

## EMV DRIVERS INFORMATION



# OPERATING YOUR EMV

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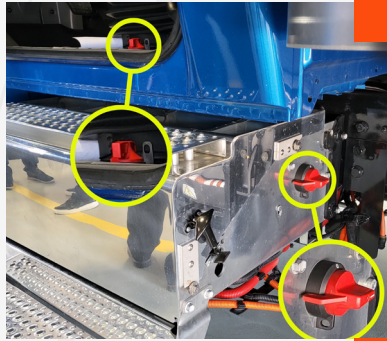


# OPERATING YOUR EMV

## POWERING UP AND OPERATION

Ensure the low and high voltage disconnects are turned to the "ON" position.

During normal day to day operation, the low and high voltage disconnects should not be turned off.



1

Ensure the Low and High Voltage disconnect switches are in the "ON" position.

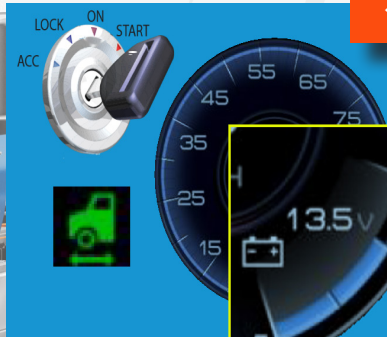


2

Turn key "ON"....

Wait 10 seconds for gauges to sweep.

Depress brake pedal.



3

Turn key to "START".

Cluster will display "GREEN" "OK to Drive" symbol.

(12-volt system must be at least 11 volts)



4

Release parking brake.



5

Select desired gear.



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# OPERATING YOUR EMV

## REGENERATIVE BRAKING

During regenerative braking, the drive motor converts the momentum of the moving vehicle into electrical energy, which is stored in the high-voltage batteries.

This process helps charge the HV batteries extending mileage between charging and extends service brake life.



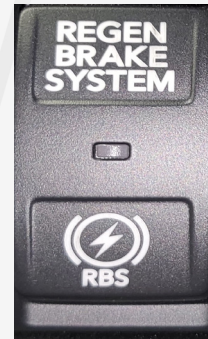
1

Regenerative brake switches are located in the dash center stack.

4



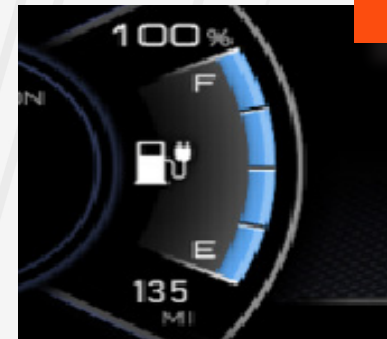
To adjust regenerative braking performance, a mode switch is available for the driver.



2

Switch to turn "ON / OFF" regenerative braking.

5



Regenerative braking can be limited if battery state of charge is high.

System will not allow HV batteries to be overcharged.



3

To adjust regenerative braking performance, a mode switch is available for the driver.

- MODE 1:** Lowest Level of Braking
- MODE 2:** Moderate Level of Braking
- MODE 3:** Highest Level of Braking





# OPERATING YOUR EMV

## TOWING

Whenever necessary, always tow the vehicle with the front wheels suspended.

This method requires extra precautions that must be taken to avoid vehicle / component damage.

Parking brake can be released by recharging the air system with at least 64 psi (441 kPa) of air. If brake system does not retain air pressure, then manually cage the spring brakes.

Procedure may differ slightly if vehicle has spring only rear suspension.



1

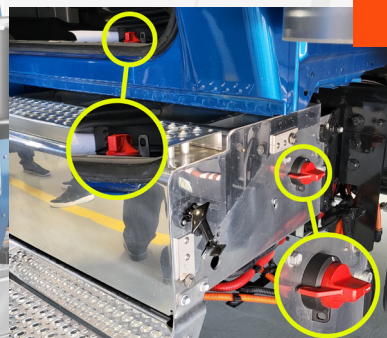
Ensure the air system is filled and can hold air pressure.

Air system can be filled through fitting found on air tank.



