

PREVOST COACH MANUFACTURER

OPERATOR'S MANUAL X3 COACHES



PA1563

revised 06/16/2023

PA1563 3rd Edition
Date: October, 2008
Starting from vehicle: 9-9614
Featuring: New Allison Transmission Shift Selector

revised 06/16/2023: light bulb data table removed

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This **Operator's Manual** for the PREVOST X3-45 coach features the new Volvo D13 engine, the DDC S60 US07 engine and also the new Allison Transmission Shift Selector. This manual has been prepared to thoroughly acquaint you, the driver, with the equipment and features of the coach in order for you to fully appreciate and safely enjoy this vehicle. Prevost is committed to the continuous improvement of coach quality, reliability, durability and safety. With innovative features, the X3 series coach was designed with passenger and driver safety and comfort in mind.

This manual contains information available at the time of publication. Because standard and optional equipment is covered in this manual, some of the optional equipment described may not apply to your coach. If in doubt, refer to the technical documentation package provided with the coach.

Driver's controls and instruments incorporate advanced technology for enhanced driving ease and security. This manual describes the main features, instruments and controls, and servicing requirements for both standard and optional equipment. Read this manual carefully to take advantage of the coach's advanced features and to ensure optimum safety and passenger comfort.

Keep this manual in the coach at all times. Make sure this manual is kept with the coach when ownership is transferred. Please use the appropriate card at the end of this manual to promptly notify Prevost of any change of address or transfer of ownership. This will ensure we provide fast and reliable coach service to all coach operators.

DANGER, WARNING, CAUTION and *NOTE*. are used throughout this manual to emphasize important points when necessary:



DANGER

Directs the operator's attention to unsafe practices which could result in serious personal injury or death.



WARNING

Directs the operator's attention to unsafe practices which could result in serious personal injury or severe damage to the vehicle.



CAUTION

Directs the operator's attention to unsafe practices where personal injury is not likely but damage to vehicle components could occur.

NOTE

Indicates supplementary information essential to the proper operation of the vehicle.

The service life of the coach depends on the kind of attention it receives. Pay close attention to the **DANGER, WARNING, CAUTION** and *NOTE*. Read the various notices and instructions posted throughout the coach and attached to equipment.

Since continuous improvement is a primary focus at Prevost, we reserve the right to make changes anytime, without notice, and without incurring any obligation.

Before reproducing or copying this manual, in whole or in part, written consent must be obtained from Prevost.

2 Safety Precautions

SAFE OPERATING PRACTICES

To ensure safe and reliable operation, heed the following safety precautions.

- Operation and maintenance of the vehicle must be performed only by qualified personnel.
- Before driving, conduct a walk around inspection and check that all baggage compartment doors and equipment access doors are securely shut.
- Make sure good visibility is maintained at all times. Keep windshields clean and free of obstructions.
- Adjust the driver's seat so that all controls can be reached easily.
- Always wear your safety belt when driving.
- Check the instrument panel frequently. Do not operate the vehicle when dials or indicators do not indicate normal operating conditions.
- Always pay attention to pedestrians passing in front and behind the vehicle. Always yield to pedestrians at pedestrian walkways.
- Do not drive over obstacles on the road. Empty boxes, piles of leaves, and snowdrifts could conceal hidden dangers that could damage the vehicle suspension and underbody.
- When turning or changing lanes, signal your intention well in advance.
- When approaching to make a right turn, reduce the space between the vehicle and the curb to make sure another vehicle cannot pass on the right. Since the vehicle makes wide turns, allow enough space to make safe turns.
- Switch from high beams to low beams when meeting or following other vehicles within 500 feet (150 meters).
- Never leave the vehicle unattended with the engine running or with the key in the ignition. Turn off the engine, remove keys and apply the parking brake before leaving the vehicle.
- Shut-off the engine before refueling, adding oil, performing maintenance or servicing tasks, unless stated otherwise.

- Fuel is highly flammable and explosive. Do not smoke when refueling. Keep away from open flames or sparks.
- Do not run the engine or HVAC system with access doors left open. Close compartment doors before operating any equipment.
- Do not remove the surge tank filler cap or the cooling system pressure cap when the engine is hot. Let the engine cool down before removing filler caps.
- Do not attempt to push or pull-start the vehicle.
- The service life of the vehicle depends on the kind of maintenance it receives. Always record any problems and report them immediately to maintenance personnel.

DEFENSIVE DRIVING PRACTICES

- For city driving, allow a four to six second travel interval between your vehicle and the vehicle ahead. Increase this travel interval to six to eight seconds for highway driving. Increase time interval for driving at night or in foul weather.
- Be prepared to stop when approaching an intersection. The stopping distance of the vehicle increases with the weight and speed.
- Establish eye-to-eye contact with other drivers and with pedestrians. Use, high beam and low beam headlights, turn signals and horn as needed.
- On highway, don't stare at the road ahead. Keep your eyes moving. Check mirrors and dashboard instruments frequently.
- To keep the vehicle from drifting across lanes during highway driving, always look over the horizon on the road ahead.
- Adjust your speed to road conditions, traffic and visibility. Never exceed the posted speed limits.
- If another vehicle is following close behind, reduce your speed to let the vehicle pass.
- For additional information about safe operation and defensive driving practices, contact the local department of motor vehicles authority.

OTHER PRECAUTIONS



DANGER

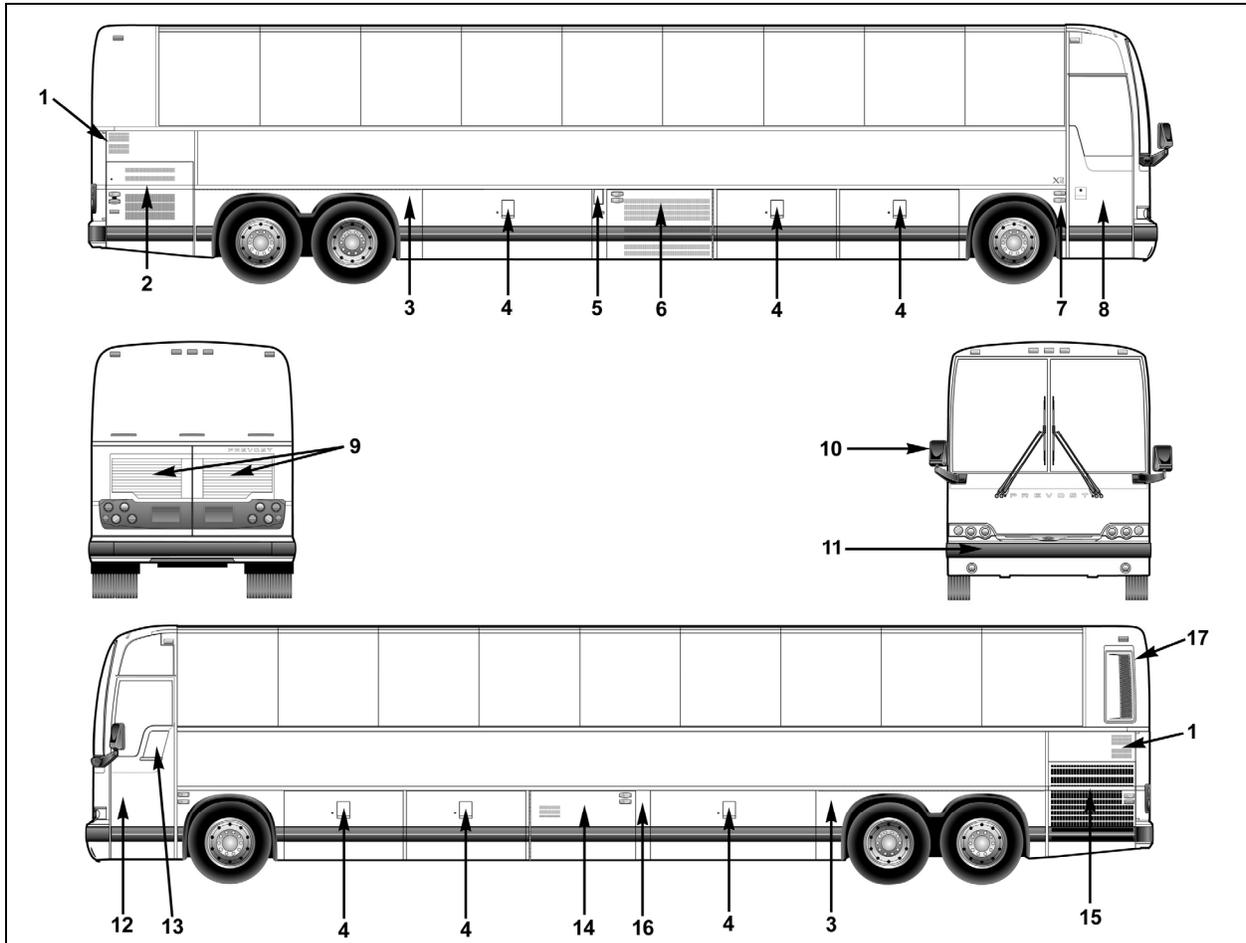
Make sure that electrical current or air pressure is removed before performing any work. A part may be energized even if the ignition switch is OFF. A part may be under pressure even if all tanks are empty. Before performing any work on the vehicle, refer to wiring diagrams and/or air schematics to thoroughly understand the system.



CAUTION

Disconnect all electronic control modules before welding. If modules (ECM, TCM, ECU, ABS) are not disconnected before welding is done, there is a high risk of destroying the electronic components (EPROM, Chip). Refer to procedure described in Maintenance Manual.

4 Coach Exterior

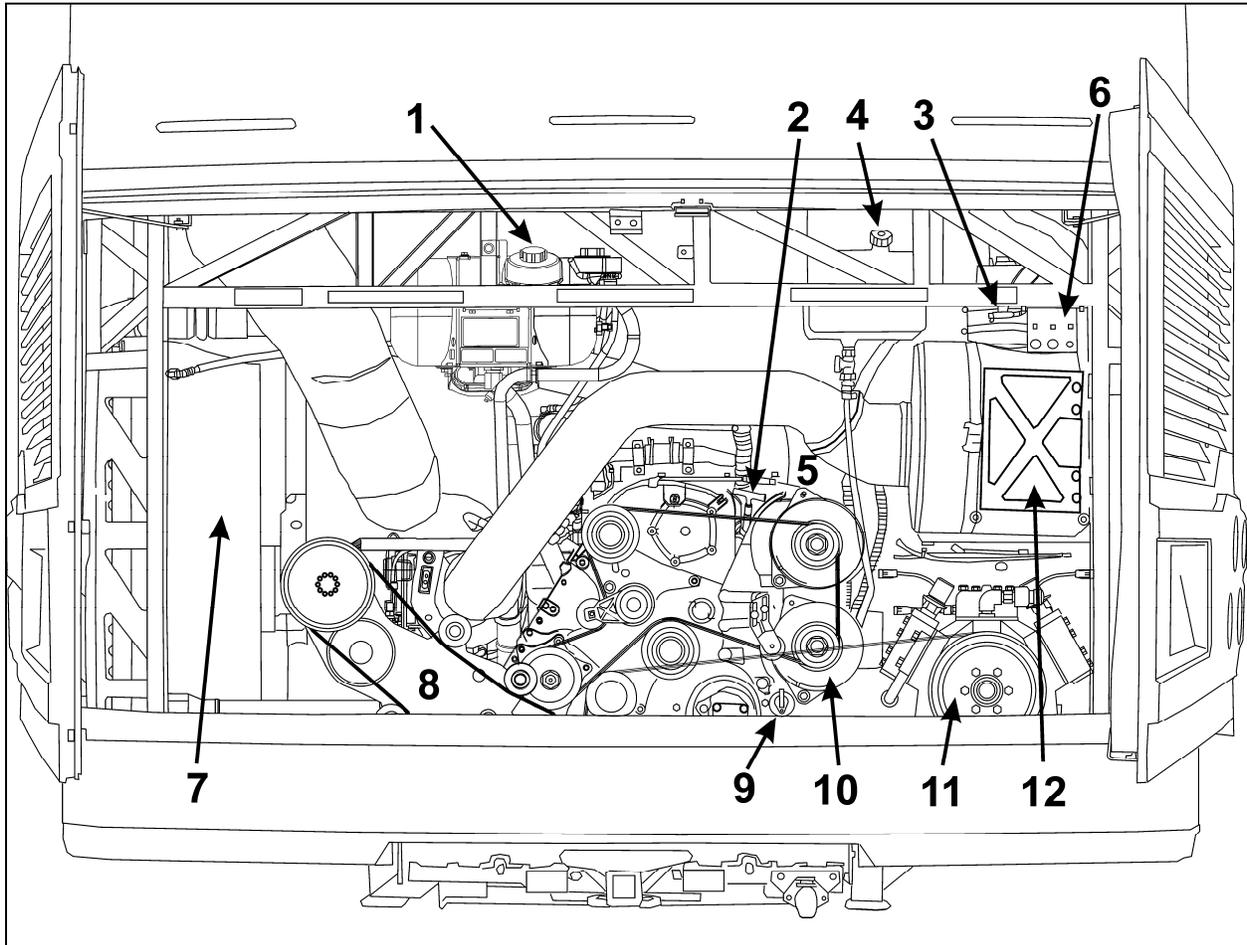


X3-45 EXTERIOR VIEW (TYPICAL)

18606

1. Engine air intake
2. Engine compartment curb-side door
3. Hinged rear fender
4. Baggage compartment
5. Fuel filler door
6. Condenser compartment
7. Entrance door control switch
8. Entrance door
9. Engine compartment rear doors
10. Rear-view mirrors
11. Spare wheel compartment
12. Front electrical and service compartment
13. Driver's power window
14. Evaporator compartment
15. Radiator door
16. Rear electrical compartment
17. Diesel Particulate Filter (DPF) compartment access door

ENGINE COMPARTMENT COMPONENTS

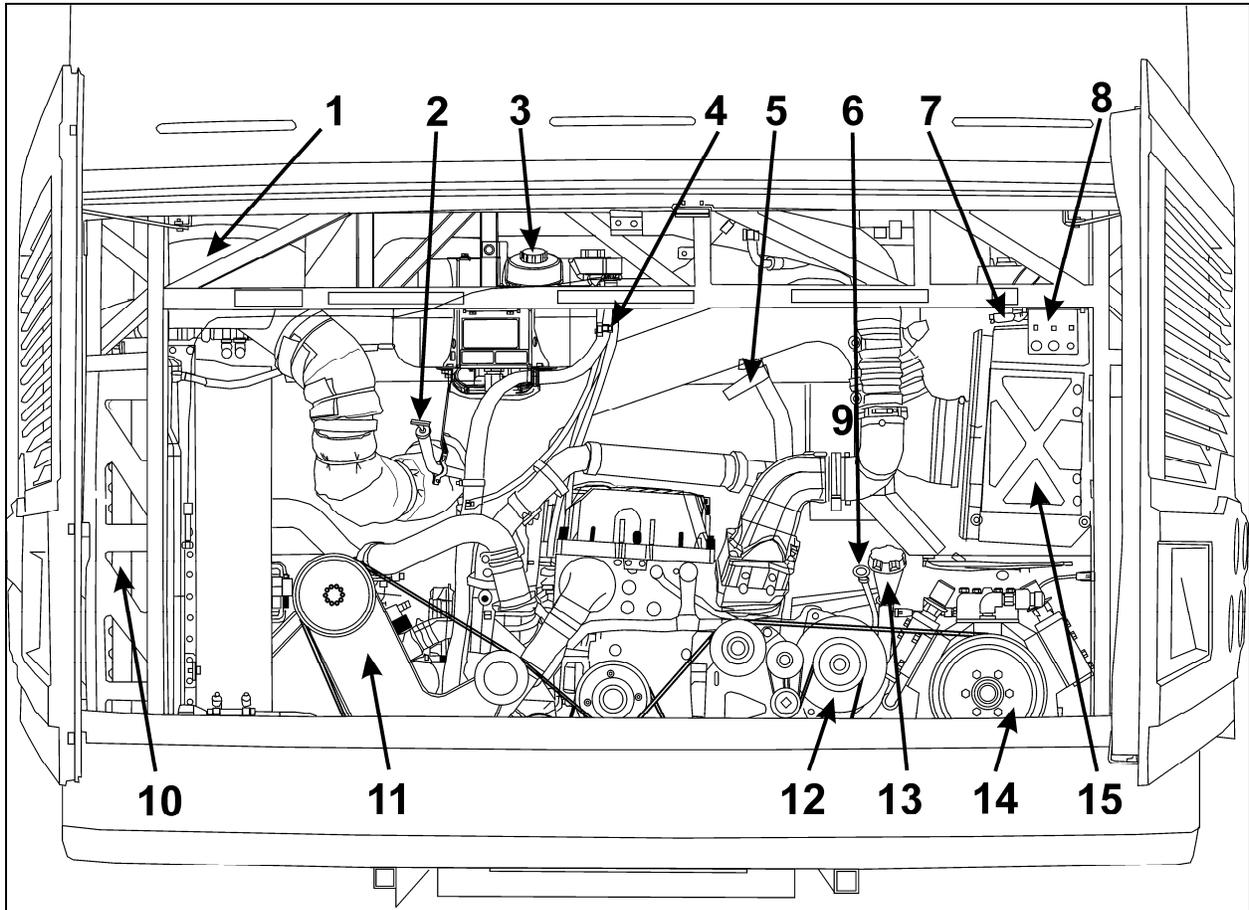


ENGINE COMPARTMENT FEATURING DDC SERIES 60 ENGINE

01184

1. Coolant fluid surge tank;
 2. Engine oil dipstick;
 3. Belt tensioner control valve;
 4. Engine oil reserve tank;
 5. Hydraulic Fluid Reservoir;
 6. Starter selector switch and Engine rear start push-button switch, Engine Compartment Lights Switch;
 7. Radiator;
 8. Radiator fan drive mechanism support;
 9. Engine oil filler tube;
 10. Alternator;
 11. Central A/C compressor.
 12. Air filter;
- Small A/C compressor (if equipped with parcel rack cooling system).

6 Coach Exterior



ENGINE COMPARTMENT FEATURING VOLVO D13 ENGINE

01184

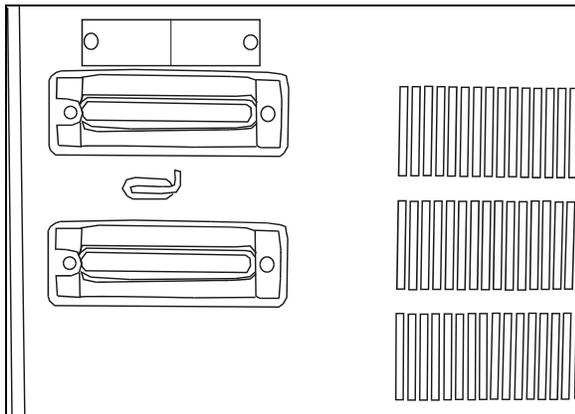
1. Diesel Particulate Filter (DPF);
 2. Transmission fluid dipstick (if equipped with Allison transmission);
 3. Coolant fluid surge tank filler cap;
 4. Coolant fluid surge tank sight glass;
 5. Air filter restriction indicator;
 6. Engine oil dipstick;
 7. Belt tensioner control valve;
 8. Starter selector switch and Engine rear start push-button switch, Engine compartment Lights Switch;
 9. Power steering fluid reservoir;
 10. Radiator and charge air cooler;
 11. Radiator fan drive mechanism support;
 12. Alternators;
 13. Engine oil filler tube;
 14. Central A/C compressor;
 15. Air filter;
- Small A/C compressor (if equipped with parcel rack cooling system);

ENGINE COMPARTMENT

ENGINE COMPARTMENT CURB-SIDE DOOR

The engine compartment curb-side door provides access to the following (if equipped):

- Engine compartment rear doors release handle;
- Booster terminals;
- Fuel filter/water separator (Optional);
- Air circuit fill valve and drain cock;
- Sump tank access cap;
- Cold weather starting fluid bottle;
- 110 - 120 volt connector;
- Lavatory maintenance valve and connectors;
- Fresh water reservoir fill connector;
- Coolant heater system.

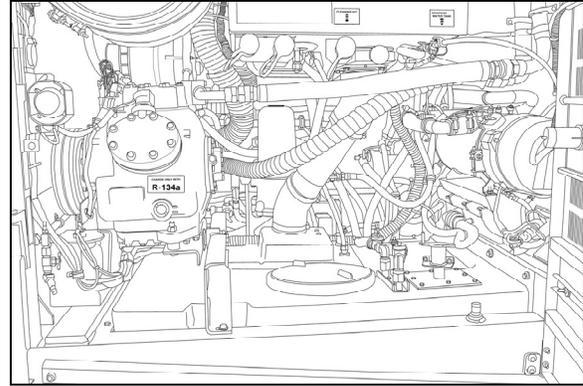


ENGINE COMPARTMENT CURB-SIDE DOOR 18559

This door can be locked or unlocked using the exterior compartment key or, if so equipped, by the central door locking system. To open, push sideways on the small lever located between the marker lights.

NOTE

This compartment can be locked/unlocked using the central locking system by pressing the switch located on the L.H. side dashboard panel.



ENGINE COMPARTMENT R.H. SIDE 18607

A telltale light illuminates when one or more compartments are unlocked.

ENGINE COMPARTMENT REAR DOORS

To open the engine compartment rear doors, open the engine compartment curb side door and pull the handle located on the rear door, close to the bottom door hinge.



WARNING

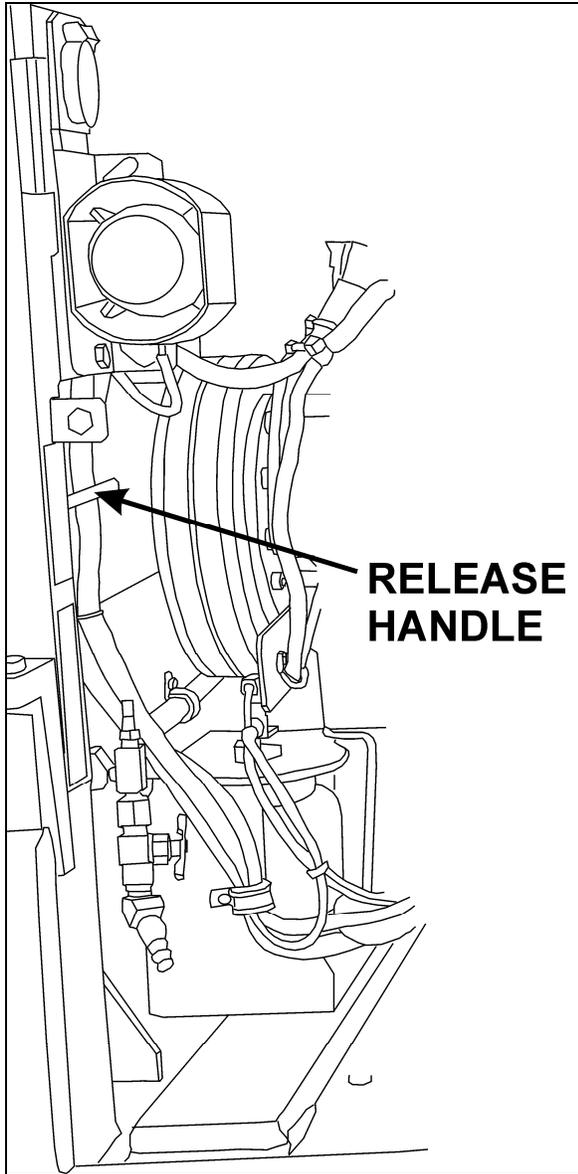
Unless otherwise stated, do not run the engine when the engine compartment is open.

These doors swing out to provide access to the following:

- Engine;
- Alternator(s);
- Compressor(s);
- Belt tension control valve (refer to chapter, Care and Maintenance);
- Engine starting selector (refer to chapter, Starting and Stopping Procedures);
- Coolant line shutoff valves;
- Certification plates;
- Engine coolant surge tank and filler cap;
- Air filter restriction indicator;
- Engine oil dipstick;
- Engine oil reserve tank (with DDC S60 engine);
- Power steering fluid reserve tank;
- Allison automatic transmission fluid dipstick;

8 Coach Exterior

A catch holding each door open engages when the door is fully open. Release the catches before closing the doors. Close the L.H. door first, then firmly shut the R.H. door.



OPENING ENGINE COMPARTMENT REAR DOORS 18608

Turn the lights ON in the engine compartment using the switch on the rear start panel.

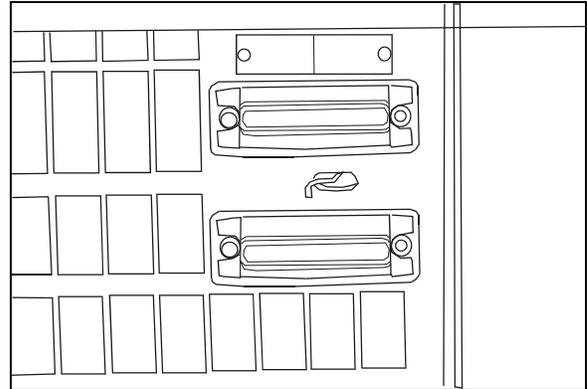


WARNING

Unless otherwise specified, do not run engine when the engine compartment rear doors are open. Close the engine compartment rear doors before starting the engine.

ENGINE RADIATOR DOOR

Open the engine radiator door by pushing the release lever sideways.



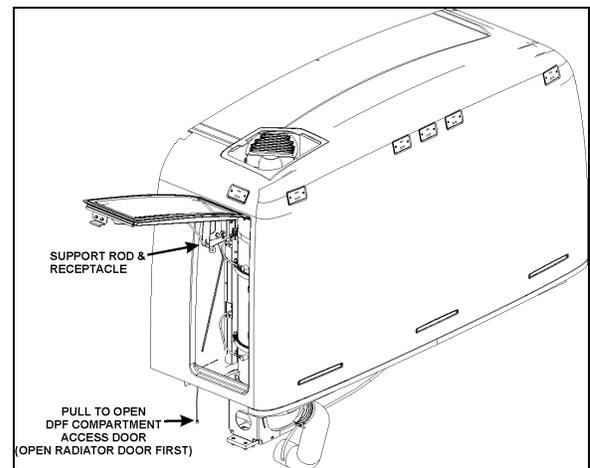
RADIATOR DOOR

18560

DIESEL PARTICULATE FILTER (DPF) COMPARTMENT ACCESS DOOR

To gain access to the DPF, open the radiator door first. At the top of the radiator compartment, pull the catch connecting rod to unlock the DPF compartment access door and lift the door open.

Hold the door open by inserting the support rod free end into the receptacle located on the left side of the DPF.



ACCESS TO THE DPF

04023



WARNING

After inserting the support rod into the receptacle, make sure the rod supports the door securely from falling down on to your head or body.



WARNING

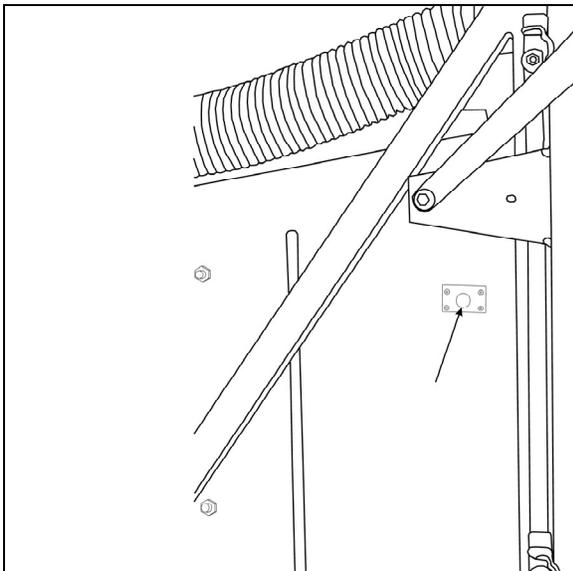
External and internal temperatures remain hot long after engine has been shutdown. Allow the Aftertreatment Device and DPF to cool before handling. Wear protective clothing and glove while servicing.

CONDENSER COMPARTMENT (A/C)

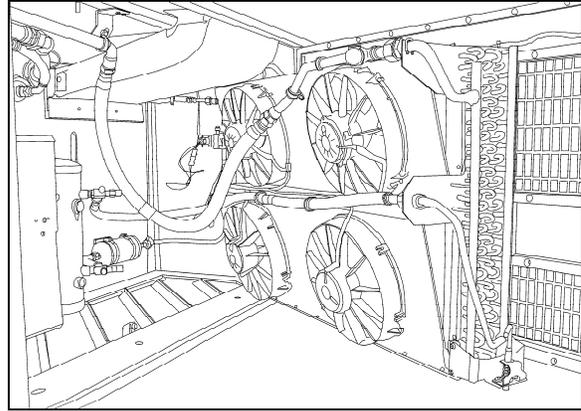
Pull the release latch located inside the L.H. side adjacent baggage compartment to open the condenser door.

The condenser compartment provides access to the following:

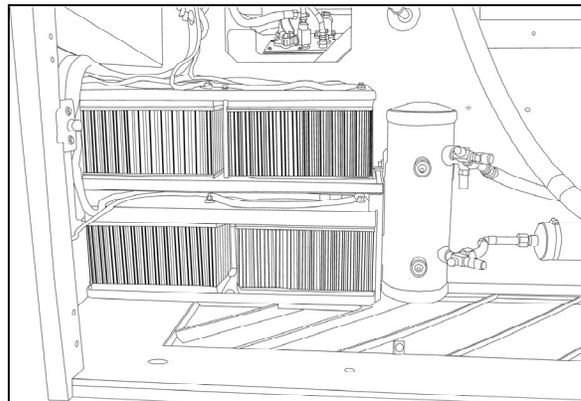
- 12 volt-Batteries;
- Battery equalizer;
- Condenser;
- Condenser fans and motors;
- Filter dryer and moisture indicator;
- Receiver tank;



ACCESS TO CONDENSER COMPARTMENT 18609



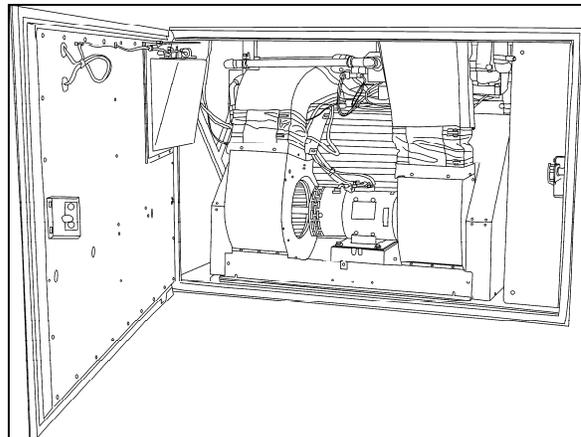
CONDENSER COMPARTMENT (A/C) 22299



BATTERIES LOCATION 22300

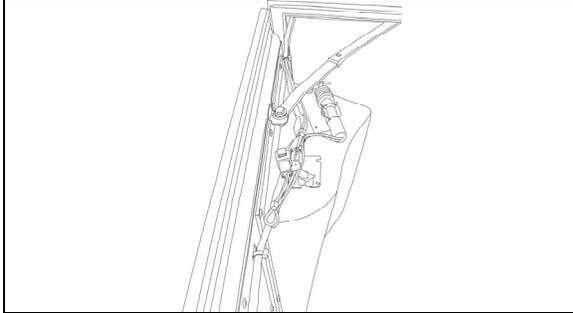
EVAPORATOR COMPARTMENT

The HVAC (Heating, Ventilating and Air-Conditioning) evaporator blower and coolant fluid circulation pump are located in this compartment. The compartment door release latch is located on the left side of the baggage compartment and to the right of the HVAC compartment door. Pull the release latch then swing the HVAC compartment door open.



EVAPORATOR COMPARTMENT 22301

10 Coach Exterior



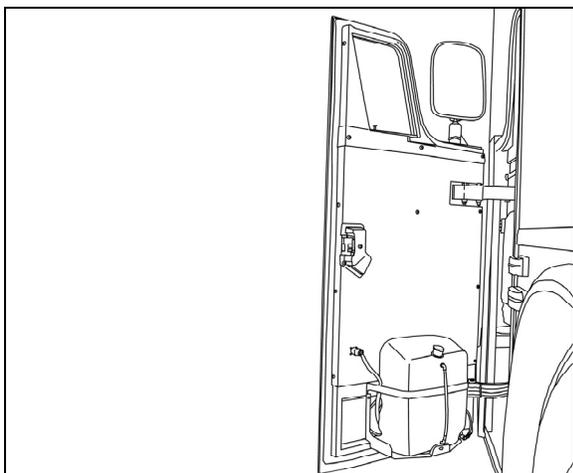
RECIRCULATION DAMPER

22302

FRONT ELECTRICAL AND SERVICE COMPARTMENT

To open the front electrical and service compartment door, pull the rod inside the vehicle, next to the driver's power window or use the key to open from outside the coach. The front electrical and service compartment provides access to the following:

- Front terminal block;
- Common Powertrain Controller (CPC) with DDC Series 60 engine;
- VECU with Volvo D13 engine;
- Vehicle Electrical Center Front (VECF), CECM and Multiplex Modules;
- Relays and fuses;
- ABS Electronic Control Unit (ECU);
- Emergency door opening unlatch valve;
- Windshield washer reservoir & headlights washer reservoir (optional);
- Accessory system fill valve;
- Accessory air tank drain valve;
- Jack and tools.



FRONT SERVICE COMPARTMENT DOOR

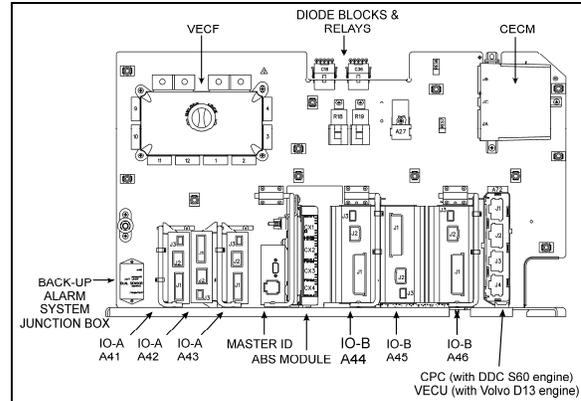
18610

This compartment door can be locked/unlocked using the exterior compartment key.

The light in the front electrical and service compartment turns *ON* automatically when the door is opened.

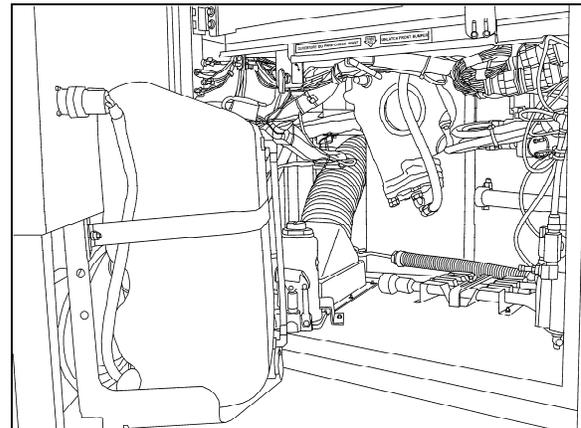
NOTE

Jack and tools are located inside the front electrical and service compartment.



FRONT ELECTRICAL COMPARTMENT

06673



FRONT SERVICE COMPARTMENT

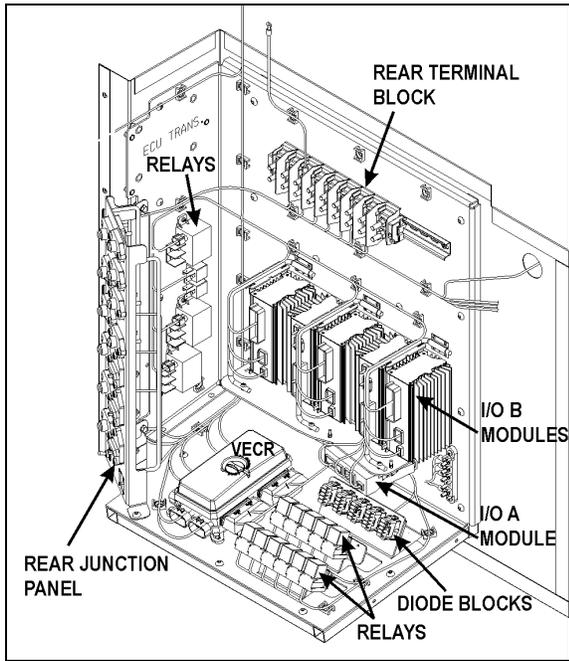
18611

REAR ELECTRICAL COMPARTMENT

The rear electrical compartment is located in the space between the evaporator compartment and the last baggage compartment (Super bay) on the driver side of the vehicle. The compartment is accessible from the last baggage compartment by removing a plastic access cover. The rear electrical compartment provides access to the following:

- Rear junction panel;
- Rear terminal block;
- Multiplex modules;
- Vehicle Electrical Center Rear (VECR)
- Battery charger;
- Relays and fuses;
- Transmission TCM
- Battery master switch (Master cut-out)
- Diagnostic Data Reader (DDR) receptacle, (refer to "Other Features" chapter).

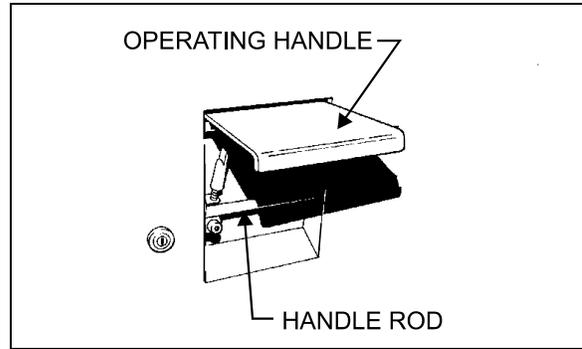
The lights turn ON automatically in the rear electrical compartment when one of the last baggage compartment doors is opened.



REAR ELECTRICAL COMPARTMENT 06618

BAGGAGE COMPARTMENTS

The baggage compartments of the X3-45 model provide 406 ft³ (11.5 m³) of storage capacity. The compartments can be locked or unlocked by using the exterior compartment key. Pull up operating handle to release the latch, and then pull the door open. Pressurized cylinders assist the opening and closing of the baggage compartment doors and hold the doors open.



BAGGAGE DOOR LOCK AND LEVER 18043

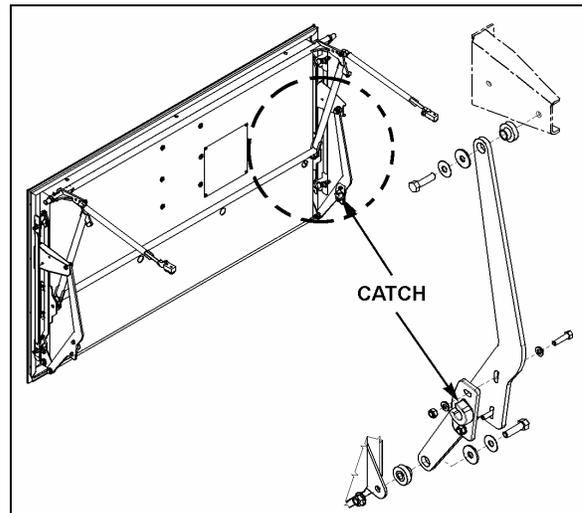
To close, pull the door down by the handle rod. Complete the closing of the door by returning the operating handle to its initial position.



CAUTION

Do not slam shut the baggage compartment doors. Damage to door weather-stripping or locking mechanism could result.

Lights in the baggage compartments turn ON automatically when the door is opened.



BAGGAGE DOOR CATCH 18612

NOTE

For added safety, open the door until the catch assist in holding the door in the open position.

NOTE

The baggage compartment doors can be locked/unlocked from the driver's position by the optional central locking system. The switch is on the L.H. control panel. Refer to "Controls & Instruments" chapter.

12 Coach Exterior



WARNING

To avoid injury, keep hands clear of baggage compartment door edge and door frame when closing.

NOTE

To prevent theft and vandalism, always lock the baggage compartment doors before leaving the vehicle unattended.

SPARE WHEEL COMPARTMENT

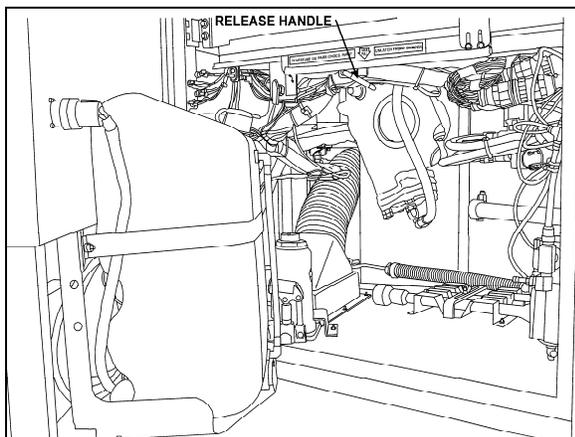
The front bumper can be tilted downward to give access to the spare wheel.



WARNING

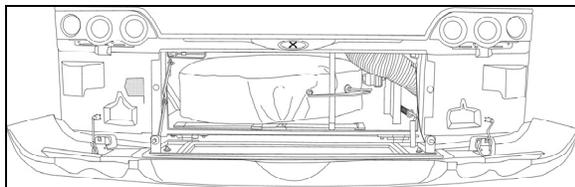
The compartment behind the bumper is not designed for miscellaneous storage. Never store loose objects in this compartment since they can interfere with the steering linkage mechanism.

Pull the release handle located inside front service compartment to tilt down the entire bumper assembly.



RELEASE HANDLE

18613



SPARE WHEEL IN FRONT BUMPER COMPARTMENT 18614



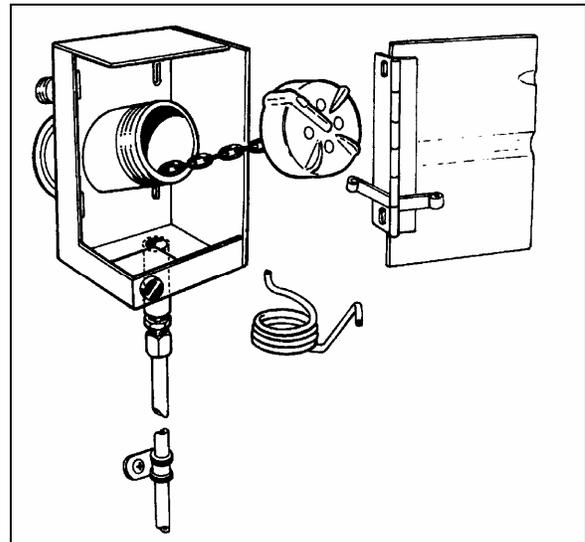
WARNING

Although a powerful spring assists in reclining the bumper, it remains heavy and rests low when open. Caution should be used when reclining.

Check that bumper is securely closed shut before driving.

FUEL FILLER DOOR

The fuel filler door is located on the R.H. side of the coach providing easy fuel filling. A spring keeps the door either open or shut. A key is provided for unlocking the door if the option was chosen.



FUEL FILLER DOOR

03046

NOTE

Provided the vehicle is parked on level ground, an automatic nozzle will automatically shut off when tank is approximately 95% full.

NOTE

The fuel filler door must be in the unlocked position before closing



CAUTION

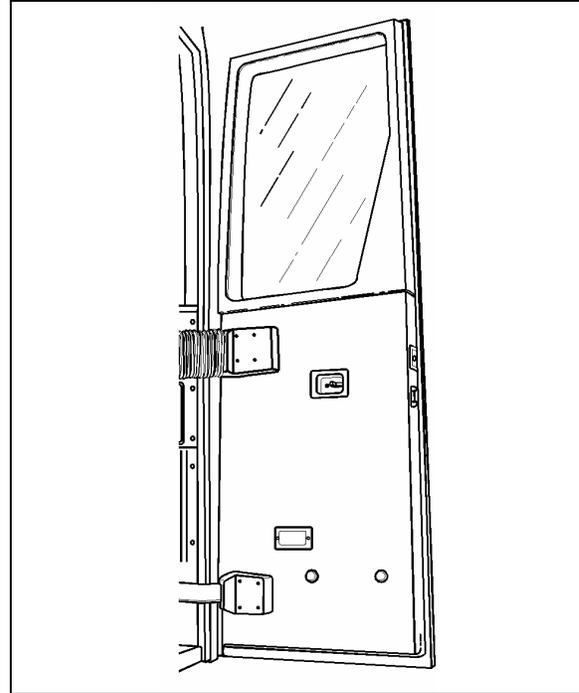
Do not fill to more than 95% of the tank capacity. Do not "top off" the tank, doing so may result in fuel spillage when the fuel expands.

ENTRANCE DOOR

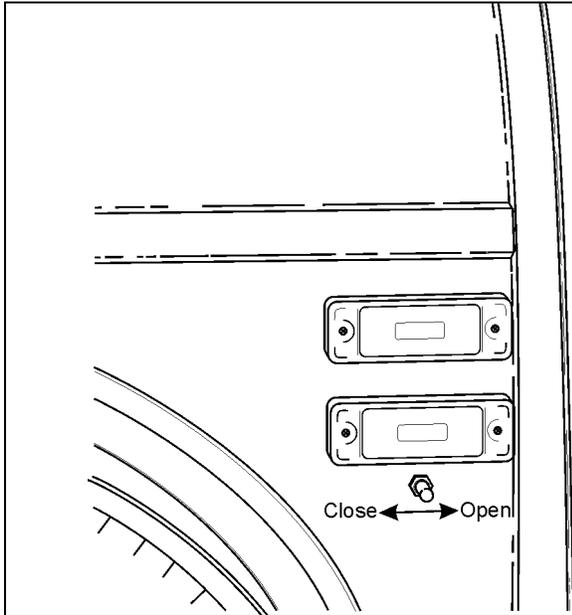
Lock or unlock the entrance door from outside the vehicle by turning the key in the door lock (counterclockwise to lock, clockwise to unlock).

From outside, open the door by pushing the switch forward, close by pushing the switch rearward.

The only way to unlock the entrance door from the inside is by sliding its lock lever to the left. If the orange tab on the door-lock lever is visible, the door is unlocked.



ENTRANCE DOOR 18001



ENTRANCE DOOR EXTERIOR SWITCH 18599

From the inside, open the door by pressing the door opening switch (L.H. button) on the R.H. dashboard panel. Close by pressing the door closing switch (R.H. button) on the dashboard. Refer to "Controls and Instruments" chapter for more information.

DOOR OPERATION LOGIC

If the switch is held in position until the door is fully open or closed, the system holds pressure in the door cylinder, locking the door in that position. The door can be opened to any position by releasing the switch (or button, if inside) when the desired position is attained. However, the door is not locked in any position other than fully open or fully closed. The door can then be opened or closed further by pushing or pulling on the door.

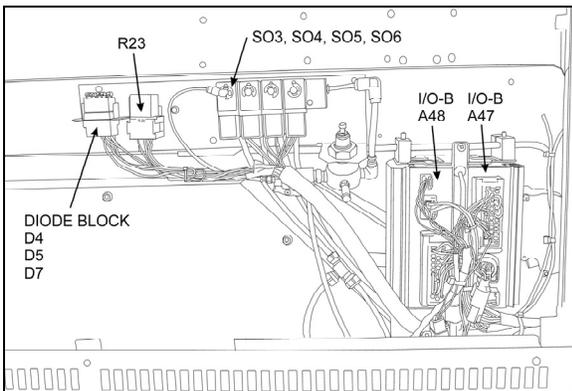
A proximity sensor will finish the closing of the door when it senses the door is almost shut. This works even when the door is shut manually.

EMERGENCY ENTRANCE DOOR OPENING

Refer to "Safety Features and Equipment" chapter.

WHEELCHAIR LIFT ACCESS DOORS

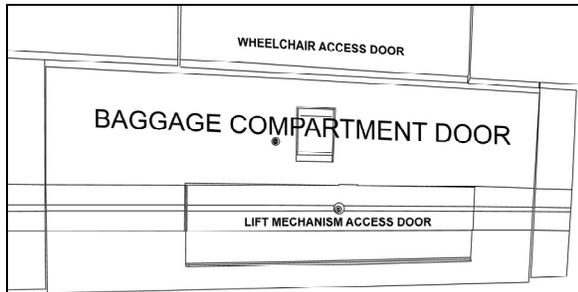
To open the optional wheelchair lift access doors, the coach must be parked on a flat and level surface with the parking brake on. Using the exterior compartment doors key, unlock and carefully lower the lift mechanism access door which is part of the baggage compartment door. The lift mechanism access door is located directly below the wheelchair access door. A



ENTRANCE DOOR & WIPER CONTROL PANEL 06614

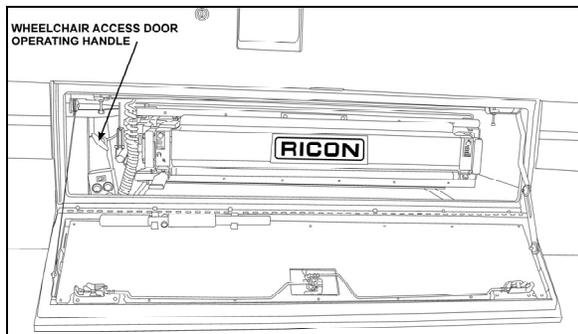
14 Coach Exterior

handle at the left of the lift mechanism unlocks and enables opening of the wheelchair access door. If the parking brake is not activated, a switch in the door will activate the parking brake when it detects the door is open.



WHEELCHAIR LIFT ACCESS DOORS 18615

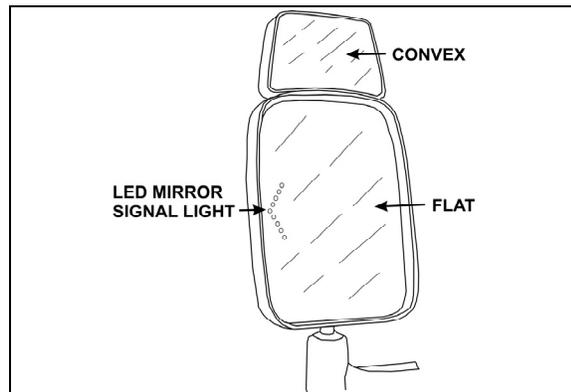
Open the wheelchair access door completely until it locks in the open position. To close the door, pull on the tab located on the inside of the door and slam the door shut. Refer to "Other Features" for more information on operating the optional wheelchair lift.



WHEELCHAIR ACCESS DOOR OPERATING HANDLE 18616

REAR VIEW MIRRORS

The vehicle is equipped with flat-type and convex-type rear-view mirrors. Convex mirrors give a wide angle view. Objects viewed in convex-type rear-view mirrors appear smaller and are actually closer than they appear.



REAR VIEW MIRRORS 18668

To provide good visibility in cold weather, the mirrors can be equipped with heating elements. The elements are activated by a rocker switch located on the dashboard. Refer to "Controls & Instruments" chapter. Thermostats are used to prevent continuous operation of the heating elements.



CAUTION

Do not attach stick-on type convex mirror accessories to the heated mirror glass. This could impede uniform heat distribution on the mirror surface and could break the mirror glass.

As an option, the mirrors may be equipped with LED turning signal lights to give an additional signal light when turning or changing lane for extra safety or for other drivers to see your signal when driving too close, in rain, fog or when in blind spot.

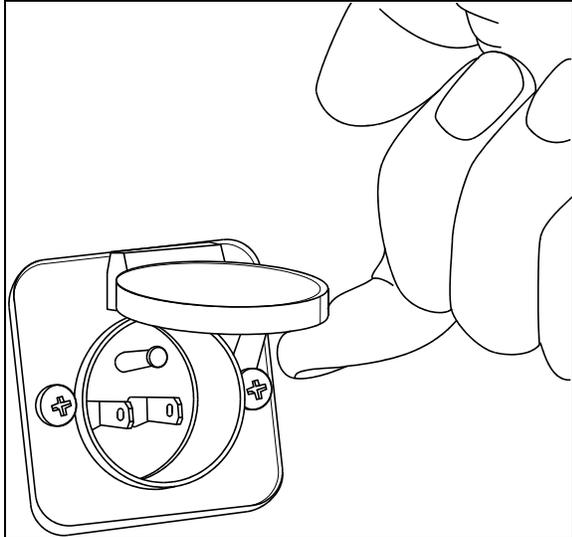
The mirrors are adjusted using the controls located on the L.H. control panel. Refer to "Controls & Instruments" chapter. Manual adjustment is also possible.

BACK-UP CAMERA

An optional back-up camera is available which provides the driver with visual assistance when backing-up. Camera monitor is installed on the dashboard L.H. side, on the windshield post. For additional information, refer to "Controls & Instruments".

110-120 VOLTS CONNECTOR

This connector is connected to the electric block heater and uses a 110-120 VAC power source. It is located near the engine compartment rear doors release handle. (Refer to chapter "Starting and Stopping Procedures").



PRISE DE 110-120 VOLTS

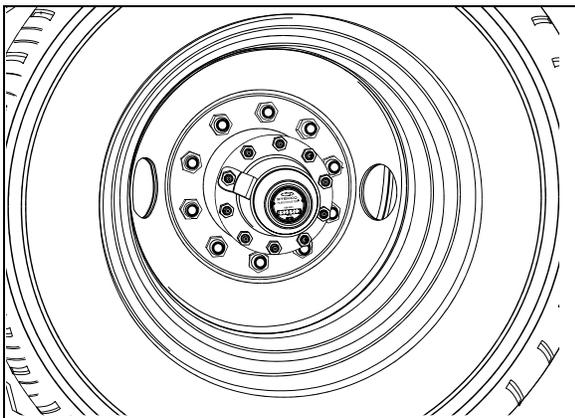
06390

HUBODOMETER

An odometer is installed on the curb-side drive axle wheel hub. The odometer calculates the total distance in miles or kilometers (depending on model installed) traveled by the coach since manufacture, including factory road testing.

NOTE

It is normal for the hubodometer, the DDEC ECM and the vehicle odometer to disagree on the total mileage.



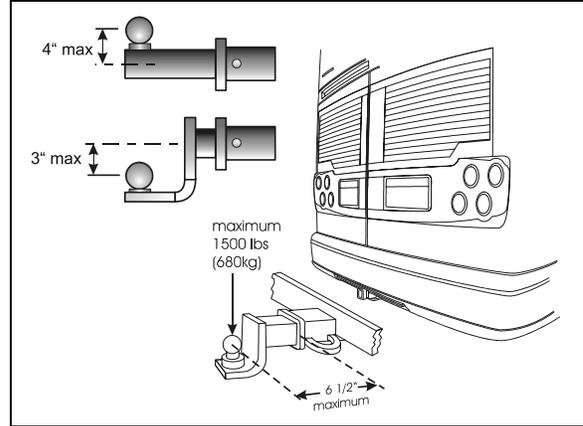
HUBODOMETER

13012

TRAILER HITCH

20 000 lb max. Gross trailer weight capacity (optional)

Your vehicle may be equipped with a factory installed trailer hitch which has been designed to meet the following rating:



TRAILER HITCH

23337

- **Maximum gross trailer weight: 20,000 lb (9072 kg)**
- **Maximum tongue weight at 6 1/2 inches (165 mm) or less from coupling receiver: 1,500 lb (680 kg)**



DANGER

The draw bar and the ball used for towing the trailer should be rated for 20,000 lbs capacity or more.



WARNING

Pulling a trailer weighing more than the recommended maximum gross weight may cause engine and transmission overheating, and also possible hitch failure.

NOTE

Pulling a trailer over long distances is considered as a "severe operating condition" for the vehicle and therefore, power plant requires more frequent servicing.

NOTE

The minimum requirement for a trailer weighing up to 20,000 lbs when coupled to a 20,000 lb Prévost Trailer Hitch is as per the following:

1. *Trailer must comply with **Federal Motor Carrier Safety Regulations 393.52** regarding trailer breaking capability.*
2. *The trailer coupling attachments meet the following minimum static test load requirements :*

16 Coach Exterior

- *Longitudinal tension and compression: (1.5 x GVWR of trailer)*
- *Transverse thrust: (0.5 x GVWR of trailer)*
- *Vertical tension and compression: (0.5 x GVWR of trailer)*

Loads indicated must be applied without incurring loss of attachments or distortion or failure which could affect the safe towing of trailer.

3. The ball and trailer coupling should meet the following minimum test load requirements without incurring failure:

- *Longitudinal tension and compression: (Gross Trailer Weight of trailer x 3)*
- *Transverse thrust: (Gross Trailer Weight of trailer x 1)*
- *Vertical tension and compression: (Gross Trailer Weight of trailer x 1.3)*

In this case, failure is identified as the point at which the coupling or ball will accept no additional test load without separation of the ball from the coupling ball socket, or the occurrence of a metal fracture of either coupling ball or coupling assembly, which results in separation of the ball from the coupling ball socket.

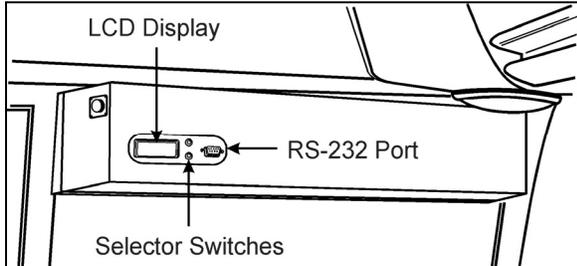
4. Two lengths of safety chain shall be used. The strength rating (minimum breaking force) of each individual chain and its connecting means shall be equal to, or exceed the trailer GVWR.

5. Towing vehicle must be equipped with engine or transmission retarder. The engine or the transmission retarder on the vehicle must be functional at all time (to be inspected frequently).

ELECTRONIC DESTINATION SIGN

Turn the optional destination sign lighting on and off using the rocker switch located on the dashboard. Refer to Controls & Instruments chapter.

Depress the selecting switches until the desired destination appears in the Liquid Crystal Display.



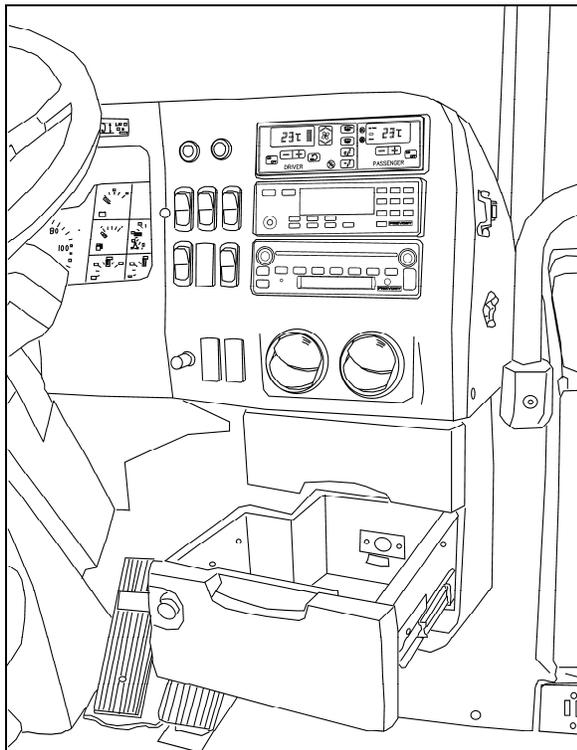
ELECTRONIC DESTINATION SIGN 23123

NOTE

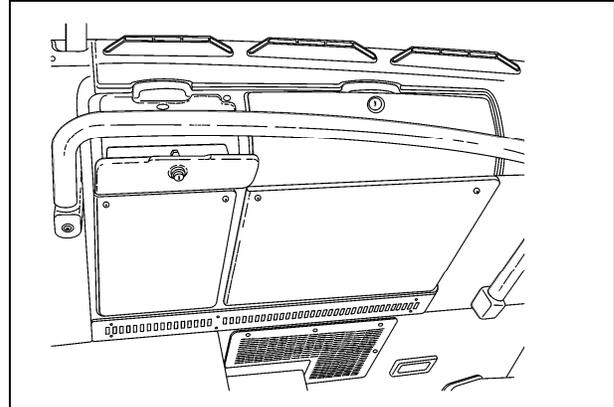
The destination sign must be programmed with a computer connected to the RS-232 connector prior to first use. Follow the instructions on the computer disk to install and run the software.

UTILITY COMPARTMENTS

Two lockable utility compartments are located at the base of the windshield. Another utility compartment is located on the console, and includes a 12 volt appliance socket.



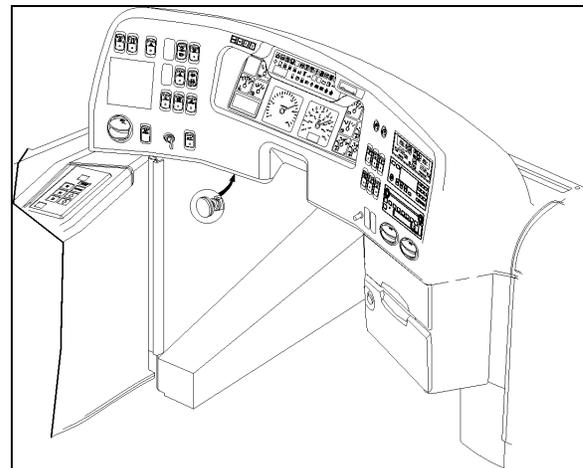
UTILITY COMPARTMENT IN CONSOLE 18669



UTILITY COMPARTMENTS 18602

STEERING WHEEL ADJUSTMENT

Push on the valve button located in the foot-operated control housing to unlock the steering wheel for tilt and telescopic adjustment (refer to "Controls and Instruments" chapter).



TILT AND TELESCOPIC ADJUSTMENT 18670



DANGER

Do not adjust the steering wheel while driving. Loss of control could result. Park the vehicle safely and apply parking brakes before adjusting the steering wheel.

AISLE MIRROR

A central mirror allows the driver to see in the aisle. Adjust mirror manually.

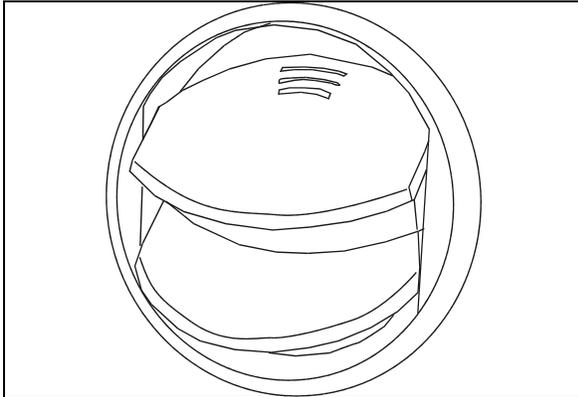
ADJUSTABLE HVAC REGISTERS

The HVAC system has adjustable registers to control air flow around the driver's area. Three are located on the dashboard; two on the R.H.

18 Coach Interior

side and one on the L.H. (refer to Controls & Instruments chapter). Another one is located close to the door, below the modesty panel wall for step de-icing. The direction and volume of air flow are adjustable manually.

Use the HVAC control panel to set air temperature.



AIR REGISTER

22249

DRIVER'S SEAT - ISRI

The coach is equipped with one of two models of ISRI driver's seats. Standard is the mechanically adjusted seat and pneumatic model is available as an option. Both seats are equipped with safety belts. Lumbar supports, heated cushions and adjustable armrests are optional.



DANGER

The driver's seat must be adjusted to allow the driver easy access to the coach controls. Never adjust seat while driving vehicle as this could result in loss of vehicle control.



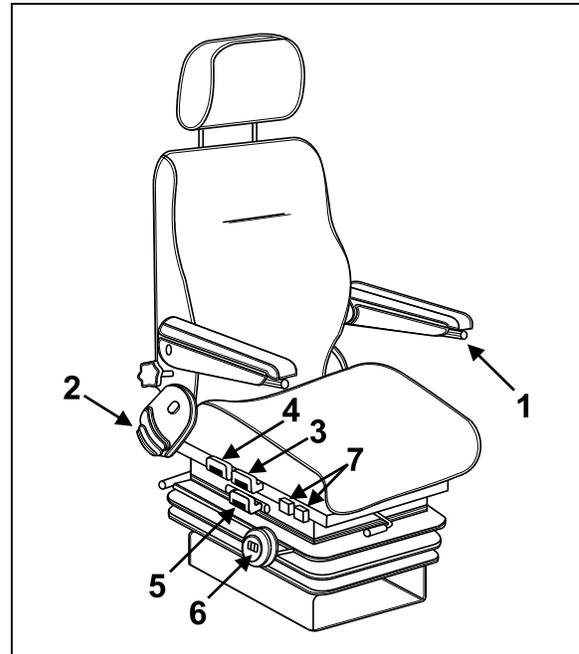
DANGER

Make sure that seat is adjusted and that safety belt is buckled up before driving vehicle.

MECHANICAL ISRI SEAT

Adjustment

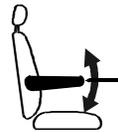
Seat can be adjusted to the desired driving position by following the instructions listed below:



DRIVER'S SEAT ADJUSTMENT (MECHANICAL)

18333

Armrest



18334

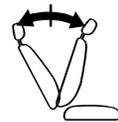
The driver's seat can be equipped with two folding armrests.

To lower the armrest:

- Turn control knob #1 (refer to figure: Driver's seat adjustment (mechanical)) counter-clockwise without applying pressure on the armrest
- Push the armrest down.
- Repeat procedure until desired position is reached.

To raise the armrest, move it to the desired position and turn control knob clockwise until it stops.

Backrest



18335

Lift lever #2 then adjust backrest to the desired angle.

Tilt (front)



18336

To lower or raise the seat's front section, pull handle #3 up and push or pull the seat cushion.

Tilt (rear)



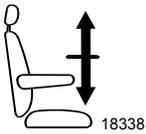
To lower or raise the seat's rear section, pull handle #4 up and push or pull the seat cushion.



WARNING

To avoid pinching the fingers between buckle and controls, lower safety belt buckle before adjusting seat height

Up and Down



Pull both handles (3 and 4) up to adjust height of the seat.

Fore and Aft



To adjust distance between driver and dashboard, pull handle #5 up and slide the seat forward or backward.

NOTE

Fore-and-aft seat adjustment control may also be located at the front of the seat.

Suspension



For maximum mechanical suspension performance, rotate handwheel #6 until your body weight (in pounds) is shown on the indicator.

The seat suspension resistance can be changed to suit the driver. Turn handwheel clockwise to increase suspension resistance and counter-clockwise to decrease resistance.

Lumbar Support



To inflate the upper lumbar support bellows, depress the front rocker switch #7 upward. To deflate, depress the rocker switch downward.

Follow the same procedure to inflate and deflate the lower bellows using the rear rocker switch.

Headrest



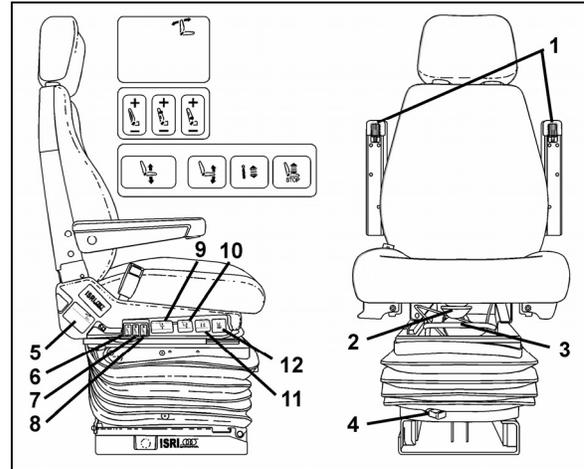
The headrest can be adjusted forward, rearward and vertically by 2 inches (50 mm). Directly move headrest to desired position.



DANGER

For best protection, position headrest behind your head, not behind your neck.

PNEUMATIC ISRI SEAT



PNEUMATIC DRIVER'S SEAT

18385

Armrest (1)

Rotate control knob to select desired arm-resting angle. When not in use, raise armrest parallel with backrest.

Seat Cushion (2)

Provides optimum comfort and support for any driver size. Adjustable to 50 mm (2 inch) length.

Fore-and-aft (3)*

Pull handle up and slide seat forwards or backwards to adjust distance between seat and dashboard.

Isolator (4)

Reduces horizontal vibration, ensuring smooth ride.

Backrest (5)

Lift lever to select proper angle of backrest.

Air Side Bolster (6)

Offers desired side support to avoid body side-way.

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Air Lumbar (7) (8)

Provides back support with upper and lower settings, ensuring comfort during lengthy sitting.

Air Height Adjustment (9)

Moves seat up or down independently of other seat settings. 100 mm (4 inch) total travel.

Adjustable Seat Recline (10)

Allows easy adjustment of four-setting inclination.

Adjustable Shock Absorber (11)

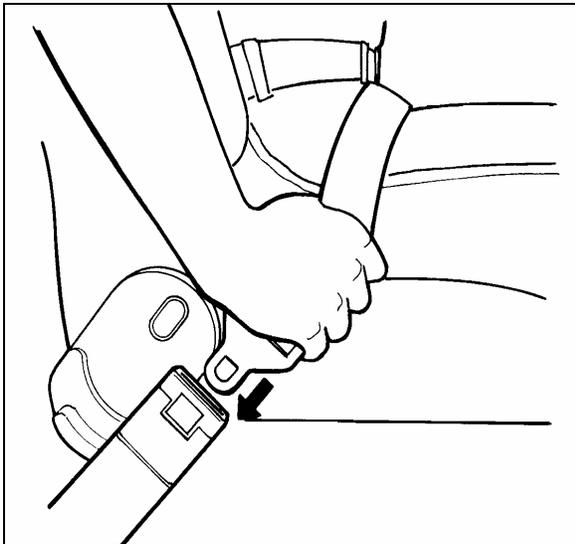
Choose stiff or soft ride infinitely.

Quick Air Release (12)

Exhausts all air from suspension, allowing for easy entry/exit. Returns seat to previous position.

SAFETY BELTS

The driver's seat is equipped with a retractable safety belt as required by State, Provincial and Federal regulations. To fasten, pull seat belt out of the retractor and insert the latch plate into the buckle until it clicks. No special adjustment is required since the reel device is self-adjusting. If seat belt operation becomes defective, report to maintenance personnel immediately.



FASTENING SEATBELT

18028

NOTE

The safety belt must be pulled out slowly and continuously, otherwise it will lock the reel before the latch plate reaches the buckle. If this happens, allow the belt to retract completely and repeat the procedure correctly.



WARNING

A snug fit with the lap belt positioned low on the hips is necessary to maximize driver safety. The belt should not be worn twisted. Avoid pinching belt and/or belt hardware in seat mechanism. Do not wear belt over rigid or breakable objects, such as eyeglasses, pens or keys as these may cause injuries.



CAUTION

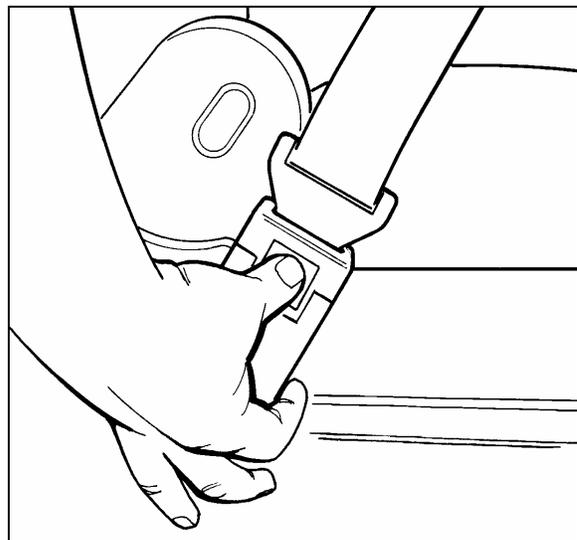
Never bleach or dry clean safety belt.

To unfasten belt, press the red button in center of buckle and allow belt to retract. If the belt does not fully retract, pull it out and check for kinks or twists. Make sure that it remains untwisted as it retracts.



DANGER

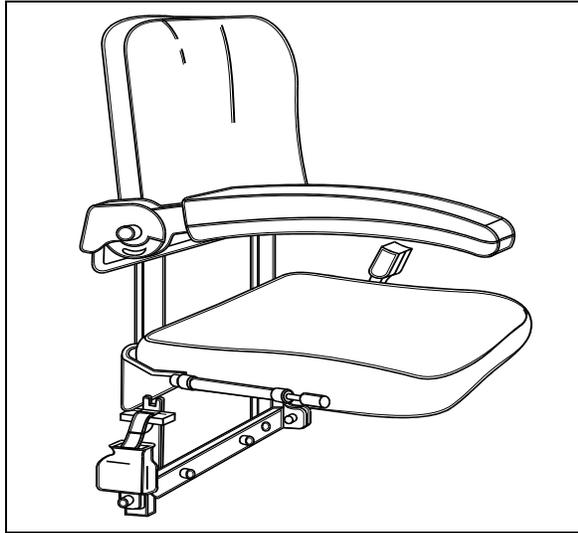
Most State and Provincial laws require that safety belts be worn when they are supplied with the seat.



UNFASTENING SEATBELT

18029

TOUR GUIDE SEAT



TOUR GUIDE SEAT

18347

The optional folding tour guide seat is equipped with a retractable arm rest and safety belt. The seat can be folded up for convenience when embarking and disembarking passengers.

The tour guide seat can be removed and stored in the first baggage compartment. To remove the seat from the stairwell wall, unscrew and remove the two anchoring pins and washers at the bottom of the seat assembly. Raise and unhook the seat assembly.



