

# INFORMATION FOR FIRST AND SECOND RESPONDERS

## EMERGENCY RESPONSE GUIDE



BRP SKI-DOO GRAND TOURING ELECTRIC  
SNOWMOBILE (2-seater)  
ELECTRIC



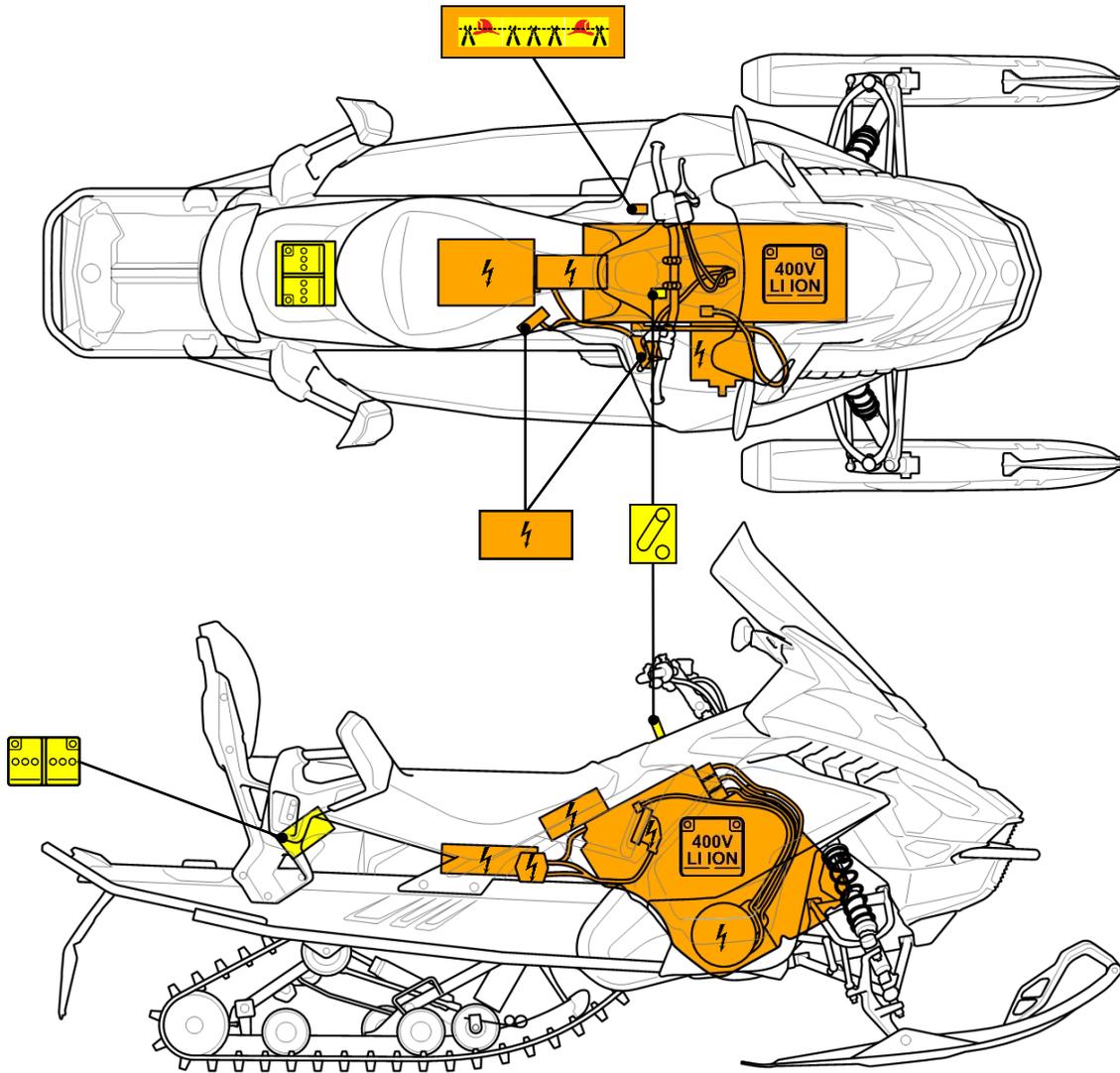
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# Ski-Doo Grand Touring Electric

Snowmobile, 2023 - Present



High-Voltage battery pack



High-Voltage components



Low-Voltage battery



High-Voltage power cable/ component



Device to shut down power in vehicle



Cable cut

ID No.

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Version No.

001

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# 1. Identification / Recognition

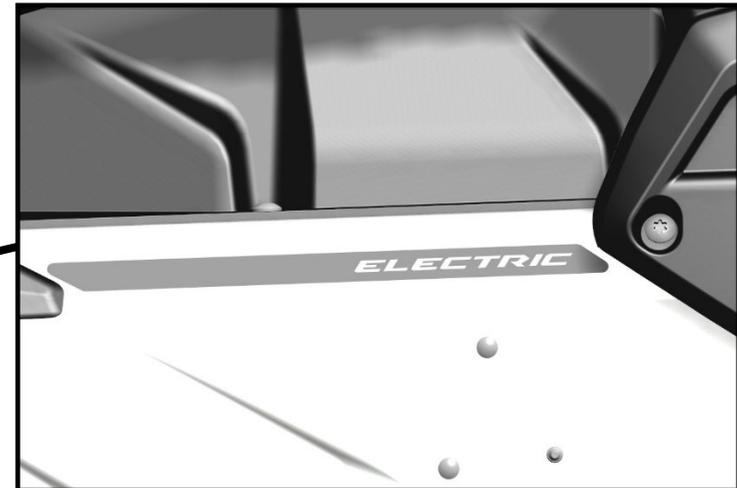
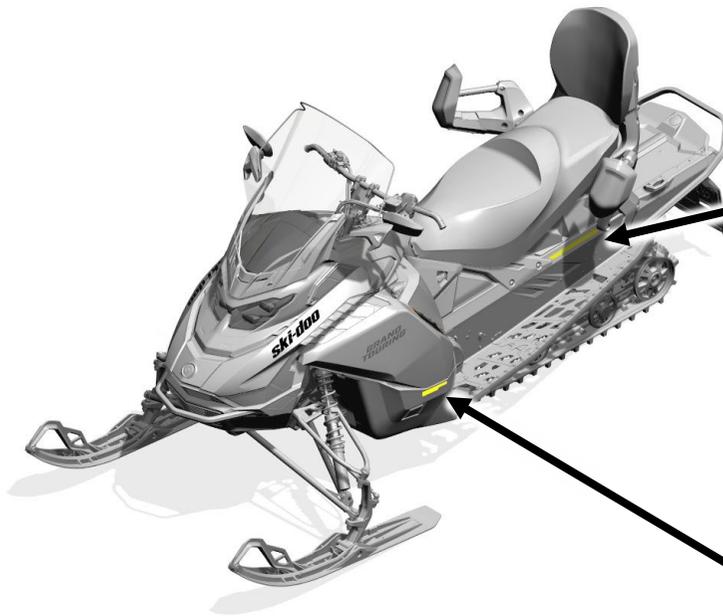


Never assume a silent electric vehicle is switched off. Always treat the vehicle as if it is powered. Wear Personal Protective Equipment (PPE).

Each snowmobile model can be identified as a high-voltage electric vehicle by the outside features below:

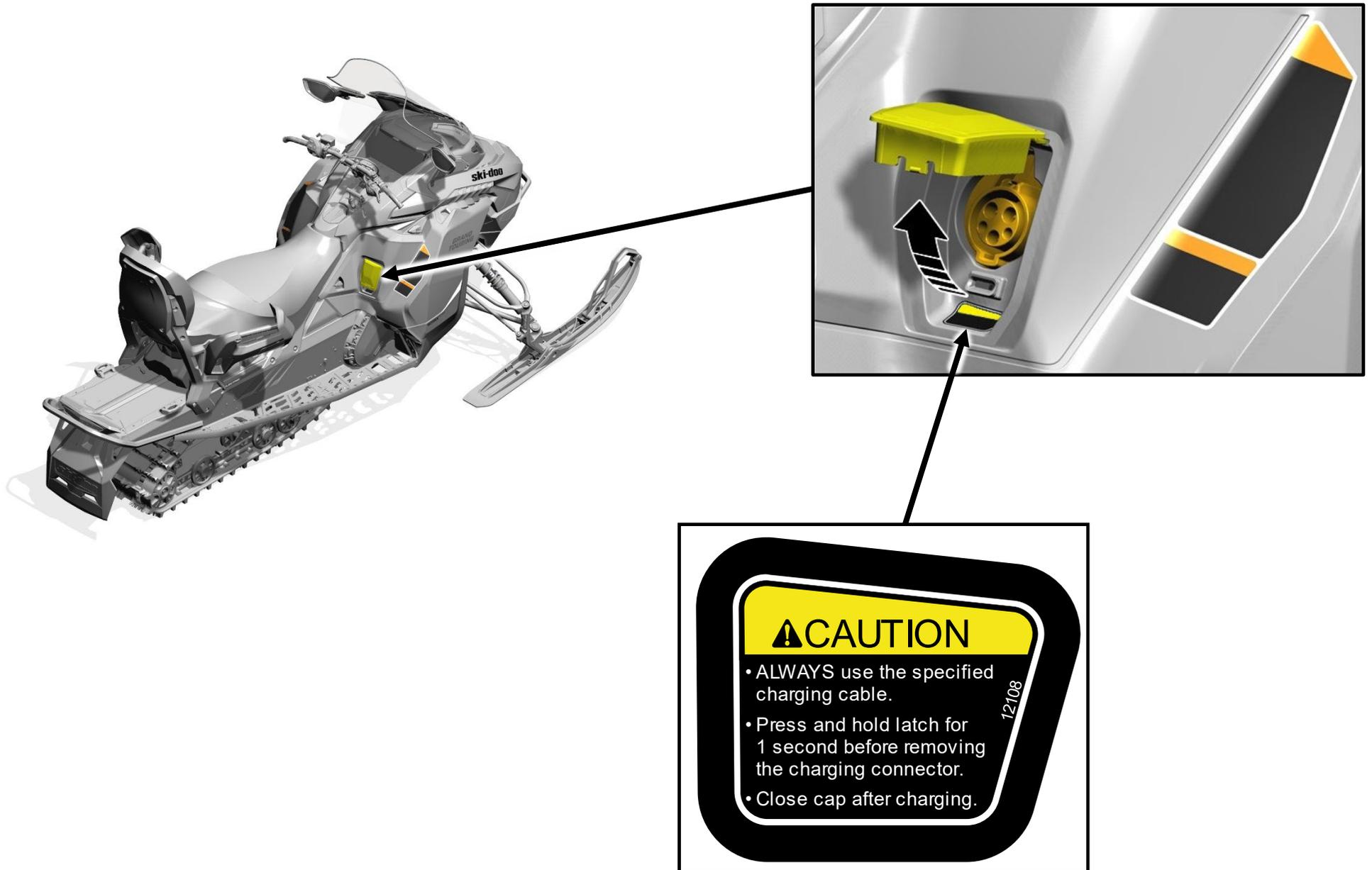
## Badging

The model labels shown identify the type of vehicle.



