

M O D E L

579_{EV}

M O D E L

567_{EV}

EV



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This manual illustrates and describes the operation of features or equipment which may be either standard or optional on this vehicle. This manual may also include a description of features and equipment which are no longer available or were not ordered on this vehicle. Please disregard any illustrations or descriptions relating to features or equipment which are not on this vehicle. PACCAR reserves the right to discontinue, change specifications, or change the design of its vehicles at any time without notice and without incurring any obligation. The information contained in this manual is proprietary to PACCAR. Reproduction, in whole or in part, by any means is strictly prohibited without prior written authorization from PACCAR Inc.

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CHAPTER 1: SAFETY

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1 USING THIS MANUAL

Please take the time to get acquainted with your vehicle by reading this Operator's Manual. We recommend that you read and understand this manual from beginning to end before you operate this equipment. This manual contains useful information for the safe and efficient operation of this equipment. It also provides maintenance information, with an outline for performing safety checks and basic preventive maintenance inspections. When replacement parts are needed, we recommend using only genuine PACCAR parts.

We have tried to present the information needed to learn about functions, controls, and operation—and to present it as clearly as possible. Occasionally, you may need to reference this manual, and we hope you find it easy to use.

i	NOTE
<p>After you have read this manual, it should be stored in the cab for convenient reference and remain with this vehicle when sold.</p>	

Your vehicle may not have all the features or options mentioned in this manual. Therefore, you should pay careful attention to the instructions that pertain to just your vehicle. In addition, if your vehicle is equipped with special equipment or options not discussed in this manual, consult your dealer or the manufacturer of the equipment.

There are several tools built into this manual to help you find what you need quickly and easily; first is the Table of Contents. Located at the front of the manual, this table arranges the subject matter into chapters, which can be quickly referenced using the numbers shown in the outer margin. The first page of each chapter presents a list of the major subjects contained in that chapter. Cross-referenced citations can also help you find information. If more information on the current subject is located elsewhere in the manual, a cross-reference may be provided, such as "see Safety Messages and Notes." Finally, you will find a helpful index at the back of the manual which lists the subjects covered alphabetically.

All information contained in this manual is based on the latest production information available at the time of publication. If you find differences between your instruments and the information in this manual, con-

tact an authorized Peterbilt dealer. Peterbilt Motors Company reserves the right to make changes at any time without notice.

2 SAFETY MESSAGES AND NOTES

Read and follow ALL safety messages in this manual. When followed, injury to yourself and others, damage to equipment and/or property, or other unknown hazards are reduced. Both safety messages and notes are emphasized using a safety message symbol and one of three signal words: WARNING, CAUTION, or NOTE. **Do not** ignore any of these messages.

Warnings



Safety messages that follow this symbol and signal word provide a warning against operating procedures, actions, or a lack of action that could result in death or injury. An unheeded warning may also result in damage to equipment, property, or the environment. Warning messages will identify the hazard, how to avoid it, and the probable consequence of not avoiding the hazard.

Example:



WARNING

DO NOT touch or attempt to remove any of the orange high-voltage (HV) cables, connectors, or components until the vehicle HV system has been de-energized. If asked to inspect HV component or cabling when the HV electrical system is energized, only inspect visually. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Cautions



Safety messages that follow this symbol and signal word provide a caution against operating procedures, actions, or a lack of action that could result in equipment, property, or environmental damage. Caution messages will identify the hazard, how to avoid it, and the probable consequence of not avoiding the hazard.

Example:



CAUTION

Always use oil and lubricant that meets PACCAR's recommended specifications. Use of oil or lubricants that do not meet the recommended specifications could adversely affect the e-motor or other e-powertrain components. Failure to comply may result in equipment or property damage.

Notes



Messages that follow this symbol and signal word provide important information that, while not safety related, should still be followed. A note will provide information that may be useful to the reader: clarifying the topic, providing valuable insight into the topic or process, or saving the reader time and effort.

Example:



NOTE

The charge port LED illuminates solid green when the vehicle is completely charged.

3 ILLUSTRATIONS

Some of the illustrations found in this manual are generic. They will not look exactly like the parts or assemblies you find installed on the vehicle.

When an illustration differs from what you see physically present on the vehicle, the language describing the procedure is still correct for the application.

4 GENERAL SAFETY INSTRUCTIONS

4.1 General Safety Instructions



WARNING

Improper practices, carelessness, or ignoring safety messages – Warnings and Cautions – may cause death, per-

sonal injury, equipment damage, or property damage.

Before performing any inspection or task, read and understand all of the safety precautions and warnings. The following is a list of general safety precautions that must be followed to provide personal safety. Failure to follow these instructions may cause death or injury. Special safety precautions are included in the procedures when they apply.

Keep in mind that even a well-maintained vehicle must be operated within the range of its mechanical capabilities and the limits of its load ratings. See the Weight Ratings label on the driver's door edge.

Every new vehicle is designed to conform to all Federal Motor Vehicle Safety Standards applicable at the time of manufacture. Even with these safety features, continued safe and reliable operation depends upon regular vehicle maintenance. Follow the maintenance recommendations found in the Maintenance section. Following maintenance recommendations will help your vehicle maintain quality conditions.

Make sure your vehicle is in top working condition before heading out on the road, it is the driver's duty to do so. Inspect the vehicle according to the Driver's Check List:

- Inspection and work areas should be dry, well lit, well ventilated; free from clutter, loose tools, parts, start switch sources, and hazardous substances.
- DO NOT wear loose-fitting or torn clothing. Tie back and/or tuck in long hair. Remove all jewelry when performing inspections or daily tasks.
- Place a "Comply with Local Lock Out/Tag Out Procedures" tag in the operator's compartment or on the controls.

 **WARNING**

DO NOT attempt to service this vehicle. Only an EV service certified dealership is authorized to service a PAC-CAR electric vehicle (EV). EVs use high voltage, posing additional hazards not present when servicing a conventional vehicle. Servicing high voltage components requires proper training, tools, and equipment. **Visual inspections are the only tasks that should be performed by the operator.** Failure

to comply may result in death, personal injury, equipment damage, or property damage.

- Always use wheel chocks or proper jack stands to support the vehicle or vehicle components before performing any work. DO NOT work on anything that is supported only by lifting jacks. Before resting a vehicle on jack stands, be sure the stands are rated for the load you will be placing on them.
- When moving or lifting any heavy equipment or parts, make sure to use proper techniques and assistance. Ensure all lifting devices such as chains, hooks, or slings are in good condition and are rated for the correct load capacity. Make sure all lifting devices are positioned correctly.
- When around the vehicle, be alert for high-voltage electrical parts on the vehicle. Contact with high voltage may result in death or personal injury.
- All high-voltage (HV) cables are colored orange for easy identification. Any component connected to an orange cable is a high voltage component also. DO NOT touch any part of the high voltage electrical system under any circumstances.

Contact with high voltage may result in death or personal injury.

⚠ WARNING

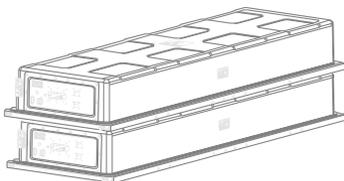
DO NOT touch or attempt to remove any of the orange high voltage (HV) cables, connectors, or components for any reason. **If asked to inspect HV component or cabling, only inspect visually.** Failure to comply may result in death, personal injury, equipment damage, or property damage.

4.2 High Voltage (HV) Battery String

The High Voltage (HV) battery string contains two batteries and a relay box connected in series. Each HV battery string supplies 650 V, with a capacity of 228 Ah, and a nominal energy of 141 kWh.

The components of a battery string include:

- Two high-voltage battery packs
- Relay box
- Cell Supervisory Circuit (CSC)



i NOTE

The high-voltage batteries contain a circuit that monitors the temperature of the batteries and reports it to the vehicle. The vehicle controls the temperature and flow of coolant to the battery packs to maintain operating temperatures.

⚠ WARNING

DO NOT open the high-voltage battery enclosure for any reason. The battery packs are part of the high-voltage system and do not contain operator-serviceable items. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

⚠ WARNING

If any issues involving the high-voltage electrical system are discovered, DO NOT drive the vehicle. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

4.3 Vehicle Loading

⚠ WARNING

DO NOT exceed the specified load rating. Overloading can result in loss of vehicle control, either by causing component failures or by affecting vehicle handling. Exceeding load ratings can also shorten the service life of the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

⚠ WARNING

Ensure the vehicle load is distributed evenly and avoids excessive load over

any one axle. An unevenly distributed load or an excessive load over one axle can adversely affect the braking and handling of the vehicle. Even if your load is under the legal limits, be sure it is distributed evenly. Failure to comply may result in death, personal injury, equipment damage, or property damage.

The Gross Vehicle Weight Rating (GVWR) and the maximum front and rear Gross Axle Weight Ratings are determined by the components installed from the factory. See the label on the inside edge of the driver's side door for vehicle axle weight ratings.

Gross Vehicle Weight Rating (GVWR) This specification is the MAXIMUM WEIGHT that the vehicle is allowed to carry. This weight includes the weight of the empty vehicle, the loading platform, occupants, fuel, and any load. Never exceed the GVWR of the vehicle.

Gross Combination Weight (GCW) This weight is the actual combined weight of the vehicle and its load: vehicle, plus trailers, plus cargo.

Gross Axle Weight Rating (GAWR) This weight is the total weight that one axle is designed to transmit to the ground. This number is listed on the inside edge of the driver's side door.

Load Distribution Make sure the vehicle's load is distributed so that no one axle exceeds its GAWR.

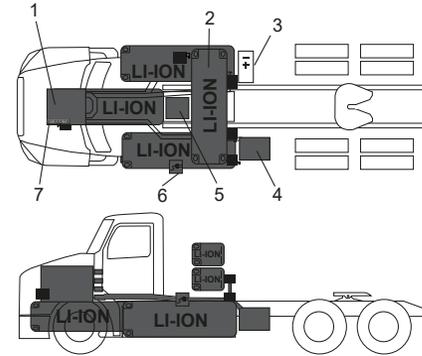
Regardless of a correct GAWR, the vehicle and its total load including trailers must never exceed the GCW.

5 BATTERY ELECTRIC VEHICLE (BEV) SAFETY LABELS

5.1 Battery Electric Vehicle (BEV) Safety Labels

Some electric-vehicle components contain enough energy to be lethal if used improperly. For this reason, Battery Electric Vehicle (BEV) badges are displayed on both sides of all battery electric trucks. High-Voltage (HV) labels may be also placed near electrical components to warn and inform operators of dangers and precautions.

Figure 1: Battery Electric Vehicle (BEV) Lay-out



- 1 Power, Controls, and Accessories Systems (PCAS)¹
- 2 Optional high-voltage battery locations
- 3 12 V disconnect switch
- 4 E-PTO (optional)
- 5 E-motor
- 6 Charge inlet
- 7 12 V cut loop

¹ Battery on the PCAS is optional.

5.2 Battery Electric Vehicle (BEV) Badge



All electric vehicles can be identified by the BEV badge located on the hood. Electric vehicles are powered by high voltage batteries which can be dangerous and toxic. Precautions must be taken while servicing the vehicle.

5.3 BEV Safety Labels

BEV SAFETY LABELS

The Battery Electric Vehicle (BEV) Safety Labels are composed of General Safety Labels and high-voltage (HV) Safety Labels to show the risks that can be encountered while servicing or walking around this vehicle.

GENERAL SAFETY LABELS

General Safety Labels help warn the operator or any other person coming in contact with certain components such as stored energies, liquids, gases, and solids that may be hazardous to health.

Table 1: Stored Energy / Liquids / Gases / Solids Labels

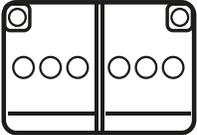
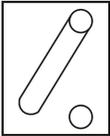
Icon	Description
	Low-voltage batteries
	12 V disconnect
	Corrosives
	Gas strut

Table 1: Stored Energy / Liquids / Gases / Solids Labels

Icon	Description
	Flammable
	Health hazards
	Explosion hazard
	Do not use wet foam
	Lithium-ion battery with Thermal Infrared Camera (TIC or IR gun)

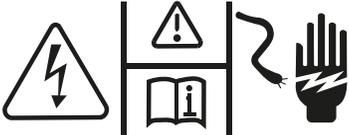
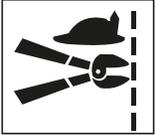
Table 1: Stored Energy / Liquids / Gases / Solids Labels

Icon	Description
	Lift point
	Compressed air tank

HIGH-VOLTAGE (HV) SAFETY LABELS

The high-voltage (HV) Safety Labels help warn the operator or any other person coming in contact with the high voltage components as they are highly dangerous. They are placed mainly on the chassis, on electrical components, and on the battery enclosures. The HV labels come in bright orange to be noticeable for the operator, indicating the amount of electrical charge.

Item	Description
	High voltage (650 V)
	Battery Lithium-ion
	Electrocution hazard
	High voltage Lithium-ion battery
	High-voltage (HV) cables

Item	Description
	Use water to extinguish Lithium-ion fires
	Master Service Disconnect (MSD)
	Charge inlet
	Battery Electric Vehicle (BEV) 12 V cut loop

6 REPAIRS

WARNING

DO NOT attempt to diagnose, correct, or repair any vehicle issue related to the high-voltage electrical system or its components. The high-voltage electrical system is capable of producing dangerous electric shock and burns. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

DO NOT attempt maintenance or repair work on the e-powertrain system. The only tasks that can be performed by an operator on this system are visual inspections. Only an EV service certified dealership is authorized to service the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

Modifying your vehicle can make it unsafe. Some modifications can affect your vehicle's electrical system, stability control system, or other important functions. Before modifying your vehicle, check with your dealer to make sure it can be done safely. Do not attempt to modify any part of the e-powertrain system. Failure to comply may result in death, personal injury, equipment damage, or property damage.

CAUTION

The installation of electronic devices to the On-board Diagnostics (OBD) connector, the vehicle Controller Area Network (CAN), or their associated wiring is not permitted. Doing so can adversely affect vehicle performance and/or cause fault codes to be recorded. The OBD connector is provided for temporary connection of service tools and for diagnostic purposes only. Failure to comply may result in equipment or property damage.

Your dealer's certified electric vehicle service center is the best place to have your vehicle repaired. You can find dealers all over the country with the equipment and trained personnel to get you back on the road quickly—and keep you there. You can find your service locations on [Service Locations](#).

7 SERVICE LOCATIONS

This vehicle requires service that can ONLY be performed by an EV service certified dealership. Some of the safety messages included in this manual instruct to contact a PACCAR service center when an issue arises with the vehicle. If a service involving the high-voltage system is needed, you should visit <https://www.peterbilt.com/find-a-dealer> to find the location of EV service certified dealership. For any questions or issues regarding the vehicle, call:

- **1-800-4Peterbilt (1-800-473-8372)**

 **WARNING**

DO NOT attempt to service this vehicle. Only an EV service certified dealership is authorized to service a PAC-CAR electric vehicle (EV). EVs use high voltage, posing additional hazards not present when servicing a conventional vehicle. Servicing high voltage components requires proper training, tools, and equipment. **Visual inspections are the only tasks that should be performed by the operator.** Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

DO NOT attempt to diagnose, correct, or repair any vehicle issue related to the high-voltage electrical system or its components. The high-voltage electrical system is capable of producing dangerous electric shock and burns. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

If any issues involving the high-voltage electrical system are discovered, DO NOT drive the vehicle. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

Ensure any modifications to the vehicle DO NOT affect the high-voltage system. A modification could affect the high voltage electrical system, resulting in electric shock, burns or even death, and will void the warranty. Failure to comply may result in death, personal injury, equipment damage, or property damage.

8 CAB ACCESS

8.1 Cab Access

 **WARNING**

Clean any oil or grease off of vehicle steps and handles before entering, exiting, or climbing onto the vehicle. Keep vehicle steps and handles clean to avoid a slip or fall. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

Always face toward the vehicle and DO NOT jump when entering or exiting the cab. Use the steps, handles, and anti-skid surfaces provided instead of components not designed for entry or exit. Always maintain at least three points of contact between your hands, feet, and the vehicle to avoid a slip or fall. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Be careful whenever you get into or out of the vehicle's cab. Always maintain at least three points of contact with your hands on the grab handles and your feet on the steps. The following image shows the best way to enter and exit the cab:



8.2 Locking and Unlocking the Cab Doors

WARNING

To reduce the possibility of personal injury or death, always lock the doors before driving the vehicle. Along with

using the seat belt properly, locking the doors helps prevent doors from inadvertently opening and occupants from being ejected from the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

To lock or unlock the doors from outside the cab, do the following:

1. To lock, rotate the key toward the rear of the vehicle (clockwise).
2. To unlock, rotate the key toward the front of the vehicle (counter clockwise).

8.3 Remote Keyless Entry (Option)

Remote Keyless Entry (RKE) is a system that adds security and convenience to your vehicle. The system will lock or unlock cab doors with the key fob. The system will alert you with parking lights when the selected doors are locked or unlocked. The system includes two key fobs that provide secure rolling code technology that prevents someone from recording the entry signal.

8.4 Operate Door Locks using Remote Keyless Entry

The key fob will not lock open doors. The key fob should be within 30 feet (9 meters) of the vehicle and should not be in proximity of other radio frequency sources. To unlock the cab doors:

1. Press the **UNLOCK** button once. The driver's door will unlock and the parking lights will come on for 40 seconds.
2. Quickly press the **UNLOCK** button a second time within 5 seconds to unlock the passenger door.
3. Press the **LOCK** button. The doors will lock and the parking lights will come on for 2 seconds.

9 DECK PLATE ACCESS

WARNING

DO NOT perform maintenance on high-voltage (HV) cables. A PACCAR trained technician is required for service. Please contact an authorized EV service certified dealership for ser-

vice. Be mindful of the location of HV cables and components when working around the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

! WARNING

Always reinstall steps before entering the cab or accessing the deck plate. Without steps you could slip and fall. Failure to comply may result in death, personal injury, equipment damage, or property damage.

! WARNING

Clean any oil or grease off of vehicle steps and handles before entering, exiting, or climbing onto the vehicle. Keep vehicle steps and handles clean to avoid a slip or fall. Failure to comply may result in death, personal injury, equipment damage, or property damage.

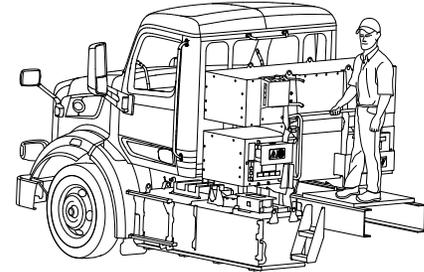
! WARNING

When you are climbing onto and off the deckplate, maintain at least three points of contact with your hands on the grab handles and your feet on the steps. Always face toward the vehicle when entering or exiting the cab and look where you are going. Failure to comply may result in death, personal injury, equipment damage, or property damage.

! WARNING

When stepping onto a surface to enter the cab or access the deckplate, only use the steps and grab handles installed and designed for that purpose. Failure to comply may result in death,

personal injury, equipment damage, or property damage.



10 OPENING THE HOOD

10.1 Opening the Hood

! WARNING

Always open the hood with both feet planted firmly on the ground and one or both hands on the hood. If you lose your footing, the hood may open or close uncontrollably. Failure to comply may result in death, personal injury, equipment damage, or property damage.

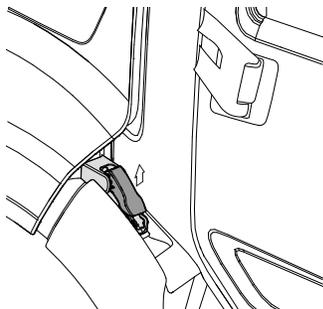
⚠ WARNING

Always ensure the hood lock has engaged whenever the hood is opened. If not properly locked open, the hood may close uncontrollably and without warning. Failure to comply may result in death, personal injury, equipment damage, or property damage.

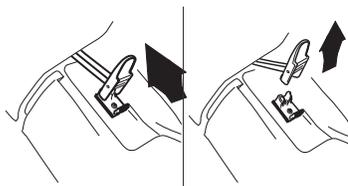
⚠ WARNING

Be sure to latch the hood securely. A hood not latched securely could open during operation and cause vehicle damage. Failure to comply may result in death, personal injury, equipment damage, or property damage.

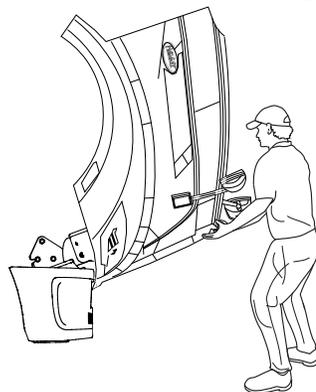
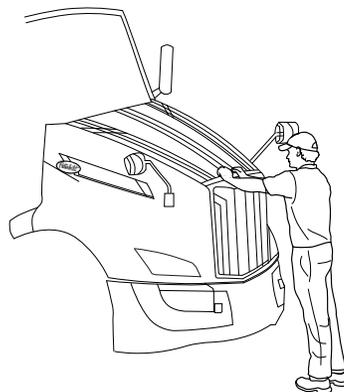
The hood is held in the closed position by two latches called hold-downs. The hold-downs are mounted on either side of the vehicle hood.



1. Release the hood hold-downs.



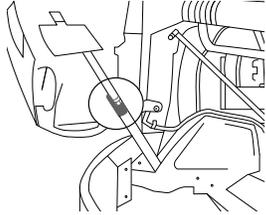
2. Place both hands at top of hood front, and tilt hood forward by pulling hood. Maintain both feet on the ground for stability.



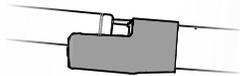
Tilt hood forward until it stops. When fully opened, the hood lock engages automatically.

3. Ensure hood lock is engaged (when hood lock is engaged, the strut is visible above the lock).

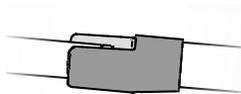
Figure 2: Hood Lock



Hood Lock - Engaged



Hood Lock - Disengaged

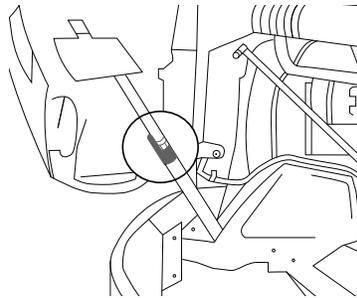


10.2 Closing the Hood

WARNING

Always make sure that there are no objects in the way before closing the hood. Grab the hood firmly and close it in a controlled manner with your feet placed on a stable, non-slip surface. Failure to comply may result in death, personal injury, equipment damage, or property damage.

The hood lock will only be engaged if the vehicle hood is fully open. Once it is fully open, the latch will automatically engage and will need to be disengaged by the operator. The release lever for the hood lock is located near the front hinge of the hood.

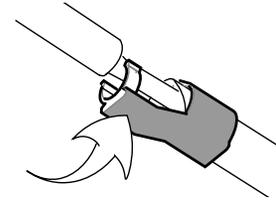


1. Ensure no obstructions are present

to block the hood from closing.

2. Disengage the hood lock by pressing the collar toward the strut until the collar snaps and surrounds the strut bar.

When the hood lock is disengaged, the strut will no longer be visible above the hood lock collar.



3. Close the hood and ensure that you maintain the same point of contact (top of hood) to control the movement of the hood as it closes.
4. Finally, lower the hood into place to avoid damage to the hood or cab.

11 SEAT

11.1 Seat

This seat has up to ten different controls that maximize the driver's comfort.

Lumbar (and bolster support if available) are provided for superior support to the back during operation. Lower support is standard and the optional functions include upper lumbar and bolster functions. Pressing on the "+" symbol of the button will add support in the area. Pressing the opposite side of the button releases pressure and will reduce support in the area.



The seats in this vehicle are equipped with a switch that locks out the fore-aft isolator function in the seat. When locked, the seat

will not move back and forth. It is rigidly fixed and only allowed to move up and down with the vehicle's movements.

This vehicle may be equipped with a swivel function on the passenger seat. This function allows the passenger seat to rotate and face toward the inside of the cab.

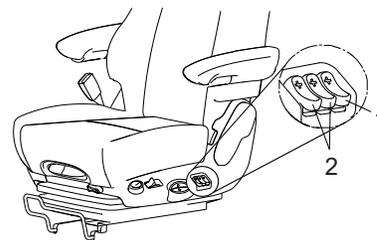
WARNING

Always make sure that the passenger seat is locked into the forward facing position when the vehicle is in motion. Locking the swivel seat into the forward-facing position maximizes visibility to the surrounding area. Failure to comply may result in death, personal injury, equipment damage, or property damage.

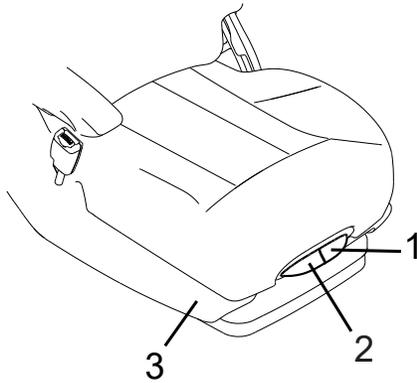
WARNING

DO NOT use the seat swivel function while a passenger is in the seat and the vehicle is in motion. The seat belt will not provide proper protection if the passenger seat is not locked facing forward and the vehicle is in an accident or other scenarios, like heavy braking. Failure to comply may result in death,

personal injury, equipment damage, or property damage.



- 1 Bolster adjustment (option)
- 2 Lower and upper lumbar adjustment



- 1 Seat bottom angle adjustment
- 2 Seat thigh support up/down
- 3 Seat heater/cooler

WARNING

This seat may be equipped with a seat heater or ventilation system. There is a possibility that some people may suffer heat-induced burns or excessive cooling when using the system. DO NOT use either of these systems if you have a diminished ability to sense temperature, a reduced ability to feel pain, or have sensitive skin. Failure to comply may result in death, personal injury,

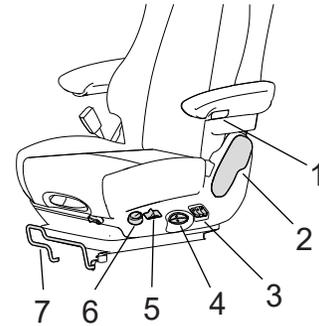
equipment damage, or property damage.

WARNING

When using the seat heater or ventilation system, DO NOT place anything on the seat such as a blanket, cushion, or similar items. Objects placed between the occupant and the seat cushion may cause the seat heater or ventilation system to overheat, which may injure the seat occupant or may damage the seat. Failure to comply may result in death, personal injury, equipment damage, or property damage.

CAUTION

DO NOT use the seat heater for more than 10 minutes when the vehicle is off. Overuse of the seat heater may drain the vehicle's low-voltage batteries. Failure to comply may result in equipment or property damage.



- 1 Armrest angle
- 2 Recline
- 3 Lumbar and bolster (bolster is an optional feature)
- 4 Seat height
- 5 Suspension stiffness
- 6 Express down
- 7 Seat fore-aft

WARNING

DO NOT drive or ride with your seat back in the reclined position. You could be injured by sliding under the seat belts in a collision. Failure to comply

may result in death, personal injury, equipment damage, or property damage.

11.2 Passenger Seat Swivel (Option)

This vehicle may be equipped with a swivel function on the passenger seat. This function allows the passenger seat to rotate and face towards the inside of the cab.

WARNING

Always make sure that the passenger seat is locked into the forward facing position when the vehicle is in motion. Locking the swivel seat into the forward-facing position maximizes visibility to the surrounding area. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

DO NOT use the seat swivel function while a passenger is in the seat and the vehicle is in motion. The seat belt

will not provide proper protection if the passenger seat is not locked facing forward and the vehicle is in an accident or other scenarios, like heavy braking. Failure to comply may result in death, personal injury, equipment damage, or property damage.

11.3 Adjusting the Seat

WARNING

DO NOT adjust the driver's seat while the vehicle is moving. The seat could slide or tilt suddenly during adjustment and cause the driver to lose control of the vehicle. Make all adjustments to the seat while the vehicle is stationary and ensure that the seat is firmly latched at the new position. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

DO NOT adjust the driver's seat while the vehicle is moving, as sudden seat movement can cause loss of vehicle control. Before driving, ensure the seat

is firmly latched and there is adequate head clearance at maximum upward travel. Failure to comply may result in death, personal injury, equipment damage, or property damage.

1. Set the seat's fore/aft position via the bar located below the seat cushion. This is a mechanical latch that does not involve any electric or air operated devices to control adjustment.
2. Set the seat height via the large switch on the left side of the seat cushion. This switch is located in the center of the seat pad and uses air to adjust the seat height. Set the seat's fore/aft position via the bar located below the seat cushion. This is a mechanical latch that does not involve any electric or air operated devices to control adjustment.
3. Adjust the thigh support by toggling the switch located immediately under the seat bottom cushion and above the fore/aft position adjustment lever.
4. Adjust the seat bottom angle using the switch next to the thigh support.
5. Set the seat's fore/aft position via the bar located below the Adjust the seat back recline angle using the

large lever situated near the seat belt buckle.

6. Adjust the lumbar support by using the switch bank located on the side the seat cushion between the up/down adjustment switch and the seat recline adjustment lever.
7. Adjust the steering wheel.
8. Adjust the cab side mirrors. If equipped with Digital Vision System with Mirrors (DVS-M)/Digital Mirrors (DM), refer to [Setting Trailer End Line](#).

11.4 Seat Belts

Seat belts have a locking mechanism. This mechanism adjusts automatically to a person's size and movements as long as the pull on the belt is slow. Hard braking or a collision locks the belt. The belt locks when driving up or down a steep hill or in a sharp curve.

Unbelted occupants may be ejected from the cab, strike other cab occupants, and sustain more severe injuries in an accident. Always observe user warnings pertaining to seat belts. The vehicle has a seat belt indicator lamp located on the dash.

WARNING

DO NOT drive without the seat belts properly fastened. Fasten in only one occupant per belt and avoid fastening the belt over breakable objects such as eyeglasses, keys, or pens. Ensure all passengers wear and adjust their seat belts before placing the vehicle into motion. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

DO NOT use the seat swivel function while a passenger is in the seat and the vehicle is in motion. The seat belt will not provide proper protection if the passenger seat is not locked facing forward and the vehicle is in an accident or other scenarios, like heavy braking. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

Fully retract and properly stow seatbelts when not in use. The metal tongue on

a loose safety restraint can become a projectile during a sudden stop or crash. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

DO NOT modify or disassemble the safety restraints in your vehicle. Modified safety restraints may not function as intended. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Correct Seat Belt Use

NOTE

Responsible operators make sure that all vehicle passengers ride safely. The operator is responsible for informing passengers and co-drivers how to prop-

erly use all available safety restraints while in the vehicle.

Figure 3: Correct Placement of Lap Belt



Figure 4: Correct Placement of Shoulder Belt



Incorrect Seat Belt Use



WARNING

DO NOT drive without the seat belts properly fastened. Fasten in only one

occupant per belt and avoid fastening the belt over breakable objects such as eyeglasses, keys, or pens. Ensure all passengers wear and adjust their seat belts before placing the vehicle into motion. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Figure 5: Lap Belt Too High on Hip



Figure 6: Shoulder Belt Incorrectly Positioned Under the Arm



Figure 7: Seat Belt Twisted



Seat Belt Use During Pregnancy



WARNING

Pregnant women should always wear a seat belt in the proper position. A properly worn seat belt significantly reduces the risk of injury to a woman or baby in the event of a crash. Failure to comply may result in death, personal injury, equipment damage, or property damage.

The lap belt portion must be worn snugly and as low as possible across the pelvis. To avoid pressure on the abdomen, the belt must never pass over the waist. A properly worn seat belt significantly reduces the risk of injury to a woman or baby in a crash.



Safety Restraint Cleaning

All safety restraints must be kept clean or the retractors may not work properly. Clean the safety restraints by following the care label on the belts. Let them dry completely before allowing them to retract or be stowed away.

WARNING

DO NOT use bleach or dye to clean a safety restraint. Chemicals can make safety restraint components weak and may cause them to not function as intended. Failure to comply may result in death, personal injury, equipment damage, or property damage.

11.5 How to Use a Seat Belt

Follow these steps to fasten the seat belt. Make sure that all other occupants do the same.

WARNING

DO NOT drive without the seat belts properly fastened. Fasten in only one occupant per belt and avoid fastening the belt over breakable objects such as eyeglasses, keys, or pens. Ensure all passengers wear and adjust their seat belts before placing the vehicle into motion. Failure to comply may result in death, personal injury, equipment damage, or property damage.

To fasten the belt:

1. Grasp the belt latch.
2. Pull the belt in a continuous slow motion across the chest and lap.
3. Insert the belt latch plate into the buckle on the inboard side of the seat.

4.

NOTE

Make sure there are no obstructions in or on the buckle that could prevent secure safety restraint locking.

Push down until the latch is securely locked with an audible click.

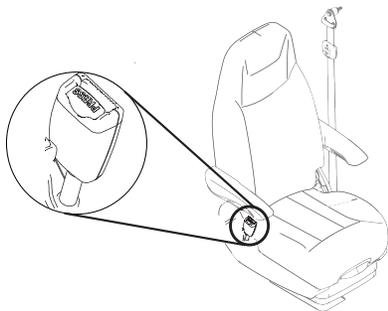
5. Pull the belt to check for proper fastening and adjustment.
 - a. Pull the shoulder belt to make sure that the belt fits snugly across the chest and pelvis.
 - b. There must be less than one inch (in) (25 mm) gap between the body and the belt.
 - c. Position the shoulder restraint over the shoulder. Never allow a shoulder belt to rest against the neck. Never wear the belt under the arm.
 - d. Make sure that any slack is wound up on the retractor. Make sure that the belt is not twisted.

Result:

If the belt is locked, lean back to remove any tension in the belt. After releasing the belt, allow the belt to retract completely.

1

Guide the belt latch until the belt comes to a stop. To unfasten the belt, push the release button on the buckle. The seat belt indicator lamp switches on when the driver's seat belt is unfastened.



11.6 Tether Belts

! WARNING

DO NOT remove, modify, or replace the tether belt system with a different tether system. A failed or missing tether belt could allow the seat base to fully extend in the event of an accident. Failure to comply may result in death or personal injury.

! WARNING

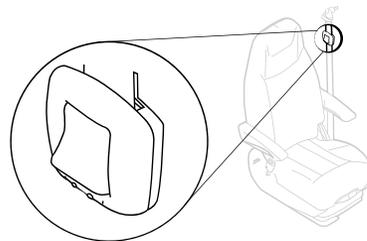
Ensure tether belts are adjusted so they are tight when the seat is in its highest and most forward position. An improperly adjusted tether belt may allow excessive movement during an accident. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Make sure that the tether belt is attached to the cab floor and seat frame. It should be routed through the buckle on each side. Often the attachments are made using a split-type hook. Make sure both halves of the hook are around the anchor bracket.

Adjust an external tether by either lengthening or shortening the strap. To lengthen it:

1. Turn the buckle to a right angle to the webbing.
2. Then pull the buckle.
3. To shorten the tether, pull on the strap.

11.7 Komfort Latch Feature



! WARNING

DO NOT set the Komfort Latch with too much slack. Too much slack may reduce the effectiveness of the seat belt. Failure to comply may result in death or personal injury.

To eliminate cinching, simply activate the Komfort Latch device located on the seat belt webbing at the appropriate time:

1. Adjust the seat to its proper driving position.
2. Latch the seat belt.

3. If available, adjust the seat belt height adjuster to a comfortable driving position.
4. While seated appropriately, push the "on" button to engage the Komfort Latch.
5. Lean forward in the seat until you hear a "click."
6. Return to normal driving position, and the Komfort Latch maintains the preset amount of tension relief.

Result:

More information and video tutorials can be found at: <https://www.imminet.com/resources/click-tug-snug/>

To disengage the mechanism unbuckle the seat belt and then press the **OFF** button of the Komfort Latch or tug on the shoulder strap.



11.8 Safety Restraint Maintenance

WARNING

Safety restraints can be damaged during everyday use at all parts of the assembly (such as webbing, bindings, buckles, or retractors). Since a damaged or worn safety restraint may not protect the wearer, if the restraint shows signs of damage or wear, it must be replaced. Failure to comply may result in death, personal injury, equipment damage or property damage.

WARNING

Any safety restraint that has stretched must be replaced. Since a damaged or worn safety restraint may not protect the wearer, if the restraint shows signs of damage or wear it must be replaced. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

A safety restraint that gets caught in vehicle hardware (such as the door, bunk, or seat) or rubs against a sharp object must be inspected. If the restraint shows signs of damage or wear, it may not protect the wearer and so must be replaced. Failure to comply may result in death, personal injury, equipment or property damage.

WARNING

If the vehicle has been in an accident, all safety restraints and safety restraint systems must be replaced, regardless of accident severity or whether the restraint was in use at the time of the accident. Visible and non-visible damage or wear can reduce the effectiveness of the safety restraint and may lead to restraint failure. Failure to comply may result in death, personal injury, equipment damage, or property damage.

i NOTE

If any safety restraint is not working properly, see an Authorized Service Center for repair or replacement.

Damaged safety restraints in the cab must be replaced. Safety restraints that have been stretched, cut, or worn out may not protect you in an accident.

For further information on safety restraints and safety restraint maintenance, see [Safety Restraint System - Inspection](#).

12 WHAT TO DO BEFORE STARTING THE VEHICLE

12.1 Procedures Before Starting the Vehicle

Safe Vehicle Operation

! WARNING

DO NOT operate the vehicle while impaired. The use of alcohol, drugs, and certain medications can impair perception, reactions, and driving ability. These circumstances can substantially

increase the risk of an accident. Failure to comply may result in death, personal injury, equipment damage, or property damage.

! WARNING

DO NOT text and drive. Your reaction time, perceptions, and judgment can be affected while texting or using any other form of mobile messaging while driving. Failure to comply may result in death, personal injury, equipment damage, or property damage.

! WARNING

Vehicle noise may be reduced in some operation modes. The vehicle operator must remain aware of nearby vehicles or pedestrians at all times. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Battery Electric Vehicles (BEV) are much quieter than traditional diesel-powered engines and pedestrians may not be aware that the vehicle is approaching. The operator must be aware of the vehicle movement

and must remain watchful for vehicles, pedestrians, and surroundings all the time to avoid potential accidents. Be sure to perform pre-trip inspections before starting and operating the vehicle. For your safety, as well as those around you, observe the following:

- Do not drive if you drink alcohol.
- Do not drive if you take drugs that impair your driving ability.
- Do not drive if you take medication that makes you drowsy or causes sleepiness.
- Do not drive if you are tired, ill, or under emotional stress.
- Do not drive if there is visible damage to high-voltage power cables or connectors.
- Do not allow the State of Charge (SOC) to reach 0%. See [State of Charge \(SOC\)](#).

Safe driving is only possible with the proper concentration on the driving task. Keep distraction to a minimum to improve your concentration. Examples of distractions may include radio controls, GPS navigation controls, cellular telephone calls, cellular text messages, reading, or reaching for something on the floor. Minimizing your distract-

tions improves safe driving and helps to avoid an accident involving death or personal injury.

Be aware of local regulations that may prohibit the use of cellular telephones while driving. In addition to being an unsafe practice, it may be against local or federal ordinances to use cellular devices while operating the vehicle.

Much has gone into the manufacturing of your vehicle including advanced engineering techniques, rigid quality control, and demanding inspections. These manufacturing processes will be enhanced by you, the safe driver, who observes the following:

- Knows and understands how to operate the vehicle and all its controls.
- Maintains the vehicle properly.
- Uses driving skills wisely.

This manual is not a training manual. It cannot tell you everything you need to know about driving your vehicle. For that, you need a proper training program or vehicle driving school. If you have not been trained, get the proper training before you drive. Only qualified drivers should drive this vehicle.

For more information, refer to

- US Department of Transportation Regulation 392.7.

- Canadian Council of Motor Transport Administrators, National Safety Code Standard 11 – Commercial Vehicle Maintenance and Inspection.
- Official Mexican Standard NOM-068-SCT-2-2014, Land Transportation – Federal Motor Transport Service for Passengers, Tourism, Cargo, Their Auxiliary Services and Private Transportation – Physical-Mechanical and Safety Conditions for Operation on General Roads of Federal Jurisdiction.

Regulations that state that interstate commercial motor vehicles are not to be driven unless the driver is sure that certain parts and accessories are in working order.

Do not drive under the influence of alcohol. Your reflexes, perceptions, and judgment can be affected by even a small amount of alcohol. You could have a serious or fatal accident if you drive after drinking. DO NOT drink and drive or ride with a driver who has been drinking.

Emergency Equipment

It is good practice to carry an emergency equipment kit in your vehicle. If you have a roadside emergency, you will be equipped with the following items:

- Window scraper
- Snow brush

- Container or bag of sand or salt
- Emergency light
- Warning triangles
- Small shovel
- First aid kit
- Fire extinguisher
- Vehicle recovery hitches

Drivers Checklist

To keep your vehicle in top shape and maintain a high level of safety for you, your passengers, and your load, make a thorough inspection every day before you drive. You will save maintenance time later, and the safety checks could help prevent a serious accident. Please remember, too, that Federal Motor Carrier Safety Regulation 392.7, National Safety Code Standard 11 – Commercial Vehicle Maintenance and Inspection, and Official Mexican Standard NOM-068-SCT-2-2014 require a pre-trip inspection and so do commercial trucking companies.

The purpose of your inspections is to find anything that might interfere with the safe and efficient transportation of yourself, any passengers, and your load. If you do find something wrong and cannot fix it yourself, have an authorized dealer or qualified technician repair your vehicle right away.

The following operations are to be performed by the driver. Performing these checks and following the maintenance procedures in this manual will help keep your vehicle running properly.

12.2 Visual Inspection While Approaching the Vehicle

WARNING

DO NOT touch or attempt to remove any of the orange high voltage (HV) cables, connectors, or components for any reason. **If asked to inspect HV component or cabling, only inspect visually.** Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

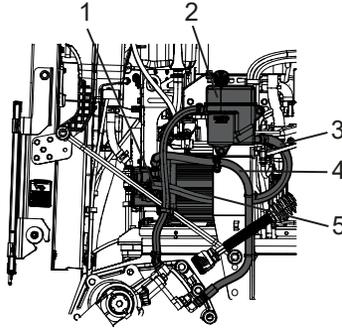
If equipped with a three-piece roof fairing, DO NOT DRIVE WITH ROOF FAIRING FOLDED DOWN, since the marker lamps will not be effective in that position. Failure to comply may result in

death, personal injury, equipment damage, or property damage.

While approaching the vehicle, inspect the general appearance of the vehicle and its surroundings for any signs of needed attention. Perform these basic inspection steps before operating the vehicle.

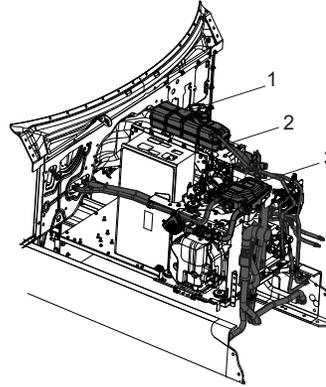
1. Inspect the overall appearance and condition. Ensure that windows, mirrors, and lights are clean and unobstructed.
2. Inspect beneath the vehicle. Ensure there are not signs of any leaking fluids.
3. Inspect for damaged, loose, or missing parts. Ensure there are not parts showing signs of excessive wear.
4. Inspect the general condition of the high-voltage (HV) cables (orange cables). Inspect for signs of overheating, cuts, cracks, or another surface irregularities. Find the proper support of an authorized EV service certified dealership if damaged cables or any other electrical component in a questionable state are found. Do not attempt to service the cable or electrical component.
5. Pay attention to your load. Ensure your load is secured properly. Axle weight ratings are listed on certification label on the driver's door jamb.
6. Inspect the wheels. Ensure the wheel cap nuts are in place and torqued properly and ensure that all tire pressures match and are in the recommended pressure range.
7. Inspect all exterior lights. Verify that the vehicle exterior lights are all functioning.
8. Inspect the coolant lines, power steering lines, and air lines. Verify that the lines, fittings, and other connections are all secure, intact, and free of chafing, and ensure the coolant reservoirs are properly filled.

Power Steering Lines for Visual Inspection



1. Steering fluid pump
2. Steering fluid reservoir
3. Reservoir-pump hose
4. Pump-gear pressure hose
5. Power steering motor pump

Power Electronics Coolant Lines for Visual Inspection



1. Power electronics coolant surge tank¹
2. Coolant vent hose
3. High-voltage cabin coolant heater
4. Heat exchanger coolant hose, source
5. Heat exchanger coolant hose, return

¹ No other component of the system except the power electronics coolant surge tank should be touched by the operator.

Result:

WARNING

DO NOT attempt to service this vehicle. Only an EV service certified dealership is authorized to service a PAC-CAR electric vehicle (EV). EVs use high voltage, posing additional hazards not present when servicing a conventional vehicle. Servicing high voltage components requires proper training, tools, and equipment. **Visual inspections are the only tasks that should be performed by the operator.** Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

If cables or components are damaged, DO NOT attempt to repair the vehicle on your own as you could receive an electric shock. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

12.3 Daily Checks

WARNING

DO NOT touch or attempt to remove any of the orange high voltage (HV) cables, connectors, or components for any reason. **If asked to inspect HV component or cabling, only inspect visually.** Failure to comply may result in death, personal injury, equipment damage, or property damage.

E-Powertrain

The operator must perform these checks of the vehicle daily, at a minimum.

- All coolant levels. Refer to [Coolant Level Inspection](#)
- E-motor oil or coolant leaks
- Electric hydraulic power steering fluid
- Low-voltage battery cables
- High-voltage (HV) cables (orange cables)
- Hood latch
- Brake lines and hoses
- Steering components

Chassis and Cab Exterior

- Lights
 - Ensure there not any exterior lights cracked or damaged.

NOTE

On certain vehicles equipped with LED technology, tail lights may emit a faint glow when the door is open and the dome light is illuminated.

- Suspension components
 - Inspect for loose or missing fasteners. Check damage to springs or other suspension parts such as cracks, gouges, distortions, bulges or chafing.
- Brake lines and hoses
 - Inspect lines, linkages, chambers, parking and service brake operation.
- Steps and grab handles

WARNING

If cables or components are damaged, DO NOT attempt to repair the vehicle on your own as you could receive an electric shock. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

DO NOT attempt to service this vehicle. Only an EV service certified dealership is authorized to service a PAC-CAR electric vehicle (EV). EVs use high voltage, posing additional hazards not present when servicing a conventional vehicle. Servicing high voltage components requires proper training, tools, and equipment. **Visual inspections are the only tasks that should be performed by the operator.** Failure to comply may result in death, personal injury, equipment damage, or property damage.

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1 ROADSIDE ASSISTANCE

Call toll-free to talk to someone at the PAC-CAR Customer Center.



Total Customer Support

1-800-4Peterbilt (1-800-473-8372)

The Customer Call Center is open 24/7-365 days a year and staffed with trained personnel (English and other languages if necessary), free of charge, to provide total roadside assistance. Their custom mapping system can locate the nearest Authorized dealers and Independent Service Providers (ISPs) based on the vehicle's location. In addition, the customer center can dispatch services for jump and pull starts, tires, trailers, fines and permits, chains, towing, hazardous clean-up, mechanical repairs, and preventive maintenance services. If they can't answer a specific question, they will direct you to a representative who can.

2 HV FIRST RESPONDER INFORMATION

First Responder instructions are available through the QR below. Download and print the documentation with your current model year. Routinely check the NFPA site to ensure your first responder materials are up-to-date.

Figure 9: First Responders Field Guide QR Code (Scan with Phone Camera to Navigate to URL)



First Responder Field Guide Label Locations

Figure 10: Under Hood, 2/4 Strings

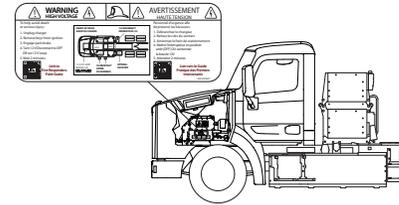
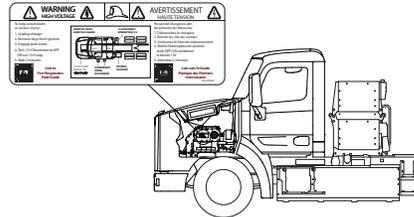


Figure 11: Under Hood, 3/5 String



i NOTE

The first responder field guide labels in the right and left batteries (under the cab) are under the batteries' covers.

Figure 12: Under Cab, Right Battery without Covers

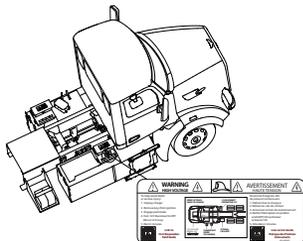


Figure 13: Under Cab, Left Battery without Covers

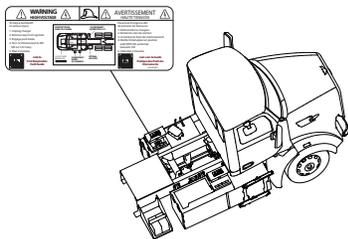
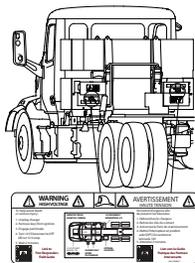


Figure 14: BOC ESS



3 LOW AIR ACTIONS

WARNING

If the air pressure falls below 65 psi (4.48 bar/448 kPa), the spring brakes may abruptly stop the vehicle. The operator must monitor air pressure gauges at all times. If the air pressure alert is activated, do not drive the vehicle until it is serviced. Failure to comply may result in death or personal injury.

NOTE

The instrument cluster gauges may appear (if hidden from view), change

brightness, and change color to bring attention to a particular system.



If this warning light appears, perform the following actions:

1. Slow down carefully.
2. Move a safe distance off the road and stop.
3. Place the vehicle in neutral and set the parking brake.
4. Turn OFF the vehicle.
5. Turn ON the emergency flasher and use other warning devices to alert other motorists.

Result:

If the warning light or audible alarm do not turn OFF at start-up, DO NOT attempt to drive the vehicle. Contact your nearest EV service certified dealership to have the problem corrected.

4 HIGH-VOLTAGE HAZARD



This warning light illuminates when there is a high-voltage hazard that may be caused by a broken high-voltage interlock loop, low isolation resistance, or other failures in the high-voltage electric powertrain system. If this warning light illuminates, find a safe place to pull over, shutdown the vehicle, and call an EV service certified dealership for assistance.

WARNING

DO NOT attempt to diagnose, correct, or repair any vehicle issue related to the high-voltage electrical system or its components. The high-voltage electrical system is capable of producing dangerous electric shock and burns. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

DO NOT touch or attempt to remove any of the orange high voltage (HV) cables, connectors, or components for any reason. **If asked to inspect HV component or cabling, only inspect visually.** Failure to comply may result in death, personal injury, equipment damage, or property damage.

5 JUMP-STARTING 12 V BATTERIES

WARNING

Electric vehicles utilize a high-voltage electrical system that has the potential to cause severe injury or death if proper safety precautions are not followed. Carefully read and understand all instructions and hazard alert messages. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

Batteries can injure you severely. They contain acid, produce poisonous and explosive gases, and supply levels of electric current high enough to cause burns. A spark or flame near a battery on charge may cause it to explode with great force. Never remove or tamper with the battery caps. Failure to comply may result in death, personal injury, equipment damage or property damage.

WARNING

DO NOT perform any repair while the vehicle is connected to a charger. Orange high-voltage (HV) cables stay energized unless the battery Manual Service Disconnect (MSD) fuses are removed. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

When jump-starting with another vehicle, it is best to jump-start with an equivalently powered vehicle. Verify that the

vehicle's low-voltage battery has the same volt and CCA specifications as the dead low-voltage battery before attempting to jump-start. Failure to comply may cause an explosion resulting in death, personal injury, equipment, or property damage.

 **WARNING**

Never spray liquid at high pressure towards the charging port while charging. Failure to comply may result in death, personal injury, equipment damage, or property damage.

To jump-start a 12 V battery system, you can use a battery jump starter, a compatible charger, or power source that puts out 12 V.

Jump-starting provides power to the Low Voltage (LV) system for the electrical systems to operate. The electrical systems must be operating to allow the high-voltage (HV) battery packs to be charged. Jump-starting DOES NOT charge the HV electrical system. The HV battery packs must be charged before driving the vehicle.

The 12 V batteries are located in the LV battery box which is mounted onto the right-hand frame rail. Ensure that the 12 V

disconnect switch is in the ON position and all low-voltage cables are secure before attempting to jump-start. To jump-start your LV Electric Vehicle (EV) system, refer to [Jump-Starting 12 V Batteries](#) and follow the instructions and precautions there.

6 RECOVERING THE VEHICLE

6.1 Recovering the Vehicle

Required tools:

- Axle hub caps or covers
- Socket wrench
- Screwdriver

 **WARNING**

DO NOT attempt maintenance or repair work on the e-powertrain system. The only tasks that can be performed by an operator on this system are visual inspections. Only an EV service certified dealership is authorized to service the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

DO NOT perform maintenance on high-voltage (HV) cables. A PACCAR trained technician is required for service. Please contact an authorized EV service certified dealership for service. Be mindful of the location of HV cables and components when working around the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

DO NOT perform any repair while the vehicle is connected to a charger. Orange high-voltage (HV) cables stay energized unless the battery Manual Service Disconnect (MSD) fuses are removed. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

Do not tow this vehicle after an accident if high-voltage components were damaged. Refer to the first responders field

guide for more instructions. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

Before towing a vehicle with a connected air system, test and inspect the recovery vehicle air system and brakes to ensure they are connected correctly and working properly. If the vehicle's air system is improperly connected it could lead to a loss of vehicle control, causing an accident. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **CAUTION**

Remove the drive axle shafts and lift the driving wheels off the ground before towing the vehicle. Towing the vehicle with either the wheels on the ground or the axle shafts in the axles will cause damage to the axle gears and electric motor. Failure to comply may result in equipment damage or property damage.

 **CAUTION**

When towing vehicles with a driver-controlled main differential lock, install the caging bolt for the differential lock so that internal components maintain their position. Failure to comply may result in equipment or property damage.

 **CAUTION**

DO NOT attach recovery rigging to bumpers or brackets. Connect to appropriate hitch points using the proper double chain setup to properly distribute weight. Failure to comply may result in equipment or property damage.

 **NOTE**

If moving the vehicle a short distance to a safe location (prior to removing the axle shafts) is necessary, it can be done by using a winch from a heavy duty tow truck.

All lubricating and oil pressure is provided by a driven pump, which does not work when drive is stopped. You could seriously

damage your vehicle by towing the vehicle with the driveline connected and the drive wheels on the ground. When vehicles are towed, either by wrecker or piggyback, the lubricant in the top front of the drive axle drains to the rear and leaves the top components dry. The resulting friction may damage them. Always remove the main drive axle shafts before towing your vehicle.

1. Review and understand all the cautions and warnings of this section.
2. Disconnect the drive axle shafts and cover the open hubs. This is necessary because no lubricant will reach the gears and bearings if the transmission is driven by the driveshaft (rear wheels on the ground), causing damage to the transmission.
See [Preparing the Axles for Towing](#).
3. Connect the towing chain or cable using best recovery practices.
See [Best Practices for Recovery Rigging](#).
4. Make sure the recovered vehicle's parking brake is released.
See [Manually Release the Parking Brake](#).
5. If you desire to use the recovered

vehicle's brake, ensure that the vehicle's air system is connected to that of the recovery vehicle. Ensure that any air line that has been removed from a driver-controlled main differential lock is firmly capped to prevent loss of air pressure from the recovery vehicle if it is supplying air pressure. If you do not desire to use the recovered vehicle's brake, ensure that you cage the spring brakes before attempting to move the vehicle.

See [Locking a Differential Manually](#).

6. Follow state/provincial and local laws that apply to vehicles in tow.
7. Do not tow vehicles at speeds in excess of 55 mph (90 km/h).

Result:

If first responders are unable to safely reach the drive axles for safe towing, in an emergency situation, refer to the First Responders Field Guide to see the speed and mileage targets that the truck can be moved. Once in a safe location, use a thermal imaging camera to check battery temperature and remove the driveline and axles to tow as previously instructed. For additional information concerning heavy duty vehicle recovery, refer to the following

Technology & Maintenance Council (TMC) literature. Copies of this literature can be obtained from the following address:

Technology & Maintenance Council 950 N. Glebe Road Arlington, VA 2220.

Phone: (703) 838-1763

Email: tmc@trucking.org

Website: <https://tmc.trucking.org/>

6.2 Manually Release the Parking Brake

Required tools:

- Wrench

WARNING

DO NOT attempt maintenance or repair work on the e-powertrain system. The only tasks that can be performed by an operator on this system are visual inspections. Only an EV service certified dealership is authorized to service the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

DO NOT perform maintenance on high-voltage (HV) cables. A PACCAR trained technician is required for service. Please contact an authorized EV service certified dealership for service. Be mindful of the location of HV cables and components when working around the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

When towing, never place the chains or straps on or across any high-voltage components. Inform the tow vehicle operator that the chains or straps are not to be attached to, or placed over high-voltage components. Failure to comply may result in damage to the high-voltage electrical system, death, personal injury, equipment damage, or property damage.

⚠ WARNING

DO NOT drive a vehicle with malfunctioning brakes. If one of the brake circuits (front or rear) becomes inoperative, braking distances will increase substantially and handling characteristics while braking will be affected. Bring the vehicle to a safe stop and have it towed to the nearest dealer or qualified repair facility. Failure to comply may result in death, personal injury, equipment damage, or property damage.

⚠ WARNING

DO NOT operate a vehicle when the spring brakes have been manually released. Driving a vehicle after its spring brakes are manually released is extremely dangerous. The brakes may not function. Failure to comply may result in death, personal injury, equipment or property damage.

⚠ WARNING

DO NOT disassemble a spring brake chamber. These chambers contain a powerful, compressed spring that

would become dangerous if suddenly released. Failure to comply may result in death, personal injury, equipment damage, or property damage.

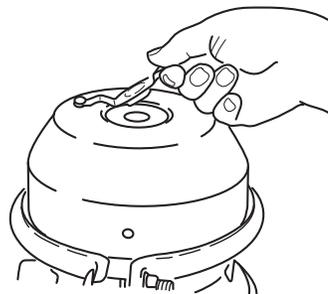
⚠ WARNING

Before manually releasing the spring brakes, always secure the vehicle with wheel chocks, chains, or other safe means to prevent the vehicle from rolling. An unattended, rolling vehicle could lead to an accident. Failure to comply may result in death, personal injury, equipment damage, or property damage.

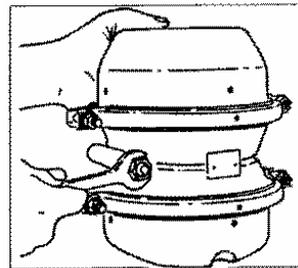
There may be times when there is not enough air pressure or the vehicle's air compressor is not able to produce enough pressure to release the parking brake. In such cases, the parking brake (or spring brake) can be manually released.

To move a vehicle immobilized by the spring brakes due to the loss of air pressure in the brake system, perform the following procedure:

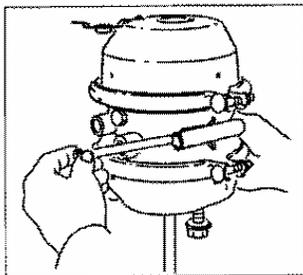
1. Remove the cap from the spring chamber.



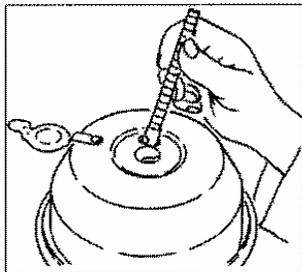
2. Remove the caging bolt assembly from the side pocket and remove the caging nut and washer from the caging bolt.



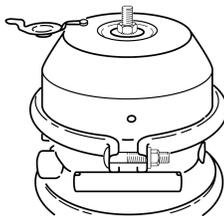
3. Slide out the caging bolt.



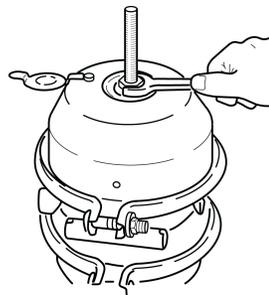
4. Insert the caging bolt through the opening in the spring chamber where the cap was removed. Insert it into the pressure plate. Turn the caging bolt 1/4 turn clockwise in the pressure plate. This secures the cross pin into the cross pin area of the pressure plate and locks it into the manual release position.



5. Assemble the caging bolt washer and nut on the caging bolt.



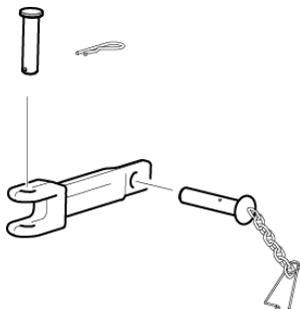
6. With a wrench, turn the caging bolt stud assembly nut until the compression spring is 90-95 percent caged. While doing this, ensure the push rod (adapter push rod or service push rod) is retracting. DO NOT over-torque the caging bolt assembly. (S-Cam-type maximum: 50 ft-lb (68 N·m), Wedge-type maximum: 30 ft-lb (41 N·m)). The spring brake is now mechanically released.



6.3 Recovery Hitch

A removable recovery hitch is a device that attaches to the sockets on the front bumper in the event that the vehicle needs to be recovered. These hitches are designed for short distance and intermittent duty to help pull a vehicle. These hitches are not designed to be used as towing devices for long distance.

Specially designed hitches are required to recover your vehicle. The recovery hitches attach to the frame. Two hitch assemblies, made up of the following parts, are recommended for the proper recovery of your vehicle.



If your vehicle is not equipped with the proper recovery hitch assembly, contact an authorized dealer to obtain the proper equipment.

