M300C Specification (Standard Ver.)

5S Protocol

	Signature	Date
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Revision History

Version	Revised by	Date	Content	Page
A01	Jun Xing	2024-02-04	First release	

Statement

This product function specification is the standard function definition description of our products and is a part of the technical archives of our products.

All instrument products of our company are allowed to adjust their function definitions according to customer needs. This document is a reference for product function definitions, operation instructions and fault analysis. The product function status you get will be subject to the confirmation and communication of actual customer needs. As a component unit of human-computer interaction of electric vehicle, the instrument plays a role in the interaction between the whole vehicle and users. However, all interaction functions depend on the function definition and data support of the overall electrical system, and the realization of some functions will depend on your vehicle system definition.

If you have any questions about the understanding of this product specification, please consult our sales or technical support personnel in time.

（BigStone ®）We reserve the right to interpret and explain this product function specification.

Nanjing Bigstone Electronic &Technology Co., Ltd

Content

A. Product introduction

1. Product name and model

2.0 Inch IPSTFT color display instrument for Electronic Power Assist bicycle.

Product model：M300C

● M300C includes UART communication and CAN communication two hardware version.M300C is UART version; M300C-CAN is CAN bus version.

● USB function is option for M300C series products.

2. Product brief

✧ The screen adopts imported tempered glass

✧ High brightness 2.0-inch 240*320 resolution Color IPSTFT LCD Screen

✧ Four key design, key combination ergonomic design

✧ Excellent outdoor waterproof design, meeting the waterproof capacity of IP67

✧ Optional USB function, support UART communication or MS-CAN2.0A communication

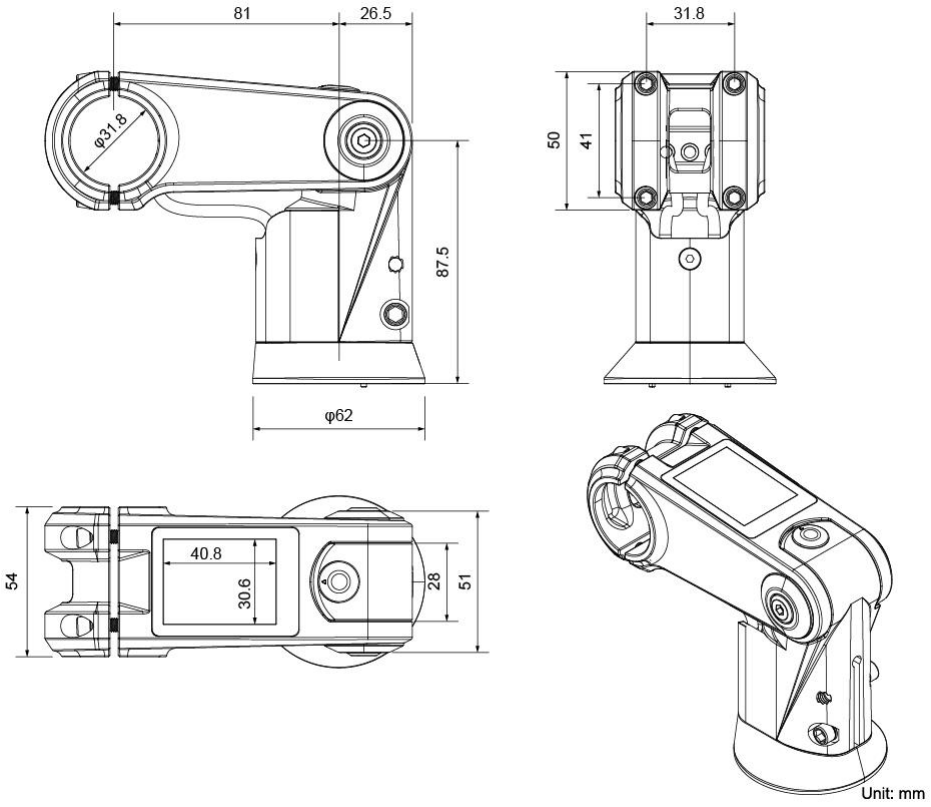
✧ It supports firmware upgrade function, which can quickly realize firmware upgrade and parameter setting, and facilitate maintenance services

3. Range of application

Suitable for electric power assist bicycle in accordance with the standard of EN15194:2017.

