

Waymo autonomously driven Jaguar I-PACE

California Emergency Response Guide and Law Enforcement Interaction Protocol

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



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Waymo Fully Autonomous
Jaguar I-PACE

Introduction to Waymo's vehicle and service



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.

Waymo has published and updated versions of Law Enforcement Interaction Protocols since 2019 in partnership with first responders and emergency services personnel in the communities we serve. We want to thank our partners in Phoenix, San Francisco, Los Angeles metro areas, as well as California Highway Patrol and Arizona Department of Public Safety.

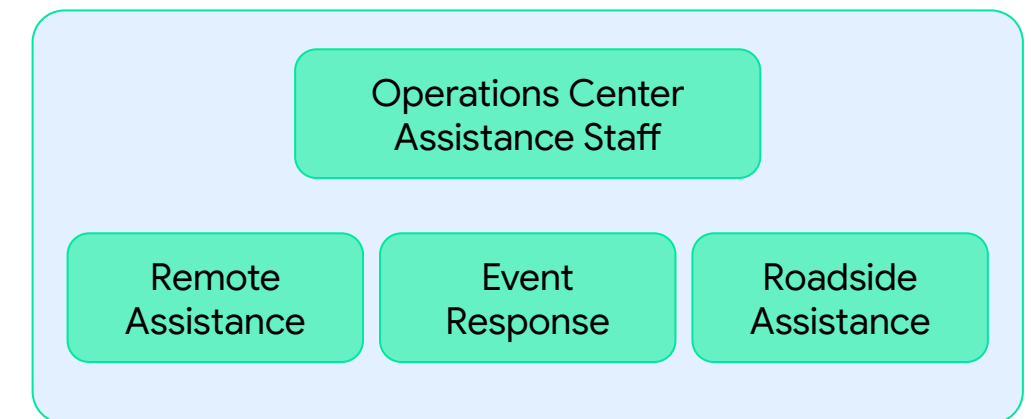
The information in these protocols is organized from more general orientation to more specific information about how to respond to specific scenarios and hazards.

Waymo updates these protocols to reflect material changes to the technology, ODD, regulatory guidance, and other factors.

Waymo Operations assists first responders

Waymo supports first responder interactions with Waymo vehicles in the field via operations teams available 24/7

- **Remote Assistance (remote location)***
 - Supports Waymo vehicles with tools to enhance vehicle performance.
 - Escalates first responder interactions to emergency response.
- **Event Response (remote location)***
 - Talk to first responders interacting with the vehicle.
 - Confirm the vehicle will remain stopped.
 - Instruct first responders on how to disengage the system, disconnect power, or take manual control of the vehicle.
- **Roadside Assistance (on-scene, direct interaction)**
 - Responds on-site to any vehicle at a scene.
 - Interacts with first responders and move the vehicle.



*This is part of the “indirect interactions” category in AVSC-I-01-2024.

Waymo toll-free hotline for first responders

Waymo has 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 representatives 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 themselves and their agency, the numerical identifier of the vehicle in question, license plate, and any location information available.

See page 22 for how to contact Waymo assistance staff via the vehicle's two-way audio.

Quick Response (QR) Code for Waymo toll-free hotline

QR Codes allow police / fire departments, and other first responders to directly contact and communicate with Waymo's professionally-trained specialists using their own cell phones.

The QR code label is located on the driver and passenger side windows, next to the side view mirrors.