! WARNING

DO NOT use parts from other vehicles or substitute materials to repair or replace a recovery hitch. Only use components specifically designed and rated for vehicle recovery to ensure structural integrity and safety. Failure to comply may result in death, personal injury, equipment damage, or property damage.

! WARNING

DO NOT attempt to diagnose, correct, or repair any vehicle issue related to the high-voltage electrical system or its components. The high-voltage electrical system is capable of producing dangerous electric shock and burns. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

! WARNING

DO NOT perform maintenance on high-voltage (HV) cables. A PACCAR trained technician is required for service. Please contact an authorized EV service certified dealership for service. Be mindful of the location of HV cables and components when working around the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

! CAUTION

DO NOT attach recovery rigging to bumpers or brackets. Connect to appropriate hitch points using the proper double chain setup to properly distribute weight. Failure to comply may result in equipment or property damage.

! CAUTION

Recovery pull maximums assume that the tow rigging evenly distributes the load between both recovery hitches. Connect the rigging according to recovery rigging instructions to avoid serious vehicle damage. Failure to comply may result in equipment or property damage.

6.4 Using a Recovery Hitch

Required tools:

- Hitch lock pin

! CAUTION

When recovering ditched or bogged vehicles, stay well below maximum capacities. Even at loads below maximum, the stresses of extraction can

damage various parts of the vehicle. Failure to comply may result in equipment or property damage.

Use the following procedure to install the Vehicle Recovery Hitches. See Recovery Hitch Assembly illustration for part identification. To see the Recovery Hitch Capacities that apply to these vehicles, refer to [Recovery Hitch Capacities](#) for more details.

1. Check the square sockets behind lower bumper for obstructions and clear if necessary.
2. With lock pins removed, insert the hitches through the bumper and into the square hitch socket.
3. Align the hole in the tow hitch with the square hitch socket hole.
4. Insert the lock pin into the square hitch socket hole and through the hole in the tow hitch until the lock tab is within the square hitch socket.
5. Rotate the lock pin 90 degrees to secure the pin in place.
6. Ensure that the tow pin and lock clip are installed before using the hitch.
7. Remove the hitches and store all parts after recovering the vehicle.

6.5 Preparing the Axles for Towing

Required tools:

- Pipe wrench
- Oil pan
- Axle hub covers
- Hammer (if needed)
- Chisel or punch tool (if needed)



WARNING

DO NOT perform maintenance on high-voltage (HV) cables. A PACCAR trained technician is required for service. Please contact an authorized EV service certified dealership for service. Be mindful of the location of HV cables and components when working around the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.



WARNING

Electric vehicles utilize a high-voltage electrical system that has the poten-

tial to cause severe injury or death if proper safety precautions are not followed. Carefully read and understand all instructions and hazard alert messages. Failure to comply may result in death, personal injury, equipment damage, or property damage.



WARNING

If a recovery vehicle is supplying air pressure, ensure any disconnected air lines from a driver-controlled main differential lock are firmly capped. An open air line on the recovered vehicle will cause a leak in the recovery vehicle air system when both vehicles' brake systems are connected. This could lead to a loss of system air and may result in the sudden application of the parking (spring) brakes, resulting in wheel lock-up, possible loss of control, or overtake by a following vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

If the vehicle is going to be towed from the front axle and using the rear axle for support, then the axle shafts should be prepared so that minimal damage is made to

the differential during the towing process. Ensure that the recovered vehicle does not have an open air line. An open air line on the recovered vehicle will cause a leak in the air system of the recovery vehicle if both vehicles' brake systems are connected. This could cause a loss of system air, which can cause the service brakes not to function, resulting in the sudden application of the spring brakes causing wheel lock-up, loss of control, or overtake by following vehicles.

1.

**CAUTION**

Do not tow the vehicle before lifting the driving wheels off the ground or removing the driveline and axle shafts. All lubricating and oil pressure is provided by a driven pump, which does not work when the vehicle is stopped. When vehicles are towed either by wrecker or piggyback, lubricant in the top front of the drive axle will drain to the rear. This will leave the top components dry, resulting in friction that will seriously damage the vehicle and components. Failure to comply may result in equipment or property damage.

Lift driving wheels off the ground and remove the axle shafts before towing the vehicle.

2. If the vehicle has driver controlled differential lock, then manually lock the differential.
3. Remove the drive axle shafts.
- 4.

**CAUTION**

Cover hubs with plastic whenever a drive axle shaft is removed. Water, dirt, and other materials can enter an open hub or axle and contaminate the axle fluid, possibly damaging axle components. Failure to comply may result in equipment or property damage.

Cover the open ends of the hubs to prevent dirt and debris from entering the axle.

6.6 Locking a Differential Manually

Required tools:

- Screwdriver

- Socket wrench
- Wrench extenders

**WARNING**

DO NOT perform maintenance on high-voltage (HV) cables. A PACCAR trained technician is required for service. Please contact an authorized EV service certified dealership for service. Be mindful of the location of HV cables and components when working around the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

**WARNING**

Electric vehicles utilize a high-voltage electrical system that has the potential to cause severe injury or death if proper safety precautions are not followed. Carefully read and understand all instructions and hazard alert messages. Failure to comply may result in death, personal injury, equipment damage, or property damage.

CAUTION

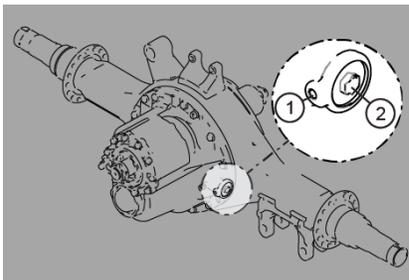
When towing vehicles with a driver-controlled main differential lock, install the caging bolt for the differential lock so that internal components maintain their position. Failure to comply may result in equipment or property damage.

WARNING

If a recovery vehicle is supplying air pressure, ensure any disconnected air lines from a driver-controlled main differential lock are firmly capped. An open air line on the recovered vehicle will cause a leak in the recovery vehicle air system when both vehicles' brake systems are connected. This could lead to a loss of system air and may result in the sudden application of the parking (spring) brakes, resulting in wheel lock-up, possible loss of control, or overtake by a following vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

If a recovery vehicle is not supplying air to the recovered vehicle, cage the recovered vehicle's brakes. A non-operating vehicle has the spring brakes applied. Those brakes need to be caged so the wheels can roll during a tow. Failure to comply may result in death, personal injury, equipment damage, or property damage.



Follow this procedure to lock a manual lock

1. Remove the air line and firmly cap the air line from the vehicle. (2)
2. Remove the caging bolt from its storage hole. (1)
3. Screw the caging bolt into the air line hole. (2)

4. When fully engaged, a 0.25-0.5 in. (6.35-12.7 mm) space remains between the air cylinder and the bolt head. This action locks the differential by pushing a piston into a "lock" position.

Result:

If the vehicle has a driver-controlled differential lock, follow these procedures. Always lock the differential when the axles are being removed to aid in re-installation. This procedure should be done before the axle shafts are removed.

- If you desire to use the recovered vehicle's brakes, ensure that the vehicle's air system is connected to that of the recovery vehicle. Also ensure that any air line that has been removed from a driver-controlled main differential lock is firmly capped to prevent loss of air pressure from the recovery vehicle.
- If you don't want to use the recovered vehicle's brakes, ensure that you cage the spring brakes before attempting to move the vehicle.

6.7 Recovery Hitch Capacities

WARNING

When towing, never place the chains or straps on or across any high-voltage components. Inform the tow vehicle operator that the chains or straps are not to be attached to, or placed over high-voltage components. Failure to comply may result in damage the high-voltage electrical system, death, personal injury, equipment damage, or property damage.

CAUTION

Always shift the vehicle into Neutral and confirm the vehicle is in Neutral position before towing. Never tow the vehicle in gear. If the vehicle can not be shifted into Neutral prior the towing, the vehicle must be transported using a flatbed truck. Failure to comply may result in equipment or property damage.

CAUTION

Remove the drive axle shafts and lift the driving wheels off the ground before towing the vehicle. Towing the vehicle with either the wheels on the ground or the axle shafts in the axles will cause damage to the axle gears and electric motor. Failure to comply may result in equipment damage or property damage.

The maximum rated loads for vehicle recovery varies depending on the direction or angle of pull. These capacities are listed in the table below and are for the two hitches working together, simultaneously.

Direction of Pull	Maximum Capacity lbs. (kg)
Directly forward	80,000 (36,000)
Directly vertical	20,000 (9,000)
45 degrees in any direction	28,000 ¹ (12,700)

¹ For a 20K front axle.

6.8 Best Practices for Recovery Rigging

WARNING

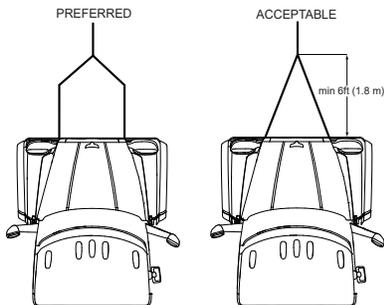
When towing, never place the chains or straps on or across any high-voltage components. Inform the tow vehicle operator that the chains or straps are not to be attached to, or placed over high-voltage components. Failure to comply may result in damage the high-voltage electrical system, death, personal injury, equipment damage, or property damage.

CAUTION

Recovery pull maximums assume that the tow rigging evenly distributes the load between both recovery hitches. Connect the rigging according to recovery rigging instructions to avoid serious vehicle damage. Failure to comply may result in equipment or property damage.

CAUTION

When recovering ditched or bogged vehicles, stay well below maximum capacities. Even at loads below maximum, the stresses of extraction can damage various parts of the vehicle. Failure to comply may result in equipment or property damage.

Table 2: Recovery Rigging Options

Use a double chain or cable setup that distributes the load equally to both hitches (see either example in the Recovery Rigging Options illustration):

- Never loop a single chain or cable through both hitches, also known as

reeving (not shown).

- Use a spreader or equalizer bar to distribute the load on both hitches (preferred), or
- If a spreader bar is unavailable: connect the main tow chain or cable no closer than 6 ft. (1.8 m) from the vehicle (acceptable).
- Secure the towed vehicle using two additional chains or cables.

6.9 Returning to Service After Recovering

Required tools:

- Approved lubricant

WARNING

DO NOT perform maintenance on high-voltage (HV) cables. A PACCAR trained technician is required for service. Please contact an authorized EV service certified dealership for service. Be mindful of the location of HV cables and components when working around the vehicle. Failure to comply may result in death, personal injury,

equipment damage, or property damage.

After the vehicle is recovered, the axles need to have oil added to prevent gear damage during operation (only required if axles were removed).

1. Into the pinion cage, add 1 pint (.47 liter) of lubricant or into the interaxle differential, add 2 pints (.94 liter) of approved lubricant.
2. After adding the specified type and amount of lubricant, unload and drive the vehicle 1 to 2 miles (1.5 to 3 km) at a speed lower than 25 mph (40 km/h) to thoroughly circulate the lubricant through the assembly.
3. If the parking brake is manually released, it will need to be modified back to its normal operating condition.
4. If the differential lock was manually locked, then the caging bolt needs to be put back in its storage location and the differential lock air line needs to be re-installed in its normal position.

Result:

Add lubricant back to the axles after recovering the vehicle and before putting it back into service.

6.10 What to Do if the Vehicle Is Stuck in Sand, Mud, Snow, or Ice

 **WARNING**

DO NOT spin the wheels faster than 35 mph (55 km/h). Under some conditions, a tire may spin twice as fast as that shown on the speedometer. Spinning a tire faster than 35 mph (55 km/h) could cause tread separation or the tire to explode. Failure to comply may result in death, personal injury, equipment damage, or property damage.

These suggestions are provided to improve the ability to free a vehicle if the vehicle gets stuck in sand, mud, snow, or ice:

- Change the vehicle direction forward and reverse to attempt to get the vehicle to rock itself unstuck.
- Remove your foot from the accelerator

pedal.

- For best traction and safety, avoid spinning the wheels.

Follow these practices to avoid transmission damage:

- Always start vehicle in motion with the selector Drive.
- DO NOT shift into reverse while the vehicle is moving and/or the tires are rotating.
- If the vehicle needs to be recovered from being stuck, do not permit the vehicle to be towed for long distances without removing the driveshaft. Refer to [Preparing the Axles for Towing](#) for more details.

If tire chains are needed, make sure they are installed on both sides of the driving axle. Installing chains on only one side of the axle can cause equipment damage.

 **WARNING**

When towing, never place the chains or straps on or across any high-voltage components. Inform the tow vehicle operator that the chains or straps are not to be attached to, or placed over high-voltage components. Failure to comply may result in damage the high-

voltage electrical system, death, personal injury, equipment damage, or property damage.

 **CAUTION**

DO NOT install tire chains on only one tandem axle. Installing chains on the tires of only one tandem axle can damage the driveline U-joints and the inter-axle differential. Failure to comply may result in equipment or property damage.

6.11 Towing the Vehicle

 **WARNING**

Electric vehicles utilize a high-voltage electrical system that has the potential to cause severe injury or death if proper safety precautions are not followed. Carefully read and understand all instructions and hazard alert messages. Failure to comply may result in death, personal injury, equipment damage, or property damage.

**WARNING**

When towing, never place the chains or straps on or across any high-voltage components. Inform the tow vehicle operator that the chains or straps are not to be attached to, or placed over high-voltage components. Failure to comply may result in damage the high-voltage electrical system, death, personal injury, equipment damage, or property damage.

A dealer or commercial towing service has the necessary equipment to safely tow the vehicle and is able to make arrangements to limit any damage to the vehicle. The towing service and the dealer should be aware of towing regulations and safety precautions.

The towing service ensures that the following precautions are taken:

- Use of a safety chain system.
- Abide by all local towing regulations.
- Ensure that the towing device does not contact any surfaces that could be damaged while in transit.
- If towing from the front, ensure that the rear axles are removed, and hub ends sealed. See [Preparing the Axles for](#)

[Towing](#) for more details on towing.

- If towing from the rear, ensure that all body components such as roof, side, and chassis fairings are secured properly to avoid damage while in transit.

**WARNING**

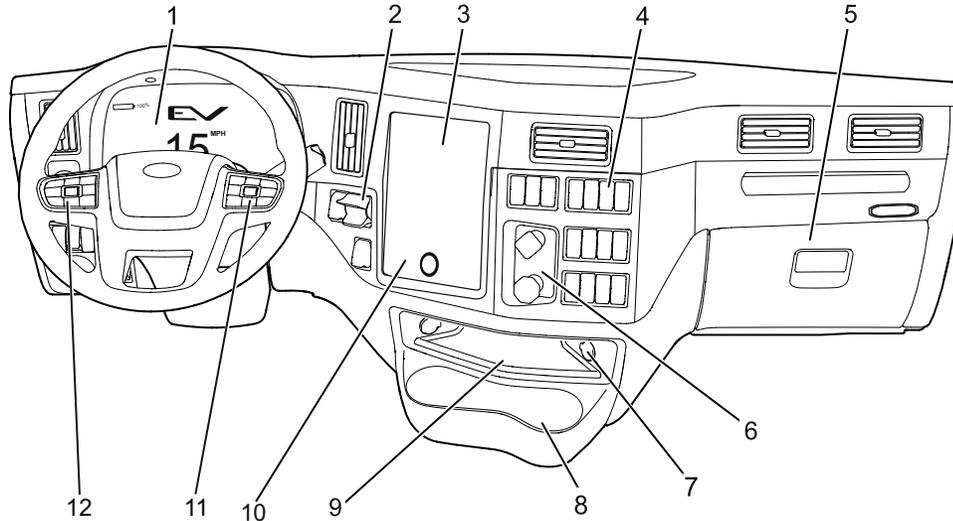
Secure the roof, side, and chassis fairings while towing from the rear. An unsecured fairing may come off of the vehicle during transit while towing from the rear. Failure to comply may result in death, personal injury, equipment damage, or property damage.

CHAPTER 3: CONTROLS

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1 INSTRUMENT PANEL

Table 3: Instrument Panel with SmartDisplay

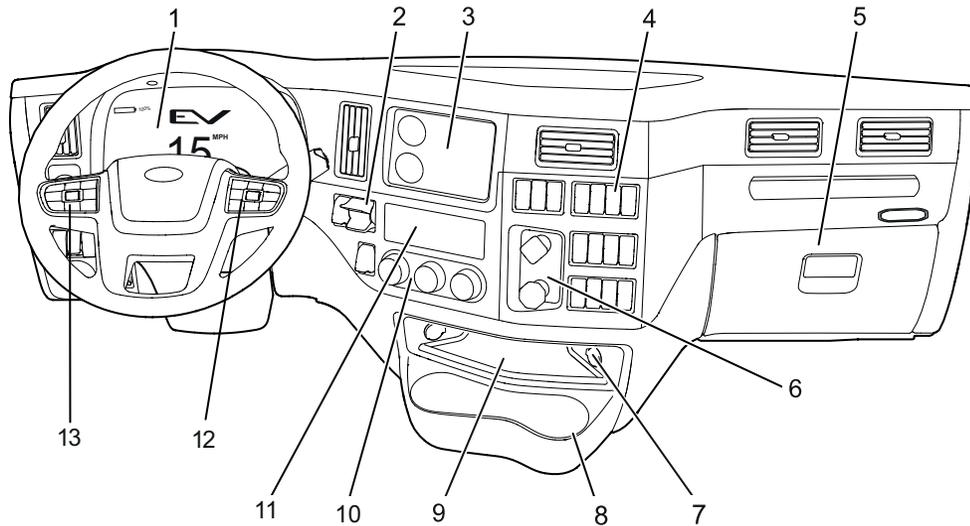


1. Digital display
2. Compact trailer valve
3. SmartDisplay (or optional gauges)
4. Switches
5. Glove box
6. Parking brakes
7. USB ports, 12 V outlet, or lighter
8. Cupholders
9. Wireless charger
10. Air conditioning controls
11. Steering wheel switches (right switch pod)
12. Steering wheel switches (left switch pod)

i NOTE

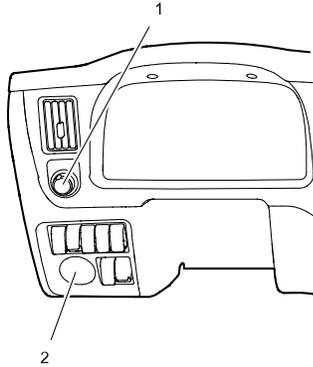
For more information on SmartDisplay features, refer to Peterbilt SmartDisplay Operator's Manual.

Table 4: Instrument Panel without SmartDisplay



1. Peterbilt digital display
2. Compact trailer valve
3. Optional content panels (gauges, storage, bins, etc.)
4. Switches
5. Glove box
6. Parking brake switches
7. USB ports, 12 V outlet, or lighter
8. Cupholders
9. Wireless charger
10. Air conditioning controls
11. Radio
12. Steering wheel switches (right switch pod)
13. Steering wheel switches (left switch pod)

Left-Side Dash



1. Master Lighting Switch
2. Start Switch

2 STEERING WHEEL CONTROLS

2.1 Steering Wheel Controls

WARNING

DO NOT attempt to service the steering wheel, clockspring, steering components (steering column, steering drive-line, or steering gear), or any electrical wiring in the multiplex system. Tampering with these components may affect steering and lead to an accident. Failure to comply may result in death, personal injury, equipment damage, or property damage.

The controls in the steering wheel allow for a safer and more convenient vehicle operation; they control the most common vehicle features and interface with the displays.



1. Left switch pod
2. Right switch pod

Switches on the left side of the horn pad include switches used to manage the toggle switch, vehicle speed functions, cruise control, and optional features such as the variable road speed limiter (VRSL), adaptive cruise control (ACC), and predictive cruise control (PCC). See [Left Switch Pod](#).

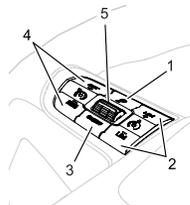
Switches on the right side control the SmartDisplay and radio (see [Cab Accessories](#)) and navigate and configure the digital display (see [Right Switch Pod](#)).

2.2 City Horn

Depressing the horn pad in the center of the steering wheel activates the city horn.

2.3 Left Switch Pod

The left switch pod on the steering wheel contains buttons for the trip and cruise control features. See [Cruise Control](#).



- | | |
|---|---|
| 1 | Trip |
| 2 | Variable Road Speed Limiter (VRSL) LIM+ and LIM- (option) |
| 3 | Cruise Control ON/OFF |
| 4 | Cruise Control (CC) SET+ and RES- |
| 5 | Toggle |

Trip

Starts a trip or sub-trip. A long press will clear all trip data.

Variable Road Speed Limiter (VRSL) LIM+ and LIM- (option)

This feature allows the operator to set an upper-limit speed for the vehicle and do not exceed this chosen speed limit. The speed

can be changed while driving by using the LIM+ and LIM- buttons. VRSL cancels the Cruise Control (CC) when active.

Cruise Control ON/OFF

By pressing the ON/OFF buttons the Cruise Control is activated or deactivated.

Cruise Control (CC) SET+ and RES-

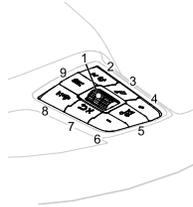
The SET+ button sets the Cruise Control speed. The RES- button resumes the previously set speed. Also, these buttons increase or decrease the Cruise Control (CC) set speed by holding down the SET+ or RES- while accelerating or decelerating the vehicle.

Toggle

This switch is optional for vehicles equipped with Adaptive Cruise Control (ACC) or Predictive Cruise Control (PCC). The toggle has toggle up, toggle down, and toggle press functionality to adjust the ACC or PCC features in the Digital Display (DD).

2.4 Right Switch Pod

The controls located on the right pod of the steering wheel are used to select the View, navigate, select items in the Menu, and view notifications.



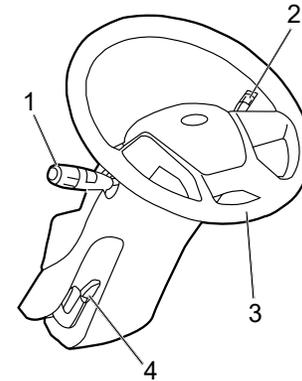
1. **Scroll Wheel**
2. **Next/Accept**
3. **Shortcuts/Voice Assistant**
4. **Volume Increase**
5. **Mute**
6. **Volume Decrease**
7. **Back/Cancel**
8. **Previous/Cancel**
9. **Media Source**

i NOTE

Voice assistant only available on Smart-Display

3 STEERING COLUMN CONTROLS

3.1 Steering Column Controls



1. Turn signal/wiper/lights stalk
2. Shifter and regenerative braking stalk
3. Steering wheel
4. Tilt/telescope lever

3.2 Turn Signal/Wiper/Lights Stalk

TURN SIGNAL/WIPER/LIGHTS STALK

The turn signal stalk is mounted on the left side of the steering column. The lever controls several functions: turn signal, high beam, and windshield wiper control. The turn signals will only operate when the key is in the start switch in the ACC or ON position.

STOP/TURN SIGNAL LAMP OPERATION

Your vehicle uses combined stop/turn signal lamps at the rear of the vehicle, using the same lamp to perform both functions. This means a single lamp is used for the brake lamp as well as the turn signal lamp. This lamp will burn steadily with the brakes applied. The same lamp will flash with the turn signal activated, even with the brakes applied.

USING THE TURN SIGNAL

The lever-action turn signal/high beam switch is located on the left side of the

steering column. The start switch must be turned to ON for the signal/switch to operate.

WARNING

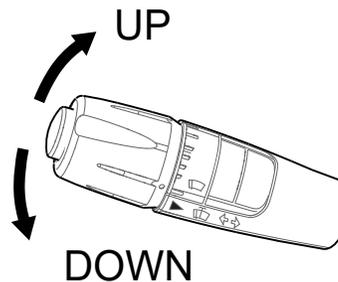
DO NOT attempt to diagnose, correct, or repair any vehicle issue related to the high-voltage electrical system or its components. The high-voltage electrical system is capable of producing dangerous electric shock and burns. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

If the turn signal lamps or turn signal indicators begin flashing at an accelerated rate (115 cycles per minute) there might be a problem with the turn signal stalk or module, and not the bulb. Please contact your nearest authorized EV service certified dealership to have the problem corrected as soon as possible. Failure to comply may result in

death, personal injury, equipment damage, or property damage.

1. Push the **Signal stalk** up to engage the right turn signal and down to engage the left turn signal.



2. Release the signal stalk.

NOTE

The regular turn signal sound will be present each time a turn signal is activated.

3.  **WARNING**

After you complete a turn, shut the turn signal off by returning the

lever to the "OFF" (center) position. Failure to shut off a turn signal could confuse other drivers and result in an accident. An indicator light in the instrument panel will flash until the turn signal is turned off. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Return the turn signal to the OFF (center) position, after the turn has been completed.

i NOTE

The turn signal is automatically deactivated when the operator turns the steering wheel in the opposite direction the turn signal was activated.

USING THE HIGH BEAMS

The high beams are operated using the turn signal stalk that is located on the left side of the steering column.

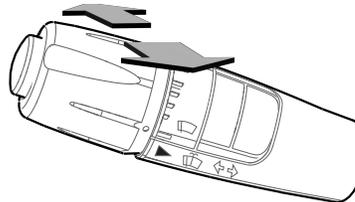
! WARNING

DO NOT use high beams in the presence of oncoming traffic. High beam glare can blind other drivers which increases the risk of an accident. Failure to comply may result in death, personal injury, equipment, or property damage.

i NOTE

The high beams and flash-to-warn activation methods use the same action. To activate the high beams, turn the low beams ON. To activate flash-to-warn, turn the low beams OFF.

1. Gently pull the **Turn Signal** stalk toward the steering wheel until you hear the switch click and the beam changes.



2. To return to previous beam, pull the **Turn Signal** stalk towards the steering wheel again.

Result:

The blue indicator light in the instrument panel will turn ON when the high beams turn ON.

USING THE HIGH BEAM ASSIST (HBA)

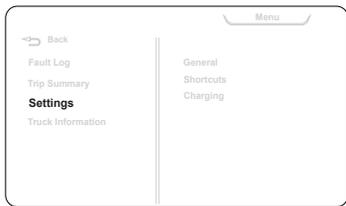
! WARNING

The driver must remain visually aware of the roadway and traffic and not rely solely on Driver Assistance features to identify and respond to the variety of vehicles or objects sharing the road. The driver must read the ADAS operator's manual associated with this feature and understand its limitations prior to driving the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

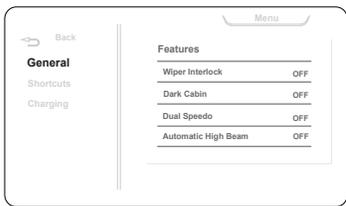
The High Beam Assist (HBA) or Automatic High Beam is an optional feature that automatically turns ON the high beams to help the driver while driving. See [High Beam](#)

Assist (HBA) for further information on this feature.

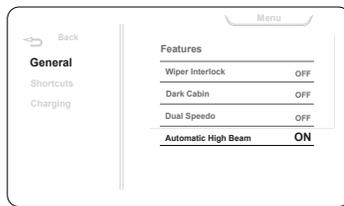
1. Go to the Main Menu in the Digital Display.
2. Select the **Settings** option.



3. Select the **General** option.



4. Scroll down until you see the **Features** section.
5. Scroll down, select **Automatic High Beam**, and set this feature to the **ON** position.



i NOTE

The High Beam Assist (HBA) can be overridden by pulling the Turn Signal stalk.

i NOTE

Regardless of the state of the high beams and the HBA, the driver will always have flash-to-pass functionality by pushing forward on the Turn Signal stalk.

EXTERIOR LIGHTING FLASHES

This vehicle comes equipped with exterior lighting flashes used to signal other drivers on the road.

FLASH-TO-WARN

WARNING

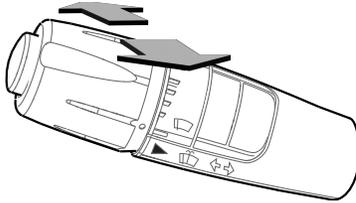
DO NOT use high beams in the presence of oncoming traffic. High beam glare can blind other drivers which increases the risk of an accident. Failure to comply may result in death, personal injury, equipment, or property damage.

i NOTE

The high beams and flash-to-warn activation methods use the same action. To activate the high beams, turn the low beams ON. To activate flash-to-warn, turn the low beams OFF.

Flash-to-warn, or “high beams flash”, allows the operator to warn other drivers by briefly flashing the high beam headlights when the headlights are turned OFF. To activate flash-to-warn:

1. When the headlights are OFF, pull the turn signal lever towards the operator to flash the headlights.



2.

**WARNING**

DO NOT hold the turn signal lever longer than necessary when activating flash-to-warn. The high beams could blind other drivers and increase the risk of an accident. Failure to comply may result in death, personal injury, equipment, or property damage.

Release the turn signal lever to the original position to end the flash-to-warn function.

Result:

The blue high beams indicator light on the instrument panel will momentarily turn on while the high beams are active.

FLASH-TO-PASS

Flash-to-pass, sometimes called “low beams flash”, allows the operator to signal other drivers. The flash looks different depending on the vehicle’s headlight type.

Halogen headlamps act one of three ways based on the headlight’s initial state:

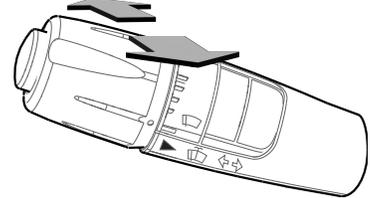
- If the low beam headlights are ON, the flash-to-pass operation will momentarily dim the headlights.
- If the low beam headlights are OFF, the flash-to-pass will turn ON and then flash the low beam headlights.
- If the high beam headlights are ON, the flash-to-pass will turn OFF the high beams and flash the low beams.

For LED (option) and HID headlamps, the flash-to-pass operation will flash the high beams. The high beams will turn off immediately after the operation is complete. Flash-to-pass does not affect the state of HID and LED low beams.

Regardless of the headlamp type, if the vehicle is using high beams, flash-to-pass will immediately deactivate the high beams. The high beams must be reactivated again after flash-to-pass is complete.

To activate flash-to-pass:

1. Push the turn signal lever away from the steering wheel.

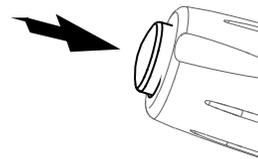


2. Release the turn signal lever to the original position.

FLASH-TO-THANK

Flash-to-thank, or “marker lights flash”, allows the operator to signal other drivers by changing the state of the marker lights. To activate flash-to-thank:

1. Press the button at the end of the turn signal lever to invert the state of the marker lights



2. Release the button to return to the original state of the marker lights.

OPERATING THE WINDSHIELD WIPERS

Required tools:

- Damp cloth

WARNING

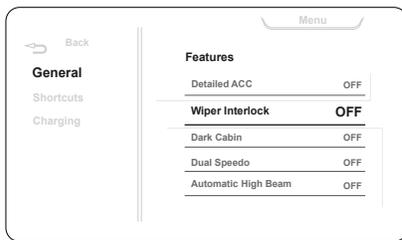
Clean blades regularly with a damp cloth to remove road film and wax buildup. **DO NOT** drive with worn or dirty wiper blades. They can reduce visibility, making driving hazardous which may lead to an accident. Failure to comply may result in death, personal injury, equipment damage, or property damage.

CAUTION

DO NOT use antifreeze or coolant in the windshield washer reservoir. These are harmful fluids to the seals and other components. Failure to comply may result in equipment or property damage.

This vehicle is equipped with a 2-speed, intermittent windshield wiper system. The windshield wiper system is integrated with the exterior lights so that the low beam headlights will turn ON when the windshield wipers turn ON.

To override this function, turn the headlights ON and then OFF again. This functionality can be changed via the **Settings** option in the instrument cluster display. Go to **Settings > General > Wiper Interlock** and set this value to OFF.

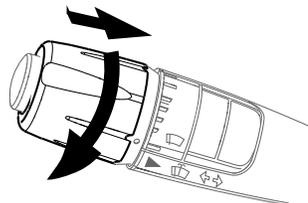


Avoid running the wiper blades over a dry windshield to prevent scratching the glass. Spray on washer fluid first. A scratched windshield will reduce visibility. A seven-position rotary wiper switch (located on the turn signal stalk) operates the windshield wipers and washer. If you need to use the windshield wipers do the following:

1. Rotate the end of the turn signal

stalk to change the wiper mode from off to on.

2. Rotate the outer knob of the turn stalk to adjust the wiper speed.



- Four levels of intermittent speeds
- Low wiper speed
- High wiper speed

HOW TO SPRAY WINDSHIELD WASHER FLUID

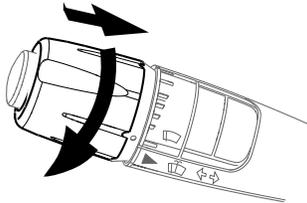
CAUTION

DO NOT operate the electric pump for a long period (more than 15 seconds) with a dry reservoir, or the pump motor may be damaged. Failure to comply may result in equipment or property damage.

This vehicle is equipped with a function to wash the windshield and simultaneously engage the wipers.

If you need to use the windshield washer follow this procedure:

1. Push the **Turn Signal Lever Outer Knob** in.



- Press and hold will activate the washer fluid and wipers.
- Instant press and release will activate the washer fluid only.

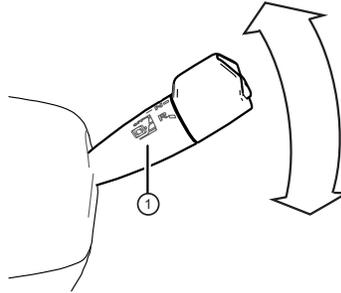
3.3 RH Slatk

RIGHT-HAND STALK

Right-hand stalk shifter controls both the Drive Mode and the Regenerative Braking System.

Regenerative Braking System (RBS)

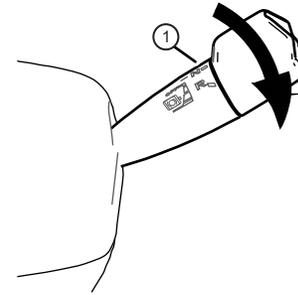
Move the stalk clockwise about the steering column axis to select the regenerative braking level. Refer to [Regenerative Braking System](#) to see more information about the RBS operation.



1. Regenerative Braking System

Drive Mode Selector

Turn the stalk end clockwise about the stalk axis to select the modes D-N-R.



1. Drive Mode Selector

3.4 Tilt/Telescope Lever

ADJUSTING THE TILT/TELESCOPE STEERING COLUMN

WARNING

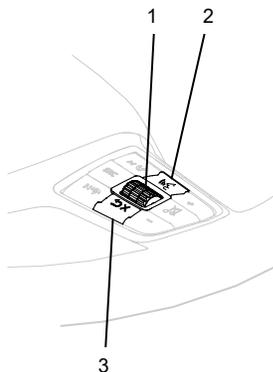
Only adjust the tilt/telescoping steering wheel while the vehicle is stopped. Adjusting it while driving can cause a loss of vehicle control. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Depending on the vehicle's configuration, the vehicle may have either a tilt or a telescoping feature.

- The tilt feature allows you to move the wheel up and down.
 - The telescoping feature allows forward and rearward movement of the wheel.
1. Push and hold the **Tilt/Telescoping** lever down fully.
 2. Push or pull the steering wheel to the desired height and angle.
 3. Push the **Tilt/Telescoping** lever back into the locked position.

4 DIGITAL DISPLAY CONTROLS

4.1 Steering Wheel Pod Use

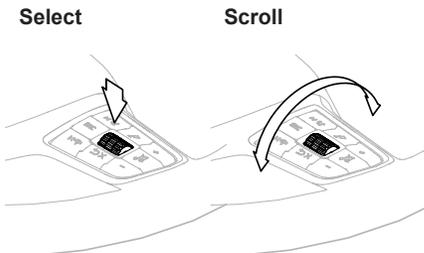


1. Scroll wheel
2. Shortcut/voice assistant (voice assistant only available on SmartDisplay).
3. Back/cancel

The controls located on the right switch pod of the steering wheel are used to manipulate content within the digital display and SmartDisplay. The shortcut button accesses items that are configured in the settings, see [Shortcuts \(Optional\)](#).

4.2 Scroll Wheel

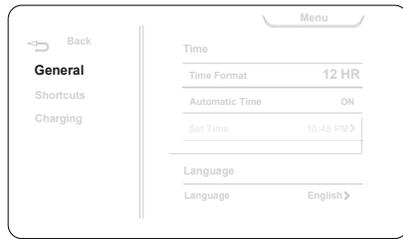
Use the Scroll Wheel to navigate through menus by rotating it up and down and press down to select menu options, change settings when in the menu, and switch between Views.



For example, vehicle time can be set using the Scroll Wheel.

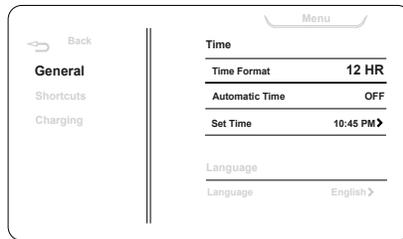
Press down **Select** to open the menu:

Figure 15: Menu Example: Main



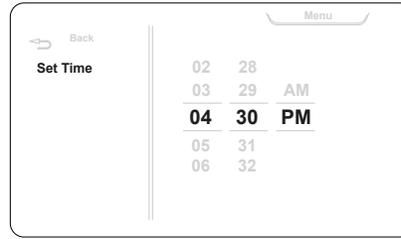
Scroll to Settings and then **Select** again to choose the Settings sub-menu: Then **Scroll** to Set Time and press **Select**.

Figure 16: Menu Example: Time



Finally, **Scroll** through the values and press **Select** to set the time.

Figure 17: Menu Example Set Function



The display indicates that the Scroll Wheel can be used to **Select** with this icon:

Figure 18: Select



4.3 Back/Cancel

Use the **Back/Cancel** button to return to the previous menu, suppress a notification, or cancel a selection. See [Notifications](#).

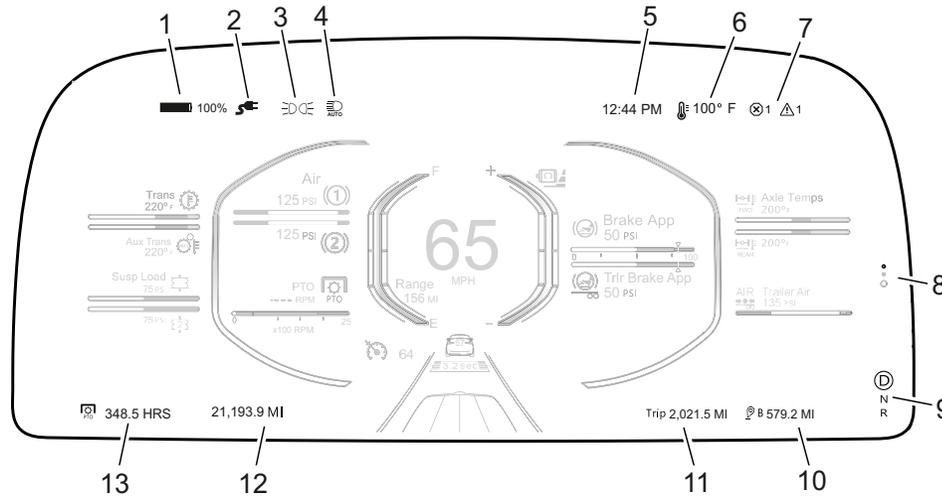
5 DIGITAL DISPLAY

5.1 Digital Display

The Digital Display is visible during all driving situations and in some parked situations. When the parking brake is set, the following actions wake up the display:

- Opening (or maintaining open) the cab doors.
- Using steering wheel switches.
- Tapping the brake.
- Turning the start switch to **ON**, **ACC**, or **START**.
- Starting the vehicle.
- Charging the vehicle.
- When charging preschedule is configured.

Display Indications



1. State of Charge (SOC)
2. Charge plug connect
3. Headlight status
4. (Optional) High Beam Assist (HBA) optional
5. Clock
6. Outside Air Temperature (OAT)
7. Active warnings
8. View indicator (pagination)
9. Vehicle mode
10. Sub-trip odometer
11. Trip odometer
12. Odometer
13. (Optional) PTO Hours

5.2 State of Charge (SOC)

 100%

The State of Charge (SOC) or charge status shows the level of charge of the high-voltage batteries, shown as a percentage.

- Blue: default/not charging
- Green: charging
- Red: low SOC
- White: plugged in to charger and waiting for scheduled charge to start

5.3 Charge Plug Connected



This indicator illuminates on the top bar of the Digital Display when the vehicle's charge inlet is plugged into a charger. The Move Disallowed symbol that states **Unplug Charger** will be displayed on the Digital Display if the driver attempts to drive the vehicle while the vehicle is still plugged into the charger. Refer to [Move Disallowed](#) for more specifications of the Move Disallowed feature.

CAUTION

DO NOT release parking brake or attempt to drive the vehicle while it is charging. Should the vehicle roll while the charging cord is connected, the charging inlet could be damaged. Ensure the charging cord is not connected and the Ready to Move indicator is illuminated on the Digital Display prior to moving the vehicle. Failure to comply may result in equipment or property damage.

5.4 Clock

10:45 PM

The clock can be displayed in a 12-hour or 24-hour format. Clock settings can be modified in the **Settings > Sub-menu**.

5.5 Outside Air Temperature

 100° F

Outside Air Temperature monitors the ambient air temperature outside the vehicle.

The display alerts the operator to high and low temperature conditions. When the outside temperature approaches freezing (36°F or 2°C) an icon appears next to the temperature (snowflake for freezing and thermometer for high) and a chime will sound. The system's unit of measure (Fahrenheit or Celsius) can be changed from the settings menu. The outside air temperature display uses a sensor (located at the bottom of the driver's side mirror assembly) to measure outside air temperature only. The outside air temperature does not display the temperature of the road surface on either the temperature display or the snowflake icon. Additionally, the outside air temperature reading may be affected by exposure to direct sunlight.

5.6 Active Warnings



Active warnings are displayed when the operator activates the Systems Check function or the Exterior Lighting Self-Test (ELST) to examine the vehicle systems as part of a pre-trip inspection. The display

notifies with red or amber notifications, the notifications are counted, and the total is displayed by the active warning indicator on the right upper side of the display. Additionally, this location is used to show the status of the system check messages during the ELST:

- Checking Systems
- All Systems OK
- Check Fault Log

5.7 View Indicator (Pagination)



The View indicator shows the view that is currently selected. Three views are available:

- Minimized
- Basic
- Enhanced

Refer to [View Options](#) for more detailed information concerning view options.

5.8 Vehicle Mode



The Vehicle Mode indicator reflects the mode that the vehicle is using. The three modes are:

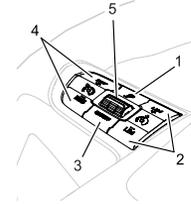
- Drive
- Neutral
- Reverse

5.9 Trip Odometer

The Trip Odometer shows how far the vehicle has traveled during the current trip (since it was last reset). The current trip can be segmented with way-point markers. The maximum distance that can be shown on the **Trip Odometer** is 62,137.0 mi (99,999.9 km) at which point the operator needs to reset.

Press and quickly release the **Way-point marker** to set segments. Press and hold the **Way-point marker** to reset the total trip and reset the segment back to A. (Item 1 in the following image):

Figure 19: Left Switch Pod



1. Trip way-point marker
2. Limiter control
3. Cruise control ON/OFF
4. Cruise control set-resume
5. Toggle switch

The operator can then view the marked segments and total trip data captured in the [Trip Summary](#).

5.10 Trip Segment Odometer

The Trip Segment Odometer can be split into smaller segments denoted with letters from A to Z. Pressing the way-point marker button on the steering wheel causes the segments to increment. Segment B is the first indicated because Segment A is the total trip until the way-point marking is used. The maximum distance that the seg-

ment will show is 6,214.9 mi (9,999.9 km) at which point the system automatically increments to the next letter. If the total trip or segments exceed the systems capacity, there is a notification on the screen or the data collection will stop until the total trip is reset. Trip data and the segmentation information can be found in the menu under Trip Summary.

5.11 Odometer

368,356.5 MI

The odometer displays the total distance that the vehicle has traveled. The maximum distance that can be shown on the odometer indicator is 6,213,711.86MI (9,999,999.9km). The odometer will roll over to zero if the maximum mileage is achieved.

5.12 PTO Hours

 99,999.9 HRS

For vehicles equipped with Power Take-off (PTO) the PTO hours indicator will display the total number of hours that the PTO has been operated. The maximum hours

that can be shown are 99,999.9. The PTO hours will roll over to zero if the maximum mileage is achieved.

1. View options

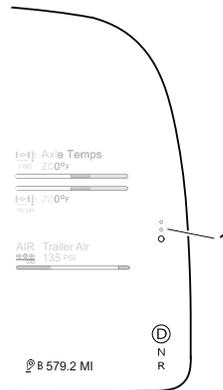
6 VIEW OPTIONS

6.1 View Options

The Digital Display is equipped with three views for the operator to use while driving:

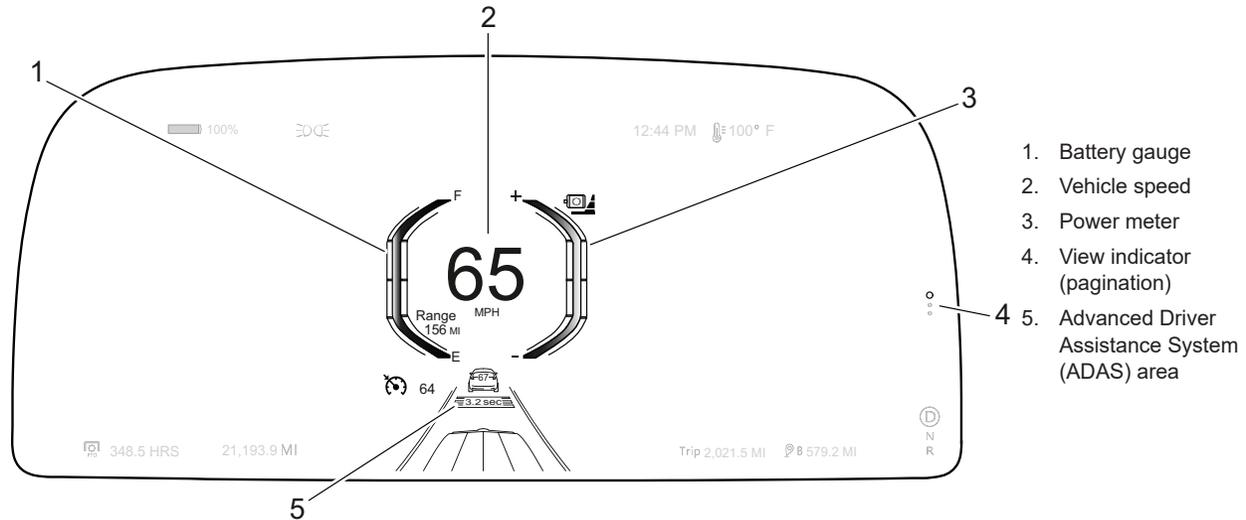
- Minimized view
- Basic view
- Enhanced view

Each view is identified by a specific view indicator on the right side of the display area:



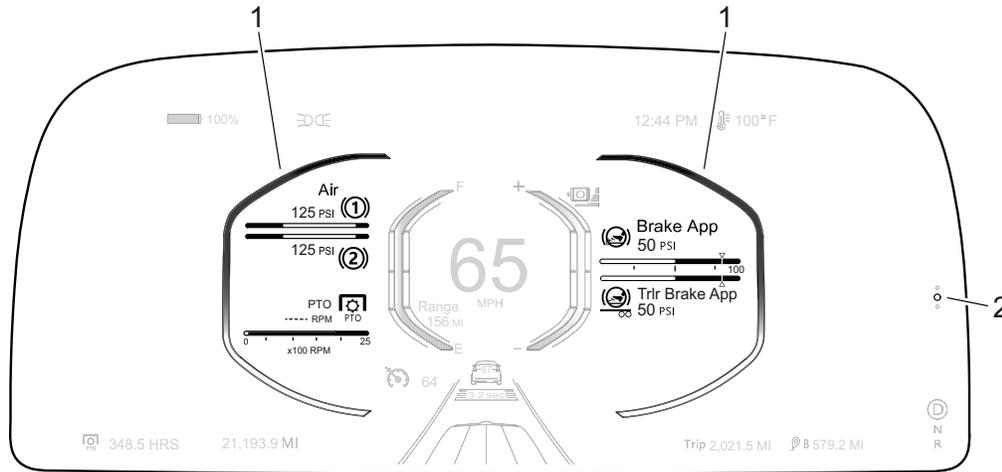
6.2 Minimized View

The minimized view is the first view option and includes the vehicle speed in the center of the Digital Display.



6.3 Basic View

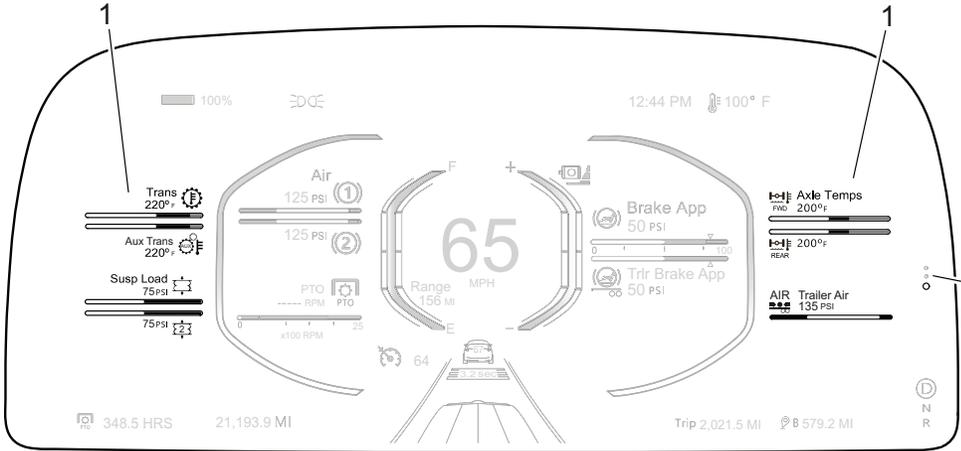
The basic view is the second view option and includes the vehicle speed, power meter, battery gauge, and other features in the center of the Digital Display.



1. Gauges for basic view
2. View indicator (pagination)

6.4 Enhanced View

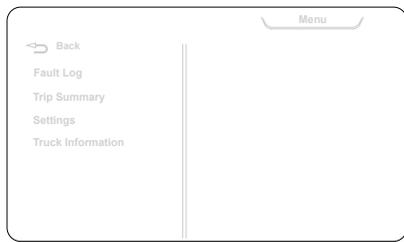
The enhanced view is the third view option and includes the vehicle speed, power meter, battery gauge, brake pressure gauge, e-coach indicators, and other features. The enhanced view is the most complete drive view.



- 1. Gauges for enhanced view
- 2. View indicator (pagination)

7 MAIN MENU

7.1 Main Menu



The following are options in the Main Menu:

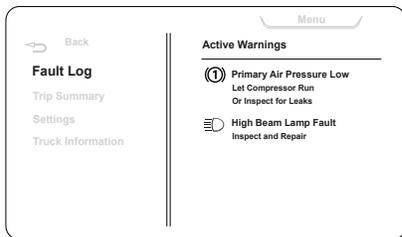
- **Fault Log**
- **Trip Summary**
- **Settings**
- **Truck Information**

These options are accessible when all the conditions below happen:

1. The parking brake is set
2. Drive Mode in Neutral
3. All active notifications are viewed and suppressed
4. The **Select** button is pressed

These menus allow the operator to configure settings on the vehicle.

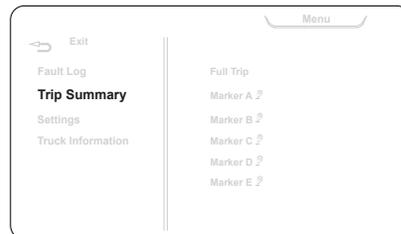
7.2 Fault Log



The **Fault Log** sub-menu displays system messages related to the condition of the vehicle, such as:

- Tire Pressure Monitoring System (TPMS)
- Active Warnings

7.3 Trip Summary



The **Trip Summary** sub-menu displays detailed information captured using the trip and segment marking function. This information is collected into the total trip (called the Full Trip) and optionally, several sub-trips (each identified with a letter). The Trip Summary collects and totals data until the **Trip** has been reset or the max total distance is reached, at which point no further trip information will be added. The max total distance for the main trip is 62,137.0MI (99,999.9km) and 6,214.9MI (9,999.9km) for a sub-trip.

Each trip can be scrolled to and selected by turning the **Scroll** and then pressing **Select**.

Each trip contains the following categories:

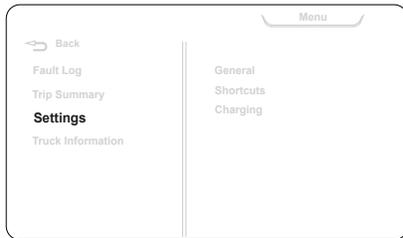
- Distance – Shows the distance traveled during the sub-trip or the total distance traveled during all trips.

- Trip Info – Shows information about trip time and cruise control usage.
- Time Stamp – Shows the start and stop times, and the dates for the selected trip.
- PTO (option) – Shows information about PTO specific usage during the trip.

The information contained in these categories can be viewed by scrolling within that specific trip sub-menu.

7.4 Settings

SETTINGS



The **Settings** sub-menu allows the operator to customize the Digital Display and the following options are accessible:

- **General**

- **Shortcuts**
- **Charging**

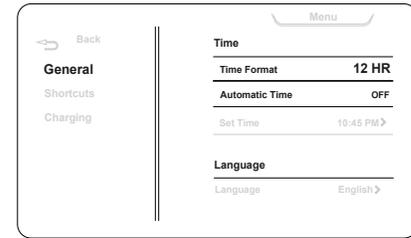
GENERAL



The **General** option of the **Settings** sub-menu displays the options:

- Time
- Units and Language
- Features (Detailed ACC, Wiper Interlock, Dark Cabin, Dual Speedometer, Automatic High Beam)

TIME



This **Time** section allows the operator to customize the clock as follows:

Time Format The **Time Format** is available for 12 or 24 hour format.¹

¹ AM or PM (A or P) will only be displayed in 12-hour time format.

Automatic Time When the **Automatic Time** is **ON**, the vehicles will receive time zone appropriate data.

Set Time The **Set Time** is available when the **Automatic Time** is not enabled. Set the clock to indicate your local time.

UNITS AND LANGUAGE

Units and language are configured in the digital display settings and if installed, shared with SmartDisplay automatically.

Units

Use this setting to change the units of measurement between these options:

- Standard: MI, PSI
- Metric (bar): km, bar
- Metric(PSI): km, PSI

Language

This option of the **Settings** sub-menu allows to change the language, which are:

- English
- French
- Spanish

PRESSURE UNITS

The Digital Display offers the following units of measurement for pressure:

- Pounds per Square Inch (psi)
- Bar (bar)

The default unit is psi for both imperial and metric systems. Metric users may switch from psi to bar in the settings.

FEATURES

The features sub-menu allows the operator to enable optional features on the vehicle to customize their experience. The following features are available for the operator:

- Detailed ACC (optional)
- Wiper Interlock
- Dark Cabin
- Dual Speedometer
- Automatic High Beam (optional)

Detailed ACC

If your vehicle is equipped with detailed ACC, this optional feature shows the Adaptive Cruise Control lead vehicle speed and headway data.

Wiper Interlock

This feature allows the headlamps turn on with windshield wipers.

Dark Cabin

This feature allows the cab dome lamps turn ON when the doors open.

Dual Speedometer

This feature shows the speedometer with both standard and metric units in one view.

Automatic High Beam

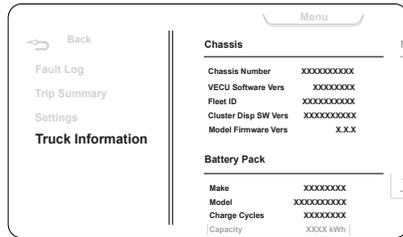
This optional feature automatically activates and deactivates the high-beam headlights when appropriate.

SHORTCUTS (OPTIONAL)

The **Shortcuts** option allows the operator to assign one of the following features to the **Shortcuts** button for an easier accessibility:

- Detailed ACC – Shows Adaptive Cruise Control lead vehicle speed and headway data
- Wiper Interlock – Headlamps turn ON with windshield wipers
- Dark Cabin – Cab dome lamps turn ON when the doors are open
- Dual Speedometer – Shows the speedometer with both standard and metric unit in one view
- Automatic High Beam – Automatically activates and deactivates high-beam headlights when appropriate (pull left-hand stalk to override).

7.5 Vehicle Information



The **Vehicle Information** sub-menu stores specifications and data about the vehicle:

- Chassis
- Battery Pack
- Motor
- ABS
- Adaptive Cruise Control (option)
- Predictive Cruise Control
- Tire Pressure Monitor System (option)
- Digital Vision System (option)
- Lane Departure Warning (option)
- Lane Change Assist (option)
- Lane Keeping Assist (option)
- PTO (option)
- Other Software

Detailed information for listed components or features can be shown by scrolling (using the **Scroll**) to the item and then pressing **Select**.

7.6 Drive Summary

The Drive Summary presents information since the last vehicle charge cycle and is shown when the start switch is turned to OFF. When insufficient information has been collected, the Drive Summary will show dashes for the monitored component or report. The Drive Summary consists of:

- Distance traveled
- Energy used
- Efficiency

8 NOTIFICATIONS

8.1 Notifications

The notification communicates vehicle information. Notifications can be red, amber, or white. Red and amber notifications are totaled in the Active Warnings indicator at the top of the display. Notifications' characteristics (color, brilliance, and

whether it flashes or has an audible alarm) depend on the condition that generated the notification.



1. Notification title
2. Instructions - contains brief instructions or elaborating information

8.2 Viewing and Suppressing Notifications

A notification can be read and suppressed by pressing the Scroll Wheel. Some situations may require pressing **Back/Cancel** instead.

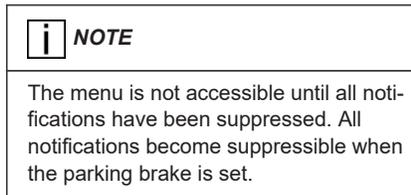
When multiple notifications are present, each notification is assigned a priority and placed in a stack. Higher priority notifications are placed at the top of the stack. The Scroll Wheel select button cycles through the active notifications, allowing each notification in the stack to be viewed.

Some notifications, once viewed, are removed from the stack; these notifications are called suppressible. Suppressible notifications show an **X** below the **Select** icon and typically do not require an imme-

3

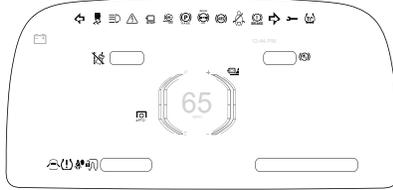
mediate response. Suppress these notifications using the **Back/Cancel** button (or the **Select** button when the parking brake is set). Non-suppressible notifications cannot be removed from the stack until the parking brake is set. For example, the notification in the following image is suppressed by pressing the Scroll Wheel (indicated with a down arrow) OR by pressing the **Back/Cancel** (indicated with an X below the roller).

Figure 20: Suppressible Notification Message



9 WARNING LIGHTS AND INDICATORS

9.1 Warning Lights and Indicators

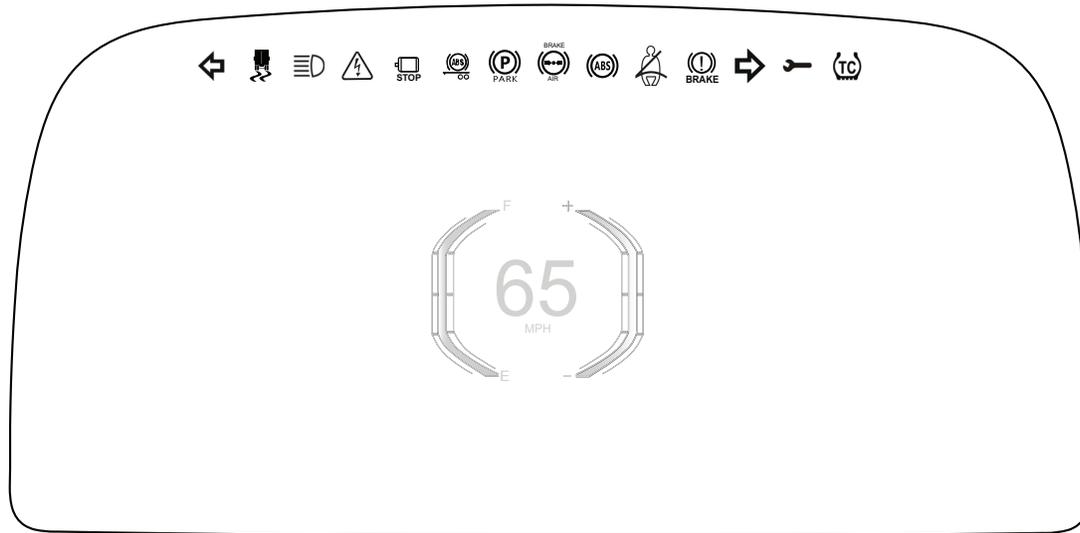


The instrument panel communicates many vehicle conditions using warning lights (also called telltales), indicators, and audible alarms and tones. Alarms and tones are sometimes accompanied by an indicator or warning light. Some indications are communicated for informational purposes only – indicators – while warning lights often require an operator response and are frequently accompanied with a notification (see [Notifications](#)).

Warning lights, indicators, and audible alarms and tones may indicate a system malfunction or attempt to draw attention to the component it monitors, so they should be checked frequently and responded to promptly. These indications could save you from a serious accident.