2

Ensure the parking brake is applied before working under the vehicle.



3

Ensure Low Voltage and High Voltage switches are in the "OFF" position.



4

Use a paint marker to record propeller shaft mating positions at the drive motor and rear axle.

Remove the propeller shaft.



5

Ensure vehicle is secure and ready to be transported.



6

During installation, align propeller shaft mating positions at the drive motor and rear axle.

Tighten the fasteners to 115 lb-ft (156 N•m)



# OPERATING YOUR EMV

## USING INCHARGE ICE CHARGER - START A CHARGING SESSION

This procedure was developed using the ICE chargers from InCharge.

The vehicle cannot be driven when a charge plug is connected to the charge port.

Please contact your local IC dealer if you experience any charging issues.

If steps are not followed in order, charging errors may occur.

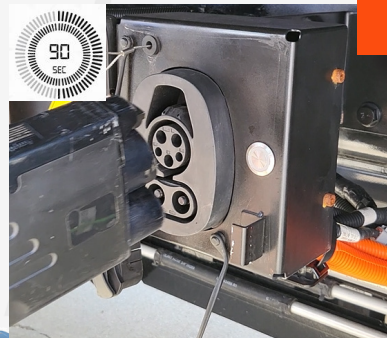
NOTE: Only use the emergency release cord in emergencies. Do not pull emergency release cord to stop a normal charging event.



1

Park vehicle within reach of charge port.

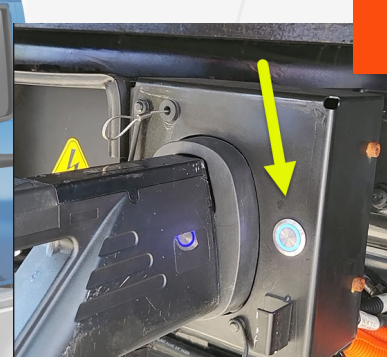
Ensure vehicle is in **Neutral (N)** and parking brake is set.



2

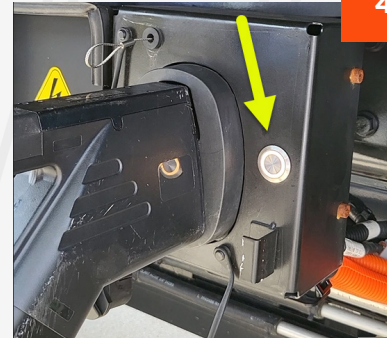
With **key in the OFF position**, wait **90 seconds**.

**Next, insert charging handle** into the vehicle charge port.



3

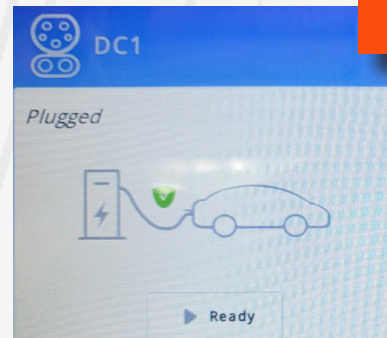
The charge interface button will then illuminate **BLUE** to indicate the charger to vehicle connection is secure.



4

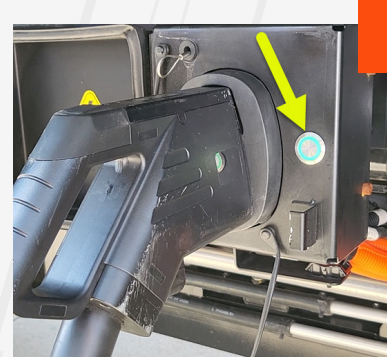
Wait for the charge interface button to turn **AMBER**.

Emergency **release cord will also retract**.



5

**Click READY button** on the charger screen to start charging process.



6

Blinking **GREEN** indicates charging is in progress.

Solid **GREEN** indicates charging complete.





# OPERATING YOUR EMV

## USING INCHARGE ICE CHARGER - STOP A CHARGING SESSION

This procedure was developed using the ICE chargers from InCharge.

The vehicle cannot be driven when a charge plug is connected to the charge port.

