# DM08C Top Tube Embedded Display Functionality Introduction

Product Name：Colored IPS Screen Display

Product Model：DM08C

| | Signature | Date |
|---|---|---|
| Editor | Liu Lei | 2024.9.03 |
| Checked | | |
| Approved | | |

# Revision History

| Version No | Reviser | Date | Revision content |
|---|---|---|---|
| V1.0 | Liu Lei | 2024.8.22 | Initial version |
| V1.1 | Liu Lei | 2024.10.18 | 1.Update product description (P5)<br>2.Add button selection recommendations (P26) |
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# Declaration

**DM08C functional definition is a function definition description of the standard-version DM08C display produced by Velofox , and is part of the technical documentation.**

**All of Velofox’s display products are customized according to the electric system’s requirements. While this document is a reference for complete function definitions, operation instructions, and error codes, any configuration difference between your display and the standard DM08C is possible, due to various technical requirements in different ebike applications. Please consult your drive system supplier for additional function requirements and data display.**

**If you have any questions about DM08C functional definition, please consult our sales or technical support team.**

**Our company (VeloFox®) reserves all the rights to interpret and explain DM08C functional definitions.**

**Hangzhou Velofox Intelligent Technology Co., Ltd**

# A.Product Introduction

## 1.Product name and model

IPS display of electric power assist bikes

Product model：DM08C

- DM08C includes two versions of UART communication and CAN BUS communication

  DM08C_U corresponds to UART communication version；

  DM08C_C corresponds to CAN BUS communication version.

- All DM08C products are equipped with Bluetooth functionality in terms of hardware.

## 2. Product introduction

✧ High-brightness 1.45" IPS color LCD screen.

✧ Enlarged operation area with ergonomically designed buttons.

✧ IP65 waterproof level, excellent for outdoor use.

✧ Built-in Bluetooth function, compatible with CAN-BUS and UART communication.

✧ Service Tool function for fast firmware upgrade, parameter setting, and easy maintenance.

## 3. Range of application

Suitable for all E-bikes that comply with EN15194 standard

## 4. Appearance and size

The shell material of DM08C is PC+ABS， the screen is made of high-hardness imported tempered glass,The product is suitable for integration into top tube projects.

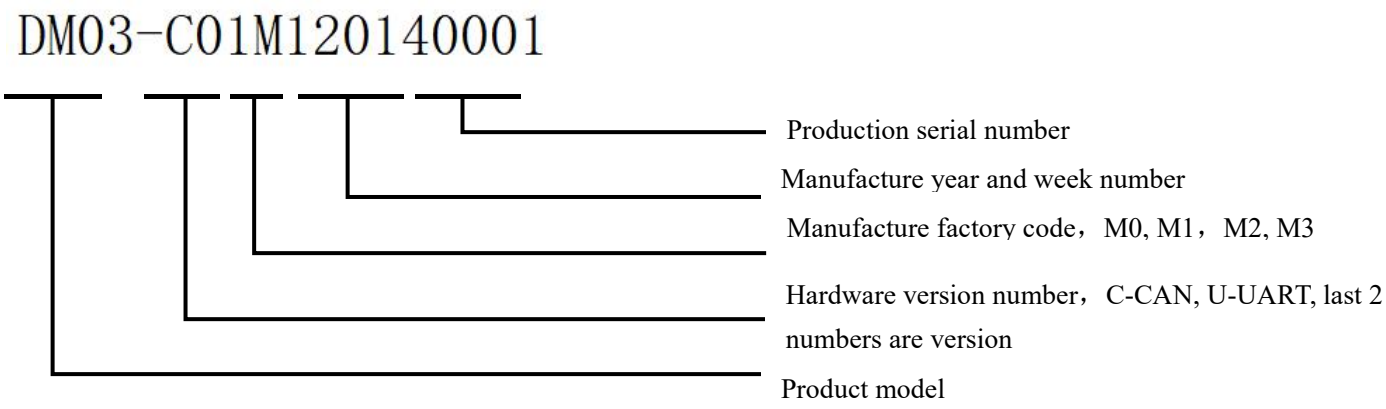
32.1mm
96mm
23:26
20.1
MPH
TRIP
145.6
KM
BOOST
M4*8 螺钉

