



INFORMATION FOR FIRST AND SECOND RESPONDERS
EMERGENCY RESPONSE GUIDE FOR VEHICLE



**IC Bus™ Electric CE Series
School Bus**

Model Year 2021–Present
Battery Electric Vehicle



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0. Rescue Sheet



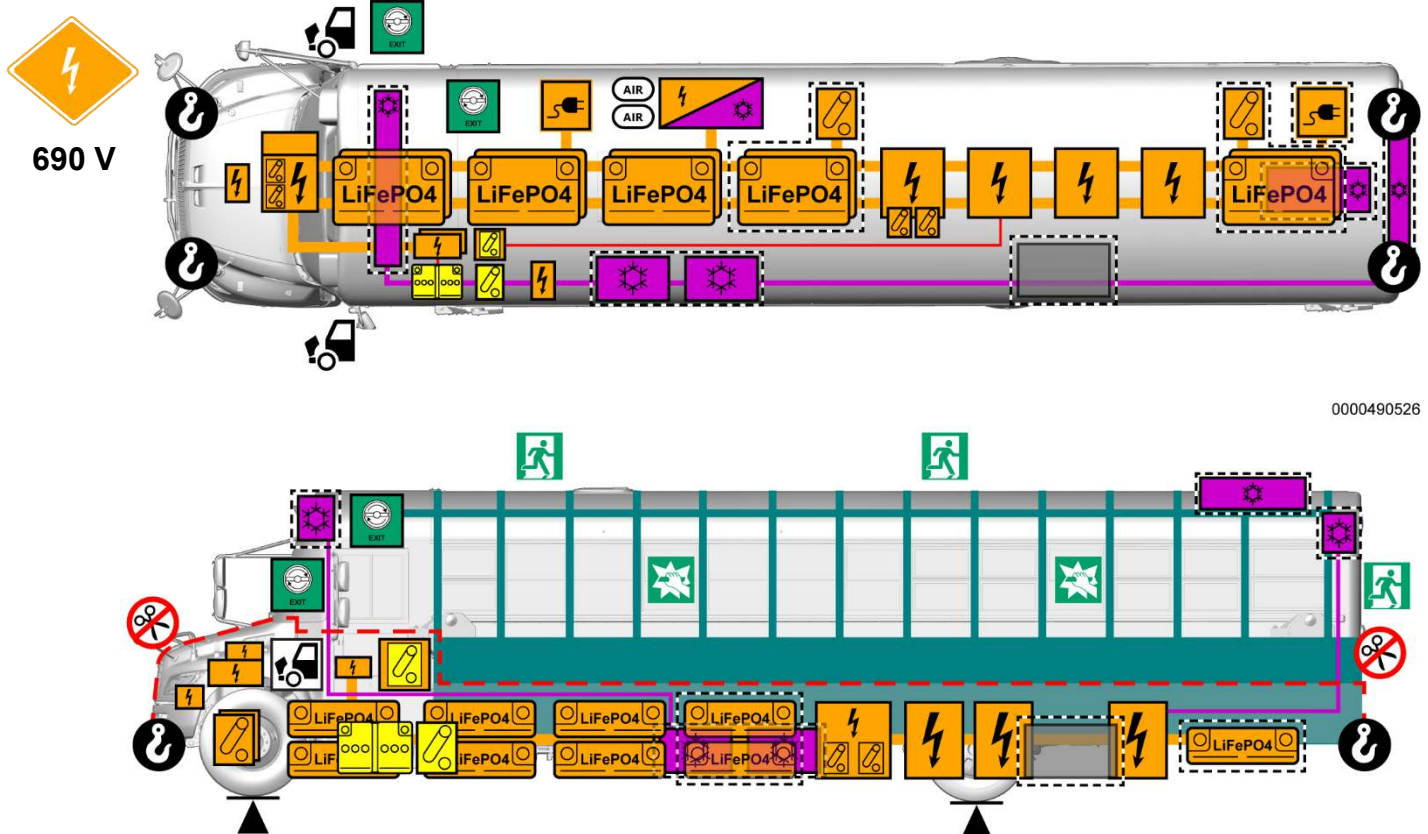
IC Bus™ Electric CE Series School Bus Model Year 2021–Present



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WARNING: TO PREVENT PERSONAL INJURY AND / OR DEATH, NEVER CUT OR ATTEMPT TO BREACH HIGH-VOLTAGE BATTERIES, HIGH-VOLTAGE COMPONENTS, OR HIGH-VOLTAGE WIRING.

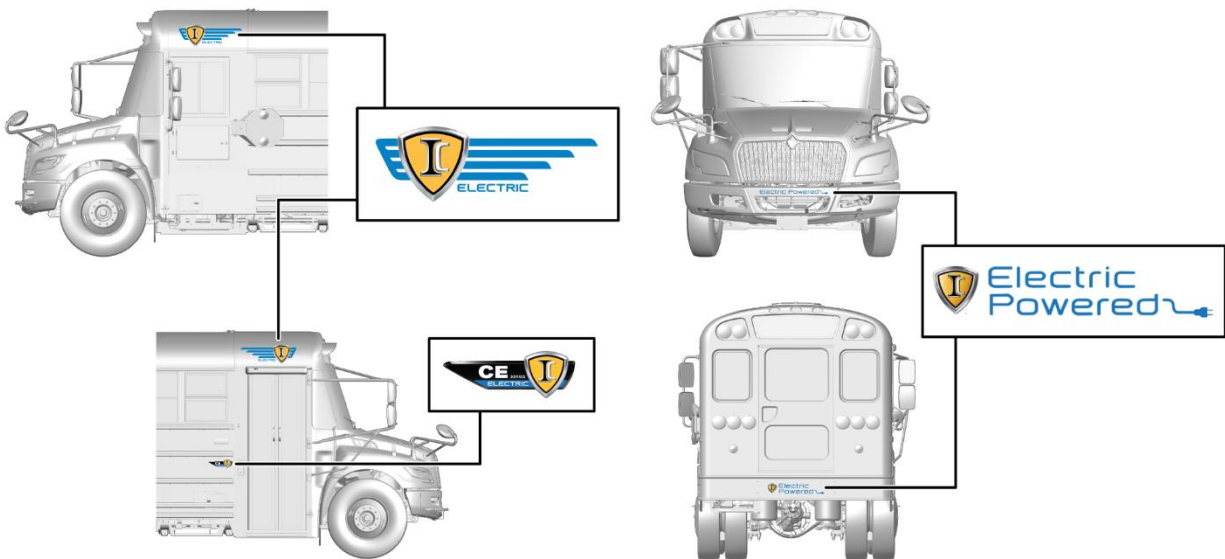
	Low-Voltage Battery		High-Voltage Battery		High-Voltage Component		High-Voltage Charge Port		Battery Thermal Mgmt System
	Low-Voltage Disconnect		12V Shutoff for High-Voltage		High-Voltage Disconnect		Tow Hook		Air Conditioning Component
	High-Voltage Power Cable		Low-Voltage Power Cable		Air Condition Line		Lift Point		Compressed Air Tank
	Emergency Exit		Break For Access		Emergency Door Opener		Diesel Heater Tank		Hood Release
	High Strength Structure		No Cut Below Line		Optional Feature		Electric Propulsion		

