

Waymo autonomously driven Jaguar I-PACE

Emergency response guide
and law enforcement interaction protocol

This document includes material
from the **JLR First Responder
Instruction Pack (X590 2021MY)**



Introduction

The Waymo fully autonomous Jaguar I-PACE is based on the Jaguar I-Pace.

This document includes material from the JLR First Responder Instruction Pack (X590 2021MY) and supplemental information related to the Waymo Driver, Waymo's autonomous driving technology.

This guide is intended to be used by trained first responders and assumes a professional-level background in safely responding to emergencies, including those involving damaged vehicles.

Jaguar I-PACE

Contents

<u>Waymo toll-free hotline for emergency responders</u>	4
<u>Identifying the Waymo fully autonomous vehicle</u>	5
<u>Location of in-vehicle documents</u>	7
<u>Level of automation</u>	8
<u>Operational design domain</u>	9
<u>Response to police and emergency vehicles</u>	10
<u>Collision response</u>	11
<u>Ensuring the vehicle will not drive autonomously</u>	13
<u>Electronic shift control operation</u>	14
<u>Parking brake operation</u>	15
<u>Disabling autonomous driving mode</u>	16
<u>Turning the vehicle off</u>	17
<u>Towing the vehicle</u>	18
<u>Opening the rear trunk</u>	19
<u>Electrical system overview</u>	21
<u>Disconnecting base vehicle 12 V battery</u>	22
<u>Disconnecting HV battery</u>	23
<u>Vehicle systems overview</u>	24
<u>Avoidance of roll away of the vehicle</u>	25
<u>Do Not Cut zones</u>	26
<u>Passive restraint device considerations</u>	27
<u>Additional information for fully or partially submerged vehicles</u>	28
<u>Additional information in case of a fire</u>	29
<u>Hazards</u>	30

Waymo toll-free hotline for emergency responders

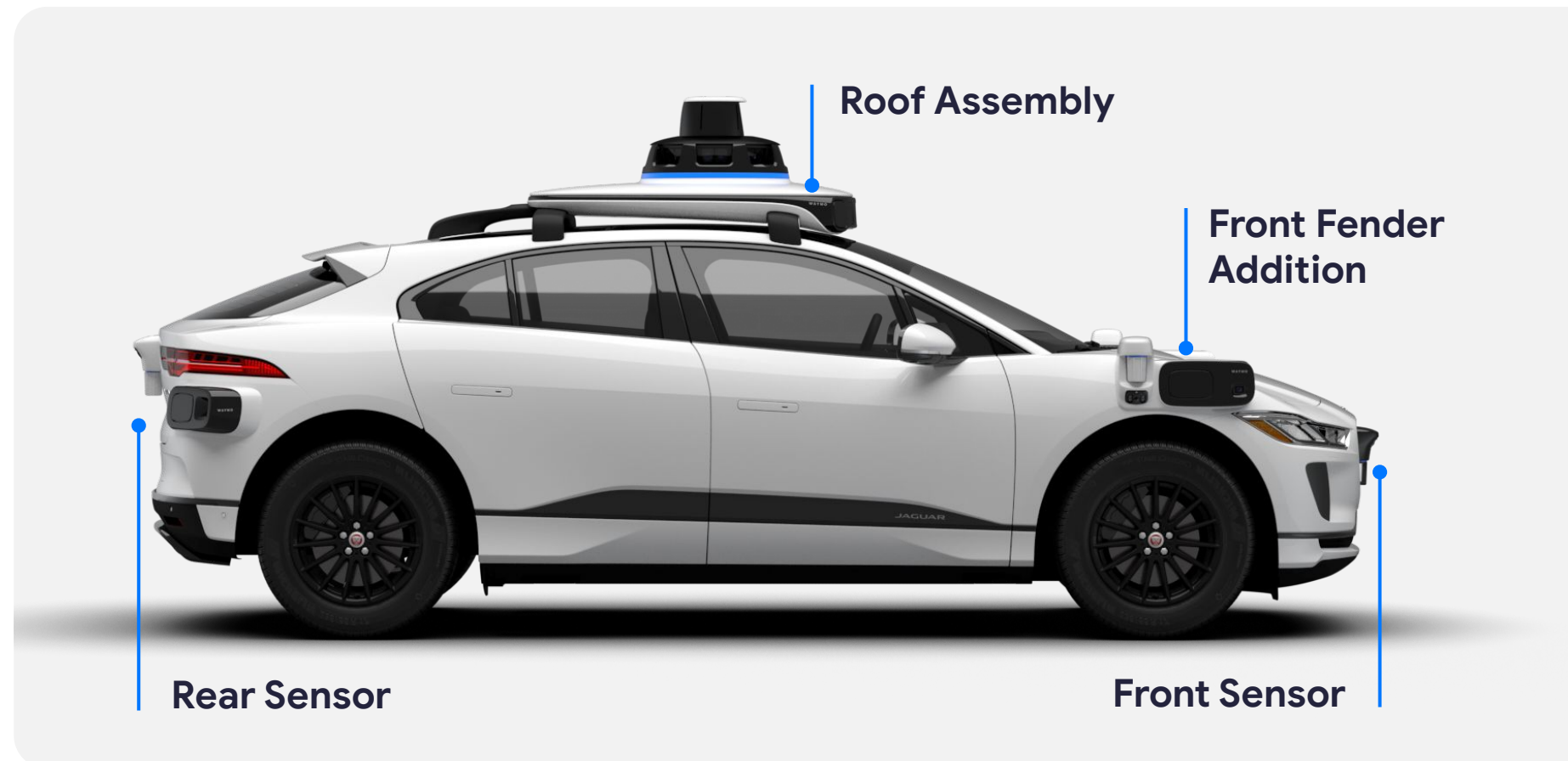
Waymo has established a toll-free 24-hour telephone hotline dedicated to allowing police, fire departments, and other first responders to communicate directly with Waymo's professionally-trained specialists at any time during our vehicle testing and operation on public roads.

