you activate the brake levers, the output signal for the internal electronic circuit is stopped and transferred to the controller. The controller cuts the energy supply line to the motor while conducting the EBD function. Inverted brake torque. For the purpose of recovering energy from turning off brakes.

4. Instrument

The instrument is to show the operational status of the electric motorcycle. The screen generally shows on and off, battery power, driving speed, failure codes, and the smart controller, and can also show gears, speed, and other statuses. The viewing mode is generally digital, with light-emitting diodes.

5. Lighting

The lamps are components that provide lighting and instructions, with headlamps, rear lights, turn signals, etc.

2. PROPER USE AND MAINTENANCE OF ELECTRIC MOTORCYCLES.

2.1 PROPER USE OF THE ELECTRIC MOTORCYCLE

FIRST, BEFORE BEGINNING INSPECTION

You must carefully read instructions before starting the electric motorcycle. Use the requirements in the vehicle's instructions to verify and prevent or reduce driving errors. General inspection is as follows:

1. Verify that the connection between vehicle parts is tight, without anomalies to prevent accidents caused by loose, falling, or fractured parts.
2. Verify that there is enough electricity. If electricity is insufficient, please charge.
3. Verify that the speed control handle, the front hydraulic brake, the rear hydraulic brake, and other control mechanisms are flexible and reliable.
4. The front and rear brake sleeve is flexible and reliable.
5. Before and after use, verify that tyre pressure is correct.
6. Lighting, sound warnings, the instrument panel, and other electrical device functions are normal.
7. Check that the front and rear tyres work correctly, without abnormal sound.

SECOND, START CORRECTLY

You must carefully read instructions before starting the electric motorcycle. Use the requirements in the vehicle's instructions to verify and prevent or reduce driving errors. General inspection is as follows:

1. According to the vehicle's instructions, you must conduct a complete inspection of the electric motorcycle and it must be in good operating condition.
2. Open the seat, put the surge protection switch in "ON" position, remove the side part. Press the "on switch" for 3 seconds. When the "P" light shows as "ready," slowly turn the accelerator handle and drive.
3. According to speed requirements, you may shift while driving.

Note: The "D" light to change to the "S" light will give a violent acceleration sensation.

THIRD, FOLLOW INSTRUCTIONS ON THE CONTROL PANEL TO CONTROL

Electric motorcycles equipped with speed viewer, power, mileage, and signal light that the user must have operative during the driving process.

FOURTH, START DRIVING

While driving electric motorcycles, you will certainly come across unexpected situations. As such, deceleration, acceleration, and parking are common. Function to turn off the electric motorcycle's brake to guarantee user safety, provided that the front brake or rear brake is being decelerated.

FIFTH, REASONABLE BRAKING

An electric motorcycle travelling under safe conditions must not be used brusquely to avoid jamming the wheels. However, in certain unexpected situations, you must consider the following points:

1. According to the "front wheel, decelerated braking" principle, always use both brakes.
2. Reduce speed beforehand when driving fast or downhill.
3. In rainy and snowy weather, with slippery and muddy roads, where braking is abrupt, the electric motorcycle's load is over 90kg, the force of inertia is greater and potentially more dangerous. You must take care while driving and braking to avoid swerving.

SIXTH, PROPER USE

In addition to good internal quality, a good electric motorcycle is closely related to regular maintenance and proper function. Make good habits and use reasonably; the lithium battery and motor's life cycle play a crucial role. Conduct maintenance carefully and charge properly.

1. Careful maintenance.

Always keep the electric motorcycle clean and orderly to keep the electric device from ageing from the sun and rain, with the body or revolving parts rusting. When using in rain or ice, the water level cannot be higher than the rear wheel's axle to prevent water damage to the motor. Tyres inflated at incorrect pressure can reduce friction resistance.

2. Proper charge.

Make good charging habits. Charge after use so that the lithium battery regularly has a semi-charge of electricity. Given the characteristics of the lithium battery, if you completely allow the charge to run out, especially after a long storage period with energy loss, this leads to leakage of chemical products inside the lithium battery, causing irreversible damage to the lithium battery. As such, you must re-charge once every three months. Charge and use the correct charger, in a cool, well-ventilated location. Avoid high temperatures and humidity and do not allow the charger to enter water to avoid electric shock. The lithium battery must be recharged in the shade. When the lithium battery's internal temperature is greater than 55°C (you can also observe when the overheating light on the instrument panel is blinking or shines brighter), you cannot charge. We recommend cooling the battery to room temperature, and then conducting the normal battery charge process.

3. Notes.

(1) Performance of lithium batteries will be affected by ambient temperature. In general, when the temperature falls beneath 0°C, the power of lithium batteries can be drastically reduced. As such, in winter or in cold areas, reduced mileage after charging is normal, and the lithium battery's function is naturally restored when the temperature increases to approximately 25°C.

(2) Frequent breaking, start-up, descent, riding against the wind, and muddy roads will consume more energy, affecting mileage. For best mileage, we recommend the following while driving:

- a. To guarantee safety, reduce frequent braking and start-up.
- b. When the lithium battery is not used for a long time, ensure that the charger is disconnected. It is best to recharge every 3-4 weeks.
- c. All batteries empty on their own. Long-term energy storage affects lithium batteries' life cycle.
- d. In rain and snow, please reduce driving speed to avoid emergency braking and unexpected events.
- e. Use the specific charger.
- f. Changing or modifying electric motorcycles without authorisation. In the vent of failure, please see your official dealer.
- g. You will find a variety of complex traffic conditions while driving and may be subject to a variety of electromagnetic interferences, since the electric motorcycle's circuit is controlled by a computer chip.
- h. If not used for long periods of time, the electric motorcycle must be protected. Firstly, the battery must be entirely charged and disconnected from the outlet. The vehicle must be kept on the central stand, dust eliminated, and tyres inflated to proper pressure. The vehicle must be placed in a dry, well-ventilated location. The battery must be recharged every three months and the charger must be placed in a dry location without dust. The lithium battery must be stored indoors during winter.
- i. The electric motorcycle's maximum load is 150kg; do not overload while driving.

(3) Safety instructions.

- a. Carefully read maintenance instructions and carefully check that all parts are intact.
- b. Rainy and snowy weather is a negative; be careful with abrupt braking.
- c. Do not disassemble the parts of which the motorcycle is composed. If you wish to replace them, go to the company's after-sales technical service to replace the original parts.
- d. For lithium batteries and charger plugins and other components for the high-voltage power source, keep plug-in connectors dry and do not put in contact with metal at the same time. In all cases, do not touch the positive and negative power source; if you do, this could cause a short-circuit.

e. After replacing the parts, all vehicle installation work must be completed before the high-voltage circuit can be connected.

f. Painting and other operations are prohibited on the case for the high-voltage components, such as batteries and controllers. If you need to weld the vehicle frame or other similar processes, ensure that all high-voltage components have been disconnected, such as the battery, the controller, and the DC.

g. Carefully follow traffic rules and drive safely to guarantee personal safety.



WARNINGS

- Do not plug in the battery, the motor controller, and other connectors when the "ON" light is on. This is forbidden while driving!
- In the event of an emergency, quickly turn the ON switch and the surge protection switch off to cut off entry of high voltage into the motor. Non-professionals, please do not connect the high voltage plug and disassemble the battery!!!
- It is forbidden for clients to disassemble or repair lithium battery backs. This must be handled by professional maintenance staff!
- When the key is turned off, the electricity in the high-voltage system completely disappears after 5 minutes.

2.2 ELECTRIC MOTORCYCLE MAINTENANCE

FIRST, ROUTINE MAINTENANCE

See the table below for parts and routine maintenance for electric motorcycles.

Regular maintenance.

Location	Maintenance methods	Maintenance time
Wheel bearings	Remove the front wheels, add lubricant, check wear on bearing parts; if worn or damaged, it must be replaced.	Once per year
Wheel axle	Remove the axle from the wheel and check whether the wheel axle has any torque deformation; if the wheel axle bends, it must be replaced.	Once every 6 months
Wheel	Before and after deflection and decentring the wheel, check whether deviation of the front and rear wheel and decentring is too great. If so, the wheel must be corrected immediately or replaced.	The first month and every two years
Brake lever	After free driving, adjust the brake lever to the instructed range: 10 mm ~ 20 mm	Once per month
Brake pads	Check wear on brake pads; if wear on brake pads exceeds the maintenance limit, the brake pads must be immediately replaced.	Once per month
Seat	Check the seat and if there is damage to the seat foam. If there is damage to the seat cover or foam, this must be replaced.	Every once in a while
Battery capacity	Check that the battery is charged enough.	After one month without using, charge the battery again.

Electric motorcycle maintenance is as follows:

1. Electric motorcycles must always be clean. After rain, the electric motorcycle must be dried with a dry cloth soon thereafter to prevent parts from rusting and electric components from short-circuiting. Painted parts must not be covered with plastic since the water is not easy to dry. Galvanised parts must be frequently rubbed with neutral oil to prevent rusting.
2. You must always check tyre pressure to maintain normal use.
3. The main transmission components of electric motorcycles, like front wheels, rear wheels (rear traction), front axles and front and rear brakes, as well as regularly inspected and adjusted parts of electric motorcycles, must be flexible and not make noise. Nuts and bolts all over the vehicle must be frequently inspected and checked to see if they are in proper condition.
4. The electric motorcycle's brake part must be inspected and regularly adjusted to be flexible and in good braking condition. Severe wear on brake pads will lead to decreased braking capacity. Brake pads, in this case, must be replaced. After a rainy day, remove sediment stuck to the surface of the brake so braking performance is not affected.
5. Check that the control components and control cable are flexible; there must be no interference or blockage.
6. The mobile parts of the electric motorcycle must always be full of a small amount of lubricating grease to reduce wear on parts and keep the electric motorcycle moving smoothly. The lubricated parts and the lubrication cycle are shown on the table:

Lubricated and lubrication cycle.

Lubrication	Lubricant	Lubrication cycle
Front axle Rear axle	Lithium grease	6 months to 1 year
Upper and lower bearings on the steering column	Lithium grease	6 months to 1 year
Axle and cuff and other sliding parts	Lithium grease	From 1 to 3 months
Other movement and rotation parts	Oil	From 1 to 3 months
Note: The table above is only for general reference and may be shortened or extended as necessary, depending on the working environment, frequency of use, quality of electric motorcycles, and previous and new conditions.		

7. Electric motorcycles must be stored in a dry, ventilated parking area to avoid dampness and temperatures too hot. The tyre rubber ages at an increased speed near heat sources.
8. The wheel-drive motor, the controller, the charger, and the lithium battery pack do not fall under the scope of routine maintenance; disassembly and repair are not permitted. In the event of failure, please see an official dealer to be repaired by a professional.

SECOND, 1,000KM AFTER INSPECTION ADJUSTMENT

The first 1,000km that an electric motorcycle runs is the "running-in period." This "running-in" period refers to a recently purchased electric motorcycle. The mileage is not the same for different models and different factory conditions, but basically, this falls under the first 1,000Km.

After the running-in period, the vehicle must be completely adjusted to guarantee normal vehicle operation in the future, but also to make the electric motorcycle faster and more long-lasting. Adjustment elements are:

1. The accelerator cable is loose.
2. The front and rear brakes (or CBS) operate correctly.

THIRD, REGULAR MAINTENANCE OF SELF-DIAGNOSTIC CONTENT

1. Check that the tyre pressure is correct. The tyre pressure for the front wheel should be 1.8-2.00 bar, and for the rear tyre 2.00-2.2 bar.
2. Check rear lights.
3. Always check the fastening nut on the front axle to avoid loosening.
4. All fasteners must be in their place. Particularly, the rear motor axle of the rear wheel must not be loose.
5. For the brake adjustment method to check whether there is sufficient brake fluid, follow instructions for filling brake fluid DOT4.
6. We recommend that new vehicles undergo more complete inspection and maintenance, in addition to every 1,000km.
7. In routine use and maintenance, if you find problems that users cannot solve, send them to the designated maintenance site so that a professional can inspect or repair them.
8. Any failure or damage caused by unauthorised disassembly of electric motorcycle parts falls outside the scope of the free warranty.
9. Motors, controllers, and lithium batteries require no maintenance. If there is a problem during the warranty period, speak to your distributor. Take care that the motor, controller, and other electric parts are not submerged in water. Electric motorcycles must be stored in a dry and well-ventilated parking area to avoid dampness and excessive temperatures. The tyre rubber ages at an increased speed near heat sources.

FOURTH, MAINTENANCE POINTS

1. Lithium battery maintenance points.

- a. The original lithium battery charger must be used to charge the lithium battery.
- b. Battery ambient working temperature: charging temperature (0°C ~ 45°C), discharge temperature (-20°C ~ 55°C).
- c. When the battery is charging, pay attention to ensure that polarity is correct.
- d. Do not short-circuit the battery; this can permanently damage the battery.
- e. Do not burn or destroy the battery; this may cause the release of toxic gases or combustion.
- f. Do not put the battery into an adverse environment with extreme temperatures or submerged in water.
- g. If the battery has abnormal voltage, an abnormal temperature, or swelling, stop using it.
- h. Avoid water and corrosive liquids near the battery.
- i. Avoid bringing the battery close to heat sources, open flames, flammable gas, and explosives (liquid).
- j. In order to guarantee the battery's life cycle and excellent performance, try to use between 20% and 90%.
- k. Given the lithium battery's special properties, the battery's capacity at low temperature lessens to different degrees:
- l. After one year of storing the battery, the battery is charged again and activated to restore energy in the battery.
- m. Do not charge in a closed space.

2. Tyre maintenance.

- a. Regularly check tyre pressure to maintain normal pressure at all times. If pressure is insufficient or is too high, this will affect normal electric motorcycle operation.
- b. Remove foreign bodies stuck to tyres.
- c. Check tyre wear. If it exceeds wear of 2.0mm, it must be replaced.
- d. Check that the valves are not cracked.
- e. The tyres must not be stained with oil. If tyres are accidentally sprayed with oil, they must be promptly cleaned to prevent tyre deformation.

