



## **iLark Repair Manual**

**ZHEJIANG DOOHAN TECHNOLOGY CO.,LTD**

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## **Preface**

This repair manual will give you information about the iLark's vehicle specifications, repair procedures, adjustments and diagnostics.

Zhejiang Doohan Technology Co.,LTD authorized service provider employees to understand this manual and future publication of maintenance technology newsletter, can provide better service for iLark users.

For the brand products, or special tools provided in this manual, it is recommended to obtain these products, parts or tools through Zhejiang Doohan Technology Co.,LTD.

The deadline for the information is 2019.

No part of this manual may be distributed in any form without the written permission of Zhejiang Doohan Technology Co.,LTD

## **Report errors and suggestions**

If you find any errors in the repair manuals or suggestions on the repair manuals, we are willing to listen to them.

Errors and suggestions can be reported by mail or email to Zhejiang Doohan Technology Co.,LTD.

After-sales Department of Zhejiang Doohan Technology Co.,LTD.

No.99 Jingda Road, Sanjia Street Development Zone, Jiaojiang District, Taizhou City, Zhejiang Province

Zip code: 318014

When contacting, please be prepared with the following information.

- Your Name
- Your Vehicle Identification Number
- Description of your concern
- Necessary and relevant information (such as samples or page numbers marked)

Zhejiang Doohan Technology Co.,LTD will reply to your question in the following way.

- Present your problem to the relevant maintenance engineer
- Ask the relevant maintenance engineer for a reply
- Provide you with answers to your questions within 10 business days

We welcome our customers to communicate their concerns to the after-sales department of Zhejiang Doohan Technology Co.,LTD.

## Cautions and Notes

### Caution, definition of caution

Repair information is provided in the service manual and is intended to help technicians diagnose and repair the system so that the vehicle can operate properly; however, there are procedures that can be dangerous if not followed as recommended. Cautions and notes are prepared to prevent hazards from occurring, but not all hazards can be anticipated. This information is placed in a prominent place in the maintenance manual. This information is prepared to prevent the following.

- Serious injury to the technician himself
- Damaged Vehicles
- Unnecessary vehicle maintenance
- Unnecessary parts replacement

### Definition of Caution

When you encounter a Caution, you are asked to take the necessary action or refrain from taking the prohibited action.

Ignoring a Caution may result in the following.

- Serious injury to the technician himself
- Serious injury to other technicians in the work area
- If the vehicle is improperly repaired and seriously injures the driver of that vehicle.

### Definition of Caution

"Caution" requires that special attention be paid to necessary measures or prohibited measures. Ignoring "care" can lead to the following consequences.

- Damaged Vehicles
- Unnecessary vehicle maintenance
- Unnecessary parts replacement
- Repair of systems or components that do not operate or perform properly
- Damage any system or component that depends on the proper operation of the maintenance system or component
- Improper operation or performance of any system or component that depends on the proper operation of the servicing system or component
- Damage to fasteners, basic tools or special tools
- Brake fluid leakage

### Caution about disconnecting power

WARNING: Before servicing any electrical component, the key must be in the "OFF" or "LOCK" position" and all electrical loads must be "OFF" unless otherwise stated in the operating procedures. Also disconnect the battery cable if the tool or setup is susceptible to contact with live exposed electrical terminals. Violation of these safety instructions can result in injury or damage to the vehicle.

### Caution regarding brake fluid irritation

Caution: Brake fluid is irritating to the eyes and skin. In case of exposure, take the following measures.

- Eye contact - Flush thoroughly with water.
- Skin contact - Wash with soap and water.
- If swallowed - see a doctor immediately.

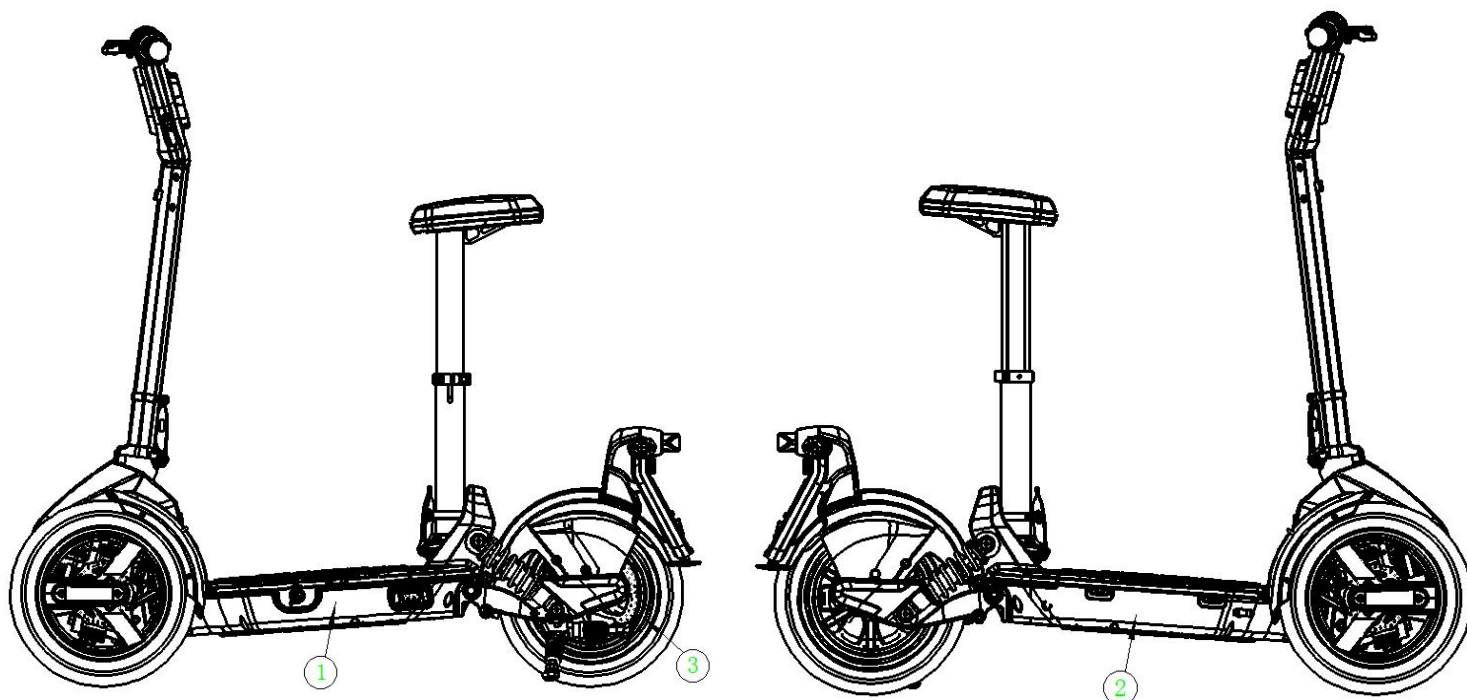
### Precautions for fasteners

Special Note: Use the correct fastener in the correct location. The part number of the replacement fastener must be correct. Do not use paint, lubricants or corrosion inhibitors on fasteners or fastener attachment surfaces unless specifically noted. These coatings affect the torque and joint force of the fastener and damage the fastener. When installing fasteners, always use the correct tightening sequence and tightening torque values.

# Chapter 1 General Information

## Vehicle identification location

When registering a vehicle or receiving a driving license, you need to submit the vehicle identification number and the motor number. The above numbers are also required when replacing parts for three-package repair.



① Vehicle Identification Number (VIN) Placard belongs to the legal identifier of the vehicle.

☆L1TSD0YH\*\*\*\*\*☆

② Vehicle placard information.

		浙江逗哈科技股份有限公司 ZHE JIANG DOOHAN TECHNOLOGY CO.,LTD.	
车辆型号	<input type="text"/>	制造年月	<input type="text"/>
电机型号	<input type="text"/>	额定功率	<input type="text"/>
整备质量	<input type="text"/>	额定电压	<input type="text"/>
车辆识别号	<input type="text"/>		
产地 中国			

③ Motor number.

