



EMERALD™

User Manual

emerald.shop

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Thank you for purchasing from EMERALD!

Congratulations on your new Emerald Bike! Electric pedal-assisted cycles (EPACs) are an increasingly popular and eco-friendly alternative means of transportation. With the combination of peddling power and electric assistance, you can cover further distances faster! Long-distance rides and steep hills become no challenge at all on your new Emerald Bike—all while cutting your carbon emissions to zero and saving on the cost of gasoline.

It is important to take safety measures when riding any bike—whether EPAC or traditional. To ensure a safe riding experience, always wear a helmet and other necessary protective equipment—and check your local traffic laws before you hit the pavement. Before your first ride on an EPAC, we recommend reading this user guide carefully so you can enjoy a pleasant (and safe) ride in confidence!



1. General Description



Parts Diagram

- | | | |
|------------------------------|-----------------------------|----------------|
| 1. Motor | 8. Handle Stem | 15. Controller |
| 2. Taillight | 9. Front Light | 16. Kick Stand |
| 3. Rear Hydraulic Disc Brake | 10. Front Fork (Integrated) | 17. Derailleur |
| 4. Lithium Battery | 11. Front Disc Brake | 18. Rim |
| 5. Saddle | 12. Frame | 19. Charger |
| 6. Display | 13. Pedal | 20. Tool Kit |
| 7. Handlebar | 14. Crank | |