DANGER

Make sure tour guide's safety belt is buckled up prior to departure.

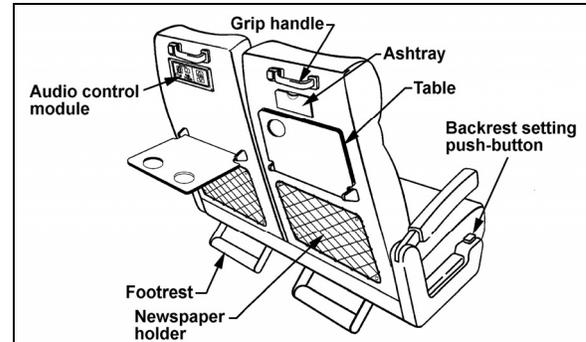
MICROPHONE JACKS

Up to six microphone jacks for the PA system can be located in the following locations:

- On the side wall of the driver's control panel;
- On the right hand side of the dashboard;
- One optional outlet for the tour guide on each of the modesty panels;
- One optional outlet on the lavatory wall, behind the last row of seats;
- One optional outlet under the overhead storage compartment, at the rear of the coach.

PASSENGER SEATS

Passenger seats may be equipped with grip handles, ashtrays, newspaper holders, trays, cup holders and footrests.



PASSENGER SEAT EQUIPMENT

18121A

All seats are track-mounted so that the seating configuration can be changed. Each set is mounted on rectangular aluminum bases to make cleaning between the base and side wall easier.

Passenger seat backrests can be tilted by using the push-button located on the base of the seat. Depress and hold push-button, then adjust backrest to the desired angle. Release push-button to lock backrest in position.

A folding armrest is installed on the aisle side of the passenger. Another folding armrest is located between the two seats and can be raised for passenger convenience. A fixed armrest is installed on the window side of the seat.

SWIVEL SEATS

The coach may be equipped with two sets of swivel seats to allow installation of card tables. The swivel seat can be rotated for passenger privacy. To rotate seats, unscrew the wing nut from under each seat cushion then remove cushions. Remove the four wing screws, pull seats toward the aisle and rotate the seat counter-clockwise. Align mounting holes, secure with wing screws and install seat cushions.

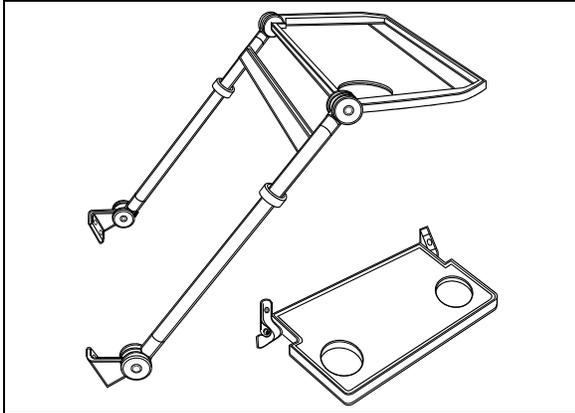
NOTE

Instructions for making swivel seat adjustments are affixed on the rear frame under the seat cushion.

FOLDING TRAYS

Two optional folding tray models can be installed in the coach.

22 Coach Interior



FOLDING TRAY MODELS

23140

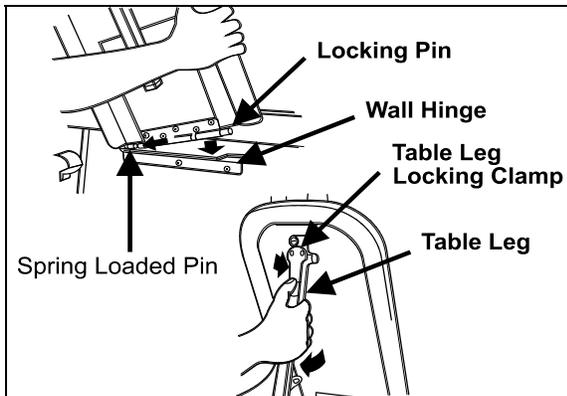
NOTE

Both tray models as well as the tray installed onto each modesty panel, are equipped with tumbler holders.

CARD TABLES

Two card tables are provided as standard equipment and are used in the passenger swivel seat configuration. The card tables are stored in the overhead storage compartments in separate stowage bags.

To install the card table, hold it at 45° (degrees) to the side wall. Insert the spring-loaded pin then the locking pin into the hinge. Push on the locking clamp to release the leg. Unfold the leg until the clamp locks it in position.



CARD TABLE INSTALLATION

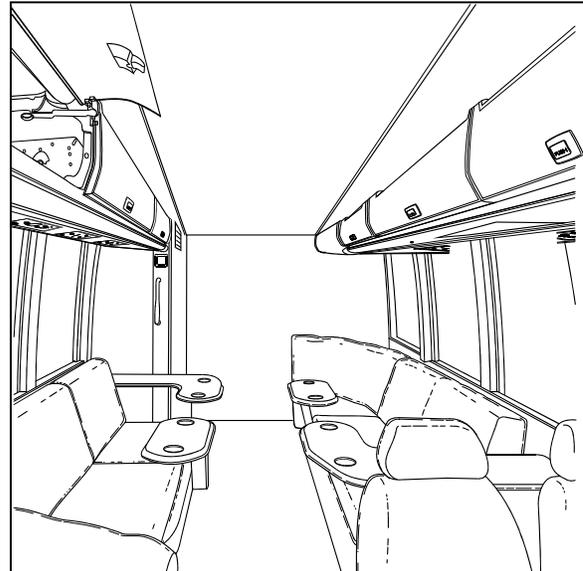
23146

QUICK-LOUNGE SYSTEM

"Quick-Lounge" is a quick-fit modular system providing luxurious seating accommodations for passengers.

The optional "Quick-Lounge" system occupies the same space as the paired seating

configuration it replaces. The existing seat spacing remains unchanged.

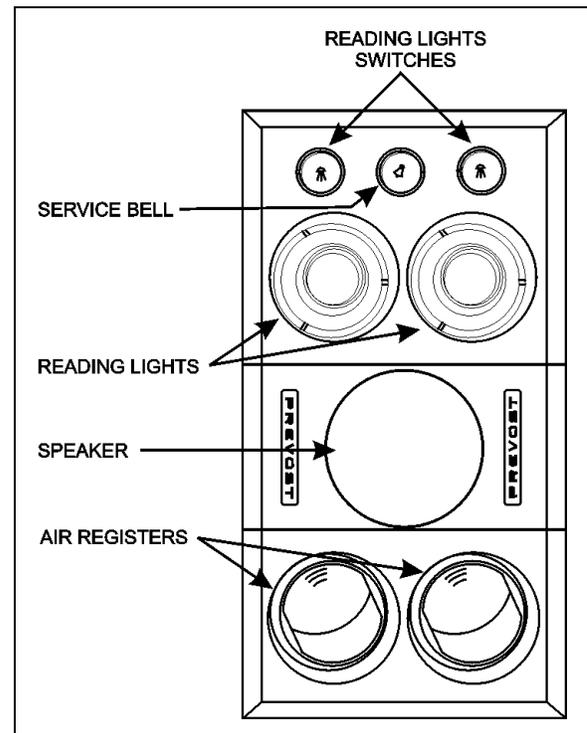


QUICK-LOUNGE SYSTEM

18395

OVERHEAD CONSOLE

One airplane type overhead console is installed above each row of twin seats to provide a total of 107 ft³ (3.0 m³) of storage capacity. Such amenities as reading lights, air vents and an optional service bell are controlled from this panel.



OVERHEAD CONSOLE

23137

ADJUSTABLE AIR REGISTERS

Manually adjustable registers located on the overhead console provide air flow to the passengers. Air flow can be directed, passengers can orient individual registers by rotating the nozzle. To adjust air flow, passengers must open or close the flaps. Activation of the fans is done by depressing a rocker switch on the dashboard. Refer to Controls & Instruments chapter.

SERVICE BELL

Pressing the service button on the overhead console will illuminate the button providing a visual cue for service personnel and, if activated, will sound a chime in the driver's area. The chime system is activated by a rocker switch located on the dashboard. Refer to Controls & Instruments chapter. Passengers may also use the chime system to request a stop for disembarking. Press the service button a second time to cancel the service request. To adjust the chime volume level, refer to "CONTROLS & INSTRUMENTS" chapter under Audiovisual Controller.

READING LIGHTS

Reading lights are mounted underneath the overhead storage compartments. Depressing a rocker switch located on the dashboard (refer to Controls & Instruments chapter) will activate the reading light circuit and allow passenger control of reading lights.

WINDOWS

The coach is equipped with frameless flush-mounted "Galaxsee" windows all around and a split-window windshield for maximum visibility.

PANORAMIC WINDOWS

Panoramic side windows can come in either single pane or, as an option, double pane (thermopane) glass. Some of these windows are of the fixed type; they are bonded to the structure and cannot be opened. Others can be easily opened to serve as emergency exits.

Fixed Windows

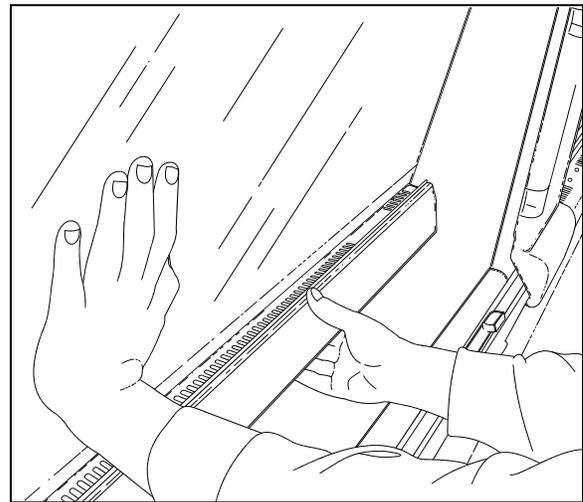
These windows are bonded to the structure and form an integral part of the body of the vehicle, helping reduce vibration and noise. Fixed windows cannot be opened.

Emergency Windows

These windows can be opened from inside the vehicle as emergency exits. A decal on window sills indicates the location of the emergency windows. To open an emergency window, lift the window release bar (sill) and push the window open from the bottom.

To close, lift the release bar and pull the window into position. Push down on release bar to lock the window shut.

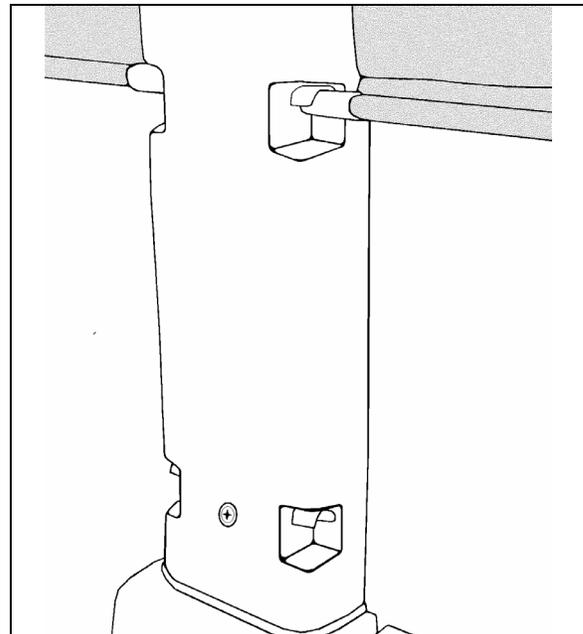
For more information on emergency features, refer to "Safety Features and Equipment" chapter.



EMERGENCY WINDOW OPENING

18391

Window Sun Shades



PULL DOWN SUN SHADES

18374

24 Coach Interior

Passenger windows may be equipped with pull-down sun shades. To operate, pull down the shade and insert the hem into the first or second catch. To retract pull out from the slots and guide the shade back up.

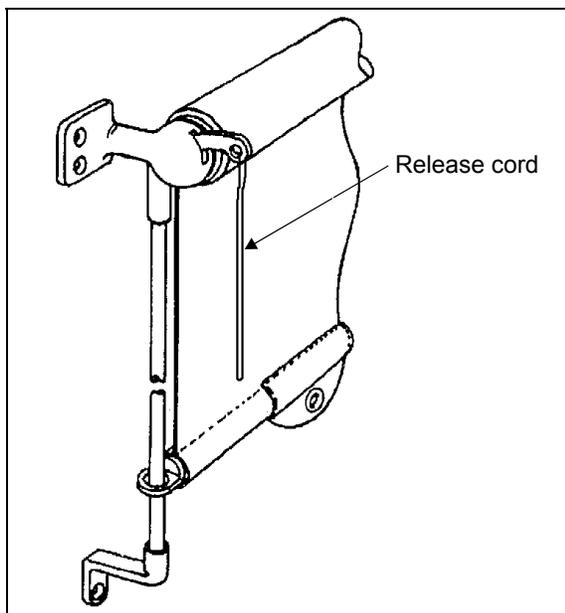
DRIVER'S POWER WINDOW

The driver has a power window on the left side of the coach. The windows are controlled by a rocker switch located on the driver's control panel. Refer to "Controls and Instruments" chapter.

Driver's window shades

This vehicle is provided with a spring release type sun shade on the driver's left side window. Another spring release type shade is available on the optional driver's guard. To operate, pull down the shade by its hem to the appropriate position and release. It will remain in position. To raise, depress the unlocking lever and guide the shade back up using the other hand.

Two electrically-operated shades are installed behind the windshields. Two rocker switches on the dashboard operate each shade individually. Refer to "Controls and Instruments" chapter for more information.



SPRING RELEASE SUNSHADE

23019

VENTILATION HATCH

A ventilation hatch is installed in the ceiling at the front of the coach. To open the hatch, push up with both hands and pull down to close. The ventilation hatch can be completely opened for emergency egress. Refer to "Safety Features and Equipment" chapter.



WARNING

Be aware of coach overhead clearance when traveling under overpasses with the ventilation hatch(es) open. Check for maximum clearance height.

OVERHEAD COMPARTMENTS

Passenger carry on baggage is stored in overhead compartments on each side of the coach. A first aid kit is located in the first front curb side overhead storage compartment. An optional video cassette player and a CD player may be installed in the first front driver's side overhead storage compartment.

To open the optional closed overhead storage compartments, push the handle in to release the latch, then let go. A pressurized cylinder opens the door.

NOTE

The overhead storage compartments have a minimum amount of separators installed so as to quicken inspection for forgotten objects.

NOTE

An optional lock can be installed on the first front driver's side overhead storage compartment door.



OVERHEAD STORAGE COMPARTMENTS

18603

WASTE CONTAINER

The waste container is located on the lavatory wall, and is accessible through an opening on each side of the wall. A small door, located on the aisle side, gives access to the waste container for cleaning.

GALLEY

The optional galley may include features such as a microwave oven and refrigerator to accommodate hot or cold food and beverage service. The galley's electrical power circuit is activated by a rocker switch located on the dashboard. Refer to "Controls & Instruments" chapter.

LAVATORY

The lavatory is located in the rear curb side corner of the coach. It is equipped with a chemical flush toilet, bathroom tissue dispenser, wash-basin, towel dispenser, waste container, mirror and a hose outlet in a compartment located over the mirror. A liquid soap dispenser and moist towel dispenser are optional.

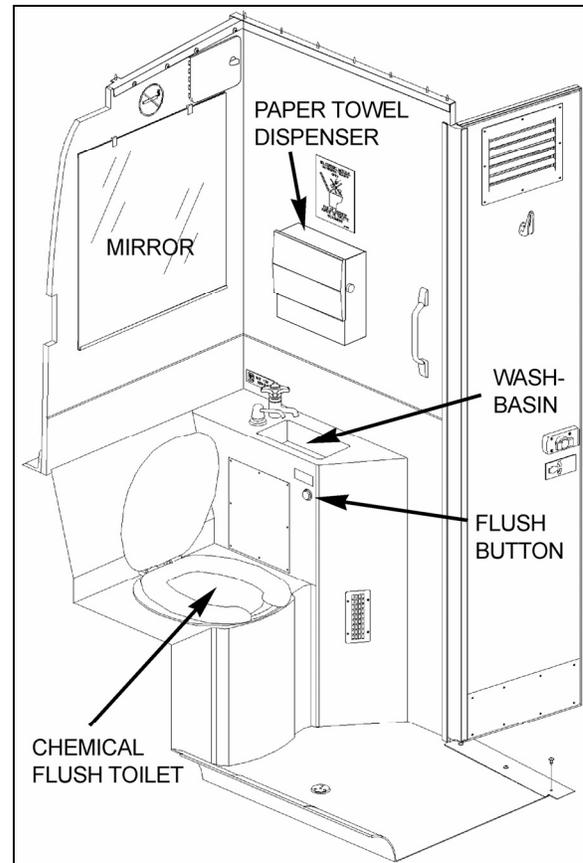
Locking the lavatory door from the inside will illuminate a fluorescent light in the lavatory and two outside signs to indicate occupation. One sign is located on the outer wall of the lavatory and another sign is located over the windshield. A telltale light on the dashboard will illuminate to inform the driver when the lavatory is occupied. A night-light is permanently lit in the lavatory when the ignition switch is in the ON position.

If emergency assistance is required, the lavatory occupant can actuate a buzzer that will sound in driver's area. The buzzer's push-button (c/w instruction label) is located on the inner curbside wall of lavatory.

The lavatory has its own ventilation system that operates only when the ignition switch is in the "ON" position.

NOTE

This fan runs constantly when the ignition switch located on the dashboard is in the "ON" position.



LAVATORY

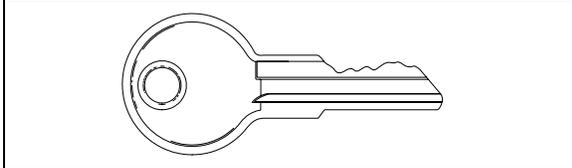
23235

26 Controls and Instruments

KEYS

Depending on options, up to eight different keys are provided with the coach.

IGNITION KEY



IGNITION KEY

23056

Coaches may be equipped with an ignition lever instead of an ignition key. Use the ignition switch to activate the electrical circuit by turning it counterclockwise to the ACC position.

To start the engine, turn the key clockwise to the START position, and then release it. The key will set to ON position.



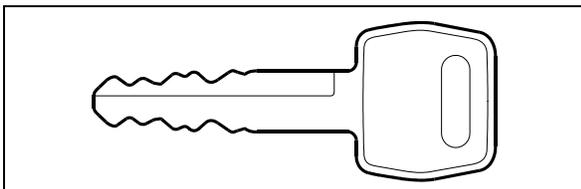
CAUTION

When the vehicle is parked overnight or for an extended period of time, the battery master switch (ignition switch) should be set to the OFF position.

NOTE

When the battery master switch (ignition switch) is set to the OFF position, all electrical supply from the batteries is cut off, with the exception of battery equalizer check module, ECM ignition and power supply, Allison TCM, ZF Transmission ECU, coolant electronic, coolant heater and water re-circulating pump, pro-driver, power-verter, fire alarm and entrance door.

ENTRANCE DOOR AND EXTERIOR COMPARTMENT DOORS KEY



ENTRANCE DOOR AND EXTERIOR COMPARTMENT DOORS KEY

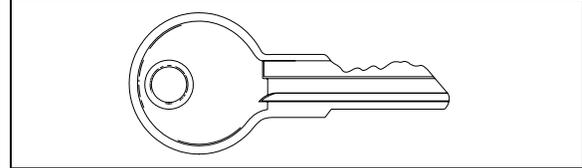
23244

Use this key to lock or unlock the entrance door, the baggage doors the electrical and service compartment doors, except the fuel filler door.

NOTE

It is also possible to lock or unlock the baggage compartments and service compartments from the inside by means of the optional central locking system.

UTILITY COMPARTMENTS KEY



UTILITY COMPARTMENTS KEY

23056

This key locks or unlocks the utility compartments and the utility drawer on the dashboard.

FUEL FILLER DOOR KEY (OPTION)

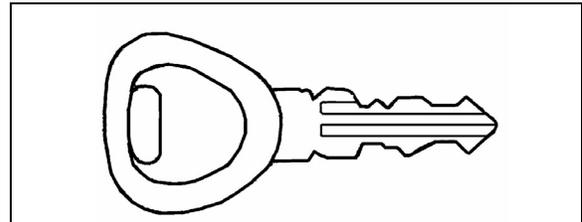


FUEL FILLER DOOR KEY

23014

Use this key to lock or unlock the fuel filler door.

LAVATORY DOOR KEY

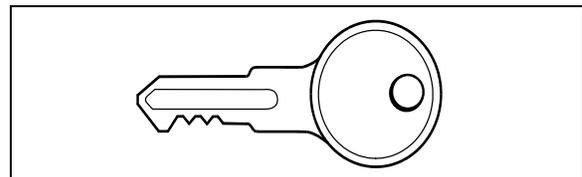


LAVATORY DOOR KEY

23302

Use this key to lock or unlock the lavatory.

UTILITY AND VIDEO COMPARTMENT KEY

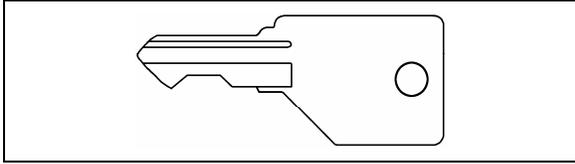


UTILITY AND VIDEO COMPARTMENT KEY

23246

Use this key to lock or unlock the lockable utility compartments and the lockable overhead compartment containing the video cassette player.

HAND TOWEL DISPENSER KEY



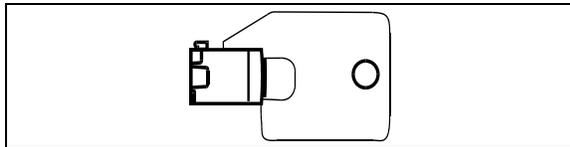
HAND TOWEL DISPENSER KEY 23354

Use this key to open the hand towel dispenser.

NOTE

Optional moist towel dispenser uses another key.

TV MONITOR KEY



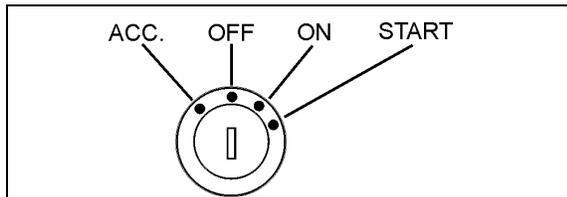
TV MONITOR KEY 23248

Use this key to remove the TV monitors for maintenance.

NOTE

For your protection against theft, record the key numbers and keep this information in a safe place. Do not keep these records inside the vehicle. It is also advisable to deposit a duplicate of each key in a safe place, so they can be obtained without difficulty in case of an emergency or loss.

IGNITION SWITCH



IGNITION SWITCH POSITIONS 06354

The ignition switch doubles as the battery master switch. Any position other than OFF activates the electrical circuits. Electrical circuits are also activated when the hazard switch is depressed. Two auxiliary master switches in series with the ignition switch are installed on the vehicle; one is located in the rear electrical compartment and one in the engine compartment on the rear start panel, for maintenance ease.

The ignition switch is located on the lower left side of the dashboard. It has four positions:

Off

In the *OFF* position, ignition cannot take place. The key can be removed when in this position.

The electrical circuits are not activated when the switch is in this position. Only the accessories connected directly to the batteries can be activated. These are the coolant heater and water pump, the battery master switch, the central locking system, the entrance door and Message Center Display (MCD). Maintain the switch in this position when parked overnight or for an extended period.

NOTE

The battery master switch is ON when the hazard flashers are activated, even if the key is in the OFF position.

Accessories

To operate the accessories only, turn the ignition key counterclockwise to the “ACC” position. The key cannot be removed when in this position.

The electrical circuits are activated when the switch is in this position or when the hazard flashers are activated.

The features enabled when the switch is in the ACC position are all those linked directly to the battery plus the exterior temperature display, the radio or entertainment system, exterior and interior lighting.

On

To place ignition switch to *ON*, turn the key clockwise to the first position. The key cannot be removed when in this position.

The electrical circuits activated when the switch is in the ACC position plus the transmission, engine and accessories, ABS system, wipers, dashboard cluster gauges and buzzers, air horn and air dryer heater are activated when the switch is in this position. Do not leave the key in this position unless the engine is running.

Start

Turn the key clockwise to the second position and release as soon as the engine starts. The key will return to the ON position. If the engine did not start, return the ignition key to the OFF position before trying to restart the engine.

The ignition switch is equipped with a starter protection which inhibits turning the key to the START position if the key has not previously been turned to the OFF position.

28 Controls and Instruments



CAUTION

To avoid overheating the starter, do not engage the starter for more than 15 seconds at a time. Allow the starter to cool before trying to restart the engine.



CAUTION

If the "STARTER ON" Indicator light remains illuminated even after releasing the ignition switch, stop the engine immediately and set the battery master switch (ignition switch) to the OFF position. Have the starter checked immediately.

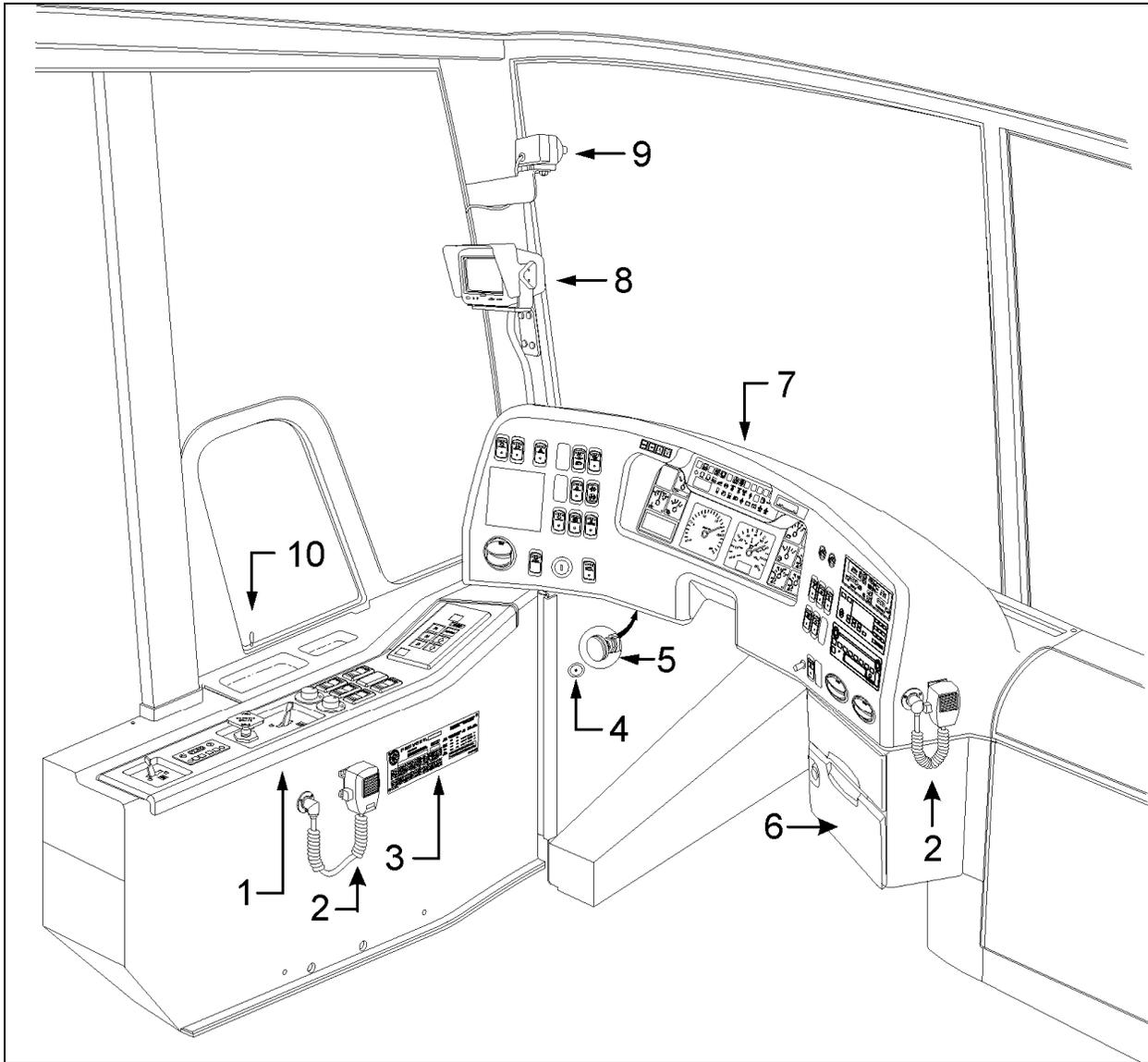
The features activated when the engine is running are all those described above plus the HVAC system and daytime running lights. The optional ether cold-start system is automatically deactivated once the engine runs.



DANGER

Volvo D13 engine

Do not use ether or other combustible starting aid fluid on any engine equipped with an intake air preheater. If the engine is equipped with a preheater, introduction of ether or similar starting aids could cause a fire or explosion resulting in severe property damage, serious personal injury or death.



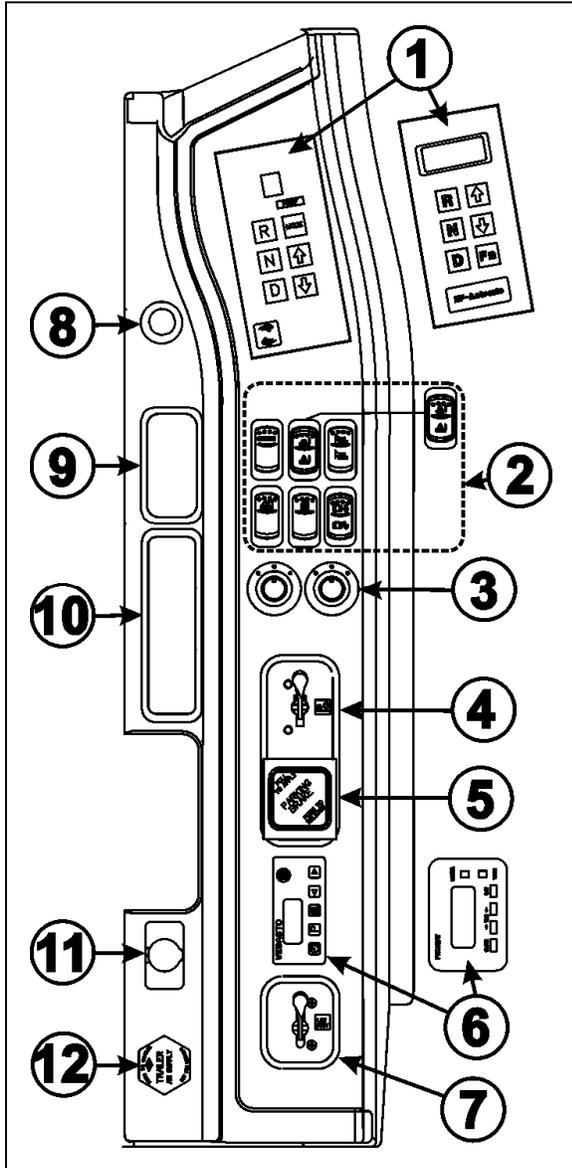
DRIVER'S SECTION

18671

1. Lateral control panel
2. Microphone
3. DOT certification plate
4. Diagnostic Data Reader (DDR) receptacle
5. Foot operated steering wheel adjustment unlock air valve
6. Driver's utility compartment
7. Dashboard
8. Rear view TV monitor (optional)
9. Front view scenic camera (optional)
10. Front service door unlocking pull rod

30 Controls and Instruments

LATERAL CONTROL PANEL



1. Transmission control pad
2. Control switches
3. Mirror controls
4. Tag axle control valve
5. Parking brakes control valve
6. Coolant heater timer (option)
7. Low-buoy control valve (option)
8. Cigarette Lighter (option)
9. Ashtray (option)
10. Utility Compartment
11. 12-volt Appliances Socket
12. Trailer Air Supply Control Valve (option)

LATERAL CONTROL PANEL

06704

TRANSMISSION CONTROL PAD (1)

The control pad for the Allison or ZF transmission is located on the lateral control panel. Refer to "Automatic Transmission" in this chapter for operating instructions and more information.

CONTROL SWITCHES (2)

Cruise Control Switch

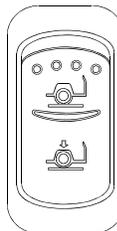


06701

Depress the **CRUISE** rocker switch to activate the cruise control. This turns the system on. A LED on the switch shows that you can now set the vehicle at a desired cruising speed.

The cruise control allows you to cruise the vehicle at a desired speed over 18 mph (30 km/h) without having to use the accelerator pedal. For operation of the cruise control, refer to "Steering Wheel Controls" paragraph in this chapter.

Kneeling / Front Axle Hi-Buoy (Optional)



06250

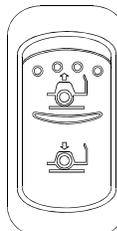
Momentarily press the rocker switch downwards to lower the front end of the coach 4 inches (100 mm). Momentarily press the rocker switch upwards to raise the coach to the normal driving height. Refer to "OTHER FEATURES" chapter for more information.

Press and hold the rocker switch upwards to raise the front end of the coach 4 inches (100 mm). Release the rocker switch to return the coach to the normal driving height.

NOTE

The parking brakes must be applied to allow the use of the kneeling.

Kneeling / Full Hi-Buoy (Optional)



06251

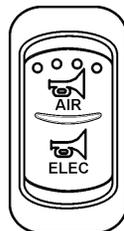
Momentarily press the rocker switch downwards to lower the front end of the coach 4 inches (100mm). Momentarily press the rocker switch upwards to return the coach to normal driving height. Refer to "OTHER FEATURES" chapter.

Press and hold the rocker switch upwards to raise the complete suspension of the coach 4 inches (100 mm). Release the rocker switch to return the coach to the normal driving height.

NOTE

The parking brakes must be applied to allow the use of the kneeling.

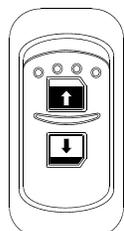
Horn Selector



06700

Use this switch the toggle between the air horn and the electric horn when pressing the steering wheel center pad.

Power Window Switch



06338

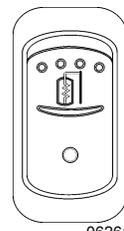
Use this rocker switch to open or close the driver's power window.



CAUTION

Close power window when parked or leaving the coach unattended.

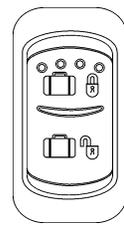
Outside Rear View Mirror Heat (Optional)



06261

Press this rocker switch to clear fog, frost or thin ice from outside mirror.

Central Locking System



06266

This system enables locking all baggage compartment doors by pressing the switch forward. To unlock, press the switch rearward.

NOTE

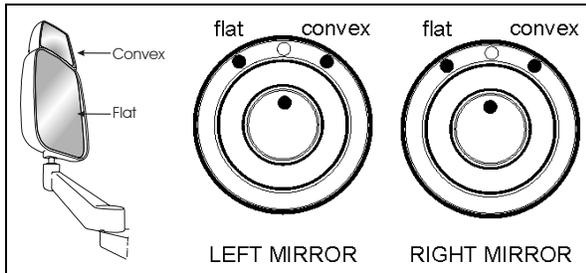
Service compartment doors are not linked to the central locking system.

32 Controls and Instruments

NOTE

Doors must be locked using the key first, they can then be unlocked or locked using the central locking system.

MIRROR CONTROLS (OPTION) (3)



MIRROR CONTROLS

06374

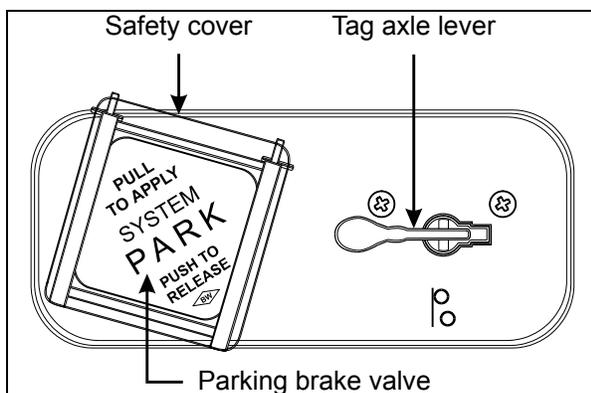
Turn left pointer knob counterclockwise for flat mirror adjustments and to the right for convex mirror adjustments, then use the joystick control to adjust the selected mirror's viewing angle. Adjust the right outside mirror similarly but by using the right side control.

NOTE

If the mirror assemblies on your vehicle do not include convex mirrors, only one (1) mirror control knob will be installed for both mirrors. To operate, turn knob to the left for L.H. mirror adjustments and to the right for R.H. mirror adjustments, then use the joystick control to adjust the selected mirror's viewing angle.

TAG AXLE CONTROL VALVE (4)

Lift the tag axle by pushing the lever forward. Pulling the lever back will lower the tag axle. Refer to "Other Features" chapter for additional information.



CONTROL VALVES

12129

PARKING BRAKES CONTROL VALVE (5)

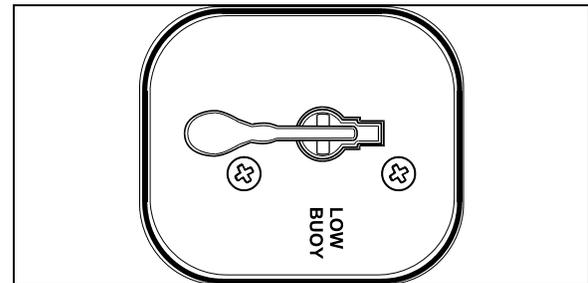
Spring-loaded parking brakes are applied by pulling up the control valve knob and protector assembly. Lift the safety cover and push down to release brakes. Refer to "Safety Features and Equipment" chapter.

COOLANT HEATER TIMER (OPTION) (6)

Use the timer to program the start time of the optional engine coolant heater. Refer to "Other Features" chapter and supplied manufacturer's manual for additional information.

LOW-BUOY CONTROL VALVE (OPTION) (7)

Toggle back the control lever to lower the coach by about four inches. Returning the lever to the normal (forward) position raises the vehicle back to its normal height.



LOW-BUOY CONTROL VALVE

16088



CAUTION

Do not exceed speeds of 5 mph (8 Km/h) when activated.

CIGARETTE LIGHTER (OPTION) (8)

Push lighter in to activate. When ready to use, it will spring out automatically. Replace lighter in non-activated position. The cigarette lighter socket can be used to power 12-volt appliances (e.g. flashlight, vacuum cleaner). The maximum power consumption allowed for appliances plugged in this socket is 130 watts. Make sure the appliances are equipped with suitable plugs that will not damage the socket.

NOTE

The cigarette lighter can still be used after the ignition key has been removed.

ASHTRAY (OPTION) (9)

To open the optional ashtray, push slightly on the cover's side. The ashtray can be removed for cleaning by pulling it out.

 WARNING
To prevent a fire, never put paper or plastic wrappers in the ashtray, empty ashtray often.

UTILITY COMPARTMENT (10)

To open the compartment, lift the cover.

12-VOLT APPLIANCES SOCKET (11)

This 12 volts DC power outlet can be used to power small 12 volt DC appliances such as a cellular phone or a vacuum cleaner. The maximum power consumption allowed for appliances plugged in this socket is 130 watts. Make sure appliances are equipped with suitable plugs that will not damage the socket.

TRAILER AIR SUPPLY CONTROL VALVE (OPTION) (12)

The trailer air braking system is supplied by pushing this control valve.

EMERGENCY/PARKING BRAKES OVERRULE CONTROL VALVE

During normal operation, if air pressure in any brake circuit drops below 40 psi (276 kPa), spring-loaded emergency brake will be immediately applied at full capacity to the drive axle wheels to stop the vehicle. Search and correct the cause of this pressure drop before driving vehicle.

The coach may be equipped with the optional parking brake overrule system, which allows the vehicle to be driven to the nearest safe parking area even if air pressure is below 40 psi (276 kPa). To actuate the parking brakes overrule system, push and hold down the control valve located on the lateral control panel.

BACK-UP CAMERA MONITOR

An optional back-up camera is available which provides the driver with visual assistance when backing-up.

The TV monitor is mounted on the windshield L.H. side pillar and switches ON automatically when the transmission is in the reverse (R) range.

SCENIC VIEWING SYSTEM CAMERA

The optional scenic viewing system enables the passengers to view the road ahead of the vehicle. The camera is mounted above the back up camera monitor and the system is switched ON using the dashboard mounted FRONT CAMERA/TV switch.

DIAGNOSTIC DATA READER (DDR) RECEPTACLE

To facilitate troubleshooting of the DDEC, Allison transmission, ZF transmission and ABS systems and to obtain data logged in the ECM (Electronic Control Module) memory, a Diagnostic Data Reader (DDR) (not supplied) can be connected through the DDR receptacle. A user's manual is supplied with the optional DDR.

The DDR receptacle is located inside the footwell, on the upper left side wall.

NOTE

<i>ZF transmission diagnostic data reader was not available at time of printing.</i>
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AUTOMATIC FIRE DETECTION AND SUPPRESSION SYSTEM (AFSS)

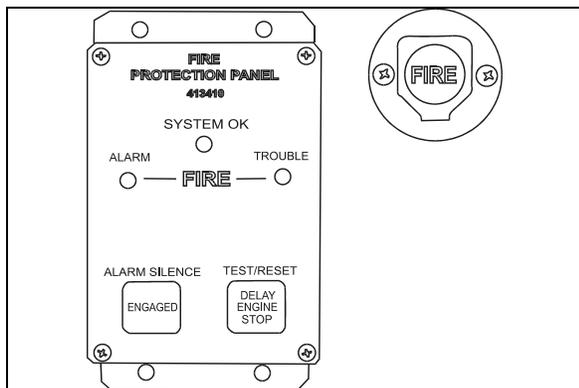
Protection Panel

The protection panel displays the current system status. The protection panel contains "SYSTEM OK", fire "ALARM" and "TROUBLE" lamps, the audio alarm, the "TEST/RESET" switch, and the "ALARM SILENCE" switch.

The "SYSTEM OK" lamp indicates power is on the system and that there are no trouble conditions present. The "TROUBLE" lamp blinks if there is a fault in the detection circuitry and illuminates solid if there is a fault in the extinguishing circuitry. When the "TROUBLE" lamp is on, the "SYSTEM OK" lamp will be off and the audible alarm will sound intermittently. The "SYSTEM OK" lamp will flash when the system is low on battery power. Depressing the "TEST/RESET" switch tests the protection panel lamps and audio alarm. The "ALARM SILENCE" switch will disable the audio alarm.

34 Controls and Instruments

When a fire detector automatically detects a fire, the fire “ALARM” lamp and audio alarm activate. When the Manual Activation Switch is activated, the fire “ALARM” lamp blinks and the audio alarm activates. The lamp will remain blinking until power is cycled to the system.



AFSS PROTECTION PANEL & MANUAL ACTIVATION SWITCH

Manual Activation Switch

The manual activation switch allows immediate system activation (extinguisher discharge and engine shutdown) by the operator at any time. Activation of the switch is accomplished by twisting and pulling the tamper seal to remove, lifting the cover and pressing the red “FIRE” button for more than half a second. After the manual activation switch has been activated, the protection panel will blink the fire “ALARM” indicator until power has been cycled to the system.

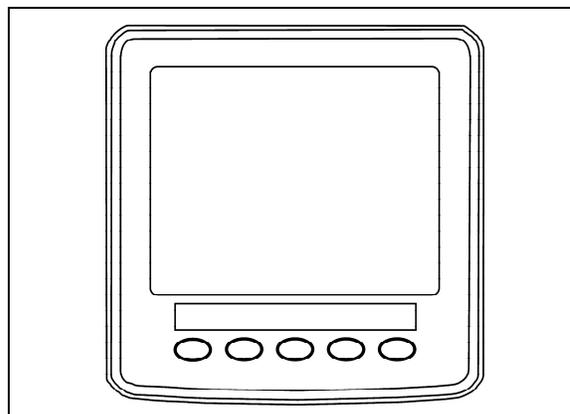
Refer to chapter “SAFETY FEATURES AND EQUIPMENT” for more information on *Kidde Dual Spectrum* Automatic Fire detection and Suppression System (AFSS).

TIRE PRESSURE MONITORING SYSTEM (TPMS)

This system is a sensing device designed to identify and display tire operating data and activate an alert or warning when pressure or temperature irregularities are detected.

NOTE

It is the responsibility of the driver to react promptly and with discretion to alerts and warnings. Abnormal tire inflation pressures should be corrected at the earliest opportunity.



TPMS DISPLAY

06711

TPMS Display

The TPMS display knows where the sensors are located. It receives the raw temperature and pressure readings from the TPMS receiver, it reads several signals from the vehicle and does the calculation required to generate the various screens.

When no readings have been received for a tire location or when the received data corresponds to a parameter range defined as unavailable, then the reading is considered as not available and appears as two dash lines “_ _”.

The TPMS display is initially configured to define how many axles and running tires are present on the vehicle. For current Prevost vehicle models, there are two axle / tire configurations. These configurations are:

Config 1: Axle 1 (Front) Two tires, Axle 2 (Drive) 4 tires, Axle 3 (Tag) 2 tires.

Config 2: Axle 1 (Front) Two tires, Axle 2 (Drive) 2 tires (super Singles), Axle 3 (Tag) 2 tires.

The TPMS display is also configured with several other parameters, including threshold levels for the alarms.

The TPMS display power supply turns OFF when the ignition key is switched OFF.

Operation

The system will monitor all vehicle tires (6 or 8) plus the spare tire when a spare is supplied.

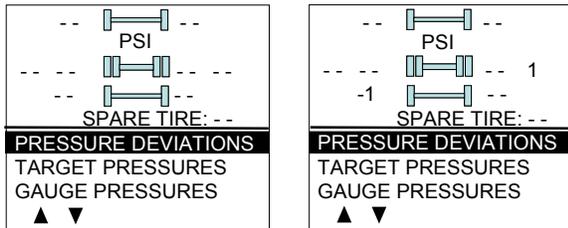
NOTE

Some vehicle models do not come with a spare tire.

There are two configurations of vehicle tires to be supported. One configuration (the most common) consists of 8 tires total: two tires on the front axle, 4 tires on the drive axle and 2 tires on tag axle. All screen figures shown in this document relates to this vehicle configuration. The second tire configuration consist of 6 tires total: 2 tires on the front axle, 2 tires on the drive axle (super single tires) and 2 tires on the tag axle. The vehicle tire configuration is selected with a parameter (Refer to chapter « SAFETY FEATURES AND EQUIPMENT » for more information). When the display is configured for 6 tires, the drive axle tires appears as one large tire on both side instead of twin tires as illustrated in this document and there is one reading appearing on each side instead of two as illustrated in this document.

Start-up

When turning the ignition switch to ON, the screen shown below appears on the TPMS Display. Dash lines are displayed meaning that no pressure data have been received by the display.

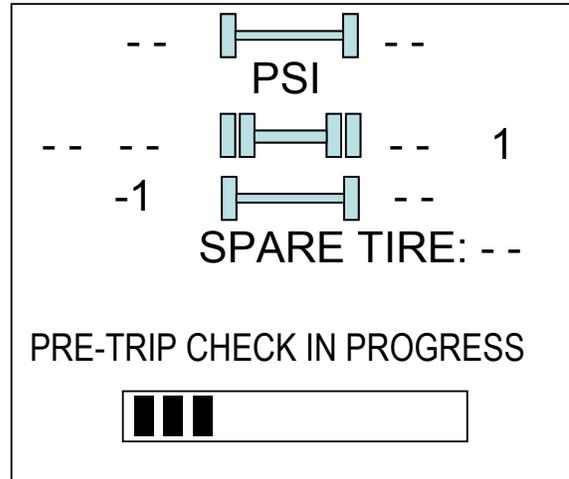


As illustrated, the pressure readings will appear replacing the dash lines as the TPMS display starts to receive pressure data from the TPMS receiver. It can take 1 minute to get all pressure readings updated since the sensors transmit at a one minute interval.

The user can flip through the menus.

Pre-Trip Check

When one of the preconditions defined to start the pre-trip check is met, the TPMS display enters into a pre-trip check routine and the screen shown below appears. The preconditions to initiate the pre-trip are: Park brake removed Or No activity on the display menu keys for a defined time (Key pressed timeout). After a pre-trip, the display is in a “drive” mode with bottom menu replaced by the alarm status. The display remains in this mode until one of the following occurs: A menu key is touched while the park brake is applied, or the park brake does a transition from released to park brake applied.

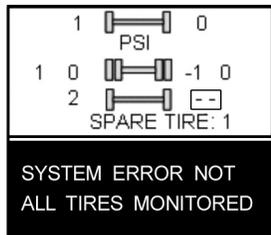
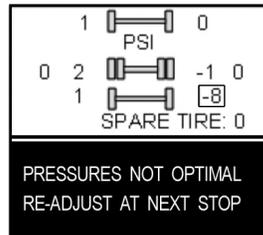
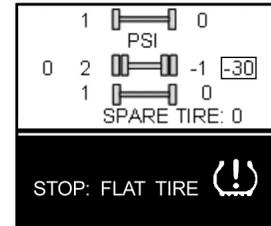
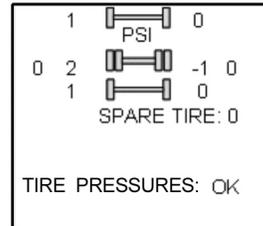


During the pre-trip check, the pressure readings for the different wheels become all available.

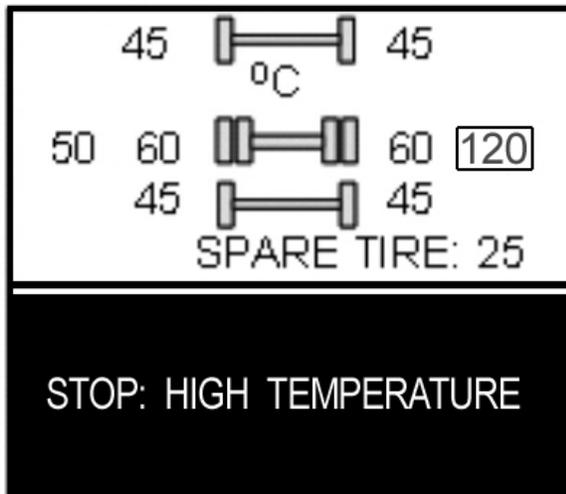
The pre-trip check ends, either when the pressure readings have been received for all running wheels or the pre-trip check maximum time has elapsed. It was selected to provide sufficient time for all wheel sensors to wake-up and send a first reading.

The pre-trip check is aborted and the bottom menu reappears if the park brake was active and the user press one of the menu keys.

Upon completion of the pre-trip check, the TPMS display will come up with one of the screens shown hereafter:



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A rectangle around each pressure / temperature reading of the tires that have an issue is blinking to draw the attention to the defective tires.

In the case of multiple errors at the same time, the highest priority error is displayed at the bottom. “Flat Tire” has the highest priority followed by “High Temperature”, “Not all tires monitored” and “Tire pressure not Optimal”.

To get the driver’s attention to the alarms, the bottom section of the screen where the alarm message appears will blink to reverse contrast at the following rate: 0.7 sec normal contrast, 0.3 sec reverse contrast. Pressing any key will acknowledge the alarms that are considered as non critical and stop the blinking of these alarms message for the remaining of the trip. The non critical alarms are: “Pressure not optimal” and “Not all tires monitored”. The “flat tires” and “high temperature” alarms are critical and will keep blinking even when a key is pressed. If a different alarm occurs, blinking will start again. The blinking rectangle around the pressure /temperature readings is not impacted by the acknowledgement and keeps blinking until the error condition disappears.

The spare tire does not contribute to alarms and so never blinks.

On the road, the TPMS display shows one of the 5 previous screens.

In the event of a temperature alarm, the display switches automatically to temperature readings.

The driver can also press any of the menu keys to momentarily switch the display to temperature readings. In this case, the temperature reading appears for 15 seconds and the display returns to pressure.

The switching to temperature by pressing a key does not take place if there is an acknowledgeable alarm active, since in this case pressing the key does acknowledge the alarm.

The switching to temperature does not take place either if there is an alarm of Temperature or Flat Tire.

The switching to temperature works when the bottom message indicates either: Tire Pressure OK, Pressure Not Optimal non flashing or not all tires monitored non flashing. When the switch is done to temperature readings, the bottom portion of the screen is not affected and still shows the status message.

NOTE

High temperature is not likely to occur during the pre-trip.

The pressure and temperature readings are continuously updated with the displayed readings of the wheel having issues blinking. The bottom line message is automatically updated to the highest priority alarm prevailing. There is a hysteresis on the alarm levels to assure that the error conditions do not flicker ON and OFF.

On the occurrence of an alarm, a beep will sound. The alarm beep could be turned OFF in the alarm settings menu.

Spare tire:

The spare tire is monitored but it is not taken into account when setting the bottom alarm messages. This is to prevent unnecessary alarms that would otherwise occur, if for example, the spare tire is removed from a vehicle.

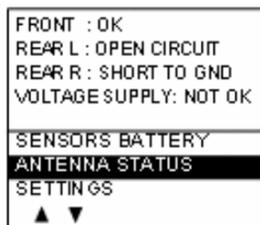
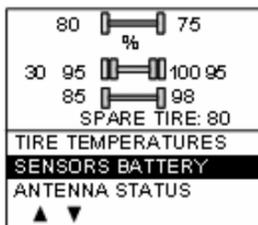
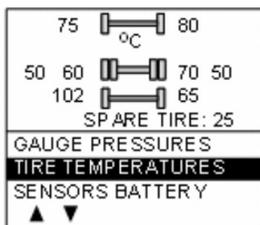
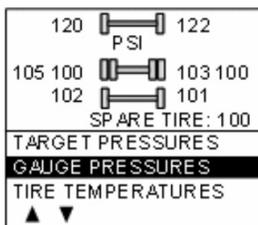
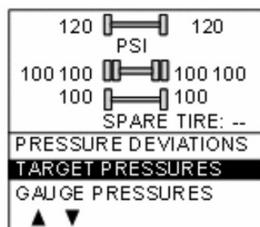
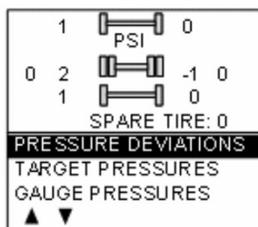
The user will have the possibility to check the pressure of the spare tire by accessing the TPMS display menu. For vehicles that have no spare tires, the title “spare tire” will still appear on the screens but the pressure will remain with two dash lines at all time.

Post Trip Operation

When parking the vehicle (park brake applied), the TPMS display keep the drive mode display active. The driver can press any keys to get the bottom lines showing the status information replaced with the menus.

The pressure readings are still displayed and updated as new readings are received and the readings are blinking if not within the optimum pressure range.

From this point the user can scroll through the menus to get more detailed information and inflate / deflate the tires to bring them back to their optimum target pressures. Scrolling through these menus is also available prior to departure.



The display remains in this mode with the menus appearing at the bottom until the pre-trip check sequence starts again.

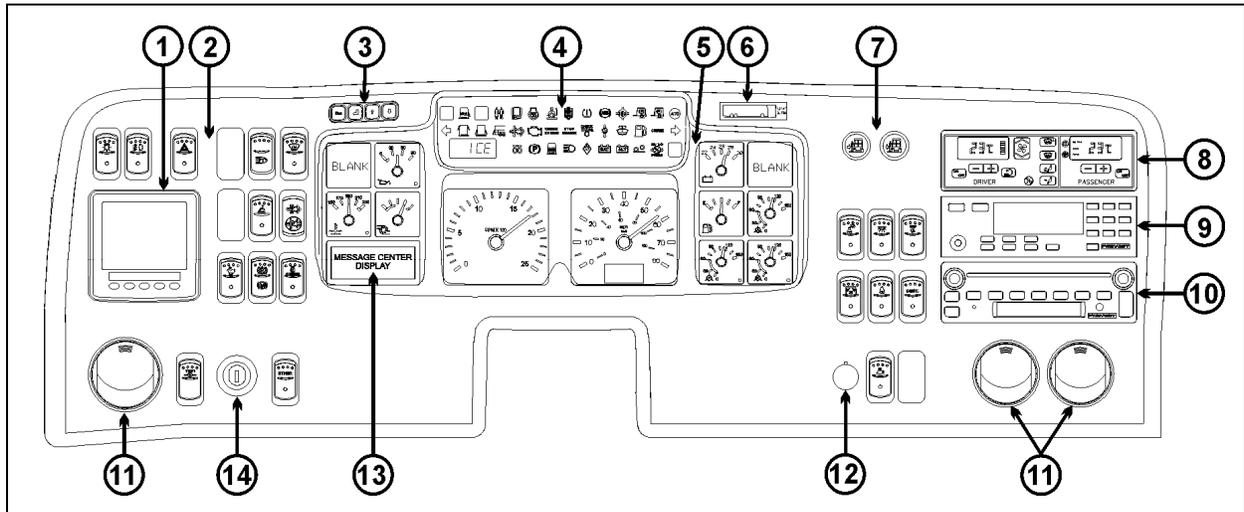
Scrolling down below the Battery life menu will show the Settings menu. Highlighting the Settings and pressing OK allows entering the settings menu. Refer to chapter "SAFETY FEATURES AND EQUIPMENT" for more information on "SETTINGS MENU".

Refer to chapter "Appendix G" for TPMS Troubleshooting Guide.

Highlighting the Exit menu and pressing OK exits the settings and come back to the pressure display mode.

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DASHBOARD



DASHBOARD

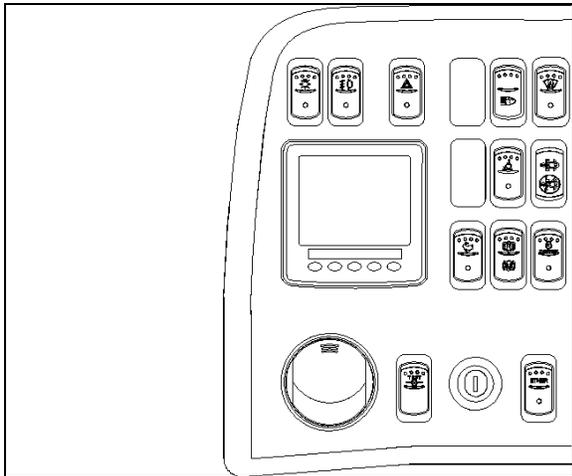
06706

1. Tire Pressure Monitoring System (TPMS) Display
2. L. H. Dashboard Panel
3. Message Center Display (MCD) keyboard
4. Telltale Panel
5. Gauges
6. Vehicle Clearance Information
7. R. H. Dashboard Panel
8. HVAC Control Unit
9. Audiovisual Controller
10. AM/FM CD Radio
11. Air Vents
12. Brightness Control
13. Message Center Display (MCD)
14. Ignition Switch

CONTROL SWITCHES

High quality laser-engraved switches are used to control many of the features of the vehicle. Many switches have an embedded indicator LED to inform the driver at a glance which features are active. Some switches' LED will turn OFF after a short while when the engine is running. This is normal and is designed to reduce glare when driving. The functions still operate even if the LED is OFF. If the switches are still ON when the engine is turned OFF, the LEDs will illuminate to warn the driver to turn them OFF. Switches are described in the order they appear, from left to right, top to bottom.

L. H. DASHBOARD PANEL

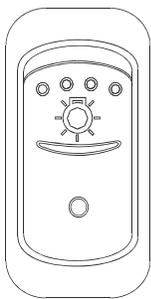


L. H. DASHBOARD PANEL

06708

The L.H. dashboard panel includes controls for the operation of the coach; it also includes the ether start control, the ignition switch and an adjustable air vent.

Headlights and Exterior Lighting



06254

Off position – Daytime running lights only

Press this rocker switch to turn on the following lights:

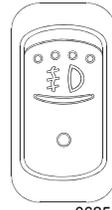
First position – Front parking lights, clearance lights, tail lights, license plate lights and marker lights.

Second position - Push down fully to turn ON the headlights, the controls and instrument lights and all lights from first position.

NOTE

Daytime running lights will be automatically cancelled when the exterior lighting switch is fully depressed (second position).

Fog Lights (Optional)



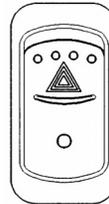
06255

Optional halogen fog lights provide better visibility in fog and precipitation. They improve close range visibility and provide added safety.

NOTE

Some states and provinces restrict the use of fog lights. Verify local state or provincial regulations before using.

Hazard Warning Flashers



06256

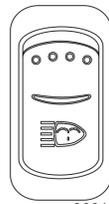
Press the rocker switch to make all turn signal lights flash at once. The dashboard telltale lights will flash when the hazard warning flashers are ON.



CAUTION

Do not use the hazard flashers for an extended period of time unless necessary because the electrical circuits are activated when the hazard switch is depressed.

Headlights washer



06616

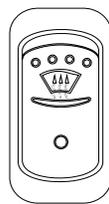
Momentarily press this rocker switch downwards to spray the headlights washer fluid. Each pressing of this switch produces 2 successive jets.



CAUTION

Do not operate the washer mechanism if the washer fluid reservoir is empty. This may damage the washer fluid pumps.

Windshield Upper Section De-icing

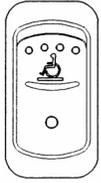


06259

The coach is equipped with a de-icing system in the windshield upper section. Press the rocker switch to activate the blower in order to clear fog, frost or thin ice from either side of the windshield upper sections.

40 Controls and Instruments

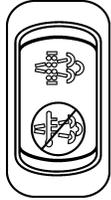
Wheelchair Lift (Optional)



06268

Activate the optional wheelchair lift by pressing down on the rocker switch. Refer to “Other Features” section and to wheelchair lift system’s Operator’s Manual for operating instructions.

Manual Regeneration / Stop Regeneration



06264

Manual Regeneration



DPF Regeneration Lamp

The «DPF Regeneration Lamp» illuminates to notify the driver of the need and urgency of a manual stationary regeneration.

If stationary regeneration is not performed, this telltale will blink, indicating that a stationary regeneration is required immediately. If stationary regeneration is still not performed, “engine power derate and shutdown” sequence may occur.

To initiate a stationary regeneration:

- Park the vehicle in a clear area, vehicle speed must be 0 mph (0km/h);
- Engine must be on normal idle and fully warmed up (coolant temperature above 140°F/60°C);
- Apply service brakes and set the transmission to the neutral “N” position.
- While maintaining the service brakes applied, apply parking brake, release it and then apply parking brake once again (this sequence is required to enable the stationary regeneration);
- **Press** and hold for 5 seconds the top-most switch position to initiate a stationary regeneration;

The regeneration will begin. Turn off the air conditioning to reduce engine load. The engine idling speed will increase to 1600 rpm. Once the regeneration is completed, the engine speed will return to normal idle.

Stop Regeneration



Inhibit Regeneration Lamp

The «Inhibit Regeneration Lamp» illuminates to indicate the system’s acknowledgement of regeneration inhibit request and to remind the driver that regenerations have been or will be inhibited.

Press down to cancel a regeneration that is in progress or to inhibit a pending regeneration. Use this function to move the vehicle to a safe parking place. Releasing the parking brakes will also cancel the regeneration.

NOTE

STATIONARY REGENERATION

This process requires the vehicle to be parked while the driver or a maintenance technician initiates the regeneration process.

NOTE

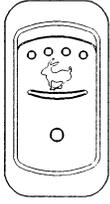
To initiate a stationary regeneration while the Engine Protection Shutdown sequence has already started, you must press and hold both the «Engine Stop Override» switch and the «Manual Regeneration» switch at the same time until the regeneration starts. Once started, the regeneration may last for only a few minutes and engine may shut down again. Repeat the operation as required until the stationary regeneration can be completed.



WARNING

Before initiating stationary regeneration or using the inhibit regeneration function, read carefully and understand paragraph DETROIT DIESEL EXHAUST AFTERTREATMENT SYSTEM in *Chapter 4: Other Features* for complete information concerning regeneration precautions. Ignoring them could result in extensive damage and/or serious personal injury.

Fast Idle



06264

For extended idling periods, run the engine at fast idle. Press down the rocker switch to engage fast idle. This increases the engine speed to approximately 1,000 rpm. Return to normal idle before driving or when stopping engine.



CAUTION

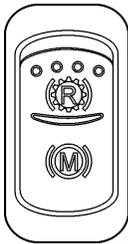
Reduce the engine to normal idle before shutting the engine OFF.

NOTE

If the parking brake is released and/or the transmission is engaged with the engine running at fast idle, the engine will return to normal idle and remain there as long as the parking brake is not applied and/or transmission is not placed in neutral (N).

The engine will return to fast idle once the parking brake is applied or neutral (N) selected.

Engine Brake / Transmission Retarder (Optional)



06703

Use this switch to select between the transmission retarder and the engine brake when using the vehicle speed retarding device switches on the steering wheel. Both systems cannot be in function at the same time. This rocker switch will be found on the dashboard only if the vehicle is equipped with both systems. Refer to "Transmission Retarder" heading in this chapter. Refer also to "Transmission Retarder" & "Engine Brake" in "OTHER FEATURES" chapter.

Engine Stop Override and DDEC Diagnostic Request



06265

Press this switch then release to override the emergency engine shutdown protection. Engine emergency shutdown will be turned OFF for 30 seconds. This procedure can be repeated if done before 30 seconds are up.



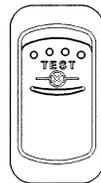
CAUTION

Use sparingly and in order to move the vehicle to a safe parking place only. Excessive use can cause severe engine damage.

DDEC Diagnostic Request (with DDC S60 engine)

With the engine at idle or OFF and with the ignition switch in the ON position, press and release the Engine Stop Override rocker switch. Active codes will be flashed on the "Stop Engine" and inactive codes on the "Check Engine" telltale lights alternately. Refer to Appendix D under "DDEC VI Diagnostic Codes".

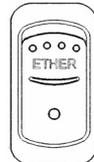
Central Telltale Light Test



06263

Press down and maintain this switch at least 2 seconds to illuminate the telltale light panel. The telltale panel audible alarm will sound. Perform this test to verify indicator light and telltale panel audible alarm functionality.

Ether Start (Optional)



06237

Activates the engine cold starting aid. Refer to "Starting and Stopping Procedures" chapter.



CAUTION

Overuse of cold weather starting aid may lead to SEVERE engine damage.

Driver Controlled Differential Lock (DCDL) (Optional)



06571

Press the rocker switch to lock or unlock differential action. Refer to "Other Features" chapter for the complete operating instructions.



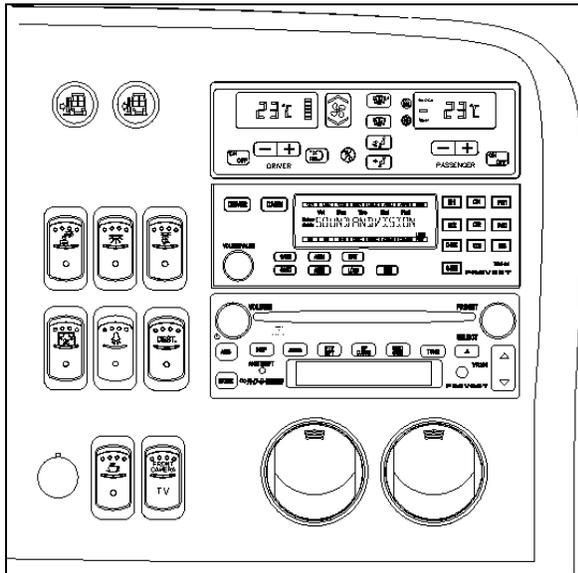
CAUTION

- Engage DCDL only under poor road surface conditions.
- DCDL will not engage and will disengage in speed higher than 5 MPH.

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- Do not lock DCDL when one or more wheels are slipping, spinning or losing traction. You can damage the drive axle.
- Using the rocker switch, unlock DCDL when the need for improved traction has passed otherwise it will reengage automatically as speed gets below 5 MPH. Over a prolonged period, this situation will increase tire wear and stress to the vehicle.
- Do not engage during downhill operation.

R. H. DASHBOARD PANEL

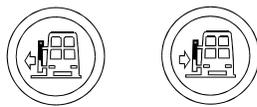


R. H. DASHBOARD PANEL

06707

The HVAC control module as well as the cluster dimmer switch, interior lighting control switches, entrance door operating buttons as well as miscellaneous control switches and air vents are located on the R.H. dashboard panel.

Entrance Door Operating Buttons



06464

Press and hold the L.H. button to open the door and the R.H. button to close the door.

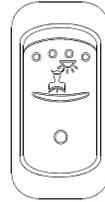
Releasing the button at any time will immediately stop door movement.



WARNING

The door mechanism has no automatic safety protection to avoid injury to bystanders. The driver is responsible for the safe operation of the door.

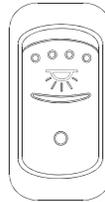
Driver's Area Lighting



06244

Press the rocker switch to illuminate the ceiling lights in the driver's area as needed.

Interior Lighting



06239

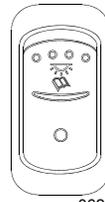
Press this rocker switch to the first position to illuminate the aisle fluorescent lighting. Press down the second position to illuminate the in-station fluorescent lights.



CAUTION

To avoid running down the batteries when the engine is off, turn off the lights or connect the optional battery charger to a 110 - 120 volt AC power supply.

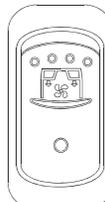
Reading Lights



06240

This switch powers the reading light circuit enabling passengers to operate their personal reading lights. Refer to "Coach Interior" chapter.

Passenger Overhead Air Registers

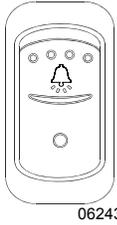


06245

Press the switch to the first position to set the fans to low speed. Press the switch to the second position to set the fans to high speed.

If equipped with the optional air conditioning in the overhead compartments, activating the fans also engages the dedicated A/C compressor.

Stop / Service Chime (Optional)



06243

Press this switch to enable the stop / service chime. When depressed, the service buttons illuminate even when the chime circuit is not enabled.

Destination Sign (Optional)



06262

Press the rocker switch to illuminate the destination sign.

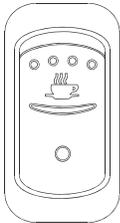
Brightness Control



06249

Adjusts the brightness of the dashboard instruments and switches.

Galley (Optional)



06241

This switch activates the galley's electrical circuit.

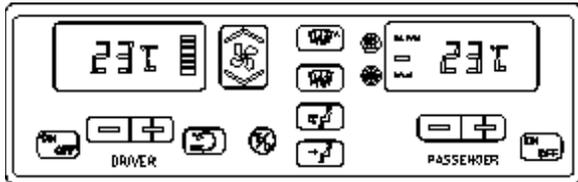
Front Camera Switch (Optional)



06334

Press this switch to turn ON the camera in the windshield and display the road ahead on the passenger TV monitors. When the front camera is not enabled, the TV circuit reverts to the video cassette player output.

HVAC Control Unit



22296

The vehicle is slightly pressurized by the central HVAC system to prevent dust and moisture from

entering. Air flow and controls divide the vehicle into two areas: driver's area with defroster and passengers' area.

Fresh air is fed in each area and has a separate return air and discharge air duct.

NOTE

To operate the air conditioning system when stationary, run engine at fast idle. When the system is running, keep windows and door closed.

To prevent battery run-down, the central A/C and heating systems will not operate if the charging system is not working properly.

When the A/C system is running, park at least 4 feet (1,5 m) from other vehicles or buildings to allow sufficient air flow through the condenser core.

Separate driver and passenger heating, ventilation and air conditioning controls are located on this panel. To operate, the vehicle's engine must be running.

The driver's and the passengers' units may be

turned ON by pressing  button.

Also, the driver's HVAC section turns on automatically at starting of the engine and uses the settings that were kept in memory before turning off of the system.

The A/C compressor starts automatically when the two following conditions are satisfied:

1. The outside temperature is above 32°F (0°C).
2. The passenger's area temperature has reached 7°F (4°C) under the set point.

NOTE

Upon starting, if the outside temperature is above 32°F (0°C) and then drops below 32°F (0°C), the compressor will keep running up to a temperature of 15°F (-9°C) to prevent condensation from forming on the windows.

All parameters set before turning the system OFF will be kept in memory for the next power ON.

The HVAC module performs a self diagnosis every time it is turned ON. Codes are shown on displays or flashed on control buttons. Refer to

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"Maintenance Manual" for more information on the diagnostic codes.

Heating Mode Indicator



This red LED illuminates when system is heating.

Cooling Mode Indicator



This green LED illuminates when the system is cooling (when the compressor clutch is engaged).

Fan Speed



The driver's fan has six speeds. Increase speed by pressing on the upper portion of the button, decrease by pressing on the lower portion.

Recirculate

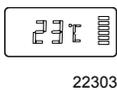


Closes or opens the driver's and passenger's section fresh air damper.

A red LED in the top right corner of the button illuminates when air is recirculated. Use for faster driver's section heating.

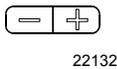
This feature is automatically cancelled when defogging is activated.

Driver's section temperature setting



The temperature displayed on the driver's side HVAC control unit is the temperature set point.

To increase the temperature set point, press on the "+" sign, to decrease the temperature set point, press on the "-" sign. Temperature range is between 60°F and 82°F (16°C to 28°C). On the driver's side only, asking for a temperature set point above 82°F (28°C) will keep the coolant valve open and "FUL" will be displayed.