Some of these indications also present an associated notification, providing additional information (see [Notifications](#)). Red and amber notifications are tallied at the top of the display and can be viewed in the Fault Log sub-menu when the parking brake is set. Additionally, gauges may become visible on the Digital Display and may change color or brightness to bring the gauge to the operator's attention.

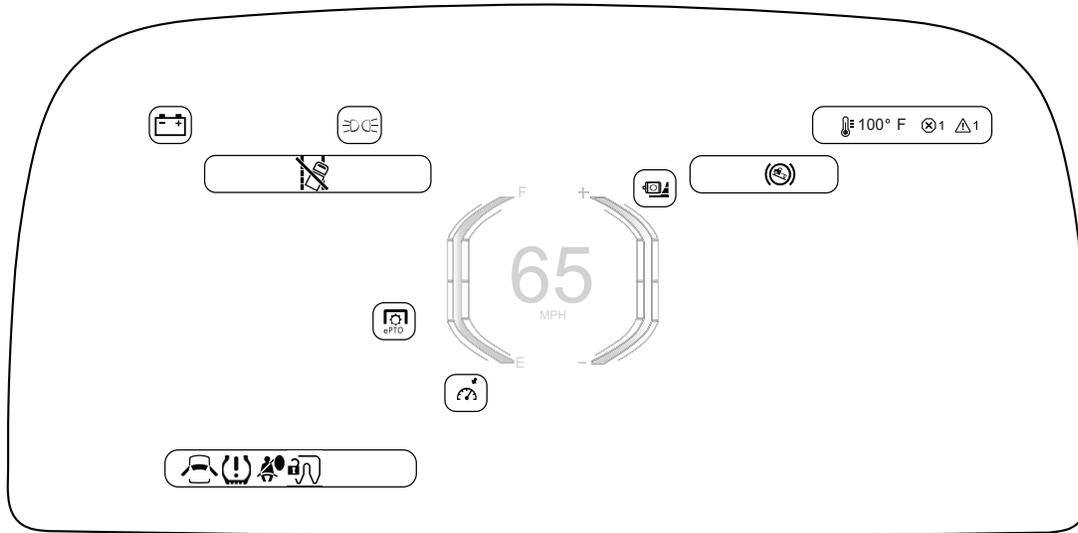
Physical Telltales



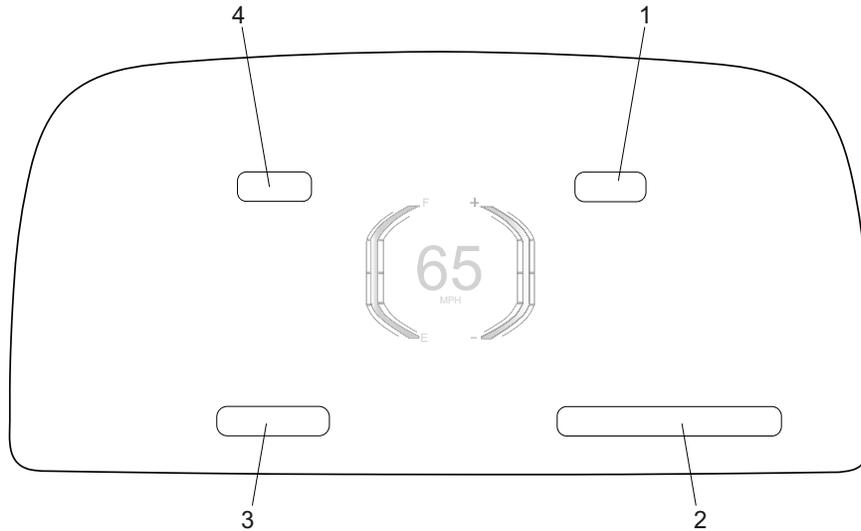
Physical telltales will always appear across the top of the display.

Dedicated Telltales

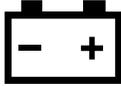
Dedicated telltales always appear in the same location on the display. Some are visible only when active, but most signify that the monitored component requires operator's attention.



Dynamic Telltales



Dynamic telltales appear on the display in the rows indicated. A dynamic telltale communicates the status of a monitored component, which may require the operator to respond or take action.

Indicator	Symbol	Color	Standard	Option
<u>12 V Battery</u>		Amber / red ¹	•	
<u>ADAS Camera Fault</u>		Amber		•
<u>Anti-lock Braking System (ABS)</u>		Amber	•	
<u>Axle Temperature</u>		Green	•	
<u>Cruise Control</u>		Green	•	
<u>Charge Plug Connected</u>		Green / Blue / White ²	•	
<u>Charge Plug Connected Fault</u>		Amber	•	
<u>Dump Truck Body Up</u>		Amber		•
<u>Electronic Stability Control</u>		Amber	•	

Indicator	Symbol	Color	Standard	Option
<u>High Beam</u>		Blue	•	
<u>High Beam Assist (HBA)</u>		Green		•
<u>High-Voltage Hazard</u>		Red	•	
<u>Hill Hold</u>		Amber		•
<u>Lane Departure Warning (LDW)</u>		Amber		•
<u>Lane Departure Warning (LDW) Fault</u>		Amber		•
<u>Lane Keeping Assist (LKA) Disable (option)</u>		None		•
<u>Lane Keeping Assist (LKA) Enabled/ Engaged</u>		White / Green ³		•

Indicator	Symbol	Color	Standard	Option
<u>Lane Keeping Assist (LKA) Fault</u>		White		•
<u>Left Turn Signal</u>		Green	•	
<u>Low Air System</u>		Green	•	
<u>Low-Voltage Disconnect (LVD)</u>		Amber	•	
<u>Move Disallowed</u>		Amber	•	
<u>PTO</u>		Green	•	
<u>Parking Brake</u>		Red	•	
<u>Ready to Move</u>		Green	•	
<u>Regenerative Braking</u>		Green / White / Grey ⁴	•	

Indicator	Symbol	Color	Standard	Option
<u>Regenerative Braking System (RBS) Fault</u>		Amber	•	
<u>Right Turn Signal</u>		Green	•	
<u>Seat Belt</u>		Red	•	
<u>Service Vehicle</u>		Amber	•	
<u>State of Charge (SOC)</u>		Blue / Green / Red / White ⁵	•	
<u>Stop Vehicle</u>		Red	•	
<u>Tire Pressure Monitoring System (TPMS)</u>		Amber	•	
<u>Torque Assisted Steering Fault</u>		Amber	•	

¹ Amber indicates a low-voltage condition; red indicates a high or very low-voltage condition.

² Green indicates charging, blue indicates not charging, and white indicates waiting to charge.

³ White indicates that the Lane Keeping Assist (LKA) feature is enabled and green that conditions for LKA have been met and the vehicle is actively engaged.

⁴ Green color indicates active, white color indicates enabled, and grey color indicates disabled.

⁵ Blue color indicates default/not charging, green color indicates charging, red color indicates low SOC and white color indicates plugged in to charger and waiting for scheduled charge to start.

9.2 12 V Battery



The 12 V battery indicator shows the battery icon, voltage, and the state of charge. The battery icon illuminates amber to indicate a low-voltage condition and illuminates red to indicate a high or very low-voltage condition. The Low-Voltage Disconnect (LVD) icon replaces the battery icon when the LVD is active. Refer to [Low-Voltage Disconnect \(LVD\)](#) for more specifications of Low-Voltage Disconnect (LVD).

9.3 ADAS Camera Fault



This warning light appears when a fault occurs with the camera used by the various Advanced Driver Assist Systems (ADAS) features: Lane Departure Warning (LDW), Lane Keeping Assist (LKA), and Adaptive Cruise Control (ACC). The LDW and optional LKA features are both dependent on the ADAS camera, and both will be disabled when this warning occurs.

In addition to issues internal to the camera, please read the topic Lane Departure Warning (LDW) for conditions which may limit camera performance, resulting in an ADAS Camera Fault.

9.4 Anti-lock Braking System (ABS)



This warning light illuminates during the Exterior Lights Self-Test (ELST). If the ABS warning light stays ON for more than 3 seconds, please contact an EV service certified dealership for assistance.

The ABS warning light:

- Illuminates during normal operating conditions to indicate a problem with the ABS.
- Illuminates when a problem exists with the Automatic Traction Control (ATC).

NOTE

After servicing the ABS, the lamp stays on after the power-on self-test. This

indicates that the ABS wheel sensors have not been checked by the ABS. As soon as the vehicle is driven at speeds above 4 mph (6 km/h) the lamp turns off, indicating that the wheel sensors have been checked by the ABS.

9.5 Axle Temperature



These indicators represent the temperature of the lubricant in the vehicle's drive axles. These temperatures will vary with the type of load that the vehicle is carrying and the driving conditions encountered. Maximum axle temperature may vary, depending upon the axle and type of lubricant. Very high temperatures mean that the axle lubrication needs to be checked.

The indicators display **FWD** for the forward-rear axle, and **REAR** for the rear-rear axle when the vehicle is in the Enhanced View. See [Enhanced View](#).

**CAUTION**

Driving with very hot temperatures in the rear axles can cause serious damage to the axle bearings and seals. If you notice a sign of overheating, please have your axle lubrication checked. Failure to comply may result in equipment or property damage.

9.6 Charge Plug Connected Fault



This indicator will illuminate on the top bar when there is a problem with the charging process. This indicator will illuminate in conjunction with different messages displayed on the Digital Display. See [Charging Status](#) for more specifications.

9.7 Cruise Control



This indicator shows the operator which Cruise Control function is currently enabled or active. This includes

- Cruise Control
- Adaptive Cruise Control (optional)
- Predictive Cruise Control (optional)
- Variable Road Speed Limiter (optional)

When a Cruise Control function is enabled, a white indicator will appear. When a Cruise Control function has been activated, the indicator will change from white to green. For more information on use of the various Cruise Control functions, see Cruise Control, Adaptive Cruise Control, Predictive Cruise Control, and Variable Road Speed Limiter.

9.8 Dump Truck Body Up



This indicator illuminates when the truck dump body is up.

9.9 Electronic Stability Control



The Stability Control calculates the operator's intended path of travel from wheel speed and steering angle sensors, then compares calculations to the actual direction of travel. The system uses individual wheel brakes to re-adjust the path of the vehicle.

- The Electronic Stability Control (ESC) warning light illuminates in the panel instrument when the start switch or key is turned ON, as a part of a bulb check function, and then the ESC turns OFF after a few seconds if no system problems are detected. If a problem is detected, the ESC warning light will turn ON and stay ON.
- The ESC illuminates when the ESC system is regulating individual wheel brakes to correct the vehicle's direction of travel. Refer to [Advanced ABS With Stability Control](#) for more information.

⚠ WARNING

If this chassis is equipped with Electronic Stability Control (ESC) and then is modified (e.g. adding or removing an axle, converting from a truck to a tractor, converting from a tractor to a truck, changing the body, lengthening of the wheelbase and/or frame, relocating frame components, or modifying pneumatic or electrical ABS/ESC harnesses) the ESC must be evaluated by a qualified technician. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

i NOTE

For more information about the stability control system installed on your vehicle, please refer to additional material supplied with this operator manual, included in your glove box informational packet.

9.10 High Beam



This indicator illuminates when the high beams are on. This indicator will flash with an audible alarm if the headlights are left ON when the door is opened and the key switch is OFF.

In addition, this icon will flash, but without an audible alarm, if there is a problem with the low beam headlights or the low beam headlight wiring. In such event, the high beam headlights will turn on at 50% normal brightness.

9.11 High Beam Assist (HBA)



If your vehicle is equipped with High Beam Assist (HBA), and it is turned ON in the menu, the HBA indicator will illuminate green when enabled, the indicator will illuminate gray when overridden, and the indi-

cator will disappear when disabled. There are two driver override states, see [High Beam Assist \(HBA\)](#).

9.12 High-Voltage Hazard



This warning light illuminates when there is a high-voltage hazard that may be caused by a broken high-voltage interlock loop, low isolation resistance, or other failures in the high-voltage electric powertrain system. If this warning light illuminates, find a safe place to pull over, shutdown the vehicle, and call an EV service certified dealership for assistance.

⚠ WARNING

DO NOT attempt to diagnose, correct, or repair any vehicle issue related to the high-voltage electrical system or its components. The high-voltage electrical system is capable of producing dangerous electric shock and burns. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in

death, personal injury, equipment damage, or property damage.

WARNING

DO NOT touch or attempt to remove any of the orange high voltage (HV) cables, connectors, or components for any reason. **If asked to inspect HV component or cabling, only inspect visually.** Failure to comply may result in death, personal injury, equipment damage, or property damage.

9.13 Hill Hold



The Hill Hold indicator illuminates amber when active. The Hill Hold helps control unwanted vehicle movement on steep grades when transitioning from brake to accelerator pedal.

9.14 Lane Departure Warning (LDW)



Illuminates when LDW system is not able to track the vehicle's position within the lane.

NOTE

For vehicles equipped with Lane Departure Warning, please refer to Lane Departure Warning Operator's Manual for additional information.

9.15 Lane Departure Warning (LDW) Fault



This amber warning light will appear when a fault occurs in the Lane Departure Warning (LDW) system. If this occurs, the LDW feature will be disabled.

9.16 Lane Keeping Assist (LKA) Disable (option)



This optional switch will disable the Lane Keeping Assist (LKA) feature. LKA will remain disabled until the next key cycle unless re-enabled by toggling this switch again.

This switch lights up green when active.

9.17 Lane Keeping Assist (LKA) Enabled/ Engaged



Indicates, when white, that the Lane Keeping Assist (LKA) feature is enabled. When green, this indicator signifies that the con-

ditions for LKA have been met and that the vehicle is actively engaged in lane keeping (see [Lane Keeping Assist \(LKA\)](#)).

9.18 Lane Keeping Assist (LKA) Fault



This white warning light will appear when there is a fault in the Lane Keeping Assist (LKA) system. When this occurs, the LKA feature will be disabled.

9.19 Left Turn Signal



This indicator illuminates when the left turn signal or the hazard light function is operating.

9.20 Low Air System



This warning light illuminates when the air pressure system falls below 65 psi (4.48 bar/448 kPa).

9.21 Low-Voltage Disconnect (LVD)



This indicator illuminates amber accompanied by an audible warning when the battery voltage drops below the LVD setting. This starts the two-minute countdown.

9.22 Move Disallowed



The Move Disallowed indicator is displayed on the Digital Display in amber color when the vehicle is not able to move under its

own power. This can occur because the battery SOC is too low, because the charge plug is attached, or because the transmission is not in Neutral on start up.

There are four requirements that need to be satisfied in order to put the vehicle in motion:

- Shift to neutral
- Unplug charger
- Apply brake pedal
- Set parking brake

9.23 Parking Brake



This indicator illuminates when the parking brake is applied.

The indicator will flash and a warning tone will sound anytime the Parking Brake is not set and the operator's door is open.

If the parking brake is set and the speed is greater than 5 miles per hour, an audible alarm will sound.

9.24 PTO



If your vehicle is equipped with Power Take-off (PTO), this indicator illuminates when the electric PTO is enabled.

9.25 Ready to Move



The ready to move indicator helps the operator to know when it is safe to start driving, as the vehicle does not emit any audible signal. The ready to move symbol turns ON in the following conditions:

- When the vehicle changes from Parking or Neutral and starts to move with the brake pedal applied.
- After the charger is unplugged and the vehicle is in Drive or Reverse mode with the brake pedal applied.

This symbol turns OFF once the vehicle has started moving, and returns when is parked with the Start switch in the ON position.

WARNING

Vehicle noise may be reduced in some operation modes. The vehicle operator must remain aware of nearby vehicles or pedestrians at all times. Failure to comply may result in death, personal injury, equipment damage, or property damage.

9.26 Regenerative Braking



The Regenerative Braking indicator is located in the center of the Digital Display and turns green when active and white when inactive. The three bars indicate the current position of the Right Hand Stalk Shifter setting. It can also indicate limitations of the regenerative system when the icon shows the bars outlined and amber. See [Regenerative Braking System](#) for the specific operation of this feature.

9.27 Regenerative Braking System (RBS) Fault



The Regenerative Braking System (RBS) fault indicator is displayed when the brake system experiences a fault condition that disables the RBS function. When this warning light appears, brakes must be applied manually to slow down the vehicle.

The RBS appears alone in the digital display with no other fault indicators in certain specific conditions (not faults). It can also appear, however, along with other fault indicators when a critical RBS fault occurs. See [Regenerative Braking Fault](#).

NOTE

The regen icon turns grey and the regen gauge has three amber bars to indicate the deactivation of the regenerative braking system due to the battery State of Charge (SOC) being near full charge.

9.28 Right Turn Signal



This indicator illuminates when the right turn signal or the hazard light function is operating.

9.29 Seat Belt



This warning light illuminates for 5 seconds whenever the vehicle is started, then it turns off. The warning light may also illuminate if the driver's seat belt is not fastened (if the vehicle is equipped with a seat belt warning light option).

9.30 Service Vehicle



This warning light illuminates when the vehicle needs to be serviced or permanent damage may occur.

WARNING

DO NOT attempt to diagnose, correct, or repair any vehicle issue related to the high-voltage electrical system or its components. The high-voltage electrical system is capable of producing dangerous electric shock and burns. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

9.31 State of Charge (SOC)

 100%

The State of Charge (SOC) or charge status shows the level of charge of the high-voltage batteries, shown as a percentage.

- Blue: default/not charging
- Green: charging
- Red: low SOC
- White: plugged in to charger and waiting for scheduled charge to start

9.32 Stop Vehicle



This warning light illuminates when the vehicle needs to be stopped at a safe place or damage may occur.

9.33 Tire Pressure Monitoring System (TPMS)



This warning light illuminates when the tire pressures need to be checked.

9.34 Torque Assisted Steering Fault



This warning light appears inside a notification when there is a fault in the Torque Assisted Steering (TAS) system. When the notification with this symbol illuminates, the Torque Assisted Steering (TAS) is not available.

i **NOTE**

Because the optional Lane Keeping Assist (LKA) feature uses the Torque Assisted Steering system, a fault in the Torque Assisted Steering system will also deactivate LKA, if equipped.

10 OPTIONAL GAUGES

For vehicles with a telematic navigation screen, optional gauges will be part of the screen functions. Please refer to the navigation system supplement for further details about its functions and how it works.

11 DASH SWITCHES

11.1 Dash Switches

This custom vehicle may have a wide variety of switch-controlled equipment. However, this particular vehicle may not have every switch identified in this section of the operator manual. Some switches on the dash may require that the vehicle either be at a specific speed, have park brakes set, or another device to be on or off for the air device to operate. The instrument display will show information regarding what needs to change in order for the air device to operate as expected. The following table provides a complete list of icons that may be found on the switch.

Switch	Symbol	Color	Standard	Option
<u>Axle, Diff. Lock - Dual</u>		Amber		•
<u>Axle, Diff-Lock - Forward Rear</u>		Amber		•
<u>Axle, Diff-Lock - Rear Rear</u>		Amber		•
<u>Axle, Diff-Lock - Single Rear</u>		Amber		•
<u>Axle, Diff-Lock - Steer</u>		Amber		•
<u>Axle, Inter-Axle Differential Locked (Tandem)</u>		Amber		•

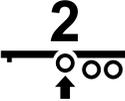
Switch	Symbol	Color	Standard	Option
<u>Back Up Alarm Mute</u>		Amber		•
<u>Batteries, 12 V Disconnect</u>		None	•	
<u>Brakes, ABS Off-Road</u>		Amber		•
<u>Brake, Parking Brake Valve</u>		Yellow	•	
<u>Brake, Trailer Hand</u>		None		•
<u>Dump Truck Gate</u>		Red		•
<u>Exterior Lighting Self-Test (ELST)</u>		None	•	

Switch	Symbol	Color	Standard	Option
<u>Fifth Wheel Slide</u>		Red		•
<u>Generic Air, Accessory</u>		Green		•
<u>Start Switch</u>		None	•	
<u>Lane Departure Warning (LDW) Disable</u>		Green		•
<u>Lights, Auxiliary</u>		Green	•	
<u>Lights, Cab Dimmer Switch</u>		Green		•
<u>Lights, Dome</u>		None	•	
<u>Lights, Flood (Spare)</u>		Green		•
<u>Lights, Fog</u>		Green		•

Switch	Symbol	Color	Standard	Option
<u>Lights, Hazard</u>		Red	•	
<u>Lights, Marker/Clearance</u>		Green	•	
<u>Lights, Marker/Clearance/Trailer</u>		None		•
<u>Lights, Master</u>		None	•	
<u>Lights, Park Light</u>		None	•	
<u>Lights, Spot</u>		Green		•
<u>Lights, Work</u>		Green		•

Switch	Symbol	Color	Standard	Option
<u>Mud and Snow Traction Control</u>		None	•	
<u>Pintle Hook</u>		Green		•
<u>Power Take-off (PTO)</u>		Amber		•
<u>Power Take-off (ePTO) Motor Control (PMC) Cab/Remote</u>		None		•
<u>Power Take-off (PTO) Motor Control (PMC) Custom Speed Preset 1-3</u>		None		•
<u>Power Take-off (PTO) Motor Control (PMC) Speed Preset +/-</u>		None		•
<u>Power Take-off (PTO) Motor Control (PMC) Speed +/-</u>		None		•

Switch	Symbol	Color	Standard	Option
<u>Stop Charging</u>		Green	•	
<u>Suspension, Air Retention</u>		Amber		•
<u>Suspension, Axle, Pusher</u>		Green		•
<u>Suspension, Axle, Tag</u>		Green		•
<u>Suspension, Dump</u>		Amber		•
<u>Suspension, Third Axle Lift</u>		Green		•
<u>Torque Assisted Steering Effort Adjustment</u>		Green		•
<u>Trailer Air Supply</u>		Red	•	

Switch	Symbol	Color	Standard	Option
<u>Trailer, Axle (3rd Axle) Lift</u>		Green		•
<u>Trailer, Axle Lift Forward</u>		Green		•
<u>Trailer, Axle Lift Rear</u>		Green		•
<u>Trailer, Belly Dump Gate Center</u>		Red		•
<u>Trailer, Front Dump Gate</u>		Red		•
<u>Trailer, Belly Dump Gate Rear</u>		Red		•
<u>Trailer, Dump Gate</u>		Red		•

Switch	Symbol	Color	Standard	Option
<u>Trailer, Hotline</u>		Green		•
<u>Trailer, Suspension Air Dump</u>		Green		•

11.2 Axle, Diff. Lock - Dual



Turn switch on to engage Front and Rear Axle Diff Lock.

11.3 Axle, Diff-Lock - Forward Rear



Turn switch on to engage Forward Rear Axle Diff Lock.

11.4 Axle, Diff-Lock - Rear Rear



Turn switch on to engage Rear Rear Axle Diff Lock.

11.5 Axle, Diff-Lock - Single Rear



Turn switch on to engage Single Rear Axle Diff Lock.

11.6 Axle, Diff-Lock - Steer



Turn switch on to engage Front Axle Diff Lock.

11.7 Axle, Inter-Axle Differential Locked (Tandem)



Turn switch on to engage Inter-Axle Differential Lock.

11.8 Back Up Alarm Mute



Turn switch on to mute Back Up Alarm.



The mute function use is discouraged. Only use mute when legally required.

11.9 Batteries, 12 V Disconnect



This Low Voltage Disconnect (LVD) dash switch is used to disable the LVD, which prevents the low voltage disconnect system from shutting power off.

11.10 Brakes, ABS Off-Road



Turn switch on to engage ABS Off-Road mode. See [Anti-Lock Brake System \(ABS\)](#).

11.11 Brake, Parking Brake Valve



Pull yellow knob to activate parking brake.

11.12 Brake, Trailer Hand



This dash mounted switch provides air pressure to apply the trailer brake only. It operates independently of the foot treadle valve.

11.13 Dump Truck Gate



Turn switch on to open Dump Truck Gate.

11.14 Exterior Lighting Self-Test (ELST)



The Exterior Lighting Self-Test (ELST) allows the operator to examine all exterior lights as part of a pre-trip inspection. An ELST can be activated via the dash switch or the key fob. A full ELST can only be activated with the start switch in the ON position; otherwise, a limited ELST is performed.

The ELST will run for fifteen minutes. You can confirm exterior light functionality by reading the instrument cluster for displayed faults and by watching the lights from outside the vehicle. Turning the vehicle off or activating the switch a second time while

the test is running interrupts the test. The ELST will also start the Simple Systems Check. Once the Simple Systems Check has been completed, there could be two possible outcomes: an active warning indicator (check fault log) symbol or an **All Systems OK** message signaling no problems in any of the systems checked.

Full ELST

When a full ELST is activated, it will alternately turn on and then off the following lights:

- Park lights
- License plate lights
- Hazard/turn signals
- Low beam headlights
- High beam headlights
- First set of fog/driving lights
- Tail lights
- Stop lights
- Reverse lights
- Fog lights (option)
- Driving lights (option)
- Daytime Running Lights (option)

The following lights stay on during the duration of a full test:

- Clearance lights

- Identification lights
- Side Marker lights
- Beacon/Strobe (option)
- Work/Load lights (option)
- Sign light (option)

Limited ELST

A limited ELST will alternately turn on and then off the following lights:

- Hazard/turn signals
- Low beam headlights
- High beam headlights
- Park lights
- Daytime running lights (option)
- License plate lights
- Tail lights
- Stop lights

The following lights will stay on during the duration of a limited test:

- Clearance lights
- Identification lights
- Side marker lights

11.15 Fifth Wheel Slide



Turn switch on to unlock Fifth Wheel Slide mechanism. The switch is guarded to protect you from accidentally activating or releasing the lock.

WARNING
<p>DO NOT move the fifth wheel while the tractor-trailer is in motion. Your load could shift suddenly, causing you to lose control of the vehicle. Never operate the vehicle with the switch in the UNLOCK position. Always inspect the fifth wheel after you lock the switch to be sure the fifth wheel slide lock is engaged. Failure to comply may result in death, personal injury, equipment damage, or property damage.</p>

NOTE
<p>Vehicles having an air slide fifth wheel have a fifth wheel slider lock controlled by a switch on the instrument panel. By placing the switch in the unlock position</p>

you can slide the fifth wheel to various positions to adjust weight distribution.

11.16 Generic Air, Accessory



Provides accessory air at the frame mounted solenoid bank. Air hose plumbing will need to be added to the solenoid bank to connect to the accessory that is intended to control with air accessory switch.

11.17 Start Switch

The start switch located to the left of the steering column has four positions: ACC (Accessories), OFF, ON, and START.



OFF: In this position, all accessories are OFF (except those listed below) and you can remove the key. The following lights and accessories have power when the key is in the OFF position:

- Brake lights
- Emergency hazard flasher
- Dome and courtesy lamps (on doors)
- City horn
- Cigarette lighter
- Tail lights
- Marker lamps
- Headlights
- Radio station memory
- Instrument lights
- Auxiliary power
- Instrument panel memory
- Settings

ACC (Accessory): With the key in this position, you can play the radio, defrost mirrors (if equipped with mirror heat), or use other accessories.

ON: In the ON position, all circuits are energized. Panel warning lights will light and the buzzer will sound until (1) the vehicle is started and (2) air brake system pressure is above 65 psi (4.48 bar/448 kPa). The high-voltage propulsion starts up as soon as the key is moved to ON. The switch must remain in this position in order to drive the vehicle.

i NOTE

The START position activates the propulsion system and places the vehicle in a drive-ready state.

11.18 Lane Departure Warning (LDW) Disable



The Lane Departure Warning (LDW) Disable switch disables both audible and visual Lane Departure Warning alerts for 15 minutes (or until the next ignition key cycle) after which time LDW will automatically re-enable. This switch will not affect any audible or visual alerts for the Adaptive Cruise Control (ACC) feature.

This switch lights up green when active.

11.19 Lights, Auxiliary



Turn switch on for Auxiliary Lights.

11.20 Lights, Beacon



Turn switch on for Beacon Light(s). In Medium Duty two types of switches are optioned: a traditional rocker switch and a push button over on the left panel.

11.21 Lights, Cab Dimmer Switch



This switch is used to alter the brightness of the instrument panel lights.

i NOTE

The Headlight Switch is an ON or OFF switch. The panel lights are on full intensity during the day and dim when headlights are on.

11.22 Lights, Daytime Running (Override)



This switch overrides the normal operation of the Day Time Running Light (DRL) system. During normal operation, the DRL will turn on lights when the headlights are turned off, the vehicle is on, and the park brakes are disengaged. The override switch will turn the DRL off in these instances. The DRL is also turned off when the headlights are turned ON.

 **WARNING**

DO NOT use daytime running lights (DRL) during periods of darkness or reduced visibility. DO NOT use DRL as a substitute for headlights or other lights during operations that require lighting of your vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

If the headlight switch is turned OFF, the DRL system engages automatically after the vehicle starts and the parking brake is released. If the headlight switch is ON, the DRL system is overridden, and headlights will operate normally.

11.23 Lights, Dome



Turn switch on for Cab Dome Lights.

11.24 Lights, Flood (Spare)



Turn switch on for trailer mounted Flood Lights.

11.25 Lights, Fog



Turn switch on for Fog Lights.

 **NOTE**

Fog lights should be used in the presence of fog, rain, dust, snow, or smoke. DO NOT use during general operation because this is illegal in some locations.

 **NOTE**

Across the U.S.A. and Canada, State/ Provincial requirements vary as to when high beams and fog lights can and cannot be used together. Some states allow only four lights to be used together, while some allow more. How your lights are arranged will affect whether you can operate headlights and fog lights concurrently always comply with the state or provincial requirements where you are driving.

11.26 Lights, Hazard



This switch operates the emergency flashers. With the switch in the ON position, the emergency flasher makes all four turn signals (front and rear) flash simultaneously. The flasher works independently of the start switch. You should always use the flasher if the vehicle is disabled or parked under emergency conditions.

WARNING

Be aware of all governing Hazard Warning Light laws and keep all necessary emergency signals in the vehicle per FMCSR 392.22. During unusual or emergency situations, use all relevant lights and signals since hard-to-see vehicles can increase the risk of accidents. Failure to comply may result in death, personal injury, equipment damage, or property damage.

11.27 Lights, Marker/Clearance



Turn switch on to control Cab and Vehicle Marker/Clearance lights.

NOTE

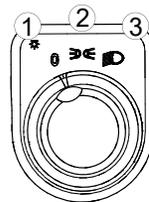
An interrupt switch for the trailer marker lights is mounted on the end of the turn signal lever.

11.28 Lights, Marker/Clearance/Trailer



Turn switch on to control trailer marker/clearance lights separately from the vehicle marker/clearance lights.

11.29 Lights, Master



1. OFF
2. AUX
3. Headlights

Three-position switch that activates either the auxiliary lighting group (AUX) – parking and marker lights – or the headlights and the aux lighting group.

OFF

Turns off all exterior lights. DRL may still be active (see [Lights, Daytime Running \(Override\)](#)).

Auxiliary Lights

When the master lighting control is in the AUX position, all lamps in the park and marker lamp groups activate simultaneously.

Headlights

When the Headlights are ON, the dash lights, side, and tail lights are also on.

11.30 Lights, Park Light

Turn switch on for Park Lights. When the Park Lights are on the dash lights, side and tail lights are also on.

11.31 Lights, Spot

Turn switch on for Spot Light.

11.32 Lights, Work

Turn switch on for cab mounted Flood Lights. Switches 1 and 2 are push buttons, but 3 is a rocker switch.

11.33 Mud and Snow Traction Control

Momentarily push switch in to engage Traction Control (TC).

11.34 Pintle Hook

Turn switch on to remove the slack from the hook.

11.35 Power Take-off (PTO)

If your vehicle is equipped with an Electric Power Take-off (ePTO), this dash-mounted toggle switch that activates it from inside the cab. When the operator activates the ePTO, the operation of obtaining and transferring electric power to move the connected vehicle accessories starts. If this switch is activated, the indicator on the display illuminates.

11.36 Power Take-off (ePTO) Motor Control (PMC) Cab/Remote

If your vehicle is equipped with Electric Power Take-off (ePTO), this switch activates the ePTO motor speed controls for both the cab and remote station and allows you to change between the two modes.

11.37 Power Take-off (PTO) Motor Control (PMC) Custom Speed Preset 1-3



up to



If your vehicle is equipped with Power Take-off (PTO) Motor Control (PMC) Custom Speed Preset switches, they activate a specific velocity for the ePTO motor. There are three custom PTO preset toggle switches located in the dash, each one with a programmable velocity.

11.38 Power Take-off (PTO) Motor Control (PMC) Speed Preset +/-



If your vehicle is equipped with Electric Power Take-off (ePTO) Motor Control (PMC) Speed Preset +/- switch it will have two configurations and operations:

- Dedicated configuration: pressing "+" commands a preset speed. Pressing "-" commands a different preset.
- Toggle configuration: pressing "+" cycles up through up to six preset speeds. Pressing "-" cycles down through up to six presets.

11.39 Power Take-off (PTO) Motor Control (PMC) Speed +/-



If your vehicle is equipped with Power Take-off (PTO) Speed Preset +/- switch that is located in the dash, it will control the ePTO motor speed. Pressing this switch activates the following functions:

- Increment/decrement - after a short press when function is active this increases or decreases the target speed by a calibrated step.

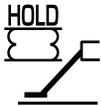
- Accelerate/decelerate - a long press when function is active causes the target speed to increase or decrease at a constant rate until the switch is released.
- Resume a previously saved target speed - after a short press of "-" when function is enabled and previously set motor speed is stored (similar to resuming cruise control).

11.40 Stop Charging



The Stop Charging switch allows the operator to stop the charging. This switch illuminates green when the charge plug is connected to the vehicle's charge inlet port and the charge plug is unlocked. See [Stop Charging Switch](#) for more specifications of this switch.

11.41 Suspension, Air Retention



The Air Retention Switch keeps the air suspension bags from losing air pressure when used with vehicle outriggers. Depress the Air Retention Switch prior to deploying the outriggers. While outriggers are deployed, axle stability is maintained.

11.42 Suspension, Axle, Pusher



Turn switch on to lower Single or Forward Pusher Axle.

11.43 Suspension, Axle, Tag



Turn switch on to lower tag axle.

11.44 Suspension, Dump



Turn switch on to deflate suspension air bags. The switch is guarded to protect you from accidentally deflating the suspension.

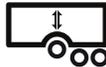
! WARNING

DO NOT operate the Air Suspension Deflate Switch (Dump Valve) while driving. Sudden deflation while your vehicle is moving can affect handling and control and could lead to an accident. Use this switch only when your vehicle is not moving. Failure to comply may result in death, personal injury, property damage, or equipment damage.

! CAUTION

Operating a vehicle with air suspension bags either overinflated or underinflated may cause damage to driveline components. If a vehicle must be operated under such conditions, DO NOT exceed 5 mph (8 km/h). Failure to comply may result in equipment or property damage.

11.45 Suspension, Third Axle Lift



Turn switch on to raise Third Axle.

11.46 Torque Assisted Steering Effort Adjustment



Three-position switch that adjusts how much steering assistance is provided for vehicles equipped with Torque Assisted Steering.

The top position provides the most assistance (requiring the operator to exert less effort to turn the wheel), the middle position moderate assistance, and the bottom position the least amount of steering assistance (requiring more effort to turn the wheel than the top and middle positions).

11.47 Trailer Air Supply



The red octagonal knob controls the air supply to the trailer.

11.48 Trailer, Axle (3rd Axle) Lift



Turn switch ON to lift 3rd Trailer Axle.

11.49 Trailer, Axle Lift Forward



Turn switch on to lift Forward Trailer Axle.

11.50 Trailer, Axle Lift Rear



Turn switch on to lift Rear Trailer Axle.

11.51 Trailer, Belly Dump Gate Center



Turn switch on to open Trailer Center Belly Dump Gate.

11.52 Trailer, Front Dump Gate



Turn switch on to open Trailer Front Belly Dump Gate.

11.53 Trailer, Belly Dump Gate Rear



Turn switch on to open Trailer Rear Belly Dump Gate.

11.54 Trailer, Dump Gate



Turn switch on to open Trailer Dump Gate.

11.55 Trailer, Hotline

HOTLINE



Turn switch on to supply electrical power to trailer accessories.

11.56 Trailer, Suspension Air Dump



Turn switch on to deflate trailer air suspension.

12 DOOR MOUNTED MIRROR CONTROLS

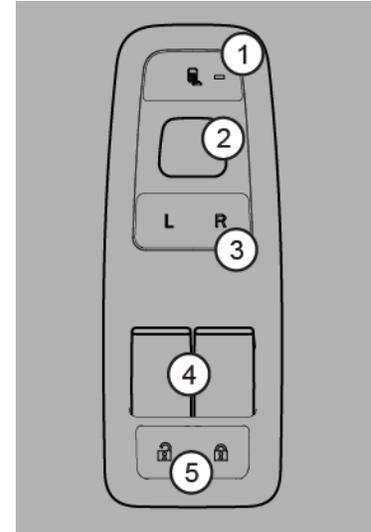
12.1 Door Mounted Mirror Controls

The vehicle can have power mirrors. If so, the mirror controls are on the driver-side door pad. You can adjust mirrors in

four directions. To provide good visibility, adjust the mirror so the side of the vehicle appears in the inboard part of the mirror.

i NOTE

The vehicle can come with a digital side-view mirror option. Refer to the PACCAR Digital Vision System with Mirrors operator's manual for instructions. This manual is in the glove box.



1. Mirror heat
2. Mirrors adjust
3. Left or right mirror adjustment selector
4. Window controls
5. Door lock control

Mirror Heat Switch

The vehicle can come with optional heated mirrors. Control the mirror heat with the mirror heat button. If the vehicle has optional hood-mounted heated mirrors, this switch also activates heat to those mirrors.

Power Mirror Switch

If the vehicle comes with power mirrors, the directional controls for both mirrors are on the top of the driver-side door.

Power Door Lock Switch

Power door lock rocker switches are located on the door pads. To lock or unlock the cab doors, depress any door lock switch at the end that displays a closed or open padlock symbol, respectively, on the switch face.

Power Window Switch

Power window rocker switches are on the door pads. Depress the switch to open the window. Pull up on the switch to close the window. Release the switch to stop window movement. The driver-side window has an express down feature. Holding the switch down activates the express down feature. Release the button and the window descends until it is fully open.

12.2 Using the Power Mirror Adjustment Switches

WARNING

Only adjust mirrors and cameras before driving the vehicle. Adjusting a mirror or cameras while driving can cause you to take your eyes off the road, which could result in an accident. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

When using convex mirrors, keep plenty of space between your vehicle and others. This space is particularly important when you are turning or changing lanes. Convex mirrors can distort images, making objects that are close to you seem far away. Be aware of this possible distortion to avoid a collision when you are turning or changing lanes. Failure to comply may result in death,

personal injury, equipment damage, or property damage.

1. Move the **Mirror Selector** switch to the right or left from the neutral center position to select the desired mirror for adjustment.
2. Depress the **Mirror Directional Control** pad in one of its four arrow directions to adjust the mirror in/out or up/down.
3. To provide good visibility, adjust the mirror so the side of your vehicle appears in the inboard part of the mirror.
4. After mirror adjustments have been completed, return the **Mirror Selector** switch back to the center (neutral) position to prevent unintentional adjustments to the mirrors.

13 HEATING, VENTILATION, AND AIR CONDITIONING (HVAC)

13.1 Heating, Ventilation, and Air Conditioning (HVAC)

This vehicle's heating and air conditioning system operates in four distinct modes: manual, automatic, semi-automatic, and maximum defrost. Each mode provides the driver with the greatest level of comfort and convenience.

The recommended mode for all conditions that do not require windshield defrosting is the automatic mode. This mode is capable of maintaining cab comfort under various driving conditions without driver interaction. The cab heater and air conditioner controls are located together in the center of the dash, just to the right of the steering column.



WARNING

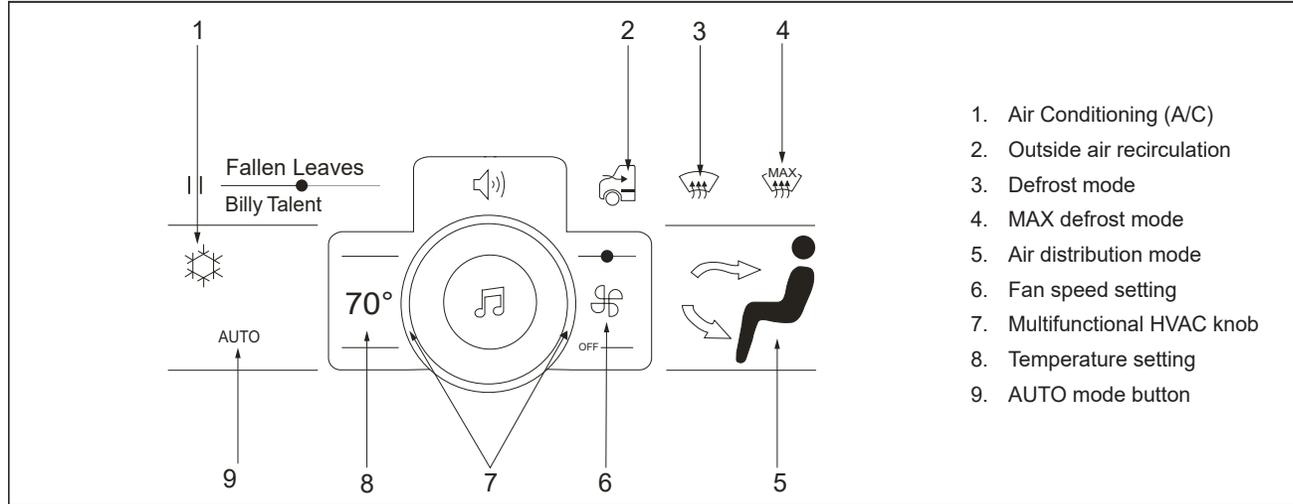
DO NOT drive with visibility reduced or obscured by fog, condensation, or frost on the windshield. Follow the

instructions of the ventilation/heating and defogging/defrosting system. Maximum heating output and fast defrosting can be obtained only after reaching the vehicle's operating temperature. If in doubt, consult your dealer. Failure to comply may result in death, personal injury, equipment damage, or property damage.

13.2 Air Conditioning Controls

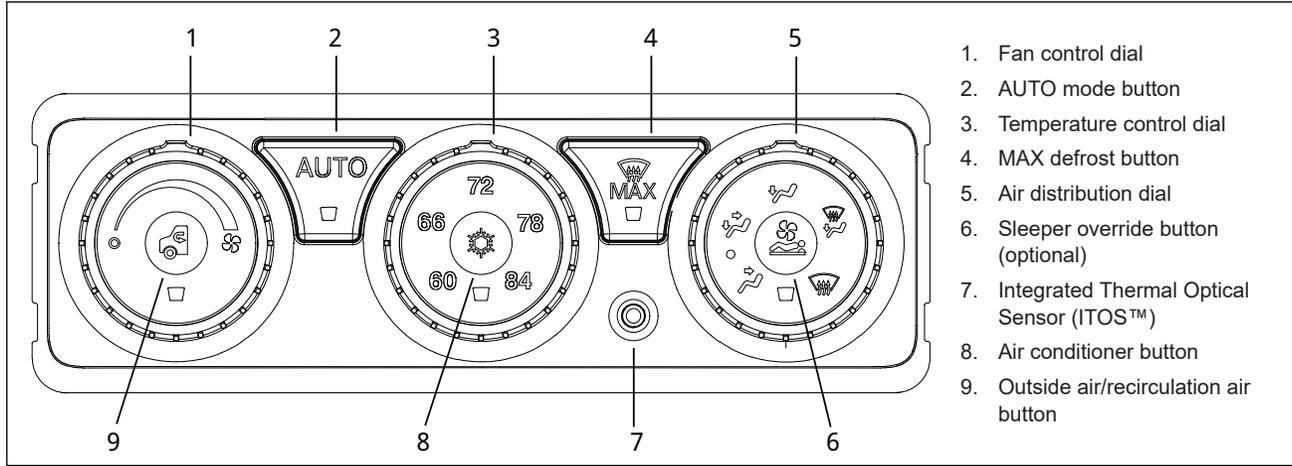
AIR CONDITIONING CONTROLS

Table 5: Air Conditioning Controls with SmartDisplay (Option)



3

Table 6: Physical Air Conditioning Controls



1. Fan control dial
2. AUTO mode button
3. Temperature control dial
4. MAX defrost button
5. Air distribution dial
6. Sleeper override button (optional)
7. Integrated Thermal Optical Sensor (ITOS™)
8. Air conditioner button
9. Outside air/recirculation air button

HVAC CONTROL FUNCTIONS

Table 7: Symbols for the air conditioning control panel

Image	Function
	The source of air entering the cab can be set to either outside air or recirculation air using the button inside the fan speed control dial. Outside air is automatically selected in defrost modes.
	The fan speed is adjusted by rotating the dial clockwise to increase speed or counterclockwise to decrease speed.
AUTO	When active, automatically adjusts system controls to maintain the selected temperature.

Table 7: Symbols for the air conditioning control panel

Image	Function
	The button inside the temperature control dial engages the air conditioning compressor. When activated the indicator on the button will illuminate. During AUTO mode, the air conditioning button indicator will remain illuminated at all times even though the compressor may be cycling.
	Max defrost function
	Floor Vents
	Defrost Vents (and Fresh air intake)
	Panel and Floor Vents

Table 7: Symbols for the air conditioning control panel

Image	Function
	Panel Vents
	Floor and Defrost Vents (and Fresh air intake)

INTEGRATED THERMAL OPTICAL SENSOR (ITOS™) AND SUNLOAD SENSOR

The Integrated Thermal Optical Sensor (ITOS™) is located on the HVAC controls or under the steering wheel (if your vehicle is equipped with SmartDisplay). The sunload sensor is located on driver's side of the dashboard. These sensors are used to calculate the air temperature inside of the cabin. The information collected by the sensors help control the internal temperature of the cabin.

CAUTION

DO NOT cover the sunload sensor. Covering the sensor can change cabin temperature data received by the HVAC system, affecting HVAC performance and reducing its efficiency to defrost or defog the windshield. Failure to comply may result in equipment or property damage.

Figure 21: ITOS Sensor - Under the Steering Wheel

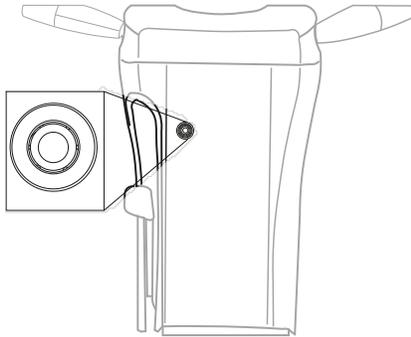


Figure 22: ITOS Sensor - On the HVAC Controls

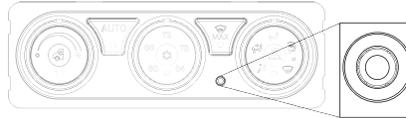
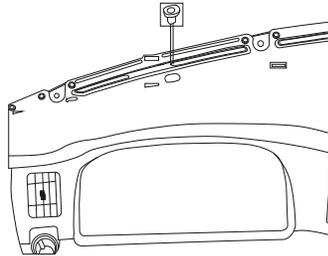


Figure 23: Sunload Sensor - On the Driver's Side



13.3 Manually Controlling the Cab Air Conditioning

Temperature Control Set Point The cab temperature is set using the temperature control dial. The operating range is 60°F (16°C) and 84°F (28°C). Adjustments are made in two degree increments.

Air Conditioner The button inside the temperature control dial engages the air conditioning compressor. When activated, the indicator on the button will illuminate. During AUTO mode, the air conditioning button indicator will remain illuminated at all times, even though the compressor may be cycling.

NOTE

Fan Control Dial must also be in the ON position for A/C to be on. A/C engages automatically in AUTO, defrost, and floor/defrost.

NOTE

The fan control dial adjusts the fan speed when the air conditioning button is activated, engaging automatically in AUTO, defrost, and floor/defrost modes.

The air conditioner defaults to Manual mode when turned ON. The fan speed, air temperature, and air outlets are selected using the dials on the controller.

1. To adjust the fan speed, turn the **Fan Control** dial clockwise to increase speed or counterclockwise to decrease speed.
2. To adjust the temperature setting, turn the **Temperature Control** dial to the desired temperature. The system automatically adjusts the outlet air temperature to achieve the desired cab temperature.
3. Push the **Air Conditioner** button

if the air temperature needs to be colder, this button will manually turn on the compressor.



4. To adjust the air distribution, turn the **Air Distribution** dial to distribute cab air as indicated by the dial graphics.
5. Press the **Recirculation** button to use cab air instead of outside air.



13.4 Auto Mode for the Air Conditioner

The AUTO mode manipulates several variables. These include air distribution, air temperature, fan speed, AC compressor, and cab air recirculation. The Auto mode adjusts to achieve the comfort level selected on the temperature dial. Depending on the specific environmental conditions, the air temperature can be slightly higher or lower than the set point. This variation is a normal function of the AUTO

mode and is not a malfunction. The button that enables automatic mode is labeled **AUTO**.

Adjust the temperature knob, and the system responds to obtain the selected comfort level as quickly as possible.



Set the cab temperature using the temperature control dial. The operating range is 60°F (16°C) and 84°F (28°C). Adjustments are made in two-degree increments.

The AUTO function uses a sunlight sensor to measure the amount of sunlight entering the cab. You can find this sensor at the base of the windshield on the driver's side. Do not block this sensor.

The system remains in automatic mode until the driver adjusts both the fan speed and air distribution dials on the control.

Semi-Automatic Mode

During AUTO mode, the operator can override any settings and operate in a semi-automatic mode. You can override AUTO mode using the dials and/or buttons on the

HVAC control. In semi-automatic mode, the AUTO button indicator extinguishes. Instead, the indicator of the adjusted setting illuminates. For example, if the driver adjusts the fan dial while in AUTO mode, the fan dial indicator illuminates. The fan speed also adjusts to the setting of the dial. However, the temperature and air outlet settings continue to function automatically. Also, if the user adjusts the air distribution setting while in AUTO mode, the air distribution dial indicator illuminates. Then the distribution adjusts to the setting of the dial. The fan and temperature settings continue to function automatically.

Economy Function

An economy function is also available in semi-automatic mode. In this mode, the system operates in AUTO mode without the use of the AC compressor. The operator can select economy by initiating AUTO mode and then pressing the AC button to disengage the compressor. The indicators for AC compressor and AUTO mode do not illuminate while operating in economy mode.

13.5 Operating the Automatic Cab Air Conditioning

Follow these steps to activate the Auto Mode:

1. Press the **AUTO** button.
2. Rotate the **Temperature Control** dial to the desired temperature.

Result:

The system will achieve the comfort level associated with the temperature selected. Cab temperature can be slightly higher or lower than the selected temperature, which is a normal when in **AUTO** mode and should not be mistaken for a system malfunction.

13.6 MAX Defrost Mode

The heating and air conditioning (AC) system provides for one-touch windshield defrosting. Certain driving conditions cause fog or ice to form on the windshield. By pressing the **MAX** defroster button, the system automatically adjusts certain settings to maximize clearing of the windshield. These settings include the blower

speed, recirculation, air temperature, and air outlet distribution. The system remains in this mode until the driver presses the button again or adjusts the dials.



The air temperature in MAX defrosts mode adjusts to the warmest temperature setting. This setting helps to clear the windshield of ice and fog more quickly. Outside air mode and the air conditioner compressor are also active to maximize performance. The AC compressor and recirculation switches do not function in MAX Defrost, and the lights on those switches blink when pressed.

13.7 Air Conditioning Operating Tips

Defrosting and Defogging the Windshield

The cab windshield and side windows can be cleared of ice and fog in two ways. The first is to use the **MAX** defrost mode. The second is to manually adjust the air distribution dial to the defrost position.

The manual defrost/defogging mode differs from the **MAX** defrost mode by allowing the driver to select an air temperature

other than full heat. This allows the driver to maintain a constant cab temperature while defrosting the windshield. However, note that performance may be reduced.

- Adjust the fan speed to high by rotating the fan control dial clockwise.
- Set the air distribution dial to the defrost mode setting. This automatically engages the outside air and the air conditioner compressor.
- Adjust the temperature dial to add heat as needed.

For maximum performance, adjust the temperature to maximum heat by rotating the temperature dial clockwise. The driver may also use the floor/defrost setting on the air control.

For Maximum Cooling

- Adjust the fan speed to high by rotating the fan control dial clockwise.
- Set the air distribution dial to the panel setting.
- Adjust the air temperature to maximum cool by rotating the temperature dial counterclockwise.
- Engage the air conditioner compressor by pressing the air conditioner button.
- Set the air source to recirculation mode by pressing the outside air/recirculation

air button. The button indicator light should be illuminated.

For Maximum Heating

- Adjust the fan speed to high by rotating the fan control dial clockwise.
- Set the air distribution dial to the floor setting.
- Adjust the air temperature to maximum heat by rotating the temperature dial clockwise.

Air Dehumidification

The air conditioner system can be used to reduce the humidity level of the cab and clear fog from the windshield.

- Adjust fan speed to the desired airflow setting.
- Engage the air conditioner compressor by pressing the air conditioner button.
- Set the air source to outside air mode by pressing the outside air/recirculation air button. The button indicator light should NOT be illuminated.

i NOTE

The A/C compressor may not engage when the outside temperature is below 34°F (1°C).

i NOTE

The air conditioning compressor may not engage when the outside temperature is below 34°F (1°C).

Cab Air Distribution

Equal distribution of air is important in maintaining a constant cab interior temperature. For best performance, all vents should remain open to allow AUTO mode to function properly. To maintain the selected cab temperature, AUTO mode may provide an air temperature from the vents that differs from the temperature set point. To ensure proper operation, it is recommended that the driver redirects the air instead of adjusting the temperature set point or closing the vent. The system may have difficulties in obtaining the desired cabin temperature if the temperature setting is repeatedly changed.

The mode of air distribution inside the cab is set using the air distribution dial. Five icons on the dial indicate the primary mode options. The driver may also select a secondary mode in between the primary modes indicated by points on the dial. Airflow is provided to the side windows in all modes. For more information about cab air temperature, see [Planned Departure](#).

Outside Air/Recirculation Air

Selecting air recirculation mode completely isolates the cab interior from the outside air. This mode is helpful in preventing dust, pollen, and odors from entering the cab. Additionally, recirculation mode can reduce the amount of time needed to cool down the vehicle while in maximum cool down. Note that the mode may increase fogging on the windshield. However, air recirculation mode is more efficient at windshield defogging than using outside air since air conditioning or heating energy can be decreased while increasing vehicle range. A coarse air filter is provided for recirculating air and is located under the instrument panel. A pleated air filter located under hood provides filtration for dust, pollen, and debris. If equipped, your vehicle may also provide for ember filtration or fine particulate filtration.

14 CAB ACCESSORIES

14.1 Cab Accessories

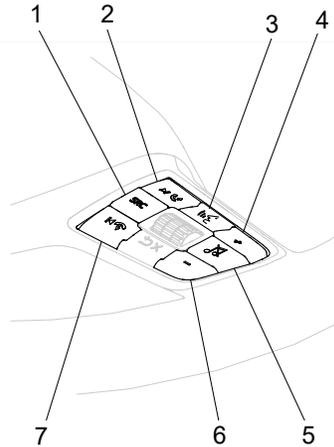
Radio (Option)

The vehicle has one of two stereo systems. An AM/FM stereo receiver is standard equipment and may have a combination of satellite radio, USB media, or Bluetooth®.

A touchscreen display based stereo system called SmartDisplay is available which optionally integrates different applications such as media player, phone projection, GPS navigation, operator manuals, vehicle health telematics, etc. For instructions on how to operate the particular radio or SmartDisplay, see the supplemental operating manual for those units.

For vehicles equipped with SmartDisplay, the radio application is installed by default. Additional controls for radio or SmartDisplay are located on the right switch pod of the steering wheel.

Figure 24: Right Switch Pod (and Radio)



1. Media source
2. Next track
3. Voice assistant (only available on SmartDisplay).
4. Volume increase
5. Mute
6. Volume decrease
7. Previous or cancel

USB Ports, Cigarette Lighter, and Ashtray (Option)

NOTE

The 12V accessory power port will operate with the start switch in either the OFF, ACC (accessory), or ON position.

This vehicle comes standard with two cupholders and power ports located in the center of the dashboard. Depending on vehicle configuration, this area may include optional features such as USB ports, an ashtray insert (for the cupholder), or a cigarette lighter instead of a power port.

The optional USB ports are located above the cupholder on the dash. These ports can charge and connect compatible devices to SmartDisplay. The USB Type-C port can be used as a 15 W charging power source and for data transfer when connecting an Apple device to the vehicle.

To operate the optional cigarette lighter, push in on the knob end of the lighter. After a few moments, the lighter will automatically pop out, glowing hot and ready to use. After use, insert the lighter back into the socket without pushing all the way in. The socket of the cigarette lighter may be

used to operate 12 V, 15 amp appliances, such as a hand spotlight or small vacuum cleaner.

 **WARNING**

DO NOT attempt to operate a cigarette lighter using the 12V power port receptacle. A cigarette lighter inserted into the 12V power port will heat up and be expelled into the cab, potentially causing fire. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

DO NOT place paper or other combustible substances in an ashtray, it could cause a fire. Keep all non-tobacco related substances out of the ashtray. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

DO NOT exceed the voltage/amperage capacity of the accessory power port. It could result in a fire. Follow all warn-

ings and instructions in the operator's manual for the appliance you are using. Failure to comply may result in death, personal injury, equipment or property damage.

Glove Box

The vehicle has a glove box to store important documents like the vehicle literature set (including this Operator's Manual), and other related materials. You can choose from various other interior storage options available to store personal supplies or small tools:

- Center console
- Map pocket on the door
- Overhead storage compartments

 **WARNING**

DO NOT drive with the glove box open. In an accident or sudden stop, you or a passenger could be thrown against the open cover and be injured. To reduce the risk of personal injury during an accident or sudden stop, keep the glove box closed when the vehicle is in motion. Failure to comply may result in

death, personal injury, equipment damage, or property damage.

 **WARNING**

DO NOT carry loose objects in your cab. In a sudden stop, or even going over a bump in the road, they could fly through the air and strike you or a passenger. Secure all loose objects in the cab before moving the vehicle. Carry heavy objects such as luggage in the exterior storage compartment and close it securely. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Appliances

If the vehicle has a television or other appliance, make sure that they are compatible with the vehicle's electrical system. Secure them in the cab so they cannot come loose in a sudden stop.

 **WARNING**

Secure any appliance (such as a radio or TV) you add to your sleeper or cab. In a sudden stop or collision, these objects could strike you or a passenger.

Failure to comply may result in death, personal injury, equipment damage, or property damage.

Vehicle Telematic System

The vehicle can be equipped with an onboard telematics system. This system is a Global Positioning Satellite (GPS)-linked computer. It receives input from multiple sources to locate the vehicle. Read and understand the Supplemental Telematics and Navigation System Owner's Manual. Observe the warnings, cautions, and notes that follow before using the system.

WARNING

Verify legal weight and height restrictions for the route suggested by the telematic system. Not verifying height restrictions could lead to an impact. Not verifying weight restrictions could result in a traffic infraction. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

Only glance at the system monitor while driving. Prolonged periods of viewing while driving could result in an accident. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

DO NOT program the telematic system while driving. Always stop the vehicle before changing settings to avoid potential accidents. Failure to comply may result in death, personal injury, equipment, or property damage.

WARNING

Regardless of the navigation system's directions, it is the operator's responsibility to operate the vehicle in a safe and legal manner. Failure to comply may result in death, personal injury, equipment or property damage.

WARNING

Ensure the volume level of all audio devices is set to a level that still allows you to hear outside traffic and emergency vehicles. Failure to comply may result in death, personal injury, equipment or property damage.

NOTE

DO NOT rely on the telematic system to route you to the closest emergency services. Not all emergency services are in the database.

NOTE

The map database is the most current available at the time of production. The database is designed to provide you with route suggestions and does not take into account the relative safety of a suggested route or of factors that may affect the time required to reach your destination. See the Supplemental Navigation System Owner's Manual for more information.

14.2 Wireless Charger (Option)

WIRELESS CHARGER

CAUTION

DO NOT place magnetic or metal items on the wireless charger. These can interfere with charging, reduce charging speed, and damage the phone battery. Failure to comply may result in equipment or property damage.

CAUTION

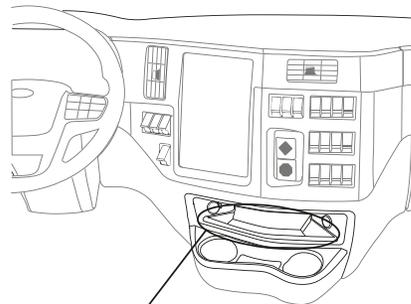
DO NOT place radio frequency ID cards or metal objects on the wireless charger. They emit magnetic fields that can lead to overheating, resulting in deactivation or damage to the wireless charger. Failure to comply may result in equipment damage or property damage.

CAUTION

DO NOT remove the rubber mat before wireless charging or use the charger if the mat is hot. Doing so increases the risks of overheating, abnormal operation, charging interruptions, or device damage. Failure to comply may result in equipment or property damage.

The wireless charger is a device that provides the operator with a 15 W power source to charge their device, it is located above the cup holder.

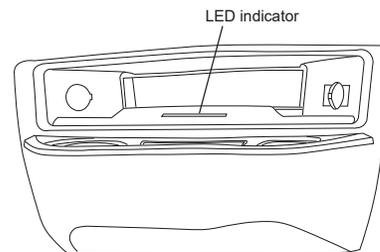
The wireless charger activates automatically when the start switch is in the **ON**, **START**, or **IGNITION/ACC** mode. The wireless charger automatically deactivates when the device reaches 100% charge. It continuously monitors the temperature and shuts off automatically if it detects a temperature increase.



Wireless Charger

NOTE

A LED indicator turns white when the wireless charger is activated by a compatible device and remains on as long as the charger is powered on.



