



220EV QUICK START GUIDE

Peterbilt's Model 220EV offers a zero emissions, high-performance vehicle for clean, efficient operation. This Quick Start Guide outlines the unique and important guidelines for operating the 220EV.

1) SAFETY

- a. Cables or connectors that are colored in bright orange signify high voltage. Before operating the vehicle, visually check for damaged components or low hanging cables below the truck. If you see anything damaged or in a questionable state, have an authorized Peterbilt technician examine and repair the components without delay. Do not touch, attempt to remove, or service high voltage parts. Ignoring this warning will create risk of injury or death to yourself and bystanders.

Your dealer's service center is the best place to have your vehicle repaired. Properly maintained high voltage personal protective equipment is required. If you are not a qualified mechanic for the Peterbilt 220EV, leave all repairs to an authorized service facility. Authorized service facilities are equipped to perform repairs safely and correctly.



- b. Electric Vehicles can be very quiet in operation, even when 'running'. Because of this, the vehicle operator must remain aware of nearby vehicles or pedestrians at all times.
- c. 'Truck running' is indicated by the Power Gauge needle moving to the vertical position on the gauge that lies in between the green 'Charge' region and the blue '%' power applied region. This means the vehicle is ready to drive.

When the vehicle is ready to drive it will also display "Ready" on the electrification display in the right corner.





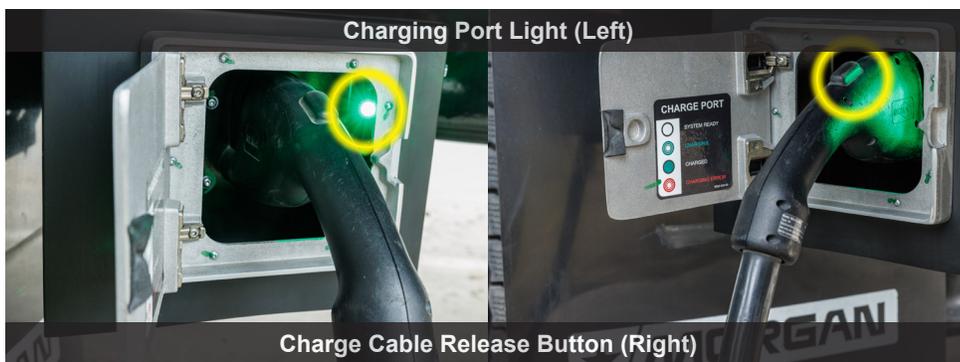
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2) CHARGING / BATTERIES

Before plugging the 220EV to a charger, ensure that the 12V disconnect switch (located behind the cab on the passenger side) is in the 'on' position. For best results wait a minimum of 2 minutes after vehicle shutdown to plug.

a. After being plugged in, a charge port light will blink green to indicate truck is being charged.

There may be a small delay between when the charger is plugged in to when the truck starts charging.



-  System Ready
-  Charging (Blinking)
-  Fully Charges (Solid)
-  Charging Error

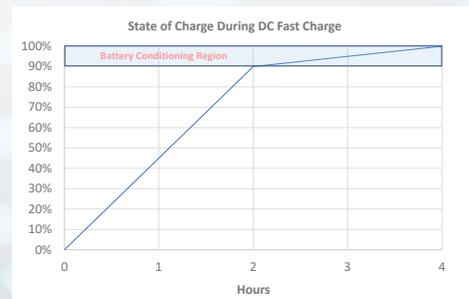
If Charging does not commence after a small delay, usually less than a minute, restart the sequence by first unplugging the charge cable and then turning off the low voltage disconnect before attempting again. Wait at least one minute before attempting again.

b. Max charge speed: Charging will be as fast as possible, per charger type, with the limit speed being the lesser of the vehicle or charger max speed.

i. Max vehicle charge speed is 75kW for 141kWh battery packs and 150kW for 209kWh and 282kWh battery packs.

c. Charge speed will slow down when the battery is nearly full, which is above 90%.

Once the truck reaches about 90% state of charge (SOC) it is a good time to stop charging, if opportunity charging. Opportunity Charging is when you have a limited time window for charging, such as a lunch break, where you can add critical range without taking all the time needed for a full charge. Utilizing opportunity charges will maximize vehicle productivity.



d. To disconnect the charge cable, charging must be stopped.

i. This can be done via the charger's interface. Some chargers are equipped with a physical emergency stop button. It is recommended that you do not use this button to stop the charging sequence unless there is an emergency. Doing so may result in faults with the vehicle.

ii. If charging has not been stopped, the the release button on the charge cable is interlocked to prevent the charge cable from being released. (See photo above)

