

S I A L

E C N

R E U

V M A



iTango
www.doohan-ev.com

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Chapter 1 Important instructions

Preface

iTango's specifications, maintenance procedures, adjustments and diagnostics will be introduced in this service manual.

The service provider that authorized by Zhejiang Doohan Technology Co., Ltd. should well understanding this manual and provide the best after service for the end users.

All products, special tools and parts has been referred in the user manual, you should obtain it from Zhejiang Doohan Technology Co., Ltd.

The deadline of information is June 30, 2017

No part of this manual may be reproduced or transmitted in any form without the written permission of Zhejiang Doohan Technology Co., Ltd.

Fault report & suggestion

We are willing to accept or update if you find any fault in the service manual or suggestions for us.

Any fault report and suggestions, you can sent mail to Zhejiang Doohan Technology Co., Ltd. The contact information as follows:
Zhejiang Doohan technology co.,ltd after sales department.

Additional information you should submit as follows:

Your name

Your VIN

The description for the problem you faced

Necessary information (sample or page of marked)

Zhejiang Doohan Technology Co., Ltd. will reply to your question as follows process:

Submit your questions to related service engineers

The related engineers will double analyzing,checking or testing to find answer

Update answers to you within 10 working days.

Welcome to submit any problems whatever you cared to the service department of Zhejiang Doohan Technology Co., Ltd.

Warnings and Attentions

Definition

The maintenance information listed in the service manual to assist the technician for diagnosing and servicing in order to the vehicle can running normally; however, if not operated as recommended, some processes may be dangerous. The warning and caution items are made to prevent danger, but not all of the dangers can be expected. These information is prominently placed in the service manual in order to prevent the following items:

- Serious injury to the technician
- Damage the vehicle
- Unnecessary vehicle maintenance
- Unnecessary parts replacement

Warning definition

When you see the warning item, it means you should take the necessary measures or not take prohibited measures. If you ignore the "warning", the following consequences will be faced:

- Serious injury to the technician
- Serious injury to the other technician on the same working area
- If the vehicle is improperly repaired, the driver will be seriously damaged.

Attention definition

"Attention" requires special attention to the necessary measures or prohibited measures. If you ignore "attention", the following consequences will be faced:

- Vehicles damaged
- Unnecessary vehicle maintenance
- Unnecessary parts replacement
- System and parts abnormality or performance defects.
- System or parts damaged which support for maintenance of system or parts.
- System and parts abnormality or performance defects which support for maintenance of system or parts.
- Damage the fasteners, Basic tools or special tools.
- Brake Fluid leakage

Warning about disconnecting the power supply

Warning: the key must be on the "OFF" or "LOCK" position before maintains any electrical parts, and all electrical load must be "OFF" unless it is available as defined by other instructions in the operation procedure. If the tool or the exposed electrical terminal, the battery cable is necessary to disconnect. If violate these safety instructions, which may result in injury or damage to person and vehicles.

Warning about irritation of brake fluid.

Warning: brake fluid is stimulus on the eyes and skin. take the following measures once in contact.

Eye –thoroughly wishing with water.

Skin- washing with soap and water.

If swallowed - see a doctor immediately

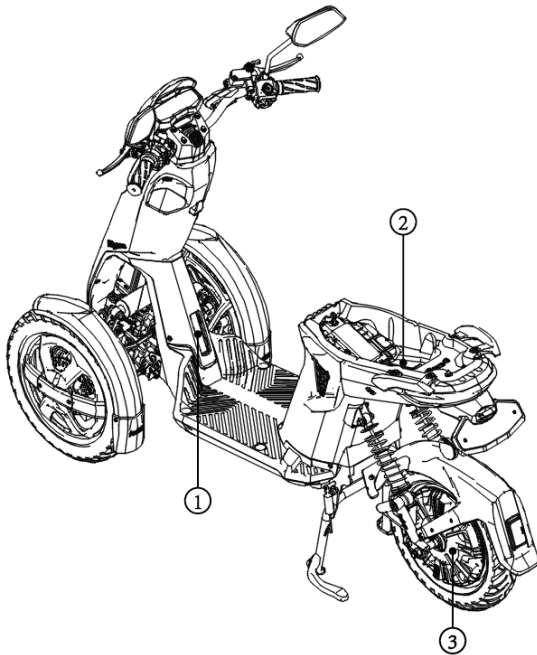
Attentions of fasteners

Special attentions: Use the correct fasteners in the correct position. The replaced part number of fastener must be correct. Do not use paint, lubricants or corrosion inhibitors on fasteners or fastener connection surfaces unless other instructions. The torque and coupling force of the fasteners will be affected or damaged by those materials. When installing the fasteners, be sure to tight the fastener with correctly torque based on the right tightening sequence .

Chapter 1 General information

VIN location

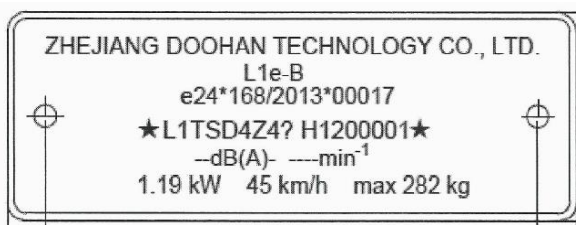
When the vehicle is registered or received a traffic license, it is necessary to report the vehicle identification number and the motor number. also need to be provided the above number for quality claim.



① Vehicle identification number (VIN) sign belongs to the vehicle's legal identifier.

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② Vehicles nameplate information.



③ Motor series No.



General specification

| Main dimension | | | |
|---|--|----------------------------|--|
| length | 1648mm | width | 651mm |
| high | 1110mm | wheelbase | 1150mm |
| front track | 460mm | | |
| Main performance | | | |
| curb weight | 74kg(not include battery) | | |
| Front and rear axle distribution of curb weight | Front 23kg/rear 33kg(not include battery) | Top designed speed | iTango Classic(DH-05-10): 25km/h; iTango HO(DH-05-12): 45km/h |
| rated voltage | 48V | | |
| load capacity | 200kg | Brake distance(dry road) | ≤2m(20km/h) ≤3.5m(30km/h) |
| person | 2 | | |
| Standard power consumption | iTango Classic: 50KM(25km/h) iTango HO: 50KM(45km/h),70KM(25km/h) | Braking distance(wet road) | ≤3m(20km/h) ≤4m(30km/h) |
| Frame | | | |
| front shock absorber | Sleeve& oil damping | | |
| rear shock absorber | Sleeve & oil damping | | |
| front tire spec. | 70/90-12×2 | | |
| rear tire spec. | 90/70-12 | | |
| Front wheel tire pressure(kpa) | 225±10 | | |
| rear wheel tire pressure(kpa) | 225±10 | | |
| wheel model(aluminum alloy) | front 2.15-12 inch aluminum wheel | | |
| rear motor | 2.15-12 motor | | |
| front brake | disc brake | | |
| rear brake | disc brake | | |
| minimum ground clearance | 142mm | | |
| seat height | 740mm | | |
| max leaning angle | ≤30° | | |
| max steering angle | ≤32° | | |
| turning radius | 2.50m | | |
| max drop height of front wheel | 180mm | | |
| battery system | | | |
| battery model | 18650 lithium battery | | |
| voltage | 48V | | |

| | |
|---|---|
| capacity | 20AH (DH-05-10) 26AH (DH-05-12) |
| charger input voltage(V) | AC 220V or 110V(optional) |
| charger output voltage(V) | 58V |
| standard charging current | 3A (iTango-C) 5A(iTango-H) |
| standard charging time | 6H |
| max range | 50KM |
| battery weight | 10KG |
| battery recycle times | 500 times |
| range of battery using ambient temperature | -20°C to 60°C |
| range of battery storage ambient temperature | -20°C to 60°C |
| range of battery charging ambient temperature | 0°C to 45°C |
| Battery protection system | over discharging protection, short circuit protection, overheat protection, over charging protection, over current protection, battery balance protection |
| others | |
| USB charging port | 5V、 1A |
| dashboard | LCD dashboard |
| fuse spec. | 5A |
| headlights spec. | 12V LED |
| front locating lights spec. | 12V LED |
| front turning lights spec. | 12V LED |
| rear turning lights spec. | 12V LED |
| taillights spec. | 12V LED |
| license plate lights | 12V LED |
| rear mirror | Non-circular paint rearview mirror ,M8 mirror pole |
| gross weight | 84kg(include 1 set battery) |

Chapter 2 Services materials

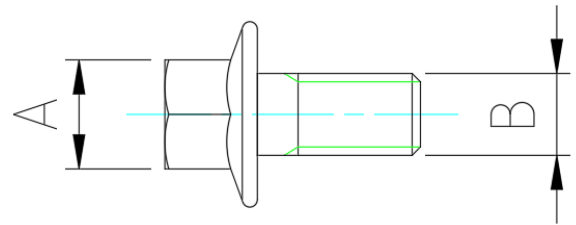
Standard parts specifications and general torque

To inform the customer about the standard parts specifications and corresponding maintenance tools.

