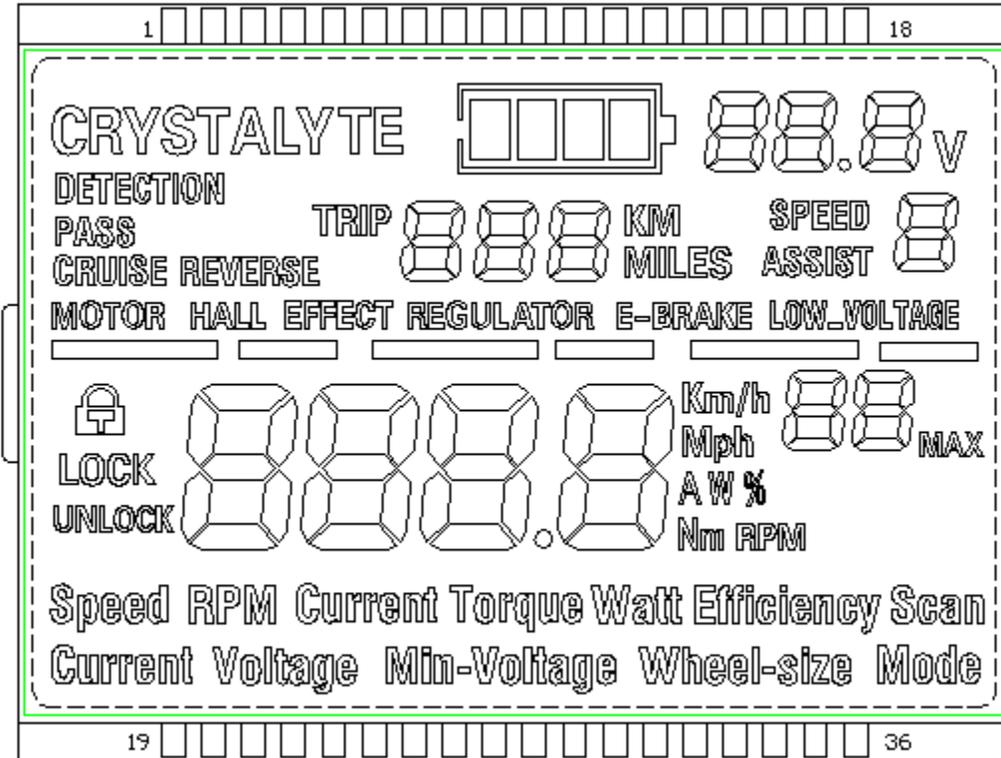


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APM Display and Controls



SAFETY

- **YOUR NEW ELECTRIC POWER SYSTEM IS NOT A TOY! YOU MUST HAVE THE SAME RESPECT FOR YOUR ELECTRIC BIKE AS YOU WOULD FOR A MOTORCYCLE! THE INNOCENT APPEARANCE AND SILENT OPERATION OF YOUR ELECTRIC POWER SYSTEM CAN BE VERY MISLEADING.....PLEASE RIDE SAFELY, AND BE AWARE OF YOUR SURROUNDINGS AT ALL TIMES!**
- **KNOW YOUR PERSONAL LIMITS AND DO NOT EXCEED THEM!**
- **ALWAYS WEAR A HELMET AND ANY OTHER SAFETY EQUIPMENT APPROPRIATE TO YOUR SKILL LEVEL AND RIDING CONDITIONS.**
- **NEVER OPERATE YOUR VEHICLE WHILE UNDER THE INFLUENCE OF DRUGS OR ALCOHOL. IF TAKING PRESCRIPTION MEDICATIONS, BE AWARE OF ANY SIDE EFFECTS THAT MIGHT PREVENT THE SAFE OPERATION OF YOUR VEHICLE. IF YOU CANNOT SAFELY OPERATE A MOTOR VEHICLE WHILE UNDER THE INFLUENCE OF YOUR MEDICATION, DO NOT ATTEMPT TO OPERATE YOUR ELECTRIC VEHICLE! THE SAME HAZARDS EXIST ON A HIGH POWER ELECTRIC BICYCLE AS ON A MOTORCYCLE!**
- **DO NOT ATTEMPT TO CHANGE ANY SETTINGS WHILE IN MOTION! YOUR FOCUS SHOULD ALWAYS BE ON THE OPERATION OF YOUR VEHICLE!**
- **CONFIRM APM-DISPLAY SETTINGS ARE CORRECT FOR YOUR SYSTEM! OPERATING YOUR SYSTEM WITH INCORRECT SETTINGS CAN RESULT IN PERMANENT DAMAGE TO YOUR BATTERY PACK AND OTHER MAJOR COMPONENTS.**

Things to know before you start:

1. You **MUST** verify, and if necessary, adjust the initial settings of your APM-Display before first-time use! You should find that the settings have already been correctly