In case of interior temperature sender unit failure, the coolant valve will remain open and three lines "---" will be displayed.



WARNING

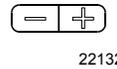
Warm temperatures may cause drowsiness and affect alertness while driving. Keep the temperature comfortable but not too high.

Passenger's section temperature setting



The temperature displayed on the passenger's side HVAC control unit is the actual temperature in the passenger's area.

To increase or decrease the temperature set point in the passenger's area, press on the "+" or the "-" sign. Pressing these buttons will flash the displayed set point and the word "SET" will highlight. Temperature range is between 60°F and 82°F (16°C to 28°C).



In case of interior temperature sender unit failure, the coolant valve will remain open and three lines "---" will be displayed.

NOTE

Upon starting of the vehicle, when the ambient temperature is very cold and so is the inside of the vehicle, the HVAC control unit will permit a temperature overshoot up to 3° over the passenger's area set point to help warming up of the area because some parts of the vehicle like the seats and the overhead compartments accumulate cold.

Windshield Defogger

Upon pressing this button, the dashboard damper sends air only to the lower windshield. The fan is turned on to maximum speed, the fresh air damper opens completely (REC off) and the driver set point is increased to 4°F (2°C) over the passenger's section set point.



The dashboard damper sends air only to the lower windshield when activated. The footwell damper is closed also but the fan speed can be reduced or increased.

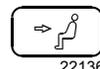


Panel and Footwell



The dashboard damper sends air to the panel vents and footwell.

Panel



Air is sent to panel registers. The footwell damper is closed.

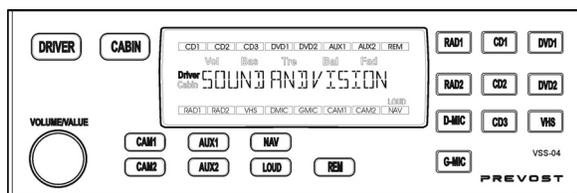
Temperature Degree Selector



22133

Toggles the HVAC control unit temperature units between Fahrenheit and Celsius. The driver's section must be on. Also toggles the outside temperature units displayed on the telltale panel.

Audiovisual Controller



23350

The VSS-04 Multichannel Sound Selector enables the driver to select audio and video entertainment with independent settings of volume level, bass, treble, etc. in the passenger and driver's areas. The dashboard radio, DVD player, video cassette player, the P.A. system, auxiliary systems and other components are controlled by this unit.

Controls and features

Power switch: there is no power button. The unit turns on automatically when the ignition switch is set to ACC or ON position and turns off when the ignition switch is set to OFF position. Start image shows "SOUND AND VISION".

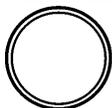


Press to adjust sound settings and select audio/video source for the driver's area. Driver's and passenger's systems are independent systems. RAD1 is default source.



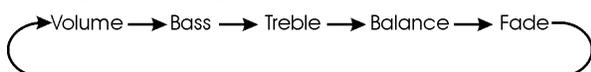
Press to adjust sound settings and select audio/video source for the passenger's area.

VOLUME VALUE



Turn to adjust volume level or sound settings value for the selected audio/video source (RAD1 is default source). Each source has independent settings of volume, bass, treble, etc.

Press repeatedly to select sound settings. Settings will change as follow:



NOTE

Some components like the standard radio, the satellite radio and the DVD Player have their own audio controls (volume, bass, treble, balance, fade, etc.). These audio controls should be adjusted once at the beginning and should not be changed after.

If volume level or sound quality adjustments are required, they should be made using the VSS-04 Sound Selector only.

Presets of the audio controls:

- Adjust each radio and DVD Player own volume level between 50% and 75% of their output range.
- Adjust radio's own bass, treble, balance and fade settings to mid-range.



Press to turn on the optional panoramic view camera. The video monitors turn on automatically. Press a second time to turn off. You can select this function simultaneously with an audio function like the radio, the driver or guide microphone or a CD player.



Press to select an optional second panoramic view camera if equipped as current video source. Press a second time to cancel. You can select this function simultaneously with an audio function like the radio, the driver or guide microphone or a CD.



Press to select an auxiliary audio/video source like a second VHS.



Press a second time to cancel the selection.



Press to select the navigation system display as current video source. Press a second time to cancel.



Press to increase the low frequencies level of the selected audio/video source. Press a second time to cancel.



Press to enable use of the remote control to operate selection of sources, settings of volume, bass, treble, etc. Press a second time to cancel use of the remote control.

46 Controls and Instruments

NOTE

Point the remote control in direction of the controller.

NOTE

Adjustment for background music

When microphone is activated, the current audio source volume will reduce to a certain level which as been set at the factory. To adjust it, proceed as follows:

- 1- Press **AUX1** and **VOLUME/VALUE** at the same time.
- 2- Turn **VOLUME/VALUE** knob to adjust the background music volume.
- 3- Press **AUX1** and **VOLUME/VALUE** once again to save the setting.

Adjustment for gong sound

If desired, a gong will sound upon activating of the microphone. This gong will also sound when a passenger activates the service bell. Gong sound level can be adjusted as follows:

- 1- Press **AUX2** and **VOLUME/VALUE** at the same time.
- 2- Turn **VOLUME/VALUE** knob to adjust gong volume.
- 3- Press **AUX2** and **VOLUME/VALUE** once again to save the setting.

The gong sound heard upon activating of the microphone can be disabled. To do so, press simultaneously **VOLUME/VALUE** and **D-MIC** repeatedly to enable/disable the gong sound. The controller will then display **MGONG N** (gong disabled) or **MGONG Y** (gong enabled).

RAD1

Press to select the dashboard radio as current audio source for the chosen area.

RAD2

Press to select an optional radio (satellite radio for example) as current audio source for the chosen area.

D-MIC

Press to turn on driver microphone (function not available on certain microphone type). A gong can be heard and the current audio source volume in the passenger's area is reduced. Press a second time to turn off. When the microphone is

activated, turn **VOLUME/VALUE** button to adjust volume. Also, you can turn on the microphone simply by pressing its on/off switch.

G-MIC

Press to turn on the guide microphone (function not available on certain microphone type). Press a second time to turn off. When the microphone is activated, turn **VOLUME/VALUE** button to adjust volume. Also, you can turn on the microphone simply by pressing its on/off switch.

CD1

Press to select up to 3 different remote CD players as current source.

CD2

CD3

DVD1

Press to select DVD Player #1 as current source.

DVD2

Press to select DVD Player #2 as current source.

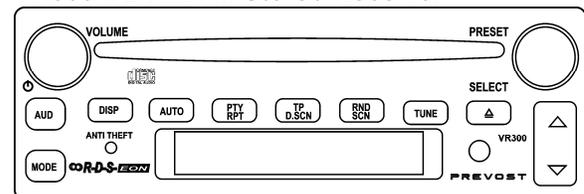
VHS

Press to select VHS as current source.

NOTE

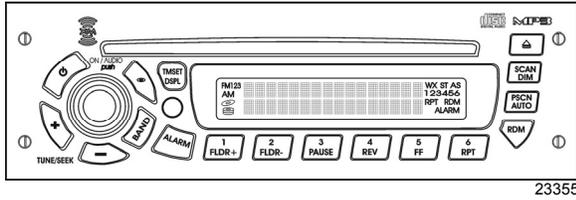
Remote control battery replacement. Use CR2025 lithium battery.

VR300 CD/AM/FM Stereo Receiver



You can select from several bands of entertainment (AM/FM) and information (WX weather band) radio services. You can play a CD inserted in the radio's CD slot or control a remote CD Changer with this unit. The complete radio operating instructions manual is included in *section 23: Accessories* of your vehicle's maintenance manual.

Satellite Radio (optional)

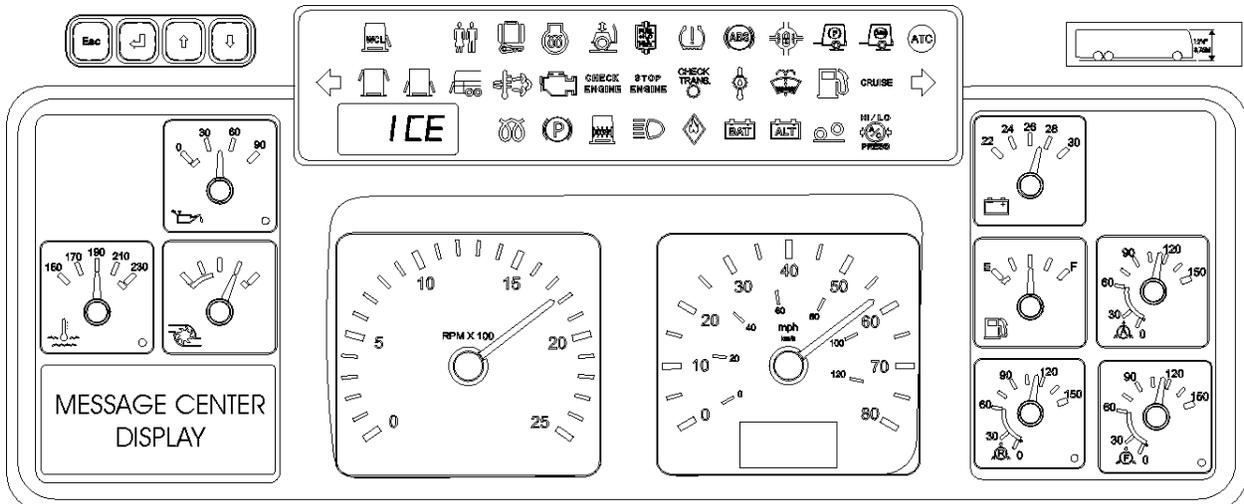


This satellite radio may be located on the dashboard or inside the first driver's side overhead compartment. The complete operating instruction manual is included in your vehicle's *technical publications box*.

AIR VENTS

Three adjustable driver air vents in the dashboard and one near the door feed air to the driver's compartment. Use the HVAC control panel to set air temperature and fan speed.

INSTRUMENT CLUSTER

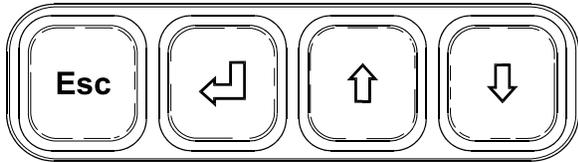


INSTRUMENT CLUSTER

06697

The instrument cluster incorporates the Message Center Display, the Telltale Panel, the Gauges and Vehicle Clearance Information.

MESSAGE CENTER DISPLAY (MCD)



06399

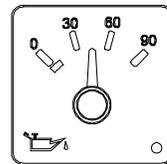
This standard feature gathers, stores and displays important information about the vehicle's operation on a display screen on the lower left portion of the cluster. Refer to Message Center Display in Other Features chapter for a description of how to set up and operate the Message Center Display.

DASHBOARD GAUGES

NOTE

Do not refer to dashboard instruments during adjustment procedures. Use only calibrated gauges.

Engine Oil Pressure



06229C

Indicates engine oil pressure. The normal reading should be between 50 and 70 psi (345 - 480 kPa) at 55 mph (90 km/h). A low oil pressure indicator LED (bottom right corner of gauge) illuminates when the oil pressure drops below 50 psi (345 kPa).

An audible alert signal also informs the driver of low oil pressure. Refer to Safety Features and Equipment chapter for table of audible alerts.

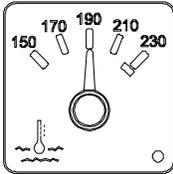
48 Controls and Instruments



CAUTION

Loss of oil pressure may cause severe engine damage. If low oil pressure LED illuminates, park the vehicle safely and stop the engine immediately. Request service assistance.

Engine Coolant Temperature

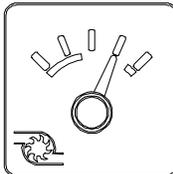


06231

Indicates the operating temperature of the engine coolant. The normal reading should be between 190°F and 222°F (88°C to 106°C).

A high coolant temperature indicator LED (bottom right corner of gauge) illuminates when the coolant temperature rises above 223°F (106°C). An audible alert signal also informs the driver of this condition. Refer to Safety Features and Equipment chapter for table of audible alerts.

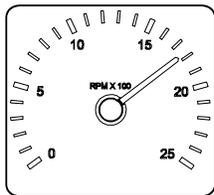
Turbo Boost Pressure



06230

Indicates turbo boost pressure in psi. Reading depends on engine rpm and load conditions.

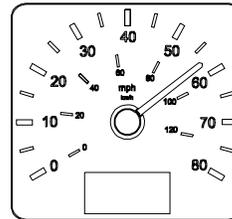
Tachometer



06221

Indicates the operating speed of the engine in hundreds of revolutions per minute (rpm x 100). The tachometer serves as a guide for gear shifting and helps to prevent engine over-speeding when driving downhill with the JACOBS engine brake operating. The maximum allowed engine speed is 2,450 rpm.

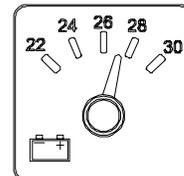
Speedometer



06222

Indicates the vehicle speed in miles per hour (mph) and kilometers per hour (km/h). The digital odometer records the distance traveled in miles or in kilometers (units are driver selectable).

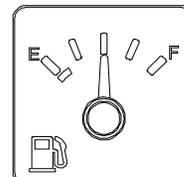
Voltmeter (24-Volt System)



06224

Indicates the condition of the 24-volt electrical system. With the engine running, the normal reading should be between 26.5 and 28.0 volts.

Fuel level



06225

Indicates the amount of fuel remaining in the fuel tank.

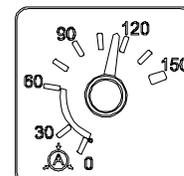
A telltale light illuminates when about 12 US gallons (45 liters) of fuel remain in the fuel tank.



CAUTION

Operating the vehicle when the reading is below 1/8 full is not recommended.

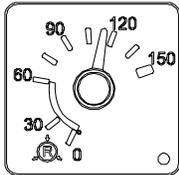
Accessories Air Pressure



06226

Indicates the accessories air system pressure. The normal operating pressure is from 95 to 125 psi (655 to 860 kPa).

Primary System Air Pressure (Rear)



06228

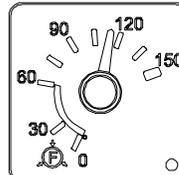
Indicates the primary air system pressure. The normal operating pressure is from 95 to 125 psi (655 to 860 kPa).

A low air pressure indicator LED (bottom right corner of gauge) illuminates when the primary air system pressure drops below 66 psi (455 kPa). An audible alert signal also informs the driver of low air pressure. Refer to Safety Features and Equipment chapter for table of audible alerts. If the air pressure drops below 40 psi (276 kPa), the emergency brake applies at full capacity.

DANGER

Do not drive the coach when air pressure is low.

Secondary System Air Pressure (Front)



06227

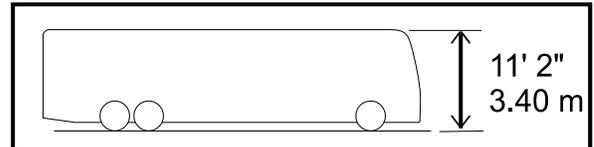
Indicates the secondary air system pressure. The normal operating pressure is from 95 to 125 psi (655 to 860 kPa).

A low air pressure indicator LED (bottom right corner of gauge) illuminates when the secondary air system pressure drops below 66 psi (455 kPa). An audible alert signal also informs the driver of low air pressure. Refer to Safety Features and Equipment chapter for table of audible alerts. If the air pressure drops below 40 psi (276 kPa), the emergency brake applies at full capacity.

DANGER

Do not drive the coach when air pressure is low.

Vehicle Clearance Information



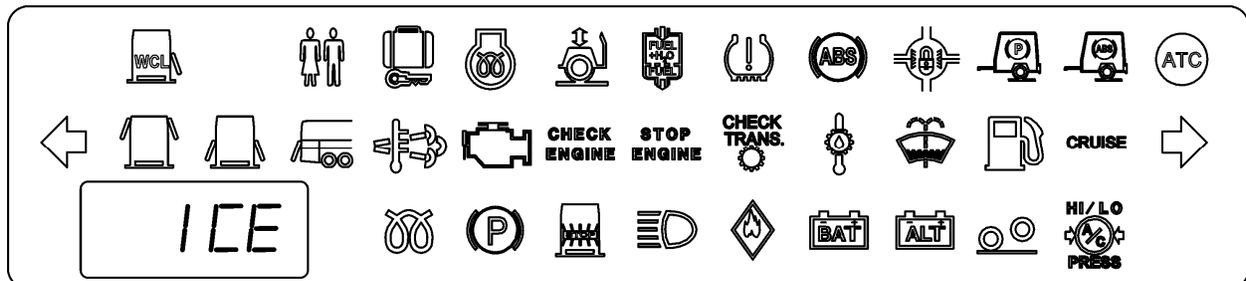
06447

Normal vehicle clearance is 11' 2" (3,40 m).

WARNING

Vehicle clearance is higher when the ventilation hatch is open; if Hi-Buoy is activated or if additional equipment is installed on the roof.

TELLTALE PANEL



TELLTALE PANEL

06693

Some telltale lights described hereafter appear on the telltale panel only if the corresponding optional equipment is installed on the vehicle.

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Wheelchair Lift Door Ajar



Illuminates when the wheelchair lift compartment door and/or the wheelchair access door are open. Also an audible alert will sound when either door is opened.

Lavatory Door Locked



Illuminates when the lavatory door is locked.

Baggage Compartment Unlocked



Illuminates when one or more baggage compartment doors are unlocked.

Preheater



Illuminates when the engine coolant preheating system is in operation.

Kneeling / Hi-Buoy Active



Illuminates when Kneeling or Hi-Buoy is active. An audible alert also informs the driver during operation. Refer to Safety Features and Equipment chapter.

Fuel Filter/Water Separator



Illuminates when accumulated water in the optional fuel filter/water separator needs to be drained. Refer to Care and Maintenance chapter.

Flat Tire [Optional with Tire Pressure Monitoring System (TPMS)]



Illuminates when a tire pressure is 25% below the target tire pressure.

Antilock Brake System (ABS) Warning Light



Illuminates when the ABS is not available or when the ABS is malfunctioning. Since the ABS system does not operate at less than 4 mph (7 km/h), the indicator will remain illuminated until the coach reaches that speed. Refer to "Other Features" chapter.

Driver Controlled Differential Lock (DCDL)



Illuminates when the differential action is locked

Trailer Emergency / Parking brake



Illuminates when the trailer emergency/parking brake is unexpectedly applied as when the vehicle is moving and a parking brake air line rupture happens.

Trailer Antilock Brake System (ABS)



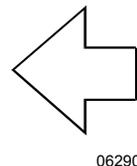
Illuminates when the trailer ABS is malfunctioning.

Automatic Traction Control (ATC)



Illuminates when the automatic traction control system intervenes to prevent excess wheel spin during acceleration.

Left Turn Signal Indicator Light

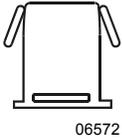


Flashes when the left turn signals are activated. Signal right and left turns by operating the multi-function lever. See Steering Column Controls in this chapter.

NOTE

The directional signals are automatically activated when the vehicle is backing up.

Emergency Window Open



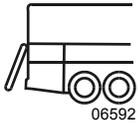
Illuminates when an emergency window is open or unlocked.

Baggage Bay Door Ajar



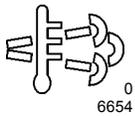
Illuminates when one or more baggage bay doors are ajar.

Engine Door Ajar



Illuminates when the engine compartment door is ajar.

High Exhaust System Temperature Lamp (HEST Lamp)



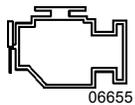
Illuminates during regeneration process if vehicle speed below 30 mph (48 km/h) and during stationary regeneration. Vehicle may be driven, except during stationary regeneration.



WARNING

During regeneration, exhaust temperature may reach up to 1200°F (650°C) at the particulate filter. Before initiating stationary regeneration, make sure that the DPF outlet diffuser is clear of people or any flammable materials, vapors or structure.

Malfunction Indicator Lamp (MIL)



Indicates a failure of an Emission Control device. May illuminate at the same time as the "Check Engine" Amber Warning Lamp. The lamp will go out after 3 completed «IGNITION ON-RIDE-IGNITION OFF» cycles. Vehicle can be driven to end of shift. Call for service.

Check Engine (Amber Warning Lamp)



Indicates a minor fault detected by DDEC VI system. This warning lamp is illuminated for all active faults.

The warning lamp will remain ON until the malfunction has been corrected. Vehicle can be driven to end of shift. Call for service.

A diagnostic code will be stored in the memory and the lamp can be used to identify the problem. Refer to Appendix D under "DDEC VI Diagnostic Codes".

STOP Engine (Red Stop Lamp)



Illuminates when a potential engine damaging fault is detected. Immediately park the coach in a safe place and stop the engine.

Flashes when Engine Protection Shutdown occurs. When a problem is detected, the engine power will automatically begin to decrease gradually, followed by full shutdown after 30 seconds. The Engine Protection Shutdown may be bypassed by using the "Engine Stop Override" switch on the L.H. lower control panel. Use only in order to move the vehicle to a safe parking place and then shutdown the engine. Call for service.

NOTE

Once the engine is stopped, it cannot be restarted until the problem has been corrected. A diagnostic code will be stored in memory. The STOP engine indicator can be used to identify the problem. Refer to Appendix D under "DDEC VI Diagnostic Codes".

Check Transmission



When the "CHECK TRANS" indicator is illuminated and the shift selector emits short beeps for 8 seconds, the transmission control module (TCM) is restricting transmission shifting because special or abnormal conditions are detected. The control pad display will be blank.

If this happens, drive the coach to the next available service center to receive assistance. The TCM will not respond to shift selector requests since operating limitations are being placed on the transmission (i.e. upshifts and

52 Controls and Instruments

downshifts may be restricted). Direction changes and shifts to and from neutral (N) will not occur.

Any time the CHECK TRANS telltale light illuminates, the transmission control module will register a diagnostic code. It may be identified on the display (Allison & ZF-Astronic transmission) or by using a diagnostic tool. Refer to Appendix C or Appendix E.

NOTE

The CHECK TRANS indicator may also illuminate when starting the engine in extremely cold weather. Refer to Allison Transmission or ZF Transmission Warm-Up in "Starting and Stopping Procedures".

Transmission Fluid Temperature



06292

Illuminates when the transmission fluid temperature is too high. An audible alert signal also informs the driver of this condition. Disengage the retarder to allow the oil temperature to cool down.

Windshield Washer or Headlights Washer Fluid Low



06601

Illuminates when the windshield washer or the headlights washer fluid level is low. The washer fluid reservoirs are located inside the front service compartment.



WARNING

Do not drive without sufficient windshield washer fluid.

Fuel Level Low



06286

Illuminates when approximately 12 US gallons (45 liters) of fuel remains in the tank. After the light comes ON, the remaining fuel will provide no more than 60 miles (100 km) of travel. Do not exceed this distance.

NOTE

Refuel as soon as possible.

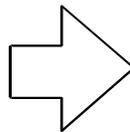
Cruise Speed Set



06284

Indicates that the vehicle cruise speed was set and stored in the memory

Right Turn Signal Indicator Light



06289

Flashes when the right turn signals are activated. Signal right and left turns by operating the multi-function lever. See Steering Column Controls in this chapter.

NOTE

The directional signals are automatically activated when the vehicle is backing up.

Freezing Conditions



06696

The word ICE is momentarily displayed when the temperature is in the range between 2°C and 1°C (35°F to 34°F), when the road is most slippery. The rest of the time, the exterior temperature is displayed at this location.

Intake Air Preheater ON – Wait before starting (with Volvo D13 engine)



06695

Illuminates when the intake air preheater element is in function. Wait until this telltale has turned off before starting the engine. For more information on this feature, refer to paragraph "Cold Weather Starting" in "STARTING AND STOPPING PROCEDURES" chapter.

Emergency/Parking Brake



06303

Illuminates when the emergency/parking brake is applied. The control valve is located on the L.H. control panel. An audible alert will sound if ignition is turned to OFF and the parking brake is not engaged.

Stoptlights ON



06305

Illuminates when rear stoptlights illuminate. This occurs when service brake is applied, when the parking brakes are applied with engine running or when the vehicle is slowing down due to the application of the engine brake or transmission retarder.

High Beam ON



06300

Illuminates when high beams are selected. High and low beams are selected by operating the multi-function lever. Refer to Steering Column Controls heading in this chapter.

Fire Detected



06288

Illuminates if a fire is detected in the engine compartment while the vehicle is on the road. An audible alert informs the driver when a fire is detected. In case of fire detection when parked (parking brake applied, engine running or not), the electric horn is activated to alert the driver. Refer to Safety Features and Equipment chapter.

DANGER

In case of a fire, stop the vehicle immediately, stop the engine and evacuate the vehicle.

NOTE

It is possible to cancel an alarm while on the road. To do so, stop the vehicle. Cycle the ignition between the ON and OFF position and then start the vehicle normally. This can be done on a temporary basis when a false alarm is activated by a defective fire detector. The driver can go on without being annoyed by the alarm.

NOTE

To stop the electric horn alarm when parked, cycle the ignition between the ON and OFF position twice within 3 seconds.

NOTE

For extinguisher's location, refer to Safety Features and Equipment chapter.

Battery Voltage Incorrect



06588

Illuminates when the battery voltage is too high, too low or not equalized.

NOTE

To identify the battery problem (too high, too low or not equalized voltage), using the message center display (MCD), perform a system diagnostic by selecting SYSTEM DIAGNOSTIC, FAULT DIAGNOSTIC & ELECTRICAL SYSTEM and see the fault messages.

NOTE

The high/low battery voltage indicator will illuminate for a few seconds after the engine is started because of the voltage drop when the starter is engaged.

NOTE

To prevent discharge of the batteries when the engine is not running, some functions are automatically switched off if the batteries voltage drops below 24.0 volts for more than 30 seconds. The "BAT" telltale light blinks while this protection mode is active. Set the ignition key to the OFF position and then turn the ignition key to the ON position to reactivate the functions for a period of 30 seconds before they switch off again.

NOTE

If the battery equalizer indicator illuminates, make sure that the battery equalizer circuit breakers are reset before requesting breakdown assistance. Wait 15 minutes after setting breakers to allow batteries to equalize. The breakers are located in the rear electrical compartment.

Alternator



06586

Illuminates when one of the alternators is not charging.

NOTE

To identify which alternator is defective (1=lower, 2=upper), using the message center display (MCD), perform a system diagnostic by selecting SYSTEM DIAGNOSTIC, FAULT DIAGNOSTIC & ELECTRICAL SYSTEM and see the fault messages.

Retracted Tag Axle



06271

Illuminates when the tag axle is raised. If the vehicle speed exceeds 12 mph (20 km/h), this telltale will start flashing and an audible alarm will sound to warn the driver that the allowed speed with tag axle raised is exceeded.

54 Controls and Instruments

A/C System Pressure High or Low



Illuminates when the A/C system pressure is too low or too high. If the A/C pressure is too low, the compressor clutch disengages and the fan stops.

If the A/C pressure is too high, the compressor clutch is disengaged, but the fan remains activated.

Refer to the Maintenance Manual for information on control panel troubleshooting mode.

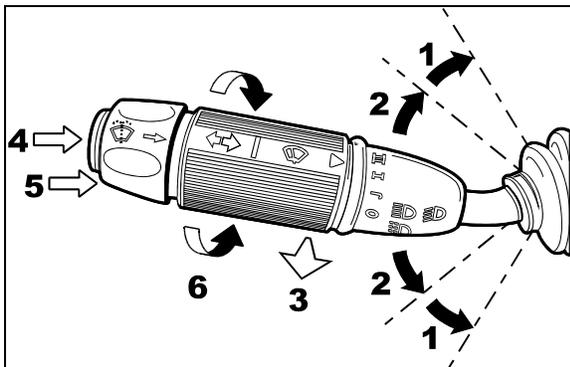
NOTE

When outside temperature is low or high, it is possible and normal for that telltale light to come ON.

STEERING COLUMN CONTROLS

Many of the most frequently used controls are conveniently placed on the steering column or the steering wheel, just like a passenger car. The Multi-function lever is located on the left side of the steering wheel while the optional transmission retarder lever is located on the right side of the steering wheel. Switches for the electric horn and the air horn are located directly on the steering wheel.

MULTI-FUNCTION LEVER



MULTI-FUNCTION LEVER

23133

The multi-function lever is used to operate the following:

Turn Signal (1)

Move the lever all the way up until it locks in position to signal a right turn. Move the lever all the way down until it locks in position to signal a left turn. The lever automatically returns to the horizontal *OFF* position once the turn is completed.

Lane Change Signal (2)

Move the lever part way to the catch position and hold until the lane change maneuver is completed. The lever will spring back into the *OFF* position once released.

Headlight Beam Toggle Switch (3)

Toggle between high and low beams by pulling the lever up towards you. To flash the headlights, pull the lever up halfway. The lever will spring back into normal position once released.

Courtesy Blinkers (4)

Clearance and parking lights can be flashed by pressing the button located on the lever tip.

Windshield Washer Control (5)

Push the external ring at the end of the lever toward the steering column to activate the windshield washers. The wipers come *ON* and continue wiping for a few seconds after the ring is released.



WARNING

Before using the windshield washers in cold weather, heat the windshield with the defroster to prevent icing and reduced visibility.



CAUTION

To avoid damaging the pump mechanism, do not use the windshield washer when the fluid level is very low or empty.

Windshield Washers (6)

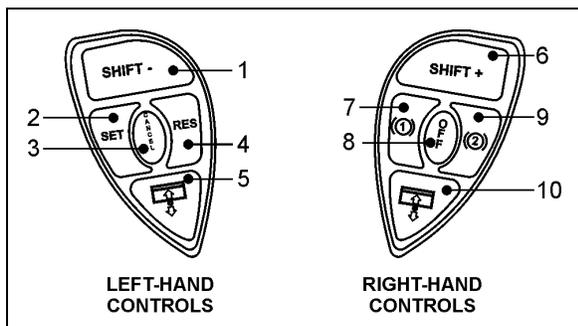
Turn the lever counterclockwise to activate the windshield wipers. The first position activates the wipers intermittently. The second position is the low speed and the third position is the high speed.



CAUTION

To avoid scratching the windshield, do not operate the wipers when the windshield is dry. To avoid damaging the wiper motor, free wiper blades that may be frozen to the windshield before operating the wipers.

STEERING WHEEL CONTROLS



STEERING WHEEL CONTROLS

14069

The steering wheel controls include the following:

(1) (6) Shift Down, Shift Up (ZF transmission)

Use these buttons to shift down or shift up manually the transmission range as would do the “↑” & “↓” keys on the ZF-Astronic range selector keypad.

Cruise Control Buttons (2) Set, (3) Cancel, (4) Res

NOTE

The **CRUISE** switch and **RESUME** button do not operate at speeds below 20 mph (32 km/h).

To operate the cruise control, press the **CRUISE** rocker switch located on the lateral control panel first.

- **Setting Coach Speed.** Accelerate the vehicle to the desired cruising speed using the accelerator pedal. Press and release the **SET** button then remove foot from the accelerator pedal. This will set the vehicle cruise speed and store it in memory.
- **Increasing Set Speed.** The vehicle cruise speed setting can be increased by one of the following methods.
 1. Accelerate using the accelerator pedal until the desired cruising speed is reached. Press and release the **SET** button.
 2. Press and hold the **RES** (RESUME) button until the desired cruising speed is reached. When the **RES** button is released, the new cruising speed will be stored in the cruise control memory.

3. When driving with cruise control, each time the **RES** button is momentarily depressed, the cruising set speed is raised by 1 mph (2 km/h).

NOTE

When driving with cruise control, the vehicle can still be accelerated by depressing the accelerator pedal in the usual manner. Once the accelerator pedal is released, the vehicle will return to the previously set cruising speed.

- **Decreasing Set Speed.** The vehicle cruise speed setting can be decreased by one of the following methods.
 1. Press and hold the **SET** button until the desired cruising speed is reached. When the **SET** button is released, the new cruising speed will be stored in the cruise control memory.
 2. Each brief pressing of the **SET** button will decrease set cruising speed by 1 mph (2 km/h).
 3. Slightly apply the service brake and when desired cruise speed is reached, press and release the **SET** button.
- **Canceling Set Speed.** You can cancel the preset cruising speed by.
 1. Pressing momentarily the **CANCEL** button.
 2. Depressing the brake pedal.
- **Resuming Set Speed.** If the preset speed is cancelled by pressing the **CANCEL** button or depressing the brake pedal, pressing the **RES** (RESUME) button will restore the speed set prior to cancellation, providing that your speed is above 9 mph (15 km/h).

NOTE

When driving downhill with the cruise control on, the engine brake or the transmission retarder engage automatically (if previously activated) when the selected cruise speed is exceeded by approximately :

- 7 km/h (4 mph) with the engine brake activated;
- 1 km/h (0.6 mph) with the transmission retarder activated.

56 Controls and Instruments

The engine brake or the transmission retarder is then disengaged when speed has returned to selected cruise speed.

The engine brake will provide low braking power or high braking power depending on which of the two steering wheel engine brake control buttons is activated; (1) LOW or (2) HIGH.

The transmission retarder maximum braking level is determined by the retarder hand lever position on the steering wheel.

NOTE

To avoid sudden vehicle hesitation, slightly depress the accelerator pedal before disengaging the cruise control.

NOTE

*When the **CRUISE** rocker switch is released, the cruise control is completely shut off and the cruise speed setting is erased from the cruise control memory.*

IMPORTANT NOTE

*If the engine was stopped and the **CRUISE** rocker switch was in the **ON** position, the rocker switch must be reset by turning it **OFF** then **ON** again in order for the cruise control to be reactivated.*



WARNING

Do not use the cruise control when driving speed must be constantly adjusted, such as in heavy traffic or on winding, icy, snow-covered or slippery roads, or on gravel roads.



WARNING

Do not put the transmission in the neutral (N) position while driving with cruise control. This may cause the engine to over-speed and result in a loss of driving control.

(5) & (10) Left Sunshade; Right Sunshade

Press and hold the button to lower the left or right sunshade. Press twice rapidly and hold the button to raise the left or right sunshade.



CAUTION

Do not attempt to raise or lower these shades manually. Damage to electric motor or roller mechanism could result.

(7) Retarder / Engine Brake Low

If your vehicle is equipped with a transmission retarder, press this button to simply enable the transmission retarder. Afterwards, operate the transmission retarder with the hand lever mounted on the steering wheel or the brake pedal. For more information about the operation of this system, refer to “Transmission Retarder” heading in this chapter.

On vehicles equipped with an engine brake, the engine brake provides two levels of braking power. Press this button for low engine braking power (about 70 % of full braking power). Refer to “OTHER FEATURES” chapter for more information about the engine brake operation.



WARNING

Engine brake must be used on dry road only. Never use the engine brake on slippery roads; loss of control could result.

(8) Retarder / Engine Brake OFF

Press this button to cancel operation of the transmission retarder or the engine brake.

(9) Retarder / Engine Brake High

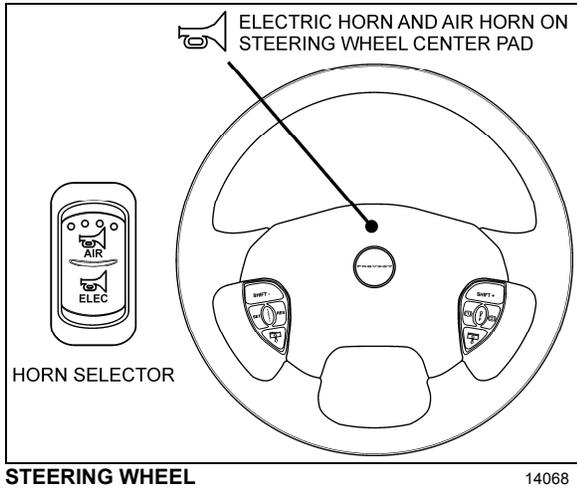
If your vehicle is equipped with a transmission retarder, this button has the same effect than the Retarder/Engine Brake Low button.

On vehicles equipped with engine brake, pressing this button will permit full application of engine brake (100% of braking power). Refer to “OTHER FEATURES” chapter for more information about the engine brake operation.



WARNING

Engine brake must be used on dry road only. Never use the engine brake on slippery roads; loss of control could result.



HORNS

The electric horn (city horn) and air horn (highway horn) are operated from the steering wheel center pad. Use the Horn Selector switch located on the lateral control panel to select the appropriate horn type.

NOTE

When the vehicle is stationary, the electric horn will sound to inform the driver that a fire is detected in the engine compartment.

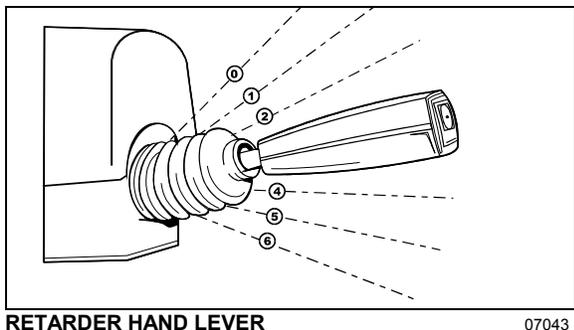
TRANSMISSION RETARDER

The transmission retarder is available only with the Allison transmission.

The retarder can be operated using a hand lever mounted on the steering wheel column or using the service brake pedal.

To use the transmission retarder, it must be activated first by pressing one of the two Retarder/Engine Brake buttons on the steering wheel.

Operating The Retarder Using The Hand Lever



With the retarder enabled and the accelerator pedal released, move the output retarder lever clockwise from the first to the sixth position. The braking level for each position is as follows:

Position	Braking level (up to)
Initial ①	Varies with brake pedal
①	16%
②	33%
③	49%
④	71%
⑤	89%
⑥	100%

NOTE

The output retarder lever is located on the right side of the steering column.

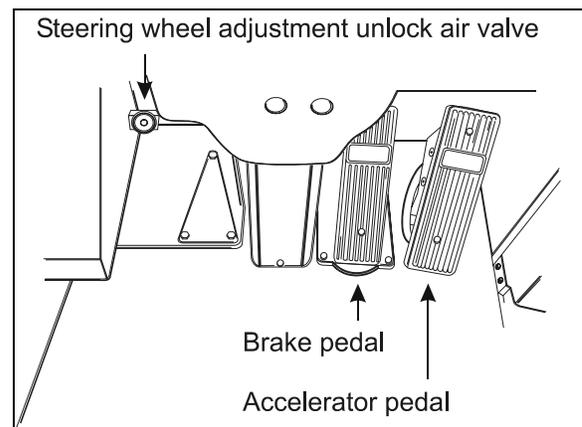
Operating The Retarder Using The Brake Pedal

With the retarder enabled, the accelerator pedal released and the output retarder lever in the initial position ①, depressing the brake pedal will engage both the service brake and the transmission retarder. This is referred to as retarder-brake blending. The further the pedal is depressed, the more total braking power is provided. Refer to "OTHER FEATURES" chapter for further information about the transmission retarder.

NOTE

If the wheels start to lock up on slippery roads, the output retarder will automatically deactivate until the wheels start to turn.

FOOT-OPERATED CONTROLS



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BRAKE PEDAL

The coach is equipped with a dual braking system. The front brakes operate from a different air pressure source from the drive and tag axle brakes. The dual braking system becomes a modulated emergency system if a pressure drop occurs in the primary brake system.

Service brakes are applied by depressing the brake pedal. Braking increases with the amount of pressure applied to the foot pedal. Refer to Other Features chapter under Antilock Braking System. When the brake pedal is depressed, the brake lights turn *ON* automatically.

For safe and effective braking, the air system pressure should reach at least 95 psi (655 kPa) in both the primary and secondary circuits. A warning light and an audible alert will sound when the air pressure in either the primary or secondary circuits drops below 66 psi (455 kPa). If this occurs, stop the coach; determine the cause of the pressure loss before proceeding. The brake pedal can be used in conjunction with the transmission retarder. Refer to Transmission Output Retarder in this chapter.



DANGER

Immediately report any brake system problem to your company or directly to the nearest Prevost or Prevost-approved service center.

Do not "fan" or "pump" the brake pedal. This practice does not increase brake system effectiveness but rather reduces system air pressure thereby causing reduced braking effectiveness.



CAUTION

"Riding" the brake by resting one's foot on the brake pedal when not braking can cause abnormally high brake temperature, can damage and cause premature wear of brake components and reduce brake effectiveness.

ACCELERATOR PEDAL

Controls engine RPM as needed.

NOTE

The accelerator pedal will not operate when the entrance door is open.

ALLISON AUTOMATIC TRANSMISSION

The transmission is fully automatic: Proper ranges should be automatically selected according to driving speeds to improve vehicle performance and control. The speed ratio of the power converter changes automatically as vehicle speed increases and direct-drive goes in and out as necessary. The speed ratio is modulated by vehicle speed and accelerator pedal position. You will find the complete transmission operation instructions and driving tips in the **Allison Bus Series Operator's Manual** included in your vehicle's publication box.

OPERATION

When a button is depressed on the transmission control pad, the corresponding letter or number is displayed indicating the transmission is ready to operate in the selected range. If the transmission control module (TCM) detects a serious problem in the transmission, a buzzing tone sounds for 5 seconds and the "CHECK TRANS" light on the dashboard illuminates to warn the driver that the transmission is held in gear. If another button is depressed, the buzzing sound will continue until the original range is selected.

NOTE

As a light bulb and systems check, the "CHECK TRANS" light will illuminate when the ignition switch is turned to ON. After about two seconds the light will turn off. If the "CHECK TRANS" light remains on, the self-diagnostic system has detected a problem. If the problem disappears, the light will go out, but a trouble code will remain stored in the TCM.

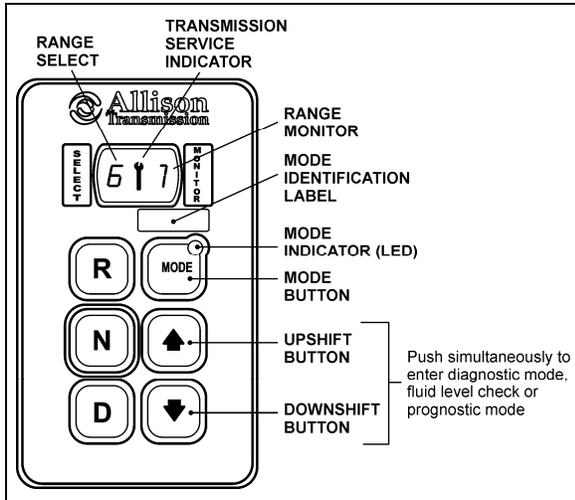
PUSHBUTTON SHIFT SELECTOR

The pushbutton shift selector has the following elements:

R (Reverse) — Press this button to select Reverse.

N (Neutral) — Press this button to select Neutral.

D (Drive) — Press this button to select Drive. The highest forward range available will appear in the digital display window under SELECT. The transmission will start out in the lowest available forward range, displayed under MONITOR, and advance automatically to the highest range.



ALLISON PUSHBUTTON SHIFT SELECTOR 07134

▲ ▼ — Press respectively the ▲ (Upshift) or ▼ (Downshift) arrow button when in DRIVE to request the next higher or lower range. One press changes gears by one range. If the button is held down, the selection will scroll up or down until the button is released or until the highest or lowest possible range is selected. Protection mechanisms inhibit selecting ranges that are not appropriate for the current speed or which may damage driveline components.

MODE — The MODE button can allow the driver to enable a secondary shift mode that has been programmed into the TCM unit. The name of the secondary mode appears on the MODE IDENTIFICATION label adjacent to the MODE button. Pressing the MODE button activates the PERFORMANCE shift schedule and illuminates the mode indicator (LED).

NOTE

When the diagnostic display mode has been entered, the MODE button is used to view and toggle through diagnostic code information. Refer to Appendix C for more details about **diagnostic code display procedure** and **fluid level check** using the pushbutton shift selector.

Functions of The “Mode” Button

Both ECONOMY (default mode at starting of the engine) and PERFORMANCE (secondary shift mode) modes are equivalent from the first to the fourth gear as the transmission upshifts at around 2000 rpm.

The ECONOMY mode allows for upshifts in fifth and sixth gear at around 1700 rpm. This is a

more efficient operation of the transmission and thereby helps improve fuel economy.

The PERFORMANCE mode keeps upshifts at 2000 rpm in fifth and sixth gears. This makes for better performance than the economy mode but with higher fuel consumption. It is recommended this mode be selected while driving up or down grades. The mode indicator (LED) is illuminating when PERFORMANCE mode is selected.

TRANSMISSION SERVICE INDICATOR

⚙ — This indicator will be illuminated upon the detection of a service issue relating to clutch, filter or fluid life. The appearance of the indicator (lit steadily, flashing, etc.) varies for each of the conditions monitored by the system. Refer to appendix C for more details about **diagnostic code display procedure, fluid level check or prognostic features** (Oil Life Monitor, Filter Life Monitor and Transmission Health Monitor) using the pushbutton shift selector.

Illuminated at startup for a bulb check, this indicator will then be turned off if no service conditions exist.

DESCRIPTION OF AVAILABLE RANGES

R (Reverse)

Press the «R» button to select reverse. Completely stop the vehicle and let the engine return to idle before shifting from forward range «D» to reverse «R» or from reverse to forward range. The reverse warning signal will be activated when this range is selected.

N (Neutral)

Use this position to start engine. Select «N» (Neutral) when checking vehicle accessories and for extended periods of engine idle operation; parking brake must then be applied. The pushbutton shifter will automatically select «N» (Neutral) when the ignition switch is turned ON.

NOTE

The automatic transmission does not have a park «P» position. Select «N» (Neutral) and apply parking brake when the vehicle is left unattended. An audible alert will sound if the engine is stopped and the parking brake is not applied.

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DANGER

Always apply parking brake and put the transmission in NEUTRAL before leaving driver's seat.



CAUTION

Detroit Diesel engines should not be idled for extended periods at "slow" idle. For extended idling, engine should run at "fast" idle.



DANGER

The vehicle service brakes or park brake must be applied whenever NEUTRAL is selected to prevent unexpected vehicle movement.



CAUTION

Do not allow your vehicle to "coast" in neutral «N». This practice can result in transmission damage. Also, no engine braking is available in neutral.

D (Drive)

Use this position for all normal driving conditions. After touching this pad, the vehicle will start in first or second range and will automatically upshift to a higher range as output speed increases. As the vehicle slows down, output speed decreases, the transmission automatically downshifts to the correct range. If a locked brake or a slick surface condition should occur, the TCM (Transmission Control Module) will command converter operation (disconnect lock-up) and inhibit downshifts for a period of time or until normal wheel speed has been restored.

IMPORTANT NOTE

Brake pedal must be applied when selecting «D» (Drive) otherwise the transmission will stay in «N» (Neutral).

NOTE

The transmission should normally be allowed to shift by itself, but manual shifting can be done as described below.

1 (First range)

Select this range when pulling through mud and snow, when speed control is needed for driving up or down steep grades or when maneuvering in tight spaces. This range also provides maximum driving torque and engine braking power or retarder braking effect. In the lower ranges (1, 2, 3 and 4), the transmission will not upshift above the highest gear selected unless engine overspeed is detected.

2 (Second range)

Select this range when operating in heavy and congested traffic. The transmission will start in first and automatically upshift to second. When slowing, the transmission will automatically downshift to first range. Low ranges provide progressively greater engine and retarder braking power (the lower the range, the greater the engine and retarder braking effect).

3, 4 (Third and fourth ranges)

Select these ranges when driving on moderate grades or when load and traffic conditions limit speed.



WARNING

Service brake should not be used to control the speed of vehicle on long, steep descents. Instead, lower transmission ranges should be used (in conjunction with output retarder. Refer to "JACOBS Engine Brake" and "Transmission Retarder" headings in "Other Features" chapter for details regarding both systems. This procedure keeps service brake cool and ready for emergency stopping.



CAUTION

When descending in lower ranges, care must be taken that engine speed does not exceed 2,450 rpm.

ZF-ASTRONIC AUTOMATIC TRANSMISSION

RANGE SELECTOR KEYPAD

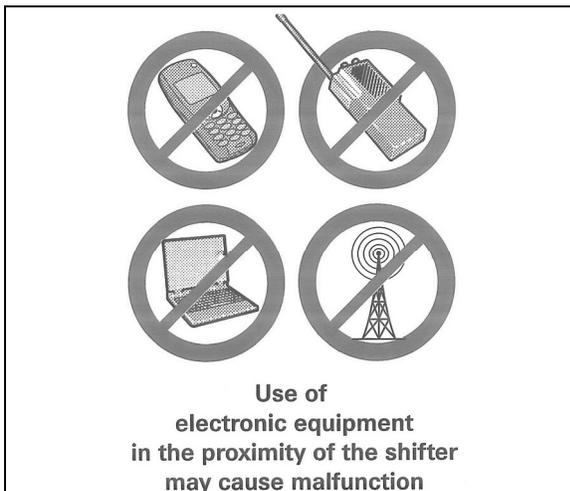
The range selector keypad contains 6 keys and a display.

- “ R “ Reverse travel
- “ N “ Neutral (no gears selected in transmission)
- “ D “ Forward travel
- “ ↑ “ Upshift
- “ ↓ “ Downshift
- “Fn“ Switches between manual and automatic mode.



RANGE SELECTOR KEYPAD

07081



WARNING

Do not use electronic equipment in the proximity of the ZF range selector keypad as this may cause improper operation and unwanted gear shifting.

INDICATOR LIGHT

Flashing: Transmission function change requested. Function change is completed when indicator light is permanently illuminated.

Permanently illuminated: Function in use.

NOTE

The “R”, “N” and “D” ranges are only selected once the keys are released. If the keys are held down for more than 5 seconds, the shifting request is ignored.

The “↑”, “↓” and “Fn” selection keys are activated when pressed.

DISPLAY

The display indicates the number of the selected gear, the neutral position as well as faults.

Display: Automatic mode



07082

Transmission in automatic mode
(2 bars and 2 arrows)

4th gear selected in transmission

Display: Manual mode



07083

4th gear selected in transmission
(No bars or arrows are displayed)

ACCELERATOR PEDAL

The position of the accelerator pedal does not need to be changed during the shifting process. The clutch actuation and engine speed are controlled by the electronic transmission control unit (ECU) depending on accelerator pedal position.

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AUTOMATIC MODE

If the “D” key is pressed, the gear shifting system selects the most appropriate gear for starting. The 2nd gear is the default starting gear; however, the system will select the 1st gear if necessary like when starting the vehicle on a slope. Once the accelerator is depressed, the clutch engages automatically and then the vehicle starts to move. The gear shifting system automatically performs upshifts and downshifts during travel. When in automatic mode, the gear shifting system avoids shifts which result in the engine overspeeding or stalling. The driver can always intervene manually (upshift and downshift) with no need to change the accelerator pedal position – for example, in difficult driving situations. The driving mode then changes from automatic to manual for approximately 20 seconds then returns to automatic mode.

MANUAL MODE

If the “Fn” key is pressed, the transmission system changes into manual mode. The driver can also press the upshift or downshift key to select a moving off gear other than the one proposed by the system. Once the accelerator is depressed, the clutch engages automatically and the vehicle starts to move. The driver uses the key “↑” or “↓” to select the gears required.

NOTE

The driver must avoid overspeeding the engine. The engine may stall if the accelerator is depressed in a gear too high.

EASY START SYSTEM

This system intervenes during passage from neutral “N” to forward travel “D” or reverse travel “R” in maintaining drive axle service brakes application for 2 seconds after brake pedal has been released. This system eases the starting of the vehicle on a slope, preventing it from rolling while the clutch is not fully engaged.

DRIVING TIPS



CAUTION

The engine should not be idled for extended periods at slow idle. For extended idling, engine should run at fast idle.



DANGER

Always apply parking brake before leaving driver's seat. The driver must not leave the vehicle when the engine is running and a gear is selected.



CAUTION

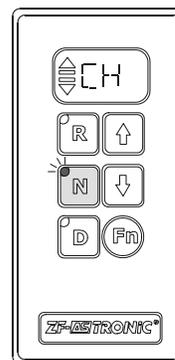
Do not allow the vehicle to coast in neutral (N). This practice can result in transmission damage. Also, no engine braking is available in neutral (N).

Indicator light in the “R”, “N” and “D” keys

Flashing: Transmission function change requested. Function change is completed when indicator light is permanently illuminated.

Permanently illuminated: Function in use.

STARTING THE ENGINE



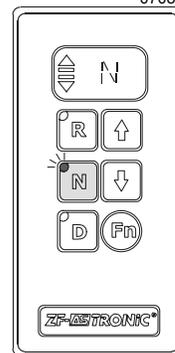
07084

☞ Apply parking brake

☞ Switch on “ignition”

☞ Transmission system self-check. “CH” appears on the display.

The indicator light of the “N” key lights up as soon as the neutral transmission shift has been completed.



07085

☞ Start the engine

☞ Self-check is completed when “N” (neutral) appears on the display, transmission is in neutral setting. On start-up, automatic mode is default selection.

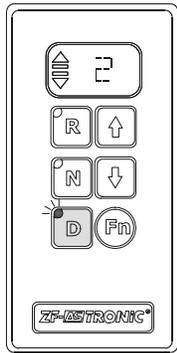
NOTE

Gear shifts are not possible when the engine is not running.

IMPORTANT NOTE

Brake pedal must be applied when selecting Drive (D) otherwise the transmission will stay in neutral (N).

SETTING OFF, FORWARD TRAVEL



07086

- ☞ Start the engine
- ☞ Apply service brakes (activation of Easy Start) and depress “D” key. Automatic mode is activated.
- ☞ The display shows the starting gear selected.
- ☞ Indicator light of “D” key lights up. (The system selects the 2nd starting gear, the clutch remains disengaged.)
- ☞ Release the service brakes and depress accelerator pedal.

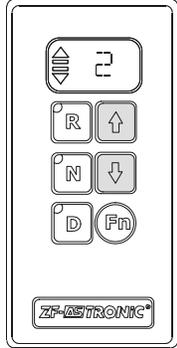


CAUTION

The vehicle may roll away even if the accelerator is not depressed after the service brakes have been released by Easy Start System.

- ☞ Vehicle sets off (clutch engages automatically).

CORRECTING THE STARTING GEAR



07087

The system selects 2nd starting gear as default. The driver may select 1st starting gear.

To undertake a correction:

- ☞ Depress “↓” key to select 1st gear.
- ☞ The display shows the starting gear selected.

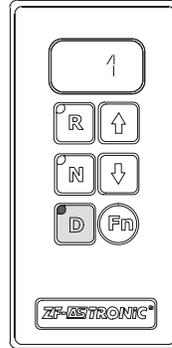
NOTE

It is recommended to select the 1st starting gear for starting on a slope.

MANEUVERING MODE

Maneuvering mode is provided for extremely slow travel. The 1st gear and the reverse gear are provided as maneuvering gears. Maneuvering mode is not available in the other gears. To engage maneuvering mode, select 1st gear or reverse gear “R” using “↑” or “↓” key. When in maneuvering mode, the clutch control differs from the normal driving mode. The accelerator pedal controls the clutch action just like a clutch pedal would. This control is available from 0 to

70% of the accelerator pedal stroke. Over 70% of the stroke, the clutch is fully engaged, and a change will be made from maneuvering mode into setting off mode. The vehicle may accelerate suddenly.



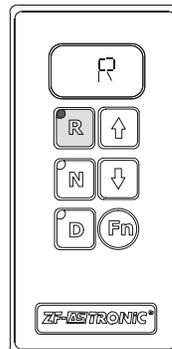
07088

Unlimited maneuvering time.

The “CL” (clutch) display appears when the clutch is overloaded.

! CAUTION

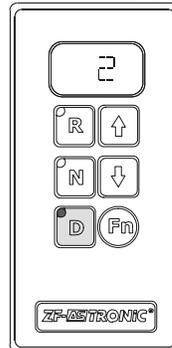
If the driver does not respond to the “CL” display, the clutch may be damaged as a result of overload.



07089

Unlimited maneuvering time.

The “CL” (clutch) display appears when the clutch is overloaded.



07090

! WARNING

If the driver does not respond to the “CL”, a change is made from maneuvering mode into setting off mode. The vehicle may accelerate rapidly.

STARTING TO ROLL ON SLOPES

Precondition: the engine must be running.



WARNING

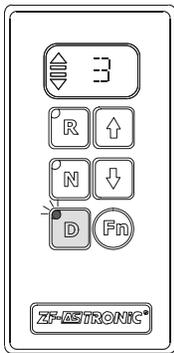
If the vehicle starts to roll and no gears are selected (the indicator light of the “N” key lights up), the engine brake is ineffective.

64 Controls and Instruments



CAUTION

Do not allow the vehicle to roll in the opposite direction of travel than the gear selected.

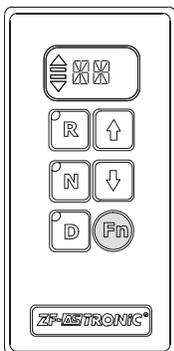


07091

If the vehicle rolls forward with transmission in neutral “N” after that the brake is released and the driver shifts from “N” to “D”, the system selects a gear suitable for the running speed.

CHANGING BETWEEN MANUAL MODE AND AUTOMATIC MODE

Always possible, even if the vehicle is in motion.



07092

Changing from manual to automatic mode.

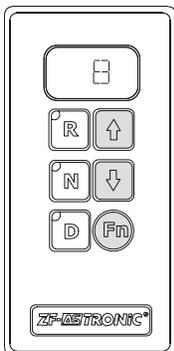
- ☞ Depress the “Fn” key

Changing from automatic to manual mode.

- ☞ Depress the “Fn” key

CHANGING GEAR

Changing gear in manual mode



07094

- ☞ Depress “↑” or “↓” key to select the required gear.

Changing gear in automatic mode

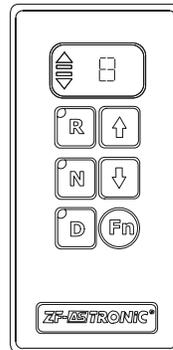
- ☞ All upshifts and downshifts are performed automatically.

They depend on:

- ☞ The drive situation.
- ☞ The load.
- ☞ The accelerator pedal position.
- ☞ The running speed.
- ☞ The engine speed.

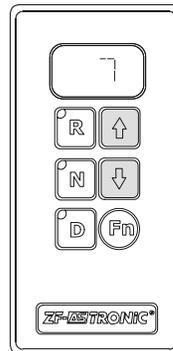
Arrows and 2 bars = automatic mode.

8th gear is selected. If a manual gear shifting is selected, the gear shifting system exits automatic mode. Depress the “Fn” key to reactivate the automatic mode. The gear shifting system will switch back automatically to automatic mode after about 20 seconds if no other manual gear shifting is selected.



07093

Jumping gears



07095

Jumping one gear:

Depress “↑” or “↓” key twice in rapid succession in the direction required.

Jumping two gears:

Depress “↑” or “↓” key three times in rapid succession in the direction required.

NOTE

- The driver can shift into neutral “N” from any gear at any time. This shift process always takes priority.
- There is no need to change the position of the accelerator pedal during the gear shifting process because the engine speed is automatically controlled.
- A gear shifting command is not carried out if this shift would result in the maximum engine speed (governing speed) being exceeded.



DANGER

If the driver shifts to neutral “N” during travel, the engine brake is then no longer effective.

Engine braking effect when changing gear

The engine brake is deactivated by the system during gear shifting. Once the gearshift is completed, the engine brake is then automatically reactivated. If the engine brake is actuated, the system switches back into automatic mode so that the maximum engine braking effect is achieved.

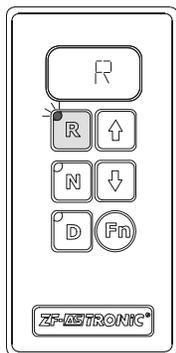


DANGER

The effect of the engine brake is interrupted during gear shifting. The vehicle may accelerate when traveling downhill.

REVERSING

Selecting reverse gear:



07096

- ☞ The vehicle **must** be at a standstill.
- ☞ Apply service brakes (activation of Easy Start System) and depress “R” key.
- ☞ “R” appears in the display (clutch remains disengaged). Indicator light of “R” key lights up.
- ☞ Release service brakes and depress accelerator pedal (clutch engages automatically).
- ☞ Vehicle moves backwards.



WARNING

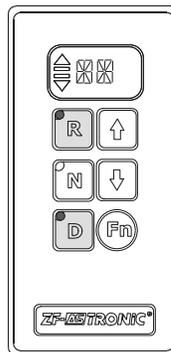
If the vehicle is rolling, shifts cannot be made into reverse. Stop the vehicle immediately.



DANGER

The vehicle may roll away even if the accelerator is not depressed after the service brakes have been released by Easy Start System.

CHANGING DIRECTION OF TRAVEL (FORWARD/ REVERSE)



07097

Changing from “R” to “D” direction of travel

- ☞ The vehicle **must** be at a standstill
- ☞ Depress “D” key

Changing from “D” to “R” direction of travel

- ☞ The vehicle **must** be at a standstill
- ☞ Depress “R” key



WARNING

A change in the direction of travel may only be undertaken when the vehicle is at a standstill otherwise the transmission will shift into neutral. While the indicator light is flashing, this indicates that the gear change is not yet complete.

STOPPING VEHICLE

- ☞ Do not actuate the accelerator; use the service brake to bring the vehicle to a standstill.
- ☞ The clutch disengages automatically before the vehicle reaches a standstill so that engine “stalling” is prevented.
- ☞ Always actuate service brake or parking brake if vehicle is not moved.



CAUTION

In order to protect the mechanical components of the clutch releasing system, the transmission must be shifted to neutral during longer stops (more than approx. 1-2 min., e.g., traffic jam, grade crossing, etc.). This disengages the clutch and relieves the clutch releasing system.



DANGER

If the vehicle is at a standstill with the engine running and a gear selected, the vehicle can be moved by simple depressing the accelerator!

Before leaving a vehicle with the engine running, the transmission must be shifted into neutral and the parking brakes must be applied.

66 Controls and Instruments

Actuating the parking brake during travel on a slippery road surface may result in the engine coming to a standstill. Power-assisted steering is then no longer available.

TOWING



CAUTION

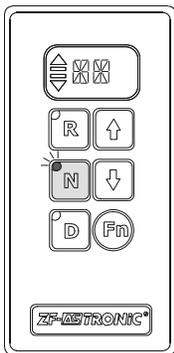
To prevent damage to the drive train components, disconnect axle shafts or driveshaft before towing. Do not attempt to push or pull-start the vehicle.



CAUTION

Make sure axle shafts or driveshaft are installed correctly after towing. Tighten axle shaft and driveshaft nuts to the correct torque settings. Do not invert shafts.

SWITCHING OFF ENGINE/PARKING VEHICLE



07098

- ☞ Bring vehicle to a standstill
- ☞ Engage parking brakes
- ☞ Depress "N" neutral key
- ☞ "N" appears on the display. Indicator light of "N" lights up.
- ☞ Switch off engine via ignition key

NOTE

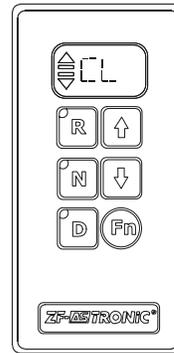
If the transmission is **not** shifted into neutral "N" before the engine is switched off, transmission shifts automatically into neutral once the ignition is "Off".



WARNING

When engine is switched off, transmission goes into neutral "N", NO gear is selected. The vehicle may roll away if brakes are not applied.

CLUTCH PROTECTION



07099

"CL" is displayed if there is a risk of clutch overload resulting from several starting processes occurring in a rapid succession or when running very slow in a starting gear too high.

NOTE

Select an operating mode in which the clutch will not be overloaded, for example:

- Accelerate vehicle (to engage the clutch)
- Stop the vehicle
- Set off quickly in a lower gear

NOTE

To preserve the mechanical components of the clutch releasing mechanism, the transmission should be shifted to neutral "N" if the vehicle stops for a long period of time (more than approx. 1 to 2 min., for example, in traffic jams, at railway crossings etc.). This disengages the clutch and relieves the clutch releasing mechanism.

Even though the clutch is automated, the driver still has considerable influence on clutch service life. To minimize the level of wear on the clutch, it is recommended to **select the lowest gear as possible when setting off.**

ENGINE OVERSPEED PROTECTION

The electronics system only allows shifts to be undertaken if they lie within the speeds specified by the vehicle manufacturer. This is done to the benefit of both engine and transmission.



CAUTION

In order to protect the engine from damaged caused by overspeed, the system effects an upshift during automatic driving operation and, depending on vehicle type, also during manual driving operation. The vehicle can accelerate during downhill driving.



CAUTION

The engine may be damaged if the vehicle is accelerated on downhill gradients and the engine thereby enters the overspeed range.

Depending on type of vehicle, there is no automatic gear shifting to a higher gear during downhill driving in manual operation. In this case, make sure that the engine speed does not exceed the permissible speed range.

ZF-ASTRONIC DISPLAY

The display provides information on the status of the transmission.

Operating Displays



07100

Automatic mode is shown in the display by means of 2 bars and 2 arrows (8th gear is selected in transmission).



07083

Manual mode
4th gear selected in transmission (No bars or arrows).



07121

Transmission in neutral position



07122

Reverse gear is engaged



07101

“CH” = system self-check appears on display when ignition is ON.

Warning Displays



07102

“AL” = airless
Alternates with the normal display. The transmission compressed air system has insufficient pressure.

NOTE

Only leave once there is sufficient pressure in the pneumatic system. If pressure is too low when the vehicle stops, do not engage the clutch otherwise the engine will “stall”.



WARNING

If shifts are undertaken when pneumatic pressure is too low, the transmission may remain in neutral to ensure that there is no direct drive and that the engine brake is effective.



07103

“FP” = accelerator pedal
Move accelerator to idling position.

If the display does not go out, there is a system error. Vehicle cannot be driven any further.



07104

“CL” = clutch
Alternates with the normal display.

Clutch is overloaded.

See “CLUTCH PROTECTION”



07105

“CW” = clutch wear
Visit nearest specialist workshop to replace the clutch.



07123

“HT” = High temperature



07124

“EE” = Electronic Error
Is displayed when communication between the display and the transmission electronics is disturbed



07125

“--” = Display Error

Is displayed when communication between the display and the transmission electronics is disturbed



07106

“SM” = system malfunction

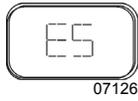
- Stop the vehicle
- Vehicle may no longer be driven



WARNING

Whenever possible, do not stop the vehicle in danger zones.

68 Controls and Instruments



"ES" = Easy Start

- **Temporarily, no electronic starting traction control is available**



WARNING

The vehicle can start moving.



"NS" = Neutral Shift

- **Shift transmission to "N" Neutral**

NOTE

Depending on the vehicle type, the transmission can automatically shift to neutral in order to protect the mechanical components of the clutch releasing system after running a certain amount of time.



"TC" = Transmission Check

- **Transmission position cannot be learned**



"CC" = Clutch Check

- **Clutch position cannot be learned**

Error messages and the reactions resulting from these errors can be deleted with the vehicle at a standstill and the "Ignition OFF".

- * Wait until the display goes out.
- * If the display does not go out once the ignition has been turned "OFF", set the battery master switch to the **OFF** position.
- * Switch the ignition back on.

If the error message is still in place, the transmission has to be repaired. The transmission is inoperative. The vehicle will have to be taken to a service point. The error number(s) must be specified when the service point is contacted. See paragraph SYSTEM FAULTS – ERROR MESSAGES in APPENDIX E of this manual.

EXHAUST AFTERTREATMENT SYSTEM

AFTERTREATMENT DEVICE

The distinctive feature behind clean emissions technology is an exhaust Aftertreatment Device (ATD) which replaces today’s muffler. The ATD primary function is to capture and oxidize (regenerate) the particulate matter (soot) in the engine exhaust gas. The ATD is split into two main sections. The exhaust gas first enters the Diesel Oxidation Catalyst (DOC) and then flow through the Diesel Particulate Filter (DPF); together they capture and regenerate the soot on a regular or passive basis. Through constant monitoring of the exhaust gas temperature and the system back pressure, the engine control is able to manage regeneration.

PASSIVE REGENERATION

Passive regeneration is the process by which the particulate matter is oxidized due to the heat generated by the engine internal combustion process. However, exhaust temperature must be above 572°F (300°C) to initiate the oxidation catalyst that precedes the filter substrate. During normal highway operation, exhaust temperatures alone are usually high enough to oxidize accumulating soot. In low ambient temperatures, however, or in some stop-and-go applications, the system needs a little help to regenerate, or clean itself. This process is called “active” regeneration.

ACTIVE REGENERATION

When required, the engine control module activates two key upstream systems that assist in a process called “active” regeneration when the engine internal combustion process alone does not generate enough heat. The first is an Intake Throttle Valve which can be actuated to help increase the Aftertreatment Device temperature which speeds the regeneration. The second system is the Dosing System, which injects a mist of diesel fuel into the exhaust system to increase and maintain the Aftertreatment temperature. Exhaust temperature must again be above 572°F (300°C) to initiate the oxidation catalyst, which in turn oxidizes the injected diesel fuel molecules to achieve up to 1200°F (650°C) exhaust temperature at the particulate filter.

This process of “active regeneration” takes place during the normal operation cycle of the vehicle without charges in performance or control for the operator.

STATIONARY (PARKED) REGENERATION

In a small number of specific engine duty cycles, the engine control module may not be capable of completing an active regeneration. In these situations, the operator will be notified that a “stationary” regeneration may be required. A DPF telltale light will illuminate indicating the need for user interaction. The lamp gives the operator a grace period to allow this process to take place at a time when most convenient for the operator. This process requires the vehicle to be parked while a driver or maintenance technician initiates the regeneration process. Once initiated, the stationary regeneration process will be complete in about 20 to 45 minutes.

The driver will be notified of the need for a stationary regeneration (parked) by illumination of the “DPF Regeneration Lamp”.

The sequence of indicator lamp(s) is as follow:

LEVEL 1  (steady)

REGENERATION NEEDED

Diesel particulate filter is becoming full.

The “DPF Regeneration Lamp” will be illuminated prior to any engine protection measures being taken. Once this lamp is lit, the stationary regeneration (parked) process should be initiated.

LEVEL 2  (flashing)

REGENERATION REQUIRED

Diesel particulate filter is full.

If no DPF regeneration occurs after the initial “DPF Regeneration Lamp” illumination, the lamp will begin blinking and a stationary regeneration should be initiated as soon as possible in order to prevent from entering into Level 3.

LEVEL 3  (flashing) + **CHECK ENGINE**

ATD SERVICE REQUIRED

ENGINE DERATE ACTIVE

Diesel particulate filter is overfull.

70 Other Features

If the flashing “DPF Regeneration Lamp” is still ignored, the “Check Engine” will illuminate at that time, engine performance is limited. Perform a parked regeneration IMMEDIATELY to avoid further derate and prevent from entering into Level 4.

LEVEL 4  (flashing) + **STOP ENGINE**

ATD SERVICE REQUIRED

ENGINE DERATE ACTIVE

A serious engine problem has occurred. The DPF may be over its maximum capacity.

If a stationary regeneration is still not initiated, a standard Engine Protection Shutdown sequence will occur. All of the following dashboard lamps will be present:

Blinking “DPF Regeneration Lamp”;
Steady “Check Engine” lamp;
Steady “Stop Engine” lamp.

Once engine derate and/or shutdown sequence is completed, a stationary regeneration must occur to continue vehicle operation. If the driver continues to operate the vehicle without a regeneration, additional measures will be taken to protect the engine and ATD from damage, up to and including engine shutdown. Parked regeneration might no longer be possible.

NOTE

At starting of the engine, if a stationary regeneration is required, the engine coolant temperature must reach 140°F (60°C) before any stationary regeneration may be initiated and completed. Permit the engine to idle for a short while or drive the vehicle until engine temperature increases sufficiently.



WARNING

Do not initiate a stationary regeneration in a closed area like a garage. Stationary regenerations must be undertaken outdoors only.



WARNING

During stationary regeneration, exhaust temperature may reach up to 1200°F (650°C) at the particulate filter.

Before initiating stationary regeneration, make sure that the DPF outlet diffuser is clear of objects and that no one is working near the DPF outlet diffuser.



WARNING

Hot surfaces. Keep yourself clear of all hot Aftertreatment Device components, particularly during and after active or stationary regeneration. Hot surfaces can cause serious burns.

MESSAGE CENTER DISPLAY (MCD)

MCD is a standard dashboard mounted graphic device that displays and records operational data transmitted by the Detroit Diesel Electronic Controls (DDEC), antilock braking system and other electronically controlled components on the SAE J1708/1587 diagnostic data link.

The many functions of the MCD include vehicle operating status for the driver and diagnostics for the technician.

The MCD uses a dashboard integrated liquid crystal display. It provides automated intensity control of the display, based on the dashboard instrument panel lights for improved driver convenience.

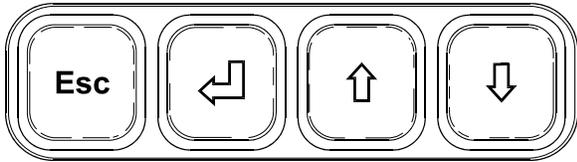
Should an alert message be sent out by the ECM, the driver will be shown what is wrong via an error code. Symbols may be displayed on the screen when a condition occurs or as a reminder that a feature is enabled. These symbols include a bell when the reminder alarm is on, “PTO” when fast idle is activated or “CC” when cruise control is activated.