1-877-503-0840

We ask that emergency responders calling this hotline identify the numerical identifier of the vehicle in question, license plate, and any location information available.

Identifying the Waymo fully autonomous vehicle

The Waymo autonomous Jaguar I-PACE can be easily identified by the white color, roof assembly, or front fender additions.



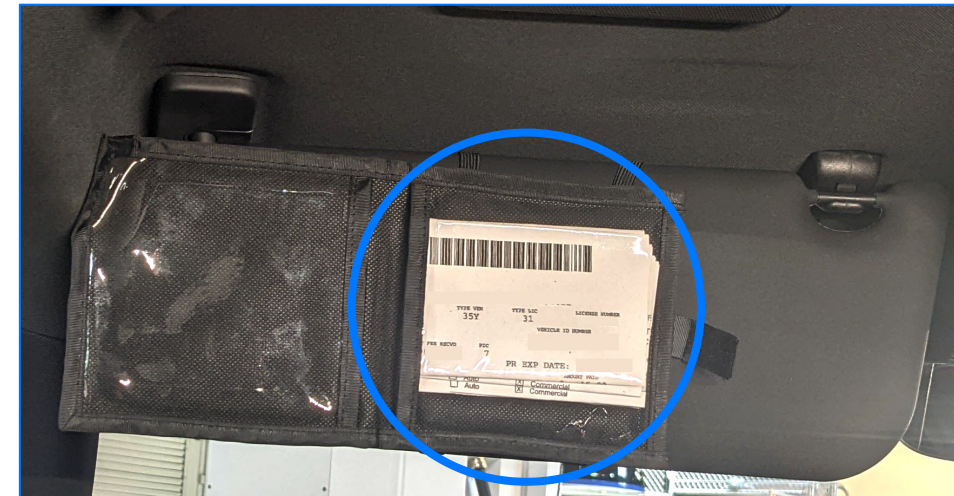
Identifying the Waymo fully autonomous vehicle

Each Waymo vehicle is identified by license plate, in addition to required identifiers in the jurisdiction (e.g., vehicle-for-hire badges).



Location of in-vehicle documents

Two physical copies of vehicle owner information, vehicle registration, and proof of insurance are stored inside each driverless vehicle. Each of the following locations contains the same sets of documents, and either set of documents can be accessed in the event law enforcement requires this information.



In a container affixed to the front driver-side sun visor



In a container affixed to the front passenger-side sun visor

Level of automation

The Waymo vehicle is capable of autonomous operation.

- It is capable of performing the entire dynamic driving task within its operational design domain.
- It is capable of performing a safe stop, known as achieving a “minimal risk condition,” without human intervention.
- It is equipped with redundancies for critical systems, such as sensors, computing, steering and braking, and can automatically detect changes to the vehicle or the environment and determine an appropriate response to keep the vehicle, its passengers, and other road users safe.

Operational design domain

The Waymo vehicle is intended to operate in the following conditions:

- On roadways including freeways, highways, city streets, and rural roads with posted speed limits up to 65 mph
- In parking lots
- At all times of day and night
- In light to moderate rain and fog

Conditions that limit autonomous operations include:

- Inclement weather including heavy rain and snowy/icy conditions
- Flooded roadways
- Mountain roadways
- Off-road

Waymo vehicles can only be operated in autonomous mode in specific geofenced areas, where they have been tested and validated to safely perform all the dynamic tasks of driving without human intervention.

- Testing and deployment territory will be expanded incrementally over time via our rigorous testing and validation process.
- Information relating to these areas is provided by Waymo directly to state and local authorities, prior to any fully autonomous operation without a human driver.

Response to police and emergency vehicles

The Waymo vehicle uses its sensors to identify police or emergency vehicles by detecting their appearance, their sirens, and their emergency lights.

- The Waymo vehicle is designed to yield as appropriate to these emergency vehicles no matter which direction they are headed.

If a Waymo autonomous vehicle detects that a police or emergency vehicle is behind it and flashing its lights, the Waymo vehicle is designed to pull over and stop when it finds a safe place to do so.

- The vehicle can unlock the doors and roll down the windows for Waymo's Rider Support team to communicate with law enforcement.
- Waymo's Rider Support specialists have protocols for interacting with any vehicle passengers in the event of the vehicle being pulled over or involved in a collision, by providing information through in-vehicle speakers, on the in-vehicle displays, and communicating with passengers through in-vehicle telecommunications capabilities.
- A Waymo support team will be dispatched to provide on-scene support, when needed, for passengers and first responders.

Collision response

The Waymo vehicle is capable of detecting that it was involved in a collision. In that event, the vehicle will brake until it reaches a full stop and immediately notify Waymo's Fleet Response specialists.

- Waymo's Fleet Response will call 911 if the circumstances warrant (e.g., where there is a significant collision in which police may be needed because of injuries, vehicles blocking traffic, etc).
- A Waymo support team will be dispatched to provide on-scene support for passengers and first responders.
- The Waymo vehicle will react differently depending on the collision severity. In the event an airbag is deployed, the base vehicle's electric propulsion system will be disabled.

Waymo Fully Autonomous
Jaguar I-PACE

Approaching, disabling, and towing



Ensuring the vehicle will not drive autonomously

The vehicle will not drive autonomously while any of the following are true:

- Any airbags are deployed
- Any door is open
- The vehicle is in Park (page 14)
- The Parking Brake is applied (page 15)

Open a door of the vehicle to prevent the vehicle from autonomously driving:

- Break a window if doors are locked and immediate entry to vehicle or ventilation of passenger compartment is necessary.
- Call Waymo (1-877-503-0840) to unlock the doors remotely if there is time and there are no signs of battery heating, smoke, or fire.

Keep at least one door open until the base vehicle is turned off (page 17) or the 12 V cut loop under the hood is cut (page 22).



Vehicles can roll or move regardless of autonomous driving state. Always use standard precautions including wheel chocks.