The wireless charger does not support all phones. Verify if this function is available on your phone; if not, charge it via USB ports.

 **NOTE**

The wireless charger only supports Qi compatible devices. Verify the device compatibility in the user manual.

WIRELESS CHARGING TROUBLESHOOTING

Follow the steps below if the phone is not charging.

1. Ensure the phone is well centered on the charging area.
2. Remove any thick phone cases, such as the MAGSafe, from the phone.
3. Restart the phone.
4. If the phone overheats, stop all attempts and try again once the phone has cooled down.

Result:

Please contact a qualified dealer if more support is necessary.

CHAPTER 4: DRIVING

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1 STARTING AND OPERATING

1.1 Low-Voltage Battery Energy Monitoring (BEM)

The purpose of the Low-Voltage (LV) Battery Energy Monitoring (BEM) is to measure the information necessary to calculate a dynamic charging setpoint that adjusts the power supplied to the low-voltage batteries to ensure the next vehicle start-up. The low-voltage disconnect (LVD) setpoint is automatically determined using information about the low-voltage battery's state of charge and temperature.

1.2 Battery Balancing

Battery balancing happens continuously anytime the start switch is ON. The battery management system can most accurately measure battery balance at the top of the State of Charge (SOC) and the bottom of the SOC window so the battery management system knows how much adjustment is needed for each cell. It is important to fully charge or fully discharge periodically for the SOC, State of Health (SOH), and balancing to calibrate.

Y53-6215-1C1 (12/25)

NOTE

When the vehicle is about to be fully discharged, make sure to be near an EV charger or where is safe to park and have access to a charger.

NOTE

AC charging is not recommended when the temperature is below 62°F (17°C). Temperatures below this threshold may cause the battery to discharge instead of charge.

1.3 Initiating a Charge

INITIATING A CHARGE

WARNING

DO NOT connect the charging plug into the vehicle charge inlet without first setting the parking brake. If the vehicle is not secured to prevent uncontrolled movement, it could roll away. Failure to comply may result in death, personal

injury, equipment damage, or property damage.

CAUTION

Although the temperature of the batteries are adjusted automatically, always attempt to maintain the vehicle away from high or low ambient temperatures while charging to mitigate weather related range loss. Failure to comply may result in reduced battery durability.

NOTE

AC charging is not recommended when the temperature is below 62°F (17°C). Temperatures below this threshold may cause the battery to discharge instead of charge.

1. Stop the vehicle.
2. Set the Vehicle Mode to Neutral.
- 3.

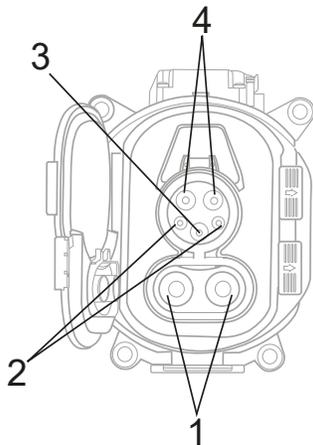
WARNING

Ensure the charging cable and charger plug are dry and free from any damage. Failure to

comply may result in death, personal injury, equipment damage, or property damage.

Engage the park brake.

4. Leave the 12 V disconnect switch in the ON position.
5. Plug in the charger plug.



- 1 DC charger receptacle
- 2 Signal ports
- 3 Ground port
- 4 AC charger receptacle

6.

CAUTION

DO NOT place the 12 V disconnect in the OFF position while the vehicle is charging or running. Removing the low voltage power causes damage to the high-voltage power electronics. Failure to comply may result in equipment or property damage.

CAUTION

DO NOT attempt to enter Drive or Reverse while the vehicle is charging. The D or the R indicator will turn amber and the Move Disallowed status indicator along with the "Unplug Charger" message will be displayed on the Digital Display. The charge plug must be unplugged before the vehicle can be driven. Failure to comply may result in equipment or property damage.

CAUTION

Ensure the charger plug is correctly connected. A loose connection will cause excessive heat and may damage the charger. Failure to comply may result in equipment or property damage.

NOTE

There may be a short delay between when the charger is plugged in and when the vehicle starts charging. If charging does not commence after the short delay, restart the sequence by first unplugging the charger then turning off the 12 V disconnect switch (the 12 V disconnect switch can only be turned OFF when restarting the sequence). Always make sure the 12 V disconnect switch is ON before attempting again.

i NOTE

The prescheduling feature can be used to set a desired percentage for the battery to stop charging. Refer to [Prescheduling](#).

i NOTE

Battery balancing happens continuously during charging and discharging the vehicle. For the durability of the battery system, PACCAR recommends to fully charge or discharge the vehicle. See [Battery Balancing](#).

Wait until the charge port LED shows the DC or AC charging status.

CHARGING CONSIDERATIONS

For maximum performance and durability of batteries, ensure to fully charge or discharge the vehicle to enable State of Charge (SOC) calibration. See [Battery Balancing](#).

You can observe the State of Charge (SOC) on the gauge that is located on the upper left side of the Digital Display.

 8%

When the SOC gets to a low charge status, a series of non-suppressible telltales on the display and audible warnings are triggered and results in a progressive loss of functionality. If the SOC gets to a critical status, power consumption systems of low priority will be disabled, like the cab A/C and the PTO, and the Move Disallowed telltale appears, indicating the vehicle's shutdown. See [Battery Gauge and Estimated Range](#) for more detailed information.

⚠ WARNING

DO NOT attempt to diagnose, correct, or repair any vehicle issue related to the high-voltage electrical system or its components. The high-voltage electrical system is capable of producing dangerous electric shock and burns. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

⚠ WARNING

DO NOT open the high-voltage battery enclosure for any reason. The battery packs are part of the high-voltage system and do not contain operator-serviceable items. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

i NOTE

Battery balancing happens continuously during charging and discharging the vehicle. PACCAR recommends to fully charge or discharge the vehicle. See [Battery Balancing](#).

i NOTE

AC charging is not recommended when the temperature is below 62°F (17°C). Temperatures below this threshold may cause the battery to discharge instead of charge.

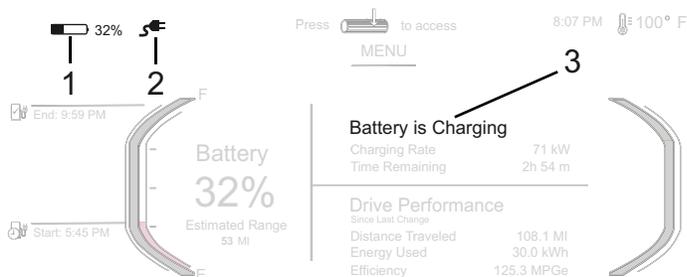
CHARGING STATUS

The following information may show on the charge port LEDs and the digital display depending on the following vehicle charging status. Two LEDs that blink with various patterns and colors show the status of the charging process.

Charge Port LED Status

LED 1 Color	LED 2 Color	Charging Status
Flashing white	None	Initializing charging with scheduled charging
Solid white	None	Scheduled charging
None	Flashing green	Initializing charging
None	Solid green	Charging in progress
None	Flashing red	Charging error
None	None	Charging progress finished

Charging Digital Display Status



- 1 State of Charge (SOC)
- 2 Charging Indicator
- 3 Message displayed

Charging Indicator on Top Bar	Color	Message
	Blue	Charging Complete
	Amber	Charger Fault
	Amber	Vehicle Charging Fault
	Amber	Set Park Brake to Charge
	Green	Battery is Charging
	Blue	Initializing Charging

STOP CHARGING SWITCH

The Stop Charging switch illuminates green when the charge plug is connected to the vehicle's charge inlet port and the charge plug is unlocked.

While charging is occurring, the plug will be locked so this switch will not be illuminated. Pressing the switch while actively charging will send a signal to cancel the current charge and unlock the plug. To disconnect the charge cable, charging must be stopped. This can be done via the charger's interface.

If the Plug Security feature is set to **ON** in the **Menu > Settings > Charging > Plug Security**, this button must be pressed in order to unlock the plug when charging has completed.

1.4 Disconnecting the Charger

WARNING

DO NOT connect the charging plug into the vehicle charge inlet without first setting the parking brake. If the vehicle is not secured to prevent uncontrolled movement, it could roll away. Failure to

comply may result in death, personal injury, equipment damage, or property damage.

CAUTION

DO NOT attempt to enter Drive or Reverse while the vehicle is charging. The D or the R indicator will turn amber and the Move Disallowed status indicator along with the "Unplug Charger" message will be displayed on the Digital Display. The charge plug must be unplugged before the vehicle can be driven. Failure to comply may result in equipment or property damage.

1. Wait for the battery to achieve the 100% SOC or the target SOC (if activated in the menu), which will illuminate the charge port solid green.

NOTE

If you need to disconnect the charger before it automatically completes charging, press the stop charging switch to end the charge.

2. Disconnect the charger plug.

1.5 Starting Up

STARTING UP

WARNING

DO NOT touch or attempt to remove any of the orange high voltage (HV) cables, connectors, or components for any reason. **If asked to inspect HV component or cabling, only inspect visually.** Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

If cables or components are damaged, DO NOT attempt to repair the vehicle on your own as you could receive an electric shock. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

1. Remove the charger plug if

connected.

2.



CAUTION

DO NOT place the 12 V disconnect in the OFF position while the vehicle is charging or running. Removing the low voltage power causes damage to the high-voltage power electronics. Failure to comply may result in equipment or property damage.

Turn ON the 12 V Disconnect switch, if necessary.

3. Turn the start switch clockwise to the ON position.
4. Release the park brake.
5. Depress the service brake.
6. Put the vehicle in Drive (D) or Reverse (R).
- 7.



WARNING

Pull over if the Stop the Vehicle, High Voltage Hazard, or Vehicle Service warning lights are on, and DO NOT drive the vehicle. Attempting to drive the vehicle

with these warning lights on could permanently damage the batteries or other the vehicle components. Failure to comply may result in death, personal injury, equipment damage, or property damage.



WARNING

Vehicle noise may be reduced in some operation modes. The vehicle operator must remain aware of nearby vehicles or pedestrians at all times. Failure to comply may result in death, personal injury, equipment damage, or property damage.

The vehicle will be ready to move when the Ready to Move indicator illuminates green. See [Ready to Move](#).

VEHICLE WARM-UP

Vehicle warm-up allows the vehicle to be in optimum conditions before driving. The vehicle can automatically be warmed-up by choosing a Planned Departure time in the Settings menu. See [Planned Departure](#).



NOTE

PACCAR recommends to use the Preconditioning feature to properly warm-up or precondition the vehicle.

1.6 Electric Power Take-Off (e-PTO)

ELECTRIC POWER TAKE-OFF (E-PTO)

Battery Electric Vehicles (BEV) have an Electric Power Take-Off (e-PTO) that sources electrical power from the high-voltage batteries through the high voltage junction box (HVJB) and transfers that power to activate the e-PTO motor and drive specific vehicle's accessories and equipment. Vehicle speed is independent of e-PTO motor speed. There are two types of e-PTO available on BEVs:

- Factory-installed e-PTO motor
- High-voltage DC power connection (equipped by customer specifications)

E-PTO Motor

The e-PTO motor is dedicated to driving external accessories or devices, such as hydraulic pumps or generators. When this motor starts to rotate, power transfer to all involved components begins.

E-PTO DC Power Connection

The batteries supply high-voltage DC current through the high-voltage junction box (HVJB) directly to the vehicle accessories such as reefers (refrigeration units) or fans. A high-voltage DC e-PTO connection provides high-voltage battery voltage to the optional e-PTO devices.

STARTING THE PTO

The PTO mode is activated and controlled with a switch in the cab. The ePTO switch in the cab commands either the ePTO Motor or ePTO Power Connection (depending on how it is configured). The following information below provides the basic process of enabling and activating ePTO control and what the operator should observe during this process.

NOTE

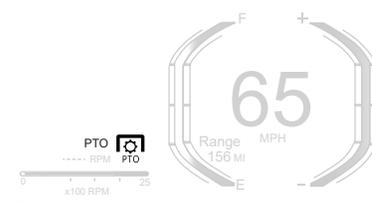
The PTO cannot engage instantly. There is a slight delay.

1. Toggle the PTO ON/OFF switch to **ON** position. Text indicating PTO activation appears in a gauge labeled PTO.
2. Toggle the PMC Speed +/- switch to enable ePTO motor speed control operations.
3. To increase or decrease ePTO motor speed use a combination of short and long presses of the PMC Speed +/- switch to the desired speed.
4. The PTO has PMC Custom Presets located on the dash and they can be configured to specific speeds.
5. There are two ways to configure the PMC Speed Preset switch:
 - Configured as "dedicated": Pressing "+" commands a preset. Pressing "-" commands a different preset.
 - Configured as "toggle": Pressing "+" cycles up through up to six presets. Pressing "-" cycles down through up to six presets.

ePTO is now active and the selected target PTO speed shows in the PTO gauge.

Result:

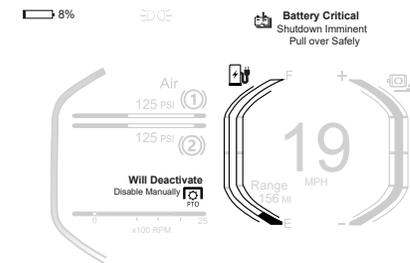
ePTO motor RPM displays next to the PTO indicator.



PTO CONDITIONS

The PTO can be deactivated depending on the State of Charge (SOC) of the vehicle.

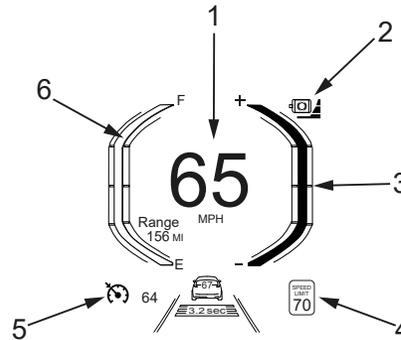
Critical SOC Warning with PTO Active



When the SOC is decreasing and the PTO is active, the vehicle will show a notification stating **Battery Near Empty** and a message stating **PTO Will Deactivate** will be displayed next to the PTO indicator, this indicated that the PTO will be deactivated soon to save battery life.

2 VEHICLE OPERATIONS

2.1 Indicators Around the Vehicle Speed



1. Speedometer
2. Regenerative gauge
3. Power gauge
4. Speed limit recognition
5. Cruise Control, Adaptive Cruise Control (optional), Predictive Cruise Control (optional)
6. Battery gauge and estimated range

2.2 Speed Limit



This vehicle has the ability to recognize traffic signs for speed limits (both US and Canada). The speed limit indicator may change color if the vehicle is traveling faster than a posted speed limit. A change in signage from MPH to KPH (when crossing a border) is not detectable until at least 3 traffic signs have been scanned.

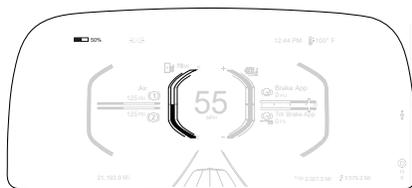
2.3 Battery Gauge and Estimated Range

The Battery Management System (BMS) monitors the State of Charge (SOC) of the High-Voltage (HV) batteries and notifies the operator of the need to get the vehicle to a safe location and charge the vehicle when necessary. The battery gauge has two locations: on the top bar and to the left of the speedometer and indicates the nominal battery state; the fill color can be either blue or red (when low SOC). In the center of the display, the estimated range bar

shows the estimated distance the vehicle can be driven before it runs out of power. This estimated range is calculated by several factors such as loading weight and driving style. When the SOC decreases to a critically low state, the estimated range number disappears from the display to signal the need to get to a charger soon.

The system alerts the operator with non-suppressible warnings on the Digital Display when the battery level of the vehicle is decreasing. When the battery reaches a critically low state, there is a power derate that prevents the vehicle from accelerating quickly and reduces the top speed. See [Charging Considerations](#).

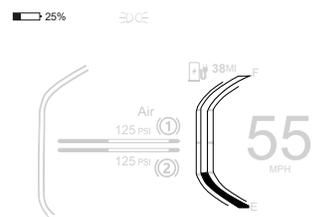
Nominal Battery State



50%

When the SOC is at optimal state, the color of the indicator at the top bar and the gauge in the center of the Digital Display remains blue. Low power location is represented by a red line across the blue gauge.

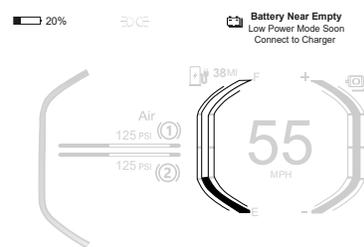
Pre-Warning



25%

When the SOC decreases and reaches 25%, the red line indicating the low power zone in the SOC gauge in the center of the display becomes a red zone, but the SOC indicator at the top bar remains blue.

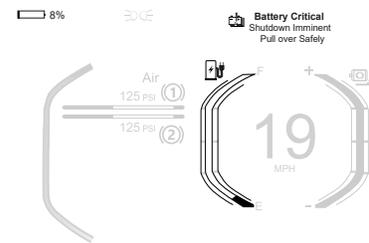
Low SOC Warning



Battery Near Empty
Low Power Mode Soon
Connect to Charger

When the SOC decreases to 20%, both the SOC indicator and the SOC gauge turn red. The vehicle also starts an audible and a visual notification of **Battery Near Empty**, indicating that the SOC is decreasing and that the vehicle needs to be connected to a charger.

Critical SOC Warning



Battery Critical
Shutdown Imminent
Pull over Safely

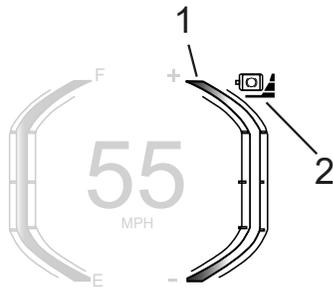
When the SOC continues decreasing, the display shows another notification stating **Battery Critical**, indicating that the vehicle needs to be stopped and that it will shutdown. The estimated range is hidden too, as it becomes difficult to estimate vehicle range as the battery runs out.

Vehicle Shutdown

At 0% SOC the vehicle will shutdown to prevent damage.

2.4 Regenerative Braking System

REGENERATIVE BRAKING SYSTEM



1. Power Meter
2. Regenerative Braking indicator

The e-motor produces power for the batteries when the vehicle is in regenerative mode, acting as a generator. The Regenerative Braking System (RBS) automatically decelerates the vehicle when the accelerator pedal is released and the vehicle is moving. Regenerative Braking adds power back into the battery, extending the driving range.

WARNING

Charging the vehicle to 98% or higher disables regenerative braking until the State of Charge (SOC) is below 98%. **In situations where regenerative braking is disabled, rely on the service brakes to slow or stop the vehicle.** Failure to comply may result in death, personal injury, equipment damage, or property damage.

NOTE

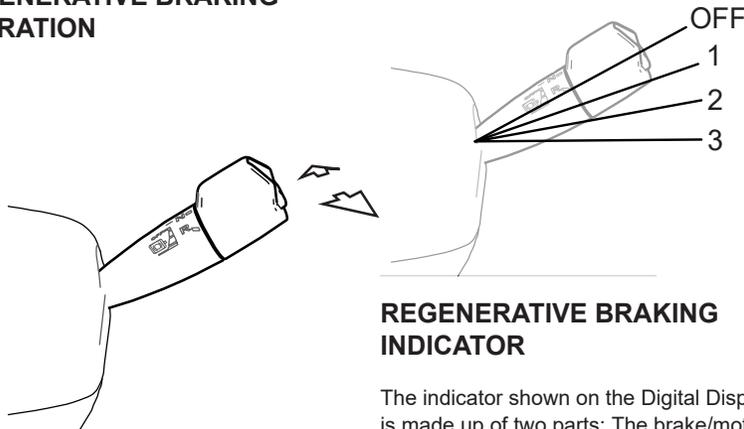
The regen icon turns gray and the regen gauge has three amber bars to indicate the deactivation of the regenerative braking system due to the battery State of Charge (SOC) being near full charge.

The Regenerative Braking system contains four levels:

- Regenerative Level OFF
- Regenerative Level 1
- Regenerative Level 2
- Regenerative Level 3

Position	Amount of Regen Braking	Indicator Shown on Digital Display
OFF	0%	
1	33%	
2	66%	
3	100%	

REGENERATIVE BRAKING OPERATION



REGENERATIVE BRAKING INDICATOR

The indicator shown on the Digital Display is made up of two parts: The brake/motor symbol and the Level Bars.

The brake/motor symbol indicates when the system is enabled and if it is actively storing energy:

- White: enabled and available to use.
- Green: actively storing energy (regen braking).
- Dark grey: not available.

The Level Bars always correspond to the selection on the Right Hand Stalk Shifter (RHSS). The colors of each bar segment also indicate that level's state:

- Light grey: available but not selected.

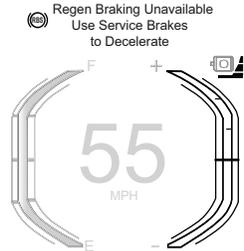
- White: available and selected.
- Amber outline: degraded performance but not selected.
- Amber: degraded performance and selected.

DEGRADED REGENERATIVE BRAKING

When the Battery Management System is unable to receive power from the Regenerative Braking System, some of the levels will have degraded performance. For example, if the battery is mostly full, you may only be able to select and use Level 1, even though you can still use the RHSS to select Levels 2 and 3. This is visually reflected in the Digital Display in both the Indicator bars being shown in amber, and amber segments appearing in the Power Gauge where the regen bar normally shows regen braking occurring.

During degraded regen braking, use your service brakes to safely maintain speed.

REGENERATIVE BRAKING UNAVAILABLE



If the regenerative braking system is unavailable, the driver receives a notification, and service brakes must be applied to slow down the vehicle.

REGENERATIVE BRAKING FAULT



The regenerative braking fault indicator may illuminate on the digital display under the following conditions:

- When the high-voltage batteries are unable to receive power from the regenerative braking system (RBS). This occurs due to specific conditions, for example, the State of Charge

(SOC) being over 98% or the batteries having an extreme temperature. In this case, the RBS indicator illuminates alone in the digital display without other fault indicators.

i NOTE

If regenerative braking system (RBS) is unavailable because of a high SOC, the indicator shows grey with amber brackets on the gauge.

- When a fault in the vehicle's brake system occurs, a RBS indicator shows along with other indicators such as the high-voltage hazard, stop vehicle (STOP), and the service vehicle with notification.



⚠ WARNING

Charging the vehicle to 98% or higher disables regenerative braking until the State of Charge (SOC) is below 98%. **In situations where regenerative braking is disabled, rely on the service**

brakes to slow or stop the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

i NOTE

The regen icon turns gray and the regen gauge has three amber bars to indicate the deactivation of the regenerative braking system due to the battery State of Charge (SOC) being near full charge.

2.5 Prescheduling and Preconditioning

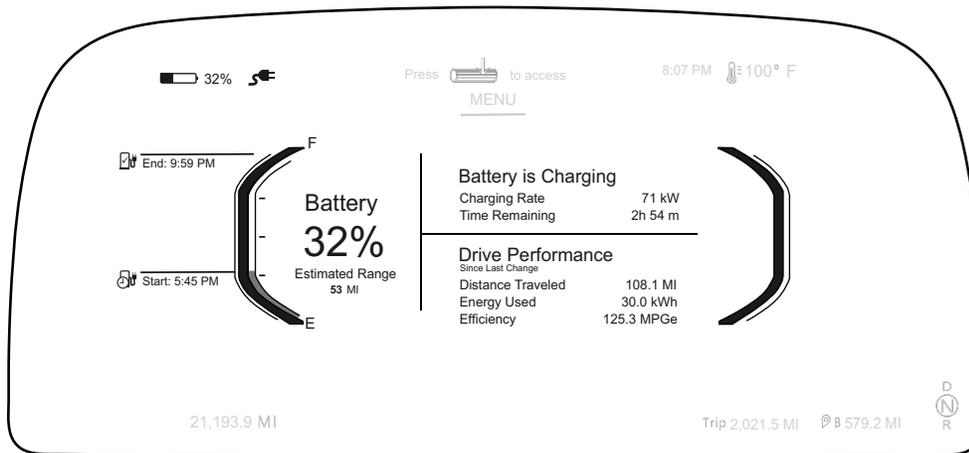
PRESCHEDULING

The Prescheduling feature allows the operator to specify the charging settings:

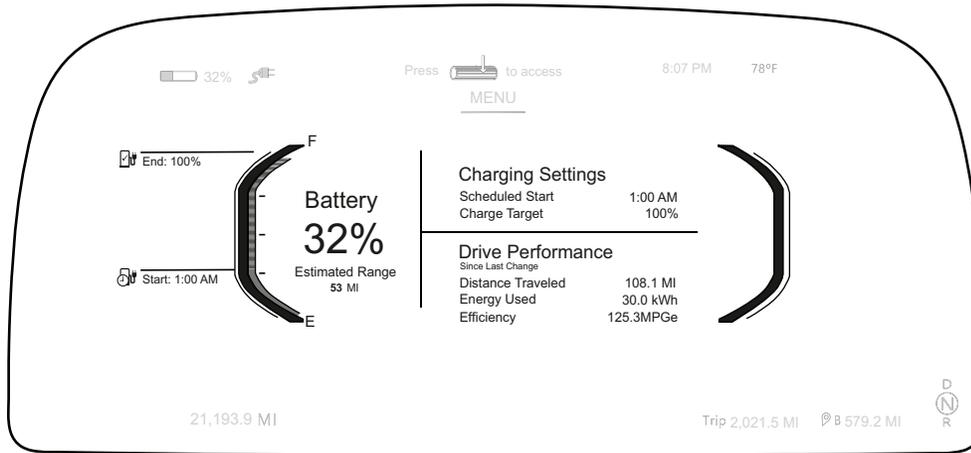
- Scheduled Charging: the time to start charging
- Charge Target: the target SOC (State of Charge)
- Planned Departure: the pre-conditions of the batteries and cab before a drive

These settings can only be set on the charging sub-menu and will be displayed on the charging overview screen.

Vehicle Charging with Scheduled Charging and Charge Target Inactive



Vehicle Charging with Scheduled Charging and Charge Target active



4

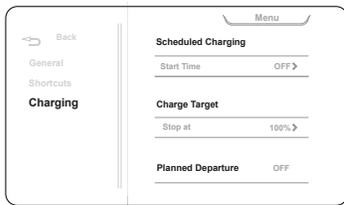
SCHEDULED CHARGING

The Scheduled Charging is off by default and is a feature that allows the operator to set a time when the vehicle will start charging. When active, this feature will attempt to charge the vehicle daily at the preselected time. The scheduled charging is independent of Charge Target and Planned Departure features. Perform the following procedures to activate this feature and set a scheduled charging:

i NOTE

Ensure that the digital display shows the accurate time before setting the scheduled charging feature. Adjust the time zone if needed.

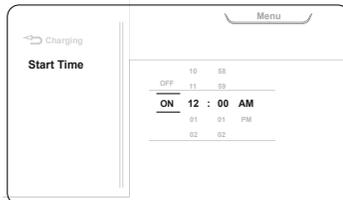
1. Open the Main Menu.
2. Select **Charging** in the Main Menu.



3. Select **Start Time** located in the

Scheduled Charging option.

4. Use the steering wheel switches to set to the **ON** position and select the desired time for the batteries to start charging.



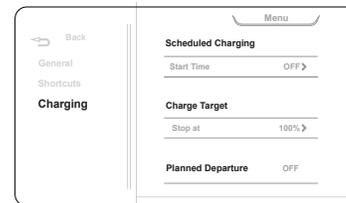
The vehicle can remain plugged in, but the charging will not start until the set time is reached; when this feature is set to OFF, the charging starts immediately.

5. Finally, go back to the Main Menu and exit.

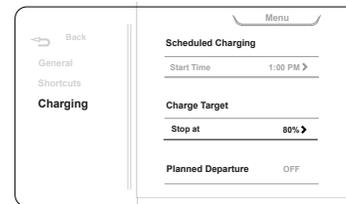
CHARGE TARGET

The Charge Target is a feature that allows the operator to select a desired State of Charge (SOC) level at which the vehicle will stop charging. Perform the following procedure to set a charge target:

1. Open the Main Menu.
2. Select **Charging** in the Main Menu.



3. Select **Stop at** located in the **Charge Target** option.
4. Use the steering wheel controls to select a desired SOC level at which the vehicle will stop charging.



i NOTE

This function may not be available if the batteries have not been fully charged for several cycles.

 **NOTE**

The vehicle must be charged to 100% periodically to maintain State of Charge (SOC) calibration. The vehicle will automatically attempt to charge to 100% at certain intervals, even if a stop charging target is set.

 **NOTE**

Once the set level is reached, the level of the charge target resets to 100%.

 **WARNING**

Charging the vehicle to 98% or higher disables regenerative braking until the State of Charge (SOC) is below 98%. **In situations where regenerative braking is disabled, rely on the service brakes to slow or stop the vehicle.** Failure to comply may result in death, personal injury, equipment damage, or property damage.

5. Finally, go back to the Main Menu and exit.

PLANNED DEPARTURE

The Planned Departure (Preconditioning) feature allows setting a departure time for which the vehicle automatically pre-heats or pre-cools the batteries and cab according to the operator's Planned Departure settings. The physical control dials stay where they are when shutdown and when preconditioning starts, it applies power to the HVAC system. The operator can activate this feature and schedule preconditioning times in the **Charging** sub-menu. The departure day and time information is displayed on the **Charging** overview screen.

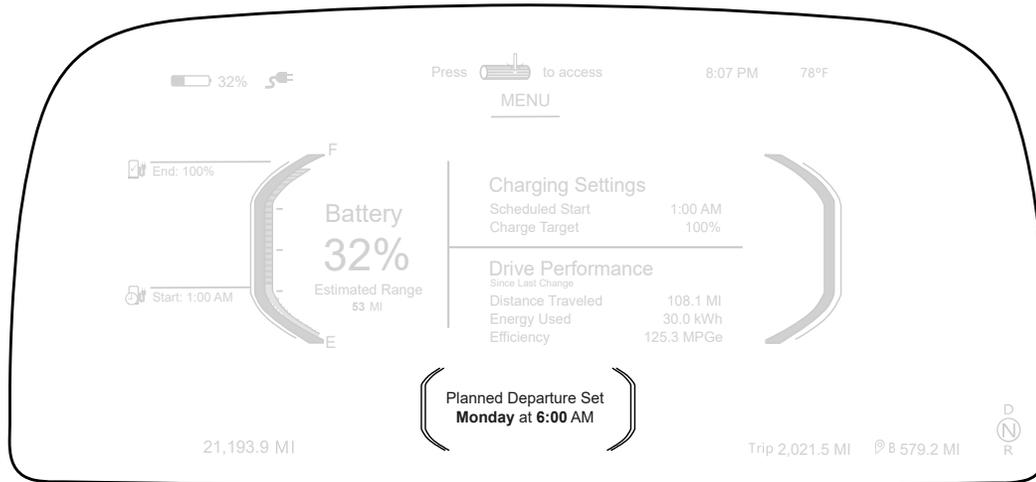
 **NOTE**

Make sure to set the dials on the HVAC controls to the desired setting when using preconditioning. The preconditioning uses whatever HVAC controls are set to when it activates.

 **NOTE**

Preconditioning can be done with or without the charging plugged in.

Vehicle Charging with Planned Departure Active

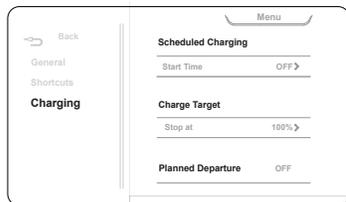


4

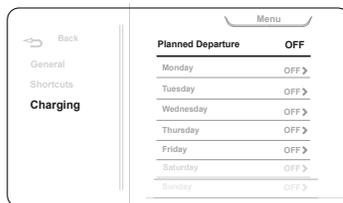
SETTING PLANNED DEPARTURE

The Planned Departure feature allows the operator to schedule a planned departure for the vehicle each day of the week, this will allow the system to precondition the vehicle before operation. Planned Departure is off by default. Perform the following procedure to activate this feature and set a planned departure:

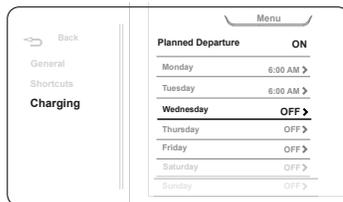
1. Open the Main Menu.
2. Select **Charging** located in the Main Menu.



3. Select **Planned Departure**.



4. Set to the **ON** position and select the planned time for each day by setting the planned time of departure.



5. Finally, go back to the Main Menu and exit.

NOTE

The Charging Menu has an ON/OFF option for Plug Security when charging in public places. If set to ON, this requires the Stop Charging switch to be pressed to

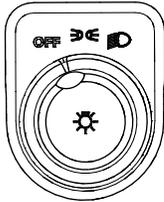
release the charging cable from the vehicle.

3 LIGHTING CONTROLS

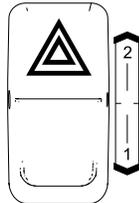
3.1 Lighting

Table 8: Lighting Switches

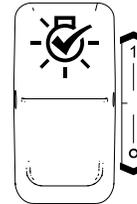
Master Lighting Switch



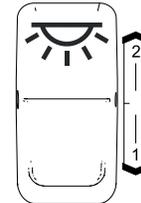
Hazard Warning



Exterior Lights
Self-Test (ELST)



Dome



Dome Light

Turns on cab interior overhead light. See [Lights, Dome](#).

ELST

Start an Exterior Lights Self-Test. See [Exterior Lighting Self-Test \(ELST\)](#)

Hazard Lights

Turns on Hazard Warning Lights. See [Lights, Hazard](#).

Master Lighting Switch

Three-position switch that activates either the auxiliary lighting group (aux) – parking and marker lights – or the headlights and the aux lighting group. See [Lights, Master](#).



NOTE

The high beams and flash-to-warn activation methods use the same action. To activate the high beams, turn the low beams ON. To activate flash-to-warn, turn the low beams OFF.



WARNING

If the vehicle's low beam wiring circuit does not function correctly, pull completely off the road and call the nearest dealer for assistance. DO NOT drive the vehicle using the high beams, as high beam glare can blind other drivers and increase the risk of an accident. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Table 9: Optional Lighting Switches



Lights, Beacon .



Lights, Daytime Running (Override).



Lights, Fog .



Lights, Marker/Clearance/Trailer .

Table 9: Optional Lighting Switches

Lights, Spot .



Lights, Work .



Lights, Flood (Spare).

Exterior Light Flashing

- **Flash-to-Warn** (or High Beams Flash) - Warn other drivers by briefly activating high beam headlights. See Flash-to-Warn.
- **Flash-to-Pass**(sometimes called Low Beam Flash) - Signal other drivers by briefly changing headlight intensity. See Flash-to-Pass.
- **Flash-to-Thank** (or Marker Lights Flash) - Signals other drivers by briefly flashing the marker lights. See Flash-to-Thank.

4 ADVANCED DRIVER ASSISTANCE SYSTEM (ADAS)

4.1 Advanced Driver Assistance System

The Advanced Driver Assistance System (ADAS) is an optional set of technologies and features that assist the operator while driving. These features improve operator and vehicle safety by alerting the operator (and in some cases taking actions) to the driving environment. The ADAS features use electronic and hardware improvements to accomplish this task: cameras, radar, sensors, and in-cab notifications.

The features described in this section should supplement the explanations, warnings, and preventive maintenance information located in the ADAS OEM operator's manuals for the equipment particular to the vehicle. It is important that the operator become familiar with the OEM manuals associated with their ADAS equipment prior to driving the vehicle.

The vehicle may be equipped with one of the following ADAS:

Table 10: Bendix™ Advanced Driver-Assistance Systems (ADAS)

Product	Feature
Bendix™ Fusion	Adaptive Cruise Control (ACC)
	Collision Mitigation
	Speed Limit Recognition
	Highway Departure Braking
	Lane Departure Warning (LDW)
	Automatic Emergency Braking (AEB)
	Traffic Sign Recognition
	High Beam Assist

4.2 ADAS Components

Camera

The camera is a forward-looking camera with a sensor for the Advanced Driver Assistance System (ADAS). The camera

is a high resolution, high dynamic range sensor, which offers a high image quality even under non-ideal lightning conditions for the operator assistance systems; the camera helps to ensure a comfortable and safe ride.

Radar

The radar is an integral component of the ADAS system and is mounted to the front of the vehicle. The radar allows the system to react to a detected forward vehicle in the same lane, traveling in the same direction.

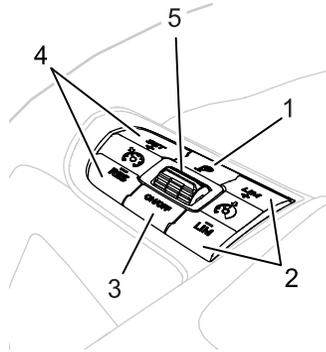
4.3 Cruise Control

CRUISE CONTROL

The cruise control automatically controls the speed of the vehicle. This vehicle's electronic system will perform a 'rationality check' every time the vehicle is started. This check is to ensure that the service brakes are working before allowing cruise control to function. This safety feature is designed to ensure that a driver is able to cancel the cruise set speed by using the service brake pedal. The system will not allow the cruise control operation if it does not pass the 'rationality check.' The display will prompt the operator to press the service brake pedal if it has not been pressed

since the vehicle has been started. For a specific explanation of the cruise control, see the cruise control manual included with the vehicle.

Figure 25: Left Switch Wheel



- 1 Trip
- 2 Variable Road Speed Limiter (VRSL) LIM+ and LIM-
- 3 Cruise Control ON/OFF
- 4 Cruise Control (CC) SET+ and RES-
- 5 Toggle

The switches on the left side of horn pad manage vehicle speed functions like cruise control and variable road speed limiter (option). If the vehicle is equipped with

adaptive cruise control (option), predictive cruise control (option), etc., the toggle switch is also used to operate that system.

CRUISE CONTROL INDICATOR



This indicator shows the operator which Cruise Control function is currently enabled or active. This includes:

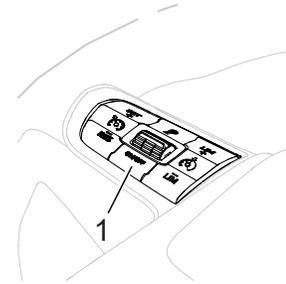
- Cruise Control (CC)
- Adaptive Cruise Control (ACC) (option).

The indicator lights white when the system is ON and lights green when the cruise control set speed is active. See [Cruise Control](#) for more information of the this feature.

SETTING THE CRUISE CONTROL SPEED WHEN DRIVING

The vehicle speed must be greater than 19 mph (30 kph) for the cruise set speed to work.

1. Turn the cruise function ON by using the ON/OFF button.



- 1 ON/OFF button

The cruise icon will appear in the display.



2. Accelerate the vehicle via accelerator pedal to the desired cruise speed.

- 3.

WARNING

Cruise Control may not hold the set speed going downhill. If the speed increases going downhill, use the brakes to slow down and cancel Cruise Control. Failure to comply may result in death, per-

sonal injury, equipment damage, or property damage.

Press the **SET +** button to set the cruise speed.

Result:

The cruise set speed will appear in the display.

CHANGING THE CRUISE SET SPEED

The vehicle cruise control must be ON and the cruise speed engaged.

- To increase vehicle speed
 - Press or long press **SET +** until you reach the desired speed, or
 - Use the Accelerator Pedal to reach the desired speed, and then press the **Set +**
- To decrease vehicle speed, press or long press **RES -** until you achieve the desired speed, and then press **SET +**.

Result:

The new cruise speed can be seen next to the Cruise Control Indicator.

CANCELING AND RESUMING THE CRUISE CONTROL

There are three ways to cancel the set speed in cruise control:

- Tap the brake pedal.
- Turn the cruise control system OFF (ON/OFF button on steering wheel).
- Press the Variable Road Speed Limit buttons.

Using the brake pedal to cancel set speed allows the operator to use the RESUME feature. Pressing the **RES -** button will resume the vehicle speed previously set.

Pressing **ON/OFF** once will deactivate cruise control, and pressing it twice will turn off the system. When turning the system OFF, the previous set speed is removed from memory. The operator will have to manually reset the vehicle's cruise speed.

4.4 Variable Road Speed Limiter (VRSL)

VARIABLE ROAD SPEED LIMITER (VRSL)

The Variable Road Speed Limiter (VRSL) prevents the vehicle from exceeding a chosen vehicle speed limit. This limit is selected by the operator and can be changed while driving. VRSL uses various braking methods to enforce the limit including ignoring further input from the accelerator pedal, but will only use Regenerative Braking if available and enabled.

VRSL replaces the Cruise Control indicator when active and will show the VRSL limit to the right of the indicator. This limit is shown in gray but turns white when actively limiting vehicle speed.

When active, the VRSL speed limit can be changed using the LIM+ and LIM- buttons in the right steering wheel switch pod. See [Setting the Variable Road Speed Limiter \(VRSL\)](#). Enabling VRSL will disable Cruise Control.

VRSL can be canceled by any of the following:

- A long press of the Cruise Control ON/OFF switch.

- Stopping then parking the vehicle.
- Activating the PTO (option).

SETTING THE VARIABLE ROAD SPEED LIMITER (VRSL)

The Variable Road Speed Limiter (VRSL) cannot establish a limit while the parking brake is set or the PTO is in operation. The minimum VRSL setting is 25 mph (40 kph). Enabling VRSL will disable Cruise Control if Cruise Control is active.

1. Press the Cruise Control **ON/OFF** button in the left, steering wheel switch pod.



Indicates that the VRSL feature is awaiting input.

2. Press, or press and hold, **LIM+** or **LIM-** to incrementally, or continuously, raise or lower the VRSL limit.

The green VRSL indicator will replace the Cruise Control indicator, indicating that VRSL is enabled. VRSL (like Cruise Control) will use the current vehicle speed as the VRSL limit until changed.

Result:

Pressing either LIM+ or LIM- will adjust the VRSL limit while this feature is active.

4.5 Adaptive Cruise Control (ACC)

ADAPTIVE CRUISE CONTROL (ACC)

WARNING

The driver must remain alert, react appropriately, and use safe driving practices while using this driver assistance feature. Ultimate responsibility for safe operation of the vehicle remains with the driver at all times. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

The driver must remain visually aware of the roadway and traffic and not rely solely on Driver Assistance features to identify and respond to the variety of vehicles or objects sharing the

road. The driver must read the ADAS operator's manual associated with this feature and understand its limitations prior to driving the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

Driver Assistance features respond differently to specific road, weather, and traffic conditions. The operator must read the ADAS operator's manual associated with this feature and understand how it responds to these specific conditions prior to driving the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

When Cruise Control is active, ACC accelerates and slows the vehicle to maintain a chosen distance from a detected forward vehicle. Collision Mitigation attempts to prevent a forward collision when the vehicle is advancing at speeds greater than 15 mph (24 kph). Please review the ACC section of this manual, and the manufacturer's manual, prior to driving this vehicle.

ADAPTIVE CRUISE DISPLAY

The display area for Active Cruise will contain dynamic visuals related to whether a tracked vehicle is in front and the amount of following distance set for Active Cruise. It will show an outline of a car in the display area when the radar is tracking a vehicle. Once it locks on to a tracked vehicle, it will display horizontal bars to represent the amount of following distance from the tracked vehicle. Once it locks and tracks a target vehicle, the system will adjust the speed to accommodate the speed of the tracked vehicle in front of it.

Figure 26: No Tracked Vehicle



The operator can set the amount of following distance from the tracked vehicle. There are five preset distances to choose from, represented by horizontal bars between the hood and the forward car. One bar represents the nearest following distance.

Figure 27: Following Distance One Bar



Five bars represents a farther distance.

Figure 28: Following Distance Five Bars



See [Set ACC Following Distance](#).

SET ACC FOLLOWING DISTANCE

Follow these steps to adjust the following distance for Adaptive Cruise Control (ACC):

1. Press the **Toggle** until the following distance bars illuminate in the view. If the vehicle has Predictive Cruise Control (PCC), you may have to press multiple times to cycle through the other settings for PCC.
2. Rotate the **Toggle** up or down to choose the amount of following distance.
3. Push the **Toggle** again to set the following distance.

FOLLOWING DISTANCE ALERTS

When a tracked vehicle is at a proper following distance, no alert shows on the Digital Display, but if the following distance decreases (less than 1.5 seconds), the following distance bars will turn amber. When the following distance decreases even more (0.5 seconds), the following distance bars will turn red. Following distance value may differ based on the vehicle option codes.

OBJECT DETECTED ALERT

When Collision Mitigation instrumentation detects a roadway object not recognized as a vehicle, the following graphic will show in the Driver Assistance area of the Digital Display:

Figure 29: Active Cruise - Object Detected



Because ACC does not classify the forward object as a vehicle, Collision Mitigation braking will not occur (see [Collision Mitigation](#)); instead, this graphic is accompanied

by an audible alert, allowing the operator to decide how to best respond to the detected object.

For more information on the characteristics of the Adaptive Cruise Control feature, please read the ADAS OEM Operator's Manual specific for your vehicle.

COLLISION MITIGATION

WARNING

The driver must remain alert, react appropriately, and use safe driving practices while using this driver assistance feature. Ultimate responsibility for safe operation of the vehicle remains with the driver at all times. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

The driver must remain visually aware of the roadway and traffic and not rely solely on Driver Assistance features to identify and respond to the variety of vehicles or objects sharing the road. The driver must read the ADAS operator's manual associated with this

feature and understand its limitations prior to driving the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

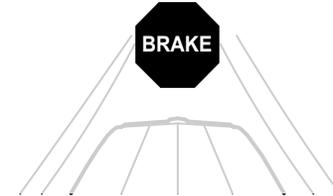
WARNING

Driver Assistance features respond differently to specific road, weather, and traffic conditions. The operator must read the ADAS operator's manual associated with this feature and understand how it responds to these specific conditions prior to driving the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Collision Mitigation will attempt to prevent or lessen the impact of a forward collision where Collision Mitigation has determined impact with a vehicle is likely. Although the Driver Assistance instrumentation can detect a non-vehicular, forward object, only a recognized vehicle can trigger Collision Mitigation.

Unlike Adaptive Cruise Control (ACC), Collision Mitigation is always on (at speeds greater than 15mph) and does not depend on Cruise Control being active. When Col-

lision Mitigation determines that a forward vehicular impact is likely, Collision Mitigation will apply the service brakes and present the following warning in the Driver Assistance area of the display along with an audible warning:



Additionally, this notification will appear instructing the operator to take control:

Collision Alert
BRAKE!

Collision Mitigation should not be used to stop or slow the vehicle without operator intervention. A Collision Mitigation braking event will temporarily disable both ACC and standard Cruise Control, requiring these features to be reactivated by the operator.

Collision Mitigation will continue to slow the vehicle until the potential for a collision has been averted, whether the potential collision be the vehicle that triggered the braking event or another forward vehicle the

system has determined may likely result in an impact. The operator can cancel the braking event by using either the accelerator pedal or the service brake. This lets Collision Mitigation know that the triggering event has been acknowledged.

To prevent abuse of this emergency feature, after three Collision Mitigation braking events, ACC and Collision Mitigation will be disabled until the next time the start switch is cycled. This is to prevent using Collision Mitigation irresponsibly or in a manner for which it was not intended. Please read the ADAS operator's manual specific for your vehicle to become familiar with the limitations of Collision Mitigation.

4.6 Automatic Emergency Braking (AEB)

The automatic emergency braking (AEB) is a function that can detect both vehicles and vulnerable road users, such as pedestrians and cyclists, and warn the driver of a potential collision. If the operator does not sufficiently intervene, AEB can decelerate the vehicle.

The AEB system consists of four main system operations as listed below:

- Collision Mitigation and Detecting Vulnerable Road Users (VRU): This

feature indicates that a collision with both detected forward vehicles or VRU is likely, and the operator should take immediate action to potentially avoid or lessen the severity of the potential collision. See [Collision Mitigation](#) for more detailed information.

- Highway Departure Braking: This feature warns the operator when the subject vehicle unintentionally drifts out of its lane of travel onto the shoulder. If the operator doesn't take corrective action, the feature then intervenes by applying the brakes. See [Highway Departure Braking](#) for more detailed information.
- Highway Departure Warning (HDW): This feature provides an audible alert if the system determines the vehicle has unintentionally left the roadway.
- Multi-lane Emergency Braking: This feature allows the operator not only to mitigate a forward collision with a vehicle in one lane, but it also helps to mitigate the potential collision when more than one lane on the highway is locked.

For more information on the characteristics of the AEB feature, refer to the ADAS specific supplier's manual.

WARNING

The driver must remain alert, react appropriately, and use safe driving practices while using this driver assistance feature. Ultimate responsibility for safe operation of the vehicle remains with the driver at all times. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

The driver must remain visually aware of the roadway and traffic and not rely solely on Driver Assistance features to identify and respond to the variety of vehicles or objects sharing the road. The driver must read the ADAS operator's manual associated with this feature and understand its limitations prior to driving the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

During the partial braking phase of an AEB event, the collision mitigation will be over-ruled with the following conditions:

- The operator manually press the brake/ accelerator pedal or apply the parking brake.
- The operator applies a change in the steering wheel position to avoid the potential collision.

The AEB is an electronic system that needs information about the operator override intention to override totally or partially the AEB function.

4.7 Lane Departure

HIGHWAY DEPARTURE BRAKING

WARNING

The driver must remain alert, react appropriately, and use safe driving practices while using this driver assistance feature. Ultimate responsibility for safe operation of the vehicle remains with the driver at all times. Failure to comply may result in death, personal injury,

equipment damage, or property damage.

WARNING

The driver must remain visually aware of the roadway and traffic and not rely solely on Driver Assistance features to identify and respond to the variety of vehicles or objects sharing the road. The driver must read the ADAS operator's manual associated with this feature and understand its limitations prior to driving the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

Driver Assistance features respond differently to specific road, weather, and traffic conditions. The operator must read the ADAS operator's manual associated with this feature and understand how it responds to these specific conditions prior to driving the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

The Highway Departure Braking (HDB) is a function that can decrease vehicle speed when the vehicle detects a potentially unintended departure over the fog line of a roadway without the driver signaling a lane change. The HDB will be automatically enabled when all of the following are true:

- The subject vehicle speed exceeds 37 mph.
- The camera has detected at least 2 lane lines.
- Lane Departure Warning (LDW) is not disabled.
- ABS is fully operational.
- ESC is fully operational.

The digital display will notify the operator of a Highway Departure Braking event with a notification and show this graphic in the Driver Assistance area accompanied by an audible alert:



HDB works along with Lane Departure Warning (LDW). LDW can warn of a highway departure prior to the braking action

taken during a HDB event (see Lane Departure Warning) Lane Departure Warning (LDW).

The operator can acknowledge and cancel a Highway Departure Braking (HDB) event by:

- Applying the service brake and braking more than that applied by HDB
- Pressing the accelerator pedal and pressing more than 90% of the pedal range
- Activating the turn signal
- Activating the hazards
- Steering the vehicle back into the lane

SPEED LIMIT RECOGNITION

Using the forward camera of the Driver Assistance instrumentation, the vehicle can read most North American speed limit signs. The detected, posted speed limit is presented on the display using a road sign located in the Driver Assistance area (see Minimized View with Driver Assistance):



The maximum/top posted speed limit that a class 8 vehicle can recognize on a highway is 70 mph. When vehicle speed exceeds the posted speed limit by 5 mph (8 kph) or more, the operator is notified using alternating red and blue "cop" lights, flashing above the sign on the display. This is accompanied by an audible alert.

HIGH BEAM ASSIST (HBA)

WARNING

The driver must remain visually aware of the roadway and traffic and not rely solely on Driver Assistance features to identify and respond to the variety of vehicles or objects sharing the road. The driver must read the ADAS operator's manual associated with this feature and understand its limitations prior to driving the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

The High Beam Assist (HBA) is a function to support the driver by automatically controlling the high beams. The HBA system utilizes a forward-facing camera to detect

the presence of other road users in front of the subject vehicle as well as detect ambient lighting conditions.

A settings menu option is available to permanently enable and disable the HBA. If the HBA is set to **enabled** in the settings menu, the driver does not have to perform any further action to enable the HBA. The HBA will be enabled when the enablement conditions are met. The HBA selection made in the settings menu will persist through key cycles. However, the state of the HBA (i.e. disabled, enabled, driver override, etc.) will not. On startup, the HBA will always be disabled and not controlling the high beams until all of the enablement conditions have been met.

NOTE

The driver can override the HBA by pulling back on the Turn Signal lever.

There are two driver override states:

- If the HBA is controlling the high beams and the high beams are on, the driver can override the HBA and turn the high beams off by pulling back on the turn stalk. The high beams will remain OFF until the driver pulls back on the turn stalk again, which will return the control

of the high beams to the HBA.

- If the HBA is controlling the high beams and the high beams are off, the driver can override the HBA and turn the high beams on continuously by pulling back on the turn stalk. The high beams will remain ON continuously until the driver pulls back on the turn stalk again, which will return control of the high beams to the HBA.

 **NOTE**

Regardless of the state of the high beams and the HBA, the driver will always have flash-to-pass functionality by pushing forward on the Turn Signal lever.

The HBA may not function correctly in the following situations and your intervention may be necessary:

- In strong weather conditions like dense fog or heavy precipitation.
- In the presence of poorly lit traffic participants like cyclists, pedestrians, or animals.
- In tight curves, at hilltops or depressions, at intersections.
- In poorly lit built-up areas, in the

presence of highly reflective signs or other unusual lighting conditions.

- When the windshield in front of the camera is fogged, dirty, or otherwise obscured.

If there is a problem with the HBA, the following notification will appear on the Digital Display indicating that inspection or service must be performed.

 **High Beam Assist Fault** 
Inspect Camera
Or Seek Service 1/2

LANE KEEPING ASSIST (LKA)

 **WARNING**

The driver must remain alert, react appropriately, and use safe driving practices while using this driver assistance feature. Ultimate responsibility for safe operation of the vehicle remains with the driver at all times. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

The driver must remain visually aware of the roadway and traffic and not rely solely on Driver Assistance features to identify and respond to the variety of vehicles or objects sharing the road. The driver must read the ADAS operator's manual associated with this feature and understand its limitations prior to driving the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

Driver Assistance features respond differently to specific road, weather, and traffic conditions. The operator must read the ADAS operator's manual associated with this feature and understand how it responds to these specific conditions prior to driving the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Vehicles with Lane Keeping Assist (LKA) will provide steering assistance when the system detects the vehicle is departing the lane without the use of a turn signal. Using Torque Assisted Steering, LKA will steer the vehicle in an attempt to nudge the vehicle back into the lane. LKA can always be overcome by the operator.

NOTE

The driver is expected to keep their hands on the steering wheel at all times.

Using this feature may increase or decrease awareness to components that are in need of inspection or maintenance, such as (but not limited to) improper tire inflation, suspension, or brake drag.

The operator is informed that their vehicle is equipped with the Lane Keeping Assist feature at vehicle start using the following Popup notification:

Figure 30: Lane Keeping Assist Installed Popup



Additionally, when LKA is enabled or engaged, the Lane Keeping Assist Enabled/ Engaged indicator is present:

Figure 31: Lane Keeping Assist Enabled/ Engaged Indicator



(See [Lane Keeping Assist \(LKA\) Enabled/ Engaged.](#))

When the vehicle speed is above 40 mph (65 km/h), the conditions are right, and the system is ready to assist in keeping the vehicle in the lane, the steering wheel on the indicator will turn green, indicating that the system is active and ready to assist in lane keeping.

NOTE

Lane Keeping Assist will disengage if vehicle speed drops below the minimum speed setpoint of 31 mph (49 km/h).

When Lane Keeping Assist system operating conditions are not met, the LKA feature may disengage (the indicator will turn white), re-engaging once the operating conditions are again satisfied. Some of

these conditions include an inability to identify lane markings, vehicle speed dropping below the minimum speed setpoint, rapid deceleration, or activating the vehicle hazard lights.

Lane Keeping can be disabled using the Lane Keeping Assist Disable switch, if optioned (see [Lane Keeping Assist \(LKA\) Disable \(option\)](#)).

For the LKA feature to operate as intended, the driver must remain in control of the vehicle with their hands on the wheel. If the system cannot detect the presence of the driver's hands on the wheel, it will disengage the LKA feature.

For more information on the Lane Keeping Assist feature, see the Lane Keeping Assist OEM operator's manual.

HANDS OFF DETECTION

WARNING

The driver must remain visually aware of the roadway and traffic and not rely solely on Driver Assistance features to identify and respond to the variety of vehicles or objects sharing the road. The driver must read the ADAS operator's manual associated with this feature and understand its limitations

prior to driving the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

The Hands Off Detection (HOD) is a feature that detects when the driver's hands are not on the wheel.

i NOTE

The HOD works independent of the LKA.

i NOTE

LKA is not responsible for moving the vehicle back to its lane. The driver must remain in full control of the vehicle at all times.

When the driver is properly operating the vehicle with driver control of the steering wheel, the arms on the LKA icon will be white.

When the driver removes their hands from the steering wheel for a certain period, the arms on the LKA icon will change color and there will also be notification messages

along with audible alerts stating warnings depending on how long the driver's hands were off.

Time With Hands off	Color in Arms	Message Displayed
10 seconds	Amber	Steering Assist System Installed, Keep Hands on Wheel At All Times
15 seconds	Red	Keep Hands on Wheel, Steering Assist will Disable!
30 seconds	Red	Driver Take Control
60 seconds	Grey	Steering Assist Disabled, Driver Take Over

i NOTE

After 60 seconds with the hands off, the LKA system will disengage and the

audible alert will continue until the driver has taken control of the steering wheel again. When the driver takes control of the steering wheel again, the system will return to its enabled state.

5 BRAKES

5.1 Air Brake System (Option)

AIR BRAKE SYSTEM (OPTION)

This vehicle's braking system and many vehicle accessories may depend on the storage and application of a high-pressure air supply. For vehicles equipped with an air brake system, the service brake, parking brake, and trailer brake will utilize this supply.

Vehicles equipped with an air brake system are of the dual circuit type: it has a circuit for the front wheels, a separate circuit for the rear wheels, and one for the trailer. The system is supplied by an electric compressor. The vehicle's compressor takes outside air and compresses it, usually to 100 to 130 psi (6.89 to 8.96 bar/689 to 896 kPa). The compressor air then goes to the air tanks to be stored until needed.

When you operate your air brakes, the stored compressed air flows into the chambers where it is used to apply your vehicle and trailer brakes. That is why, when you push down on the brake pedal, you do not feel the same amount of pressure on the pedal that you do when you apply the brakes on your car. All you are doing on your vehicle is opening an air valve to allow air to flow into the brake chambers.

**WARNING**

The antilock brake system (ABS) is a critical vehicle safety system. For the safety of you and others around you, have the vehicle submitted for periodic preventive maintenance checks. If you suspect problems, immediately contact an authorized dealer. Failure to maintain the brake system properly can lead to serious accidents. Failure to comply may result in death, personal injury, equipment damage, or property damage.

**WARNING**

DO NOT drive the vehicle with the parking brake applied. Always release the parking brake prior to moving the vehi-

cle. Failure to disengage the parking brake prior to moving your vehicle could result in excessive heat buildup in the brake system, resulting in premature failure of the braking system and/or a fire. Failure to comply may result in death, personal injury, equipment damage, or property damage.

FRONT BRAKE SYSTEM

When the brake pedal is depressed, the front circuit portion of the treadle valve delivers air from the front service air tank to the front axle brake chambers via a quick-release valve.

Simultaneously (on full vehicle configurations), air is also supplied to the modulating valve control port. In the event of a rear service circuit failure, the modulating valve will exhaust air from the spring brake chambers, applying the spring brakes in proportion to the front circuit application.

REAR BRAKE SYSTEM

When the brake pedal is depressed, the rear circuit portion of the treadle valve delivers air from the rear service air tank to the service brake relay valve control port. The relay valve then delivers air directly

from the rear service air tank to the rear brake chambers in proportion to the treadle pressure.

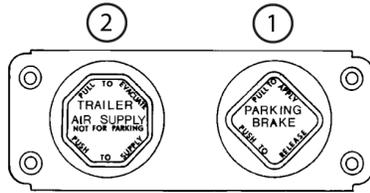
USING THE PARKING BRAKE

The yellow diamond-shaped knob on the dash controls the vehicle parking brake. These are spring brakes that you activate by releasing air pressure from their chambers. When they are not in use, air pressure compresses the springs and releases the brakes. Pulling the valve OUT applies the parking brake, which exhausts air from the chambers and allows the springs to extend and apply the brakes.

**WARNING**

DO NOT leave the cab of the vehicle without first applying the parking brake. The vehicle could roll and cause an accident. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Figure 32: Combination (Vehicle/Trailer) Parking Brake Control Valves



- 1 Parking Brake Control (yellow)
2 Trailer Air Supply Control (red)

BEFORE YOU LEAVE THE CAB

1. Apply all parking brakes. Pull out the **Yellow** Parking Brake Control knob (1) located on the dash. The **Red** (octagon-shaped) Trailer Air Supply Control knob will automatically pop out. (A dash warning light will indicate when the brake is ON.)
2. Shift the vehicle into Park position.
3. Select Neutral.
4. Turn the key to OFF.
5. Remove the key.

Result:

WARNING

DO NOT use the parking brake to slow your vehicle unless the service brake, retarders (engine brake, exhaust brake, transmission retarder, or regenerative braking), and other brake options fail. If your vehicle is moving, using the parking brake may cause sudden wheel lockup, loss of control, or collision with another vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

The parking brake acts on the rear wheels only. They are spring-applied, with air pressure used to release them. Release air is supplied by both the front and rear circuit air tanks through a double check valve.