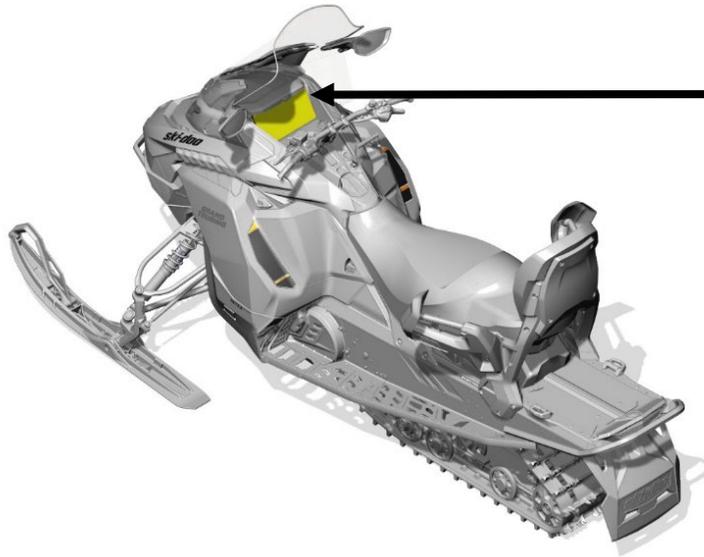
## Charging Port

The charging connection port is identified by a hinged cover and a caution label below it with a yellow bar.



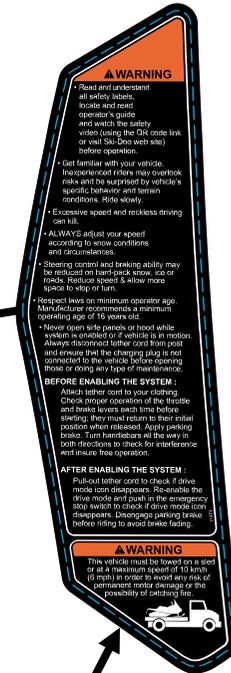
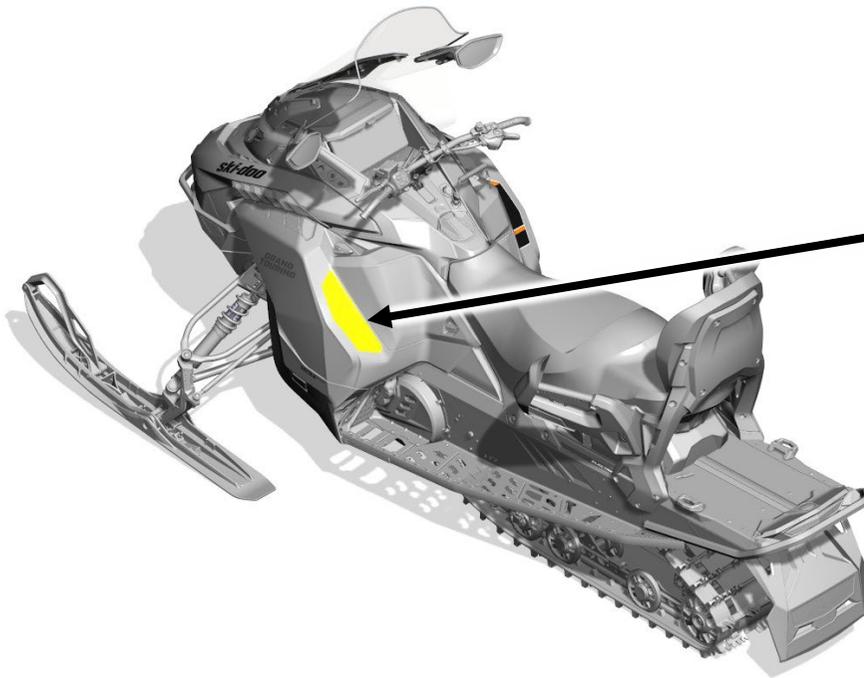
## Instrument Cluster

The instrument cluster displays the battery charge level and a power-meter, and "READY" depending on the state of the vehicle.



# High-Voltage warning labels on vehicle

The warning label can be identified on the left trim panel.



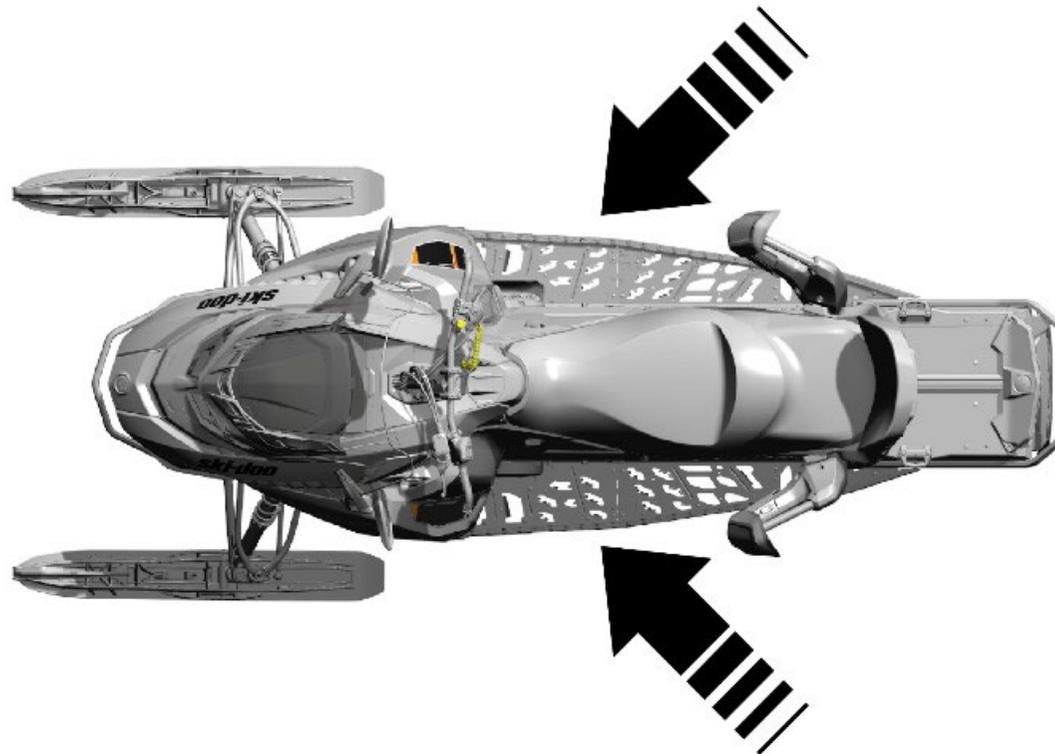
## 2. Immobilization / Stabilization / Lifting

### Approach the Vehicle



**Wear the applicable PPE before you approach the vehicle. High-voltage components could have been damaged.**

Always approach the vehicle from the sides, toward the handlebars. This will allow access to the emergency stop switch, digital encoded security system (D.E.S.S.) key and parking brake lever, while staying out of the potential vehicle movement path. Refer to section 2 for more information.



## Determine if Vehicle is ON/OFF

The three states of the vehicle are as follows:

### VEHICLE IS OFF

Electrical components are turned OFF if ALL conditions are met:

- Black Screen, and;
- Vehicle is not connected to charging station, and;
- No D.E.S.S. key on vehicle knob/receptacle. Inserting the key will give potential to wake up the vehicle and the high voltage components.



### VEHICLE IS ON

Electrical components are turned ON when screen is lit up:

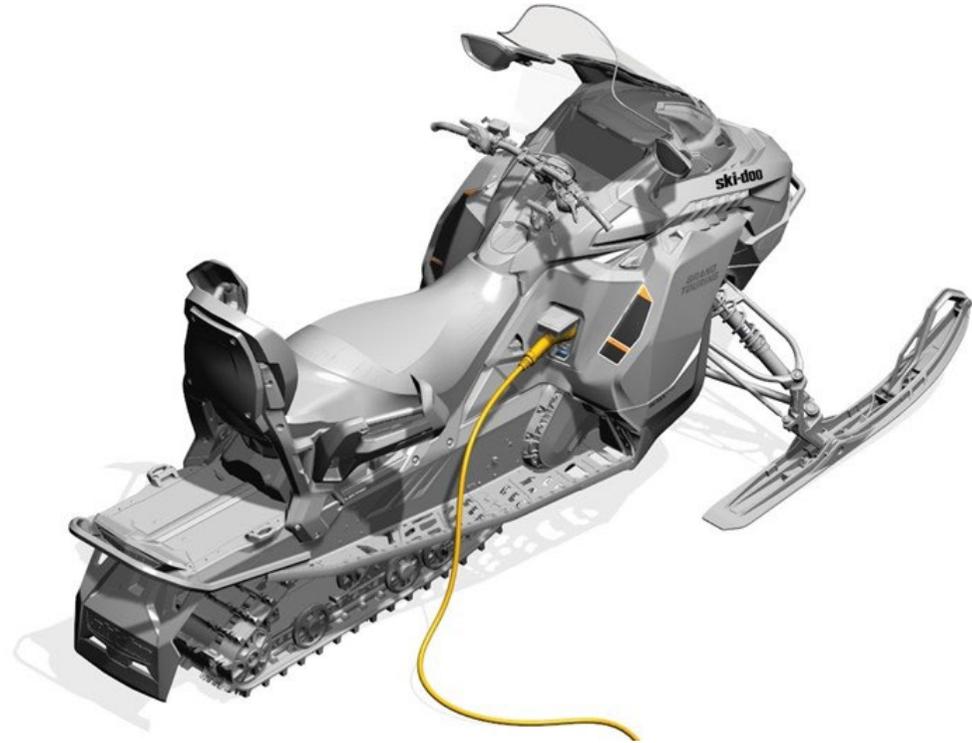
- "ON" indicator means the high voltage is enabled. Removing the D.E.S.S. key will turn off the vehicle.
- "READY" indicator means the propulsion is enabled. "D" or "R" gear mode indicators may also be visible. Pressing the emergency stop switch will disable the propulsion.



## VEHICLE IS CONNECTED TO ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE)

Electrical components are turned ON when the vehicle is connected to a charging station.

- Screen may be black when charging.
- Refer to Vehicle Charging in section 3 to unplug charger cable handle then resume section 2.



## Immobilization



Never assume the snowmobile will not slide or move with the parking brake applied. The parking brake will only stop the snowmobile track from movement. If the vehicle is pushed, it can slide or move which can result in serious injury or death.