1. Identification / Recognition

Exterior Identification

The following markings identify the vehicle as electric powered. Some localities may not include all badging or decals.

- BLUE ELECTRIC decal on both sides of the roof
- BLUE CE ELECTRIC marking badge near the passenger door
- BLUE ELECTRIC POWERED decal on the front and rear bumpers

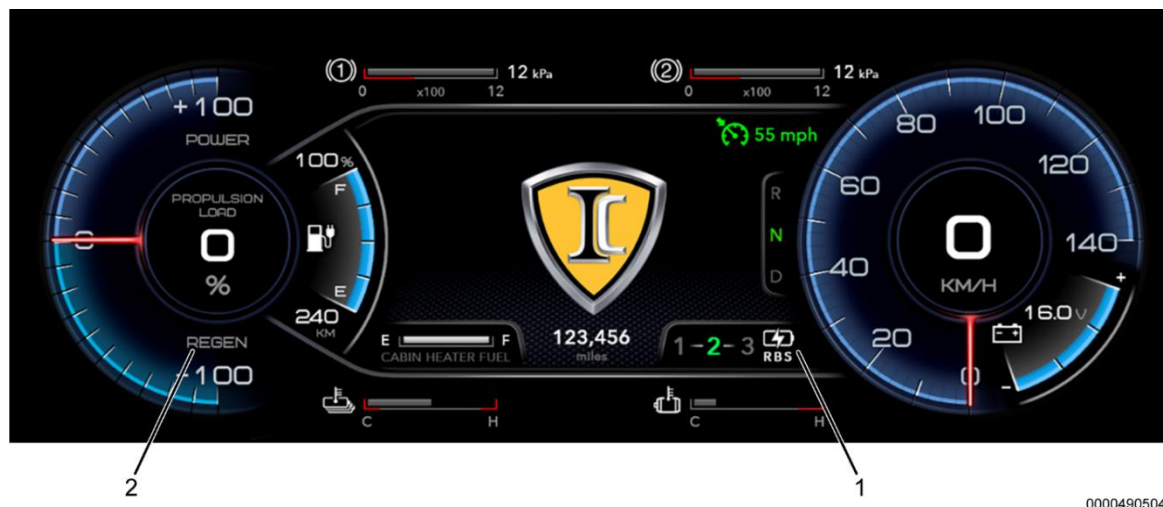


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Figure 1. Exterior Identification

1. Identification / Recognition

Interior Identification





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Figure 2. Instrument Cluster

1. Regenerative Braking System (RBS) indicator, Levels 1, 2, 3
2. REGEN

The word REGEN (Figure 2, Item 2) and Regenerative Braking System (RBS) indicator, levels 1, 2, 3 (Figure 2, Item 1) are on the bottom of the instrument cluster.

Icon	Name
 0000490483	REGEN
 0000488716	Regenerative Braking System (RBS) indicator, Levels 1, 2, 3

IC Bus Electric CE Series buses also have a regenerative braking selector switch (1-2-3) on one of the panels as shown.



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Figure 3. Regenerative Brake Selector Switch

1. Identification / Recognition

High-Voltage Component Identification



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Figure 4. High-Voltage Component Identification

High-voltage cables and components can be identified by the following:

- A triangle with lightning bolt
- ORANGE in color and / or ORANGE with stripes

2. Immobilization / Stabilization / Lifting

Immobilization

When approaching the bus, check if the bus is ON by the following indications:

- The headlights, tail lights, and marker lights are ON.
- A humming sound will also come from under the hood.
- Front and rear external speakers produce an audible tone.

NOTE: When the bus is turned off, the motor returns to Neutral. The bus can roll if the parking brake is not set.

Immobilization of a compromised vehicle can be achieved by the following methods:

1. Turn OFF the bus and set the parking brake (refer to Section 3, Disable Direct Hazards / Safety Regulations).
2. Insert an emergency plug into the charge port.
3. Install wheel chocks.

NOTE: An emergency plug immobilizes the bus by automatically engaging the parking brake and setting the motor to Neutral. The emergency plug does not disconnect power from the high-voltage circuits.

