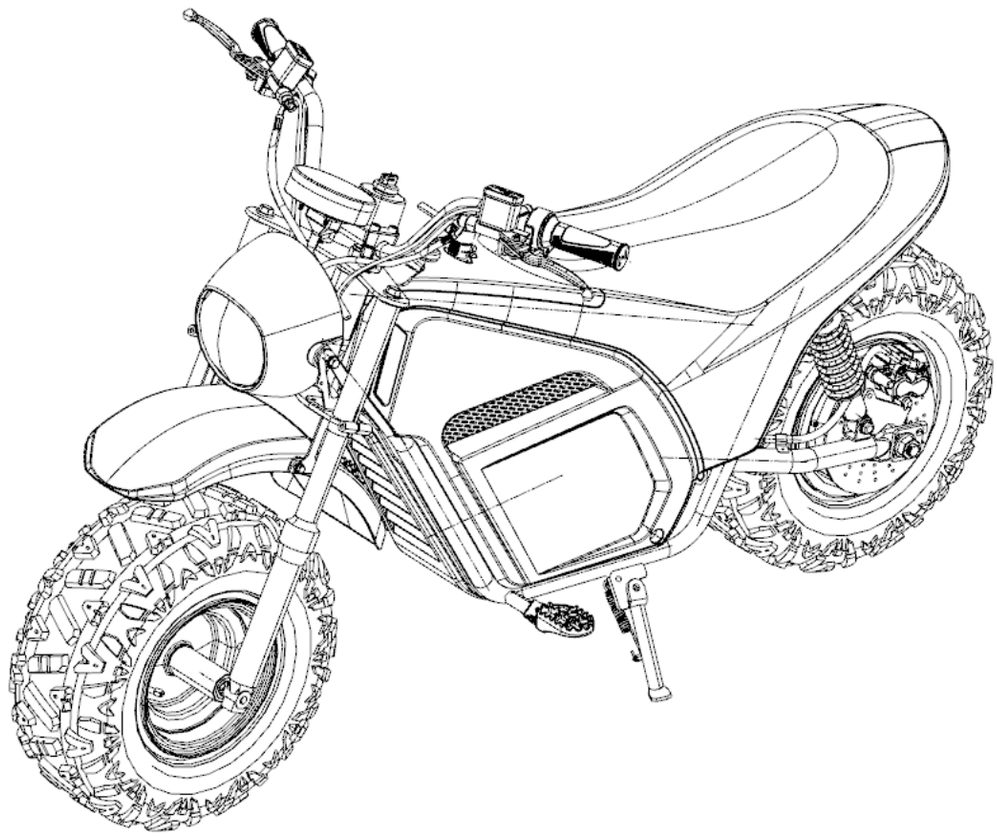
# Owner’s Manual

EVB200



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# 1. Introduction

Dear Customer,
Thank you for purchasing this Champion Motorsports Group product. The correct use and maintenance of the product are outlined in this instruction manual. Following these instructions will ensure your long-term safety and worry-free use of the vehicle.

# 2. Purpose of Use

This vehicle is designed for use on flat, smooth, and obstacle-free roads. It can be used for driving on rural roads. Only adults are allowed to drive this vehicle. It is not suitable for use on rough terrains.

This vehicle is equipped with a 2KW rated power DC brushless motor. The vehicle speed is changed by the voltage of the electronic handle - type throttle. The vehicle is equipped with disc brakes for vehicle braking during driving.

# 3. Safety Warnings

This instruction manual contains important safety information and introductions. It must be carefully read before using the vehicle. For your own and others' safety, please abide by these rules.

The unsafe and careless use of this vehicle can lead to serious personal injuries. The driver can minimize potential risks by wearing a helmet. The driver should wear a helmet before driving. To avoid rough roads and obstacles, be sure to keep your hands on the handlebars when driving.

It is not recommended to drive this product on roads with a slope greater than 25 degrees.

Children under the age of 13 are not advised to drive this product.

**DANGER** indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.


**WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury


**CAUTION** indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

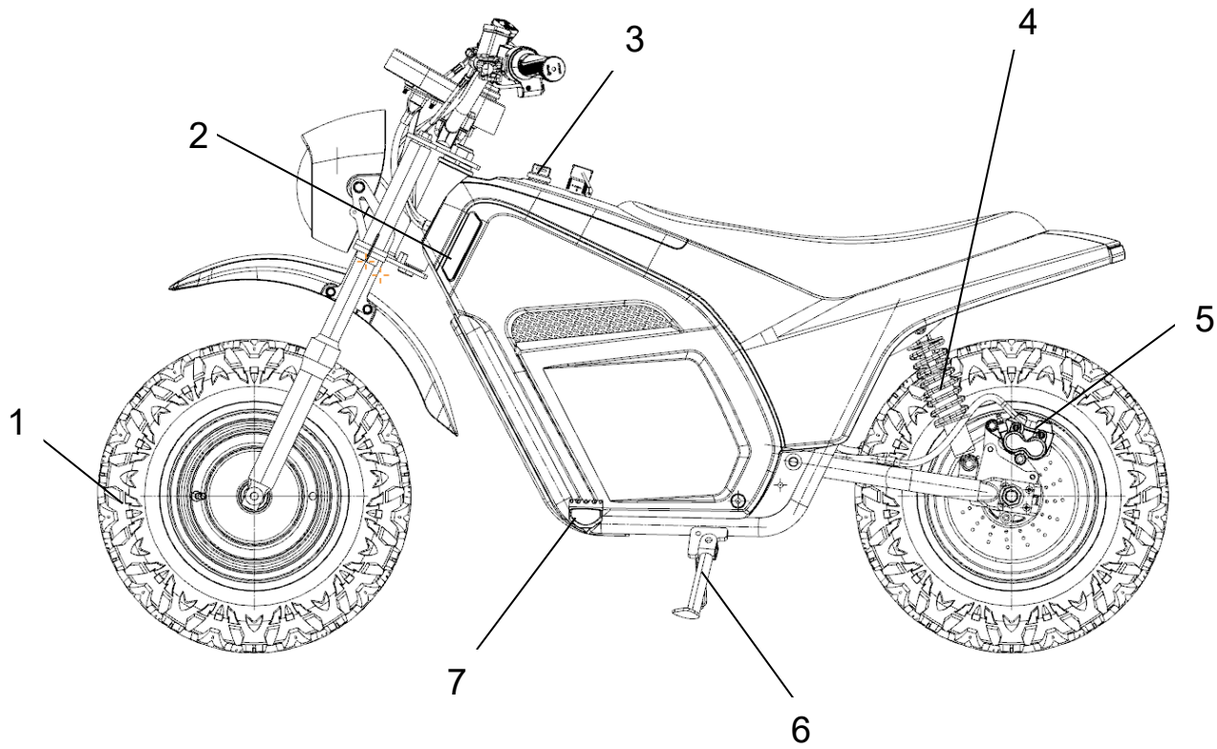

**NOTICE** indicates a potentially hazardous situation which, if not avoided, could result in property damage.

# 4. Technical Parameters

| | | | | |
|---|---|---|---|---|
| Technical Parameters | Vehicle Curb Weight | 154 LBS | Seat Cushion Height | 16.9 IN. |
| | Load Capacity | 198 LBS | Minimum Ground Clearance | 6.9 IN. |
| | Number of Seats | 1 | Wheelbase | 44.3 IN. |
| | Length*Width*Height | 62.7×37.2×34.1 IN | | |
| Electrical System | Controller Type | DC Brushless | | |
| | Rated Voltage | 60V | Vehicle Voltage | 60V |
| | Battery Pack Type | Lithium - Ion Battery (16S5P, Charging Voltage 67.2V, Protection Voltage 44V) | Battery Capacity | 25AH |
| | Maximum Discharge Current | 45A | Rated Discharge Current | 25A |
| | Motor Type | DC Brushless | Motor Power | 2KW |
| | Rated Rotation Speed | 490rpm | Drive Mode | Traction |
| | Charger Input Voltage | 110V - 220V Wide Voltage Input | Charging Method | Portable Charging |
| | Charging Time | 6H - 8H | Range (Fully Loaded) | 31.1 Miles |
| | Maximum Gradability [%] | ≤25% | Maximum Vehicle Speed | ≤20mph |
| | Braking Distance | ≤9.8ft. | Braking Method | Hydraulic Disc Brake |
| Body System | Seat | Leather Fabric + High - Resilience PU Seat | | |
| | Vehicle Body | Carbon Steel Frame + Injection - Molded Cover Parts | | |
| | Instrument | LCD Large Screen (Power, Speed, Mileage, etc.) | | |
| | Lights and Signals | Combined Front Headlights, Electric Horn | | |
| | Switch | Light + Horn Combined Switch | | |
| | Frame | Carbon Steel Composite Structure Frame | | |
| | Steering Mode | Handle - Type | | |
| Chassis System | Power Transmission System | Continuously Variable Transmission System | | |
| | Front Axle and Suspension | Hydraulic Front Fork | | |
| | Rear Axle and Suspension | Hub Motor + High - Strength Spring Shock Absorber | | |
| | Braking System | Front and Rear Disc Brake Oil Brakes | | |
| | Front and Rear Wheel Models | 8 - inch Aluminum Alloy Hub + Road Tire 197 - 8 / 197 - 10 | | |
| Paint | | Automotive - Grade Paint | | |