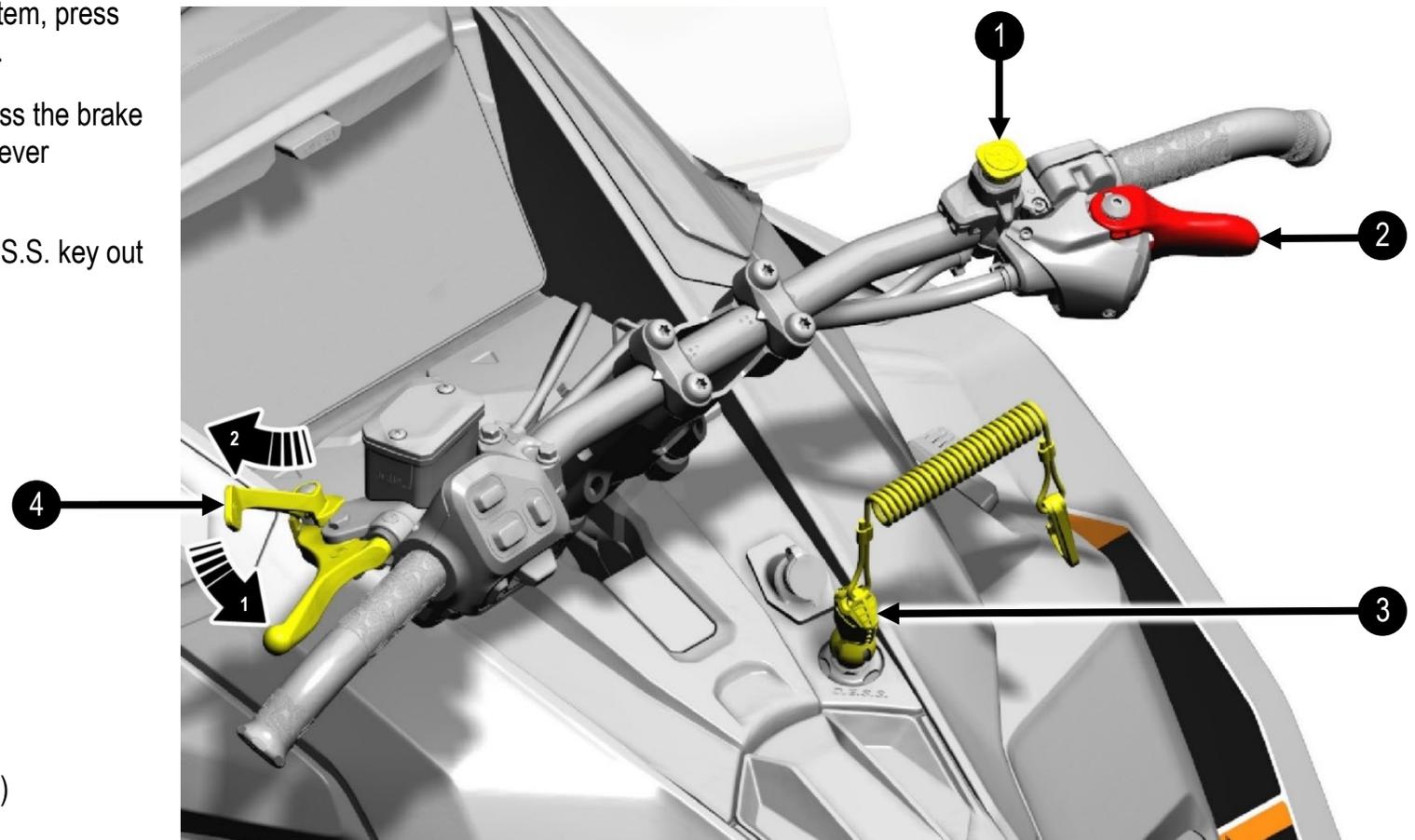
Do not press or touch the throttle lever during all rescue activities.

Locate the vehicle components identified in the illustration below to apply the parking brake and turn OFF the vehicle.

To disable the vehicle propulsion system, press down on the Emergency Stop Switch.

To apply the parking brake, (1) depress the brake lever then (2) turn the parking brake lever clockwise past the notch.

To turn OFF the vehicle, pull the D.E.S.S. key out of the vehicle receptacle.



1. Emergency Stop Switch
2. Throttle Lever
3. D.E.S.S. Key
4. Parking Brake Lever (applied)

## Lifting



This vehicle should only be lifted or manipulated by personnel properly trained, equipped and advised that the vehicle presents high-voltage hazards.

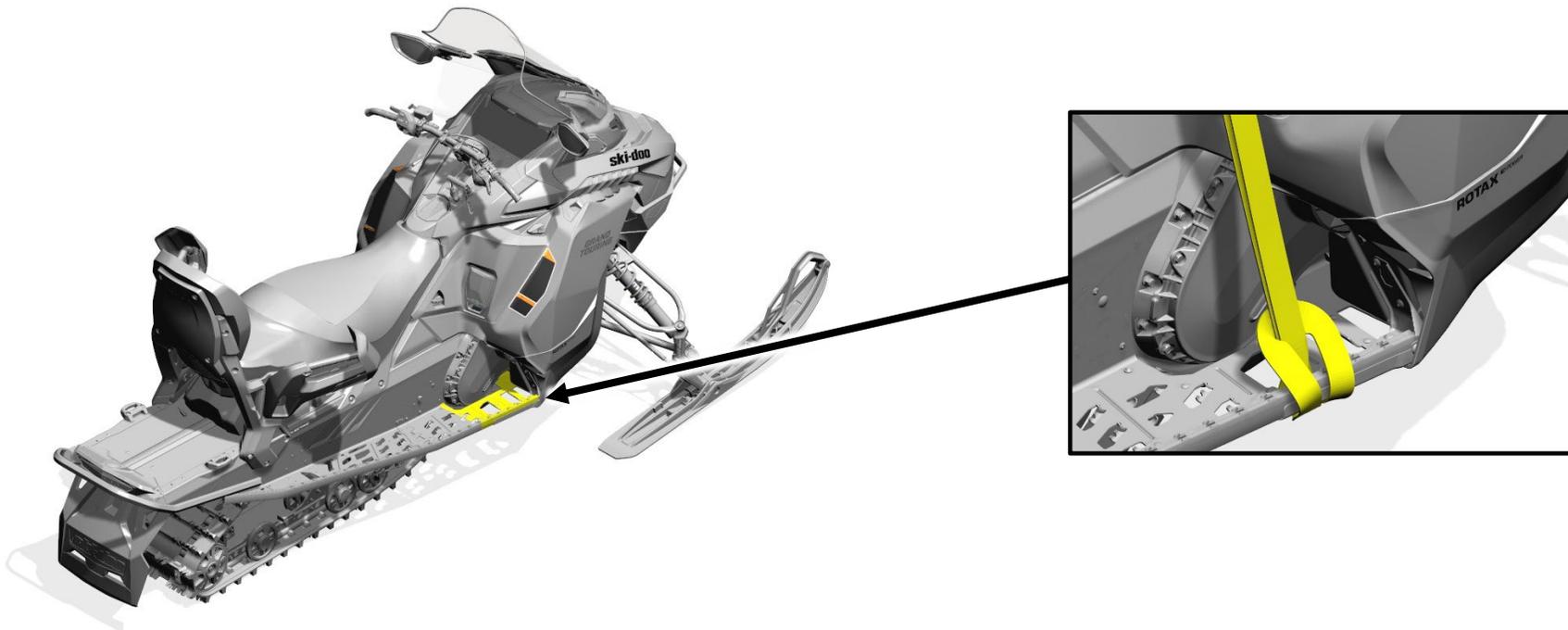


Avoid direct contact with the high-voltage battery pack or other high-voltage components when the vehicle is being lifted or manipulated. Always wear the appropriate PPE.



The vehicle should be lifted using the following lifting points. Lifting slings or tow ropes shall be attached at the front side of the footrests. If applicable, an additional lifting sling or tow rope can be attached to the front and rear bumpers. The weight of the vehicle is less than 600 lbs. and therefore, in an emergency situation, can be lifted with a sufficient number of personnel.

If lifting the vehicle is not possible, pulling the vehicle can be used as an alternative method, using specific precautions. Refer to section 8 for more information about lifting the vehicle or alternative methods of manipulation.



### 3. Disable direct hazards / safety regulations

#### DISABLE THE HIGH VOLTAGE



After the vehicle has been in an accident, and the high-voltage disabling procedure has been performed, always assume the high-voltage components are energized because it is not known if the contactors inside the high-voltage battery pack or other high-voltage components have been damaged.

**NEVER** damage or cut open an orange high voltage cable or the high-voltage battery pack during emergency operations.



Performing the high voltage disabling procedure will not discharge the high-voltage battery pack. The high voltage power will remain isolated within the battery pack. The high-voltage battery pack is **ALWAYS** energized.



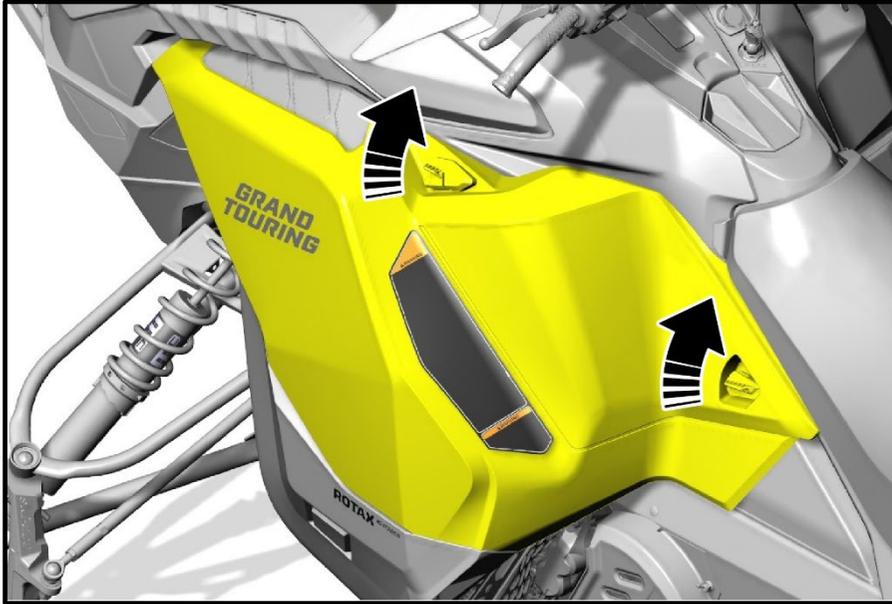
When a vehicle has an incident while connected to an EVSE, or charging station, all attempts should be made to disable the charging station before executing emergency procedures to the vehicle.

**NEVER** try to forcefully pull on the charger cable handle.

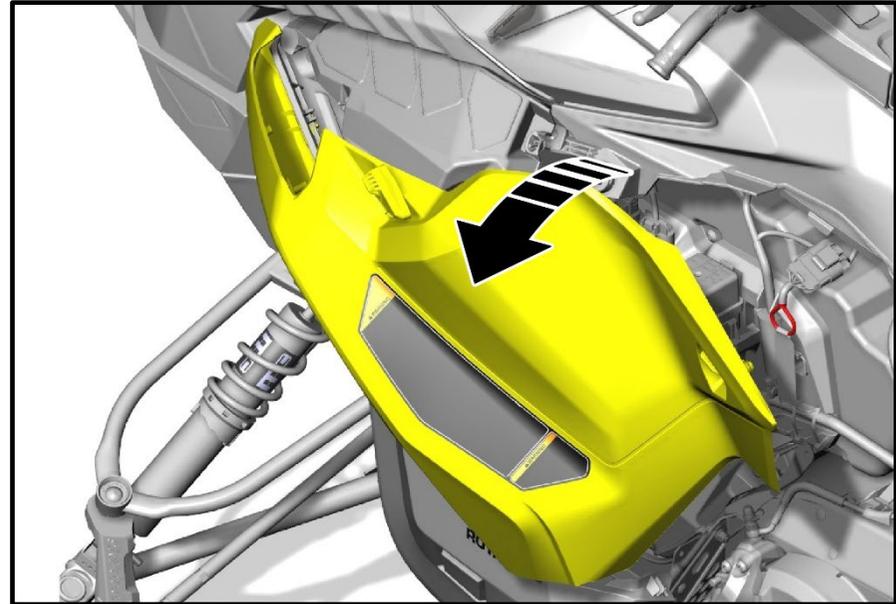
## Access

The first responder cut loop is located under the left side cover panel.