3. Maintenance and cleaning instructions.

- a. Use a neutral detergent to gently clean painted parts or dirtiness from the surface of plastic parts, then clean with a dry cloth.
- b. Clean the metal parts on the body with anti-rust oil to prevent rust.
- c. It is prohibited to apply lubricant to the front and rear brakes, the aluminium wheels (tyres), and exterior rubber.

Nota: Si no puede solucionar problemas o no puede determinar la fallo, incluyendo principalmente (motor, controlador, cargador, batería de litio) y otros componentes; envíe la motocicleta eléctrica al sitio de mantenimiento para su prueba; no repare los componentes anteriores. De lo contrario, la fabrica no se responsabiliza.

- d. No inserte arbitrariamente los componentes eléctricos de la motocicleta eléctrica y el enchufe del cable, para evitar cortocircuitos y otras fallos.
- e. Las partes lubricadas generalmente se pueden mantener una vez en 1-2 meses, se recomienda para el mantenimiento del aceite lubricante: aceite.



3. STRUCTURE AND MAINTENANCE OF THE ELECTRIC MOTORCYCLE'S ELECTRIC CONTROL COMPONENTS.

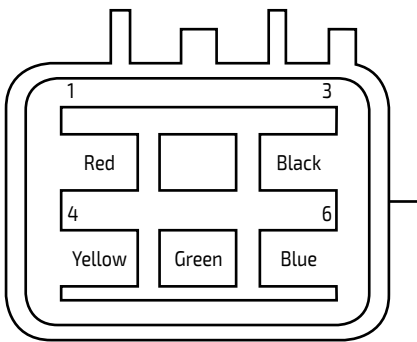
3.1 STRUCTURE AND MAINTENANCE OF THE DRIVE MOTOR

FIRST, THE MOTOR PROFILE

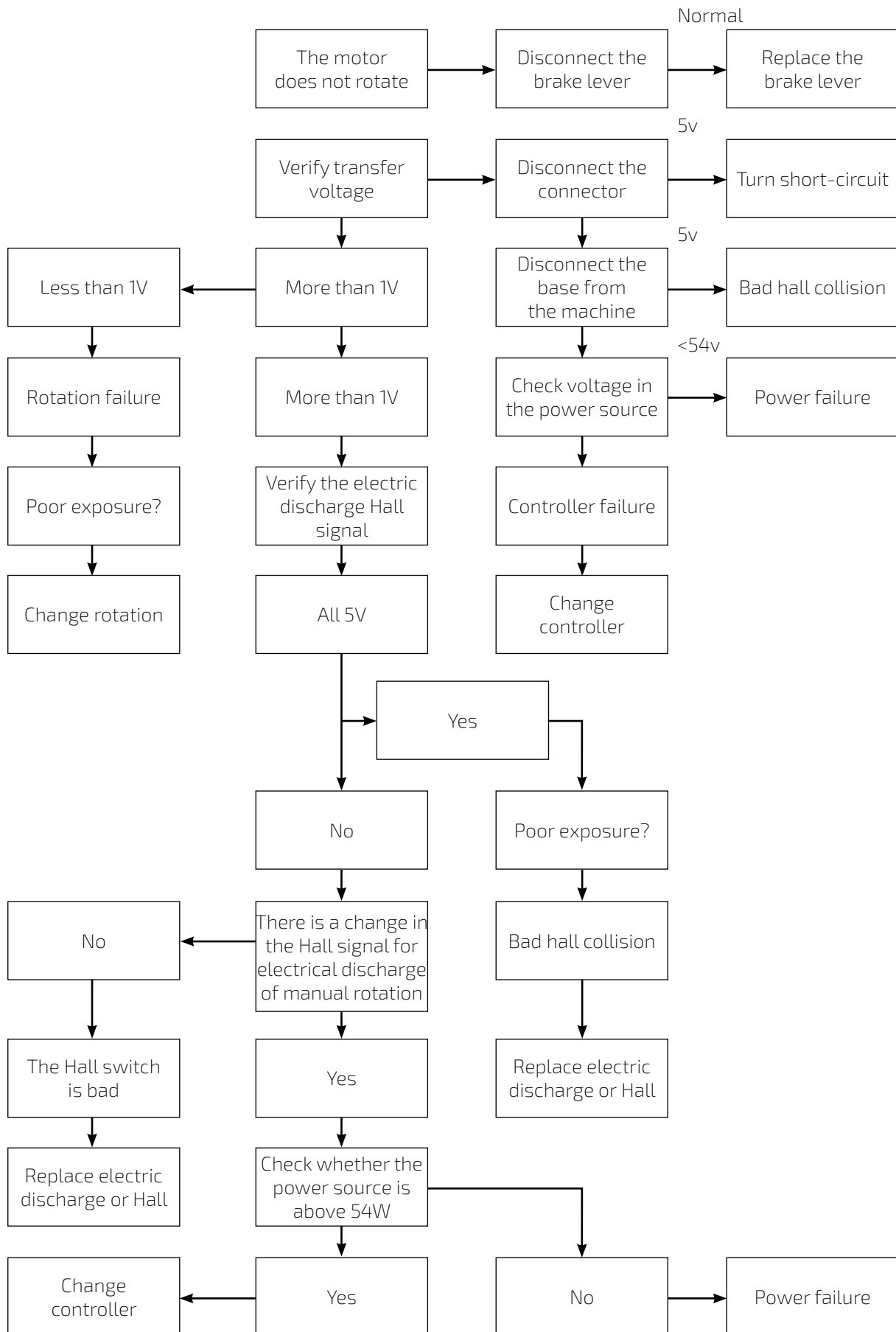
- Description:** The vehicle uses a brushless CC wheel motor. Small-sized brushless CC motor, lightweight, output torque, high reliability and high efficacy, the motor does not lose energy or pollute, with a comprehensive energy saving of 20% to 60%.

Operating principle: The brushless CC motor's stator is the spool case, the rotor is a permanent magnet. Through real-time detection of the motor rotor's position, and then based on the position of the rotor in different motor phases, with the right current, the stator causes uniform changes in direction of the revolving magnetic field, followed by the motor.

2. Connector definition:

Connector name	Plugin model	Cycles
Sensor Hall		
Port number or pin.	Colour	Port definition
1	Red	5V+
2	/	/
3	Black	5V-
4	Yellow	Yellow hall
5	Green green	Green hall
6	Blue	Blue hall

SECOND, PROBLEM-SOLVING



1. Hall Motor

Verification method one:

- a. The drive motor is connected to confirm that the motor controller is intact, power is on, rotation does not turn directly. (The vehicle must be suspended so that the back wheels do not touch the ground)
- b. Check the voltage from the power source with a multimeter, a multimeter with a red end and a black end. The normal voltage is 5V.
- c. Use the multimeter to measure the three-phase voltage signal. Connect the black end to pin 3, the red end to pin 4. But the motor on slow. The variation in voltage should go from 0 to 5V. The black end should have no change, the red measurement should show changes in pin 5 voltage for the motor.

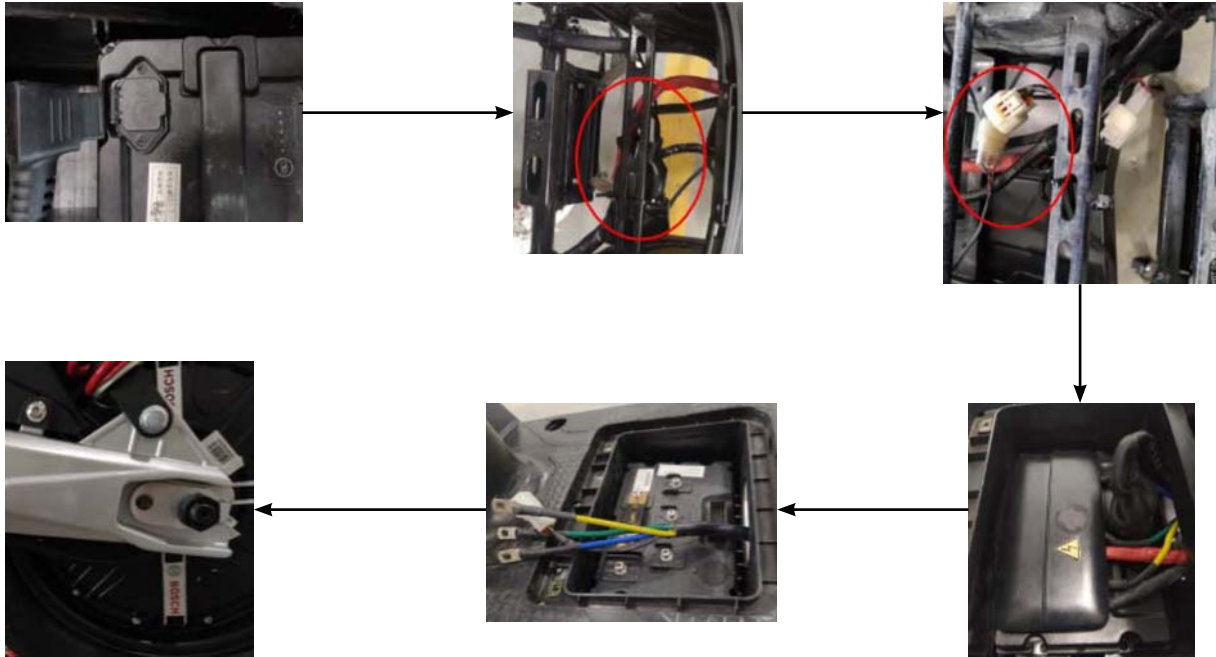
Verification method two:

- a. Disconnect the motor controller connector from the drive motor and measure the resistance of the three Halls respectively.
- b. With a red-tipped multimeter and pin 3, black line, respectively, with pins 4, 5, and 6, the resistance should basically be the same for the three. Then, respectively change the two ends and test: if resistance of the third line is inconsistent, the sensor may be damaged; this method can lead to errors.

THIRD, FAILURE ANALYSIS AND PROCESSING METHODS

Serial number	Failure phenomenon	Cause analysis	Processing method
1	Current without motor charge	The drive motor's internal friction is too great, the spool has a local short-circuit, the magnet is demagnetised.	Change the motor
2	Noise inside motor	Loose magnetism	Put the magnet back
		The bearing has too much play	Replace bearings
3	Mileage is short, the motor output is weak	The battery does not last long enough	Change the battery
		The battery is not full	Full of electricity
4	Motor phase missing	Hall motor element failure	Change the motor Hall

FOURTH, MOTOR REPLACEMENT



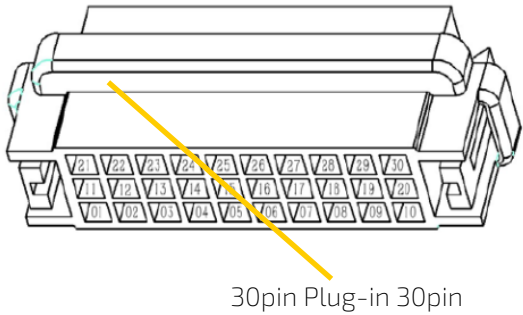
After turning the key off, wait for the system to settle for at least 5 minutes to release high pressure before replacing high-pressure parts to guarantee personal safety.

Turn off the surcharge protection switch, disconnect the battery:

1. Open the dust cover behind the controller compartment and disconnect the Hall plugin from the motor;
2. Open the motor controller's insulation cover;
3. The motor and the controller are connected to the high-voltage three-phase line and the communication complement;
4. The motor's wiring line, loosen the hexagonal flange bolt on both sides of the motor;
5. Replacing the motor
6. The principle of exchange between motors is: motor power, specifications, the same model.

When the key is turned off, electricity in the high-voltage system disappears entirely after 5 minutes.

SECOND, CHARACTERISTICS OF THE CONTROLLER AND FUNCTIONAL BASIS

Part name	Vector motor controller	Complement type	
		 30pin Plug-in 30pin	
Part name	Port description (predetermined)	Part name	Port description (predetermined)
1	CANL	2	CANH
3	/	4	ground
5	ground	6	ground
7	Side stand switch	8	/
9	Electric door lock	10	/
11	Motor Hall C (blue)	12	Motor Hall B (green)
13	Motor Hall A (yellow)	14	5V Motor Hall 5V
15	/	16	/
17	Low-speed archive	18	/
19	Archive/cruise, key repair (multiplexing)	20	/
21	Motor Hall	22	High-speed archive
23	/	24	/
25	Stop brake	6	Ground rotation
27	Signal rotation	28	5V rotation
29	/	30	Charge protection

THIRD, PROBLEM-SOLVING

1. Input power source:

Use the multimeter to measure voltage of the input power source with pin 30 controller (door lock), the same normal number and the same battery voltage.

2. Accelerator signal:

The accelerator signal provided by transfer, input into the controller consists of three parts in the controller pin, defined as follows:

Pin number	Definition
26	Ground
27	Signal rotation
28	5V power source (provided by the controller)

- Check whether there is a short-circuit in the circuit between the transfer and the pin 30 controller.
- Verify pin 28 with or without 5V output;
- Voltage range numbers are measured at between 26 and 27. In the initial case, the voltage range was between 0.83 and 0.9 V, the maximum number was between 3.75 and 3.85 V, and rotation voltage should gradually increase.



3. Brake signal:

Put the multimeter on the block/20V (DC), first measure the output signal. If the brake is being held and voltage is approximately 12V, braking is normal.