NOTE

When a condition requiring attention occurs, the screen relating to that condition will automatically replace the current display.

The MCD works with interactive menus in a series of cascading layers. The MCD allows access only to GAUGE MODE, FUEL ECONOMY, TIME/DIST and FAULTS ?menus when the vehicle is moving. Access to the remaining menus is granted when the vehicle is stopped.

The driver inputs commands and settings by using the keys on the MCD keypad.



06399

Use the up (↑) and down (↓) arrows to highlight a function or a setting. At any given level, small arrows may appear in the upper and lower right corner of the display. This means that more information is available by scrolling up or down with the arrow keys.

To change the setting of a feature, press enter key (↵). The first value to set is highlighted. Set the correct value with the arrow keys. Press the enter key when the correct value is displayed. The next value to set is highlighted. In some cases, the enter key will reset compiled data. In that situation, the MCD will prompt you to press the enter key for 1 second to prevent accidental resetting.

To return to the previous level, press Esc key any time. In most cases, the MCD will return to the previous level once a setting has been chosen.

To return to the main menu from any submenu, press Esc key a few times.

DRIVING MODE MENU

This menu includes the following modes;

Gauge Mode; Fuel Economy, Time/Dist; Faults?.

GAUGE MODE MENU

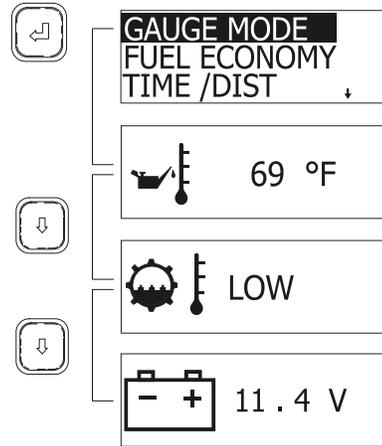
Transmission fluid temperature, engine oil temperature and battery voltage can be displayed in this mode.

To display:

1. Highlight GAUGE MODE;
2. Press enter key (↵);
3. Choose a gauge using the up (↑) or down (↓) arrow keys.

To exit gauge mode, press Esc key.

NOTE
 When a condition requiring attention occurs, the screen relating to that condition will automatically replace the current display.



06398

FUEL ECONOMY MENU

Check average and instantaneous fuel consumption, as well as distance until empty.

To display:

1. Highlight FUEL ECONOMY
2. Press enter key (↵);
3. Toggle between average/instantaneous fuel consumption or leg fuel consumption using the up and down arrows;

To exit FUEL ECONOMY menu, press Esc key any time.

4. To reset average and instantaneous fuel consumption, press enter key. The MCD will prompt you to press enter key for one second to reset.

If you do not wish to reset the fuel data, press Esc to return to previous menu.

TIME / DIST MENU

This menu gives access to the digital clock, the reminder alarm, two trip odometers and the average speed counter.

To display the digital clock:

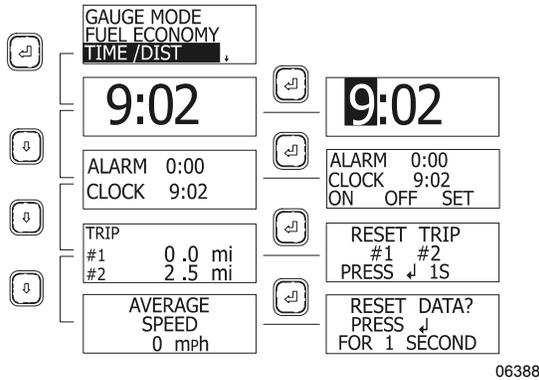
1. Highlight TIME/DIST;
2. Press enter key (↵);

The digital clock appears;

3. Use the up (↑) or down (↓) arrow keys to display the alarm and clock display, the trip odometer display or the average speed counter display.

To exit TIME/DIST menu, press Esc key.

72 Other Features



Setting the Digital Clock

1. Display the clock;
2. Press the enter key (↵);
The first digit of the time is highlighted.
3. Set the correct value using the arrow keys;
4. Press enter key (↵);
The next digit of the time is highlighted.
5. Set the correct time using the arrow keys and the enter key.

After pressing the enter key when the last digit is highlighted, the display reverts to clock mode.

Reminder Alarm

The alarm can be useful to remind the driver of a task to do at a given time.

To set the alarm:

1. Display the alarm and clock menu;
2. Press the enter key (↵);
3. Using the arrow keys, highlight ON, to arm the alarm, OFF to disarm the alarm or SET to set the alarm time;
4. Press the enter key (↵).

If you have chosen SET, set the time using the arrow keys and enter key.

To exit any menu and return to the previous menu, press Esc key.

A bell appears in the upper right corner on all MCD screens if the alarm is armed.

When armed, the alarm will sound at the set time even when the battery master switch is off.

To stop the alarm from sounding, press any key on the MCD keypad.

Trip Odometers

Two trip odometers are available for driver convenience.

To reset a trip odometer:

1. Display the trip odometers;
2. Press the enter key (↵);
3. Using the arrow keys, highlight the trip odometer you wish to reset;
4. Press the enter key (↵) for 1 second.

To exit anytime, press Esc key.

Average Speed

The average speed display shows the average speed has been driven since the last reset.

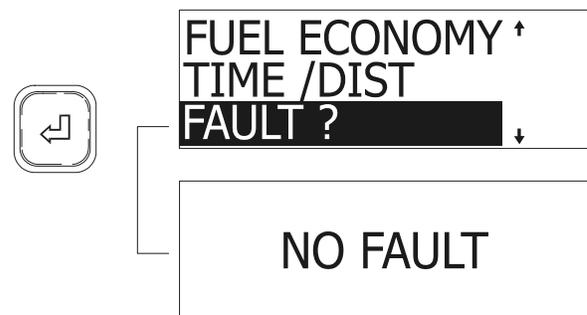
To reset:

1. Display the average speed;
2. Press the enter key (↵);
3. When prompted, press the enter key for 1 second to reset data.

FAULT ? MENU (Fault messages)

To display logged fault messages:

1. Highlight FAULT ?
2. Press the enter key (↵);
3. Fault messages are displayed (if any).



NON-DRIVING MODE MENU

SET UP MODE MENU

Set up mode allows the driver to customize the MCD. Set up mode allows setting the language, units used (Metric or Standard), clock format, display contrast, backlight and night display.

If the correct password is entered, default language, fleet fuel target and passwords can also be set.

To configure the MCD, highlight SET UP MODE using the arrow keys, then press the enter key.

Language Selection

If available, language may be selected. To select a language:

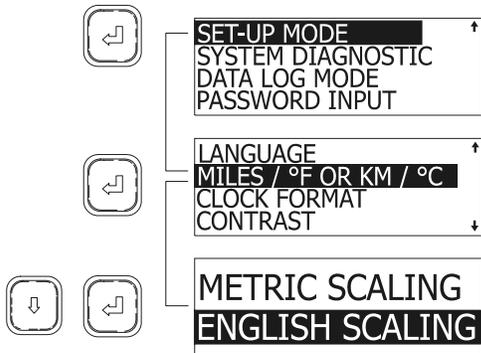
1. In SET UP MODE, highlight LANGUAGE using the arrow keys;
2. Press the enter key (↵);
3. Highlight the desired language using the arrow keys;
4. Press enter key (↵) to confirm the language choice.

The MCD returns to SET UP MODE menu.

Metric or Standard Units

1. In SET UP MODE menu, highlight MILES/°F OR KM/°C using the arrow keys;
2. Press the enter key (↵);
3. Highlight the desired units using the arrow keys;
4. Press enter key (↵) to confirm.

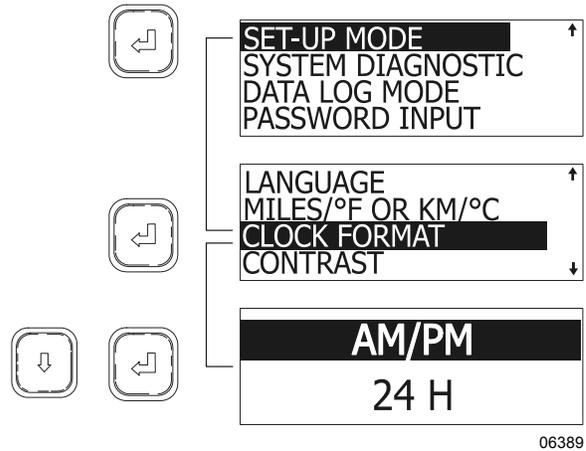
The MCD returns to SET UP MODE menu.



Clock Format

1. In SET UP MODE, highlight CLOCK FORMAT using the arrow keys;
2. Press the enter key (↵);
3. Highlight the desired format (AM/PM or 24 H) using the arrow keys;
4. Press enter key (↵) to confirm.

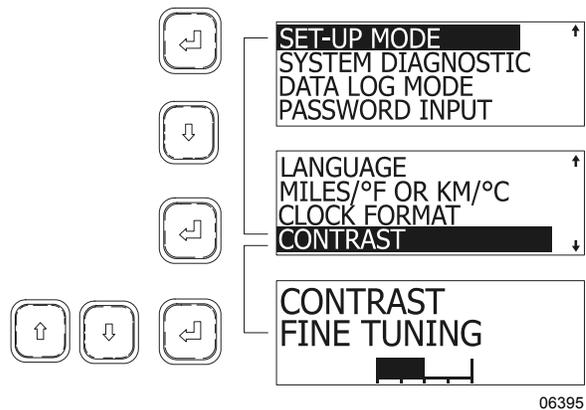
The MCD returns to SET UP MODE.



Setting Contrast

1. In SET UP MODE, highlight CONTRAST using the arrow keys;
2. Press the enter key (↵);
3. Using the arrow keys, set the desired contrast. A horizontal graphic shows state of contrast;
4. Press enter key (↵) to confirm.

The MCD returns to SET UP MODE.

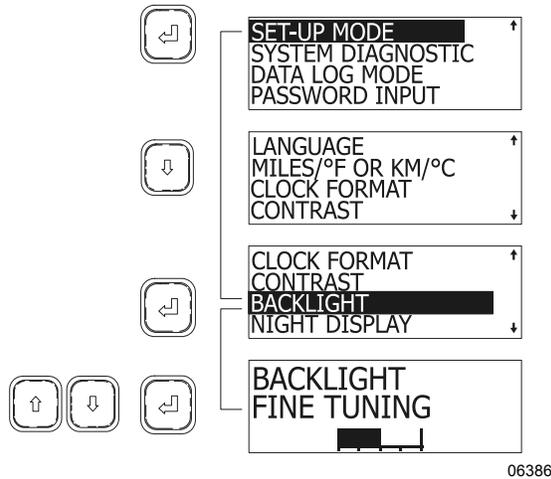


Setting Backlight

1. In SET UP MODE, highlight BACKLIGHT using the arrow keys;
2. Press the enter key (↵);
3. Using the arrow keys, set the desired back lighting. A horizontal graphic shows state of lighting;
4. Press enter key (↵) to confirm.

The MCD returns to SET UP MODE.

74 Other Features

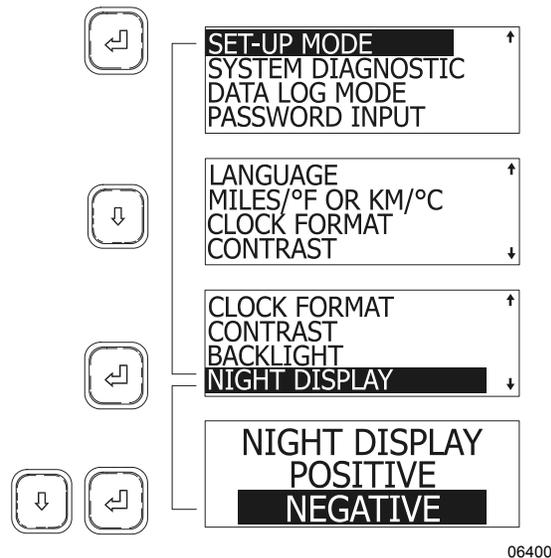


Setting Night Display

Night display, when activated, shows all displays in negative when the headlights are ON.

1. In SET-UP MODE, highlight NIGHT DISPLAY using the arrow keys;
2. Press the enter key (↵);
3. Highlight the desired display using the arrow keys;
4. Press enter key (↵) to confirm.

The MCD returns to SET UP MODE.



Setting Default Language

This feature is enabled when the correct password is entered (see PASSWORD INPUT).

1. In SET UP MODE, highlight DEFAULT LANGUAGE using the arrow keys;

2. Press the enter key (↵);
3. Highlight the desired language using the arrow keys;

4. Press enter key (↵) to confirm.

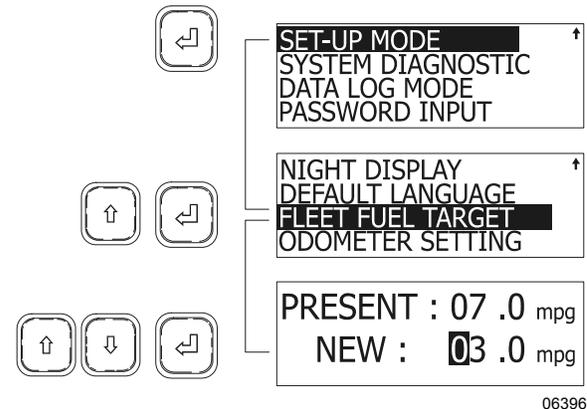
The MCD returns to SET UP MODE.

Setting Fleet Fuel Target

This feature is enabled when the correct password is entered (see PASSWORD INPUT).

1. In SET UP MODE, highlight FLEET FUEL TARGET using the arrow keys;
2. Press the enter key (↵);
3. Using the arrow keys set the highlighted digit;
4. Press enter key to confirm, the following digit is highlighted. Set as in step three;
5. When last digit is set, press the enter key (↵) to confirm new target.

The MCD returns to SET UP MODE.



Setting the Odometer

This feature is disabled.

SYSTEM DIAGNOSTIC MENU

System Diagnostic menu allows the driver to request diagnostics from the ECM or ECU of components such as the engine, ABS brakes and other instruments. The driver can also perform a cluster self test and read data about the ECM or ECU.

Enter diagnostic mode by using the arrow keys to highlight SYSTEM DIAGNOSTIC, then pressing the enter key to confirm.

FAULT DIAGNOSTIC MENU

To request a diagnostic:

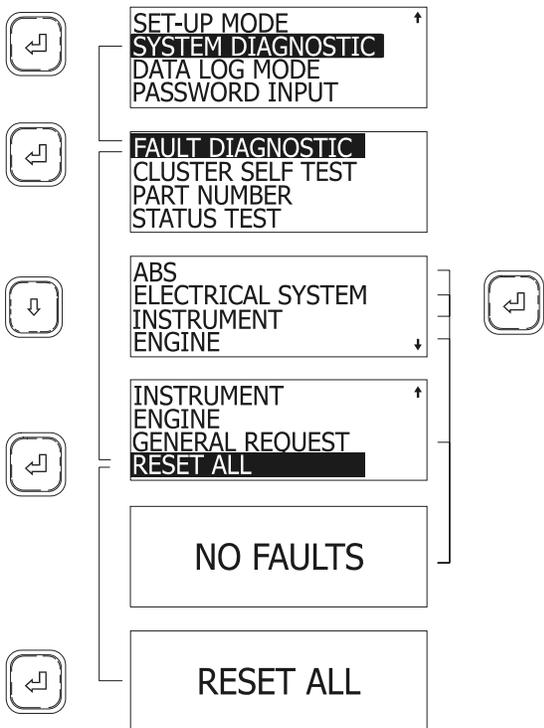
1. Highlight FAULT DIAGNOSTIC with the arrow keys;
2. Press the enter key (↵) to confirm;
3. Highlight the component to request a diagnostic using the arrow keys;
4. Press the enter key (↵).

After showing a fault message (if any) the MCD returns to FAULT DIAGNOSTIC screen.

To request a general diagnostic:

1. Highlight GENERAL REQUEST using the arrow keys;
2. Press the enter key (↵).

After showing a fault message (if any) the MCD returns to FAULT DIAGNOSTIC screen.



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To reset fault codes:

1. Highlight RESET ALL using the arrow keys;
 2. Press the enter key (↵);
- The MCD displays RESET ALL.
3. Press enter key (↵) to confirm.

After resetting the fault codes, the MCD returns to FAULT DIAGNOSTIC screen.

Exit FAULT DIAGNOSTIC and return to SYSTEM DIAGNOSTIC using Esc key.

Cluster Self Test

Tests cluster light bulbs, gauges, MCD display and buzzers.

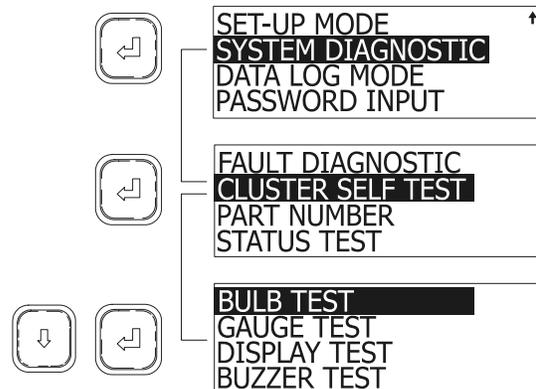
To perform a self test:

1. In diagnostic mode, highlight CLUSTER SELF TEST using the arrow keys;
2. Press enter key (↵) to confirm;
3. Highlight the test to perform using the arrow keys;
4. Press enter key (↵) to confirm.

The test may normally take several seconds to perform. The MCD may explain the progression of the test as it runs. The display returns to cluster self test mode once finished.

NOTE

While in the cluster self test mode, the engine ECM data link is disconnected. Therefore, the gauges will not function until the cluster is out of the self test mode. To interrupt any test, cycle the ignition key off and on.



06378

BULB TEST

Turns ON all telltale lights and red warning LED's in the gauges which have them, for ten seconds.

GAUGE TEST

This test causes the pointers in the tachometer, speedometer, oil pressure, coolant temperature; fuel and turbo boost gauges to move from minimum scale to full scale and back, briefly stopping at mid-scale each way. This occurs three times. The air pressure and voltmeter gauges are excluded from the test.

76 Other Features

DISPLAY TEST

To help identify defects in the graphic display, the display goes from dark to bright in about ten seconds.

BUZZER TEST

Sounds each of the buzzer signals for ten seconds each. The name of the buzzer is written on the display as the test runs.

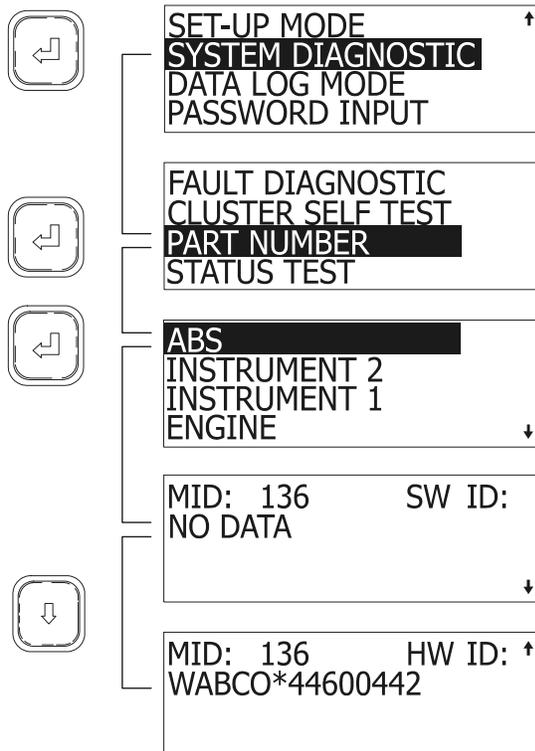
PART NUMBER

This feature requests information from the available components. This information includes the component's SAE message identifier (MID), its software ID (SW ID) and hardware ID (HW ID) if available.

To access PART NUMBER:

1. When in SYSTEM DIAGNOSTIC menu, highlight PART NUMBER using the arrow keys;
2. Press enter key (↵);
3. Highlight the desired component;
4. Press enter key (↵).

The MCD displays the information on two screens. Toggle between screens using the arrow keys.



06391

STATUS TEST

This feature allows testing the response of vehicle systems. This can be useful when troubleshooting or checking the proper working order of senders and other components. This feature is enabled when correct password is entered (see password input)

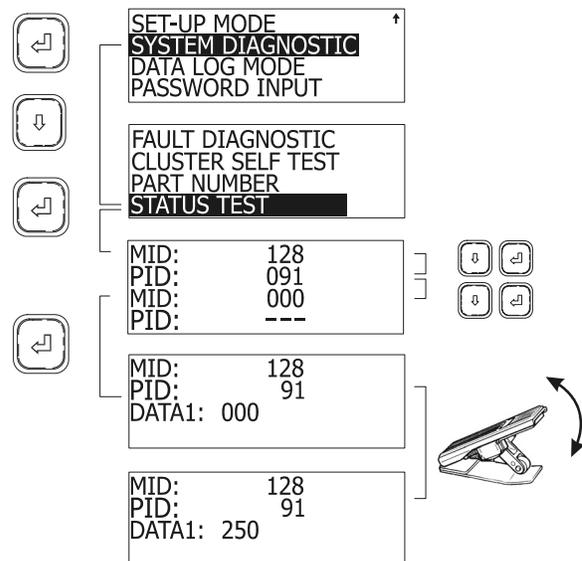
In Status Test mode, the MCD will monitor the system and display the data on the screen. Up to two components can be monitored at once.

To perform a status test:

1. When in SYSTEM DIAGNOSTIC, highlight STATUS TEST using the arrow keys;
2. Press enter key (↵);
3. Using the arrow and enter keys, enter a MID and PID (or PPID);
4. Press enter key (↵).

The MCD now displays in real time the value of the component. The example below shows how changing the throttle position will be displayed on the MCD. That way one can verify if any identifiable sender unit is working properly or whether the link is OK.

5. Press Esc key to exit.



06420

In this example, a throttle pedal in good working order will send a linear and continuous (no jumps) signal to the ECM, appearing as DATA value on the MCD screen. Full pedal movement will display values from 000 (no throttle) to 250 (maximum throttle).

NOTE

The MCD can perform a status test on as many as two components simultaneously. To do so, when setting MID and PID codes, set a second (non zero) MID and PID code.

DATA LOG MODE MENU

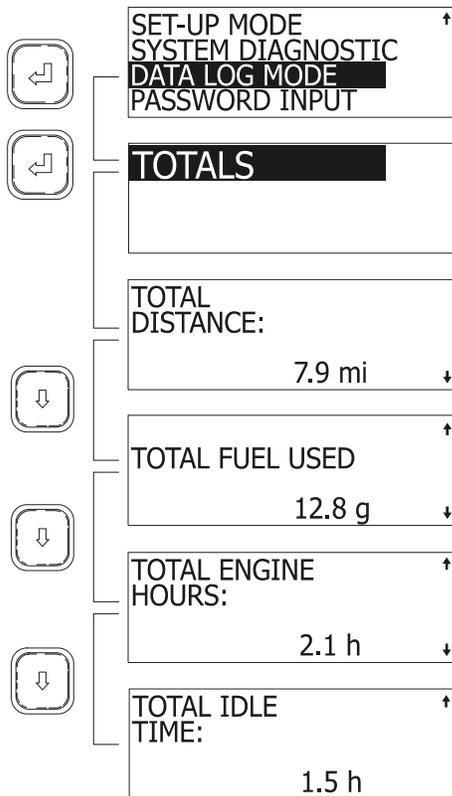
This feature shows total accumulated distance, fuel used engine hours and idle time.

1. To access data log:
2. Highlight DATA LOG MODE using the arrow keys;
3. Press enter key (↵) to confirm;

The screen shows TOTALS highlighted.

4. Press enter key (↵);
5. View totals using the arrow keys.

Exit by pressing the Esc key.



06383

PASSWORDS

The MCD recognizes two passwords: a mechanic's password and an owner's password. The mechanic's password allows setting DEFAULT LANGUAGE, FLEET FUEL TARGET,

performing a STATUS TEST and using the RESET ALL function. The owners password gives access to all the above and allows changing both passwords.

The mechanic's password is initially set to "0000".

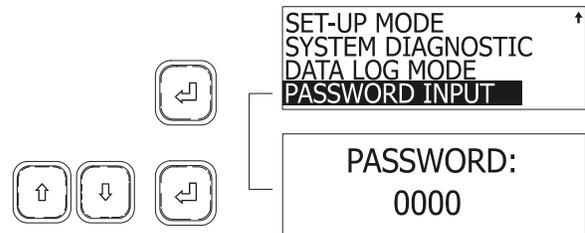
The owner's password is initially set to "1234".

Password Input

To enter either password and have access to restricted functions of the MCD:

1. Use the arrow keys to highlight PASSWORD INPUT;
2. Press enter key (↵) to confirm;
3. Use the arrow keys to set the first digit of the password;
4. Press enter to highlight the next digit;
5. Pressing enter key (↵) on last digit will confirm the password.

If the entered password is correct, the MCD will revert to the previous screen. Access to restricted screens is allowed.



06402

Changing passwords

To change any password, owner's password must be entered first.

To change passwords:

1. Using the arrow keys, highlight SET UP MODE;
2. Press enter key (↵) to confirm;
3. Using the arrow keys, highlight PASSWORD CONFIG;
4. Press enter key (↵) to confirm;
5. Using the arrow keys, select MECHANIC or OWNER;
6. Press enter key (↵) to confirm;
7. Set new password.

78 Other Features

TRANSMISSION RETARDER

The transmission retarder is an optional device that helps to reduce the speed of a vehicle. It improves vehicle control, increases driving safety and permits more economical operation. The retarder provides slowing power when it is most needed, such as when descending mountain roads, in stop-and-go traffic and on crowded freeways.

The transmission retarder is a vehicle-slowng device, not a vehicle-stopping device. It is not a substitute for the service braking system. The service brake must be used to bring the vehicle to a complete stop.

The retarder is provided with control buttons on the steering wheel and a lever on the steering column (refer to "CONTROLS AND INSTRUMENTS" chapter).

NOTE

Extended use will raise the temperature of the transmission fluid.

The retarder helps reduce speed on grades without using the vehicle's conventional service braking system. This virtually eliminates brake overheating and reduces the risk of a runaway vehicle. A retarder greatly increases the service life of brake pads and discs, resulting in reduced brake maintenance costs.

NOTE

The stoplights automatically illuminate when the vehicle is slowing down due to the application of transmission retarder.

NOTE

For vehicles equipped with the Antilock Braking System (ABS), as the wheels start to lock up on slippery roads, the output retarder automatically deactivates until the wheels roll freely.

ENGINE BRAKE



WARNING

A vehicle speed retarding device (such as engine brake) is not intended to replace the service brake systems on your vehicle nor intended to bring your vehicle to a stop. A vehicle speed retarding device is only intended to reduce the speed of your vehicle under certain conditions.

Several types of engine brake can be installed or are standard on certain engines. All are used to reduce wear on the vehicle brake linings.

WITH DDC SERIES 60 ENGINE

The JACOBS engine brake is an optional diesel engine retarder which uses engine compression to aid in slowing and controlling the vehicle. When activated, (refer to "CONTROLS & INSTRUMENTS" chapter) the JACOBS brake alters the operation of the engine's exhaust valves so that the engine works as a power-absorbing air compressor. This provides a retarding action to the wheels.

The engine brake is a vehicle-slowng device, not a vehicle-stopping device. It is not a substitute for the service braking system. The service brake must be used to bring the vehicle to a complete stop.

Effectiveness of the engine brake system will vary according to the transmission range in use. The engine brake system is more effective in lower ranges and at higher engine speeds.



WARNING

When descending significant grades, use the service brake as little as possible. If the engine does not slow the vehicle to a safe speed, apply service brake and shift to a lower range. Let the engine (and engine brake) slow the vehicle. Keep brakes cool and ready for emergency stopping.

NOTE

Jacobs engine brake is only engaged when the accelerator pedal is fully released, the engine speed exceeds 750 rpm and one of the two engine brake control buttons is activated; (1) LOW or (2) HIGH. The stoplights automatically illuminate when the vehicle is slowing down due to the application of the engine brake.

WITH VOLVO D13 ENGINE

NOTE

When driving with cruise control, the exhaust brake automatically engages if the selected cruise speed is exceeded by approximately 4 mph (7 km/h). The exhaust brake is then disengaged when the speed has returned close to selected cruise speed, provided that the engine brake button was previously activated.

NOTE

For both exhaust and engine brakes, use a "one gear" driving strategy when going downhill to keep engine speed up for effective braking (for example: uphill in 7th gear and downhill in 6th).

Exhaust Brake

The exhaust brake is used to reduce wear on the brake linings. The exhaust brake is most effective at high engine speeds (1500 to 2300 rpm). The exhaust brake is automatically disengaged if the engine speed drops to or below 1100 rpm.

The exhaust brake works by containing the exhaust gases in the exhaust manifold, thereby making the engine work against the back pressure. This provides a retarding force on the drive wheels.

The following must be in effect for the exhaust brake to function:

- The Engine Brake Low (1) button on the steering wheel controls is activated ;
- Accelerator pedal is fully released ;
- The Engine Brake / Transmission Retarder selector switch is set to Engine Brake position. This selector switch can be found on the dashboard only if the vehicle is equipped with both systems;
- Engine speed exceeds 1150 rpm.

Volvo Engine Brake (VEB)

The Volvo Engine Brake (VEB) has a higher braking effect than the exhaust brake. The engine brake is most effective at high engine speeds (1500 to 2300 rpm). It is automatically disengaged if engine speed drops below 1000 rpm.

The engine brake function is operated by the Engine Brake High button on the steering wheel controls. It works together with the exhaust brake to provide two levels of braking power. The engine brake control on the steering wheel is achieved by the use of three buttons: OFF, (1) LOW and (2) HIGH. With the Engine Brake button (1) LOW depressed, only the exhaust brake is engaged. With the Engine Brake button (2) HIGH, both the exhaust brake and the compression brake are activated.

VEB = Exhaust Brake + Compression Brake

For the engine brake to function, the following must be in effect:

- The Engine Brake High button on the steering wheel controls is depressed ;
- The Engine Brake / Transmission Retarder selector switch is set to Engine Brake position. This selector switch can be found on the dashboard only if the vehicle is equipped with both systems;
- Vehicle speed over 7.5 mph (12 km/h) ;
- Engine temperature over 110°F (43°C) ;
- Accelerator pedal is fully released ;
- Engine speed exceeds 1150 rpm.

ANTILOCK BRAKING SYSTEM (ABS) – [AUTOMATIC TRACTION CONTROL (ATC) – ELECTRONIC STABILITY PROGRAM (ESP) (OPTIONAL)]

The purpose of the Antilock Braking System (ABS) is to maintain vehicle stability and control during braking and to minimize the stopping distance in any road condition.

On slippery roads and more generally in emergency situations, over-braking frequently induces wheel locking. Wheel locking greatly increases braking distance on any road surface. Locked wheels also impede directional control and cause severe tire abrasion. An antilock braking system provides maximum braking performance while maintaining adequate control on slippery roads.

The basis of ABS is constant monitoring of wheel parameters during braking. Sensors on each wheel of the front and drive axles constantly measure wheel speed during braking. This information is transmitted to a four-channel electronic processor which senses when any wheel is about to lock. Modulating valves quickly adjust brake pressure (up to 5 times every second) to prevent wheel lock. Each wheel is therefore controlled according to the available grip.

In this way, the vehicle is brought to a stop in the shortest possible time while remaining stable and under the driver's control.



WARNING

Vehicles following ABS-equipped vehicles may not be able to brake as fast on slippery roads.

80 Other Features

In addition to the ABS function, advanced models of Bendix controllers may be installed (Optional) to provide an **Automatic Traction Control (ATC)** feature and also provide ABS-based stability features referred to as **ESP® Electronic Stability Program**. Bendix ATC can improve vehicle traction during acceleration, and lateral stability while accelerating through curves. ATC utilizes **Engine Torque Limiting (ETL)** where the ECU communicates with the engine's controller and/or **Differential Braking (DB)** where individual wheel brake applications are used to improve vehicle traction.

The Bendix ESP system is an ABS-based stability system that enhances vehicle stability by both reducing engine throttle and by applying vehicle braking based on actual vehicle dynamics. Accordingly, the ESP system is available only on specific approved vehicle platforms after vehicle application and development efforts and validation testing. Only certain limited variations of an approved vehicle platform are permitted without further validation of the ESP system application.



DANGER

In the case where a vehicle equipped with the ESP system pulls a trailer, the latter must be equipped with ABS.

ESP stability system consists of Yaw Control (YC) and Roll Stability Program (RSP) features.



CAUTION

Even with ESP-equipped vehicles, the driver remains responsible for ensuring vehicle stability during operation.

DRIVER CONTROLLED DIFFERENTIAL LOCK (DCDL)

By actuating the electric switch, the driver can lock or unlock differential action.

The purpose of the DCDL is to provide maximum vehicle traction and control on unfavorable road or highway surfaces. When the DCDL is actuated, a clutch collar completely locks the differential case, gearing, and axle shafts together. This feature maximizes traction to both wheels. The lock position will also protect against spinout damage to the differential. The DCDL should not be actuated when favorable road conditions exist.

OPERATION TIPS

1. The DCDL can be locked or unlocked if the vehicle is standing still or moving at a constant low speed when the wheels are not spinning, slipping, or losing traction.
2. When the DCDL is locked, operate the vehicle at low speeds. DCDL will not engage and will disengage in speed higher than 5 MPH (8 km/h).
3. When the DCDL is locked, the vehicle's turning radius will increase. This condition is called "understeer." The driver must use caution, good judgment and drive at low speeds when operating the vehicle with the DCDL locked.
4. Always unlock the DCDL as soon as the need for maximum traction has passed and the vehicle is traveling on a good road or highway.
5. Do not lock the DCDL when the wheels are slipping or losing traction, or damage to the axle can result.
6. Do not lock the DCDL when the vehicle is traveling down steep grades, or potential loss of vehicle stability could occur.

LOCKING THE DCDL

When encountering poor road or highway conditions where maximum traction is needed, follow the recommended procedures:

1. Without the wheels spinning, slipping or losing traction, flip the DCDL control switch to the "LOCK" position while maintaining a constant vehicle speed.
2. Let up momentarily on the accelerator to relieve torque on the gearing, allowing the DCDL to lock.
3. When the DCDL is fully locked, the vehicle will have an "understeer" condition when making turns. Proceed cautiously over poor road or highway conditions.

UNLOCKING THE DCDL

When the vehicle can safely operate and driving conditions have improved, disengage the DCDL following the recommended procedures:

1. Flip the control switch to the "UNLOCK" position, when the vehicle is stopped or when traveling at low speed while the wheels are not spinning, slipping or losing traction.

2. Let up momentarily on the accelerator to relieve torque on the gearing, allowing the DCDL to unlock.
3. Resume driving at normal speed using good driving judgment.

KNEELING SYSTEM

This system lowers the front end, enabling passengers to get on and off the coach without any difficulty.

NOTE

This coach is equipped with an interlock system which automatically applies the parking brake when the kneeling system is activated.

To operate, stop the coach, set the transmission to neutral (N), then push down the rocker switch located on the dashboard. (Refer to "Controls & Instruments" chapter). The parking brake will be applied automatically and a warning flasher will indicate that the front of the coach is being lowered.

To raise the front of the coach to its normal height, push up the rocker switch. The front end will rapidly rise up. The system will release the parking brake and shift the transmission to the previously selected range.

 **CAUTION**

Avoid parking the coach too close to the sidewalk or to other obstacles which could damage the coach during kneeling.

NOTE

The kneeling system does not operate when the coach is traveling over 5 mph (8 km/h). Consequently, the driver cannot inadvertently operate the kneeling system at higher speeds.

NOTE

Kneeling is disabled when the entrance door is open.

HI-BUOY

The coach may be equipped with the optional front Hi-Buoy or full Hi-Buoy. The front Hi-Buoy system has the same functions as front kneeling. In addition it enables passengers to get on or off the coach easily by raising the front end about 4 inches (100 mm), which may prove useful when the dock is higher than usual. The front Hi-Buoy is combined with front kneeling to

increase flexibility of the system. Refer to "Controls & Instruments" chapter.

The full Hi-Buoy system raises the whole coach about 4 inches (100 mm). It can be used to enable passengers to get on or off the coach easily, and to safely travel roads with high obstacles. Refer to "Controls & Instruments" chapter.

NOTE

The Hi-Buoy system does not operate when the coach is traveling over 5 mph (8 km/h). Consequently, the driver cannot inadvertently operate the Hi-Buoy system at higher speeds.

LOW-BUOY

This system lowers the coach about 4 inches (100 mm). It enables the coach to drive through underpasses where the height is less than 12 feet (3.7 m).

Low-Buoy operation is controlled by a valve located on the right lateral console. The valve can be switched to either LOW-BUOY or NORMAL positions. A warning light on the dashboard will indicate that the coach is being lowered. Refer to "Controls & Instruments" chapter.

 **CAUTION**

Avoid parking too close to the curb or other obstacles that could damage the coach during low-buoy operation.

NOTE

The Low-Buoy system does not operate when the coach is traveling over 5 mph (8 km/h). Consequently, the driver cannot inadvertently operate the Low-Buoy system at higher speeds.

UNLOADING TAG AXLE

To reduce the turning radius, the air springs pressure will be automatically reduced by 75% when the coach is moving at speed lower than 5 mph (8 km/h) and with more than 1½ turn from the steering.

RETRACTABLE TAG AXLE

The standard tag axle retraction system is controlled by a valve located on the right lateral console. The valve can be switched to either the WHEELS UP or WHEELS DOWN position.

82 Other Features

The axle will be raised or lowered by air pressure according to the valve position. Refer to "Controls & Instruments" chapter.

The tag axle service brakes operate only when the tag axle is in the WHEELS DOWN position. Never lower the tag axle while the coach is moving. When the tag axle is in the WHEELS UP position, the corresponding indicator light will illuminate. The indicator light will start flashing and an audible alarm will sound to warn the driver if the vehicle speed exceeds 12 mph (20 km/h) with tag axle raised. The tag axle can be raised in tight maneuvering areas like in a parking lot or to make it easier to turn a short corner. The tag axle shortens the wheelbase and allows tighter turning. Raising the tag axle transfers extra weight and additional traction to the drive wheels providing improved control on slippery roads.



CAUTION

Do not use tag axle in raised position for an extended period. Raising tag axle increases load on the drive axle, suspension and tires.

Do not drive vehicle with tag axle raised when speed is exceeding 12 mph (20 km/h).

In order to prevent damage to the suspension, always raise the tag axle before lifting the coach.

IN-STATION LIGHTING

The in-station lighting system circuit is linked with the optional battery charger. When the charger is connected to an external power source, the in-station lighting circuit can be energized without depleting the batteries.

The receptacle used for the battery charger is located on the main power compartment door.

ENGINE COOLANT HEATER

This optional auxiliary heating system is used for preheating and retaining the heat of water-cooled engines. It can be used before startup to ease starting and to provide rapid operation of the interior heating system. It can also be used with the engine running to maintain coolant heat and interior temperature.

The heater operates independently of the engine. It is connected to the cooling system, heating circuits and to the vehicle's fuel and electrical system.



DANGER

The coolant heating system uses the same fuel as the engine. Do not operate in a closed building or while refueling. Operate only in a well ventilated area.

SWITCHING THE HEATER ON

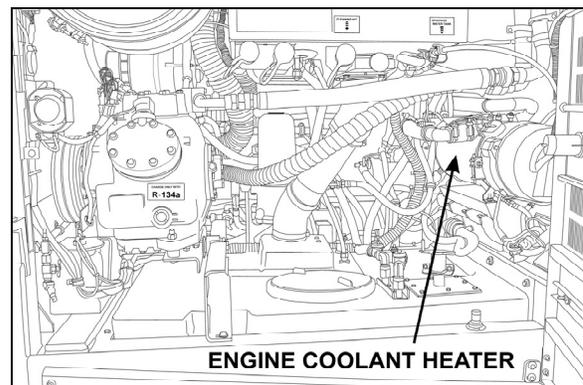
The timer light illuminates when the heater is switched *ON*. Air is forced in to flush out the combustion chamber of residual gases and the water circulation pump begins operating. The fuel metering pump delivers fuel in precise amounts to the combustion chamber, where fuel and combustion air form a combustible mixture which is ignited by the ignition unit.

Once the flame sensor has signaled to the control unit that combustion has taken place, the ignition unit is switched *OFF*. The dashboard telltale light will illuminate to indicate when the burner is *ON*.

Hot combustion gases are diverted at the end of the flame pipe and are then forced through the indirect heating surfaces of the heat exchanger. The heat exchanger transfers the heat to the coolant water passing through the heat exchanger.

The heater is thermostatically controlled and operates intermittently (i.e., the switched-on time of the burner varies depending on the heat requirement). The water temperature is controlled by the built-in water thermostat.

The water circulation pump remains in operation as long as the heater is operating, even during the regulated intervals and during the delayed cut-out of the heater. The pump can also be operated independently of the heater by means of an appropriate circuit. The heater can be switched *ON* at any time (i.e., during the delayed cut-out period). Ignition takes place after the delayed cut-out time expires.



ENGINE COMPARTMENT R.H. SIDE

18607

SWITCHING THE HEATER OFF

The fuel supply is interrupted when the heater is switched OFF. This causes the flame to go out and a delayed cut-out of 2.5 minutes begins. The circulating combustion air flushes the remaining combustion gases out of the chamber and cools off the heated parts on the exhaust side of the heat exchanger. The water circulation pump continues to transfer the latent heat present in the heat exchanger, thus preventing hot spots. Once the delayed cut-out time expires, both the combustion air blower and the water circulation pump switch OFF automatically. A cut-out will automatically take place in case of heater failure. Refer to Technical Information chapter for additional information.

COOLANT HEATER TIMER

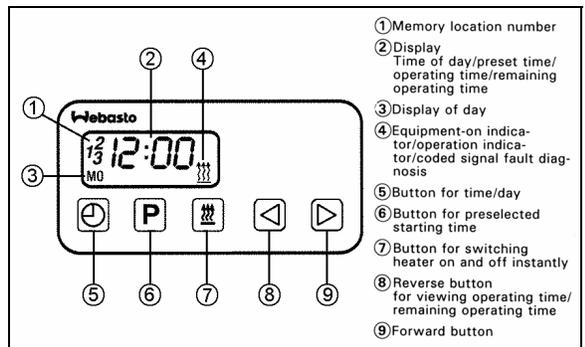
The timer, located on L.H. lateral console is used to program the starting and stopping time of the preheating system and to give Fault Codes. The system indicator light, located on the timer, illuminates when the system is functional.

 CAUTION
The preheating system should not operate for more than one hour before starting engine as this could discharge batteries.

 DANGER
Preheating system must not operate when vehicle is parked inside or during fuel fill stops.

<p><i>NOTE</i></p> <p>Preheating system uses the same fuel as the engine.</p>

Timer operating instructions (Webasto)



These instructions refer to the Webasto timer illustrated above.

Remaining Operating Time

The remaining operating time refers to the period of time the heater still continues to remain in operation. It may be changed while the heater is in operation.

Setting the Digital Timer

After the power has been connected, all symbols on the digital display are flashing. The time of the day and the day of the week must be set.

All flashing symbols of the timer can be set by means of the Forward (9) or Reverse (8) buttons.

When buttons (8) and (9) are pressed for more than 2 seconds, the quick digit advance mode is activated.

Setting the Time and Day of the Week

1. Press button (5) for more than 2 seconds (time display flashes).
2. Press (8) or (9) button to set the time of day.
3. Wait 5 seconds. The time of day is stored (day of week flashes).
4. Press (8) or (9) button to set the correct day of week.
5. Wait 5 seconds. The day of week is stored.

Viewing the Time (Ignition ON)

Continuous display of current time and day of the week.

Viewing the Time (Ignition OFF)

Briefly press button (5) to display current time and day for 5 seconds.

Switching Heater ON (Instant Heating) With Ignition ON:

Press button (7). Heater is switched on (continuous operation) and continues to operate until button (7) is pressed again or ignition is switched off.

<p><i>NOTE</i></p> <p>If the ignition is switched off while heater is in operation, the remaining operating time of 15 minutes flashes on the display and the heater will continue to operate for this period of time.</p>
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84 Other Features

Switching Heater ON (Instant Heating) With Ignition OFF:

Press button (7). Heater is switched on for preset operating time (the factory-set heater operating duration is 60 minutes)

Switching Heater OFF

Press button (7). The heater starts its after-run cycle and switches off thereafter.

Presetting Starting Time

1. Press button (6). Memory location number flashes.

NOTE

By repeatedly pressing button (6), starting time 2 or 3 can be preset.

2. Press button (8) or (9) until correct startup time is set.
3. Wait 5 seconds. Preset starting time is stored and day of week flashes.
4. Press button (8) or (9) to select the correct startup day of week.
5. Wait 5 seconds. The startup day of week is stored.

The number of memory location remains on the display. The timer is now in the programmed mode and will switch the heater on at the preset time.

NOTE

We recommend that memory locations 1 and 2 be used for presetting times within 24 hours of setting the timer. Memory location 3 can be used for a starting time within the next 7 days of setting the timer.

Recalling Preset Times

Press (6) repeatedly until the desired memory location number and preset time are displayed.

Canceling Preset Time

Press button (6) repeatedly until no more memory location number is visible on the display.

Setting Operating Time

1. With heater off, press button (8). Operating time flashes.
2. Press button (8) or (9) to set the operating time (between 1 and 120 minutes)
3. Wait 5 seconds. Operating time is stored.

The heater remains in operation for the preset time (except for continuous operation).

Setting the Remaining Operating Time

1. With heater in operation, press button (8). Remaining operating time flashes.
2. Set remaining time with button (8) or (9).
3. Wait 5 seconds. Remaining operating time is stored.

TROUBLESHOOTING AND MAINTENANCE

The diagnostic code system in Webasto timers is standard. Refer to the Maintenance Manual and to Webasto manual for more information.

NOTE

If there are no heater faults, the heater will go through a normal start cycle and regulate based on thermostat setting.

NOTE

Switch on the preheating system briefly about once a month, even during the warm season.



CAUTION

When welding on the vehicle, disconnect the preheater module connector in order to protect this system from voltage surges.



CAUTION

To avoid running down the batteries, do not turn on the preheating system for more than one hour before starting the engine.

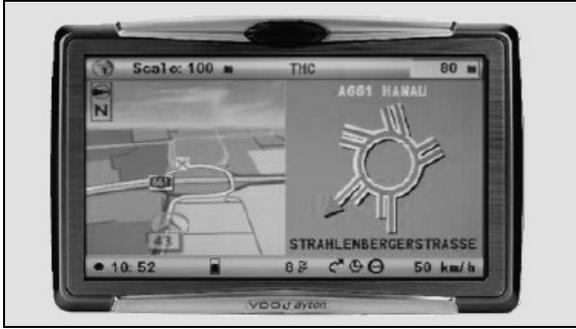


DANGER

The preheating system uses the same fuel as the engine. Do not operate in a building or while refueling. Operate only in a well-ventilated area.

GPS NAVIGATION SYSTEM (OPTIONAL)

The Navigation System instruction manual is included in your vehicle's technical publication box.



GPS NAVIGATION SYSTEM

WHEELCHAIR LIFT SYSTEM

Read and understand the RICON Service/Owner Manual before attempting to use the wheelchair lift. The instructions below are a quick reference and serve to complement the information provided by RICON.

	<p>WARNING</p>
<p>To operate the optional wheelchair lift, the coach must be parked on a flat and level surface, with the parking brake applied.</p>	

Activate the lift mechanism circuit by pressing down on the wheelchair rocker switch on the dashboard.

WHEELCHAIR LIFT AND ACCESS DOORS

Open the lift mechanism access door and carefully lower. Pull the wheelchair access door operating handle in the left section of the lift mechanism compartment and swing the door until locked open.

A light inside the vehicle illuminates the doorway when the wheelchair access door is open.

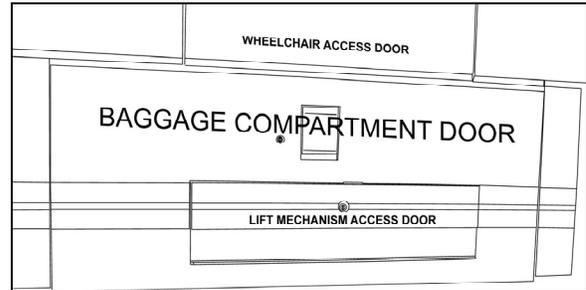
A telltale light on the dashboard illuminates when the lift mechanism access door or the wheelchair access door is open. Refer to Controls and Instruments chapter.

When either the lift mechanism access door or the wheelchair access door is open, the parking brake cannot be released and the transmission gear selector will not register any gear selection.

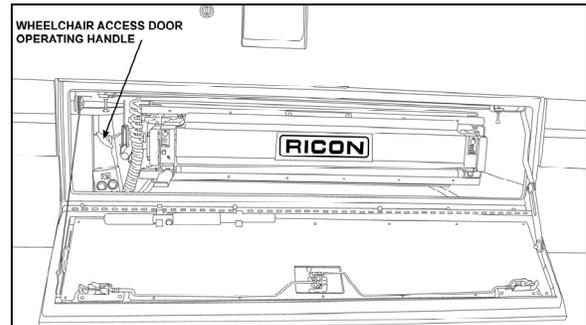
If in motion and the access door opens, a telltale light will illuminate and an audible alert will sound.

To close the door, take the tension off the locking mechanism by pushing the door more open, then pull on the tab at the bottom of the

door to unlock from the open position, and then slam the door shut.



WHEELCHAIR LIFT AND ACCESS DOORS 18615



WHEELCHAIR ACCESS DOOR OPERATING HANDLE 18616

OPERATING THE WHEELCHAIR LIFT

	<p>WARNING</p>
<p>Inspect the lift before each use as described in the RICON Owner's manual. If any unsafe condition exists, or if unusual noises or movements are noticed, DO NOT use and contact an authorized RICON dealer for repair.</p>	

	<p>WARNING</p>
<p>Read and comply with all warning labels and symbols affixed to the wheelchair lift.</p>	

	<p>WARNING</p>
<p>Do not operate with a load in excess of 660 lbs (300 Kg).</p>	

The coach must be parked at least 10 feet (3 meters) away from other vehicles or large objects. Turn on the POWER ENABLE switch and then control each lift motion by pressing an appropriate button. The POWER ENABLE switch provides power to the pendant and thereby enables the lift. When turned on, the power switch and each button illuminate. When

86 Other Features

operating the lift, be careful the control wire doesn't bind with the lift mechanism.

Using the handheld control pendant, deploy the lift by pressing on the DEPLOY button.

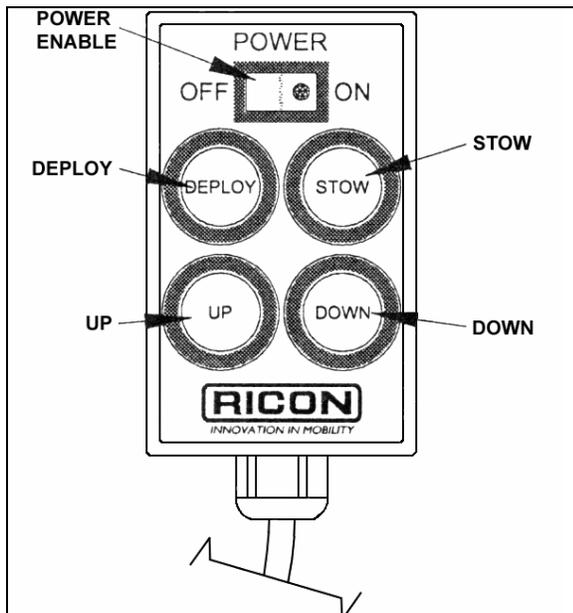
When the lift begins to deploy, it is normal to hear a clutch action of one or two clicks should be heard. Once deployed, lift the handrails until locked in vertical position. Buckle the restraint belt.

Use the UP and DOWN buttons to raise or lower the platform. Upon reaching the top or the bottom of its stroke, the appropriate rollstop will lower.

NOTE

The restraint belt acts as a safety device and it prevents raising or lowering the lift when not buckled.

Roll the wheelchair onto the platform with the wheelchair facing outwards because the front rollstop is not designed to keep the large rear wheels of a wheelchair from rolling off the platform.



CONTROL PENDANT

23364



DANGER

Use extreme care when rolling on or off the platform and lock the wheelchair brakes while stationary on the platform. Make sure the wheelchair fits safely on the platform. Keep arms and legs away from moving parts.

To stow the platform, detach the restraint belt and fold the left handrail, then fold the right handrail (lift the slam lock handles to fold handrails). Re-fasten restraint belt. Press down and hold the STOW button until the lift is fully stowed.

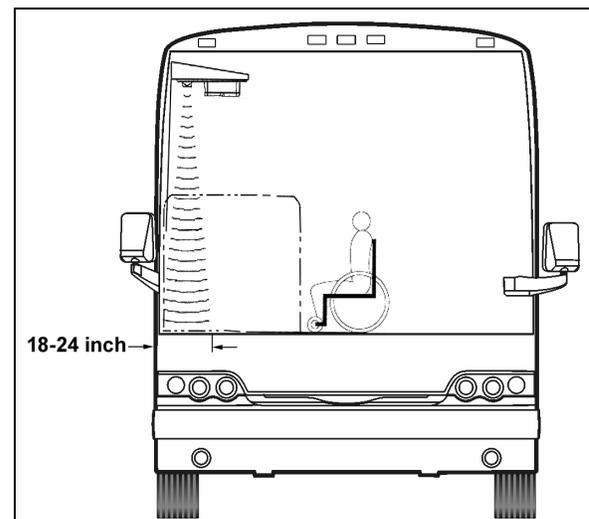
THRESHOLD WARNING SYSTEM (TWS) ADJUSTMENT

There are three verifications to perform; 1) Adjust Aiming of Acoustic Sensor Beam, 2) Test Aim of Acoustic Sensor Beam, and 3) Adjust Acoustic Sensor Timing.

Adjustment of the sensor timing is done at the factory and should not need to be repeated in the field. Readjustment should only be considered if the sensor aiming could not be adjusted to ignore both the wheelchair in the aisle and the platform during its normal movement.

Adjust Aiming of Acoustic Sensor Beam

1. Place wheelchair with passenger in center aisle of coach, pointed at doorway where Threshold Warning System (TWS) is installed. The TWS should not detect a wheelchair and passenger when they are located this far from doorway.



TWS AREA

23371

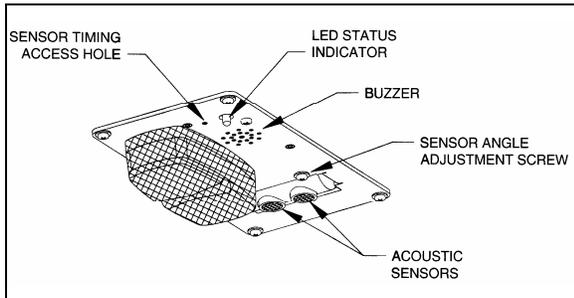
2. Turn power to lift on (LED on TWS module will light steady) and indicator light on the control device illuminates. If wheelchair and passenger are detected by acoustic sensors the LED will flash, the buzzer will sound and the module red light will flash. If this occurs it is necessary to adjust aiming of sensors.

- Turn sensor angle adjustment screw clockwise to move direction of beam away from center aisle and towards doorway. Stop adjustment when LED ceases to flash.

NOTE

Only in rare instances will adjustment be needed in the counterclockwise direction.

- Move centerline of small wheels of wheelchair (with passenger) to within 24 inches of doorway and repeat aiming procedure in previous step.



TWS MODULE DETAIL

23368

Test Aim of Acoustic Sensor Beam

- Move wheelchair and passenger slowly towards doorway. TWS should detect wheelchair and passenger (LED will flash, buzzer will sound and the module red light will flash) when centerline of front wheels is between 18 and 24 inches from doorway.
- Open vehicle access door above lift. Lower platform to ground and place wheelchair and passenger at rear of platform. Rollstop (rear barrier) should be up. Raise platform to floor level. This normal platform motion with wheelchair and passenger aboard should not actuate TWS. If LED does flash (buzzer will also sound and module red light will flash), turn sensor adjustment screw slightly counterclockwise.

NOTE

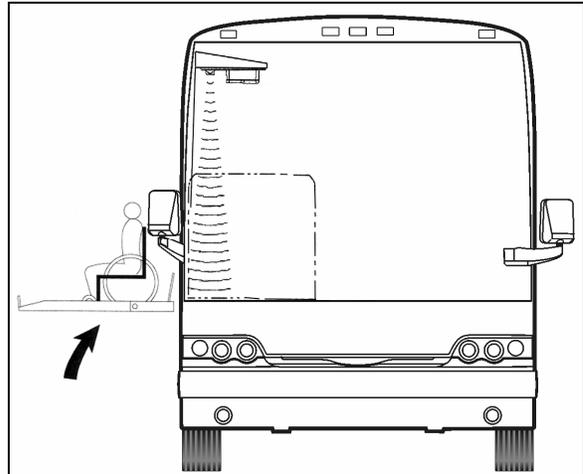
If an adjustment is made, repeat the previous step where wheelchair is between 18 and 24 inches from doorway.

Adjust Acoustic Sensor Timing

- Support a flat sheet of cardboard, or similar material, directly beneath TWS module at a distance of 4½ feet below module. Sheet must be facing sensors.

NOTE

Before proceeding, visually inspect sensors to verify that they are pointing directly at floor, or nearly, and are not pointing off at an extreme angle..



CHECKING NORMAL PLATFORM POSITION

23372

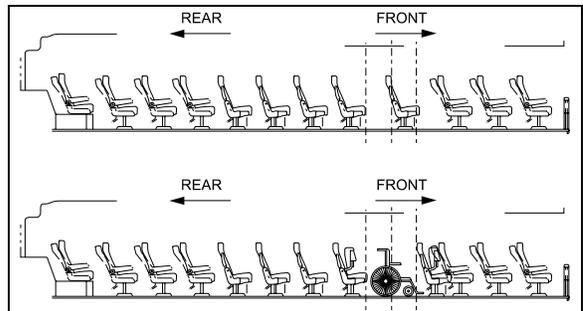
- Note the sensor timing access hole. This hole provides access to a plunger-actuated switch that sets the sensor timing. Insert a 1/16-inch diameter wire-like object into the access hole and press the plunger inward. The LED will flash momentarily while the module establishes the distance and then remain on steady. Release the plunger when the LED ceases to flash.

NOTE

It is important that objects, such as your body, tools, seats, etc, do not interfere with the beam while the adjustment is being made.

INTERIOR APPOINTMENTS

To accommodate a wheelchair, two rows of regular seats on one side of the coach must be folded and slid away. Seats may be folded on both sides of the coach to make room for a second wheelchair.

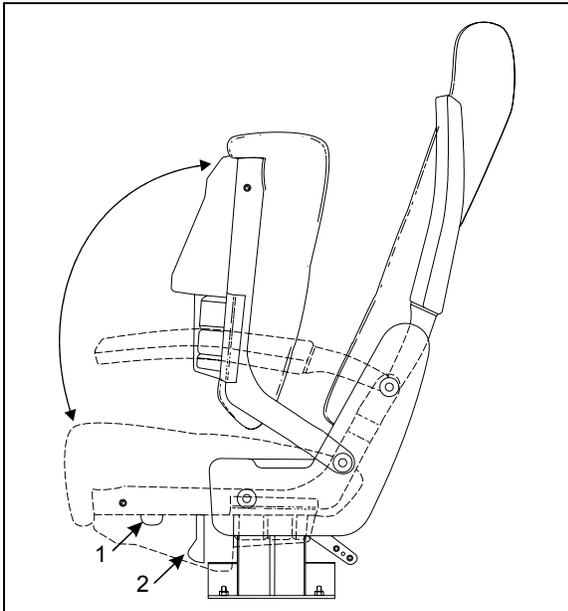


POSSIBLE SEATING ARRANGEMENTS

23259

88 Other Features

An electrical wheelchair or tri-wheeler may require sliding back seats from both sides of the coach to allow enough turnaround space.



FOLDING SEATS

18430

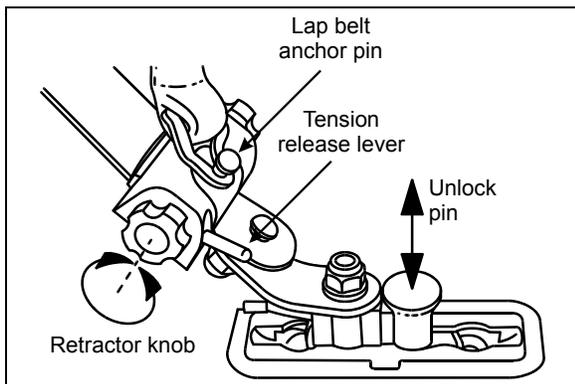
To fold a set of seats, raise the seat back then lift up the seat cushion (pull on lever 1). To slide a row of seats, remove the black covers from the floor tracks. Pull the lever 2 while sliding the seat along the track.

The wheelchair occupants have a hostess/stop chime and a reading light switch at their disposal on the window sill of the coach, within easy reach.

Wheelchair Restraint System

Two sets of wheelchair restraint belts are kept in plastic pouches and stowed in an overhead compartment.

To secure each wheelchair, four tiedown straps must be used (at all four corners).



BELT ANCHORING AND RETRACTION SYSTEMS

23266

Two of the four retaining belts have attaching pins on the retractors to secure the occupant's lap belt. They must be placed at the rear of the wheelchair.

Each tiedown retractor slots into a floor anchorage track.

To anchor the retaining belts, lift the track cover, push in the retractor anchor, then slide it until it locks in place. Hook one strap to each corner of the wheelchair frame (not the wheels) and allow the retractors to tension the belts.

To remove the restraint belts, release tension in the locking mechanism by tightening the belt slightly more with the retractor knob before pushing down on the red release lever on the retractor. Unhook the wheelchair and allow the belts to retract. Guide the belts in, making sure they remain untwisted as they retract.

Release the anchor by lifting the lock pin then sliding out and up the anchor from the floor track. Close the lid on the tracks to prevent dirt from entering the track cavity.

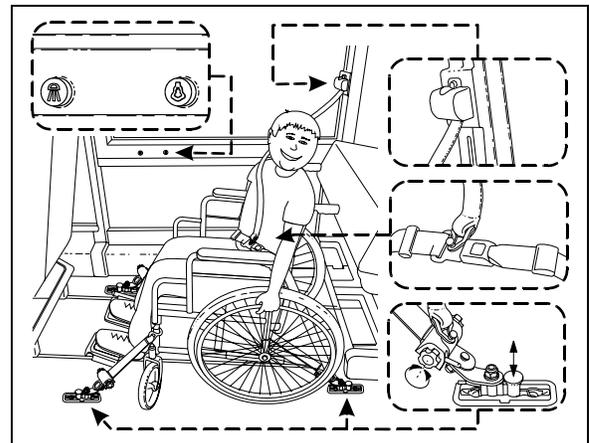


CAUTION

Do not let restraint or safety belts rub against sharp edges. Do not bleach or dry clean.

Wheelchair Occupant Restraint

Secure the wheelchair occupant in the following manner:



WHEELCHAIR RESTRAINTS AND ACCESSORIES

23262

Snap the lap belts to the pins on the retractors of the rear restraint belts. Adjust the lap belt so it sits snug across the hips. Snap the shoulder belt to the pin on the lap belt. A retractor adjusts shoulder belt length automatically.

To release the belt, unsnap the shoulder belt then press the red button in the center of the buckle.

WARNING

A snug fit with the lap belt positioned low on the hips is necessary to maximize safety. The belt should not be worn or twisted. Avoid pinching the belt and/or hardware. Do not wear over rigid or breakable objects such as eyeglasses, pens or keys as these may cause injuries.

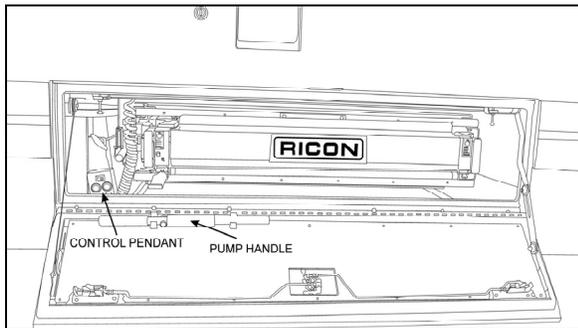
EMERGENCY OPERATION

In the event of electrical power loss, manual operation of the lift is possible as explained below.

To manually deploy the platform

Allow enough space for lift operation and passenger boarding. If a break down situation exists and the vehicle cannot be moved so that the lift system can be operated safely, the operator must summon emergency assistance to move the vehicle before operating the lift.

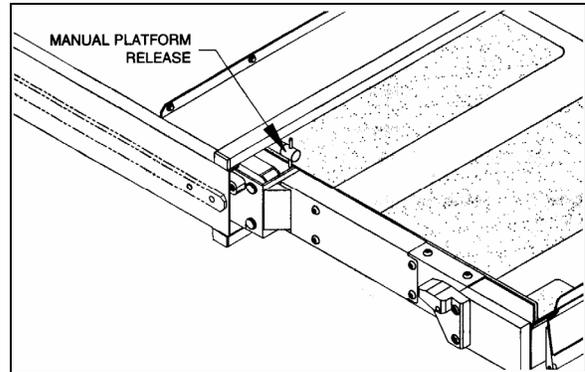
Fully open wheelchair access and lift doors. Ensure that there are no obstacles in the path of the lift.



WHEELCHAIR LIFT MANUAL OPERATION 23375

Remove the pump handle from inside the lift mechanism access door.

Turn one of the manual platform release shafts using pump handle extension.



MANUAL PLATFORM RELEASE SHAFT 23334

Grasp the platform and pull firmly until the lift is all the way out against the carriage stops.

To manually raise the platform

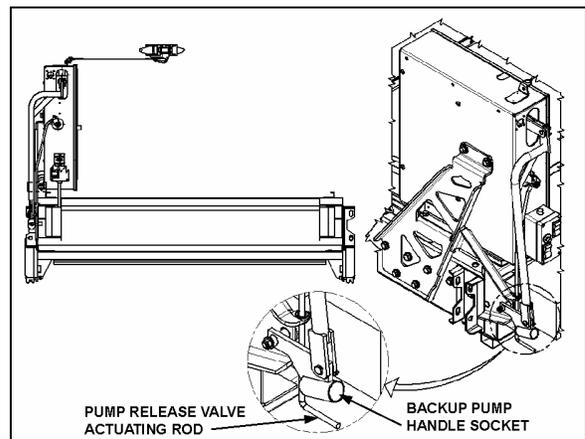
Remove the pump handle from inside the lift mechanism access door.

Push the pump release valve actuating rod UP.

CAUTION

During manual rising of the lift, do not raise the platform more than 1-½ inches above the vehicle floor level. Any excessive travel will make it difficult to enter the platform and/or damage the lift bridge plate actuator. The outer edge of the bridge plate must rest squarely on the vehicle floor.

Insert handle extension into manual backup pump handle socket and pump to raise the platform to the vehicle floor level.



WHEELCHAIR LIFT MANUAL HYDRAULIC PUMP 23373

The lift passenger and attendant must follow the instructions to ENTER or EXIT the vehicle, as previously described.

90 Other Features

To manually lower the platform

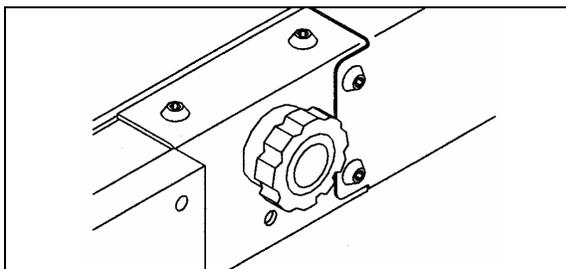
Slowly pull the pump release valve actuating rod DOWN until the platform begins to lower.

Allow the platform to reach ground level.

Push the pump release valve actuating rod back UP until lightly-snug.

Using the rollstop manual control knob and one hand on the rollstop, OPEN the rollstop.

The attendant and lift passenger should follow the instructions to ENTER or EXIT the vehicle, as described previously.



ROLLSTOP MANUAL CONTROL KNOB

23275

To manually stow the platform

Raise or lower the platform to the deploy/stow position; the platform frame must be parallel to the side of the lift enclosure. If the exact position cannot be obtained, slightly low is preferred to slightly high.

Using the rollstop manual control knob and one hand on the rollstop, close the rollstop until it latches.

Use one person on each side of the lift to prevent mechanical binding.

With fingers up and palms forward, push the platform forcefully to start the lift moving inward. As the lift begins to move inward, maintain a constant pushing motion until the lift comes to rest completely inside the lift enclosure.

Push firmly and make sure that the platform manual release shafts have turned to lock the platform.

To manually stow the lift from ground level

In the unlikely event of a hydraulic system failure and the manual backup pump is inoperative, the lift may be stowed as follows by **two or more able-bodied people**:

Raise or lower the platform to the deploy/stow position; the platform frame must be parallel to the side of the lift enclosure. If the exact position

cannot be obtained. Slightly low is preferred to slightly high.

Using the rollstop manual control knob and one hand on the rollstop, close the rollstop until it latches.



WARNING

The platform is heavy and should be lifted using caution and proper lifting technique: Always lift with legs and not the back when attempting to lift heavy objects.

Use one person on each side of the lift to prevent mechanical binding.

With fingers up and palms forward, push the platform forcefully to start the lift moving inward. As the lift begins to move inward, maintain a constant pushing motion until the lift comes to rest completely inside the lift enclosure.

Push firmly and make sure that the platform manual release shafts have turned to lock the platform.

WHEELCHAIR LIFT REMOVAL FOR STORING OR MAINTENANCE PURPOSES

Disconnect connector located at compartment ceiling.

Remove 4 fixing bolts located inside compartment, on each side of platform.

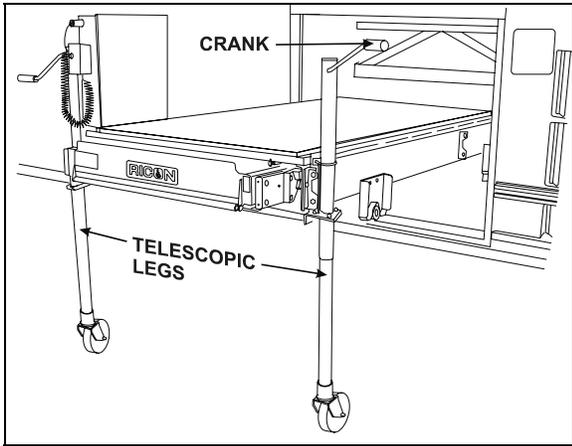
Grasp the platform and pull firmly, sustaining a constant pull so that the platform slides onto the rails until the carriage come in contact with the stops.

Secure the first two telescopic legs onto the platform.

NOTE

There are two telescopic legs for each platform side. The proper side is indicated onto the telescopic leg.

Turn telescopic leg crank to raise the carriage to be able to clear the stops.



INSTALLATION OF TELESCOPIC LEGS 23333

Pull the platform until the rear carriage hit against the stops.

Secure the two rear telescopic legs onto the platform then turn telescopic leg crank to be able to clear the stops.

Remove platform completely.

Lower the platform to minimum height using the telescopic leg cranks before moving it.

WARNING

For better stability, keep the platform at minimum height when moving.

WARNING

Never deploy the platform from enclosure while standing on the telescopic legs.

WARNING

Telescopic legs were designed to support and move the platform only, do not use as a work table.

WARNING

Before moving platform, make sure that floor is level and free of obstacles.

WHEELCHAIR LIFT INSTALLATION

Raise the platform to proper level.

Insert the platform so that the rear carriage clears the stops.

Turn telescopic leg crank until the carriage comes in contact with the rails.

Remove the two rear telescopic legs from the platform.

Insert the platform until the front carriage clears the stops.

Lower the front of the platform.

Remove the two front telescopic legs from the platform.

Push firmly and make sure that the platform manual release shafts have turned to lock the platform.

Secure the 4 fixing bolts located inside compartment, on each side of platform. **Apply a torque of 60 lbf-ft.**

Reconnect connector located at compartment ceiling.

WARNING

When re-inserting platform into compartment, make sure that carriage wheels are properly aligned over the L. H. side triangular rail before removing telescopic legs.

92 Starting and Stopping Procedures

STARTING THE ENGINE

In normal circumstances, the engine should be started from the driver's seat. However, a rear-start panel in the engine compartment permits starting the engine from that location, mainly for maintenance purposes.

STARTING FROM THE DRIVER'S SEAT

- Make sure the starter selector switch located in the engine compartment is set to the *NORMAL* position and that the battery master switch (master cut-out) located in the rear electrical compartment is set to the *ON* position.
- Apply the spring-loaded parking brake by pulling the parking brake control button all the way up;
- Place transmission in neutral;
- Turn ignition key to *START* position (refer to Controls and Instruments chapter), release the key after the engine starts.
- Brake pedal must be applied when selecting Drive (D) otherwise the transmission will stay in neutral (N).



CAUTION

Do not engage starter for more than 15 seconds at a time. If engine does not start within 15 seconds, release ignition key and let starter cool for one minute before attempting to restart.