## 5.display coding rules

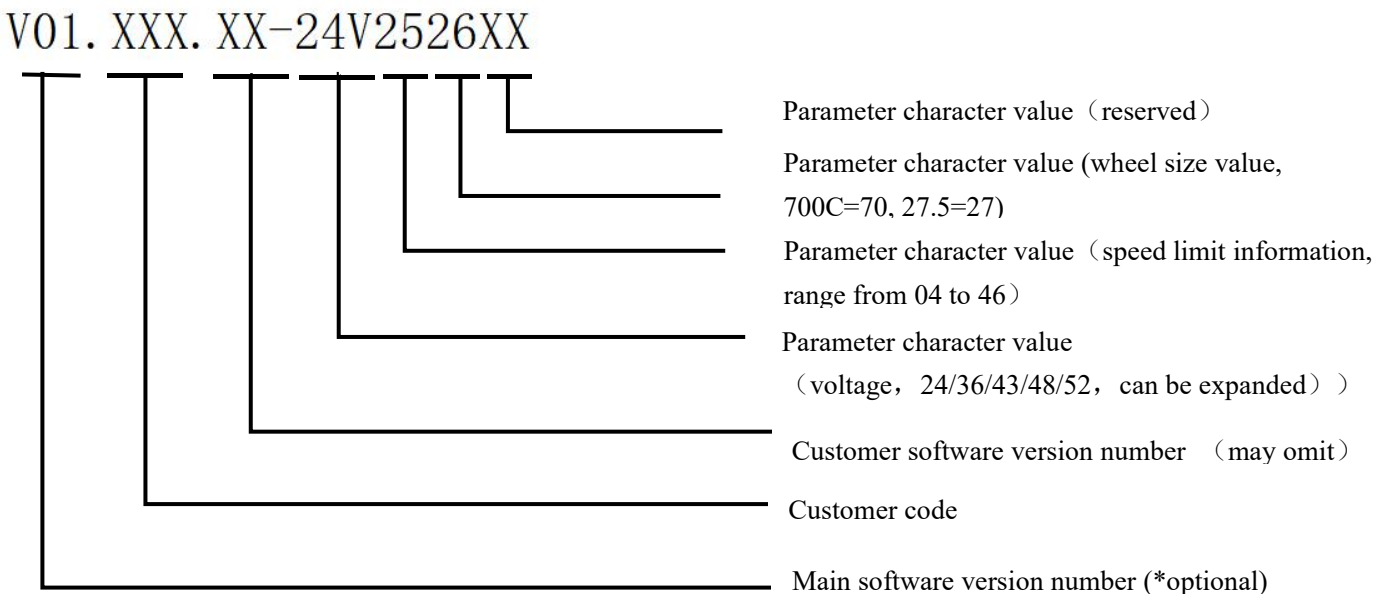
DM03-C01M120140001

V01.XXX.XX-24V2526XX

As shown in above picture：




M0: Represents VeloFox self-made.




Example：

DM08C-C01M020340001

A27.01-36V2570

# B. Product manual

## 1. Specifications

① Power supply：DC 24V/36V/48V/72V

② Rated current：40mA

③ Shutdown leakage current：<1uA

④ Screen specification：1.45" IPS color LCD screen.

⑤ Communication method：UART/ CAN-BUS

⑥ Operating temperature：-20° C ~ 60° C

⑦ Storage temperature：-20° C ~ 70° C

⑧ Waterproof level：IP65

## 2.Function overview

① 2 buttons, ergonomic design

② Selectable digital assist levels and icon-based assist levels, highly visible

③ Units: Metric/Imperial switchable

④ Speed display: Supports real-time speed/max speed/average speed display

⑤ Battery indicator with percentage display

⑥ Mileage display: Trip mileage (TRIP), Total mileage (ODO)

⑦ Walk assist function

⑧ Parameter setting function and advanced setting function

⑨ Error code display function

## 3. Installation

① Insert the head mounting clip into the top tube and push the display to the end.

② Use an M4 Torx screwdriver to secure and tighten the fixing screws (tightening torque: 0.5 N • m).