# 5. Location of Parts

## 5.1 Left View

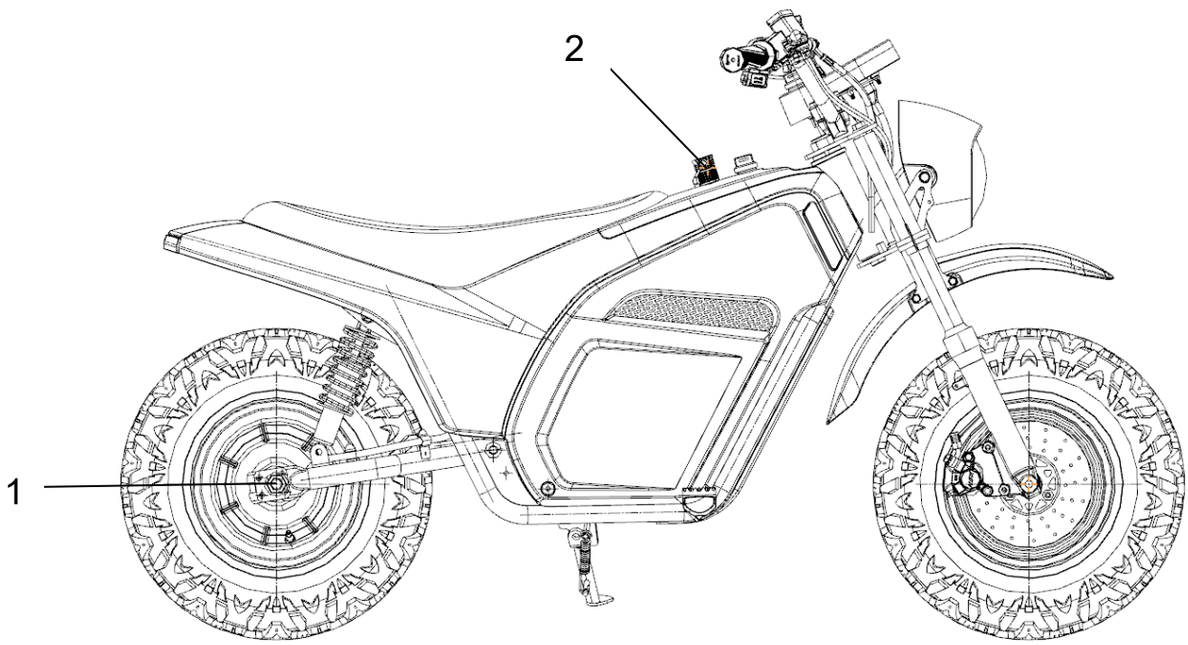



(Figure 1)

1. Front Tire
2. Driving Light
3. Electric Ignition Switch
4. Shock Absorption
5. Braking System
6. Side Stand
7. Footrest

# 5. Location of Parts cont’d

## 5.2 Right View

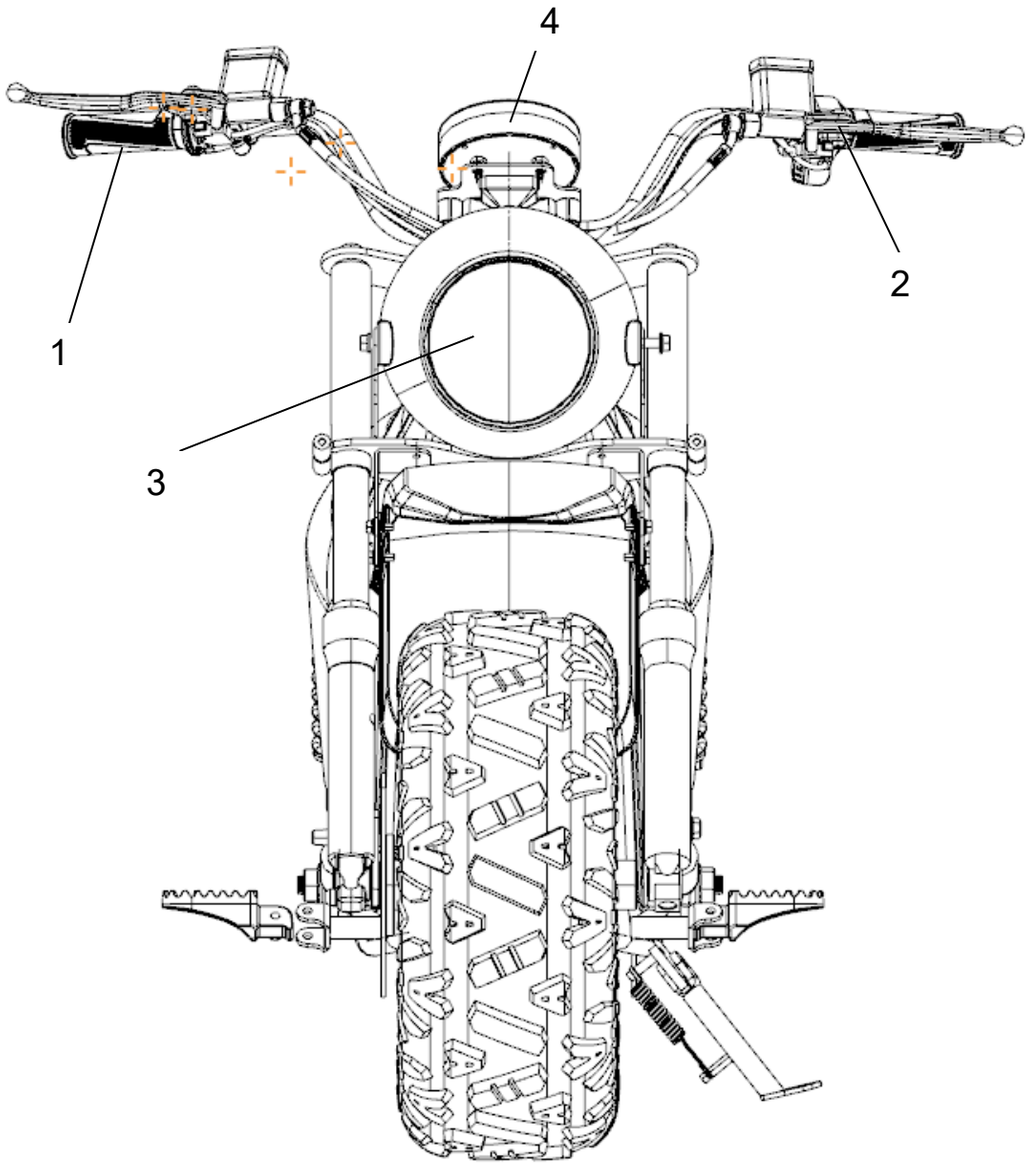



(Figure 2)