According to the ISO standard thread depth to define the locking torque of the standard firmware. The locking torque of the special components or assembly is described in the relevant sections of the manual. To tighten the multi-firmware assembly to the specified torque in a crisscross and progressive manner avoid bend. Unless otherwise specified, the locking torque should be based on the cleaning and drying threads, and the components should be kept at indoor temperature.

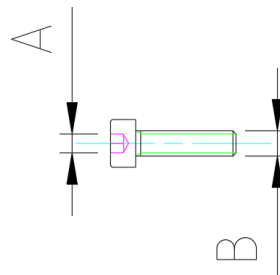
1, The national standard GB / T 5789-2000 for hexagonal flange bolts, standard parts specifications, maintenance tool specifications and general torque as following table:

| A | B (spec.) | Open/wrench&socket | General torque(N.m) |
|------|-----------|--------------------|----------------------|
| 10mm | M6 | 10# | 10~13 |
| 12mm | M8 | 12# | 25~35 |
| 14mm | M10 | 14# | 63~80 |



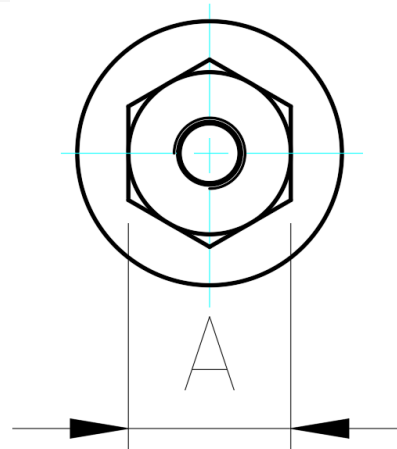
2, The national standard GB / T 70.1-2000 for hexagon head bolts, standard parts specifications, maintenance tool specifications and general torque as following table:

| A | B (spec.) | Open/wrench&socket | General torque(N.m) |
|-----|-----------|--------------------|----------------------|
| 4mm | M5 | 4# | 4~7 |
| 5mm | M6 | 5# | 10~13 |
| 6mm | M8 | 6# | 25~35 |
| 8mm | M10 | 8# | 63~80 |
| | | | |



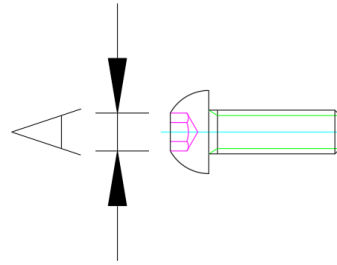
3. The national standard GB / T 6177.1-2000 for hexagonal flange nuts, GB / T 6187.1 for hexagonal flange self-locking nuts, standard parts specifications, maintenance tool specifications and general torque as following table:

| A | B (spec.) | Open/wrench&socket | General torque(N.m) |
|------|-----------|--------------------|----------------------|
| 7mm | M4 | 7# | 2~3 |
| 8mm | M5 | 8# | 4~7 |
| 10mm | M6 | 10# | 10~13 |
| 12mm | M8 | 12# | 25~35 |
| 14mm | M10 | 14# | 63~80 |



4, The national standard GB / T 70.2-2000 for hexagon flat round head bolts, standard parts specifications, maintenance tool specifications and general torque as following table:

| A | B (spec.) | Open/wrench&socket | General torque(N.m) |
|-----|-----------|--------------------|----------------------|
| 3mm | M5 | 4# | 4~7 |
| 6mm | M8 | 5# | 25~35 |



5, The national standard GB / T 845-1985 for cross-slot head tapping screws, GB / T818-2000 for cross-groove round head screws, maintenance tools for the unity of the screwdriver. Torque is not required, only need to be tighten.

Preparation of disassemble & replacement

- ① Before cleaning or removing, clean the dust, dirt and foreign matter on the vehicle.
- ② When disassembling, be sure to place the pairing parts with groups. Pairing parts must be reused or replaced in groups.
- ③ When disassembling, clean all parts and place them in the tray based on disassembly order. In doing so, it can save assembly time and ensures that parts are installed correctly.
- ④ Keep all parts in a location away from fire and water

Washer and oil seal

The washer surface, oil seal must be cleaned before assembled.

Bearing & oil seal

To keep clearly for the mark of manufacturer and series number when install the bearing and oil seal, When installing the oil seal, to spread on the oil seal lip by a small amount of grease of lithium soap base. To lubricate the bearing by lubricating oil after installed.

Attention:

Do not use compressed air to rotate the bearing, which can damage the bearing surface.

Inspect the connecting parts

Check wiring, coupler joints whether with dirt, dust or water and so on.

1.Connection:

- ① wiring
- ② coupler
- ③ connector

2. Inspection

- ① wiring
- ② coupler
- ③ connector

Water stain - dry with air guns

Dust, dirt - repeated remove and connection several times

3. Inspection

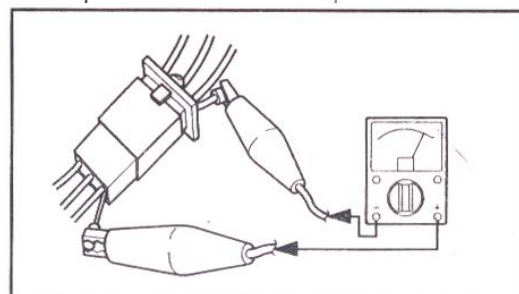
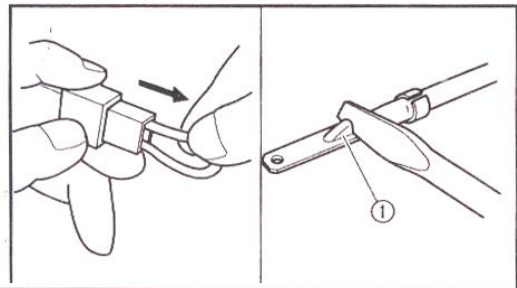
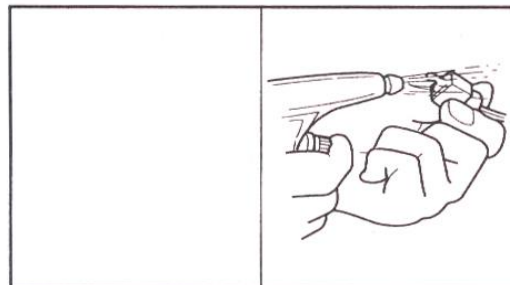
- ① check all connecting part
- ② Loosen joint parts: correct connection

Attention

Regain it If the pin on the terminal is flattened.

4.connection

- ① wiring
- ② coupler
- ③ connector



Attention

Make sure all joint part have been locked.

5. Inspection

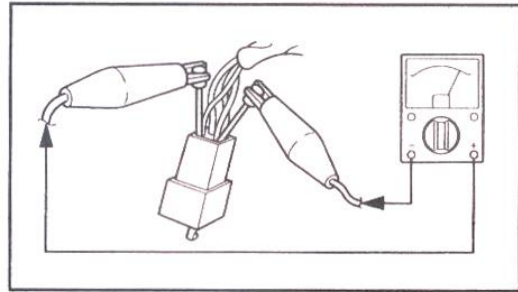
(Using multimeter) to continuously check other related items.

Attention

If there is no need to continue to check the items, please clean the terminals.

follow up steps 1 to 3 to check the wire jacket.

To correct it quickly, use the contact 【Contact restorer】.



Chapter 3 Inspection & adjustment

This chapter contains all the information what is items must be checked and adjusted. If regularly implement these maintenance procedures, it will make the vehicle more smoothly driving and life can be extended. The cost of relative maintenance will be down. The information has been described in this chapter applies to vehicles that are not sold and sold. All service technicians should be familiar with all information in this chapter.

Steering column inspection&adjustment.

1. Place the vehicle on a flat table. Put up the main stander to let the front wheel off the ground.

2.inspection

- Steering column

Hold the front wheel and shake it up and down.

