
Product Specification

07/2019

Product	TFT LCD Display
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Mode	
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Abbreviation	860C
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Client	
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Customer	
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audit	
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Supplier	APT (Tianjin) Develop Co., Ltd.
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	1001, Building 5 HuaDing, No.1 HuaKe 3 Road, Binhai hi-tech Industrial Development Zone, Tianjin, China
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Tel	TEL:+86 22 83715556 FAX:+86 22 83719955
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Email	<u>yzhao@aptdevelop.com</u>
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1. Product Name

- ✧ TFT LCD display
- ✧ Model : 860C

2. Suppliers

- ✧ APT (Tianjin) Develop Co., Ltd.

3. Electrical Parameters

- ✧ 3.5inch IPS screen
- ✧ 24V/36V/48V/52V battery supply
- ✧ Rated operating current : 40mA
- ✧ Max operating current : 100mA (36V battery, with USB equipment changed)
- ✧ USB changing port : 5V 500mA
- ✧ Off leakage current < 1uA
- ✧ Max output current to controller : 100mA
- ✧ Operating temperature : -20~70℃, Storage temperature : -30~80℃

4. Dimensions & Material

- ✧ Product shell is ABS+PC, LCD transparent window is imported super tempered glass, full bonding process.
- ✧ Dimensions : host/L96.6mm*W71.6mm*H6.1mm



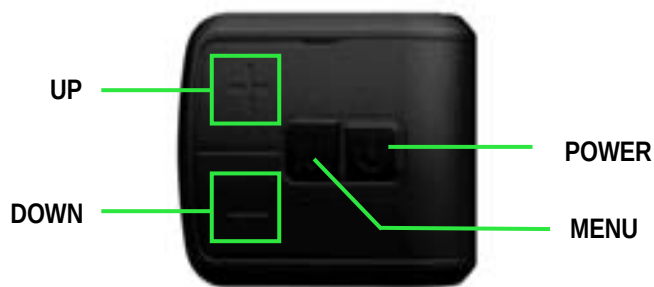
5. Features

- ✧ Suitable for low temperature, Max -20℃.
- ✧ High-contrast 3.5inch IPS colorful matrix screen.
- ✧ Ergonomic external button design, easy to operate.
- ✧ **Speed display:** AVG SPEED, MAX SPEED, SPEED(Real-time).
- ✧ **Kilometer / Mile:** Can be set according to customers' habits.
- ✧ **Smart battery indicator:** Provide a reliable battery indicator.
- ✧ **9-level Assist :** 3-level/5-level/9-level optional.
- ✧ **Mileage indicator:** Odometer/Trip distance/ Clock/ Riding time.
- ✧ **Power/Current indicator:** real time power indicator or Current.
- ✧ **Error code indicator.**
- ✧ **Light sensor (Optional)**
- ✧ **Software upgraded:** Software can be upgraded through UART.
- ✧ **USB charging port :** 5V/500mA

6. TFT screen instructions



7. Functional Description



7.1 Power On/Off

Press and hold **Power** button for 1 second can turn on/off the display. The Display can automatically shut down when there is no operate & ride for X minutes (X could be 0~9) .

*If the display has been set password power on, you need to input the right password before start.

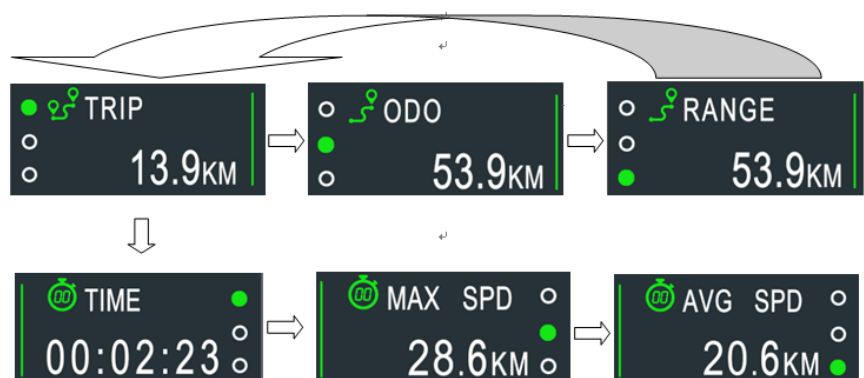
7.2 Assist level operating

Short press **UP/DOWN** button can change the assist level. Top assist level is 9, 0 for neutral. Level quantities can be adjusted according to the customer requirements.