Please contact your local IC dealer if you experience any charging issues.

If steps are not followed in order, charging errors may occur.

NOTE: Only use the emergency release cord in emergencies. Do not pull emergency release cord to stop a normal charging event.



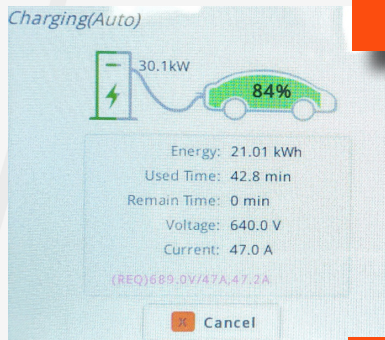
1

Press charger interface button **to stop charging session.**



4

The **emergency release cord** will extend outward.



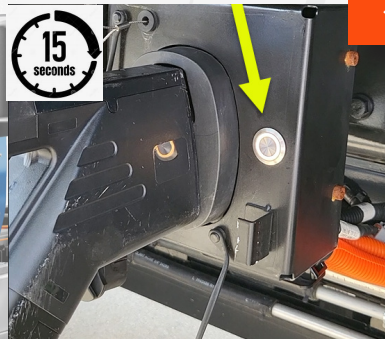
2

Charger status will show disconnecting / session ending.



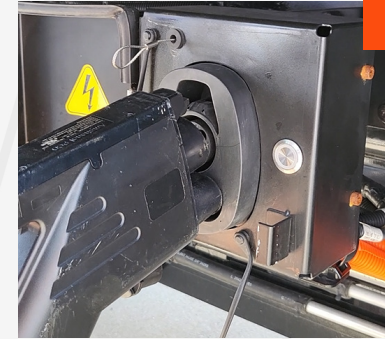
5

LED indicator will turn **BLUE.**



3

**Wait 15 seconds** and press the charge interface button a second time.



6

Unplug charging cord by **pressing the release button** on top of the charging handle.



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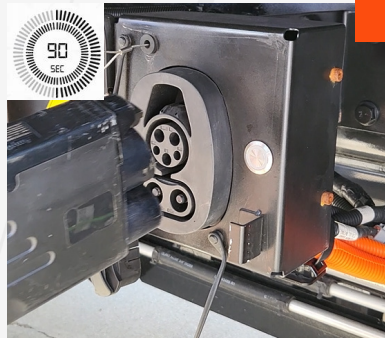
## USING INCHARGE ICE CHARGER - SEQUENTIAL CHARGING

This procedure was developed using the ICE chargers from InCharge.

NOTE: ICE-30 chargers can come with one or two charge plugs. The ICE-30 charger can only charge one vehicle at a time.

With sequential charging enabled, two vehicles can be connected and once the first vehicle has finished charging, the second will automatically start.

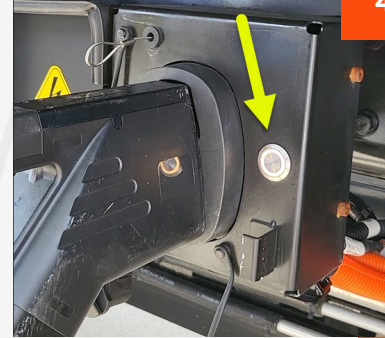
NOTE: Only use the emergency release cord in emergencies. Do not pull emergency release cord to stop a normal charging event.



1

With key in the OFF position, wait 90 seconds.

Next, insert charging handle into vehicle #1 charge port.



4

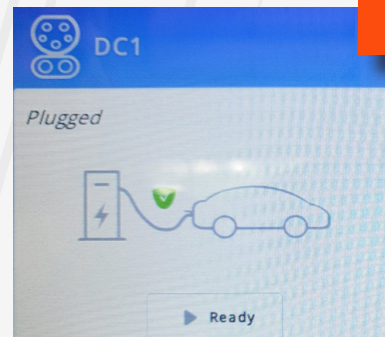
With key in the OFF position on vehicle #2, wait 90 seconds.

Insert charging handle into the vehicle #2 charge port.