Motor 180W No.: 08ZW480480Z20A \*\*\*\*\*

Motor 300W No.: 08ZW480480Z25A \*\*\*\*\*

## General specifications

Main dimensions			
Car Captain	1133mm	Car width	513mm
Car High	1082mm	Wheelbase	800mm
Front Wheelbase	405mm		
Main Performance			
Overall mass	28kg (without battery)		
Front and rear axle distribution of overall mass	Front 16kg/back 12kg (without battery)	Maximum design speed	25km/h
Rated voltage	48V		
Maximum load capacity	75kg	Braking distance (dry land)	≤15m(25km/h)
fixed staff	1 person		
Climbing ability	≤7°	Braking distance (Wetlands)	≤19m(16km/h)
Standard power consumption	1.4KWh/100km(25km/h)(Low) 1.9KWh/100km(25km/h)(High)		
Frame			
Rear Shock Absorber	Sleeve, oil-damped type		
Tire specification	Front 60/80-8, rear 75/65-8		
Front and rear tire pressure(Kpa)	Front 250±10, rear 300±10		
Wheel type (aluminum wheel)	Front MT1.50-8 inch aluminum wheels		
Rear motor	Post MT 1.85-8		
Front braking method	/		
Rear braking method	Disc type		
Minimum Ground Clearance	83mm		
Seat cushion height	585-807mm		
Maximum Lateral Tilt Angle	≤31°		
Maximum steering angle	≤33°		
Turning radius	2.50m		
Maximum distance between the first two rounds of drop	170mm		
Battery System			
Battery Type	18650 ternary lithium battery		
Voltage	48V		
Capacity	48V10AH (low) 48V15AH(High)		
Charger input voltage (V)	AC 220V or 110V(optional)		
Charger output voltage (V)	54.6V		
Standard charging current	3A		
Standard charging time	4H (Low) 6H (High Profile)		
Maximum range	25KM (Low) 35KM (High)		
Battery weight	3.2±0.2Kg (10AH) 4.2±0.2Kg (15AH)		
Battery charge and discharge times	500 times		
Ambient temperature range for battery use and storage	-20°C to 60°C		
Battery charging ambient temperature range	0°C to 45°C		
Battery protection system	Undervoltage protection, short circuit protection, temperature		

	protection, overcharge protection, overcurrent protection, battery equalization protection
Other	
Instrumentation	LCD meter
Fuse specification (A)	3A, 20A
Luminaire specifications	12V LED



## Chapter 2 Service Information

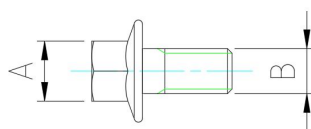
### Standard parts specifications and general torque

It is used to inform customers of the specifications of the standard parts used in the whole vehicle and the repair tools corresponding to them.

The locking torque specified for standard fasteners is based on the ISO standard thread depth. **Locking torques for special components or assemblies are described in the relevant sections of the manual.** To avoid bending, lock multi-firmware assemblies to the specified torque in a crisscross pattern and in a progressive manner. Unless otherwise specified, the locking torque should be based on clean and dry threads and the assembly should be maintained at room temperature standard.

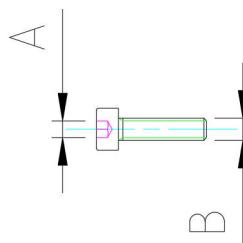
1. the whole car using the national standard number GB/T 5789-2000 hexagonal flange face bolts, standard specifications, maintenance tool specifications and general torque see the following table.

A	B (Specification)	Open-end wrenches /sockets	General torque N.m
10mm	M6	10#	10~13
12mm	M8	12#	25 to 35
14mm	M10	14#	63 to 80



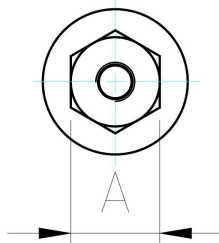
2. the whole car using the national standard number GB/T70.1-2000 hexagonal cylindrical head bolts, standard specifications, maintenance tool specifications and general torque see the following table.

A	B (Specification)	Hexagonal wrench	General torque N.m
4mm	M5	4#	4 to 7
5mm	M6	5#	10~13
6mm	M8	6#	25 to 35
8mm	M10	8#	63 to 80



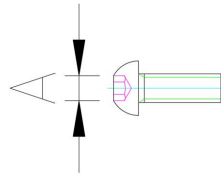
3. the whole car using the national standard number GB/T 6177.1-2000 hexagonal flange face nuts, GB/T6187.1 hexagonal flange face self-locking nuts, standard specifications, maintenance tool specifications and general torque see the following table.

A	Specification	Open-end wrenches /sockets	General torque N.m
7mm	M4	7#	2 to 3
8mm	M5	8#	4 to 7
10mm	M6	10#	10~13
12mm	M8	12#	25 to 35
14mm	M10	14#	63 to 80



4. The entire vehicle uses the national standard number GB/T70.2-2000 hexagonal flat round head bolts, standard specifications, maintenance tool specifications and general torque are shown in the following table.

A	Specification	Hexagonal wrench	General torque N.m
3mm	M5	4#	4 to 7
6mm	M8	5#	25 to 35



5. the whole car using the national standard number GB/T 845-1985 cross slot pan head self-tapping screws, GB/T818-2000 cross slot round head screws, maintenance tools are unified cross screwdriver. Torque is not required, tighten it.

## Preparation for disassembly and replacement

- ① Clean the dust, dirt and foreign objects from the vehicle before performing dismantling or demolition work.
- ② When disassembling, be sure to put the mating parts together. Paired parts must be reused or replaced in groups.
- ③ When disassembling, clean all parts and place them in the tray in the order of disassembly. Doing so saves assembly time and ensures that the parts are installed correctly.
- ④ Place all parts away from fire and water sources

## Gaskets, oil seals

The surface of the gasket to be replaced and the oil seal all need to be cleaned.

## Bearings and Oil Seals

Install the bearing and oil seal so that the manufacturer's mark or number is clearly visible. When installing the oil seal, use a small amount of lithium soap-based grease to coat the lip of the oil seal. Once the bearings are properly installed, use lubricant to lubricate the bearings.

**Caution.** \_\_\_\_\_

**Do not use compressed air to rotate the bearing, as this will damage the bearing surface.**

## Check the connection components

Check the wiring and coupler connectors for dirt, dust and water stains.

1. Connection.

- ① Wiring
- ② Linker
- ③ Joint

2. Inspection.

- ① Wiring
- ② Linker
- ③ Joint

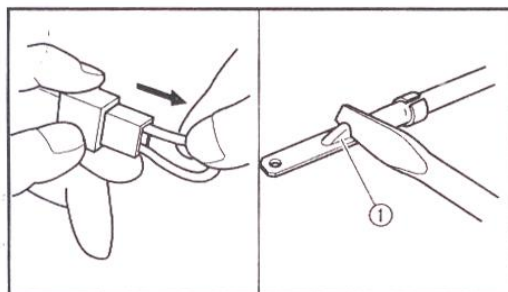
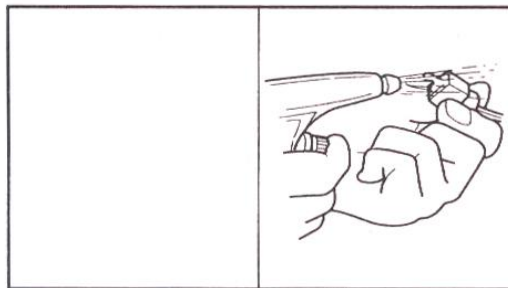
Water stains - blow dry with air gun

Dust, dirt - repeated evacuation and connection several

3. Inspection.

- ① All connection parts
- ② Loosen the connection part: Connect correctly.

**Caution.**



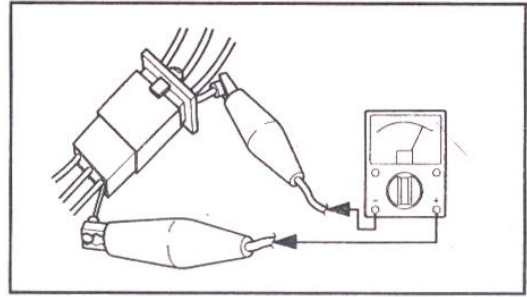
**If the pin on the terminal becomes flat, board it up.**

4. Connection.

- ① Wiring
- ② Linker
- ③ Joint

**Caution.**

**Make sure that all connection parts are locked.**



5. Inspection.

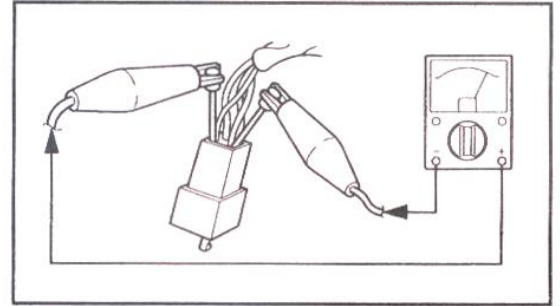
(Use a multimeter) to continuously check other related items.

**Caution.**

**If there are no items that need to be checked further, clean the terminals.**

**To inspect the wire jacket, perform steps 1 through 3.**

**To correct quickly, please use [contact recovery agent].**

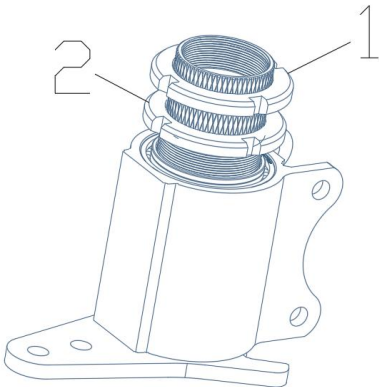


## Chapter 3 Inspection and adjustment

This chapter contains all the information on the various checks and adjustments that must be made. If these maintenance procedures are carried out regularly, the vehicle will run more smoothly and last longer. The relative cost of maintenance is thus reduced. The information described in this chapter applies to both unsold and sold vehicles. All service technicians should be fully familiar with all the information in this chapter.

