



EMERGENCY RESPONSE GUIDE

VECTOR

Electric Fire Truck with Range Extender

PRODUCTION START: 2023



REV Fire Group

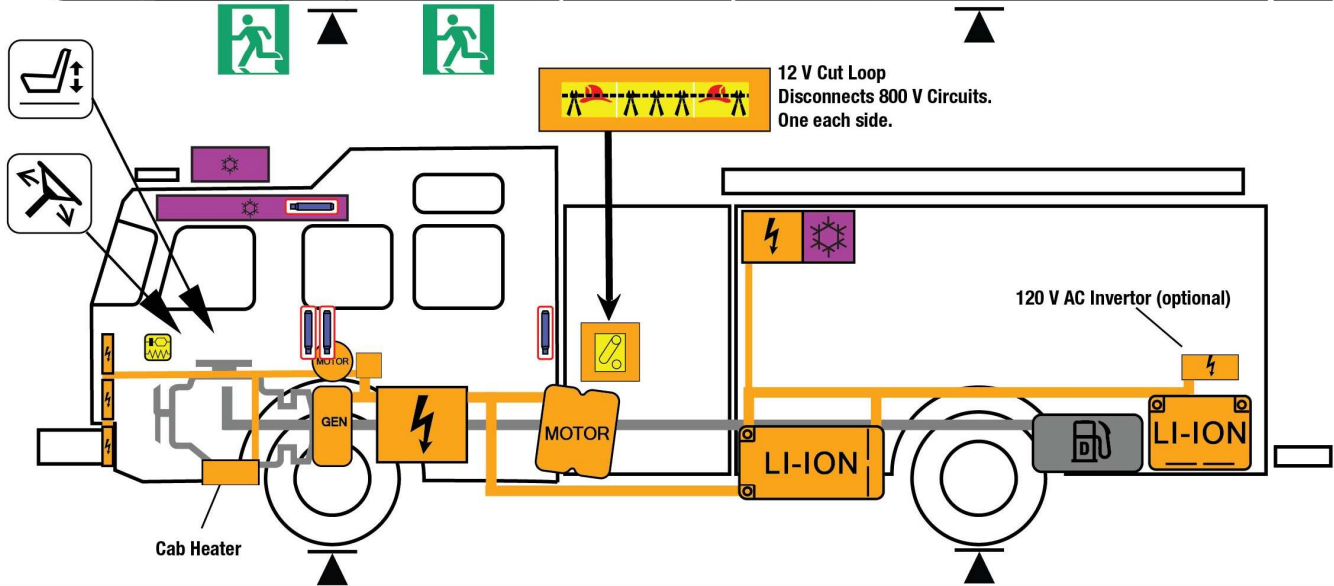
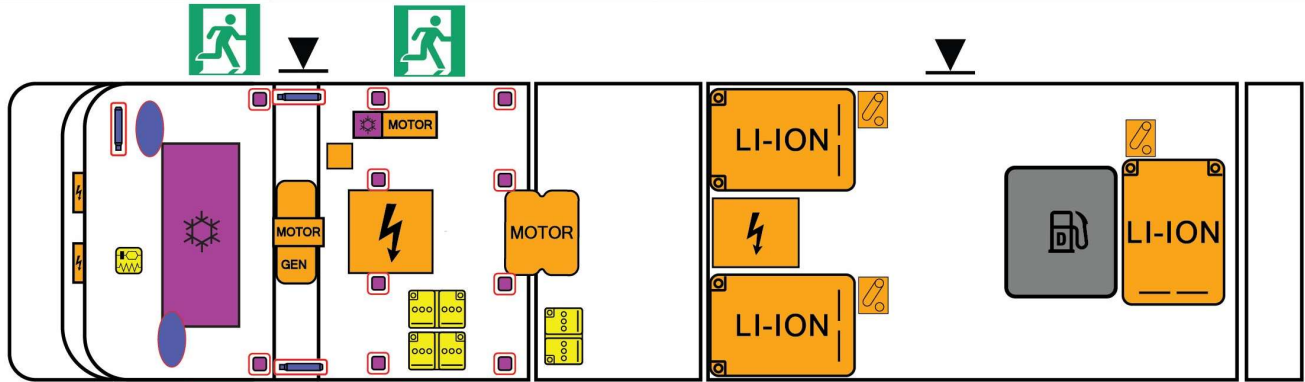
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