TO RELEASE THE VEHICLE PARKING BRAKE ONLY

- Push IN the **Yellow** knob on the dash. Your trailer will remain parked.
- Below 60 psi (4.14 bar/414 kPa) the **Yellow** parking brake valve remains OUT (ON position). If air pressure is not restored above 60 psi (4.14 bar/414

kPa), the knob will automatically return to the OUT position if you attempt to push it in. Check the Primary and Secondary Air Pressures in the Primary Gauges panel view.

TO RELEASE THE TRAILER BRAKE ONLY

- Push IN the **Red** knob on the dash. The vehicle will remain parked.

TO RELEASE THE FULL COMBINATION OF BRAKES

- Push IN **BOTH** knobs on the dash.
- In the event that air pressure is reduced below a safe level: the low air warning light will come on first; if air pressure continues to drop, the parking brake valve will pop OUT, automatically applying the spring brakes.

WARNING

If an air pressure warning light appears, an air pressure gauge changes color, or the low air pressure alert is heard, immediately bring the vehicle to a safe stop. If vehicle air pressure falls below 60 psi (4.14 bar/414 kPa), the spring

brakes may abruptly stop the vehicle. DO NOT drive the vehicle until it is serviced. Failure to comply may result in death, personal injury, equipment damage, or property damage.

**WARNING**

DO NOT rely on the service brake or trailer hand brake to hold a parked vehicle. Loss of air pressure may allow the vehicle to roll unexpectedly. Always set the parking brake to ensure the vehicle remains stationary. Failure to comply may result in death, personal injury, equipment damage, or property damage.

**CAUTION**

DO NOT attempt to move the vehicle before air system pressure reaches 100 psi (6.89 bar/689 kPa). The wheels may still be locked by the spring brakes, resulting in unnecessary brake wear or damage. Failure to comply may result in equipment damage or property damage.

INITIAL CHARGE

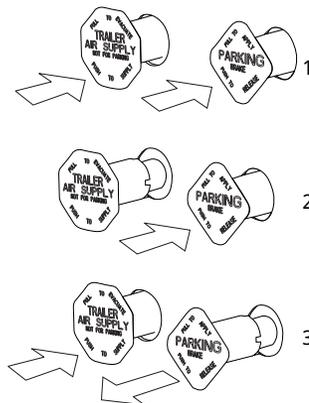
The red octagon knob controls the air supply to the trailer. With the system completely discharged, both the **Red** (trailer air supply) and the **Yellow** (parking brake) knobs are OUT; thus, vehicle and the trailer parking (spring) brakes are applied.

To supply air to the trailer system and release the trailer parking brake:

1. Allow the vehicle air system pressure to build up to operating level.
2. When system pressure reaches 50 psi (3.44 bar) the **Red** knob may be pushed IN.
3. Hold the **Red** knob IN by hand until the trailer air pressure builds to a pre-set level, about 45 psi (3.10 bar). At this point it will remain in, charging the trailer system and releasing only the trailer brakes.
4. The **Yellow** knob will remain OUT (vehicle brakes ON).

NORMAL RUN POSITION

- The **Yellow** knob (system park) may now be pushed IN, which will supply air to the vehicle spring brakes, releasing them.



1. Normal run position
2. Trailer park with vehicle released
3. System park or trailer charge with vehicle parked

TRAILER PARK OR EMERGENCY BRAKE APPLICATION ONLY

If there is ever a failure or the air supply hose disconnects from the trailer, the trailer parking brake will set. The red knob will

automatically pop out and seal off the vehicle air tanks to protect the vehicle air system pressure.

To apply the trailer brakes:

Pull out the red knob; this will exhaust air from the trailer supply line, causing the vehicle protection valve to close and the trailer spring brakes to apply. The trailer is now in emergency or park; this mode would be used to uncouple from the trailer (running without a trailer connected).



WARNING

When parking a vehicle, fully raise lift axles that are not equipped with a parking brake. If left in the down position, a lift axle not equipped with a parking brake could cause the parked vehicle to roll, resulting in an accident. Failure to comply may result in death, personal injury, equipment damage, or property damage.

SYSTEM PARK

With both knobs pushed in for normal operating modes, the parking brakes of both the vehicle and the trailer may be applied by pulling the **Yellow** knob OUT. This will exhaust the air from the vehicle spring

brakes, and simultaneously cause the **Red** knob to pop OUT, which will apply the trailer brakes. This complies with the Federal Motor Vehicle Safety Standards (FMVSS) 121 requirement that one control should apply all the parking brakes on the vehicle.

TRAILER CHARGE

To recharge the trailer when both knobs are OUT (combination vehicle is parked), push in the **Red** knob. This will repressurize the trailer supply line. The vehicle will remain parked. For more information on air supply pressure requirements, see [Initial Charge](#).

TRAILER BRAKE HAND VALVE

This hand valve provides air pressure to apply the trailer brakes only. It operates independently of the foot treadle valve.

To operate the trailer brake hand valve:

- Squeeze to pull down the valve or hold the end to keep the brakes applied until no longer needed.
- The valve is self-returning. When pressure is removed from the valve lever, it will return to the OFF position.



CAUTION

The trailer brake is not to be used as a substitute for the service brakes. Using this brake frequently, instead of using the foot brake, will cause the trailer brakes to wear out sooner. Failure to comply may result in equipment or property damage.



WARNING

When parking a vehicle, fully raise lift axles that are not equipped with a parking brake. If left in the down position, a lift axle not equipped with a parking brake could cause the parked vehicle to roll, resulting in an accident. Failure to comply may result in death, personal injury, equipment damage, or property damage.

BRAKE COMPONENTS

The following is a brief description of the air/brake system.

Electric Compressor-Compressor	Supplies air to the system. System pressure is controlled by the governor.
Standalone Electronic Air Controller (SA-EAC)	The Standalone Electronic Air Controller (SA-EAC) controls the AD-HFI® air dryer and the turning off/on of the vehicle electric air compressor. The SA-EAC uses vehicle inputs via Controller Area Network (CAN) and provides the basic governor control of the electric air compressor. The SA-EAC takes in the tank pressures and commands the compressor RPM setpoints when the pressure gets low. The electric air compressor turns off when the pressure reaches 130 psi (8.96 bar/896 kPa) and turns on when the pressure drops to 110 psi (7.58 bar/728 kPa) through the SA-EAC air system pressure monitoring.
Safety Valve	Installed on the supply air tank outlet. It should vent off at 150 psi (10.34 bar/1034 kPa) permitting air to escape.
Air Dryer	Collects and removes moisture and contaminants from the air as it travels from the compressor to the wet tank.
Compressed Air Tanks	The wet tank receives air from the air dryer and cools it somewhat, allowing moisture to condense for draining. Relatively dry air is then supplied to the two service air tanks for distribution to their respective brake circuits. The service air tanks are isolated from each other by check valves.
Dual Service Brake Treadle Valve	Delivers air to the two service brake circuits.

Double Check Valve	Directs the higher air pressure from either the rear (primary) or front (secondary) service air tank to the modulating valve. * Limits spring brake hold-off air pressure delivered to the spring brake chambers. * Provides a quick release of air pressure from the spring brake chambers to speed spring brake application. * Modulates spring brake application in proportion to front service application in the event of a rear service failure. * Prevents coupling of service and spring applications.
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Modulating Valve (SR-1)	Used only on full trucks, not tractors, performs two main functions: * Supplies a specific, limited hold-off pressure to the spring brakes if service brakes failure occurs. * Modulates the spring brakes application through the use of the service brake valve.
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Quick-Release Valve	Speeds the release of air from the brake chambers. When air is released, the air in the brake chambers is exhausted at the quick-release valve, rather than exhausting back through the treadle valve.
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Single Check Valve	Allows air flow in one direction only.
---------------------------	--

Parking Brake Valve	Yellow diamond-shaped knob. It controls the application and release of the parking (spring) brakes of the vehicle or of the vehicle-trailer combinations. If the air system is being charged from zero pressure, the parking brake valve will not hold in the release position until the system pressure exceeds 60 psi (4.14 bar/414 kPa), which is the pressure required to override the load of this valve's plunger return spring.
----------------------------	--

Trailer Supply Valve	The Red octagonal-shaped knob protects the vehicle system; it functions in conjunction with the parking brake valve (yellow). The trailer supply valve is responsible for synchronizing the vehicle and trailer parking and emergency brakes. If the air system is being charged from zero pressure, the trailer supply valve will not hold in the applied position until the system pressure exceeds 50 psi (3.45 bar/345 kPa). It automatically pops out and exhausts air if supply air pressure drops below 60 psi (4.14 bar/414 kPa).
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Vehicle Protection Valve	The functions of this valve are to (1) receive all pneumatic signals pertinent to the operation of the trailer brake system, (2) transmit these signals to the trailer, and (3) protect the vehicle air supply in case of separation of the air lines connecting the vehicle to the trailer.
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5.2 Brake Safety and Emergency

BRAKE SAFETY AND EMERGENCY

WARNING

Do not operate the vehicle in the event of an air or hydraulic circuit malfunction. Such a malfunction may prevent the brake system from operating properly. Do not operate the vehicle until repair is complete and both braking circuits,

including all pneumatic, hydraulic, and mechanical components, are working properly. Failure to comply may result in death, personal injury, property damage, or equipment damage.

 **WARNING**

The service brakes must be used in an emergency. Retarders alone (such as the engine brake, exhaust brake, transmission retarder, or regenerative braking) might not stop the vehicle fast enough to prevent an accident. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

DO NOT use a retarder (such as the engine brake, exhaust brake, transmission retarder, or regenerative braking) when operating on road surfaces with poor traction (such as wet, icy, or snow covered roads, or gravel). Retarders can cause the wheels to skid on a slippery surface. You could lose control of the vehicle or jackknife if the wheels begin to skid, resulting in an accident.

Failure to comply may result in death, personal injury, equipment damage, or property damage.

- If pressure is lost in the vehicle front or rear circuit, the "check" valves isolate the unaffected circuit, allowing this circuit to continue normal operation. The trailer brakes are still functional.
- If air pressure is lost in the trailer supply/park circuit, and the pressure drops below 60 psi (4.14 bar/414 kPa), the trailer spring brakes are automatically applied, and the vehicle air pressure circuits are unaffected.
- If air pressure is lost in the trailer brake service circuit, and the pressure in the vehicle front and rear circuits drops below 60 psi (4.14 bar/414 kPa), the vehicle and trailer spring brakes are automatically applied.

ABS WARNING LAMP

The ABS warning lamp will come on briefly, then go off, when the key switch is first turned on. If the lamp remains ON until a speed of 4 mph (6 km/h) is reached, then goes OFF, there may be a stored fault code. If the lamp remains ON when

a speed in excess of 4 mph (6 km/h) is reached, there may be an active fault in the ABS system.

 **WARNING**

No indication will be given via the dashboard warning lights or buzzer if tires of the wrong size are installed on your vehicle. The antilock brake system (ABS) is calibrated for the specific tire revolutions per mile. Use of a tire and/or wheel size different from that originally installed on your vehicle may cause the ABS system to not function during a hard braking event. This could cause an accident or serious personal injury. Consult with your dealer before using a different tire and/or wheel size than was originally installed on your vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

If the ABS warning light does not briefly illuminate when the start switch is first turned to ON, have the vehicle inspected as soon as possible. If the ABS warning light does not illuminate,

it will not alert the operator in the event of an ABS malfunction. Failure to comply may result in death, personal injury, equipment damage, or property damage.

AUTOMATIC TRACTION CONTROL



Your vehicle ABS is equipped with an automatic traction control (ATC) feature. This feature is controlled by a switch on the dash. Do not allow the traction control lamp to remain on continuously for an extended length of time. Extended continuous use of the ATC can cause overheating of the drive wheel brakes. Vehicle speed should be reduced to eliminate wheel spin and prevent excessive application of the ATC system. Except for checking for proper illumination of the ABS and traction control warning lamps when first starting the vehicle, and for monitoring these lamps while driving, no special operating procedures are required. For detailed system description, see literature for your specific ABS that was provided with your vehicle.

ANTI-LOCK BRAKE SYSTEM (ABS)

This vehicle is equipped with an Anti-Lock Braking System (ABS), which reduces the possibility of wheel lock-up. If a wheel is about to lock during braking, the ABS will automatically adjust air pressure to the brake chambers on the appropriate wheel(s) to prevent wheel lock-up. The ABS is automatically turned on when the start switch is turned on.

Electric vehicles may also be equipped with an Anti-Lock Braking System (ABS) integration. The ABS integration is an input processing function to determine the ABS, Automatic Traction Control (ATC), and Hill Start Aid (HSA) switch states and provides this information to the ABS controller by the Vehicle Electronic Control Unit (VECU). The VECU is a computer installed inside the cab that processes all input and output from the driver controls to the cab and chassis.

The ABS integration function is divided in three different sections:

- Multiplexed switch handling
- Brake signal handling
- Front axle signal handling

WARNING

The antilock brake system (ABS) is a critical vehicle safety system. For the safety of you and others around you, have the vehicle submitted for periodic preventive maintenance checks. If you suspect problems, immediately contact an authorized dealer. Failure to maintain the brake system properly can lead to serious accidents. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

DO NOT rely on an antilock brake system that is functioning improperly. You could lose control of the vehicle resulting in a severe accident, causing personal injury or death. If your ABS lamp goes on while you are driving or stays on after the self-check, your antilock system might not be working. The ABS may not function in an emergency. You will still have conventional brakes, but not antilock brakes. If the lamp indicates a problem, have the ABS checked. Failure to comply may result in death, per-

sonal injury, equipment damage, or property damage.

 **WARNING**

If your vehicle is not equipped with anti-lock braking (ABS), avoid depressing the service brake pedal completely, even during an emergency. Depressing the brake pedal completely can cause wheel lockup and lead to a dangerous skid. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Vehicles without ABS are typically equipped with a bobtail brake proportioning system. When a trailer is not connected, the drive axle brake application pressure will automatically be limited by the proportioning system. When driven in a bobtail mode, these tractors will require greater brake pedal application to provide the equivalent braking to a bobtail tractor not equipped with a proportioning system.

Trailer ABS Power Line Communication (PLC)

North American on-highway vehicles are equipped with a separate electrical circuit to power the ABS on towed vehicle(s). In

most cases, the ABS power will be supplied through the auxiliary circuit on the primary 7-way trailer light line connector. If the vehicle was manufactured with a switchable auxiliary circuit for trailer accessories, an additional 7-way connector would have been provided for trailer ABS power. In either case, the ABS power line on the vehicle will be PLC equipped.

 **WARNING**

DO NOT splice into the non-switchable Auxiliary circuit on the primary 7-way trailer light line. Doing so may cause the trailer ABS to malfunction. This circuit is dedicated for trailer ABS power. To add a switchable auxiliary circuit, contact a dealership. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **NOTE**

Tractors/Trucks and trailers built after 03/01/2001 must be able to turn on an In-Cab Trailer ABS Warning Light (per U.S. FMVSS121). The industry chose Power Line Communication (PLC) as the standard method to turn it on. On trailers built prior to 03/01/2001 ver-

ify trailer ABS system status via the required external warning light mounted on the trailer. The indicator light on the trailer should be amber and identified with the letters ABS.

For doubles or triples, the lamp does not distinguish between trailers. An ABS problem in any of the trailers will activate the Trailer ABS Warning Lamp.

If you change the intended service in any way (for example, number of axles, multiple trailers, add switchable trailer accessories, etc.) from the date the vehicle was manufactured, you should contact your trailer manufacturer and/or trailer anti-lock brake manufacturer to determine if the power available at the 7-way trailer light line is adequate. Failure to do so might result in insufficient power to the trailer ABS system, which may affect its operation.

 **WARNING**

Make sure the center pin of the 7-way trailer light line does not accidentally turn on trailer equipment. It might result in insufficient power to the trailer ABS system, which may affect its operation. Failure to comply may result in death,

personal injury, equipment damage, or property damage.

Special Trailer ABS Without PLC (Option)

If a trailer does not have PLC, but it does have ABS that is powered through an optional second trailer connector (ISO 3731) and that trailer ABS is designed to control the Trailer ABS Warning Lamp in the cab and the vehicle has been ordered with the option to turn on this lamp for these types of trailers, then this lamp will turn on when that trailer ABS has a system problem. This should be checked by a dealer as soon as possible. The Trailer ABS Warning Lamp will not turn on for the power-on test when connected to these types of trailers.

i NOTE

Very few trailers built before 03/01/2001 have this option. Trailers built after 03/01/2001 are built with PLC technology.

ADVANCED ABS WITH STABILITY CONTROL

Advanced ABS with Stability Control is a feature that reduces the risk of rollovers and other loss of control situations. For vehicles towing trailers, the feature can reduce the risk of a trailer jack-knifing.

During operation, the system constantly compares performance models to the vehicle's actual movement. It uses the wheel speed sensors of the antilock brake system (ABS), and lateral, yaw, and steering angle sensors. If the vehicle begins to leave the appropriate travel path, the system intervenes to assist the driver.



Electronic Stability Control can reduce the vehicle speed automatically. To minimize unexpected deceleration and reduce the risk of a collision, the operator must:

- Avoid aggressive driving maneuvers, such as sharp turns or abrupt lane changes at high speeds, which can

trigger the stability system.

- Always operate the vehicle safely. Drive defensively, anticipate obstacles and pay attention to road, weather, and traffic conditions. ABS, ATC, and ESC stability systems are no substitute for prudent, careful driving.

BRAKE WARNING LAMP

When the brake fault indicator comes on, it indicates a malfunction in the air brake system. A possible malfunction may be a loss of differential pressure between the primary and secondary brake circuits.

! WARNING

Do not operate the vehicle if the Brake System Malfunction warning light is lit or the audible alarm is sounding. If the warning light or audible alarm continue for longer than a few seconds, they may indicate a brake component or system failure. If you are driving when the warning light or audible alarm occur:

- Immediately pull over to the side of the road.
- Turn the start switch to OFF.
- Restart the vehicle.

If the warning light or audible alarm persist, turn the vehicle OFF. Do not operate the vehicle. Contact your nearest authorized dealer for more information. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Figure 33: Brake System Failure Indicator



If the buzzer sounds while driving, or if the BRAKE light comes on, do the following:

1. Slow down carefully. Here are some things you can do to assist in slowing the vehicle:
 - Depress the accelerator pedal to slow the vehicle speed.
 - Depress the brakes - Depressing the brake pedal may generate enough pneumatic pressure to stop the vehicle.

- Use the parking brake. The parking and emergency brake is separate from the pneumatic system (air system). Therefore it can be used to slow the vehicle speed.
2. Move a safe distance off the road and stop.
 3. Set the parking brake.
 4. Turn on the emergency flasher and use other warning devices to alert other motorists.

WET BRAKES

WARNING

DO NOT drive through water deep enough to wet brake components. It may cause the brakes to work less efficiently than normal. The vehicle stopping distance may be longer than expected or the vehicle may pull to the left or right when brakes are applied, causing an accident. Failure to comply may result in death, personal injury, equipment damage, or property damage.

If you have been driving in heavy rain or deep standing water, the brakes will get wet. Water in the brakes can cause them to be weak, to apply unevenly, or to grab. These conditions can cause a lack of braking power, wheel lockups, or pulling of the vehicle to one side or the other.

Avoid driving through deep puddles or flowing water if possible. If avoidance is impossible, take the following steps:

- Slow down the vehicle by depressing the accelerator pedal.
- Gently press on the brake pedal
- Increase speed while keeping light pressure on the brake pedal for a short distance to dry out the brake linings
- Check the brakes after driving through deep water

BRAKE OPERATION

WARNING

DO NOT drive through water deep enough to wet brake components. It may cause the brakes to work less efficiently than normal. The vehicle stopping distance may be longer than expected or the vehicle may pull to the left or right when brakes are applied,

causing an accident. Failure to comply may result in death, personal injury, equipment damage, or property damage.

To rectify this condition, check the rear and both sides of the vehicle for clear traffic, then apply the brakes gently, releasing and gently reapplying until the brakes dry out, restoring normal operation. Always check brakes after driving through deep water to help reduce the possibility of personal injury or an accident.

OVERHEATED BRAKES

There could be situations where the disc brakes can overheat by prolonged use, such as long descents. Overheated brakes will damage linings and disc surfaces, ultimately decreasing brake performance. Refer to [Regenerative Braking System and Driving Tips and Techniques](#) to avoid overheating the brakes.

When service brakes are used for emergency braking or for prolonged periods (brake pedal hold down too long or too often while going down a steep or long grade), internal brake disc temperatures may exceed the allowed range. This can be detected by a burning smell or smoke coming from a lining. If this occurs, you should

immediately stop and check for cracked brake disc or lining fires. If neither exists, continue driving and resume a slow speed as soon as possible to cool the brakes.

WARNING

DO NOT hold the brake pedal down too long or too often while going down a steep or long grade. This could cause the brakes to overheat and reduce their effectiveness. As a result, the vehicle will not slow down at the usual rate. Before going down a steep or long grade, reduce the speed. Failure to follow procedures for proper downhill operation may cause loss of vehicle control, resulting in death, personal injury, equipment damage, or property damage.

WARNING

Charging the vehicle to 98% or higher disables regenerative braking until the State of Charge (SOC) is below 98%. **In situations where regenerative braking is disabled, rely on the service brakes to slow or stop the vehicle.** Failure to comply may result in death,

personal injury, equipment damage, or property damage.

NOTE

When the regenerative braking system is limited due to the State of Charge (SOC), the service brakes need to be applied.

6 AXLE AND SUSPENSION

6.1 Differential Lock



The vehicle may be equipped with switches to lock the either of the rear axle differentials. Depending on how the vehicle is specified, a combination of individual switches may be available that can lock the interaxle driveline and/or any combination of the forward rear or rear-rear driving axles. The interaxle differential switch allows each axle to turn independently. In certain situations, engaging the interaxle differential lock relieves stress on the rear

axles and reduces tire wear. Engaging this switch will also provide better traction in slippery or loose gravel conditions.

In the LOCK position, continuous operation on paved, dry surfaces, put stress on the axles, and can possibly damage the internal gears. The switch has a guard to prevent accidental operation of the switch.

Locking the differentials is typically used during ice or snow conditions and without tire chains, unpaved roads that have loose sand, mud or uneven surfaces. Look ahead and predict when the differential needs to be locked. Stop the vehicle and lock the differentials before approaching.

While using the differential in the locked position, do not exceed 25 mph (40 km/h). When disengaging the differential lock, reduce the throttle to prevent drivetrain damage.

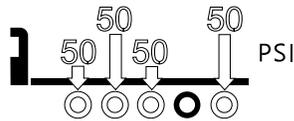
WARNING

DO NOT put the differential lock in the LOCK position while the wheels are spinning freely (slipping). You could lose control of the vehicle or cause axle damage. Switch to LOCK only when the wheels are not spinning. Failure to comply may result in death, personal injury,

equipment damage, or property damage.

6.2 Auxiliary Axle

AUXILIARY AXLE



Adjustable auxiliary axles (commonly known as Pusher or Tag axles) can add to the productivity of the vehicle by increasing the load capabilities of the vehicle when they are in the deployed (down) position. There are different configurations of axles with different functionality (liftable versus steerable). Some configurations are capable of showing a pressure and/or position graphic on the instrument cluster that looks like the picture above matched to the axles on the vehicle. Without the extra axle, the excessive weight can reduce the service life of vehicle components such as, but not limited to, the frame rail, axles, suspension and brakes.

Operation of the auxiliary axles includes the proper maintenance of the system and calibration of its controls. Operating

the auxiliary axles will also require a firm understanding of the Gross Axle Weight Rating (GAWR) and the load that is being carried.

The vehicle will have switches on the dash to control the position of the auxiliary axles. In certain situations, however, the system will override the controls to protect the axle system. For Self Steering Lift Axles, the axle will raise when the park brakes are applied or if the vehicle is placed in reverse. For Non-Steer Lift Axles, the axle will only automatically raise if the park brakes are applied and there are no park brakes on the lift axle. Non-Steer Lift Axles do not automatically raise when the vehicle is placed in reverse.

Operating the auxiliary liftable axles must be performed in a manner that does not exceed the axle creep rating. Axle creep ratings are weight and speed limits that are allowed while the vehicle is fully loaded (in excess of the vehicle's standard GAWR) and the axle is in its up position. Axle creep ratings are assigned by the axle manufacturer and are based on axle model and intended service of the vehicle. Contact an authorized dealership if you are unable to identify the axle creep rating of this vehicle.

- Liftable/steerable (axle lift calibration required)

- Lifiable/non-steerable (axle lift calibration required)
- Non-lifiable (some suspensions require dump valve calibration)

**WARNING**

If the vehicle is unladen or being unloaded, DO NOT operate or park the vehicle with its auxiliary axles in the down or loaded position unless those axles are equipped with (and are using) parking brakes. This could result in a loss of vehicle control or roll-away. Raise auxiliary axles that lack park brakes prior to unloading the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

ADJUSTABLE LIFT AXLES

Vehicles with liftable AUX axles have knobs available to adjust the pressure in the AUX axle suspension. These knobs are in addition to the tag and pusher axle switches that control the axle position.

Adding more pressure to the AUX axle increases the pressure the (AUX) axle pushes down. Increasing pressure decreases load on the drive axles and

decreases traction. Decreasing pressure transfers more weight to the drive axles and results in more traction from the drive axles.

Deflate the auxiliary (AUX) axle suspension before coupling or uncoupling a trailer. When initially coupled or uncoupled, increase pressure to balance traction and axle load requirements. Inflate air springs of the AUX axles to the desired pressure after coupling to a loaded trailer. Make sure that you maintain proper traction of the drive-axles.

To obtain the desired traction, adjust the pressure regulator control knob to a lower pressure. By reducing air pressure at the pusher or tag axle, you can transfer the load to the drive axles. Do not overload drive axles.

Always deflate the air springs of the AUX axles before attempting to unload the vehicle. This action allows maximum traction of the driving axles to control the vehicle.

Calibrations can change depending on the suspension. Contact an authorized dealer or axle/suspension manufacturer for specific calibration procedures.

Some suspensions require dump valve calibration. For example, some dead axles do not lift. You can dump the air out of them to

unload them when empty. You control air pressure via an adjustable regulator. Calibrate these axles for load.

Contact an authorized dealer or axle/suspension manufacturer for dump valve calibration procedures.

AXLE CREEP RATING

Vehicles outfitted with auxiliary axles and full truck configuration will have an axle creep rating which defines how much load is allowed when the vehicle has a full load and maneuvering the vehicle, at very slow speeds, with auxiliary axles in the up position. In these situations, the load exceeds the gross axle weight rating of the axles.

Operators using vehicles equipped with liftable auxiliary axles must consider creep ratings when any liftable axle is unloaded or in the raised position. Liftable auxiliary axles should only be raised (or unloaded) to improve maneuverability in an off-road use or when vehicle is unloaded.

**WARNING**

Always calibrate lift axles to the correct pressure to carry the load. An incorrectly calibrated lift axle can result in an overloaded frame, increased braking distances, or a loss of traction and

stability. Failure to comply may result in death, personal injury, equipment damage, or property damage.

CAUTION

DO NOT exceed Axle Creep ratings. Exceeding the creep ratings can damage the frame, suspension, and axles by overloading them. Failure to comply may result in equipment or property damage.

CAUTION

Always lower the axles as soon as possible after receiving a load. Never exceed 5 mph (8 km/h) when driving with a load with the auxiliary axle(s) raised/unloaded. Not lowering the axle(s) can overload the frame and remaining axles. Failure to comply may result in equipment or property damage.

CAUTION

DO NOT modify the air system or control functionality on a factory installed auxiliary axle. Modifying the factory-

intended operation of a pusher axle or tag axle will void the warranty and can cause damage. Failure to comply may result in equipment or property damage.

CAUTION

Repeat suspension calibration procedures when installing tires with a different loaded radius from tires on the other drive, steer, or auxiliary axles. Installing tires with a different loaded radius can affect the load received by other axles. Failure to comply may result in equipment or property damage.

Contact your dealer or axle manufacturer to determine what the creep rating is for your particular axle(s) and configuration. Creep ratings are generally limited to the following:

- Tandem rear axles only
- Straight trucks only
- Maximum spring mount centers per axle manufacturers specifications
- Maximum tire static loaded radius (SLR) per axle manufacturers specifications

PUSHER OR TAG SUSPENSION CALIBRATION

Perform this procedure at or near a weight scale. Procedure can be performed while parked on the weight scale if scale is available. To obtain the desired axle load distribution, you must correlate the suspension air gauge pressure to the actual axle load by scaling the axle weight(s) and adjusting the pressure to obtain the desired load. Once the desired load or load range is achieved, document the pressure-to-load ratio or setting for future use.

NOTE

This procedure must be performed prior to placing the vehicle into service.

Setting To obtain the desired axle load distribution, you must correlate the suspension air gauge pressure to the actual axle load by scaling the axle weight(s) and adjusting the pressure to obtain the desired load. Once the desired load or load range is achieved, document the pressure-to-load ratio or setting for future use.

These instructions are general in nature. For more specific instructions, review the pusher or tag suspension manufacturer's

maintenance manual or contact the nearest authorized dealer.

1. Park the loaded vehicle on a level surface with the wheels blocked.
2. Release vehicles spring brakes. (Do not release for Lifiable/Non-Steerable pusher or tag axles)
3. Lower the pusher/tag axles with the **Axle Lift Control** flip valve. (For some non-lifiable axles, inflate air suspension)
4. Adjust the amount of load on each axle by turning the **Pressure Regulator** clockwise to increase the load, or counterclockwise to decrease the load. (The suspension manufacturer may publish pre-established Pressure-to-Load Ratio Pressure Settings to assist you in achieving an estimated ground load).
5. After setting the pressure to obtain the desired axle load, verify proper ground loading with the weight scale.

i NOTE

Exceeding local, state, or federal weight limits may result in citations. Contact your local commer-

cial weight enforcement office for limits in your area.

i NOTE

Steerable-pusher and/or tag axle(s) will raise when the transmission is shifted into reverse or when the parking brake is applied.

6.3 Air Suspension Ride Height

AIR SUSPENSION RIDE HEIGHT

Vehicles equipped with rear or front air suspensions have their ride height and axle (pinion) angle(s) preset at the factory. These are precision settings and should not be altered. Incorrectly adjusted ride height may result in improper interaxle U-joint working angles. This can result in premature driveline wear and driveline vibration.

If it becomes necessary to reset the ride height, you may temporarily set it by following the next procedure. Proper ride height

measurement and values are shown in the illustration and table below.

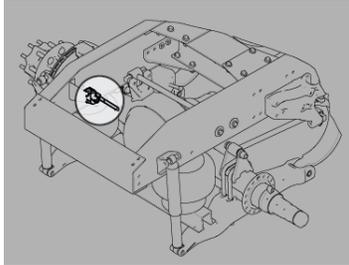
CAUTION

To avoid drive-line damage, adjust the suspension ride height only when improper inter-axle u-joint angles exist and immediately drive to the nearest authorized dealer or repair facility. The ride height and pinion angle should be reset using the proper technique and equipment. Failure to comply may result in equipment damage or property damage.

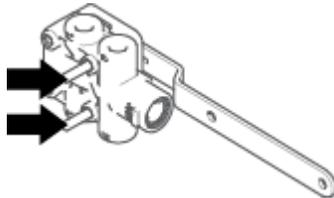
i NOTE

Suitable wheel chocks are at a minimum 18 in. (46 cm) long 4x4.

1. Park the vehicle, engage the parking brake and chock the wheels.
2. Locate the air suspension ride height valve.



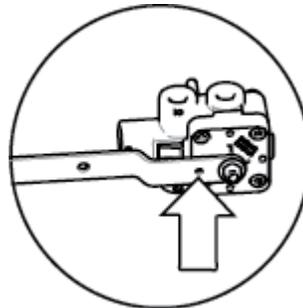
3. Ensure that the tractor is fully laden during this procedure. Do not use these procedures on a vehicle that is not laden (bobtail).
4. Ensure the air supply and delivery plumbing of the height control valve is consistent with the following illustrations.
5. Loosen the fasteners mounting the height control valve to its bracket.



6. Rotate the valve either clockwise or counterclockwise until air pressure in the air springs provides the ride

height specified for that suspension. Measure the ride height from the bottom of the frame rail to the approximate centerline of the rearmost drive axle hub:

- For tandem axles, make the vertical measurement at the centerline of the suspension.
 - For a single axle, make the measurement in front of the axle, in the area forward of the tires but not past the suspension bracket.
7. When at the correct ride height (Refer to Air Ride Height Data), place the height control valve lever in the neutral position, and install either the built-in alignment pin or a 1/8 in. (3 mm) dowel.



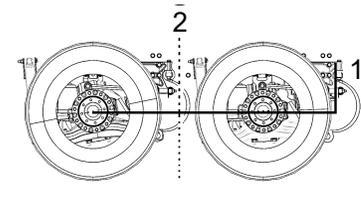
8. Torque the mounting fasteners to

55-75 lb-in. (6.2-8.5 N·m).

9. Remove the alignment pin or dowel.
10. Repeat Steps 2 through 6 above for the right-hand valve on vehicles with a dual-valve system.

AIR RIDE HEIGHT DATA

These are factory settings for one of the variety ride height rear suspension for BEV models.



1. Ride height
2. Centerline of suspension

Tandem Axle	Laden Ride Height -in. (mm)
FLEX Air	8.50 (216)

Tandem Axle	Unladen Ride Height -in. (mm)
FLEX Air	8.75 (222)

6.4 Inter-Axle Differential Lock Operation

INTER-AXLE DIFFERENTIAL LOCK OPERATION



WARNING

Do not use the differential lock during downhill operation or at speeds above 25 mph (40 km/h). When it is engaged under these conditions, the vehicle will exhibit understeer handling characteristics. This understeer condition will cause the vehicle to not turn as quickly and more steering effort will be required, which can cause an accident. Failure to comply may result in death,

personal injury, equipment damage, or property damage.

Figure 34: Understeer Condition



1. Turning Radius When Unlocked (Disengaged)
2. Turning Radius When Locked (Engaged)

LOCKING THE INTER-AXLE DIFFERENTIAL

1. Anticipate when you might need increased traction, slow down to a steady speed under 25 mph (40 kph) or stop the vehicle. Do not lock the differential while going down steep grades or traveling faster than 25 mph (40 kph), or while wheels are spinning or traction is minimal; lock the differential before you encounter these conditions.
2. Set the inter-axle differential lock switch in the **LOCK** position. When the light on the switch turns on,

indicates that the differential is locked (engaged).

3. If you **LOCK** or **UNLOCK** the differential while moving, gradually reduce the pressure on the accelerator pedal to relieve torque on the gearing and allow full engagement of the clutch (mechanism that locks the wheels).

NOTE

The Meritor main differential lock or Dana Spicer wheel differential lock is controlled by the switch labeled WHEEL DIFFERENTIAL. By moving the switch you can LOCK or UNLOCK the main differential when the vehicle is moving or stopped.

NOTE

If your vehicle has an automatic transmission, it may be necessary to shift the transmission to the Neutral position momentarily to allow the main differential lock splines to fully engage or disengage.

4. Drive the vehicle along the poor traction area, keeping your speed under 25 mph (40 km/h).

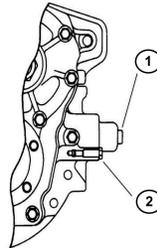
UNLOCKING THE INTER-AXLE DIFFERENTIAL

1. When you reach the dry pavement or better road conditions where the differential lock is not needed, switch the differential lock to **UNLOCK**.
2. Gradually reduce the pressure on the accelerator pedal to relieve torque and allow the clutch to disengage.
3. When unlocking the differential, normal vehicle handling will resume and the light on the switch will turn off.

6.5 Driver Controlled Main Differential Lock

If your vehicle has a Meritor axle with a Driver Controlled Main Differential Lock, install the caging bolt before removing the axles for towing. Installation of the caging bolt prevents damage by locking internal axle components in position. Use the procedure below to lock the Meritor differential.

Figure 35: Driver Controlled Main Differential Lock



1. Air Line - Remove to Install Caging Bolt
2. Caging Bolt Storage Location

Activate the Main Differential Lock

1. Remove the air line.
2. Remove the caging bolt from its storage hole.
3. Screw the caging bolt all the way into the air line hole. This locks the differential by pushing a piston into lock position.

6.6 What to do if an Air Spring Ruptures

If an air spring has ruptured, drive the vehicle to a safe stop off the highway to investigate the problem.

WARNING

DO NOT drive a vehicle with ruptured air springs. The air loss can cause the spring brakes to apply, dragging the brakes and burning up the linings. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

DO NOT drive the vehicle if the air pressure is less than 100 psi (6.89 bar/689 kPa). Driving the vehicle with less than 100 psi (6.89 bar/689 kPa) could make the brakes unsafe to use which could result in an accident. Failure to comply may result in death, personal injury, equipment damage, or property damage.

CAUTION

Operating a vehicle with air suspension bags either overinflated or underinflated may cause damage to driveline components. If a vehicle must be operated under such conditions, DO NOT exceed

5 mph (8 km/h). Failure to comply may result in equipment or property damage.

You can get to a repair facility by removing the height control link connected to the axle and to the suspension air valve control arm. This will cause the air valve control arm to center in the closed position. Removing the link will allow the air system of the vehicle to operate normally so that the vehicle can be driven to a service center.

6.7 Suspension Air Pressure Gauge & Switch



Your vehicle may have an air suspension and a deflation switch which allows the air in the suspension to be exhausted from a switch on the dash. The normal purpose of this feature is to lower the vehicle for loading. A guard on the switch prevents accidental deflation of the suspension.

The Suspension Air Pressure gauge (optional) indicates the amount of air pressure in the air suspension springs in

pounds per square inch (psi). Air pressure in the spring is related to the rear axle load. The greater the rear axle load, the greater the air pressure in the air bags. Therefore, the air pressure displayed will vary, depending upon the rear axle load.

7 TRAILER OPERATIONS

7.1 Locking the Kingpin

WARNING

DO NOT perform maintenance on high-voltage (HV) cables. A PACCAR trained technician is required for service. Please contact an authorized EV service certified dealership for service. Be mindful of the location of HV cables and components when working around the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

DO NOT perform any repair while the vehicle is connected to a charger. Orange high-voltage (HV) cables stay

energized unless the battery Manual Service Disconnect (MSD) fuses are removed. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

Always inspect the fifth wheel for proper locking after coupling the tractor to a trailer. Ensure the kingpin is engaged in a closed and locked jaw and that there is no gap between the fifth wheel top plate and the trailer upper-coupler plate. If these requirements are not met, the trailer may separate and cause an accident. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Ensure that the fifth wheel lock is in the unlocked position.

To lock the fifth wheel around the kingpin:

1. Ensure trailer brakes are locked and the landing gear is down.
2. Back the tractor fifth wheel into the trailer kingpin to engage and lock.
3. Pull the tractor forward to ensure the kingpin has been locked in place.

- 4. Set the tractor parking brake.
- 5. Connect the tractor brake air and electric lines to the trailer.

Result:

If equipped with JOST sensor fifth wheel, follow the same procedure but by monitoring the proper locking and safe coupling of the fifth wheel with the dashboard display inside the cab. This fifth wheel has three sensors built in that verify the proximity of the skid plate, that the kingpin is in the lock, and that the fifth wheel is locked and the release handle secure.

The JOST sensor fifth wheel display shows the condition of the fifth wheel and the trailer:

- Unlocked icon in red when ready to couple.
- Locked icon in green when properly coupled.

Figure 36: JOST Sensor Fifth Wheel Properly Coupled Indicator



Conduct a pre-trip inspection prior to releasing the brakes, raising the landing gear, and driving the vehicle.

7.2 Releasing the Kingpin Remotely (option)

⚠ WARNING

DO NOT perform maintenance on high-voltage (HV) cables. A PACCAR trained technician is required for service. Please contact an authorized EV service certified dealership for service. Be mindful of the location of HV cables and components when working around the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

⚠ WARNING

DO NOT perform any repair while the vehicle is connected to a charger. Orange high-voltage (HV) cables stay energized unless the battery Manual Service Disconnect (MSD) fuses are removed. Failure to comply may result

in death, personal injury, equipment damage, or property damage.

⚠ CAUTION

DO NOT deflate the rear suspension before unlocking the fifth wheel. Deflating the rear suspension before unlocking the fifth wheel could cause difficulty during uncoupling and result in damage to the fifth wheel and kingpin. Failure to comply may result in equipment or property damage.

1. Set both the vehicle and trailer parking brakes.
2. Lower the landing gear.
3. Disconnect the tractor brake air and electric lines from the trailer.
4. Flip up cover, then press and hold the **Kingpin Release** switch for 3 seconds. A countdown timer notification will appear on the display, and the unlock symbol on the **Kingpin Release** switch will illuminate.
The notification will inform the operator when to release the switch.

Figure 37: JOST Fifth Wheel Indication (option)



If equipped with JOST Fifth Wheel

i NOTE

The fifth wheel will not unlock unless the vehicle is stopped and the parking brake is set. In this situation, a red-colored notification appears, informing the operator that kingpin release is not available and to set the parking brake. This will require restarting this procedure.

5. Release the switch. The unlock symbol on the **Kingpin Release** switch will turn off.
6. Ease tractor forward enough for the kingpin to clear the fifth wheel (about 12 to 18 inches).

i NOTE

Do not drive tractor free of trailer.

7. If the tractor has a rear air suspension, deflate (dump) the rear suspension enough so that the fifth wheel will smoothly separate from the trailer.

Figure 38: Suspension Dump Symbol



8. Ease tractor forward, clearing the trailer.
9. If the rear suspension was deflated, return rear suspension to its normal height.

7.3 Releasing the Kingpin Manually

! WARNING

DO NOT perform maintenance on high-voltage (HV) cables. A PACCAR

trained technician is required for service. Please contact an authorized EV service certified dealership for service. Be mindful of the location of HV cables and components when working around the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

! WARNING

DO NOT perform any repair while the vehicle is connected to a charger. Orange high-voltage (HV) cables stay energized unless the battery Manual Service Disconnect (MSD) fuses are removed. Failure to comply may result in death, personal injury, equipment damage, or property damage.

! CAUTION

DO NOT deflate the rear suspension before unlocking the fifth wheel. Deflating the rear suspension before unlocking the fifth wheel could cause difficulty during uncoupling and result in damage to the fifth wheel and kingpin. Failure

to comply may result in equipment or property damage.

i NOTE
The specific method required to operate the fifth wheel release handle will depend on the fifth wheel manufacturer and model. The operator should be familiar with this method prior to attempting this procedure.

To release the kingpin and separate tractor from trailer

1. Position the tractor and trailer in a straight line on firm, level ground.
2. Set both the tractor and trailer parking brakes.
3. Exit cab and lower the trailer landing gear.
4. Disconnect brake air and electric lines from trailer, and secure lines.
5. Unlock the fifth wheel release handle if necessary, then unlock the fifth wheel.

i NOTE
Operating the release handle and unlocking the fifth wheel will depend on the fifth wheel manufacturer.

6. Return to cab and release tractor parking brake.
7. Ease tractor forward enough for the kingpin to clear the fifth wheel (about 12 to 18 inches).

i NOTE
Do not drive tractor free of trailer.

8. If the tractor has a rear air suspension, deflate (dump) the rear suspension enough so that the fifth wheel will smoothly separate from the trailer.

Figure 39: Suspension Dump Symbol



9. Ease tractor forward, clearing the

trailer.

10. If the rear suspension was deflated, return rear suspension to its normal height.

7.4 Air-Controlled Sliding Fifth Wheel

AIR-CONTROLLED SLIDING FIFTH WHEEL



The Air-Controlled Sliding Fifth Wheel is an optional feature for these vehicles. These vehicles have a fifth wheel slider lock controlled by a switch on the accessory switch panel. To operate this type of lock, move the switch to the appropriate position. By placing the switch in the **UNLOCK** position, you can slide the fifth wheel to various positions to adjust weight distribution. There is a guard on this switch to protect you against accidentally activating or releasing the lock.

**WARNING**

DO NOT move the fifth wheel while the tractor-trailer is in motion. Your load could shift suddenly, causing you to lose control of the vehicle. Never operate the vehicle with the switch in the UNLOCK position. Always inspect the fifth wheel after you lock the switch to be sure the fifth wheel slide lock is engaged. Failure to comply may result in death, personal injury, equipment damage, or property damage.

SLIDING THE FIFTH WHEEL**WARNING**

DO NOT perform maintenance on high-voltage (HV) cables. A PACCAR trained technician is required for service. Please contact an authorized EV service certified dealership for service. Be mindful of the location of HV cables and components when working around the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

**WARNING**

DO NOT perform any repair while the vehicle is connected to a charger. Orange high-voltage (HV) cables stay energized unless the battery Manual Service Disconnect (MSD) fuses are removed. Failure to comply may result in death, personal injury, equipment damage, or property damage.

**WARNING**

DO NOT move the fifth wheel while the tractor-trailer is in motion. Your load could shift suddenly, causing you to lose control of the vehicle. Never operate the vehicle with the switch in the UNLOCK position. Always inspect the fifth wheel after you lock the switch to be sure the fifth wheel slide lock is engaged. Failure to comply may result in death, personal injury, equipment damage, or property damage.

**WARNING**

DO NOT attempt to slide the fifth wheel until all persons and obstacles are clear of the vehicle. Failure to comply may

result in death, personal injury, equipment damage, or property damage.

**NOTE**

This procedure assumes a connected trailer. The trailer kingpin must be locked within the fifth wheel when changing slide positions.

1. Position the tractor and trailer in a straight line on firm, level ground.
2. Place the tractor in neutral, and set the tractor and trailer parking brakes.

3.

**CAUTION**

Ensure the tractor and trailer brakes are engaged prior to sliding the fifth wheel. Not engaging the brakes could result in uncontrolled sliding of the fifth wheel and damage the tractor or trailer. Failure to comply may result in equipment or property damage.

Unlock the slide by repositioning the Fifth Wheel Slide switch.

Figure 40: Fifth Wheel Slide Symbol



4. Inspect and verify that locking plungers have fully withdrawn from the fifth wheel slide tracks.
 - a. If locking plungers did not fully withdraw, move tractor slightly to reposition plungers and reinspect.
 - b. If plungers are still not fully withdrawn, lower the landing gear and deflate the rear suspension (if available) to lessen pressure on the slide.

Figure 41: Suspension Dump Symbol



5. Release the tractor parking brake, but keep the trailer brake engaged.
6. Slowly ease tractor forward or backward, and stop at the desired position.

7. Lock the slide by returning the Fifth Wheel Slide switch to its previous position.
8. Inspect and verify that the locking plungers are fully inserted into the fifth wheel slide tracks.

a.



WARNING

DO NOT operate the vehicle unless the locking plungers are fully inserted into the fifth wheel slide track. Operating the vehicle while the plungers are not fully inserted could lead to the slide moving unexpectedly, resulting in a loss of vehicle control. Failure to comply may result in death, personal injury, equipment damage, or property damage.

If the locking plungers are not fully inserted in the track, move the tractor slightly to reposition plungers and reinspect.

9. If the landing gear was lowered, raise the landing gear.
10. If the rear suspension was deflated, return rear suspension to its normal

height.

8 DRIVING TIPS AND TECHNIQUES

This section covers additional driving tips and techniques on how to drive your vehicle more efficiently.

Range / Efficiency

An electric vehicle has a limited range, so the operator behavior is key to maximizing the range. The recommended speed is 65 mph. Routes/applications with more stops/starts result in the best range when compared to high-speed highway driving. A moderate acceleration and deceleration is the best driving efficiency (25% to 75% of the accelerator pedal).

If the vehicle is in motion and the Regenerative Braking System (RBS) is engaged, the vehicle will be slowed down when the operator's foot eases off the accelerator pedal; this is energy being put back into the batteries. The regenerative braking system will slow the vehicle to 5 mph, then the operator will need to use the service brakes to bring the vehicle to a complete stop. The regenerative braking is controlled by the right hand stalk.

The batteries need to be at moderate temperatures. The vehicle will automatically adjust the battery temperature, however, the operator must plan for a reduced range in these conditions: parking the vehicle in shade for hot climates and parking the vehicle in an indoor warmer area for cold climates.

Descending a Grade

WARNING

DO NOT hold the brake pedal down too long or too often while going down a steep or long grade. This could cause the brakes to overheat and reduce their effectiveness. As a result, the vehicle will not slow down at the usual rate. Before going down a steep or long grade, reduce the speed. Failure to follow procedures for proper downhill operation may cause loss of vehicle control, resulting in death, personal injury, equipment damage, or property damage.

Use of Digital Display

WARNING

DO NOT look at a screen on the instrument cluster for long periods while driving. Vehicle screens should be referenced only briefly and should not be used as a substitute for observing actual road and traffic conditions. Failure to pay attention to the vehicle's road position or situation can lead to an accident. Failure to comply may result in death, personal injury, equipment damage, or property damage.

See [Trip Summary](#) for more information. A driver will find the section describing Trip Information and the rpm detail useful.

9 STOPPING THE VEHICLE

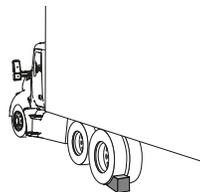
9.1 Stopping the Vehicle

After a drive that required higher rates of battery discharge, due to towing or periods of hard acceleration, the temperature of various vehicle components increases considerably. The vehicle has a cooling system that maintains optimal thermal stability of the battery packs, e-motor, PCAS, and

other components, but to maximize their service life, it is recommended to give the vehicle (and batteries) time to cool down before charging it.

9.2 Powering OFF the Vehicle

1. Put the vehicle in Neutral.
2. Pull the park brake to ensure that it is applied.
3. Remove the key from the start switch.
4. Ensure the Ready to Move indicator is not visible in the Digital Display.
5. If the vehicle is parked on a steep grade, block the wheels.



6. Secure the vehicle by closing all the windows and locking all the doors.

Result:

If the vehicle will be OFF for an extended period of time (and not plugged into a charger), the 12 V disconnect switch must be set to the OFF position. This will preserve charge in the low-voltage system.

 **CAUTION**

DO NOT place the 12 V disconnect in the OFF position while the vehicle is charging or running. Removing the low voltage power causes damage to the high-voltage power electronics. Failure to comply may result in equipment or property damage.

CHAPTER 5: MAINTENANCE

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1 PREVENTIVE MAINTENANCE

Preventive maintenance begins with the daily checks listed in your vehicle's operator's manual. Routine vehicle checks can help avoid many large, expensive, and time-consuming repairs. Neglecting recommended maintenance can void your vehicle's warranty. Maintenance operations on the e-powertrain system, such as inspections, are the only tasks that must be performed by the operator; the rest of the maintenance operations demand skills and equipment that only an EV service certified dealership can perform. Please contact or take your vehicle to an EV service certified dealership. See [Service Locations](#).

 **WARNING**

DO NOT attempt to service this vehicle. Only an EV service certified dealership is authorized to service a PAC-CAR electric vehicle (EV). EVs use high voltage, posing additional hazards not present when servicing a conventional vehicle. Servicing high voltage components requires proper training, tools, and equipment. **Visual inspections are the only tasks that should**

be performed by the operator. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

DO NOT touch or attempt to remove any of the orange high voltage (HV) cables, connectors, or components for any reason. **If asked to inspect HV component or cabling, only inspect visually.** Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

If any issues involving the high-voltage electrical system are discovered, DO NOT drive the vehicle. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

DO NOT attempt maintenance or repair work on the e-powertrain system. The only tasks that can be performed by an operator on this system are visual inspections. Only an EV service certified dealership is authorized to service the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

Ensure any modifications to the vehicle DO NOT affect the high-voltage system. A modification could affect the high voltage electrical system, resulting in electric shock, burns or even death, and will void the warranty. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

DO NOT attempt to diagnose, correct, or repair any vehicle issue related to the high-voltage electrical system or its components. The high-voltage electri-

cal system is capable of producing dangerous electric shock and burns. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

2 NEW VEHICLE MAINTENANCE SCHEDULE

2.1 First Day

First Day
Perform a total vehicle alignment once a body is installed on the truck chassis.
Steering U-joint pinch bolt <ul style="list-style-type: none"> Refer to <u>Steering Shaft Bolt Torque Specifications</u> for maintenance instructions.
Front suspension - U-bolts <ul style="list-style-type: none"> Check the general condition and the tightness of the nuts. Tighten the U-bolts using a calibrated torque wrench to the specified torque value. Refer to <u>Suspension U-Bolts, Grade 8</u> for maintenance instructions.
Front suspension - SOFTEK® NXT (Hendrickson) - Shock absorbers <ul style="list-style-type: none"> Refer to the Hendrickson manual provided with your vehicle.
Front suspension - SOFTEK® NXT (Hendrickson) - Spring pins and shackles <ul style="list-style-type: none"> Refer to the Hendrickson manual provided with your vehicle.
Front suspension - SOFTEK® NXT (Hendrickson) - Ride height <ul style="list-style-type: none"> Refer to the Hendrickson manual provided with your vehicle.
Front axle - SOFTEK® NXT (Hendrickson) - Axle clamp through bolts <ul style="list-style-type: none"> Refer to the Hendrickson manual provided with your vehicle.

2.2 First 50-100 mi/80-160 km

First 50-100 mi/80-160 km¹

Wheel mounting

- Refer to Wheels for maintenance instructions.

¹ Ensure that all maintenance intervals leading up to this point are repeated during this interval prior to the completion of those listed here.

2.3 First 500 mi/800 km

First 500 mi/800 km¹

Front axle U-bolt torque

- Refer to Suspension U-Bolts, Grade 8 for maintenance instructions.

¹ Ensure that all maintenance intervals leading up to this point are repeated during this interval prior to the completion of those listed here.

2.4 First 2,000 mi/3,218 km

First 2,000 mi/3,218 km¹

Rear suspension fasteners

- Refer to Rear Axle and Suspension for maintenance instructions.

¹ Ensure that all maintenance intervals leading up to this point are repeated during this interval prior to the completion of those listed here.

2.5 First 3,000-5,000 mi/4,800-8,000 km

First 3,000-5,000 mi/4,800-8,000 km ¹
Axle lubrication <ul style="list-style-type: none">• For Meritor axle, refer to Meritor Axle Lubrication for maintenance instructions.• For Eaton/Dana axle, refer to Eaton/Dana Axle Lubrication for maintenance instructions.
Fluid - Electro-Hydraulic Power Steering <ul style="list-style-type: none">• Drain and replace the fluid.

¹ Ensure that all maintenance intervals leading up to this point are repeated during this interval prior to the completion of those listed here.

3 MAINTENANCE SCHEDULE

3.1 Maintenance Schedule

MAINTENANCE SCHEDULE

Preventive maintenance program begins with the daily and weekly routine checks. Refer to Daily Checks for further instructions. Routine vehicle checks can help avoid many large, expensive, and time consuming repairs. The vehicle will operate better, be safer, and last longer. Neglect of recommended maintenance can void your vehicle's warranty. Some maintenance operations demand skills and equipment you may not have. For such situations, please take your vehicle to an authorized Service Center.

 **WARNING**

Electric vehicles utilize a high-voltage electrical system that has the potential to cause severe injury or death if proper safety precautions are not followed. Carefully read and understand all instructions and hazard alert messages. Failure to comply may result in

death, personal injury, equipment damage, or property damage.

 **WARNING**

DO NOT perform any repair while the vehicle is connected to a charger. Orange high-voltage (HV) cables stay energized unless the battery Manual Service Disconnect (MSD) fuses are removed. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

DO NOT attempt to diagnose, correct, or repair any vehicle issue related to the high-voltage electrical system or its components. The high-voltage electrical system is capable of producing dangerous electric shock and burns. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

DO NOT wear loose-fitting or torn clothing, jewelry or accessories, or loose hairstyles. Loose or dangling materials can get caught in fan blades or other moving parts. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

Always support the vehicle with appropriate safety stands if it is necessary to work underneath the vehicle. A jack is not adequate for this purpose. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

When working underneath the vehicle with the wheels on the ground (not supported), make sure that:

- The vehicle is on hard, level ground.
- The parking brake is applied.

- All wheels are blocked (front and rear).
- The start switch key is removed to prevent the vehicle from starting.

Failure to comply may result in death, personal injury, equipment damage or property damage.

The following pages contain a table of maintenance tasks with the related intervals for each task on the right side of the table. The top of the table displays a guide to a maintenance interval and its schedule. Some tasks are dependent on the vehicle application. These tasks will be shown as separate tasks and will have the words "ON HIGHWAY", "CITY DELIVERY" or "OFF-HIGHWAY" after the description. These tasks are differentiated because they are dependent on the vehicle's operating environment. On Highway is defined for applications where the vehicle is NOT used off of a paved road during normal operation. City Delivery is defined for applications where frequent Start and Stopping is required during normal operation and the highway is used infrequently and for short periods of time. Off Highway is defined for applications where the vehicle may be dri-

ven off the pavement on a regular basis, even if it is an infrequent basis and/or for a brief time period.

Please contact an authorized service dealership if there are questions regarding which interval to follow. Consult the supplier for specific recommendations where discrepancies develop between these recommendations in this table and component supplier recommendations.

- The initial fill of drive axle lubricant must be changed before the end of the first scheduled maintenance interval. See the axle manufacturer's operator's manual for recommended lubrication specifications and service intervals.

AT FIRST 15,000 MI/24,000 KM OR AT FIRST PM

At First 15,000 mi/24,000 km or at First PM¹
<p>Front suspension U-bolts</p> <ul style="list-style-type: none"> • (ON HIGHWAY) Check the general condition and tightness of the nuts. Tighten the nuts to the specified torque value as required. Refer to <u>Suspension U-Bolts, Grade 8</u> for maintenance instructions. • (VOCATIONAL) Check the general condition and tightness of the nuts. Tighten the U- bolts after the first day or two of operation. Then tighten the nuts to the specified torque value as required. Refer to <u>Suspension U-Bolts, Grade 8</u> for maintenance instructions.
<p>Drive axle (SISU) - Axle housing</p> <ul style="list-style-type: none"> • Refer to the SISU manual provided with your vehicle.
<p>Rear suspension - U-bolts</p> <ul style="list-style-type: none"> • Check the torque. Tighten to specified torque value as required. Refer to <u>Suspension U-Bolts, Grade 8</u> for maintenance instructions.
<p>Rear suspension - Mounting brackets and fasteners</p> <ul style="list-style-type: none"> • Check the condition and the fastener torque. Tighten to the specified torque value as required. Refer to <u>Rear Axle and Suspension</u> for maintenance instructions.
<p>Cooling - Hoses</p> <ul style="list-style-type: none"> • Check the radiator and heater hoses for leaks. Refer to <u>Cooling System Maintenance</u> for maintenance instructions.
<p>Steering components - Drag link castle nut and ball stud</p> <ul style="list-style-type: none"> • Check the torque. Tighten to specified torque value as required. Refer to <u>Steering System</u> for maintenance instructions.
<p>Steering components - Pitman arm clamp bolt and nut</p> <ul style="list-style-type: none"> • Check the torque. Tighten to specified torque value as required. Refer to <u>Steering System</u> for maintenance instructions.

At First 15,000 mi/24,000 km or at First PM¹
<p>Steering components - Steering intermediate shaft</p> <ul style="list-style-type: none"> • Check the torque on the pinch bolt and nut. Refer to Steering Shaft Bolt Torque Specifications for maintenance instructions.
<p>Steering components - Steering intermediate shaft U-joints (ON HIGHWAY)</p> <ul style="list-style-type: none"> • Lubricate with Chevron Delo EP NLGI-2 grease or equivalent, -10 to 325°F (-23 to 163°C) range. Refer to Steering System for maintenance instructions.
<p>Steering components - Steering intermediate shaft U-joints (OFF HIGHWAY or CITY DELIVERY)</p> <ul style="list-style-type: none"> • Lubricate using Chevron Delo EP NLGI-2 greases or equivalent, -10 to 325°F (-23 to 163°C) range. Refer to Steering System for maintenance instructions.
<p>Steering components - Drag link and tie rod arm ball sockets (ON HIGHWAY, OFF HIGHWAY or CITY DELIVERY)</p> <ul style="list-style-type: none"> • Lubricate using Chevron Delo EP NLGI-2 grease or equivalent. Refer to Steering System for maintenance instructions.
<p>Driveshafts - Models SPL-90, 1710 and 1810 slip member and U-joints</p> <ul style="list-style-type: none"> • Lubricate²
<p>Driveshafts - Models SPL- 140/140HD/170/170HD/250/250HD slip members and U- joints (OFF HIGHWAY)</p> <ul style="list-style-type: none"> • Lubricate³

¹ Ensure that all maintenance intervals leading up to this point are repeated during this interval prior to the completion of those listed here.

² Use only Spicer Driveshaft approved lubricants when greasing Spicer U-joints.

³ Use only Spicer Driveshaft approved lubricants when greasing Spicer U-joints.

3.2 E-Powertrain Components

E-FAN (HIGH VOLTAGE)

Every 10,000 mi / 16,000 km

E-fan - High Voltage

- Visually inspect the fans for cracks or chips in the blades potentially caused by impact from rocks or debris.^{1, 2}

¹ Inspect but DO NOT touch the e-fan and any other part of the high-voltage system.

² The operator must perform this inspection according to this interval or when any issue with the fan or airflow is encountered.

E-MOTOR (HIGH VOLTAGE)

Every 75,000 mi / 120,000 km / Every 2 Years (VOCATIONAL, REFUSE, CITY DELIVERY)

Oil - E-motor

- Drain and replace the oil.¹ See [E-Motor Oil Specifications](#) for specific oil.
- Replace the oil filter.

Breather Element - E-motor

- Replace the breather element.²

¹ The specifications in this section are for informational purposes, DO NOT attempt to perform any service. Service tasks must be performed and de-energized ONLY by an EV service certified dealership with the proper Personal Protective Equipment (PPE) and facilities.

² The specifications in this section are for informational purposes, DO NOT attempt to perform any service. Service tasks must be performed and de-energized ONLY by an EV service certified dealership with the proper Personal Protective Equipment (PPE) and facilities.