Electronic shift control operation

To determine if the vehicle is in Park or the Parking Brake is applied, approach the vehicle from the driver's side and check for:

- The letter “P” is displayed in center the instrument cluster display
- Red “P” (Park) indicator on the Electronic Shift Control

The Electronic Shift Control and Parking Brake cannot be manually controlled while the vehicle is in autonomous driving mode. See page 16 to disable autonomous driving mode.



NOTE: Base vehicle 12 V power must be functional to shift in or out of Park

Parking brake operation

The Parking Brake is automatically applied when the vehicle is shifted to “P”. To determine if the Parking Brake is applied, check if the red “Park” indicator is displayed on the left of the instrument cluster display. The Parking Brake switch is located on the switch pack between the steering wheel and the driver's door.

Operate as follows:

- With the vehicle’s electrical system switched on, press the brake pedal, and pull the Parking Brake switch out to release the Parking Brake
- Push the Parking Brake switch in to apply the Parking Brake. The “Park” indicator illuminates to confirm.

The Parking Brake cannot be manually controlled while the vehicle is in autonomous driving mode. See page 16 to disable autonomous driving mode.

NOTE: Base vehicle 12 V power must be functional to shift in or out of Park or apply or release the parking brake.



“Park” indicator



Parking brake switch

Disabling autonomous driving mode

Emergency responders needing to disable autonomous driving mode should contact Waymo using one of the following methods:

- Call: **1-877-503-0840**
- Or: **Activate in-vehicle Rider Support by pushing the “DISP” button in the center console.**

Identify yourself and request that the Waymo representative authorize the vehicle for manual mode. If calling the toll-free hotline, you will need to identify the vehicle by license plate and/or location.

Follow the Waymo representative’s instructions, which will include pressing buttons on the steering wheel.

NOTE: Successful transition to manual mode can be confirmed by attempting to turn the vehicle on or off or change gears. If gears can be changed or the vehicle can be manually turned on or off, the vehicle is not in autonomous driving mode.



Call Rider Support



Disengage buttons. Use as directed by Rider Support

Turning the vehicle off

The **READY / OFF** indicator in the instrument panel indicates when the vehicle is running (**READY**) or when it is off (**OFF**)

- **READY** when the vehicle is turned **ON**
- **OFF** when the vehicle's electrical system is switched on and the vehicle is **NOT ready to be driven**

The **start-stop button** will not turn the vehicle off while autonomous driving mode is enabled.

To turn off the vehicle:

1. Disable autonomous driving mode (page 16)
2. Push the start-stop button until "OFF" is displayed in the instrument panel

If the button does not turn the vehicle off:

- Ensure autonomous driving mode has been disabled
- Cut base vehicle 12 V battery (page 22)
- Disconnect the HV battery (page 23)



Ready / off indicator



Vehicle start-stop button

Towing the vehicle

The recommended method for recovery or transportation of the vehicle is on a flatbed truck or trailer designed for that purpose.

- Make sure that the steering column is unlocked during vehicle recovery. The smart key must remain inside the vehicle and the vehicle's electrical system must be switched on.
- The vehicle should not be towed on all four wheels or with the front or rear wheels suspended. Doing so can result in serious damage to the vehicle.
- The recovery agent must activate the transmission park release before recovery commences.

NOTE: In emergency situations, push bumpers may be used to move the vehicle from the roadway, though sensor damage will likely occur.



Opening the rear trunk

The rear trunk is locked during normal operation.

To access the trunk:

1. Disable autonomous driving mode (page 16)
2. Pull the exterior handle **or** press the liftgate button to the left of the steering wheel (see right).

NOTE: The rear liftgate latch is electrical and will be inoperable when in autonomous driving mode or if base vehicle 12 V power is removed.