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Diesel



800 V



							
Electric Propulsion Diesel Generator	Battery Pack, High Voltage	High Voltage Component	High Voltage Power Cable	Disconnect High Voltage Device	Battery, Low Voltage	Air Conditioning or Cooling Component	Lifting Point
							
Diesel Fuel Lines	Diesel Component	Seat Adjustment	Steering Wheel Adjustment	Airbag Inflator/ Stored Gas Inflator	Seat Belt Pretensioner	SRS Control Unit	Airbag
							
Emergency Exit Right Hand	Emergency Exit Left Hand	Manual Service Disconnect (MSD)					
DO NOT CUT ANY ORANGE COLORED HIGH VOLTAGE CABLES				Identification Number	Version Number	Page Number	
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1. Identification / Recognition



VECTOR  
VECTOR

Electric Fire Truck with Range Extender Diesel



2. Immobilization / Stabilization / Lifting



Immobilize Vehicle:

1. Apply Parking Brake
2. Block Wheels



Lifting Points:

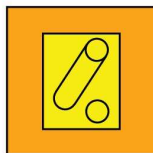
1. Use only these lifting points.
2. Lift by axles only

3. Disable Direct Hazards / Safety Regulations



Primary Procedure:

1. Turn OFF Run Switch
2. Turn OFF Power Switch
3. Press EV Sleep button



Emergency Procedure:

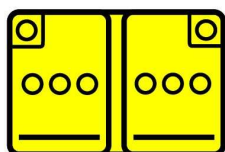
1. Cut First Responder wire loop

4. Access to the Occupants



Four door exits, two on each side of the cab.

5. Stored Energy / Liquids / Gases / Solids



12 Volt



800 Volt



In case of thermal runaway, the lithium-ion batteries can release hydrogen fluoride. If the batteries catch on fire breather valves on the bottom may emit large flames.

DO NOT CUT ANY ORANGE COLORED HIGH VOLTAGE CABLES

Identification Number

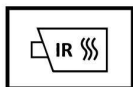
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Coolant leaking inside the battery pack can become unstable and possibly a risk for a fire. Check the battery pack temperature using a thermal imaging camera.

6. In Case of Fire

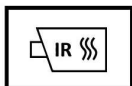


A battery on fire will not explode.



Primary Procedure:

1. Adopt defensive posture.
2. Protect surrounding structures.
3. Use copious amounts of water to cool the battery and to extinguish a fire.



Potential for Battery Re-Ignition. Use thermal imaging camera to ensure they remain cool.

7. In Case of Submersion



The high voltage battery is isolated from the vehicle chassis. If the vehicle is immersed in water, you will not be electrocuted by touching the vehicle.

After the vehicle was removed from the water, do the following:

1. Allow the vehicle to dry out.
2. Perform the high voltage disabling procedure in Section 3.

8. Towing / Transportation / Storage



The electric motors can produce electricity when moving the truck with the rear drive tires on the ground. This remains a potential source of electric shock even when the high voltage system is disabled.

Before towing the truck place the pump transmission in Neutral, disconnect the shaft between the motors and the rear axle, or pull the axle shafts.

Use front or rear tow hooks or tow eyes to pull the vehicle onto a flatbed carrier from a flat road surface.

Store the vehicle a safe distance from, and separated from other vehicles, structures, or equipment.

Observe the truck for a minimum period of 48 hours using a thermal infrared camera.

DO NOT CUT ANY ORANGE COLORED HIGH VOLTAGE CABLES

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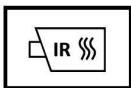
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Potential for continued hazards (rekindling/re-gassing/etc) if a damaged vehicle batteries are jostled during recovery, including the towing and storage process. Use thermal imaging camera to ensure they are cool.

