

Quarantining & Your EV

Drive Electric Columbus
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Intro

- Quarantining your EV
- Background in general EV technology pertaining to batteries
- Things to Know about Short Term & Long Term Storage
- Some Do's and Don'ts
- How to check the voltage of your 12 Volt LVB (Low Voltage Battery)
- Other important things to know about not driving or storing your EV
- Maintaining your 12 Volt Battery



Short Term & Long Term EV Storage

Important Things to know about your EV's batteries

- Not all vehicles are created equally
- Not all vehicles have the same unique features (or problems)
- EV's have both a High Voltage "Traction" Battery and a 12-Volt Battery as well
- EV 12-Volt batteries are usually smaller than those in ICE cars because there is no "engine cranking", but they are often "deep cycle" batteries
- Some EV's have "Remote Terminals" under the hood with the 12-Volt
 - The 12-Volt Battery is sometimes located elsewhere in the vehicle
 - cargo/trunk area
 - deep in the passenger side next to the firewall
 - other places? Check your manual...

RTFM - Manufacturer Specific Things?

REMEMBER THIS: It never hurts to check the manual!

- Can't find your manual? Look it up online on the manufacturer website or from your Driver's Portal webpage
- Most manufacturers have a specific section in the owner's manual about "Storing your vehicle" and specific recommendations for their products
- Talking about general recommendations in this presentation
- **DISCLAIMER:** Your vehicle's specific requirements or recommendations may differ, please consult your owner's guide for appropriate actions

e.g. Tesla Model 3 manual states "LEAVE YOUR VEHICLE PLUGGED IN when you are not using it"

EV's and Batteries - Differences and Similarities

- Nissan LEAF (at least 1st Generation, likely 2nd Gen also)
 - Recommend HVB storage charge to 60-80%
 - Self-charging 12-volt Battery function, however it is not very “smart” and lets the 12V battery discharge too much too often, causing battery damage
 - “Battery Saver System” and “Extended Storage Switch” (2nd Gen. only)
- Chevy Bolt
 - Reduce HVB to 2-3 bars remaining; do not use EVSE; remove Negative 12V
 - Battery Power Protection and Exterior Lighting Battery Saver features
- Kia Niro EV/Hyundai Kona EV
 - Do not store full nor empty
 - Self-charging 12-volt Battery Maintainer and “Aux. Battery Saver+” features
- Tesla
 - Leave the EVSE plugged in when the car is not in use
 - Self-maintains 12-volt battery when left idle and unplugged

General Recommendations - Do's and Don'ts

(When Storing Short (or Long) Term)

DO:

- **UNPLUG:** Phone Chargers, Dash Cams, USB Devices, Radar Detectors
- **UNPLUG:** OBD2 devices and any other aftermarket accessories
- **CHECK:** Make sure Doors, Hatches, and Lighted Compartments are **CLOSED**
- Set all switches to “OFF” -- just in case (i.e. automatic headlights, etc.)
- Consider using a Battery Tender

DON'T:

- **Don't Charge the HVB (High Voltage Battery) to 100%**
 - Even IF you leave the EVSE plugged in
 - Fully charged is not good for any Lithium-based battery long term
- **Don't Drive it till it's dead -- also not good for any Lithium-based battery**

General Recommendations - Do's and Don'ts

(When Storing LONG Term)

DO:

- **UNPLUG and CHECK:** All the same things on the Short Term list
- Check Tire Pressures are in the recommended range
- Charge the HVB to the Manufacturer Recommended Value or Range
- *Disconnect and wrap/insulate the 12 Volt Battery terminal connector
- Consider using a Battery Tender

DON'T:

- Don't Charge the HVB to 100% nor nearly dead (extra bad long-term)
 - If you have to leave it one way or the other, leave it charged
- Don't forget to ROLL the tires occasionally or flat spots will develop
- Don't forget to Exercise the FRICTION Brakes occasionally - rust/lock-up

Why be concerned? 12-Volt Battery Drains.

- “Vampire” drains on 12-volt battery systems are more prevalent in EV’s
 - Telematics units (calling home to the mothership)
 - Reporting current HVB status, charging state, GPS location, etc.
 - Checking for software updates, charging schedules, etc.
 - Signal issues if the vehicle is stored in a garage or metal structure
 - Drive/”Go” Time settings, Climate Control updates
 - General EV health - including periodic systems and status checks
 - HVB and LVB Status Checks, Battery Saver functions, etc.
 - ... and more! (Especially if you leave accessories plugged in!)
- Many vehicles start to exhibit odd behaviors or indicators at the 11 volt mark
- Most vehicles cease to function at all with the LVB at 9 volts or below



Other
“things”
to watch
out for...