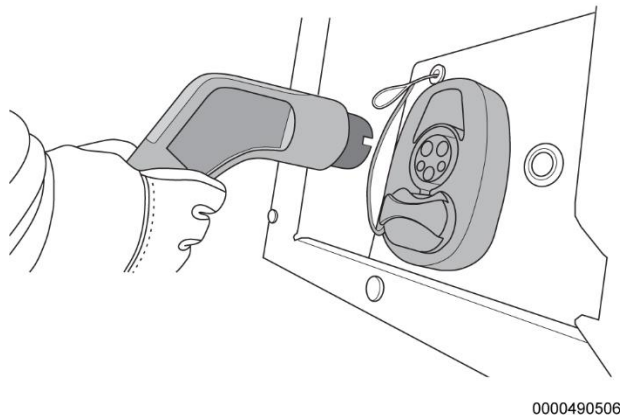
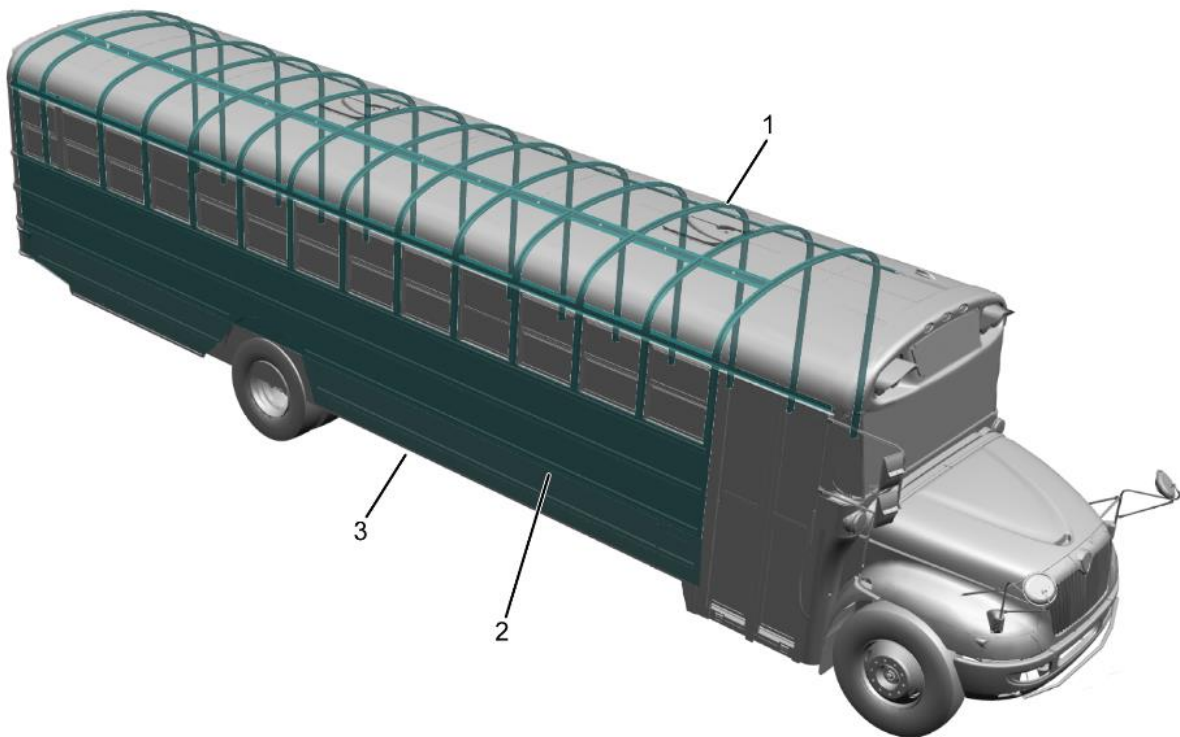


Figure 5. Emergency Plug

3. Immobilization / Stabilization / Lifting

Stabilization

If needed, place rescue struts and cribbing under the frame rails or body to stabilize the bus. The threaded body construction has 14-gauge vertical bows between windows, reinforced skirting, and riveted side rails which provide a strengthened cage structure for the cabin.



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Figure 6. Bus Body Structure

- 4. Vertical bows
- 5. Riveted side rails
- 6. Reinforced skirting

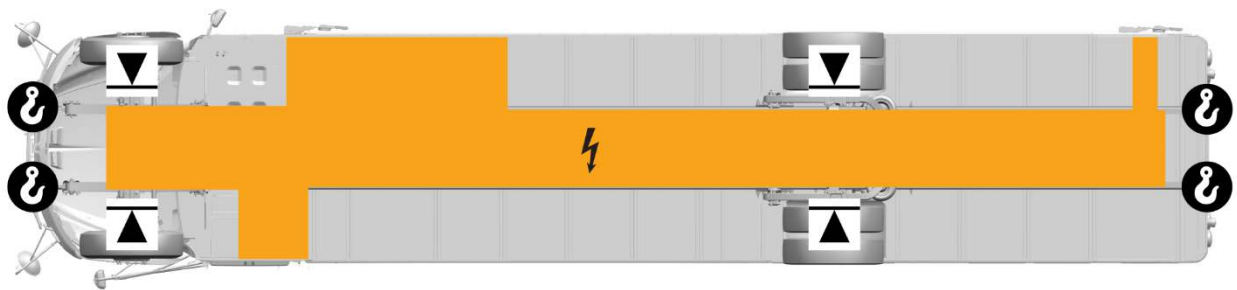
2. Immobilization / Stabilization / Lifting

Lifting

Do not lift or apply force under high-voltage batteries, components, or cables. Wheel lifts or platform lifts are recommended.

In a roadside condition when these lifts are not available, raise the bus under the axles at the lifting points shown. Install support stands under axles and side members as needed for stability.

Use the front and rear tow hooks to lift or recover the bus short distances as needed.



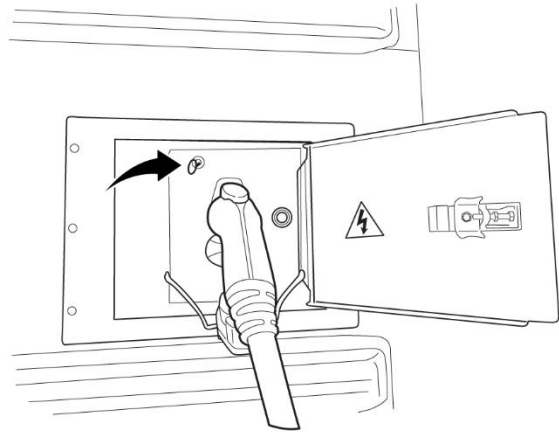
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Figure 7. Lifting Points and Tow Hooks

3. Disable Direct Hazards / Safety Regulations

Emergency Charger Release

To manually release a locked charger and stop the charging process, pull the emergency charger plug release cable.

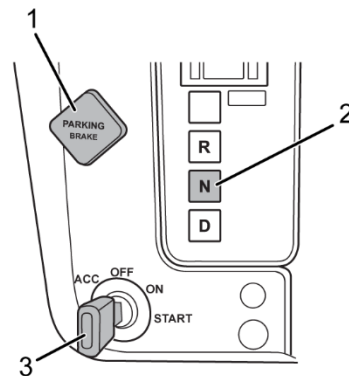


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Figure 8. Emergency Charger Plug Release Cable

Turning OFF the Bus

1. Push Neutral (N) button (Figure 9, Item 2).
2. Set the parking brake by pulling the parking brake knob (Figure 9, Item 1).
3. Turn the key (Figure 9, Item 3) to the left to turn OFF the bus.
4. Remove the key.