9. Important Additional Information

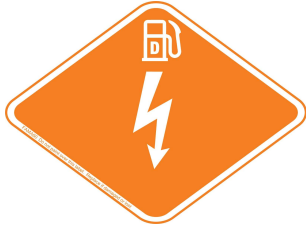


1. Do not cut any orange cables.
2. Do not touch any high voltage cables and electric components.
3. Do not perform any operation on a damaged truck without appropriate Personal Protective Equipment

10. Explanation of Pictograms Used

	To indicate the risk of flammability		To signify a general warning.
	To indicate the risk of damaging human health.		To warn of electricity and dangerous voltage.
	To indicate the risk of acute toxicity.		To indicate the dangers concerning low temperatures, e.g. frost bites due to cold gas.
	To indicate the risk of corrosive materials or substances.		To indicate that a thermal infrared camera should be used to detect a fire.
	To indicate the risk of an explosion.		
	To indicate that water should be used to extinguish the fire		
DO NOT CUT ANY ORANGE COLORED HIGH VOLTAGE CABLES	Identification Number	Version Number	Page Number
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1. Identification / Recognition



2. Immobilization / Stabilization / Lifting



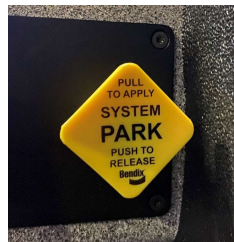
Warning: Always approach the truck from the sides to stay out of the potential travel path. Due to lack of noise it can be difficult to determine if the truck is running.



Warning: Keep all lift equipment at least 12 inches from all high voltage components

1 Apply Parking Brake

2 Chock the Wheels



Place chocks on the down-hill side of tires if positioned on a grade.
Place chocks on both sides of the tire if positioned on level ground.

3 Lift from Axles Only

3. Disable Direct Hazards / Safety Regulations



Danger: Vehicle main batteries contain 800V of direct current. Ensure high Voltage is OFF. Assume all high voltage components are always energized. Do not cut any High Voltage components, including high voltage orange cables. Failure to comply will injure or kill.



Warning: Call the REV Customer Service department before proceeding if any high voltage part damage could have occurred.



Warning: This symbol on the driver display or the pump panel display indicates a thermal runaway of one of the main battery packs is eminent. Maintain distance from vehicle.



Warning: After disabling 12-volt power, wait at least 10 seconds to allow any un-deployed airbag reserve energy to dissipate and wait at least 1 minute to allow high voltage energy to discharge.



Primary Procedure



- 1 Turn OFF the Run Switch
- 2 Turn OFF the Power Switch



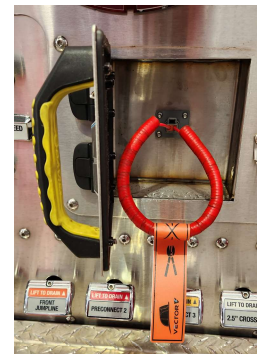
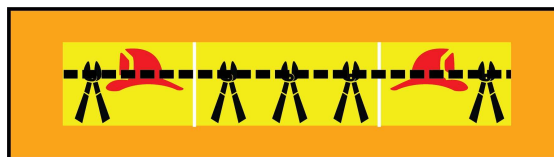
- 3 Put the vehicle to sleep using the WAKE/SLEEP button on the dash.



If unable to perform primary procedure



- 1 Cut or unplug First Responder Loop (12V)





If Vehicle is Charging

- 1 Press the Charge Plug Unlock Button
- 2 Remove the Charge Plug when the Charge Plug Lock Indicator turns GREEN



If the Charge Plug cannot be pulled out: Use the manual unlock pin



- 1 Tilt the cab
- 2 Reach behind the pump panel and locate the pin on the back side of the Charge Port socket
- 2 Rotate the pin counter-clockwise



Before Servicing

- 1 Locate the Manual Service Disconnects (MSD) from each EV battery pack
- 2 Remove each MSD



4. Access to the occupants



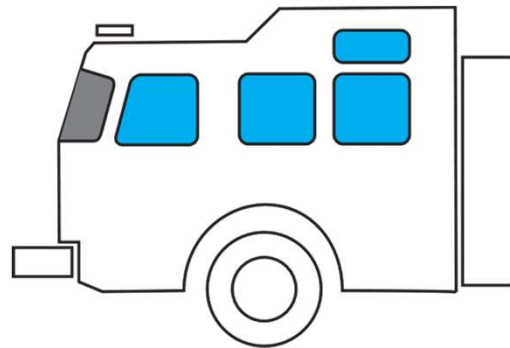
Window Glass



Windshield is made of Laminated Glass



Side and roof windows are made of Tempered Glass



Opening the doors from the outside

1

Unlock using the key if the door is locked

2

To open the door, grasp the handle and pull while exerting some force on the door.