### Inspection and adjustment of the steering column

1. Place the vehicle on a flat surface. Support the double brace so that the front wheels are off the ground.
2. Inspection.
  - Directional column  
Hold the front wheel and wiggle it up and down.  
Steering column stuck or loose - adjust
3. Dismantling.
  - Front panel and toolbox (refer to "Chapter 4: Plastic Parts").
4. Adjustment
  - Steering column
    - a. Remove the lock nut 1.
    - b. Loosen locknut 2, then use a ring wrench to lock to the specified torque.



#### **Caution.**\_\_\_\_\_

**Do not lock the round nut too tightly.**

- c. Check for slack or stuck directional column rotation. If stuck, check the upper and lower bearings in the faucet tube, damaged - replace.
    - d. Use the ring wrench to hold the locknut 2 and lock the upper locknut 1.
5. Installation.
  - Front panel and toolbox (refer to "Chapter 4: Plastic Parts").

### Shock absorber inspection

Check.

- Shock absorber inner tube.  
Damaged/scratched - replace.
- Oil seal.  
Oil leak - replace
- Check the smooth action of the shock absorber.  
If it doesn't work well - have it replaced.

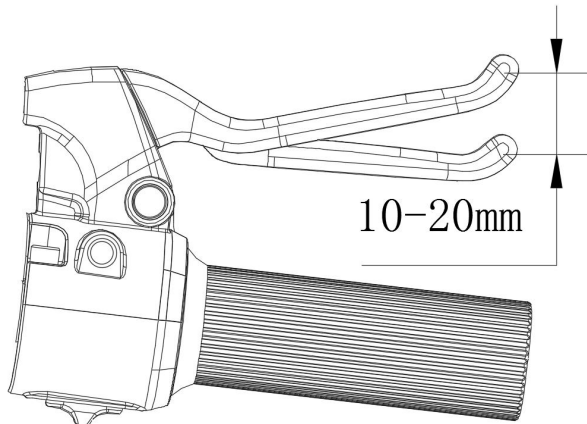
## Inspection and adjustment of brakes

### 1. Check.

- Brake Grip Free Clearance
- Exceeds the standard value - adjust.

### Caution.

**The brake grip free clearance is (10-20) mm, whichever is at the end of the brake grip.**



### Rear brake inspection

The inspection/adjustment of each brake block is carried out according to the following procedure.

### 1. Check.

- Rear hydraulic brake shoes
- Shiny parts - repair.  
Use coarse sandpaper to grind.

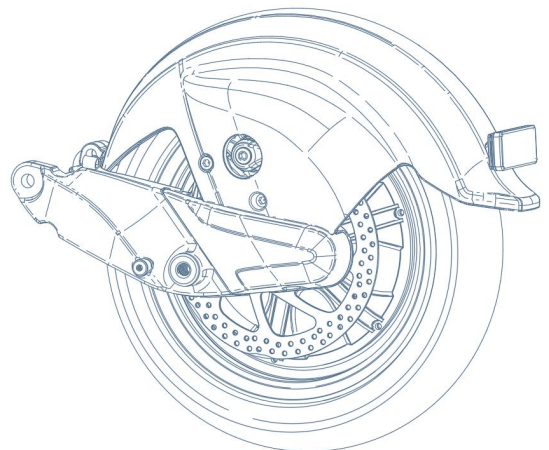
### Caution. \_\_\_\_\_

After grinding with coarse sandpaper, clean the brake block with a cloth.

### 2. Measurement.

- Thickness of rear hydraulic brake shoes
- Exceeds standard value - replace.

Thickness of the brake block using limit  
(minimum value) 1.5 mm



### Caution. \_\_\_\_\_

- **Oil or grease should not be attached to the brake shoes.**
- **One side of the brake shoes wear to the limit of use must be replaced as a whole group of brake shoes.**

### 3. Measurements.

- Disc Thickness
- If outside the standard value - replace the disc brake disc.

Thickness limit of disc brake disc (min.) 3mm

### 4. Check.

- Brake disc cross-section
- Attachment of oil - clean up  
Wipe with a cloth dampened with lacquer thinner or oil cleaner.  
Scratch - Repair.  
Lightly and evenly buff the scratched area with coarse sandpaper.

## Inspection of tires

The following procedure applies to both front and rear tires.

1. Check the tires.

① Tire pressure

Exceed the standard value ( $250 \pm 10 \text{KPa}$ ), please adjust the tire pressure.

### Caution.

- Please check and adjust the tire pressure when the outside tire temperature is equal to the outdoor room temperature.
- Riding an overloaded vehicle can lead to damaged tires or accidental injuries.
- Do not overload your vehicle.

2. Outer tire surface

Tread depth of I outer tire

II Wear Indicator

Minimum tread depth of the outer tire	
Front Wheel	Rear Wheel
3.5mm	4.0mm

Please replace if damaged or worn.



### Caution.

**It is best not to attempt to repair a tire that has been punctured. If you must, try to be careful and replace it with a good quality tire as soon as possible.**

Tire specification	
Front Wheel	Rear Wheel
60/80-8	75/65-8

The symbol of rotation direction on the I tire

### Caution.

**When mounting the tire, align the symbol on the tread to the direction of wheel rotation.**



3. Car rim inspection

- Wheel Rims
- If damaged or worn, please replace.

### Caution.

**Do not repair damaged or deformed rims, but replace them with new products.**

## Lasso inspection and lubrication

The following procedures apply to all steel cables.

1. Check.

- Steel cable

Damage - replace.

2. Inspection.

- Steel cable operation

Poor movement - lubrication.

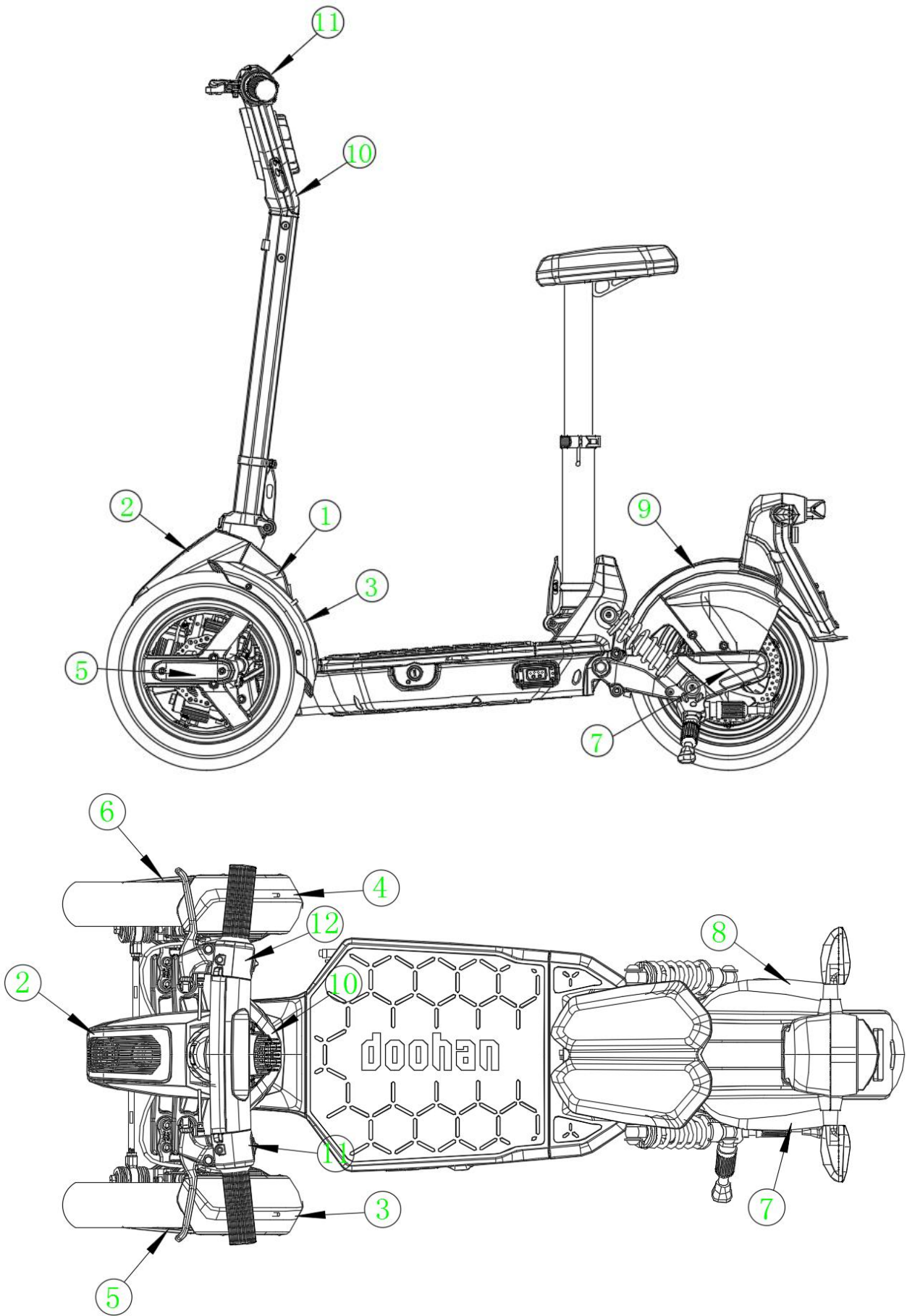
Recommended Lubricants	Engine oil or appropriate steel cable lubricant
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**Caution.**\_\_\_\_\_