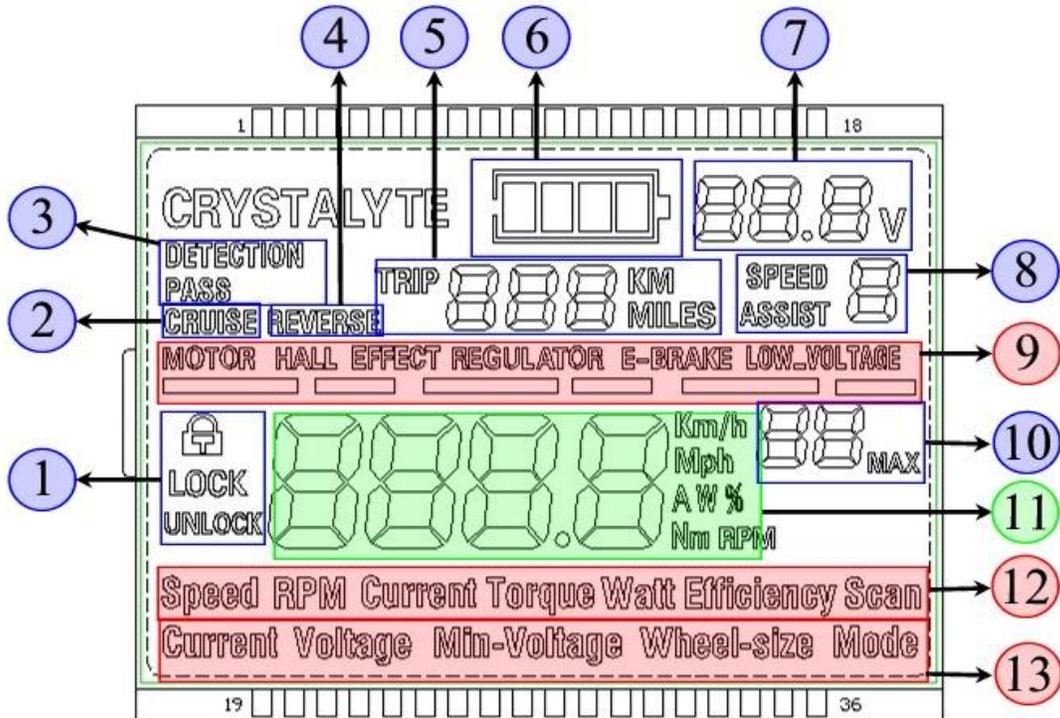
adjusted for your system, which is done by our kit builders during assembly.

2. To turn the power of your APM-Display ON/OFF, hold the power button for 3 seconds. **The APM-Display power must be ON** in order to change or view settings and displays.
3. For a setting to be saved, leave the APM-Display untouched for 5 seconds. Once a setting is saved, the 4 digit display will revert back to the main screen.
4. Make sure to set your measurement type (metric/standard) on the APM-Display before you enter your wheel size. If the measurement type is set to Miles, your wheel size should be entered in inches. If set to Kilometers, your wheel size should be entered in CM.
5. Your APM-Display runs a diagnostic test every time it is powered ON. If the word "PASS" is displayed, it detects NO failures. If a failure *is* detected, the word "detection" will appear, along with a message identifying the fault.

CAUTION!

- **Do NOT operate your system until you have read and understand the information provided in this manual.**
- **Settings MUST be applied to your APM-Display before it can properly operate with your system!! Operating your system with incorrect settings can result in permanent damage to your battery pack and other major components!**
- **Damage caused by incorrect settings of your APM-Display are NOT covered under the warranty.**

APM-Display



- = Individual Feature Being Described
- = Multiple Display or Mode Selections
- = Display Varies Based On Display Selection

	<u>POWER BUTTON</u>
	<u>UP ARROW</u>
	<u>LOCK/UNLOCK</u>
	<u>DOWN ARROW</u>

APM-Display Descriptions

Lock/Unlock   - Locks and unlocks the keypad.

Cruise – Indicates whether the “cruise control” feature is activated.

Detection/Pass – If the APM-Display senses a bad connection or failure, it will display the word “detection” while high-lighting the area in which it has been detected. **Number 9** above contains the detection options. If no failures or bad connections are detected, the word “Pass” will appear on the display.

Reverse – The word “reverse” will appear when the motor’s direction of travel is reversed.

Tripmeter – Displays the total distance traveled in km or miles until reset by the rider.

Battery Level Indicator – Indicates battery capacity remaining. Four solid black bars indicate a fully charged battery pack. As the battery is discharged, the solid black bars disappear from right to left on the display.

Voltage Indicator – Displays the voltage of the battery pack at all times while APM-Display is powered ON.

Speed/Assist Indicator

Speed – The rider has a choice between 3 preset speeds when the word “speed” is displayed.