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

# 4 .Interface

4.1 Boot interface

Boot logo interface is displayed for 3 seconds after the display is turned on. When the communication connection is established, display enters the main interface which shows information obtained from the controller. ( All data displayed is following communication protocol provided by the customer)

4.2 Basic interface and operation

① 2 buttons ： the power button、+/−Adjustment button.

② The standard cable exit method is straight out (optional to add any VeloFox RM protocol button).

③ The screen uses a 1.45-inch high-brightness, high-definition IPS LCD, meeting the customization and modification needs of the startup interface and partial UI interfaces.

4.3 Function interface introduction

**Boot interface and basic function interface**

The boot logo interface is displayed for 3 seconds after the display is turned on. Once the communication connection is established, the display reads and shows relevant information stored in the controller according to the communication protocol, and displays battery BMS information. (If BMS information is not available, the system will not show the battery percentage.) All other information is displayed in real time.

**Other function interfaces**

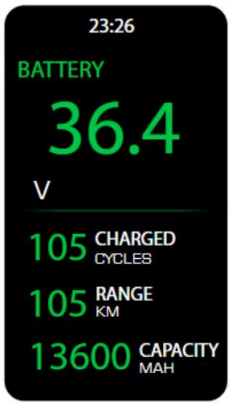
**Function interface I**

Interface I primarily displays speed information, including trip mileage, average speed, maximum speed, and total mileage, with the trip mileage (TRIP) being the same as on the main interface. The speed display value is a 3-digit number with one decimal place, with a maximum value of 99.9 KM/H. The trip mileage value is usually a 4-digit number including one decimal place; once it exceeds 999.9 KM, the decimal point is no longer displayed, showing a direct 4-digit number with a maximum value of 9999 KM. When the maximum value is exceeded, the displayed number is the actual mileage value modulo 10000.The total mileage is a 6-digit number with one decimal place. When it exceeds 99,999.9 KM, it will no longer display the decimal place and will show a 6-digit number, with a maximum value of 999,999 KM.When the maximum value is exceeded, the displayed number is the actual mileage value modulo 10000.

**Function interface Ⅱ**

Functional Interface II primarily displays battery-related information, including battery voltage, capacity percentage, total charge cycles, and remaining range. The total charge cycles are provided by the battery BMS (Battery Management System); if the BMS does not provide this information, it will display ----. The remaining range information is calculated by the controller based on the battery BMS capacity. If the

controller does not provide the remaining range information, it will display ----.




**Functional Interface III**

Functional Interface III primarily displays the usage time statistics for different assist modes during riding. The statistical data is calculated by the display based on the actual riding state and is shown as a percentage. The usage time statistics for assist modes can be reset to zero through a data clearing operation.

**Functional Interface Ⅳ**

Interface Ⅳ primarily displays power statistics, including the average power output of the motor, maximum power.

**Functional Interface Ⅴ**

Function Interface V primarily displays the rider power and motor power ratio statistics, which requires support from the controller.

**Error code interface**

When the display receives the error info returned by controller, it will show a detailed error code on interface, indicating relevant electrical system fault information. The error code will be displayed numerically in the speed display area.

# 5.Button definition

5.1 Button name

Power button: Long press to turn on/off the display；

Short press to toggle the light on and off.

Adjust button:Short press to adjust the assist level (cycling through levels) and use the function switch key for setting operations.

Long press the adjustment key to switch between pages.

5.2 Definition of button operation

| Operation Type | Description |
|---|---|
| **Short press** | Press the button and soon released, while the button is released,the function activated accordingly. |
| **Long press** | Press the button and hold, when the hold time exceeds the setting time(generally 2 seconds), the function activated accordingly. |
| **Combined Short Press** | Combined short press involves briefly pressing one button, then, while keeping it pressed, pressing another button. Release both buttons after the second button has been pressed for the set time (usually within 1 second) to trigger the function. |
| **Combined long press** | Combined long press means pressing and holding down two buttons simultaneously. When the buttons are held for longer than the set long press duration (usually 1 second), the corresponding function is triggered. |

# 6. Basic function operation

## 6.1 Turn on/off the display

To turn on, long press button until boot logo interface appears and shortly enters the basic interface. To turn off, long press button until display is turned off. If the rider does not perform any operation on the display within set shutdown time, while speed is 0, and current is less than 1A, then the display will be turned off automatically. Set shutdown time is self-defined by user.