FOURTH, FAILURE ANALYSIS AND PROCESSING METHODS

1. Failure analysis table.

Serial number	Failure phenomenon	Cause analysis	Processing method
1	Damaged power devices	Motor damage, caused by overloading	Change the motor
		The device itself or the internal circuit is damaged	Change the controller
2	The controller works intermittently	Virtual CAN line/deficient contact, short-circuit	Check the line
		The bearing has too much play	Find the source of interference
3	Lost control signal	The CAN line barrier/connector contact is not good	Check the line/complement
		Failure in controlled device	Replace the controlled device
4	Internal power damage	Internal short-circuit or open circuit	Change the motor controller
		External line short-circuit	Check the line

2. Solving common controller problems.

2.1 Brushless controller with no output

a. Put the multimeter on the block/20V (DC), first measure the output signal. If the brake is being held, the signal potential should change to more than 4V and you can rule out door failure.

b. With the multimeter CA voltage + 200V block, detect the voltage in the MOS 6-channel tube and angle of the rotor rotation. If they do not match, this indicates that the PWM circuit or the MOS tube drive circuit in the controller is defective. Regarding the phase verification table for the brushless controller, if the input/output pin's voltage for the measurement chip matches the rotor's rotation angle, then the chip is defective. Replace with the same kind of chip to solve problems.

2.2 Tower

Speed failure is generally caused by a failure in the MOS tube. Check the MOS tube, the multimeter's diode switch can be used to measure the three MOS tube pins, there should be no short-circuits. If the MOS tube is damaged, you can solve the problem by replacing the same kind of electric device.

2.3 Replace the motor controller



- a. After turning the key off, wait for the system to settle for at least 5 minutes to release pressure before replacing high-pressure parts to guarantee personal safety.
- b. Disconnect the empty connection and the battery, open the insulating cover for the motor controller.
- c. Remove the 30PIN motor controller complement.
- d. Use a screwdriver to remove the power cable from the fixed motor controller and the three-phase cable.
- e. Use an Allen wrench to remove the bolt from the fixed motor controller as shown.
- f. Remove and replace the motor controller.



WARNINGS

- When the key is turned off, electricity in the high-voltage system disappears entirely after 5 minutes.

FIFTH, THE CONTROLLER PROTECTS THE INDICATOR LIGHT

System protection characteristics		Number of LED blinks
Protection against surges	The battery's voltage is higher than the system settings.	1
Low voltage protection	The battery's voltage is lower than system settings	2
Overcurrent protection	Motor phase short-circuit or short-circuit from phase to power source	3
Block protection	The motor block working hours are more than the system's design	4
HALL protection	HALL input is not normal	5
Power tube protection	Checking the power tube gives abnormal results	6
Lack of phase protection	One of the motor phases is disconnected	7

System protection characteristics		Number of LED blinks
Brake condition	The controller is in brake status	9
Check protection for errors	The system in self-verification found anomalies	10
Protection for controller excess temperature	The controller's operating temperature is higher than system settings	11
Change protection	The controller rotates and fails	14
Anti-theft status	The controller is in anti-theft status	15

3.3 PRINCIPLE AND MAINTENANCE OF LITHIUM BATTERY STRUCTURE

FIRST, THE PRINCIPLE OF THE LITHIUM BATTERY STRUCTURE

1. The lithium battery structure mainly consists of three parts: battery, BMS protective plate, battery box. These include the role of the BMS protective plate.
 - a. Collects the battery temperature, voltage, current, SOC calculation, and other information.
 - b. To protect the temperature of the battery management system, BMS protection against charge surges, protection against discharge surge, short-circuiting, and other protective functions.
 - c. Maximum operational current limit, cell voltage balance, etc.



2. Lithium battery instructions.

- a. Battery connector definition.



- b. Use of battery host computer.



The first step: select the appropriate CAN card.

The second step: select the appropriate CAN interface.

The third step: the other end of the CAN card connects the computer interface.

Step four: select the adaptation battery, correctly connect the CANH/CANL battery connector.

Step five: open the "battery_test" host computer programme, click on "connection".

Step six: select "red CAN" - "250K speed in bauds" - "computer settings channel", click on "connection" - "read".

After making the correct connection, as shown below:



SECOND, BMS PARAMETERS OF THE LITHIUM BATTERY REQUIRE

Serial number	Testing elements	Typical value
1	Protects high voltage	71.4±1V
2	Protects low voltage	51±1V
3	Protection from high discharge temperature	70±3°
4	Protection from freezing discharge	-20±3°
5	Protection from high charge temperature	55±3°
6	Protection from freezing charge temperature	0-3
7	Fall test	No charge/discharge
8	Energy consumption in hibernation mode	<400uA

THIRD, PROBLEM-SOLVING

1. BMS communication failure detection.

Remove the battery separately to measure resistance between CANH and CANL in the battery connector.

The normal value should be approximately 110 ~ 140nm.



2. Failure detection in the upper battery computer.

Pursuant to the above (2), in using the battery host computer, the correct connection to the host computer, the interface is as follows:

Basic battery pack information

基本信息 记录 BMS配置 930校准	voltage: 70.131 mV current: 0 mA soc: 100% soh: 99% remain cap: 34484 mAh full cap: 34484 mAh cycle count: 40 hardware: 0.0 software: 2.3 ID#: U214 usb current: 512 mA	design cap: 35000 mAh design vol: 61800 mV manu- date: 2020-1-9 manu-name: GREENWAY battery name: DM1531710 cell name: LG MJ1 SN: AN9CB963817000007 max temp: 72 °C min temp: 10 °C max cellvol: 4193 mV min cellvol: 2999 mV max discurrent: -81846 mA max chcurrent: 17526 mA	cell vol#1: 4120 mV cell vol#2: 4120 mV cell vol#3: 4122 mV cell vol#4: 4121 mV cell vol#5: 4123 mV cell vol#6: 4125 mV cell vol#7: 4125 mV cell vol#8: 4123 mV cell vol#9: 4127 mV cell vol#10: 4123 mV cell vol#11: 4126 mV cell vol#12: 4124 mV cell vol#13: 4128 mV cell vol#14: 4125 mV cell vol#15: 4125 mV cell vol#16: 4144 mV cell vol#17: 4145 mV cell vol#18: 0 mV cell vol#19: 0 mV cell vol#20: 0 mV 最大电压: 25 mV 放电电流: 80A
--	---	---	--

Individual cell voltage screen

Number of logs of errors and classification

Internal battery temperature screen

- a. Basic information on the battery pack: see current battery voltage, current in real time, remaining power, number of cycles, and other information.
- b. Number of logs of errors and classification. see content of specific failure alarm for current battery.
- c. Internal battery temperature: real-time view of battery cell and BMS protective plate temperature screen. When it is detected that the battery temperature goes over 60 degrees, the battery stops for a period of time, until the temperature decreases before use again.
- d. Unique voltage availability: to understand the voltage in each cell, you can see with precision.

Pursuant to the host computer to view information on the specific battery failure, contact professional maintenance staff.

3. Problem-solving.

- a. If the battery pack connections are loose, they must be tightened or cleaned immediately. The cable is damaged and must be immediately replaced.
- b. If the battery is burned, you must immediately stop using it and use carbon dioxide or dry powder fire extinguisher. If you inhale battery smoke, this may cause difficulty in breathing. Quickly move to a space with fresh air and seek medical attention.
- c. If the battery loses its charge, first use the original charger. See if use is normal. You may charge and discharge multiple times, you may also repair the internal battery balance function. If this does not work, please contact professional maintenance staff.
- d. When the battery temperature exceeds 70 degrees, the instrument indicator failure code 49 appears, and you must immediately stop using the battery and remove the battery and set aside. If the temperature continues to increase, a safe cooling treatment is required, such as burying in sand.
- e. Lack of power, short driving range, and other phenomena must be checked if the battery capacity is insufficient or internal resistance is too great.
- f. The battery is broken, the vehicle cannot start up, etc. Check that the battery connector is connected, and that the connection is solid.

3.4 PRINCIPLE OF THE CHARGER STRUCTURE AND MAINTENANCE

FIRST, THE PRINCIPLE OF THE CHARGER STRUCTURE



Connect the plug-in for the battery



Connect the CA power source



1. Charge technology requirements.

a. Technical charger parameters.

b. The vehicle will heat during charging. It must be charged under proper ventilation and heat-dissipation conditions. Do not cover other articles around the charger and the vehicle, keep away from flammable materials and explosives, and avoid unnecessary damage caused by fire.

c. It is best to charge indoors or outdoors without obstructions. Do not expose to rainy days or charge near a fire source to prevent accidents such as short-circuits and fire from the outside environment.

d. A high-voltage current will be generated during charging. It is forbidden to conduct any other operation on the charger during charging to avoid electrical shock. It is forbidden for staff to disassemble and repair the charger.

e. It is best to use the original charger and not make any changes to the charger to avoid the accidental risk of not matching the vehicle.

f. Charging time should not be too long, generally 7-9 hours. The charger should not be connected for too long.

g. When the vehicle is not used for a prolonged period, you must remove the battery to charge it, store it at room temperature, and regularly recharge it to avoid reducing the battery's duration caused by prolonged power supply.

SECOND, COMMON FAILURES AND CAUSE ANALYSIS

1. Output voltage is normal, but the charge current is too low.

Output voltage is normal, but the charge current is too low.

Failure analysis::

Situation 1: the battery in the is 80% done with the charging process with constant current, then 20% with constant voltage. With increased battery, the charging current gradually decreases, this is normal.

Situation 2: when the battery discharges too much, the multimeter measures voltage at both ends of the battery at less than 51V. The connection to the adaptation charger is correct, the current charger mode is small (2A), this is normal.

Situation three: due to excess temperature protection in the lithium battery, plug in the charger. The charger light alternatively blinks the LEDs at a 2-second frequency, which means it cannot charge, until the battery temperature goes down to the established temperature. When recovered, the light turns red and you can charge normally. This is a normal situation.

Excluding the situation above, if the problem persists, you must disconnect the two ends of the charger and let the charger rest for 1 minute again, following the process.

2. High temperature phenomenon.

Failure analysis: this is because some users often bring the vehicle near a heat source or work long hours. This is mainly not normal for voltage operation; the fan is not working, which leads to heat problems for the charger. Disconnect the charger until the temperature goes down, then operate.

If you still cannot solve the problem, you must replace the part.

a. When you charge, the charge indicator is green.

First, check that the power input plugin for the charger and the charger plugin for the battery case are not too tight. If you are sure that there is no problem, check that the battery case has positive and negative voltage; otherwise, conduct a normal battery test.

If you still cannot solve the problem, you must disconnect the charger at both ends, leave the charger for 1 minute, and then follow the process again or repeat the operation several times.

b. The charge light is not on.

Check that the charger's power source input plug-in is connected. The charger may be plugged into a normal outlet. If the situation remains the same, if it is damaged, you may replace it with the same type.

c. The charge indicator red light is blinking.

Firstly, rule out whether the battery temperature is too hot, which would trigger protection against excess temperature. After this, you must disconnect the two ends of

the charger, and let rest for approximately 1 minute after the operation as you follow the process.

1. High heat, accompanied by an abnormal sound, no charge. Available with the same type of replacement.

3.5 PRINCIPLE OF INSTRUMENT STRUCTURE AND MAINTENANCE

FIRST, THE PRINCIPLE OF THE INSTRUMENT STRUCTURE

The metre is the operational status of electronic control components that provide light that the electric motorcycle displays. The instrument is as follows:

MILOMETER - 1200 W

Driving mode

- Economy
- Dynamic
- Sport

Battery charge in percentage

Electric current

Current consumption in operation

Left turn signal

Recharge light

High beam on

Stop light START DRIVING

Lights on

Cruise control light

Battery overheating indicator

Speed

Mileage

Right turn signal

MILOMETER - 3000 W

Turn signal to the left

Electric failure indicator

Driving mode

- Economy
- Dynamic
- Sport

Light sensor

Electric consumption while driving

Batter charge in percentage

Bluetooth cruise

Control on

Indicator stop

High beam on

Overheat for the battery

Right turn signal

Recharge indicator

Speed indicator

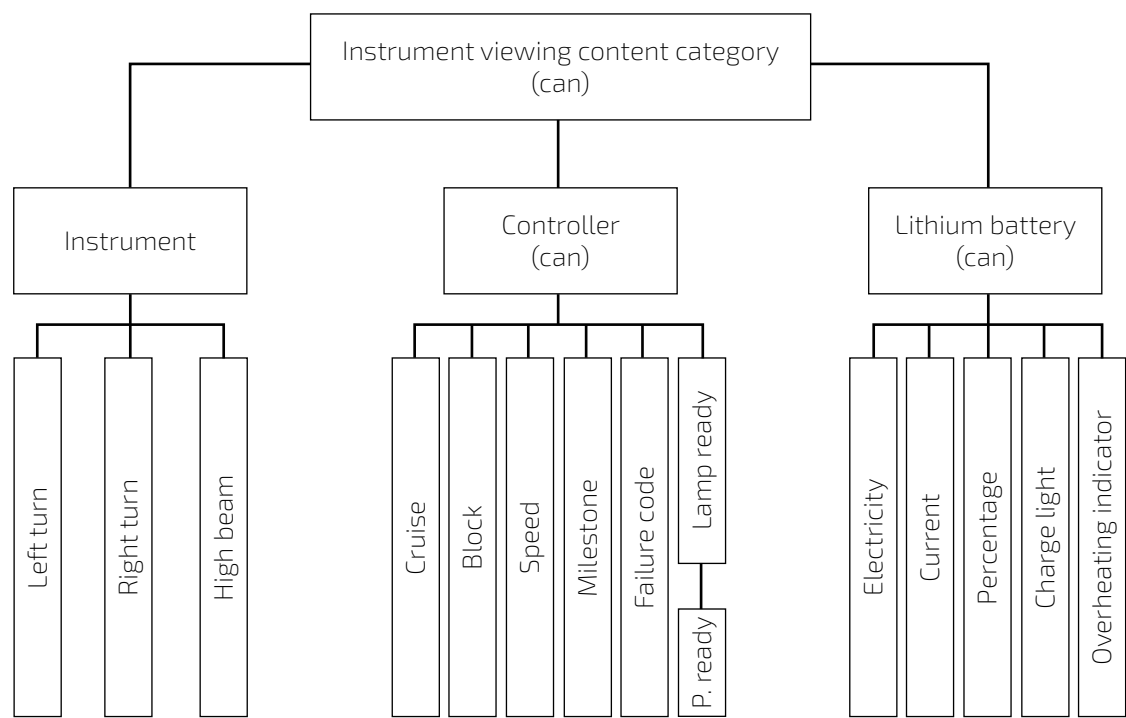
Incoming call

Stop light START DRIVING

Mileage

SECOND, CLASSIFICATION OF THE INSTRUMENT VIEWING SIGNAL

The metre is the operational status of electronic control components that provide light that the electric motorcycle displays. The instrument is as follows:



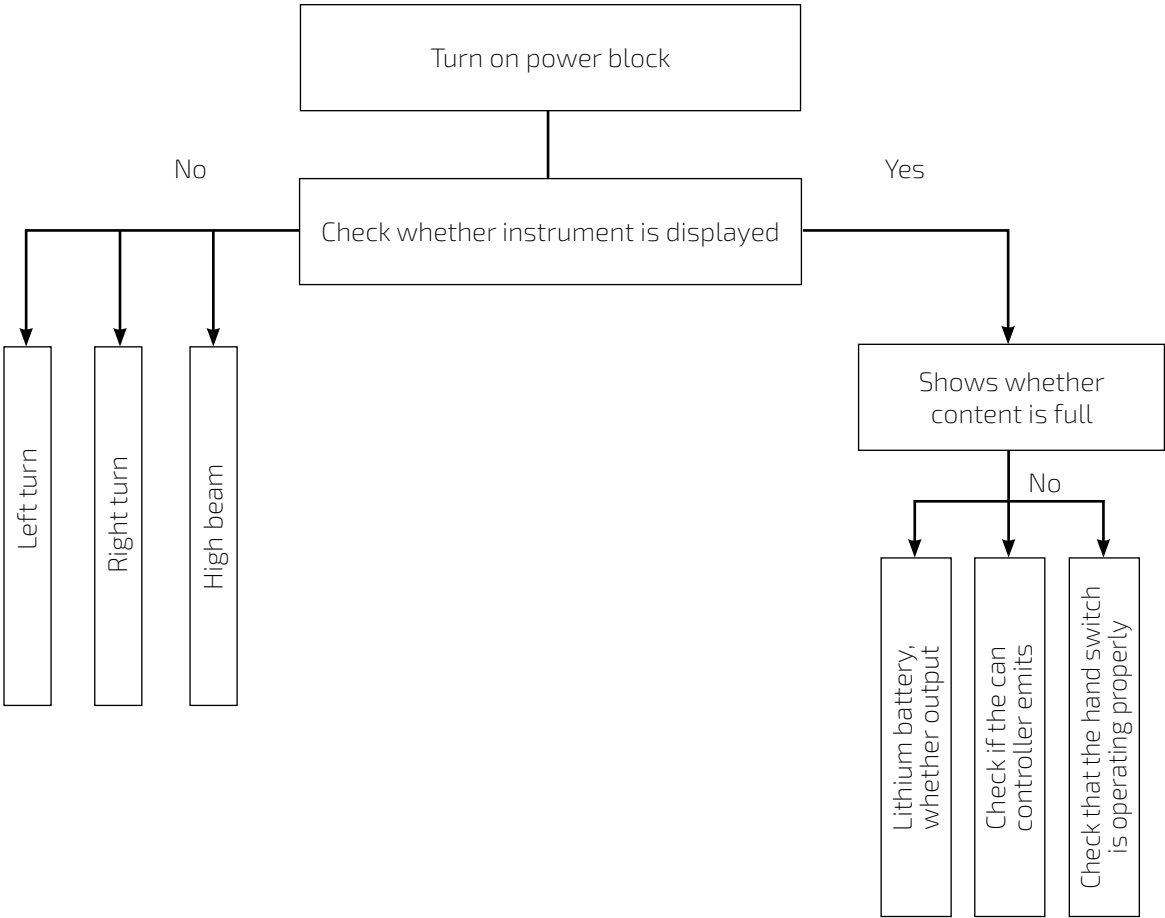
Battery overheat indicator, while driving the vehicle, the yellow light blinks to remind the driver to reduce speed. The light is always on, following motor power instructions, which suggests that the vehicle automatically limits speed.

THIRD, INSTALLATION, MAINTENANCE, AND REPAIR

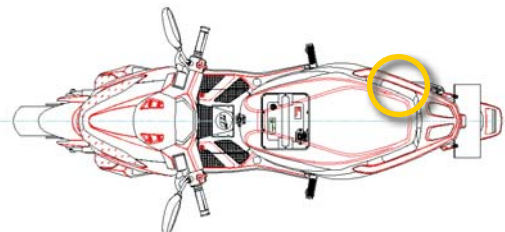
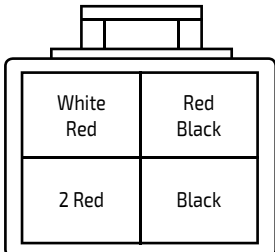
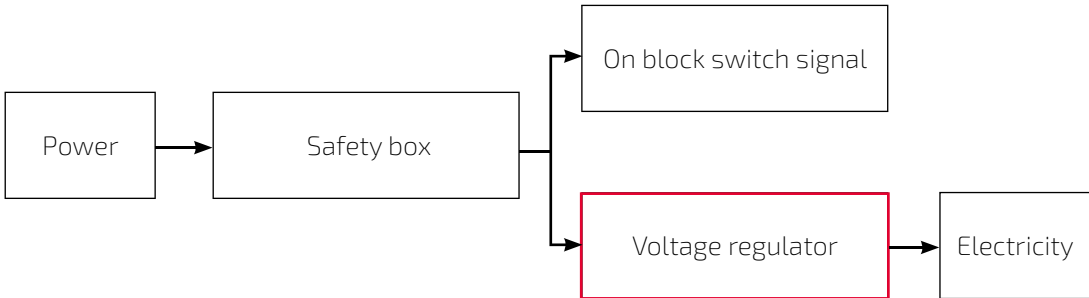
Turn on the on switch to see if the signal light is on.



Instrument maintenance diagnostic process.



3.6 MAINTENANCE OF LIGHTING AND SIGNAL SYSTEM

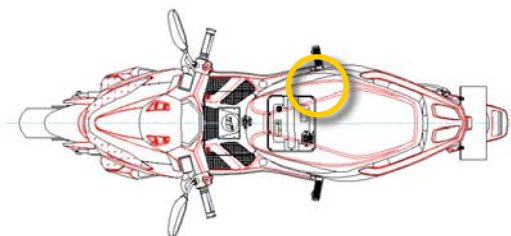
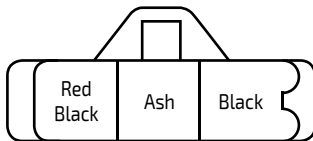
Part name	Voltage converter	Plug-in code	DJ7048-6.3-20
Location	Frame on right side of seat	Role	Adjust battery voltage to 12V and power the electric device with a nominal voltage of 12V
			
Pin	Colour	Description	
1	Black	Negative power source	
2	Red	Battery voltage input (51V ~ 72V)	
3	Red and black	Output voltage power source (12V)	
			
Power source electricity	Instrument, USB charger, lamps, turn lights, rear lights, plate lights, flash.		
			

Detection of voltage converter input power:

- First step: turn on power;
- Second step: check CC voltage between the red line and the black line at the position of the voltage regulator interface;
- The third step: the multimeter CC voltage reading must be the same as the output voltage of battery voltage.

Detection of voltage converter output power:

- First step: turn on power;
- The second step: use the key to start the electric vehicle in idle mode.
- Third step: check CC voltage between the red line and the black line at the position of the voltage regulator interface;
- The fourth step: the multimeter's CC voltage reading must be approximately 12V.

Part name	Lamp flash	Plug-in code	DJ7031A-2.8-20
Location	Frame on right side of seat	Role	Control the turn light flash
			
Pin	Colour	Description	
1	Black	Negative	
2	Ash	Flash signal	
3	Red and black		
			
Voltage Regulator Flash relay Hand switch left Turn lights			

Flash detection:

Step one: turn on power, turn on the electric vehicle.

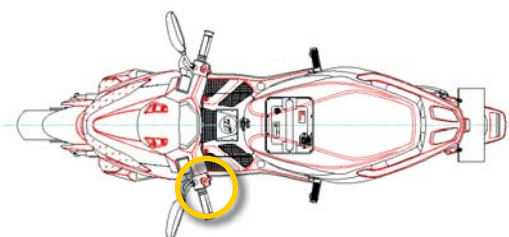
Step two: turn on the turn signal switch to the left or to the right to see if the turn signal can be controlled with the control switch. If the turn signal is not on or the turn signal is still on, the flash relay has broken down. If the turn signal control switch cannot turn off the turn signals, use the right switch to handle.

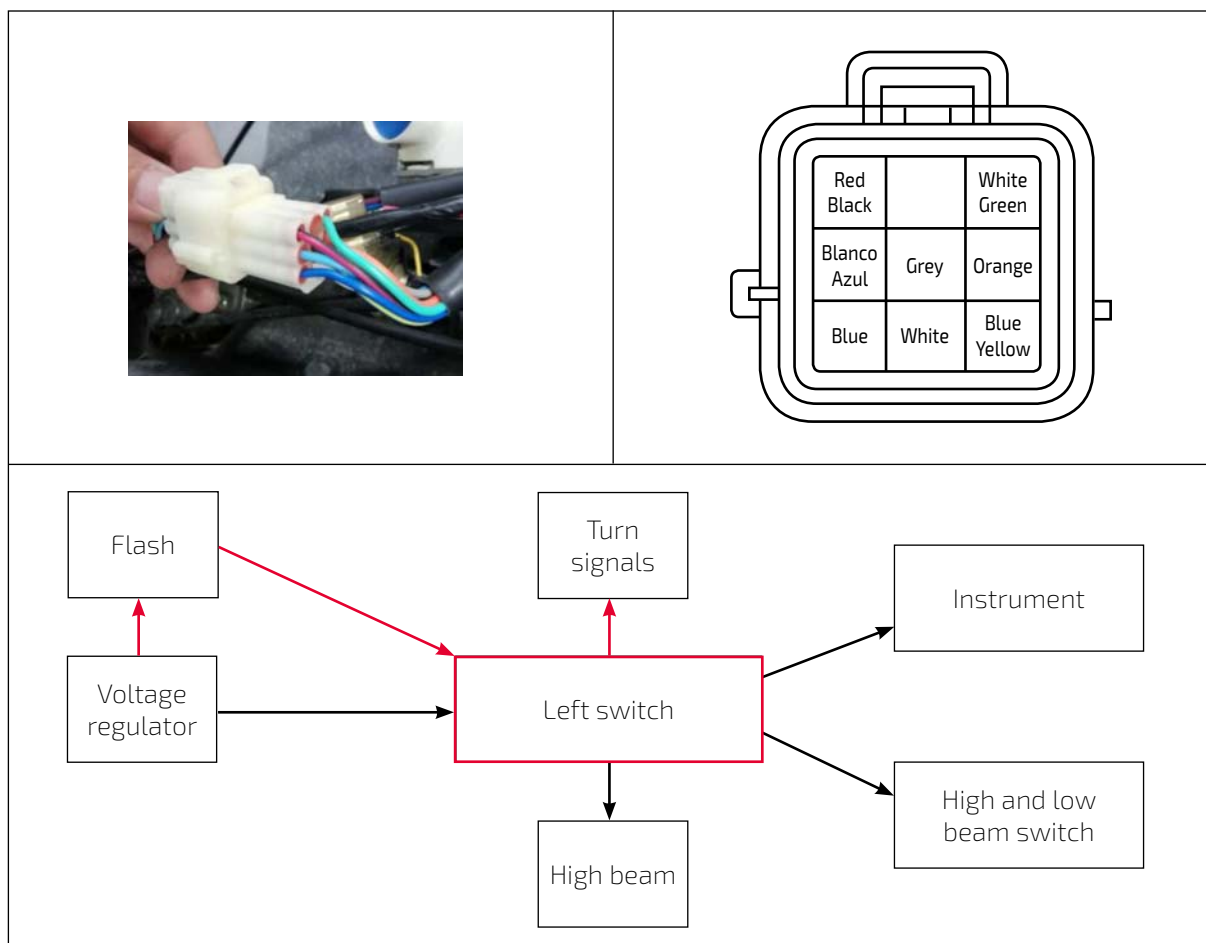
Step three: if the turn signal light is still on, verify that the red and black line and grey line are not short-circuited; otherwise, replace the flash relay.

Step four: if the turn signal lights do not work, check whether the connector is loose, begin the test.

Step five: if not resolved, shorten the grey and the red and black line to begin detection.

Step six: if the turn signal light is on, replace the flash relay; if the turn signal light is not on, use your right hand to turn on the switch.