4. Appearance and Dimension

The material of M300C is ABS+PC, and the panel adopts high hardness imported tempered glass. The product is suitable for mounting φ31.8mm horizontal pipe.



5. Product coding rules

M300C	-CAN
	CAN communication, if it is CAN communication suffix, add -CAN
	Product family name. If there is no suffix by default, it is serial port communication

B. Product Description

1. Specifications

① Power supply：DC 24V/36V/48V/52V

② Rated current：<30 mA

③ Shutdown current：<1uA

④ Screen specification：2.0 ” 240*320 resolution Color IPSTFT LCD Screen

⑤ Communication method：UART/ CAN-BUS optional

⑥ Operating temperature：-20°C ~ 60°C

⑦ Storage temperature：-30°C ~ 80°C

⑧ Waterproof level：IP67

2. Functional overview

① Four ergonomic buttons

② Digital assisted level indication.

③ Units: KMH / MPH switch

④ Speed display: Real-time speed/ Maximum speed/Average speed display

⑤ Battery indicator combined percentage display

⑥ Range display（*Battery BMS provides support in case of margin information）

⑦ Front light control and status indication

⑧ Mileage display: (TRIP), (ODO)

⑨ Walk assistance function

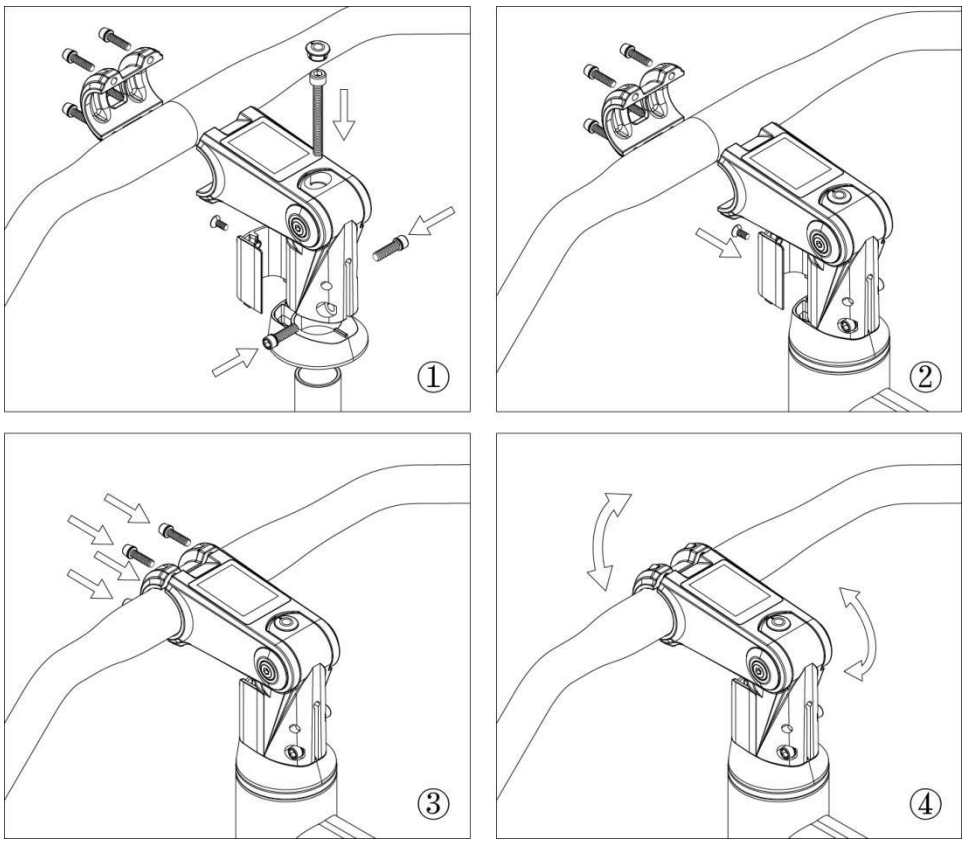
⑩ Parameter setting function and advanced setting function

⑪ Error code indication

⑫ Display riding time

⑬ USB function

3. Installation



① Fix the M300 with three screws according with arrow direction

② Fix the handlebar between end cap and display with four screws.

