

Product Specification

7/2018

Product	TFT Display
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Mode	APT TFT850C
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Abbreviation	850C
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Client

Customer

audit

Supplier	Tianjin APT Science and Technology 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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Email	<u>yzhao@aptdevelop.com</u>
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1. Product Name

- ✧ TFT display
- ✧ Model : APT TFT 850C

2. Suppliers

- ✧ Tianjin APT Science and Technology Co., Ltd.
- ✧ Email : yzhao@aptdevelop.com apt@aptdevelop.com

3. Electrical Parameters

- ✧ 3.2inch IPS screen
- ✧ 24V/36V/48V 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, transparent window is made with high strength Acrylic.
- ✧ Dimensions : host/L92mm*W60mm*H14mm



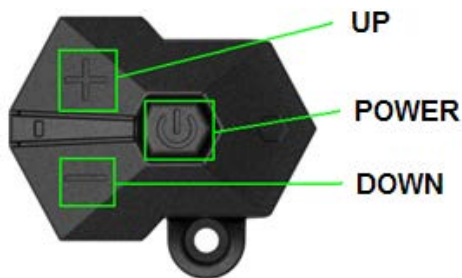
5. Features

- ✧ Suitable for low temperature, Max -20℃.
- ✧ High-contrast 3.2inch 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 indicator** : real time power indicator, digital or analog.
- ✧ **Battery information** (needs to be supported by battery communication)
- ✧ **DST indicator** (needs to be supported by battery communication)
- ✧ **Self-Testing**
- ✧ **Error code indicator.**
- ✧ **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 5, 0 for neutral. Level quantities can be adjusted according to the customer requirements.



7.3 Speed & Mileage mode switch

Short press **POWER** button can change the speed and mileage mode, TRIP->ODO->RANGE-> TRIP -> TIME -> MAX SPD->AVG SPD.



**If there is no operation for 10 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.

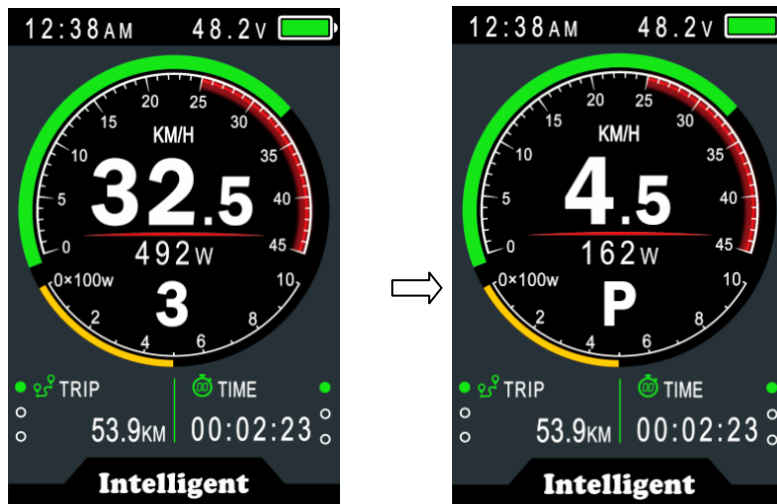


Daytime mode

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

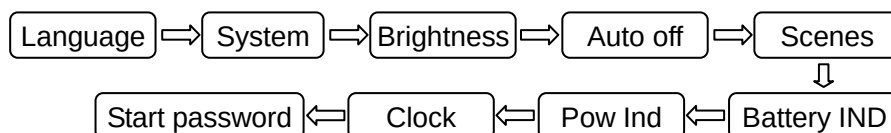
Double press **POWER** button (press interval less than 0.3 second) can get into setting menus, press **UP/DOWN** buttons to change the parameter setting, press **POWER** button can switch to next item. Double press **POWER** button will exit from menu.

* 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 are as follow.



8.1 Language: Nonadjustable.

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

8.3 Brightness : Press Up / Down button to change the brightness of the backlight, | is darkness, ||||| is brightness. Daytime mode default |||||, night mode default ||.