Hood release button

Liftgate button



Liftgate handle

Waymo Fully Autonomous
Jaguar I-PACE

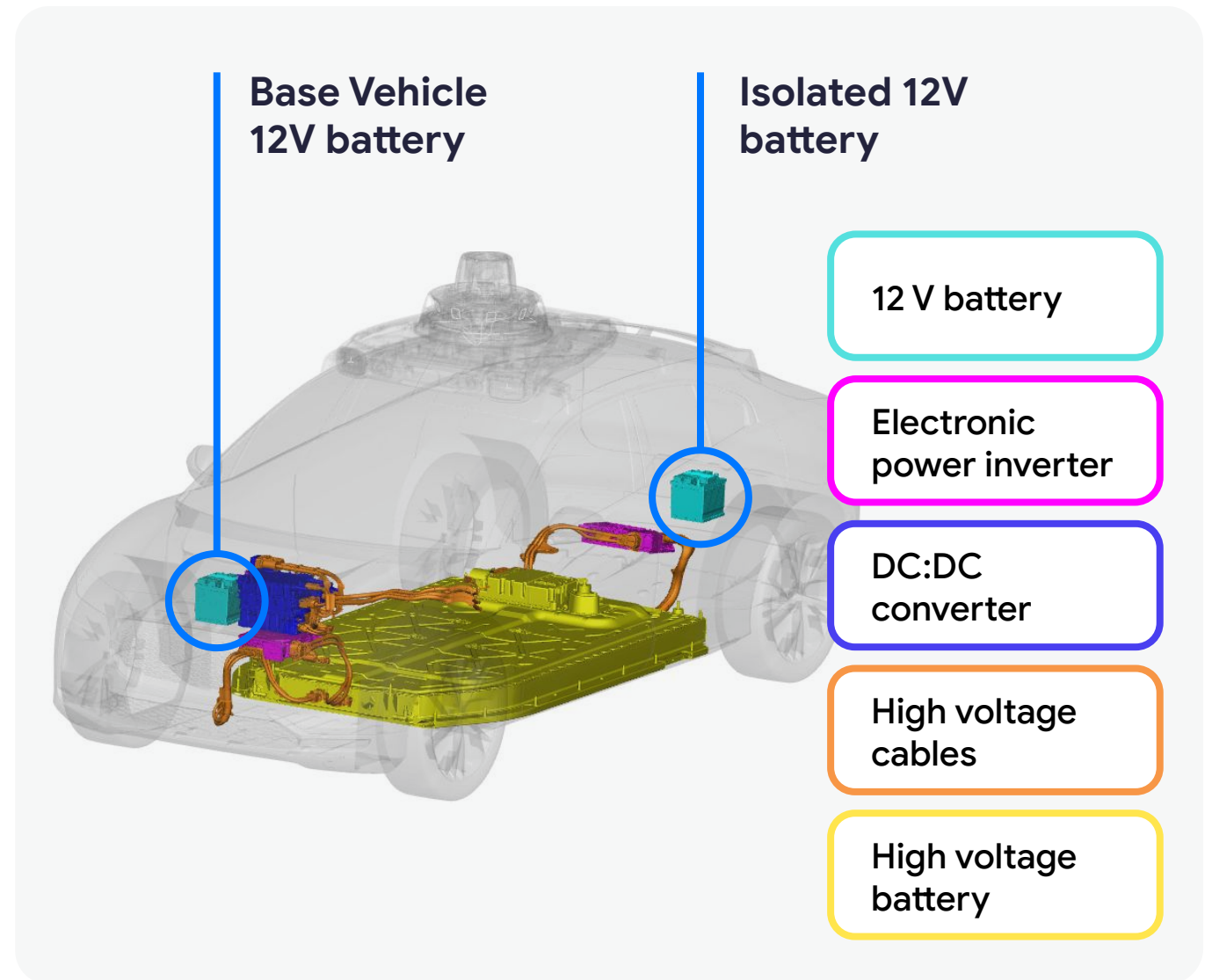
Vehicle systems safety considerations



Electrical system overview

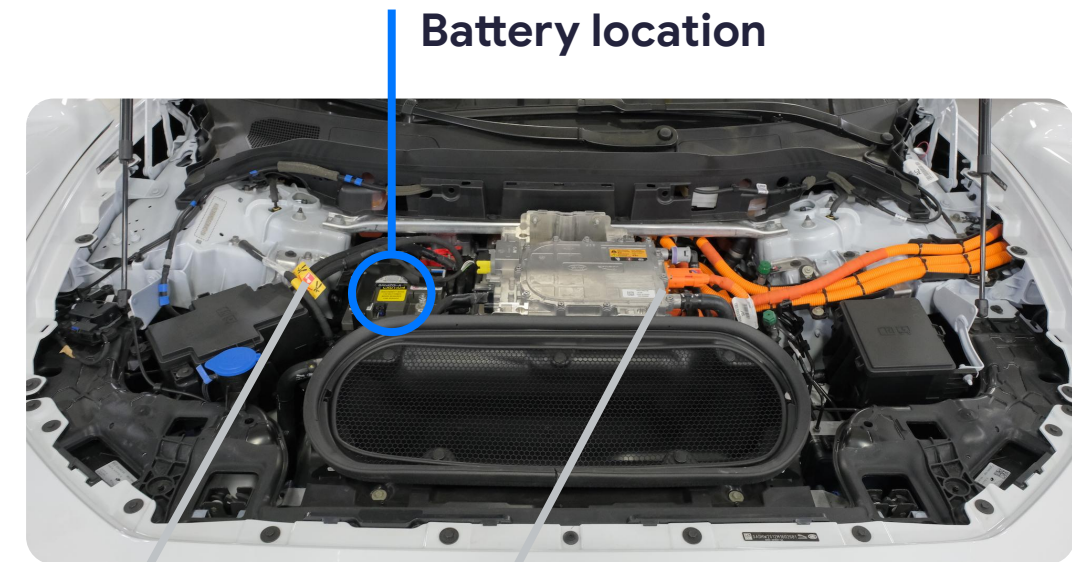
The I-PACE electrical system includes:

- a high voltage (HV) **battery pack** along the bottom of the vehicle
- Two **electronic power inverters** provide power to the Drive Units
- Two **DC:DC converters** (under the hood) provide all of the HV to 12 V power conversion on the platform
- 12 V power is supplied by the **base vehicle's 12V battery** (under the front hood) and a separate, **isolated 12V battery** (in the rear trunk) that powers components of the autonomously driven system.



Disconnecting base vehicle 12 V battery

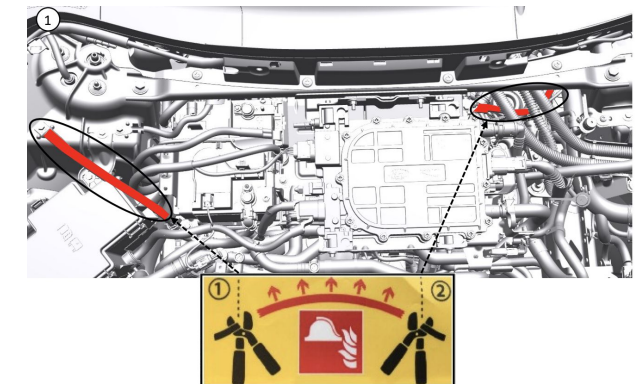
1. Before disconnecting 12 V power, open the hood, the trunk, and all doors. Both hood release and liftgate button are located to the left of the steering wheel at the base of the lower dash panel (see page 19).
2. Remove the front compartment center trim panel to reveal the power electronics and the accessory 12 V system. The 12 V battery is to the left of the compartment.
3. Cut and remove a segment of 2 cables as illustrated:
 - a. **Cut location 1:** 12 V negative power cable
 - b. **Cut location 2:** positive 12 V power cable connecting the DC:DC converter to the battery
4. Protect the cut ends from arcing against metal parts.