1. Hub Motor
2. Charging Port

# 5. Location of Parts cont’d

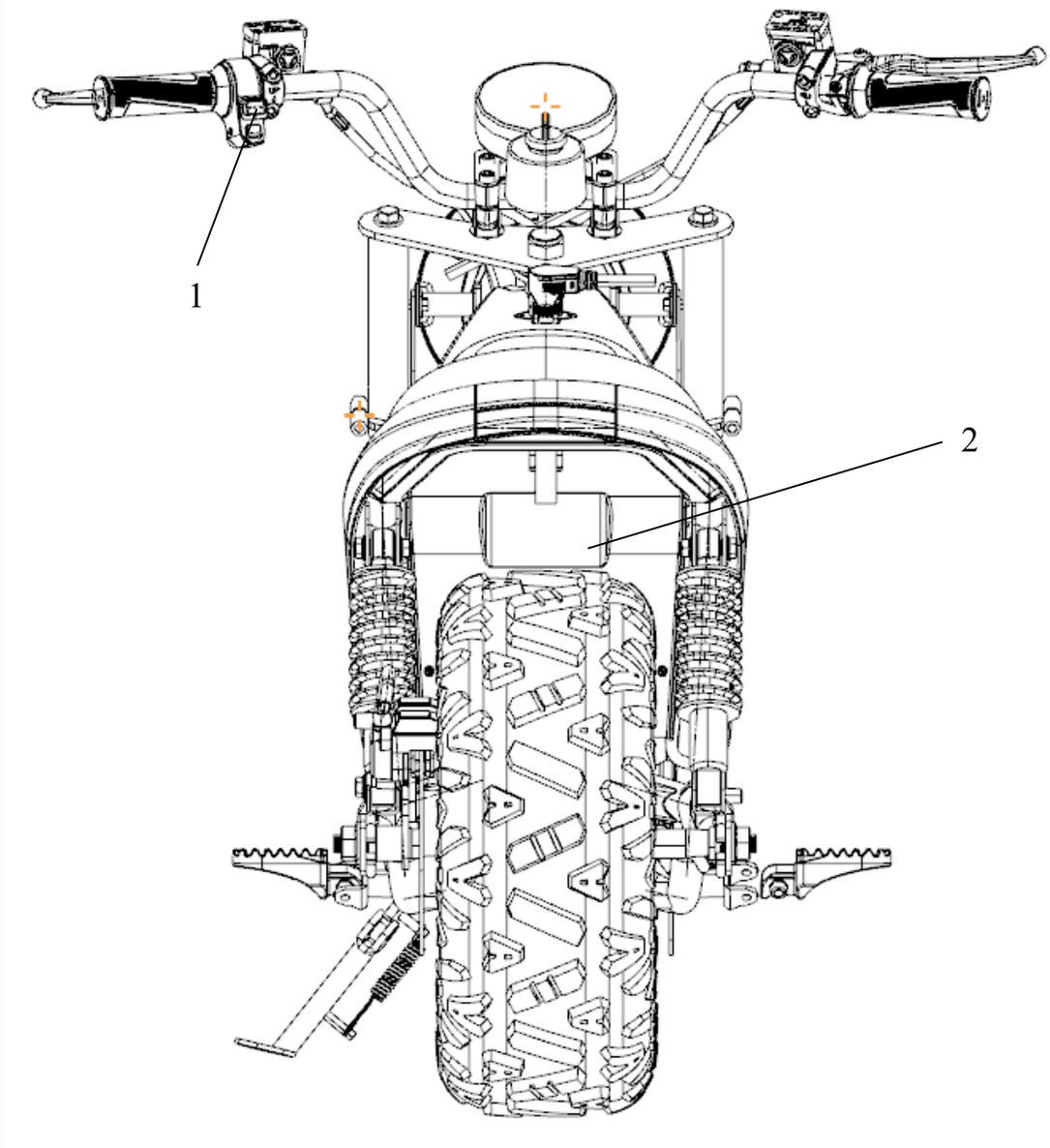
## 5.3 Front View




(Figure 3)

1. Throttle
2. Brake
3. Front Headlight
4. Instrument

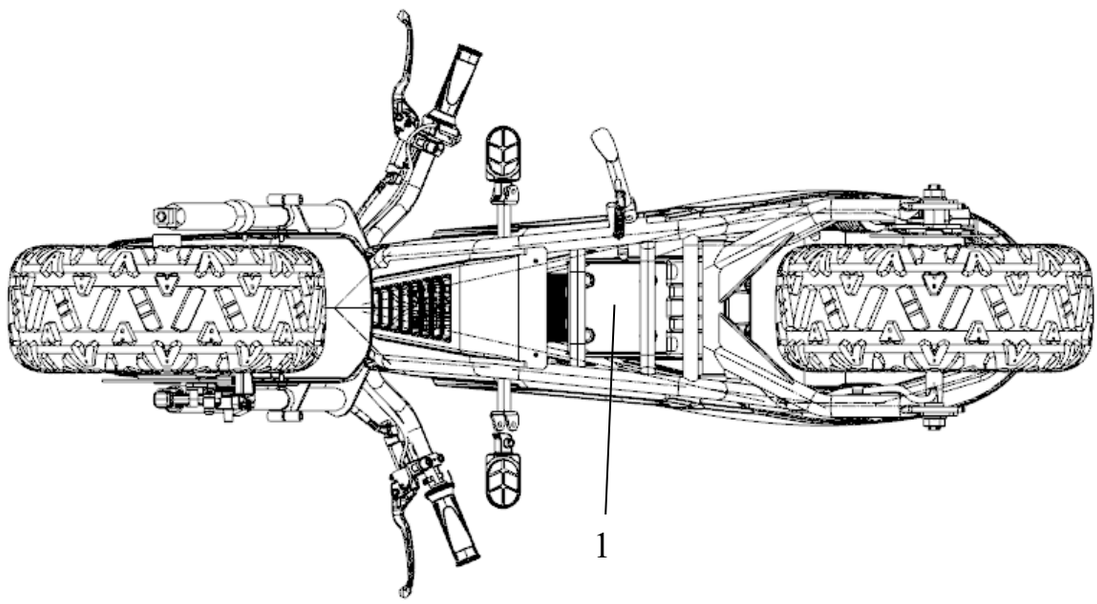
## 5.4 Rear View




(Figure 4)

1. Function Switch
2. Driving Brake Light

## 5.5 Bottom View

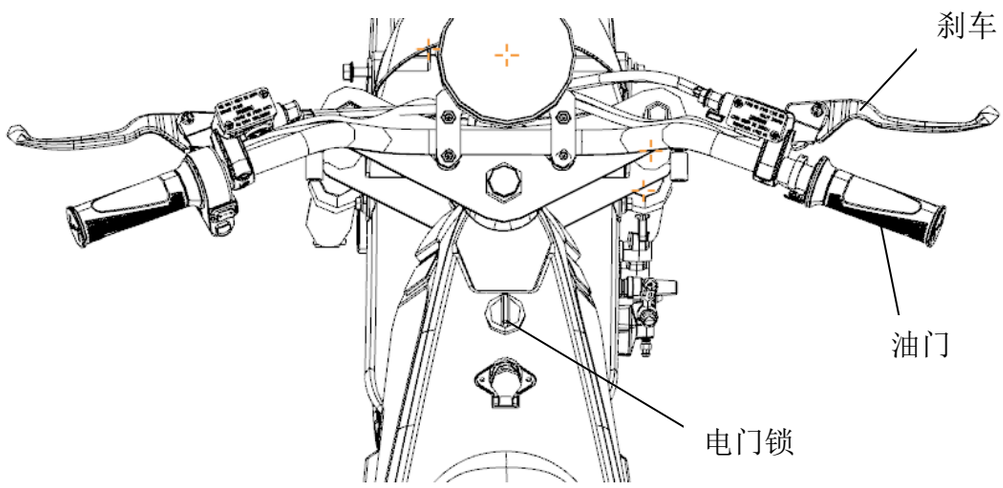



(Figure 5)

1. Battery

# 6. Functions and Usage Methods of Parts

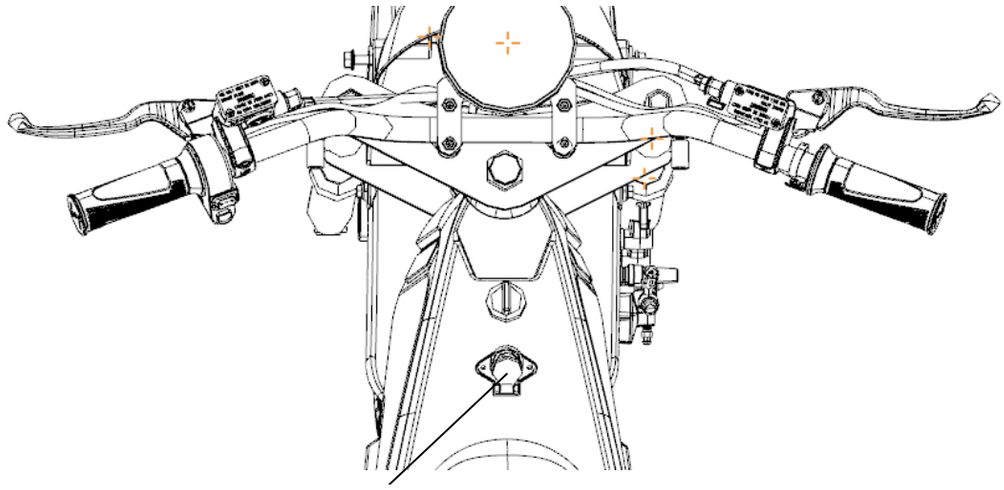
## 6.1 Starting and Braking




(Figure 6)

1.The electric ignition switch controls the on - off of the vehicle's power supply. When the electric ignition switch is turned on, the vehicle is powered on and in the "P" gear. Press the brake, and the vehicle switches to the "D" gear. Rotate the throttle, and the vehicle accelerates. Press the brake, and the vehicle decelerates. When the electric ignition switch is turned off, the vehicle's circuit is disconnected, and the vehicle shuts down.