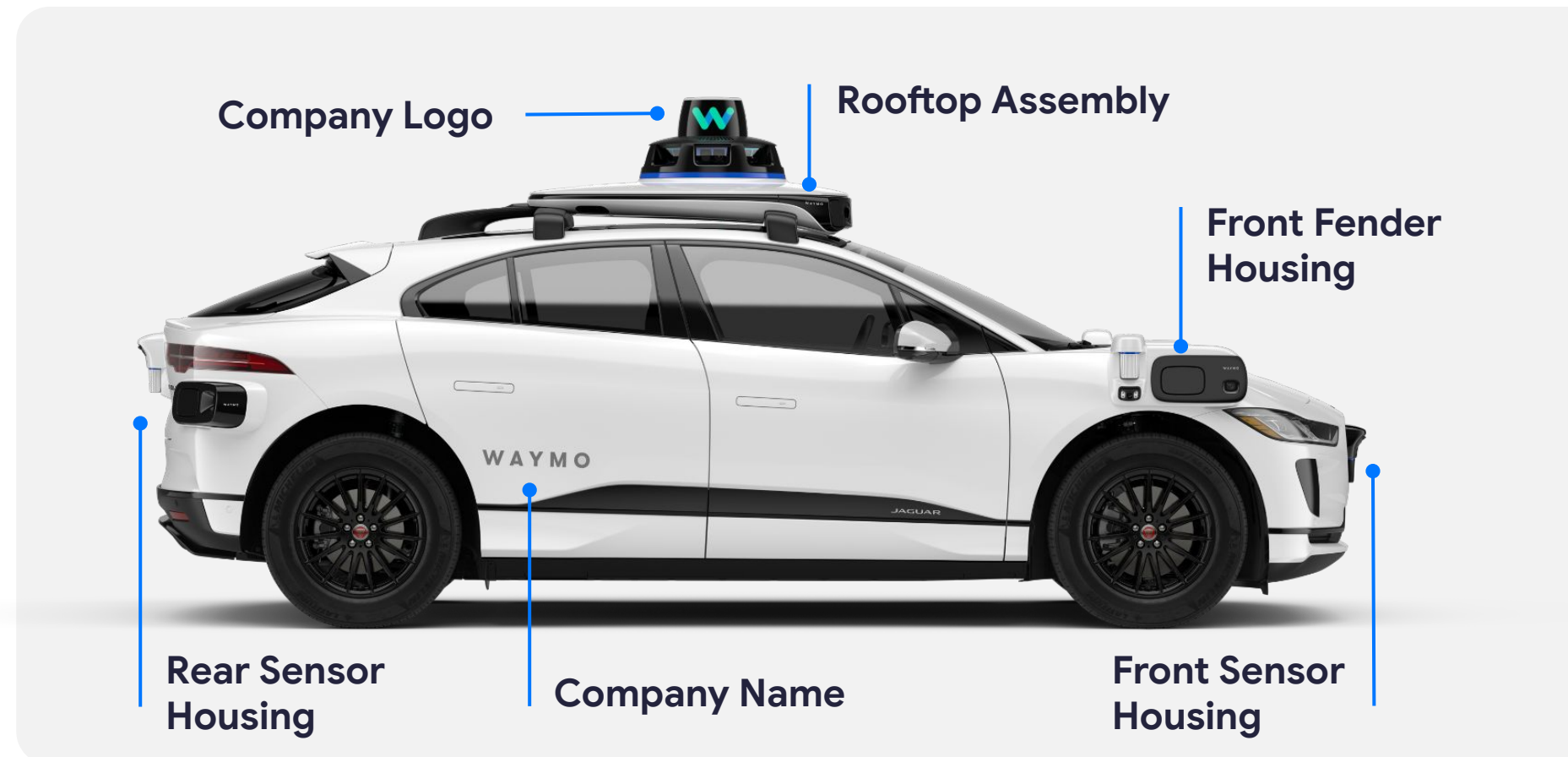


Identifying Waymo's fully autonomous vehicles

The Waymo autonomous Jaguar I-PACE can be easily identified by the white color, rooftop assembly, and sensor housings.

Specific Waymo brand features include:

- Waymo blue colored band on rooftop assembly
- Light display on the rooftop sensor that may show a “W” logo, two-letter rider initials, or other icons (e.g. boarding, pedestrian crossing)
- Company name on the side of the vehicle



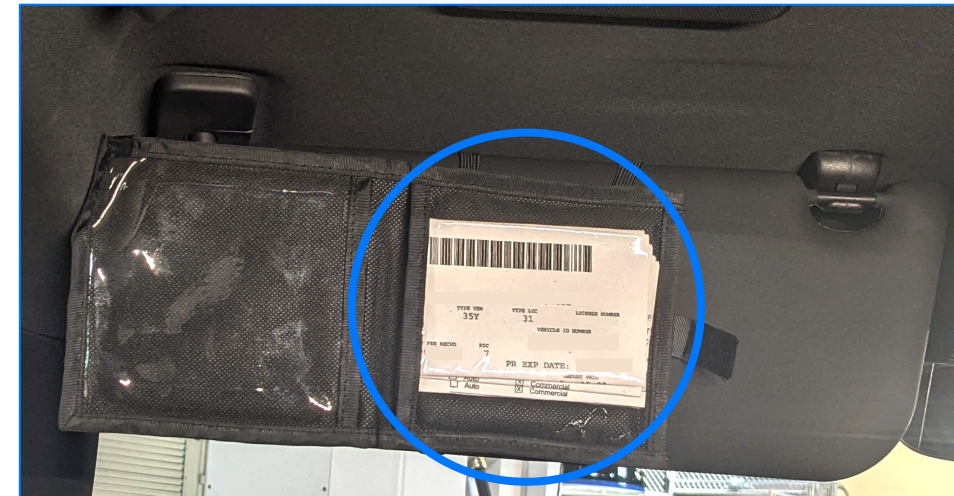
Identifying Waymo's fully autonomous vehicles

Each Waymo vehicle is identified by license plate, in addition to required identifiers in the jurisdiction (e.g. carrier identification symbols).



Location of in-vehicle documents

Two physical copies of vehicle owner information, vehicle registration, and proof of insurance are stored inside each autonomous 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 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, rural roads, and other roadways, including all speed limits.
- In parking lots.
- At all times of day and night.
- All rain, fog, and other weather conditions.

Conditions that limit autonomous operations include:

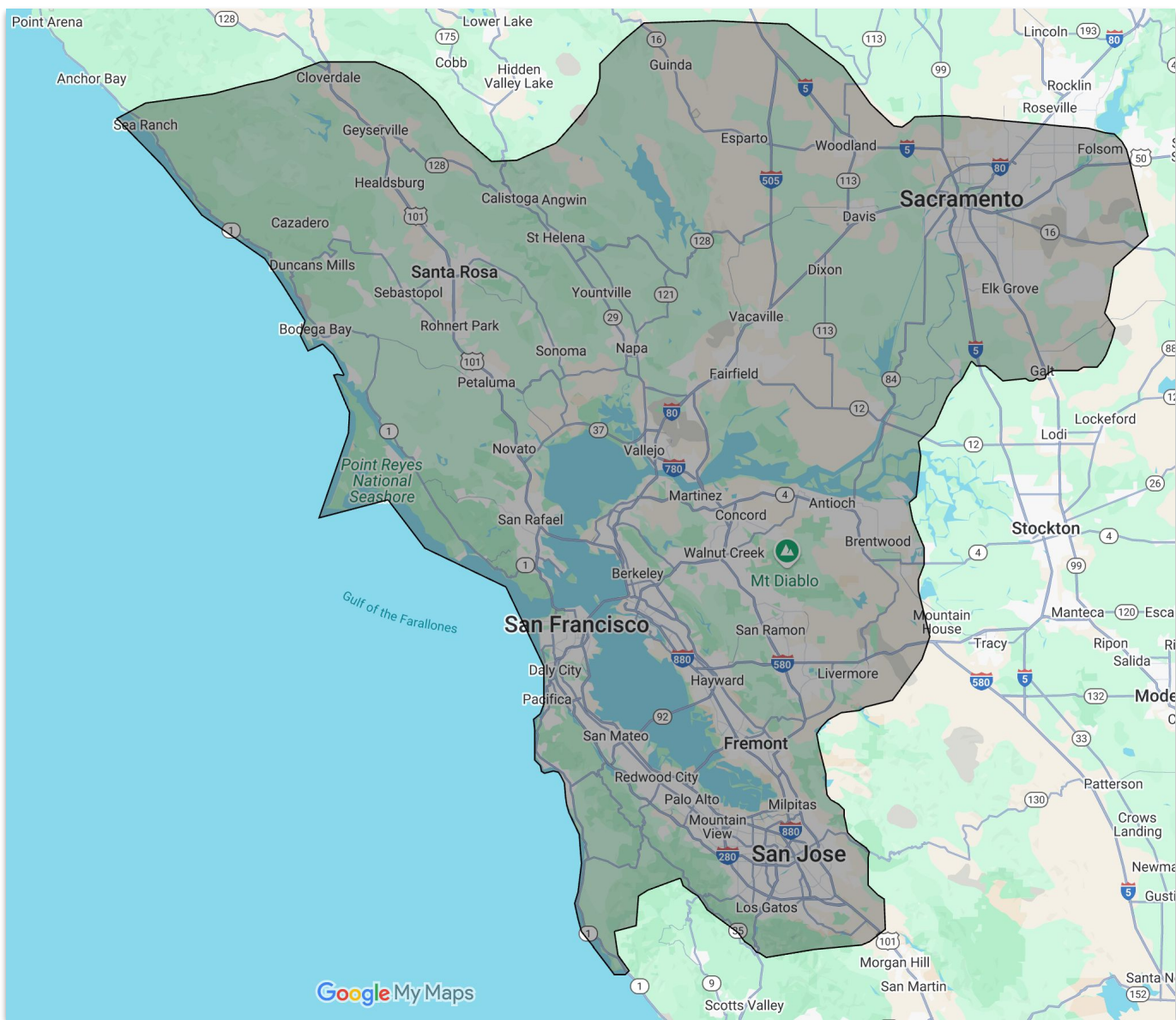
- Widespread snow or ice accumulation on the roadway.