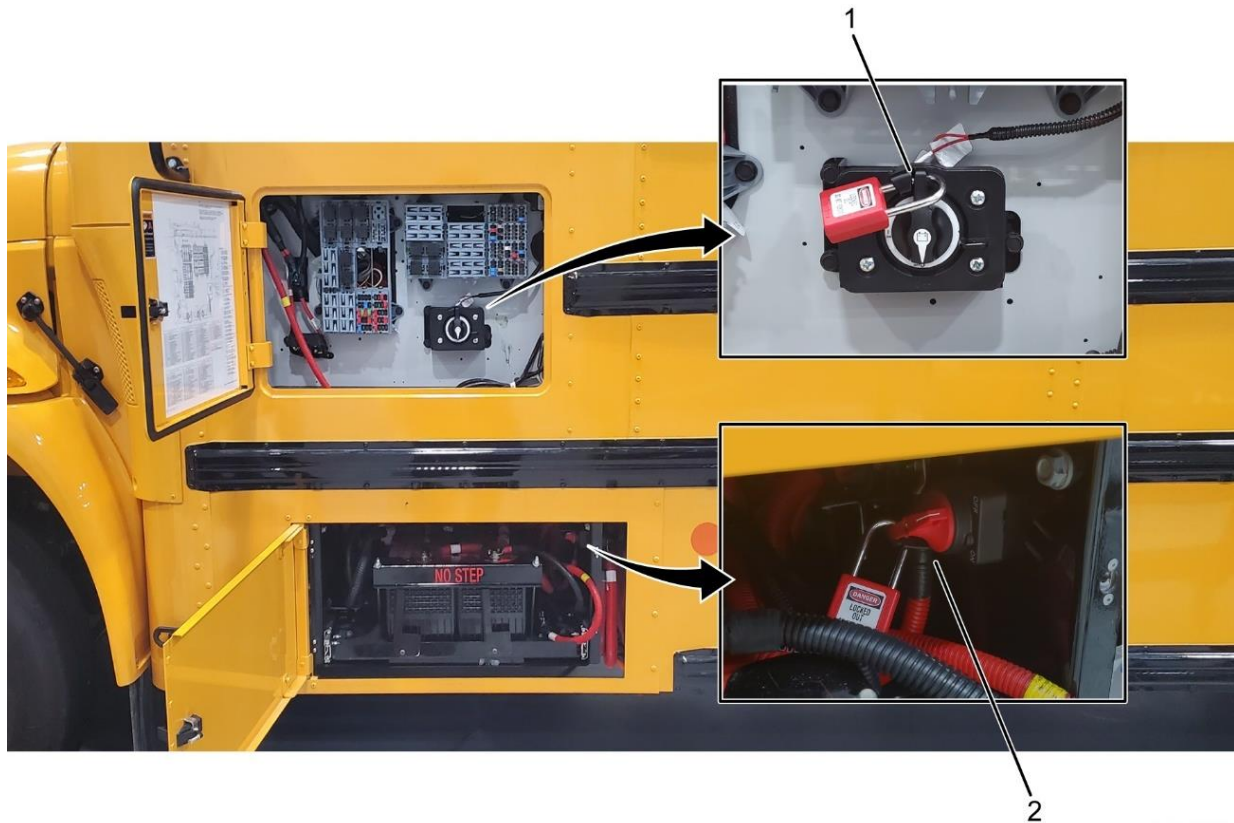
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Figure 9. Dashboard

1. Parking brake knob
2. Neutral button
3. Key

3. Disable Direct Hazards / Safety Regulations

Turning OFF 12V and High-Voltage Disconnect Switches



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Figure 10. 12V and High-Voltage Disconnect Switches

1. High-voltage disconnect switch
2. 12V disconnect switch

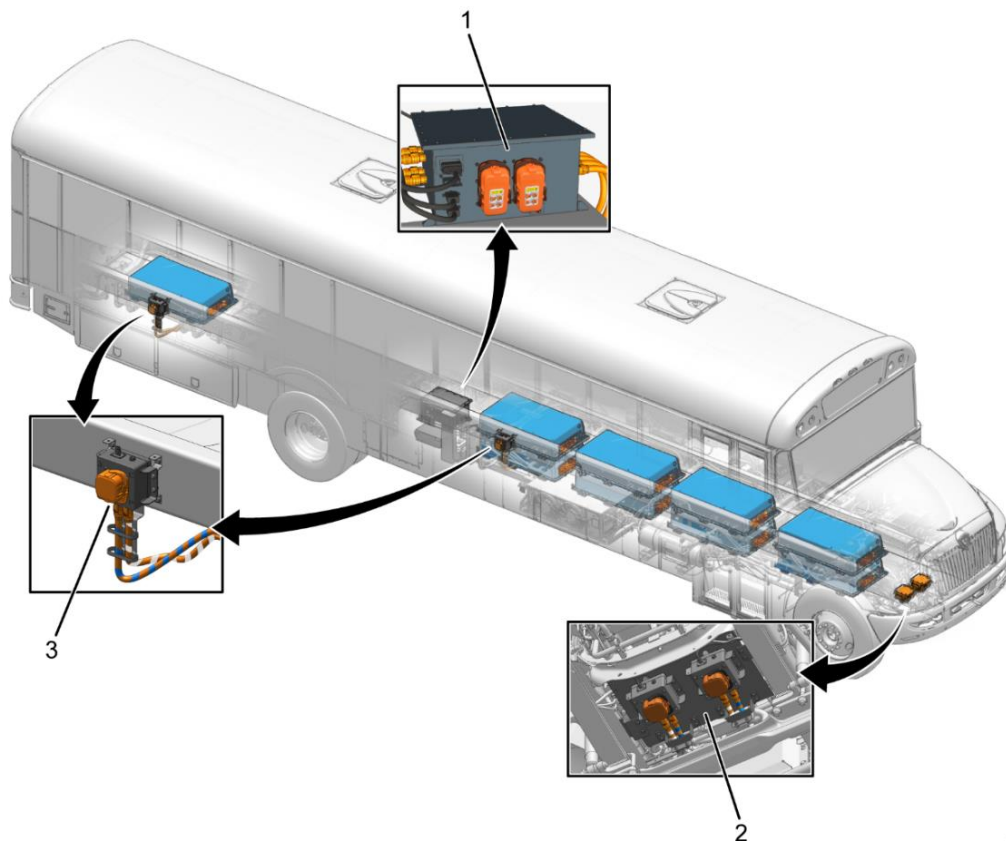
WARNING: To prevent personal injury and / or death, always remember the high-voltage disconnect switch only isolates high-voltage from components after the S-Box. The high-voltage disconnect switch does not disconnect high-voltage in the s-box, the high-voltage batteries, or the cables between these items. The 12 volt system could still be energized. Always shut off both the high-voltage disconnect switch and the 12v disconnect switch whenever interacting with a damaged bus. Never touch orange cables without wearing appropriate high-voltage personal protection equipment (PPE).