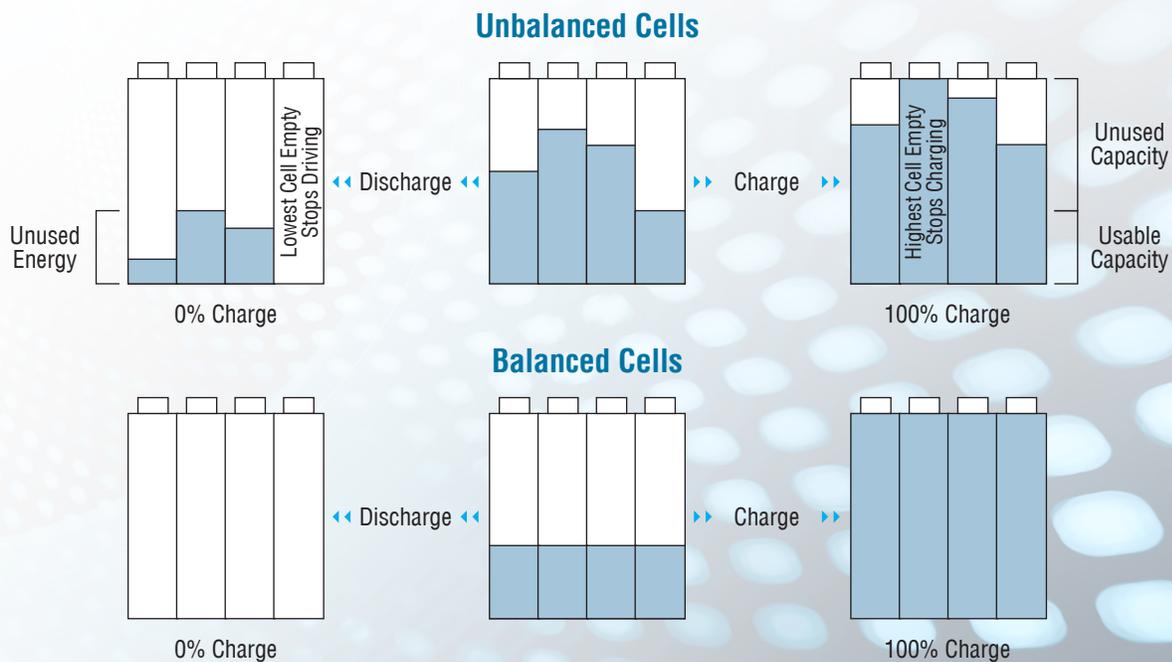
iii. The vehicle also has an interlock which prevents it from being driven while connected to the charge cable. When there is a charger tell-tale illuminated on the instrument cluster and the B-panel screen the vehicle interlock is engaged.



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- e. Battery balancing occurs during the last 10% of charging. For the longevity of the battery system make sure to fully charge the truck at least once a week.
 - i. The energy storage system consists of many individual battery cells organized into banks. When driving the vehicle, energy is drawn from the bank, which means energy is drawn from all cells. However different cells within the bank can have differing energy levels. Once a single cell in the bank is completely empty, the truck considers the bank empty. On the other side of things, when charging the truck as quickly as possible the truck will show to be fully charged when a single cell in the bank is completely full.
 - ii. If you charge the truck overnight, the truck's battery monitoring system begins passive balancing, and can fill all the cells completely full, minimizing the difference in energy levels. It is important for the longevity of the battery system to charge overnight and enable passive balancing at least twice a week.





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f. Low voltage batteries

- i. The 220EV is equipped with two 12V batteries in series for a cab system voltage of 24V. These batteries are used to power the cab electronics and enable starting, just like a diesel truck. When the truck is 'running' these 12V batteries are filled by a high voltage to low voltage inverter which is analogous to an alternator on a diesel truck. Please note that when the 12V batteries are dead the truck will not start. Jump Starting is not recommended due to the various LV battery installations and electrical options. It is recommended that the dead batteries be swapped with charged batteries.



- ii. If powering off for an extended period and not plugged into a charger, set the low voltage disconnect switch to off. This will preserve charge in the low voltage system. The 220EV has CCS1 charging port and system voltage of 650V. Compatible DC fast chargers, must have a minimum voltage of 700V. For AC charging, a minimum of 240V is necessary to slow charge.
- iii. During Charging or when the truck is 'running' do not turn off the low voltage disconnect. This may cause damage to the vehicle.

