DS102 Display technical specifications

Product Name：Intelligent LCD display

Part Number：DS102

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A. Introduction

1Product name and model

Intelligent LCD display, model：DS102

2Product Introduction

- Simple and lightweight, separate installation bracket design
- High contrast 3.5 inch segment LCD screen
- Excellent outdoor design with IPx5 level waterproof
- Micro USB serial communication interface, convenient maintenance services

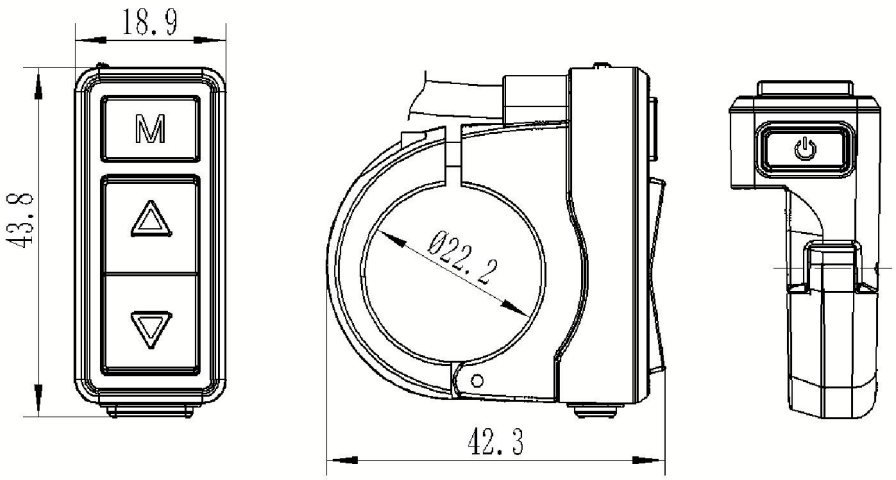
3Range of application

Suitable for electric power assist bicycle in accordance with the standard of EN15194