Photo Credit:
Twitter
@aminorjourney

Other Storage Considerations

- Rodentia nesting issues -- EV's stay warmer under the hood than a Cold ICE
 - EV Plugged In = Warm Components and a Warm Car
 - Pop the hood occasionally to make sure no "problems" have occurred
 - What If's ?
 - You don't have a 120V outlet nearby to plug in a Battery Tender?
 - You don't have an EVSE at home or near to where you park?
 - You don't own a 12V battery tender or trickle charger?
- ⇒ **Get out and Drive! (Or at LEAST just turn the car on.)**
- Run or Drive the vehicle for 20 minutes every 2-3 weeks



EV's and 12-Volt Batteries

How does a two battery system work?

- EV's do not have an Alternator like an Internal Combustion vehicle
- EV's have a DC-to-DC converter to efficiently convert HVB to LVB levels
 - Converts power used to run 12-Volt accessories, lights, radio and entertainment systems, wiper motors, etc.
 - Also used to charge the 12-Volt battery while running or driving
- When on L1/L2/DCFC while the EV is using the On-Board Charger (OBC)
 - Most EVs are not capable of running BOTH the OBC and DC-to-DC converter to charge the LVB at the same time
 - Effectively can't charge both batteries at once

Suspect problems with your 12-Volt?

- Problems with your 12-Volt?
 - Charging circuits for 12-Volt battery normally run around ~14.6V
 - Most EV's have OBD2 capabilities that can report on both LVB voltage and charging currents
- Don't forget auto stores like AutoZone and Advance Auto will test your 12-Volt battery for free
 - Just don't tell them you have an EV up front -- it doesn't matter!
 - If you state you have an EV, they'll tell you they can't test the HVB

Checking your vehicle's 12-Volt battery

- Want to check your 12-Volt battery?
 - For the simplest test you can do yourself, all you need is an inexpensive multimeter, nearly every meter can do this



Any
multimeter
will do,
really



Turn the setting to measure DC voltage, as shown.

Make sure the vehicle is **TURNED OFF!**



Connect the meter ...

1) Black Lead to the Negative Battery Terminal (usually has a Black Cable)

and

2) Red Lead to the Positive Battery Terminal (usually has a Red Cable)

A healthy 12-Volt battery will typically show above 12.6 Volts. Closer to 13 Volts indicates a fully charged battery.



A battery that reads less than 12 Volts is deeply discharged and may end up leaving you stranded somewhere.

You need to either run your vehicle to charge the battery or use an external battery charger on a battery this low.



Maintaining your 12-Volt Battery

Charging your vehicle with a maintainer

- Use a battery charger that indicates on the packaging or in the manual that it can be left attached LONG TERM to maintain proper voltage
- Not all battery chargers are created equally, you get what you pay for
- Higher quality chargers will be temperature compensated and automatic
- A quality charger will prevent over-charging the low voltage battery
- Using a battery charger is easy (as long as you have an outlet nearby)!
- If you park outdoors, be aware you may need to lower your hood