Steering column is jammed or loosened – adjust it

3. Remove

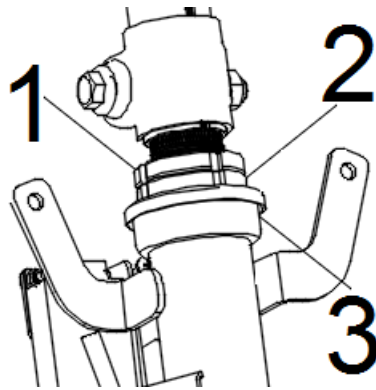
- Front panel and tools box(refer to chapter 4 :plastic parts)

4. Adjustment

- Steering column

a. Remove the locking nuts 1.

b. Loose locking nuts 2, then use the ring wrench to lock based on the specified torque.



Attention

Don't allow to lock the round nuts too tight.

C. Check the rotation of steering column whether it is loosen or stuck. If stuck, please check the top & lower bearing of top tube. If damaged - replace.

D. Use the ring wrench to fix the lock nut 2 and lock the upper locking nut 1.

5. Installation

- Front panel and tool box(refer to chapter 4 plastic parts).

Inspection of shock absorber

Inspection

- Inner pipe of shock absorber
Damage/scratch--replace.
- oil seal
leakage-replace
- Check whether the action of shock absorber is working smoothly.
If not working smoothly--please change a new one.

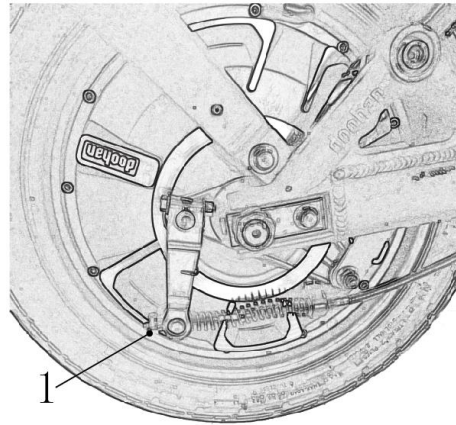
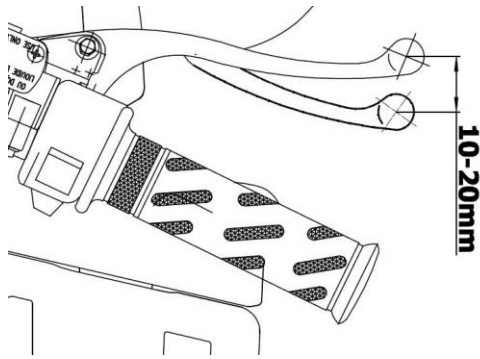
Inspection & adjustment of brake

1. Inspection

- free clearance of brake handle
- Over standard value-adjustment.

Attention

The free clearance of brake handle is 10-20 mm subject to the end of the brake handle.



Inspection & adjustment of rear drum brake

1. brake operation
2. inspection
 - wear indicator

Attention

When the wear indicator points to the wear limit line, replace the whole brake block.

3. adjustment
 - free clearance of brake handle
 - Rotate the rear brake nut 1 with clockwise and counterclockwise direction until to fit the specified free clearance of brake handle.

| | |
|------------------|---|
| clockwise | Increased, free clearance of brake handle |
| counterclockwise | Decreased, free clearance of brake handle |

Attention

To make sure the brakes are not towed after adjusting the free clearance of brake handle.

Tire inspection

The following procedure is suits for inspection of front & rear tire

1. Tire checking

① Tire pressure

Over standard value(standard:225±10KPa): Adjust tire pressure.

Attention

- Please check and adjust the tire pressure when the tire temperature is equal to the outdoor temperature.
- Riding an overloaded vehicle can cause damage to the tire or accidental injury.
- Do not overload.

2.tire surface

I tire tread depth

II wear indicator

| Min tire tread depth | |
|----------------------|-----------|
| front tire | rear tire |
| 1.5mm | 2.0mm |



If damaged or scratched, please replace.

Attention

Don't try to repair a tire which has been punctured. If must to repair it, please be careful and replace with high quality tires as soon as possible.

| tire spec. | |
|------------|-----------|
| front tire | rear tire |
| 70/90-12 | 90/70-12 |

1: The tire has a sign of the direction of rotation

Attention

When the tires are installed, keep the symbols of tire tread toward the rotating direction of the wheel.



3. Rim inspection

- rim
- If damaged or scratched, please replace.

Attention

If rime is damaged or deformed, do not repair it, please replace with a new one.

Inspection & lubrication of cable

The following procedures applies to all cables.

1. Inspection

- cable

Damaged--replacement

2. Inspection

- cable operation

Poor operation -lubrication

| | |
|-----------|---|
| lubricant | Engine oil or suitable wire rope lubricants |
|-----------|---|

Attention

- The damaged cable will affect the function. Please replace the cable as soon as possible.
- Hold the cable end vertically and drip little lubricants in the cable or use the appropriate lubrication equipment.
-

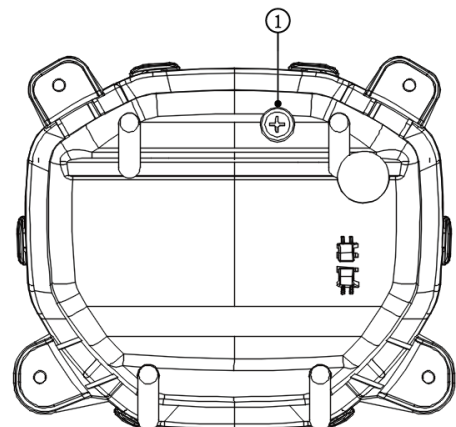
Adjustment of headlights beam

1. Remove

- front panel

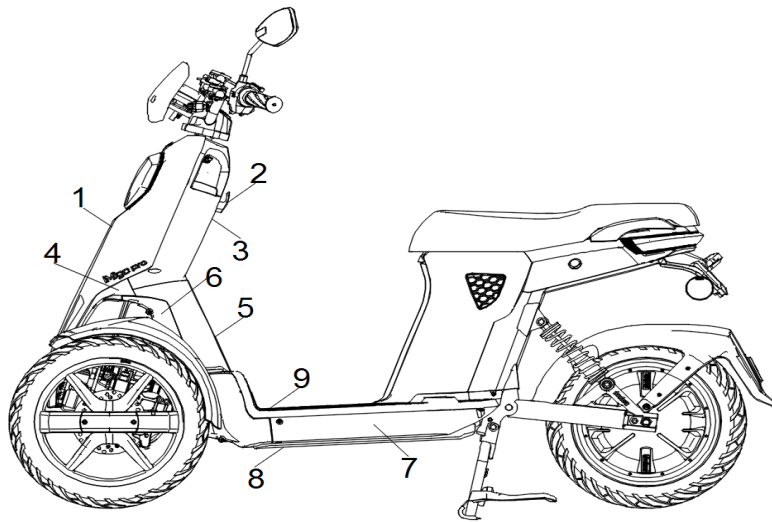
2. adjustment

- Rotate the adjusting screw with clockwise ①, the headlight beam down
- Rotate the adjusting screw with counterclockwise ①, headlight beam up