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

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

MENU		MENU		MENU	
Display Setting		Display Setting		Display Setting	
Language	EN	Language	EN	Language	EN
System	Imperial	System	Imperial	System	Imperial
Brightness		Brightness		Brightness	
→ Auto off	1 min	→ Auto off	9 min	→ Auto off	OFF
Scenes	Analog	Scenes	Analog	Scenes	Analog
Battery Ind	Percent	Battery Ind	Percent	Battery Ind	Percent
Pow Ind	Current	Pow Ind	Current	Pow Ind	Current
Clock	>	Clock	>	Clock	>
Start Password	>	Start Password	>	Start Password	>
Basic Setting		Basic Setting		Basic Setting	
...		...		...	
EXIT		EXIT		EXIT	

8.5 Scenes : Nonadjustable.

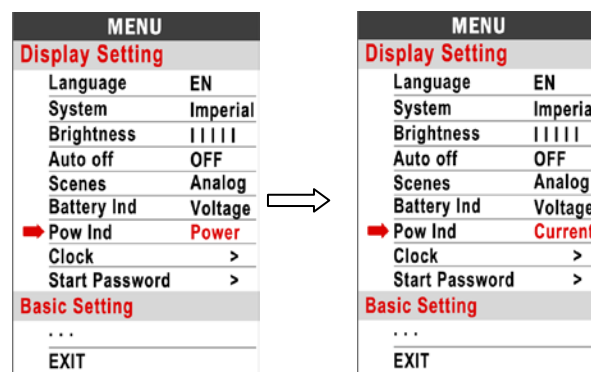
8.6 Battery Ind : Press UP/DOWN button to change the battery indicator, Voltage / Percentage / OFF.

*Accurate percentage needs communication with battery.



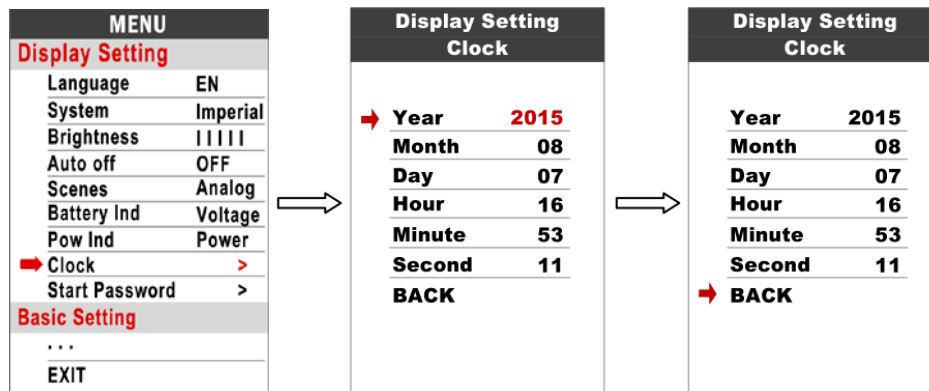
8.7 Pow Ind : Press UP/DOWN button to change the Power indicator, Power / Current.