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

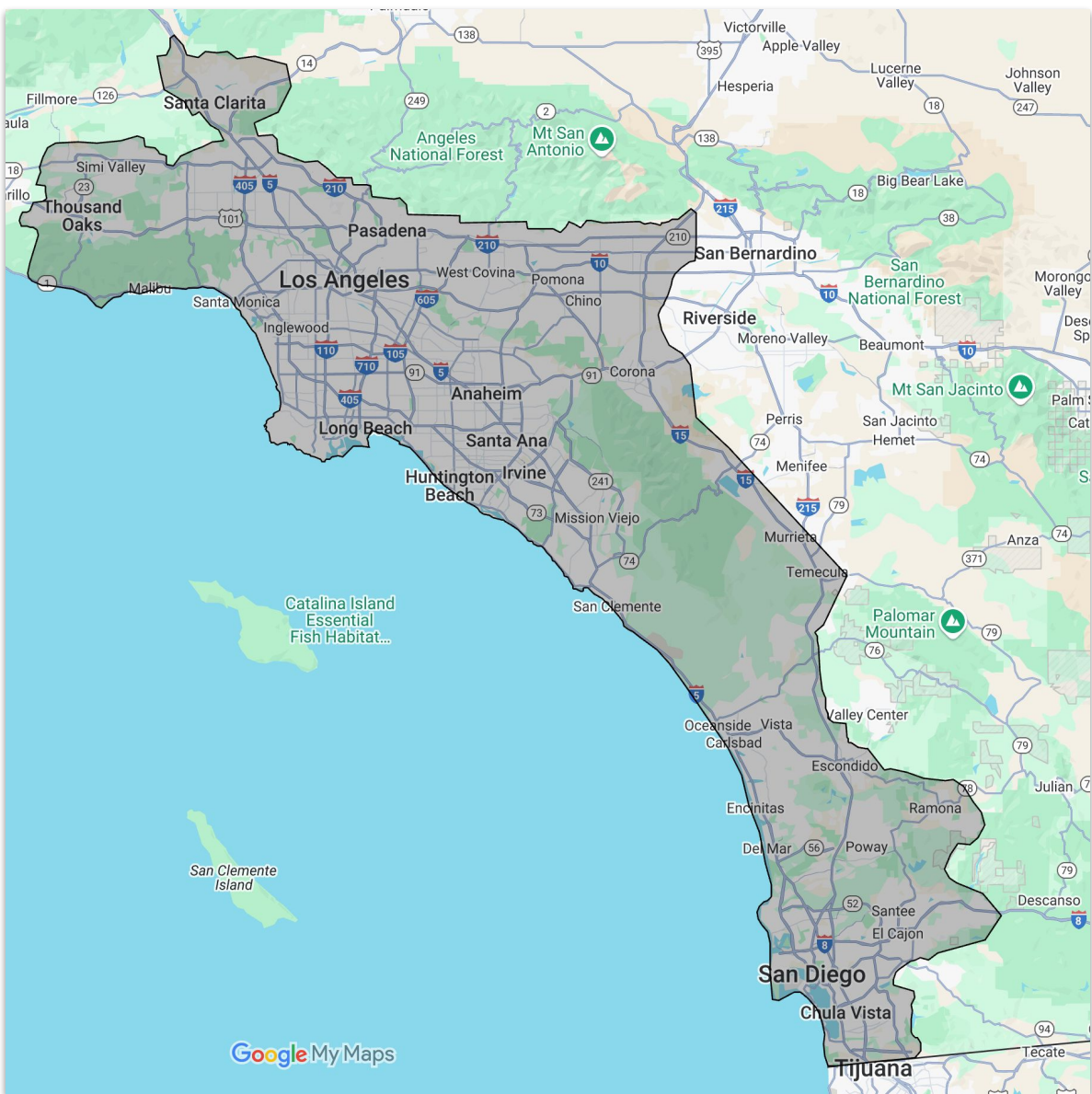
- Testing and deployment territory will be expanded incrementally over time via our rigorous testing and validation process.
- Information relating to these areas is provided by Waymo directly to state and local authorities, prior to any fully autonomous operation without a human driver.

Geofenced areas for testing & deployment without a human driver

Northern California



Southern California



Response to police and emergency vehicles

The Waymo vehicle uses its sensors to identify first responders, emergency vehicles, and temporary traffic control devices by detecting their appearance and features like sirens and emergency lights.

- The Waymo vehicle is designed to yield as appropriate to stationary or moving emergency vehicles, no matter which direction they are headed.
- The Waymo vehicle is designed to respond to customary first responders instructions.

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 and, once stopped for a traffic stop, to remain stationary for the duration of the stop.