Every 112,000 mi / 180,000 km / Every 2 Years (ON-HIGHWAY)

Oil - E-motor

- Drain and replace the oil.¹ See [E-Motor Oil Specifications](#) for specific oil.
- Replace the oil filter.

Breather Element - E-motor

- Replace the breather element.²

¹ The specifications in this section are for informational purposes, DO NOT attempt to perform any service. Service tasks must be performed and de-energized ONLY by an EV service certified dealership with the proper Personal Protective Equipment (PPE) and facilities.

² The specifications in this section are for informational purposes, DO NOT attempt to perform any service. Service tasks must be performed and de-energized ONLY by an EV service certified dealership with the proper Personal Protective Equipment (PPE) and facilities.

HIGH-VOLTAGE BATTERIES

Every year

State of Health (SOH) - Batteries

- Calibrate the State of Health (SOH). See [HV State of Health \(SOH\) Calibration](#).

Every 2 years

Battery Coolant System - Batteries

- Visually inspect the manifolds and coolant routings to prevent leaks.¹

¹ Inspect but DO NOT touch the e-fan and any other part of the high-voltage system.

3.3 Thermal Management System Components

AIR COMPRESSOR

Every year / 1,500 hours
Oil - Air Compressor
<ul style="list-style-type: none">• Drain and replace the oil.• Replace the oil filter.• Replace the air filter.• Visually inspect for damage or leaks.
For maintenance specifications and procedures refer to Zero Emissions Powertrain - 2.1m Heavy Duty Operator's Manual.

ELECTRO-HYDRAULIC POWER STEERING

Every 12,400-18,600 mi / 20,000-30,000 km
Fluid - Electro-Hydraulic Power Steering
<ul style="list-style-type: none">• Drain and replace the fluid.

Every 1 year / 100,000 mi / 160,000 km
Fluid and filter- Vocational (PACCAR) - Electro-Hydraulic Power Steering
<ul style="list-style-type: none">• Replace the fluid and the filter.

Every 4 years / 400,000 mi / 643,000 km

Fluid and filter- Electro-Hydraulic Power Steering (ON HIGHWAY)

- Replace the fluid and the filter.

3.4 Component Specific Intervals

COMPONENT SPECIFIC INTERVALS

These maintenance tasks should be reviewed at each maintenance interval. They are not specific to one interval.

Component Specific Intervals¹
Drive axle (Dana) - Axle Housing <ul style="list-style-type: none"> Refer to the Dana manual provided with your vehicle.
Drive axle (Meritor Line Haul/ON HIGHWAY) <ul style="list-style-type: none"> Refer to the Meritor manual provided with your vehicle.
Drive axle (Meritor City Delivery/OFF HIGHWAY) <ul style="list-style-type: none"> Refer to the Meritor manual provided with your vehicle.
Front axle - Vocational (PACCAR) - Kingpin bushings, thrust bearings, and tie rod ball ends (OFF-HIGHWAY) <ul style="list-style-type: none"> Lubricate weekly regardless of mileage with approved grease. Refer to <u>Front Axle and Suspension</u> for maintenance instructions.
Front axle - Vocational (PACCAR) - Steering knuckle spindles, thrust bearings, kingpins, drawkeys, tie rod ends, steering stops, and bushings (OFF-HIGHWAY) <ul style="list-style-type: none"> Inspect weekly regardless of mileage for wear, damage, and end play. Shim or replace as required. Refer to <u>Front Axle and Suspension</u> for maintenance instructions.
Tires and wheels - Tires <ul style="list-style-type: none"> Weekly check cold inflation pressure using calibrated gauge. Refer to <u>Tires</u> for maintenance instructions.
Driveshafts - Models SPL-90, 1710 and 1810 slip member and U-joints <ul style="list-style-type: none"> U-joint inspections should be performed every time a vehicle comes in for scheduled maintenance.

Component Specific Intervals¹
<p>Driveshafts - Models SPL-100 slip member and U-joints</p> <ul style="list-style-type: none"> U-joint inspections should be performed every time a vehicle comes in for scheduled maintenance.
<p>Driveshafts - Models SPL-140/140HD/170/170HD/250/250HD slip members and U-joints (ON HIGHWAY and LINEHAUL)</p> <ul style="list-style-type: none"> U-joint inspections should be performed every time a vehicle comes in for scheduled maintenance.
<p>Driveshafts - Models SPL-140XL/170XL/250XL slip members and U-joints (OFF HIGHWAY)</p> <ul style="list-style-type: none"> Lubricate at 350,000 mi (560,000 km) the 1st interval and then every 100,000 mi (160,00 km) after that.
<p>Driveshafts - Models SPL-140XL/170XL/250XL slip members and U-joints (ON HIGHWAY and LINE HAUL)</p> <ul style="list-style-type: none"> U-joint inspections should be performed every time a vehicle comes in for scheduled maintenance.
<p>Driveshafts - Models SPL-140XL/170XL/ 250XL slip members and U-joints (OFF HIGHWAY and CITY)</p> <ul style="list-style-type: none"> U-joint inspections should be performed every time a vehicle comes in for scheduled maintenance.
<p>Air - Air dryer (ON HIGHWAY)</p> <ul style="list-style-type: none"> Inspect every 360,000 miles/576,000 km. Refer to Air Dryer Maintenance.
<p>Safety - Three-point safety belt system</p> <ul style="list-style-type: none"> Inspect every 20,000 miles/32,000km. If the vehicle is exposed to severe environmental or working conditions, more frequent inspections may be necessary. Refer to Safety Restraint System - Inspection for maintenance instructions.

¹ Ensure that all maintenance intervals leading up to this point are repeated during this interval prior to the completion of those listed here.

EVERY 15,000 MI/24,000 KM/MONTHLY

Every 15,000 mi/24,000 km - Monthly ¹
<p>Frame - Fifth wheel</p> <ul style="list-style-type: none"> • Check the kingpin lock and plate for wear and function. Lubricate with NLGI #2 grease. Refer to Ensure that all maintenance intervals leading up to this point are repeated during this interval prior to the completion of those listed here. <u>Fifth Wheel Monthly Maintenance</u> on page 327 for maintenance instructions.
<p>Front axle - SOFTEK® NXT (Hendrickson) - Kingpin bearings (OFF HIGHWAY or CITY DELIVERY)</p> <ul style="list-style-type: none"> • Use multipurpose grease NLGI grade 2
<p>Front suspension - Spring pins</p> <ul style="list-style-type: none"> • Check for proper function. Refer to <u>Front Axle and Suspension</u> for maintenance instructions.
<p>Front suspension - U-bolts (OFF HIGHWAY)</p> <ul style="list-style-type: none"> • Check the general condition and tightness of the nuts. Tighten the U-bolts after the first day or two of operation. Then tighten the nuts to the specified torque value as required. Refer to <u>Suspension U-Bolts, Grade 8</u> for maintenance instructions.
<p>Front suspension - SOFTEK® NXT (Hendrickson) - Leaf spring bushing threaded (optional) (LINE HAUL, CITY DELIVERY, and OFF HIGHWAY)</p> <ul style="list-style-type: none"> • Chevron Delo EP NLGI-2 grease or equivalent
<p>Drive axle - Vocational (PACCAR) - Axle assembly</p> <ul style="list-style-type: none"> • Check oil level. • Visually inspect for damage or leaks.
<p>Drive axle - Vocational (PACCAR) - Breather</p> <ul style="list-style-type: none"> • Check the operation. If the cap doesn't rotate freely, replace.

Every 15,000 mi/24,000 km - Monthly¹
<p>Drive axle (Meritor City Delivery / OFF HIGHWAY) - Axle housing</p> <ul style="list-style-type: none"> • Check the "cold" fill level at the differential carrier plug for a pinion angle of less than 7 degrees, or at the axle bowl plug for a pinion angle of greater than 7 degrees. Tighten the plug to 35-50 lb-ft (47-68 N·m.). Refer to <u>Drive Axle - Meritor</u> for maintenance instructions.
<p>Drive axle (Meritor City Delivery / OFF HIGHWAY) - Breather</p> <ul style="list-style-type: none"> • Check the operation. If the cap doesn't rotate freely, replace. Refer to <u>Drive Axle - Meritor</u> for maintenance instructions.
<p>Tires and wheels - Tires</p> <ul style="list-style-type: none"> • Inspect the wheel disc for any cracks or surface irregularities. Inspect the rim edge and bead seat area for damage. Replace any damaged wheels DO NOT ATTEMPT TO REPAIR. Refer to <u>Tires</u> for maintenance instructions.
<p>Tires and wheels - Disc wheels</p> <ul style="list-style-type: none"> • Inspect the mounting ring, rim gutter, side ring, and lock ring for damage. Replace as required. Refer to <u>Wheels</u> for maintenance instructions.
<p>Tires and wheels - Wheel nuts and studs</p> <ul style="list-style-type: none"> • Inspect for damaged hex corners, stripped or damaged threads, and excessive corrosion. Clean or replace as required. Refer to <u>Wheels</u> for maintenance instructions.
<p>Power steering - Reservoir</p> <ul style="list-style-type: none"> • Check the fluid level. Refer to <u>Checking Power Steering Fluid Level</u> for maintenance instructions.
<p>Steering components - Drag link and tie rod arm ball sockets (OFF HIGHWAY or CITY DELIVERY)</p> <ul style="list-style-type: none"> • Lubricate using Chevron Delo EP NLGI-2 grease or equivalent. Refer to <u>Steering System</u> for maintenance instructions.
<p>Driveshafts - Models SPL-90, 1710 and 1810 slip member and U-joints</p> <ul style="list-style-type: none"> • Lubricate

Every 15,000 mi/24,000 km - Monthly¹
<p>Ensure that all maintenance Driveshafts - Model SPL-100 slip member and U-joints</p> <ul style="list-style-type: none"> • Check the condition of the cables, cushion clamps, nylon tie straps, and routing. Replace a cushion clamp if the rubber has deteriorated. Repair or tighten terminals, and secure cables to prevent chafing. Replace damaged cables (cuts, cracks, or excessive wear). Refer to <u>Low Voltage Batteries</u> for maintenance instructions.
<p>Electrical and lights - Warning lights in light bar</p> <ul style="list-style-type: none"> • Check at the start switch key position to verify Electronic Stability Control (ESC) and systems check function.
<p>Electrical and lights - Turn, stop, reverse lights, and signals</p> <ul style="list-style-type: none"> • Visual check. Refer to <u>Daily Checks</u> for further instructions.
<p>Electrical and lights - Power supply harnesses</p> <ul style="list-style-type: none"> • Check for worn or damaged insulation, corroded terminals, frayed wires, and oil or fluid leaks on the connectors or wiring. Refer to <u>Electrical System</u> for maintenance instructions.
<p>Heating and air conditioning - Air conditioner</p> <ul style="list-style-type: none"> • Operate the system. Refer to <u>Heater and Air Conditioner Maintenance</u> for maintenance instructions.
<p>Heating and air conditioning - Cabin fresh air filter (ON HIGHWAY and OFF-HIGHWAY)</p> <ul style="list-style-type: none"> • Inspect and clean, replace if necessary. Refer to <u>Replacing the Air Conditioner Filter</u> for maintenance instructions.

¹ Ensure that all maintenance intervals leading up to this point are repeated during this interval prior to the completion of those listed here.

EVERY 25,000 MI/40,000 KM/6 MONTHS

Every 25,000 mi/40,000 km or Every 6 Months
<p>Front axle - Linehaul (PACCAR) - Kingpin joint grease/Tie rod ends</p> <ul style="list-style-type: none"> Heavy-Duty multipurpose lithium based: #1 or #2 Grade. Refer to Front Axle and Suspension for maintenance instructions.
<p>Front suspension - SOFTEK NXT (Hendrickson) - Shock absorbers</p> <ul style="list-style-type: none"> Refer to the Hendrickson manual provided with your vehicle.
<p>Front suspension - SOFTEK NXT (Hendrickson) - Spring pins and shackles</p> <ul style="list-style-type: none"> Refer to the Hendrickson manual provided with your vehicle.
<p>Front suspension - SOFTEK NXT (Hendrickson) - U-bolts</p> <ul style="list-style-type: none"> Refer to the Hendrickson manual provided with your vehicle.
<p>Front axle - SOFTEK® NXT (Hendrickson) - Axle clamp through bolts</p> <ul style="list-style-type: none"> Refer to the Hendrickson manual provided with your vehicle.

EVERY 30,000 MI/48,000 KM

Every 30,000 mi/48,000 km ¹
<p>Front suspension - Spring pins</p> <ul style="list-style-type: none"> Lubricate with approved grease. Refer to Front Axle and Suspension for maintenance instructions.
<p>Drive axle - Linehaul (PACCAR) - Axle assembly</p> <ul style="list-style-type: none"> Check oil level and inspect for leaks. Visually inspect for damage or leaks.

Every 30,000 mi/48,000 km¹
<p>Drive axle - Linehaul (PACCAR) - Breather</p> <ul style="list-style-type: none"> • Check the operation. If the cap doesn't rotate freely, replace.
<p>Drive axle - Vocational (PACCAR) - Axle assembly</p> <ul style="list-style-type: none"> • Drain and replace mineral-based lubricant.
<p>Drive axle (Meritor Line Haul / ON HIGHWAY) - Axle housing</p> <ul style="list-style-type: none"> • Refer to the Meritor manual provided with your vehicle.
<p>Drive axle (Meritor Line Haul / ON HIGHWAY) - Breather</p> <ul style="list-style-type: none"> • Refer to the Meritor manual provided with your vehicle.
<p>Steering components - Steering intermediate shaft U-joints (OFF HIGHWAY or CITY DELIVERY)</p> <ul style="list-style-type: none"> • Lubricate using Chevron Delo EP NLGI-2 grease or equivalent. Refer to <u>Steering System</u> for maintenance instructions.
<p>Steering components - Drag link and tie rod arm ball sockets (ON HIGHWAY)</p> <ul style="list-style-type: none"> • Lubricate using Chevron Delo EP NLGI-2 grease or equivalent. Refer to <u>Steering System</u> for maintenance instructions.
<p>Heating and air conditioning - Heater and air conditioner</p> <ul style="list-style-type: none"> • Perform the checks per <u>Heater and Air Conditioner Maintenance</u> instructions.
<p>Air - Air lines</p> <ul style="list-style-type: none"> • Check condition and routing to prevent chafing. See <u>Air Compressor</u> for maintenance instructions.
<p>Air - Air dryer</p> <ul style="list-style-type: none"> • Perform the checks listed in <u>Air Dryer Maintenance</u>.

¹ Ensure that all maintenance intervals leading up to this point are repeated during this interval prior to the completion of those listed here.

EVERY 60,000 MI/96,000 KM/6 MONTHS

Every 60,000 mi/96,000 km or Every 6 Months ¹
<p>Frame - Fifth wheel</p> <ul style="list-style-type: none"> Inspect fifth wheel operation. Refer to <u>Fifth Wheel Monthly Maintenance</u> for maintenance instructions.
<p>Front axle - Vocational (PACCAR) - Steer axle wheel ends: oil bath (adjusted)</p> <ul style="list-style-type: none"> Synthetic SAE 75W-140, SAE 50. Mineral oil SAE 75W, 75W-90, 75W-140, 80W-90, 85W-140. Refer to <u>Front Axle and Suspension</u> for maintenance instructions.
<p>Front axle - Vocational (PACCAR) - Steer axle semi-fluid (adjusted)</p> <ul style="list-style-type: none"> Semi-fluid synthetic grease: Delo SF, Mobil SCH 007. Refer to <u>Front Axle and Suspension</u> for maintenance instructions.
<p>Front axle - Vocational (PACCAR) - Steer axle grease pack (adjusted)</p> <ul style="list-style-type: none"> Heavy-Duty multipurpose lithium base, grade 2. Refer to <u>Front Axle and Suspension</u> for maintenance instructions.
<p>Front axle - SOFTEK® NXT (Hendrickson) - Kingpin bearings and tie rod ends (LINE HAUL)</p> <ul style="list-style-type: none"> Refer to the Hendrickson manual provided with your vehicle.
<p>Front axle - SOFTEK® NXT (Hendrickson) - Axle clamp through bolts</p> <ul style="list-style-type: none"> Refer to the Hendrickson manual provided with your vehicle.
<p>Front suspension - Front spring</p> <ul style="list-style-type: none"> Inspect for cracked leaves, worn bushings, and excessive corrosion. Refer to <u>Front Axle and Suspension</u> for maintenance instructions.
<p>Front suspension - Spring pins and shackles</p> <ul style="list-style-type: none"> Inspect for worn parts and excessive joint clearance. Shim or replace as required. Refer to <u>Front Axle and Suspension</u> for maintenance instructions.

Every 60,000 mi/96,000 km or Every 6 Months¹
<p>Front suspension - Shock absorbers</p> <ul style="list-style-type: none"> Inspect for leaking, body damage, and damaged or worn bushings. Replace as required. Check the shock mounting stud torque. Refer to <u>Front Axle and Suspension</u> for maintenance instructions.
<p>Front suspension U-bolts - U-bolts (ON HIGHWAY and VOCATIONAL)</p> <ul style="list-style-type: none"> Check the general condition and the tightness of the nuts. Tighten the U-bolts using a calibrated torque wrench to the specified torque value. Refer to <u>Suspension U-Bolts, Grade 8</u> for maintenance instructions.
<p>Front suspension - SOFTEK® NXT (Hendrickson) - Ride height</p> <ul style="list-style-type: none"> Refer to the Hendrickson manual provided with your vehicle.
<p>Drive axle - Linehaul (PACCAR) - Axle assembly</p> <ul style="list-style-type: none"> Drain and replace mineral-based lubricant.
<p>Drive axle (Dana) - Axle housing</p> <ul style="list-style-type: none"> Refer to the Dana manual provided with your vehicle.
<p>Drive axle (Dana) - Air shift unit</p> <ul style="list-style-type: none"> Refer to the Dana manual provided with your vehicle.
<p>Drive axle (Dana) - Lube pump (OFF HIGHWAY)</p> <ul style="list-style-type: none"> Refer to the Dana manual provided with your vehicle.
<p>Drive axle (Dana) - Lube filter (OFF HIGHWAY)</p> <ul style="list-style-type: none"> Refer to the Dana manual provided with your vehicle.
<p>Drive axle (Dana) - Magnetic drain plug and breather (OFF HIGHWAY)</p> <ul style="list-style-type: none"> Refer to the Dana manual provided with your vehicle.

Every 60,000 mi/96,000 km or Every 6 Months¹
<p>Drive Axle (SISU)</p> <ul style="list-style-type: none"> Refer to the SISU manual provided with your vehicle.
<p>Rear suspension - U-bolts</p> <ul style="list-style-type: none"> Check the torque. Tighten to specified torque value as required. Refer to <u>Suspension U-Bolts, Grade 8</u> for maintenance instructions.
<p>Disc brakes (Bendix®) - Brake pads</p> <ul style="list-style-type: none"> Refer to the Bendix manual provided with your vehicle.
<p>Disc brakes (Bendix®) - Brake disc/rotor</p> <ul style="list-style-type: none"> Refer to the Bendix manual provided with your vehicle.
<p>Disc brakes (Bendix®) - Caliper sliding function</p> <ul style="list-style-type: none"> Refer to the Bendix manual provided with your vehicle.
<p>Disc brakes (Bendix®) - Caliper slide pins</p> <ul style="list-style-type: none"> Refer to the Bendix manual provided with your vehicle.
<p>Disc brakes (Bendix®) - System operation</p> <ul style="list-style-type: none"> Refer to the Bendix manual provided with your vehicle.
<p>Cooling - Hoses</p> <ul style="list-style-type: none"> Check the radiator and heater hoses for leaks. Refer to <u>Cooling System Maintenance</u> for maintenance instructions.

Every 60,000 mi/96,000 km or Every 6 Months¹
<p>Electro-hydraulic power steering - Steering gear</p> <ul style="list-style-type: none"> • Check the lash of the sector shaft; adjust as required. Refer to Steering System for maintenance instructions. • Grease the trunnion bearing using Chevron Delo EP NLGI-2 grease or equivalent. Refer to Steering System for maintenance instructions. • Grease the input shaft seal using Chevron Delo EP NLGI-2 grease or equivalent. Refer to Steering System for maintenance instructions.
<p>Electro-hydraulic power steering - Hoses and tubes</p> <ul style="list-style-type: none"> • Check for leaks and chafing. Refer to Steering System for maintenance instructions.
<p>Steering components - Drag link tube clamp and ball socket</p> <ul style="list-style-type: none"> • Check the torque and tighten to specified torque value as required. Refer to Steering System for maintenance instructions.
<p>Steering components - Pitman arm clamp bolt and nut</p> <ul style="list-style-type: none"> • Check the torque and tighten to specified torque value as required. Refer to Steering System for maintenance instructions.
<p>Steering components - Steering intermediate shaft</p> <ul style="list-style-type: none"> • Check the torque on the pinch bolt and nut. Refer to Steering Shaft Bolt Torque Specifications for maintenance instructions.
<p>Steering components - Steering intermediate shaft U-joints (ON HIGHWAY)</p> <ul style="list-style-type: none"> • Lubricate with Chevron Delo EP NLGI-2 grease or equivalent. Refer to Steering System for maintenance instructions.
<p>Driveshafts - Models SPL- 140/140HD/170/170HD/250/250HD slip members and U-joints (ON HIGHWAY and LINEHAUL)</p> <ul style="list-style-type: none"> • Lubricate²
<p>Electrical and lights - ECM connector</p> <ul style="list-style-type: none"> • Check the tightness of the ECM connector. Refer to Electrical System for maintenance instructions.

Every 60,000 mi/96,000 km or Every 6 Months¹
<p>Electrical and lights - Wheel sensors</p> <ul style="list-style-type: none"> • Check for damaged sensors and connectors, and worn or frayed wires. Refer to Electrical System for maintenance instructions.
<p>Electrical and lights - Power supply harnesses</p> <ul style="list-style-type: none"> • Check for worn or damaged insulation, corroded terminals, frayed. Wash to remove excess grease. Refer to Electrical System for maintenance instructions.
<p>Cab structure, doors, and hoods</p> <ul style="list-style-type: none"> • Refer to Cab Structure, Doors, and Hoods for maintenance instructions.
<p>Cab structure, doors, and hoods – Hinges and latch (EXCLUDING door hinges)</p> <ul style="list-style-type: none"> • Lubricate with silicone spray. Refer to Cab Structure, Doors, and Hoods for maintenance instructions.
<p>Heating and air conditioning - Condenser</p> <ul style="list-style-type: none"> • Clear any debris from the front of the condenser. Refer to Heater and Air Conditioner Maintenance for maintenance instructions.
<p>Air system</p> <ul style="list-style-type: none"> • Lubricate as required. Refer to Air System for maintenance instructions.
<p>Under cab PCAS mounts</p> <ul style="list-style-type: none"> • Inspect the general condition and tightness of the M16 mm mounting bolts. Tighten using a calibrated torque wrench. Refer to Under Cab PCAS Bolts for the specific torque value.

¹ Ensure that all maintenance intervals leading up to this point are repeated during this interval prior to the completion of those listed here.

² Use only Spicer Driveshaft approved lubricants when greasing Spicer U-joints.

EVERY 120,000 MI/192,000 KM/ANNUALLY

Every 120,000 mi/192,000 km/Annually ¹
<p>Frame - Frame fasteners</p> <ul style="list-style-type: none"> • Check for tightness; tighten to the specified torque value as required. Refer Frame Fastener Torque Requirements for maintenance instructions.
<p>Frame - Crossmembers and mounting brackets</p> <ul style="list-style-type: none"> • Inspect for cracks and loose fasteners. Replace or tighten to the specified torque value as required. Refer to Frame Fastener Torque Requirements for maintenance instructions.
<p>Front axle - Linehaul (PACCAR) - Steer axle wheel ends: oil bath (adjusted)</p> <ul style="list-style-type: none"> • Synthetic SAE 75W-140, SAE 50W. Refer to Front Axle and Suspension for maintenance instructions.
<p>Front axle - Linehaul (PACCAR) - Steer axle wheel ends: oil bath (adjusted)</p> <ul style="list-style-type: none"> • Mineral oil SAE 75W, 75W-90, 75W-140, 80W-90, 85W-140. Refer to Front Axle and Suspension for maintenance instructions.
<p>Front axle - Linehaul (PACCAR) - Steer axle semi-fluid (adjusted)</p> <ul style="list-style-type: none"> • Semi-fluid synthetic grease: Delo SF, Mobil SCH 007. Refer to Front Axle and Suspension for maintenance instructions.
<p>Front axle - linehaul (PACCAR) - Steer axle grease pack (adjusted)</p> <ul style="list-style-type: none"> • Heavy-Duty multipurpose lithium base: grade #2. Refer to Front Axle and Suspension for maintenance instructions.
<p>Front axle - Vocational (PACCAR) - Steer axle wheel ends: oil bath LMS</p> <ul style="list-style-type: none"> • Synthetic SAE 75W-90. Refer to Front Axle and Suspension for maintenance instructions.
<p>Drive axle - Linehaul (PACCAR) - Axle shaft</p> <ul style="list-style-type: none"> • Tighten the rear axle flange nuts to the specified torque value.

Every 120,000 mi/192,000 km/Annually¹
<p>Drive axle (Meritor line haul/ON HIGHWAY) - Interaxle differential</p> <ul style="list-style-type: none"> • Check the operation. Refer to <u>Drive Axle - Meritor</u> for maintenance instructions.
<p>Drive axle (Meritor City Delivery/OFF HIGHWAY) - Lubricant filter</p> <ul style="list-style-type: none"> • Refer to the Meritor manual provided with your vehicle.
<p>Drive axle (Meritor City Delivery/OFF HIGHWAY) - Input shaft and pinion shaft</p> <ul style="list-style-type: none"> • Refer to the Meritor manual provided with your vehicle.
<p>Drive axle (Meritor City Delivery/OFF HIGHWAY) - Axle shaft</p> <ul style="list-style-type: none"> • Refer to the Meritor manual provided with your vehicle.
<p>Drive axle (Meritor City Delivery/OFF HIGHWAY) - Interaxle differential</p> <ul style="list-style-type: none"> • Refer to the Meritor manual provided with your vehicle.
<p>Drive axle (SISU)</p> <ul style="list-style-type: none"> • Refer to the SISU manual provided with your vehicle.
<p>Rear suspension - Frame and crossmembers bolts</p> <ul style="list-style-type: none"> • Check the torque. Tighten to specified torque value as required. Refer to <u>Rear Axle and Suspension</u> for maintenance instructions.
<p>Rear suspension - Mounting brackets and fasteners</p> <ul style="list-style-type: none"> • Check the condition and the fastener torque. Tighten to the specified torque value as required. Refer to <u>Suspension U-Bolts, Grade 8</u> for maintenance instructions.
<p>Steering components - Steering linkage</p> <ul style="list-style-type: none"> • Check all joints for excessive lash: replace as required. Refer to <u>Steering System</u> for maintenance instructions.

Every 120,000 mi/192,000 km/Annually¹
Driveshafts - Models SPL-140XL/ 170XL/250XL Slip Members and U- joints (OFF HIGHWAY and CITY) <ul style="list-style-type: none"> Lubricate
Cab structure, doors, and hoods <ul style="list-style-type: none"> Refer to <u>Cab Structure, Doors, and Hoods</u>.
Heating and air conditioning - Heater and air conditioner <ul style="list-style-type: none"> Full operational and diagnostic check. Refer to <u>Heater and Air Conditioner Maintenance</u> for maintenance instructions.
Heating and air conditioning - Recirculation cab air filter (ON HIGHWAY) <ul style="list-style-type: none"> Please contact an authorized dealer when the service interval is required to inspect the cabin recirculation air filter. Refer to <u>Replacing the Recirculation Air Filter</u> for maintenance instructions.
Heating and air conditioning - Recirculation cab air filter (OFF-HIGHWAY) <ul style="list-style-type: none"> Please contact an authorized dealer when the service interval is required to inspect the cabin recirculation air filter. Refer to <u>Replacing the Recirculation Air Filter</u> for maintenance instructions.
Air - Air dryer <ul style="list-style-type: none"> Replace oil-coalescing cartridge . See <u>Air Dryer Maintenance</u>. Replace purge valve.

¹ Ensure that all maintenance intervals leading up to this point are repeated during this interval prior to the completion of those listed here.

EVERY 240,000 MI/384,000 KM

Every 240,000 mi/384,000 km¹

Drive axle - Vocational (PACCAR) - Axle assembly

- Drain and replace synthetic-based lubricant.

¹ Ensure that all maintenance intervals leading up to this point are repeated during this interval prior to the completion of those listed here.

EVERY 300,000 MI/480,000 KM/6,750 HOURS/3 YEARS

Every 300,000 mi/480,000 km/6,750 Hours/3 Years¹

Cooling - Battery Coolant Circuit

- Coolant must be flushed/drained/refilled every 3 years. Refer to Coolant Level Inspection for maintenance instructions.

Cooling - Power electronics coolant circuit

- Cooling system must be flushed/drained/refilled every 3 years. Refer to Coolant Level Inspection for maintenance instructions.

¹ Ensure that all maintenance intervals leading up to this point are repeated during this interval prior to the completion of those listed here.

EVERY 500,000 MI/800,000 KM/5 YEARS

Every 500,000 mi/800,000 km/5 years¹

Front axle - Linehaul (PACCAR) - Steer axle wheel ends: oil bath LMS

- Synthetic SAE 75W-90. Refer to Front Axle and Suspension for maintenance instructions.

Drive axle - Linehaul (PACCAR) - Axle assembly

- Drain and replace synthetic-based lubricant.

¹ Ensure that all maintenance intervals leading up to this point are repeated during this interval prior to the completion of those listed here.

4 DO NOT WORK ON HIGH-VOLTAGE ELECTRICAL SYSTEMS



WARNING

DO NOT attempt to diagnose, correct, or repair any vehicle issue related to the high-voltage electrical system or its components. The high-voltage electrical system is capable of producing dangerous electric shock and burns. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

DO NOT work or do any repair in the high-voltage electrical system and its components. Maintenance and service to the vehicle that involves the high-voltage system must be handled and de-energized by EV certified technicians prior to the procedure. Contact the nearest authorized EV service certified dealership to schedule a maintenance appointment.

5 POWER CONTROLS AND AUXILIARY SYSTEMS (PCAS)

The Power Controls and Auxiliary Systems (PCAS) integrates auxiliary, thermal, and power electronic systems. The PCAS assembly is mounted on a structure capable of supporting the weight of all the systems that integrate the e-motor. The PCAS consists of controllers, the air conditioning compressor, e-compressors, cab heater, PS inverter, the power steering, pumps, and valves.

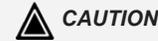
If you find any problem or malfunction with the PCAS, contact your nearest EV service certified dealership and bring your vehicle for the proper service. The PCAS involves high-voltage systems and harnesses that require an EV service certified dealership and safety measures to handle the components.



WARNING

DO NOT attempt to diagnose, correct, or repair any vehicle issue related to the high-voltage electrical system or its components. The high-voltage electrical system is capable of producing dan-

gerous electric shock and burns. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.



CAUTION

DO NOT perform any repair to the vehicle electrical system including the power distribution box. Please contact or take the vehicle to an authorized EV service certified dealership for service. Improper repair or modification will void your warranty and cause serious damage to your vehicle. Failure to comply may result in equipment damage or property damage.

6 LUBRICANTS

Schedule service more frequently if you are operating under severe conditions such as extreme heat or cold, with very heavy loads, off-road, etc. For any special service requirements, consult your service manuals and your lubricant supplier. Please remember: one key to keeping your vehicle running at top economy and prolonging its life

is proper lubrication servicing. Neglecting this essential aspect of vehicle care can cost time and money in the long run.

⚠ WARNING

Handle lubricants carefully. Vehicle lubricants (oil and grease) can be poisonous and cause sickness. Failure to comply may result in death, personal injury, equipment damage, or property damage.

⚠ CAUTION

DO NOT mix different lubricant brands or different lubricant types, such as oil and grease. Before refilling or reapplying, drain or remove old lubricants from the component. Mixing different brands or lubricant types may damage vehicle components. Failure to comply may result in equipment or property damage.

Driveline Universal Joints

Refer to the Spicer Universal Joints and Driveshafts service manual and lubrication specifications.

Non-PACCAR Axles and Hubs

For all non-PACCAR brands, see the manufacturer's operator's manual for recommended lubrication specifications and maintenance intervals.

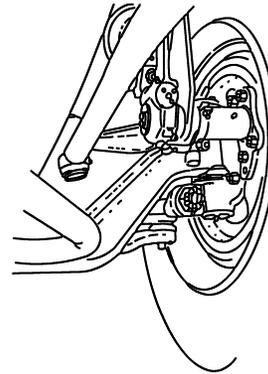
7 FRONT AXLE AND SUSPENSION

7.1 Front Axle and Suspension

Axle Lubrication

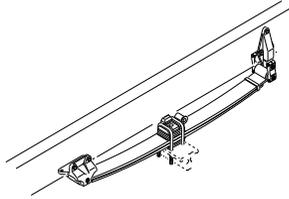
Refer to the axle manufacturer's operator's manual for lubrication specifications and service intervals.

Kingpin Lubrication



Lubricate with approved lubricant. Lubricate knuckle thrust bearings, knuckle pins, and tie rod ends. Lack of lubrication causes premature wear and hard steering. Lubrication schedule may be shortened if necessary.

Suspension Lubrication



Each standard spring anchor pin has a grease fitting. Pressure lubricate spring pins as specified. At regular intervals, the spring leaves may be lubricated with a rust-inhibiting oil applied with a spray gun or brush. Depending on your suspension, lubricate all spring pins until grease flows out of both ends of the bushing. Look for signs of rust or water in the flushed grease. If a pin will not accept grease, it should be removed, cleaned, and inspected.

CAUTION

DO NOT spray the suspension with chemical products or mineral oil; it can cause damage to the bushings. Failure to comply may result in equipment or property damage.

NOTE

Before lubricating perform all inspections and measurements tasks.

Inspection

For all vehicles, mandatory maintenance procedures include retightening all U-bolts and inspecting the suspension for loose, damaged, or abnormally worn fasteners. Visually inspect the shock absorbers, the rubber bushings, the leaf springs, and that the suspension is aligned and functioning properly. Mono leaf spring suspensions should also have their rear shackle brackets checked for proper alignment.

Even with proper maintenance, however, the service life of leaf springs are affected by many factors: fatigue, vehicle gross weight, type of load, road conditions, and vehicle speed. Check for cracks, wear marks, splits, or other defects on the surface of the spring. Defective parts must be replaced. Because repaired springs cannot be fully restored to their original service life, replace the complete assembly if cracks or other defects are detected.

Follow these steps to perform a general inspection:

- Check the shackle side clearance and

adjust if necessary.

- Visually inspect front springs. Check for cracks, rust nicks, and unusual wear patterns or spring scrubbing.
- Visually inspect shock absorbers and rubber bushings.
- Check front axle U-bolt torque.
- Check shock absorbers for proper action. Examine the body of the shock absorber. Fully extend and compress it. If any dents, signs of warping, or fluid leakage is detected, replace the shock absorber (refer to Assembly/ Disassembly).

Wheel Alignment

For driving safety and comfort, and to prolong the life of your vehicle, it is important to have wheels correctly aligned. Check tire wear frequently. Uneven tire wear is a sign that the wheels may be misaligned. If you see uneven wear, take your vehicle to an authorized dealer familiar with aligning wheels on your vehicle.

Suspension U-Bolts

It is important that U-bolts remain tight. Severe use of your vehicle will cause them to loosen faster, and all vehicles need to have their U-bolts checked and tightened regularly. Be sure someone with the proper

training and the right tools checks and tightens the U-bolts on your vehicle. New springs can settle in after service, relieving the tension on the U-bolts. Loose U-bolts can cause leaf spring breakage, axle misalignment, hard steering, and abnormal tire wear. All vehicles should have suspension U-bolts tightened after the first 500 miles (800 km) of operation. Re-torque the front spring pinch bolts and shackle pinch bolts.

 **WARNING**

DO NOT operate the vehicle if the suspension U-bolts are not properly tightened. Improperly tightened (loose) suspension U-bolts can lead to an unsafe vehicle condition, including hard steering, axle misalignment, spring breakage, or abnormal tire wear. Failure to comply may result in death, personal injury, equipment damage, or property damage.

U-bolts are difficult to tighten unless you have the right equipment. If you cannot tighten them correctly yourself, be sure to have them checked and tightened regularly by an authorized technician. Tighten U-bolt nuts to the specified torque value with the vehicle loaded to its normal gross weight.

See [Suspension U-Bolts, Grade 8](#) specifications for torque values applying to U-bolts and nuts.

 **WARNING**

DO NOT replace U-bolts and nuts with common U-bolts or standard nuts. These parts are critical to vehicle safety. If the wrong U-bolts or nuts are used, the axle could loosen or separate from the vehicle and cause a serious accident. Use only PACCAR replacement parts. Failure to comply may result in death, personal injury, equipment damage, or property damage.

7.2 PACCAR FX-20 Front Axle Lubrication

Proper lubrication practices are important in maximizing the service life of the steer axle assembly.

 **WARNING**

Vehicle noise may be reduced in some operation modes. The vehicle operator must remain aware of nearby vehicles or pedestrians at all times. Failure

to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

DO NOT perform maintenance on high-voltage (HV) cables. A PACCAR trained technician is required for service. Please contact an authorized EV service certified dealership for service. Be mindful of the location of HV cables and components when working around the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Kingpins, Thrust Bearings, and Tie Rod Ends

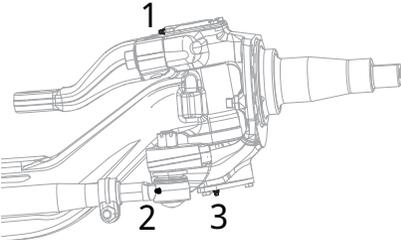
For standard on-highway applications follow the steps below.

- Pressure lubricate every 6 months or 25,000 miles (40,000 km).
- A more frequent lubrication cycle is required for axles used in on/off-highway, refuse, or other severe service applications. Use heavy-duty, multipurpose lithium base (#2 grade) grease.

CAUTION

Only use lithium-based grease and DO NOT mix with sodium-based grease. Doing this could cause the grease mix to soften, reducing lubrication capacity and lowering protection against oxidation, corrosion, extreme temperatures, and water. Failure to comply may result in equipment damage or property damage.

Figure 42: PACCAR FX-20 Front Axle Lube Point



- 1 Upper kingpin bearing
- 2 Tie rod end
- 3 Lower kingpin bearing

NOTE

If it is difficult to grease either the upper or lower bearing, try greasing the bearings with the vehicle jacked up and supported on axle stands to improve grease flow and flush contamination.

Oil Bath

Lubricate wheel end assembly with a drive axle lubricant that meets MIL-L-2105D specifications. Either SAE 80W-90 mineral based or 75W-90 synthetic gear oil is acceptable. Check the lubricant level at each greasing interval. Maintain the lubrication fluid level at centerline of axle or fill line on hub cap. Always check fluid level on flat ground.

CAUTION

Never mix oil bath and grease-packed wheel ends. Mixing oil and grease will reduce the effectiveness of both lubricants and may cause damage to the wheel ends. Failure to comply may result in equipment or property damage.

8 REAR AXLE AND SUSPENSION

8.1 Rear Axle and Suspension

WARNING

Electric vehicles utilize a high-voltage electrical system that has the potential to cause severe injury or death if proper safety precautions are not followed. Carefully read and understand all instructions and hazard alert messages. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

Vehicle noise may be reduced in some operation modes. The vehicle operator must remain aware of nearby vehicles or pedestrians at all times. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Your vehicle's suspension, by design, requires a minimal amount of maintenance. However, suspensions in over-the-road operations require periodic inspection to ensure trouble-free performance.

 **WARNING**

Prior to performing maintenance, do the following to prevent uncontrolled vehicle movement:

- Park the vehicle on a hard and level surface.
- Chock forward and rear wheels securely.

Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

DO NOT operate the vehicle if the suspension U-bolts are not properly tightened. Improperly tightened (loose) suspension U-bolts can lead to an unsafe vehicle condition, including hard steering, axle misalignment, spring breakage, or abnormal tire wear. Failure to comply may result in death, personal

injury, equipment damage, or property damage.

 **WARNING**

Failure to maintain the specified torque values or to replace worn parts can cause component failure, possibly resulting in an accident. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **CAUTION**

DO NOT spray the suspension with chemical products or mineral oil; it can cause damage to the bushings. Failure to comply may result in equipment or property damage.

 **NOTE**

Failure to follow these recommendations could void warranty.

Visual Inspection

For all vehicles, mandatory maintenance procedures include retightening of U-bolts and complete inspection. Even with proper maintenance, however, many factors affect the service life of springs and suspension components: fatigue, vehicle gross weight, type of load, road conditions, and vehicle speed. All vehicles need to have their U-bolts checked and tightened regularly, but severe use of the vehicle can cause them to loosen faster. It is important that U-bolts remain tight. Be sure someone with proper training and the right tools checks and tightens the U-bolts on your vehicle. After the first 500 miles (800 km) of operation, periodically inspect the suspension as noted below:

- Visually check for loose or missing fasteners, cracks in hanger, or axle connection brackets
- Check that springs are centered in hangers and in good condition
- Check for cracks, wear marks, splits, or other defects on the surface of the spring
- Replace defective parts. Because repaired springs cannot be fully restored to their original service life, replace the complete assembly if cracks or other defects are detected

- After replacement of any part or discovery of loose components, check the torque of all fasteners
- New springs settle-in after the vehicle's initial service, causing the U-bolts to become loose

Rear Suspension Fasteners

To maintain the performance of the air suspension, check fastener torque values after the first 2,000 miles (3,200 km) of service and every 60,000 miles (96,000 km) thereafter. Torque recommendations apply to fasteners supplied and installed by vehicle manufacture. The values listed at the back of this chapter (see Suspension U-Bolts, Grade 8 and Frame Fastener Torque Requirements) are for cadmium plated or phosphate and oil fasteners only.

Rear Suspension U-Bolts

U-bolts are difficult to tighten unless you have the right equipment. If you cannot tighten them correctly yourself, be sure to have them checked and tightened regularly by an authorized technician.

 NOTE
To ensure an accurate torque reading, use properly maintained and cali-

brated torque wrenches. Clean the nut and bolt. No dirt, grit, or rust should be present.

 WARNING
DO NOT operate the vehicle if the suspension U-bolts are not properly tightened. Improperly tightened (loose) suspension U-bolts can lead to an unsafe vehicle condition, including hard steering, axle misalignment, spring breakage, or abnormal tire wear. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 NOTE
Whenever possible, torque all frame fasteners on the nut end, not the bolt head.

Load the vehicle to its normal gross weight before tightening U-bolts. Loading the vehicle ensures proper adjustment of the U-bolt and spring assembly.

 WARNING
DO NOT replace U-bolts and nuts with common U-bolts or standard nuts. These parts are critical to vehicle safety. If the wrong U-bolts or nuts are used, the axle could loosen or separate from the vehicle and cause a serious accident. Use only PACCAR replacement parts. Failure to comply may result in death, personal injury, equipment damage, or property damage.

8.2 Rear Axle Lubrication

See the axle manufacturer's operator's manual for lubrication specifications and service intervals. Check oil level with the vehicle parked on level ground and the fluid warm. The level should be even with the bottom of the filler hole.

8.3 Rear Axle Alignment

Continual road shock and load stresses may force the rear axles out of alignment. If you detect rapid tire wear on the rear axles, you may have misaligned axles. If

you suspect rapid tire wear, have your rear axle alignment checked and adjusted by an authorized dealer.

Suspension alignment should be checked when any one of the following conditions exist:

- Total vehicle alignment required after a body has been installed on truck chassis.
- Discovery of loose suspension fasteners (loose defined as any torque below the recommended torque value)
- Discovery of elongated holes in a suspension component
- Bushing replacement
- Excessive or abnormal tire wear
- Immediately after post body installation (See First Day in the Maintenance Chapter)

8.4 Drive Axle - Dana

DRIVE AXLE - DANA

Refer to the Dana manual provided with your vehicle.

EATON/DANA AXLE LUBRICATION

Refer to the Eaton or Dana manual provided with your vehicle.

8.5 Drive Axle - Meritor

DRIVE AXLE - MERITOR

Refer to the Meritor manual provided with your vehicle.

MERITOR AXLE LUBRICATION



WARNING

Never assume a Battery Electric Vehicle (BEV) is powered down without verifying it. BEVs can move with little to no sound. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Refer to the Meritor manual provided with your vehicle.

8.6 Drive Axle - SISU Breather and Brakes

Refer to the SISU manual provided with your vehicle.

8.7 Drive Axle (SISU) Inspection

Refer to the SISU manual provided with your vehicle.

8.8 Drive Axle (SISU) Oil Servicing

Refer to the SISU manual provided with your vehicle.

8.9 Drive Axle - (SISU) Lube Filter

Refer to the SISU manual provided with your vehicle.

9 AIR SYSTEM

9.1 Air System

The operation of the vehicle's braking system and many vehicle accessories depends on the storage and application of high-pressure air supply.

 **WARNING**

DO NOT attempt to diagnose, correct, or repair any vehicle issue related to the high-voltage electrical system or its components. The high-voltage electrical system is capable of producing dangerous electric shock and burns. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

Vehicle noise may be reduced in some operation modes. The vehicle operator must remain aware of nearby vehicles or pedestrians at all times. Failure to comply may result in death, personal

injury, equipment damage, or property damage.

 **WARNING**

DO NOT modify, alter, repair, or disconnect any air system component. Repairs or modifications to the air system, other than preventive maintenance, should only be performed by an authorized dealer. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

Prior to the removal of any air system component, block and hold the vehicle by a secure means other than the vehicle brake. Depleting air system pressure may cause the vehicle to roll unexpectedly resulting in an accident. Failure to comply may result in death, personal injury, equipment or property damage.

 **WARNING**

Chamber push rods and slack adjusters will move as air system pressure drops in the spring brake chambers and as the parking or service brakes are cycled. To avoid possible injury or property damage, keep hands and objects away from brake system components when performing these procedures.

 **WARNING**

After completing any repairs to the air system, always test for air leaks, and check the brakes for safe operation before putting the vehicle in service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

Never connect or disconnect a hose or line containing air pressure. It may whip as air escapes. Never remove a component or pipe plug unless you are certain all system pressure has been depleted. Failure to comply may result in death,

personal injury, equipment damage, or property damage.

 **WARNING**

Always wear safety glasses when working with pressurized air. DO NOT exceed the recommended air pressure limits, look into the air jets, or direct the air jets towards yourself or another individual. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

Never attempt to install, remove, disassemble, or assemble a component until you have read and understood the recommended procedures. Some components contain powerful springs, and injury can result if not properly disassembled. Use only proper tools, and observe all precautions pertaining to use of those tools. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

If it is necessary to temporarily bypass an air dryer, always adhere to the procedure provided by the manufacturer. Completely bypassing an air dryer will bypass the system pressure protection valves, which could lead to a loss of air pressure or damage the vehicle air system. A loss of vehicle air could unexpectedly engage the emergency brakes, resulting in an accident. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

DO NOT install an air dryer brand or model different from the original without a full system review to ensure continued FMVSS 121 compliance. Incompatibility may impair air system performance and vehicle control. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

If the air tanks are not drained at the recommended frequency, water could enter the air lines and valves. This could cause corrosion or blockage and compromise brake system performance, which could lead to an accident. Failure to comply may result in death, personal injury, equipment damage, or property damage.

The vehicle's compressor takes outside air and compresses it, usually to 100 to 120 psi (6.89 to 8.27 bar/689 to 827 kPa). The compressed air then goes to the reservoirs to be stored until needed. When operating the air brakes, the stored compressed air flows into the chambers where it is used to apply the truck and trailer brakes. That is why, when pushing down on the brake pedal, the same amount of pressure on the pedal will not be felt as when applying the brake on the car. All that is being done on the truck is opening an air valve to allow air to flow into the brake chambers. Contamination of the air supply system is the major cause of problems in air-operated components such as brake valves, and suspen-

sion height control valves. To keep contaminants to the lowest possible level, follow these maintenance procedures.

Daily Checks

- Drain moisture from the supply and service air tanks.
- Operate air devices to circulate lubricant within the unit.

Periodically

- Clean filter screens ahead of the valves by removing the screens and soaking them in solvent. Blow dry them with pressurized air before reinstalling.

Twice a Year

- Maintain the air compressor to prevent excessive oil bypass. See the maintenance manual for details.
- Replace worn seals in valves and air motors as needed.

9.2 Air Gauges and Air Leaks

AIR GAUGES AND AIR LEAKS

 WARNING
<p>DO NOT operate the vehicle if leakage in the air system is detected, it must be evaluated by a qualified technician. If any questions arise, contact an authorized dealer. Failure to comply may result in death, personal injury, equipment damage, or property damage.</p>

If your vehicle is equipped with air brakes, it has two separate, additional air systems: Primary and Secondary. Each air system is monitored by a gauge indicating system pressure in either pounds per square inch (psi), and/or bar (bar).

The Primary gauge indicates pressure in the rear braking system:

Figure 43: Primary Air Pressure Gauge



The Primary and Secondary Air Pressure gauges are shown in the Primary Gauges View on the Digital Display. Low cab forward right-hand stand-up model uses additional physical gauges for Primary and Secondary Air Pressure.

At start-up, the Primary and Secondary Air Pressure gauges may indicate red, and the Low Air System Pressure alarm may sound until the minimum operational pressure set-point of 65 psi (4.48 bar) is reached. Low cab forward right-hand stand-up model also indicates low air pressure using a warning light in the physical gauges.

 NOTE
<p>The Low Air System Pressure alarm is not active when the motor is off.</p>

If the tanks are empty, this can take up to two minutes. If these gauges:

- Remain red
- Turn red
- Indicate below 65 psi (4.48 bar)

Or the Low Air System Pressure Alarm

- Turns on
- Does not turn off

Do not attempt to drive the vehicle until the problem is found and fixed: system pressure is too low for normal brake operation.

i NOTE

Park brakes lock up at 60 psi (4.14 bar), the audible alarm will sound at 65 psi (4.48 bar).

CHECKING THE COMPRESSED AIR SYSTEM FOR LEAKS

⚠ WARNING

DO NOT operate the vehicle if leakage in the air system is detected, it must be evaluated by a qualified technician. If any questions arise, contact an authorized dealer. Failure to comply may result in death, personal injury, equipment damage, or property damage.

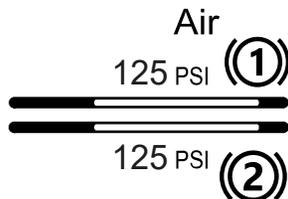
Check the compressed air system for leaks:

- After maintenance
- When an air system component is replaced
- When a leak is suspected

- Periodically, to ensure system integrity

To check for Air System leaks

1. Start the vehicle if not already running by turning the start switch to the ON position.
2. **Scroll** to either the Basic or Enhanced View to monitor Primary and Secondary Air Pressures:



3. Build up air pressure in the system until the system cutout setpoint or until 120 psi (8.27 bar/827 kPa) is reached.
4. Turn the start switch to the OFF position (stopping the vehicle propulsion).
5. Release the service brakes, and observe the rate of air pressure drop. This rate should not exceed 2 psi (0.14 bar/14 kPa) per minute.
6. Start the vehicle and build up the air pressure again.
7. Turn the start switch to the OFF

position (stopping the vehicle propulsion).

8. Apply the brake fully, holding the pedal down for five minutes. The pressure drop should not exceed 3 psi (0.21 bar/21 kPa) per minute.
9. If you detect excessive leakage (air pressure loss greater than 3 psi (0.21 bar/21 kPa) after five minutes of brake application), a leakage test should be made at the air line connections and at all air brake control units. These tests should determine where air is escaping.

9.3 Air Compressor

When the compressor is running loaded (compressing air), compressed air flows through the compressor discharge line to the inlet port of the air dryer body. The compressor is off when the system pressure reaches 130 psi (8.96 bar/896 kPa), and compression is reestablished (compressor is on) when system pressure falls to 110 psi (7.58 bar/758 kPa).

Preventive Maintenance

The following service checks are provided for informational purposes, and should **ONLY** be performed by a certi-

fied technician. Contact your dealer or the manufacturer's maintenance manual for further information on servicing air compressors. After completing any repairs to the air system, always test for air leaks, and check the brakes for safe operation before putting the vehicle in service. Below is a list of areas to maintain for the air compressor:

- Inspect compressor air filter element, if equipped, and replace element if clogged.
- Remove compressor discharge valve cap nuts and check for presence of excessive carbon. If excessive carbon is found, clean or replace the compressor cylinder head. Also, check compressor discharge line for carbon, and clean or replace the discharge line if necessary.
- Disassemble compressor and thoroughly clean and inspect all parts. Repair or replace all worn or damaged parts, or replace compressor with a factory exchange unit. HV orange cables should be disconnected in order to perform this task, therefore, only EV certified technicians must perform this service.

 **WARNING**

Use only authorized refrigerant lubricant for this vehicle. This vehicle uses a non-conductive refrigerant lubricant and not the typical refrigerant lubricant used for PACCAR vehicles. Use of a conductive lubricant could result in electrical damage within the compressor, possibly leading to a fire. Failure to comply may result in death, personal injury, equipment, or property damage.

9.4 Air Dryer Maintenance

AIR DRYER MAINTENANCE

 **WARNING**

DO NOT attempt to diagnose, correct, or repair any vehicle issue related to the high-voltage electrical system or its components. The high-voltage electrical system is capable of producing dangerous electric shock and burns. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **NOTE**

Because no two vehicles operate under identical conditions, maintenance and maintenance intervals will vary. Experience is a valuable guide in determining the best maintenance interval for any one particular operation.

 **NOTE**

A small amount of oil in the system may be normal and should not, in itself, be considered a reason to replace the desiccant cartridge. Oil stained desiccant can function adequately.

Every 900 operating hours or 25,000 miles (40,000 km) or every 3 months check for moisture in the air brake system by opening air tanks, drain cocks, or valves and checking for presence of water.

A tablespoon of water found in the air tank would point to the need for a desiccant cartridge change. However, the following conditions can also cause water accumulation and should be considered before replacing the desiccant cartridge.

- Air usage is exceptionally high and not normal for a highway vehicle. This

may be due to accessory air demands or some unusual air requirement that does not allow the compressor to load and unload (compressing and non-compressing cycle) in a normal fashion or it may be due to excessive leaks in the air system.

- In areas where more than a 30°F (17°C) range of temperature occurs in one day, small amounts of water can accumulate in the air brake system due to condensation. Under these conditions, the presence of small amounts of moisture is normal and should not be considered as an indication that the dryer is not performing properly.
- An outside air source has been used to charge the air system. This air did not pass through the drying bed.

i NOTE

Review the warranty policy before performing any maintenance procedures. An extended warranty may be voided if unauthorized maintenance is performed during this period.

i NOTE

Each time the oil-coalescing desiccant cartridge is changed, the air dryer purge valve should be changed.

BENDIX® AD-HF SERIES AIR DRYER

Your vehicle may be equipped with a Bendix® AD-HF series air dryer. Any air dryer replacement should be made with an identical component.

Refer to the Bendix manual provided with your vehicle.

⚠ WARNING

DO NOT install an air dryer brand or model different from the original without a full system review to ensure continued FMVSS 121 compliance. Incompatibility may impair air system performance and vehicle control. Failure to comply may result in death, personal injury, equipment damage, or property damage.

The AD-HF Series air dryer has incorporated into its design various components that have typically been installed separately on the vehicle (see below for components/ areas affected):

- Pressure protection valves
- Safety valve
- Solenoid valves and plumbing
- Plumbing of the front and rear service air tanks
- Plumbing to accessory systems

These components are required to meet the Federal Motor Vehicle Safety Standards (FMVSS 121 - Air Brake Systems). As the Warning above states, any other type of air dryer installed in the place of an AD-HF Series will require changes, modifications, and/or additions to your vehicle's air system to maintain compliance with FMVSS 121.

AIR DRYER OIL-COALESCING CARTRIDGE

⚠ WARNING

DO NOT attempt to diagnose, correct, or repair any vehicle issue related to the high-voltage electrical system or its

components. The high-voltage electrical system is capable of producing dangerous electric shock and burns. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

This vehicle's air system is equipped with an oil-coalescing air dryer. The air dryer's oil-coalescing cartridge must be replaced yearly, regardless of mileage.

9.5 Air Tanks

WARNING

DO NOT perform any repair while the vehicle is connected to a charger. Orange high-voltage (HV) cables stay energized unless the battery Manual Service Disconnect (MSD) fuses are removed. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

DO NOT perform maintenance on high-voltage (HV) cables. A PACCAR trained technician is required for service. Please contact an authorized EV service certified dealership for service. Be mindful of the location of HV cables and components when working around the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

If the air tanks are not drained at the recommended frequency, water could enter the air lines and valves. This could cause corrosion or blockage and compromise brake system performance, which could lead to an accident. Failure to comply may result in death, personal injury, equipment damage, or property damage.

CAUTION

DO NOT use penetrating oil, alcohol, brake fluid, or wax-based oils in the air

system. These fluids may cause severe damage to air system components. Failure to comply may result in equipment or property damage.

The air tanks must be drained daily. Operate air devices daily to circulate lubricants within the unit.

9.6 Dual Air System Function Test

WARNING

DO NOT perform any repair while the vehicle is connected to a charger. Orange high-voltage (HV) cables stay energized unless the battery Manual Service Disconnect (MSD) fuses are removed. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Conduct this test at least every 3 months or if there is any indication of a potential problem.

Park the vehicle on level ground and block the wheels. Have an assistant open the drain valves and, where required, observe brake action at the wheels. If a malfunction

tion occurs during this test, do not move the vehicle until the problem has been corrected.

i NOTE

Tractor air system must be connected to trailer.

10 BRAKE SYSTEM

10.1 Brake System

To learn more about brakes, see the Index, under Brakes.

! WARNING

DO NOT work on the brake system without the parking brake set, the START switch in the OFF position, and wheels chocked securely. If the vehicle is not properly secured to prevent movement, it could roll unintentionally. Failure to comply may result in death, personal injury, equipment, or property damage.

! WARNING

Park the vehicle on level ground and block the tires to prevent vehicle movement or displacement. Never work under or around a vehicle held only by lifting devices. Always support the lifted vehicle with rigid supports. Failure to comply may result in death, personal injury, equipment damage, or property damage.

! WARNING

DO NOT use brake linings with a thickness below the specified minimum. Such linings will have lining rivets exposed that can damage the brake drum and reduce brake efficiency. Failure to comply may result in death, personal injury, equipment damage, or property damage.

! WARNING

DO NOT use any replacement part in the brake system unless it conforms exactly to original specifications. A nonconforming part in the vehicle's brake system could cause a malfunction

resulting in a loss of vehicle control, leading to an accident. Failure to comply may result in death, personal injury, equipment damage, or property damage.

i NOTE

Before performing inspections, put on safe eye protection.

Brake adjustment and brake balance must be set carefully to (1) make the most efficient use of the forces available for braking and (2) allow equal stopping forces at all wheels. Once a brake system is set to specifications, changing any one of its components or any combination of components may cause the system to not work as well. All parts have to work together to perform as they should. Any replacement components in your brake system should be exactly equal to the original components. Any changes from the original specifications can affect the whole system. All of the following areas are interrelated and must conform to original specifications:

- Tire size
- Drum brakes
- Cam radius

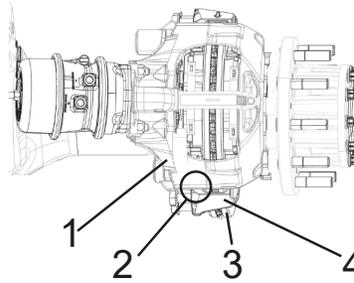
- Wedge angle
- Drum radius
- Brake linings
- Brake chambers
- Slack adjusters
- Disc brakes
- Disc rotors

All vehicle operators should check their brake regularly.

10.2 Air Disc Brakes

AIR DISC BRAKES

This vehicle is equipped with disc brakes; all the system work with a pneumatic system. The main components that make the air disc brake system are showed in the image below.



- 1 Brake caliper
- 2 Caliper mounting flange
- 3 Brake rotor
- 4 Inspection notches

BRAKE PADS ON DISC BRAKES INSPECTION

Required tools:

- Flat head screwdriver

WARNING

Electric vehicles utilize a high-voltage electrical system that has the potential to cause severe injury or death if proper safety precautions are not followed. Carefully read and understand all instructions and hazard alert mes-

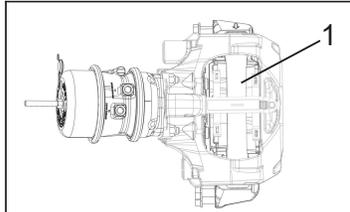
sages. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

DO NOT attempt to diagnose, correct, or repair any vehicle issue related to the high-voltage electrical system or its components. The high-voltage electrical system is capable of producing dangerous electric shock and burns. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

To inspect the brake pads:

1. Wear safe eye protection. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Ensure that the service and parking brakes are released before inspecting.
2. Visually inspect the pad retain. Remove the pad shield, if fitted. If the pad retainer is bent or damaged, replace the pad retainer.



1. Pad retainer

3. Looking from the ground up at the bottom of the caliper and rotor, compare the relative position of two notches; one located on the caliper and the other on the carrier.
4. Take a measurement from between these two notches and compare them to the specifications to determine if the pads need to be replaced. Have a qualified technician perform a detailed inspection if the notches are not found. The pads and rotors should be measured and compared against the manufacturer's specifications located in the brake manufacturer's service manual.