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

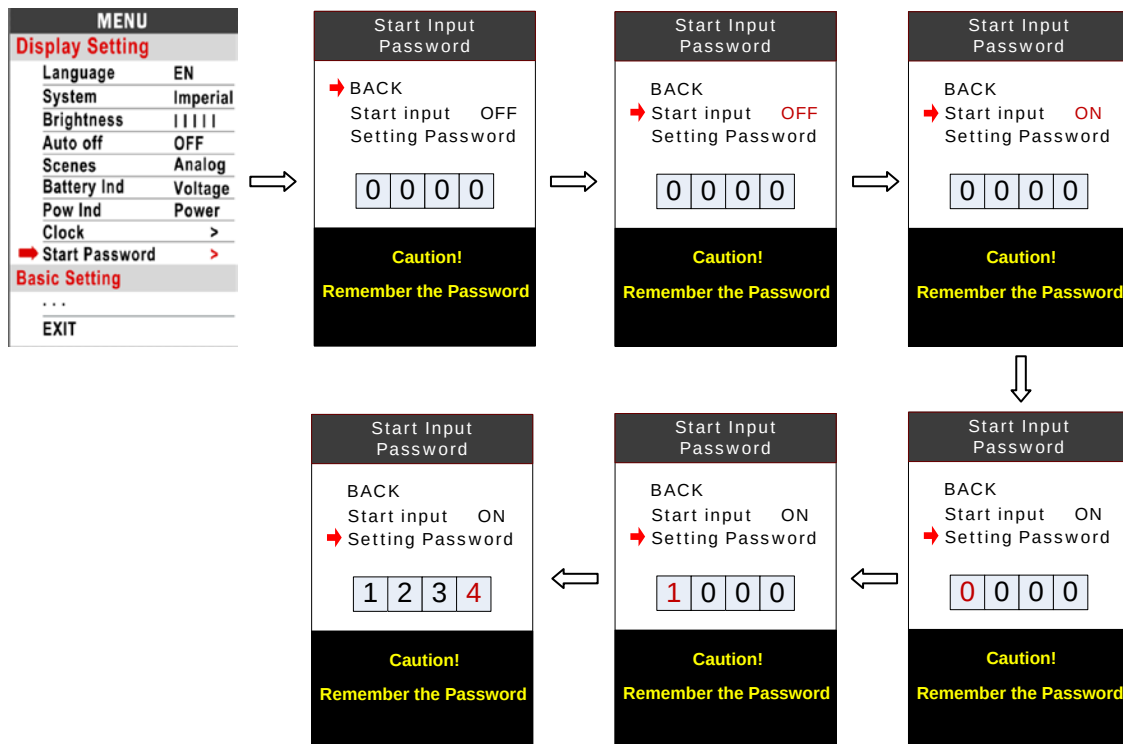




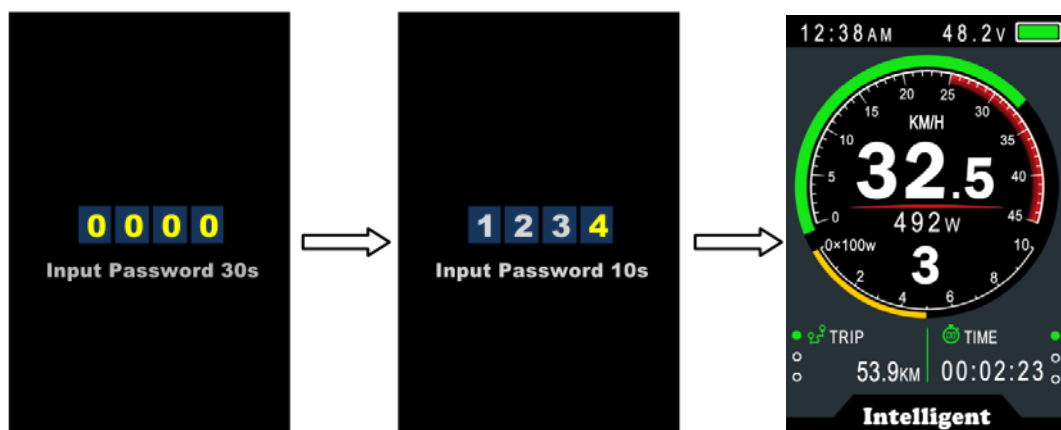
8.8 Clock : Clock setting, press POWER button get into the clock setting menu, press UP/DOWN button to set Year/Month/Day/Hour/Min/Sec.



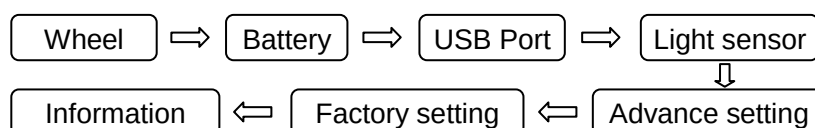
8.9 Start password : Press POWER button get into the password setting menu. If you had set Start input **ON**, you must input right password before power on, password is accorded to your setting.