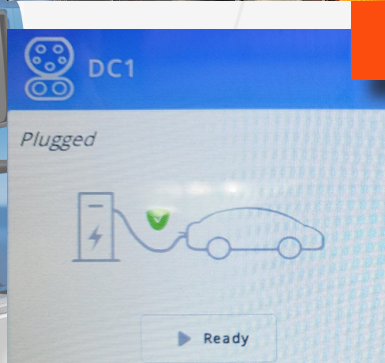
2

The charge interface button will then illuminate BLUE and then AMBER.



5

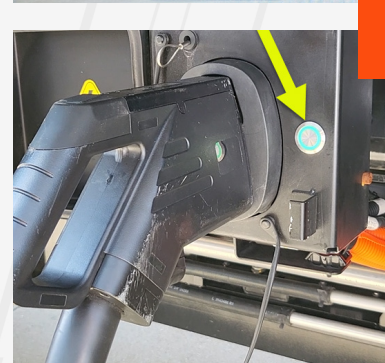
Click READY button on the charger screen to start charging process for vehicle #2.



3

Initiate charge event by clicking the READY button on the charger screen for the respective charge gun.

Wait 30 seconds.



6

The charger will display "Please Wait..." message on screen for vehicle #2.

This is normal operation until vehicle #1 reaches its full charge.





# OPERATING YOUR EMV

## USING ABB CHARGER - START A CHARGING SESSION

This procedure was developed using the ABB 24kW charger from InCharge.

The vehicle cannot be driven when a charge plug is connected to the charge port.

Please contact your local IC dealer if you experience any charging issues.

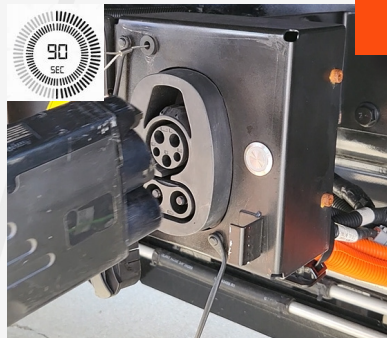
If steps are not followed in order, charging errors may occur.

NOTE: Only use the emergency release cord in emergencies. Do not pull emergency release cord to stop a normal charging event.



Park vehicle within reach of charge port.

Ensure vehicle is in **Neutral (N)** and parking brake is set.

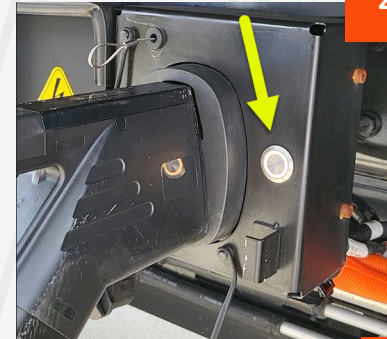


With **key in the OFF** position, wait **90 seconds**.

**Next, insert charging handle** into the vehicle charge port.

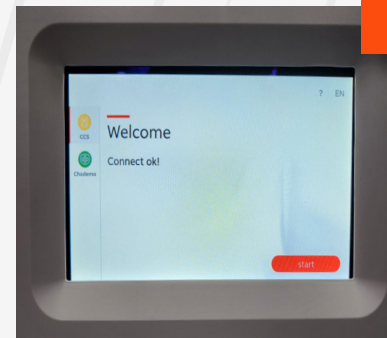


The charge interface button will then illuminate **BLUE** to indicate the charger to vehicle connection is secure.



Wait for the charge interface button to turn **AMBER**.

Emergency **release cord** will also retract.



Click **READY** button on the charger screen to start charging process.



Blinking **GREEN** indicates charging is in progress.

Solid **GREEN** indicates charging complete.



# OPERATING YOUR EMV

## USING ABB CHARGER - STOP A CHARGING SESSION

This procedure was developed using the ABB 24kW charger from InCharge.

The vehicle cannot be driven when a charge plug is connected to the charge port.

Please contact your local IC dealer if you experience any charging issues.