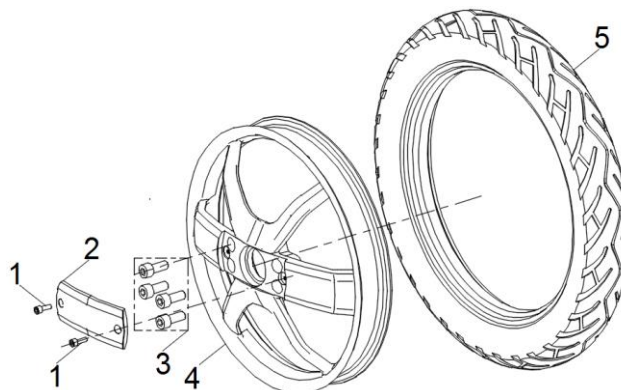
Chapter 4 Vehicles Body

Plastic parts



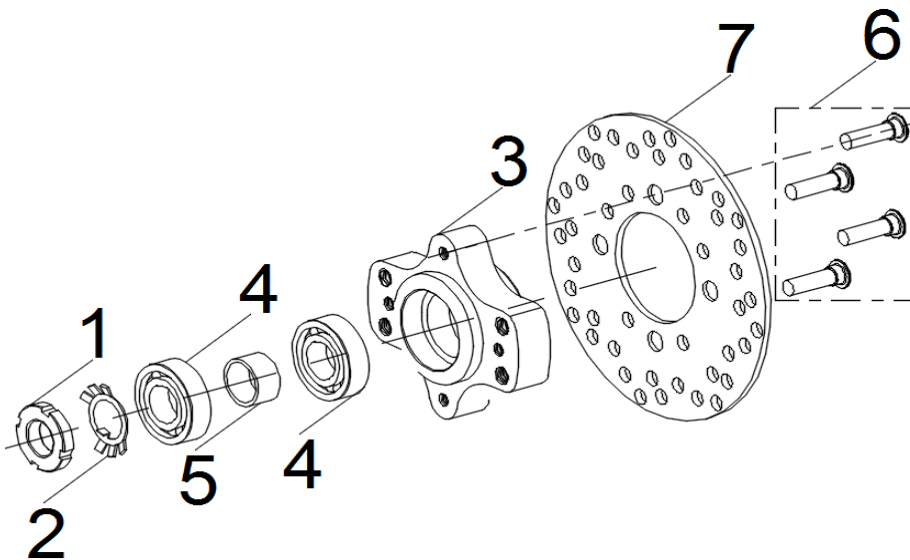
| Sequence of Operation | Spare parts name | Quantities | Remarks |
|-----------------------|---|------------|--|
| | Remove plastic parts | | |
| 1 | Front panel | 2 | Remove parts as sequence. Parts assembling with the reverse order of disassembling. |
| 2 | Helmet hook | 1 | |
| 3 | Tool box | 4 | |
| 4 | Lower interior lining panel,Front panel lower liner | 1 | |
| 5 | Lower part, Tool box | 1 | |
| 6 | Frame left/right fender | 1 | |
| 7 | Right/left strip | 1 | |
| 8 | Frame base plate | 1 | |
| 9 | Pedal | 1 | |

Front wheel



| Sequence of Operation | Spare parts name | Quantities | Remarks |
|-----------------------|---|------------|--|
| 1 | Remove front wheel Hexagon socket head cap screws, M5×10 Trim strip, Front axle. | 2 | Disassemble parts in order Attention To hold up the vehicle by appropriate bracket to suspend. Parts assembling with the reverse order of disassembling. |
| 2 | Hexagon socket head cap screws M10×25 | 1 | |
| 3 | Front aluminum rim | 4 | |
| 4 | Front tire | 1 | |
| 5 | | 1 | |

Disc brake & bearing



| Sequence of Operation | Spare parts name | Quantities | Remarks |
|-----------------------|--------------------------|------------|---|
| | Remove disc brake | | Disassemble parts in order |
| 1 | Round nut | 1 | Attention To hold up the vehicle by appropriate bracket to suspend. |
| 2 | Retaining washer | 1 | |
| 3 | Disc brake holder | 1 | |
| 4 | (6004-2Z)bearing | 2 | |
| 5 | Bushing | 1 | |
| 6 | Screw,Disc brake screw | 4 | Parts assembling with the reverse order of disassembling. |
| 7 | Front disc brake | 1 | |

1. Inspection

- Wheel bearings: if front wheel rotation is not smooth or loose, please replace the wheel bearings.
- Bushing
Damaged or scratched-replace.

Inspection of front disc brake

To inspect and adjust the brake block as follows.

1. Inspection

- Shoe block, Front hydraulic brake.
Shiny parts - repair
To polish with raw emery paper

Attention

To clean the shoe block after grinded by raw emery paper.

2. Measurement

- The thickness of the shoe block of front hydraulic brake
Overstep standard value - replacement.

The limited thickness of shoe block: 1.5mm

Attention

- **Do not leave oil or butter on shoe block.**
- **Replace whole shoe block if abrasion is out of limited value for any side of shoe block.**

3. Measurement

- Thickness of brake disc
If overstep the standard value - replace the brake disc.

The limited thickness of shoe block: 3 mm

4. Inspection

- Cross section of brake disc.

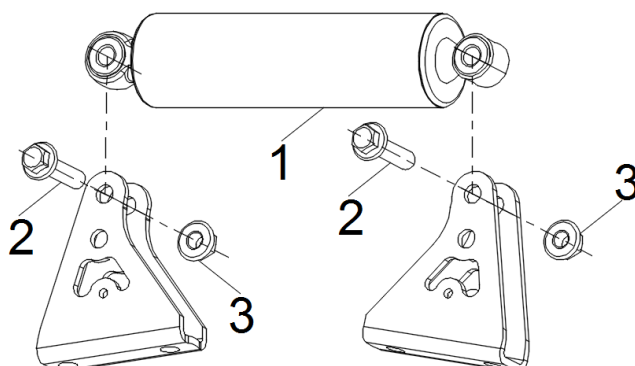
if adhesive oil - cleaning

To wipe with cloth of lacquer diluent or oil cleaner.

Scratched - maintenance.

To polish the scratched parts with raw emery paper

Front Shock Absorber Assy

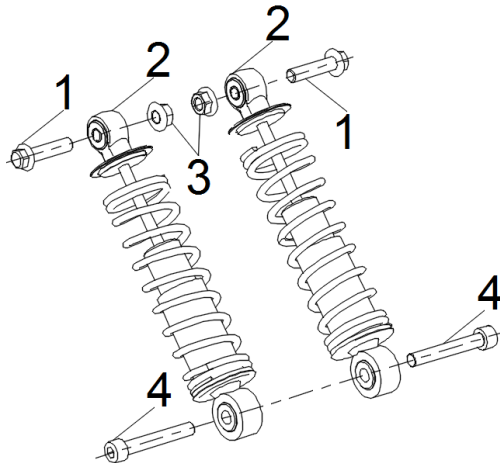


| Sequence of Operation | Spare parts name | Quantities | Remarks |
|-----------------------|--|------------|---|
| | Disassemble the front shock absorber assy | | |
| 1 | Front shock absorber assy | 1 | Disassemble parts in order |
| 2 | M10×45 ,Hexagonal flange bolt | 2 | |
| 3 | M10,Hexagonal flange nylon self-locking nut | 2 | |
| | | | Parts assembling with the reverse order of disassembling. |

Inspection of shock absorber

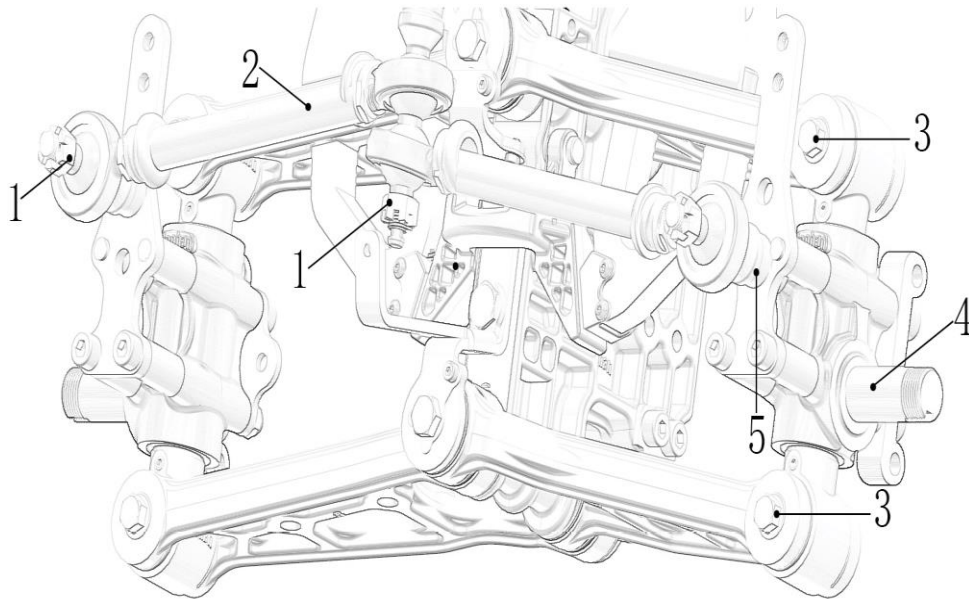
- Shock absorber rod
Deformed/damaged--replace shock absorber assy.
- Shock absorber
Leakage--replace shock absorber assy.
- Spring
Wear/damaged--replace.
- Oil seal of dust proof
Wear/damaged--replace
- Bolt
Deformed/damaged/worn out--replace

Rear Shock Absorber Assy



| Sequence of Operation | Spare parts name | Quantities | Remarks |
|-----------------------|---|------------|---|
| | Disassemble rear shock absorber assy | | |
| 1 | M10×40 ,Hexagonal flange | 2 | Disassemble parts in order |
| 2 | Rear shock absorber | 2 | |
| 3 | M10 Hexagonal flange nylon self-locking nut | 2 | |
| 4 | M10×60,Hexagonal round head screws | | |
| | | | Parts assembling with the reverse order of disassembling. |

Ass,Pull rod of ball head, Steering knuckle axletree assy



| Sequence of Operation | Spare parts name | Quantities | Remarks |
|-----------------------|--|------------|--|
| | Disassemble the ball head rod assy | | |
| 1 | M10,Hexagonal flange iron self-locking nut | 2 | Disassemble parts in order |
| 2 | Pull rod of ball head, assy | 1 | Attention <u>Both sides is symmetrical, Don't need to remove both sides when one side need to service.</u> Parts assembling with the reverse order of disassembling. |
| 3 | M10×60,Hexagonal flange bolt | 2 | |
| 4 | Steering knuckle axle assy | 1 | |
| 5 | Spacer assy,bracket plate of steering knuckle. | 1 | |
| | | | |

Inspection, pull rod of ball head.