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

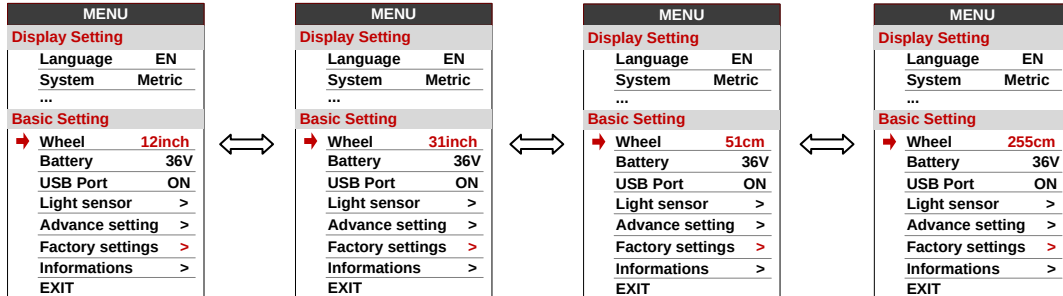


Basic Setting

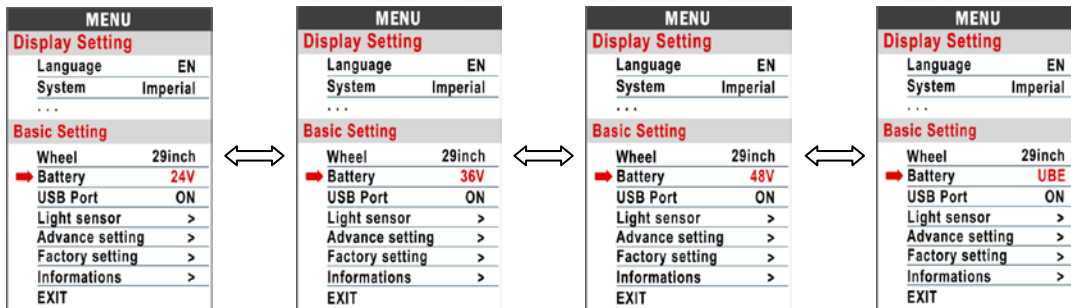


*Press DOWN button to move the red arrow to ➔ ..., press POWER button can show all items of the Basic Setting.

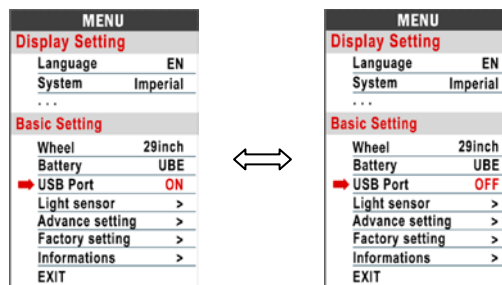
8.10 Wheel : Press UP/DOWN can change the wheel setting, optional wheel diameter is 12/14/16/18/20/22/24/26/27/27.5/28/29/30/31 inch, 51cm~255cm represent wheel circumference (this needs controller support). Wrong value for wheel diameter will cause speed & mileage abnormal.



8.11 Battery : Press UP/DOWN will change battery voltage setting, optional value is 24V/36V/48V/UBE, UBE means user define value.



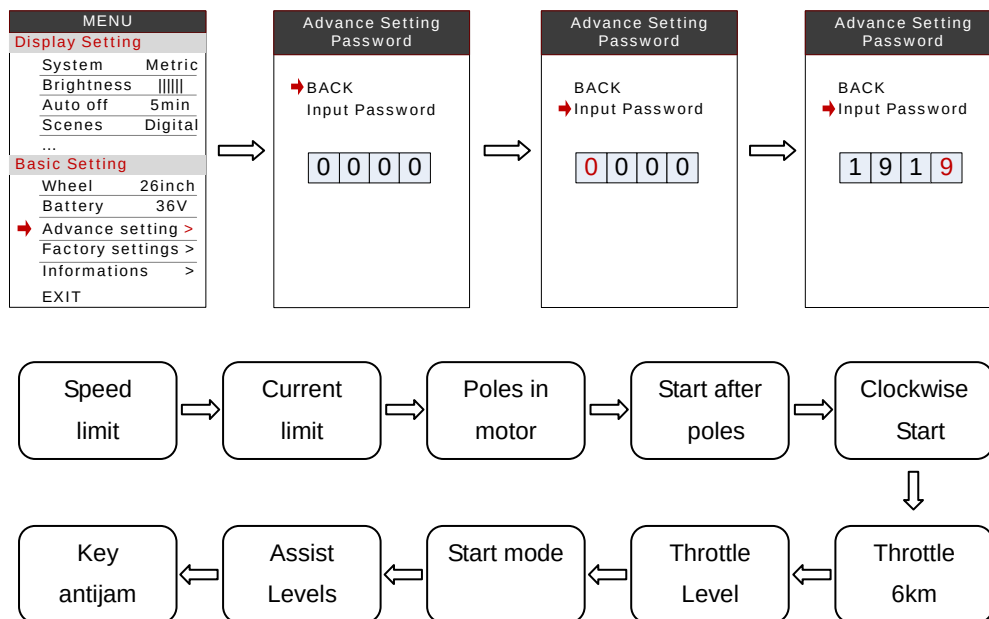
8.12 USB: press UP/DOWN button, select press **OFF/ON**, Will be no Voltage/Current output after switching off.