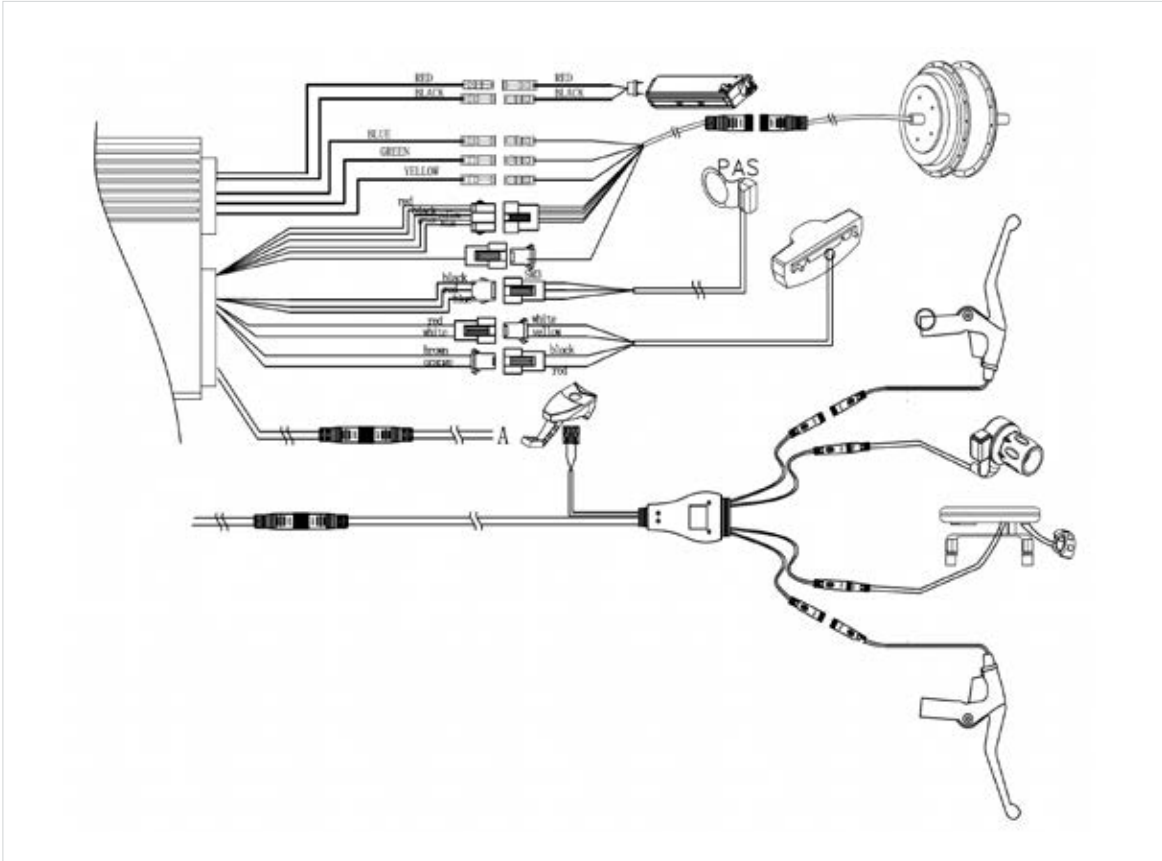


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2. Electric System



Wiring Diagram

Note: Above is the wiring diagram of front/rear drive motor. There might be difference for different model or display.

3. Parts Identification

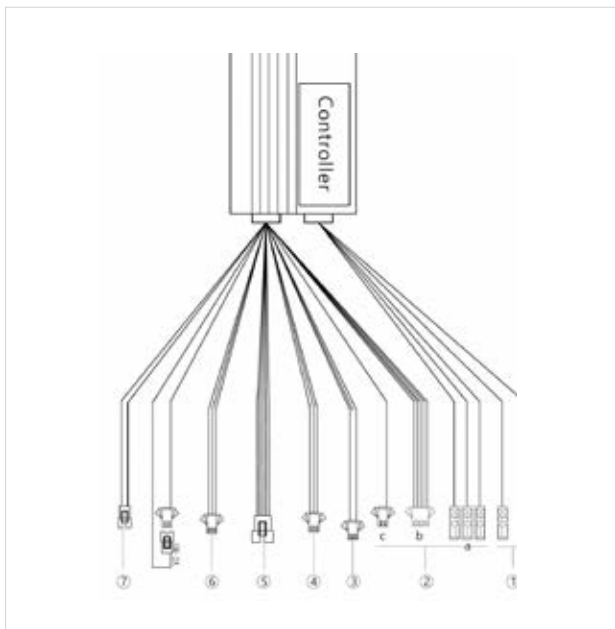


3.1 Function Display

Display–LCD

1. **Model: ON/OFF**
2. **Assistance level increase (+)
Bottom left of display**
3. **Assistance level reduction (-)
Bottom right of display**

Note: There are 5 levels of pedal assistance; simply press (-) to reduce or (+) to increase. See section 7.) Display and Controls for further explanation.



3.2 Controller

Note: On the left is the wiring diagram of the basic controller. There might be slight differences between different models or displays.



3.3 PAS

Specifications & Reliability

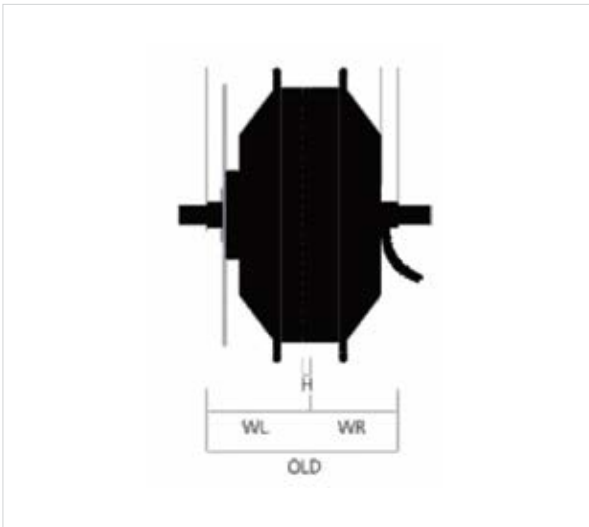
- **Model:** SM-07
- **Rated Voltage:** 5V (DC)
- **Installation Direction:** Left/Right
- **Color:** Black
- **Corresponding Time When Brake:** <0.001S
- **Corresponding Distance:** 2.3mm
- **Hall Electrical Life:** >20M times
- **Insulation Wet Condition:** >20M ohm
- **Insulation Dry Condition:** >2M ohm



Connector and Cable

- **Red:** +5V
- **Yellow:** GND
- **Blue:** Pulse Signal

Note: Above are specifications of the sensor of the double hall and 12 magnet buttons. There might be difference for different model or display.