- **A damaged cable will affect the action of the steel cable. Please replace the cable as soon as possible.**
- **Hold the end of the cable vertically and drip a small amount of lubricant into the cable or use appropriate lubrication equipment.**

# Chapter 4 Body

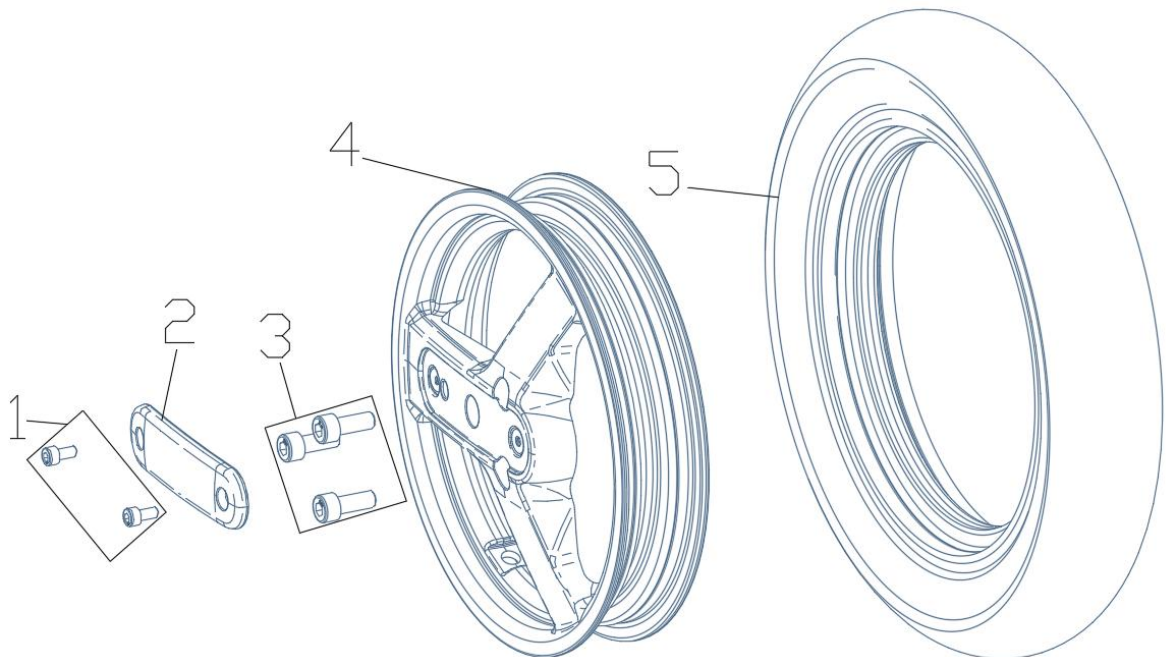
## Plastic parts





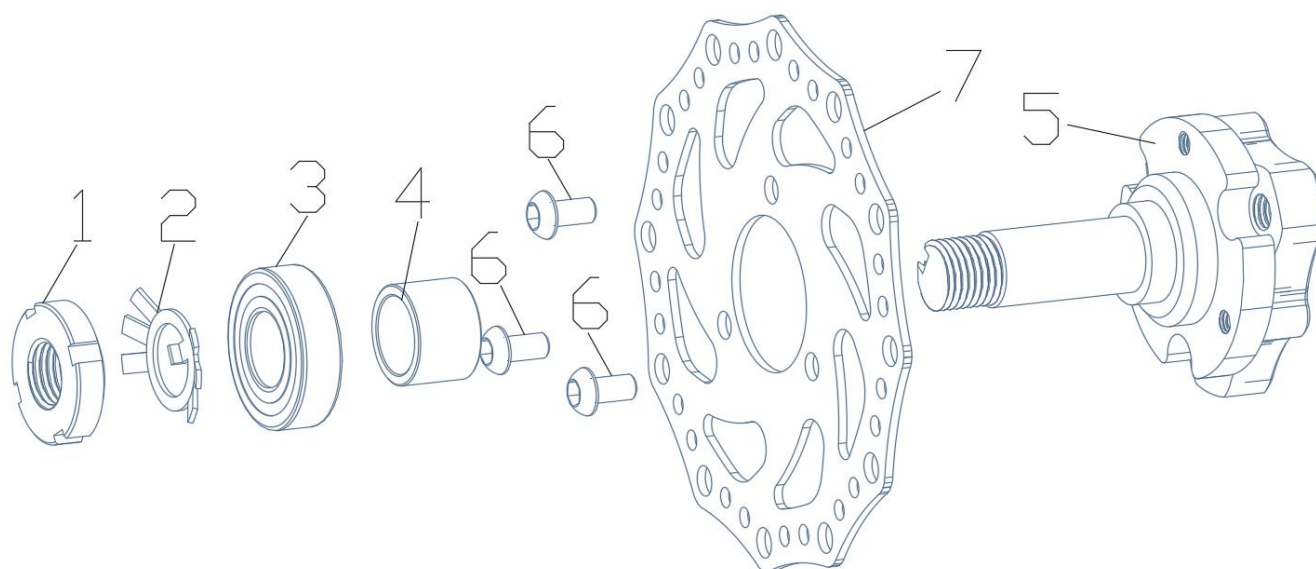
Operation order	Part Name	Standard Parts	Quantity	Tools	Remarks
1	Steering column rear cover	Hexagon socket flat round head bolts S4-M6×10	2	4# Hexagonal	Disassemble the parts in order, and when installing them, follow the reverse order of disassembly.
2	Steering column front cover	Cross recessed pan head tapping screws ST 4.2×16 (head φ10)	2	Phillips screwdriver	
		Hexagon socket flat round head bolts S3-M5×10	1	3# Hexagonal	
3	Front wheel left fender assembly	Hexagon socket cylindrical head bolts S5-M6×12	3	5# Hexagonal	
4	Front wheel right fender assembly	Hexagon socket cylindrical head bolts S5-M6×12	3	5# Hexagonal	
5	Front rim trim cover	Hexagon socket cylindrical head bolts S4-M5×10	2	4# Hexagonal	
6	Front rim trim cover	Hexagon socket cylindrical head bolts S4-M5×10	2	4# Hexagonal	
7	Rear flat fork left cover	Hexagon socket cylindrical head bolts S5-M6×12	1	5# Hexagonal	
8	Rear flat fork right cover	Hexagon socket cylindrical head bolts S5-M6×12	1	5# Hexagonal	
9	Rear wheel fender assembly	Cross recessed pan head screws M6×16 (head φ10)	4	Phillips screwdriver	
10	Instrument cover	Hexagon socket flat round head bolts S4-M6×12	3	4# Hexagonal	
11	Left combination switch assembly	Hexagon socket cylindrical head bolts S4-M5×20	2	4# Hexagonal	
12	Right combination switch assembly	Hexagon socket cylindrical head bolts S4-M5×20	2	4# Hexagonal	

## Front Wheel



Operation order	Job name / Part name	Quantity	Remarks
<b>Removing the front wheel</b>			
1	Hexagon socket cylindrical head bolts M5×10	2	Disassemble the parts in order.  <b>Caution.</b> Propping up the vehicle with appropriate brackets to allow the front wheels to hang in the air. When installing, follow the reverse order of disassembly.
2	Front rim trim cover	1	
3	Hexagon socket cylindrical head bolts M8×1.25×20	3	
4	Front rim	1	
5	Front Tire	1	

## Disc brake discs and bearings



Operation order	Job name / Part name	Quantity	Remarks
<b>Remove disc brake disc</b>			Disassemble the parts in order.
1	Round Nuts	1	<b>Caution.</b> Propping up the vehicle with appropriate brackets to allow the front wheels to hang in the air.  When installing, follow the reverse order of disassembly.
2	Check washers	1	
3	Bearing ( 6004-2Z )	1	
4	Bushing	1	
5	Front wheel flange seat	1	
6	Brake disc screws	3	
7	Front brake disc	1	

### 1. Check.

- Wheel bearing: If the front wheel does not turn smoothly or is loose, please replace the wheel bearing.
- Bushing.  
Damaged or worn - replace.

## Front brake inspection

The inspection/adjustment of each brake block is carried out according to the following procedure.

### 1. Check.

- Front hydraulic brake shoes  
Shiny parts - repair.  
Use coarse sandpaper to grind.