Cut location 1



Cut location 2

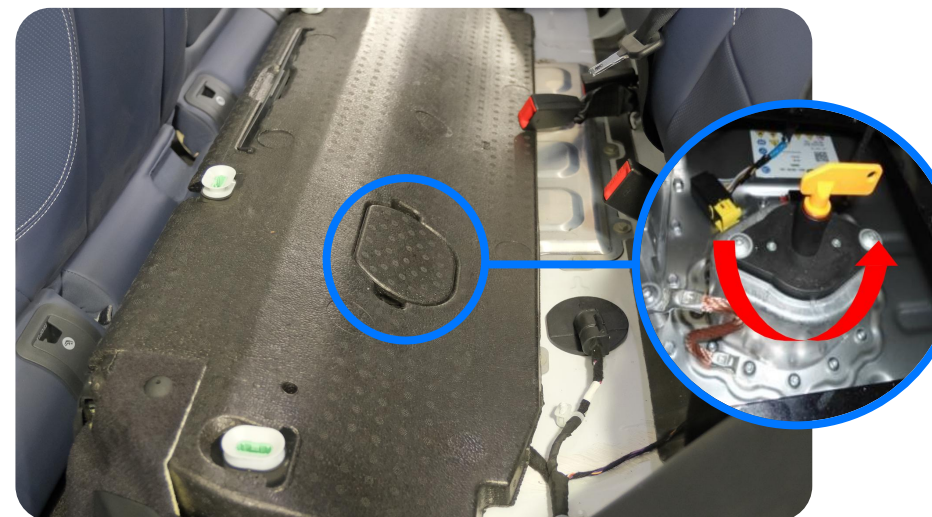


Disconnecting HV battery

1. Lift the rear seat base from the front, this will reveal the foam battery cover.
2. Lift clear the foam insert, this gives access to the Manual Service Disconnect (MSD).
3. Rotate the key counterclockwise to the OFF position.
4. Remove the key.