3.4 Motor

Specifications

- **Motor Parameters:** 48v500W/380R (max.478R)
- **Top Speed:** 20 MPH
- **Maximum Torque:** 52.91N.m
- **Noise Level:** ≤ 55dB (measured at 1m axial)
- **Weight:** 12.8lbs
- **Mounting Width:** 175mm
- **Max. Diameter of Wheel:** 420mm
- **Model:** CZJB104Y16L175



3.5 Throttle

Specifications

- **Approvals:** RRoHS
- **Size:** L 60mm W 30mm H 47.5mm
- **Waterproof:** IPX5
- **Materials:** PC/ABS
- **Wiring:** Three Core Wiring
- **Power:** Working Voltage 5V Output Voltage 0.8-4.2V



3.6 Brakes

Adjustable Sensor Control XD-E500

Adjustable Sensor Control Design
For Use With Linear Pull Brakes &
Rapid-fire Shifters

Specifications

- **Hydraulic Oil:** Mineral Oil
- **Handle Material:** Aluminum
- **Hand Grip:** 3 Fingers / 4 Fingers
- **Disc as Standard:** 140MM 160MM 180MM 203MM Column/Side
- **Caliper Structure:** Split type
- **Surface Treatment:** Plastic Spraying, Painting
- **Power-Off Method:** Mechanical Contact Type Power Off
- **Average Weight:** Upper Pump 140G Caliper 150G
- **Disc Area:** 160mm

3.7 Battery



Specifications

- **Dimension (L*W*H):** 135*90*45mm
- **Nominal Voltage:** 48V
- **Nominal:** 10.5Ah/14Ah
- **Weight (Approx.):** <9lbs
- **Cell:** Samsung 35E 18650

4. Before You Ride

4.1 Adjusting the Height of the Seat

Unlock the lever (OPEN), adjust the seat height to the desired position without ever exceeding the mark carved onto the seat's tube, and lock the lever (LOCK). The seat's height must be set so that your leg is stretched out when the corresponding pedal is in the lowest position. The insertion depth of the seat post height must exceed the safe line.

4.2 Adjusting the Height of the Handlebar Stem

Adjust the handlebar height by changing the handle stem angle with the provided Allen wrench.

The Recommended Handlebar Torque Value

| Name of clamp bolts | Bolt | Standard torque / N.M |
|---------------------|------|-----------------------|
| Bolt for handlebar | M5 | 10-12 N.M |
| Bolt for handlebar | M4 | 4-6 N.M |
| Handlebar stem | M5 | 8-10 N.M |
| Handlebar stem | M6 | 10-12 N.M |



4.3 Lights

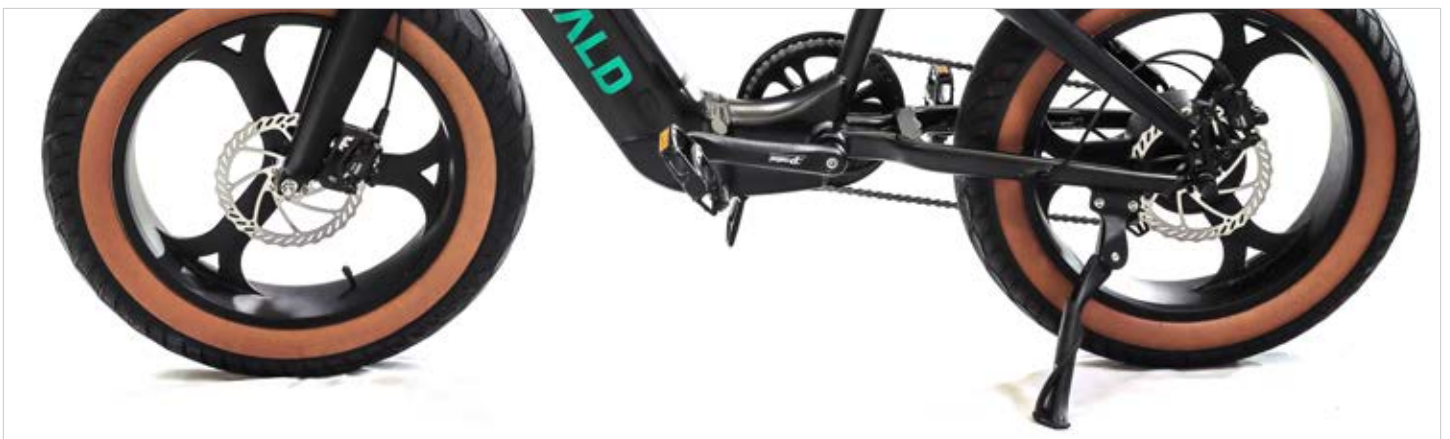
Front light is controlled by holding the (+) button on the display. The Rear light has an autonomous power supply, which is turned on and off using the power button located on the light.