### Caution. \_\_\_\_\_

After grinding with coarse sandpaper, clean the brake block with a cloth.

### 2. Measurement.

- Thickness of front hydraulic brake shoes  
Exceeds standard value - replace.

Thickness of the brake block using limit (minimum value) 1.5 mm
--------------------------------------------------------------------

### Caution. \_\_\_\_\_

- **Oil or grease should not be attached to the brake shoes.**
- **One side of the brake shoes wear to the limit of use must be replaced as a whole group of brake shoes.**

### 3. Measurements.

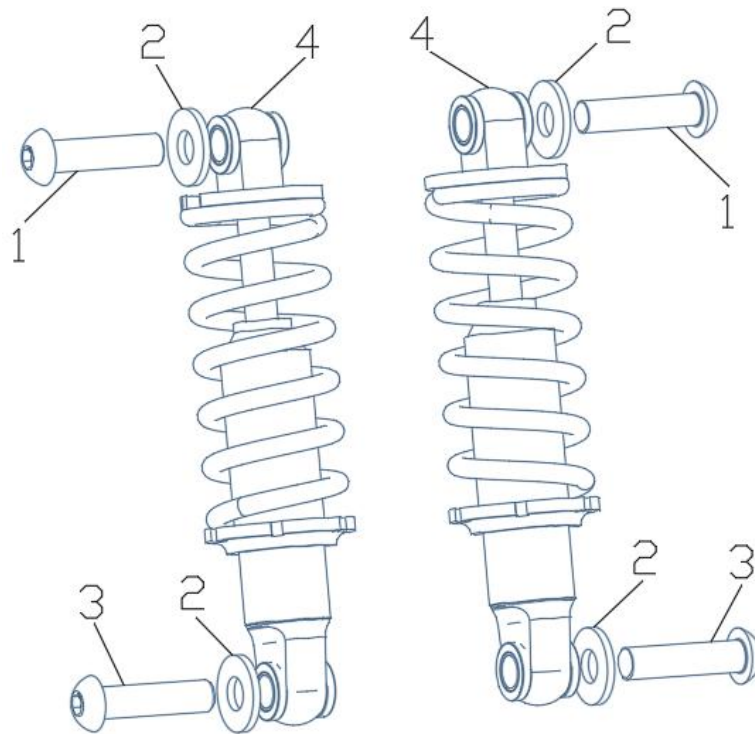
- Disc Thickness  
If outside the standard value - replace the disc brake disc.

Thickness limit of disc brake disc (min.) 3mm
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### 4. Check.

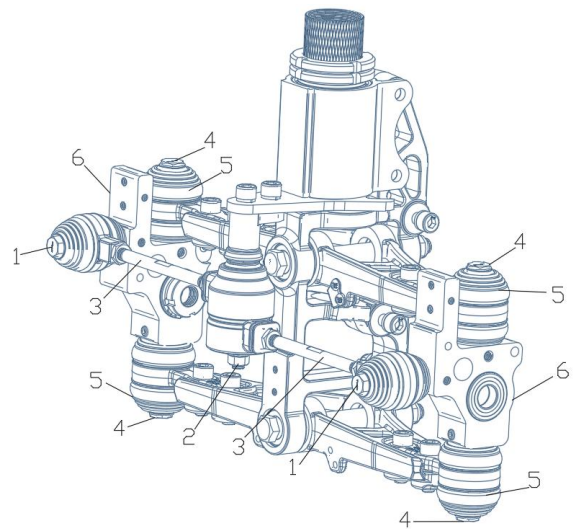
- Brake disc cross-section  
Attachment of oil - clean up  
Wipe with a cloth dampened with lacquer thinner or oil cleaner.  
Scratch - Repair.  
Lightly and evenly buff the scratched area with coarse sandpaper.

## Rear shock absorber assembly



Operation order	Job name / Part name	Quantity	Remarks
<b>Remove the rear shock absorber assembly</b>			
1	Hexagon socket flat round head bolts M10×1.5×35	2	Disassemble the parts in order.  When installing, follow the reverse order of disassembly.
2	Flat washers	4	
3	Hexagon socket flat round head bolts M10×1.5×40	2	
4	Rear Shock Absorber	2	

## Ball Tie Rod Assembly, Steering Knuckle Assembly



Operation order	Job name / Part name	Quantity	Remarks
<b>Removing the ball tie rod assembly</b>			Disassemble the parts in order.
1	Hexagonal flange face bolt M8×1.25×60	2	<b>Caution.</b> <u>Left and right belong to the symmetrical relationship, and it is not necessary to remove both sides when repairing single-side parts.</u> When installing, follow the reverse order of disassembly.
2	Flange face nylon self-locking nut M8×1.25×11	1	
3	Steering Adjustment Tie Rod	2	
4	Hexagonal flange face bolt M10×1.5×60	4	
5	Rocker arm rod end spherical bearings	4	
6	Left steering knuckle, right steering knuckle	1	

### Overhaul of ball tie rods.

- Tie Rod  
Bent/damaged - replace the ball tie rod assembly.
- Ball bearings  
Inflexible rotation - clean the surface sludge.  
Damaged, loose - replace the ball tie rod assembly.
- Hexagonal nuts  
Loose - adjust.
- Bolt  
Bend/damage/wear - replace.

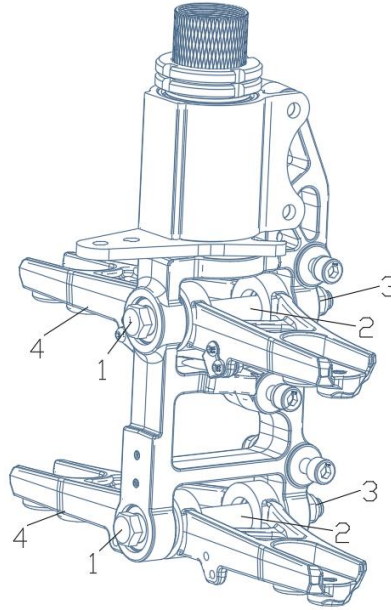
### Overhaul of the steering knuckle assembly.

- Lamb's horn wheel axle  
Bent/damaged - Replace the ball ramrod wheel axle assembly.
- Ram's horn ball head bracket plate spacer assembly  
Bend/damage - replace.
- Bearings  
Inflexible rotation - clean the surface sludge.  
Damaged, loose - Replace the ramrod wheel axle assembly.
- Dustproof oil seal

Damage/wear - replace.

- Sheep horn rotary head  
Loose - adjust.
- Bolts, nuts  
Bend/damage/wear - replace.

## Rocker arm assembly



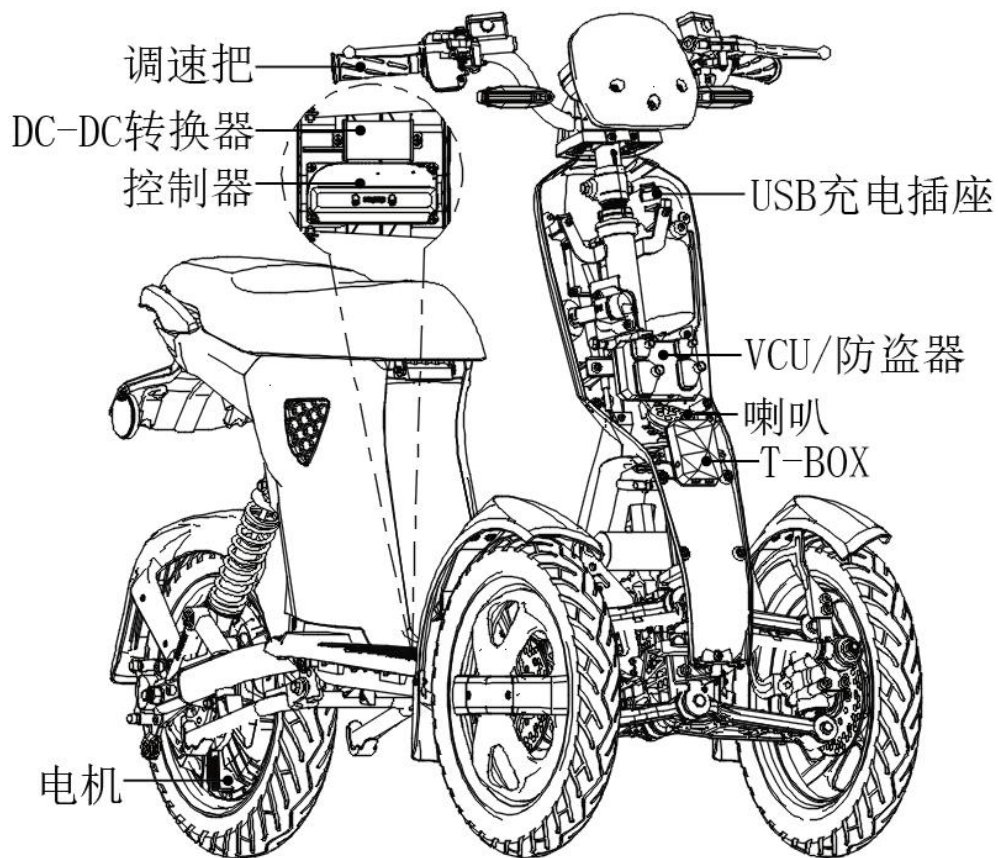
Operation order	Job name / Part name	Quantity	Remarks
<b>Removal of rocker arm assembly</b>			
1	Hexagon head bolt M10×1.5×119	2	<p>Disassemble the parts in order.</p> <p><b>Caution.</b></p> <p><b><u>Left and right belong to the symmetrical relationship, and it is not necessary to remove both sides when repairing single-side parts.</u></b></p> <p>For installation, follow the reverse order of disassembly</p>
2	Rocker shaft spacer	2	
3	Flange face nylon self-locking nut M10×1.5×13.5	2	
4	Rocker	2	

### Overhaul of rocker arm assembly.

- Rocker arm assembly  
Bent/damaged - Replace rocker arm assembly.
- Bearings  
Inflexible rotation - clean the surface sludge.  
Damaged, loose - replace.
- Dustproof oil seal  
Damage/wear - replace.
- Bolt  
Bend/damage/wear - replace.