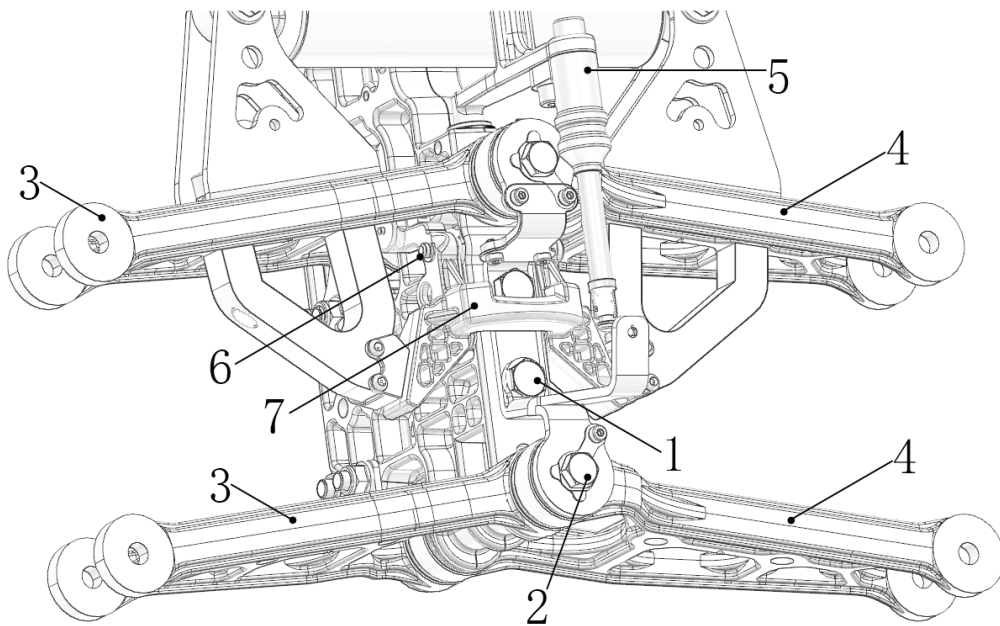
- Pull rod
Bend/damaged—replace the assy of pull rod of ball head.
- Ball head bearing
Rotation is not flexible—clean the surface mud
Damage/loosen—replace ball head assy
- Hex nut
Loosen—adjustment
- Bolt
Bend/damage/wear—replace

Inspection of steering knuckle axletree assy

- Steering knuckle axletree
Bend/damage—replace the steering knuckle axletree assy
- Spacer assy of steering knuckle bracket plate
Bend/damage—replace
- Bearing
Rotation is not flexible—clean the surface mud
Damage/loose—replace steering knuckle axletree assy
- Oil seal of dust proof
Damage/scratched—replace.
- Steering knuckle rotary bearing
loosen—adjustment.
- Bolt, nut
Bend/damage/scratched—replace.

Swing arm assy

Fixed seat of parking bracket



| Sequence of Operation | Spare parts name | Quantities | Remarks |
|-----------------------|---------------------------------------|------------|---|
| | Disassemble swing arm assy | | Disassemble parts in order |
| 1 | M10x20,Hexagon socket head cap screws | 2 | Attention <u>Both sides is symmetrical, Don't need to remove both sides when one side need to service.</u> |
| 2 | M10x150,Hex bolt | 2 | |
| 3 | Right swing arm assy | 2 | |
| 4 | Left swing arm assy | 1 | |
| 5 | Connecting rod of steering column | 1 | |
| 6 | Parking PIN | 1 | |
| 7 | Fixed-seat,parking bracket | | |

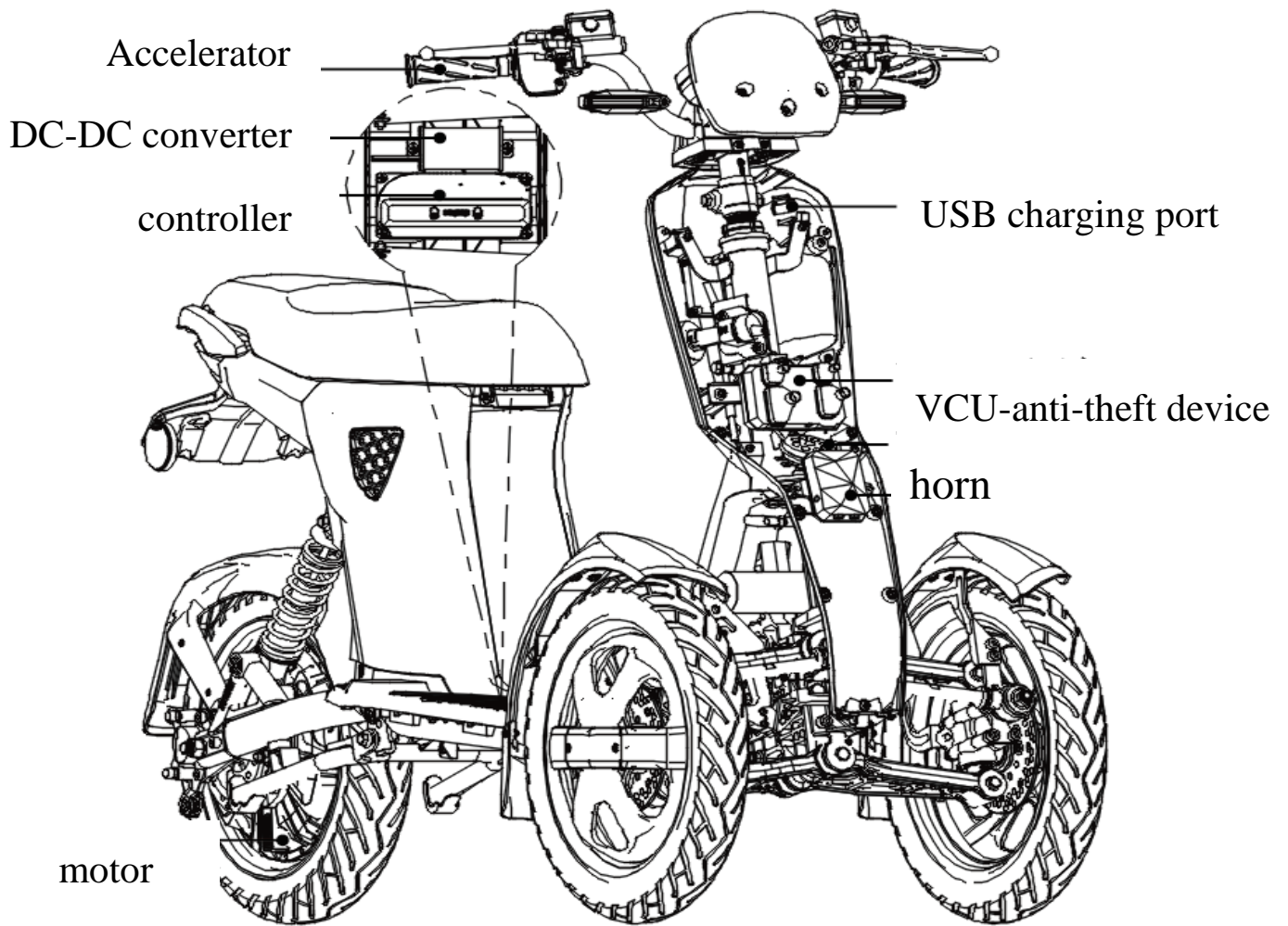
Inspection of swing arm.

- Assy,Swing arm
Bend/damage——replace swing arm assy.
- Bearing
Rotation is not flexible——clean the surface mud.
Damage/loose——replace.
- Oil seal of dust proof
Damage/scratched——replace.
- Bolt
Bend/damage/worn out——replace.

Inspection,Fixed seat of parking bracket

- Fixed seat, Parking bracket.
Bend/damage——replace parking bracket holder
- parking PIN
Rotation is not flexible——clean up surface mud.
Damage/scratched——replace.