Note: It is important to be aware of the national legal requirements when riding an e-bike on a public road. Depending on the country, certain restrictions may apply regarding where and when e-bikes can be used. Some countries require e-bike riders to wear a helmet or have speed limits in certain areas due to safety concerns. Additionally, there may be age restrictions for operating an e-bike and registration/licensing requirements that need to be fulfilled before taking it out onto public roads. Check local laws prior to use. Failing to do so could result in serious consequences such as fines or other penalties.



4.4 Propping Your Electric Bike On Its Stand

Your electric bike is equipped with a side stand. Always prop up your bike on its stand on a flat, stable ground surface.



5. Routine Maintenance

5.1 Lubrication

| Frequency | Component | Lubricant | How to Lubricate |
|------------------|---|--|---|
| Weekly | Chain Derailleur Pulleys Derailleurs Brake Calipers Brake Levers | Chain Lube or Light Oil Chain Lube or Light Oil Oil Oil Oil | Brush On or Squirt Brush On or Squirt Oil Can 3 Drops From Oil Can 2 Drops From Oil Can |
| Monthly | Shift Levers | Lithium-Based Grease | Disassemble |
| Every Six Months | Freewheel Brake Cables | Oil Lithium-Based Grease | 2 Squirts From Oil Can Disassemble |
| Yearly | Bottom Bracket Pedals Derailleur Cables Wheel Bearings Headset Seat Post | Lithium-Based Grease Lithium-Based Grease Lithium-Based Grease Lithium-Based Grease Lithium-Based Grease Lithium-Based Grease | Disassemble Disassemble Disassemble Disassemble Disassemble Disassemble |

5.2 Recommended Values of the Nut Torque

| Frequency | Component | Lubricant | How to Lubricate |
|------------------|---|--|---|
| Weekly | Chain Derailleur Pulleys Derailleurs Brake Calipers Brake Levers | Chain Lube or Light Oil Chain Lube or Light Oil Oil Oil Oil | Brush On or Squirt Brush On or Squirt Oil Can 3 Drops From Oil Can 2 Drops From Oil Can |
| Monthly | Shift Levers | Lithium-Based Grease | Disassemble |
| Every Six Months | Freewheel Brake Cables | Oil Lithium-Based Grease | 2 Squirts From Oil Can Disassemble |
| Yearly | Bottom Bracket Pedals Derailleur Cables Wheel Bearings Headset Seat Post | Lithium-Based Grease Lithium-Based Grease Lithium-Based Grease Lithium-Based Grease Lithium-Based Grease Lithium-Based Grease | Disassemble Disassemble Disassemble Disassemble Disassemble Disassemble |

5.3 Service Checklist

Before Every Ride

- Be Sure Batteries Are Fully Charged
- Check Tire Pressure (Recommended 15-30 PSI)
- Check Brake Operation
- Check Wheels for Loose Spokes

After Every Ride

- Be Sure to Fully Charge Batteries
- Quick Wipe Down With Damp Cloth



Weekly

- Lubrication as per Schedule 2.6

Monthly

- Inspect Wires and Connectors
- Check Derailleur Adjustment and Brake Adjustment
- Check Brake and Gear Cable Adjustment
- Check Tire Wear and Pressure
- Check Wheels are True and Spokes Tight
- Check Hub, Headset, and Crank Bearings for Looseness
- Check That Pedals, Handlebars, and Stem Are Tight
- Check That Seat and Seat Post Are Tight and Comfortably Adjusted
- Check Frame and Fork for Trueness
- Lubrication as per Schedule 2.6
- Perform Safety Check