Part name	Left switch	Plug-in code	DJ7031A-2.8-20
Location	Left end steering	Role	Switch to control vehicle lighting
			
Pin	Colour	Description	
1	Red and black	12V	
2	Light green	Horn	
3	Light blue	Lights and instruments for right turn	
4	Ash	Flash	
5	Orange	Turn left toward lights and instruments	
6	Blue	High beam lights and instruments	
7	White	Near the lamp	
8	Blue and yellow	Right switch	



On/Off detection and turn left switch off:

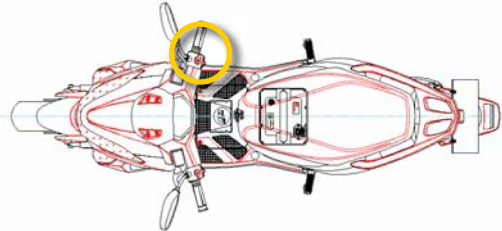
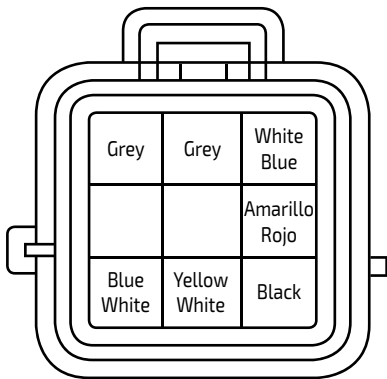
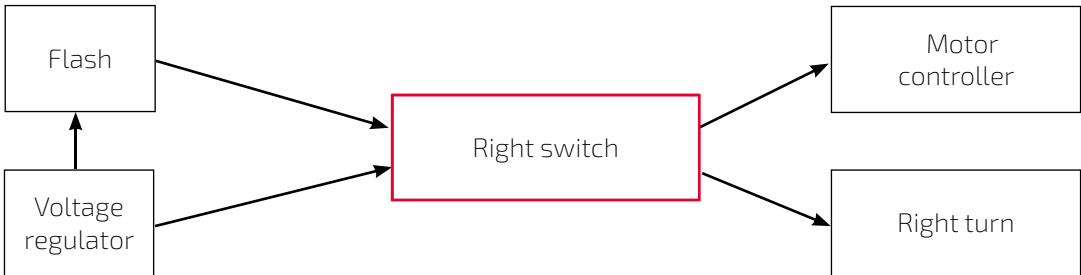
The first step: disconnect power, disconnect the right switch, and the main cable connector.

The second step: the multimeter in disconnection position, the tip in contact with the grey line and the orange line.

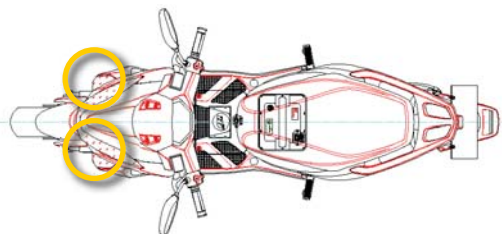
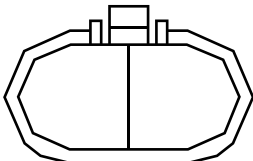
The third step: turn the left turn signal control switch on. The multimeter emits a buzz. Turn the left turn signal control switch off, the multimeter stops buzzing.

The fourth step: The steps in the detection method for the other switches are the same as described before. The wiring you must test is the right turn signal (grey line - light blue line), the cable (black red line - light green line), blue light, blue line (blue yellow line).

Test right on/off switch:

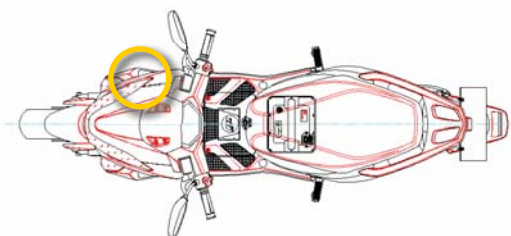
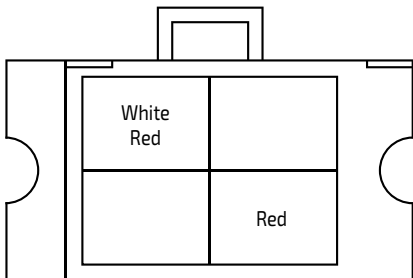
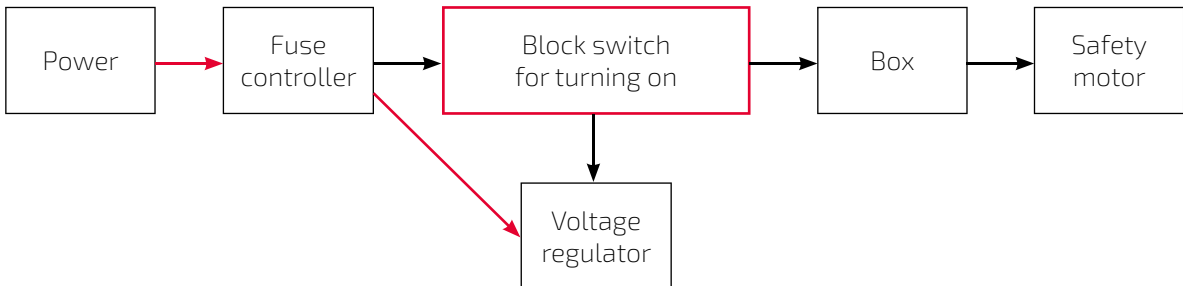
Part name	Left switch	Plug-in code	DJ7063-2.3-21
Location	Right steering	Role	Switch to control vehicle lighting
			
Pin	Colour	Description	
1	Red and black	Positive power source (12V)	
2	Blue and yellow	Lamp control signal	
3	Red and yellow	P archive/cruise control signal (motor controller)	
4	Blue and white	Top-line control signal (motor controller)	
5	Yellow and white	Low-line control signal (motor controller)	
6	Black	Negative power source	
			
			

The detection method is the same as the left switch. The cable to be tested is the right turn signal (grey line - light blue line) and the left light cruise switch (grey line - orange line) (black line - red yellow line), white line (white and black line).

Part name	Left switch	Plug-in code	DJ7021A-2.8-20
Location	Front left and right mask	Role	Send the driving status signal
			
Pin	Colour	Description	
1	Red and black	Positive power source (12V)	
2	Blue and yellow	Lamp control signal	
3	Red and yellow	P archive/cruise control signal (motor controller)	
			
Voltage regulator Flash Hand switch left Instrument Turn lights			

Turn signal detection:

- First step: turn on battery power and turn on left turn signal switch (right).
- Second step: check voltage between the orange line (light blue line) for the turn signal light connector and the black line.
- Third step: 12K multimeter CC voltage reading.

Part name	Left switch	Plug-in code	DJ70413-6.3-20
Location	Under steering	Role	Start-up and stop switch for vehicle
			
Pin	Colour	Description	
1	Red and white	On power output signal	
2	Red	Positive battery (51V ~ 72V)	
			
			

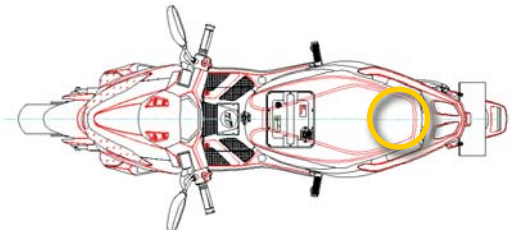
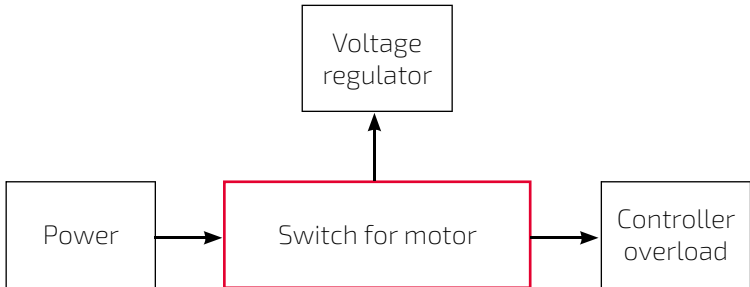
On block switch detection:

First step: turn on switch on.

Second step: measure CC voltage between the vehicle's red line and the black line.

Third step: the multimeter's CC voltage readings and the battery's output voltage are the same.



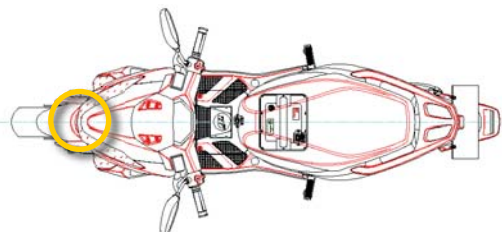
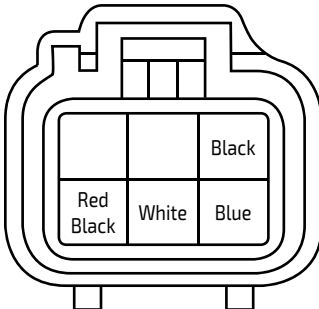
Part name	Left switch	Plug-in code	
Location	Under the seat	Role	Protect vehicle components
			
Pin	Colour	Description	
1	Red	Positive battery electrode (51V ~ 72V)	
2	Red	Motor controller and voltage regulator (51V ~ 72V)	
 <pre>graph LR; Power[Power] --> Switch[Switch for motor]; Switch --> Voltage[Voltage regulator]; Switch --> Controller[Controller overload];</pre>			

Overload switch detection:

First step: turn on switch on.

Second step: measure CC voltage between two ends of overload switch and the vehicle's black line.

Third step: the multimeter's CC voltage readings and the battery's output voltage are the same.

Part name	Left switch	Plug-in code	Black DJ7063-2.3-20
Location	Encrusted in the front mask frame	Role	For night lighting and viewing the vehicle's location
			
Pin	Colour	Description	
1		Block	
2		Block	
3	Black	Negative power source	
4	Red and black	Front position light control signal	
5	White	Headlamp control signal	
6	Blue	High beam control signal	
			
Regulator Hand switch instrument High beam Left voltage Low beam Regulator → Hand switch instrument Hand switch instrument → Left voltage Hand switch instrument → Low beam Hand switch instrument → High beam			

Headlamp detection:

First step: turn on switch on.

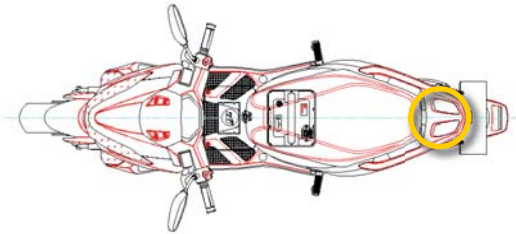
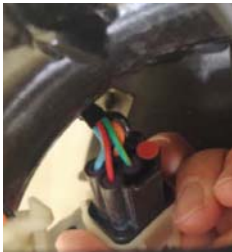
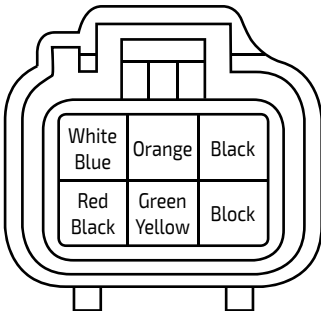
Second step: measure CC voltage between the red and black line and the black line. The multi-meter's CC voltage reading is approximately 12V.

Third step: turn on the fluorescent lamp control switch.

Fourth step: measure CC voltage between the white line and the black line, the CC voltage reading in the multimeter is approximately 12V.

Fifth step: turn on the high beam control switch.

Sixth step: measure CC voltage between the blue line and the black line. The multimeter's CC voltage reading is approximately 12V.

Part name	Left switch	Plug-in code	Black DJ7063-2.3-20
Location	Under arm rest	Role	Shows vehicle position and braking, status of rear turn signal
			
Pin	Colour	Description	
1	Light blue	Right turn signal control (12V)	
2	Orange	Right turn signal control (12V)	
3	Black	Negative power source	
4	Red and black	Rear position light control signal	
5	Green and yellow	Brake light control signal	
6	Block		
			
Flash		Hands right turn signal lights	
Voltage regulator		Brake handle	
		Left and	
		Brake lights	
		Rear position lights	

Rear light detection:

First step: turn the power on.

Second step: measure CC voltage between the red and black line and the black line. The multi-meter's CC voltage reading is approximately 12V.

Third step: squeeze the brake handle.

Fourth step: measure CC voltage between the green line and the black line, the CC voltage reading in the multimeter is approximately 12V.

Fifth step: turn the light control switch on.

Sixth step: measure CC voltage between the white line and the black line, the CC voltage reading in the multimeter is approximately 12V.

Seventh step: turn the high beam control switch on.

Eighth step: measure CC voltage between the blue line and the black line. The multimeter's CC voltage reading is approximately 12V.

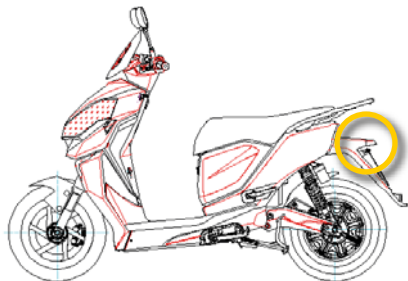
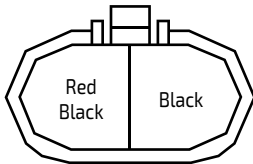
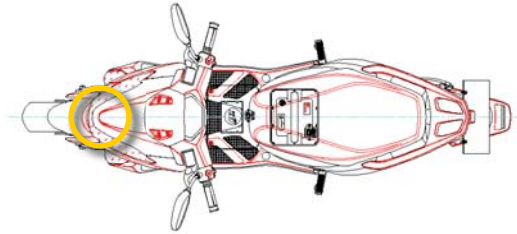
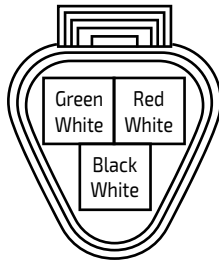
Part name	Left switch		Plug-in code	DJ7021-2-21
Location	Frontal		Role	Lighting license information
				
Pin		Colour	Description	
1		Red and black	Plate light control signal	
2		Black	Negative power source	
				
Voltage converter → Position lights				

Plate light detection:

First step: turn on power;

Second step: measure CC voltage between the red and black line and the black line. The multimeter's CC voltage reading is approximately 12V.



Part name	Left switch	Plug-in code	DJ7032-2.3-20
Location	In front mask	Role	Controls motor function
			
Pin	Colour	Description	
1	Green and white	Turn signal	
2	Red and white	5V turn 5V	
3	White and black	Ground rotation	
 			
Hall rotation Motor controller Motor			

Turn Hall sensor signal output detection:

First step: turn the power block switch off.