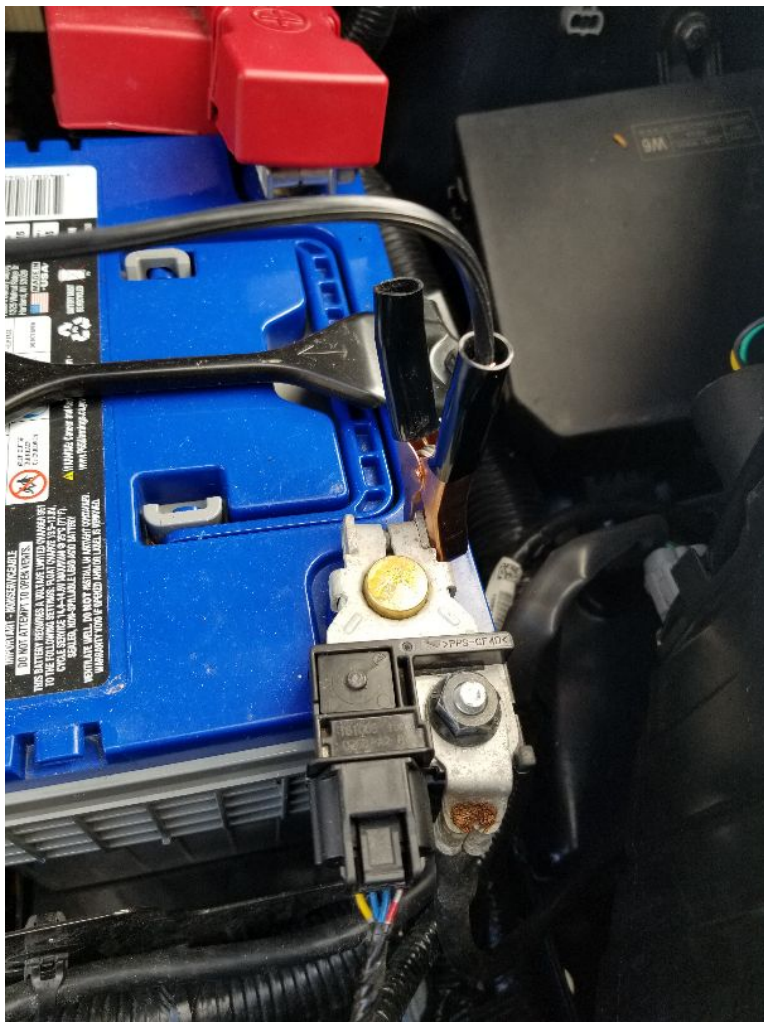


Here is an example of a long-term smart battery maintainer, computer controlled with safety features



This is the
Battery
Tender Plus
1.25 Amp
Charger

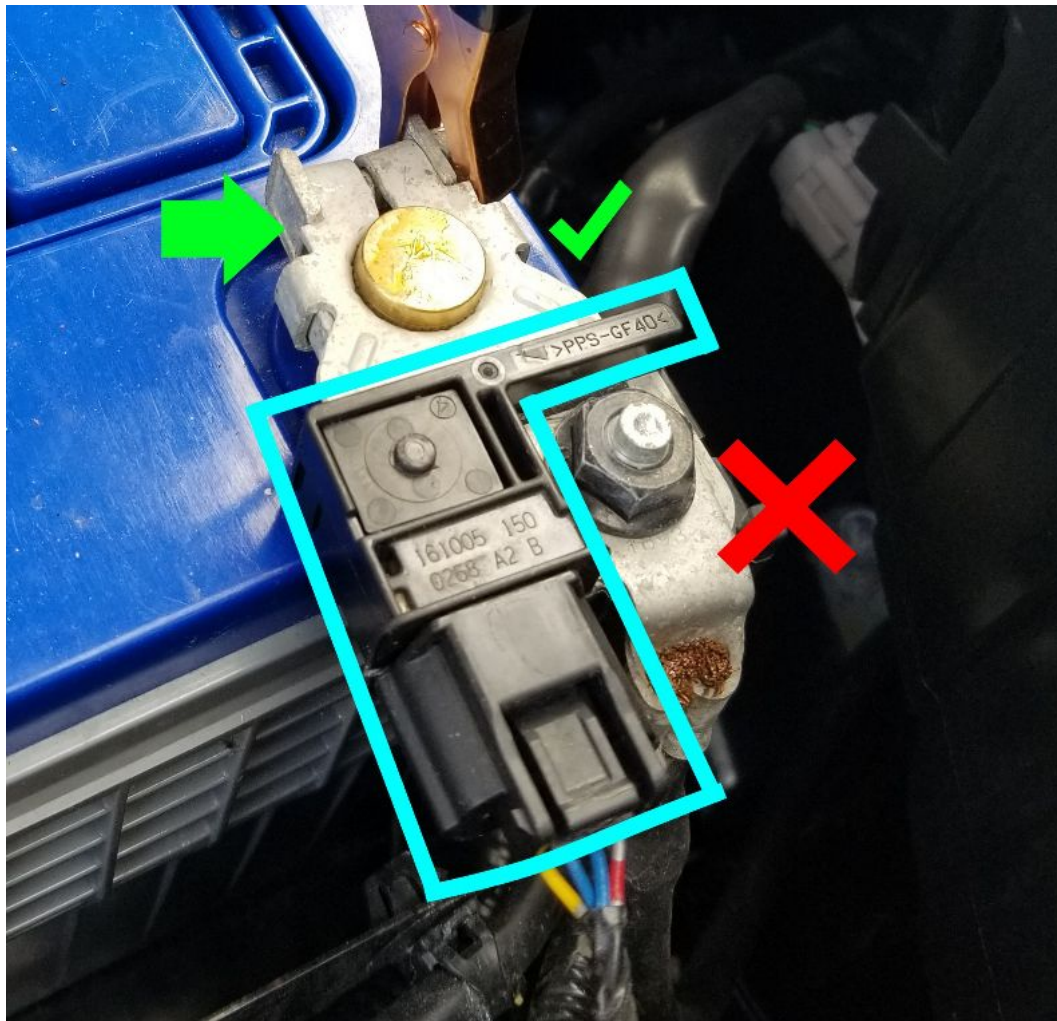
Available
locally at
Batteries Plus
or elsewhere
for around
\$60



Plug in the battery charger first.

Hook up the Negative (Ground) Terminal first. This usually has a black cable connected to the clamp.