7.3 Speed & Mileage mode switch

Short press **MENU** button can change the speed and mileage mode, TRIP→ODO→RANGE→TRIP→TIME→MAX SPEED→AVG SPEED



*Range need smart BMS support.

**If there is no operation for 5 seconds, display will return Speed (Real-Time) display automatically.

7.4 Headlight/backlight On/Off

Press and hold **UP** button for 1 second can turn on/off the headlight, and the screen will switch to the corresponding mode.

*The motor does not work when the battery voltage is low, Display still can keep the headlight on for a while when E-bike is in riding.

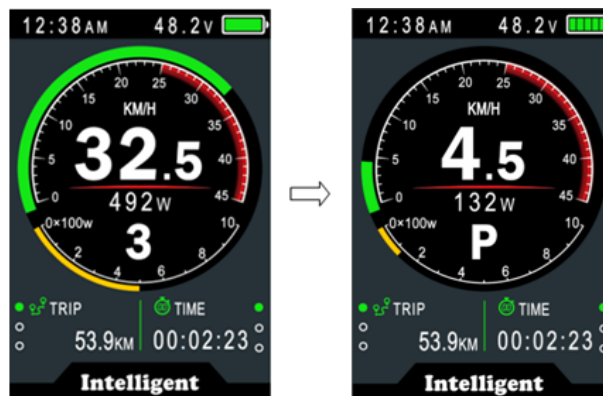


Daytime mode

night mode

7.5 Walking mode (6km)

Press and hold **DOWN** button for 2 second can get into walking mode, out of the mode when release the button.



* This feature needs to be supported by controller.

7.6 Data cleanup

Press and hold **UP** & **DOWN** buttons together for 1 second can reset several temporary data, temporary data include **AVG Speed / MAX Speed / Trip / Time**.

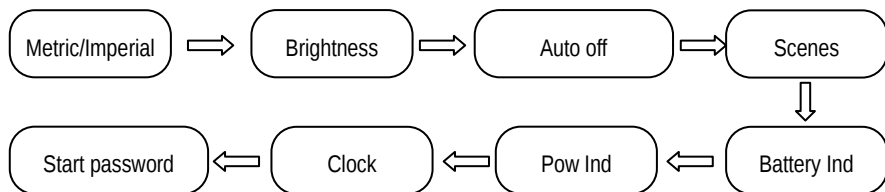
* These temporary data can't be erased by power off.

8. Parameter setting

Double press **MENU** button (press interval less than 0.3 second) can get into setting menus, press **UP/DOWN** buttons to change the parameter setting, press **MENU** button can switch to next item. Double press **MENU** button will exit from menu.

- * Display will automatically quit menu when there is no operation for 30 seconds.
- * For safety reasons, display can't get into MENU when riding.
- * Display will quit MENU when start riding.

The order of parameters is as follow.



8.1 Language: Default EN , Un adjustable

MENU	
Display Setting	
→ Language	EN
System	Metric
Brightness	
Auto off	8 min
Scenes	Analog
Battery Ind	Percent
Pow Ind	Current
Clock	>
Start Password	>
Basic Setting	
...	
EXIT	

8.2 System: Press Up / Down button to switch between Metric / Imperial.

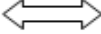
MENU	
Display Setting	
Language	EN
➡ System	Metric
Brightness	
Auto off	8 min
Scenes	Analog
Battery Ind	Percent
Pow Ind	Current
Clock	>
Start Password	>
Basic Setting	
...	
EXIT	

MENU	
Display Setting	
Language	EN
➡ System	Imperial
Brightness	
Auto off	8 min
Scenes	Analog
Battery Ind	Percent
Pow Ind	Current
Clock	>
Start Password	>
Basic Setting	
...	
EXIT	

8.3 Brightness : Press Up / Down button to change the brightness of the backlight, | is

darkness,  is brightness, default value is .