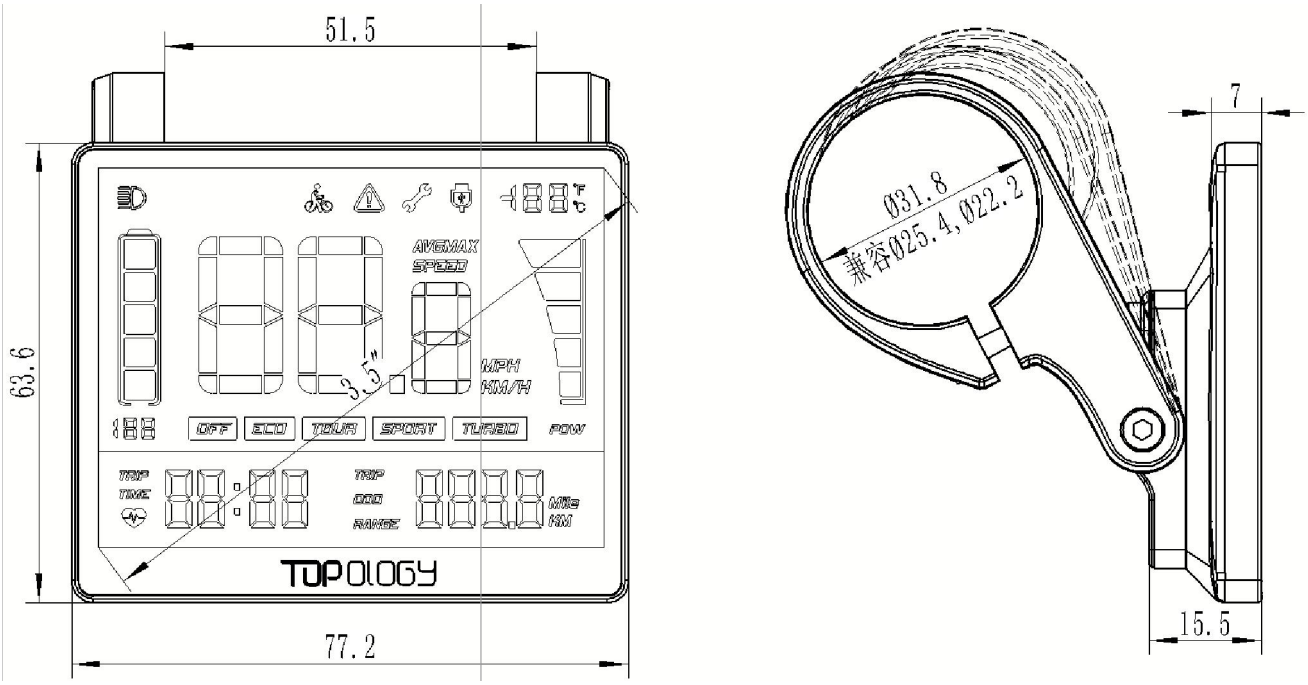
4Appearance and size

The material of product shell is ABS + PC. And the material of the window is tempered glass.

4.1 Switch appearance and dimensions



4.2 Display appearance and dimensions



5 Display coding rules

As shown as above picture C1 is the manufacture factory code

1701 is the manufacture year and week number

A means the hardware version

001 is the firmware version number
0001 is the product serial number

B. Product manual

1. Specifications

①Power supply: DC 24V/36V/48V
②Rated current：18mA/36V
③Shutdown leakage current：<1uA;
④Screen specification：3.5” LCD（FSTN）
⑤Communication method：UART
⑥Operating temperature：-20°C ~ 60°C
⑦Storage temperature：-30°C ~ 80°C
⑧Waterproof level：IP65

2Functional overview

①Four buttons, easy to operate
②Km / miles
③Mileage display: Subtotal mileage (TRIP) total mileage (ODO)
④Speed display: Real-time speed（SPEED）maximum speed（MAX）、average speed（AVG）
⑤Five stalls of power assist control：0-4level (OFF-ECO-TOUR-SPORT-TURBO）
⑥Six levels of electricity instructions：1-5level power and under voltage prompts
⑦Headlight indicator: Headlight on/off status indication (need information from controller)
⑧Motor power display: Realtime display motor output power (segment display)
⑨Riding time （TRIP TIME) display
⑩6km/h walk assist function
⑪System maintenance instructions: Advice maintenance information based on riding distance and charge cycles
⑫UART communication port（Micro USB）convenient for system maintenance, parameter setting.

⑬ Error code indicator

3 Installation

① Determine if you need to select the corresponding mounting clamp and rubber clip ring according to the diameter of the handlebar (Applicable handlebar specifications：Φ22.2、Φ25.4、Φ31.8. Open the display lock clamp and insert the rubber clip into the correct position of the lock clamp.

② Set the rubber ring in the bracket then assemble the middle of the handlebar, adjust the angle of the Display to make it easier to see the display screen when riding. After setting the angle, tighten the screws.

Tightening torque is 1N.m.