## 6.2 Assist level switch

In the working state after power-on, short press the +/- adjustment buttons to display the assist progress on the left bar graph and the current gear number at the bottom left. You can switch between assist levels (the levels cycle through).

Interface Diagram

Short pressing the +/- adjustment buttons cycles through assist levels. After reaching the BOOST level, continued short pressing of the +/- adjustment buttons will return to the OFF level, completing the cycle.

## 6.3 Information switch

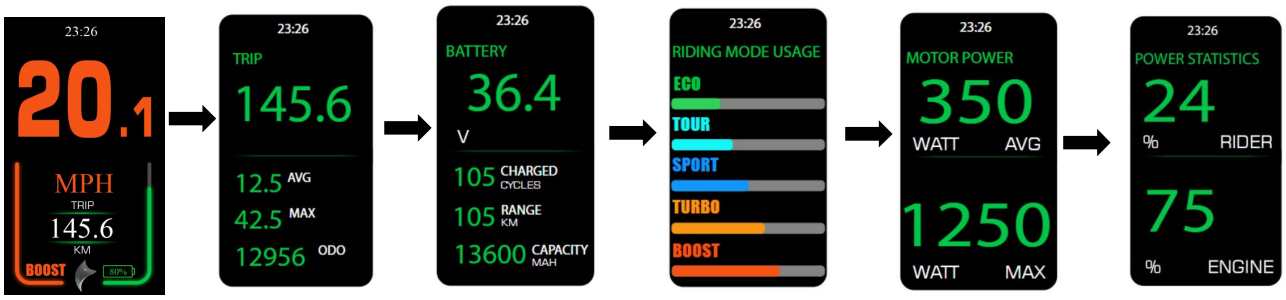
After 10 seconds in the power-on state, long press the +/- adjustment buttons to cycle through the display information screens: Basic Interface, Function Interface I, and Function Interface II. During normal riding, if the speed is greater than 0 and the display is not on the Basic Interface, the system will

automatically switch back to the Basic Interface.

Function Display Screen I shows average speed, maximum speed, and total mileage for a single ride.

Function Display Screen II shows remaining range, voltage, and remaining capacity.

The interface switching flow is shown in the diagram below:




*If the system does not support BMS communication, the display cannot obtain accurate RANGE information, and the RANGE value will be shown as ----.

6.4 Light control function

When the battery is installed and the vehicle is powered on, a short press of the button will turn on the front light. The display will show the light-on icon in the top left corner, indicating the light is on, and the screen brightness will decrease. Pressing the button again will turn off the front light.

6.5 Speed Display Switching

The display provides speed information, showing real-time speed, average speed (AVG), and maximum speed (MAX). Users can switch between these options by long pressing the +/- buttons. For details, refer to section 6.3 on display information switching.

6.6 Battery power indicator and assist power output

When the battery level is normal, the battery percentage is displayed. Before establishing communication with the battery on startup, the percentage is not shown, and the battery level displays 100% with a 2Hz flash. Once the battery level is read, the flashing stops and the percentage is displayed. If communication is not established within 3 seconds of startup, the flashing stops, and the percentage is not displayed.

When the battery capacity drops below 5% or the battery voltage falls below the undervoltage threshold, the display will indicate undervoltage, and the battery outline will flash at 1Hz. After an undervoltage condition, the system needs to be powered off and on again. The undervoltage mode will only be exited if the voltage is greater than the undervoltage threshold and the battery capacity is at least 5%.