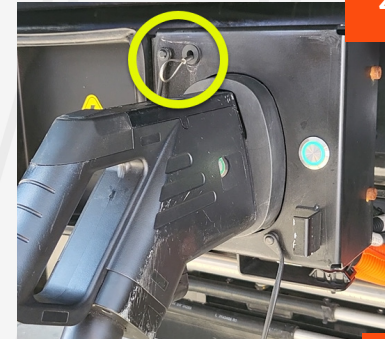
If steps are not followed in order, charging errors may occur.

NOTE: Only use the emergency release cord in emergencies. Do not pull emergency release cord to stop a normal charging event.



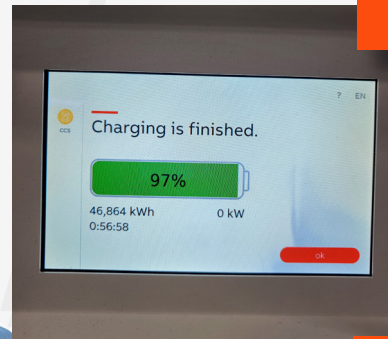
1

Press charger interface button **to stop charging session.**



4

The **emergency release cord** will extend outward.



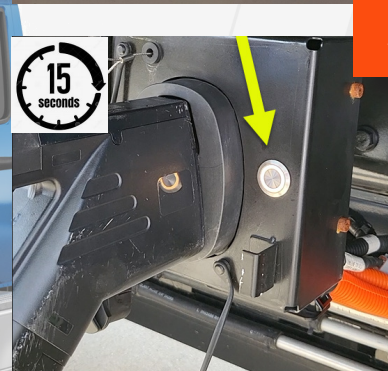
2

Charger status will show disconnecting / session ending.



5

LED indicator will turn **BLUE.**



3

**Wait 15 seconds** and press the charge interface button a second time.



6

Unplug charging cord by **pressing the release button** on top of the charging handle.





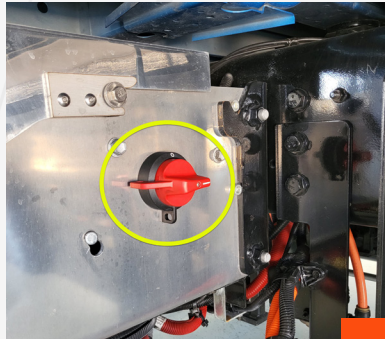
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## FIRST/SECOND RESPONDERS GUIDE

The following information is designed to provide first and second responders with helpful information about the eMV in the event of an emergency.

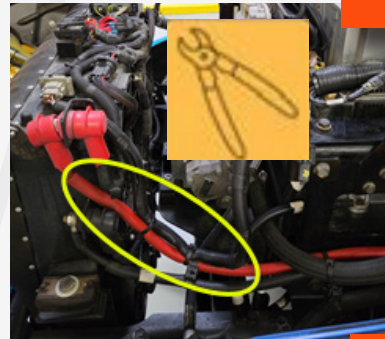
Additional information can be found on the National Fire Protection Association (NFPA) website at

<https://www.nfpa.org/Training-and-Events/By-topic/Alternative-Fuel-Vehicle-Safety-Training/Emergency-Response-Guides/Navistar>



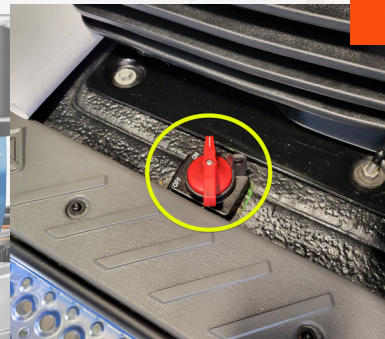
1

Isolating the 12V system can be accomplished via the Low Voltage Disconnect switch **OR** by cutting the main red battery cable located under the hood.



2

High voltage in Zone 1 can be isolated when the High Voltage Disconnect switch is in the **"OFF"** position.



3

High voltage in **Zone 1** is electrically isolated when **Level 1 Manual Service Disconnects (MSDs)** are disconnected.



4

High voltage in **Zone 2** is electrically isolated when **Level 2 MSDs** are disconnected.