8.13 Light sensor: No light sensor, this item nonadjustable. Light sensor item, press POWER, enter into Light sensor interface, Press **UP/DOWN** button select **OFF/ON**; select Sensitivity, press UP/DOWN to 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'.



8.15 Speed limit : Press UP/DOWN will change speed limit, range 10km/h~60km/h. Default value is 25km/h.

Advance Setting	Advance Setting	Advance Setting
→ Speed limit 10km/h	→ Speed limit 25km/h	→ Speed limit 60km/h
Current limit 15A	Current limit 15A	Current limit 15A
Poles in motor 1	Poles in motor 1	Poles in motor 1
Start after poles 3	Start after poles 3	Start after poles 3
Clockwise Start Y	Clockwise Start Y	Clockwise Start Y
Throttle 6km N	Throttle 6km N	Throttle 6km N
Throttle Level N	Throttle Level N	Throttle Level N
Start mode STD	Start mode STD	Start mode STD
Assist levels 5	Assist levels 5	Assist levels 5
Key antijam Y	Key antijam Y	Key antijam Y
BACK	BACK	BACK
EXIT	EXIT	EXIT

8.16 Current limit : Press UP/DOWN will change current limit, range 6A~50A. Default value is 15A.

Advance Setting	Advance Setting	Advance Setting
Speed limit 60km/h	Speed limit 60km/h	Speed limit 60km/h
→ Current limit 06A	→ Current limit 15A	→ Current limit 50A
Poles in motor 1	Poles in motor 1	Poles in motor 1
Start after poles 3	Start after poles 3	Start after poles 3
Clockwise Start Y	Clockwise Start Y	Clockwise Start Y
Throttle 6km N	Throttle 6km N	Throttle 6km N
Throttle Level N	Throttle Level N	Throttle Level N
Start mode STD	Start mode STD	Start mode STD
Assist levels 5	Assist levels 5	Assist levels 5
Key antijam Y	Key antijam Y	Key antijam Y
BACK	BACK	BACK
EXIT	EXIT	EXIT

*Speed limit and current limit are restricted by controller and motor.

8.17 Poles in motor : Magnetic poles inside the motor, press UP/DOWN will change pole number, range 1~10. Default value is 1.

Advance Setting	Advance Setting	Advance Setting
Speed limit 60km/h	Speed limit 60km/h	Speed limit 60km/h
Current limit 50A	Current limit 50A	Current limit 50A
→ Poles in motor 0	→ Poles in motor 1	→ Poles in motor 10
Start after poles 3	Start after poles 3	Start after poles 3
Clockwise Start Y	Clockwise Start Y	Clockwise Start Y
Throttle 6km N	Throttle 6km N	Throttle 6km N
Throttle Level N	Throttle Level N	Throttle Level N
Start mode STD	Start mode STD	Start mode STD
Assist levels 5	Assist levels 5	Assist levels 5
Key antijam Y	Key antijam Y	Key antijam Y
BACK	BACK	BACK
EXIT	EXIT	EXIT

8.18 Start after poles : How many poles (speed sensor) need to be detected by controller before starting motor. Default value is 3.

Advance Setting	
Speed limit	60km/h
Current limit	50A
Poles in motor	1
→ Start after poles	1
Clockwise Start	Y
Throttle 6km	N
Throttle Level	N
Start mode	STD
Assist levels	5
Key antijam	Y
BACK	
EXIT	

↔

Advance Setting	
Speed limit	60km/h
Current limit	50A
Poles in motor	1
→ Start after poles	2
Clockwise Start	Y
Throttle 6km	N
Throttle Level	N
Start mode	STD
Assist levels	5
Key antijam	Y
BACK	
EXIT	

↔

Advance Setting	
Speed limit	60km/h
Current limit	50A
Poles in motor	1
→ Start after poles	3
Clockwise Start	Y
Throttle 6km	N
Throttle Level	N
Start mode	STD
Assist levels	5
Key antijam	Y
BACK	
EXIT	

8.19 Clockwise start : This parameter represent speed sensor turn direction, default value is Y (forward).

Advance Setting	
Speed limit	60km/h
Current limit	50A
Poles in motor	1
Start after poles	3
➡ Clockwise Start	Y
Throttle 6km	N
Throttle Level	N
Start mode	STD
Assist levels	5
Key antijam	Y
BACK	
EXIT	