Opening the doors from the inside

1

Unlock using the RED lock lever.

2

To open the door, pull inward on the paddle while pushing outward on the door.



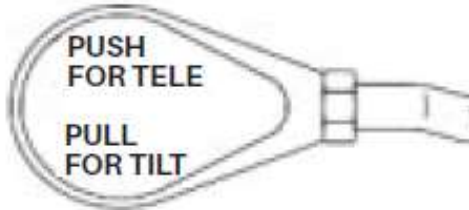
High Strength Zone

Note: There are no High-Strength or Ultra-High-Strength Steel in the cab. The cab structure is made predominantly of aluminum.



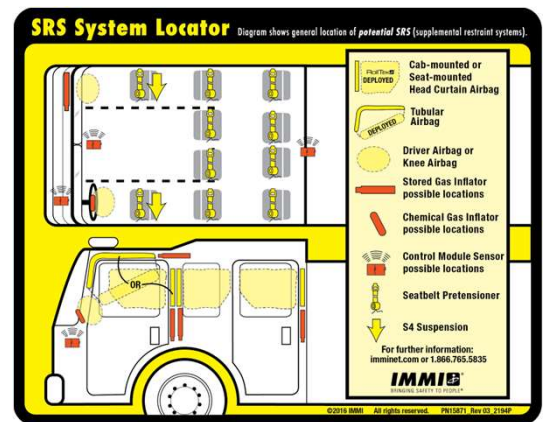
Moving the Steering Wheel

- 1 Push the lever to allow the steering column to telescope in or out
- 2 Pull the lever to tilt the steering column



Occupant Restraint System

Note: Frontal crash airbags, rollover airbags, seatbelt pretensioners and suspension seat hold-down devices are optional safety systems on a fire truck. A truck with any of these systems will have an SRS System Locator label on each side of the cab, probably in one of the side windows.



Warning: Do not damage the gas generators of airbags or seat pretensioners that did not deploy. Do not cut into airbag modules.



Warning: Avoid exposing airbag modules to heat, e.g. by using flame cutters. The gas generator in the airbag has a self-ignition temperature of approx. 200°C. If vehicles are on fire, this is why the airbags deploy after being exposed to heat for a long period.



Parts of the Safety Restraint System

Control Module(s). There will be one or two modules located on the driver side on top of the engine tunnel behind the dash. is the device that will cause the occupant restraint system to deploy during a crash. It is typically located under the dash



Driver Air Bag: Located in the center of the steering wheel.

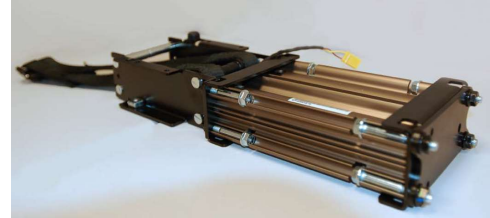


Driver Knee Bag: Located behind the steering column in the dash.



Front Passenger Air Bag: Located in front of the front right side passenger.

Seat Pretensioning: Located below or behind the front suspension seats. This device pulls down the seat and pretensions the seat belt.

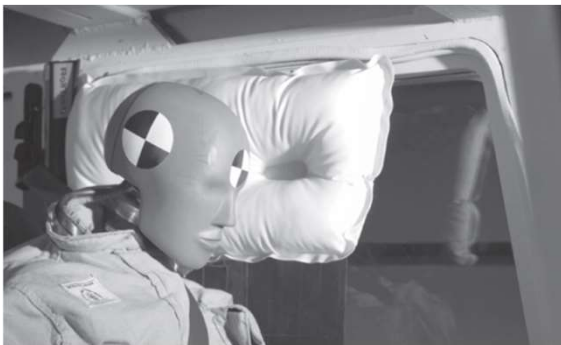


Belt Pretensioner: Located behind or beside each seat. Pretensions the seat belt in a crash.