Every Six Months

- Lubrication as per Schedule 1
- Check All Points as Per Monthly Service
- Check Brake Pads, Replace if Required
- Check Chain for Excess Play or Wear

Yearly

- Lubrication as per Schedule 2.6

5.4 Charging Your Emerald Bike

Make sure your Emerald Bike is ready for use when you need it by keeping your battery charged. The Emerald Bike battery has a long battery life, but it will require charging eventually. Connect the battery charger to any standard 120-volt outlet. The battery may be charged while still connected to the ebike or removed from the ebike. Check that the wall-to-charger cord is fully connected, then insert the charging chord into the battery and charge until full.

Complete Charge Time: 4-6 hrs.



6. Folding Your Emerald Bike for Storage

Storing your Emerald Bike is easy and takes very little space! In compliance with regulations, folding is done in several steps, and this will only take you a few seconds.

Step 1 Removing the Battery



Insert the key into the battery lock (circled in gold above) and turn the key to the left to unlock the battery.



Pull the battery out of the holder for storage or for charging. Note: The battery can be charged while still connected to the ebike.

Inserting the Battery



When inserting the battery back into the holder, insert the key into the lock and turn the key to the left. Insert the battery in the holder, making sure to align the prongs at the bottom. The battery is completely inserted when you feel a click. Turn the key to the right and return the key to the neutral position to remove the key from the lock.

Warning: Fall Hazard

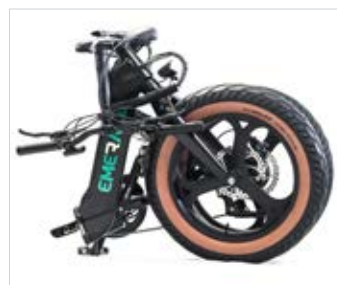
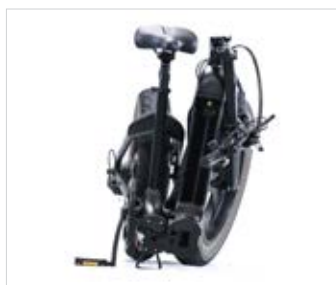
Loose battery may cause loss of control and result in serious injury or death. Lock battery and remove key before operation.

Step 2 Folding the Handlebars



Lower the position of the handlebars to the lowest position. Untighten the butterfly lever at the base of the handlebars. Press the silver pin upward to release the lever, then completely fold over the handlebars for safe storage.

Step 3 Folding the Frame



Position the pedals perpendicular to the ground. Press the red tab on the frame hinge lever, then untighten the lever and free the frame hinge. You will then hear the safety hatch release itself. Stand on the hinge side of the bike. Place the kickstand in the riding position. Tilt the bike forward so the right side is on the ground. With your right foot, press on the back frame behind the hinge, and lift the front side of the bike over by grabbing the front wheel. While folding, position the pedals so that they pass through the gap between the front wheel and the front frame.

Step 4 Quick-Release Devices



Tighten the adjusting nut by hand and move the quick-release lever to the closed position. You should feel considerable resistance while moving the lever. If not, re-open and re-tighten the lever, then move it to the closed position so it is in line with the frame.

7. Display and Controls

7.1 Pedal Assistance

Increase or decrease the level of pedal assistance to your desired feel by pressing the (+) or (-) buttons on the bottom of the display.

Note: The Pedal Assist Increase button is on the bottom left of the display, and the Pedal Assist Decrease button is on the bottom right.



7.2 Throttle

Located on the right side of the handlebars, the throttle is positioned where your right thumb rests. Press the throttle down for a boost of speed, or for full electric acceleration.



7.3 Horn

The horn button is located on the left side of the handlebars, positioned below the display. Press this button to sound the horn.