The following table shows the battery percentage and corresponding display icons(requires BMS or controller to provide the percentage):

| Remaining Percentage Information | Battery Indicator | Description |
|---|---|---|
| 5% ≤SOC ≤100% | | The battery capacity is displayed directly as a percentage. |
| 0% ≤ SOC < 5% | | A red icon is displayed, and the battery symbol flashes at 1Hz. |

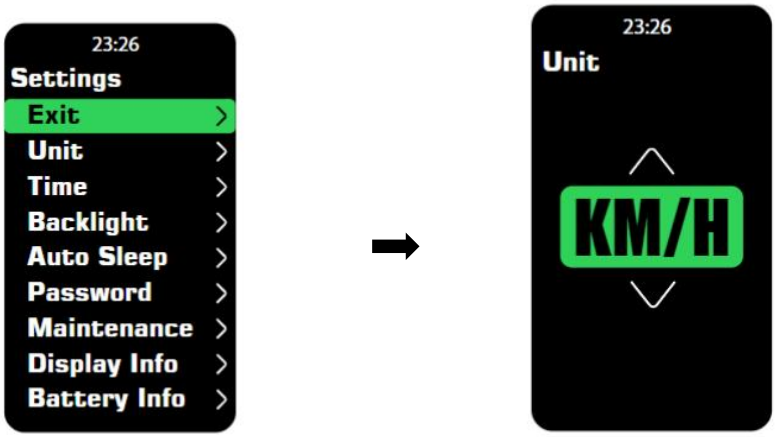
## 7.Setting function

Display provides specific parameter setting functions. The optional items of setting function will be deleted according to different market and product standards. The following is the complete parameter setting, information reading function description under the default state of display. Please contact our sales and

technical support team for confirmation in case of any discrepancies.

Within 10 seconds of powering on, long press the function key of the external button to enter the settings menu. When using external buttons, a combined long press of the “+” and “-” buttons will enter the settings menu. A short press of the “+” or “-” buttons will cycle through the settings menus. In any settings menu, a combined short press of the “+” and “-” buttons will enter parameter editing mode. In the parameter editing interface, selection is indicated with a blue icon, and selected options or parameters are displayed with a grey background and white font. To modify parameters, use short presses of the “+” or “-” buttons. A combined long press of the “+” and “-” buttons confirms changes and exits the editing mode. Another combined long press of the “+” and “-” buttons will exit to the previous menu screen.

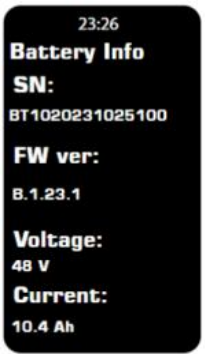
In the selection state, the chosen parameter is displayed with a green background and black text, as shown in the illustration below:




he settings menu initially enters the primary system parameters settings interface. Descriptions of each parameter settings interface are as follows:

| Settings Items | Interface Content | Parameter Definition | Parameter Values Definition | Remarks |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| Unit setting | | Unit | Value=KM/H<br>MPH | Default Value=KM/H<br><br>KM/H—Metric<br><br>MPH—Imperial |
| Clock Settings | | Time | Factory setting writes the current time. | can be modified. |
| Backlight level setting | | Backlight | Value= 1,Back light level60%<br><br>Value= 2Back light level80%<br><br>Value= 3Back light level100% | Default Value= 3 |
| Auto shutdown time | | Auto Sleep | Value=OFF,5-30 min | Default Value=5min "OFF" Indicates No Auto Shutdown |

| | | | | |
|---|---|---|---|---|
| Power on Password setting | | Password | Value= OFF and ON；<br>参数值为 ON 的情况下，允许用户设定 4 位数密码 | Default Value：OFF |
| Maintenance Reminder Settings | | MAINTENANCE | Fixed value | Default= 5000km |
| Display info | | Display Info | read only | According to communication protocol |
| Battery info |  | Battery Info | read only | According to communication protocol |

| | | | | |
|---|---|---|---|---|
| Controller info | | Controller Info | read only | According to communication protocol |
| *Advanced setting functions | | Advanced Set | Entering Advanced Settings Secondary Parameter Configuration Interface | Refer to the advanced settings instructions for details. |
| Reset to Factory settings | | Reset | factory data reset | All parameters will be restored to factory settings values. |