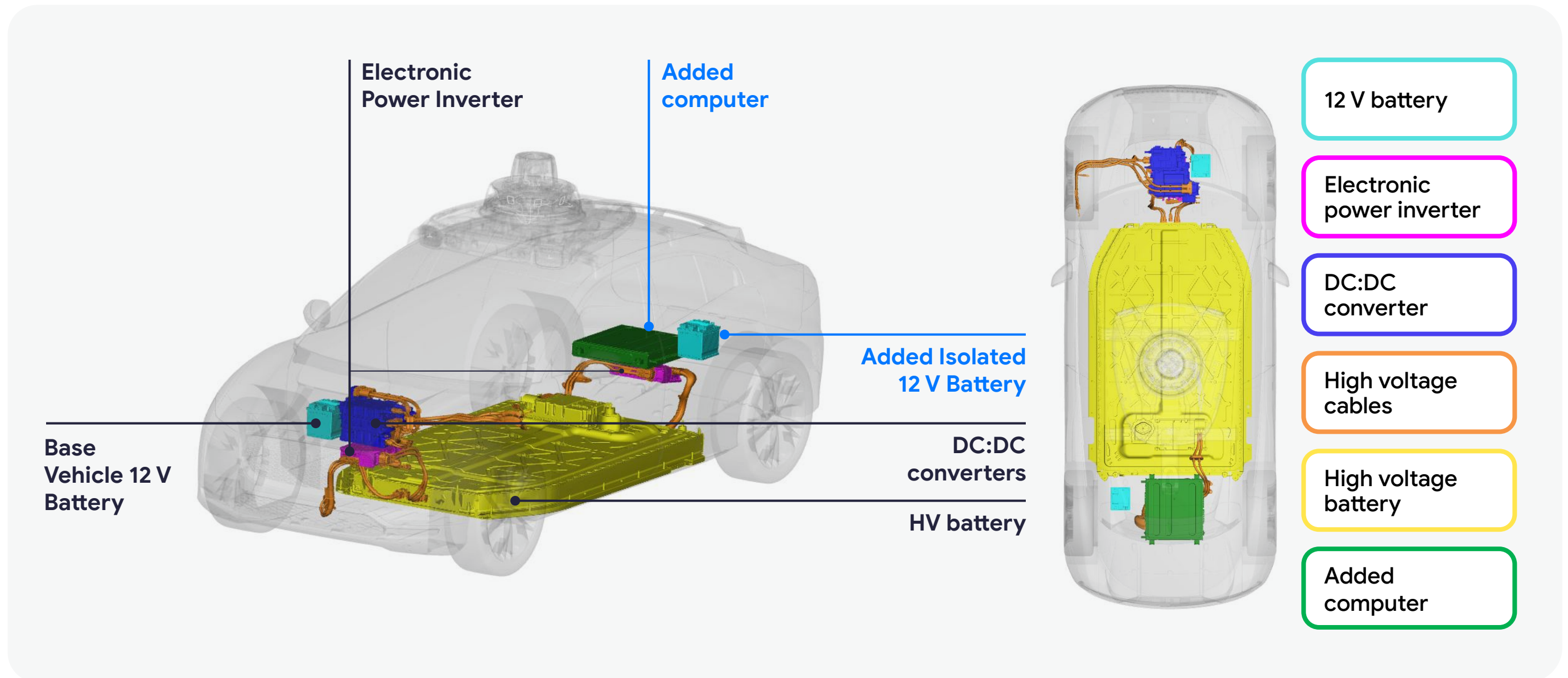


Lift rear seat base from the front



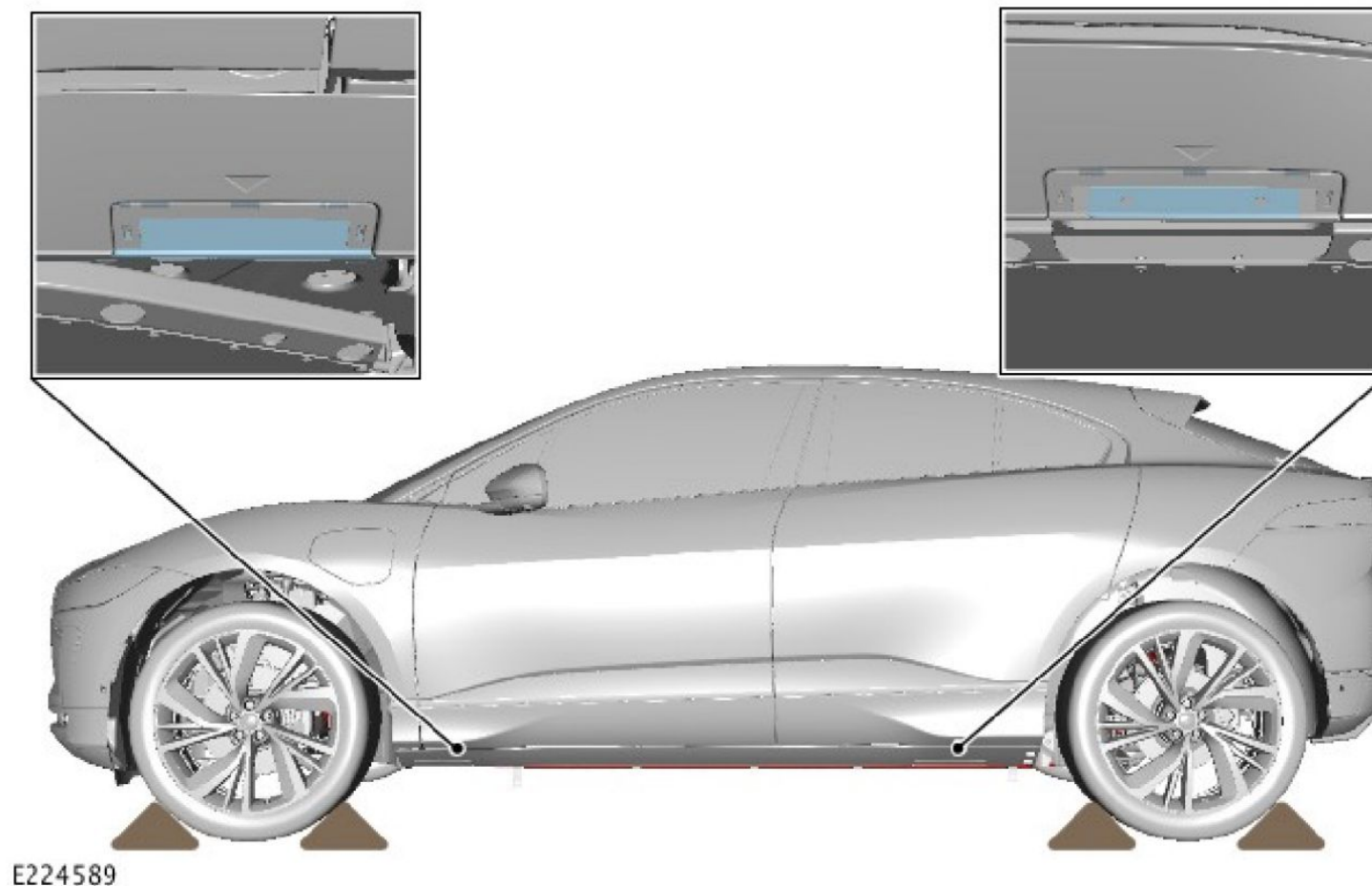
Manual Service Disconnect location

Vehicle systems overview



Avoidance of roll away of the vehicle

- The vehicle may roll if the transmission does not lock or the park brake is inoperable. The road wheels should be chocked to prevent unexpected movement.
- Vehicle lifting and jacking points can be found behind the sill trims as shown in the illustration.
- The jack or lift support must be positioned centrally on the locations shown to provide a safe vehicle weight distribution and avoid vehicle damage.

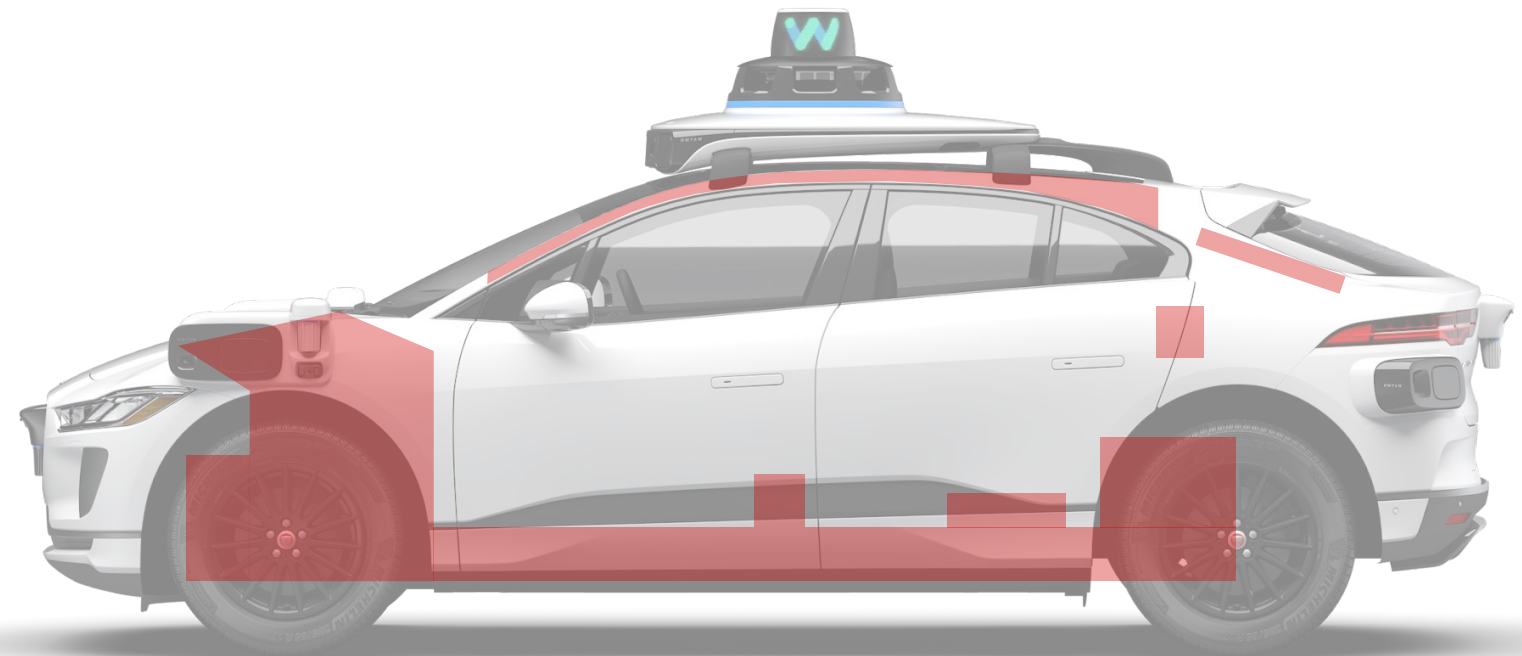


Make sure that no contact is made between the lifting equipment and the high voltage battery or any other high voltage component.