7.4 Gear Selector

Located on the right side of the handlebars near the grip, you can select the desired gear speed by clicking the (+) pad with your thumb. The red arrow will indicate your current gear in the gear display (1-7) near the right side grip. To decrease gear speed, simply press the paddle over the right-side hand brake until you feel the click for your desired gear.



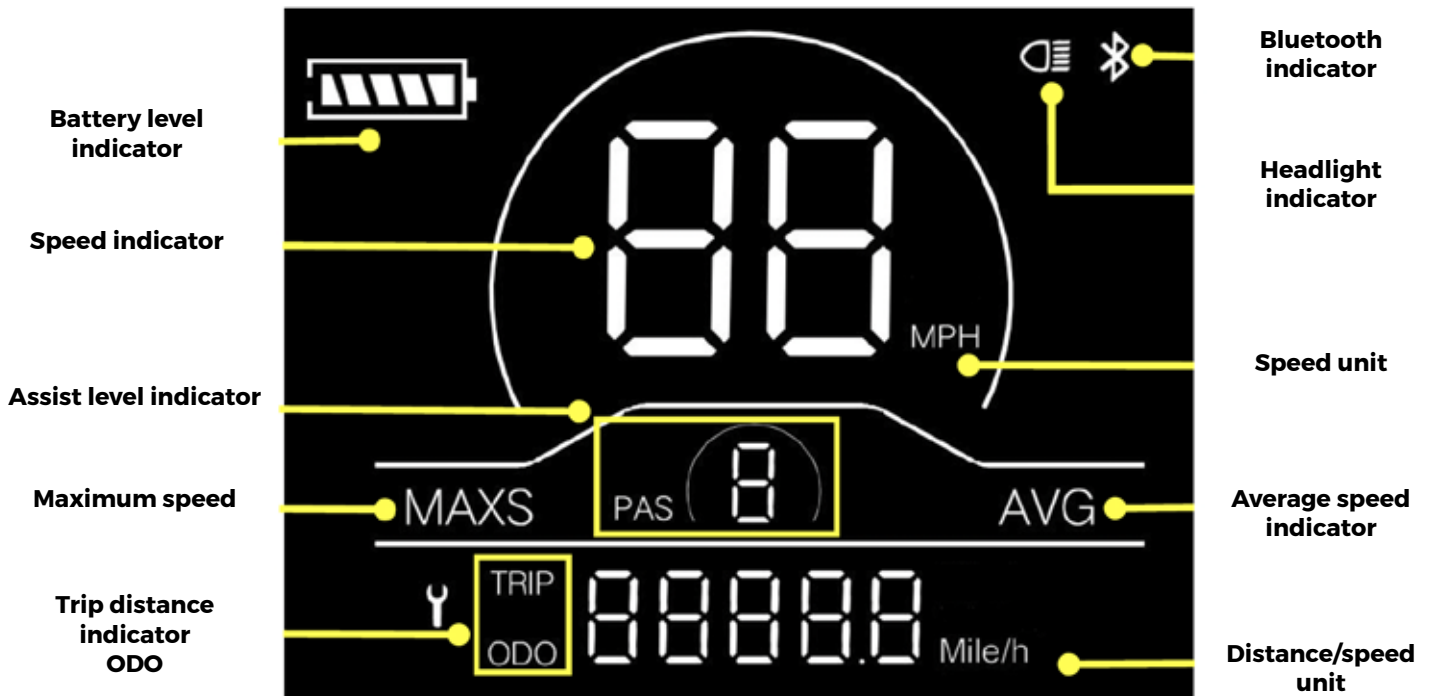
7.5 Brakes

The handbrakes are located in front of either side of the handlebars. The left handbrake controls the front wheel's disc brake, and the right handbrake controls the rear wheel's disc brake.



7.6 Display

Functional Area Layout Interface of Display YL81C



Turning On/Off

To turn the display on and off, simply press and hold the power button located at the top left side of the display.

Pedal Assist Levels

Your selected pedal assist levels will be indicated underneath the speedometer indicated on the display. Pressing the PAS Increase or Decrease buttons will change your Pedal Assist levels from level 1 through level 5.