Location of electric parts



Function introduction of electric parts

Battery:

The battery is power for electric scooter. It is 18650 ternary lithium battery cells from Japan and South Korea system for our E-scooters. by the series To enhance the total capacity of the battery with series system and improve the total voltage of the battery with parallel system, To complete the management of the battery by BMS system, BMS functions including over discharge protection, overcurrent protection, temperature protection, short circuit protection, balanced the dropout voltage of battery cells, SOC power display, CAN communication, The battery will automatically dormant and stop output when the output current is lower than 2A, the battery plug can be hot-swappable, battery output Controlled by K- (Ignition lock). Recommendation: If the vehicle is not used for a long time, disconnect the battery plug from the vehicle.

Controller:

The controller is core parts of electric system to control the motor rotate speed with FOC vector control technology, Lower starting noise, with functions such as under voltage, current limiting and overcurrent protection. Motor is available for energy recovery as a generator when braking.

Motor:

The motor is a component to turn the electric energy into mechanical energy, and to drive the wheels rotation. This E-vehicles equipped with the three-phase DC brushless wheel hub motor, consists of rotor, stator, magnet, Hall components and other components, with high efficiency, low noise and other advantages.

Charger

The charger is a device to charge the battery. The charger should connected with the battery when battery charging, first you need to connect the charger output and battery, then connect the charger with regular electric, otherwise the charger couldn't enter into the charging state; The charger have precharge function, To 2A pre-charge when the battery voltage is lower than 46.4V and higher than 35V. if the battery voltage is higher than 46.4V, it is normal charging current for battery charging.

DC-DC Convertor:

DC-DC converter is convert the battery voltage to 12V in order to power supply for electric parts as 12V required by operating voltage, such as dashboard, lamps and horn etc. 12V converter output was controlled by the enable line (ignition lock) to avoid impact by instantaneous and high current for ignition lock.

VCU:

VCU is the central control system of vehicles and transceiver parts of vehicles data. Built-in SIM card, GPS positioning module, gyroscope, etc., For example, you can check the vehicle's position on the APP after SIM card received the information and send to server by GPS location. as well as the vehicle's data and status will be updated to show on APP through this way. You will get remind message if vehicles is rolled or fall after checked by Gyro, this part built-in battery. When the built-in battery is fully charged and the vehicle battery is disconnected, the built-in battery can still support 20 hours at least.

Accelerator

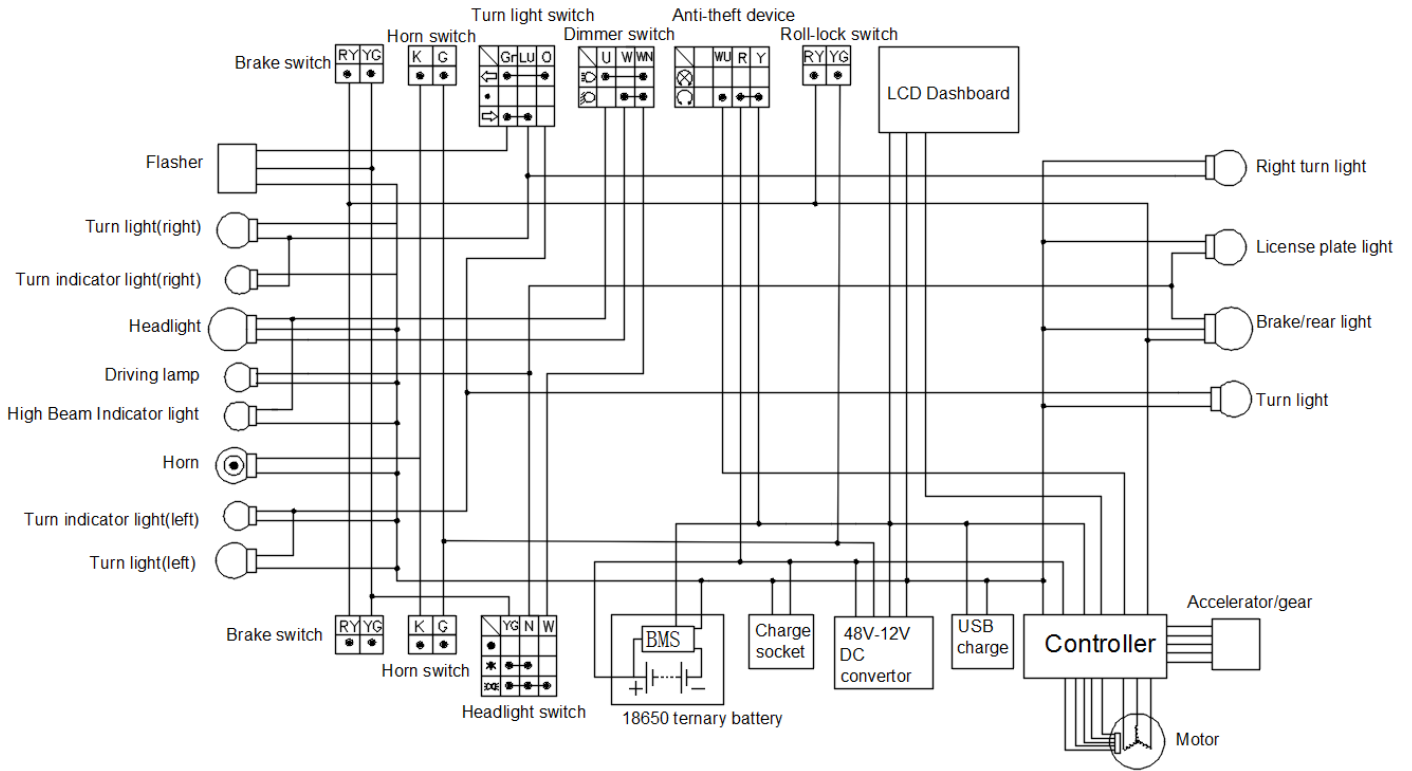
To adjust the rotate speed of motor and vehicle speed by accelerator rotation after power connected. When using the accelerating switch, it is required to rotate lightly when accelerator rotating.

Anti-theft device

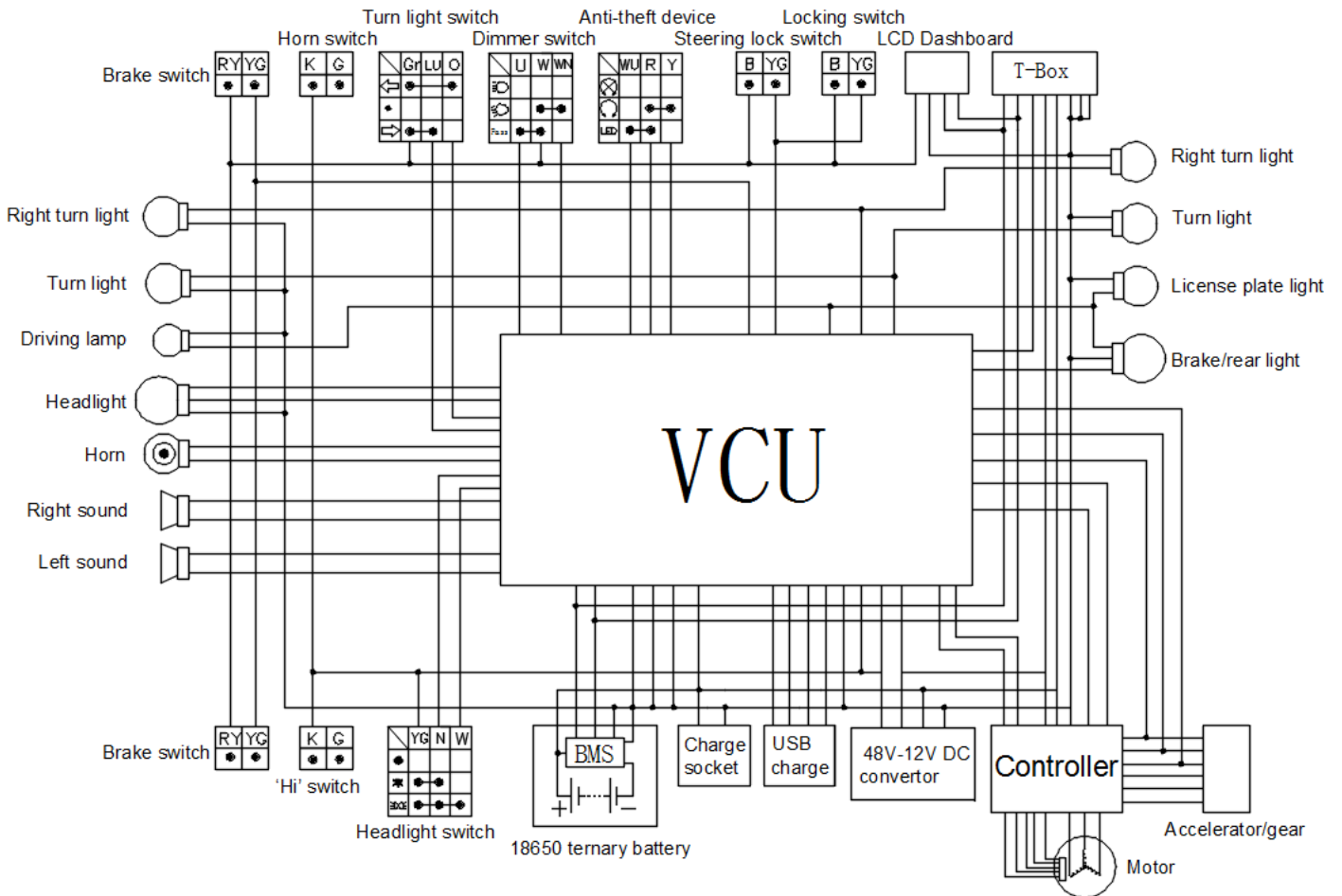
Anti-theft device have the function of vehicle's searching, anti-theft alarm and motor locking.

