# Enjoy the ride

User manual
Gebruikershandleiding
↓
intelligent LCD display
DS 102

POPAL

At Popal we make bicycles for daily use. Bikes that you can count on, and will never leave you out in the cold. For us, it’s not just about the fastest route, but about the journey itself. The journey is where you can enjoy your favourite music, appreciate conversation or simply see the beauty around you. In short, moments that are important to you, are important to us and that’s why we make sure you are able to rely on our bikes. No excuses here: we always make the best bicycles, for the best prices, with the care and love that our riders deserve.

Ready for your journey.

Bij Popal maken we fietsen voor dagelijks gebruik. Fietsen waar je op kunt rekenen en die je niet in de kou laten staan. Het gaat bij ons niet om de snelste tijd, maar om de reis. Een reis waarin je kunt genieten van muziek, een gesprek of het mooie uitzicht. Kortom, momenten die belangrijk zijn. En juist daarom moet je op onze fietsen kunnen vertrouwen. Wij doen dan ook niet aan concessies: met aandacht en liefde maken we altijd de beste fiets voor de beste prijs.

Klaar voor jouw reis.

Care for your battery!
Our batteries are of high quality, but be aware, even very good batteries are vulnerable when misused. Make sure to read our tips to secure a long live cycle and to protect it against fatal deep discharging.
→ Always charge your battery when nearly empty
→ Switch the system off, if you’re battery runs out of power during your ride
→ Store your battery at room temperature and keep the charging level at 30%-70%
→ Check the charging level once a month

For more tips and tricks or information regarding warranties and terms and conditions please visit:
popal.com/klantenservice

Zorg goed voor je accu!
Onze accu’s zijn van topkwaliteit, maar een accu kan kwetsbaar zijn bij onjuist gebruik. Onderstaand een aantal tips voor lang fietsplezier en ter voorkoming van onherstelbare schade door diepteontlading:
→ Laad je accu altijd op als deze bijna leeg is
→ Fiets niet door met een lege accu, maar schakel het system uit
→ Bewaar je accu op kamertemperatuur en houd de acculading tussen de 30% en 70%
→ Controleer maandelijks de status van je acculading

Voor meer tips, informatie over garantie of de algemene voorwaarden ga naar:
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DS102 Display technical specifications

Product Name：Intelligent LCD display

Part Number：DS102

# Content

# A. Product introduce

## 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

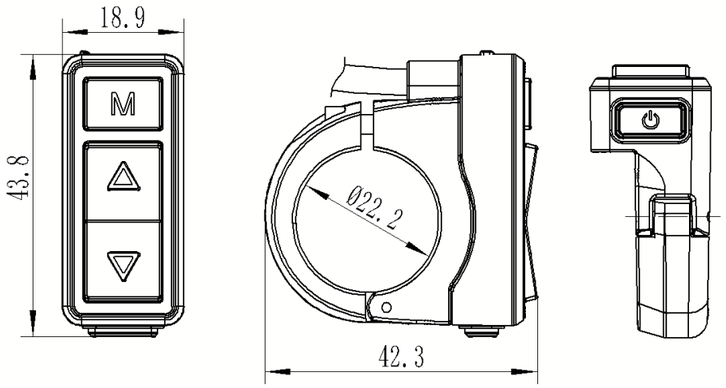
Suitable for electric power assist bicyclein accordance with the standard of EN15194