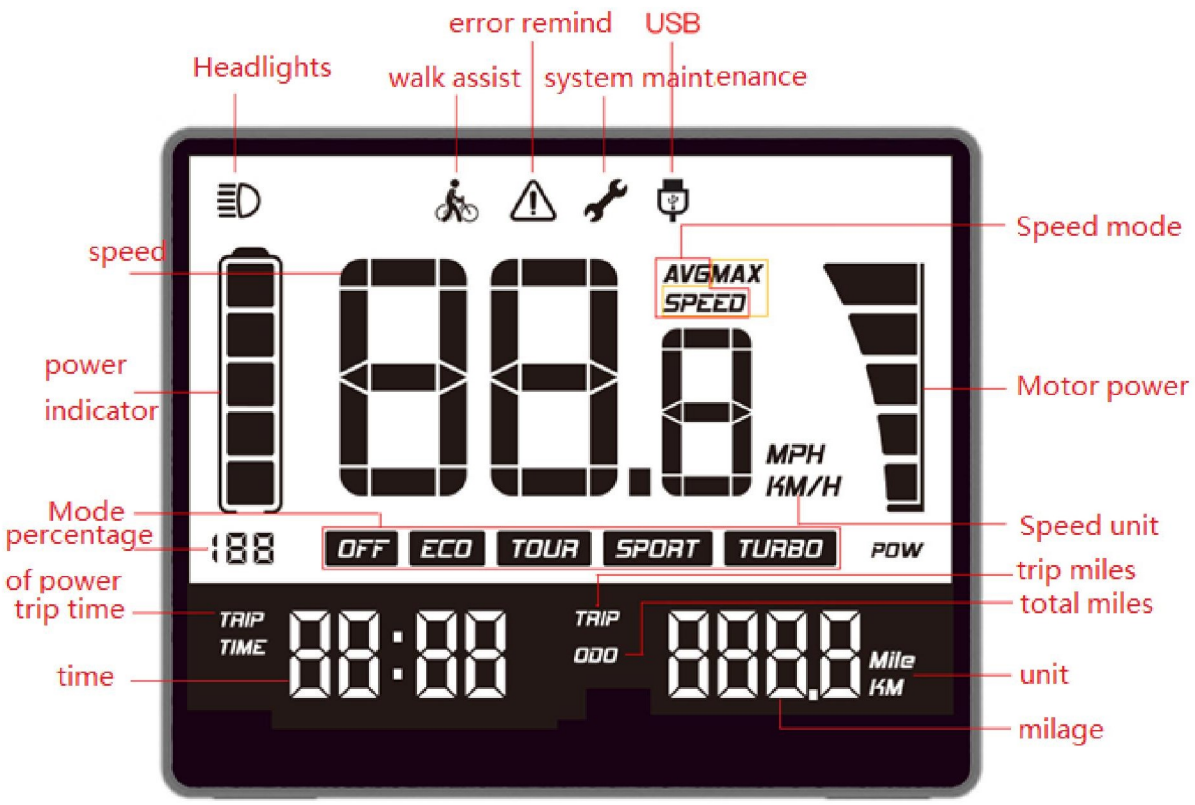
③ Open the lock ring of the switch and set it in the appropriate position on the left side of the handlebar. Adjust the angle of the switch, so that rider can see the switch and operate easily. (Applicable handlebar dimensions Φ22.2)

④ Fix and tighten the handlebar fixing screw with M3 Hex wrench, locking torque is 0.8Nm.

⑤ Connect the display connector to the controller connector according to the label.

Note: Damage caused by excessive torque is not covered by the warranty.

4 Interface



①Headlights: Shown when the headlamp is on. When the headlamp is turned off or does not have this Function the icon is not shown.

②Walk assist: Is Shown when 6KM walk assist mode. It is not shown on the rest of the modes.

③Error remind: This icon flashes when the system has malfunctioned, it will not be seen when in normal use.

④System maintenance: Is shown when the system needs to be maintained (when the mileage exceeds the set value.

⑤USB: Will show when the display communicates with the PC

⑥Speed: When the display turned on it shows the speed.

⑦Speed mode: SPEED indicates that the speed shown on the display is the current speed, AVG SPEED indicates that the speed shown is the average speed and MAX SPEED indicates that the speed shown is the maximum speed.

⑧ Power indicator: Five levels of power indicated and under voltage indicated.

⑨ Percentage of power: Indicates the percentage of the battery power left.

⑩ Mode：Shows the current assist mode range from low power assist to high power assist: ECO、TOUR、SPORT、TURBO， ECO as default；OFF indicates no power assist.

⑪ Speed unit: indicates the unit of the speed, KM/H or MPH.

⑫ Motor power: has five sections to show motor in real-time power.

⑬Trip time: It shows the ridding time of the trip.

⑭Time: It shows the riding time including hours and minutes

⑮trip miles: When this icon is on the number after the icon means the mileage of each trip (the unit can be in miles or Kms).

⑯ODO：When this icon is on the number after the icon means the mileage of all trips (the unit can be miles or Km).

⑰Unit: Is the unit of trip mileage and total mileage (the unit can be miles or Km).

⑱Mileage: Shows the number of the miles. Note that trip mileage is accurate to one decimal place, the total mileage is accurate to single digits.