1. Locate the 2 latches on the left side access panel. Turn them clockwise to unlock the panel.



2. Open the left side panel and pull up to remove completely.



## Disable



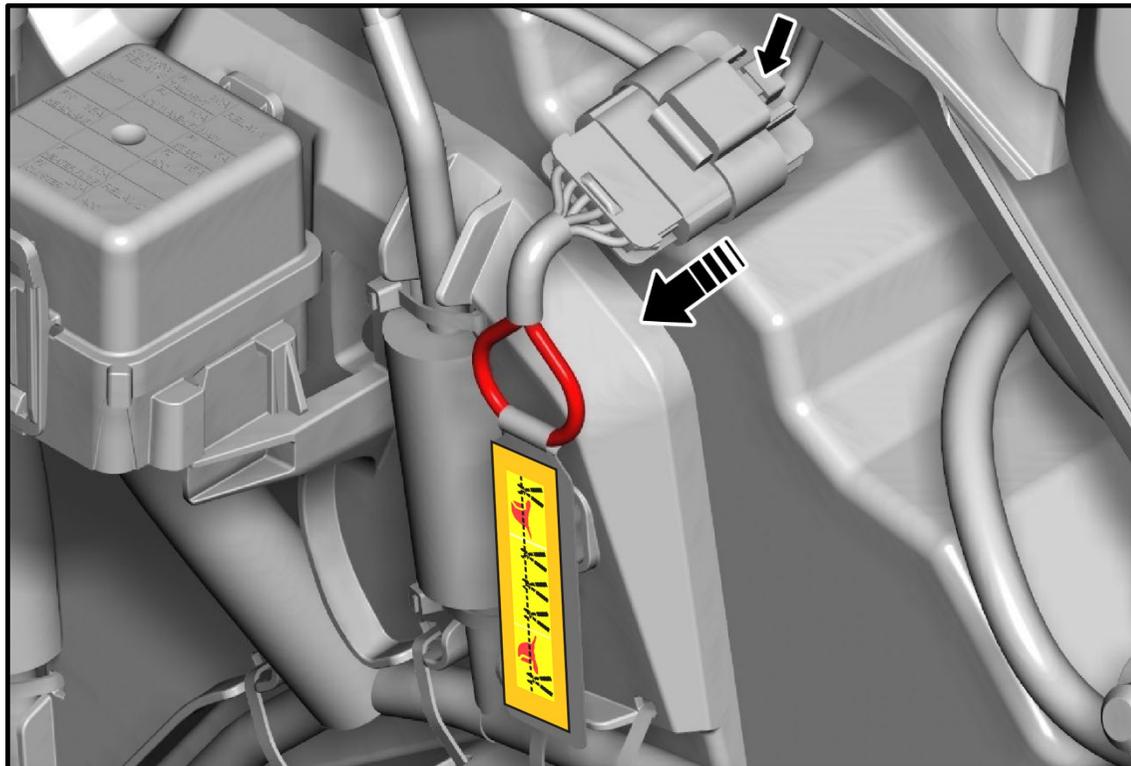
**Wear the appropriate PPE. Do not touch, cut, or open high-voltage components or high-voltage battery pack. Avoid contact between the cutting tool and any surrounding metal parts. Always double cut the first responder cut loop.**



**The high-voltage circuit might require a significant period of time to completely discharge after deactivation, the period could extend from few seconds to 2 minutes.**

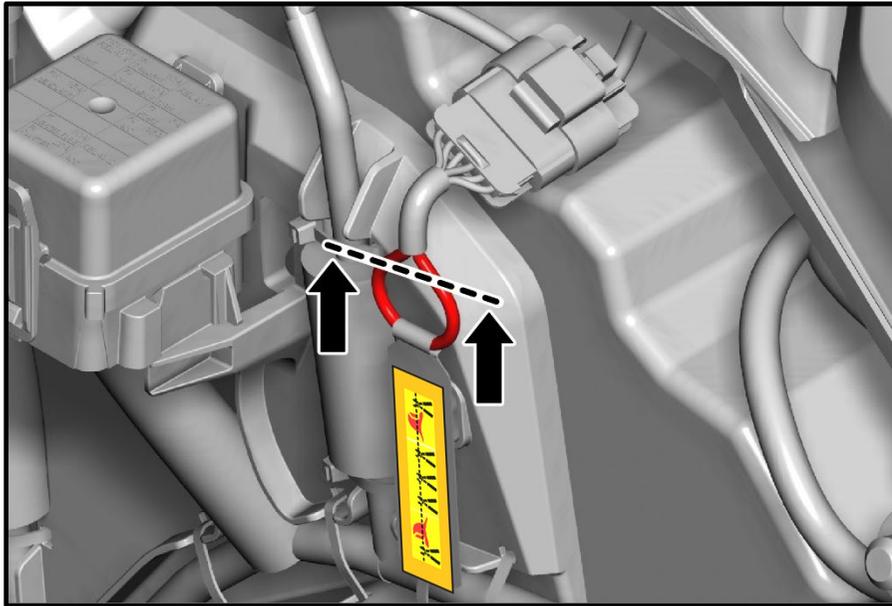
### **Preferred Method:**

1. Manually disconnect the first responder loop connector from vehicle.

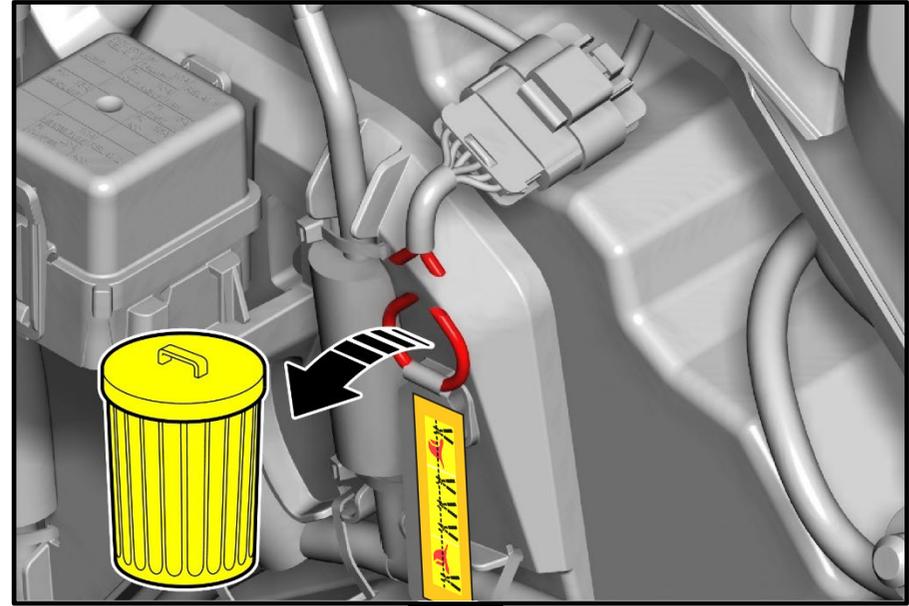


## Alternate Method:

1. Cut the first responder loop such that it cannot make a complete circuit. Harness must be cut at 2 places.



2. Discard the cut section to prevent reconnection.



### First Responder Cut Loop (Cable cut)

Cutting the first responder cut loop removes low-voltage power going to the high voltage contactors inside of the high-voltage battery pack. Cutting the first responder cut loop does not disable the low-voltage battery system.

Even if the first responder cut loop has been cut, the cells inside the high-voltage battery pack still have stored energy. Always treat the vehicle as if there is high-voltage active in it. It is not known if the high-voltage battery pack or other high-voltage components have been damaged.

## VEHICLE CHARGING



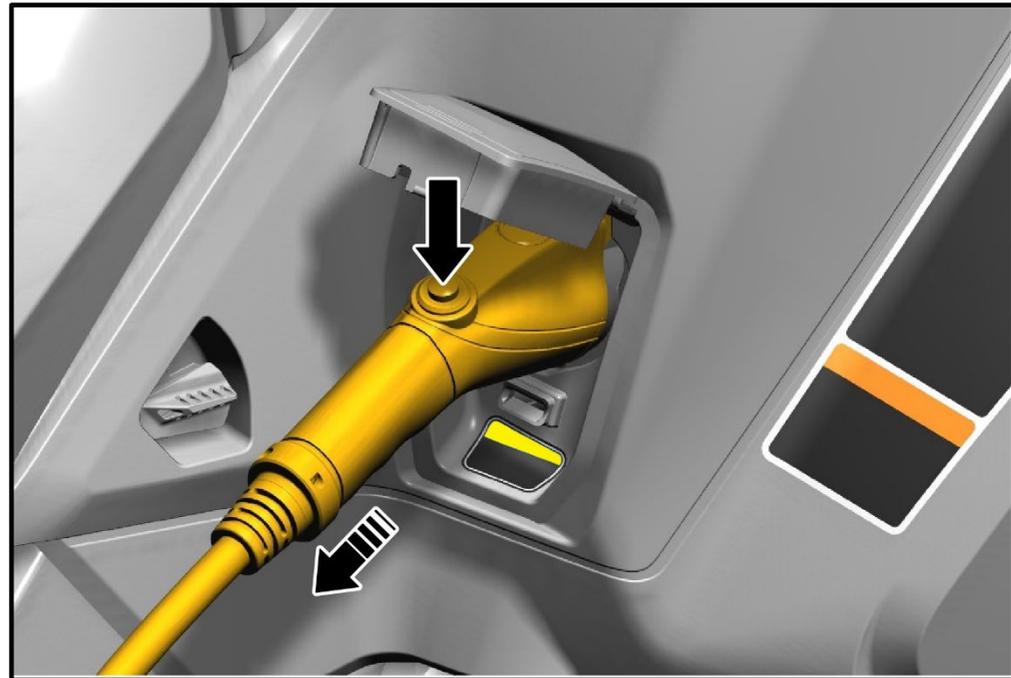
When a vehicle has an incident while connected to an Electric Vehicle Supply Equipment (EVSE), or charging station, all attempts should be made to disable the EVSE before executing emergency procedures to the vehicle.

**NEVER** interrupt a high voltage current flow by cutting the EVSE charging cable or forcefully pulling on the charger cable handle.

In the case of an emergency incident while charging that involves collision, electrical failure, or fire, additional steps should be taken to first isolate the charging station by disabling its main service disconnect.

Before attempting any emergency manoeuvres on a vehicle that is charging or connected to a charging station, the charger cable handle must be disconnected from the vehicle.

1. Hold down the release button on the charger cable handle for 1 second and remove it from the vehicle charging port.
2. Proceed with the “Disable the High Voltage” procedure.



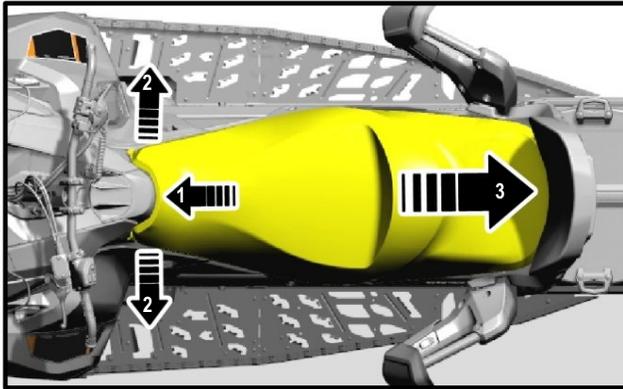
## **DISABLE THE LOW-VOLTAGE**

Deactivating the low-voltage battery is not sufficient to turn off the vehicle. Follow the immobilization procedure found in section 2 to turn off the vehicle. The high voltage disabling procedure found in section 3 must be performed to disable the high voltage systems of the vehicle.

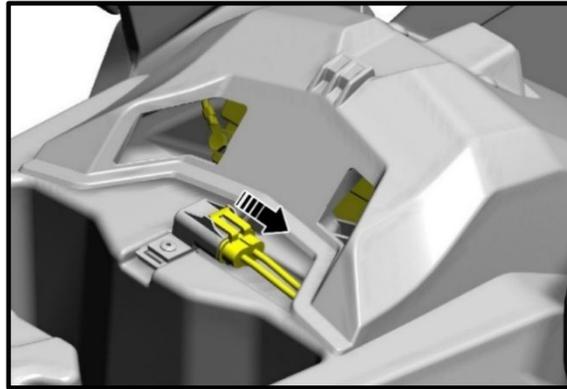
After section 2 and section 3 procedures are performed, the low-voltage system must be deactivated before handing the vehicle to the 2nd responders.