MENU	
Display Setting	
Language	EN
System	Imperial
➔ Brightness	
Auto off	8 min
Scenes	Analog
Battery Ind	Percent
Pow Ind	Current
Clock	>
Start Password	>
Basic Setting	
...	
EXIT	



MENU	
Display Setting	
Language	EN
System	Imperial
➔ Brightness	
Auto off	8 min
Scenes	Analog
Battery Ind	Percent
Pow Ind	Current
Clock	>
Start Password	>
Basic Setting	
...	
EXIT	

Note: You can set brightness independently between Daytime mode and Night mode.

8.4 Auto off : Press UP/DOWN button to change the auto power off time, from 1 to 9/OFF, the number represent minutes to shutdown, OFF means disable auto off function, default value is 5 minutes.

MENU	
Display Setting	
Language	EN
System	Imperial
Brightness	
➔ Auto off	1 min
Scenes	Analog
Battery Ind	Percent
Pow Ind	Current
Clock	>
Start Password	>
Basic Setting	
...	
EXIT	



MENU	
Display Setting	
Language	EN
System	Imperial
Brightness	
➔ Auto off	9 min
Scenes	Analog
Battery Ind	Percent
Pow Ind	Current
Clock	>
Start Password	>
Basic Setting	
...	
EXIT	



MENU	
Display Setting	
Language	EN
System	Imperial
Brightness	
➔ Auto off	OFF
Scenes	Analog
Battery Ind	Percent
Pow Ind	Current
Clock	>
Start Password	>
Basic Setting	
...	
EXIT	

8.5 Scenes : Analog only

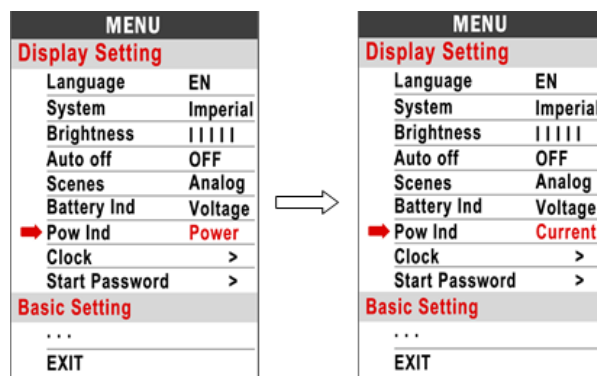
MENU	
Display Setting	
Language	EN
System	Imperial
Brightness	
Auto off	OFF
➔ Scenes	Analog
Battery Ind	Voltage
Pow Ind	Power
Clock	>
Start Password	>
Basic Setting	
...	
EXIT	

8.6 Battery Ind: Press UP/DOWN button to change the battery indicator, Voltage / Percentage / OFF.



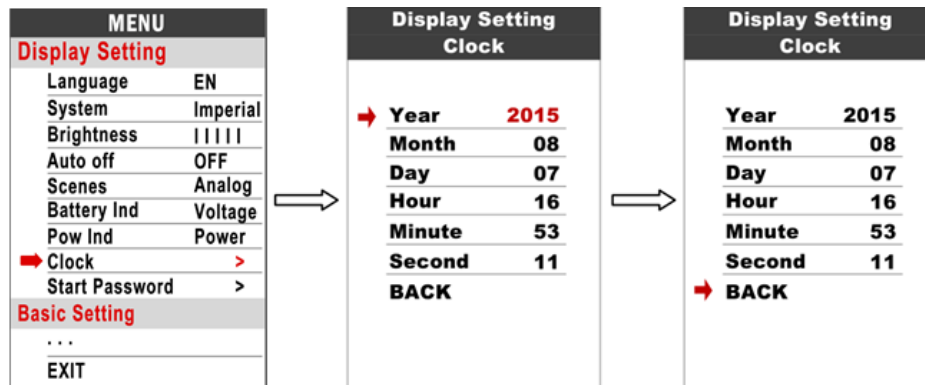
8.7 Pow Ind: Press UP/DOWN button to change the Power indicator, Power / Current.

* This data represent power output of the battery (not motor).





8.8 Clock: Clock setting, press MENU button get into the clock setting menu, press UP/DOWN button to set Year/Month/Day/Hour/Min/Sec.