Second step: open front mud guard.

Third step: the multimeter connected to the Hall sensor on the green and white line and the white and black line.

Fourth step: turn on the on switch, slowly turn the speed control handle, check signal output voltage, starting angle: 0.83 ~ 0.9V, ending angle: 3.75 ~ 3.85V, turn the speed control handle, the voltage value must be stable between the standard values.

Turn Hall sensor output power detection:

First step: turn the power block switch off.

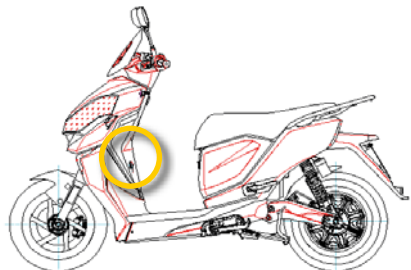
Second step: disconnect the Hall sensor.

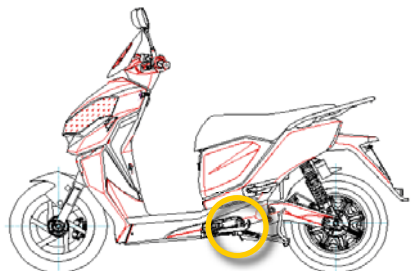
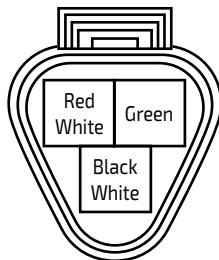
Third step: turn on switch on.

Fourth step: use the multimeter to measure voltage between the red and white line and the white and black line of the connector for the Hall sensor on the main cable. Voltage: 4.2 ~ 5V.

If the measurement greatly exceeds the standard value, check: 1, whether the motor controller is defective;

2, whether the line between the motor controller and the Hall sensor is in poor contact or is open.

art name	Horn	Plug-in code	DJ622-D6.3A
Location	Upper front wheel	Role	Horn, warning vehicles and passers-by
			
Pin	Colour	Description	
1	Black	Power	
2	Light green	Horn control signal	
Voltage converter → Switch left-hand → Horn			

Part name	Side support switch	Plug-in code	DJ7032-2.3-20
Location	On the side	Role	Prevents side from moving when starting up vehicle
			
Pin	Colour	Description	
1	Red White	5V power source	
2	Green	Motor controller signal output	
3	Black and white	5V power source	
Motor controller → Switch controller → Side support motor			

Colour and definition of vehicle cabling

Nº	Colour	Description	Nº	Colour	Description
1	Red	Positive power source (51V ~ 72V)	16	Blue and white	High degree (0V)
2	Red White	Power block control signal (51V ~ 72V)	17	Yellow and white	Low degree (0V)
3	Red Black	Voltage converter output (12V)	18	Blue and white	CAN-H (0 ~ 5V), twisted pair shielded line
4	Black	Negative power source (0V)	19	Green and white	CAN-L (0 ~ 5V), twisted pair shielded line
5	Light Green	Horn control signal (12V)	21	Black and yellow	CAN braided pair shielding
6	Light blue	Right turn signal control (12V)	22	Black and red	Speed limit (0V)
7	Ash	Flash output control signal (12V)	23	Green and yellow	Brake control signal (0 ~ 12V)
8	Orange	Light control signal left turn (12V)	24	Red yellow	P/cruise/key repair (0 ~ 5V)
9	Blue	High beam control signal (12V)	25	1 green and white	Turn signal (0 ~ 5V)
10	White	Low beam control signal (12V)	26	1 Red and white	Gire 5V
11	Green and black	Load protection port (0V)	27	1 White and black	Turn power source (0V)
12	Violet	Instrument diagnostic interface	28	Green	Side control signal (0 ~ 5V)
13	2 Blue	C Signal Hall Motor (0 ~ 5V)	29	2 yellow	A Signal Hall Motor (0 ~ 5V)
14	2 Green	B Signal Hall Motor (0 ~ 5V)	30	5 Red	Source Hall motor for positive power 5V
15	5 Black	Negative Power Hall motor (0V)			

4. DIAGNOSIS OF COMMON FAILURES AND PROBLEM-SOLVING FOR ELECTRIC MOTORCYCLES.

4.1 INSTRUMENT DISPLAYS NORMAL, MOTOR DOES NOT TURN

FIRST, FAILURE ANALYSIS

1. Check whether the brake switch is short-circuited or burnt.
2. Check whether the speed control is short-circuited or burnt.
3. Check whether the motor is short-circuited or burnt.
4. Check whether the controller is short-circuited or burnt.

SECOND, MAINTENANCE METHODS

1. Disconnect the base from the brake switch to check the side, motor operation; if the brake switch fails, the brake switch must be replaced. Rotation speed of 5V normal voltage power source, detection of signal voltage. The rotation signal voltage must vary between 0.8 to 4.2V from low to high. If the voltage does not change and is less than 1V, the line with failure or rotation short-circuits, and the instrument shows failure code "27." If voltage is greater than 1V and the change is normal, the motor Hall signal is detected (yellow, green, blue line). If the three-phase Hall signal voltage is 5V and contact is appropriate, then the Hall motor burns. The motor or Hall motor element must be replaced.
2. The motor Hall signal line is detected separately, and the motor slowly spins by hand. The electric voltage by phase varies from 0 to 5V. If there is no change in voltage, the motor Hall is damaged and the motor or motor Hall element must be replaced. If phase voltage conversion is normal and energy supply is normal, the controller is damaged and the controller must be replaced.
3. Use the multimeter to detect the controller's power source input voltage. The voltage must be greater than 54V (sufficient electricity in batter); if there is no voltage, check the input line. Check the controller to take voltage from the power source (then the red and white, white and black cable). Normal voltage is between 4-5 V; if there is no voltage, unplug the base. If voltage returns to normal, it is damaged (short circuit). Disconnect with no 5V voltage. Unplug the Hall connector from the motor. If 5V voltage is recovered, the Hall element of the motor may be short circuited. If there is no 5V voltage, then the controller is failing, and the controller must be replaced.
4. Firstly, verify speed control and the motor Hall switch for short circuiting. In general, rain is the most likely cause of a short circuit after moisture, so pay attention to the leak-proof swivelling joint. If the controller is damaged, before replacing the new controller, you must first check whether the Hall switch and the motor Hall switch are short circuited. Otherwise, the replacement controller will constantly be damaged.
5. The motor does not turn. Focus on the motor Hall switch and the turn signal; when on, the controller case is very hot. Generally, this is due to a short circuit in the controller's internal power tube. Immediately cut off power.

4.2 THE DRIVE MOTOR STOPS ROTATION

FIRST, FAILURES

1. Lithium battery voltage in critical low voltage condition.
2. The lithium battery connector contact is not good.
3. Very slow rotation speed, serious wear.
4. Failure in turn-off switch for brake switch.
5. The power block damaged the deficient contact.
6. The line connector connection is not good.
7. The controller's internal components have deficient contact.
8. The motor cable spool is virtually welded.

SECOND, MAINTENANCE METHODS

Use the multimeter voltage block to detect the battery's output voltage. If there is no voltage, the battery is defective. If the battery's output voltage is normal, you must check the CC converter input for voltage. If there is none, check whether the fuse is on. If the fuse is intact, the contact with the battery or cable is not good. If all the aforementioned is normal, check whether the energy block is good or bad.

4.3 SLOW DRIVE MOTOR SPEED

FIRST, FAILURE ANALYSIS

1. Poor rotation speed.
2. The battery's capacity is inadequate or is not charged.
3. The controller broke down.
4. Drive motor failure.

SECOND, MAINTENANCE METHODS

Detection of the manual speed control signal line (green line), speed control at maximum angle, voltage for the speed terminal is 4.2V. If voltage is lower than this, the result is a slow motor speed, and the speed control handle must be replaced.

Replace the battery.

Change the controller or drive the motor.

4.4 MOTOR FLUCTUATION

FIRST, FAILURE ANALYSIS

1. The drive motor Hall components are not good.
2. See the poor contact.
3. There is interference in the speed signal line.

SECOND, MAINTENANCE METHODS

1. The drive motor Hall connector has a deficient contact, connect again.
2. See the poor contact, connect again.
3. Interference in the speed signal line. Attempt to replace the controller and the metre.
4. Electric motorcycles being used, generally due to the connector in the Hall motor opening and the plug-in contact, due to a deficient contact. Inspect the connector, especially the motor Hall connector.

4.5 DRIVE MOTOR NOISE

FIRST, FAILURE DIAGNOSTIC

1. Too much play in the motor bearing.
2. The stator rotor makes noise.
3. Loose motor, off.
4. Axial motor movement.

SECOND, MAINTENANCE METHODS

1. Replace the bearing.
2. Repair the rotor stator.
3. Put the magnet back.
4. Add the appropriate bearing in axial fashion.

4.6 SPEED

FIRST, FAILURE DIAGNOSIS

1. Speed control damaged or coming from earthing (black line) open circuit or plug-in and play.
2. Controller failure.

SECOND, MAINTENANCE METHODS

1. Disconnect speed control. If the motorcycle returns to normal, this means the controller is normal, you must check the speed control and negative cable. If the wheels cannot stop, the controller is damaged, replace the controller.
2. The wheels spin quickly, commonly known as "motorcycle out of control," mainly due to improper contact with the negative line, inspect the negative line.

4.7 INSTRUMENT WITHOUT POWER SCREEN, THE DRIVE MOTOR OPERATES CORRECTLY

FIRST, FAILURE DIAGNOSIS

1. There is no voltage between positive and negative cables of the instrument.
2. The instrument is damaged.
3. Cable short circuit, which leads to protection against CC converter short circuits.

SECOND, REPAIR METHOD

1. Multimeter in DC 50V and detect positive and negative voltage. If voltage is normal, then the metre is damaged. If there is no voltage, the cable or the connector is short circuited. Inspect the cable and the connector.

4.8 INSTRUMENT POWER, THE NORMAL CURRENT SCREEN, SPEED AND MILEAGE, THE ABNORMAL GEAR SCREEN, THE DRIVE MOTOR WORKS CORRECTLY

FIRST, INSPECTION

1. The instrument is damaged.
2. The motor controller is broken down.
3. The gear shift switch is broken down.
4. Interference in the bus CAN.

SECOND, MAINTENANCE METHODS

1. Turn on with a multimeter to verify the OBD diagnostic interface on the can signal line (blue and white, green and white) and black and yellow voltage. Normal voltage is 1.5 ~ 3V. If there is voltage, the bus CAN is normal. After power failure, use the multimeter to verify signal line resistance (blue and white, green and white) on the OBD diagnostic interface. Normal resistance is 40-70 ohms, and the bus CAN is normal.

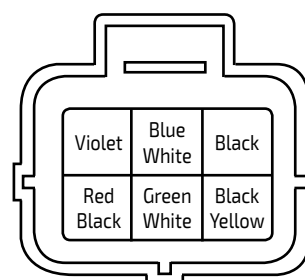
Steps to access the vehicle's OBD connector.



First step: remove the screws on the left and right of the plate, then remove the plate;

Second step: find the red connector, which is the OBD diagnostic outlet.

CAN bus interference: use the CAN analyser, compile information on the bus, according to the CAN bus communication protocol to see the controller ID or motor instrument to determine whether the motor instrument or controller is damaged or check the source of interference to quickly find the failure point.



4.9 HORN OUT OF CONTROL

FIRST, FAILURE INSPECTION

1. The horn is damaged.
2. Damaged horn switch.
3. Cable or connector short circuit.

SECOND, REPAIR METHOD

1. Press the horn switch with the multimeter voltage switch to detect voltage on the horn line at both ends. If voltage is normal, the horn is damaged. If there is no voltage, the horn's switch is damaged, or the cable is broken. Horn switch has two short wires, the failure point can be found quickly.

4.10 LIGHT FAILURE

FIRST, FAILURE INSPECTION

1. The LEDs are burnt out
2. Damaged light switch.
3. Cable or connector short circuit.

SECOND, MAINTENANCE METHOD

4. Press the headlamp switch with the multimeter voltage to detect the voltage waves of the lamp at both ends. With normal 12V voltage, damage is to the LED bulb in the headlamp. If there is no voltage, the lamp's switch is damaged, or the cable is broken.
5. With the positive and negative lamp switch circuit connected to the negative, the lamp is not on.

4.11 TURN SIGNAL FAILURE

FIRST, FAILURE INSPECTION

1. Damaged flash.
2. The turn signal switch is incorrect.
3. Turn signal connection or connector short circuit.
4. Turn signals. LED bulbs are incorrect.

SECOND, MAINTENANCE METHOD

1. El flash izquierdo y derecho al mismo tiempo no es brillante, la posibilidad de que el flash sea malo. Si la luz de giro a la izquierda no está encendida y la luz de giro a la derecha está encendida o la luz de giro a la derecha no está encendida y la luz de giro a la izquierda está encendida, entonces el flash está intacto. Debe verificar el interruptor de la lámpara de giro y las cuentas de la lámpara LED.

4.12 CONSTANT FUSE FAILURE

FIRST, FAILURE INSPECTION

1. The controller is damaged.
2. The DC converter is bad.
3. Positive and negative lithium battery.
4. The cable is damaged and short circuited.

SECOND, MAINTENANCE METHOD

1. Unplug the lithium battery plug, turn the on switch on and turn off all lamp switches. Measure resistance with the multimeter between the plugins. If resistance is very low, near "OFF", this means that the line has a short circuit. You may use the open-circuit method for detection. When electricity returns to normal after disconnecting the controller power connector, this means the controller is incorrect. If still not normal, unplug DC testing, and so on successively.

4.13 INSUFFICIENT RANGE AFTER CHARGING LITHIUM BATTERY

"Continuous mileage" is full energy with a new battery. The driver weighs 75 kg, ambient temperature is (25 °+/- 5), wind speed is no more than 3 m/s, and driving speed is 35 km/h on a flat secondary road.