Advance Setting	
Speed limit	60km/h
Current limit	50A
Poles in motor	1
Start after poles	3
➡ Clockwise Start	N
Throttle 6km	N
Throttle Level	N
Start mode	STD
Assist levels	5
Key antijam	Y
BACK	
EXIT	

8.20 Throttle 6KM : this parameter can set the throttle function, N represent max speed, Y represent 6Km.

Advance Setting	
Speed limit	60km/h
Current limit	50A
Poles in motor	1
Start after poles	3
Clockwise Start	Y
→ Throttle 6km	N
Throttle Level	N
Start mode	STD
Assist levels	5
Key antijam	Y
BACK	
EXIT	

↔	

Advance Setting	
Speed limit	60km/h
Current limit	50A
Poles in motor	1
Start after poles	3
Clockwise Start	Y
→ Throttle 6km	Y
Throttle Level	N
Start mode	STD
Assist levels	5
Key antijam	Y
BACK	
EXIT	

8.21 Throttle Level : This parameter is functional when Throttle 6KM set N, Press UP/DOWN will change Y/N, N represent Throttle start max speed, Y represent throttle's speed is accorded to the assist level.

Advance Setting		Advance Setting	
Speed limit	60km/h	Current limit	50A
Current limit	50A	Poles in motor	1
Poles in motor	1	Start after poles	3
Start after poles	3	Clockwise Start	Y
Clockwise Start	Y	Throttle 6km	N
Throttle 6km	N	→ Throttle Level	N
→ Throttle Level	N	Start mode	STD
Start mode	STD	Assist levels	5
Assist levels	5	Key antijam	Y
Key antijam	Y	BACK	
BACK		EXIT	
EXIT			

8.22 Start mode : Pow/ECO/STD(default) represent Power/ECO/Standard, Power mode means use maximum current when speed up, ECO mode means use minimum current.

*This function is optional, may not supported by each mode.

Advance Setting		Advance Setting		Advance Setting	
Speed limit	60km/h	Speed limit	60km/h	Speed limit	60km/h
Current limit	50A	Current limit	50A	Current limit	50A
Poles in motor	1	Poles in motor	1	Poles in motor	1
Start after poles	3	Start after poles	3	Start after poles	3
Clockwise Start	Y	Clockwise Start	Y	Clockwise Start	Y
Throttle 6km	N	Throttle 6km	N	Throttle 6km	N
Throttle Level	N	Throttle Level	N	Throttle Level	N
→ Start mode	Pow	→ Start mode	STD	→ Start mode	ECO
Assist levels	5	Assist levels	5	Assist levels	5
Key antijam	Y	Key antijam	Y	Key antijam	Y
BACK		BACK		BACK	
EXIT		EXIT		EXIT	

8.23 Assist levels : This parameter can customize assist levels, options are 3/5/9/UBE, UBE represent factory default settings.

Advance Setting		Advance Setting		Advance Setting		Advance Setting	
Speed limit	60km/h	Speed limit	60km/h	Speed limit	60km/h	Speed limit	60km/h
Current limit	50A	Current limit	50A	Current limit	50A	Current limit	50A
Poles in motor	1	Poles in motor	1	Poles in motor	1	Poles in motor	1
Start after poles	3	Start after poles	3	Start after poles	3	Start after poles	3
Clockwise Start	Y	Clockwise Start	Y	Clockwise Start	Y	Clockwise Start	Y
Throttle 6km	N	Throttle 6km	N	Throttle 6km	N	Throttle 6km	N
Throttle Level	N	Throttle Level	N	Throttle Level	N	Throttle Level	N
Start mode	STD	Start mode	STD	Start mode	STD	Start mode	STD
→ Assist levels	3	→ Assist levels	5	→ Assist levels	9	→ Assist levels	UBE
Key antijam	Y	Key antijam	Y	Key antijam	Y	Key antijam	Y
BACK		BACK		BACK		BACK	
EXIT		EXIT		EXIT		EXIT	