## 4Appearance and size

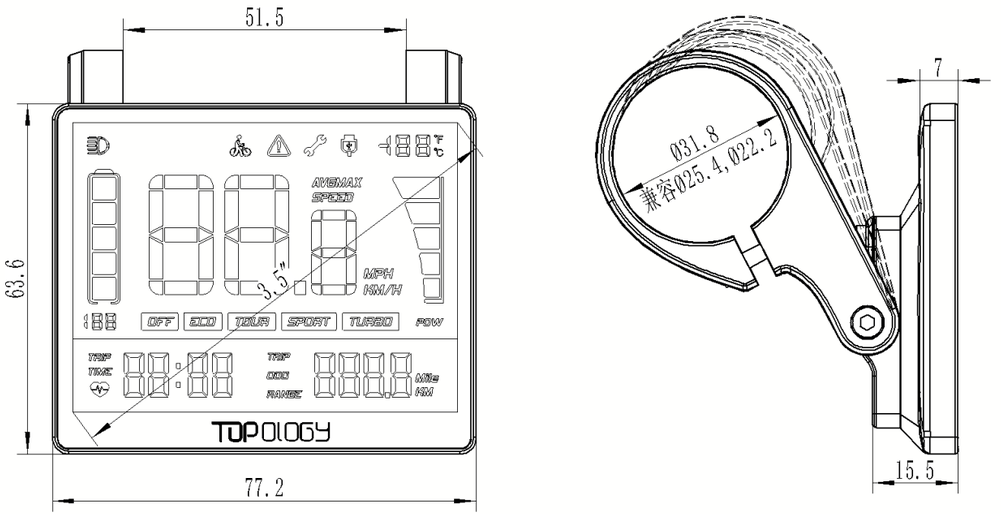
The material of product shell is ABS + PC. And the material of the window is tempered glass.




### 4.1 Switch appearance and dimensions




### 4.2Display appearance and dimensions




## 5 Display coding rules

S/N:C11701A0010001

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

③ Mileage 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

①Determine if you need to select the corresponding mounting clamp and rubber clip ring according to the diameter of the handle bar（Applicable handle bar 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.

②Set the rubber ring in the bracket then assembleon the middle of the handle bar, adjust the angle of the display,make it easier to see the display screen when riding. After fixing the angle, tighten the screws. Tightening torque is 1N.m.

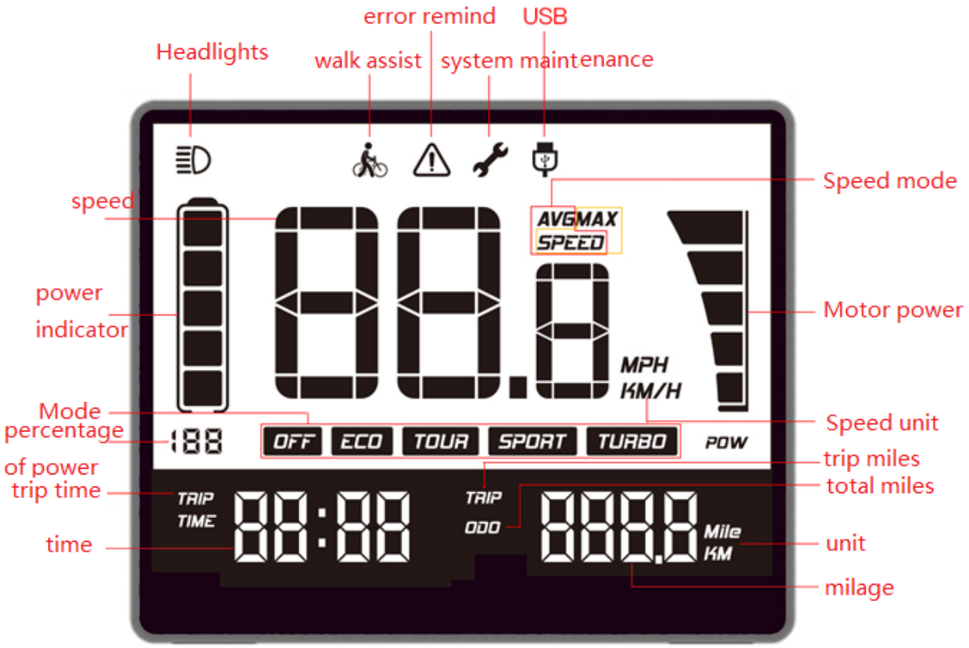
③Open the lock ring of the switch and set it in the prorate position on the left side of the handlebar. Adjust the angle of the switch, so that rider can see the switch and operate easily. (Applicable handle bar dimensionis Φ22.2)

④Fix and tighten the handlebar fixing screw with M3Hex wrench, locking torque is 0.8Nm.

⑤Connect 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：It shows when the headlamp is on. When the headlamp is turned off or does not have this function. The icon is not showed.

②Walk assist：It shows when 6KM walk assist mode. It is not showed on the rest of the states.

③Error remind：This icon flashes when the system is malfunction.It will not be seen when normal use.