- Waymo representatives can unlock the doors and roll down the windows to enable communication with law enforcement, including, for example, confirming from law enforcement that a vehicle may continue autonomous operations after a traffic stop.
- Waymo's assistance staff has 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.
- Waymo roadside assistance will be dispatched when needed to provide on-scene support 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 comes to a full stop and immediately notify Waymo's assistance staff.

- Waymo's assistance staff 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).
- Waymo's assistance staff will be dispatched when needed to provide on-scene support for passengers and first responders.
- The Waymo vehicle will react differently depending on the nature of the collision. 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



Determining the Presence of Passengers

A Waymo autonomous vehicle may be operated with or without passengers. To determine whether or not there are passengers present in the vehicle, a first responder should follow these steps:

- Do a visual inspection of the passenger area of the vehicle.
- Call the toll-free hotline for emergency responders to speak with a Waymo representative.

1-877-503-0840

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 20)
- The Parking Brake is applied (page 21)

Open a door of the vehicle to prevent the vehicle from autonomously driving or assist passengers with exiting:

- 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 23) or the 12V cut loop under the hood is cut (page 29).

Vehicle hazard lights will be active while the vehicle is in stopped or parked condition:

- Parking Brake applied
- Pulled over
- Stopped for extended period of time



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

Identifying autonomous mode

The cruise control icon indicates when the vehicle is operating in Autonomous mode or in Manual mode.

The vehicle is operating in Autonomous mode when the cruise control icon is illuminated green (see below).



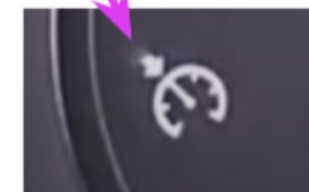
Icon is green



The vehicle is operating in Manual mode when the cruise control icon is not illuminated (see below).



Icon is grey



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:

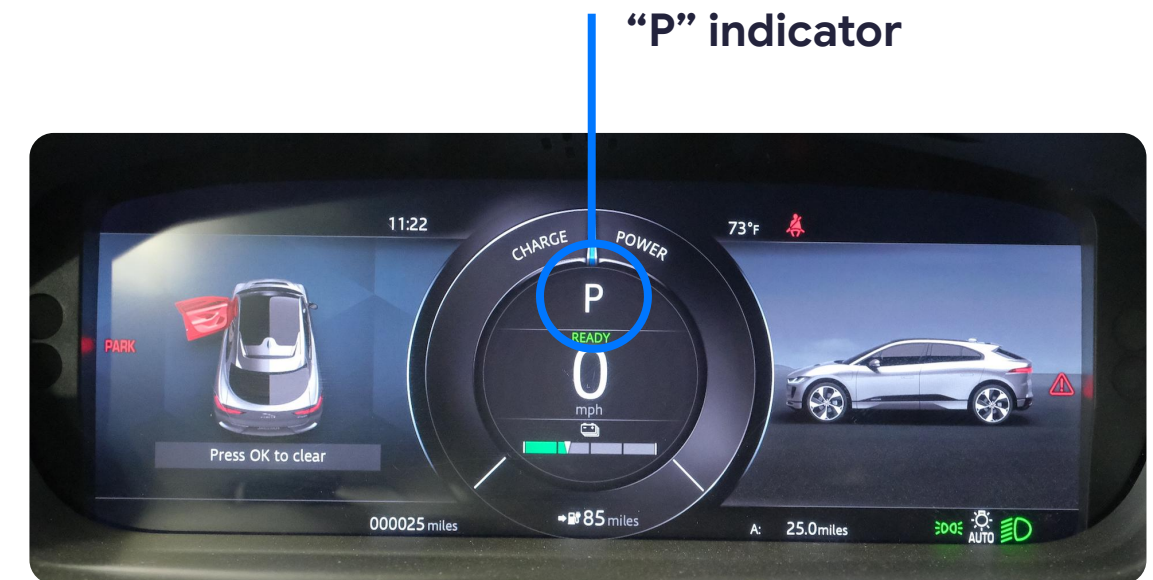
- The letter “P” is displayed in center the instrument cluster display
- Red “P” (Park) indicator on the Electronic Shift Control

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

See page 22 to disable autonomous driving mode.

NOTE:

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



“P” indicator



“P” indicator

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 22 to disable autonomous driving mode.

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



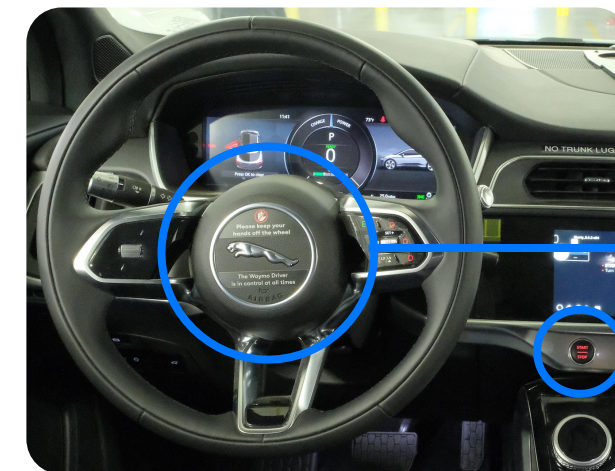
Disabling autonomous driving mode

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 call with assistance staff by pushing the ignition button or pressing the horn on the steering wheel.**

Identify yourself and request that the Waymo assistance staff 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 assistance staff's instructions, including to provide identification verification information, if requested



Vehicle
horn (will not sound
when pressed)

Vehicle
start-stop button

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.

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**

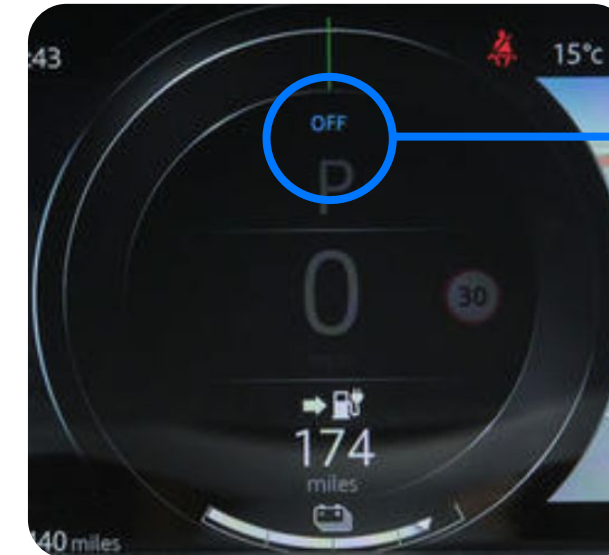
The **start-stop button** will not turn the vehicle off while autonomous driving mode is enabled.