3. Disable Direct Hazards / Safety Regulations

1. Turn the ignition key to the OFF position and set the parking brake.
2. Open the two outer access doors under the driver window.
3. Turn the 12V disconnect switch to OFF (Figure 10, Item 2). Lock the switch.
7. Turn the high-voltage disconnect switch to OFF (Figure 10, Item 1). Lock the switch.
8. Wait 3 minutes for high-voltage energy to dissipate.

NOTE: Components in high-voltage Level 2 / Zone 2 (BLUE-striped cables) and high-voltage Level 3 / Zone 3 (WHITE-striped cables) remain live after the high-voltage disconnect switch is turned OFF. These levels are located primarily between the frame rails on the underside of the bus and are labeled.

Disconnecting the Manual Service Disconnects (MSDs)



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Figure 11. MSD Locations

1. Level 1 / Zone 2 MSDs
2. Level 2 / Zone 2 MSDs (except early models)
3. Level 2 / Zone 2 MSDs (optional 9-battery models only)

3. Disable Direct Hazards / Safety Regulations

WARNING: To prevent personal injury and / or death, wear and use approved high-voltage personal protective equipment (PPE) when near a high-voltage electric vehicle. Inspect PPE before use. Do not use gloves or other ppe with expired dates, holes, cracks, or damage. Never touch energized orange high-voltage cables or high-voltage components without wearing approved high voltage PPE.

There are two sets of Manual Service Disconnects (MSDs) on the bus. The MSDs shut down power to the BLUE-striped cables (Level 2 / Zone 2) and remaining ORANGE cables that were not already shut down by the high-voltage disconnect. WHITE-striped cables (Level 3 / Zone 3) will remain powered after removing the Level 1 and 2 MSDs.

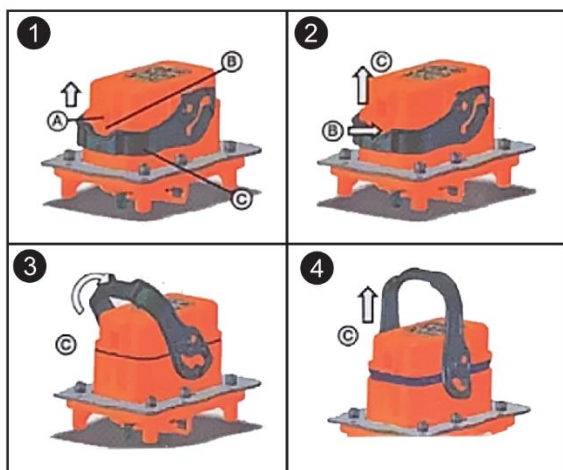
Inform the tow truck driver of the MSD locations. MSDs should typically not need to be disconnected unless service access is needed near the ORANGE high voltage cables.

If removing the MSDs, remove them in the following order:

1. The level 1 MSDs are located between the frame rails in front of the rear axle (Figure 11, Item 1).
2. The level 2 MSDs are located forward of the front axle (Figure 11, Item 2). These MSDs may not exist on a small number or early models.
3. Two additional level 2 MSDs may be located on the frame rail under the operator side of the bus (Figure 11, Item 3). These MSDs are only equipped on optional 9-battery models.

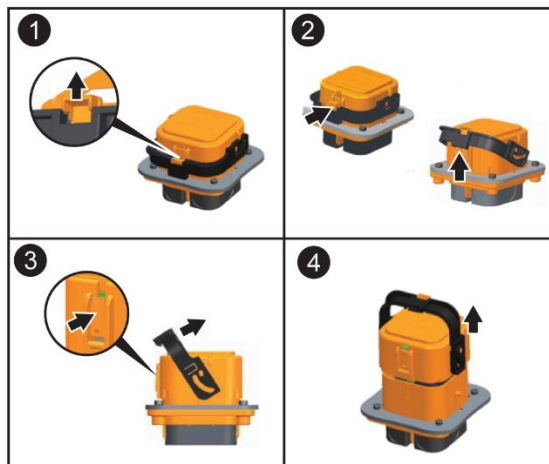
NOTE: Power still exists in Level 3 / Zone 3 cables (WHITE-striped cables) after MSDs are removed.

3. Disable Direct Hazards / Safety Regulations



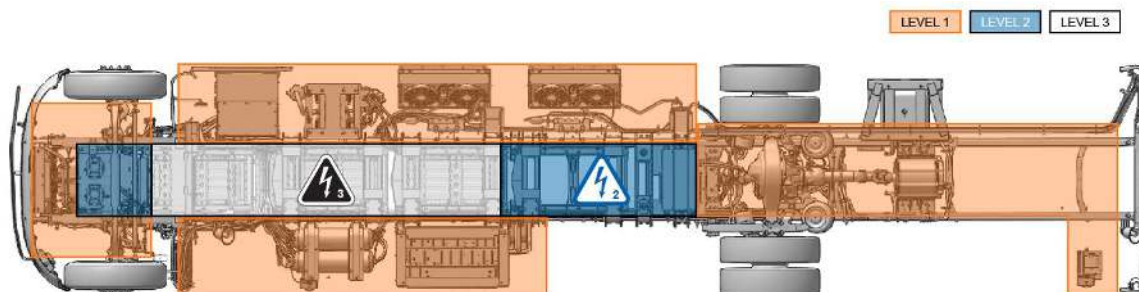
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Figure 12. Level 1 MSDs



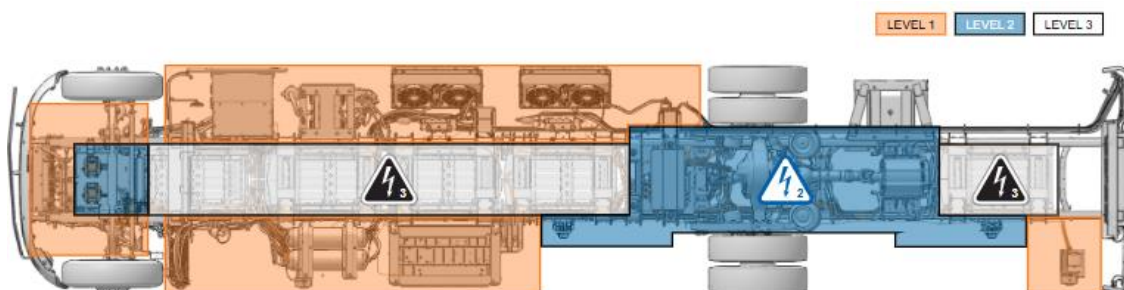
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Figure 13. Level 2 MSDs