③ Fixed these four screws but locking.

④ Adjust the handlebar angle and display angle to fit position, then locking all screws.

* Damage caused by excessive torque is not covered by the warranty.

Connect display cable to driver interface cable.

4. Interface

4.1 Startup screen

The customer logo will be displayed for 2 seconds when system power on. After the communication connection is established, the display will enter the basic function display screen, and the display will show the information obtained from the controller.

(The displayed data information is executed according to the communication protocol provided by the customer)

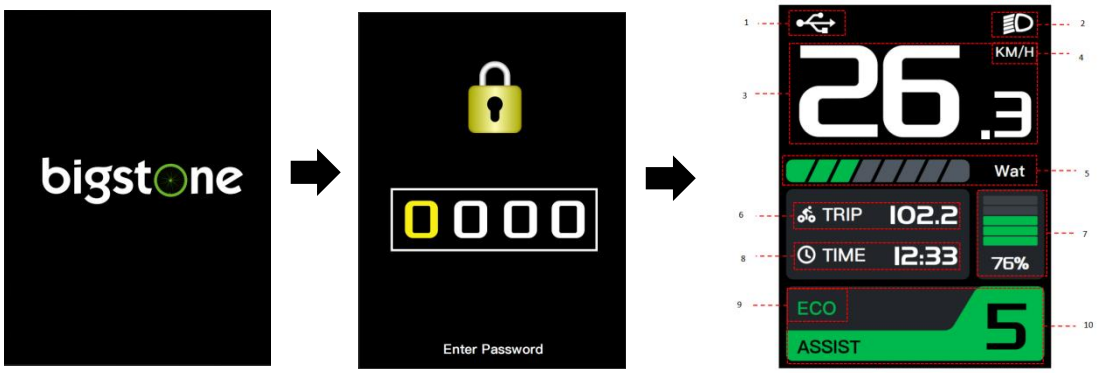
4.2 Basic screen

① The standard outlet mode is the board end connector, which is convenient for after-sales maintenance and replacement.

② The screen adopts 2.0-inch Color IPSTFT LCD Screen, meet the customization and modification requirements of the startup interface and local UI interface.

4.3 Function introduction

Startup screen, password screen and basic function screen



After startup, the consumer logo will be displayed for 2 seconds. If the password is enabled, enter the password input form, and enter the password to enter the basic function interface; If the password is not enabled, you can directly enter the basic function interface. The boot logo can be customized.Boot logo can be customized.

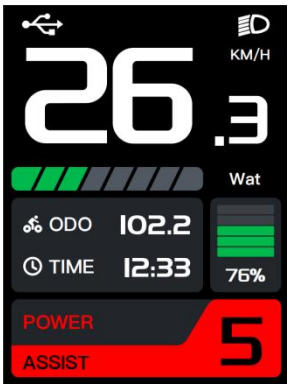
The display reads Information about the controller and BMS information then show on screen.

The ride mode can be set in the general settings, and each mode corresponds to its style as follows:

ECO

NORMAL

POWER



① USB:

USB charging function.

② Backlight:

When the user is in the startup state, click ON/OFF to light the instrument backlight, while the headlight is on, and the headlight symbol is displayed here.

③ Speed indication

Displays real-time speed.

④ Kilometer-mile display:

Display the current speed in kilometers or miles according to the unit set by the customer.

⑤ Power indication:

Displays the current motor output power in the form of a progress bar.

⑥ Mileage display:

Displays the current mileage.

⑦ Battery display:

The remaining power of the current meter is displayed in the form of a progress bar, and the low power is blinking.