④System maintenance:It shows when the system needs to be maintained（It shows when the mileage exceeds the set value or the number of battery cycles reaches the set value. If the customer does not request, it closed and was not shown as default.）

⑤USB：It shows when the display communicates with the PC, It is not showed on the rest of the states.

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

⑦ speed 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,MAX SPEEDindicates that the speed shown is the maximum speed.

⑧ power indicator: Five levels power indicate and under voltage indicate.

⑨ Percentage of power: Indicate the percentage of the battery power.



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

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

⑫ Motor power: it has five sections to show motor 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, unit can be mile or Km.

⑯ODO：When this icon is on, the number after the icon means the mileage of all trips; unit can be mils or Km.

⑰unit： It's the unit of trip mileage and total mileage, with Mile and KM 2 options.

⑱Mileage: It shows the number of the mileage. 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+：**^，**Adjust -：**v

## 6 Operation

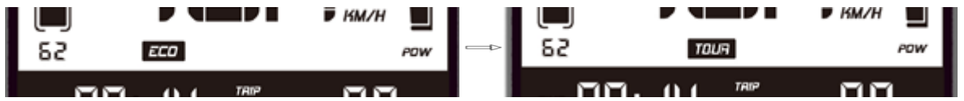
### 6.1 Turn on/off

Maintain the normal connection of the display and the controller. Long press (2 seconds)⏻键 button when is display is off.Display shows the boot interface with all icons on. Then it enters the basic interface to start work. Long press (2 seconds)⏻ button when is display is on. Display closed. If no operation to the

display and the speed is 0 for 5 minutes, display will turn off automatically.

6.2Assist mode select

Press ^ or v to select the assist mode 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

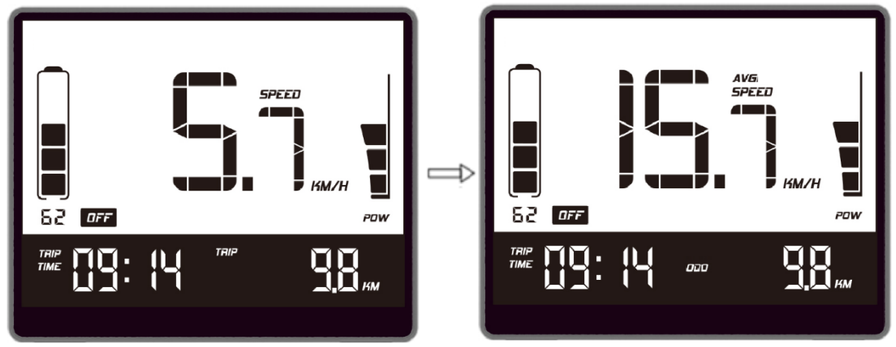

OFF Mode

6.3 Display information switch

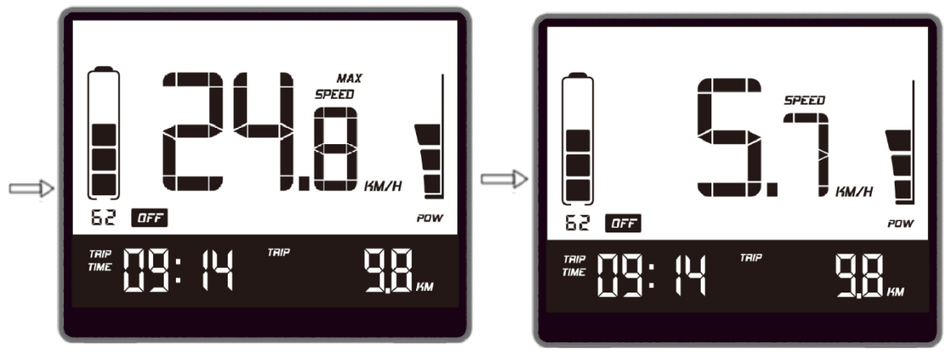
Information switches from trip miles, average speed, max speed, total mileage by short press M when the display is on. It shows loop from current speed/trip miles (TRIP) -> average speed (AVG)、total mileage (ODO)->maximum speed (MAX)、trip miles (TRIP)->current speed/trip miles (TRIP).