# Chapter 5 Introduction to electrical components and their fault repair

## Location of electrical components



# Electrical parts function introduction

## Batteries:

The battery is the accompanying energy to provide the energy of the electric vehicle. The batteries of electric vehicles produced by our company all adopt 18650 ternary lithium cells of Japanese and Korean system, which are connected in series to enhance the total capacity of the battery pack and in parallel to increase the total voltage of the battery pack, and the BMS completes the management of the battery pack to achieve over-discharge protection, over-current protection, temperature protection, short-circuit protection, balanced cell pressure difference, SOC power display, CAN communication, battery automatically when the output current is lower than 2A Hibernation without output, battery plug can be hot-swapped, and battery output is controlled by K-(electric door lock). Suggestion: If the vehicle is not used for a long time, please disconnect the battery plug from the whole vehicle.

## Controller:

The controller is the component that controls the motor speed and is the core of the electrical system of the electric vehicle. It adopts FOC vector control technology, with low starting noise, under-voltage, current-limiting and over-current protection functions, and can use the motor as a generator for energy recovery by braking during driving.

## Motor:

The motor is the part that converts the battery electric energy into mechanical energy and drives the wheel rotation of the electric car. The motor of the electric car produced by our company is a three-phase DC brushless wheel motor, which consists of rotor, stator, magnet, Hall element, etc. It has the advantages of high efficiency, low noise, etc.

## Charger:

The charger is a device to replenish the electric power to the battery. The charger of the electric vehicle produced by our company is connected to the battery, when charging the battery, it is necessary to connect the charger output to the battery first, and then connect the charger input to the utility, otherwise the charger cannot enter the charging state; the charger has a pre-charging function, when the battery voltage is lower than 46.4V and higher than 35V, it will enter the pre-charging state of 2A, when the battery voltage is higher than 46.4V, it will enter the normal Charging current to charge the battery.

## DC-DC converters:

DC-DC converter is to convert the battery voltage to 12V to complete the entire vehicle requires 12V working voltage electrical parts power supply, such as instruments, lamps and speakers, etc. The 12V output of the converter is controlled by the enable line (electric door lock) to avoid the electric door lock to withstand the instantaneous high current shock.

## VCU:

VCU is the central control system of the vehicle, as the data sending and receiving components of the vehicle. Built-in SIM card, GPS positioning module, gyroscope, etc., for example, when the location of the vehicle changes, through the GPS module for location detection, sent by the network of SIM card to the server after processing updated to the map of the APP interface, then people can see the location of the vehicle, and at the same time there are vehicle data and status, is also updated to the APP in this way. Gyroscope is to detect abnormalities in the vehicle (such as rollover and tipping) after the use of push messages to alert the user, this part contains a built-in battery, in the case of the built-in battery is fully charged, the whole vehicle battery disconnected, the built-in battery can also support more than 20 hours.

## Speed control handle:

The speed control part of electric car. After the whole car is powered up normally, rotate the opening degree of the handle to control the speed of the motor and the speed of the car, when using the debugging handle, it is required to rotate lightly and put it down lightly without rotating hard.

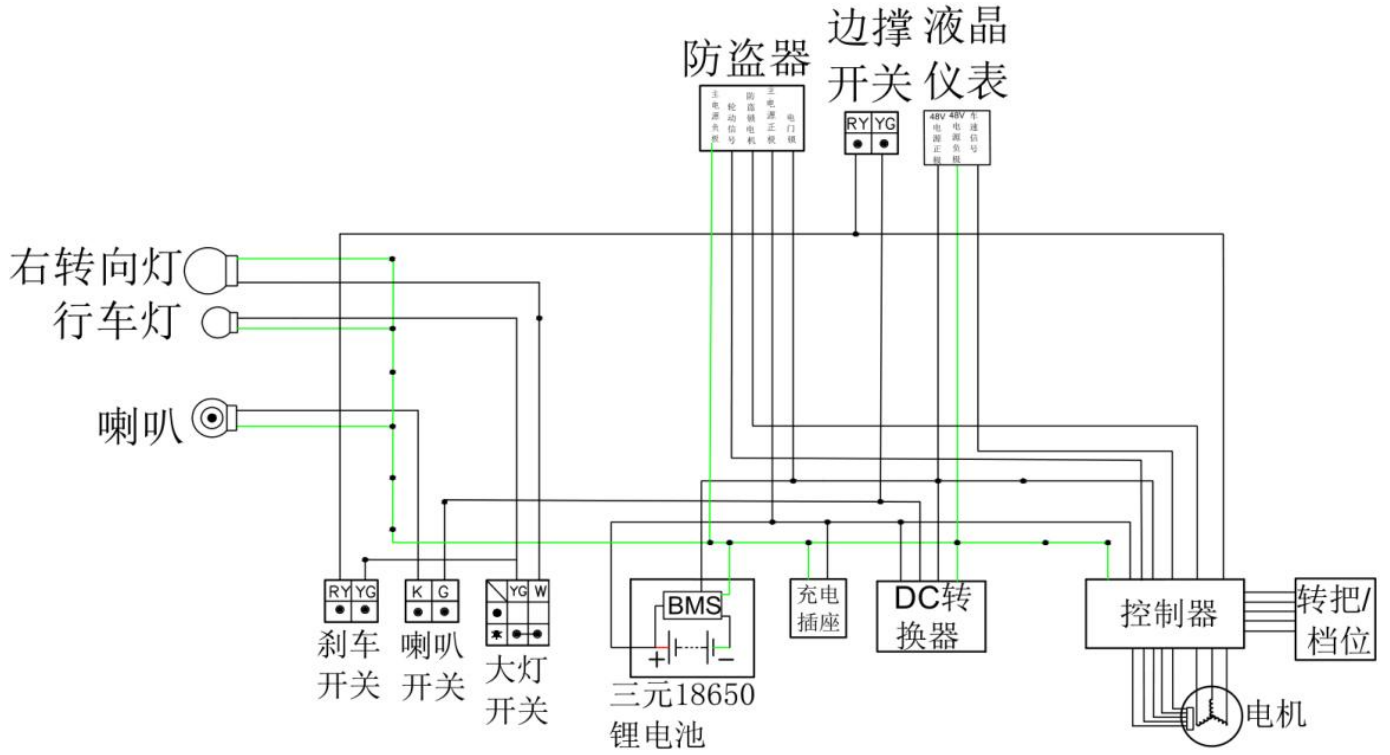
## Anti-theft device:

The anti-theft device has the functions of car finding, anti-theft alarm and locking motor.