Do Not Cut zones

The areas highlighted in **RED** show areas that must not be cut.

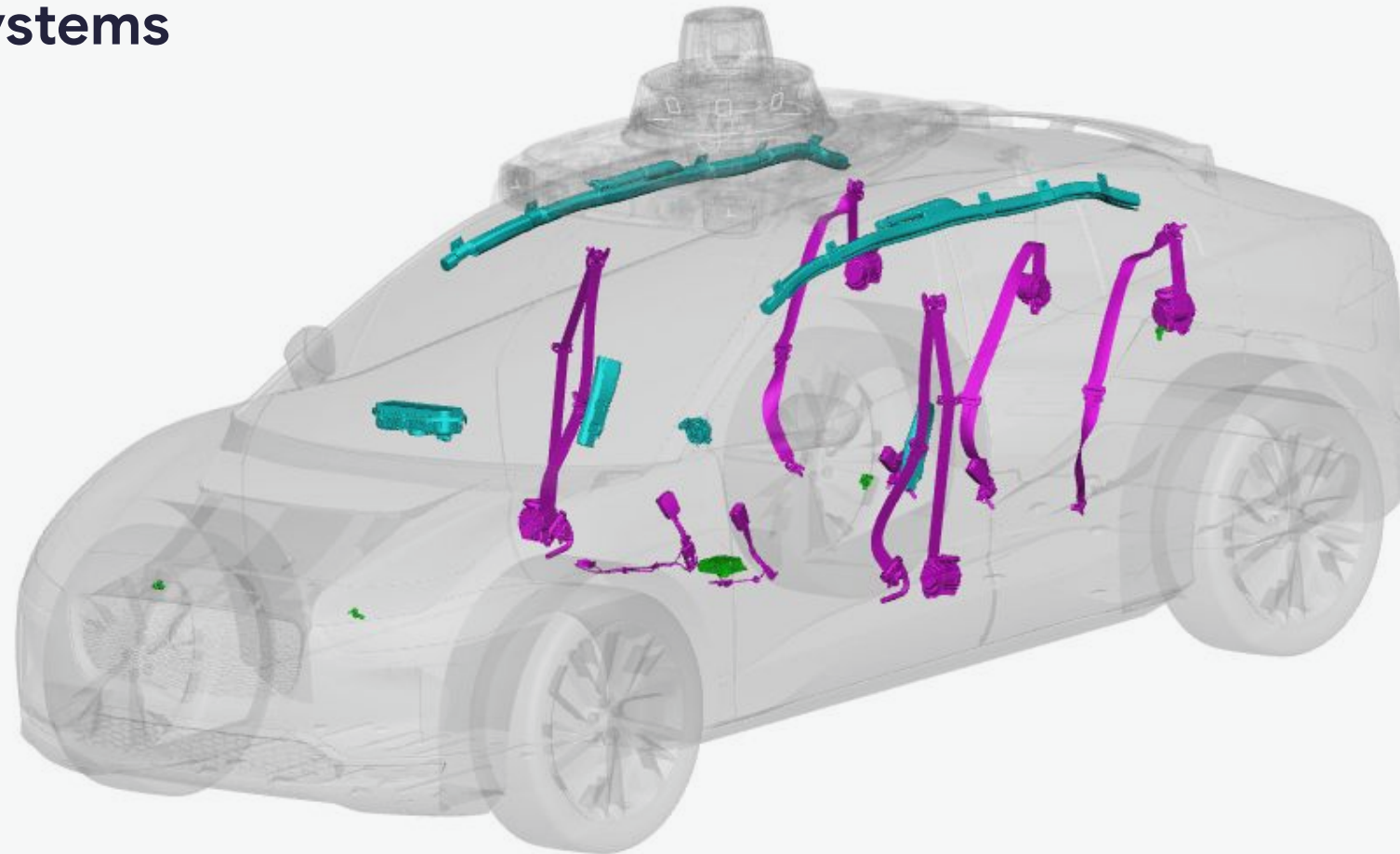
The sills must be supported during cutting and extrication procedures. If a ram must be deployed, place blocks under the sill around the area where force is applied. If a suitable jacking point cannot be located, support the sills and deflate the tires.



NOTE: The right C-pillar contains a hose that supplies windshield wiper fluid to the Roof Assembly. When cutting the right C-pillar, windshield wiper fluid may leak.