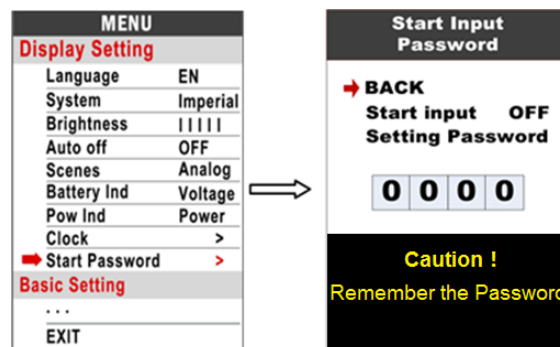


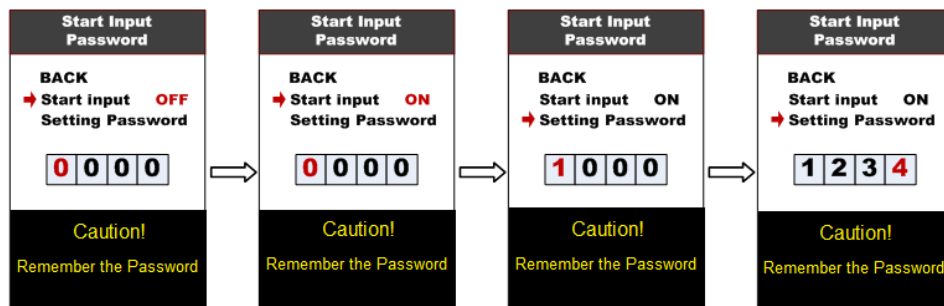
Note: There is a rechargeable battery inside display, it keeps the clock running when display is powered off. The battery can be charged by the external power when display is power on. This battery can maintain clock running for 100-120 days while it has not been charged. Battery may be exhausted after long time unused (after winter or transportation), you need to recharge the battery as below.

Set Menu: Auto off -> OFF (make display can't power off automatically)

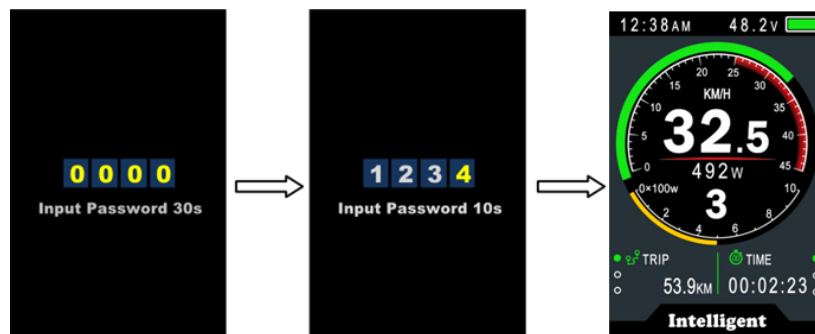
Keep the display power on for 72 hours, it can charge the battery.

8.9 Start password: Press MENU button get into the password setting menu. If you had set Start input ON, you must input right password before power on, password is accorded to your setting.

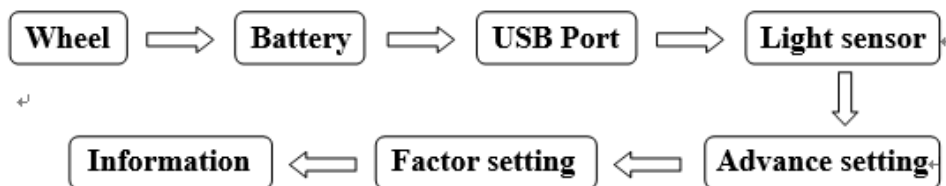




You need to input the right password before start with 30 seconds, display will power off automatically if the password was wrong.