To turn off the vehicle:

1. Disable autonomous driving mode (page 22)
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 12V battery (page 29)
- Disconnect the HV battery (page 30)



Ready / off indicator



Vehicle start-stop button

Opening the rear trunk

The rear trunk is locked during normal operation.

To access the trunk:

1. Disable autonomous driving mode (page 22)
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 12V power is removed.



Liftgate button

Hood release button



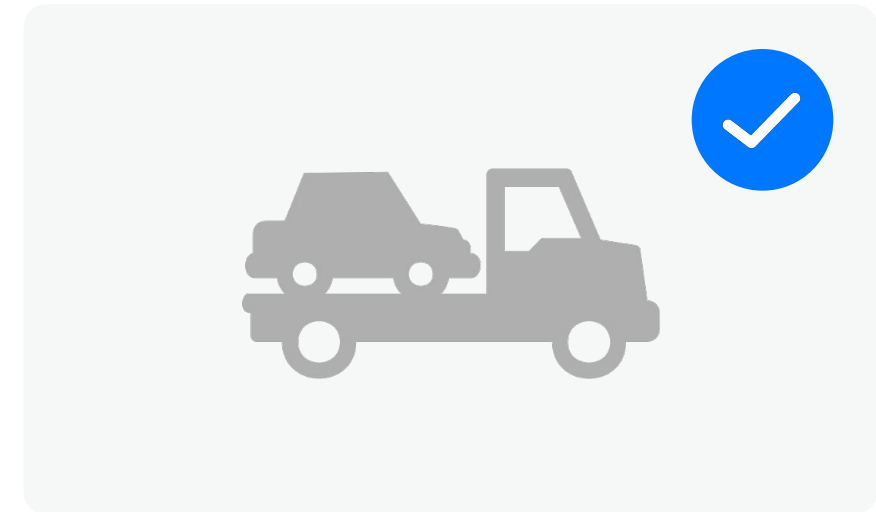
Liftgate handle

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.
- Call 1-877-503-0840 to connect with an operations team member regarding Roadside Assistance.

NOTE: In emergency situations (e.g., if unable to contact Waymo), use appropriate means to move the vehicle from the roadway, though sensor damage will likely occur.



Accessing Vehicle Data

Waymo may provide data to law enforcement officials in response to proper legal process (e.g. search warrant, subpoena, etc.). Law enforcement officials should email their request and legal documents to:

waymolawenforcement@google.com



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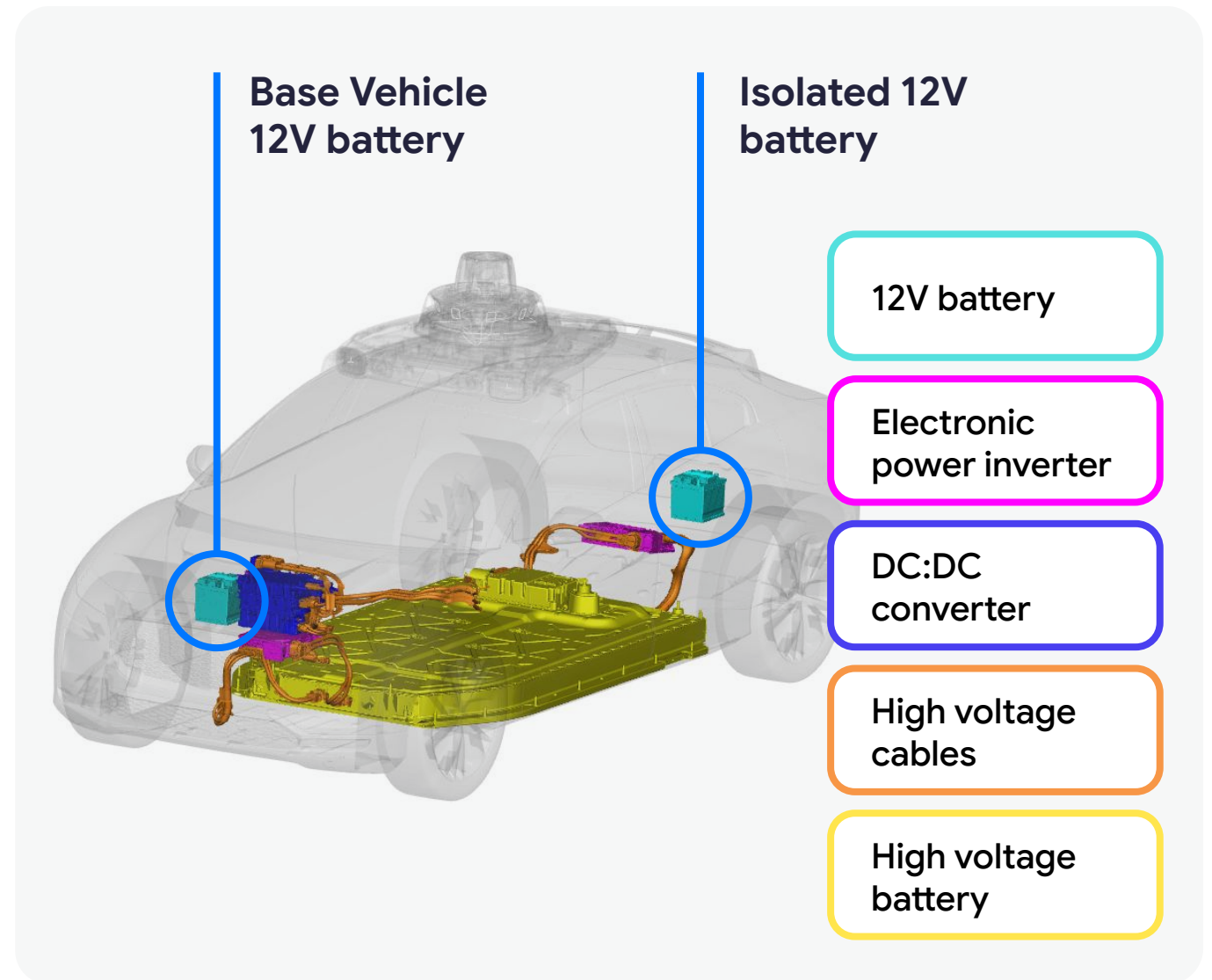
Vehicle systems safety considerations