8.24 Key antijam : Press UP/DOWN to select Y or N, Y indicates key antijam effectiveness.

Advance Setting		Advance Setting	
Speed limit	60km/h	Speed limit	60km/h
Current limit	50A	Current limit	50A
Poles in motor	1	Poles in motor	1
Start after poles	3	Start after poles	3
Clockwise Start	Y	Clockwise Start	Y
Throttle 6km	N	Throttle 6km	N
Throttle Level	N	Throttle Level	N
Start mode	STD	Start mode	STD
Assist levels	5	Assist levels	5
→ Key antijam	Y	→ Key antijam	N
BACK		BACK	
EXIT		EXIT	

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

MENU		Restore Factory Settings		Restore Factory Settings
Display Setting		→ BACK		BACK
Language	EN	YES		→ YES
System	Imperial			...
...				
Basic Setting				
Wheel	29inch			
Battery	UBE			
USB Port	OFF			
Light sensor	>			
Advance setting	>			
→ Factory setting	>			
Informations	>			
EXIT				

8.26 Information : Show information of the E-bike.

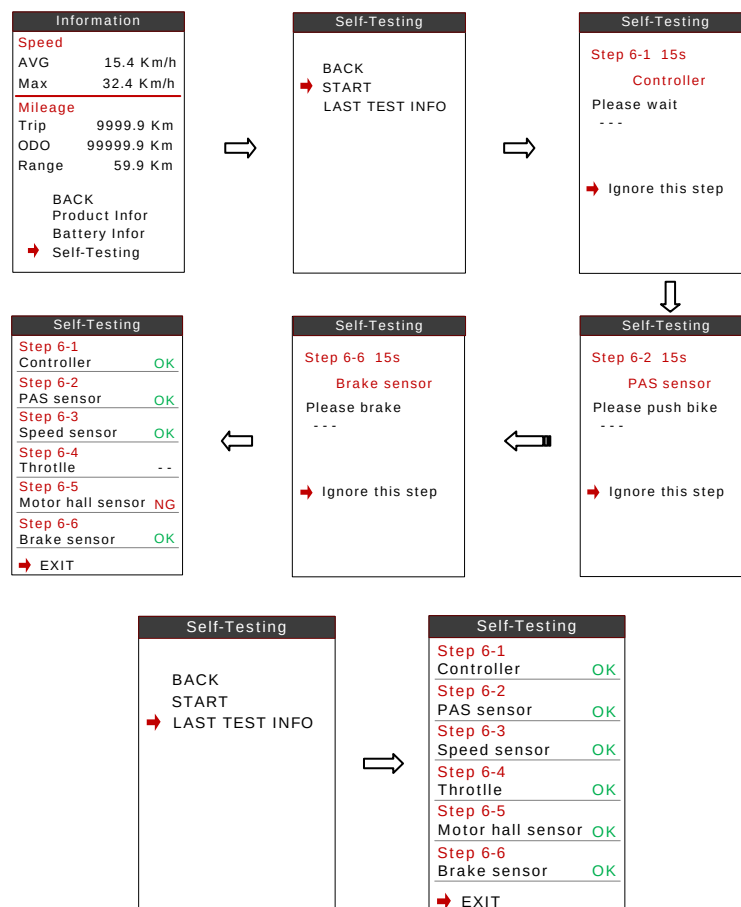
Information
Speed
AVG 15.4 Km/h
Max 32.4 Km/h
Mileage
Trip 9999.9 Km
ODO 99999.9 Km
Range 59.9 Km
→ BACK
Product Infor
Battery Infor
Self-Testing

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

Information	Product Information
Speed	Version
AVG 15.4 Km/h	Hardware ver. 2.0
Max 32.4 Km/h	Software ver. 1.0K-V1
Mileage	Product Information
Trip 9999.9 Km	Date
ODO 99999.9 Km	Serial No
Range 59.9 Km	→ EXIT
→ BACK	
Product Infor	
Battery Infor	
Self-Testing	

Information			Battery Information			Battery Information	
Speed			Voltage	42.0V		Initial Capacity	
AVG	15.4 Km/h		Capacity	100%			12000mAh
Max	32.4 Km/h		Cycle times	5		Max Charge Times	
			Health	95%			100 h
Mileage			Temperature	35 °C			
Trip	9999.9 Km	⇒	Remaining Capacity	11400mAh	⇒		
ODO	99999.9 Km		Full Charge Capacity	11400mAh			
Range	59.9 Km						
BACK Product Infor ➔ Battery Infor Self-Testing		⇒	➔ NEXT PAGE EXIT			➔ EXIT	

*-- This indicates ignore detection, NG test will not pass.