Warning: To assure that the patient is not affected by the accidental deployment of a seat belt pretensioner while EMS personnel are rendering care, the seat belt should be unbuckled as soon as it is practical. If the buckle cannot be released or if the belt is interfering in any way with patient care or extrication, it should be cut.

Inflatable Head Curtain: Located above and behind the doors, or in the side of the seat back

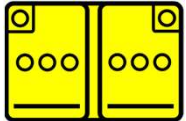





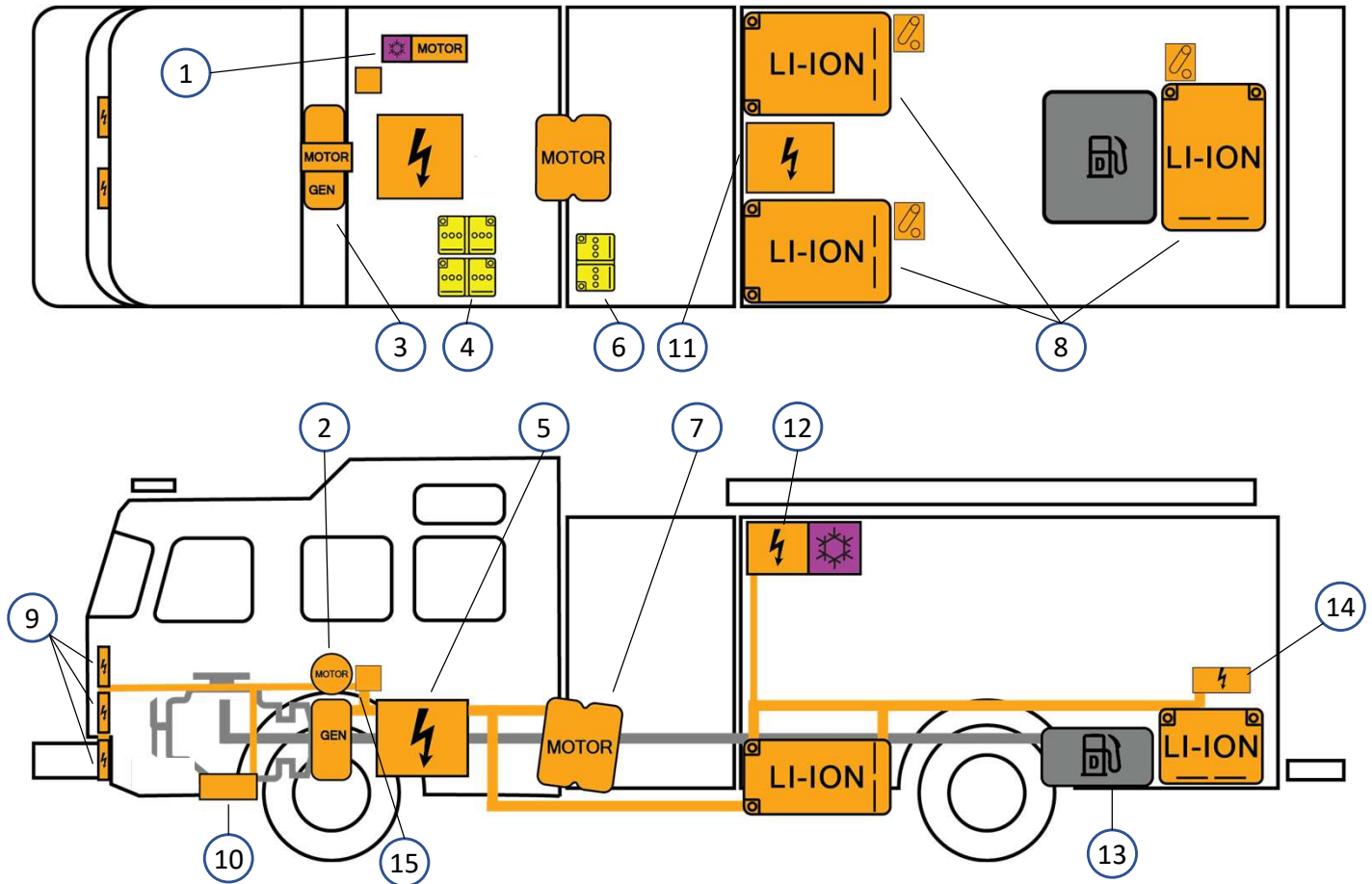
Stored Gas Inflator



Warning: Undeployed stored gas inflator units must never be cut, punctured or crushed during extrication activities. Removing portions of the interior cab headliner or roof pillar trim material will reveal the actual location of the stowed airbags and the metal inflator cylinder. Crews must work around these systems as extrication tasks are accomplished. For example, when cutting the roofline, crews should be able to expose and see the safety system and the airbag inflators, so cuts can be made in the cab structure below or behind the unit. These cuts can allow an entire section of the vehicle's roof as well as the undeployed airbag system to be moved or removed intact.

5. Stored Energy / Liquids / Gases / Solids

		<p>12 V</p>
		<p>800 V</p>



1. Air Conditioning Compressor and Motor. 800 V sealed motor and compressor unit pressurizes refrigerant for cab cooling.

2. Auxiliary Motor. 800 V motor spins both the air brake compressor and the steering pump.

3. Generator. Powered by the range extender diesel. Provides up to 140 KW of power to recharge the batteries.

4. Starter Batteries. 12 V lead-acid batteries used for starting the range extender engine.

5. PDU and Invertors. Power distribution unit switches the 800 V power and houses the battery management system. Generator Invertor. 12V DC Down-Converter.

6. Electronics Battery. 12 V AGM battery provides power to electronics prior to wake-up of the 800 V EV batteries.

7. Traction Motors. Permanent magnet traction motors provide power for the pump and the drive wheels.

8. EV Batteries. Three Lithium Ion battery packs provide 800 V power to all aspects of the vehicle.

9. Cooling Fans. 800 V cooling fans for the range extender engine radiator as well as the electronics cooling radiator.

10. Cab Heater 800 V heater provides warm coolant for the cab heater circuit.

11. Traction Invertors. Converts DC current into AC current to power traction motor.




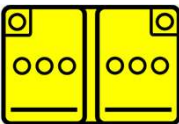




12. BTMS. Battery thermal management system has 800 V heater and refrigerant compressor to warm or cool the battery coolant.