Electrical schematic diagram

iTango-C



iTango-H

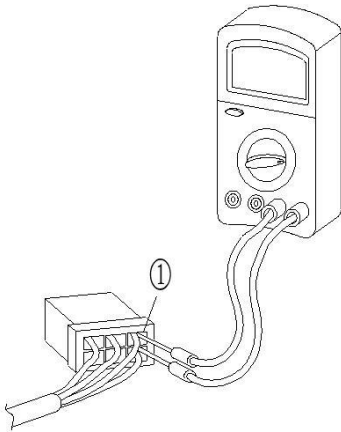


Access inspection of plug-in

Use the multimeter to check the access of each plug-in. If the access value is incorrect, check the wiring connection and replace the plug-in as needed.

Attention

- Do not insert the meter bar into the wire's terminal end of the connector. The bar must be inserted into the wired terminal end of the connector ①, when inserting, be careful not to loosen or damage the wiring.
- To set the multimeter to "Ω" before checking the access,
- Switch back and forth several times between switch positions when checking the path,



Check each switch whether it is damaged or wear, or the connection is correct and the access whether access is normal for connectors. Details refer to "Access inspection of plug-in".

Damage/Wear → repair or replace

Wrong connection → correct connection

Access is poor connection → replace the plug in

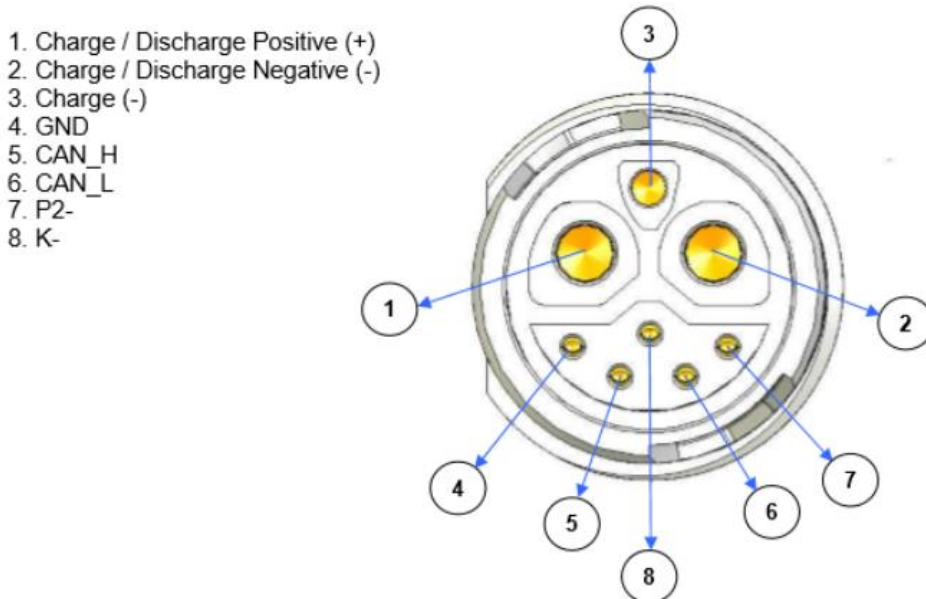
Faults phenomena and maintenance methods

Faults phenomena: No power supply

① No power of battery:

A. Press the button on the battery indicator to observe if the indicator light is lighted or not, the red light is means lowest power, the red light flashing is means that the battery has been run out.

B. Use the wire to connect between the positive pole of the battery and the K-⑧ pin of the battery to measure the voltage should be higher than 50V for positive pole① of the battery and the voltage of the negative pole ② with the multimeter to 200V DC voltage section, otherwise the battery is out of power, you need to charge the battery, the following is the interface diagram of battery output:



C. If the battery is fully charged, follow and b steps to test, if the battery voltage is still low, you need to repair and replacement because of the battery is break down.

② battery has power, but no power supply after connected to the vehicle

A. If the battery has power, connected to the vehicle battery plug, open the ignition lock; if the vehicle is no power, you should the battery plug is reliable connected, re-connect and confirm again.

B. if confirmed the battery is connected with the vehicle, and open the ignition lock, the vehicle is still no power. measure the positive and negative of charging port whether there is power(voltage same as the battery port);To measure the voltage of positive pole ① and negative ③ pole whether it is same as the battery port with 200V DC voltage by multimeter after open the ignition lock.

C. If the voltage is too low or no voltage, it means the battery didn't normal output, to check the fuse on the vehicle of 70A and 5A whether its fusing (to disconnect the battery first), 5A fuse is below the seat and in the cover of controller, need to open the cover to check; if the 70A fuse is fusing, need to check whether the controller is burnout, if 5A fuse is fusing, then need to check whether the DC converter is burnout.

(1) Method of measuring controller

Make sure that the battery is disconnected from the battery plug, open the cover of line ball of the controller, adjust the multimeter to buzzer, and check whether the positive and negative terminals of the controller is conduction state (interchange red and black probe to test) ,If conduction state, the controller is burnout, if not, need to check whether it is conduction state between the positive or negative pole of the controller and the motor phase line(interchange red and black probe to test), the controller is burnout and need to replace if conduction state.

(2) Method of measuring the DC converter

As with the method of measuring controller, remove the vehicle headlamp parts and converter plug, measure the converter red line and green line or black line if its turned on, if conducted, it means that the converter has burned, they need to be replaced.

D. When the fault is identified, after confirmed unnecessary fault or replacement, turn on the battery and open ignition lock again to confirm if the vehicle is normal, test the voltage of vehicle charging port whether its normal or not.

E. If the fuse is not blown, Check,whether the ignition lock is burned, remove the vehicle headlamp parts, unplug the ignition lock

plug and transfer the multimeter to the buzzer. When the ignition lock is in the open state, the measurement of electricity if the red line and the black line of the ignition lock are "ON", if it does not pass, it means that the lock is burned and needs to be replaced.

③ DC converter burnout

A. The battery output is normal, the speed meter, light or speaker does not work, the vehicle does not have forward gear and can not move forward, only reverses gear, the DC converter is burnout, need to be replaced or repair the DC converter.

B. The battery output is normal, the speed meter, light or speaker do not work, but the vehicle can run normally, it means the DC converter is burnout, they need to be replaced or repaired.

④ Speed meter burnout

A. Speed meter does not work (the screen does not light), the vehicle can be normal driving, lights and speakers are normal, the speed meter is burnout, need to replace.

B. Speed meter working (screen is lighted), but no gear and power display, no speed show while the vehicle is running, to check whether the VCU is working or not

(1) if the VCU power supply is normal:

VCU and anti-theft device share same power supply, turn off the ignition lock at this time, to press the key of lock, unlock or searching with the remote control, whether it can be worked properly, if yes, it is means that power supply is normal, and go ahead for next step

(2) disconnect the battery more than 2 minutes, then connect the battery, open the ignition lock to observe whether the speed meter is normal, if the speed meter shows normal, it means VCU is abnormal, contact the service supporter to upgrade the VCU software by remote control.

(3) If you disconnect the battery and still abnormal, check whether the connector is well connected and reliable for VCU and speed meter, the battery plug whether is well inserted, and reinsert.

(4) Check whether the communication of speed meter is burnout, if burnout, you need to replace it.