Mode switch as below pictures:





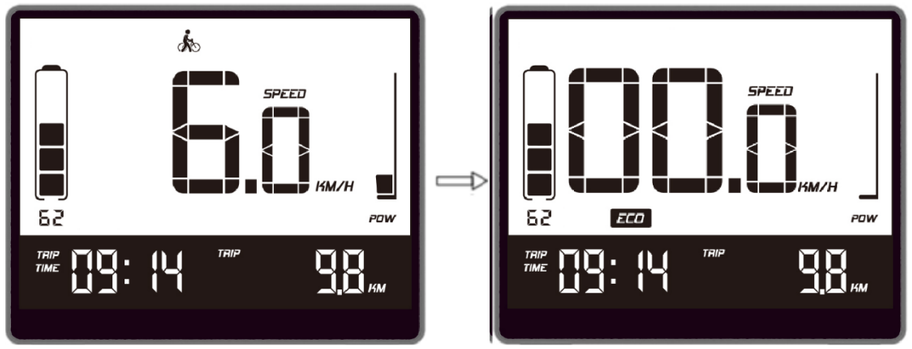

SPEED、TRIPAVG SPEED、ODO




MAX SPEED、TRIP SPEED、TRIP

6.4Walk assist mode

Long press v button for 2 seconds, bike entered walk assist mode. When is shown, loose v button to exit walk assist mode .Walk assist mode switch as below pictures (only in the walk assist status)：



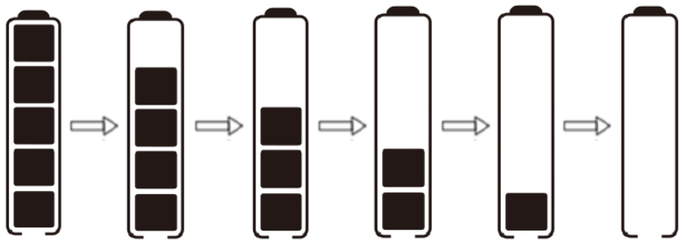

Walk assist Mode Normal Mode

6.5Headlight (backlight) on/off

Long press^button for 1 second,the headlight is turned on（need support of controller）.Headlight icon shows on the interface. At the same time, the backlight is on. Long press ^ button for 1 second again, the headlight is turned off. The icon of headlight is off. And the backlight is off.

6.6Power indicator

When the battery is normal, the battery 5-segment LCD is displayed according to the time and the outer border is on. When the battery is exhausted, the 5 full LCD and the outer border of the battery indicator flashes, you need to charge immediately.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 |

7 User settings

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



7.1enter setting

- ✧ 10 seconds within display turned on, long press M（3seconds）, system enter the data setting interface. On this status users can set and view the parameters of the display.
- ✧ Long press M(3 seconds） to exit and save the setting status.
- ✧ User settings interface state, if 10 seconds without the operation, display returns to normal riding state without saving the parameter settings.
- ✧ On data setting state, short press^/ˇto switch setting items
- ✧ Short press M to switch setting items circularly.

7.2unit setting

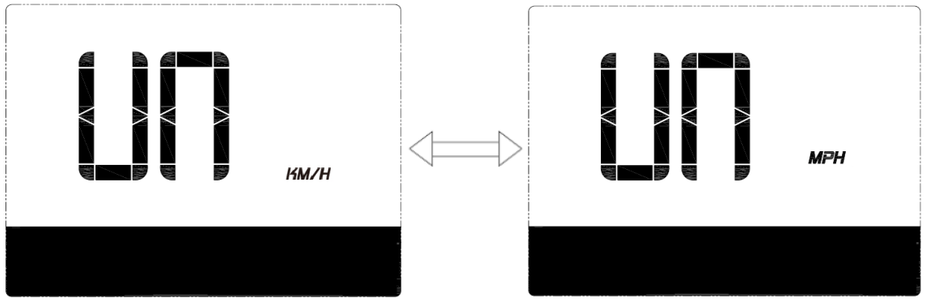
Press^/ˇ to select KM/H or MPH in unit setting interface. Press （short）M to switch setting interface.