Battery Level

The battery icon on the upper left side of the display screen will show your Emerald Bike's current battery level.

Trip

Your current Trip distance will be indicated in your desired metrics on the bottom of the display screen.

To reset trip distance, hold the display power button and PAS decrease button (-) simultaneously.

Speed

Your current speed will be indicated in the center of the display screen in bold font.

To change your desired metric, hold the PAS increase and decrease buttons simultaneously until the screen changes. Use either the PAS (+) or (-) buttons to scroll to P4.

Light Controls

To turn on the front light, press and hold the (+) Pedal Assist Increase button on the bottom left of the display.

7.7 General Operation**Power On/Off**

Press and hold the button to power on and off. The display will not use battery power in the power-off state, and its leakage current will be less than 1uA.

Display Interface

After the display is turned on, it will show the real-time speed (MPH) and the trip distance (m) by default. By pressing the button, the information displayed will switch between the trip distance (m), ODO (m), maximum speed (MPH), and average speed (MPH). When the distance reaches 9999.9 m, it will be automatically reset to zero.

Display Interface Switching



Trip distance indicator



ODO



Average speed indicator



Maximum speed indicator

Push Assistance

By pressing and holding the (-) button, the electric push assistance mode will be enabled. Your ebike will run at the constant speed of 3.7 mph. The display will show level P. By releasing the (-) button, your ebike will immediately stop power output and return to the state before push assistance.

Headlight On/Off

By pressing and holding the button, the controller will turn on the headlights, and the display backlight will turn dark. By pressing and holding the button again, the controller will turn off the headlights, and the display backlight will resume the luminance.

Battery Level Indicator

When the battery is fully charged, all five segments will be on. In case of Undervoltage, the outline of the battery indicator will flash, which means the battery needs to be charged immediately.



Full battery level indication



Undervoltage flashing

Error Code Indicator

When a fault occurs in the electronic control system of your ebike, the display will automatically indicate the error code in the distance area in the format of E0**. Detailed definitions of error codes are shown in Schedule 1.

Schedule 1 Error Code Definitions

| Error Code | Definition |
|------------|-------------------------------|
| E021 | Current Abnormality |
| E022 | Throttle Abnormality |
| E023 | Motor Phase Abnormality |
| E024 | Motor Hall Signal Abnormality |
| E025 | Brake Abnormality |
| E030 | Communication Abnormality |

Factory Reset

dEF refers to factory reset. dEF-n keeps the settings as-is, and dEF-y restores factory settings. Press and hold the buttons at the same time for more than 2 seconds to enter the factory reset interface, and press the button / to select a parameter.

Custom Setting

Your ebike must be at a complete stop to set parameters. The steps for custom settings are as follows:

In the power-on state, when the display shows the speed at 0,

- (1) Press and hold the buttons at the same time for more than 2 seconds to enter the selection interface of custom setting options;
- (2) Press the button / to switch the selection interface of general setting options, and press the button to enter the parameter modification interface;
- (3) Press the button / for parameter selection;
- (4) Press the button to save the parameter and return to the selection interface of custom setting options;
- (5) Press and hold the button to save the parameter and exit the selection interface of custom setting options.

Rated Voltage Setting

Available values: 36V & 48V

Wheel Diameter Setting

Available parameters: 8-32 inches

Speed Limit Setting

Adjustable range: 6-25 MPH

Metric/imperial system setting

00 represents the metric system; 01 represents the imperial system.

Speed sensor setting

Setting range: 1-63

Can be set according to the number of magnetic heads installed on the wheels of your ebike.

Current limit setting

Adjustable range: 1-25A.

Assistance sensor setting

Adjustable range: 5, 6, 7, 8, 9, 10, and 12

This is where the number of steel magnets of the assistance magnetic disk can be set.

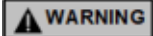
Power-on password setting

PSd-Y means a power-on password is required, and PSd-N means no power-on passwords are required.

The default value of the display is PSd-N.