## 6.2 Charging Operation at the Charging Port



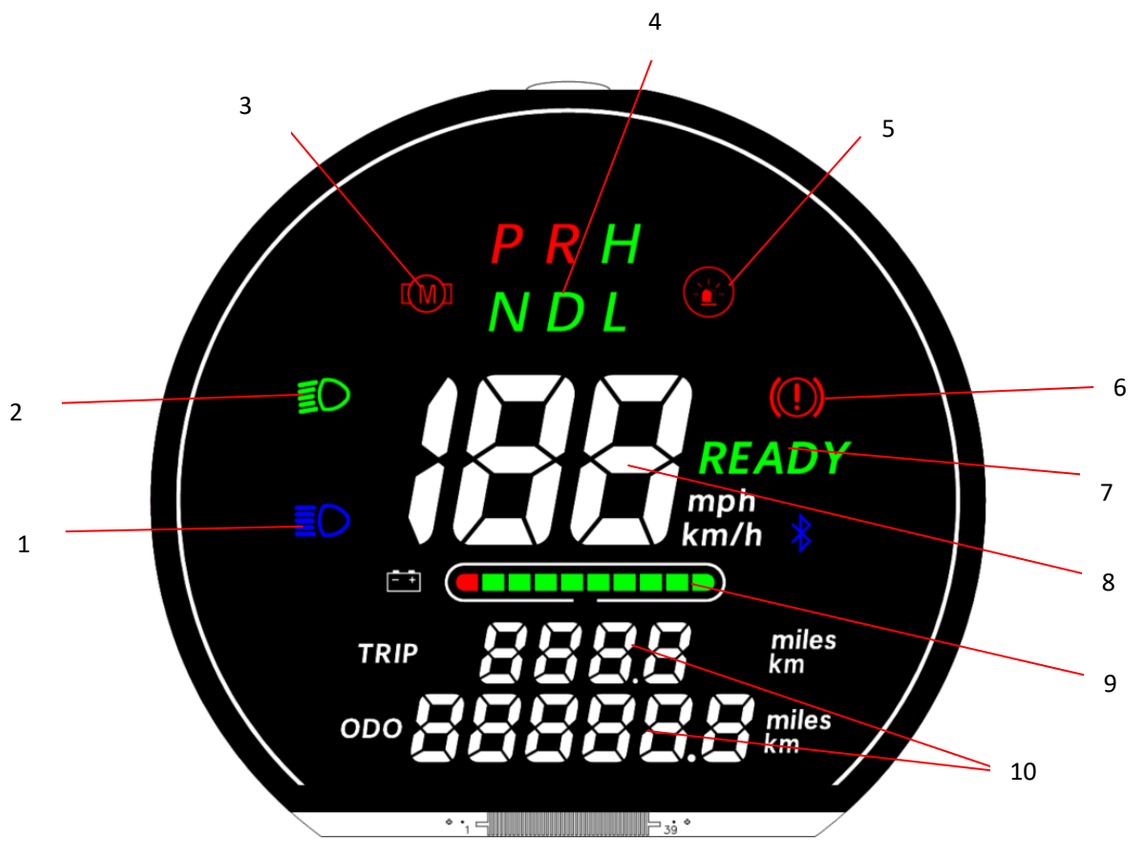

(Figure 7)

1.Charging Instructions: First, turn off the electric ignition switch, then open the battery compartment cover, then you can insert the charging gun.

2.Attention: When charging, it is necessary to first plug in the charging gun and then connect it to AC power for charging.After finishing, you need to unplug the AC plug first, and then unplug the charging gun. Please operate according to the above steps to avoid incorrect operation and prevent damage to the vehicle.

## 6.3 Instrument Function Instructions

### 6.3.1 Main Interface Display




(Figure 8)

1.High - Beam Indicator
2.Low - Beam Indicator
3.Motor Fault Indicator
4.Gear Indicator
5.Push Alarm Indicator
6.Brake Parking Indicator
7.Ready Status Indicator
8.Speed Unit Indicator
9.Battery Power Indicator
10.Total Mileage and Trip Mileage Indicator

# 7. Safe Driving

## 7.1 Pre - Drive Checks

1. Turn on the electric ignition switch and observe the power display on the instrument to see if the vehicle can travel the required mileage.

2. Before driving, gently rotate the throttle and then press the brake to test the effectiveness of the brake.

3. Wear a helmet before driving to ensure personal safety during vehicle operation.

## 7.2 Operation Steps

1. Turn on the electric ignition switch to start the vehicle.

2. Press the brake to switch from P gear to D gear, and make sure there are no obstacles on the selected driving path.

3. Retract the side stand, rotate the throttle, and the electric two - wheeled vehicle will start. The greater the rotation of the throttle, the higher the vehicle speed.

4. When parking, release the throttle grip and press the brake. The electric two - wheeled vehicle will stop slowly. If you need to park for a long time, put down the side stand. When you need to drive again, retract the side stand, make sure the vehicle is in D gear, and rotate the throttle to start the vehicle.

5. When leaving the vehicle, please turn off the electric ignition switch and remove the key.

## 7.3 Driving Precautions

1. Only those who have received learning and training are allowed to drive the vehicle.

2. Wear a helmet before driving.

3. Slow down and drive carefully on slippery, crowded, or complex road sections.

4. When driving on curves or slopes, pay attention to slowing down or braking, and operate carefully to avoid accidents.

5. Since this vehicle is not designed for driving on public roads, it is not allowed to drive on public roads. Otherwise, serious consequences will occur.

6. Since this vehicle is manufactured in strict accordance with the vehicle design standards, it is never allowed to be modified after leaving the factory. Otherwise, serious consequences will occur.

7. It is strictly prohibited to overload or carry more passengers than permitted.

8. It is strictly prohibited to drive this vehicle after drinking alcohol or taking stimulants or narcotics.

9. When the electric two - wheeled vehicle is not in use, it should be parked indoors. Because if it is left outdoors for a long time, rainwater (in rainy conditions) will penetrate into the vehicle, causing damage to electrical components and rusting of mechanical parts, reducing the service life of the vehicle.

10.The vehicle is not suitable for long - term riding on slopes greater than 25%. Otherwise, excessive working current may burn out the motor or electronic controller, seriously affecting driving safety.

## 7.4 Parking

1.If the driver wants to stop the vehicle, he/she should first release the throttle, press the brake until the vehicle stops, then put down the side stand, and turn off the electric ignition switch.

2.Friendly Reminder: After using the vehicle, check the power display on the instrument. To make it more convenient to use the vehicle next time, you can recharge the battery when the power is low. When parking the vehicle on a slope, use the parking brake.

# 8. Precautions during Vehicle Operation

**8.1** If you operate the vehicle as recommended during the first 100 kilometers, you can extend its service life and improve economic efficiency.

1. Avoid sudden acceleration when starting the vehicle.
2. Avoid frequent rotation of the throttle.
3. Avoid turning the throttle to the maximum extent.
4. Regularly Check whether the connecting wires of the lithium battery, the connections of the electronic control and the motor, as well as the fastening bolts are loose. If they are loose, tighten them immediately.
5. Do not over - charge or over - discharge the lithium - ion battery, as it will shorten the battery's service life.
6. During the first 500 kilometers of the vehicle, check the gas tightness of the steering system, the front suspension, and the wheel nuts.

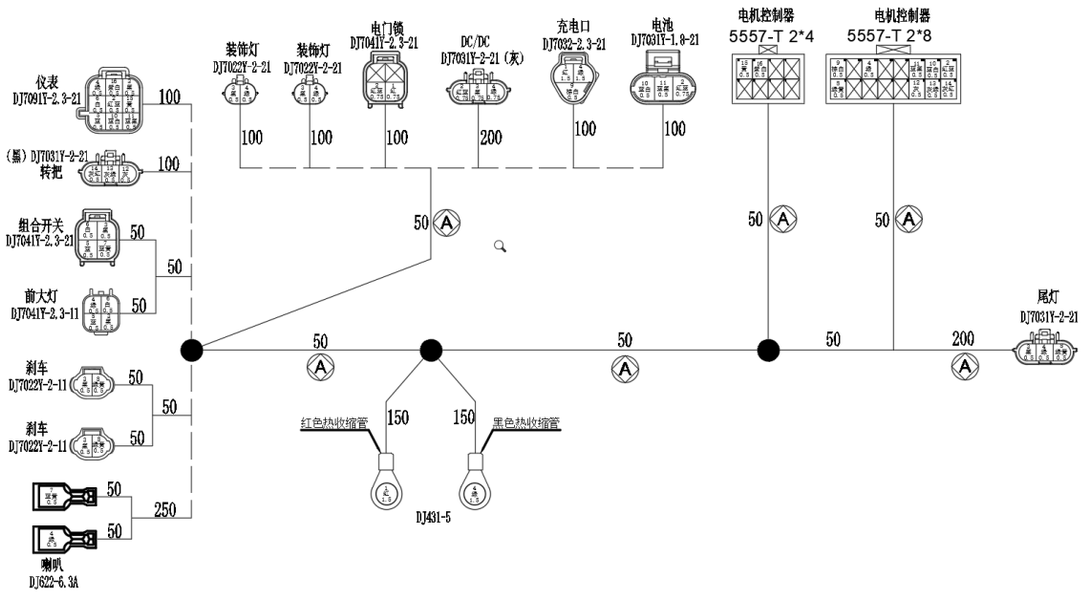
## 8.2 Vehicle Maintenance Records

All vehicles must be regularly maintained and records should be kept. This can improve the vehicle's service life, reduce costs, increase driving pleasure, and ensure safety.