⑧ Ride time display:

Displays the current ride time.

⑨ Riding mode display:

There are three riding modes: Power, ECO and Normal, which can be adjusted by setting the interface, and each mode corresponds to its interface theme skin.

⑩ Assist level display:

- Short press "+" or "-" to change the EV level, switch the assist level, and change the motor output power. The output power of the instrument ranges from 0-5 level, and the default level is 1 level when starting.
- 6KM walk assist:

Long press the - button for 2 seconds to enable the 6KM walk assist function.

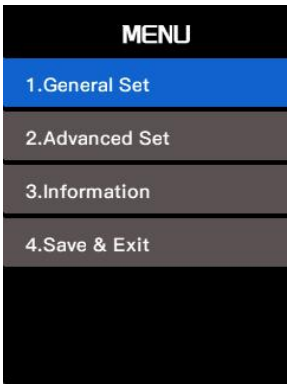
⑪ Fault code display interface:

After receiving the fault information returned by the controller, the instrument will display the fault code on the instrument side, prompting the user to related electrical system fault information. The fault code is displayed in numerical mode. For details about the fault code, see 10. Fault Information.

Setting function

On the basic function screen, hold down the SET key to enter the Settings screen.

Short press the + or − button to select the setting items in sequence according to the order of each setting item;Short press the SET button to confirm the Settings

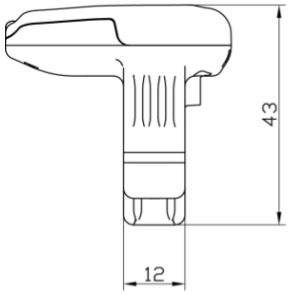


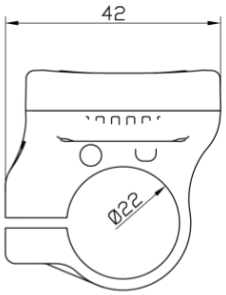
- General Set： Trip Clear, Brightness, Max speed, Wheel Size, Speed Unit, Sys. Voltage, Ride Mode.
- Advanced Set：Pedal Sensor，Speed Magnets, Start Magnets, Assist Magnets, Soft Start, Throttle Follow, Throttle Speed, Max Current ,Password.
- Information Displays the current instrument information and error code information.
- Save&Exit：Save the Settings and exit

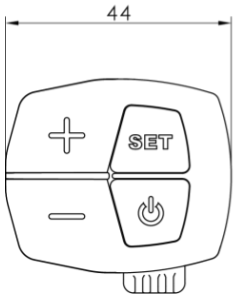
See Part 7 for the definition of detail set operations.

5. Buttons definition

5.1 Definition of buttons







The M300C instrument is equipped with 4 buttons including ON/OFF, SET, UP and DOWN.

Turn Power button: hold to on/off system power.

SET button: Switching the function display and entering the parameter setting operation.

Adjust button: Adjust the assist level during cycling and set it up with the fun ction switch button, and the specific function operation can be carried out with long press button

5.2 Button operation

Operation type	Description
Press down	Press down and release
Press and hold	Press down and hold until the function was active. Hold time i s about 2s.

6. Operation

6.1 Turn on/off

Press down power button at power off state, M300C will be power on and show logo 2 seconds, then switch into the basic function screen and start work; in power on status, press and hold power key to shut down system. If the rider has no any operation within the set turn-off time, and the speed is 0, and the bus current is less than 1A, the M300C will automatically power off.

6.2 Assist level switch

In power on state, at basic function screen, press down + or − button can change the power assist level, and the adjustable range is 0-5.

Assist level

Press + button to increase assist power, press − button to decrease assist power.

6.3 Front light function

When the battery is loaded into the vehicle and the vehicle is powered ON, short press the ON/OFF button to turn on the headlight. At the same time, the indicator icon is displayed in the upper right corner of the instrument interface to indicate the light on status and the instrument displays the normal function status. Short press ON/OFF again to turn off the headlights.