Assist – This feature is unnecessary for systems without pedal assist equipment. The assist feature acts like the speed feature in which it offers 3 preset assist options.

Detection Points – Motor/Hall effect/Regulator/E-brake/Low Voltage are all areas or points of failure the APM-Display might detect. These are connections it checks for when powered ON. For example, if your throttle is not plugged in, the word “Regulator” may appear.

Maximum Speed – Displays the maximum speed reached until the tripmeter has been reset by the rider.

4-digit Display – Displays information based on the mode and settings of your display. If set to “Speed” mode, your speed will be displayed in this area. If set to “current” mode, the amount of current (amps) being used is displayed in this area. All “modes” displayed in this area are real-time.

Display Modes – Speed/RPM/Current/Torque/Watt/Efficiency/Scan are all “display modes” that the rider can view while riding. These modes are all displayed in their respective units of measurement, and in real-time. When “Scan” is selected, each display mode will appear for approx. 5 seconds before changing to the next display mode. The Scan mode allows the rider

to know their current situation at any given time...almost like an instrument panel does for a pilot.

Display Settings – Current/Voltage/Min. Voltage/Wheel Size/Mode are all setting options. The rider **MUST** verify these settings are correct based on their system **BEFORE RIDING!**
See: Setting your APM-Display

Adjusting Parameters of the APM-Display

KPH/MPH, KM/M and “CM/IN (for wheel size setting)” – Hold the DOWN ▼ arrow for 3 seconds and both the KPH/MPH and the KM/M displays will change. **NOTE:** *This also changes your wheel size setting between CM/IN. Example: Change your display setting to MPH/Miles before you set your wheel size to 26 inches. See: Wheel size setting*

Voltage Setting – To set the APM-Display to the correct voltage for your system, press and hold both the UP ▲ and DOWN ▼ arrows until you see the word “current” flashing along with the speedometer display. Press the Power button to change from flashing the word “current” to “voltage”. When the word “voltage” is flashing, pressing the UP ▲ and DOWN ▼ arrows will cycle between 24, 48, 60, 72, and 84.

Maximum Current Setting – To set the maximum current you want the controller to provide to the motor, press and hold both the UP ▲ and DOWN ▼ arrows until you see the word “current” flashing along with the speedometer display. At this point, the display is in the “maximum current setting” mode. Press the UP ▲ and DOWN ▼ arrows to increase or decrease the number of amps (current) you wish to allow. Once you reach the desired number, wait 3 seconds for the setting to be saved.

Low Voltage Cutoff (LVC) Setting – To set the low voltage cutoff, press and hold both the UP ▲ and DOWN ▼ arrows until you see the word “current” flashing along with the speedometer display. Use the Power button to cycle from “current” to “voltage”, and again to “Low Voltage”. Use the UP ▲ and DOWN ▼ arrows to adjust the parameters. The low voltage cutoff setting allows the rider to set the low voltage boundary at which the system will shut down. This setting makes possible the use of any battery chemistry, assuming that battery can provide the power necessary to run your system. The standard low voltage cutoff for SLA batteries is around 10.2V per 12v battery. **Example: To set the LVC for a standard 48V SLA battery pack, simply multiply 10.2V x 4 (number of 12V batteries) = 40.8V (or 41V) for the LVC setting. NOTE: You MUST retrieve LVC information from your battery supplier if using a battery chemistry other than SLA.**

Wheel Size Setting – To set your wheel size, hold UP ▲ and DOWN ▼ at the same time until you see the word “current” and the speed display **flashing**. Tap the power button several times until you see the words “wheel-size” flashing. Use the UP ▲ and DOWN ▼ arrows to select your wheel size in inches or centimeters, depending on whether your display is set to miles or kilometers. Left unchanged for 3 seconds, the setting will be

saved. **Example: If your wheel size is 26 inches, you will press the UP ▲ arrow until the number 26 is displayed - wait 3 seconds for it to save.**

Lock/Unlock Settings 🔒 🔓 - Once you have the APM-Display set with your desired settings, you can lock 🔒 your settings by holding the lock 🔒 button for 3 seconds. This locks in any settings in case a button is pushed on accident. This feature works much like a cell phone button lock. To change settings at any time, simply hold the lock button 🔒 again to unlock 🔓, and change the desired settings.

Features and Display Modes

Diagnostic Scan – When powered ON, the APM-Display runs a system check to look for failures. If it finds failures, the word “detection” will appear, along with where it sees the failure. If it sees no failures, the word “Pass” will appear and remain lit.

Battery Level Indicator – Displays remaining “useable” battery level. A fully charged battery will display 4 solid black bars. As the battery is discharged, each bar disappears from right to left as the battery capacity decreases. Each bar represents 25% of capacity. **Example: 3 solid black bars equals 75% of capacity remaining.**

Voltage – Displays “real-time” battery voltage.