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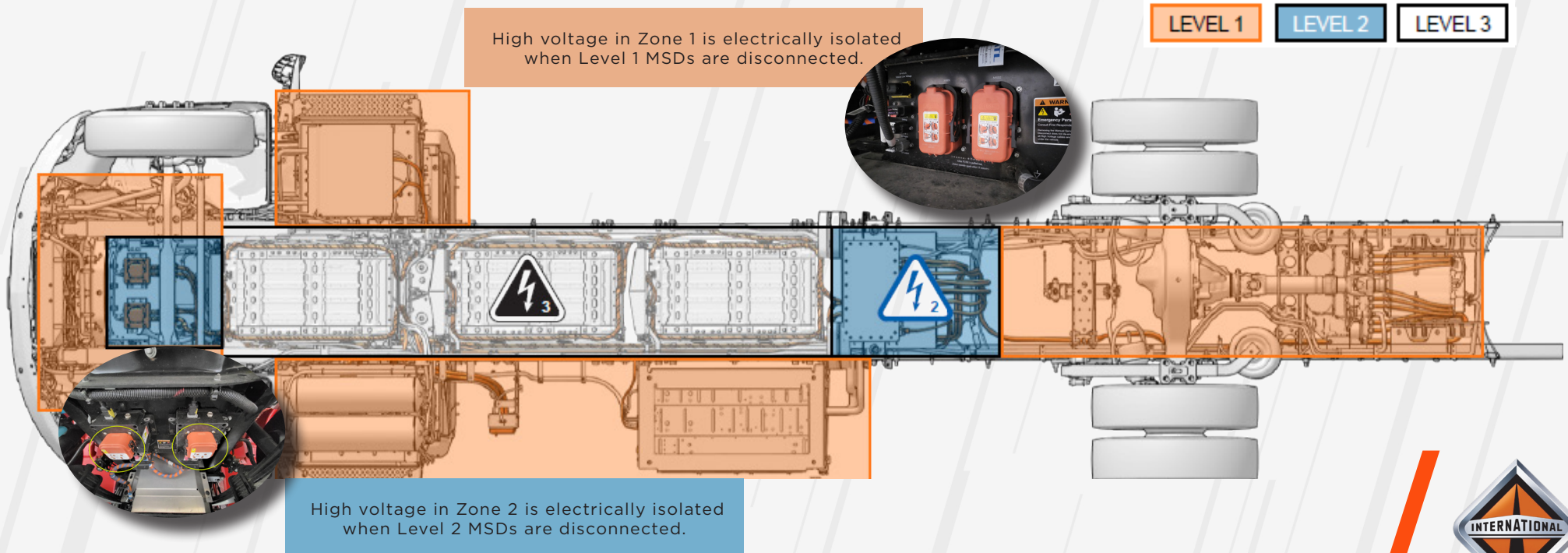


# OPERATING YOUR EMV

## FIRST/SECOND RESPONDERS GUIDE - LOCATION OF MSDS

If the Low and High Voltage Disconnect switches are not accessible, Zone 2 high voltage isolation can be accomplished by disconnecting the two Level 2 MSDs at the front of the vehicle.

Colored areas outlined in image below represent areas of isolation and cable color coding.





# OPERATING YOUR EMV

## MAINTENANCE TABLE - HIGH VOLTAGE COMPONENTS

The following table references the high voltage components requiring maintenance.

The remaining chassis maintenance items follow the current diesel service intervals and procedures.

For a full list of vehicle maintenance items, please refer to the Operation and Maintenance Manual.

Maintenance Item	Interval
High Voltage Air Compressor Filter	10,000 miles (16,000 km) / 400 hours / 1 Year
Air Dryer Filter	AD-9 Model: 250,000 miles (400,000 km) / 2 Years Other Models: 125,000 miles (200,000 km) / 1 Year
Electronics Cooling System - Change and Refill	150,000 miles (240,000 km) / 5 Years
BTMS Coolant System - Change and Refill	150,000 miles (240,000 km) / 5 Years
Cabin Heater Coolant System - Change and Refill	150,000 miles (240,000 km) / 5 Years
Power Steering - Change and Refill	100,000 miles (160,000 km)
Rear Axle With Petroleum - Change and Refill	60,000 miles (96,000 km) / 1 Year
Rear Axle With Synthetic - Change and Refill	180,000 miles (288,000 km) / 3 years

**A complete list of Pre/Post check items and other chassis related maintenance intervals can be found in the Operation and Maintenance Manual.**



## VEHICLE STORAGE INSTRUCTIONS

The following information outlines vehicle storage instructions.