INSPECT DISC BRAKE CALIPER FOR RUNNING CLEARANCE

WARNING

DO NOT attempt to diagnose, correct, or repair any vehicle issue related to the high-voltage electrical system or its components. The high-voltage electrical system is capable of producing dangerous electric shock and burns. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Regularly inspect caliper for Running Clearance:

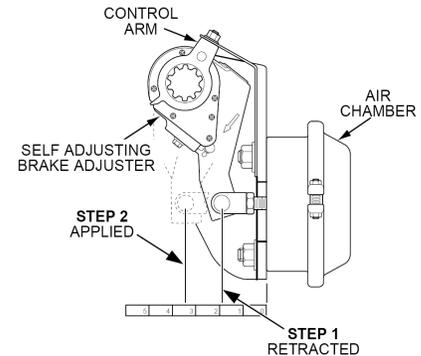
1. Wear safe eye protection.
2. Park the vehicle on a level surface and chock the wheels.
3. Temporarily release the parking brake.
4. Grab the caliper and move it. This movement is Running Clearance.
5. Proper Running Clearance is 0.08 in. (2 mm) of movement of the brake caliper (approximately the thickness of a nickel) in the inboard/outboard direction.

Result:

Have a qualified technician provide further inspection if the caliper does not move or appears to move more than the specified clearance.

10.3 Auto Slack Adjuster

The auto slack adjuster is a mechanism to maintain the correct amount of space between the braking surface and the friction material.



1. Retracted position, no brake pedal applied
2. Applied position, brake pedal engaged

11 CAB MAINTENANCE

11.1 Cab Maintenance

Cab exterior, interior, and frame components need maintenance to ensure longevity and safe operations. A clean vehicle also allows leaks to be detected easier.

 **WARNING**

DO NOT perform any repair while the vehicle is connected to a charger. Orange high-voltage (HV) cables stay energized unless the battery Manual Service Disconnect (MSD) fuses are removed. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

Never pressure wash any part of the high-voltage electrical system, electric powertrain or components. Extreme water pressure can damage electrical components. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

Always allow hot surfaces to cool down before attempting to work near them. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

Handle cleaning agents carefully. Cleaning agents may be poisonous. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

DO NOT use gasoline, kerosene, naphtha, nail polish remover, or other volatile cleaning fluids. They may be toxic, flammable, or hazardous in other ways. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

DO NOT clean the underside of chassis, fenders, wheel covers, etc. without protecting your hands and arms. You may cut yourself on sharp edged metal parts. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Vehicle Cleaning

- Observe all caution labels.
- Always read directions on the container before using any product.
- Do not use any solution that can damage the body paint.
- Most chemical cleaners are concentrates that require dilution.
- Only use spot removing fluids in well ventilated areas.
- Any vehicle is subjected to deterioration from multiple causes (i.e. industrial fumes, ice, snow, corrosive road salt, etc.).

Exterior and Under-Hood Compartment

Corrosive materials used to remove ice, snow and dust from the road can collect on the entire vehicle with concentrated accu-

mulations throughout the under-body and under-hood compartment. If these materials are not removed, accelerated corrosion (rust) can occur on under-body parts such as frame rails, floor pan, electrical and air system, even though they have been provided with corrosion protection.

At least every spring, flush these materials from the entire vehicle, including the under-body and under-hood compartment, with plain water using light water pressure. On vehicles used in applications and/or areas that experience high usage of, or exposure to, corrosive materials, cleaning of the entire vehicle should be done more frequently. If desired, your dealer can do this service for you.

 **WARNING**

DO NOT direct high pressure water onto electrical components, plug connectors, seals, or flexible hoses. High pressure water is more likely to affect components or be introduced into closed systems. This can accelerate corrosion, degrade electrical components, or contaminate system lubricants and fluids. Failure to comply may result in death, personal injury, equipment damage, or property damage.

To prevent rust, keep chromed parts clean and protected with wax at all times, especially in winter conditions when the roads are salted.

- If necessary, use a commercial chrome cleaner to remove light rust.
- Chrome surfaces are best cleaned with fresh water. Wipe dry to preserve their luster. A commercial chrome cleaner will remove light rust. After cleaning, wax flat surfaces and apply a thin coat of rust preventive lubricant around bolts or other fasteners.
- Clean aluminum wheels and bumpers with cool water. Tar-remover will get rid of heavy deposits of road grime. To prevent spotting, wipe aluminum surfaces dry after washing.
- Under corrosive conditions, such as driving on salted roads, clean aluminum parts with steam or high-pressure water from a hose. A mild automotive soap solution will help. Rinse thoroughly.

A non-abrasive chrome polish can be used sparingly on hard-to-clean areas. DO NOT clean your high-heat chrome using scouring pads, abrasive chrome polish, highly acidic chemical cleaners or any other abrasive cleaners.

Even high quality stainless steel parts can rust under prolonged exposure to salt water, especially when the salt-laden moisture is held against the metal surface by road grime. It is important to frequently clean salty moisture and grime from stainless steel surfaces.

- If surface rust is encountered, wash the surface and use a commercial polishing compound to clean off the rust, followed by a coating of wax.
- Never use steel wool when cleaning stainless steel. Minute particles of the steel wool can become embedded in the surface of the stainless steel part and cause rust staining.

Weather Stripping

 **WARNING**

Never pressure wash any part of the high-voltage electrical system, electric powertrain or components. Extreme water pressure can damage electrical components. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Frequent washing of the vehicle is required to remove road grime and contaminants that can stain and oxidize paint and accelerate corrosion of plated and polished metal surfaces. Waxing offers added protection against staining and oxidation. DO NOT apply wax in the hot sun and DO NOT friction burn the paint with a buffing machine. Occasionally spray weather-stripping on doors and windows with silicone compound to help preserve resiliency. This is especially useful in freezing weather to prevent doors and windows from sticking shut with ice.

i NOTE

To allow enough time for your vehicle's finish to cure, wait at least thirty days after the date of manufacture before waxing.

Cleaning Interior Vinyl and Upholstery

i NOTE

Strong cleaning agents such as hand sanitizer, solvents, paint thinners, and window cleaner must never be used on your vehicle's interior. Repeated exposure to chemicals such as sun-

screen, insect repellents containing DEET, or brake fluid may cause accelerated wear, tackiness, or discoloration of interior surfaces.

Wipe vinyl upholstery and lining with a good commercial upholstery cleaner. DO NOT use acetone or lacquer thinner. Clean fabric upholstery with upholstery shampoo specially formulated for this purpose.

- First remove loose dirt, dust or debris with a vacuum cleaner.
- Use a soft brush to loosen caked-on dirt before vacuuming it away.
- Wipe the fabric surface with a slightly damp cloth and dry the seat fabric thoroughly. If the fabric is still dirty, wipe using a mixture of mild soap and lukewarm water, then dry thoroughly.
- If the stain does not come out use an upholstery shampoo specially formulated for this purpose. Test the cleaner on a hidden place to make sure it does not harm the fabric. Follow the instructions on the container.

Other interior surfaces may be cleaned using a mixture of mild soap and lukewarm water, or an automotive interior cleaner,

used on its intended surface (i.e., use leather conditioner on leather surfaces, etc.).

Avoid frequent or repeated use of the following products on interior surfaces:

- Alcohol-based cleaners (including hand sanitizer)
- Methanol-based cleaners
- Bleach
- Acetone
- Any other strong solvent
- Abrasive cleaners
- Sunscreen

11.2 Washing the Exterior of the Vehicle

Required tools:

- Car wash solution
- Clean, soft cloth or a soft brush
- Automotive wax

⚠ WARNING

Handle cleaning agents carefully. Cleaning agents may be poisonous. Failure to comply may result in death,

personal injury, equipment damage, or property damage.

 **WARNING**

DO NOT use gasoline, kerosene, naphtha, nail polish remover, or other volatile cleaning fluids. They may be toxic, flammable, or hazardous in other ways. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

DO NOT clean the underside of chassis, fenders, wheel covers, etc. without protecting your hands and arms. You may cut yourself on sharp edged metal parts. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

Moisture, ice, and road salt on brakes may affect braking efficiency. Test the brakes carefully after each vehicle wash. Failure to comply may result in

death, personal injury, equipment damage, or property damage.

 **WARNING**

DO NOT aim the water jet directly at a door lock or latch and tape over the key holes to prevent water from entering. An occupant could become trapped in the vehicle if water seeps into the lock cylinder and freezes. Prevent locks from freezing in the winter by squirting glycerin or lock deicer into the lock cylinders. If water should seep in, remove it with compressed air. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

Never pressure wash any part of the high-voltage electrical system, electric powertrain or components. Extreme water pressure can damage electrical components. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Your dealer has a number of vehicle-care products and can advise on which ones to use for cleaning the exterior and interior of the vehicle.

1.

 **WARNING**

DO NOT direct high pressure water onto electrical components, plug connectors, seals, or flexible hoses. High pressure water is more likely to affect components or be introduced into closed systems. This can accelerate corrosion, degrade electrical components, or contaminate system lubricants and fluids. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Begin by spraying water over the dry surface to remove all loose dirt before applying the car wash solution.

- DO NOT wash the vehicle in direct sunshine.
 - DO NOT spray water directly into the cab vents.
2. Using soapy water, wash the vehicle with a clean soft cloth or a soft brush

made for automotive cleaning.

- Use cool water and a mild, automotive-type soap. Strong industrial detergents, cleaning agents and household-type soaps are not recommended and may damage the vehicle's paint.
 - DO NOT use stiff brushes, paper towels, steel wool, or abrasive cleaning compounds because they will scratch painted, plated, and polished metal surfaces.
3. Rinse painted surfaces with gentle water pressure frequently while washing to flush away dirt that might scratch the finishes during the washing operation.

4.



WARNING

DO NOT direct high pressure water onto electrical components, plug connectors, seals, or flexible hoses. High pressure water is more likely to affect components or be introduced into closed systems. This can accelerate corrosion, degrade electrical components, or contaminate system lubricants and fluids. Failure to comply may result in death, per-

sonal injury, equipment damage, or property damage.

- Hose dirt and grime from the entire chassis.
5. Wipe everything dry with a chamois to avoid water spots. To prevent water spotting, dry off the cosmetic surfaces with a clean cloth or chamois.
 6. Remove road tar with an automotive-type tar remover or mineral spirits.
 7. After cleaning and drying the entire vehicle, apply a quality automotive wax to protect the vehicle's finish.

11.3 Cleaning Screen



CAUTION

DO NOT spray water or cleaning solution directly onto the screen. Liquid dripping or permeating through the edges of the screen can cause a short circuit, component breakdown, and lead to screen malfunction. Failure to comply may result in equipment or property damage



CAUTION

DO NOT use cleaners that contain alcohol or ammonia. These can strip protective coatings from the screen and cause cracking or yellowing. Failure to comply may result in equipment or property damage.

To clean the screen, dampen a clean, soft, and lint-free cloth with water only. A mild glass cleaner that does not contain alcohol or ammonia may also be used. Cleaners that contain alcohol or ammonia will eventually dry out, crack, and "yellow" the screen. Wipe the screen back and forth gently. You can also use a commercial cleaner specially designed for LCD screens.

12 CAB STRUCTURE, DOORS, AND HOODS



WARNING

DO NOT perform maintenance on high-voltage (HV) cables. A PACCAR trained technician is required for service. Please contact an authorized EV service certified dealership for ser-

vice. Be mindful of the location of HV cables and components when working around the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Lubricate the lower hood pivot (only if lube fittings are present).

13 SETTING TRAILER END LINE

Required tools:

- Traffic cone or triangle

i NOTE

Before starting this procedure, locate a physical reference object like a traffic cone or triangle.

The Digital Vision System with Mirrors (DVS-M)/Digital Mirrors (DM) displays a line on the monitors to visually represent the end location of the trailer. Because overall combination vehicle lengths can vary, this line position is user adjustable. The line must be adjusted each time the overall vehicle length changes.

The Digital Vision System with Mirrors (DVS-M)/Digital Mirrors (DM) also automatically detects when an electrical truck-to-trailer connection is made and informs the operator with the following on-screen message: **Trailer Detected. Is Trailer End Line correct?**

The choices are:

- **Yes**
- **Adjust**

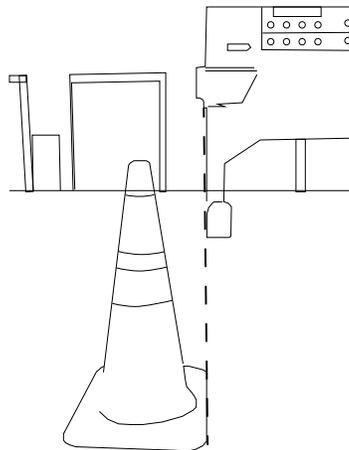
If “Yes” is selected, the pop-up message disappears and the system returns to the last active view mode and is ready for driving. If “Adjust” is selected, the end line adjustment screen goes active and the operator is permitted to set the end line using the following guided process.

1. Set parking brake.

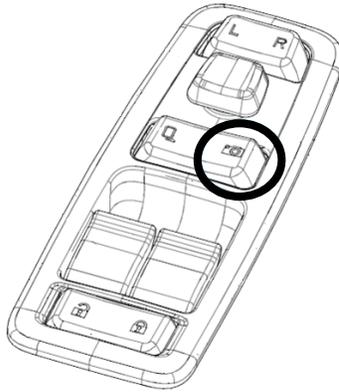
i NOTE

Trailer End Line Adjustments are found in the menu which can only be accessed with the parking brake engaged.

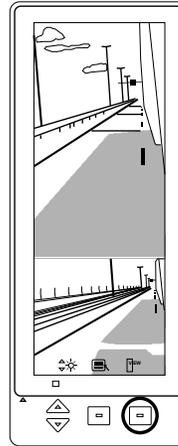
2. Place a physical object for reference (like a traffic cone or triangle) at the end of the trailer.



3. Make sure the toggle on the Door Control Module is set to camera mode.



4. Use the left and right toggle on the Door Control Module to switch monitor sides. If the driver's monitor has a green outline, it means that monitor is selected.
5. Ensure the monitors are in "Traditional View". To cycle through the display views use the right button on the driver side monitor.



i NOTE

Traditional view is when the upper and largest area of the monitor shows an image similar to that of a traditional flat-glass physical mirror, while the lower smaller portion shows a view similar to a convex bubble mirror.

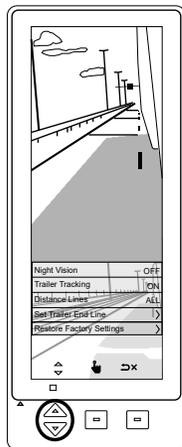
6. Enter the Digital Vision System with Mirrors (DVS-M)/Digital Mirrors (DM) menu by selecting the center button.

7.

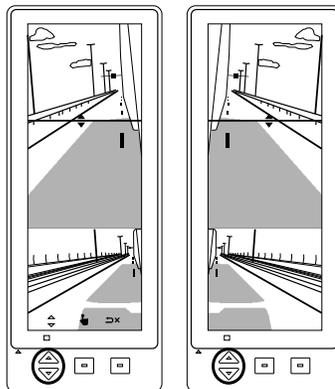
! WARNING

Correct trailer end line setting is essential for the monitor displays to provide reliable information to the driver. Failure to ensure the end line setting is accurate before using the monitors to operate the vehicle may result in death, personal injury, equipment or property damage.

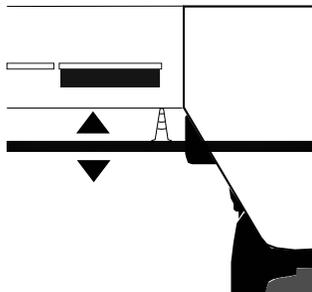
Use the up and down arrow buttons until "Set Trailer End Line" is highlighted in blue.



8. Press and release the center button to enter "Set Trailer End Line".
9. Confirmation that you have entered "Set Trailer End Line" is the red lines on both monitors move together.



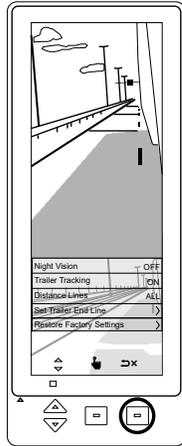
10. Use the arrow buttons to position the red line to end of trailer (aligned to where the reference object contacts the ground).



i NOTE

Best practice is to position top of the trailer end line at the base of the reference object.

11. To set and record the new trailer end line, press and release the center button.
12. The system returns to the Digital Vision System with Mirrors (DVS-M)/ Digital Mirrors (DM) menu and the three trailer distance lines appear on screen. If no other system changes are desired, press the right (back) button to exit the menu.



13. The system is now ready for use.

14 SAFETY RESTRAINT SYSTEM - INSPECTION

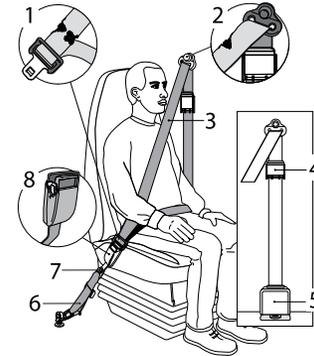
WARNING

Periodically inspect and maintain the safety restraint system. Safety restraint components can wear out and no longer protect the occupant in the event of an accident. Failure to comply may

result in death, personal injury, equipment damage, or property damage.

WARNING

If the vehicle has been in an accident, all safety restraints and safety restraint systems must be replaced, regardless of accident severity or whether the restraint was in use at the time of the accident. Visible and non-visible damage or wear can reduce the effectiveness of the safety restraint and may lead to restraint failure. Failure to comply may result in death, personal injury, equipment damage, or property damage.



1. Web cut or frayed or extremely worn at latch area
2. Web cut or frayed at D-loop web guide
3. Web for deterioration, due to exposure to the sun
4. Comfort Clip cracked or damaged
5. Retractor Web Storage for damage (located behind trim panel)
6. Tethers for web wear and proper tightness of mounting hardware
7. Mounting hardware for corrosion, proper tightness of bolts and nuts
8. Buckle casting broken

Factors contributing to reduced seat belt life:

- Heavy trucks typically accumulate twice as many miles as the average passenger car in a given time period.
- Seat and cab movement in trucks causes almost constant movement of the belt due to ride characteristics and seat design. The constant movement of the belt inside the restraint hardware and the potential for the belt to come in contact with the cab and other vehicle parts, contributes to the wear of the entire system.
- Environmental conditions, such as dirt and ultraviolet rays from the sun, will reduce the life of the seat belt system.

Due to these factors, the three-point seat belt system installed in your vehicle requires thorough inspection every 20,000 miles (32,000 km). If the vehicle is exposed to severe environmental or working conditions, more frequent inspections may be necessary. Any seat belt system that shows cuts, fraying, extreme or unusual wear, significant discoloration due to UV (ultraviolet) exposure, abrasion to the seat belt webbing, or damage to the buckle, latch plate, retractor hardware, or any other obvious problem should be replaced immediately, regardless of mileage.

Inspection Guidelines

Follow these guidelines when inspecting for cuts, fraying, extreme or unusual wear of the webbing, and damage to the buckle, retractor, hardware, or other factors. Damage to these areas indicates that seat belt system replacement is necessary.

 **WARNING**

Replace the entire belt system (retractor and buckle side) if any part needs replacement. Hidden damage to components could prevent the system from functioning properly when needed. Failure to comply may result in death, personal injury, equipment damage, or property damage.

1. Check the web wear in the system. The webbing must be closely examined to determine if it is coming into contact with any sharp or rough surfaces on the seat or other parts of the cab interior. These areas are typical places where the web will experience cutting or abrasion. Cuts, fraying, or excessive wear would indicate the need for replacement of the seat belt system.
2. The pillar web guide (D-loop) is the area where almost constant movement

of the seat belt webbing occurs because of relative movement between the seat and cab.

3. Check the Komfort Latch for cracks or possible damage and check for proper operation.
4. Check buckle and latch for proper operation and to determine if latch plate is worn, deformed, or damaged.
5. Inspect the retractor web storage device, which is mounted on the floor of the vehicle, for damage. The retractor is the heart of the occupant restraint system and can often be damaged if abused, even unintentionally. Check operation to ensure that it is not locked up and that it spools out and retracts webbing properly.
6. If tethers are used, be sure they are properly attached to the seat and, if adjustable, that they are adjusted in accordance with installation instructions. Tethers must also be inspected for web wear and proper tightness of mounting hardware.
7. Mounting hardware should be evaluated for corrosion, and for tightness of bolts and nuts.
8. Check web in areas exposed to ultraviolet rays from the sun. If the color

of the web in these areas is gray to light brown, the physical strength of the web may have deteriorated due to exposure to the sun's ultraviolet rays. Replace the system.

Once the need for replacement of the seat belt has been determined, be certain it is only replaced with an authorized PACCAR Parts replacement seat belt. If the inspection indicates that any part of the seat belt system requires replacement, the entire system must be replaced. An installation guide is attached to every replacement belt. Utilize the proper guide for your type of seat, and follow the instructions very closely. It is vitally important that all components be reinstalled in the same position as the original components that were removed and that the fasteners be torqued to specification. This will maintain the design integrity of the mounting points for the seat belt assembly. Contact your dealer if you have any questions concerning seat belt replacement.

15 COOLING SYSTEM MAINTENANCE

15.1 Cooling System Maintenance

The cooling system in your vehicle was factory filled with coolant that meets or exceeds standard specifications. PACCAR recommends only using a 50/50 mixture of distilled water and Delo® when cooling system service is required. A 50/50 mixture of Delo® and distilled water will provide freeze protection down to -34°F (-36.7°C), which is adequate for most locations in North America. For extremely cold operating conditions, a 60/40 mixture (coolant/water ratio) can be used to provide freeze protection down to -62°F (-52.2°C).

Unless otherwise optioned, factory fill coolant is an ethylene glycol formulation at a 50:50 coolant-to-distilled water mixture. Maintaining coolant chemistry and freeze protection is critical to PCAS and cooling system component health and longevity.



WARNING

DO NOT touch, inhale, or consume antifreeze or coolant. If antifreeze/

coolant comes into contact with eyes, rinse thoroughly with water for 15 minutes. If there is prolonged or repeated contact with skin, immediately wash skin with soap and water. If antifreeze/coolant is consumed, seek immediate medical attention. DO NOT induce vomiting. Failure to comply may result in death, personal injury, equipment damage, or property damage.



CAUTION

Always use a genuine PACCAR coolant filter. Genuine PACCAR filters comply with component specifications and will optimize coolant system operation. Use of non-genuine PACCAR coolant filter can cause severe damage to vehicle components. Failure to comply may result in equipment or property damage.



NOTE

Coolant is harmful to the environment. Unused coolant must be stored as a toxic hazardous material in leak-proof containers. Used coolant must be processed as industrial chemical waste.

Please follow HAZMAT guidelines with both used and unused coolants.

Concentration

Check the level of freeze/boil-over protection, which is determined by the glycol concentration. Use a glycol refractometer to determine glycol level. Add coolant to obtain the coolant/water ratio required to provide the protection you need. A 50:50 mix of coolant and water is adequate for most applications. For extremely cold operating conditions, the ratio can be adjusted to a higher concentration of coolant.

Table 11: Glycol Concentration Level

Level	Desired Coolant/ Water Ratio	Freeze Point °F (°C)
Recom- mended Levels	40%	-12 (-24)
	45%	-23 (-31)
	50%	-34 (-37)
	55%	-50 (-46)
	60%	-62 (-52)

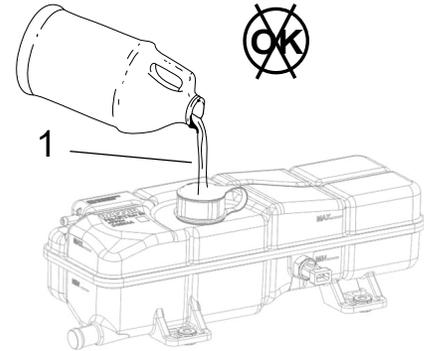
Condition

Perform a visual inspection of the coolant. It should have no cloudiness or floating debris. Determine the chemical inhibitor concentration level by using a test kit or test strips. Inhibitor concentration level determines corrosion protection. If there is concern about possible coolant quality, contamination, or mechanical problems, submit a coolant sample for analysis. Improper maintenance may cause coolant degradation and could result in damage to the cooling system and PCAS components. Consult a dealer or the coolant manufacturer's representative for recommended test kits, test strips, and laboratory sample procedures.

Checking Coolant Level

Check the coolant level daily. When adding coolant, avoid mixing different brands and formulations. If the coolant is mixed with more than 25% of a different formulation, component corrosion damage can occur. If mixing exceeds 25% of total system volume, it is recommended to flush and refill the system completely with one type of coolant.

Cooling System Sealing Additives and Soluble Oils



1 Do not use soluble oils or sealing additives.

CAUTION

The use of sealing additives or soluble oils in the cooling system can cause damage to the PCAS and e-motor. These additives can plug various areas of the radiator and oil cooler. The plugging of the cooling system can hamper heat transfer, causing internal motor damage. DO NOT use sealing additives

or soluble oils in the cooling system. The use of sealing additives can

- Build up in coolant low-flow areas
- Plug the radiator and oil cooler
- Damage to coolant pump seals
- Damage heat transfer surfaces
- Damage seals and hoses
- Corrode brass and copper

Failure to comply may result in equipment or property damage.

15.2 Coolant Level Inspection

WARNING

Electric vehicles utilize a high-voltage electrical system that has the potential to cause severe injury or death if proper safety precautions are not followed. Carefully read and understand all instructions and hazard alert messages. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

DO NOT perform maintenance on high-voltage (HV) cables. A PACCAR trained technician is required for service. Please contact an authorized EV service certified dealership for service. Be mindful of the location of HV cables and components when working around the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

DO NOT touch or attempt to remove any of the orange high voltage (HV) cables, connectors, or components for any reason. **If asked to inspect HV component or cabling, only inspect visually.** Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

DO NOT perform any repair while the vehicle is connected to a charger. Orange high-voltage (HV) cables stay

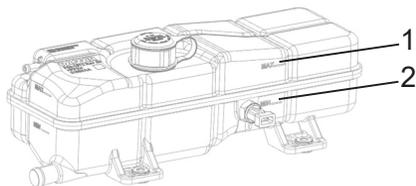
energized unless the battery Manual Service Disconnect (MSD) fuses are removed. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Inspect the vehicle's coolant surge tanks for proper coolant level. Add coolant if the level in the tanks is below the line marked as **MIN**.

The power electronic coolant surge tank is mounted in the Power Controls and Auxiliary Systems (PCAS). The fluid levels are visible when opening the hood.

The minimum fluid level is determined by the line on the surge tank indicated by the letters **MIN**. The cooling system will need to be filled if the level is not above the **MIN** line, regardless of motor, fans, and power electronic components temperature.

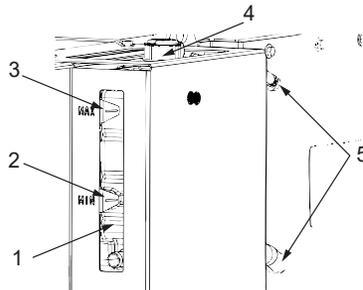
Figure 44: Power Electronic Coolant Surge Tank



- 1 Max level indicator
- 2 Min level indicator

Check the coolant level on the high-voltage (HV) batteries with the level indicators on the outboard side of the surge tank, or through the deck plate. Deck plate access is not available for all configurations. Locate the surge tank at the upper left side of the back of cab (BOC) batteries. The surge tank can also be mounted to the cab support for under cab configurations. Refer to [Deck Plate Access](#) for more information.

Figure 45: HV Battery Surge Tank Coolant Levels



- 1 HV battery coolant surge tank ¹
- 2 Min level indicator ²
- 3 Max level indicator
- 4 Battery coolant surge tank's fill cap
- 5 HV battery coolant lines

- 1 No other component of the system except the high-voltage battery coolant surge tank should be touched by the operator.
- 2 If the coolant level is below the Min level, fill the reservoir to the Max level.

15.3 Radiator Hoses Inspection

WARNING

DO NOT perform any repair while the vehicle is connected to a charger. Orange high-voltage (HV) cables stay energized unless the battery Manual Service Disconnect (MSD) fuses are removed. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

DO NOT perform maintenance on high-voltage (HV) cables. A PACCAR trained technician is required for service. Please contact an authorized EV service certified dealership for service. Be mindful of the location of HV cables and components when working around the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Perform this procedure for radiator hoses inspection:

1. Visually check the following radiator hose conditions:
 - Deterioration/signs of leaking

- Hose clamp torque

16 DRIVER ASSISTANCE MAINTENANCE

16.1 Driver Assistance Maintenance

Cameras, radars, and sensors need maintenance to ensure longevity and safe operation. Clean components of the system allow the driver to operate the vehicle safely.

WARNING

Follow the daily maintenance tasks for the components of the driver assistance system to ensure a safe operation. Failure to comply may result in death, personal injury, equipment damage, or property damage.

16.2 Camera

- Inspect and keep the camera clean to ensure a clear view of the road ahead.
- Protect the camera lens whenever the inside of the windshield is cleaned.

Within the viewing area of the camera the windshield has to be free of visible scratches and injuries.

16.3 Radar Sensor

- Inspect and keep the radar front and windshield clean and free of obstructions.
- Inspect for damage to the bumper and radar to ensure that the alignment has not been compromised. Never use the radar unit as a step.

WARNING

In cases where the bumper, radar and/or windshield have sustained any damage, are misaligned, or if the device is suspect for tampering, DO NOT use the active cruise control until the vehicle has been repaired and the radar realigned. In addition, an indicator on the dash typically will illuminate if the system detects any of these conditions. Failure to comply may result in death, personal injury, equipment damage, or property damage.

CAUTION

The installation of aftermarket deer guards, bumper guards, snow plows, or similar potential obstructions is not recommended and could impair the operation of the radar. Failure to comply may result in equipment or property damage.

16.4 ECU - Bendix SDP5

- Refer to the Bendix manual provided with your vehicle.
- Protect the processor from damage and displacement from its set location in the overhead compartment.

17 ELECTRICAL SYSTEM

17.1 Electrical System

WARNING

Electric vehicles utilize a high-voltage electrical system that has the potential to cause severe injury or death if proper safety precautions are not followed. Carefully read and understand all instructions and hazard alert mes-

sages. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

Never assume a Battery Electric Vehicle (BEV) is powered down without verifying it. BEVs can move with little to no sound. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

DO NOT attempt to diagnose, correct, or repair any vehicle issue related to the high-voltage electrical system or its components. The high-voltage electrical system is capable of producing dangerous electric shock and burns. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Wash hands after handling. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **CAUTION**

DO NOT perform any repair to the vehicle electrical system including the power distribution box. Please contact or take the vehicle to an authorized EV service certified dealership for service. Improper repair or modification will void your warranty and cause serious damage to your vehicle. Failure to comply may result in equipment damage or property damage.

17.2 Low-Voltage Disconnect (LVD)

 **WARNING**

Electric vehicles utilize a high-voltage electrical system that has the potential to cause severe injury or death if proper safety precautions are not followed. Carefully read and understand all instructions and hazard alert messages. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

DO NOT attempt maintenance or repair work on the e-powertrain system. The only tasks that can be performed by an operator on this system are visual inspections. Only an EV service certified dealership is authorized to service the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

The Low-Voltage Disconnect (LVD) may increase battery life and avoid depleting the battery below the minimum charge needed to start the vehicle by shutting off non-vital battery loads.

When battery voltage drops below the LVD setting, LVD starts a two-minute countdown. If battery voltage remains below the LVD setting and the vehicle is not started, when the countdown ends, all non-vital battery loads (hotel loads) will be shut off. The LVD setting is adjusted in the Settings sub-menu of the Digital Display.

When battery voltage drops below the LVD setting,

1. An amber LVD notification occurs, accompanied by an audible warning. This starts the two-minute countdown.
2. Thirty seconds before the countdown ends, the Battery Voltage indicator is replaced by the amber (or red) LVD telltale. On the 15-in display, LVD telltale color depends on the severity of battery depletion. The LVD notification will turn red and will be accompanied by a continuous audible warning.
3. When the two-minute countdown has ended, the LVD "Hotel Loads Disconnected" notification appears, and LVD shuts off all loads connected through the LVD system.



The LVD condition will not clear until battery voltage increases above the LVD setting or the vehicle is started.

Electrical loads shut off by LVD

- Cab dome lamps
- Cab accessories
- Spare LVD wiring for customer added accessories

i NOTE

The determination of what circuits/loads that were connected to the LVD was based upon the recommendation from Technology and Maintenance Council (TMC) of the American Trucking Association. To review the recommended practice, see TMC RP-136.

i NOTE

Low-voltage battery cables are black or red.

17.3 Fuses, Circuit Breakers and Relays

FUSES, CIRCUIT BREAKERS AND RELAYS

Fuses, circuit breakers, and relays are located in the Power Distribution Center (PDC), mounted into the Cab firewall.

FUSES LOCATION

⚠ WARNING

Electric vehicles utilize a high-voltage electrical system that has the potential to cause severe injury or death if proper safety precautions are not followed. Carefully read and understand all instructions and hazard alert messages. Failure to comply may result in death, personal injury, equipment damage, or property damage.

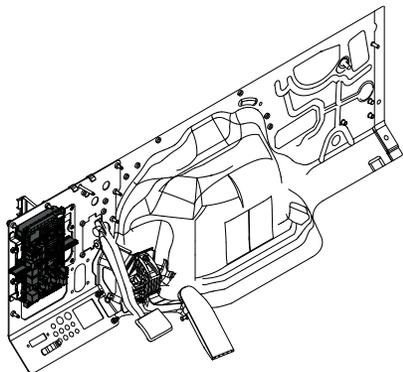
⚠ WARNING

DO NOT attempt to diagnose, correct, or repair any vehicle issue related to the high-voltage electrical system or its

components. The high-voltage electrical system is capable of producing dangerous electric shock and burns. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

The 12 V battery box is mounted onto the right-hand frame rail and the 12 V fuses are located in the cab Power Distribution Center (PDC) which is mounted into the cab firewall.

Figure 46: Fuse Panel Location



INSPECTING AND REPLACING A FUSE

Turn off the vehicle and turn off all lights. Locate the 12 V fuses in two locations: the Power Distribution Center (PDC) mounted to the cab firewall and the 12 V battery box mounted on the right-hand frame rail.

WARNING

Only replace a fuse with one of the correct size and amperage rating. Installing a fuse of the wrong rating may cause serious electrical damage or result in a thermal event. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

Never install a circuit breaker/polyswitch in a location indicated for "fuse only." Using a polyswitch (circuit breaker) in a fuse-only circuit may cause the circuit to overheat in the event of a short. Failure to comply may result in death, personal injury, equipment damage, or property damage.

CAUTION

If a circuit keeps blowing fuses, have the electrical system inspected for a short circuit or overload by an authorized dealer. Delaying could cause serious damage to the electrical system or vehicle. Failure to comply may result in equipment or property damage.

CAUTION

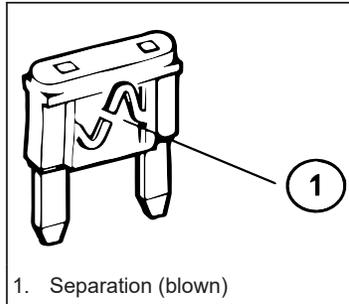
Before replacing a fuse, turn OFF all lights and accessories and remove the key from the start switch to avoid damaging the electrical system. Failure to comply may result in equipment or property damage.

All the electrical circuits have a 12 V battery box located on the right-hand frame rail, and 12 V fuses located in the cab PDC to protect them from short-circuiting or overloading. If an electrical component on the chassis stops working, the first thing to check for is a blown fuse.

1. Turn OFF all lights and accessories and turn OFF the vehicle to avoid damaging the electrical system.
2. Determine from the chart on the

fuse panel which fuse controls that component.

- If the circuit has a fuse, remove the fuse and see if it is blown.
- If the circuit has a polyswitch, have your electrical system inspected by a BEV service facility.



3.

WARNING

Always use an approved Type II modified reset polyswitch (circuit breaker) with a current rating equal to or less than the polyswitch being replaced. Never use a Type I (automatic reset) or Type III (manual reset) polyswitch. Use of an improper polyswitch can

result in a temperature increase along the electrical path causing severe damage to the electrical system. Failure to comply may result in death, personal injury, equipment damage, or property damage.

If the fuse is blown, replace it with a fuse of the same rating. If a fuse of the same rating is not available, a fuse of a lower rating may be temporarily substituted. You can also use a fuse from a circuit you can do temporarily without (for example an accessory circuit or radio).

NOTE

A fuse with a current rating equal to or less than the polyswitch (circuit breaker) being replaced can also be used.

17.4 Altering the Electrical System

WARNING

Perform only visual inspections and report any damaged, unsecured or otherwise hazardous concerns with the high-voltage system. If cabling is damaged or unsecured please contact an authorized EV service certified dealership for service. DO NOT make contact with high-voltage cabling. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

Improper handling, repair, assembly, or inspection practices can expose you to levels of electrical current that have the potential to cause severe injury or death if proper safety precautions are not followed. Failure to comply may result in death, personal injury, equipment damage, or property damage.

⚠ WARNING

Only replace a fuse with one of the correct size and amperage rating. Installing a fuse of the wrong rating may cause serious electrical damage or result in a thermal event. Failure to comply may result in death, personal injury, equipment damage, or property damage.

⚠ WARNING

Never install a circuit breaker/polyswitch in a location indicated for “fuse only.” Using a polyswitch (circuit breaker) in a fuse-only circuit may cause the circuit to overheat in the event of a short. Failure to comply may result in death, personal injury, equipment damage, or property damage.

⚠ CAUTION

Follow all manufacturers' circuit protection recommendations for added wires or components. Failure to comply may result in equipment or property damage.

i NOTE

If you are unfamiliar with proper electrical repair practices and procedures, see your authorized dealer for assistance.

i NOTE

Only authorized BEV technicians can service this vehicle.

17.5 Vehicle CAN Bus

Your vehicle is equipped with a CAN bus electrical system. Because of how the electrical system is designed it is important that any accessories added after the vehicle is built are installed only on the K-CAN or the S-CAN. These dedicated CANs are provided on the driver's side of the cab, near to the interior fuse panel. Access to the K-CAN and S-CANs is provided by two RP1226 connectors. DO NOT tap into, connect to, tamper with, or splice into any CAN network other than the K-CAN or the S-CAN. Connecting to a unapproved CAN network may trigger CAN fault codes.

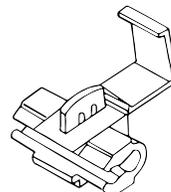
⚠ CAUTION

Connecting to an unapproved CAN network may trigger CAN fault codes. The manufacturer will not warrant failures or damage caused to CAN network components when the failure or damage is a result of improper connections to the CAN network. Failure to comply may result in equipment or property damage.

⚠ CAUTION

The use of scotch locks, scraped off insulation, or electrical tape are not approved CAN connection techniques. These are the sources of numerous CAN faults, short circuits, wiring failures, and malfunctioning connections. Failure to comply may result in equipment damage or property damage.

Figure 47: Scotch locks



 **NOTE**

Access to BEV-specific CANs requires special diagnostic harness(es).

17.6 Low Voltage Batteries

LOW VOLTAGE BATTERIES

Regular attention to the charging system will help prolong the service life of the batteries.

 **WARNING**

DO NOT ignore any safety procedure as the battery can overheat and catch fire or explode. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

Never remove or tamper with battery caps. Ignoring this could allow battery acid to contact eyes, skin, fabrics, or painted surfaces. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **CAUTION**

DO NOT store items (such as tools or equipment) in the battery box. Storing items in the battery box could damage the batteries or vehicle. Failure to comply may result in equipment or property damage.

 **CAUTION**

When reinstalling batteries, ensure the new battery cable routings are free from chafing, and DO NOT overtighten the battery tie-downs. Always replace the battery cover. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Some common causes of battery failure are:

- Overcharge: this condition results from improper voltage regulator adjustment. It results in overheating of the battery, warped plates, and evaporation of electrolyte.
- Undercharge: if your vehicle has undergone long periods of inactivity or short distance driving. These conditions result in battery plates

becoming covered with a hard coating.

- Vibration: loose battery hold-downs may cause battery plate failure.
- Short circuits: these discharge the battery by draining electricity.
- Dirty or loose connections: improper connections may stop the flow of electrical power to and from the battery.

Low Voltage Battery Charging

 **WARNING**

Batteries can injure you severely. They contain acid, produce poisonous and explosive gases, and supply levels of electric current high enough to cause burns. A spark or flame near a battery on charge may cause it to explode with great force. Never remove or tamper with the battery caps. Failure to comply may result in death, personal injury, equipment damage or property damage.

The recommended maximum current for the low voltage batteries are the following:

- Odyssey PC2150 AGM – 100A per battery
- East Penn AGM – 33A per battery

Only trickle charge the batteries to maintain battery condition. Have the batteries fully deep-charged by a qualified service facility. To help reduce the risk of personal injuries, follow these guidelines carefully when recharging a battery:

- Before attempting any service in the electrical installation, disconnect the battery negative cable.
- Allow no sparks or open flame anywhere near the charging area.
- Trickle charge a battery only in a well-ventilated area such as outdoors or in a fully open garage. No open flames, including pilot lights can be present. Allow explosive gases generated during the charging process to escape.
- Always make sure that the battery charger is OFF before connecting or disconnecting the cable clamps.
- Never store or rest metal tools like jumper cables close to the battery. Metal must not come in contact with the positive battery terminal while also touching any other metal on the vehicle. The vehicle's body and frame are the electrical systems ground. Accidentally connecting the positive terminal directly to the frame or body could cause a short circuit and possibly an explosion.

Low-Voltage Battery Charging Reminders

- Use protective eyewear.
- Keep all batteries away from children.
- Never reverse battery poles.
- Never attempt to place the vehicle in motion with batteries disconnected.
- Keep the battery clean and dry.
- Look for any signs of damage.
- Battery terminals should not be coated with improper grease. Use a commercially available, noncorrosive, non-conductive terminal coating, or petroleum jelly.
- Never use a fast charger as a booster to start the vehicle. This can seriously damage sensitive electronic components such as relays, radio, etc., as well as the battery charger. Fast charging a battery is dangerous and should only be attempted by a competent technician with the proper equipment.

SLOW BATTERY CHARGING

Required tools:

- Charger cables
- 12 V power source

WARNING

Always connect the cables from positive to positive (+ to +) and negative to negative (- to -). Improperly attaching the cables could cause the battery to explode. Failure to comply may result death, personal injury, equipment damage, or property damage.

WARNING

Always make sure the battery charger is OFF before connecting or disconnecting the cable clamps to reduce the danger of explosions and resulting death or personal injury. DO NOT connect or disconnect charger cables while the charger is operating. Damage to the charging system may occur. Failure to comply may result in death, personal injury, equipment damage, or property damage.

NOTE

Follow the instructions that come with your battery charger.

1. Access the battery terminals, the

batteries do not have to be removed from the vehicle.

2. Make sure the battery charger is turned off.
3. Disconnect the battery cables.
4. Connect charger cables. Ensure you connect positive (+ to +) and negative to negative (- to -).
5. Start charging the battery at a rate not over 6 amperes. Normally, a battery should be charged at no more than 10 percent of its rated capacity.
6. After charging, turn OFF the charger and disconnect charger cables.

JUMP-STARTING 12 V BATTERIES

Required tools:

- Jumper cables
- 12 V power source

 WARNING
DO NOT ignore any safety procedure as the battery can overheat and catch fire or explode. Failure to comply may

result in death, personal injury, equipment damage, or property damage.

 WARNING
Heed all warnings and instructions of the jumper cable manufacturer. Failure to comply may result in death, personal injury, equipment or property damage.

 WARNING
Remove all jewelry before working on the batteries or electrical system. If jewelry or other metal comes into contact with an electrical circuit, a dangerous short circuit may occur. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 WARNING
DO NOT connect any components to the high-voltage batteries. Only low-voltage batteries can be used for jump-starting the vehicle. Failure to comply will result in death, personal injury,

equipment damage, or property damage.

 WARNING
When jump starting using a battery charger/booster, verify that the battery charger/booster is set to the same jump start voltage and amperage specifications as the vehicle electrical system and batteries (for example, if the vehicle electrical system is a 12 volt system, the jump start voltage on the battery charger/booster shall be set at no higher than a 12 volt setting). Applying a higher voltage will cause expensive damage to electronic components. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 WARNING
Never jump start a battery near fire, flames, or electrical sparks. Batteries generate gases that could explode. Keep sparks, flames, and lighted cigarettes away from batteries. Failure to comply may result in death, personal

injury, equipment damage, or property damage.

 **CAUTION**

Not following the prescribed jump-start procedure can cause serious damage to both vehicles. Failure to comply may result in equipment or property damage.

To jump-start a 12 V battery system, you can use a battery jump starter, a compatible charger, or power source that puts out 12 V. The instructions below describe a jump-start with another vehicle.

1. Select a jumper cable that is long enough to be attached to both vehicles so that the vehicles do not touch each other.
2. Position the two vehicles together, but do not allow them to touch.
3. Turn OFF all the accessories on both vehicles.
4. Set the parking brakes by pulling the park brake knob back.
5. Shift the Vehicle Mode into neutral.
6. If either vehicle is equipped with a 12 V Disconnect switch, ensure they are in the OFF position prior to

connecting the two vehicles.

7.

 **WARNING**

Always connect the cables from positive to positive (+ to +) and negative to negative (- to -). Improperly attaching the cables could cause the battery to explode. Failure to comply may result death, personal injury, equipment damage, or property damage.

Locate the positive (+) and negative (-) terminals on the discharged 12 V battery.

8. Attach one end of a jumper cable to the positive (+) terminal of the discharged (dead) battery. This terminal may have a large red + or P on the battery case, post, or clamp.
9. Attach the other end of the same cable to the positive (+) terminal of the charged battery.
10. Attach the remaining jumper cable FIRST to the negative (-) terminal (black or N) of the charged battery.
11. Attach the other end of the negative cable to the negative (-) terminal (black or N) of the discharged

battery.

12. Shift the battery disconnect switch to the ON position.
13. Start the vehicle that has the charged battery first and let it run for five minutes.
14. Start the vehicle that has the discharged battery next. The vehicle will start and is ready to operate.
15. Remove the jumper cables.

Result:

The vehicle must power on. If the vehicle fails to power on, do not continue to attempt to start the vehicle. Instead, contact the nearest EV service certified dealership. See [Service Locations](#).

17.7 High-Voltage (HV) Batteries

HV STATE OF HEALTH (SOH) CALIBRATION

The State of Health (SOH) calibration must be performed every year to increase battery life. Follow the next procedure to fully calibrate the SOH of your batteries.

1. Discharge as close to 0% SOC as possible (within 5%, but not 0%).

2. Turn the start switch off, but leave the 12 V Disconnect switch on for 90 minutes.
3. Charge to 100% in a single charge.

Result:

Once the SOH has been calibrated, ensure to fully charge or discharge your vehicle in your routine.

HV BATTERY STORAGE

Battery Storage Requirements Summary				
Storage Conditions	Duration			
	Up to 7 Days	8 to 30 Days	Over 30 Days	Any
State of Charge (SOC) (Unplugged)	40% to 70%			Any
Environment	Shaded / covered area (avoid direct sunlight)	Shaded / covered area (avoid direct sunlight)	Shaded / covered area (temperature controlled building recommended)	Temperature-controlled building
Temperature inside the battery enclosure	-22°F to 149°F (-30°C to 65°C)	-22°F to 104°F (-30°C to 65°C)	-22°F to 104°F (-30°C to 40°C)	-22°F (-30°C)
Parking brake	Engaged			
12 V disconnect switch	Closed (12 V ON) ¹			

¹ If the vehicle will be parked for multiple months, the 12 V disconnect switch needs to be OFF.

Battery Storage Requirements Actions	
Condition	Action
Every 12 months while in storage	Drive the vehicle until SOC displays 0-5%, park with 12 V disconnect switch ON for 90 minutes, and then fully charge.
If the batteries are exposed to temperatures below 32°F (0°C) or above 104°F (40°C) at any time	Plug the vehicle into a charger to bring batteries to operating temperature before driving. If the vehicle is charging properly, the charge port LED will illuminate depending on vehicle status charging and the Digital Display will activate the charging gauges. If the vehicle is not charging, do not unplug the charger. The colder the weather is, the more time the battery needs to charge. ¹

¹ Do not plug the vehicle to a charger if the vehicle has been previously exposed to an extreme temperature of -22°F (-30°C). If the vehicle reaches 70°F (21°C) when driving, park in a garage or shaded area until battery temperature decreases.

 **NOTE**

The vehicle deactivates functionalities at 0% State of Charge (SOC), but may continue to be drivable just to get to a charger or safe place to park before the vehicle shuts off.

 **WARNING**

DO NOT open the high-voltage battery enclosure for any reason. The battery packs are part of the high-voltage system and do not contain operator-serviceable items. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

17.8 Remote Keyless Entry

REMOTE KEYLESS ENTRY

 **WARNING**

DO NOT perform any repair while the vehicle is connected to a charger. Orange high-voltage (HV) cables stay energized unless the battery Manual Service Disconnect (MSD) fuses are removed. Failure to comply may result in death, personal injury, equipment damage, or property damage.

The system will lock or unlock cab doors with the key fob. The system will alert with parking lights when the selected doors are locked or unlocked. There are two key fobs provided with the system which provide secure rolling code technology that prevents someone from recording the entry signal.

If there are issues with a key fob, replace the battery and reprogram the key fob. In some situations, the key fob may need to be replaced and in others, a fuse may have failed that could render both key fobs inoperative. Contact your dealer for help if a key fob does not work and it is not because of a bad battery.

The key fob uses one CR2032, 3 V battery. Batteries should last approximately three years, depending on use. Consistently reduced range is an indicator that the battery needs replacement. Batteries commonly are available at most discount, hardware, and drug stores. The battery can be accessed by removing the cover of the key fob. After a new battery is installed, the key fob may need to be reprogrammed to pair with the vehicle. The reprogramming instructions are located on [Programming Key Fobs](#).

Table 12: Key Fob Battery

Quantity	Type
1	CR2032

REPLACING THE KEY FOB BATTERY

 **WARNING**

DO NOT perform any repair while the vehicle is connected to a charger. Orange high-voltage (HV) cables stay energized unless the battery Manual Service Disconnect (MSD) fuses are removed. Failure to comply may result

in death, personal injury, equipment damage, or property damage.

If the key fob does not unlock the doors, replace the battery.

1. Remove the cover of the key fob.
2. Replace the battery and dispose of the old battery.
3. Check to see if the key fob is still paired to the vehicle. If not, reprogram the key fob.

PROGRAMMING KEY FOBS

 **WARNING**

DO NOT perform any repair while the vehicle is connected to a charger. Orange high-voltage (HV) cables stay energized unless the battery Manual Service Disconnect (MSD) fuses are removed. Failure to comply may result in death, personal injury, equipment damage, or property damage.

The key fob may need to be paired with the vehicle when the battery is replaced or

when the key fob has not been used for an extended period of time.

1. Turn the start switch to ON position.
2. Open the driver and passenger doors.
3. Press and hold the passenger door unlock button for 5 seconds, then release it.
4. Within 3 seconds press and hold the passenger door lock button for 5 seconds, then release it. The vehicle cycle the locking system should be heard by unlocking, then relocking the doors. (This indicates that the door module has entered "learning mode.")
5. Within the next 10 seconds, press and hold the key fob lock button for 5 seconds, the vehicle lock the doors should be heard. Then, press and release the unlock button.
6. Once programming is complete (or the 10 seconds from Step 5 have passed), the vehicle will cycle the locking system twice (unlock, lock, unlock, lock). This process should be repeated for each fob to be paired with the module. A maximum of five key fobs may be paired to a single module.

18 EXTERIOR LIGHTING

18.1 Maintaining Headlight Performance

Bulb Replacement



WARNING

Never drive the vehicle with only one operating headlight. Driving with a single headlight reduces the operator's visibility of the road and the visibility of their vehicle to other drivers. Failure to comply may result in death, personal injury, equipment damage, or property damage.



NOTE

Halogen, incandescent, and HID bulbs are brightest when they are new and dim over time. For optimal performance, replace your bulbs frequently. Keep a spare or lightly used bulb in the glove compartment.

Know your vehicle headlamp type—standard Incandescent or Halogen. See [Vehicle Light Bulb Specifications](#) for headlight bulb replacement information.

- An unclear bulb indicates that it has overheated. It may perform poorly and/or be close to failure, and should be replaced as soon as possible.
- Bulbs should be replaced with a premium brand. Bulbs with the long life designation "LL" are recommended, but not required.
- When replacing a bulb, do not touch the globe with your fingers. Oil from human skin can focus the light locally, resulting in early bulb failure.
- If the access caps or fender liner are removed during the bulb replacement, they must be re-installed to protect the headlight from high pressure water spray and gravel bombardment.

Lens and Body



CAUTION

DO NOT clean the headlamp lens with solvents, abrasive brushes or substances, or petroleum products. Improper cleaning methods can break down the lens coating, which could

cloud or scratch the lens. This may result in a glare that reduces headlight performance. Failure to comply may result in equipment or property damage.

- Headlamp lenses should be cleaned with a mild, particulate-free dish soap, water, and a soft cloth. A dirty headlight reduces performance and creates glare.
- If the lens is worn to the point that it is not completely clear, the headlamp should be replaced.
- A headlamp lens should only be buffed using a professional polishing service but never more than twice.
- The headlamp lenses are designed to withstand the force of wind but should not be used to push on, or be pushed by, a solid object.
- The headlamp assembly is equipped with filtered vents to keep insects out and evacuate water vapor. The filters are non-serviceable as the filter cap is destroyed when removed. Keep obstructions or obstructing agents like mud away from the vents

19 FRAME

19.1 Frame

WARNING

DO NOT cut, splice, weld, or drill frame rails through the top or bottom frame rail flanges. These actions could affect frame rail strength, leading to its failure, and resulting in an accident. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

Frame welding is NOT recommended. The high heat of welding nullifies the special heat treatment of the rails, greatly reducing the tensile strength of the frame rail. If a frame member becomes cracked from overloading, fatigue, surface damage, or a collision, the only permanent repair is to replace the damaged frame member with a new part. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

Electric vehicles utilize a high-voltage electrical system that has the potential to cause severe injury or death if proper safety precautions are not followed. Carefully read and understand all instructions and hazard alert messages. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

DO NOT perform any repair while the vehicle is connected to a charger. Orange high-voltage (HV) cables stay energized unless the battery Manual Service Disconnect (MSD) fuses are removed. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

DO NOT perform maintenance on high-voltage (HV) cables. A PACCAR trained technician is required for service. Please contact an authorized EV service certified dealership for ser-

vice. Be mindful of the location of HV cables and components when working around the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Emergency Welding

In an emergency, a temporary repair may be performed. Observe the following precautions to protect electronic systems during welding operations. Emergency welding procedures are further explained in the maintenance manuals. Please refer to the ordering information on the back cover to obtain a maintenance manual.

In the event of emergency welding of a frame rail and when welding any other part of your vehicle or any component attached to your vehicle, observe the following precautions before welding:

- Ensure the vehicle is powered down and completely de-energized of voltage.
- Disconnect the low-voltage battery cables and insulate them from the vehicle.
- DO NOT use the ECU ground stud for the grounding of the welding probe.
- Ensure that the ground connection for

the welder is as close to the weld point as possible. This ensures maximum weld current and minimum risk to damage of electrical components on the vehicle.

19.2 Fifth Wheel Monthly Maintenance



WARNING

Electric vehicles utilize a high-voltage electrical system that has the potential to cause severe injury or death if proper safety precautions are not followed. Carefully read and understand all instructions and hazard alert messages. Failure to comply may result in death, personal injury, equipment damage, or property damage.



WARNING

DO NOT attempt maintenance or repair work on the e-powertrain system. The only tasks that can be performed by an operator on this system are visual inspections. Only an EV service certified dealership is authorized to service the vehicle. Failure to comply may

result in death, personal injury, equipment damage, or property damage.

- Refer to specific manufacturer's literature for any special instructions.
- Steam clean the fifth wheel.
- Check lock guard operation using a commercial lock tester.
- Clean and oil all moving parts.
- Lubricate the lock mechanism with a lithium-base grease.
- All grease fittings (especially those which grease the top surface of the fifth wheel).

19.3 Fifth Wheel Bi-Annual Maintenance



WARNING

DO NOT attempt to diagnose, correct, or repair any vehicle issue related to the high-voltage electrical system or its components. The high-voltage electrical system is capable of producing dangerous electric shock and burns. Please contact or take the vehicle to an authorized EV service certified dealership for

service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

DO NOT perform maintenance on high-voltage (HV) cables. A PACCAR trained technician is required for service. Please contact an authorized EV service certified dealership for service. Be mindful of the location of HV cables and components when working around the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **NOTE**

Whenever possible, torque all frame fasteners on the nut end, not the bolt head.

- Refer to specific manufacturer's literature for any special instructions.
- Remove fifth wheel from vehicle. Refer to the Shop Manual Fifth Wheel Removal.
- Steam clean the fifth wheel and

mounting brackets.

- Check all moving parts for excessive wear or damage. Replace all worn or broken parts.
- Complete two-month service procedure.
- Install fifth wheel. Refer to the Shop Manual Fifth Wheel Installation.

Tighten all frame fasteners with a torque wrench. See [Frame Fastener Torque Requirements](#).

19.4 Sliding Fifth Wheels

 **WARNING**

DO NOT perform maintenance on high-voltage (HV) cables. A PACCAR trained technician is required for service. Please contact an authorized EV service certified dealership for service. Be mindful of the location of HV cables and components when working around the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Lubricate bearing surface of support bracket through the grease fittings on the side of the fifth wheel plate. Use a water resistant lithium-base grease.

 **NOTE**

The plate must be lifted up slightly to relieve the weight of the bracket while applying grease.

20 HEATER AND AIR CONDITIONER MAINTENANCE

20.1 Heater and Air Conditioner Maintenance

The combination heater-air conditioner provides comfort for those in the cab through accurate control of the cab environment in all weather conditions. Regular attention to the items below will help keep the heater-air conditioner unit running well. It is recommended that the vehicle's cab be serviced by a competent technician as follows:

To allow for proper operation of the vehicle ventilation system, proceed as follows:

- Keep the inlet grille at the base of the

windshield clear of snow, ice, leaves, and other obstructions at all times.

- Check the drain tube of the fresh air inlet for trapped water before assuming that there is a leak in the heating system.

Special Precautions

 **WARNING**

Never weld, solder, steam clean, or use a blow torch near any part of the air conditioning system. Excessive heat may cause the pressurized components of the air conditioning system to explode. Failure to comply may result in death, personal injury, equipment damage or property damage.

 **WARNING**

Always wear personal protective equipment (PPE) when working with refrigerant, this includes safety goggles, a face shield, and nitrile gloves. Gas could escape from containers, hoses, or fittings, and exposure to R134a or R134aUV can result in frostbite or eye damage. Failure to comply may result in

death, personal injury, equipment damage, or property damage.

 **WARNING**

R134a refrigerant is combustible. Store in a cool, well-ventilated area away from heat sources and direct sunlight to prevent fire or explosion. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

Never allow large quantities of R134a refrigerant (concentrations higher than 1000 parts per million) to escape in a small, unventilated space. R134a is toxic and will also displace nearby oxygen, which can lead to asphyxiation. Failure to comply may result in death, personal injury, equipment damage, or property damage.

If a refrigerant leak develops in the presence of excessive heat or an open flame, hazardous gases may be generated. If you become aware of a refrigerant leak on the

vehicle have the system serviced immediately and observe the following precautions:

- DO NOT permit any open flames in the area.
- Even a match or a cigarette lighter may generate a hazardous quantity of poisonous gas.
- DO NOT smoke in the area.
- Inhaling gaseous refrigerant through a cigarette may cause violent illness.

Heater

 **CAUTION**

During extreme cold weather, blowing hot defroster air onto a cold windshield can crack the glass. When the heater core is hot and the windshield is cold (such as idling the engine when the HVAC has been off), move the Temperature Control Dial to "COOL." Gradually increase the temperature as the windshield warms up. Failure to comply may result in equipment or property damage.

- Check all heater controls for full-range operation.
- Check hoses and connections for condition and leaks.

Air Conditioner



WARNING

The air conditioning system is under pressure. If not handled properly during servicing, it could explode. Any servicing that requires depressurizing and recharging the air conditioning system must be conducted by a qualified technician in an approved facility. Failure to comply may result in death, personal injury, equipment damage, or property damage.



WARNING

Always wear safety glasses when working with pressurized air. DO NOT exceed the recommended air pressure limits, look into the air jets, or direct the air jets towards yourself or another individual. Failure to comply may result in death, personal injury, equipment damage, or property damage.

- Check all hoses for kinks, deterioration, chafing, and leaks. Adjust kinked or chafing hoses to eliminate restrictions and prevent further wear.

- Check all components and connections for refrigerant leaks. If a leak is discovered, DO NOT try to tighten a connection. Tightening a connection may cause a leak to worsen. Have a qualified technician correct the problem.



NOTE

A leaking evaporator or condenser core cannot be repaired; it must be replaced.

Have the air conditioning system fully serviced annually by an authorized dealer. Qualified service technicians will have to evacuate and recharge the system.

20.2 Replacing the Air Conditioner Filter

Required tools:

- Screwdriver

Inspect the clean cab air filter every 3-6 months of service. Depending on the operating environment, if the air flow from the air conditioner and heater is less efficient or

if the windows fog easier, the cab air filter may need to be replaced.

1.



WARNING

Always open the hood with both feet planted firmly on the ground and one or both hands on the hood. If you lose your footing, the hood may open or close uncontrollably. Failure to comply may result in death, personal injury, equipment damage, or property damage.



WARNING

Always ensure the hood lock has engaged whenever the hood is opened. If not properly locked open, the hood may close uncontrollably and without warning. Failure to comply may result in death, personal injury, equipment damage, or property damage.

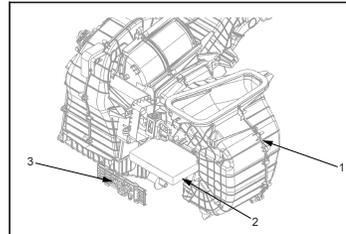
Tilt the hood open.