Disconnect the main fuse (FA) to deactivate the vehicle low voltage.

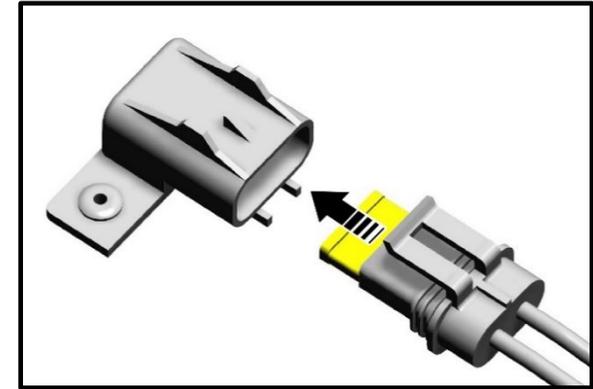
1. Remove the seat.



2. Pull out the fuse connector.



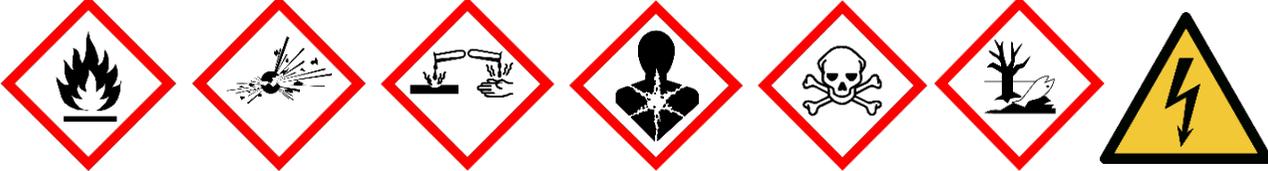
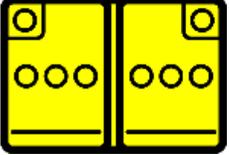
3. Pull out the main fuse (FA) from the connector.



## 4. Access to the occupants

Not applicable due to vehicle type.

## 5. Stored energy / liquids / gases / solids

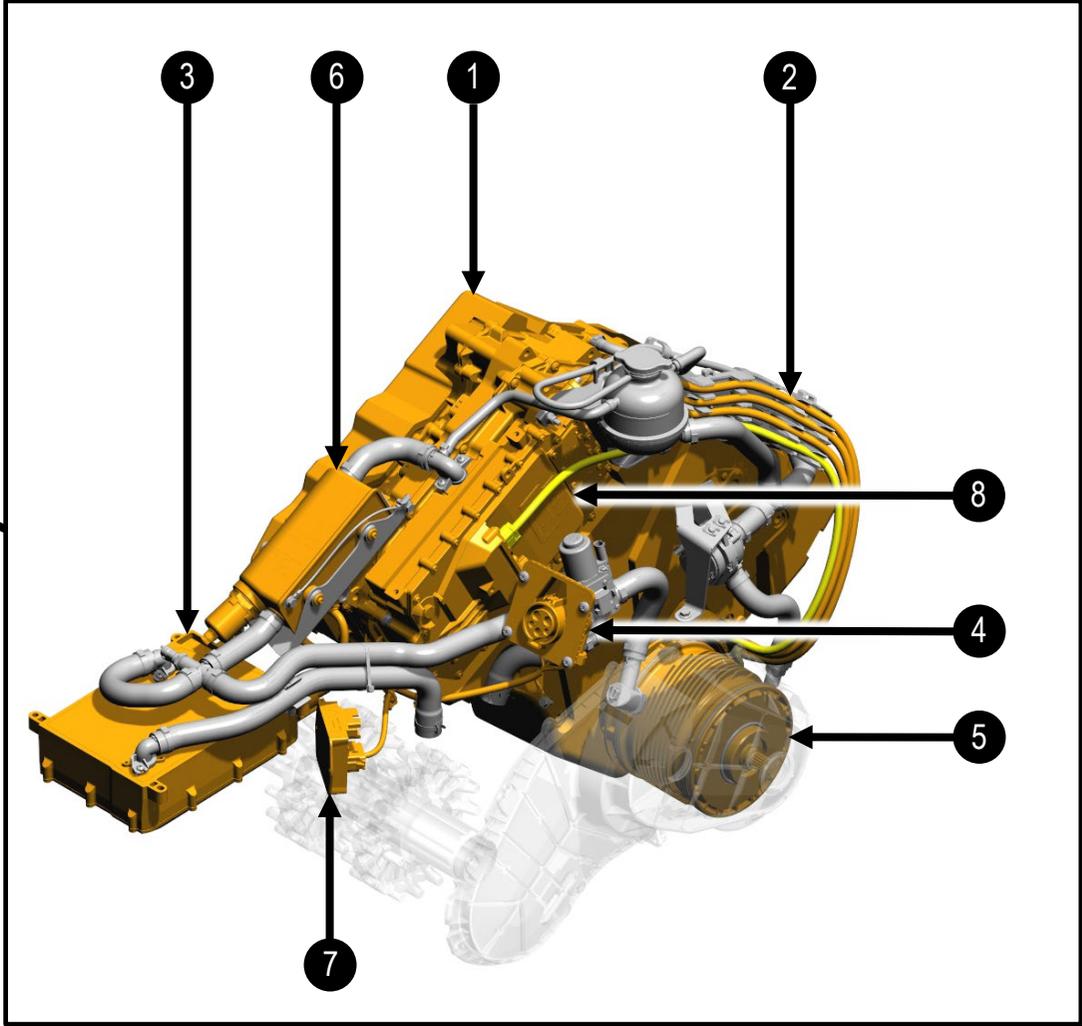
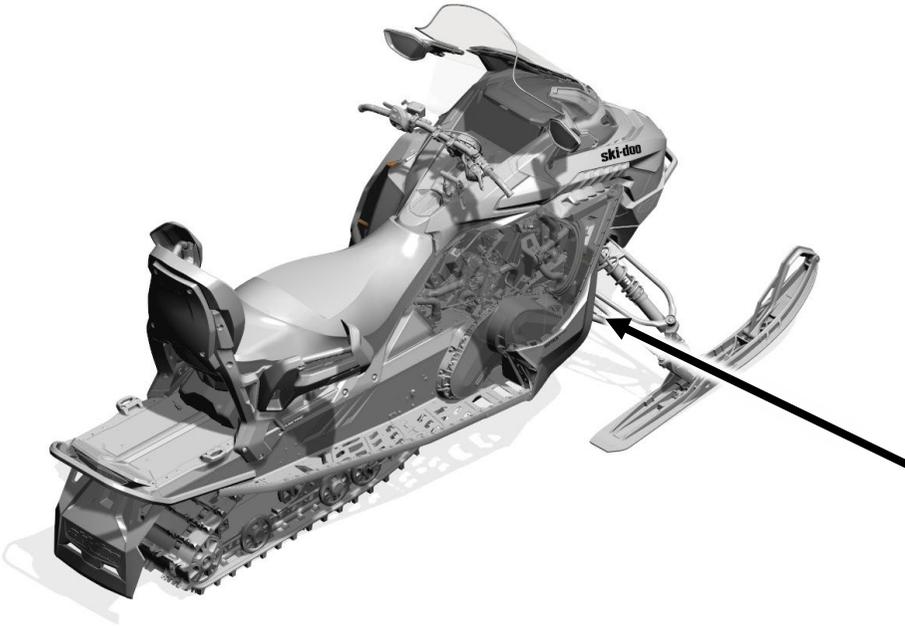
		400V
		12V
Coolant for High-Voltage system		6.2 Litres / 50/50 pre-mix coolant* / Orange
Brake fluid		65 ml / Dot4 Specification / Clear
Chaincase oil		250 ml / API GL-5 Specification** / dark brown - black

\* Ethyl glycol and distilled water or coolant specifically formulated for aluminium engines.

\*\* 75W140 gear oil that meets the API GL-5 specification.



# High-Voltage Components



- 1. High-Voltage Battery Pack
- 2. High-Voltage Cables
- 3. High-Voltage Charger
- 4. High-Voltage Charging Socket
- 5. High-Voltage E-motor
- 6. High-Voltage Heater
- 7. High-Voltage Heater Module
- 8. High-Voltage Inverter



## High-Voltage Battery Pack

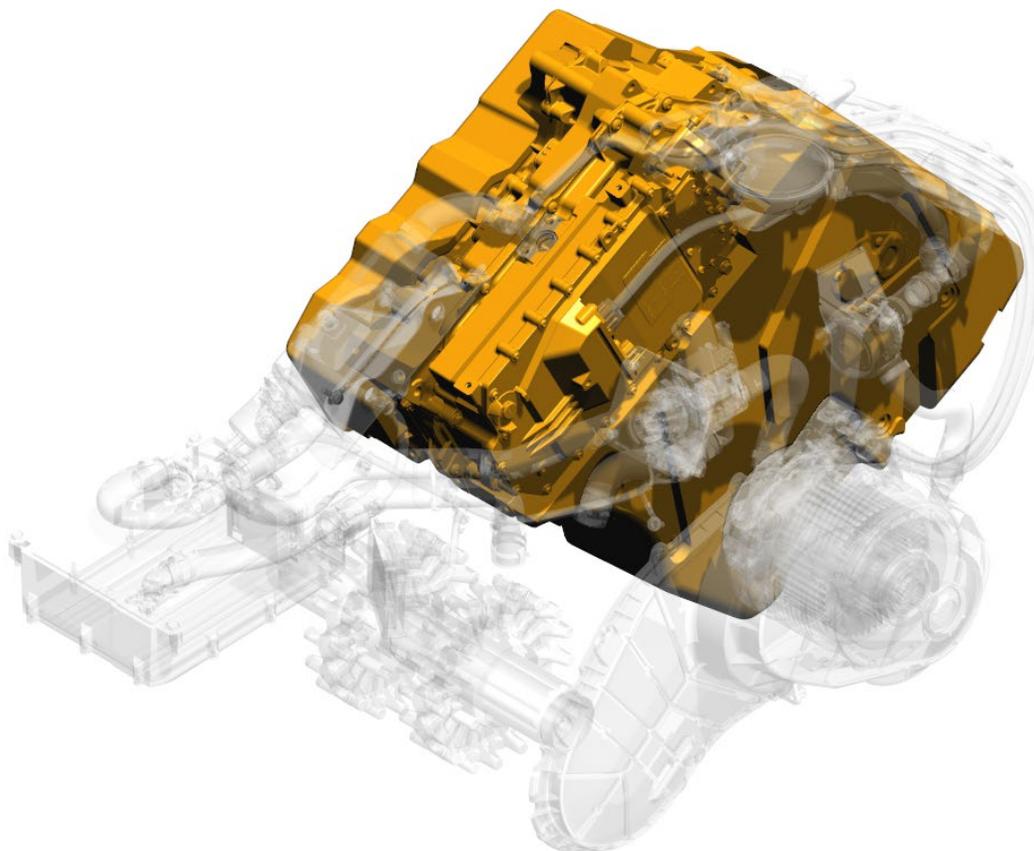


**Never breach or damage the high-voltage battery pack when the vehicle is lifted, manipulated or when you remove panels from the vehicle. When rescue equipment is used, care must be taken to make sure the battery pack is not damaged in any way.**



This vehicle uses a 400V lithium Ion (Li-ion) battery, made up of multiple cells. These cells are used to store energy within the battery. The cells of the high-voltage battery pack are sealed.