Electrical system overview

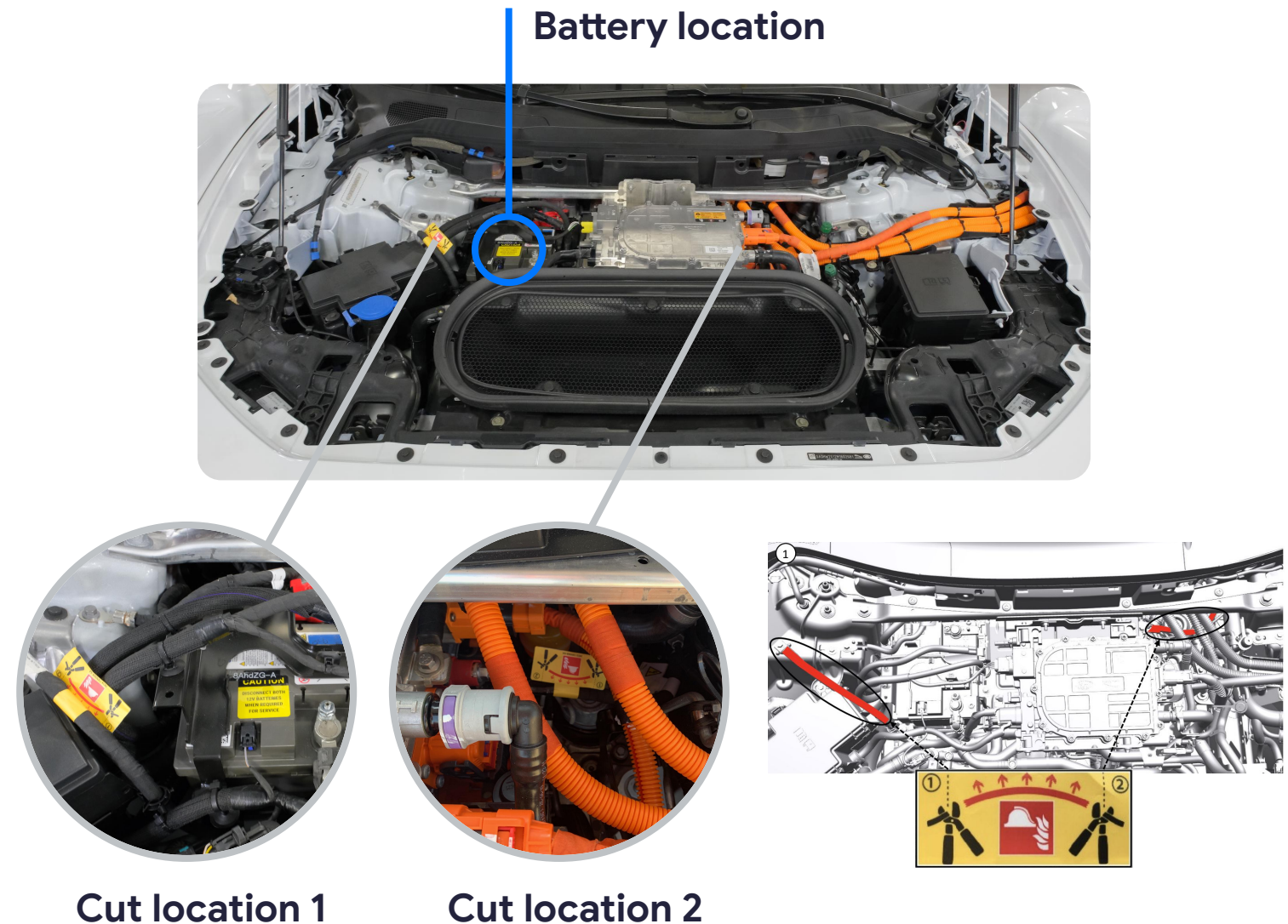
The I-PACE electrical system includes:

- 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 12V power conversion on the platform
- 12V 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 the 12V battery

1. Before disconnecting 12V 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 21).
2. Remove the front compartment center trim panel to reveal the power electronics and the accessory 12V system. The 12V battery is to the left of the compartment.
3. Cut and remove a segment of 2 cables as illustrated:
 - a. **Cut location 1:** 12V negative power cable
 - b. **Cut location 2:** positive 12V power cable connecting the DC:DC converter to the battery
4. Protect the cut ends from arcing against metal parts.

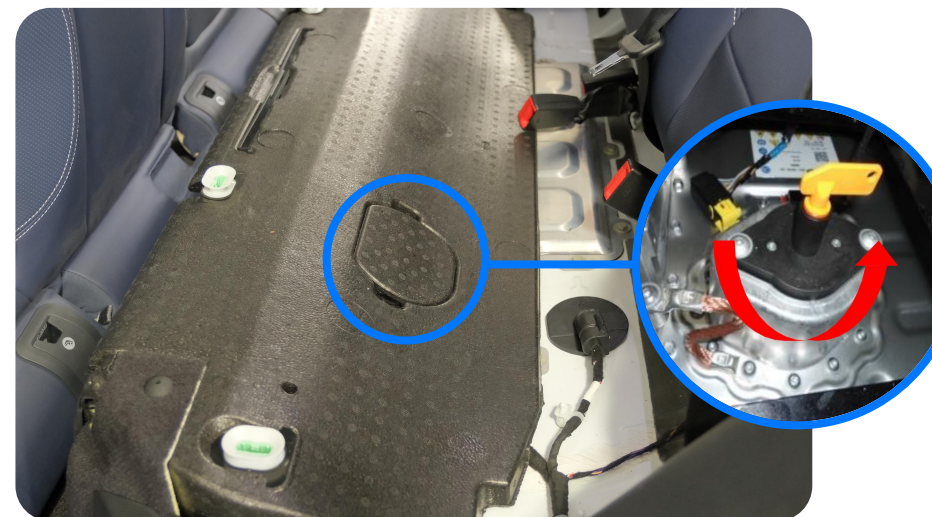


Disconnecting the HV battery

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.