CAUTION

Do not press accelerator pedal before starting. This could result in an electronic control unit fault and degrade the fuel system control.



CAUTION

Special precautions are necessary with turbocharged engines to avoid possible turbine damage. After starting, run the engine at normal idle for two minutes to allow lubricating oil to reach the turbocharger then run the engine at fast idle. Let oil pressure reach normal operating range before driving.

NOTE

If engine does not start, return key to *OFF* position before attempting to restart.

NOTE

If the accelerator pedal is depressed before starting, release and wait 30 seconds before attempting to restart.

Stopping the Engine

- Apply parking brake and place transmission in neutral (N);
- Allow engine to idle for at least two minutes before shutting engine *OFF*. This insures that the turbine speed drops and allows time for the engine exhaust gas temperature to drop to about 300°F (150°C);
- Shut off all electrical loads;
- Turn the ignition key to the *OFF* position.



CAUTION

Do not shut *OFF* engine when running above normal idle.



CAUTION

Set the battery master switch (master cut-out) to the *OFF* position after parking and when left unattended for an extended period of time.

STARTING FROM THE ENGINE COMPARTMENT

Switches to start and stop the engine from inside the engine compartment are mounted on a small panel above the air filter.



DANGER

Apply parking brake and place transmission in neutral (N) before starting engine from inside the engine compartment.

Set the battery master switches (ignition and master cut-out) to the *ON* position;

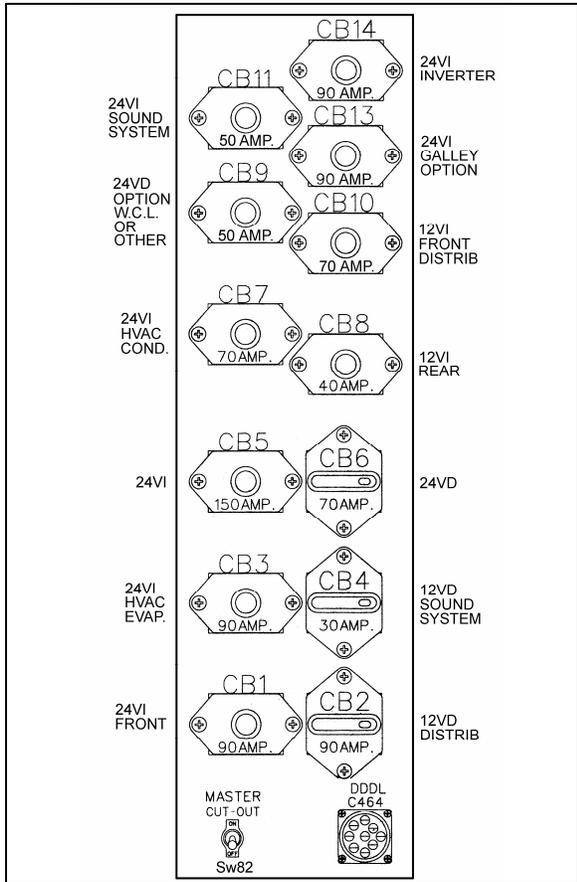
Set the starter selector switch to the *REAR START* position;

Press the *REAR START* push-button switch, release push-button after the engine starts.



DANGER

Do not wear loose clothing when working near engine. Stand clear of rotating components.

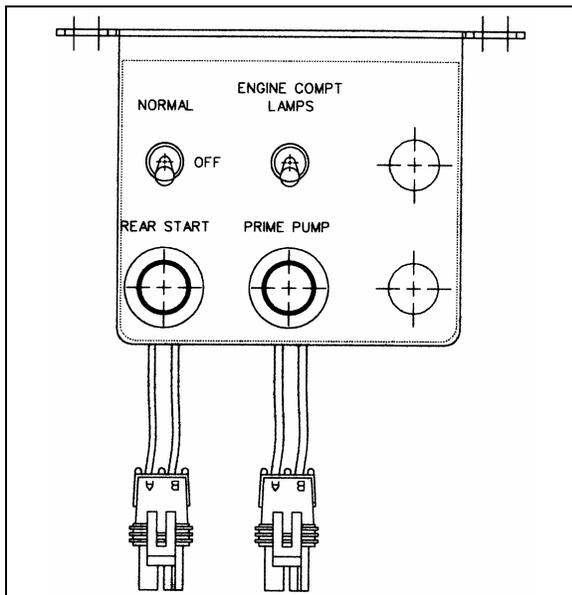


REAR ELECTRICAL COMPARTMENT SAFETY SWITCH 06621



CAUTION

Refer to cautions in “Starting From The Driver’s Seat” in this chapter



REAR START PANEL

06622



DANGER

Rotating shafts can be dangerous. You can snag cloths, skin, hair, hands, etc. This can cause a serious injury or death. Do not work on a shaft (with or without a guard) when the engine is running.

Stopping the Engine

To stop the engine from the engine compartment, set the starter selector switch to the OFF position.



CAUTION

Do not stop engine by any other method.

COLD WEATHER STARTING

With Detroit Diesel S60 Engine

The vehicle may be equipped with the optional ether cold starting aid to facilitate cold-weather starts. A toggle switch located near the ignition switch on the dashboard activates the starting aid. A dashboard logic circuit prevents inadvertent activation while the engine is running.

To activate the ether starting aid, proceed as follows:

1. While cranking engine, press the “Ether” rocker switch on the dashboard for 3 seconds to fill the solenoid valve;
2. Release rocker switch to discharge a shot of ether;
3. Keep engine cranking, allow 3 seconds for the shot to discharge;
4. The engine should start.



CAUTION

Use the cold starting aid only when absolutely necessary. Excessive use of starter fluid could result in severe engine damage.



CAUTION

Do not engage starter for more than 15 seconds at a time. If engine does not start within 15 seconds, release ignition key and let starter cool for one minute before attempting to restart.

94 Starting and Stopping Procedures

With Volvo D13 Engine

When starting a cold engine, the intake air should be warmed up by using the intake air preheater. Turn the ignition switch to the ON position. The preheater will not engage at coolant temperature above 54°F (12°C). If the coolant temperature is below 54°F (12°C), the preheater will engage and will light the preheater telltale between 0 and 50 seconds, depending on the engine coolant temperature. Wait before the preheater telltale has turned off before starting the engine.

If necessary, once the engine has started, the preheater will reengage (post heating) for the same length of time as the preheat time.



WARNING

Do not use ether or other combustible starting aid fluid on any engine equipped with an intake air preheater. If the engine is equipped with a preheater, introduction of ether or similar starting aids could cause a fire or explosion resulting in severe property damage, serious personal injury or death.

Engines not equipped with an intake air preheater may, depending on coolant temperature, take longer to start. If this should happen, DO NOT release the ignition key until the engine has started (while still observing the 15 second maximum cranking time).

JUMP STARTING

In order to avoid damage to solid-state electrical components, it is important that jumper (booster) cables be used correctly and only in emergencies. To jump start, use another 24 volt DC, negative grounded, power source. Use only jumper cables rated at 500 cranking amperes.



DANGER

Injury, explosion, battery acid damage or charging system overload may result if these jump starting procedures are not precisely followed.



WARNING

Wear eye protection and remove rings, metal jewelry and watches with metal bands.



DANGER

The gases given off by batteries while jump starting are explosive. Do not smoke near batteries.



DANGER

The battery could rupture or explode if jump started when the run-down battery fluid is frozen or if the battery fluid level is low. Check condition of run-down battery before attempting to jump start.



CAUTION

Do not let the two vehicles touch. Keep a walk-through distance between the two vehicles. Make sure positive (red) and negative (black) jumper cable clamps do not touch.



CAUTION

Never connect the jumper cable to the negative terminal post of the run-down battery.



CAUTION

Do not jump start if a maintenance-free battery has a yellow test indicator. Have the battery replaced.



WARNING

Before attempting to jump start, make sure the parking brake is applied and the transmission is in neutral (N). Turn off all lights, heaters and other electrical accessories.



CAUTION

Choose a booster vehicle which produces comparable amperage as your vehicle.

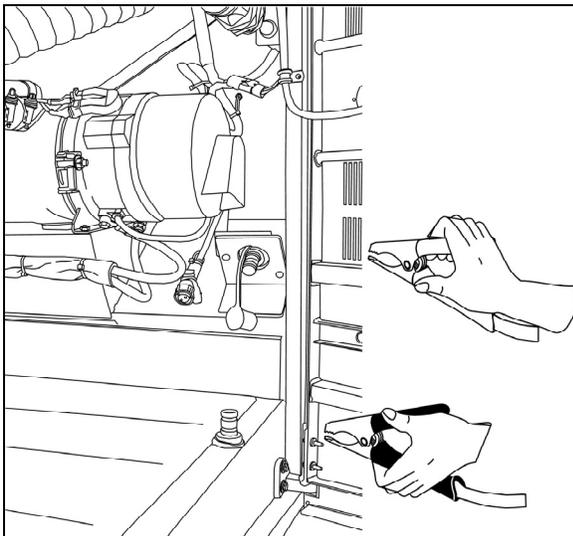
To jump start, proceed as follows:

1. Remove the protective cap from the booster block terminal located in the R.H. side engine compartment;

2. Connect one end of the red jumper cable to the positive (+) post of the booster power source. If the good battery is in another vehicle, that vehicle's engine must be shut *OFF* before connecting;
3. Connect the other end of the same red jumper cable to the positive (+) terminal on the booster block;
4. Connect one end of the black jumper cable to the negative (-) post on the booster power source;
5. Connect the other end of the same black jumper cable to the negative (-) terminal on the booster block; If the good battery is in another vehicle, start that vehicle's engine;
6. Let the engine run for a few minutes, then start the vehicle with the run-down battery;
7. Disconnect the jumper cables in reverse order given in steps 2 through 5;
8. Install protective cap on the booster block terminal.

NOTE

Jumper cables must be rated at 500 cranking amperes. If jumper cable length is 20 feet (6 m) or less, use 2/0 (AWG) gauge wires. If cable length is between 20 to 30 feet (6 to 9 m), use 3/0 (AWG) gauge wires.



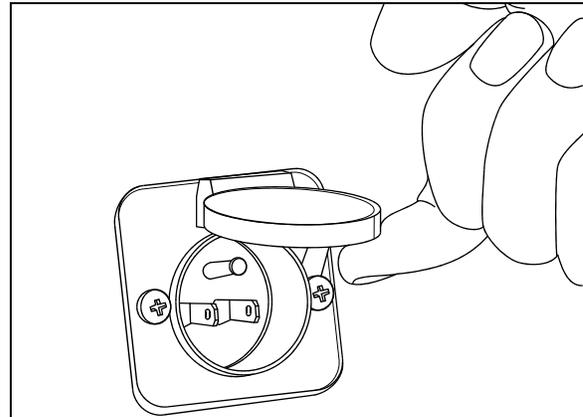
BOOSTER BLOCK LOCATION

06623

ENGINE BLOCK HEATER

The vehicle may be equipped with an engine immersion-type electric block heater to assist cold weather starting. A connector is on the rear

pillar of the curb-side engine compartment door frame. Using an extension cord, connect to a 110 - 120 VAC outlet.



110-120 VOLTS CONNECTOR

06390



CAUTION

Connect only to a 110-120 VAC power source. Use only grounded (three prongs) extension cords with a minimum rated capacity of 15 amps. Disconnect the extension cord before starting. Before driving, make sure the extension cord is disconnected and the engine compartment door is closed.

ENGINE WARM-UP

After starting the engine, keep the parking brake applied and let the engine run at normal idle for two minutes to allow lubricating oil to reach the turbocharger. Increase engine speed to fast idle, using the FAST IDLE switch located on the dashboard for five minutes, without loading the engine. Monitor the gauges and indicator lights to make sure all conditions are normal. If an abnormal condition is observed, stop the engine immediately and have the condition corrected.



DANGER

Never let the engine run in an enclosed, non-ventilated area. Engine exhaust fumes contain dangerous gases which can be fatal if inhaled. Before warming up the engine, open the door(s) or move the vehicle outside.

NOTE

The engine will reach normal operating temperature shortly after driving. Avoid driving at full throttle until engine coolant temperature reaches 140°F (60°C).

96 Starting and Stopping Procedures

ALLISON TRANSMISSION WARM-UP

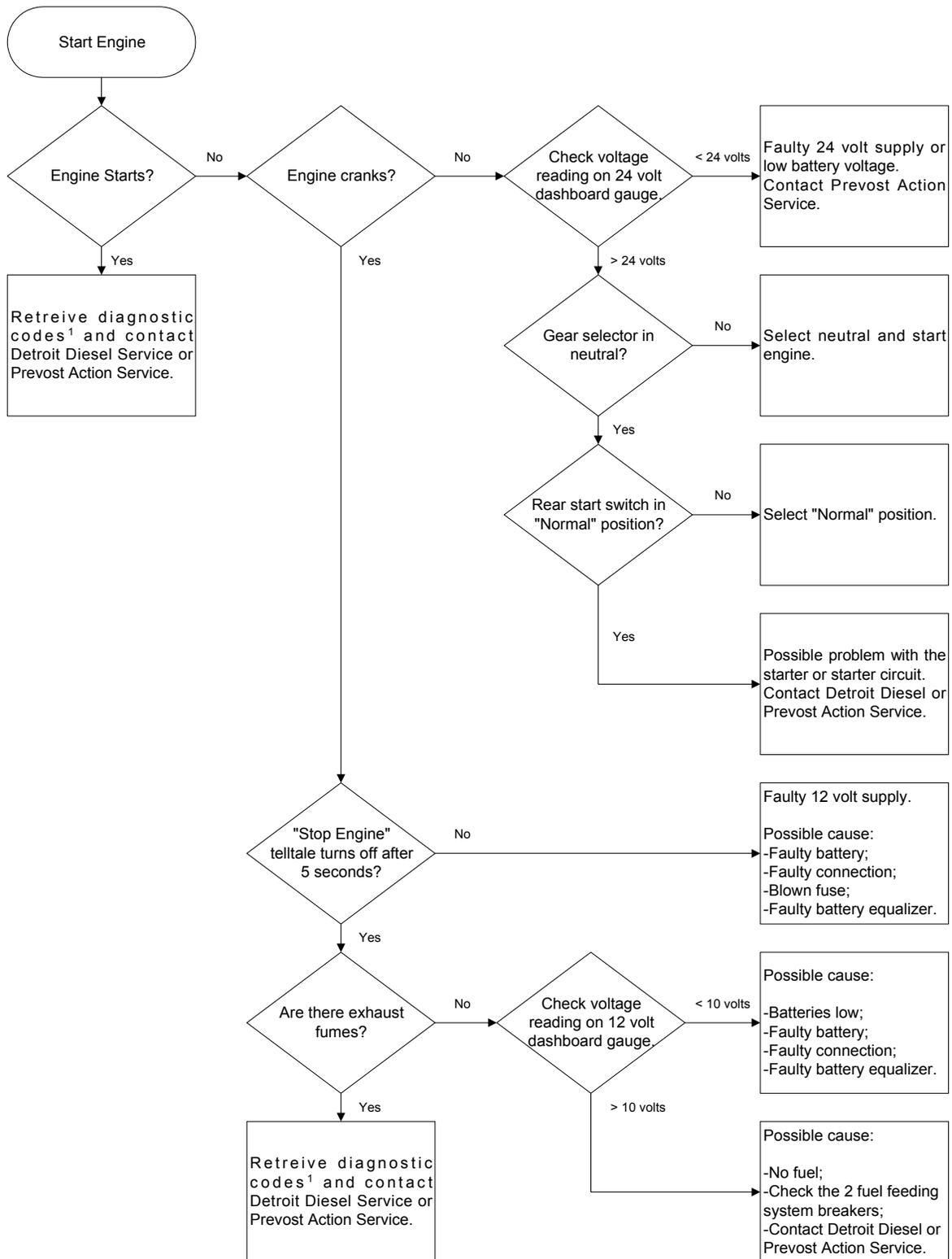
When the transmission temperature falls below -20°F (-29°C), the CHECK TRANS telltale light illuminates after the engine is started, and a reminder tone will sound. In this case, the transmission will be locked in neutral (N) until the transmission temperature rises above -20°F (-29°C) and the CHECK TRANS telltale light goes out. The transmission will only operate in first or reverse gears until it reaches normal operating temperature.

ZF-ASTRONIC TRANSMISSION - STARTING THE VEHICLE AT LOW TEMPERATURES

For outside temperatures between -20°C and -30°C , the transmission will require a warming up phase once the engine is started. The engine must be operated for at least 10 minutes with the vehicle at a standstill until the transmission oil has warmed up.

For outside temperatures below -30°C , warm air must be used to heat the transmission up to a temperature above -30°C before the engine is started.

ENGINE TROUBLESHOOTING FLOWCHART



(1) Refer to DDEC VI Diagnostic Codes in appendix D.

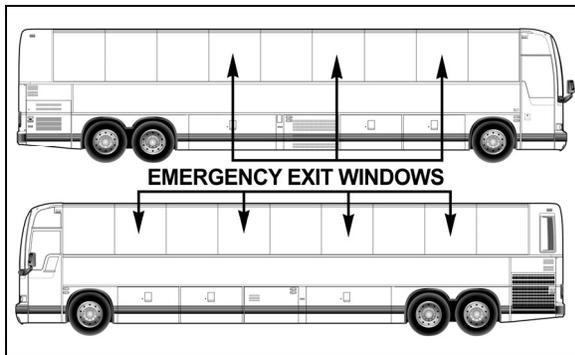
98 Safety Features and Equipment

EMERGENCY EXITS

Locate and learn how to use all possible emergency exits. It is good practice to inform passengers of the location of exits and how to use them in case of an emergency.

SIDE WINDOWS

Some side windows can be opened from the inside for emergency exit. A decal located on the bottom of each passenger window indicates the location of the nearest emergency exit. Also, blue lights close to the wall in the overhead storage compartments illuminate the emergency exit decals. These lights illuminate when the general lighting switch is on.



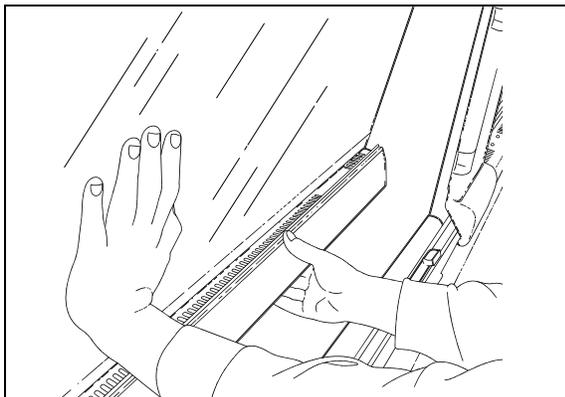
EMERGENCY EXIT WINDOWS (X3-45)

18617

To open a side window emergency exit, tilt up the release bar and push the bottom of the window outwards, as illustrated below. The window is hinged from the top and will not fall out.

A telltale light on the dashboard illuminates when a window is opened. Refer to Controls and Instruments chapter for more information.

To close the window, tilt up the release bar and pull the window back. Push down the release bar to lock shut.

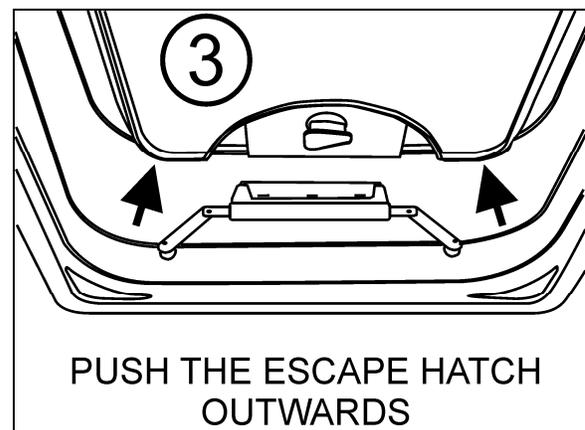
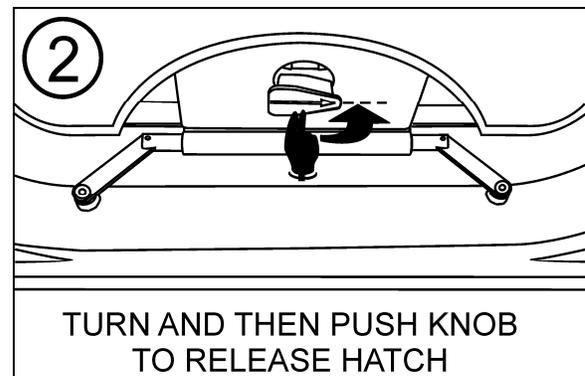
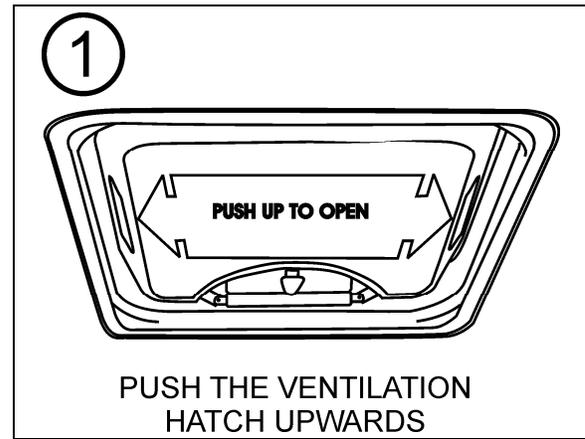


SIDE WINDOW EMERGENCY EXIT

18391

ROOF HATCH

A roof ventilation hatch, designed to be opened by occupants may be installed in the roof at the rear of the vehicle. Another optional roof hatch may be located in the front of the vehicle. The hatches can serve as emergency exits. In case of an emergency, push the ventilation hatch upwards (1). Turn knob ¼ turn (arrow pointing "TO EXIT") and then push knob to release the hatch (2). Push the escape hatch outwards (3). A decal with operating instructions is located on the hatch.



EMERGENCY ROOF ESCAPE OPENING

NOTE

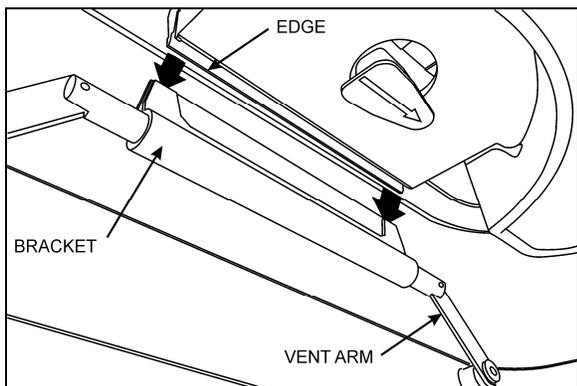
In the event of ventilation blower motor failure, the roof hatch may be used to aid ventilation by pushing the hatch upwards.



CAUTION

Be aware of reduced vehicle overhead clearance when driving under overpasses with the roof hatch open.

To latch escape hatch after use, vent arms must be pushed upright in FULL OPEN VENT position. Insert edge firmly between the two sections of the bracket and then return knob to original position (arrow pointing "LATCHED") to lock the hatch. Finally, pull the hatch in to closed position, one side at a time.



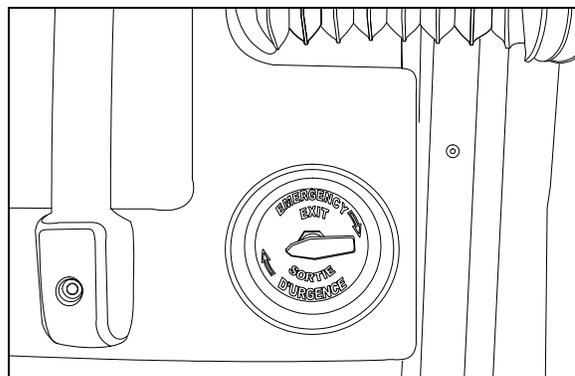
ROOF ESCAPE LATCHING

EMERGENCY ENTRANCE DOOR OPENING

An unlatch air valve located on the front wall, close to the entrance door allows emergency depletion of the door and latching cylinders. Another unlatch valve is located in the front service compartment and allows opening the door from the outside. To open the door in an emergency situation, first turn the unlatch valve in the direction of the arrows and push (or pull) the door open. To close the door after emergency opening, return the valve to its initial position, open the door using the door cylinder, then close the door normally.

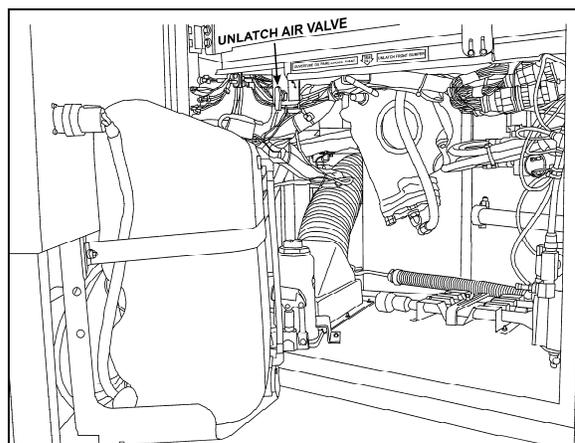
NOTE

To be able to open the entrance door in an emergency situation, the entrance door must first be unlock using the key or lock lever before unlatching the door from the outside or the inside.



INTERIOR UNLATCH AIR VALVE

12164



UNLATCH AIR VALVE LOCATION

12209

EMERGENCY EQUIPMENT

SUPPRESSION SYSTEM (AFSS) (OPTIONAL)

The coach may be equipped with the optional Automatic Fire Detection and Suppression System (AFSS).

System operation

When a fire is detected inside the engine compartment, the system sends a fire alarm signal to the **Protection Panel** located in the Driver's area near the lateral control panel. The **Protection Panel** immediately turns on the fire "ALARM" lamp and sounds the audio alarm. After a 15-second time delay the engine is automatically shut down. The fire extinguisher is discharged simultaneously with engine shutdown.

NOTE

*The **Manual Activation Switch** is used when immediate discharge of the fire extinguisher and engine shutdown is desired.*

100 Safety Features and Equipment

NOTE

The **Protection Panel** continuously monitors system integrity and displays the information via the “SYSTEM OK” and fire “TROUBLE” indicators.

Operational sequence (fire)

1. A fire detector or liner thermal detector detects a fire in the engine compartment and sends a signal to the **Protection Panel** in the driver’s area.
2. The fire “ALARM” lamp on the **Protection Panel** will illuminate solid red and an audible alarm will sound.
3. The operator shall bring the vehicle to a safe stop.
4. The system automatically shuts down the vehicle engine and discharges the extinguisher into the engine compartment 15 seconds after the fire alarm starts unless advanced or delayed by the operator.
 - o If the operator presses the **Manual Activation Switch**, all delays will terminate and the engine shutdown and extinguisher discharge will occur immediately.
 - o If the operator presses and releases the **Delay Engine Stop** switch once, the engine shutdown and extinguisher discharge will be delayed by an additional 15 seconds.



WARNING

The engine will stop 15 seconds after the fire alarm starts. The operator must be prepared to bring the vehicle to a safe stop as soon as the alarm sounds. Steering may become difficult after engine shutdown. If more time is required, the “DELAY ENGINE STOP” switch may be pressed and released for an additional 15 second delay.



WARNING

The extinguisher discharge may cause an obscuring cloud behind and near the vehicle.

5. The red fire “ALARM” lamp and audible alarm will stay on. The yellow fire “TROUBLE” lamp will also be on indicating a discharged extinguisher.
6. The system must be reset and the fire extinguisher removed and replaced in accordance with the System Reset portion of the Kidde Dual Spectrum Operation & Maintenance Manual.

TIRE PRESSURE MONITORING SYSTEM (TPMS) (OPTIONAL)

The coach may be equipped with the optional Tire Pressure Monitoring System (TPMS).

Description

System includes the following elements:

- Special tire valves;
- RF sensor inside each tire, fixed to the valve;
- 3 antennas to receive the sensors RF signal (one in the front spare tire compartment, one above the L.H. side rear wheels and one above the R.H. side rear wheels);
- A TPMS receiver connected to the antennas and located in the front electrical compartment, above the CECM;
- A TPMS display built in the L.H. dashboard panel;
- A “FLAT TIRE” telltale panel indicator.

The section of the special tire valves located inside the tire is dome-shaped to allow fixing the sensor.

Sensors provide continuous tire pressure and temperature reading.

The normal sensor battery lifespan is 5 years. The remaining lifespan is displayed as a percentage in the TPMS display.

NOTE

It is recommended to check the remaining battery lifespan when changing the tires in order to replace the sensors at the same time if they are due for replacement before the next change.

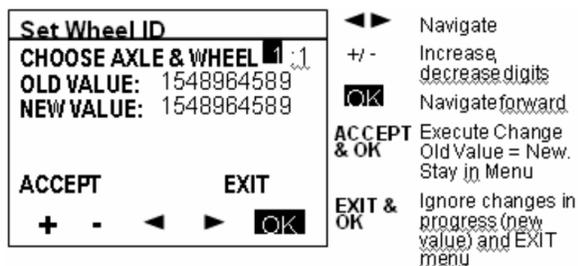
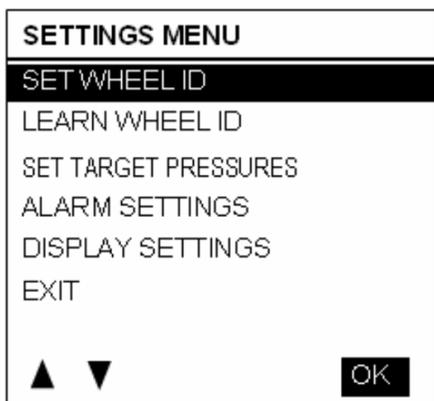
The screw fixing the sensor to the valve can only be used once because the threads are powder-coated to lock the sensor in place and prevent unfastening.

Safety Features and Equipment 101

The telltale panel indicator illuminates for 3 seconds when the ignition switch is turned ON to check the display operation and the communication between the display and the vehicle multiplex system. This confirms the communication between the TPMS display and CECM.

Settings Menu

- Set Wheel ID



- Learn Wheel ID

This menu allows learning new wheel sensors ID. The user can learn only one wheel, several wheels or all wheels of the vehicle. The sequence automatically jumps to the next wheel such that a user can initiate all wheels without having to come back to the display between each wheel.

The display uses a pressure change as the criteria to recognize which wheel sensor the operator wants to get assigned to a given location. The amount of pressure change required is established at 2 PSI.

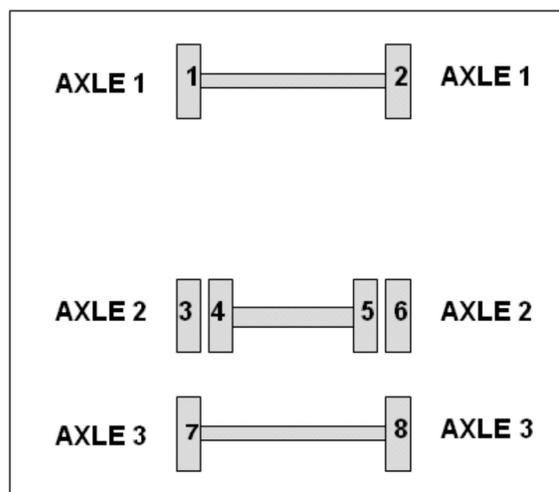
A pressure change of about 3 PSI is needed to wake up a sensor and then an extra amount of pressure change of 2 PSI is needed to trigger the display. The operator has to create a pressure change by at least 6 PSI and then wait for the display to recognize the pressure change. The wait time correspond to the sensor sampling rate.

When entering the menu, the axle 1, wheel 1 is selected by default as a starting point for the learning. The user can select another axle with +/- , move the cursor to the wheel number with the right arrow and select another wheel with the +/- or move the cursor down to the start learning button.

After the start learning button is selected, the display stores the first transmission it gets from each sensor ID into the “initial pressure” for that sensor ID. Then it compares each subsequent pressures received for that sensor ID with the initial one and when the comparison shows a delta pressure exceeding the defined level required, this sensor ID is assigned to the selected tire location.

Once a wheel ID has been assigned, the display increments the number of Wheels done and it moves the axle/wheel to the next one in the sequence waiting for another sensor to come up with a pressure change. Within one learning session, the display remembers which sensor has been assigned and it will not assign it twice.

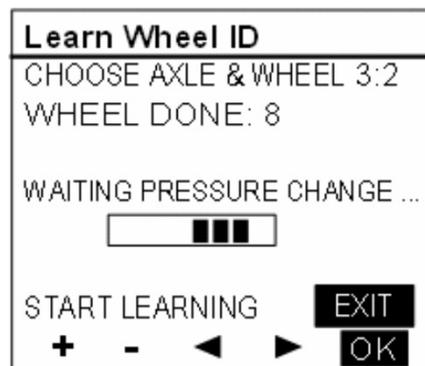
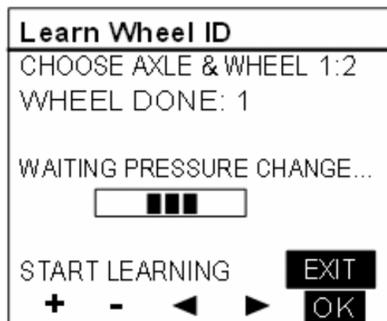
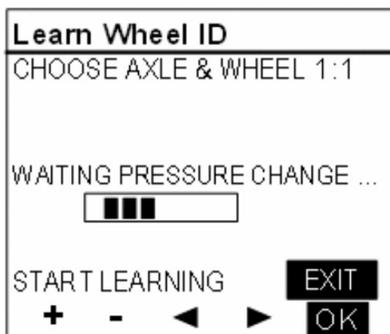
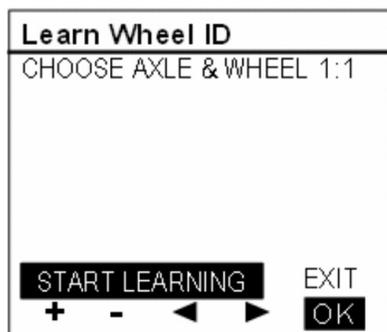
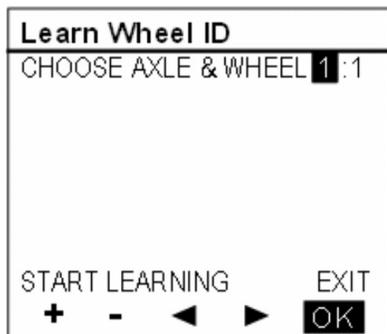
The sequence increments to the next wheel on the same axle counting wheels from left to right and then moves to the next axle counting axles from front to rear.



The display activates the next wheel parameter each time a wheel is done. This parameter is use by the vehicle electronic to activate an audible signal on the vehicle thus providing a feedback to the user that he can move to the next wheel.

The spare Tire can be done by selecting the axle/wheel “spare” which is internally encoded to 15:1.

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- Set Target Pressures

This menu allows the end user fine tuning the target pressure setting to account for the specific operating conditions (cold weather operation or unloaded operation). The end user can readjust the target pressure within +30% and -20% of the factory set target pressure but not outside this range.

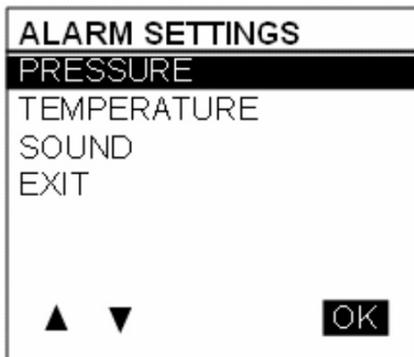
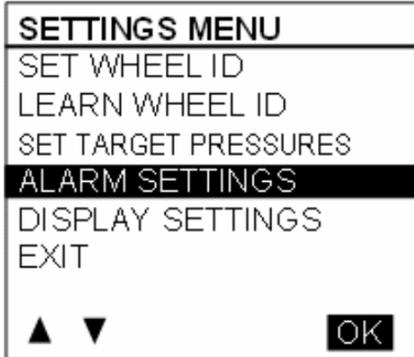
The factory set target pressure is always kept in permanent memory into the TPMS display and cannot be edited by the end user.

When the user enters a new target value, the user cannot select values outside the valid range.

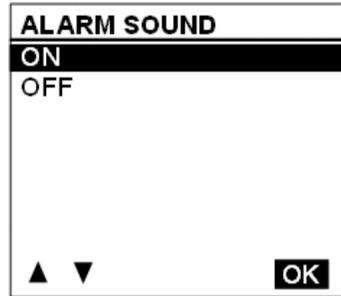
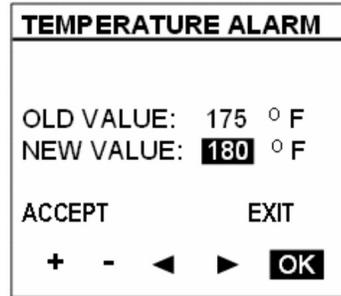
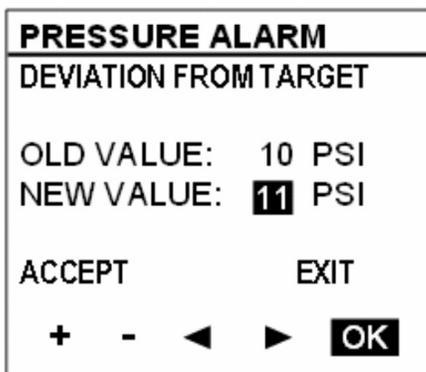


- Alarm Settings

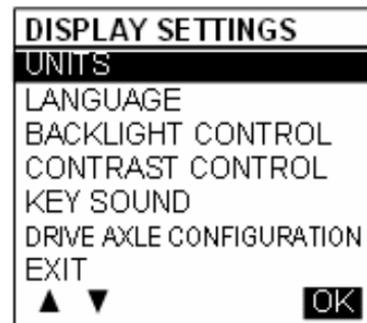
When selecting the Alarm Settings Menu, a sub menu containing Pressure Alarm and Temperature Alarm appears.



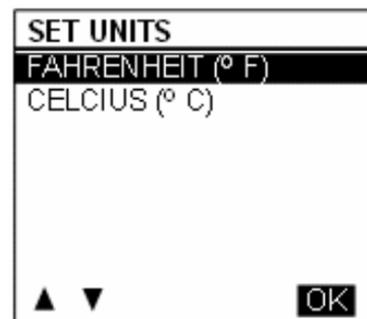
When selecting Pressure Alarm the screen pressure alarm shown below appears. A similar screen is defined for temperature settings. The cursor can be moved to highlight the number beside “new value”, “ACCEPT” or “EXIT”. +/- allows increasing or decreasing the numbers. Pressure alarms changes are allowed in steps of 1 PSI in the range from 5 to 20 PSI. Temperature alarms in steps of 5°F (2°C) in the range from 150 to 180 °F (64 to 82 °C). Pressing OK with “ACCEPT” highlighted applies the change and exits to the previous menu. Pressing OK when “EXIT” is highlighted exits without changes.



- Display Settings



Units

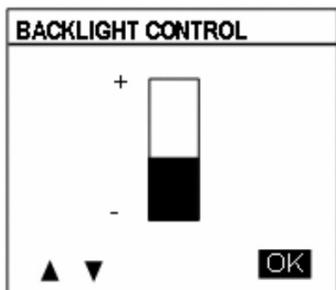


104 Safety Features and Equipment

Languages

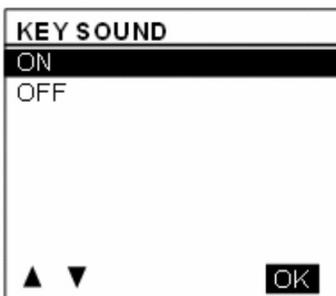


Backlight Intensity



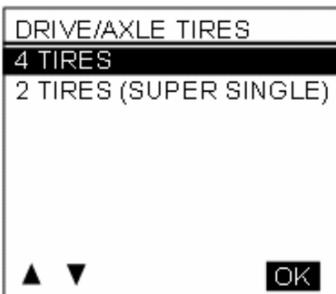
Key Sound

Turns key press sound ON/OFF.



Tire / Axle Configuration

Pressing the up down arrow when the number of tires is highlighted allows flipping the number to 2 or 4 which are the only valid choices.



Refer to "Appendix G" for Troubleshooting Guide on Tire Pressure Monitoring System (TPMS).

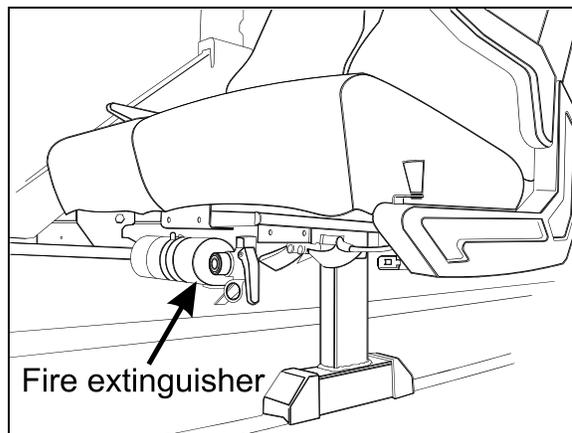
FIRE EXTINGUISHERS

One fire extinguisher is located under the seats in the first row on each side of the aisle. Instructions for use are found on the extinguishers.



WARNING

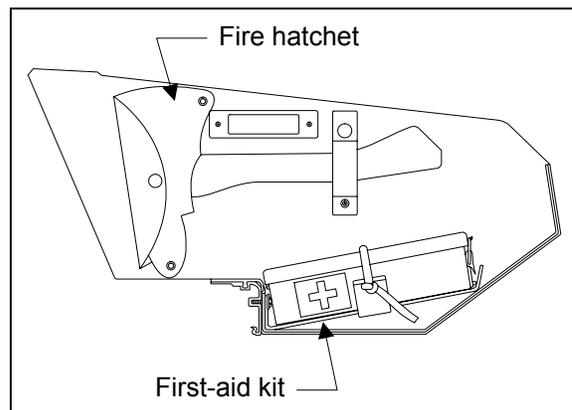
Make sure you know how to operate the fire extinguishers in case of an emergency.



FIRE EXTINGUISHER LOCATION

23136

FIRST AID KIT



FIRST CURB-SIDE OVERHEAD COMPARTMENT

23141a

The optional first aid kit is stored in the first curb-side overhead storage compartment. A white cross over red background decal identifies the first aid kit location

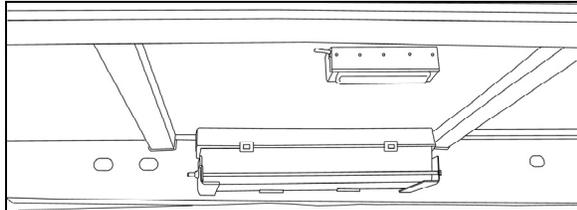
FIRE HATCHET

An optional fire hatchet may be installed in the first curb-side overhead storage compartment.

Safety Features and Equipment 105

WARNING REFLECTORS

A kit containing three triangular reflectors is provided to warn other drivers on the road in case of a breakdown. The kit is located at the ceiling of the first baggage compartment, on the R.H. side. The reflectors provide visible warning of an emergency situation. The three reflectors should be placed as indicated on the box cover. These reflectors comply with FMVSS 125 (Federal Motor Vehicle Safety Standards).



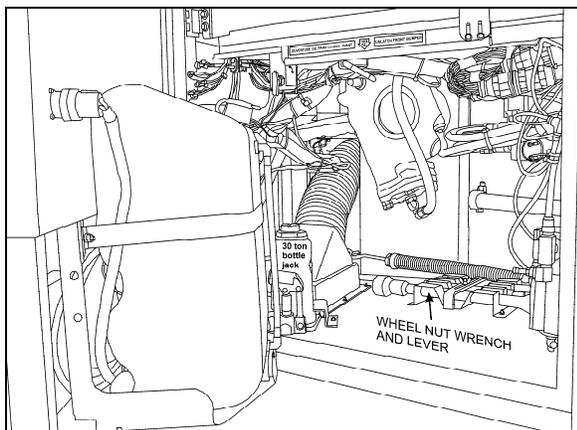
WARNING REFLECTORS LOCATION

23376

JACK / TOOLS

A kit for jacking up the vehicle and changing wheels is stored in the front service compartment. The kit includes a:

- 30 ton bottle jack;
- Wheel nut wrench and lever.



JACK/TOOLS LOCATION

23377

SPARE PARTS KIT

The vehicle may be equipped with a spare parts kit (optional). The kit contains parts such as bulbs, circuit breakers, belts, etc. The spare parts kit is stored in the first baggage compartment.

“LIMP-HOME” BELT

In case of malfunction of the lower alternator, install the limp-home belt on the upper

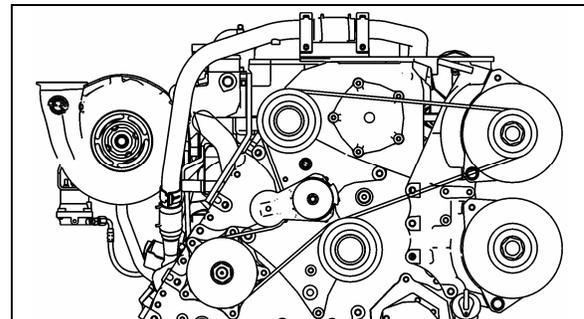
alternator. The installation of the belt allows the coach to be driven to a repair facility after only minor manipulations.

Lower alternator failure:

1. Raise the belt tensioner. Use a breaker bar with a $\frac{3}{4}$ inch drive to rotate the tensioner pulley upward and relieve alternator belt tension. Remove belt;
2. Install the limp-home drive belt on the drive and top alternator pulleys first;
3. Complete installation of the limp-home belt as shown hereafter;
4. Slide the belt on the lower idler pulley (S60). Use a screwdriver or even a quarter to ease clearing the pulley lip (the lower pulley is devoid of grooves, making it easier to slide the belt in place);
5. Gently release the belt tensioner.

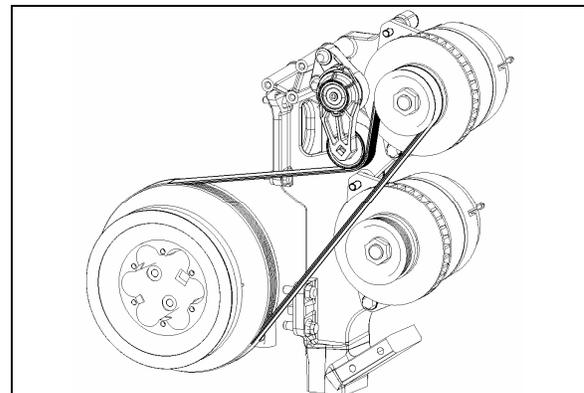
NOTE

To prevent the batteries from discharging, the HVAC system is turned OFF when running on a single alternator.



LIMP-HOME BELT ON TOP ALTERNATOR (WITH DDC S60 ENGINE)

01154



LIMP-HOME BELT ON TOP ALTERNATOR (WITH VOLVO D13 ENGINE)

01194

106 Safety Features and Equipment

SPARE WHEEL AND TIRE

The spare wheel and tire is located in a compartment behind the reclining front bumper.

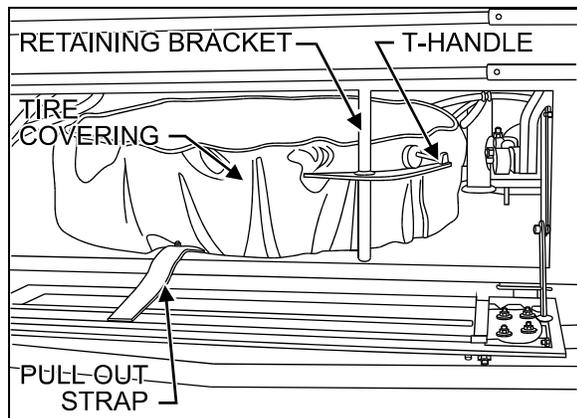
In case of a flat tire, turn ON the hazard flashers and bring the coach to a stop on the side of the road. Apply the parking brake. Make sure the coach is parked safely away from traffic. Set up the triangular reflectors in accordance with applicable highway regulations.

CHANGING A WHEEL

To access the spare wheel, lower the front bumper. To remove the spare, untighten the pressure screw holding the tire in place, then press down on the spring loaded locking pin located at the top of the retaining bracket and remove the bracket. Using the strap, pull the spare out of the compartment (refer to the following illustrations). Rollers ease manipulation. Remove the protective cover. Install the flat tire in place of the spare by reversing the procedure.

NOTE

Do not forget to have the flat tire repaired as soon as possible.



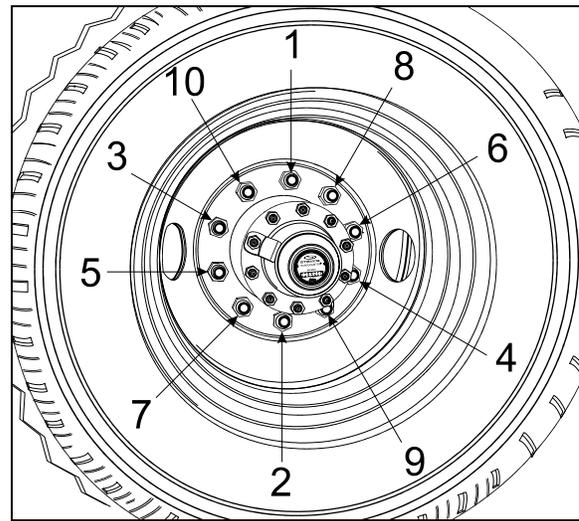
SPARE WHEEL AND TIRE

18415

1. Loosen the wheel nuts about one turn;
2. Raise the vehicle by the closest jacking point (See Jacking Points in this chapter);
3. Remove the wheel nuts and remove the wheel;
4. Mount the spare wheel over the studs, being careful not to damage the stud threads;
5. Screw in the wheel nuts according to the sequence shown in the following figure and tighten slightly more and repeat the

sequence a few times to position the wheel correctly. Once tightening induces wheel spin, lower the coach for final tightening;

6. Tighten the nuts progressively in the sequence shown. Final tightening should be done using a torque wrench. Dry tightening torque is 450 – 500 lbf-ft (610 – 680 Nm) for steel as well as for aluminum wheels.



TIGHTENING SEQUENCE

13018

NOTE

The jack and tools are located in the front service compartment.

NOTE

Periodically check the spare's inflation pressure. Tire pressure should be the maximum pressure specified in the chart.

NOTE

Periodically check that the spare is securely fastened in its compartment.

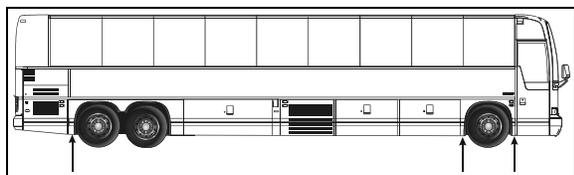


WARNING

Before driving, be sure the flat tire, track, jack and tools are securely reinstalled in their respective compartments. Check that the bumper is securely closed shut before driving.

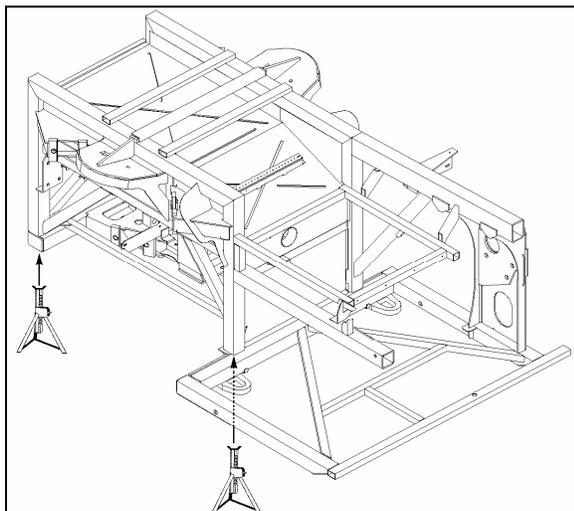
JACKING POINTS

Twelve jacking points are located on the vehicle; three are located on each side of the frame and two are located under each axle. Refer to the following illustrations for the location of jacking points.



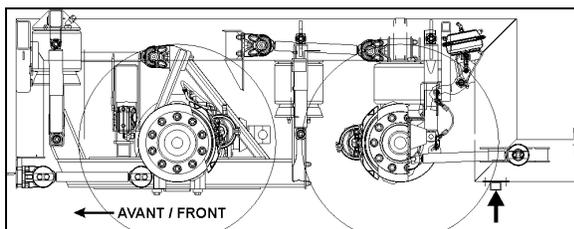
JACKING POINTS ON FRAME

18618



FRONT END JACKING POINTS

18592



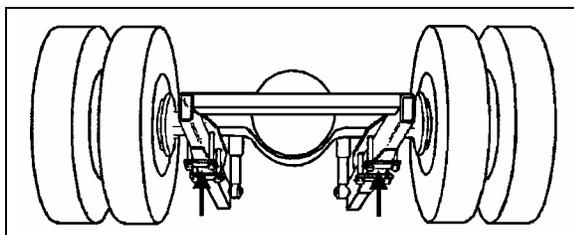
REAR END JACKING POINTS

18593



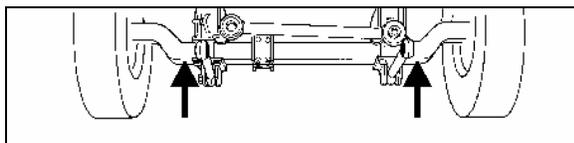
WARNING

The suspension of the vehicle must be in the normal ride position before jacking.



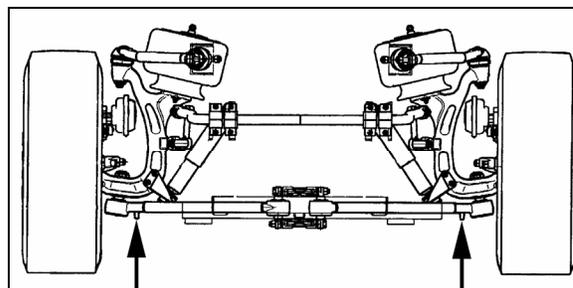
JACKING POINTS ON DRIVE AXLE

11005



JACKING POINTS ON FRONT AXLE

10005



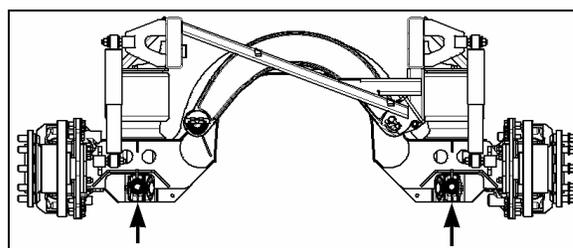
JACKING POINTS ON IND. FRONT SUSPENSION

16139



WARNING

Always unload or retract the tag axle before jacking the vehicle from the front and drive axle jacking points to prevent damage to suspension components.



JACKING POINTS ON TAG AXLE

11029



WARNING

The jacking points on the tag axle must be used for raising the tag axle only.

Several kinds of hydraulic jacks can be used. Only jack at the specified jacking points. Jack must support the following capacities:

Front axle: 20,000 lb (9 100 kg);

Drive axle: 40,000 lb (18 200 kg).

HYDRAULIC JACK

To raise: turn release valve clockwise. Insert handle in socket and raise by pumping.

To lower: remove handle and turn the release valve slowly counterclockwise.

Always keep ram and extension screw retracted when jack is not in use.

Service: Check oil level when jack fails to raise to full height. Lower ram completely with release valve open and jack in upright position, remove filler plug and refill to level of filler hole with hydraulic jack oil. **Never use brake fluid.**

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DANGER

Jack is intended for lifting only. Do not get under the vehicle or load for any reason unless it is properly supported with safety stands and securely blocked.



DANGER

Do not load jack above rated capacity. Prevent "side loading", make sure load is centered on ram. Do not push or tilt load off jack.

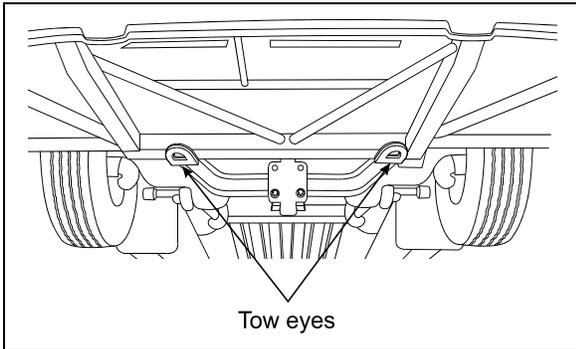
TOWING

To prevent damage to the vehicle, use the two tow eyes fixed to the vehicle frame between the front axle and the front bumper. Use only a solid link tow bar and a safety chain to tow the vehicle. If required, connect an auxiliary air supply to the vehicle so the emergency/parking brakes don't apply while towing.



CAUTION

To prevent damage to the vehicle structure, it is not recommended to tow the vehicle from the rear. In case of damage to the drive train components, use a low bed semi-trailer to support the rear end.



Tow eyes

TOW EYES UNDER VEHICLE

18401



DANGER

Do not carry passengers while the coach is being towed.



CAUTION

To prevent damage to the drive train components, disconnect axle shafts or driveshaft before towing. Do not attempt to push or pull-start the coach.



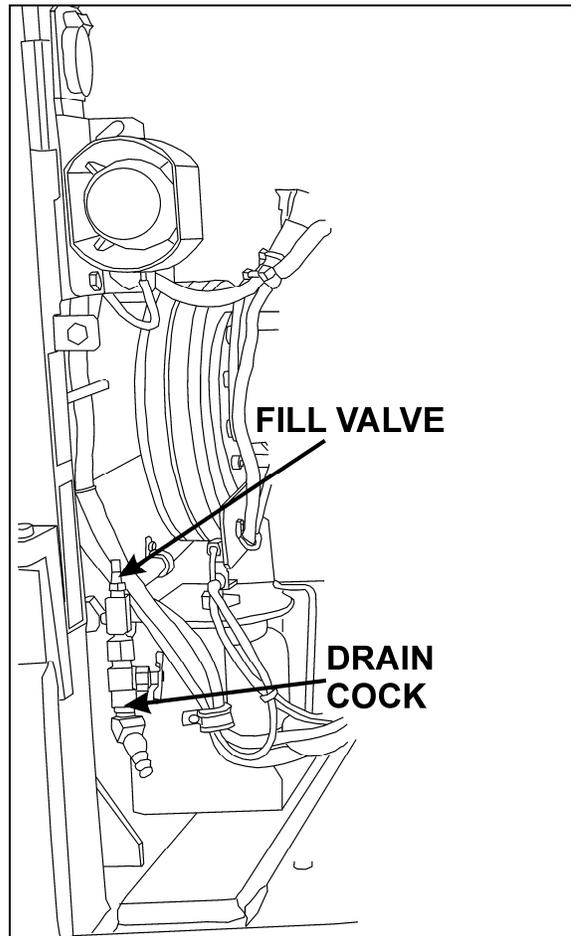
CAUTION

Make sure axle shafts or driveshaft are installed correctly after towing. Tighten axle shaft and driveshaft nuts to the correct torque settings. Do not invert shafts.

EMERGENCY AIR-FILL VALVES

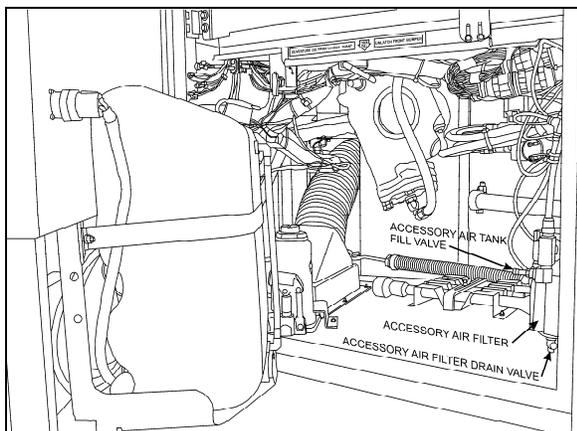
The vehicle is equipped with two air system emergency fill valves to supplement the air system when air pressure is low and the engine cannot be operated. One valve is located inside the front service compartment. The other valve is located inside the engine compartment.

Both air system emergency fill valves are fitted with standard tire valve stems. The air systems can be filled using any standard external air supply line. The fill valve located in the engine compartment supplies air for all systems (brakes, suspension and accessories). The fill valve located in the front service compartment supplies air for accessories only.



FILL VALVE IN ENGINE COMPARTMENT

12211



FRONT SERVICE COMPARTMENT

12210



CAUTION

Air filled through the two emergency fill valves will pass through the standard air filtering-drying system. Do not fill air at any other location. Do not exceed 120 psi (827 kPa).

EMERGENCY AND PARKING BRAKES

During normal operation, if air pressure in any brake circuit drops below 40 psi (276 kPa), spring-loaded emergency brake will be immediately applied at full capacity to the drive axle wheels to stop the vehicle.

Spring-loaded parking brake is applied by pulling up the control valve knob located on the L.H. lateral console.

Parking brake is not designed to be used as a service brake. For normal driving conditions, the control valve knob must remain in the down position.



DANGER

Always apply the parking brake before leaving the driver's seat.

NOTE

Only use the parking brake to supplement the service brake to stop the vehicle in emergency conditions. The stopping distance will be considerably longer than when using normal service brake.

NOTE

Before releasing the parking brake by pushing down the control valve knob, check the pressure gauges to make sure that the brake system air pressure is greater than or equal to 95 psi (655 kPa).

NOTE

A beep will sound if the ignition switch has been turned off without applying the parking brake. The same beep will sound if pressure is still applied to the service brake pedal.

NOTE

The stoplights will automatically turn on when the parking brake is applied and the ignition key is turned to the ON position.

DAYTIME RUNNING LIGHTS

The inner lamps only also called high beams illuminate automatically when the engine is started and the parking brake is released to serve as daytime running lights. The daytime running lights provide added safety by making the traveling vehicle more visible to other drivers during the day.

The daytime running lights system turns the headlights on when:

- Engine is running;
- Parking brake is released;
- The exterior lighting switch is set to the OFF position or pressed to the first position.



WARNING

Do not drive with only the daytime running lights at night because the tail and marker lights are not turned on in that situation and the high beams can blind other drivers. For night driving, turn ON the headlights by depressing the exterior lighting rocker switch to the second position.

FOG LIGHTS

Optional halogen fog lights are available. They provide better visibility in fog and precipitation. They improve visibility immediately in front of the vehicle. They also provide added safety.

110 Safety Features and Equipment

NOTE

Some states or provinces may restrict the use of fog lights. Verify local state or provincial regulations before using.

COMPARTMENT LIGHTING

Baggage compartments and front service compartment lights are automatically turned *ON* when the corresponding compartment door is opened. A telltale light on the dashboard illuminates when the baggage compartment door is open.

MUD FLAPS AND SPLASH GUARDS

Mud flaps are installed behind each front and tag axle wheel in order to minimize dirt on the lower panels of the vehicle and prevent stones and debris from being thrown at vehicles traveling behind the vehicle. Mud flaps are also installed on front of each front axle wheel to reduce water splash on rear-view mirrors. Splash guards may be installed behind each dual wheel of the drive axle to prevent stone projectiles from being thrown at the tag axle wheels.

BACK-UP CAMERA

An optional back-up camera is available which provides the driver with visual assistance when backing-up.

The TV monitor may be mounted on the left side pillar. It switches *ON* automatically when the transmission is in the reverse (R) range.

BACK-UP ALARM

The back-up alarm alerts pedestrians and other drivers when the vehicle is being backed-up. Take extra precautions whenever backing-up. If necessary, use a guide to provide directions when backing-up. Both the alarm and optional camera are automatically activated when the transmission is put in the reverse (R) range.

ESSENTIAL FUNCTIONS TO OPERATE THE VEHICLE (BASIC LIMP-HOME FUNCTIONS)

Even with a defective CECM (Chassis Electronic Control Module) or a CAN network problem, essential base functions are maintained to rear start the vehicle from the engine compartment and drive in a secure manner.

AVAILABLE FUNCTIONS

- Startup: Turn on the ignition in the driver's area and rear start the vehicle from the engine compartment,
- Opening the door: Functions normally,
- Closing the door: Manually pull on the door and it will lock automatically,
- Windshield wipers: Wipers functions at 1st speed only,
- Headlights: Low beams only,
- Directional signals: Rear and front only,
- Stoplights: 2 upper stoplights + high-mounted stoplight are functional,
- HVAC: Functional with set point fixed at 70°F (22°C), evaporator and condenser fixed at speed 1, defroster fixed at speed 4.



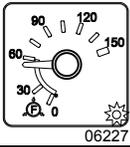
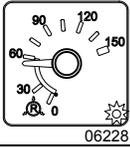
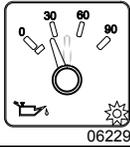
CAUTION

The following directives must be followed.

- Never connect a battery charger when the ignition is at the *ON* position on a vehicle with a CAN defective or certain functions will start up by themselves,
- Disconnect the charger before starting the vehicle, if not the default functions will not activate,
- If the default mode does not activate, try to turn the ignition *OFF* while ensuring that no charger is connected and then restart the vehicle.

AUDIBLE ALERTS

In addition to the dashboard telltale lights, the vehicle is equipped with an alert system to provide audible indications to the driver of the conditions given in the following table:

Visual Indication	Audible Alert	Condition
	Yes	Air pressure in primary system below 66 psi (860 kPa)
	Yes	Air pressure in secondary system below 66 psi (860 kPa)
	Yes	Engine oil pressure below 50 psi (345 kPa)
	Yes	Coolant temperature above 223°F (106°C)
	Yes	Gear changing inhibited
None	Yes	Reverse gear engaged
	Yes	Fire in engine compartment
	Yes	Tag axle retracted and vehicle speed exceeding 12 mph (20 km/h).
	Yes	Kneeling down
None	Yes	Engine OFF but parking brake not applied

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Visual Indication	Audible Alert	Condition
None	Yes	Lavatory emergency call button
	Yes	Major problem detected by engine
	Yes	Outside temperature close to water freezing point
	Yes	Transmission fluid too hot
	Yes	Wheelchair lift access door ajar but the parking brake is not applied

CLEANING

The cleaning information provided in this section is regarded as recommended cleaning practices. Cleaning results may vary depending on the condition of the stain. Always clean stains promptly for best results.

NOTE

Use only approved cleaning products such as Prevost A.P.C., all purpose cleaner (Prevost # 683664). Never use stain protection products on new fabrics. To prevent permanent staining of fabrics, clean stains soon after they occur. Incorrect treatment of stains can worsen them. Get help from a cleaning specialist to remove stubborn stains.



CAUTION

Custom fabrics and materials may require different cleaning and maintenance practices. Consult your converter.

SEAT UPHOLSTERY

Firmly beat the fabric with a blunt object, such as a wooden paddle, to release dust and dirt. Vacuum the seat fabric in the direction of the stitching using an upholstery nozzle.

NOTE

The abrasive nature of dirt and grit will reduce upholstery life expectancy. Vacuum regularly.

Removal Of Stains And Marks

Depending on the nature of the stain, apply one of the two methods explained below to remove stains and marks on wool plush.

Method One:

1. Apply a nonflammable solvent (Trichloroethylene) to stained area with a clean, white absorbent rag;
2. Clean stain by starting at the outer edges of the stain and working in toward the center;
3. Blot affected area frequently with a clean, dry absorbent cloth to prevent stain rings caused by excess solvent.



WARNING

Use solvents in a well ventilated area. Open all windows and doors.

Method Two

1. Wet the stain with a solution of household detergent and lukewarm water. Do not soak the stain;
2. Rub the stain with a damp cloth;
3. Rinse cloth after each application.



CAUTION

Do not use soap, soap powder, ammonia, soda, bleach or cleaning products containing any of these compounds.

Beverage Stains

Remove beverage stains by following method one. If stain persists, repeat method one using methylated spirits instead of solvent.

Alcoholic Beverage Stains

Remove alcoholic beverage stains by wetting the stain with water, then cleaning following method two.

Burns

Scrape burnt area using a knife or razor blade then clean following method two. Consult an upholstery specialist when dealing with extensive burns.

Cosmetic Stains

Remove stains left by cosmetics by following method one then method two.

Ink Stains

Remove ink stains following method two. If stain persists, apply a warm oxalic acid solution. Rinse with water.

Blood, Urine Or Vomit Stains

Remove such stains by following method two.

Copying Ink - Ball-Point Pen Ink

Treat with methylated spirits, blotting frequently to avoid spreading stain, followed by method two.

Marking Ink (Felt-tip Pens)

Treat with Methyl-Ethyl-Ketone (MEK) followed by method two.

114 Care and Maintenance

Oil, Grease And Paint

Remove excess using a knife. Treat with method one followed by method two. If stain persists, repeat procedure.

Rust Stains

Remove rust stains by following method two. Apply a warm oxalic acid solution to stained area. Rinse with water.

Tar

Soften tar with benzene, then treat using method one followed by method two.

Chewing Gum

Soften gum with cyclohexane. Carefully scrape off stains using a sharp knife or razor blade.

PLASTIC AND VINYL

Clean plastic and vinyl trim using a clean damp cloth or sponge. For vinyl trim marks, use a lukewarm all purpose cleaner or a mild saddle soap. Remove water spots and soap traces using a clean damp cloth or sponge. Dry with a clean soft cloth.

Remove grease, tar or oil stains with a clean cloth or sponge and an all purpose or solvent-type vinyl cleaner.

Apply a colorless vinyl or leather protective product to maintain the luster and pliability of the plastic or vinyl surface.

WINDOWS

Clean the inside of the windows with a solution of one part vinegar to ten parts water.

STAINLESS STEEL

Use a stainless steel cleaner and follow the manufacturer's instructions. Stainless steel cleaning solution may be ordered from Prevost Car Inc. quoting part number 68-0356.

FORMICA

Remove stains on Formica surfaces with a household detergent, methylated spirits or mineral turps. Clean with a mild abrasive and water solution if stain persists.

CARPET

Vacuum carpets regularly to prolong carpet life.

RUBBER COMPONENTS

Use only pure water or glycerin to clean stains on rubber components.



CAUTION

Never use solvents on rubber components.

FLOOR CLEANING

Clean vinyl floors with a quality nonionic detergent cleaner. Follow the manufacturer's recommendations for cleaning.

Remove any excess detergent solution using a wet/dry vacuum or mop. Rinse floor with a solution of one part Clorox to ten parts warm water.

Polish dry floor using a high-speed buffer and a smooth red 3-M polishing pad.

Mop floor periodically with a solution of 5 per cent Clorox in warm water.

NOTE

For custom or special floor covering materials, consult the manufacturer or your converter for information on how to clean and maintain these types of floors.

EXTERIOR SURFACES

Frequent washing and waxing of the vehicle exterior will help protect the finish and luster. The paint finish is attacked by the abrasive effects of airborne particles and corrosive pollutants.

Before washing the exterior of the vehicle, close the fresh air dampers using the "REC" button located on HVAC control panel and on the air intake duct in the evaporator compartment. Install keyhole protectors to prevent water from penetrating. Rinse vehicle with water to remove all loose dirt. Wash vehicle using a quality brand car wash soap. Follow manufacturer's recommendations for cleaning. Rinse well with water.

The vehicle exterior should be cleaned, waxed and buffed when water droplets no longer form on the painted surfaces.



CAUTION

Hot water can damage paint. Keep water cool or lukewarm.



CAUTION

- Make sure cleaning solutions are not harmful to painted surfaces. Read the manufacturer's instructions before using.
- Do not spray water jet directly into fresh air inlet dampers.
- Do not aim high pressure water jet at radiator doors. This could damage the radiator fins.

To prevent corrosion, remove caked-on dirt and road salt from the vehicle underbody using a high pressure water jet. Clean wheel housings, bumpers, muffler, tailpipe and brackets.

Carry out corrosion prevention cleaning at least twice a year. Spray underneath of the vehicle and let soak before cleaning. Let engine and exhaust system cool down before cleaning.

Tar Or Oil

Remove tar or oil as soon as possible with an approved automotive tar and oil remover or turpentine. Thoroughly clean area with car wash soap and water. Let dry, then wax.

Insects

Remove insect stains as soon as possible with lukewarm soap and water or insect remover.

Tree Sap

Remove tree sap or bird droppings with lukewarm soap and water. Do not allow to harden.

WINDSHIELD

To prevent windshield wiper streaking, keep silicone sprays away from windshield. Remove road film and wax build-up from windows with lukewarm soap and water or with an alcohol-based cleaning agent. If a chamois is used to dry and polish glass, use it exclusively for that purpose.

Wiper Blades

To avoid tearing frozen wiper blades, loosen them before removing. Remove and clean wiper blades periodically with an alcohol-based cleaning solution. Clean wiper blades using a sponge or soft cloth.

LAVATORY MAINTENANCE

Flush water in the lavatory is recirculated from the main sump tank. When the main sump tank water is too soiled to be recirculated, the driver can dump it into the optional auxiliary sump tank until a suitable dump location can be reached.

Routine draining and filling of lavatory tanks should be performed by maintenance personnel only, and should be done before parking the coach overnight in freezing temperature.

FRESH WATER RESERVOIR

Water from the fresh water reservoir supplies the washbasin in the lavatory.



DANGER

Do not drink water from the fresh water reservoir.

Filling The Fresh Water Reservoir

Connect the fresh water supply hose to the fresh water reservoir fill connection located in the curb-side engine compartment. Fill the reservoir until the overflow tube leaks, signaling that the reservoir is full.