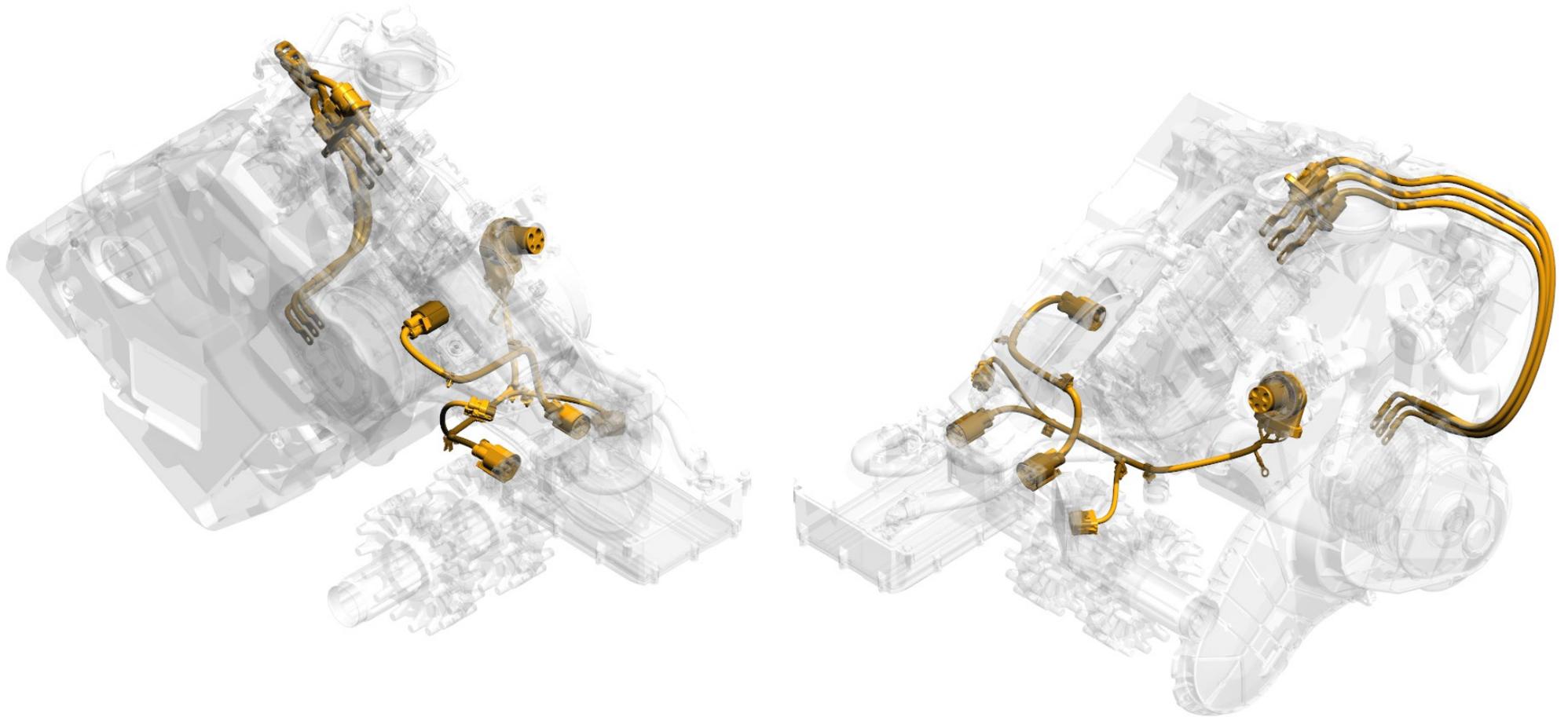
The inverter for the high-voltage system is directly mounted onto the high-voltage battery pack.





## High-Voltage Cables

All high-voltage cables on the vehicle are orange in appearance. Do not cut or otherwise damage the orange high-voltage cables with rescue tools, and always treat the orange high-voltage cables as if they were live and powered.



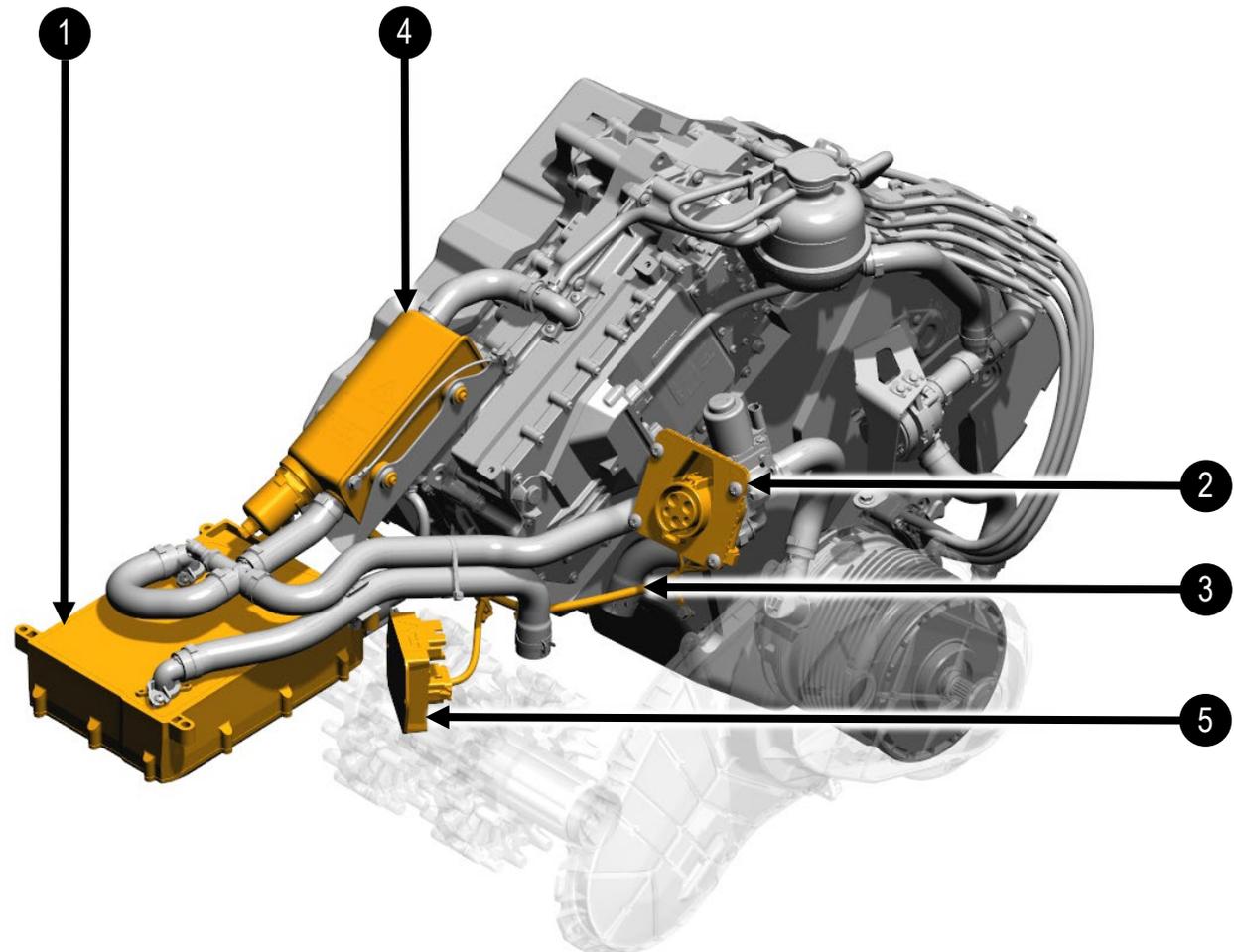


## High-Voltage Charging System

The Charging System is complemented with a high-voltage heater that will maintain the appropriate operating temperature of all high-voltage components using the cooling system.

The high-voltage heater will be automatically activated, as required, when connected to a high-voltage charging station and under normal vehicle usage.

The charging system and its related components are as follows:

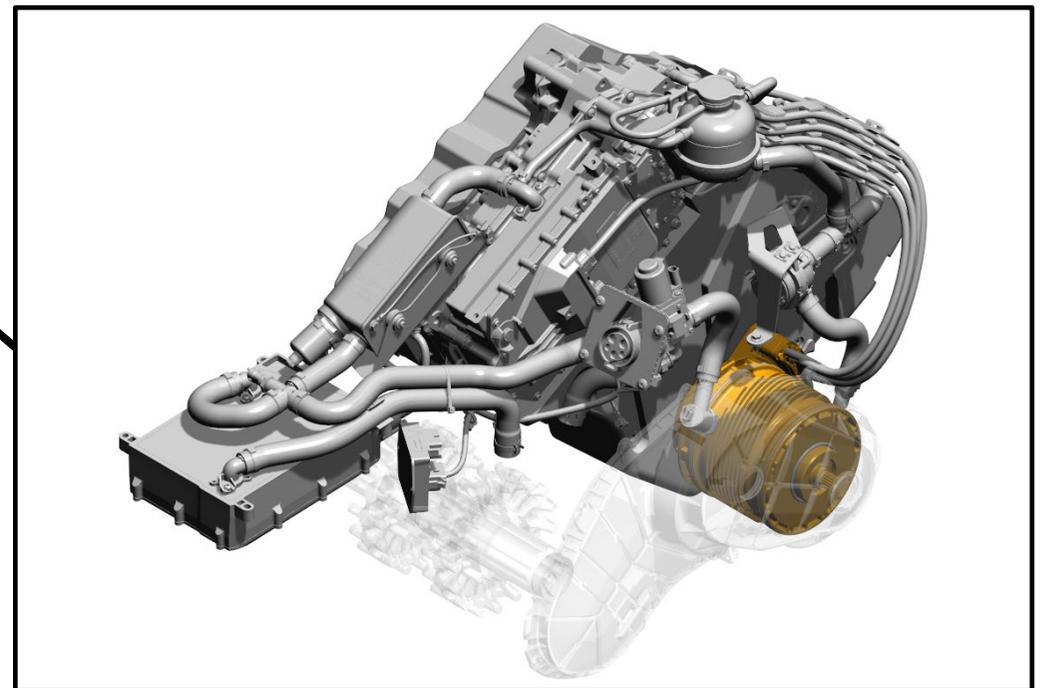
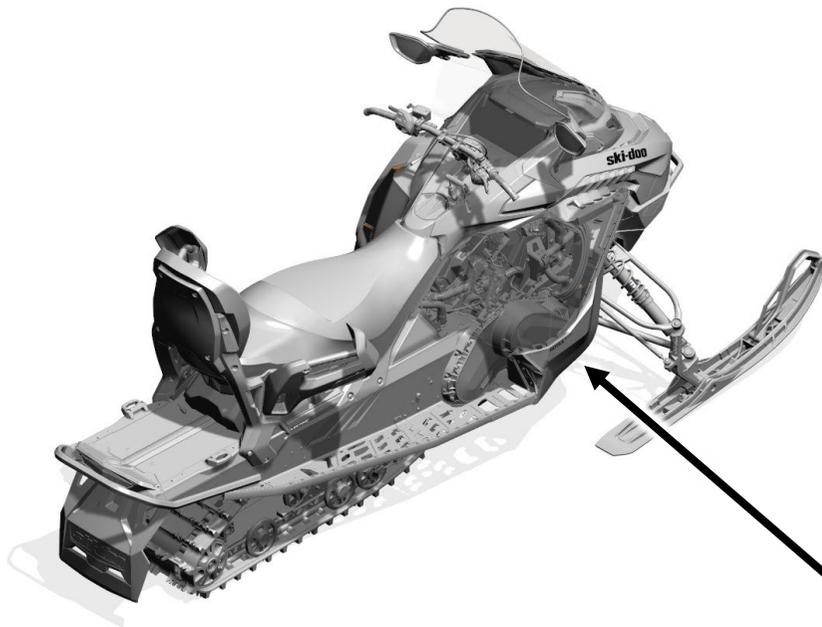