Be cognizant if your vehicle employs a current measuring device! Be sure to connect on the side of the clamp CLOSEST to the actual battery terminal itself.



NOTE: Not all vehicles have this device, or it may be on the other battery terminal.

The current sensor is the black plastic piece and connector outlined in blue. Hook up the clamp for the maintainer closer to the battery terminal, as indicated by the arrow.



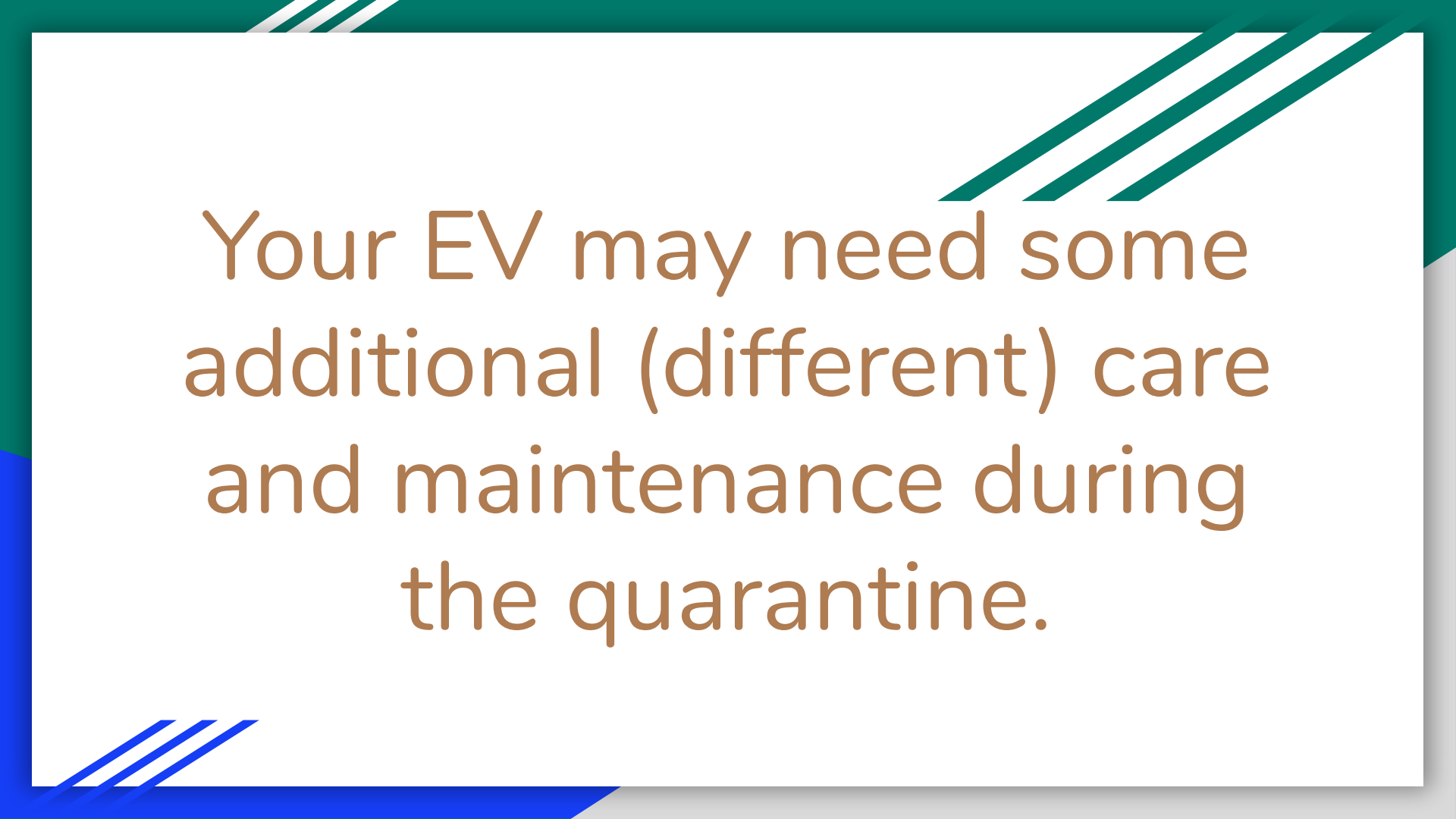
Hook up the Positive
(Power) Terminal next.

This usually has a red cable
connected to the clamp.

Don't let the positive clamp
touch anything but the
positive battery terminal
connector.



Summary & Wrap-up



Your EV may need some additional (different) care and maintenance during the quarantine.



If you need help with your
specific vehicle, reach out
to your local EV chapter.



Thanks for
Listening!

Drive Electric Columbus