There are many factors that affect mileage: for example, age of lithium batteries, a new set of lithium batteries, actual "continuous mileage" can exceed 70km, and using lithium batteries over time can lead to decreased "continuous mileage". This is mainly because the capacity of lithium batteries decreases when used over time. Moreover, the actual load weight, with a flat road surface, with or without slope, wind speed, wind direction, braking while driving, the number of starts, suitable tyre pressure and correct charging method, ambient temperature and other factors will affect the actual duration of the "continuous mileage".

MAINTENANCE METHODS

1. If tyre pressure is low, inflation may be the issue.
2. Check whether battery is charged sufficiently and charge if not.
3. Adjust brake play before and after.
4. Adjust play in front and rear axle bearing.

4.14 BUS CAN COMMUNICATION DIAGNOSIS DIAGRAM

First, bus CAN, the bus CAN communication output has a motor controller and a lithium battery, the instrument responsible for the viewing function.

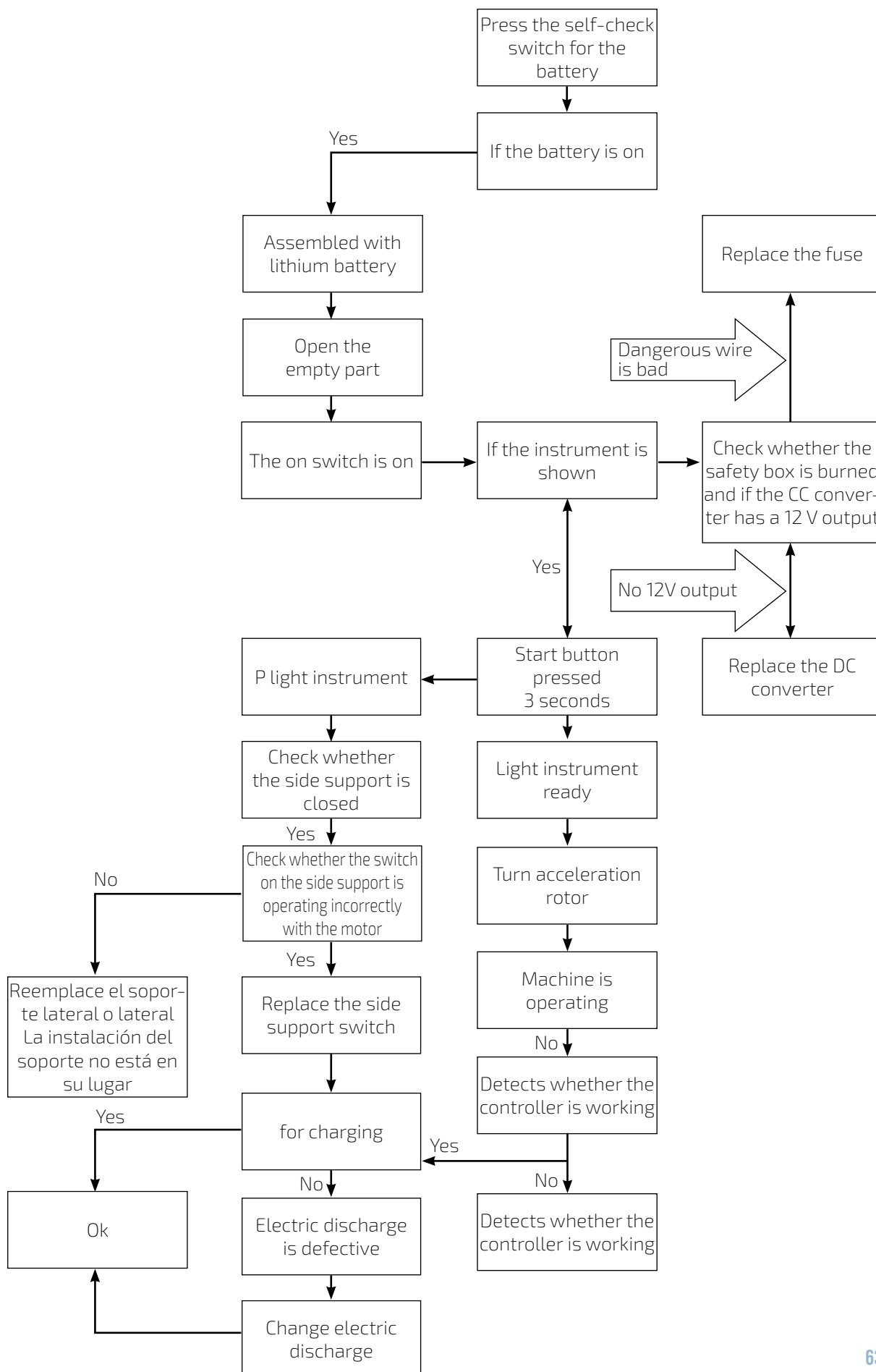


Secondly, the instrument screen can initially determine where the lithium battery or motor controller is breaking down. The instrument is shown as follows:

Third, turn the key off. To guarantee correct connection of the different components, with no load on the vehicle and the multimeter in resistance mode, test the blue and white line diagnosis interface, the resistance of the green and white line, with normal resistance at 40-70 ohms. The CAN bus is normal if the battery's resistance controller is approximately 110. At this point, using the gradual method of elimination, the specific methods are:

Firstly, unplug the motor controller's 30pin communication complement. Based on the previous method, resistance is 0, which means that the motor controller is normal and the CAN module within the instrument and the battery is bad. If resistance is approximately 110-140, this means that the motor controller is correct. At this point, unplug the battery; if resistance is 0, this means the battery is normal and the CAN module within the instrument is bad. If resistance is approximately 110-140, this means the instrument is normal and the battery is broken. The method above can quickly verify whether the CAN bus node is good or bad.

4.15 FLOW DIAGRAM FOR DIAGNOSING FAILURES IN ELECTRIC MOTORCYCLES



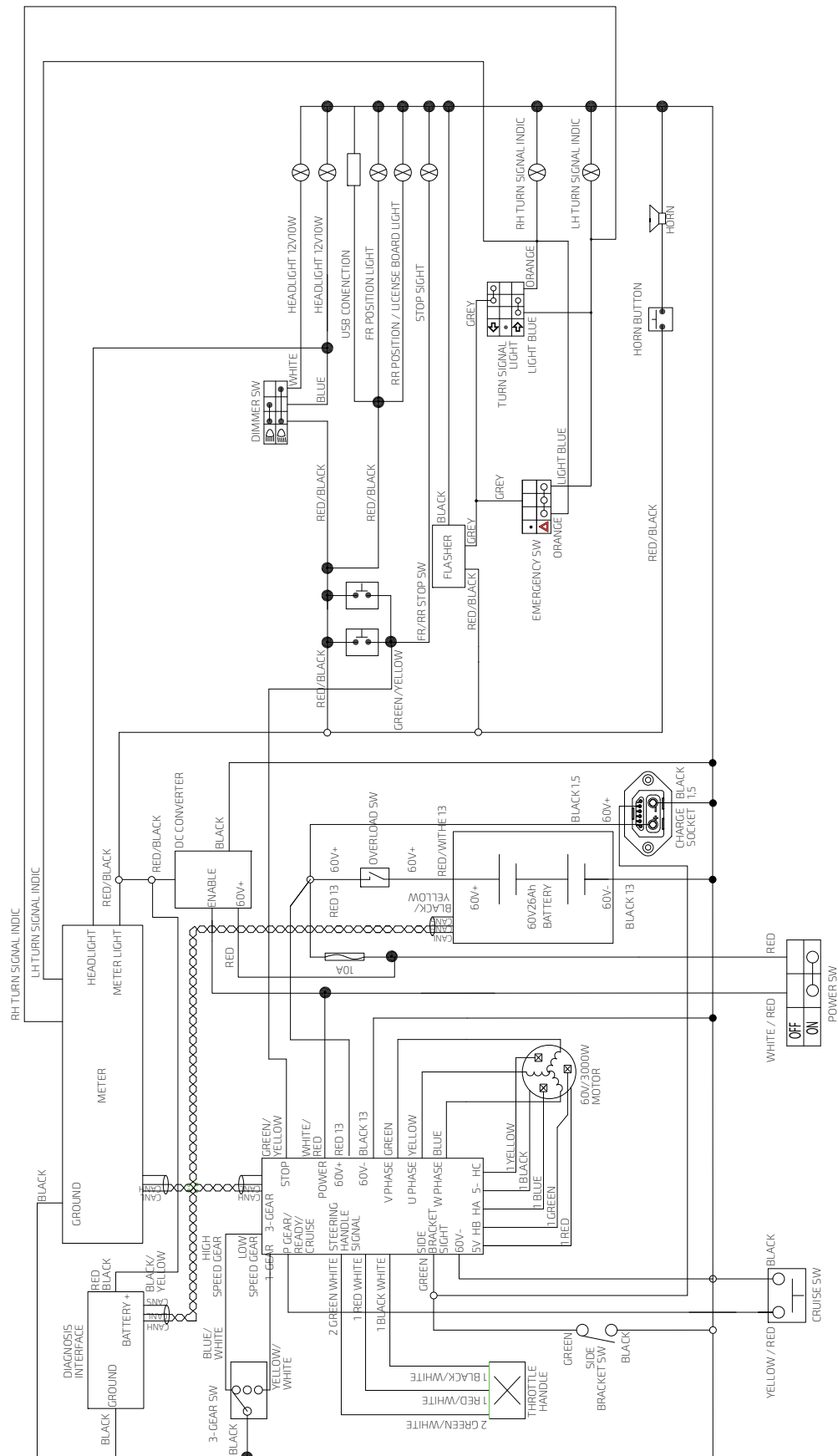
4.16 DISTRIBUCIÓN DEL CÓDIGO DE FALLO DE LA MOTOCICLETA ELÉCTRICA

Serial number	Equipment	Code or failure	Failure name	Reasons	Treatment	
1	Motor	01	Motor failure	Motor phase failure	Please contact after-sales service	
2		02		Hall motor failure	Please contact after-sales service	
3		03		Motor overheating failure	Check whether the rear wheel is stuck; otherwise, contact after-sales service	
4		04		Motor block failure		
5	Controller	21	Motor failure	MOSFET failure	Please contact after-sales service	
6		22		MOSFET failure		
7		23		Overcurrent failure		
8		24		Surge failure		
9		25		Overheating failure		110°
10		26	Controller failure	Low voltage failure		48V
11		27	Turn failure	Turn failure	Check whether the transfer is damaged; otherwise, contact after-sales service	No Hall signal or more than 3.8V
12	BMS lithium battery	41	Lithium battery warning	Charge saturation protection	Disconnect the device from charging and stop charging	71.4V
13		42		Battery low voltage protection	Place charge on time	51V
14		43		Charge overcurrent protection	Disconnect the device from charging and stop charging	
15		44		Discharge overcurrent protection	Please contact after-sales service	
16		45		Protection against battery discharge overheating	Please remove the battery and place it in the shade	Over 70

17	BMS lithium battery	46	Lithium battery warning	Protection from battery freezing discharge	Disconnect the device from charging and stop charging	Under -20
18		47		Open battery		
19		48		Protection against discharge short circuits		
20		49		Protection against battery discharge overheating		Over 70
21		50		Protection from battery freezing discharge		Under -20
22		51		Protection against overheating for the MOS circuit board		120°
23		52	Lithium battery failure	Temperature sensor failure (short circuit/ broken)	Disconnect the device from charging and stop charging	
24	DMU	61	Communica- tion module failure	SIM card identification failed		
25		62		SIM card charges (shown 2 seconds)		
26		63		GPS failure		
27		64		GPS antenna short circuit		
28		65		GPS antenna open		
29		66		SN not written on vehicle	Control serial number (flash) not written, please contact after-sales service	

5. ELECTRIC MOTORCYCLE. PART OF THE PRINCIPLE OF THE VEHICLE'S STRUCTURE AND MAINTENANCE

ELECTRIC BLUEPRINT (1200W)



5.1 VEHICLE FRAME STRUCTURE

FIRST, THE PRINCIPLE OF THE CHASSIS STRUCTURE

The chassis is the skeleton that supports the electric motorcycle, it is the main supporting part of the electric motorcycle. Given that electric motorcycles are subject to heavy blows and vibrations on the road while driving, both material selection and the structure require considerable resistance and rigidity. At the same time, the frame must be relatively lightweight, which is beneficial for driving electric motorcycles. The U-shaped frame used for the electric vehicle is highly resistant with good rigidity and applicability. It mainly consists of the frontal tube, the inclined frontal tube, the left and right handle, rear connection tube, etc. The chassis structure is shown in the figure.



The chassis' main role is to hold the battery, steering mechanism, transmission, gear system, control system, brake system, and other components, but also other ancillary components to provide support points for installation. The electric motorcycle forms a complete ensemble.

5.2 PRINCIPLE OF THE SUSPENSION SYSTEM STRUCTURE AND MAINTENANCE

FIRST, PRINCIPLE OF THE SHOCK ABSORBER STRUCTURE AND MAINTENANCE

The front shock absorber is a flexible connection between the front wheel and the frame. The rear shock absorber mainly takes the radial force from the motorcycle's rear wheel and, together, they withstand the weight of the body. During the process of driving the electric motorcycle, the impact and vibration of the front and rear wheels on the motorcycle driver are effectively and quickly absorbed. The force of each of the motorcycle's components is absorbed, prolonging the life cycle of the electric motorcycle and improving comfort, handling, and stability for the driver.

1. Front shock absorber.

The electric motorcycle's front shock absorber consists of a hydraulic spring, mainly composed by a combination of a fork tube, a shock-absorber spring, a seal, mud guard, piston ring, lower cylinder, piston rod, etc. The shock absorber's structure is shown below.