Press the button to enter the modification interface, and press the button / to enter the selection interface. If PSd-N is selected, press the button to return to the selection interface of custom setting options; If PSd-Y is selected, press the button to enter the password setting interface. If you don't want to change the password, press and hold the button to exit the custom setting interface. If you want to change the password, press the button for cursor movement and the button / for figure selection, and then press the button to return to the selection interface of custom setting options.

8. Important Safety Information



READ AND UNDERSTAND ALL INSTRUCTIONS AND WARNINGS. FAILURE TO FOLLOW THESE SAFETY INSTRUCTIONS COULD RESULT IN SERIOUS PERSONAL INJURY, DEATH, OR DAMAGE TO THE PRODUCT ITSELF OR NEARBY PROPERTY

GENERAL

- 1. Always wear a helmet while riding.**
- 2. Never ride your ebike while under the influence of drugs or alcohol.**
- 3. Stop using your ebike if any part is damaged.** Inspect your ebike and all component parts regularly. If you suspect any part is damaged, discontinue use immediately. Continuing to use your ebike if any part is damaged may cause overheating, fire, explosion, electric shock, or smoking, which could result in serious personal injury or death. It could also result in other damage to your ebike or nearby property.
- 4. Inspect your ebike before every ride.** Confirm that (1) all bolts are tightened securely and (2) no parts are damaged before every ride. Failure to do so may cause the bike to break or collapse during your ride, which may result in serious personal injury or death.
- 5. Ride your ebike on smooth, stable, paved, dirt, and sand surfaces only.** The suspension system on your ebike is designed for use only on smooth, stable, paved, dirt and sand surfaces. Do not take this bike dirt jumping, BMX, or to any extreme sports that will stress the suspension system. If the suspension system is damaged or fails, the rider may fall off the bike and sustain serious or fatal injuries.
- 6. Take your ebike to a professional bicycle mechanic for all service.** Please consult a professional bicycle mechanic to properly assemble, repair, and maintain your ebike. Improper assembly or repair could damage your ebike, which may result in serious personal injury or death.

BATTERY

- 1. Use only the charger provided to charge the battery.** Do not use any other charger to charge your ebike battery, unless you purchase it from Emerald, and you confirm that it is intended for use specifically with your ebike model. Using any other chargers may lead the battery to overheat or catch fire, which could result in serious personal injury, death, or damage to nearby property.
- 2. Disconnect the charger from the battery when the battery is finished charging and the light turns green.** Overcharging the battery may cause it to overheat or catch fire.
- 3. Do not leave your battery or charger near heat sources, in direct sunlight, or places where heat collects.** Allowing the battery or charger to become too hot may cause overheating, fire, explosion, electric shock, or smoking, which could result in serious personal injury or death, or damage to your ebike or nearby property.

4. **Do not take the battery apart.** There are no user-serviceable parts in the battery or any of its component parts. Do not attempt to open them. Any attempt to open the battery could result in electric shock. It could also damage the battery, which could cause overheating, fire, explosion, electric shock, or smoking, which could result in serious personal injury, death, or damage to nearby property.
5. **Do not connect the positive and negative terminals of the battery.** This will cause the battery to short and could cause it to short circuit, spark, and/or catch fire, which may result in serious personal injury or death.
6. **Do not get the battery wet.** It is not waterproof. Clean only with a dry cloth. Getting the battery wet may cause electric shock, fire, explosion, or smoking, which could result in serious personal injury or death or damage to nearby property.
7. **Do not expose the battery to acidic or corrosive liquids.** Exposure to acidic or corrosive liquids can damage the battery and cause overheating, fire, explosion, electric shock, or smoking, which could result in serious personal injury or death. It could also cause other damage to nearby property.
8. **Always lock your battery in place and remove the key before riding your ebike.** If the battery is not secured to your ebike it can fall off during a ride and cause loss of control, which could result in serious personal injury or death.

CHARGER

1. **Do not take the charger apart.** There are no user-serviceable parts in the charger or any of its component parts. Do not attempt to open them. Any attempt to open the charger could result in electric shock. It could also damage the charger, which could cause overheating, fire, explosion, electric shock, or smoking, which could result in serious personal injury, death, or damage to nearby property.



Send us your photos of Emerald in Action!



#EmeraldinAction

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