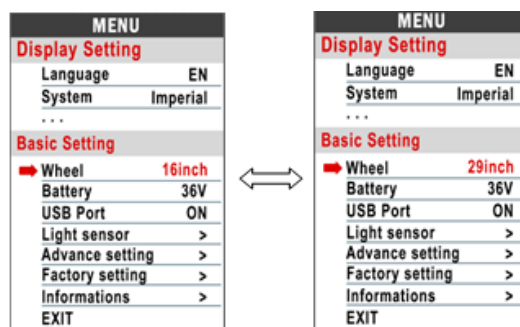


Basic Setting

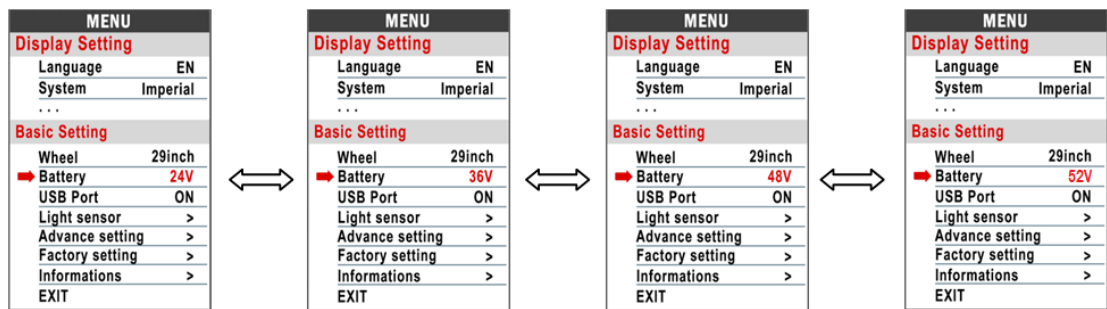


*Press DOWN button to move the red arrow to **Basic Setting**, press POWER button can show all items of the Basic Setting.

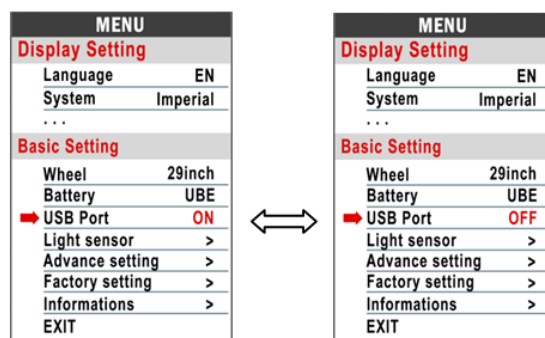
- 8.10 Wheel:** Press UP/DOWN can change the wheel setting, optional wheel diameter is 16/18/20/22/24/26/27/27.5/28/29/30/31 inch, 51cm~255cm represent wheel circumference (this needs controller support).



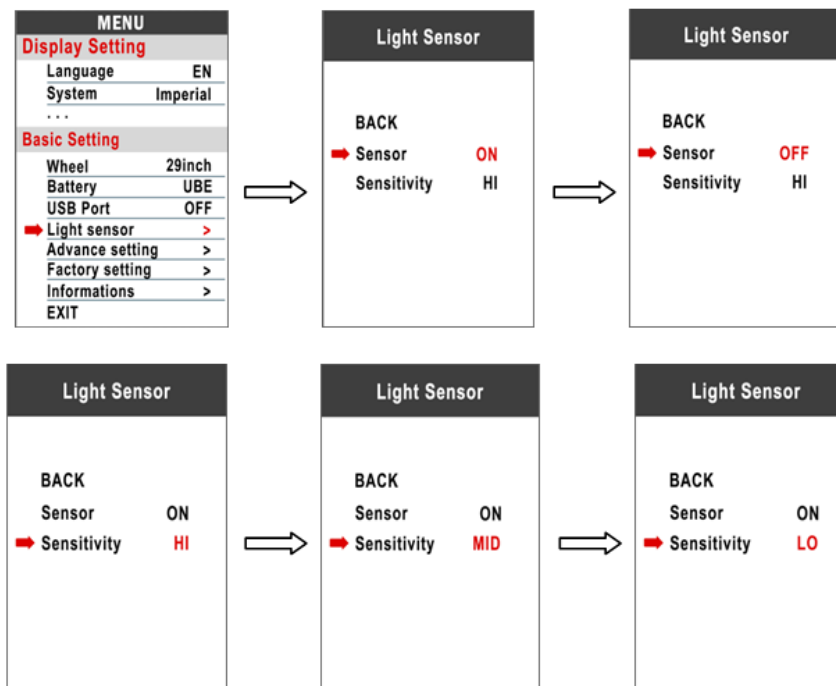
- 8.11 Battery:** Press UP/DOWN will change battery voltage setting; optional value is 24V/36V/48V/52V.