### 8.2.1 Preventive Maintenance

1. The maintenance area should be clean, safe, well - ventilated, and equipped with fire - fighting facilities.
2. When performing maintenance, turn off the power supply and put the vehicle in the parking brake state. When checking and repairing the motor, motor controller, and high - voltage power lines, the positive - pole battery power supply connection wire must be removed to ensure that the main circuit is disconnected and avoid short - circuits.
3. When the vehicle is lifted, do not crawl under the vehicle.

# 9. Whole Vehicle Wiring Harness




(Figure 9)

# 10. Common Fault Analysis and Troubleshooting Methods

## 10.1 Judgment of Mechanical Faults

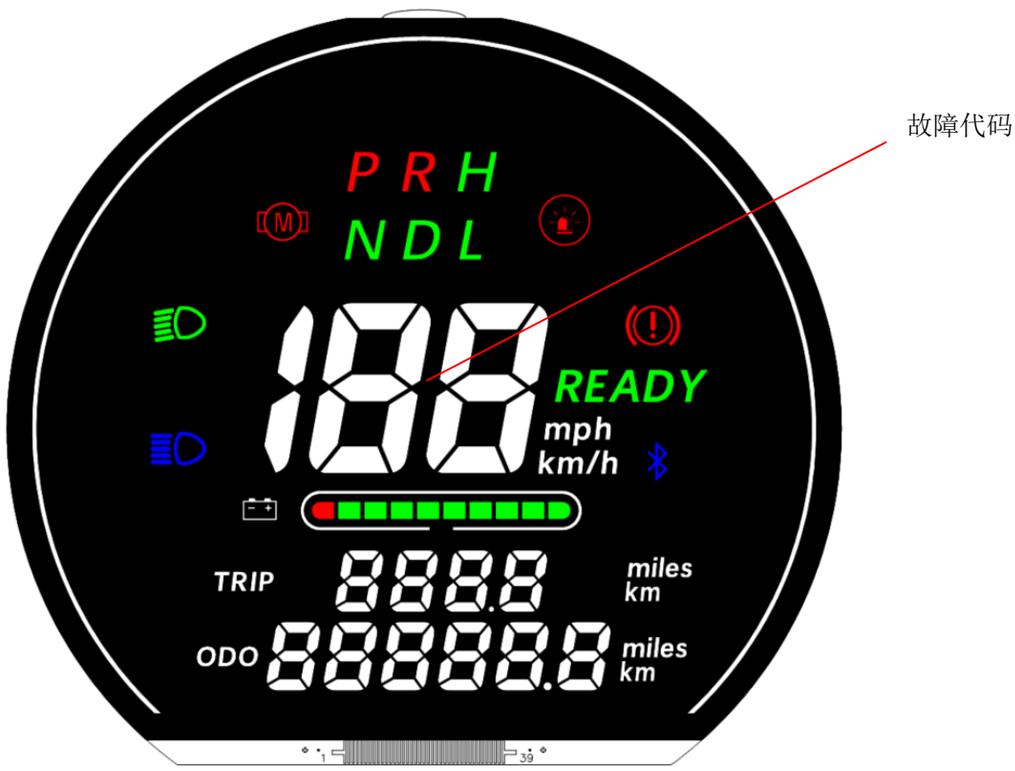
| Fault Phenomenon | Cause | Treatment Method |
|---|---|---|
| Uneven Tire Wear | Low Tire Pressure | Inflate to the recommended pressure value |
| | Incorrect Front Wheel Toe - in | Adjust the front wheel toe - in |
| Abnormal Noise from the Drive Motor | Worn - out Drive Motor Bearing | Replace the bearing |
| Inflexible Steering | Water in the Steering Gear Housing or Solidified Lubricating Oil | Clean the housing, replace the gasket, and inject an appropriate amount of lubricating oil |
| Braking Deviation | Uneven Tire Inflation Pressure | Adjust the tire inflation pressure |
| | Uneven Wheel Braking Force | Adjust the brake shoe |
| Insufficient Braking Force | Seriously Worn Brake Shoes | Replace the brake shoes |
| | Poor Contact between Brake Shoes and Brake Drums | Adjust the gap, repair the worn parts, and improve the contact |
| | Oil or Water on Brake Shoes | Remove it |
| Failure of the Anti - Drag Braking Function | Damaged Controller | Check the controller and replace relevant parts |

## 10.2 Judgment of Electrical Faults

| Fault Phenomenon | Cause | Treatment Method |
|---|---|---|
| The Vehicle Stops and Starts Intermittently | Activation of the Circuit Over - Current or Over - Heat Protection System<br>Poor Contact of Electrical Connectors | Check the circuit<br>Wait for cooling |
| The Vehicle Stops Immediately after Starting | Insufficient Power | Charge the lithium - ion battery |
| | Drive Motor Fault | Check and repair |
| The Vehicle Fails to Move | No Power in the Lithium - Ion Battery | Test the battery power and recharge |
| | Loose Connection of Lithium - Ion Battery Wires | Tighten the connection nuts |
| | Damaged Acceleration Micro - Switch | Replace the micro - switch |
| | Drive Motor Fault | Check the fault location, repair or replace parts |
| The Lithium - Ion Battery Cannot Be Charged | Damaged Charger | Check the charger for faults, repair or replace parts |
| | Loose or Disconnected Connecting Wires | Check and tighten the installation nuts |
| | Damaged Lithium - Ion Battery | Replace the lithium - ion battery |
| | Low Charging Voltage | Adjust the charging voltage |
| | The Lithium - Ion Battery is Over - Discharged and Completely Depleted | Activate the battery with a blind - charging charger and then charge it with the vehicle - mounted charger, or replace the battery |
| Unstable Vehicle Speed | Damaged Accelerator | Replace the accelerator |

# 11. Usage and Maintenance of Motor Controllers.

## 11.1Fault Indication




When a fault occurs in the electric two - wheeled vehicle and it cannot operate normally, the dynamic vehicle speed display will change to a fault code.

## 11.2 Definition of Alarm Levels

| Fault Code Display Rules | |
|---|---|
| MCU | Fault codes starting with the letter "M" or "K" are MCU fault codes |
| BMS | Fault codes starting with the letter "B" are BMS fault codes |
| MCU Forward BMS Fault Codes | 1.BMS Level 1 Fault M135<br>2.SOC Low Fault Code M170<br>3.BMS Level 2 Fault M134<br>4.Warning M176<br>5.Communication Fault M101 |

# Chapter 1 Fault Indication

Fault identification: (LED indicator light)

| state | | Description of LED display information |
|---|---|---|
| red light | green light | |
| OFF | OFF | The system is not power on |
| OFF | Normally on | The system is being powered on or restored to factory Settings |
| OFF | Breathing flashing | Normal system operation |
| flashing | flashing | System failure<br>Fault code = Blinking green times * 10 + blinking red times<br>For example, fault code 24, the green indicator blinks twice and the red indicator blinks four times in a unit time. |