9. Error Code define

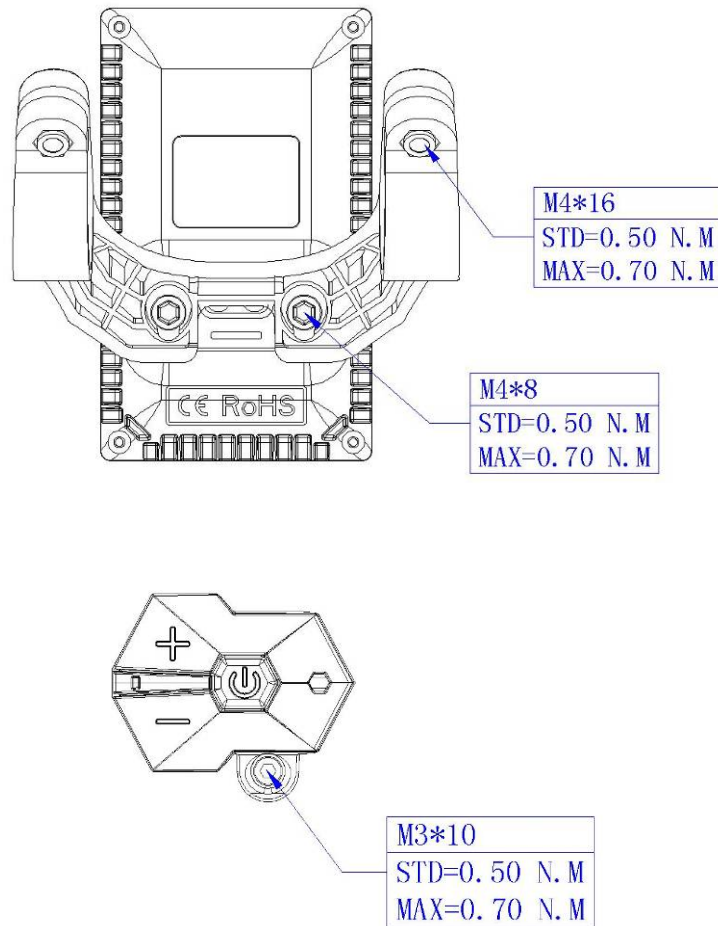
850C can show warning message,  icon shows on the screen, and show error code at the bottom of the screen, error code from 01~25, definition see the table below.

Error Code	Error description	Handle
01H	Communication checksum error	Check the cable connection
02H	Controller protection	Check three-phase power line.
03H	three-phase power error	Check three-phase power line connection
04H	Battery low	Charge the battery
05H	Brake error	Check the brake connection.
06H	Turn error	Check throttle and connection.
07H	Hall error	Check the hall connection
08-FFH	Reserved	Please contact the controller's manufacturer for error definitions
30H	Communication Error	Check the cable connection



10. Assembly instructions

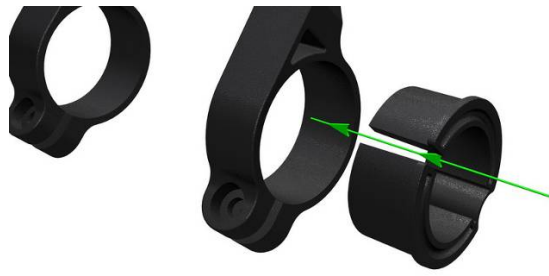
Please pay attention to the screw's torque value, damaged caused by excessive torque is not within the scope of the warranty.



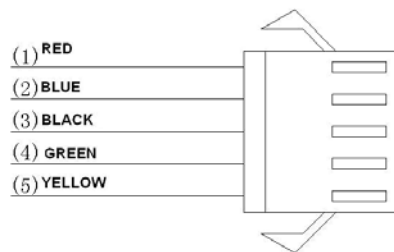
There are 2 directions for the clamp installation, forward or backward.



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, pay attention to the green arrow below.



11. Connector descriptions



- 1、Red wire : Anode(24v/36v/48V)
- 2、Blue wire : Power cord to the controller
- 3、Black wire : GND
- 4、Green wire : RxD (controller -> display)
- 5、Yellow 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	2	3	
		4	
	3	5	
2		6	
	4	7	
		8	
3	5	9	

13. Certification

CE / IP65 (water proof) / ROHS.