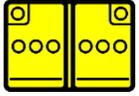
1. High-Voltage Charger
2. High-Voltage Charging Socket
3. High-Voltage Connector Cable
4. High-Voltage Heater
5. High-Voltage Heater Module



## High-Voltage E-Motor

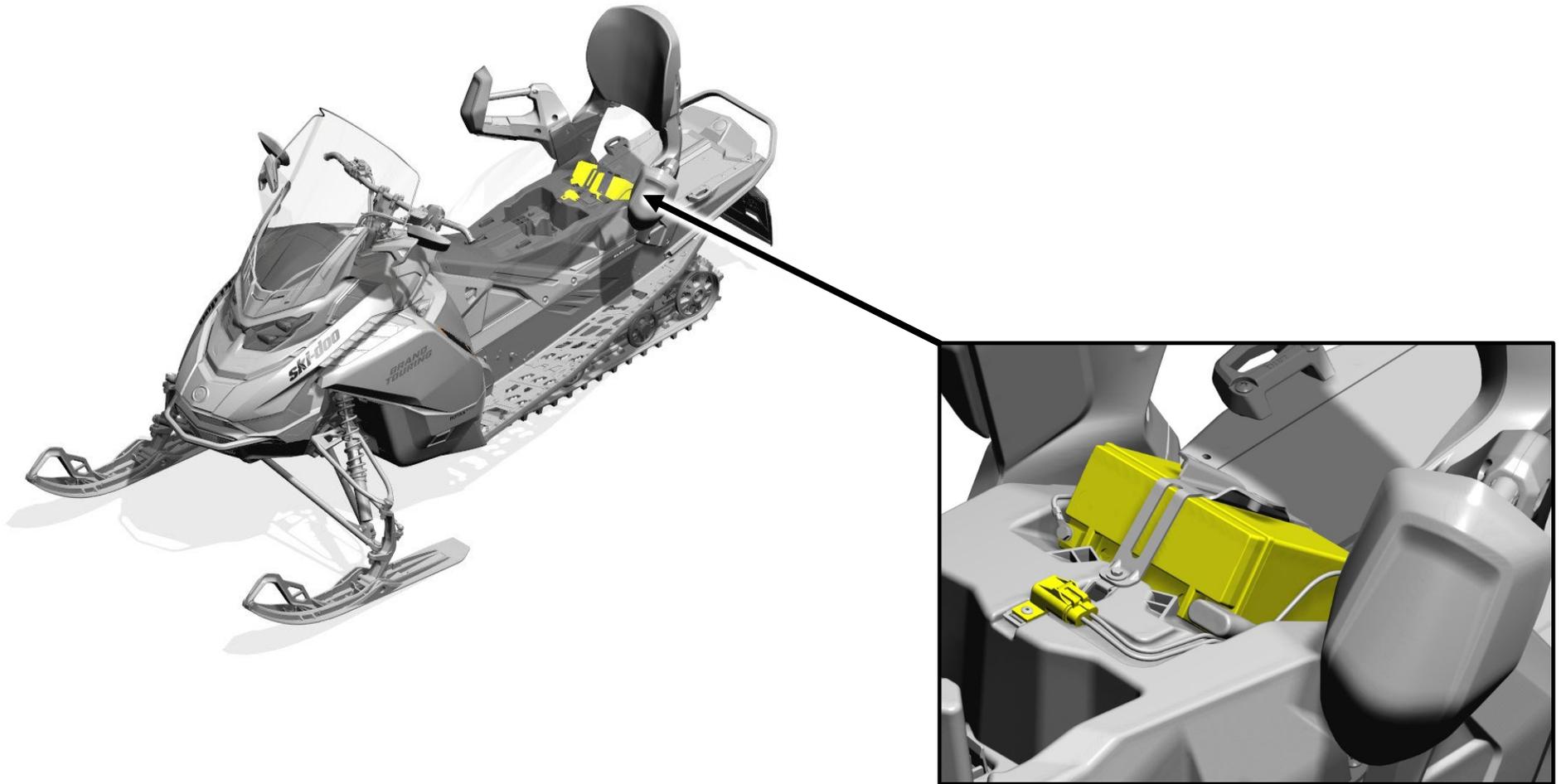
This vehicle is equipped with an electric motor capable of generating a voltage when rotated. The motor is mechanically connected at all times to the snowmobile track. Wherever possible, the vehicle should not be pulled or towed to cause the track to move, refer to section 8 for more information.





## Low-Voltage Battery

The low-voltage battery (12V) is required to activate low-voltage and high-voltage components. During normal operation and charging, the vehicle's high-voltage battery through a DC-to-DC converter provides charging current to the low-voltage battery. The low-voltage battery can be disconnected, after removing the seat, using the Main Fuse FA located on the battery cover.



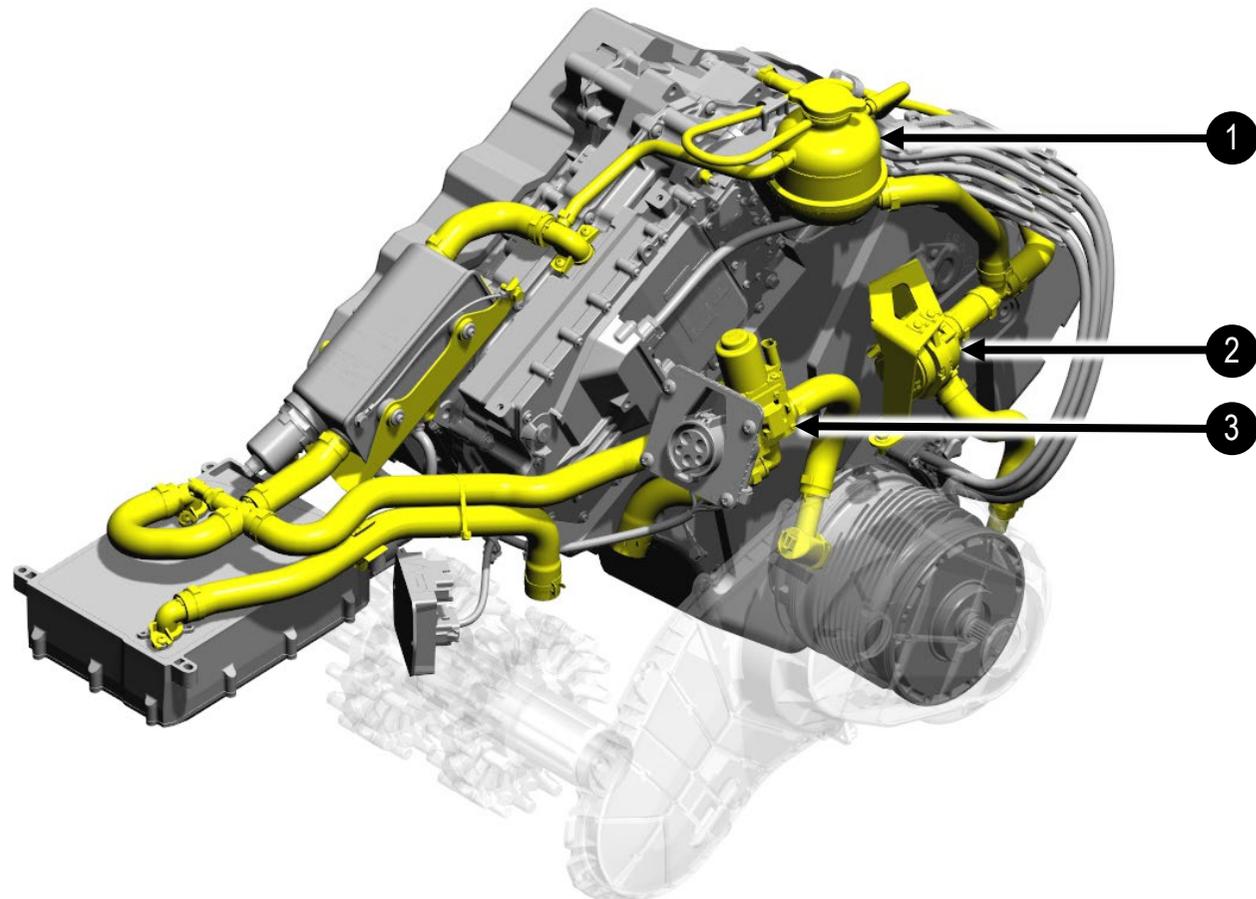
## Cooling System



**If coolant is leaking from the high-voltage battery pack, there is a risk of a thermal reaction inside the high-voltage battery pack. Monitor the high-voltage battery pack temperature with thermal infrared camera.**



The high-voltage battery pack has an integral liquid cooling circuit to cool the battery. If the vehicle has been involved in an accident and the high-voltage battery pack casing is damaged, coolant may leak from within the unit. Other components that may leak if damaged are the high-voltage charger, high-voltage E-motor, high-voltage heater, and high-voltage DC to DC converter. The coolant used is orange in appearance.



1. Cooling System Reservoir
2. Cooling System Pump
3. Cooling System Bypass Valve

## 6. In case of fire



Always assume high-voltage systems to be energized. During firefighting activities avoid contact with high-voltage components. Cutting of high-voltage component or attempting to open the high-voltage battery pack could cause serious injury or death.



A burning battery releases super-heated gases and toxic vapours. This release may include volatile organic compounds, hydrogen gas, carbon dioxide, carbon monoxide, soot, particulates which contain oxides of nickel, aluminium, lithium, copper, cobalt, and hydrogen fluoride. Responders must always protect themselves with full PPE, including SCBA, and take appropriate measures to protect civilians downwind from the incident.



Lithium-ion batteries can self-ignite spontaneously or after a delay if damaged or used incorrectly. Lithium-ion batteries can re-ignite after a fire has been suppressed or when they have not burned out completely. Monitor with a thermal infrared camera to confirm the battery pack has cooled down completely.



**USE LARGE AMOUNT OF WATER TO EXTINGUISH THE HIGH-VOLTAGE BATTERY PACK**



Use water to fight a fire involving a high-voltage battery pack. If the battery itself is on fire, is exposed to high heat or generates heat or gases, large quantities of water must be applied directly to the battery to cool it. Always make sure there is a sufficient supply of water as fast as possible. High-voltage battery fires can take large quantities of water to fully extinguish and be cooled down.

If water is not immediately available, CO<sub>2</sub>, dry chemicals, or other typical fire-extinguishing agents can be used to fight the fire from other surrounding combustibles but will have no effective cooling effect on the battery. Water should be applied directly to the battery. If it is safe to do so, lift or tilt the vehicle to allow for direct access to the battery.

Never open the battery for the purpose of cooling it. If an opening is available from a collision, it can be used to apply water directly onto the high-voltage battery pack.

Water must continue to be applied until a complete suppression of fire and smoke is observed from the battery pack. A thermal camera should be used to check for remaining heat sources and monitor the temperature of the battery pack.

For small fires that do not involve the high-voltage battery pack, these can be tackled using typical vehicle firefighting procedures. When extinguishing a fire, do not touch any of the high-voltage components with rescue equipment. Always use insulated tools.

## **Battery Pack Damage**

The high-voltage battery pack and high-voltage components are liquid cooled with a glycol-based automotive coolant that is orange in appearance. If damaged, this coolant can leak out.