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Figure 14. High-Voltage Isolation Levels / Zones (6-Battery Configuration, Viewed from Bottom)

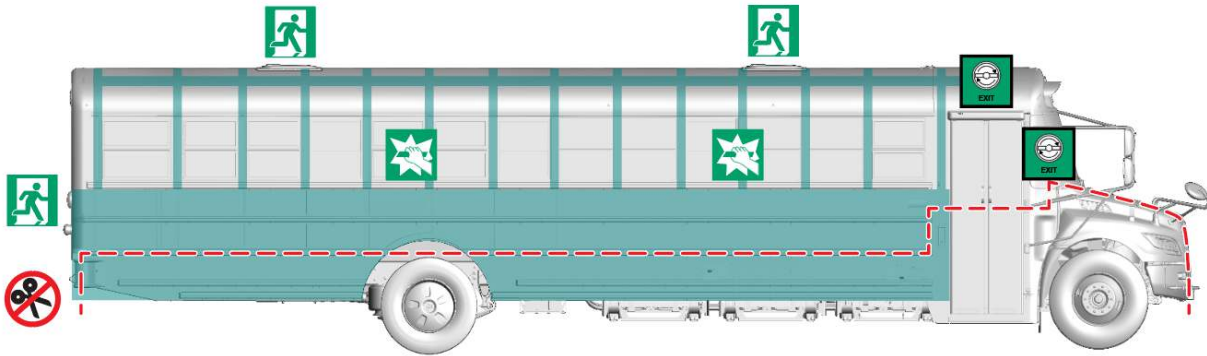


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Figure 15. High-Voltage Isolation Levels / Zones (9-Battery Configuration, Viewed from Bottom)

4. Access to the Occupants

Primary and emergency exits are shown below. If cutting into the bus is required, do not cut below the lower rub rail (passenger floor). The body has reinforced skirting and vertical rails between windows.








	Emergency Exit		Break For Access		No Cut Below Line		High Strength Structure		Emergency Door Opener
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Figure 16. Access to Occupants

Rear Emergency Door

The rear emergency door may have tempered glass or laminated safety glass.

1. Open the interlock latch. This will typically be unlatched while the bus is in use.
2. Rotate the handle to open the door.



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Figure 19. Rear Emergency Interlock Latch

4. Access to the Occupants

Entrance Door

To open from outside: Rotate the key switch outside the door to release the latch. Pull the door open.

To open from inside: Push the manual release lever above the door to release the latch. Push the door open.

If the door must be pried open, the latching mechanism is at the top middle of the door.

The door may have tempered or laminated safety glass.



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Figure 17. Entrance Door Release Switch (from Outside)



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Figure 18. Entrance Door Release Lever (from Inside)

4. Access to Occupants

Emergency Window

Lift the handle and push the window out on its hinge.

Emergency windows may be tempered glass or laminated safety glass. Tempered glass windows may be broken for access if needed.



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Figure 20. Emergency Window Release Lever

Windshield Removal

The windshield has laminated safety glass.

In the event of a rollover, the windshield can become a large exit to quickly rescue passengers through the front of the bus. Cut the plastic molding around the windshield and remove the glass.



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Figure 21. Windshield Molding

4. Access to Occupants

Manually Unfolding / Lowering Wheelchair Lift

1. Open the interlock latch inside the bus. This will typically be unlatched when the bus is in use.
2. Open the door to the wheelchair lift.



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Figure 22. Wheelchair Lift Interlock Latch

3. Using the lever from the back side of the lift assembly, rotate the valve clockwise until tight.



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Figure 23. Wheelchair Lift Valve

4. Access to the Occupants

4. Pump the valve 2–3 times until the lift assembly is tight.

NOTE: If the lift does not begin unfolding in the following step, check that the latches on each side of the lift assembly are not binding.

5. Rotate the valve counterclockwise one-half turn to slowly unfold and lower the lift.



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Figure 24. Wheelchair Lift Pump

Emergency Hatch

Hatches may be opened for ventilation or evacuation, especially if the bus is rolled on its side.

Some hatches have an optional handle on the outside of the door for access.

Rotate the handle and push the hatch up to open.



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Figure 25. Emergency Hatch

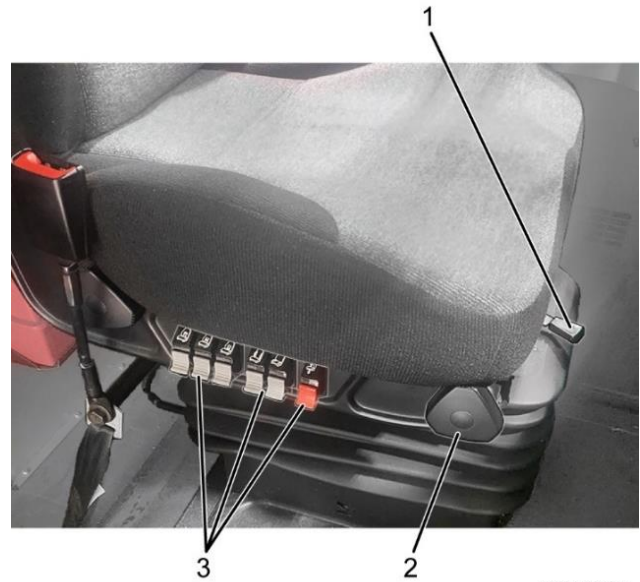
4. Access to the Occupants

Driver Seat / Steering Controls

Driver seat configurations can vary with a number of mechanical and pneumatic controls.

For pneumatic controls, press down the switches to lower the seat. The switches operate even if the bus has no power.

The steering wheel can be raised using the lever on the left-side of the steering column.