When the electric motorcycle's front wheel is affected and jolted by the road surface, the lower part of the front shock absorber rises and the shock absorber oil in the shock absorber flows upward through the retention valve and the orifice in the piston rod; shock absorbing force is not great. When the shock absorber cylinder continues the rise, the space between the retaining valve and the conical surface of the piston rod grows smaller, which increases shock absorption and prevents the front shock absorber cylinder from colliding. When the shock absorber descends due to the force of the spring from the front shock absorber, the shock absorber oil can only flow from the piston rod's orifice because the retention valve closes, providing greater shock absorption, effectively absorbing the vibration of the front shock absorber spring.

2. Rear shock absorber.

The electric motorcycle's rear shock absorber consists of a hydraulic spring, mainly composed of the upper joint, the shock absorbent hose, the ferule, the rear shock absorber spring, the rear shock absorber rod, the piston, the shock absorber, and the lower joint.

The rear shock absorber is mainly affected by the radial force of the electric motorcycle's rear wheel. When the electric motorcycle's rear wheel is subject to the impact and vibration of the road surface, the shock absorber compresses and extends. The shock absorber's hydraulic oil is pushed through the shock absorption orifice when the shock absorber vibrates.

3. Rear shock absorber disassembly, maintenance, and repair.

3.1 Remove the seat and remove the side panel.



3.2 Remove the connection bolt from the shock absorber to check whether the ferule is worn or damaged.



3.3 Remove the connection bolt under the shock absorber to check whether the ferule is worn or damaged.



3.4 Check whether the shock absorber spring relaxes after checking whether the shock absorber has oil leaks and after replacing the shock absorber.



3.5 Ways the rear suspension can be damaged, potential failures, and maintenance methods are shown on the table.

Part name	Damage	Component failure	Vehicle failure	Maintenance methods
Rear shock absorber set	After the shock absorber spring breaks or is not elastic	After the shock absorber spring breaks or is not elastic	After the shock absorber is too gentle or not enough	Replace the shock absorber set
	Oil leak in rear shock absorber	Oil leak in rear shock absorber	After shock absorber leak, or the rear shock absorber is too gentle	
	Flex deformation or piston rod wear in rear shock absorption	Flex deformation or piston rod wear in rear shock absorption	Flex deformation or piston rod wear in rear shock absorption	

SECOND, PRINCIPLE OF THE STEERING MECHANISM STRUCTURE AND MAINTENANCE

The steering mechanism mainly consists of the steering set and the front fork set and other components, the steering column, and the manual tube steering connection. To lift the chassis in the centre, the pressure bearings and other accessories, the steering column on the front tube, tighten the safety nut, the adjustment nut. Then, the steering tube is inserted into the steering column. Use the safety nut to tighten the steering column to the connection tube, and for the front fork set and the steering set to be tightly joined. The front fork set is mainly to control the front wheels, so that the electric motorcycle moves in a certain direction. When the steering turns left and right, the front wheel turns with the steering column to control the direction of driving, with the electric vehicle's steering column and the steering handle as shown in the figure.



1. Steering set

On the right side of the handle, there is the drive motor speed control and the front brake handle. There is a rubber sleeve on the left end and handle for the rear brake. The left and right ends are also equipped with mirrors and combined switches.

2. Front fork set

The front fork set is an important part of the electric motorcycle's steering mechanism, under the plate is the steering set in the chassis' vertical tube. The front fork set mainly consists of the steering column, the steering bearing, the bearing retaining ring, and other components. The impact from the wheel on the road goes through the front shock absorber to the steering column and then to the vehicle's frame. As such, the steering column must not only withstand a greater impact, but also guarantee flexible rotation while driving.



THIRD, THE PRINCIPLE OF THE WHEEL STRUCTURE AND MAINTENANCE

The wheels are driving components in electric motorcycles that provide quality to the entire vehicle and guarantee reliable adhesion to the road while driving, without sliding. The wheels can relieve and absorb the vibrations and blows caused by the road. Front wheel and part of steering control to set the electric motorcycle's direction. The rear wheel takes power from the motor to drive the electric motorcycle. The wheel mainly consists of the tyre, aluminium wheels, bearings, ferules, oil seals, axles, and other components.

1. Tyre

The electric motorcycle tyre is an important part of the driving system. Its role is to be in direct contact with the road, to help with the quality of the entire vehicle. The use of elasticity helps with the vibration and impact while driving and to guarantee balanced driving of the vehicle with reliable adhesion. The vehicle uses a vacuum tyre.

Tyre with the tread, frame, shock absorption layer, and other components. The tyre tread is in direct contact with the road surface. The tread consists of a variety, so the motorcycle obtains suitable adhesion on different kinds of roads. The frame must have a certain resistance, but to improve heat dissipation, it must not be too thick. When the tyre is appropriately attached, the circumference of the band is small enough that disassembling the tyre is not too difficult. The perimeter is large enough that the tyre cannot easily jump. The cover is the tyre's external skeleton, while the layers outside the tyre are crossed over each other and form a corner with the crosscut part of the tyre (tyre crown angle). The radial tyre band

lies in the radial direction of the ground. The crown angle is 0. The radial tyre has the advantages of reducing power loss, saving fuel, long life cycle, etc.

2. Hubs

The hub is the support, the skeleton for the tyre. It is normally made of metal cast under pressure. Aluminium alloy is the pressure casting method, followed by tooling. This hub is high resistance and is easy to assemble, but its elasticity is poor. It cannot be adjusted. If deformed or damaged, it must be replaced.

3. Wheel

The electric motorcycle's wheels are the front wheel and the rear wheel. The rear wheel is one single wheel that acts as the driving wheel with the motor, taking power from the electric motorcycle. The front and rear wheel structure is shown in the figure.

4. Wheel maintenance

When the motorcycle is in use, if tyre pressure is insufficient, first check the valve nozzle for leaks. Check tyre wear, the limit for maintenance is 2 mm. If the valve has leaks, the valve must be repaired or replaced.



5. Wheel maintenance

5.1 Remove the bolt from the front brake pin.

5.2 Remove the nut from the front axle, remove the front axle, and check whether the axle is deformed.



5.3 Remove the front wheel and the ferule from the front wheel. Check whether the ferule on the front wheel is worn or damaged and check the depth and pressure on the tyre tread.

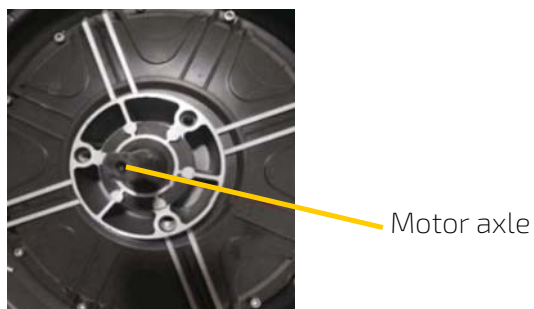
5.4 Remove the oil seal from the front wheel and check whether the oil seal lip is worn or damaged.



5.5 Remove the nut from the motor axle, remove the motor set, and check whether the motor axle is deformed. Check whether there are damaged parts, check the depth of the tyre tread, pressure.



5.6 Check whether the motor axle is worn or damaged.



Kind of damage to wheel, failure, and maintenance methods on table.

Part name	Damage	Component failure	Vehicle failure	Maintenance methods
Front wheel	Front wheel distorted	Front wheel distorted	Veering while driving, turn to shake	Replace front wheel
	Excessive wear on the wheel bearing orifice	Wheel bearing orifice and bearing loose	Veering while driving, turning or shaking while driving	
	Excessive wear on the wheel bearing orifice	Wheel bearing orifice and bearing loose	Veering while driving, turning or shaking while driving	
Front tyre	Perforated or ruptured tyres	The front tyre pressure is insufficient	Inflexible turning	Tyre
	Excessive tyre wear (depth of tyre tread under 2mm)	Excessive tyre wear (depth of tyre tread under 2mm)	Slippage while driving, low slide capacity	
Rear wheel	Excessive wear on brake pads	Excessive wear on brake pads	Rear brake	Replace brake pads
	Bearings worn or damaged	Axle and radial orifices are too large or inflexible	Veering while driving, rear wheel rotation while driving	Replace bearings
Rear tyre	Perforated or ruptured tyres	Tyre pressure is insufficient	Inflexible turning	Change the tyre
	Excessive tyre wear (depth of tyre tread under 2mm) Excessive tyre wear (depth of tyre tread under 2mm)		Slippage while driving, low slide capacity	

6. Principle of the brake structure and maintenance

6.1 Structural principle

Electric motorcycles need to reduce speed or park and require brakes on the wheel to stop power rotation or torque, in order to decelerate and to park. Front wheel brakes are generally controlled with the right hand, and brakes on the back wheels are controlled with the left hand. The electric motorcycle brake is a disc brake.



Brake structure diagram CBS



Brake disc



Rear hydraulic brakes
(1200W)



Front hydraulic brakes
(1200W)

6.2 Brake adjustment

6.2.2 Press the front brake handle with your right hand and check front brake performance. The standard free stroke for the front brake handle is 10-20 mm. If the front brake handle is not within the prescribed range, the front brake must be readjusted. The front brake is a disk brake and you must check wear on brake pads and the brake disc.

6.2.3 Check that there is enough oil in the brake pump. Check whether the brake tube is damaged and whether it must be replaced.



Oil deposit



Tube

6.3.3 Remove the attachment bolt from the front brake pin set, remove the front brake pin set and check wear on front brake pads. When necessary, replace the front brake pads.



6.3.4 Remove the attachment nut from the front axle, remove the front wheel set, remove the disk bolt from the front brake, check whether wear to the front brake disc is excessive; the limit for maintenance on the front brake disc is 3mm.



6.3.5 Press the rear brake handle with your left hand and check rear brake performance. The standard free stroke for the rear brake handle is 10-20 mm. If the rear brake handle is not within the prescribed range, the rear brake must be readjusted. The rear brake is a disc brake. Check wear on brake pads and the brake disc and use the same disassembly procedure as for the front brake.



Damage to front and rear brake, failure type, and maintenance method.

Nombre de la pieza	Forma dañada	Fenómeno de fallo de componentes	Fenómeno de fallo del vehículo	Métodos de mantenimiento
Front brake set	Insufficient brake fluid	Insufficient brake fluid	Front brake failure	Replace DOT4 brake fluid in the upper line and drain the brake system oil circuit
	Brake fluid is deteriorated or clearly contaminated	/		Replace brake fluid
	The cylinder surface is damaged or scratched	/		Replace the front brake's main pump set
	Cracked cylinders	Cylinder spillage		
Front brake sub-pump set	Brake tube mixed with air	/		Leak in brake system oil circuit
	Aged or broken front brake tube	Oil leak in the brake tube		Replace the front brake tube
	Excessive wear on brake pads (meaning, the friction plate has been used to the line's limit)	/		Replace the entire brake pad set
Front brake disc	Excessive wear (meaning, the width of the brake disc is less than the 3 mm limit)	Leak in front brake pin body	Front brake failure	Change brake disc
	Distorsión	Oil seal leak	Abnormal noise in front brakes or failure	Replace the front brake disc

Rear brake set	Insufficient brake fluid	Insufficient brake fluid	Rear brake failure	Replace DOT4 brake fluid in the upper line and drain the brake system oil circuit
	Brake fluid is deteriorated or clearly contaminated	/		Replace brake fluid
	The cylinder surface is damaged or scratched. The cylinder surface is damaged or scratched.	/		Replace the main brake pump set
	Cracked cylinders	Cylinder spillage		
Rear brake sub-pump set	Air in brake circuit	/		Leak in brake system oil circuit
	Wear or rupture in brake tube	Oil leak in the brake tube		Replace the brake tube
	Excessive wear on brake friction plate (meaning the friction plate has been used past the indicated limit)	Failure in rear brake		Complete brake friction plate set must be replaced
Brake disc	Excessive wear (meaning, the width of the brake disc is less than the 3 mm limit)	Leak in front brake pin	The brake makes a noise or is broken	Change brake disc
	Distortion	Oil from seal leaking		

7. Low brake performance while driving

Failure diagnosis and problem-solving.

When brake performance is reduced, braking is weak while driving. Brakes may be improved again by replacing the brake pads or brake disc.

Brake pad inspection:

- 7.1 Check wear on brake pads. If wear on brake pads exceeds the line indicating the wear limit, the brake pads must be replaced.
- Check wear on the brake disc. If wear on the brake disc exceeds the 3.5mm wear limit, the brake disc must be replaced.

Bear precautions in mind while braking:

1. When braking, the rear brake must be used first to reduce speed, and then the front brake to stop.
2. When driving fast, you must brake before you think you need to.
3. You must gradually apply the rear brake.
4. When the vehicle is operating at high speed, do not abruptly squeeze the front brake.

Note: The production plant has the latest version of the maintenance manual.

6 SOLUTION FOR COMMON PROBLEMS

Problem	Cause	Solution
The instrument panel does not work when power is activated	Ignition key ruined or poor connection	Check the ignition key and connection components: repair or replace them if necessary
	Poor connection between the power pin and the battery plug	Check the power pin and outlet; repair or replace them if necessary
	Circuit with melted fuse	Check and replace fuse if necessary
	Instrument panel malfunction	Check the instrument panel and replace if necessary
The instrument panel works properly, but does not show acceleration when on	Insufficient discharged electric energy	Charge
	Accelerator failure	Go to assistance centre
	Improper right or left handlebar operation	Go to assistance centre
	Controller/motor failure	Go to assistance centre
Insufficient speed or autonomy	Insufficient power	Recharge
	Insufficient tyre inflation pressure	Check pressure, possible inflate until reaching correct pressure
	Repeated braking or surge	Proper driving style
	Aged battery or charge level depleted	Replace the battery
	Temperature too low	Normal situation
	Controller failure	Check that the controller operates correctly
The battery does not charge or has insufficient charge	The battery charger is not connected to the lithium battery correctly	Connect it correctly
	Loose or disconnected cable	Attach the cable to the battery correctly
	Battery charger operates incorrectly	Go to assistance centre

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