DANGER

Never put antifreeze in fresh water reservoir; antifreeze is toxic.



DANGER

If reservoir has not been drained for an extended period of time, draining and filling operations must be repeated three (3) times in order to clean reservoir and eliminate contaminated water.

Draining The Fresh Water Reservoir

The fresh water reservoir can be drained by simply opening the drain cock. Don't forget to close the cock when draining is complete.

NOTE

The fresh water reservoir is equipped with a thermal valve which is set to open at about 35°F, thereby automatically draining the reservoir in near-freezing temperatures.

116 Care and Maintenance

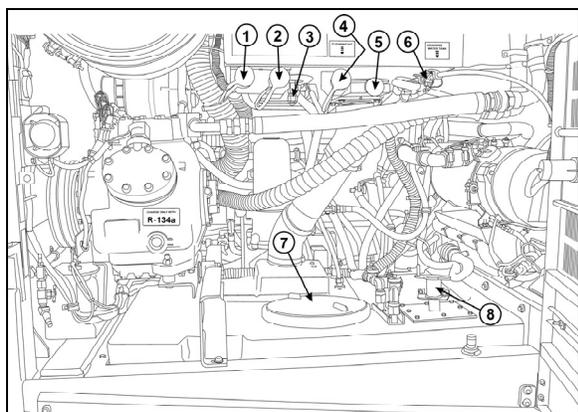
CLEANING CABINET

A hose connection and valve is located behind a small door in the top corner of the rear lavatory wall, over the mirror. It can be used to attach a garden hose for lavatory cleaning. To use, connect a fresh water supply to the connection in the curb-side engine compartment, identified as "Cleaning Kit", located next to the fresh water reservoir fill coupling.

To prevent freezing during cold weather, drain the hose after every use.

FILLING THE MAIN SUMP TANK

Open the main sump tank overflow cock and connect a water supply hose to the toilet sump tank fill connection. The main tank is full when water starts flowing through the clear overflow tube. Close main sump tank overflow cock when the tank is full.



ENGINE COMPARTMENT, CURB-SIDE

23378

1. Fresh water reservoir fill connector;
2. Main sump tank fill connector;
3. Main sump tank overflow cock;
4. Cleaning kit hose connector;
5. Main sump tank drain valve;
6. Fresh water reservoir drain cock;
7. Auxiliary sump tank access cap;
8. Auxiliary sump tank drain valve.

DRAINING THE MAIN SUMP TANK

When recirculating water in the toilet is soiled, drain main sump tank. If equipped with the optional auxiliary sump tank, drain the main sump tank contents into the auxiliary tank and perform the filling procedure of the main tank.

DRAINING THE AUXILIARY SUMP TANK

To drain the auxiliary sump tank contents, remove the cap located underneath the tank then turn the drain valve lever counterclockwise about eight or nine turns and pull the lever up. Remove the access cap and flush tank with clean water. To close, push the valve down on its seat then turn the drain valve lever several turns clockwise until the rubber bladder seals the drain hole. Reinstall both caps.



CAUTION

Lavatory tanks should be serviced only at suitably equipped stations.

NOTE

It is unlawful to dump sump tank contents in any location other than those designated as such.

When a complete tank draining is required, clean main tank by repeating the draining and filling operations while leaving the auxiliary sump tank drain valve opened. Close valves and drop in a packet of commercial toilet deodorant (Prevost part #900329) in toilet before starting final filling of the main tank.



WARNING

The toilet deodorant contains compounds which can be very irritating to skin. Use rubber gloves when handling and then clean toilet seat.



CAUTION

When cold weather is expected, both sump tanks must be drained if the coach is parked overnight or for an extended period of time.

NOTE

Due to the heat it produces, there is less risk of freezing in the tanks when the engine is operating.

NOTE

New coaches are delivered with the sump and fresh water tanks empty. Fill with water before putting the coach in service.

FLUID LEVEL VERIFICATION

Periodic inspection of oil and fluids levels is the most economical and easiest way to help your vehicle perform at its best. Rigorous oil level inspection and replacement will greatly help minimize expensive and unscheduled repairs.

ENGINE OIL LEVEL

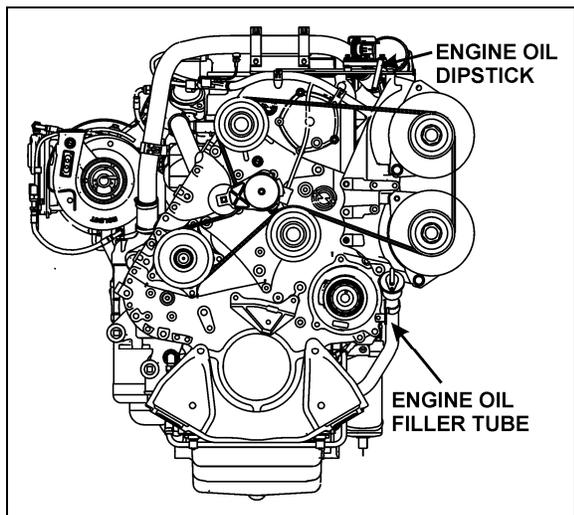
Check engine oil level when engine is still warm and with vehicle parked on a level surface. Shut *OFF* engine and wait at least 10 minutes for oil to drain into oil pan before checking. Check engine oil level daily or before each trip. Add oil as required. Do not overfill. Remove dipstick, wipe clean and fully reinsert to ensure an accurate reading. Remove dipstick and check engine oil level.

DDC Series 60 Engine

The oil level must be maintained between the two marks indicated on the dipstick. **Do not** let the oil level drop below the L mark. Add oil by opening the oil reserve tank drain cock or through the oil filler pipe. Use the markings on the tank to check the quantity of oil added. Close the oil reserve tank drain cock or oil filler cap after adding oil. Recheck the oil level. Do not let the oil level go above the F mark on the dipstick.



ENGINE OIL LEVEL DIPSTICK 01027

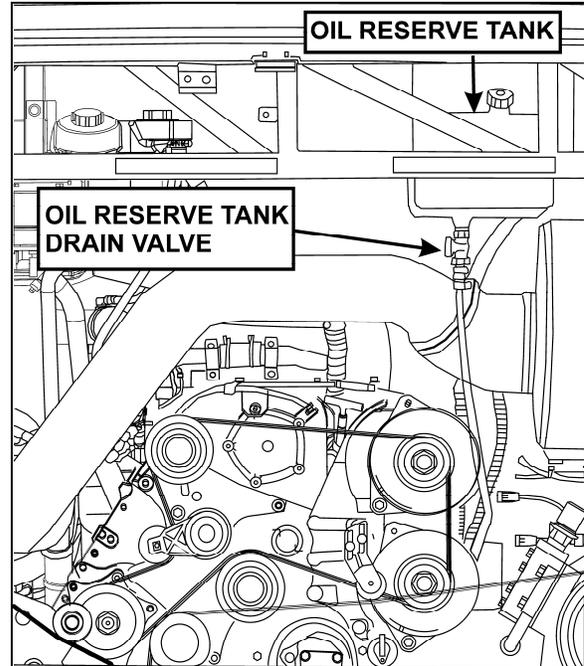


ENGINE COMPARTMENT 01190



CAUTION

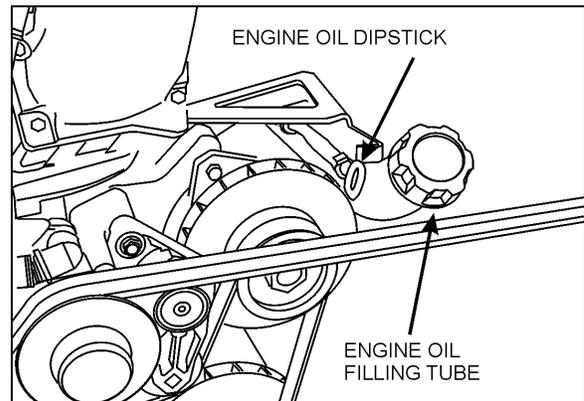
Keep engine oil level between "L" and "F" on dipstick. Do not overfill. Check when refueling.



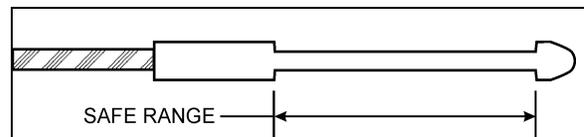
ENGINE OIL RESERVE TANK 01188

Volvo D13 Engine

Do not let the oil level fall below the marking on the dipstick. **Do not** overfill so the level is above the upper marking on the dipstick. Add oil through the oil filler pipe as required in order to maintain level within the safe range



ENGINE BOIL DIPSTICK - VOLVO D13 ENGINE 01192



VOLVO D13 ENGINE OIL LEVEL DIPSTICK 01195

118 Care and Maintenance

TRANSMISSION OIL LEVEL

 **DANGER**

To prevent personal injury, do not service transmission wearing loose clothing. Stand clear of the engine and rotating components while checking the oil level.

 **CAUTION**

Do not mix fluid types or brands because of possible incompatibility.

 **CAUTION**

Use clean fluid and containers when filling transmission. Never use containers that have contained water or anti-freeze (Glycol).

Allison Automatic Transmission Oil Level

Transmission fluid level may be checked using dipstick or transmission control pad display. For more information on how to use the shift selector display to check the transmission oil level, refer to Appendix C under "Allison transmission oil level check using the pushbutton shift selector" in this manual.

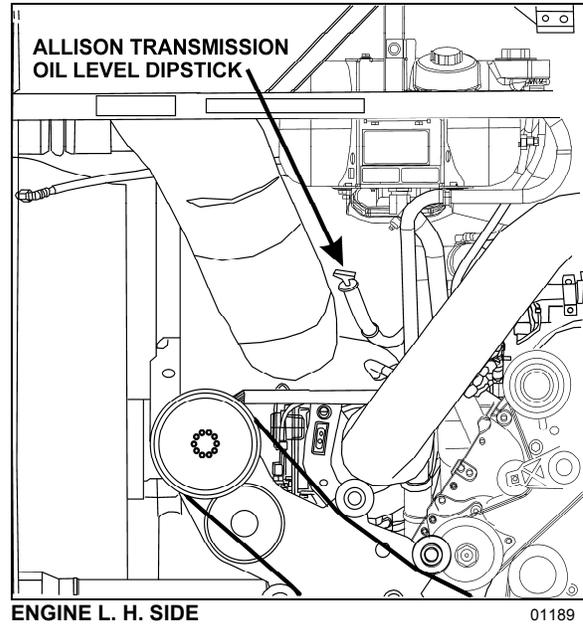
The transmission fluid level dipstick is accessible through the engine compartment rear door and is located on the left side of the engine.

To check the transmission fluid level, a "cold check" and a "hot check" must be performed. A cold check must be made when the transmission fluid is between 60°F and 120°F (16°C and 50°C).

NOTE

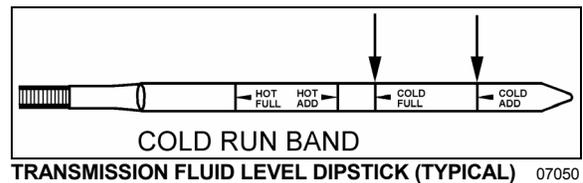
Perform the cold check first to verify the transmission fluid level before performing the hot check.

To prevent dirt and foreign matter from entering the transmission, clean the end of the oil fill tube before removing dipstick. To remove dipstick, unscrew filler cap approximately three turns and pull out dipstick.



- **Cold Check**

Run the engine until the transmission fluid temperature is between 60°F and 120°F (16°C and 50°C). With the engine idling, make sure the parking brake is applied and the transmission is in neutral (N). Remove and wipe the dipstick with a clean cloth. Check oil level. If the oil level is within the COLD RUN band, the oil level is correct and a hot check can be performed. If the oil level is on or below the lower line of the COLD RUN band, add oil until the level lies within the COLD RUN band. If the oil level is above the COLD RUN band, drain oil until the level is within the band.



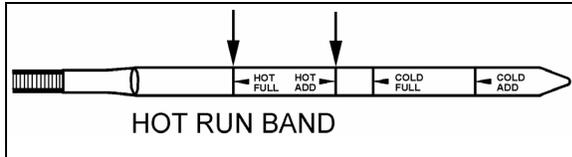
 **CAUTION**

The oil level rises as oil temperature rises. Do not add oil above the "cold run" band before the transmission reaches 180°F to 220°F (82°C to 104°C).

- **Hot Check**

Make sure the transmission fluid temperature is between 180°F and 220°F (82°C and 104°C) before performing the hot check. Run the engine

between 1,000 and 1,200 RPM for approximately one minute to purge air from the system. With the engine idling and the parking brake applied, shift transmission from forward (D) to reverse (R) and back into neutral (N) to fill clutch cavities with oil. Remove and clean dipstick, then check oil level. If the oil level is on or under the lower HOT RUN line, add just enough oil to bring up the level to the middle of the HOT RUN band.



TRANSMISSION FLUID LEVEL DIPSTICK (TYPICAL) 07049

Replace dipstick and tighten the filler tube cap until the rubber seal is correctly seated.

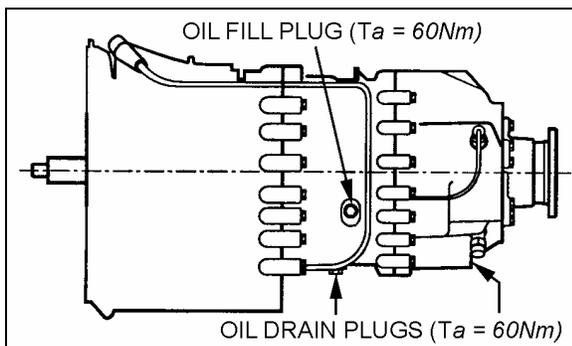


CAUTION

Do not overfill transmission fluid reservoir. Severe damage may result.

ZF-ASTRONIC Transmission Oil Level

- Vehicle should be on horizontal ground when oil is changed;
- Do not check oil level straight after a journey (incorrect measurement). Undertake the check once the transmission oil has cooled down (lower than 104°F or 40 °C);
- Remove oil fill plug;
- Add oil through the oil filling point if the oil level has fallen below the oil filling point;
- Approximately 11 liters is needed for a complete oil change;



ZF TRANSMISSION FILLING POINT

07111

- The oil level is correct once the top of the oil has reached the bottom of the filling point or

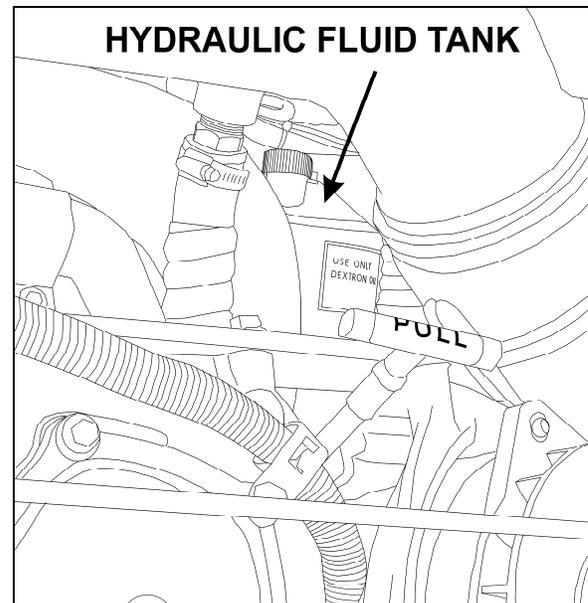
once oil has already started to escape from the filling point.

POWER STEERING FLUID LEVEL

The coach is equipped with a power steering system. The hydraulic fluid tank is located in the engine compartment behind the engine air intake pipe and above the alternators.

Check fluid level as follows:

1. Stop engine, open engine compartment doors and place rear start switch to *OFF* position;
2. Unscrew and remove the dipstick located on top of the fluid tank and wipe with a clean rag;
3. Replace dipstick in tank, then remove to check fluid level;
4. Add hydraulic fluid until it reaches the FULL mark on the dipstick (use Dexron II, Dexron IIE, Dexron III or Mercon fluid type);
5. Replace and tighten dipstick;
6. Place engine rear start switch to *NORMAL* position. Close engine compartment doors.



ENGINE COMPARTMENT

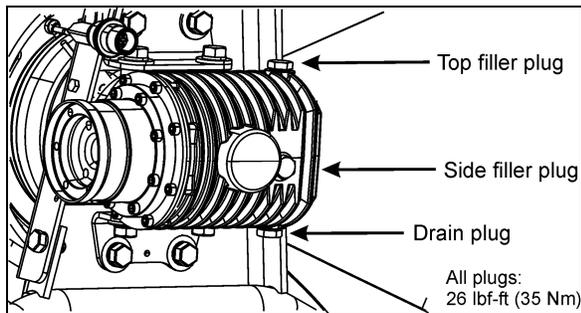
14059

COOLING FAN RIGHT ANGLE GEARBOX OIL LEVEL

Check cooling fan right angle gearbox oil level as follows:

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1. Stop engine, open engine compartment doors and place engine rear start switch to *OFF* position;
2. Remove side oil filler plug;
3. Add oil through the top or side oil filling point if the oil level has fallen below the side oil filling point;
4. The oil level is correct once the top of the oil has reached the bottom of the side oil filling point or once oil has already started to escape from the side oil filling point;
5. Replace the seal and screw the side and top filler plugs back in;
6. Place engine rear start switch to *NORMAL* position. Close engine compartment door.



RIGHT ANGLE GEARBOX OIL LEVEL CHECK 05118

DRIVE AXLE WHEEL BEARING OIL LEVEL

Drive axle wheel bearings are lubricated by the differential oil. Maintain differential oil at correct level to ensure adequate lubrication of drive axle wheel bearings at all times.

FRONT AND TAG AXLE WHEEL HUBS

The unitized hub bearings used on the NDS range of axles, are non-serviceable items. Bearings are pre-adjusted, lubricated and have seals fitted as part of the manufacturing process. The bearings are greased for life and there is no need or facility for re-lubrication.

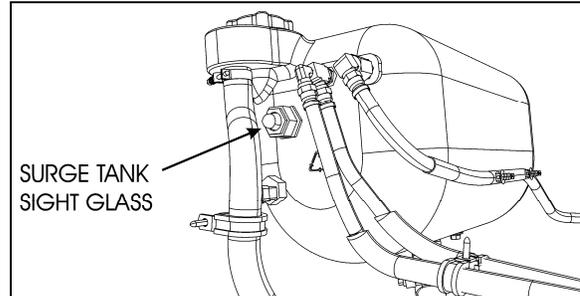
COOLANT FLUID LEVEL

Coolant level is correct when coolant is visible through the surge tank sight glass when cold. Fill the tank as necessary with the same 50/50 water-antifreeze mixture normally used. **Do not** mix two different types of coolant. Refer to the Maintenance Manual for proper coolant type specifications or see the label affixed near the coolant surge tank on the vehicle.



CAUTION

On Volvo D13 engine, use **only** Extended Life Coolant (ELC). **Do not** add supplemental coolant additives (SCA) to extended life coolant. **Do not** use a coolant filter containing Supplemental Coolant Additives (SCA).



COOLANT LEVEL SIGHT GLASS

05094

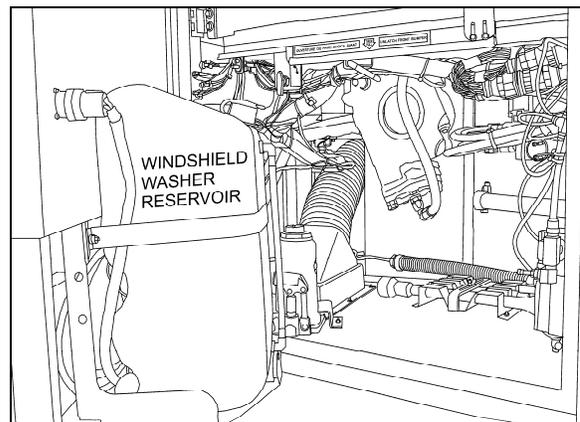


WARNING

Hot engine coolant is under high pressure. Allow engine to cool down before adding coolant.

WINDSHIELD WASHER & HEADLIGHTS WASHER RESERVOIRS

The windshield washer reservoir and headlights washer reservoir are located in the front service compartment door. The windshield washer reservoir has a capacity of 5.3 US gallons (20 liters) while the headlights washer reservoir has a capacity of 2.6 US gallons (10 liters). Check fluid level regularly.



WINDSHIELD WASHER RESERVOIR

18619

The windshield spray jets are located on the windshield wipers and are angled to spray towards the center of the windshield.

Adjust the headlights washer nozzles according to the instructions found in section 23 of the maintenance manual. You may use water or windshield washer fluid as well.



CAUTION

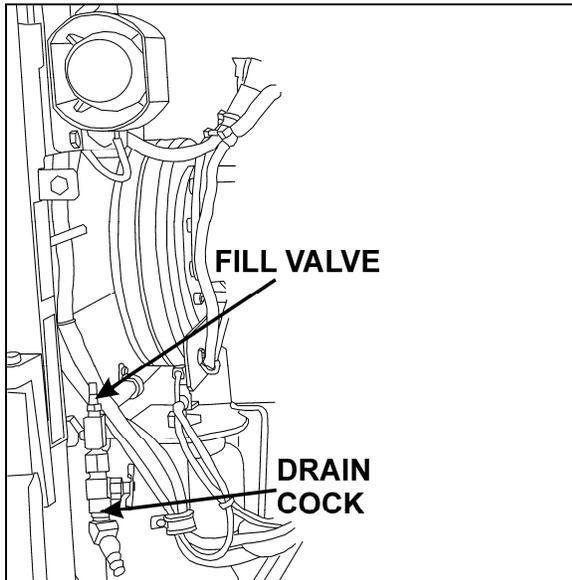
During cold weather days, use windshield washer fluid suitable for freezing temperature only.

OTHER VERIFICATIONS

It is good practice to regularly inspect the vehicle for signs of component wear and to perform safety and maintenance routines.

AIR TANK PURGE

The vehicle may be equipped with up to six air tanks. Purge accessory and wet air tanks before each trip. The primary and secondary air tanks must be purged at every oil change. Oil changes should be scheduled at least every 12,500 miles (20 000 km).



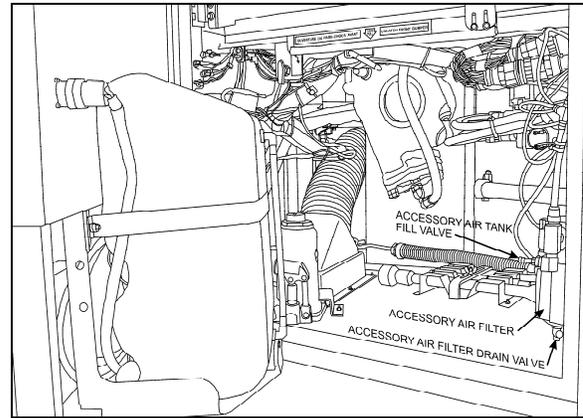
ENGINE COMPARTMENT R. H. SIDE

12211

The accessory air tank drain cock is accessible from the front service compartment.

The wet air tank drain cock is accessible from the engine compartment. All air tanks are equipped with a drain cock underneath the tank. Refer to the "Lubrication and Service Check Point Chart" in this chapter for tank locations.

Drain tanks by turning cocks counterclockwise.



FRONT SERVICE COMPARTMENT

12210

FIRE EXTINGUISHERS

Inspect fire extinguishers monthly to insure operation in emergency situations.

On extinguishers with a pressure gauge, the needle should be in the green or *NORMAL* range. Refill or replace extinguisher if pressure is below normal;

Check that seal on handle is intact;

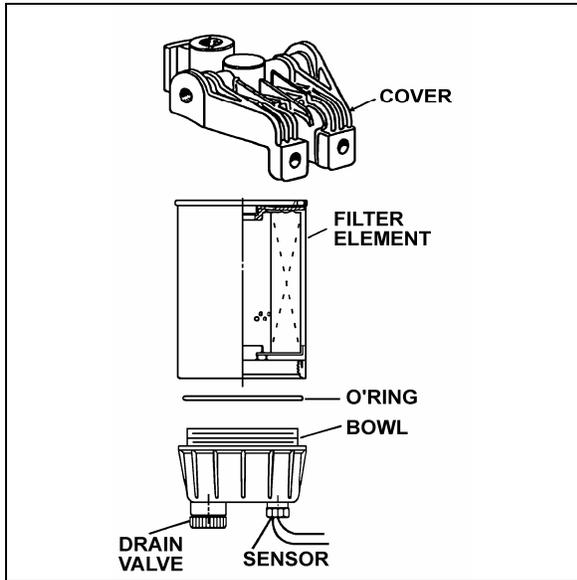
Check that hose nozzle is in good condition and the nozzle is free of obstructions;

Keep fire extinguishers clean.

PRIMARY FUEL FILTER

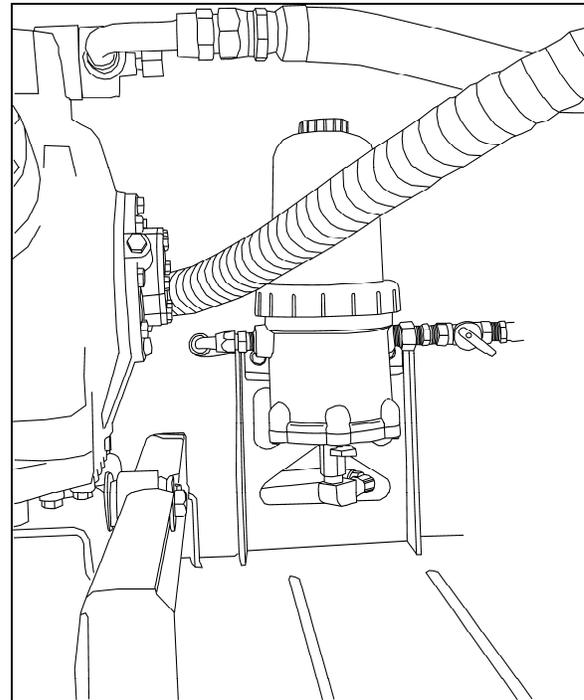
A primary fuel filter is installed on the engine. This filter may consist of a filter cartridge with a drain valve at the bottom, or a filter cartridge, a water separation bowl and may have a fuel heater built in. It is used to prevent water from entering the fuel system. The primary fuel filter should be drained periodically or when the telltale light on the dashboard illuminates if equipped with this system. To drain water, loosen the drain valve below the separator. Close the drain valve when finished.

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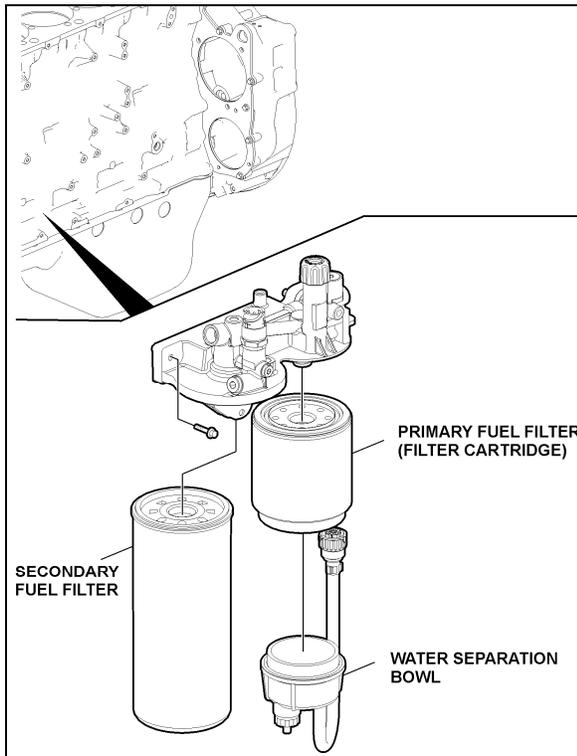
FUEL FILTER/WATER SEPARATOR

03025



DAVCO FUEL PRO 382 INSTALLATION

03062



FUEL FILTERS WITH VOLVO D13 ENGINE

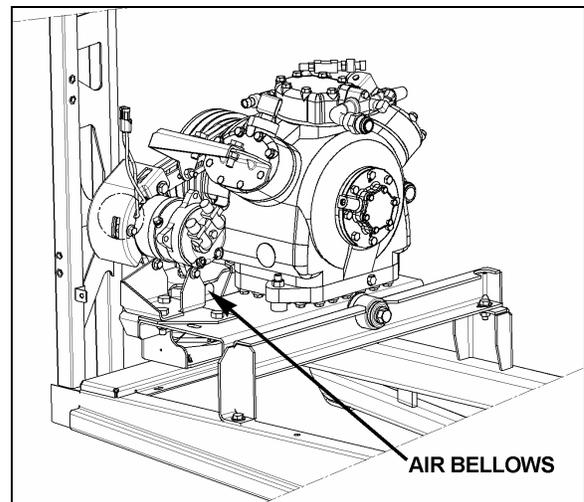
03085

The optional Fuel Pro 382 diesel fuel filter system consists of a permanently mounted fuel processor, a replaceable filter element, a filter element cover and collar and a fluid filter base assembly. This system is installed between the fuel tank and the fuel pump and replaces the primary fuel filter. The filter serves as a water separator as well as a fuel filter. To drain, turn $\frac{1}{4}$ turn the drain valve below filter, close when water has been flushed out.

A/C COMPRESSOR BELT TENSION ADJUSTMENT

The air conditioning compressors are driven by V-belts.

Belt tensioning is applied through air bellows which are adjusted by an air pressure regulating valve mounted in the engine compartment, right behind the belt tensioning pressure control valve. The correct pressure of 35 psi (241 kPa) is set at the factory. Periodically verify the pressure at the regulating valve using a pressure gauge and correct if necessary.

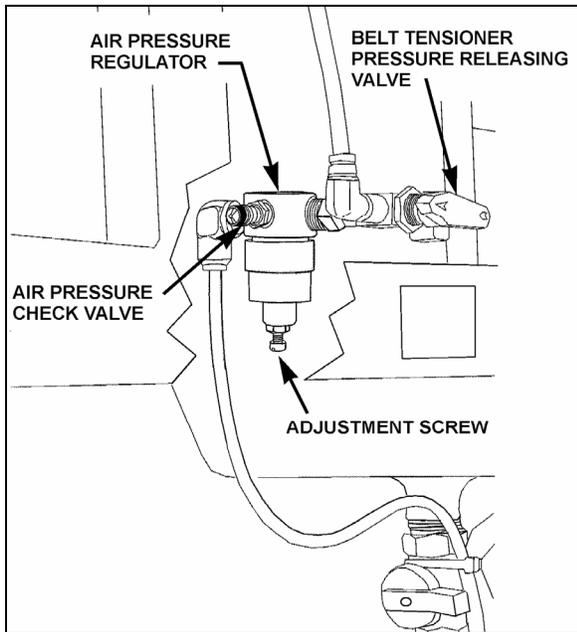


AIR BELLOWS

01069

For belt replacement, air pressure must be released from bellows by means of the belt tensioning pressure control valve. This valve, mounted close to the pressure regulating valve, is manually operated. Before handling, set the rear start switch to OFF and observe all applicable safety precautions.

- Refer to the Parts Manual, Maintenance Manual or "Service Bulletins" for recommended belt sizes and tension settings;
- Periodically inspect belt and pulleys for wear or damage;
- Do not treat belts with any compounds. Keep belts dry.



PRESSURE REGULATING VALVE 12200

FAN AND ALTERNATOR DRIVE BELTS

These belts have automatic belt tensioner to keep the correct tension without adjustment.

BACK-UP CAMERA

The optional back-up camera is located on the rear cap. To clean the camera's protective glass, spray with soapy water. Wipe with a clean damp rag or wiper blade.



WARNING

To avoid injury, do not clean camera with transmission in reverse (R). Shut off engine and apply parking brake before cleaning.



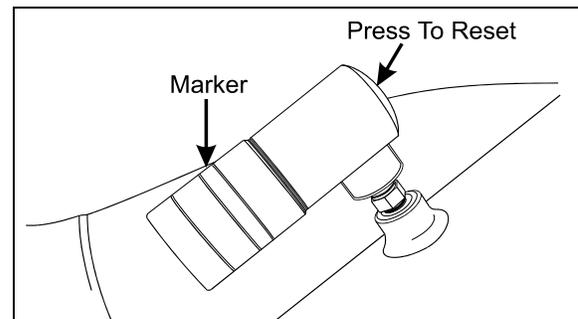
CAUTION

To prevent scratches to the camera protective glass, do not wipe with dry rag. Use a clean damp rag.

AIR FILTER RESTRICTION INDICATOR

A filter restriction indicator (optional) is used to monitor the vacuum level between the air filter and engine. A red marker is displayed when the air filter is clogged. Replace the air filter when a red marker is displayed or after a maximum of two years. Reset by pressing on the indicator's extremity.

The filter restriction indicator is located on the engine air intake duct



AIR FILTER RESTRICTION INDICATOR 01052

A/C AND HEATING SYSTEM AIR FILTERS

For maximum air conditioning and heating system efficiency, air filters should be inspected and cleaned as required in maintenance schedule to ensure proper ventilation of the evaporator and heating radiator cores. To clean filters, back flush with water, then dry with air.



CAUTION

Do not use high pressure water jet to avoid damaging filter.



CAUTION

Be sure not to reverse filter upon installation.

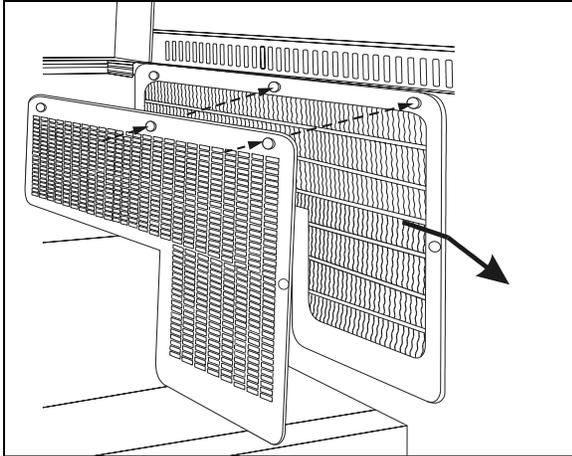
Driver's Area Air Filters

The driver HVAC system's air filters are located behind the R.H. console. To gain access to the A/C filters, unscrew the grill located at the top step of the entrance door steps. Remove the filters for cleaning or replacement.

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NOTE

If the windshield is continuously fogged, check that the driver's air filter is not clogged.

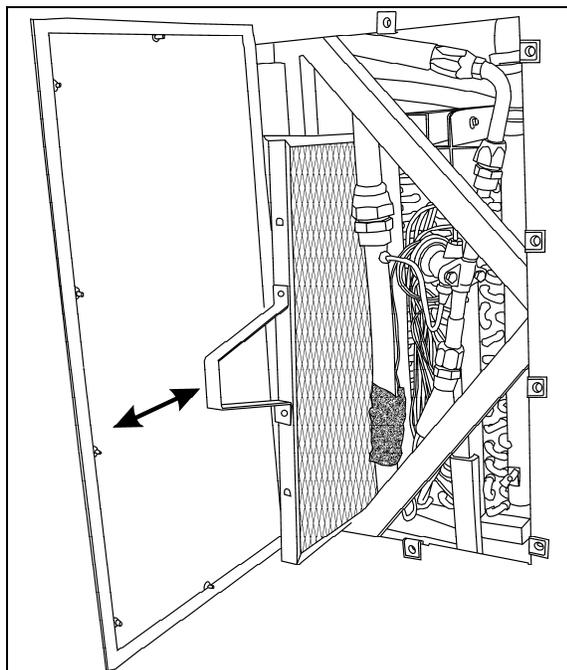


DRIVER'S AREA AIR FILTER REMOVAL

22193

Passengers Area Air Filter

The central HVAC system's air filter is located in the evaporator compartment on driver's side of the vehicle. To access, open the baggage compartment forward of the evaporator compartment. An access door held shut by six retaining screws is located in the wall separating the baggage compartment and the evaporator compartment. Slide out the filter for maintenance purposes.



PASSENGERS AREA AIR FILTER REMOVAL

22306

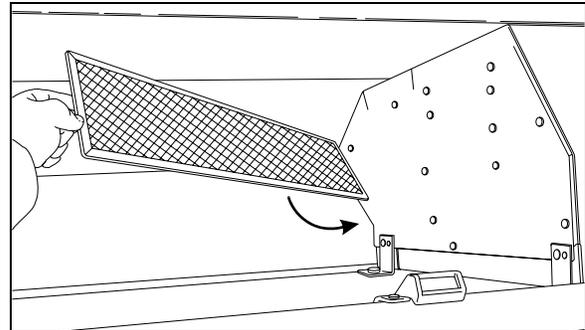


CAUTION

Be sure not to install filter in inverted position.

Air Filters in the Overhead Compartments

Remove, clean or replace the air filter located behind each overhead baggage compartment fan.



OVERHEAD COMPARTMENT FAN AIR FILTER

22201

HOSE INSPECTION

Inspect hoses for leaks regularly to ensure efficient, economical and safe operation of the engine and related equipment. Carefully inspect all fittings, clamps and ties. To prevent chafing, make sure hoses are not touching shafts, couplings, heated surfaces, sharp edges or other parts. Since hose clamps and ties can vibrate loose or fail over time, inspect frequently and tighten or replace as necessary.

Correct leaking hoses immediately. Failure to correct leaks can cause severe damage to the equipment, as well as increase operating costs due to lost fluids. Treat fuel and oil leaks as an immediate fire hazard.



WARNING

Personal injury and property damage may result from fire caused by leaking flammable fluids.

Hose Service Life

Hoses have a limited service life. Thoroughly inspect hoses annually. Look for surface damage or indications of twisted, worn, crimped, cracked or leaking lines. Replace damaged hoses immediately.

Hoses should be replaced during major overhaul or after a maximum of seven years service. Be

certain replacement hoses match the original equipment manufacturer's specifications.

LUBRICATION

Grease all lubrication points during scheduled maintenance. For heavy loads or extended use, lubricate more often. Refer to the Maintenance Manual, section 24 for information on lubrication.

WHEELS AND TIRES

Check for loose wheel nuts. Inspect all types of rims for cracks. Cracks can appear in many places but typically radiate out from where a load is applied. Both aluminum alloy and steel wheel nuts should be tightened to 450 to 500 foot-pounds (610 to 680 N.m.) torque.

Keep the tires inflated to the recommended inflation pressure to prolong tire life and for safety.

NOTE

Recommended tire inflation pressures are given in the "Coach Final Record", placed in the technical publications package supplied with the vehicle. The cold tire inflation pressures are on the Department of Transport certification plate located on the L.H. console besides the driver's seat. When special tires are installed by Prevost on a new vehicle, a special tire inflation chart is added next to the certification plate.



WARNING

Do not exceed maximum inflation pressure. Incorrect tire pressure increases tire wear and could lead to loss of driving control because of reduced road handling. Check tire pressure regularly.

- Vehicles equipped with BERU TPMS

On vehicles equipped with the Beru Tire Pressure Monitoring System (TPMS), it is better to use the TPMS display as the primary reference to judge when tire pressure need adjustment.

The TPMS presents pressure readings of each tire as a +/- deviation from the wanted target.

If a tire reads within +/- 3 PSI no adjustment is needed.

If a tire reads -4 PSI and below, re-inflate by the marked amount.

If a tire reads +4 PSI and above, deflate by the marked amount.

Relying on the TPMS system is better than relying on a hand gage since the TPMS is temperature compensated and remain accurate no matter if the tires are cold or hot.

Tires take up to 3 hours to get down to ambient temperature after a ride. A common mistake consist of checking pressure while the tires have not fully cooled down which leads into under-inflated tires. Relying on the TPMS eliminate this mistake.

Running tires at optimal pressure reduce tire wear, improve safety and fuel economy.

NOTE

It is more accurate to use the TPMS display to set the tire pressures than a pressure gauge.

WHEEL BEARINGS

Check wheel bearing cover for overheating (especially after using the service brakes) during fuel stops by touching the wheel bearing cover.



WARNING

If replacement tires are different from those described on the certification plate, pressure must be adjusted as requested in the Tire and Rim Association Manual.

SERVICE BRAKE TEST

Check for correct pressure build-up. Stop engine and check pressure gauge Pressure loss should be imperceptible with engine stopped and without brake pedal applied. Air loss should not exceed 3 psi/minute (21 kPa/minute) with engine stopped and brake pedal fully applied.

PARKING BRAKE TEST

Release parking/emergency brake. Pump service brake pedal until air pressure drops to 65 psi (448 kPa). Make sure the warning buzzer operates and that the emergency brakes apply (the control valve knob lifts up). Allow air pressure to reach 95 psi (655 kPa) before releasing parking brake.

Driving the vehicle while the parking brake is applied should not be possible.

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EXTERIOR LIGHTING VERIFICATION

Exterior Lighting Test Mode

This useful function allows quick verification of the vehicle exterior lights.

- **Activating the test mode:**

When the vehicle is stationary (parking brake applied), pull up the multi-function lever 3 times within 3 seconds to activate the test mode. This test can be done when the engine is not running providing that the battery charge is sufficient (above 24.0 volts).

The telltale panel alarm emits a sound each second to remind that the test mode is in progress.

- **Stopping the test mode:**

To stop the test mode, pull up the multi-function lever once or turn the ignition OFF or remove the parking brake.

IMPORTANT NOTE

The test mode is useful to check the functioning of the multiplex outputs and the exterior lights. It doesn't test the functionality of the commands related to the exterior lighting. For a complete testing, the directional signal commands, the headlights commands and the brake pedal have to be checked before. Once these commands tested, activate the test mode to check the exterior lighting.

- **Using the test mode:**

First, test the functionality of the commands related to the exterior lighting:

- Activate the right directional signal and check that the corresponding telltale light illuminates.
- Activate the left directional signal and check that the corresponding telltale light illuminates.
- Press on the brake pedal and check that the STOP telltale light illuminates.

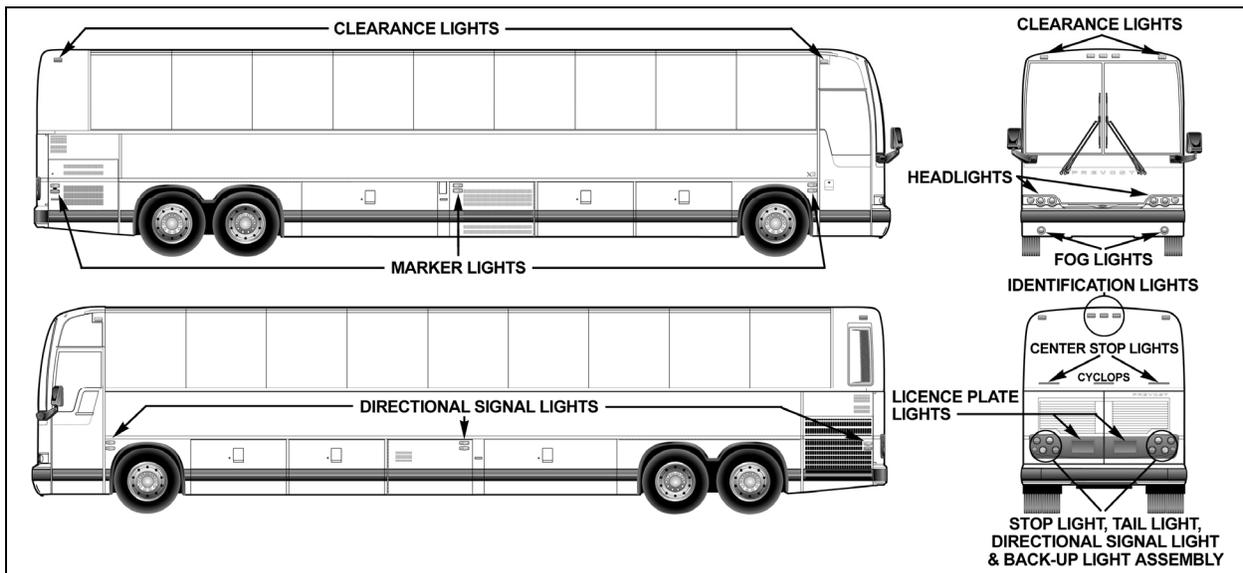
Once these commands tested, activate the test mode to check the exterior lighting by pulling up the multi-function lever 3 times within 3 seconds.

Go to the front of the vehicle and check the lights:

- First the left and right directional signals.
- Identification lights and clearance lights.
- Low beams.
- High beams.

Go to the left side of the vehicle:

- Directional signals.
- Marker lights.
- Directional signals.
- Marker lights.



VARIOUS LIGHTS LOCATION

Go to the rear of the vehicle:

- Directional signals.
- Identification lights and clearance lights.
- Stoplights and taillights.
- Back-up lights and back-up alarm (option).

IMPORTANT NOTE

To check the back-up lights and back-up alarm, you must flip the starter selector switch to REAR START position. (If the engine is running, do this quick enough so that the engine does not stop).

Go to the right side of the vehicle (same sequence as left side).

FIRST SERVICE ON NEW VEHICLE

NOTE

Refer to Maintenance Manual for precise service schedule.

ENGINE OIL

Preliminary oil change is not required since the engine has been test-run at the factory. Change oil and filter as specified in Section 24 of the Maintenance Manual.

COOLANT SYSTEM FILTER

The coolant system filter is designed to recover the soldering residues trapped inside the coolant lines during their initial assembly. Clean filter after first 3,000 miles (5 000 km) and then every 50,000 miles (80 000 km). Refer to the Maintenance Manual under section 05: Cooling System.

NOTE

If soldering has been performed on cooling system, clean filter after 3,000 miles (5 000 km).

GENERAL RECOMMENDATIONS

- Understand basic principles of vehicle operation;
- Always maintain the vehicle in good running condition;

- Do not drive with low fuel. If the fuel tank runs dry, the engine will not start until the air is bled from the fuel system. Refer to "Maintenance Manual" for more information;
- Allow engine to run for at least two minutes at normal idle before shutting OFF;
- Engine should be at idle when shifting from neutral (N) to forward (D) or from neutral (N) to reverse (R);
- The automatic transmission does not have a park (P) position. Place transmission in neutral (N) position and apply parking brake when the vehicle is stopped. A warning buzzer will sound if the engine is stopped and the parking brake has not been applied when foot pressure is removed from the brake pedal;
- Always follow the procedures described in this manual;
- Unless stated otherwise, shut OFF the engine before performing all servicing, lubrication and maintenance tasks;
- Do not attempt to push or pull-start the coach;
- The vehicle may be damaged if towed with the axle shafts or driveshaft connected;
- Two chemical fire extinguishers are under the first row of passenger seats. In case of fire, immediately evacuate all occupants. Occupant safety is the first priority. Do not attempt to extinguish the fire if there is immediate danger or risk for personal injury;
- When driving on ice and snow, accelerate and decelerate gradually;

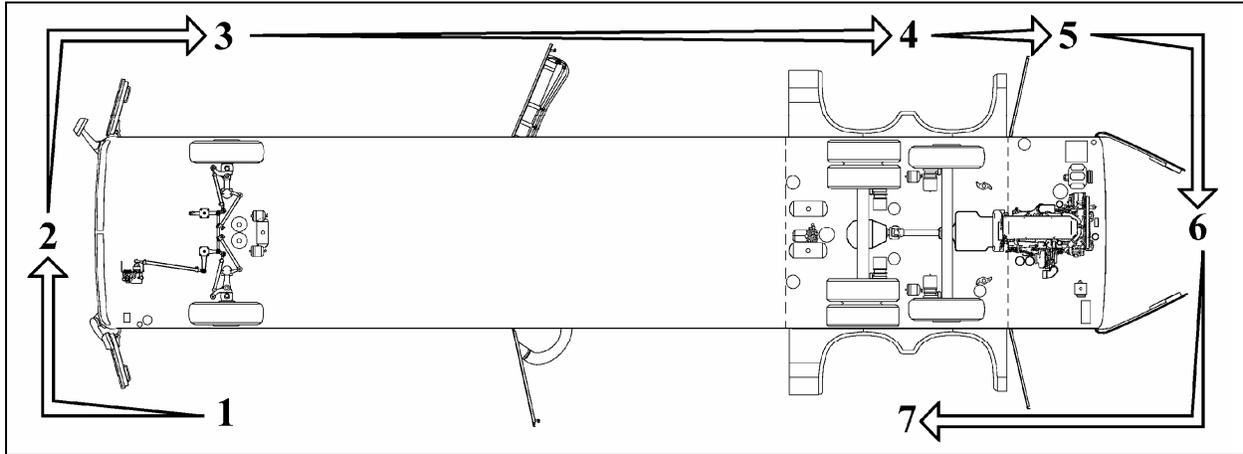


WARNING

Report all problems affecting passenger or driver safety to a Prevost service center or an authorized service center. Have problems corrected immediately.

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WALK-AROUND INSPECTION (BEFORE EVERY TRIP)



NOTE

Inspect the coach in a circular manner as shown in the illustration.

Approaching the Coach

- Check under the coach for oil, fuel, coolant leaks or other signs of damage.
- Check exterior body surfaces for signs of breaks or damage.
- Check that baggage and service compartment doors are properly closed.

Preparation

- Drain accumulated water from accessory and wet air tanks.
- Close air tank drain valves.
- Start the engine and let the air pressure build up to normal. Stop engine.
- Switch on hazard warning flashers.
- Make sure parking brakes are applied.

Step 1: Front Left Side of the Coach

- Check condition of wheel rim. Especially look for cracks, missing nuts, bent or broken studs.
- Check condition of tire: properly inflated, no serious cuts, bulges, tread wear or any signs of misalignment; valve stem not touching wheel or rim; valve cap in place.
- Check windshield and headlights washer reservoir fluid level and add if necessary.

Step 2: Front of the Coach

- Check for damage and clean if dirty.
- Check windshield wiper arms for proper spring tension.
- Check wiper blades for any damage, “dead” rubber and attachment to arm.
- Check clearance and identification lights, they should be clean, operating and of the proper color. Refer to “Exterior Lighting Verification” in Care and Maintenance chapter.
- Turn on headlights. High and low beams should be operating and lenses clean. If equipped, check fog lights. Refer to “Exterior Lighting Verification” in Care and Maintenance chapter.
- Left and right front turn signal lights clean, operating and proper color. Refer to “Exterior Lighting Verification” in Care and Maintenance chapter.

Step 3: Front Right Side of the Coach

- Check condition of wheel rim. Especially look for cracks, missing nuts, bent or broken studs.
- Check condition of tire: properly inflated, no serious cuts, bulges, tread wear or any signs of misalignment; valve stem not touching wheel or rim; valve cap in place.

Step 4: Rear Right Side of the Coach

- Check condition of wheels and rims. Especially look for cracks, missing nuts, bent or broken studs.
- Check condition of tires: properly inflated, no serious cuts, bulges, tread wear or any signs of misalignment; valve stems not touching wheels or rims; valve caps in place and no objects stuck between the wheels.

Step 5: Engine Compartment Right Side Area

- Check engine and surrounding areas for coolant, oil and fuel leaks.
- Check fuel/filter water separator and drain if necessary. Check for leaks.
- If so equipped, check coolant heater system for fuel leaks.
- Check wiring harness for signs of damage.

Step 6: Engine Compartment

- Check engine and surrounding areas for coolant, oil and fuel leaks.
- Check wiring harness for signs of damage.
- Check condition of drive belts.
- Check engine crankcase oil level, add if necessary.
- Check Allison transmission fluid level (can also be checked from push-button shift selector), add if necessary.
- Check power steering reservoir fluid level, add if necessary.
- Check coolant surge tank fluid level, add if necessary.
- Check air cleaner restriction indicator, replace air cleaner when red signal locks in full view.
- Check stop light, tail light, directional signal light and back-up light assembly; operating, clean and proper color. Refer to "Exterior Lighting Verification" in Care and Maintenance chapter.

Step 7: Rear Left Side of the Coach

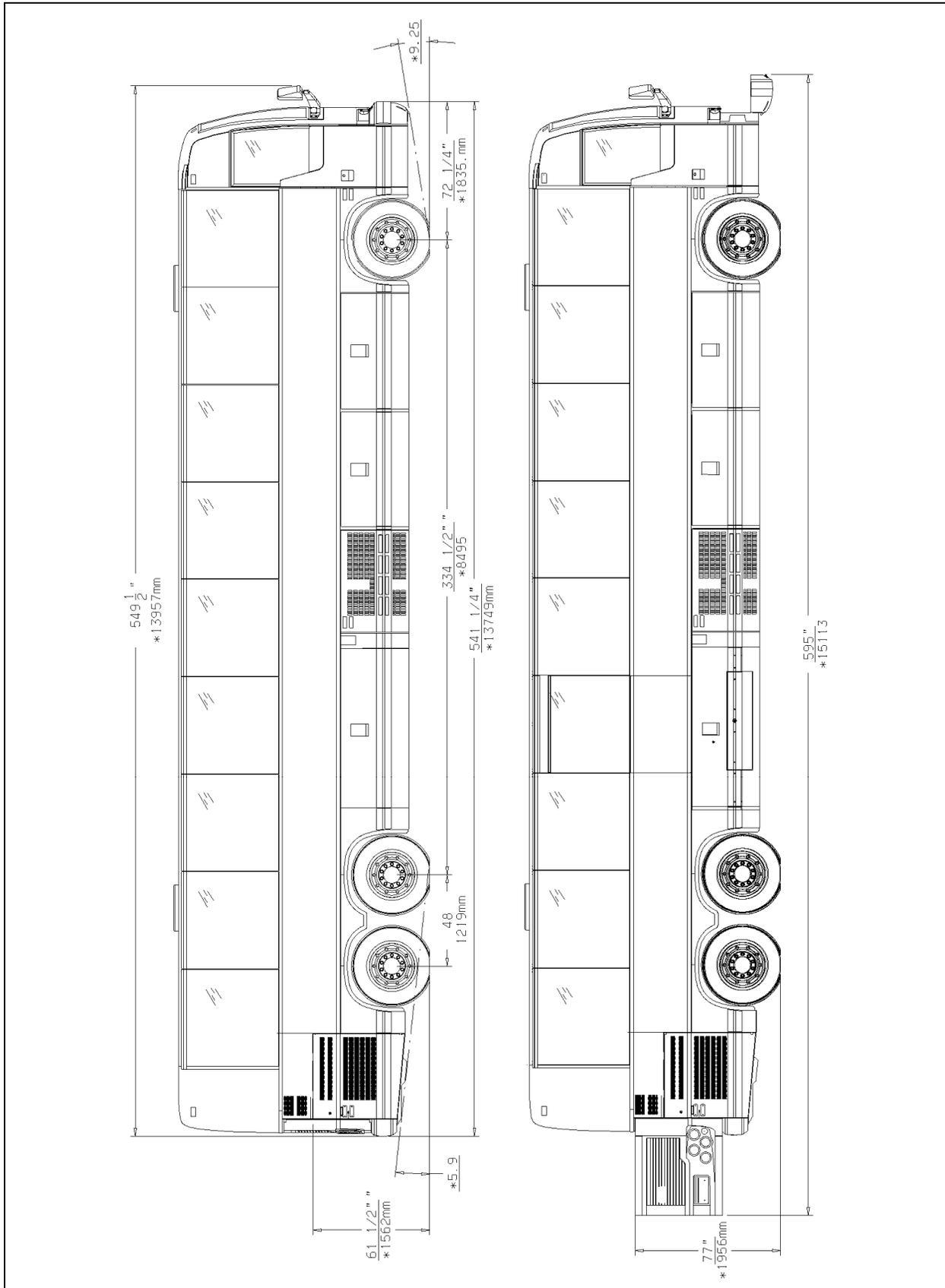
- Check condition of wheels and rims. Especially look for cracks, missing nuts, bent or broken studs.
- Check condition of tires: properly inflated, no serious cuts, bulges, tread wear or any signs of misalignment; valve stems not touching wheels or rims; valve caps in place and no objects stuck between the wheels.

Inside the Coach

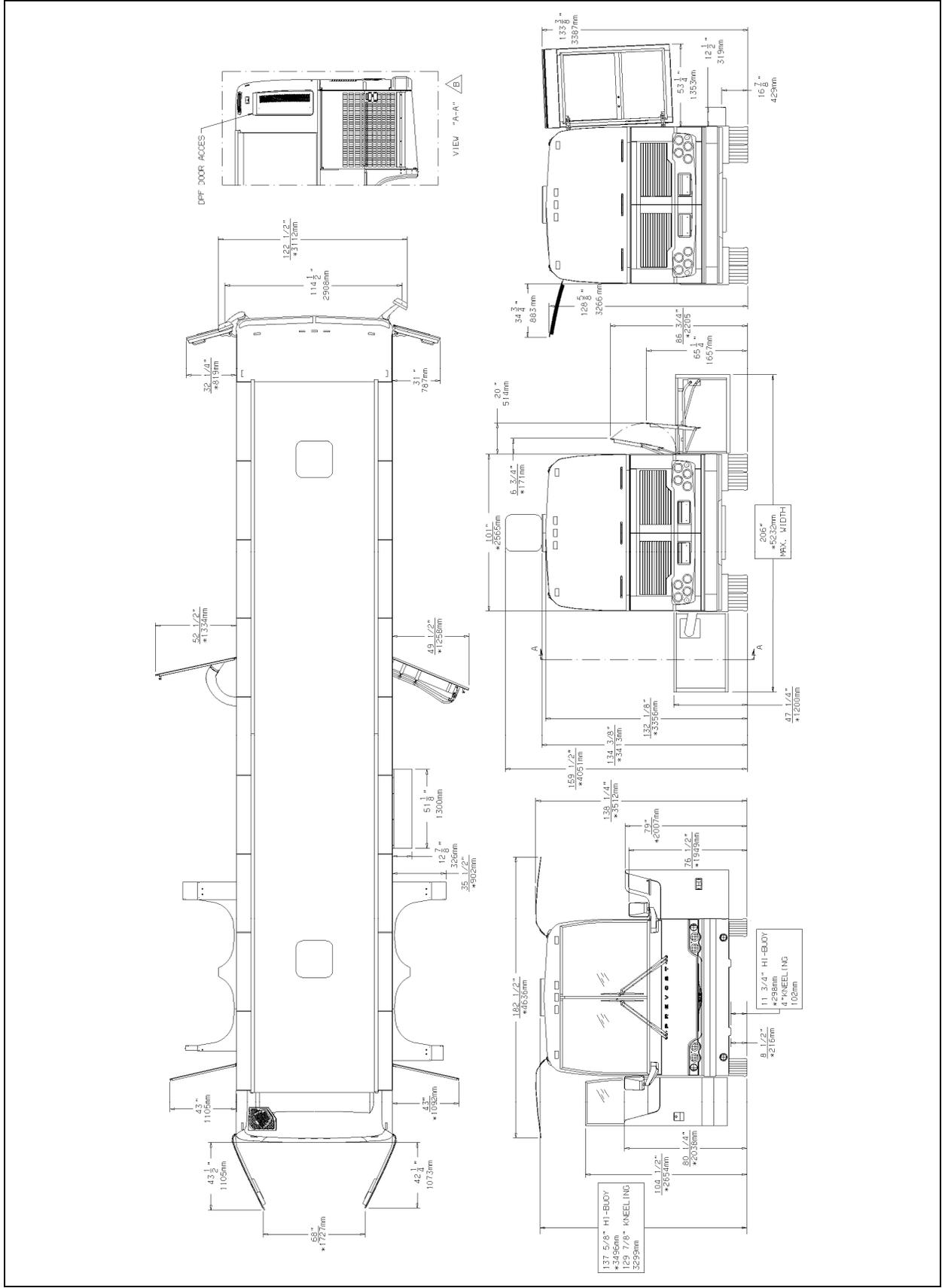
- Check for proper operation of the entrance door.
- Check steps; clean them if there is any substance that makes them slippery, which makes coach entry/exit hazardous.
- Check that emergency exit windows and roof escape hatches can be opened then close all windows and hatches securely.
- Verify proper operation of windshield wiper/ washer.
- Adjust and clean mirrors for adequate rear view vision.
- Start engine and check for proper operation of all gauges and indicator lights.
- Check for proper operation of electric and air horns and back-up alarm.

Perform a brake test. Check both primary and secondary pressure gauges

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X3-45 OVERALL DIMENSIONS (SIDE ELEVATION)



X3-45 OVERALL DIMENSIONS (TOP, FRONT AND REAR VIEWS)

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DIMENSIONS AND WEIGHTS	X3-45
Overall length (including bumpers)	45' (13,7 m)
Overall width	102" (2,59 m)
Overall height	134 3/8" (3,413 m)
Wheelbase (center of front axle to center of drive axle)	340" (8,64 m)
Floor height from ground	48 1/2" (1,23 m)
Ground clearance	11" (280 mm)
Step height from ground	15" (380 mm)
Step height (other steps)	7" (178 mm)
Headroom	80" (2,03 m)
Entrance door opening width	30" (762 mm)
Front overhang	70 3/4" (1,80 m)
Rear overhang	107 1/2" (2,73 m)
Front track	85.9" (2,18 m)
Drive track	76.7" (1,95 m)
Rear track (Tag axle)	83.6" (2,12 m)
Turning circle radius (I-Beam Axle)	47'-3" (14.4 m)
Turning circle radius (independent suspension)	43'-9" (13.3 m)
Curb weight	36,000 lb (16 327 kg)
Gross Vehicle Weight Rating (G.V.W.R.)	49,600 lb (22 498 kg)
Front axle Gross Axle Weight Rating (G.A.W.R.)	16,500 lb (7 500 kg)
Drive axle (G.A.W.R.)	23,000 lb (10 455 kg)
Tag axle (G.A.W.R.)	12,600 lb (5 727 kg)

The Gross Vehicle Weight Rating (G.V.W.R.) and the Gross Axle Weight Rating (G.A.W.R.) for front, drive and tag axles are listed on a certification plate located on the L.H. control panel in driver's section.

CAPACITIES	X3-45
DDC S60 Engine oil (in crankcase)	41 U.S. qts (39 l)
Volvo D13 Engine oil (in crankcase)	38 U.S. qrts (36 l)
Engine oil (in reserve tank)	8.4 U.S. qts (8,0 l)

CAPACITIES	X3-45
Fuel tank (legal capacity equal to 95% of volume)	208 U.S. gal. (787 l)
Cooling system	18.7 U.S. gal. (71 l)
Allison Automatic Transmission (does not include external circuit)	6 U.S. gallons (23 l) 6.9 U.S. gallons (26 l) with retarder
ZF-Astronic Automatic Transmission	3 U.S. gallons (11 l)
Differential oil	20 U.S. qts (18,7 l)
Power steering reservoir	4.0 U.S. qts (3,8 l)
A/C compressor oil	4.5 U.S. qts (4,3 l)
Windshield washer reservoir	5.3 U.S. gal. (20 l)
Refrigerant	24.1 lb (11 kg)

FUEL TYPE

Diesel engines for 2007 and later model year vehicles are designed to operate only with **Ultra Low Sulfur Diesel** (ULSD) fuel, which can contain no more than 15 ppm sulfur.



CAUTION

ULSD fuel is necessary to avoid fouling the engine's Aftertreatment Device (ATD). Use of fuel other than ULSD will reduce the efficiency and durability of the engine.

BIODIESEL FUELS

ULSD-B5 biodiesel may be used. B5 tells you the percentage of biodiesel mixed in with ULSD. B5 is 5% biodiesel and 95% ULSD.

Fuel used must meet engine manufacturer's specification for biodiesel fuel. For Detroit Diesel engines refer to "Diesel Fuel Specifications" as stated in DDC publication 7SE270 LUBRICATING OIL, FUEL, AND FILTERS. Concerning the use of biodiesel with Volvo D13 engines, refer to Volvo's specifications.

Biodiesel fuels are alkyl esters of long chain fatty acids derived from renewable resources. Detroit Diesel highly recommends biodiesel fuels made from soybean or rapeseed oil through the proper transesterification reaction process. Other feedstock source of biodiesel fuels such as animal fat and used cooking oils are not recommended by Detroit Diesel. Biodiesel fuels meeting ASTM D6751 specification and from

BQ-9000 accredited producer, prior to blending can be mixed up to 5% maximum by volume in petroleum diesel fuel. The resulting mixture must meet the fuel properties listed in Table 5-1 (see Detroit Diesel publication 7SE270 LUBRICATING OIL, FUEL, AND FILTERS.) and ASTM D975 specification. Failures attributed to the use of biodiesel fuel will not be covered by Volvo, Detroit Diesel or Prevost product warranty. Also, any engine performance problem related to the use of biodiesel fuel would not be recognized nor considered as Volvo, Detroit Diesel or Prevost's responsibility.

WHEELS AND TIRES

- Accuride steel wheels9" X 22½"
- Alcoa aluminum forged wheels9" X 22½"
- Except inner drive axle (steel).....8¼" X 22½"
- Alcoa aluminum forged wheels
(for super single tire) 14" X 22½"
- Tires 315/80 R22.5 load range "L"
- Tires 365/70 R22.5 load range "L"
- Tires (super single) 455/55 R22.5 load range "L"

RECOMMENDED TIRE INFLATION PRESSURE AT MAXIMUM COLD LOAD

The recommended tire inflation pressures are given in the applicable documents supplied with the vehicle. In addition, maximum cold tire inflation pressures are listed on the Department of Transport (DOT) certification plate, affixed on the left wall near the driver's seat. For special tire selection, a "PREVOST COACH SPECIAL SPECIFICATION" chart is supplied with the vehicle and is affixed next to the DOT certification plate, located on the left wall close to the driver's seat.

Vehicle equipped with TPMS: The TPMS target pressures are factory set to equal the prevailing tire pressure at delivery time. When tire pressures are increased to account for higher vehicle weight, the TPMS set point need to be increased accordingly.



CAUTION

These tire pressures are established in accordance with the maximum allowable load on each axle. A lower pressure is recommended if the axle load is less than the above specifications. Weigh vehicle fully loaded and pressurize according to tire manufacturer's recommendations. For non standard tire and wheel specifications, see Prevost tire pressure tabulation in "Coach Final Record" or special specification chart affixed next to the DOT certification plate.



WARNING

Special tire selection may lower maximum allowable speed limit, even below posted speed limit. For maximum safety, check with tire manufacturer.

BELTS

WITH DETROIT DIESEL S60 ENGINE

Use	Model	Qty
Cooling fan drive belt	V-Belt AX-73	1
A/C system 05G compressor	BX-100	2
A/C small system Sanden compressor	V-Belt A-41 9012-2041	2
Alternator (twin Bosch)	Multi V-10 Rib 10/2232	1
Alternator (emergency)	Multi V-10 Rib 10/2000	1

WITH VOLVO D13 ENGINE

Use	Model	Qty
Cooling fan drive belt	Multi V-14 Rib 14PK2526	1
A/C system 05G compressor	V Belt BX-100 9212-0404	2
A/C small system Sanden compressor	V-Belt A-41 9012-2041	2
Alternator (twin Bosch)	Multi-V-8 Rib 8PK1935	1
Alternator (emergency)	Multi-V-8 Rib 8PK1865	1

NOTE

Belts specifications may vary. For proper belt selection, always consult your vehicle Coach Final Record.

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ENGINE

DETROIT DIESEL S60 ENGINE

Detroit Diesel DDEC VI Series 60 engine, displacing 14 liters. The engine is an inline six cylinder, four stroke, turbocharged, air to air charge cooled, diesel engine with an overhead camshaft and four valves per cylinder.

Rated H.P. (BASIC)425 HP @ 1,800 rpm
Rated H.P. (STD)445 HP @ 1,800 rpm
Peak torque 1,450 lbf-ft @ 1,200 rpm
Operating range 1,200 – 2,100 rpm

VOLVO D13

Volvo D13 engine displacing 12.8 liters. The engine is an inline six cylinder, four stroke, turbocharged, air to air charge cooled, diesel engine with SOHC with 4 valves per cylinder.

Power435 HP
Torque 1,650 lbf-ft @ 1,100 rpm
Recom. cruise speed range 1300-1500rpm
Full dress, dry weight2519 lb

ALLISON TRANSMISSION

Allison B500 (B500R with the optional output retarder) electronically controlled six speed automatic transmission.

Gear Ratios

1st3.510
2nd1.906
3rd1.429
4th1.000
5th0.737
6th0.639
Reverse4.801
Converter1.578
Differential ratio4.30
Differential ratio (optional)4.10
Differential ratio (optional)4.56
Differential ratio (optional)4.88

ZF-ASTRONIC TRANSMISSION

Electronically controlled twelve speed automatic transmission.

Gear Ratios

1st12.37
2nd9.60
3rd7.44

4th5.78
5th4.57
6th3.55
7th2.70
8th2.10
9th1.63
10th1.27
11th1.00
12th0.78
Reverse11.41
Differential ratio3.73
Differential ratio (optional)3.42
Differential ratio (optional)3.58

PROPELLER SHAFT

Dana 1810 type with 4" outside diameter tubular shafts. It is provided with heavy-duty universal joints.

BRAKES

The features of the braking system include a dual system where the front and rear circuits are completely independent from each other. The brakes are air operated disc type brakes with automatic slack adjusters on front, drive and tag axles. The emergency/parking brakes are located on the drive and tag axles only.

BRAKE CHAMBER EFFECTIVE AREA

Front axle24 in²
Drive axle24/24 in² (service / emergency)
Tag axle14/16 in² (service / emergency)

AIR SYSTEM

WITH DETROIT DIESEL SERIES 60 ENGINE

Compressed air is provided by a 15.8 cfm Bendix-Westinghouse BA-921 one cylinder, gear-driven, water-cooled and engine oil lubricated air compressor.

Other features and components of the air system include an air dryer and nylon color-coded air lines.

WITH VOLVO D13 ENGINE

Compressed air is provided by a twin cylinder, 31.8 cfm Wabco, gear-driven, water-cooled and engine oil lubricated air compressor.

ANTILOCK BRAKING SYSTEM (ABS)

The antilock braking system has one Electronic Control Unit (ECU) controlling a four channel system. A wheel slip sensor is mounted at each front axle and drive axle wheel. The Tag axle wheels are slave to the drive axle wheels.

The Electronic Control Module (ECM) is maintenance free. Its operating voltage is 24 ± 6 volts DC. The thermal operating range for the ECM is from -40 to 167°F (-40 to 75°C).

The solenoid control valves are maintenance free. Their operating voltage is 24 (+4.8, -2.4) volts DC. The rated current draw is 1.65 amps. The thermal operating range of the solenoid control valves is from -40 to 176°F (-40 to 80°C).

TROUBLESHOOTING AND TESTING

For troubleshooting and testing of the vehicle's anti-lock braking system, refer to Meritor WABCO Maintenance Manual: "Anti-Lock Brake Systems For Trucks, Tractors and Buses" or use dashboard Message Center Display (MCD) Diagnostic Mode under ECU Diagnostic: "ABS".

AUTOMATIC TRACTION CONTROL (ATC) – ELECTRONIC STABILITY PROGRAM (ESP)

In addition to the ABS function, vehicle may be equipped with an advanced model of Bendix EC-60 controller to provide an **Automatic Traction Control (ATC)** feature. Bendix ATC can improve vehicle traction during acceleration, and lateral stability while accelerating through curves. ATC utilizes **Engine Torque Limiting (ETL)** where the ECU communicates with the engine's controller and/or **Differential Braking (DB)** where individual wheel brake applications are used to improve vehicle traction.

The EC-60 advanced model controller also provides ABS-based stability features referred to as **ESP® Electronic Stability Program**.

Refer to Maintenance Manual, Section 12: Brake and Air System for more information on this system.



CAUTION

Even with ESP-equipped vehicles, the driver remains responsible for ensuring vehicle stability during operation.



DANGER

ESP may reduce the vehicle speed automatically.

ESP can make the vehicle **decelerate automatically**. ESP can slow the vehicle with or **without the operator applying the brake**, and **even when the throttle is being applied**.

STEERING

- ZF 8098 integral hydraulic assisted steering gear;
- Variable assistance in function of speed is optional.
- TRW, PS25 series hydraulic pump gear driven from engine drive.
- Hydraulic reservoir and dipstick accessible from engine compartment.
- System pressure: 2175 psi (150 bars).
- Steering wheel diameter 20". Tilt steering wheel and telescopic steering column; pneumatically locked with foot operated switch for adjustment.
- Number of turns: 5¾.
- Outside turning radius: See Dimensions and Weight.

ELECTRICAL SYSTEM

- 24 volt, negative ground;
- 12 volt exterior lighting;
- Twin 28 volt, 140 amp, self-regulated, belt-driven, air-cooled Bosch alternators;
- Four 12 volt, group 31 format maintenance-free batteries connected in series/parallel. Cold cranking capacity is 1900 amps with a reserve capacity of 195 minutes;
- 100 amp battery equalizer.

SUSPENSION

Goodyear rolling lobe type air springs (bellows) are used throughout.

I-BEAM AXLE FRONT SUSPENSION (OPTION)

2 Bellows (12"); for a G.A.W.R. of 16,500 lb;

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- 2 Shock absorbers;
- 4 Radius rods;
- 1 Transverse radius rod;
- 1 Height control valve.
- 1 sway bar (1¾" diameter).

INDEPENDENT FRONT SUSPENSION

- 2 Bellows (12") for a G.A.W.R. of 16,500 lb;
- 2 Shock absorbers;
- 2 Upper A-arms;
- 2 Lower A-arms;
- 2 Torque rods;
- 2 Steering Levers;
- 1 Height control valve;
- 1 sway bar (1¾" diameter).