Chart of indicator flashing of LED on the Controller

| Times of LED flashing | Fault type | Fault description | solution |
|-----------------------|-------------------------|---|--|
| 1 | Over voltage protection | The input voltage is too high after checked by controller | ① Please use the battery supplied by our company ② The controller is faulty and need to be replaced |
| 2 | Undervoltage protection | The input voltage is too low after checked by controller | ① charge the battery to ensure that the battery is normal ② To check whether the wiring of the controller is normal connected. ③ The controller is abnormal and the controller need to be replaced |
| 3 | Over current protection | The phase line of the motor is short circuit or it is short circuit between the phase line and power supply | ① Check,whether the motor is normal, or, replace the motor ② Check, whether the controller is burnout, or replace the controller |
| 4 | Locked-rotor protection | Motor is locked-rotor, couldn't running well. | The battery load is too large or uphill, the motor can not running properly |
| 5 | Hall protection | Motor HALL input is abnormal | ① Check,whether it is well connected for the motor HALL plug-in and controller. ② Check,whether the motor Hall is burnout, replace the motor |
| 6 | Power tube protection | Power tube self-inspection is abnormal | Turn off the ignition lock and disconnect the battery plug to confirm, then to replace the controller |

| | | | |
|----|----------------------------------|---|---|
| 7 | Phase loss protection | One of the phase line of motor is disconnected. | ① Check whether it is well connected for the phase line of motor and controller. ② if the controller is burnout, replace a new one |
| 9 | Brake state | The controller is braking state | ① Check whether return of brake handle is normal and brake switch is burnout, replace if necessary. ② Check whether return of switch of side stander is normal and side stander power-off switch is burnout, replace if necessary. |
| 10 | Self-inspection error protection | Abnormal when power of self-test of controller | Close the ignition lock and disconnect the battery plug to confirm and replace the controller |
| 11 | Overheat protection | Controller overheat | When the vehicle is running, the temperature of controller is too high, need to stop vehicles for a period of time, until the temperature of controller is normal, then, the vehicle can running again. |
| 14 | Accelerator handlebar protection | Accelerator handlebar fault | Check whether accelerator handle bar is return or burnout, if burnout, replace a new one. |
| 15 | Anti-theft state | controller is under the state of anti-theft | ① Press the unlock button with remote controller ② Check, whether the anti-theft device is damaged ,and replaced if necessary |

Fault phenomenon: Turn on the ignition lock, turn the accelerator handlebar, but the motor does not rotate.

Fault reasons and solutions:

- ① The battery voltage is too low, the controller is under voltage protection: To charge the battery;
- ② Return of accelerator cable box is not well done: Check whether the accelerator cable is out of the accelerator cable box, need to install properly
- ③ Accelerator cable box is damaged: replace the accelerator cable box;
- ④ Brake switch is not turn off: Check whether the return of brake handle is normal or brake power-off switch is defect, the brake light does not lighted when you should not pull the brake handle or lift up the stander, you need to repair or replace the brake switch;
- ⑤ power-off switch of stander did not disconnect: lift up the stander, brake lights are bright, it need to be maintenance or replacement of stander power-off switch;
- ⑥ Bad connection between Motor Hall connector and controller: unplug the connector of motor Hall and well re-plug.
- ⑦ Motor Hall Burnout: Repair motor Hall or replace motor
- ⑧ Controller burnout: repair or replace the controller

Fault phenomenon: Range is short after the battery is fully charged.

Fault reasons and solutions:

- ① battery burn-in: replace or repair the battery;
- ② Lower tire pressure: Need to tire inflation (with standard pressure value)
- ③ brake disc is attrition by disc brake :disc brake maintenance;
- ④ Charger fault, the battery can not be fully charged: replace or repair the charger.

Fault phenomenon: The battery is short charging time.

Fault reasons and solutions:

- ① Charger fault: battery can not be fully charged: replace or repair the charger;
- ② battery socket burn-in, poor contact: repair or replace the battery.

Fault phenomenon: The green light of charger always bright, lights of charger is not bright or fans doesn't rotate when charging after plug is well connected.

Fault reasons and solutions:

- ① Pay attention to the connection sequence for charger and battery: first to connect the charger output plug and battery, and connect the regular electricity with the charger plug;
- ② the battery temperature is lower than 0°C or higher than 50 °C: waiting for the battery temperature is higher than 3 °C or less than 45 °C;
- ③ Poor connection for charging plug and socket: Unplug the charging plug, re-plug, observe the charging status, or replace the battery;
- ④ Charger and battery connection is good, the indicator does not light: replace or repair the charger;
- ⑤ The fan of charger does not rotate during charging: replace or repair the charger.

Fault phenomenon: the electric quantity of battery is not accurate, even fully charged, the display is still less than 100% with large deviation for electric quantity.

Fault reasons and solutions:

Full charge/discharge of the battery: drive the vehicle until the battery with no electricity and couldn't ride any more, full charged the battery and drive again. Redo it with two times, if there is no improvement, you need to replace or repair the battery

Fault phenomenon: When the symbol as "wrench" on the dashboard, please use APP to enter the "vehicle situation" page to self-inspection. To analyze the abnormalities based on the inspection report after self-inspection:

| System category | Trouble | solution |
|-----------------|---|---|
| Power system | Power tube of Controller | Check the controller, to repair or replace |
| | Power supply of Controller | Check the controller, to repair or replace |
| | Over current of Controller | ① Overload, working current is too large, tire pressure is insufficient ② Check the controller and motor to repair or replace |
| | The controller voltage is too high or too low | Please use the original battery supplied by our company, To check whether the voltage of battery and controller is normal, if not, repair or replace. |
| | Controller overheat protection | The controller temperature is too high, let the vehicle to stop for a while, waiting for the controller and motor temperature to decrease |
| | Motor phase line | ① To check whether the motor phase line and the controller is well connected, the motor phase line without any sign of damage or fracture , replace or repair the motor |
| | Motor Hall | ① To check whether the motor hall connector is connected to the controller |

| | | |
|-----------------------------------|---|--|
| | | ② Motor Hall is defects, replace or repair the motor |
| | Under voltage protection | Battery voltage is too low, charge the battery. |
| | Locked-rotor protection | Overload or the motor is burnout, to repair or replace the motor |
| | Accelerator handle | To check whether the accelerator cable box is damaged, and replace it |
| | The handle bar is not return when power on. | To check whether it is return of the accelerator cable box, and repair. |
| Power supply system | Charging overheat protection | The battery temperature is higher than 50 °C, charge is not available; to normal charge after remove the battery to indoor and battery temperature is below to 45 °C. |
| | Protection of Charging temperature too low | The battery temperature is below 0 °C, charge is not available. To normal charge after remove the battery into indoor and battery temperature is higher than 3 °C. |
| | Discharge overheat protection | The battery temperature is higher than 65 °C, it is not available for discharging , when the battery temperature is below 60 °C, it is available for normal discharging. |
| | Protection of discharge temperature too low protection. | The battery temperature is below -20 °C, it is not available for discharging, when the battery temperature higher than -10 °C, it is available for normal discharging. |
| | Loose connection protection | Re-plug the battery plug, if not normal, repair or replace |
| | Battery high voltage protection | The total voltage of the battery is too high, the charging voltage is too high, check the charger, to repair or replace |
| | MOSFET overheat | ①MOSFET temperature is higher than 115 °C, need to disconnect the battery plug in order to down the MOSFET temperature battery to below 80 °C ② Check whether VCU or anti-theft power supply is normal, repair or replace |
| | Over voltage protection of battery cells | The battery's single-cell voltage is too high, check the battery and charger, repair or replacement |
| | Battery Pack Low Voltage Protection | The total voltage of the battery is too low, battery charging or repair and replace it |
| | Low voltage protection of battery cells | The battery's single-cell voltage is too low, battery charging or repair and replace it |
| | Charge over current protection | The battery charge current $\geq 26A$, Check whether the charger is burnout, repair or replace. |
| Discharge over current protection | The battery discharge current $\geq 75A$, Check whether the controller is burnout, repair or replace | |

| | | |
|---|---|---|
| | Short circuit protection | Check the vehicle circuit whether there is the phenomenon of short circuit, to repair or replace it if short circuit. |
| Vehicles Central control system(VCU) | GPS Fault | VCU internal faults, maintenance and replacement |
| | GPRS Fault | VCU internal faults, maintenance and replacement |
| | Gyro Fault | VCU internal faults, maintenance and replacement |
| | Abnormal power | VCU internal faults, maintenance and replacement |
| | Communication with the controller is abnormal | Check the communication between controller and VCU, then to repair and replace. |
| | Communication with the BMS is abnormal | Check the communication between the battery and VCU, then to repair and replace |
| | Communication with the dashboard is abnormal | Check the communication between the dashboard and VCU, then to repair and replace |



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