The high-voltage battery pack contains lithium-ion cells. If damaged, electrolyte can leak, often creating chemical reactions that release heat. This heat can then damage other battery cells, creating a chain reaction.

If there is smoke, steam, or noises such as audible popping or hissing coming from the battery pack, treat it as heated and take appropriate action as described above.

## **Release of Battery / Vehicle to Second Responder**

High voltage battery fires can take up to 24 hours to fully extinguish.

A thermal imaging camera can be used to measure the temperature of the high-voltage battery and monitor the rate of heating or cooling. Before the vehicle can be released to second responders (such as law enforcement, vehicle transporters, etc.) there must be clear sign that fire, smoke, or heating is not present in the high-voltage battery for at least one hour.

The battery must be completely cooled before the vehicle is released to second responders or otherwise leaving the incident. Even if all deactivation procedures are properly executed, second responders must be advised that there is a risk of re-ignition from the stranded energy still in the battery. Monitor the vehicle temperature to prevent thermal runaway.

## 7. In case of submersion



**Always handle any submerged vehicle with the appropriate PPE for water rescue. Failure to do so can result in serious injury or death.**

Handle a submerged electric vehicle like any other submerged vehicle. The body of the vehicle does not present a greater risk of shock because it is in water. However, vehicles that have been submerged in water should be handled with greater caution due to the potential risk of a high-voltage electrical battery fire. Always treat any submerged vehicle while wearing the appropriate PPE for water rescue.

First Responders should be prepared to respond to a potential fire risk.

After the vehicle is removed from the water, continue with the disabling procedures as outlined in section 3.

## 8. Towing / transportation / storage



Lack of engine sounds does not mean the vehicle is off. Before moving or transporting the vehicle, make sure the high voltage disabling procedure has been performed. Wear appropriate PPE.



After the vehicle has been in an accident, the high-voltage battery and components can be damaged and compromised. Always treat these components as being energized. Avoid direct contact with the high-voltage battery and the high-voltage components. Always wear appropriate PPE. Failure to do so may result in serious injury or death.



If the high-voltage battery pack has been damaged or the vehicle has been involved in a fire, any vehicle movement could lead to self-ignition or re-ignition of the high-voltage battery pack.



If a vehicle has been involved in a submersion, fire, or collision that has damaged the high-voltage battery pack, there is a risk of battery re-ignition several days after the initial incident. Store the vehicle outside in an open area at least 15 m (50 ft) from any flammable materials and other vehicles or structure, and monitor the vehicle temperature to prevent thermal runaway.



**When transporting the damaged vehicle, always carry a water-based fire extinguisher and have the tow truck followed by a support vehicle for monitoring and ready for calling fire response.**

The electric motor installed to this vehicle can generate electricity when rotated. The electric motor is mechanically connected to the snowmobile track.

**BRP RECOMMENDS TO AVOID PULLING OR PUSHING THE VEHICLE TO CAUSE THE TRACK TO MOVE WHEREVER POSSIBLE.**

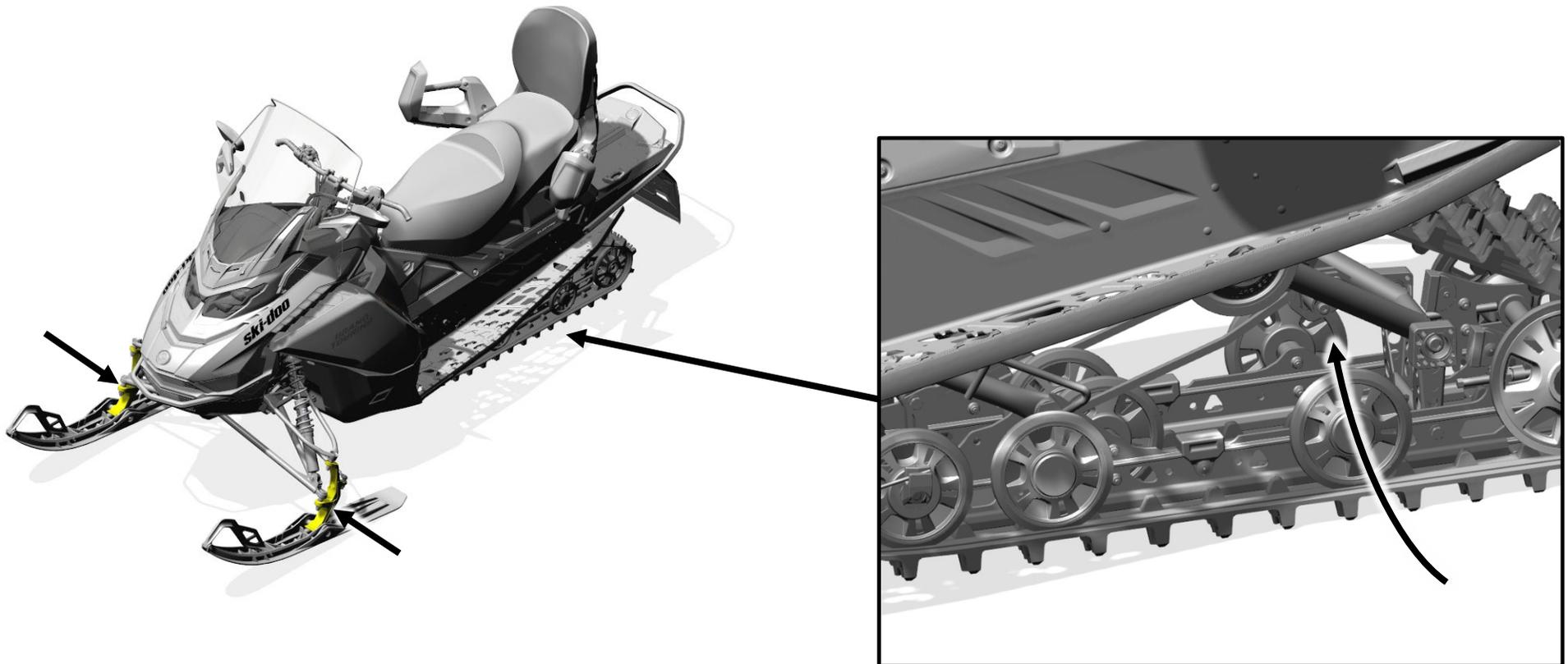
The vehicle must be secured in an upright position whenever it is being lifted or manipulated. Never use metal or conductive components to lift, manipulate, or secure the vehicle. Refer to section 2 for appropriate lifting points.



A flatbed truck or comparable transport vehicle is recommended to transport the vehicle to prevent the track from moving. The vehicle shall be secured onto the platform facing forward using the ski legs, not the skis, and the rear suspension. A strap can be used on each of the front ski legs (spindles) or 1 strap can be passed behind both ski legs (spindles). Pass a strap through the rear suspension to anchor the track on the platform. Alternatively, the 2 footrests can also be used, at the lifting points.

**Note:** Front and rear bumpers should not be used as sole attachment points when towing a snowmobile on a trailer/flatbed platform.

Secure the vehicle at the locations identified in the illustration below.



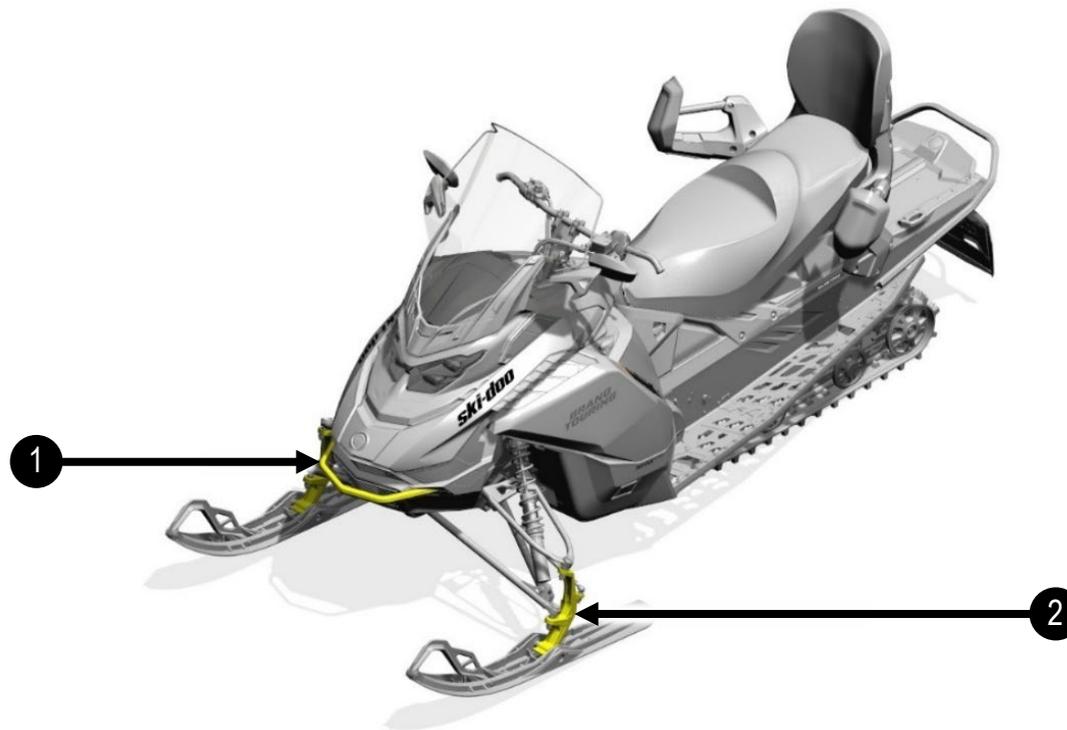
## Pulling or Pushing the Vehicle



**Never transport this vehicle with the track on the ground or so that the propulsion system can rotate at a speed higher than 10 km/h (6 mph). This can cause the motor to generate a voltage which can do significant damage, cause the motor to overheat and cause the vehicle to have erratic behaviour. In rare cases, extreme overheating can ignite surrounding components.**



If the vehicle cannot be lifted onto the flatbed, or if a flatbed is not available and the vehicle must be recovered, it may be winched or temporarily towed at a speed below 10 km/h (6 mph), using a tow rope attached to both ski legs (spindles), not the skis. If the ski legs are not accessible, the tow rope can be attached to the front bumper. Attach a towing rope at the locations identified in the illustration below.



1. Front bumper
2. Ski spindle

If possible, the parking brake should be applied with a cargo sled or sliding carpet installed under the track to prevent them from turning.



## 9. Important additional information

This guide contains important instructions and warnings intended to assist emergency response professionals and safely respond to incidents involving a Ski-Doo Grand Touring Electric snowmobile.

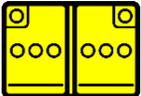
Copies of the Emergency Response Guide and the Operator's Guide for this vehicle and other vehicles are available for reference and downloading at: <https://operatorsguides.brp.com>.

### **Contact (Canada, USA):**

For questions, please contact your local BRP authorized dealer, or BRP Customer Services Department at:

- 1-888-272-9222, between 8 a.m. and 8 p.m. Eastern time seven days a week
- or <https://www.brp.com/forms/contact-us.html>

## 10. Explanation pictograms used

	Electric Vehicle		Device to shut down power in vehicle		Explosive
	Battery pack, high-voltage		Battery, low-voltage		Corrosives
	High voltage component		Cable cut		Hazardous to the human health
	High voltage power cable		Use thermal Infrared camera		Acute toxicity
	General warning sign		Lifting point		Environmental hazard
	Warning, Electricity		Use water to extinguish the fire		Flammable