DRIVE AXLE

- 4 Bellows (11");
- 4 Shock absorbers;
- 3 Radius rods;
- 1 Panhard rod;
- 2 Height control valves.

TAG AXLE

- 2 Bellows (11");
- 2 Shock absorbers;
- 3 Radius rods;
- 1 Panhard rod.

ALIGNMENT SPECIFICATIONS

Use wheel alignment systems which work with angle measurements only, such as Josam or Hunter systems. Alignment specifications are listed in the following tables:

I-BEAM AXLE FRONT SUSPENSION			
	Minimum value	Nominal value	Maximum value
Right camber (degrees)	-0.250	0.125	0.375
Left camber (degrees)	-0.250	0.125	0.375
Right caster (degrees)	2.0	2.75	3.5
Left caster (degrees)	2.0	2.75	3.5
Total toe-in (degrees)	0.08	0.13	0.17

FRONT AXLE (INDEPENDENT SUSPENSION)			
	Minimum value	Nominal value	Maximum value
Right camber (degrees)	0.0	0.150	0.35
Left camber (degrees)	0.0	0.150	0.35
Right caster (degrees)	2.35	2.6	2.85
Left caster (degrees)	2.35	2.6	2.85
Total toe-in (degrees)	0.08	0.13	0.17

DRIVE AXLE			
	Minimum value	Nominal value	Maximum value
Thrust angle (degrees)	-0.04	0	0.04

TAG AXLE			
	Minimum value	Nominal value	Maximum value
Parallelism (degrees)	-0.02	0	0.02
(*) Use the drive axle as reference			

COOLING SYSTEM

- Extra capacity, copper fin radiator and aluminum charge air cooler arranged one behind the other, Valeo made.
- 3 speed fan clutch DDEC controlled.
- Rubber insulated from the body.
- Expansion tank above radiator and remote mounted.
- System pressure 14 psi.
- 185° F thermostat.
- System capacity 27.6 us gal (DDC S60).
- Coolant filter.
- Radiator fan: 38 inches fan belt and drive shaft driven.

FUEL SYSTEM

Polyethylene 208 US gallons/787 liters fuel tank centrally located.

Equipped with:

- Anti-spill device.
- Safety filler cap on right side of coach.
- Pressure relief valve.
- Electric fuel gauge.
- Low level signal at 26 US gallons/98.4 liters.
- Primary filter 25 microns (standard).
- Primary fuel filter with electrical water indicator (Volvo D13).
- Fuel pro 382 filter available as an option as a primary filter.
- Secondary filter 3 to 5 microns.
- Shut-off valve on fuel supply line.
- Provided with filling access on the right side of the coach.
- Fuel cooler.

EXHAUST SYSTEM

One all stainless steel exhaust system including:

- Meritor (DDC S60) or FleetGuard (Volvo D13) After Treatment Device made of a DPF (Diesel Particulate Filter) and a DOC (Diesel Oxidation Catalyst). Noise, vibration and heat insulated. This ATD is mounted to the bus structure and is accessible through an exterior access door.
- Tail pipe diffuser and rain deviation device.
- Exhaust pipe with Insulation and a flexible section.
- Exhaust to rear left hand top of rear cap.

HEATING AND AIR CONDITIONING

Two air conditioning systems are available: the large capacity (central) A/C and an optional auxiliary A/C. The large capacity A/C provides adequate capacity of conditioned and filtered air for all climatic conditions. Fresh air is drawn into the system from the left (driver's) side of the vehicle. Return air is taken from the middle of the vehicle. The driver's heater and defogger are controlled separately from the central unit. An air mixture selector enables air to be drawn into the system from outside the vehicle or recirculated. The optional auxiliary A/C is used to cool air delivered from registers in the passenger overhead compartments.

AUXILIARY A/C	
Air conditioning capacity	2 tons
Refrigerant type	134A
Air flow	450 cfm (12,7 m ³ /min)

COMPRESSOR (for auxiliary A/C)	
Number of cylinders	7
Operating speed	700 to 6 000 rpm
Oil capacity	6 U.S. oz. (0,18 l)
Approved oil	SP-20 (PAG)

CENTRAL A/C	
Air conditioning capacity	9 tons
Refrigerant type	134A
Heating capacity	152 000 Btu/h
Air flow	2 600 cfm (73,6 m ³ /min)

COMPRESSOR (for central A/C)	
Number of cylinders	6
Operating speed	400 to 2 200 rpm (2,600 rpm, intermittent)
Minimum speed for lubrication	400 rpm
Oil capacity	4.5 U.S. qts (4,3 l)
Approved oil	Castrol SW-68 (POE)

NOTE

The above oils are suitable for use with reciprocating compressors using refrigerant R-134a and with evaporator temperatures above -40°F (-40°C).

OIL SPECIFICATIONS

ENGINE

Use SAE 15W-40 meeting API classification CJ-4 is required in 2007 diesel engines.

The Volvo D13 engine oil specification is designated EO-O Premium Plus (or VDS-4). EO-O Premium Plus oils exceed the new API service category CJ-4.

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CAUTION

CJ-4 contains less than 1% ash which is key to achieving maximum diesel particulate filter cleaning intervals. Use of high ash engine oils will reduce the cleaning interval on the Diesel Particulate Filter (DPF). DPF regenerates the combustible soot, but the ash (a product of the oil lubricant package) slowly accumulates in the channels of the DPF.

ALLISON TRANSMISSION

Allison Transmission recommends the following fluids:

- Castrol TranSynd™ or TES-295 specification equivalent fluid;
- Dexron-III® automatic transmission fluid;
- Dexron-VI® automatic transmission fluid or TES-389 specification equivalent fluid.

ZF-ASTRONIC AUTOMATIC TRANSMISSION

The ZF-Astronic transmission must be filled with Castrol Syntrans grade 75W-85 oil.

DIFFERENTIAL

Multigrade gear oil meeting MIL-PRF-2105E: 85W140 is recommended for use in drive axle. This lubricant performs well over a broad temperature range, providing good gear and bearing protection in a variety of climates. If temperature drops below 10°F (-12°C), 80W90 should be used, and below -15°F (-26°C), 75W90 should be used. In extreme conditions or for better performance, full synthetic gear oil should be used.

FAN RIGHT ANGLE GEARBOX

Use only synthetic gear lubricant SAE 75W-90.

POWER STEERING RESERVOIR

Use Automatic Transmission Fluid (ATF) Dexron-IIE or Dexron-III for this system.

PRE-HEATING SYSTEM

Depending on options chosen, a coolant heater may be installed on the coolant circuit. The heater can be used as a pre-heater or as an auxiliary heat source.

Only the Webasto 104,000 Btu preheater is available. The heater is controlled by a programmable timer. See Other Features chapter for information on how to use the timer.

WEBASTO	
Model	Thermo 300
Heating output	104,000 Btu/hr (30 kW)
Fuel type	Same as engine
Fuel consumption	4.8 US qts/hr (4.5 l/hr)
Rated voltage	24 V DC
Operating voltage	20-28 V DC
Electric power consumption without water pump	110 watts
Dimensions (L)	24.01 (610 mm)
Inch (mm) (W)	9.69 (246 mm)
(H)	8.66 (220 mm)
Weight lb (kg)	41.88 (19)

LIGHT BULB DATA

Please, refer to your vehicle Parts Manual for selection of replacement light bulbs.

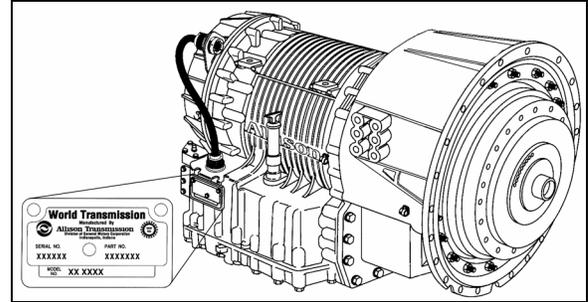
140 Technical Information

PLATES AND CERTIFICATION

The main components of the vehicle such as engine, transmission, axles and chassis are identified by different serial numbers. It may be necessary to locate these numbers for warranty purposes.

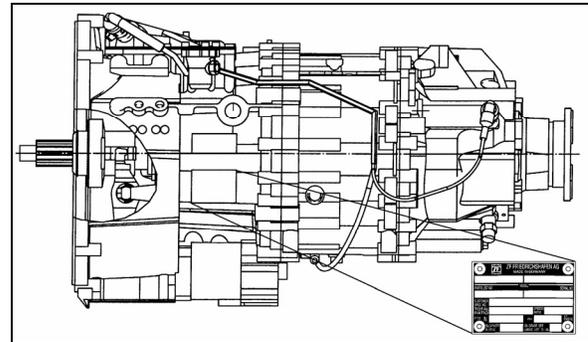
The engine serial and model number are laser etched on the cylinder block (as viewed from the flywheel end) on the left side just below the intake manifold and above the cast-in Detroit Diesel logo.

In addition, option decals are located on the rocker cover (starter side). The engine serial and model number and a list of the optional engine equipment are written on these decals. Refer to this information when ordering replacement parts.



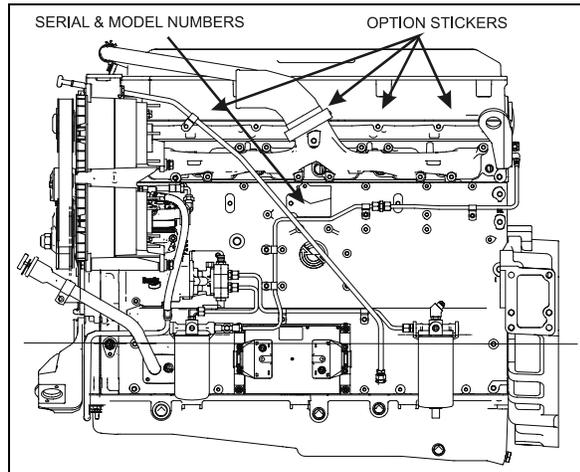
ALLISON TRANSMISSION

07076



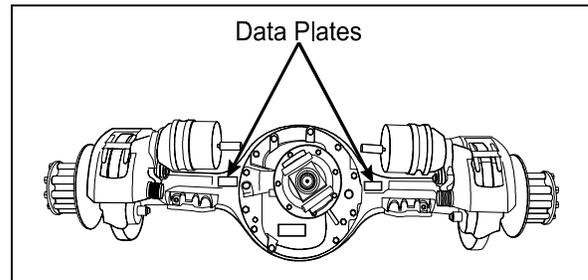
ZF-ASTRONIC TRANSMISSION

00040



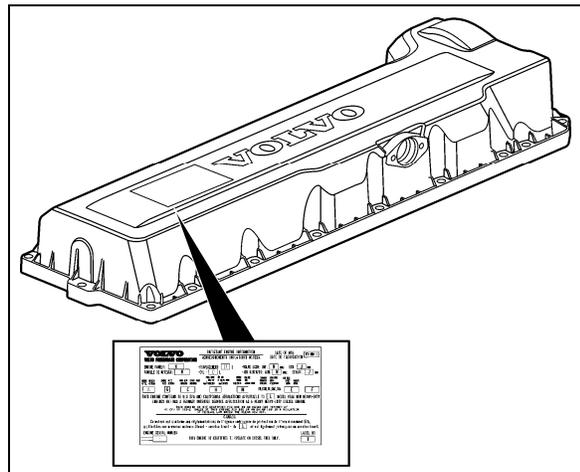
SERIES 60 ENGINE

00043



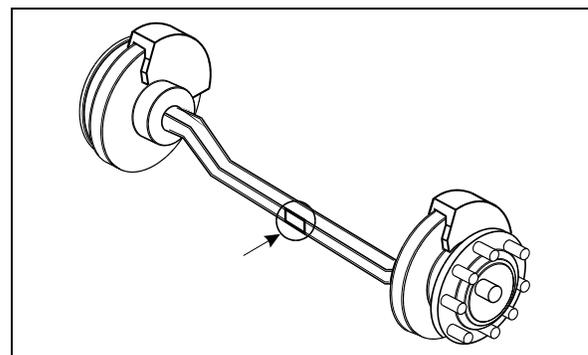
DRIVE AXLE

00007



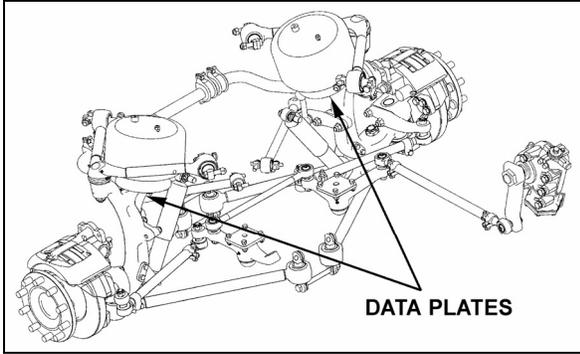
VOLVO D13 ENGINE DATA PLATE

00052



I-BEAM FRONT AXLE

00008



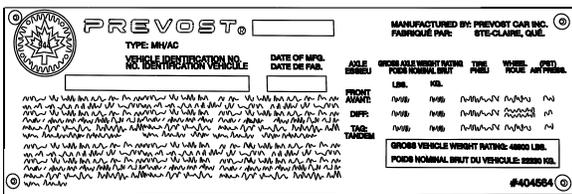
INDEPENDENT FRONT SUSPENSION 16136

SAFETY CERTIFICATION

- Vehicle components meet specifications and standards as follows:
- Material and parts conform to ASTM and/or SAE standards in effect at the time of manufacture.
- All factory-installed interior materials meet FMVSS 302 for fire resistance.
- Certified according to Provincial, State and Federal Safety standards (Canadian and US) BMCSS, FMVSS and CMVSS.
- Other applicable certification labels are affixed to the component.

DOT CERTIFICATION PLATE

This certifies that vehicles manufactured by Prevest Car Inc. comply with all Federal Motor Vehicle Safety Standards at the time of manufacture. Information such as date of manufacture, model year, gross vehicle weight rating, tire types and inflation pressure is also etched on this plate. The DOT Certification plate is affixed to L.H. control panel.

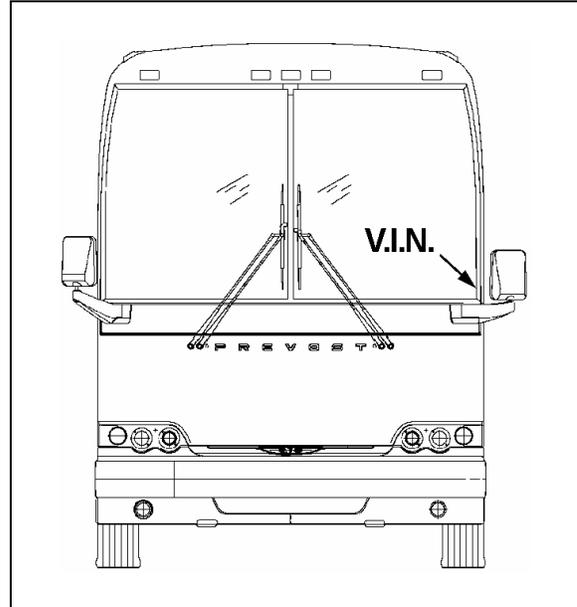


DOT CERTIFICATION PLATE 00016

EPA ENGINE LABEL

The emissions certification label affixed inside the engine compartment above the lavatory maintenance service valves certifies that the engine conforms to federal and any state exhaust emissions regulations.

VEHICLE IDENTIFICATION NUMBER (VIN)



VEHICLE IDENTIFICATION NUMBER 00044

The Vehicle Identification Number is stamped on a plate located on the windshield frame pillar (driver's side). The VIN is visible from the outside of the vehicle. Make sure the correct vehicle identification number is given when ordering replacement parts. Using the VIN when ordering parts will facilitate processing.

NOTE

Record the VIN in the vehicle documentation and keep with company records. The VIN will normally be used for vehicle registration, service reference needs and for obtaining vehicle insurance coverage.

COACH FINAL RECORD

The Coach Final Record is a record of all data pertaining to the assembly of the vehicle. This record is included in the technical publications package supplied with the vehicle. Retain this record in the company records office for reference and safe-keeping.

SERVICE LITERATURE

Visit our web sit at www.prevostcar.com for on-line product information and technical publications!

Additional copies of the following service literature are available on request and at low cost. These can be helpful to mechanics and drivers alike.

- * **Maintenance Manual**
- * **Operator's Manual**
- * **Parts Manual**
- * **Service Center Directory**

To order, call Prevost Parts toll free 1-800-463-8876 or write to:

PREVOST PARTS INC.

2955-A Watt Street
Sainte-Foy, (Quebec)
Canada G1X 3W1

Specify the complete vehicle serial number. Allow 30 days for delivery

144 Appendix A – Service Literature

NOTICE

DECLARATION OF THE MANUFACTURING DEFECTS TO THE GOVERNMENT OF THE UNITED STATES

If you believe that your vehicle has defect which could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying Prevest.

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 become involved in individual problems between you, your dealer, or Prevest Car Inc.

To contact NHTSA you may either call the Auto Safety Hotline toll-free at **1-800-424-9393** (or **366-0123** in Washington, D.C. area) or write to:

**NHTSA
U.S. Department of transportation
Washington, D.C. 20590.**

You can also obtain other information about motor vehicle safety from the Hotline.

DECLARATION OF THE MANUFACTURING DEFECTS TO THE CANADIAN GOVERNMENT

If you live in Canada, and if you believe that your vehicle has a safety defect, you should immediately inform Transport Canada and Prevest. You may write to:

**Transport Canada
Box 8880
Ottawa, Ontario, K1G 3J2**

DECLARATION OF THE MANUFACTURING DEFECTS TO PREVOST.

In addition to notify the NHTSA (or Transport Canada), please contact Prevest at **1-418-831-2046**. Or you may write to:

**Prevest
After-sales service department
850 Olivier Road,
Saint-Nicolas (Quebec)
Canada, G7A 2N1**

Troubleshooting

Problem/Symptom	Probable Causes	Actions
Vehicle does not Start	<p>Rear Start selector switch is not in the NORMAL position</p> <p>Master cut-out switch in the rear electrical compartment is in the OFF position (down)</p>	<ol style="list-style-type: none"> 1. Check that the rear start selector switch is flipped up to NORMAL start position and master cut-out switch is flipped up to ON and retry cranking 2. Flip the rear start selector switch to "Rear Start" and start the vehicle from the rear
	<p>CAN network problem (Multiplex)</p> <p>Module A53 not powered or is defective</p> <p>Engine ECM does not receive the ignition signal</p> <p>Engine ECM is not powered</p>	<p>If the vehicle does not start from the rear:</p> <ol style="list-style-type: none"> 1. Verify that module A53 is powered: <ol style="list-style-type: none"> a) Check the SYSTEM DIAGNOSTIC menu of the message center display (MCD). Select FAULT DIAGNOSTIC and ELECTRICAL SYSTEM. The message "No Response ModA53, Active", indicates a power problem on the module or a CAN network problem. b) Check / reset circuit breaker CB5 c) Check / replace fuse F65 d) Probe gray connector on module to see if it is powered. 2. Verify that the engine ECM is powered and get the ignition signal <ol style="list-style-type: none"> a) Check / reset circuit breaker CB8 Check / replace fuse F74 b) Check / reset circuit breaker CB2 Check / replace fuse F78
<p>None of the Multiplexed functions are operating, including the basic limp-home functions (door opening, flashers, wipers in speed 1)</p> <p>Three dashes "---" appear in the telltale panel instead of the outside temperature</p> <p><i>Note: The sunshades are still functioning since these are not multiplexed</i></p>	<p>The program version in the CECM is different than the program in the I/O modules and the CECM is forcing all I/O modules to stay inactive</p>	<ol style="list-style-type: none"> 1. Engage the auto-programming of the I/O modules: Turn the ignition key to the OFF position, flip the master cut-out switch in the rear electrical compartment to OFF and ON and then turn the ignition key ON. The letters CAN will appear in the telltale LCD panel for about 3 minutes Everything shall get back to normal once the letters CAN are replaced with outside temperature display 2. Try disconnecting the green connector on the CECM and reconnect 3. If step 1 and 2 are ineffective, try disconnecting the Master ID module completely and repeat step 1

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Problem/Symptom	Probable Causes	Actions
		4. Try disconnecting the CECM completely, leave it disconnected and see if the limp-home functions (start of the vehicle from the engine compartment, wipers speed 1, flashers, etc) are functioning
<p>Many secondary functions (not essential for driving) not functioning (interior lighting, driver's area lighting, wiper speed 2 and intermittent).</p> <p>Outside temperature display in the telltale LCD panel displays three dashes "---"</p> <p>Marker lights and clearance lights are turned ON when setting ignition to the ON position.</p>	<p>The CECM module does not receive 24 V power.</p> <p>The CAN network is not working. It could be caused by a short on the network, an open circuit, a problem with the CECM or the CECM being disconnected from the network.</p>	<p>1. Check / reset circuit breaker CB6 (3rd from the bottom on the right side column) Check / replace fuse F1</p> <p>2. Operate in limp-home mode by starting the vehicle from the engine compartment (REAR START). All functions essential to drive are available</p> <p>To close and lock the door, pull the door manually up to its closed position and it will lock by itself. The door opening button is still functioning</p>
<p>No temperature control in the passenger area</p> <p>Passenger temperature display indicates two dashes "--"</p>	<p>Problem with the temperature sensor located in the evaporator compartment air intake or the sensor wiring</p>	<p>Instruct the driver to manually control the temperature by playing with the passenger set point. Set above 22°C (72°F) to heat and below 22° C (72°F) to cool</p>
<p>Entrance door does not open nor close using the control buttons</p> <p>Defroster fan not functioning</p> <p>Windshield wipers not functioning in speed 1 or intermittent</p>	<p>Module A47 is not powered or is faulty</p>	<p>1. Check the SYSTEM DIAGNOSTIC menu of the message center display (MCD). Select FAULT DIAGNOSTIC and ELECTRICAL SYSTEM. The message "No Response ModA47, Active" indicates a power problem on the module. (A CAN network problem would show the same message but doesn't produce these symptoms).</p> <p>2. Check / reset circuit breaker CB6</p> <p>3. Check / replace fuse F5</p> <p>4. Probe gray connector on module to see if it is powered.</p> <p>5. Use the air release valves near the entrance door and in the front service compartment to lock / unlock the door</p>
<p>Windshield wipers not functioning in speed 1 or intermittent</p>	<p>No power on R23</p>	<p>Check / replace fuse F82</p>

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Problem/Symptom	Probable Causes	Actions
HVAC condenser fans not functioning in speed 1	Circuit breaker CB7 was manually tripped and not reset	Check / reset circuit breaker CB7
HVAC condenser fans not functioning in speed 2	Circuit breaker CB7 was manually tripped and not reset	Check / reset circuit breaker CB7
Windshield washer not functioning Windshield upper section de-icing system not functioning Defroster fan is functioning but no heat or cooling available in the driver area.	Module A46 is not powered or is faulty	<ol style="list-style-type: none"> 1. Check the SYSTEM DIAGNOSTIC menu of the message center display (MCD). Select FAULT DIAGNOSTIC and ELECTRICAL SYSTEM. The message "No Response ModA46, Active" indicates a power problem on the module. (A CAN network problem would show the same message but doesn't produce these symptoms). 2. Check / reset circuit breaker CB1 3. Check / replace fuse F12 or F13 4. Probe gray connector on module to see if it is powered.
Low beam headlights and front flasher on left side not functioning Electric horn not functioning	Module A45 is not powered or is faulty	<ol style="list-style-type: none"> 1. Check the SYSTEM DIAGNOSTIC menu of the message center display (MCD). Select FAULT DIAGNOSTIC and ELECTRICAL SYSTEM. The message "No Response ModA45, Active" indicates a power problem on the module. (A CAN network problem would show the same message but doesn't produce these symptoms). 2. Check / reset circuit breaker CB2 3. Check / replace fuse F33 and F34 4. Probe gray connector on module to see if it is powered.
Low beam headlights and flasher on right side not functioning	Module A48 is not powered or is faulty	<ol style="list-style-type: none"> 1. Check the SYSTEM DIAGNOSTIC menu of the message center display (MCD). Select FAULT DIAGNOSTIC and ELECTRICAL SYSTEM. The message "No Response ModA48, Active" indicates a power problem on the module. (A CAN network problem would show the same message but doesn't produce these symptoms). 2. Check / reset circuit breaker CB2 3. Check / replace fuse F33 and F34 4. Probe gray connector on module to see if it is powered.

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Problem/Symptom	Probable Causes	Actions
<p>Rear flashers not functioning</p> <p>Stoplights and center stoplights not functioning</p>	<p>Module A51 is not powered or is faulty</p>	<ol style="list-style-type: none"> 1. Check the SYSTEM DIAGNOSTIC menu of the message center display (MCD). Select FAULT DIAGNOSTIC and ELECTRICAL SYSTEM. The message “No Response ModA51, Active” indicates a power problem on the module. (A CAN network problem would show the same message but doesn't produce this symptom). 2. Check / reset circuit breaker CB2 3. Check / replace fuse F80 4. Probe gray connector on module to see if it is powered.
<p>Engine is overheating and radiator fan clutch does not engage</p> <p>The A/C compressor clutch does not engage</p>	<p>Module A52 is not powered or is faulty</p>	<ol style="list-style-type: none"> 1. Check the SYSTEM DIAGNOSTIC menu of the message center display (MCD). Select FAULT DIAGNOSTIC and ELECTRICAL SYSTEM. The message “No Response ModA52, Active” indicates a power problem on the module. (A CAN network problem would show the same message but doesn't produce this symptom). 2. Check / reset circuit breaker CB5 3. Check / replace fuse F65 4. Probe gray connector on module to see if it is powered.
<p>Evaporator fan not functioning</p>	<p>Circuit breaker CB3 tripped</p> <p>Module A54 is not powered or is faulty</p>	<ol style="list-style-type: none"> 1. Check / reset circuit breaker CB3 2. Check the SYSTEM DIAGNOSTIC menu of the message center display (MCD). Select FAULT DIAGNOSTIC and ELECTRICAL SYSTEM. The message “No Response ModA54, Active” indicates a power problem on the module. (A CAN network problem would show the same message but doesn't produce this symptom). 3. Check / reset circuit breaker CB5 4. Check / replace fuse F67 , F68 5. Probe gray connector on module to see if it is powered.
<p>HVAC condenser fans not functioning in speed 1</p>	<p>Module A54 is not powered or is faulty</p>	<ol style="list-style-type: none"> 1. Check the SYSTEM DIAGNOSTIC menu of the message center display (MCD). Select FAULT DIAGNOSTIC and ELECTRICAL SYSTEM. The message “No Response ModA54,

Problem/Symptom	Probable Causes	Actions
		<p>Active” indicates a power problem on the module. (A CAN network problem would show the same message but doesn't produce this symptom).</p> <ol style="list-style-type: none"> 2. Check / reset circuit breaker CB5 3. Check / replace fuse F67 , F68 4. Probe gray connector on module to see if it is powered.
Sound system not functioning	Circuit breaker CB4 or CB11 was manually tripped and not reset	Check / reset circuit breaker CB4 or CB11
Fire alarm telltale light and audible alarm always ON and there is no fire or high temperature in the engine compartment	Short-circuited fire sensor or defective sensor	Prior to start the vehicle, cycle the ignition key to the ON position, OFF position and then ON position again and then start the vehicle. This will deactivate the fire alarm function. This has to be repeated each time the vehicle is re-started
The vehicle is parked and the electrical horn is activated to indicate a fire in the engine compartment but there is no fire	Short-circuited fire sensor or defective sensor	Cycle the ignition key between the ON and OFF position twice within 3 seconds. This will deactivate the fire alarm function. This has to be repeated each time the vehicle is parked
A single light, a group of LED lights or another function of the vehicle is not functioning	The multiplex outputs are protected in current by an internal “soft-fuse”. When an output is shorted, it turns OFF and stays OFF until the "soft-fuse" is reset	Turn the ignition key to the OFF position and turn to the ON position again. This resets all "soft –fuses"
No backlighting in the instrument cluster	Circuit breaker CB10 is tripped or fuse F20 blown	<p>Check / reset circuit breaker CB10</p> <p>Check / replace fuse F20</p>
The radiator fan clutch does not function and the engine is overheating		<ol style="list-style-type: none"> 1. Set the ignition key to the ON position. 2. Activate the dashboard Telltale Light Test switch 3 times within 4 seconds. 3. In the engine compartment, set the starter selector switch to REAR START and then start the engine from the rear. <p>While in this mode, the rear start push-button can be used to manually engage the fan clutch. The Multiplex system knows when the engine is already running, and it will not activate the starter.</p>

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Problem/Symptom	Probable Causes	Actions
		<p>4. Press the push-button one time to engage the clutch in 1st speed, press a second time to engage in 2nd speed, press a third time to stop the fan, press once again to return to 1st speed.</p> <p>If the fan clutch does not engage using this procedure then the clutch is faulty or the wiring between the multiplex module and the clutch is faulty. Mechanically lock the fan clutch as described in section 05: COOLING SYSTEM of the maintenance manual.</p>

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DIAGNOSTIC TROUBLESHOOTING CODES (DTC) — ALLISON 4TH GENERATION CONTROLS

DIAGNOSTIC TROUBLESHOOTING CODES (DTC) OVERVIEW

Diagnostic codes (DTC) are numerical indications relating to a malfunction in transmission operation. These codes are logged in a list in the TCM memory with the most severe or most recent code listed first. A maximum of five codes (numbered d1 to d5) may be listed in memory at one time. As codes are added, the oldest inactive code is dropped from the list. If all codes are active, the code with the lowest priority that is not included on the severity list is dropped from the list.

Diagnostic codes (DTC) and code information may be accessed through the pushbutton shift selector or using an Allison DOC™ diagnostic tool.

The TCM separately stores the active and inactive codes. An active code is any code that is current in the TCM decision-making process. Inactive codes are codes that are retained in the TCM memory and will not necessary affect the TCM decision-making process. Inactive codes are useful in determining if a problem is:

- Isolated ;
- Intermittent ;
- Result from a previous malfunction.

The TCM may automatically delete a code from memory if it has not recurred. If the condition which generated the code is active, the LED indicator on the selector will be illuminated simultaneously with the display of the code. If the condition which generated the code no longer exists, the LED is not illuminated and the code is maintained only as a historical record of the prior condition. An illuminated MODE INDICATOR (LED) during normal operation signifies secondary shift mode operation.



DIAGNOSTIC CODES – ALLISON 4TH GENERATION CONTROLS

When the diagnostic mode is entered, the first code (position d1) is displayed as follows:

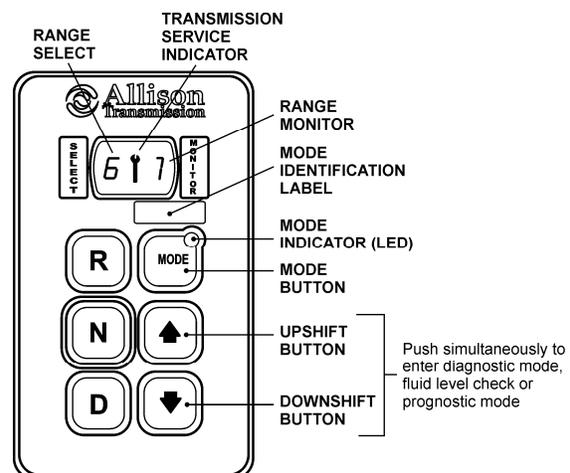
Exemple: Code P0722

Displayed as: **d1...P...07...22**

The code list position is the first item displayed, followed by the DTC. Each item is displayed for about one second. The display cycles continuously until the next code list position is accessed by pressing the **MODE** button. The following example shows how DTC P0722 is displayed on the pushbutton shift selector.

SELECT	d	1	MONITOR
		P	
	0	7	
	2	2	

- d1 (code list position) – The position which a code occupies in the list. Positions are displayed as « d1 » through « d5 » (code list position 1 through code list position 5).
- P0722 (DTC) – The diagnostic troubleshooting code number referring to the general condition or area of fault detected by the TCM.



152 Appendix C – Allison Diagnostic Troubleshooting Codes

DIAGNOSTIC CODE DISPLAY AND CLEARING PROCEDURE – ALLISON 4TH GENERATION CONTROLS

Diagnostic codes can be read and cleared by two methods:

- Using an Allison DOC™ diagnostic tool. For specific instructions on how to use an Allison DOC™ diagnostic tool, refer to the User Guide.
- Using the pushbutton shift selector.

To begin the diagnostic process:

1. Bring the vehicle to a stop at a safe location.
2. Apply the parking brake.

To display stored codes:

1. Simultaneously press the ▲ (Up) and ▼ (Down) arrow buttons five times to access the Diagnostic Display Mode.

NOTE

To access the Oil Level Display Mode, simultaneously press the ▲ (Up) and ▼ (Down) arrow buttons once. Consult paragraph: « ALLISON TRANSMISSION OIL LEVEL CHECK USING THE PUSHBUTTON SHIFT SELECTOR » at the end of this section.

2. Observe the digital display for code (d1).
3. Press the MODE button to see the next code (d2) – repeat for subsequent codes (d3, d4 & d5).

NOTE

Be sure to record all codes displayed before they are cleared. This is essential for troubleshooting.

NOTE

The Diagnostic Display Mode can be entered for viewing codes at any speed. Codes can only be cleared when the output speed = 0 and no output speed sensor failure is active

Active indicators (MODE INDICATOR LED) and inactive codes can be cleared manually, while in the diagnostic display mode, after the condition causing the code is identified.

To clear active indicators and inactive codes:

1. While in Diagnostic Display Mode, press and hold the MODE button for 10 seconds to clear both active indicators and inactive codes.
2. Begin operating as normal. Have the transmission checked at the earliest opportunity by an Allison Transmission distributor or dealer.

NOTE

All active indicators are cleared at TCM power down.

Some codes will clear their active indicator when the condition causing the code is no longer detected by the TCM.

Appendix C – Allison Diagnostic Troubleshooting Codes 153

The Diagnostic Display Mode can be exited by any of the following methods:

- Press simultaneously the ▲ (Up) and ▼ (Down) arrow buttons at the same time on the pushbutton shift selector.
- Press any range button «D», «N» or «R» on the pushbutton shift selector (the shift will be commanded if it is not inhibited by an active code).
- Wait until the calibrated time (approximately 10 minutes) has passed. The system will automatically return to the normal operating mode.
- Turn off power to the TCM (shut off the engine using the ignition key).

NOTE

If clearing a code while locked in a «D» (Drive) or «R» (Reverse) position (fail-to-range), the transmission will still be in «D» (Drive) or «R» (Reverse) when the clearing procedure is completed. «N» (Neutral) must be manually selected.

DIAGNOSTIC CODE RESPONSE

The following responses are used in the "Diagnostic Troubleshooting Code List and Inhibited Operation Description" table to command safe operation when diagnostic codes are sent.

DNS - Do Not Shift Response

Release lock up clutch and inhibit lock up operation.

Inhibit all shifts.

Turn *ON* the CHECK TRANS light.

Display the range attained.

Ignore any range selection inputs from the shift selector.

DNA - Do Not Adapt Response

The TCM stops adaptive shift control while the code is active.

SOL OFF - SOLenoid OFF Response

All solenoids are commanded *OFF* (turning solenoids "A" and "B" off electrically cause them to be on hydraulically).

RPR - Return to Previous Range Response

When the speed sensor ratio or C3 pressure switch test associated with a shift not successful, the TCM commands the same range as commanded before the shift.

NNC - Neutral No Clutches Response

When certain speed sensor ratio or C3 pressure switch tests are not successful, the TCM commands a neutral condition with no clutches applied.

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ALLISON TRANSMISSION DIAGNOSTIC TROUBLESHOOTING CODES (DTC) AND DESCRIPTIONS

DTC	Description	CHECK TRANS Light	Inhibited Operation Description
C1312	Retarder Request Sensor Failed Low	No	May inhibit retarder operation if not using J1939 datalink
C1313	Retarder Request Sensor Failed High	No	May inhibit retarder operation if not using J1939 datalink
P0122	Pedal Position Sensor Low Voltage	No	Use default throttle values. Freezes shift adapts.
P0123	Pedal Position Sensor High Voltage	No	Use default throttle values. Freezes shift adapts.
P0218	Transmission Fluid Over Temperature	No	Use hot mode shift schedule. Holds fourth range. TCC is inhibited. Freezes shift adapts.
P0561	System Voltage Performance		
P0562	System Voltage Low		
P0563	System Voltage High		
P0602	TCM Not Programmed	Yes	Lock in Neutral
P0610	TCM Vehicle Options (Trans ID) Error	Yes	Use TID A calibration
P0613	TCM Processor	No	All solenoids off
P0614	Torque Control Data Mismatch - ECM/TCM	Yes	Allows operation only in reverse and second range.
P0634	TCM Internal Temperature Too High	Yes	SOL OFF (hydraulic default)
P063E	Auto Configuration Throttle Input Not Present	Yes	Use default throttle values
P063F	Auto Configuration Engine Coolant Temp Input Not Present	No	None
P0658	Actuator Supply Voltage 1 (HSD1) Low	Yes	DNS, SOL OFF (hydraulic default)
P0659	Actuator Supply Voltage 1 (HSD1) High	Yes	DNS, SOL OFF (hydraulic default)
P0667	TCM Internal Temperature Sensor Circuit Range / Perform		
P0668	TCM Internal Temperature Sensor Circuit Low		
P0669	TCM Internal Temperature Sensor Circuit High		
P0701	Transmission Control System Performance		
P0702	Transmission Control System Electrical (TransID)	Yes	Use TID A calibration
P0703	Brake Switch Circuit Malfunction	No	No Neutral to Drive shifts for refuse packer. TCM inhibits retarder operation if a TPS code is also active.
P0708	Transmission Range Sensor Circuit High Input	Yes	Ignore defective strip selector inputs
P070C	Transmission Fluid Level Sensor Circuit – Low Input	No	None
P070D	Transmission Fluid Level Sensor Circuit – High Input	No	None
P0711	Transmission Fluid Temperature Sensor Circuit Performance	Yes	Use default sump temp
P0712	Transmission Fluid Temperature Sensor Circuit Low Input	Yes	Use default sump temp
P0713	Transmission Fluid Temperature Sensor Circuit High Input	Yes	Use default sump temp
P0716	Turbine Speed Sensor Circuit Performance	Yes	DNS, Lock in current range
P0717	Turbine Speed Sensor Circuit No Signal	Yes	DNS, Lock in current range
P071A	RELS Input Failed On	Yes	Inhibit RELS operation
P071D	General Purpose Input Fault	Yes	None

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DTC	Description	CHECK TRANS Light	Inhibited Operation Description
P0720	Output Speed Sensor Circuit		
P0721	Output Speed Sensor Circuit Performance	Yes	DNS, Lock in current range
P0722	Output Speed Sensor Circuit No Signal	Yes	DNS, Lock in current range
P0726	Engine Speed Sensor Circuit Performance	No	Default to turbine speed
P0727	Engine Speed Sensor Circuit No Signal	No	Default to turbine speed
P0729	Incorrect 6 th Gear Ratio	Yes	DNS, Attempt 5 th , then 3 rd
P0730	Incorrect Neutral Gear ratio		
P0731	Incorrect 1 st Gear ratio	Yes	DNS, Attempt 2 nd , then 5 th
P0732	Incorrect 2 nd Gear ratio	Yes	DNS, Attempt 3 rd , then 5 th
P0733	Incorrect 3 rd Gear ratio	Yes	DNS, Attempt 4 th , then 6 th
P0734	Incorrect 4 th Gear ratio	Yes	DNS, Attempt 5 th , then 3 rd
P0735	Incorrect 5 th Gear ratio	Yes	DNS, Attempt 6 th , then 3 rd , then 2 nd
P0736	Incorrect Reverse Gear ratio	Yes	DNS, Lock in Neutral
P0741	Torque Converter Clutch System Stuck Off	Yes	None
P0776	Pressure Control Solenoid 2 Stuck Off	Yes	DNS, RPR
P0777	Pressure Control Solenoid 2 Stuck On	Yes	DNS, RPR
P0796	Pressure Control Solenoid 3 Stuck Off	Yes	DNS, RPR
P0797	Pressure Control Solenoid 3 Stuck On	Yes	DNS, RPR
P0842	Transmission Pressure Switch 1 Circuit Low	Yes	DNS, Lock in current range
P0843	Transmission Pressure Switch 1 Circuit High	Yes	DNS, Lock in current range
P0847	Transmission Pressure Switch 2 Circuit Low		
P0848	Transmission Pressure Switch 2 Circuit High		
P088A	Transmission Fluid Filter Deteriorated		
P088B	Transmission Fluid Filter Very Deteriorated		
P0880	TCM Power Input Signal	No	None
P0881	TCM Power Input Signal Performance	No	None
P0882	TCM Power Input Signal Low	Yes	DNS, SOL OFF (hydraulic default)
P0883	TCM Power Input Signal High	No	None
P0894	Transmission Component Slipping	Yes	DNS, Lock in first
P0960	Pressure Control Solenoid Main Mod Control Circuit Open	Yes	None
P0961	Pressure Control Solenoid (PCS) MM System Performance		
P0962	Pressure Control Solenoid Main Mod Control Circuit Low	Yes	DNS, SOL OFF (hydraulic default)
P0963	Pressure Control Solenoid Main Mod Control Circuit High	Yes	None
P0964	Pressure Control Solenoid 2 (PCS2) Control Circuit Open	Yes	DNS, SOL OFF (hydraulic default)
P0965	Pressure Control Solenoid (PCS) 2 System Performance		
P0966	Pressure Control Solenoid 2 (PCS2) Control Circuit Low	Yes	DNS, SOL OFF (hydraulic default)
P0967	Pressure Control Solenoid 2 (PCS2) Control Circuit High	Yes	DNS, SOL OFF (hydraulic default)
P0968	Pressure Control Solenoid 3 (PCS3) Control Circuit Open	Yes	DNS, SOL OFF (hydraulic default)
P0969	Pressure Control Solenoid (PCS) 3 System Performance		
P0970	Pressure Control Solenoid 3 (PCS3) Control Circuit Low	Yes	DNS, SOL OFF (hydraulic default)
P0971	Pressure Control Solenoid 3 (PCS3) Control Circuit High	Yes	DNS, SOL OFF (hydraulic default)
P0973	Shift Solenoid 1 (SS1) Control Circuit Low	Yes	DNS, SOL OFF (hydraulic default)
P0974	Shift Solenoid 1 (SS1) Control Circuit High	Yes	DNS, SOL OFF (hydraulic default)

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DTC	Description	CHECK TRANS Light	Inhibited Operation Description
P0975	Shift Solenoid 2 (SS2) Control Circuit Open	Yes	7-speed: Allow 2 through 6, N, R
P0976	Shift Solenoid 2 (SS2) Control Circuit Low	Yes	7-speed: Allow 2 through 6, N, R Inhibit TCC operation
P0977	Shift Solenoid 2 (SS2) Control Circuit High	Yes	7-speed: Allow 2 through 6, N, R
P0989	Retarder Pressure Sensor Failed Low	No	None
P0990	Retarder Pressure Sensor Failed High	No	None
P1739	Incorrect Low Gear Ratio	Yes	Command 2 nd and allow shifts 2 through 6, N, R
P1891	Throttle Position Sensor PWM Signal Low Input	No	Use default throttle values
P1892	Throttle Position Sensor PWM Signal High Input	No	Use default throttle values
P2184	Engine Coolant Temperature Sensor Circuit Low Input	No	Use default engine coolant values
P2185	Engine Coolant Temperature Sensor Circuit High Input	No	Use default engine coolant values
P2637	Torque Management Feedback Signal (SEM)	Yes	Inhibit SEM
P2641	Torque Management Feedback Signal (LRTP)	Yes	Inhibit LRTP
P2670	Actuator Supply Voltage 2 (HSD2) Low	Yes	DNS, SOL OFF (hydraulic default)
P2671	Actuator Supply Voltage 2 (HSD2) High	Yes	DNS, SOL OFF (hydraulic default)
P2685	Actuator Supply Voltage 3 (HSD3) Low	Yes	DNS, SOL OFF (hydraulic default)
P2686	Actuator Supply Voltage 3 (HSD3) High	Yes	DNS, SOL OFF (hydraulic default)
P2714	Pressure Control Solenoid 4 (PCS4) Stuck Off	Yes	DNS, RPR
P2715	Pressure Control Solenoid 4 (PCS4) Stuck On	Yes	DNS, SOL OFF (hydraulic default)
P2718	Pressure Control Solenoid 4 (PCS4) Control Circuit Open	Yes	DNS, SOL OFF (hydraulic default)
P2719	Pressure Control Solenoid (PCS) 4 System Performance		
P2720	Pressure Control Solenoid 4 (PCS4) Control Circuit Low	Yes	DNS, SOL OFF (hydraulic default)
P2721	Pressure Control Solenoid 4 (PCS4) Control Circuit High	Yes	DNS, SOL OFF (hydraulic default)
P2723	Pressure Control Solenoid 1 (PCS1) Stuck Off	Yes	DNS, RPR
P2724	Pressure Control Solenoid 1 (PCS1) Stuck On	Yes	DNS, RPR
P2727	Pressure Control Solenoid 1 (PCS1) Control Circuit Open	Yes	DNS, SOL OFF (hydraulic default)
P2728	Pressure Control Solenoid (PCS) 1 System Performance		
P2729	Pressure Control Solenoid 1 (PCS1) Control Circuit Low	Yes	DNS, SOL OFF (hydraulic default)
P2730	Pressure Control Solenoid 1 (PCS1) Control Circuit High	Yes	DNS, SOL OFF (hydraulic default)
P2736	Pressure Control Solenoid 5 (PCS5) Control Circuit Open	Yes	Inhibit retarder operation
P2737	Pressure Control Solenoid (PCS) 5 System Performance		
P2738	Pressure Control Solenoid 5 (PCS5) Control Circuit Low	Yes	Allow 2 through 6, N, R. Inhibit retarder and TCC operation
P2739	Pressure Control Solenoid 5 (PCS5) Control Circuit High	Yes	Inhibit retarder operation
P2740	Retarder Oil Temperature Hot	No	None
P2742	Retarder Oil Temperature Sensor Circuit – Low Input	No	Use default retarder temp values
P2743	Retarder Oil Temperature Sensor Circuit – High Input	No	Use default retarder temp values
P2761	TCC PCS Control Circuit Open	Yes	Inhibit TCC operation
P2762	TCC PCS Control Circuit Range / Performance		
P2763	TCC PCS Control Circuit High	Yes	Inhibit TCC operation
P2764	TCC PCS Control Circuit Low	Yes	7-speed: Allow 2 through 6, N, R. Inhibit TCC operation
P2772	Four Wheel Drive Low Switch Circuit Performance		
P278A	Kickdown Input Failed ON	No	Inhibit kickdown operation

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DTC	Description	CHECK TRANS Light	Inhibited Operation Description
P2793	Gear Shift Direction Circuit	Yes	Ignores PWM input from shift selector
P2808	Pressure Control Solenoid 6 (PCS6) Stuck Off	Yes	DNS, RPR
P2809	Pressure Control Solenoid 6 (PCS6) Stuck On	Yes	DNS, RPR
P2812	Pressure Control Solenoid 6 (PCS6) Control Circuit Open	Yes	DNS, SOL OFF (hydraulic default)
P2813	Pressure Control Solenoid (PCS) 6 System Performance		
P2814	Pressure Control Solenoid 6 (PCS6) Control Circuit Low	Yes	DNS, SOL OFF (hydraulic default)
P2815	Pressure Control Solenoid 6 (PCS6) Control Circuit High	Yes	DNS, SOL OFF (hydraulic default)
U0001	Hi Speed CAN Bus Reset Counter Overrun (IESCAN)	No	Use default values, inhibit SEM
U0010	CAN BUS Reset Counter Overrun	No	Use default values, inhibit SEM
U0100	Lost Communications with ECM/PCM (J1587)	Yes	Use default values
U0103	Lost Communication with Gear Shift Module (Shift Selector) 1	Yes	Maintain range selected, observe gear shift direction circuit
U0115	Lost Communication with ECM	Yes	Use default values
U0291	Lost Communication with Gear Shift Module (Shift Selector) 2	Yes	Maintain range selected, observe gear shift direction circuit
U0304	Incompatible Gear Shift Module 1 (Shift Selector) ID	Yes	Ignore shift selector inputs
U0333	Incompatible Gear Shift Module 2 (Shift Selector) ID	Yes	Ignore shift selector inputs
U0404	Invalid Data Received From Gear Shift Module (Shift Selector) 1	Yes	Maintain range selected, observe gear shift direction circuit
U0592	Invalid Data Received From Gear Shift Module (Shift Selector) 2	Yes	Maintain range selected, observe gear shift direction circuit

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ALLISON TRANSMISSION OIL LEVEL CHECK USING THE PUSHBUTTON SHIFT SELECTOR

Oil level codes are obtained as follows:

1. Park vehicle on a level surface, select «N» (neutral) on the pushbutton shift selector and apply parking brake.
2. Press simultaneously the ▲ (Up) and ▼ (Down) arrow buttons once.
3. Oil level codes are displayed in 2 minutes (e.g. display will flash and 8, 7, 6, 5, ...; countdown will occur during the 2 minutes) once the following parameters are met:
 - **Waiting time, vehicle must be stationary for at least 2 minutes to allow the oil to settle;**
 - **Engine at idle;**
 - **Oil at normal operating temperature, between 140°F (60°C) and 220°F (104°C);**
 - **Transmission in «N» (Neutral);**
 - **Transmission output shaft stopped;**
 - **Oil level sensor present and working.**

After 2 minutes, the display will flash one of the codes shown below:

CODE	CAUSE OF CODE
OL...OK	Oil level is correct
OL...LO... 1	Oil Level is LOw 1 quart
OL...LO... 2	Oil Level is LOw 2 quart
OL...LO... 3	Oil Level is LOw 3 quarts
OL...LO... 4	Oil Level is LOw 4 or more quarts
OL...HI... 1	Oil Level is Hlgh 1 quart
OL...HI... 2	Oil Level is Hlgh 2 quarts
OL...HI... 3	Oil Level is Hlgh 3 or more quarts
OL... – (fc)	Oil Level is invalid. Source of invalid reading is defined by a two-character fault code (fc)

NOTE

Note that the quantities LO 4 and HI 3 are the largest values displayed and that the actual variation in oil level may exceed these numbers.

NOTE

Failure to meet one of the above parameters will stop the two minute countdown. One of the codes shown hereafter will indicate the cause of the countdown interruption. Once all parameters are met, the countdown will continue from where it left off.

If the fluid level check cannot be completed, an Invalid for Display fault is reported. This condition is reflected by the display of "OL", followed by "–", followed by one or two additional characters. The displayed characters define the cause of the fault, which may be either a system malfunction or an improper condition for conducting the check.

CODE	CAUSE OF CODE
OL...-...0X	Waiting period is not complete
OL...-...EL	Engine speed (rpm) too low
OL...-...EH	Engine speed (rpm) too high
OL...-...SN	N (neutral) must be selected
OL...-...TL	Sump oil temperature too low
OL...-...TH	Sump oil temperature too high
OL...-...SH	Output shaft rotation
OL...-...FL	Sensor failure

EXITING THE FLUID LEVEL DISPLAY MODE

To exit the Oil Level Display Mode, press any range button: «R», «N» or «D» at any time.

CONTROL SYSTEM PROGNOSTICS

The transmission control system includes the provision for the user to monitor various transmission operating parameters. Transmission operating parameters monitored by the prognostics feature are:

- Oil Life Monitor
- Filter Life Monitor
- Transmission Health Monitor

NOTE

*The prognostics package requires the use of TranSynd™ or an Allison approved TES-295 licensed fluid in the transmission and Allison High Capacity filters. If any other fluids or filters are used, Prognostic mode **must be disabled**. Prognostic information will not be accurate with any other fluids or filters and could result in missed maintenance activities resulting in transmission damage.*

Refer to TES 295 Approved Fluids list, found under the Service/Fluids heading on the home page of the Allison Transmission web site.

www.allisontransmission.com

When a specified threshold is detected for any of the serviceable conditions, the TRANSMISSION SERVICE indicator  is illuminated to alert the operator. Failure to attend to the service condition and reset the TRANSMISSION SERVICE indicator within a defined operating period will result in illumination of the CHECK TRANS light on the dashboard telltale panel, indicating the increased probability that the service condition will develop into a more serious condition.

To access the Prognostic Mode functions, simultaneously press the  (Up) and  (Down) arrow buttons repeatedly. See the reference table at the end of this section.

OIL LIFE MONITOR

The display message denotes the calculated remaining life of the transmission fluid. This value is based on the established life for the required baseline fluid, and then is continuously adjusted for cumulative effects of such operating parameters as operating time, retarder operation, output shaft revolutions and shift frequency.

Display: The display is a two-digit number, denoting percentage of the fluid life which remains. New fluid is displayed as 99%.

The TRANSMISSION SERVICE indicator  will be illuminated, denoting a required change of transmission fluid, when the remaining fluid life reaches approximately 1–2 %. The indicator will be lit steadily upon each initialization of the TCM, and will remain on steady for approximately 1–2 minutes after the first selection of “D” (drive) range each time, until service is performed and the indicator is reset.

Failure to perform maintenance and reset the TRANSMISSION SERVICE indicator within a defined period will result in the illumination of the CHECK TRANS light on the dashboard telltale panel and diagnostic code P0897 Transmission Fluid at Limit will be set.

Reset: The TRANSMISSION SERVICE indicator can be reset by a message over the SAE J1939 communication interface, with the Allison DOC™ for PC diagnostic program, or by depressing and holding the MODE button for ten (10) seconds while the Oil Life Monitor function is displayed. It may also be reset by selecting N-D-N-D-N-R-N on the shift selector, pausing briefly (less than 3 seconds) between each selector movement, with the ignition on and the engine not running.



CAUTION

Required calendar-based oil & filter change intervals (based on month) still apply because Oil Life Monitor function cannot measure time while ignition power is OFF.

If the Oil Life Monitor function has not indicated the need for a fluid change before 60 month (five years) have passed, it will be necessary to change the fluid and filters per calendar requirements and reset the system.

FILTER LIFE MONITOR

The display message denotes operating status of the transmission main fluid filter, based on the measured pressure drop across the filter. The feature is not functional at transmission sump temperatures below 40 °C (105 °F). Both the main and lube filters **must be** changed when the TRANSMISSION SERVICE indicator  shows the main filter should be changed.

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Display: An acceptable filter life status is displayed as "OK". An unacceptable filter life status is displayed as "LO".

Once the programmed threshold for maximum filter pressure drop has been observed and verified, the diagnostic code P088A Transmission Filter At/Over Limit will be recorded to indicate that the filter has reached the end of its designed life. At the next initialization of the TCM, the TRANSMISSION SERVICE indicator **⚡** will flash for approximately 1–2 minutes after the first selection of "D" (drive) range. Thereafter, the indicator will illuminate and flash upon each TCM initialization, continuing to flash for 1–2 minutes after the first selection of a drive range each time, until service is performed and the indicator is reset.

Failure to perform maintenance and reset the monitor after a calibration-defined number of warnings will result in the illumination of the CHECK TRANS light on the dashboard telltale panel and diagnostic code P088B will be recorded to indicate a highly deteriorated filter.

Reset: The feature will reset automatically when the main fluid filter has been changed and the pressure drop across the filter no longer exceeds the threshold value. A manual reset can be performed by depressing and holding the MODE button for ten (10) seconds while the Filter Life Monitor function is displayed. It may also be reset by selecting N-R-N-R-N-D-N on the shift selector, pausing briefly (less than 3 seconds) between each selector movement, with the ignition on and the engine not running.

TRANSMISSION HEALTH MONITOR

The display message denotes clutch life status, as determined by monitored changes and the calculated running clearance of the transmission clutches C1, C2, C3, C4 & C5.

Display: An acceptable clutch life status is displayed as "OK". An unacceptable clutch life status is displayed as "LO". The specific clutch(es) for which the function indicates "LO" cannot be identified with the shift selector. Allison DOC™ for PC-Service Tool displays clutch condition as OK or NOT OK for each clutch, C1 through C5.

The TRANSMISSION SERVICE indicator will be illuminated, indicating the need for clutch maintenance, when the remaining clutch life reaches approximately 10%, or if the running clearance exceeds a maximum value which may indicate a non-wear-related issue. Thereafter, the indicator will be lit upon each initialization of the TCM, and will remain on steady during all vehicle operation until service is performed and the indicator is reset.

Failure to perform maintenance and reset the monitor after a number of warnings will result in the illumination of the CHECK TRANS light on the dashboard telltale panel and diagnostic code P2789 Clutch Adaptive learning at Limit will be set.

Reset: The feature will reset automatically upon elimination of the clutch clearance condition which initiated it. The indicator can also be manually reset using the Allison DOC™ for PC diagnostics program if necessary.

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▲ (up) & ▼ (down) arrow buttons pressed simultaneously	Description	SELECT	MONITOR
1st press	Allison transmission oil level check Other codes will be displayed	" _ "	" _ "
2nd press	Oil Life Monitor Oil life remaining will range from 99% down to 00%	" O " Some number from 9 to 0	" M " Some number from 9 to 0
3rd press	Filter Life Monitor Present life of filter is OK Present life of filter is low	" F " " O " " L "	" M " " K " " O "
4th press	Transmission Health Monitor Shows "OK" until remaining life of one or more of the clutch(es) wear enough so that the programming changes One or more of the clutches C1 through C5 have worn enough to change the program	" O " " O " " L "	" K " " K " " O "
5th press	Display of diagnostic codes Other codes will be displayed	" d "	" 1 "

DDEC VI DIAGNOSTIC CODES

DIAGNOSTIC SYSTEM

Diagnostics is a standard feature of DDEC VI. The purpose of this feature is to provide information for problem identification and problem solving in the form of a code. The MCM and CPC continuously perform self diagnostic checks and monitor the other system components. Information for problem identification and problem solving is enhanced by the detection of faults, retention of fault codes and separation of active from inactive codes.

The engine-mounted MCM includes control logic to provide overall engine management. System diagnostic checks are made at ignition on and continue throughout all engine operating modes. Sensors provide information to the MCM and CPC regarding various engine and vehicle performance characteristics. The information is used to regulate engine and vehicle performance, provide diagnostic information, and activate the engine protection system.

The DDEC VI on-board diagnostic system accessories include the following:

- Check Engine telltale light (AWL);
- Stop Engine telltale light (RSL);
- Stop Engine Override switch (SEO);
- Diagnostic Data Link (DDL) connectors.

The AWL is illuminated and a code is stored if an electronic system fault occurs. This indicates the problem should be diagnosed as soon as possible. The CPC illuminates the AWL and RSL and stores a malfunction code if a potentially engine damaging fault is detected. These codes can be accessed in one of four ways:

- Commercially available J1587/J1939 diagnostic tools.
- Detroit Diesel Diagnostic Link® (DDDL 7.0).
- Flashing the AWL and RSL with the SEO/Diagnostic Request Switch.
- Dashboard's Message Center Display (MCD).

READING DIAGNOSTIC CODES – FLASHING LIGHT METHOD

DDEC VI makes use of two types of codes: Active and inactive. The difference between the two types of codes is as follows:

Active Codes: Codes that are currently keeping the Check Engine or Stop Engine telltale light illuminated. Active codes are flashed via the Stop Engine Light when checked with the stop-engine-override switch.

Inactive Codes: These are all the codes logged in the CPC, which have previously occurred, (whether or not they are currently turning on the Stop or Check Engine Light). Inactive codes are flashed via the Check Engine telltale light when checked with the stop-engine-override switch.

In most instances, only the DDR can provide the information necessary for a quick diagnosis of the problem. If you just need to read out codes, however, and do not have a DDR available, the following procedure will let you read out codes. Make sure the rear-starting switch (located in the engine compartment) is in the normal position. With the ignition ON, the engine idling or engine shut-off, momentarily depress the Stop Engine Override (SEO) switch. Active codes will be flashed on the stop engine telltale, followed by the inactive codes being flashed on the check-engine telltale panel. The cycle repeats itself until the operator depresses the stop engine override switch again.

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Flashing codes provide a four digit number. Each fault code is flashed twice in order to help with counting the flashes. If there are no active faults or if there are no inactive faults the number “3” is flashed once followed by an ~3s delay.

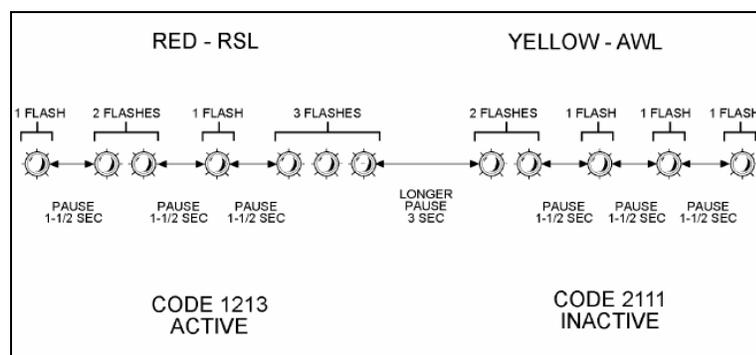


Figure 1: flashing faults codes

Refer to DDEC Troubleshooting Manual 6SE567 for more information and SAE codes.

NOTE

Active codes are flashed in ascending numerical flash code order. Inactive codes are flashed in most recent to least recent order.

DDEC VI CPC DIAGNOSTIC CODES LIST

SPN	FMI	PID/SID	PID/SID ID	FLASH CODES	FAULT DESCRIPTION
70	2	PID	70	2111	Park Brake Status Not Plausible (Vehicle Moving)
70	19	SID	234	2112	J1939 Park Brake Switch Signal from Source #1 is erratic
70	13	SID	234	2112	J1939 Park Brake Switch Signal from Source #1 is missing
70	19	SID	234	2112	J1939 Park Brake Switch Signal from Source #2 is erratic
70	13	SID	234	2112	J1939 Park Brake Switch Signal from Source #2 is missing
70	19	SID	234	2112	J1939 Park Brake Switch Signal from Source #3 is erratic
70	13	SID	234	2112	J1939 Park Brake Switch Signal from Source #3 is missing
84	21	PID	84	2113	Vehicle Speed Failure
84	3	PID	84	2113	Vehicle Speed Sensor Circuit Failed High
84	4	PID	84	2113	Vehicle Speed Sensor Circuit Failed Low
84	2	PID	84	2113	VSS Anti Tamper Detection via Virtual Gear Ratio
84	8	PID	84	2113	VSS Anti Tamper Detection via Fixed Frequency Device

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SPN	FMI	PID/SID	PID/SID ID	FLASH CODES	FAULT DESCRIPTION
84	6	PID	84	2113	VSS Anti-Tamper Detection via ABS Vehicle Speed Comparison
84	19	PID	84	2113	J1939 Wheel-Based Vehicle Speed Signal from Source#1 is erratic
84	13	PID	84	2113	J1939 Wheel-Based Vehicle Speed Signal from Source#1 is missing
84	19	SID	84	2113	J1939 Wheel-Based Vehicle Speed Signal from Source#2 is erratic
84	13	PID	84	2113	J1939 Wheel-Based Vehicle Speed Signal from Source#2 is missing
84	19	PID	84	2113	J1939 Wheel-Based Vehicle Speed Signal from Source#3 is erratic
84	13	PID	84	2113	J1939 Wheel-Based Vehicle Speed Signal from Source#3 is missing
84	20	PID	84	2113	Vehicle Speed Sensor Drifted High Error (VSS signal not plausible)
91	13	PID	91	2114	Accelerator Pedal Learn Error
91	3	PID	91	2114	Accelerator Pedal Circuit Failed High
91	4	PID	91	2114	Accelerator Pedal Circuit Failed Low
91	8	PID	91	2114	Pwm Accelerator Pedal Signal 1 Frequency Out Of Range
91	14	PID	91	2114	Pwm Accelerator Pedal Not Learned
91	7	PID	91	2114	Pwm Accelerator Pedal Idle Not Recognized
91	31	PID	91	2114	Pwm Accelerator Pedal Learned Range to Large
91	3	PID	91	2114	Accelerator Pedal Signal Circuit Failed High
91	9	SID	231	2615	J1939 EEC2 Message is missing
98	0	PID	98	2115	Oil Level High
98	18	PID	98	2115	Oil Level Low
98	1	PID	98	2115	Oil Level Very Low
100	18	PID	100	2121	Oil Pressure Low
100	1	PID	100	2121	Oil Pressure Very Low
107	0	PID	107	2122	Air Filter Restriction High
107	4	PID	107	2122	Air Filter Signal Circuit Failed Low
107	3	PID	107	2122	Air Filter Signal Circuit Failed High
110	16	PID	110	2123	Coolant Temperature High
110	0	PID	110	2123	Coolant Temperature Very High
111	18	PID	111	2124	Coolant Level Low
111	3	PID	111	2124	Coolant Level Circuit Failed High
111	4	PID	111	2124	Coolant Level Circuit Failed Low
111	1	PID	111	2124	Coolant Level Very Low
168	0	PID	168	2125	Battery Voltage Very Low

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SPN	FMI	PID/SID	PID/SID ID	FLASH CODES	FAULT DESCRIPTION
168	0	PID	168	2125	Battery Voltage High
168	18	PID	168	2125	Battery Voltage Low
168	14	PID	168	2125	Opt Idle Detected Charging System or Battery Failure
168	14	PID	168	2125	ECU powerdown not completed (Main Battery Terminal Possibly Floating)
171	2	PID	171	2131	Ambient Temperature Sensor Data Erratic
171	14	PID	171	2131	J1587 Ambient Air Temp Sensor Data Not Received This Ign Cycle
171	9	PID	171	2131	J1587 Ambient Air Temp Sensor Data Message Stopped Arriving
191	9	SID	231	2615	J1939 ETC1 Message is missing
191	19	SID	231	2132	J1939 Transmission Output Shaft Speed Signal is erratic
191	13	SID	231	2132	J1939 Transmission Output Shaft Speed Signal is missing
247	9	PID	247	2615	MCM Engine Hours Data not received or stopped arriving
247	10	PID	247	2615	MCM Engine Hours Data increasing at an implausible rate
247	0	PID	247	2615	MCM Engine Hours Data higher than expected
247	1	PID	247	2615	MCM Engine Hours Data lower than expected
523	19	PID	163	2133	J1939 Transmission Current Gear Signal is erratic
523	13	PID	163	2133	J1939 Transmission Current Gear Signal is missing
524	9	SID	231	2615	J1939 ETC2 Message is missing
527	9	SID	231	2615	J1939 CCVS Message from Source #1 is missing
527	9	SID	231	2615	J1939 CCVS Message from Source #2 is missing
527	9	SID	231	2615	J1939 CCVS Message from Source #3 is missing
558	2	SID	230	2134	Idle Validation Switch Inputs Reversed
558	5	SID	230	2134	Idle Validation Switch 2 Circuit Failed Low
558	6	SID	230	2134	Idle Validation Switch 2 Circuit Failed High
558	4	SID	230	2134	Idle Validation Switch 1 Circuit Failed Low
558	3	SID	230	2134	Idle Validation Switch 1 Circuit Failed High
596	19	SID	244	2135	J1939 Cruise Control Enable Switch Signal from Source #1 is erratic
596	13	SID	244	2135	J1939 Cruise Control Enable Switch Signal from Source #1 is missing
596	19	SID	244	2135	J1939 Cruise Control Enable Switch Signal from Source #2 is erratic
596	13	SID	244	2135	J1939 Cruise Control Enable Switch Signal from Source #2 is missing

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SPN	FMI	PID/SID	PID/SID ID	FLASH CODES	FAULT DESCRIPTION
596	19	SID	244	2135	J1939 Cruise Control Enable Switch Signal from Source #3 is erratic
596	13	SID	244	2135	J1939 Cruise Control Enable Switch Signal from Source #3 is missing
597	2	SID	246	2141	Service Brake Status Not Plausible
597	19	SID	246	2141	J1939 Service Brake Switch Signal from Source #1 is erratic
597	13	SID	246	2141	J1939 Service Brake Switch Signal from Source #1 is missing
597	19	SID	246	2141	J1939 Service Brake Switch Signal from Source #2 is erratic
597	13	SID	246	2141	J1939 Service Brake Switch Signal from Source #2 is missing
597	19	SID	246	2141	J1939 Service Brake Switch Signal from Source #3 is erratic
597	13	SID	246	2141	J1939 Service Brake Switch Signal from Source #3 is missing
599	4	SID	243	2142	Cruise Control SET and RESUME Circuits Failed Low
600	19	SID	243	2143	J1939 Cruise Control Coast Switch Signal from Source #1 is erratic
600	13	SID	243	2143	J1939 Cruise Control Coast Switch Signal from Source #1 is missing
600	19	SID	243	2143	J1939 Cruise Control Coast Switch Signal from Source #2 is erratic
600	13	SID	243	2143	J1939 Cruise Control Coast Switch Signal from Source #2 is missing
600	19	SID	243	2143	J1939 Cruise Control Coast Switch Signal from Source #3 is erratic
600	13	SID	243	2143	J1939 Cruise Control Coast Switch Signal from Source #3 is missing
602	19	SID	242	2144	J1939 Cruise Control Accelerate Switch Signal from Source #1 is erratic
602	13	SID	242	2144	J1939 Cruise Control Accelerate Switch Signal from Source #1 is missing
602	19	SID	242	2144	J1939 Cruise Control Accelerate Switch Signal from Source #2 is erratic
602	13	SID	242	2144	J1939 Cruise Control Accelerate Switch Signal from Source #2 is missing
602	19	SID	242	2144	J1939 Cruise Control Accelerate Switch Signal from Source #3 is erratic
602	13	SID	242	2144	J1939 Cruise Control Accelerate Switch Signal from Source #3 is missing
608	14	SID	250	2145	J1708 Data Link Failure
609	12	SID	233	2145	CPC2 Hardware Failure
615	9	SID	231	2615	J1939 DM1 Message from Transmission is missing

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SPN	FMI	PID/SID	PID/SID ID	FLASH CODES	FAULT DESCRIPTION
625	13	SID	248	2151	ECAN ID_1629 Diagnostic Message Not Received This Ignition Cycle
625	9	SID	248	2151	ECAN ID_1629 Diagnostic Message No Longer Being Received
625	10	SID	248	2151	ECAN ID_1629 Reporting Inconsistent Number of Frames
625	2	SID	248	2151	ECAN ID_1629 Diagnostic Message Reporting Data Not Available
625	14	SID	248	2151	ECAN ID_1629 Diagnostic Message Reporting an Unknown MUID
625	9	SID	248	2151	Incorrect MCM System ID Received
625	9	SID	248	2151	MCM System ID Not Received or Stopped Arriving
625	4	SID	248	2151	ECAN Link Circuit Failure
628	14	SID	254	2151	XFLASH Static Fault Code Memory Page Read Write Failure
628	13	SID	155	2615	20ms ECU OS Task Locked in an Endless Loop
628	13	SID	155	2615	20ms ECU OS Task Timed out Prior to Completion
628	13	SID	155	2615	1000ms ECU OS Task Locked in an Endless Loop
628	13	SID	155	2615	1000ms ECU OS Task Timed out Prior to Completion
629	2	SID	254	2151	CPC Hardware/Software Mismatch
629	12	SID	254	2151	DDEC Data Xflash Write Error. Replace CPC2.
630	2	SID	253	2152	EEPROM Checksum Failure
630	2	SID	253	2152	EEPROM Checksum Failure for the SCR Block
630	13	SID	253	2152	SCR Number Out of Range
630	14	SID	155	2615	MCM Fault Codes Unavailable via J1939 and J1587
630	14	SID	155	2615	MCM Fault Code Table Inconsistent - Upgrade MCM Software
630	14	SID	155	2615	Insufficient Static Fault Code Storage Memory - Upgrade CPC Software
630	14	SID	155	2615	MCM Fault Code Table Inconsistent - Upgrade MCM Software
639	14	SID	231	2153	J1939 Data Link Failure
701	3	SID	26	2211	Digital Output 4 09 Circuit Failed High
701	4	SID	26	2211	Digital Output 4 09 Circuit Failed Low
702	3	SID	40	2212	Digital Output 3 17 Circuit Failed High
702	4	SID	40	2212	Digital Output 3 17 Circuit Failed Low
703	3	SID	51	2213	Digital Output 3 09 Circuit Failed High
703	4	SID	51	2213	Digital Output 3 09 Circuit Failed Low