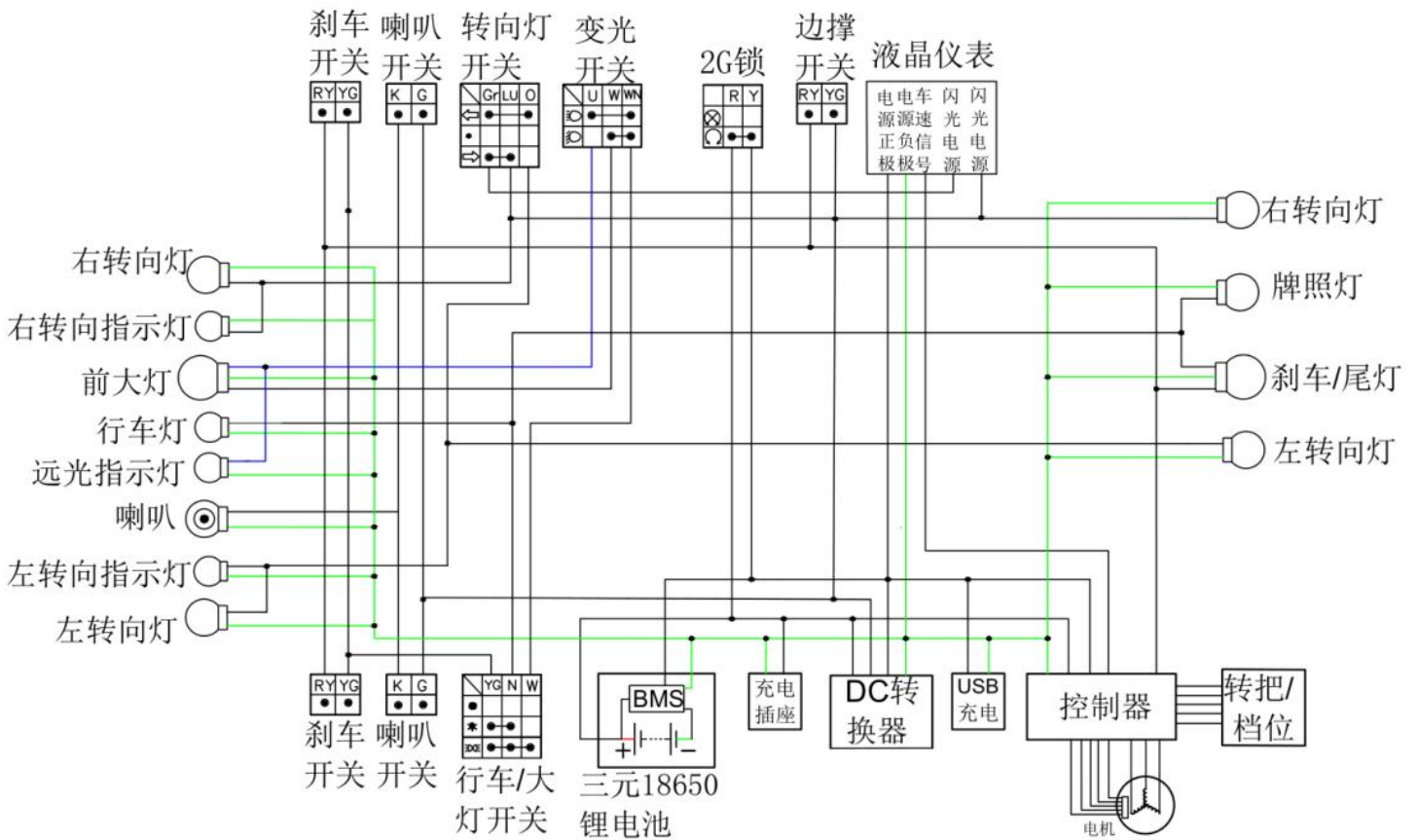


# Electrical schematic

## Low Profile



## High Availability

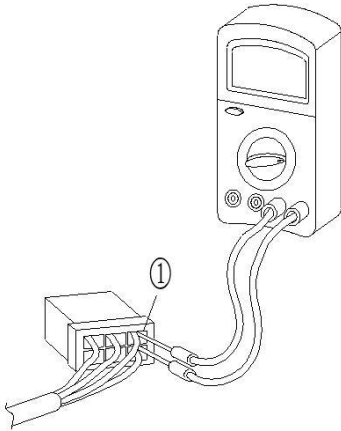


## Plug-in access check

Use a multimeter to check the pathway of each plug-in. If the readings of the pathway are wrong, check the wiring connections and replace the plug-in as necessary.

### Attention:

- Do not insert the meter measuring rod into the slot of the wireless end of the connector. The measuring rod must be inserted into the slot of the wired end of the connector.① When inserting, be careful not to loosen or hurt the wiring.
- Before checking the path, set the multi-meter to " " or " $\Omega$ " file.
- When checking the pathway, switch back and forth between switch positions several times.



Check each switch for damage or wear/proper connection and proper access between connectors, refer to "Access Inspection of Plug-ins".

Damage/wear —→ Repair or replace.

Connected incorrectly —→ Connected correctly.

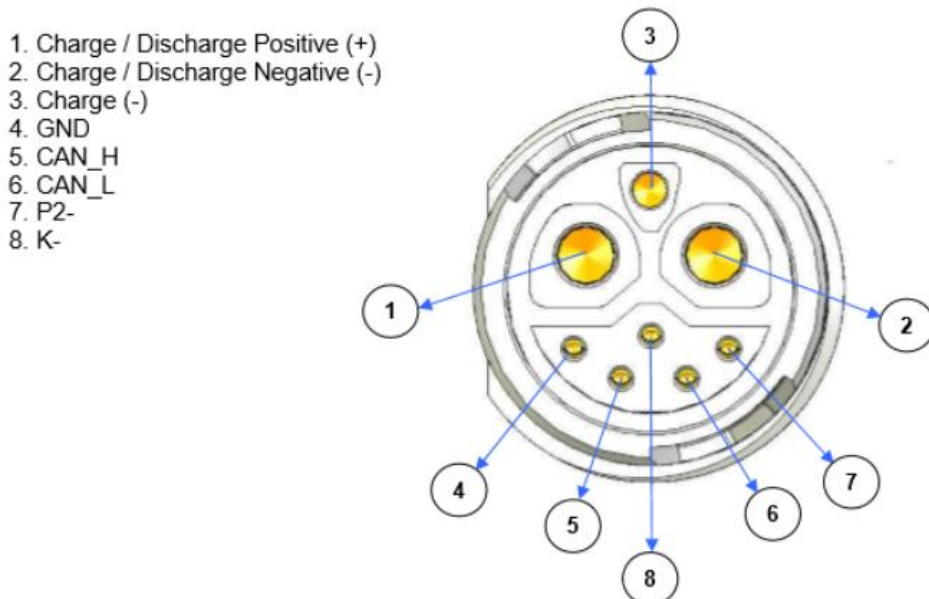
Poor pass-through conduction —→ Replace the plug-in.

## Fault phenomenon and repair method

### Fault phenomenon: the whole car without electricity

#### ① No battery power.

- Press the button on the battery indicator, observe whether the light is on, the red light is always on for the lowest power, the red light blinking indicates that the battery is dead
- Use the wire to short the positive ① pin of the battery and the K-⑧ pin of the battery, set the multimeter to 200V DC voltage file, measure the positive ① pin and negative ② pin of the battery voltage should be higher than 50V, otherwise the battery is not charged, the battery needs to be charged, the following figure is the battery output interface diagram.



- If the battery is fully charged, in accordance with steps a and b for testing, the battery voltage is still very low, the battery has failed and needs to be repaired and replaced

#### ②The battery is charged and connected to the whole car, and the whole car is not charged

- If the battery has power, connect the battery plug on the whole car, open the electric door lock, the whole car has no power, should check whether the battery plug has been connected reliably, reconnect to confirm
- After confirming that the battery is reliably connected to the car, open the electric door lock, the car is still without electricity, at this time, measure whether the positive and negative terminals of the car charging port have electricity (the same voltage as the battery port), in the case of the electric door lock open, set the multimeter to 200V DC voltage file, and measure whether the voltage of the positive ① pin and negative ③ pin of the battery is the same as the voltage of the battery port
- If the voltage is too low or no voltage, it means that the battery does not have normal output, detect whether the fuse 70A and 5A on the whole car is blown (disconnect the battery first), the 5A fuse is in the controller cover under the seat, you need to open the cover to see, if the 70A fuse is blown, you need to detect whether the controller is burnt, if the 5A fuse is blown, you need to detect whether the DC converter is burnt

##### (1) Measurement controller method

Confirm that the battery and battery plug disconnected, the controller pressure line cover open, adjust the multimeter to the beeping gear, measure whether the positive and negative ends of the controller is in a state of conduction (exchange red and black pen test to confirm), if conduction that the controller has been burned, if not, you need to measure the positive or negative end of the controller and the motor phase line between the conduction (exchange red and black pen test to confirm) if conduction that the controller has been burned need to be replaced

##### (2) Measurement of DC converter method

The same method as the measurement of the controller, the whole car headlight components removed, unplug the converter, measure the converter red wire and green or black wire is on, if on, it means that the converter has been burned,

need to be replaced

d. When the fault is identified, after the exclusion of replacement, connect the battery again to open the electric door lock, confirm whether the whole car is normal, test the whole car charging port voltage is normal

e. If the fuse is not blown, check whether the electric door lock is burned out, the whole car headlight parts removed, unplug the electric door lock, set the multimeter to beeping gear, in the electric door lock in the open state, measuring the electric door lock end of the red line and black line is in conduction, if not, that the electric door lock burned out, need to replace

### ③ DC converter burned out

a. The battery output is normal, the instrument and light horn are not working, the whole car has no forward gear, can not drive forward, can only reverse, at this time the DC converter has been burned, need to replace or repair the DC converter

b. The battery output is normal, the instrument and light horn are not working, but the whole car can drive normally, at this time the DC converter has been burned out, need to replace or repair the DC converter

### ④ Instrument burnout

a. The instrument does not work (the screen does not light up), the vehicle can drive normally, the lights and horn are normal, the instrument is burned out, replace the instrument

b. Instrument work (screen light), but no gear and power display, the vehicle is driving without speed, check whether the VCU is working properly

(1) Check whether the power supply of VCU is normal: because the power supply of VCU and immobilizer is shared, turn off the electric door lock at this time, operate with the remote control, press the lock, unlock or find the car key, whether it can work normally, can work normally indicates that the power supply is normal, carry out the second step

(2) disconnect the battery for more than 2 minutes, then connect the battery, open the electric door lock to observe whether the meter display is normal, if the meter display is normal, it indicates that the VCU is abnormal, contact the staff to update the VCU software remotely,.