5 Definition of the buttons

On/off：⏻， Mode：M， Adjust + Λ： ， Adjust - V：

6 Operation

6.1 Turn on/off

Maintain the normal connection of the display and the controller. Press for (2 seconds) ⏻ button when is display is off. The display shows the boot interface with all icons on. Then it enters the basic interface to start work. Hold down (2 seconds) ⏻ button when the display is on.
Display closed. If no operation of the display is performed within 5 minutes the display will shut down.

6.2Assist mode select

Press ^ or v to select and change the assist power mode. There are 5 modes:

OFF/ECO/TOUR/SPORT/TURBO. Default ECO mode when display turned on. OFF means no assist power.

（assist mode: select as below picture）

ECO Mode

TOUR Mode

SPORT Mode

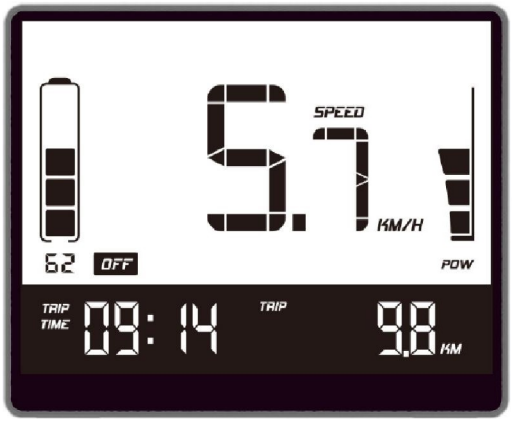
TURBO Mode

OFF Mode

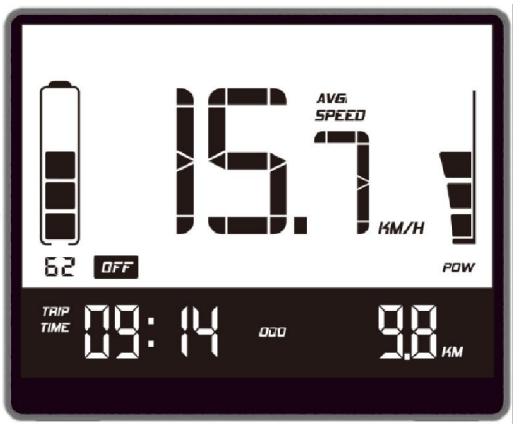
6.3 Display information switch

Information switches from trip to miles, average speed, max speed, total mileage by pressing M when the display is on. Trip miles travelled, current speed/trip miles (TRIP) -> average speed (AVG)、total mileage (ODO)−>maximum speed (MAX)、trip miles (TRIP)−>current speed/trip miles (TRIP).

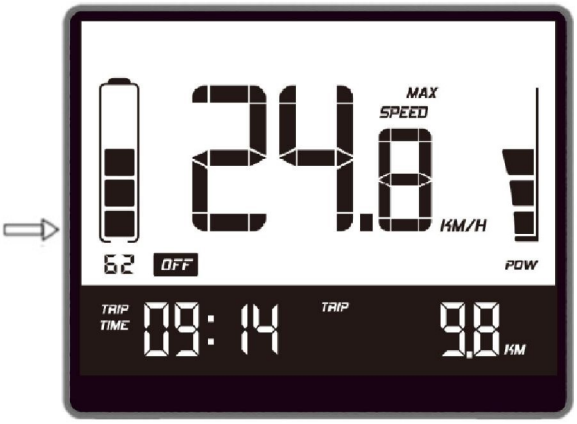
Mode switch as below pictures:



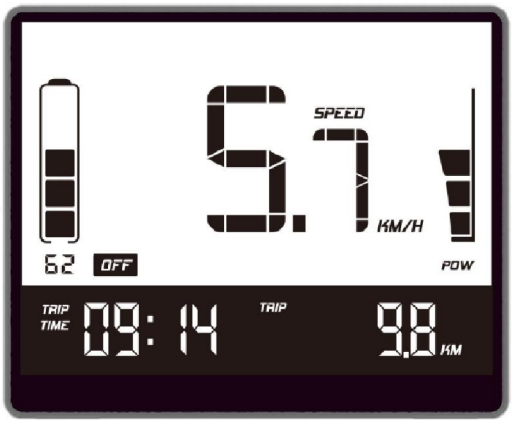
SPEED, TRIP



AVERAGE SPEED, ODO



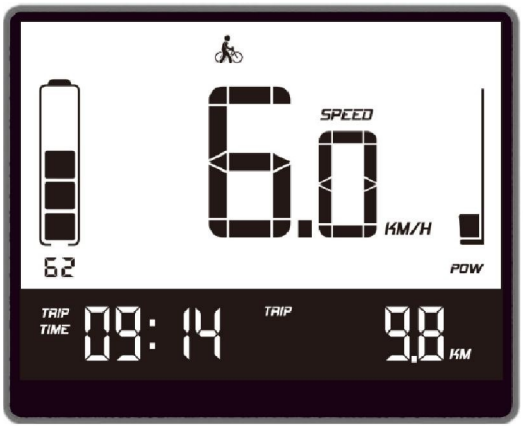
MAX SPEED, TRIP



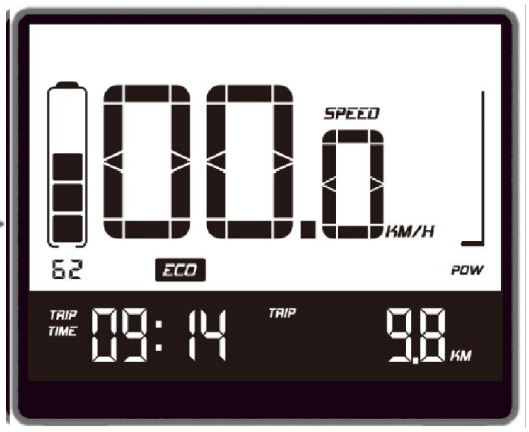
SPEED、TRIP

6.4Walk assist mode

Long press ⌄ button for 2 seconds, the bike will enter walk assist mode. When is showing the bike will be in walk assist mode. Hold down the button to exit walk assist mode. Walk assist mode is shown below:



Walk assist Mode

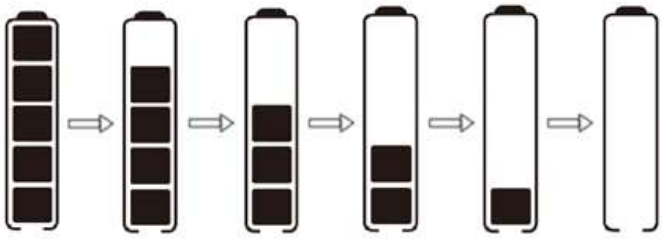


Normal Mode

Hold down the ^ button to activate the headlight (need support of controller) Headlight icon shows on the Interface. At the same time, the backlight is on. Hold down ^ button for 1 second again, the headlight is turned off. And the backlight is off.

6.6Power

When the battery is normal the battery capacity gauge will show 5-segments on the LCD, when the battery is low only the outer border will show, the 5 full segments and the outer border of the battery indication will flash accordingly.
The battery power is shown as below:



Percentage of battery power（C）and power level table

No.	Percentage on the display (SOC)	Level on the display	voltage (24V)	voltage (36V)	Voltage (48V)
1	C≤5%	Outer border flashes	U≤23.1	U≤33	U≤42.9
2	5%<C<15%	1 level power	23.1<U<24.5	33<U<34.7	42.9<U<45.1
3	15%≤C<35%	2 level power	24.5≤U<25.1	34.7≤U<35.8	45.1≤U<46.5
4	35%≤C<55%	3 level power	25.1≤U<25.6	35.8≤U<36.7	46.5≤U<47.5
5	55%≤C<75%	4 level power	25.6≤U<27	36.7≤U<38.5	47.5≤U<50.1
6	C≥75%	5 level power	U≥27	U≥38.5	U≥50.1