Passive restraint device considerations

Restraint systems



Airbags

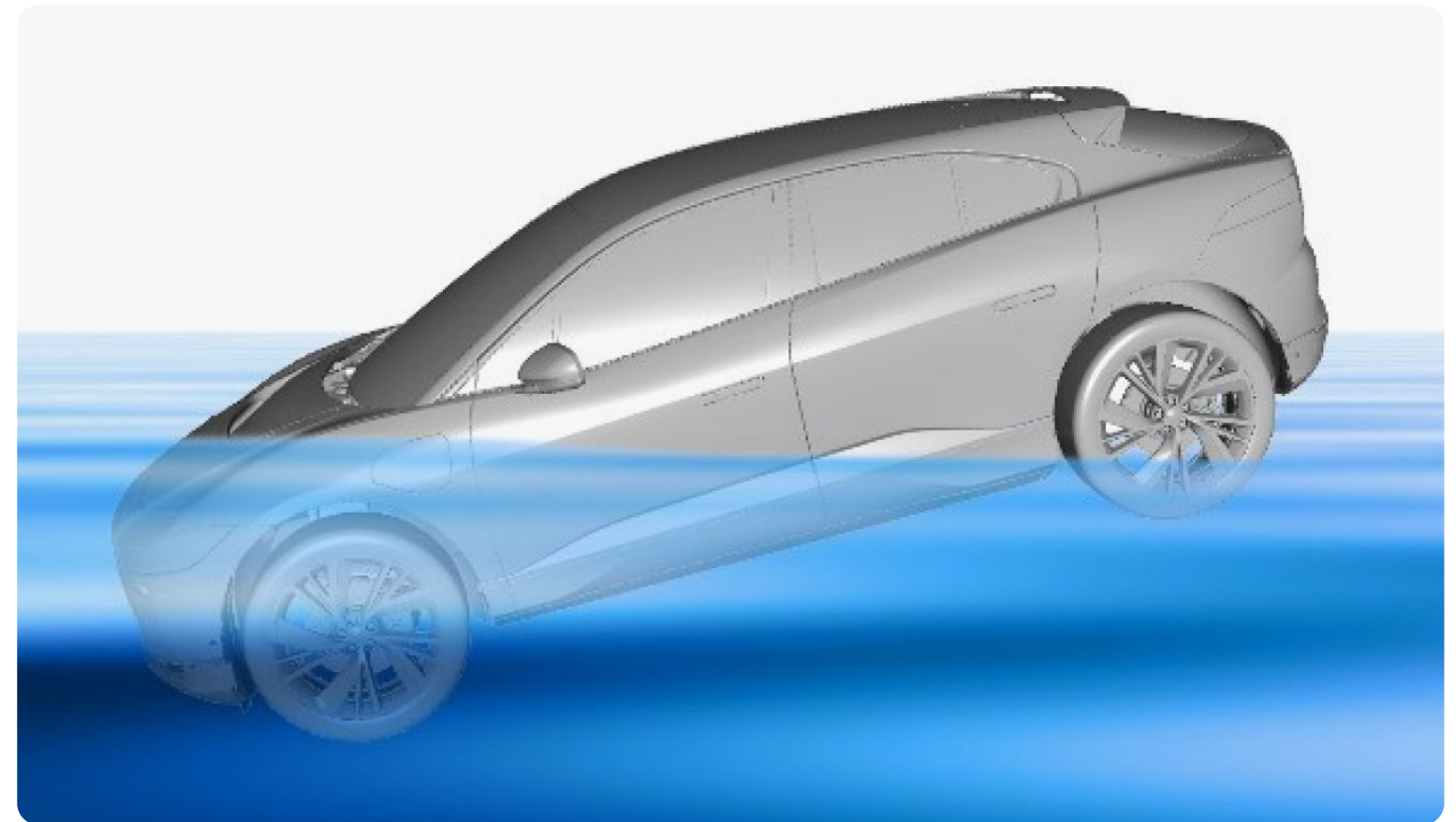
Restraint

Sensors

Additional information for fully or partially submerged vehicles

A Battery Electric Vehicle (BEV) that has experienced complete or partial submersion in water can be treated in the same manner as other vehicles, the vehicle body does not present an increased risk.

Persons handling the recovery of a BEV must wear appropriate PPE, as detailed by your local authority, until the High Voltage (HV) system has been correctly powered down.



Additional information in case of a fire

Small vehicle fires that do not involve the High Voltage (HV) system can be treated with normal firefighting methods.

High Voltage (HV) System Exposure

An Electric Vehicle (EV) battery involved in a fire, or exposed to high heat levels, will release toxic vapors.

These vapors include:

- Sulfuric acid
- Oxides of carbon
- Nickel
- Lithium
- Copper
- Cobalt

Responders must protect themselves with full **PPE** and **breathing apparatus** and consider other persons in the surrounding areas. The EV battery consists of lithium-ion cells. These cells are considered dry cells. If damaged, only a small amount of fluid can leak. Lithium-ion battery fluid is clear in color.

The High Voltage (HV) system has its own coolant which is typically glycol based coolant. If the system is damaged, this orange coolant can leak out of the high voltage battery or surrounding components.

A damaged EV battery can create rapid heating of the battery modules. If you notice smoke coming from the EV battery or surrounding components assume the vehicle is **UNSAFE** and contact Emergency services for further assistance.

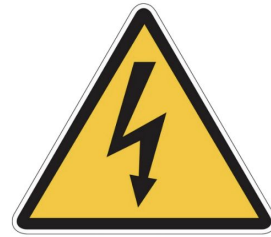
High Voltage (HV) Battery Fire

If the Electric Vehicle (EV) battery or components within the High Voltage (HV) system are subject to fire or high heat levels, the HV system must be treated as **UNSAFE** and therefore sufficient **PPE** must be worn and any contact with the vehicle is to be avoided. Areas exposed to fire or high heat must be treated using high volumes of water, **DO NOT** attempt to extinguish a HV system fire without sufficient water supply. Wait for the correct Emergency services if required.

Battery fires can take up to 24 hours to extinguish. Consider allowing the battery to burn while protecting the surrounding areas.

Hazards

High voltage



There is HV DC in the battery and associated components. AC power may be present on the inverter and traction motors. Both should be considered hazardous.

HV cables are ORANGE in colour.

Anything at the end of an orange cable should be treated as hazardous.

DO NOT cut HV cables, battery case or associated components.

Suitable PPE shall be worn

Fire



Fire in the battery is very unlikely, and the battery is contained in a sealed metal enclosure underneath the vehicle. It will not normally be possible to get extinguishing media into the battery compartment.

If the vehicle is on fire, remove occupants from the vehicle and evacuate the area, **RAISE THE ALARM** to the Fire service.

In the case of fire HV fumes are likely to escape from the battery – leave a safe distance from vehicle.