8.12 USB Port: press **UP/DOWN** level, select press **OFF/ON**, Will be no Voltage/Current output after switching off.



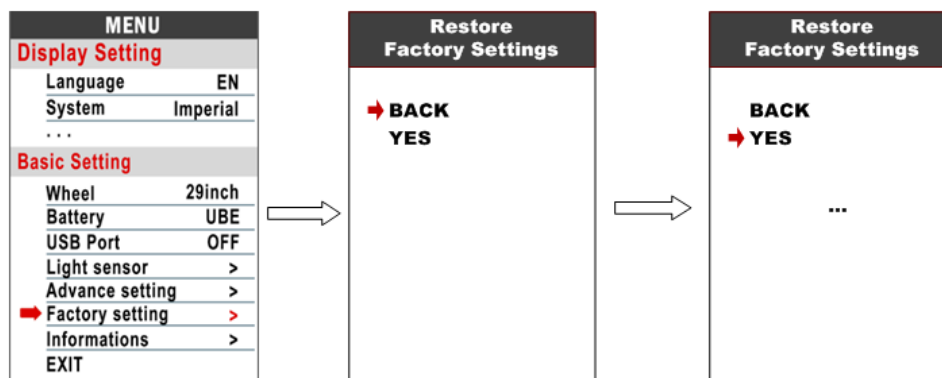
8.13 Light sensor: Light sensor item, press **MENU** Button , enter into Light sensor interface , Press **UP/DOWN** button select **OFF/ON**; select Sensitivity, press **UP/Down** Select sensitivity of light sensation **HI/MID/LO**.



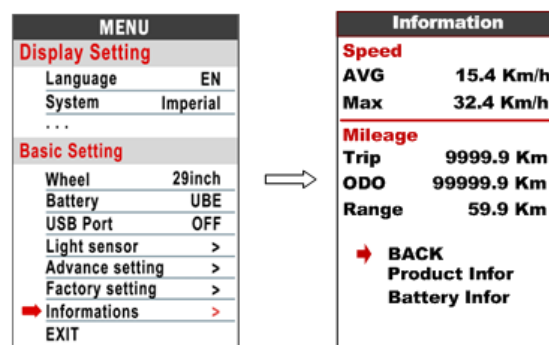
8.14 Advance setting: Press POWER button can get into the advance setting menu, default password is '1919'.

Advance Setting	
Speed limit	25km/h
Assist levels	5
Error code	
04 09 11 21 08	
30 24 12 23 07	
➔ BACK	
EXIT	

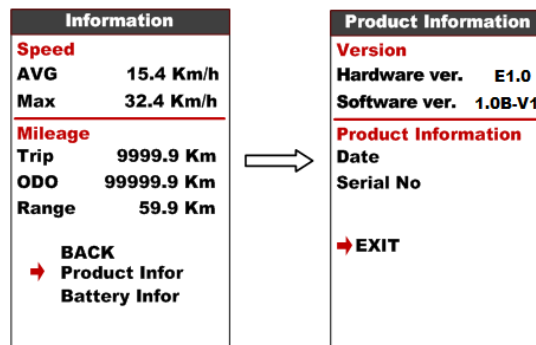
8.18 Factory setting: Press MENU button enter Restore Factory settings item, set YES will restore all parameter to factory settings.



8.19 Information: Show information of the E-bike.

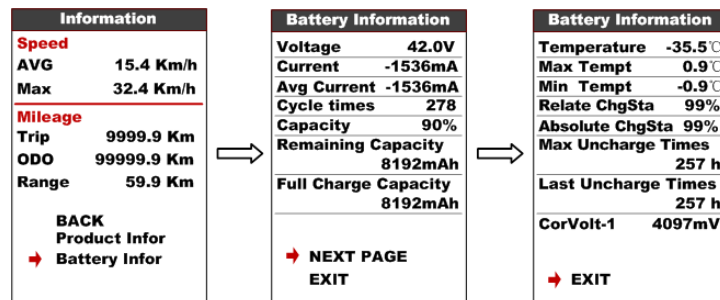


8.20 Product info: Get into this item can show hardware version software version...



8.21 Battery info : Get into this item can show all information of battery, including Voltage, Current, Avg Current, Cycle times, Capacity, Remaining Capacity , Full Charge Capacity , Temperature, Max Tempt, Min Tempt , Relate ChgSta , Absolute ChgSta , Max Uncharge Times , Last Uncharge Times , CorVolt-1.

*These information needs to be supported by battery communication.