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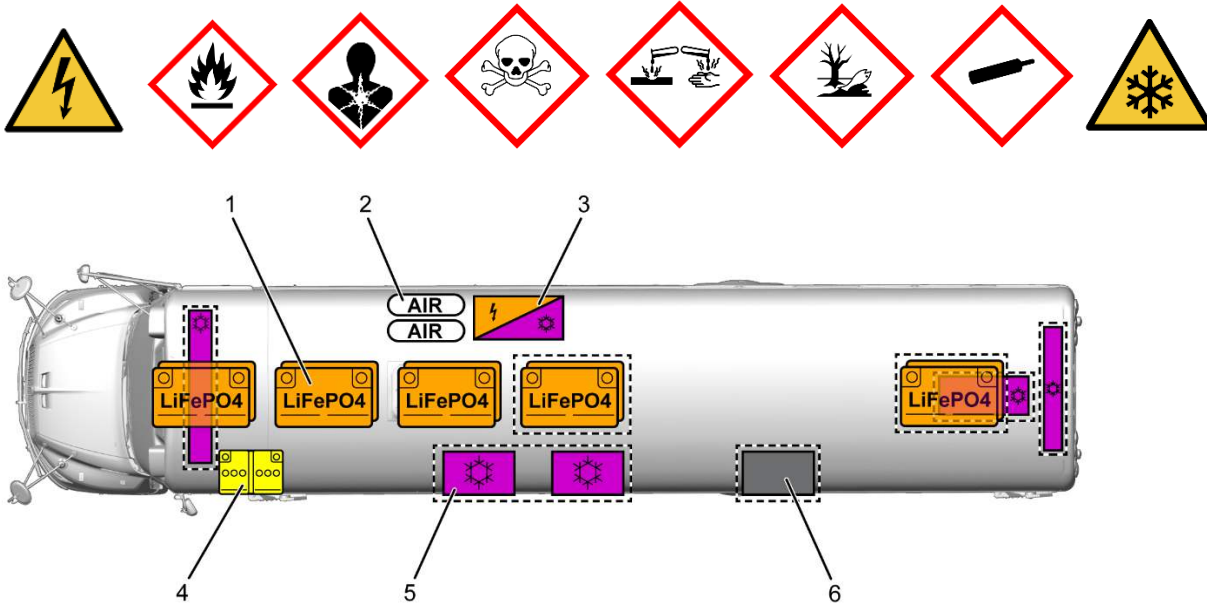
Figure 26. Driver Seat Controls



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Figure 27. Steering Column Control

5. Stored Energy / Liquids / Gases / Solids



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Figure 28. Stored Energy, Liquids, and Gases

1. High-voltage battery (6 or 9)
2. Compressed air tank (2)
3. Battery Thermal Management System
4. 12V battery (2)
5. HVAC system (optional air conditioning)
6. Diesel heater tank (optional)

WARNING: To prevent personal injury and / or death, always wear full personal protection equipment (PPE), including self-contained breathing apparatus (SCBA), whenever fire is involved.

WARNING: To prevent personal injury and / or death, never breach or remove the battery covers under any circumstances, including fire. Doing so might result in severe electrical burns, shock, or electrocution.

Battery Thermal Management System

The cooling system for high-voltage electronics is under the right-side of the bus. The high-voltage batteries, drive motor, and other high-voltage components are liquid cooled with a glycol-based automotive coolant. Coolant may be hot and under pressure with hose routings to power electronics components. The coolant is RED in color and may leak if the cooling system is damaged. The system includes R-134a refrigerant to chill the coolant.

5. Stored Energy / Liquids / Gases / Solids

High-Voltage Batteries

The high-voltage system has six (or optionally nine) lithium iron phosphate (LiFePO₄) dry cell batteries which are typically mounted between the frame rails. The high-voltage battery system and cables have a nominal voltage of 609V DC with a maximum potential voltage of 690V DC. Most of the electrolyte stored in these batteries is absorbed by active materials. Only a small amount of fluid may leak if damaged. Leaking electrolyte occurs in drops, not puddles. The fluid is clear in color with a sweet ether-type odor. The smell may indicate a battery leak.

LiFePO₄ batteries have a stable chemistry which does not easily combust or react with oxygen as with other cobalt-containing batteries. LiFePO₄ batteries only tend to smoke, leak, melt, deform, or swell at increased temperatures, even in thermal runaway, and are much less likely to produce flames or explode. However, fire or explosion is still possible in extreme situations.

While LiFePO₄ batteries are considered environmentally safe, compromised batteries with leaks, smoke, or gases may produce respiratory problems, skin irritation, and other issues. Use PPE with Self-Contained Breathing Apparatus when handling a bus with potentially compromised batteries.

The high-voltage batteries are liquid cooled with RED glycol-based coolant from the Battery Thermal Management System. Leaks from a high-voltage battery casing may be from either a coolant leak (RED) or from battery electrolyte (CLEAR).

HVAC System

The HVAC system on the driver-side of the bus uses a RED colored NOAT coolant. The electric cabin heater is under the hood. Hoses are routed to the driver heater / blower, stepwell heater / blower, and passenger heaters along the baseboards. Coolant may be hot and under pressure.

If optional air conditioning is installed, the air conditioning components and lines contain R-134a refrigerant under pressure. Each optional air-condition system (front, rear, and rooftop, if equipped) contains approximately 6–7 lbs (2.7–3.2 kg) of refrigerant. R-134a refrigerant is non-flammable under normal conditions but can be combustible at high temperatures. Be aware of possible refrigerant lines routed to the rooftop if an optional condenser is installed on the rear of the bus.

5. Stored Energy / Liquids / Gases / Solids

12V Batteries

Two 12V DC AGM batteries support the low voltage components and circuits.

Auxiliary Diesel Heater

If an optional fuel-fired diesel heater is installed, an 18-gallon (68 liter) diesel fuel tank will be located near the rear wheel on the driver-side of the bus.

Compressed Air Tanks

Two air tanks on the passenger-side (right-side) of the bus contain compressed air for the braking system. The air tanks and system hoses may contain a nominal air pressure of 100–140 psi (690–965 kPa). The parking brake will engage if the air tanks are depleted.

Hazardous Material Emergency Cleanup

Following an electric vehicle accident / incident, hazardous materials will need to be cleaned up appropriately.

Please contact your local and state authorities for more information regarding proper response and cleanup of hazardous materials.

6. In Case of Fire



WARNING: To prevent personal injury and / or death, always wear full personal protection equipment (PPE), including self-contained breathing apparatus (SCBA), when fire is involved. Fires in crash-damaged electric vehicles could emit toxic or combustible gases. Small amounts of eye, skin, or lung irritants may be present. If exposed, rinse with large amounts of water for 10–15 minutes. Consider the entire vehicle as energized.