2. Locate the air intake housing at the passenger's rear corner of the vehicle under the rain tray.

3. Locate filter cover labeled "OPEN" with an arrow pointing rearward in vehicle. Slide the filter cover rearward in the vehicle until you are able to remove the cover.
4. Remove and inspect the filter referring to the maintenance interval schedule.
5. Replace the filter in housing, taking care to align the airflow direction that is indicated on the side of the filter element with the airflow direction that is marked on the air intake housing.
6. Replace the filter cover on the air intake housing and slide the cover forward in the vehicle. An audible snap sound can be heard when the cover is correctly in place. If the snap feature is damaged there are two screw features that may be utilized to retain the cover in place.

death, personal injury, equipment damage, or property damage.

Close and secure hood of the vehicle.



1. Air intake housing
2. A/C filter
3. Filter cover

20.3 Replacing the Recirculation Air Filter

7.

WARNING

Be sure to latch the hood securely. A hood not latched securely could open during operation and cause vehicle damage. Failure to comply may result in

WARNING

DO NOT attempt to diagnose, correct, or repair any vehicle issue related to the high-voltage electrical system or its components. The high-voltage electrical system is capable of producing dan-

gerous electric shock and burns. Please contact or take the vehicle to an authorized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Please contact an authorized dealer when the service interval is required to inspect the cabin recirculation air filter.

20.4 Cab Air Conditioning Lubrication

Please contact your nearest authorized dealership for cab air conditioning lubrication maintenance.

21 NOISE CONTROL

21.1 Noise Control

There are specific components on the vehicle that are designed to meet certain Environmental Protection Agency (EPA) emissions and noise regulations. To maintain conformance with the regulations, these components need to be functional and properly maintained.

Noise Emission Warranty

Peterbilt warrants to the first person who purchases this vehicle for purposes other than resale and to each subsequent purchaser that this vehicle as manufactured by Peterbilt, was designed, built, and equipped to conform at the time it left Peterbilt's control with all applicable U.S. EPA Noise Control Regulations.

This warranty covers this vehicle as designed, built, and equipped by Peterbilt, and is not limited to any particular part, component, or system of the vehicle manufactured by Peterbilt. Defects in design, assembly, or in any part, component, or system of the vehicle as manufactured by Peterbilt, which, at the time it left Peterbilt's control, caused noise emissions to exceed Federal standards, are covered by this warranty for the life of the vehicle.

Tampering with Noise Control System

Federal law prohibits the following acts or the causing thereof:

1. The removal or rendering inoperative by any person other than for purposes of maintenance, repair, or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate

purchaser or while it is in use, or

2. The use of the vehicle after such device or element of design has been removed or rendered inoperative by any person. Among those acts presumed to constitute tampering are the acts listed below:

Inner Fender Shields and Cab Skirts	Removing shield or skirts.
Noise Insulating Blankets	Removing hood-mounted noise insulation.
Noise Insulating Blankets	Cutting away parts of shields, skirts or damaged or loose portions of shields or skirts.
Noise Insulating Blankets	Cutting holes in, or cutting away part of noise insulators.

21.2 Inspecting Noise Components

If during periodic inspection and maintenance of other systems and components, it is found that parts of the noise control system require attention, we recommend that those parts be inspected at more frequent intervals to assure adequate maintenance and performance.

21.3 Noise Control System - Maintenance Log

To ensure your vehicle's noise control requirements are maintained, record maintenance checks. Use the following log sheet and retain copies of documents regarding maintenance services performed and parts replaced on the vehicle.

Component	Recommended Interval (miles)	Date & R.O. No.	Repair Facility & Location	Work Performed	Date & R.O. No.	Repair Facility & Location	Work Performed
Shutters Shrouds	25,000						
Inner Fender Shields	50,000						
Cab Skirts Fasteners	50,000						

22 STEERING SYSTEM

22.1 Steering System

 **WARNING**

DO NOT attempt maintenance or repair work on the e-powertrain system. The only tasks that can be performed by an operator on this system are visual inspections. Only an EV service certified dealership is authorized to service the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

DO NOT operate the vehicle if the steering system is not working properly. If the steering system is not in good working condition, you could lose control of the vehicle, resulting in an accident. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

Adjustments or repairs made to any part of the steering system must be performed by an authorized dealer. Failure to comply may result in property damage, personal injury, or death.

 **WARNING**

On chassis equipped with Electronic Stability Control (ESC), recalibrate the steering angle sensor when servicing, removing, or replacing any part of the steering system. The steering system includes, but is not limited to the wheels, steering column, tie rods, steering rack, and the steering angle sensor itself. The sensor should also be recalibrated in the event of airbag deployment. An uncalibrated steering angle sensor could result in a loss of vehicle control. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Hydraulic fluid (under low pressure) provides the power to operate the steering gear. It also serves to lubricate moving

parts and remove heat. A loss of steering efficiency will occur if too much heat builds up in the system.

If the steering feels unbalanced from side-to-side while turning, check for the following possible causes:

- Unequal tire pressures
- Vehicle overloaded or unevenly distributed load
- Wheels out of alignment
- Wheel bearings improperly adjusted

If you cannot correct the problem, check with an authorized dealer.

Your vehicle is equipped with integral power steering. The system includes a motor-driven fluid pump, a fluid reservoir, the steering gear, and connecting hoses. Because of the hydraulic power assist, little effort is required to turn the steering wheel. When no input is applied through the steering wheel, the steering gear will return to the neutral position. If, for any reason, the power assist system goes out, steering the vehicle is still possible but it will require much greater effort.

Visually check the following parts:

- Crosstube: Is it straight?
- Drag link castle nut: Check for looseness or interference. (Refer

to Drag Link Castle Nut Torque for specified torque).

- Ball joints and steering U-joints: Check for looseness
- Steering wheel for excessive free-play. Check the simplest probable causes first: (A) unequal tire pressures; (B) loose cap nuts; (C) bent crosstube; or (D) lack of lubrication

If these checks do not reveal the problem, or if you correct them and still have a steering problem, take your vehicle to an authorized dealer for evaluation.

22.2 Checking Power Steering Fluid Level

Required materials:

- Power steering system fluid

WARNING

Hydraulic fluids and hydraulic brake fluids are toxic substances. DO NOT allow hydraulic fluids to get into your mouth or onto your skin. Wear impervious protective clothing and gloves when handling hydraulic fluids. In the event of slight skin contact, thoroughly rinse the

affected area with clean water. If there is excessive skin contact or any ingestion/inhalation, seek medical advice immediately. Failure to comply may result in death, personal injury, equipment damage, or property damage.

CAUTION

The presence of dirty or foreign particles in the fluid reservoir or power steering system can cause severe damage to the components. Clean the area before opening any part of the power steering system. Failure to comply may result in equipment or property damage.

CAUTION

When adding fluid, only use fluid of the same type. While many fluids have the same description and intended purpose, they may contain incompatible additives. Incompatible fluids may cause damage to power steering system components. Failure to comply may result in equipment or property damage.

NOTE

Before removing reservoir cap, wipe the outside of the cap so that no dirt or debris falls into the reservoir.

PACCAR recommends using the following Automatic Transmission Fluids (ATF): ATF Chevron HD389, ZF TE-ML14, ATF DEXRON-III H, ATF MERCON, and ATF Allison C-4.

Check the fluid level. Use the following procedure:

1. Park the vehicle on level ground and turn off the vehicle.
- 2.

WARNING

Always open the hood with both feet planted firmly on the ground and one or both hands on the hood. If you lose your footing, the hood may open or close uncontrollably. Failure to comply may result in death, personal injury, equipment damage, or property damage.

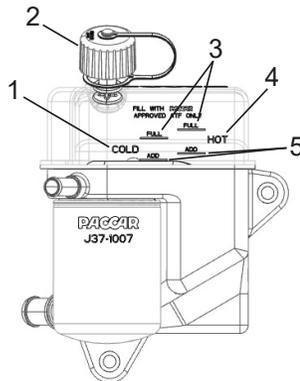
WARNING

Always ensure the hood lock has engaged whenever the hood is opened. If not properly locked open, the hood may close uncontrollably and without warning. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Open the hood.

3. Check the fluid level on the reservoir.

Figure 48: Power Steering Reservoir



- 1 Cold line
- 2 Fill cap
- 3 Full line
- 4 Hot line
- 5 Add line

- If you check the fluid with the PCAS and steering system cold, the fluid level should be above the COLD ADD indicator level and should generally not exceed the middle point between the COLD ADD and COLD FULL level indicators.

- If you check the fluid with the steering system warm, the fluid should not exceed the HOT FULL level indicator and should generally not drop below the middle point between the HOT FULL and HOT ADD level indicators.

4.

NOTE

Fill with PACCAR approved Automatic Transmission Fluid (ATF) only.

To add fluid, open the fill cap to the power steering reservoir and then add fluid until the fluid level is in the middle of the appropriate minimum and maximum level indicators.

5.

WARNING

Always make sure that there are no objects in the way before closing the hood. Grab the hood firmly and close it in a controlled manner with your feet placed on a stable, non-slip surface. Failure to comply may result in death,

personal injury, equipment damage, or property damage.

Reinstall the reservoir fill cap and close the hood.

22.3 Steering Shaft Bolt Torque Specifications

WARNING

DO NOT perform any repair while the vehicle is connected to a charger. Orange high-voltage (HV) cables stay energized unless the battery Manual Service Disconnect (MSD) fuses are removed. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

DO NOT perform maintenance on high-voltage (HV) cables. A PACCAR trained technician is required for service. Please contact an authorized EV service certified dealership for service. Be mindful of the location of HV cables and components when work-

ing around the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

The steering (intermediate shaft) U-joint pinch bolt should be tightened on the first day or two of operation, then checked weekly (see Weekly Checks). The following are common torque specifications for most steering shafts.

Table 13: Steering U-joint Pinch Bolt

Fastener Size	Torque Spec. lb-ft (N•m)
7/16 -in.	37-43 (50-58)

Table 14: Pitman Arm Clamp Bolt

Fastener Size	Torque Spec. lb-ft (N•m)
3/4 -in.	300-320 (406-433)

WARNING

Any modification to a vehicle with Electronic Stability Control (ESC) may result in a loss of vehicle control or non-compliance with Federal Motor Vehicle

Safety Standards. Modifications include but are not limited to changes to the vehicle's axle weight ratings, number of axles, front and rear suspension, wheel-base length or frame, steering controls, or intended body type and size. A modified vehicle with ESC must be evaluated by a qualified technician before it can be operated. Contact your authorized dealer for evaluations. Failure to comply may result in death, personal injury, equipment damage, or property damage.

22.4 E-Powertrain Lubrication

WARNING

Various kinds of oil and other lubricants used in the vehicle may constitute a health hazard if they contact the skin. This also applies to electric powertrain coolant, refrigerant in air conditioning systems, and battery acid. DO NOT contact vehicle liquids without the appropriate personal protective equipment. Failure to comply may result in death, personal injury, equipment damage, or property damage.

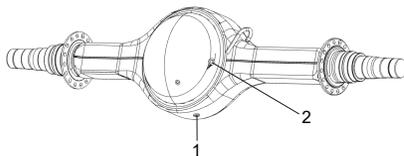
⚠ WARNING

DO NOT attempt maintenance or repair work on the e-powertrain system. The only tasks that can be performed by an operator on this system are visual inspections. Only an EV service certified dealership is authorized to service the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

⚠ CAUTION

DO NOT mix different brands or types of lubricants. Always drain (or remove) old lubricants from the unit before refilling it. Failure to comply may result in equipment or property damage.

The differential must have adequate lubrication to prevent wear. Use the lubricates indicated in the brand with the specifications mentioned (Castrol Syngear 75W-90).



- 1 Drain lubrication plug
- 2 Fill lubrication plug

23 DRIVELINE

See the driveshaft manufacturer's operator manual for lubrication specifications and service intervals.

⚠ WARNING

Improper lubrication of U-joints can cause them to fail prematurely. The driveshaft could separate from the vehicle and result in an accident. Make sure lubricant is purged at all four ends of each U-joint and loosen caps if necessary. Also, regularly inspect U-joints for excessive wear or movement, and repair or replace as necessary. Failure to comply may result in death, personal injury, equipment damage, or property damage.

⚠ WARNING

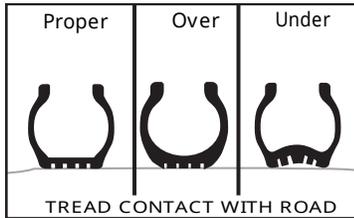
On chassis equipped with Electronic Stability Control (ESC), recalibrate the steering angle sensor when servicing, removing, or replacing any part of the steering system. The steering system includes, but is not limited to the wheels, steering column, tie rods, steering rack, and the steering angle sensor itself. The sensor should also be recalibrated in the event of airbag deployment. An uncalibrated steering angle sensor could result in a loss of vehicle control. Failure to comply may result in death, personal injury, equipment damage, or property damage.

24 TIRES

⚠ WARNING

DO NOT perform any repair while the vehicle is connected to a charger. Orange high-voltage (HV) cables stay energized unless the battery Manual Service Disconnect (MSD) fuses are removed. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Tires are a very important part of your vehicle's whole braking system. How fast you can stop depends mostly on how much friction you get between the road and your tires. In addition, keeping your tires in good condition is essential to the safe, efficient operation of your vehicle. Regular, frequent inspection and the right care will give you the assurance of safe and reliable tire operation. Here are some tips on maintaining your tires.



⚠ WARNING

All tire repairs should be performed by an expert. DO NOT repair damaged tires unless you are fully qualified and equipped to do so. Wheel and tire assemblies cannot be worked on without proper tools and equipment. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Checking Inflation Pressure

⚠ WARNING

DO NOT perform maintenance on high-voltage (HV) cables. A PACCAR trained technician is required for service. Please contact an authorized EV service certified dealership for service. Be mindful of the location of HV cables and components when working around the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Low pressure is a tire's worst enemy. Underinflation allows tires to flex improperly, causing high temperatures to build up. Heat causes early tire damage such as flex break, radial cracks, and ply separation. Low pressure may affect control of your vehicle, especially at the front wheels. Most tire wear problems are caused by underinflation as the result of slow leaks, so check tire pressure regularly. Lower tire pressure does not provide better traction on ice or snow. Give your tires a visual test every day, and check inflation with a gauge every week:

- When checking tire pressure, inspect

each tire for damage to sidewalls, cuts, cracks, uneven wear, rocks between duals, etc. If a tire appears underinflated, check for damage to the wheel assembly. Don't forget to check between dual wheels. If you find wheel damage, have an expert tire service repair it.

- Maximum tire pressure will be indicated on the sidewall of a tire.
- Check pressure only when the tires are cool. Warm or hot tires cause pressure buildup and will give you an inaccurate reading. So never deflate a warm tire to the specified pressure.

⚠ WARNING

DO NOT operate a vehicle with underinflated tires. Underinflation (or low tire pressure) can create extra heat leading to sudden tire failure (such as a tire fire or blow out) or may affect control of the front wheels, both conditions possibly resulting in an accident. Keep your tires inflated to the manufacturer's recommended air pressure. Failure to comply may result in death, personal injury, equipment damage, or property damage.



WARNING

DO NOT install a damaged wheel assembly, and DO NOT install or inflate a tire that has been damaged or has been run flat. Always follow section 1910.177 of OSHA regulations. Truck wheels and tires should be serviced only by fully qualified and properly equipped technicians authorized to do so. Failure to comply may result in death, personal injury, equipment damage, or property damage.



NOTE

Follow all warnings and cautions contained within the tire and wheel manufacturers literature.

Overloaded Tires

Overloading your truck is as damaging to your tires as underinflation. The following chart shows how neglect or deliberate abuse can affect the life of your tires.

Table 15: Effects of Load and Pressure on Tire Life

Vehicle Load	Tire Pressure	Expected Total Tire Mileage
Normal	Normal	Normal
20% over	20% low	70%
40% over	30% low	50%
60% over	35% low	40%
80% over	45% low	30%
100% over	55% low	25%

Overinflated Tires

Overinflating the tires reduces the tread contact area with the road surface, concentrating all of the vehicle weight on the center of the tread. This causes premature wear of the tire.



WARNING

Ensure all tires are inflated correctly according to the manufacturer's recommendations. Overinflated tires wear more quickly and are more subject to punctures, cracks, and other damage

that can cause loss of vehicle control. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Matching Tires

Be sure to buy matching tires for your vehicle, especially on the rear axles. Mismatched tires can cause stress between axles and cause the temperature of your axle lubricant to get too hot. Matching tires will help your driveline last longer and will give you better tire mileage.



WARNING

DO NOT mismatch or mix tires of different design such as steel belted radials and bias ply tires, etc. Mixing tire types and sizes will adversely affect the road-holding ability of both types of tires and can lead to loss of vehicle control. Failure to comply may result in death, personal injury, equipment damage, or property damage.



WARNING

DO NOT install regrooved or reinforcement repaired tires on steering axles.

They could fail unexpectedly and cause loss of vehicle control. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Replacing Tires

Front: Replace front tires when less than 4/32 -in. of tread remains. Check at three places equally spaced around the tire.
 Drive Axles or Trailers: Replace tires on drive axles or trailers when less than 2/32 -in. of tread depth remains in any major groove. Check at three places equally spaced around the tire.

 **WARNING**

DO NOT replace original equipment tires with tires whose load ratings are less than the originals. Doing so could overload the tire and cause a failure resulting in a loss of vehicle control. Failure to comply may result in death, personal injury, equipment or property damage.

 **NOTE**

To prolong your tires' life, have their radial and lateral run-out checked at your dealer. Anytime a tire is replaced or reinstalled, it should be balanced.

Tire Chains

If you need tire chains, install them on both sides of each driving axle.

Speed Restricted Tires

 **WARNING**

Check each tire's sidewall and/or tire manufacture's data book for maximum rated speed. This vehicle is equipped with speed restricted tires and should not be operated at speeds in excess of maximum rated speed as this may cause sudden tire failure resulting in loss of control leading to an accident. Failure to comply may result in death, personal injury, equipment damage, or property damage.

25 WHEELS

25.1 Wheels

After the vehicle travels about 50 to 100 miles (80 to 160 km), wheel mountings seat in and will lose some initial torque. Check hub/wheel mountings after this initial period and retighten. Threads should be clean and dry. Do not lubricate wheel nuts or studs.

 **WARNING**

DO NOT perform any repair while the vehicle is connected to a charger. Orange high-voltage (HV) cables stay energized unless the battery Manual Service Disconnect (MSD) fuses are removed. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

Never use oil or grease on studs or nuts. Lubricants will result in improper torque readings, which could cause improper wheel clamping and could lead to wheel failure. Failure to comply may result in death, personal injury,

equipment damage, or property damage.

i NOTE

If a tire looks under-inflated, stand off the side and check for damage to wheel assembly. Compare the wheel in question to other wheels on the vehicle. For dual wheel assemblies, check between the wheels for damage. If tire damage is found or you suspect damage, do not attempt further repair. Call for expert tire service.

Wheel Replacement with Disc Brake

! WARNING

Only use tires of the same wheel brand, size, and part number of those originally installed. A different wheel brand or size could cause the valve stem to interfere with a brake component, which could lead to loss of vehicle control. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Vehicles equipped with front disc brakes are fitted with wheels designed specifically for disc brake applications. If it ever becomes necessary to replace an original equipment wheel, the replacement wheel must be the same brand and size as the take-off wheel. On vehicles equipped with 22.5 in. disc wheels, installing the wrong replacement wheel could result in the wheel valve stem making contact with the disc brake assembly. When installing any replacement wheel, always inspect the tires/wheels to ensure there is adequate clearance between other vehicle components. With the hood open, check for clearance between the wheel and disc brake assembly. Use a hydraulic jack to raise the front of the vehicle off the ground to allow the wheel to spin freely. While rotating the wheel, check to ensure there is adequate clearance between the wheel and disc brake assembly.

! WARNING

Follow the manufacturer's literature exactly when mounting and dismounting a wheel or tire. Improperly mounting or dismounting a wheel or tire could cause uneven tire wear, tire blowout, a loss of vehicle control, and lead to an accident. Failure to comply may result in death,

personal injury, equipment damage, or property damage.

! WARNING

Always ensure the hood lock has engaged whenever the hood is opened. If not properly locked open, the hood may close uncontrollably and without warning. Failure to comply may result in death, personal injury, equipment damage, or property damage.

! WARNING

Always support the vehicle with appropriate safety stands if it is necessary to work underneath the vehicle. A jack is not adequate for this purpose. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Disc Wheels

! WARNING

Use the correct components and tools when working on wheels. Using an

incorrect tool or component could misalign or damage the wheel and cause a loss of vehicle control. Failure to comply may result in death, personal injury, equipment damage, or property damage.

The disc wheel comprises of a rim that is permanently welded to a center disc. It attaches to the hub by nuts on studs that pass through the disc.

The standard disc wheel system has a 10-hole mount and uses an inner and outer cap nut for the installation of dual wheels (Stud-piloted disc wheel). The Motor Wheel WHD-8 system is a hub-pilot wheel system and uses 8 cone lock-nuts for each wheel, all of which have right-hand threads (Hub-piloted disc wheels).

Visually inspect the disc wheels for cracks or damage. The causes of bolt hole cracks that can cause the disc wheel to fail are the following:

- Improper torquing
- Excessive loading
- Insufficient mounting flange support by the hub or brake drum

When working on disc wheels, ensure the end of the wheel wrench is smooth. Burrs on the end of the wrench can tear grooves in the disc. These grooves may lead to cracks in the disc, and can cause it to fail.

Wheel Bearings

Service the bearings, seals and disc wheels oil every 350,000 mi (560,000 km). This interval may be different depending on the results of the regular inspection. For safe, reliable operation and adequate service life, your wheel bearings must be adjusted properly at the recommended intervals. Contact your authorized dealer to make sure the wheel bearings are properly adjusted.

25.2 Tightening Wheel Cap Nuts

WARNING

DO NOT perform any repair while the vehicle is connected to a charger. Orange high-voltage (HV) cables stay energized unless the battery Manual Service Disconnect (MSD) fuses are removed. Failure to comply may result

in death, personal injury, equipment damage, or property damage.

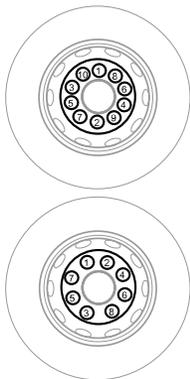
WARNING

DO NOT perform maintenance on high-voltage (HV) cables. A PACCAR trained technician is required for service. Please contact an authorized EV service certified dealership for service. Be mindful of the location of HV cables and components when working around the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

Torque wheel cap nuts properly. If they are not properly torqued, the wheel nuts could loosen allowing the wheel to detach or fail while the vehicle is moving. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Figure 49: Hub Piloted Disc Wheels



Proper wheel torque can best be obtained on level ground. Install lug nuts and finger-tighten in the numerical sequence as shown below. This procedure will ensure that the wheel is drawn evenly against the hub. Contact an authorized dealer for information on the proper installation procedure for the wheels on your truck. This is a job you may not be able to do yourself. You need the right torquing equipment to do it.

26 WINDSHIELD WIPER/WASHER

26.1 Windshield Wiper/Washer

WARNING

DO NOT perform any repair while the vehicle is connected to a charger. Orange high-voltage (HV) cables stay energized unless the battery Manual Service Disconnect (MSD) fuses are removed. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

DO NOT perform maintenance on high-voltage (HV) cables. A PACCAR trained technician is required for service. Please contact an authorized EV service certified dealership for service. Be mindful of the location of HV cables and components when working around the vehicle. Failure to comply may result in death, personal injury,

equipment damage, or property damage.

The windshield wiper system is designed to be maintenance-free. Check the wiper blades annually, every 60,000 miles (96,000 km), or when they begin to show signs of wear.

Check the wiper fluid level daily. The washer reservoir is located under the hood. If it is low, fill to the proper level.

26.2 Refilling the Washer Fluid Reservoir

Required tools:

- Windshield washer fluid

WARNING

DO NOT perform any repair while the vehicle is connected to a charger. Orange high-voltage (HV) cables stay energized unless the battery Manual Service Disconnect (MSD) fuses are removed. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

DO NOT perform maintenance on high-voltage (HV) cables. A PACCAR trained technician is required for service. Please contact an authorized EV service certified dealership for service. Be mindful of the location of HV cables and components when working around the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **CAUTION**

DO NOT use antifreeze or coolant in the windshield washer reservoir. These are harmful fluids to the seals and other components. Failure to comply may result in equipment or property damage.

It is recommended to do daily safety checks before heading off. If the washer fluid reservoir requires refilling, follow the steps below:

1. Park the vehicle and apply the parking brake.

2.

 **WARNING**

Always open the hood with both feet planted firmly on the ground and one or both hands on the hood. If you lose your footing, the hood may open or close uncontrollably. Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **WARNING**

Always ensure the hood lock has engaged whenever the hood is opened. If not properly locked open, the hood may close uncontrollably and without warning. Failure to comply may result in death, personal injury, equipment damage, or property damage.

Open the hood and secure it in the open position.

3. Locate the washer fluid reservoir located on the driver's side of the e-motor compartment, on top of the radiator, and open the filler cap.

4. Fill the 2.0 Gallon (7.6 Liters) reservoir with windshield washer fluid and replace the cap.
5. Close and secure the hood.

27 E-MOTOR/ TRANSMISSION

27.1 E-Motor/Transmission

The e-motor transmission consists of three forward gears and one reverse gear. If any problem or malfunction with the e-motor/transmission are found, contact your nearest authorized EV service certified dealership and bring your vehicle for the proper service. The e-motor involves high-voltage systems and harnesses that require an EV service certified dealership and safety measures to handle the components.

 **WARNING**

DO NOT attempt to diagnose, correct, or repair any vehicle issue related to the high-voltage electrical system or its components. The high-voltage electrical system is capable of producing dangerous electric shock and burns. Please contact or take the vehicle to an autho-

alized EV service certified dealership for service. Failure to comply may result in death, personal injury, equipment damage, or property damage.



WARNING

Ensure any modifications to the vehicle DO NOT affect the high-voltage system. A modification could affect the high voltage electrical system, resulting in electric shock, burns or even death, and will void the warranty. Failure to comply may result in death, personal injury, equipment damage, or property damage.

27.2 E-Motor Oil Specifications

To maintain the motor performance and durability, use the PACCAR recommended ZF Ecofluid E SAE 75W-70 28A.

The oil must be changed every 2 years or every 74,565 mi (120,000 km) if generally used under the following conditions:

- Use in areas where the monthly average temperature exceeds 77°F (25°C) in more than two months within

a year, or if temperatures rise above 104°F (40°C) or more than seven days in a year.

- Scheduled routes (city and suburban operation).
- Short-distance transport.
- Tough operating conditions.
- Average speed from 12.4 to 37.2 mph (20 to 60 km/h).

The oil must be changed every 2 years or every 111,847 mi (180,000 km) if generally used under the following conditions:

- Long-distance transport.
- Average speed of 37 mph (60 km/h).



WARNING

DO NOT attempt to service this vehicle. Only an EV service certified dealership is authorized to service a PACCAR electric vehicle (EV). EVs use high voltage, posing additional hazards not present when servicing a conventional vehicle. Servicing high voltage components requires proper training, tools, and equipment. **Visual inspections are the only tasks that should be performed by the operator.** Failure to comply may result in death, personal

injury, equipment damage, or property damage.



CAUTION

Always follow PACCAR's recommendations to ensure that the e-motor and other electric powertrain components are not affected by using different oil and lubricants specifications. Failure to comply may result in equipment or property damage.

27.3 E-Motor Coolant Specifications

The e-motor must maintain an optimum temperature while operating, and the coolant that PACCAR recommends is Delo® Water/Glycol (50/50).



WARNING

DO NOT attempt to service this vehicle. Only an EV service certified dealership is authorized to service a PACCAR electric vehicle (EV). EVs use high voltage, posing additional hazards not present when servicing a conven-

tional vehicle. Servicing high voltage components requires proper training, tools, and equipment. **Visual inspections are the only tasks that should be performed by the operator.** Failure to comply may result in death, personal injury, equipment damage, or property damage.

 **CAUTION**

Always follow PACCAR's recommendations to ensure that the e-motor and other electric powertrain components are not affected by using different oil and lubricants specifications. Failure to comply may result in equipment or property damage.

28 SPECIFICATION REFERENCE CHARTS

28.1 Pipe and Hose Clamp Torque Values

Torque specifications for PCAS parts.

Application	Type of Clamp	lb-in.	N•m
Radiator and Heat Exchanger Hoses	Constant Torque CT-L	90-110	10.2-12.5
Heater Hoses	Constant Tension	Not required	Not required

28.2 Drag Link Castle Nut Torque

Ball Stud Fastener	Castle Nut Torque lb-ft (N•m)
7/8-14	120 to 170 (163 to 231)

28.3 Wheel Cap Nut Torque Specifications

At the first scheduled lube interval, have all wheel cap nuts torqued to their specified value. After that, check wheel cap nuts at least once a week.

Contact an authorized dealer for information on the proper installation procedure for the wheels on your vehicle. This is a job you may not be able to do yourself. You need the right torquing equipment to do it.

Wheel and Nut Configuration	Stud Size	Torque for Two Piece Flanged Cap Nuts	
		lb-ft	N•m
Hub-Piloted Disc-Type Wheel w/Two Piece Flanged Cap Nuts: Steel or Aluminum Wheel PHP-10; Budd Uni-Mount-10; WDH-8	M22-1.5	450-500	610-680

28.4 Lubrication Specifications

Component	Fluid	Fill Volume	Check Frequency	Drainage's Frequency	Change Frequency (mi / yearly / monthly)	
					ON HIGHWAY	OFF HIGHWAY/ CITY DELIVERY
Meritor Drive Axle (Differential) Oil	Hypoid gear oil SAE 75W-90 synthetic gear lubricant	-	Check every 25,000 mi / 40,000 km	Initial drain at 5,000 mi / 8,000 km	Every 240,000 mi / 384,000 km	Every 120,000 mi / 192,000 km

Component	Fluid	Fill Volume	Check Frequency	Drainage's Frequency	Change Frequency (mi / yearly / monthly)	
					ON HIGHWAY	OFF HIGHWAY / Severe Service
Dana / Eaton Drive Axle (Differential) Oil	SHAES-256 Oil SAE 75W-90 synthetic gear lubricant	-	Check every 25,000 mi / 40,000 km	Initial drain at 5,000 mi / 8,000 km	ON HIGHWAY	Every 240,000 mi / 384,000 km / 2 years
					OFF HIGHWAY / Severe Service	Every 120,000 mi / 192,000 km / yearly
Air Compressor System Oil and Filter	Castrol Alphasyn T46 or Chevron Cetus PAO 46	-	As needed/ required	-	Every year / 1,500 hours	
HV Battery Chiller Refrigerant	R134a refrigerant	-	-	As needed/ required	N/A	
HV Battery Chiller Lubricant	See service manual	-	-	As needed/ required	N/A	
Air Conditioning Refrigerant	R134a refrigerant	-	-	As needed/ required	N/A	
HV Air Conditioning Condenser Lubricant	Check fill port label	-	-	As needed/ required	N/A	
Power Electronics (Coolant) ^{1, 2}	Delo® glycol/ water (50/50) prediluted Antifreeze	-	Check daily	-	Every 3 years / 300,000 mi / 480,000 km	

Component	Fluid	Fill Volume	Check Frequency	Drainage's Frequency	Change Frequency (mi / yearly / monthly)
Battery Coolant System (Coolant) ³	Delo® glycol/water (50/50) prediluted Antifreeze	-	Check daily	-	Every 3 years / 300,000 mi / 480,000 km
E-motor Oil	ZF Ecofluid E SAE 75W-70 28 A	-	As needed/required	-	Every 75,000 mi / 120,000 km / 2 years
Electro-Hydraulic Power Steering Oil	ATF Chevron HD389, ZF TE-ML14, DEXRON-III H, MERCON, and Allison C-4 fluids	-	Check daily	Initial drain at 3,000 mi / 5,000 km	Every 12,400 mi / 20,000 km
Air Dryer Coalescing Filter	-	-	-	Drain every 6,000 mi / 9,600 km / monthly	Semi-annually

¹ The e-motor is part of the power electronics assembly.

² Vehicle must not be operated in temperatures lower than -22°F (-30°C).

³ Vehicle must not be operated in temperatures lower than -22°F (-30°C).

28.5 Frame Fastener Torque Requirements



CAUTION

When torquing fasteners, always consider the following:

- Use a torque wrench for final tightening of a fastener. DO NOT use an impact gun. Bolts may over-torque and break.
- When torquing a frame fastener that is not captured, welded, or riveted, the nut must rotate slightly before achieving the torque value. If the nut does not rotate, the fastener is over-torqued and should be replaced.
- To achieve correct clamp loads with a frame fastener that is not captured, welded, or riveted, torque must be applied to the nut. The intended clamp load may not be achieved if the nut is held and torque is applied to the bolt.

Incorrectly tightening a fastener may result in clamp load or frame failures. Failure to comply may result in equipment or property damage.

28.6 Suspension U-Bolts, Grade 8

Tighten all U-bolts with a torque wrench. Torque requirements in the table below apply to PACCAR proprietary suspensions using Protect Torque/TEXO coated U-bolts only. For all other suspensions, follow the manufacturer's recommended torque values. PACCAR proprietary suspension U-bolts must be tightened in a specific sequence. Take your vehicle to an authorized dealer to tighten the U-bolts on your vehicle.

Table 16: Torque for Grade 8 U-Bolts

Front Suspension U-bolts		
U-Bolt Size Diameter (-in.)	Torque (lb-ft)	Torque (N•m)
3/4	260-290	353-393
7/8	370-415	502-563
For all non-PACCAR suspension systems, see the manufacturer's operator's manual for torque specifications.		

Rear Suspension U-bolts		
Rear Suspension Type	U-Bolt Diameter	Torque lb-ft (N•m) ¹
Low Air Leaf (U-bolt, spring)	M22 x 1.5	375–475 (508–644)
Flex Air	M22 x 1.5	325–375 (440–508)
Tandem Low Air Leaf	M22 x 1.5	375–475 (508–644)
Air Leaf (U-bolt, spring)	1.0 - in. NF	450–550 (610–746)
Air-Trac	1.0 - in. NF	450–550 (610–746)
13.5K Taper Leaf (Axle U-bolt)	¾ -in. 16 UNF	275–320 (373–434)
18K Taper Leaf (Axle U-bolt)	¾ -in. 16 UNF	275–320 (373–434)

Rear Suspension U-bolts		
Rear Suspension Type	U-Bolt Diameter	Torque lb-ft (N•m) ¹
18K Air Leaf (Axle U-bolt)	¾ -in. 16 UNF	275–320 (373–434)
For all non-PACCAR suspension systems, see the manufacturer's operator's manual for torque specifications.		

¹ Torques listed are for primed (or non-oiled) U-bolts.

i NOTE

The values shown here are for suspension U-bolts and should not be applied to bolts and fasteners for the frame.

28.7 Rear Suspension Fasteners

AIR-TRAC FASTENER TORQUE VALUES

Fastener	Fastener Name	lb•ft (N•m)
M16	Tracking rod bolts	125–165 (170–224)
0.75 NF	Spring center bolt	165–210 (224–285) ¹
M16 0.75 NF	Radius rod bolts (forward)	155–195 (210–264)
	Radius rod bolts (at axle)	250–350 (339–475)
M16	Frame bracket bushing bolts	50–65 (68–88)
1.0 NF	U-bolt ²	Refer to section on Suspension U-Bolts, Grade 8.

Fastener	Fastener Name	lb•ft (N•m)
0.5 UNC	Air bag stud nut	40–50 (54–68)
M16	Tracking rod bolts	125–165 (170–224)

¹ Torque requirement applies at sub-assembly of air-spring support and leaf spring only.

² See owners manual for torque tightening sequence.

LOW AIR LEAF TORQUE VALUES

Low Air Leaf Torque values apply to both single and tandem axles.

Fastener	Fastener Name	Torque lb•ft (N•m)
M20 x 2.5	Bar pin bolts	325–425 (441–576)
M22 x 1.5	U-bolt, spring ¹	Refer to section on Suspension U-Bolts, Class 10.9.

Fastener	Fastener Name	Torque lb•ft (N•m)
0.5 UNC	Air bag stud nut	40–50 (54–68)
M16	Tracking rod bolts	125–165 (210–264)

¹ Contact your dealer for torque tightening procedure.

Fastener	Fastener Name	Torque lb•ft (N•m)
M20 x 2.5	Bar pin bolts	325–425 (441–576)
M22 x 1.5	U-bolt, spring ¹	Refer to section on Suspension U-Bolts, Class 10.9.
0.5 UNC	Air bag stud nut	40–50 (54–68)
M16	Tracking rod bolts	125–165 (210–264)

¹ Contact your dealer for torque tightening procedure.

FLEX AIR FASTENER TORQUE VALUES

Fastener	Fastener Name	Torque lb•ft (N•m)
M16	Drive bracket - frame bolts	125–165 (170–224)
	Drive bracket - link spring bolt	
	Drive bracket - radius rod bolt	
	Drive beam - shock bolt (lower)	
	Shock bracket - shock bolt (upper)	
	Tracking rod bolts (all)	
M10	Air spring support beam bolts	36–51 (49–69)

Fastener	Fastener Name	Torque lb•ft (N•m)
0.88 - 14 UNF	Drive beam - link spring bolt	380–460 (515–624)
0.88 - 14 UNF	Radius rod bracket bolt	380–460 (515–624)
M22 x 1.5	U-bolt ¹	Refer to section on Suspension U-Bolts, Class 10.9.
0.5 UNC	Air bag stud nut	40–50 (54–68)

¹ Contact your dealer for torque tightening procedure.

Fastener	Fastener Name	Torque lb-ft (N•m)
M16	Drive bracket - frame bolts	125–165 (170–224)
	Drive bracket - link spring bolt	
	Drive bracket - radius rod bolt	
	Drive beam - shock bolt (lower)	
	Shock bracket - shock bolt (upper)	
	Tracking rod bolts (all)	
M10	Air spring support beam bolts	36–51 (49–69)
0.88 - 14 UNF	Drive beam - link spring bolt	380–460 (515–624)

Fastener	Fastener Name	Torque lb-ft (N•m)
0.88 - 14 UNF	Radius rod bracket bolt	380–460 (515–624)
M22 x 1.5	U-bolt ¹	Refer to section on Suspension U-Bolts, Class 10.9.
0.5 UNC	Air bag stud nut	40–50 (54–68)

¹ Contact your dealer for torque tightening procedure.

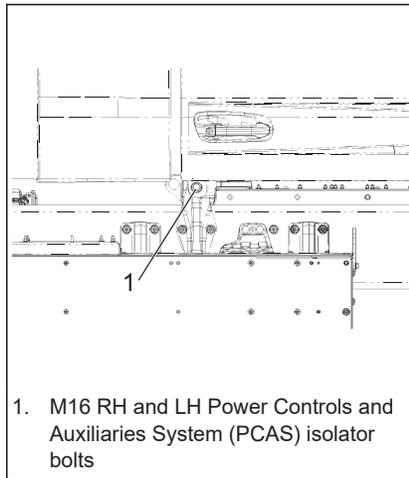
VEHICLE LIGHT BULB SPECIFICATIONS

Bulb Location	Type of Bulb	Notes
Low beam halogen	H11–LL: 12 volts, 55 Watts (SAE)	(Long life version not required)
Low beam LED	N/A	Non-serviceable
High beam halogen	HB3A – LL: 12 volts, 60 Watts (SAE)	(Long life version not required)

Bulb Location	Type of Bulb	Notes
High beam LED	N/A	Non-serviceable
Daytime running/position/turn signal	4157K: 12 volts 28.5 Watts (SAE)	N/A
LED Side marker	N/A	LED
Rear tail/turn signal	N/A	LED
Interior map/dome/indirect light	N/A	LED

28.8 Under Cab PCAS Bolts

Fastener	Fastener Name	Torque lb•ft (N•m)
M16	Right-hand (RH) iso-lator bolt	145-165 (197 to 224 N•m)
M16	Left-hand (LH) iso-lator bolt	145-165 (197 to 224 N•m)



CHAPTER 6: INFORMATION

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1 CONSUMER INFORMATION

Ordering Replacement Parts

Replacement parts may be obtained from an EV service certified dealership. When you order, it is IMPORTANT that you have the following information ready:

- Your name and address
- Serial number of the vehicle
- The name of the part you need
- The name and number of the component for which the part is required
- The quantity of parts you need
- How you want your order shipped

National Highway Traffic and Safety Administration (NHTSA)

If you believe that your vehicle has a defect, which could cause a crash or could cause death or personal injury, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying the vehicle manufacturer. If NHTSA receives similar complaints, it may open an investigation, and if it finds that a safety defect exists in a group of vehicles, it may order a recall and remedy

campaign. However, NHTSA cannot get involved in individual problems between you, your dealer, and vehicle manufacturer. Contacting NHTSA is possible through telephone, written mail, and email. NHTSA also has a website where you can input your comments directly to them on the web. Please use any of the four ways to contact NHTSA:

Ex: Toll Free 1-888-327-4236
(800-424-9153 TTY) 8:00 a.m. to 10:00 p.m. EST Monday-Friday

Mail: Office of Defects Investigations/
CRD NVS-216 1200 New Jersey Ave. SE
Washington, D.C. 20590

Website: www.safercar.gov

Email: nhtsa.webmaster@dot.gov

Transport Canada

Canadian customers who wish to report a safety-related defect to Transport Canada, Defect Investigations and Recalls, may telephone the toll free hotline 1-800-333-0510, or contact Transport Canada by mail at:

Transport Canada, ASFAD Place de Ville
Tower C 330 Sparks St. Ottawa, ON K1A 0N5

For additional road safety information, please visit the Road Safety website at: <http://www.tc.gc.ca>

Federal Communications Commission (FCC)

Federal Communications Commission (FCC) ID: L2C0031T IC: 3432A-0031T
FCC ID: L2C0032R IC: 3432A-0032R
This device complies with Part 15 of the FCC Rules and with RSS-210 of Industry Canada. Operation is subject to the following two conditions (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. The term IC: before the radio certification number only signifies that Industry Canada technical specifications were met.

2 DATA RECORDER

California Vehicle Code - Section 9951 - Disclosure of Recording Device
Your vehicle may be equipped with one or more recording devices commonly referred to as "event data recorders" (EDR) or

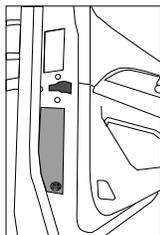
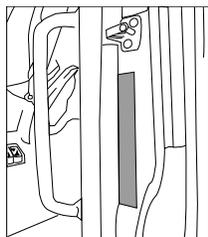
"sensing and diagnostic modules" (SDM). If you are involved in an accident, the device(s) may have the ability to record vehicle data that occurred just prior to and/or during the accident. For additional information on your rights associated with the use of this data, contact:

- The California Department of Motor Vehicles - Licensing Operations Division
- <http://www.dmv.ca.gov/>

3 VEHICLE IDENTIFICATION LABELS

Each vehicle completed by Peterbilt Motors Company uses a vehicle identification number (VIN) that contains the model year designation of your vehicle. The practice is in compliance with 49 CFR 565, Code of Federal Regulations.

The full, 17-digit VIN is located on the Weight Rating Data Label. The label is located on the driver's side door edge or on the driver's side door frame.



Chassis Number

The Chassis Number refers to the last six characters of the VIN. This number will allow your dealer to identify your vehicle. You will be asked for this number when you bring it in for service. Chassis Number Locations:

- Right frame rail, top flange, about 3 ft. from the front end
- Back of cab, left-hand rear panel, lower edge

- Tire, Rim, and Weight Rating Data label (truck)
- Components and Weights label
- Noise Emission label
- Paint Identification label

Certification Labels

Your vehicle information and specifications are documented on labels. As noted below, each label contains specific information pertaining to vehicle capacities and specifications that you should be aware of.

Components and Chassis Weight Label

The Components and Chassis Weight Label is located on either the driver's side door edge or on the driver's side door frame. It includes chassis number, chassis weight and gross weight, plus model information for the vehicle, e-motor, and axles.

Tire, Rim and Weight Rating Data Label

The Tire, Rim, and Weight Rating Data Label is located on the driver's side door edge or on the driver's side door frame. It contains the following information:

- GVWR - Gross Vehicle Weight Rating
- GAWR FRONT, INTERMEDIATE and REAR - Gross Axle Weight Ratings for Front, Intermediate and Rear Axle
- TIRE/RIM SIZES AND INFLATION PRESSURES - Tire/Rim Sizes and Cold Pressure Minimums
- VIN including CHASSIS NUMBER

The components of your vehicle are designed to provide satisfactory service, if the vehicle is not loaded in excess of either the gross vehicle weight rating (GVWR), or the maximum front and rear gross axle weight ratings (GAWRs).



WARNING

DO NOT exceed the specified load rating. Overloading can result in loss of vehicle control, either by causing component failures or by affecting vehicle handling. Exceeding load ratings can also shorten the service life of the vehicle. Failure to comply may result in death, personal injury, equipment damage, or property damage.

i NOTE

GVW the TOTAL SCALE WEIGHT the vehicle is designed to carry. This includes the weight of the empty vehicle, loading platform, occupants, and any load.

Noise Emission Label

The Noise Emission Label is located in the driver's side door frame. It contains information regarding U.S. noise emission regulations, chassis number, and date of manufacture.

Paint Identification Label

The Paint Identification Label contains the paint colors used by the factory to paint your vehicle. It lists frame, wheels, cab interior and exterior colors. This label is located inside the glove box.

Federal Safety Standard Certification Label

The NHTSA regulations require a label certifying compliance with Federal Safety Standards, for United States and U.S. Territories, be affixed to each motor vehicle and prescribe where such label may be located. This certification label, which indicates the date of manufacture and other pertinent information, is located on the driver's side door edge or on the driver's side door frame.

Component Identification

Each of the major components on your vehicle has an identification label or tag. For easy reference, record component numbers such as, model, serial, and assembly number.

E-Powertrain	For further information, please refer to the 2.1m HD Zero Emissions Powertrain.
Steer Axle	The front axle serial number is stamped on a plate located on the center of the axle beam.
Axle Specification Number	Usually stamped on the right rear side of the axle housing. This number identifies the complete axle.

Axle Housing Number	Usually located on the left forward side of the housing arm. This tag identifies the axle housing.
Axle Differential Carrier Identification	Usually located on the top side of the differential carrier. The following information is either stamped, or marked with a metal tag: Model No., Production Assembly No., Serial No., Gear Ratio, and Part Number.

4 GREENHOUSE GAS CERTIFIED CONFIGURATION

This vehicle includes Greenhouse Gas (GHG) regulated parameters and technologies. A Vehicle Emission Control Information label is located on the driver's door with codes that partially identify the vehicle's GHG certified configuration. In addition to the Vehicle Emission Control Information label, other technologies that reduce GHG emissions and regulated parameters included in the vehicle's GHG certified configuration are described in this section.

i NOTE

Modifying a vehicle's certified configuration without good engineering judgment or PACCAR's approval may be a violation of the Clean Air Act and subject to fines and penalties. Please contact the vehicle manufacturer for further information about this vehicle's certified configuration.

Vehicle Emission Control Information Label Descriptions

Label Identifiers	Label Identifier Descriptions
Family Name	Describes the vehicle's certified manufacturer, regulatory category, and regulatory subcategory
Emission Controls	Describes regulated emission control devices installed on the vehicle
Compliance Statement	Describes the vehicle's compliance standards
Regulatory Subcategory	Describes the vehicle's certified regulatory subcategory

Emission Controls	Emission Control Descriptions
ARF	Aerodynamic roof fairing

ARFR	Adjustable height aerodynamic roof fairing
ATS	Aerodynamic side skirt and/or fuel tank fairing
AFF	Aerodynamic front fairing
AREF	Aerodynamic rear fairing
TGR	Gap reducing fairing
LRRRA	Low rolling resistance tires (all)
LRRD	Low rolling resistance tires (drive)
LRRS	Low rolling resistance tires (steer)
VSL	Vehicle speed limiter
VSLS	Soft-top vehicle speed limiter
VSLE	Expiring vehicle speed limiter

VSLD	Vehicle speed limiter with both soft-top and expiration
IRT	Engine shutoff system
IRT5	Engine shutoff after 5 minutes or less of idling
IRTE	Expiring engine shutoff
ADVH	Vehicle includes advanced hybrid technology components
ADVO	Vehicle includes other advanced-technology components
INV	Vehicle includes innovative (off-cycle) technology
ATI	Automatic tire inflation system
TPMS	Tire pressure monitoring system

GHG Regulated Technology Not On the Vehicle Emission Control Information Label

Technology	Compliance Requirements
Wheel-Related Weight Reduction	Wheel-related weight reduction benefits may be included in this vehicle's certified configuration. Changing aluminum wheels to steel wheels may be a violation of the Clean Air Act and subject to fines and penalties.

Non wheel-Related Weight Reduction

Non wheel-related weight reduction benefits may be included in this vehicle's certified configuration. Changing aluminum material to steel material may be a violation of the Clean Air Act and subject to fines and penalties.

Other Technologies This vehicle may be equipped with factory installed automatic engine shut-down (AES), neutral idle, start-stop systems, intelligent controls (Predictive Cruise Control and Neutral Coast), or extended idle reduction systems (Engine Idle Shut-down Timer, Engine Auto Start, Sleeper APUs, Fuel-Fired Sleeper Heater System). Disabling or modifying any GHG regulated technology may be a violation of the Clean Air Act and subject to fines and penalties.

GHG Regulated Powertrain Parameters Not On the Vehicle Emission Control Information Label

Powertrain Components	Regulated Parameters
Engine	Engine idle speed, torque, horsepower, and governed RPM
Transmission	Lock up gear, number of gears, and torque converter
Axle	Configuration and drive axle ratio

GHG Regulated Aerodynamic Performance

The vehicle needs to stay in as-built aerodynamic performance unless good engineering judgment shows that the modification will improve safety or will not increase greenhouse gases.

GHG Regulated Certified Tires

i NOTE
The tires installed on this vehicle at the factory as original equipment are certi-

fied for Greenhouse Gas and Fuel Efficiency regulations. Replacement tires must be of an equal or larger loaded drive tire size and an equal or lower rolling resistance level (TRRL or Crr). Consult with your tire supplier(s) for appropriate replacement tires.

In order to limit the rolling resistance of the tires and optimize fuel economy, the maintenance procedures specified by the tire manufacturer must be followed. Please see Vehicle Emissions Limited Express Warranty for warranty on greenhouse gas certified tires.

GHG Regulated Air Conditioning Leakage Standards

Loss of refrigerant from the air conditioning systems may not exceed a total leakage rate of 11.0 grams per year or a percent leakage rate of 1.50 percent per year, whichever is greater. This vehicle was built to meet these air conditioning leakage standards. Any modification of the air conditioning system must comply with leakage rates defined in SAE J2727.

i NOTE

Modifying a vehicle's certified configuration without good engineering judgment or PACCAR's approval may be a violation of the Clean Air Act and subject to fines and penalties. Please contact the vehicle manufacturer for further information about this vehicle's certified configuration.

5 BATTERY ELECTRIC VEHICLES WARRANTY

Original Equipment Tires

PACCAR Inc. warrants the tires installed as original equipment on this vehicle only against defects in materials and workmanship which cause the vehicle to fail to comply with applicable U.S. and Canadian greenhouse gas emission limits ("Warrantable Emissions Failures"). This vehicle emissions limited express warranty relating to original equipment tires is valid for two (2) years or 24,000 miles (38,000 km), whichever occurs first. YOUR SOLE AND EXCLUSIVE REMEDY AGAINST PACCAR Inc. IS LIMITED TO THE REPAIR OR REPLACEMENT OF ORIGINAL EQUIPMENT TIRES, SUBJECT TO PACCAR'S

TIME AND MILEAGE LIMITATIONS LISTED ABOVE. This Vehicle Emissions Limited Express Warranty relating to original equipment tires begins on the date of delivery of the vehicle to the first purchaser or lessee and accrued time and mileage is calculated when the vehicle is brought in for correction of the Warrantable Emissions Failures relating to the original equipment tires. PACCAR MAKES NO OTHER VEHICLE EMISSIONS WARRANTIES RELATING TO THE ORIGINAL EQUIPMENT TIRES, EXPRESS OR IMPLIED. WHERE PERMITTED BY LAW, PACCAR EXPRESSLY DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE RELATING TO VEHICLE EMISSIONS. PACCAR AND THE SELLING DEALER SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES INCLUDING, BUT NOT LIMITED TO: LOSS OF INCOME OR LOST PROFITS; VEHICLE DOWNTIME; COMMUNICATION EXPENSES; LODGING AND/OR MEAL EXPENSES; FINES; APPLICABLE TAXES OR BUSINESS COSTS OR LOSSES; ATTORNEY'S FEES; AND ANY LIABILITY YOU MAY HAVE IN RESPECT TO ANY OTHER PERSON OR ENTITY RELATING TO WARRANTABLE EMISSIONS FAILURES. This Vehicle

Emissions Limited Express Warranty relating to original equipment tires is limited to emissions compliance only. The tires are separately warranted by their manufacturer for defects in materials and workmanship other than those which cause non-compliance with U.S. and Canadian GHG regulations, subject to limitations and conditions contained within the tire manufacturer's warranty agreement. You are responsible for the safe operation and maintenance of the vehicle and its tires. PACCAR does not warrant wear and tear of the tires.

Greenhouse Gas (GHG) Components Other Than Tires

This GHG vehicle Warranty applies to the vehicle (hereafter, vehicle) certified with the US Environmental Protection Agency.

Your Warranty Rights and Obligations

This Battery Electric Vehicle (BEV) is warranted for components that directly impact the manufacturers certification with the California Air Resources Board (CARB). PACCAR must warrant these components for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of the vehicle. If a BEV-related part on your vehicle is found to

have a defect in material or assembly, the part will be repaired or replaced by PACCAR.

Manufacturer's Warranty Coverage

Emissions Warranty Coverage is provided for five years or 100,000 miles (160,000 km), whichever occurs first, from the date of delivery of the vehicle to the first purchaser of first lease. Where a Warrantable Condition exists, PACCAR will diagnose and repair the vehicle, parts and labor included, at no cost to the first purchaser or first lessee and each subsequent purchaser or lessee. This warranty does not override any extended warranty purchased to cover specific vehicle components.

Owner's Warranty Responsibilities

The vehicle owner is responsible for performing required maintenance that is listed in your electric powertrain and vehicle Operator's Manuals. The owner is responsible for presenting the vehicle to a service location as soon as a problem exists. Any warranty repairs should be completed in a reasonable amount of time.

PACCAR recommends that you retain all receipts. PACCAR may deny warranty coverage if a vehicle component has failed due to abuse, neglect, improper maintenance, unapproved modifications (both physi-

cal components and computer programming) or using non-Original Equipment replacement parts. If there are any questions regarding these warranty rights and responsibilities, please contact the vehicle OEM manufacturer at the customer center telephone number provided with the vehicle operating instructions. Prior to the expiration of the applicable warranty, Owner must give notice of any warranted failure to an authorized PACCAR dealer and deliver the vehicle to such facility for repair. Owner is responsible for incidental costs such as: communication expenses, meals, lodging incurred by Owner or employees of Owner as a result of a Warrantable Condition. Owner is responsible for non-powertrain repairs, downtime expenses, cargo damage, towing, fines, all applicable taxes, all business costs, and other losses resulting from a Warrantable Condition.

Replacement Parts

PACCAR recommends that any service parts used for maintenance, repair or replacement of emission control systems be new or genuine PACCAR approved rebuilt parts and assemblies, and that the BEV be serviced by an authorized EV service certified dealership. Your vehicle contains air and electrical components that may affect powertrain emission controls.

The use of non-genuine BEV or vehicle replacement parts that are not equivalent to the PACCAR BEV or OEM vehicle manufacturer's original part may impair the powertrain and vehicle emissions control system from working or functioning effectively, and may jeopardize your emissions warranty coverage.

The owner may elect to have maintenance, replacement or repair of the emission control parts performed by a facility other than an authorized EV service certified dealership and may elect to use parts other than new or genuine-approved rebuilt parts and assemblies for such maintenance, replacement or repair; however, the cost of such service or parts and subsequent failures resulting from such service or parts will not be covered under this battery electric vehicle warranty, except for emergency repairs.

Emergency Repairs

In the case of an emergency where an authorized EV service certified dealership is not available, repairs may be performed by any available repair location or by any individual using any replacement parts. PACCAR will reimburse the owner for expenses (including diagnosis), not to exceed the manufacturers suggested retail price for all warranted parts replaced and labor charges based on the manufacturers

recommended time allowance for the warranty repair and the geographically appropriate hourly labor rate.

PACCAR Responsibilities

The warranty coverage begins when the BEV is delivered to the first purchaser or first lessee. Repairs and service will be performed by any authorized EV service certified dealership using new or genuine PACCAR approved rebuilt parts and assemblies. PACCAR will repair any of the emission control parts found by PACCAR to be defective without charge for parts or labor (including diagnosis which results in determination that there has been a failure of a warranted emission control part).

Warranty Limitations

Your sole and exclusive remedy against PACCAR and the selling dealer arising from your purchase and use of this BEV is limited to the repair or replacement of "warrantable failures" at authorized United States and Canadian EV service certified dealership, or an authorized PACCAR BEV facility where applicable, subject to PACCAR's time and mileage limitations of the BEV warranty. The maximum time and mileage limitations of the BEV warranty begin running on the date of delivery to the first purchaser or first lessee. The accrued

time or mileage is calculated when the BEV is brought into an authorized dealer for correction of warrantable failures.

Failures, other than those resulting from defects in material or factory workmanship, are not covered by this warranty. PACCAR is not responsible for failures or damage resulting from what PACCAR determines to be abuse or neglect, including, but not limited to: damage due to accident; operation without adequate coolants or lubricants; overspeeding; lack of maintenance of lubricating, cooling; improper storage, starting, warm-up, run-in or shutdown practices; unauthorized modifications of the vehicle. PACCAR is also not responsible for failures caused by incorrect water, dirt or other contaminants in the BEV. Failure of replacement parts used in repairs due to the above non-warrantable conditions is not warrantable.

PACCAR is not responsible for failures resulting from improper repair or the use of parts which are not genuine PACCAR approved parts.

PACCAR is not responsible for the material and labor costs of BEV control parts and assemblies replaced during Scheduled Maintenance of the BEV as specified in PACCAR Operator's Manuals.

THIS WARRANTY, TOGETHER WITH THE EXPRESS COMMERCIAL WARRANTIES MADE BY PACCAR IN REGARD TO THESE BATTERY ELECTRIC VEHICLES.

THIS LIMITED BATTERY ELECTRIC VEHICLE WARRANTY IS THE SOLE WARRANTY MADE BY PACCAR AND THE SELLING DEALER. EXCEPT FOR THE ABOVE LIMITED WARRANTY, PACCAR AND THE SELLING DEALER MAKE NO OTHER WARRANTIES, EXPRESS OR IMPLIED. PACCAR AND THE SELLING DEALER EXPRESSLY DISCLAIM ANY WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. PACCAR AND THE SELLING DEALER SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES INCLUDING, BUT NOT LIMITED TO: LOSS OF INCOME OR LOST PROFITS; POWERTRAIN OR VEHICLE DOWNTIME; THIRD PARTY DAMAGE, INCLUDING DAMAGE OR LOSS TO OTHER POWERTRAINS, VEHICLES OR PROPERTY, ATTACHMENTS, TRAILERS AND CARGO; LOSS OR DAMAGE TO PERSONAL CONTENTS; COMMUNICATION EXPENSES; LODGING AND/OR MEAL EXPENSES; FINES; APPLICABLE TAXES OR BUSINESS COSTS OR

LOSSES; ATTORNEYS' FEES; AND ANY LIABILITY YOU MAY HAVE IN RESPECT TO ANY OTHER PERSON OR ENTITY.

6 TELEMATICS CONTROL UNIT FCC INFORMATION

General Information

Model	IC
TCU2 NA IP30	2AUXS-TCU2NAIP30A
TCU2 NA IP67	2AUXS-TCU2NAIP67A

i NOTE

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

i NOTE

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

i NOTE

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to

correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

Radiofrequency radiation exposure Information:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 8 in. (20 cm) between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Used Frequency Bands (+antenna)

Table 17: LTE

Band	MHz
7	2600
12 (incl. 17)	700
25 (incl. 2)	1900
26 (incl. 5)	850
66 (incl. 4)	1700
71	600

Table 18: Bluetooth™ and WiFi Frequencies

Bluetooth	2402 - 2480 MHz
Bluetooth, low energy	2402 - 2480 MHz
802.11b	2412 - 2742 MHz
802.11g	2412 - 2742 MHz

Table 18: Bluetooth™ and WiFi Frequencies

802.11n	2412 - 2742 MHz
	5180 - 5240 MHz
	5260 - 5320 MHz
	5500 - 5700 MHz
	5745 - 5825 MHz
802.11ac	5180 - 5240 MHz
	5260 - 5320 MHz
	5500 - 5700 MHz
	5745 - 5825 MHz

Canada-specific Information

Model	IC
TCU2 NA IP30	25847-TCU2NAIP30
TCU2 NA IP67	25847-TCU2NAIP67

Contains IC ID: 4441A-UMCSTD31BPN

NOTE

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- This device may not cause interference
- This device must accept any interference, including interference that may cause undesired operation of the device

RF Exposure Information:

This equipment complies with Canada radiation exposure limits set forth for an uncontrolled environment. Install and operate this equipment with minimum distance of 8 inches (20 cm) between the radiator and your body.

Mexico-Specific Information

The operation of this equipment is subject to the following two conditions:

- This equipment or device may not cause harmful interference and
- This equipment or device must accept

any interference, including interference
that may cause undesired operation

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Before operating vehicle study the manual carefully.
Read and understand all warnings, cautions and notes.



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