# ES500B Meter User Manual

1. GENERAL INFORMATION

1.1 Product Specifications

| MODEL | ES500B | ECU | ES500BFOC |
|---|---|---|---|
| Standby Power | ＜5mA | Working Voltage | 42 V |
| Dimension | 37*32*22 (mm) | Working Temperature | -40℃~70℃ |
| Head Lamps | ES500B Head Lamp | Acceleration | Hall Acceleration |
| Brake | Mechanical Brake | Hardware Version | 2020-11-27 |
| Case Material | None | Software Version | 516184 |

1.2 Harness Interface

| Interface | Terminal Specification | |
|---|---|---|
| Headlamp | White 2-core SMfemale; red and black wire. | Meter |
| Brake | White 3-core male; red, green and black wire. | |
| Acceleration | White air docking 3-core female; red, yellow and black wire. | |
| Communication | 5-core male; red, green, blue, yellow and black wire. | |
| Horn | White 2-core female; red and black wire. | |

## 2. TECHNICAL PARAMETERS

### 2.1 BLE Parameters

| No | Item | Parameters |
|---|---|---|
| 1 | Antenna | Internal Only |
| 2 | Chipset | NRF52832 |
| 3 | Frequency | 2.4G RF Transceiver Compatible with Bluetooth Low Energy (BLE) |
| 4 | Sensitivity | Excellent Receiver Sensitivity -90dBm |
| 5 | Max out RF Power | Up to -0.26dBm |
| 6 | Antenna Gain | 1dBi |

### 2.2 Other Parameter

| No | Item | Parameters |
|---|---|---|
| 1 | MCU | Core: NRF52832<br>Flash Memory: 512 kB<br>Ram: 64 kB |
| 2 | Timing Report | Reportstatus at pre-set intervals |

## 3. METER FUNCTION DESCRIPTION

### 3.1 Operation Function

| No | Function Item | Function Description |
|---|---|---|
| 1 | Headlight Control | The headlights are turned on by default when the power is turned on.<br>The headlights are turned off when the power is turned off.<br>The headlights are blinking when looking for the scooter, and the headlights are automatically turned off when charging. |
| 2 | Speed Limit | The speed limit mode is sent by the APP via Bluetooth to the meter, and then the meter sets the controller.<br>The speed is limited under 18mph. |
| 3 | Acceleration | When the power is on, the assist sliding speed exceeds 4 km/h (2.5 mph).<br>When the handle is pressed, the system will control the rotation of the hub |

| | | |
|---|---|---|
| | | according to the depth of the handle press.<br>The lighter the press, the slower the speed, the faster the press, the faster the speed. The real-time speed is displayed in the first three words of the meter. |
| 4 | Brake | The brake is electronic brake + drum brake. When the brake is pressed, the system controls the output electromagnetic brake and slows down gradually until the hub is locked. |
| 5 | Kick Start | The controller can drive the motor only when the speed of the kicking is above 4 km/h or 2.5mph. |
| 6 | Speed Unit Switching | The speed unit of kilometer or mile is controlled by app via Bluetooth.<br>The speed unit can be changed by pressing the button 5 times. |
| 7 | Online upgrade | Controller firmware and instrument firmware can be upgraded through Bluetooth. |
| 8 | Bluetooth control command receiving | It can receive instructions sent by mobile phone/upper computer via Bluetooth, analyze them, and perform corresponding actions, such as turning on and off vehicle locks and headlights |
| 9 | Issue of control instruction | Relevant control instructions are sent through UART channel to control the relevant actions of the controller. |
| 10 | Error Code Showing and reporting | The meter can display error code reported by its own judgment and controller, and report to the upward computer/APP via Bluetooth timing. |
| 11 | Timely reporting of real-time vehicle information | The instrument reports the real-time status information of the body, such as current speed, VMT, total VMT, etc., through Bluetooth timing up-position machine/APP |
| 12 | Vehicle configuration information report | After receiving the instruction to read the vehicle configuration information via Bluetooth, the instrument will report the vehicle configuration information via Bluetooth upward machine/APP. |
| 13 | Switch to start mode | Switch the scooter to power-assisted or non-power-assisted startup mode through Bluetooth command configuration; |
| 14 | E level implementation | When the speed is greater than 3km, the motor can be started. The |

| | | |
|---|---|---|
| | mode | maximum speed is 5km. It can only be started with help, not without help, and the meter flashes at the same time. |
| 15 | On/off cruise mode | Configure the scooter to turn on or off the constant speed cruise mode by Bluetooth command. |