3) START UP Pre-Truck Inspection

a. Exterior

- i. Check for low hanging cables below the truck, especially, orange high voltage cables. Have an authorized technician examine any questionable components and repair them without delay.
- ii. Ensure the wheel cap nuts are in place and torqued properly.
- iii. Check the parking spot for evidence of any fluids leaking.
- iv. Verify that the truck exterior lights are all functioning.
- v. Ensure all windows, mirrors, and lights are clean and unobstructed.



b. Power Accessories

- i. Verify that the coolant lines, power steering lines, airlines, fittings, and other connections are all secure, intact, and free of chafing.
- ii. Verify that all coolant reservoirs are in the correct location and adequately filled. The power electronics/motor coolant reservoir fluid level can be checked via the indicators molded into the translucent reservoirs. The battery chiller reservoir fluid level can be checked via the site glass. If fluid can be seen on the site glass then there is adequate fluid.
- iii. Ensure the radiator fan is free of debris.





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3) START UP *continued*

c. Interior

- i. Remove the charger plug if necessary.
- ii. Switch on the low voltage disconnect switch if necessary. It is recommended to turn the key to the run position for at least one minute. This will allow the truck to fully run through all the starting checks before the ignition sequence.
- iii. Turn the ignition key fully clockwise and let spring back.
- iv. Release the park brake.
- v. Put the truck in drive.
- vi. The truck will be ready to move when the green Ready to Move tell-tale is illuminated.

d. Towing

- i. Do not attempt to tow without reading the 220EV operators manual. Failure to follow correct procedure towing procedure could result in injury death or damage to the vehicle. Because of the midship motor layout of the 220EV, the towing procedure is very similar to a diesel 220EV. Again refer to the operators manual for instructions.

e. Shutdown

- i. Put the truck in N (neutral).
- ii. Pull the park brake to ensure that it is applied.
- iii. Remove the key from the ignition.
- iv. Ensure the Ready to Move tell-tale is extinguished.

4) RANGE/EFFICIENCY *EVs have a limited range, so driver behavior is key to maximizing range!*

a. Highest energy consumption is driving at high average speeds/freeway speeds.

- i. 65 MPH cruise or slower is recommended.
- ii. Routes/applications with more stops/starts will result in the best EV range vs high speed highway driving.

b. Moderate driving behavior.

- i. As with any vehicle, moderate acceleration and deceleration will result in the best driving efficiency (25% - 75% of the accelerator pedal).



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4) RANGE/EFFICIENCY *continued*

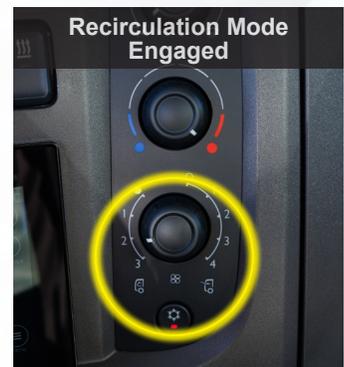
c. One pedal driving

- i. If the vehicle is in motion and the regenerative braking is engaged, the vehicle will be slowed down when the operator's foot eases off the accelerator pedal. This is energy being put back into the batteries. There is single regenerative braking setting, and it can be activated using the switch on the steering wheel.
- ii. Higher utilization of regenerative braking will result in the most efficient driving possible and will extend range.
- iii. When the battery is completely full the vehicle will be unable to use regenerative braking since there is no room in the battery to store the regenerative braking energy. This is normal. When this occurs the regenerative braking tell-tale will light up on the instrument cluster. In the event that the drive motor, drive motor inverter or battery temperature is too high, the regenerative braking tell-tale may also illuminate. This indicates the regenerative braking system has been disabled.



d. HVAC

- i. Energy consumption at idle is relatively low as compared to driving.
- ii. Best practice is to eliminate excessive idle time by turning the truck off when leaving the cab. This will reduce energy consumption and improve range.
- iii. Utilize the recirculation mode on the HVAC system to minimize heating and cooling energy consumption. Also, do not drive with the windows down and HVAC running.
- iv. Turning on the heater requires pressing the heater button the dash. Once activated an LED in the center of the button will turn green.





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3) RANGE/EFFICIENCY *continued*

e. Temperature

i. Batteries like to be at moderate (room) temperatures. The truck will automatically adjust the battery temperature by heating them when cold, or cooling them when hot.

1. This means temperature extremes will affect vehicle range. Plan for reduced range in these conditions.

ii. Preconditioning

1. Bringing the vehicle, batteries and cabin to operating temperature while connected to the charger, prior to departing, will help to mitigate weather-related range loss.

iii. Park the vehicle with weather-related range loss in mind.

1. For hot climates, park in shade.



2. For cold climates, park in an indoor, warmer area if possible.

Note: This quick start guide is intended as a quick reference. Operators should fully read the 220EV operators manual before operating the 220EV. This quick start guide also does not replace driver training and operators must be properly trained before driving the 220EV.