# 8. Advanced setting functions

***Warning**

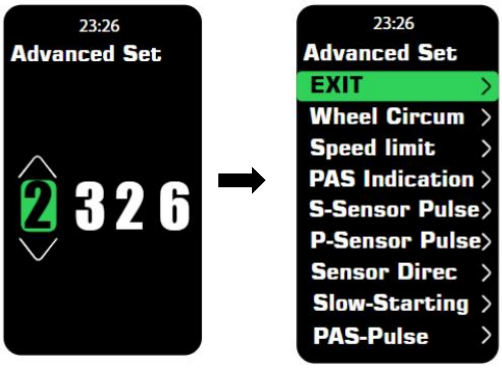
The advanced setting function is based on specific protocol content, allowing to modify and set the controller and system parameter through display side. This feature is only available to specific groups of people, such as bike manufacturers, dealers and other entities with professional technical capabilities. Debugging and maintenance are allowed through advanced setting functions. In case of improper parameter setting or other setting problems, the whole system will work improperly or even have failure problems.

Please be cautious about whom to open this feature to!

Advanced settings require a specific password, if you need to use this feature, please communicate with our company sales and technical support team to confirm compatibility with your current hardware version. In the meantime, please confirm with our sales and technical support team for adequate maintenance capacity, before obtaining the password.

**Advanced setting operation instructions**

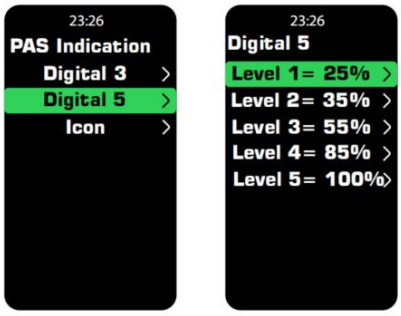
After selecting the advanced setting in the first-level menu, short press the +/- adjustment keys to enter the login password. Short press the +/- adjustment keys to select the corresponding password digit in the 4-digit password field. The selected password digits will be highlighted with a white background. Short press the +/- adjustment keys to edit password value and confirm the input. The password input interface is as follows:




After the password is typed correctly, advanced setting is entered, divided into two-page contents. Short press the +/- adjustment keys to pick and select.The triangular cursor on the right indicates the selected item.

Advanced setting functions descriptions：

| Setting item | Interface | Description | Setting data | Remark |
|---|---|---|---|---|
| Wheel size setting | | Wheel Circum | Value=16、18、20、22、24、26、27.5、700C、28、29 | Default value：26 |
| Speed limitation setting | | Speed limit | Value= 5 to 46 | Default value= 25<br>Step=1 |

| | | | | |
|---|---|---|---|---|
| **Assist Level Mode Setting** |  | PAS lndicatin | Value=<br>Dig-3；<br>Dig-5；<br>ICON | **Dig-3**: 3-Level Setting<br>**Dig-5**: 5-Level Setting<br>**ICON**: English Version Levels |
| **Speed Magnetic Steel Number** | | S-Sensor Pulse | Value= 1--12 | Default value：1<br>Step=1；<br>Motor Speed Magnet Number |
| **Assist Magnetic Steel Number** | | P-Sensor Pulse | Value= 1-64 | Default value：12<br>Step=1;<br>Assist Magnet Number |
| **Assist Magnetic Steel Direction** | | Sensor Direc | Value= F or R | F=Forward<br>R=Reversed<br>Assist Sensor Signal Direction: Can be adjusted based on left or right mounting. |

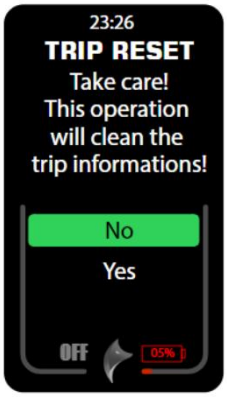
| | | | | |
|---|---|---|---|---|
| **Soft Start** | | Slow-Starting | Value= 0-3 | Default value：0 |
| Assist Magnetic Steel Starting Pole Number | | PAS pulse | Value= 2-63 | Default value：2<br>Step=1<br>Assist Start Magnet Count |
| Current Limiting Value Setting | | Current Limit | Value= 0-31.5A | Default value：12<br>Step=0.5A<br>Controller Current Limit Setting |
| **System Voltage Setting** | | System Voltage | Value= 24V/36V/48V | Default value：36V<br>Select System Voltage Value |

| | | | | |
|---|---|---|---|---|
| **Under-Voltage Protection Setting** | | Low Voltage | Value=<br>10.0-52.0V | Default value：<br>31.5V<br>Step=0.5V<br>Set Controller Undervoltage Protection Value |

## 9. Data clearance

Data clearance is aimed at the removal of data information such as subtotal mileage TRIP, average speed, and maximum speed.