Additional vehicle storage instructions can be found in the Operators and Maintenance Manual.

**1**

Check the coolant in all three cooling systems for proper level and adequate freeze protection. -20°F (-29°C) is standard for medium duty models.

**2**

Drain air brake reservoirs and close the drain cocks.

**3**

Check state-of-charge in 12V batteries and recharge if open circuit voltage is below 12.6 volts.

**4**

To ensure optimal operation of the electric vehicle, the following storage instructions for the high voltage system are required:

- Prior to storage, ensure battery State of Charge (“SOC”) is between 40% and approximately 90% to help maintain battery life during extended storage periods.
- Charge the vehicle to 100% SOC at minimum every three (3) months.
- Recommend storage at ambient temperatures of less than 34 degree C (95 degree F).
- Avoid storage at ambient temperatures greater than 50 degree C (122 degree F).

Temporary energy losses may result following long periods of storage without operation of the vehicle. Self-discharge rate will increase when vehicle is stored at higher ambient temperatures.

**5**

Drive vehicle monthly to exercise the brakes, driveline, and steering. Run the vehicle long enough for the vehicle systems to reach operating temperature.





# OPERATING YOUR EMV

## LIFTING CAUTION

Due to the inherent design and setup of drive on hoists, special precautions related to electric vehicles should be noted.

Some components located under the vehicle may be damaged if the hoist height or drive on angle is not monitored during vehicle loading.

In addition, obstacles located in the center portion of the lift may contact high voltage cables or shielding underneath the vehicle.



1

Before using a drive on hoist, ensure the hoist is lowered all the way to the ground.



2

Ensure there are no obstacles that may contact HV cables or shielding underneath the vehicle.



3

Center section of hoist may still contact vehicle if drive on angle is too steep.



4

Please pay special attention to HV cables and shielding located towards the rear of the vehicle.



5

Recommended lifting hoist is a column style hoist with a minimum of 14,000 lbs. lifting capacity per column.



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# OPERATING YOUR EMV

## EXTERIOR WASHING - HIGH VOLTAGE COMPONENTS

For exterior washing of the vehicle use warm water and mild soap, then wipe wet surfaces with a chamois or soft cloth.

**Pressure / power washing any high voltage components, cables, or modules is not permitted.**

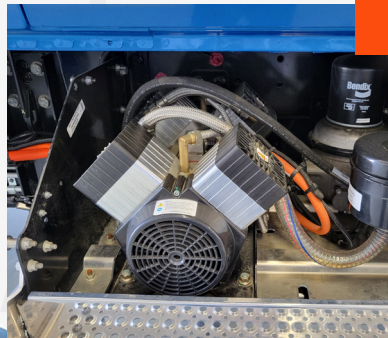
The following images show areas that should be avoided when using a pressure / power washer.

Additional vehicle care information can be found in the Operators and Maintenance Manual.



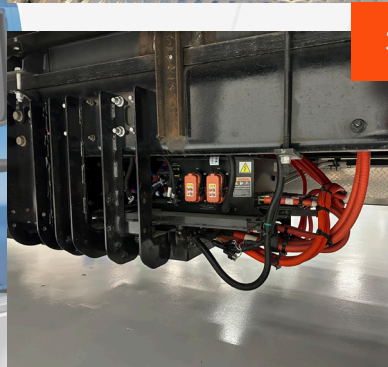
1

Avoid all under hood HV components.