# Chapter2 Definition of Alarm Leves

**Class 1:** Main circuit breaker is open, motor is prohibited from working, and motor command (accelerator) fails.

**Class 2:** Motor prohibited from operation, and motor command (accelerator) fails.

**Class 3:** Battery is undervoltage, limiting the maximum motor speed.

**Class 5:** Limit maximum output torque of the motor.

**Class 6:** Limit maximum motor speed.

**Class 15:** Power output port overcurrent fault, faulty port output prohibited.

**Class 20:** Warning.

# Chapter3 Overview of fault codes

| Fault code | | Fault level | fault name | Note |
|---|---|---|---|---|
| hexadecima | decimal | | | |
| 1 | 1 | 1 | Battery voltage too high. | |
| 2 | 2 | 1 | Battery voltage too low. | |
| 3 | 3 | 20 | Accelerator startup wrong | |
| 4 | 4 | 20 | Maintenance time reached | |
| 5 | 5 | 1 | Flash memory error | |
| 6 | 6 | 1 | Bus voltage too low | |
| 7 | 7 | 20 | Bus voltage too high | |
| 8 | 8 | 1 | Drive motor overcurrent | |
| B | 11 | 1 | The main contactor faulty | |
| C | 12 | 3 | Battery capacity low. | |
| D | 13 | 5 | Drive motor temperature too high | |
| F | 15 | 1 | Drive motor current offset | |
| 11 | 17 | 1 | The main contactor coil overcurrent | |
| 14 | 20 | 5 | Controller temperature too high | |
| 1B | 27 | 1 | Controller current over threshold | |
| 25 | 37 | 1 | The 5V output of the controller is too low | |
| 26 | 38 | 1 | The 12V output of the controller is too low | |
| 27 | 39 | 2 | Motor stall（Locked Rotor） | |
| 28 | 40 | 15 | DRIVE 1 output over current | |
| 29 | 41 | 15 | DRIVE 2 output over current | |
| 2A | 42 | 15 | DRIVE 3 output over current | |
| 2B | 43 | 15 | DRIVE 4 output over current | |
| 2C | 44 | 15 | DRIVE 5 output over current | |
| 2D | 45 | 15 | DRIVE 6 output over current | |
| 2E | 46 | 15 | DRIVE 7 output over current | |
| 2F | 47 | 2 | Solenoid brake control coil open fault | |
| 30 | 48 | 6 | Mechanical failure of electromagnetic brake | |
| 31 | 49 | 1 | Battery charger connected | |
| 3D | 61 | 2 | Drive motor temperature too high | |
| 3E | 62 | 2 | The direction switch is activated simultaneously | |
| 3F | 63 | 20 | The interlock switch not activated | |
| 40 | 64 | 20 | Wrong start sequence | |
| 42 | 66 | 2 | Controller temperature too high | |
| 47 | 71 | 2 | Controller temperature sensor faulty | |
| 4A | 74 | 1 | Drive motor encoder failure | |

| | | | | |
|---|---|---|---|---|
| 53 | 83 | 1 | Flash no parameters | |
| 54 | 84 | 1 | Flash memory parameter overrun | |
| 55 | 85 | 20 | Wrong starting sequence | |
| 57 | 87 | 1 | The system parameters do not match the firmware version | |
| 58 | 88 | 1 | The system parameters do not match the firmware type | |
| 59 | 89 | 1 | The system parameters do not match the firmware product number | |
| 5B | 91 | 6 | Steering sensor failure | |
| 5C | 92 | 2 | Pedal accelerator error | |
| 5F | 95 | 2 | The motor temperature sensor short circuit | |
| 61 | 97 | 2 | The motor temperature sensor open circuit | |
| 62 | 98 | 1 | Bus capacitor precharge failure | |
| 64 | 100 | 2 | The external meter communication is faulty | |
| 65 | 101 | 6 | The CAN bus communication is faulty | |

# Chapter 4 Fault Description and Solutions

## Bus Over - voltage Protection

Fault Code: 1

Fault Level: 1

Fault diagnosis: According to internal measurement of the control unit, the bus voltage exceeds the set maximum allowed threshold.

Solution :

1. Check whether the battery string cable is properly connected to the electric control system.

2. Check whether the battery voltage is normal.

3. Determine the over-voltage threshold

4. Replace the controller.

## Battery Under - voltage Fault

Fault Code: 2

Fault Level: 1

Fault diagnosis: The control unit measures the battery string voltage lower than the set minimum allowed threshold.

Solution :

1. Check the battery string voltage.

2. Check whether the battery string cables are connected incorrectly and whether the positive and negative electrode connectors are corroded.

3. Check the battery string status: If the battery electrolyte is partially exhausted, the controller undervoltage protection fault may occur.

4. Ensure that the overvoltage threshold is proper.

5. Replace the controller.

## Accelerator Pedal Depressed Before Starting

Fault Code: 3

Fault Level: 20

Fault diagnosis: According to internal measurement of the control unit, the bus voltage exceeds the set maximum allowed threshold.

Solution :

1. Check whether the battery string cable is properly connected to the electric control system.

2. Check whether the battery voltage is normal.

3. Determine the overvoltage threshold

4. Replace the controller.

## Normal Maintenance Cycle Reached

Fault Code: 4

Fault Level: 20

Fault diagnosis: The maintenance period ends.

Solution :

1. Re-assign the value of the maintenance timer in the controller through FJ monitoring software or instrument

2. Turn off this function (no maintenance prompt is required) and restart the electric control

## Flash Memory Fault Alarm

Fault Code: 5

Fault Level: 1

Fault diagnosis:A controller fails to read or write data from the flash memory

Solution :

1.Replace the Controller

## Bus Low - voltage Alarm

Fault Code: 6

Fault Level: 1

Fault diagnosis: According to internal measurement of the control unit, the bus voltage is lower than the set minimum allowed threshold.

Solution :

1. Check whether the main circuit breaker works properly.

2. Check the cable harness connected to the coil of the main circuit breaker

3. Check whether the main fuse is in good condition.

4. Check whether the battery string voltage is normal

5. Ensure that the undervoltage threshold is proper

6. Replace the controller.

## Over - voltage Current Limiting Activated

Fault Code: 7

Fault Level: 20

Fault diagnosis: The bus voltage exceeds the set value, and the output current is restricted according to the fault diagnosis.

Solution :

1. Check whether the battery is properly connected

2. Check whether battery string parameters are consistent

## Drive motor overcurrent

Fault Code:8

Fault level:1

Fault diagnosis: The output current of the controller exceeds the threshold.

Solution :

1. Check whether there is a short circuit between the UVW three-phase cable connection between the drive module and the motor (short circuit between the three-phase cables or a phase cable and the forklift frame), and check whether the motor coil has a burning smell.

2. Disconnect the UVW cable of the power module, and use a multimeter to check whether the resistance value between the +/-B terminal of the module and the UVW terminal is symmetrical. If the resistance value of one phase is found to deviate significantly from the other phases, it can be determined that the controller has burned out and needs to be replaced.

## Main Circuit Breaker Adhesion

Fault Code: 11

Fault Level: 1

Fault diagnosis: The system is powered on, and the voltage of the precharged capacitor cannot be released.

Solution :

1. Replace the main circuit breaker.

2. Replace the controller.

## Battery Pack Low - voltage Alarm

Fault Code: 12

Fault Level: 3

Fault Diagnosis Cause: The voltage of the battery string is lower than the minimum discharge threshold.

Solution :

1. Monitor the battery string voltage, stop the operation, and charge the battery string.

2. Check whether battery string parameters are correctly set.

## Drive motor temperature too high

Fault code :13

Fault level :5

Fault diagnosis: The measured motor temperature exceeds the user-set "Traction motor overtemperature Protection Point" temperature.

Solution:

First check whether the connection between the motor temperature sensor and the main line is normal. If the fault occurs when the motor is not hot:

1. Use a handheld multimeter, put it in resistance measurement mode, measure the resistance value between the two lines of the motor temperature sensor, compare with the true value table of the motor temperature sensor, if the measured value is inconsistent with the actual temperature of the motor, then replace the temperature sensor.

2. Replace the controller.

If the fault occurs when the motor is very hot:

1. If the temperature value read from the monitoring software or instrument of the upper computer is consistent with the actual temperature of the motor, check whether the motor housing clean, motor heat dissipation is normal.

2. Test whether the drive motor is working normally, whether there is brake lock or other abnormal conditions.

## Motor Phase Current Not Zero during Self - check

Fault Code: 15

Fault Level: 1

Fault diagnosis: The phase current of the driving motor is not zero when the system is started.

Solution :

1. Check whether the system battery and motor are well insulated

2. Replace the controller.

## The main contactor coil overcurrent

Fault code :17

Fault level :1

Fault diagnosis: The main contactor coil current is too high, which is out of the operating range.

Solution :

1. Check whether the control coil of the main contactor is short-circuited to the wire harness.

2. Check whether the resistance value of the main contactor control coil is within the normal range.

3. Replace the controller.

## Controller Power Unit Overheating

Fault Code: 20

Fault Level: 5

Fault diagnosis: The temperature of the power unit exceeds 80°C.

Solutions:

1. The fault may be caused by insufficient heat dissipation. Check the heat dissipation between the control unit and the aluminum plate as well as between the aluminum plate and the frame. Note: you can read the temperature of the motor power module through your own upper computer software or instrument.

2. If the heat dissipation measures of the above modules are all good, it is necessary to check whether the drive motor works normally and the electrical conduction if it does not work normal power module overheating;Second,repleace the power module.