3.2 Error reporting Function

| Error Code | Error Item | Reasons |
|---|---|---|
| 01E | Over current protection | The current exceeds the limit. |
| 02E | low-voltage protection | battery voltage lower than 42V |
| 03E | Short circuit of motor phase line | Short circuit of motor phase line when unlocking |
| 04E | Motor block protection | Motor blocked or short circuit or drive failure |
| 05E | Drive upper bridge failure | Drive upper bridge MOS tube damaged or breakdown |
| 06E | Drive down bridge failure | Drive down bridge MOS tube damaged or breakdown |
| 07E | Hall problem for the motor | Hall line sequence is wrong or poorly connected |
| 08E | High temperature of the motor | Motor temperature higher than normal working temperature |
| 09E | Throttle problem | Hall problem for the throttle or poorly connected |
| 10E | Left rake problem | brake problem or poorly connected |
| 11E | communication failure between instrument and electronic controller electronic controller | instrument problem or poorly connector for the communication signal wire signal wire |
| 12E | Instrument received data timeout failure | instrument problem or poorly connector for the communication wire |
| 14E | Right rake problem | Hall problem for the throttle or poorly connected |
| 15E | Controller firmware missing | Instrument and controller communication failed or unable to communicate |
| 18E | Turn and turn back | Do not turn back on startup |
| 19E | Left brake handle not in position | The left brake handle is not in position on boot |
| 20E | Right brake handle not in position | The right brake is not in position when starting up |
| 31E | High temperature of controller | The working temperature of the controller exceeds the normal temperature |

3.3 Display Function

**Powerbutton:**

Long press to turn on, long press to turn off; after boot, click to turn on/off the headlights; double click to switch gears; short press 6 times to switch mile/mile;

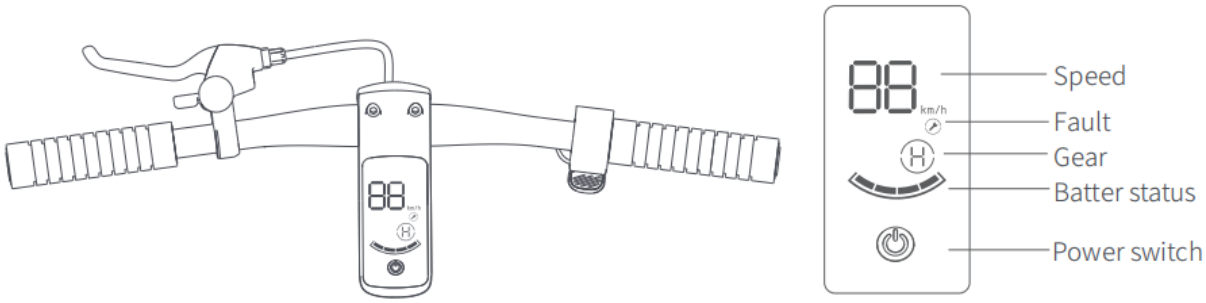
Short press once power button to turn on/off the headlights while the vehicle is power-on;

Short press twice to switch to E (pedestrian mode) /L (economic mode) /H (sports mode) while the vehicle is power-on;

E mode is pedestrian mode, the maximum speed is limited to 3 mph, suitable for pavement implementation;

L mode is economic mode, the maximum speed is limited to 9 mph;

The H mode is sports mode, and the maximum speed is limited to 18 mph;



## FCC Statement

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) This device must accept any interference received, including interference that may cause undesired operation.

### FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment .This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

**Note:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.
—Increase the separation between the equipment and receiver.
—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
—Consult the dealer or an experienced radio/TV technician for help.