Trip-meter – The trip-meter function keeps track of your distance traveled, in either miles or kilometers depending on the setting you have chosen.

Speedometer – The speedometer displays your speed in either KPH or MPH depending on the setting you have chosen.

Maximum Speed Display (M.S.D.) – The M.S.D. displays the maximum speed acquired for the entire duration of a ride. The maximum speed remains displayed until the rider resets the trip-meter, which also resets the M.S.D.

Speed Mode – The APM-Display has 3 preset speed modes. The rider can adjust the speed setting by pressing the UP ▲ and DOWN ▼ arrows to switch between speeds 1 thru 3.

Cruise – Working on this feature, will update when information is available.

Display Modes

There are 5 display options, depending on what information the rider would like to see. To cycle through the display options, press the Power button (do not hold), and the APM-Display will present the next set of parameters.

DISPLAY OPTIONS:

Speed – Displays your speed, real-time. The rider can choose KPH or MPH.

RPM – Displays the RPM of the motor while in motion.

Current – Displays the amount of current (Amps) being used to keep your vehicle in motion.

Torque – Displays the amount of torque your system is producing at any given time.

Watts – Displays the amount of Watts (Power) being used by your motor to keep your vehicle in motion.

Efficiency – Displays the efficiency percentage of your current riding situation. **Example:** You may notice your efficiency is at 10% when applying full throttle from a dead stop. However, you will also notice that pedaling very lightly during acceleration will increase your efficiency dramatically. The efficiency display can help the rider to know when energy is being wasted, and how to balance power and range effectively. We highly recommend using the efficiency display feature, as it can help to extend your range dramatically without much effort.

Scan – This display option will continuously cycle through all the display options. Each display option will appear for 3-5 seconds before switching to the next.

Input Initial Data Specific to your Battery System

1. Make sure your electric power system is properly installed before setting your APM-Display.
2. Turn your power system keyswitch to the ON position.
3. Press the APM-Display power button to turn your APM-Display ON.
4. Hold the UP ▲ and DOWN ▼ arrows for 3 seconds until you see the word “**current**” flashing on your display. You will repeatedly press the UP ▲ arrow until the number has reached the current (Amp) rating of your controller. Example: For a 4840 controller, the rider will press the UP ▲ arrow until the number on the display reaches 40. **DO NOT EXCEED THE CURRENT RATING OF YOUR CONTROLLER!**
5. Once your current is set, press the power button once to cycle to the next display screen where you will see the word “**voltage**” flashing. You can choose 24V, 36V, 48V, 60V, 72V, and 84V. **MAKE SURE YOU SET THE APM-DISPLAY TO THE CORRESPONDING VOLTAGE OF YOUR CONTROLLER! Example: For a 4840 controller, the rider will press the UP ▲ arrow until the numbers “48” appear.**
6. Next, press the power button again to cycle to the next set of parameters, “**Min. Voltage**”. This is where you will determine and set the low voltage cutoff for your system, which prevents the battery from discharging to an unsafe or damaging level. For lithium and other advanced battery chemistries, you will need to contact your battery vendor for the low voltage parameters. For Sealed Lead Acid (SLA) batteries, an average of 10.2V per 12V battery is the low voltage limit.

The following are the low voltage limits for SLA battery packs:

**BATTERY
VOLTAGE = (LVC)**

- A. 24V = **(20.4V)**
- B. 36V = **(30.6V)**
- C. 48V = **(40.8V)**
- D. 60V = **(51V)**
- E. 72V = **(61.2V)**

7. Once you have completed setting the low voltage parameters, press the power button again to cycle to “**Wheel Size**”. You will use the UP ▲ and DOWN ▼ arrows to increase or decrease by one digit. Standard wheel sizes include 20”, 24”, 26”, and 700C. The wheel size setting must be complete before the APM-Display can offer accurate

measurements of distance and speed.

8. Once you have chosen your wheel size, press the power button one last time. This will cycle you to the last initial display setting, “**Mode**”. The mode setting switches between modes “Speed” or “Assist”.
 - A. **Assist** - If you are using pedal assist equipment, you can adjust the “assist” power level to add more or less assistance.
 - B. **Speed** – You have a choice between 3 pre-programmed speeds, 1-3. Speed 1 is slow speed while speed 3 is high speed. This is a great feature for situations that call for a little less power, like letting the kids ride...or maybe even the parents☺

We hope you really enjoy your new ride! Remember, always ride safe, wear a helmet, and be aware of everything around you! Your Phoenix II system is not a toy, you must treat it with great respect. We hope it will save you money, time, and the stress of waiting in traffic! For those who have never owned an electric bike or Phoenix system, welcome to the family, and welcome to a life of freedom from the pump! Also, welcome to the best (and cheapest) parking spaces everywhere...bike racks!!