3. Replace the controller.

## Controller current over threshold

Fault code :2

Fault level :1

Fault diagnosis: The fault causes: The output current of the controller exceeds a set threshold. A

Solution:

1. Ensure that the threshold is set properly

2. Check whether there is a short circuit between the UVW three-phase cable connection between the drive module and the motor (short circuit between three-phase cables or a phase cable and the forklift frame), and check whether the motor coil has a burning smell.

3. Disconnect the UVW cable of the power module, and use a multimeter to check whether the resistance value between the +/-B terminal of the power module and the UVW terminal is symmetrical. If the resistance value of one phase is found to be significantly different from the other phases, the power module can be determined to be burned out and the power module needs to be replaced.

4. Replace the controller.

## Control Unit 5V Voltage Output Fault

Fault Code: 37

Fault Level: 1

Fault diagnosiss: the 5V output voltage of the control unit is lower than 4.3V.

Solution:

1. Check whether the 5V output is grounded, and check whether the wiring of each motor encoder is correct.

2. Exclude external devices that use the 5V output of the control unit one by one.

3. Replace the controller.

## Control Unit 12V Voltage Output Fault

Fault Code: 38

Fault Level: 1

Fault diagnosis: The voltage of the K1 - 17 connector (12V output) of the control unit is lower than 10.5V.

Solutions:

1. Check whether the 12V output is grounded. It is usually caused by the incorrect wiring of the following devices:

▲Accelerator pedal

▲Lifting sensor

▲Steering sensor

▲Instrument

2. Eliminate the external devices that use the 12V output of the control unit one by one. Replace the control .

## Motor stall

Fault code :39

Fault level :6

Fault diagnosis: the motor has a rotation command, but the actual speed is 0, according to the fault .

Solution:

1. Check whether the motor encoder is normal

2. Whether the setting of driving current is reasonable and meets the requirements of working conditions

3. The actual working condition (climbing slope) exceeds the design value of the vehicle.

## Controller power port (Drive1 to Drive7) output overcurrent

Fault code :40~46 (corresponding to Drive1~Drive7)

Fault level :15

Fault diagnosis: Through the internal measurement of the control unit, Drive1~Drive7 port output current exceeds the threshold.

Solution:

1. Check whether Drive1~Drive7 port connection load is too large.

2. Check whether the cable harness connecting Drive1~Drive7 ports has a short circuit.

3. Replace the control unit.

## Solenoid brake control coil open fault

Fault code :47

Fault level :2

Fault diagnosis: Controller internal detection, electromagnetic brake control coil disconnection

Solution:

1. Check whether the broken resistance value of the electromagnetic brake control coil is reasonable.

2. Replace the electromagnetic brake.

3. Ensure that the output port of the controller driver is correct.

4. Replace the controller.

## Electromagnetic Brake Mechanical Fault

Fault Code: 48

Fault Level: 6

Fault diagnosis: The electromagnetic brake has been released, but the controller detects that the motor still has a rotational speed.

Solutions:

1. Check that the type of the electromagnetic drive matches the load of the vehicle

2. Check the cable harness of the control coil corresponding to the electromagnetic drive

3. Replace the controller

## Charging Prohibited

Fault Code: 49

Fault Level: 1

Fault diagnosis:The charger is connected, and the vehicle is restricted from moving.

Solution: Give a warning.

## Motor Shutdown Due to Excessive Temperature

Fault Code: 61

Fault Level: 1

Fault diagnosis: The measured motor temperature exceeds the maximum allowed temperature set by the user.

Solution:

First check whether the connection between the motor temperature sensor and the main line is normal.

**If the fault occurs when the motor is not hot:**

1. Use a handheld multimeter, put it in resistance measurement mode, measure the resistance value between the two lines of the motor temperature sensor, compare with the true value table of the motor temperature sensor, if the measured value is inconsistent with the actual temperature of the motor, then replace the temperature sensor

2. Replace the controller.

**If the fault occurs when the motor is very hot:**

1. If the temperature value read from the monitoring software or instrument of the upper computer is consistent with the actual temperature of the motor, check whether the motor housing is clean and whether the heat dissipation of the motor is normal

2. Test whether the drive motor is working normally, whether there is brake lock or other abnormal conditions.

## The direction switch is activated simultaneously

Fault Code: 62

Fault Level: 2

Fault diagnosis： The controller receives a non - zero motor speed command from the ECU, but both the forward and reverse direction commands are activated at the same time.

Solutions:

1. Check the direction switch.

2. Check the wiring harness.

## LOCK Switch Not Closed during Startup

Fault Code: 63

Fault Level: Warning

Fault diagnosis: When the system is powered on, the LOCK switch is not closed; or after the main circuit breaker is closed, the LOCK switch remains open for longer than the time set by the "LOCK Switch Delay" parameter.

Solutions:

1. Check whether the switch and its connection wiring harness are normal.

2. Replace the controller.

## Incorrect Starting Conditions

Fault Code: 64

Fault Level: Warning

Fault diagnosis: The forward/reverse switch is activated during startup or when the LOCK signal is activated.

Solutions:

1. Release the direction switch.

2. If the direction switch is not activated, check whether the connection terminals of the direction switch and the main wiring harness are correctly connected. You can use FJ's upper - computer monitoring software for auxiliary detection.

3. Replace the direction switch.

4. Replace the controller.

## Power Unit Overheating Shutdown

Fault Code: 66

Fault Level: 1

Fault diagnosis: The temperature of the power module of the driving motor exceeds 95 ° C.

Solution :

1. The fault may be caused by insufficient heat dissipation. Check the heat dissipation between the power module and the aluminum plate as well as between the aluminum plate and the frame.Note: you

can read the temperature of the motor power module through your own upper computer software or instrument.

2. If the heat dissipation measures of the above modules are good, it is necessary to check whether the drive motor is working properly. If the power is not working properly, it will cause power

3. Module overheating; Second, replace the power module.

4. Replace the controller.

## Controller temperature sensor faulty

Fault Code: 71

Fault Level: 2

Fault diagnosis: the feedback voltage of the power unit temperature sensor is out of the normal range, which causes a short-circuit or disconnection.

Solution: Replace the control unit.

## Motor Encoder Fault

Fault Code: 74

Fault Level: 1

Fault diagnosis: the encoder (A or B) channel signal is lost during the motor working.

Solution:

1. Check whether the encoder is correctly connected

2. If the cables are correctly connected, replace the encoder.

3. Replace the controller.

## Flash no parameters

Fault code :83

Fault level :1

Fault diagnosis: The flash memory has no default parameters.

Solution:

1. Reset the controller and power it on again

2. Replace the controller

## Parameter Exceeding Limit

Fault Code: 84

Fault Level: 1

Fault diagnosis: The parameter values read from the flash memory exceed the normal limit range.

Solutions:

1.Reset the controller and power it on again.

2.Replace the controller.

## Wrong starting sequence

Fault code :85

Fault level :20

Fault diagnosis:: The accelerator is activated at the same time that the direction switch is activated.

Solution:

1. Release the accelerator.

2. Check whether the accelerator wiring harness is correct.

## The system parameters do not match the firmware version.

Fault code :87

Fault level :1

Fault diagnosis: The firmware version does not match the system default parameter version (old and new versions).

Solution:

1. Check whether the firmware version corresponds to the default parameter version and load the correct firmware or E2 file.

## The system parameters do not match the firmware type

Fault code :88

Fault level :1

Fault diagnosis: The firmware does not match the system default parameter types (in different application domains).

Solution :

1. Check whether the firmware type corresponds to the current default parameter and load the correct firmware or E2 file.

## The system parameters do not match the firmware product number

Fault code :89

Fault level :1

Fault Diagnosis : The firmware does not match the default system parameters.

Solution :

1. Check the product number of the firmware and the current default parameters, and load the correct firmware or E2 file.

## Steering sensor failure

Fault code :91

Fault level :6

Fault diagnosis: The feedback voltage of the steering sensor is out of the calibration range.

Solution :

1. Check whether the steering sensor is correctly connected:

2. If the wiring is fine, recalibrate the clockwise, intermediate and counterclockwise values of the steering sensor.

3. Replace the steering sensor and recalibrate.

4.Replace the control unit.

## Pedal accelerator error

Fault code :92

Fault level :2

Fault diagnosis:When the accelerator pedal feedback voltage value is greater than halfway through the trip, and the switch signal is still not activated.

Solution :

1. Check the value setting of "Accelerator pedal Calibration" to see whether the minimum and maximum voltage values of the accelerator pedal are set accurately. If not, recalibrate using the upper computer monitoring software.

2. Replace the accelerator pedal.

3. Replace the controller.

## The motor temperature sensor short circuit.

Fault code:95

Fault level:5

Fault cause: The feedback resistance value of the motor temperature sensor exceeds the normal range and approaches 0.

Solution:

1.Check whether the connection between the temperature sensor of the driving motor and the main cable is normal.

2.Replace the drive motor temperature sensor.