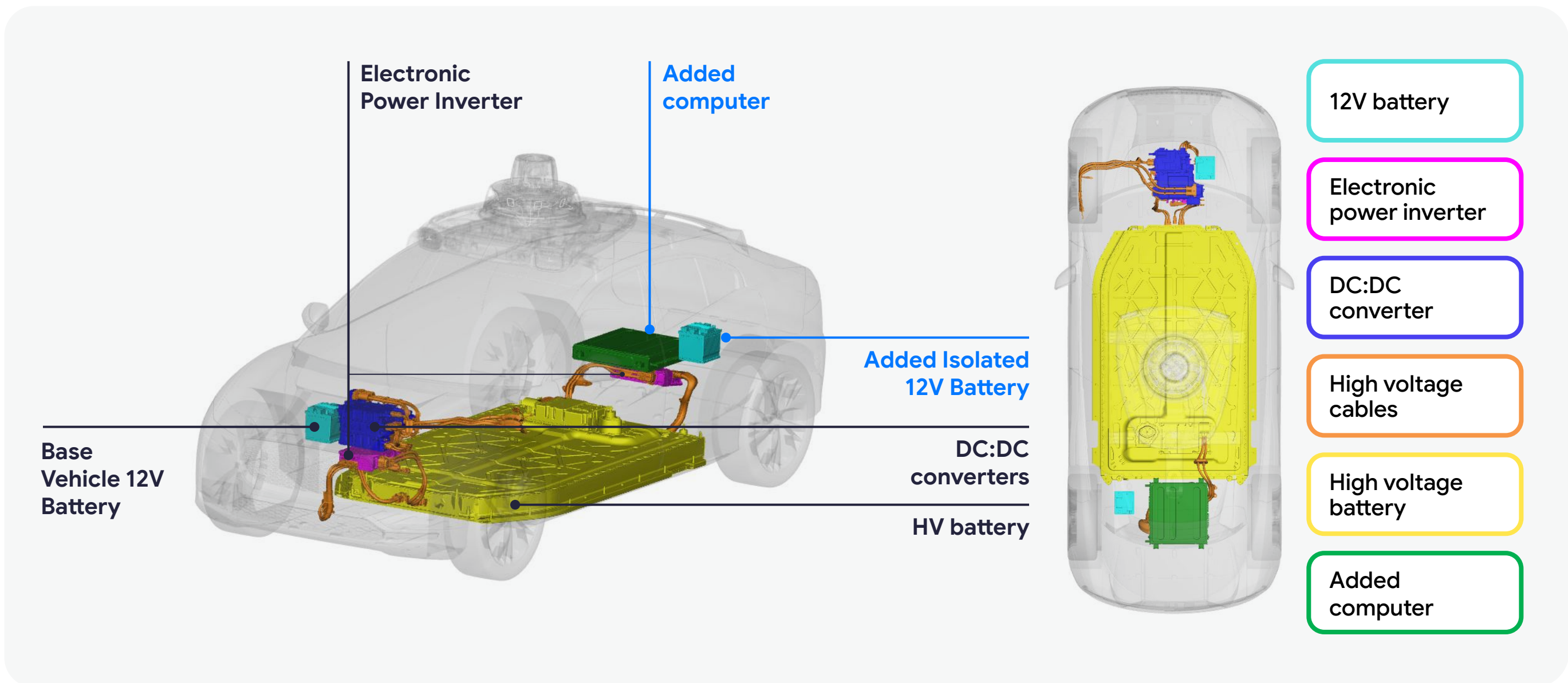


Lift rear seat base from the front



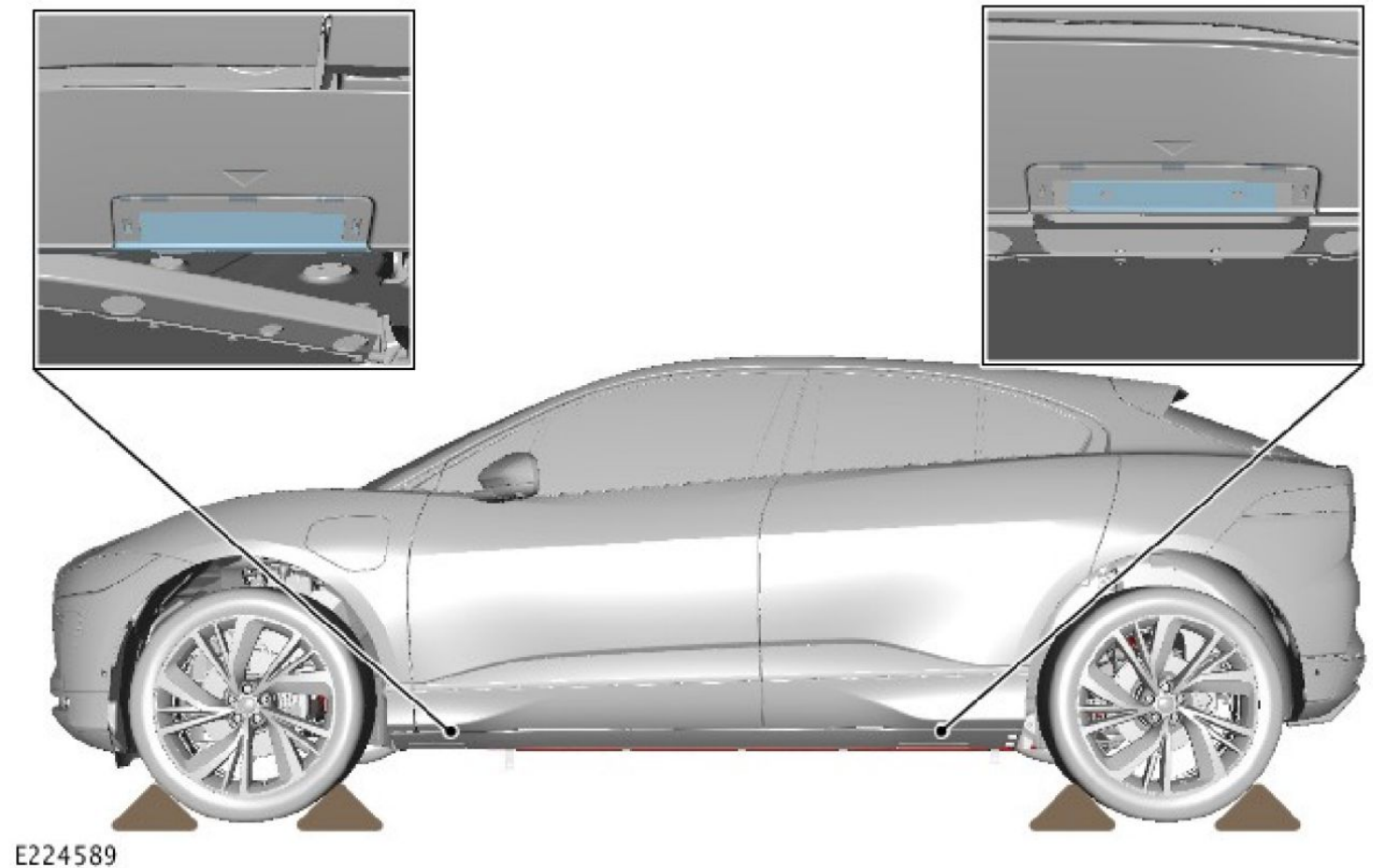
Manual Service Disconnect location

Vehicle systems overview



Prevent vehicle roll away

- 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.

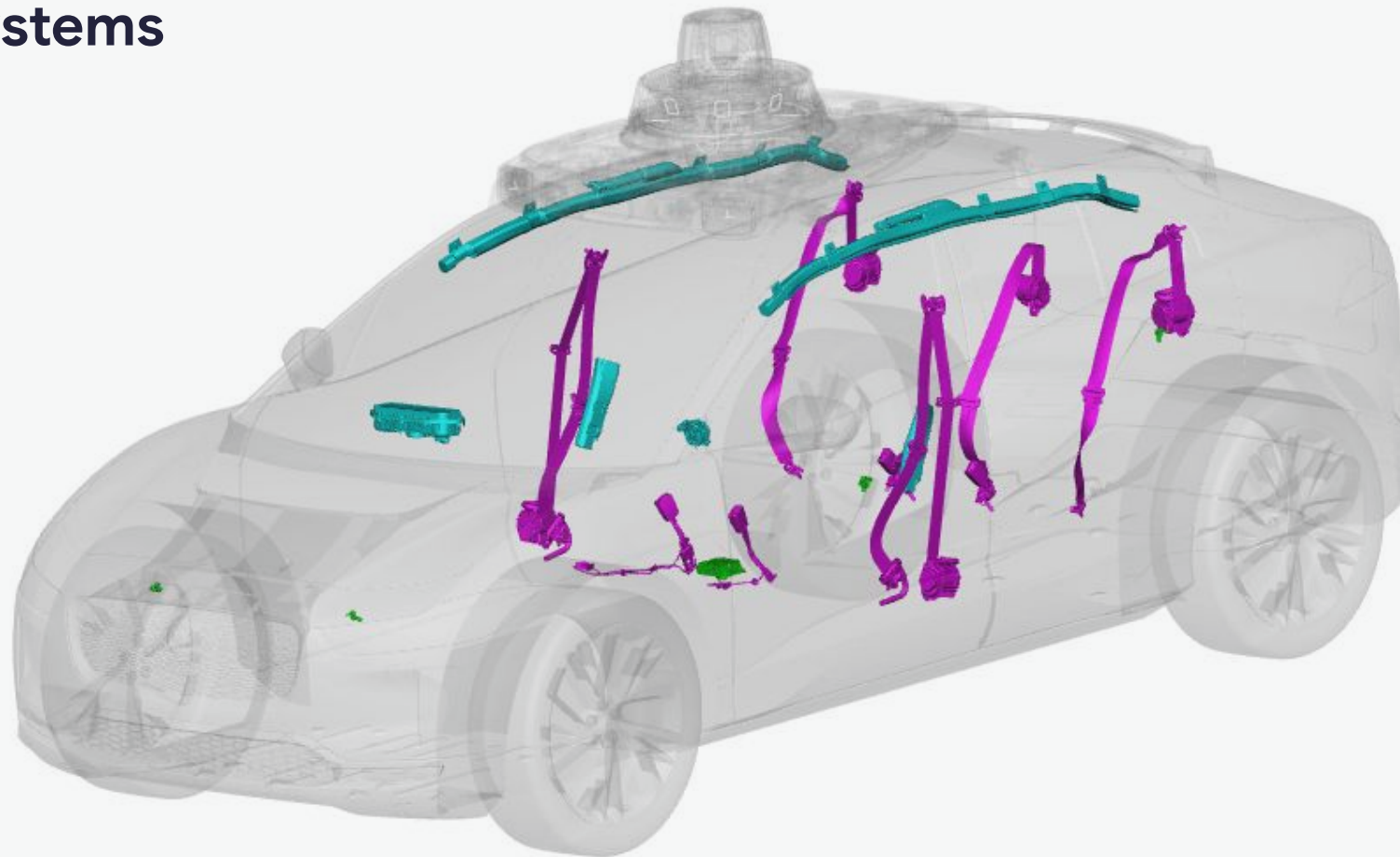
The sills must be supported during cutting and extrication procedures. If a ram must be deployed, place blocks under the sill around the area where force is applied. If a suitable jacking point cannot be located, support the sills and deflate the tires.



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

Persons handling the recovery of a Battery Electric Vehicle (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.

WARNING! 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.

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