2

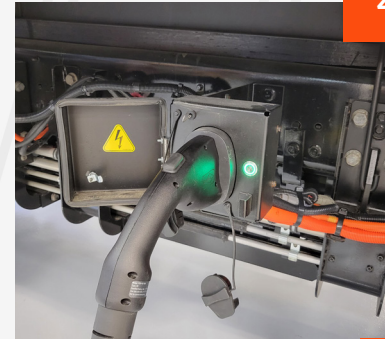
Avoid HV air compressor area.



3

Avoid undercarriage areas specifically where HV components and HV cables enter modules.

Avoid HV batteries.



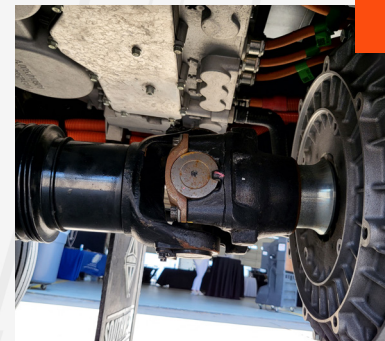
4

Avoid charging port area.



5

Avoid underneath front bumper area where front MSDs are located.



6

Avoid underneath HV drive motor and traction power inverter module areas.





# OPERATING YOUR EMV

## INSTRUMENT CLUSTER OPERATOR WARNINGS - LOW VOLTAGE

Vehicle operators may encounter instrument cluster warnings related to the vehicle being at a low State of Charge (SOC).

The vehicle will display two main indicators to warn the operator of a low voltage concern related to the high voltage system.

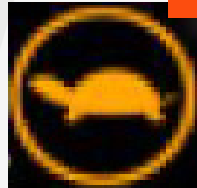
In addition, a 12 volt battery system low voltage indicator can also display for the operator.



1

When the state of charge on the instrument cluster reaches less than 20%, the first indicator displayed to the operator will be an amber colored range indicator as pictured to the left.

At this time, there is no loss of available power to the operator. The operator should review the remaining available mileage and adjust their route to the nearest available charging location.



2

The next indicator the operator will encounter will be the turtle indicator. The turtle indicator will illuminate when battery conditions (SOC, temperature, etc.) limit charge or discharge capability of the high voltage batteries. For example, in typical operating conditions, this indicator will illuminate around 9% state of charge as noted on the instrument cluster.

At this time, there will be a slight reduction in available power to the operator. If the vehicle continues to be driven down to 0% state of charge, the power available will be further reduced.



3

If the 12 volt battery system has low voltage, the red battery indicator will show on the instrument cluster. If this indicator is present, the vehicle will not go into "High Voltage Ready" mode and the vehicle will not be able to start.

If the low voltage battery system is less than 9 volts measured at the batteries, the system voltage is low and many of the control modules will not power up.

In this situations, the low 12 volt battery condition can be corrected by simply charging the 12 volt batteries or installing a 12 volt battery charge pack to the low voltage batteries.



# OPERATING YOUR EMV

## VEHICLE OPERATION - ROLL BACK

The inherent design of the current Electric Vehicle drivetrain components, as compared to most internal combustion engine drivetrains, may allow a noticeable difference in what is referred to as roll back.



### WARNING

**To prevent personal injury and / or death, or damage to property, when stopping your vehicle on a grade during normal operation, ALWAYS apply the service brake to prevent vehicle from rolling rearward.**

Roll back can occur whenever the vehicle is positioned on an incline or a surface with sufficient grade, and during transition from the service brake pedal to the accelerator pedal, the vehicle may exhibit a tendency to roll.

This can also occur when the emergency brake is released while parking on a grade. Vehicle size, weight, facing direction, intended direction of travel and grade of incline can all contribute to the roll forward or roll back characteristic.

It is important the vehicle operator is aware of this characteristic and the operator is applying the service brake pedal during normal operation appropriately whenever these, or similar scenarios can occur.







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# **MV ELECTRIC**

Note: The information and conclusions contained herein are believed to be correct at time of publication, but do not necessarily apply to similar vehicles with different specifications or with production dates after the production of this publication. Vehicles with different specifications or later dates of production may yield different results. Vehicle specifications are subject to change without notice. 01/2023 ©2023 NAVISTAR Inc. All rights reserved. All marks are trademarks of their respective owners