WARNING: To prevent personal injury and / or death, pay attention to secondary fire events. There is a high risk of reignition after fire is extinguished.

A battery may be damaged internally without external evidence when involved in a crash. Use a thermal imaging camera to determine if there is excessive heat in any of the batteries which might lead to fire. Flames, smoke, arcing, or hot spots like melted plastic may indicate fire or the presence of stored high-voltage energy.

Be aware that a battery burn or fire burn or fire will result in smoke that may be toxic if inhaled.

If signs of a fire are present at the scene, follow instructions below:

1. Clear the area around the bus if possible. If necessary, move the bus to a safe and open space. Keep the bus and all combustible materials at least 50 ft (15 m) apart to prevent any potential fire spread.
2. If possible, open the bus doors to avoid buildup of gases in the passenger compartment.
3. Identify hot spots with a thermal imaging camera.

NOTE: Refer to and follow state, municipal, and department guidelines for properly handling electrical vehicle battery fires.

4. Water may be applied to heat sources to cool or extinguish fires. If bus has started burning excessively, it may be more practical to let the battery burn to completion.

Batteries must be completely cooled down before releasing the bus to a second responder. Advise second responder that there is always a risk of reignition.

7. In Case of Submersion



In case of submersion, secondary impact damage can never be excluded. Damaged high-voltage components pose an increased electrical shock hazard. Stay away from damaged high-voltage components. Handle any fully or partially submerged bus while wearing the appropriate Personal Protection Equipment (PPE).

A submerged bus **without** impact damage has a low electrical shock hazard risk. Small bubbles may be noticed exiting the bus. This is due to electrolysis of the water and does not create a higher risk of shock hazard.

WARNING: To prevent personal injury and / or death, pay attention to secondary fire events. There is a high risk of reignition due to damage and corrosion. Saltwater increases this risk for electrical shorts post incident. Keep full personal protection equipment (PPE) ready, including self-contained breathing apparatus (SCBA).

WARNING: To prevent personal injury and / or death, handle a submerged vehicle with appropriate personal protection equipment (PPE). Consider the entire vehicle as energized.

WARNING: To prevent personal injury and / or death, avoid any contact with a submerged high-voltage system. Do not attempt to disable the high-voltage service disconnect switch while the vehicle is submerged. The vehicle key may be turned to the off position.

In case of submersion follow instructions below:

1. Turn the bus OFF (if possible).
2. Recover the bus. Refer to Section 2, Immobilization / Stabilization / Lifting.
3. Drain the water out of the bus.
4. Isolate high-voltage energy. Turn the High-Voltage Service Disconnect switch to the OFF position. Refer to Section 3, Disabling Direct Hazards / Safety Regulations.
5. Remove the Manual Service Disconnects (MSDs). Refer to Section 3, Disabling Direct Hazards / Safety Regulations.

8. Towing / Transportation / Storage



Towing

Haul the bus on a flatbed or lowboy trailer, or tow the bus with the rear wheels suspended. If the bus must be towed with the rear wheels on the ground, the drive shaft must be removed between the drive motor and rear axle.

The bus may be moved slowly (maximum of 5 mph [8 km/h]) over a very short distance to clear the bus from traffic. The electric drive motor is connected to the rear wheels and generates electric voltage as the rear wheels are rotated. Higher speed could cause damage to the drive motor and the high-voltage system, and can create a potential hazard.

The bus defaults to Neutral when turned off. Release the parking brake before towing. If the air system has lost pressure, recharge the air tanks on the right side of the bus to 64 psi (441 kPa) to provide pressure to release the parking brake before towing.



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Figure 29. Towing on Flatbed / Lowboy Trailer

8. Towing / Transportation / Storage

Transportation

Inform the tow truck driver that reignition is possible at any time with a damaged high-voltage system. If possible, remove manual service disconnect(s) from the bus and use a thermal or infrared camera to check whether the battery stacks are cold before towing the bus. To ensure that the electric motor does not rotate, remove the drive shaft before towing the bus to the next location.

Storage

Damaged buses should be isolated outdoors until inspected. Open windows and doors during isolation to avoid buildup of gases in the compartment. Separate the compromised bus from all combustibles, other vehicles, and structures by a distance of at least 50 ft (15 m).

WARNING: To prevent personal injury and / or death, pay attention to secondary fire events. Even days later secondary fire events cannot be excluded.


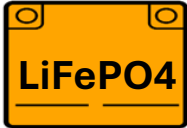


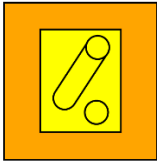

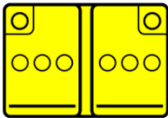

Inform tow truck driver that high-voltage may still be present in high-voltage batteries and cables.










9. Important Additional Information



Additional information about accident assistance and recovery of vehicle with high-voltage systems can be found at:





- NFPA Alternative Fuel Vehicle Training
<http://www.nfpa.org/for-professionals/training-for-me/buy-alternative-fuel-vehicles-training>
- VDIK Accident Assistance and Recovery of Vehicles with High-Voltage or 48-Volt Systems
vdik.de/wp-content/uploads/2020/07/Accident_Assistance_Recovery_FAQ_en_072020_VDIK-1.pdf
- SAE J2990 Hybrid and EV First and Second Responder Recommended Practice
www.sae.org/standards/content/j2990
- National Transportation Safety Board (NTSB)
www.nts.gov

10. Explanation of Pictograms Used

Pictogram	Designation
	Electric Vehicle
	Lithium Iron Phosphate Battery
	Hood Release
	Device to Shut Down Power In Vehicle
	Low-Voltage Device to Disconnect High-Voltage
	High-Voltage Disconnect
	Battery, Low-Voltage
	Emergency Exit Left-Side

	Emergency Exit Right-Side
	Break for Access
	Emergency Door Opener
	High-Voltage Component
	High-Voltage Charge Port
	Battery Thermal Management System
	Air Conditioning Component
	High Strength Structure
	High-Voltage Power Cable

	Low-Voltage Power Cable
	Air Conditioning Line
	Warning, Electricity
	General Warning Sign
	Low Temperature
	Use Only These Lifting Points
	Air Tank
	Tow Hook
	Diesel Heater Tank

	Optional Feature
	Do Not Cut
	Use Thermal Infrared Camera
	Use Water to Extinguish the Fire
	Explosive
	Flammable
	Hazardous to Human Health
	Corrosives
	Acute Toxicity

	Environmental Hazard
	Gas Under Pressure