9. Error Code define

860C can show warning message,  icon shows on the screen, and show error code at the bottom of the screen, error code from 04~30, definition see the table below.

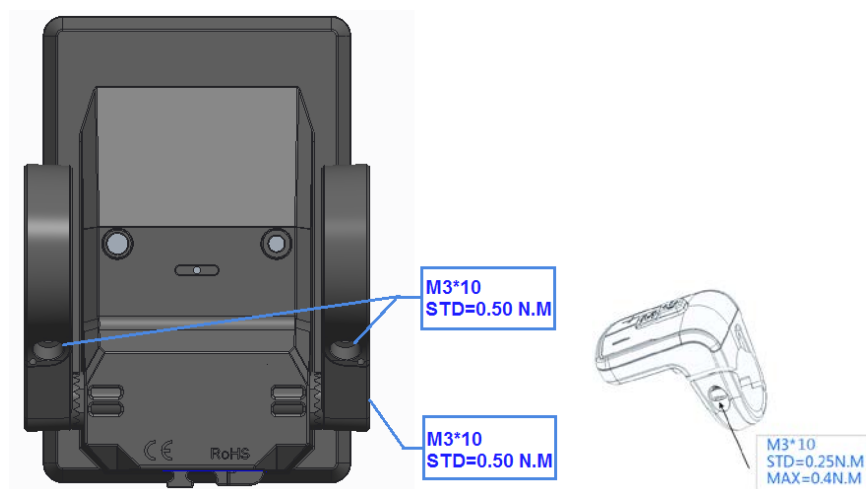
Error Code	Error description	Error display
04	Throttle on high position	Display 04H on LOGO position
05	Throttle error	Display 05H on LOGO position
07	High voltage protection	Display 07H on LOGO position
08	Motor's hall sensor error	Display 08H on LOGO position
09	Phase line of motor error	Display 09H on LOGO position
10	Controller over temperature	Display 10H on LOGO position
11	Motor over temperature	Display 11H on LOGO position
12	Current sensor error	Display 12H on LOGO position
13	Battery's temperature sensor error	Display 13H on LOGO position
14	Motor's temperature sensor	Display 14H on LOGO position

	error	
15	controller's temperature sensor error	Display 15H on LOGO position
21	Speed sensor error	Display 21H on LOGO position
22	BMS communication error	Display 22H on LOGO position
23	Head light error	Display 23H on LOGO position
24	Head light sensor error	Display 24H on LOGO position
25	Torque sensor error-Torque	Display 25H on LOGO position
26	Torque sensor error-speed	Display 26H on LOGO position
30	Communication error	Display 30H on LOGO position



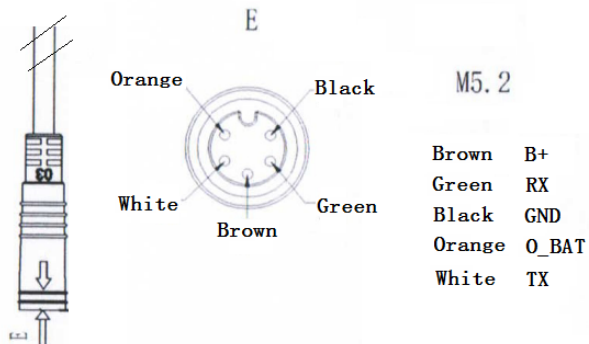
10. Assembly instructions

Please pay attention to the screw's torque value, damaged caused by excessive torque is not within the scope of the warranty.



Clamps suit for 3 size of handlebar, 31.8mm, 25.4mm, 22.2mm, there are transfer rings for 25.4mm and 22.2mm, transfer ring must be assembled with the special directions.

11. Connector descriptions



- 1、 Brown wire : Anode(24v/36v/48V/52V)
- 2、 Orange wire : Power cord to the controller
- 3、 Black wire : GND
- 4、 Green wire : RXD (controller -> display)
- 5、 White wire : TXD (display -> controller)

12. Assist level instructions

Assist level can be customized, the highest level is 9, common used assist level see the table below:

3 level	5 level	9 level	
0	0	0	No power assist
		1	
	1	2	
1		3	
	2	4	
2		5	
	3	6	
		7	
	4	8	
3	5	9	

13. Certification

CE / IP65 (water proof) / ROHS.