13. Diesel Tank. Diesel fuel storage for the range extender engine and optional fuel-fired cab heater.

14. AC Power Invertor. Optional power invertor provides 110 V AC power.

15. Aux PDU Box. Splitter to provide power to auxiliary systems.

6. In case of fire

		Use a large sustained volume of water to extinguish lithium-ion battery related fire.	800 V
		If other materials are involved, use class ABC fire extinguisher.	12 V
	A battery on fire will not explode. If battery cells reach high enough temperature, they vent and release electrolyte. Battery electrolyte is flammable.		
	Gases emitted from the battery pack are toxic.		
	Skin contact may cause irritation. Prolonged contact with electrolyte mixture may result in more severe irritation. Flush contaminated skin with plenty of water.		
	Potential for eye, nose and throat irritation with prolonged exposure.		



Primary Procedure

- 1 **Adopt Defensive Posture.** Prepare for fire suppression even if there is no sign of smoke or flames.
- 2 **Protect Surrounding Structures.** Move vehicle away from structures, other vehicles, or equipment if safe to do so.
- 3 **Apply Water.** Use copious amounts of water to cool the battery and to extinguish a fire. Direct water onto the battery using portable ground monitor, specialized fire suppression tools, or other means to cool the battery as effectively as possible



Potential for Battery Re-Ignition



To prevent personal injury and / or death, consider the entire vehicle as energized. Always wear full Personal Protection Equipment (PPE).

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), including Self-Contained Breathing Apparatus (SCBA) ready.

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 vehicle while wearing the appropriate Personal Protection Equipment (PPE).

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

The damage level of a submerged vehicle may not be visible.

Submersion in water can damage 12 V and 800 V components.

Handling a submerged truck without appropriate Personal Protective Equipment (PPE) may result in serious injury or death due to electric shock.

Avoid any contact with the traction voltage cables and electric components.



Submerged Vehicle Procedure

- 1 Turn the RUN and POWER switches OFF and/or cut the first responder cut loop (if possible).
- 2 Recover the vehicle
- 3 Drain the water from the vehicle.
- 4 Allow vehicle to dry out.
- 5 Perform the high voltage disabling procedure in Section 3.
- 6 Have the vehicle inspected and serviced.