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

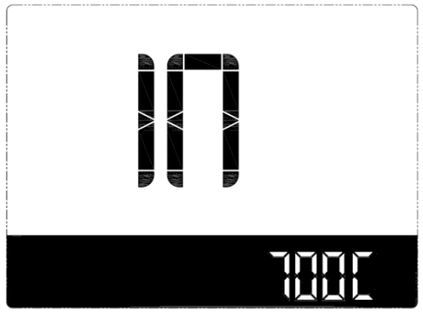
In wheel information interface, short press M to turn to speed limitation interface.

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）

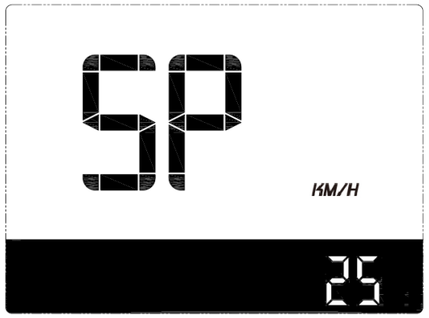
7.4Speed limitation information

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：



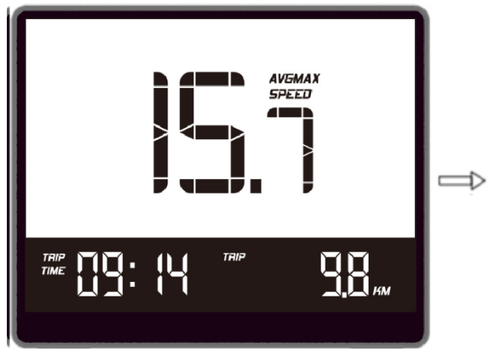

## 8.Data clearance

10 seconds after display turned on, long press 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 dataclear.**

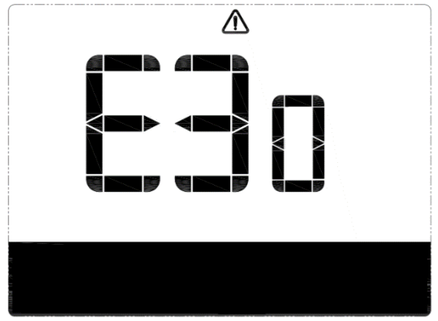



Data clearance interfaceriding interface

## 9 Error information

9.1 error shown

Presenting error code and error icon



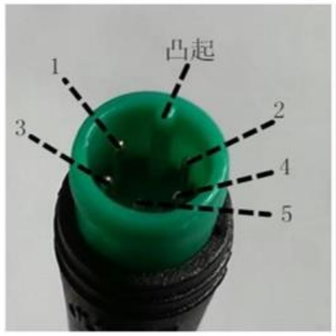

9.2 error code definition

Error code table:

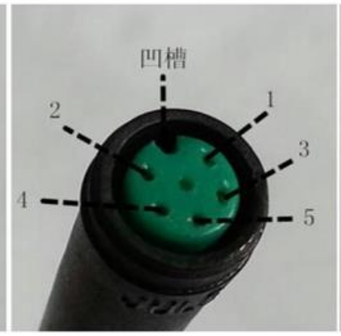
| Error code | Fault description | Checking methord |
|---|---|---|
| "04" shown at speed | throttle doesn't turn back to zero position | Check if the throttle return to zero position |
| "05" shown at speed | throttle failure | check throttle |
| "07" shown at speed | overvoltage protection | check 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 | check the battery |

| | | |
|---|---|---|
| "14" shown at speed | failure of the temperature of the motor | check the 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 |

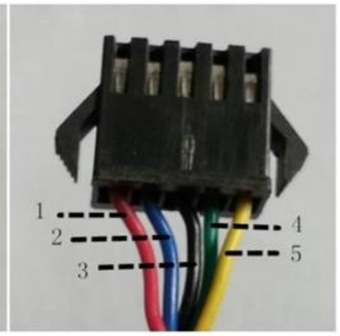
## 10 wire definition




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

- ✧ In the use of the display, pay attention to the security, do not plug the display in and out the when the power is on.
- ✧ Try to avoid use exposurein harsh environments like heavy rain, heavy snow, and strong sunlight
- ✧ When the display can’t be used normally, it should be send to repair as soon as possible.



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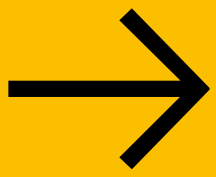

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