After 10 seconds of normal startup, on the main page of the display, long press the +/- adjustment keys to enter the data clearing prompt status. Short press the +/- keys to select the operation content in the pop-up dialog. Long press the +/- keys to confirm and clear the data information. The data clearing pop-up will exit the data clearing mode if no operation is performed within 30 seconds or if the +/- keys are long pressed.




After data clearing, the trip meter (TRIP), average speed, and maximum speed will be reset to zero. The cumulative mileage (ODO) cannot be cleared through the display and requires specialized maintenance tools for resetting.

# 10. Error information

Display can warn bike faults. When faults are detected, error code will be shown on the interface and blink at 1Hz. When error code is shown, button functions will not be affected, meaning interfaces can be shown normally by pressing buttons. If no button operation after 5s, the display will return to the error code interface.

Error code interface as shown below:

**error code information table:**

| Error code | Error description | Suggest operation |
|---|---|---|
| "04" shown at speed | throttle doesn't turn back to zero position (stay on the high position) | Check if the throttle turned back |
| "05" shown at speed | throttle failure | Check throttle |
| "07" shown at speed | overvoltage protection | Check battery voltage |
| "08" shown at speed | failure of motor's hall signal wire | Check motor |
| "09" shown at speed | failure of motor's phase wire | Check motor |
| "11" shown at speed | failure of the motor's temperature sensor | Check controller |
| "12" shown at speed | failure of the current sensor | Check controller |
| "13" shown at speed | failure of the temperature of the battery | Check battery |
| "14" shown at speed | Controller temperature is too high, and reaches the protection point | Check motor |

| | | |
|---|---|---|
| **"21" shown at speed** | **failure of the speed sensor** | **Check the install position of the speed sensor** |
| **"22" shown at speed** | **Failure of BMS communication** | **Change battery** |
| **"30" shown at speed** | **communication failure** | **Check connector to controller** |

**（* Different communication protocols are different in error code system. If an error code appears, please communicate with our sales and technical support team to verify and confirm!）**

## 11. Key Selection Recommendations

| | | | | |
|---|---|---|---|---|
| **Remote** | Product images | | | |
| | **Product name** | **RM01** | **RM05** | **RM07（Bluetooth Key）** |
| | Button | Four keys: power on/off (power button)/M key/+ key/- key | Add +/subtract - key | Add +/subtract - key |

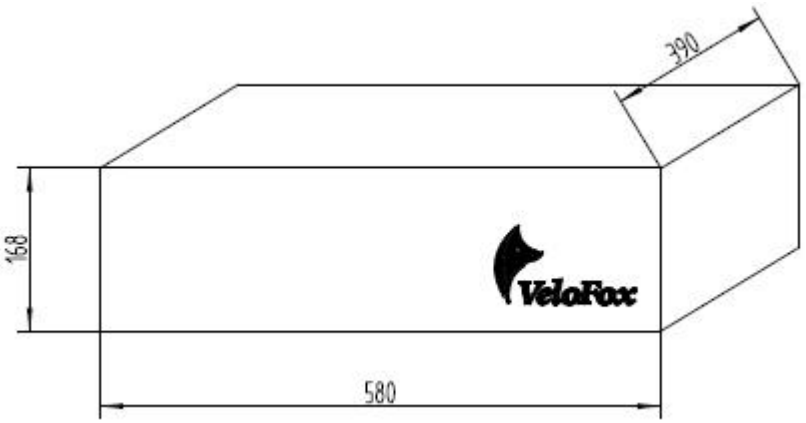
# 12. Wire definition

According to the system adaptation for the customer's actual vehicle model, the wiring status of the display is as shown in the figure below:

# C.Package specifications

Standard delivery, in double corrugated box packaging. The inner layer is a double corrugated septum plus EPE foam product bag.

Outer box size：580*390*168mm (L*W*H)




# D.Note

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