Setting items: unit, *wheel diameter, *speed limitation information. (* means fixed items do not provide user settings options)

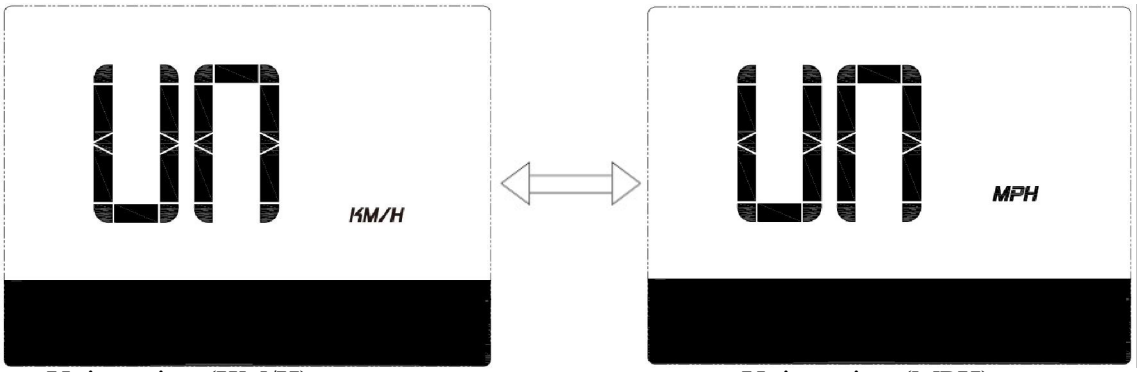
7.1enter setting

1. Within 10 seconds of the display being turned on hold down M （3seconds）system enters the data setting interface. On this status users can set and view the parameters of the display.
2. Hold down M for (3 seconds）to exit and save the setting status.
3. User settings interface state, if 10 seconds elapses without operation the display returns to the normal riding state without saving the parameter settings.
4. On data setting state, press ^ v to switch setting items
5. Short press M button to switch between setting items.

7.2unit

Press the up and down arrow to select KM/H or MPH in unit setting interface. Press M to switch setting interface.

UN: unit setting
KM/H： The unit of trip mileage and total mileage is Km. The unit of current speed, average speed; maximum speed is KM/H.
MPH： The unit of trip mileage and total mileage is Miles. The unit of current speed, average speed; maximum speed is MPH.
The interface is shown as below：



Unit setting (KM/H) Unit setting (MPH)

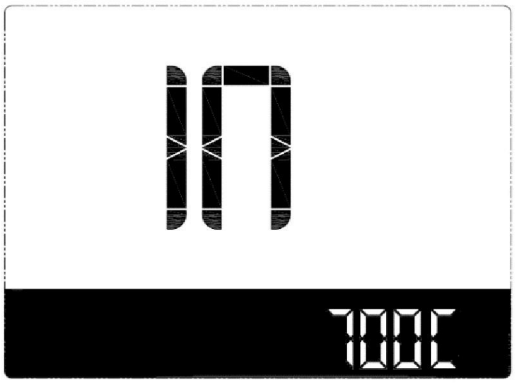
7.3Wheel diameter information

In wheel information interface press M to turn to speed limitation interface. IN wheel diameter information.

700C：means current display is setting for the bike of 700C wheel diameter.

Wheel diameter value can be set:16inch 18inch 20inch 22inch 24inch 26inch 700Cinch 28inch 29inch.

The interface is shown as below：



Wheel diameter information（700C）

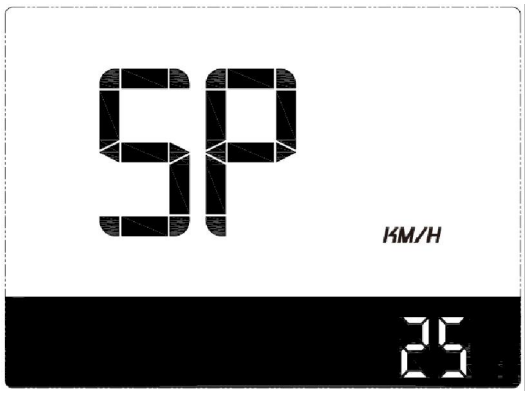
7.4Speed limitation information

In speed limitation interface, short press M to turn to unit setting interface.