Light on

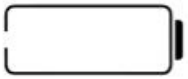
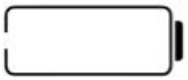
6.4 Walk assist mode

When assist level is not zero, hold ━ button in 2 seconds to start walk assist, the motor outputs power according to the set push speed value and controls the actual push speed. M300C shows the walk assistant icon  at right bottom position on screen. After releasing the ━ button or operating any other key during the implementation process, the implementation power mode will be released, and the motor will cut off the output., M300C recovery to normal display, the walk assistant active screen as follow:

6.5 Battery capacity indicator

When the battery capacity is less than 5 % or the battery voltage is lower than the under-voltage value, the battery indicates shows 0 grid, the battery frame flashes at 1 Hz.

Battery capacity percentage and icon corresponding table is as follows

Percentage	Battery bar instructions	Explained
80% ≤ SOC		Display full 5
60% ≤ SOC < 80%		Display 4
40% ≤ SOC < 60%		Display 3
20% ≤ SOC < 40%		Display 2
10% ≤SOC < 20%		Display 1
5% ≤ SOC < 10%		Display 0
0% ≤ SOC < 5%		Display 0, And the battery symbol flickers at 1Hz

- Note about the power display function:

When battery communication fails:

1. The meter will estimate the electricity according to the voltage and display the corresponding number of batteries;

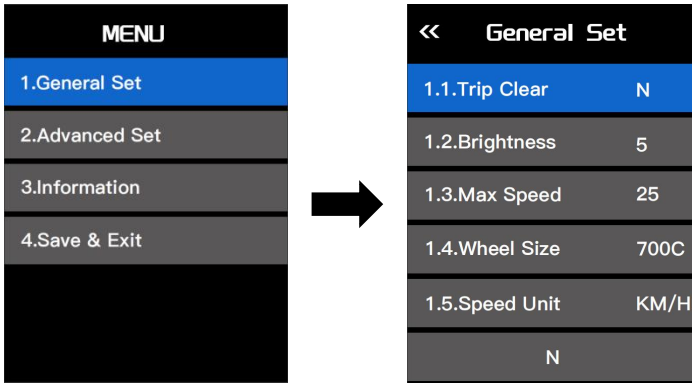
2. Electricity percentage value is not displayed;

3. The remaining mileage is not displayed;

7. Basis functions settings

The instrument provides a specific parameter setting function, and the optional items of the setting function will be reduced according to different market and different product standards. The following is a complete description of parameter Settings and information reading functions in the default state of the instrument. If there is any inconsistency with the real goods, please promptly communicate with our sales and technical support team for verification and confirmation.

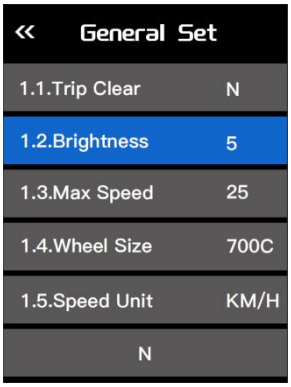
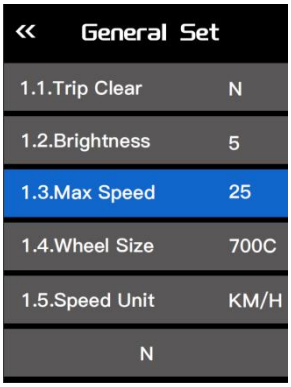
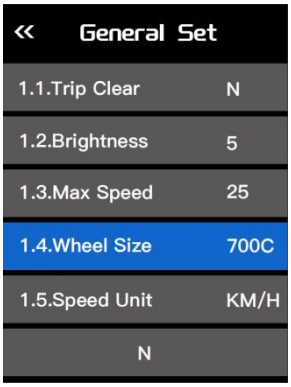
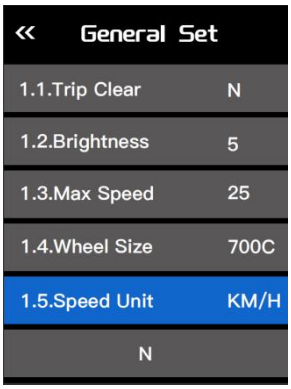
After starting up, in the basic function interface, long press SET to enter the setting interface, as shown in the follow:

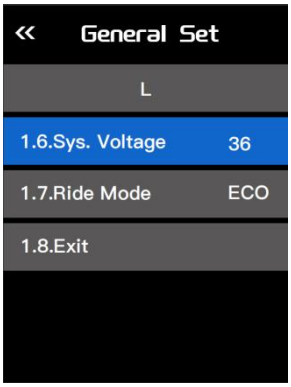
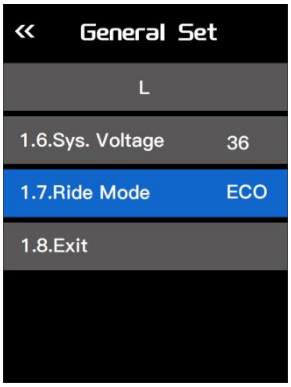


In this case, tap + or - to select a setting item. Press SET to enter the setting interface corresponding to the selected icon;Tap the Exit icon to exit the current configuration screen. On the Settings screen, select Save & Exit to exit the current configuration screen and return to the upper-level menu screen.

Setting function and each parameter setting is described as follows:

Setting items	Detail screen	Setting parameter	Parameter values	Remarks
Trip Clear	« General Set 1.1.Trip Clear N 1.2.Brightness 5 1.3.Max Speed 25 1.4.Wheel Size 700C 1.5.Speed Unit KM/H N	Clear the TRIP value	N-Save TRIP Y- Clear TRIP	Default: N

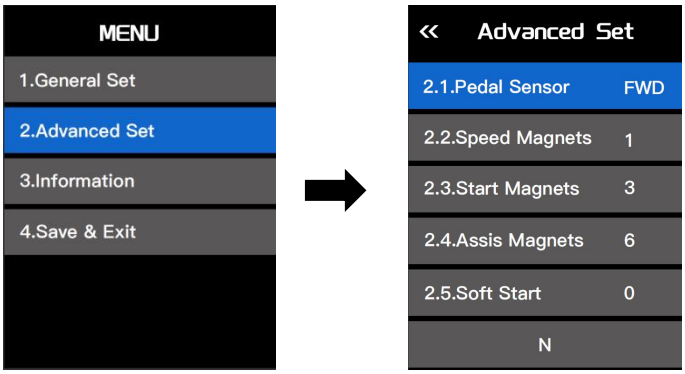
Brightness		Adjust the backlight brightness	0-5 adjustable, light mode	Default: 5
Max Speed			Parameter value: 10km/h-41km/h, 99km/h	Default: 25km/h
Wheel Size			Parameter value: 16, 20, 24, 26, 700C, 28, 29 (unit:inch)	Default: 700C
Speed Unit			Parameter value: KM/H or MPH	Default: KM/H

Sys. Voltage			Parameter value: 24V,36V,48V, 52V	Default: 36V
Ride Mode			Parameter value: ECO NOR POW	Default: ECO