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SPN	FMI	PID/SID	PID/SID ID	FLASH CODES	FAULT DESCRIPTION
704	3	SID	52	2214	Digital Output 4 07 Circuit Failed High
704	4	SID	52	2214	Digital Output 4 07 Circuit Failed Low
705	3	SID	53	2215	Digital Output 1 13 Circuit Failed High
705	4	SID	53	2215	Digital Output 1 13 Circuit Failed Low
706	3	SID	54	2221	Digital Output 3 10 Circuit Failed High
706	4	SID	54	2221	Digital Output 3 10 Circuit Failed Low
707	3	SID	55	2222	Digital Output 2 10 Circuit Failed High (CEL / AWL Lamp)
707	4	SID	55	2222	Digital Output 2 10 Circuit Failed Low (CEL / AWL Lamp)
708	3	SID	56	2223	Digital Output 3 12 Circuit Failed High
708	4	SID	56	2223	Digital Output 3 12 Circuit Failed Low
709	3	SID	257	2224	Digital Output 3 16 Circuit Failed High
709	4	SID	257	2224	Digital Output 3 16 Circuit Failed Low
710	3	SID	258	2225	Digital Output 4 06 Circuit Failed High
710	4	SID	258	2225	Digital Output 4 06 Circuit Failed Low
711	3	SID	259	2231	Digital Output 1 05 Circuit Failed High
711	4	SID	259	2231	Digital Output 1 05 Circuit Failed Low
712	3	SID	260	2232	Digital Output 1 04 Circuit Failed High
712	4	SID	260	2232	Digital Output 1 04 Circuit Failed Low
713	3	SID	261	2234	Digital Output 3 07 Circuit Failed High
713	4	SID	261	2234	Digital Output 3 07 Circuit Failed Low
713	5	SID	261	2234	Digital Output 3 07 Open Circuit
713	7	SID	261	2234	TOP2 Shift Failure
714	3	SID	262	2235	Digital Output 3 08 Circuit Failed High
714	4	SID	262	2235	Digital Output 3 08 Circuit Failed Low
714	5	SID	262	2235	Digital Output 3 08 Open Circuit
715	3	SID	263	2241	Digital Output 4 10 Circuit Failed High
904	9	SID	231	2615	J1939 EBC2 Message from ABS is missing
904	19	SID	231	2242	J1939 Front Axle Speed Signal is erratic
904	13	SID	231	2242	J1939 Front Axle Speed Signal is missing
972	2	SID	203	2243	Throttle inhibit switch signal not plausible due to excess vehicle speed
973	9	SID	231	2615	J1939 EBC1 Message is missing
973	13	SID	231	2244	J1939 Engine Retarder Selection Signal Missing
973	19	SID	231	2244	J1939 Engine Retarder Selection Signal Erratic
974	2	PID	372	2245	Remote Accelerator Pedal Supply Voltage Out of Range
974	3	PID	372	2245	Remote Accelerator Pedal Circuit Failed High
974	4	PID	372	2245	Remote Accelerator Pedal Circuit Failed Low
981	0	SID	155	2311	PTO CC+ and CC- Switches Pressed Simultaneously
986	9	SID	231	2615	J1939 CM1 Message is missing

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SPN	FMI	PID/SID	PID/SID ID	FLASH CODES	FAULT DESCRIPTION
1267	4	SID	123	2312	Digital Output 4 10 Circuit Failed Low
1267	3	SID	123	2312	Digital Output 4 10 Circuit Failed Open
1321	4	SID	128	2314	Starter Lockout Output Shorted to Ground
1321	3	SID	128	2314	Starter Lockout Output Open Circuit
1590	19	SID	155	2615	Adaptive Cruise Control Message Not Received
1590	9	SID	231	2615	Adaptive Cruise Control Device Reporting Error
1624	9	SID	231	2615	J1939 TCO1 Message is missing
1624	19	SID	231	2315	J1939 Tachograph Vehicle Speed Signal is erratic
1624	13	SID	231	2315	J1939 Tachograph Vehicle Speed Signal is missing
1663	7	SID	123	2321	Optimized Idle Safety Loop Faulted
1716	9	SID	231	2615	J1939 ERC1 Message is missing
1845	9	SID	231	2615	J1939 TCFG2 Message is missing
2623	14	PID	91	2322	Pwm Accelerator Pedal GAS1 and GAS2 Signal Missing
2623	8	PID	91	2322	Pwm Accelerator Pedal Signal 2 Frequency Out Of Range
2900	9	SID	231	2615	J1939 ETC7 Message is missing
3510	3	SID	211	2333	Accelerator Pedal Supply Voltage Circuit Failed High
3510	4	SID	211	2333	Accelerator Pedal Supply Voltage Circuit Failed Low
3510	4	SID	211	2333	Pwm Accelerator Pedal Supply Voltage Missing
3510	3	SID	211	2333	Accelerator Pedal Supply Voltage Circuit Failed High
3606	9	SID	231	2615	J1939 ESS Message is missing
3695	2	SID	155	2334	Manual DPF Regen and DPF Inhibit Switch Rationality Fault
3695	19	SID	155	2334	DPF Regen Inhibit MUX Switch Message Contains Data Error Indicator
3695	13	SID	155	2334	DPF Regen Inhibit MUX Switch Message Contains SNV Indicator
3695	9	SID	155	2334	DPF Regen Inhibit MUX Switch Message Stopped Arriving
3695	14	SID	155	2334	DPF Regen Inhibit MUX Switch Message Not Received this Ign Cycle
3696	19	SID	155	2335	DPF Regen Force MUX Switch Message Contains Data Error Indicator
3696	13	SID	155	2335	DPF Regen Force MUX Switch Message Contains SNV Indicator
3696	9	SID	155	2335	DPF Regen Force MUX Switch Message Stopped Arriving
3696	14	SID	155	2335	DPF Regen Force MUX Switch Message Not Received this Ign Cycle

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DDEC VI MCM DIAGNOSTIC CODES LIST

SPN	FMI	PID/ SID	PID/SID ID	FLASH CODE	FAULT DESCRIPTION
27	4	PID	27	1111	EGR Valve Position Circuit Failed Low
27	3	PID	27	1111	EGR Valve Position Circuit Failed High
27	2	PID	27	1111	EGR Valve Position Feedback Failed
27	0	PID	27	1111	EGR Valve Position Feedback Failed (High Box)
27	1	PID	27	1111	EGR Valve Position Feedback Failed (Low Box)
27	14	PID	27	1111	EGR Valve Position Positive Torque Error
27	7	PID	27	1111	EGR Valve Stuck Open
27	19	PID	27	1521	Smart Actuator Indicates EGR Position Error
51	4	SID	51	1112	Intake Air Throttle Circuit Failed Low
51	3	SID	51	1112	Intake Air Throttle Circuit Failed High
51	2	PID	51	1112	Intake Throttle Position Deviation Error
51	0	PID	51	1112	Intake Air Throttle Position High
51	1	PID	51	1112	Intake Air Throttle Position Low
51	7	PID	51	1112	Intake Throttle Auto Calibration Error
94	4	PID	94	1112	Fuel Compensation Pressure Sensor Circuit Failed Low
94	3	PID	94	1112	Fuel Compensation Pressure Sensor Circuit Failed High
94	1	PID	94	1112	Fuel Pressure Too High/Too Low
97	4	PID	97	1615	Water in Fuel Circuit Failed Low
97	3	PID	97	1615	Water in Fuel Circuit Failed High
98	1	PID	98	1114	Oil Level Circuit Failed Low
98	0	PID	98	1114	Oil Level Circuit Failed High
98	13	PID	98	1634	Oil Level Measurement, Configuration Error
98	14	PID	98	1634	Oil Level Measurement, Oil Level Too Low or Too High
100	4	PID	100	1114	Engine Oil Pressure Circuit Failed Low
100	3	PID	100	1114	Engine Oil Pressure Circuit Failed High
100	1	PID	100	1114	Engine Oil Pressure Low
100	2	PID	100	1114	Oil Pressure Plausibility - Engine Running
100	2	PID	100	1114	Oil Pressure Plausibility - Stop
103	2	PID	103	1115	Turbocharger Speed Not Plausible
103	1	PID	103	1115	Turbo Charger Speed Below Threshold (High Box)
103	0	PID	103	1115	Turbo Charger Speed Above Threshold (Low Box)
103	4	PID	103	1115	Turbo Charger Speed Sensor Circuit Failed Low
103	3	PID	103	1115	Turbo Charger Speed Sensor Circuit Failed High
108	4	PID	108	1211	Barometric Pressure Circuit Failed Low
108	3	PID	108	1211	Barometric Pressure Circuit Failed High
108	2	PID	108	1211	Ambient Pressure Plausibility Fault (Low Box)
108	20	PID	108	1211	Ambient Pressure Plausibility Fault (High Box)
110	4	PID	110	1212	Engine Coolant Outlet Temperature Circuit Failed Low
110	3	PID	110	1212	Engine Coolant Outlet Temperature Circuit Failed High
110	0	PID	110	1212	Coolant Temperature High
110	14	PID	110	1212	Coolant Temperature / Engine Oil Temperature Plausibility Fault
110	2	PID	110	1212	Engine Coolant Sensor (OUT), General Temp. Plausibility Error
132	7	PID	132	1213	Intake Air Throttle Valve Closure Detection- Positive Torque
132	14	PID	132	1213	Intake Air Throttle Valve Closure Detection -Braking Condition
132	14	PID	322	1635	HC-Doser Fuel Pressure Not Plausible
132	1	PID	322	1213	Air Mass Flow Too Low
132	13	PID	132	1213	Air Mass Auto Calibration Failed
158	2	PID	43	1214	Ignition Switch Not Plausible
164	4	PID	164	1215	Rail Pressure Governor Sensor Circuit Failed Low
164	3	PID	164	1215	Rail Pressure Governor Sensor Circuit Failed High
164	0	PID	164	1215	Rail Pressure Governor (High Side) Error

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SPN	FMI	PID/ SID	PID/SID ID	FLASH CODE	FAULT DESCRIPTION
164	0	PID	164	1215	Rail Pressure Governor (Low Side) Error
168	1	PID	168	1221	Battery Voltage Low
168	0	PID	168	1221	Battery Voltage High
171	4	PID	171	1222	Ambient Temperature Circuit Failed Low
171	3	PID	171	1222	Ambient Temperature Circuit Failed High
174	4	PID	174	1223	Fuel Temperature Circuit Failed Low
174	3	PID	174	1223	Fuel Temperature Circuit Failed High
174	2	PID	174	1223	Fuel Temperature Sensor, General Temp. Plausibility
174	0	PID	174	1223	Fuel Temperature Too High
175	4	PID	175	1224	Engine Oil Temperature Circuit Failed Low
175	3	PID	175	1224	Engine Oil Temperature Circuit Failed High
175	14	PID	175	1224	Engine Oil Temperature Sensor Plausibility Fault
175	2	PID	175	1224	Engine Oil Temperature Sensor, General Temp. Plausibility
190	2	PID	190	1225	Engine Speed High
354	4	PID	354	1231	Relative Humidity Circuit Failed Low
354	3	PID	354	1231	Relative Humidity Circuit Failed High
411	4	PID	411	1232	EGR Delta Pressure Sensor Circuit Low
411	3	PID	411	1232	EGR Delta Pressure Sensor Circuit High
411	0	PID	411	1232	EGR Differential Pressure Failed (High Box)
411	1	PID	411	1232	EGR Differential Pressure Failed (Low Box)
411	5	PID	411	1232	EGR Sampling Range Failed
411	13	PID	411	1232	EGR Delta Pressure Sensor Out Of Calibration
411	13	PID	411	1232	EGR Delta Pressure Sensor Out Of Calibration
412	3	PID	412	1233	EGR Temperature Sensor Circuit Failed High
412	4	PID	412	1233	EGR Temperature Sensor Circuit Failed Low
412	20	PID	412	1233	EGR Temperature Drift (High Box)
412	21	PID	412	1233	EGR Temperature Drift (Low Box)
412	2	PID	412	1233	EGR Temperature Sensor, General Temp. Plausibility Error
412	0	PID	412	1512	EGR Temperature Very High
412	16	PID	412	1233	EGR Temperature Sensor / Temperature Too High
615	4	SID	155	1615	Reserved Monitoring Unit For Temperature Diagnostics, Circuit Failed Low MU_ISP_T_TBD4_SRL
615	3	SID	155	1615	Reserved Monitoring Unit For Temperature Diagnostics, Circuit Failed High MU_ISP_T_TBD4_SRH
615	4	SID	155	1615	Reserved Monitoring Unit For Temperature Diagnostics, Circuit Failed Low MU_ISP_T_TBD1_SRL
615	3	SID	155	1615	Reserved Monitoring Unit For Temperature Diagnostics, Circuit Failed High MU_ISP_T_TBD1_SRH
615	4	SID	155	1615	Reserved Monitoring Unit For Temperature Diagnostics, Circuit Failed Low MU_ISP_T_TBD2_SRL
615	3	SID	155	1615	Reserved Monitoring Unit For Temperature Diagnostics, Circuit Failed High MU_ISP_T_TBD2_SRH
615	4	SID	155	1615	Reserved Monitoring Unit For Temperature Diagnostics, Circuit Failed Low MU_ISP_T_TBD3_SRL
615	3	SID	155	1615	Reserved Monitoring Unit For Temperature Diagnostics, Circuit Failed High MU_ISP_T_TBD3_SRH
615	4	SID	155	1615	Catalyst Temperature Sensor Circuit High Input (Bank 1 Sensor 1)
615	3	SID	155	1615	Catalyst Temperature Sensor Circuit Low Input (Bank 1 Sensor 1)
615	4	SID	155	1615	Catalyst Temperature Sensor Circuit High (Bank 1 Sensor 2)
615	3	SID	155	1615	Catalyst Temperature Sensor Circuit Low (Bank 1 Sensor 2)
615	4	SID	51	1322	Water Pump 1 Circuit Failed Low
615	3	SID	51	1322	Water Pump 1 Circuit Failed High
615	5	SID	51	1322	Water Pump 1 Circuit Failed Open
615	4	SID	55	1331	Turbo Compound Valve Circuit Failed Low

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SPN	FMI	PID/ SID	PID/SID ID	FLASH CODE	FAULT DESCRIPTION
615	3	SID	55	1331	Turbo Compound Valve Circuit Failed High
615	5	SID	55	1331	Turbo Compound Valve Circuit Failed Open
615	4	SID	259	1335	Turbo Brake Sleeve Circuit Failed Low
615	3	SID	259	1335	Turbo Brake Sleeve Circuit Failed High
615	5	SID	259	1335	Turbo Brake Sleeve Circuit Failed Open
615	4	SID	261	1355	Function 20 Circuit Failed Low
615	3	SID	261	1355	Function 20 Circuit Failed High
615	5	SID	261	1355	Function 20 Circuit Failed Open
615	3	SID	155	1451	Service Push Button Circuit Failed High
615	14	SID	155	1615	Turbocharger/Supercharger Boost System Performance
615	14	SID	155	1615	Starter Electronic Fault / ECU internal (Res)
615	14	SID	155	1615	Starter Jammed (Tooth to Tooth Jam)
615	14	SID	155	1615	Rail Pressure Governor, Valve Stays Open
615	14	SID	155	1615	MU_RPG_INT_MON_SRH, I Term Value Too High
615	14	SID	155	1615	Rail Pressure Governor, Leakage in High Pressure Too High
615	14	SID	155	1615	Rail Pressure Governor Sensor, Signal Drift
615	14	SID	155	1615	Rail Pressure Governor Sensor, Sensor Supply Line Broken
615	4	SID	155	1615	Compressor Differential Pressure Outlet Failed Low
615	3	SID	155	1615	Compressor Differential Pressure Outlet Failed High
615	14	SID	155	1615	Doser Metering and Safety Unit Valve Seals Check
615	14	SID	155	1615	High Pressure Pump, Leakage or TDC Position Wrong
615	4	SID	155	1615	Flap In Front of EGR Cooler Circuit Failed Low
615	3	SID	155	1615	Flap In Front of EGR Cooler Circuit Failed High
615	5	SID	155	1615	Flap In Front of EGR Cooler Circuit Failed Open
615	4	SID	155	1615	Water Pump 2 Circuit Failed Low
615	3	SID	155	1615	Water Pump 2 Circuit Failed High
615	5	SID	156	1615	Water Pump 2 Circuit Failed Open
615	4	SID	157	1615	RCP Test Function 1 Circuit Failed Low
615	3	SID	158	1615	RCP Test Function 1 Circuit Failed High
615	5	SID	159	1615	RCP Test Function 1 Circuit Failed Open
615	4	SID	160	1615	RCP Test Function 2 Circuit Failed Low
615	3	SID	161	1615	RCP Test Function 2 Circuit Failed High
615	5	SID	162	1615	RCP Test Function 2 Circuit Failed Open
615	4	SID	163	1615	Volute Control Valve, Shorted to Ground
615	3	SID	164	1615	Volute Control Valve, Shorted to Battery
615	5	SID	165	1615	Volute Control Valve, Open Load
615	4	SID	166	1615	Volute Shut Off Valve, Shorted to Ground
615	3	SID	167	1615	Volute Shut Off Valve, Shorted to Battery
615	5	SID	168	1615	Volute Shut Off Valve, Open Load
615	4	SID	169	1615	Function 30 Circuit Failed Low
615	3	SID	170	1615	Function 30 Circuit Failed High
615	5	SID	171	1615	Function 30 Circuit Failed Open
615	4	SID	172	1615	Function 31 Circuit Failed Low
615	3	SID	173	1615	Function 31 Circuit Failed High
615	5	SID	174	1615	Function 31 Circuit Failed Open
615	14	SID	155	1453	Smart Remote Actuator 2, No Failsafe Mode, Motor Off
615	9	SID	155	1453	Smart Remote Actuator 2, Failsafe Mode, Motor Off
615	16	SID	155	1453	Smart Remote Actuator 2, Temperature Fault
615	7	SID	155	1453	Smart Remote Actuator 2, Failsafe Mode, Motor On

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SPN	FMI	PID/ SID	PID/SID ID	FLASH CODE	FAULT DESCRIPTION
615	11	SID	155	1453	Smart Remote Actuator 2, Restricted Operability
615	15	SID	155	1453	Smart Remote Actuator 2, Temperature Warning
615	8	SID	155	1453	Smart Remote Actuator 2, Internal Test Running
615	31	SID	155	1453	Smart Remote Actuator 2, Unknown Error Code
615	13	SID	155	1454	Turbocharger Compressor Outlet Differential Pressure Sensor Out Of Calibration
615	13	SID	155	1454	Turbocharger Compressor Outlet Differential Pressure Sensor Out Of Calibration
615	19	SID	155	1637	Smart Actuator Indicates Actuator Position Error
625	2	SID	248	1234	Invalid Data on Engine CAN Link
625	9	SID	248	1234	No Data Received from Engine CAN Link
625	9	SID	248	1234	Engine CAN Low Wire Defect - (wire 1)
625	9	SID	248	1234	Engine CAN High Wire Defect - (wire 2)
630	12	SID	253	1452	EEPROM Read / Write Operation Failed
630	13	SID	253	1455	Calibration Data Not Plausible
630	13	SID	253	1455	Calibration Data Not Plausible (CPLD)
634	4	SID	40	1321	Constant Throttle Valve Circuit Failed Low
634	3	SID	40	1321	Constant Throttle Valve Circuit Failed High
634	5	SID	40	1321	Constant Throttle Valve Circuit Failed Open
636	1	SID	21	1235	Crankshaft Position Sensor Signal Voltage Too Low
636	3	SID	21	1235	Crankshaft Position Sensor Open Circuit
636	4	SID	21	1235	Crankshaft Position Sensor Short to Ground
636	8	SID	21	1235	Crankshaft Position Sensor Time Out
636	14	SID	21	1235	Crankshaft Position Sensor Pins Swapped
636	2	SID	21	1235	No Match of Camshaft and Crankshaft Signals
641	4	SID	27	1542	Turbo Control Circuit Failed Low
641	3	SID	27	1542	Turbo Control Circuit Failed High
641	5	SID	27	1542	Turbo Control Circuit Open
641	14	SID	147	1241	Smart Remote Actuator 5 (VGT), No Failsafe Mode, Motor Off
641	9	SID	147	1241	Smart Remote Actuator 5 (VGT), Failsafe Mode, Motor Off
641	7	SID	147	1241	Smart Remote Actuator 5 (VGT), Failsafe Mode, Motor On
641	11	SID	147	1241	Smart Remote Actuator 5 (VGT), Restricted Operability
641	8	SID	147	1241	Smart Remote Actuator 5 (VGT), Internal Test Running
641	31	SID	147	1241	Smart Remote Actuator 5 (VGT), Unknown Error Code
647	4	SID	33	1334	Fan Stage 1 Circuit Failed Low
647	3	SID	33	1334	Fan Stage 1 Circuit Failed High
647	5	SID	33	1334	Fan Stage 1 Circuit Failed Open
651	14	SID	1	1242	Injector Cylinder #1 Needle Control Valve Abnormal Operation
651	10	SID	1	1242	Injector Cylinder #1 Needle Control Valve Abnormal Rate of Change
651	5	SID	1	1242	Injector Cylinder 1, Nozzle Control Valve or Spill Control Valve, Jammed Closed
651	7	SID	1	1242	Injector Cylinder 1, Nozzle Control Valve or Spill Control Valve, Jammed Open or Leakage
651	6	SID	1	1242	Injector Cylinder #1 Needle Control Valve, Valve Shorted Circuit
651	31	SID	1	1242	Engine Smoothness Control / Cylinder #1 Value Out of Range
652	14	SID	2	1243	Injector Cylinder #2 Needle Control Valve Abnormal Operation
652	10	SID	2	1243	Injector Cylinder #2 Needle Control Valve Abnormal Rate of Change

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SPN	FMI	PID/ SID	PID/SID ID	FLASH CODE	FAULT DESCRIPTION
652	5	SID	2	1243	Injector Cylinder 2, Nozzle Control Valve or Spill Control Valve, Jammed Closed
652	7	SID	2	1243	Injector Cylinder 2, Nozzle Control Valve or Spill Control Valve, Jammed Open or Leakage
652	6	SID	2	1243	Injector Cylinder #2 Needle Control Valve, Valve Shorted Circuit
652	31	SID	2	1243	Engine Smoothness Control / Cylinder #2 Value Out of Range
653	14	SID	3	1244	Injector Cylinder #3 Needle Control Valve Abnormal Operation
653	10	SID	3	1244	Injector Cylinder #3 Needle Control Valve Abnormal Rate of Change
653	5	SID	3	1244	Injector Cylinder 3, Nozzle Control Valve or Spill Control Valve, Jammed Closed
653	7	SID	3	1244	Injector Cylinder 3, Nozzle Control Valve or Spill Control Valve, Jammed Open or Leakage
653	6	SID	3	1244	Injector Cylinder #3 Needle Control Valve, Valve Shorted Circuit
653	31	SID	3	1244	Engine Smoothness Control / Cylinder #3 Value Out of Range
654	14	SID	4	1245	Injector Cylinder #4 Needle Control Valve Abnormal Operation
654	10	SID	4	1245	Injector Cylinder #4 Needle Control Valve Abnormal Rate of Change
654	5	SID	4	1245	Injector Cylinder 4, Nozzle Control Valve or Spill Control Valve, Jammed Closed
654	7	SID	4	1245	Injector Cylinder 4, Nozzle Control Valve or Spill Control Valve, Jammed Open or Leakage
654	6	SID	4	1245	Injector Cylinder #4 Needle Control Valve, Valve Shorted Circuit
654	31	SID	4	1245	Engine Smoothness Control / Cylinder #4 Value Out of Range
655	14	SID	5	1251	Injector Cylinder #5 Needle Control Valve Abnormal Operation
655	10	SID	5	1251	Injector Cylinder #5 Needle Control Valve Abnormal Rate of Change
655	5	SID	5	1251	Injector Cylinder 5, Nozzle Control Valve or Spill Control Valve, Jammed Closed
655	7	SID	5	1251	Injector Cylinder 5, Nozzle Control Valve or Spill Control Valve, Jammed Open or Leakage
655	6	SID	5	1251	Injector Cylinder #5 Needle Control Valve, Valve Shorted Circuit
655	31	SID	5	1251	Engine Smoothness Control / Cylinder #5 Value Out of Range
656	14	SID	6	1252	Injector Cylinder #6 Needle Control Valve Abnormal Operation
656	10	SID	6	1252	Injector Cylinder #6 Needle Control Valve Abnormal Rate of Change
656	5	SID	6	1252	Injector Cylinder 6, Nozzle Control Valve or Spill Control Valve, Jammed Closed
656	7	SID	6	1252	Injector Cylinder 6, Nozzle Control Valve or Spill Control Valve, Jammed Open or Leakage
656	6	SID	6	1252	Injector Cylinder #6 Needle Control Valve, Valve Shorted Circuit
656	31	SID	6	1252	Engine Smoothness Control / Cylinder #6 Value Out of Range
657	14	SID	7	1253	Injector Cylinder #7 Needle Control Valve Abnormal Operation
657	10	SID	7	1253	Injector Cylinder #7 Needle Control Valve Abnormal Rate of Change
657	6	SID	7	1253	Injector Cylinder #7 Needle Control Valve, Valve Shorted Circuit
657	31	SID	7	1253	Engine Smoothness Control / Cylinder #7 Value Out of Range
658	14	SID	8	1254	Injector Cylinder #8 Needle Control Valve Abnormal Operation
658	10	SID	8	1254	Injector Cylinder #8 Needle Control Valve Abnormal Rate of Change
658	6	SID	8	1254	Injector Cylinder #8 Needle Control Valve, Valve Shorted Circuit
658	31	SID	8	1254	Engine Smoothness Control / Cylinder #8 Value Out of Range
677	2	SID	39	1255	Starter Switch Inconsistent
677	5	SID	39	1255	Engine Starter Relay Circuit Failed Low
677	4	SID	39	1255	Engine Starter Relay Open Circuit

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SPN	FMI	PID/ SID	PID/SID ID	FLASH CODE	FAULT DESCRIPTION
677	14	SID	39	1255	Starter Electronic Fault / ECU internal (Main)
677	7	SID	39	1255	Engine Starter Relay - Starter Does Not Engage
677	3	SID	39	1255	Engine Starter Relay Shorted to High Source
677	7	SID	39	1255	Engine Starter Relay Jammed
698	4	SID	58	1312	Gridheater Circuit Failed Low
698	3	SID	58	1312	Gridheater Circuit Failed High
698	5	SID	58	1312	Gridheater Circuit Failed Open
715	4	SID	263	1412	High Side Digital Output # 1 Circuit Failed Low
715	3	SID	263	1412	High Side Digital Output # 1 Circuit Failed High
715	5	SID	263	1412	High Side Digital Output # 2 Circuit Failed Open
716	4	SID	264	1413	High Side Digital Output # 2 Circuit Failed Low
723	1	SID	64	1415	Camshaft Position Sensor Signal Voltage Too Low
723	3	SID	64	1415	Camshaft Position Sensor Open Circuit
723	4	SID	64	1415	Camshaft Position Sensor Short to Ground
723	8	SID	64	1415	Camshaft Position Sensor Time Out
723	14	SID	64	1415	Camshaft Position Sensor Pins Swapped
729	4	PID	45	1421	Grid Heater Circuit Failed Low
729	14	PID	45	1421	Grid Heater Special Instructions
729	3	PID	45	1421	Grid Heater Circuit Failed High
729	7	PID	45	1421	Grid Heater Defect
729	0	PID	45	1421	Grid Heater Permanently On
1071	4	SID	60	1314	Fan Stage 2 Circuit Failed Low
1071	3	SID	60	1314	Fan Stage 2 Circuit Failed High
1071	5	SID	60	1314	Fan Stage 2 Circuit Failed Open
1072	4	SID	79	1422	Jake Brake Stage 1 Circuit Failed Low
1072	3	SID	79	1422	Jake Brake Stage 1 Circuit Failed High
1072	5	SID	79	1422	Jake Brake Stage 1 Circuit Failed Open
1073	4	SID	80	1315	Jake Brake Stage 2 Circuit Failed Low
1073	3	SID	80	1315	Jake Brake Stage 2 Circuit Failed High
1073	5	SID	80	1315	Jake Brake Stage 2 Circuit Failed Open
1074	4	SID	81	1345	Exhaust Brake Circuit Failed Low
1074	3	SID	81	1345	Exhaust Brake Circuit Failed High
1074	5	SID	81	1345	Exhaust Brake Circuit Failed Open
1077	14	PID	164	1241	Rail Pressure Governor Error, Open Loop Error
1077	5	PID	164	1423	Rail Pressure Governor Error, Current Governor, Current Too Low
1077	7	PID	164	1423	Rail Pressure Governor Error, Pressure Governor, Pressure Not Plausible
1077	6	SID	155	1423	Rail Pressure Governor Error, Current Too High
1127	4	SID	273	1424	Turbocharger Compressor Outlet Pressure Circuit Failed Low
1127	3	SID	273	1424	Turbocharger Compressor Outlet Pressure Circuit Failed High
1172	4	PID	351	1425	Turbocharger Compressor Inlet Temperature Circuit Failed Low
1172	3	PID	351	1425	Turbocharger Compressor Inlet Temperature Circuit Failed High
1172	2	PID	351	1425	Coolant Temp/Compressor Inlet Temp Plausibility Error
1172	2	PID	351	1425	Turbocharger Compressor Inlet Temp. Sensor, General Temp. Plausibility Error
1176	4	SID	314	1431	Turbocharger Compressor Inlet Pressure Circuit Failed Low
1176	3	SID	314	1431	Turbocharger Compressor Inlet Pressure Circuit Failed High
1176	2	PID	314	1431	Compressor Pressure Plausibility Fault (High Box)
1176	5	PID	314	1431	Compressor Inlet Pressure Plausibility Fault (Delta)
1176	20	SID	314	1431	Compressor Inlet Pressure Plausibility Error, Pressure Too High (High Box)
1188	4	SID	32	1325	Waste Gate Circuit Failed Low
1188	3	SID	32	1325	Waste Gate Circuit Failed High

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SPN	FMI	PID/ SID	PID/SID ID	FLASH CODE	FAULT DESCRIPTION
1188	5	SID	32	1325	Waste Gate Circuit Failed Open
1188	14	SID	32	1432	Smart Remote Actuator 1 (Wastegate), No Failsafe Mode, Motor Off
1188	9	SID	32	1432	Smart Remote Actuator 1 (Wastegate), Failsafe Mode, Motor Off
1188	16	SID	32	1432	Smart Remote Actuator 1 (Wastegate), Temperature Fault
1188	7	SID	32	1432	Smart Remote Actuator 1 (Wastegate), Failsafe Mode, Motor On
1188	11	SID	32	1432	Smart Remote Actuator 1 (Wastegate), Restricted Operability
1188	15	SID	32	1432	Smart Remote Actuator 1 (Wastegate), Temperature Warning
1188	8	SID	32	1432	Smart Remote Actuator 1 (Wastegate), Internal Test Running
1188	31	SID	32	1432	Smart Remote Actuator 1 (Wastegate), Unknown Error Code
1188	19	SID	32	1432	Smart Actuator Indicates Turbocharger Wastegate Position Error
1213	4	SID	257	1333	MIL Lamp Circuit Failed Low
1213	3	SID	257	1333	MIL Lamp Circuit Failed High
1213	5	SID	257	1333	MIL Lamp Circuit Failed Open
1323	31	SID	155	1433	Cylinder 1 Misfire detected
1323	14	SID	156	1434	Misfire Detected
1324	31	SID	155	1435	Cylinder 2 Misfire detected
1325	31	SID	155	1441	Cylinder 3 Misfire detected
1326	31	SID	155	1442	Cylinder 4 Misfire detected
1327	31	SID	155	1443	Cylinder 5 Misfire detected
1328	31	SID	155	1444	Cylinder 6 Misfire Detected
1329	31	SID	155	1445	Cylinder 7 Misfire Detected
1330	31	SID	155	1446	Cylinder 8 Misfire Detected
1351	4	SID	155	1615	Switchable Air Compressor Circuit Failed Low
1351	3	SID	155	1615	Switchable Air Compressor Circuit Failed High
1351	5	SID	155	1615	Switchable Air Compressor Circuit Failed Open
1636	4	PID	105	1511	Intake Manifold Temperature Circuit Failed Low
1636	3	PID	105	1511	Intake Manifold Temperature Circuit Failed High
1636	2	PID	105	1511	Intake Manifold Temperature Plausibility Error
1636	21	PID	105	1511	Difference Intake Manifold Temperature and EGR Temp. Less Than Threshold (Low Box)
1636	2	PID	105	1511	Difference Intake Manifold and I Cooler Temperature Out Less Than Threshold (Low Box)
1636	2	PID	105	1511	Difference Intake Manifold and I Cooler Temperature Out Less Than Threshold (High Box)
1636	20	PID	105	1511	Intake Manifold Temperature Drift (Low Box)
1636	21	PID	105	1511	Intake Manifold Temperature Drift (High Box)
2629	4	PID	404	1513	Turbocharger Compressor Outlet Temperature Circuit Failed Low
2629	3	PID	404	1513	Turbocharger Compressor Outlet Temperature Circuit Failed High
2629	20	PID	404	1513	Turbocharger Out Temperature, Temperature Too High (Low Box)
2629	21	PID	404	1513	Turbocharger Out Temperature, Temperature Too Low (High Box)
2629	2	PID	404	1513	Turbocharger Compressor Outlet Temp. Sensor, General Temp. Plausibility Error
2630	4	SID	272	1514	Charge Air Cooler Outlet Temperature Circuit Failed Low
2630	3	SID	272	1514	Charge Air Cooler Outlet Temperature Circuit Failed High
2630	2	SID	272	1514	Charge Air Cooler Outlet Temperature Sensor Plausibility Error
2630	20	SID	272	1514	Charge Air Outlet Temperature Drift (Low box)
2630	21	SID	272	1514	Charge Air Outlet Temperature Drift (High box)
2631	4	SID	273	1515	Charge Air Cooler Outlet Pressure Circuit Failed Low
2631	3	SID	273	1515	Charge Air Cooler Outlet Pressure Circuit Failed High
2659	1	SID	277	1515	EGR Flow Target Error Diagnostic - Low Flow
2659	0	SID	277	1515	EGR Flow Target Error Diagnostic - High Flow

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SPN	FMI	PID/ SID	PID/SID ID	FLASH CODE	FAULT DESCRIPTION
2791	4	PID	146	1521	EGR Valve Circuit Failed Low
2791	3	PID	146	1521	EGR Valve Circuit Failed High
2791	5	PID	146	1521	EGR Valve Circuit Failed Open
2791	7	SID	146	1521	EGR Valve Position Incorrect
2791	14	SID	146	1521	Smart Remote Actuator 3 (EGR), No Failsafe Mode, Motor Off
2791	9	SID	146	1521	Smart Remote Actuator 3 (EGR), Failsafe Mode, Motor Off
2791	16	SID	146	1521	Smart Remote Actuator 3 (EGR), Temperature Fault
2791	7	SID	146	1521	Smart Remote Actuator 3 (EGR), Failsafe Mode, Motor On
2791	11	SID	146	1521	Smart Remote Actuator 3 (EGR), Restricted Operability
2791	15	SID	146	1521	Smart Remote Actuator 3 (EGR), Temperature Warning
2791	8	SID	146	1521	Smart Remote Actuator 3 (EGR), Internal Test Running
2791	31	SID	146	1521	Smart Remote Actuator 3 (EGR), Unknown Error Code
2795	9	SID	269	1241	CAN3 Communication Error
2795	4	SID	269	1522	Position Waste Gate (VNT) Failed Low
2795	3	SID	269	1522	Position Waste Gate (VNT) Failed High
2795	2	SID	269	1522	VNT Valve Position Feedback Failed
2795	0	SID	269	1522	VNT Valve Position Feedback, Position Too Low (High Box)
2795	1	SID	269	1522	VNT Valve Position Feedback, Position Too High (Low Box)
2795	19	SID	147	1522	Smart Actuator Indicates Turbocharger Vane Position Error
2797	4	SID	317	1523	Injector Needle Control Valve Cylinder 1, 2, 3 Shorted to Ground
2797	4	SID	317	1524	Injector Needle Control Valve Cylinder 4, 5, 6 Shorted to Ground
2797	4	SID	317	1615	Injector Needle Control Valve Bank 3, Shorted to Ground
2797	3	SID	317	1523	Injector Needle Control Valve Cylinder 1,2,3 Shorted to Battery
2797	3	SID	317	1524	Injector Needle Control Valve Cylinder 4,5,6, Shorted to Battery
2797	3	SID	317	1615	Injector Needle Control Valve Bank 3, Shorted to Battery
2798	4	SID	317	1615	Injector Spill Control Valve Cylinder 1, 2, 3 Shorted to Ground
2798	4	SID	317	1615	Injector Spill Control Valve Cylinder 4, 5, 6 Shorted to Ground
2798	4	SID	317	1615	Injector Spill Control Valve ("Amplifier") Bank 6, Shorted to Ground
2798	3	SID	317	1615	Injector Spill Control Valve Cylinder 1,2,3, Shorted to Battery
2798	3	SID	317	1615	Injector Spill Control Valve Cylinder 4,5,6, Shorted to Battery
2798	3	SID	317	1615	Injector Spill Control Valve ("Amplifier") Bank 6, Shorted to Battery
2988	4	SID	262	1411	EGR Water Cooling Regulator Circuit Failed Low
988	3	SID	262	1411	EGR Water Cooling Regulator Circuit Failed High
2988	5	SID	262	1411	EGR Water Cooling Regulator Circuit Failed Open
3050	0	SID	155	1525	Engine Air Flow Out of Range Low
3050	1	SID	324	1525	Active Regen Temp Out of Range Low
3058	13	PID	146	1615	EGR System Parametrization Failure
3064	13	SID	155	1615	DPF System Parametrization Failure
3242	4	PID	318	1531	DOC Inlet Temperature Circuit Failed Low
3242	3	PID	318	1531	DOC Inlet Temperature Circuit Failed High
3242	10	SID	318	1531	DOC Inlet Temperature Sensor Stuck
3242	2	SID	318	1531	DOC Inlet Temperature Sensor - Plausibility Error
3246	4	SID	320	1532	DPF Outlet Temperature Circuit Failed Low
3246	3	SID	320	1532	DPF Outlet Temperature Circuit Failed High
3246	14	SID	320	1532	Abnormal DPF Temperature Rise b)

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SPN	FMI	PID/ SID	PID/SID ID	FLASH CODE	FAULT DESCRIPTION
3246	0	SID	320	1532	DPF Outlet Temperature High
3246	10	SID	320	1532	DPF Outlet Temperature Sensor Stuck
3246	2	SID	320	1532	DPF Outlet Sensor, General Temp. Plausibility
3246	31	SID	323	1532	Abnormal DPF Temperature Rise
3250	4	PID	322	1533	DOC Outlet Temperature Circuit Failed Low
3250	3	PID	322	1533	DOC Outlet Temperature Circuit Failed High
3250	14	PID	322	1533	Abnormal DOC Temperature Rise
3250	10	SID	322	1533	DOC Outlet Temperature Sensor Stuck
3250	2	SID	322	1533	DOC Outlet Temperature Sensor - Plausibility Error
3250	31	PID	322	1533	Abnormal DOC Temperature Rise
3250	0	PID	322	1533	DOC Outlet Temperature High
3251	0	SID	324	1534	DPF Pressure - Out of Range Very High
3251	1	SID	324	1534	DPF Pressure - Out of Range Low
3251	9	SID	324	1534	Abnormal Soot Rate
3251	16	SID	324	1534	DPF Pressure - Out of Range High
3358	4	SID	155	1535	EGR Pressure Failed Low
3358	3	SID	155	1535	EGR Pressure Failed High
3464	4	SID	59	1313	Intake Throttle Valve Circuit Failed Low
3464	3	SID	59	1313	Intake Throttle Valve Circuit Failed High
3464	5	SID	59	1313	Intake Throttle Valve Circuit Failed Open
3464	14	SID	59	1615	Intake Air Throttle Control Electrical Fault
3464	2	PID	51	1541	Intake Throttle Valve, Spring Response Time Not Plausible
3464	7	PID	51	1541	Intake Throttle Valve, Stuck
3464	14	PID	51	1541	Intake Throttle Valve, Integrated Absolute Error Plausibility
3464	8	PID	51	1541	Intake Throttle Valve, Current Deviation Too High
3470	4	SID	57	1311	Actuator Turbo Compound Bypass Circuit Failed Low
3470	3	SID	57	1311	Actuator Turbo Compound Bypass Circuit Failed High
3470	5	SID	57	1311	Actuator Turbo Compound Bypass Circuit Failed Open
3471	4	SID	334	1323	HC Doser Circuit Failed Low
3471	3	SID	334	1323	HC Doser Circuit Failed High
3471	5	SID	334	1323	HC Doser Circuit Failed Open
3471	1	SID	155	1542	EDV Failed Self Test
3480	2	SID	332	1543	Doser Fuel Line Pressure Abnormal
3480	1	SID	332	1543	Doser Fuel Supply Pressure Abnormal
3480	14	SID	332	1543	Doser FLP Sensors Failed Self Test
3482	4	SID	56	1332	Fuel Cut Off Valve Circuit Failed Low
3482	3	SID	56	1332	Fuel Cut Off Valve Circuit Failed High
3482	5	SID	56	1332	Fuel Cut Off Valve Circuit Failed Open
3482	7	SID	155	1544	FCV Failed Self Test
3509	3	SID	212	1631	Multiplexer 1 Channel 1, Shorted High
3509	3	SID	212	1631	Multiplexer 1 Channel 2, Shorted High
3510	3	SID	211	1632	Multiplexer 2 Channel 1, Shorted High
3510	3	SID	211	1632	Multiplexer 2 Channel 2, Shorted High
3511	3	SID	211	1633	Multiplexer 3 Channel 1, Shorted High
3511	3	SID	211	1633	Multiplexer 3 Channel 2, Shorted High
3556	1	SID	155	1545	Regen Temperature - Out of Range Low
3556	0	SID	155	1551	Regen Temperature - Out of Range High
3563	4	PID	106	1551	Intake Manifold Pressure Circuit Failed Low
3563	3	PID	106	1551	Intake Manifold Pressure Circuit Failed High
3563	20	PID	106	1551	Ambient and Inlet Manifold Pressure Difference (Low Box)
3563	21	PID	106	1551	Ambient and Inlet Manifold Pressure Difference (High Box)

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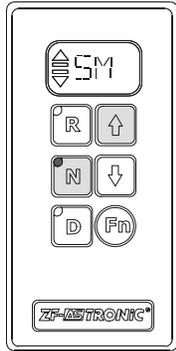
SPN	FMI	PID/ SID	PID/SID ID	FLASH CODE	FAULT DESCRIPTION
3563	1	PID	106	1551	Inlet Manifold Pressure Failed Low
3563	0	PID	106	1551	Inlet Manifold Pressure Failed High
3563	3	PID	106	1551	Inlet Manifold Pressure Sampling Range Failed
3563	20	PID	106	1551	Intake Manifold Pressure Plausibility (Low Box)
3563	21	PID	106	1551	Intake Manifold Pressure Plausibility Error, Pressure Too Low (High Box)
3588	4	SID	156	1552	Ether Start, Shorted to Ground
3588	3	SID	157	1552	Ether Start, Shorted to Battery
3588	5	SID	158	1552	Ether Start, Open Load
3597	3	SID	155	1553	Proportional Valve Bank 1 Circuit Failed Low
3597	3	SID	155	1615	Proportional Valve Bank 1 Circuit Failed High
3597	6	SID	155	1325	Current Flow on HS1 IM1 Too High
3598	4	SID	155	1615	Proportional Valve Bank 2 Circuit Failed Low
3598	3	SID	155	1615	Proportional Valve Bank 2 Circuit Failed High
3599	4	SID	317	1615	Switching Power Supply Voltage Failed Low
3599	3	SID	317	1615	Switching Power Supply Voltage Failed High
3609	4	PID	370	1554	DPF Inlet Pressure Circuit Failed Low
3609	3	PID	370	1554	DPF Inlet Pressure Circuit Failed High
3609	10	SID	370	1554	DPF Inlet Pressure Sensor Stuck
3609	20	SID	370	1554	DPF Inlet Pressure Sensor Drifted High In Range Fault (Low Box)
3609	2	SID	370	1554	DPF Inlet Pressure Sensor Drifted High In Range Fault (High Box)
3609	21	SID	370	1554	DPF Inlet Pressure Sensor Drifted Low In Range Fault (Low Box)
3609	21	SID	370	1554	DPF Inlet Pressure Sensor Drifted Low In Range Fault (High Box)
3610	3	SID	371	1555	DPF Outlet Pressure Circuit Failed High
3610	4	SID	371	1555	DPF Outlet Pressure Circuit Failed Low
3610	0	SID	371	1334	DPF System Back Pressure Too High
3610	10	SID	371	1555	DPF Outlet Pressure Sensor Stuck
3610	2	SID	371	1555	DPF Pressure Sensors - Plausibility Error
3610	20	SID	371	1555	DPF Outlet Pressure Sensor Drifted High In Range Fault (Low Box)
3610	14	SID	371	1555	DPF Outlet Pressure Sensor Drifted High In Range Fault (High Box)
3610	21	SID	371	1555	DPF Outlet Pressure Sensor Drifted Low In Range Fault (Low Box)
3610	31	SID	371	1555	DPF Outlet Pressure Sensor Drifted Low In Range Fault (High Box)
3659	14	SID	362	1611	Injector Cylinder #1 Spill Control Valve Abnormal Operation
3659	10	SID	362	1611	Injector Cylinder #1 Spill Control Valve ("Amplifier") Abnormal Rate of Change
3659	6	SID	362	1611	Injector Cylinder #1 Spill Control Valve ("Amplifier"), Valve Shorted Circuit
3660	14	SID	363	1612	Injector Cylinder #2 Spill Control Valve Abnormal Operation
3660	10	SID	363	1612	Injector Cylinder #2 Spill Control Valve ("Amplifier") Abnormal Rate of Change
3660	6	SID	363	1612	Injector Cylinder #2 Spill Control Valve ("Amplifier"), Valve Shorted Circuit
3661	14	SID	364	1613	Injector Cylinder #3 Spill Control Valve Abnormal Operation
3661	10	SID	364	1613	Injector Cylinder #3 Spill Control Valve ("Amplifier") Abnormal Rate of Change
3661	6	SID	364	1613	Injector Cylinder #3 Spill Control Valve ("Amplifier"), Valve Shorted Circuit
3662	14	SID	365	1614	Injector Cylinder #4 Spill Control Valve Abnormal Operation
3662	10	SID	365	1614	Injector Cylinder #4 Spill Control Valve ("Amplifier") Abnormal Rate of Change
3662	6	SID	365	1614	Injector Cylinder #4 Spill Control Valve ("Amplifier"), Valve Shorted Circuit
3663	14	SID	366	1615	Injector Cylinder #5 Spill Control Valve Abnormal Operation
3663	10	SID	366	1615	Injector Cylinder #5 Spill Control Valve ("Amplifier") Abnormal Rate of Change

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SPN	FMI	PID/SID	PID/SID ID	FLASH CODE	FAULT DESCRIPTION
3663	6	SID	366	1615	Injector Cylinder #5 Spill Control Valve ("Amplifier"), Valve Shorted Circuit
3664	14	SID	367	1621	Injector Cylinder #6 Spill Control Valve Abnormal Operation
3664	10	SID	367	1621	Injector Cylinder #6 Spill Control Valve ("Amplifier") Abnormal Rate of Change
3664	6	SID	367	1621	Injector Cylinder #6 Spill Control Valve ("Amplifier"), Valve Shorted Circuit
3665	14	SID	368	1622	Injector Cylinder #7 Spill Control Valve Abnormal Operation
3665	10	SID	368	1622	Injector Cylinder #7 Spill Control Valve ("Amplifier") Abnormal Rate of Change
3665	6	SID	368	1622	Injector Cylinder #7 Spill Control Valve ("Amplifier"), Valve Shorted Circuit
3666	14	SID	369	1623	Injector Cylinder #8 Spill Control Valve Abnormal Operation
3666	10	SID	369	1623	Injector Cylinder #8 Spill Control Valve ("Amplifier") Abnormal Rate of Change
3666	6	SID	369	1623	Injector Cylinder #8 Spill Control Valve ("Amplifier"), Valve Shorted Circuit
3719	16	SID	155	1624	Soot Level High
3719	0	SID	155	1624	Soot Level Very High
3719	31	SID	155	1635	DPF Zone 2 Condition
3719	15	SID	155	1636	DPF Zone 3 Condition
3720	15	SID	155	1625	DPF Ash Clean Request
3720	16	SID	155	1625	DPF Ash Clean Request - Derate
4076	4	PID	110	1212	Engine Coolant Inlet Temperature Circuit Failed Low
4076	3	PID	110	1212	Engine Coolant Inlet Temperature Circuit Failed High
4076	2	SID	155	1615	Engine Coolant Sensor (IN), General Temp. Plausibility Error
4077	4	SID	332	1543	Doser Fuel Line Pressure Sensor Circuit Failed Low
4077	3	SID	332	1543	Doser Fuel Line Pressure Sensor Circuit Failed High
4077	14	SID	332	1543	Doser Fuel Line Pressure Failed Self Test
4226	4	SID	155	1615	Compressor Differential Pressure Inlet Failed Low
4226	3	SID	155	1615	Compressor Differential Pressure Inlet Failed High
4226	0	SID	155	1615	Turbocharger Compressor Inlet Differential Pressure Too High (Low Box)
4226	1	SID	155	1615	Turbocharger Compressor Inlet Differential Pressure Too Low (High Box)
4226	5	SID	155	1615	Turbocharger Compressor Inlet Differential Pressure Sampling Range Failure
4226	13	SID	155	1454	Turbocharger Compressor Inlet Differential Pressure Sensor Out Of Calibration
4226	13	SID	155	1454	Turbocharger Compressor Inlet Differential Pressure Sensor Out Of Calibration
4227	4	SID	53	1324	Electrostatic Oil Separator Circuit Failed Low
4227	3	SID	53	1324	Electrostatic Oil Separator Circuit Failed High
4227	5	SID	53	1324	Electrostatic Oil Separator Circuit Failed Open
4227	4	SID	155	1615	Oil Separator Circuit Failed Low
4227	3	SID	155	1615	Oil Separator Circuit Failed High
4227	7	SID	155	1615	Oil Separator, Max. Duration Time Reached
4228	16	SID	147	1241	Smart Remote Actuator 5 (VGT), Temperature Fault
4228	15	SID	147	1241	Smart Remote Actuator 5 (VGT), Temperature Warning

ZF-ASTRONIC TRANSMISSION SYSTEM FAULTS AND ERROR MESSAGES

SYSTEM FAULTS (ERROR MESSAGES)



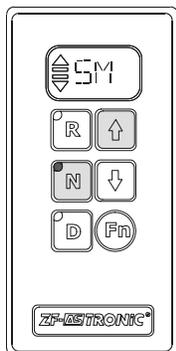
07107

If the “SM” symbol appears in the display, a system error has occurred.

- Stop the vehicle
- Vehicle may no longer be driven

Error messages and the reactions resulting from these errors can be deleted with the vehicle at a standstill and the “Ignition OFF”. (Wait until the display goes out). If the display does not go out once the ignition has been turned “OFF”, set the battery master switch to the **OFF** position. Switch the ignition back on. If the error message is still in place, the transmission has to be repaired. The transmission is inoperative. The vehicle will have to be taken to a service point. The error number(s) must be specified when the service point is contacted.

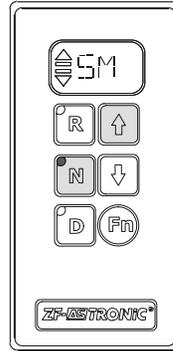
Calling up error numbers



07107

- ☞ Switch on ignition
- ☞ Depress “N” key
- ☞ Hold down “↑” key
- ☞ One or more error numbers appear on the display. These correspond to the errors presently active in the system.

Calling up error numbers from the error memory:



07107

- ☞ Switch on ignition
- ☞ Press “N” key and at the same time depress the foot-operated brake
- ☞ Hold down the foot-operated brake and depress and hold down “↑” key
- ☞ The errors stored in the transmission ECU are shown on the display one after another.

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ERROR CODES

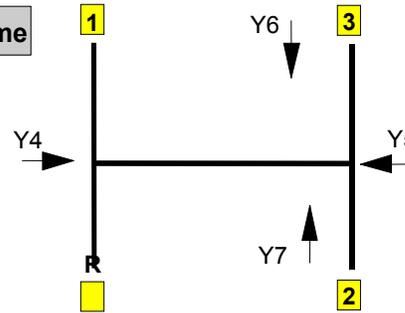
Remark to titles in table:

- ZF fault number : defined by ZF.
- Display SM-Symbol : (0=NO, 1=YES) Display shows “SM”(severe failure)
- Warning lamp : (0=NO, 1=YES) Telltale panel warning lamp “check trans“(less severe failure)

Shift schemes of transmissions:

10/12-Gear Scheme

- Y2 Splitter K2
- Y3 Splitter K1
- Y8 Range (GP) low
- Y9 Range (GP)



ON MESSAGES CENTER DISPLAY (MCD) SAE-J1587 Codes	ON SHIFT SELECTOR DISPLAY	ISO CODES WITH TESTMAN TOOL	DESCRIPTION
8, 7	8	161	Easy Start, Brake doesn't open completely
8, 14	8	162	Easy Start, Not Available
20,6	14	22	Short circuit to ground at output ACC (wakeup control signal for ZMTEC, keep alive signal for voltage doubler, and power signal for speed sensor #2)
20,5	14	54	Interruption at output ACC (wakeup control signal for ZMTEC, keep alive signal for voltage doubler, and power signal for speed sensor #2)
32,3	20	141	No splitter group (GV) sensor signal (Short circuit to positive)
32,6	20	142	No splitter group (GV) sensor signal (Short circuit to ground)
32,5	20	143	No splitter group (GV) sensor signal (Interruption)
32,13	20	144	Splitter group (GV) sensor self adjustment error
32,7	20	160	Splitter sensor signal leaves engaged position during driving
33,14	21	107	Stabilised voltage supply at output AU (clutch sensor supply) too high or too low
33,13	21	117	Error in clutch self-adjustment process
33,2	21	124	Error on clutch travel signal
34,7	22	120	Mechanical failure of small clutch disengagement valve
34,7	22	121	Mechanical failure of large clutch disengagement valve
34,7	22	122	Mechanical failure of small clutch engagement valve
34,7	22	123	Mechanical failure of large clutch engagement valve
34,6	22	18	Short circuit to ground at output stage to small disengagement clutch valve
34,6	22	19	Short circuit to ground at output stage to small engagement clutch valve
34,6	22	20	Short circuit to ground at output stage to large disengagement clutch valve
34,6	22	21	Short circuit to ground at output stage to large engagement clutch valve

Appendix E - ZF-Astronic Transmission Error Codes 185

ON MESSAGES CENTER DISPLAY (MCD) SAE-J1587 Codes	ON SHIFT SELECTOR DISPLAY	ISO CODES WITH TESTMAN TOOL	DESCRIPTION
34,5	22	50	Interruption at output stage to small disengagement clutch valve
34,5	22	51	Interruption at output stage to small engagement clutch valve
34,5	22	52	Interruption at output stage to large disengagement clutch valve
34,5	22	53	Interruption at output stage to large engagement clutch valve
34,3	22	82	Short circuit to positive at output stage to small disengagement clutch valve
34,3	22	83	Short circuit to positive at output stage to small engagement clutch valve
34,3	22	84	Short circuit to positive at output stage to large disengagement clutch valve
34,3	22	85	Short circuit to positive at output stage to large engagement clutch valve
35,5	23	41	Interruption at output stage to Y9 (Valve Range)
35,3	23	73	Short circuit to positive at output stage to Y9 (Valve range)
35,6	23	9	Short circuit to ground at output stage to Y9 (Valve Range)
36,5	24	40	Interruption at output stage to Y8 (Valve Range)
36,3	24	72	Short circuit to positive at output stage to Y8 (Valve range)
36,6	24	8	Short circuit to ground at output stage to Y8 (Valve Range)
37,6	25	2	Short circuit to ground at output stage to Y2 (Valve Splitter)
37,5	25	34	Interruption at output stage to Y2 (Valve Splitter)
37,3	25	66	Short circuit to positive at output stage to Y2 (Valve Splitter)
38,6	26	3	Short circuit to ground at output stage to Y3 (Valve Splitter)
38,5	26	35	Interruption at output stage to Y3 (Valve Splitter)
38,3	26	67	Short circuit to positive at output stage to Y3 (Valve Splitter)
39,5	27	36	Interruption at output stage to Y4 (Valve Select)
39,6	27	4	Short circuit to ground at output stage to Y4 (Valve Select)
39,3	27	68	Short circuit to positive at output stage to Y4 (Valve Select)
40,5	28	38	Interruption at output stage to Y6 (Valve Shift)
40,6	28	6	Short circuit to ground at output stage to Y6 (Valve Shift)
40,3	28	70	Short circuit to positive at output stage to Y6 (Valve Shift)
43,2	2B	175	Error on "Ignition lock" signal (terminal 15)
48,3	30	129	No shift sensor signal (Short circuit to positive)
48,6	30	130	No shift sensor signal (Short circuit to ground)
48,5	30	131	No shift sensor signal (Interruption)
48,13	30	132	Self adjustment error of shift sensor
48,7	30	157	Selector sensor signal leaves position during driving
48,7	30	158	Engage sensor signal leaves engaged position during driving
50,5	32	37	Interruption at output stage to Y5 (Valve Select)
50,6	32	5	Short circuit to ground at output stage to Y5 (Valve Select)
50,3	32	69	Short circuit to positive at output stage to Y5 (Valve Select)
51,5	33	39	Interruption at output stage to Y7 (Valve Shift)
51,6	33	7	Short circuit to ground at output stage to Y7 (Valve Shift)
51,3	33	71	Short circuit to positive at output stage to Y7 (Valve Shift)

186 Appendix E – ZF-Astronic Transmission Error Codes

ON MESSAGES CENTER DISPLAY (MCD) SAE-J1587 Codes	ON SHIFT SELECTOR DISPLAY	ISO CODES WITH TESTMAN TOOL	DESCRIPTION
54,6	36	17	Short circuit to ground at output stage to Y1 (inertia brake valve)
54,5	36	49	Interruption at output stage to Y1 (inertia brake valve)
54,3	36	81	Short circuit to positive at output stage to Y1 (inertia brake valve)
55,7	37	114	Clutch engaged unintentionally at standstill, gear engaged
55,7	37	118	Clutch does not disengage
55,7	37	119	Clutch does not engage / does not transmit engine torque
56,7	38	145	Range change group (GP) disengagement error
56,7	38	146	Changeover error during range change group (GP) shifting
56,7	38	147	Range change group (GP) does not engage
57,2	39	108	Error in shift lever
57,14	39	110	ZF CAN timeout (can also means shift lever error through ZMP06400.hex)
58,7	3A	154	Main transmission gear does not disengage
58,7	3A	155	Main transmission gear does not engage
58,7	3A	156	Wrong gear shifting
59,7	3B	151	Selector cylinder does not disengage
59,7	3B	152	Change over error during gate selection procedure
59,7	3B	153	Selector cylinder does not engage
60,3	3C	133	No gate select sensor signal (Short circuit to positive)
60,6	3C	134	No gate select sensor signal (Short circuit to ground)
60,5	3C	135	No gate select sensor signal (Interruption)
60,13	3C	136	Gate select sensor self adjustment error
61,7	3D	148	Splitter (GV) does not disengage
61,7	3D	149	Change over error during splitter shifting
61,7	3D	150	Splitter (GV) does not engage
63,14	3F	100	Error on output speed signal 2
106,0	6A	125	Error on pressure reduction valve
106,14	6A	126	Error on pressure sensor signal
150,14	96	59	Acknowledge fault of PTO 1
150,14	96	60	Acknowledge fault of PTO 2
150,7	96	61	Disengagement fault of PTO 1
150,7	96	62	Disengagement fault of PTO 2
150,7	96	63	Engagement fault of PTO1
150,7	96	64	Engagement fault of PTO2
151,14	97	102	Plausibility error between transmission input speed and output speed
152,6	98	10	Short circuit to ground at output stage to Y10 (Main valve)
152,5	98	42	Interruption at output stage to Y10 (Main valve)
152,3	98	74	Short circuit to positive at output stage to Y10 (Main valve)
153,14	99	-	Error on ISO 14320 communications line
154,14	9A	101	Error on both output speed signals

Appendix E - ZF-Astronic Transmission Error Codes 187

ON MESSAGES CENTER DISPLAY (MCD) SAE-J1587 Codes	ON SHIFT SELECTOR DISPLAY	ISO CODES WITH TESTMAN TOOL	DESCRIPTION
161,14	A1	98	Error on transmission input speed signal
177,2	B1	128	Error on oil temperature sensor signal
191,14	BF	194	Both sources of vehicle speed are faulty
191,14	BF	99	Error on output speed signal 1
230,14	E6	166	Permanent idle signal
230,14	E6	168	No idle signal or error on "idle signal switch" signal (EEC2)
230,14	E7	103	Error on "Wheel-based vehicle speed" signal (CCV)
231,7	E7	163	Engine does not react on torque intervention
231,14	E7	164	Error on "Drivers demand engine percent torque" (EEC1)
231,14	E7	165	Error on "Accelerator pedal position" (EEC2)
231,14	E7	167	Error on "Percent load at current speed" signal (EEC2)
231,14	E7	171	Error on "Actual engine percent torque" signal (EEC1)
231,14	E7	172	Permanent engine brake request signal
231,14	E7	173	Error on "Brake switch" signal (CCVS)
231,14	E7	177	System-CAN Busoff error
231,11	E7	178	CAN error frames
231,11	E7	179	CAN queue overrun
231,14	E7	180	CAN EEC1 timeout
231,14	E7	181	CAN EEC2 timeout
231,14	E7	182	CAN CCVS timeout
231,14	E7	183	CAN ERC1_ER timeout
231,14	E7	197	Error on "Front axle speed" (WSI)
231,14	E7	198	Error on "Relative wheel speeds" (WSI)
231,14	E7	199	CAN WSI timeout
231,14	E7	26	CAN engine configuration timeout
231,14	E7	27	Error on "engine configuration message" (engine configuration)
231,14	E7	31	Error on "Actual engine retarder - percent torque" signal (ERC1_ER)
231,14	E7	32	Error on "Engine retarder configuration message" (Engine retarder configuration)
231,14	E7	33	CAN "Engine retarder configuration" timeout
231,14	E7	91	CAN EBC1 timeout
231,14	E7	92	Error on "ABS active" signal (EBC1)
231,14	E7	93	Error on "ASR engine control active" signal (EBC1)
231,14	E7	94	Error on "ASR brake control active" signal (EBC1)
231,14	E7	95	Error on "Cruise control active" signal (CCVS)
231,14	E7	96	Error on "Cruise control set speed" (CCVS)
231,14	E7	97	Error on "Engine speed" signal (EEC1)
-	EE	-	Communication error between GS3 and ZMTEC on display line
248,6	F8	25	Short circuit to ground at output SD to display
248,3	F8	89	Short circuit to positive at output SD to display

188 Appendix E – ZF-Astronic Transmission Error Codes

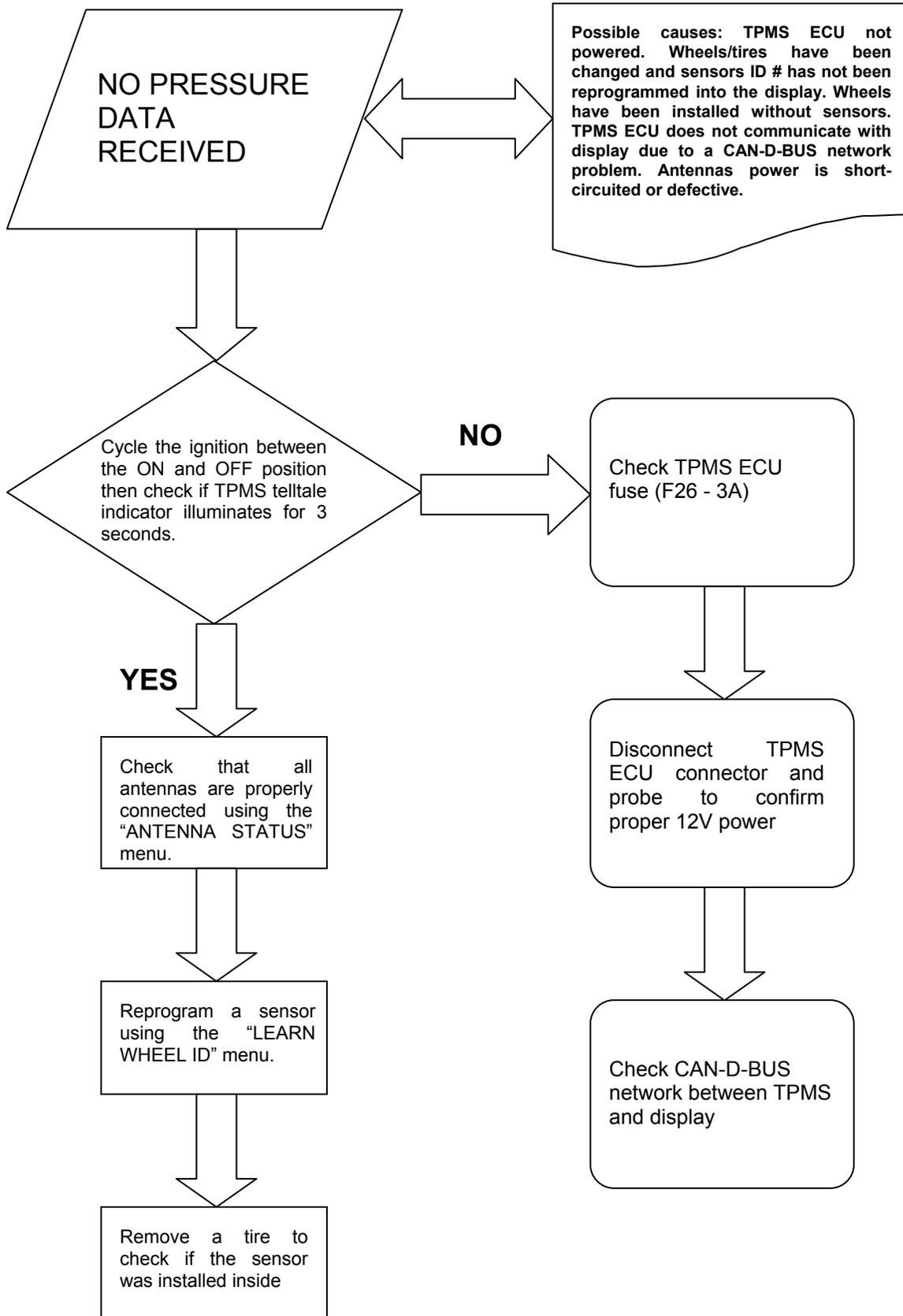
ON MESSAGES CENTER DISPLAY (MCD) SAE-J1587 Codes	ON SHIFT SELECTOR DISPLAY	ISO CODES WITH TESTMAN TOOL	DESCRIPTION
251,0	FB	104	High voltage (Vehicle electrical system voltage too high)
251,1	FD	105	Low voltage (Vehicle electrical system voltage too low)
253,14	FD	190	EOL EEPROM parameter out of valid range
253,14	FD	191	EOL EEPROM parameter checksum error
254,12	FE	169	Cut-off relay in ECU does not switch off
254,13	FE	170	No voltage supply at pin 30 or cut-off relay in ECU does not switch on
254,14	FE	188	ECU fault - wrong interrupt
254,14	FE	189	ECU fault - stack watch
254,14	FE	192	ECU fault - EEPROM access failure (or first power-up after programming without managed power down cycle)
254,14	FE	90	Communication error between controller 1 and controller 2 (ECU failure)
-	FF	-	ZMTEC does not recognise the ISO fault code

Appendix F – Webasto Preheater Flash Codes 189

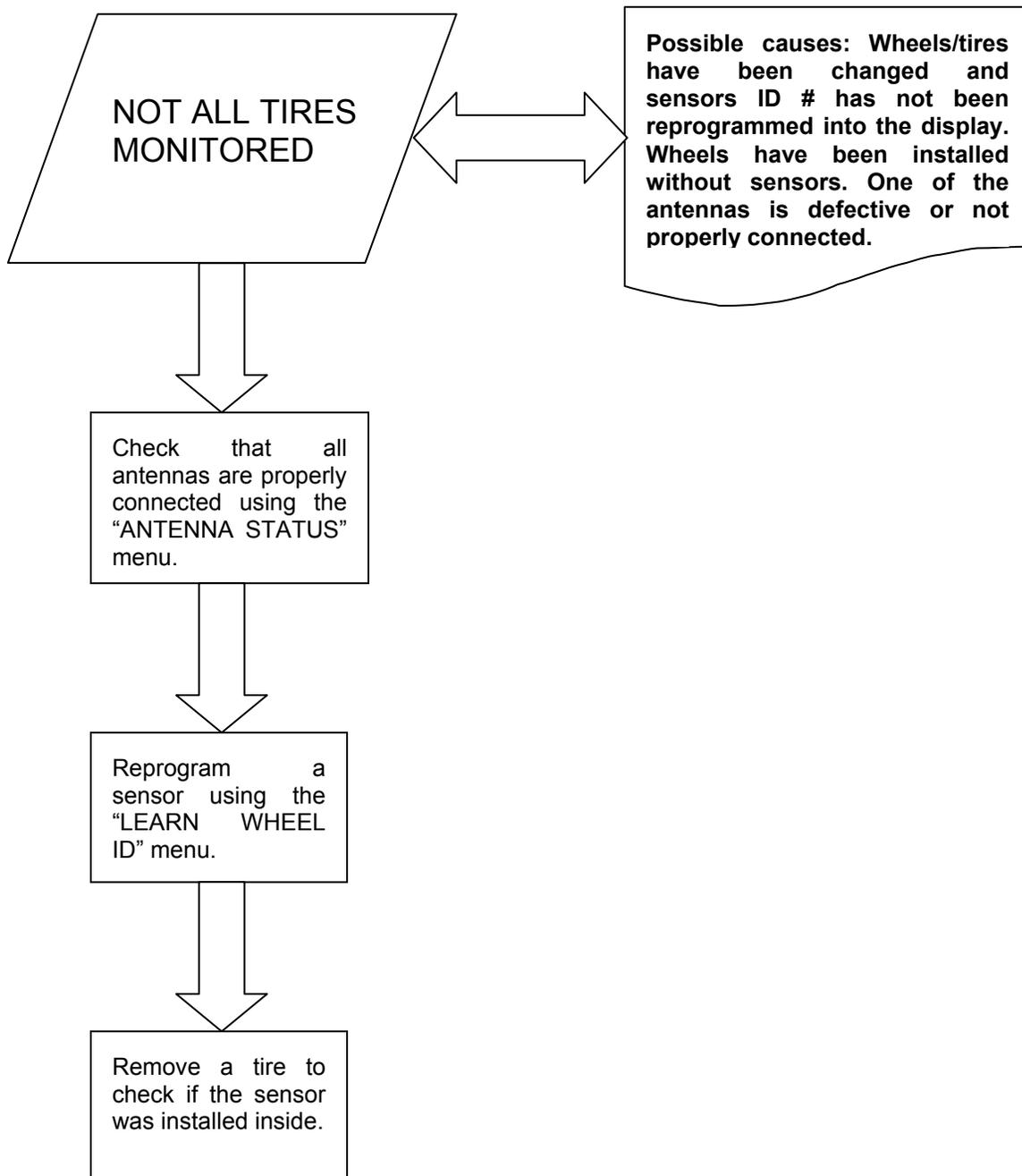
OPERATIONAL FAILURE SYMPTOMS VIA FAULT/FLASH CODE

The following table lists the possible faults which can be read by flashing code off of an appropriate timer, the equipment-on indicator /operation indicator flashes.

Failure Symptom	Probable Cause	Check and Correct
1X Flash (F 01) No combustion after completion of start up sequence.	- Fuel system - Combustion air - Electronic ignition	- Fuel level - Type of fuel being used - Fuel filter - Fuel line connections (air bubbles in fuel lines) - Fuel nozzle plugged - Air intake or exhaust, restricted or plugged - Incorrect electrode gap
2X Flashes (F 02) Flame out during burner operation no restart possible	- Fuel supply (shortage of fuel)	- Restriction in the fuel system - Fuel filter - Fuel line connections (air bubbles in fuel lines) - Type of fuel being used
3X Flashes (F 03) Low voltage for more than 20 seconds	- Electrical system	- Load test batteries - Corrosion at connections - Loose connections
4X Flashes (F 04) Flame detector recognizes false flame signal during pre-start or shut-down cycle	- Defective flame detector	- Replace flame detector
5X Flashes (F 05) Flame detector	- Wiring - Defective flame detector	- Damaged wiring, open or short circuit - Replace flame detector
6X Flashes (F 06) Temperature sensor	- Wiring - Defective temperature sensor	- Damaged wiring, open or short circuit - Replace temperature sensor
7X Flashes (F 07) Fuel solenoid valve	- Wiring - Defective solenoid valve	- Damaged or corroded wiring, open or short circuit - Replace solenoid valve
8X Flashes (F 08) Combustion air fan motor	- Wiring - Wrong RPM - Defective combustion air fan motor	- Damaged wiring, open or short circuit - Replace combustion air fan - Replace combustion air fan
9X Flashes (F 09) Circulation pump motor	- Wiring - Defective circulation pump motor	- Damaged wiring, open or short circuit - Replace circulation pump motor
10X Flashes (F 10) Temperature limiter	- Overheat condition - Coolant flow - Wiring - Defective temperature limiter	- Reset temperature limiter - Coolant level or flow restriction - Air trapped in coolant circuit - Damaged or corroded wiring, open or short circuit - Replace temperature limiter
11X Flashes (F 11) Electronic ignition coil	- Wiring - Defective electronic ignition coil	- Damaged wiring, open or short circuit - Replace electronic ignition coil
12X Flashes (F 12) Heater lock out	- 3 repeated faults/flame-outs or 5 repeated start attempts	- Reinitialize control unit by switching heater on and disconnecting power.



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