SP: speed limitation information

25KM：maximum speed is 25KM/H；

The interface is shown as below：



8. Data clearance

10 seconds after the display is turned on, hold down M（3 seconds）enter the data clearance interface.

Interface shows: speed, time, mileage, riding time, trip, unit.

Press (short) M to clean TRIP, TRIP TIME, AVG speed and MAX speed. Then display return to operation interface. Display will return to riding interface without data clearance if no operation in 5 seconds.

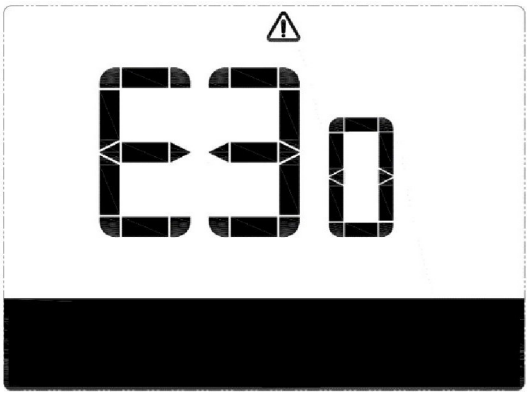
Normal shutdown and power-down will not make the above data clear.

Data clearance interface riding interface

9 Error information

9.1 error shown

Presenting error code and error icon



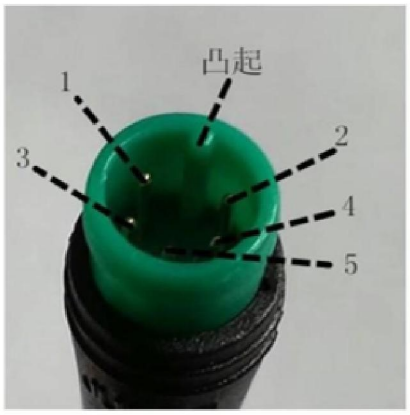
9.2 error code definition

Error code table:

Error code	fault description	checking method
"04" shown at speed	throttle doesn't turn back to zero position	Check if the throttle return to zero position
"05" shown at speed	throttle failure	check throttle
"07" shown at speed	overvoltage protection	check the voltage of the battery
"08" shown at speed	failure of motor's hall signal wire	check the motor
"09" shown at speed	failure of motor's phase wire	check the motor
"11" shown at speed	failure of the controller's temperature sensor	check the controller
"12" shown at speed	failure of the current sensor	check the controller
"13" shown at speed	failure of the temperature of the battery	

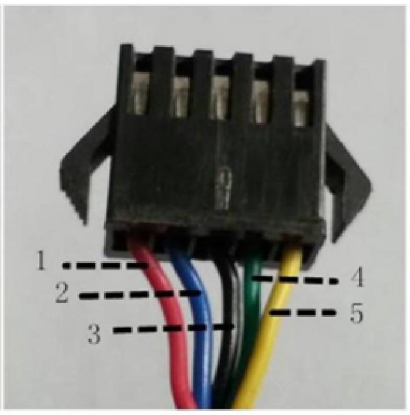
"14" shown at speed	Motor temperature to high	Check motor
"21" shown at speed	failure of the speed sensor	check the position of the speed sensor
"22" shown at speed	failure of the BMS communication	check the battery
"30" shown at speed	communication failure	check the connector of the controller

10 wire definition



Wires out of the display

Wires connect to the display



Connector to controller

Table 1 wires definition

No.	Color	Function
1	Red (VCC)	VCC
2	Blue (Kp)	Power control wire of the controller
3	Black (GND)	GND of display
4	Green (RX)	Data receive of the display
5	Yellow (TX)	Data transmit of the display

C.Note

1. Pay attention to the security, do not plug the display in and out the when the power is on
2. Try to avoid exposure to harsh environments like heavy rain, heavy snow and strong sunlight
3. When the display can't be used normally it should be sent for repair as soon as possible