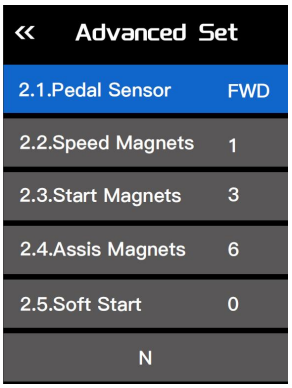
8. Advanced setting

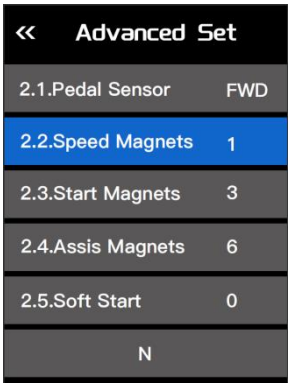
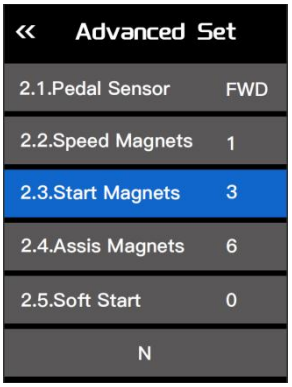
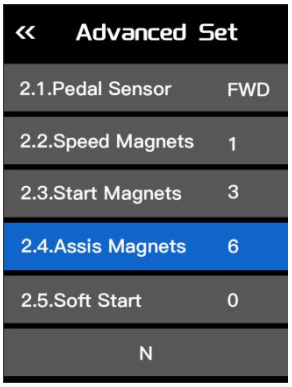
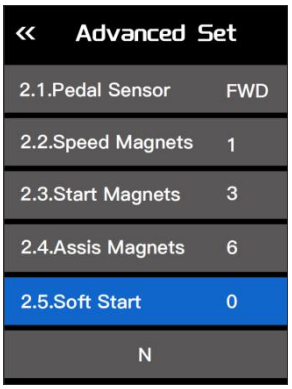
* Warning

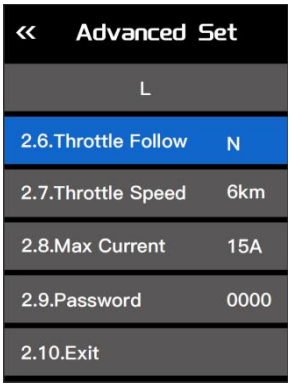
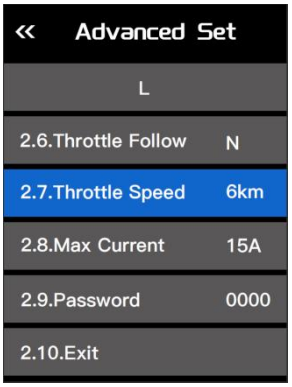
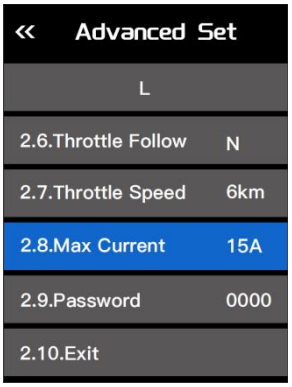
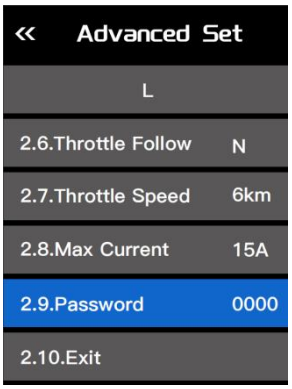
The advanced setting function is based on specific protocol content, allowing the modification, and setting of controller and system parameters through M300C. This feature suggests professional operation, such as bicycle manufacturers, distributor, and other objects with professional technical ability. Allows necessary system debugging and maintenance through advanced setting functions. If there is incorrectly parameter setting or other setting problems, the bicycle system will not work properly, or even other failure problems.



Each function parameter under the advanced setting function is described as follows:

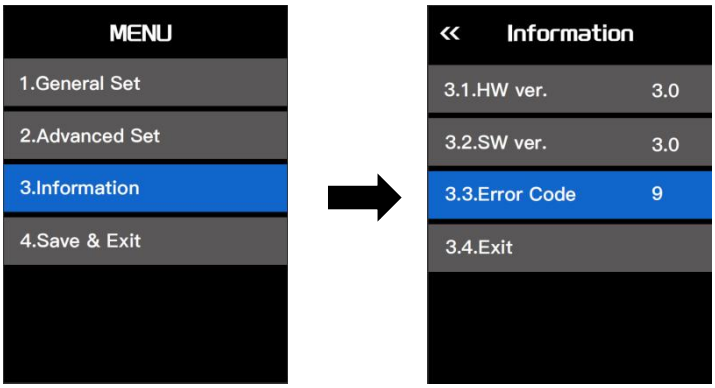
Set items	Screen Content	Setting parameter	Parameter values	Remarks
Pedal Sensor		Sensor assisted direction selection	Parameter value: FWD is positive BWD is reversed	The default sensor assist direction of the instrument is positive