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 ignition may be turned OFF.

8. Towing / transportation / storage



The electric motors can produce electricity when moving the truck with the rear drive tires on the ground. This remains a potential source of electric shock even when the high voltage system is disabled.



Tow for Short Distance on Flat and Level Surface. Use this method only to move a disabled vehicle away from a hazard or to provide storage separation no more than 1 mile and at speeds not to exceed 10 mph.

1

Turn the RUN and POWER switches OFF

2

Secure vehicle to towing vehicle

3

Ensure sufficient air brake pressure and release Park Brake.

4

Tow vehicle for short distance (power steering will not function).

4

Apply Park Brake and chock wheels.



Lift and Tow from Front

1

Turn the RUN and POWER switches OFF

2

Disconnect the shaft between the motors and the rear axle, or pull the axle shafts.

3

Cage the spring brakes.

4

Lift and tow from the front axle beam.



Transportation

1

Place the vehicle in Neutral

2

Winch the vehicle onto a flatbed carrier from a flat road surface using the front or rear tow hooks or tow eyes.



Storage

Store the vehicle and/or any removed high voltage batteries a safe distance from, and separated from other vehicles, structures, or equipment.

Observe the vehicle for a minimum period of 48 hours using a thermal infrared camera.

9. Important additional information



Do not cut any orange cables.

Do not touch any high voltage cables and electric components.

Do not perform any operation on a damaged truck without appropriate Personal Protective Equipment (PPE).

WARNING

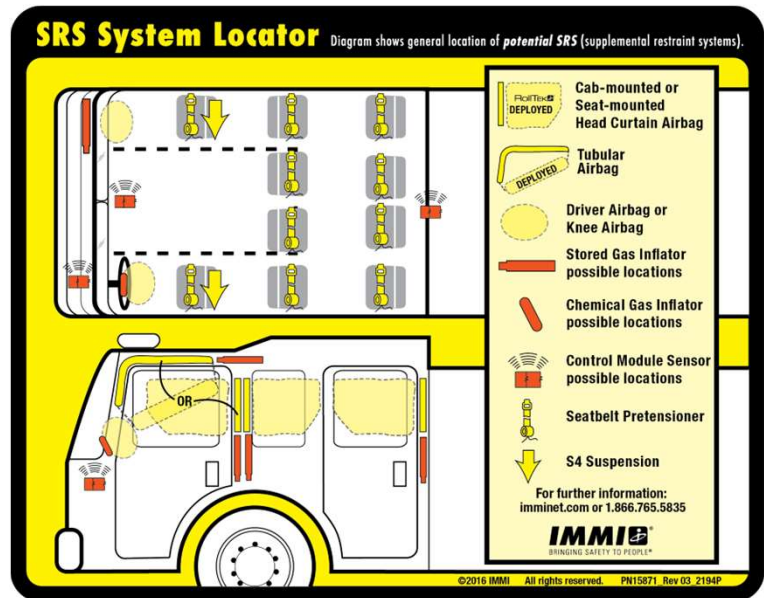
Electrocution Hazard
 Vehicle has high voltage batteries
 Orange cables carry high charge
 Service only by trained technicians
 Read and follow safety procedures found in service manual
 Failure to comply may injure or kill.

FAMAS7 Do not paint over this label. Replace if damaged or lost.

DANGER

Automatic Engine Start Equipped
 Engine will start and spin fan and belts without warning.
 Shut OFF Ignition before servicing.
 Contact with spinning parts will injure or kill.

FAMAB2 Do not paint over this label. Replace if damaged or lost.



10. Explanation of pictograms used

	To indicate the water should be used to extinguish the fire		To signify a general warning
	To indicate that ABC foam should be used to extinguish the fire.		To warn of electricity and dangerous voltage
	To indicate the risk of flammability		To indicate the dangers concerning low temperatures, e.g. frost bites due to cold gas
	To indicate the risk of acute toxicity		To indicate that a thermal infrared camera should be used to detect a fire.
	To indicate the risk of corrosive materials or substances		To indicate the risk of an explosion
	To indicate the risk of damaging human health.		