(3) If the disconnected battery is still not normal, check whether the VCU, the instrument connector contact is secure, whether the battery plug is in place, and re-plug.

(4) Check whether the instrument communication is burned out, if the instrument communication is burned out, the instrument needs to be replaced

### LED indicator blinking on the controller corresponds to the table

Number of LED flashes	Fault Type	Fault Description	Solutions
1	Overvoltage protection	Controller detects high input voltage	①Please use the battery configured by our company ②The controller is malfunctioning, replace the controller
2	Undervoltage protection	Controller detects low input voltage	①Charge the battery to make sure it is normal ②Check if the wiring of the controller is normal ③The controller is abnormal, carry out the replacement controller
3	Overcurrent protection	Phase line of the motor is shorted or phase line is shorted to the power supply	①Check if the motor is normal, carry out the replacement motor ②Check whether the controller is burned out, and carry out the replacement of the controller
4	Blocking protection	Motor blocking, can not run normally	Excessive load on the battery or uphill sections that prevent the motor from turning properly
5	HALL Protection	Motor HALL input is not normal	①Check if the motor HALL plug-in is well connected to the controller ②Check whether the motor Hall burned, replace the motor
6	Power tube protection	Power tube self-test is not normal	Close the electric door lock and disconnect the battery plug for confirmation, replace the controller

7	Out-of-phase protection	One of the phase wires of the motor is disconnected	① test the motor phase line and controller connection is good ② controller burned, to replace
9	Braking status	Controller in braking state	①Check whether the brake handle return is normal and whether the brake switch is burnt out, and replace it. ② check whether the single support switch back to normal, single support power-off switch is burned out, to replace
10	Self-test error protection	Controller power-on self-test found abnormal	Close the electric door lock and disconnect the battery plug for confirmation, replace the controller
11	Over temperature protection	Controller temperature is too high	The controller temperature is too high when the vehicle is running, stop the car for a period of time, wait for the controller temperature to reduce, in order to drive normally
14	Turnbuckle protection	Throttle turner failure	Check whether the throttle handle is back or burned out, if burned out to replace
15	Anti-theft status	Controller is in anti-theft status	① Press the unlock button with the remote control ②Check if the immobilizer is damaged and replace it

**Fault phenomenon: open the electric door lock, turn the speed control handle, the motor does not turn**

**Fault causes and repair methods.**

- (i) The battery voltage is too low and the controller goes into undervoltage protection: charging the battery.
- ② throttle cable pull box is not reset: check whether the throttle cable pull is off the throttle cable pull box and installed in place.
- ③ Damaged throttle puller box: Replace the throttle puller box.
- ④ brake switch is not disconnected: check whether the brake handle return is normal or whether the brake disconnect switch has been bad, should not pull the brake handle or single support lift, the brake light does not light, repair or replace the brake switch.
- ⑤ single support power-off switch is not disconnected: lift the single support, the brake light is always on, repair or replace the single support power-off switch.
- ⑥ Motor poor contact between the Hall plug and the controller connection: unplug the motor Hall line connector and plug it in again.
- (7) motor hall burned out: repair the motor hall or replace the motor
- ⑧ controller burned out: repair or replace the controller

**Fault phenomenon: after the battery is fully charged, the driving distance is short**

**Failure causes and repair methods.**

- ① battery aging: replace or repair the battery.
- ② Insufficient tire pressure: inflate the tires.
- ③ Disc brake grinding disc: repairing disc brakes.
- ④Charger failure, the battery is not charged: replace or repair the charger.

**Fault phenomenon: short battery charging time**

**Failure causes and repair methods.**

- ① Charger failure, resulting in failure to fully charge the battery: replace or repair the charger.
- ② battery socket aging, poor contact: repair or replace the battery.

**Fault phenomenon: the charger to the car or battery charging, plugged in the charger green light is always on or no light on and the fan does not turn**

**Fault causes and repair methods.**

- ① Pay attention to the order of connecting the charger to the battery: first connect the charger output plug to the battery reliably, and then connect the charger input to the mains.

- ②The temperature of the battery is lower than 0 degrees or higher than 50 degrees: etc. The temperature of the battery is higher than 3 degrees or lower than 45 degrees.
- ③ poor contact between the charging plug and the socket: unplug the charging plug, reinsert it and observe the charging status, or carry out battery replacement.
- ④The charger is well connected to the battery and the indicator light is not on: replace or repair the charger.
- ⑤ Charger to the battery is charging, the fan does not turn: replace or repair the charger.

**Fault phenomenon: the battery power display is not accurate, fully charged display less than 100%, the display distance deviation is large**

**Fault causes and repair methods.**

- ①Learn to calibrate the battery full and full: drive the vehicle until the battery is dead and the car is completely undriveable, fully charge the battery and then use it, do it twice in a row, if there is no improvement then the battery needs to be replaced or repaired.

**Fault phenomenon: When the fault "wrench" on the instrument lights up, please use the APP to enter the "car condition" page to carry out a physical examination of the vehicle, and then check the detailed physical examination report to analyze the abnormal situation of the vehicle after the physical examination is completed, as follows.**

System classification	Failure	Solutions
Power System	Controller power tube failure	Check controller for repair or replacement
	Controller drive power failure	Check controller for repair or replacement
	Controller overcurrent fault	①The load is too heavy, the driving current is too large, the tire pressure is not enough ②Check the controller and motor, repair or replace
	Controller voltage is too high or too low	Please use the special battery provided by our company, check whether the battery and controller voltage is normal, and repair or replace
	Controller over-temperature protection	Controller temperature is too high, let the vehicle stop for a while, wait for the controller and motor temperature to reduce
	Motor phase line fault	① Check whether the motor phase line and controller connection is good, the motor line is not broken or fractured phenomenon, replace or repair the motor
	Motor Hall Failure	①Check if the motor Hall plug is well connected to the controller ② motor Hall is bad, replace or repair the motor
	Undervoltage protection	Battery voltage is too low, charge the battery
	Blocking protection	The load is too heavy or the motor has burned out, repair or replace the motor
	Rotor failure	Check if the throttle cable box is damaged and replace it
	Turning handle is not loosened when power is applied	Check if the throttle puller box has been returned for repair
Power supply system	Charging temperature overload protection	The battery temperature is higher than 50 degrees, the battery can not be charged, put the battery indoors so that the battery temperature is lower than 45 degrees, in order to charge normally
	Charging temperature protection	The battery temperature is lower than 0 degrees, the battery can

	too low	not be charged, put the battery indoors so that the battery temperature is higher than 3 degrees, in order to charge normally
	Discharge temperature overload protection	The battery temperature is higher than 65 degrees, the battery can not be discharged, when the temperature of the battery is lower than 60 degrees, to normal discharge
	Low discharge temperature protection	Battery temperature below minus 20 degrees, can not discharge the battery, when the temperature of the battery is higher than minus 10 degrees, to normal discharge
	Drop Protection	Plug the battery back in, if it is still not normal, repair or replace
	Battery high voltage protection	The total voltage of the battery is too high, the charger charging voltage to the battery is too high, check the charger, repair or replace
	Excessive MOSFET temperature	①MOSFET temperature is higher than 115 degrees, you need to disconnect the battery plug to let the battery MOSFET temperature below 80 degrees ② Check whether the VCU or immobilizer power supply is normal, repair or replace
	Over-voltage protection for battery cells	The battery's single cell voltage is too high, check the battery and charger, repair or replace
	Battery package low voltage protection	The total voltage of the battery is too low, charge the battery or repair and replace it
	Low-voltage protection for electric cores	The battery's single cell voltage is too low, charge the battery or perform repair and replacement
	Charging overcurrent protection	Battery charging current $\geq 26A$ , check whether the charger is burnt out, repair or replace
	Discharge overcurrent protection	Battery discharge current $\geq 75A$ , check whether the controller is burned out, repair or replace
	Short circuit protection	Check the whole car circuit for short circuit, repair or replace the burnt and shorted parts
Central Control Unit (VCU) System	GPS failure	VCU internal failure, repair and replacement
	GPRS failure	VCU internal failure, repair and replacement
	Gyroscope failure	VCU internal failure, repair and replacement
	Power supply abnormalities	VCU internal failure, repair and replacement
	Communication exception with controller	Check the communication between controller and VCU, repair and replace
	Communication exception with BMS	Check the communication between the battery and VCU for repair and replacement
	Abnormal communication with the instrument	Check the communication between the instrument and VCU for repair and replacement