3.Replace the controller.

## The motor temperature sensor open circuit

Fault code:97

Fault level:5

Fault diagnosis: The driving motor temperature sensor feedback resistance value exceeds the normal range and approaches infinity.

Solution:

1. Check whether the connection between the temperature sensor of the driving motor and the main cable is normal.

2. eplace the drive motor temperature sensor.

3. Replace the controller.

## Bus capacitor precharge failure

Fault code :98

Fault level :1

Fault diagnosis: During startup self-check, the voltage of a precharged capacitor increases slowly.

Solution:

1. Ensure that +B and -B are properly connected

2. Replace the controller.

## External meter communication is faulty

Fault code :100

Fault level :1

Fault diagnosis: The controller does not receive data from an external instrument during a fixed period of time (configurable).

Solution:

1. Check whether the cable harness is properly connected to the CAN bus

2. Check whether the external meter is running properly

3. Replace the controller.

## CAN Bus Communication Fault

Fault Code: 101

Fault Level: 6

Fault Cause: The communication unit data (BMS) is not received at the agreed time.

Solutions:

1. Check whether the communication unit is lost.
2. Check whether the communication line between the communication unit and the electric control is in good contact.
3. Replace the communication unit.
4. Replace the controller.

# 12. Lithium - Battery Fault Description

## Level 1 Faults

| | | | |
|---|---|---|---|
| Severe Over - temperature Alarm | 1 | Alarm, report the fault level, send fault code 01; Limit the discharge current to 0, follow the high - voltage discharge process; Disconnect all relays; UL 95°C | Power off after UL/95°C/10S |
| Discharge Severe Over - current | 2 | Alarm, report the fault level, send fault code 04; Limit the discharge current to 0, follow the high - voltage discharge process; Disconnect all relays; | Reserved / The protection board cuts off power when the first - level current exceeds 600A for more than 10S, and the second - level over - current is 800A/1S |
| Single - cell Voltage Seriously Too Low | 3 | Alarm, report the fault level, send fault code 06; Limit the discharge current to 0, follow the high - voltage discharge process; Disconnect all relays; | When the single - cell voltage is seriously too low at 2.4V (without power off), prompt passengers to pull over |
| Low SOC | 4 | Alarm; Report the fault level, send fault code 13; Limit the discharge current according to the SOP power - limit table | When it reaches 1%, the controller reduces the speed and stops the vehicle |

## Level 2 Faults

| Fault Name | Code | Handling Measures | Remarks |
|---|---|---|---|
| High - temperature Alarm | 21 | Alarm; Report the fault level, send fault code 21; Limit the discharge current according to the SOP power - limit table | At 75°C / Warning |
| Low - temperature Alarm | 22 | Reported by BMS, limit the motor power to 50% | |

| Fault Name | Code | Handling Measures | Remarks |
|---|---|---|---|
| Low Single - cell Voltage | 24 | Alarm; Report the fault level, send fault code 22; Limit the discharge current according to the SOP power - limit table | |
| Over - current | 25 | Alarm; Report the fault level, send fault code 25; Limit the discharge current to 50% according to the SOP power - limit table | 270A, 30S |
| BMS Internal Communication Fault | 26 | Alarm; Report the fault level, send fault code 26; | |
| SOC 5% Low | 27 | Alarm; Report the fault level, send fault code 27; Limit the discharge current according to the SOP power - limit table | Prompted by the controller |
| Large Battery Voltage Difference | 28 | Alarm; Report the fault level, send fault code 28; Limit the discharge current to 50% according to the SOP power - limit table | |
| Large Battery Temperature Difference | 29 | Alarm; Report the fault level, send fault code 29; Limit the discharge current to 60% according to the SOP power - limit table | |
| Low Discharge Total Voltage | 31 | Report the fault level, send fault code 31; Limit the discharge current to 20% according to the SOP power - limit table | |
| Charging Over - current | 32 | Alarm; Report the fault level, send fault code 32; At the same time, reduce the charging current to 8A | |

| Fault Name | Code | Handling Measures | Remarks |
|---|---|---|---|
| Feedback Over - current | 33 | Alarm; Report the fault level, send fault code 33; Limit the feedback current to 10% according to the SOP power - limit table | |
| Thermal Sensing Cable Disconnected | 37 | Alarm, report the fault level, send fault code 37; | |
| Ultra - low Total Voltage | 37 | Report the fault level, send fault code 03; Limit the discharge current to 0, follow the high - voltage discharge process; Disconnect all relays; | |
| Low - temperature Discharge | 38 | Alarm, report the fault level, send fault code 08; Limit the discharge current according to the SOP power - limit table, follow the high - voltage discharge process; Disconnect all relays; | |
| Discharge Single - cell Voltage Difference | 39 | Alarm; Report the fault level, send fault code 10; Limit the discharge current to 10% according to the SOP power - limit table | |
| Charging Over - current | 40 | Alarm, report the fault level, send fault code 11; Reduce the charging current to 0A, power off according to the charging flowchart, and disconnect all relays; | |
| Feedback Over - current | 41 | Alarm; Report the fault level, send fault code 12; Prohibit feedback, do not disconnect the high - voltage relay | Limit the feedback current to 100A at the second - level reduction |

## Level 3 Faults

| Fault Name | Code | Handling Measures | |
|---|---|---|---|
| Low SOC | 61 | Alarm; Report the fault level, send fault code 61; Limit the discharge current according to the SOP power - limit table | 10% |
| Large Battery Voltage Difference | 62 | Alarm; Report the fault level, send fault code 62; Limit the discharge current to 70% according to the SOP power - limit table | |
| Large Battery Temperature Difference | 63 | Alarm; Report the fault level, send fault code 63; | |
| Pre - charge Failure | 72 | Alarm, report the fault level, send fault code 72; Follow the discharge/charging power - off process, and disconnect all relays; | |
| High - temperature Discharge | 73 | Alarm; Report the fault level, send fault code 73 | |
| Low - temperature Discharge | 74 | Alarm; Report the fault level, send fault code 74, limit the discharge current according to the SOP power - limit table | |
| High - temperature Charging | 75 | Alarm; Report the fault level, send fault code 75 | |
| Low - temperature Charging | 76 | Alarm; Report the fault level, send fault code 76; | |
| Low Discharge Single - cell Voltage | 78 | Alarm; Report the fault level, send fault code 78; Limit the discharge current to 50% according to the SOP power - limit table | |

| Fault Name | Code | Handling Measures | |
|---|---|---|---|
| Low Discharge Total Voltage | 80 | Report the fault level, send fault code 80; Limit the discharge current to 50% according to the SOP power - limit table | |
| Charging Over - current | 81 | Alarm; Report the fault level, send fault code 81; At the same time, reduce the charging current to 16A | |
| Continuous Discharge Over - current | 82 | Alarm; Report the fault level, send fault code 82; Limit the discharge current to 80% according to the SOP power - limit table | 250A, 60S |
| Feedback Over - current | 83 | Alarm; Report the fault level, send fault code 83; Limit the feedback current to 50% according to the SOP power - limit table | Greater than 110A |
| Voltage Cable Disconnected | 89 | Alarm, report the fault level, send fault code 89; During driving, limit the discharge current to 0; During charging, limit the charging power to 0, stop charging; Follow the discharge/charging power - off process, and disconnect all relays; | |
| Low Charging Single - cell Voltage | 90 | Alarm, report the fault level, send fault code 90; Power off according to the charging flowchart, and disconnect all relays; | |
| Heating Fault | 91 | Alarm, report the fault level, send fault code 91; Follow the discharge/charging power - off process, and disconnect all relays; | |
| Thermal Sensing Cable Disconnected | 92 | Alarm, report the fault level, send fault code 37; Limit the discharge current to 0 according to the SOP, | |

| Fault Name | Code | Handling Measures | |
|---|---|---|---|
| | | and limit the charging power to 0; Follow the discharge/charging power - off process, and disconnect all relays; | |
| BMS Internal Communication Fault | 93 | Alarm, report the fault level, send fault code 26; During driving, limit the discharge current to 0; During charging, limit the charging power to 0, follow the discharge/charging power - off process, and disconnect all relays; | |
| Discharge Temperature Difference | 94 | Alarm; Report the fault level, send fault code 9; Limit the discharge current to 0 | |
| Charger Temperature Fault | 94 | BMS requests the charger to stop charging, and the instrument displays the fault code | |
| Charger - Battery Connection Fault | 96 | BMS requests the charger to stop charging, and the instrument displays the fault code | |
| Ultra - high Total Voltage | 97 | Alarm, report the fault level, send fault code 02; Prohibit discharge and feedback, follow the high - voltage discharge process; Disconnect all relays; | Reduce to level 3, notify not to charge, and the controller should not reverse - charge when it is less than 60V |