Speed Magnets		Speed sensor number of magnetic steel in a circle	Parameter value: 1 or 6	Default: 1
Start Magnets		Indicates that the power of several magnetic steel starts	Parameter value: 2-63	Default: 3
Assist Magnets		Set the parameters of the assist magnets	Parameter value:6,12,24	Default : 6
Soft Start		Set the parameters of soft start strength	Parameter value: 0-3. 0 is the strongest and 3 is the slowest	Default: 0

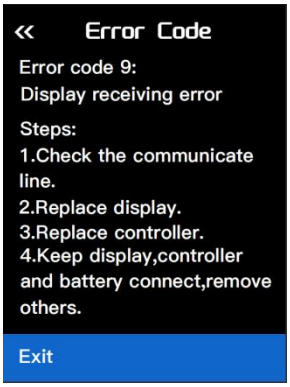
Throttle Follow			Parameter value: N: The throttle does not shift Y: Shift the throttle	Default: N
Throttle Speed			Parameter value: FULL: Normal throttle 6KM: speed limit 6KM/H	Default: 6KM
Max Current		Maximum current setting	Parameter value: 2- 20A	Default:15A
Password		Set Password	The meter has no password by default, and the user can set a 4-digit password	the startup password is set to any non-zero value is enabled. set to 0000 is disabled

9. Device information

Setting screen You can choose to enter the device information screen, as shown in the following figure:



M300C hardware version (HW ver.),M300C software version (SW ver.) and error code. Selecting the fault code and pressing the SET button can display the fault code explanation and fault relief method.



10. Error information

After starting up, in the basic function interface, when a fault occurs, the error code is often displayed.

The error code shows as follows:

The 5S protocol fault code table is as follows:

Error code	definition	content	Treatment method
30	Instrument communication failure	1. The blue communication cable of the instrument is in poor contact 2. The instrument communication circuit is faulty 3. The communication circuit of the controller is faulty	1. Ensure that the communication cable between the controller and the instrument is in good contact 2. Replace the meter 3. Replace the controller
21	Current anomaly	1. The connection line between the motor and the controller is in poor contact 2. The motor is damaged 3. The controller is damaged	1. Check the thick wire connector between the controller and the motor to avoid short connection 2. Replace the controller 3. Replace the controller
22	Throttle anomaly	1. The throttle is damaged 2. The controller swivel detects circuit faults 3. The ground cable of the rotating cable falls off	1. Replace the throttle 2. Replace the controller 3. Check that the negative cable of the rotary handle is properly connected to the negative signal cable of the controller
23	Motor out	1. Motor phase line falls off	1. Ensure that the motor phase

	of phase	2. The controller is damaged 3. The motor is damaged	wire is properly connected 2. Replace the controller 3. Replace the motor
24	Hall anomaly of machine	1. The motor cable is not properly connected to the controller 2. The motor Hall is damaged 3. The controller detects a circuit fault 4. The ground cable falls off	1. Ensure that the motor is properly connected to the controller terminal 2. Replace the motor 3. Replace the controller
25	Abnormal braking	1. Bad brake throttle 2. The brake lever link is short-circuited 3. The controller detects a circuit fault	1. Replace the brake throttle 2. Replace the cable connection for the brake throttle 3. Replace the controller

(* The corresponding fault code of different system protocols is different. If the fault code of the instrument is displayed, please promptly communicate with our sales and technical support team for verification and confirmation!)

11. Wire definition

Definition of standard cable

Table 1 cable color and function

No.	Color	Function
1	Red	Battery+
2	Blue	Weak lock line
3	Black	Battery-
4	Yellow	TX
5	Green	RX

C. Packing specification

Standard shipment, according to three layers of corrugated box packing plus pearl cotton packaging bag packaging products; there are 20 small grids in each layer of corrugated grid.

Box specification: 670mm*355mm*185mm

D. Notes

✧ 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 exposure in 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, Otherwise it will affect the normal operation of the system.